

ABB string inverters

TRIO-5.0-TL-OUTD

5.0 kW



The all-in-one, residential, three-phase TRIO-5.0 kW inverter deliver performance, ease of use and installation, monitoring and control. With their 98% peak efficiency and wide input voltage range, these new residential TRIO inverters mean flexible installations and powerful output.

Commercial grade engineering at residential scale

The topology of the larger, commercial TRIO inverters has been redesigned to ensure that the TRIO-5.0 model also enjoy high conversion efficiency across a wide range of input voltages. Optional integrated dataloggers and smart grid functionality, remote firmware updating and elegantly simple sliding front covers make these all-in-one devices easy to install and maintain. In short, they are commercial grade engineering at residential scale.

Inverters packed with powerful features

The double maximum power point tracker (MPPT) gives maximum installation flexibility for an optimal energy production. The new generation inverters can integrate power control, monitoring functionalities, and environmental sensor inputs, all without requiring external components.

A compact Ethernet expansion card provides data logging functionality for monitoring the main parameters of the plant as well as advanced O&M operations both locally (with the integrated webserver) and remotely (with the AV Plant Portfolio Manager portal), via a LAN connection.

The outer cover with its natural cooling mechanism qualifies at IP65 environmental protection level for external use. It provides for maximum reliability and ease of installation, with a sliding front panel giving access to the connection and configuration area without requiring the complete removal of the cover.

Highlights

- Three-phase bridge topology for DC/AC output converter
- Transformerless topology
- Two independent MPPT channels allows optimal energy harvesting from two sub-arrays oriented in different directions
- Flat efficiency curves ensure high efficiency at all output levels enabling consistent and stable performance across the entire input voltage and output power range
- Wide input voltage range
- Remote inverter upgrade
- Reactive power management

Additional highlights

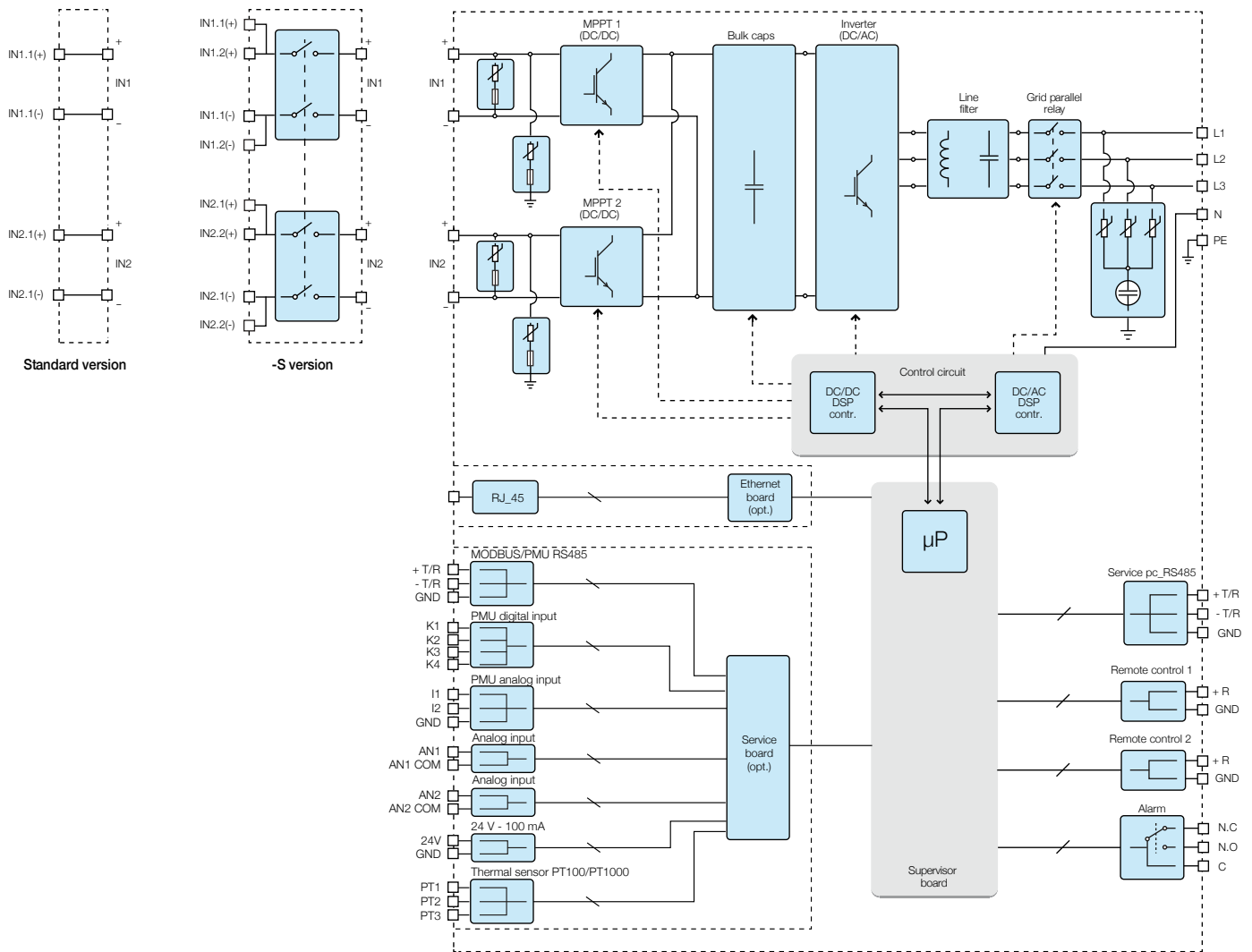
- DC switch version option (-S)
- Natural convection cooling for maximum reliability
- Outdoor enclosure for unrestricted use under any environmental conditions (IP65)
- Sliding cover for the easiest installation and maintenance
- Data logger and smart grid functionalities integrated on expansion cards:
- PMU expansion card option, with external sensor inputs for monitoring environmental conditions and additional RS-485 for Modbus protocol
- Ethernet expansion card option with integrated web server and remote monitoring capability via web portal (Modbus/TCP supported)
- Availability of auxiliary DC output voltage (24 V, 100 mA)



Technical data and types

Type code	TRIO-5.0-TL-OUTD
Input side	
Absolute maximum DC input voltage ($V_{max,abs}$)	1000 V
Start-up DC input voltage (V_{start})	350 V (adj. 200...500 V)
Operating DC input voltage range ($V_{dcmn}...V_{dcmax}$)	0.7 x $V_{start}...950$ V
Rated DC input voltage (V_{dcr})	480 V
Rated DC input power (P_{dcr})	5100 W
Number of independent MPPT	2
Maximum DC input power for each MPPT ($P_{MPPTmax}$)	3000 W
MPPT input DC voltage range ($V_{MPPTmin}...V_{MPPTmax}$) at P_{acr}	320...800 V
DC input voltage range with parallel configuration of MPPT at P_{acr}	320...800 V
DC power limitation with parallel configuration of MPPT	Linear Derating From MAX to Null [$800V \leq V_{MPPT} \leq 950V$]
DC power limitation for each MPPT with independent configuration of MPPT at P_{acr} , max unbalance example	3000 W [$320V \leq V_{MPPT} \leq 800V$] the other channel: $P_{dcr} = 3000W$ [$215V \leq V_{MPPT} \leq 800V$]
Maximum DC input current (I_{dcmx}) / for each MPPT ($I_{MPPTmax}$)	30 A / 15 A
Maximum input short circuit current for each MPPT	20.0 A
Number of DC inputs pairs for each MPPT	2 (-S version)
DC connection type	Quick fit PV connector ¹⁾ (Screw terminal block on Standard version)
Input protection	
Reverse polarity protection	Yes, from limited current source
Input over voltage protection for each MPPT - varistor	2
Photovoltaic array isolation control	According to local standard
DC switch rating for each MPPT (version with DC switch)	25 A / 800 V
Output side	
AC grid connection type	Three-phase 3W+PE or 4W+PE
Rated AC power ($P_{acr}@\cos\phi=1$)	5000 W
Maximum apparent power (S_{max})	5000 VA
Rated AC grid voltage (V_{acr})	400 V
AC voltage range	320...480 V ²⁾
Maximum AC output current ($I_{ac,max}$)	8.0 A
Contributory fault current	9.0 A
Rated output frequency (f_r)	50 Hz / 60 Hz
Output frequency range ($f_{min}...f_{max}$)	47...53 Hz / 57...63 Hz ³⁾
Nominal power factor and adjustable range	>0.995, adj. ± 0.9 with $P_{acr}=4.50$ kW, adj. ± 0.8 with max 5.0 kVA
Total current harmonic distortion	< 2%
AC connection type	Screw terminal block, maximum cross-section 10 mm ²
Output protection	
Anti-islanding protection	According to local standard
Maximum external AC overcurrent protection	10.0 A
Output overvoltage protection - varistor	4 plus gas arrester
Operating performance	
Maximum efficiency (η_{max})	98.0%
Weighted efficiency (EURO/CEC)	97.4% / -
Feed in power threshold	36 W
Night consumption	< 15 W

Block diagram of TRIO-5.0-TL-OUTD



Technical data and types

Type code	TRIO-5.0-TL-OUTD
Communication	
Wired local monitoring	Ethernet card with webserver (opt.), PVI-USB-RS232_485 (opt.)
Remote monitoring	Ethernet card (opt.), VSN300 Wifi Logger Card (opt.), VSN700 Data Logger (opt.)
Wireless local monitoring	VSN300 Wifi Logger Card (opt.)
User interface	Graphic display
Environmental	
Ambient temperature range	-25...+60°C / -13...140°F with derating above 50°C/122°F
Relative humidity	0...100% condensing
Sound pressure level, typical	< 50 dBA @ 1 m
Maximum operating altitude without derating	2000 m / 6560 ft
Physical	
Environmental protection rating	IP65
Cooling	Natural
Dimension (H x W x D)	641mm x 429 mm x 220 mm/ 25.2" x 16.9" x 8.7" (855 mm x 429 mm x 237 mm/ 33.7" x 16.9" x 9.3" with open front cover)
Weight	28.0 kg / 61.7 lb
Mounting system	Wall bracket
Safety	
Isolation level	Transformerless
Marking	CE (only 50 Hz), RCM
Safety and EMC standard	EN 62109-1, EN 62109-2, AS/NZS3100, EN 61000-6-2, EN 61000-6-3, EN 61000-3-2, EN 61000-3-3
Grid standard (check your sales channel for availability)	CEI 0-21, CEI 0-16, DIN V VDE V 0126-1-1, VDE-AR-N 4105, G83/2, G59/3, RD 1699, RD 413, NRS-097-2-1, AS 4777, IEC 61727, IEC 62116, VFR 2014
Available products variants	
Standard	TRIO-5.0-TL-OUTD-400
With DC switch	TRIO-5.0-TL-OUTD-S-400

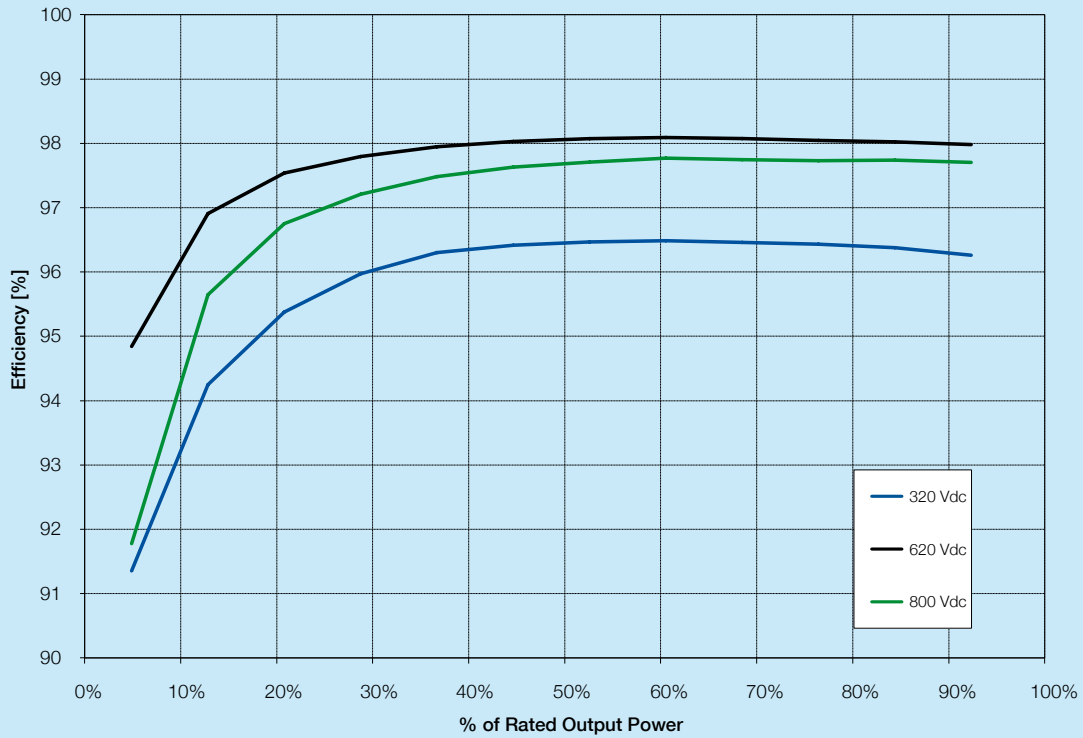
¹ Please refer to the document "String inverters – Product manual appendix" available at www.abb.com/solarinverters for information on the quick-fit connector brand and model used in the inverter

² The AC voltage range may vary depending on specific country grid standard

³ The Frequency range may vary depending on specific country grid standard

Remark. Features not specifically listed in the present data sheet are not included in the product

Efficiency curves of TRIO-5.0-TL-OUTD



Support and service

ABB supports its customers with dedicated, global service organization in more than 60 countries and strong regional and national technical partner networks providing complete range of life cycle services.

For more information please contact your local ABB representative or visit:

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