

Power Mobility Resource Guide



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WHO TO CALL?

Technical Trainer:

Rick Alves: 1-800-668-5324 ext. 4320

Invacare Technical Services Dept. 1-800-668-5324 ext. 2655

◆ Please have the Model & Serial Number Ready

◆ Please have Version of Electronics & Error Codes

◆ It would be best if you were with the product , when contacting Tech Services

◆ Before troubleshooting a chair, make sure the batteries are in good condition and fully charged

ASL 1-800-626-8698

Peachtree 1-830-693-6030

Magitek 1-800-347-9928

New Abilities (TTK) 1-800-829-8889

TASH (Buddy Buttons) 1-800-463-5685

Therafin (Sip-n-Puff Straws and Traps) 1-800-843-7234

National Power Chair (Brush Chalk) 1-800-444-3528

The Aftermarket Group/TAG 1-800-668-5324

Motion Concepts 1-800-680-4191

Invacare Website Address www.invacare.ca

Register as a Provider on our Website to view the Technical ZONE!!!

RECOMMENDED TOOL LIST

Invacare Programmer	Digital Volt Meter
Pitch Angle Gauge	Assorted Pliers
Wire Crimping Pliers	Electrical Connector Assortment
Tire Tools (available from TAG)	Hex T-Handle Wrenches (Metric/SAE)
1/4" Socket Set (Metric/SAE)	3/8" Socket Set (Metric/SAE)
1/2" Socket Set (Metric/SAE)	3/8" & 1/2" Torque Wrench
SAE Wrench Set 1/4"-1"	Metric Wrench Set 4mm-19mm
Channel Locking Pliers	Vise Grip Pliers
Dead Blow Hammer	Screw Driver Set
Small Pry Bar Set	Tape Measures
Tie Wrap Assortment	Electrical Tape
Brush Chalk (available from National Power Chair)	Scissors/Razor Blade Knife
6" & 12" Crescent Wrench	Tire Gauge
Hacksaw	Bench with Vise and Bench Grinder
Compressed Air Source	Drill with Drill Bits
Remote Battery Charger 12 volts	Remote 8 amp 24 Volt Charger
Wire Brush	Heat Gun & Shrink Wrap
Small Files	Assorted Fasteners
Soldering Iron	Glue Gun
Safety Items	Optional Items for Service Tech's
First Aid Kit	Hand Truck
Eye Wash	Wheelchair/Scooter Lift
Safety Glasses	Computer with Internet Access
Shop Apron	Instant Camera
Rubber Gloves	Cell Phone
Antibacterial Cleaner	Portable Van Ramps
Lint Free Shop Rags	Laptop IVS Software
Back Support Devices	3/8" Torque Wrench
	RPM Gauge for Motors
	Amp Gauge for Motor Leads

“DON'T FORGET”

A Technicians #1 Tool, is the Manufacturers Service Manual.

INVACARE REMOTE PROGRAMMER PART # 1109091

(call the Invacare Parts Department for pricing and availability)

Easy Remote Programmer Features:

- ☐ Save Standard Programs.
- ☐ Make Performance Adjustments.
- ☐ Check the Condition of the Batteries.
- ☐ Diagnose System for Error Codes.
- ☐ Turn Rehab Menu Options On/Off.
- ☐ Calibrate Potentiometers & GB Motors

The MKIV ERP lets you customize the chairs electronics to match the user's needs, and make changes when needed.

The ERP will also aid you in the troubleshooting process, by displaying full words and error codes to diagnose problems within the system. The user friendly keypad, will speed up the process of making changes to the electronics.



Remote Programmer 3-pin connector used for RII, RII-LP, and all MK5 & MK6 Electronics.



Remote Programmer 5-pin connector used for all MKIV electronics, and MK5 accessories.



1144516 SD Card Professional MK6



1139985 Programmer, MK6i

1142215 Kit, MK6i Programmer w/ SD Professional Card & Card Holder (1813M6)



Remote programmer 5-pin connector can be used with the MK5 TAC and TRCM.

Lap Top IVS SOFTWARE



LapTop IVS is used by Invacare Technicians during the troubleshooting and programming processes.

The Lap Top IVS Software is a user friendly application that will speed up the programming process for technicians. In addition to making programming changes, it will also give you the ability to save the completed programming values to the hard drive of your PC for future downloading. Visit our website to download your FREE copy today.



Modem Cable Part # 1095204 is required to utilize the FREE software

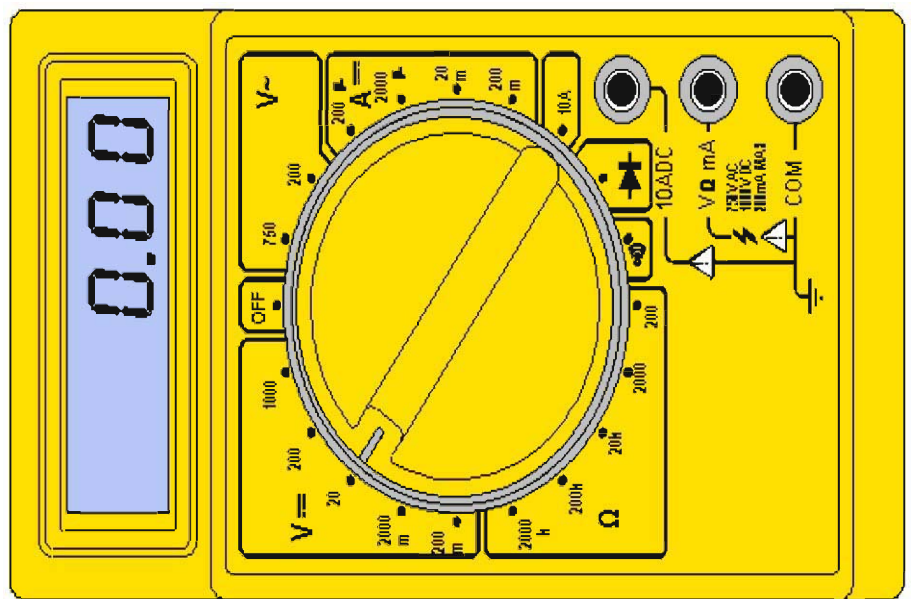
Lap Top IVS Software Benefits:

- ☐ Adjust programming values, and store a copy for future use on your PC's hard drive.
 - ☐ Download saved programming values onto a controller (new, newly repaired, and loaners).
 - ☐ Erasing a single fault, or the complete Fault Log to aide in diagnosing problems.
 - ☐ View all programmable drives at once, and adjust/save changes to all drives with the click of a mouse button.
 - ☐ Print out the programming values to keep on file, or e-mail electronic files to Invacare Technical Service for review (Snap Shot option available with 2.1.17 version Lap Top IVS).
 - ☐ MK5 compatible (control module must be 3.56 version or higher only).
 - ☐ TAC and TRCM compatible (control module must be 4.1 version or higher only).
- ☐ "NEW" Lap Top IVS Software includes the MK5 Download Application, which allows you to update the version of software on a controller out in the field.

Visit our website @ www.invacare.ca for your FREE software today.

A PRO SD card is needed for the MK6i version of software (no cable).

Using a Multimeter



5 IMPORTANT USES FOR YOUR DIGITAL VOLT METER

(refer to your original DMM instructions prior to performing any of these test.)

1. Use the VDC setting to check battery voltage.
2. Use the VDC setting to perform a Field Load test.
3. Use the Ohm's Resistance setting to check Motors and Brakes.
4. Use the Audible Continuity setting to check wiring harnesses.
5. Use the VAC setting to check the outlet power in the home.



Digital Multimeters are critical to servicing Electrical Mobility Vehicles. They are relatively inexpensive to purchase, and quality name brands such as FLUKE® and CRAFTSMAN® meters can be found at your local SEARS Hardware stores.

What is a multimeter?

- A **multimeter** is a device used to measure voltage, resistance and current in electronics & electrical equipment
- It is also used to test continuity between to 2 points to verify if there is any breaks in circuit or line
- There are two types of multimeter Analog & Digital
 - Analog has a needle style gauge
 - Digital has a LCD display (**Referenced during this PPT**)

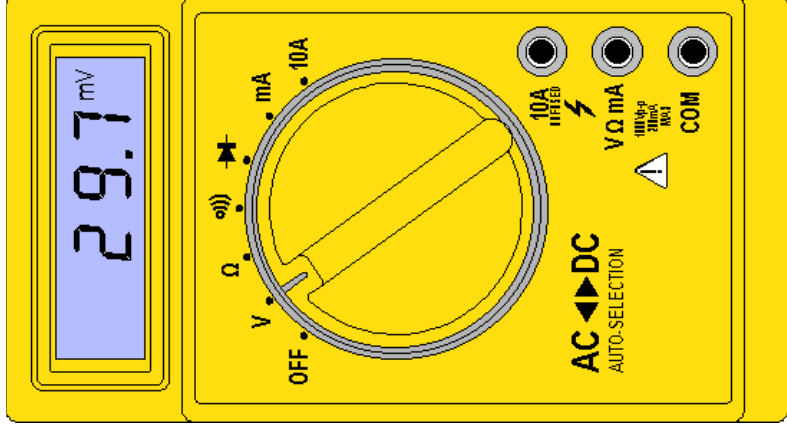
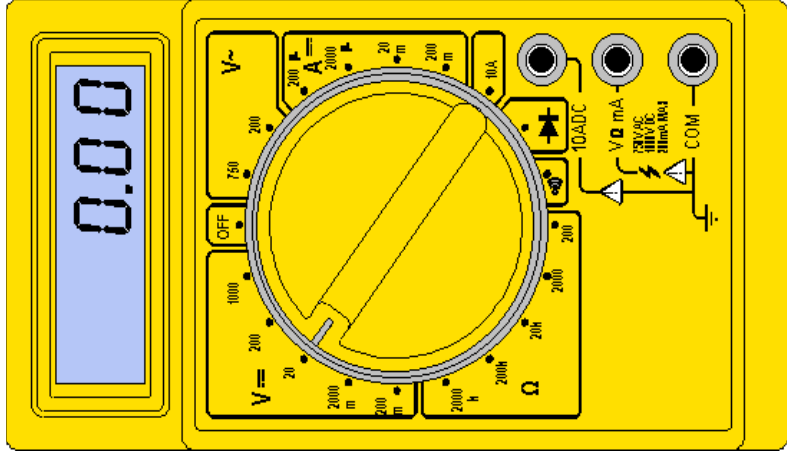
There are 2 styles of multimeters

Switched

Manually switch between ranges to get most accurate reading.

Auto Range

Switches between ranges automatically for best reading.



Both of these styles work the same

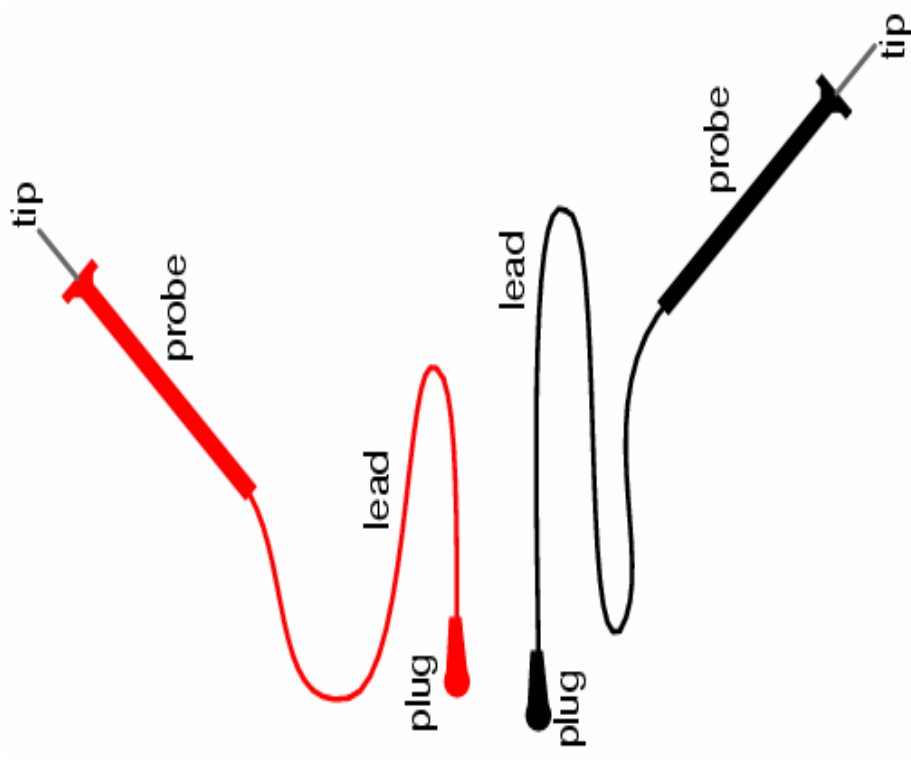
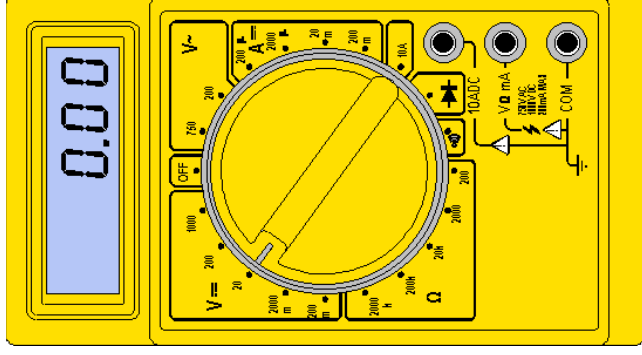
Meter leads

- **Red** meter lead
Is connected to Voltage/Resistance or amperage port
Is considered the positive connection

- **Probes**
Are the handles used to hold
tip on the tested connection

- **Tips**
Are at the end of the probe
and provides a connection
point

- **Black** meter lead
Is always connected to the common port
Is considered the negative connection



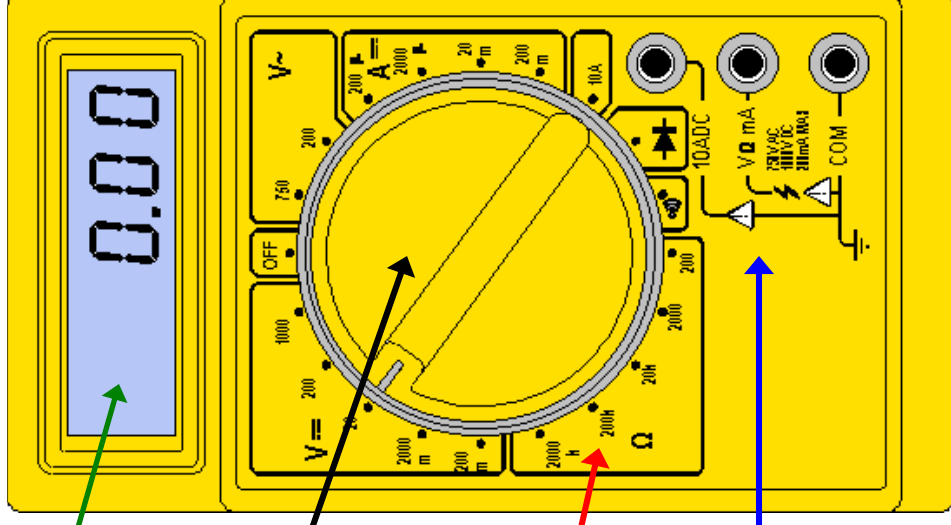
Display & Dial Settings

- **Digital Display** — Shows measured value.





- **Meter Dial** — Turn dial to change functions. Turn dial to OFF position after use.

- **Panel Indicator** — Shows each function and setting range to turn dial to.

- **Probe Connections** — Specific for each function.



Common DMM Symbols

~	AC Voltage		Ground
	DC Voltage		Capacitor
Hz	Hertz	μF	MicroFarad
+	Positive	μ	Micro
-	Negative	m	Milli
Ω	Ohms	M	Mega
	Diode	K	Kilo
•)))	Audible Continuity	OL	Overload

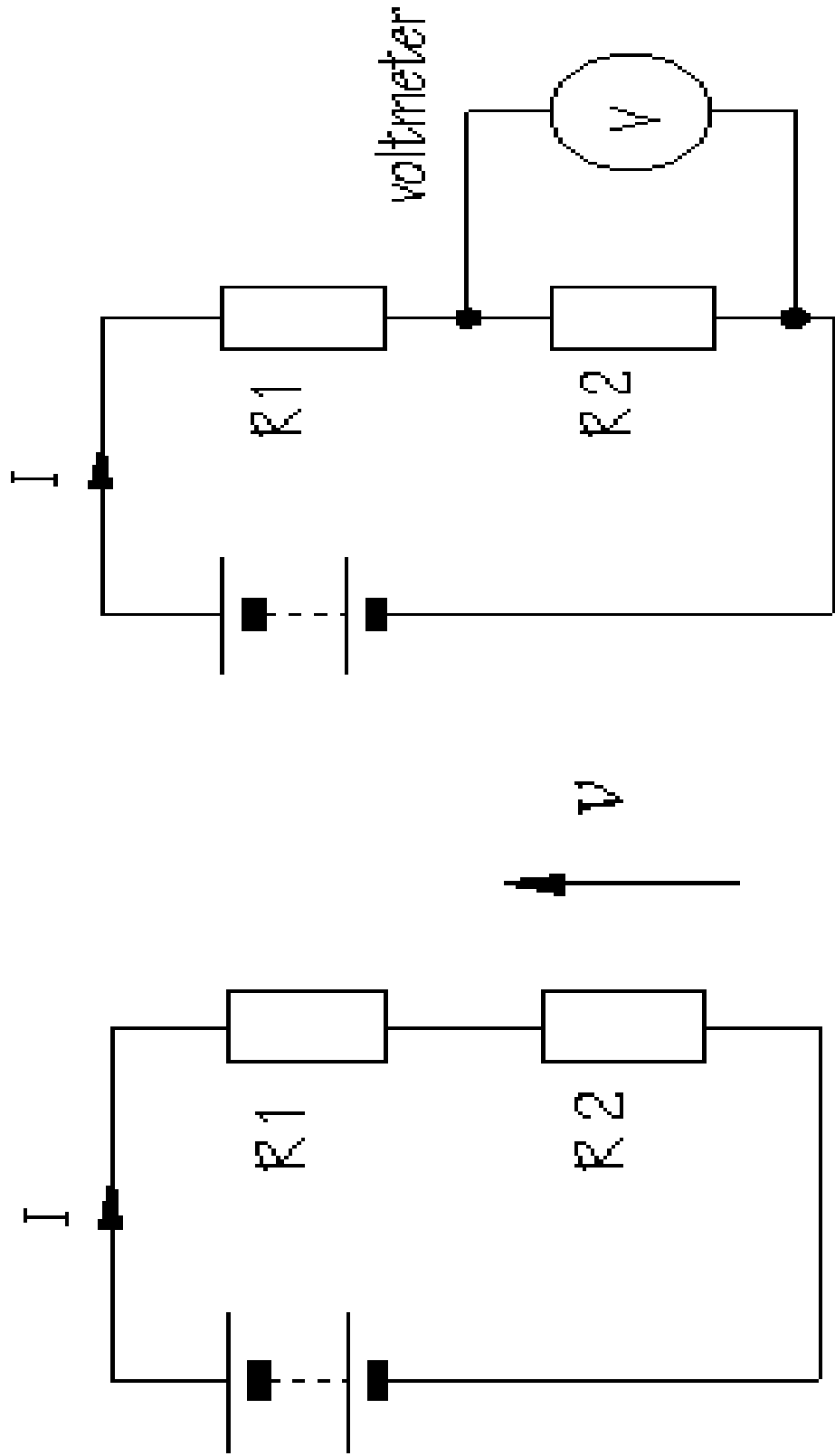
These symbols are often found on multimeter and schematics.

They are designed to symbolize components and reference values.

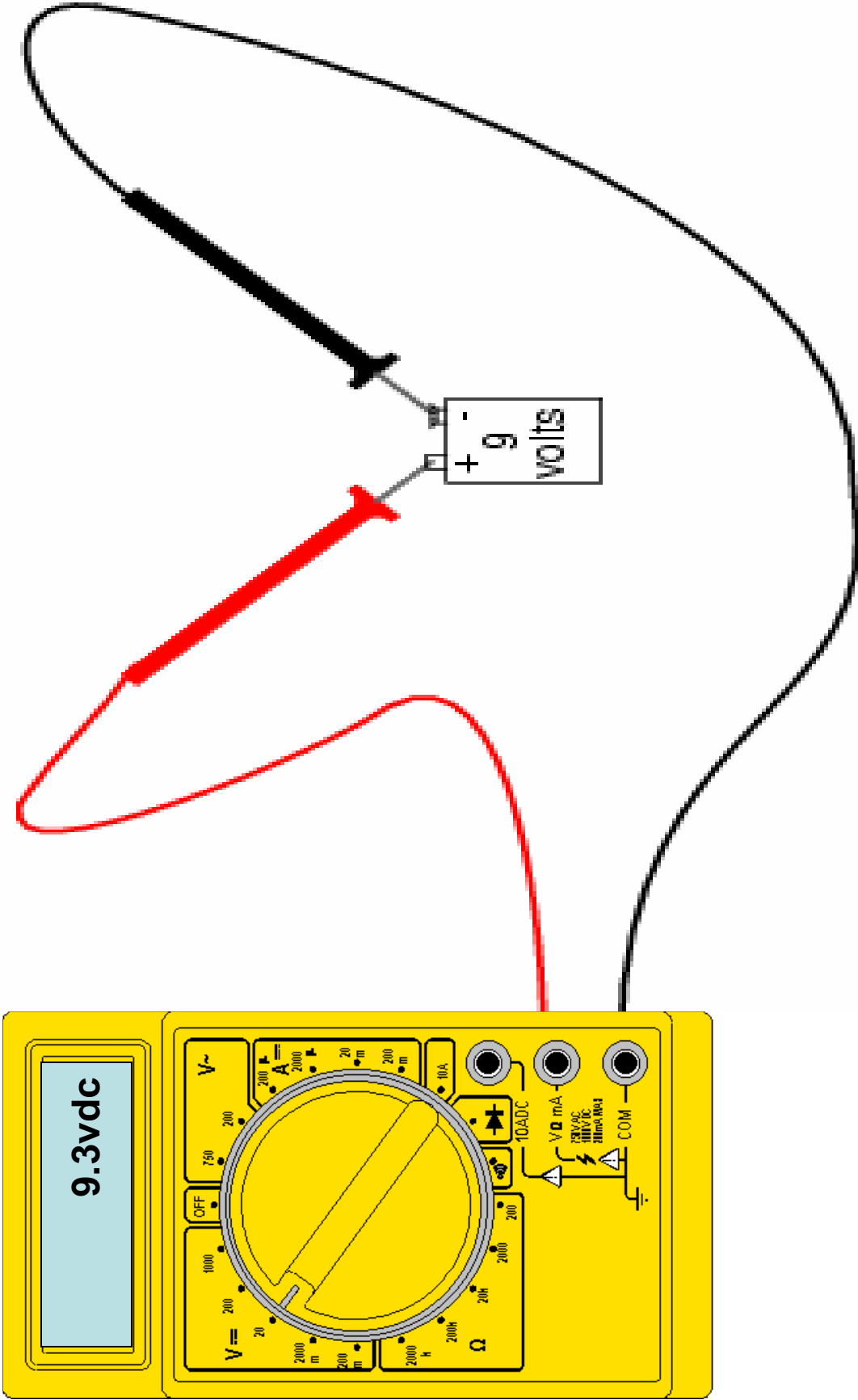
Measuring Voltage

- Voltage (V) is the unit of electrical pressure; one volt is the potential difference needed to cause one amp of current to pass through one ohm of resistance
- Voltage is broke up into 2 sections AC & DC
 - Alternating Current (AC)** is house voltage (**110vac**)
 - Direct Current (DC)** is battery voltage (12vdc)
- On switched meters use one value higher than your expected value
- Be very careful to not touch any other electronic components within the equipment and do not touch the tips to each other while connected to anything else
- To measure voltage connect the leads in parallel between the two points where the measurement is to be made. The multimeter provides a parallel pathway so it needs to be of a high resistance to allow as little current flow through it as possible

Measuring Voltage



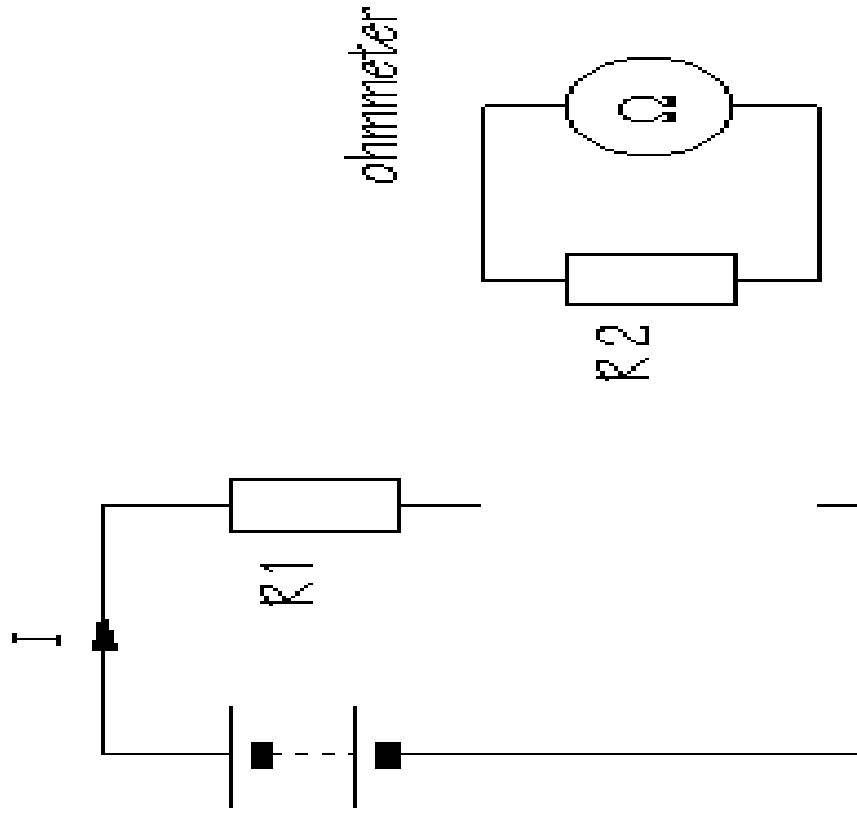
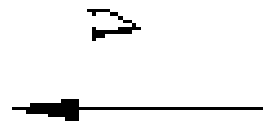
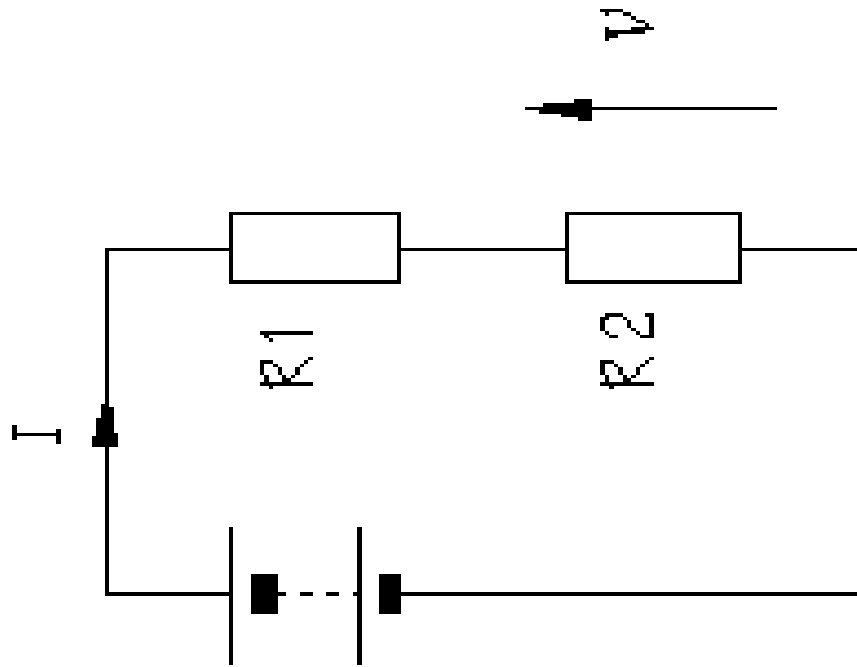
Measuring Voltage



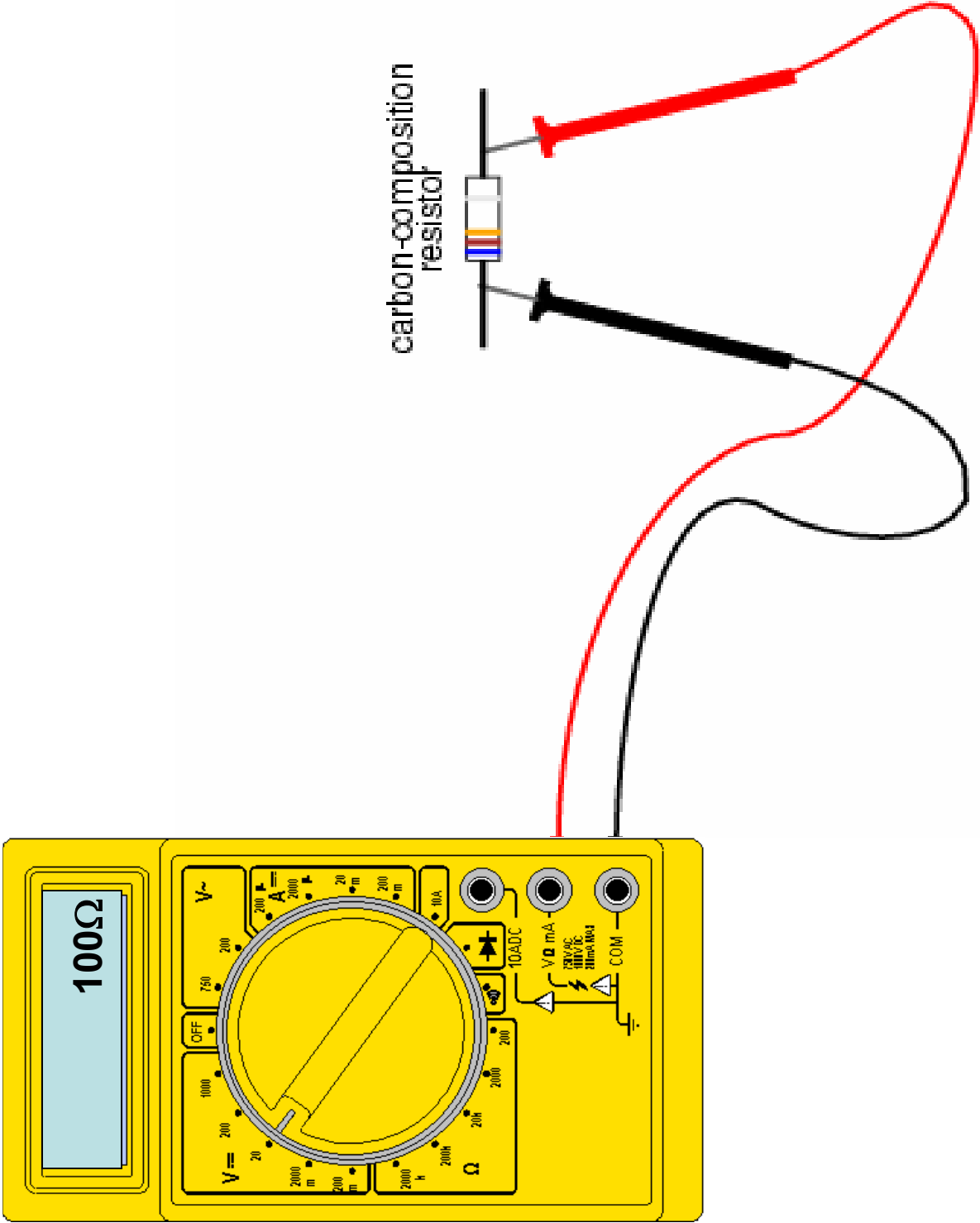
Measuring Resistance and Continuity

- **Resistance (Ω) is the opposition to current**
- **Resistance is measured in Ohm's**
- **Disconnect power source before testing**
- **Remove component or part from system before testing**
- **Measure using lowest value, if OL move to next level**
- **Testing for continuity is used to test to verify if a circuit, wire or fuse is complete with no open**
- **Audible continuity allows an alarm if circuit is complete**
- **If there is no audible alarm resistance of 1ohm to .1ohm should be present**

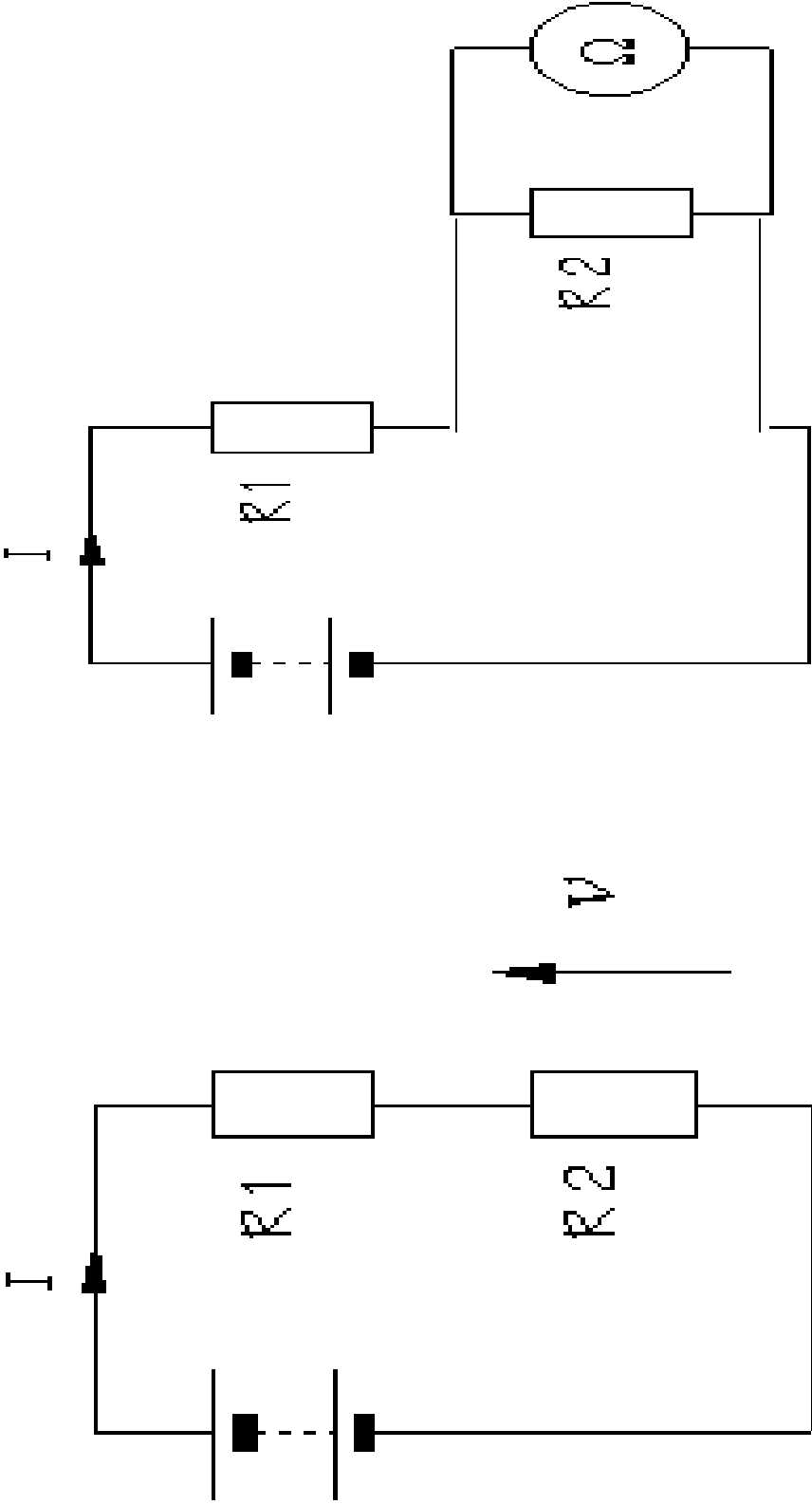
Measuring Resistance



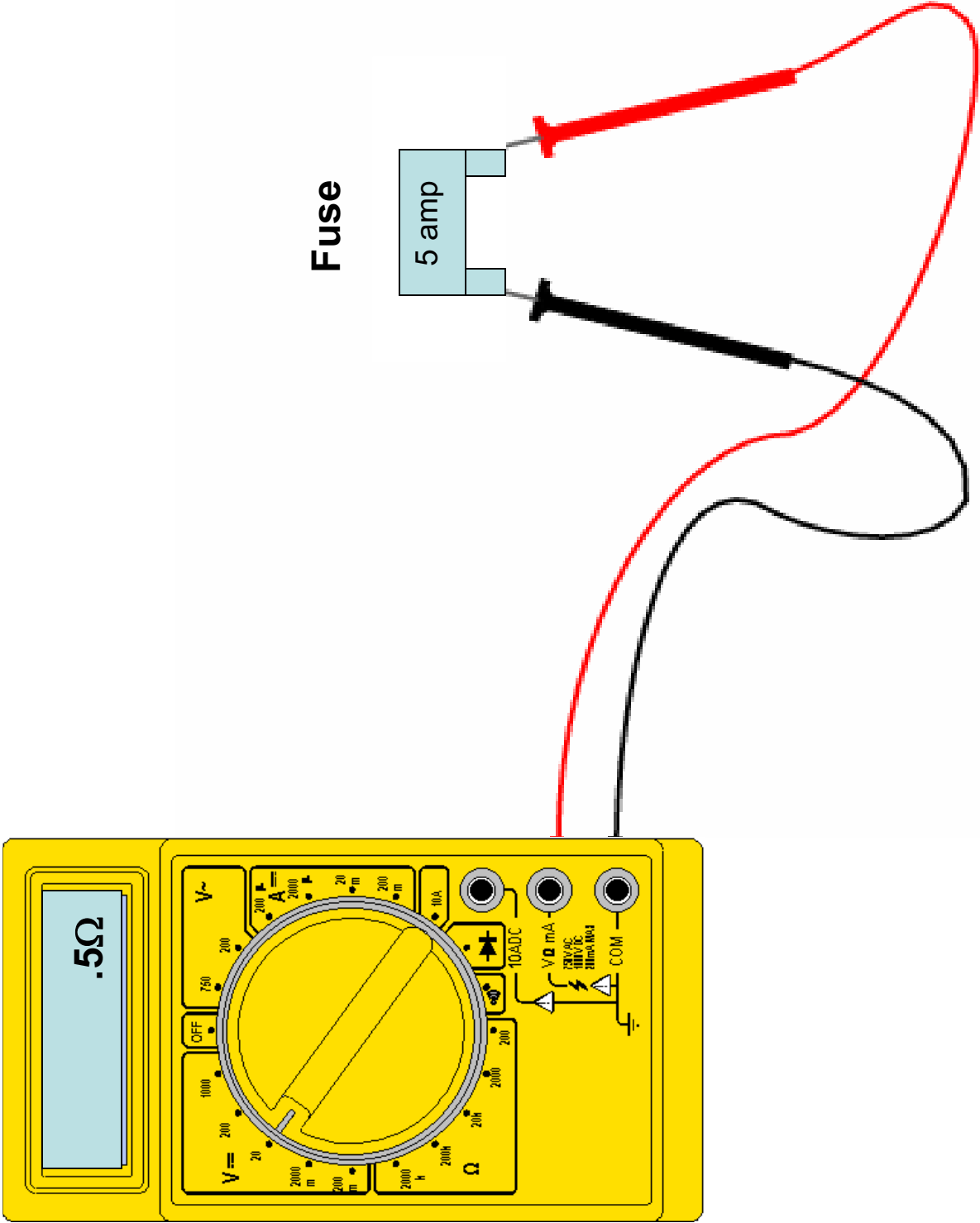
Measuring Resistance



Measuring or Testing Continuity



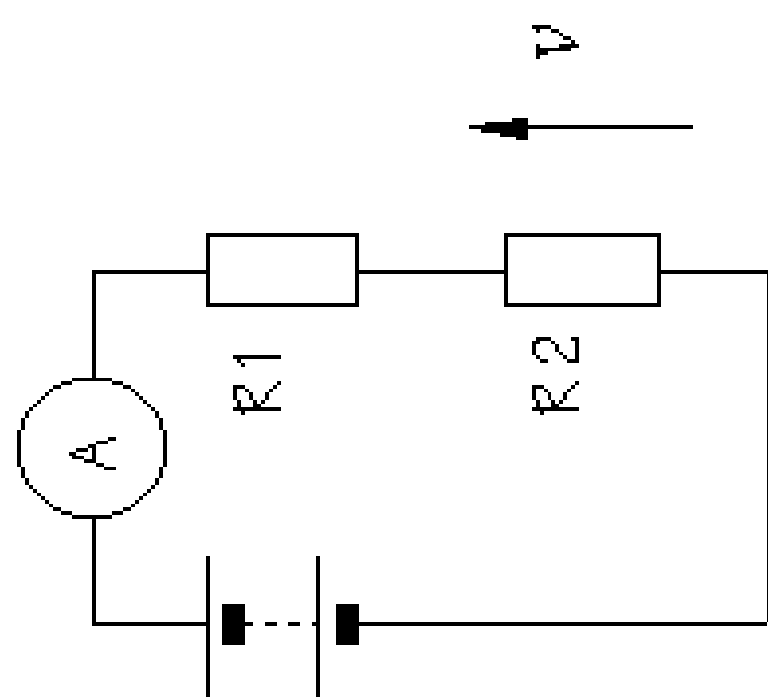
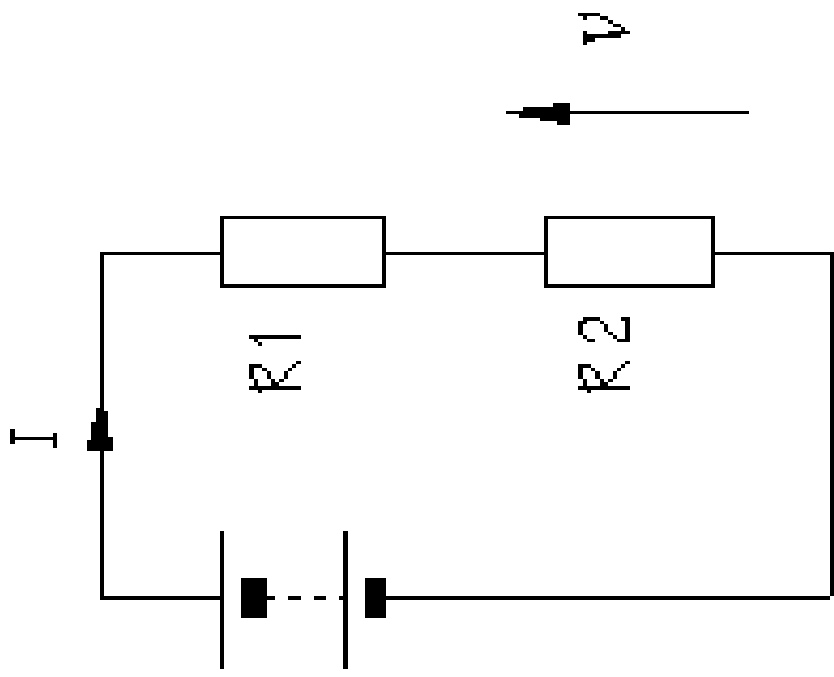
Measuring or Testing Continuity



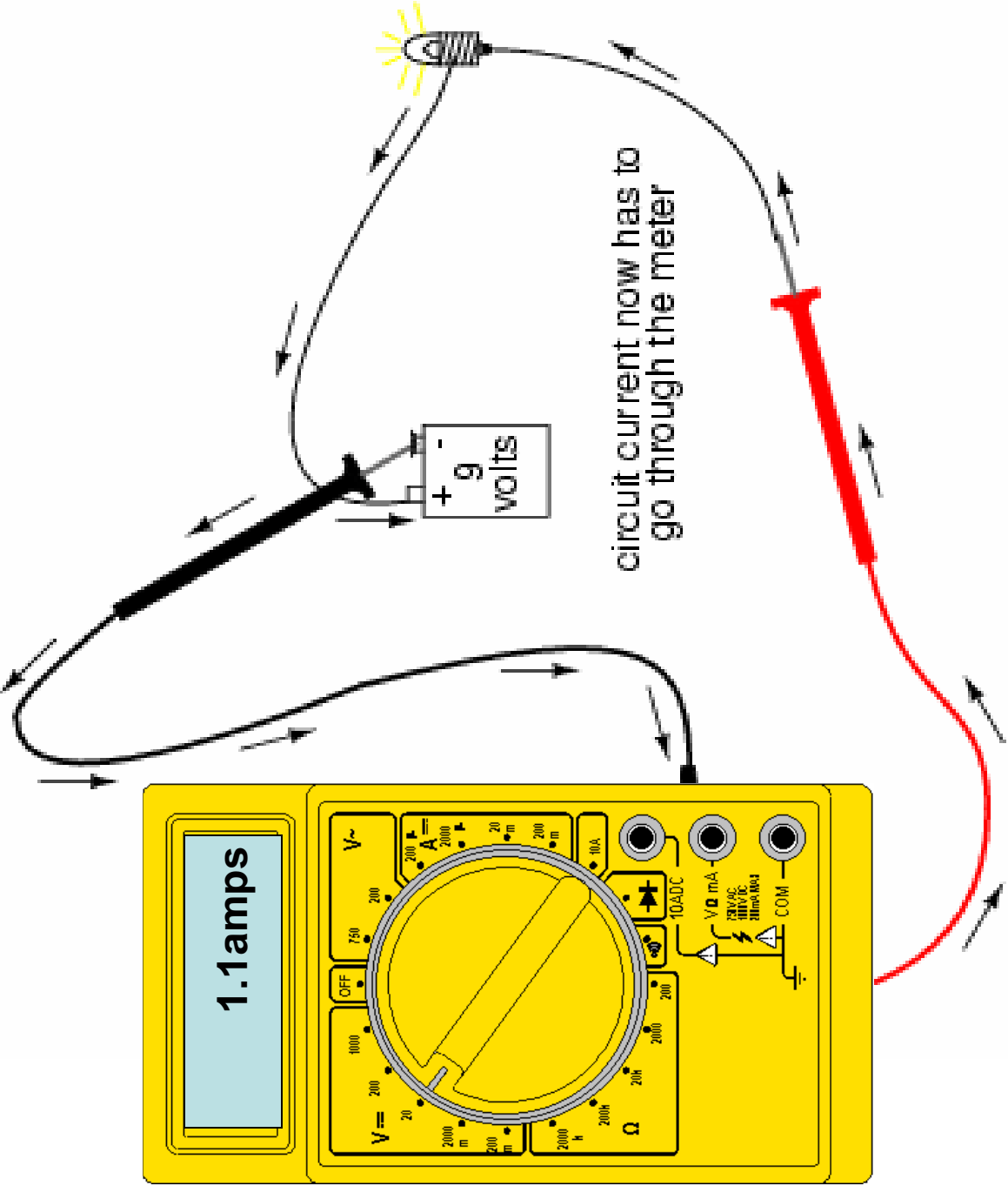
Measuring Current

- **Current (amps) is the flow of electrical charge through a component or conductor**
- **Current is measured in amps or amperes**
- **Disconnect power source before testing**
- **Disconnect completed circuit at end of circuit**
- **Place multimeter in series with circuit**
- **Reconnect power source and turn ON**
- **Select highest current setting and work your way down.**

Measuring Current



Measuring Current



Review

- A meter capable of checking for voltage, current, and resistance is called a *multimeter*,
- When measuring Voltage the multimeter must be connected to two points in a circuit in order to obtain a good reading. Be careful not to touch the bare probe tips together while measuring voltage, as this will create a short-circuit!
- Never read Resistance or test for Continuity with a multimeter on a circuit that is energized.
- When measuring Current the multimeter must be connected in a circuit so the electrons have to flow *through* the meter
- Multimeters have practically no resistance between their leads. This is intended to allow electrons to flow through the meter with the least possible difficulty. If this were not the case, the meter would add extra resistance in the circuit, thereby affecting the current



"ALL ABOUT BATTERIES & MORE"



Visit the Technical Zone
@ www.invacare.ca
Technical Services Phone Support
1-800-668-5324 ext. 2655

DEEP CYCLE GELL BATTERIES



How does a Gel Cell Work?

A Gel cell is a “recombinant” battery. This means that the oxygen that is normally produced on the positive plate in all lead-acid batteries recombines with the hydrogen given off by the negative plate. The “recombination” of the hydrogen and oxygen produces water (H₂O), which replaces the moisture in the battery. Therefore, the battery is maintenance-free, as it never needs water.

Source:

MK Battery Technical Manual, www.mkbattery.com

DOES THE DEPTH OF THE DISCHARGE AFFECT CYCLE LIFE?

YES! The greater the load on the batteries, the sooner they will have to be replaced.

*Typical Gel Cell Cycling Ability vs. Depth of Discharge	
Capacity Withdrawn	Typical Life Cycles
100%	300
*75%	450
50%	650

*75% is the average capacity withdrawn for an active user.

*NOTE: Consumers may experience longer or shorter battery life, depending on charging habits, temperature, and accessories in the system.

Source:

MK Battery Technical Manual, www.mkbattery.com

WHEELCHAIR BATTERIES

WHAT CONSUMERS NEED TO KNOW ABOUT BATTERIES

(courtesy of MK Battery)

Battery Size:

- Always follow the manufacturers recommendations for battery size.

Battery Type:

- Always use Deep Cycle batteries, due to the fact that they are designed to be discharged and recharged on a regular basis.
- Cold Cranking Amp or Marine type batteries are for starting purposes only, and are not intended for electronic type vehicles.

Lead Acid vs. Gel Cell Batteries:

- Gel Cell batteries are the safest choice due to FAA and DOT regulations, and are recommended by most manufacturers.
- Gel Cell batteries require less maintenance than Lead Acid batteries, and are the safest choice for your consumer.

Chargers and Charging:

- Use the manufacturers charger on all models, and no more than 8 amps MAX.
- Never allow the batteries to be run completely down, Deep Cycle batteries do not have a memory.
- Avoid topping off batteries with frequent short charges, it will do more harm than good. Once a recharge cycle begins, allow it to run for the duration until the charger shuts itself off.

Transportation:

- All GEL MK batteries are approved for public and private transportation. See there website for more details @www.mkbattery.com.

Storing Batteries:

- All batteries should be stored with a full charge, and it is a good idea to disconnect the main power source to avoid possible discharging.

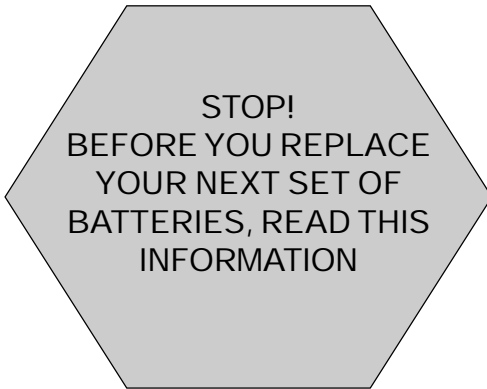
BATTERY CARE & SAFETY

Don't	Do									
<p>Don't perform any installation or maintenance without first reading the service manual.</p> <p>Don't perform installation or maintenance of batteries in an area that could be damaged by battery spills.</p> <p>Don't tell your clients to run the batteries completely down before recharging.</p> <p>Don't put new batteries into the field without charging them first.</p> <p>Don't tip or tilt Lead Acid batteries.</p> <p>Don't use ordinary tap water to top-off Lead Acid batteries.</p> <p>Don't overfill Lead Acid battery cells.</p> <p>Don't tap on clamps with hammers or any other tools to pry open.</p> <p>Don't charge Lead Acid batteries when the Dual Mode charger is in the Gel Setting, and vice versa.</p> <p>Don't set batteries on concrete.</p> <p>Don't believe that Deep Cycle batteries have a memory.</p> <p>Don't store power mobility vehicles for long periods with the batteries discharged.</p> <p>Don't believe that Marine batteries will work on power mobility vehicles.</p>	<p>Read and understand the service manual and any service information that accompanies a battery and charger before working on the wheelchair or scooter.</p> <p>Move the wheelchair to a work area before or opening battery boxes, checking the fluid level, adding distilled water, and cleaning terminals.</p> <p>You can recharge as frequently as possible to maintain a high charge level for extended battery life.</p> <p>Fully charge new batteries before use, to verify that the batteries and charging system are working properly.</p> <p>Use a carrying strap to remove or carry batteries, when ever possible.</p> <p>ONLY use distilled water to top-off Lead Acid batteries.</p> <p>Fill Lead Acid battery cells just to split-ring level.</p> <p>Push the battery clamps onto the terminals, and use terminal spreader tool to open clamps.</p> <p>Use a Fully Automatic Dual Mode charger for best charging results.</p> <p>It is no longer true that setting batteries on concrete surfaces will discharge them.</p> <p>Deep Cycle batteries do not have a memory.</p> <p>Recharge the batteries and disconnect them from the controller before storing the PMV for long periods of time.</p> <p>Do use batteries that state they are approved for electronics type vehicles, and are deep cycle.</p>									
<p>Tools & Safety Items</p> <table style="width: 100%; border: none;"> <tr> <td style="width: 33%;">Rubber Gloves</td> <td style="width: 33%;">Safety Glasses</td> <td style="width: 33%;">Shop Apron</td> </tr> <tr> <td>Carrying Strap</td> <td>Insulated Wrenches</td> <td>Terminal Spreaders</td> </tr> <tr> <td>Distilled Water</td> <td>Wire Brush</td> <td>Cleaning Solvent</td> </tr> </table>		Rubber Gloves	Safety Glasses	Shop Apron	Carrying Strap	Insulated Wrenches	Terminal Spreaders	Distilled Water	Wire Brush	Cleaning Solvent
Rubber Gloves	Safety Glasses	Shop Apron								
Carrying Strap	Insulated Wrenches	Terminal Spreaders								
Distilled Water	Wire Brush	Cleaning Solvent								

REPLACING WHEELCHAIR BATTERIES

Do you replace a set of batteries every time a customer says there bad?

Before you do replace a pair of batteries, make sure you have accurately diagnosed the problem first.



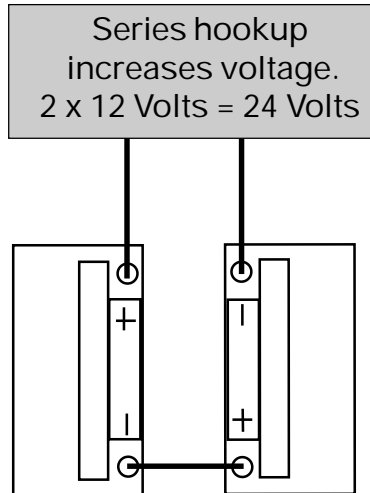
Battery Testing Procedure:

1. Use your Digital Multi Meter to read the static battery voltage. A fully charged set of gel batteries should be at least 25.6 volts or higher.
2. If the batteries are not fully charged, try to recharge them overnight before replacing them. Severely discharged batteries could take up to 10 to 16 hours to reach a 100% full charge. Severely discharged batteries could also rise rapidly, and give the charger a false reading causing the OEM charger to shut off too soon. If the batteries are too low for the OEM charger to begin, remove the batteries from the battery boxes, and use a 12 volt charger (no more than 10 AMPS) on each battery for an hour. Then put the batteries back into the battery boxes, and recharge them overnight with the OEM charger.
3. Once the batteries are fully charged, perform a field load test or use your programmer to check the Battery Quality Menu.
4. If the batteries are determined to be bad, replace the batteries. If the batteries check out good, then your problem lies elsewhere. Check the motors, and the chairs electronics for further problems.

BATTERY CONNECTIONS

“SERIES CIRCUIT”

A “series” system increases the voltage, but keep the battery capacity the same. Therefore, two 12-volt batteries connected in series (POS to NEG, NEG to POS) will deliver 24-volts at the same rating as one battery. During recharge, each battery will receive the same amount of current (AMPS).



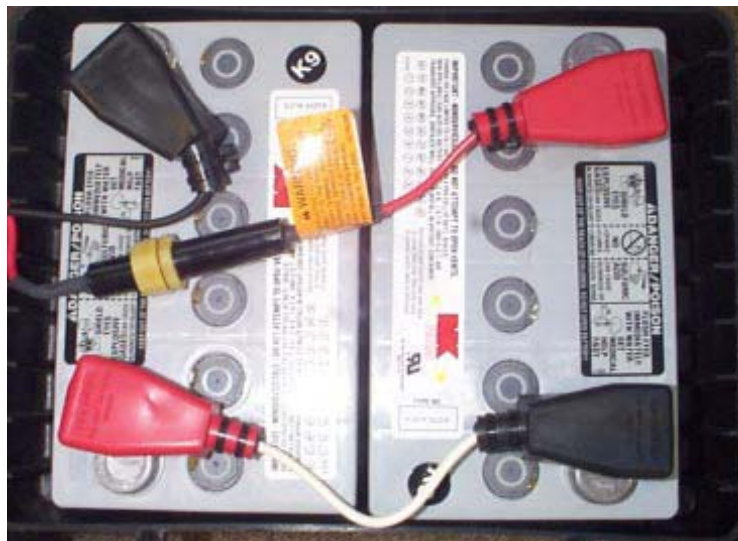
Series Connection Example (Single Battery Box w/ 22NF Batteries)

Negative -

Positive +

Positive +

Negative -



TECHNICIANS NOTE: Depending on the make and model of the product, the batteries may be in individual battery boxes. In this case the connections are much easier, one positive connection (RED +) and one negative connection (BLACK -).

BATTERY STATE OF CHARGE

Wet Lead Acid Type Deep Cycle			
Charge Level	Specific Gravity	Static Reading	On Charge
100%	1.265	25.4 VDC	31.0 VDC
75%	1.225	24.8 VDC	29.0 VDC
50%	1.190	24.4 VDC	27.0 VDC
25%	1.155	24.0 VDC	26.0 VDC
DISCHARGED	1.120	23.8 VDC	25.0 VDC

GEL/SEALED Lead Acid Type Deep Cycle			
Charge Level	Specific Gravity	Static Reading	On Charge
100%	N/A	25.6 VDC	28.8 VDC
75%	N/A	25.0 VDC	28.2 VDC
50%	N/A	24.6 VDC	27.8 VDC
25%	N/A	24.4 VDC	27.4 VDC
DISCHARGED	N/A	24.2 VDC	27.0 VDC

Battery Tech Tips	
<input type="checkbox"/>	You don't have to remove the battery boxes or shrouds to take a static voltage reading, use the charger port to take a static reading.
<input type="checkbox"/>	Voltage readings can be viewed with an Easy Remote Programmer, by going into the Calibration menu, and selecting the Battery Quality Menu.

USING HYDROMETER TO CHECK BATTERY CELLS (FOR LEAD ACID BATTERIES ONLY, SEE FIGURE 2)

WARNING

NEVER smoke or strike a match near the batteries. If the caps of the battery cells are removed, **NEVER** look directly into them when charging the battery.

The use of rubber gloves and safety glasses is recommended when testing the battery cells.

When reading a hydrometer, **DO NOT** allow any liquid to come in contact with your eyes or skin. It is a form of acid and can cause serious burns, and in some cases, blindness. If you do get battery acid on you, flush the exposed areas with cool water immediately. If the acid comes into contact with eyes or causes serious burns, get medical help **IMMEDIATELY**.

The battery acid can damage your wheelchair, clothing, and household items. Therefore, take readings cautiously and only in designated areas.

Most batteries are not sold with instructions. However, warnings are frequently noted on the cell caps. Read them carefully.

CAUTION

ONLY use distilled water when topping off the battery cells. Ordinary tap water will shorten the life of the battery.

1. Remove the battery box(es) from the wheelchair.
2. Remove the battery caps from the battery.
3. Squeeze the air from the hydrometer.
4. Place the hydrometer into a battery cell.

TECHNICIANS NOTE: DO NOT fill hydrometer more than 3/4 full.

5. Draw up sufficient acid to cover float balls.
6. Tap lightly to remove air bubbles.
7. Number of floating balls indicates charge.

NUMBER OF FLOATING BALLS	
0	Discharged
1	25% Charged
2	50% Charged
3	75% Charged
4	100% Charged
* 5	Overcharged

* Check charging system.

8. Flush the liquid back into the same cell after reading the float. Repeat this step until all cells have been properly read. A shorted or dead cell can be detected when it is the only cell that doesn't charge.

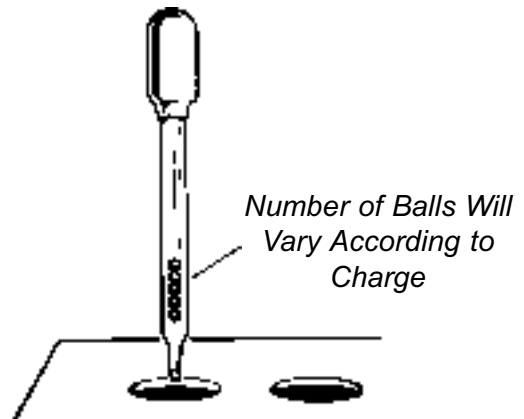


FIGURE 2 - USING A HYDROMETER

9. Flush the hydrometer in cold running water by allowing the water to rise into the hydrometer as far as possible. Do this several times to guard against burn damage.
10. Replace the battery caps.
11. Reinstall battery box(es).

CHARGING BATTERIES

TECHNICIANS NOTE: New batteries MUST be fully charged prior to initial use of the wheelchair. There have been occasions where new batteries have failed out of the box. Save yourself a service call, and charge the batteries the night before your delivery or before the customer is scheduled to pick up the chair.

The range per battery charge (using recommended batteries) should be approximately 5 to 9 hours of typical operation. Extensive use on inclines may substantially reduce per charge mileage. A good rule of thumb, is for every hour of actual drive time, you should equal that amount of time or exceed it when recharging.

Description and Use of Battery Chargers

The charger automatically reduces the charge from an initially high rate to a zero reading at a fully charged condition. If left unattended, the charger should automatically shut-off when full charge is obtained. There still are some older chargers out in service, that were not Fully Automatics chargers. They usually can be identified by having an egg timer style switch on the front of the charger or simply by saying that is only an Automatic Charger. These chargers will shut off automatically, but still maintain a trickle charge that could possibly overcharge the batteries.

TECHNICIANS NOTE: Be aware that if your Customer had lead acid batteries and is switching to gel batteries, the charger must be a dual mode charger (make sure the switch is in the correct position on the front or back of the charger).

There are some basic concepts which will help you understand this automatic process. They are: The amount of electrical current drawn within a given time to charge a battery is called the "charge rate". If, due to usage, the charge stored in the battery is low, the charge rate is high, as indicated by the green light on the charger. Initially, the green light will stay illuminated for a short period of time followed by a longer period of off time. As a charge builds up, the charge rate is reduced, and the green light will stay illuminated for a longer period of time followed by a shorter off time.

TECHNICIANS NOTE: Allow eight (8) hours for normal charging. Larger batteries (greater than 55 ampere-hours) or severely discharged batteries may require up to sixteen (16) hours to be properly charged and equalized. If charger operates for sixteen (16) hours and is unable to fully charge the batteries, an internal timer turns the charger off and begins to fast blink the green light. Perform a load test on the batteries, and determine if replacements are needed.

It is advantageous to recharge frequently rather than only when necessary. In fact, a battery's life is extended if the charge level is maintained well above a low condition.

FULLY AUTOMATIC BATTERY CHARGERS

The Lester Dual Mode chargers are available in 8 amp version, **(the 12,4 & 5 amp version has been discontinued)**. The Dual Mode switch on the front panel can be set for Lead Acid Batteries or Gel Type Batteries. On the front panel as well, is the On/Off power switch, and a green diagnostic LED. Cutoff voltage for Lead Acid Batteries is set at 31.0 volts, and 28.8 volts for Gel Batteries. The start up voltage range is 18-22 volts.

*1061411 = 4 Amp *1053161 = 8 Amp



Check internal fuses for no power situations first , before returning for repair.

CTE Fully Automatic Battery. It does not have an On/Off switch or a Dual Mode switch on the front panel. The CTE Charger knows the difference between Lead /Gel Batteries, and will adjust itself accordingly. The start up voltage setting is around 7 volts, but may shut off after starting. In some extreme cases remove the batteries from the battery box, and charge them individually with an automotive type 12 volt charger for a brief period of time. Then put the batteries back into a 24 volt series, and recharge them overnight.



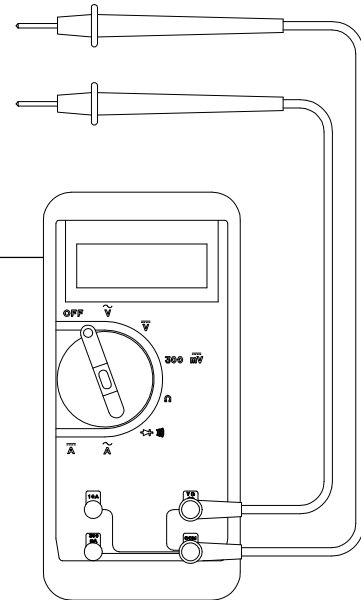
WIRING HARNESS TESTING

1. Check the wiring harness for visible damage, broken/loose connections, and corrosion. If any damage is found replace harness, or repair it with factory equivalent parts. If the damage is due to corrosion, clean all connections thoroughly. Corrosive connections create high resistance, which could cause problems with the electronics.
2. Check all fuses in the system, which includes inside the battery boxes.
3. Check all connections inside each supplied battery box. Battery boxes have an in-line BUSS/MIDI fuse inside one of the boxes, use your multi meter to test this fuse.

TECHNICIANS NOTE: Set your multi meter up to perform an audible continuity check, and check all connections that are suspected of not making good contact.



TECH TIP: If wiring was damaged due to incontinence, use an old pneumatic tire tube and tie wraps to cover major connections on the new harness.



Invacare Corporation has initiated a field correction involving certain Invacare power wheelchairs manufactured from 1988 through June 2000. Some of these power wheelchairs utilize a battery box harness and a charger harness that have the remote possibility to short and cause a fire. While the likelihood of this occurring remains remote, all potential for fire must be eliminated. If you have a consumer who has purchased a power wheelchair during these time periods, please contact Invacare for details on how to get the new components installed.

WIRING HARNESS AND BATTERY BOX FUSES



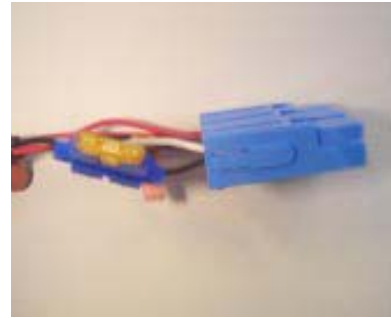
1090117 - 15 Amp BUSS ATM-15
(Blue - 15 Short)



50000X166- 60 Amp BUSS 2-1/4"
Not Shown
1042740 - 30/50 Amp
Shaumut 1-1/2"



1089385 - 80 AMP MIDI



1101099 - 20 Amp BUSS ATC-20
(Yellow - 20 Long)



1098892 - 15 Amp BUSS ATC-15
(Blue - 15 Long)



Pronto M91 75 Amp
Pronto M94 100 Amp

CHARGER & WIRING HARNESS ACCESSORIES



1053831 - New Round Plug to Old Square Plug Charger Adapter



*1098905 - PTO to Dual Anderson 24 Volt Accessory Cable



1083929 - 24" Round Charger Extension Cable

Not Shown
1013399 - 34" Square Charger Extension Cable

*NOTE: Original wiring harness, must have a fused PTO connector.



1092912 - Programmer Extension Cable (Std. on 2GTR chairs)



1118231 5-Pin Adapter for MK5 EX & TT-EX Accessories



1119418 PTO 24 Volt Adapter for MK5 EX & TT-EX Controllers



1095204 - MKIV/V One2One Modem Cable

WIRING CONNECTORS & HOUSINGS

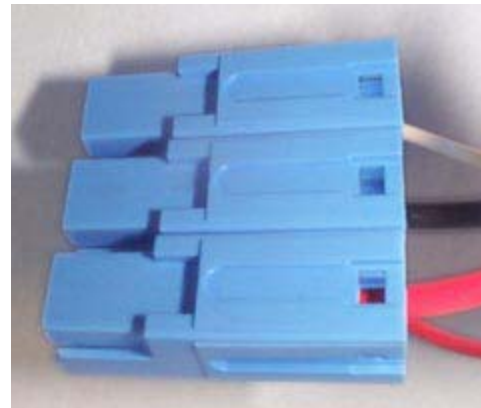
Motor Connectors

1007043	4-Pole Housing w/ Latch
1007044	4-Pole Housing w/o Latch
1007032	Housing Hardware: 2 Screws 1 Clamp 1 Roll Pin



Anderson Housing Connectors

1007034	Red
1007035	Black
1007036	White
1007042	30 Amp Contacts (Motor)
1007041	15 Amp Contacts (Brake)



Controller 75 Amp Anderson Connector	
50000X161	Blue Anderson Connector
98000X031	75 Amp Contacts



Black 75 Amp Battery Connector	
1022461	Black Anderson Housing with Spring & Contacts
1108234	Gray Anderson Housing with Spring & Contact



Round Charger Cable Connector	
1057436	Round Charger Cable Connecotor - Male
1052593 (not shown)	Round Charger Cable Connector - Female (part of battery wiring harness)



Gel Batteries

The Sealed Battery Specialists



Advanced design/manufacturing including IPF™ technology combine to make MK Battery's Sealed Gel Batteries the standard by which all other gel batteries are measured.

GENERAL APPLICATIONS

Specifications							Minutes Discharged @ 1.75VPC @ 77°F (25°C)*						Discharge Amps						
Model	Voltage	Foot Notes	Terminal	CCA @ 0° F	CA @ 32° F	RC @ 80° F	75 Amps	50 Amps	25 Amps	15 Amps	8 Amps	5 Amps	5 Min.	10 Min.	15 Min.	20 Min.	30 Min.	60 Min.	90 Min.
8GU1	12	1	Y	175	250	44	5	12	47	90	190	325	74.7	54.3	44.6	38.8	31.9	21.0	15.0
8GU1H	12	H/1	Y	175	250	44	5	12	47	90	190	325	74.7	54.3	44.6	38.8	31.9	21.0	15.0
8G40	12	2	C	225	325	59	11	21	63	120	250	430	110	79.0	61.0	51.0	39.0	25.8	19.0
8G22NF	12	2	G	210	300	77	13	27	82	157	330	557	120	86.7	69.1	60.0	47.0	31.8	23.2
8G34	12	2	C	300	420	90	21	39	96	172	368	640	155	115	92.0	77.0	59.0	36.0	26.0
8G24	12	1	U	410	575	132	33	57	140	245	500	845	204	152	119	100	78.0	48.5	35.0
8G24 FT	12	1	C	335	470	132	33	57	140	245	500	845	204	152	119	100	78.0	48.5	35.0
8G24 UT	12	1	G	335	470	132	33	57	140	245	500	845	204	152	119	100	78.0	48.5	35.0
8G27	12	H/1	U	505	700	160	40	70	170	300	605	1000	242	185	143	119	90.3	57.0	41.5
8G27-T876	12	H/1	B	400	550	160	40	70	170	300	605	1000	242	185	143	119	90.3	57.0	41.5
8G27-T881	12	1	G	400	550	160	40	70	170	300	605	1000	242	185	143	119	90.3	57.0	41.5
8G30H	12	H/1	B	450	640	180	51	84	190	335	690	1160	266	200	162	138	105	64.5	47.0
8G31DT	12	H/1	U	550	780	180	51	84	190	335	690	1160	266	200	162	138	105	64.5	47.0
8G31	12	H/1	X	450	640	180	51	84	190	335	690	1160	266	200	162	138	105	64.5	47.0
8GGC2	6	4	G	585	850	345	92	155	375	680	1360	2200	325	250	210	180	150	99.0	76.0
8G4D	12	H/3	S	970	1245	375	105	175	395	685	1385	2300	485	375	300	255	195	122	88.0
8G4D LTP	12	H/3	T	970	1245	375	105	175	395	685	1385	2300	485	375	300	255	195	122	88.0
8G8D	12	H/3	S	1150	1470	475	135	220	500	890	1750	3000	600	460	370	315	245	150	105
8G8D LTP	12	H/3	T	1150	1470	475	135	220	500	890	1750	3000	600	460	370	315	245	150	105

Charging Information

* AMPERE HOUR CAPACITY IS A NOMINAL RATING. ALL RATINGS ARE AFTER 15 CYCLES AND CONFORM TO B.C.I. SPECIFICATIONS.

IMPORTANT CHARGING INSTRUCTIONS: WARRANTY VOID IF OPENED OR IMPROPERLY CHARGED. Constant under or overcharging will damage any battery and shorten its life! Use a good constant potential, voltage-regulated charger. For 12-volt batteries, charge to at least 13.8 volts but no more than 14.1 volts at 68°F (20°C). For 6-volt batteries, charge to at least 6.9 volts but no more than 7.05 volts at 68°F (20°C). Do not charge in a sealed container.

BENEFITS

- Sealed construction eliminates periodic watering, corrosive acid fumes and spills.
- Electrolyte will not stratify, no equalization charging required. Allows faster recharge.
- Increases durability and deep cycle ability for heavy demand applications.
- Less than 2% per month stand loss means little deterioration during transport and storage.
- Individual plate formation (IPF™) ensures voltage matching between cells.
- Transports easily and safely by air.
- Quality construction ensures reliable performance.

APPLICATIONS

- Water Pumping
- Residential
- Communications
- Cathodic Protection
- Remote Monitoring
- Refrigeration
- Lighting
- Aids to Navigation
- Wind Generation
- Power Wheelchairs
- RV
- Golf Cart
- Solar
- Many Other Applications

SPECIFICATIONS

Plate Alloy	Lead calcium
Posts	Forged terminals & bushings
Container/Cover	Polypropylene
Charge Voltage @ 68°F (20°C)	Cycle 2.30 to 2.35; Float 2.25 to 2.30 v.p.c.
Electrolyte	Sulfuric acid thixotropic gel
Vent	Self sealing
Operating Temperature	Fully charged range: -76°F (-60°C) to 140°F (60°C)
Non-Spillable Rating	by DOT (Department of Transportation), ICAO (International Commercial Airline Organization), and IATA (International Airline Transport Association) definitions.

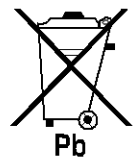
GEL SPECIFICATIONS

to 1.75VPC @ 77°F (25°C)*							Ampere Hour Capacity*						Weight	Dimensions – Inches (mm)		
3 Hr	5 Hr	10 Hr	20 Hr	24 Hr	48 Hr	100 Hr	100 Hr Rate	20 Hr Rate	10 Hr Rate	5 Hr Rate	3 Hr Rate	1 Hr Rate	Approx. Lbs. (kg)	L	W	H [■]
8.5	5.4	3.1	1.6	1.3	0.73	0.36	36.0	31.6	30.5	26.8	25.5	21.0	23 (10.5)	7.71 (196)	5.18 (132)	7.22 (183)
8.5	5.4	3.1	1.6	1.3	0.73	0.36	36.0	31.6	30.5	26.8	25.5	21.0	23 (10.5)	8.31 (211)	5.18 (132)	7.22 (183)
10.6	6.8	3.7	2.0	1.7	0.92	0.48	48.0	40.0	37.0	34.0	31.9	25.8	32 (14.5)	7.76 (197)	6.62 (168)	6.87 (174)
13.3	8.6	4.8	2.6	2.2	1.2	0.58	58.0	51.0	47.5	43.2	39.9	31.8	37 (16.8)	8.99 (228)	5.47 (139)	9.24 (235)
14.5	9.5	5.3	3.0	2.6	1.4	0.70	70.0	60.0	53.0	47.5	43.5	36.0	42 (19.1)	10.20 (259)	6.65 (169)	7.05 (179)
19.8	12.6	6.8	3.7	3.1	1.7	0.85	84.5	73.6	68.0	63.0	59.3	48.5	52.5 (23.8)	10.90 (277)	6.80 (173)	9.88 (251)
19.8	12.6	6.8	3.7	3.1	1.7	0.85	84.5	73.6	68.0	63.0	59.3	48.5	52 (23.6)	10.20 (259)	6.80 (173)	8.24 (209)
19.8	12.6	6.8	3.7	3.1	1.7	0.85	84.5	73.6	68.0	63.0	59.3	48.5	52 (23.6)	10.20 (259)	6.80 (173)	9.24 (235)
23.3	14.4	8.0	4.4	3.7	2.0	0.99	99.0	88.0	80.3	72.0	69.9	57.0	63.2 (28.7)	12.83 (326)	6.80 (173)	9.88 (251)
23.3	14.4	8.0	4.4	3.7	2.0	0.99	99.0	88.0	80.3	72.0	69.9	57.0	63 (28.6)	12.83 (326)	6.56 (167)	9.30 (236)
23.3	14.4	8.0	4.4	3.7	2.0	0.99	99.0	88.0	80.3	72.0	69.9	57.0	63 (28.6)	12.83 (326)	6.56 (167)	9.24 (235)
26.2	16.1	9.0	4.9	4.1	2.2	1.1	108	97.6	90.0	80.5	78.6	64.5	70 (31.8)	12.93 (329)	6.75 (171)	9.76 (248)
26.2	16.1	9.0	4.9	4.1	2.2	1.1	108	97.6	90.0	80.5	78.6	64.5	70 (31.8)	12.93 (329)	6.75 (171)	9.34 (237)
26.2	16.1	9.0	4.9	4.1	2.2	1.1	108	97.6	90.0	80.5	78.6	64.5	70 (31.8)	12.93 (329)	6.75 (171)	9.34 (237)
45.3	29.4	16.8	9.0	7.6	3.9	2.0	198	180	168	147	136	99.0	68 (30.8)	10.26 (261)	7.09 (180)	11.06 (281)
49.2	30.5	16.9	9.2	7.8	4.2	2.1	210	183	169	153	148	122	127 (57.6)	20.73 (527)	8.44 (214)	10.00 (254)
49.2	30.5	16.9	9.2	7.8	4.2	2.1	210	183	169	153	148	122	127 (57.6)	20.73 (527)	8.44 (214)	10.82 (275)
60.6	37.6	21.0	11.3	9.5	5.2	2.7	265	225	210	188	182	150	157 (71.2)	20.75 (527)	11.00 (279)	10.00 (254)
60.6	37.6	21.0	11.3	9.5	5.2	2.7	265	225	210	188	182	150	157 (71.2)	21.03 (534)	11.00 (279)	10.82 (275)

■ Total height includes terminals.

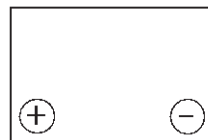


East Penn Manufacturing
QUALITY SYSTEM
CERTIFIED TO
ISO 9001
ISO/TS 16949
ISO 14001



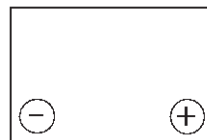
FOOTNOTES

TERMINAL POLARITY



1

8GU1, 8GU1H, 8G24, 8G24FT,
8G24UT, 8G27, 8G27T876,
8G27T881, 8G30H, 8G31DT, 8G31



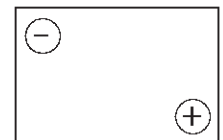
2

8G22NF, 8G34, 8G40



3

8G4D, 8G4DLTP,
8G8D, 8G8DLTP



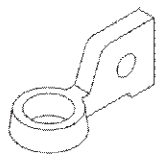
4

8GGC2

CASE OPTIONS

H

Includes handles



B

Flag terminal with 3/8"
diameter hole
(T876)



C

Insert
with 1/4" - 20
round hole



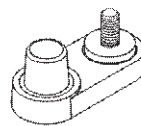
S

SAE "Automotive Post"
(TSAE)



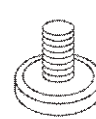
T

Heavy Duty "L"
terminal with 3/8"
diameter hole
(T975)



U

Molded-in offset
SAE post & vert
3/8" POS. & 3/8"
POS. stainless steel
studs & wing nuts



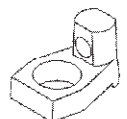
X

3/8" - 16 stainless
steel stud posts
(STUD)



Y

Small "L" terminal
with 1/4" - 20
round hole
(T873)



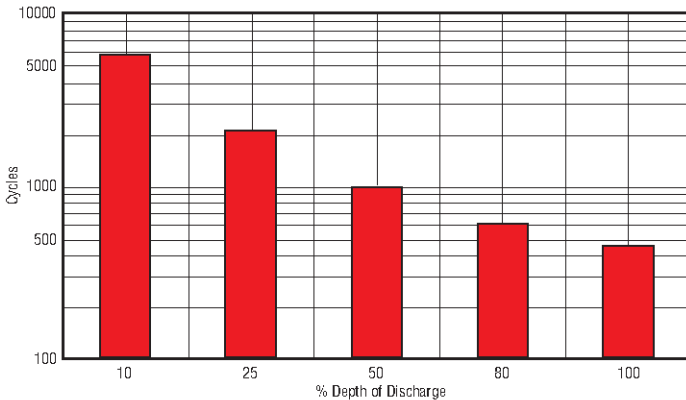
G

Offset post with
horizontal hole,
stainless steel 5/16"
bolt & hex nut
(T881)

TERMINAL TYPE

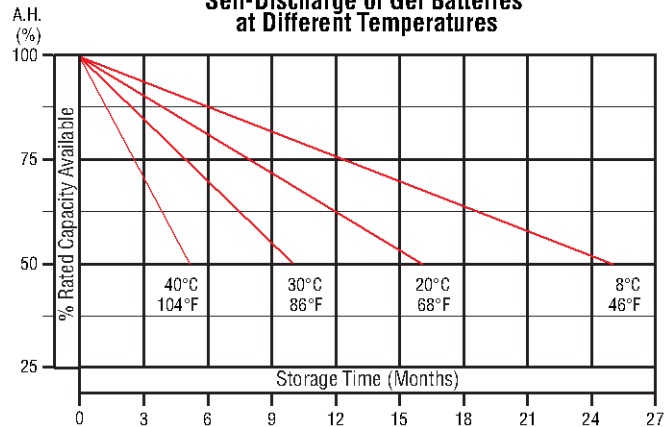
CHARACTERISTICS OF MK GEL BATTERIES

**Gel Cycle Life vs Depth of Discharge at +25°C (77°F)
Based on BCI 2-hour Capacity**

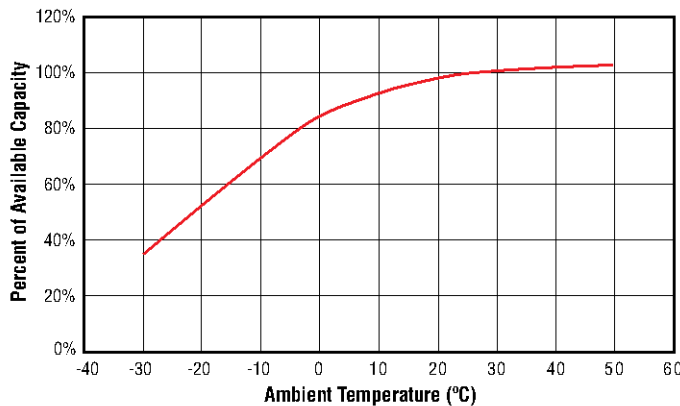


Cycle Chart applies to all MK Gel batteries (except 8GGC2 cycle chart x 2, 8G24/8G27 with a U terminal and 8G31DT cycle chart x .67).

**Self-Discharge of Gel Batteries
at Different Temperatures**



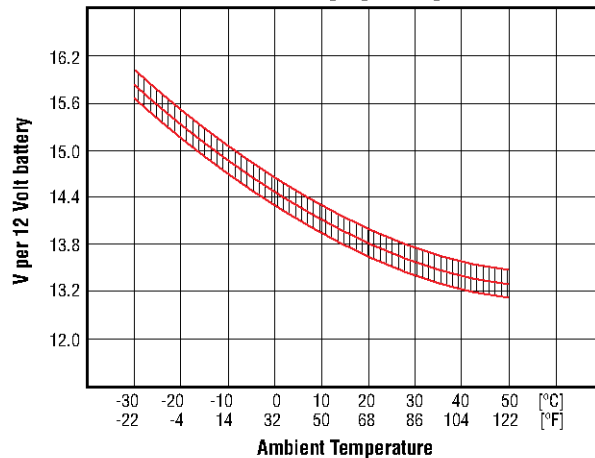
Capacity vs Operating Temperature



Capacity vs Operating Temperatures

Shown are the changes in capacity for wider ambient temperature range, giving the available capacity, as a percentage of the rated capacity, at different ambient temperatures.

Constant Charging Voltage



Constant Charging Voltage

Shown is the constant charging voltage in relation to the ambient temperature. The bandwidth shows a tolerance of $\pm 30\text{mV/cell}$. This constant voltage is suitable for continuous charging and cyclic operation. In a parallel stand-by mode it always keeps the battery in a fully charged state; in a cyclic mode, it provides for rapid recharging and high cyclic performance.

YOUR PARTNER IN POWER

Products
Service
Customer Care

MK Battery is one of the largest sealed lead acid battery suppliers worldwide due to our total commitment to the following core principles:

MK Battery supplies only the highest quality batteries (gel, AGM and flooded deep cycle) that are specifically designed for our customers' many, varied applications including broadband communications, UPS (uninterruptible power supplies), power wheelchairs, telephony (valve-regulated stationary), solar, marine and electronics.

MK Battery ships fresh inventory fast, often within 24 hours, from a stock of more than 100,000 batteries in multiple distribution centers throughout the world and assists our customers with proper spent battery disposal through EPA permitted smelters. (Please note that violation of hazardous waste disposal laws can place heavy penalties on offenders).

MK Battery is genuinely concerned for our customers' well-being as a long-term partner... not just a supplier. MK Battery listens to our customers and delivers what you want, when you need it.



MK Battery: 1631 South Sinclair Street • Anaheim, California 92806

Toll Free 800-372-9253 • Tel 714-937-1033 • Fax 714-937-0818 • Website: www.mkbattery.com • Email: sales@mkbattery.com

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Safety & Maintenance Guidelines For The HME Battery User

Take A Tip From Top Mobility Equipment Makers.

There's a simple reason why MK is the Number One brand of mobility battery among all major wheelchair manufacturers and leading rehab equipment suppliers. These industry leaders cannot afford to have their reputations riding on anything but the best power source available.

That's why the MK Powered name is your assurance of getting the best battery available for your wheelchair, scooter or other mobility device.



You'll Cover More Ground With An MK Battery.

Although a wet lead-acid design is initially less expensive, a wet lead-acid battery has a much shorter service life, requires regular maintenance and poses a much higher safety risk because of potential battery acid contact and/or explosion.

An MK Gel battery features an inherently safer, truly maintenance-free design. MK Gel batteries have provided years of proven performance and a significantly longer life - averaging 1 to 2 years or longer when properly charged.

MK Battery also offers a line of AGM (absorbed glass mat) batteries for lighter duty mobility use. Although AGM batteries will not match the cycle-life performance of our Gel batteries, they do offer a lower initial cost and will supply sufficient functionality to meet the less critical needs of certain lighter duty mobility applications. For heavy daily use and traditional rehab applications, continued utilization of our heavy duty Gel batteries is highly recommended.

Proper Battery Charging Procedures.

To properly charge your mobility battery, follow these simple procedures:

- Use the manufacturer's automatic charger for all routine charging.
- Never use an automotive or wet-type charger on sealed Gel or AGM batteries. (This will damage your battery).
- Never run your battery completely flat.
- Don't "top off" the battery with frequent charging.



How often should a battery be charged?

- **Daily Users** – Charge daily. This applies to anyone who actually uses their equipment for community mobility outside the home.
- **Occasional Users** – Charge your battery before an outing and always after active use (ideally when the "fuel gauge" is at about 50%).

How should a battery be stored?

- Always store your batteries FULLY CHARGED.
- Check all batteries once a month and recharge as needed.
- Sealed Gel and AGM batteries can hold a charge for up to 6 months.
- When storing a chair or scooter for more than 2 weeks, charge the batteries and then disconnect them.
- Avoid hot and cold extremes when storing.

Safety: First, Last And Always!

All batteries can be hazardous. So, always read and follow the instructions and warnings attached to any battery you purchase.

All mobility batteries contain lead and sulfuric acid. Both elements are toxic and considered dangerous. In addition, when they are charged, batteries produce hydrogen gas, which is highly flammable and can cause an explosion.

Proper handling of batteries is mandatory at all times. Improper handling may result in any of the following:

- **Explosion!** – Improper charging, poor maintenance or battery failure can cause low acid/electrolyte levels, resulting in high concentrations of hydrogen gas within the battery. This could potentially cause an explosion. While possible with all batteries, an explosion is much less likely in sealed Gel and AGM batteries.
- **Fire!** – Dropping a tool or touching a watch or bracelet across the terminals can result in a shock, sparks, smoke and even an explosion.
- **Pollution** – All old batteries must be recycled through an approved agency to prevent improper disposal. MK Battery uses only EPA certified smelters. Improperly disposed batteries can result in major fines and criminal prosecution.

REMEMBER: Always have your batteries installed by a properly trained wheelchair or scooter technician. They have the proper training and tools required to do the job safely and correctly.



The Benefits Of An Advanced Sealed Gel and AGM Battery.

Battery technology has changed tremendously in just the past few years. In fact, size-for-size, MK's advanced sealed Gel and AGM batteries deliver more power and more consistent performance than other types and brands of batteries used for mobility. MK's performance-proven sealed Gel and AGM designs:

- Can last longer than other batteries due to high quality manufacturing standards.
- Are A-67 DOT/FAA/ATA Standard approved for airline and public transportation.
- Do not need to be fully discharged before recharging.
- Do not develop a "memory" that limits their recharging.
- Will not automatically discharge if put on concrete.

While MK sealed Gel and AGM batteries aren't among the lowest priced brands, like a good set of radial tires for your car, they're designed to enhance performance and safety, last longer and, ultimately, be more cost-efficient.



All Mobility Batteries Are Not Created Equal.

Do you know the difference between an "SLI" (Starting Lighting and Ignition) versus a "deep-cycle" battery? What about a "wet lead-acid" versus a sealed Gel or AGM battery?

In virtually all wheelchair, scooter and other mobility applications, a deep-cycle, sealed Gel or AGM design is best. And here's why:

- SLI's are automotive-type "starting" batteries designed to provide rapid bursts of power. While they can be recharged quickly via alternator, the number of times they can be recharged is relatively few.
- Deep-cycle batteries, unlike SLI's, are specially designed to provide a more constant flow of power for a longer period of time. They're also designed to be charged and recharged hundreds of times.
- Wet lead-acid batteries need to have water added on a regular basis and are not recommended for mobility use.
- Sealed Gel or AGM batteries are exactly that – sealed – and need no additional water. Truly "maintenance-free," they provide extra convenience and safety.
- NOTE OF CAUTION: Many marine batteries are actually SLI batteries which have no application in wheelchair or scooter use. Also, not all Gel and AGM batteries are approved for air transportation as non-hazardous cargo. MK's sealed Gel and AGM batteries are approved for airline travel.



Who We Support and Why They Support You!

Many believe that mobility equipment is just another commodity item and that one size fits all. We believe that mobility devices should be provided to individuals to meet individual needs. We support the following organizations that fight for your right to obtain appropriate mobility equipment.

- **NRRTS - National Registry of Rehabilitation Technology Suppliers**
- **RESNA - Rehabilitation Engineering Society of North America**
- **AA Homecare**
- **CAMPS • NEMED • PAMES**
- **PAMS • WAMES • MAMES**



We support the Darrell Gwynn research fund at The Miami Project to Cure Paralysis. For more information, call: **800 STAND UP** (800-782-6387).

There's Only One Place To Buy Mobility Batteries.

MK Batteries are sold exclusively through HME suppliers throughout North America. MK does not sell direct to consumers for one reason. The best source for your batteries is the well-trained wheelchair technician at your local supplier. They know your equipment, inside and out, and which batteries best fit your mobility equipment's specific needs. For quality MK Battery products and peak performance, visit the following authorized MK Battery supplier:



MK Battery supports and endorses the new ANSI/RESNA Sealed Battery Standard for mobility equipment.

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The HME Battery Guide



Compliments of MK Battery



What Are Your Freedom and Independence Really Worth?

Battery-powered mobility systems provide thousands of Americans with additional freedom and independence.

None of these ingeniously designed vehicles, however, can perform to their full potential without a top-quality battery as the fuel source.

In fact, choosing the right battery for your equipment can enhance performance and safety, simplify charging and maintenance and, in the long-run, save you time, money and peace of mind.

Before you buy any battery, take a few minutes to review the facts and tips this guidebook provides. They include:

- **Types of Batteries**
- **Facts About Performance**
- **Safety Concerns**
- **Proper Charging**
- **Routine Maintenance**
- **Where To Buy**

This guidebook will help you maximize your current battery's performance and, better still, help you make a smart decision when it's time for replacement. All of this adds up to greater freedom and independence.

Getting Started With New Gel Batteries

Active power wheelchair users deep cycle their batteries daily. This stringent application requires a unique battery design that compromises initial capacity for the sake of long life. The most obvious indicator of a high quality deep cycle Gel battery is that it requires 15-20 cycles before reaching full capacity. Deep Cycle Gel construction requires a break-in period to fully activate the battery. Durability and Longevity is the consumers' reward.

Be Patient - Be Rewarded



AGM batteries, for lighter duty applications, can break-in period, however, their cycle life can be considerably shorter than that of Gel batteries.



“Power Mobility Technical Tips”



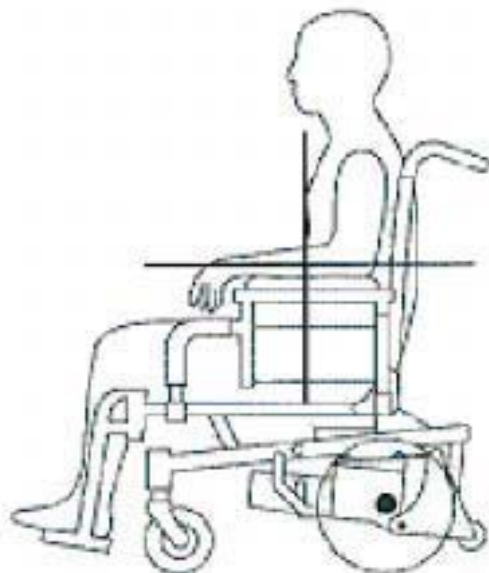
Visit the Technical Zone
@ www.invacare.ca
Technical Services Phone Support
1-800-668-5324 **ext. 2655**

POWERCHAIR MECHANICAL SAFETY INSPECTION CHECKLIST

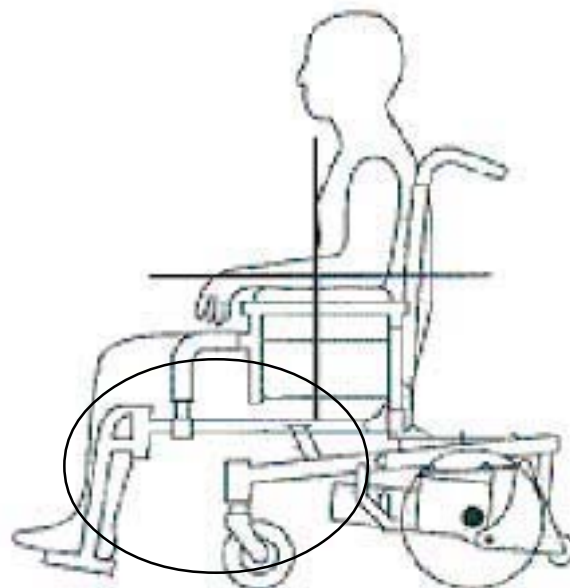
"Routine Maintenance is the critical key, to the chairs overall performance"				
Component	Initially	Weekly	Monthly	6 Months
Seat Upholstery/Pan	x		x	x
Back Upholstery/Hardware	x		x	x
Cushion Condition	x	x	x	x
Arms/Pads	x			x
Caster Bearings	x			x
Headtube Bearings	x			x
Forks	x			x
Tire Pressure	x	x	x	x
Tire Wear		x	x	x
Torque Specs	x		x	x
Tracking Issues	x			x
Front Loading Issues	x			x
Motor Brushes				x
Motor Coupler				x
Motor Gearbox Seals	x		x	x
Front Riggings	x			x
Wiring Harness/Fuses	x			x
Charger Operation	x			x
Battery Condition	x	x	x	x
Electronics/Accessories	x			x

TECHNICIANS NOTE: Every six months perform a thorough inspection of the powered product. Regular cleaning and servicing will reveal loose or worn parts, and enhance the smooth operation of the product. For optimum performance and safety, the product must be cared for on a routine basis. Routine maintenance will extend the life and efficiency of any product.

WEIGHT DISTRIBUTION ON POWER CHAIRS



RWD Chair
70% Rear & 30% Front
GOOD



RWD Chair
Front Loaded Casters
BAD

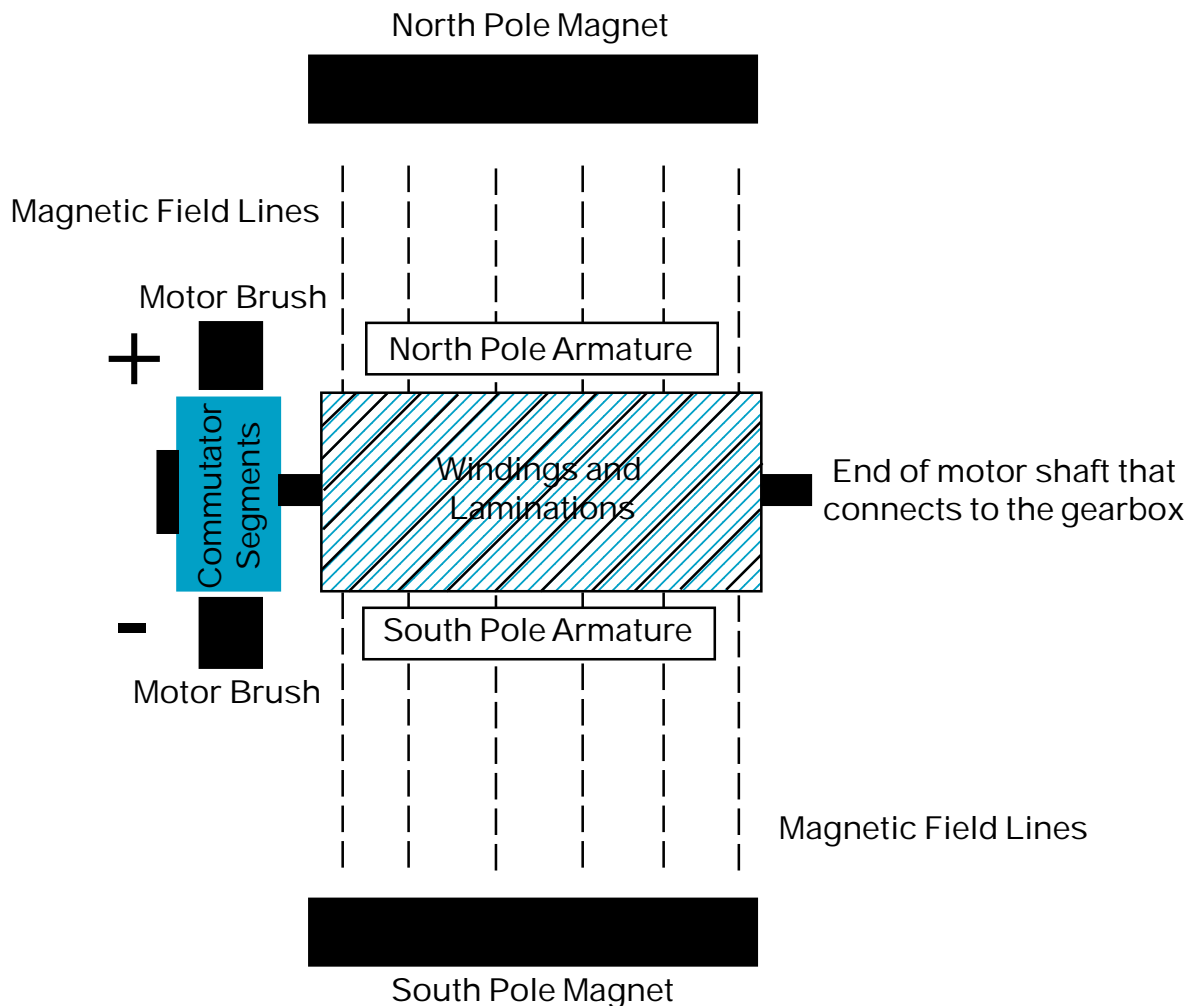


Conditions may vary on MWD & FWD chairs, it may take more than one adjustment to find a comfortable setting for the owner.

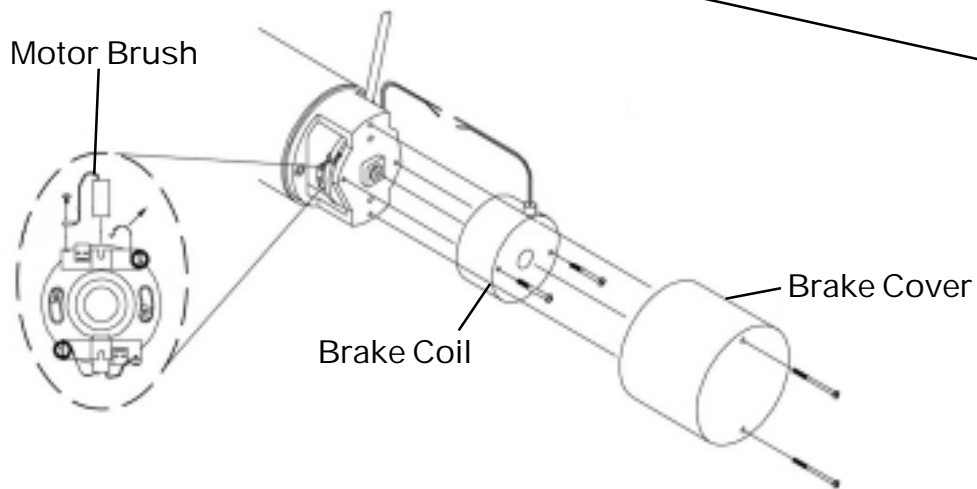
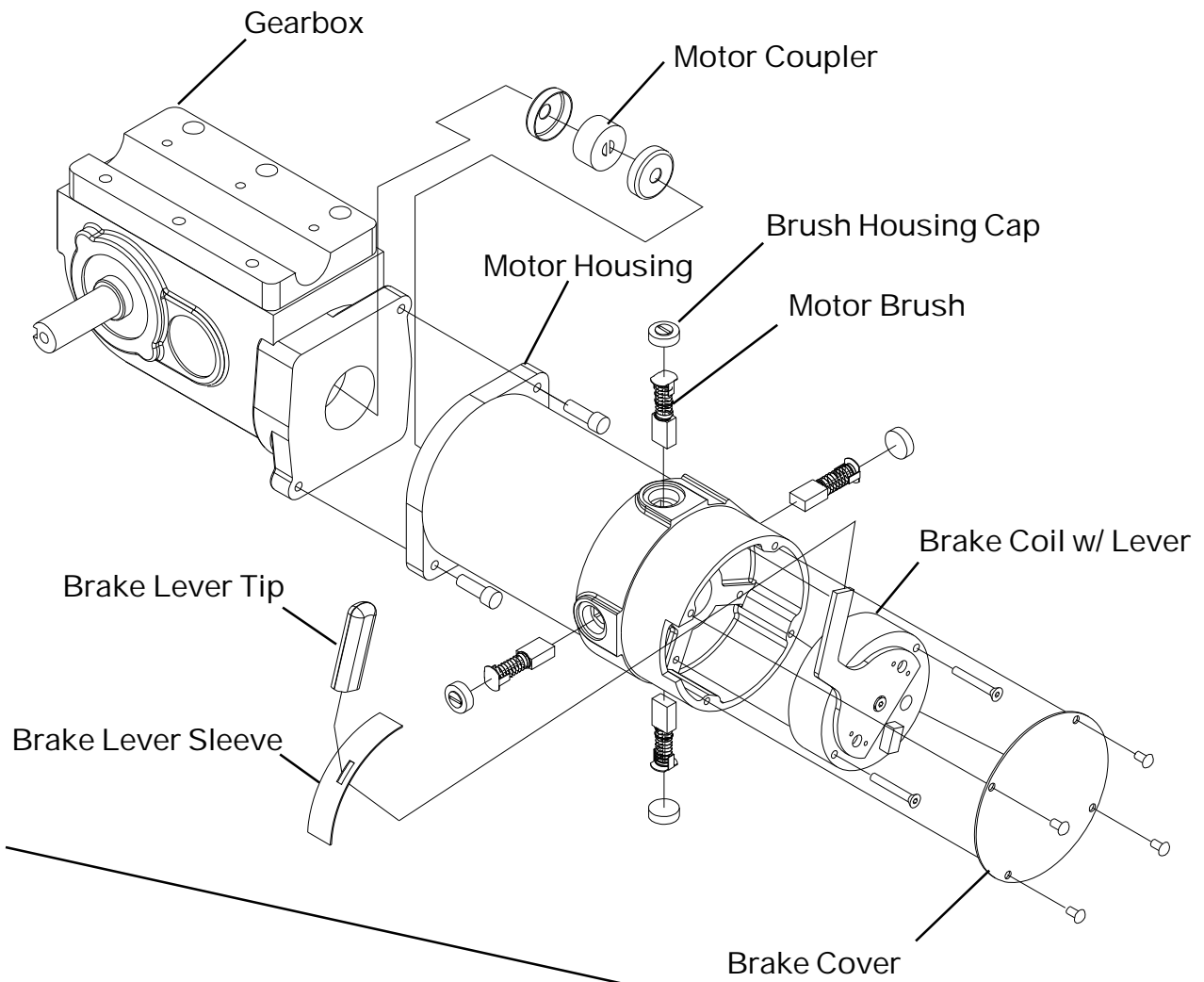
Most Invacare power wheelchairs have the capability of changing the center of gravity. It can be done two ways, one by sliding the ASBA (adjustable seat and back angle) seat forward or backwards on the base frame, two by changing the position of the motors on the frame (usually there is 3 inches of total adjustment, refer to the chair's Service Manual for more information). By making sure that the weight distribution is correct, the chair's components will not be under a load, which can cause premature wear on the chair's electronics and frame components. Front loading will also cause the chair to go into Current Rollback much sooner than normal.

PERMANENT MAGNET DC MOTORS

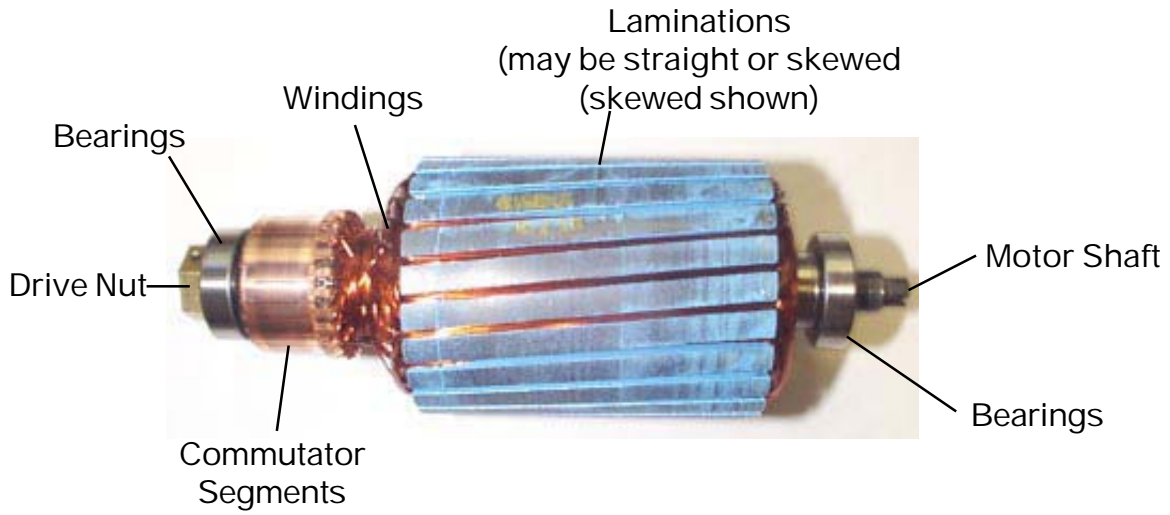
DC Motor Operation - Electrical current supplied by the power wheelchair batteries passes through the motor brushes to the windings, and energizes the coil and laminations thus it becomes an electrical magnet. One end magnetizes as the north pole, and the opposite as the south pole. The north pole windings are positioned next to the motor casings north pole permanent magnets, and the south pole of the windings are positioned next to the motor casings south pole permanent magnets. Armature rotation is caused by like poles repelling, and opposite poles attracting one another. The direction, speed, torque, and braking of the motor is controlled by the wheelchairs electronics.



DC MOTOR COMPONENT IDENTIFICATION
(2 & 4-POLE SHOWN)



DC MOTOR COMPONENTS IDENTIFICATION
(continued)



Motor Brushes & Commutator



Motor Housing with Permanent Magnets



Motor Brake & Lever Front View



Motor Brake
Rear View

TECHNICAL DEFINITIONS

Bearings - Two roller bearings are pressed onto the motor shaft, to allow the shaft to rotate freely.

Commutator Segments - The commutator segments are linked to the motor windings, which allows it to be energized when voltage is applied through the carbon brushes.

Drive Nut - The drive nut attached to the motor shaft, is mated with the fiber element in the electromechanical brake assembly.

Laminations - The laminations position the windings of the armature, which become magnetized when energy is applied to the motor.

Motor Shaft - The motor shaft is the core component of the armature.

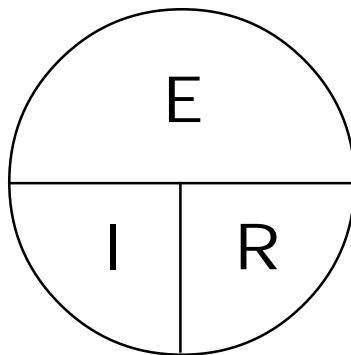
Windings - The copper windings are the communication link, between the commutator segments and the laminations.

Brushes - Carbon material with a shunt wire attached to it , which supplies current to the commutator.

Electro-Mechanical Brake - Component used to hold wheelchair in place when in neutral.

Coupler - Rubber element used to connect and dampen the motor and gearbox shaft rotation.

Ohms Law



E = Voltage measured in volts
I = Current measured in amps
R = Resistance measured in ohms

Ohms Law - This law states that one volt of electrical energy through a one ohm resistor, will consume one amp of current and generate one watt of power.

Example: $I = E/R$ or $I = (24 \text{ VDC} / 5 \text{ ohms}) 4.8 \text{ amps}$

DC MOTOR TESTING TOOLS & TIPS

Motor RPM TEST - Testing each motors RPM speed with a hand held RPM Gauge, can isolate internal problems. Severe brush wear, worn out motors, and dragging brakes, will cause veering motor problems that cannot be corrected by reprogramming Motor Balance in the Calibration Menu.



Testing Procedure to Current Draw (Conventional Motors Only)

1. Use a Digital AC/DC Clamp Meter, and make sure the batteries are fully charged before proceeding to Step 2.
2. Raise drive wheels off of the ground, and secure chair in place.
3. Locate a motor lead and slide back some of the sleeving to isolate the single RED Wire. Clamp on your meter to the Red Wire Only. Set up your meter for 40A DC.
3. Engage motors levers and give the chair a forward command to warm up the Motors and Gearbox (if cold) and hold the command.
5. Take reading while holding a forward drive command.

Typical Motor Current Draws

Two pole gear motor.

- From 2 ½ amps to 5 amps. (Make sure motors are warm, if lube is cold in the gearbox you will get a higher than normal reading)

Two pole motor with gearbox attached.

- From 2 ½ amps to 5 amps. (Make sure motors are warm, if lube is cold in the gearbox you will get a higher than normal reading)

Two pole motor only.

- From 1 ½ amps to 3 amps.

Four pole motor with gearbox attached.

- From 4 to 7 amps. (Make sure motors are warm, if lube is cold in the gearbox you will get a higher than normal reading)

Four pole motor only.

- From 2 ½ to 5 amps.



Example shown is a 4-Pole motor running in the forward direction drawing 5.24 amps (unloaded amp draw).

DC MOTOR TESTING AND BRUSH INSPECTION

1. Turn off the power on the chair, and disconnect the motor lead on the motor you wish to test.
2. Set your digital multimeter to measure OHMS.
3. Measure the resistance on the two (2) motor contacts, (be sure to rotate motor and take at least two readings). A normal reading is between .5 to 5 ohms. A reading of 0.L. (Open Line) or in excess of 15 ohms indicates a problem. High readings are generally caused by bad contacts, worn brushes, and internal motor problems. On average 40% of the motor problems can be fixed by replacing motor brushes and completing the brush seating procedure (see page 10).



4. Inspect all brushes and the motors commutator for abnormal wear, replace brushes if necessary. After replacing the brushes, refer to page 10 of this manual for the brush seating procedure.



When should you replace brushes?

Brushes should be replaced before the tamped shunt or pigtail lead has a chance to score the commutator and before the brush is at the end of the spring travel. When the brushes have less than a 1/4" of material left, the brushes should be replaced.

Also check the shunt wire for any discoloring, and check the spring for damage. If either is noticed replace the brush. Be sure to make sure the brush housing is clean, so the brush is able to slide in and out freely without resistance.

4-POLE MOTOR BRUSH REMOVAL AND REPLACEMENT

1. Disengage the motors and make sure the power is off on the display or driver control. With a flat head screwdriver locate the brush cap (caps), and remove the brush cap by turning the screwdriver counter clockwise.



2. Before removing the brush for inspection, place a temporary mark on the motor casting, and on the top of the brush. (If not replacing the brush with a new one, it must be put back into the brush holder in its original position.) Remove the brush from the brush holder, and inspect the brush thoroughly. Look for excessive wear or chips in the brush, and any discoloration in the shunt wire.



3. Install the new brush (or original brush) back into the brush holder, and replace the brush cap (turn the screwdriver clockwise to tighten cap). **DO NOT OVERTIGHTEN** the brush cap, tighten and loosen the cap a couple of times to ensure proper seating of the brush in the brush holder. After securing all brushes on the chair, raise the drive wheels off of the ground, and block the front casters to secure the chair. Do not leave the chair unattended when performing STEP 4.



4. Begin the brush seating process by turning the power on and verify that the drive wheels are off of the ground. Engage the motors and use a rubber band to hold the joystick in the forward position. Allow the motors to run in the forward direction for at least one hour. After one hour allow the motors to cool off, and repeat this procedure in the reverse direction. After completing this procedure test drive the chair and you should notice an increase in performance.



2-POLE MOTOR BRUSH REMOVAL AND REPLACEMENT

Please refer to the (specific model) power wheelchair service manual, for motor removal procedures if necessary.

1. Locate the two phillips head screws at the front of the motor, and remove these two screws. Remove the long plastic cap and locate the brush assembly on each side of the motor.



2. Before removing the brushes, review the following technical tips.
 - ❑The brush spring retainer is not available as a service part, caution should be used when removing brushes.
 - ❑The screw and washer that attaches the shunt wire to the motor is not available as a service part, caution should be used when removing this screw.



3. Remove the screw that attaches the shunt wire to the motor assembly (please keep the screw and washer to attach the new motor brush).



4. Release the tension on the brush spring retainer with a small screwdriver, and position the screwdriver in place to hold the spring tension. Remove the brush and inspect the commutator for damage. Place the new brush into the brush housing, and release the tension on the spring to hold the brush in place. Attach the shunt wire to the motor housing by reusing the small screw and washer to secure the shunt wire. Repeat this procedure for the opposite brush.



5. Replace the motor cap and screws, and test motor. Please review page 10 for the brush seating procedure.

ELECTROMECHANICAL PARKING BRAKE TESTING

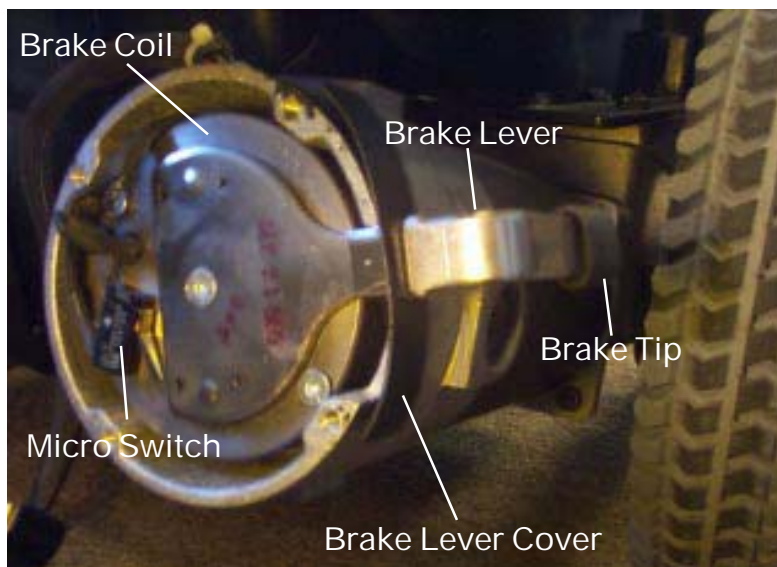
1. Turn off the power on the chair, and disconnect the motor lead on the motor you wish to test.
2. Set -up your dmultimeter to take an Ohms reading , and engage the motor brake lever.
3. This test will measure the resistance in the brake coil. A normal reading is in the range of 45 - 50 ohms (depending on type and manufacturer of motor). A reading of 0.L. or a very high reading; indicates a shorted brake or an open connection respectively.
4. Check the connectors for damage or corrosion, then take another reading. If the reading is still bad, replace the brake or the motor.

CAUTION

A short circuited brake will damage the brake output section in the controller. DO NOT connect a bad electromechanical brake to a good controller module.
A shorted electromechanical brake MUST be replaced.



40-50 OHMS = GOOD



Exploded view of the electromechanical brake assembly

2-POLE DC MOTOR WITH LONG CAP BRAKE COIL REPLACEMENT

Please refer to the specific model power wheelchair service manual, for motor removal procedure.

1. Locate the two phillips head screws at the front of the motor, and remove these two screws. Remove the long plastic cap to expose the brake coil assembly on the end of the motor.
2. Locate the two white wires on the brake coil, and cut off the shrink wrap to expose the wire connectors. Cut the wires just below the connector to retain the length of the two black wires on the motor leads.
3. Locate and remove the two phillips head screws that attach the brake coil to the motor assembly. Remove the brake coil, clapper plate with springs, friction disk, and reaction plate. The new brake coil kit will include all of these items to complete the repair.
4. Remove the contents of the new brake coil and begin to replace the brake coil assembly. The new brake coil is spring loaded, so the clapper plate will need to be held together to hold the springs in place. Line up the brake coil assembly with the screw holes, and tighten the screws to secure the brake coil to the motor assembly.
5. Connect the two white wires to the two black wires with an insulated connector, and cover the two connections with heat shrink to protect the connections. Reverse step 1 and reattach the long plastic cap and two screws to the motor assembly. Temporarily connect the motor plug to the controller and test the motor before putting it back on the chair. Make sure that there are no E09 or E10 error codes when testing motor. When testing is complete reattach motor to the chair and test drive chair.



4-POLE DC MOTOR BRAKE COIL REPLACEMENT

1. When encountering E09 or an E10 error code, turn the chair off and determine which motor needs to be checked.

Use your Digital Multi Meter to OHM out the motor connector to determine where the problem is, (normal readings are .5-5 OHMS for the motor , and 45-50 OHMS for the brake).

After determining that the brake coil is bad, replace it , or the motor with brake before turning the chair back on. A bad brake coil can cause damage to a good controller, call the Invacare Parts Dept. for a replacement brake coil.

NOTE: If the problem is not found on either side motor, then the problem may be in the controller, call Technical Services for verification for a replacement or a repair.

2. After confirming that a bad brake coil needs to be replaced, refer to the power chair Service Manual, and follow the procedure for removing the motor. After the motor has been removed from the chair, begin by removing the brake cap screws, and remove the screws that fasten the brake coil to the motor.

3. The motor lead has a protective sleeve and a strain relief that needs to be removed, in order to replace the brake coil. Some motors have a plastic threaded nut, and others have a plastic connector that prevent the motor leads from being damaged. Use caution when removing the strain relief and the protective sleeve, due to the fact that they will have to be reused when putting the motor back together.

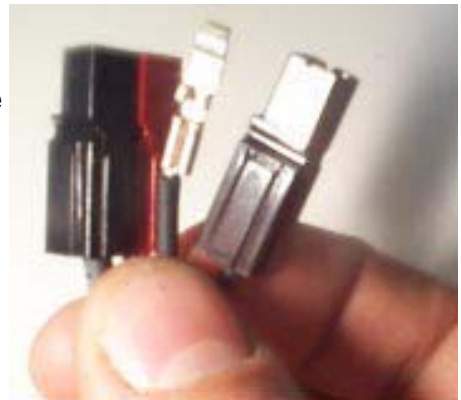


4-POLE DC MOTOR BRAKE COIL REPLACEMENT (continued)

4. Begin to disassemble the motor connector by removing the roll pin and the top of the connector, and remove the two screws and clamp at the base of the connector.



5. Slide the Anderson housing back to expose the motor and brake individual connectors. The red and black connectors are for the motor, and the two black connectors are for the brake. You will need to separate the Anderson housing from the wire and contact leads as shown in the picture to the right. The new brake coil will have new contact already attached to the



6. Upon completing step 5, slide the Anderson housing off of the motor lead, and remove the protective sleeve to expose the wires coming from the motor housing.



Caution

Do not cut this protective cover, slide it off of the wires unless you have a replacement protective covering for the wires. If you are cutting off the protective covering, be careful not to damage the original motor wiring. If you do cut into the insulation of the motor wiring, it must be repaired before putting the protective covering back onto the wiring.

4-POLE DC MOTOR BRAKE COIL REPLACEMENT

7. With the wiring loose, and the brake coil screws removed, begin to remove the brake coil from the motor housing. Pull up on the brake coil and pull the brake coil wires through the opening on the motor housing. Mark the brake coil defective and discard it, and take the new brake coil and pull the brake coil wiring through the motor housing opening. Reattach the brake coil to the motor housing the fasteners you removed in step 2.

NOTE: Before going onto step 8, make sure that the brake coil pad is mated with the hex drive nut on the end of the motor shaft. Release the brake lever to realign the brake coil pad if necessary.



8. Reapply the protective covering or use new material to protect the wiring from being damaged. Then slide on the Anderson housing on, before reassembling the individual Anderson connectors to the contacts. The two brake coil wires go together side by side, and the red and black motor connectors go beneath the brake coil connectors. View the opposite motor connector in case you have forgotten how the housing is to be assembled, before attempting to connect it to the controller.



9. Before reattaching the motor to the power chair, temporarily hook it up the chair to verify that it has been repaired successfully. To verify your repair of the brake coil, raise the drive wheels off of the ground and connect motor lead to the controller. Verify again that the drive wheels are off of the ground, and power up the chair with both motors engaged (If the joystick is equipped with a speed potentiometer, turn it down to the slow setting). Give the joystick a forward and reverse command to verify the motor and brake operation, if an error code exist (E09 or E10) check your connection or call Technical Services.

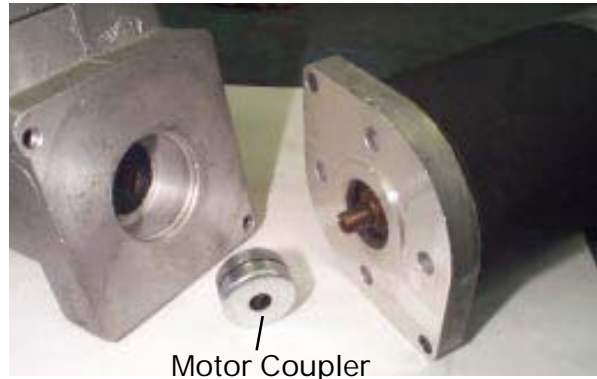


Raise both of the drive wheels off of the ground . Place a block in front of both caters before testing motor and brake assembly.

GEARBOXES

Motor Coupler Inspection -

On conventional motors with gearboxes, there is a motor coupler that needs to be inspected. To inspect the coupler, you will need to remove the motor. The coupler works as a flexible connection between the motor and the gearbox, which means it will eventually wear out. If it is never serviced, it may cause severe damage to the motor. Whenever replacing a motor or a gearbox, it is a good idea to replace the coupler.



Gearbox Drive Ratios

18:1

or

*24:1

(*Heavy Duty & Std. on Torque SP)

A: Gearbox with bevelled top, used on a chairs equipped with a swing arm type suspension. This style gearbox also has external threads on the output shaft w/ keyway.



B: Gearbox used on chairs with no suspension, or on Storm FWD models.



C: Gearbox permanently attached to a DC motor, with clutch handle fix onto the back for free wheeling. This type of gearbox with a long or short cap motor, is non-serviceable in the field.



NOTE: Having the make, model, and serial number, is crucial when reordering gearboxes.

GB MOTORS (Gearless/Brushless DC Motor)

A DISCOVERY FROM THE PAST THAT WILL CHANGE THE FUTURE

It was once one of those moments of discovery that is easily taken for granted by later generations. English physicist Michael Faraday had studied early experiments in electromagnetism with great interest. In fact, he had already created the world's first electric motor, a crude model in which a wire rotated around a fixed magnet. But if an electrical current could influence a magnetic field, Faraday reasoned, then perhaps the opposite was true, as well. He set a magnet spinning within an uncharged, horseshoe-shaped coil. And, true to his hypothesis, the magnet's motion generated an electric charge in the coil. What Faraday had discovered was the phenomenon of induced electromagnetism. What he had created was the world's first electric generator.

5 Year Warranty (GB motors are Non-Serviceable)



GB Motors used on chairs prior to February 2003



GB Motors used on chairs after to February 2003

TECHNICIANS NOTE: When replacing a GB motor or controller, you <u>must</u> calibrate the motors with your Remote Programmer. See page 20, for the Calibration Procedure.

GEARLESS/BRUSHLESS TROUBLESHOOTING RIGHT OR LEFT MOTOR BRAKE CIRCUIT OPEN (E09 AND E10)

How to test the internal electromechanical brake.

1. Engage the motor (put it in the drive mode), and unplug the controller connector from the motor.
2. Locate pins 9 and 10 (see figure 1) on the motor connector to perform a continuity test (see figure 2).
3. Use a multimeter to connect the leads to pins 9 and 10. With the motor engaged, the brake circuit should be closed and your multimeter should read 0 ohms. If both motors test, OK. Then you will need to send the controller in for repair. If you get an abnormal reading, or cannot perform this test call Invacare for further assistance. We will help you determine whether you need to replace the motor or the controller.

GB Motor Connector



Figure 1. Motor Connector with numbered pins.



Figure 2. Engage and Disengage Brake lever, while your meter leads are connected to pins 9 and 10. You should hear an audible come on, then off while performing this test.

TECHNICIANS NOTE: When replacing a GB motor or controller, you must calibrate the motors with your Remote Programmer. See page 20, for the Calibration Procedure.

GB MOTOR CALIBRATION PROCEDURE

On chairs equipped with GB motors, motor calibration must be done when the following conditions occur.


- When replacing a GB Motor.
- When replacing a GB Controller.

NOTE: In order to calibrate a GB motor, an Invacare Remote Programmer is needed.

1. Raise both drive wheels off of the ground, and block the front casters to prevent the chair from rolling forward. The chair must be secure to prevent any injuries.
2. Engage the motors, and plug in the Remote Programmer into the chairs controller.
3. Turn on the chair, then the Remote Programmer. Select the Calibration Menu and arrow down to Calibrate Motor.

The programmer screen will prompt you with the following questions:

1. WHEELS WILL MOVE! DRIVE WHEELS RAISED? YES OR NO
 2. CHAIR WILL DRIVE! ARE DRIVE WHEELS RAISED? YES OR NO
4. Press the Select button on the programmer to begin the Calibration procedure. To CANCEL the Calibration press the MENU button.
 5. When the calibration is complete, the screen will display the following:
COMPLETED TEST SAVING NEW VALUES

 <p>Allow a minimum of 2" ground clearance.</p>	<p>TECH NOTE:</p> <p>Make sure the rear drive wheels are clearly off of the ground (they will begin to MOVE when calibration begins).</p> <p>Place an object in front of the two casters, to prevent the chair from rolling forward off of the stationary stand.</p>
--	---



Yes, you can.

SAVE THESE INSTRUCTIONS

NOTE: Check all parts for shipping damage before using. In case of damage, DO NOT use the equipment. Contact your dealer/carrier for further instruction.

Safety Summary

To ensure the safe and proper installation of the G-Trac controller and/or the G-Trac module, these instructions **MUST** be followed:

⚠ WARNING

DO NOT install this equipment without first reading and understanding this instruction sheet. If you are unable to understand the warnings, cautions and instructions, contact a healthcare professional, dealer or technical personnel if applicable, before attempting to install this equipment - otherwise, injury or damage may occur.

⚠ ACCESSORIES WARNING

Invacare products are specifically designed and manufactured for use in conjunction with Invacare accessories. Accessories designed by other manufacturers have not been tested by Invacare and are not recommended for use with Invacare products.

⚠ INSTALLATION WARNINGS

The procedures in this instruction sheet **MUST** be performed by a qualified technician.

After any adjustments, repair or service and before use, make sure all attaching hardware is tightened securely. Otherwise injury or damage may occur.

Before adjusting, repairing or servicing the seating system, ALWAYS turn the wheelchair power Off. Otherwise, injury or damage may result.

Pinch points exist between seat and base frames. Use caution, otherwise injury may occur.

Cables MUST be secured to the wheelchair frame and/or base with tie-wraps after servicing is complete. Failure to follow the warnings and instructions below could result in injury to the users, attendants and/or bystanders and/or damage to the wheelchair.

Cables MUST be secured so there are no loops of excess cable extending away from the wheelchair. Bundle all excess cable together and secure with a tie-wrap. It may also be necessary to secure these bundles to the seat frame and/or base.

ALWAYS test all wheelchair functions after securing the cables to be sure cables DO NOT get pinched, crushed or pulled during operation of the wheelchair.

For more information regarding Invacare products, parts, and services,
please visit www.invacare.com

Overview

Install the G-Trac controller and/or the G-Trac module according to wheelchair model:

- TDX SP, SI, SC/SC with elevate and TDX Spree - Refer to Replacing the G-Trac Module and/or Controller on TDX SP, SI, SC/SC with Elevate and TDX Spree on page 2.
- 3G Storm Series Wheelchairs - Refer to Replacing the G-Trac Module and/or Controller on 3G Storm Series Wheelchairs on page 8.
- Power Tiger - Refer to Replacing the G-Trac Module and/or Controller on the Power Tiger on page 12.

Replacing the G-Trac Module and/or Controller on TDX SP, SI, SC/SC with Elevate and TDX Spree

Replacing the G-Trac Module on TDX SP, SI, SC/SC with Elevate and TDX Spree

NOTE: For this procedure, refer to FIGURE 1 on page 4.

NOTE: Take note of position and orientation of tie-wraps before removing. Wiring MUST be secured in the same locations with tie-wraps when installing the new G-Trac module.

1. TDX SC/SC with Elevate and TDX Spree Only - Remove the batteries from the wheelchair base. Refer to owner's manual shipped with the wheelchair base.
2. If necessary, remove the rear shroud. Refer to Removing/Installing the Rear Shroud on page 7.
3. Cut tie-wraps securing the existing G-Trac module cable to the wheelchair base frame and or other cables.
4. Disconnect the G-Trac module cable from the controller (Detail "A").
5. If necessary, disconnect the seating system wiring harness from the G-Trac module cable.
6. Loosen the locknut and carriage bolt securing the G-Trac module to wheelchair base frame.
7. Lift up on the G-Trac module until the carriage bolt slides out of key hole in the wheelchair base frame.
8. Save the existing G-Trac module for return to Invacare.
9. Insert new carriage bolt through the back of the new G-Trac module and loosely secure with the new locknut.

NOTE: TDX SP and SI - Install the new G-Trac module outside, rear wall of the wheelchair base frame the controller.

NOTE: TDX SC - Install the new G-Trac module on the inside, lower rear wall of the wheelchair base frame.

NOTE: TDX SC with Elevate and TDX Spree - Install the new G-Trac module on the inside, right wall of the wheelchair base frame.

10. Insert the head of the carriage bolt into the key hole of the wheelchair base frame.

CAUTION

The anti-rotation pin on G-trac module MUST be engaged with the locator hole before tightening locknut.

The anti-rotation pin ensures the G-trac module remains in proper alignment with the wheelchair base frame.

If the locating pin of the new G-trac module is damaged contact Invacare for replacement.

11. Insert the anti-rotation pin on the back side of the new G-Trac module into the locator hole on the wheelchair base frame (above the key hole).
12. Torque the locknut to 35 in-lbs \pm 20% to secure the new G-Trac module to the wheelchair base frame.
13. If necessary, connect the seating system wiring harness to the G-Trac module cable.
14. Perform one of the following:
 - Replacing the G-Trac Module Only - Proceed to STEP 15.
 - Replacing the G-Trac Module and Controller - Replace the controller. Refer to Replacing the G-Trac Controller on TDX SP, SI, SC/SC with Elevate and TDX Spree on page 5.
15. Connect the G-Trac module cable to the controller (Detail "A").
16. Using tie-wraps, secure the G-Trac module cable (and seating system wiring harness) to the wheelchair base frame.
17. TDX SC/SC with Elevate or TDX Spree Only - Reinstall the batteries into the wheelchair base frame. Refer to the owner's manual shipped with the wheelchair base frame.
18. Install the rear shroud.
19. Perform the post-inspection checklist. Refer to Post-Service Inspection Checklist on page 16.

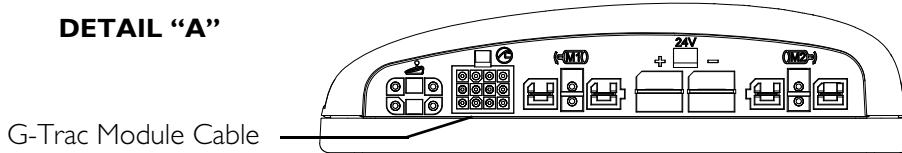
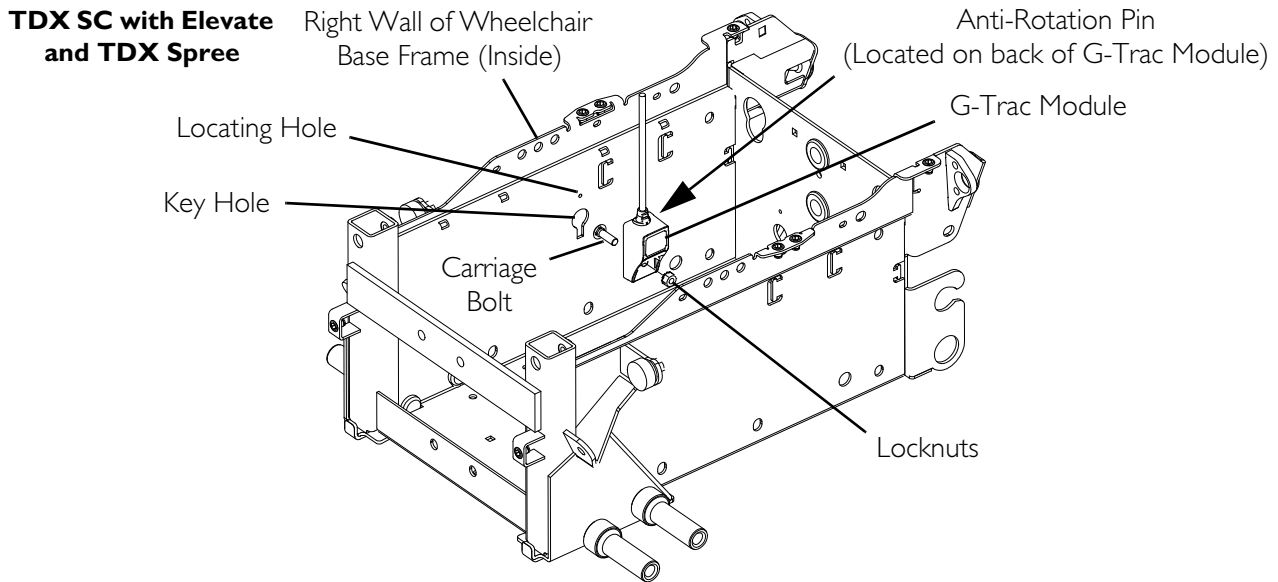
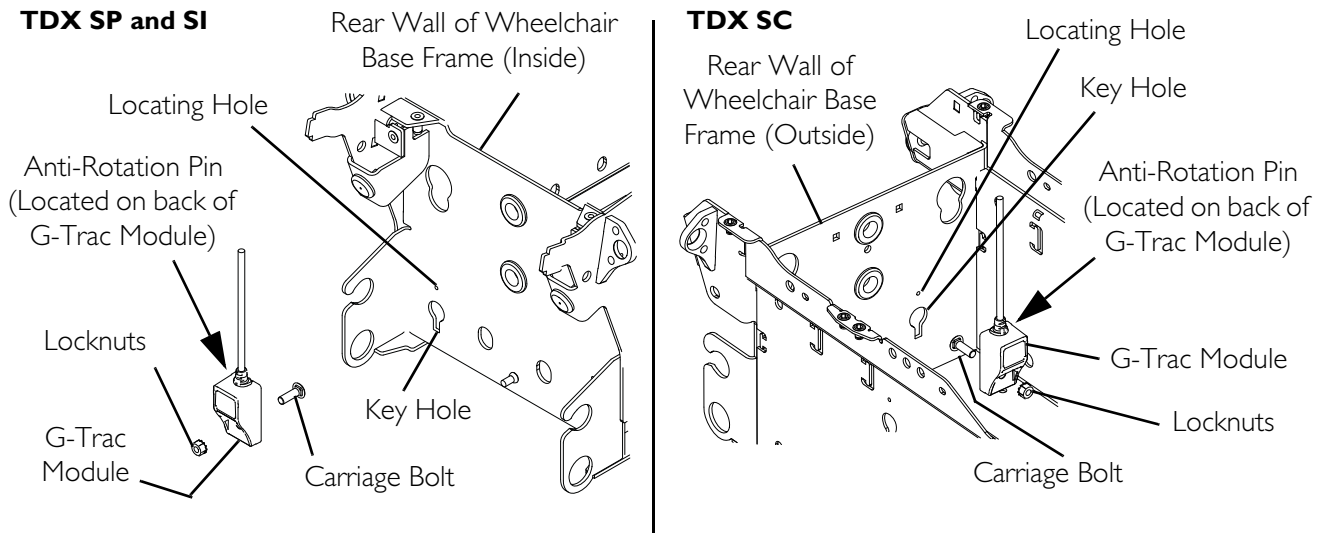


FIGURE I Replacing the G-Trac Module on TDX SP, SI, SC/SC with Elevate and TDX Spree

Replacing the G-Trac Controller on TDX SP, SI, SC/SC with Elevate and TDX Spree

NOTE: For this procedure, refer to FIGURE 2 on page 6.

1. If necessary, remove the rear shroud. Refer to Removing/Installing the Rear Shroud on page 7.

NOTE: If necessary to remove any tie-wraps from the wheelchair wiring in order to disconnect cables from the controller, take note of position and orientation of tie-wraps before removing. Wiring MUST be secured in the same locations with tie-wraps when installing the new G-Trac controller.

2. Perform one of the following:
 - Replacing the G-Trac Controller Only - Disconnect the G-Trac module cable from the controller. Proceed to STEP 3.
 - Replacing the G-Trac Controller and Module - Perform STEPS 2- 13 of Replacing the G-Trac Module on TDX SP, SI, SC/SC with Elevate and TDX Spree on page 2.
3. Disconnect the right and left motors from the controller.
4. Disconnect the joystick cable from the controller.
5. Disconnect the battery cable from the controller.
6. Place two 5-inch blocks under the front of the wheelchair base frame.
7. Remove the two nylon spacers and 1/4-20 X 5/8-inch mounting screws (Detail "A").
8. Let the rear frame assembly fall away from the battery box to create more room to work.
9. Lift the controller up until the two 9/16 ID X 1-1/16 OD X 3/8-inch washers release from the base frame.
10. Pull the controller away to remove the controller from the wheelchair frame.
11. If necessary to install the controller mounting hardware, perform the following:
 - A. Insert the two controller mounting washers into two 9/16 ID X 1-1/16 OD X 3/8-inch washers.
 - B. Using the two 8-32 X 1.00-inch pan head screws and 8-32 locknuts, secure the controller mounting washers and 9/16 ID X 1-1/16 OD X 3/8 inch washers to the controller.
12. Align the two 9/16 ID X 1-1/16 OD X 3/8-inch washers of the controller with the two large openings of the base frame.
13. Insert the two 9/16 ID X 1-1/16 OD X 3/8-inch washers into the two large openings of the base frame and push down until the controller is securely locked into position.
14. Connect the battery cable to the controller.
15. Connect the joystick cable to the controller.
16. Connect the right and left motors to the controller.
17. Connect the G-Trac module cable to the controller.

18. Lift the rear frame assembly up towards the wheelchair frame (Detail "A").
19. Using the two 1/4-20 X 5/8-inch mounting screws and nylon spacer, secure the rear frame assembly to the wheelchair frame. Torque to 75 in-lbs ± 20%.
20. If necessary, use tie-wraps to secure loose wiring to the wheelchair.
21. Install the rear shroud. Refer to Removing/Installing the Rear Shroud on page 7.
22. Remove the two 5-inch blocks from under the wheelchair base frame.
23. TDX SC/SC with Elevate or TDX Spree Only - Reinstall the batteries into the wheelchair base frame. Refer to the owner's manual shipped with the wheelchair base frame.
24. Perform the post-inspection checklist. Refer to Post-Service Inspection Checklist on page 16.

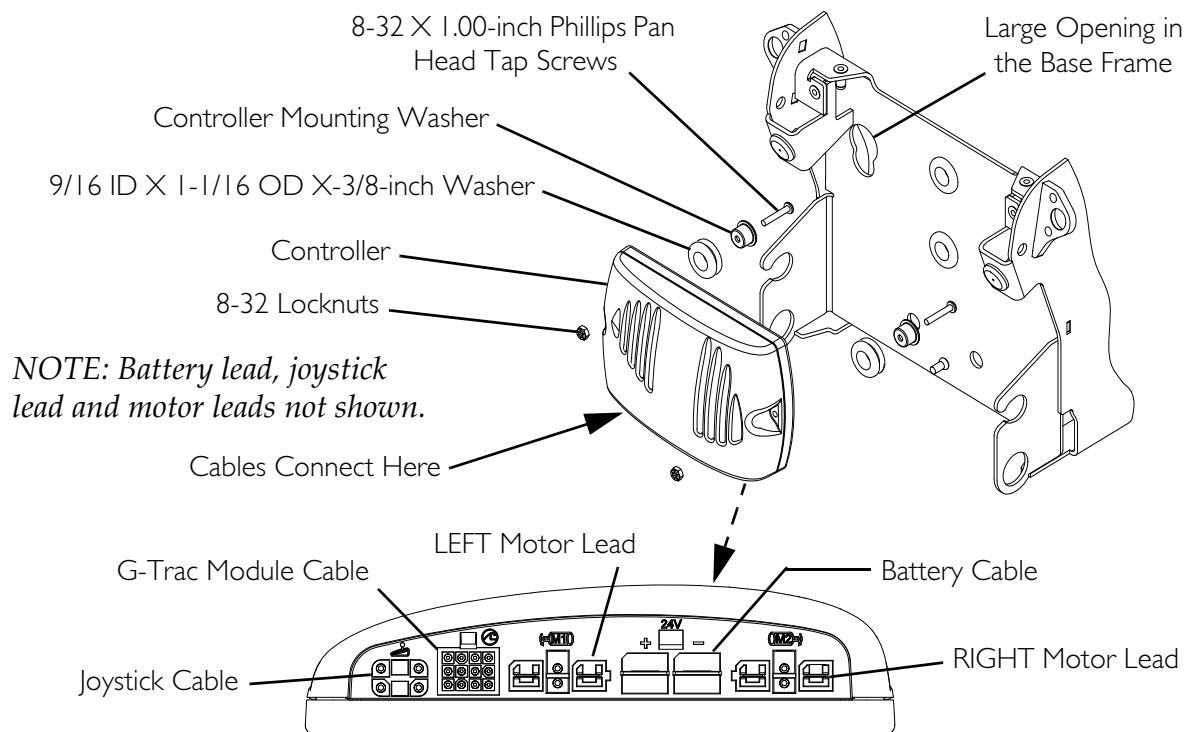
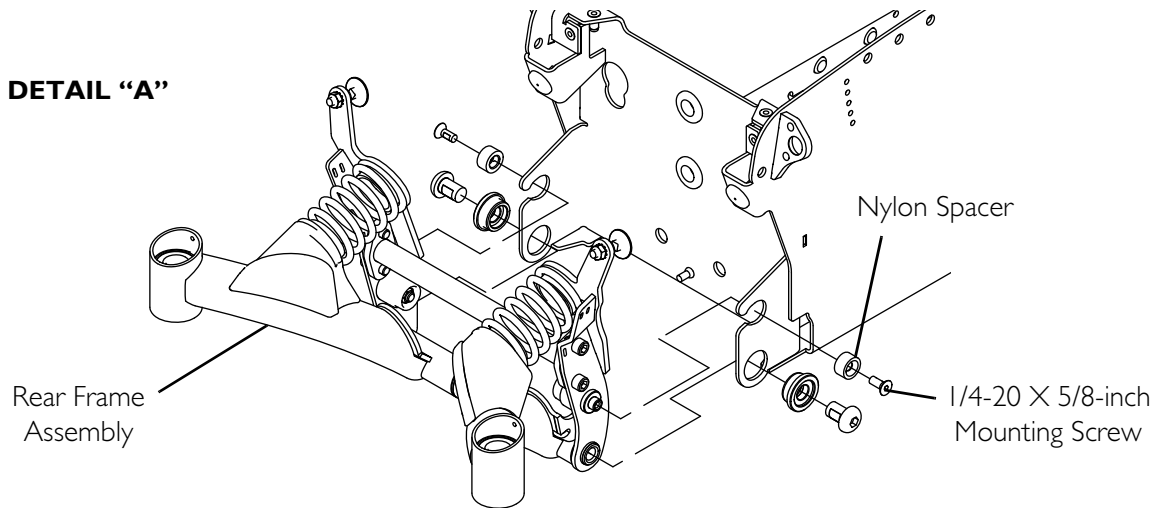


FIGURE 2 Replacing the G-Trac Controller on TDX SP, SI, SC/SC with Elevate and TDX Spree

Removing/Installing the Rear Shroud

NOTE: For this procedure, refer to FIGURE 3.

NOTE: Reverse this procedure to install the rear shroud.

1. Perform one of the following:
 - TDX SP or SI - Remove the three 10-32 X 1/2-inch pan head screws that secure the rear shroud to the wheelchair base frame.
 - TDX SC/SC with Elevate or TDX Spree - Remove the two thumb screws that secure the rear shroud to the wheelchair base frame.
2. Remove the rear shroud from the wheelchair base frame.

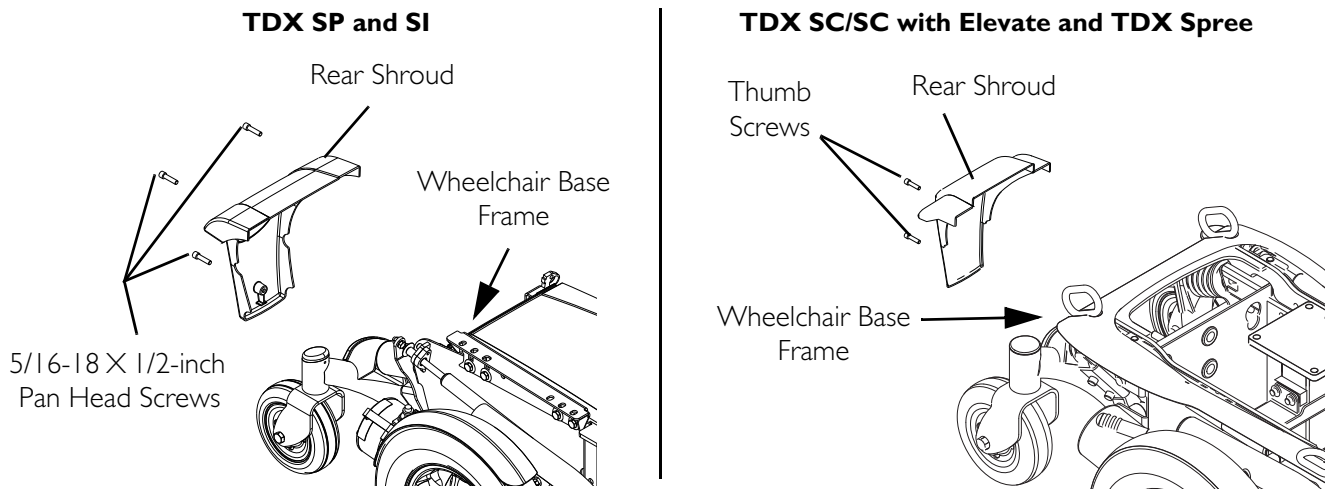


FIGURE 3 Removing/Installing the Rear Shroud

Replacing the G-Trac Module and/or Controller on 3G Storm Series Wheelchairs

Replacing the G-Trac Module on 3G Storm Series Wheelchairs

NOTE: For this procedure, refer to FIGURE 4 on page 9.

NOTE: Take note of position and orientation of tie-wraps before removing. Wiring MUST be secured in the same locations with tie-wraps when installing the new G-Trac module.

1. If necessary Remove the controller shroud. Refer to Removing/Installing the Controller Shroud on page 11.
2. Cut tie-wraps securing the existing G-Trac module cable to the wheelchair base frame and or other cables.
3. Disconnect the G-Trac module cable from the controller (Detail "A").
4. If necessary, disconnect the seating system wiring harness from the G-Trac module cable.
5. Loosen the locknut and carriage bolt securing the G-Trac module to wheelchair base frame.
6. Lift up on the G-Trac module until the carriage bolt slides out of key hole in the G-Trac module mounting bracket.
7. Save the existing G-Trac module for return to Invacare.
8. Insert new carriage bolt through the back of the new G-Trac module and loosely secure with the new locknut.
9. Insert the head of the carriage bolt into the key hole of the G-Trac module mounting bracket.

CAUTION

The anti-rotation pin on G-trac module MUST be engaged with the locator hole before tightening locknut.

The anti-rotation pin ensures the G-trac module remains in proper alignment with the wheelchair base frame.

If the locating pin of the new G-trac module is damaged contact Invacare for replacement.

10. Insert the anti-rotation pin on the back side of the new G-Trac module into the locator hole on the G-Trac module mounting bracket (above the key hole).
11. Torque the locknut to 35 in-lbs \pm 20% to secure the new G-Trac module to the wheelchair base frame.

12. If necessary, connect the seating system wiring harness to the G-Trac module cable.
13. Perform one of the following:
 - Replacing the G-Trac Module Only - Proceed to STEP 14.
 - Replacing the G-Trac Module and Controller - Replace the controller. Refer to Replacing the G-Trac Controller on 3G Storm Series Wheelchairs on page 10.
14. Connect the G-Trac module cable to the controller (Detail "A").
15. Using tie-wraps, secure the G-Trac module cable (and seating system wiring harness) to the wheelchair base frame.
16. Install the controller shroud. Refer to Removing/Installing the Controller Shroud on page 11.
17. Perform the post-inspection checklist. Refer to Post-Service Inspection Checklist on page 16.

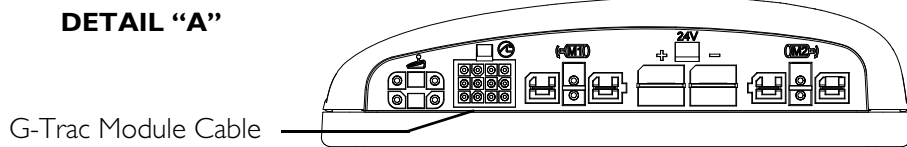
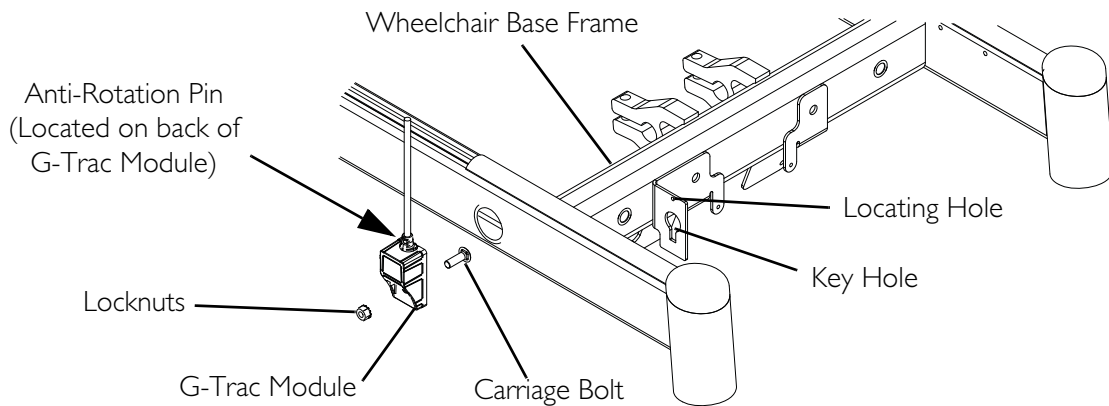


FIGURE 4 Replacing the G-Trac Module on 3G Storm Series Wheelchairs

Replacing the G-Trac Controller on 3G Storm Series Wheelchairs

NOTE: For this procedure, refer to FIGURE 5 on page 11.

1. If necessary, remove the controller shroud. Refer to Removing/Installing the Controller Shroud on page 11.

NOTE: If necessary to remove any tie-wraps from the wheelchair wiring in order to disconnect cables from the controller, take note of position and orientation of tie-wraps before removing. Wiring MUST be secured in the same locations with tie-wraps when installing the new G-Trac controller.

2. Perform one of the following:
 - Replacing the G-Trac Controller Only - Disconnect the G-Trac module cable from the controller. Proceed to STEP 3.
 - Replacing the G-Trac Controller and Module - Perform STEPS 2 - 12 of Replacing the G-Trac Module on 3G Storm Series Wheelchairs on page 8.
3. Disconnect the right and left motors from the controller.
4. Disconnect the joystick cable from the controller.
5. Disconnect the battery cable from the controller.
6. Remove the two mounting screws and lock nuts securing the existing controller to the controller bracket.
7. Remove the existing controller from the controller bracket.
8. Position the new controller onto the controller bracket.
9. Using two mounting screws and locknuts, secure the new controller to the controller bracket.
10. Connect the battery cable to the controller.
11. Connect the joystick cable to the controller.
12. Connect the right and left motors to the controller.
13. Connect the G-Trac module cable to the controller.
14. If necessary, use tie-wraps to secure loose wiring to the wheelchair.
15. Install the controller shroud. Refer to Removing/Installing the Controller Shroud on page 11.
16. Perform the post-inspection checklist. Refer to Post-Service Inspection Checklist on page 16.

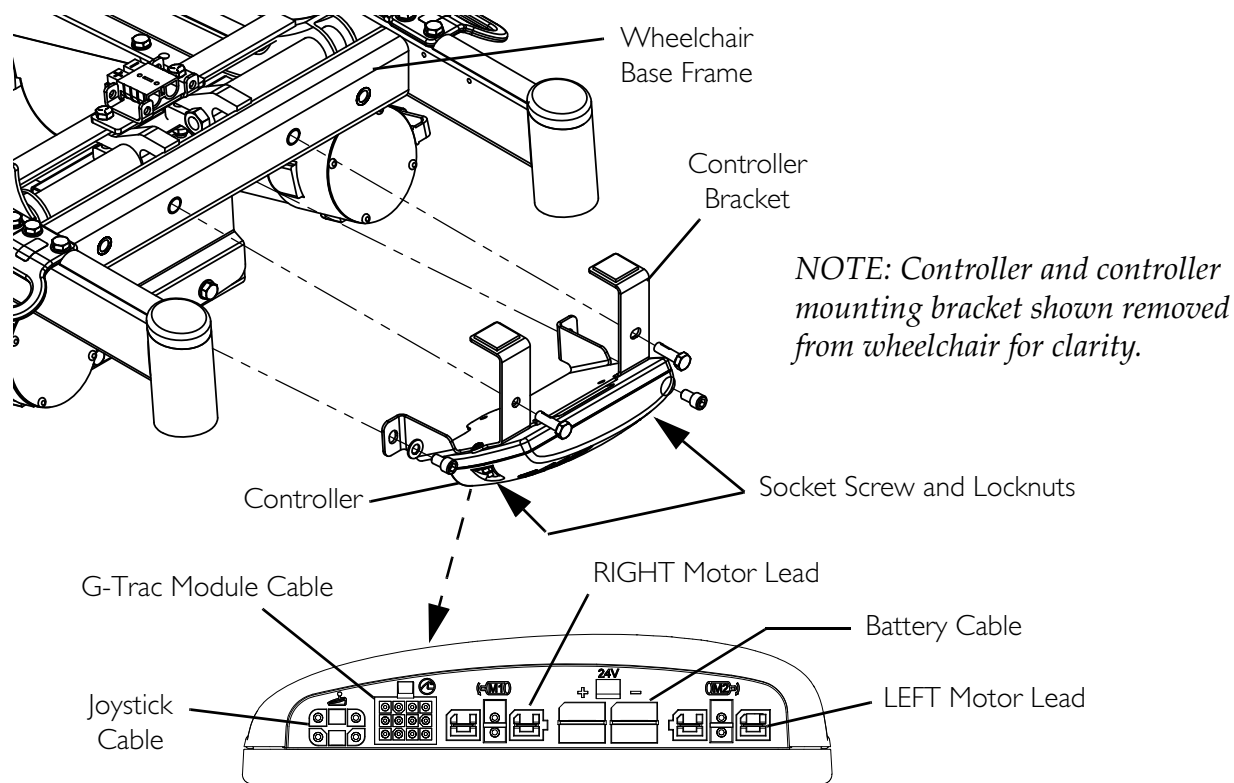


FIGURE 5 Replacing the G-Trac Controller on 3G Storm Series Wheelchairs

Removing/Installing the Controller Shroud

NOTE: For this procedure, refer to FIGURE 6.

NOTE: Reverse this procedure to install the rear shroud.

1. Perform one of the following to remove the controller shroud:
 - Turn the two screws $\frac{1}{4}$ -turn to release the controller shroud from the base frame.
 - Remove the two Phillips screws securing the controller shroud to the base frame.
 - Pull the controller shroud to release the hook and loop fasteners securing the controller shroud to the base frame.
2. Remove the controller shroud from the wheelchair base frame.

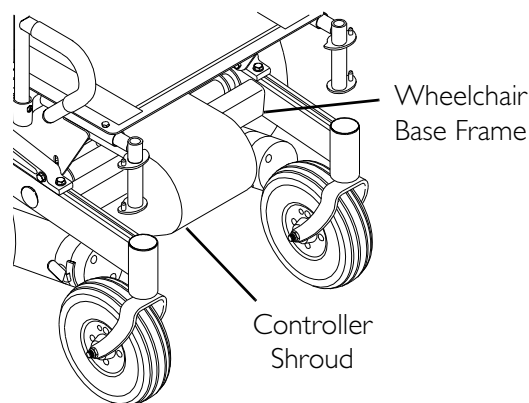


FIGURE 6 Removing/Installing the Controller Shroud

Replacing the G-Trac Module and/or Controller on the Power Tiger

Replacing the G-Trac Module on the Power Tiger

NOTE: For this procedure, refer to FIGURE 8.

NOTE: Take note of position and orientation of tie-wraps before removing. Wiring MUST be secured in the same locations with tie-wraps when installing the new G-Trac module.

1. Cut tie-wraps securing the G-Trac module cable to the wheelchair base frame and or other cables.
2. Disconnect the existing G-Trac module cable from the controller (Detail "A").
3. If necessary, disconnect the seating system wiring harness from the G-Trac module cable.
4. Loosen the locknut and carriage bolt securing the G-Trac module to the left controller mounting bracket.
5. Lift up on the G-Trac module until the carriage bolt slides out of key hole in the left controller mounting bracket.
6. Save the existing G-Trac module for return to Invacare.
7. Insert new carriage bolt through the back of the new G-Trac module and loosely secure with the new locknut.
8. Insert the head of the carriage bolt into the key hole of the left controller mounting bracket.

CAUTION

The anti-rotation pin on G-trac module MUST be engaged with the locator hole before tightening locknut.

The anti-rotation pin ensures the G-trac module remains in proper alignment with the wheelchair base frame.

If the locating pin of the new G-trac module is damaged contact Invacare for replacement.

9. Insert the anti-rotation pin on the back side of the new G-Trac module into the locator hole on the left controller mounting bracket (above the key hole).
10. Torque the locknut to 35 in-lbs \pm 20% to secure the new G-Trac module to the wheelchair base frame.
11. If necessary, connect the seating system wiring harness to the G-Trac module cable.

12. Perform one of the following:

- Replacing the G-Trac Module Only - Proceed to STEP 13.
- Replacing the G-Trac Module and Controller - Replace the controller. Refer to Replacing the G-Trac Controller on the Power Tiger on page 14.

13. Connect the G-Trac module cable to the controller (Detail "A").

14. Using tie-wraps, secure the G-Trac module cable (and seating system wiring harness) to the wheelchair base frame.

15. Perform the post-inspection checklist. Refer to Post-Service Inspection Checklist on page 16.

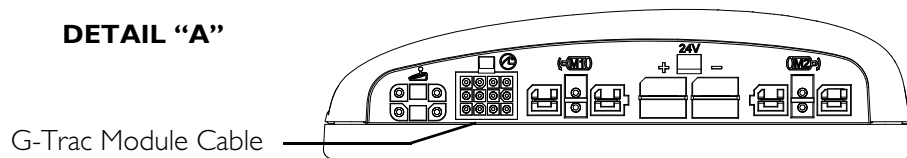
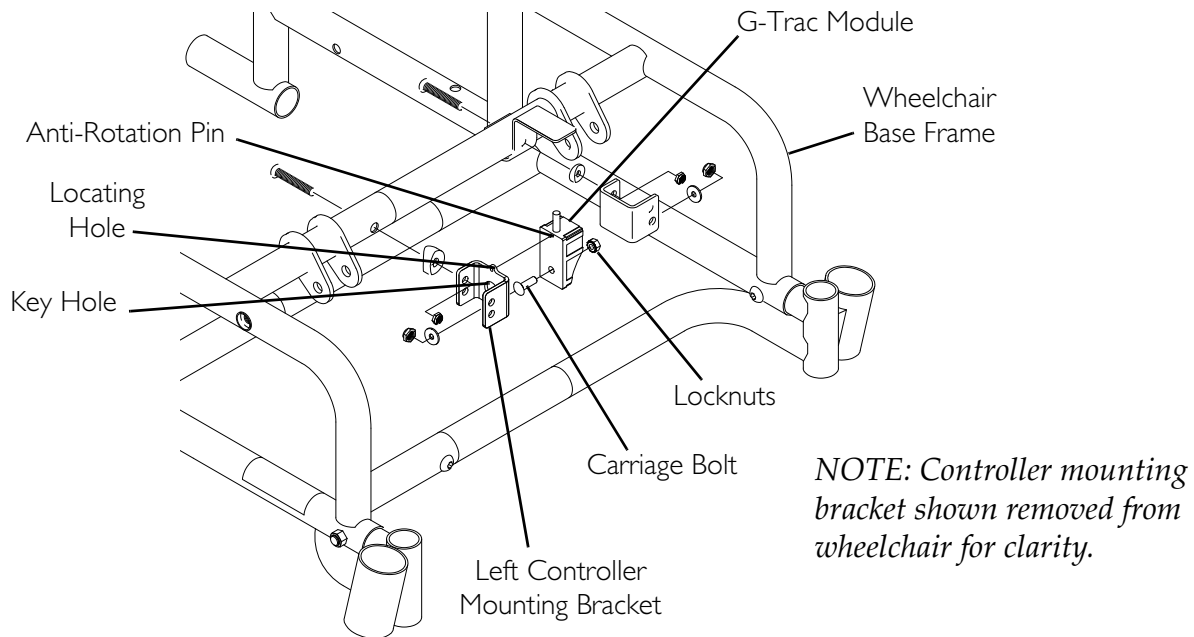


FIGURE 7 Replacing the G-Trac Module on the Power Tiger

Replacing the G-Trac Controller on the Power Tiger

NOTE: For this procedure, refer to FIGURE 8.

NOTE: If necessary to remove any tie-wraps from the wheelchair wiring in order to disconnect cables from the controller, take note of position and orientation of tie-wraps before removing. Wiring MUST be secured in the same locations with tie-wraps when installing the new G-Trac controller.

1. Perform one of the following:
 - Replacing the G-Trac Controller Only - Disconnect the G-Trac module cable from the controller. Proceed to STEP 3.
 - Replacing the G-Trac Controller and Module - Perform STEPS 2- 13 of Replacing the G-Trac Module on the Power Tiger on page 12.
2. Disconnect the right and left motors from the controller.
3. Disconnect the joystick cable from the controller.
4. Disconnect the battery cable from the controller.
5. Remove the two mounting screws, washers and locknuts securing the existing controller to the controller brackets.
6. Remove the existing controller from the controller brackets.
7. Position the new controller onto the controller brackets.
8. Using two mounting screws, washers and locknuts, secure the new controller to the controller brackets.
9. Connect the battery cable to the controller.
10. Connect the joystick cable to the controller.
11. Connect the right and left motors to the controller.
12. Connect the G-Trac module cable to the controller
13. If necessary, use tie-wraps to secure any loose wiring to the wheelchair.
14. Perform the post-inspection checklist. Refer to Post-Service Inspection Checklist on page 16.

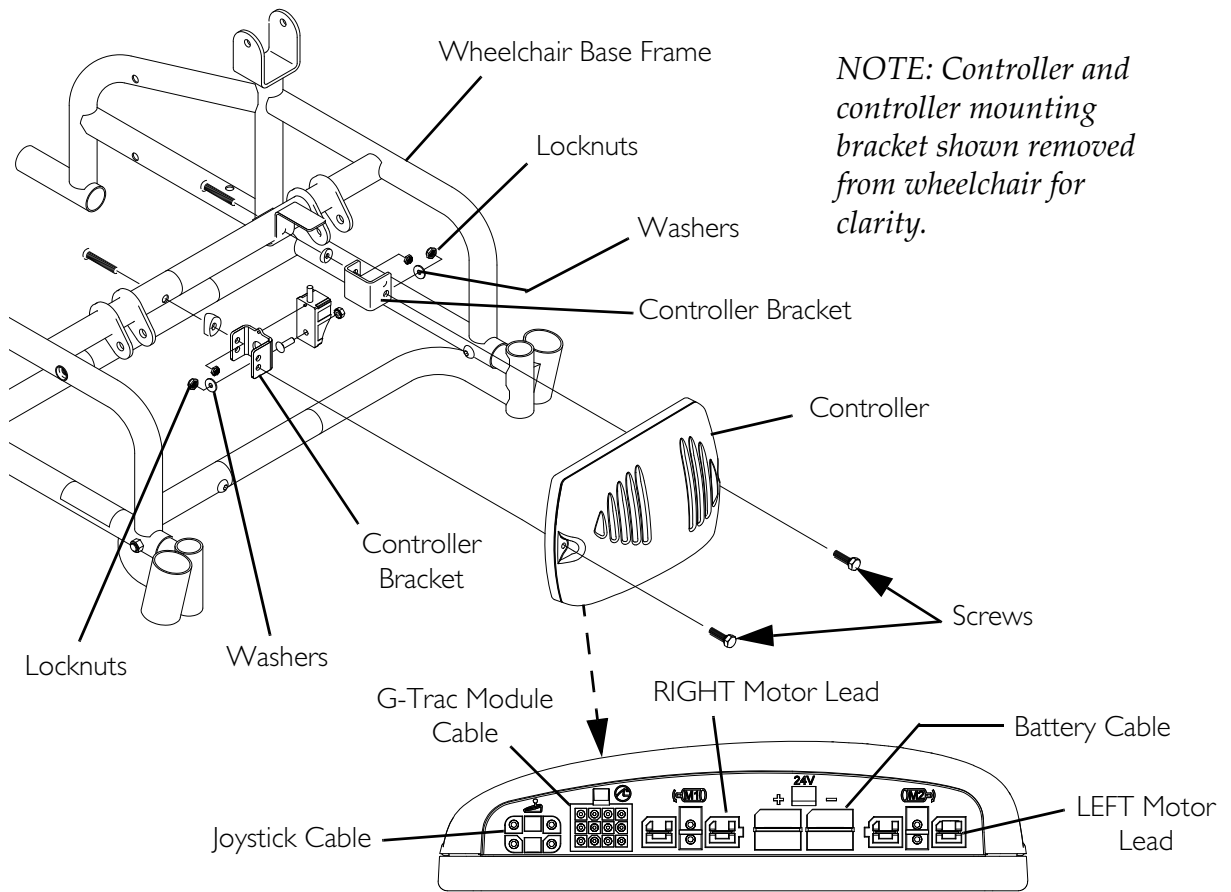


FIGURE 8 Replacing the G-Trac Controller on the Power Tiger

Post-Service Inspection Checklist

⚠ WARNING

ALWAYS test all wheelchair functions after securing the cables to be sure the cables do not get pinched or crushed during operation of the wheelchair.

Follow this checklist after the cables have been secured:

- Verify all attaching hardware is tightened securely.
- Verify all wiring and cables are secured to the wheelchair.
- Using a MK6i™ programmer, display, or MPJ™+ joystick, turn on wheelchair power and ensure G-Trac is on and functioning.
- With the wheelchair unoccupied, test all system functions to verify proper operation.
- Verify charger function.
- Ship the existing G-Trac module and/or controller back to Invacare.



Yes, you can.®

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Part No 1160831

Rev A - 12/08



MK₅TM NXTM Electronics

NX

NX-B

NX-LP

NX-50

NX-75

NX w/ACC

DEALER: Keep this manual. The procedures in this manual **MUST** be performed by a qualified technician.

For more information regarding
Invacare products, parts, and services,
please visit www.invacare.com



Yes, you can.

⚠ WARNING

A QUALIFIED TECHNICIAN MUST PERFORM THE INITIAL SET UP OF THIS WHEELCHAIR. ALSO, A QUALIFIED TECHNICIAN MUST PERFORM ALL PROCEDURES IN THE SERVICE MANUAL.

WHEELCHAIR USERS: DO NOT SERVICE OR OPERATE THIS EQUIPMENT WITHOUT FIRST READING AND UNDERSTANDING (1) THE OWNER'S OPERATOR AND MAINTENANCE MANUAL AND (2) THE SEATING SYSTEM MANUAL (IF APPLICABLE). IF YOU ARE UNABLE TO UNDERSTAND THE WARNINGS, CAUTIONS, AND INSTRUCTIONS, CONTACT INVACARE TECHNICAL SUPPORT BEFORE ATTEMPTING TO SERVICE OR OPERATE THIS EQUIPMENT - OTHERWISE INJURY OR DAMAGE MAY RESULT.

DEALERS AND QUALIFIED TECHNICIANS: DO NOT SERVICE OR OPERATE THIS EQUIPMENT WITHOUT FIRST READING AND UNDERSTANDING (1) THE OWNER'S OPERATOR AND MAINTENANCE MANUAL, (2) THE SERVICE MANUAL (IF APPLICABLE) AND (3) THE SEATING SYSTEM MANUAL (IF APPLICABLE). IF YOU ARE UNABLE TO UNDERSTAND THE WARNINGS, CAUTIONS AND INSTRUCTIONS, CONTACT INVACARE TECHNICAL SUPPORT BEFORE ATTEMPTING TO SERVICE OR OPERATE THIS EQUIPMENT - OTHERWISE, INJURY OR DAMAGE MAY RESULT.

USEFUL TERMS

The following acronyms are used throughout this manual:

ACRONYM	DEFINITION
SPJ	Single Purpose Joystick
CSPJ	Composite Single Purpose Joystick
ACC	Accessory
NX AND NX-50	Non-Expandable
NX-LP	Non-Expandable Limited Programming
NX-B	Non-Expandable with Alternate Standard Program
NX-75	Non-Expandable with 75 Amps
RWD	Rear Wheel Drive
CWD	Center Wheel Drive
DCI	Drive Control Input

NOTE: Updated versions of this manual are available on www.invacare.com.

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SPECIAL NOTES

Signal words are used in this manual and apply to hazards or unsafe practices which could result in personal injury or property damage. Refer to the table below for definitions of the signal words.

SIGNAL WORD	MEANING
DANGER	Danger indicates an imminently hazardous situation which, if not avoided will result in death or serious injury.
WARNING	Warning indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
CAUTION	Caution indicates a potentially hazardous situation which, if not avoided, may result in property damage.

NOTICE

THE INFORMATION CONTAINED IN THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE.

THIS MANUAL PERTAINS TO ONLY MK₅ ELECTRONICS.

⚠ REPAIR OR SERVICE WARNING

Setup of the Electronics Control Unit is to be performed only by a qualified technician. The adjustments of the controller may affect other activities of the wheelchair. Damage to the equipment could occur if improperly set-up or adjusted.

⚠ OPERATION WARNING

Performance adjustments should only be made by professionals of the health care field or persons fully conversant with this process and the driver's capabilities. Incorrect settings could cause injury to the driver, bystanders, damage to the wheelchair and surrounding property. After the wheelchair has been setup, check to make sure that the wheelchair performs to the specifications entered in the setup procedure. If the wheelchair does not perform to specifications, turn the wheelchair off immediately and re-enter setup specifications. Repeat this procedure until the wheelchair performs to specifications.

⚠ WARNING

Invacare products are specifically designed and manufactured for use in conjunction with Invacare accessories. Accessories designed by other manufacturers have not been tested by Invacare and are not recommended for use with Invacare products.

Wheelchairs should be examined during maintenance for signs of corrosion (water exposure, incontinence, etc.). Electrical components damaged by corrosion should be replaced **IMMEDIATELY**.

Wheelchairs that are used by incontinent users and/or are frequently exposed to water may require replacement of electrical components more frequently.

SECTION I—GENERAL GUIDELINES

⚠ WARNING

SECTION I - GENERAL GUIDELINES contains important information for the safe operation and use of this product. **DO NOT** use this product or any available optional equipment without first completely reading and understanding these instructions and any additional instructional material such as **Owner's Manuals, Service Manuals or Instruction Sheets** supplied with this product or optional equipment. If you are unable to understand the **Warnings, Cautions or Instructions**, contact a healthcare professional, dealer or technical personnel before attempting to use this equipment - otherwise, injury or damage may occur.

Controller Settings/Repair or Service

Set-up of the Electronics Control Unit is to be performed only by a qualified technician. The final adjustments of the controller may affect other activities of the wheelchair. Damage to the equipment could occur if improperly set-up or adjusted.

Operation Information

After the wheelchair has been set-up, check to make sure that the wheelchair performs to the specifications entered during the set-up procedure. If the wheelchair does not perform to specifications, turn the wheelchair off immediately and reenter set-up specifications. Repeat this procedure until the wheelchair performs to specifications.

Invacare products are specifically designed and manufactured for use in conjunction with Invacare accessories. Accessories designed by other manufacturers have not been tested by Invacare and are not recommended for use with Invacare products.

DO NOT use the wheelchair if the joystick boot is torn or cracked. If the joystick boot becomes torn or cracked, replace **IMMEDIATELY**.

If the joystick knob is missing, **DO NOT** use the wheelchair. In case of a fall, the exposed stem could cause serious personal injury.

Periodically inspect the joystick and joystick cable for damage. Joystick cable **MUST** be routed and secured properly to ensure that cable does not become entangled and damaged/pinched during normal operation of wheelchair. If the joystick and/or cable is damaged, **DO NOT** use the wheelchair.

If the joystick knob does not return back to the neutral position, **DO NOT** use the wheelchair.

SECTION 2—EMI INFORMATION

⚠ WARNING

CAUTION: IT IS VERY IMPORTANT THAT YOU READ THIS INFORMATION REGARDING THE POSSIBLE EFFECTS OF ELECTROMAGNETIC INTERFERENCE ON YOUR POWERED WHEELCHAIR.

Electromagnetic Interference (EMI) From Radio Wave Sources

Powered wheelchairs and motorized scooters (in this text, both will be referred to as powered wheelchairs) may be susceptible to electromagnetic interference (EMI), which is interfering electromagnetic energy (EM) emitted from sources such as radio stations, TV stations, amateur radio (HAM) transmitters, two way radios, and cellular phones. The interference (from radio wave sources) can cause the powered wheelchair to release its brakes, move by itself, or move in unintended directions. It can also permanently damage the powered wheelchair's control system. The intensity of the interfering EM energy can be measured in volts per meter (V/m). Each powered wheelchair can resist EMI up to a certain intensity. This is called its "immunity level." The higher the immunity level, the greater the protection. At this time, current technology is capable of achieving at least a 20 V/m immunity level, which would provide useful protection from the more common sources of radiated EMI.

There are a number of sources of relatively intense electromagnetic fields in the everyday environment. Some of these sources are obvious and easy to avoid. Others are not apparent and exposure is unavoidable. However, we believe that by following the warnings listed below, your risk to EMI will be minimized.

The sources of radiated EMI can be broadly classified into three types:

- 1) Hand-held Portable transceivers (transmitters-receivers with the antenna mounted directly on the transmitting unit. Examples include: citizens band (CB) radios, "walkie talkie", security, fire and police transceivers, cellular telephones, and other personal communication devices).

NOTE: Some cellular telephones and similar devices transmit signals while they are ON, even when not being used.

- 2) Medium-range mobile transceivers, such as those used in police cars, fire trucks, ambulances and taxis. These usually have the antenna mounted on the outside of the vehicle; and
- 3) Long-range transmitters and transceivers, such as commercial broadcast transmitters (radio and TV broadcast antenna towers) and amateur (HAM) radios.

NOTE: Other types of hand-held devices, such as cordless phones, laptop computers, AM/FM radios, TV sets, CD players, cassette players, and small appliances, such as electric shavers and hair dryers, so far as we know, are not likely to cause EMI problems to your powered wheelchair.

⚠ WARNING

Powered Wheelchair Electromagnetic Interference (EMI)

Because EM energy rapidly becomes more intense as one moves closer to the transmitting antenna (source), the EM fields from hand-held radio wave sources (transceivers) are of special concern. It is possible to unintentionally bring high levels of EM energy very close to the powered wheelchair's control system while using these devices. This can affect powered wheelchair movement and braking. Therefore, the warnings listed below are recommended to prevent possible interference with the control system of the powered wheelchair.

Electromagnetic interference (EMI) from sources such as radio and TV stations, amateur radio (HAM) transmitters, two-way radios, and cellular phones can affect powered wheelchairs and motorized scooters.

FOLLOWING THE WARNINGS LISTED BELOW SHOULD REDUCE THE CHANCE OF UNINTENDED BRAKE RELEASE OR POWERED WHEELCHAIR MOVEMENT WHICH COULD RESULT IN SERIOUS INJURY.

- 1) Do not operate hand-held transceivers (transmitters receivers), such as citizens band (CB) radios, or turn ON personal communication devices, such as cellular phones, while the powered wheelchair is turned ON;
- 2) Be aware of nearby transmitters, such as radio or TV stations, and try to avoid coming close to them;
- 3) If unintended movement or brake release occurs, turn the powered wheelchair OFF as soon as it is safe;
- 4) Be aware that adding accessories or components, or modifying the powered wheelchair, may make it more susceptible to EMI (NOTE: There is no easy way to evaluate their effect on the overall immunity of the powered wheelchair); and
- 5) Report all incidents of unintended movement or brake release to the powered wheelchair manufacturer, and note whether there is a source of EMI nearby.

Important Information

- 1) 20 volts per meter (V/m) is a generally achievable and useful immunity level against EMI (as of May 1994) (the higher the level, the greater the protection).
- 2) This device has been tested to a radiated immunity level of 20 volts per meter.
- 3) The immunity level of the product is unknown.

Modification of any kind to the electronics of this wheelchair as manufactured by Invacare may adversely affect the EMI immunity levels.

SECTION 3—TROUBLESHOOTING

All Power Wheelchairs

SYMPTOM	PROBABLE CAUSE	SOLUTIONS
Error Code E03 or E04, 3 or 4 flashes of joystick LEDs.	Motor lock levers disengaged.	Engage motor lock levers. Refer to the wheelchair Owner's Manual for more information.
	Bad motor connection.	Check all motor connections.
		Ohm out motors. Check brushes and replace if necessary. Replace motors if high reading is present. Normal reading is 0.2-5 Ohms (4 Pole motors) or 0.5-5 Ohms (2 Pole motors). Refer to wheelchair Service Manual.
Bad brake coil	Ohm out brake connection. Normal reading is 40-80 Ohms.	
Error Code E02, 2 flashes of joystick LEDs.	Batteries need to be charged.	Charge batteries. Refer to the wheelchair Owner's Manual for charging instructions.
Joystick erratic or does not respond as desired.	Damaged motor coupling.	Contact Dealer/Invacare for Service.
	Electrical malfunction.	Contact Dealer/Invacare for Service.
	Controller programmed improperly.	Contact Dealer/Invacare to have controller reprogrammed.
Wheelchair veers to the left or right when driving on level surface.	Joystick needs to be calibrated.	Calibrate joystick with programmer. If this does not work, replace joystick. Refer to <u>Joystick Throw</u> on page 33 for calibration information.
No LED's on joystick.	Joystick connection to controller unplugged or damaged.	Check all joystick connections. Refer to wheelchair Owner's Manual. If damage is found, replace joystick.
Corroded wiring or connections.	Possible water, salt, or urine damage.	Replace wiring harness. Refer to wheelchair Owner's Manual.
Wheelchair does not respond to commands.	Poor battery terminal connection.	Have clean terminals. Refer to wheelchair Owner's Manual.
	Bad joystick connection.	Check all joystick connections. Refer to wheelchair Owner's Manual.
	Bad wiring harness connection or blown fuse.	Replace wiring harness. Refer to wheelchair Owner's Manual.
	Battery charger connected to joystick.	Unplug battery charger.
Power indicator off - even after recharging.	Electrical malfunction.	Contact Invacare.

Wheelchairs With Elevate Systems

SYMPTOM	PROBABLE CAUSE	SOLUTIONS
Seating system not functioning or working intermittently.	Low batteries.	Charge batteries. Refer to the seating system Owner's Manual.
	Faulty electrical connection.	Check all connections.
	Blown fuse.	Replace wiring harness. Refer to the seating system Owner's Manual.
	Seat has been driven under a heavy load for an extended period of time.	Allow time for the electronics to cool down (Light Duty Use). Leave power on, and do not activate powered seating functions for at least 3 minutes.
	Open Motor connection/ Motor locks disengaged.	Check all motor connectors.
Make sure motor locks are engaged.		
Wheelchair slows while driving.	Elevating seat is elevated. The elevating seat is equipped with a speed reduction safety mechanism. While the seat is in an elevated position, the safety feature slows the speed of the wheelchair by 80%.	Return the seat to its lowest position. Refer to the seating system Owner's Manual.
Wheelchair drives at full speed when seat is elevated.	Faulty electrical connection.	Check all connectors.
	Malfunctioning seating system controller.	Check for error codes. Refer to <u>Performance Adjustments</u> on page 19 for the correct performance adjustment menu descriptions. Replace seating system controller, if necessary. Contact Invacare.

SECTION 4—JOYSTICK DESCRIPTIONS

SPJ™ and CSPJ™ Joystick Switches and Indicators

NOTE: For the following information, refer to FIGURE 4.1.

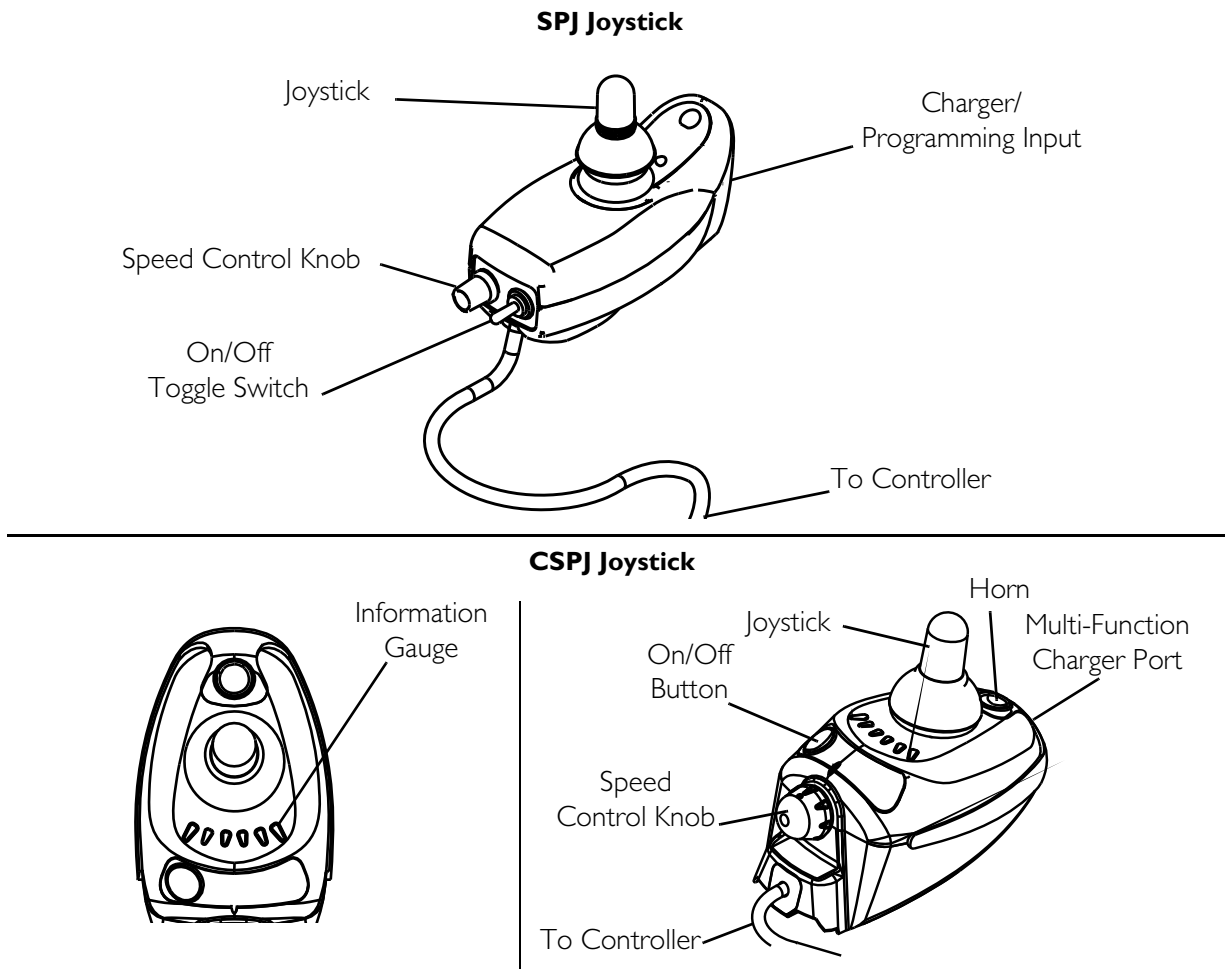


FIGURE 4.1 SPJ™ and CSPJ™ Joystick Switches and Indicators

On/Off Switch

SPJ Joysticks

This toggle switch is located at the rear of the joystick housing.

CSPJ Joysticks

This button is located on top of the joystick housing at the rear of the joystick.

Speed Control Knob

The speed control knob is located on the back of the joystick housing. This rotary switch is used for controlling the speed and acceleration of the wheelchair.

1. Turn the switch clockwise to increase the speed of the wheelchair.
2. Turn the switch counterclockwise to decrease the speed of the wheelchair.

Joystick

The joystick has proportional drive control, meaning that further the joystick is pushed from the upright (neutral) position, the faster the wheelchair moves. Your top speed, however, is limited by the setting of the speed-control knob and programmed settings.

To slow the wheelchair to a stop, simply release the joystick. The wheelchair has automatic speed and direction compensation to minimize corrections.

Charger/Programming Input

Located at the front of the joystick housing. This provides easy access for charging the wheelchair batteries. This port also serves as the Remote Programmer Communication connection.

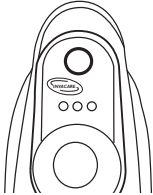
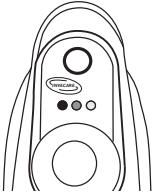
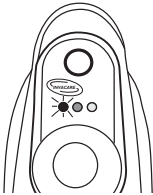
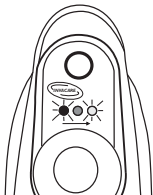
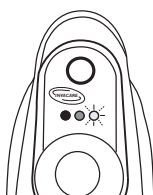
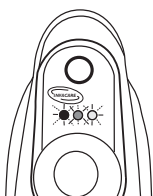
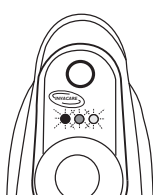
Information Gauge Display

The Information Gauge Display is located on the front of the joystick housing. It provides the following information to the user on the status of the wheelchair -








1. Power is on.
2. True state-of-battery-charge, including notification of when the battery requires charging:
 - A. GREEN LED is lit, indicating well charged batteries.
 - B. Only AMBER LEDs are lit, indicating batteries are moderately charged. Recharge batteries before taking a long trip.
 - C. Only RED LED is lit, indicating batteries are running out of charge. Recharge batteries as soon as possible.
3. Program, inhibit or charge modes.
4. Fault indication (Flash Codes).

The Information Gauge display also serves as a system diagnostic device when a fault is detected by the control module. A specific number of flashes of the LEDs indicate the type of fault detected. Refer to the following table of the diagnostic indications of the wheelchair status.

SPJ Diagnostic Indications of Wheelchair Status

DISPLAY	DESCRIPTION	DEFINITION	COMMENTS
	All three LEDs are off.	Power is Off.	
	All three LEDs are on.	Power is On.	Fewer than three LEDs on implies reduced battery charge.
	RED LED is flashing.	Battery charge is low.	The batteries should be charged as soon as possible.
	Left to Right “chase” alternating with steady display.	Joystick is in programming, inhibit and/or charging mode.	The steady LEDs indicate the current state of the battery charge.
	GREEN LED is flashing.	Joystick is in Speed Limit mode.	The current state of battery charge will be displayed at the same time.
	All LEDs are flashing slowly.	Joystick has detected Out-of-Neutral-at-Power-Up mode.	Release the joystick back to Neutral.
	All LEDs are flashing quickly.	Joystick has detected a fault.	Joystick uses Flash codes to indicate faults.

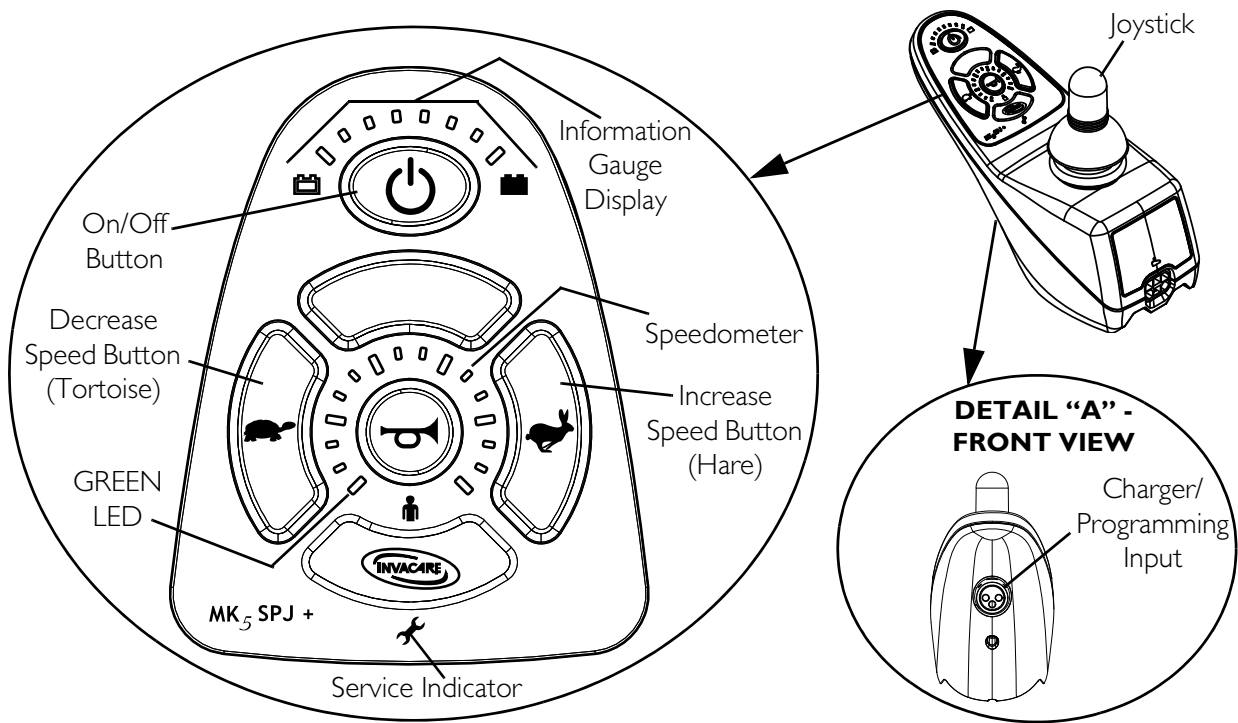
CSPJ Diagnostic Indications of Wheelchair Status

DISPLAY	DESCRIPTION	DEFINITION	COMMENTS
	All LEDs are off.	Power is Off.	
	All LEDs are on.	Power is On.	Fewer than three LEDs on implies reduced battery charge.
	Left RED LED is flashing.	Battery charge is low.	The batteries should be charged as soon as possible.
	Left to Right “chase” alternating with steady display.	Joystick is in programming, inhibit and/or charging mode.	The steady LEDs indicate the current state of the battery charge.
	Right GREEN LED is flashing.	Joystick is in Speed Limit mode.	The current state of battery charge will be displayed at the same time.
	All LEDs are flashing slowly.	Joystick has detected Out-of-Neutral-at-Power-Up mode.	Release the joystick back to Neutral.
	All LEDs are flashing quickly.	Joystick has detected a fault.	Joystick uses Flash codes to indicate faults. Refer to the electronics manual (Part Number 1110532).

SPJ+ and SPJ+ w/ACC Joystick Switches and Indicators

NOTE: For this procedure, refer to FIGURE 4.2.

SPJ+ Joystick



SPJ+ w/ACC Joystick

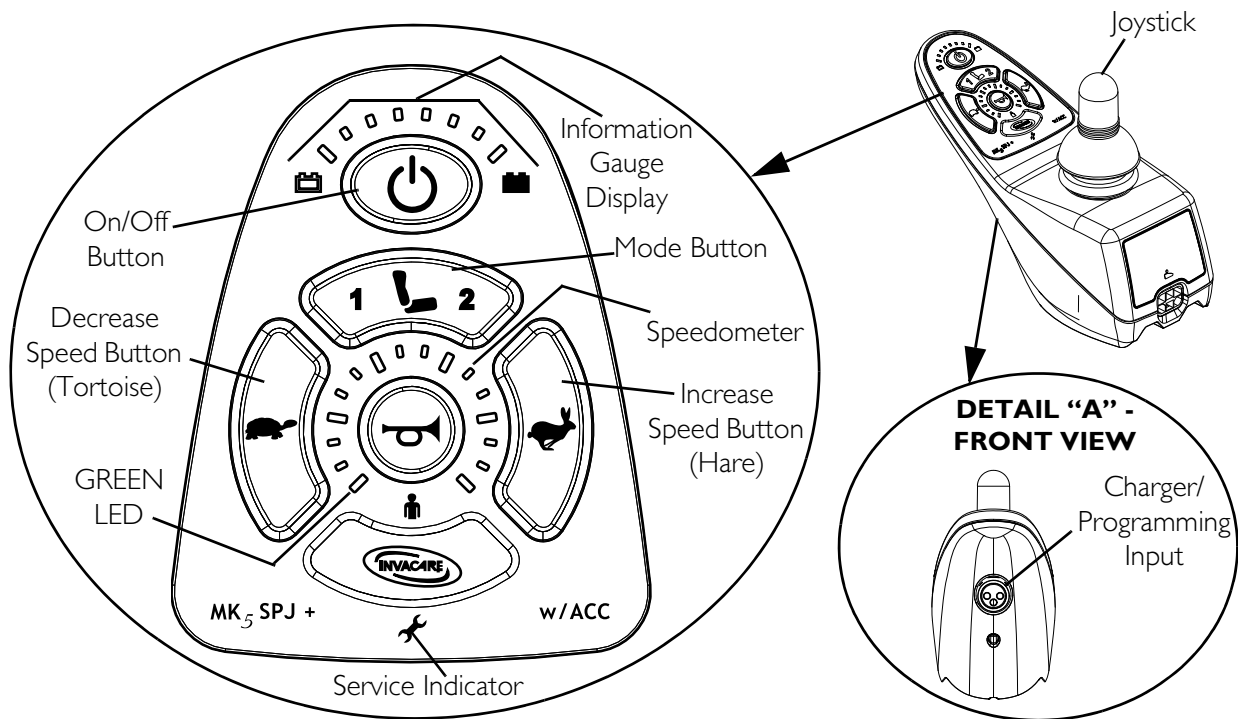


FIGURE 4.2 SPJ+ and SPJ+ w/ACC Joystick Switches and Indicators



On/Off Button









This button is located at the front of the joystick housing. It is used to turn the wheelchair on and off, to remove the joystick from sleep mode (if programmed) and to lock or unlock the joystick (if programmed).

Speedometer

The speedometer is used to show the maximum speed. The right-most LED indicates current maximum speed setting. The bottom left GREEN LED flashes to indicate that the joystick is in speed limit mode. Speed limit mode limits the drive speed to a pre-programmed value, typically when the seat has been elevated and the wheelchair is required to drive at 20% speed.

Speed Control Buttons

The speed control buttons (tortoise button () and hare button () are used to set and adjust the maximum speed.

1. To adjust the speed, perform one of the following:
 - Adjust Speed in 20% Increments (5 Speed Mode) - Press the tortoise button () or hare button () to decrease/increase the speed in 20% increments. The larger bars in the speedometer will light.
 - Adjust Speed in Smaller Increments (VSP Mode) - Perform the following steps:
 - i. Press and hold both the tortoise button () and hare button () until the joystick beeps.
 - ii. Perform one of the following:
 - Press the tortoise button () or hare button () to decrease/increase the speed in 20% increments. The larger bars in the speedometer will light.
 - Press and hold the tortoise button () or hare button () to decrease/increase the speed in smaller increments. The smaller bars in the speedometer will light.

Mode Button

NOTE: The mode button is present on the SPJ+ w/ACC joystick only.

Press the mode button to switch from driving mode to elevate mode. Refer to the wheelchair owner's manual for elevating seat operating instructions.

Joystick

The joystick has proportional drive control, meaning that further the joystick is pushed from the upright (neutral) position, the faster the wheelchair or seat moves. Your top speed, however, is limited by the programmed settings.

To slow the wheelchair to a stop, simply release the joystick. The wheelchair has automatic speed and direction compensation to minimize corrections.

Charger/Programming Input

The charger/programming input is located at the front of the joystick housing. This provides easy access for charging the wheelchair batteries. This port also serves as the Remote Programmer Communication connection. Driving is prevented while the system is charging.

Service Indicator

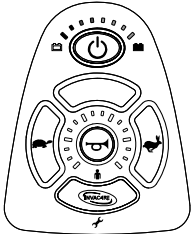
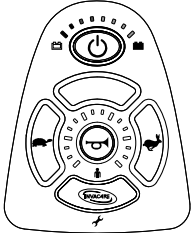
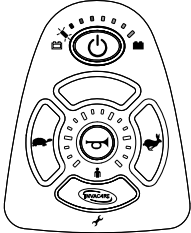
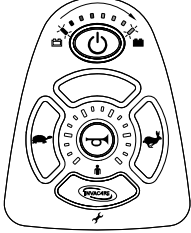
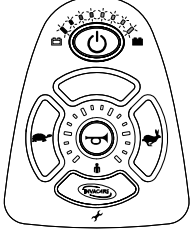
The AMBER service indicator will light when an error or fault occurs. Refer to [Diagnostic Codes](#) on page 34 for a listing of the flash codes and what they indicate.

Information Gauge Display

Located on the front of the joystick housing, it provides the following information to the user on the status of the wheelchair -

1. Power is on.
2. True state-of-battery-charge, including notification of when the battery requires charging:
 - A. GREEN LEDs are lit, indicating well charged batteries.
 - B. AMBER LEDs are lit, indicating batteries are moderately charged. Recharge batteries before taking a long trip.
 - C. RED LEDs are lit, indicating batteries are running out of charge. Recharge batteries as soon as possible.

The Information Gauge display also serves as a system diagnostic device when a fault is detected by the control module. A specific number of flashes of the LEDs indicate the type of fault detected. Refer to the table for the diagnostic indications of the wheelchair status.



INFORMATION GAUGE DISPLAY	DESCRIPTION	DEFINITION	COMMENTS
	All LEDs are off.	Power is off.	
	All LEDs are on.	Power is on.	Fewer than three LEDs on implies reduced battery charge.
	Left RED LED is flashing.	Battery charge is low.	The batteries should be charged as soon as possible.
	Left to Right “chase” alternating with steady display.	Joystick is in programming, inhibit and/or charging mode.	The steady LEDs indicate the current state of the battery charge.
	All LEDs are flashing slowly.	Joystick has detected Out-of-Neutral-at-Power-Up mode.	Release the joystick back to Neutral.

SECTION 5—PERFORMANCE ADJUSTMENTS

Main Menu

NOTE: For this procedure, refer to FIGURE 5.1.

The first display screen shown after powering on the Remote Programmer is the Main Menu.

The main menu consists of the following options: **Performance Adjust**, **Programs**, **Other**. The arrow to the left is the selection pointer. It can be moved up or down the main menu by pressing the up  or down  key.

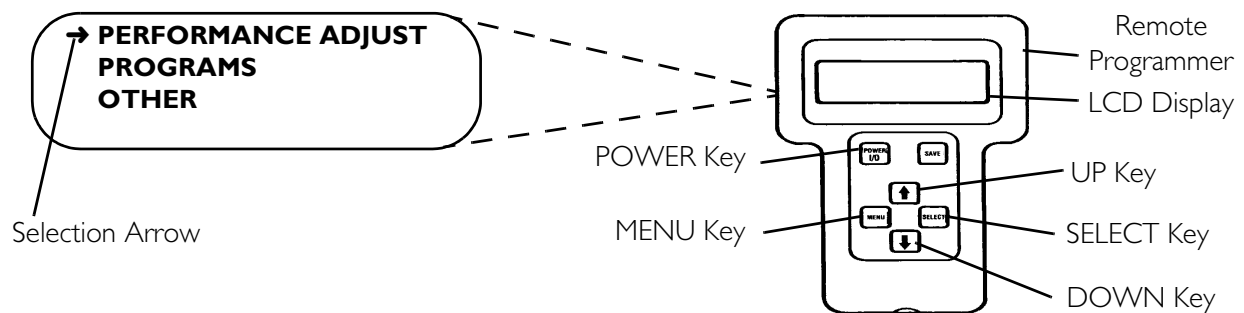


FIGURE 5.1 Main Menu

Performance Adjust Menu

NX, NX-50, NX-75, NX w/ACC, and NX-B

NOTE: For this procedure, refer to FIGURE 5.2.

The Performance Adjust Menu for NX, NX-75, NX w/ACC and NX-B consists of the following:

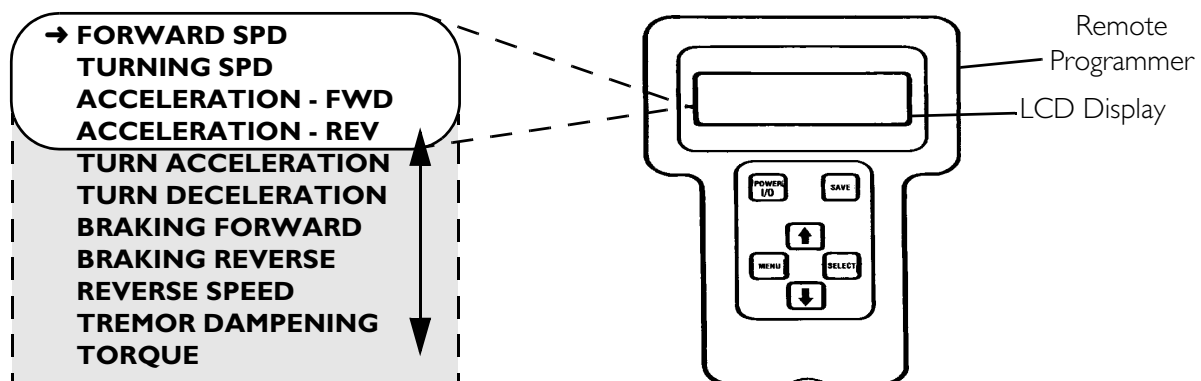


FIGURE 5.2 Performance Adjust Menu - NX, NX-50, NX-75, NX w/ACC, and NX-B

NX-LP

NOTE: For this procedure, refer to FIGURE 5.3.

The Performance Adjust Menu for NX-LP consists of the following:

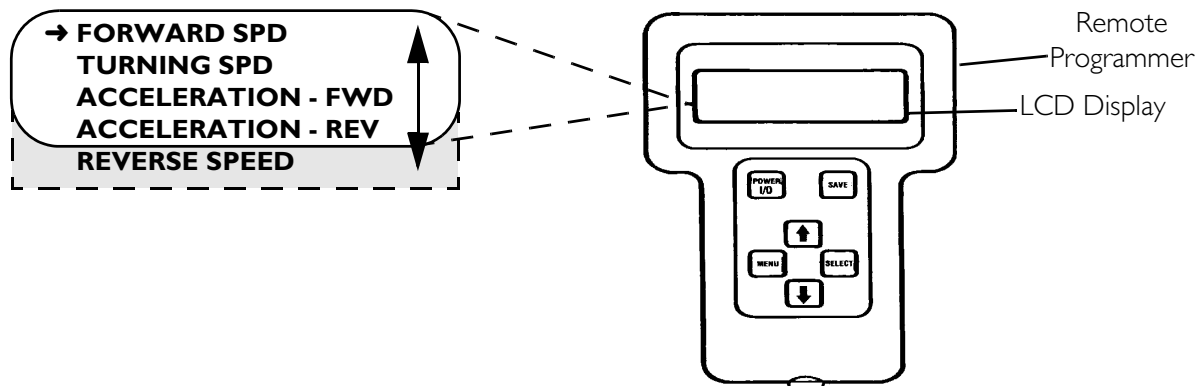


FIGURE 5.3 Performance Adjust Menu - NX-LP

Making Performance Adjustments

⚠ WARNING

DO NOT mismatch a program with the wheelchair type (i.e. selecting a rear wheel drive program for a center wheel drive wheelchair or vice versa). Adverse joystick control of the wheelchair will occur, possibly resulting in serious bodily injury.

NOTE: If unsure if correct program is selected, perform the instructions outlined in [Programs](#) on page 29 before making performance adjustments.

The selection arrow points to PERFORMANCE ADJUST. To select this activity press the SELECT key.



→ PERFORMANCE ADJUST
PROGRAMS
OTHER

The display screen will change to show the first four performance functions and the programmed value for the functions. The selection arrow points to the first function - Forward Speed. Pressing the **↑** or **↓** key will move the selection arrow up or down. Continue pressing the **↑** or **↓** key to cycle through all the options listed in the flowchart in [NX](#), [NX-50](#), [NX-75](#), [NX w/ACC](#), and [NX-B Controller](#) on page 22 or [NX-LP Controller](#) on page 24.



→ FORWARD SPEED
TURNING SPEED
ACCELERATION - FWD
ACCELERATION - REV

To change the programmed value for an option (i.e. Acceleration - FWD), press the  key so the selection arrow points to Acceleration - FWD.

FORWARD SPEED
TURNING SPEED
→ ACCELERATION - FWD
ACCELERATION - REV

Press the SELECT key. The display screen changes to the adjustment screen. The top line shows the function. The second line shows the value. At the bottom is a bar graph which shows the relative position of the current value to the total adjustment range. Pressing the  or  key will adjust the value.

ACCELERATION - FWD
35%
 [■■■■■]

Pressing the  key causes the value to increase and the bar graph to move to the right. Pressing the  key causes the value to decrease and the bar graph to move to the left.

ACCELERATION - FWD
70%
 [■■■■■■]

To save this change, press the SAVE key.

When saving to the drive program is complete, the screen will change to display:

CHANGES SAVED TO
***RWD - 2 POLE**
CONTINUE? PRESS MENU
QUIT? PRESS POWER

**NOTE: The driving program selected is either RWD-2 Pole, RWD - 4 Pole, or CWD 2 - Pole. Refer to the flow chart in [NX](#), [NX-50](#), [NX-75](#), [NX w/ACC](#), and [NX-B Controller](#) on page 22 or [NX-LP Controller](#) on page 24.*

Pressing the MENU key allows the adjustment sequence to be repeated for other driving programs.

NX, NX-50, NX-75, NX w/ACC, and NX-B Controller

Flowchart

NOTE: For this procedure, refer to FIGURE 5.4.

Below is a flowchart on how to use a hand held programmer to select and modify functions.

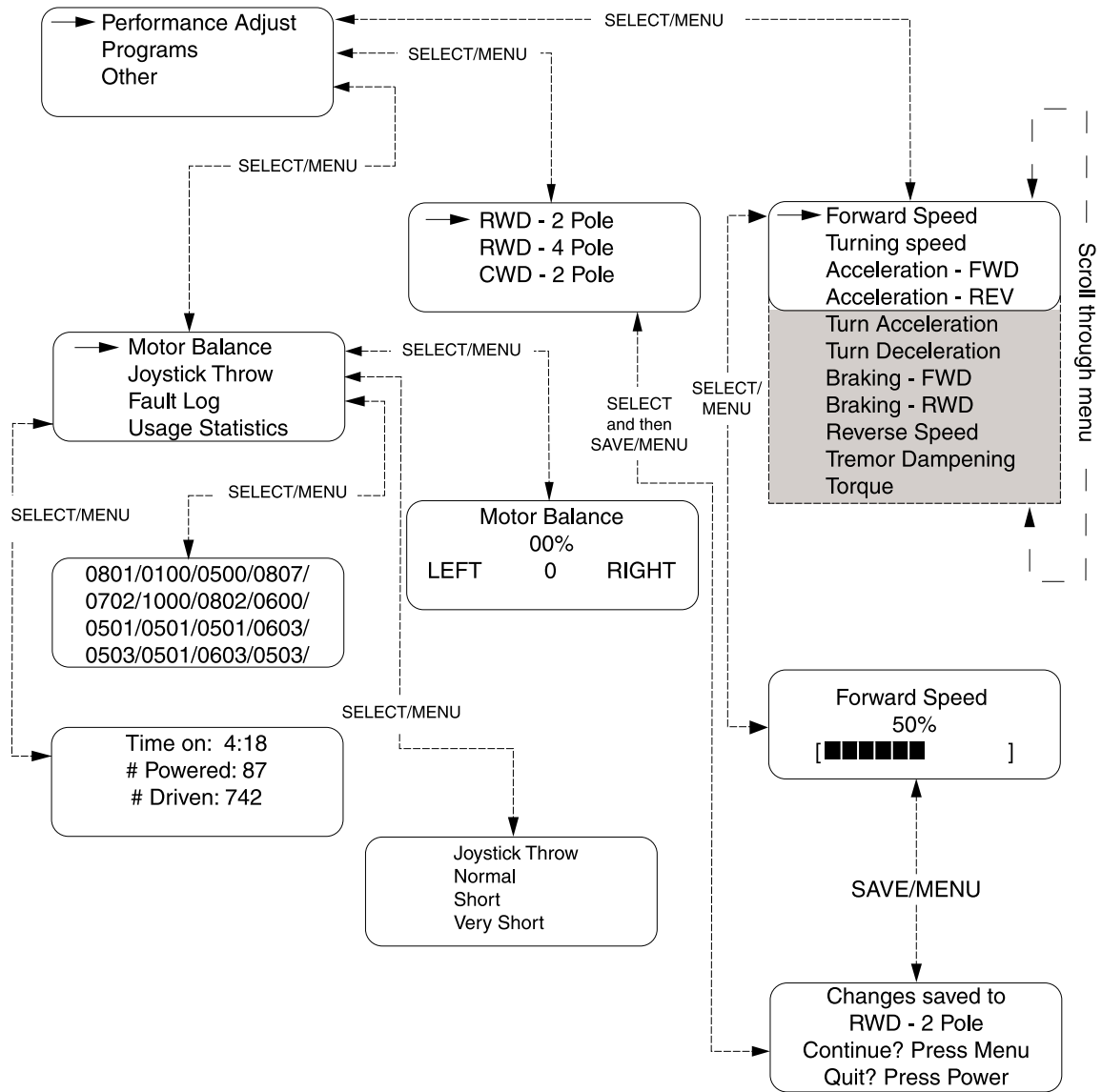






FIGURE 5.4 NX, NX-50, NX-75, NX w/ACC, and NX-B Controller

Performance Menu Description

The performance adjustment menu items are listed below with a description of each function.

MENU ITEM	DESCRIPTION
FORWARD SPEED	Sets the maximum forward speed. The fastest speed setting is 100%. Use the  and  keys to change the value.
TURNING SPEED	Sets the TURNING SPEED as a percentage of the maximum forward speed. The turning speed is independent of the forward speed setting so that the turning speed can be greater than the forward speed. The fastest turning speed setting is 60%. Use the  and  keys to change the value.
ACCELERATION - FWD	ACCELERATION - FWD sets how quickly the controller will accelerate when the joystick is moved forward from neutral.
ACCELERATION - REV	ACCELERATION - REV sets how quickly the controller will accelerate when the joystick is moved to the rear from neutral.
TURN ACCELERATION	TURN ACCELERATION sets how quickly the controller will accelerate when the joystick is moved to the left or right from neutral.
TURN DECELERATION	TURN DECELERATION sets how quickly the controller will decelerate when the joystick is moved to the left or right from neutral.
BRAKING FORWARD	BRAKING FORWARD sets how quickly the controller will decelerate when the joystick is moved toward neutral from a forward position.
BRAKING REVERSE	BRAKING REVERSE sets how quickly the controller will decelerate when the joystick is moved toward neutral from a reverse position.
REVERSE SPEED	The maximum speed the controller will drive with the joystick full reverse and the speed pot fully clockwise.
TREMOR DAMPENING	As the wheelchair approaches a required speed (determined by joystick position) acceleration/deceleration will reduce. A higher value will soften the transition from acceleration/deceleration to that speed.
TORQUE	This parameter allows the controller to compensate appropriately for adverse driving conditions, for example when going over curbs and ramps. It is the parameter that optimizes the driving performance of the controller to the motors being used by setting a specific motor resistance. The controller will not control the wheelchair correctly unless this is carefully set.

NX-LP Controller

Flowchart

NOTE: For this procedure, refer to FIGURE 5.5.

Below is a flowchart on how to use a hand held programmer to select and modify functions.

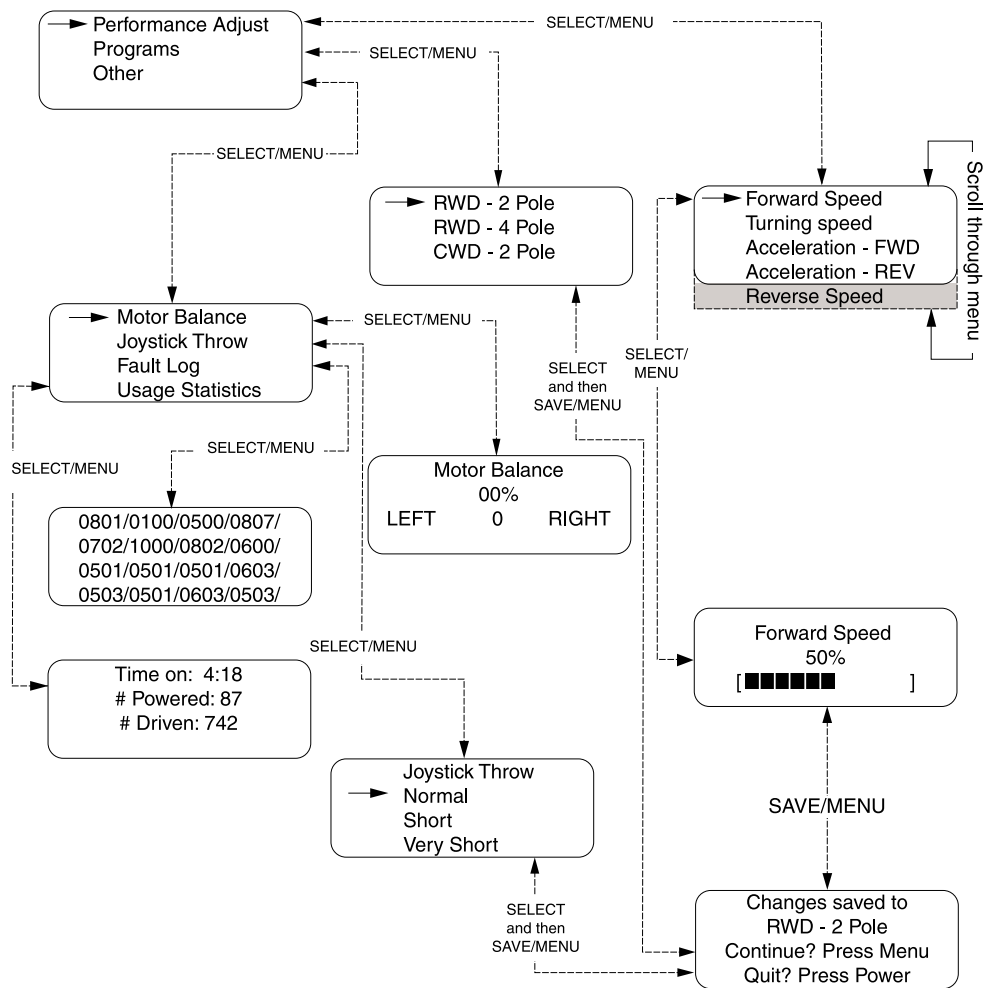






FIGURE 5.5 NX-LP Controller

Performance Menu Description

The performance adjustment menu items are listed below with a description of each function.

MENU ITEM	DESCRIPTION
FORWARD SPEED	Sets the maximum forward speed. The fastest speed setting is 100%. Use the  and  keys to change the value.
TURNING SPEED	Sets the TURNING SPEED as a percentage of the maximum forward speed. The turning speed is independent of the forward speed setting so that the turning speed can be greater than the forward speed. The fastest turning speed setting is 60%. Use the  and  keys to change the value.
ACCELERATION - FWD	ACCELERATION - FWD sets how quickly the controller will accelerate when the joystick is moved forward from neutral.
ACCELERATION - REV	ACCELERATION - REV sets how quickly the controller will accelerate when the joystick is moved to the rear from neutral.
REVERSE SPEED	The maximum speed the controller will drive with the joystick full reverse and the speed pot fully clockwise.

SECTION 6—REMOTE PROGRAMMER

Overview

NOTE: For this procedure, refer to FIGURE 6.1.

The Remote Programmer is the information center of the control module. Through simple key sequences, the Remote Programmer allows modification of the performance characteristics, gives diagnostics information for troubleshooting and permits calibration of the control module.

NOTE: The joystick power switch must be on for the programmer to operate. If the programmer displays “Communication Error”, disconnect the programmer and reconnect it with the joystick turned on.

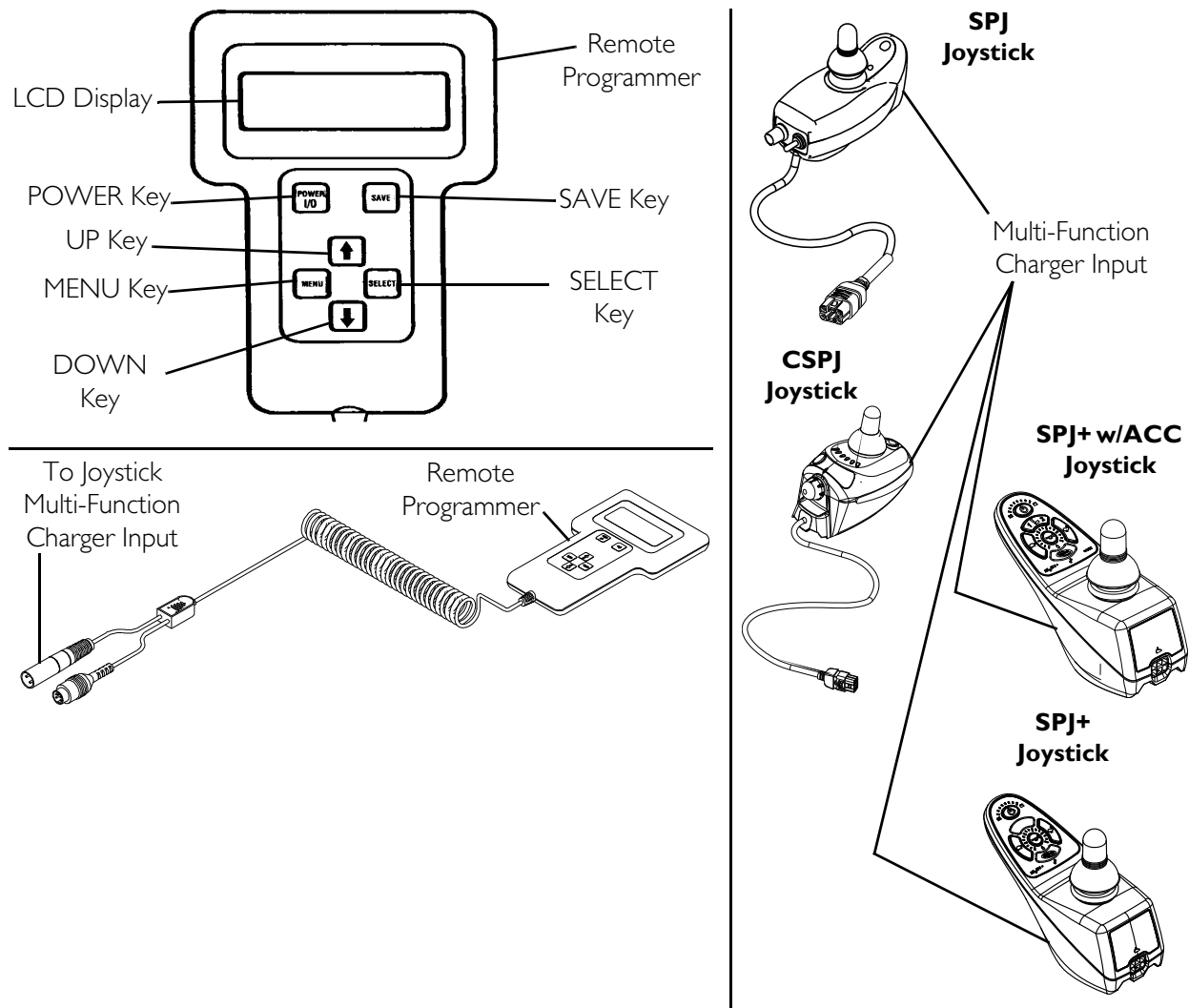


FIGURE 6.1 Overview

Remote Programmer Terminology

Function

A function is a performance characteristic which can be adjusted or modified to improve the operation of the wheelchair for a particular control need. Two examples are:

The forward speed function may be adjusted to a higher or lower speed the same way as you would adjust a trimpot in other controls.

Stand-by Mode Function may be turned ON or OFF the same as a switch would be used. All functions are listed in a menu.

Value

Each function has a value. It is the degree or amount of the function which is used to influence the overall wheelchair performance. Most values are numerical or in percentages, for instance - high speed may be set to 75% of the wheelchair's maximum. For others, the value is either ON or OFF, for example - Stand-by Mode. Changing a value is called Adjustment.

Program (Preset Programs with Standard Value Settings)

The standard programs are fixed function values which are used as an initial set up point from which individualization of the wheelchair performance can begin. Standard values are NEVER altered or modified. Refer to [Programs](#) on page 29.



Temporary Memory

This is the location where function values may be altered to suit individual needs by using the remote programmer. Unless saved, changes to the values in the temporary memory will be erased when the wheelchair power is turned off. Refer to [User Memory Values](#) below.

User Memory Values

User memory is the location where the individualized function values are permanently stored. Each time the power switch is turned on, these values are copied to the temporary memory and are used to control the wheelchair performance. The user memory values can only be changed through the Remote Programmer by first modifying the temporary memory values and then by saving them in the user memory where they become the user program. The Remote Programmer is activated by pressing the POWER key when the wheelchair is in neutral. The wheelchair cannot be driven when the LCD display is illuminated. The display will automatically turn itself OFF after 45 seconds if no keys are pressed. It can also be turned OFF by pressing the POWER key.

Description Of Remote Programmer Keys

KEY	DESCRIPTION
POWER KEY	The POWER key turns on and off the LCD display. Press the POWER key once and the display will come ON. Press the POWER key again and the display will turn OFF.
MENU KEY	The MENU key returns the LCD display to the previous screen. If a function is being adjusted, pressing the MENU key returns the display to the Performance Menu. Pressing the key again will cause the display to change to the Main Menu.
UP  AND DOWN  KEYS	These keys are used to move the selection arrow on the LCD up and down or adjust a value up or down. An adjusted value is not saved unless the SAVE key is pressed.
SELECT KEY	The SELECT key chooses the item to which the selection arrow on the LCD is pointing and displays the appropriate next screen.
SAVE KEY	The SAVE key causes the Save screen to appear or causes the values that have been modified in temporary memory to be permanently stored in the driving program specified by the selection arrow.

SECTION 7—PROGRAMS

Program Settings

⚠ WARNING

DO NOT mismatch a program with the wheelchair type (i.e. selecting a rear wheel drive program for a center wheel drive wheelchair or vice versa). Confirm that the settings and program match the wheelchair before selecting or saving. Otherwise, unintended and unsafe joystick control of the wheelchair will occur, possibly resulting in serious bodily injury.

The program settings are available as a reference point for initial set-up of the wheelchair, for final user setting or whenever major changes have been made in the performance and a known starting point needs to be reestablished. Confirm that the settings and program match the wheelchair before selecting or saving.

Three programs are available.

1. Select PROGRAMS from the main menu to display the standard value menu.
2. Press **↑** or **↓** and then the SELECT key to select the standard program to be placed in the temporary memory.
3. Press the SAVE key to store the program into a selected drive.
4. Make changes to specific functions as needed.

The general capabilities of the standard programs are listed below:

PROGRAMMER READS	DRIVE TYPE	MOTOR TYPE
RWD	Rear Wheel Drive	2-Pole
RWD	Rear Wheel Drive	4-Pole
ATM	Rear Wheel Drive	2-Pole
CWD	Center Wheel Drive	2-Pole
MWD	Center Wheel Drive	2-Pole

NOTE: If the default settings in the following tables are not desired, they will need to be changed manually. Performance Adjustments on page 19.

DEFAULT SETTINGS FOR NX

FUNCTION	PROGRAM 1 RWD 2-POLE	PROGRAM 2 RWD 4-POLE	PROGRAM 3 CWD 2-POLE
FORWARD SPEED	95	90	95
TURNING SPEED	25	20	30
ACCELERATION - FWD	30	25	25
ACCELERATION - REV	30	20	25
TURN ACCELERATION	30	20	25
TURN DECELERATION	35	25	30
BRAKING FORWARD	50	50	50
BRAKING REVERSE	55	45	55
REVERSE SPEED	40	30	40
TREMOR DAMPENING	40	40	40
TORQUE	144	48	144

DEFAULT SETTINGS FOR NX-B

FUNCTION	PROGRAM 1 ATM 2-POLE	PROGRAM 2 RWD 2-POLE	PROGRAM 3 CWD 2-POLE
FORWARD SPEED	95	95	100
TURNING SPEED	50	25	30
ACCELERATION - FWD	30	30	25
ACCELERATION - REV	30	30	25
TURN ACCELERATION	80	30	25
TURN DECELERATION	75	35	30
BRAKING FORWARD	85	50	50
BRAKING REVERSE	55	55	55
REVERSE SPEED	40	40	40
TREMOR DAMPENING	40	40	40
TORQUE	144	144	144

DEFAULT SETTINGS FOR NX-50

FUNCTION	PROGRAM 1 M41-1	PROGRAM 2 M41-2	PROGRAM 3 M41-3
FORWARD SPEED	90	90	90
TURNING SPEED	20	20	20
ACCELERATION - FWD	50	50	50
ACCELERATION - REV	20	20	20
TURN ACCELERATION	20	20	20
TURN DECELERATION	22	22	22
BRAKING FORWARD	50	50	50
BRAKING REVERSE	65	65	65
REVERSE SPEED	40	40	40
TREMOR DAMPENING	35	35	35
TORQUE	48	48	48

DEFAULT SETTINGS FOR NX W/ACC

FUNCTION	PROGRAM 1 MWD - M61 (1)	PROGRAM 2 MWD - M61 (2)	PROGRAM 3 MWD - M61 (3)
FORWARD SPEED	95	95	95
TURNING SPEED	25	25	25
ACCELERATION - FWD	25	25	25
ACCELERATION - REV	25	25	25
TURN ACCELERATION	30	30	30
TURN DECELERATION	30	30	30
BRAKING FORWARD	50	50	50
BRAKING REVERSE	55	55	55
REVERSE SPEED	40	40	40
TREMOR DAMPENING	35	35	35
TORQUE	144	144	144

DEFAULT SETTINGS FOR NX-75



FUNCTION	PROGRAM 1 CWD M9I	PROGRAM 2 CWD M9I HD	PROGRAM 3 CWD M9I
FORWARD SPEED	95	95	95
TURNING SPEED	20	20	20
ACCELERATION - FWD	20	20	20
ACCELERATION - REV	20	20	20
TURN ACCELERATION	25	20	25
TURN DECELERATION	35	20	35
BRAKING FORWARD	50	50	50
BRAKING REVERSE	55	55	55
REVERSE SPEED	50	40	50
TREMOR DAMPENING	35	40	35
TORQUE	36	36	36

DEFAULT SETTINGS FOR NX-LP



FUNCTION	PROGRAM 1 RWD 2-POLE	PROGRAM 2 RWD 4-POLE	PROGRAM 3 CWD 2-POLE
FORWARD SPEED	95	90	100
TURNING SPEED	25	20	30
ACCELERATION - FWD	30	25	25
ACCELERATION - REV	30	20	25
REVERSE SPEED	40	30	40

SECTION 8—OTHER FUNCTIONS

Description of Other Functions

Select OTHER from the main menu to display Motor Balance, Joystick Throw, Fault Log, and Usage Statistics. Use the  and  keys to select the function desired. The SELECT key will display the current value and permit modifications. Always press SAVE after changes are made.

NOTE: At any point, press the MENU key to return to the previous screen.

MENU ITEM	DESCRIPTION
MOTOR BALANCE	Motor balance corrects for veer when going straight on level ground. To correct for a veer to the right, move the bar graph indicator to the right using the  key. To correct for veer to the left, move the bar graph indicator to the left using the  key.
JOYSTICK THROW	Joystick throw calibration is used to calibrate the neutral position and the full speed travel of the proportional joystick. The control module stores the maximum displacement of the joystick and later, during driving, uses the values to generate a full speed command whenever that displacement is reached. Exceeding this displacement does not product further increase in speed. The result of this method of calibration is a customized driving template.
FAULT LOG	The Fault Log shows the fault codes that have been detected by the diagnostic system since the control was built in the factory. The fault codes correspond to the Diagnostics Codes given in the next section. The Fault Log can be used by the service technician to uncover the cause of intermittent faults that are not evident when the wheelchair is being serviced. <i>NOTE: It is normal to have some codes in the Fault Log, even in a new wheelchair, because they are generated during factory testing and calibration.</i>
USAGE STATISTICS	The usage statistics screen displays how long the wheelchair has been on in hours: minutes, the total number of times the wheelchair has been powered up and how many times the wheelchair has been driven.

SECTION 9—DIAGNOSTIC CODES

What Are Diagnostics Codes?

The joystick information gauge and the Remote Programmer give indications of the type of fault or error detected by the control module. When a fault is detected, the wheelchair will stop and not drive. All of the lights on the information gauge will begin to flash (SPJ and CSPJ joysticks) or the service indicator light will flash (SPJ+ and SPJ+ w/ACC joystick). The number of flashes indicates the nature of an abnormal condition. An error code and a quick description of the fault will begin to scroll across the Remote Programmer display. If multiple faults are found, only the first fault encountered by the control module program will be displayed. Refer to the Power Wheelchair Service Manual for detailed troubleshooting and repair instructions. A table of the diagnostics codes and their causes follows.

**NOTE: The fault log displays a four digit number. The first two digits are the diagnostic code and the remaining two digits are the sub code.*

NUMBER OF FLASHES	DIAGNOSTICS CODE	ERROR CODE DESCRIPTION	SUB CODE*	DETAILS OF ERROR CODE	POSSIBLE SOLUTION
1	E 01	User Fault	00	Stall Timeout or user error.	Release joystick to neutral and try again.
2	E02	Battery Fault	00	Recharge batteries or replace.	Check the batteries and cable. Try charging the batteries. Batteries may require replacing.
3	E03	Left Motor Fault	00	Left Motor Short Circuit	Check the left motor, connections and motor cable.
			01	Left Motor Open Circuit	
			02	Left Motor Connection Fault B-	
			03	Motor Terminal Connected to B+	
			04	Left Motor Voltage Fault	
			05	Left Motor Bridge Fault	
			06	Too Many Hardware Current Limit Events	
			07	Current Offset Out of Range	
			08	Hardware Current Limit Fault	

NUMBER OF FLASHES	DIAGNOSTICS CODE	ERROR CODE DESCRIPTION	SUB CODE*	DETAILS OF ERROR CODE	POSSIBLE SOLUTION
4	E04	Right Motor Fault	00	Right Motor Short Circuit	Check the right motor, connections and motor cable.
			01	Right Motor Open Circuit	
			02	Right Motor Connection Fault B-	
			03	Motor Terminal Connected to B+	
			04	Right Motor Voltage Fault	
			05	Right Motor Bridge Fault	
			06	Too Many Hardware Current Limit Events	
			07	Current Offset Out of Range	
			08	Hardware Current Limit Fault	
5	E05	Left Park Brake Fault	00	Left Park Brake Drive-Time Test Failed	Check the left park brake connections and cable.
			01	Left Park Brake Output Enabled When Wheelchair Idle	
			02	Left Park Brake Output Did not Enable When Entering Drive Mode	
			03	Left Park Brake fault during power-up testing	
			04	Left park brake feedback low during drive (park brake short)	
6	E06	Right Park Brake Fault	00	Right Park Brake Drive-Time Test Failed	Check the right park brake connections and cable.
			01	Right Park Brake Output Enabled When Wheelchair Idle	
			02	Right Park Brake Output Did not Enable When Entering Drive Mode	
			03	Right Park Brake fault during power-up testing	
			04	Right park brake feedback low during drive (park brake short)	

SECTION 9—DIAGNOSTIC CODES

NUMBER OF FLASHES	DIAGNOSTICS CODE	ERROR CODE DESCRIPTION	SUB CODE*	DETAILS OF ERROR CODE	POSSIBLE SOLUTION
7	E07	Remote Fault	00	Local SR Fault (CPU, EEPROM, etc.)	Check the communications bus, connections and wiring. Replace the remote.
			01	Joystick fault at the remote	
			02	Speed pot fault at the remote	
8	E08	Controller Fault	00	Controller fault	Check connections and wiring. Replace power module.
			01	RAM fault	
			02	ROM fault	
			03	CPU fault	
			04	EEPROM fault	
			05	Watchdog fault	
			06	Stack fault	
			07	Software fault	
			08	Power-up testing fault	
			09	Relay fault or precharge fault	
			10	Bridge fault or disable all fault	
			11	Electronics fault: Thermistor	
			12	Calibration setting fault	
9	E09	Communications Fault	00	Remote connection lost	Check connections and wiring. Replace Bus cable.
			01	Low communication mode	
10	E10	General Fault	00	General fault	Check all connections and wiring. Contact Invacare Technical Service.
11	E11	Incompatible/incorrect Remote	00	Incompatible/incorrect Remote	Wrong type of remote connected. Ensure the branding of the joystick matches that of controller unit.

SECTION 10—CONNECTOR DESCRIPTIONS

Controller Connector Descriptions

NX, NX-50, NX-75, NX-B and NX-LP

NOTE: For this procedure, refer to FIGURE 10.1.

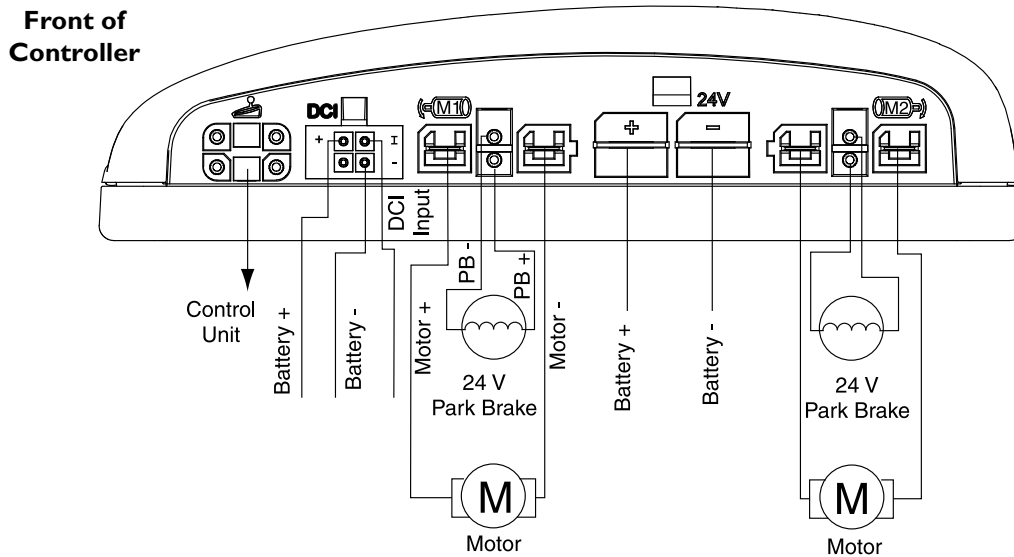


FIGURE 10.1 NX, NX-50, NX-75, NX-b and NX-LP

NX w/ACC

NOTE: For this procedure, refer to FIGURE 10.2.

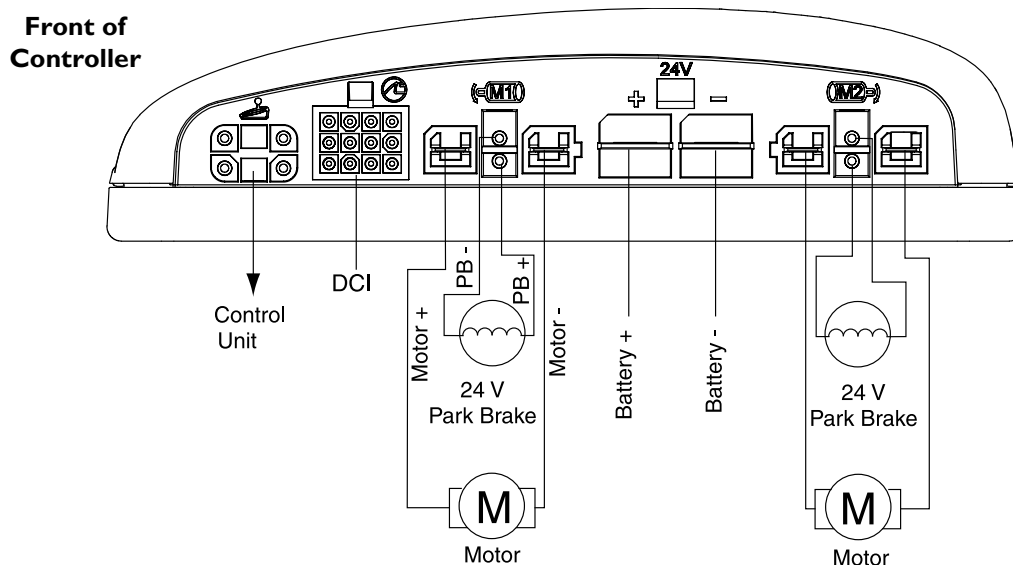


FIGURE 10.2 NX w/ACC

Battery Connector Pinout

NOTE: For this procedure, refer to FIGURE 10.3.

PIN	FUNCTION
1	Battery Positive
2	Battery Negative

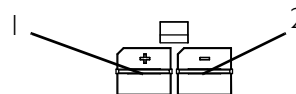


FIGURE 10.3 Battery Connector Pinout

Motor Connector Pinout

NOTE: For this procedure, refer to FIGURE 10.4.

PIN	FUNCTION
1	Motor Positive
2	Motor Negative
3	Park Brake Negative
4	Park Brake Positive

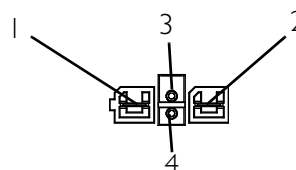


FIGURE 10.4 Motor Connector Pinout

Joystick Connector Pinout

NOTE: For this procedure, refer to FIGURE 10.5.

PIN	FUNCTION
1	Battery Positive
2	Communication Bus High
3	Communication Bus Low
4	Battery Negative

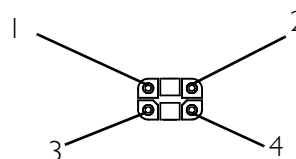


FIGURE 10.5 Joystick Connector Pinout

Drive Control Input (DCI)

NOTE: Wheelchairs equipped with DCI have seating options (i.e. elevate and tilt).

The DCI allows the wheelchair mode to depend on the resistance of the DCI “Loop”:

- Inhibit - prevents the wheelchair from driving, typically when the wheelchair is being charged, or when the seat is tilted.
- Slow - limits the drive speed to a predetermined value, typically when the seat is raised.

To determine the mode, an appropriate resistance must be placed across the DCI input pin (I) and the DCI Battery Negative (-) pin. Depending on the resistance value, the controller will inhibit, slow, and/or swivel driving. Resistors used must be 5% tolerance resistors.

MODE	RESISTANCE
Inhibit	0
Slow	120
Normal	Open

NX, NX-50, NX-75, NX-B, and NX-LP

NOTE: For this procedure, refer to FIGURE 10.6.

PIN	FUNCTION
1	Battery Positive
2	DCI Input (Drive Lockout)
3	--No Connection--
4	Battery Negative

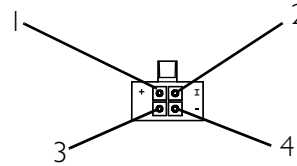


FIGURE 10.6 NX, NX-50, NX-75, nx-b, and NX-LP

NX w/ACC

NOTE: For this procedure, refer to FIGURE 10.7.

PIN	FUNCTION
1	Actuator 1 Negative
2	Actuator 1 Positive
3	n/a
4	n/a
5	Actuator 2 Negative
6	Drive Control Input (Drive Lockout)
7	Battery Positive
8	n/a
9	Actuator 2 Positive
10	Battery Negative
11	-- No Connection --

PIN	FUNCTION
12	n/a

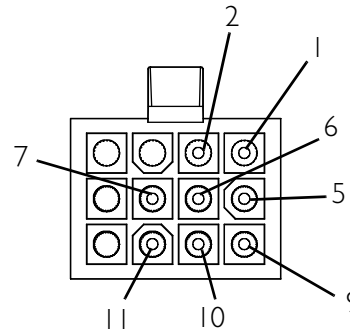


FIGURE 10.7 NX w/ACC

Battery Charger Port

NOTE: For this procedure, refer to FIGURE 10.8.

PIN	FUNCTION
1	Battery Positive
2	Battery Negative
3	Serial Data/DCI Input

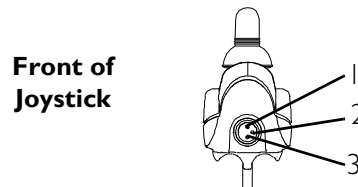


FIGURE 10.8 Motor Connector Pinout

LIMITED WARRANTY

PLEASE NOTE: THE WARRANTY BELOW HAS BEEN DRAFTED TO COMPLY WITH FEDERAL LAW APPLICABLE TO PRODUCTS MANUFACTURED AFTER JULY 4, 1975.

This warranty is extended only to the original purchaser/user of our products.

This warranty gives you specific legal rights and you may also have other legal rights which vary from state to state.

Invacare warrants the **NX, NX-50, NX-75, NX-LP, NX-B** and **NX w/ACC Controller** to be free from defects in materials and workmanship for a period of one year from date of purchase. If within such warranty period any such product shall be proven to be defective, such product shall be repaired or replaced, at Invacare's option. This warranty does not include any labor or shipping charges incurred in replacement part installation or repair of any such product. Invacare's sole obligation and your exclusive remedy under this warranty shall be limited to such repair and/or replacement.

For warranty service, please contact the dealer from whom you purchased your Invacare product. In the event you do not receive satisfactory warranty service, please write directly to Invacare at the address at the bottom of the back cover. Provide dealer's name, address, date of purchase, indicate nature of the defect and, if the product is serialized, indicate the serial number. Do not return products to our factory without our prior consent.

LIMITATIONS AND EXCLUSIONS: THE FOREGOING WARRANTY SHALL NOT APPLY TO SERIAL NUMBERED PRODUCTS IF THE SERIAL NUMBER HAS BEEN REMOVED OR DEFACED, PRODUCTS SUBJECT TO NEGLIGENCE, ACCIDENT, IMPROPER OPERATION, MAINTENANCE OR STORAGE, COMMERCIAL OR INSTITUTIONAL USE, PRODUCTS MODIFIED WITHOUT INVACARE'S EXPRESS WRITTEN CONSENT INCLUDING, BUT NOT LIMITED TO, MODIFICATION THROUGH THE USE OF UNAUTHORIZED PARTS OR ATTACHMENTS; PRODUCTS DAMAGED BY REASON OF REPAIRS MADE TO ANY COMPONENT WITHOUT THE SPECIFIC CONSENT OF INVACARE, OR TO A PRODUCT DAMAGED BY CIRCUMSTANCES BEYOND INVACARE'S CONTROL, AND SUCH EVALUATION WILL BE SOLELY DETERMINED BY INVACARE. THE WARRANTY SHALL NOT APPLY TO PROBLEMS ARISING FROM NORMAL WEAR OR FAILURE TO ADHERE TO THESE INSTRUCTIONS.

THE FOREGOING EXPRESS WARRANTY IS EXCLUSIVE AND IN LIEU OF ANY OTHER WARRANTIES WHATSOEVER, WHETHER EXPRESS OR IMPLIED, INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, AND THE SOLE REMEDY FOR VIOLATIONS OF ANY WARRANTY WHATSOEVER, SHALL BE LIMITED TO REPAIR OR REPLACEMENT OF THE DEFECTIVE PRODUCT PURSUANT TO THE TERMS CONTAINED HEREIN. THE APPLICATION OF ANY IMPLIED WARRANTY WHATSOEVER SHALL NOT EXTEND BEYOND THE DURATION OF THE EXPRESS WARRANTY PROVIDED HEREIN. INVACARE SHALL NOT BE LIABLE FOR ANY CONSEQUENTIAL OR INCIDENTAL DAMAGES WHATSOEVER.

THIS WARRANTY SHALL BE EXTENDED TO COMPLY WITH STATE/PROVINCIAL LAWS AND REQUIREMENTS.



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Alternative Controls For INVACARE 2006



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This catalog showcases a limited number of ASL products. For a complete catalog contact ASL. For Technical support and product application contact

ASL, Who We Are

ASL designs products specifically for those who can not access their environment through conventional means.

Our inventions and designs are a direct result of the needs of those we serve.

Our goal has always been independence and equal rights for those we work with.

ASL pioneered the use of Proximity sensors, Fiber Optic sensors, Photo Electric sensors and Ultra Sonic sensors in the field of power chair controls.

Milestones

Single Switch Scanner (1984) -
Dave Southwick and Rucker Ashmore
Proximity Head Array (1991) -
Rucker Ashmore
Fiber Optic Array (1991) -
Rucker Ashmore
Proximity Tray Array (1991) -
Rucker Ashmore
ALS Drive Control Program Implemented (1993) -
Sip & Puff Head Array (1994) -
Lisa Rotelli and Rucker Ashmore
National Education Programs Implemented (1996) - Byron Guisbert
Two Switch Fiber Optic Array (1997) -
James Pham



“ For many patients, the difference between using an ASL product and not using an ASL product is the difference between having mobility and not having mobility.”

KAREN M. KANGAS, OTR/L

ASL Head Array



HISTORY

The Proximity Head Array was invented by ASL in 1991.

All ASL Head arrays have the ASL logo on the left wing.

The ASL Head Array provides three sensors for movement. A fourth sensor or switch is provided for reset/mode change. This switch can be one of the following:



ASL 204

ASL 208

ASL210

ASL 300

ASL 304

What sensor or switch used for the reset/mode change function depends on the ability of the patient.

If head movement is the only available switch site you should use either the ASL 210 Beam Switch or the ASL 204 Proximity Switch.

The ASL 210 Beam Switch is placed on top of the head array (as shown below). Switch activation occurs when the head comes out of the beams range. This range is adjustable from 3" to 15".





ASL105JCXR

When using the ASL 204 Proximity Switch, we extend either the right or left wing 1 1/2" and place the 204 in the extension.



ASL 611

If the patient has hand function you can use one of the following: ASL 208 Adjustable Proximity Switch, ASL 300 Egg Switch or the ASL 304 Wobble Switch. The ASL 300 and 304 come with the ASL 611 Adjustable Mounting Bracket.



Shown with reset/mode change switch in right extension also available in left extension

ASL 105 Curved Head Array

Junior Curved - JC

Dimensions are:

Back pad - 5" x 4"

Wing - 1" 1/2 x 5" 1/4



Pediatric Curved - PC

Dimensions are:

Back pad- 5" x 3" 1/4

Wing - " 1 1/2 x " 5



Junior Nub

Back pad - 5" x 4"

Wing - 1" 1/2 x 3" 1/4



ASL 105 Straight Head Array

Straight - JS

Dimensions are:

Back pad - 5" x 4"

Wing - 1" 1/2 x 5"



Pediatric Straight - PS

Dimensions are:

Back pad - 5" x 3" 1/4

Wing - 1" 1/2 x 3" 1/4



Mini

Dimensions are:

Back pad - 4" 1/2 x 2" 1/2

Wing - 1" 5/8 x 1" 1/2



BUILD YOUR SYSTEM

PRODUCT TYPE BACKPAD TYPE

PASL 105 IVC

J = Junior
P = Pediatric
M = Mini
Stealth
Adult
Pediatric



EXAMPLE: PASL 105 IVC JC, ASL210

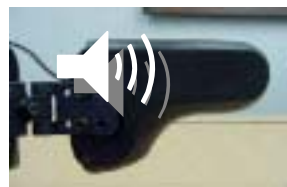
Options for Head Array



ASL 908
Sub-Occipital
With Post



ASL 105 UP
Un plugged Forward



ANSM-1
Ancillary Speaker

WHEN ORDERING **WING TYPE RESET**

S = Straight
C = Curved
N = Nub

ASL 204 wing extension



XR - ext. right



XL - ext. left



ASL 208



ASL 210



ASL 300



ASL 304A



ASL IVC Interface.



The ASL 105 IVC Interface has a new look and increased function. The enclosure is now smaller and you will see a “Slide Switch” on the faceplate between the numbers “3” & “4”.

In the past, if you were using an ASL 106 IVC or an ASL 108 IVC, you had to designate the function of the “4th” switch. If you wanted the “4th” switch to be Reset you received an ASL 151 Interface box with the system. If you wanted the “4th” switch to be Reverse you received an ASL 150 Interface box with the system.

The new ASL Interface box allows you to choose the function of the “4th” switch. If you want the “4th” switch to be Reset, move the “Slide Switch” to the number “3”. If you want the “4th” switch to be Reverse, move the “Slide Switch” to the number “4”.

As before there is a pigtail with a “3” pin connector that allows an electronic switch to be used for Reset. There is a mono port labeled “R” that allows a single function mechanical switch to be used for “Reverse”. The mono port labeled “S” allows a single function mechanical switch to be used for “Reset”.

The “9 pin” port is for an attendant control.

ASL 210 Adjustable Beam Switch



ASL 210

Adjustable Beam Switch

When used in conjunction with the ASL105 ASL Head Array the Adjustable Beam Switch functions as a passive stop switch and a reset/mode change switch.

A set screw on the ASL 210 Beam Switch allows the activation range to be adjusted up to a maximum distance of fifteen (15) inches. This sensor projects an invisible beam of light, Switch activation occurs when the head is moved beyond the adjusted sensing range.

When used with the ASL105, the ASL 210 should be mounted to the top of the head array. To set the activation range, ask the individual driving the chair to pull his/her head off the back pad to stop. This movement must not activate the beam switch. From this stop position, ask the individual to move his/her head toward their chest or move their head further from the back pad. This secondary movement away from the back pad is what is needed to cause switch activation.

The ASL 210 has a unique three pin connector which allows it to be used only with the ASL 105.



MKIV

As seen on MKIV with Visual Display w/switches

Main Menu

<input checked="" type="checkbox"/>	PERFORMANCE ADJUST STANDARD PROGRAMS CALIBRATIONS QUIT? PRESS POWER
-------------------------------------	--

LEARNER 3SPD MOM

VERY SLOW 1SPD MOM

ASL STD PROGRAM

LEARNER SIP & PUFF

Main Menu

<input checked="" type="checkbox"/>	PERFORMANCE ADJUST STANDARD PROGRAMS CALIBRATIONS QUIT? PRESS POWER
-------------------------------------	--

VERY SLOW 1SPD S & P

- DRIVE 1
- DRIVE 2
- DRIVE 3
- DRIVE 4

<input checked="" type="checkbox"/>	FORWARD SPD TURNING SPD ACCELERATION SENSITIVITY BRAKING ADJ REVERSE SDP TORQUE ENERGY SAVER (< 3/1/00) POWER LEVEL (>3/1/00) (INPUT TYPE) JOYSTICK THROW
	MOM/LATCHED (MOM MODE SEL)** (LATCHED TYPE)** (MOM/REVERSE)
	STANDBY MODE** STANDBY SELECT (STANDBY TIME) REMOTE SEL* RIM CONTROL NO DRIVING ECU (1, 2, 3, 4)* (RECLINER)* (TILT/RECLINE)* (TTJP) (AUDIBLE IND)

Note. RIM Mode is 3 quadrant driving

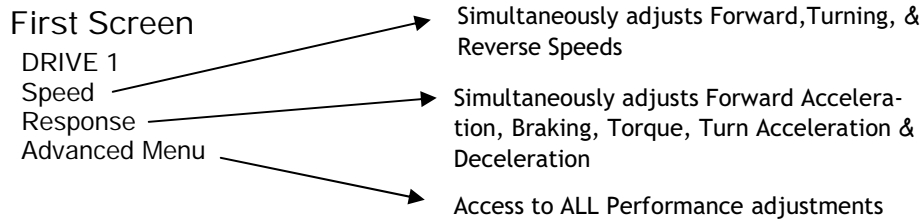
Forward, Left & Right quadrants of the Driver Control are active while the Reverse quadrant is not.

To Access Reverse, the Driver pushes a Reset Switch. The Forward command now becomes the Reverse command . Pressing the Reset Switch again will change the Reverse command back to a Forward direction.

MK5TM

PLANNED INTRODUCTION APRIL '03

As seen on MK5 with Visual Display w/switches



→ PERFORMANCE ADJUSTMENT
STANDARD PROGRAMS
 CALABRATIONS
 CURRENT STATUS

→ INDOOR JOYSTICK AVE
 MODERATE OUTDOOR
 SPEED / LEVEL TERRAIN
 RAMPS & CURBS MODE
 INDOOR LEARNER
 VERY SLOW DRIVING
 TREMOR DAMPED MODE
 LEARNER 3 SPD MOM
ASL INDOOR / LEARNER
ASL OUTDOOR / FASTER
 LEARNER SIP & PUFF
 VERY SLOW 1SPD S&P
 LEARNER 1500 RIM

F	S
T	S
A	
T	A
T	D
B	ADJ
R	S
T	
P	L
J	T
M	/
S	
S	
R	
RIM	
D	
N	

Programming for ASL Head Array

MKIV



* This is merely a starting point. Final Program settings depend on the ability of the end-user.*

1. Press the Power On button on the IVC Programmer.
2. Arrow down and Select Standard Programs
3. Arrow down to the ASL Standard Program.
4. Press the Save button, then save to desired drives.
5. Press Menu and Select Performance Adjustment.
6. Arrow down to RIM and press the Select Button, place the RIM on the ON position. (This will allow the chair to toggle between Forward and Reverse with the reset /mode change switch).
7. Press the Save button then save to the desired drives.
8. Power Off Programmer.
9. Power Off/On MKIV Display with Switches or Joystick.



The slide switch on the ASL IVC Interface must be in the "3" position.

Programming for ASL Head Array

MK₅

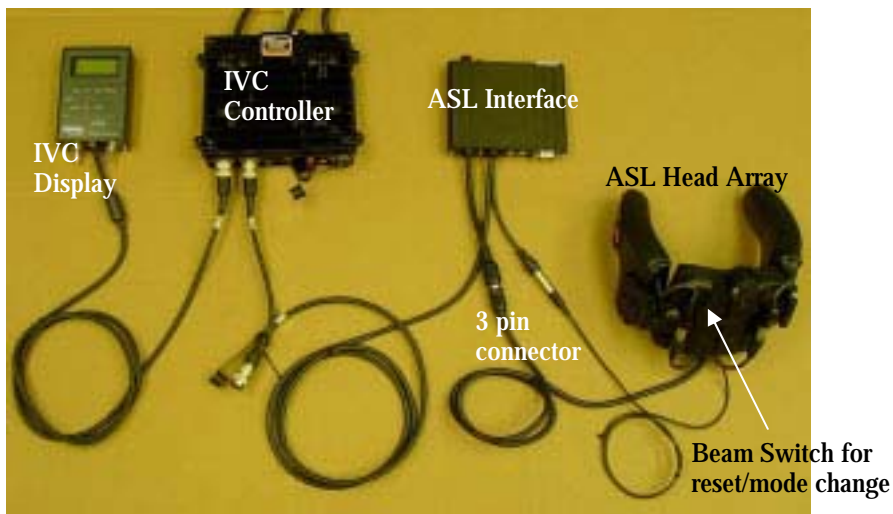


* This is merely a starting point. Final Program settings depend on the ability of the end-user.*

1. Press the Power On button on the IVC Programmer.
2. Arrow down and Select Advanced Menu
3. Arrow down and Select Standard Programs.
4. Arrow down and Select ASL Indoor / Learner
5. Press the Save button, then save to desired drives.
6. Press Menu and Select Performance Adjustment.
7. Arrow down to RIM and press the Select Button, Adjust RIM to the ON position. (This will allow the chair to toggle between Forward and Reverse with the reset /mode change switch).
8. Press the Save button then save to the desired drives.
9. Power Off Programmer.
10. Power Off/On **MK₅** Display with Switches or Joystick.

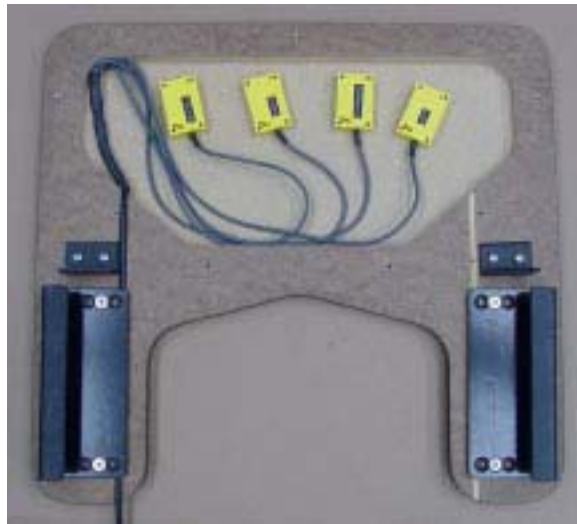
Connection Diagram

PASL 105 IVC



Connection Diagram depicts
PASL 105 IVC JC 210

PASL106 IVC 4 Switch Proximity Array



HISTORY
Invented by ASL in
1991

This driver control device utilizes four (4) Adjustable Proximity sensors. Each sensor controls movement in one of the four (4) directions the fourth sensor may be used as Reverse or Reset depending on position of the 3-4 switch on the front of the interface. A wobble switch is provided for mode change/reset. A tray is provided as the driving platform.

The sensors can be placed inside the tray at any desired location. A hand or finger placed on the tray above a sensor will cause movement in the appropriate direction. Veering can be accomplished by activating the forward or reverse sensor in conjunction with either the right or left sensor.

This driver control has a quick disconnect feature which allows the tray to be removed with the sensors intact. Each sensor has an adjustment feature that allows it to be mounted inside or beneath most materials of up to an inch in thickness. This adjustment feature also allows a sensor to be turned off if necessary.

Programming for 4 Switch Proximity Array

MKIV



* This is merely a starting point. Final Program settings depend on the ability of the end-user.*

1. Press the Power On button on the IVC Programmer.
2. Arrow down and Select Standard Programs
3. Arrow down to the ASL Standard Program.
4. Press the Save button, then save to desired drives.
5. Press Menu and Select Performance Adjustment.
6. Arrow down to RIM and press the Select Button, place the RIM on the ON position. (This will allow the chair to toggle between Forward and Reverse with the reset /mode change switch).
7. Press the Save button then save to the desired drives.
8. Power Off Programmer.
9. Power Off/On MKIV Display with switches or Joystick.



The slide switch on the ASL IVC Interface must be in the "3" position.

The PASL 106 IVC includes the ASL 511 Lap tray driving platform. Please specify chair width when ordering.



Programming for 4 Switch Proximity Array

MK₅

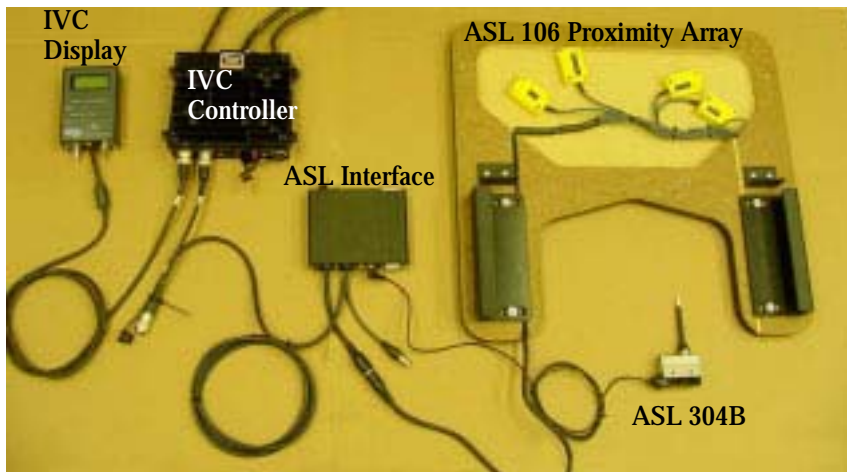


* This is merely a starting point. Final Program settings depend on the ability of the end-user.*

1. Press the Power On button on the IVC Programmer.
2. Arrow down and Select Advanced Menu
3. Arrow down and Select Standard Programs.
4. Arrow down and Select ASL Indoor / Learner
5. Press the Save button, then save to desired drives.
6. Press Menu and Select Performance Adjustment.
7. Arrow down to RIM and press the Select Button, Adjust RIM to the ON position. (This will allow the chair to toggle between Forward and Reverse with the reset /mode change switch).
8. Press the Save button then save to the desired drives.
9. Power Off Programmer.
10. Power Off/On **MK₅** Display with Switches or Joystick.

Connection Diagram

PASL 106 IVC



In the configuration above, with the ASL 304B functioning as a reset switch, the slide switch on the front of the ASL IVC Interface must be on the “4” position.

The “4” proximity sensors control movement in the four directions, and the ASL 304B as a reset.

PASL 107 IVC Fiber Optic Array

PASL 107 IVC Fiber Optic Array

This array consists of three Fiber Optic switches. Two of the Fiber Optics are your directional switches and the 3rd Fiber Optic is reset/mode change .

When you cover the right switch the chair moves right. When you cover the left switch the chair moves left. When you cover both switches the chair moves forward.

The 3rd Fiber Optic is your reset/mode change switch.

HISTORY

Invented by ASL in 1997



Shown with ASL 619 + ASL EFOM
(Available Option)



Programming for ASL Fiber Optic Array's PASL 107 IVC and PASL 108 IVC

MKIV



* This is merely a starting point. Final Program settings depend on the ability of the end-user.*

1. Press the Power On button on the IVC Programmer.
2. Arrow down and Select Standard Programs
3. Arrow down to the ASL Standard Program.
4. Press the Save button, then save to desired drives.
5. Press Menu and Select Performance Adjustment.
6. Arrow down to RIM and press the Select Button, place the RIM on the ON position.(This will allow the chair to toggle between Forward and Reverse with the reset /mode change switch).
7. Press the Save button then save to the desired drives.
8. Power Off Programmer.
9. Power Off/On MKIV Display with switches or Joystick.



The slide switch on the ASL IVC Interface must be in the "3" position.

Programming for ASL Fiber Optic Array's PASL 107 IVC and PASL 108 IVC

MK₅



* This is merely a starting point. Final Program settings depend on the ability of the end-user.*

1. Press the Power On button on the IVC Programmer.
2. Arrow down and Select Advanced Menu
3. Arrow down and Select Standard Programs.
4. Arrow down and Select ASL Indoor / Learner
5. Press the Save button, then save to desired drives.
6. Press Menu and Select Performance Adjustment.
7. Arrow down to RIM and press the Select Button, Adjust RIM to the ON position. (This will allow the chair to toggle between Forward and Reverse with the reset /mode change switch).
8. Press the Save button then save to the desired drives.
9. Power Off Programmer.
10. Power Off/On **MK₅** Display with Switches or Joystick.

Connection Diagram

PASL 107 IVC



PASL 108 IVC Fiber Optic Array

PASL 108 IVC Fiber Optic Array

This array consists of four Fiber Optic switches. Three Fiber Optics control Forward, Right and Left movement. The fourth Fiber Optic controls reset/mode change function.

When a user covers the desired switch the chair moves in that direction. Veering can be achieved by activating the forward command or Reverse command in combination with either the right or left command.

HISTORY

Invented by ASL in 1991

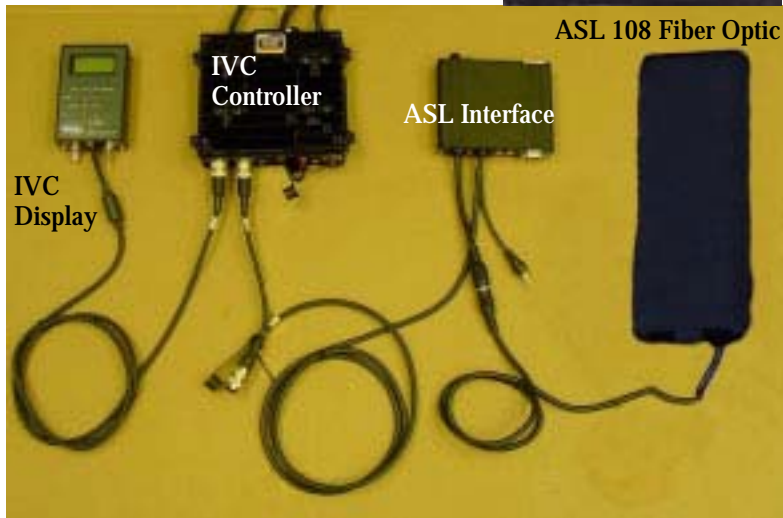


The PASL 108 IVC includes the ASL 511 Lap tray driving platform. Please specify chair width when ordering.

Connection Diagram

PASL 108 IVC

Shown with Optional Tray



PASL 109 IVC Sip/Puff Head Array

Sip & Puff / Head Array

The ASL109 is designed for those individuals who, because of weak breath volume, are unable to achieve both a hard and soft “sip” and “puff”.

In this driver control device any “puff” equals forward and any “sip” equals reverse. Right and left turns are controlled by sensors located in the wings of the headrest.



HISTORY

Invented by ASL 1994

The ASL109 should be “latched” for proper operation. “Steering” or “veering” can be achieved by rotating the head toward one of the headrest wings while going forward in the latch mode. An ASL202 Fiber Optic Switch, programmed normally closed (NC), functioning as a passive stop switch, is required and comes with this system.

This driver control consists of an adjustable winged headrest with a sensor inside each wing, a Sip & Puff assembly (specify headrest or chair mount), an ASL154 Sip & Puff / Head Array Interface, and an ASL 202 Fiber Optic reset/mode change switch.



Programming for Sip & Puff Head Array

MKIV



- *This is merely a starting point. Final Program settings depend on the ability of the end-user.*
1. Press the Power On button on the IVC Programmer.
 2. Arrow down and Select Standard Programs
 3. Arrow down to the ASL Standard Program.
 4. Press the Save button, then save to desired drives.
 5. Press Menu and Select Performance Adjustment.
 6. Arrow down to MOM / LATCHED and Select
 7. Arrow down to Latched and Select
 8. Press the Save button then save to the desired drives.
 9. Power Off Programmer.
 10. Power Off/On MKIV Display with switches or

ASL 202 Fiber Optic Switch Application and Setup

In order to drive the chair, the Fiber Optic switch must see the users lip. Activation occurs when the Fiber Optic switch does not see the lip. Typically, a user will open his mouth, the Fiber Optic no longer sees the lip and activation occurs.

The white trim pot allows the Fiber Optic beam to be adjusted from touch to approximately 3 inches. The slide switch must be in the D-ON mode.

The red light indicates power to the sensor, the green light indicates activation.

If a user is driving his chair and the Fiber Optic beam does not see his lip the chair will stop. It serves as passive stop switch.



Programming for Sip & Puff Head Array **MK5**



- This is merely a starting point. Final Program settings depend on the ability of the end-user.*
1. Press the Power On button on the IVC Programmer.
 2. Arrow down and Select Advanced Menu
 3. Arrow down and Select Standard Programs.
 4. Arrow down and Select ASL Indoor / Learner
 5. Press the Save button, then save to desired drives.
 6. Press Menu and Select Performance Adjustment.
 7. Arrow down to MOM / LATCHED and Select
 8. Arrow down to Latched and Select
 9. Press the Save button then save to the desired drives.
 10. Power Off Programmer.
 11. Power Off/On MK5 Display with switches or Joystick.

Connection Diagram

PASL 109 IVC



PASL 101IVC Single Switch Scanner

HISTORY

Invented by ASL in 1984



This driver control device enables an individual who can activate only one (1) switch to drive a powerchair, access and operate all power seat functions, and access and control the ECU or auxiliary capabilities of the wheelchair's electronics.

The SINGLE SWITCH SCANNER has an operators display module that contains five (5) LED's that represent forward, right, left, reverse and reset/mode change . These five (5) LED's illuminate and rotate at the scan rate selected. The user can drive the chair or change the mode of operation by activating the drive switch when the appropriate LED is illuminated. Every time the drive switch is released the scanner returns to the forward position to begin a new rotation.

The ASL101 comes complete with an operator's display module, an attendant control module, a training intervention control device, an adjustable scan rate, an auxiliary device access port, an attendant control device.

Available options include:

Large Display with Jumbo LED's
Communication Modification
Auditory Feed back Modification



Programming for Single Switch Scanner

MKIV



* This is merely a starting point. Final Program settings depend on the ability of the end-user.*

(Digital interface required)

1. Press the Power On button on the IVC Programmer.
2. Arrow down and Select Standard Programs
3. Arrow down to the ASL Standard Program.
4. Press the Save button, then save to desired drives.
5. Power Off Programmer.
6. Power Off/On MKIV Display with switches or Joystick.



Programming for Single Switch Scanner

MK₅



* This is merely a starting point. Final Program settings depend on the ability of the end-user.*

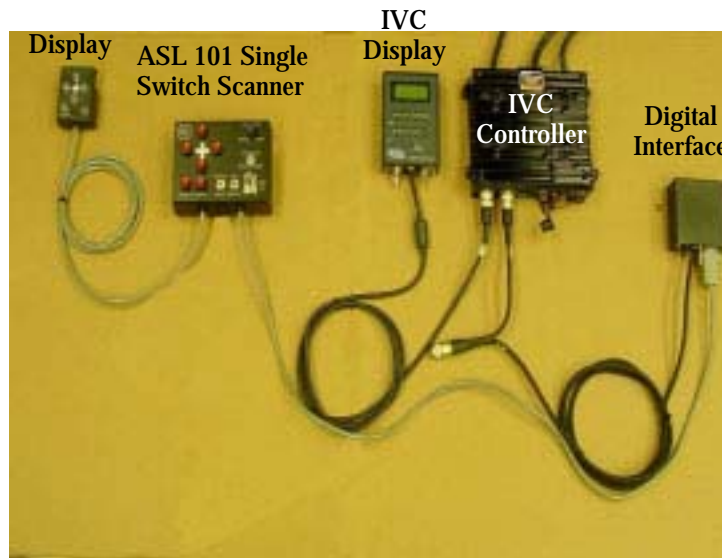
(Digital interface required)

1. Press the Power On button on the IVC Programmer.
2. Arrow down and Select Advanced Menu
3. Arrow down and Select Standard Programs.
4. Arrow down and Select ASL Indoor / Learner
5. Press the Save button, then save to desired drives.
6. Power Off Programmer.
7. Power Off/On MK₅ Display with switches or Joystick.



Connection Diagram

PASL 101 IVC



ASL MJ IVC Mushroom Joystick



Unique design transforms minimal force into peak response. Cap of joystick matches the contour of a hand and allows the hand to easily move across the top of joystick. Available with a pediatric or adult size cap. The cap can be rubber coated in many different colors.

Mushroom Joystick comes complete with Stealth Gatlin Mid-line Mount and swings away for ease of transfer.

Programming for Mushroom Joystick

MKIV



* This is merely a starting point. Final Program settings depend on the ability of the end-user.*

1. Press the Power On button on the IVC Programmer.
2. Arrow down and Select Standard Programs
3. Arrow down to the Learning/Indoor.
4. Press the Save button, then save to desired drives.
5. Power Off Programmer.
6. Power Off /On MKIV Display with switches or Joystick.

Note: If using an A or A+ Joystick instead of the Visual Display with switches, you must program Input Type to 1812 joystick.

Connection Diagram



Programming for Mushroom Joystick

MK₅



* This is merely a starting point. Final Program settings depend on the ability of the end-user.*

1. Press the Power On button on the IVC Programmer.
2. Arrow down and Select Advanced Menu
3. Arrow down and Select Standard Programs
4. Arrow down and Save INDOOR LEARNER
5. Power Off Programmer.
6. Power Off /On **MK₅** Display or Joystick with switches.

Note: If using a Invacare Multi-Purpose Joystick instead of the Visual Display with switches, you must program Input Type to 1812 joystick.

ASL MPJ IVC Proportional Mini Joystick



The Mini Joystick is a small proportional joystick which can be manipulated with <10 grams of force. The stroke of the stick itself is very small and therefore the Mini Joystick is the perfect solution for people who can only use small strength and perform minimal movements.

You can manipulate the joystick by finger, hand, chin, tongue, etc. Its ergonomic shape allows you to take the joystick in your hand and move the stick with your thumb.

An installation kit is also provided by which you can install the Mini Joystick in any position (underneath the joystick you find 4 attachments holes). The electronics of the Mini Joystick are completely protected which makes it moisture proof.

Programming for Proportional Mini Joystick

MKIV



* This is merely a starting point. Final Program settings depend on the ability of the end-user.*

1. Press the Power On button on the IVC Programmer.
2. Arrow down and Select Standard Programs
3. Arrow down to the Learning/Indoor.
4. Press the Save button, then save to desired drives.
5. Power Off Programmer.
6. Power Off /On MKIV Display with switches or Joystick .

Note: If using an A or A+ Joystick instead of the Visual Display with switches, you must program Input Type to 1812 joystick.

Connection Diagram



Programming for Proportional Mini Joystick



* This is merely a starting point. Final Program settings depend on the ability of the end-user.*

1. Press the Power On button on the IVC Programmer.
2. Arrow down and Select Advanced Menu
3. Arrow down and Select Standard Programs
4. Arrow down and Save INDOOR LEARNER
5. Power Off Programmer.
6. Power Off /On **MK₅** Display or Joystick with switches.

Note: If using an Invacare Multi-Purpose Joystick instead of the Visual Display with switches, you must program Input Type to 1812 joystick.

ASL 550 & 551 Mouse Emulator

ASL 550 and 551 Infrared Transmitter/Receiver Mouse Emulator

The ASL 550 and 551 Wireless Infrared Transmitters/Receivers and Mouse Emulators allow users to access a computer through their existing wheelchair driving system. Compatible with both MAC or PC through a USB connection. The mouse emulators are available in either three-channel and five-channel versions.



With the ASL 550 three-channel version, three switches activate the mouse: One switch controls up/down movement, another controls left/right movement, and the third switch controls click/drag. The three-channel version provides perfect access through the ASL 105 Electronic Head Array for complete mouse control.

With the ASL 551 five-channel version, five switches activate the mouse your fifth switch is activated through the 1/8 mono on the transmitter. It functions as left click. This device is an excellent option for individuals who want the power-chair joystick to become the mouse. This system gives users the freedom to use the directions up/down and left/right and to veer with a combination of directions for better and faster control. If used in conjunction with the ASL 521, mouse clicks can be attained on the joystick.

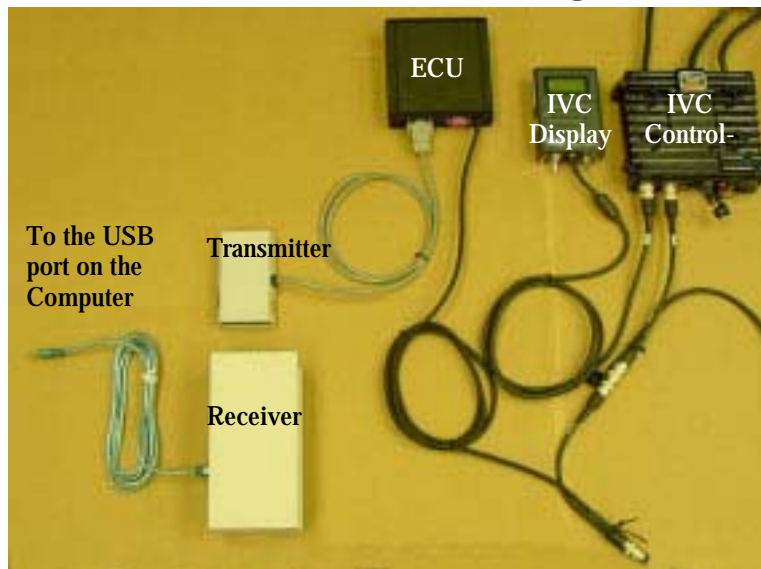
Programming for Mouse Emulator

MKIV



1. Press the Power On button on the IVC Programmer.
2. Select Performance Adjustment
3. Select desired Drive
4. Arrow down to ECU and select port that Transmitter is plugged into.
5. Press Select button, Arrow Down to Communication.
6. Press Save and Power Off Programmer.

Connection Diagram



Programming for Mouse Emulator

MK₅



1. Press the Power On button on the IVC Programmer.
2. Arrow down and Select Advanced Menu
3. Select Performance Adjustment
4. Select desired Drive
5. Arrow down to ECU and select port that Transmitter is plugged into.
6. Press Select button, Arrow Down to Communication.
7. Press Save and Power Off Programmer.



**ASL 994
Tilt Interface**

This interface allows a power tilt or recline motor to be controlled by a single switch or through an

ECU port on the powerchair's electronics.

It is fused at 15 amps, has a built in attendant control and toggles direction at switch activation.



**ASL 804 B
24 Volt Power Source Adaptor**

This adaptor provides three (3) 24 volt power source connections without inhibiting the charger port. This is designed to be used with the Invacare PTO Block power connector.



ASL 518

On/Off Modification

This modification allows users, who are unable to turn their powerchairs on/off by the standard toggle or pushbutton switch, to turn their powerchairs on/off with “any” single function or momentary switch. You pick the switch and its placement, this modification does the rest.

The ASL 518 requires an ASL 804 for power.



ASL 520BG

Remote Attendant Control

The ASL 520BG is a remote attendant control. It connects to the Attendant port on the ASL IVC Interface.

The ASL 520BG can perform two separate functions. With the ASL IVC Interface “ON” and a user driving, it can serve as a training intervention device. The attendant may perform the turns while the user is going Forward/Reverse and stop the chair if necessary. When the ASL IVC Interface is turned “OFF”, the ASL 520BG serves as an Attendant control.

The ASL 520BG requires an ASL 804 for power. 9 pin Female coming from ASL 520BG





ASL Options/Products

From the ASL Product Web Page.



Adaptive Switch Labs, Inc.

125 Spur 191

P.O. Box 636

Spicewood, TX 78669

Phone: 830-798-0005 Fax: 830-798-6221

Email: Info@asl-inc.com

Web: www.asl-inc.com

Invacare Canada Technical Services:

1-800-668-5324 ext. 2655

www.invacare.ca



PASL101_AFM
Auditory Feedback Modification For Single Switch Scanner ASL101

This modification causes a "beep" to sound every time a direction choice is indicated on the operator display. This modification provides a "cue" for the scanner user who requires an auditory stimulus.



PASL101_CM
Communication Modification for Single Switch Scanner ASL101

Optional Upgrade to the ASL 101 to allow seamless integration with communication devices. This modification allows scanner users with a secondary switch site to change from the drive mode to the communication mode without the help of an attendant. The same switch that is used to drive the wheelchair also controls the communication device.



PASL101_JLM
Large Display with Jumbo LED's for Single Switch Scanner ASL101

Optional Upgrade to the ASL 101 single switch scanner to provide an large display with LEDs.



PASL101IVC
ASL Single Switch Scanner package for Invacare Electronics - E2399

This driver control device enables an individual who can activate only one (1) switch to drive a powerchair, access and operate all power seat functions. The SINGLE SWITCH SCANNER has an operators display module that contains five (5) LED's that represent forward, right, left, reverse and select. These five (5) LED's illuminate and rotate at the scan rate selected. The user can drive the chair or change the mode of operation by activating the drive switch when the appropriate LED is illuminated. Every time the drive switch is released the scanner returns to the forward position to begin a new rotation.



PASL105IVC
Proximity Head Array Package for Invacare Electronics

This driver control system utilizes three (3) proximity sensors placed inside a headrest for control of a power wheelchair. The sensors mounted inside the right and left wings control movement in those directions. The sensor mounted inside the backpad of the headrest controls movement in the forward or the forward/reverse direction. Veering is accomplished by activating the sensor in the backpad along with either the right or left wing sensor.



PASL105IVCST
Proximity Head Array Stealth Ultra Headrest Package for Invacare Electronics

This driver control system utilizes three (3) proximity sensors placed inside a headrest for control of a power wheelchair. The sensors mounted inside the right and left wings control movement in those directions. The sensor mounted inside the backpad of the headrest controls movement in the forward or the forward/reverse direction. Veering is accomplished by activating the sensor in the backpad along with either the right or left wing sensor. The Stealth Ultra headrest array also includes a right and left swing away mechanism for the side sensors to facilitate easier transfer & position adjustable left and right sensor mounts as well as a sub occipital pad that encourages the driver to find their center head position.



PASL106_E_IVC
Proximity Switch Array with Eclipse driving tray for Invacare Electronics

This driver control device utilizes 4 proximity sensors placed inside a Stealth Partial Eclipse tray with the option of the fourth proximity sensor to be used for mode/reset change or reverse depending on the position of the 3-4 switch on the front of the interface. The Stealth Eclipse tray is angle adjustable and mounted to the midline Gattlin mount for easy transferring. Also included in this package is the powerchair interface. Typical users are individuals with developmental disabilities (i.e. moderate/severe CP), and other gross motor conditions such as traumatic brain injury.



PASL106IVC
Adjustable Proximity Switch Array with Lap Tray for Invacare Electronics

This driver control device utilizes four (4) adjustable proximity sensors. Each sensor controls movement in one of the four (4) directions in which the fourth sensor may be used as reverse or reset/mode change depending on the position of the 3-4 switch on the front of the interface. Also included is a choice of the ASL304B medium force wobble switch. Generally a tray is used as the driving platform, however the sensors may be placed at any available.



PASL107IVC
Two Switch Fiber Optic Array Package with Lap Tray for Invacare

This driver control consist of three (3) fiber optic switches. Two of the Fiber Optics are your directional switches and the third Fiber Optic is Reset/Mode change or reverse depending on the position of the 3-4 switch on the front of the interface. When you cover the right switch the chair moves right, when you cover the left switch the chair moves left, and when you activate both left and right switches the chair moves forward.

PASL107_E_IVC (not shown)
Two Switch Fiber Optic Array Package with Eclipse driving tray for Invacare Electronics

This driver control consist of three (3) fiber optic switches. Two of the Fiber Optics are your directional switches and the third Fiber Optic is Reset/Mode change or reverse depending on the position of the 3-4 switch on the front of the interface. When you cover the right switch the chair moves right, when you cover the left switch the chair moves left, and when you activate both left and right switches the chair moves forward.



PASL108IVC
Four Switch Fiber Optic Array Package with Lap Tray for Invacare Electronics

This array consists of four Fiber Optic Switches. Three Fiber Optics control Forward, Left and Right movement. The forth switch controls Reset/Mode change or reverse depending on the position of the 3-4 switch on the front of the interface. When the user covers the desired switch the chair will move in that direction. Veering can be achieved by activating the forward or reverse command with either the left or right command.



PASL109IVC
Sip N Puff/Head Array package for Invacare Electronics

The ASL 109 is designed for those individuals who, because of weak breath volume, are unable to achieve both hard and soft "sip" and "puff". In this driver control device any "puff" equals forward and any "sip" equals reverse. Right and left turns are controlled by sensors located in the wings of the headrest. "Steering" or "veering" can be achieved by rotating the head toward one the headrest wings while going forward in latched mode.



PASL109IVCST
Sip N Puff/Stealth Head Array package for Invacare Electronics

The ASL 109 is designed for those individuals who, because of weak breath volume, are unable to achieve both hard and soft "sip" and "puff". In this driver control device any "puff" equals forward and any "sip" equals reverse. Right and left turns are controlled by sensors located in the wings of the headrest. "Steering" or "veering" can be achieved by rotating the head toward one the headrest wings while going forward in latched mode. The Stealth head array includes a right and left swing away mechanism for the side sensors to facilitate easier transfer & position adjustable left and right sensor mounts as well as a sub occipital pad that encourages the driver to find their center head position.



PASL113_IVC
ASL Heavy Duty Non-Proportional "Monster" joystick

ASL Heavy Duty Non-Proportional "Monster" joystick.



PASLMJIVC
ASL Mushroom joystick package

Complete ASL mushroom joystick for Invacare electronics.



PASLPMJIVC
ASL Proportional Mini Joystick package

Complete ASL proportional mini joystick for Invacare electronics. Typical users would have marginal hand function due to progressive diseases (e.g. MS/ALS/MD). Due to the progression of their disease, these individuals would no longer be able to reliably operate a standard joystick, but would desire to remain with a proportional driving method.



ASL105_AE
ASL Stealth Elite Adult Size Head Array

ASL Stealth Elite Head Array, a standard ASL adult size head array with swing away, position adjustable spot pads for easily transfers.



ASL105_beam
ASL Head array with a 210 Beam Switch

ASL Head Array shown with a 210 beam switch mounted as reset/mode change.



ASL105_JC
ASL Head array with Junior size and Curved Wings

ASL head array with Junior size backpad and curved wings.



ASL105_JS
ASL Head array with Junior size and Straight wings

ASL head array with junior size backpad and straight wings.



ASL105_Mini
ASL head array in mini size and wing style

ASL head array with mini size backpad and mini wings.



ASL105_PC
ASL Head Array with Pediatric size and Curved Wings

ASL head array with pediatric size backpad and curved wings.



ASL105_PE
ASL Stealth Elite Pediatric Size Head Array

ASL Stealth Elite Head Array, a standard ASL pediatric size header with swing away, position adjustable spot pads for transfer.



ASL105_PS

ASL Head Array with Pediatric size and Straight Wings

ASL head array with pediatric size backpad and straight wings.



ASL105_STA

ASLStealth Ultra Adult Size Head Array

ASL Stealth Ultra Head Array, a standard ASL Adult size head array combined with a Stealth Headrest to provide a sub-occipital and swing away, position adjustable spot pads for transfer.



ASL105_STP

ASL Stealth Ultra Pediatric Size Head Array

ASL Stealth Ultra Head Array, a standard ASL pediatric size head array combined with a Stealth Headrest to provide a sub-occipital and swing away, position adjustable spot pads for transfer.



ASL202_3-Pin

Fiber Optic Sensor with 3 pin connector

The ASL 202 is a single function switch with a round target area 1/4 inch in diameter. It has an adjustable activation range from touch to 2.5 inches. The fiber optic switch can be programmed for either NO or NC operation. In the normally open operation (NO) mode, switch activation occurs when an object is detected in the adjusted range. In the normally closed (NC) mode, switch activation occurs when an object is no longer detected in the adjusted range.



ASL202_M

Fiber Optic Sensor with mono output and 12 or 24 volt connector

The ASL 202 is a single function switch with a round target area 1/4 inch in diameter. It has an adjustable activation range from touch to 2.5 inches. The fiber optic switch can be programmed for either NO or NC operation. In the normally open operation (NO) mode, switch activation occurs when an object is detected in the adjusted range. In the normally closed (NC) mode, switch activation occurs when an object is no longer detected in the adjusted range.



ASL203 3-Pin

Mini Fiber Optic Sensor with 3 pin connector

The ASL203 is a single function switch with a round target area, pencil lead size in diameter. It has an adjustable activation range from touch to 1/4 inch. The fiber optic switch can be programmed for either NO or NC operation. In the normally open (NO) mode, switch activation occurs when an object is detected in the adjusted range. In the normally closed (NC) mode, switch activation occurs when an object is no longer detected in the adjusted range.



ASL203 M
Mini Fiber Optic Sensor with mono port and 12 or 24 volt connector

The ASL203 is a single function switch with a round target area, pencil lead size in diameter. It has an adjustable activation range from touch to 1/4 inch. The fiber optic switch can be programmed for either NO or NC operation. In the normally open (NO) mode, switch activation occurs when an object is detected in the adjusted range. In the normally closed (NC) mode, switch activation occurs when an object is no longer detected in the adjusted range.



ASL204 3-Pin
Non-Adjustable Proximity Sensor with 3 pin connector

ASL Proximity "no touch" switch and 3 pin connector made to interface with any ASL non proportional driver controls. This single function switch has an activation range of touch to 1/2 inch. Activation occurs when it senses a hand or another part of the body in the activation area.



ASL204 M
Non-Adjustable Proximity Sensor with mono port output and 12 or 24 volt connector

ASL Proximity "no touch" switch, mono port and 12 or 24 volt power connector, this switch is intended for use with ASL proportional driver controls or non driving utilization. Requires the addition of an appropriate ASL 804 power source cable to receive power from the power wheelchair. This single function switch has an activation range of touch to 1/2 inch. Activation occurs when it senses a hand or another part of the body in the activation area.



ASL208 3-Pin
Adjustable Proximity Sensor with 3 pin connector

This single function switch has an activation range of touch to 1/2 inch. Activation occurs when it senses a hand or other body part in the adjusted activation range. This switch is able to detect a hand, head, or knee through an inch of foam, plastic, or wood.



ASL208 M
Adjustable Proximity Sensor with mono port output and 12 or 24 volt connector

This single function switch has an activation range of touch to 1/2 inch. Activation occurs when it senses a hand or other body part in the adjusted activation range. This switch is able to detect a hand, head, or knee through an inch of foam, plastic, or wood.



ASL209 3-Pin
Adjustable Photo-Electric Sensor with 3 pin connector

This switch projects a cone shaped, invisible beam of light to an adjustable maximum distance of twenty-one (21) inches. Switch activation occurs when any object passes through or is detected in the target area. The ASL 209 should be considered when the available switch site is dependent on controlled gross movement.



ASL209 M
Adjustable Photo-Electric Sensor with mono port and 12 or 24 volt connector

This switch projects a cone shaped, invisible beam of light to an adjustable maximum distance of twenty-one (21) inches. Switch activation occurs when any object passes through or is detected in the target area. The ASL 209 should be considered when the available switch site is dependent on controlled gross movement.



ASL210
Adjustable Beam Switch with 3 pin connector

This sensor projects an invisible beam of light. Switch activation occurs when the head is moved beyond the adjusted sensing range. A set screw on the barrel of the switch allows the activation range to be adjusted up to maximum distance of fifteen (15) inches. When used in conjunction with the ASL105 Electronic Head Array, the adjustable beam switch functions as a passive stop switch and a reset switch.



ASL210T
Adjustable Beam Switch with mono port and 12 or 24 volt connector

The ASL210T can be set for either normally open (NO) operation or normally closed (NC) operation. This switch projects an invisible beam of light and has an adjustable activation range of up to fifteen (15) inches. In the NO mode, switch activation occurs when an object is detected in the adjusted range. In the NC mode, switch activation occurs when an object is no longer detected in the adjusted range.



ASL300
ASL Egg Switch

Unique to ASL, this mechanical "egg" switch features a seal that prevents foreign substances from entering the switch and interfering with operation. The base of this creative switch features screw insets for secure mounting to hardware like the ASL611.



ASL300R
ASL Egg Switch Finger Ring Mount

When the switch needs to stay with the individual, the ASL finger ring mount for the ASL 300 egg switch is the perfect solution. This innovative mount allows the ASL 300 egg switch to remain securely on the finger of the driver - perfect for powered seating operation.



ASL301
ASL Lip Switch

This tiny momentary switch allows a "Sip & Puff" user to access the control capabilities of a powerchair's electronics by lip movement. The switch is mounted approximately 1/2 inch from the end of the Sip & Puff straw and plugs into the reset port on the controller. To change modes, the user presses the switch with their lip.



ASL304A
ASL Wobble Switch/Light Pressure

This single function switch has a light action spring and can be activated by contact from any direction.



ASL304B
ASL Wobble Switch/Medium Pressure

This single function switch has a medium spring and can be activated by contact from any direction.



ASL305
ASL Button Switch

This momentary switch has an activation button the size of a dime and requires medium force for activation.



ASL308
ASL Pneumatic Switch - "Sip & Puff" Switch

This dual function switch is also known as a "Sip and Puff" switch. A Sip will activate one switch while a puff will activate the other switch.



ASL309
ASL Treadlite Switch

This single function switch, which is housed in metal, is best suited as a foot switch.



ASL312
ASL Microlight Switch

Extremely light-touch mechanical switch with tactile and auditory feedback.



ASL502
ASL Five Switch Adaptor Interface Box

This adaptor allows the four (4) directional commands and the select or reset command to be controlled by five (5) momentary switches with 1/8 inch mono-plug ends. This adaptor is compatible with all wheelchair electronics and/or other devices that allow for switch control and provide a DB-9 connection for that control.



ASL504
ASL Remote Emergency Stop Switch

The Remote Stop Switch allows a power chair to be stopped within a range of 50 feet. This switch is helpful when intervention is needed during training.



ASL505
ASL 12 volt AC power source wall plug

12 volt power source wall plug for accessories.



ASL506
ASL 24 volt AC power source wall plug

24 volt power source wall plug for accessories.



ASL509
ASL Laptop Power Converter

The ASL 509 enables a laptop computer to run off of the powerchair batteries. The power source converter connects to the powerchair batteries via an ASL power source and converts 24 volts to the voltage required to power a laptop computer. Computer model and voltage specifications are required when ordering.



ASL510
ASL Attendant Control Device (for ASL Driver Controls only)

Four (4) directional training/attendant override control with D9-Pin for powerchair with reset/mode change capability that, in drive mode, can perform as a passive kill switch.



ASL515
ASL 12 volt sealed lead acid battery and charger

12 volt power source with charger for 12 Volt DC switch/sensors.



ASL519
ASL Mouse Emulator/USB

The Mouse Emulator is available in a three (3) switch or five (5) switch configuration for MAC or IBM compatible computers. In the three switch version, full mouse emulation is achieved with only 3 switches. the right switch moves the mouse cursor right and left across the screen. The forward switch moves the mouse cursor up and down the screen. The left switch controls the "left click" and "drag" functions. The five (5) switch version allows the powerchair joystick to become a joystick operated mouse which requires a separate switch for "left click" and "drag" features.



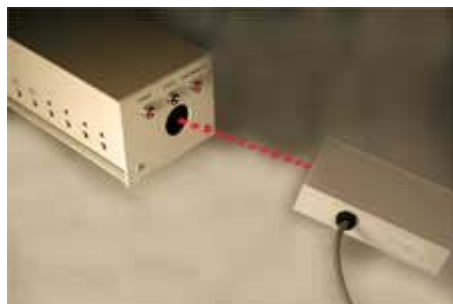
ASL520BG
ASL Remote Attendant Control

The ASL 520BG allows a parent or an aide to have control over one or more directions of a powerchair via a wireless attendant control. It can be used as a training tool to control right and/or left turn's) while in the learning process, or it can be used as a full attendant control device when needed. The remote attendant control is compatible with all wheelchair electronics that allow for switch control.



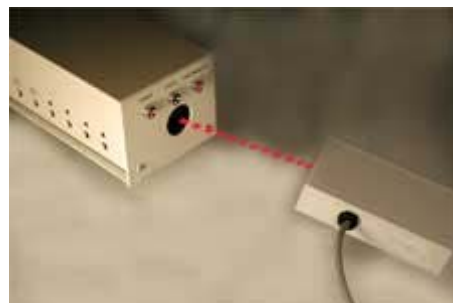
ASL521
ASL Joystick Extension 5th Switch

ASL mechanical switch built into a joystick extension.



ASL550
ASL Wireless IR Mouse Emulator 3-channel (USB only)

ASL desktop wireless, infra-red transmitter/receiver mouse emulator with three (3) switch configuration for MAC or IBM compatible computers. In the three (3) switch version, full mouse emulation is achieved with only 3 switches. The right switch moves the mouse cursor right and left across the screen. The forward switch moves the mouse cursor up and down the screen. The left switch controls the "click" and "drag" functions. Computer access from the powerchair can be achieved via a wireless connection.



ASL551
ASL Wireless IR Mouse Emulator 5-channel (USB only)

ASL desktop wireless, infra-red transmitter/receiver mouse emulator with 5 switch configuration for MAC and IBM compatible computers. The five (5) switch version allows the powerchair joystick to become a joystick operated mouse. Computer access from the powerchair can be achieved via a wireless connection.



ASL601
ASL Lap Tray Driving Platform

This tray is designed to serve as a driving platform for the ASL 106 4 Switch Electronic Array and the ASL 108 Fiber Optic Array. Ample space is provided inside the tray for various combinations of switch placement. The driving platform has a bottom cover that holds each switch in its desired location. The ASL 601 is available in the following widths: 12 to 13 inches, 14 to 15 inches, 16 to 17 inches, 18 to 20 inches.



ASL603
ASL Adjustable Height Driving Platform Joystick Mount for Prop. Mini Joystick.

Adjustable Height Driving Platform Joystick Mount for Prop. Mini Joystick with a through hole top to allow PMJ to fit through tray - requires Gatlin mount.



ASL603_S
ASL Solid Adjustable Height Driving Platform Joystick Mount for Prop. Mini Joystick.

Adjustable Height Driving Platform Joystick Mount for Prop. Mini Joystick with solid top and 3 directions of adjustment. Requires Gatlin Mid-line Mount.



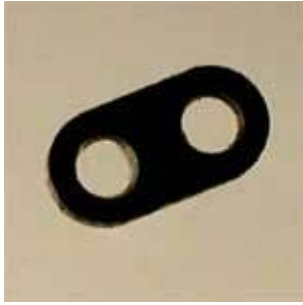
ASL604
ASL Headset mount for mini fiber optic sensor

This product houses a special fiber optic cable in a headset adapted mounting bracket. When connected to the fiber optic switch (not included), this device allows those individuals, with only tongue or puff of the cheek movement, a very reliable switch site.



ASL605_B
Mounting bracket for beam switch (arrowhead)

replacement mounting bracket for ASL beam switch.



ASL606_F
Fiber Optic Cable Mounting hardware for SNP straw

Mounting bracket for the fiber optic switch to mount on Sip and Puff Straw.



ASL606
ASL Multi axis (adjustable/removable) headrest mounting

Headset hardware with multiple axis adjustable ideal for use with head array and positioning.



ASL607_BC
ASL Sip and Puff Tube Assembly - for backcane mount

This assembly can be used with any Sip & Puff system. The design allows for numerous mounting possibilities.



ASL607_ER
ASL Sip and puff tube assembly built into headstrap - ear mount

Built into a light weight behind the ear strap, the SNP tube remains in place.



ASL607_HR
ASL Sip and Puff Tube Assembly - headrest mount

This assembly can be used with any Sip & Puff system. This design allows for any Auto Bock headrest mount including the ASL Head Array.



ASL607_ST
ASL SNP assembly made for Stealth headrest

This swing away mount integrates SNP tubing to the Stealth Headrest



ASL611
ASL Arm Rest Switch Mounting Bracket

This bracket has a clamp lock mechanism with an adjustable height rod that is attached to a small circular platform. It fits tubing up to 1" in diameter and allows for the mounting of numerous items.



ASL614
ASL Protective Covering for Electronics

Protective covering for cables and electronics.



ASL615
Stealth Compact (IVC 1812) Joystick Mount

At last a practical design for an attendant joystick mount. This allows the attendant to remove the joystick and drive the powerchair up a ramp, down a tight corridor, or use as a primary drive point. The design locks the joystick into place and slides out for easy removal.



ASL616
Stealth Gatlin midline swingaway joystick Mount

There is a new mid line mount in town. This uniquely designed mid line mount is very versatile and stable. The Gatlin has a swing away locking design to prevent rotation and slipping. Its angle adjustable, multi-positional features will allow you to mount virtually anything from the mushroom joystick, an adjustable tray with switches, or an augmentative communication devices. Using the existing joystick mounting bracket the options are limitless.



ASL616 E

ASL Stealth Partial Eclipse driving platform with ASL 616 Gatlin included

Partial Eclipse Driving Platform, with ASL 616 Gatlin Mid-Line Mount- Adjustable with 360 Degrees of Rotation.



ASL617

Stealth Flip Down Headrest Mounting Bracket

Hardware for ASL headrest to easily flip down (Otto Bock style).



ASL618 IVC

ASL Swingaway Visual Display mounting hardware for IVC

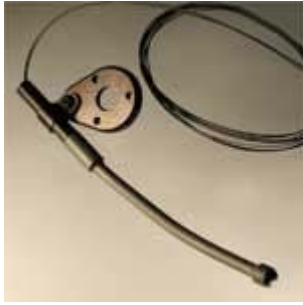
Highly flexible visual display mounting hardware for Invacare display.



ASL619 GE

ASL Stealth Partial Eclipse tray only (Gatlin not included)

Partial Eclipse Driving Platform.



ASL620
ASL Fiber optic mount for Stealth Ultra

Fiber Optic Cable mounted into a flexible casing attached to a Stealth lateral swing away mechanism. Intended to mount to a Stealth headrest.



ASL622
ASL Stealth LINK Headrest Mounting Hardware
(adjustable/removable)

Highly adjustable headrest hardware for use with standard headrest or Head Arrays.

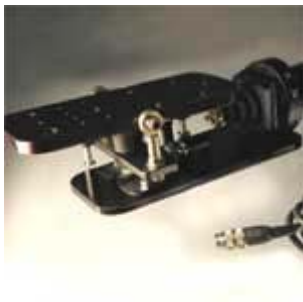


ASL626 A
ASL collar mount for chin joystick - for proportional mini joystick

Collar Style Mount for PMJ chin joysticks with built in reset mechanical switch.

ASL626 B (not shown)
ASL collar mount for full size chin joystick

Collar Style Mount for chin joysticks with built in reset mechanical switch.



ASL627
ASL Foot Control hardware interface

This adaptor provides a mounting platform for a proportional joystick and allows wheelchair control through plantar and dorsa flexion combined with right and left foot movements. (Joystick and shoe holder not included.) This Multi-axial foot driving platform is made to interface with IVC, P&G or Dynamic joystick



ASL402_1
ASL Ancillary Speaker Modification 1 - specify side

Optional upgrade to the ASL 105 Head Array, in which a speaker is built into head array for audio output from a communication device or computer.



ASL402_2
ASL Ancillary Speaker Modification 2 - both sides

Optional upgrade to the ASL 105 Head Array, in which speakers built into both sides of the ASL 105 head array for audio output from a communication device or computer.



ASL628
ASL swing away adjustable height chin mount for PMJ

Swing-away, Adjustable Headrest Mount for Prop. Mini Joystick.



ASL629
ASL Height adjustable joystick mount

Joystick mounting hardware to allow tube height & angle adjustment.



ASL711
ASL Low Voltage Leg Bag Emptier

Powered emptying mechanism for leg bag made to receive power and operation signals from the power chair.



ASL802_2
ECU Interface Cable 2 Mono-Plug

This cable converts two (2) of the four (4) directional commands from the ECU port into separate mono plugs. It can be used for functions such as tilting or reclining the power wheelchair to accessing a computer or communication device that requires a mono plug to the ECU port for control. The ASL 802_2 has two (2) output jacks from the left and right signal on the driver control operating the power wheelchair in ECU mode.



ASL802_3
ECU Interface Cable 3 Mono-Plug

This cable converts three of the four (4) directional commands from the ECU port into separate mono plugs. It can be used for functions such as tilting or reclining the power wheelchair to accessing a computer or communication device that requires a mono plug to the ECU port for control. The ASL 802_3 has output jacks from the forward, left and right signal on the driver control operating the power wheelchair in ECU mode.



ASL802_4
ECU Interface Cable 4 Mono-Plug

This cable converts the four (4) directional commands from the ECU port into separate mono plugs. It can be used for functions such as tilting or reclining the power wheelchair to accessing a computer or communication device that requires a mono plug to the ECU port for control.



ASL804A
24 volt Power Source Adaptor with straight round connector

This adaptor provides three (3) 24 volt power source connections without inhibiting the charger port.



ASL804B
24 volt power source with IVC PTO lego block connector

This adaptor provides three (3) 24 volt power source connections without inhibiting the charger port. This is designed to be used with the Invacare PTO Block power connector.



ASL805
ASL D9 to D9 Cable

Male D9 to a female D9 extension cable.



ASL806
Mono To Mono Patch Cable

This cable is 6 feet long and has a male mono jack on each end. It serves as a patch cord from one device to another. For example: From the auxiliary output port on the ASL 101 Single Switch Scanner to the single or mono port on a communication device.



ASL807
Mono extension cable

Mono Extension cable with a female mono to male mono configuration.



ASL811
ASL 8-Pin Extension Cable

8-Pin Extension Cable.



ASL814_IVC
ASL Invacare 5 pin A/B multi input interface

5 pin multi input interface for Invacare electronics.



ASL815
ASL MKIV to MKV adaptor cable

Adapter cable for MKV to allow MKIV driver controls to be used



ASL894A
ASL Power tilt interface for Invacare

Basic Tilt power interface with drive lockout



ASL894B
ASL Power tilt interface for Invacare

Power Tilt interface for the Invacare 2GT.



ASL817
ASL dual switch input adaptor

Adapter to allow two mono port switches to have the same output.



ASL818
ASL MKV EX aux. Power cable

Cable for Invacare MKV EX controller to allow auxilliary power - provides a lego block connector for MKV EX.



ASL819
ASL Lego block charger option cable for Invacare

Lego block to round charger port for Invacare.



ASL820
ASL MKV EX Controller 5 pin option cable

Options cable for Invacare MKV EX with a 5 pin round to an EX input.



ASL822
ASL 8 pin to D9 cable

Round ASL 8 pin to a D9 Connector with an AC power source adapter - this allows the head array to be used with a communication device on a manual wheelchair.

ASL825
Custom Cable Configuration

You design the cable you need!

MK6i™ Electronics

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For more information regarding Invacare products, parts, and services,
please visit www.invacare.com



Yes, you can.

⚠ WARNING

A qualified technician **MUST** perform the initial set up of this wheelchair. also, a qualified technician must perform all procedures in the service manual.

DO NOT use this product or any available optional equipment without first completely reading and understanding these instructions and any additional instructional material such as owner's manuals, service manuals or instruction sheets supplied with this product or optional equipment. If you are unable to understand the warnings, cautions or instructions, contact a healthcare professional, dealer or technical personnel before attempting to use this equipment - otherwise, injury or damage may occur

⚠ ACCESSORIES WARNING

Invacare products are specifically designed and manufactured for use in conjunction with Invacare accessories. Accessories designed by other manufacturers have not been tested by Invacare and are not recommended for use with Invacare products.

NOTE: Updated versions of this manual are available on www.invacare.com.

Special Notes

Signal words are used in this manual and apply to hazards or unsafe practices which could result in personal injury or property damage. Refer to the table below for definitions of the signal words.

SIGNAL WORD	MEANING
WARNING	Warning indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
CAUTION	Caution indicates a potentially hazardous situation which, if not avoided, may result in property damage or minor injury or both.

NOTICE

THE INFORMATION CONTAINED IN THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE.

⚠ REPAIR OR SERVICE WARNING

Setup of the Electronics Control Unit is to be performed only by a qualified technician. The final adjustments of the controller may affect other activities of the wheelchair. Damage to the equipment could occur if improperly set-up or adjusted.

⚠ OPERATION WARNING

Performance adjustments should only be made by professionals of the health care field or persons fully conversant with this process and the driver's capabilities. Incorrect settings could cause injury to the driver, bystanders, damage to the wheelchair and surrounding property. After the wheelchair has been setup/adjusted, check to make sure that the wheelchair performs to the specifications entered in the setup procedure. If the wheelchair does not perform to specifications, turn the wheelchair **Off IMMEDIATELY** and re-enter setup specifications. Repeat this procedure until the wheelchair performs to specifications.

What's New for MK6i

New Joysticks



- Two choices for standard joysticks - Basic - SPJ™+ (Non-expandable - 1 drive mode) or Rehab - MPJ™+ (Expandable - 4 drive modes).
- PSF and PSR - MK6i versions of the Personalized Style Joysticks are available.
- A full array of alternative proportional and digital driver controls are also available.

New Controllers



- Four controllers cover the entire current MK6i platform:
 - MK660 ACC - 2 Pole motors
 - MK690 and MK690 ACC - 4 Pole motors
 - MK6TT - TrueTrack motors
- MK6i Controllers allow changing from a non-expandable system, (one drive mode), to an expandable system (four drive modes), simply by removing the SPJ+ joystick, adding a necessary cable, and plugging in an MPJ+, PSR+, PSF+ joystick or a MK6i Display.

New Connectors



- Universal connectors make it easy to add or remove options, & eliminate the daisy chain.
- All MK6i options plug into the system using the same connector – in the same location.
- No more questioning the type of connector, or where to plug in.
- Locking securement tabs assure solid connections.

What's New for MK6i

Smart Actuators

- Smart Actuators are used on Formula™ TRE powered seating systems and are an option on Formula™ CG powered seating systems.
- The positioning sensor has been placed into the actuator. This allows setting up and down limits, while eliminating potentiometers and mercury switches.
- The Micro-processor for programming is integrated with the actuator and eliminates the need for a TAC or TRECM.
- Automatic Positioning, a new programmable feature available with custom actuators – allows pre-setting powered seat positions, attainable with a single driver command.

Professional Memory Card

- A New Professional Memory Card places the features of Laptop IVS into the palm of your hand.
- Allows saving Individual Drive profiles and multiple system profiles in one place.
- Create Libraries of ready to install custom profiles.
- View Help Library, advanced diagnostics and troubleshooting tips.
- Standard with all programmers. USB ready version comes with a card reader with a USB adapter.



New Display

- Larger brighter LCD screen.
- Crisp Text and Icons for easy viewing, even in sunlight.
- Allows alternative controls to be used with an expandable electronic platform.
- View all four drives, all at once.
- View Standard programs names programmed into each drive.
- Insert a Memory Card and turn the Display into the programmer for that wheelchair.



New Programmer

- Based on a MK₅™ foundation – same rules – similar keystrokes.
- View values for all four drives – all at once.
- Can still use a MK₅ programmer with access to EVERYTHING except “Help” screen.
- New Programmable features include:
 - Three Scanning modes (Refer to [VIEW/SCAN](#) on page 63.)
 - Automatic Positioning (Refer to [AUTOMATIC POSITIONING](#) on page 57.)



Four Way Switch Box (4WSB)



- Present with ALL multiple actuator systems.
- Provides a 9 Pin Port for any separate 4 Quadrant switch to operate powered seating.
- No charge compatible switches include the “4 Way Toggle” and the “4 Quadrant Push Buttons”.



Multiple Actuator Interface Box (S4WSB)



- Replaces above 4-way switch box when operating multiple actuators through the Driver control.
- Provides a 9 Pin port for any separate 4 Quadrant ATTENDANT switch to operate powered seating.
- Provides two Additional ports, “A” and “B” for accessory powered seating switches.
 - Port A - Cycles/selects through connected actuators.
 - Port B - Operates the selected actuator in an up/down control method.
- HCPCS code E2311

Single Actuator Node (SANODE)



- Added to any Expandable system (4 drives) to allow operating a single actuator system through the Driver Control
- Not compatible with the SPJ+ joysticks (Non-expandable systems)
- HCPCS code E2310

Auxiliary Module 12 (AUX12M6)



- Provides two 9 pin ECU outputs with 4 switch closures each.
- Less than half the size of the original ECU boxes.

Auxiliary Module 32 (AUX34M6)



- Same as Auxiliary Module 12 with an additional mono port to add a 5th switch and allow 5 switch closures through the output.

“Y” Splitter Cable



- Allows adding a second switch to the Mode Port of the MK6i Driver Control Options.
- Switch functions are programmable (Calibrations menu)
- Not compatible with SPJ+ joysticks.

24 Volt Auxiliary Power Source



- Provides an accessory lead for devices requiring auxiliary power (e.g. electronic switches).

G-Trac™

G-Trac Description

- G-Trac uses an electronic gyro module and special controller developed to enhance the tracking and control capabilities of the chair from very slow speeds to fast speeds. Side sloped terrain (even slightly), obstacles at only one wheel or encountered on one side ahead of the other (such as door thresholds), steps and curbs approached at an angle, and soft or rough uneven terrain all make it difficult for power chairs to stay on course without veering to one side or the other. These situations are especially challenging for drivers using head controls, switch controls, Sip-n-Puff systems and alternative joystick controls to negotiate. G-Trac makes it possible to drive a power chair in these environments in a more controlled and easier manner.
- The G-Trac technology can be used with the standard 2 and 4 pole motors on many Invacare Powered Wheel Chairs, including the TDX® Spree, TDX SC, TDX SI, TDX SP, Power Tiger™, Storm Torque™ SP, and Storm Ranger X™. G-Trac is an option on the order form, is available with expandable (4-drive) electronic systems, and is not available with the Gearless Brushless (GB) motors.



G-Trac Installation

- G-Trac can only be installed at the factory.

MK6i New Joysticks

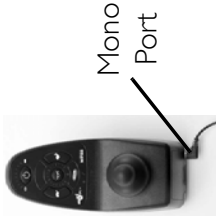
SPJ+ (Non-Expandable Systems)

- Single drive
- Push buttons - On/Off, speed select and horn
- LED battery and speed indicators
- Charger port
- Quick disconnect cord



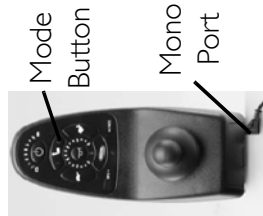
MK6i SPJ+ w/PSS (for Powered Seating)

- All features of SPJ+
- Mono port for powered seating switch



MK6i SPJ+ w/ACC (with Actuator Control)

- All features of MK6i SPJ+ w/PSS
- Mode Button through the joystick
- HCPCS code E2310.



MPJ+ (Standard Proportional Joystick)

- Four programmable drives
- Toggle On/Off and drive select, speed control pot
- Large, backlit LCD display with icons to reflect programmed modes in each drive
- Memory card reader
- Charger port
- Mono ports: One for remote On/Off switch, One with two programmable functions available (drive select, mode switch or actuator control)
- Built-in mode button
- Built-in swivel mount



PSF (Proportional Joystick)

- Same features as MPJ+ except no mono port for remote On/Off
- Toggle On/Off Drive Select - speed pot standard.
- No Switch or Left-Right On/Off options.



PSR (Proportional Joystick)

- Same features as MPJ+
- Toggle On/Off switch can be on left or right
- 3 switch option choices
 - Toggle On/Off drive select - speed pot standard
 - Push button On/Off and push button drive select
 - Push button On/Off and speed pot



New MK6i Display

Features

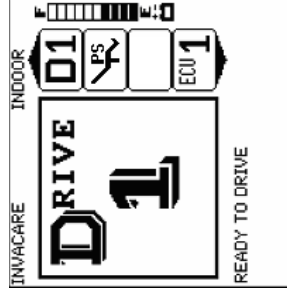
- The new MK6i Display can have up to four alternative drive controls (plus an attendant over-ride control) active on the wheelchair.
- View all four drives at once.
- View all programmed modes available in each drive.
- View standard program name or custom name programmed for each drive.
- View system name. The system name is the name for all four drives.
- Choose Standard View or Enhanced view (Refer to STANDARD on page 63).
- Convert into a MK6i Programmer using the Invacare Memory Card.
- Two ports - Remove On/Off Switch Port and Mode/Actuator/Drive Select Switch Port.



Remote On/Off
Switch Port

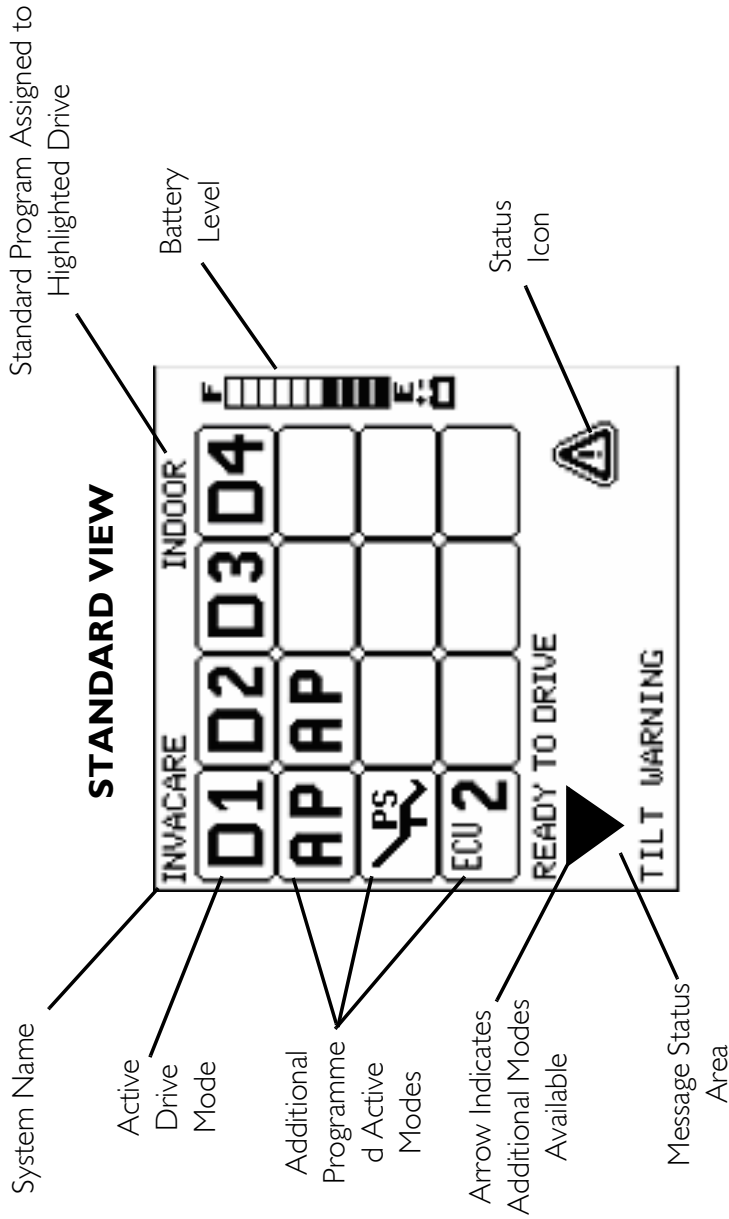
Mode/Actuator/
Drive Select
Switch Port

ENHANCED VIEW



NOTE: Enhanced view shows one drive at a time with enlarged icons.

New MK6i Display










DETAIL "A" - Status Icons

	"WARNING"
	Attendant Over-ride
	Charger Plugged in
	Drive Lockout Disabled
	Standby Mode Active
	G-Trac On (See Note)
	G-Trac Off (See Note)

NOTE: When a chair is programmed with at least one drive using G-Trac and the controller and gyro installed, there are two status icons that are displayed. The first icon, **GT**, is displayed if the selected drive has G-TRAC turned on. If G-TRAC is turned off in a drive, the displayed icon is **GT**

Available Modes

DISPLAY ICON	DRIVE MODE
	Drive Mode (1 through 4)
	Automatic Positioning
	Actuator Control Through Driver Control
	ECU Output activated (1 through 4)
	RIM Mode Activated
	Drive Select Mode Activated
	No Driving
	3-Speed Digital Driving Mode Activated

Proportional Alternative Controls

Compact Joystick (1558M6)



- A proportional 4 Quadrant (directional) driver control.
- The most versatile of proportional driver controls.
- Used for hand control, chin control, foot control, elbow control, midline control or attendant control.
- Programming parameters can compensate for impaired upper extremity/head/foot control function.
- Requires MK6i Display if used as a “stand alone” control.

ASL Micro Extremity

- A proportional 4 Quadrant control with Built in Mode switch (Activated by depressing the inductive).
- Minimal pressure required for activation.
- Primarily for users with good finger dexterity but otherwise minimal upper extremity function.
- Mounting includes hand or chin mount.
- Requires MK6i Display if used as a “stand alone” control.

PSR/PSF Joysticks



- Both PSR and PSF have four drive modes.
- PSF = Inductive in front, On/Off - drive select toggle and speed potentiometer mounted standard. No switch options or Right/Left options available with MK6i version.
- PSR = Inductive in the rear and choice for three combinations of two switches using Toggle, push buttons or speed potentiometer.

ASL Stealth Mushroom Joystick (ASLPSMJI)



- A proportional 4 Quadrant (directional) driver control.
- Modeled after a track ball design, this is a good option for those driving with shoulder and arm function rather than hand/finger.
- Can be Traditional Side Mounted - Mid Line Mount - Recess mounted in a Lap Tray.
- Replaces traditional "Goal Post" adaptation for some SCI Hand Control users.

RIM Head Control (I500M6)



- 3 Quadrant Proportional Head Control.
- A Reset Switch Toggles the Forward command to Reverse (Can be bypassed under some circumstances).
- Permits proportional head driving requiring standard joystick force.

Peachtree (PHC-3)



- 3 Quadrant Proportional Head Control.
- Proportional forward/reverse - digital left/right.
- Reset switch built into occipital pad to access / change modes, toggle RIM from forward to reverse, etc.
- Access to ALL Programming Parameters - Drives – ECU functions.
- Forward Head movement operates Forward / Reverse quadrants.
- Lateral Head movement (tilt) operates Left / Right quadrants.

Digital Alternative Controls

Sip N' Puff Controls (SNPM6)

- 4 Quadrant Non-Proportional Driving, Intra-Oral Pressure - NOT Breath Control. Pressure requirements can be calibrated to user's abilities.
- Quadrants can be re-assigned from Factory Set directions (through axes selection) to meet users needs. Factory Setting: Hard Puff = Forward, Soft Puff = Right, Hard Sip = Reverse, Soft Sip = Left.



ASL Head Array

- 3 Quadrant Driver Control (3 Proximity Switches: Occipital pad & Temporal Wings of the Head Rest).
- Size & Configuration options available.
- Mode switch (mechanical or electrical) used to toggle Rim functions Forward / Reverse.
- Choose from four standard reset switches: proximity, beam, egg and wobble; or add own custom.



ASL Proximity Switch Array

- Can be mounted into any orientation for a gross-movement, no-force switch system (Shown here with Driving Platform).



ASL SNP Head Array



- Combines the ASL switch head array (left and right directions) with Sip n' Puff (forward and reverse).
- Any Puff (hard or soft) = Forward Command, Any Sip = Reverse.
- Left & Right are digital commands (proximity switches) in the wings of the head rest.

ASL Stealth Ultra Head Array



- 3 Quadrant Digital Driver Control (3 Proximity Switches: Occipital pad & Temporal Wings of the Head Rest).
- Provides head support through the sub-occipital pad.
- Temporal pads are adjustable, & swing away for transfers.

ASL Fiber Optic Array



- Can be mounted into any orientation for a minimal-movement, no-force switch system.
- Options include 4 Quadrant & 3 Quadrant systems.

Tash® Mini Joystick



- 4 Quadrant Digital Joystick requiring minimal force & minimal throw to activate. (Depressing the joystick downward accesses a fifth switch, used for reset).
- Used for Hand Control when there is reduced hand wrist movement / strength / endurance. Often used in a midline mount or can be used in a traditional side mount.
- Chin Control when there is reduced head / neck movement.
- Can be Bib mounted or used with swing away midline mounts.

Tash Wafer Board



- Four “Directional” membrane switches with a fifth switch for “Re-Set”.
- Also available in a “Star” configuration.
- An option when there is limited hand dexterity, but at least moderate upper extremity control.

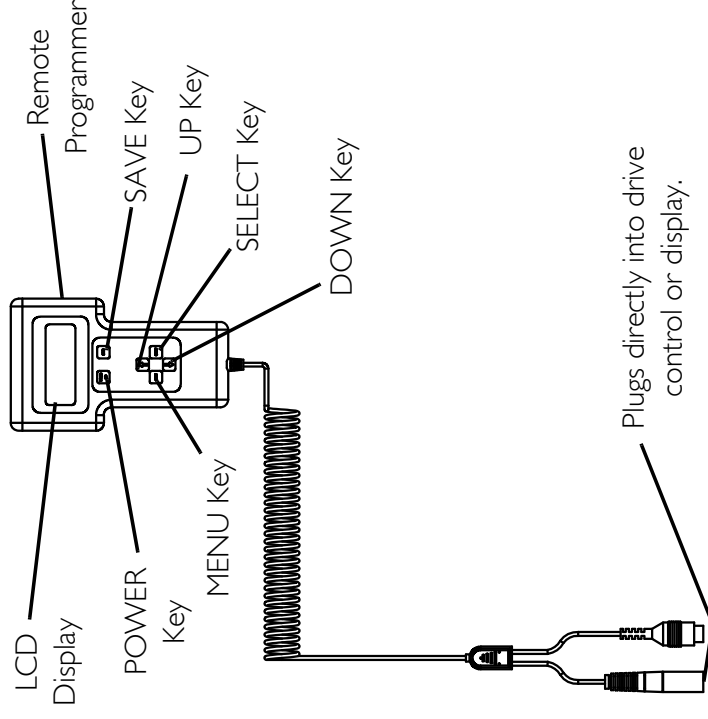
Single Switch Scanner



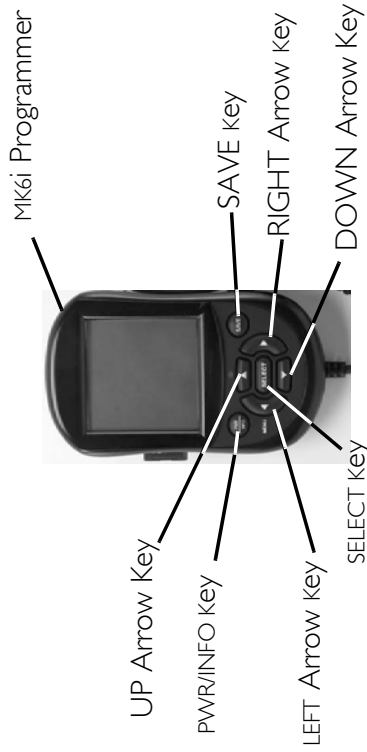
- A Single Switch Driving System, Scanning rate is adjustable.
- Can utilize any mechanical or electrical switch that has a 1/8” phono plug.
- The display scans each quadrant. When the quadrant led is turned on for the desired direction, the user holds the switch down and the wheelchair drives in that direction.

Using the MK₅ Programmer with MK6i Electronics

The MK5 programmer allows access to ALL MK6 programming with the exception of the HELP key. The primary difference is that only one drive can be viewed at a time. Select **ADVANCED MENU** to see the full MK6 programming screens. Refer to USING THE MK6I EASY REMOTE PROGRAMMER on page 20 for more programming information.



Using the MK6i Easy Remote Programmer



PWR/INFO Key

Use this key to:

- Turn the programmer On and Off. Hold the key down for more than two seconds.
- Display Help information (definitions for highlighted parameters and values). While the programmer is On, press and hold this key for 1 second then release. Press this key to dismiss the help information and return to programming.

NOTE: The Professional Memory Card MUST be inserted into the programmer to access the Help information.

Use these keys to:

- Scroll through menu options.
- Scroll through the Help information.
- Raise or lower selected performance values.

LEFT/RIGHT Arrow Keys

Use these keys to:

- Scroll along menu line items.
- Branch further in the menu structure.
- Return to the previous screen.

SELECT Key

Use this key to:

- Display adjustable values or selection choices when parameters are highlighted.
- Choose the new value or selection choice.
- Begin memory card transfer when prompted.

SAVE Key

The Save key **MUST** be pressed twice to save anything. The first press **ALWAYS** confirms that you want to save or where you want to save, and the second press saves the values.

When an entire row is highlighted - All 4 drives are saved at once. When only one value is highlighted - Only that drive is saved.

Selecting a Parameter

Use the Up/Down arrow keys to select the desired parameter to adjust.
 Use the Right arrow key to open the desired parameter's menu, if ">>>" is displayed.



MK6i PROGRAMMING				
PARAMETER	D1	D2	D3	D4
SPEED	100	100	100	100
RESPONSE	100	100	100	100
PERFORMANCE ADJUST	>>>			
STANDARD PROGRAMS	>>>			
MEMORY CARD	>>>			
POWERED SEATING	>>>			
CALIBRATIONS	>>>			
DIAGNOSTICS	>>>			

NOTE: Screen shown to the left is for reference only. Speed and Response values may differ.

Menu Descriptions

For descriptions of the parameters refer to the chart at the bottom of this page or these sections:

- Refer to **MK6i PERFORMANCE ADJUSTMENTS** on page 23.
- Refer to **MK6i STANDARD PROGRAMS** on page 36.
- Refer to **USING THE MEMORY CARD** on page 46.
- Refer to **POWERED SEATING** on page 51.
- Refer to **CALIBRATION MENU** on page 58.
- Refer to **DIAGNOSTICS** on page 75.

LCD DISPLAY	PERFORMANCE ADJUSTMENT DESCRIPTION
<p>SPEED 100%</p> <p>LESS  MORE</p>	<p>Sets maximum overall speed.</p> <ul style="list-style-type: none"> • 100% means 100% of programmed performance adjustment settings. • Cannot be more than 100% of programmed values. • Changes affect of all speed parameters (Forward, Turning and Reverse Speeds)
<p>RESPONSE 100%</p> <p>LESS  MORE</p>	<p>Sets overall response of the wheelchair to joystick commands.</p> <ul style="list-style-type: none"> • 100% means 100% of programmed performance adjustment settings. • Response can be increased up to 200% for quicker response to commands. • Response can be lowered for softened or delayed response to commands. • Changes affect Accelerations, Braking, Decelerations and Tremor Dampening.

MK6i Programming Outline

PERFORMANCE ADJUSTMENT	STANDARD PROGRAMS	MEMORY CARD	POWERED SEATING	CALIBRATIONS	DIAGNOSTICS
NAME	ANALOG	DRIVE PRGM >>> STORE TO CARD READ FROM CARD	DRIVE LOCKOUT L-ON/L-OFF	NAME DRIVE CONFIG >>> L-LEFT RIGHT CHOOSE CHAIR CONFIGURATION	JOYSTICK TILT
FWD SPEED	IDR_AVG	L-DRIVE>>> L-FOLDER>>> L-FILE NAME>>>	ACT CONTROL>>> L-OFF L-4SW L-4SWL L-4SW 2LVL L-4SW L 2LVL L-4SW MOM L-4SW L	MOTOR BALANCE MOTOR CALIBRATE ACC FUNCTION CONVENTIONAL ACTUATORS ONLY L-GENERIC L-TILT L-RECLINE L-LEG L-LEGS	RECLINE CNTR LEGS FAULT LOG VERSION
FWD ACCEL	MOD_OUTDR	L-START STORING L-START READING		TTJC (ACTUATOR)	
FWD BRAKE	SPEED_LVL			ACC DCI L-CONTINUOUS L-OFF L-ACTIVE	
REV SPEED	RAMPS_CURB	L-FOLDER>>> L-NAME>>>	<ACT CTLSTD PRGM>> TREL TRL TR TE	MONO PORT 1 MONO PORT 2 L-MODE RE-SET L-DRIVE SELECT L-ACTUATOR	
REV ACCEL	VERY SLOW	L-START STORING L-START READING	TILT ONLY RECLINE & LEGS ELEVATE ONLY LEGS ONLY	DISPLAY ORIENT VIEW/SCAN L-STANDARD L-ENHANCED L-R/C SCAN L-ENH SCAN L-SEQ SCAN	
REV BRAKING	MEC		ACT_SELECT>>> L-RWD L-REV L-LEFT L-RIGHT	(INIT TIME) (REPEAT TIME) L-SECONDS L-SECONDS	
TURN SPEED	INDR_LNDR	SYSTEM>>> STORE TO CARD READ FROM CARD	CHOOSE ACT FUNCTION	4W STD PRGM >>> L-FORWARD L-LEFT L-RIGHT L-REVERSE	
TURN ACCEL	I500_RIM	L-START STORING L-START READING		CHOOSE SEATING SYSTEM	
TURN DECEL	DIGITAL		SEATING ADJUST >>> (TILT) (RECLINE) (CNTR LEGS)	CHOOSE ACTUATOR FUNCTION	
TREMOR DAMP	ASL_INDR	SEATING CONTROL>>> STORE TO CARD READ FROM CARD	L-MAX UP SPEED L-MAX DN SPEED L-MAX UP ANGLE L-MAX DN ANGLE	FOLLOW SCREEN PROMPTS	
POWER LEVEL	ASL_OUTDR		L-1 ACTUATOR L-1 POSITION L-2 ACTUATOR L-2 POSITION L-3 ACTUATOR L-3 POSITION L-4 ACTUATOR L-4 POSITION L-5 ACTUATOR L-5 POSITION L-6 ACTUATOR L-6 POSITION	SPEED POT MAX TILT CAL RECLINE CAL CENTER LEG CAL	
TORQUE	SNP_LNR		(LT AP PRGM) (RT AP PRGM)	BACK ANGLE START IN DRIVE L-LAST L-DRIVE 1 L-DRIVE 2 L-DRIVE 3 L-DRIVE 4	
JOYSTICK THROW	3SPD_DIG			AUDIBLE IND L-OFF L-STANDARD L-RM	
AXES SELECT	SLOW_SNP			PRS TIME 0 TO 60 MIN	
INPUT TYPE				ERASE ALL FOLLOW PROMPTS	
MOMILATCH					
(LATCH TYPE)					
(1 SP)					
(3 SP)					
(3 SPD UID)					
(5 SP)					
(5 SPD UID)					
(CRUISE CTL)					
(MOM REVERSE)					
SLEEP MODE					
STANDBY SELECT					
(STANDBY TIME)					
(STBY IN ECU)					
RIM					
DRIVE SELECT					
(ECU1)					
(ECU2)					
(ECU3)					
(ECU4)					
ASM1					
ASM2					
NO DRIVING					
VIEW SCAN					

MK6i Performance Adjustments

Performance Adjustment Enhancements in MK6i

Name

The name of any Standard Program saved to a drive will be displayed on the LCD screen of the MK6i Joystick or Display. Changes in performance adjustment values from standard will defer to a default name (e.g. Drive 1). Drive profiles can be re-named by selecting "NAME" under the Performance Adjustment menu.

Forward Braking/Reverse Braking

The Braking Adjust parameter of the MKIV and MK₅ Performance menu has been split into two separate parameters, one for Forward only and the other for Reverse.

Reverse Acceleration

The ability to adjust acceleration in reverse or how quickly the wheelchair achieves programmed reverse speed has been added.

Tremor Dampening

Tremor dampening was previously a Standard Program used for individuals with tremors or ataxic upper extremity/hand movements. By adding a Tremor Dampening adjustment parameter to the Performance menu, any Standard Drive Profile from very slow to faster can be easily adjusted to accommodate tremors.

Torque - Redefined

Torque values are now displayed in ohms, a more accurate way to display what is actually occurring when values are changed. Slight changes in values programmed can have significant effects on driving.

View Scan

Enables or disables scanning features to be active in a particular drive.

Traction

A reduction of speed when going into or coming out of turns. The higher the value the greater the reduction. Does not affect direct turning speed. Helpful to soften veer correction during latched driving modes.

Name Changes

Remote Select has been renamed DRIVE SELECT.

Standby Mode has been renamed SLEEP MODE.

Momentary Mode Select has been renamed DIGITAL 3 SPEED.

Using the MK₅ Programmer to Make Performance Adjustments

1. Select ADVANCED MENU.
2. Select PERFORMANCE ADJUST.
3. Select the desired drive for performance adjustments.

DRIVE 1
> DRIVE 2
DRIVE 3
DRIVE 4

MK6i Performance Adjustments

SPJ+ Performance Adjustments

There is only one drive that can have the following adjustments:



FORWARD SPD
TURNING SPD
ACCELERATION FWD
ACCELERATION REV
TURN ACCELERATION
TURN DECELERATION
BRAKING FWD
BRAKING REV
REVERSE SPD
TREMOR DAMPENING
TORQUE
DCI OPERATION
DCI MONITORING
ACC 1
ACC 2

MPJ+ or Display Performance Adjustments




There are four drives that can have the following adjustments:

NAME
FWD SPEED
FWD ACCEL
FWD BRAKE
REV SPEED
REV ACCEL
REV BRAKE
TURN SPEED
TURN ACCEL
TURN DECEL
TREM DAMP
POWER LEVEL
G-TRAC
TORQUE
TRACTION
JSTK THROW
AXES SEL
INPUT TYPE
<i>*NOTE: Mode switch required unless STANDBY SEL is turned on.</i>
<i>**NOTE: Mode switch ALWAYS required.</i>

MOM/LATCH
LATCHED TYPE**
MOM REVERSE
3 SPEED DIGITAL**
SLEEP MODE**
STBY SEL
STANDBY TIME
STANDBY IN ECU**
RIM CONTROL
DRIVE SEL*
ECU1*
ECU2*
ECU3*
ECU4*
ASM1
ASM2
NO DRIVING
AUTO SCAN - DISPLAY ONLY
<i>*NOTE: Mode switch required unless STANDBY SEL is turned on.</i>
<i>**NOTE: Mode switch ALWAYS required.</i>



Performance Adjustment Definitions

LCD DISPLAY	PERFORMANCE ADJUSTMENT DESCRIPTION
<p>NAME SPEED_LVL ^</p>	<p>Allows the name of a saved standard drive program to be changed. Sets a 10 character Name for each drive. This is displayed on various screens during normal operation.</p> <ul style="list-style-type: none"> • Move the joystick right/left to move the carat (^) to the desired letter to change. • Move the joystick up/down to change the letter. • Changing any performance parameters will change the name to default "Drive #" • Use underscore to separate names. DO NOT leave blank spaces.
<p>FWD SPEED 80% MORE</p> <p>LESS </p>	<p>Sets maximum forward speed.</p> <ul style="list-style-type: none"> • Generally reduced for learning modes, indoor use, when precise maneuvering is required, or driving with digital controls. • Generally increased for outdoors, open level terrain, and "experienced" drivers.
<p>FWD ACCEL 30% MORE</p> <p>LESS </p>	<p>Time taken to reach maximum forward speed.</p> <ul style="list-style-type: none"> • Typically referred to as "Response" by the driver. • 100% = quickest acceleration. • Reduced to accommodate tremors or ataxia.
<p>FWD BRAKE 35% MORE</p> <p>LESS </p>	<p>Maximum braking force available to Stop or Slow the wheelchair.</p> <ul style="list-style-type: none"> • 100% = maximum. • Affects only the forward quadrants. • Generally increased when quick response and precise maneuvering of the wheelchair is needed at lower speeds.

LCD DISPLAY	PERFORMANCE ADJUSTMENT DESCRIPTION
<p>REV SPEED 50%</p> <p>LESS MORE</p>	<p>Sets the maximum reverse speed, independent of turning and forward speed.</p> <ul style="list-style-type: none"> • Generally set at low levels.
<p>REV ACCEL 30%</p> <p>LESS MORE</p>	<p>Time taken to reach maximum Reverse speed.</p> <ul style="list-style-type: none"> • Typically referred to as “Response” by the Driver. • 100% = quickest acceleration. • Reduced to accommodate tremors or ataxia.
<p>REV BRAKE 35%</p> <p>LESS MORE</p>	<p>Maximum braking force available to Stop or Slow the wheelchair in Reverse.</p> <ul style="list-style-type: none"> • Affects only the reverse quadrant. • Generally increased when quick response and precise maneuvering of the w/c is needed at lower speeds.
<p>TURN SPEED 50%</p> <p>LESS MORE</p>	<p>Sets Maximum Turning Speed – Independent of Forward Speed.</p> <ul style="list-style-type: none"> • Generally kept near 15% - 25% for most driving profiles. • Fast Turning Speeds are generally not Recommended for safety. • Often set equal or nearly equal to forward speed with very slow driving.
<p>TURN ACCEL 35%</p> <p>LESS MORE</p>	<p>How quickly the wheelchair reaches the programmed turning speed</p> <ul style="list-style-type: none"> • Also typically referred to as “Response” by the Driver. • Reduced to accommodate tremors or ataxia. • First suggested parameter to address if chair is too responsive to driver commands.

MK6i Performance Adjustments

LCD DISPLAY	PERFORMANCE ADJUSTMENT DESCRIPTION
<p>TURN DECEL 35% MORE</p> <p>LESS </p>	<p>How quickly the wheelchair “brakes” out of a turn when returning joystick to neutral.</p> <ul style="list-style-type: none"> • Turning Deceleration affects only the Left & Right Joystick Quadrants.
<p>TREM DAMP 50% MORE</p> <p>LESS </p>	<p>Accommodates Upper Extremity Tremors / Ataxia</p> <ul style="list-style-type: none"> • Previously a Standard Program – Now an Adjustment. • Higher levels = softer (delayed) response to joystick commands (accelerations & decelerations). • Lower levels = Increased or faster Response to joystick commands.
<p>POWER LEVEL 50% MORE</p> <p>LESS </p>	<p>Sets the Max power (current) available to the motors / drive wheels, or the point at which the wheelchair will stall at an obstacle or under a load.</p> <ul style="list-style-type: none"> • Will not effect “normal” driving, only with inclines, obstacles, etc. • Generally set low with pediatrics, cognitive or visually impaired, and New Drivers. • Generally set high for switch drivers, rough terrain, indoors at slow speeds over thick carpeting, etc.
<p>G-TRAC > ON OFF</p>	<ul style="list-style-type: none"> • Each of the 4 drives can be programmed to use the G-Trac feature, or have G-Trac disabled in that drive. To accomplish, use a Hand Held Programmer and select the Performance Adjustments menu item. Scroll down to G-TRAC and set it for ON or OFF.

LCD DISPLAY	PERFORMANCE ADJUSTMENT DESCRIPTION
<p>TORQUE 36</p> <p>LESS </p> <p>MORE</p>	<p>A function of Time & Power. How quickly programmed Power Level is reached.</p> <ul style="list-style-type: none"> • ALL FOUR quadrants are affected by the programmed torque level. • High = immediate ramping up to programmed power level. Recommended for Slow Speeds, Switch drivers, rough terrains, curbs, significant obstacles. • Low = slower ramping up to programmed power level. Recommended for faster speeds, level terrains, new drivers - even at some slower speeds. • MK6i Torque levels are noted in Ohms. • Small changes to torque have a significant impact. • Recommendation is to change only in 4 Ohm increments to determine if needs are met.
<p>DCI OPERATION (SPJ+ ONLY)</p> <p>OFF</p> <p>AFTERMARKET (OR “NORMALLY OPEN”)</p> <p>INVACARE (OR “NORMALLY CLOSED”)</p>	<p>Determines Drive Lock Out Function for systems utilizing any version of the SPJ+ Joystick</p> <p>OFF</p> <ul style="list-style-type: none"> • Disables Drive Lock Out for tilt or recline systems (manual or power), • Recommended setting for chairs without tilt or recline seating systems <p>NORMALLY OPEN/AFTERMARKET</p> <ul style="list-style-type: none"> • Setting for some systems using aftermarket powered seating systems. Consult the aftermarket seating manufacturer for more information. <p>NORMALLY CLOSED/INVACARE</p> <ul style="list-style-type: none"> • Setting used for Invacare tilt or recline systems (manual or power).


MK6i Performance Adjustments

LCD DISPLAY	PERFORMANCE ADJUSTMENT DESCRIPTION
<p>DCI MONITORING (SPJ+ ONLY)</p> <p>>IVC MANUAL SEATING (OR “CONTINUOUS”)</p>	<p>Determines the method Drive Lock Out status is monitored by the controller</p> <p>CONTINUOUS/IVC MANUAL SEATING</p> <ul style="list-style-type: none"> • Status of the drive lockout switch (i.e. Mercury Switch) is continuously monitored for change. • Use this setting for manual tilt or recline systems. • Recommended for some aftermarket powered seating systems. Consult the aftermarket seating manufacturer for more information. <p>LATCHING/IVC POWER SEATING</p> <ul style="list-style-type: none"> • Monitors the Drive Lockout Input switch ONLY during power up, and after actuator operation • This setting is recommended for Invacare powered seating systems
<p>IVC POWER SEATING (OR “LATCHING”)</p> <p>ACC 1 (2)</p> <p>(SPJ+ ONLY)</p> <p>OFF</p> <p>ON</p>	<p>Allows setting actuator to operate through the SPJ+ with ACC Joysticks when ACC is used on the TDX® Spree Power Wheelchair with power tilt.</p> <p>ACC 1 = ELEVATE, ACC2 = TILT</p>
<p>TRACTION</p> <p>30%</p> <p>LESS</p> <p> </p> <p>MORE</p>	<p>A reduction of the speed when going into and coming out of turns.</p> <ul style="list-style-type: none"> • The higher the value, the greater the reduction in speed. • Set at 0% for the majority of wheelchair users. • Increasing values may be helpful to soften veer correction in “latched” driving mode, or to dampen veer correction speed for aggressive drivers.

LCD DISPLAY	PERFORMANCE ADJUSTMENT DESCRIPTION
<p>JSTK THROW</p> <p>MOVE JOYSTICK TO: FORWARD_REVERSE_ LEFT_RIGHT_AND_ THEN NEUTRAL_</p>	<p>Used to calibrate joystick throw.</p> <ul style="list-style-type: none"> • Sets the point for reaching full speed in relation to joystick displacement. • Values DO NOT return to default settings unless Manually Re-Set. • Used with individuals having reduced ROM available for joystick operation.
<p>AXES SEL</p> <p>FORWARD >FORWARD REVERSE >REVERSE LEFT >LEFT RIGHT >RIGHT</p>	<p>Assigns / Re-Assigns joystick commands to a desired direction.</p> <ul style="list-style-type: none"> • Useful when changing “Joystick Operation” in relation to “Joystick Position”. • Each of the four input axes can be redirected to any output axis, or turned off. • Settings DO NOT refer back to default unless manually re-set. • “Select” Key on Programmer cycles through output choices.
<p>INPUT TYPE</p> <p>MPJ MK6i MPJ+ PSR MK6i PSR PSF MK6i PSF COMP COMPACT JOYSTICK MEC MICRO EXTREMITY / MINI PROP PEACHTREE ANALOG I500 PROPORTIONAL SNP INVACARE RIM CONTROL DIGITAL SIP-N-PUFF ASL DIG NON-PROPORTIONAL ASL SYSTEMS ONLY</p>	<p>Used to Add / Change Assigned driver control in one or more drives.</p> <ul style="list-style-type: none"> • Choose desired driver control for each drive according to this list. • Only available when more than one Driver control is connected. • Only driver controls connected will be displayed. • Only systems with 4 drive modes may add additional driver controls. • Two driver controls of the same Input Type cannot be used on one chair. • To increase the combinations of driver controls allowed, the following changes were made from MK5 to MK6i: <ul style="list-style-type: none"> • MK5 SWITCH JOY has been divided into MK6i Digital - ASL Digital • MK5 I812 has been divided into MK6i Analog - MEC - Peachtree • ASL Mushroom and Magitek Controls use ANALOG.

MK6i Performance Adjustments

LCD DISPLAY	PERFORMANCE ADJUSTMENT DESCRIPTION
<p>MOM/LATCH > MOM LTCH</p>	<p>Determines the mode for FORWARD driving commands.</p> <ul style="list-style-type: none"> • Momentary commands are only active while the command is being given. • Latched commands remain active after release of the driver control - until 2 reverse commands or emergency stop switch is activated. • Left & Right commands are ALWAYS momentary. (See “MOM/REVERSE”). • Available on proportional & digital controls on 4 drive systems. • Latched driving requires mode switch / emergency stop switch.
<p>LATCHED TYPE >CRUISE CTL 1 SPD 3 SPD 3 SPD U/D 5 SPD 5 SPD U/D</p>	<p>Allows different speeds in Latched driving. Present if Latched mode is selected</p> <ul style="list-style-type: none"> • 1 SPEED = 1 Forward Speed. • 3 SPEEDS = 3 stepped Speeds (1/3 percentages of forward speed). • 5 SPEEDS = 5 stepped Speeds (1/5 set percentages of forward speed). • CRUISE CTL = Default = Cruise Control (set speed determined by driver). • Stepped latch will increase one step in speed with each successive forward command. A reverse command stops the wheelchair. Used to provide speed selections in latched modes without changing drives. • In 3 SPD U/D and 5 SPD U/D, each successive FORWARD command ramps up to the next step, each successive REVERSE command steps down one step. In U/D mode, a SUSTAINED REVERSE command STOPS the chair, as does activating the “Emergency Stop Switch”. • In cruise control, speed will continuously ramp up as the forward command is sustained, and maintain the speed reached when releasing the forward command. Speed decreases in the same rate with a reverse command. Two reverse commands within one second (or an emergency stop switch) stops the wheelchair.
<p>MOM REVERSE > MOM LTCH</p>	<p>Allows Reverse to be set as either MOMENTARY or LATCHED.</p> <ul style="list-style-type: none"> • Available only when “Latched” mode driving is selected. • On sets reverse as momentary. Off sets reverse in Latched. • Helpful for some sip-n-puff users backing into spaces.

LCD DISPLAY	PERFORMANCE ADJUSTMENT DESCRIPTION
<p>DIGITAL 3 SPEED > 3 SPEEDS 1 SPEED</p>	<p>Allows either 1 or 3 driving speeds for Digital Controls in Momentary Mode (Previously named "Momentary Mode Select")</p> <ul style="list-style-type: none"> • 1 SPEED provides only one forward speed. • 3 SPEEDS provides 3 forward speeds, (1/3, 2/3, or full programmed speed), selected with a mode (re-set) switch prior to driving. • "3 SPEEDS" provides speed selections using digital driver controls - without changing drives. • Present only when digital driver control is selected under Input Type.
<p>SLEEP MODE > ON OFF</p>	<p>Allows the Wheelchair to enter an "Inactive (resting) Mode" mode after a set period of time with no driver control activity. (Previously named StandBy Mode)</p> <ul style="list-style-type: none"> • Used with drivers who cannot access the On/Off switch during periods of no activity. • Used to prevent "accidental operation" when in a resting mode. • A Mode Switch (Reset) is required to return the wheelchair to operating mode. • Disappears from the menu if Standby Select is On.
<p>STBY SEL > ON OFF</p>	<p>Sends the wheelchair into resting mode. Driver commands then SELECT next operating function – BYPASSING the "Reset Switch". Once in Standby mode:</p> <ul style="list-style-type: none"> • FORWARD command ALWAYS returns the wheelchair back to Drive Mode. • RIGHT Command = Remote Drive Select Mode (if turned on). Subsequent Left command changes to next drive. • LEFT Command = ECU functions, then Powered Seating Functions (if turned on). • Disappears from the menu if Sleep Mode is On.
<p>STANDBY TIME 60 S MORE</p> <p>LESS </p>	<p>Sets the time before for a Wheelchair will enter into "STAND BY" (resting) Mode</p> <ul style="list-style-type: none"> • Range is from 2 seconds to 120 seconds. • Present only when "Stand By" or "Standby Select" is activated.

MK6i Performance Adjustments

LCD DISPLAY	PERFORMANCE ADJUSTMENT DESCRIPTION
<p>STANDBY IN ECU > ON OFF</p>	<ul style="list-style-type: none"> • ON allows “Normal” Stand-By Function. • OFF eliminates Stand-By in ECU modes, but REQUIRES a Mode switch to exit ECU mode (Helpful during mouse emulation or Aux. Comm. operation through the driver control when Sleep Mode or Standby Select is also needed elsewhere, but they interfere). • Present only if Sleep Mode or Standby Select is On.
<p>RIM CONTROL > ON OFF</p>	<p>Allows three commands (quadrants) to drive 4 directions.</p> <ul style="list-style-type: none"> • Pressing a Mode switch (reset) changes the forward command to reverse driving. • Pressing the switch again toggles the command back to forward driving. • To eliminate the need for the mode switch: <ul style="list-style-type: none"> • Turn ON Standby Select • Turn OFF any additional modes using Standby Select for that drive (ECU Modes, Power Seating through the joystick, AP). • To activate “Reversing” without mode switch: <ul style="list-style-type: none"> • Allow the chair to enter Standby Mode • A left command activates Reversing • A forward command returns to normal driving.
<p>DRIVE SELECT > ON OFF</p>	<p>Drive Select: Allows Left Driver Command to change drives (1, 2, 3, 4)</p> <ul style="list-style-type: none"> • MUST be turned on in all drives to be accessed through the Driver Command. • Uses a Reset switch (or Standby Select) to enter & exit Remote Select (Drive Select) mode. • A LEFT driver command will advance to the next drive number activated. • Standby Select bypasses reset switch requirement to enter mode. <ul style="list-style-type: none"> • Right command activates Drive Select. • Left command advances drives. • After allowing the wheelchair to re-enter Standby Select Mode, Forward command returns to driving.

LCD DISPLAY	PERFORMANCE ADJUSTMENT DESCRIPTION
<p>ECU 1 (2, 3, OR 4) > OFF MOM MOTOR LATCHED COMM</p>	<p>Sets performance settings for devices connected to an ECU Port. Each output (1, 2, 3, or 4) appears separately in the menu. (Requires COM12, or COM 34).</p> <ul style="list-style-type: none"> • OFF Disables that output. (Recommended if no device is connected to it.). • MOM.MOTOR allows each driver command to operate in the momentary mode. • LATCHED places the driver commands in the latched mode, requiring an opposite direction command to turn off. (Suggested for pneumatic operation of Tilt / Recline when operating through a COM unit). • COMM allows immediate response of the relays – used with computers or communication devices. Also allows two relays to be closed at once (i.e., Forward & Right) for diagonal (veer) capability.
<p>NO DRIVING > ON OFF</p>	<p>Allows Driving to be turned off for that particular drive.</p> <ul style="list-style-type: none"> • Eliminates driving to dedicate that drive to another activity. • Helpful when performing multiple activities through the driver control to reduce choices users need to make. • Can be used to eliminate access to drives (until user is ready to add functions / features).
<p>VIEW/SCAN > ON OFF</p>	<p>Allows Scanning to be turned off or on for that particular drive.</p> <ul style="list-style-type: none"> • Available on the MK6i Display only. • Scanning Modes (Row column, Sequential, Enhanced) are chosen in the “Calibrations” menu. • Particular drives to be scanned are chosen here. • When scanning in “Sequential” mode, it can be helpful to limit the number of drives scanned. • Any driver command will initiate scanning. • Any driver command will select highlighted icon. • Scanning will return to resting mode after 3 cycles.

MK6i Standard Programs

Standard Program Descriptions

STANDARD PROGRAM	TYPE	DESCRIPTION
INDOOR JOYSTICK AVE	Proportional	Average joystick user – an Indoor program (FACTORY SETTING DRIVE 1)
MODERATE OUTDOOR	Proportional	Medium speed for rougher terrain (FACTORY SETTING DRIVE 2)
SPEED/LEVEL TERRAIN	Proportional	High speed program for flat level surfaces (FACTORY SETTING DRIVE 3)
RAMPS & CURBS MODE	Proportional	Medium Speed with High Power & High Torque (FACTORY SETTING DRIVE 4)
INDOOR LEARNER	Proportional	Slow settings for Indoor learning
VERY SLOW DRIVING	Proportional	Slowest driving standard program
MEC	Proportional	A Program with Sensitivity & Acceleration settings already softened. Ideal for Micro extremity & Mini Proportional Joysticks
LEARNER 3 SPD MOM	Digital	A Momentary switch (non-proportional) program with 3 forward & 1 reverse speed
ASL INDOOR / LEARNER	Digital	A Momentary switch (non-proportional) program ideal for drivers new to ASL systems
ASL OUTDOOR/FASTER	Digital	A Momentary switch program ideal for drivers experienced with ASL systems
LEARNER SIP & PUFF	Digital	A Learning Program for SIP N Puff in Momentary Mode
VERY SLOW 1SPD S&P	Digital	A Slow Program for SIP N Puff with 1 latched forward speed
LEARNER 1500 RIM	Digital	A Learning Program for the RIM Head Control

MK660 w/ACC (2-Pole Motors) Standard Values (RWD)

	INDOOR JOYSTICK AVE.	MOD. OUTDOOR	SPEED LEVEL TERRAIN	RAMPS & CURB	VERY SLOW DRIVING	MEC	INDOOR LEARNER	ASL INDOOR	ASL OUTDOOR	SNP LEARNER	LEARNER 3 SPEED MOM	VERY SLOW 1 SPEED SNP	LEARNER 1500 RIM
FORWARD SPEED	45	75	95	50	15	25	30	20	40	30	30	15	30
FORWARD ACCEL	20	25	20	15	20	20	20	20	20	20	20	20	20
FORWARD BRAKING	50	50	50	60	50	50	50	50	50	50	50	50	50
REVERSE SPEED	30	30	30	25	15	12	12	12	12	12	12	12	12
REVERSE ACCEL	20	25	20	20	20	20	20	20	20	20	20	20	20
REVERSE BRAKING	55	55	55	60	55	50	50	50	50	55	50	50	50
TURN SPEED	12	20	20	15	15	15	15	15	15	15	15	15	15
TURN ACCEL	15	20	20	15	15	15	15	15	15	15	15	15	15
TURN BRAKING	40	45	45	60	40	40	40	40	40	40	40	40	40
TREMOR DAMP	35	35	35	35	35	35	35	35	35	35	35	35	35
POWER LEVEL	100	100	100	100	100	100	100	100	100	100	100	100	100
TORQUE (OHMS)	144	144	144	156	144	144	144	144	144	144	144	144	144
TRACTION	0	0	0	0	0	0	0	0	0	0	0	0	0

MK660 a/ACC (2-Pole Motors) Standard Values (CWD)

	INDOOR JOYSTICK AVE.	MOD. OUTDOOR	SPEED LEVEL TERRAIN	RAMPS & CURB	VERY SLOW DRIVING	MEC	INDOOR LEARNER	ASL INDOOR	ASL OUTDOOR	SNP LEARNER	LEARNER 3 SPEED MOM	VERY SLOW 1 SPEED SNP	LEARNER 1500 RIM
FORWARD SPEED	45	75	95	50	15	30	30	20	35	35	35	20	30
FORWARD ACCEL	20	20	20	15	20	20	20	20	20	30	20	30	20
FORWARD BRAKING	50	50	50	50	50	50	50	50	50	50	50	50	50
REVERSE SPEED	35	35	45	25	15	25	20	15	20	15	20	15	20
REVERSE ACCEL	20	20	20	20	20	20	20	20	20	20	20	20	20
REVERSE BRAKING	45	55	55	45	55	50	50	50	50	55	50	55	50
TURN SPEED	15	20	20	12	12	15	15	15	12	15	12	15	15
TURN ACCEL	15	20	20	15	15	15	15	15	15	15	12	35	15
TURN BRAKING	35	45	45	25	35	35	35	35	35	35	35	35	35
TREMOR DAMP	35	35	35	35	35	35	35	35	35	35	35	35	35
POWER LEVEL	100	100	100	100	100	100	100	100	100	100	100	100	100
TORQUE (OHMS)	144	144	144	156	144	144	144	144	144	144	144	144	144
TRACTION	0	0	0	0	0	0	0	0	0	0	0	0	0

MK660 w/ACC and SPJ+ Joystick (2-Pole Motors) Standard Values

	M51/M61 (2)	EURO-M61 (2)	SPREE/SC/M71 (2)	RWD-2P (1)
FORWARD SPEED	95	95	95	95
FORWARD ACCEL	25	25	20	20
FORWARD BRAKING	50	80	50	55
REVERSE SPEED	40	40	35	35
REVERSE ACCEL	25	25	20	25
REVERSE BRAKING	55	55	55	55
TURN SPEED	25	25	20	20
TURN ACCEL	30	30	20	15
TURN BRAKING	30	30	45	35
TREMOR DAMP	35	35	35	35
POWER LEVEL	100	100	100	100
TORQUE (OHMS)	144	144	144	144
TRACTION	0	0	0	0

MK6i Standard Programs

MK690 or MK690ACC Motors Standard Values (RWD)

	INDOOR JOYSTICK AVE.	MOD. OUTDOOR	SPEED LEVEL TERRAIN	RAMPS & CURB	VERY SLOW DRIVING	MEC	INDOOR LEARNER	ASL INDOOR	ASL OUTDOOR	SNP LEARNER	LEARNER 3 SPEED MOM	VERY SLOW 1 SPEED SNP	LEARNER 1500 RIM
FORWARD SPEED	45	75	95	50	15	25	30	15	35	25	30	16	30
FORWARD ACCEL	20	20	20	15	20	15	20	20	20	20	20	20	20
FORWARD BRAKING	50	50	50	60	50	50	50	50	50	50	50	50	50
REVERSE SPEED	30	30	30	25	15	18	25	15	15	15	15	15	15
REVERSE ACCEL	20	25	20	20	20	15	20	20	20	20	20	20	20
REVERSE BRAKING	55	55	55	60	55	55	55	55	55	55	55	55	55
TURN SPEED	15	20	25	15	10	12	12	10	12	18	12	16	12
TURN ACCEL	15	20	20	15	15	15	15	20	15	50	15	25	15
TURN BRAKING	40	45	45	60	35	45	40	40	40	35	40	35	40
TREMOR DAMP	35	35	30	35	35	40	35	35	35	35	35	35	35
POWER LEVEL	100	100	100	100	100	100	100	100	100	100	100	100	100
TORQUE (OHMS)	36	36	36	48	48	44	36	48	40	40	40	40	36
TRACTION	0	0	0	0	0	0	0	0	0	0	0	0	0

MK690 or MK690ACC Motors Standard Values (CWD)

	INDOOR JOYSTICK AVE.	MOD. OUTDOOR	SPEED LEVEL TERRAIN	RAMPS & CURB	VERY SLOW DRIVING	MEC	INDOOR LEARNER	ASL INDOOR	ASL OUTDOOR	SNP LEARNER	LEARNER 3 SPEED MOM	VERY SLOW 1 SPEED SNP	LEARNER 1500 RIM
FORWARD SPEED	45	75	95	50	15	20	30	15	32	25	30	15	30
FORWARD ACCEL	20	20	20	10	20	10	20	25	20	25	20	25	20
FORWARD BRAKING	45	35	40	45	50	50	50	50	50	50	50	50	50
REVERSE SPEED	30	35	40	25	15	10	25	11	15	15	21	15	25
REVERSE ACCEL	20	20	20	20	20	15	20	20	20	20	50	20	20
REVERSE BRAKING	45	55	55	45	55	55	50	55	55	55	55	55	50
TURN SPEED	15	20	20	12	8	10	12	11	11	12	11	11	12
TURN ACCEL	15	20*	20*	15	15	10	15	15	12	15	12	15	15
TURN BRAKING	35	45	45	35	35	45	35	35	35	35	35	35	35
TREMOR DAMP	35	35	35	40	35	50	40	35	35	35	35	35	45
POWER LEVEL	100	100	100	100	100	100	100	100	100	100	100	100	100
TORQUE (OHMS)	36	36	36	48	48	42	36	36	40	48	36	48	36
TRACTION	0	0	0	0	0	0	0	0	0	0	0	0	0

NOTE: On M91™ wheelchairs this value is 15.

2- POLE CWD TDX SI ONLY

	Very Slow	Indoor Learner	Indoor Average	Mod Outdoor	Speed Level Terrain	Ramps and Curbs	Micro Proportional	Learner 1500 RIM	ASL Indoor	ASL Outdoor	SNP Learner	Very Slow 1 Sp SNP	Learner 3 Speed Digital	SP+
FORWARD SPEED	15	30	45	75	95	40	25	30	20	35	25	15	30	95
FORWARD ACCEL	20	20	20	20	20	15	15	20	20	20	20	20	20	20
FORWARD BRAKING	45	45	45	45	50	55	45	45	45	45	45	45	45	50
REVERSE SPEED	10	15	20	30	35	20	15	15	10	15	10	10	15	35
REVERSE ACCEL	20	20	20	20	20	20	20	20	20	20	20	20	20	20
REVERSE BRAKING	45	45	45	45	45	45	45	45	45	45	45	45	45	45
TURN SPEED	10	12	15	20	25	15	10	12	12	15	12	8	10	20
TURN ACCEL	10	12	15	20	20	15	12	12	10	12	15	15	15	20
TURN DECEL	40	40	40	50	50	45	40	40	40	40	40	40	40	50
TREMOR DAMP	30	30	30	30	30	30	30	30	30	30	30	30	30	30
POWER LEVEL	100	100	100	100	100	100	100	100	100	100	100	100	100	100
TORQUE (OHMS)	88	88	88	80	80	80	88	88	88	88	88	88	88	80
TRACTION	0	0	0	0	0	0	0	0	0	0	0	0	0	0

MK690, MK690 w/ACC and SPJ+ Joystick Standard Values

	TDX 4P (5)	RWD 4P (1)	CWD M91/SP	CWD M91 HD (4)
FORWARD SPEED	95	95	95	95
FORWARD ACCEL	20	20	20	20
FORWARD BRAKING	50	47	50	50
REVERSE SPEED	40	25	50	40
REVERSE ACCEL	20	15	20	20
REVERSE BRAKING	55	55	55	55
TURN SPEED	25	25	20	20
TURN ACCEL	15	15	25	20
TURN BRAKING	40	23	30	20
TREMOR DAMP	35	35	35	40
POWER LEVEL	100	100	100	100
TORQUE (OHMS)	32	32	32	36
TRACTION	0	0	0	0

MK6TT Motors Standard Values (RWD)

	INDOOR JOYSTICK AVE.	MOD. OUTDOOR	SPEED LEVEL TERRAIN	RAMPS & CURB	VERY SLOW DRIVING	MEC	INDOOR LEARNER	ASL INDOOR	ASL OUTDOOR	SNP LEARNER	LEARNER 3 SPEED MOM	VERY SLOW 1 SPEED SNP	LEARNER 1500 RIM
FORWARD SPEED	45	75	100	50	15	20	30	12	32	20	30	8	30
FORWARD ACCEL	20	20	20	10	12	12	12	10	10	10	10	10	12
FORWARD BRAKING	40	45	45	50	50	50	40	40	40	40	40	40	50
REVERSE SPEED	12	15	20	12	5	5	10	8	8	5	10	5	10
REVERSE ACCEL	20	20	20	20	15	15	15	20	20	20	20	20	15
REVERSE BRAKING	55	55	55	55	55	55	55	55	55	50	55	50	55
TURN SPEED	15	20	20	15	5	10	10	8	10	8	8	5	15
TURN ACCEL	20	20	20	20	20	15	15	10	10	15	20	15	15
TURN BRAKING	50	45	45	50	50	50	50	45	45	35	30	35	50
TREMOR DAMP	35	40	40	35	35	40	35	35	35	25	35	25	35
POWER LEVEL	100	100	100	100	100	100	100	100	100	100	100	100	100
TORQUE (OHMS)	15	10	5	70	15	15	5	25	50	75	25	25	20
TRACTION	0	0	0	0	0	0	0	0	0	0	0	0	0

MK6TT Motors Standard Values (CWD)

	INDOOR JOYSTICK AVE.	MOD. OUTDOOR	SPEED LEVEL TERRAIN	RAMPS & CURB	VERY SLOW DRIVING	MEC	INDOOR LEARNER	ASL INDOOR	ASL OUTDOOR	SNP LEARNER	LEARNER 3 SPEED MOM	VERY SLOW 1 SPEED SNP	LEARNER 1500 RIM
FORWARD SPEED	45	75	100	50	15	20	30	8	32	20	30	5	30
FORWARD ACCEL	20	20	20	10	12	12	12	15	10	15	10	15	10
FORWARD BRAKING	40	45	45	50	50	50	40	45	40	45	40	45	40
REVERSE SPEED	15	20	20	15	5	5	5	5	5	5	10	4	10
REVERSE ACCEL	20	20	20	20	15	15	15	20	20	20	20	20	20
REVERSE BRAKING	55	55	55	55	55	55	55	50	55	50	55	50	55
TURN SPEED	18	20	22	18	5	8	10	5	10	5	8	5	8
TURN ACCEL	20	20	20	20	20	15	15	15	15	15	20	15	15
TURN BRAKING	50	45	45	50	50	50	50	35	30	35	30	35	30
TREMOR DAMP	35	40	40	35	35	40	35	25	35	25	35	25	35
POWER LEVEL	100	100	100	100	100	100	100	100	100	100	100	100	100
TORQUE (OHMS)	15	10	5	75	15	15	5	75	75	75	75	75	50
TRACTION	0	0	0	0	0	0	0	0	0	0	0	0	0

Using the Memory Card

Description

The memory card allows programming parameters to be transferred from the power wheelchair to files on the memory card, where the parameters can be stored or organized. These parameters can be transferred to other wheelchairs as long as the motors, drive configurations, and driver controls are the same. The entire profile (all drives at once) may be saved or transferred. The individual drive profiles (1 through 4) may also be saved or transferred.

Basic Memory Card

Features of the basic memory card:

- Standard on delivery with all power wheelchairs with rehab (expandable) driver controls.
- Only used to backup/restore programmed settings/adjustments for one wheelchair.
- Does not contain advanced diagnostics, help screens, software updates, or file structure.
- Not compatible with SPJ™ + joysticks.

Professional Memory Card

Features of the professional memory card:

- Standard with all MK6i programmers.
- Available with the USB card reader.
- Contains advanced diagnostics, help screens, software updates, and file storage/retrieval.
- Not compatible with SPJ+ joysticks.

MK6i PROGRAMMING				
PARAMETER	D1	D2	D3	D4
SPEED	100	100	100	100
RESPONSE	100	100	100	100
PERFORMANCE ADJUST	>>>			
STANDARD PROGRAMS	>>>			
MEMORY CARD	>>>			
POWERED SEATING	>>>			
CALIBRATIONS	>>>			
DIAGNOSTICS	>>>			

Using the Basic Memory Card

NOTE: For this procedure, refer to FIGURE 13.1.

The basic memory card is recommended for storing a backup copy of final programming settings. This card can be attached to the wheelchair or left with the user. If the display or driver control need exchanging, the memory card serves to restore the original settings. Additional backup copies of the program values can be saved to the professional memory card. For the basic memory card to restore final program settings, the file name (system name) on the card **MUST** match the system name of the MK6i Display or the MK6i Joystick. To change the system name of the display or the joystick, refer to SYSTEM NAME on page 60.

To use the basic memory card:

1. Insert the basic memory card into the card slot of the MK6i display or driver control.
2. Turn the wheelchair On.
3. Use the joystick (forward/reverse) or display (up/down arrows) to select:
 - STORE TO CARD - Create a back up file.
 - READ FROM CARD - Restore programming settings.
4. Press one of the following to begin storing or reading:
 - Display - Press the Select key.
 - MPJ+, PSR or PSF joysticks - Press the mode button.

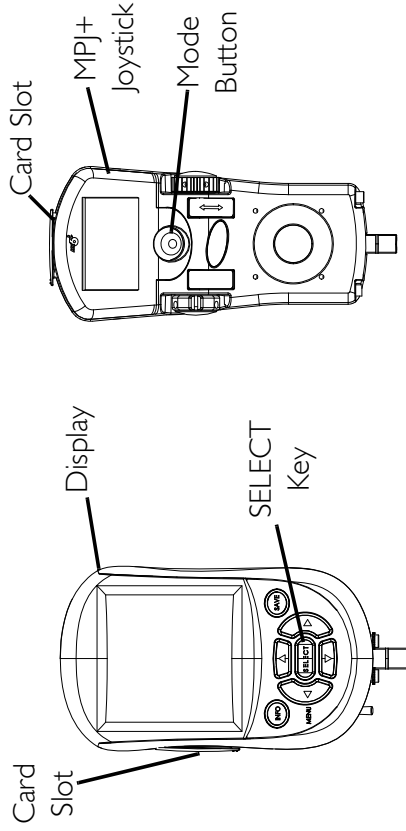


FIGURE 13.1 Using the Basic Memory Card

Using the Professional Memory Card

Updating the Professional Memory Card

1. Go to www.invacare.com.
2. Log into the website.
3. Click Technical Zone.
4. Click Software Downloads under the Diagnostics heading.
5. Download the MK6i Software Update and save to your desktop.

6. Insert the MK6i professional memory card into a SD card reader and plug the card reader into the USB port of your computer.
7. Open the MK6i update folder.
8. Open the "MK6_ver X.X Update.exe" file.
9. Select (highlight) the drive location of the professional memory card when prompted.
10. Select "OK" and the card will automatically be updated.

Using the Memory Card

Updating MK6i Software

1. Ensure the wheelchair is Off.
2. Insert the updated professional memory card into the card slot of the MK6i display or the MPJ+ joystick.
3. Turn the wheelchair On.
4. The screen shows "Firmware X.X.X is Available." Perform one of the following:
 - MK6i Display - Press Save to begin the update process.
 - MK6i MPJ+ Joystick - Press the Mode Switch to begin the update process.
5. The screen shows:
 - "Erasing" followed by a progress bar.
 - "Programming" followed by a progress bar.
6. After programming is complete, the screen shows one of the following:
 - MK6i Display - the first screen for using the Display as a programmer.
 - MK6i MPJ+ Joystick - the first screen for Through the Joystick Programming.

Saving or Installing a Drive Program, a System or a Seating Profile

NOTE: For this procedure, refer to FIGURE 13.2 on page 50.

1. Insert the professional memory card into the MK6i display or driver control.
2. Turn the wheelchair on.
3. Select MEMORY CARD on the menu.
4. Select the desired profile:
 - DRIVE PROGRAM- An individual drive for performance adjustments only.
 - SYSTEM - All four drives for performance adjustments and powered seating.
 - SEATING CONTROL - An individual drive for powered seating programming.
5. Select the desired action:
 - SAVE - Transfers files to the memory card.
 - READ - Transfers files to the power wheelchair.
6. Perform one set of the following steps based on the selection from step 4:
 - SYSTEM is selected -
 - a. Select FOLDER to display the selected folder from a list of folders to save to or read from.
 - ii. Press Select (display) or the mode button (joysticks) to select a folder.
 - iii. Select NAME to display/change the current system name (if saving) or to display a list of all system names in the folder (if reading).
 - iv. Press Select (display) or the mode button (joysticks) to select a system.
 - v. Select START to begin the reading or saving process.
 - DRIVE PROGRAM or SEATING CONTROL is selected -
 - i. Use the Select key (display) or the mode button (joysticks) to select the desired drive to save to or read from.
 - ii. Select FOLDER to display the selected folder from a list of folders to save to or read from.
 - iii. Press Select (display) or the mode button (joysticks) to select a folder.
 - iv. Select NAME to display the current drive or seating profile name (if saving) or to display a list of all drives or seating profile names in the folder (if reading).

Using the Memory Card

- v. Press Select (display) or the mode button (joysticks) to select a system.
- vi. Select START to begin the reading or saving process.

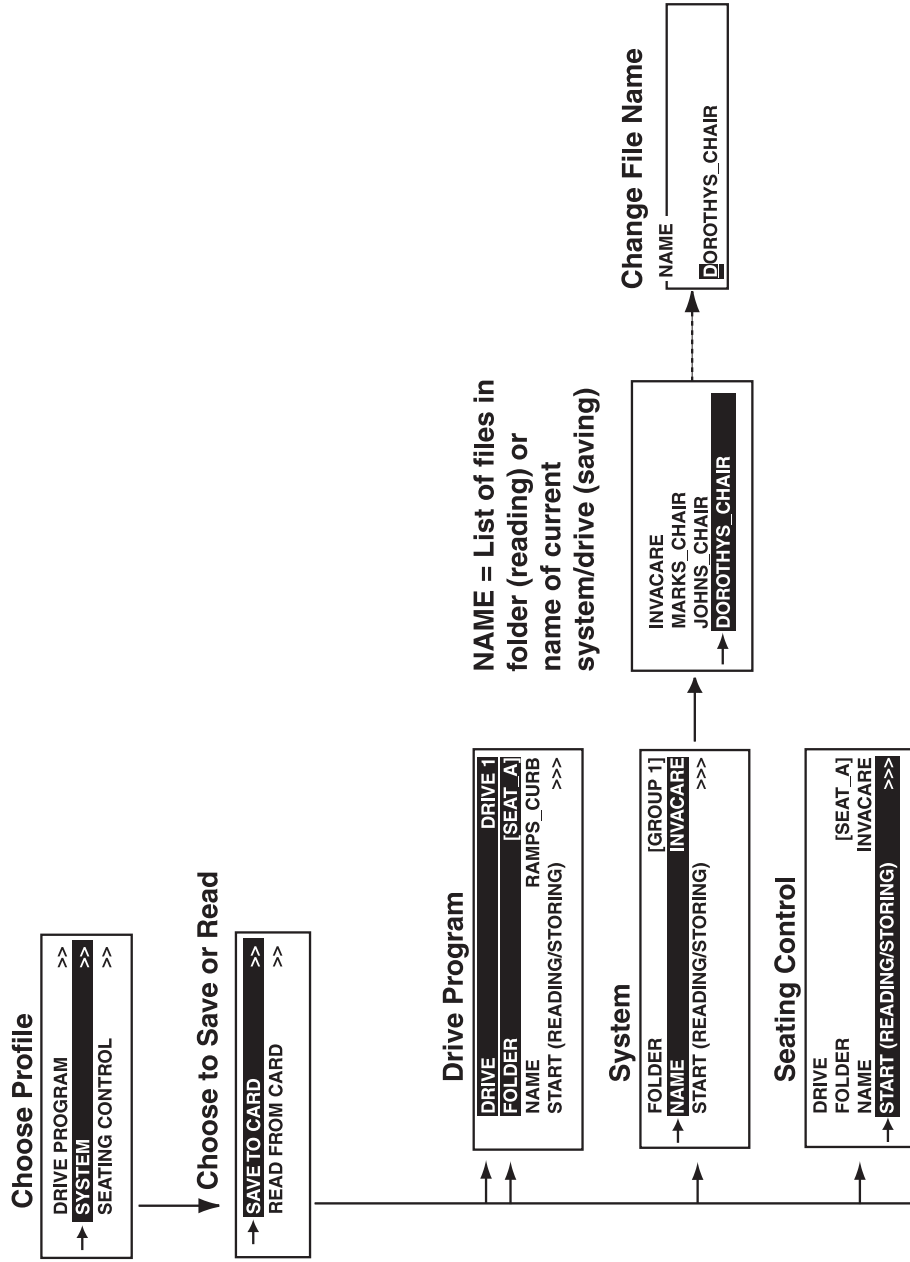


FIGURE I3.2 Professional Memory Card Saving and Installing Flow Chart

Powered Seating

Main Menu

MK6i PROGRAMMING				
PARAMETER	D1	D2	D3	D4
SPEED	100	100	100	100
RESPONSE	100	100	100	100
PERFORMANCE ADJUST	>>>			
STANDARD PROGRAMS	>>>			
MEMORY CARD	>>>			
POWERED SEATING	>>>			
CALIBRATIONS	>>>			
DIAGNOSTICS	>>>			

Drive Lock Out

Allows choice for Drive Lock Out to be enabled or disabled in individual drives.

MK6i PROGRAMMING				
PARAMETER	D1	D2	D3	D4
DRIVE LOCK OUT	ON	ON	ON	ON
ACT CONTROL	4SW	4SW	4SW	4SW
ACT CTL STD PRGM	NONE	NONE	NONE	NONE
ACTUATOR SELECT	>>>			
SEATING ADJUST	>>>			

Powered Seating Menu

MK6i PROGRAMMING				
PARAMETER	D1	D2	D3	D4
DRIVE LOCK OUT	ON	ON	ON	ON
ACT CONTROL	4SW	4SW	4SW	4SW
ACT CTL STD PRGM	NONE	NONE	NONE	NONE
ACTUATOR SELECT	>>>			
SEATING ADJUST	>>>			

DRIVE LOCKOUT

> ON
OFF

- Select On to enable drive lockout for the selected drive.
- Not available for SPJ+ joysticks.
- To disable drive lock out on conventional single actuator systems, choose "OFF" under <ACC DCI> in the calibrations menu.

Powered Seating

Actuator Control

An actuator control setting **MUST** be selected to operate powered seating through the driver control. The actuator control menu determines the method for operation of actuators through a driver control that is accessed through a mode switch or stand-by select. This menu appears only when there is a multiple actuator interface box or SANODE installed on the seating system.

ACTUATOR CONTROL

OFF

> 4-SWITCH

LATCH. 4SW

4 SW-2 LEVELS

4SWL-2 LEVELS

MOM.ISW

LATCH.ISW

- OFF - disables driver control operation of the powered seating for that drive only.
- 4 SW - Directions of driver command mirror Actuator Selection choices; Momentary mode.
- LATCH 4 SW - Same as 4 SW, but in latched mode. First command initiates actuators, repeated command stops actuator.
- 4 SW - 2 Levels - Recommended for head Controls in RIM mode. Dedicates left and right commands while turning off forward (occipital pad) command.
 - Mode Switch activates level 1, then level 2
 - Level 1 - Left driver command = Forward actuator selection, Right driver command = Reverse actuator selection.
 - Level 2 - Left drive command = Left actuator selection, Right driver command = Right actuator selection.
 - Standby Select bypasses mode switch requirement and allows Left command (held down) to cycle through each level.
 - Level 1 - Forward - Reverse actuator selections
 - Level 2 - Left - Right actuator selections
- MOM.ISW - Intended primarily for Head Control drivers operating with RIM.
 - Mode switch cycles through each actuator selection choice. Right command operates selected choice.
 - Standby Select allows left command (held down) to cycle through each actuator selection choice. Right command operates selected actuator (Momentary Mode).
- LATCH.ISW - Right command operates the actuators in a latched mode. The first command activates, repeated command releases.

Actuator Control Standard Program

STD PRG

NONE

TREL

TRL

TR

TE

TILT ONLY

RECLINE & LEGS

ELEVATE ONLY

LEGS ONLY

- Allows Pre set Actuator Selection Choices assigned to specific joystick quadrants.
- Selections can be customized using the actuator selection.
- i.e. Tilt Only: Forward = Tilt UP, Reverse = Tilt DOWN, Left & Right = OFF, etc.
- To view pre-set assignments for quadrant directions of the different standard programs, Refer to 4W STD PGM on page 68.

Actuator Selection

The actuator selection menu allows each quadrant (button) of the 4-way switch to be assigned to a specific actuator function. Operating the powered seating through the driver control will mirror actuator selection configured for that drive. An actuator selection MUST be made for at least one quadrant to operate the actuator through the driver control.

Select an individual quadrant in an individual drive by highlighting only that function or select the same quadrant for all drives by highlighting the entire row.

This is an example of the types of actuator functions that could be assigned to each direction in the Actuator Selection Menu:

Actuator Selection Menu

>> FWD	TILT U/D
REV	RECLINE & LEGS U/D
LT	ELEVATE UP
RT	ELEVATE DOWN

Actuator Functions

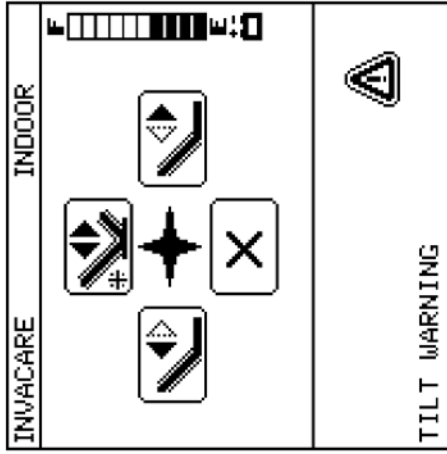
Each actuator function listed below has a choice for U/D (Up/Down), Up or Down and corresponding icons.

- TILT
- RECL
- LEGS
- ELEVATE
- RIGHT LEG
- LEFT LEG
- R&Lg (Recline & Legs)
- GENERIC (using the Controller actuator)

Display Icons

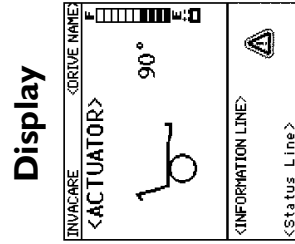
		TILT OPERATIONS
		RECLINE OPERATIONS
		CENTER LEG OPERATIONS
		RIGHT LEG OPERATIONS
		LEFT LEG OPERATIONS
		ELEVATE OPERATIONS
		SHARK POWER MODULE ACTUATOR OPERATIONS

DISPLAY EXAMPLE SCREEN: 4 SWITCH MODE FOR ACTUATOR OPERATION THROUGH THE

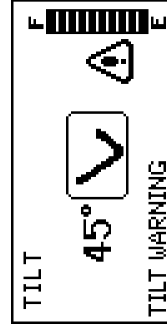


ACTUATOR OPERATION EXAMPLE SCREENS

Smart Actuators

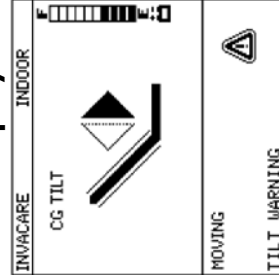


MPJ+

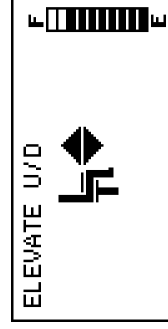


Conventional Actuator

Display



MPJ+



Powered Seating

Seating Adjust

The Seating Adjust menu allows the assignment of the maximum angles and the speed of the actuators. Automatic positioning programs are also set from this menu.

Seating Adjust

TILT ADJUST	>>>
RECLINE ADJUST	>>>
LEGS ADJUST	>>>
RIGHT LEG ADJUST	>>>
LEFT LEG ADJUST	>>>
LEFT AP PROGRAM	>>>
RIGHT AP PROGRAM	>>>

Adjusting the Actuators

When adjusting Smart Actuators note the following:

- Only Tilt, Recline and Center Mount Legs are available with Smart Actuators.
- Only Smart Actuators allow programming Max Up or Down Angles.

Adjustment Options

TILT ADJUST	SPEED UP SPEED DOWN MAX UP ANGLE (SMART ACTUATORS) MAX DOWN ANGLE (SMART ACTUATORS)
RECLINE ADJUST	SPEED UP SPEED DOWN MAX UP ANGLE (SMART ACTUATORS) MAX DOWN ANGLE (SMART ACTUATORS)
LEGS ADJUST	SPEED UP SPEED DOWN MAX UP ANGLE (SMART ACTUATORS) MAX DOWN ANGLE (SMART ACTUATORS) ONLY)
RIGHT LEG ADJUST	SPEED UP SPEED DOWN
LEFT LEG ADJUST	SPEED UP SPEED DOWN

Automatic Positioning

The LEFT AP PROGRAM and RIGHT AP PROGRAM are used to set Automatic Positioning. Automatic Positioning is a program for a set of actuators to move to a desired position with a single driver command.

- Only Smart Actuators can be programmed in Automatic Positioning.
- Each program (sequence) can have up to 6 steps. There are two programs (sequences) available for Automatic Positioning settings:
 - Left AP Program - Sets the sequence for tilting and/or reclining back and is ALWAYS a left driver command.
 - Right AP Program - Sets the sequence for returning to an upright sitting position and is ALWAYS a right driver command. The Right AP Program can be in a different sequence than the Left AP Program.
- Different automatic positioning programs can be set for each drive.
- The actuator choices for AP Programs are:

- NONE
- TILT
- RECLINE
- LEG
- RECLINE AND LEGS

1. Select POWERED SEATING > SEATING ADJUST > LEFT AP PROGRAM.
2. Highlight the desired drive or an entire row for the actuator and press Select.
3. Make the actuator selection from the choices on the list and press Select.
4. Highlight the desired drive or an entire row for the angle and press Select.
5. Press Select again to accept the warning shown on the screen.
6. Use the up and down arrow keys to operate the actuators.

NOTE: This will place the seat in the desired position.

7. Press select when the seat is in the desired position.
8. Repeat STEPS 1-7 for additional actuators.
9. Repeat STEPS 1-8 for the Right AP program to return the seat to the upright position.

NOTE: To remove automatic positioning from a drive, set Actuator 1 to "NONE" for the left and the right in the AP Program Menu.

MK61 PROGRAMMING				
PARAMETER	D1	D2	D3	D4
1. ACTUATOR	NONE	NONE	NONE	NONE
1. ANGLE	0	0	0	0
2. ACTUATOR	NONE	NONE	NONE	NONE
2. ANGLE	0	0	0	0
3. ACTUATOR	NONE	NONE	NONE	NONE
3. ANGLE	0	0	0	0
4. ACTUATOR	NONE	NONE	NONE	NONE
4. ANGLE	0	0	0	0
5. ACTUATOR	NONE	NONE	NONE	NONE
5. ANGLE	0	0	0	0
6. ACTUATOR	NONE	NONE	NONE	NONE
6. ANGLE	0	0	0	0

Calibration Menu

About Calibrations

The Calibrations Menu appears on wheelchairs with MPJ+, PSR or PSF joysticks or MK6i Display.

All calibrations are global.

Any calibration saved to one drive, is automatically saved to all four drives.

Main Menu

NOTE: Screen shown to the right is for reference only. Speed and Response values may differ.

MK6i PROGRAMMING				
PARAMETER	D1	D2	D3	D4
SPEED	100	100	100	100
RESPONSE	100	100	100	100
PERFORMANCE ADJUST	>>>			
STANDARD PROGRAMS	>>>			
MEMORY CARD	>>>			
POWERED SEATING	>>>			
CALIBRATIONS	>>>			
DIAGNOSTICS	>>>			

Calibrations Menu

CALIBRATIONS
SYSTEM NAME
DRIVE CONFIG
MOTOR BALANCE
CALIBRATE MOTORS
ACC FUNCTION
TTJC ACTUATOR
ACC DCI
MONO PORT 1
MONO PORT 2
DISPLAY ORIENT
VIEW / SCAN (MK6I DISPLAY ONLY)
INIT TIME
REPEAT TIME
4W STD PGM
4 WAY SWITCH
HARD PUFF CAL
SOFT PUFF CAL
HARD SIP CAL
SOFT SIP CAL
SPEED POT MAX
TILT CALIBRATE
RECLINE CALIBRATE
C. MOUNT LEGS CAL
BACK ANGLE
START IN DRIVE
AUDIBLE IND
PRS TIME
ERASE ALL

Calibration Menu

Calibration Menu Description

CALIBRATION	LCD DISPLAY	DESCRIPTION
<p>SYSTEM NAME</p>	<p>SYSTEM NAME INVACARE_</p>	<p>Create the Name for the System's Programming Settings</p> <ul style="list-style-type: none"> Name will be displayed on the Top Right corner of the MK6i Display. Use the Programmer Left & Right Arrow keys to position the Insertion Point (" "). Use the Programmer Up and Down Arrow keys to change the letter / number. Blank Spaces Not allowed. Name will end at that point.
<p>DRIVE CONFIG</p>	<p>DRIVE CONFIG >>4P CWD M91 & SP 2P RWD 2P CWD 4P RWD 4P RWD HD 4P CWD TDX 4P CWD HD GB RWD GB CWD</p>	<p>Switches motor outputs without switching motor connectors. Turning speed is modified to improve driving feel & control. Select the configuration to match the wheelchair.</p> <ul style="list-style-type: none"> The wheelchair will not perform as designed without the correct drive configuration selected and saved. This setting MUST be changed and saved each time a MPJ+, PSR, PSF or Display is added or replaced. <p>GB RWD and GB CWD are available only on the TDX - SR. G-Trac controller supports 4P CWD M91 & SP, 4P RWD, 2P-CWD, 2P-RWD and TDX-SI</p>
<p>MOTOR BALANCE</p>	<p>MOTOR BALANCE 32</p> <p>LEFT </p> <p>RIGHT</p>	<p>Ensures that left and right motors operate equally.</p> <ul style="list-style-type: none"> Can be used to correct for slight veer (i.e. with some digital controls).

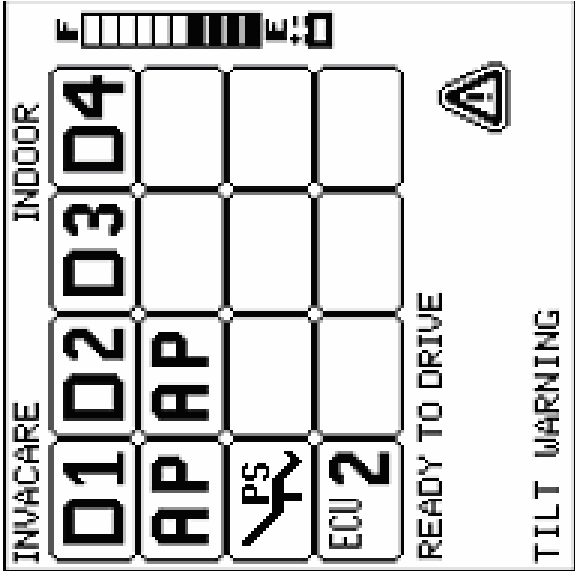
CALIBRATION	LCD DISPLAY	DESCRIPTION																		
MOTOR CALIBRATION		Calibrates motors. <ul style="list-style-type: none"> • For Gearless Brushless GB™ motors only. • Raise / Support Drive wheels off the ground. • Follow Instructions on Programmer. 																		
ACC FUNCTION	<p>>>OFF</p> <p>TILT</p> <p>RECLINE</p> <p>ELEVATE</p> <p>LEG</p>	Sets which actuator operates directly through the controller, not through an additional actuator module. <ul style="list-style-type: none"> • Allows display icons, programming options and drive lockout settings to match the chair configuration (i.e., tilt only, tilt and recline, etc.) • Set according to this chart: <table border="1"> <tr> <td>Tilt Only or Tilt w/Ind. Power Legs = TILT</td> <td>Tilt w/Ind. Power Legs =</td> <td>Tilt w/Pwr. Centermount = LEG</td> </tr> <tr> <td>Recline Only or Recline w/Ind. Power Legs = RECLINE</td> <td>Recline w/Ind. Power</td> <td>Recline w/Pwr. Centermount = LEG</td> </tr> <tr> <td>Tilt & Recline & Power Center Mount = LEG</td> <td>Tilt & Recline & Power Center Mount = LEG</td> <td>Center Mount Leg Only = LEG</td> </tr> <tr> <td>Individual Power Legs = OFF (or Generic)</td> <td>Individual Power Legs = OFF (or Generic)</td> <td>Tilt & Recline Only = OFF (or Generic)</td> </tr> <tr> <td>Tilt & Recline & Individual Power Legs = OFF (or Generic)</td> <td>Tilt & Recline & Individual Power Legs = OFF (or Generic)</td> <td>Elevate Only = ELEVATE</td> </tr> <tr> <td>Tilt & Recline & Elevate = ELEVATE</td> <td>Tilt & Recline & Elevate = ELEVATE</td> <td>Tilt & Elevate = ELEVATE</td> </tr> </table>	Tilt Only or Tilt w/Ind. Power Legs = TILT	Tilt w/Ind. Power Legs =	Tilt w/Pwr. Centermount = LEG	Recline Only or Recline w/Ind. Power Legs = RECLINE	Recline w/Ind. Power	Recline w/Pwr. Centermount = LEG	Tilt & Recline & Power Center Mount = LEG	Tilt & Recline & Power Center Mount = LEG	Center Mount Leg Only = LEG	Individual Power Legs = OFF (or Generic)	Individual Power Legs = OFF (or Generic)	Tilt & Recline Only = OFF (or Generic)	Tilt & Recline & Individual Power Legs = OFF (or Generic)	Tilt & Recline & Individual Power Legs = OFF (or Generic)	Elevate Only = ELEVATE	Tilt & Recline & Elevate = ELEVATE	Tilt & Recline & Elevate = ELEVATE	Tilt & Elevate = ELEVATE
Tilt Only or Tilt w/Ind. Power Legs = TILT	Tilt w/Ind. Power Legs =	Tilt w/Pwr. Centermount = LEG																		
Recline Only or Recline w/Ind. Power Legs = RECLINE	Recline w/Ind. Power	Recline w/Pwr. Centermount = LEG																		
Tilt & Recline & Power Center Mount = LEG	Tilt & Recline & Power Center Mount = LEG	Center Mount Leg Only = LEG																		
Individual Power Legs = OFF (or Generic)	Individual Power Legs = OFF (or Generic)	Tilt & Recline Only = OFF (or Generic)																		
Tilt & Recline & Individual Power Legs = OFF (or Generic)	Tilt & Recline & Individual Power Legs = OFF (or Generic)	Elevate Only = ELEVATE																		
Tilt & Recline & Elevate = ELEVATE	Tilt & Recline & Elevate = ELEVATE	Tilt & Elevate = ELEVATE																		
TTJC ACTUATOR	<p>>>TILT</p> <p>RECLINE</p> <p>ELEVATE</p>	Through the Joystick Control. <ul style="list-style-type: none"> • Only present with Multiple Actuators and the SANODE. • Allows choice of operating only one actuator through the joystick if multiple actuators are in the system. 																		

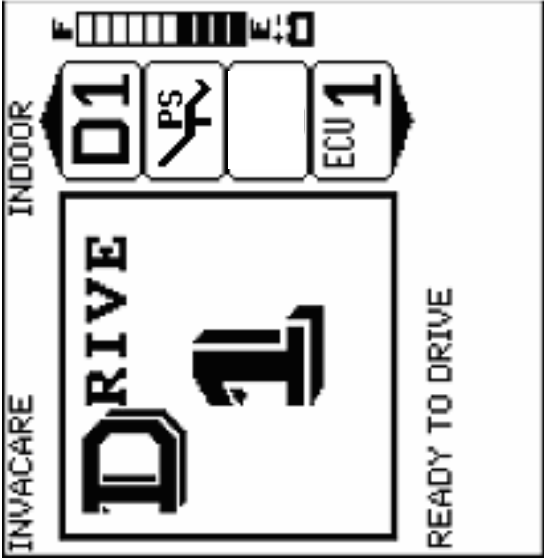
Calibration Menu

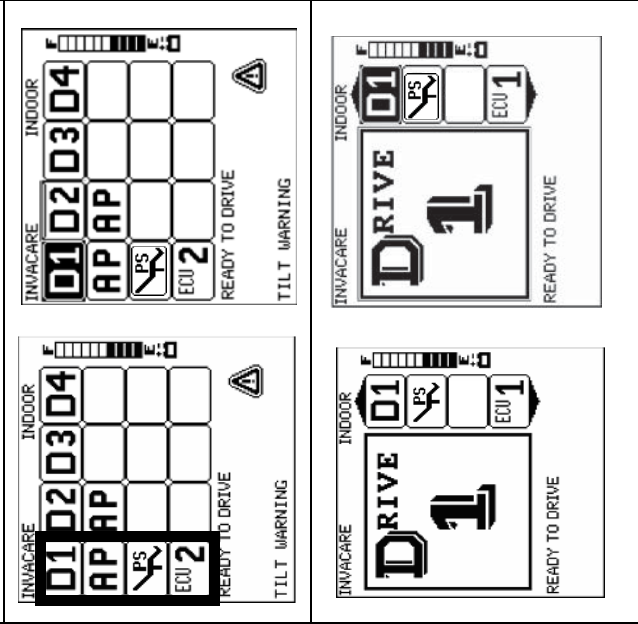
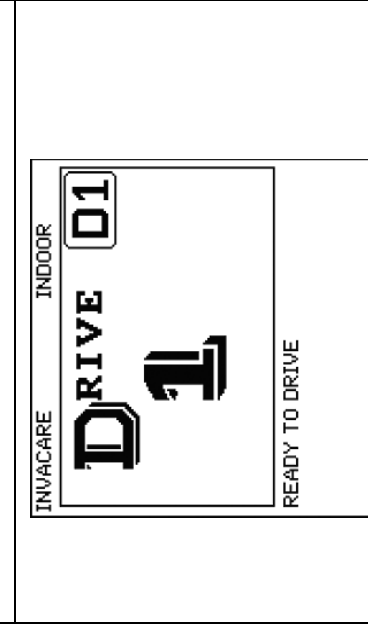
CALIBRATION	LCD DISPLAY	DESCRIPTION
<p>ACC DCI</p>	<p>>>OFF</p> <p>INVACARE MANUAL (OR CONTINUOUS)</p> <p>INVACARE POWER (OR LATCHING)</p>	<p>Determines Mercury Switch Function for the Actuator assigned to the ACC Controller (conventional Actuators and ACC Controllers only)</p> <p>Allows turning Drive Lock out OFF on Single Actuator Systems or setting how the Controller monitors the Drive Lockout Mercury Switch (only when Actuator is operating through the ACC of the Controller)</p> <p>Standard settings are:</p> <ul style="list-style-type: none"> • OFF: Standard for IVC Tilt and Recline combination systems, any system w/Power Center Mount Leg or Tilt w/Elevate. Also allows disabling drive lockout for Conventional Single Actuator Systems • IVC Manual (Continuous): Mercury switch status is continually monitored. Used with IVC Manual Tilt or Recline systems and some aftermarket Powered Seating Systems • IVC Power (Active): Formula CG Single Actuator powered seating systems
<p>MONO PORT I</p>	<p>MONO PORT I</p> <p>OFF</p> <p>>>DRIVE SELECT MODE SWITCH</p> <p><ACTUATOR> UP/DOWN <ACTUATOR> UP <ACTUATOR> DOWN</p>	<p>Assigns the Function of the Left Mono Port on the MK6i Display & Multiple Drive Joysticks.</p> <ul style="list-style-type: none"> • Drive Select allows the mono switch to change Drives 1 through 4. • Mode/Reset allows the Switch to function as a reset switch. • <Actuator> Up/Down allows the switch to operate the actuator (up/down mode) when one actuator is connected to the system. • Mono Port I is the default if not using a “Y” cable (splitter).

CALIBRATION	LCD DISPLAY	DESCRIPTION
MONO PORT 2	<p>MONO PORT 2 OFF >>DRIVE SELECT MODE SWITCH <ACTUATOR> UP/DOWN <ACTUATOR> UP <ACTUATOR> DOWN</p>	<p>Allows a second switch function in the Right Mono Port of the MK6i Display & Multiple Drive Joysticks.</p> <ul style="list-style-type: none"> If a second function is selected, a “Y” Splitter cable –Stereo to two mono – is required to access the second switch port or else a stereo switch (2 PB, 2 WT) may be used.
DISPLAY ORIENT	<p>DISPLAY ORIENT NORMAL INVERTED</p>	<p>Only available when MPJ+, PSF or PSR is on the wheelchair.</p> <ul style="list-style-type: none"> Choose Normal for MPJ+ or PSF. Choose Inverted for PSR.
VIEW/SCAN	<p>STANDARD ENHANCED >>ROW/COLUMN SCAN SEQUENTIAL SCAN ENHANCED SCAN</p>	<p>Selects view mode on MK6i Display.</p> <ul style="list-style-type: none"> When a scan mode is selected, only those drives with Auto Scan turned on in the performance adjustment menu will be active. Each scan repeats 3 times.



Calibration Menu

CALIBRATION	LCD DISPLAY	DESCRIPTION
<p>VIEW/SCAN (CONTINUED)</p>		<p>Standard View - All 4 Drives at once in grid format.</p>

CALIBRATION	LCD DISPLAY	DESCRIPTION
<p>VIEW/SCAN (CONTINUED)</p>	 <p>The screenshot shows a central display area with the word 'DRIVE' in large letters above a large '1'. Below this, it says 'READY TO DRIVE'. To the left of the main display is the word 'INVACARE' and to the right is 'INDOOR'. Above the main display are four smaller icons: a battery level indicator, a 'PS' icon with a house symbol, a blank box, and 'ECU 1'. At the top of the screen are 'F' and 'E+D' labels with corresponding bar indicators.</p>	<p>Enhanced View - One drive only in expanded view.</p>

CALIBRATION	LCD DISPLAY	DESCRIPTION
<p>VIEW SCAN (CONTINUED)</p>		<p>Row/Column Scanning</p> <ul style="list-style-type: none"> • After initiating the scan with a driver command, each column is highlighted, one at a time. • Any driver command selects the column when it is highlighted. • A second driver command highlights individual icons in that column, one at a time. • A third driver command selects individual icons, placing the wheelchair in that active mode. <p>Enhanced Scan</p> <ul style="list-style-type: none"> • After initiating the scan with a driver command, each drive configuration, with all active icons, is displayed on the LCD, one at a time. • Any driver command selects the block (a drive and its icons) when it is highlighted. • A second driver command highlights individual icons in that block, one at a time. • A third driver command selects individual icons, placing the wheelchair in that active mode.
		<p>Sequential Scan</p> <ul style="list-style-type: none"> • Each icon in the active drive is enlarged and displayed one at a time. • Any driver command selects the icon, placing the wheelchair in that active mode.

Calibration Menu

CALIBRATION	LCD DISPLAY	DESCRIPTION
INIT TIME	<p style="text-align: center;"> INIT TIME .4S LESS  MORE </p>	<p>Used to determine when scanning starts after the chair becomes idle, for instance after the chair is not driving or seating feature is stopped.</p> <ul style="list-style-type: none"> • After repeating the scan 3 times, the chair will enter a resting mode. • Any driver command will initiate the scan again.
REPEAT TIME	<p style="text-align: center;"> REPEAT TIME .10S LESS  MORE </p>	<p>Used to determine the amount of time the scanning screen will dwell on a highlighted item before moving to the next item.</p>

Calibration Menu

CALIBRATION	LCD DISPLAY	DESCRIPTION																																							
4W STD PGM TREL TRL TR TE TILT ONLY RECLINE & LEGS ELEVATE ONLY LEGS ONLY		The Standard Programs Menu allows the choice of preconfigured actuator selections (switch assignments) for operation of the 4-way toggle or Quad push buttons. <ul style="list-style-type: none"> • Selections can be customized using the 4 Way Switch Settings. 																																							
	<table border="1"> <thead> <tr> <th>STANDARD PROGRAM</th> <th>SWITCH DIRECTION</th> <th>ACTION</th> </tr> </thead> <tbody> <tr> <td>TILT-RECLINE-ELEVATE-LEGS (TREL)</td> <td>FORWARD</td> <td>TILT UP/DOWN</td> </tr> <tr> <td></td> <td>REVERSE</td> <td>RECL & LEG UP/DOWN</td> </tr> <tr> <td></td> <td>LEFT</td> <td>ELEVATE UP/DOWN</td> </tr> <tr> <td></td> <td>RIGHT</td> <td>LEGREST UP/DOWN</td> </tr> <tr> <td>TILT-RECLINE-LEGS (TRL)</td> <td>FORWARD</td> <td>TILT UP/DOWN</td> </tr> <tr> <td></td> <td>REVERSE</td> <td>RECLINE UP/DOWN</td> </tr> <tr> <td></td> <td>LEFT</td> <td>LEGREST UP</td> </tr> <tr> <td></td> <td>RIGHT</td> <td>LEGREST DOWN</td> </tr> <tr> <td>TILT-RECLINE (TR)</td> <td>FORWARD</td> <td>TILT UP</td> </tr> <tr> <td></td> <td>REVERSE</td> <td>TILT DOWN</td> </tr> <tr> <td></td> <td>LEFT</td> <td>RECLINE UP</td> </tr> <tr> <td></td> <td>RIGHT</td> <td>RECLINE DOWN</td> </tr> </tbody> </table>	STANDARD PROGRAM	SWITCH DIRECTION	ACTION	TILT-RECLINE-ELEVATE-LEGS (TREL)	FORWARD	TILT UP/DOWN		REVERSE	RECL & LEG UP/DOWN		LEFT	ELEVATE UP/DOWN		RIGHT	LEGREST UP/DOWN	TILT-RECLINE-LEGS (TRL)	FORWARD	TILT UP/DOWN		REVERSE	RECLINE UP/DOWN		LEFT	LEGREST UP		RIGHT	LEGREST DOWN	TILT-RECLINE (TR)	FORWARD	TILT UP		REVERSE	TILT DOWN		LEFT	RECLINE UP		RIGHT	RECLINE DOWN	
STANDARD PROGRAM	SWITCH DIRECTION	ACTION																																							
TILT-RECLINE-ELEVATE-LEGS (TREL)	FORWARD	TILT UP/DOWN																																							
	REVERSE	RECL & LEG UP/DOWN																																							
	LEFT	ELEVATE UP/DOWN																																							
	RIGHT	LEGREST UP/DOWN																																							
TILT-RECLINE-LEGS (TRL)	FORWARD	TILT UP/DOWN																																							
	REVERSE	RECLINE UP/DOWN																																							
	LEFT	LEGREST UP																																							
	RIGHT	LEGREST DOWN																																							
TILT-RECLINE (TR)	FORWARD	TILT UP																																							
	REVERSE	TILT DOWN																																							
	LEFT	RECLINE UP																																							
	RIGHT	RECLINE DOWN																																							

CALIBRATION	LCD DISPLAY	DESCRIPTION	ACTION
4W STD PGM (CONTINUED)	STANDARD PROGRAM	SWITCH DIRECTION	TILT UP
	TILT-ELEVATE (TE)	FORWARD	TILT DOWN
		REVERSE	ELEVATE UP
		LEFT	ELEVATE DOWN
		RIGHT	TILT UP
	TILT ONLY	FORWARD	TILT DOWN
		REVERSE	OFF
		LEFT	OFF
		RIGHT	RECLINE & LEGS UP
	RECLINE & LEGS	FORWARD	RECLINE & LEGS DOWN
		REVERSE	LEGS UP
		LEFT	LEGS DOWN
		RIGHT	ELEVATE UP
	ELEVATE ONLY	FORWARD	ELEVATE DOWN
		REVERSE	OFF
		LEFT	OFF
		RIGHT	LEGS UP
	POWER LEGS ONLY	FORWARD	LEGS DOWN
		REVERSE	OFF
		LEFT	OFF
	RIGHT	OFF	

CALIBRATION	LCD DISPLAY	DESCRIPTION
<p>HARD PUFF SOFT PUFF HARD SIP SOFT SIP (CONTINUED)</p>		<p>Instructions for Sip-n-Puff Calibration:</p> <ol style="list-style-type: none"> 1. Puff into the Sip-N-Puff tubing and see how far the bars light up to right. 2. Use the up/down arrow keys to change the H value right or left to match the distance the bars moved. 3. Ask the user to puff hard again to check for consistency reaching the set level. 4. Once the user is consistent reaching the value being calibrated, use the Menu key to return to the menu and proceed to the next calibration (Soft Puff Calibration). 5. Repeat STEPS 1-3 for the Soft Puff Calibration, setting the value low enough for easy distinction between a soft and hard puff. 6. Repeat for Soft Sip calibration. 7. Repeat for Hard Sip Calibration. 8. Save changes. <p>Additional Tips for Success</p> <ul style="list-style-type: none"> • Teach the user to use their mouth muscles to create the pneumatic pressures, not their lungs or with exhaling. This helps teach that it is intra-oral pressure that makes Sip-n-Puff work, not lung capacity. • Eliminate excess pneumatic tubing on set-up of the system by mounting the interface box close to where the breath tube kit is mounted. The less volume of air the user has to move, the easier it is to activate. • Be certain to eliminate all possible leaks in the system with good connections - especially where the pneumatic straw is connected. • Teach the user to place the entire straw in their mouth to ensure a good seal.

Calibration Menu

CALIBRATION	LCD DISPLAY	DESCRIPTION
SPEED POT MAX	SPEED POT MAX 77	Sets the point on the speed pot (MPJ+, PSR or PSF) at which max speed is attained. <ul style="list-style-type: none"> Generally set to 77 for MPJ+ and 277 for PSR or PSF
TILT CALIBRATE RECLINE CALIBRATE CM LEGS CALIBRATE	TILT CALIBRATE MOVE DOWN SET DOWN ANGLE MOVE UP SET UP ANGLE > —° > —°	Calibrating Tilt, Recline or Center Mount Legs, requires a Pitch-Angle Gauge. <ul style="list-style-type: none"> For Custom Actuators Only. <ol style="list-style-type: none"> Select MOVE DOWN. Use the down arrow key to tilt the system all the way. Press the Select key. Select SET DOWN ANGLE. Measure the angle of the seat using the Pitch-Angle Gauge. Use the arrow keys to set the SET DOWN ANGLE to the gauge measurement. Repeat for MOVE UP and tilt the system all the way up.
BACK ANGLE	BACK ANGLE 95	The angle of the back relative to the seat. <ul style="list-style-type: none"> The back angle plus the tilt angle determines the drive lockout angle. A value between 85° and 105°, typically set at 95°. Only displayed with smart actuators on tilt only systems.
START IN DRIVE	START IN DRIVE >>LAST USED DRIVE 1 DRIVE 2 DRIVE 3 DRIVE 4	Allows Setting the Drive Mode (1 through 4) the wheelchair powers up into. <ul style="list-style-type: none"> RETURN TO LAST USED allows the wheelchair to power up into the drive it was in when last powered down. DRIVE 1 allows the wheelchair to ALWAYS return to 1 when turned on.

CALIBRATION	LCD DISPLAY	DESCRIPTION
<p>AUDIBLE IND</p>	<p>AUDIBLE IND > OFF STD RIM</p>	<p>Available only on MK6i Display. Turns on auditory feedback (series of beeps to indicate the active mode).</p> <ul style="list-style-type: none"> • OFF - No audible beeps. • STD - Audible beeps as follows: (no beeps when driving in reverse) Drive Mode is Active: 2 short beeps Remote Drive Select: 3 short beeps Drive Level is advanced: 1 short & 1 long = Drive 1 2 short & 1 long = Drive 2 3 short & 1 long = Drive 3 4 short & 1 long = Drive 4 RIM Mode: 1 long beep <p>ECU:</p> <ul style="list-style-type: none"> 1 long beep = ECU ONE 2 long beeps = ECU TWO 3 long beeps = ECU THREE 4 long beeps = ECU FOUR <p>Powered Seating:</p> <ul style="list-style-type: none"> 1 short beep = 4 switch mode or Automatic Positioning Mode 1 long & 1 short beep = Level 1 - 4 switch/2 level 1 long & 2 short beeps = Level 2 - 4 switch/2 level <p>Standby Select Mode (or Sleep Mode):</p> <ul style="list-style-type: none"> 1 very long beep <ul style="list-style-type: none"> • RIM = All STD beeps above, PLUS, continuous intermittent beeping when driving in reverse using RIM mode • 4 long beeps = Pressure Relief Signal activated. (This occurs automatically, is not chosen when changing modes) • ASM1: 1 long beep • ASM2: 2 long beeps • IR mode: 1 long beep + 2 short beeps + 1 long beep • Mouse Mode: 1 long beep + 2 short beeps + 1 long beep

Calibration Menu

CALIBRATION	LCD DISPLAY	DESCRIPTION
PRS TIME	<p>PRS TIME 30 M</p> <p>LESS </p> <p>MORE</p>	<p>Pressure Relief Signal</p> <ul style="list-style-type: none"> • Can be set from 0 to 60 minutes. • Requires a Mode Switch. • The PRS TIME menu sets a time for an audible warning (on Display only) that it is time to change positions. The Display will show PRESS RESET and the wheelchair will not operate until Reset is pressed.
ERASE ALL	ERASE ALL	<p>ERASE ALL allows the MPJ+/Display settings to be set to the factory default standard programs. There is a confirmation screen that appears and a reminder to SET THE DRIVE CONFIGURATION (in the Calibration Menu) after the Erase All completes. If drive configuration is not set, the display will indicate "Please Set Drive Configuration". To correct this condition, choose and save the appropriate Drive Configuration in the Calibrations menu.</p>

Diagnostics

Diagnostics Menu

>> JOYSTICK STATUS
FAULT LOG
TILT ACTUATOR
RECLINE ACTUATOR
CM LEG ACTUATOR
VERSION

Joystick Status

The JOYSTICK STATUS menu displays joystick throw settings for each quadrant when actively moving the joystick inductive.

DRIVE I INPUT			
FWD	REV	LEFT	RIGHT
0	0	0	0

Fault Log

The FAULT LOG displays a history of error codes, including those intentionally caused during factory testing. Highlighting the Error code and pressing the INFO key on the MK6i programmer will display Cause of Error code and troubleshooting steps to resolve the error.

FAULT LOG		
E32	E28	E19
E04	E28	

NOTE: A professional memory card is required in the MK6i Programmer to view error code and troubleshooting information.

Tilt Actuator, Recline Actuator and CM Leg Actuator

The TILT ACTUATOR, RECLINE ACTUATOR AND CM LEG ACTUATOR menu displays information about the actuators and allows actuator movement.

- Smart actuators in the system will show position angle and amp draw.
- Conventional actuators connected to the ACC controller will not be displayed.
- Conventional actuators connected using an actuator module (e.g., TRAM (tilt recline actuator module), TRK (recline actuator module) will show amp draw not position angle.
- POS - Displays the current position of the smart actuator.
- Pressing the Up or Down arrow keys on the programmer will move the actuator and display the position change and amp draw of the actuator.

```
USE ARROWS TO MOVE
TILT
POS=  °      AMPS=±0.0
```

Version

The VERSION menu displays the software version of all components recognized in the MK6i System.

```
VERSION
TRAM 1.33
4WSB 1.33
MPJ+ 1.3.0
```

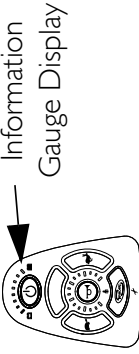
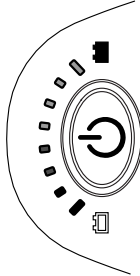

Diagnostic Codes

MK6i SPJ+, MK6i SPJ+ w/PSS or MK6i SPJ+ w/ACC Joysticks

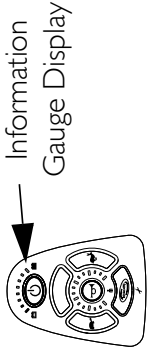

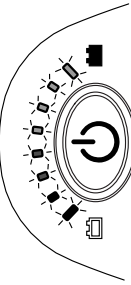
The joystick information gauge and the Remote Programmer give indications of the type of fault or error detected by the control module. When a fault is detected, the wheelchair will stop and not drive. The lights on the information gauge display and/or service indicator light will flash. The number or type of flashes indicates the nature of an abnormal condition. An error code and a quick description of the fault will begin to scroll across the Remote Programmer display. If multiple faults are found, only the first fault encountered by the control module program will be displayed. Refer to the Power Wheelchair Service Manual for detailed troubleshooting and repair instructions. A table of the diagnostics codes and their causes follows.

**NOTE: The fault log displays a four digit number. The first two digits are the diagnostic code and the remaining two digits are the sub code. Refer to the service manual for detailed descriptions.*

Information Gauge Display Diagnostics

DISPLAY	DESCRIPTION	DEFINITION	COMMENTS
	All LEDs are off.	Power is off.	
	All LEDs are on.	Power is on.	Fewer than three LEDs on implies reduced battery charge.

Information Gauge Display Diagnostics

DISPLAY	DESCRIPTION	DEFINITION	COMMENTS
 <p>Information Gauge Display</p>	<p>Left RED LED is flashing.</p>	<p>Battery charge is low.</p>	<p>The batteries should be charged as soon as possible.</p>
	<p>Left to Right "chase" alternating with steady display.</p>	<p>Joystick is in programming, inhibit and/or charging mode.</p>	<p>The steady LEDs indicate the current state of the battery charge.</p>
	<p>All LEDs are flashing slowly.</p>	<p>Joystick has detected Out-of-Neutral-at-Power-Up mode.</p>	<p>Release the joystick back to Neutral.</p>

Service Indicator Light Diagnostics

NUMBER OF FLASHES	DIAGNOSTICS CODE*	ERROR CODE DESCRIPTION	POSSIBLE SOLUTION
1	E0100	User Fault	Release joystick to neutral and try again.
2	E0200	Battery Fault	Check the batteries and cable. Try charging the batteries. Batteries may require replacing.
3	E0300-E0308	Left Motor Fault	Check the left motor, connections and motor cable.
4	E0400-E0408	Right Motor Fault	Check the right motor, connections and motor cable.
5	E0500-E0504	Left Park Brake Fault	Check the left park brake connections and cable.
6	E0600-E0604	Right Park Brake Fault	Check the right park brake connections and cable.
7	E0700-E0702	Remote Fault	Check the communications bus, connections and wiring. Replace the remote.
8	E0800-E0812	Controller Fault	Check connections and wiring. Replace power module.
9	E0900-E0901	Communications Fault	Check connections and wiring. Replace Bus cable.
10	E1000	General Fault	Check all connections and wiring. Contact Invacare Technical Service.
11	E1100	Incompatible/incorrect Remote	Wrong type of remote connected. Ensure the branding of the joystick matches that of controller unit.

MK6i MPJ+, MK6i Display, MK6i PSR and MK6i PSF




MPJ+, display, PSR and PSF Error code Groups





ERROR CODE	SECTION	DESCRIPTION
E01-E99	MK6 System	The MK6 MPJ/Display generates these errors and encompasses features such as input devices, system integrity and device connections.
E100-E299	Controller	The Motor Controller generates these errors.
Wxxx	Warnings	Warnings are normal operational conditions that warrant the operator's attention. They are predominantly information.

Icons display and text displays to represent different conditions.

A serious fault condition is noted by a  symbol on the display and a **X** symbol on the MPJ, PSR and PSF joysticks. In the following table, a stop sign is used to indicate a serious condition. When this symbol is displayed, a condition exists that will cause the wheelchair to not perform its expected function.

A warning condition is noted by a  symbol. Text will display that clarifies the condition that may cause a feature to perform in an unexpected manner.

ERROR CODE	SYMPTOM	PROBABLE CAUSE	SOLUTIONS
E01 (FWD)	 JOYSTICK FAULT displays and the wheelchair does not drive.	The joystick or input device is sending a value outside of the reverse, forward, left or right limits.	Replace joystick or input device.
E02 (REV)			
E03 (LFT)			
E04 (RGT)			
E09 (LEFT)	 LEFT PARK BRAKE FAULT displays and wheelchair does not drive.	The left motor lock lever is disengaged; Left on RWD - Right on CWD (the drive tire is freewheeling).	Engage motor lock levers
E10 (RIGHT)	 RIGHT PARK BRAKE FAULT displays and wheelchair does not drive.	The right motor lock lever is disengaged; Right on RWD - Left on CWD (the drive tire is freewheeling).	







ERROR CODE	SYMPTOM	PROBABLE CAUSE	SOLUTIONS
E14	 Battery Fault displays and the wheelchair does not drive.	The controller has determined the batteries need to be replaced.	Replace batteries.
E18	NEUTRAL TESTING displays.	The joystick neutral test has failed.	Release the joystick and try to get the joystick back into the center-most position.
E19	 BAD JOYSTICK CAL VALUES displays and the wheelchair does not drive.	The joystick calibration values are outside of the expected range.	Recalibrate the joystick (joystick throw procedure).
E28	CHARGER PLUGGED IN displays.	Battery charger connected.	Unplug battery charger from the wheelchair if charging is complete.
E32	 JOYSTICK TIMEOUT displays and the wheelchair does not drive	Joystick or input device is disconnected.	Turn off power, reconnect the joystick of input device and turn power on.
E41	 CONTROLLER STARTUP FAULT displays and the wheelchair drives slowly.	The controller has determined a fault during a previous turn-off process.	Turn the wheelchair off and back on.
E102	GB GRNL FAULT	Unidentifiable Error	Call Technical Services.
E103	GB FAULT - CYCLE PWR	Possible Controller Failure	Turn chair off and then back on. If fault repeats, replace controller and recalibrate motors.
E104-E105	GB CTRL FAULT	Left Current Sensor Error	Replace controller and recalibrate motors.
E106-E107	GB CTRL FAULT	Right Current Sensor Error	Replace controller and recalibrate motors.
E108-E109	CURR CAL FAULT	Current Calibration Error	No action required - Factory Test Only
E110-E111	GB CTRL FAULT	Left (on CWD)/Right (on RWD) Current Sensor Error	Call Technical Services. Replace controller and recalibrate motors.
E112-E113	GB CTRL FAULT	Right (on RWD)/Left (on CWD) Current Sensor error	Call Technical Services Replace controller and recalibrate motors.
E114-E127	CURR CAL FAULT	Current Calibration Error	No action required - Factory Test Only
E128	M2 MOTOR FAULT	Left Motor (M2) (on RWD)/Right (on CWD) Over Current Fault	Check Left Motor (M2) (on RWD)/Right (on CWD) and Cabling.







Diagnosics

ERROR CODE	SYMPTOM	PROBABLE CAUSE	SOLUTIONS
E129	M1 MOTOR FAULT	Right Motor (M1) (on RWD)/Left (on CWD) Over Current Fault	Check Right Motor (M1) (on RWD)/Left (on CWD) and Cabling.
E130, E132	M2 MTR CAL	Left Motor (RWD)/Right Motor (CWD) - Too much drag/load	Recalibrate motor.
E131, E133	M1 MTR CAL	Right Motor (RWD)/Left Motor (CWD) - Too much drag/load	Recalibrate motor.
E134-E139	SW FAULT	Controller Software Fault	Replace the controller. Call Technical Service.
E140, E141	CTLR PWR FAULT	Check Joystick Cabling	Check all connections for physical damage. Check Joystick and Joystick Cabling.
E142	LOW BATTERY	Low battery	Recharge batteries. Replace batteries if not corrected after charging.
E143	HI BATT VOLTS	High Battery Fault	Check Battery Voltage. Call Technical Service.
E144	M2 MTR FAULT	Left Motor (on RWD)/Right Motor (on CWD) brake coil short circuit	Check Left Motor (M2) (on RWD)/Right Motor (on CWD) Cabling.
E145	M1 MTR FAULT	Right Motor (on RWD)/Left Motor (on CWD) brake coil short circuit	Check Left Motor (M2) (on RWD)/Right Motor (on CWD) Cabling.
E146-E150	GB CTRL FAULT	GB Controller Failure	Replace controller and recalibrate motors Call Technical Service
E151, E152	M2 MTR FAULT	Left Motor (on RWD)/Right Motor (on CWD) Hall Sensor Fault	Check Left Motor (M2) (on RWD)/Right Motor (on CWD) Cabling.
E153, E154	M1 MTR FAULT	Right Motor (on RWD)/Left Motor (on CWD) Hall Sensor Fault	Check Right Motor (M1) (on RWD)/Left Motor (on CWD) Cabling.
E155, E157	GB CTRL FAULT	Current Calibration Lost	Turn chair off and then back on. If error repeats, replace controller and recalibrate motors.
E156	MTR NOT CAL	Motors not calibrated	Recalibrate motors.

ERROR CODE	SYMPTOM	PROBABLE CAUSE	SOLUTIONS
E158-E160	GB CTRL FAULT	Software error	Turn chair off and then back on. If error repeats, replace controller and recalibrate motors.
E161	GB CTRL FAULT	GB Controller Fault	Turn chair off and then back on. If error repeats, replace controller and recalibrate motors.
E162-E164	GB CTRL FAULT	Controller/Motor Short/Open	Check all connections.
E165-E171	GB CTRL FAULT	Direct Input Joystick Fault	Replace controller and recalibrate motors.
E172, E174	M2 SHORT/OPEN	Motor/Controller Short/Open - M2, Right Motor (on RWD)/Left Motor (on CWD)	Check all connections.
E173, E175	M1 SHORT/OPEN	Motor/Controller Short/Open - M1, Left Motor (on RWD)/Right Motor (on RWD)	Check all connections.
E176	OVERHEAT	Rollback - Battery	Allow controller to cool off w/power on.
E177	OVERHEAT	Rollback - M2	Allow controller to cool off w/power on. Possible bad M2 motor (Right Motor on RWD, Left Motor on CWD).
E178	OVERHEAT	Rollback - M1	Allow controller to cool off with power on. Possible bad M1 motor (Left Motor on RWD, Right Motor on CWD).
E179	OVERHEAT	Rollback - Controller temperature too high	Allow controller to cool off w/power on.
E180	SHORT TO FRAME	Voltage on frame	Check wiring for short to frame of chair. Replace controller and recalibrate motors. Replace motors.
E181-E183	GB CTRL FAULT	General type controller failure.	Replace controller and recalibrate motors.

Diagnostics

ERROR CODE	SYMPTOM	PROBABLE CAUSE	SOLUTIONS
E200	Controller not connected	Input device does not recognize the controller.	Turn chair off and then back on. If fault repeats, replace the cable from the Display or MPJ+/PSF+/PSR+ to the controller. If fault repeats, replace Display or Joystick. If fault repeats, replace Controller.
E201	General controller fault	General controller fault	Turn chair off and then back on If fault repeats, replace controller.
E202	 LEFT MOTOR FAULT displays and the wheelchair does not drive.	Displayed when a problem with the left motor is detected. Left on RWD - Right on CWD	Check motor lock engagement (clutch). Check motor connection plug. Verify left/right by switching motor plugs. If fault follows motor, replace motor. If fault does not follow motor, replace controller.
E203	 RIGHT MOTOR FAULT displays and the wheelchair does not drive.	Displayed when a problem with the right motor is detected. Right on RWD - Left on CWD	Check motor lock engagement (clutch). Check motor connection plug. Verify left/right by switching motor plugs. If fault follows motor, replace motor. If fault does not follow motor, replace controller.
E204	 REMOTE FAULT displays and the wheelchair does not drive.	This is displayed when the controller determines an incorrect configuration.	Replace the controller.
E205	 CONTROLLER FAULT displays and the chair does not drive.	This is displayed when the controller fails a power-up test.	Replace the controller.
E206	 CONTROLLER WRONG REMOTE displays and the wheelchair does not drive.	This is displayed when he controller has determined an invalid configuration.	Check all connections and wiring.
E207	 CONTROLLER SETUP FAULT displays and the wheelchair does not drive.	This is displayed when the controller module does not recognize the MK6 MPJ+/Display as a valid device.	Replace the controller.

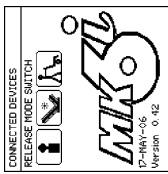
ERROR CODE	SYMPTOM	PROBABLE CAUSE	SOLUTIONS
E208	 G-TRAC FAULT is displayed	The G-Trac module or controller is not functioning correctly.	Replace the G-trac module and/or the controller. Please note that the chair will drive with this error displayed, however, the G-trac feature is disabled and the chair performs without the benefit of the G-Trac features.
W01	 TILT WARNING displays and the wheelchair will not drive.	If the wheelchair has a TIAM and RIAM, this message is displayed when the Tilt angle, the recline angle or the combined tilt and recline angle are greater than 20° from fully upright (beyond the drive lock-out angle of 20°). If the wheelchair has a TRAM or TIAM, this message is displayed when the mercury switch is open.	Return the system to upright position.
W02	 MAX BACK ANGLE displays.	The wheelchair back has reached the maximum programmed back angle on a wheelchair with a TIAM, RIAM or TRAM.	The wheelchair back will not go past the programmed maximum back angle. This is normal behavior.
W03	 CONTROLLER INHIBITED displays and the wheelchair does not drive.	The system is tilted or reclined beyond the drive lock-out angle of 20°.	Return the system to the upright position.
W04	 SLOW DOWN is displayed and the wheelchair drives slowly.	The elevating seat is elevated.	Return elevating seat to the lowest position to drive at full speed.
W05	ATTENDANT ACTIVE and  displays.	The Proportional or Digital Attendant control is active and can be used to drive the wheelchair.	This is normal behavior.

Connected Devices

Connected Devices

Connected Devices

DISPLAY



MPJ+



This screen is displayed if a Mode Select switch is depressed (held active) for 10 seconds. An icon representing all devices that are connected to the chair will be displayed.

MPJ ICON	DISPLAY ICON	CONNECTED DEVICE DESCRIPTION
		INTELLIGENT TILT ACTUATOR
		INTELLIGENT RECLINE ACTUATOR
		INTELLIGENT CENTER LEG ACTUATOR
		ELEVATE ACTUATOR
		GENERIC TILT ACTUATOR
		GENERIC RECLINE ACTUATOR
		GENERIC LEG ACTUATORS
		GENERIC RIGHT LEG ACTUATOR
		GENERIC LEFT LEG ACTUATOR
		INTELLIGENT CG TILT
		SHARK POWER MODULE (SPM) ACTUATOR

MPJ ICON	DISPLAY ICON	CONNECTED DEVICE DESCRIPTION
		SANODE OR SINGLE ACTUATOR CONTROL INTERFACE
		4-WAY SWITCH BOX
		MULTIPLE ACTUATOR CONTROL BOX
		RIM CONTROL
		ECU 1/2 AND ECU 3/4
		PROPORTIONAL ATTENDANT CONTROL
		COMPACT JOYSTICK
		SIP AND PUFF CONTROL
		DIGITAL ATTENDANT CONTROL
		MICRO EXTREMITY CONTROL
		PEACHTREE CONTROL
		ASL DIGITAL CONTROL
		GENERIC ANALOG CONTROL
		THIS IS DISPLAYED IF THE CONTROLLER SUPPORTS G-TRAC

EMI Information

WARNING

CAUTION: IT IS VERY IMPORTANT THAT YOU READ THIS INFORMATION REGARDING THE POSSIBLE EFFECTS OF ELECTROMAGNETIC INTERFERENCE ON YOUR POWERED WHEELCHAIR.

Electromagnetic Interference (EMI) From Radio Wave Sources

Powered wheelchairs and motorized scooters (in this text, both will be referred to as powered wheelchairs) may be susceptible to electromagnetic interference (EMI), which is interfering electromagnetic energy (EM) emitted from sources such as radio stations, TV stations, amateur radio (HAM) transmitters, two way radios, and cellular phones. The interference (from radio wave sources) can cause the powered wheelchair to release its brakes, move by itself, or move in unintended directions. It can also permanently damage the powered wheelchair's control system. The intensity of the interfering EM energy can be measured in volts per meter (V/m). Each powered wheelchair can resist EMI up to a certain intensity. This is called its "immunity level." The higher the immunity level, the greater the protection. At this time, current technology is capable of achieving at least a 20 V/m immunity level, which would provide useful protection from the more common sources of radiated EMI.

⚠ WARNING

There are a number of sources of relatively intense electromagnetic fields in the everyday environment. Some of these sources are obvious and easy to avoid. Others are not apparent and exposure is unavoidable. However, we believe that by following the warnings listed below, your risk to EMI will be minimized.

The sources of radiated EMI can be broadly classified into three types:

- 1) Hand-held Portable transceivers (transmitters-receivers with the antenna mounted directly on the transmitting unit. Examples include: citizens band (CB) radios, "walkie talkie", security, fire and police transceivers, cellular telephones, and other personal communication devices).

NOTE: Some cellular telephones and similar devices transmit signals while they are ON, even when not being used.

- 2) Medium-range mobile transceivers, such as those used in police cars, fire trucks, ambulances and taxis. These usually have the antenna mounted on the outside of the vehicle; and
- 3) Long-range transmitters and transceivers, such as commercial broadcast transmitters (radio and TV broadcast antenna towers) and amateur (HAM) radios.

⚠ WARNING

NOTE: *Other types of hand-held devices, such as cordless phones, laptop computers, AM/FM radios, TV sets, CD players, cassette players, and small appliances, such as electric shavers and hair dryers, so far as we know, are not likely to cause EMI problems to your powered wheelchair.*

Powered Wheelchair Electromagnetic Interference (EMI)

Because EM energy rapidly becomes more intense as one moves closer to the transmitting antenna (source), the EM fields from hand-held radio wave sources (transceivers) are of special concern. It is possible to unintentionally bring high levels of EM energy very close to the powered wheelchair's control system while using these devices. This can affect powered wheelchair movement and braking. Therefore, the warnings listed below are recommended to prevent possible interference with the control system of the powered wheelchair.

Electromagnetic interference (EMI) from sources such as radio and TV stations, amateur radio (HAM) transmitters, two-way radios, and cellular phones can affect powered wheelchairs and motorized scooters.

FOLLOWING THE WARNINGS LISTED BELOW SHOULD REDUCE THE CHANCE OF UNINTENDED BRAKE RELEASE OR POWERED WHEELCHAIR MOVEMENT WHICH COULD RESULT IN SERIOUS INJURY.

⚠ WARNING

- 1) **DO NOT** operate hand-held transceivers (transmitters receivers), such as citizens band (CB) radios, or turn **ON** personal communication devices, such as cellular phones, while the powered wheelchair is turned **ON**;
- 2) Be aware of nearby transmitters, such as radio or TV stations, and try to avoid coming close to them;
- 3) If unintended movement or brake release occurs, turn the powered wheelchair **OFF** as soon as it is safe;
- 4) Be aware that adding accessories or components, or modifying the powered wheelchair, may make it more susceptible to **EMI** (**NOTE**: There is no easy way to evaluate their effect on the overall immunity of the powered wheelchair); and
- 5) Report all incidents of unintended movement or brake release to the powered wheelchair manufacturer, and note whether there is a source of **EMI** nearby.

Important Information

- 1) 20 volts per meter (V/m) is a generally achievable and useful immunity level against **EMI** (as of May 1994) (the higher the level, the greater the protection);
 - 2) This device has been tested to a radiated immunity level of 20 volts per meter.
-

⚠ WARNING

- 3) The immunity level of the product is unknown.
Modification of any kind to the electronics of this wheelchair as manufactured by Invacare may adversely affect the EMI immunity levels.
-

NOTES

NOTES

Global Limited Warranty (Excluding Canada)

PLEASE NOTE: THE WARRANTY BELOW HAS BEEN DRAFTED TO COMPLY WITH FEDERAL LAW APPLICABLE TO PRODUCTS MANUFACTURED AFTER JULY 4, 1975.

This warranty is extended only to the original purchaser who purchases this product within any country excluding CANADA when new and unused from Invacare or a dealer. This warranty is not extended to any other person or entity and is not transferable or assignable to any subsequent purchaser or owner. Coverage under this warranty will end upon any such subsequent sale or other transfer of title to any other person. For products purchased in Canada, please refer to the Canada Limited Warranty.

This warranty gives you specific legal rights and you may also have other legal rights which vary from state to state.

Invacare warrants all electronics and electrical components (excluding batteries), motors, powered seating actuators and gearboxes to be free from defects in materials and workmanship for a period of one (1) year from the date of purchase from Invacare or a dealer, with a copy of the seller's invoice required for coverage under this warranty. If within such warranty periods any such product component shall be proven to be defective, the product component shall be repaired or replaced, at Invacare's option. This warranty does not include any labor or shipping charges incurred in replacement part installation or repair of any such product. Invacare's sole obligation and your exclusive remedy under this warranty shall be limited to such repair and/or replacement. For warranty service, please contact the dealer from whom you purchased your Invacare product. In the event you do not receive satisfactory warranty service, please write directly to Invacare at the address on the bottom of the back cover. Provide dealer's name address, date of purchase, indicate nature of the defect and, if the product is serialized, indicate the serial number. Do not return products to our factory without our prior consent.

LIMITATIONS AND EXCLUSIONS: THE FOREGOING WARRANTY SHALL NOT APPLY TO SERIAL NUMBERED PRODUCTS IF THE SERIAL NUMBER HAS BEEN REMOVED OR DEFACTED, PRODUCTS SUBJECT TO NEGLIGENCE, ACCIDENT, IMPROPER OPERATION, MAINTENANCE OR STORAGE, COMMERCIAL OR INSTITUTIONAL USE, PRODUCTS MODIFIED WITHOUT INVACARE'S EXPRESS WRITTEN CONSENT (INCLUDING, BUT NOT LIMITED TO, MODIFICATION THROUGH THE USE OF UNAUTHORIZED PARTS OR ATTACHMENTS); PRODUCTS DAMAGED BY REASON OF REPAIRS MADE TO ANY COMPONENT WITHOUT THE SPECIFIC CONSENT OF INVACARE, OR TO A PRODUCT DAMAGED BY CIRCUMSTANCES BEYOND INVACARE'S CONTROL, AND SUCH EVALUATION WILL BE SOLELY DETERMINED BY INVACARE. THE WARRANTY SHALL NOT APPLY TO PROBLEMS ARISING FROM NORMAL WEAR AND TEAR OR FAILURE TO ADHERE TO THE PRODUCT INSTRUCTIONS. A CHANGE IN OPERATING NOISE, PARTICULARLY RELATIVE TO MOTORS AND GEARBOXES DOES NOT CONSTITUTE A FAILURE OR DEFECT AND WILL NOT BE REPAIRED; ALL DEVICES WILL EXHIBIT CHANGES IN OPERATING NOISE DUE TO AGING. THE FOREGOING EXPRESS WARRANTY IS EXCLUSIVE AND IN LIEU OF ANY OTHER WARRANTIES WHATSOEVER, WHETHER EXPRESS OR IMPLIED, INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, AND THE SOLE REMEDY FOR VIOLATIONS OF ANY WARRANTY WHATSOEVER, SHALL BE LIMITED TO REPAIR OR REPLACEMENT OF THE DEFECTIVE PRODUCT PURSUANT TO THE TERMS CONTAINED HEREIN. THE APPLICATION OF ANY IMPLIED WARRANTY WHATSOEVER SHALL NOT EXTEND BEYOND THE DURATION OF THE EXPRESS WARRANTY PROVIDED HEREIN AND INVACARE SHALL NOT BE LIABLE FOR ANY CONSEQUENTIAL OR INCIDENTAL DAMAGES WHATSOEVER; SOME STATES DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGE, OR LIMITATION OF HOW LONG AN IMPLIED WARRANTY LASTS, SO THE ABOVE EXCLUSION AND LIMITATION MAY NOT BE APPLICABLE.

THIS WARRANTY SHALL BE EXTENDED TO COMPLY WITH STATE/PROVINCIAL LAWS AND REQUIREMENTS.

Canada Limited Warranty

PLEASE NOTE: THE WARRANTY BELOW HAS BEEN DRAFTED TO COMPLY WITH FEDERAL LAW APPLICABLE TO PRODUCTS MANUFACTURED AFTER JULY 4, 1975.

This warranty is extended only to the original purchaser who purchases this product within Canada when new and unused from Invacare or a dealer. This warranty is not extended to any other person or entity and is not transferable or assignable to any subsequent purchaser or owner. Coverage under this warranty will end upon any such subsequent sale or other transfer of title to any other person.

This warranty gives you specific legal rights and you may also have other legal rights which vary from state to state.

Invacare warrants all electronics and electrical components (excluding batteries) to be free from defects in materials and workmanship for a period of two (2) years from the date of purchase from Invacare or a dealer, with a copy of the seller's invoice required for coverage under this warranty. If within such warranty periods any such product component shall be proven to be defective, the product component shall be repaired or replaced, at Invacare's option. This warranty does not include any labor or shipping charges incurred in replacement part installation or repair of any such product. Invacare's sole obligation and your exclusive remedy under this warranty shall be limited to such repair and/or replacement.

For warranty service, please contact the dealer from whom you purchased your Invacare product. In the event you do not receive satisfactory warranty service, please write directly to Invacare at the address on the bottom of the back cover. Provide dealer's name address, date of purchase, indicate nature of the defect and, if the product is serialized, indicate the serial number. Do not return products to our factory without our prior consent.

LIMITATIONS AND EXCLUSIONS: THE FOREGOING WARRANTY SHALL NOT APPLY TO SERIAL NUMBERED PRODUCTS IF THE SERIAL NUMBER HAS BEEN REMOVED OR DEFACTED, PRODUCTS SUBJECT TO NEGLIGENCE, ACCIDENT, IMPROPER OPERATION, MAINTENANCE OR STORAGE, COMMERCIAL OR INSTITUTIONAL USE, PRODUCTS MODIFIED WITHOUT INVACARE'S EXPRESS WRITTEN CONSENT (INCLUDING, BUT NOT LIMITED TO, MODIFICATION THROUGH THE USE OF UNAUTHORIZED PARTS OR ATTACHMENTS); PRODUCTS DAMAGED BY REASON OF REPAIRS MADE TO ANY COMPONENT WITHOUT THE SPECIFIC CONSENT OF INVACARE, OR TO A PRODUCT DAMAGED BY CIRCUMSTANCES BEYOND INVACARE'S CONTROL, AND SUCH EVALUATION WILL BE SOLELY DETERMINED BY INVACARE. THE WARRANTY SHALL NOT APPLY TO PROBLEMS ARISING FROM NORMAL WEAR AND TEAR OR FAILURE TO ADHERE TO THE PRODUCT INSTRUCTIONS. A CHANGE IN OPERATING NOISE, PARTICULARLY RELATIVE TO MOTORS AND GEARBOXES DOES NOT CONSTITUTE A FAILURE OR DEFECT AND WILL NOT BE REPAIRED; ALL DEVICES WILL EXHIBIT CHANGES IN OPERATING NOISE DUE TO AGING. THE FOREGOING EXPRESS WARRANTY IS EXCLUSIVE AND IN LIEU OF ANY OTHER WARRANTIES WHATSOEVER, WHETHER EXPRESS OR IMPLIED, INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, AND THE SOLE REMEDY FOR VIOLATIONS OF ANY WARRANTY WHATSOEVER, SHALL BE LIMITED TO REPAIR OR REPLACEMENT OF THE DEFECTIVE PRODUCT PURSUANT TO THE TERMS CONTAINED HEREIN. THE APPLICATION OF ANY IMPLIED WARRANTY WHATSOEVER SHALL NOT EXTEND BEYOND THE DURATION OF THE EXPRESS WARRANTY PROVIDED HEREIN AND INVACARE SHALL NOT BE LIABLE FOR ANY CONSEQUENTIAL OR INCIDENTAL DAMAGES WHATSOEVER; SOME STATES DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGE, OR LIMITATION OF HOW LONG AN IMPLIED WARRANTY LASTS, SO THE ABOVE EXCLUSION AND LIMITATION MAY NOT BE APPLICABLE.

THIS WARRANTY SHALL BE EXTENDED TO COMPLY WITH STATE/PROVINCIAL LAWS AND REQUIREMENTS.

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Rev F - 10/08



Owner's Operator and Programming Manual

MK6i™ IR Control/Mouse Emulation

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DEALER: Keep this manual. The procedures in this manual **MUST** be performed by a qualified technician.

For more information regarding Invacare products, parts, and services,
please visit www.invacare.com



Yes, you can!

⚠ WARNING

A QUALIFIED TECHNICIAN MUST PERFORM THE INITIAL SET UP OF THIS WHEELCHAIR. ALSO, A QUALIFIED TECHNICIAN MUST PERFORM ALL PROCEDURES IN THE SERVICE MANUAL.

DEALERS AND QUALIFIED TECHNICIANS: DO NOT SERVICE OR OPERATE THIS EQUIPMENT WITHOUT FIRST READING AND UNDERSTANDING (1) THE OWNER'S OPERATOR AND MAINTENANCE MANUAL, (2) THE SERVICE MANUAL (IF APPLICABLE) AND (3) THE SEATING SYSTEM'S MANUAL (IF APPLICABLE). IF YOU ARE UNABLE TO UNDERSTAND THE WARNINGS, CAUTIONS AND INSTRUCTIONS, CONTACT INVACARE TECHNICAL SUPPORT BEFORE ATTEMPTING TO SERVICE OR OPERATE THIS EQUIPMENT - OTHERWISE, INJURY OR DAMAGE MAY RESULT.

NOTE: Updated versions of this manual are available on www.invacare.com.

Special Notes

Signal words are used in this manual and apply to hazards or unsafe practices which could result in personal injury or property damage. Refer to the table below for definitions of the signal words.

SIGNAL WORD	MEANING
WARNING	Warning indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
CAUTION	Caution indicates a potentially hazardous situation which, if not avoided, may result in property damage or minor injury or both.

NOTICE

THE INFORMATION CONTAINED IN THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE.

⚠ REPAIR OR SERVICE WARNING

Setup of the Electronics Control Unit is to be performed only by a qualified technician. The final adjustments of the controller may affect other activities of the wheelchair. Damage to the equipment could occur if improperly set-up or adjusted.

⚠ OPERATION WARNING

Performance adjustments should only be made by professionals of the health care field or persons fully conversant with this process and the driver's capabilities. Incorrect settings could cause injury to the driver, bystanders, damage to the wheelchair and surrounding property. After the wheelchair has been setup/adjusted, check to make sure that the wheelchair performs to the specifications entered in the setup procedure. If the wheelchair does not perform to specifications, turn the wheelchair **Off** immediately and re-enter setup specifications. Repeat this procedure until the wheelchair performs to specifications.

⚠ WARNING

Invacare products are specifically designed and manufactured for use in conjunction with Invacare accessories. Accessories designed by other manufacturers have not been tested by Invacare and are not recommended for use with Invacare products.

Overview

Invacare MK6i IR Control and Mouse Emulation

NOTE: For this procedure, refer to FIGURE 1.1.

NOTE: The MK6i IR/Mouse Module requires MPJ/Display firmware version 1.8.0 or later.

The new Invacare IR Module is an accessory that can be ordered with new power wheelchairs, or added to existing power wheelchairs using MK6i electronics and an expandable (4 drive mode) system. Standard features include both infrared control and computer (PC and Mac) mouse emulation.

The MK6i Infrared Control feature, allows users to control and operate infrared-enabled devices using the wheelchair driver control. These devices include typical consumer market type products, i.e. televisions, DVD players and such. The MK6i Infrared Control feature can also control an infrared-enabled telephone and X10 control module.

The Mouse Emulation feature allows the user to use the wheelchair driver control to control a computer mouse. This feature utilizes radio frequency technology. When the feature is combined with an on-screen keyboard, the user has access to virtually all standard software programs.

Both the IR Control and Mouse Emulation provide full functionality when using either a three or four quadrant driver control.



FIGURE 1.1 MK6i™ IR Control and Mouse Components

Terms and Definitions

Infrared – Infrared refers to the technology that transmits and receives signals using non-visible light. This well established technology has been used in television remote controls and has expanded to include home automation devices such as door openers and light switches. It is this infrared technology that is used for the IR Control feature of the MK6i electronics.

Radio Frequency (RF) – Radio Frequency refers to the technology that transmits and receives signals using radio frequencies. It is this technology used by the MK6i Mouse Emulation feature. (Frequency is 2.4 MHz).

Four Quadrant Driver Control – This type of control, provides the user access to all 4 directions (forward, left, right, and reverse), in either a proportional (analog) or switch (digital) device. The MK6i Compact Joystick and MK6i MPJ+ Joystick are examples of a 4-quadrant proportional control. The Sip-n-Puff control and Tash™ Wafer Board are examples of a 4-quadrant digital control.

Three Quadrant Driver Control – This type of driver control provides the user access to all 4 directions even though they can control only three quadrants or 3 driving commands, typically only forward, left, and right. To access reverse direction, the wheel chair is programmed with RIM ON and a switch is used allowing the forward drive command to toggle between the forward and reverse directions.

PC™ – “PC” is an acronym for Personal Computer and can be a desktop or a laptop. The MK6i Mouse Emulation feature will work with any PC running Microsoft® Windows® XP, Microsoft® Vista, Mac OS and any PC that supports a USB Mouse.

Mac – “Mac” is an acronym used for an Macintosh® Operating System by Apple Computer, Inc.

X-10 – A home automation system that uses individual modules to turn on/off electrical appliances/lights plugged into standard 110 volt wall outlets. The Invacare® IR module can control up to eight X-10 modules through an infrared X-10 converter such as a “Powerhouse” or “Infrared Mini Controller,” both available commercially. The X-10 Infrared commands (ON/OFF) need to be learned.

Dongle – The “dongle” refers to the hardware device that plugs into the USB port on the PC and communicates to MK6i electronics using Radio Frequency (RF) technology.

IR Blaster – The IR Blaster refers to the device that has a monoplug on one end of the cable to interface with the IR Module, and the infrared transmitter on the opposite end. The transmitter has a broad angled broadcast beam, but it needs to be positioned directly in the line of sight to the receiver.



Dongle



IR Blaster

Infrared Setup, Programming and Usage

Mounting the IR/Mouse Module

1. Turn the power wheelchair off.
2. Using tie wraps, mount the IR Module to the wheelchair seat frame.

NOTE: Usual locations include the back canes or under the arm rests. The IR Module should be mounted in an inconspicuous location. Access to the IR/Mouse Module is required if the device to be controlled needs to be “learned”.

3. Plug the MK6i connector of the IR Module into the MK6i network cable.
4. Plug the IR Blaster (IR Transmitter) monoplug into the IR/Mouse Module.
5. Secure the transmitter portion of the IR Blaster to the front of the wheelchair. There is a mounting bracket included and double-sided tape on the IR Blaster for easier mounting.

NOTE: The location of the IR Blaster is important due to the infrared line-of-sight technology. Meaning, the IR Blaster must be able to “view” or “see” the device’s infrared receiver without obstruction. Usual locations include the front of a joystick or display, and front of an armrest.

6. Secure all cabling and wires to the power wheelchair base.

Programming the IR Module

Programming should only be completed by qualified individuals. Programming can be accomplished using a Professional SD-Card, the MK6i Remote Hand Held Programmer (HHP), or the MK5 Remote HHP.

1. Set up each device to be controlled. Refer to Enabling IR Devices on page 8.
2. Activate IR control in each of the desired drive modes (1 through 4). Refer to Activating IR Control on page 8.

Enabling IR Devices

1. From the main menu of the remote hand help programmer, select <CALIBRATIONS>, then <IR SETTINGS>. There is a list of 6 devices, all set to NONE.
2. Select <IR DEVICE 1> and then select the device type. There are 7 device choices; TV-BSC (Basic), TV ENH (Enhanced), DVDVCR, CBLSAT, PHONE, AUD and X10.
3. Next, set the <DEVICE CODE 1>. Locate the appropriate code for device by brand name. Refer to IR Device Codes on page 25.

NOTE: There may be multiple codes, selecting the correct code is a matter of trial and error. It is possible that some codes will operate only some or all of the operations. If none of the codes operate the features, you can use the "learn" feature. Refer to IR Learning on page 9.

NOTE: A device set up as a VCR or X10 has to be learned to operate.

4. Continue setting the <IR DEVICE 2> through <IR DEVICE 6> and <DEVICE CODE 2> through <DEVICE CODE 6> as desired. There can be a mix of the same devices, i.e. multiple TV's and multiple DVD's.
5. To use the Tash IR Telephone, set the device type to PHONE and the DEVICE CODE to 161.
6. When Finished, Press <SAVE>, then Press <SAVE> again as prompted.

Activating IR Control

1. From the main menu of the remote hand help programmer, select <PERFORMANCE ADJUST>.
2. Scroll down to <IR CONTROL>, then scroll across to desired drive for IR use and press <SELECT>
3. Choose 3-QUAD or 4-QUAD to activate the IR Control in that drive. Refer to Using the IR Feature on page 13.
4. Press <SAVE>, then Press <SAVE> again as prompted.

Using the Basic SD-Card

The Basic SD-Card allows programming new IR Devices and their codes, and even supports the “learning” feature.

1. Turn off the power to the wheelchair.
2. Insert the Basic SD-Card into the MK6i Display (or Joystick)
3. Turn on the wheelchair.
4. Use the down arrow (Display), or reverse command (MPJ+), to scroll down to IR SETTINGS.
5. Use the right arrow (Display), or right command (MPJ+), to select.
6. The rest of the programming is identical to that described above. Please note that enabling and disabling the IR Control Mode in a drive is only possible with the Professional SD-Card or a hand held programmer.

IR Learning

The IR/Mouse Module has “learning” capabilities. This means that the IR/Mouse can learn an individual button command from an existing remote control. This is useful if, for example, you have a TV that is not listed in the Code List or if the TV Code does not properly operate all of the commands. In other words, if the device does not work you can use the remote control to teach the IR/Mouse Module the infrared sequence.

1. From the main menu of the remote hand held programmer, select <CALIBRATIONS>.
2. Scroll down to <IR SETTINGS> and press <SELECT>.
3. Scroll down to desired device to learn the IR Signals and press <SELECT>.
4. Enter a code of “0” and press <SELECT>. When the DEVICE CODE is 0, learning is enabled.

NOTE: For this procedure, refer to FIGURE 3.1 Learn Features.

5. Select the next menu item, <LEARN>.

MK6i Programming			
Parameter	D1	D2	D3 D4
POWER ON/OFF			>>>
VOLUME UP			>>>
VOLUME DOWN			>>>
CHANNEL UP			>>>
CHANNEL DOWN			>>>
PREV			>>>
-- MORE --			>>>

FIGURE 3.1 Learn Features

NOTE: For this procedure, refer to FIGURE 3.2 Learning the Key.

6. Scroll down to the feature you wish to teach and press the <SELECT> button on the HHP.

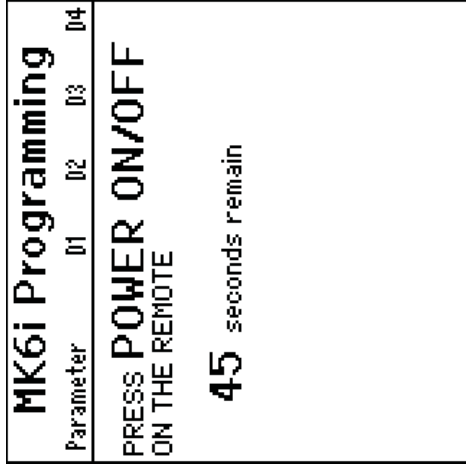


FIGURE 3.2 Learning the Key

NOTE: You now have 45 seconds to learn the key.

7. Point the remote control at the IR/Mouse Module “learning” window and momentarily press the button on the remote control. If the screen indicates “OK”, the IR/Mouse Module has learned that key. If the screen indicates “ERROR”, press the <MENU> button on the HHP and try again. If the time continues to count down, press the key on the remote control again.
8. Repeat for all desired keys to be learned.

Infrared Setup, Programming and Usage

9. When finished, Press <SAVE>, then press <SAVE> a second time as prompted.

NOTE: Only one device type can be learned. For instance, there can only be one TV learned, however, other TV's can be used if they use a 3 or 4 digit device code.

10. At the end of the IR SETTINGS menu is an item labeled ERASE LEARNED KEYS. The feature allows the learnt codes to be cleared and can be used at any time. Realize that performing this feature erases all learned keys for all devices.

Using the IR Feature

NOTE: For this procedure, refer to FIGURE 4.1

Selecting the IR Mode

To use the IR Control Mode, power up the wheelchair normally (not in programming mode), select the appropriate drive and select the IR mode. The following screen shot from the MK6i Display Unit indicates that the IR Control Mode is in Drive 4.

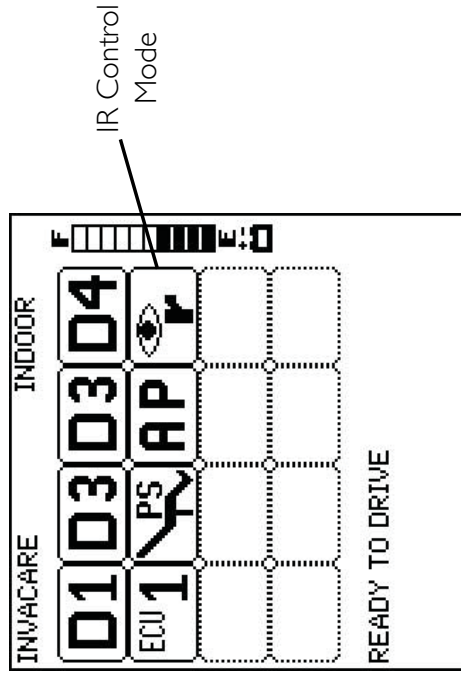



FIGURE 4.1 IR Mode

Selecting the Device

NOTE: For this procedure, refer to FIGURE 4.2

After selecting the IR Control Mode, the IR Control Screen is displayed as depicted by the next figure. In this example, there is a TV and a Phone setup and the TV is highlighted. The left-most icon  can be selected to GO BACK to exit the IR Control Mode.

If IR Control is set to 4-QUAD, use the Right or Left driver commands to scroll left and right to a different device or the GO BACK feature. Use the Forward command to “Select the Device” which then displays the next screen.

If IR Control is set to 3-QUAD, use the right command to scroll right to the next device or continue scrolling to wrap around to the GO BACK icon. Use the Left driver command to “Select the Device” (icon) which then displays the next screen.

NOTE: In 3-QUAD mode, the forward command is inactive.

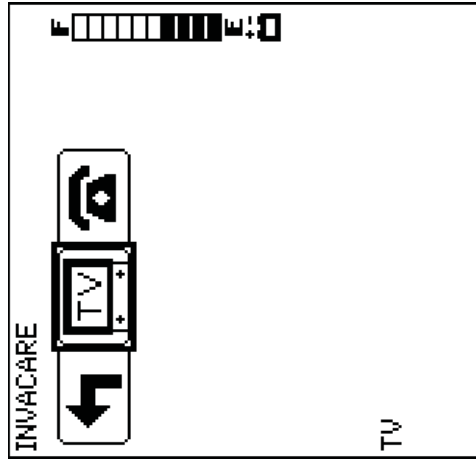
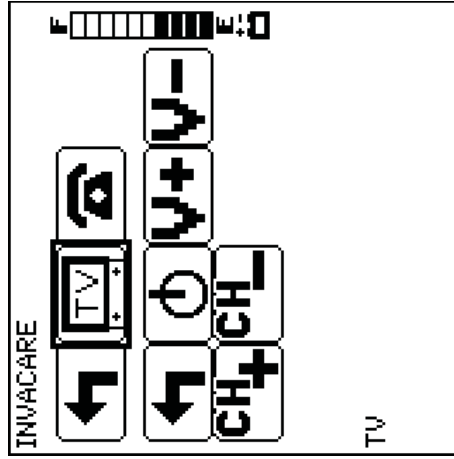


FIGURE 4.2 DRIVER COMMANDS

Using the IR Device Features

NOTE: For this procedure, refer to FIGURE 4.3

The screen below shows the “features” associated with the selected device. In this example, the features are those for the TV-BSC device type and include GO BACK, Power On/Off, Volume Up, Volume Down, Channel Up and Channel Down, reference full list of devices and features on page 18.



If IR Control is set to 4-QUAD, the user must issue a Left or Right driver command to scroll to and highlight the feature. Then, use the Forward or Reverse driver command to execute the feature.

If IR Control is set to 3-QUAD, the user must issue a Right driver command to scroll right to the next feature and the Left driver command to execute the feature.








NOTE: Executing the GO BACK feature, allows the user to select a different device, or exit IR mode.







FIGURE 4.3 DEVICE SELECTION

IR Device Features








The following table shows the available devices and their respective features.








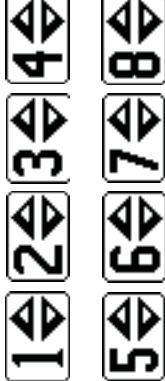
 **NOTE:** This is the icon shown on the Main Screen when IR Mode is set to ON. It appears after Driving (i.e. D1), seating controls (4-Switch, AP) and before the ECU's.

Device Type	Feature Symbol	Feature Description
 TV-BSC AND TV-ENH		Power On/Off (TV-BSC and TV-ENH)
		Volume Up/Down (TV-BSC and TV-ENH) (These features repeat when held active.)
		Channel Up/Down (TV-BSC and TV-ENH) (These features repeat when held active.)
		Keypad Access (TV-ENH Only) allows the user to enter a 1, 2, 3 or 4 digit channel directly.
		Input Source (TV-ENH Only)
		3 Favorite Channels (TV-ENH Only)





Device Type	Feature Symbol	Feature Description
 DVD AND VCR	    	Power On/Off Play Stop Rewind Fast Forward

IR Device Features

Device Type	Feature Symbol	Feature Description
 <p>PHONE (To use the Tash Phone, set the DEVICE CODE to 161)</p>	     	<p>Answer</p> <p>Hang Up</p> <p>Speed Dials</p> <p>Open Directory</p> <p>Next Directory Entry</p> <p>Previous Directory Entry</p>

Device Type	Feature Symbol	Feature Description
 AUDIO DEVICE	  	<p>Power On/Off</p> <p>Volume Up/Down (These features repeat when held active.)</p> <p>Channel Up/Down (These features repeat when held active.)</p>
 X10 HOME AUTOMATION	  	<p>Turns all devices ON</p> <p>Turns all devices OFF</p> <p>The following turn on/off each device</p>

IR Device Features

Device Type	Feature Symbol	Feature Description
 CABLE OR SATELLITE	  	Power On/Off Volume Up/Down (These features repeat when held active.) Channel Up/Down (These features repeat when held active.)

Mouse Emulation Setup, Programming and Usage

Hardware Installation

The Mouse Emulation uses two devices, the MK6i IR/Mouse Module and Dongle. The MK6i IR/Mouse Module is connected to the MK6i Network using the cable attached to the IR/Mouse Module. (See section 3.1). The Dongle is plugged into the computers USB port.

Mouse Initialization

The MK6i IR/Mouse and Dongle are uniquely linked allowing multiple users to be in the same area without interference.

Perform the following if link needs to be reestablished:

1. To establish this link, ensure the Dongle is plugged into the computer and the computer is then powered-up.
2. Ensure the wheel chair is turned off and plug a switch (1/8" mono or stereo) into the "Input" port of the MK6i IR/Module.
3. Press the (small) button on the Dongle; the LED on the Dongle should start to blink.
4. Hold the switch in the IR Module closed and power up the wheelchair for 2 seconds and then release the switch. The Dongle's LED should stop blinking and turn green for a moment to indicate that the link has been established.

NOTE: This may take as long as 15 seconds.

Mouse Emulation Programming

The MK6i can be programmed to use the Mouse Emulation in any drive.

1. Go to PERFORMANCE ADJUST and set MOUSE to 3-QUAD (generally used with 3-quadrant head controls) or 4-QUAD (generally used with 4-quadrant joysticks) in any or all drives.


Mouse Emulation Setup, Programming and Usage

2. Save Changes.
3. Digital Driver Controls ONLY - 5 additional parameters can be used to assist in controlling the mouse. Under the CALIBRATION menu select MOUSE SETTING and adjustment parameters. Refer to 3-QUAD MOUSE SETTINGS on page 22.

3-QUAD MOUSE SETTINGS		
Parameter	Default Value	Description
SWITCH DELAY	0.0 seconds	This parameter allows a delay from switch activation to switch recognition. For instance, if this parameter is set to 1 second, the mouse will not respond until the driver control has been active for more than 1 second.
DRAG LATCH TIME	0.0 seconds	When this parameter is non-zero, the left click button latching is enabled which provides "dragging". The parameter is the time from when the left click button is pressed and the left button is latched. This is typically used with 3-quadrant drivers to allow a sustained left command to latch an icon / graphic handle, and then use right & forward commands to re-position the icon / handle.
BASE SPEED	20	This is a percentage of the mouse speed.
HIGH SPEED DELAY	0.0 seconds	This time determines when the mouse speed ramps up to a higher speed. If this parameter is zero, the mouse speed is not affected. Generally used with "HIGH SPEED FACTOR" settings other than NONE.
HIGH SPEED FACTOR	NONE	This is the multiplication factor for the high speed mouse movement. The choices are NONE, 2X, 4X and 8X

Using the Mouse Emulator


To use the Mouse Emulator with a mouse set to 4-QUAD:

1. Enter the Mouse Mode depicted by the  icon.
2. Use the driver control to move the mouse cursor on the computer.
3. Use a switch plugged into the IR/Mouse Module to issue a left button click.

NOTE: If a stereo switch is in place, one switch operates a left mouse click, the other operates a right mouse click.

NOTE: If a user does not have the ability to use a switch for mouse click operation, several "Dwell Click" software programs are available for purchase and download. Refer to [FREEWARE DWELL CLICK SOFTWARE PROGRAMS](#); on page 24.

To use the Mouse Emulator with a mouse set to 3-QUAD:

1. Enter the Mouse Mode depicted by the  icon.
2. Use the right driver command to move the mouse horizontally, toggling between left and right. The mouse changes horizontal direction with each successive right driver command.
3. The forward driver command moves the mouse vertically, toggling between up and down. The mouse changes vertical direction with each successive forward driver command.
4. The left driver command emulates clicking the left mouse button. A sustained left command will select an icon or type an insertion point to allow for dragging. A second left command will deselect.

Freeware Dwell Click Software Programs:

<http://www.naturalpoint.com/smartnav/support/downloads.html> SmartNav
<http://en.kioskea.net/telecharger/telecharger-695-dwell-clicker> Dwell Clicker 1.0
<http://www.sensorysoftware.com/dwellclicker.html> "Dwell Clicker"
<http://www.polital.com/pncl/> "Point-N-Click"

Dwell Click Software Programs:

<http://www.ijcooper.com/smartclick/>
<http://www.boosttechnology.com/products.html> "MouseTool 3.13" Donationware (\$20 to any charity of choice)
<http://www.quillmouse.com/> "Quill NIB" \$49.00
http://www.infogrip.com/product_view.asp?RecordNumber=219&sbcolor=006600&optionxt=Search "Dragger" \$95
http://www.infogrip.com/product_view.asp?RecordNumber=988&sbcolor=006600&optionxt=Search "PointSmart" \$99
(Mouse Driver Enhancement Software)
http://www.infogrip.com/product_view.asp?RecordNumber=222&sbcolor=006600&optionxt=Search "SmartClick" \$109
<http://www.gusinc.com/dwell.html> Gus Dwell Cursor \$125
<http://www.madentec.com/products/magic-cursor.php> "MagicCursor 2000" \$230 Free demo

IR Device Codes

TV Codes

BRAND	COUNT	CODE
ABEX	1	019
ACER	1	249
ADMIRAL	4	001, 020, 033, 039
ADVENT	1	024
ADVENTURA	1	021
AIKO	1	032
AIWA	3	123, 283, 310
AKAI	7	002, 028, 222, 255, 272, 291, 312
ALLERON	1	008
AMERICA ACTION	1	036
AMTRON	1	007
ANAM	1	036
ANAM NATIONAL	2	003, 007
AOC	5	004, 005, 028, 047, 219
APEX	5	034, 040, 060, 146, 276

BRAND	COUNT	CODE
AUDIOVOX	7	007, 032, 036, 038, 180, 189, 282
AVENTURA	1	035
BANG & OLUFSEN	2	045, 046
BELCOR	1	047
BELL & HOWELL	2	001, 009
BENQ	3	127, 215, 216
BRADFORD	2	007, 036
BROCKWOOD	1	047
BROKSONIC	5	036, 039, 272, 288, 294
CANDLE	4	005, 021, 028, 047
CARNIVALE	1	028
CARVER	1	031
CCE	1	130
CELEBRITY	2	002, 026
CELERA	1	040
CHANGHONG	1	040

IR Device Codes

BRAND	COUNT	CODE
CITIZEN	7	005, 007, 015, 018, 028, 032, 047
CLARION	1	036
COBY	1	292
COLORTYME	2	005, 047
COMMERCIAL SOLUTIONS	1	029
CONCERTO	2	005, 047
CONTEC	1	036
CONTEC/CONY	2	006, 007
CRAIG	2	007, 036
CROSLEY	1	031
CROWN	3	007, 012, 036
CTX	1	124
CURTIS MATHES	11	000, 005, 009, 015, 018, 028, 029, 031, 033, 038, 047
CXC	2	007, 036
CYTRON	2	129, 293

BRAND	COUNT	CODE
DAEWOO	11	004, 005, 018, 032, 038, 047, 062, 113, 151, 234, 309
DAYTRON	3	005, 018, 047
DELL	3	051, 220, 223
DIMENSIA	1	000
DUMONT	3	017, 027, 047
DURABRAND	5	025, 035, 036, 039, 106
DWIN	1	033
ELECTROBAND	2	002, 026
ELECTROGRAPH	1	042
ELECTROHOME	4	002, 003, 005, 047
EMERSON	16	005, 006, 007, 008, 009, 018, 035, 036, 039, 047, 062, 212, 273, 290, 294, 311
EMPREX	1	227
ENVISION	3	005, 028, 047
EPSON	2	041, 202
ESA	1	035

IR Device Codes

BRAND	COUNT	CODE
FISHER	2	009, 125
FUJITSU	6	008, 241, 242, 243, 244, 245
FUNAI	6	007, 008, 035, 036, 121, 252
FUTURETECH	2	007, 036
GATEWAY	3	042, 044, 250
GE	11	000, 003, 005, 010, 011, 029, 038, 047, 055, 059, 298
GIBRALTER	4	017, 027, 028, 047
GOLDSTAR	7	004, 005, 006, 018, 019, 028, 047
GRADIENTE	1	131
GRUNPY	3	007, 008, 036
HAIER	1	025
HALLMARK	2	005, 047
HARMAN/KARDON	1	031
HARVARD	2	007, 036
HAYERMY	1	033

BRAND	COUNT	CODE
HELLO KITTY	1	038
HISENSE	1	214
HITACHI	11	005, 006, 047, 064, 186, 230, 251, 265, 266, 267, 268
HP	2	050, 256
ILO	3	224, 225, 280
IMA	1	007
INFINITY	2	012, 031
INITIAL	1	280
INSIGNIA	3	106, 128, 226
INTEQ	1	027
JANEIL	1	021
JBL	2	012, 031
JC PENNEY	9	000, 004, 005, 010, 011, 015, 018, 019, 047
JCB	2	002, 026
JENSEN	3	005, 047, 129

IR Device Codes

BRAND	COUNT	CODE
JVC	14	006, 011, 030, 090, 099, 110, 152, 167, 182, 183, 263, 285, 306, 308
KAWASHO	3	002, 005, 047
KEC	1	036
KENWOOD	3	005, 028, 047
KLH	1	040
KLOSS NOVABEAM	2	007, 021
KONKA	1	043
KTV	4	007, 018, 028, 036
LG	3	004, 047, 286
LOEWE	1	012
LOGIK	1	001
LUXMAN	2	005, 047
LXI	7	000, 005, 009, 012, 029, 031, 034
MAGNAVOX	15	005, 012, 028, 031, 047, 058, 066, 076, 111, 114, 157, 246, 280, 302, 311
MAJESTIC	1	001

BRAND	COUNT	CODE
MARANTZ	6	005, 012, 028, 031, 047, 247
MATSUSHITA	1	037
MAXENT	3	042, 206, 207
MEDIA CENTER	1	050
MEGATRON	1	005
MEMOREX	7	001, 004, 005, 009, 039, 121, 122
MGA	4	004, 005, 028, 047
MIDLAND	6	011, 017, 018, 019, 027, 029
MINTEK	1	280
MINUTZ	1	010
mitsubishi	12	004, 005, 033, 047, 093, 107, 132, 135, 137, 258, 261, 264
MONTGOMERY WARD	1	001
MOTOROLA	3	003, 020, 033
MTC	5	004, 005, 015, 028, 047
MULTITECH	2	007, 036

IR Device Codes

BRAND	COUNT	CODE
PHILCO	9	003, 004, 005, 006, 012, 028, 031, 047, 122
PHILIPS	23	003, 006, 012, 031, 047, 058, 063, 081, 087, 091, 101, 102, 109, 143, 144, 147, 172, 173, 192, 228, 280, 281, 302
PHILIPS MAGNAVOX	8	058, 066, 087, 091, 102, 109, 114, 119
PILOT	3	018, 028, 047
PIONEER	6	005, 022, 047, 134, 145, 238
PLASMSYNC	1	247
POLAROID	3	040, 194, 208
PORTLAND	5	004, 005, 018, 032, 047
PRICE CLUB	1	015
PRIMA	1	024
PRISM	1	011
PROSCAN	3	000, 029, 069
PROTON	3	005, 006, 047
PROVIEW	1	048

BRAND	COUNT	CODE
MULTIVISION	1	013
NAD	3	005, 022, 034
NEC	7	003, 004, 005, 028, 047, 205, 247
NET-TV	3	042, 217, 250
NIKKO	3	005, 028, 032
NORCENT	1	219
NTC	1	032
OLEVIA	2	049, 175
ONWA	2	007, 036
OPTIMUS	2	022, 037
OPTONICA	3	014, 020, 033
ORION	3	039, 106, 294
PANASONIC	29	003, 011, 012, 037, 054, 056, 068, 084, 088, 096, 103, 117, 120, 136, 138, 139, 140, 142, 161, 164, 170, 184, 198, 229, 233, 279, 299, 314, 315
PENNEY	3	028, 029, 034

IR Device Codes

BRAND	COUNT	CODE
PULSAR	3	017, 027, 047
QUASAR	4	003, 011, 037, 299
RADIO SHACK	4	009, 028, 029, 036
RADIO SHACK/ REALISTIC	9	000, 005, 006, 007, 009, 014, 018, 019, 047
RCA	15	000, 003, 004, 005, 029, 047, 052, 059, 065, 069, 100, 277, 301, 303, 318
REALISTIC	3	009, 028, 036
RUNCO	3	017, 027, 028
SAMPO	9	005, 018, 019, 028, 042, 047, 126, 218, 250
SAMSUNG	30	004, 005, 006, 015, 018, 019, 028, 047, 077, 079, 080, 098, 105, 108, 116, 133, 163, 165, 166, 169, 181, 187, 190, 195, 204, 235, 237, 262, 287, 295
SANSUI	6	039, 067, 106, 272, 289, 294
SANYO	4	009, 047, 125, 253
SCOTCH	1	005

BRAND	COUNT	CODE
SCOTT	6	005, 006, 007, 008, 036, 047
SEARS	11	000, 005, 008, 009, 023, 029, 031, 034, 035, 047, 155
SHARP	23	005, 006, 014, 018, 020, 033, 047, 082, 092, 149, 153, 158, 159, 160, 162, 171, 174, 176, 191, 200, 271, 296, 317
SHENG CHIA	1	033
SHOGUN	1	047
SIGNATURE	1	001
SONY	24	002, 026, 057, 061, 071, 073, 074, 089, 115, 118, 141, 150, 156, 168, 185, 201, 231, 232, 236, 260, 269, 270, 284, 305
SOUNDESIGN	5	005, 007, 008, 036, 047
SQUAREVIEW	2	023, 035
SSS	3	007, 036, 047
STARLITE	2	007, 036

IR Device Codes

BRAND	COUNT	CODE
TNCI	1	027
TOSHIBA	27	009, 015, 016, 034, 070, 072, 075, 078, 083, 086, 095, 104, 178, 179, 199, 203, 247, 248, 257, 259, 272, 274, 275, 297, 304, 313, 319
TOTEVISION	1	018
TRUTECH	1	213
TVS	1	039
UNIVERSAL	1	010
VECTOR RESEARCH	1	028
VICTOR	1	030
VIDIKRON	1	031
VIDTECH	3	004, 005, 047
VIEWSONIC	8	042, 193, 197, 209, 210, 211, 250, 251
VIKING	1	021
VIZIO	1	044

BRAND	COUNT	CODE
SUPERSCAN	2	033, 311
SUPRE-MACY	1	021
SUPREME	2	002, 026
SVA	1	254
SYLVANIA	14	005, 012, 028, 031, 035, 047, 097, 121, 212, 273, 278, 300, 311, 316,
SYMPHONIC	5	007, 023, 035, 036, 085
SYNTAX	1	175
SYNTAX-BRILLIAN	2	155, 175
TANDY	2	020, 033
TATUNG	3	003, 044, 221
TECHNICS	2	011, 037
TECHWOOD	3	005, 011, 47
TEKNIKA	12	001, 004, 005, 006, 007, 008, 015, 018, 031, 032, 036, 047
TELECAPTION	1	016
TMK	2	005, 047

IR Device Codes

BRAND	COUNT	CODE
WARDS	11	000, 001, 004, 005, 008, 010, 012, 014, 028, 031, 047
WAYCON	1	034
WESTINGHOUSE	5	026, 038, 177, 193, 196
WHITE WESTINGHOUSE	2	039, 062
YAMAHA	4	004, 005, 028, 047
ZENITH	16	001, 017, 027, 032, 039, 047, 053, 094, 112, 148, 154, 188, 239, 240, 294, 307

VCR Codes

BRAND	COUNT	CODE
ABS	1	060
ADMIRAL	1	021
ADVENTURA	2	012, 026
AIWA	4	012, 026, 027, 115
AKAI	3	001, 002, 117
ALIENWARE	1	060
AMERICAN HIGH	1	011
APEX	1	073
ASHA	2	007, 030
AUDIO DYNAMICS	2	003, 004
AUDIOVOX	2	008, 027
BANG & OLUFSEN	3	059, 098, 099
BEAUMARK	3	006, 007, 030
BELL & HOWELL	1	005
BROKSONIC	5	006, 065, 072, 085, 097
CALIX	2	008, 027

BRAND	COUNT	CODE
CANDLE	3	007, 008, 009
CANON	1	011
CAPEHART	2	010, 020
CCE	2	016, 023
CITIZEN	4	007, 008, 009, 027
COLORTYME	1	003
COLT	2	016, 023
CRAIG	7	007, 008, 016, 023, 027, 029, 030
CURTIS MATHES	5	000, 003, 007, 009, 011
CYBERNEX	2	007, 030
CYBERPOWER	1	060
CYPERPOWER	1	060
DAEWOO	5	012, 020, 050, 093, 114
DAVIDSON	1	026
DAYTRON	1	020
DBX	2	003, 004

IR Device Codes

BRAND	COUNT	CODE
DELL	1	060
DENON	1	022
DIMENSIA	1	000
DIRECTV	1	025
DURABRAND	1	028
DYNATECH	2	012, 026
ELECTROHOME	3	008, 013, 027
ELECTROPHONIC	2	008, 027
EMERSON	11	001, 006, 008, 011, 012, 013, 026, 027, 074, 097, 116
ESA	1	058
FISHER	2	005, 029
FUJI	2	002, 011
FUNAI	5	012, 026, 031, 069, 074
GARRARD	2	012, 026
GATEWAY	1	060

BRAND	COUNT	CODE
GE	6	000, 007, 011, 030, 056, 103
GO VIDEO	3	030, 081, 083
GOLDSTAR	4	003, 008, 027, 095
GRADIENTE	2	012, 026
HARLEY DAVIDSON	1	012
HARMAN/KARDON	1	003
HARWOOD	2	016, 023
HEADQUARTER	1	005
HEWLETT PACKARD	1	060
HI-Q	1	029
HITACHI	5	015, 022, 026, 066, 091
HOWARD COMPUTERS	1	060
HP	1	060
HUGHES NETWORK SYSTEMS	2	022, 025
HUMAX	1	025
HUSH	1	060
IBUYPOWER	1	060

IR Device Codes

BRAND	COUNT	CODE
INSIGNIA	1	061
INSTANT REPLAY	1	011
JC PENNEY	9	003, 004, 005, 006, 007, 008, 011, 015, 016
JCL	1	011
JENSEN	1	015
JVC	22	003, 004, 005, 037, 041, 045, 047, 049, 062, 070, 082, 111, 113, 125, 126, 127, 128, 129, 130, 131, 132, 133
KEC	1	027
KENWOOD	4	003, 004, 005, 009
KLH	2	016, 023
KODAK	3	008, 011, 027
LG	4	008, 061, 071, 096
LINKSYS	1	060
LLOYD'S	2	012, 026
LOGIK	2	016, 023

BRAND	COUNT	CODE
LXI	2	008, 027
MAGNAVOX	7	011, 019, 026, 028, 092, 108, 116
MAGNIN	2	008, 030
MARANTZ	5	003, 004, 005, 009, 011
MARTA	2	008, 027
MATSUSHITA	1	011
MEDIA CENTER PC	1	060
MEI	1	011
MEMOREX	15	005, 007, 008, 011, 012, 019, 021, 026, 027, 028, 029, 030, 032, 057, 072
MGA	2	013, 030
MGN TECHNOLOGY	2	007, 030
MICROSOFT	1	060
MIDLAND	1	014
MIND	1	060
MINOLTA	2	015, 022

IR Device Codes

BRAND	COUNT	CODE
MITSUBISHI	4	013, 015, 038, 052
MONTGOMERY WARD	2	017, 021
MOTOROLA	2	011, 021
MTC	3	007, 026, 030
MULTITECH	7	007, 009, 012, 014, 016, 023, 026
NEC	4	003, 004, 005, 009
NIKKO	2	008, 027
NIVEUS MEDIA	1	060
NOBLEX	2	007, 030
NORTHGATE	1	060
OLYMPUS	1	011
OPTIMUS	3	008, 021, 027
OPTONICA	1	018
ORION	2	032, 097
PANASONIC	8	011, 024, 034, 086, 104, 105, 119, 120
PENNEY	3	022, 027, 030
PENTAX	3	009, 015, 022

BRAND	COUNT	CODE
PHILCO	1	011
PHILIPS	6	011, 018, 025, 074, 092, 108
PHILIPS MAGNAVOX	1	092
PILOT	2	008, 027
PIONEER	3	004, 015, 067
POLAROID	1	073
PORTLAND	2	009, 020
PRESIDIAN	1	074
PROFITRONIC	1	030
PROSCAN	2	000, 055
PROTEC	2	016, 023
PULSAR	2	019, 028
QUARTER	1	005
QUARTZ	1	005
QUASAR	2	011, 105
RADIO SHACK	3	008, 018, 026

IR Device Codes

BRAND	COUNT	CODE
SEARS	8	005, 008, 011, 015, 022, 026, 027, 029
SHARP	10	013, 018, 021, 035, 040, 046, 063, 089, 101, 122
SHINTOM	3	002, 016, 023
SHOGUN	2	007, 030
SIGNATURE	1	021
SINGER	3	011, 016, 023
SONIC BLUE	1	024
SONY	9	002, 026, 036, 039, 060, 075, 077, 087, 110
STACK	1	060
STS	2	011, 022
SUPERSCAN	1	116
SYLVANIA	8	011, 012, 026, 074, 078, 106, 116, 121
SYMPHONIC	4	012, 026, 031, 074
SYSTEMAX	1	060
TAGAR SYSTEMS	1	060

BRAND	COUNT	CODE
RADIO SHACK/REALISTIC	8	005, 007, 008, 011, 012, 013, 018, 021
RADIX	2	008, 027
RANDEX	2	008, 027
RCA	14	000, 001, 007, 011, 015, 022, 030, 033, 042, 048, 053, 080, 107, 123
REALISTIC	11	005, 007, 008, 011, 012, 013, 018, 021, 026, 027, 029
REPLAYTV	1	024
RICAVISION	1	060
RUNCO	2	019, 028
SAMSUNG	8	007, 014, 025, 030, 079, 084, 100, 124
SANKY	3	019, 021, 028
SANSUI	6	004, 026, 032, 068, 072, 097
SANYO	5	005, 007, 029, 030, 094
SCOTT	1	006

IR Device Codes

BRAND	COUNT	CODE
TANDY	1	005
TASHIKO	1	008
TEAC	2	012, 026
TECHNICS	1	011
TEKNIKA	5	008, 011, 012, 026, 027
THOMAS	1	026
TIVO	1	025
TMK	2	007, 030
TOSHIBA	12	015, 043, 044, 051, 054, 060, 064, 076, 088, 102, 109, 118
TOTEVISION	4	007, 008, 027, 030
TOUCH	1	060
UNITECH	2	007, 030
VECTOR RESEARCH	3	003, 004, 009
VICTOR	1	004
VIDEO CONCEPTS	3	003, 004, 009
VIDEOMAGIC	1	027

BRAND	COUNT	CODE
VIDEOSONIC	2	007 030
VIEWSONIC	1	060
VILLAIN	1	026
VOODOO	1	060
WARDS	14	007, 008, 011, 012, 013, 015, 016, 018, 021, 022, 023, 026, 029, 030
WESTINGHOUSE	1	023
WHITE WESTINGHOUSE	1	031
XR-1000	5	011, 012, 016, 023, 026
YAMAHA	3	003, 004, 005
ZENITH	8	002, 019, 026, 028, 061, 090, 097, 112
ZT GROUP	1	060

DVD Codes

BRAND	COUNT	CODE
ADVENT	1	008
AIWA	2	179, 199
AKAI	4	001, 191, 208, 213
ALCO	1	006
AMPHION MEDIAWORKS	2	012
AMW	2	012, 094
APEX	8	022, 024, 031, 052, 059, 157, 188, 195
APPLE	2	265, 266
ASPIRE	1	011
ASTAR	1	130
AUDIOVOX	5	006, 181, 185, 203, 246
BANG & OLUFSEN	3	025, 192, 193
BLAUPUNKT	2	024, 081
BLUE PARADE	1	020
BOSE	2	097, 224
BROKSONIC	5	001, 149, 168, 191, 194

BRAND	COUNT	CODE
CALIFORNIA AUDIO LABS	1	003
CAMBRIDGESOUNDWORKS	1	247
CLARION	1	098
CLASSIC	1	099
COBY	4	009, 010, 209, 236
CYBERHOME	1	029
CYTRON	1	212
DAEWOO	2	064, 174
DENON	2	003, 242
DESAY	1	115
DISNEY	1	023
DURABRAND	1	026
DVD2000	1	017
EMERSON	5	002, 023, 100, 158, 205
ESA	1	095
FUNAI	3	023, 156, 158
GATEWAY	1	117
GE	4	018, 024, 096, 142

IR Device Codes

BRAND	COUNT	CODE
GO VIDEO	4	117, 164, 166, 180
GOLDSTAR	1	176
GPX	1	101
GRADIENTE	2	003, 116
GREENHILL	1	024
GRUNDIG	1	019
HARMAN/KARDON	2	113, 114
HITACHI	5	039, 067, 135, 153, 171
HITEKER	1	022
HUMAX	1	249
ILO	1	204
INITIAL	3	024, 096, 206
INSIGNIA	3	152, 187, 244
INTEGRA	2	004, 020
IRRADIO	1	125
JBL	1	237
JENSEN	1	010

BRAND	COUNT	CODE
JVC	21	021, 043, 053, 066, 073, 080, 123, 145, 147, 165, 200, 240, 250, 253, 254, 255, 256, 257, 258, 259, 260
KAWASAKI	1	006
KENWOOD	3	003, 046, 092
KLH	3	006, 024, 071
KONKA	1	000
KOSS	4	005, 014, 082, 235
LANDEL	1	027
LASONIC	1	102
LENOXX	2	013, 026
LG	7	121, 146, 148, 150, 172, 207, 210
LIQUID VIDEO	1	014
LITEON	3	117, 122, 127
MAGNAVOX	8	002, 016, 019, 023, 078, 119, 173, 206
MARANTZ	2	019, 091

IR Device Codes

BRAND	COUNT	CODE
MEMOREX	2	001, 103
MICROSOFT	1	018
MINTEK	3	024, 204, 206
MITSUBISHI	3	017, 058, 087
NAD	2	100, 104
NAKAMICHI	1	105
NESA	1	024
NEXT BASE	1	027
NEXXTECH	1	028
NORCENT	3	009, 093, 107
ONKYO	4	004, 016, 108, 238
ORITRON	3	005, 014, 082
PANASONIC	19	003, 016, 035, 036, 046, 047, 077, 079, 124, 129, 169, 198, 215, 216, 225, 226, 227, 229, 233
PHILIPS	16	016, 019, 023, 051, 055, 086, 090, 125, 128, 134, 137, 158, 162, 189, 206, 241

BRAND	COUNT	CODE
PIONEER	8	020, 045, 070, 075, 132, 141, 154, 223
POLAROID	3	094, 157, 177
POLK AUDIO	1	019
PRESIDIAN	2	023, 158
PROCEED	1	022
PROSCAN	2	018, 089
QWESTAR	2	005, 082
RCA	13	006, 018, 020, 024, 037, 049, 050, 142, 163, 182, 196, 219, 234
REGENT	1	013
ROTEL	1	021
ROWA	1	007
SAMPO	1	109
SAMSUNG	14	003, 039, 040, 048, 062, 074, 118, 135, 166, 167, 183, 201, 220, 230
SANSUI	5	001, 110, 155, 191, 202
SANYO	3	001, 139, 175

IR Device Codes

BRAND	COUNT	CODE
SENSORY SCIENCE	1	117
SHARP	10	023, 054, 060, 136, 151, 170, 186, 218, 245, 252
SHERWOOD	2	111, 248
SHINCO	1	096
SHINSONIC	1	015
SONY	22	015, 032, 033, 034, 038, 041, 042, 044, 063, 068, 083, 085, 126, 159, 161, 184, 211, 221, 222, 228, 231, 232
SUNGALE	1	106
SUPERSCAN	1	002
SYLVANIA	8	002, 023, 072, 133, 158, 162, 197, 217
SYMPHONIC	2	023, 158
TEAC	2	006, 204
TECHNICS	1	003
TECHWOOD	1	112
THETA DIGITAL	1	020

BRAND	COUNT	CODE
TOSHIBA	25	001, 016, 030, 056, 057, 061, 069, 076, 084, 088, 120, 131, 143, 144, 160, 178, 191, 194, 214, 243, 251, 261, 262, 263, 264
TRUTECH	1	029
URBAN CONCEPTS	1	016
VENTURER	2	006, 190
XBOX	1	018
YAMAHA	4	003, 019, 138, 239
ZENITH	5	016, 065, 140, 146, 176

CD Codes

BRAND	COUNT	CODE
AIWA	1	283
BOSE	1	284
DENON	2	271, 276
EMERSON	1	277
HARMAN/KARDON	1	280
JVC	1	287
KENWOOD	1	288
MARANTZ	1	267
ONKYO	2	268, 282
PANASONIC	1	269
PHILIPS	1	279
PIONEER	1	281
RCA	1	275
SANYO	1	274
SHERWOOD	1	272
SONY	3	278, 285, 286
TEAC	1	273

BRAND	COUNT	CODE
YAMAHA	1	270

IR Device Codes

Cable Codes

BRAND	COUNT	CODE
ABC	8	000, 001, 002, 024, 025, 039, 041,
ADELPHIA	1	042
ALCATEL	1	061
AMERICAST	1	031
AMSTRAD	2	050, 065
ANTRONIX	2	005, 006
ARCHER	1	006
ARCON	1	050
AT&T	1	047
AXIS	1	050
BELL SOUTH	1	031
CABLE VISION	1	043
CABLETENNA	1	005
CABLETIME	1	051
CABLEVIEW	1	004
CLEARMASTER	1	030
CLEARMAX	1	030
CLYDE	1	052
COLOUR VOICE	1	008
COMCAST	3	044, 045, 048
COMCRYPT	1	063

BRAND	COUNT	CODE
COMTRONICS	1	009
CONTEC	2	010, 038
COOLMAX	1	030
COX	1	046
CRYPTOVISION	1	053
DIRECTOR	1	045
EASTERN	1	011
EVERQUEST	1	026
FIDELITY	1	050
FILMNET	1	063
FILMNET	2	054, 059
FILMNET	1	054
FINLUX	1	056
FOCUS	1	029
FOXTEL	1	065
FRANCE TELECOM	2	060, 064
FREEBOX	1	066
GC ELECTRONICS	1	006
GE	2	000, 001
GEC	1	052
GEMINI	2	012, 026
GENERAL	5	001, 028, 044, 045, 062

IR Device Codes

BRAND	COUNT	CODE	BRAND	COUNT	CODE
GOLDSTAR	1	027	NEC	1	003
GOODING	1	055	NOKIA	1	056
GRUNDIG	2	050, 055	NOOS	1	064
HAMLIN	2	013, 014	NSC	1	017
HIRSCHMANN	1	056	OAK	1	010
HITACHI	1	001	PACE	3	033, 034, 035
ITT NOKIA	1	056	PALLADIUM	1	055
JASCO	1	026	PANASONIC	3	021, 023, 025
JERROLD	8	001, 012, 024, 026, 028, 045, 057,	PARAGON	1	025
JVC	1	055	PHILIPS	6	007, 008, 015, 055, 060, 061
MACAB	1	064	PIONEER	6	018, 019, 027, 033, 036, 050
MAGNAVOX	1	015	POPULAR	1	029
MASPRO	1	055	PROSCAN	2	000, 001
MATSUI	1	055	PULSAR	1	025
MEMOREX	2	016, 025	PVP STEREO VISUAL	1	057
MINERVA	1	055	QUASAR	1	025
MNET	2	059, 063	RADIO SHACK	2	026, 030
MOTOROLA	5	028, 045, 046, 047, 048	RCA	2	004, 023
MOVIE TIME	1	017	REALISTIC	1	006
MR ZAPP	1	064	RECOTON	1	029
MULTICHOICE	1	063	REGAL	1	014
MULTITECH	1	030	REGENCY	1	011

IR Device Codes

BRAND	COUNT	CODE
REBRANDT	1	001
RUNCO	1	025
SAGEM	1	064
SAMSUNG	2	019, 027
SAT	1	050
SCIENTIFIC	10	033, 036, 037, 038, 039, 040, 041,
SIGNAL	2	012, 026
SIGNATURE	1	001
SONY	2	032, 043
SPRUCER	1	023
STANDARD	1	020
STARCOM	4	012, 024, 026, 062
STARGATE	2	012, 026
STARQUEST	2	012, 026
SUPERCABLE	1	028
SUPERMAX	1	030
TELE+1	3	054, 059, 063
TELEPIU	2	059, 063
TIME WARNER	1	046
TOCOM	1	002
TORX	1	062
TOSHIBA	1	025

BRAND	COUNT	CODE
TRISTAR	1	030
TUSA	2	012, 026
TV86	1	017
UNIKA	2	005, 006
UNITED CABLE	2	024, 057
UNIVERSAL	2	005, 006
UNIVERSUM	2	055, 056
V2	1	030
VIDEOWAY	1	058
VIEW STAR	3	010, 015, 017
VIEWMASTER	1	030
VISION	1	030
VISIOPASS	3	056, 060, 064
VORTEX VIEW	1	030
WITTENBERG	1	050
ZENITH	3	022, 025, 031
ZENITEK	1	029

Satellite Codes

BRAND	COUNT	CODE
ABSAT	4	141, 142, 152, 158
AGS	1	141
AKAI	1	110
ALBA	7	073, 074, 075, 076, 100, 112, 142
ALDES	4	075, 076, 077, 156
ALLSAT	4	078, 096, 110, 154
ALLSONIC	4	076, 082, 134, 156
ALLTECH	1	142
ALPHASTAR	1	019
AMITRONICA	1	142
AMPERE	2	080, 129
AMSTRAD	9	079, 111, 129, 135, 142, 146, 147, 159, 168
ANGLO	1	142
ANKARO	6	076, 082, 134, 142, 155, 156

BRAND	COUNT	CODE
ANTTRON	3	073, 076, 154
APOLLO	1	073
ARCON	4	080, 081, 129, 157
ARMSTRONG	1	079
ASAT	1	110
ASLF	1	142
AST	1	085
ASTACOM	1	141
ASTON	1	121
ASTRA	6	079, 083, 084, 106, 138, 142
ASTRO	9	076, 077, 082, 088, 132, 133, 134, 135, 138
AUDIOTON	2	076, 096
AURORA	1	145
AUSTAR	2	145, 151
AXIEL	1	141
AXIS	4	082, 084, 092, 134

IR Device Codes

BRAND	COUNT	CODE
BARCOM	1	081
BEST	3	081, 082, 134
BLAUPUNKT	2	088, 132
BLUE SKY	2	142, 147
BOCA	4	079, 106, 129, 142
BOSTON	2	129, 141
BRAIN WAVE	2	090, 157
BRANDT	1	116
BROADCAST	1	089
BROCO	1	142
BSKYB	3	159, 168, 206
BT	1	141
BT SATELLITE	1	116
BUBU SAT	1	142
BUSH	7	074, 078, 091, 100, 112, 154, 211
BVV	1	157
CAMBRIDGE	1	135

BRAND	COUNT	CODE
CANAL SATELLITE	1	133
CANAL+	2	114, 133
CHANNEL MASTER	1	075
CHAPARRAL	1	005
CHEROKEE	2	141, 152
CHESS	4	120, 131, 137, 142
CITYCOM	6	074, 093, 128, 138, 143, 151
CLATRONIC	1	090
CLEMENS KAMPHUS	1	102
CNT	1	077
COLOMBIA	1	129
COLUMBIA	1	129
COLUMBUS	1	097
COMAG	1	129
COMMANDER	1	155
COMMLINK	2	076, 156
COMTECH	2	092, 156

IR Device Codes

BRAND	COUNT	CODE
CONDOR	3	082, 134, 138
CONNEXIONS	2	087, 134
CONRAD	5	128, 129, 134, 135, 138
CONRAD ELECTRONIC	2	138, 142
CONTEC	2	092, 093
COSAT	1	096
CROWN	1	079
CYBERMAXX	1	125
DAERYUNG	1	087
DAEWOO	2	142, 162
DANSAT	2	078, 154
DDC	1	075
DECCA	1	094
DELEGA	1	075
DEW	1	092
DIAMOND	1	095

BRAND	COUNT	CODE
DIGIALITY	1	138
DIGIPRO	1	148
DIRECTV	26	023, 024, 025, 027, 028, 030, 033, 034, 035, 036, 037, 039, 040, 042, 043, 044, 045, 047, 048, 049, 051, 056, 057, 061, 062, 071
DISCOVERER	2	131, 137
DISCOVERY	1	141
DISEQC	1	141
DISH NETWORK	24	000, 001, 002, 003, 026, 032, 060, 069, 087, 120, 142, 152, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228
DISHPRO	2	026, 032
DISKXPRESS	1	081
DISTRATEL	1	147
DITRISTRAD	1	096

IR Device Codes

BRAND	COUNT	CODE
DNR	1	157
DNT	2	087, 110
DONG WOO	1	105
DRAKE	1	006
DSTV	1	145
DUNE	1	134
DYNASAT	1	140
ECHOSTAR	8	026, 032, 060, 069, 087, 120, 142, 152
EINHELL	7	073, 076, 079, 129, 135, 142, 156
ELAP	2	141, 142
ELEKTA	1	077
ELSAT	1	142
ELTA	5	073, 082, 096, 110, 134
EMANON	1	073
EMME ESSE	5	082, 091, 102, 134, 140

BRAND	COUNT	CODE
ENGEL	1	142
EP SAT	1	074
EURIEULT	3	130, 146, 147
EURODEC	1	123
EUROPA	3	135, 138, 155
EUROPHON	2	129, 138
EUROSAT	1	079
EUROSKY	7	079, 082, 128, 129, 134, 135, 138
EUROSTAR	5	079, 128, 138, 140, 143
EUTELSAT	1	142
EXATOR	2	073, 076
EXPRESSVU	1	032
FENNER	4	131, 134, 137, 142
FERGUSON	6	074, 078, 091, 123, 154, 201
FIDELITY	1	135
FINLANDIA	1	074

IR Device Codes

BRAND	COUNT	CODE
FINLUX	2	074, 099
FINNSAT	2	092, 123
FLAIR MATE	1	142
FOXTEL	3	145, 150, 151
FRACARRO	1	112
FRANCE SATELLITE/TV	1	097
FREECOM	4	073, 101, 132, 135
FRESAT	1	146
FTE	2	080, 103
FTEMAXIMAL	2	134, 142
FUBA	12	073, 081, 082, 083, 087, 088, 097, 099, 110, 128, 132, 134
FUGIONKYO	1	148
GALAXIS	13	076, 081, 082, 084, 092, 096, 100, 118, 128, 134, 45, 151, 156
GARDINER	1	143
GE	3	004, 051, 056

BRAND	COUNT	CODE
GENERAL INSTRUMENT	2	007, 029
GMI	1	079
GOI	1	032
GOLDBOX	1	133
GOLDSTAR	1	101
GOODING	1	136
GOODMANS	3	074, 100, 207
GRANDIN	1	130
GROTHUSEN	2	073, 101
GRUNDIG	18	074, 076, 088, 091, 111, 122, 132, 135, 136, 145, 147, 159, 168, 182, 184, 185, 187, 195
G-SAT	1	154
HANSEATIC	2	108, 137
HÄNSEL & GRETEL	2	129, 138
HANTOR	3	073, 090, 105
HANURI	1	077

IR Device Codes

BRAND	COUNT	CODE
HASE & IGEL	1	157
HAUPPAUGE	2	178, 196
HELIOCOM	2	080, 138
HELIUM	1	138
HINARI	2	075, 154
HIRSCHMANN	9	088, 102, 132, 134, 135, 138, 141, 146, 183
HISAWA	1	090
HISENSE	1	031
HITACHI	4	020, 062, 074, 091
HNE	1	129
HOUSTION	1	155
HOUSTON	1	096
HTS	1	032
HUGHES NETWORK SYSTEMS	9	018, 025, 033, 035, 037, 043, 048, 057, 066
HUMAX	6	117, 151, 177, 179, 180, 203

BRAND	COUNT	CODE
HUTH	12	076, 079, 089, 090, 092, 096, 102, 129, 138, 149, 155, 156
HYPSON	1	130
ID DIGITAL	1	151
ILO	1	031
IMEX	1	130
IMPERIAL	2	100, 112
INGELEN	1	146
INNOVATION	5	082, 108, 118, 120, 125
INTERNATIONAL	1	129
INTERSTAR	1	148
INTERTRONIC	1	079
INTERVISION	2	096, 138
ITT NOKIA	2	074, 091
JERROLD	1	029
JOHANSSON	1	090
JOK	1	141

IR Device Codes

BRAND	COUNT	CODE
JSR	1	096
JVC	2	032, 136
KAMM	1	142
KATHREIN	18	088, 093, 103, 110, 128, 132, 141, 142, 143, 152, 163, 167, 170, 175, 176, 179, 204, 214
KATHREIN EUROSTAR	1	128
KEY WEST	1	129
KLAP	1	141
KONIG	1	138
KOSMOS	3	101, 102, 103
KR	1	076
KREISELMEYER	2	088, 132
K-SAT	1	142
KYOSTAR	2	073, 129
L&S ELECTRONIC	2	129, 134

BRAND	COUNT	CODE
LASAT	10	077, 082, 104, 105, 106, 128, 129, 131, 134, 138
LEMON	1	157
LENCO	9	073, 101, 107, 128, 134, 138, 142, 155, 157
LENG	1	090
LENNOX	1	096
LENSON	2	098, 135
LG	2	030, 101
LIFE	1	118
LIFESAT	10	082, 108, 118, 120, 125, 129, 131, 134, 137, 142
LIFETEC	5	082, 108, 118, 120, 125
LORENZEN	4	129, 138, 155, 157
LORRAINE	1	101
LUPUS	2	082, 134
LUXOR	1	135

IR Device Codes

BRAND	COUNT	CODE
LYONNAISE	1	123
M&BI	1	137
MACAB	1	123
MAGNAVOX	1	028
MANATA	4	129, 130, 141, 142
MANHATTAN	5	074, 077, 091, 096, 141
MARANTZ	1	110
MASCOM	1	077
MASPRO	6	074, 091, 132, 136, 142, 157
MATSUI	4	116, 132, 136, 141
MAX	1	138
MB	2	108, 137
MEDIABOX	1	133
MEDIAMARKT	1	079
MEDIASAT	3	084, 133, 135
MEDION	8	082, 108, 118, 120, 125, 129, 134, 142

BRAND	COUNT	CODE
MEDISON	1	142
MEGA	1	110
MELECTRONIC	1	143
MEMOREX	1	028
METRONIC	9	073, 076, 077, 081, 130, 142, 143, 147, 156
METZ	2	088, 132
MICRO	3	135, 138, 142
MICRO ELECTRONIC	1	142
MICRO TECHNOLOGY	1	142
MICROMAXX	6	082, 108, 118, 120, 125, 134
MICROSTAR	5	082, 108, 118, 120, 125
MICROTEC	1	142
MINERVA	2	088, 136
MITSUBISHI	5	033, 037, 074, 088, 116

IR Device Codes

BRAND	COUNT	CODE
MIKKO	2	079, 142
NOKIA	5	074, 091, 171, 173, 186
NOMEX	1	126
NORDMENDE	5	073, 074, 075, 077, 123
NOVA	1	145
NOVIS	1	090
OCEANIC	1	095
OCTAGON	4	073, 076, 092, 155
OKANO	3	079, 102, 103
ONDIGITAL	1	153
OPTEX	2	093, 096
OPTUS	3	133, 145, 149
ORBIT	1	085
ORBITECH	4	073, 131, 133, 135
OSAT	1	076
OTTO VERSAND	1	088

BRAND	COUNT	CODE
MITSUMI	1	106
MORGAN SYDNEY	1	124
MORGAN'S	5	079, 106, 110, 129, 142
MOTOROLA	2	029, 144
MULTICHOICE	2	122, 145
MULTISTAR	2	103, 105
MULTITEC	2	120, 131
MURATTO	2	086, 101
MYSAT	1	142
NAVEX	1	090
NEC	1	109
NETWORK	1	154
NEUHAUS	8	084, 096, 098, 135, 138, 142, 155, 157
NEUSAT	2	142, 157
NEXT LEVEL	1	029
NEXT WAVE	1	119
NEXTWAVE	1	149

IR Device Codes

BRAND	COUNT	CODE
PACE	15	074, 078, 088, 091, 100, 111, 141, 152, 154, 159, 168, 192, 199, 210, 212
PACIFIC	1	095
PACKSAT	1	141
PALCOM	4	075, 083, 097, 098
PALLADIUM	3	079, 135, 136
PALSAT	2	131, 135
PALTEC	1	083
PANASAT	2	139, 145
PANASONIC	12	016, 047, 049, 052, 061, 063, 074, 091, 111, 159, 161, 168
PANDA	4	074, 078, 132, 138
PANSAT	1	058
PATRIOT	2	129, 141
PAYSAT	1	028
PCCW	1	041

BRAND	COUNT	CODE
PHILIPS	23	021, 023, 025, 028, 033, 037, 040, 066, 071, 074, 091, 110, 132, 133, 136, 141, 143, 153, 154, 155, 191, 193, 208
PHOENIX	3	092, 100, 154
PHONOTREND	5	074, 076, 096, 102, 156
PIONEER	4	025, 050, 133, 209
POLSAT	1	123
POLYTRON	1	093
PREDKI	1	090
PREISNER	1	129
PREMIER	1	133
PREMIERE	4	096, 114, 133, 151
PRIESNER	1	079
PRIMESTAR	1	017
PROFI	1	107
PROFILE	1	141

IR Device Codes

BRAND	COUNT	CODE
PROMAX	1	074
PROSAT	5	075, 076, 100, 112, 156
PROSCAN	2	004, 042
PROTEK	1	095
PROTON	1	031
PROVISION	1	077
PYE	1	136
QUADRAL	7	075, 076, 082, 134, 141, 152, 156
QUELLE	3	088, 128, 138
QUIERO	1	123
RADIO SHACK	1	029
RADIOLA	1	110
RADIX	3	087, 146, 169
RAINBOW	1	076
RCA	9	004, 039, 042, 054, 055, 065, 066, 067, 216

BRAND	COUNT	CODE
REALISTIC	1	008
RED STAR	1	134
REDIFFUSION	1	109
REDPOINT	1	084
REDSTAR	1	082
RFT	4	076, 110, 155, 156
ROADSTAR	1	142
ROCH	1	130
ROVER	2	134, 142
RUEFACH	1	107
SABA	9	077, 091, 112, 128, 138, 141, 147, 154, 157
SABRE	1	074
SAGEM	1	123
SAKURA	2	092, 100
SALORA	1	109

IR Device Codes

BRAND	COUNT	CODE
SAMSUNG	11	024, 025, 044, 046, 066, 073, 165, 166, 172, 181, 213
SAT	4	075, 085, 086, 135
SAT CRUISER	1	149
SAT PARTNER	1	135
SAT TEAM	1	142
SATCOM	4	089, 108, 137, 138
SATEC	3	091, 142, 154
SATELCO	1	134
SATFORD	1	089
SATMASTER	1	089
SATPARTNER	6	073, 076, 077, 090, 101, 102
SATPLUS	1	131
SCHNEIDER	6	082, 118, 120, 125, 131, 141
SCHWAIGER	11	093, 095, 108, 117, 119, 129, 131, 137, 138, 147, 154

BRAND	COUNT	CODE
SCS	1	128
SEDEA ELECTRONIQUE	2	129, 148
SEEMANN	3	079, 084, 087
SEG	6	073, 082, 090, 108, 134, 137
SELECO	1	096
SEPTIMO	1	147
SERVI SAT	2	130, 142
SHARP	1	064
SIEMENS	2	088, 132
SILVA	1	101
SKANTIN	1	142
SKARDIN	1	084
SKINSAT	1	135
SKR	1	142
SKY	1	144
SKY DIGITAL	1	111

IR Device Codes

BRAND	COUNT	CODE
SKYMASTER	9	076, 108, 120, 131, 137, 142, 156, 164, 174
SKYMAX	1	110
SKYSAT	5	131, 135, 137, 138, 142
SKYVISION	1	096
SL	2	129, 157
SM ELECTRONIC	2	131, 142
SMART	4	128, 129, 142, 146
SONY	9	015, 027, 036, 038, 045, 068, 070, 111, 133
SR	3	079, 106, 129
STAR CHOICE	1	029
STARLAND	2	120, 142
STARRING	1	090
START TRAK	1	073
STRONG	8	073, 076, 082, 101, 112, 134, 145, 148

BRAND	COUNT	CODE
STS	1	022
STSI	1	009
STS2	1	010
STS3	1	011
STS4	1	012
STVI	1	130
SUMIDA	1	079
SUNNY SOUND	1	134
SUNSAT	1	142
SUNSTAR	4	079, 106, 129, 134
SUPER SAT	1	140
SUPERMAX	1	149
SYSTEC	1	129
TANDBERG	1	123
TANDY	1	076
TANTEC	4	074, 091, 097, 098
TATUNG	1	094

IR Device Codes

BRAND	COUNT	CODE
TCM	5	082, 108, 118, 120, 125
TECHNILAND	1	089
TECHNISAT	8	087, 098, 131, 133, 135, 160, 202, 215
TECHNOLOGY	1	145
TECHNOSAT	1	149
TECHNOWELT	3	129, 138, 147
TECO	2	079, 106
TELANOR	1	075
TELASAT	4	108, 128, 137, 138
TELECOM	1	142
TELEDIREKT	1	154
TELEFUNKEN	4	073, 091, 116, 141
TELEKA	6	076, 079, 087, 135, 138, 157
TELEMASTER	1	077
TELEMAX	1	104
TELESAT	3	108, 137, 138

BRAND	COUNT	CODE
TELESTAR	4	098, 131, 133, 135
TELEVES	4	074, 124, 129, 135
TELEWIRE	1	096
TEMPO	1	149
TEVION	6	082, 108, 118, 120, 125, 142
THOMSON	15	074, 113, 116, 123, 128, 133, 138, 141, 142, 188, 190, 194, 197, 198, 200
THORENS	1	095
THORN	3	074, 078, 091
TIOKO	2	093, 129
TIVO	2	025, 066
TONNA	5	074, 089, 096, 135, 142
TOSHIBA	3	013, 033, 048
TPS	1	115
TRIAD	3	085, 086, 101

IR Device Codes

BRAND	COUNT	CODE
VEGA	1	134
VENTANA	1	110
VIA DIGITAL	1	113
VIASAT	1	152
VEWSAT	1	059
VISIONIC	1	148
VISIOSAT	6	090, 096, 120, 121, 141, 142
VIVA	1	155
VIVANCO	1	127
VIVID	1	150
VOOM	1	029
VORTEC	1	073
V-TECH	3	085, 086, 143
WELLTECH	1	131
WETEKOM	3	131, 135, 137
WEVASAT	1	074
WEWA	1	074

BRAND	COUNT	CODE
TRIASAT	2	099, 135
TRIAx	6	088, 098, 128, 129, 135, 142
TURN SAT	1	142
TVONICS	1	201
TWINNER	4	124, 129, 130, 142
UEC	2	145, 150
UHER	1	131
ULTIMATE TV	1	027
UNIDEN	3	014, 028, 053
UNISAT	3	079, 092, 129
UNITOR	2	081, 090
UNIVERSUM	5	088, 128, 132, 136, 138
US DIGITAL	1	031
USDTV	1	031
VARIOSAT	1	132
VARIOSTAT	1	088

IR Device Codes

BRAND	COUNT	CODE
WINERSAT	1	090
WINTERGARTEN	1	156
WISI	8	074, 085, 086, 087, 088, 132, 135, 138
WOORISAT	1	077
WORLDSAT	1	141
XRYPTON	1	134
XSAT	2	142, 152
ZAUNKONIG	1	157
ZEHNDER	10	077, 081, 082, 086, 103, 128, 134, 143, 189, 205
ZENITH	3	034, 072, 144
ZINWELL	1	151
ZODIAC	1	076

Audio Codes

BRAND	COUNT	CODE
ADCOM	1	113
AIWA	5	014, 055, 064, 099, 126
AUDIOVOX	2	123, 156
BANG & OLUFSEN	1	132
BOSE	2	128, 136
CAMBRIDGESOUNDWORKS	1	157
CARVER	1	014
COBY	1	146
DENON	20	008, 048, 049, 060, 065, 066, 072, 075, 076, 078, 082, 083, 084, 085, 086, 087, 091, 101, 103, 152
EMERSON	1	120
GE	1	015
GRADIENTE	1	131
HARMAN/KARDON	6	012, 014, 105, 107, 108, 109
INSIGNIA	3	115, 116, 154

BRAND	COUNT	CODE
JBL	2	009 147
JVC	7	047, 068, 077, 089, 094, 095, 150
KENWOOD	9	035, 036, 039, 046, 052, 059, 063, 070, 079
KOSS	1	145
LEFT COAST	1	012
LINN	1	014
MAGNAVOX	1	014
MARANTZ	5	004, 012, 014, 110, 133
MITSUBISHI	1	090
NAD	1	019
NAKAMICHI	1	016
NEC	1	001
ONKYO	15	018, 023, 025, 040, 041, 043, 051, 054, 069, 074, 080, 088, 092, 093, 148
OPTIMUS	1	013

IR Device Codes

BRAND	COUNT	CODE
PANASONIC	13	024, 067, 104, 106, 117, 118, 119, 124, 133, 137, 138, 139, 143
PARASOUND	2	000, 010
PHILIPS	5	012, 014, 122, 130, 151
PIONEER	12	002, 021, 033, 034, 042, 044, 061, 062, 071, 081, 129, 160
POLAROID	1	125
POLK AUDIO	2	012, 114
PROSCAN	1	015
QUASAR	1	133
RCA	2	015, 144
RCA & DIMENSIA	1	134
ROTEL	1	111
SAMSUNG	2	017, 141
SANSUI	1	014
SHARP	1	155
SHERWOOD	3	112, 135, 158

BRAND	COUNT	CODE
SHURE	1	001
SONY	21	011, 020, 022, 028, 029, 030, 031, 032, 038, 050, 056, 057, 058, 096, 097, 098, 121, 127, 140, 142, 159
SOUNDMATTERS	1	007
TECHNICS	5	024, 053, 100, 104, 133
TOSHIBA	1	153
WARDS	1	014
YAMAHA	10	003, 005, 006, 026, 027, 037, 045, 073, 102, 149

TV/DVD Combo Codes

BRAND	COUNT	TV CODE	DVD CODE
AIWA	2	283	199
AKAI	4	272	191
		291	208
APEX	2	276	195
AUDIOVOX	2	282	203
BANG & OLUFSEN	4	045	192
		046	193
BROKSONIC	4	272	191
		288	194
COBY	2	292	209
CYTRON	2	293	212
EMERSON	4	273	158
		290	205
ILO	2	280	204
INITIAL	2	280	206
JVC	2	285	200

BRAND	COUNT	TV CODE	DVD CODE
LG	4	047	210
		286	207
MAGNAVOX	2	280	206
MINTEK	2	280	206
PHILIPS	4	280	206
		281	162
RCA	2	277	196
SAMSUNG	2	287	201
SANSUI	4	272	191
		289	202
SYLVANIA	4	273	158
		278	197
TOSHIBA	6	272	191
		274	194
		275	194

TV/VCR Combo Codes

BRAND	COUNT	TV CODE	VCR CODE
AIWA	2	310	115
BANG & OLUFSEN	4	045	098
		046	099
BROKSONIC	2	294	097
DAEWOO	2	309	114
EMERSON	2	294	097
GE	2	298	103
JVC	4	306	111
		308	113
MAGNAVOX	2	302	108
ORION	2	294	097
PHILIPS	2	302	108
QUASAR	2	299	105
RCA	4	301	107
		303	107
SAMSUNG	2	295	100
SANSUI	2	294	097

BRAND	COUNT	TV CODE	VCR CODE
SHARP	2	296	101
SONY	2	305	110
SYLVANIA	2	300	106
TOSHIBA	4	297	102
		304	109
ZENITH	4	294	097
		307	112

TV/DVD/VCR Combo Codes

BRAND	COUNT	TV CODE	DVD CODE	VCR CODE
AKAI	3	312	213	117
EMERSON	3	311	002	116
MAGNAVOX	3	311	002	116
RCA	3	318	219	123
SAMSUNG	3	287	220	124
SHARP	3	317	218	122
SUPERSCAN	3	311	002	116
SYLVANIA	6	311	002	116
		316	217	121
TOSHIBA	3	313	214	118

DVD/VCR Combo Codes

BRAND	COUNT	DVD CODE	VCR CODE
APEX	2	157	073
BROKSONIC	6	001	072
		149	065
		168	085
DAEWOO	2	174	093
EMERSON	2	158	074
FUNAI	4	156	069
		158	074
GO VIDEO	4	164	081
		166	083
GOLDSTAR	2	176	095
HITACHI	4	153	066
		171	091
INSIGNIA	2	152	061

IR Device Codes

BRAND	COUNT	DVD CODE	VCR CODE
JVC	18	145	062
		147	070
		165	082
		253	128
		254	129
		256	130
		257	131
		259	132
		260	133
		LG	8
		148	071
		150	061
		172	096
MAGNAVOX	2	173	092
MEMOREX	2	001	072
PANASONIC	2	169	086
PHILIPS	2	158	074
PIONEER	2	154	067

BRAND	COUNT	DVD CODE	VCR CODE
POLAROID	2	157	073
PRESIDIAN	2	158	074
RCA	2	163	080
SAMSUNG	4	166	079
		167	084
SANSUI	4	001	068
		155	072
SANYO	2	175	094
SHARP	4	151	063
		170	089
SONY	6	159	075
		161	077
		159	087
SYLVANIA	4	158	074
		162	078
SYMPHONIC	2	158	074

BRAND	COUNT	DVD CODE	VCR CODE
TOSHIBA	6	144	064
		160	076
		160	088
ZENITH	4	146	061
		176	090

IR Device Codes

HTIB Combo Codes

BRAND	COUNT	DVD CODE	AUDIO CODE
AUDIOVOX	2	246	156
BOSE	2	224	136
CAMBRIDGESOUNDWORKS	2	247	157
COBY	2	236	146
DENON	2	242	152
INSIGNIA	2	244	154
JBL	2	237	147
JVC	2	240	150
KOSS	2	235	145
ONKYO	2	238	148
PANASONIC	10	225	137
		226	138
		227	139
		229	137
		233	143
PHILIPS	2	241	151

BRAND	COUNT	DVD CODE	AUDIO CODE
PIONEER	2	223	160
RCA	2	234	144
SAMSUNG	2	230	141
SHARP	2	245	155
SHERWOOD	2	248	158
SONY	8	221	159
		228	140
		231	142
		232	142
TOSHIBA	2	243	153
YAMAHA	2	239	149
SONY	8	221	159
		228	140
		231	142
		232	142
TOSHIBA	2	243	153
YAMAHA	2	239	149

TV/DVD/Tuner Combo Codes

BRAND	COUNT	TV CODE	DVD CODE	TUNER CODE
PANASONIC	3	279	198	119
SONY	3	284	211	121

TV/VCR/Tuner Combo Codes

BRAND	COUNT	TV CODE	DVD CODE	TUNER CODE
PANASONIC	6	299	104	117
		299	105	118

Tuner/CD Combo Codes

BRAND	COUNT	TUNER CODE	CD CODE
AIWA	2	126	283
BOSE	2	128	284
EMERSON	2	120	277

SAT/DVD Combo Codes

BRAND	COUNT	SAT CODE	DVD CODE
HUMAX	2	180	249

TV/DVD/VCR/Tuner Combo Codes

BRAND	COUNT	TV CODE	DVD CODE	TUNER CODE
PANASONIC	8	314	215	119
		315	216	120

Tuner/CD Combo Codes

BRAND	COUNT	TV CODE	TUNER CODE
AUDIOVOX	2	189	123
GRADIENTE	2	131	131
PHILIPS	2	173	122
POLAROID	2	194	125

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PLEASE NOTE: THE WARRANTY BELOW HAS BEEN DRAFTED TO COMPLY WITH FEDERAL LAW APPLICABLE TO PRODUCTS MANUFACTURED AFTER JULY 4, 1975.

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Invacare warrants all electronics and electrical components (excluding batteries), motors, powered seating actuators and gearboxes to be free from defects in materials and workmanship for a period of one (1) year from the date of purchase from Invacare or a dealer, with a copy of the seller's invoice required for coverage under this warranty. If within such warranty periods any such product component shall be proven to be defective, the product component shall be repaired or replaced, at Invacare's option. This warranty does not include any labor or shipping charges incurred in replacement part installation or repair of any such product. Invacare's sole obligation and your exclusive remedy under this warranty shall be limited to such repair and/or replacement.

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For warranty service, please contact the dealer from whom you purchased your Invacare product. In the event you do not receive satisfactory warranty service, please write directly to Invacare at the address on the bottom of the back cover. Provide dealer's name address, date of purchase, indicate nature of the defect and, if the product is serialized, indicate the serial number. Do not return products to our factory without our prior consent.

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Condensed Reference Guide

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Version 1.5.0
12/30/07

New Components with MK6i

New Standard Joysticks



- Two Choices for Standard Joysticks
 1. Non-Expandable Systems: **SPJ+** (One drive mode)
 2. Expandable Systems: **MPJ+** (Four drive modes)
- PSF+** and **PSR+** - MK6i versions of the Personalized Style Joysticks - are available
- A full array of additional alternative proportional and digital driver controls are also available

New Controllers



- Controllers are provided at 60Amp, 75 Amp, 90Amp & 100 Amp (TrueTrack) to match the needs of the user with the driving environment for consistent smooth performance.
- MK6i Controllers allow changing from a **Non-Expandable** system, (one drive mode), to an **Expandable** system (four drive modes), by exchanging the driver control or using a MK6 Display with an alternative driver control.

New Connectors



- Universal connectors make it easy to add or remove options, & eliminate the daisy chain
- All MK6i options plug into the system using the same connector – in the same location
- No more questioning where to interface components
- Sliding Lock Tab assures solid connections

Smart Actuators



- Smart Actuators are standard on Formula TRE powered seating systems and an option of Formula CG Powered Seating
- Placing the positioning sensor with the actuator itself allows programmable up and down limits, and pre-setting automatic positions while also eliminating potentiometers and mercury switches.
- Automatic Positioning, a new programmable feature available **ONLY** with custom actuators – allows pre-setting powered seat positions, attainable with a single driver command.

Memory Card



- A New Invacare Memory card places the features of Laptop IVS into the palm of your hand
- Basic** Version for Backing up / Restoring programming values for a single chair.
- Professional** version allows saving Individual Drive profiles and multiple system profiles, Create Libraries of ready to install custom profiles, view Help Library, advanced diagnostics and trouble shooting tips.

New Display



- Larger brighter LCD screen -Crisp Text and Icons for easy viewing, even in sunlight
- Allows Alternative Controls to be used with an Expandable Controller Platform
- View all four drives, all at once
- Two Viewing Options, Three Scanning Options
- Insert an Invacare Memory card and turn the Display into the programmer for that chair.

New Programmer



- Based on a MK5 foundation – same rules – same menu structure - similar keystrokes
- View values for all four drives – all at once
- Help key allows access to view definitions, error code explanations and trouble shooting tips on the Professional Memory Card
- Can still use a MK5 programmer with access to EVERYTHING except “Help” screen
- New Programmable features include:
 - Three Scanning modes
 - Automatic Positioning
 - Programmable Pressure Relief Signal (PRS)

What's New in MK6i

Four Way Switch Box (4WSB)



- Multiple Actuator Systems Only (4 Way Switch -OR- Quad Push Buttons Standard)**
- Standard with two or more actuators
- Provides a 9 Pin Port for any 4 quadrant switch to operate multiple powered seating systems
- “No Charge” compatible switches include the “4 Way Toggle” and the “4 Quadrant Push Buttons”
- 4-Way switch is programmed in Calibrations Menu



Multiple Actuator Interface Box (S4WSB)



- Multiple Actuator Systems Only**
- Allows Driver Control to operate multiple actuators
- Replaces 4-Way Switch**
- Provides a 9 Pin Port for any separate 4 quadrant ATTENDANT switch to operate seating
- Provides two Additional ports, “A” and “B” for Direct Select Switch Functions
- “A” switch port cycles through available actuators.
- “B” switch port operates selected actuator.
- (4 Way Switch -OR- Quad Push Buttons Standard)**
- HPCPS Code E2311**

Single Actuator Node (SANODE)



- Single Actuator Systems Only (Not compatible with SPJ Joysticks)
- Enables operating a single actuator system through the Driver Control.
- HPCPS code E2310**

Auxiliary Module 12 (AUX12M6) Auxiliary Module 34 (AUX34M6)



- Allows Driver Control to Operate Alternative Devices (Mouse Emulator, Aug. Comm, ECU, etc...)**
- Each Module provides two 9-Pin ECU outputs with 4 switch closures each
- AUX34 adds a mono port to add an additional fifth switch and allow 5 switch closures through the output

“Y” Splitter Cable



- Allows adding a second switch to the Mode Port of the MK6 Driver Control Options
- Switch functions are programmable (Calibrations Menu)
- Not Compatible with SPJ+ Joysticks

Two Push Button (2PB) -OR- Two Way Toggle (2WT)



- Stereo Switches – Not Compatible with SPJ+ Joysticks
- Allow programming two switch functions through the Mode Port – ELIMINATING THE “Y” SPLITTER
- Choices include Mode (reset), Drive Select, (Actuator choices added for single power seating systems
- May program “Tilt UP” in Mono Port 1, “Tilt DOWN” in Port 2 if used with a Single Actuator System

24 Volt Auxiliary Power Source



- Provides an Accessory lead for devices requiring auxiliary power (e.g. electronic switches)

New Joysticks: (Non-Expandable Systems)



SPJ+

- Single drive
- Push button on/off & Speed Select
- Push button horn
- LED battery & speed indicators
- Charger port
- Quick disconnect

Powered Seating Versions

MK6i SPJ+ w/ PSS (For Powered Seating)

- Mono port for Powered Seating Switch added
- Standard with Egg Switch to operate actuator

MK6i SPJ+ w/ ACC (With Actuator Control)

- Mode button to allow Powered Seating operation through the joystick AND a Switch Port
- HCPCS Code E2310

SPJ+ w/ PSS (Actuator Port Only)

SPJ+ w/ ACC (Actuator Port) + (Mode Switch)



Egg Switch
W/ 611 Mount



New Joysticks: (Expandable Systems)

STANDARD PROPORTIONAL JOYSTICK



MPJ+

- Four programmable drives
- Toggle on/off –drive select
- Speed control Pot.
- Large, backlit LCD display with icons to reflect programmed modes in each drive
- Memory card reader
- Charger port
- Port for Remote On/Off Switch
- Second Port: Choose two of three programmable functions available
 - (Drive Select, Mode Switch, Actuator Control)
- Built In Mode Switch
 - Built in swivel mount

ALTERNATIVE PROPORTIONAL JOYSTICKS

PSR+



- Same Features as MPJ+
- Toggle On/Off can be positioned on Left, or on Right
- 3 Switch Option Choices
 - Toggle On/Off-Drive Select _ Speed Pot. Standard
 - Push Button On/Off _ Push Button Drive Select
 - Push Button On/Off _ Speed Pot.

PSF+

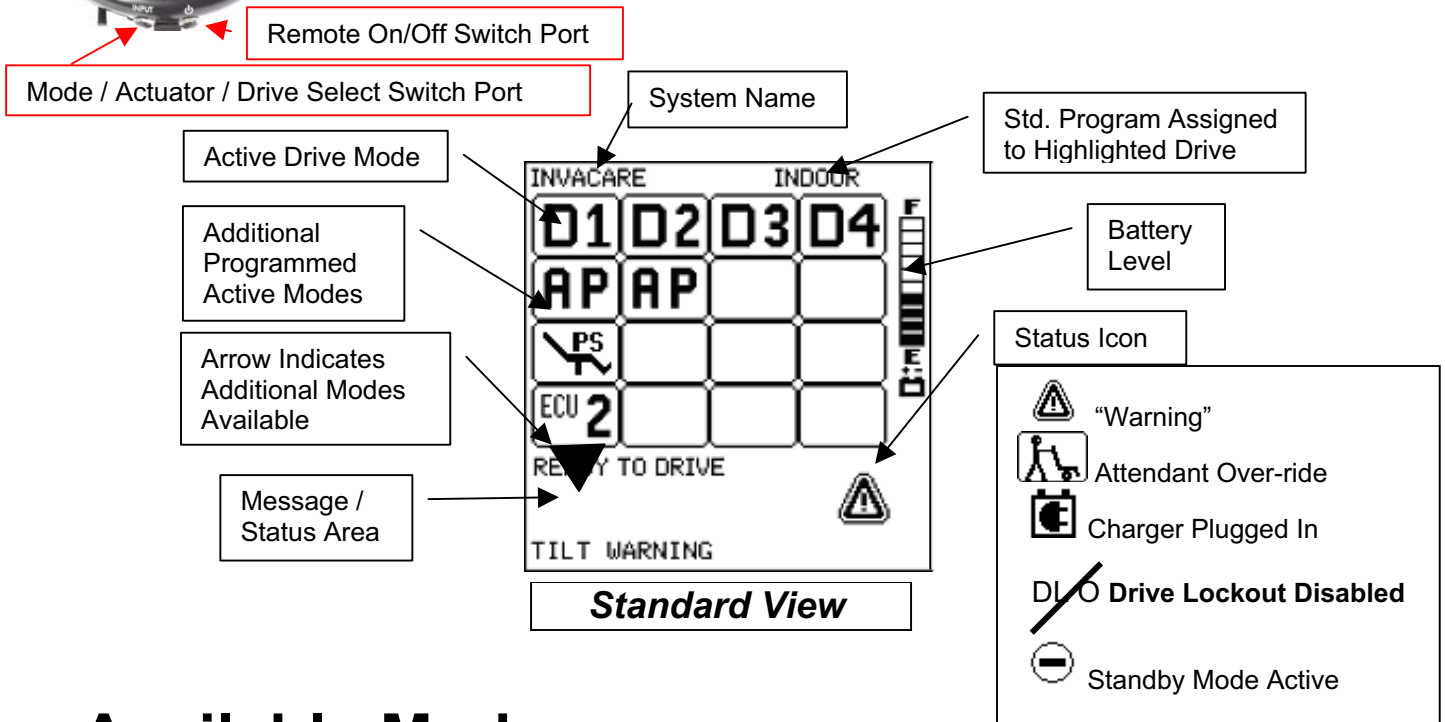
- No Mono Port for Remote On/Off
- Otherwise Same Features as MPJ+
- Toggle On/Off-Drive Select _ Speed Pot. Standard
- No Switch or Left-Right On/Off options



New MK6i Display Features



- The New MK6i Display can have up to four alternative drive controls (plus an attendant over-ride control) active on the chair
- View all four drives at once
- View all programmed modes available in each drive.
- View standard program name or custom name programmed for each drive
- View System name
- Choose Standard View (shown a left) or Enhanced View (Shown Below)
- Convert into a MK6i Programmer using the Invacare Memory Card



Available Modes

D1 D2 D3 D4 Drive Mode (1 through 4)

AP Automatic Positioning

PS Actuator Control Switch Mode
(i.e., 4-switch, 4-switch 2 levels, , etc...)

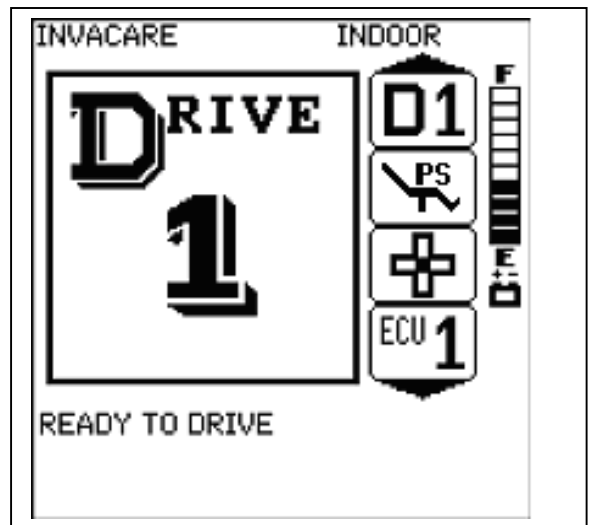
ECU 1 ECU 2 ECU 3 ECU 4 ECU Mode (1 through 4)

R/L RIM Mode

1234 Drive Select Mode

⊘ No Driving

D¹/₃ D²/₃ D³/₃ Digital 3 Speed



- Active Icon is Enlarged
- Additional available Icons shown on right

ALTERNATIVE CONTROLS - Proportional

Compact Joystick (1558M6)



- A proportional 4 quadrant (directional) driver control
- The **most versatile** of proportional driver controls.
- Used for Hand control, chin control, foot control, elbow control, midline control or attendant control.
- Programming parameters can compensate for impaired upper extremity / head / foot control function.
- Requires Display with Switches if used as a "Stand Alone" Control.

Micro Extremity



- A proportional 4-quadrant control with Built in Mode switch (Activated by depressing the inductive).
- **Minimal pressure required for activation.**
- Hand Mount version primarily for users with good finger dexterity but otherwise minimal U.E. function.
- Chin control Bib mount available
- Requires Display with Switches if used as a "Stand Alone" Control.



PSR / PSF Joysticks



- Both PSR & PSF = four independent drive modes
- PSF = Inductive Mode switch in the **front**, On/Off – Drive Select Toggle, Speed Potentiometer standard
- No "Switch Options" or "Right / Left" Options available with MK6i version
- PSR = Inductive in the **rear**, & choice of three combinations of two switches using Toggle, push buttons, or speed potentiometer. Includes built in mode switch.

ASL Stealth Mushroom Joystick (ASLPSMJ)



- A proportional 4-quadrant (directional) driver control
- Modeled after a track ball design, this is a good hand control option for those with limited hand grasp / finger dexterity
- Can be Traditional Side Mounted - Mid Line Mounted - Recessed mounted in a Lap Tray
- Replaces traditional "Goal Post" adaptation for some SCI Hand Control users

RIM Head Control (1500M6)



- 3 Quadrant Proportional Head Control
- A Reset Switch Toggles the Forward command to Reverse (Can be bypassed under some circumstances)
- Permits proportional head driving requiring standard joystick force

Peachtree (PHC-M6)



- 3 Quadrant Head Control
- Proportional forward / Reverse – Digital Left Right
- Reset switch built into occipital pad to access / change modes, toggle RIM from forward to reverse, etc...
- Access to ALL MKIV – MK5 Programming parameters – Drives – ECU functions.
- Forward Head movement operates Forward / Reverse quadrants
- Lateral or rotation Head movement operates Left / Right quadrants



ATTENDANT CONTROLS – (Dedicated)



Proportional (PACM6)



Digital (1552M6)

- Activated by turning "on". Works in any drive
- True Plug-n-Play. No programming required.
- Over-rides any active driver control
- Programmable Performance adjustment using MK5 Remote Programmer
- Neither is compatible with SPJ+ Joysticks

Proportional Attendant control plugs into MK6 Universal Connectins
Digital Attendant Control requires MK6 SnP Digital Interface Box

ALTERNATIVE CONTROLS - Digital

Sip n' Puff Controls



- 4 Quadrant Non-Proportional Driving. Intra-Oral Pressure - NOT Breath Control
- Pressure requirements can be calibrated to users abilities.
- Quadrants can be re-assigned from Factory Set directions (through axes selection) to meet users needs
- Factory Setting: Hard Puff = Forward Soft Puff = Right
 Hard Sip = Reverse Soft Sip = Left

ASL Head Array



- 3 Quadrant Driver Control (3 Proximity Switches: Occipital pad & Temporal Wings of the Head Rest)
- Size & Configuration options available
- Mode switch (mechanical or electrical) used to toggle Rim functions Forward / Reverse
- Choose from four standard reset switches: proximity, beam, egg and wobble; or add own custom

ASL SNP Head Array



- Combines the ASL switch head array (left and right directions) with Sip n' Puff (forward and reverse)
- Any Puff – hard or soft = Forward Command Any Sip – Hard or Soft - = Reverse
- Left & Right are digital commands (proximity switches) in the wings of the head rest.

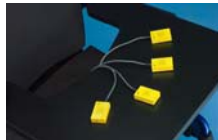
ASL Fiber Optic Array



- Can be mounted into any orientation for a minimal-movement, no-force switch system
- Options include 4 quadrant & 3 quadrant systems



ASL Proximity Switch Array



Can be mounted into any orientation for a gross-movement, no-force switch system
Shown here with Driving Platform

ASL Stealth Ultra Head Array



- 3 Quadrant Driver Control (3 Proximity Switches: Occipital pad & Temporal Wings of the Head Rest)
- Provides head support through the sub-occipital pad
- Temporal pads are adjustable, & swing away for transfers

Tash Mini Joystick



- A 4-quadrant joystick requiring minimal force & minimal throw to activate. Depressing the joystick downward accesses a fifth switch, used for reset.
- Used for Hand Control when there is reduced hand wrist movement / strength / endurance. Often used in a midline mount or can be used in a traditional side mount. Can be recessed in a lap tray.
- Chin Control when there is reduced head / neck movement.
- Can be Bib mounted or used with swing away midline mounts.
- Can be Bib mounted or used with swing away midline mount.

Tash Wafer Board



- Four "Directional" membrane switches with a fifth switch for "Re-Set".
- Also available in a "Star" configuration
- An option when there is limited hand dexterity, but at least moderate U.E. Control.

Single Switch Scanner



- A Single Switch Driving System, Scanning rate is adjustable
- Can utilize any mechanical or electrical switch that has a 1/8" phono plug
- The display scans each quadrant. When the quadrant led is turned on for the desired direction, the user holds the switch down and the chair drives in that direction.

MK6i Easy Remote Programmer

MK6i Programming				
Parameter	D1	D2	D3	D4
SPEED	100	100	100	100
RESPONSE	100	100	100	100
PERFORMANCE ADJUST	>>>			
STANDARD PROGRAMS	>>>			
MEMORY CARD	>>>			
POWERED SEATING	>>>			
CALIBRATIONS	>>>			
DIAGNOSTICS	>>>			

First Programming Screen

Performance Adjustment Screen



Changing All values in All Drives at once
(Also to Saving ALL Four Drives At Once)

Performance Adjust				
Parameter	D1	D2	D3	D4
NAME	SPEE	INDO	OUTD	RAMP
FWD SPEED	95	75	45	25
FWD ACCEL	25	25	25	25
FWD BRAKE	45	55	50	45
REV SPEED	20	20	20	20
REV ACCEL	20	25	30	25

Fwd Accel
Drive 2 **25%**

Changing One value in One Drive only
(Also to Save One Drive At Only)

Performance Adust				
Parameter	D1	D2	D3	D4
NAME	SPEE	INDO	OUTD	RAMP
FWD SPEED	95	75	45	25
FWD ACCEL	20	25	20	20
FWD BRAKE	45	55	50	45
REV SPEED	20	15	15	10
REV ACCEL	20	25	30	25

Fwd Accel
Drive 2 **25%**

Up & Down arrow keys scroll through menu options, as well as raise or lower selected performance values.

Left & Right arrow keys scroll along menu line items, as well as branch further in the menu structure, or return to the previous screen

Select Key

- Displays adjustable values / highlighted choices,
- Selects changes in values / selections made
- Begins Memory Card file transfer when prompted

SAVING STANDARD PROGRAMS

Save key must be used twice to save new profiles

1. First time = prompt screen "SAVE CHANGES TO DRIVE..."
2. Second time = Changes saved.

SAVING PERFORMANCE ADJUSTMENTS

- When an **ENTIRE ROW** is highlighted, all four drives are saved at once
- When only **ONE VALUE** is highlighted in one drive, only that drive is saved

Save key must be used twice to save changes

1. First time = prompt screen "Are you certain you want to save changes, Press Save again to Continue.
2. Second time = Changes saved.

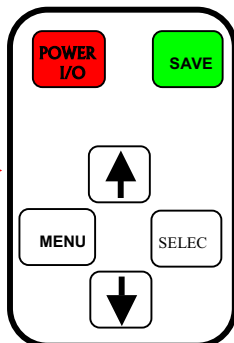
SAVING ALL OTHER PARAMETERS

Save key must be used twice to save changes

1. First time = prompt screen "Are you certain you want to save changes, Press Save again to Continue.
2. Second time = Changes saved.

HELP Key displays definitions for highlighted parameters & values

MK5 Programmer:



-The MK5 Programmer allows access to ALL MK6 programming with the only exception of no "HELP KEY" available.

-Primary difference is the MK5 programmer can only view one drive at a time.


First Screen:

SPEED
RESPONSE
→ ADVANCED MENU

-Scroll to & Select "ADVANCED MENU" to see full MK6 Programming Screens

Using the Memory Card

MK6i Programming				
Parameter	D1	D2	D3	D4
SPEED	100	100	100	100
RESPONSE	100	100	100	100
PERFORMANCE ADJUST	>>>			
STANDARD PROGRAMS	>>>			
MEMORY CARD	>>>			
.....				



- The memory card allows programming parameters to be transferred from the power chair and stored / organized as files in preset folders”
- These parameters can be transferred to other chairs, providing the Motors, drive configuration, and driver controls are the same
- **Entire profiles** (all drives at once) may be saved or transferred.

BASIC Memory Card



- Standard on delivery with ALL Power Chairs with Rehab (Expandable) Driver Controls.
- Only used to Back up / Restore Programmed Settings / Adjustments, for Only One Chair
- Does Not Contain Advanced Diagnostics / Help Screens / Software Updates / File Structure
- (Not compatible with SPJ+ Joysticks)

PROFESSIONAL Memory Card



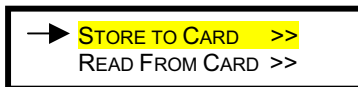
- Standard with All MK6i Programmers
- Available with USB Card Reader on the Order form
- Contains Advanced Diagnostics, Help Screens, Software Updates, File Storage/ Retrieval
- (Not compatible with SPJ+ Joysticks)

USING THE “BASIC” MEMORY CARD:

SAVING Back Up System File to Card / INSTALLING Back-Up System File from Card

It is Recommended a back-up copy of the final programming settings be made to the “BASIC Memory Card”. This card can be attached to the chair, or left with the user. This will serve to restore original programming settings should the Driver Control or Display need to be exchanged for any reason. **Simply make certain the System Name of the Chair to be restored matches the system name (file name) on the basic card.**

A provider’s back-up copy can be saved to the “PROFESSIONAL CARD”. (See page 11).



1. Insert BASIC Memory Card into Card Slot of the MK6i Display or Driver Control
2. Turn Power on with the Display (Driver Control)
3. Display screen will show only two choices: “Store to” or “Read From” card
4. Use Forward Reverse (Joystick) Up/Down Arrows (Display) to highlight selection
5. Select “STORE TO CARD” to create back up file
6. Select “READ FROM CARD” to restore programming set on chair delivery

USING THE “PROFESSIONAL” MEMORY CARD

UPDATING MK6i SOFTWARE ON THE MEMORY CARD

1. Insert the MK6 Professional Memory Card into the USB port of your computer using an SD Card Reader.
2. [Download the MK6i Software Update](#) from the Tech Zone of the Invacare web site and save to your desktop.
3. Open the MK6 install folder on your desk top, then open the "MK6_ver X.X Install.exe" file.
4. Select the drive location of the Professional Memory card when prompted.
5. Select "OK" and your card will be automatically updated.

UPDATING MK6i SOFTWARE ON THE WHEELCHAIR

1. PLACE PROFESSIONAL MEMORY CARD INTO THE CARD SLOT OF THE MK6i DISPLAY OR MK6i JOYSTICK.
2. TURN CHAIR ON.
3. DISPLAY WILL READ “UPDATED MK6i SOFTWARE AVAILABLE”
 - a. PRESS “DRIVE SELECT” TO BY-PASS UPDATE
 - b. Press Mode Switch to Begin Update – Follow the Prompts

USING THE “PROFESSIONAL” MEMORY CARD

DRIVE PROGRAM, SYSTEM & SEATING PROFILES:

SAVING TO CARD / INSTALLING FROM CARD

Choose Profile



Choose To Save or Read



1.) Select “MEMORY CARD” from main menu

2.) Select Profile:

DRIVE PROGRAM = Single Individual Drive – Performance Adjustments only

SYSTEM = All 4 Drives - Performance Adjustments and Powered Seating

SEATING CONTROL = Powered Seating Programming – Individual Drive

3.) Select Desired Action:

“SAVE” to transfer file to Card

“READ” to transfer file to power chair

4.) **DRIVE PROGRAM / SEATING ONLY:**

Select Drive. This will determine which Drive profile to save to Card or Install to (Read from Card)

Choose from list the destination drive to read to / or save from BY HIGHLIGHTING CHOICE AND PRESSING SELECT

5. **FOLDER:**

“Folder” will display selection from a list of folders to “Save to” or “Read From”. Select “Folder” to display the list of all folders to choose from. Scroll to desired Group folder and press select.

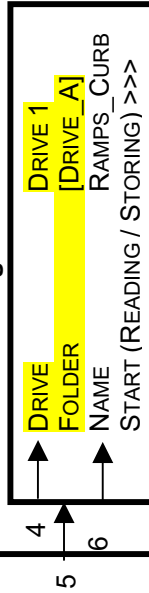
6. **NAME:**

If Saving, “Name” will display current system name. Select Name to change if desired.

If Reading, select “Name” to display list of all system names in the above folder. Highlight and select the desired system

7.) Select “START” to begin File Transfer

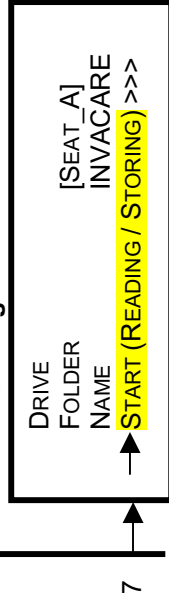
Drive Program



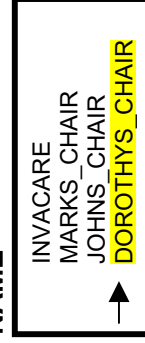
System



Seating Control



NAME



CHANGE FILE NAME





MK6i™ Performance Adjustments

SPJ+™
One Drive
→ Performance Adjust Programs Other
FORWARD SPD
TURNING SPD
ACCELERATION FWD
ACCELERATION REV
REVERSE SPD
TURN ACCELERATION
TURN DECELERATION
TORQUE
*BRAKING FWD
*BRAKING REV
*TREMOR DAMPENING
DCI OPERATION
DCI MONITORING

MPJ+™
-OR-
DISPLAY
FOUR DRIVES
DRIVE 1- 4
Speed _____ %
Response _____ %
→ Advanced Menu
→ Performance Adjust Standard Programs Powered Seating Memory Card Calibrations Diagnostics
NAME
FORWARD SPEED
FWD ACCELERATION
FWD BRAKING
REVERSE SPEED
REV ACCELERATION
REV BRAKING
TURN SPEED
TURN ACCELERATION
TURN DECELERATION
TREMOR DAMPENING
POWER LEVEL
TORQUE
TRACTION
JOYSTICK THROW
AXES SELECTION
INPUT TYPE
DIGITAL 3 SPEED *
MOM/LATCH
LATCHED TYPE**
MOM REVERSE
SLEEP MODE**
STANDBY SEL
STANDBY TIME
STANDBY IN ECU**
RIM CONTROL (*)
DRIVE SEL *
ECU1 *
ECU2 *
ECU3 *
ECU4 *
NO DRIVING
VIEW - SCAN

Performance Adjustment Enhancements in MK6i:

NAME:

- The name of any Standard Program saved to a drive will be displayed on the LCD screen of the MK6i Joystick or Display.
- Changes in performance adjustment values from standard will defer to a default name (e.g., Drive 1).
- Drive Profiles can be re-named by selecting “NAME” under the Performance Adjustment menu

FORWARD BRAKING / REVERSE BRAKING:

- The “Braking Adjust” parameter of the MKIV and MK5 Performance menu has been split into two separate parameters, one for Forward only and the other for Reverse

REVERSE ACCELERATION:

- The ability to adjust acceleration in reverse, how quickly the chair achieves programmed reverse speed has been added

TREMOR DAMPENING:

- Tremor dampening was previously a Standard Program used for individuals with tremors or ataxic upper extremity / hand movements.
- By adding a Tremor Dampening adjustment parameter to the Performance menu, any Standard Drive Profile from very slow to faster can be easily adjusted to accommodate Tremors.

TORQUE - REDFINED:

- Torque values are now displayed in ohms, a more accurate way to display what is actually occurring when values are changed.
- Slight changes in values programmed can have significant effects on driving. Recommendations when changing is to increase / decrease in increments of 4 ohms at a time.

VIEW - SCAN:

- Enables or disables scanning features to be active in a particular drive.

TRACTION:

- A reduction of speed when transitioning into or out of turns. The higher the value, the greater the reduction.
- Helpful to soften veer correction during latched driving
- Helpful for drivers with impaired trunk balance driving at faster speeds

NAME CHANGES

STANDBY MODE:

This has been renamed “**SLEEP MODE**”

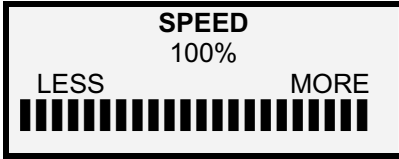
REMOTE SELECT

This has been renamed “**DRIVE SELECT**”

MOMENTARY MODE SELECT

This has been changed to “**DIGITAL 3 SPEED**”

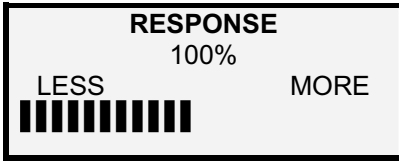
Performance Adjustments



100% is Maximum Allowed

Sets Maximum Overall Speed.

- 100% means chair is performing at the true performance adjustment setting levels for that drive. Cannot be set higher than 100%.
- Changes affect all speed parameters (Forward, Turning & Reverse Speeds)
- When modified, individual performance adjustment numbers will not change for that drive, but chair will be performing at _____% less than those settings



200% is Maximum Allowed

Sets Maximum Overall Response of the chair to Joystick commands.

- 100% means chair is performing at the true performance adjustment setting levels for that drive. Can be increased to 200% for quicker response to adjustment setting levels.
- Response can be lowered for softened or delayed response to commands.
- Changes affect Traction and Tremor Dampening

DRIVE 1-4
Speed _____%
Response _____%
→ **Advanced Menu**

Advanced Menu - MK5 Programmer only – selects “Main Menu”

Main Menu
→ **Performance Adjust**
Standard Programs
Powered Seating
Memory Card
Calibrations
Diagnostics

Select Performance Adjust to advance to Drive Menu

DRIVE MENU MK5 Only
DRIVE 1
→ **DRIVE 2**
DRIVE 3
DRIVE 4
PROP ATTENDANT
DIG ATTENDANT

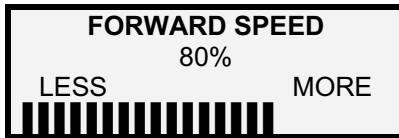
1. Select “ADVANCED MENU”
2. Select “PERFORMANCE ADJUST”
3. Select Desired Drive to modify -MK5 programmer Only. Mk6i Programming screen will display all Drives at once. (Attendant Controls will be displayed if plugged in. Limited performance adjustments will be available.)

Definitions

NAME
SPEED_LVL

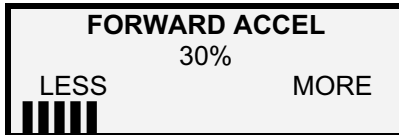
Allows Name of Saved Standard Drive Program to be Changed in Each Drive

- Current name will reflect Standard Program saved into that drive.
- Up and Down Arrow keys scroll through alphabet above flashing insertion point
- Left and Right Arrow keys backspace / advance insertion point
- USE UNDERSCORE TO SEPARATE NAMES. DO NOT LEAVE BLANK SPACES.



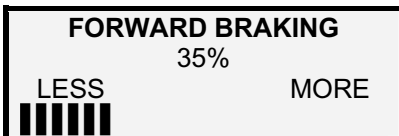
Sets Maximum Forward Speed.

- Generally reduced for Learning Modes, Indoor use, when precise maneuvering is required, or driving with digital controls.
- Generally Increased for outdoors, open level terrain, and “experienced” drivers.



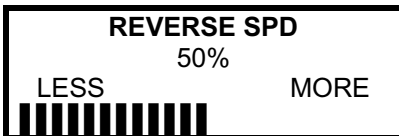
Time taken to reach maximum forward speed.

- Typically referred to as “Response” by the Driver
- 100% = quickest acceleration
- Reduced to accommodate tremors or ataxia



Maximum braking force available to Stop or Slow the chair. (100% = max)

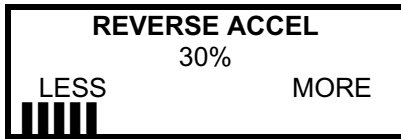
- Affects only the forward quadrants.
- Generally increased when quick response and precise maneuvering of the w/c is needed at lower speeds.



Sets the Max. Reverse speed, Independent of turning & forward speed.

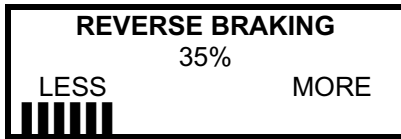
- Generally kept set at low levels.

Performance Adjustment Definitions: Continued



Time taken to reach maximum Reverse speed.

- Typically referred to as “Response” by the Driver
- 100% = quickest acceleration
- Reduced to accommodate tremors or ataxia



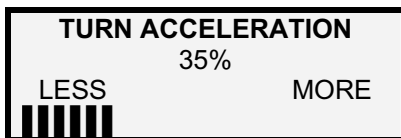
Maximum braking force available to Stop or Slow the chair in Reverse.

- Affects only the reverse quadrant.
- Generally increased when quick response and precise maneuvering of the w/c is needed at lower speeds.



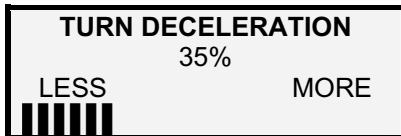
Sets Maximum Turning Speed – Independent of Forward Speed.

- Generally kept near 15% - 25% for most driving profiles.
- Set too low may cause difficulty turning over rough surfaces..
- Often set equal or nearly equal to forward speed with very slow driving.



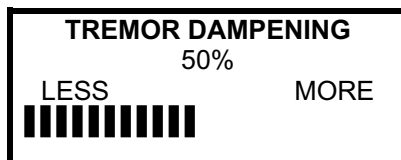
How quickly the chair reaches the programmed turning speed

- Also typically referred to as “Response” by the Driver
- Reduced to accommodate tremors or ataxia
- First suggested parameter to address if chair is too responsive to driver commands.



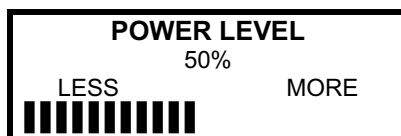
How quickly the chair “brakes” out of a turn when returning joystick to neutral.

- Turning Deceleration affects only the Left & Right Joystick Quadrants



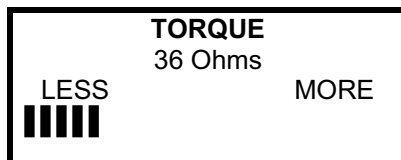
Accommodates Upper Extremity Tremors / Ataxia

- Previously a Standard Program – Now an Adjustment
- Higher levels = softer (delayed) response to joystick commands (accelerations & decelerations)
- Lower levels = Increased or faster Response to joystick commands



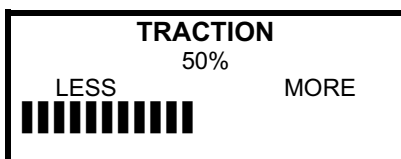
Sets the Max power (current) available to the motors / drive wheels, or the point at which the chair will stall at an obstacle or under a load.

- Will not effect “normal” driving, only impactful with inclines, obstacles, etc
- Generally set low with pediatrics, cognitively or visually impaired, and New Drivers.
- Recommended setting is 100% for switch drivers, rough terrain, indoors at slow speeds over thick carpeting, etc



A function of Time & Power. How quickly programmed Power Level is reached

- ALL FOUR quadrants are affected by the programmed torque level
- High = immediate ramping up to programmed power level: Recommended for Slow Speeds, Switch drivers, rough terrains, curbs, significant obstacles.
- Low = slower ramping up to programmed power level: Recommended for faster speeds, level terrains, new drivers - even at some slower speeds
- **MK6i Torque levels are noted in Ohms.**
- **Small changes have significant impact**
- RECOMMENDATIONS ARE TO CHANGE ONLY IN 4 OHM INCREMENTS TO DETERMINE IF NEEDS WERE MET -**



Reduces Speed when going into or coming out of turns

- The higher the value, the greater the speed reduction.
- Set at 0% for the majority of wheelchair users.
- Increasing values may be helpful for some users with impaired balance driving outdoors.
- Helpful to soften veer corrections during latched driving.

Performance Adjustment Definitions: Continued

JOYSTICK THROW
 MOVE JOYSTICK TO:
 FORWARD__ REVERSE__
 LEFT__ RIGHT__ AND
 THEN NEUTRAL__

Used to calibrate joystick throw (or Re-calibrate Joystick to the Controller).

- Sets the point for reaching full speed in relation to joystick displacement.
- Values DO NOT return to default settings unless Manually Re-Set
- Used with individuals having reduced ROM available for joystick operation.

AXES SELECTION
 FORWARD ⇒ FORWARD
 REVERSE ⇒ REVERSE
 LEFT ⇒ LEFT
 RIGHT ⇒ RIGHT

Assigns / Re-Assigns joystick commands to a desired direction.

- Useful when changing “Joystick Operation” in relation to “Joystick Position”.
- Each of the four input axes can be redirected to any output axis, or turned off.
- Settings **DO NOT** refer **back to default** unless manually re-set
- Use “Select” Key on Programmer to cycle through output choices

INPUT TYPE
 MPJ (MK6i MPJ+)
 PSR (MK6i PSR+)
 PSF (MK6i PSF+)
 COMP (*Compact Joystick*)
 MEC (*Micro Extremity / Mini Prop*)
 PEACHTREE
 ANALOG (*Proportional*)
 1500 (*Invacare RIM control*)
 SnP (*Sip-N-Puff*)
 DIGITAL (*Non- Proportional controls*)
 ASL DIG (*ASL Digital systems*)

Used to Add / Change Assigned driver control in one or more drives.

- Choose desired driver control for each drive according to this list.
- Only driver controls connected will be displayed.
- Only systems with 4 drive modes may add driver controls.
- Two drivers controls of the same “Input Type” can not be used on one chair
 To increased the combinations of Driver controls allowed, the following changes were made from MK5 to MK6

MK5 “**SWITCH JOY**” has been divided into: MK6 = **Digital – ASL Digital**
 MK5 “**1812**” has been divided into: MK6 = **Analog - MEC - Peachtree**

ASL Mushroom & Magitek Controls use “ANALOG”

MOM/LATCHED
 →MOMENTARY
 LATCHED

Determines the mode for FORWARD driving commands.

- Momentary commands are only active while the command is being given.
- Latched commands remain active after release of the driver control - until 2 reverse commands or emergency stop switch is activated.
- Left & Right commands are always momentary. (See “MOM/REVERSE”)
- Available on proportional & digital controls on 4 drive systems.
 (LATCHED DRIVING REQUIRES MODE SWITCH / EMERGENCY STOP SWITCH)

LATCHED TYPE
 →CRUISE CTL
 1 SPEED
 3 SPEEDS
 5 SPEEDS

Allows different speeds in Latched driving. Present if Latched mode is selected

- 1 SPEED = 1 Forward Speed
- 3 SPEEDS = 3 stepped Speeds ($\frac{1}{3}$ percentages of forward speed)
- 5 SPEEDS = 5 stepped Speeds ($\frac{1}{5}$ set percentages of forward speed)
- CRUISE CTL = Default = Cruise Control (set speed determined by driver)

Present only when Latched Mode is Selected

Stepped latch will increase one step in speed with each successive forward command. A reverse command stops the chair. Used to provide speed selections in latched modes without changing drives.

In Cruise Control, speed will continuously ramp up as the forward command is sustained, and maintain the speed reached when releasing the forward command. Speed decreases in the same rate with a reverse command. Two reverse commands within one-second, (or an emergency stop switch) stops the chair.

MOM/REVERSE
 →ON
 OFF

Allows Reverse to be set as either MOMENTARY or LATCHED.

- Available only when “Latched” mode driving is selected.
- On sets reverse as momentary, Off sets reverse in Latched.
- Helpful for some sip-n-puff users backing into spaces.

Present only when Latched Mode is Selected

Performance Adjustment Definitions: Continued

DIGITAL 3 SPEED
→3 SPEEDS
1 SPEED

Present only when digital driver control is selected under "Input Type"

Allows either 1 or 3 driving speeds for Digital Controls in Momentary Mode (Previously named "Momentary Mode Select")

- 1 SPEED provides only one forward speed
- 3 SPEEDS provides 3 forward speeds, ($\frac{1}{3}$, $\frac{2}{3}$, or full programmed speed), selected with a mode (re-set) switch prior to driving.
- "3 SPEEDS" provides speed selections using digital driver controls - without changing drives.

SLEEP MODE
→ON
OFF

Disappears from Menu if Standby Select is On

Allows the Chair to enter an "Inactive (resting) Mode" mode after a set period of time with no driver control activity. (Previously named Stand-By Mode)

- Used with drivers who cannot access the on/off switch during periods of no activity.
- Used to prevent "accidental operation" when in a resting mode.
- A Mode Switch (Reset) is required to return the chair to operating mode.**

STANDBY SELECT
→ON
OFF

Disappears from Menu if Sleep Mode is On

Sends the chair into resting mode. Driver commands then SELECT next operating function – BYPASSING the "Reset Switch".

Once in Standby mode...

- FORWARD command always returns the chair back to Drive Mode
- RIGHT Command = Remote Drive Select (if **turned on**) then left command changes to next drive that has Remote select turned on)
- LEFT Command = ECU functions, then Powered Seating Functions (if **activated**)

STANDBY TIME
60 S
LESS MORE



Present only when Sleep or Standby Select is On

Sets the time before for a Chair will enter into "STAND BY" (resting) Mode

- Range is from 2 seconds to 120 seconds
- Present only when "Stand By" or "Standby Select" is activated.

STANDBY IN ECU
→ON
OFF

Present only when Sleep or Standby Select is On

ON allows "Normal" Stand-By Function

Off eliminates Stand-By in ECU modes, but **REQUIRES a Mode switch to exit ECU mode** (Helpful during mouse emulation or Aug. Comm. operation through the driver control when Sleep mode or Stand by select is also needed for elsewhere.

RIM CONTROL
→ON
OFF

Allows three commands (quadrants) to drive 4 directions.

- Pressing a Mode switch (re-set) changes the forward command to Reverse.
- Pressing the switch again toggles the command back to forward driving.

To eliminate need for the mode switch,

Turn ON Standby Select.

Turn OFF any additional modes using Standby Select for that drive. (ECU Modes, Power Seating through the joystick, AP).

To Activate "REVERSING" w/out mode switch:

Allow the chair to enter "Stand-By" mode

A "LEFT" command activates "REVERSING"

A "RIGHT" command activates "FORWARD" driving.

Performance Adjustment Definitions: Continued

DRIVE SELECT
 →ON
 OFF

Drive Select: Allows Left Driver Command to change drives (1, 2, 3, 4)

- Must be turned on in all drives to be accessed through the Driver Command
- Uses a Reset switch (or Standby Select) to enter & exit Drive Select mode
- A LEFT driver command will advance to the next drive number activated
- Stand-By Select bypasses reset switch requirement to enter mode:
 After entering "Stand-By Select Mode",
 RIGHT Command activate Drive Select,
 LEFT Command advances Drives
 (Allow chair to re-enter "Stand-By Select Mode")
 FORWARD Command returns to driving

ECU 1 (2, 3, or 4)
 →OFF
 MOM MOTOR
 LATCHED
 COMM

Sets performance settings for devices connected to an ECU Port. Each output (1, 2, 3, or 4) appears separately in the menu. (Requires COM12, or COM 34)

- OFF** Disables that output. (Recommended if no device is connected to it.)
- MOM.MOTOR** allows each driver command to operate in the momentary mode.
- LATCHED** places the driver commands in the latched mode, requiring an opposite direction command to turn off. (Suggested for pneumatic operation of Tilt / Recline when operating through a COM unit).
- COMM** allows Immediate response of the relays – used with computers or communication devices. Also allows 2 relays to be closed at once (i.e., Forward & Right) for diagonal (veer) capability.

NO DRIVING
 →ON
 OFF

Allows Driving to be turned off for that particular drive.

- Eliminates driving to dedicate that drive to another activity.
- Helpful when performing multiple activities through the driver control to reduce choices users need to make.
- Can be used to eliminate access to drives (until user is ready to add functions / features)

VIEW / SCAN
 →ON
 OFF

Allows Scanning to be turned off or on for that particular drive.

- Scanning Modes (Row column, Sequential, Enhanced) are chosen in "Calibrations" menu.
- Particular drives to be scanned are chosen here.
- When "Sequential scanning, it can be helpful to limit the number of drives scanned.
- Any Driver command will initiate scanning
- Any Driver command will select highlighted icon
- Scanning will return to resting mode after 3 cycles

SPJ+ Joysticks using MK6i ACC Controllers Only

DCI OPERATION
 → OFF
 AFTER MARKET
 or "Normally Open"
 INVACARE
 or "Normally Closed"

Sets Drive Lock Out Function for systems utilizing SPJ+ Joysticks

- OFF
1. Disables Drive Lock Out for tilt or recline systems (manual or power),
 2. Recommended Setting for chairs without tilt or recline seating systems
- AFTER MARKET (NORMALLY OPEN)
1. Setting for some systems using aftermarket powered seating systems. (Consult the after market seating manufacturer)
- INVACARE (NORMALY CLOSED)
1. Setting used for Invacare Manual or Power, Tilt or Recline Systems.

DCI MONITORING
 IVC MANUAL SEATING
 or "Continuous"
 → IVC POWER SEATING
 or "Latching"

Determines the Controller method Drive Lock Out status is monitored

- 17
- IVC MANUAL SEATING (CONTINUOUS)
1. Status of the drive lockout switch (i.e. Mercury Switch) is continuously monitored for change.
 2. Use this setting for Manual Tilt or Recline Systems. (Recommended for some aftermarket powered seating systems. (Consult the after-market seating manufacturer)
- IVC POWER SEATING (LATCHING) (called "Active" in expandable controller systems)
1. Monitors the Drive Lockout Input switch ONLY during power up, and after actuator operation
 2. This setting is Recommended for Invacare Powered Seating Systems

ACTUATOR 1 (2)
 Off
 →Tilt
 Elevate

Allows setting two actuators to operate through the SPJ+ Powered Seating Joysticks

MK₅TM Standard Programs

SPJ+ TM NX TM	SPJ+ TM NX-75
P9000 XDT Nutron Series M-51 M-61 M-71 Van Seat	M-91 Van Seat
Performance Adj → Programs Other	Performance Adj → Programs Other
RWD – 2 POLE	CWD M91
RWD – 4 POLE	CWD M91 HD
CWD - 2 POLE	CWD M91

- NX-LP, NX, & NX-75 Controllers do Not Have “Standard Programs” – Only Pre-set Factory Settings
- “Programs” Selection on the Menu Screen allows matching the controller to the motor & configuration type of the chair

NX - 75



75 Amp

FACTORY DEFAULT SETTINGS:

Once default settings are changed, re-selecting/saving a program WILL NOT return to default settings. If performance adjustments are changed, each must be manually re-programmed to factory default if desired.

	NX			NX-75		
	RWD 2-Pole	RWD 4-Pole	CWD 2-Pole	CWD M91*	CWD M91 HD	CWD M91*
Forward Speed	95	90	100	95	95	95
Turning Speed	25	20	30	20	20	20
Acceleration FWD	30	25	25	20	20	20
Acceleration REV	30	20	25	20	20	20
Turn Acceleration	30	20	25	25	20	25
Turn Deceleration	35	25	30	35	20	35
Braking Forward	50	50	50	50	50	50
Braking Reverse	55	45	55	55	55	55
Reverse Speed	40	30	40	50	40	50
Tremor Dampening	40	40	40	35	40	35
Torque (Ohms)	144	48	144	36	36	36

* Changes saved to one “CWD M91” are identical in the second “CWD M91.”

MK6i Standard Programs

Proportional

INDOOR JOYSTICK AVE	Average joystick user – an Indoor program	(FACTORY SETTING DRIVE 1)
MODERATE OUTDOOR	Medium speed for rougher terrain	(FACTORY SETTING DRIVE 2)
SPEED/LEVEL TERRAIN	High speed program for flat level surfaces	(FACTORY SETTING DRIVE 3)
RAMPS & CURBS MODE	Medium Speed with High Power & High Torque	(FACTORY SETTING DRIVE 4)
INDOOR LEARNER	Slow settings for Indoor learning	
VERY SLOW DRIVING	Slowest driving standard program	
MEC	A Program with Sensitivity & Acceleration settings already softened. Ideal for Micro extremity & Mini Proportional Joysticks	

Digital

LEARNER 3 SPD MOM	A Momentary switch (non-proportional) program with 3 forward & 1 reverse speed.
ASL INDOOR / LEARNER	A Momentary switch (non-proportional) program ideal for drivers new to ASL systems
ASL OUTDOOR/FASTER	A Momentary switch program ideal for drivers experienced with ASL systems
LEARNER SIP & PUFF	A Learning Program for SIP N Puff with Latched Cruise Control & Mom. Reverse.
VERY SLOW 1SPD S&P	A Slow Program for SIP N Puff with 1 latched forward speed.
LEARNER 1500 RIM	A Learning Program for the RIM Head Control.

MK660: 2-POLE MOTORS DRIVE STANDARD PROGRAMS

MK660 Standard Values (RWD)

	Indoor Joystick Ave.	Mod. Outdoor	Speed Level Terrain	Ramps & Curb	Very Slow Driving	MEC	Indoor Learner	ASL Indoor	ASL Outdoor	SNP Learner	Learner 3 speed MOM	Very Slow 1 speed SNP	Learner 1500 RIM	SPJ+
Forward Speed	45	75	95	50	15	25	30	20	40	30	30		30	95
Forward Accel	20	25	20	15	20	20	20	20	20	20	20	20	20	20
Forward Braking	50	50	50	60	50	50	50	50	50	50	50	50	50	50
Reverse Speed	30	30	30	25	15	12	12	12	12	12	12	12	12	30
Reverse Accel	20	25	20	20	20	20	20	20	20	20	20	20	20	20
Reverse Braking	55	55	55	60	55	50	50	50	50	55	50	50	50	55
Turn Speed	12	20	20	15	8	10	10	8	10	10	10	10	10	20
Turn Accel	15	20	20	15	15	15	15	15	15	15	15	15	15	20
Turn Braking	40	45	45	60	40	40	40	40	40	40	40	40	40	45
Tremor Damp	35	35	35	35	35	35	35	35	35	35	35	35	35	35
Power Level	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Torque	144	144	144	156	144	144	144	144	144	144	144	144	144	144
Traction	0	0	0	0	0	0	0	0	0	0	0	0	0	0

MK660 Standard Values (CWD)

	Indoor Joystick Ave.	Mod. Outdoor	Speed Level Terrain	Ramps & Curb	Very Slow Driving	MEC	Indoor Learner	ASL Indoor	ASL Outdoor	SNP Learner	Learner 3 speed MOM	Very Slow 1 speed SNP	Learner 1500 RIM	SPJ+
Forward Speed	45	75	95	50	15	30	30	20	35	35	35	20	30	95
Forward Accel	20	20	20	15	20	20	20	20	20	30	20	30	20	20
Forward Braking	50	50	50	50	50	50	50	50	50	50	50	50	50	50
Reverse Speed	35	35	45	25	15	25	20	15	20	15	20	15	20	45
Reverse Accel	20	20	20	20	20	20	20	20	20	20	20	20	20	20
Reverse Braking	45	55	55	45	55	50	50	50	50	55	50	55	50	55
Turn Speed	15	20	20	12	12	15	15	15	12	15	12	15	15	20
Turn Accel	15	20	20	15	15	15	15	15	15	15	12	35	15	20
Turn Braking	35	45	45	25	35	35	35	35	35	35	35	35	35	45
Tremor Damp	35	35	35	35	35	35	35	35	35	35	35	35	35	35
Power Level	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Torque	144	144	144	156	144	144	144	144	144	144	144	144	144	144
Traction	0	0	0	0	0	0	0	0	0	0	0	0	0	0

MK690 4-pole Motors CENTER WHEEL DRIVE STANDARD PROGRAMS

MK690 Standard Values (CWD)

	Indoor Joystick Ave.	Mod. Outdoor	Speed Level Terrain	Ramps & Curb	Very Slow Driving	MEC	Indoor Learner	ASL Indoor	ASL Outdoor	SNP Learner	Learner 3 speed MOM	Very Slow 1 speed SNP	Learner 1500 RIM	SPJ+
Forward Speed	45	75	95	50	15	20	30	15	32	25	30	15	30	95
Forward Accel	20	20	20	10	20	10	20	25	20	25	20	25	20	20
Forward Braking	45	35	40	45	50	50	50	50	50	50	50	50	50	50
Reverse Speed	30	35	40	25	15	15	25	11	15	15	21	15	25	40
Reverse Accel	20	20	20	20	20	10	20	20	20	20	50	20	20	20
Reverse Braking	45	55	55	45	55	55	50	55	55	55	55	55	50	55
Turn Speed	15	20	20	12	8	10	12	11	11	12	11	11	12	25
Turn Accel	15	20 (M91: 15)	20 (M91: 15)	15	15	10	15	15	12	15	12	15	15	15
Turn Braking	35	45	45	35	35	45	35	35	35	35	35	35	35	40
Tremor Damp	40	35	35	40	35	50	40	35	35	35	35	35	45	35
Power Level	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Torque	36	36	36	48	48	42	36	36	40	48	36	48	36	32
Traction	0	0	0	0	0	0	0	0	0	0	0	0	0	0

MK6TT Motors CENTER WHEEL DRIVE STANDARD PROGRAMS

	Indoor Joystick Ave.	Mod. Outdoor	Speed Level Terrain	Ramps & Curb	Very Slow Driving	MEC	Indoor Learner	ASL Indoor	ASL Outdoor	SNP Learner	Learner 3 speed MOM	Very Slow 1 speed SNP	Learner 1500 RIM
Forward Speed	45	75	100	50	15	20	30	8	32	20	30	5	30
Forward Accel	20	20	20	10	12	12	12	15	10	15	10	15	10
Forward Braking	40	45	45	50	50	50	40	45	40	45	40	45	40
Reverse Speed	15	20	20	15	5	5	5	5	5	5	10	4	10
Reverse Accel	20	20	20	20	15	15	15	20	20	20	20	20	20
Reverse Braking	55	55	55	55	55	55	55	50	55	50	55	50	55
Turn Speed	18	20	22	18	5	8	10	5	10	5	8	5	8
Turn Accel	20	45	20	20	20	15	15	15	15	15	20	15	15
Turn Braking	50	45	45	50	50	50	50	35	30	35	30	35	30
Tremor Damp	35	40	40	35	35	40	35	25	35	25	35	25	35
Power Level	100	100	100	100	100	100	100	100	100	100	100	100	100
Torque	15	10	5	75	15	15	5	75	75	75	75	75	50
Traction	0	0	0	0	0	0	0	0	0	0	0	0	0

MK690 4-POLE MOTORS / REAR WHEEL DRIVE STANDARD PROGRAMS

MK690 Standard Values (RWD)

	Indoor Joystick Ave.	Mod. Outdoor	Speed Level Terrain	Ramps & Curb	Very Slow Driving	MEC	Indoor Learner	ASL Indoor	ASL Outdoor	SNP Learner	Learner 3 speed MOM	Very Slow 1 speed SNP	Learner 1500 RIM	SPJ+
Forward Speed	45	75	95	50	15	25	30	15	35	25	30	16	30	95
Forward Accel	20	20	20	15	20	15	20	20	20	20	20	20	20	20
Forward Braking	50	50	50	60	50	50	50	50	50	50	50	50	50	47
Reverse Speed	30	30	30	25	15	18	25	15	15	15	15	15	15	25
Reverse Accel	20	25	20	20	20	15	20	20	20	20	20	20	20	15
Reverse Braking	55	55	55	60	55	55	55	55	55	55	55	55	55	55
Turn Speed	15	20	25	15	10	12	12	10	12	18	12	16	12	25
Turn Accel	15	25	20	15	15	15	15	20	15	50	15	25	15	15
Turn Braking	40	45	45	60	35	45	40	40	40	35	40	35	40	23
Tremor Damp	35	35	30	35	35	40	35	35	35	35	35	35	35	35
Power Level	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Torque	36	36	36	48	48	44	36	48	40	40	40	40	36	32
Traction	0	0	0	0	0	0	0	0	0	0	0	0	0	0

MK6TT MOTORS

REAR WHEEL DRIVE STANDARD PROGRAMS

	Indoor Joystick Ave.	Mod. Outdoor	Speed Level Terrain	Ramps & Curb	Very Slow Driving	MEC	Indoor Learner	ASL Indoor	ASL Outdoor	SNP Learner	Learner 3 speed MOM	Very Slow 1 speed SNP	Learner 1500 RIM
Forward Speed	45	75	100	50	15	20	30	12	32	20	30	8	30
Forward Accel	20	20	20	10	12	12	12	10	10	10	10	10	12
Forward Braking	40	45	45	50	50	50	40	40	40	40	40	40	50
Reverse Speed	12	15	20	12	5	5	10	8	8	5	10	5	10
Reverse Accel	20	20	20	20	15	15	15	20	20	20	20	20	15
Reverse Braking	55	55	55	55	55	55	55	55	55	50	55	50	55
Turn Speed	15	20	20	15	5	10	10	8	10	8	8	5	15
Turn Accel	20	20	20	20	20	15	15	10	10	15	20	15	15
Turn Braking	50	45	45	50	50	50	50	45	45	35	30	35	50
Tremor Damp	35	40	40	35	35	40	35	35	35	25	35	25	35
Power Level	100	100	100	100	100	100	100	100	100	100	100	100	100
Torque	15	10	5	70	15	15	5	25	50	75	25	25	20
Traction	0	0	0	0	0	0	0	0	0	0	0	0	0

Powered Seating

MK6i Programming				
Parameter	D1	D2	D3	D4
SPEED	100	100	100	100
RESPONSE	100	100	100	100
PERFORMANCE ADJUST	>>>			
STANDARD PROGRAMS	>>>			
MEMORY CARD	>>>			
POWERED SEATING	>>>			
CALIBRATIONS	>>>			
DIAGNOSTICS	>>>			

POWERED SEATING

	D1	D2	D3	D4
DRIVE LOCK OUT	ON	ON	ON	ON
ACT CONTROL	4SW	4SW	4SW	4SW
ACTUATOR SELECT	>>>			
SEATING ADJUST	>>>			

Drive Lock Out

Drive lockout

Allows choice for DRIVE LOCKOUT to be enabled or disabled in individual drives
(Not Available with SPJ+ Joysticks)

To disable Drive Lockout on Conventional Single Actuator Systems not operating through the driver control, Choose "OFF" in the Calibrations menu, under DCI FUNCTION"

Powered Seating Operation Through Driver Control

A SANODE (Single Power Systems) –OR- MULTIPLE ACTUATOR INTERFACE BOX (Multiple Power Systems) must be present to allow Power Seating Operation through the Driver Control

"ACTUATOR CONTROL" MUST BE SET TO OPERATE POWERED SEATING THROUGH DRIVER CONTROL

Actuator Control

OFF
→4-SWITCH
LATCH. 4SW
4 SW-2 LEVELS
4SWL-2 LEVELS
MOM.1SW
LATCH.1SW

Appears Only with "Multiple Actuator Interface box" or "SANODE"
Determines method for Driver Control Operation of Actuators
Accessed either through a MODE Switch or "Stand-By Select".

- OFF** Disables driver control operation of the Powered Seating for that drive only
- 4 SW** Directions of driver command mirror Actuator Selection Choices; Momentary Mode.
- LATCH 4 SW**: Same as 4SW, but in Latched mode. First command initiates actuator, repeated command stops actuator
- 4SW – 2 Levels** (Recommended for Head Controls in RIM Mode)
Dedicates left & right commands while turning off forward (occipital pad) command.
Mode switch activates level 1, then level 2
Level 1: Left Driver command = "Forward" Actuator Selection
Right Driver command = "Reverse" Actuator Selection
Level 2: Left Driver command = "Left" Actuator Selection
Right Driver command = "Right" Actuator Selection
Standby Select: bypasses mode switch requirement.
Allows Left Command (held down) to cycle through each level.
Level 1 = Forward - Reverse Actuator Selections
Level 2 = Left – Right Actuator Selections
- 1swM**: Intended primarily for Head Control drivers operating with RIM
Mode switch cycles through each actuator selection choice. Right command operates selected choice.
Standby Select (must be turned on) allows Left Command (held down) to cycle through each actuator selection choice. Right command operates selected actuator (Momentary Mode).
- 1swL** Right command operates the actuators in a latched mode. The first command activates, repeated command releases

Powered Seating: Operation Through Driver Control

An “Actuator Selection” must be made for at least one quadrant to operate actuator through driver control

MK6i Programming				
Parameter	D1	D2	D3	D4
SPEED	100	100	100	100
RESPONSE	100	100	100	100
PERFORMANCE ADJUST	>>>			
STANDARD PROGRAMS	>>>			
MEMORY CARD	>>>			
POWERED SEATING	>>>			
CALIBRATIONS	>>>			
DIAGNOSTICS	>>>			

POWERED SEATING

	D1	D2	D3	D4
DRIVE LOCK OUT	ON	ON	ON	ON
ACT CONTROL	4SW	4SW	4SW	4SW
ACTUATOR SELECT	>>>			
SEATING ADJUST	>>>			

Actuator Selection

Parameter	D1	D2	D3	D4
FORWARD	TILT U	TILT U	TILT U	TILT U
REVERSE	TILT D	0	0	0
LEFT	LEG U	0	0	0
RIGHT	LEG D	0	0	0

-Actuator Selection allows each quadrant of the Driver Control to be assigned to a specific actuator function.

-Select an individual quadrant in an individual drive by highlighting only that function

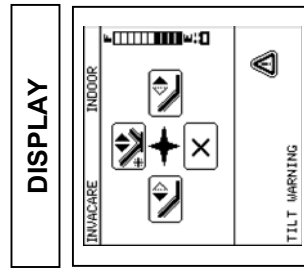
-OR- Select the same quadrant for all drives by highlighting the entire row. Assign required choice for each quadrant from list below.

Actuator Selection:

Actuator Selection>>>

Display Icons	Tilt.	Recline.	Recline & Leg	Leg.	Right Leg.	Left Leg.	Elevate.	ACC.

→ **FWD** -TILT U/D
REV
LT
RT



Sample screen: 4 Switch Mode for Actuator Operation through Driver Control

Selection Choices

OFF
→ **TILT U/D**
TILT UP
TILT DOWN
RECL U/D
RECLINE UP
RECLINE DOWN
ELEVATE U/D
ELEVATE UP
ELEVATE DOWN
LEG U/D
LEG UP
LEG DOWN
RECL & LEG U/D
RECL & LEG UP
RECL & LEG DOWN
LEFT LEG U/D
LEFT LEG UP
LEFT LEG DOWN
RIGHT LEG U/D
RIGHT LEG UP
RIGHT LEG DOWN

Sample: Actuator Operation Screens

Conventional

Smart Actuator

Seating Adjust:

MK6i Programming				
Parameter	D1	D2	D3	D4
SPEED	100	100	100	100
RESPONSE	100	100	100	100
PERFORMANCE ADJUST	>>>			
STANDARD PROGRAMS	>>>			
MEMORY CARD	>>>			
POWERED SEATING	>>>			
CALIBRATIONS	>>>			
DIAGNOSTICS	>>>			

DRIVE LOCK OUT
ACTUATOR CONTROL
ACTUATOR SELECTION
SEATING ADJUST

Seating Adjust Menu	
TILT ADJUST	>>>
RECLINE ADJUST	>>>
LEGS ADJUST	>>>
LEFT AP PROGRAM	>>>
RIGHT AP PROGRAM	>>>

1. Select Powered Seating
2. Select Seating Adjust
3. Select Desired Action

CUSTOM (Smart) ACTUATORS

- ❑ Only Tilt, Recline, and Center Mount Legs are available with Custom Actuators.
- ❑ Only Custom Actuators allow programming Max Up or Down Angles.
- ❑ Only Custom Actuators can be programmed for Automatic Positioning

Actuator Adjust Settings:

Tilt Adjust: Speed Up (Recline) Speed Down (CM LEG) Max Up Angle (Custom Actuator Only) Max Down Angle (Custom Actuator Only)	Right (Left) Leg Adjust: Speed Up Speed Down
---	--

- Speed UP & Speed Down Settings allow setting the speed at which the actuator will move.
- Max Up & Down Angles (Smart Actuators Only) set limits for how far the actuator will travel.

Automatic Positioning

Left AP Program Sets the Sequence for Tilting and/or Reclining **Back** (Always a Left Driver Command)

Right AP Program Sets the Sequence for returning to an **upright** sitting position (Always a Right Driver Command)
(Will not show AP ICON on display unless Right AP program is saved)

MK6i Programming				
Parameter	D1	D2	D3	D4
1. ACTUATOR	NONE	NONE	NONE	NONE
1. ANGLE	0	0	0	0
2. ACTUATOR	NONE	NONE	NONE	NONE
2. ANGLE	0	0	0	0
3. ACTUATOR	NONE	NONE	NONE	NONE
3. ANGLE	0	0	0	0
.....
6. ACTUATOR	NONE	NONE	NONE	NONE
6. ANGLE	0	0	0	0

<ul style="list-style-type: none"> ❑ Sequence can have up to SIX steps ❑ A different program can be set for each drive ❑ Returning sequence (Right AP Program) can be in a different sequence than Left AP Program
Actuator Choices for AP Sequence are:
NONE
TILT
RECLINE
LEG
RECLINE and LEGS

Setting Left & Right AP Programs

1. Select <Powered Seating> <Seating Adjust> <LEFT AP Program>
2. Highlight, and then press select key for <1. Actuator>, either Row, or Individual Drive (D1)
3. Make Actuator Selection from choices on list, press select
4. Scroll down to <Angle> & press select, press select again to accept warning shown on screen.
5. Use up & down arrow keys to operate actuators, placing seat in the desired position, press select to accept.
6. Repeat for <2. Actuator>, & each successive actuator required, for up to 6 steps – any combination. Save Changes.
7. Repeat for Right AP Program to return seat to upright position.

Calibration Menu

MK6i Programming				
Parameter	D1	D2	D3	D4
SPEED	100	100	100	100
RESPONSE	100	100	100	100
PERFORMANCE ADJUST	>>>			
STANDARD PROGRAMS	>>>			
MEMORY CARD	>>>			
POWERED SEATING	>>>			
CALIBRATIONS	>>>			
DIAGNOSTICS	>>>			

All Calibrations are "Global".
Any calibration saved to one drive, is automatically saved to all Four Drives

CALIBRATIONS
SYSTEM NAME
DRIVE CONFIG
MOTOR BALANCE
CALIBRATE MOTORS
MONO PORT 1
MONO PORT 2
DISPLAY ORIENT
TTJS ACTUATOR
ACC FUNCTION (ACC1, ACC2)
ACC DCI FUNCTION
VIEW / SCAN (MK6i DISPLAY ONLY)
INIT TIME
REPEAT TIME
4W STD PROGRAM
4-WAY SWITCH
HARD PUFF CAL
SOFT PUFF CAL
HARD SIP CAL
SOFT SIP CAL
TILT CALIBRATE
RECLINE CALIBRATE
CENTER LEG CAL
SPEED POT MAX
BACK ANGLE
START IN DRIVE
AUDIBLE INDICATOR
PRS TIME
ERASE ALL

SYSTEM NAME
INVACARE

Create the Name for the System's Programming Settings / File Name

- Name will be displayed on the Top Right corner of the MK6i Display
- Use the Programmer Left & Right Arrow keys to position the Insertion Point ("_")
- Use the Programmer Up and Down Arrow keys to change the letter / number
- Blank Spaces Not allowed. Name will end at that point.

DRIVE CONFIG
→4P CWD M91 & SP
2P RWD
2P CWD
4P RWD
4P RWD HD
4P CWD TDX
4P CWD HD

•Select configuration to match chair.

- The chair will not perform as designed without correct drive configuration selected and saved.

MUST BE CHANGED /SAVED EACH TIME WHEN ADDING OR REPLACING AN MPJ+, PSR+, PSF+, or MK6 DISPLAY

MOTOR BALANCE
LEFT RIGHT



Ensures that Left & Right Motors operate equally.

- Can be used to correct for slight veer. (i.e., with some digital controls).

CALIBRATE MOTORS
GB MOTORS ONLY

Raise / Support Drive wheels off the ground.
Follow Instructions on Programmer

MONO PORT 1 (2)
OFF
→DRIVE SELECT
MODE Switch
ACTUATOR CTL

Assigns the Function of the Right Mono Port on the MK6i Display & Multiple Drive Joysticks

- Drive Select allows the mono switch to directly change Drives 1 through 4
- Mode allows the Switch to function as a "Re-Set" Switch
- Actuator Control allows switch to operate the actuator (up/down toggle mode)
- Mono Port 1 is the default if not using a "Y" cable (splitter) or dual switch.

BACK ANGLE
°

Tilt Only Systems with a Smart Actuator

Note the Seat to Back Angle setting of the chair (Drive Lock Out purposes)

Display Orient
Normal
Inverted

Only Available when MPJ+, PSF+, or PSR+ is on the chair.

- Choose Normal for MPJ+, PSF+
- Choose Inverted for PSR+

Calibrations (Continued)

ACC FUNCTION: Conventional Actuators with ACC Controllers Only.

[Single System “conventional” actuators plug directly into the ACC Controller. Multiple System conventional actuators require an actuator module (i.e., TRAM or Tilt Recline Actuator Module, DLAM or Dual Leg Actuator Module) and plug into the system through the MK6 Universal Connectors.]

ACC Function (ACC1, ACC2) sets which Actuator operates directly through the Controller, not through the additional actuator module. This allows Display icons, Programming options and Drive lockout settings to match the chair configuration. (i.e., tilt only, tilt and recline, etc.). **SET ACCORDING TO BELOW CHART:**

ACC FUNCTION
OFF
Tilt
Recline
Elevate
Leg

•Tilt Only or Tilt w/ Ind. Power Legs = TILT	•Tilt w/ Pwr. Centermount = LEG
•Recline Only or Recline w/ Ind. Power Legs = RECLINE	•Recline w/ Pwr. Centermount = LEG
•Tilt & Recline & Power Center Mount = LEG	•Center Mount Leg Only = LEG
•Individual Power Legs = OFF (or Generic)	•Tilt & Recline Only = OFF (or Generic)
•Tilt & Recline & Individual Power Legs = OFF (or Generic)	•Elevate Only = ELEVATE
•Tilt & Recline & Elevate = ELEVATE	•Tilt & Elevate = ELEVATE

ACC DCI Function
OFF
Invacare Manual
→Invacare Power

-Determines How the Controller monitors the Mercury Switch for Drive Lockout –**ONLY** when actuator is operating through the ACC of the controller.

-Allows Disabling Drive Lockout for Conventional Single Actuator Systems.

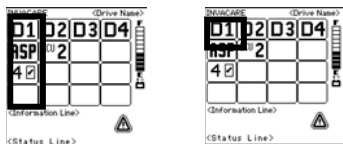
- IVC Manual:** Mercury switch status is Continually monitored. Used primarily with **Manual** Tilt or Recline systems, and some After Market Powered Seating
- Off:** setting for IVC **Tilt and Recline**, **any system w/ Pwr Center Mount Leg**, or **Tilt w/ Elevate**
- IVC Power:** **Formula CG Single Actuator** powered seating systems

VIEW SELECTION / SCANNING

VIEW / SCAN
STANDARD
ENHANCED
(Scanning Options):
→ROW / COLUMN SCAN
ENHANCED SCAN
SEQUENTIAL SCAN

Selects view mode on MK6i Display

- Standard = all 4 drives at once in grid format
- Enhanced = One drive only in expanded view Active Icon (mode) is enlarged.
- When a Scan mode is selected, only those drives with “Auto Scan” turned on in the performance adjustment menu will be active
- ANY** Driver command initiates scanning to begin
- Each Scan mode repeats 3 times, then stops.



ROW / COLUMN SCANNING (modified)

- After initiating the scan with a driver command, Each Column is highlighted, one at a time
- ANY Driver command selects the column when it is highlighted, then individual icons in that column are highlighted, one at a time
- A Third Driver Command selects individual icons, placing the chair in that active mode.

ENHANCED SCANNING

- After initiating the scan, Each Drive Profile, with all active icons, is displayed on the LCD, one drive at a time
- ANY Driver command selects the Drive when shown. Then individual icons in that drive appear (enlarged as shown), one at a time
- A Third Driver Command selects individual icons, placing the chair in that active mode.



SEQUENTIAL SCANNING

- After initiating scan with a driver command, Each icon in the active drives is enlarged and displayed one at a time.
- ANY second Driver command selects the icon, placing the chair in that active mode.



INIT TIME		
LESS	.4S	MORE

Determines amount of time chair will remain in an active mode before scanning is re-initiated.

- After repeating the scan three times, the chair will enter a resting mode.
- Any driver command will initiate the scan again.

REPEAT TIME		
LESS	10S	MORE

Used to determine the amount of time the scanning screen will dwell on a highlighted item before moving to the next item.

Calibrations (Continued)

4W STD PROGRAM
TREL
TRL
TR
TE
TILT ONLY
RECLINE & Legs
ELEVATE ONLY
LEGS ONLY

Chooses a standard profile for how the 4-way switch (quad push buttons) will operate in each quadrant.

Selections can be customized using 4-way switch settings.

Standard Program Actuator Selection (Switch) Assignments

TILT-RECL-ELE-LEGS	FWD REV LT RT	-TILT U/D -RECL & LEG U/D -ELEVATE U/D -LEGREST U/D
TILT-RECLINE-LEGS	FWD REV LT RT	-TILT U/D -REC & LEG U/D -LEGREST UP -LEGREST DOWN
TILT-RECL	FWD REV LT RT	-TILT UP -TILT DOWN -RECLINE UP -RECLINE DOWN
TILT - ELEVATE	FWD REV LT RT	-TILT UP -TILT DOWN -ELEVATE UP -ELEVATE DOWN
TILT ONLY	FWD REV LT RT	-TILT UP -TILT DOWN -OFF -OFF
RECLINE Legs	FWD REV LT RT	-R & Legs UP -R & Legs Down -Legs UP -Legs DOWN
ELEVATE ONLY	FWD REV LT RT	-ELEVATE UP -ELEVATE DOWN -OFF -OFF
PWR LEGS ONLY	FWD REV LT RT	-LEGS UP -LEGS DOWN -OFF -OFF

4-WAY SWITCH
FWD -TILT U/D
REV -RECL & LEGS U/D
LT -ELEVATE UP
RT -ELEVATE DOWN

Allows Customizing operation of the 4-way switch to meet users needs

Select switch quadrant, (i.e. FWD), to view list of choices

Select desired actuator operation from list

Selection Choices	
OFF TILT U/D TILT UP TILT DOWN RECL U/D RECLINE UP RECLINE DOWN ELEVATE U/D ELEVATE UP ELEVATE DOWN I FG U/D	LEG UP LEG DOWN RECL & LEG U/D RECL & LEG UP RECL & LEG DOWN LEFT LEG U/D LEFT LEG UP LEFT LEG DOWN RIGHT LEG U/D RIGHT LEG UP RIGHT I FG DOWN

TILT CALIBRATE
MOVE Down >>>
SET DOWN ANGLE — °
MOVE UP >>>
SET UP ANGLE — °

(Requires a Pitch-Angle Gauge)

-Select "MOVE DOWN"

-Use Down Arrow Key to operate Tilt Down to full range, Press Select "Select" SET DOWN ANGLE,

-Use Arrow keys to Match programmer value with Angle gauge reading, Press Select

-Repeat for "MOVE UP"

RECLINE CALIBRATE

Follow Prompts on Programming Screen

(Same as Tilt Calibrate)

CM LEGS CALIBRATE

Follow Prompts on Programming Screen

(Same as Tilt Calibrate)

27

SPEED POT MAX
77

Sets the point on the speed pot (MPJ+, PSR/F+) at which max speed is attained. Generally at 77 for MPJ+, at 277 for PSR+ / PSF+

Calibrations (Continued)

HARD PUFF CAL.

MIN	0.70	MAX
S	H	

0.10 to 1.28

SOFT PUFF CAL.

SOFT SIP CAL.

HARD SIP CAL.

Calibrates pressures required to activate hard / soft, puff & sip of commands.
(Separate screens for each of the 4 pressures).

Select command to calibrate. Follow instructions below. Save on completion.

GOAL: Separate “S” & “H” values sufficiently for easy distinction between Hard & Soft commands – AND set values low enough to assure they can be consistently achieved.

- In a **Hard** calibration mode, the up & down arrows of the programmer raise & lower the “H” value, which must be met as the user puffs (sips).
- In a **Soft** calibration mode, the up & down arrows of the programmer raise or lower the “S” value, which must be met as the user puffs (sips).

Instructions for Hard Puff Calibration Screen:

1. Puff into the S-N-P tubing and see how far the bars light up to the right.
2. Use the up & down arrow keys of the E.R.P. to change the “H” value right or left to match the distance the bars moved.
3. Ask user to puff hard again to check for consistency reaching the set level.
4. Once user is consistent reaching the value being calibrated, Use “Menu” key to back up on the menu, then Down Arrow to move to the next calibration (Soft Puff Cal.)
5. Repeat for Soft Puff Calibration – setting the value low enough for easy distinction between a soft & a hard puff.
6. Repeat for Soft SIP calibration
7. Repeat for Hard Sip calibration
8. Save changes

Additional Tips for Sip-n-Puff Success

- Teach the user to use their mouth muscles to create the pneumatic pressures, NOT their lungs or with exhaling. This helps teach it is intra-oral pressure that makes Sip-n-Puff work, Not lung capacity
- Eliminate excess pneumatic tubing on set-up of the system by mounting the interface box close to where the breath tube kit is mounted. The less volume of air the user has to move, the easier it is to activate....
- Be certain to eliminate all possible leaks in the system with good connections - especially where the pneumatic straw is connected.
- Teach the user to place the entire straw in their mouth to ensure a good seal.

START IN DRIVE.

Last

1

2

3

4

Choose desired Drive to be active when chair is first turned on.

Last = last used drive when chair was turned off
 1 = Chair will turn on into Drive 1
 2 = Chair will turn on into Drive 2
 etc...

Audible Indicator.

Off

Standard

RIM

MK6 Display Only (Not available with MPJ+ or PS Joysticks)

Turns on Auditory feedback: (Series of Beeps t indicate Active mode)
 Standard = normal auditory beeps – NO beeps when driving in reverse
 RIM = normal auditory beeps with intermittent beeps when driving in reverse

TTJC

Through the Joystick Control

Only Present with Multiple Actuators & SANODE. Allows choice of operating only one actuator Through Joystick if Multiple actuators are in the system.

PRS TIME.

30 M

LESS		MORE
------	--	------

Pressure Relief Signal

Can be set from 0 to 60 minutes. **REQUIRES MODE SWITCH**
 After Set is up, Chair Audible indicator will sound (MK6 Display only) and the Display will show “PRESS RESET”,
 Chair will not operate until user acknowledges the PR Signal by pressing the mode switch

ERASE ALL

Follow instructions in Display

Allows Erasing all programming values and Setting chair programming back to factory default Standard Programs. Follow prompts on screen.

MUST SELECT APPROPRIATE DRIVE CONFIGURATION FROM CALIBRATION MENU FOR CAIR TO OPERATE AFTER ERASING

Recalibrate Joystick (Joystick Throw) on completion.

Diagnostics

DIAGNOSTICS

JOYSTICK STATUS
 TILT ACTUATOR
 RECLINE ACTUATOR
 CM LEG ACTUATOR
▶ **FAULT LOG**
 VERSION

DRIVE 1 INPUT

FWD	REV	LEFT	RIGHT
0	0	0	0

FAULT LOG

E32 E28 E09 E19

USE ARROWS TO MOVE TILT

POS = ___° AMPS = +/- 0.0
(CUSTOM ACTUATORS ONLY)

VERSION

4WSB 1.33
 MPJ+ 1.3.0

Joystick Status:

- ❑ Displays throw settings for each quadrant when actively moving Joystick Inductive

Fault Log:

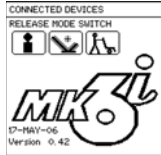
- ❑ Displays History of Error codes, including those intentionally caused during factory testing

Tilt Actuator: (Recline Actuator & Center Mount Leg Actuator)

- ❑ POS Displays current position angle of the smart actuator
- ❑ Pressing Up / Down Arrow keys of the programmer will move the actuator, Display the Angle Position change, and Display Amp Draw of the actuator

Displays software version of all components recognized in the MK6 System

Connected Devices:



This screen is displayed if a Mode Select switch is depressed (held active) for 10 seconds. An icon representing all devices that are connected to the chair will be displayed. In the sample at the left, the connected devices are the Compact Joystick, Intelligent Tilt Actuator, and Proportional Attendant Control..



	Intelligent Tilt Actuator		4-Way Switch Box.
	Intelligent Recline Actuator		Multiple Actuator interface Box.
	Intelligent Center Leg Actuator		RIM Control
	Elevate Actuator		ECU1/2 and ECU3/4.
	Generic Tilt Actuator		Proportional Attendant Control
	Generic Recline Actuator		Compact Joystick
	Generic Leg Actuators		Sip and Puff Control and Digital Attendant Control
	Generic Right Leg Actuator		Micro Extremity Control
	Generic Left Leg Actuator		Peachtree Control
	Shark Power Module (SPM) Actuator		ASL Digital Control
	SANODE or Single Actuator Control Interface.		Generic Analog Control
	Recline with Legs enabled		


Error Codes in the MK6i System. Groups








CODES	SECTION	DESCRIPTION
E01-E99	MK6 System	The MK6 MPJ/Display generates these errors and encompass feature such as input devices, system integrity, and device connections.
E100-E299	Controller	The Motor Controller generates these errors.
Wxx	Warnings	Warnings are normal operational conditions that warrant the operator's attention. They are predominantly information.

Error Codes and Warnings











The MK6i displays an icon and text to represent different conditions.

A serious fault condition is noted by a  symbol on the display and a  symbol on the MPJ, PSR and PSF's. In the following table a "Stop Sign" is used to indicate a serious condition. When this symbol is display, a condition exists that will cause the chair to not perform its expected function.

A warning condition is noted by a . The associated verbiage clarifies a condition that may cause a feature to perform in an unexpected manner.

ERROR CODE	SYMPTOM	PROBABLE CAUSE	SOLUTION
E01 - FWD E02 - REV E03 - LEFT E04- RIGHT	"Joystick Fault" and  displayed and the chair does not drive.	The inductive joystick is sending a value outside of the limits	-Update software to ver 1.3.0 or newer. -Inspect joystick for physical damage -Sometimes corrected by "Re-calibrating Joystick -Otherwise Replace the Joystick or Input Device.
E09	"Left Park Brake Fault" and  are displayed and the chair does not drive.	This is displayed when the left motor's parking brake is on. Right on RWD – Left on CWD	-Release the motor's parking brake and cycle power on the chair. -Check motor connection plug -Verify Left or right by switching motor plugs
E10	"Right Park Brake Fault" and  are displayed and the chair does not drive.	This is displayed when the right motor's parking brake is on. Right on RWD – Left on CWD	-Release the motor's parking brake and cycle power on the chair. -Check motor connection plug -Verify Left or right by switching motor plugs
E14	" Battery Fault" and  are displayed and the chair does not drive.	This is displayed when the controller determines that the batteries are no good.	-Check voltage. If less than 25v, charge batteries. -Replace batteries if charging does not correct
E18	"Neutral Testing"	This is displayed when the joystick neutral test has failed.	-Turn chair off, release the driver control (joystick) and turn chair back on. -Recalibrate Joystick. -Check Joystick for physical damage. -Otherwise, replace Joystick.
E19	"Bad Joystick Cal Values" and  displayed and the chair does not drive.	This is displayed when the joystick calibration values are outside of the expected range.	-Turn chair off, and then back on. -If error repeats, recalibrate Joystick. -Otherwise, call Technical Services.
E28	"Charger Plugged In"	This screen indicates that the charger is plugged into the chair.	-Unplug battery charger
E32	"Joystick Timeout" and  displayed and the chair does not drive.	Joystick or Input Device is disconnected from the system.	-Check cables for damage -Check connections. -Otherwise, call Technical Services.
E41	"Controller Startup Fault" and  are displayed and the chair drives slowly.	This is displayed when the controller has determined a fault during a pervious turn-off process.	-Turn chair off, and then back on. -If fault repeats, replace controller.
E102	GB GNRL FLT	Unidentifiable Error	-Call Technical Services
E103	GB FLT – CYCLE PWR	Possible Controller Failure	-Turn chair off, and then back on. -Replace controller & recalibrate motors
E104- E105	GB CTRL FLT	Left Current Sensor Error	-Replace controller & recalibrate motors
E106- E107	GB CTRL FLT	Right Current Sensor Error	-Replace controller & recalibrate motors
E108-E109	CURR CAL FLT	Current Calibration Error	-No action required – Factory Test Only.
E110-E111	GB CTRL FLT	Left (on CWD) / Right (on RWD) Current Sensor Error	-Call Technical Services -Replace controller & recalibrate motors.

CODE	SYMPTOM	PROBABLE CAUSE	SOLUTION
E112-E113	GB CTRL FLT	Right (on RWD) / Left (on CWD) Current Sensor error	-Call Technical Services -Replace controller & recalibrate motors.
E114-E127	CURR CAL FAULT	Current Calibration Error	-No action required – Factory Test Only.
E128	M2 MOTOR FAULT	Left Motor (M2) (on RWD) / Right (on CWD) Over Current Fault	-Check Left Motor (M2) (on RWD) / Right (on CWD) and Cabling.
E129	M1 MOTOR FAULT	Right Motor (M1) (on RWD) / Left (on CWD) Over Current Fault	-Check Right Motor (M1) (on RWD) / Left (on CWD) and Cabling.
E130, E132	M2 MTR CAL	Left Motor (RWD) / Right Motor (CWD) – Too much drag / load	-Recalibrate motor.
E131, E133	M1 MTR CAL	Right Motor (RWD) / Left Motor (CWD) – Too much drag / load	-Recalibrate motor.
E134-E139	SW FLT	Controller Software Fault	-Replace the controller. -Call Technical Service
E140, E141	CTLR PWR FLT	Check Joystick Cabling	-Check all connections for physical damage. -Check Joystick and Joystick Cabling
E142	LOW BATTERY	Low battery	-Recharge Batteries -Replace batteries if not corrected after charging
E143	HI BATT VOLTS	High Battery Fault	-Check Battery Voltage -Call Technical Service
E144	M2 MTR FAULT	Left motor (on RWD) / Right motor (on CWD) brake coil short circuit	-Check Left Motor (M2) (on RWD) / Right Motor (on CWD) Cabling.
E145	M1 MTR FAULT	Right motor (on RWD) / Left motor (on CWD) brake coil short circuit	-Check Right Motor (RWD) / Left Motor (CWD) Cabling.
E146-E150	GB CTRL FAULT	GB Controller Failure	-Replace controller & recalibrate motors -Call Technical Service
E151, E152	M2 MTR FAULT	Left Motor (on RWD) / Right Motor (on CWD) Hall Sensor Fault	-Check Left Motor (M2) (on RWD) / Right Motor (on CWD) Cabling.
E153, E154	M1 MTR FLT	Right Motor (on RWD) / Left Motor (on CWD) Hall Sensor Fault	-Check Right Motor (M1) (on RWD) / Left Motor (on CWD) Cabling.
E155, E157	GB CTRL FAULT	Current Calibration Lost	-Turn chair off, and then back on. -If repeats, replace controller & recalibrate motors.
E156	MTR NOT CAL	Motors not calibrated	-Recalibrate motors
E158-E160	GB CTRL FLT	Software Error	-Turn chair off, and then back on. -If repeats, replace controller & recalibrate motors
E161	GB CTRL FLT	GB Controller Fault	-Turn chair off, and then back on. -If repeats, replace controller & recalibrate motors
E162-E164	GB CTRL FLT	Controller/Motor Short/Open	-Check all connections
E165-E171	GB CTRL FAULT	Direct Input Joystick Fault	-Replace controller & recalibrate motors.
E172, E174	M2 SHORT/OPEN	Motor / Controller Short / Open – M2, Right Motor (on RWD) / Left Motor (on CWD)	-Check all connections.
E173, E175	M1 SHORT/OPEN	Motor / Controller Short / Open – M1, Left Motor (on RWD) / Right Motor (on RWD)	-Check all connections.
E176	OVERHEAT	Rollback – Battery	-Allow controller to cool off w/ power on.
E177	OVERHEAT	Rollback – M2	-Allow controller to cool off w/ power on. -Otherwise, possible bad M2 motor (Right Motor on RWD, Left Motor on CWD).
E178	OVERHEAT	Rollback – M1	-Allow controller to cool off with power on.

CODE	SYMPTOM	PROBABLE CAUSE	SOLUTION
			-Otherwise, possible bad M1 motor (Left Motor on RWD, Right Motor on CWD).
E179	OVERHEAT	Rollback – Controller Temperature too high	-Allow controller to cool off w/ power on.
E180	SHORT TO FRAME	Voltage on frame	-Check wiring for short to frame of chair -Replace controller and recalibrate motors. -Replace motors.
E181-E183	GB CTRL FAULT	General type controller failure.	-Replace controller & recalibrate motors.
E200	Controller Not Connected	Input device does not recognize the controller	-Turn chair off, and then back on. -If fault repeats, replace the cable from the Display or MPJ+/PSF+/PSR+ to the controller. -If fault repeats, replace Display or Joystick. -If fault repeats, replace Controller.
E201	General controller fault	General Controller Fault	-Turn chair off, and then back on. -If fault repeats, replace controller.
E202	"Left Motor Fault" and  are displayed and the chair does not drive.	This is displayed when a problem with the left motor is detected. Right on RWD – Left on CWD	-Check motor lock engagement (clutch). -Check motor connection plug. -Verify left/right by switching motor plugs. -If fault follows motor, replace motor. -If fault does not follow motor, replace controller.
E203	"Right Motor Fault" and  are displayed and the chair does not drive.	This is displayed when a problem with the right motor is detected. Right on RWD – Left on CWD	-Check motor lock engagement (clutch). -Check motor connection plug. -Verify left/right by switching motor plugs. -If fault follows motor, replace motor. -If fault does not follow motor, replace controller.
E204	"Controller Remote Fault" and  are displayed and the chair does not drive.	This is displayed when the controller determines an incorrect configuration.	-Turn chair off, and then back on. -If fault repeats, replace controller.
E205	"Controller FAULT" and  are displayed and the chair does not drive.	This is displayed when the controller has failed a power-up test.	-Turn chair off, and then back on. -If fault repeats, replace controller.
E206	"Wrong Remote Fault" and  are displayed and the chair does not drive.	This is displayed when the controller has determined an invalid configuration.	-Turn chair off, and then back on. -If fault repeats, replace controller.
E207	"Controller User Fault" and  are displayed and the chair does not drive.	This is displayed when controller module does not recognize the MPJ/Display as a valid device.	-Turn chair off, and then back on. -If fault repeats, replace controller
W01	"Tilt Warning" and  are displayed and the chair does not drive.	If the chair has a TIAM & RIAM, message is displayed when Tilt angle, Recline angle or combined Tilt & Recline angle are >20° from fully upright.. Displayed If the chair has a TRAM or TIAM, when the merc. switch is open.	-Drive actuators to their fully upright position.
W02	"Max Back Angle" and  are displayed.	This message is display when the operator attempts to drive an actuator in the down direction past the Maximum Back Angle, i.e. 170 degrees. This applies to only TIAM, RIAM and TRAM actuator.	-This is normal behavior.
W03	"Controller Inhibited" and  are displayed and the chair does not drive.	This is displayed when a positional device is connected to the controller, i.e. mercury switch, and the switch is active.	-Drive the actuator to allow it to be in it's normal driving position, i.e. Move the tilt or recline to a fully upright position.
W04	"Slow Down" and  are displayed and the chair drives slowly.	This is displayed when a positional device is connected to the controller, (i.e. magnetic switch on an elevate) and the switch is active.	-Drive the actuator to it's normal driving position.
W05	"Attendant Active" and  are displayed.	This means that the Proportional or Digital Attendant is active and can be used to drive the chair.	

SPJ+, SPJ+ w/PSS, SPJ+ w/ACC Error Codes

First two digits = diagnostic code. Last two digits = sub code. Refer to service manual for detailed descriptions

# of Flashes	Code	Description	Solution
1	E0100	User fault	Release joystick to neutral & try again
2	E0200	Battery fault	Check batteries & cable. Try charging batteries. Batteries may require replacing.
3	E0300 – E0308	Left Motor fault	Check left motor, connections & motor cable
4	E0400 – E0408	Right Motor fault	Check right motor, connections & motor cable
5	E0500 – E0504	Left Park Brake Fault	Check left park brake, connections & cable
6	E0600 – E0604	Right Park Brake Fault	Check right park brake, connections & cable
7	E0700 – E0702	Remote fault	Check communications bus, connection & wiring. Replace the remote
8	E0800 – E0812	Controller Fault	Check Connections & Wiring – Replace Power Module
9	E0900 – E0901	Communications fault	Check Connections & Wiring – Replace Bus cable
10	E1000	General Fault	Check connections & wiring – Contact Tech Service
11	E1100	Incompatible Remote	Wrong type of Remote connected



POWERED SEATING STANDARD SWITCH CONTROL.

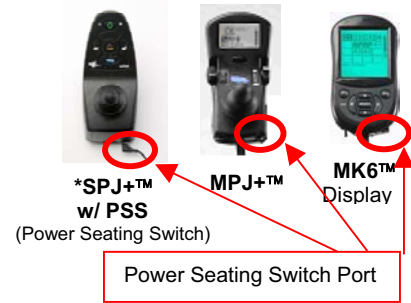


Single Actuator Systems:

The standard switch provided for operating any **single actuator** powered seating system is a simple egg switch, mounted on the chair using a versatile ASL 611 mount. This switch plugs into the switch port of the MK6™ Joystick, or the MK6 Display. Any switch with a 1/8" mono plug can be substituted.

Both Non-expandable (single drive), and Expandable (multiple drive) electronic systems are compatible with single actuator powered seating platforms.

* **SPJ+ with PSS** is **standard** on Single Actuator Systems with **Non-Expandable** Electronics



Multiple Actuator Systems:

The Standard switch offered for operating Multiple Actuator Systems is either the **4-way toggle**, or **Quad Push Button**. This switch plugs into a "**4-Way Switch Box**" mounted on the chair, and is programmed in the "Calibrations Menu" of the Hand Held Programmer.

Only Expandable Electronic Systems are compatible with Multiple Actuator powered seating platforms.



OPERATION THROUGH THE DRIVER CONTROL:

Operating Powered Seating Through the Driver Control is not standard on any Powered Seating System.

There is **ALWAYS** a component to either add - or replace - in the system.

Only **THREE** Scenarios exist in the MK6 Platform for Powered Seating operation Through the Driver Control

1. Single Actuator - Non-Expandable System: (SPJ+ Joysticks)



SPJ+ w/ ACC

-Change Joystick to an **SPJ+ with ACC (Actuator Control)**

- Incorporates electronics required to operate Powered Seating inside the Joystick Housing
- Adds a mode switch to cycle between Driving the power chair – Operating powered seating
- Includes a switch port for optional Attendant Powered Seating Switch (Not Included)

2. Single Actuator - Expandable System: (MPJ+ PS+ Joysticks, MK6 Display)



SANODE

-Add a **SANODE (Single Actuator Node)** into the MK6 System

- Enables a mode switch to cycle the driver control between operating powered seating and Driving the power chair.
- Must order attendant tilt switch (egg switch or equivalent) if desired when ordering a SANODE

3. Multiple Actuators - Expandable Systems Only: (MPJ+ PS+ Joysticks, MK6 Display)



Multiple Actuator Interface Box

-Add a **Multiple Actuator Interface Box (S4WSB)**

- Allows Through Driver Control operation of **Multiple Actuators**
- Replaces **4-Way Switch Box**
- Provides a 9 Pin Port for any separate 4 quadrant ATTENDANT switch

Electronics
MK6i™



Yes, you can.™

Parts Catalog Usage Guide

The information contained in this document is subject to change without notice. This catalog contains service parts for Form No. 06-110. If you have any questions regarding this catalog, please contact one of our Customer Service Representatives.

For Customer Service Support Call:

1-800-333-6900

For Faxed In Orders Call:

1-800-678-4682 or

1-440-366-0709

For Technical Service Call:

1-800-832-4707

Literature Can Be Found at:

www.invacare.com or

1-800-828-6272

SYMBOL DEFINITION

Throughout this catalog you will notice letters to draw your attention to specific footnotes which are located at the bottom of the page or below specified charts.

Examples:

A,B,C etc. = Special Comments

NOTE: = General information pertaining to that specific page

NLA = No Longer Available

HARDWARE MEASUREMENTS

The measurements for the hardware will be listed as follows:

Screws, Bolts Diameter X Thread Count/Pitch X Length

Washers Inside Diameter X Outside Diameter X Thickness

Spacers Inside Diameter X Outside Diameter X Length

For your convenience, we have supplied an area for you to list your Invacare Representatives.

Name	Phone Numbers

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A: READ THIS FIRST (THIS CATALOG IS DIFFERENT!)

MK6i™ parts catalog is used in association with the following catalogs:

Consumer Power

<u>Description</u>	<u>Form No.</u>
Pronto® M50™/M51™ After 1/19/05 and Pronto® M61™ with SureStep®	04-050
Pronto® M71™ with SureStep®	01-229
Pronto® M91™ with SureStep®	02-014

High End Power

<u>Description</u>	<u>Form No.</u>
Power Tiger™	93-37
Storm Series® 3rd Generation (Elevating Seat Included)	00-191
TDX™ SP/SR	06-105
TDX®3; TDX®4; TDX®5	03-025
TDX® SC (CGE option included) and TDX® SPREE (CGE standard)	07-082
TDX® SP/SR	06-105
TDX® SI	08-080

Powered Seating

<u>Description</u>	<u>Form No.</u>
Power Tilt Only (PTO-STM); Elevating Seat w/ PTO	01-038
Formula™ Invisible Super Low™ Tilt	03-034
Formula™ PTO Plus	04-042
Formula™ TRE Powered Seating	04-041
Formula™ CG Powered Seating Elevate, Tilt, Recline, and Tilt/Recline	06-106
Formula™ CG Tilt Powered Seating CGT on M51	07-079
Formula™ CG Tilt Powered Seating CGT on TDX® SC and TDX® SPREE	08-077
Formula™ CG Tilt Powered Seating CGT on TDX® SI	08-081

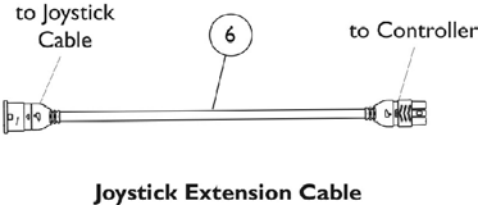
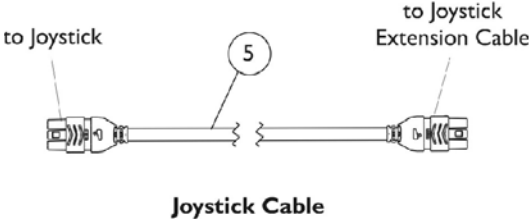
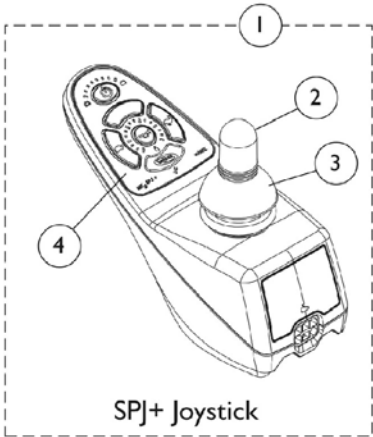
Literature

Item Number	Note	Part Number	Description	Quantity Per	
				Package	Assembly
1	A	1141471	Programming Guide, MK6i	1	1

NOTE: A - Not Shown

When adjusting or replacing parts, please refer to your Owner's Manual for assistance.

Joystick and Joystick Cables - SPJ+

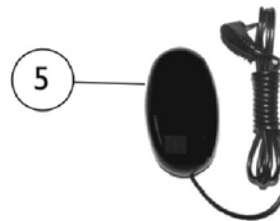
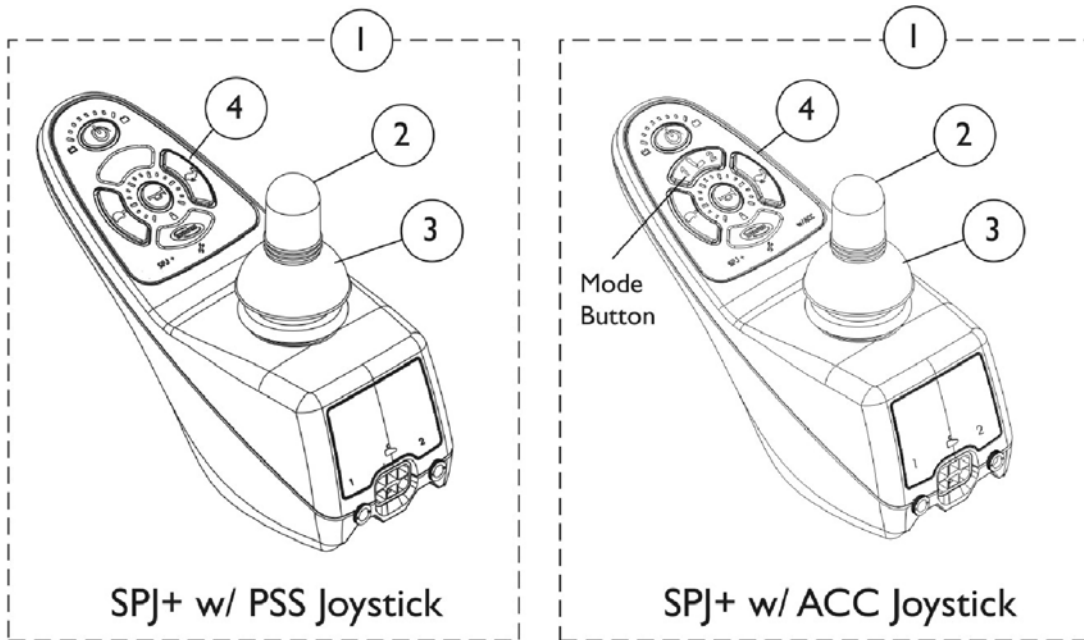


Joystick and Joystick Cables - SPJ+

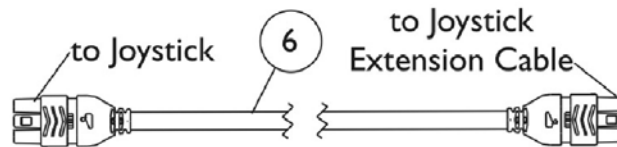
Item Number	Note	Part Number	Description	Quantity Per	
				Package	Assembly
1	A	1127291	Joystick, SPJ+	1	1
2		1040217	Knob, Joystick, Black	1	1
3		1040218	Skirt, Joystick	1	1
4		1151384	Overlay, SPJ+ Joystick	1	1
5		1127293	Cable, Joystick SPJ+	1	1
6		1116404	Cable, Joystick Extension	1	1
	B	1006270	Extension, Joystick, "T" Style (1560) (4" W x 5-1/2" L)	1	1
	B	1006271	Extension, Joystick, Straight Style (1561) (1/2" W x 5" L)	1	1
NOTE: A - Includes the Joystick and items 2-4. B - Not Shown					

Joysticks, Joystick Cables, and Reset Switch

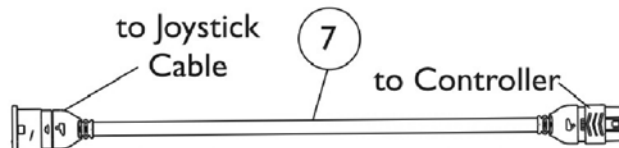
SPJ+ w/ PSS (SPJAP) and SPJ+ w/ ACC (SPJAPM)



EGSBLK Egg Switch



Joystick Cable



Joystick Extension Cable

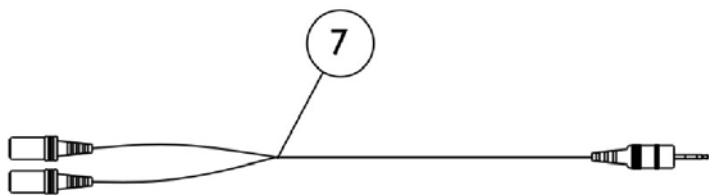
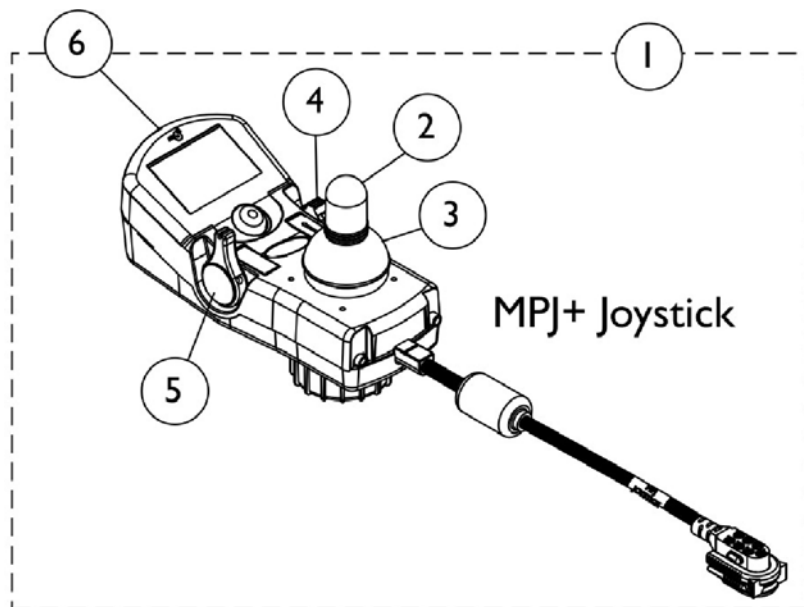
Joysticks, Joystick Cables, and Reset Switch SPJ+ w/ PSS (SPJAP) and SPJ+ w/ ACC (SPJAPM)

Item Number	Note	Part Number	Description	Quantity Per	
				Package	Assembly
1	A	1136937	Joystick, MK6 SPJ+ with PSS (SPJAP)	1	1
1	A	1136938	Joystick, MK6i SPJ+ with ACC (SPJAPM)	1	1
1	A,C,D	1127289	Joystick, MK5/MK6i SPJ+ w/ ACC	1	1
2		1040217	Knob, Joystick, Black	1	1
3		1040218	Skirt, Joystick	1	1
4	E	1151385	Overlay, SPJ+ w/ACC Joystick	1	1
5		1123276	Kit, Switch, Black Egg Reset w/ Hook/Loop Adhesive Back Fastener & Attaching Screws (EGSBLK)	1	1
6		1127293	Cable, Joystick SPJ+	1	1
7		1116404	Cable, Joystick Extension	1	1
	B	1006270	Extension, Joystick, "T" Style (1560) (4" W x 5-1/2" L)	1	1
	B	1006271	Extension, Joystick, Straight Style (1561) (1/2" W x 5" L)	1	1

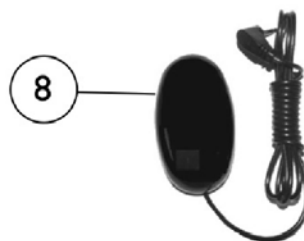
NOTE: A - Includes the Joystick and items 2-4 also.
 B - Not Shown
 C - Used on M61 models only.
 D - After 10/15/06 part#1127289 J/S was revised to function MK5 & MK6i applications and phono ports were added also.
 E - Part number 1151385 Overlay is used for Joystick part number 1127289 only. Overlays are currently not available for Joystick part numbers 1136937 and 1136938.

Joystick and Joystick Cables

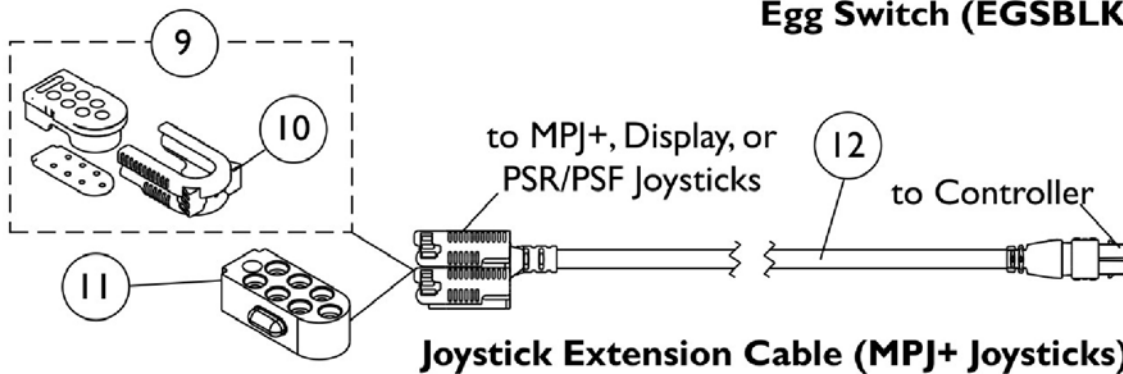
MPJ+ (MPJM6)



Monoport "Y" Phono Cable (MPY)



Egg Switch (EGSBLK)



Joystick Extension Cable (MPJ+ Joysticks)

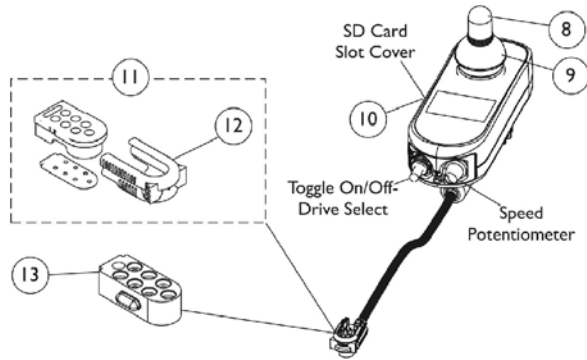
Joystick and Joystick Cables MPJ+ (MPJM6)

Item Number	Note	Part Number	Description	Quantity Per	
				Package	Assembly
1	A	1136885	Joystick, MPJ+ (MPJM6)	1	1
1	A	1136885E	Joystick, MPJ+ (MPJM6) Reconditioned	1	1
2		1040217	Knob, Joystick, Black	1	1
3		1040218	Skirt, Joystick	1	1
4		1139998	Knob, Speed Adjustment, Black - MK6i	1	1
5		1115214	Knob, Power/Drive Select - MK5/MK6i MPJ	1	1
6		1145074	Package, Cover Slot SD (For MPJM6 & PSFM6/PSRM6 Joysticks)	10	1
7		1140027	Cable, Monoport "Y" Phono (MPY)	1	1
8		1123276	Kit, Switch, Black Egg Reset w/ Hook/Loop Adhesive Back Fastener & Attaching Screws (EGSBLK)	1	1
9	B	1133182	Cap, Top Connector, 7 Pin, Black	1	1
10		1145408	Latch, Top Connector, Black	1	1
11		1133183	Cap, Bottom Connector, 7 Pin	1	1
12	C	1133180	Cable, MK6i Joystick Extension (16" L)	1	1
12	D	1140038	Cable, MK6i Joystick Extension (34" L)	1	1
12	E	1140039	Cable, MK6i Joystick Extension (58" L)	1	1
	F	1006270	Extension, Joystick, "T" Style (1560) (4" W x 5-1/2" L)	1	1
	F	1006271	Extension, Joystick, Straight Style (1561) (1/2" W x 5" L)	1	1

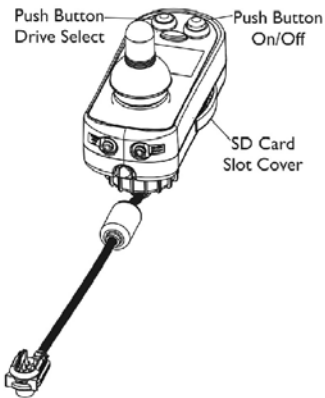
NOTE: A - Includes items 2-6 also.
 B - Includes Main Body, Gasket, and Latch. Latch is the only item offered individually.
 C - Used on Non-Elevate TDX, M71, M91 and Power Tiger chairs.
 D - Used on Elevating TDX and Storm chairs.
 E - Used on Non-Elevate 3G Storm chairs.
 F - Not Shown

PSFM6/PSRM6 Joysticks

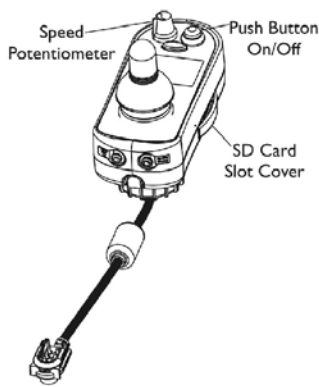
NOTE: Available 4/16/07



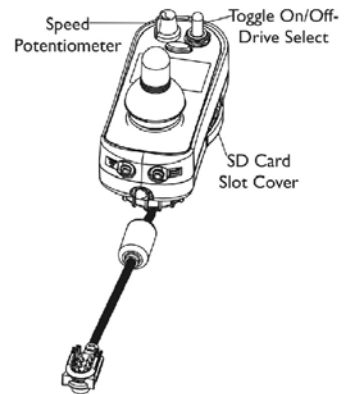
Item #1 (1139944)
ON CHAIR: PSFM6



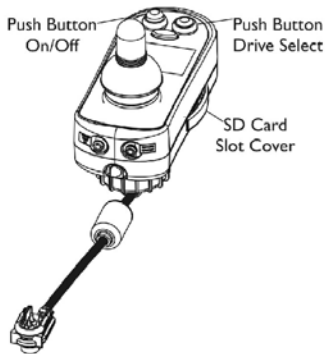
Item #2 (1140047)
ON CHAIR: PSRM6/PBOD/OR



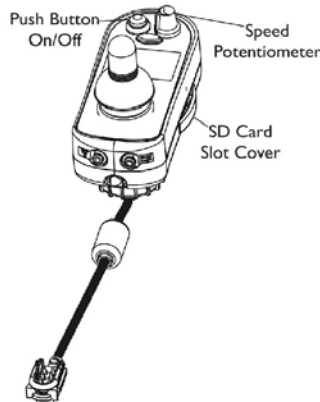
Item #3 (1139941)
ON CHAIR: PSRM6/PBSS/OR



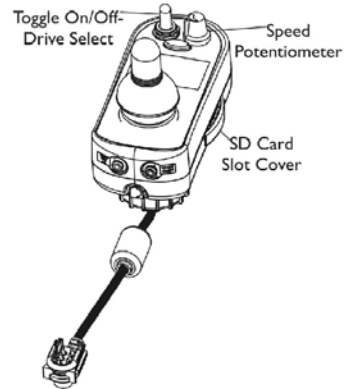
Item #4 (1144844)
ON CHAIR: PSRM6/OR



Item #5 (1140048)
ON CHAIR: PSRM6/PBOD/OL



Item #6 (1140046)
ON CHAIR: PSRM6/PBSS/OL



Item #7 (1144845)
ON CHAIR: PSRM6/OL

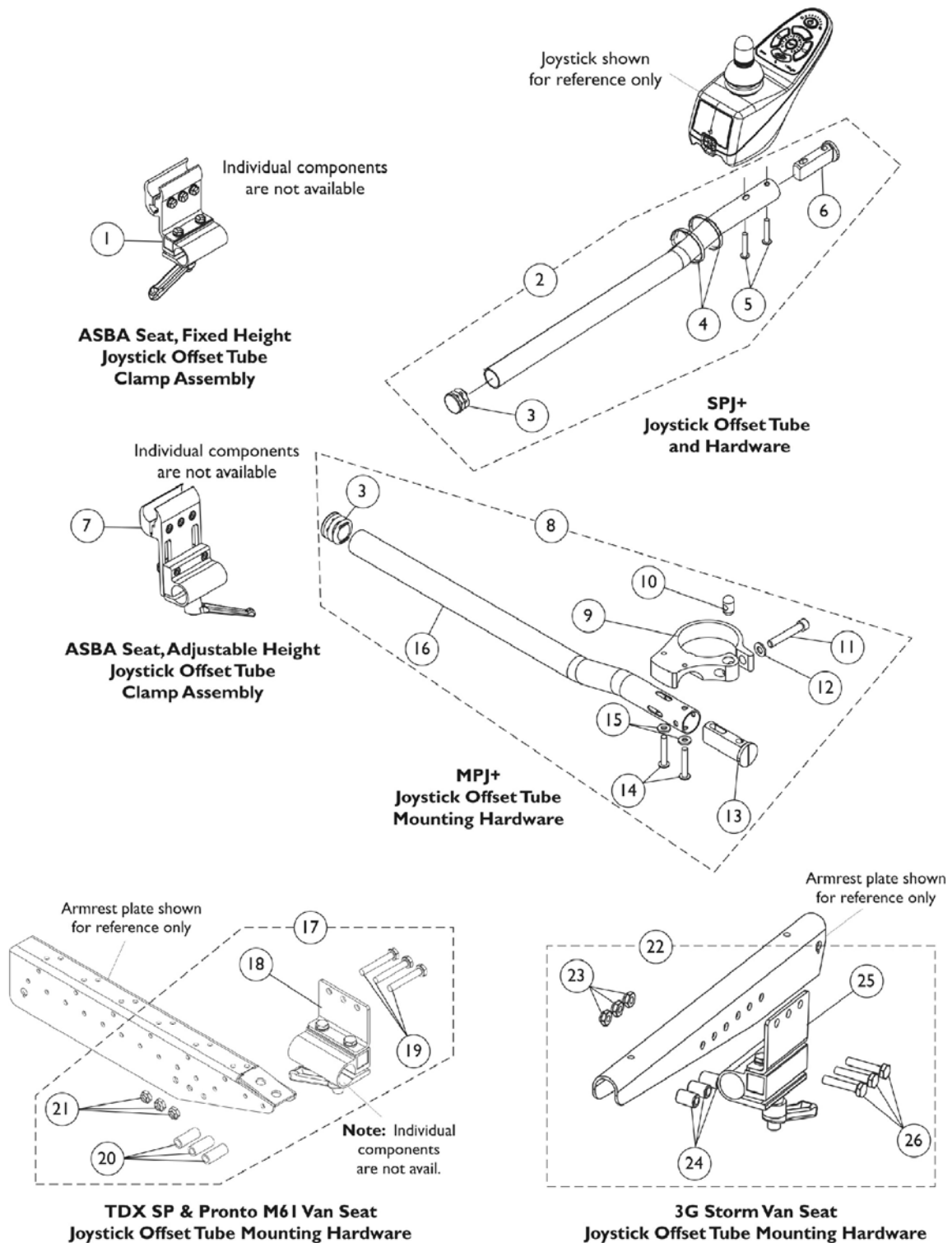
PSFM6/PSRM6 Joysticks

NOTE: Available 4/16/07

Item Number	Note	Part Number	Description	Quantity Per	
				Package	Assembly
1	A	1139944	Joystick, PSFM6	1	1
2	B	1140047	Joystick, PSRM6/PBOD/OR	1	1
3	C	1139941	Joystick, PSRM6/PBSS/OR	1	1
4	D	1144844	Joystick, PSRM6/OR	1	1
5	E	1140048	Joystick, PSRM6/PBOD/OL	1	1
6	F	1140046	Joystick, PSRM6/PBSS/OL	1	1
7	G	1144845	Joystick, PSRM6/OL	1	1
8		1040217	Knob, Joystick, Black	1	1
9		1040218	Skirt, Joystick	1	1
10		1145074	Package, Cover Slot SD (For MPJM6 & PSFM6/PSRM6 Joysticks)	10	1
11	H	1133182	Cap, Top Connector, 7 Pin, Black	1	1
12		1145408	Latch, Top Connector, Black	1	1
13		1133183	Cap, Bottom Connector, 7 Pin	1	1

NOTE: A - This PSFM6 Joystick has a toggle on/off-drive select (left side) & speed select potentiometer knob (right side) STANDARD
 B - This PSRM6/PBOD/OR Joystick has a push button on/off (right side) & push button drive select (left side)
 C - This PSRM6/PBSS/OR Joystick has a push button on/off (right side) & speed select potentiometer knob (left side)
 D - This PSRM6/OR Joystick has a toggle on/off-drive select (right side) & speed select potentiometer knob (left side)
 E - This PSRM6/PBOD/OL Joystick has a push button on/off (left side) & push button drive select (right side)
 F - This PSRM6/PBSS/OL Joystick has a push button on/off (left side) & speed select potentiometer knob (right side)
 G - This PSRM6/OL Joystick has a toggle on/off-drive select (left side) & speed select potentiometer knob (right side)
 H - Includes Main Body, Gasket and Latch. Latch is the only item offered individually

Joystick Mounting Hardware

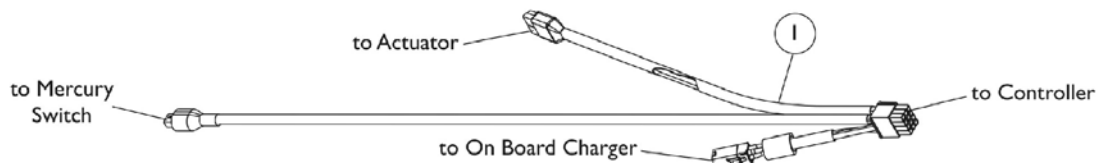


Joystick Mounting Hardware

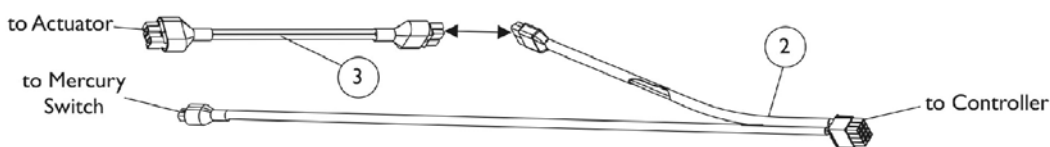
Item Number	Note	Part Number	Description	Quantity Per	
				Package	Assembly
1		1093071	Clamp, Fixed Height Joystick Tube	1	1
2	A,B	1093069	Kit, 1/2" Offset Joystick Tube with Hardware	1	1
3		1027095	Plug Button, Black (7/8")	1	1
4		1095502	Package, Cable Tie (11-1/2" L)	10	1
5		1025714	Screw, Phillips Pan Head (#10-32 x 1-1/8")	1	2
6		1093063	Spacer, Joystick Tube	1	1
2	B,C	1117464	Kit, 2" Offset Joystick Tube with Hardware	1	1
3			Plug Button, Black (7/8")	1	1
			Tube, Joystick Offset (2")	1	1
4			Tie Wrap (11-1/2" L)	1	1
5			Screw, Phillips Pan Head (#10-32 x 1-1/8")	1	2
6			Spacer, Joystick Tube	1	1
7		1139422	Clamp, Height Adjustable Joystick Tube (ARM250)	1	1
8	D	1140094	Kit, Joystick Tube Mounting Hardware - MPJ+/PSR/PSF	1	1
3			Plug Button, Black (7/8")	1	1
9			Clamp, Joystick	1	1
10			Pin, Threaded (3/8" x 3/4")	1	1
11			Screw, Socket Head (1/4-28 x 1-1/2")	1	1
12			Washer (1/4 x 1/2 x 1/16")	1	1
13			Spacer, Joystick Tube	1	1
14			Screw, Phillips Pan Head (#10-32 x 1-1/8")	1	2
15			Washer (3/16 x 7/16 x 1/16")	1	2
16			Tube, Joystick Offset (1/2")	1	1
16	A	1114971	Tube, Joystick Offset (1/2")	1	1
16	C	1117463	Tube, Joystick Offset (2")	1	1
17	E	1115000	Kit, Joystick Tube Mounting Hardware - Captain/ Van Seat	1	1
18		1105049	Clamp Assembly, Captain/ Van Seat	1	3
19		1037610	Screw, Hex Head (1/4-20 x 1-5/8")	1	3
20		1087219	Spacer (1/4 x 3/8 x 1")	1	3
21		1025195	Locknut (1/4-20)	1	3
22	F	1105050	Kit, Joystick Tube Mounting Hardware - Captain/ Van Seat	1	1
23		1025195	Locknut (1/4-20)	1	3
24		1101524	Spacer (1/4 x 7/16 x 5/8")	1	3
25		1105049	Clamp Assembly, Captain/ Van Seat	1	1
26		1057955	Screw, Hex Head (1/4-20 x 1-1/4")	1	3

NOTE: A - Used on chairs with ASBA seats.
 B - Includes joystick tube plus items 3 - 6.
 C - Used on chairs with Van seats.
 D - Includes item 3 & 9 - 16.
 E - Includes item 18 - 21.
 F - Includes item 23 - 26.

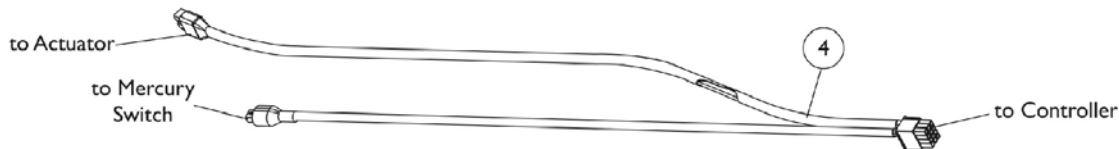
Harnesses



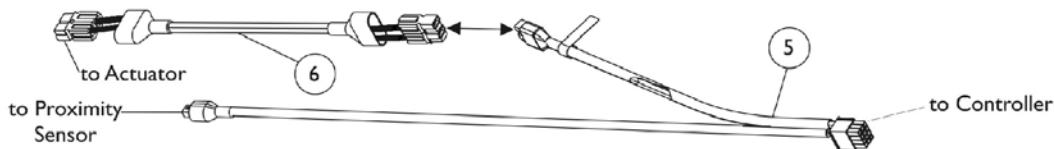
Tilt Actuator, Sensor, and Charger Harness (PTO Plus on M71/M91, M71jr Tilt chairs) & (Formula CGT on M51)



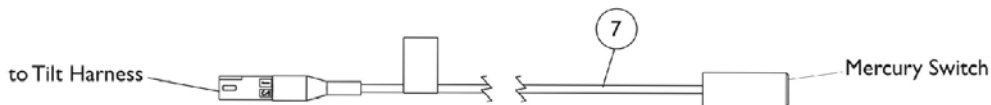
Tilt Actuator and Sensor Harness (Power Tiger w/ Tilt), (Super Low Tilt & PTO Plus on TDX chairs), (Formula CG on TDX SP Before 6/19/07), (Formula CG on 3G Storm)



Tilt Actuator and Sensor Harness (Formula CG on TDX SP After 6/18/07) & (Formula CGT on TDX SC & TDX SI)



Elevate Actuator and Sensor Harness (Formula Elevate on TDX, Formula CGE on TDX SP, TDX SC & 3G Storm)



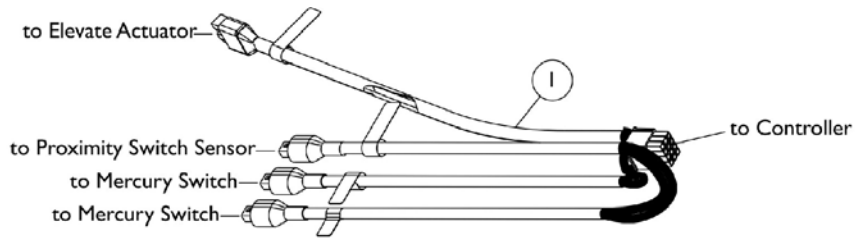
Drive Lockout Mercury Switch

Harnesses

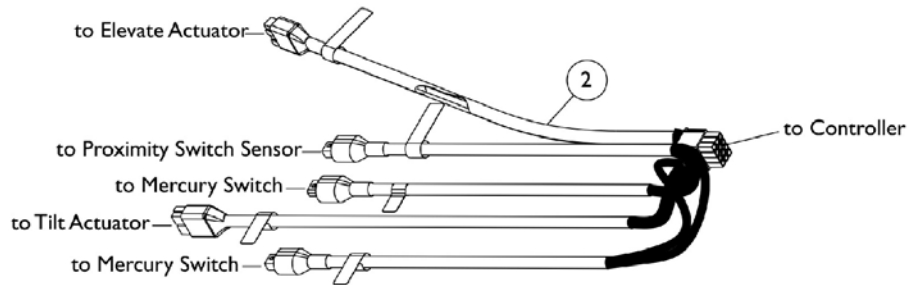
Item Number	Note	Part Number	Description	Quantity Per	
				Package	Assembly
1	A	1140124	Harness, Tilt Actuator with Sensor and Charger	1	1
2	B	1140101	Harness, Tilt Actuator and Sensor	1	1
3	C	1145414	Cable, Actuator Jumper Adapter (MK6i)	1	1
3	G	1101400	Harness, ELRPW Power Legrest - Right	1	1
4	D,D1	1150961	Harness, Tilt Actuator and Sensor	1	1
5	E,F	1140100	Harness, Elevate Actuator and Sensor	1	1
6	F	1142207	Cable, Actuator Jumper Adapter R2T (MK6i)	1	1
7	H	1140099	Switch, Drive Lockout Mercury (MK6i)	1	1

NOTE: A - Chairs with (PTO Plus on Pronto M71/M91), (M71jr tilt) and (Formula CGT on M51) models.
 B - Chairs with (Manual Tilt on Power Tiger), (Super Low Tilt & PTO Plus on TDX), (Formula CG on TDX SP before 6/19/07) and (Formula CG w/ a Conventional Tilt Actuator Motor on 3G Storm and 4-Pole Motors).
 C - Used for TDX SP models made before 6/19/07. If the customer wants to eliminate the need for the adapter cable, order item #4 "Harness, Tilt Actuator and Sensor" dated after 6/18/07
 D - After 6/18/07 a new Tilt Actuator and Sensor Harness was created to eliminate the need for item #3 "Cable, Actuator Jumper Adapter". The Harness is backward compatible for chairs made before 6/19/07 if the customer wants to eliminate the adapter cable.
 D1 - Used for a Conventional Tilt Actuator Motor only on TDX SP models equipped with 4-Pole Motors. Used for Formula CGT on TDX SC and TDX SI models also.
 E - Chairs with (Formula Elevate on TDX), (Formula CGE on TDX SP, TDX SC and 3G Storm).
 F - The Actuator Jumper Adapter R2T Cable is only used in connection with item #5 Elevate Actuator and Sensor Harness for Formula Elevate on TDX
 G - Used for 3G Storm Series models only with 4-Pole Motors and a Conventional Tilt Actuator Motor.
 H - Mercury Switch is used for Conventional Actuator Motors only.

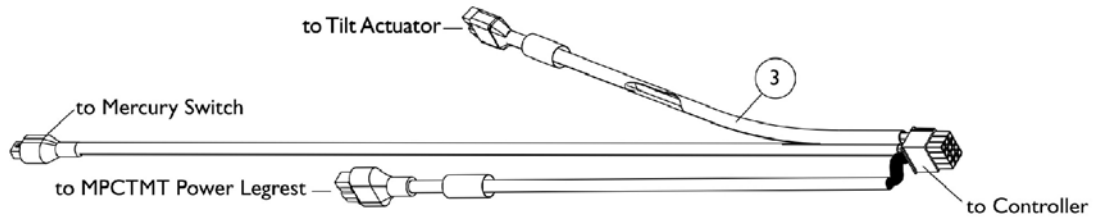
Harnesses (continued)



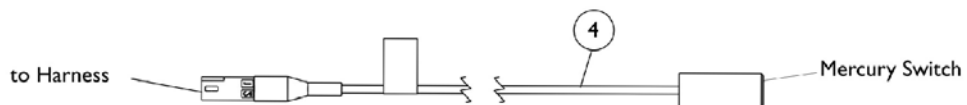
Elevate Actuator and Manual Tilt Sensor Harness (Manual Tilt on TDX SPREE)



Elevate/Tilt Actuator and Sensor Harness (Formula CGT on TDX SPREE)



Tilt Actuator/MPCTMT Power Legrest and Sensor Harness (Formula CGT on TDX SC)



Drive Lockout Mercury Switch

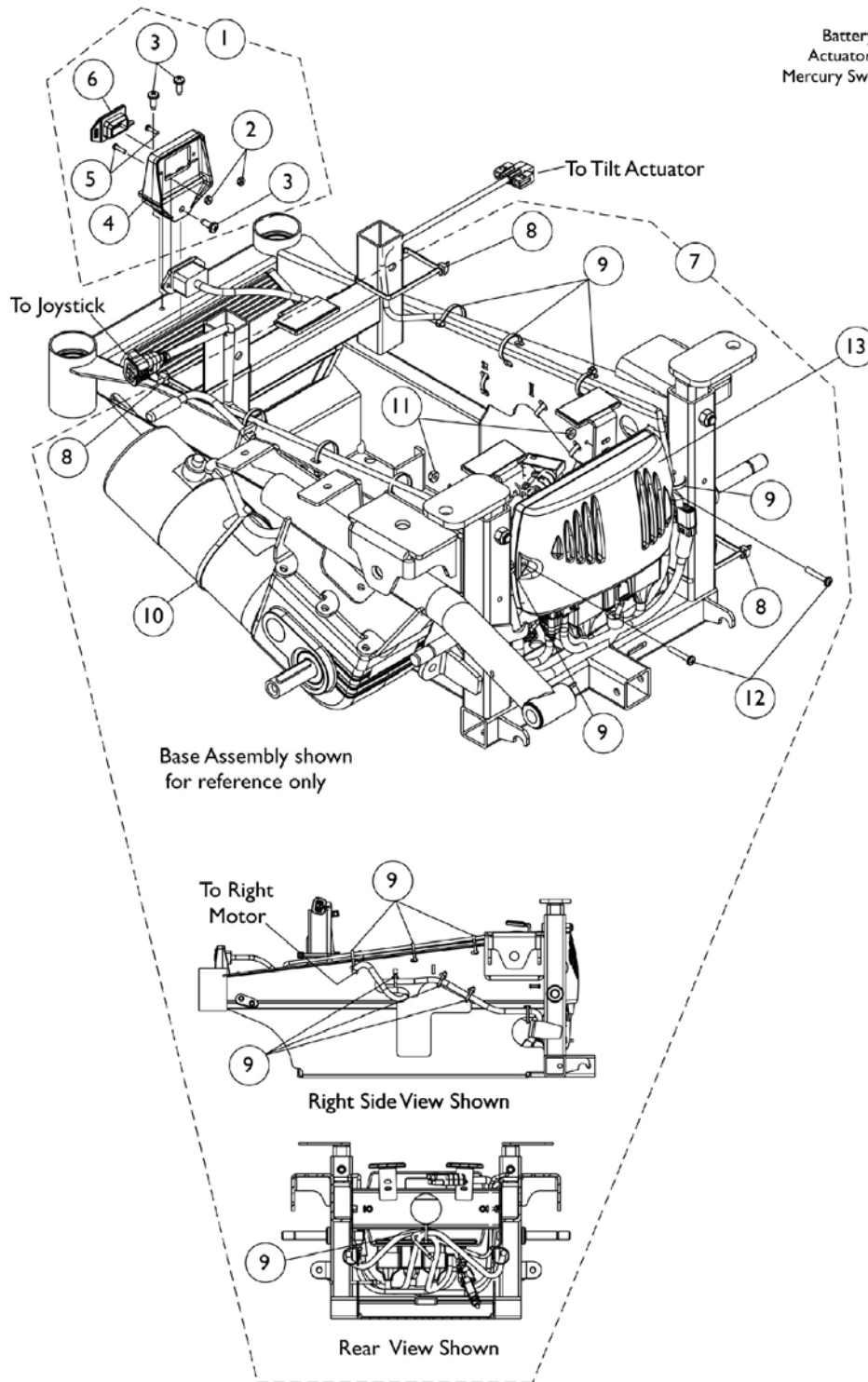


Proximity Switch Sensor

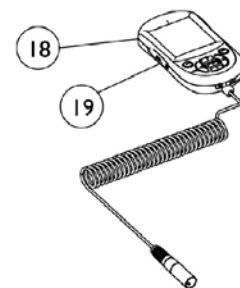
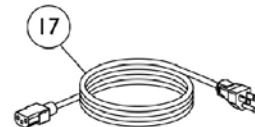
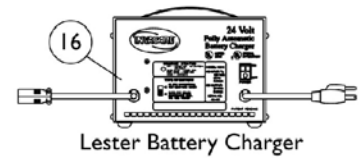
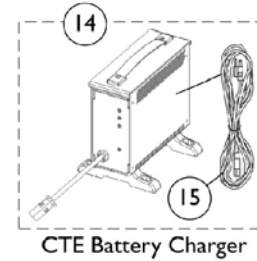
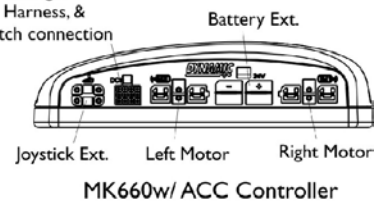
Harnesses (continued)

Item Number	Note	Part Number	Description	Quantity Per	
				Package	Assembly
1	A	1151591	Harness, Elevate Actuator and Manual Tilt Sensor	1	1
2	B	1151608	Harness, Elevate/Tilt Actuator and Sensor	1	1
3	C	1153867	Harness, Tilt Actuator/MPCTMT Power Legrest and Sensor	1	1
4		1140099	Switch, Drive Lockout Mercury (MK6i)	1	2
5		1122586	Sensor, Proximity Switch	1	1
NOTE: A - Used for TDX SPREE with a Manual Tilt (MT) seating option B - Used for TDX SPREE with a Formula CGT seating option C - Used for TDX SC with a Formula CGT seating option with MPCTMT Power Legrest					

Controller, Programmer, & Mtg. Hdwr. - Pronto M51 w/ Formula CG Tilt



Battery Charger,
Actuator Harness, &
Mercury Switch connection

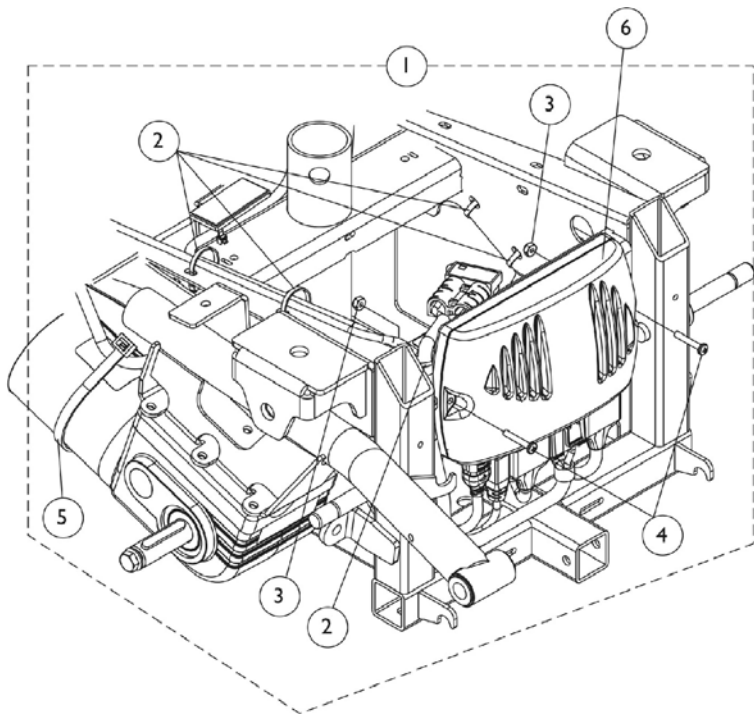


Controller, Programmer, & Mtg. Hdwr. - Pronto M51 w/ Formula CG Tilt

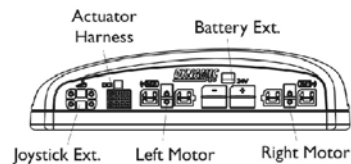
Item Number	Note	Part Number	Description	Quantity Per	
				Package	Assembly
1	A	1127301	Kit, Charger Mounting Hardware	1	1
2			Nut, Hex Keps (#4-40)	1	2
3			Screw, Phillips Pan Head Tap (#10-32 x 1/2")	1	3
4			Bracket, Charger Connector, Black	1	1
5			Screw, Phillips Pan Head (#4-40 x 7/16")	1	2
6			Cover, Connector	1	1
7	B	1153344	Kit, Controller Mounting Hardware	1	1
8			Tie Wrap (11-1/2" L)	1	3
9			Tie Wrap (5-5/8" L)	1	17
10			Tie Wrap (17-1/2" L)	1	2
11			Locknut (#8-32)	1	2
12			Screw, Phillips Pan Head (#8-32 x 1")	1	2
13		1127270	Controller, MK5 NX w/ ACC/ MK660 w/ ACC	1	1
14	C,D	1123249	Battery Charger, 8 Amp. 115vac (Off Board)	1	1
			Single Mode Round Plug w/ AC Power Line Cord, CTE Corp.		
15		1089627	Cord, AC Power Line, 115VAC, 2 Prong Off-Board (11' 6" L)	1	1
16	E	1053161	Charger, Battery, 8 Amp, 115vac, Off Board	1	1
			Dual Mode Round Plug, Lester		
17		1121086	Cord, AC Power Line, 115VAC, 3 Prong On-Board (6' 6-1/2" L)	1	1
18		1139985	Programmer, MK6i	1	1
18		1142215	Kit, MK6i Programmer w/ SD Professional Card & Card Holder (1813M6)	1	1
19		1139997	Cover, SD Card Slot	1	1

NOTE: A - Includes items 2-6
 B - Includes items 8-12
 C - Used on Gel Cell or AGM (Absorbed Glass Mat) batteries. For wet cell batteries refer to the Lester 8 amp charger
 D - Includes item 15, AC power cord
 E - Used on Wet Cell Batteries

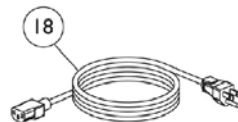
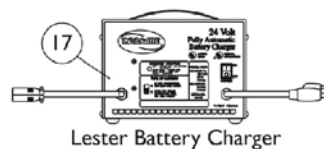
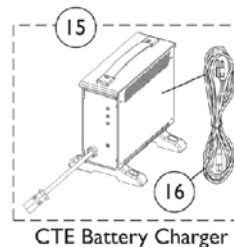
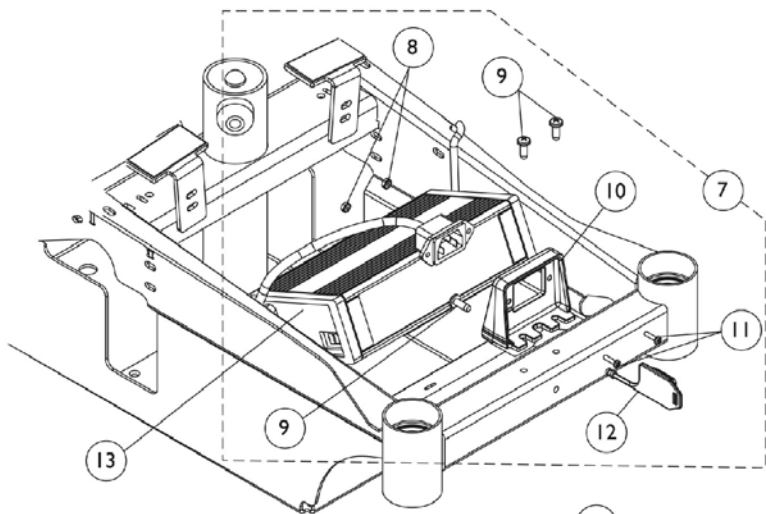
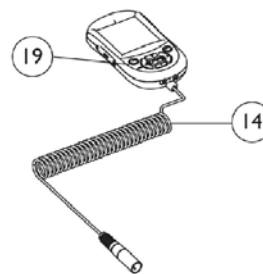
Controller, Programmer, and Mounting Hardware - Pronto M61



Controller Connections



Controller for Elevating Seat



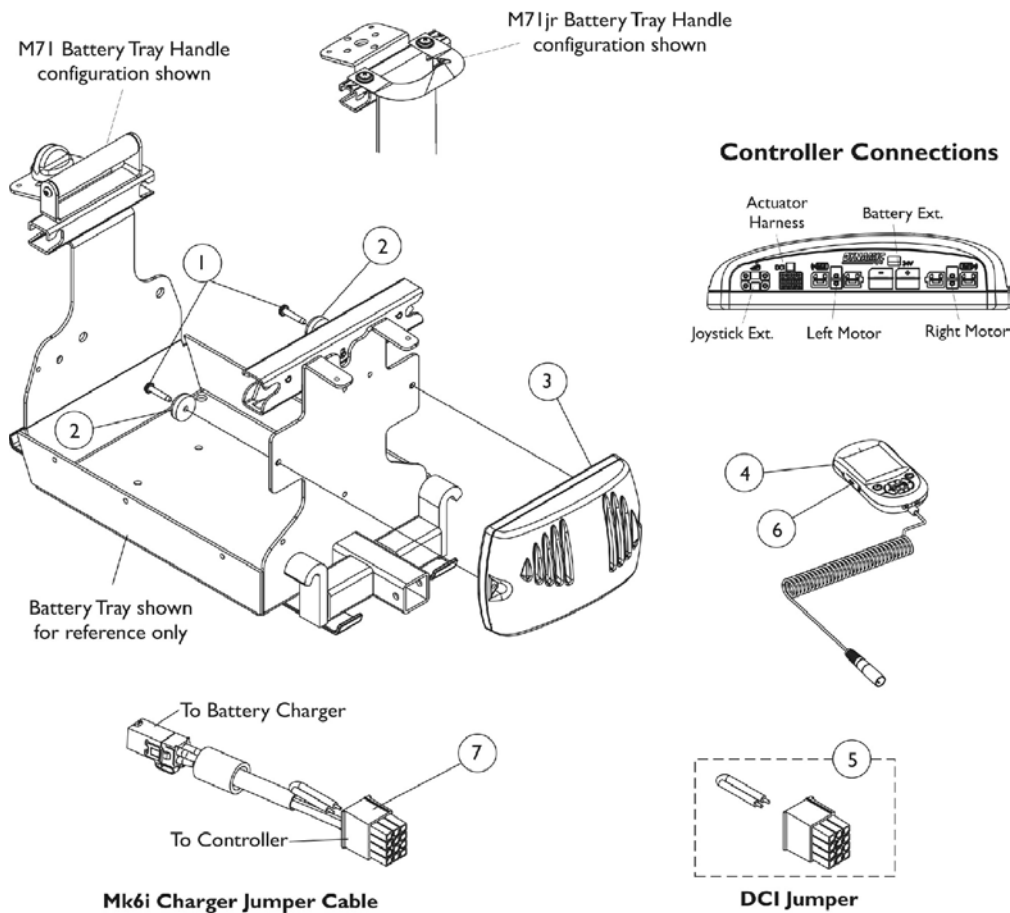
Controller, Programmer, and Mounting Hardware - Pronto M61

Item Number	Note	Part Number	Description	Quantity Per	
				Package	Assembly
1	A	1127302	Kit, Controller Mounting Hardware	1	1
2			Tie Wrap (5-5/8" L)	1	14
3			Locknut (#8-32)	1	2
4			Screw, Phillips Pan Head (#8-32 x 1")	1	2
5			Tie Wrap (17-1/2" L)	1	2
6	G,G1	1127270	Controller, MK5 NX w/ ACC/ MK660 w/ ACC	1	1
7	B	1127301	Kit, Charger Mounting Hardware	1	1
8			Nut, Hex Keps (#4-40)	1	2
9			Screw, Phillips Pan Head Tap (#10-32 x 1/2")	1	3
10			Bracket, Charger Connector, Black	1	1
11			Screw, Phillips Pan Head (#4-40 x 7/16")	1	2
12			Cover, Connector	1	1
13	F	1118923	Charger, Battery with Power Cord 3 Amp, On-Board	1	1
14		1139985	Programmer, MK6i	1	1
14		1142215	Kit, MK6i Programmer w/ SD Professional Card & Card Holder (1813M6)	1	1
15	C,D	1123249	Battery Charger, 8 Amp. 115vac (Off Board) Single Mode Round Plug w/ AC Power Line Cord, CTE Corp.	1	1
16		1089627	Cord, AC Power Line, 115VAC, 2 Prong Off-Board (11' 6" L)	1	1
17	E	1053161	Charger, Battery, 8 Amp, 115vac, Off Board Dual Mode Round Plug, Lester	1	1
18		1121086	Cord, AC Power Line, 115VAC, 3 Prong On-Board (6' 6-1/2" L)	1	1
19		1139997	Cover, SD Card Slot	1	1

NOTE: A - Includes items 2-5, does not include controller
 B - Includes itmes 8-12
 C - Used on Gel Cell or AGM (Absorbed Glass Mat) batteries. For wet cell batteries refer to the Lester 8 amp charger
 D - Includes item 16, AC power cord
 E - Used on Wet Cell batteries
 F - On Board charger is included as a standard feature
 G - The MK5 NX w/ ACC controller was revised to function as a MK660 w/ ACC 10/9/06. a MK660 w/ ACC is backward compatible w/ MK5 electronics.
 G1 - Any controller in the feild manufactured for chairs before 10/9/06 with a controller labeled description MK5 NX w/ ACC "will not" be compatible with MK6i electronics. This note was provided because the part number remained the same.

Controller, Programmer, and Mounting Hardware - Pronto M71/Pronto M71jr

MK6i electronics are only used on Pronto M71 chairs with Rehab seats. Chairs that have Van seats use MK5 electronics. See Pronto M71 parts catalog for parts information.



Controller, Programmer, and Mounting Hardware - Pronto M71/Pronto M71jr

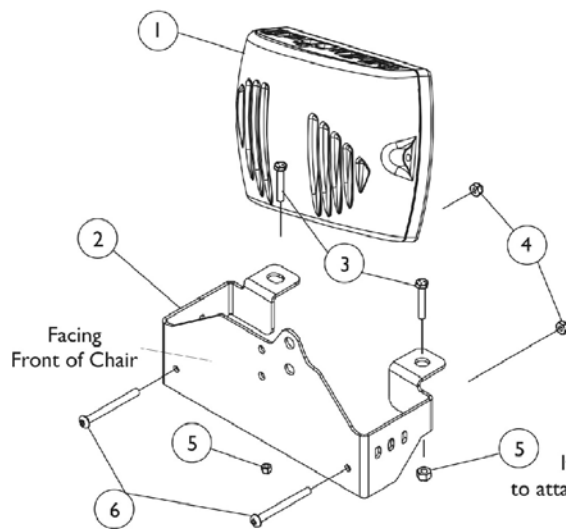
MK6i electronics are only used on Pronto M71 chairs with Rehab seats. Chairs that have Van seats use MK5 electronics. See Pronto M71 parts catalog for parts information.

Item Number	Note	Part Number	Description	Quantity Per	
				Package	Assembly
1		1113439	Screw, Phillips Pan Head Tap (#10-32 x 1")	1	2
2		1109471	Bumper with Washer	1	2
3	B,B1,E, E1	1127270	Controller, MK5 NX w/ ACC/ MK660 w/ ACC	1	1
3	F	1148361-NLA	Controller, MK660 w/ ACC	1	1
4		1139985	Programmer, MK6i	1	1
4		1142215	Kit, MK6i Programmer w/ SD Professional Card & Card Holder (1813M6)	1	1
5	D	1140125	Jumper, DCI	1	1
6		1139997	Cover, SD Card Slot	1	1
7	C	1134169	Cable, MK6i Charger Jumper	1	1
	A	1095502	Package, Cable Tie (11-1/2" L)	10	1

NOTE: A - Not Shown
 B - The MK5 NX w/ ACC controller was revised to function as a MK660 w/ ACC 10/9/06. A MK660 w/ ACC is backward compatible with MK5 electronics.
 B1 - Any controller in the field manufactured for chairs before 10/9/06 with a controller label description MK5 NX w/ ACC "will not" be compatible with MK6i electronics. This note was provided because the part number remained the same.
 C - Jumper Cable used on Pronto M71 (ADJASBA) Seating with an ON-Board Battery Charger and Pronto M71jr. (ASBA) models with an ON-Board Battery Charger and NON-Tilt Seating
 D - DCI Jumper is used when an MPJ+ Joystick is used
 E - Part #1148361 controller is no longer required as a replacement for a chair ordered with Manual Tilt Option before 1/19/07.
 E1 - because the software for part #1127270 was revised 8/31/07 to version 2.61a and now accommodates all Manual Tilt optioned chairs shipped before 1/19/07 as well.
 F - Used for Chairs with Manual Tilt Option only. Discontinued 8/31/07. see part #1127270 as a direct replacement.

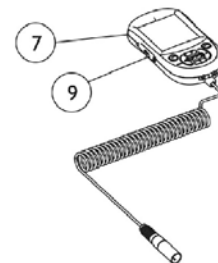
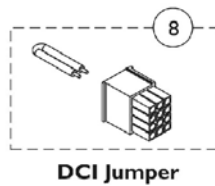
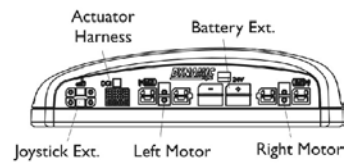
Controller, Programmer, and Mounting Hardware - Pronto M91/Pronto M94

MK6i electronics are used on Pronto M91 chairs with Rehab seats and all Pronto M94 chairs. Pronto M91 chairs that have Van seats use MK5 electronics. See Pronto M91 parts catalog for parts information.



Items 3 & 5 are used to attach bracket to chair frame

Controller Connections



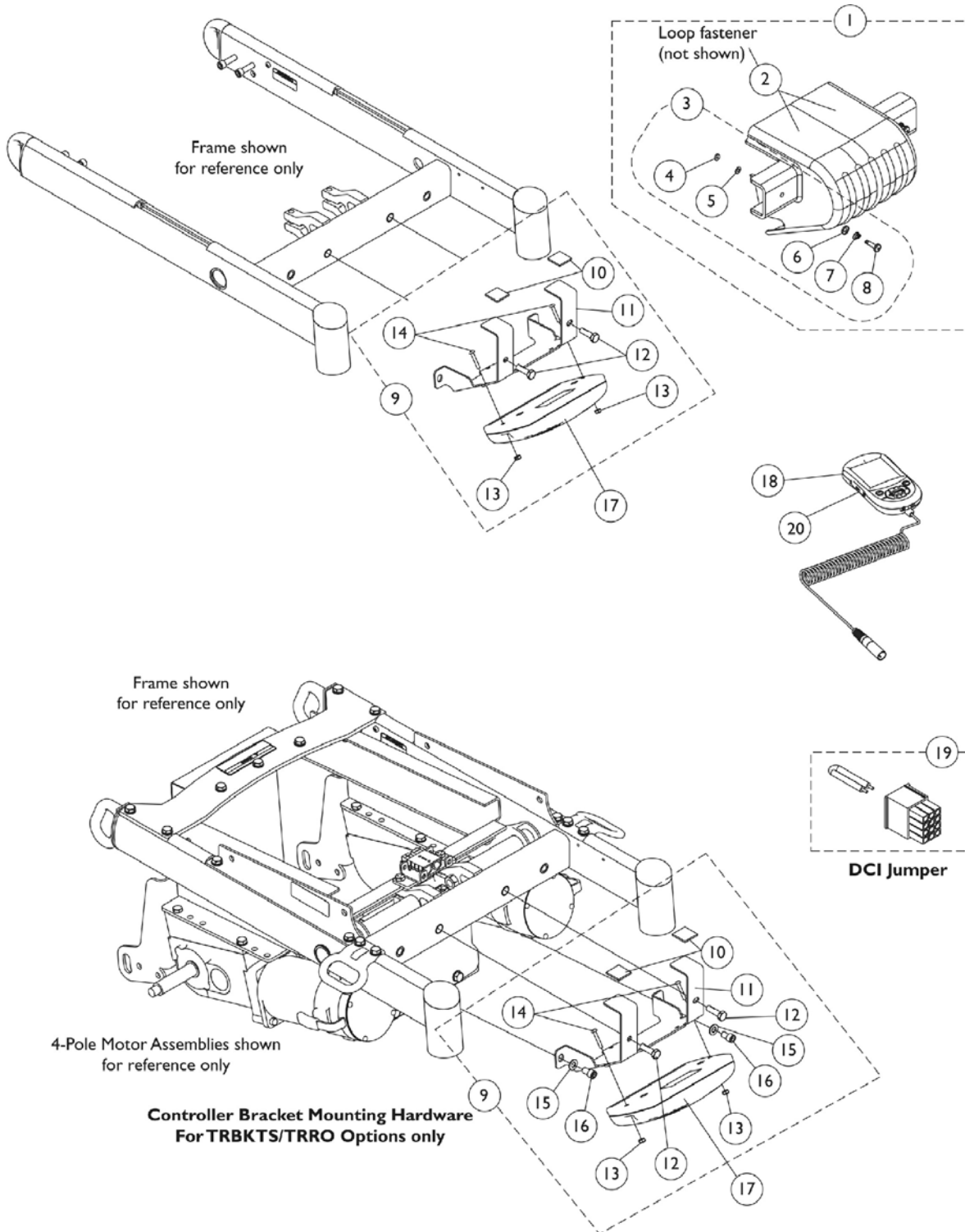
Controller, Programmer, and Mounting Hardware - Pronto M91/Pronto M94

MK6i electronics are used on Pronto M91 chairs with Rehab seats and all Pronto M94 chairs. Pronto M91 chairs that have Van seats use MK5 electronics. See Pronto M91 parts catalog for parts information.

Item Number	Note	Part Number	Description	Quantity Per	
				Package	Assembly
1		1136897	Controller, MK690	1	1
1	C,C1	1136898	Controller, MK690 w/ ACC	1	1
1	D	1148360-NLA	Controller, MK690 w/ ACC	1	1
2		1110665	Bracket, Controller Mounting, Black	1	1
3		1044939	Screw, Hex Head (5/16-18 x 1-3/4")	1	2
4		1056098	Locknut (#8-32)	1	2
5		1026158	Locknut (5/16-18)	1	2
6		1127352	Screw, Phillips Pan Head (#8-32 x 1")	1	2
7		1139985	Programmer, MK6i	1	1
7		1142215	Kit, MK6i Programmer w/ SD Professional Card & Card Holder (1813M6)	1	1
8	B	1140125	Jumper, DCI	1	1
9		1139997	Cover, SD Card Slot	1	1
	A	1095502	Package, Cable Tie (11-1/2" L)	10	1

NOTE: A - Not Shown
 B - DCI Jumper is used when an MPJ+ Joystick is used
 C - Part # 1136898 is used when a PTO Plus Powered Seating System is ordered and all Base Only orders. When a customer request part # 1136898 for a Base Only order that shipped before 1/19/07,
 C1 - part #1148360 is no longer required as a replacement because the software for part #1136898 was revised 9/12/07 to version 2.61a and now accommodates all Base Only orders that shipped before 1/19/07 as well.
 D - Used for all Base Only orders. Discontinued 9/12/07, see part #1136898 as a direct replacement.

Controller, Programmer, Shroud Cover & Mounting Hardware - 3G Storm w/ 4 Pole Motors Non-Powered Seating

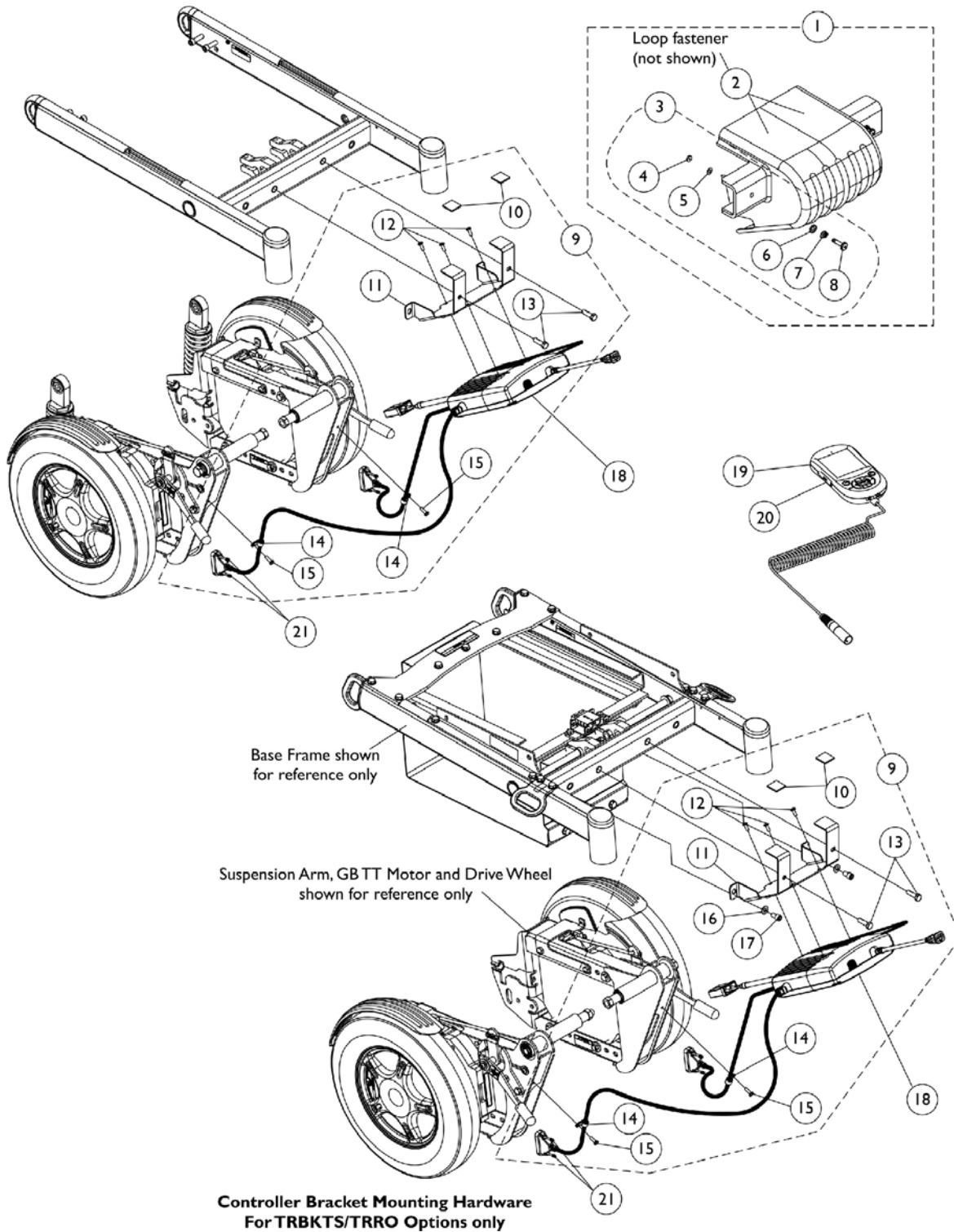


Controller, Programmer, Shroud Cover & Mounting Hardware - 3G Storm w/ 4 Pole Motors Non-Powered Seating

Item Number	Note	Part Number	Description	Quantity Per	
				Package	Assembly
1	A	1104839	Kit, Controller Shroud w/ Hardware	1	1
2		1079246	Fastener, Loop Adhesive Back (1" W x 3" L)	1	2
3	B	1104706	Kit, Controller Shroud Mounting Hardware (Pair)	1	1
4		1110509	Retainer, Stud (1/4" Turn)	1	2
5		1070580	Washer, Nylon Retainer (1/4 x 1/2 x 1/32")	1	2
6		1070581	Washer, Nylon Cupped (9/32 x 19/32 x 3/32")	1	2
7		1093312	Spring, Torsion Ejector	1	2
8		1110508	Stud, Phillips Recess (1/4" Dia. x 1" Long)	1	2
9	C	1145380	Kit, Controller Bracket Mounting Hardware	1	1
10			Fastener, Hook with Adhesive Back (1" W x 1" L)	1	2
11			Bracket, Controller Mounting, Black	1	1
12			Screw, Hex Head Cap w/ Patch (5/16-18 x 1")	1	2
13			Locknut (#8-32)	1	2
14			Screw, Phillips Pan Head (#8-32 x 1")	1	2
9	F	1147373	Kit, Controller Bracket Mounting Hardware (For TRBKTS/TRRO Option)	1	1
10			Fastener, Hook with Adhesive Back (1" W x 1" L)	1	2
11			Bracket, Controller Mounting, Black	1	1
12			Screw, Hex Head Cap w/ Patch (5/16-18 x 1")	1	2
13			Locknut (#8-32)	1	2
14			Screw, Phillips Pan Head (#8-32 x 1")	1	2
15			Washer, Flat (5/16 x 5/8 x 1/16")	1	2
16			Screw, Socket Head Cap (5/16-18 x 1/2")	1	2
17		1136897	Controller, MK690	1	1
17	G,G1	1136898	Controller, MK690 w/ ACC	1	1
17	H	1148360-NLA	Controller, MK690 w/ ACC	1	1
18		1139985	Programmer, MK6i	1	1
18		1142215	Kit, MK6i Programmer w/ SD Professional Card & Card Holder (1813M6)	1	1
19	E	1140125	Jumper, DCI	1	1
20		1139997	Cover, SD Card Slot	1	1
	D	1095502	Package, Cable Tie (11-1/2" L)	10	1

NOTE: A - Includes shroud cover and items 2-3.
 B - Includes items 4-8.
 C - Includes items 10-14.
 D - Not Shown
 E - DCI Jumper is used when an MPJ+ Joystick is used
 F - Includes items 10-16
 G - Part # 1136898 is used for all Base Only orders. When a customer request part # 1136898 for a Base Only order that shipped before 1/19/07,
 G1 - part #1148360 is no longer required as a replacement because the software for part #1136898 was revised 9/12/07 to version 2.61a and now accommodates all Base Only orders that shipped before 1/19/07 as well.
 H - Used for all Base Only orders. Discontinued 9/12/07, see part #1136898 as a direct replacement.

Controller, Programmer, Shroud Cover & Mounting Hardware - 3G Storm w/ GB TT Motors Non-Powered Seating

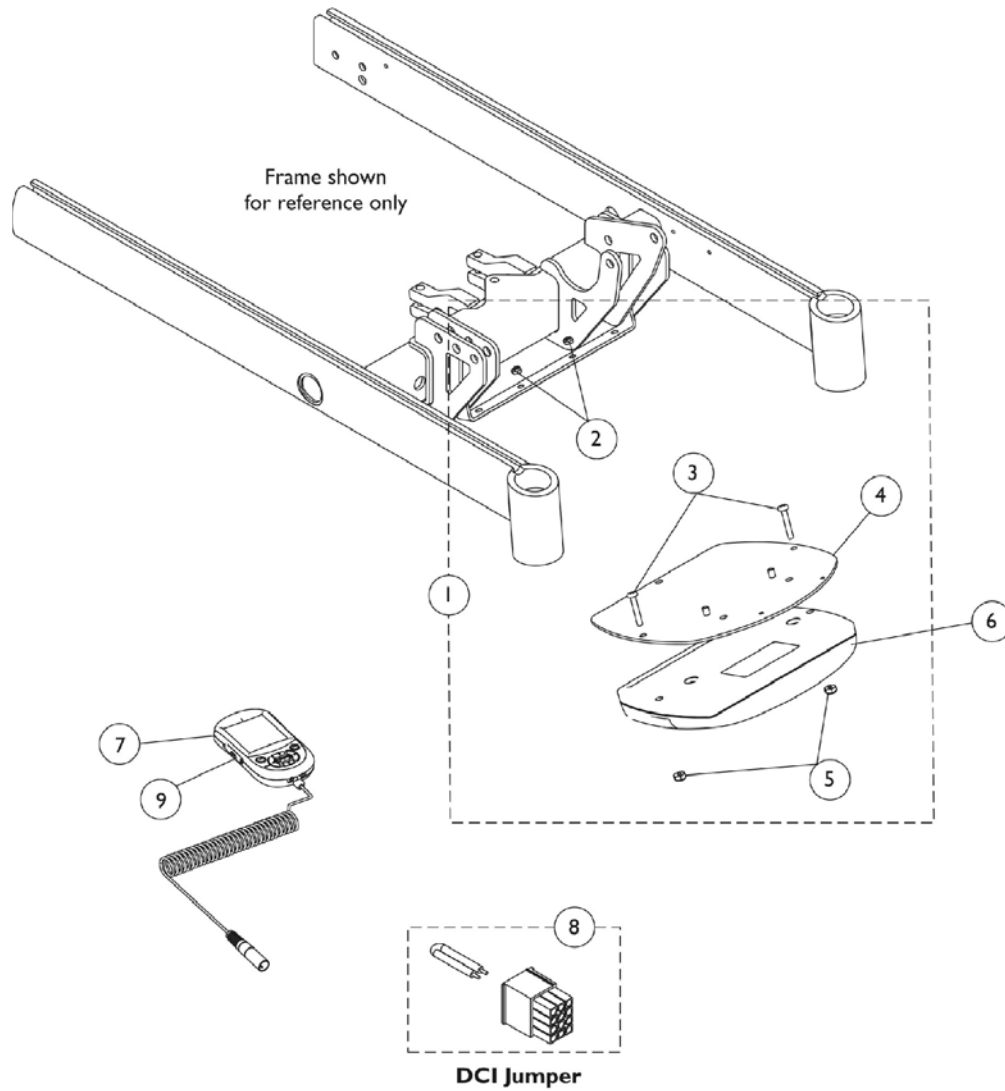


Controller, Programmer, Shroud Cover & Mounting Hardware - 3G Storm w/ GB TT Motors Non-Powered Seating

Item Number	Note	Part Number	Description	Quantity Per	
				Package	Assembly
1	A	1104839	Kit, Controller Shroud w/ Hardware	1	1
2		1079246	Fastener, Loop Adhesive Back (1" W x 3" L)	1	2
3	B	1104706	Kit, Controller Shroud Mounting Hardware (Pair)	1	1
4		1110509	Retainer, Stud (1/4" Turn)	1	2
5		1070580	Washer, Nylon Retainer (1/4 x 1/2 x 1/32")	1	2
6		1070581	Washer, Nylon Cupped (9/32 x 19/32 x 3/32")	1	2
7		1093312	Spring, Torsion Ejector	1	2
8		1110508	Stud, Phillips Recess (1/4" Dia. x 1" Long)	1	2
9	C	1145386	Kit, Controller Bracket Mounting Hardware	1	1
10			Fastener, Hook with Adhesive Back (1" W x 1" L)	1	2
11			Bracket, Controller Mounting, Black	1	1
12			Screw, Phillips Pan Head w/ Patch (#10-32 x 1/2")	1	3
13			Screw, Hex Head Cap w/ Patch (5/16-18 x 1")	1	2
14			Clamp, Cable (9/16")	1	2
15			Screw, Phillips Pan Head (#10-32 x 5/8")	1	2
9	C	1142210	Kit, Controller Bracket Mounting Hardware (For TRRO/TRBKTS Options)	1	1
10			Fastener, Hook with Adhesive Back (1" W x 1" L)	1	2
11			Bracket, Controller Mounting, Black	1	1
12			Screw, Phillips Pan Head w/ Patch (#10-32 x 1/2")	1	3
13			Screw, Hex Head Cap w/ Patch (5/16-18 x 1")	1	2
14			Clamp, Cable (9/16")	1	2
15			Screw, Phillips Pan Head (#10-32 x 5/8")	1	2
16			Washer, Flat (5/16 x 5/8 x 1/16")	1	2
17			Screw, Socket Head Cap (5/16-18 x 1/2")	1	2
18	F	1134213	Controller w/ Gasket Connectors, MK6i GB TT RWD	1	1
19		1139985	Programmer, MK6i	1	1
19		1142215	Kit, MK6i Programmer w/ SD Professional Card & Card Holder (1813M6)	1	1
20		1139997	Cover, SD Card Slot	1	1
21		1159217	Package, Thumb Screw (1-1/2" L)	10	1
	E	1095502	Package, Cable Tie (11-1/2" L)	10	1
	E,G,G1	1134214	Kit, GB HD Controller Gasket Connector	1	1

NOTE: A - Includes shroud cover and items 2-3
B - Includes items 4-8
C - Includes items 10-15
E - Not Shown
F - Controller will include Gasket Connectors created 10/26/07 that will be attached to the motor cables. Part number on controller will reference 1140040, always order 1134213 as a service parts replacement
G - Kit was created 10/26/07 and attaches to the controller motor cables. Includes 2 ea. GB HD Controller Gasket Connectors, 2 ea. Silicon Lubricant Packets, 1 ea. Instruction Sheet. Individual components are non-saleable.
G1 - The kit can retrofit to existing GB HD controllers in the field

Controller, Programmer, and Mounting Hardware - 3G Storm w/ 4 Pole Motors & PTO Seating

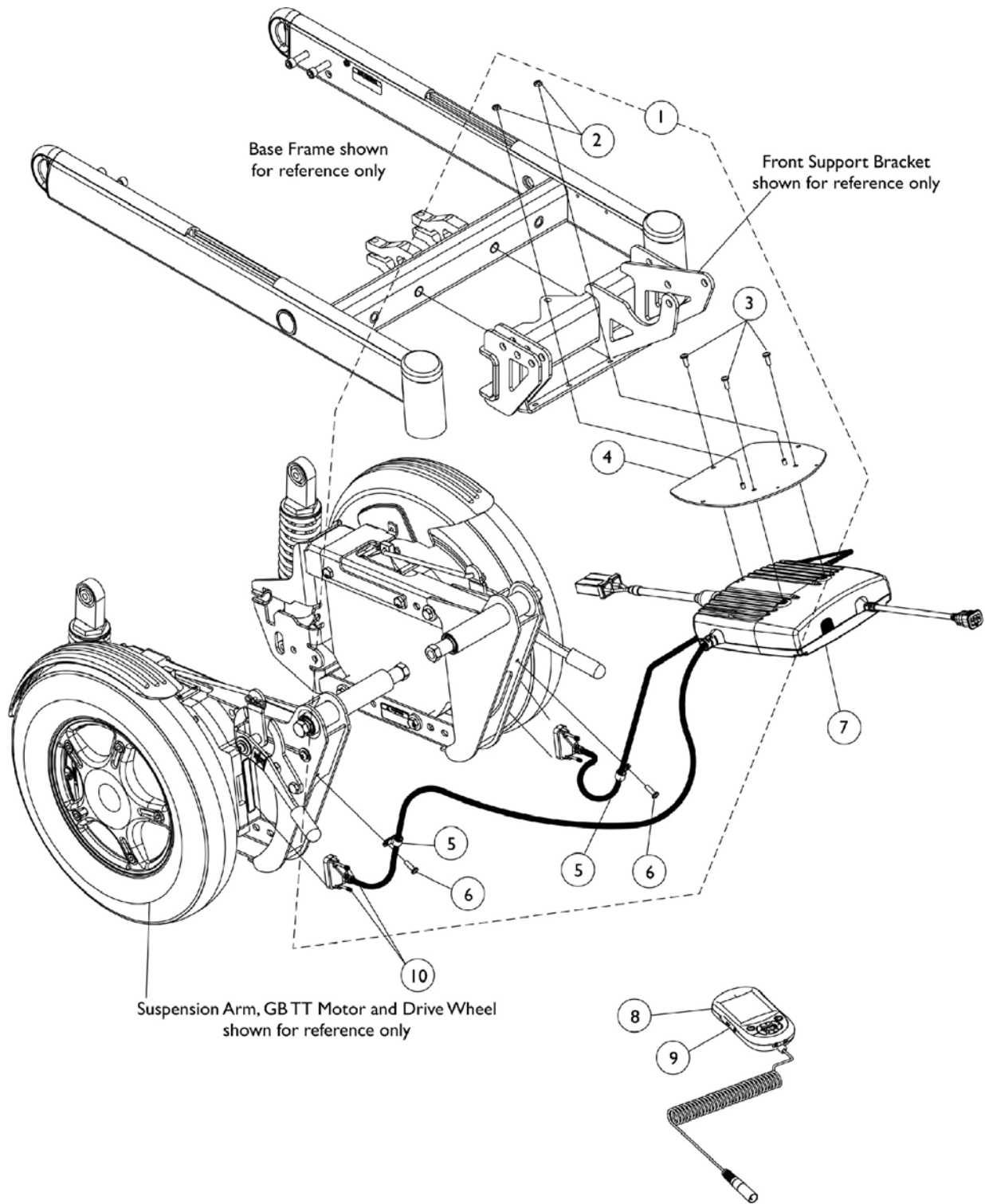


Controller, Programmer, and Mounting Hardware - 3G Storm w/ 4 Pole Motors & PTO Seating

Item Number	Note	Part Number	Description	Quantity Per	
				Package	Assembly
1	A	1145384	Kit, Controller Bracket with Hardware	1	1
2			Locknut (#10-32)	1	2
3			Screw, Phillips Pan Head (#8-32 x 1")	1	2
4			Bracket, Controller Mounting, Black	1	1
5			Locknut (#8-32)	1	2
6		1136898	Controller, MK690 w/ ACC	1	1
7		1139985	Programmer, MK6i	1	1
7		1142215	Kit, MK6i Programmer w/ SD Professional Card & Card Holder (1813M6)	1	1
8	C	1140125	Jumper, DCI	1	1
9		1139997	Cover, SD Card Slot	1	1
	B	1095502	Package, Cable Tie (11-1/2" L)	10	1

NOTE: A - Includes items 2-5.
 B - Not Shown
 C - DCI Jumper is used when an MPJ+ Joystick is used

Controller, Programmer and Mounting Hardware - 3G Storm w/ GB TT Motors & PTO Seating

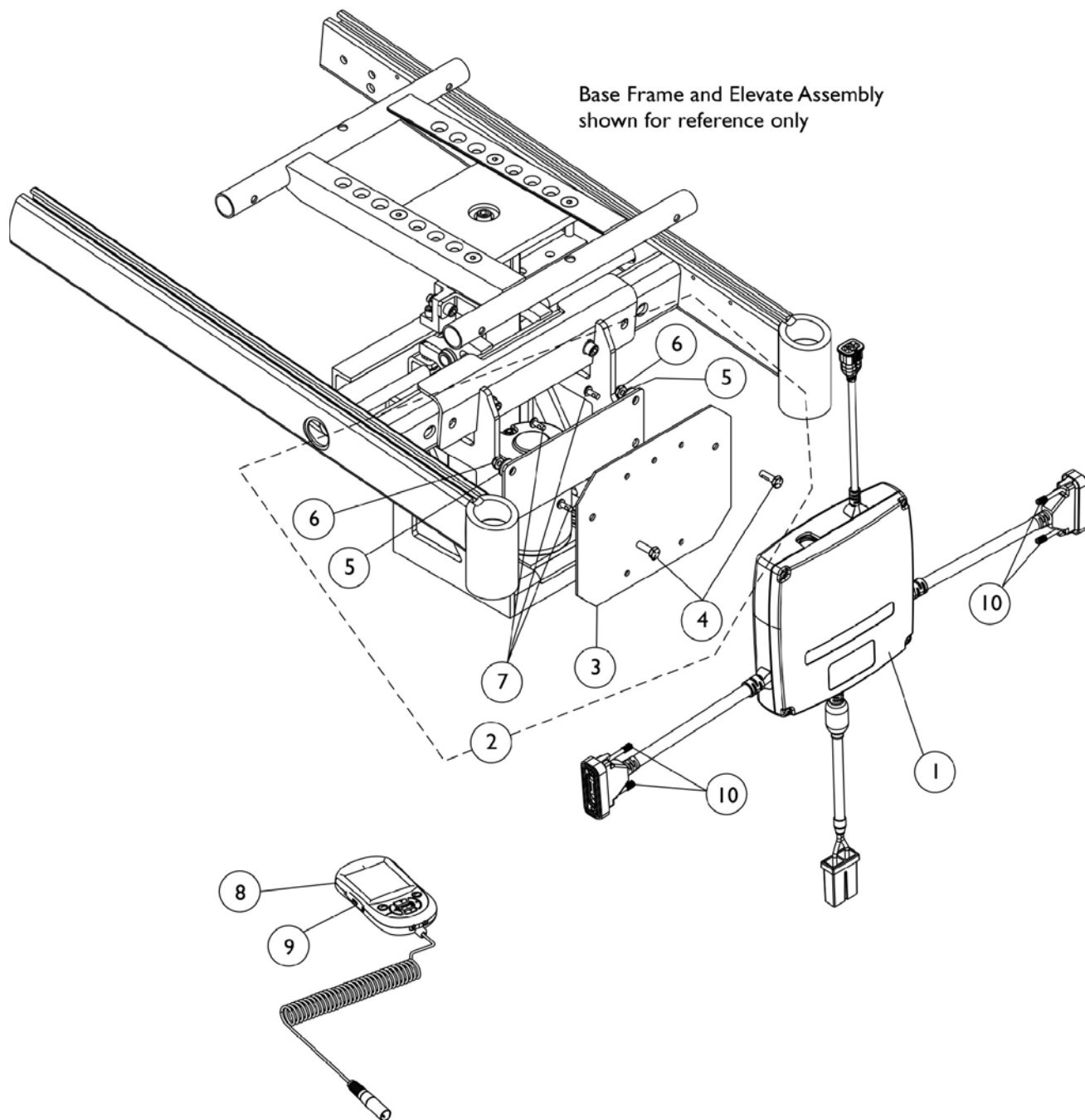


Controller, Programmer and Mounting Hardware - 3G Storm w/ GB TT Motors & PTO Seating

Item Number	Note	Part Number	Description	Quantity Per	
				Package	Assembly
1	A	1145387	Kit, Controller Bracket Mounting Hardware	1	1
2			Locknut (#10-32)	1	2
3			Screw, Phillips Pan Head w/ Patch (#10-32 x 1/2")	1	3
4			Bracket, Controller Mounting, Black	1	1
5			Clamp, Cable (9/16")	1	2
6			Screw, Phillips Pan Head (#10-32 x 5/8")	1	2
7	C	1134213	Controller w/ Gasket Connectors, MK6i GB TT RWD	1	1
8		1139985	Programmer, MK6i	1	1
8		1142215	Kit, MK6i Programmer w/ SD Professional Card & Card Holder (1813M6)	1	1
9		1139997	Cover, SD Card Slot	1	1
10		1159217	Package, Thumb Screw (1-1/2" L)	10	1
	B	1095502	Package, Cable Tie (11-1/2" L)	10	1
	B,D,D1	1134214	Kit, GB HD Controller Gasket Connector	1	1

NOTE: A - Includes items 2-6
 B - Not Shown
 C - Controller will include Gasket Connectors created 10/26/07 that will be attached to the motor cables. Part number on controller will reference 1140040, always order 1134213 as a service parts replacement
 D - Kit was created 10/26/07 and attaches to the controller motor cables. Includes 2 ea. GB HD Controller Gasket Connectors, 2 ea. Silicon Lubricant Packets, 1 ea. Instruction Sheet. Individual components are non-saleable.
 D1 - The kit can retrofit to existing GB HD controllers in the field

Controller, Programmer & Mounting Hardware - 3G Storm w/ GB TT Motors & Formula CG Elevate

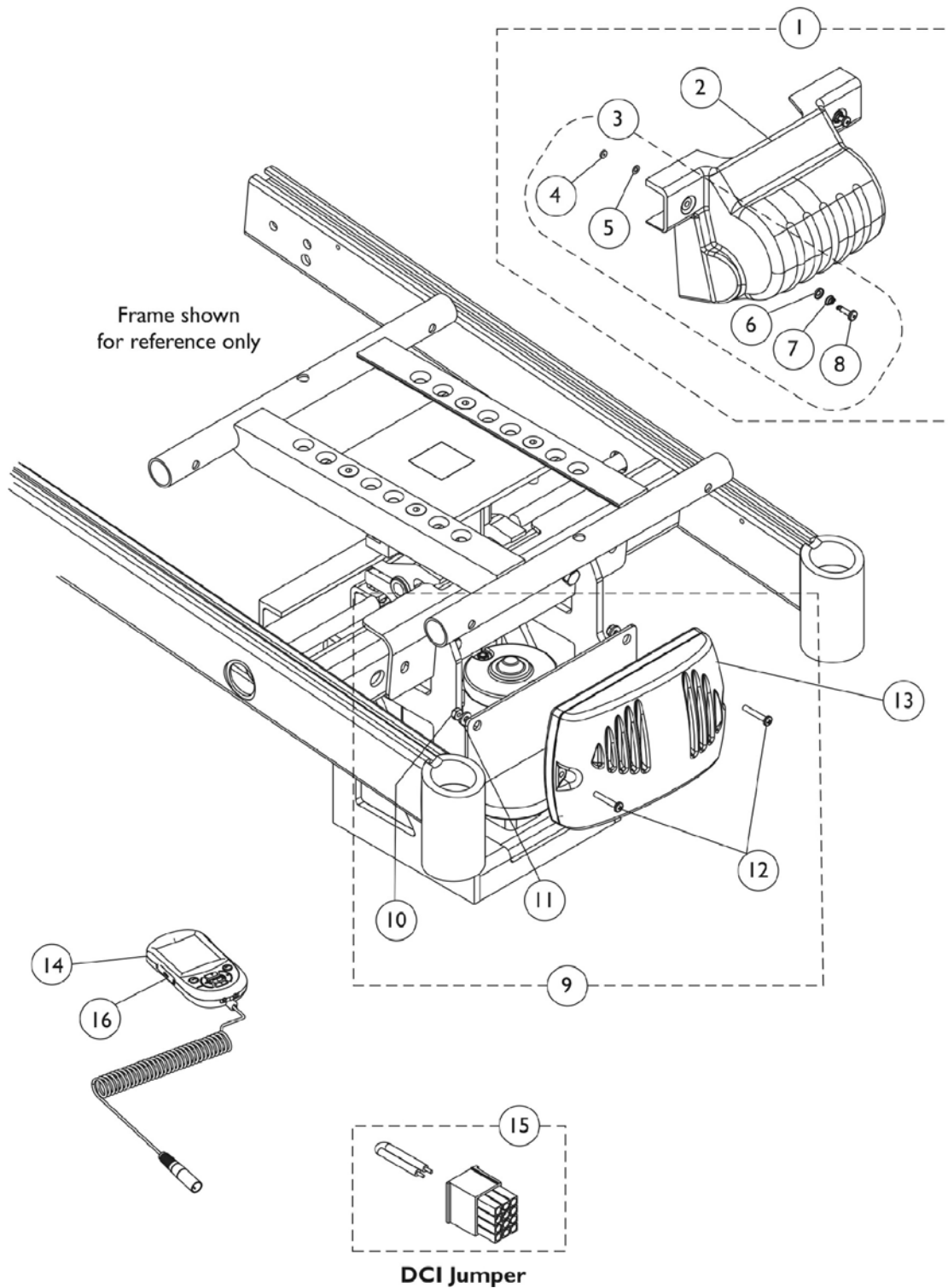


Controller, Programmer & Mounting Hardware - 3G Storm w/ GB TT Motors & Formula CG Elevate

Item Number	Note	Part Number	Description	Quantity Per	
				Package	Assembly
1	A	1134213	Controller w/ Gasket Connectors, MK6i GB TT RWD	1	1
2	B	1151800	Kit, GB HD Controller Mounting Hardware	1	1
3			Plate, GB HD Controller Mounting	1	1
4			Screw, Hex Head (1/4-20 x 3/4")	1	2
5			Washer (1/4 x 23/32 x 1/16")	1	2
6			Locknut (1/4-20)	1	2
7			Screw, Phillips Pan Head w/ Patch (#10-32 x 1/2")	1	3
8		1139985	Programmer, MK6i	1	1
8		1142215	Kit, MK6i Programmer w/ SD Professional Card & Card Holder (1813M6)	1	1
9		1139997	Cover, SD Card Slot	1	1
10		1159217	Package, Thumb Screw (1-1/2" L)	10	1
	C	1095502	Package, Cable Tie (11-1/2" L)	10	1
	C,D,D1	1134214	Kit, GB HD Controller Gasket Connector	1	1

NOTE: A - Controller will include Gasket Connectors created 10/26/07 that will be attached to the motor cables. Part number on controller will reference 1140040, always order 1134213 as a service parts replacement
 B - Includes items 3-7
 C - Not Shown
 D - Kit was created 10/26/07 and attaches to the controller motor cables. Includes 2 ea. GB HD Controller Gasket Connectors, 2 ea. Silicon Lubricant Packets, 1 ea. Instruction Sheet. Individual components are non-saleable.
 D1 - The kit can retrofit to existing GB HD controllers in the field

Controller, Programmer, Shroud Cover & Mounting Hardware - 3G Storm w/ 4 Pole Motors & Formula CG Elevate



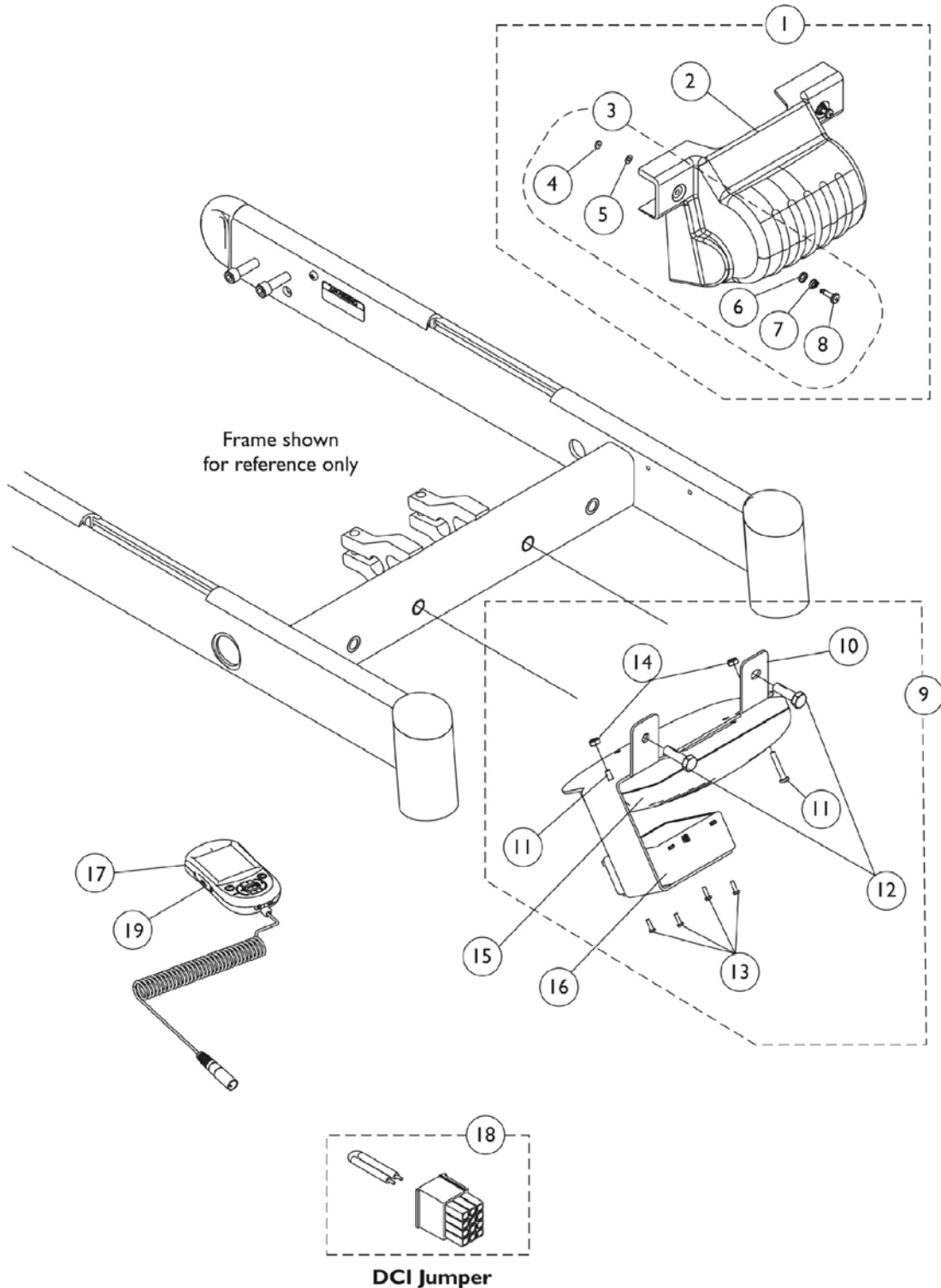
Controller, Programmer, Shroud Cover & Mounting Hardware - 3G Storm w/ 4 Pole Motors & Formula CG Elevate

Item Number	Note	Part Number	Description	Quantity Per			
				Package	Assembly		
1	A	1144784	Kit, Controller Shroud with Hardware	1	1		
2			Shroud, Controller	1	1		
4			Retainer, Stud (1/4" Turn)	1	2		
5			Washer, Nylon Retainer (1/4 x 1/2 x 1/32")	1	2		
6			Washer, Nylon Cupped (9/32 x 19/32 x 3/32")	1	2		
7			Spring, Torsion Ejector	1	2		
8			Stud, Phillips Recess (1/4" Dia. x 1" Long)	1	2		
3			B	1104706	Kit, Controller Shroud Mounting Hardware (Pair)	1	1
4	Retainer, Stud (1/4" Turn)	1			2		
5	Washer, Nylon Retainer (1/4 x 1/2 x 1/32")	1			2		
6	Washer, Nylon Cupped (9/32 x 19/32 x 3/32")	1			2		
7	Spring, Torsion Ejector	1			2		
8	Stud, Phillips Recess (1/4" Dia. x 1" Long)	1			2		
9	C	1145570			Kit, Controller Mounting Hardware	1	1
10					Locknut (#8-32)	1	2
11			Washer (3/16 x 7/16 x 1/16")	1	2		
12			Screw, Phillips Pan Head (#8-32 x 1")	1	2		
13			1136898	Controller, MK690 w/ ACC	1	1	
14			1139985	Programmer, MK6i	1	1	
14			1142215	Kit, MK6i Programmer w/ SD Professional Card & Card Holder (1813M6)	1	1	
15			E	1140125	Jumper, DCI	1	1
16	1139997	Cover, SD Card Slot			1	1	
	D	1095502	Package, Cable Tie (11-1/2" L)	10	1		

NOTE: A - Includes items 2 and 3.
 B - Includes items 4-8.
 C - Includes items 10-12.
 D - Not Shown
 E - DCI Jumper is used when an MPJ+ Joystick is used

Controller, Programmer, Shroud Cover, MK6i TRAM & Mtg. Hdw. - 3G Storm w/ 4 Pole Motors and Formula CG

NOTE: After 12/9/07 the TRAM Module was relocated next to the Recline Actuator Conventional Motor for Tilt/Recline & Recline Only systems



Controller, Programmer, Shroud Cover, MK6i TRAM & Mtg. Hdwr. - 3G Storm w/ 4 Pole Motors and Formula CG

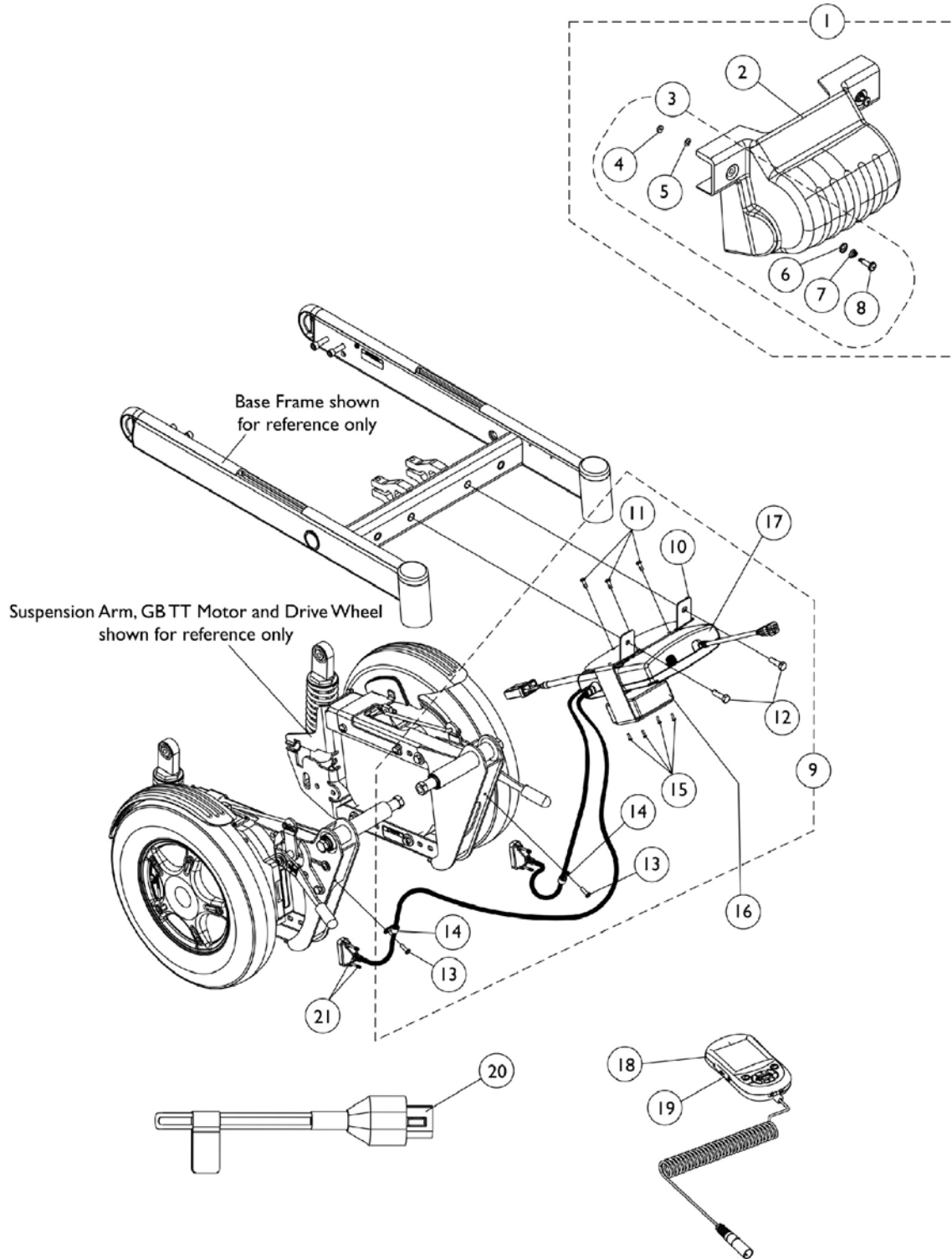
NOTE: After 12/9/07 the TRAM Module was relocated next to the Recline Actuator Conventional Motor for Tilt/Recline & Recline Only systems

Item Number	Note	Part Number	Description	Quantity Per	
				Package	Assembly
1	A	1144784	Kit, Controller Shroud with Hardware	1	1
2			Shroud, Controller	1	1
4			Retainer, Stud (1/4" Turn)	1	2
5			Washer, Nylon Retainer (1/4 x 1/2 x 1/32")	1	2
6			Washer, Nylon Cupped (9/32 x 19/32 x 3/32")	1	2
7			Spring, Torsion Ejector	1	2
8			Stud, Phillips Recess (1/4" Dia. x 1" Long)	1	2
3	B	1104706	Kit, Controller Shroud Mounting Hardware (Pair)	1	1
4		1110509	Retainer, Stud (1/4" Turn)	1	2
5		1070580	Washer, Nylon Retainer (1/4 x 1/2 x 1/32")	1	2
6		1070581	Washer, Nylon Cupped (9/32 x 19/32 x 3/32")	1	2
7		1093312	Spring, Torsion Ejector	1	2
8		1110508	Stud, Phillips Recess (1/4" Dia. x 1" Long)	1	2
9	C	1145381	Kit, Controller Bracket with Hardware	1	1
10			Bracket, Controller Mounting, Black	1	1
11			Locknut (#8-32)	1	2
12			Screw, Hex Head Cap w/ Patch (5/16-18 x 1")	1	2
13			Screw, Phillips Pan Head (#4-40 x 3/8")	1	4
14			Locknut (#8-32)	1	2
15		1136898	Controller, MK690 w/ ACC	1	1
16		1140098	Module, Tilt Recline Actuator (TRAM) - MK6i	1	1
17		1139985	Programmer, MK6i	1	1
17		1142215	Kit, MK6i Programmer w/ SD Professional Card & Card Holder (1813M6)	1	1
18	E	1140125	Jumper, DCI	1	1
19		1139997	Cover, SD Card Slot	1	1
	D	1095502	Package, Cable Tie (11-1/2" L)	10	1
	F	1101400	Harness, ELRPW Power Legrest - Right	1	1

NOTE: A - Includes items 2 and 3.
 B - Includes items 4-8.
 C - Includes items 10-14.
 D - Not Shown
 E - DCI Jumper is used when an MPJ+ Joystick is used
 F - Not Shown. ELRPW Power Legrest Harness part #1101400 is used to connect between the TRAM Module and the Tilt Actuator as well

Controller, Programmer, Shroud Cover, MK6i TRAM & Mtg. Hdwr. - 3G Storm w/ GB TT Motors and Formula CG

NOTE: After 12/9/07 the TRAM Module was relocated next to the Recline Actuator Conventional Motor for Tilt/Recline & Recline Only systems. Tilt Only Systems with Conventional Tilt Actuator Motors use a GTAM module in place of the TRAM module also.



Controller, Programmer, Shroud Cover, MK6i TRAM & Mtg. Hdwr. - 3G Storm w/ GB TT Motors and Formula CG

NOTE: After 12/9/07 the TRAM Module was relocated next to the Recline Actuator Conventional Motor for Tilt/Recline & Recline Only systems. Tilt Only Systems with Conventional Tilt Actuator Motors use a GTAM module in place of the TRAM module also.

Item Number	Note	Part Number	Description	Quantity Per	
				Package	Assembly
1	A	1144784	Kit, Controller Shroud with Hardware	1	1
2			Shroud, Controller	1	1
4			Retainer, Stud (1/4" Turn)	1	2
5			Washer, Nylon Retainer (1/4 x 1/2 x 1/32")	1	2
6			Washer, Nylon Cupped (9/32 x 19/32 x 3/32")	1	2
7			Spring, Torsion Ejector	1	2
8			Stud, Phillips Recess (1/4" Dia. x 1" Long)	1	2
3	B	1104706	Kit, Controller Shroud Mounting Hardware (Pair)	1	1
4		1110509	Retainer, Stud (1/4" Turn)	1	2
5		1070580	Washer, Nylon Retainer (1/4 x 1/2 x 1/32")	1	2
6		1070581	Washer, Nylon Cupped (9/32 x 19/32 x 3/32")	1	2
7		1093312	Spring, Torsion Ejector	1	2
8		1110508	Stud, Phillips Recess (1/4" Dia. x 1" Long)	1	2
9	C	1145385	Kit, Controller Bracket Mounting Hardware	1	1
10			Bracket, Controller Mounting, Black	1	1
11			Screw, Phillips Pan Head w/ Patch (#10-32 x 1/2")	1	3
12			Screw, Hex Head Cap w/ Patch (5/16-18 x 1")	1	2
13			Screw, Phillips Pan Head (#10-32 x 5/8")	1	2
14			Clamp, Cable (9/16")	1	2
15			Screw, Phillips Pan Head (#4-40 x 3/8")	1	4
16	D,D1	1140098	Module, Tilt Recline Actuator (TRAM) - MK6i	1	1
17	F	1134213	Controller w/ Gasket Connectors, MK6i GB TT RWD	1	1
18		1139985	Programmer, MK6i	1	1
18		1142215	Kit, MK6i Programmer w/ SD Professional Card & Card Holder (1813M6)	1	1
19		1139997	Cover, SD Card Slot	1	1
20	D	1142223	Plug Assembly, Max Angle Shorting	1	1
21		1159217	Package, Thumb Screw (1-1/2" L)	10	1
	E	1095502	Package, Cable Tie (11-1/2" L)	10	1
	G,E	1134214	Kit, GB HD Controller Gasket Connector	1	1
	H	1101400	Harness, ELRPW Power Legrest - Right	1	1

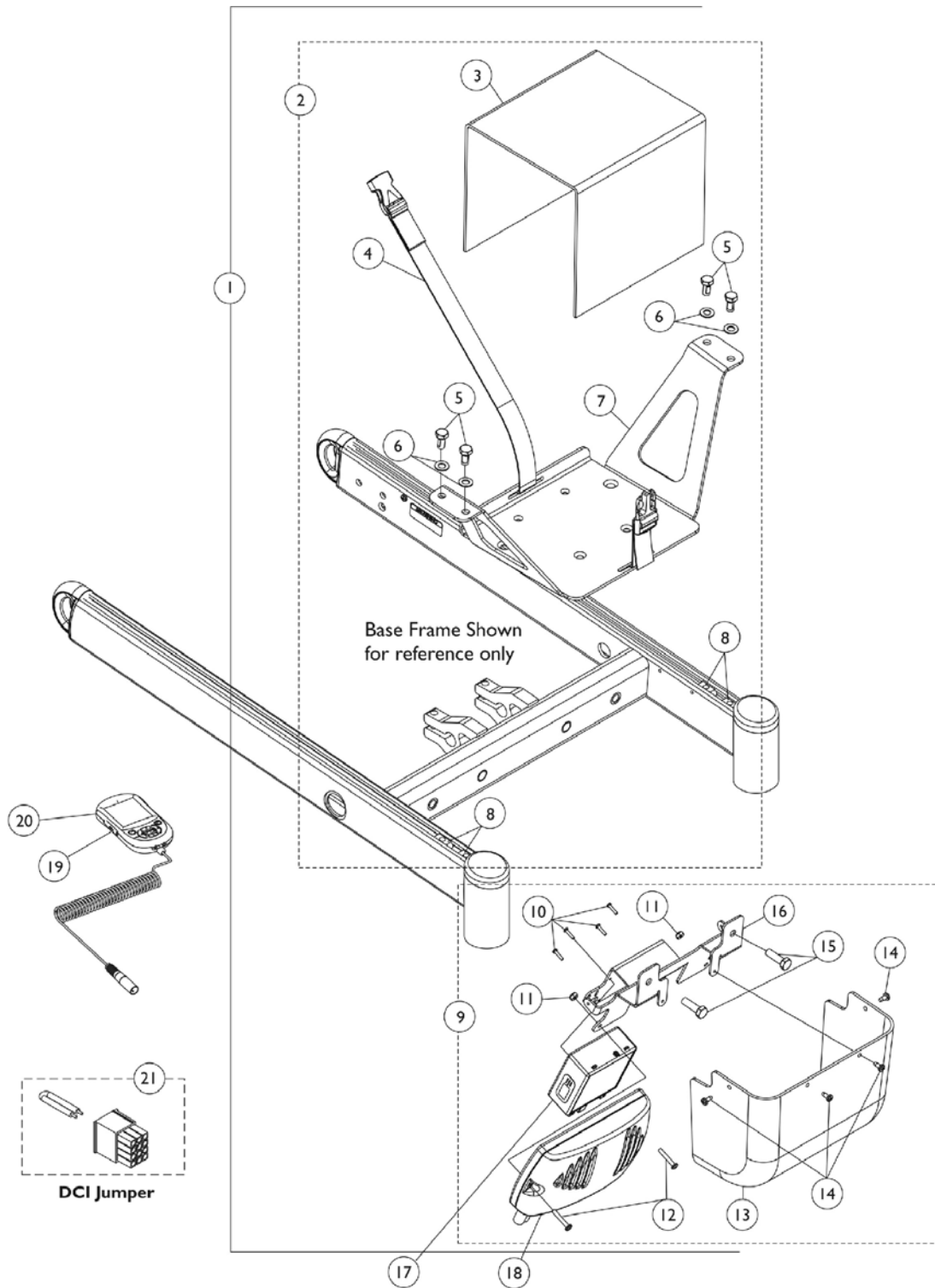
Controller, Programmer, Shroud Cover, MK6i TRAM & Mtg. Hdwr. - 3G Storm w/ GB TT Motors and Formula CG

NOTE: After 12/9/07 the TRAM Module was relocated next to the Recline Actuator Conventional Motor for Tilt/Recline & Recline Only systems. Tilt Only Systems with Conventional Tilt Actuator Motors use a GTAM module in place of the TRAM module also.

NOTE: A - Includes items 2 and 3
B - Includes items 4-8
C - Includes items 10-15
D - Max Angle Shorting Plug Assembly plugs into the Max Angle Connector on the TRAM module to close the circuit. Only the Tilt Sensor Connector is used. This applies to a Conventional Tilt Actuator only.
D1 - Max Angle Shorting Plug is not used with the GTAM that replaced the TRAM for (CGT) with GB motors.
E - Not Shown
F - Controller will include Gasket Connectors created 10/26/07 that will be attached to the motor cables. Part number on controller will reference 1140040, always order 1134213 as a service parts replacement
G - Kit was created 10/26/07 and attaches to the controller motor cables. Includes 2 ea. GB HD Controller Gasket Connectors, 2 ea. Silicon Lubricant Packets, 1 ea. Instruction Sheet. Individual components are non-saleable.
H - Not Shown. ELRPW Power Legrest Harness part #1101400 is used to connect between the TRAM Module and a Conventional Tilt Actuator as well.

Controller, Programmer, Shroud Cover, MK6i TRAM & Mtg. Hdwr. - 3G Storm w/ 4 Pole Motors & Formula CG w/ Vent

NOTE: After 12/9/07 the TRAM Module was relocated next to the Recline Actuator Conventional Motor for Tilt/Recline & Recline Only systems



Controller, Programmer, Shroud Cover, MK6i TRAM & Mtg. Hdwr. - 3G Storm w/ 4 Pole Motors & Formula CG w/ Vent

NOTE: After 12/9/07 the TRAM Module was relocated next to the Recline Actuator Conventional Motor for Tilt/Recline & Recline Only systems

Item Number	Note	Part Number	Description	Quantity Per	
				Package	Assembly
1	A	1146618	Kit, Vent Battery Tray, MK690 w/ ACC Controller & MK6i TRAM Mtg Hdwr	1	1
3			Shroud, Vent Battery	1	1
4			Battery Strap Assembly	1	1
5			Screw, Hex Head (5/16-18 x 5/8")	1	4
6			Washer, Flat (5/16 x 5/8 x 1/16")	1	4
7			Tray, Vent Battery	1	1
8			T-Nut (5/16-18)	1	4
10			Screw, Phillips Pan Head (#4-40 x 1/2")	1	4
11			Locknut (#8-32)	1	2
12			Screw, Phillips Pan Head (#8-32 x 1")	1	2
13			Shroud, Controller Cover (for Vent Option)	1	1
14			Screw, Self Tapping Pan Head (#8-32 x 3/8")	1	4
15			Screw, Hex Head Cap w/ Patch (5/16-18 x 1")	1	2
16			Bracket, Mounting, Black (For Vent Option)	1	1
2	B	1148656	Kit, Vent Battery Tray w/ Hardware	1	1
3			Shroud, Vent Battery	1	1
4			Battery Strap Assembly	1	1
5			Screw, Hex Head (5/16-18 x 5/8")	1	4
6			Washer, Flat (5/16 x 5/8 x 1/16")	1	4
7			Tray, Vent Battery	1	1
8			T-Nut (5/16-18)	1	4
9	C	1148655	Kit, MK690 w/ ACC Controller/TRAM Mounting Bracket, Shroud Cover and Mounting Hardware	1	1
10			Screw, Phillips Pan Head (#4-40 x 1/2")	1	4
11			Locknut (#8-32)	1	2
12			Screw, Phillips Pan Head (#8-32 x 1")	1	2
13			Shroud, Controller Cover (for Vent Option)	1	1
14			Screw, Self Tapping Pan Head (#8-32 x 3/8")	1	4
15			Screw, Hex Head Cap w/ Patch (5/16-18 x 1")	1	2
16			Bracket, Mounting, Black (For Vent Option)	1	1
17		1140098	Module, Tilt Recline Actuator (TRAM) - MK6i	1	1
18		1136898	Controller, MK690 w/ ACC	1	1
19		1139985	Programmer, MK6i	1	1
19		1142215	Kit, MK6i Programmer w/ SD Professional Card & Card Holder (1813M6)	1	1
20		1139997	Cover, SD Card Slot	1	1
21	D	1140125	Jumper, DCI	1	1
	E	1101400	Harness, ELRPW Power Legrest - Right	1	1

Controller, Programmer, Shroud Cover, MK6i TRAM & Mtg. Hdwr. - 3G Storm w/ 4 Pole Motors & Formula CG w/ Vent

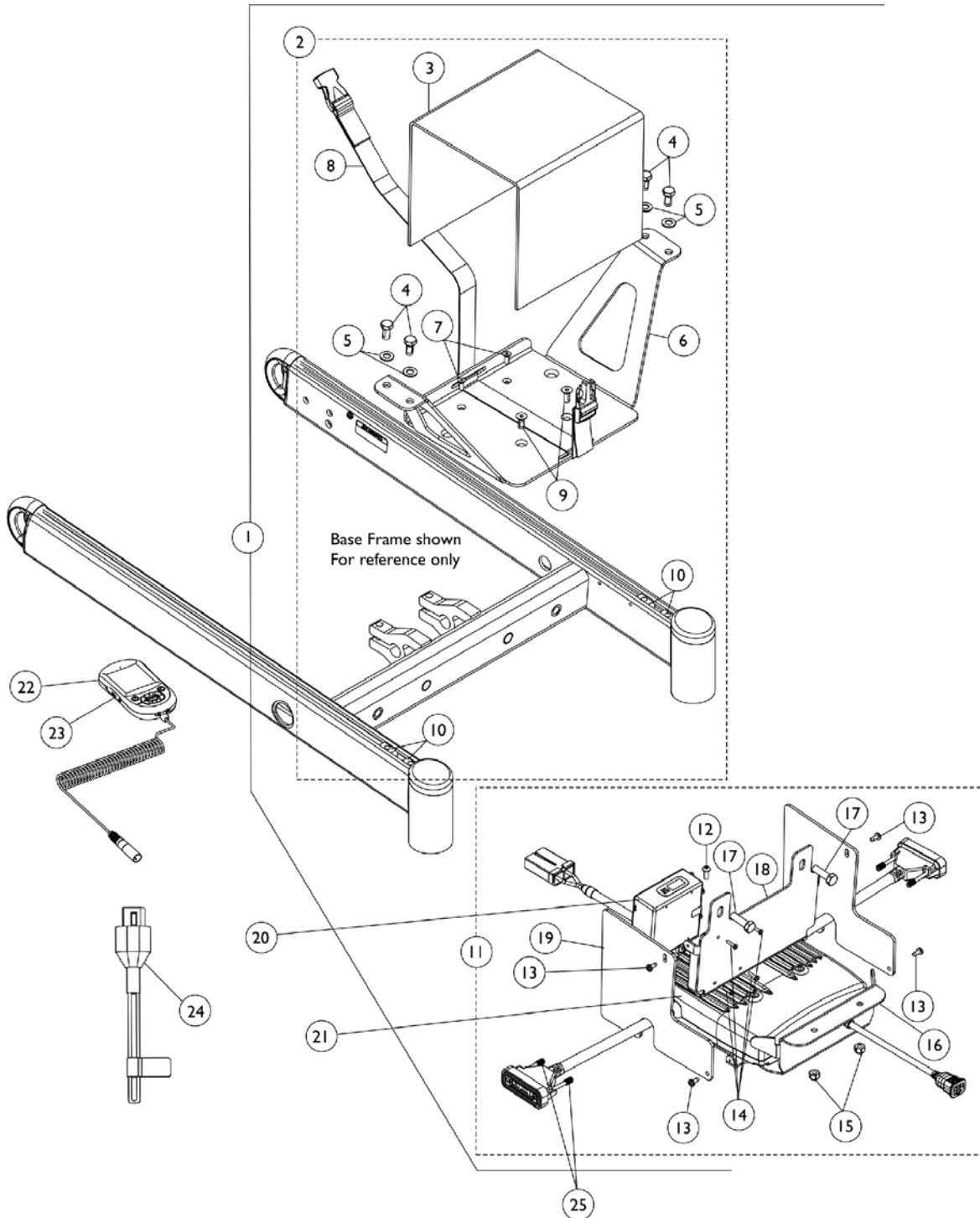
NOTE: After 12/9/07 the TRAM Module was relocated next to the Recline Actuator Conventional Motor for
Tilt/Recline & Recline Only systems

NOTE:	A - Includes items 3-8 and 10-16
	B - Includes items 3-8
	C - Includes items 10-16
	D - A DCI Jumper is used when an MPJ+ Joystick is used
	E - Not Shown. ELRPW Power Legrest Harness part #1101400 is used to connect between the TRAM Module and the Tilt Actuator as well

Controller, Programmer, Shrouds, MK6i TRAM & Mounting Hardware

3G Storm w/GB TT Motors and Formula CG w/ Vent

NOTE: After 12/9/07 the TRAM Module was relocated next to the Recline Actuator Conventional Motor for Tilt/Recline & Recline Only systems. Tilt Only Systems with Conventional Tilt Actuator Motors use a GTAM module in place of the TRAM module also.



Controller, Programmer, Shrouds, MK6i TRAM & Mounting Hardware

3G Storm w/GB TT Motors and Formula CG w/ Vent

NOTE: After 12/9/07 the TRAM Module was relocated next to the Recline Actuator Conventional Motor for Tilt/Recline & Recline Only systems. Tilt Only Systems with Conventional Tilt Actuator Motors use a GTAM module in place of the TRAM module also.

Item Number	Note	Part Number	Description	Quantity Per	
				Package	Assembly
1	A	1146625	Kit, Vent Battery Tray MK6i GB TT RWD Controller Mounting Hardware	1	1
3			Shroud, Vent Battery	1	1
4			Screw, Hex Head (5/16-18 x 5/8")	1	4
5			Washer, Flat (5/16 x 5/8 x 1/16")	1	4
6			Tray, Vent Battery	1	1
7			Screw, Socket Flat Head Countersunk (#10-32 x 1/2")	1	2
8			Battery Strap Assembly	1	1
9			Screw, Socket Flat Head Countersunk w/ Patch (1/4-20 x 5/8")	1	2
10			T-Nut (5/16-18)	1	4
12			Screw, Socket Button Head (#10-32 x 1/2")	1	1
13			Screw, Self Tapping Pan Head (#8-32 x 3/8")	1	4
14			Screw, Phillips Pan Head (#4-40 x 1/2")	1	4
15			Locknut (1/4-20)	1	2
16			Bracket, MK6i GB TT RWD Controller Mounting, Black (for Vent Option)	1	1
17			Screw, Hex Head Cap w/ Patch (5/16-18 x 1")	1	2
18			Bracket, MK6i GB TT RWD TRAM Mounting, Black (for Vent Option)	1	1
19			Shroud, MK6i GB TT RWD Controller/TRAM, Black (Vent Options)	1	2
2	B	1148657	Kit, Vent Battery Tray w/ Hardware - MK6i GB TT RWD	1	1
3			Shroud, Vent Battery	1	1
4			Screw, Hex Head (5/16-18 x 5/8")	1	4
5			Washer, Flat (5/16 x 5/8 x 1/16")	1	4
6			Tray, Vent Battery	1	1
7			Screw, Socket Flat Head Countersunk (#10-32 x 1/2")	1	2
8			Battery Strap Assembly	1	1
9			Screw, Socket Flat Head Countersunk w/ Patch (1/4-20 x 5/8")	1	2
10			T-Nut (5/16-18)	1	4
11	C	1148658	Kit, MK6i GB TT RWD Controller/TRAM Mounting Bracket, Shroud Covers and Mounting Hardware	1	1
12			Screw, Socket Button Head (#10-32 x 1/2")	1	1
13			Screw, Self Tapping Pan Head (#8-32 x 3/8")	1	4
14			Screw, Phillips Pan Head (#4-40 x 1/2")	1	4
15			Locknut (1/4-20)	1	2

Controller, Programmer, Shrouds, MK6i TRAM & Mounting Hardware

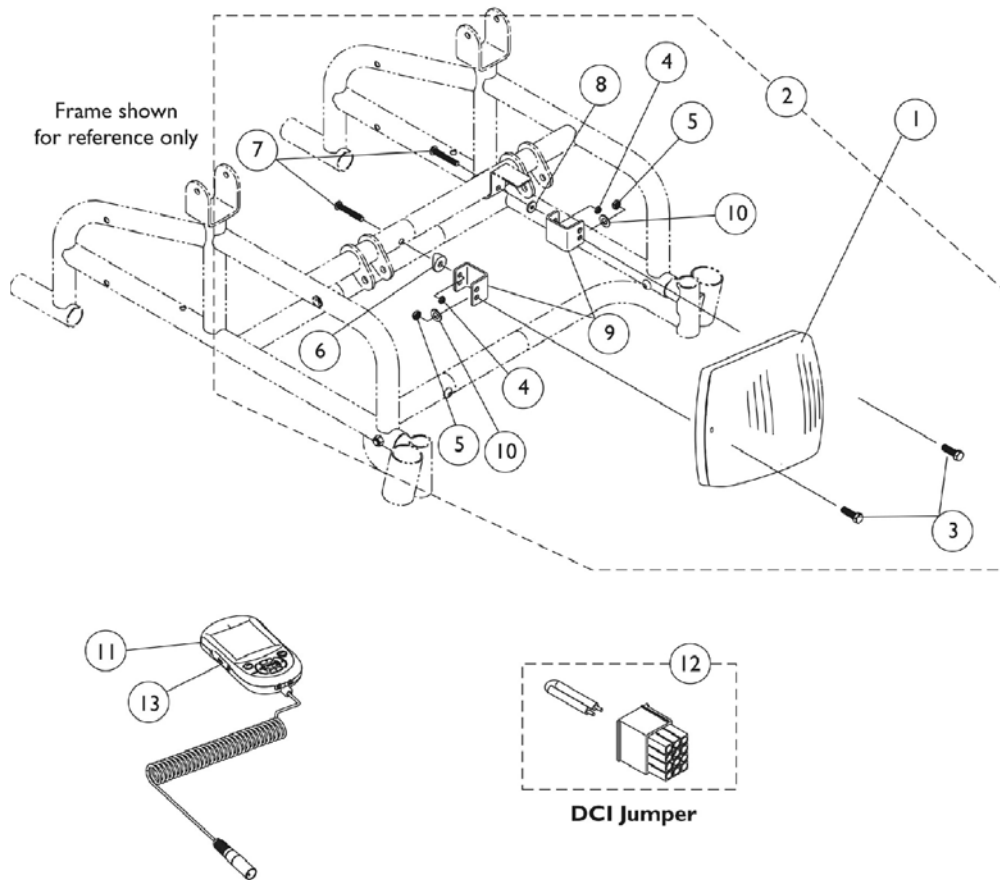
3G Storm w/GB TT Motors and Formula CG w/ Vent

NOTE: After 12/9/07 the TRAM Module was relocated next to the Recline Actuator Conventional Motor for Tilt/Recline & Recline Only systems. Tilt Only Systems with Conventional Tilt Actuator Motors use a GTAM module in place of the TRAM module also.

Item Number	Note	Part Number	Description	Quantity Per	
				Package	Assembly
16			Bracket, MK6i GB TT RWD Controller Mounting, Black (for Vent Option)	1	1
17			Screw, Hex Head Cap w/ Patch (5/16-18 x 1")	1	2
18			Bracket, MK6i GB TT RWD TRAM Mounting, Black (for Vent Option)	1	1
19			Shroud, MK6i GB TT RWD Controller/TRAM, Black (Vent Options)	1	2
20		1140098	Module, Tilt Recline Actuator (TRAM) - MK6i	1	1
21	D	1134213	Controller w/ Gasket Connectors, MK6i GB TT RWD	1	1
22		1139985	Programmer, MK6i	1	1
22		1142215	Kit, MK6i Programmer w/ SD Professional Card & Card Holder (1813M6)	1	1
23		1139997	Cover, SD Card Slot	1	1
24	H1,H	1142223	Plug Assembly, Max Angle Shorting	1	1
25		1159217	Package, Thumb Screw (1-1/2" L)	10	1
	E,E1,F	1134214	Kit, GB HD Controller Gasket Connector	1	1
	G	1101400	Harness, ELRPW Power Legrest - Right	1	1

NOTE: A - Includes items 3-10 and 12-19
 B - Includes items 3-10
 C - Includes items 12-19
 D - Controller will include Gasket Connectors created 10/26/07 that will be attached to the motor cables. Part number on controller will reference 1140040, always order 1134213 as a service parts replacement
 E - Kit was created 10/26/07 and attaches to the controller motor cables. Includes 2 ea. GB HD Controller Gasket Connectors, 2 ea. Silicon Lubricant Packets, 1 ea. Instruction Sheet. Individual components are non-saleable.
 E1 - The kit can retrofit to existing GB HD controllers in the field
 F - Not Shown
 G - Not Shown. ELRPW Power Legrest Harness part #1101400 is used to connect between the TRAM Module and a Conventional Tilt Actuator as well
 H - Max Angle Shorting Plug Assembly plugs into the Max Angle Connector on the TRAM module to close the circuit. Only the Tilt Sensor Connector is used. This applies to a Conventional Tilt Actuator only.
 H1 - Max Angle Shorting Plug is not used with the GTAM that replaced the TRAM for (CGT) with GB motors.

Controller, Programmer, and Mounting Hardware - Power Tiger

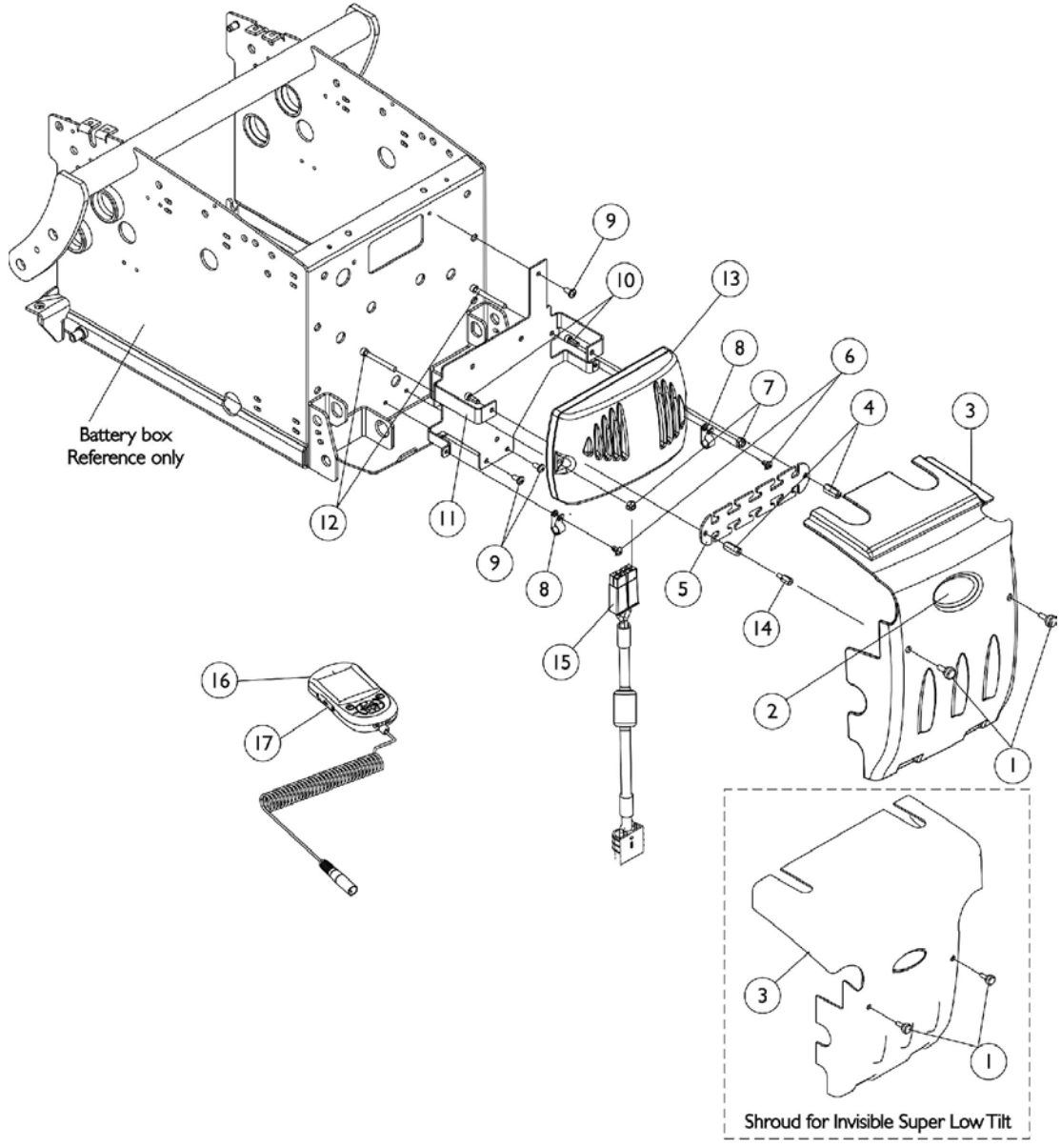


Controller, Programmer, and Mounting Hardware - Power Tiger

Item Number	Note	Part Number	Description	Quantity Per	
				Package	Assembly
1	B1,D,D	1127270	Controller, MK5 NX w/ ACC/ MK660 w/ ACC	1	1
1	1,B				
1	E	1148361-NLA	Controller, MK660 w/ ACC	1	1
2	A	1146608	Kit, Controller Mounting Hardware	1	1
3			Screw, Phillips Pan Head (#8-32 x 1")	1	2
4			Locknut (1/4-20)	1	2
5			Locknut (#8-32)	1	2
6			Spacer, Coved (1/4 x 7/8 x 7/16")	1	1
7			Screw, Socket Button Head (1/4-20 x 1-1/2")	1	2
8			Washer (1/4 x 5/8 x 3/32")	1	1
9			Bracket, Controller Mounting, Black	1	2
10			Washer, Flat (3/16 x 5/8 x 1/16")	1	2
11		1139985	Programmer, MK6i	1	1
11		1142215	Kit, MK6i Programmer w/ SD Professional Card & Card Holder (1813M6)	1	1
12	C	1140125	Jumper, DCI	1	1
13		1139997	Cover, SD Card Slot	1	1

NOTE: A - Includes items 3-10
 B - The MK5 NX w/ ACC controller was revised to function as a MK660 w/ ACC 10/9/06. A MK660 w/ ACC is backward compatible with MK5 electronics.
 B1 - Any controller in the field manufactured for chairs before 10/9/06 with a controller label description MK5 NX w/ ACC "will not" be compatible with MK6i electronics. This note was provided because the part number remained the same.
 C - DCI Jumper is used when an MPJ+ Joystick is used
 D - Part #1148361 controller is no longer required as a replacement for a chair ordered with Manual Tilt Option before 1/19/07.
 D1 - because the software for part #1127270 was revised 8/31/07 to version 2.61a and now accommodates all Manual Tilt optioned chairs shipped before 1/19/07 as well.
 E - Used for Chairs with Manual Tilt Option only. Discontinued 8/31/07, see part #1127270 as a direct replacement.

Controller, Programmer, Shroud Cover & Mounting Hardware - TDX 3, 3 SE, 4 & 5

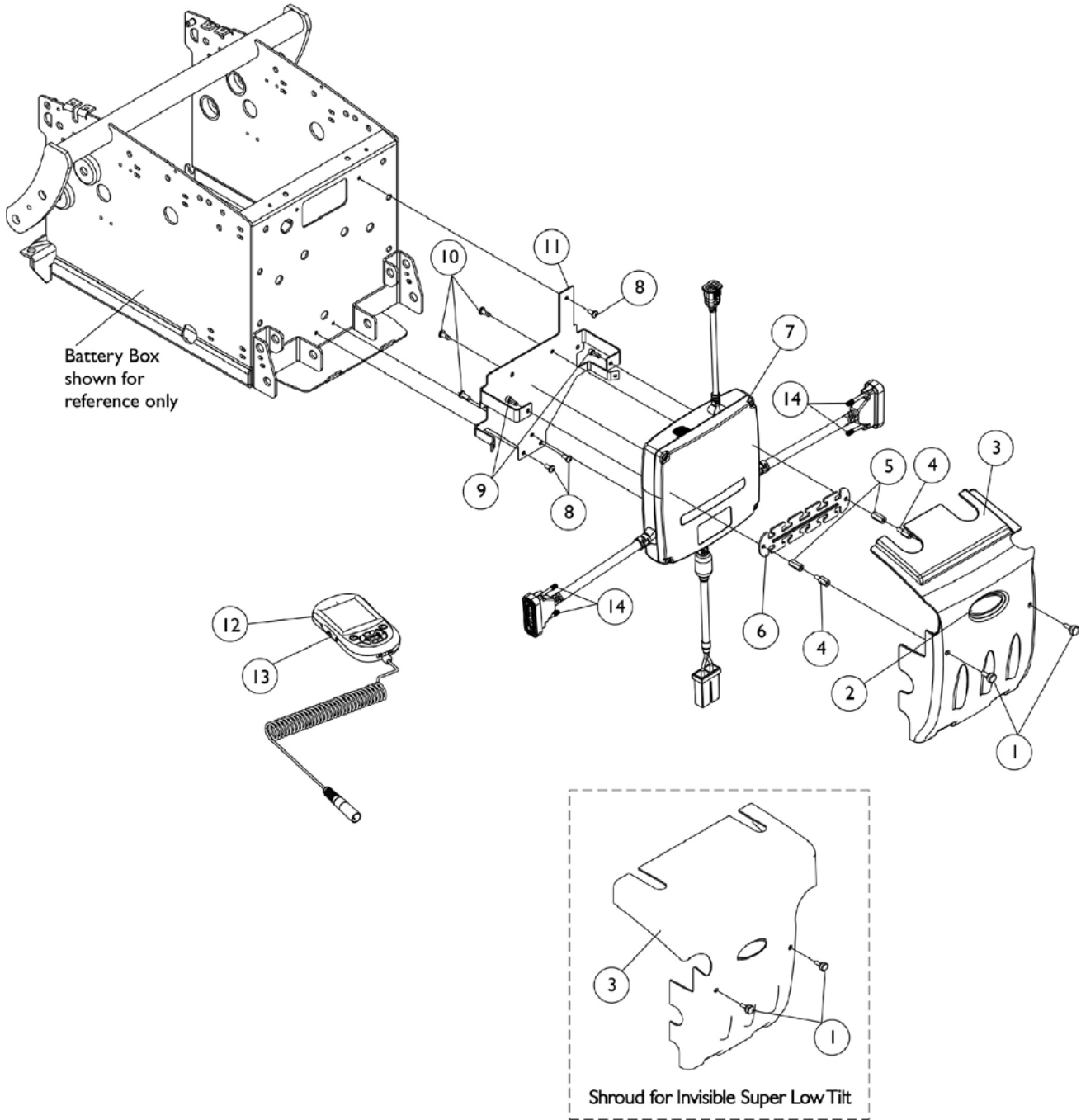


Controller, Programmer, Shroud Cover & Mounting Hardware - TDX 3, 3 SE, 4 & 5

Item Number	Note	Part Number	Description	Quantity Per	
				Package	Assembly
1		1117240	Screw, Thumb (#10-32 x 1/2")	1	2
2		1095489	Decal, Invacare 3-D Logo (2-1/2" L)	1	1
3		1113214	Cover with Decal, Controller Shroud	1	1
3	A	1120240	Cover with Decal, Controller Shroud	1	1
4		1113342	Stand-Off (#10-32 x 3/4")	1	2
5		1117194	Strip, Wiring	1	1
6		90017X000	Screw, Phillips Pan Head (#10-32 x 5/16")	1	2
7		1056098	Locknut (#8-32)	1	2
8		1079245	Clamp, Cable	1	2
9		1022597	Screw, Phillips Pan Head Tap (#10-32 x 3/8")	1	3
10		1113438	Screw, Socket Head (#10-32 x 1/2")	1	2
11		1115829	Bracket, TDX Controller, Black	1	1
12		1127352	Screw, Phillips Pan Head (#8-32 x 1")	1	2
13	C	1136897	Controller, MK690	1	1
13	D,D1,D2	1136898	Controller, MK690 w/ ACC	1	1
13	E	1148360-NLA	Controller, MK690 w/ ACC	1	1
14	B	1120258	Stand-Off (10-32 x 1/2")	1	2
15		1119449	Cable, Battery Extension	1	1
16		1139985	Programmer, MK6i	1	1
16		1142215	Kit, MK6i Programmer w/ SD Professional Card & Card Holder (1813M6)	1	1
17		1139997	Cover, SD Card Slot	1	1

NOTE: A - Used on Super Low Tilt system
 B - Item 14 is increased to a quantity of 4 when an Invisible Super Low Tilt is present
 C - MK690 Controller used for All Non-Powered Seating except for the Formula TRE Powered Seating Systems. Used for Manual Recline Backs also.
 D - MK690 w/ ACC used for Formula CG , Formula Invisible Super Low Tilt and Formula PTO Plus Powered Seating Systems.
 D1 - part #1148360 is no longer required as a replacement for Base Only orders that shipped before 1/19/07,
 D2 - because the software for part #1136898 was revised 9/12/07 to version 2.61a and now accommodates all Base Only orders that shipped before 1/19/07 as well.
 E - Used for all Base Only orders. Discontinued 9/12/07, see part #1136898 as a direct replacement.

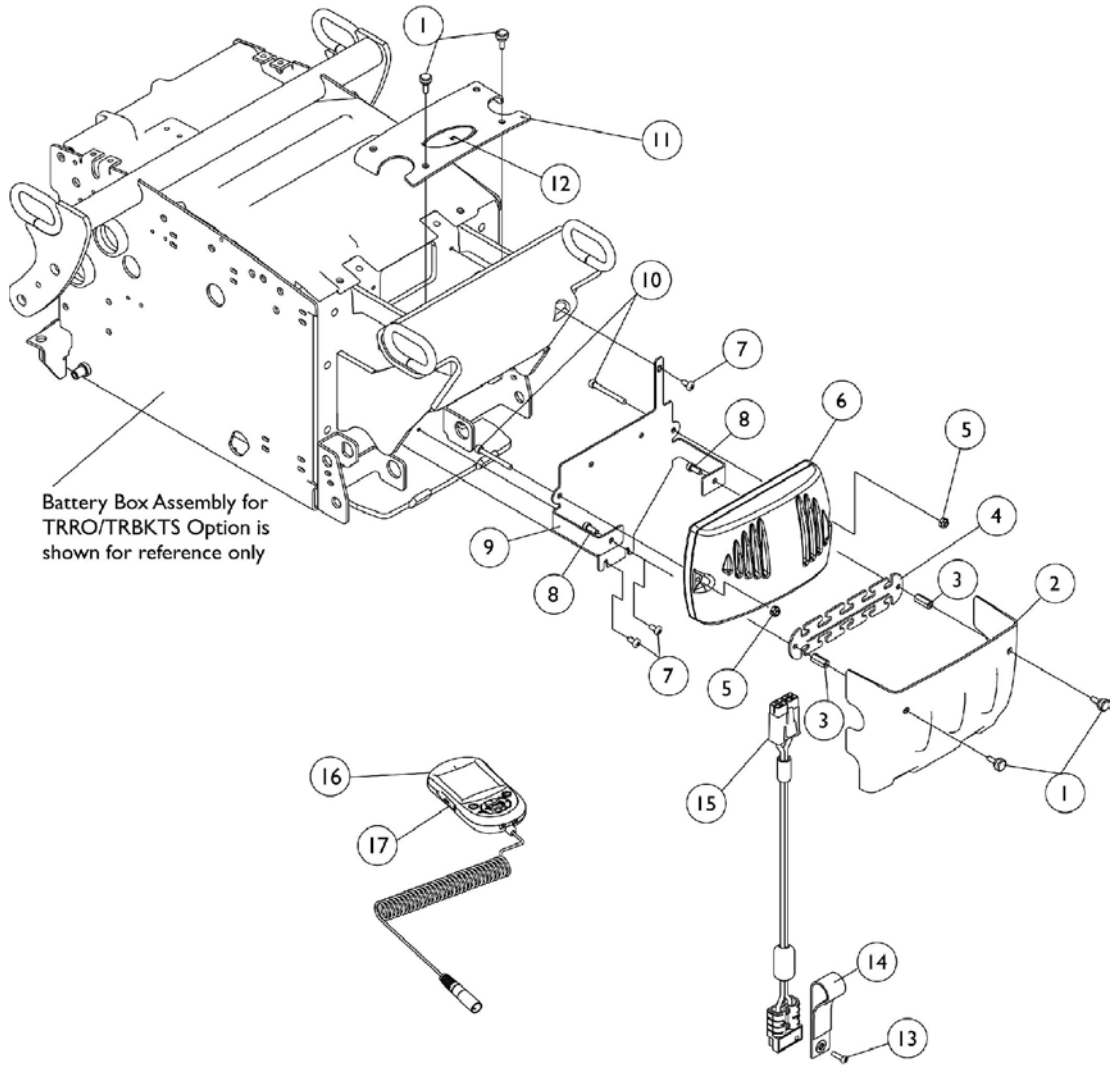
Controller, Programmer, Shroud Cover & Mounting Hardware - TDX 3, 3 SE, 4, & 5 w/ GB TT Motors



Controller, Programmer, Shroud Cover & Mounting Hardware - TDX 3, 3 SE, 4, & 5 w/ GB TT Motors

Item Number	Note	Part Number	Description	Quantity Per	
				Package	Assembly
1		1117240	Screw, Thumb (#10-32 x 1/2")	1	2
2		1095489	Decal, Invacare 3-D Logo (2-1/2" L)	1	1
3		1113214	Cover with Decal, Controller Shroud	1	1
3	A	1120240	Cover with Decal, Controller Shroud	1	1
4		1120258	Stand-Off (10-32 x 1/2")	1	2
5		1113342	Stand-Off (#10-32 x 3/4")	1	2
6		1117194	Strip, Wiring	1	1
7	C	1134212	Controller w/ Gasket Connectors, MK6i GB TT CWD	1	1
8		1022597	Screw, Phillips Pan Head Tap (#10-32 x 3/8")	1	3
9		1113438	Screw, Socket Head (#10-32 x 1/2")	1	2
10		1104259	Screw, Phillips Pan Head w/ Patch (#10-32 x 1/2")	1	3
11		1115829	Bracket, TDX Controller, Black	1	1
12		1139985	Programmer, MK6i	1	1
12		1142215	Kit, MK6i Programmer w/ SD Professional Card & Card Holder (1813M6)	1	1
13		1139997	Cover, SD Card Slot	1	1
14	B	1159217	Package, Thumb Screw (1-1/2" L)	10	1
	B	1095502	Package, Cable Tie (11-1/2" L)	10	1
	B,D,D1	1134214	Kit, GB HD Controller Gasket Connector	1	1
<p>NOTE: A - Used on Formula Super Low Tilt systems B - Not Shown C - Controller will include Gasket Connectors created 10/26/07 that will be attached to the motor cables. Part number on controller will reference 1136899, always order 1134212 as a service parts replacement D - Kit was created 10/26/07 and attaches to the controller motor cables. Includes 2 ea. GB HD Controller Gasket Connectors, 2 ea. Silicon Lubricant Packets, 1 ea. Instruction Sheet. Individual components are non-saleable. D1 - The kit can retrofit to existing GB HD controllers in the field</p>					

Controller, Programmer, Shroud Cover & Mounting Hardware - TDX 3, 3 SE, 4 & 5 with TRRO/TRBKTS Option

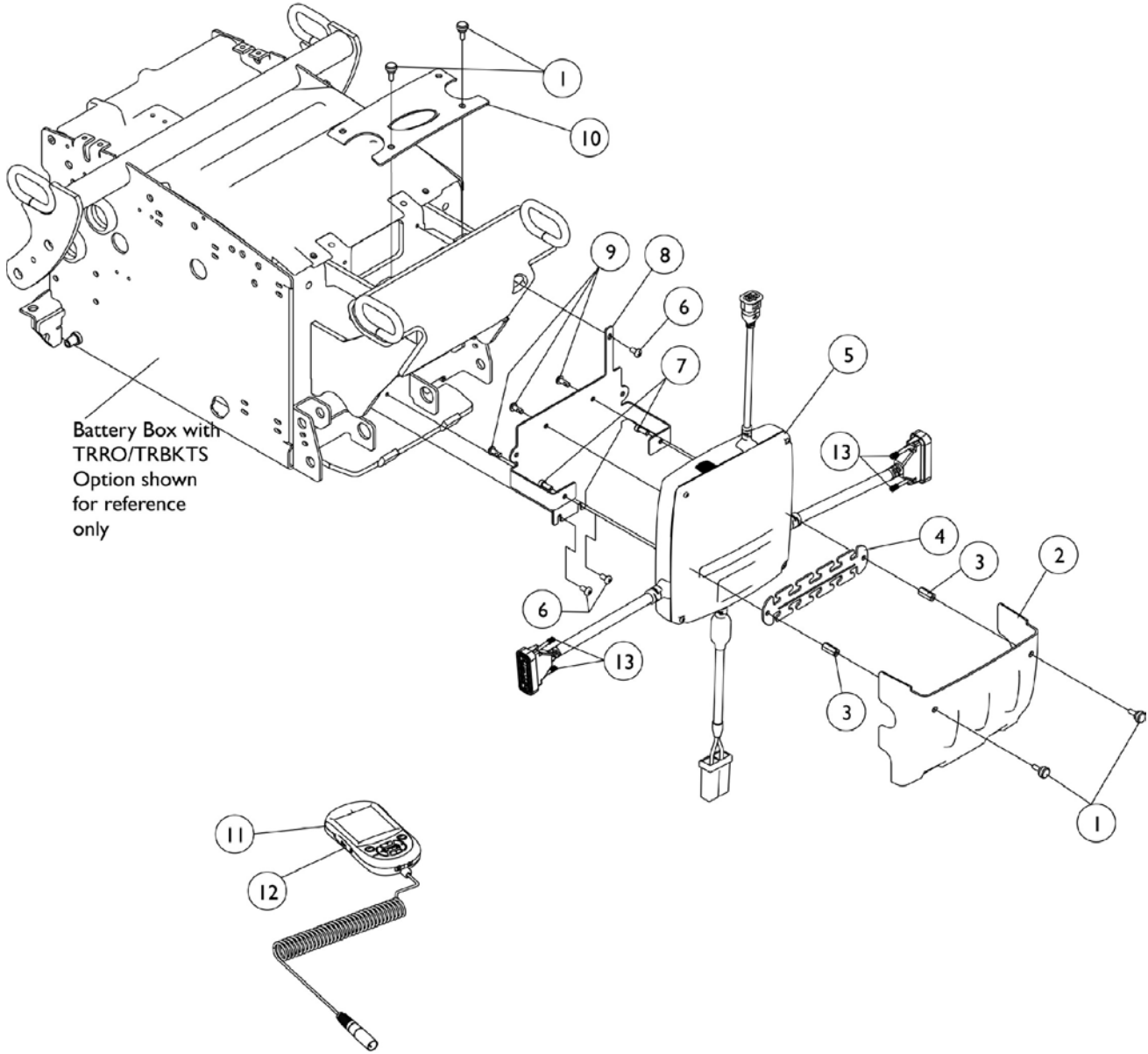


Controller, Programmer, Shroud Cover & Mounting Hardware - TDX 3, 3 SE, 4 & 5 with TRRO/TRBKTS Option

Item Number	Note	Part Number	Description	Quantity Per	
				Package	Assembly
1		1117240	Screw, Thumb (#10-32 x 1/2")	1	4
2		1137243	Cover, Controller Rear Shroud TRRO/TRBKTS	1	1
3		1113342	Stand-Off (#10-32 x 3/4")	1	2
4		1117194	Strip, Wiring	1	1
5		1056098	Locknut (#8-32)	1	2
6	A	1136897	Controller, MK690	1	1
6	B,B1	1136898	Controller, MK690 w/ ACC	1	1
6	C	1148360-NLA	Controller, MK690 w/ ACC	1	1
7		1022597	Screw, Phillips Pan Head Tap (#10-32 x 3/8")	1	3
8		1113438	Screw, Socket Head (#10-32 x 1/2")	1	2
9		1133754	Bracket, Controller Mounting, Black	1	1
10		1127352	Screw, Phillips Pan Head (#8-32 x 1")	1	2
11		1139532	Cover, Controller Top Shroud	1	1
12		1095489	Decal, Invacare 3-D Logo (2-1/2" L)	1	1
13		1114276	Screw, Phillips Pan Head (#8-16 x 5/8")	1	1
14		1113331	Strap, Battery Plug Pull	1	1
15		1119449	Cable, Battery Extension	1	1
16		1139985	Programmer, MK6i	1	1
16		1142215	Kit, MK6i Programmer w/ SD Professional Card & Card Holder (1813M6)	1	1
17		1139997	Cover, SD Card Slot	1	1

NOTE: A - MK690 Controller used for All Non-Powered Seating except for the Formula TRE Powered Seating Systems.
 B - MK690 w/ ACC used for Formula CG , Formula Invisible Super Low Tilt and Formula PTO Plus Powered Seating Systems.
 B1 - part #1148360 is no longer required as a replacement for Base Only orders shipped before 1/19/06 because the software for part #1136898 was revised 9/12/07 to version 2.61a and now accommodates all Base Only orders that shipped before 1/19/07 as well.
 C - Used for all Base Only orders. Discontinued 9/12/07, see part #1136898 as a direct replacement.

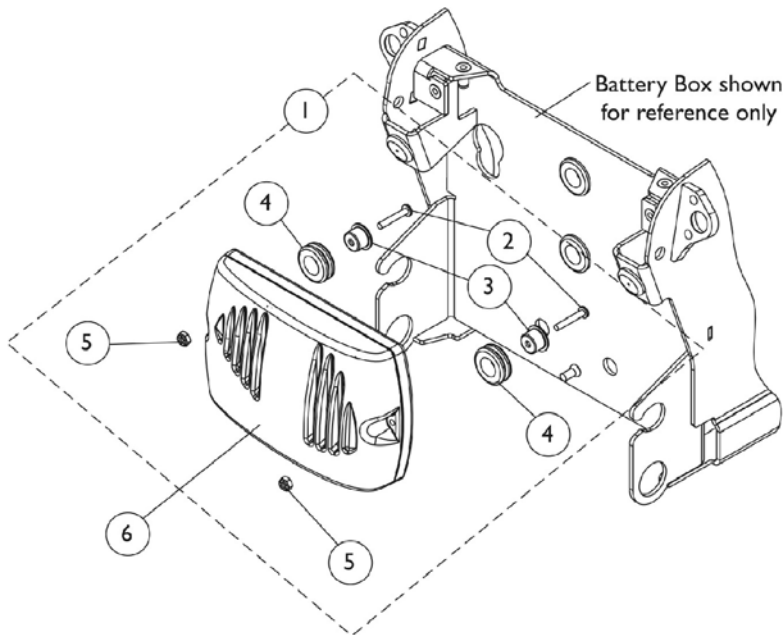
Controller, Programmer, Shroud Cover & Mounting Hardware - TDX 3, 3 SE, 4, & 5 w/ GB TT Motors & TRRO/TRBKTS Option



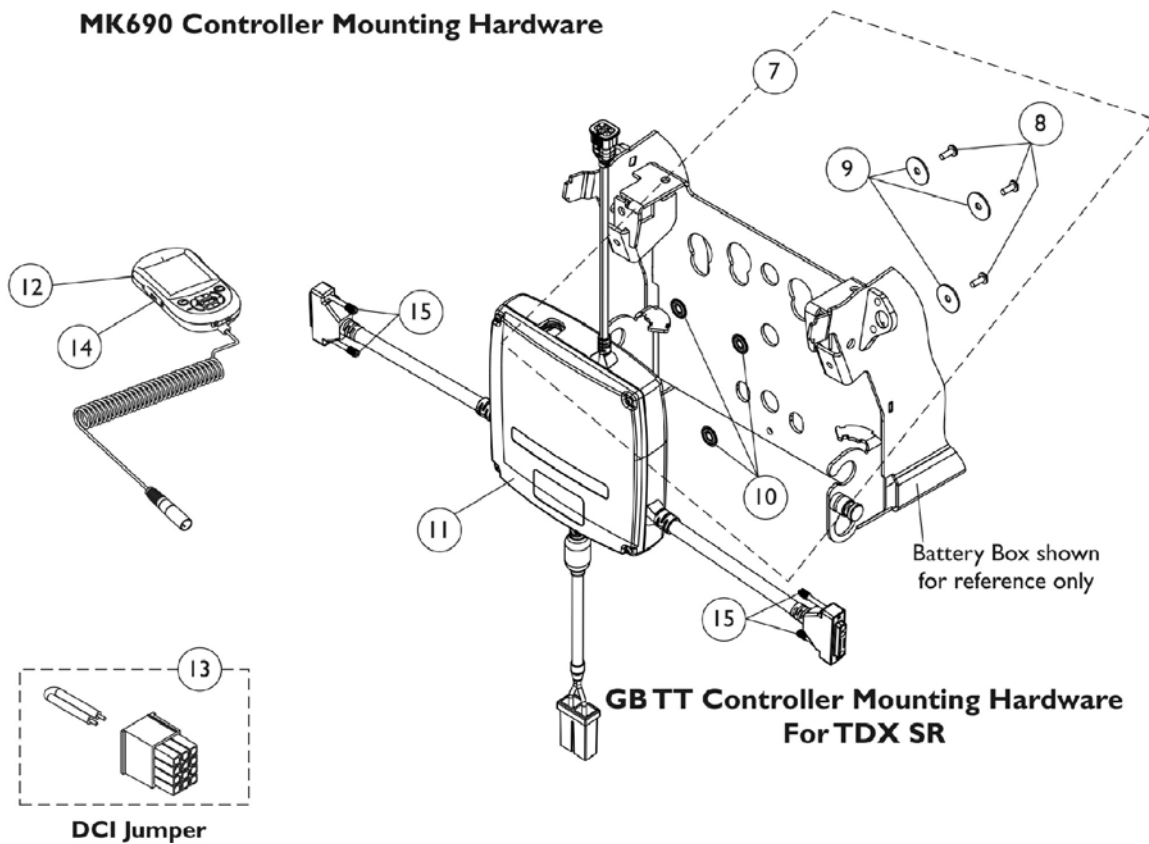
Controller, Programmer, Shroud Cover & Mounting Hardware - TDX 3, 3 SE, 4, & 5 w/ GB TT Motors & TRRO/TRBKTS Option

Item Number	Note	Part Number	Description	Quantity Per	
				Package	Assembly
1		1117240	Screw, Thumb (#10-32 x 1/2")	1	4
2		1137243	Cover, Controller Rear Shroud TRRO/TRBKTS	1	1
3		1113342	Stand-Off (#10-32 x 3/4")	1	2
4		1117194	Strip, Wiring	1	1
5	B	1134212	Controller w/ Gasket Connectors, MK6i GB TT CWD	1	1
6		1022597	Screw, Phillips Pan Head Tap (#10-32 x 3/8")	1	3
7		1113438	Screw, Socket Head (#10-32 x 1/2")	1	2
8		1133754	Bracket, Controller Mounting, Black	1	1
9		1104259	Screw, Phillips Pan Head w/ Patch (#10-32 x 1/2")	1	3
10		1139532	Cover, Controller Top Shroud	1	1
11		1139985	Programmer, MK6i	1	1
11		1142215	Kit, MK6i Programmer w/ SD Professional Card & Card Holder (1813M6)	1	1
12		1139997	Cover, SD Card Slot	1	1
13		1159217	Package, Thumb Screw (1-1/2" L)	10	1
	A	1095502	Package, Cable Tie (11-1/2" L)	10	1
	A,C,C1	1134214	Kit, GB HD Controller Gasket Connector	1	1
<p>NOTE: A - Not Shown B - Controller will include Gasket Connectors created 10/26/07 that will be attached to the motor cables. Part number on controller will reference 1136899, always order 1134212 as a service parts replacement C - Kit was created 10/26/07 and attaches to the controller motor cables. Includes 2 ea. GB HD Controller Gasket Connectors, 2 ea. Silicon Lubricant Packets, 1 ea. Instruction Sheet. Individual components are non-saleable. C1 - The kit can retrofit to existing GB HD controllers in the field</p>					

Controller, Programmer, and Mounting Hardware - TDX SP/SR



MK690 Controller Mounting Hardware



GB TT Controller Mounting Hardware For TDX SR

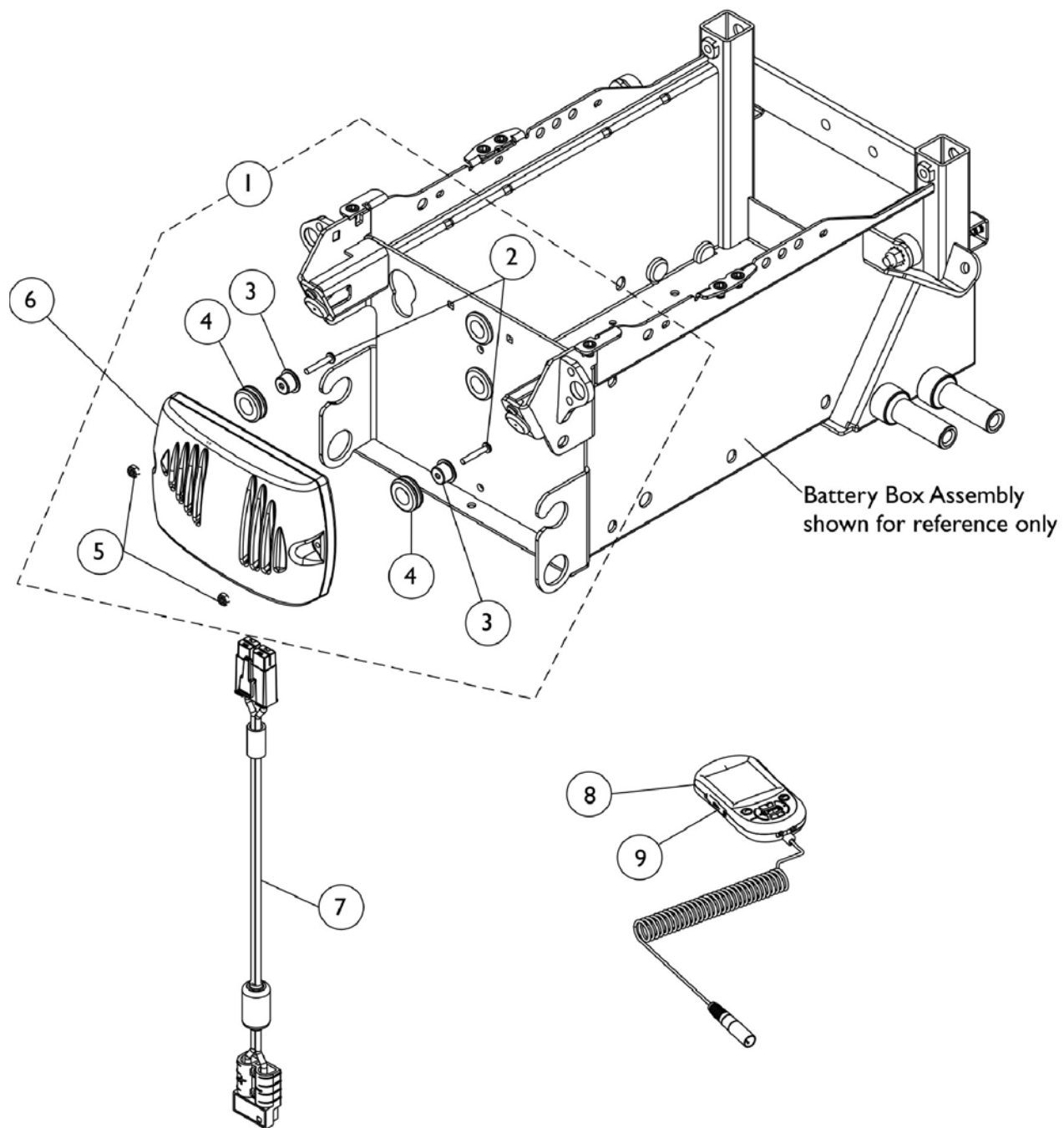
DCI Jumper

Controller, Programmer, and Mounting Hardware - TDX SP/SR

Item Number	Note	Part Number	Description	Quantity Per	
				Package	Assembly
1	A	1145070	Kit, Controller Mounting Hardware	1	1
2			Screw, Phillips Pan Head (#8-32 x 1")	1	2
3			Bushing	1	2
4			Grommet, Rubber (9/16 ID x 11/16 OD x 3/8")	1	2
5			Locknut (#8-32)	1	2
6	C	1136897	Controller, MK690	1	1
6	D,D1	1136898	Controller, MK690 w/ ACC	1	1
6	F	1148360-NLA	Controller, MK690 w/ ACC	1	1
7	G	1149352	Kit, GB TT CWD Controller Mounting Hardware	1	1
8			Screw, Phillips Pan Head (#10-32 x 1/2")	1	3
9			Washer, Plain (1/4 x 7/8 x 1/16")	1	3
10			Washer (1/4 x 3/4 x 3/32")	1	3
11	H,J	1134213	Controller w/ Gasket Connectors, MK6i GB TT RWD	1	1
12		1139985	Programmer, MK6i	1	1
12		1142215	Kit, MK6i Programmer w/ SD Professional Card & Card Holder (1813M6)	1	1
13	E	1140125	Jumper, DCI	1	1
14		1139997	Cover, SD Card Slot	1	1
15		1159217	Package, Thumb Screw (1-1/2" L)	10	1
	B	1095502	Package, Cable Tie (11-1/2" L)	10	1
	B,I	1134214	Kit, GB HD Controller Gasket Connector	1	1

NOTE: A - Includes items 2-5.
 B - Not Shown
 C - MK690 Controller used with all Non-Powered Seating Systems. Used for Manual Recline Backs also
 D - MK690 w/ ACC used with Formula CG Powered Seating Systems. Part #1148360 is no longer required as a replacement for a Base Only order that shipped before 1/19/07,
 D1 - because the software for part #1136898 was revised 9/12/07 to version 2.61a and now accommodates all Base Only orders that shipped before 1/19/07 as well.
 E - DCI Jumper is used when an MPJ+ Joystick is used
 F - Used for all Base Only orders. Discontinued 9/12/07, see part #1136898 as a direct replacement.
 G - Includes items 8-10
 H - Controller will include Gasket Connectors that attach to the motor cables. Part number on controller will reference 1140040, always order 1134213 as a service parts replacement
 I - Kit includes 2 ea. GB HD Controller Gasket Connectors, 2 ea. Silicon Lubricant Packets, 1 ea. Instruction Sheet. Individual components are non-saleable.
 J - The MK6i GB TT RWD controller is used for TDX SR models because of the longer motor leads that are required.

Controller, Programmer, and Mounting Hardware - TDX SC and SPREE

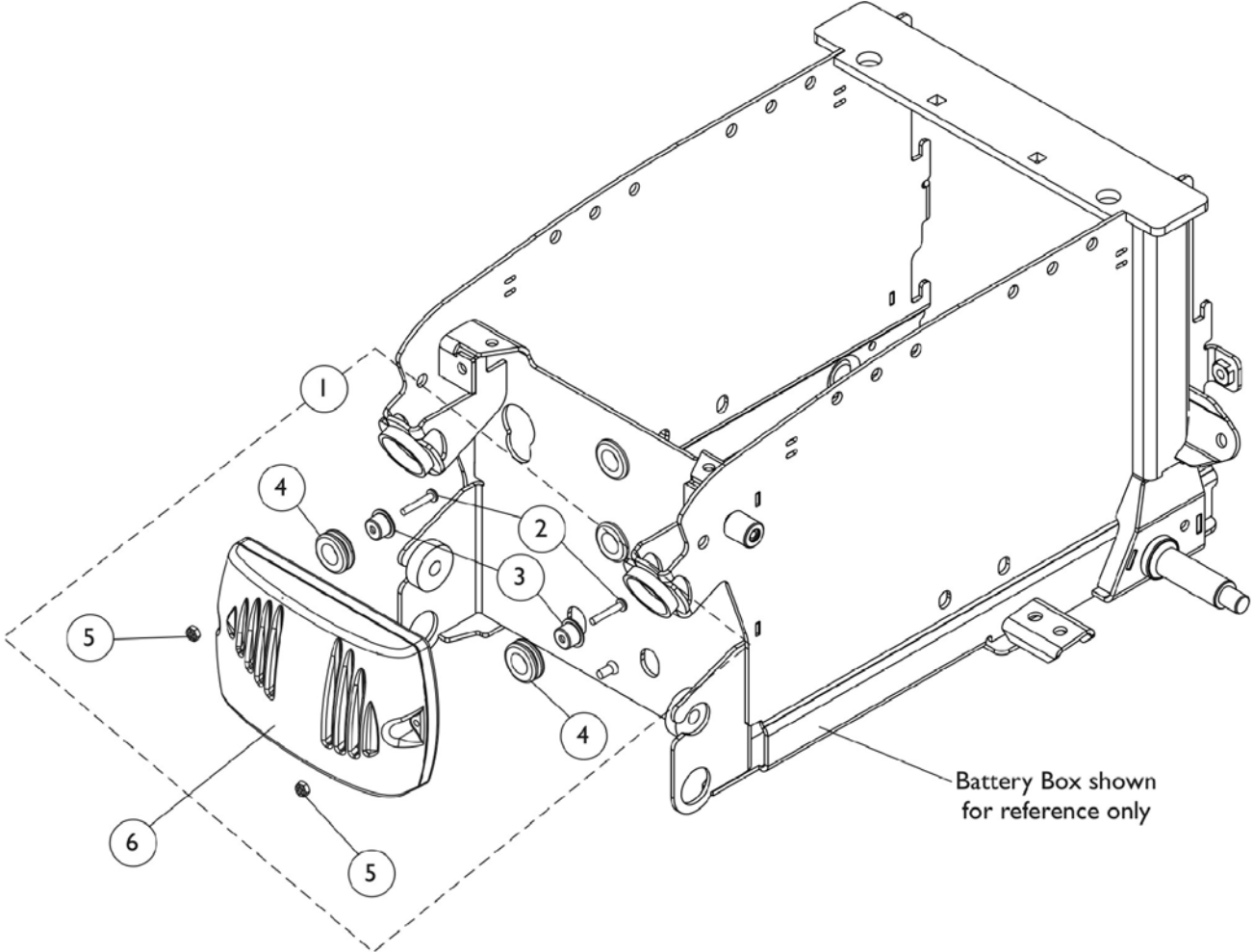


Controller, Programmer, and Mounting Hardware - TDX SC and SPREE

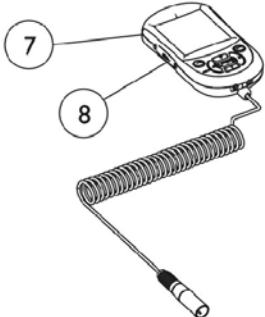
Item Number	Note	Part Number	Description	Quantity Per	
				Package	Assembly
1	A	1145070	Kit, Controller Mounting Hardware	1	1
2			Screw, Phillips Pan Head (#8-32 x 1")	1	2
3			Bushing	1	2
4			Grommet, Rubber (9/16 ID x 11/16 OD x 3/8")	1	2
5			Locknut (#8-32)	1	2
6		1127270	Controller, MK5 NX w/ ACC/ MK660 w/ ACC	1	1
7		1119449	Cable, Battery Extension	1	1
8		1139985	Programmer, MK6i	1	1
8		1142215	Kit, MK6i Programmer w/ SD Professional Card & Card Holder (1813M6)	1	1
9	B	1139997	Cover, SD Card Slot	1	1
		1095502	Package, Cable Tie (11-1/2" L)	10	1

NOTE: A - Includes items 2-5.
B - Not Shown

Controller, Programmer, and Mounting Hardware - TDX SI



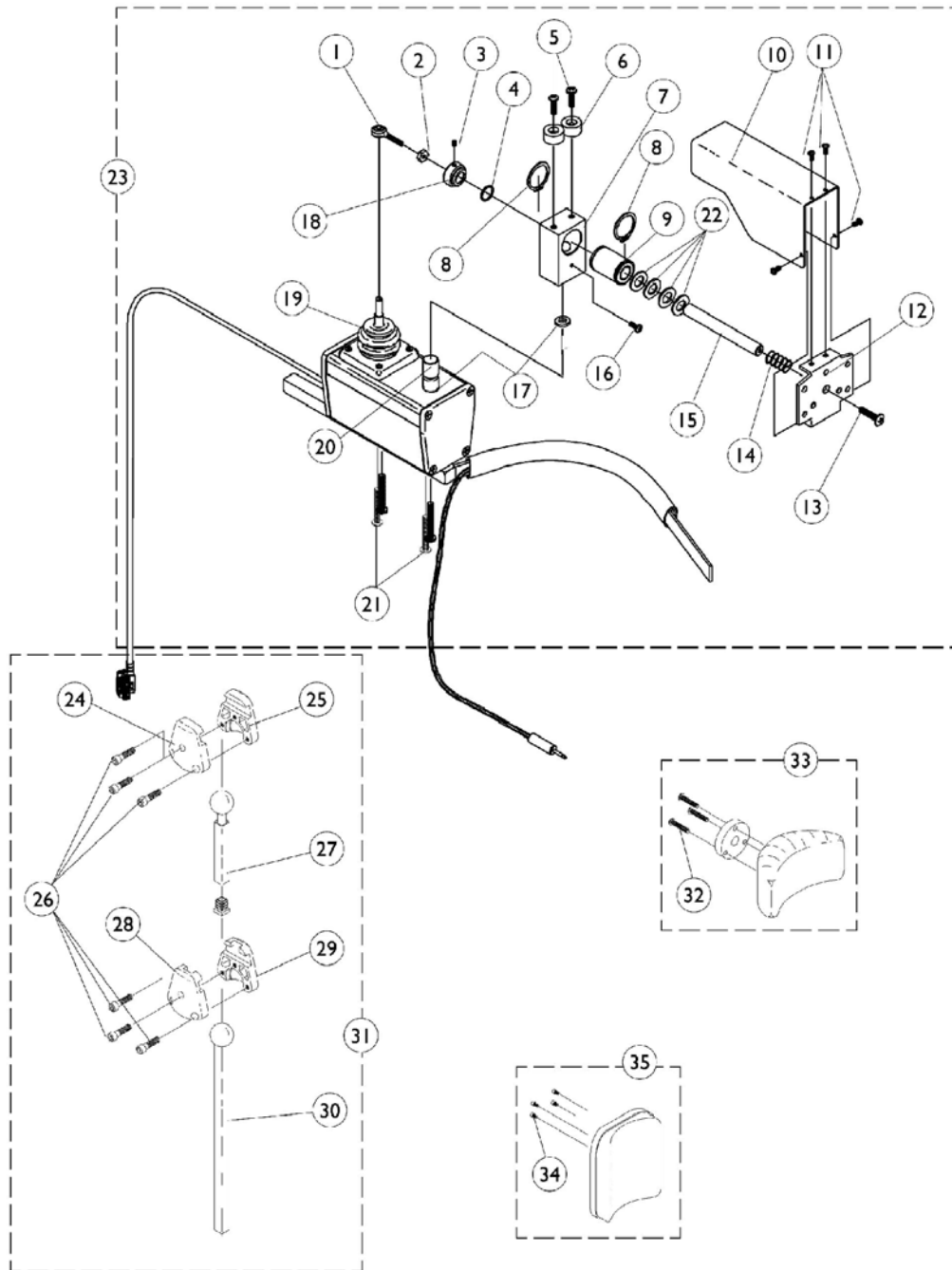
MK660 w/ ACC Controller Mounting Hardware



Controller, Programmer, and Mounting Hardware - TDX SI

Item Number	Note	Part Number	Description	Quantity Per	
				Package	Assembly
1	A	1145070	Kit, Controller Mounting Hardware	1	1
2			Screw, Phillips Pan Head (#8-32 x 1")	1	2
3			Bushing	1	2
4			Grommet, Rubber (9/16 ID x 11/16 OD x 3/8")	1	2
5			Locknut (#8-32)	1	2
6	B	1157825	Controller, MK660-2 w/ ACC	1	1
7		1139985	Programmer, MK6i	1	1
7		1142215	Kit, MK6i Programmer w/ SD Professional Card & Card Holder (1813M6)	1	1
8		1139997	Cover, SD Card Slot	1	1
		1095502	Package, Cable Tie (11-1/2" L)	10	1
NOTE: A - Includes items 2-5 B - Not Shown					

R.I.M. Head Control Assembly (1500M6)

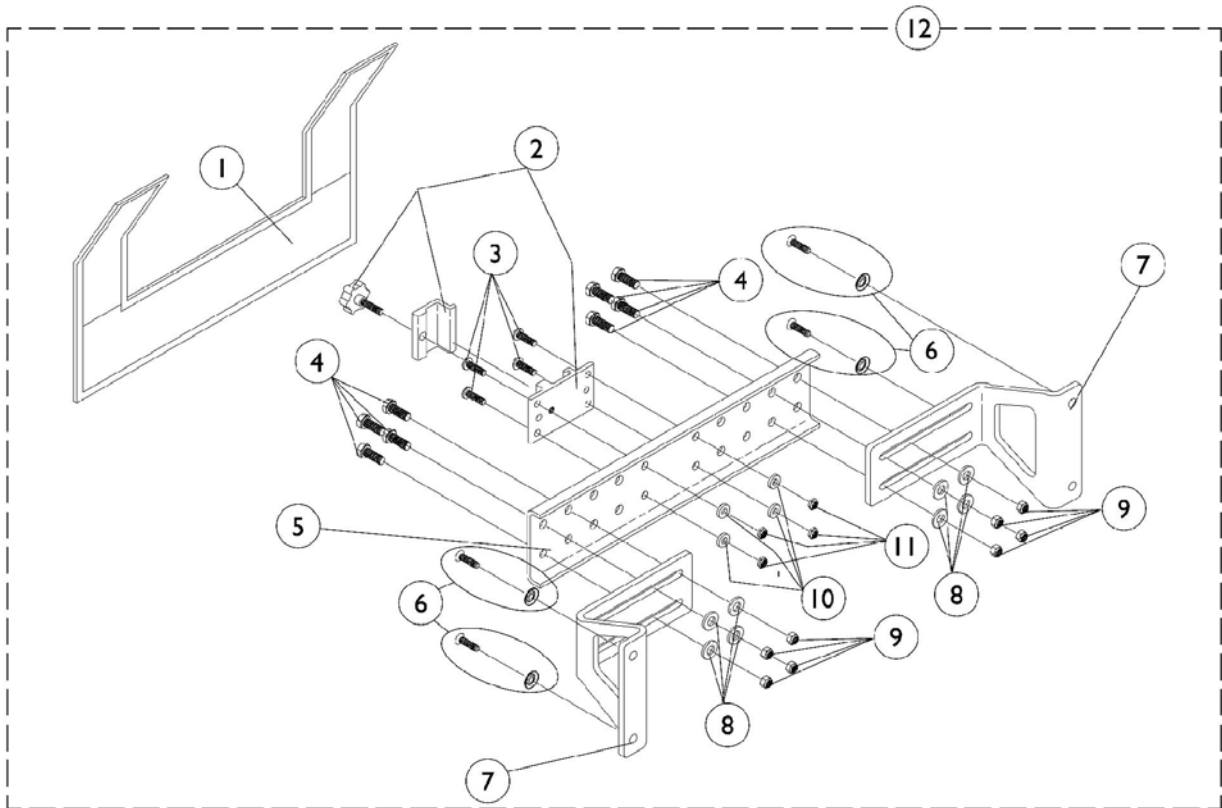


R.I.M. Head Control Assembly (1500M6)

Item Number	Note	Part Number	Description	Quantity Per	
				Package	Assembly
1		1001625	Tie Rod End	1	1
2		48095X000	Locknut (#10-32)	1	1
3		1025275	Set Screw with Nylock (#8-32 x 1/4")	1	1
4		2001139	O-Ring (1/2" I.D.)	1	1
5		1028529	Screw, Phillips Pan Head (#8-32 x 3/8")	1	2
6		1055002	Washer, Nylon	1	2
7		1056206	Block, Pivot	1	1
8		1054939	Ring, Snap	1	2
9		1018113	Bearing, Linear	1	1
10		1055014	Shield, Push Rod	1	1
11		1021742	Screw, Phillips Pan Head (#4-40 x 1/2")	1	4
12		1055031	Bracket, Headrest Mounting, Black	1	1
13		40127X002	Screw, Phillips Oval Head (#10-32 x 3/4")	1	1
14		1055145	Spring, Compression	1	1
15		1055016	Rod, Push	1	1
16		1026728	Screw, Phillips Pan Head (#6-32 x 1/4")	1	1
17		1010398	Washer, Nylon (1/4 x 1/2 x 1/16")	1	2
18		1025236	Collar, Shoulder	1	1
19		50000X364	Boot, Joystick	1	1
20		1055017	Rod, Pivot	1	1
21		11008X014	Screw, Phillips Round Head (#10-32 x 1")	1	1
22		1003766	Washer, Plain (1/2 x 1 x 1/8")	1	4
23	A	1136889	Joystick, Remote Head MK6i	1	1
24		1055023	Clamp, Horizontal Pivot	1	1
25		1055024	Clamp, Threaded, Horizontal Pivot	1	1
26		1055144	Screw, Socket Head (M6 x 25)	1	6
27		1055028	Slide Tube, Square, -Short	1	1
28		1055025	Clamp, Vertical Pivot	1	1
29		1055026	Clamp, Threaded, Vertical Pivot	1	1
30		1055027	Slide Tube, Square, -Long	1	1
31	B	1056213	Hardware, Adjustment	1	1
32		1005383	Screw, Socket Button Head (#10-32 x 1")	1	3
33		1056211	Kit, Headrest with Hardware, La Bac, Small	1	1
34		1005310	Screw, Socket Head (#10-32 x 3/8")	1	4
35		1056212	Kit, Headrest with Hardware, La Bac, Large	1	1

NOTE: A - Includes items 1-22
B - Includes items 24-30

R.I.M. Head Control Mounting Hardware (RIMHW)

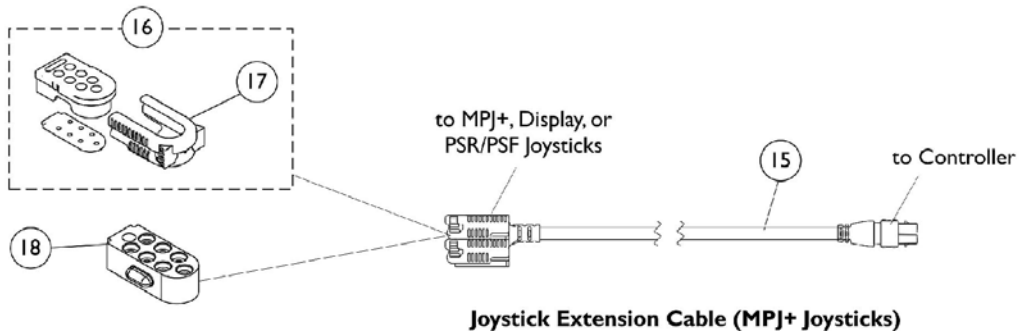
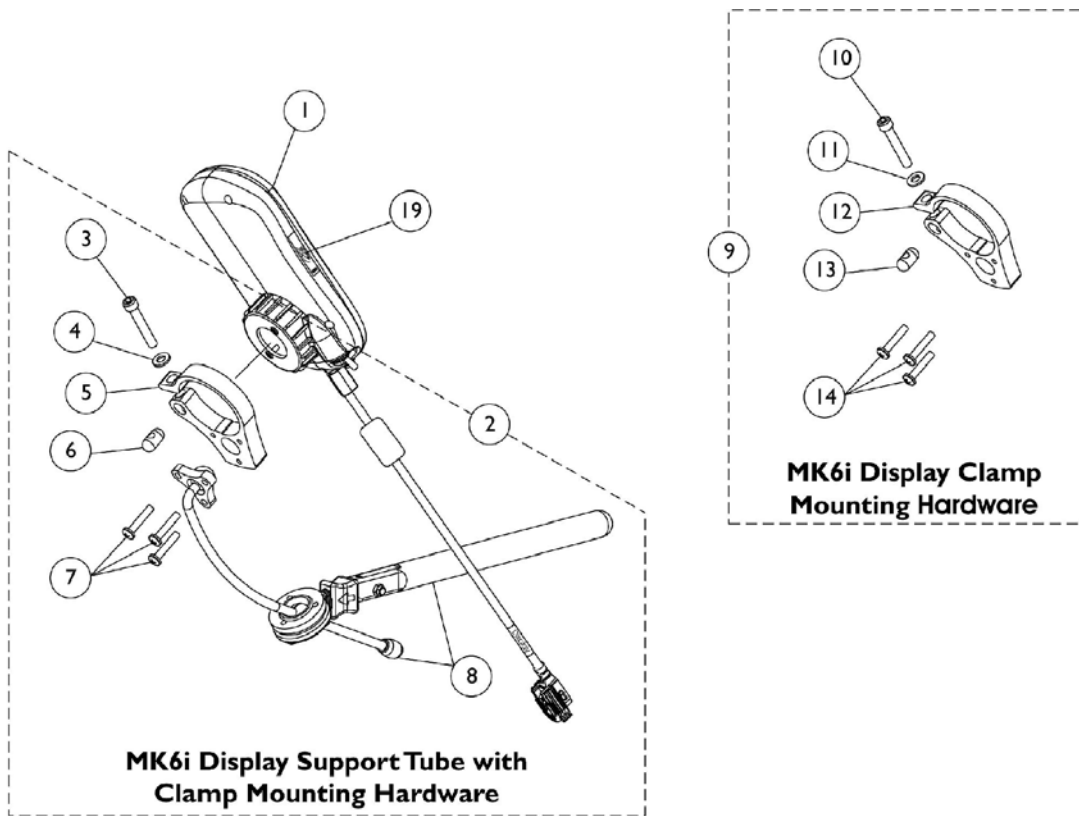


R.I.M. Head Control Mounting Hardware (RIMHW)

Item Number	Note	Part Number	Description	Quantity Per	
				Package	Assembly
1	B	1055149	Cover, Nylon	1	1
1	C	1055151	Cover, Nylon	1	1
2		1055148	Clamp with Knob, Two-Piece	1	1
3		1003645	Screw, Socket Button Head (#10-32 x 3/4")	1	4
4		7930326	Screw, Hex Head (1/4-20 x 3/4")	25	8
5	B	1054931	Bracket, Attaching, Black (12 - 18" W)	1	1
5	C	1054933	Bracket, Attaching, Black (19 - 24" W)	1	1
6		1031095	Screws with Washers (#10-16 x 7/8")	4	1
6		1076284	Screw w/ washer (#10 x 7/8")	1	4
7		1054929	Bracket, Wing, Black	1	2
8		1026907	Washer (1/4 x 1/2 x 1/16")	1	8
9		7930333	Locknut (1/4-20)	25	8
10		1026034	Washer, Nylon (3/16 x 7/16 x 1/8")	1	4
11		7930332-NLA	Locknut, High Profile (#10-32)	25	4
12	B,A	1056347	Hardware, Rim Control Mounting (RIMHW) (12-18" W)	1	1
12	C,A	1056348	Hardware, Rim Control Mounting (RIMHW) (19-24" W)	1	1

NOTE: A - Includes items 1-11
 B - For 12-18" wide chairs
 C - For 19-24" wide chairs

Display (ASLRDYM6)



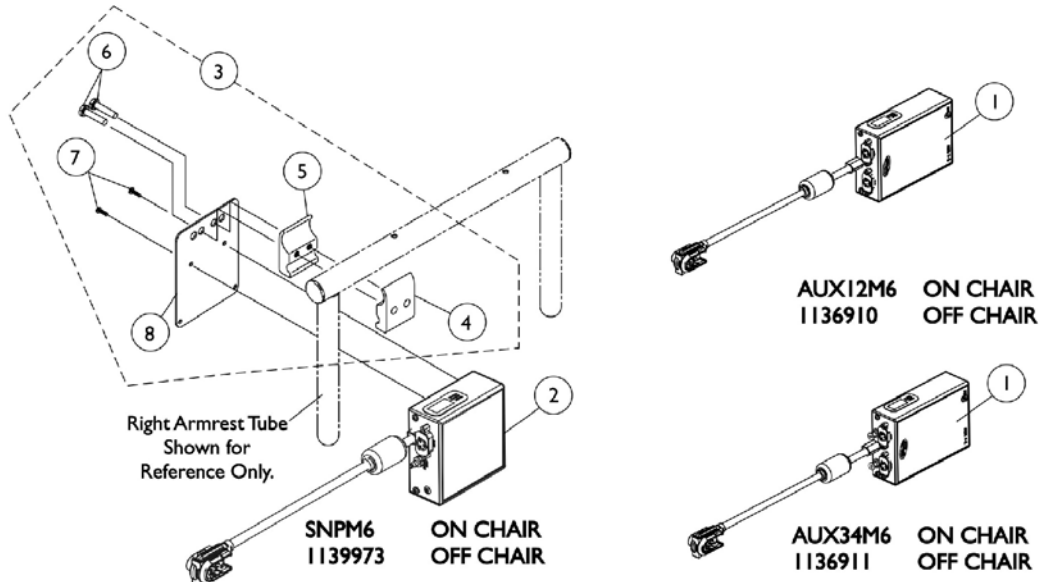
Display (ASLRDYM6)

Item Number	Note	Part Number	Description	Quantity Per	
				Package	Assembly
1		1136880	Display, MK6i (ASLRDYM6)	1	1
2	A	1144857	Kit, MK6i Display Support Tube with Clamp Mounting Hardware	1	1
3			Screw, Socket Head (1/4-28 x 1-1/2")	1	1
4			Washer (1/4 x 1/2 x 1/16")	1	1
5			Clamp, Display	1	1
6			Pin, Threaded (3/8" x 3/4")	1	1
7			Screw, Phillips Pan Head (#10-32 x 1")	1	3
8			Display Support Tube Assembly	1	1
9	B	1144594	Kit, Display Joystick Clamp Mounting Hardware	1	1
10			Screw, Socket Head (1/4-28 x 1-1/2")	1	1
11			Washer (1/4 x 1/2 x 1/16")	1	1
12			Clamp, Display	1	1
13			Pin, Threaded (3/8" x 3/4")	1	1
14			Screw, Phillips Pan Head (#10-32 x 1")	1	3
15	C	1133180	Cable, MK6i Joystick Extension (16" L)	1	1
15	D	1140038	Cable, MK6i Joystick Extension (34" L)	1	1
15	E	1140039	Cable, MK6i Joystick Extension (58" L)	1	1
16	F	1133182	Cap, Top Connector, 7 Pin, Black	1	1
17		1145408	Latch, Top Connector, Black	1	1
18		1133183	Cap, Bottom Connector, 7 Pin	1	1
19		1139997	Cover, SD Card Slot	1	1

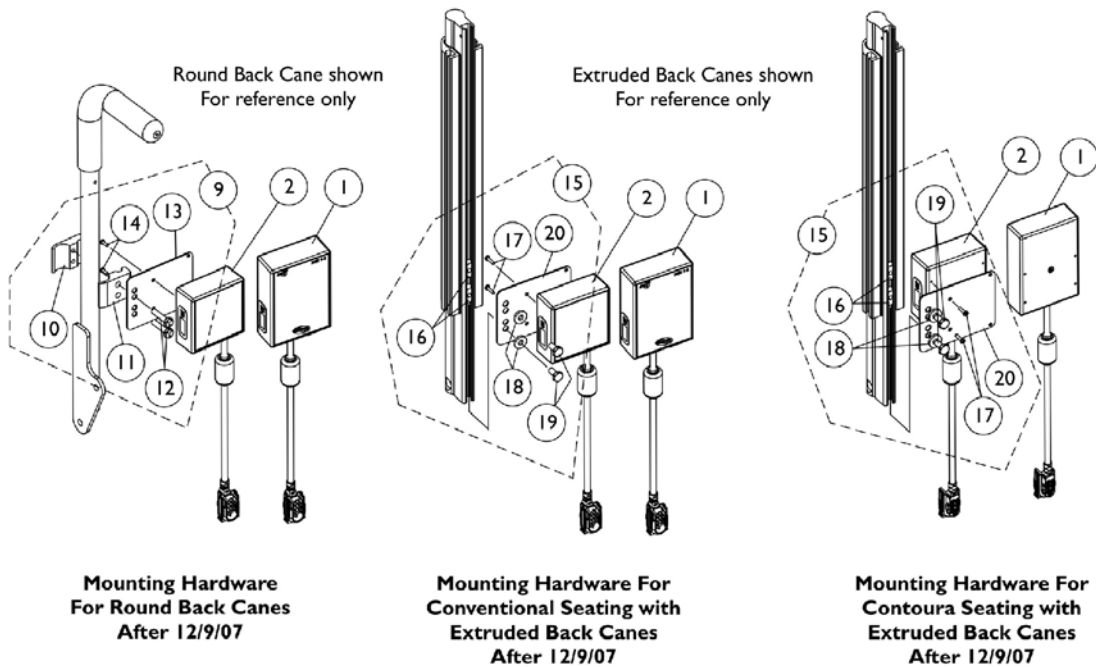
NOTE: A - Includes items 3-8.
 B - Includes items 10-14.
 C - Used on Non-Elevate 3G Storm chairs.
 D - Used on Non-Elevate TDX, M71, and M91 chairs.
 E - Used on Elevating TDX and Storm chairs.
 F - Includes Main Body, Gasket, and Latch. Latch is the only item offered individually.

Sip-N-Puff / Digital Interface SNPM6 and AUX12M6 and AUX34M6

NOTE: Currently the Formula (CGT) on Pronto M51 base still uses the mounting hardware that attaches to the Arm Tube.



Mounting Hardware Before 12/10/07



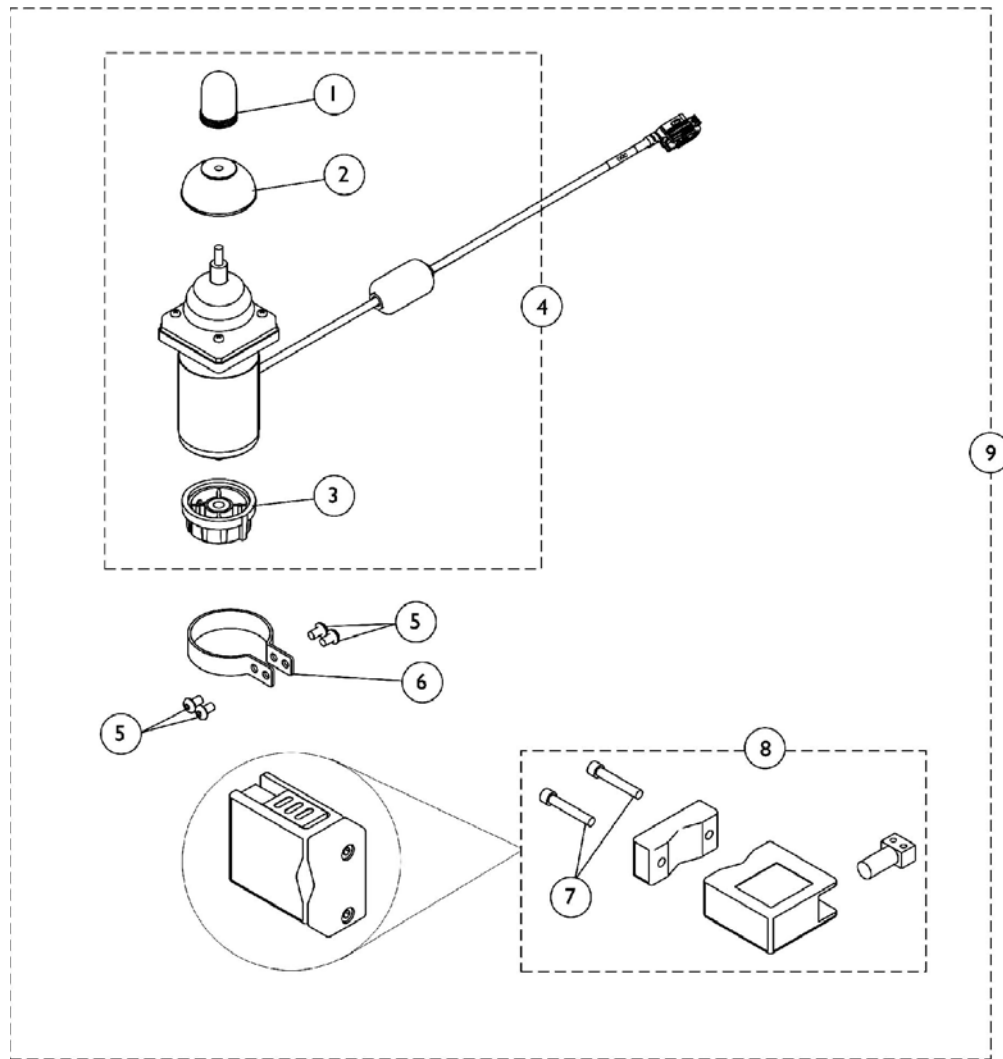
Sip-N-Puff / Digital Interface SNPM6 and AUX12M6 and AUX34M6

NOTE: Currently the Formula (CGT) on Pronto M51 base still uses the mounting hardware that attaches to the Arm Tube.

Item Number	Note	Part Number	Description	Quantity Per	
				Package	Assembly
1		1136910	Module, Communication, AUX12M6	1	1
1		1136911	Module, Communication, AUX34M6	1	1
2		1139973	Sip-N-Puff with Digital Interface SNPM6	1	1
3	B,A,A2, A1	1049593	Kit, SNP/DI, MK5 SAC, 4WSB, S4WSB, GTAM, AUX12M6, AUX34M6 Mtg. Hdwr.	1	1
4			Half Clamp, Threaded Holes	1	1
5			Half Clamp, Non-Threaded Holes	1	1
6			Screw, Hex Head (1/4-20 x 1-1/8")	1	2
7			Screw, Phillips Pan Head (#4-40 x 3/8")	1	2
8			Plate, Mounting	1	1
9	C	1142226	Kit, SNP/DI, 4WSB, S4WSB, GTAM, AUX12M6, AUX34M6 Mounting Hardware For Round Back Canes	1	1
10			Half Clamp, Threaded Holes	1	1
11			Half Clamp, Non-Threaded Holes	1	1
12			Screw, Hex Head (1/4-20 x 1-1/8")	1	2
13			Plate, Mounting	1	1
14			Screw, Phillips Pan Head (#4-40 x 3/8")	1	2
			Tie Wrap (5-5/8" L)	1	5
15	D	1142227	Kit, SNP/DI, 4WSB, S4WSB, GTAM, AUX12M6, AUX34M6 Mounting Hardware For Extruded Back Canes	1	1
16			T-Nut (1/4-20)	1	2
17			Screw, Phillips Pan Head (#4-40 x 1/2")	1	2
18			Washer (1/4 x 5/8 x 3/32")	1	2
19			Screw, Hex Head (1/4-20 x 1-1/2")	1	2
20			Plate, Mounting	1	1
			Tie Wrap (5-5/8" L)	1	5
	E	1095503	Package, Cable Tie (5-5/8" L)	10	1

NOTE: A - Includes items 4-8. As of 5/22/07 the mounting plates holes and orientation of the hardware was revised to attach the electronics closer to the chair.
A1 - The mounting plate was revised again 12/10/07 by making the plate longer to accommodate relocation of the electronics to the back canes. The mounting plate is backward compatible for using under the armrest tube.
A2 - When both the SNPM6 & Communication Module is ordered together, the Communication Module will be mounted on the left side of the chair using additional item #3 hardware.
B - Before 12/10/07
C - After 12/9/07 and includes items 10-14 and (Cable Ties not shown)
D - After 12/9/07 and includes items 16-20 and (Cable Ties not shown)
E - Not Shown

Proportional Attendant Control Joystick (PACM6)

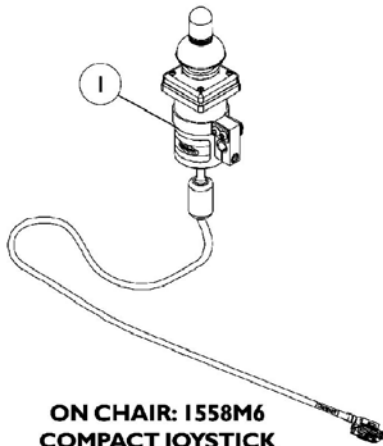


Proportional Attendant Control Joystick (PACM6)

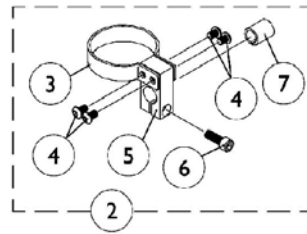
Item Number	Note	Part Number	Description	Quantity Per	
				Package	Assembly
1		1040217	Knob, Joystick, Black	1	1
2		1040218	Skirt, Joystick	1	1
3		1114232	Knob, Control	1	1
4	A	1136888	Joystick, Proportional Attendant Control (PACM6)	1	1
5		1021460	Screw, Socket Button Head (#10-32 x 5/16")	1	4
6		1025048	Clamp	1	1
7		0140406	Screw, Socket Head, Cap (5/16-18 x 1-1/2")	1	2
8		1123244	Bracket Assembly	1	1
9	B	1147097	Kit, Proportional Attendant Control Joystick w/ Bracket & Clamp - MK6i (PACM6)	1	1

NOTE: A - Includes Joystick plus items 1-3
B - Includes items 4-8

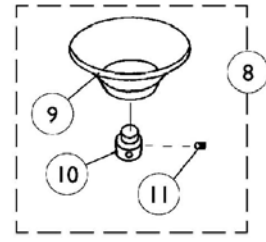
Joystick Options



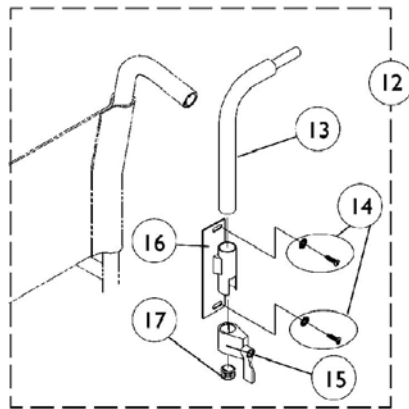
**ON CHAIR: 1558M6
COMPACT JOYSTICK
W/ MTG. HARDWARE**
Used with MK6i display or MPJM6 joystick



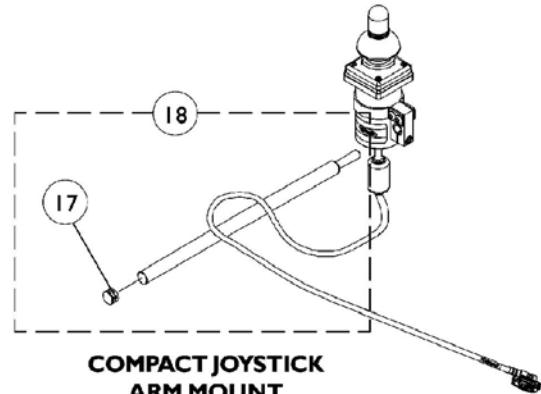
**COMPACT JOYSTICK
MOUNTING HARDWARE**



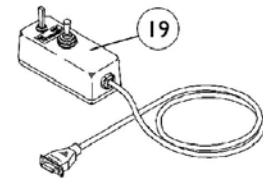
**ON CHAIR: 1826
CHIN CUP ASSEMBLY**



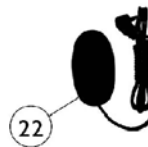
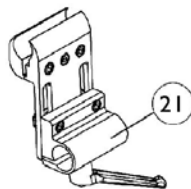
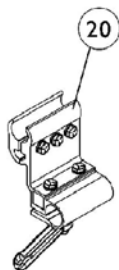
**ON CHAIR: RCM
REAR CANE MOUNT**



**COMPACT JOYSTICK
ARM MOUNT**



**ON CHAIR: 1552M
ATTENDANT CONTROL
JOYSTICK**
Used with SNPM6
Sip-N-Puff/Digital interface

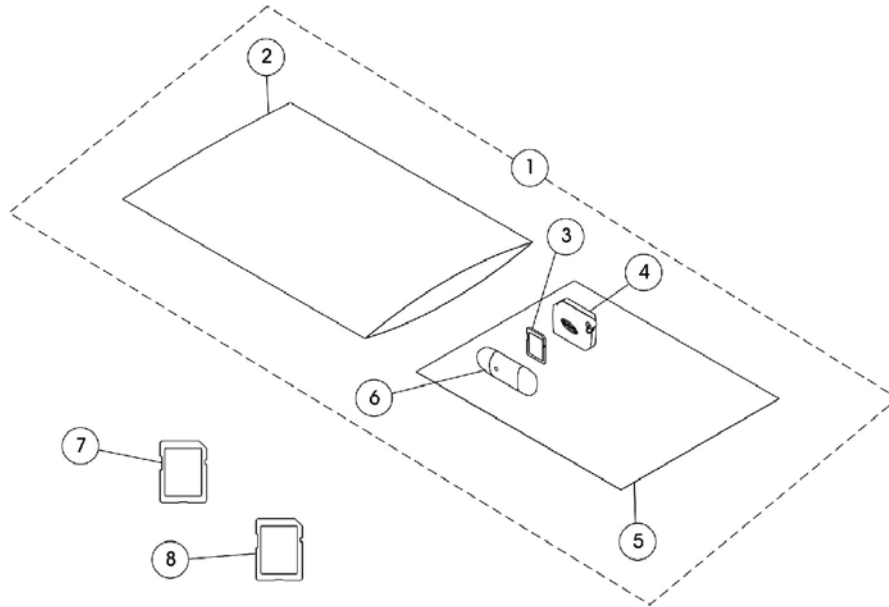


**ON CHAIR: EGSBLK
Reset Switch**
May be required for joystick options listed

Joystick Options

Item Number	Note	Part Number	Description	Quantity Per	
				Package	Assembly
1		1136887	Joystick, MK6 Compact with Mounting Hardware (1558M6)	1	1
2	A	1108012	Hardware, Dual/Compact Joystick Clamp Mounting	1	1
3		1025048	Clamp	1	1
4		1021460	Screw, Socket Button Head (#10-32 x 5/16")	1	4
5		1025045	Clamp, Mounting	1	1
6		1027089	Screw, Socket Head (#10-24 x 1/2")	1	1
7		1026273	Spacer, Split (3/8" I.D.)	1	1
8	B	1020392	Chin Cup Assembly - 1826	1	1
9		1017545	Cup, Chin	1	1
10		1017612	Screw, Adaptor	1	1
11		90032X000	Screw, Socket Set (#8-32 x 1/4")	1	1
12	C	1044917	Hardware, Rear Cane Mount (1673/RCM)	1	1
13		1044918	Tube, Joystick	1	1
14		1026298	Package, Screws with Washers (#10 x 7/8")	1	2
15		1027274	Adjustment Lock Assemnbly, Black	1	1
16		1025245	Bracket, Upright, Black -Right	1	1
17		1027095	Plug Button, Black (7/8")	1	1
18	D	1052309	Tube, Arm Mount with Plug Button, Black	1	1
19		1025590	Joystick, Attendant Control (1552M)	1	1
20		1093071	Clamp, Fixed Height Joystick Tube	1	1
21		1139422	Clamp, Height Adjustable Joystick Tube (ARM250)	1	1
22		1123276	Kit, Switch, Black Egg Reset w/ Hook/Loop Adhesive Back Fastener & Attaching Screws (EGSBLK)	1	1
NOTE: A - Includes items 3-7 B - Includes items 9-11 C - Includes items 13-17 D - Includes item 17					

SD Memory Card and Reader (USB Ready) (1813SD)

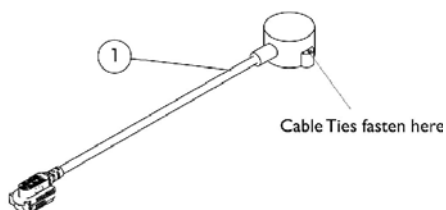


Item Number	Note	Part Number	Description	Quantity Per	
				Package	Assembly
1	A	1145396	Kit, SD Card Professional (USB Ready) (1813SD)	1	1
2			Bag, Poly Zip-Lip (13" L x 9" W)	1	1
3			Card, SD Professional	1	1
4			Holder, Card Memory	1	1
5			Instruction Sheet, Memory Card	1	1
6			Drive, Flash Memory Removable	1	1
5		1143175	Instruction Sheet, Memory Card	1	1
7		1144515	Card, SD Basic	1	1
8		1144516	Card, SD Professional	1	1

NOTE: A - Includes items 2-6.

Sanode

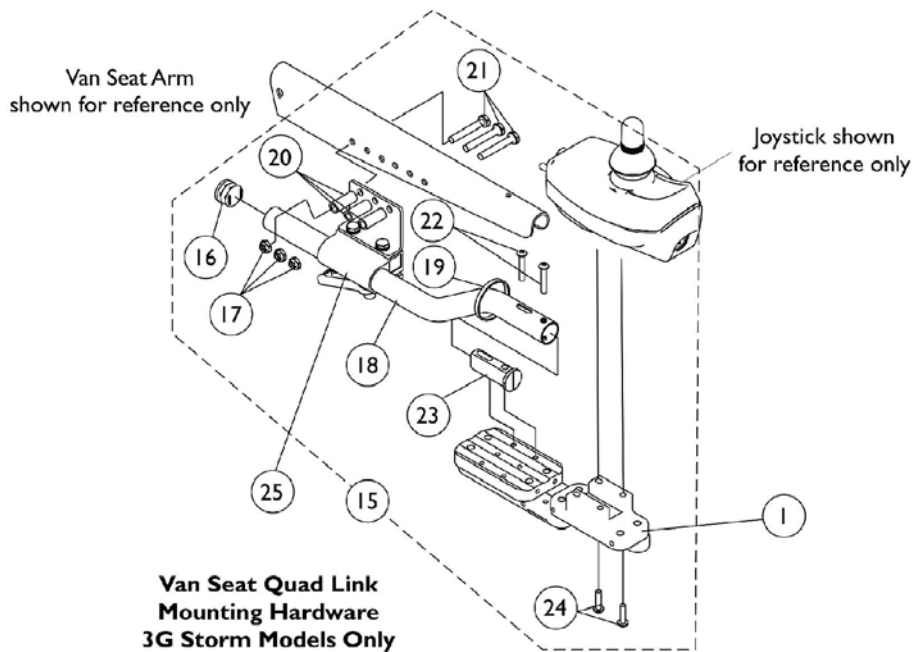
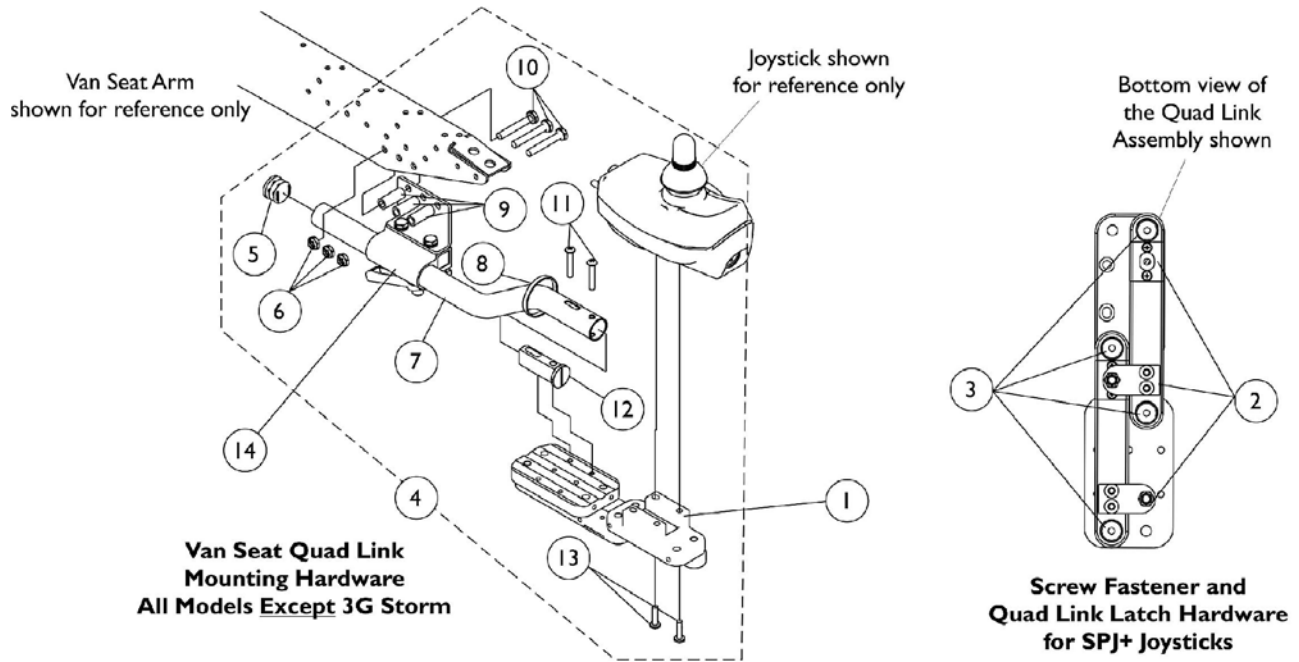
Required for "single" actuator operation through the driver control - multiple drive systems (MPJ+, PSR, PSF, or Display).



Item Number	Note	Part Number	Description	Quantity Per	
				Package	Assembly
1	A	1140045	Sanode, MK6i	1	1
		1095502	Package, Cable Tie (11-1/2" L)	10	1

NOTE: A - Not Shown

Quad Link (QL) - Van Seats with SPJ+ Joysticks

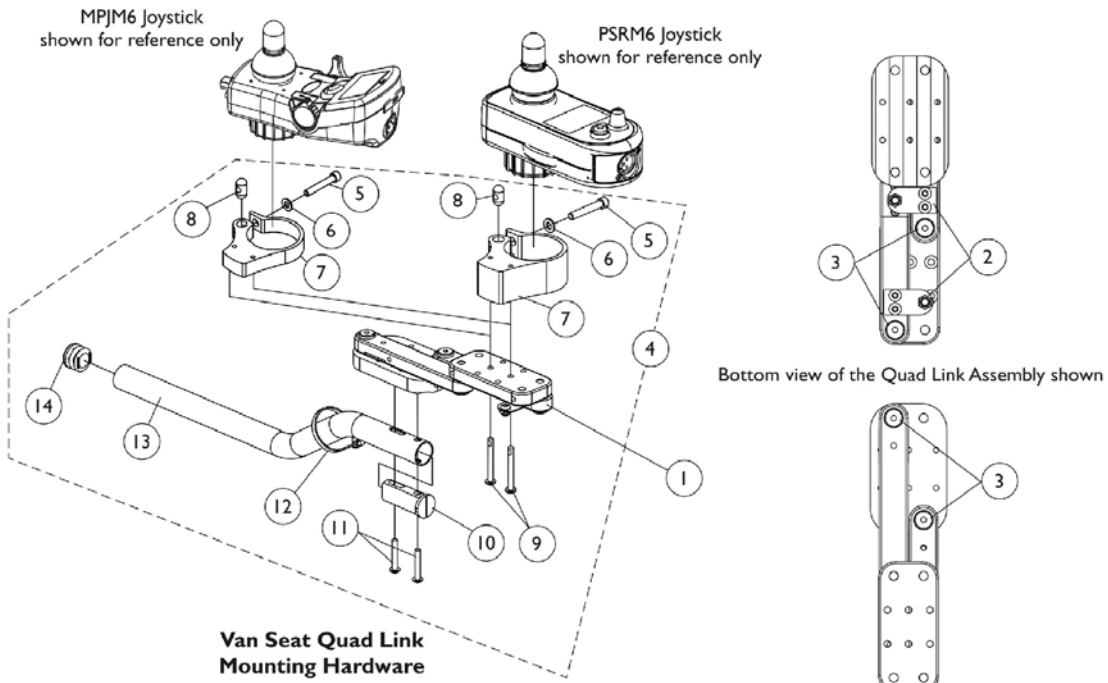


Quad Link (QL) - Van Seats with SPJ+ Joysticks

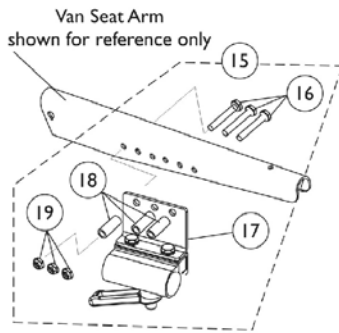
Item Number	Note	Part Number	Description	Quantity Per	
				Package	Assembly
1		1140898	Quad Link (QL) with Instruction Sheet - Right	1	1
1		1140899	Quad Link (QL) with Instruction Sheet - Left	1	1
	E	1134844	Instruction Sheet, Quad Link	1	1
2	A	1140425	Kit, Quad Link Latch Hardware	1	1
3	B	1140424	Kit, Quad Link Screw Fastener Hardware	1	1
4	C	1143042	Kit, Quad Link Mounting Hardware - Van Seat	1	1
5			Plug Button, Black (7/8")	1	1
6			Locknut (1/4-20)	1	3
7			Tube, Joystick Offset (2")	1	1
8			Tie Wrap (11-1/2" L)	1	1
9			Spacer (1/4 x 3/8 x 1")	1	3
10			Screw, Hex Head (1/4-20 x 1-5/8")	1	3
11			Screw, Phillips Pan Head (#10-32 x 1-1/8")	1	2
12			Spacer, Joystick Tube	1	1
13			Screw, Phillips Pan Head w/ Patch (10-32 x 3/4")	1	2
13		1105414	Screw, Phillips Pan Head w/ Patch (10-32 x 3/4")	1	2
14		1139681	Clamp, Van Seat Arm Joystick Tube	1	1
15	D	1143041	Kit, Quad Link Mounting Hardware - Van Seat	1	1
16			Plug Button, Black (7/8")	1	1
17			Locknut (1/4-20)	1	3
18			Tube, Joystick Offset (2")	1	1
19			Tie Wrap (11-1/2" L)	1	1
20			Spacer (1/4 x 7/16 x 5/8")	1	3
21			Screw, Hex Head (1/4-20 x 1-1/4")	1	3
22			Screw, Phillips Pan Head (#10-32 x 1-1/8")	1	2
23			Spacer, Joystick Tube	1	1
24			Screw, Phillips Pan Head w/ Patch (10-32 x 3/4")	1	2
24		1105414	Screw, Phillips Pan Head w/ Patch (10-32 x 3/4")	1	2
25		1105049	Clamp Assembly, Captain/ Van Seat	1	1

NOTE: A - Latch Kit includes 4 ea. Button Head Cap Screws (10-32 x 3/8"), 2 ea. Latch Spring Assembly, 4 ea. Phillips Flat C'Sunk Head Screws, 2 ea. Spring Catch Plates, 2 ea. Socket Head Set Screws (10-32 x 3/8")
 B - Screw Fastener Kit includes 4 ea. Socket Head Shoulder Screws (3/8 x 3/8"), 2 ea. Socket Head Cap Screws (1/4-20 x 3/8"), 2 ea. Socket Head Set Screws (1/4-20 x 1/2"), 4 ea. Socket Head Set Screws (10-32 x 1/8")
 C - Includes items 5-13.
 D - Includes items 16-24.
 E - Not Shown

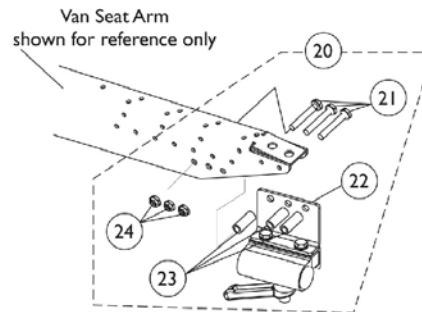
Quad Link (QLM6) - Van Seats with MPJM6/PSRM6/PSFM6 Joysticks



Screw Fastener and Quad Link Latch Hardware For MPJM6/PSRM6/PSFM6 Joysticks



**Joystick Tube Mounting Hardware
3G Storm Models Only**



**Joystick Tube Mounting Hardware
All Models Except 3G Storm**

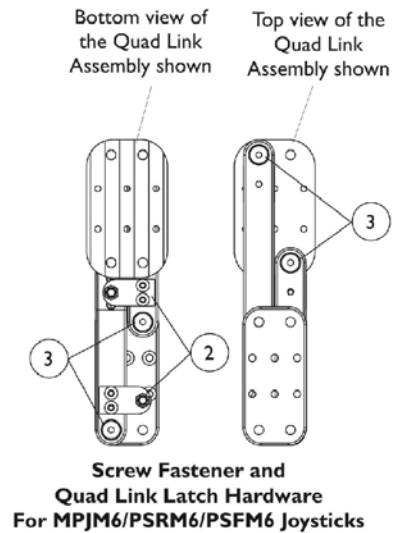
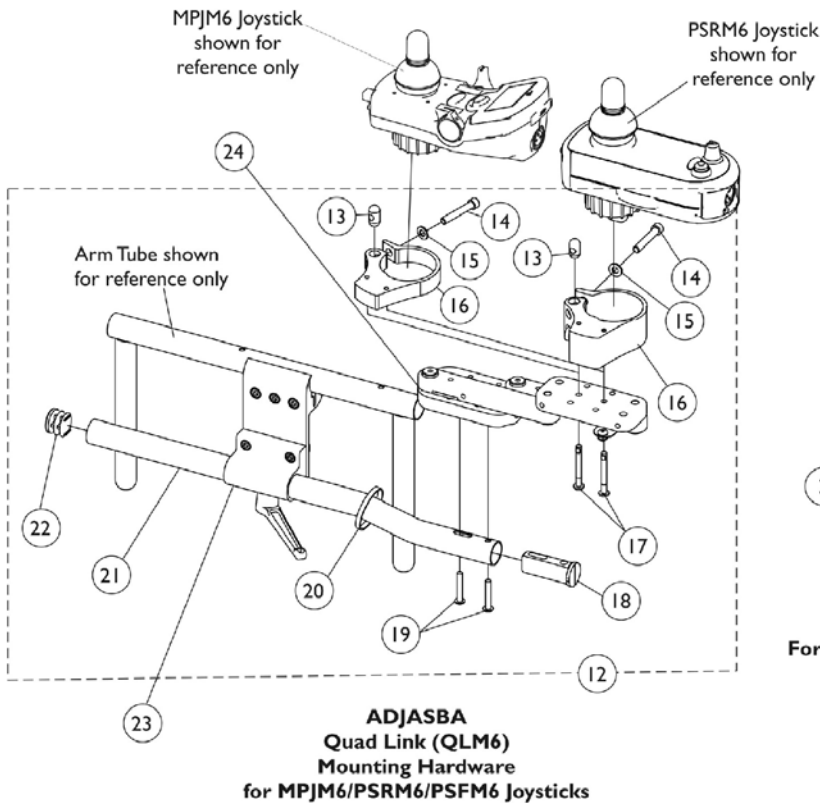
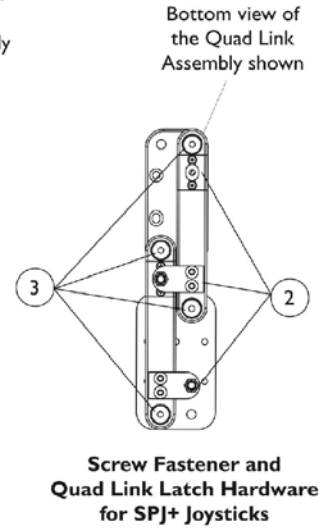
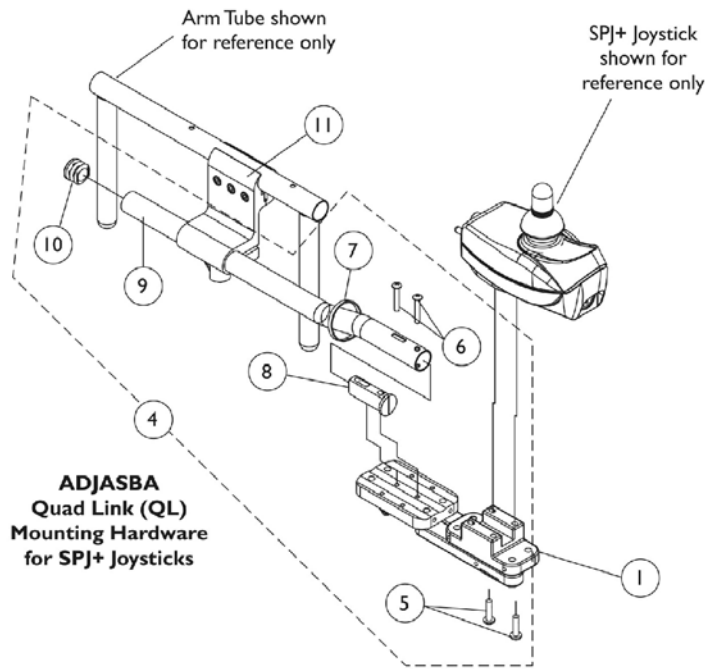
Quad Link (QLM6) - Van Seats with MPJM6/PSRM6/PSFM6 Joysticks

Item Number	Note	Part Number	Description	Quantity Per	
				Package	Assembly
1		1145397	Quad Link (QLM6/QLAM6) - Right	1	1
1		1145398	Quad Link (QLM6/QLAM6) - Left	1	1
	C	1134844	Instruction Sheet, Quad Link	1	1
2	A	1140425	Kit, Quad Link Latch Hardware	1	1
3	B	1140424	Kit, Quad Link Screw Fastener Hardware	1	1
4	I	1154077	Kit, Quad Link Mounting Hardware - Van Seat w/ MPJM6 Joystick	1	1
5			Screw, Socket Head (1/4-28 x 1-1/2")	1	1
6			Washer (1/4 x 1/2 x 1/16")	1	1
7			Clamp, Joystick MK6 Quad Link MPJM6	1	1
8			Pin, Threaded (3/8" x 3/4")	1	1
9			Screw, Phillips Pan Head w/Patch (#10-32 x 7/8")	1	2
10			Spacer, Joystick Tube	1	1
11			Screw, Phillips Pan Head (#10-32 x 1-1/8")	1	2
12			Tie Wrap (11-1/2" L)	1	1
13			Tube, Joystick Offset (2")	1	1
14			Plug Button, Black (7/8")	1	1
4	D,D1	1152661	Kit, Quad Link Mounting Hardware - Van Seat w/ PSRM6/PSFM6 Joystick	1	1
5			Screw, Socket Head (1/4-28 x 1-1/2")	1	1
6			Washer (1/4 x 1/2 x 1/16")	1	1
7			Clamp, Joystick (1-1/4" Thick Material)	1	1
8			Pin, Threaded (3/8" x 3/4")	1	1
9			Screw, Phillips Pan Head w/ Patch (#10-32 x 1-5/8")	1	2
10			Spacer, Joystick Tube	1	1
11			Screw, Phillips Pan Head (#10-32 x 1-1/8")	1	2
12			Tie Wrap (11-1/2" L)	1	1
13			Tube, Joystick Offset (2")	1	1
14			Plug Button, Black (7/8")	1	1
7	I	1153820	Clamp, Joystick MK6 Quad Link MPJM6	1	1
7	F	1152026	Clamp, Joystick (1-1/4" Thick Material)	1	1
9	G	1139677	Screw, Phillips Pan Head (#10-32 x 1")	1	2
9	H	1025723	Screw, Phillips Pan Head w/ Patch (#10-32 x 1-5/8")	1	2
9	J	1029157	Screw, Phillips Pan Head w/Patch (#10-32 x 7/8")	1	2
15		1105050	Kit, Joystick Tube Mounting Hardware - Captain/ Van Seat	1	1
16		1057955	Screw, Hex Head (1/4-20 x 1-1/4")	1	3
17		1105049	Clamp Assembly, Captain/ Van Seat	1	1
18		1101524	Spacer (1/4 x 7/16 x 5/8")	1	3
19		1025195	Locknut (1/4-20)	1	3
20	E	1142480	Kit, Joystick Tube Mounting Hardware - Captain/Van Seat	1	1
21			Screw, Hex Head (1/4-20 x 1-5/8")	1	3
22			Clamp, Van Seat Arm Joystick Tube	1	1

Quad Link (QLM6) - Van Seats with MPJM6/PSRM6/PSFM6 Joysticks

Item Number	Note	Part Number	Description	Quantity Per	
				Package	Assembly
23			Spacer (1/4 x 3/8 x 1")	1	3
24			Locknut (1/4-20)	1	3
21		1037610	Screw, Hex Head (1/4-20 x 1-5/8")	1	3
22		1139681	Clamp, Van Seat Arm Joystick Tube	1	1
23		1087219	Spacer (1/4 x 3/8 x 1")	1	3
24		1025195	Locknut (1/4-20)	1	3
<p>NOTE: A - Latch Kit includes 4 ea. Button Head Cap Screws (#10-32 x 3/8"), 2 ea. Latch Spring Assembly, 4 ea. Phillips Flat C'Sunk Head Screws, 2 ea. Spring Catch Plates, 2 ea. Socket Head Set Screws (10-32 x 3/8")</p> <p>B - Screw Fastener Kit includes 4 ea. Socket Head Shoulder Screws (3/8 x 3/8"), 2 ea. Socket Head Cap Screws (1/4-20 x 3/8"), 2 ea. Socket Head Set Screws (1/4-20 x 1/2"), 4 ea. Socket Head Set Screws (#10-32 x 1/8")</p> <p>C - Not Shown</p> <p>D - Includes items 5-14. Joystick Clamp was revised from 5/8" to 1-1/4" material 10/31/07 to accommodate not only the MPJM6 but the PSFM6/PSRM6 Joysticks also.</p> <p>D1 - As of 3/13/08 the 1-1/4" thick Joystick Clamp is no longer used for MPJM6 Joysticks and used exclusively for PSRM6/PSFM6 only. See item 4 pt# 1154077 for "all" MPJM6 Joysticks.</p> <p>E - Includes items 21-24</p> <p>F - As of 3/13/08 the 1-1/4" thick Joystick Clamp is used exclusively for PSRM6/PSFM6. See item 7 pt# 1153820 Joystick Clamp and item 9 pt # 1029157 Screws for "all" MPJM6 Joysticks.</p> <p>G - Before 10/31/07. Used with Joystick Clamp 5/8" thick material.</p> <p>H - After 10/30/07. Used with Joystick Clamp 1-1/4" thick material.</p> <p>I - As of 3/13/08 a new Quad Link Joystick Clamp and Mounting Hardware was created exclusively for MPJM6 Joysticks. The new Quad Link Clamp is backward compatible for all MPJM6 Joysticks in the field.</p> <p>J - After 3/12/08 used with MPJM6 Quad Joystick Clamp pt # 1153820 only.</p>					

Quad Link (QL) and (QLM6) - ADJASBA Seats



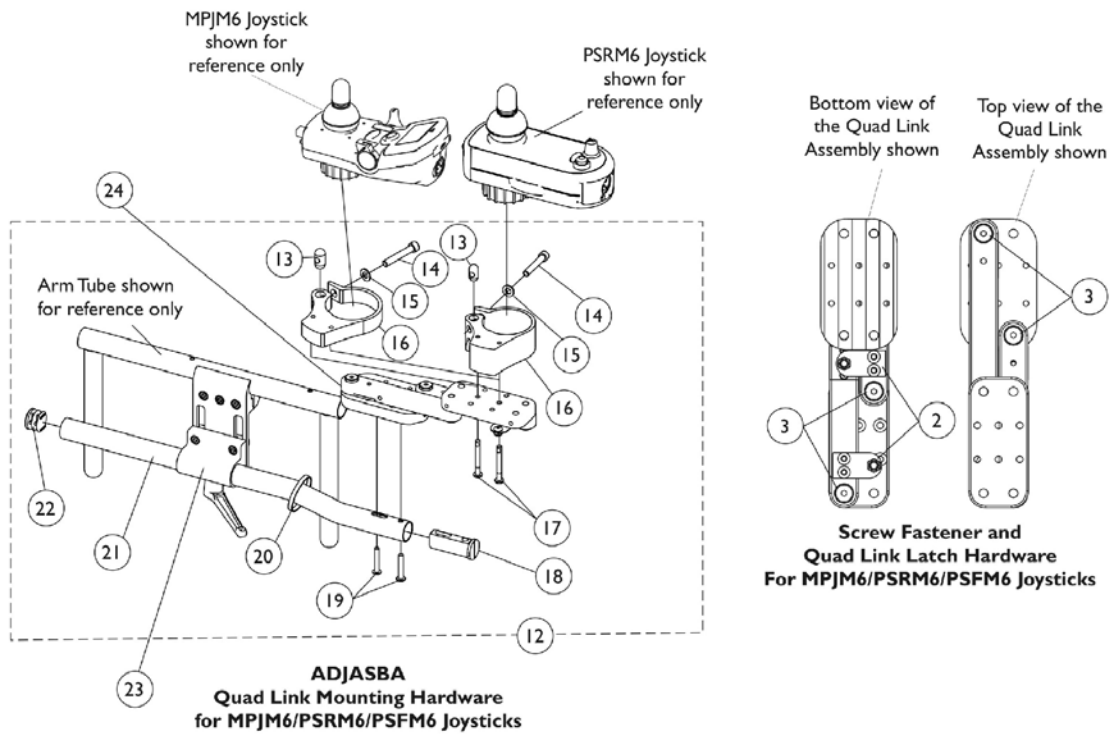
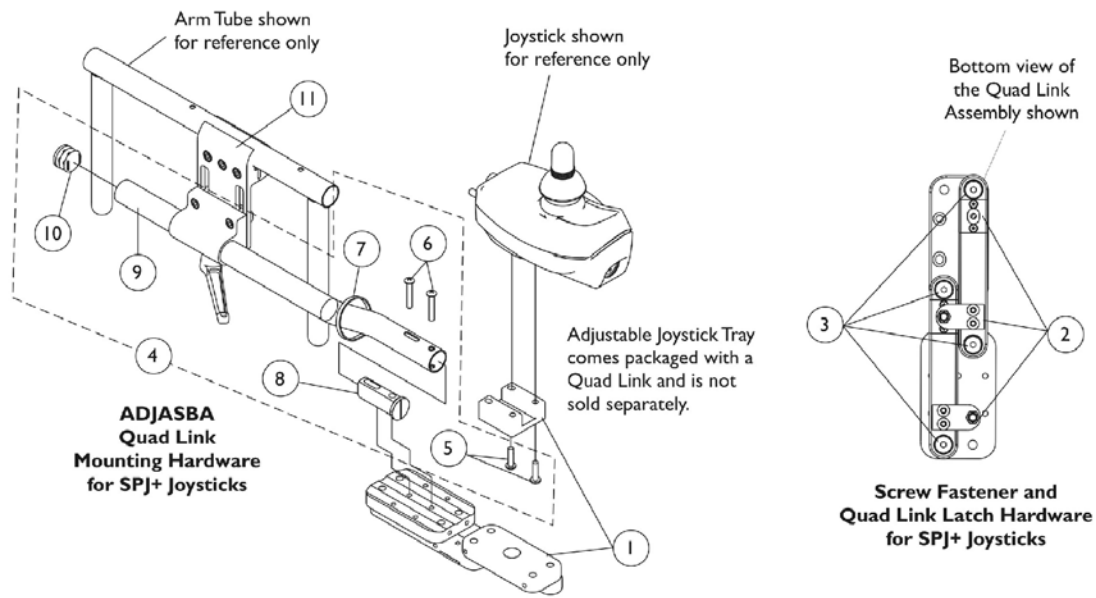
Quad Link (QL) and (QLM6) - ADJASBA Seats

Item Number	Note	Part Number	Description	Quantity Per	
				Package	Assembly
1	D	1140898	Quad Link (QL) with Instruction Sheet - Right	1	1
1	D	1140899	Quad Link (QL) with Instruction Sheet - Left	1	1
	G	1134844	Instruction Sheet, Quad Link	1	1
2	A	1140425	Kit, Quad Link Latch Hardware	1	1
3	B	1140424	Kit, Quad Link Screw Fastener Hardware	1	1
4	C	1142937	Kit, ASBA/ADJASBA Quad Link Mounting Hardware	1	1
5			Screw, Phillips Pan Head w/ Patch (10-32 x 3/4")	1	2
6			Screw, Phillips Pan Head (#10-32 x 1-1/8")	1	2
7			Tie Wrap (11-1/2" L)	1	1
8			Spacer, Joystick Tube	1	1
9			Tube, Joystick Offset (2")	1	1
10			Plug Button, Black (7/8")	1	1
5		1105414	Screw, Phillips Pan Head w/ Patch (10-32 x 3/4")	1	2
11		1093071	Clamp, Fixed Height Joystick Tube	1	1
12	K	1154076	Kit, Quad Link Mounting Hardware - MPJM6 Joysticks	1	1
13			Pin, Threaded (3/8" x 3/4")	1	1
14			Screw, Socket Head (1/4-28 x 1-1/2")	1	1
15			Washer (1/4 x 1/2 x 1/16")	1	1
16			Clamp, Joystick MK6 Quad Link MPJM6	1	1
17			Screw, Phillips Pan Head w/Patch (#10-32 x 7/8")	1	2
18			Spacer, Joystick Tube	1	1
19			Screw, Phillips Pan Head (#10-32 x 1-1/8")	1	2
20			Tie Wrap (11-1/2" L)	1	1
21			Tube, Joystick Offset (1/2")	1	1
22			Plug Button, Black (7/8")	1	1
12	F,F1	1152027	Kit, Quad Link Mounting Hardware - PSRM6/PSFM6 Joysticks	1	1
13			Pin, Threaded (3/8" x 3/4")	1	1
14			Screw, Socket Head (1/4-28 x 1-1/2")	1	1
15			Washer (1/4 x 1/2 x 1/16")	1	1
16			Clamp, Joystick (1-1/4" Thick Material)	1	1
17			Screw, Phillips Pan Head w/ Patch (#10-32 x 1-5/8")	1	2
18			Spacer, Joystick Tube	1	1
19			Screw, Phillips Pan Head (#10-32 x 1-1/8")	1	2
20			Tie Wrap (11-1/2" L)	1	1
21			Tube, Joystick Offset (1/2")	1	1
22			Plug Button, Black (7/8")	1	1
16	K	1153820	Clamp, Joystick MK6 Quad Link MPJM6	1	1
16	H	1152026	Clamp, Joystick (1-1/4" Thick Material)	1	1
17	I	1139677	Screw, Phillips Pan Head (#10-32 x 1")	1	2
17	J	1025723	Screw, Phillips Pan Head w/ Patch (#10-32 x 1-5/8")	1	2
17	L	1029157	Screw, Phillips Pan Head w/Patch (#10-32 x 7/8")	1	2
23		1093071	Clamp, Fixed Height Joystick Tube	1	1
24	E	1145397	Quad Link (QLM6/QLAM6) - Right	1	1

Quad Link (QL) and (QLM6) - ADJASBA Seats

Item Number	Note	Part Number	Description	Quantity Per	
				Package	Assembly
24	E	1145398	Quad Link (QLM6/QLAM6) - Left	1	1
<p>NOTE:</p> <p>A - Latch Kit includes 4 ea. Button Head Cap Screws (#10-32 x 3/8"), 2 ea. Latch Spring Assembly, 4 ea. Phillips Flat C'Sunk Head Screws, 2 ea. Spring Catch Plates, 2 ea. Socket Head Set Screws (10-32 x 3/8")</p> <p>B - Screw Fastener Kit includes 4 ea. Socket Head Shoulder Screws (3/8 x 3/8"), 2 ea. Socket Head Cap Screws (1/4-20 x 3/8"), 2 ea. Socket Head Set Screws (1/4-20 x 1/2"), 4 ea. Socket Head Set Screws (#10-32 x 1/8")</p> <p>C - Includes items 5-10.</p> <p>D - For use with SPJ+ Joysticks.</p> <p>E - For use with MPJM6/PSRM6/PSFM6 Joysticks.</p> <p>F - Includes items 13-22. Joystick Clamp was revised from 5/8" to 1-1/4" material 10/31/07 to accommodate not only the MPJM6 but the PSFM6/PSRM6 Joysticks also.</p> <p>F1 - As of 3/13/08 the 1-1/4" thick Joystick Clamp is no longer used for MPJM6 Joysticks and used exclusively for PSRM6/PSFM6 only. See item 12 pt# 1154076 for "all" MPJM6 Joysticks.</p> <p>G - Not Shown</p> <p>H - As of 3/13/08 the 1-1/4" thick Joystick Clamp is used exclusively for PSRM6/PSFM6. See item 16 pt# 1153820 Joystick Clamp and item 17 pt # 1029157 Screws for "all" MPJM6 Joysticks.</p> <p>I - Before 10/31/07. Used with Joystick Clamp 5/8" thick material.</p> <p>J - After 10/30/07. Used with Joystick Clamp 1-1/4" thick material.</p> <p>K - As of 3/13/08 a new Quad Link Joystick Clamp and Mounting Hardware was created exclusively for MPJM6 Joysticks. The new Quad Link Clamp is backward compatible for all MPJM6 Joysticks in the field.</p> <p>L - After 3/12/08 used with MPJM6 Quad Joystick Clamp pt # 1153820 only.</p>					

Quad Link (QLA) and (QLAM6)



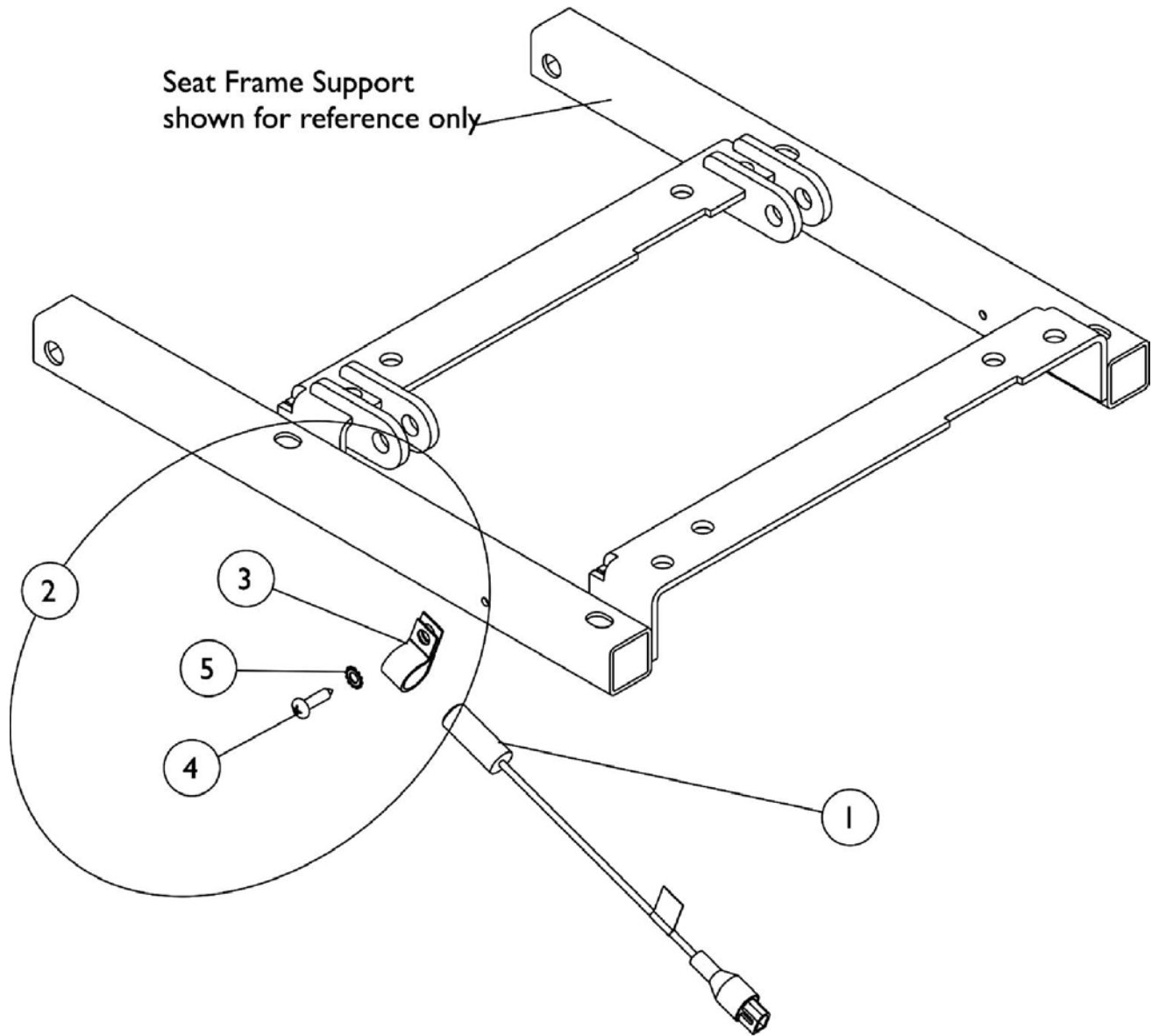
Quad Link (QLA) and (QLAM6)

Item Number	Note	Part Number	Description	Quantity Per	
				Package	Assembly
1	D	1140896	Quad Link w/ Adjustable Joystick Tray (QLA) and Instruction Sheet - Right	1	1
1	D	1140897	Quad Link w/ Adjustable Joystick Tray (QLA) and Instruction Sheet - Left	1	1
	G	1134844	Instruction Sheet, Quad Link	1	1
2	A	1140425	Kit, Quad Link Latch Hardware	1	1
3	B	1140424	Kit, Quad Link Screw Fastener Hardware	1	1
4	C	1139416	Kit, ASBA/ADJASBA Quad Link Mounting Hardware	1	1
5			Screw, Phillips Pan Head w/ Patch (10-32 x 3/4")	1	2
6			Screw, Phillips Pan Head (#10-32 x 1-1/8")	1	2
7			Tie Wrap (11-1/2" L)	1	1
8			Spacer, Joystick Tube	1	1
9			Tube, Joystick Offset (1/2")	1	1
10			Plug Button, Black (7/8")	1	1
5		1105414	Screw, Phillips Pan Head w/ Patch (10-32 x 3/4")	1	2
11		1139422	Clamp, Height Adjustable Joystick Tube (ARM250)	1	1
12	K	1154076	Kit, Quad Link Mounting Hardware - MPJM6 Joysticks	1	1
13			Pin, Threaded (3/8" x 3/4")	1	1
14			Screw, Socket Head (1/4-28 x 1-1/2")	1	1
15			Washer (1/4 x 1/2 x 1/16")	1	1
16			Clamp, Joystick MK6 Quad Link MPJM6	1	1
17			Screw, Phillips Pan Head w/Patch (#10-32 x 7/8")	1	2
18			Spacer, Joystick Tube	1	1
19			Screw, Phillips Pan Head (#10-32 x 1-1/8")	1	2
20			Tie Wrap (11-1/2" L)	1	1
21			Tube, Joystick Offset (1/2")	1	1
22			Plug Button, Black (7/8")	1	1
12	F1,F	1152027	Kit, Quad Link Mounting Hardware - PSRM6/PSFM6 Joysticks	1	1
13			Pin, Threaded (3/8" x 3/4")	1	1
14			Screw, Socket Head (1/4-28 x 1-1/2")	1	1
15			Washer (1/4 x 1/2 x 1/16")	1	1
16			Clamp, Joystick (1-1/4" Thick Material)	1	1
17			Screw, Phillips Pan Head w/ Patch (#10-32 x 1-5/8")	1	2
18			Spacer, Joystick Tube	1	1
19			Screw, Phillips Pan Head (#10-32 x 1-1/8")	1	2
20			Tie Wrap (11-1/2" L)	1	1
21			Tube, Joystick Offset (1/2")	1	1
22			Plug Button, Black (7/8")	1	1
16	K	1153820	Clamp, Joystick MK6 Quad Link MPJM6	1	1
16	H	1152026	Clamp, Joystick (1-1/4" Thick Material)	1	1
17	I	1139677	Screw, Phillips Pan Head (#10-32 x 1")	1	2
17	J	1025723	Screw, Phillips Pan Head w/ Patch (#10-32 x 1-5/8")	1	2
17	L	1029157	Screw, Phillips Pan Head w/Patch (#10-32 x 7/8")	1	2

Quad Link (QLA) and (QLAM6)

Item Number	Note	Part Number	Description	Quantity Per	
				Package	Assembly
23		1139422	Clamp, Height Adjustable Joystick Tube (ARM250)	1	1
24	E	1145397	Quad Link (QLM6/QLAM6) - Right	1	1
24	E	1145398	Quad Link (QLM6/QLAM6) - Left	1	1
<p>NOTE: A - Latch Kit includes 4 ea. Button Head Cap Screws (#10-32 x 3/8"), 2 ea. Latch Spring Assembly, 4 ea. Phillips Flat C'Sunk Head Screws, 2 ea. Spring Catch Plates, 2 ea. Socket Head Set Screws (10-32 x 3/8")</p> <p>B - Screw Fastener Kit includes 4 ea. Socket Head Shoulder Screws (3/8 x 3/8"), 2 ea. Socket Head Cap Screws (1/4-20 x 3/8"), 2 ea. Socket Head Set Screws (1/4-20 x 1/2"), 4 ea. Socket Head Set Screws (#10-32 x 1/8")</p> <p>C - Includes items 5-10.</p> <p>D - For use with SPJ+ Joysticks.</p> <p>E - For use with MPJM6/PSRM6/PSFM6 Joysticks.</p> <p>F - Includes items 13-22. Joystick Clamp was revised from 5/8" to 1-1/4" material 10/31/07 to accommodate not only the MPJM6 but the PSFM6/PSRM6 Joysticks also.</p> <p>F1 - As of 3/13/08 the 1-1/4" thick Joystick Clamp is no longer used for MPJM6 Joysticks and used exclusively for PSRM6/PSFM6 only. See item 12 pt# 1154076 for "all" MPJM6 Joysticks.</p> <p>G - Not Shown</p> <p>H - As of 3/13/08 the 1-1/4" thick Joystick Clamp is used exclusively for PSRM6/PSFM6. See item 16 pt# 1153820 Joystick Clamp and item 17 pt # 1029157 Screws for "all" MPJM6 Joysticks.</p> <p>I - Before 10/31/07. Used with Joystick Clamp 5/8" thick material.</p> <p>J - After 10/30/07. Used with Joystick Clamp 1-1/4" thick material.</p> <p>K - As of 3/13/08 a new Quad Link Joystick Clamp and Mounting Hardware was created exclusively for MPJM6 Joysticks. The new Quad Link Clamp is backward compatible for all MPJM6 Joysticks in the field.</p> <p>L - After 3/12/08 used with MPJM6 Quad Joystick Clamp pt # 1153820 only.</p>					

Switch, Drive Lockout Mercury (MK6i) For PTO on 3G Storm

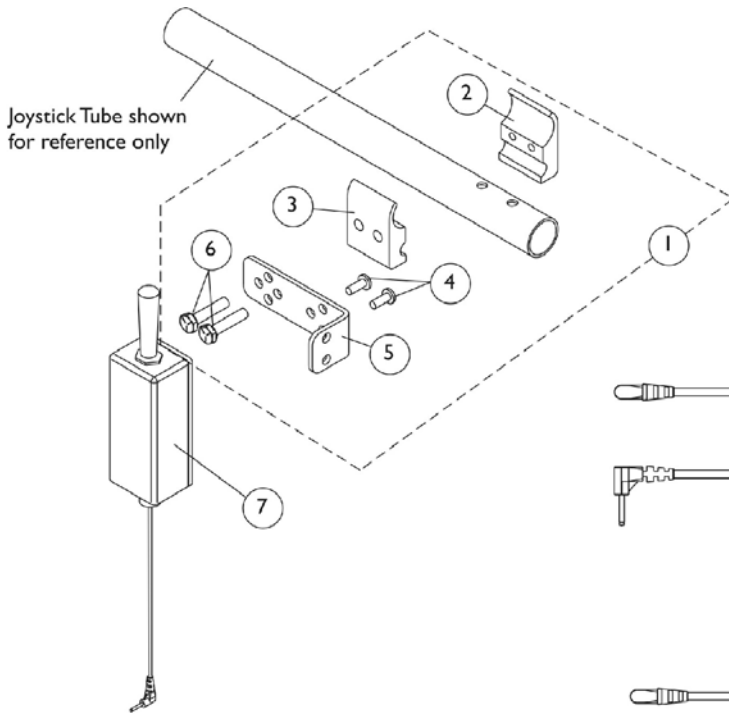


Switch, Drive Lockout Mercury (MK6i) For PTO on 3G Storm

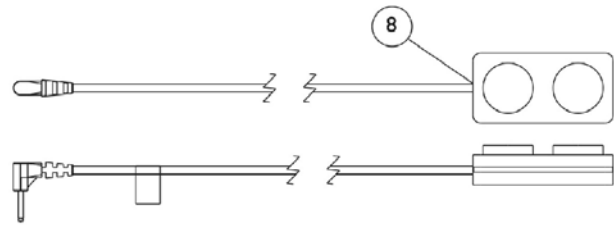
Item Number	Note	Part Number	Description	Quantity Per	
				Package	Assembly
1		1140099	Switch, Drive Lockout Mercury (MK6i)	1	1
2	A	1106544	Kit, Switch Clip with Mounting Hardware	1	1
3			Bracket, Cable/Wire Mounting, Black	1	1
4			Screw, Phillips Self-Tapping (#10-32 x 3/4")	1	1
5			Lockwasher, External Tooth (#10)	1	1

NOTE: A - Includes items 3-5

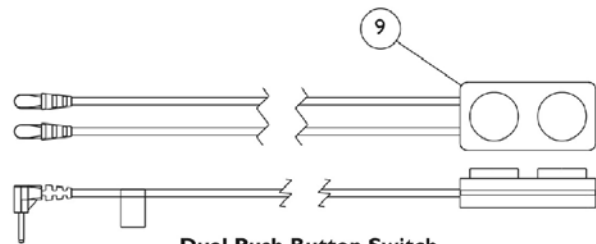
Dual Push Button Switches, Dual Toggle Switch (2SW) & Monoport "Y" Phono Cable (MPY)



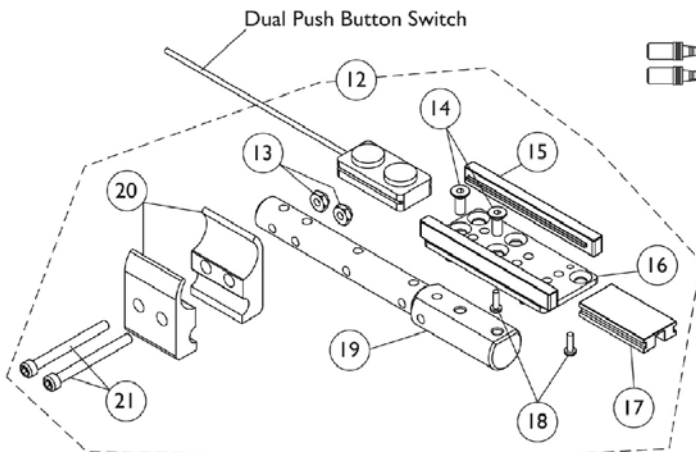
Dual Toggle Switch (2SW)



Dual Push Button Switch (2PB)



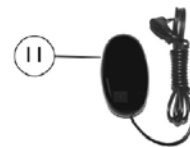
Dual Push Button Switch



**Push Button Switch
Armrest Mounting Hardware**



Monoport "Y" Phono Cable (MPY)

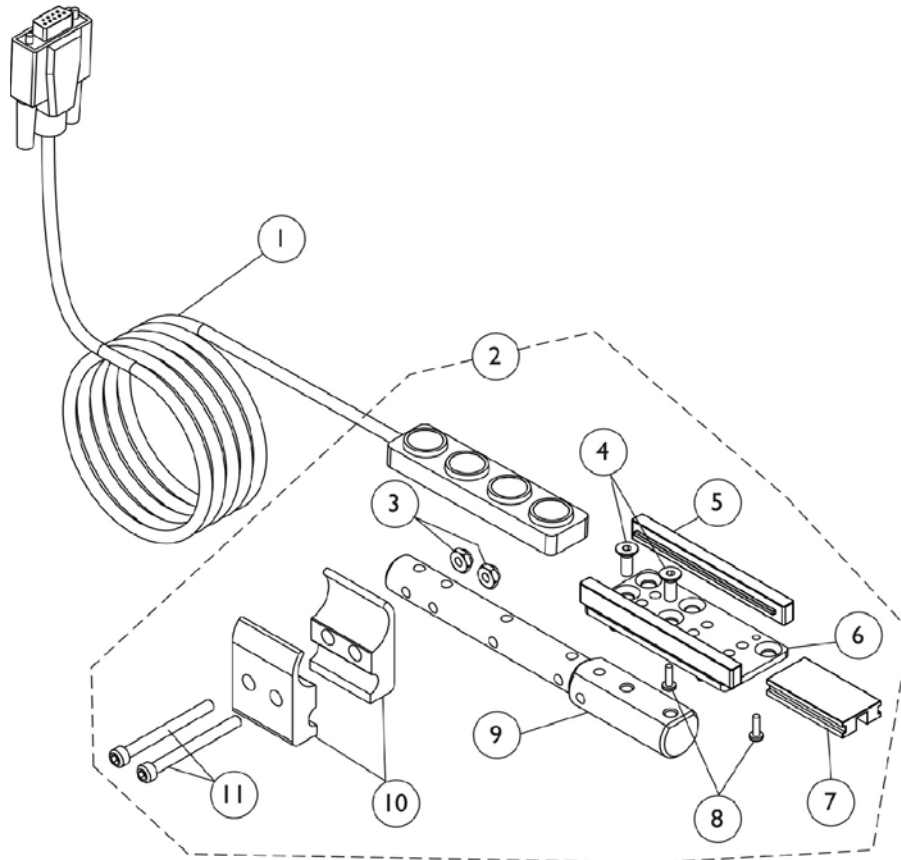


Egg Switch (EGSBLK)

Dual Push Button Switches, Dual Toggle Switch (2SW) & Monoport "Y" Phono Cable (MPY)

Item Number	Note	Part Number	Description	Quantity Per	
				Package	Assembly
1	A	1091496	Kit, Joystick Tube Toggle Switch Mounting Hardware	1	1
2			Half Clamp, Threaded Holes	1	1
3			Half Clamp, Non-Threaded Holes	1	1
4			Screw, Hex Head Cap w/ Patch (1/4-20 x 1/2")	1	2
5			Bracket, Toggle Switch Mounting, Black	1	1
6			Screw, Hex Head (1/4-20 x 1-1/8")	1	2
7	B	1142221	Switch, Dual Function Toggle (2SW)	1	1
8	B,D	1153635	Kit, Switch, Dual Push Button (2PB) (MPJ+, MK6i Display, PSFM6/PSRM6 Joysticks)	1	1
9	D,E	1157818	Kit, Switch, Dual Push Button (Spj+ Joysticks Only)	1	1
10	C	1140027	Cable, Monoport "Y" Phono (MPY)	1	1
11		1123276	Kit, Switch, Black Egg Reset w/ Hook/Loop Adhesive Back Fastener & Attaching Screws (EGSBLK)	1	1
12	F	1157817	Kit, Push Button Switch Armrest Mounting Hardware (PBMT)	1	1
13			Locknut (#10-32)	1	2
14			Screw, Socket Flat Countersunk Head (10-32 x 1/2")	1	2
15			Rail, Push Button Slide	1	2
16			Plate, Push Button Mounting	1	1
17			Blank, 2-Position Push Button	1	1
18			Screw, Phillips Pan Head Tap (4-40 x 3/8")	1	4
19			Bar, Push Button Support	1	1
20			Half Clamp, Non-Threaded Holes	1	2
21			Screw, Socket Head (#10-32 x 2")	1	2
<p>NOTE: A - Includes items 2-6 B - For use in the mode switch port of the MK6i Display, MPJ+, PSFM6 and PSRM6 Joysticks to provide TWO programmable switch functions, (Mono Port 1 and Mono Port 2 of the calibrations menu). Not compatible with SPJ+ Joysticks. C - Monoport "Y" Phono Cable allows adding a second switch (ex. Egg Reset Switch) to the mode switch port of the MK6i Display, MPJ+, PSFM6 and PSRM6 Joysticks. The "Y" Phono Cable can not be used with item #7 or #8 switches D - Includes the Dual Push Button Switch with Hook & Loop Adhesive Back Fastener. E - For use in the switch ports of the MK6 SPJ+ w/ PSS (SPJAP) or MK6i SPJ+ w/ ACC (SPJAPM) Joystick to provide TWO programmable switch functions, (Mono Port 1 and Mono Port 2 of the calibrations menu). F - Kit is sold complete and includes items 13-21. Kit is standard on TDX SPREE with SPJ+ Joystick</p>					

Quad Push Button (QPB) and Mounting Hardware

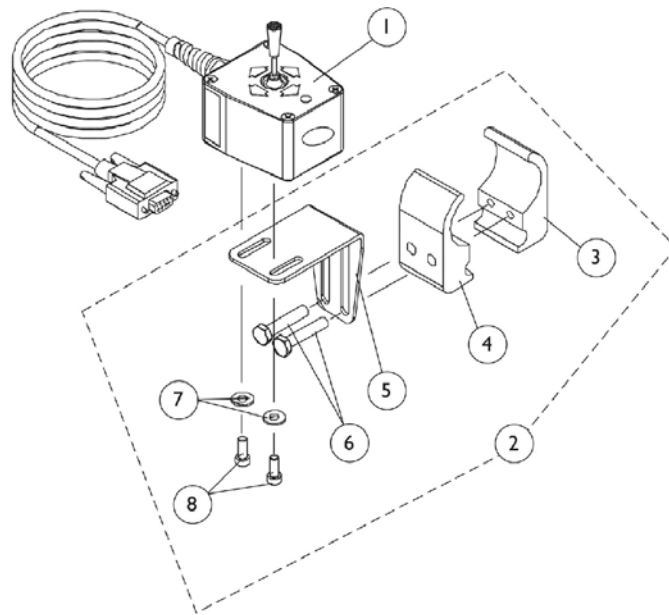


**Push Button Switch
Armrest Mounting Hardware**

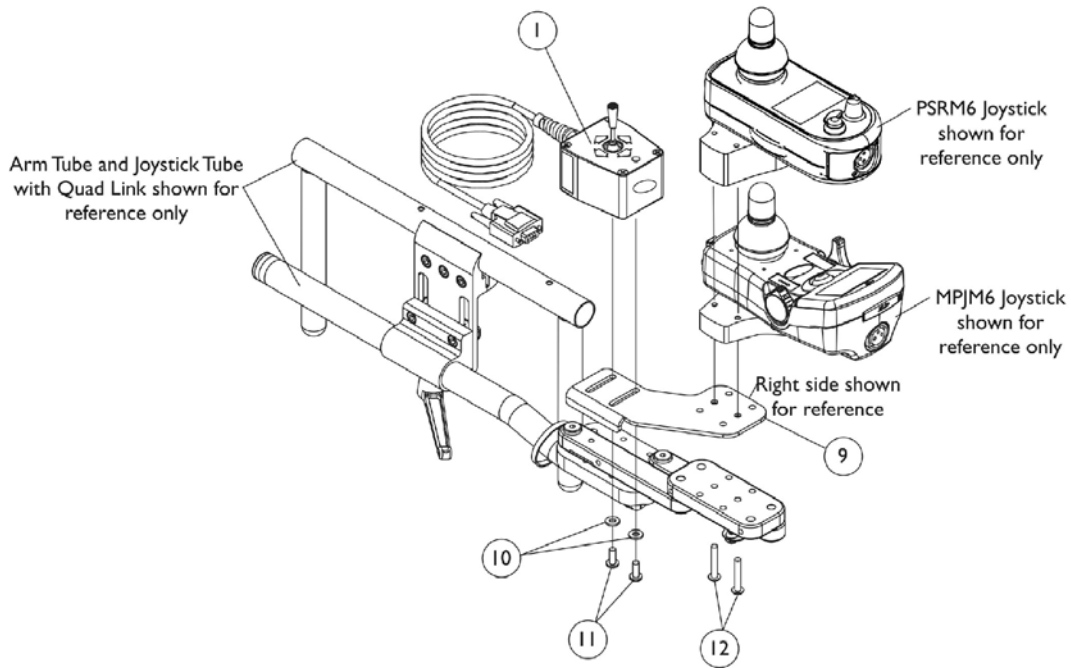
Quad Push Button (QPB) and Mounting Hardware

Item Number	Note	Part Number	Description	Quantity Per	
				Package	Assembly
1	A	1153636	Kit, Switch, Quad Push Button (QPB)	1	1
2	B	1157817	Kit, Push Button Switch Armrest Mounting Hardware (PBMT)	1	1
3			Locknut (#10-32)	1	2
4			Screw, Socket Flat Countersunk Head (10-32 x 1/2")	1	2
5			Rail, Push Button Slide	1	2
6			Plate, Push Button Mounting	1	1
7			Blank, 2-Position Push Button	1	1
8			Screw, Phillips Pan Head Tap (4-40 x 3/8")	1	4
9			Bar, Push Button Support	1	1
10			Half Clamp, Non-Threaded Holes	1	2
11			Screw, Socket Head (#10-32 x 2")	1	2
NOTE: A - Includes the Quad Push Button Switch with Hook & Loop Adhesive Back Fastener B - Kit is sold complete and includes items 3-11.					

4-Way Toggle Switch (FWT) and Mounting Hardware



**4-Way Switch
Joystick Tube Mounting Hardware**



**4-Way Switch
Quad Link Mounting Hardware**

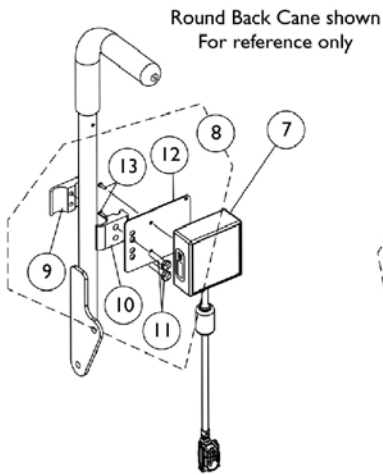
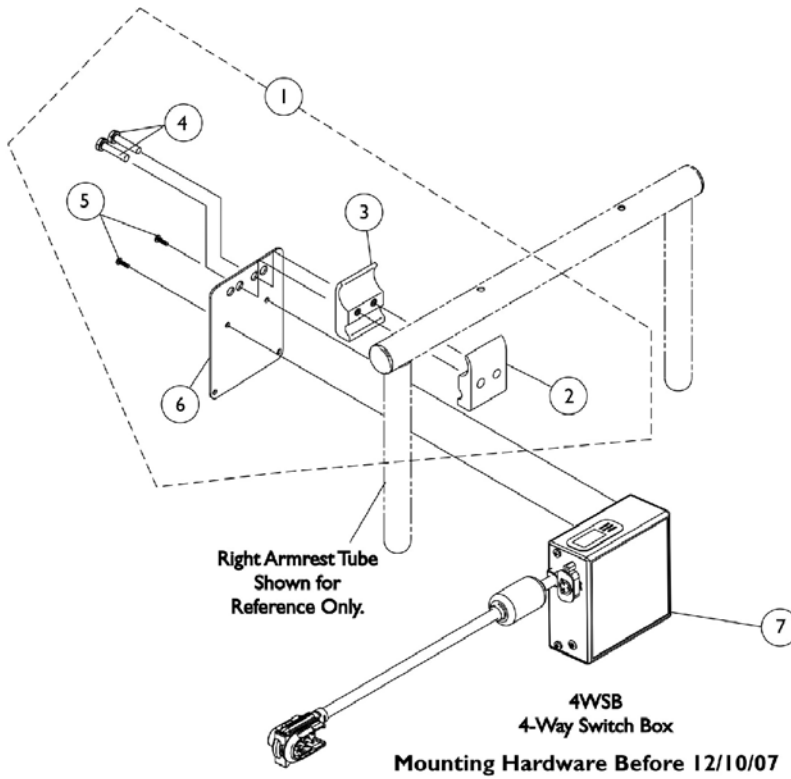
4-Way Toggle Switch (FWT) and Mounting Hardware

Item Number	Note	Part Number	Description	Quantity Per	
				Package	Assembly
1		1080116	Switch, 4-Way (FWT)	1	1
2	B,A	1077519	Kit, 4-Way Switch Joystick Tube Mounting Hardware	1	1
3			Half Clamp, Threaded Holes	1	1
4			Half Clamp, Non-Threaded Holes	1	1
5			Bracket, Joystick Mounting, Black	1	1
6			Screw, Hex Head (1/4-20 x 1-1/8")	1	2
7			Washer (#10 Flat)	1	2
8			Screw, Phillips Pan Head (#10-32 x 1/2")	1	2
9		1145404	Bracket, 4-Way Switch, Black - Right	1	1
9		1145405	Bracket, 4-Way Switch - Left	1	1
10		1059111	Washer, Nylon (#10)	1	2
11		1026114	Screw, Phillips Pan Head (#10-32 x 1/2")	1	2
12	C	1025714	Screw, Phillips Pan Head (#10-32 x 1-1/8")	1	2
12	D	1025723	Screw, Phillips Pan Head w/ Patch (#10-32 x 1-5/8")	1	2

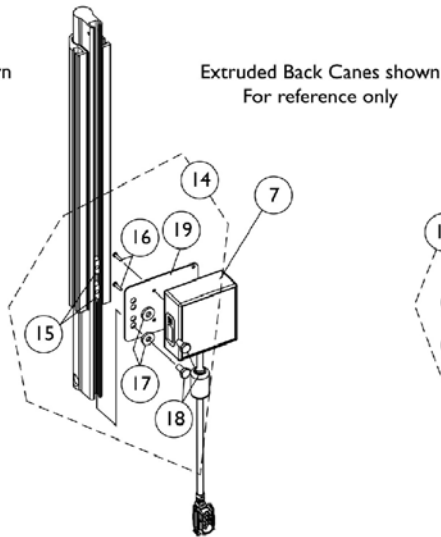
NOTE: A - Includes items 3-8.
 B - As of 5/22/07 the orientation of the Hardware was revised to attach the electronics closer to the chair. The Mounting Hardware Kit is backward compatible.
 C - Before 10/31/07. The 1-1/8" long screw is used with Joystick Clamp 5/8" thick material.
 D - After 10/30/07. Joystick Clamp was revised from 5/8" to 1-1/4" material 10/31/07 to accommodate not only the MPJM6 but the PSFM6/PSRM6 Joysticks also.

4-Way Switch Box (4WSB) and Mounting Hardware

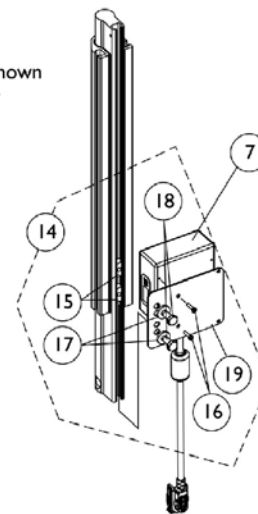
Must use a Four-Way Toggle Switch (FWT) or Quad Push Button (QPB) with a Four-Way Switch Box (4WSB)



Mounting Hardware For Round Back Canes
After 12/9/07



Mounting Hardware For Conventional Seating with Extruded Back Canes
After 12/9/07



Mounting Hardware For Contoura Seating with Extruded Back Canes
After 12/9/07

4-Way Switch Box (4WSB) and Mounting Hardware

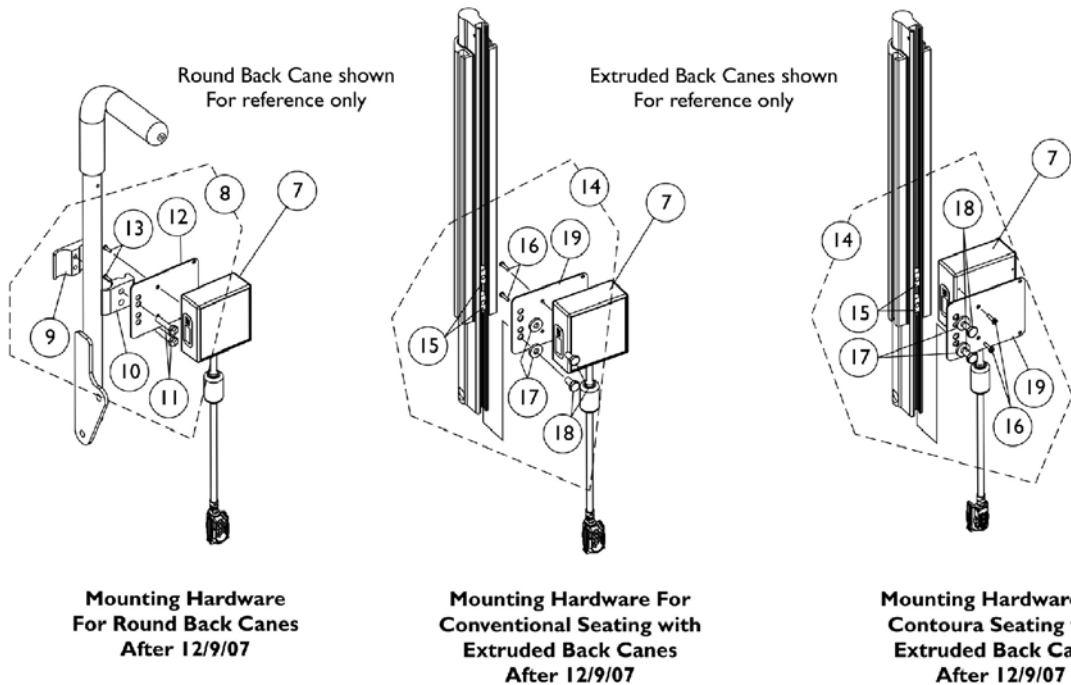
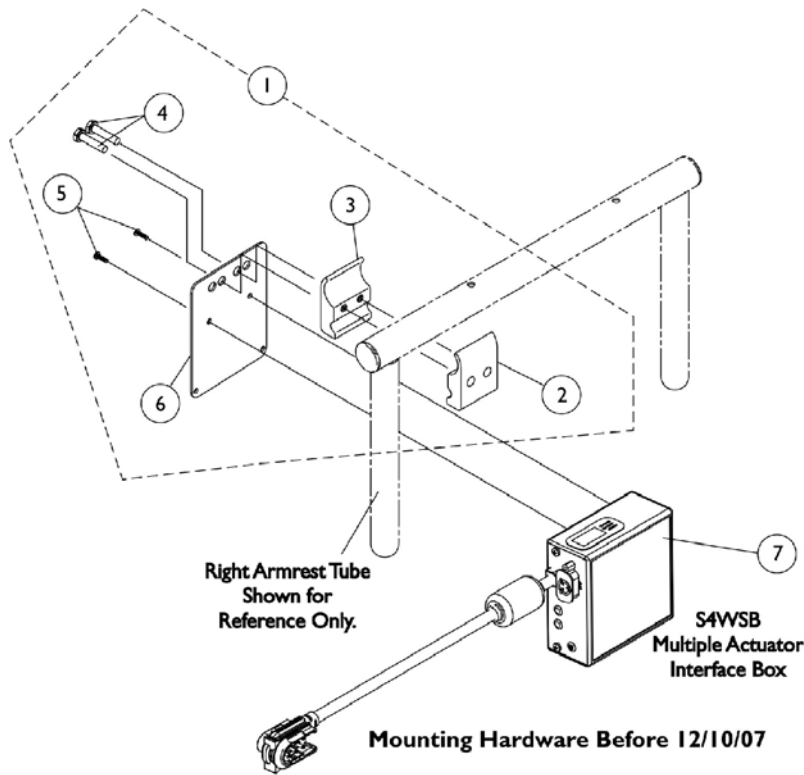
Must use a Four-Way Toggle Switch (FWT) or Quad Push Button (QPB) with a Four-Way Switch Box (4WSB)

Item Number	Note	Part Number	Description	Quantity Per	
				Package	Assembly
1	B,A,A1	1049593	Kit, SNP/DI, MK5 SAC, 4WSB, S4WSB, GTAM, AUX12M6, AUX34M6 Mtg. Hdw.	1	1
2			Half Clamp, Threaded Holes	1	1
3			Half Clamp, Non-Threaded Holes	1	1
4			Screw, Hex Head (1/4-20 x 1-1/8")	1	2
5			Screw, Phillips Pan Head (#4-40 x 3/8")	1	2
6			Plate, Mounting	1	1
7		1140044	Box, 4 Way Switch (4WSB)	1	1
8	C	1142226	Kit, SNP/DI, 4WSB, S4WSB, GTAM, AUX12M6, AUX34M6 Mounting Hardware For Round Back Canes	1	1
9			Half Clamp, Threaded Holes	1	1
10			Half Clamp, Non-Threaded Holes	1	1
11			Screw, Hex Head (1/4-20 x 1-1/8")	1	2
12			Plate, Mounting	1	1
13			Screw, Phillips Pan Head (#4-40 x 3/8")	1	2
			Tie Wrap (5-5/8" L)	1	5
14	D	1142227	Kit, SNP/DI, 4WSB, S4WSB, GTAM, AUX12M6, AUX34M6 Mounting Hardware For Extruded Back Canes	1	1
15			T-Nut (1/4-20)	1	2
16			Screw, Phillips Pan Head (#4-40 x 1/2")	1	2
17			Washer (1/4 x 5/8 x 3/32")	1	2
18			Screw, Hex Head (1/4-20 x 1-1/2")	1	2
19			Plate, Mounting	1	1
			Tie Wrap (5-5/8" L)	1	5
	E	1095503	Package, Cable Tie (5-5/8" L)	10	1

NOTE: A - Includes items 2-6. As of 5/22/07 the Mounting Plate holes and the orientation of the Hardware was revised to attach the electronics closer to the chair. The Mounting Hardware Kit is backward compatible.
A1 - The mounting plate was revised again 12/10/07 by making the plate longer to accommodate relocation of the electronics to the back canes. The mounting plate is backward compatible for using under the armrest tube.
B - Before 12/10/07
C - After 12/9/07 and includes items 9-13 and (Cable Ties not shown)
D - After 12/9/07 and includes items 15-19 and (Cable Ties not shown)
E - Not Shown

Multiple Actuator Interface Box (S4WSB) and Mounting Hardware

Allows multiple actuator operation through the driver control.



Multiple Actuator Interface Box (S4WSB) and Mounting Hardware

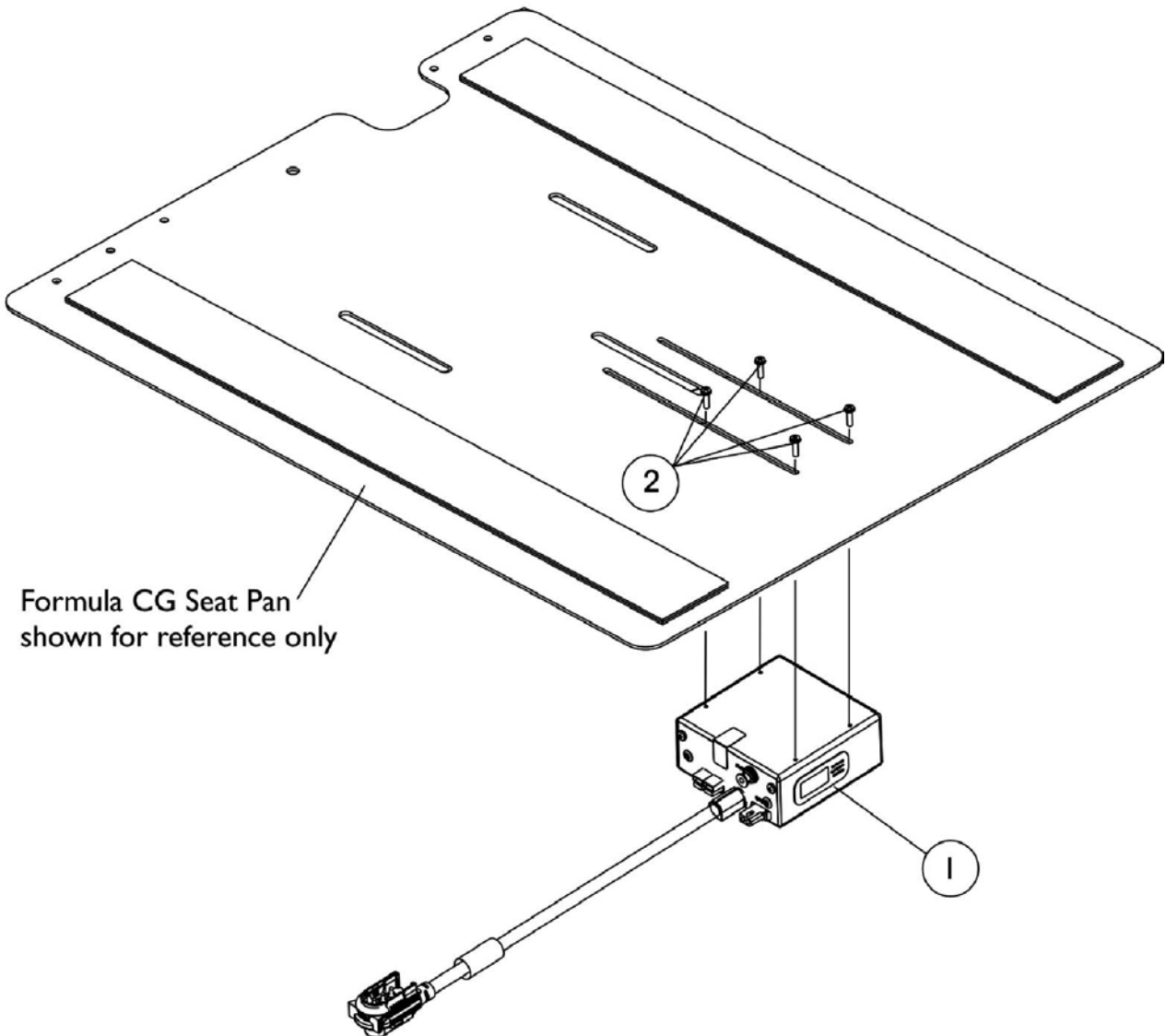
Allows multiple actuator operation through the driver control.

Item Number	Note	Part Number	Description	Quantity Per	
				Package	Assembly
1	B,A,A1	1049593	Kit, SNP/DI, MK5 SAC, 4WSB, S4WSB, GTAM, AUX12M6, AUX34M6 Mtg. Hdw.	1	1
2			Half Clamp, Threaded Holes	1	1
3			Half Clamp, Non-Threaded Holes	1	1
4			Screw, Hex Head (1/4-20 x 1-1/8")	1	2
5			Screw, Phillips Pan Head (#4-40 x 3/8")	1	2
6			Plate, Mounting	1	1
7		1136903	Box, Multiple Actuator Interface (S4WSB)	1	1
8	C	1142226	Kit, SNP/DI, 4WSB, S4WSB, GTAM, AUX12M6, AUX34M6 Mounting Hardware For Round Back Canes	1	1
9			Half Clamp, Threaded Holes	1	1
10			Half Clamp, Non-Threaded Holes	1	1
11			Screw, Hex Head (1/4-20 x 1-1/8")	1	2
12			Plate, Mounting	1	1
13			Screw, Phillips Pan Head (#4-40 x 3/8")	1	2
			Tie Wrap (5-5/8" L)	1	5
14	D	1142227	Kit, SNP/DI, 4WSB, S4WSB, GTAM, AUX12M6, AUX34M6 Mounting Hardware For Extruded Back Canes	1	1
15			T-Nut (1/4-20)	1	2
16			Screw, Phillips Pan Head (#4-40 x 1/2")	1	2
17			Washer (1/4 x 5/8 x 3/32")	1	2
18			Screw, Hex Head (1/4-20 x 1-1/2")	1	2
19			Plate, Mounting	1	1
			Tie Wrap (5-5/8" L)	1	5
	E	1095503	Package, Cable Tie (5-5/8" L)	10	1

NOTE: A - Includes items 2-6. As of 5/22/07 the Mounting Plate holes and the orientation of the Hardware was revised to attach the electronics closer to the chair. The Mounting Hardware Kit is backward compatible.
A1 - The mounting plate was revised again 12/10/07 by making the plate longer to accommodate relocation of the electronics to the back canes. The mounting plate is backward compatible for using under the armrest tube.
B - Before 12/10/07
C - After 12/9/07 and includes items 9-13 and (Cable Ties not shown)
D - After 12/9/07 and includes items 15-19 and (Cable Ties not shown)
E - Not Shown

Elevate Integrated Actuator Module (EIAM)

3G Storm w/ GB TT Motors & Formula CG Elevate

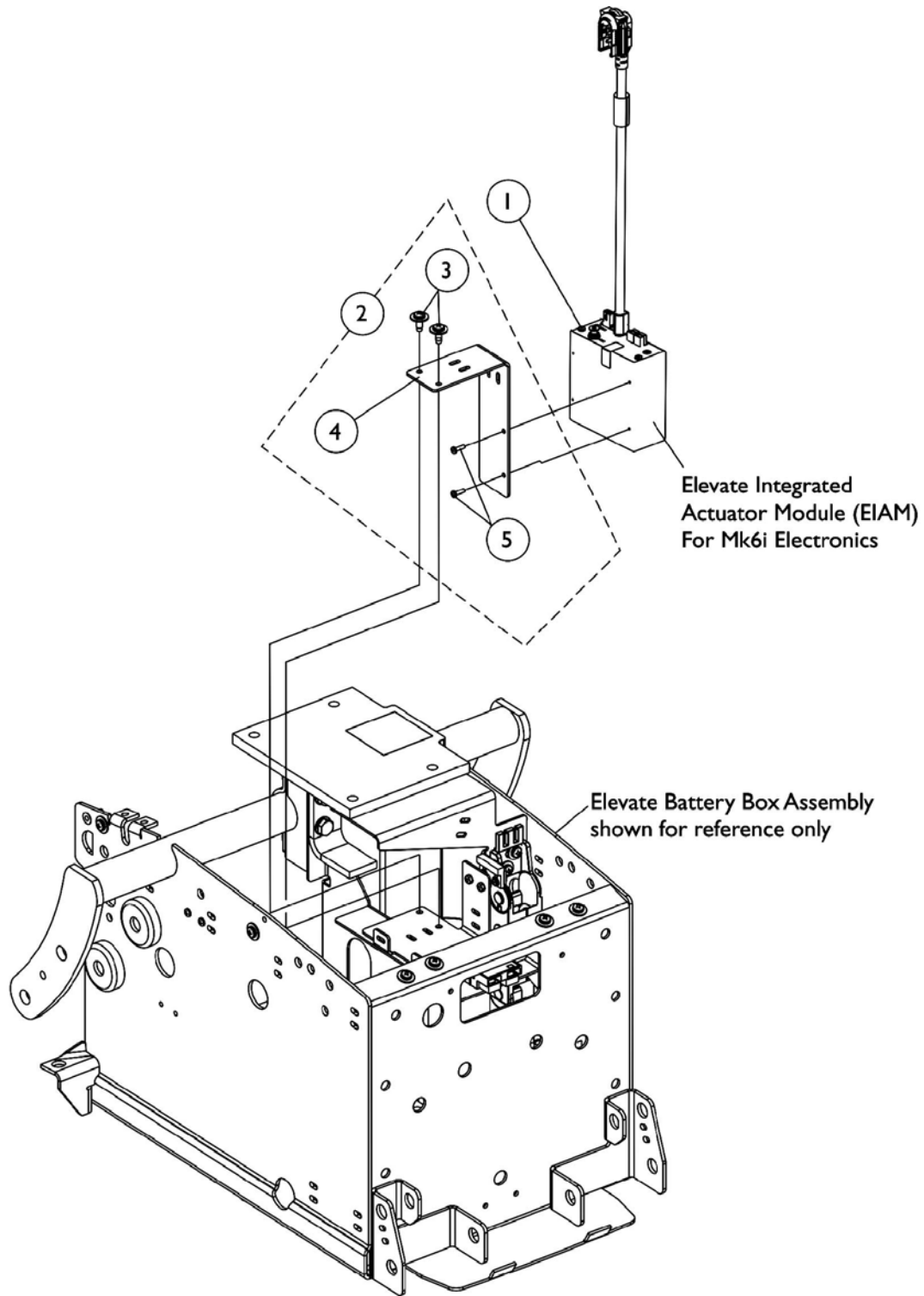


Elevate Integrated Actuator Module (EIAM) 3G Storm w/ GB TT Motors & Formula CG Elevate

Item Number	Note	Part Number	Description	Quantity Per	
				Package	Assembly
1		1140036	Module, Elevate Integrated Actuator (EIAM) - MK6i	1	1
2	A	1125685	Kit, MK5 SAC-E/ MK6i EIAM Mounting Hardware	1	1
3			Screw, Phillips Pan Head Tap (#10-32 x 1/2")	1	2
4			Bracket, Mounting, Black	1	1
5			Stud Plate, Quad Link	1	2
6			1119418	Cable, Auxiliary Power	1

NOTE: A - Includes items 3-5

Elevate Integrated Actuator Module (EIAM) For TDX with Formula Elevate



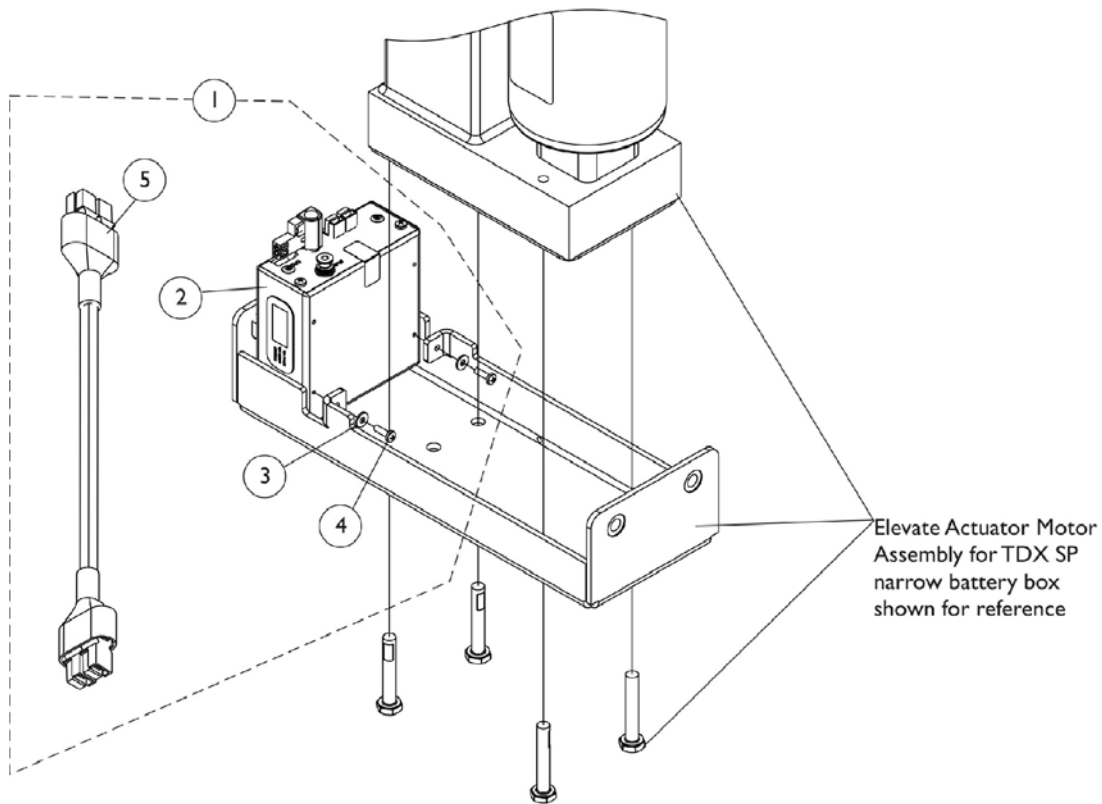
Elevate Integrated Actuator Module (EIAM) For TDX with Formula Elevate

Item Number	Note	Part Number	Description	Quantity Per	
				Package	Assembly
1		1140036	Module, Elevate Integrated Actuator (EIAM) - MK6i	1	1
2	A	1125685	Kit, MK5 SAC-E/ MK6i EIAM Mounting Hardware	1	1
3			Screw, Phillips Pan Head Tap (#10-32 x 1/2")	1	2
4			Bracket, Mounting, Black	1	1
5			Stud Plate, Quad Link	1	2
6			1119418	Cable, Auxiliary Power	1

NOTE: A - Includes items 3-5

Elevate Integrated Actuator Module (EIAM)

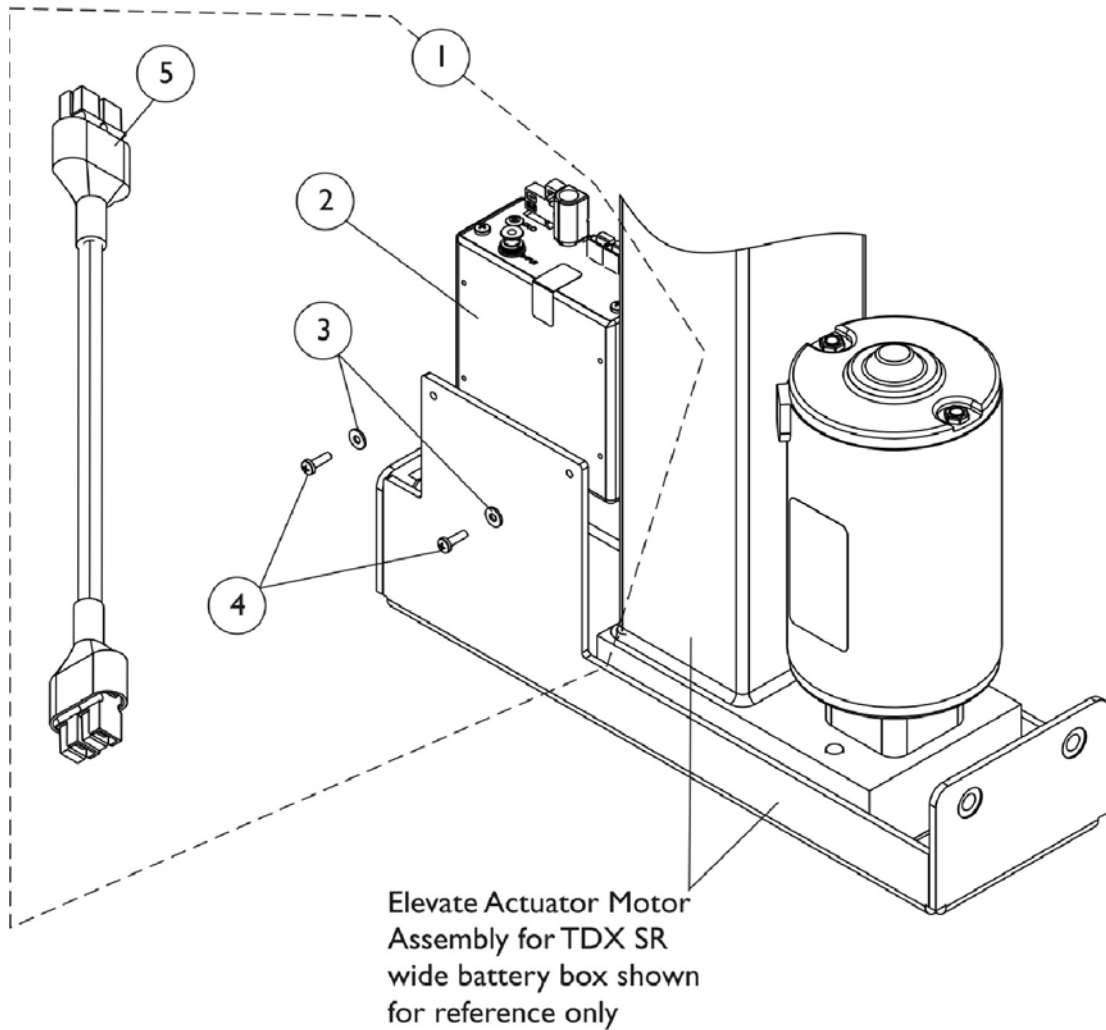
TDX SP (Narrow Battery Box) w/ Formula CGE & MPCTMT Power Elevating Legrest



Item Number	Note	Part Number	Description	Quantity Per	
				Package	Assembly
1	A	1149786	Kit, MK6i EIAM with Mounting Hardware	1	1
2			Module, Elevate Integrated Actuator (EIAM) - MK6i	1	1
3			Washer, Plain (1/8 x 5/16 x 1/32)	1	2
4			Screw, Phillips Pan Head (#4-40 x 3/8")	1	2
5			Cable, Actuator Jumper Adapter (MK6i)	1	1
3		1011011	Washer, Plain (1/8 x 5/16 x 1/32)	1	2
4		1027704	Screw, Phillips Pan Head (#4-40 x 3/8")	1	2
5		1145414	Cable, Actuator Jumper Adapter (MK6i)	1	1

NOTE: A - Includes items 2-5

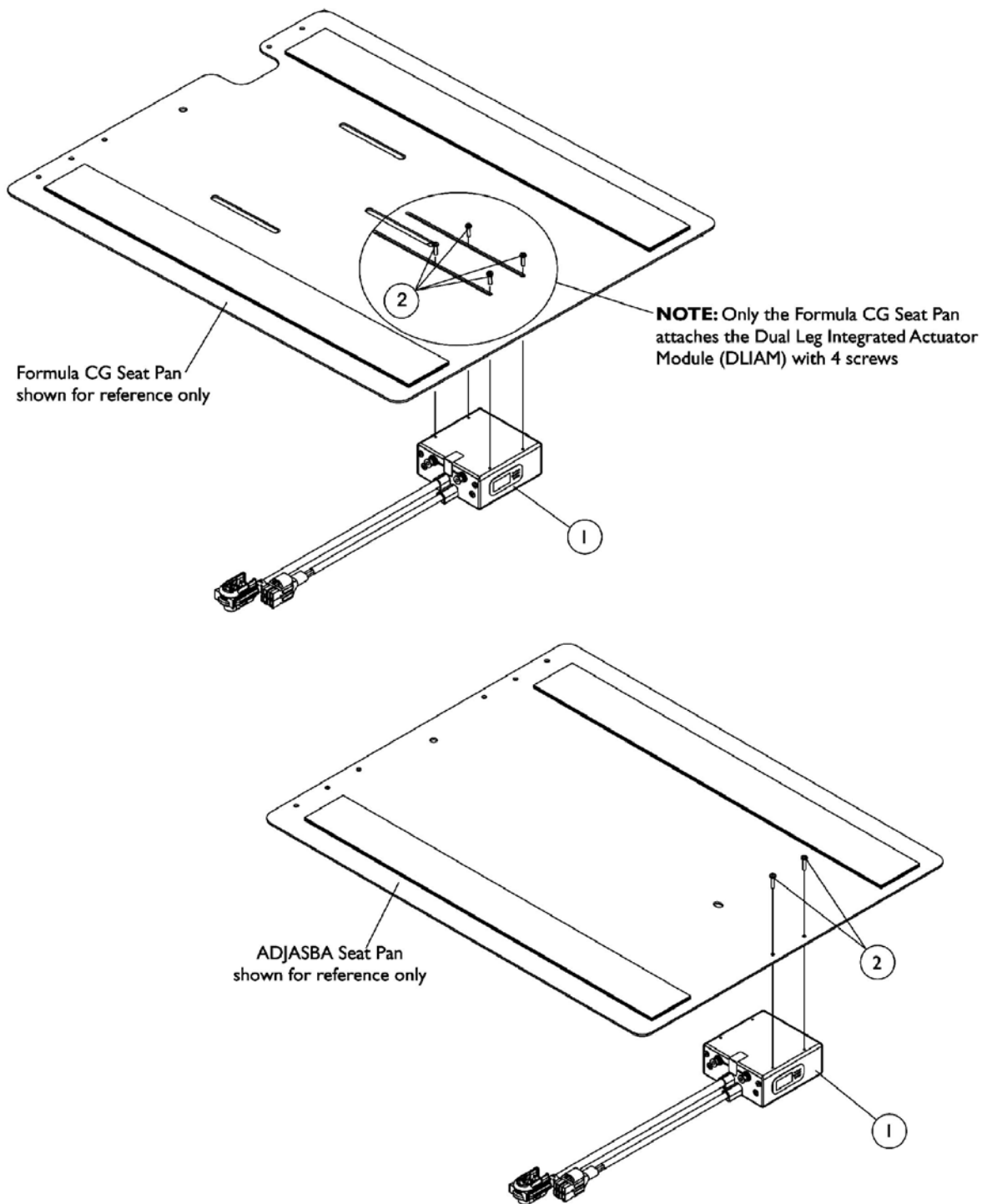
Elevate Integrated Actuator Module (EIAM) For TDX SR with Formula CGE



Item Number	Note	Part Number	Description	Quantity Per	
				Package	Assembly
1	A	1149786	Kit, MK6i EIAM with Mounting Hardware	1	1
2			Module, Elevate Integrated Actuator (EIAM) - MK6i	1	1
3			Washer, Plain (1/8 x 5/16 x 1/32)	1	2
4			Screw, Phillips Pan Head (#4-40 x 3/8")	1	2
5			Cable, Actuator Jumper Adapter (MK6i)	1	1
3		1011011	Washer, Plain (1/8 x 5/16 x 1/32)	1	2
4		1027704	Screw, Phillips Pan Head (#4-40 x 3/8")	1	2
5		1145414	Cable, Actuator Jumper Adapter (MK6i)	1	1

NOTE: A - Includes items 2-5

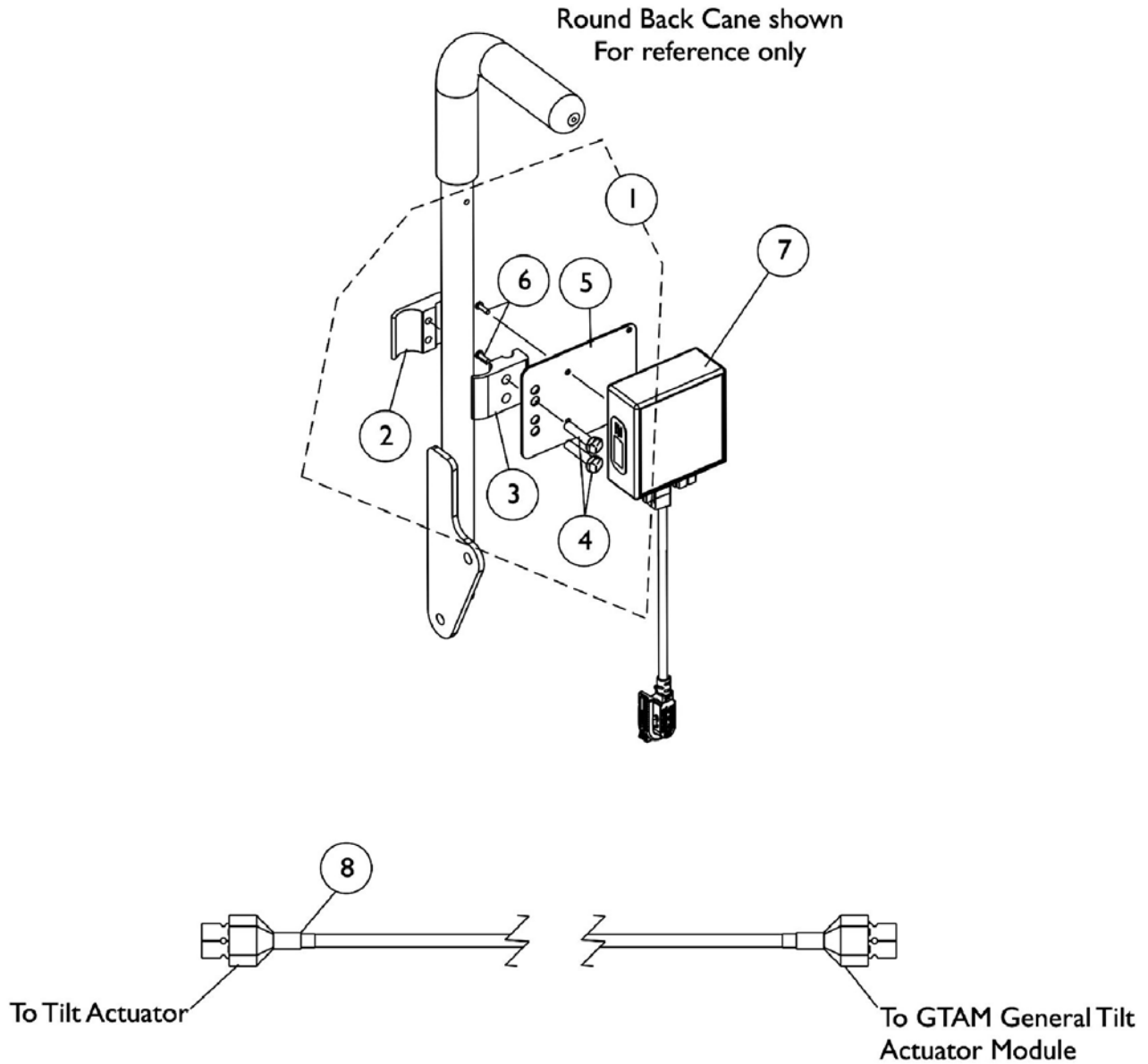
Dual Legs Integrated Actuator Module (DLIAM) MK6i For ELRPW Front Riggings



Dual Legs Integrated Actuator Module (DLIAM) MK6i For ELRPW Front Riggings

Item Number	Note	Part Number	Description	Quantity Per	
				Package	Assembly
1	A,B	1140032	Module, Dual Legs Integrated Actuator (DLIAM) - MK6i	1	1
2		1021742	Screw, Phillips Pan Head (#4-40 x 1/2")	1	2
NOTE: A - The Dual Legs Integrated Actuator Module is attached to a 12"-16" wide ADJASBA (NON-Formula CG Seating System) seat pan in the same way when ELRPW Front Riggings are ordered with MK6i electronics B - On 2/28/07 the Dual Leg Actuator Module (DLIAM) harness cable lengthened from approximately 3" to 20" long to eliminate the need for the ELRPW Power Legrest Harness Assemblies that attached between the DLIAM box and the ELRPW Power Legrest actuators.					

General Tilt Actuator Module (GTAM) For TDX with Formula Invisible Super Low Tilt



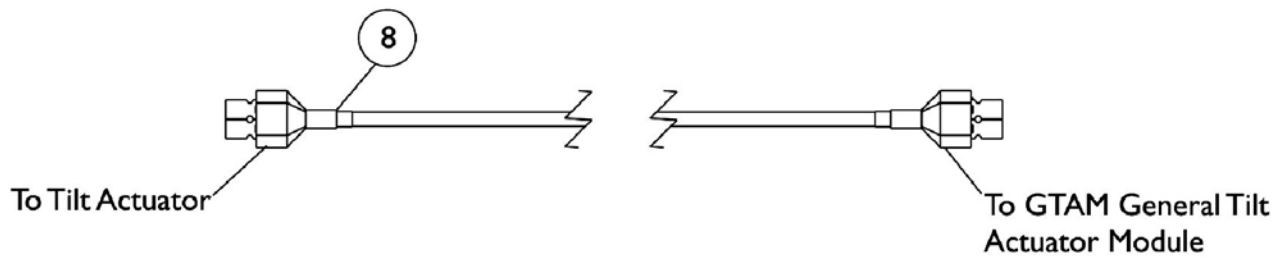
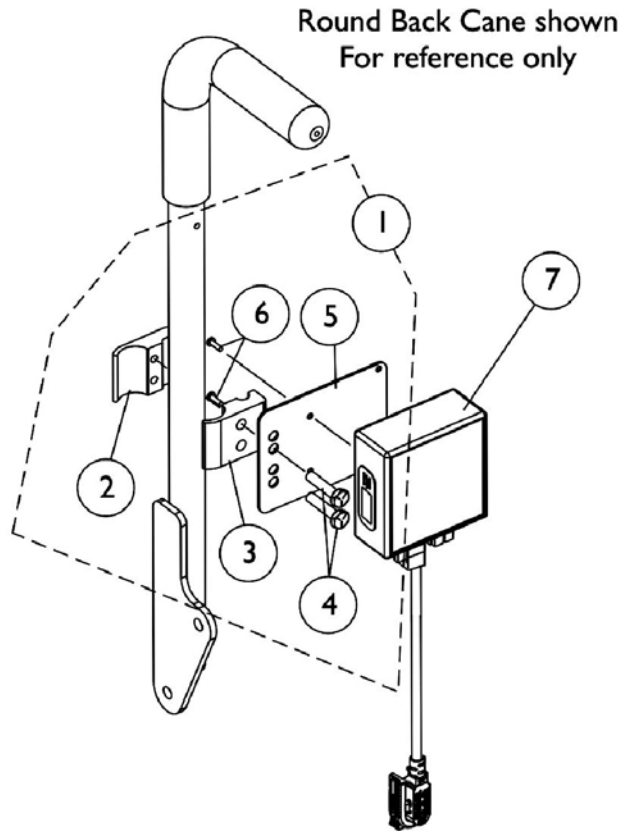
General Tilt Actuator Module (GTAM) For TDX with Formula Invisible Super Low Tilt

Item Number	Note	Part Number	Description	Quantity Per	
				Package	Assembly
1	A	1142226	Kit, SNP/DI, 4WSB, S4WSB, GTAM, AUX12M6, AUX34M6 Mounting Hardware For Round Back Canes	1	1
2			Half Clamp, Threaded Holes	1	1
3			Half Clamp, Non-Threaded Holes	1	1
4			Screw, Hex Head (1/4-20 x 1-1/8")	1	2
5			Plate, Mounting	1	1
6			Screw, Phillips Pan Head (#4-40 x 3/8")	1	2
			Tie Wrap (5-5/8" L)	1	5
7	B	1140037	Module, General Tilt Actuator (GTAM) - MK6i	1	1
8		1142224	Harness, Actuator Extension	1	1

NOTE: A - Includes items 2-6 and (Cable Ties not shown)
 B - The General Tilt Actuator Module (GTAM) is used when a MK6i GB TT Controller is selected for a Formula Invisible Super Low Tilt System. Item 8 Actuator Extension Harness is required also.

General Tilt Actuator Module (GTAM)

3G Storm w/ GB TT Motors & Formula (CGT) (After 12/9/07)



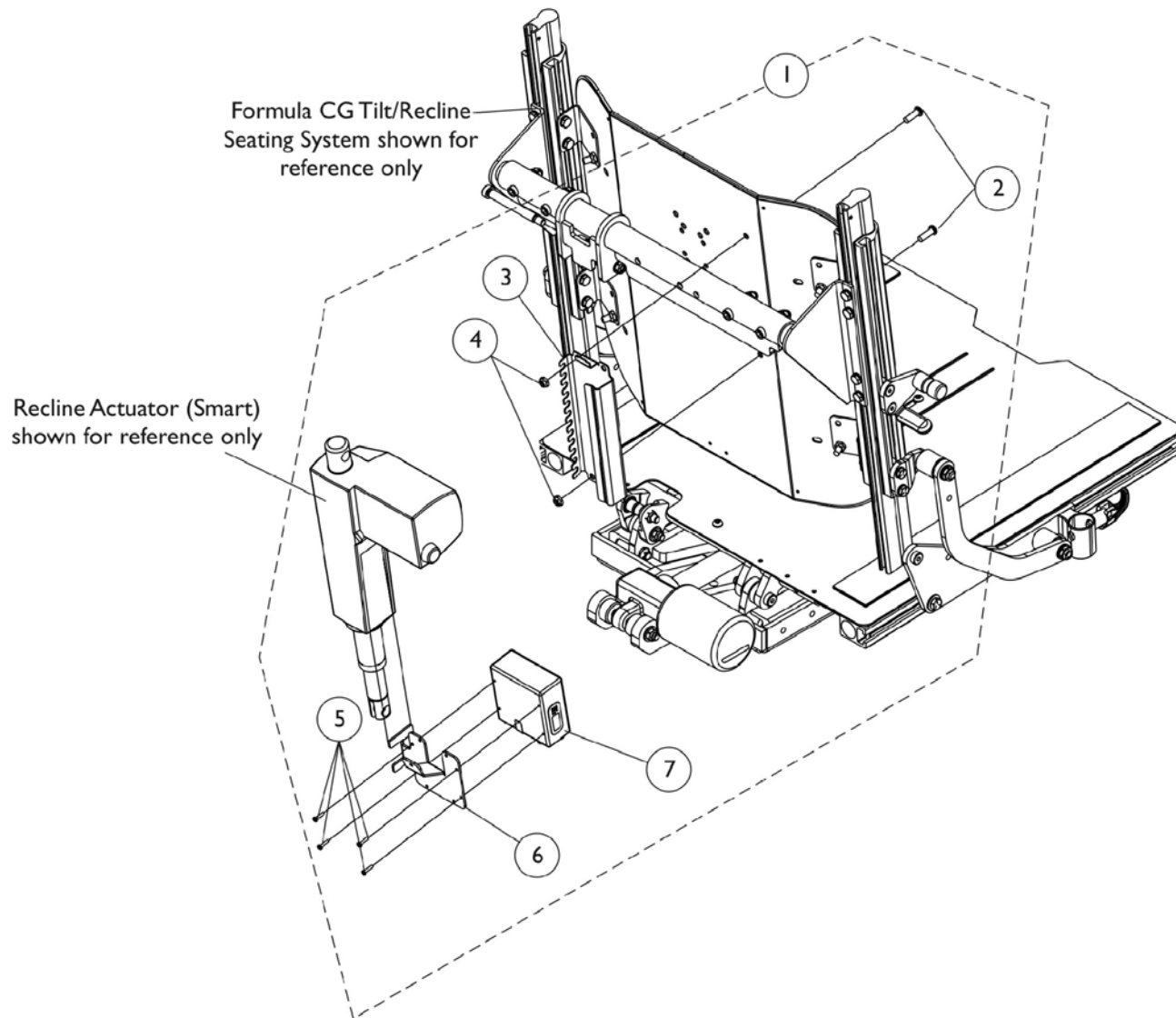
General Tilt Actuator Module (GTAM) 3G Storm w/ GB TT Motors & Formula (CGT) (After 12/9/07)

Item Number	Note	Part Number	Description	Quantity Per	
				Package	Assembly
1	A	1142226	Kit, SNP/DI, 4WSB, S4WSB, GTAM, AUX12M6, AUX34M6 Mounting Hardware For Round Back Canes	1	1
2			Half Clamp, Threaded Holes	1	1
3			Half Clamp, Non-Threaded Holes	1	1
4			Screw, Hex Head (1/4-20 x 1-1/8")	1	2
5			Plate, Mounting	1	1
6			Screw, Phillips Pan Head (#4-40 x 3/8")	1	2
			Tie Wrap (5-5/8" L)	1	5
7	B	1140037	Module, General Tilt Actuator (GTAM) - MK6i	1	1
8		1101400	Harness, ELRPW Power Legrest - Right	1	1
	C	1095503	Package, Cable Tie (5-5/8" L)	10	1

NOTE: A - Includes items 2-6 and (Cable Ties not shown).
 B - The General Tilt Actuator Module (GTAM) is used when a MK6i GB TT Controller is selected for a Formula (CGT) System with a Conventional Tilt Actuator Motor. Item #8 ELRPW Power Legrest Harness - Right is used to connect the GTAM to the Tilt Actuator Motor
 C - Not Shown

Recline Intergrated Actuator Module (RIAM) and Mounting Hardware

TDX SP/SR/3G Storm w/ Formula (CGR/CGTR) & Smart Actuator Motors



MK6i Recline Integrated Actuator Module (RIAM) and Mounting Hardware

NOTE: Mounting Hardware used for Conventional and Contoura Seating

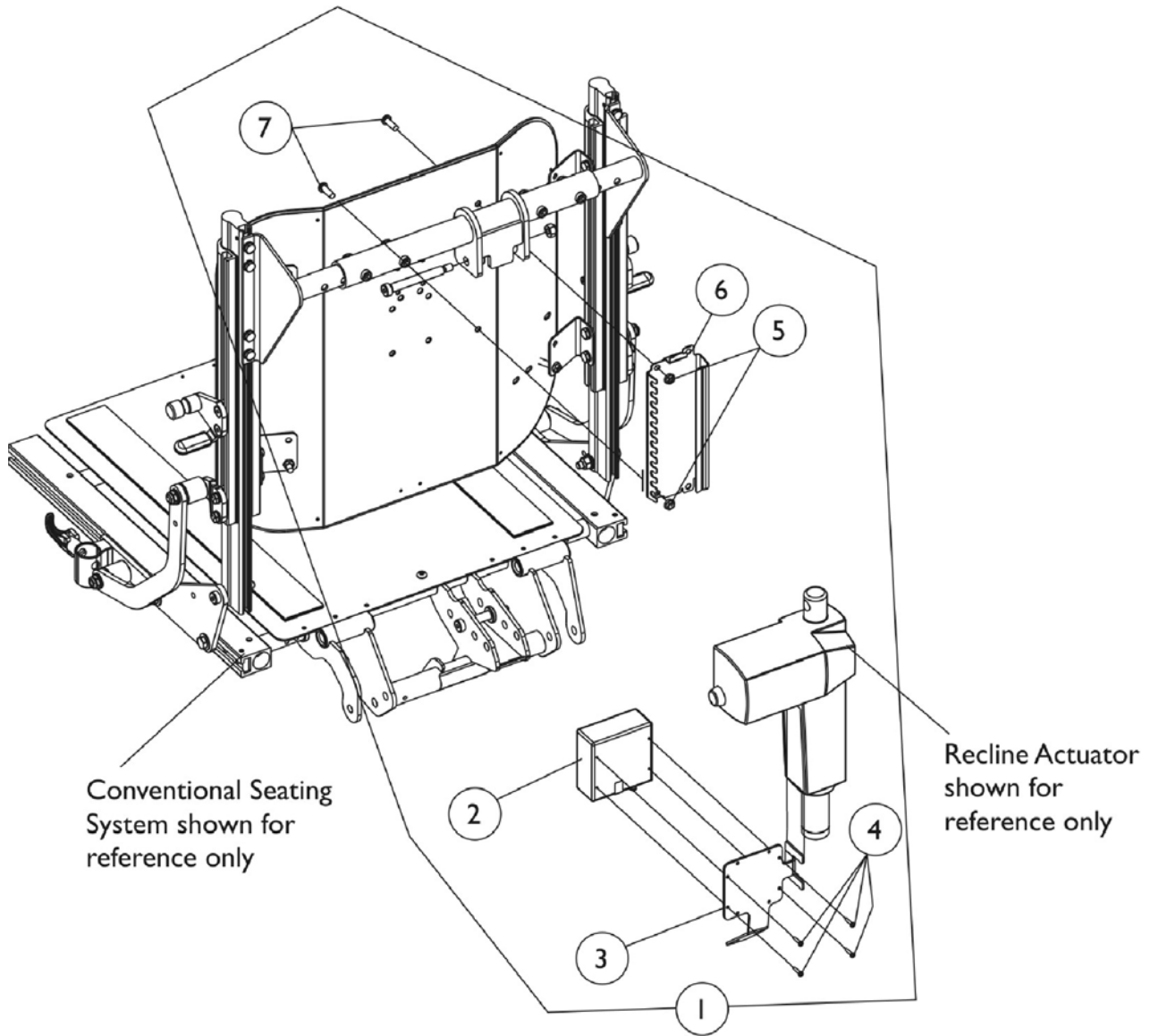
Recline Intergrated Actuator Module (RIAM) and Mounting Hardware

TDX SP/SR/3G Storm w/ Formula (CGR/CGTR) & Smart Actuator Motors

Item Number	Note	Part Number	Description	Quantity Per	
				Package	Assembly
1	A	1152536	Kit, MK6i Recline Integrated Actuator Module (RIAM) and Mtg. Hdwr.	1	1
2			Screw, Socket Head (1/4-20 x 3/4")	1	2
3			Bracket, MK6i Connector, Black	1	1
4			Locknut (1/4-20)	1	2
5			Screw, Phillips Pan Head (#4-40 x 1/2")	1	4
6			Bracket, MK6i Actuator Module, Black	1	1
7			Module, Recline Integrated Actuator (RIAM) - MK6i	1	1
3		1160374	Bracket, MK6i Connector, Black	1	1
7		1140034	Module, Recline Integrated Actuator (RIAM) - MK6i	1	1

NOTE: A - Includes items 2-7

Recline Integrated Actuator Module (RIAM) For Formula Recline and Tilt/Recline



MK6i Recline Integrated Actuator Module (RIAM) and Mounting Hardware.

NOTE: Mounting Hardware used for Conventional and Contoura Seating

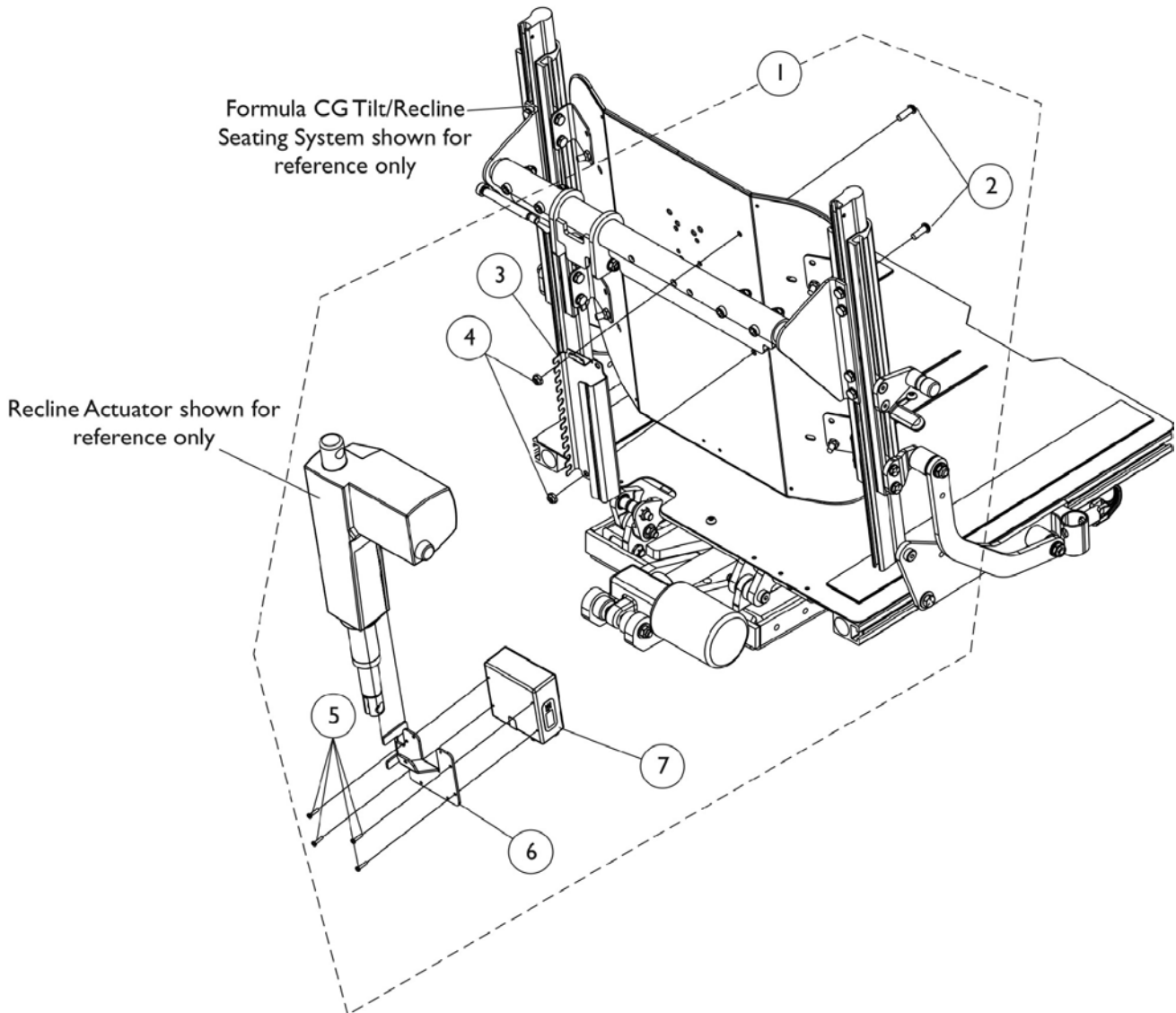
Recline Integrated Actuator Module (RIAM) For Formula Recline and Tilt/Recline

Item Number	Note	Part Number	Description	Quantity Per	
				Package	Assembly
1	A	1145415	Kit, MK6i Recline Integrated Actuator Module (RIAM) w/ Mtg. Hardware	1	1
2			Module, Recline Integrated Actuator (RIAM) - MK6i	1	1
3			Bracket, MK6i Recline Integrated Actuator Module, Black (RIAM)	1	1
4			Screw, Phillips Pan Head (#4-40 x 1/2")	1	4
5			Locknut (1/4-20)	1	2
6			Bracket, MK6i Connector, Black	1	1
7			Screw, Socket Head (1/4-20 x 3/4")	1	2
2		1140034	Module, Recline Integrated Actuator (RIAM) - MK6i	1	1
3		1145403	Bracket, MK6i Recline Integrated Actuator Module, Black (RIAM)	1	1
4		1021742	Screw, Phillips Pan Head (#4-40 x 1/2")	1	1
5		1025195	Locknut (1/4-20)	1	2
6		1160374	Bracket, MK6i Connector, Black	1	1
7		1009838	Screw, Socket Head (1/4-20 x 3/4")	1	2

NOTE: A - Includes items 2-7. Kit is used for Conventional and Contoura Seating

Tilt/Recline Actuator Module (TRAM) and Mounting Hardware

TDX SP/ (3G Storm After 12/9/07) w/ Formula (CGR/CGTR) & Conv. Actuators



MK6i Tilt/Recline Actuator Module (TRAM) and Mounting Hardware

NOTE: Mounting Hardware used for Conventional and Contoura Seating

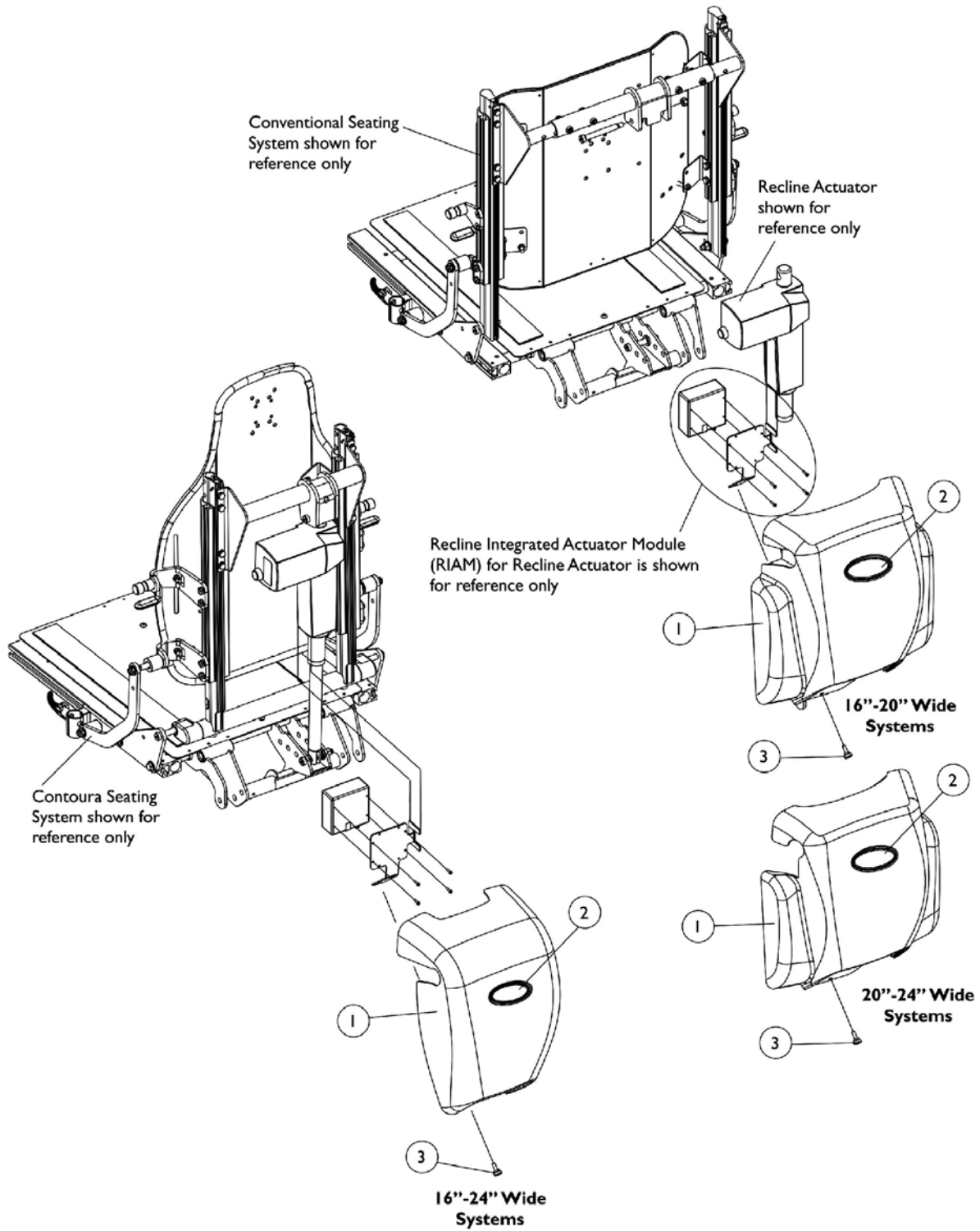
Tilt/Recline Actuator Module (TRAM) and Mounting Hardware

TDX SP/ (3G Storm After 12/9/07) w/ Formula (CGR/CGTR) & Conv. Actuators

Item Number	Note	Part Number	Description	Quantity Per	
				Package	Assembly
1	A	1147143	Kit, MK6i Tilt/Recline Actuator Module (TRAM) and Mtg. Hdwr. For TDX SP	1	1
2			Screw, Socket Head (1/4-20 x 3/4")	1	2
3			Bracket, MK6i Connector, Black	1	1
4			Locknut (1/4-20)	1	2
5			Screw, Phillips Pan Head (#4-40 x 1/2")	1	4
6			Bracket, MK6i Actuator Module, Black	1	1
7			Module, Tilt Recline Actuator (TRAM) - MK6i	1	1
3		1160374	Bracket, MK6i Connector, Black	1	1
7		1140098	Module, Tilt Recline Actuator (TRAM) - MK6i	1	1
	B	1101400	Harness, ELRPW Power Legrest - Right	1	1
NOTE: A - Includes items 2-7 B - Not Shown. ELRPW Power Legrest Harness part #1101400 is used to connect between the TRAM Module and the Tilt Actuator as well					

Shroud Covers, Recline Actuator

Formula Recline & Tilt/Recline Conventional or Contoura Seating



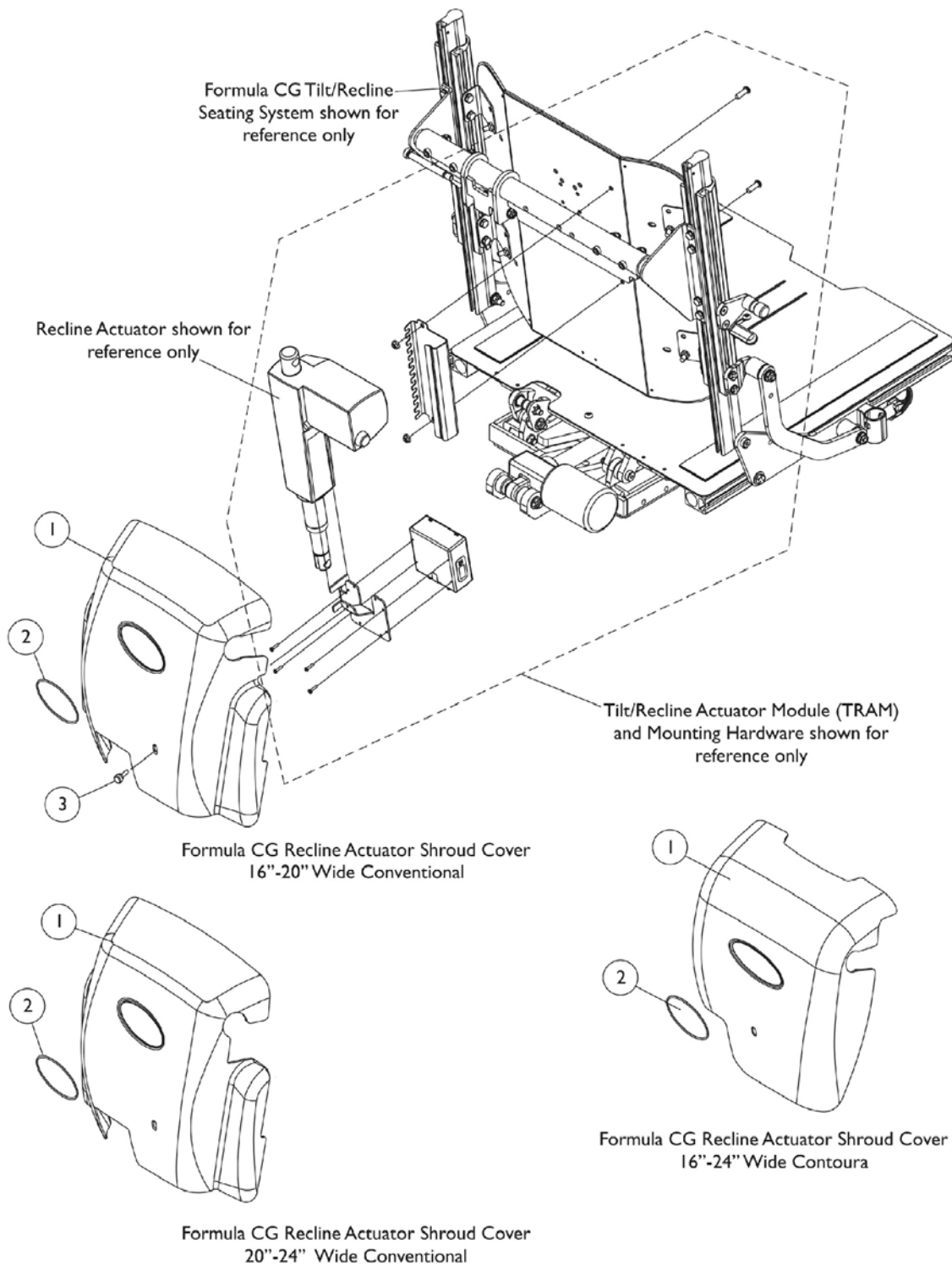
Shroud Covers, Recline Actuator

Formula Recline & Tilt/Recline Conventional or Contoura Seating

Item Number	Note	Part Number	Description	Quantity Per	
				Package	Assembly
1		1146501	Cover with Decal, Contoura (16 - 24" W)	1	1
1		1146502	Cover with Decal, Conventional (16 - 20" W)	1	1
1		1146503	Cover with Decal, Conventional (20 - 24" W)	1	1
2		1090147	Decal, Invacare Medallion - Large	1	1
3		1117240	Screw, Thumb (#10-32 x 1/2")	1	1

Shroud Covers, Recline Actuator

Formula (CGR/CGTR) w/ Conventional or Contoura For TDX SP/SR/ (3G Storm After 12/9/07)



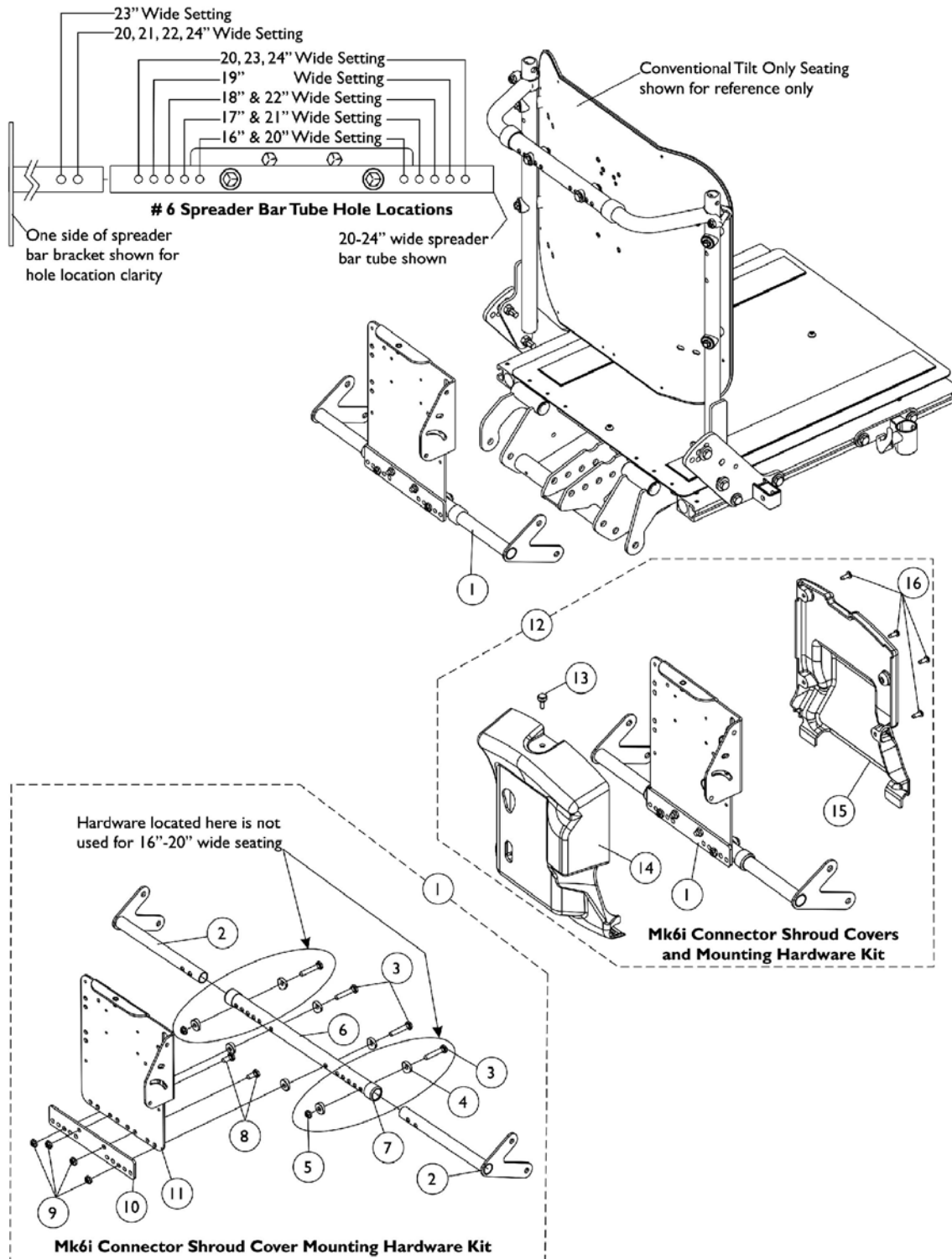
Shroud Covers, Recline Actuator

Formula (CGR/CGTR) w/ Conventional or Contoura For TDX SP/SR/ (3G Storm After 12/9/07)

Item Number	Note	Part Number	Description	Quantity Per	
				Package	Assembly
1		1148698	Cover with Decal, Conventional (16 - 20" W)	1	1
1		1147139	Cover with Decal, Conventional (20 - 24" W)	1	1
1		1147959	Cover with Decal, Contoura (16 - 24" W)	1	1
2		1090147	Decal, Invacare Medallion - Large	1	1
3		1117240	Screw, Thumb (#10-32 x 1/2")	1	1

Shroud Covers Before 3/1/07, MK6i Connector Formula Conventional Tilt, Tilt w/ BPO Option or Tilt-elevate

NOTE: MK6i connectors are bundled and cable-tied to the MK6i Connector Shroud Mounting Tray Assembly item #11



Shroud Covers Before 3/1/07, MK6i Connector

Formula Conventional Tilt, Tilt w/ BPO Option or Tilt-elevate

NOTE: MK6i connectors are bundled and cable-tied to the MK6i Connector Shroud Mounting Tray
Assembly item #11

Item Number	Note	Part Number	Description	Quantity Per	
				Package	Assembly
1	A	1140266	Kit, TRECM/TAC/MK6i Connector Shroud Mtg. Hdw. 16-20" Wide For Conventional Tilt Only	1	1
2			Bracket, Spreader Bar, Black - Right	1	1
2			Bracket, Spreader Bar, Black - Left	1	1
3			Screw, Hex Head (1/4-20 x 1-1/2")	1	2
4			Spacer, Coved (1/4 x 11/16 x 1/2")	1	4
6			Tube, Spreader Bar, Black (16 - 20" W)	1	1
7			Collar, Anti-Rattle (7/8")	1	2
8			Screw, Hex Head (1/4-20 x 5/8")	1	2
9			Locknut (1/4-20)	1	4
10			Plate, Mounting	1	1
11			TRECM/SAC/TAC/MK6i Connector Shroud Mounting Tray Assembly	1	1
1	B	1140267	Kit, TRECM/TAC/MK6i Connector Shroud Mtg. Hdw. 20-24" Wide For Conventional Tilt Only	1	1
2			Bracket, Spreader Bar, Black - Right	1	1
2			Bracket, Spreader Bar, Black - Left	1	1
3			Screw, Hex Head (1/4-20 x 1-1/2")	1	4
4			Spacer, Coved (1/4 x 11/16 x 1/2")	1	8
5			Locknut (1/4-20)	1	2
6			Tube, Spreader Bar, Black (20 - 24" W)	1	1
7			Collar, Anti-Rattle (7/8")	1	2
8			Screw, Hex Head (1/4-20 x 5/8")	1	2
9			Locknut (1/4-20)	1	4
10			Plate, Mounting	1	1
11			TRECM/SAC/TAC/MK6i Connector Shroud Mounting Tray Assembly	1	1
12	C	1140268	Kit, TRECM/TAC/MK6i Connector Shrouds and Mtg. Hdw. 16-20" Wide For Conventional Tilt Only	1	1
			Screw, Phillips Pan Head (#10-32 x 3/8")	1	2
2			Bracket, Spreader Bar, Black - Right	1	1
2			Bracket, Spreader Bar, Black - Left	1	1
3			Screw, Hex Head (1/4-20 x 1-1/2")	1	2
4			Spacer, Coved (1/4 x 11/16 x 1/2")	1	4
6			Tube, Spreader Bar, Black (16 - 20" W)	1	1
7			Collar, Anti-Rattle (7/8")	1	2
8			Screw, Hex Head (1/4-20 x 5/8")	1	2
9			Locknut (1/4-20)	1	4
10			Plate, Mounting	1	1
11			TRECM/SAC/TAC/MK6i Connector Shroud Mounting Tray Assembly	1	1
13			Screw, Thumb (#10-32 x 1/2")	1	1

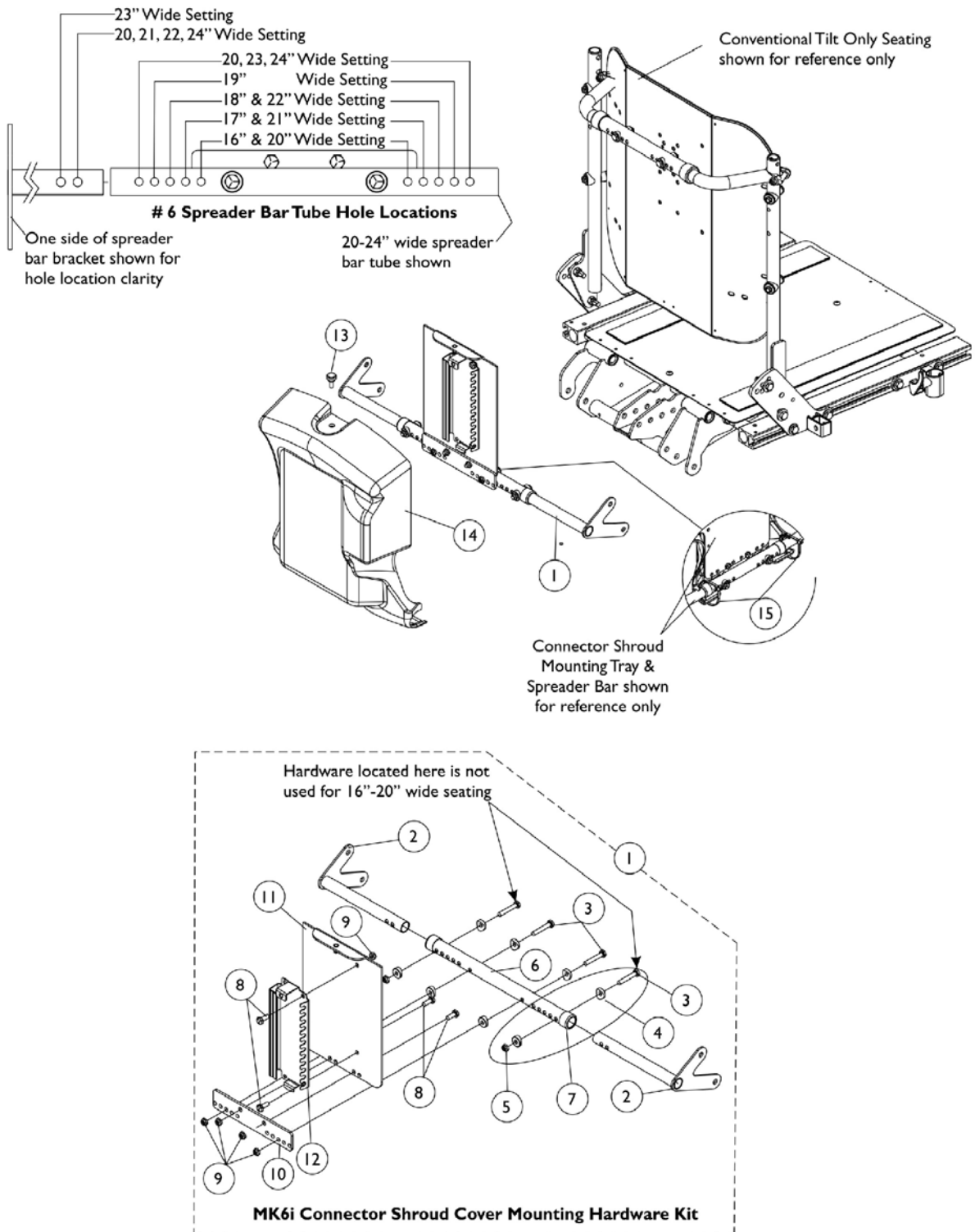
Shroud Covers Before 3/1/07, MK6i Connector Formula Conventional Tilt, Tilt w/ BPO Option or Tilt-elevate

NOTE: MK6i connectors are bundled and cable-tied to the MK6i Connector Shroud Mounting Tray
Assembly item #11

Item Number	Note	Part Number	Description	Quantity Per	
				Package	Assembly
14			Shroud, Cover	1	1
15			Shroud, Back	1	1
16			Screw, Phillips Pan Head Tap (#10-32 x 1/2")	1	4
12	D	1140269	Kit, TRECM/TAC/MK6i Connector Shrouds and Mtg. Hdwr. 20-24" Wide For Conventional Tilt Only	1	1
			Screw, Phillips Pan Head (#10-32 x 3/8")	1	2
2			Bracket, Spreader Bar, Black - Right	1	1
2			Bracket, Spreader Bar, Black - Left	1	1
3			Screw, Hex Head (1/4-20 x 1-1/2")	1	4
4			Spacer, Coved (1/4 x 11/16 x 1/2")	1	8
5			Locknut (1/4-20)	1	2
6			Tube, Spreader Bar, Black (20 - 24" W)	1	1
7			Collar, Anti-Rattle (7/8")	1	2
8			Screw, Hex Head (1/4-20 x 5/8")	1	2
9			Locknut (1/4-20)	1	4
10			Plate, Mounting	1	1
11			TRECM/SAC/TAC/MK6i Connector Shroud Mounting Tray Assembly	1	1
13			Screw, Thumb (#10-32 x 1/2")	1	1
14			Shroud, Cover	1	1
15			Shroud, Back	1	1
16			Screw, Phillips Pan Head Tap (#10-32 x 1/2")	1	4
	E	1095502	Package, Cable Tie (11-1/2" L)	10	1

NOTE: A - Includes items 2-4 and 6-11
 B - Includes items 2-12
 C - Includes (part #1079316 Screw - Not Shown and not used for MK6i application) and items 2-4, 6-11 and 13-16
 D - Includes (part #1079316 Screw - Not Shown and not used for MK6i application) and items 2-11 and 13-16
 E - Not Shown

Shroud Cover After 2/28/07, MK6i Connector Formula Conventional Tilt, Tilt w/ BPO Option or Tilt-Elevate



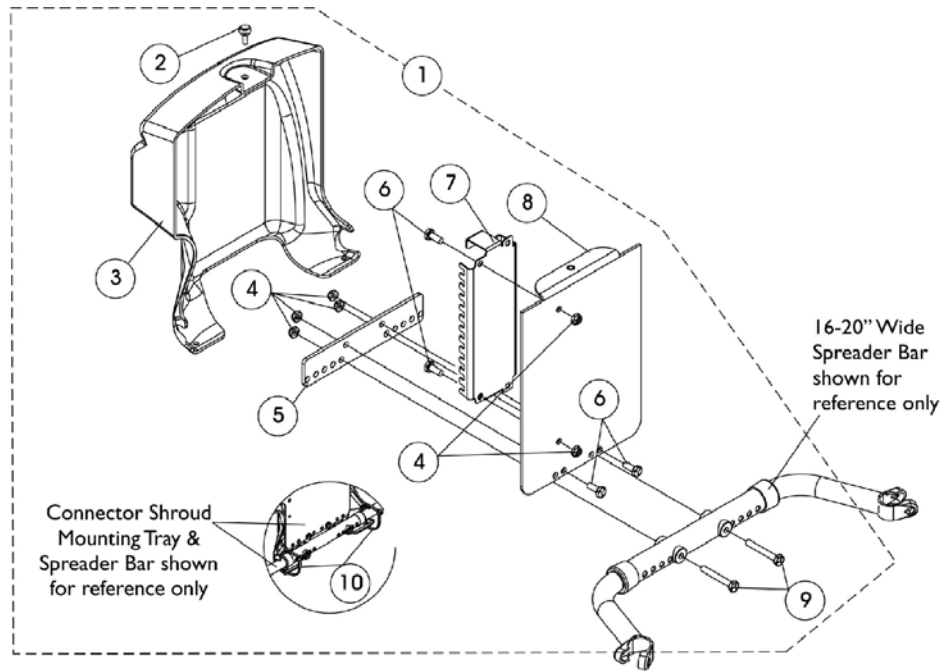
Shroud Cover After 2/28/07, MK6i Connector Formula Conventional Tilt, Tilt w/ BPO Option or Tilt-Elevate

Item Number	Note	Part Number	Description	Quantity Per		
				Package	Assembly	
1	C,A	1148231	Kit, MK6i Connector Shroud Mtg. Hdwr. 16-20" Wide For Conventional Tilt Only	1	1	
2			Bracket, Spreader Bar, Black - Right	1	1	
2			Bracket, Spreader Bar, Black - Left	1	1	
3			Screw, Hex Head (1/4-20 x 1-1/2")	1	2	
4			Spacer, Coved (1/4 x 11/16 x 1/2")	1	4	
6			Tube, Spreader Bar, Black (16 - 20" W)	1	1	
7			Collar, Anti-Rattle (7/8")	1	2	
8			Screw, Hex Head (1/4-20 x 5/8")	1	4	
9			Locknut (1/4-20)	1	6	
10			Plate, Mounting	1	1	
11			Tray, MK6i Connector Shroud Mounting	1	1	
12			C,B	1148232	Bracket, MK6i Connector, Black	1
1	Kit, MK6i Connector Shroud Mtg. Hdwr. 20-24" Wide For Conventional Tilt Only	1			1	
2	Bracket, Spreader Bar, Black - Right	1			1	
2	Bracket, Spreader Bar, Black - Left	1			1	
3	Screw, Hex Head (1/4-20 x 1-1/2")	1			4	
4	Spacer, Coved (1/4 x 11/16 x 1/2")	1			8	
5	Locknut (1/4-20)	1			2	
6	Tube, Spreader Bar, Black (20 - 24" W)	1			1	
7	Collar, Anti-Rattle (7/8")	1			2	
8	Screw, Hex Head (1/4-20 x 5/8")	1			4	
9	Locknut (1/4-20)	1			6	
10	Plate, Mounting	1			1	
11	Tray, MK6i Connector Shroud Mounting	1	1			
12	C	1154125	Bracket, MK6i Connector, Black	1	1	
12			Kit, MK6i Connector Bracket and Threaded Insert	1	1	
13			1117240	Screw, Thumb (#10-32 x 1/2")	1	1
14			1148151	Shroud, MK6i Connector	1	1
15			1095502	Package, Cable Tie (11-1/2" L)	10	1

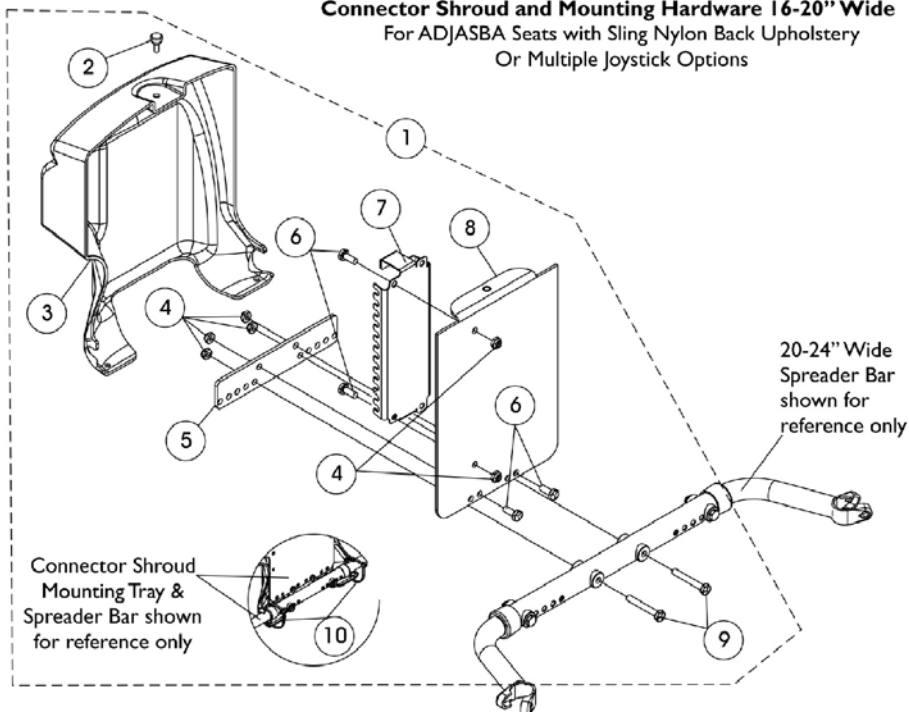
NOTE: A - Includes items 2-4 and 6-12
B - Includes items 2-12
C - Item 12 MK6i Connector Bracket was revised 4/28/08 and is backward compatible. When a new MK6i Connector Bracket is requested, order service part # 1154125.

Shroud Cover, MK6i Connector Before 12/10/07

(ADJASBA w/ Sling Nylon Back Uph. or Multiple Switch Options)



Connector Shroud and Mounting Hardware 16-20" Wide
For ADJASBA Seats with Sling Nylon Back Upholstery
Or Multiple Joystick Options



Connector Shroud and Mounting Hardware 20-24" Wide
For ADJASBA Seats with Sling Nylon Back Upholstery
Or Multiple Joystick Options

Shroud Cover, MK6i Connector Before 12/10/07

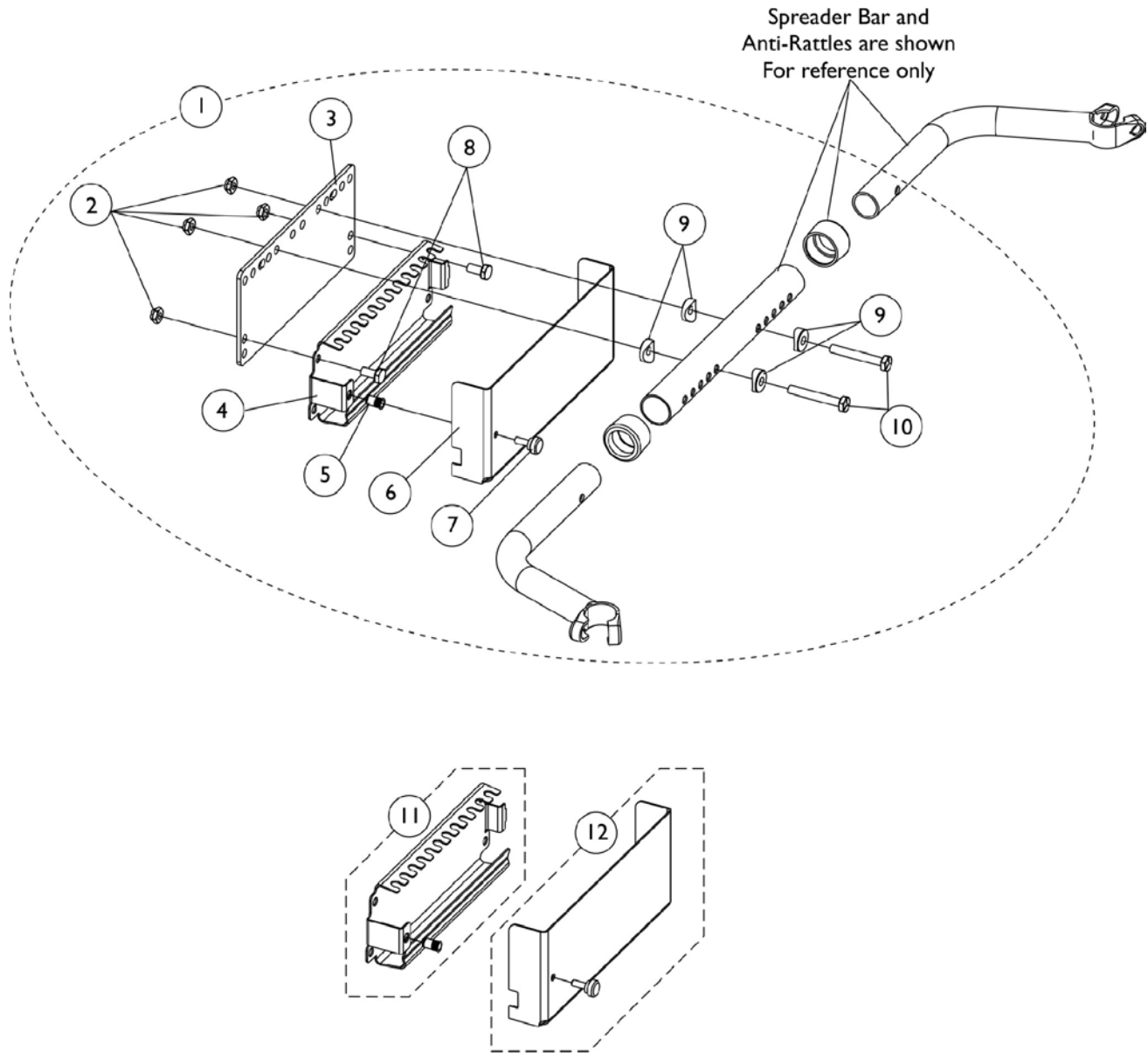
(ADJASBA w/ Sling Nylon Back Uph. or Multiple Switch Options)

Item Number	Note	Part Number	Description	Quantity Per	
				Package	Assembly
1	A,B	1145075	Kit, Connector Shroud and Mtg. Hdwr. for 16"-24" Wide ADJASBA Seats w/ Nylon Sling Back Uph.	1	1
2			Screw, Thumb (#10-32 x 1/2")	1	1
3			Shroud, MK6i Connector	1	1
4			Locknut (1/4-20)	1	6
5			Plate, Mounting	1	1
6			Screw, Hex Head (1/4-20 x 5/8")	1	4
7			Bracket, MK6i Connector, Black	1	1
8			Tray, MK6i Connector Shroud Mounting	1	1
9			Screw, Hex Head (1/4-20 x 1-3/4")	1	2
10			Tie Wrap (11-1/2" L)	1	2
2		1117240	Screw, Thumb (#10-32 x 1/2")	1	1
3		1148151	Shroud, MK6i Connector	1	1
7	B	1154125	Kit, MK6i Connector Bracket and Threaded Insert	1	1

NOTE: A - Includes items 2-10.
B - Item 7 MK6i Connector Bracket was revised 4/28/08 and is backward compatible. When a new MK6i Connector Bracket is requested, order service part # 1154125

MK6i Connector Bracket and Hardware After 12/9/07

ADJASBA w/ Sling Nylon Back Upholstery or Multiple Switch Options



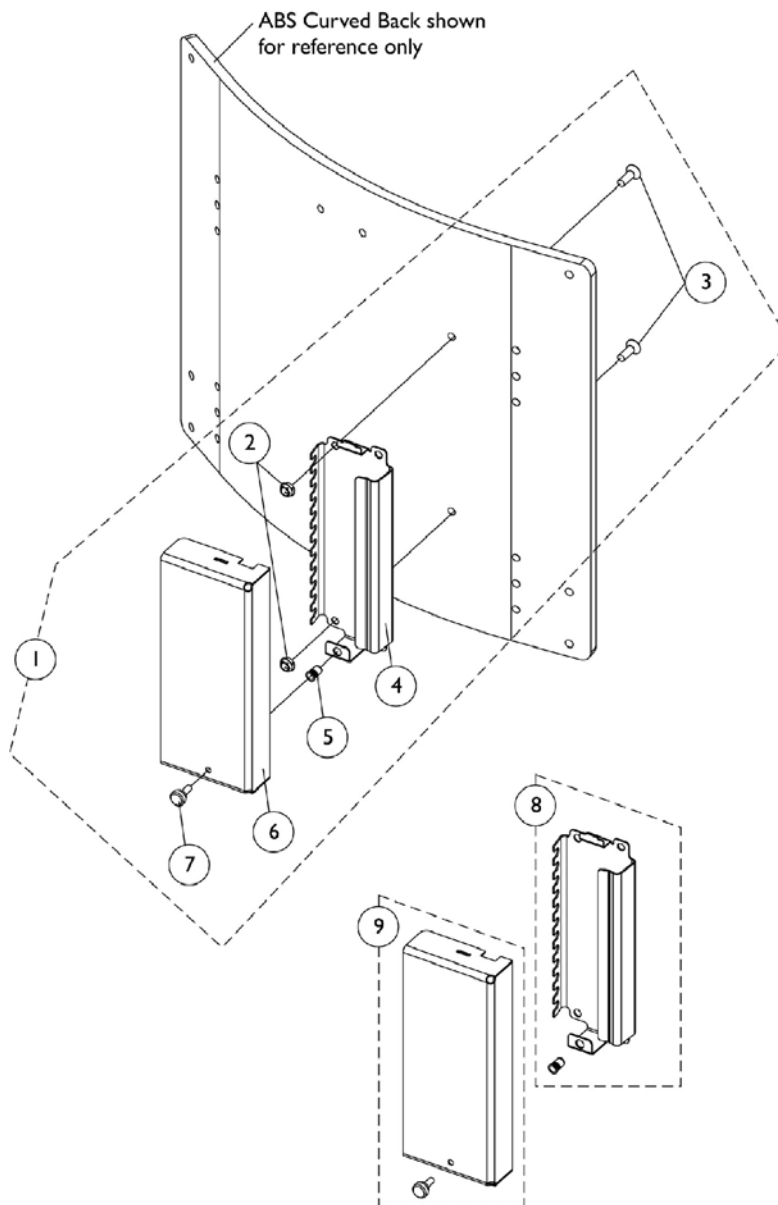
MK6i Connector Bracket and Hardware After 12/9/07

ADJASBA w/ Sling Nylon Back Upholstery or Multiple Switch Options

Item Number	Note	Part Number	Description	Quantity Per	
				Package	Assembly
1	A	1134242	Kit, MK6i Connector Bracket & Mounting Hardware for 16"-24" Wide	1	1
2			Locknut (1/4-20)	1	4
3			Plate, Mounting	1	1
4			Bracket, MK6i Connector, Black	1	1
5			Insert, Threaded (#10-32)	1	1
6			Cover, MK6i Connector Bracket	1	1
7			Screw, Thumb (#10-32 x 1/2")	1	1
8			Screw, Hex Head (1/4-20 x 1-1/2")	1	2
9			Spacer, Coved (1/4 x 11/16 x 1/2")	1	4
10			Screw, Hex Head (1/4-20 x 1-3/4")	1	2
11	B	1154125	Kit, MK6i Connector Bracket and Threaded Insert	1	1
12	C	1154126	Kit, MK6i Connector Bracket Cover and Attaching Screw	1	1
6			Cover, MK6i Connector Bracket	1	1
7			Screw, Thumb (#10-32 x 1/2")	1	1

NOTE: A - Includes items 2-10. Item 6 Connector Bracket Cover was introduced 4/28/08 and item 4 Connector Bracket was revised to use the cover.
 B - Includes items 4 and 5
 C - Includes items 6 and 7. When converting in the field for the first time to add the Connector Bracket Cover that was introduced 4/28/08, items 11 and 12 must be ordered together.

MK6i Connector Bracket & Hardware After 12/9/07 Formula (CGT) w/ ABS Curved Back & Multiple Switch Options

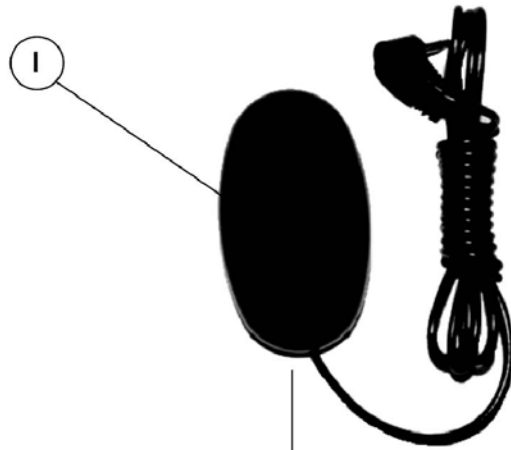


MK6i Connector Bracket & Hardware After 12/9/07 Formula (CGT) w/ ABS Curved Back & Multiple Switch Options

Item Number	Note	Part Number	Description	Quantity Per	
				Package	Assembly
1	A,B	1134243	Kit, MK6i Connector Bracket and Mounting Hardware For ABS Curved Back	1	1
2			Locknut (1/4-20)	1	2
3			Screw, Socket Head (1/4-20 x 3/4")	1	2
4			Bracket, MK6i Connector, Black	1	1
5			Insert, Threaded (#10-32)	1	1
6			Cover, MK6i Connector Bracket	1	1
7			Screw, Thumb (#10-32 x 1/2")	1	1
8	C	1154125	Kit, MK6i Connector Bracket and Threaded Insert	1	1
9	D	1154126	Kit, MK6i Connector Bracket Cover and Attaching Screw	1	1
6			Cover, MK6i Connector Bracket	1	1
7			Screw, Thumb (#10-32 x 1/2")	1	1
<p>NOTE: A - Includes items 2-7 and can only be used on ABS Curved Backs manufactured after 12/9/07 that have the two holes added to accommodate the MK6i Connector Bracket</p> <p>B - Item 6 Connector Bracket Cover was introduced 4/28/08 and item 4 Connector Bracket was revised to use the cover</p> <p>C - Includes items 4 and 5</p> <p>D - Includes items 6 and 7. When converting in the field for the first time to add the Connector Bracket Cover that was introduced 4/28/08, items 8 and 9 must be ordered together.</p>					

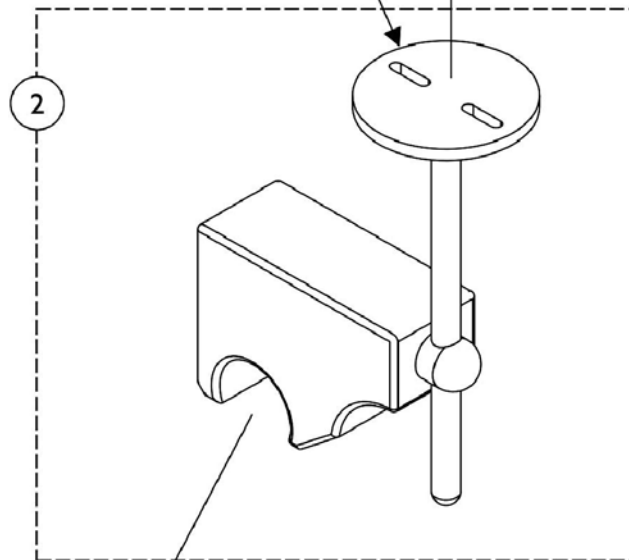
ASL 611 Mount For The Egg Switch

ASL 611 Mount is used to attach an Egg Switch when the Hook & Loop Adhesive method is not preferred



EGSBLK Egg Switch

NOTE: Egg Switch is mounted here with 2 ea.(6-32 x 3/8" Phillip Pan Head Screws) that come packaged with the Egg Switch



NOTE: The ASL 611 Mount assembles to a 7/8" round tube

ASL 611 Mount For The Egg Switch

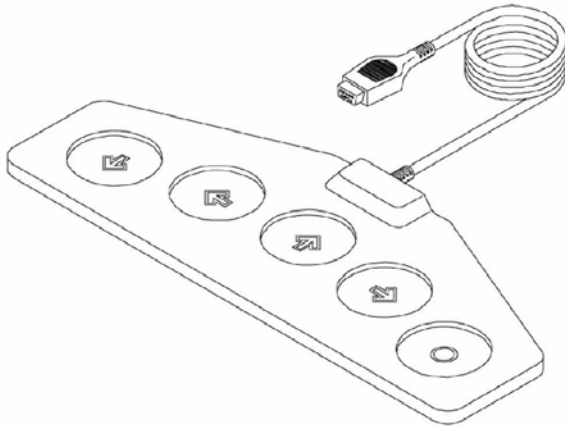
ASL 611 Mount is used to attach an Egg Switch when the Hook & Loop Adhesive method is not preferred

Item Number	Note	Part Number	Description	Quantity Per	
				Package	Assembly
1	A	1123276	Kit, Switch, Black Egg Reset w/ Hook/Loop Adhesive Back Fastener & Attaching Screws (EGSBLK)	1	1
2	A	1134165	Mount, ASL 611	1	1

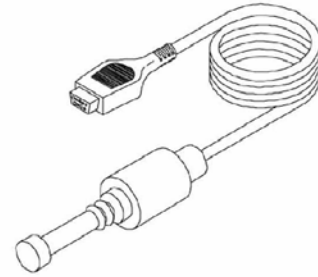
NOTE: A - Individual components are not available

Tash and Therafin Accessories

NOTE: Used with (MK6 display or MPJM6 joystick) with SNPM6 Sip-N-Puff/Digital interface



P5018-Wafer Board



P5020-Mini Joystick with Push

Item Number	Note	Part Number	Description	Quantity Per	
				Package	Assembly
	A	1142362	Bib Assembly (PKG32669)	1	1
	A	1140824	Sip-N-Puff, 16" Fixed (PKG32666) Includes: 3 Air Tube Straws, 2 Saliva Traps, Tubing, Pivot Shaft/Flexible Metal Gooseneck Assembly, and Extruded Figure "8" Clamp to fit 7/8" Wheelchair Frame Tubing. Extruded Back Cane Adapter Clamp also included.	1	1
	B	P5018	Wafer Board (5018)	1	1
	B	P5020	Mini Joystick with Push (5020)	1	1
NOTE: A - Not Shown B - See pictorial for additional reference to part number listed					
For more information on Tash and Therafin products, please contact one of our Rehab Specialists.					

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Form No. 06-110



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MK6i™ Electronics

Answers to Frequently Asked Questions

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Invacare MK6i Electronics

Answers for Frequently Asked Questions

ACC Function: (Calibrations Menu)

This is only available with ACC Controllers when there is an expandable electronic system on the chair (MPJ+, PSR/F+, MK6i Display).

Single "conventional" actuators plug directly into the ACC Controller. Multiple conventional actuators require an actuator module (i.e., TRAM or Tilt Recline Actuator Module, DLAM or Dual Leg Actuator Module) to plug into the system.

ACC Function (ACC1, ACC2) sets which Actuator operates directly through the Controller, not through the additional module. This allows display icons, programming options and drive lockout settings to match the chair configuration. (i.e., tilt only, tilt and recline, etc.).

If ACC Function is set incorrectly, the Display may falsely read it is in Drive Lockout when it is fully upright, correct powered seating icons may not appear on the display, and/or powered seating operation choices may not match configuration of the chair.

Set according to the following chart:

ACC FUNCTION OFF Tilt Recline Elevate Leg	●Tilt Only or Tilt w/ Ind. Power Legs = TILT	●Tilt w/ Pwr. Centermount = LEG
	●Recline Only or Recline w/ Ind. Power Legs = RECLINE	●Recline w/ Pwr. Centermount = LEG
	●Tilt & Recline & Power Center Mount = LEG	●Center Mount Leg Only = LEG
	●Individual Power Legs = OFF (or Generic)	●Tilt & Recline Only = OFF (or Generic)
	●Tilt & Recline & Ind. Power Legs = OFF (or Generic)	●Elevate Only = ELEVATE
	●Tilt & Recline & Elevate = ELEVATE	●Tilt & Elevate = ELEVATE

ACC DCI Function: (Calibrations Menu)

Conventional Actuators and ACC Controllers Only. Addresses Mercury Switch Function

Allows Turning Drive Lock Out Off on Single Actuator Systems -or- Setting how the Controller monitors the Drive Lockout Mercury Switch-ONLY WHEN ACTUATOR IS OPERATING THROUGH THE ACC OF THE CONTROLLER (AS SET UNDER ACC FUNCTION OF THE CALIBRATIONS MENU)

STANDARD SETTINGS ARE AS FOLLOWS:

- Off:** Standard for **IVC Tilt and Recline**, **any system w/ Pwr Center Mount Leg**, or **Tilt w/ Elevate**.
-AND- Allows disabling drive lockout for Conventional Single Actuator Systems
- IVC Manual (Continuous):** Mercury switch status is Continually monitored. Used with IVC **Manual** Tilt or Recline systems, and some After Market Powered Seating Systems
- IVC Power (Active):** **Formula CG Single Actuator** powered seating systems

Adding a Driver Control

Turn the chair off

Plug Driver control into the MK6i Universal connectors

Connect a Programmer to the chair, turn the chair on, and then turn the programmer on.

Go to <Performance Adjust> scroll right to the desired drive , then scroll down & select <Input Type>

Choose the appropriate input type from the list displayed. (Pg 15 of the Condensed Reference Guide)

Save to desired drive

Attendant Controls:

Attendant controls are not available with power chairs using any SPJ+ Joystick.

An alternative driver control, analog or digital, may be added to a chair with expandable electronics (4 drives) and dedicated for use as an attendant control by assigning it to one or more drives in the performance adjustment menu.

Dedicated Attendant Controls:

The digital control (1552M6) combined with a D/I box (1554M6) is an override attendant control. The switch placed in the "on" position over-rides any active user driver control, and drives at a pre-set speed. When in the off position, this control can be used the same as any other digital drive control, dedicated to one or more drives, and programmed using "Digital" as the "Input Type" found in the "Performance Adjustment" Menu.

The PACM6 is a proportional override attendant control. Turning the speed potentiometer to the "On" position to the desired speed will over-ride any active user driver control.

MK6 Attendant controls will operate the current active mode of the power chair when turned on.

MK6 Attendant control performance adjustments are programmable using a MK5 Programmer, MK6 Laptop IVS, or using a Professional memory card in an MPJ+, PSR+ or PSF+ Joystick

Auditory Feedback: (AUDIBLE IND, Calibration Menu)

Available only on MK6 Display. Turns on auditory feedback (series of beeps to indicate the active mode).

OFF - No audible beeps.

STD - Audible beeps as follows:

1 short beep - Drive level advanced to next higher level.

2 short beeps - Drive mode is active.

3 short beeps - Remove Drive Select is active.

1 long beep - ECU ONE or seating control mode is active.

2 long beeps - ECU TWO is active.

3 long beeps - ECU THREE is active.

4 long beeps - ECU FOUR is active.

1 very long beep - Standby mode is active.

3 Short Beeps - Pressure Relief Signal activated

No beeps when driving in reverse.

RIM - All STD beeps PLUS continuous intermittent beeping when in active RIM mode.

Automatic Positioning:

See "Smart Actuators"

Axes Selection: (Performance Adjustment menu)

Axes selection allows assignment or reassignment of driving directions to the different joystick quadrants, or turning selected quadrants off.

If remounting the joystick in a sideways orientation, the quadrants can be re-assigned to always allow forward movement of the joystick to be forward operation of the chair.

If training for cause and effect, all quadrants can be made forward

If training for operation, selected quadrants, even 3 of the 4 can be turned off

If operating in RIM, which quadrants perform which directions can be set.

Can be set differently in different Drives

Bypassing a Reset switch

"StandBy Select" (Performance Adjustment Menu) allows the chair to enter a standby mode where the driver control command selects the next active mode desired, eliminating use of a re-set switch to change modes. In the Performance adjustment Menu, Turn StandBy Select "On", and then set StandBy Time to the desired delay required for the system to enter into Standby Mode.

Only the following performance adjustment settings allow using "Stand By Select" to Bypass the Reset Switch:

Drive Select: Activate Drive Select Mode = Right Command;

(Advance to next drive using Left Command of the active driver control)

Tip: Be certain Drive Select is turned on in all drives to be accessed this way

ECU 1-4: Activate AUX 1-4 Settings = Left Command;

Tip: Be certain ECU1 (2-3-4) is programmed to desired setting in each drive

Powered Seating: Activate = Left Command;

Tip: Program powered seating to operate through the driver control in each desired drive from the <Powered Seating> Menu, <Actuator Control> <4SW, 4SW2LVL, etc>

RIM: Activate = Left Command, (Only available with StandBy Select if Powered Exit StandBy to Return to Normal Driving: = Forward Command

Tip: Seating and ECU Functions are turned off in that same drive

Calibration settings

Always global - Always the same in all four drives - Can NOT be different in Different Drives

Changing Drives 1 through 4: Four Options Available

1. Use the toggle switch located on the driver control to change drives
2. Program a Mono Port (Mono Port 1, or Mono Port 2) for a switch in the calibrations menu to be a Drive Select Switch. Successive switch activations will advance to the next drive.
3. Use an external Mode switch (re-set switch) and a Left Driver command
Turn on <Drive Select> in the Performance Adj. Menu for the desired drives. Activating a reset switch will enter "Drive Select" mode. Each successive left driver command will now advance to the next drive with "Drive Select" mode still active. Activating the Re-set Switch a second time will return the chair back to active driving mode - in the new drive.
4. Use Only a driver Command - Bypassing the reset switch
Turn on <Drive Select> and <Standby Select> for the desired drives, and set Standby time at desired delay.
After _ seconds of no activity, the chair will enter "Stand By Mode". A Right command now will place the chair into drive select mode where the left driver command will advance through the drives. Once landing in the desired drive, allow the chair to re-enter "Stand by Mode", a Forward command will now re-enter drive mode.

COM 1-4 (AUX12, AUX34)

An AUX12 or AUX34 allows the wheelchair electronics to communicate with an external device (ECU, Augmentative Communication Device, Aftermarket Powered Seating, etc...). The Driver Control becomes the switch operating the external device. The device is plugged into the ECU Port .

ECU Ports:

AUX 12 has ECU Ports 1 & 2, Allowing two devices, Four switch closures each.

AUX 34 has ECU Ports 3 & 4, Allowing two devices, Five switch closures each

The fifth switch port of AUX 34 is for those devices that require a fifth switch, such as a mouse emulator or some augmentative communication devices, (i.e., Mouse up, down, left, right, click)

4 ECU Ports Total - 4 Additional devices total, 18 Switch closures total

Each output (1, 2, 3, 4) appears separately in the program menu, & can be set up in 1 of 4 ways;

- OFF** Disables the output for that drive only. If using only one output of a COM unit, turn off the other.
- MOM.MOTOR** allows each command to operate in the momentary mode. (Suggested for operation of Tilt / Recline Actuators)
- LATCHED** places the Forward & Reverse commands in the latched mode, requiring an opposite direction command to turn off. Right & Left are never latched. (Suggested for pneumatic operation of Tilt / Recline).
- COMM** allows Immediate response of the relays - used with computer or communication devices. Also allows 2 relays to be closed at once (i.e., Forward & Right) for diagonal / veer capability when operating mouse emulation or augmentative communication devices.

Dedicate a Drive Profile to Powered Seating Only

To eliminate driving and dedicate a drive to operating powered seating only

Go to the Performance Adjustment Menu

Scroll right to the desired drive

Turn "No Driving" ON

Make certain RIM, ECU 1-4, are set to "Off"

SAVE CHANGES

Go to the Powered Seating Menu

Make Certain Actuator Control is set to "4SW" (or appropriate setting)

Go to Actuator Selection and make certain the forward, left, right, and reverse quadrants are set to operate the desired actuator function

SAVE CHANGES

Digital Interface Boxes:

All Digital (non-proportional) driver controls first plug into a digital interface (D/I) box. The same D/I box has a pneumatic port for Sip-n-Puff Controls.

ASL Driver Controls (Digital) utilize their own Digital M6 Interface that plugs directly into the Network block, (it has the D/I board integrated within).

Digital controls use "DIGITAL" as the input type assigned in the Performance Adjustment Menu.

ASL Digital Controls use "ASL DIG" as the input type assigned.

Digital 3 Speed:

A Momentary Driving mode available with digital controls that allows a choice of operating the chair in that drive profile in either a 1 Speed or 3 Speed mode.

Application for this parameter is to allow changing drive speeds in a momentary drive mode without changing drives.

In 1 speed mode, the chair will only drive forward at the forward speed programmed.

In 3 Speed mode, slow = 1/3 of forward speed, medium = 2/3 of forward speed, or full speed is selected prior to driving through reset / mode switch commands. The mode or re-set switch will cycle through the three speed selections.

(Activating a reset switch while driving will ALWAYS Stop the chair).

Doesn't operate. What do I check First?

1. Make certain the chair is turned on, & the clutches are engaged.
2. Make certain the battery charger is disconnected.
3. If tilt or recline, make certain the chair is not in "Drive Lock Out". If so, bring seat upright.
4. Make certain ACC Function and ACC DCI Function are set correctly in the Calibrations menu. (Page 26 of the Condensed Reference Guide.
5. If a programmer is plugged in, make certain it is turned off.
6. Make certain the display shows the chair is in an active drive mode
7. Make certain the attendant control is turned off
8. Check the Input Type assigned in the Performance adjustment menu for that drive to be certain it matches the intended control on the chair. Re-set as necessary.
9. Make certain NO error warnings / Faults are displayed. Correct as necessary.

SOME FAULTS ARE CAUSED BY EITHER BAD OR POORLY CHARGED BATTERIES AND ARE CORRECTED BY REPLACING OR RECHARGING THEM.

The above trouble shooting steps resolve the majority of the reasons chairs will not drive.

If the chair still does not drive, identify the fault code from the diagnostics menu of the programmer and take the necessary steps to correct.

Drive Profiles, Independent and Unique:

MK6 Display, MPJ, PSR, and PSF joysticks allow 4 completely independently programmable drives.

Each drive can have it's own driver control assigned in any combination of proportional or digital.

"No Driving" can be enabled in any drive to dedicate that drive to alternative activities such as seating system, computer access, alternative communication devices, ECU operation, etc...

Alternative activities can be selectively enabled or disabled in each drive.

Eliminate a Drive:

To remove a drive from the display (1 through 4),

Go to the Performance Adjustment Menu

Scroll right to the desired drive

Turn "No Driving" ON

Make certain RIM, Sleep Mode, ECU 1-4, are set to "Off"

Go to the Powered Seating Menu

Make Certain Actuator Control is set to "NONE"

Make certain Right AP Program under Seating Adjust has NONE selected for all Actuator selections 1-6

Emergency Stop / Re-set:

Any reset switch plugged into the Mono Port (1 or 2) of a MK6 Display, MPJ+ or PSR/F+ Joystick and programmed in the calibrations menu as "Mode / Re-Set" will stop the chair if activated while driving. (Not available with SPJ+ Joysticks).

To return to driving, allow the driver control to return to "Neutral", and resume driving.

Fault Codes: (Diagnostics menu)

The Fault Log in the Diagnostics Menu of the programmer displays all faults (including corrected faults) detected by the diagnostic system since the joystick was built, even those generated during testing at the factory.

Displaying old fault conditions helps diagnose intermittent faults not evident during chair service.

See Fault / Diagnostic Codes in the Field Reference guide or the Condensed Reference Guide for a list of all faults by name, number, or flash code on the joystick, and suggested solutions.

Use of a professional memory card and MK6 Hand Help Programmer will display fault code definitions and suggested resolutions for systems with 4 drives (Not systems using any SPJ Joystick).

To view the Fault log help screens help screens on the MK6i Programmer with the Professional Memory card inserted, Go to:

<Diagnostics>,

<Fault Log>,

Highlight an error code to view the fault description

Press the "Info Key" to view the suggested responses

4SW: (Four Switch)

See "Tilt / Recline Functions through the Driver Control"

Four Switch Two Level (4SW2LVL): (Actuator Control Setting)

4SW2LVL uses only the left and right driver commands to operate all four directional quadrants of powered seating programming. Dividing the 4 quadrants into two separate levels - each level operating only two of the directional quadrants, does this.

Level one operates the FORWARD & REVERSE powered seating actuator selections.

Left Driver command = "Forward" Actuator Selection. (i.e. Tilt UP/DOWN)

Right Driver command = "Reverse" Actuator Selection (i.e., Recline UP/DOWN)

Level two operates the LEFT & RIGHT powered seating actuator selections.

Left Driver command = "Left" Actuator Selection (i.e. Elevate UP/DOWN)

Right Driver command = "Right" Actuator Selection (i.e. Legs UP/DOWN)

Application of 4SW2LVL is to allow an ASL Head Array to operate all powered seating functions using only the left and right driver commands, allowing the back pad to remain as a head rest.

A Mode switch will advance from driving - to level one - then level two - then back to driving.

If using "Standby Select to Bypass the mode switch, once in standby, a left command will advance to level one.

Either a second left command, or a sustained left command will advance to level two, then back to one, back to two, etc...

4 Way Toggle (Quad Push Button) Settings

Programming for the 4-way switch (quad push button) is in the Calibration Menu.

"4Way Standard Programs" is a list of pre-set configurations for operation of the switch quadrants set according to the system chosen (i.e. tilt only, tilt and recline, etc...)

"4 Way Switch" allows the individual quadrants of the switch to be changed to meet the users needs from functions pre-set by selecting a 4Way standard program.

These programming functions are only available with multiple actuator systems.

4-Way Switch settings are ALWAYS the same in all 4 drives.

Head Array Programming

1. Turn the chair off
2. Plug All components of the head array into the MK6i System (ASL Interface box, Head Array, Mode switch)
3. Turn the chair on
4. Go to "Standard Programs" and select an appropriate drive profile for the driving environment. Save to desired drive (1 through 4)
5. Go to "Performance Adjustment" Menu
6. Scroll right to desired drive
7. Go to "Input Type" and select "ASL Digital"
8. Go to "RIM" and Select "On"
9. **Save Changes**

Head Array Operation of Tilt/Recline functions - Programming Steps - THREE OPTIONS

Operating powered seating systems with an ASL Head Array also requires a Multiple Actuator Interface Box (S4WSB) for multiple actuator systems, or MK6i SANODE for single actuator systems.

1. MODE SWITCH:

ASL Head Array driving & Single Actuator operation in the same drive:

Single Actuator Systems: In the performance adjustment menu for desired drives, SET:

Input Type = ASL DIG, RIM Driving = ON

In the Powered Seating menu for desired drives,

Act Control = 4SW (four switch)

Act Selection = Forward & Reverse = OFF

Left = Tilt Up

Right = Tilt Down

Multiple Actuator Systems: In the performance adjustment menu for desired drives, SET:

Input Type = ASL DIG

RIM Driving = ON

In the Powered Seating menu for desired drives,

Act Control = 4SW2LVL (four switch - two level)

Act Selection = Forward = Tilt Up / Down (Left Command in Level 1)

Reverse = Recline Up / Down (Right Command in Level 1)

Left = Leg Up / Down (or desired actuator) (Left Command in Level 2)

Right = Elevate Up/Down (or desired actuator) (Right Command in Level 2)

Operating the System in this programming mode allows the mode / re-set switch to cycle between "Normal" Driving, "RIM" Driving, and Powered Seating operation (4SW, or 4SW Level 1, then 4SW Level 2)

CONTINUED...

Head Array Operation of Tilt/Recline functions - Programming Steps - THREE OPTIONS CONTINUED...

2. MODE SWITCH for RIM ONLY - STAND-BY SELECT TO ENTER POWERED SEATING:

To eliminate the need for cycling through all modes and allow the re-set switch to only cycle between Normal & RIM Driving, Use Stand By Select to enter powered seating functions in desired drives...

Standby Select = ON

Standby Time = 4 Sec (A place to start)

Once in Standby Mode, Left Command = Powered Seating mode(s), Forward Command = Driving

3. ELIMINATE ALL MODE SWITCHES - USE ONLY 3 QUADRANTS FOR ALL FUNCTIONS - INCLUDING CHANGING DRIVES

Programming Requirements: Separate & Dedicate drive(s) to ONLY Driving / ONLY Seating

"Drive Select" on in all active drives

"No Driving" On in drive(s) dedicated to Powered Seating Only

"RIM" on in drives dedicated to Driving Only

"Standby Select" on in all active drives

Act Selection (Powered Seating) to 4SW for single, 4SW2LVL for multiple systems as above.

In this configuration, once in standby mode, use a right command to active drive select mode and subsequent left command to change drives to either a driving or powered seating drive profile.

If in a drive profile dedicated to driving, a left command from standby will enter RIM active mode, a forward command will enter NORMAL driving mode.

If in a drive profile dedicated to 4SW powered seating, a left command will enter 4SW mode

If in a drive profile dedicated to 4SW2 LVL, (multiple actuator systems) The first left command will enter Level 1, either a second left command or sustained left command will cycle into Level 2

Installing New (Replacing) MPJ+ Driver Control

1. Turn chair off

2. Remove and replace the MPJ+

SET DRIVE CONFIGURATION

3. Plug in a Remote Programmer

4. Turn chair on, turn programmer on.

5. Go to <Calibrations> Menu, <Drive Configuration>

6. Choose Match configuration listed to the installation chair - SAVE CHANGE

CALIBRATE JOYSTICK

7. Go To <Performance Adjust> Menu, Scroll down to Joystick Throw

8. Highlight entire row, then press select key

9. Follow prompts on the screen, then SAVE CHANGES

Program performance and modes as user requires

Latched Driving: {Performance Adjust menu - MOM/LATCH}

Driving mode where the **Forward Command remains Active** even after the Driver Control has been released.

Momentary commands are only active while the command is being given.

In Latched driving, Forward is Always latched, Left & Right can Never be latched, Reverse is a separate choice to be either in momentary or in latched mode. (MOM/REVERSE)

Latched Driving requires an emergency stop switch (reset switch) on the chair for safety. (Must be activated after turning electronics on)

Latched Driving modes are:

- 1 Speed** **5 Speeds (stepped)**
- 3 Speeds (stepped)** **Cruise Control**

To **Increase or Decrease speed**, in 3 & 5 Speeds, short bursts of a forward command increase speed to the next step; short bursts of a reverse command bring the chair to a stop. In Cruise Control, speed continuously ramps up with a sustained forward command & ramps down at the same rate with a sustained reverse command.

To Stop in Latched mode, use either 2 reverse commands within 1 second, or a reset switch signal.

Momentary / Latched: {Performance Adjust menu}

The MPJ+, PSR+, PSF+, or ANY alternative driver control used with a MK6 Display - digital or analog - can be set to operate in either a momentary or latched mode. (MOM/LATCHED). (Not Available with SPJ+ Joysticks)

In a momentary mode, the driver command is only active the moment the command is being held.

In a Latched mode, the command continues even after the command is released

Multiple Actuator Interface Box (S4WSB)

The Multiple Actuator Interface Box replaces the Four Way Switch Box to allow operating multiple actuators through the Driver Control.

Provides a 9-pin port for addition of a separate 4 quadrant ATTENDANT switch to operate powered seating.

Provides two additional ports, "A" and "B" for accessory "Direct Select" powered seating switches .

Port A Switch- Cycles through /selects connected actuators.

Port B - Operates the selected actuator in an up/down control method.

The 9-pin port allows any 4-quadrant digital switch to operate as an attendant control or user control of the powered seating actuators. (Programmed in the calibrations menu.

Performance Adjustments

Includes all Driving Parameters, and Driver Control Operations - with the exception of powered seating functions.

Only those parameters & adjustments corresponding to what is connected to the chair will be displayed.

All adjustments are independent and able to be uniquely different in each of the 4 drives.

Powered Seating - Single Actuator System

Programming for a single powered seating switch (egg switch standard) is in the calibrations menu, and is one of the choices within Mono Port 1 or Mono Port 2.

Smart Actuators will automatically display the appropriate actuator choice (i.e. tilt, recline)

Conventional Actuators require ACC Function of the Calibrations menu to be set correctly to allow the correct Actuator choice in the Mono Port Menu and correct icon to be shown on the display.

Three choices include <Actuator>Up/Down, <Actuator> Up, and <Actuator> Down

Choose Up/Down if using only a single switch

If using two switches - or a Stereo Switch, consider making:

Mono Port 1 = <Actuator> Up,

Mono Port 2 = <Actuator> Down

(No Choices available with the SPJ Joysticks)

MK6 Hand Held Programmer Operating Guidelines

Plug the programmer into the joystick. Turn on the chair, then the programmer.

The chair will not operate when the programmer is turned on, but the programmer can be turned off & remain plugged into the chair when driving.

PWR/INFO Key

Use this key to:

Turn the programmer On and Off. Hold the key down for more than two seconds.

Display Help information (definitions for highlighted parameters and values). While the programmer is On, press and hold this key for 1 second then release. Press this key to dismiss the help information and return to programming.

NOTE: *The Professional Memory Card must be in the programmer to access the Help information.*

UP/DOWN Arrow Keys

Use these keys to:

Scroll through menu options.

Scroll through the Help information.

Raise or lower selected performance values.

LEFT/RIGHT Arrow Keys

Use these keys to:

Scroll along menu line items.

Branch further in the menu structure.

Return to the previous screen.

SELECT Key

Use this key to:

Display adjustable values or selection choices when parameters are highlighted.

Choose the new value or selection choice.

Begin memory card transfer when prompted.

SAVE Key

The Save key must be pressed twice to save anything. The first press always confirms that you want to save or where you want to save, and the second press saves the values.

When an entire row is highlighted - All 4 drives are saved at once.

When only one value is highlighted - Only that drive is saved.

Selecting a Parameter

Use the Up/Down arrow keys to select the desired parameter to adjust.

Use the Right arrow key to open the desired parameter' s menu, if " >>>" is displayed.

MK6 Professional Memory Card Guidelines

The memory card allows programming parameters to be transferred from the power wheelchair to files on the memory card, where the parameters can be stored or organized. These parameters can be transferred to other wheelchairs as long as the motors, drive configurations, and driver controls are the same. The entire profile (all drives at once) may be saved or transferred. The individual drive profiles (1 through 4), or Individual powered Seating Profiles per drive may also be saved or transferred.

Features of the professional memory card:

Standard with all MK6i programmers.

Available with the USB card reader.

Contains advanced diagnostics, help screens, software updates, and file storage/retrieval.

Not compatible with SPJ+ joysticks.

MK6 Basic Memory Card Guidelines

Features of the basic memory card:

Standard on delivery with all power wheelchairs with rehab (expandable or 4 drive) driver controls.

Only used to backup/restore programmed settings/adjustments for one wheelchair.

Able to back up entire systems only. Not individual drives, or individual drive seating parameters.

Does not contain advanced diagnostics, help screens, software updates, or file structure.

Not compatible with SPJ+ joysticks

When transferring a system file from the card to the chair, the system name of the file must match the system name of the chair.

Press Re-Set Shows on Start up

A "Press Re-Set" message will appear on the display for one of two reasons:

1. Performance Setting Requirement

If any of the following performance adjustments are turned on in ANY drive, a "Press Re-Set" message will be displayed when the chair is powered up:

Sleep Mode

Latched Driving

PRS Time (Calibrations Menu)

Digital 3 Speed

RIM

2. Missing Component

If a MK6i component has been removed from the system, but remains in the programming menu, (i.e., driver control assigned to a specific drive), the chair will display a missing component message along with a Press-Re-set message.

To remove the message, reprogram the chair as appropriate, (i.e., re-assign connected driver controls, remove powered seating control functions no longer present on the chair, etc...)

Re-Set Switch / Modes Switch Functions:

Can be mechanical (least expensive) or electrical (most sensitive).

Set Mono Port (1 or 2) of the calibrations menu to function as a mode/re-set switch,

- If Driving, switch activation will always stop the chair,
- If in "Sleep Mode", the chair will return to the previous active mode,
- If using "3 speed" Momentary (non-proportional), speed is selected prior to driving,
- If in RIM Mode, the Forward command will change to a Reverse Command, or Reverse to Forward.
- Will cycle Driver Control Operation between driving and other activated modes (ECU, Remote Select, Tilt/Recline, etc...)
- If using "Stand By Select" to bypass the need for a switch to change modes - AND using RIM driving, the reset switch will only cycle between forward / reverse in the driving mode. Changing modes (i.e., driving to tilting to ECU operation) is still done through driver control commands without using the switch - using driver commands only.

RIM:

3 Quadrant Driving - Allows the Forward command of the Driver Control to also be the Reverse command.

Toggling between forward and reverse is done by activating a Reset Switch. Most frequently used with Head Controls. Can be used with proportional joysticks (not SPJ+), and switch driving systems.

To eliminate the need for a switch to toggle between forward and reverse:

In the Performance Adjustment Menu, turn RIM "ON", Turn Standby Select "ON", Set Standby Time appropriately (try 3 seconds).

To operate, when the chair enters Standby, a forward driver command enters "Normal" Driving, a Left Command enters "RIM" Driving.

(Requires ECU and Powered Seating functions to be off in that drive)

SANODE:

A component added to a single actuator system using an MPJ+, PSR/F+ Joystick, or MK6 Display with an Alternative driver control to enable operation of the actuator through the driver control.

If used on a system with multiple actuators, it will allow the choice of which single actuator can also operate through the driver control (Calibrations menu)

Sip n Puff Calibrating:

The goal in Sip n Puff calibration is twofold:

1. Match the Hard & Soft Sip and Puff pressures to those the user is capable of both when alert and when fatigued.
2. Separate the Hard & Soft values sufficiently to allow clear distinction between each.

Each calibration, Hard Sip, Soft Sip, Hard Puff, and Soft Puff are separately set within the calibrations menu.

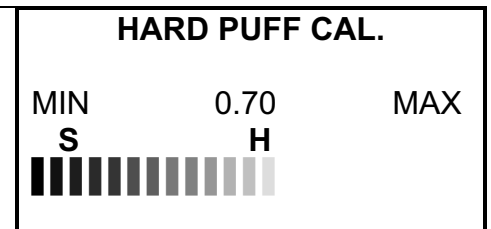
Go to <Calibration Menu> <Hard Puff Calibrate> Press Select Key.

In a **Hard** calibration mode, the up & down arrows of the programmer move the **H** value left (lower) or right (Higher). As the user gives a hard puff into the straw, the bars under S & H light up to the right. Move the H value left or right with the up & down arrows to match what the user can consistently reach.

Use the Menu Key to back up in the menu, scroll down to Soft Puff, and then repeat. In a Soft Calibration mode, the up and down arrows of the programmer move the **S** left and right. Repeat for Soft Puff.

Separate the **S** and the **H** far enough apart to allow the user to easily distinguish between a hard & a soft command. Repeat for Hard and Soft Sip calibrations.

SAVE ALL CHANGES



Sleep Mode: (Previously named StandBy Mode)

Allows the Wheelchair to enter an "Inactive (resting) Mode" mode after a set period of time with no driver control activity.

Used with drivers who cannot access the On/Off switch during periods of no activity.

Used to prevent "accidental operation" when in a resting mode.

A Mode Switch (Reset) is required to return the wheelchair to operating mode.

Disappears from the menu if Standby Select is On.

Smart Actuators:

An Actuator is the component that drives powered seating movement. i.e., power tilt, power recline etc...

It works simply by lengthening or shortening to move seating components.

e.g. A tilt actuator connects between the wheelchair base and seat.

As it lengthens, the seat tilts back

As it shortens, the seat returns to an upright position

Invacare offers two types of Actuators: Conventional and Smart.

Conventional Actuators: Have one function only - to drive movement. They have NO Intelligence, cannot talk back to the controller electronics, and rely on the wheelchair electronics for ALL commands. (Start, Stop, Drive Lock out, etc...)

Smart Actuators Drive movement, but also have Intelligence.

Built in Positioning Sensors allow it to know at all times the exact angle it is in.

Built in Micro Processors allow it to communicate with the wheelchair controller system, telling it how far it is moving.

Only Tilt, Recline, and Power Center Mount Actuators are available Smart or Conventional. All other actuators are conventional only.

FEATURES OF SMART ACTUATORS:

1. Pre-set Stop limits
2. Automatic Positioning

Pre-Set Stop Limits tell the actuator when to stop in each direction, and are programmed by setting the Max up angle and Max Down Angle. Programming Instructions are found in the Condensed Reference Guide - Pg. 24.

APPLICATION of STOP LIMITS:

1. Limiting Recline Max Up angle to 95° or 100° - matching the users available Hip flexion (passive Range of Motion) - can help prevent sliding out of the chair during recline cycles and even limit hip pain for some.
2. Limiting Tilt Max Up Angle can facilitate gravity assisted positioning for postural stability.
3. Limiting Max down angles benefits include helping to prevent discomfort & assure safe repositioning.

Automatic Positioning is a Pre-programmed - Pre-set seat position, attainable with one driver command.

Four Drives in the system allow 4 pre-set positions. Each pre-set position can be a single step - a single actuator moving to a set position, or a series of up to six steps in any order of actuator selection.

Programming Automatic Positioning is done with the user in the chair. Instructions are found in the Condensed Reference Guide - Pg. 24.

A Left Driver Command (LEFT AP PROGRAM), is programmed to move the seat down or back.

A Right Driver Command (RIGHT AP PROGRAM) is programmed to bring the seat up (Upright).

APPLICATION of PRE-SET POSITIONS:

1. Assurance of consistent, safe and adequate positioning for Pressure Relief
2. Inhibit sliding out of the chair when returning to upright sitting by pre-selecting the order and distance actuators move.
3. Assurance of pre-tilt positioning for safe travel up and down ramps and inclines
4. Assurance of proper positioning for daily activities such as transfers, feeding, swallowing, etc..

Standard Programs:

Simply a list of "Pre-Set" Performance Adjustments, determining a specific Driving outcome, or pre-setting for a specific driver control

Up to 13 Standard programs are available.

Not all 13 programs will always be displayed on the programmer - only those corresponding to the electronics plugged into the chair. (i.e., if there is no digital interface box plugged into the chair to connect Sip-n-Puff controls, there will be no Sip-n-Puff standard programs listed on the programmer).

Performance values for each of the standard programs are modified for each motor and drive configuration (2-Pole, 4-Pole, GB - Rear, or Center wheel drive).

Standby Select:

Sends the wheelchair into resting mode. Driver commands then SELECTS next operating function - BYPASSING the "Reset Switch".

Once in Standby mode:

FORWARD command always returns the wheelchair back to Drive Mode.

RIGHT Command = Remote Drive Select Mode (if turned on). Subsequent Left command advances to next drive where Drive Select is also activated.

LEFT Command = ECU functions, then Powered Seating Functions (if turned on).

Disappears from the menu if Sleep Mode is On.

Tilt / Recline Functions through the Driver Control - 4 Drive Systems - Programming Steps:

Single Actuator Systems require a SANODE (Single Actuator NODE) in the system

Multiple Actuator Systems require a Multiple Actuator Interface Box (S4WSB)

In the Powered Seating Menu:

<Actuator Control> Choose the mode (4SW, 4SWL, etc) for the desired drive(s) or all 4 drives.

<Actuator Selection> Set the desired actuator function for each quadrant of the driver control. This can be the same assignment in all drives or different (tilt in drive 1, recline in drive 2, etc).

Save Changes.

Use a reset switch to change between driving & powered seating modes in each drive.

Bypass the reset switch to change modes using driver commands only by turning on "Stand By Select" in the Performance Adjust menu. .

After the chair enters "Stand By Mode"...

<Left Command> now enters Powered Seating functions. The driver control will now operate all tilt / recline functions as programmed in the Actuator Selection Menu. To return to driving, allow the chair to re-enter standby, a forward driver control command will return the chair to driving mode.

Traction:

Reduces speed when going into or coming out of a turn. Helpful when needing to soften veer correction in latched driving modes, or to dampen turning / veer correction speed for aggressive drivers.

The higher the value, The greater the speed reduction.

Tremor Dampening:

No Longer a Standard Program, but a Performance adjustment that allows programming increased or decreased levels of dampening per user needs, or different settings in different drives (i.e., increased dampening for faster speeds, lower dampening for slower speeds).



Powered Mobility Trouble Shooting Guide

Page 1	Batteries
Page 2	Battery Chargers
Page 3-5	Motors/Gearboxes
Page 6	Wiring Harness/Fuses
Page 16-17	What is Current Rollback?

Technical Service Hotline

1-800-668-5324 **ext. 2655**

Visit the "Technical Zone" @ www.invacare.ca

Troubleshooting Guide

Battery Trouble Shooting Guide		
Problem	Possible Cause	Corrective Action
Batteries won't charge.	Blown fuse in wiring harness, or charger.	Check all fuses on the chair, and in the charger.
	Charger not plugged into outlet.	Make sure charger is plugged into the outlet.
	No AC power at the outlet.	Check for AC power with a digital volt meter.
	Charger Power cord may be damaged, or the connector may be damaged.	Check for damage and replace if necessary, or send in for repair.
	Charger may have internal damage.	Charge batteries with known good charger.
	Battery voltage too low for charger to start charging cycle.	Replace batteries.
Batteries have short driving range during a single charge. Battery Gauge falls off faster than normal.	Consumer Not charging batteries long enough.	Charge for 8-10 hours minimum.
	Batteries may be weak.	Perform load test, or check Battery Quality Menu with your programmer.
	Check programming settings.	Torque setting and Power Level setting may be to High.
Batteries have swelled up.	Heavy load on motors.	Chairs weight distribution may be offset (chair may be front loaded).
	Batteries have been overcharged.	Check or Replace batteries. Some swelling in Gell Batteries is normal.

Troubleshooting Guide

Battery Charger Trouble Shooting Guide		
Problem	Possible Cause	Corrective Action
Batteries won't charge.	Blown fuse or damaged cords.	Replace fuse and check cords for damage.
No LED's on Charger.	Charger not plugged into outlet, or disconnected from wiring harness on chair.	Make sure the charger is plugged into the outlet, and check the wiring on the chair.
	No AC power at the outlet.	Check for AC power with a digital volt meter.
	Power cord may be damaged.	Check for damage on the power cord, replace if damaged or send in for repair.
	Charger LED's may be burnt out.	Send charger to Invacare for repair.
	Charger may have internal fuse that is blown.	Remove charger cover and check for fuses.
Charger starts up and shuts off after running for a short period of time, red or green lights may be flashing.	Powerchairs batteries may be severely discharged (voltage too low).	Remove each battery and use a 12 Volt charger on each battery for 1 hour. Put both batteries back into battery box(es), and restart charger. Replace batteries if needed.
Short Charge Time	One or both batteries may be bad, (if batteries charge up to soon).	Load test each battery, and replace if needed.

Troubleshooting Guide

Motor/Gearbox/Brake Trouble Shooting Guide		
Problem	Possible Cause	Corrective Action
Motor makes a clicking noise.	Bad coupler between motor and gearbox, or bad bearings inside of motor.	Replace coupler, if bearings are bad replace motor.
	Raised commutator plate inside of motor.	Ohm out motor, and Replace motor if high reading is present. .5 - 5 Ohms Normal.
Grinding noise or motor is locking up.	Bad gearbox.	Replace gearbox.
Motors stall and starts up again.	Current Rollback.	Leave power ON and allow controller to count down, and recharge the chair overnight with power ON.
Chair will not drive with power on (E09 or E10).	Check motor locks.	Engage Motors to drive chair.
Motor Chatters or runs erratically, or only one motor turns.	Damaged connector or worn brushes.	Ohm out motors, check or replace brushes.
	Controller malfunction.	Swap out motor leads. Check for error codes with programmer.
Chair veers to the left or right when driving on level surface.	Uneven tire pressure. Motors out of balance.	Inflate tires, or replace if worn. Use programmer to balance motors (2/4-Pole Only).
	Joystick needs calibrated.	Recalibrate joystick with programmer, or replace inductive if necessary.
	GB Motor Calibration needed.	Recalibrate motors with programmer.
E09/E10 error code will not go away.	Bad motor connection. Bad Brake Coil.	Check all connections. Ohm out each brake coil. 45 - 50 Ohms Good. Swap motor leads to see if code switches sides (call Tech Services).
Brake dragging causing chair to veer.	Bad brake coil, or connection. On early 2-Pole motors if the Brake Lever is bent, it may be rubbing on the brake pad.	Replace brake coil.

Troubleshooting Guide

Motor/Gearbox/Brake Trouble Shooting Guide		
Problem	Possible Cause	Corrective Action
Gearbox is leaking Fluid.	Bad seal around drive shaft, or loose hardware.	If seal is bad replace gearbox. If loose hardware is found retighten hardware.
Excessive clicking coming from motor/gearbox.	Bad bearing in motor or gearbox.	Replace motor or gearbox.
	Loose wheel hardware.	Tighten hardware, (use removable Loctite TM on hardware). Follow torque setting in Service Manual.
Gearbox shaft movement, or bent shaft.	Rough Driving.	Replace Gearbox.
GB Motors clicking.	Excessive load on chair, or damage from rough terrain.	Replace Motor.
	Loose Hub on motor.	Tighten loose hardware. May need hub washer upgrade, call Tech Services
Brake lever not engaging brake coil.	Bent lever or internal damaged.	Replace brake coil.
	Bad micro switch or out of adjustment.	Repair micro switch, readjust switch, or replace brake coil (motor).
Motor Stutters.	Poor connection, or worn brushes.	Check Anderson connectors. Check brushes and replace if necessary.
	GB Motor Calibration.	Recalibrate Motors.

Troubleshooting Guide

Motor/Gearbox/Brake Trouble Shooting Guide		
Problem	Possible Cause	Corrective Action
Motor Fails to start after initial installation.	Motor is miswired.	Verify wiring to motor from controller.
	Battery Voltage is too low.	Check batteries and recharge if necessary.
	Switch motor leads.	Replace motor or controller (call Tech Services).
Motor is running then fails to restart when stopped.	Heavy Load on the motors and, chair is in the Current Rollback mode.	Leave power ON and allow controller to count down, and recharge the chair overnight with power ON..
	Circuit Breaker may have tripped. Blown Fuse in Wiring Harness.	Reset Breaker and check wiring. Replace fuse.
	OHM out motor to check for possible internal damaged. Worn out brushes may be possible.	Replace brushes if necessary, or replace motor if internal damage is determined.
	Controller power stage board, or relays may be damaged.	Replace controller or send to Invacare for repair.
Motor runs but loses power.	Controller senses heavy load, and has entered the Current Rollback mode.	Leave the power on and allow the controller to count down. Recharge overnight with power ON.
Scooter or Chair loses all power while driving.	“Soft Stop” is engaged. If key/power is turned “OFF” while driving, the chair artificially holds power for 1.5 seconds slowly decelerating until to a stop.	With key/power “OFF” position, wait 10 seconds and turn power back “ON”.

Troubleshooting Guide

Wiring Harness Trouble Shooting Guide		
Problem	Possible Cause	Corrective Action
No power to chair motors.	Bad connection or blown fuse. Check Joystick connection.	Check all connections and housings for damage. Replace fuse if blown.
	Loose battery connections	Check battery cable connections, may have vibrated loose when driving on rough terrain.
E28 Error code.	Damaged controller connections.	Repair connection, or clean contacts.
	Drive lockout condition in High back Van seat, Recliners, and Power Seating Systems.	Return to upright seat and back angle. Recalibrate mercury switch or reconnect wiring (may have come loose). Check POT Calibration or Mercury switch on chairs equipped with power seating.
	Internal Wiring Harness damage. Use a volt meter to perform a continuity test on each connection.	Replace Wiring Harness.
	Charger still plugged when user tries to drive the chair.	Unplug charger to drive chair.
No LED's on Joystick or Tiller.	Tiller harness unplugged. Joystick connection to controller unplugged or damaged.	Plug connections back together, and check for damage wiring.
Corroded wiring or connections.	Possible water, salt, or urine damage.	Replace Harness.

WHAT IS CURRENT ROLLBACK?

Current flows from the batteries, through the controller, and then into the motors. As speed, load, rolling resistance, and terrain angle increases so does the amount of current flowing through the system. Current generates heat and if it is excessive for too long it can lead to component failure. To protect the system, all MKIV controllers have a way to monitor the current drawn through the system and limit it when it reaches a critical point preventing damage to the circuitry. This feature is called Current Rollback. If the internal temperature of the controller reaches the current rollback setting then the controller will automatically reduce the output which will cause the chair to slow down or stop depending upon the load and operating terrain. The controller has an internal timer that keeps the operating system at this reduced output until the system has had able time to cool down. Once it counts down full power output is restored to the system.

What increases the risk of current rollback?

Weight - Weight on the chair plays a factor. Weight includes the user in the chair as well as all other accessories mounted to the chair. It takes more energy to move a 185-pound person that has a power tilt/recline system with a ventilator than a 185-pound person in a standard seat does.

Rolling Resistance – The surface that the chair is operating on makes a difference to how hard the chair has to work. Sand or deep grass offers more rolling resistance than pavement. Front Loading increases rolling resistance and is explained below.

Terrain Angle - Inclines require the system to work harder as you fight gravity. Ramps are obvious but the land terrain (slopes, hills) are not as obvious but plays a part in current rollback.

Speed – A system running at 100% forward speed requires more power than one running at 75%. Combine high-speed settings with factors above and you run the risk of going into current rollback.

A big factor that leads to a chair going into current rollback is front loading. Front loading occurs when an excessive amount of the user's weight rests on the front casters and not the drive wheels. As rear wheel drive chairs are designed to carry weight and not push it, the impact to performance of front loading is significant.

Symptoms of front loading:

- 1.) When seated in the chair, the user's belly button is more than 8 inches in front of the nut on the main drive wheel. Or more than 4-5 inches of the seat hang over the front casters.
- 2.) Chair requires max torque and power level to perform a slow turn or go over obstacles.
- 3.) Chair feels jerky or erratic while driving.
- 4.) Poor traction on the drive wheels or frequent replacement needed of drive wheels.
- 5.) Failing front forks and frequently worn casters.
- 6.) Chair stops or drives erratically when going through rougher terrain (grass, snow, ramps, etc.)

HOW TO SOLVE IT?

Mechanical Adjustments:

- 1.) Move the drive wheels forward: The Storm Series bases allow for the drive wheels to be moved to any of 3 positions. Most chairs are ordered with the wheels in the rear most position allowing for 2 inches of forward movement.
- 2.) If a standard ASBA seat (not a tilt or recline), then the seat can very easily be slide rearward by loosening the four ½” hex head bolts that attach the seat to the base. Again the further back you can get the seat, without hitting the foot on the casters, the better the weight and balance.
- 3.) If the user would tolerate, angling the seat by adjusting the static tilt will also shift weight rearward. Some tilt will also allow for the seat to be shifted rearward more and not hit the casters. The compromise with more static tilt is that the front seat to floor will increase.

Electronic Adjustments:

- 1.) In most of the cases so far, the provider has picked up a programmer before they tried a wrench resulting in a front loaded chair with the highest torque and power level settings. **NOT A GOOD COMBINATION.**
- 2.) Once the mechanics have been optimized, then load the standard proportional performance or learner indoor program. These have moderate torque levels that should provide adequate power on a well-balanced chair.
- 3.) If the chair feels like it needs more power, then **FIRST** check the power level setting in **EACH** drive. Most are set at 80% or lower. Simply increase this parameter and re-save. If more power is still needed, then the torque parameter can be increased. Torque should never need to be max-ed out. If it is then there is another problem (i.e. front loading or a drive motor that is not powerful enough for the task).
- 4.) With power level at 100% and a very high Torque setting, you could be going into current rollback more quickly because of the amount of current being allowed into the system.

Drive Motors:

The standard 4 pole and the Gearless Brushless are rated for loads up to 300 lbs. and the heavy duty 4 pole is used for loads up to 400 lbs. If the 4 pole or GB is not providing enough power once the above has been done, then the user would be a candidate for the heavy duty 4 pole. Remember heavy duty drives are not just for users over 300 lbs., but also for user's who are very **ACTIVE**. If the provider knows that the user is a very hard user, then they are better served going to the heavy duty 4 pole from the start.

COMMON Mistakes:

The most common mistake and aggravation to this situation are that the user or provider turns the chair off to cool down. The controller has a counter in it that begins to count up when the current reaches a dangerous level. Once the chair current is normal again, then it needs to count down. It can only do this with the chair turned **ON**.

If you have someone who claims to be in a state of constant current rollback, then chances are that they are turning their chair off and the counter is remaining high, so that it only takes a little bit of driving to go back into rollback. This could happen with a chair that sat on a charger all night. The best thing to tell people is to try charging their chair with the power on. This ensures that the counter is zeroed and the batteries are full.

Power Mobility Diagnostic Tool for Invacare Scooters Programming Instructions

For more technical information, visit the “TECHNICAL Zone” @www.invacare.ca

CAUTION: Please read all instructions carefully.

1. Turn OFF the vehicle.
2. Remove the seat and the rear shroud (refer to Owner’s Manual for more information).

WARNING

The scooter cannot be driven while the programmer is plugged into the controller. Before making any connections to the controller elevate the drive wheels, and secure the scooter.



3. Turn the vehicle ON.
4. Locate the programmer socket.
5. Remove the protective plug, and plug in your programmer.

NOTE: If after a few seconds a fault is indicated on the display, refer to the back of the programming card for details, or refer to the Owner’s Manual.

6. Press the MENU key to scroll through all of the menus available with the programmer.

Main Menu Options:

- 1) **Setup Menu** - Allows the scooter to be customized for the user’s driving preferences or environment. Adjustable feature include:
 - Acceleration
 - Deceleration
 - Forward Speed
 - Reverse Speed
 - Reduce Speed
 - Buzzer Volume
 - Sleep Time
- 2) **Options Menu** - Allows you to change two factory-preset values.
 - Pot Reverse
 - Enable Sleep
- 3) **Speed Lever in Neutral Menu** - Allows you to calibrate the throttle about neutral.
- 4) **Controller Version Menu** - Provides you with the version of the controller software.

HOW TO MAKE ADJUSTMENTS IN THE SETUP MENU

From the Setup Menu Display, press ENTER to scroll through the options.

1. The first option is ACCELERATION (Factory Default 3)
 - Press the VARY key to change the acceleration rate.
 - Range: 1 - slowest acceleration to maximum forward speed
 - 10 - fastest acceleration to maximum forward speed
 - Press ENTER to confirm the value when finished.
2. The second option is DECELERATION (Factory Default 7)
 - Press the VARY key to change the acceleration rate.
 - Range: 1 - slowest deceleration from maximum forward speed
 - 10 - fastest deceleration from maximum forward speed
 - Press ENTER to confirm the value when finished.

Power Mobility Diagnostic Tool Invacare Scooters

Programming Instructions

For more technical information, visit the “TECHNICAL Zone” @www.invacare.ca

3. The third option is FORWARD SPEED (Factory Default 10)
 - Press the VARY key to change the acceleration rate.
 - Range: 1 - slowest forward speed
10 - fastest forward speed
 - Press ENTER to confirm the value when finished.
4. The fourth option is REVERSE SPEED (Factory Default 4)
 - Press the VARY key to change the acceleration rate.
 - Range: 1 - slowest reverse speed
10 - fastest reverse speed
 - Press ENTER to confirm the value when finished.
5. The fifth option is REDUCE SPEED (Factory Default 5)
 - Press the VARY key to change the acceleration rate.
 - Range: 1 - slowest limit of maximum forward speed and maximum reverse speed
10 - fastest limit of maximum forward speed and maximum reverse speed
 - NOTE:** For example, if REDUCE SPEED is set to 7, FORWARD SPEED to 10 and REVERSE SPEED to 6, maximum forward speed will reduce to 7, but maximum REVERSE SPEED will stay at 6, as it is already lower than REDUCE SPEED.
 - Press ENTER to confirm the value when finished.
6. The sixth option is BUZZER VOLUME (Factory Default 10)
 - Press the VARY key to change the acceleration rate.
 - Range: 1 - a setting of 1 turns the horn/buzzer OFF
10 - any other value turns the horn/buzzer ON, 10 being the highest volume
 - Press ENTER to confirm the value when finished.
7. The seventh option is SLEEP TIME (Factory Default 30 minutes)
 - Press the VARY key to change the acceleration rate.
 - Range: 5 min. - fastest sleep time setting for scooter (scooter powers down after 5 min. of inactivity)
60 min. - slowest sleep time setting for scooter (scooter powers down after 60 min. of inactivity)
 - Press ENTER to confirm the value when finished.

HOW TO MAKE ADJUSTMENTS IN THE OPTIONS MENU

1. The first option is POT REVERSE (Factory Default OFF)
 - The Option Menu settings are either ON or OFF.
 - Range: ON - Polarity of the throttle Pot is reversed. (Left Hand Drive)
OFF- Normal Polarity of the throttle Pot. (Right Hand Drive)
 - Press ENTER to confirm the value when finished.
2. The second option is ENABLE SLEEP (Factory Default ON)
 - The Option Menu settings are either ON or OFF.
 - Range: ON - Sleep Time is enabled
OFF- Sleep Time is disabled
 - Press ENTER to confirm the value when finished.

HOW TO MAKE ADJUSTMENTS TO THE SPEED LEVER IN NEUTRAL

1. The SPEED LEVER IN NEUTRAL option is used to calibrate the throttle pot for neutral.
 - This menu allows you to calibrate the throttle pot about neutral so that when the throttle is at rest (in neutral), the controller sees a voltage that translates to zero speed. The default voltage for zero speed is 2.5 VDC.
 - Range: After entering this menu option loosen the two set screws in the throttle pot assembly, and rotate the throttle shaft slowly until the buzzer sounds. If the controller version is 2.46 or higher, the status light will also glow.
 - Press ENTER to confirm the value when finished.

CONTROLLER VERSION

1. The CONTROLLER VERSION Menu Option will display the current version of software.

***** It is important to unplug the programmer before turning off the the scooter for the changed settings to be saved. *****

Scooter (HMV) ERROR CODES

The HMV Tiller is equipped with a Status Indicator LED that will flash valuable diagnostic code information. The Status Indicator LED is located on the left side underneath the Battery Charge Indicator (see picture below).

The Status Indicator LED will flash in burst, separated by a pause to provide diagnostic information. See page 15 for display picture.

Number of Flashes	Fault	Impact on Scooter	Notes
1	Battery needs recharging	Will Drive	Battery charge is running low. Recharge the batteries as soon as possible.
2	Battery Voltage too low	Drive Inhibited	Battery charge is empty. Recharge the batteries. If the scooter is left off for a few minutes, battery charge may recover sufficiently to allow driving for a short period of time.
3	Battery Voltage too high	Drive Inhibited	Battery charge is too high. Scooter will charge batteries when travelling down slopes or decelerating. Excessive charging in this manner may cause this fault. Turn the scooter power off and then back on again.
4	Current Limit time-out	Drive Inhibited	The scooter has drawn too much current for too long, possibly because the motor has been overworked, jammed or stalled. Turn the scooter power off, leave for a few minutes, and then turn back on again. The controller has detected a shorted motor. Check the wiring harness for shorts and check the motor.

Scooter (HMV) ERROR CODES

The Status Indicator LED will flash in burst, separated by a pause to provide diagnostic information.

Number of Flashes	Fault	Impact on Scooter	Notes
5	Brake Fault	Drive Inhibited	Check that the park brake release lever is in the engaged position. The park brake coil or wiring is faulty. Check the park brake and wiring for open or short circuits.
6	Out of Neutral at power up	Drive Inhibited	Throttle is not in neutral position when turning the key switch on. Return throttle to neutral, turn power off, and back on again. Throttle may need to be re-calibrated. Check Throttle wiring.
7	Speed Pot Error	Drive Inhibited	The throttle or its wiring is faulty. Check for open or short circuits. Throttle may not be correctly set up.
8	Motor Volts Error	Drive Inhibited	The motor or its wiring is faulty. Check for open or short circuits.
9	Other Internal Errors	Drive Inhibited	Call Invacare Technical Services at 1-800-668-5324 ext. 2655.

HMV TILLER DISPLAY



The part I enjoyed the most is (and why?) _____

The part I enjoyed the least is (and why?) _____

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What is $E=MC^2$? or What is your favourite Shakespearean Soliloquy?

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Overall:

Comments:

1	How would you rate the content of this class?	1 2 3 4 5	
2	How would you rate the performance of the instructor?	1 2 3 4 5	
3	This course will help you better serve <u>your customers.</u>	1 2 3 4 5	
4	The audiovisual materials were helpful.	1 2 3 4 5	
5	The handouts were well organized and helpful.	1 2 3 4 5	
6	The Invacare staff in attendance was helpful and knowledgeable.	1 2 3 4 5	
7	The room was comfortable.	1 2 3 4 5	
8	I would recommend this course to others.	1 2 3 4 5	

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The part I enjoyed the most is (and why?) _____

The part I enjoyed the least is (and why?) _____

Is there anything you would like added or taken away from this course?:

Additional Comments _____

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