



BEDROCK V3000



Compact high-performance fanless edge server

www.solid-run.com



Remarkable performance with 8 Core, 64 GB DDR5 ECC and 3x NVME Gen 4



Best-in-class connectivity with dual 10 GbE, 4x 2.5 GbE, 5G and WiFi 6E



State-of-the-art fanless thermal design for operation in -40°C to 85°C

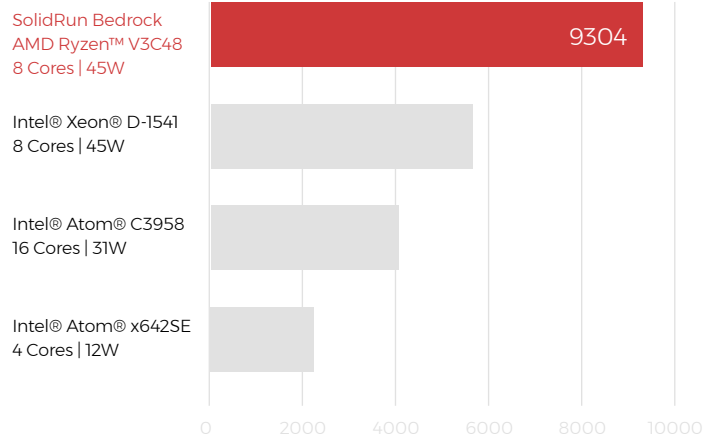


Easy-to-integrate compact design with DIN-Rail mounting, 12V-60V DC input

Solid Performance

SolidRun Bedrock V3000 Basic is powered by AMD Ryzen™ Embedded V3C48 Processor, a state-of-the-art 6nm 8C/16T CPU with industry leading performance and power efficiency. Bedrock PC is utilizing the full capabilities of the processor, including 20 lanes of PCIe Gen4 to allow storage, networking and I/O to keep pace with the CPU. The result is unprecedented performance for a compact fanless Edge Server / IPC.

CPU Performance - Geekbench 5 CPU Multi-Core



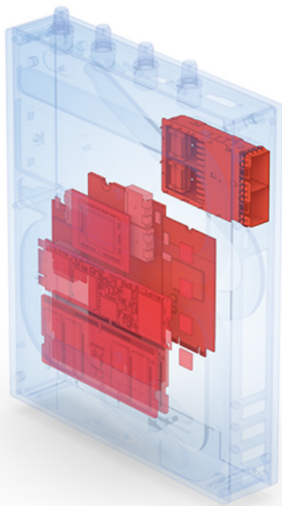
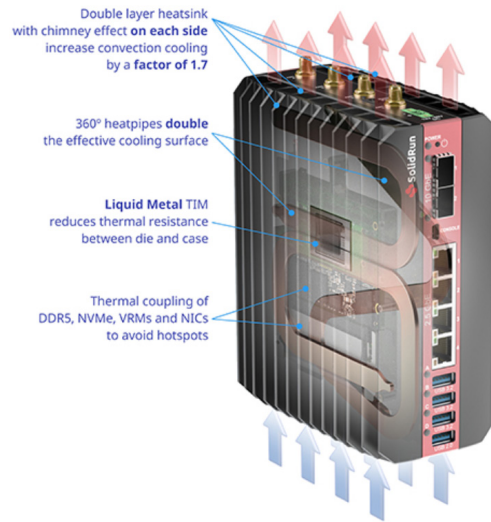
Packed Solid with Features

NVME Gen 4x4	10 Gbit Ethernet	2.5 Gbit Ethernet
64 GB DDR5 - 4800ECC	WiFi 6E BT 5.3	5G Modem Dual SIM

The memory, storage and networking devices found in SolidRun's Bedrock V3000 Basic stand out in both performance and capacity. 64 GB DDR5 with ECC, 3x NVME Gen4 2280, 2x 10 GbE SFP+ copper/fiber + 4x 2.5 GbE ports, WiFi 6E, 5G modem with dual SIM and 4 USB ports. All these features are tightly packed in a fanless enclosure of under 1 liter.

Remarkable Fanless Cooling

Hot chips require innovative cooling. Bedrock was designed from the ground up for effective fanless cooling. The CPU is thermally coupled to the chassis using liquid metal TIM to reduce thermal resistance. Stacked heatpipes distribute the heat evenly 360° around the all-aluminum chassis. To optimize convective heat transfer, each chassis wall has two heat exchange layers – aluminum air-ducts that stimulate airflow by chimney effect, and another layer of conventional cooling ribs. As a result, Bedrock can dissipate over 3 times the power of fanless computers of similar size.



Cooling secondary heat sources

Cooling the secondary heat sources is a key requirement for reliable 24/7 operation under extreme storage or networking utilization profiles. All power dissipating devices inside SolidRun's Bedrock V3000 Basic are thermally coupled to the chassis, including the 3 NVMe, both SODIMMs, power FETs, NICs, SFP+ cages, WiFi adapter and 5G modem.

Rock Solid Reliability

Bedrock is designed with reliability in mind based on decades of experience in development of IPCs and embedded systems. DC power is through a terminal block with screw locking and has a wide voltage range of 12V – 60V with two stages of regulation. RAM supports ECC. NVMe with power-loss-protection (PLP) can be ordered. Bedrock has redundant SPI Flash to prevent bricking by BIOS corruption as well as WDT and TPM. The enclosure is extremely ruggedized – all-aluminum, fanless and ventless dust-resistant IP40.



Innovative Modular Design

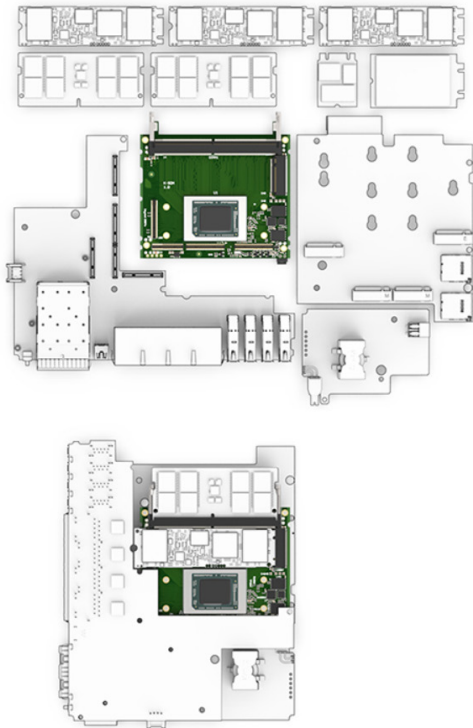
Innovative Modular Design

Bedrock is designed to address the diversity of requirements in the IoT space. This is achieved by partitioning the hardware into the following boards:

- SoM with the CPU, DDR5 and NVMe slots and all native interfaces on 380 pins of high density connectors.
- Networking and I/O board (NIO) with NICs and ports.
- Storage and Extension Cards board (SX) with slots for WiFi, 5G modem and extra NVMe devices.
- Power Module (PM) with DC to DC converter and DC input connector.

This modular design enables agile customization of Bedrock for addressing specific requirements. SolidRun is developing multiple NIO, SX and PM boards that can be mixed and matched as an off-the-shelf solution and also offers development of custom boards as an ODM service. Customers and 3rd parties that are interested in developing custom NIO, SX or PM boards are welcome to contact SolidRun for support.

Bedrock enclosure is designed with customization in mind. Modification of I/O, power input, antenna openings etc. can be performed cost effectively even in small volume.



Painless Integration

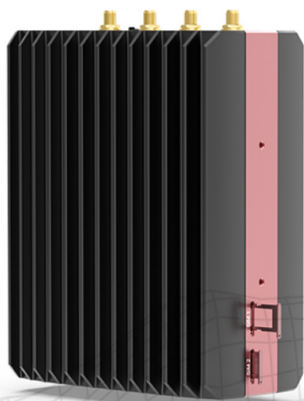
The compact footprint of Bedrock, robust structure, effective fanless cooling and DC input tolerance simplify Bedrock integration. All Bedrock I/O is brought to the front panel, with DC input and antennas in the top panel. The bottom and rear panel are both reserved for mounting, allowing full usability while Bedrock is mounted to a wall or to a desk.

SolidRun offers multiple types of mounting brackets, including lever-based DIN-Rail bracket with locking, wall mount, small stand and ruggedized stand.



Field Usability

As a fanless, ventless IPC Bedrock requires no maintenance. Bedrock is designed to avoid the need to open it in the field. SIM cards are accessible from the panel using pin-hole trays. Remote power button connector is conveniently located on the top panel. All brackets and mounting fixtures are assembled from the outside. Should the need arise to open Bedrock (e.g. to install a storage device or replace the RTC battery) Bedrock opens by unscrewing a single screw.



The 0.6 liter Bedrock Tile

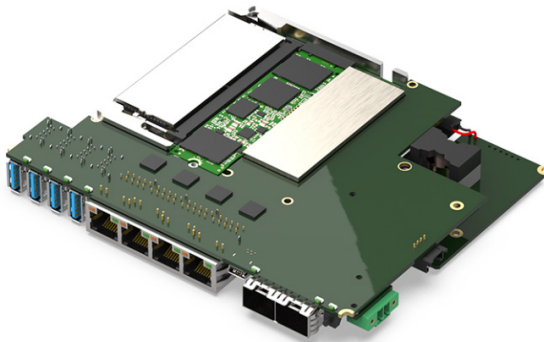
When integrating an IPC in tight space convection cooling becomes ineffective and is better replaced with conduction cooling. It is also desirable to make the IPC as compact and thin as possible.

Bedrock Tile is designed for these use cases. The ribbed chassis walls are replaced with flat walls with blind threadings for fastening Bedrock Tile to a cold plate. A key feature of Bedrock Tile is that it preserves the 360° internal heat distribution so it can be cooled from either side. With thickness of just 29mm and volume of 0.6 liter, Bedrock Tile is easy to integrate in tight spaces. Having all connectors on one side further simplifies the integration.



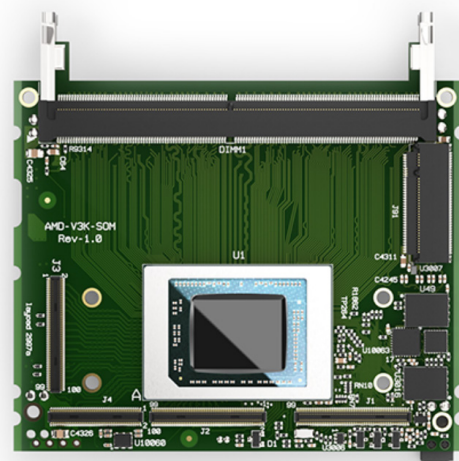
Advanced Integration Using Deck

Some integration scenarios call for custom enclosures (e.g. when additional devices must be installed with the computer in the same housing). To support these use cases Bedrock introduces the Deck concept (deck-of-cards). The SoM, NIO, SX and PM are rigidly held together with fasteners independently of the Bedrock enclosure. The Deck provides first stage cooling for most devices, in particular it includes a copper heat-plate on the CPU. The Deck is fastened to the custom chassis with only 3 screws. Fastening provides thermal coupling to the CPU, RAM, NVMe and FETs. The DC input connector is on wires and can be relocated in the chassis.

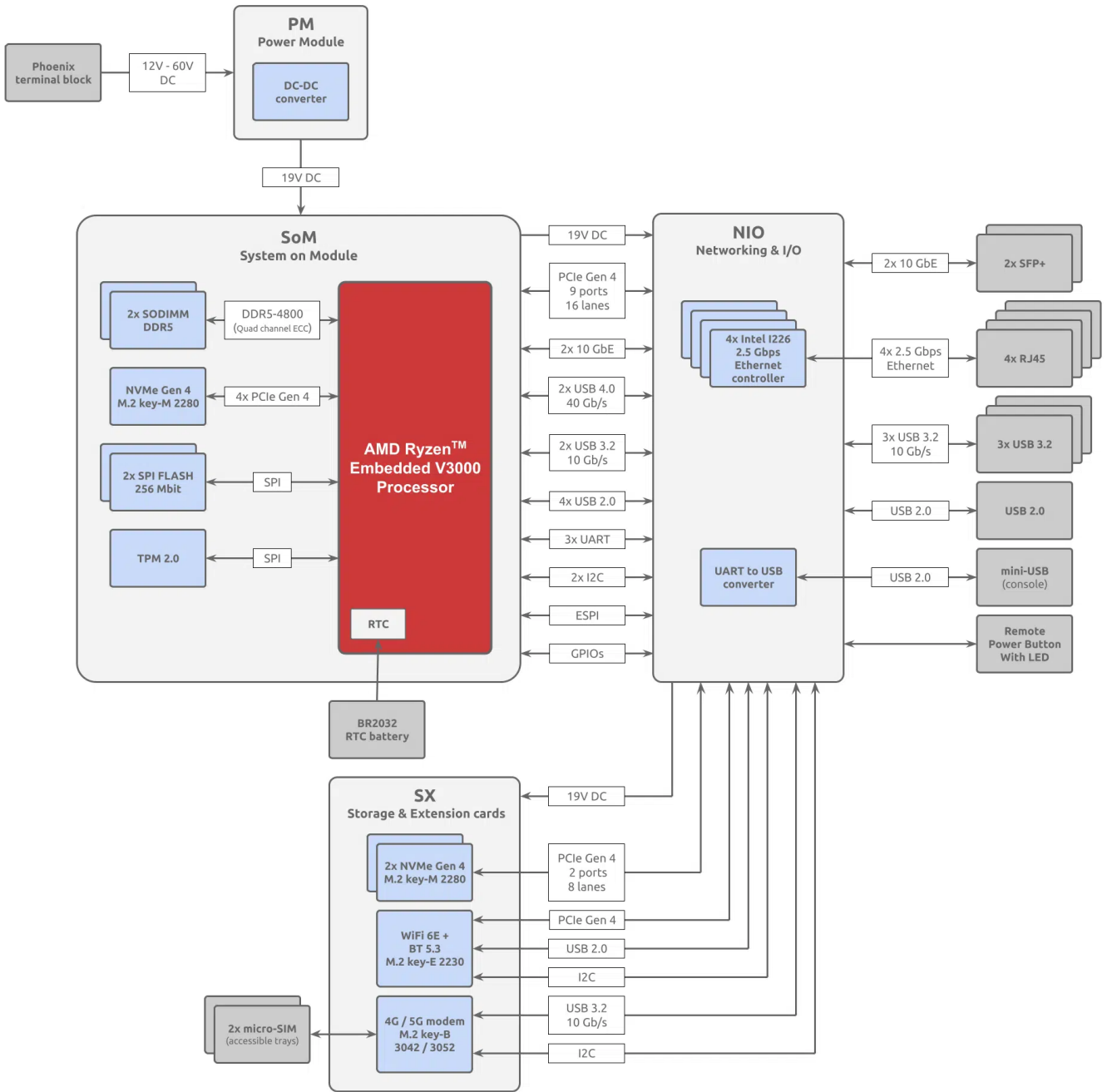


Designing with Bedrock SoM

Bedrock SoM makes a convenient and flexible building block for board designers. For many developers, using a SoM would be the only way to develop a computer based on AMD Ryzen™ Embedded V3000. Bedrock SoM makes an attractive platform for that purpose for several reasons. The SoM is far more self-contained than traditional SoMs. It has not only the essential CPU and RAM, but also NVMe, direct DC input with 12V - 19V tolerance and RTC battery. The SoM is provided in a ruggedized metal skirt that protects the SoM, provides mounting fixture for extension cards and serves as a heat-spreader for secondary heat sources. Copper heat-plate is pre-assembled on the CPU.



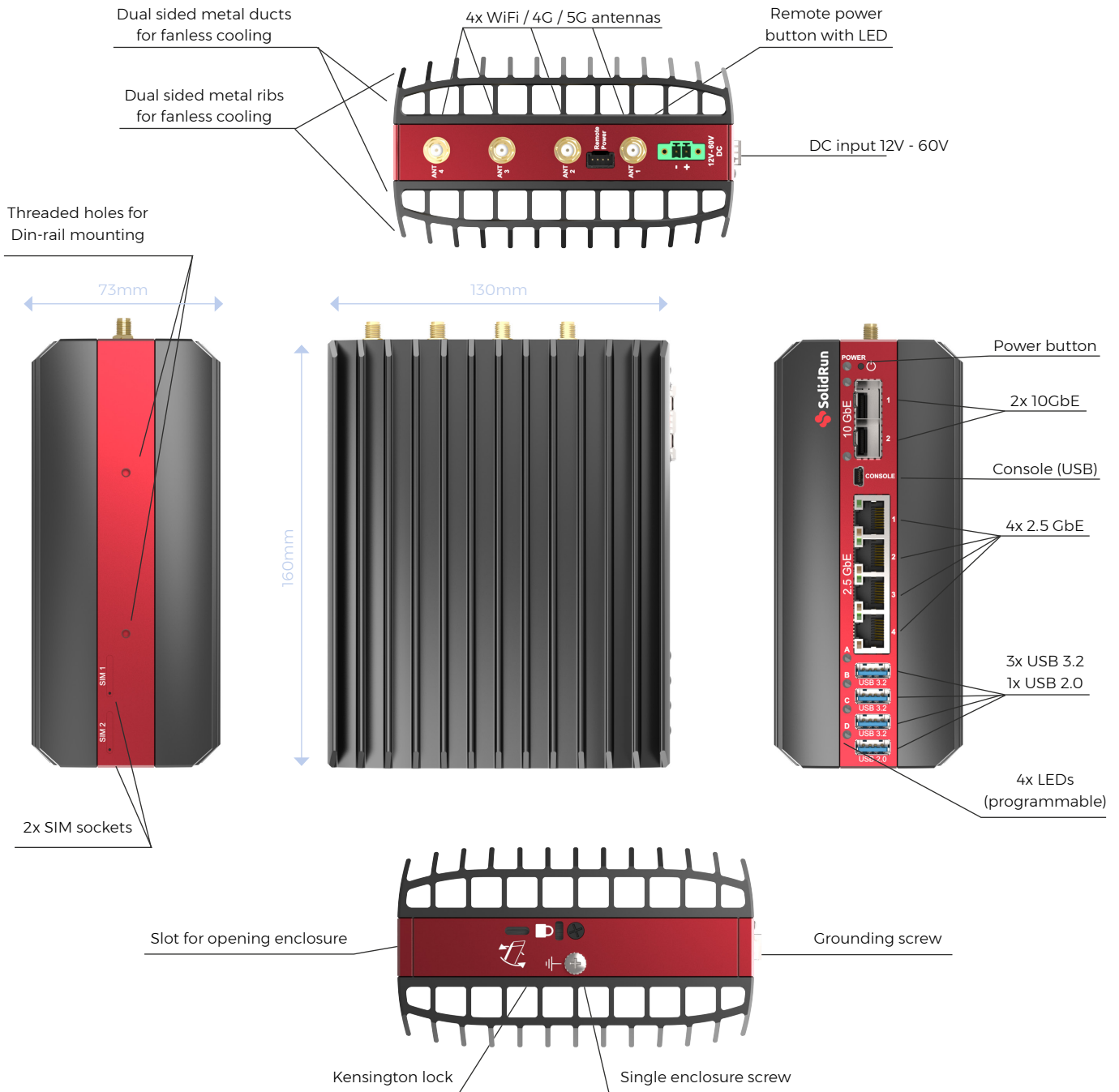
Block Diagram



Specifications

Feature	Specification	Notes
CPU	AMD Ryzen™ Embedded V3000 Series 8C/16T Zen3+ 6nm Up to 3.8 GHz Up to 45W	
RAM	Quad channel DDR5-4800 up to 64 GB ECC / non-ECC	2x SODIMM RAM is conduction cooled
Main storage	NVMe PCIe Gen4 x 4	M.2 key-M 2280 Optional power-loss-protection NVMe is conduction cooled
Extra storage	2x NVMe PCIe Gen4 x 4	2x M.2 key-M 2280 NVMe devices are conduction cooled
LAN	2x 10 GbE (native, supports fiber / copper) 4x 2.5 GbE (Intel I226)	2x SFP+ 4x RJ45
WLAN	WiFi 6E (Intel AX210) BT 5.3	2x RP-SMA antennas Optional and upgradable (M.2 key-E 2230)
Modem	4G / 5G (Quectel)	2x SMA antennas Optional and upgradable (M.2 key-B 3042 / 3052)
USB	3x USB 3.2 gen 2 10 Gb/s 1x USB 2.0	connectors: 4x USB type-A
Console	Serial over USB	mini-USB connector
BIOS	AMI Aptio V	Dual SPI FLASH for redundancy Console redirection
Operating systems	Windows 10/11/IoT, Linux	Other x86 operating systems supported
Power	DC 12V-60V	Phoenix terminal Other DC connectors available
Temperature range	0°C to 70°C	-40°C to 85°C to be available in 2023
Dimensions	30W model: 45 mm (W) x 160 mm (H) x 130 mm (D) – 0.9 liter 60W model: 73 mm (W) x 160 mm (H) x 130 mm (D) – 1.5 liter Tile model: 29 mm (W) x 160 mm (H) x 130 mm (D) – 0.6 liter	
Mounting	DIN-rail, wall, table top	

Bedrock V3000 Drawing



For more information contact:
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