

ABB string inverters

TRIO-20.0/27.6-TL-OUTD

20 to 27.6 kW



The three-phase commercial inverter offers more flexibility and control to installers who have large installations with varying aspects or orientations.

The dual input section containing two, independent Maximum Power Point Tracking (MPPT), allows optimal energy harvesting from two sub-arrays oriented in different directions.

The TRIO features a high speed and precise MPPT algorithm for real power tracking and improved energy harvesting.

High efficiency at all output levels

Flat efficiency curves ensure high efficiency at all output levels ensuring consistent and stable performance across the entire input voltage and output power range.

This device has an efficiency rating of up to 98.2%.

The very wide input voltage range makes the inverter suitable for installations with reduced string size.

In addition to its new look, this inverter has new features including a special built-in heat sink compartment and front panel display system. The unit is free of electrolytic capacitors, leading to a longer product lifetime.

Highlights of the improved design – first time shown at Intersolar 2014

- True three-phase bridge topology for DC/AC output converter
- Transformerless topology
- Each inverter is set on specific grid codes which can be selected in the field
- Detachable wiring box to allow an easy installation
- Wide input range
- 'Electrolyte-free' power converter to further increase the life expectancy and long term reliability

Additional highlights

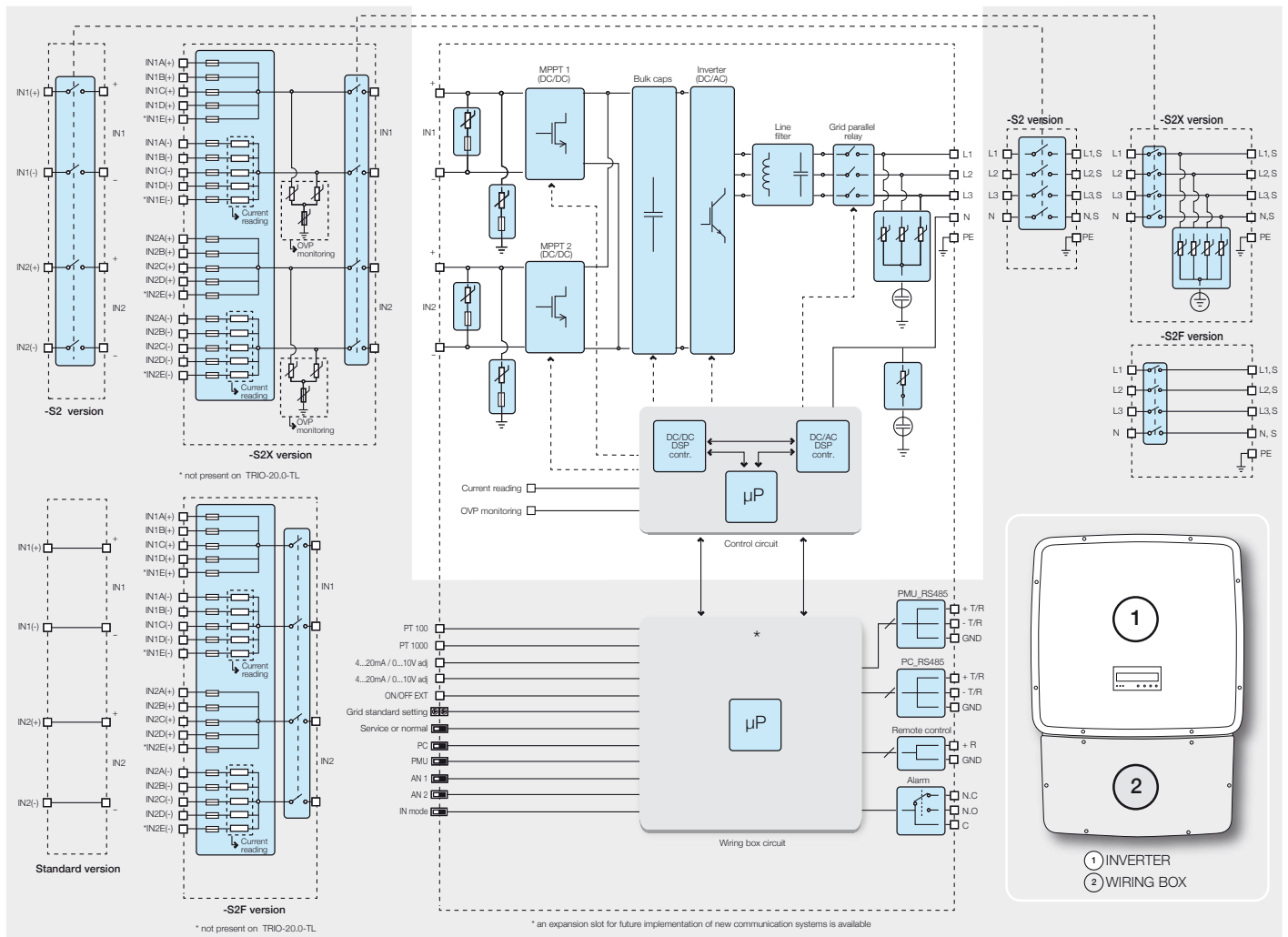
- Integrated string combiner with different options of configuration which include DC and AC disconnect switch in compliance with international standards (-S2, -S2F and -S2X versions)
- Natural convection cooling for maximum reliability
- Outdoor enclosure for unrestricted use under any environmental conditions
- Capability to connect external sensors for monitoring environmental conditions
- Availability of auxiliary DC output voltage (24V, 300mA)



Technical data and types

Type code	TRIO-20.0-TL-OUTD	TRIO-27.6-TL-OUTD
Input side		
Absolute maximum DC input voltage ($V_{max,abs}$)	1000 V	
Start-up DC input voltage (V_{start})	360 V (adj. 250...500 V)	
Operating DC input voltage range ($V_{dcmin}...V_{dcmax}$)	0.7 x $V_{start}...950$ V	
Rated DC input voltage (V_{dcr})	620 V	
Rated DC input power (P_{dcr})	20750 W	28600 W
Number of independent MPPT	2	
Maximum DC input power for each MPPT ($P_{MPPTmax}$)	12000 W	16000 W
DC input voltage range with parallel configuration of MPPT at P_{dcr}	440...800 V	500...800 V
DC power limitation with parallel configuration of MPPT	Linear derating from max to null [800V ≤ V_{MPPT} ≤ 950V]	
DC power limitation for each MPPT with independent configuration of MPPT at P_{dcr} , max unbalance example	12000 W [480V ≤ V_{MPPT} ≤ 800V] the other channel: P_{dcr} -12000W [350V ≤ V_{MPPT} ≤ 800V]	16000 W [500V ≤ V_{MPPT} ≤ 800V] the other channel: P_{dcr} -16000W [400V ≤ V_{MPPT} ≤ 800V]
Maximum DC input current (I_{dcmax}) / for each MPPT ($I_{MPPTmax}$)	50.0 A / 25.0 A	64.0 A / 32.0 A
Maximum input short circuit current for each MPPT	30.0 A	
Number of DC inputs pairs for each MPPT	1 (4 in -S2X and -S2F Versions)	1 (5 in -S2X and -S2F Versions)
DC connection type	Tool Free PV connector WM / MC4 (Screw terminal block on standard and -S2 versions)	
Input protection		
Reverse polarity protection	Inverter protection only, from limited current source, for standard and -S2 versions, and for fused versions when max 2 strings are connected	
Input over voltage protection for each MPPT - varistor	2	
Input over voltage protection for each MPPT - plug in modular surge arrester (-S2X version)	3 (Class II)	
Photovoltaic array isolation control	According to local standard	
DC switch rating for each MPPT (version with DC switch)	40 A / 1000 V	
Fuse rating (versions with fuses)	15 A / 1000 V	
Output side		
AC grid connection type	Three phase 3W or 4W+PE	
Rated AC power ($P_{acr}@cos\phi=1$)	20000 W	27600 W
Maximum AC output power ($P_{acmax}@cos\phi=1$)	22000 W ⁽³⁾	30000 W ⁽⁴⁾
Maximum apparent power (S_{max})	22200 VA	30000 VA
Rated AC grid voltage (V_{acr})	400 V	
AC voltage range	320...480 V ⁽¹⁾	
Maximum AC output current ($I_{ac,max}$)	33.0 A	45.0 A
Contributory fault current	35.0 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 $P_{acr}=20.0$ kW, ± 0.8 with max 22.2 kVA	> 0.995, adj. ± 0.9 with $P_{acr}=27.6$ kW, ± 0.8 with max 30 kVA
Total current harmonic distortion	< 3%	
AC connection type	Screw terminal block, cable gland PG36	
Output protection		
Anti-islanding protection	According to local standard	
Maximum AC overcurrent protection	34.0 A	46.0 A
Output overvoltage protection - varistor	4	
Output overvoltage protection - plug in modular surge arrester (-S2X version)	4 (Class II)	
Operating performance		
Maximum efficiency (η_{max})	98.2%	
Weighted efficiency (EURO/CEC)	98.0% / 98.0%	
Feed in power threshold	40 W	
Stand-by consumption	< 8W	

Block diagram of TRIO-20.0/27.6-TL-OUTD



Technical data and types

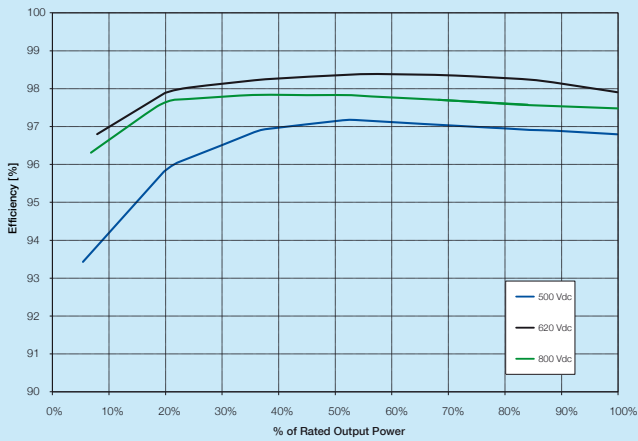
Type code	TRIO-20.0-TL-OUTD	TRIO-27.6-TL-OUTD
Communication		
Wired local monitoring	PVI-USB-RS232_485 (opt.)	
Remote monitoring	VSN300 Wifi Logger Card ⁽⁵⁾ (opt.), PVI-AEC-EVO (opt.), VSN700 Data Logger (opt.)	
Wireless local monitoring	VSN300 Wifi Logger Card ⁽⁵⁾ (opt.)	
User interface	Graphic display	
Environmental		
Ambient temperature range	-25...+60°C / -13...140°F with derating above 45°C/113°F	
Relative humidity	0...100% condensing	
Noise emission	< 50 dB(A) @ 1 m	
Maximum operating altitude without derating	2000 m / 6560 ft	
Physical		
Environmental protection rating	IP 65	
Cooling	Natural	
Dimension (H x W x D)	1061 mm x 702 mm x 292 mm / 41.7" x 27.6" x 11.5"	
Weight	< 70.0 kg / 154.3 lb (Standard version)	< 75.0 kg / 165.4 lb (Standard version)
Mounting system	Wall bracket	
Safety		
Isolation level	Transformerless	
Marking	CE (50 Hz only)	
Safety and EMC standard	EN 50178, EN62109-1, EN62109-2, AS/NZS3100, AS/NZS 60950, EN61000-6-2, EN61000-6-3, EN61000-3-11, EN61000-3-12	
Grid standard (check your sales channel for availability)	CEI 0-21, CEI 0-16, VDE 0126-1-1, VDE-AR-N 4105, G59/3, C10/11, EN 50438 (not for all national appendices), RD1699, RD 1565, AS 4777, BDEW, ABNT NBR 16149, NRS-097-2-1, CLC/FprTS 50549, PEA, MEA	
Available products variants		
Standard	TRIO-20.0-TL-OUTD-400	TRIO-27.6-TL-OUTD-400
With DC+AC switch	TRIO-20.0-TL-OUTD-S2-400	TRIO-27.6-TL-OUTD-S2-400
With DC+AC switch and fuse	TRIO-20.0-TL-OUTD-S2F-400	TRIO-27.6-TL-OUTD-S2F-400
With DC+AC switch, fuse and surge arrester	TRIO-20.0-TL-OUTD-S2X-400	TRIO-27.6-TL-OUTD-S2X-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. Limited to 20000 W for Germany

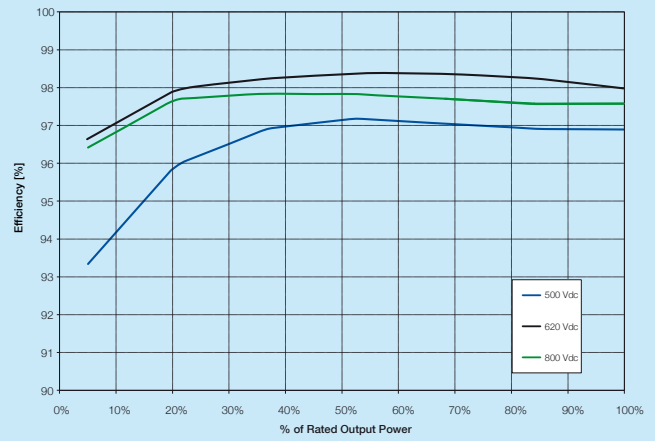
4. Limited to 27600 W for Germany
5. Check availability before to order

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

Efficiency curves of TRIO-20.0-TL-OUTD



Efficiency curves of TRIO-27.6-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.

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