

ABB string inverters

TRIO-5.8/7.5/8.5-TL-OUTD

5.8 to 8.5 kW



The all-in-one, residential, three-phase TRIO-5.8, 7.5 and 8.5 kW inverters 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-5.8/7.5/8.5 models 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 (TRIO-7.5/8.5 models). 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 for TRIO-7.5/8.5 allows optimal energy harvesting from two sub-arrays oriented in different directions (one MPPT channel for TRIO-5.8)
- 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

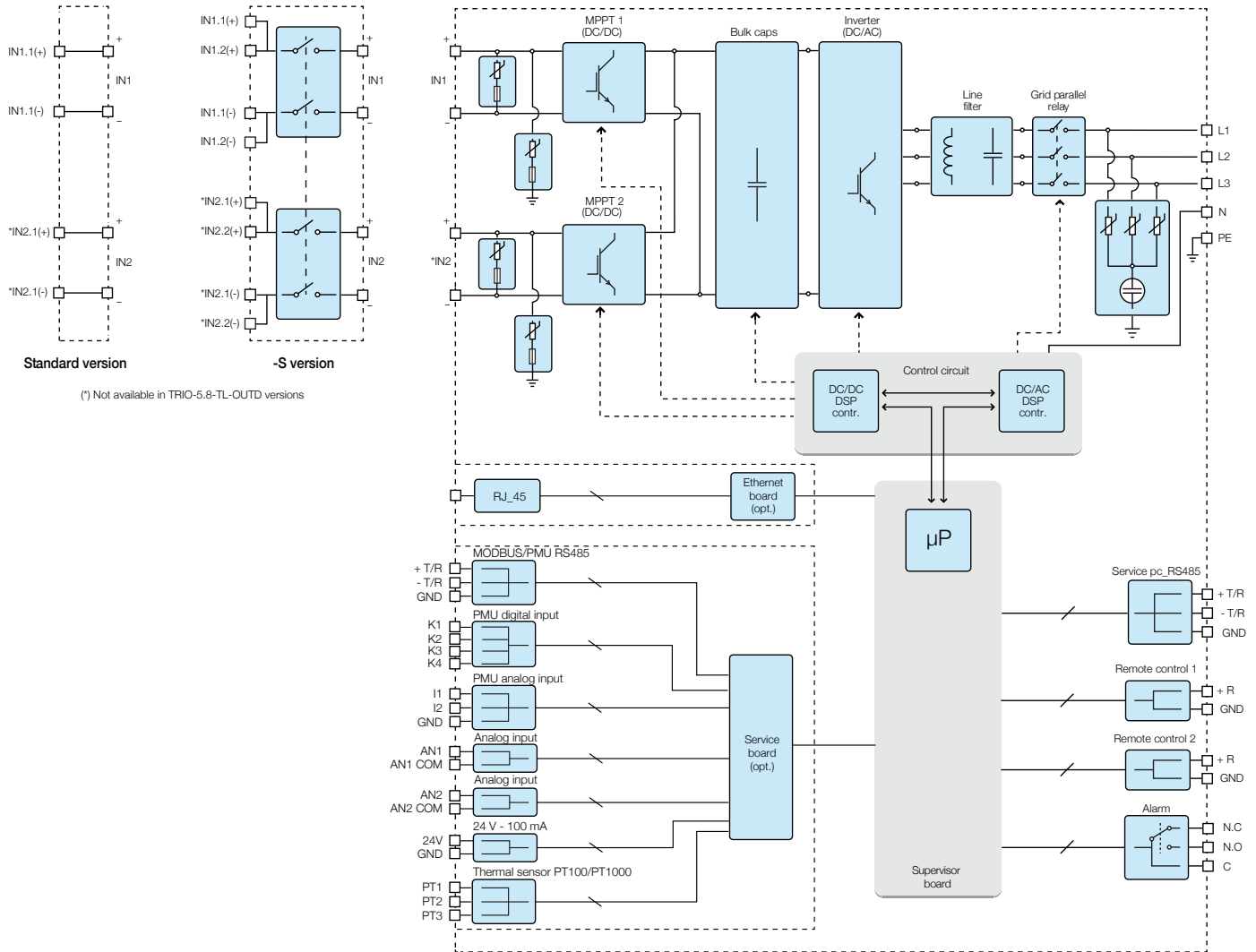
- DC switch version option (-S)
- Natural convection cooling for maximum reliability
- Outdoor enclosure for unrestricted use under any environmental conditions (IP65)
- Sliding cover for the easiest installation and maintenance
- Data logger and smart grid functionalities integrated on expansion cards:
 - 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-5.8-TL-OUTD	TRIO-7.5-TL-OUTD	TRIO-8.5-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 ($V_{dmin}...V_{dmax}$)	0.7 x V_{start} ...950 V (min 200 V)		
Rated DC input voltage (V_{acr})	620 V		
Rated DC input power (P_{dcr})	5950 W	7650 W	8700 W
Number of independent MPPT	1	2	2
Maximum DC input power for each MPPT ($P_{MPPTmax}$)	6050 W Linear derating from max to null [800 V ≤ V_{MPPT} ≤ 950 V]	4800 W	4800 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	320...800 V
DC power limitation with parallel configuration of MPPT	-	Linear derating from max to null [800 V ≤ V_{MPPT} ≤ 950 V]	
DC power limitation for each MPPT with independent configuration of MPPT at P_{acr} , max unbalance example	-	4800 W [320 V ≤ V_{MPPT} ≤ 800 V] the other channel: P_{dcr} = 4800 W [215 V ≤ V_{MPPT} ≤ 800 V]	4800 W [320 V ≤ V_{MPPT} ≤ 800 V] the other channel: P_{dcr} = 4800 W [290 V ≤ V_{MPPT} ≤ 800 V]
Maximum DC input current ($I_{dcr,max}$) / for each MPPT ($I_{MPPT,max}$)	18.9 A	30.0 A / 15.0 A	30.0 A / 15.0 A
Maximum input short circuit current for each MPPT	24.0 A	20.0 A	20.0 A
Number of DC inputs pairs for each MPPT	-	2 (-S version)	
DC connection type	PV quick fit connector ³⁾ on -S version / Screw terminal block on Standard version		
Input protection			
Reverse polarity protection	Yes, from limited current source		
Input over voltage protection for each MPPT - varistor	Yes, 4		
Photovoltaic array isolation control	According to local standard		
DC switch rating for each MPPT (version with DC switch)	16 A / 1000 V, 25 A / 800 V		
Output side			
AC grid connection type	Three-phase 3W+PE or 4W+PE		
Rated AC power ($P_{acr} @ \cos\phi=1$)	5800 W	7500 W	8500 W
Maximum apparent power (S_{max})	5800 VA	7500 VA	8500 VA
Rated AC grid voltage ($V_{acr,r}$)	400 V		
AC voltage range	320...480 V ¹⁾		
Maximum AC output current ($I_{ac,max}$)	10.0 A	12.5 A	14.5 A
Contributory fault current	12.0 A	14.5 A	16.5 A
Rated output frequency (f_r)	50 Hz / 60 Hz		
Output frequency range ($f_{min}...f_{max}$)	47...53 Hz / 57...63 Hz ²⁾		
Nominal power factor and adjustable range	> 0.995, adj. ± 0.9 with P_{acr} = 5.22 kW, ± 0.8 with max 5.8 kVA	> 0.995, adj. ± 0.9 with P_{acr} = 6.75 kW, ± 0.8 with max 7.5 kVA	> 0.995, adj. ± 0.9 with P_{acr} = 7.65 kW, ± 0.8 with max 8.5 kVA
Total current harmonic distortion	< 2%		
AC connection type	Screw terminal block, cable gland M32		
Output protection			
Anti-islanding protection	According to local standard		
Maximum external AC overcurrent protection	16.0 A	16.0 A	20.0 A
Output overvoltage protection - varistor	4 plus gas arrester		
Operating performance			
Maximum efficiency (η_{max})	98.0%		
Weighted efficiency (EURO/CEC)	97.4% / -	97.5% / -	97.5% / -
Feed in power threshold	32 W	36 W	36 W
Night consumption	< 3 W		

Block diagram of TRIO-5.8/7.5/8.5-TL-OUTD



Technical data and types

Type code	TRIO-5.8-TL-OUTD	TRIO-7.5-TL-OUTD	TRIO-8.5-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	25.0 kg / 55.1 lbs	28.0 kg / 61.7 lbs	28.0 kg / 61.7 lbs
Mounting system	Wall bracket		
Safety			
Isolation level	Transformerless		
Marking	CE (50 Hz only), 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-5.8-TL-OUTD-400	TRIO-7.5-TL-OUTD-400	TRIO-8.5-TL-OUTD-400
With DC switch	TRIO-5.8-TL-OUTD-S-400	TRIO-7.5-TL-OUTD-S-400	TRIO-8.5-TL-OUTD-S-400

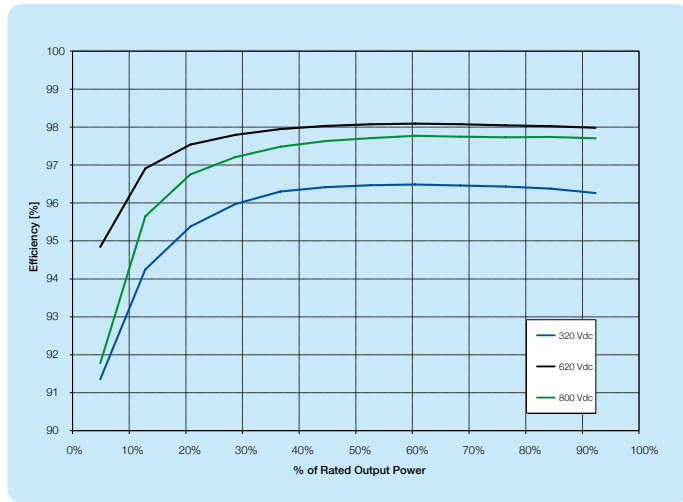
¹⁾ The AC voltage range may vary depending on specific country grid standard

²⁾ The Frequency range may vary depending on specific country grid standard

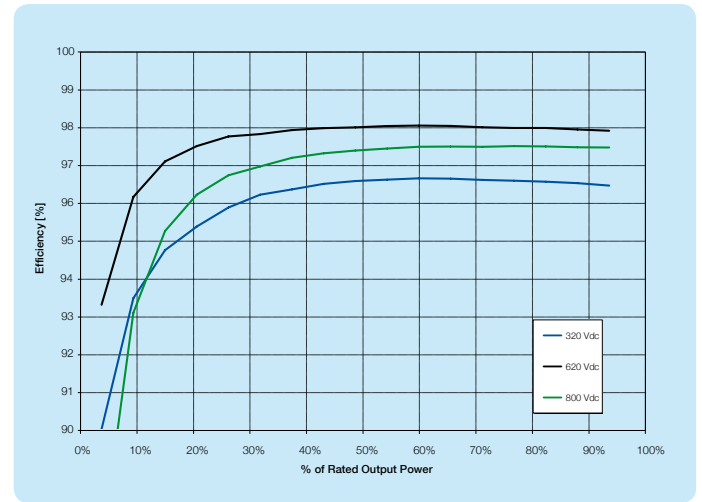
³⁾ Please refer to the document "String inverters – Product manual appendix" available at www.abb.com/solarinverters for information on the quick-fit connector brand and model used in the inverter

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

Efficiency curves of TRIO-5.8-TL-OUTD



Efficiency curves of TRIO-8.5-TL-OUTD



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