



ABB solar inverters

Explore the industry's broadest portfolio

String inverters

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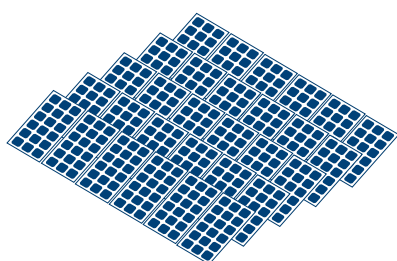
Services

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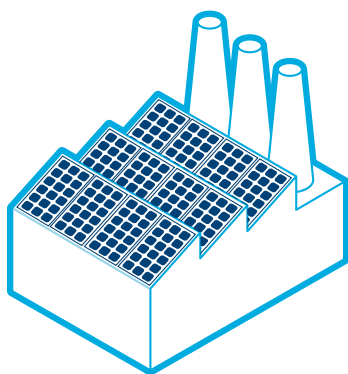
ABB's solar inverter portfolio

Your brightest choice for everything under the sun



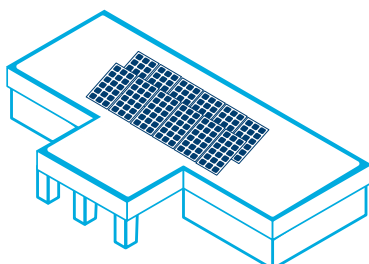
Power plants

In large multi-megawatt photovoltaic (PV) power plants the PV modules are typically mounted at ground level, either on fixed-tilted structures facing the sun or on tracking devices. For these land-based power plants ABB central inverters offer the most cost-effective solution for PV energy generation by feeding electricity directly to the medium voltage (MV) power distribution network (i.e. grid). ABB's offering for large plants includes a wide range of central inverters, inverter stations and megawatt stations.



Commercial and industrial

PV power systems installed on commercial and industrial buildings represent distributed power generation at its best close-to-consumption point. In these systems the peak load typically coincides with maximum PV production and thus electricity demand from the distribution network can be reduced during peak daytime hours. This is beneficial as energy transmission demand and losses in the grid are thus also reduced. For these applications ABB has advanced string inverters with full flexibility to be used together with smaller string inverters to meet your required system design.



Small commercial and residential

PV systems are among the few power generation technologies that can be installed right at the point of consumption, regardless of the amount of energy demanded. This saves infrastructure costs for cabling, transformers and switchgear. ABB's string inverters make it possible to cover a wide variety of design needs required in these applications.



Big or small, commercial or residential, utility or industry, ABB has the power to support you



String inverters



ABB string inverters

UNO-2.0/2.5-I-OUTD

2 to 2.5 kW



The UNO-2.0-I and UNO-2.5-I are packed with ABB's proven high performing technology. The smallest of ABB's outdoor range, these products are the right size for the average rooftop installation.

The high speed and precise Maximum Power Point Tracking (MPPT) algorithm enables more real-time power tracking and improved energy harvesting.

Efficiency of up to 96.3%

Despite the isolated operation, the UNO-2.0-I and UNO-2.5-I feature an efficiency of 96.3%. The wide input voltage range makes the inverter suitable to low power 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.

This rugged outdoor inverter has been designed as a completely sealed unit to withstand the harshest environmental conditions.

String inverters

PV + Storage

Central inverters

Packaged solutions

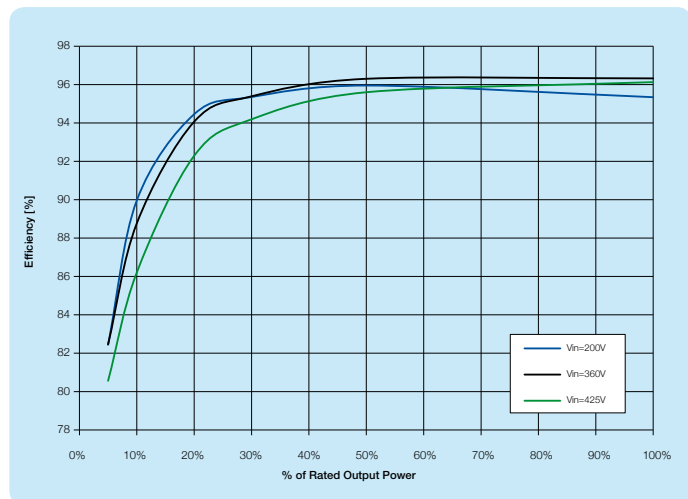
Monitoring and communications



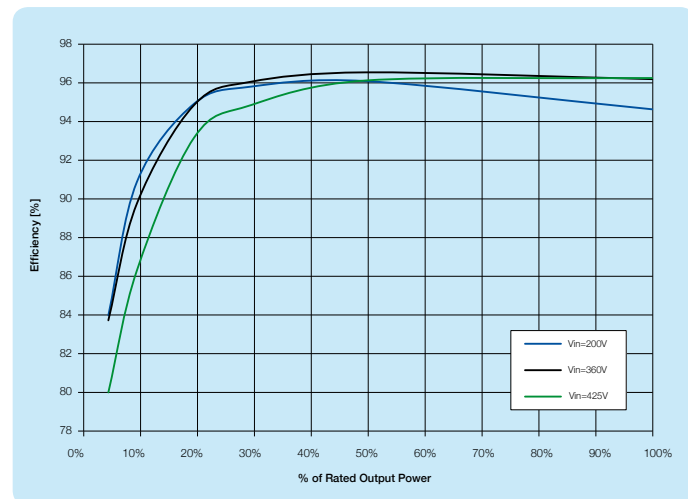
Highlights

- Single-phase output
- High frequency isolated topology
- Each inverter is set on specific grid codes which can be selected in the field
- Wide input voltage range
- Flat efficiency curves ensure high efficiency at all output levels ensuring consistent and stable performance across the entire input voltage and output power range
- Natural convection cooling for maximum reliability
- Outdoor enclosure for unrestricted use under any environmental conditions
- RS-485 communication interface (for connection to laptop or datalogger)

Efficiency curves of UNO-2.0-I-OUTD



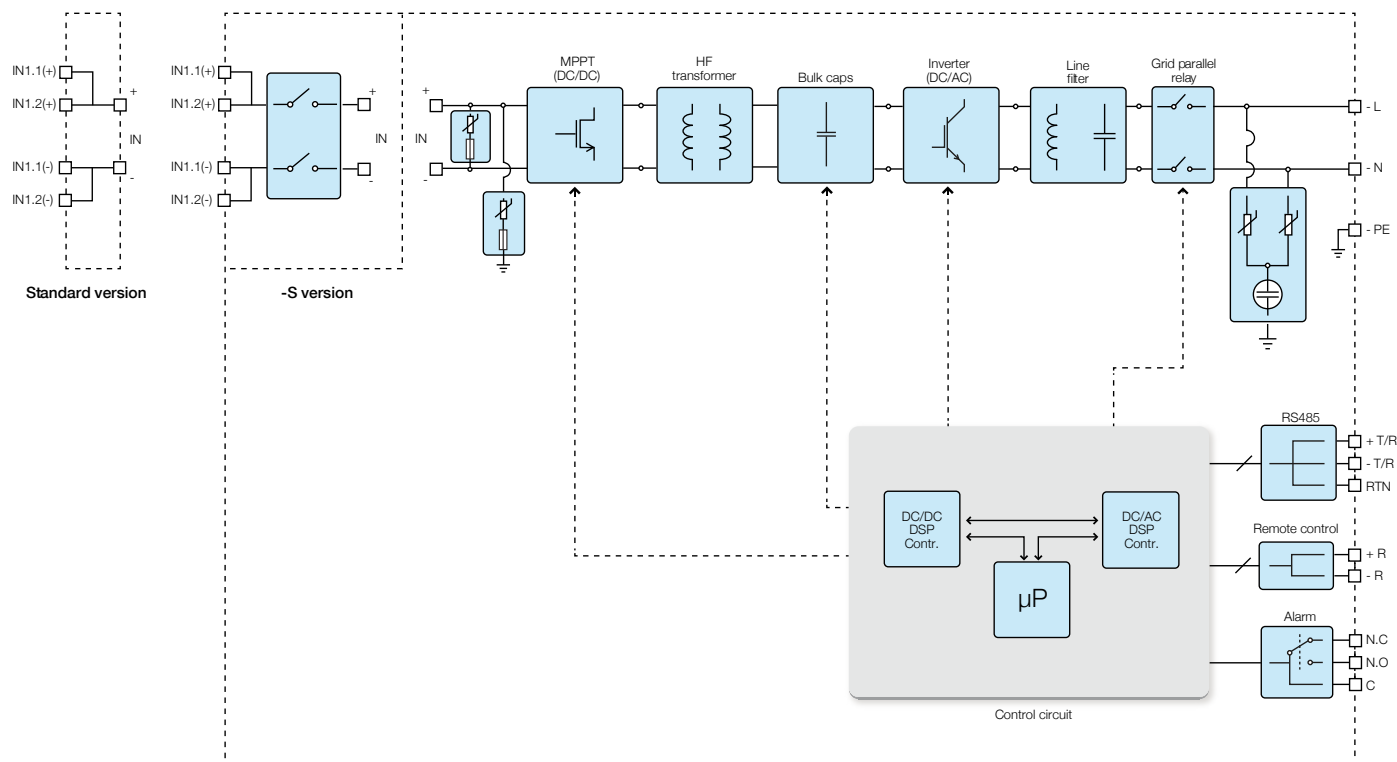
Efficiency curves of UNO-2.5-I-OUTD



Technical data and types

Type code	UNO-2.0-I-OUTD		UNO-2.5-I-OUTD
Input side			
Absolute maximum DC input voltage ($V_{max,abs}$)	520 V		
Start-up DC input voltage (V_{start})	200 V (adj. 120...350 V)		
Operating DC input voltage range ($V_{dcrmin}...V_{dcrmax}$)	0.7 x $V_{start}...520$ V (min 90 V)		
Rated DC input voltage (V_{dcr})	360 V		
Rated DC input power (P_{dcr})	2100 W	2600 W	
Number of independent MPPT	1		
Maximum DC input power for each MPPT ($P_{MPPTmax}$)	2300 W Linear derating from max to null [470 V $\leq V_{MPPT} \leq 520$ V]		2900 W Linear derating from max to null [470 V $\leq V_{MPPT} \leq 520$ V]
MPPT input DC voltage range ($V_{MPPTmin}...V_{MPPTmax}$) at P_{acr}	200...470 V		200...470 V
Maximum DC input current (I_{dcrmax}) / for each MPPT ($I_{MPPTmax}$)	12.5 A / 12.5 A		12.8 A / 12.8 A
Maximum input short circuit current for each MPPT	15.0 A		
Number of DC inputs pairs for each MPPT	2		
DC connection type	PV quick fit connector ³⁾		
Input protection			
Reverse polarity protection	Yes, from limited current source		
Input over voltage protection for each MPPT - varistor	Yes		
Photovoltaic array isolation control	According to local standard		
DC switch rating for each MPPT (version with DC switch)	16 A / 600 V		
Output side			
AC grid connection type	Single-phase		
Rated AC power (P_{acr} @ $\cos\phi=1$)	2000 W	2500 W	
Maximum AC output power (P_{acmax} @ $\cos\phi=1$)	2200 W ⁵⁾	2750 W ⁶⁾	
Rated AC grid voltage (V_{acr})	230 V		
AC voltage range	180...264 V ¹⁾		
Maximum AC output current ($I_{ac,max}$)	10.5 A	12.5 A	
Contributory fault current	16.0 A		
Rated output frequency (f _i)	50 Hz / 60 Hz		
Output frequency range (f _{min} ...f _{max})	47...53 Hz / 57...63 Hz ²⁾		
Nominal power factor and adjustable range	> 0.990 ⁸⁾		
Total current harmonic distortion	< 2%		
AC connection type	Screw terminal block, cable gland M25		
Output protection			
Anti-islanding protection	According to local standard		
Maximum external AC overcurrent protection	16.0 A		
Output overvoltage protection - varistor	2 (L - N / L - PE)		

Block diagram of UNO-2.0/2.5-I-OUTD



Technical data and types

Type code	UNO-2.0-I-OUTD	UNO-2.5-I-OUTD
Operating performance		
Maximum efficiency (η_{max})		96.3%
Weighted efficiency (EURO/CEC)	95.1% / -	95.4% / -
Feed in power threshold		24.0 W
Night consumption		< 0.6 W ⁴⁾
Communication		
Wired local monitoring		PVI-USB-RS232_485 (opt.)
Remote monitoring		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)	-25...+60°C (-13...+ 140°F) with derating above 45°C (113°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)		518 mm x 367 mm x 161 mm / 20.4" x 14.4" x 6.3"
Weight		< 17 kg / 37.4 lbs
Mounting system		Wall bracket
Safety		
Isolation level		HF transformer
Marking		CE (50 Hz only), RCM
Safety and EMC standard		EN 50178, IEC/EN 62109-1, IEC/EN 62109-2, AS/NZS 3100, AS/NZS 60950.1, EN 61000-6-2, EN 61000-6-3, EN 61000-3-2, EN 61000-3-3
Grid standard (check your sales channel for availability)		DIN V VDE V 0126-1-1, VDE-AR-N 4105 ⁷⁾ , G83/2, EN 50438 (not for all national appendices), RD 1699, RD 413, AS 4777, C10/11, IEC 61727, IEC 62116
Available products variants		
Standard	UNO-2.0-I-OUTD	UNO-2.5-I-OUTD
With DC switch	UNO-2.0-I-OUTD-S	UNO-2.5-I-OUTD-S

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

⁴⁾ Stand-by consumption < 8.0 W

⁵⁾ Limited to 2000 W for Germany

⁶⁾ Limited to 2500 W for Germany

⁷⁾ Limited to plant power ≤3.68 kVA

⁸⁾ The unit has not reactive power capability

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

ABB string inverters

UNO-2.0/3.0/3.6/4.2-TL-OUTD

2 to 4.2 kW



This new line of transformerless single-phase inverters completes the UNO family as an optimal solution to maximize the return on investment (ROI) for residential systems.

The new design wraps ABB's quality and engineering into just 12 kgs thanks to technological choices optimized for installations with a uniform orientation.

Easy to install

The presence of Plug and Play connectors, both on the DC and AC side as well as on the RS485 communication port, enable a simple, fast and safe installation of the unit even in harsh weather conditions without the need of opening the front cover of the inverter.

Flexibility

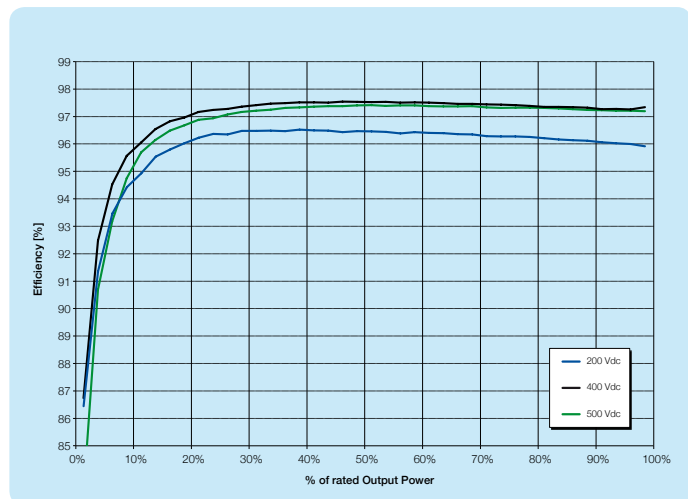
- The compatibility with the VSN300 Wifi Logger Card (optional) within the integrated expansion slot, assures an advanced and cost effective solution for the control and monitoring of the plant, without the need of further components
- Integrated load manager for control of energy consumption



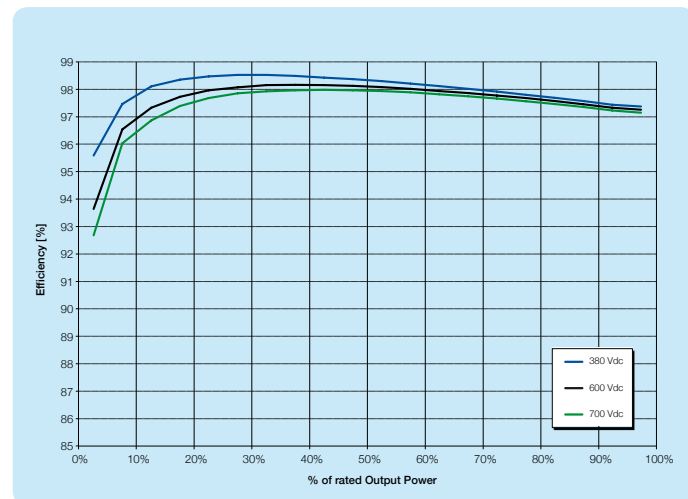
Highlights

- Single-phase output
- Transformerless topology
- Each inverter is set to specific grid codes which can be selected in the field
- Wide input range and high efficiency values
- High speed and precise MPPT algorithm enables real-time power tracking and improved energy harvesting
- Plug and Play connection for DC, AC and communication side
- Integrated DC switch, in compliance with international standards (-S version)
- Natural convection cooling for maximum reliability
- Outdoor enclosure for unrestricted use under any environmental conditions

Efficiency curves of UNO-3.0-TL-OUTD



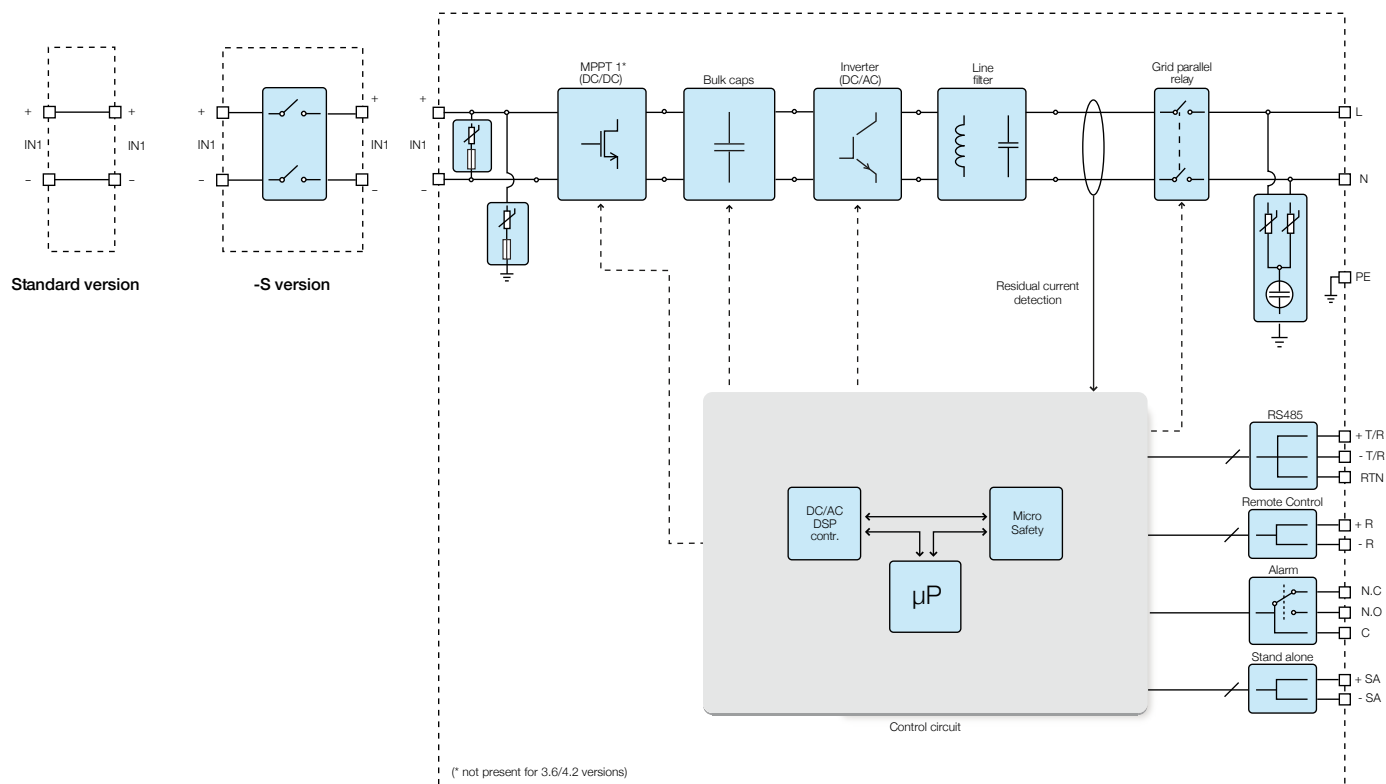
Efficiency curves of UNO-4.2-TL-OUTD



Technical data and types

Type code	UNO-2.0-TL-OUTD	UNO-3.0-TL-OUTD	UNO-3.6-TL-OUTD	UNO-4.2-TL-OUTD
Input side				
Absolute maximum DC input voltage ($V_{max,abs}$)	600 V		850 V	
Start-up DC input voltage (V_{start})	100...300 V (default 150 V)		380 V	
Operating DC input voltage range ($V_{dmin}...V_{dmax}$)	0.7x $V_{start}...580$ V (min 80 V)		350...820 V	
Rated DC input voltage (V_{dcr})	400 V		500 V	600 V
Rated DC input power (P_{dcr})	2200 W	3200 W	3900 W	4500 W
Number of independent MPPT			1	
MPPT input DC voltage range ($V_{MPPTmin}...V_{MPPTmax}$) at P_{dcr}	180...500 V	200...500 V	380...700 V	
Maximum DC input current (I_{dcmax})	12.5 A	16 A	12.5 A	
Number of DC inputs pairs			1	
DC connection type	PV quick fit connector ³⁾			
Input protection				
Reverse polarity protection	Yes, from limited current source			
Input over voltage protection - varistor	Yes			
Photovoltaic array isolation control	According to local standard			
DC switch rating (version with DC switch)	600 V, 25 A		1000 V, 16 A	
Output side				
AC Grid connection type	Single-phase			
Rated AC power (P_{acr} @ $\cos\phi=1$)	2000 W	3000 W	3600 W	4200 W
Maximum AC output power (P_{acmax} @ $\cos\phi=1$)	2000 W	3000 W	3600 W	4200 W
Maximum apparent power (S_{max})	2000 VA	3000 VA	3600 VA	4200 VA
Rated AC grid voltage ($V_{acr,r}$)	230 V			
AC voltage range	180...264 V ¹⁾			
Maximum AC output current ($I_{ac,max}$)	10 A	15 A	16 A	20 A
Contributory fault current	12 A	17 A	18 A	22 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. \pm 0.8 with max S_{max}			
Total current harmonic distortion	< 3%			
AC connection type	Panel female connector			
Output protection				
Anti-islanding protection	According to local standard			
Maximum external AC overcurrent protection	16 A	20 A	20 A	25 A
Output overvoltage protection - varistor	2 (L - N / L - PE)			

Block diagram of UNO-2.0/3.0/3.6/4.2-TL-OUTD



Technical data and types

Type code	UNO-2.0-TL-OUTD	UNO-3.0-TL-OUTD	UNO-3.6-TL-OUTD	UNO-4.2-TL-OUTD
Operating performance				
Maximum efficiency (η_{max})	97.30%		98.40%	
Weighted efficiency (EURO/CEC)	96.00% / -		97.5% / -	
Feed in power threshold	10 W		8 W	
Night consumption	< 0.1 W			
Communication				
Remote monitoring	VSN300 Wifi Logger Card (opt.)			
Wireless local monitoring	VSN300 Wifi Logger Card (opt.)			
User interface	Display (2x16 line LCD)			
Environmental				
Ambient temperature range	-20...+60°C, with derating > 45°C			
Relative humidity	0...100% condensing			
Maximum operating altitude without derating	2000 m / 6560 ft			
Physical				
Environmental protection rating	IP65			
Cooling	Natural			
Dimension (H x W x D)	553 x 418 x 175 mm / 21.8" x 16.5" x 6.9"			
Weight	12 kg / 26.45 lb			
Mounting system	Wall bracket			
Safety				
Isolation level	Transformerless			
Marking	CE			
Safety and EMC standard	IEC/EN 62109-1, IEC/EN 62109-2, EN 61000-6-2, EN 61000-6-3, EN 61000-3-2, EN 61000-3-3			
Grid standard (check your sales channel for availability)	C10/11, EN 50438, CEI 0-21, DIN V VDE V 0126-1-1, VDE-AR-N 4105, G83/2, G59/3, VFR 2014, IEC 61727, IEC 62116, NRS-097-2-1, RD 413, AS 4777, MEA, ABNT NBR16149/16150			
Available products variants				
Standard	UNO-2.0-TL-OUTD	UNO-3.0-TL-OUTD	UNO-3.6-TL-OUTD	UNO-4.2-TL-OUTD
With DC switch	UNO-2.0-TL-OUTD-S	UNO-3.0-TL-OUTD-S	UNO-3.6-TL-OUTD-S	UNO-4.2-TL-OUTD-S

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

ABB string inverters

PVI-3.0/3.6/4.2-TL-OUTD

3 to 4.2 kW



ABB's UNO family of single-phase string inverters complements the typical number of rooftop solar panels, allowing home owners to get the most efficient energy harvesting for the size of the property.

The dual input section processes two strings with independent Maximum Power Point Tracking (MPPT). This is particularly useful for rooftop installations with two different orientations (e.g. East and West). The high speed MPPT offers real-time power tracking and improved energy harvesting.

Efficiency of up to 96.8%

The transformerless (TL) operation gives the highest efficiency of up to 96.8%. The wide input voltage range makes the inverter suitable for low power installations with reduced string size.

This rugged outdoor inverter has been designed as a completely sealed unit to withstand the harshest environmental conditions.

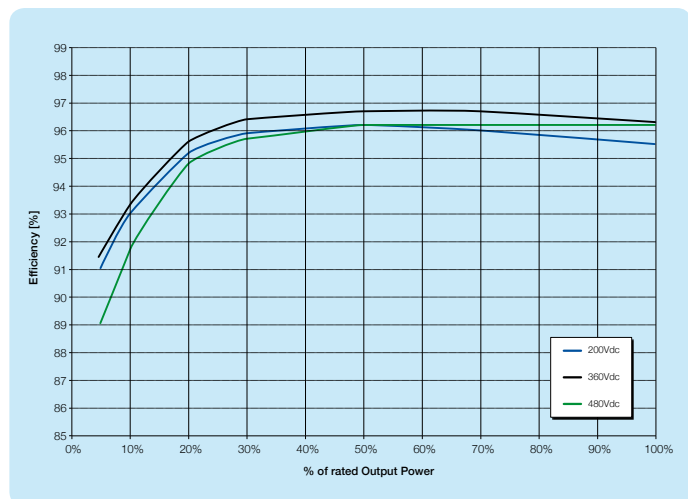
Our most common residential inverter is the ideal size for an average-sized family home.



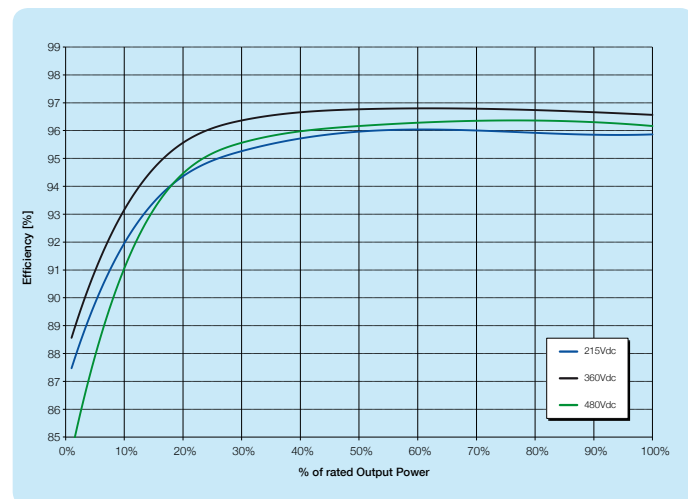
Highlights

- Single-phase output
- Transformerless topology
- Each inverter is set on specific grid codes which can be selected in the field
- Wide input voltage range
- High speed and precise MPPT algorithm for real time power tracking and improved energy harvesting
- Dual input section with independent MPPT, allows optimal energy harvesting from two sub-arrays oriented in different directions
- Flat efficiency curves ensure high efficiency at all output levels ensuring consistent and stable performance across the entire input voltage and output power range
- Integrated DC disconnect switch in compliance with international standards (-S version)
- Natural convection cooling for maximum reliability
- Outdoor enclosure for unrestricted use under any environmental conditions
- RS-485 communication interface (for connection to laptop or datalogger)

Efficiency curves of PVI-3.0-TL-OUTD



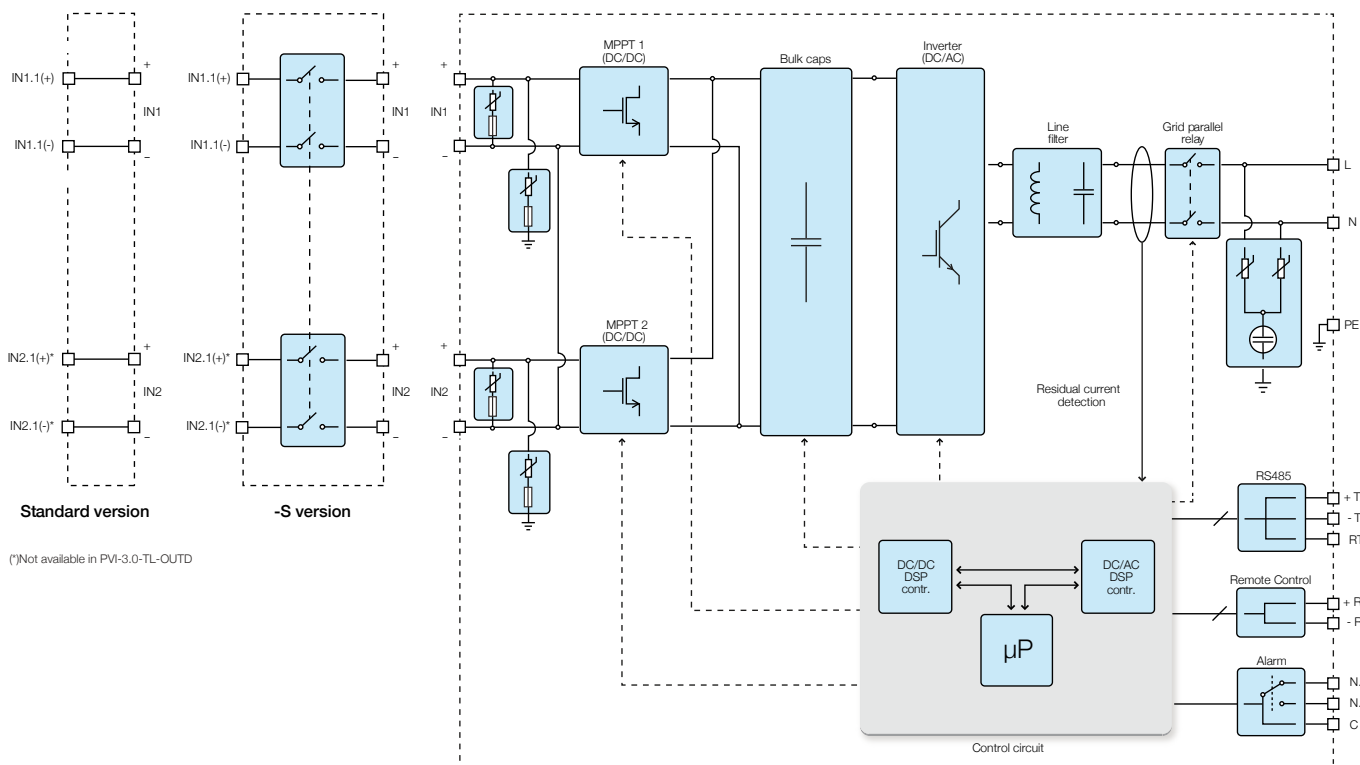
Efficiency curves of PVI-4.2-TL-OUTD



Technical data and types

Type code	PVI-3.0-TL-OUTD	PVI-3.6-TL-OUTD	PVI-4.2-TL-OUTD
Input side			
Absolute maximum DC input voltage ($V_{max,abs}$)	600 V		
Start-up DC input voltage (V_{start})	200 V (adj. 120...350 V)		
Operating DC input voltage range ($V_{dmin}...V_{dmax}$)	0.7 x $V_{start}...580$ V (min 90 V)		
Rated DC input voltage (V_{dcr})	360 V		
Rated DC input power (P_{dcr})	3120 W	3750 W	4375 W
Number of independent MPPT	2		
Maximum DC input power for each MPPT ($P_{MPPTmax}$)	2000 W	3000 W	3000 W
DC input voltage range with parallel configuration of MPPT at P_{acr}	160...530 V	120...530 V	140...530 V
DC power limitation with parallel configuration of MPPT	Linear derating from max to null [530 V≤ V_{MPPT} ≤580 V]		
DC power limitation for each MPPT with independent configuration of MPPT at P_{acr} , max unbalance example	2000 W [200 V≤ V_{MPPT} ≤530 V] the other channel: P_{dcr} =2000 W [112 V≤ V_{MPPT} ≤530 V]	3000 W [190 V≤ V_{MPPT} ≤530 V] the other channel: P_{dcr} =3000 W [90 V≤ V_{MPPT} ≤530 V]	
Maximum DC input current ($I_{dcr,max}$) / for each MPPT ($I_{MPPTmax}$)	20.0 A / 10.0 A	32.0 A / 16.0 A	
Maximum input short circuit current for each MPPT	12.5 A	20.0 A	
Number of DC inputs pairs for each MPPT	1	1	1
DC connection type	PV quick fit connector ³⁾		
Input protection			
Reverse polarity protection	Yes, from limited current source		
Input over voltage protection for each MPPT - varistor	Yes		
Photovoltaic array isolation control	According to local standard		
DC switch rating for each MPPT (version with DC switch)	25 A / 600 V		
Output side			
AC grid connection type	Single-phase		
Rated AC power (P_{acr} @cosφ=1)	3000 W	3600 W	4200 W
Rated AC power (P_{acr} @cosφ=±0.9)	3000 W	3600 W	4200 W
Maximum AC output power (P_{acmax} @cosφ=1)	3300 W ⁵⁾	4000 W ⁶⁾	4600 W ⁷⁾
Maximum apparent power (S_{max})	3330 VA	4000 VA	4670 VA
Rated AC grid voltage ($V_{ac,r}$)	230 V		
AC voltage range	180...264 V ¹⁾		
Maximum AC output current ($I_{ac,max}$)	14.5 A	17.2 A ²⁾	20.0 A
Contributory fault current	16.0 A	19.0 A	22.0 A
Rated output frequency (f_r)	50 Hz / 60 Hz		
Output frequency range ($f_{min}...f_{max}$)	47...53 Hz / 57...63 Hz ⁴⁾		
Nominal power factor and adjustable range	> 0.995, adj. 0.8 inductive to 0.8 capacitive		
Total current harmonic distortion	< 3.5%		
AC connection type	Screw terminal block, cable gland M25		
Output protection			
Anti-islanding protection	According to local standard		
Maximum external AC overcurrent protection	20.0 A	25.0 A	25.0 A
Output overvoltage protection - varistor	2 (L - N / L - PE)		

Block diagram of PVI-3.0/3.6/4.2-TL-OUTD



Technical data and types

Type code	PVI-3.0-TL-OUTD	PVI-3.6-TL-OUTD	PVI-4.2-TL-OUTD
Operating performance			
Maximum efficiency (η_{max})		96.8%	
Weighted efficiency (EURO/CEC)		96.0% / -	
Feed in power threshold		10.0 W	
Night consumption		< 0.4 W	
Communication			
Wired local monitoring		PVI-USB-RS232_485 (opt.)	
Remote monitoring		VSN300 Wifi Logger Card (opt.), VSN700 Data Logger (opt.)	
Wireless local monitoring		VSN300 Wifi Logger Card (opt.)	
User interface		16 characters x 2 lines LCD display	
Environmental			
Ambient temperature range	-25...+60°C / -13...140°F with derating above 50°C/122°F	-25...+60°C / -13...140°F with derating above 55°C/131°F	-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)		618 mm x 325 mm x 222 mm / 24.3" x 12.8" x 8.7"	
Weight		17.5 kg / 38.5 lbs	
Mounting system		Wall bracket	
Safety			
Isolation level		Transformerless	
Marking		CE (50 Hz only), RCM	
Safety and EMC standard		EN 50178, IEC/EN 62109-1, IEC/EN 62109-2, AS/NZS 3100, EN 61000-6-1, EN 61000-6-3, EN 61000-3-11, EN 61000-3-12	
Grid standard (check your sales channel for availability)		CEI 0-21, DIN V VDE V 0126-1-1, VDE-AR-N 4105, G83/2, G59/3, EN 50438 (not for all national appendices), RD 1699, RD 413, ITC-BT-40, AS 4777, IEC 61727, IEC 62116	
Available products variants			
Standard	PVI-3.0-TL-OUTD	PVI-3.6-TL-OUTD	PVI-4.2-TL-OUTD
With DC switch	PVI-3.0-TL-OUTD-S	PVI-3.6-TL-OUTD-S	PVI-4.2-TL-OUTD-S

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

²⁾ For UK G83/2 setting, maximum output current limited to 16A up to a maximum output power of 3.68 kW

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

⁴⁾ The Frequency range may vary depending on specific country grid standard

⁵⁾ Limited to 3000 W for Germany

⁶⁾ Limited to 3600 W for Germany

⁷⁾ Limited to 4200 W for Germany

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

ABB string inverters

PVI-5000/6000-TL-OUTD

5 to 6 kW



Designed for residential and small commercial photovoltaic installations, this inverter fills a specific niche in the product line to cater for those installations producing between 5kW and 20kW.

This inverter has a dual input section to process two strings with independent Maximum Power Point Tracking (MPPT), high speed and precise MPPT algorithm for real-time power tracking and energy harvesting, as well as transformerless operation for high performance efficiencies of up to 97.0%.

Suitable for low power installations with reduced string size

The wide input voltage range makes the inverter suitable for low power installations with reduced string size. 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 outdoor inverter has been designed as a completely sealed unit to withstand the harshest environmental conditions.

String inverters

PV + Storage

Central inverters

Packaged solutions

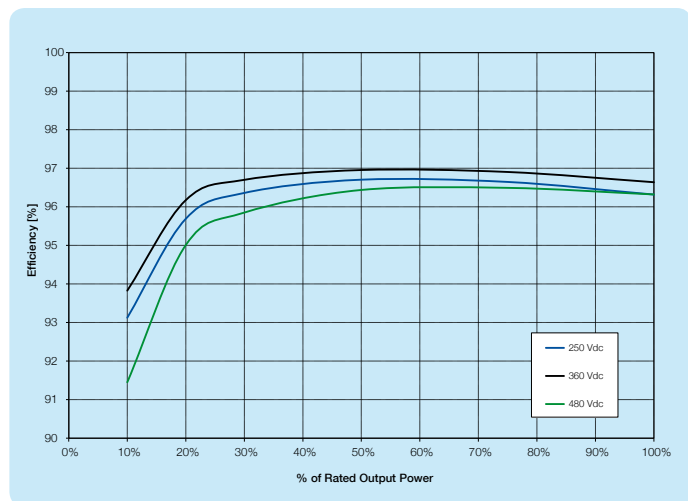
Monitoring and communications



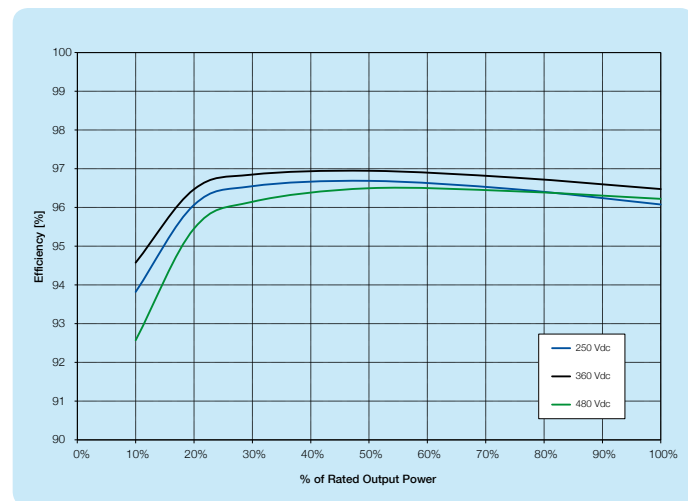
Highlights

- Single-phase output
- Transformerless topology
- Each inverter is set on specific grid codes which can be selected in the field
- Dual input section with independent MPPT, allows optimal energy harvesting from two sub-arrays oriented in different directions
- Wide input voltage range
- Natural convection cooling for maximum reliability
- Outdoor enclosure for unrestricted use under any environmental conditions
- RS-485 communication interface (for connection to laptop or datalogger)

Efficiency curves of PVI-5000-TL-OUTD



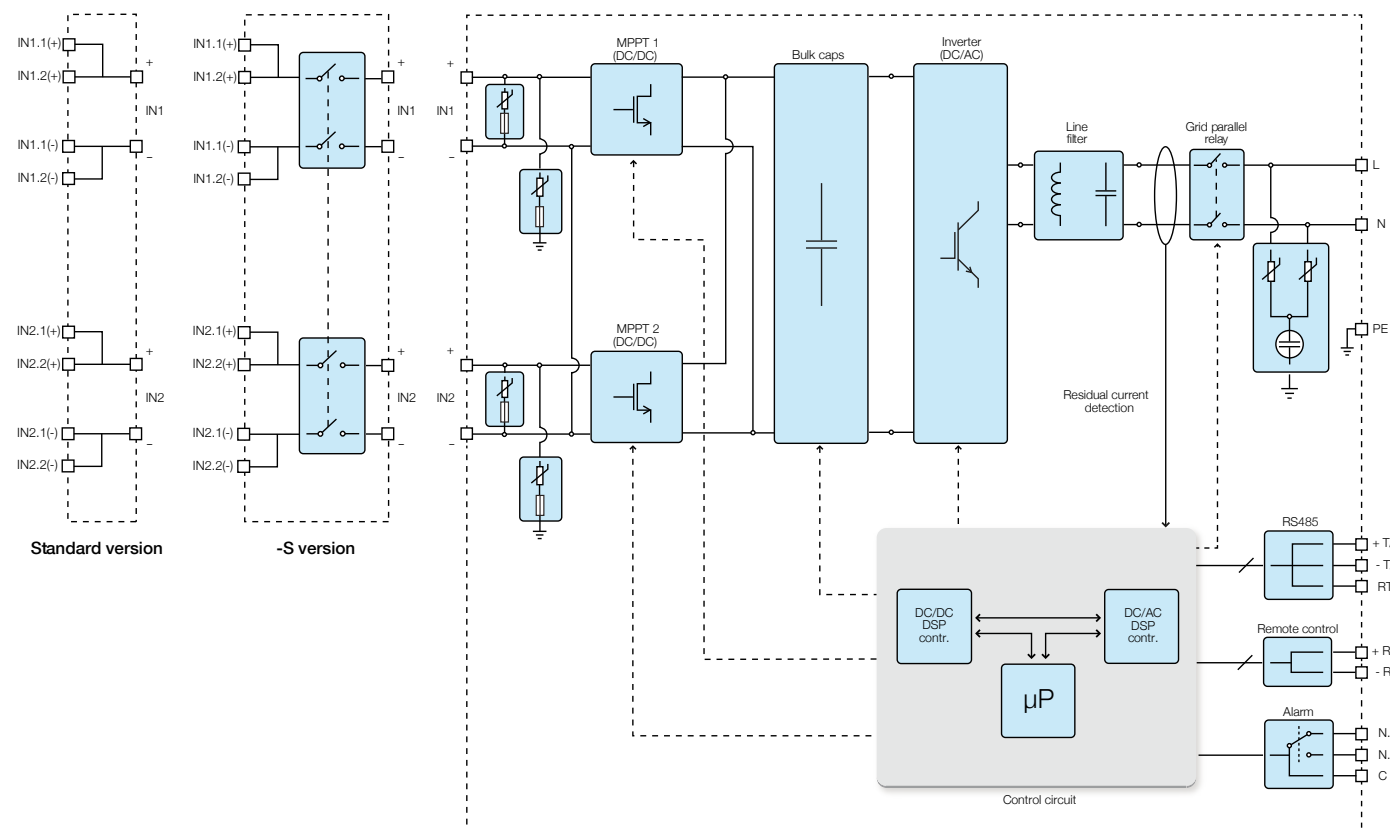
Efficiency curves of PVI-6000-TL-OUTD



Technical data and types

Type code	PVI-5000-TL-OUTD		PVI-6000-TL-OUTD
Input side			
Absolute maximum DC input voltage ($V_{max,abs}$)	600 V		
Start-up DC input voltage (V_{start})	200 V (adj. 120...350 V)		
Operating DC input voltage range ($V_{dmin}...V_{dmax}$)	$0.7 \times V_{start}...580$ V (min 90 V)		
Rated DC input voltage (V_{dcr})	360 V		
Rated DC input power (P_{dcr})	5150 W		6200 W
Number of independent MPPT	2		
Maximum DC input power for each MPPT ($P_{MPPTmax}$)	4000 W		
DC input voltage range with parallel configuration of MPPT at P_{acr}	150...530 V		180...530 V
DC power limitation with parallel configuration of MPPT	Linear derating from max to null [$530 V \leq V_{MPPT} \leq 580 V$]		
DC power limitation for each MPPT with independent configuration of MPPT at P_{acr} , max unbalance example	4000 W [$220 V \leq V_{MPPT} \leq 530 V$] the other channel: P_{dcr} =4000 W [$90 V \leq V_{MPPT} \leq 530 V$]		4000 W [$220 V \leq V_{MPPT} \leq 530 V$] the other channel: P_{dcr} =4000 W [$120 V \leq V_{MPPT} \leq 530 V$]
Maximum DC input current (I_{dmax}) / for each MPPT ($I_{MPPTmax}$)	36.0 A / 18.0 A		
Maximum input short circuit current for each MPPT	22.0 A		
Number of DC inputs pairs for each MPPT	2		
DC connection type	PV quick fit connector ³⁾		
Input protection			
Reverse polarity protection	Yes, from limited current source		
Input over voltage protection for each MPPT - varistor	Yes		
Photovoltaic array isolation control	According to local standard		
DC switch rating for each MPPT (version with DC switch)	25 A / 600 V		
Output side			
AC grid connection type	Single-phase		
Rated AC power (P_{acr} @ $\cos\phi=1$)	5000 W ⁴⁾		6000 W
Maximum AC output power (P_{acmax} @ $\cos\phi=1$)	5000 W ⁴⁾		6000 W
Maximum apparent power (S_{max})	5560 VA		6670 VA
Rated AC grid voltage ($V_{ac,r}$)	230 V		
AC voltage range	180...264 V ¹⁾		
Maximum AC output current ($I_{ac,max}$)	25.0 A		30.0 A
Contributory fault current	32.0 A		40.0 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. \pm 0.9 with P_{acr} =5.0 kW		> 0.995, adj. \pm 0.9 with P_{acr} =6.0 kW
Total current harmonic distortion	< 3.5%		
AC connection type	Terminal block, cable gland M32		
Output protection			
Anti-islanding protection	According to local standard		
Maximum external AC overcurrent protection	32.0 A		40.0 A
Output overvoltage protection - varistor	2 (L - N / L - PE)		

Block diagram of PVI-5000/6000-TL-OUTD



Technical data and types

Type code	PVI-5000-TL-OUTD	PVI-6000-TL-OUTD
Operating performance		
Maximum efficiency (η_{max})	97.0%	
Weighted efficiency (EURO/CEC)	96.4% / -	
Feed in power threshold	10.0 W	
Night consumption	< 0.4 W	
Communication		
Wired local monitoring	PVI-USB-RS232_485 (opt.)	
Remote monitoring	VSN300 Wifi Logger Card (opt.), VSN700 Data Logger (opt.)	
Wireless local monitoring	VSN300 Wifi Logger Card (opt.)	
User interface	16 characters x 2 lines LCD display	
Environmental		
Ambient temperature range	-25...+60°C (-13...+ 140°F)	-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)	810 mm x 325 mm x 222 mm / 31.9" x 12.8" x 8.7"	
Weight	< 26.0 kg / 57.3 lbs	
Mounting system	Wall bracket	
Safety		
Isolation level	Transformerless	
Marking	CE (50 Hz only), RCM	
Safety and EMC standard	EN 50178, IEC/EN 62109-1, IEC/EN 62109-2, AS/NZS 3100, EN 61000-6-1, EN 61000-6-3, EN 61000-3-11, EN 61000-3-12	
Grid standard (check your sales channel for availability)	CEI 0-21, DIN V VDE V 0126-1-1, G59/3, EN 50438 (not for all national appendices), RD 1699, RD 413, ITC-BT-40, AS 4777, C10/11, IEC 61727, IEC 62116	
Available products variants		
Standard	PVI-5000-TL-OUTD	PVI-6000-TL-OUTD
With DC switch	PVI-5000-TL-OUTD-S	PVI-6000-TL-OUTD-S

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

⁴⁾ 4600 W for Australia

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

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.

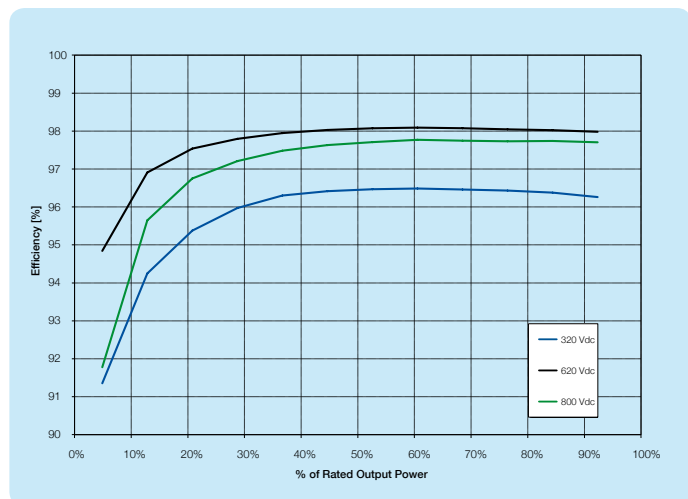
The outer cover with its natural cooling mechanism qualifies at IP65 environmental protection level for external use. It provides for maximum reliability and ease of installation, with a sliding front panel giving access to the connection and configuration area without requiring the complete removal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



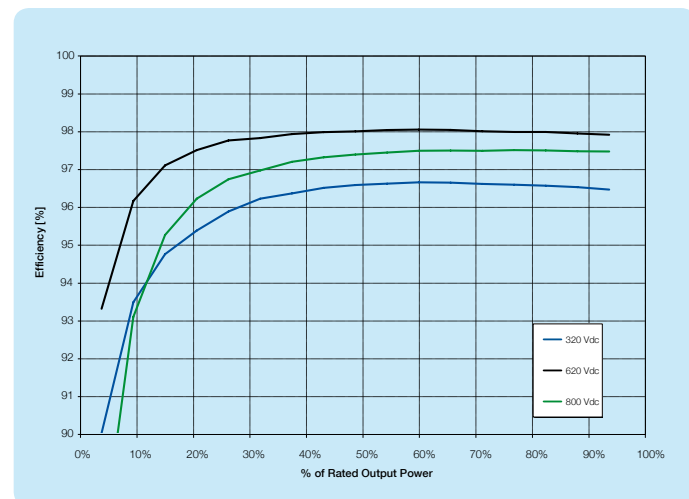
Highlights

- 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
- 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)

Efficiency curves of TRIO-5.8-TL-OUTD



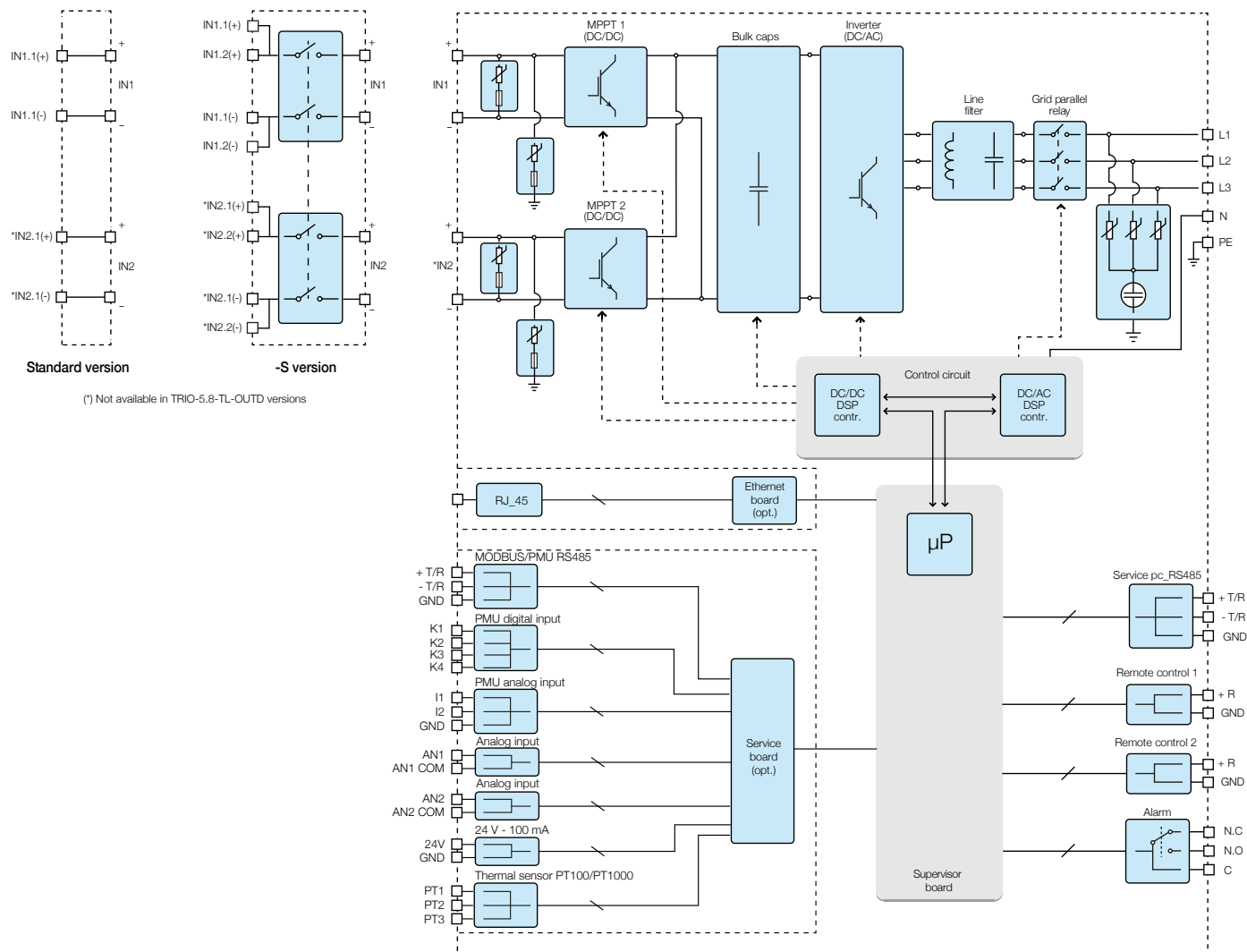
Efficiency curves of TRIO-8.5-TL-OUTD



Technical data and types

Type code	TRIO-5.8-TL-OUTD	TRIO-7.5-TL-OUTD	TRIO-8.5-TL-OUTD
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 _{dcr})	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 _{MPPTmax})	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} @cosφ=1)	5800 W	7500 W	8500 W
Maximum apparent power (S _{max})	5800 VA	7500 VA	8500 VA
Rated AC grid voltage (V _{acr,t})	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 _i)	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

ABB string inverters

PVI-10.0/12.5-TL-OUTD

10 to 12.5 kW



Designed for commercial usage, this PVI-10/12.5, three-phase inverter is highly unique in its ability to control the performance of the PV panels, especially during periods of variable weather conditions.

The high speed and precise Maximum Power Point Tracking (MPPT) algorithm provides real-time power tracking and improved energy harvesting.

Two independent MPPTs and efficiency ratings up to 97.8%

This transformerless device has two independent MPPTs and efficiency ratings of up to 97.8%.

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

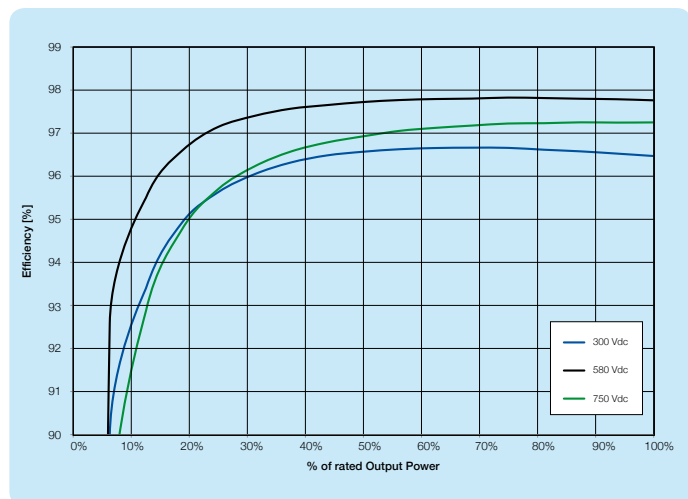
The wide input voltage range makes the inverter suitable for low power installations with reduced string size.



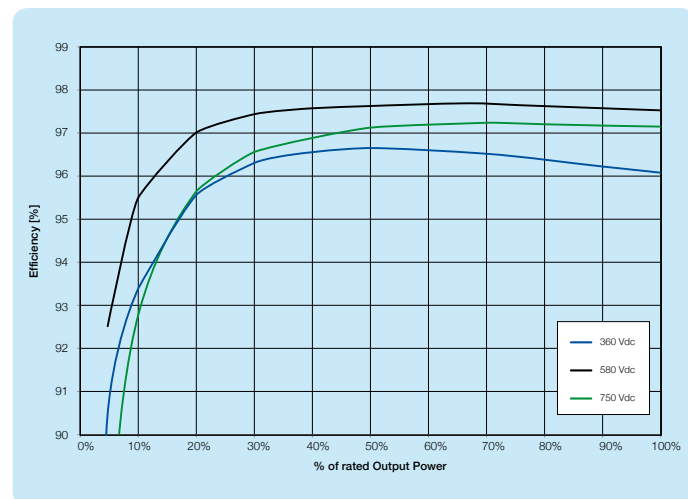
Highlights

- 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
- Wide input voltage range
- Dual input section with independent MPPT allows optimal energy harvesting from two sub-arrays oriented in different directions
- Integrated DC disconnect switch in compliance with international standards (-S and -FS versions)
- Natural convection cooling for maximum reliability
- Outdoor enclosure for unrestricted use under any environmental conditions
- RS-485 communication interface (for connection to laptop or datalogger)

Efficiency curves of PVI-10.0-TL-OUTD



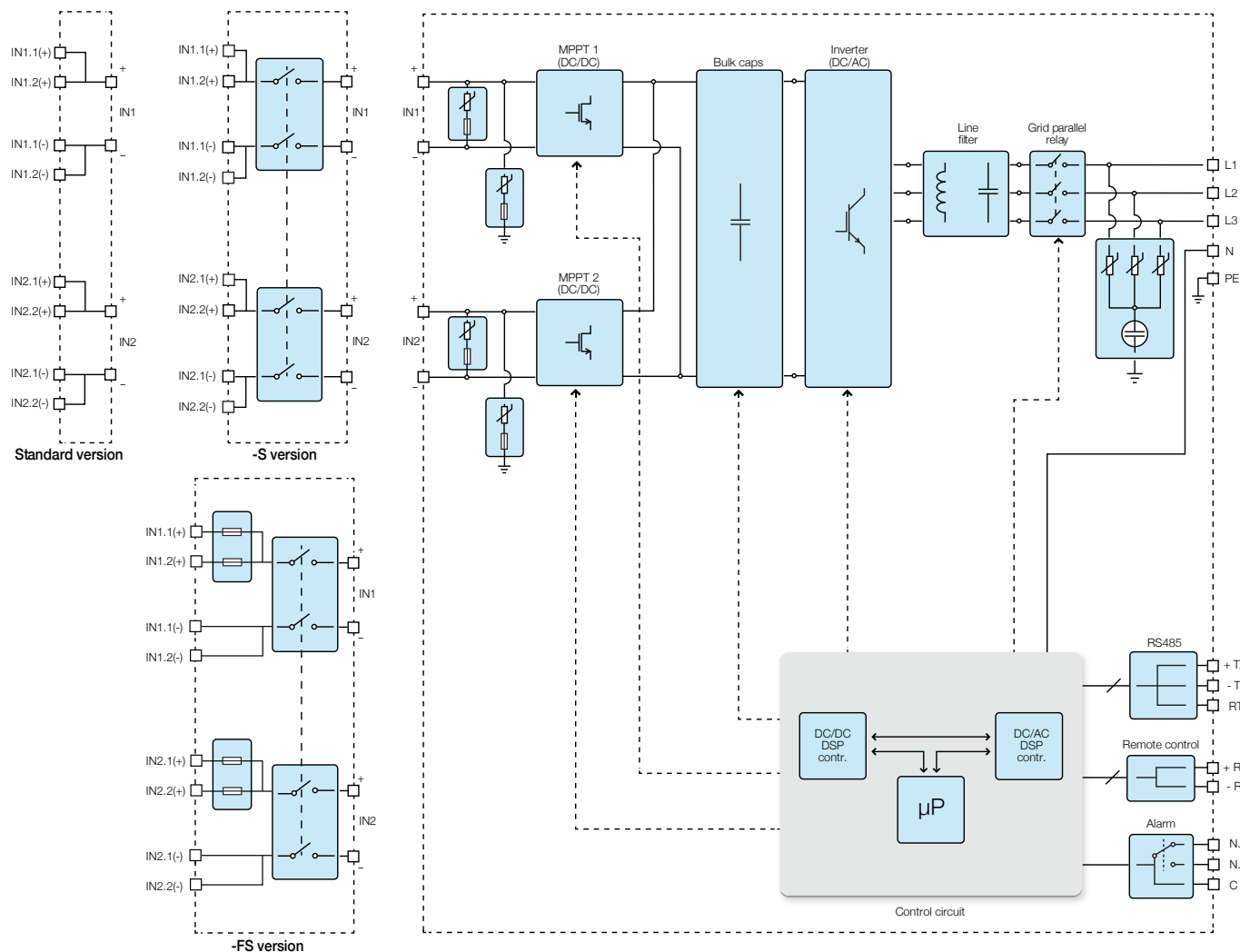
Efficiency curves of PVI-12.5-TL-OUTD



Technical data and types

Type code	PVI-10.0-TL-OUTD	PVI-12.5-TL-OUTD
Input side		
Absolute maximum DC input voltage ($V_{max,abs}$)	900 V	
Start-up DC input voltage (V_{start})	360 V (adj. 250...500 V)	
Operating DC input voltage range ($V_{dmin}...V_{dmax}$)	0.7 x $V_{start}...850$ V (min 200 V)	
Rated DC input voltage (V_{dcr})	580 V	
Rated DC input power (P_{dcr})	10300 W	12800 W
Number of independent MPPT	2	
Maximum DC input power for each MPPT ($P_{MPPTmax}$)	6500 W	8000 W
DC input voltage range with parallel configuration of MPPT at P_{dcr}	300...750 V	360...750 V
DC power limitation with parallel configuration of MPPT	Linear derating from max to null [750 V≤ V_{MPPT} ≤850 V]	
DC power limitation for each MPPT with independent configuration of MPPT at P_{dcr} , max unbalance example	6500 W [380 V≤ V_{MPPT} ≤750 V] the other channel: P_{dcr} -6500 W [225 V≤ V_{MPPT} ≤750 V]	8000 W [445 V≤ V_{MPPT} ≤750 V] the other channel: P_{dcr} -8000 W [270 V≤ V_{MPPT} ≤750 V]
Maximum DC input current ($I_{dcr,max}$) / for each MPPT ($I_{MPPTmax}$)	34.0 A / 17.0 A	36.0 A / 18.0 A
Maximum input short circuit current for each MPPT	22.0 A	
Number of DC inputs pairs for each MPPT	2	
DC connection type	PV quick fit connector ³⁾	
Input protection		
Reverse polarity protection	Inverter protection only, from limited current source	
Input over voltage protection for each MPPT - varistor	Yes	
Photovoltaic array isolation control	According to local standard	
DC switch rating for each MPPT (version with DC switch)	25 A / 1000 V	
Fuse rating (versions with fuses)	15 A / 1000 V	
Output side		
AC grid connection type	Three-phase 3W+PE or 4W+PE	
Rated AC power (P_{acr} @cosφ=1)	10000 W	12500 W
Maximum AC output power ($P_{ac,max}$ @cosφ=1)	11000 W ⁴⁾	13800 W ⁵⁾
Maximum apparent power (S_{max})	11500 VA	13800 VA
Rated AC grid voltage ($V_{acr,i}$)	400 V	
AC voltage range	320...480 V ¹⁾	
Maximum AC output current ($I_{ac,max}$)	16.6 A	20.0 A
Contributory fault current	19.0 A	22.0 A
Rated output frequency (f_i)	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} =10.0 kW, ± 0.8 with max 11.5 kVA	> 0.995, adj. ± 0.9 with P_{acr} =12.5 kW, ± 0.8 with max 13.8 kVA
Total current harmonic distortion	< 2%	
AC connection type	Screw terminal block, cable gland M40	
Output protection		
Anti-islanding protection	According to local standard	
Maximum external AC overcurrent protection	25.0 A	
Output overvoltage protection - varistor	3 plus gas arrester	
Operating performance		
Maximum efficiency (η_{max})	97.8%	
Weighted efficiency (EURO/CEC)	97.1% / -	97.2% / -
Feed in power threshold	30.0 W	
Night consumption	< 1.0 W	

Block diagram of PVI-10.0/12.5-TL-OUTD



Technical data and types

Type code	PVI-10.0-TL-OUTD		PVI-12.5-TL-OUTD
Communication			
Wired local monitoring	PVI-USB-RS232_485 (opt.)		
Remote monitoring	VSN300 Wifi Logger Card (opt.), VSN700 Data Logger (opt.)		
Wireless local monitoring	VSN300 Wifi Logger Card (opt.)		
User interface	16 characters x 2 lines LCD display		
Environmental			
Ambient temperature range	-25...+60°C (-13...+140°F) with derating above 55°C (131°F)		-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)	716 mm x 645 mm x 224 mm / 28.2" x 25.4" x 8.8"		
Weight	< 41.0 kg / 90.4 lbs		
Mounting system	Wall bracket		
Safety			
Isolation level	Transformerless		
Marking	CE (50 Hz only), RCM		
Safety and EMC standard	EN 50178, IEC/EN 62109-1, IEC/EN 62109-2, AS/NZS 3100, AS/NZS 60950.1, EN 61000-6-2, EN 61000-6-3, EN 61000-3-11, EN 61000-3-12		
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, G59/3, C10/11, EN 50438 (not for all national appendices), RD 1699, RD 413, RD 661, P.O. 12.3, AS/NZS 4777, IEC 61727, IEC 62116, BDEW, MEA, NRS 097-2-1, VFR 2014		
Available products variants			
Standard	PVI-10.0-TL-OUTD		PVI-12.5-TL-OUTD
With DC switch	PVI-10.0-TL-OUTD-S		PVI-12.5-TL-OUTD-S
With DC switch and fuse	PVI-10.0-TL-OUTD-FS		PVI-12.5-TL-OUTD-FS

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

⁴⁾ Limited to 10000 W for Belgium and Germany

⁵⁾ Limited to 12500 W for Germany

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

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%.

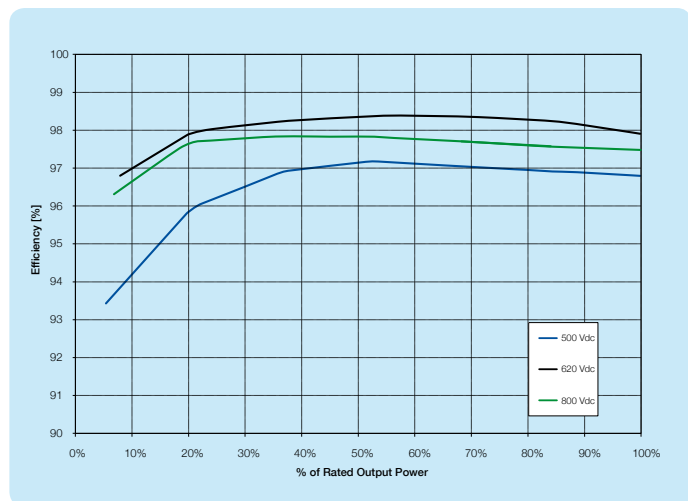
The very wide input voltage range makes the inverter suitable for installations with reduced string size.



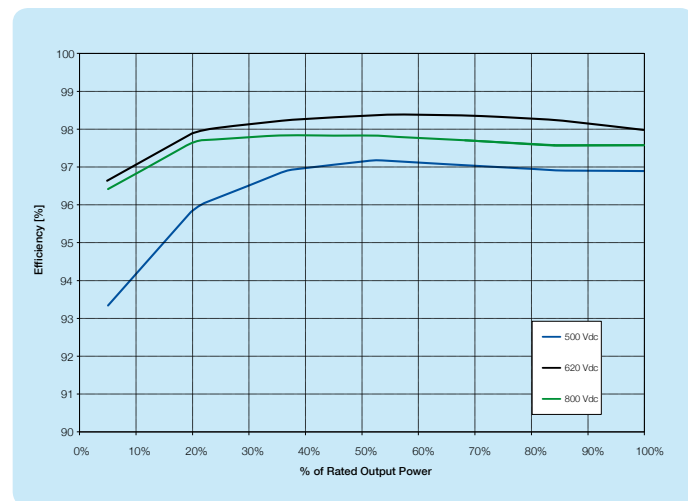
Highlights

- 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 voltage range
- Integrated string combiner with different options of configuration which include DC and AC disconnect switch in compliance with international standards (S2, S1J, -S2J, -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 (24 V, 300 mA)

Efficiency curves of TRIO-20.0-TL-OUTD



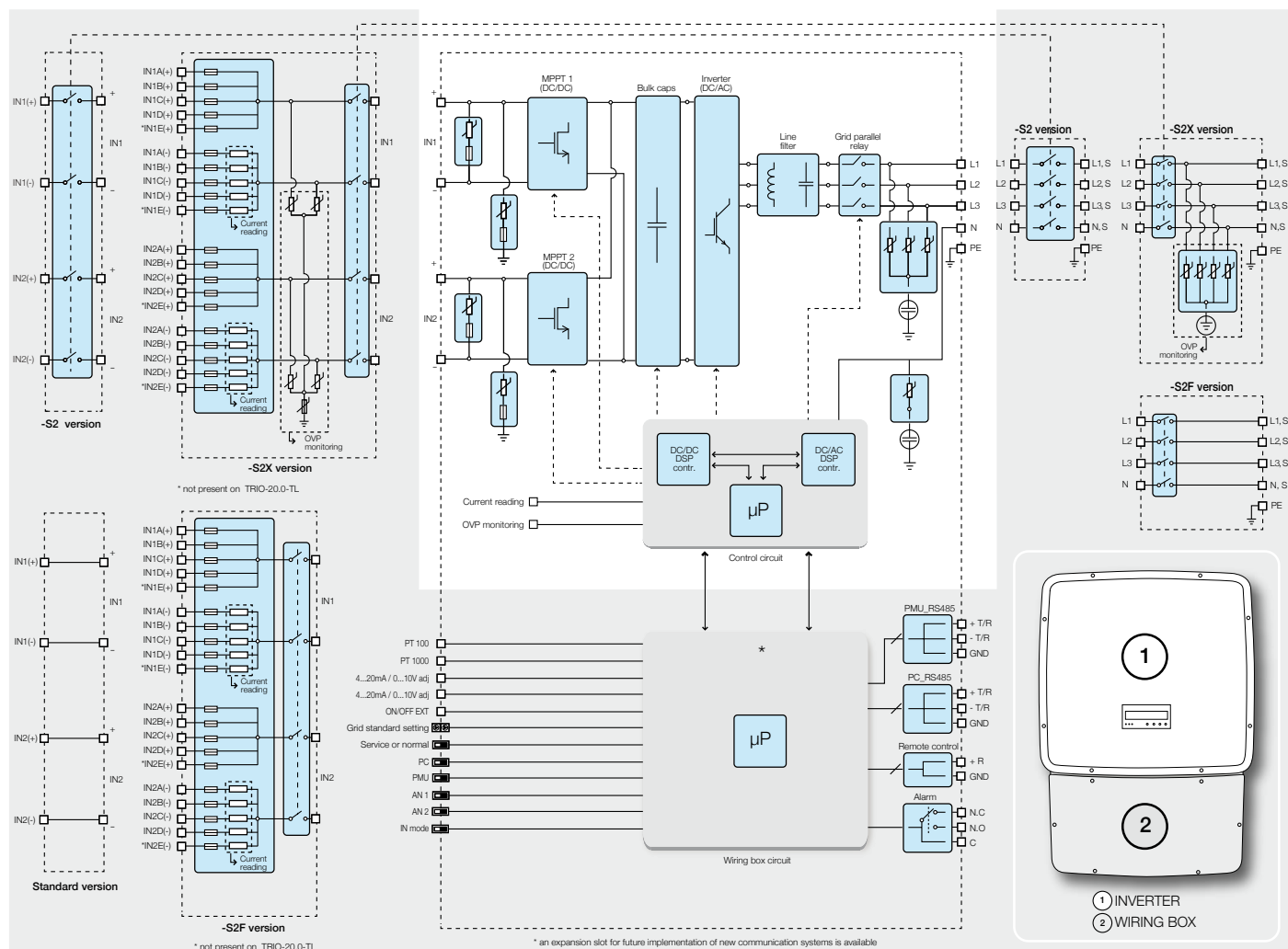
Efficiency curves of TRIO-27.6-TL-OUTD



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})	430 V (adj. 250...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 _{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 _{acr}	440...800 V	500...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	12000 W [480 V≤V _{MPPT} ≤800 V] the other channel: P _{dcr} =12000 W [350 V≤V _{MPPT} ≤800 V]	16000 W [500 V≤V _{MPPT} ≤800 V] the other channel: P _{dcr} =16000 W [400 V≤V _{MPPT} ≤800 V]
Maximum DC input current (I _{dmax}) / 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	40.0 A
Number of DC inputs pairs for each MPPT	1 (4 in -S2X, -S2F, -S1J, -S2J versions)	1 (5 in -S2X and -S2F versions, 4 in -S1J and -S2J)
DC connection type	PV quick fit connector ³⁾ / Screw terminal block on Standard and -S2 versions	
Input protection		
Reverse polarity protection	Yes, from limited current source	
Input over voltage protection for each MPPT - varistor	Yes, 4	
Input over voltage protection for each MPPT - plug in modular surge arrester (-S2X, -S1J and -S2J versions)	-S2X: Type 2; -S1J, -S1J: Type 1+2	
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+PE or 4W+PE	
Rated AC power (P _{acr} @cosφ=1)	20000 W	27600 W
Maximum AC output power (P _{acmax} @cosφ=1)	22000 W ⁴⁾	30000 W ⁵⁾
Maximum apparent power (S _{max})	22200 VA	30670 VA
Rated AC grid voltage (V _{ac,r})	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	46.0 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 external AC overcurrent protection	50.0 A	63.0 A
Output overvoltage protection - varistor	4	
Output overvoltage protection - plug in modular surge arrester (-S2X version)	4 (Type 2)	
Operating performance		
Maximum efficiency (η _{max})	98.2%	
Weighted efficiency (EURO/CEC)	98.0% / 98.0%	
Feed in power threshold	40 W	
Night consumption	< 0.6 W	

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 (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 45°C/113°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)	1061 mm x 702 mm x 292 mm / 41.7" x 27.6" x 11.5"		
Weight	< 70.0 kg / 154.3 lbs (Standard version)	< 75.0 kg / 165.4 lbs (Standard version)	
Mounting system	Wall bracket		
Safety			
Isolation level	Transformerless		
Marking	CE (50 Hz only), RCM		
Safety and EMC standard	EN 50178, IEC/EN 62109-1, IEC/EN 62109-2, AS/NZS 3100, AS/NZS 60950.1, EN 61000-6-2, EN 61000-6-3, EN 61000-3-11, EN 61000-3-12		
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, G59/3, C10/11, EN 50438 (not for all national appendices), RD 1699, RD 413, RD 661, P.O. 12.3, AS 4777, BDEW, NRS-097-2-1, MEA, IEC 61727, IEC 62116, Ordinul 30/2013, VFR 2014		
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	
With DC+AC switch, fuse and 1 DC surge arrester Type 1 + 2	TRIO-20.0-TL-OUTD-S1J-400	TRIO-27.6-TL-OUTD-S1J-400	
With DC+AC switch, fuse and 2 DC surge arrester Type 1 + 2	TRIO-20.0-TL-OUTD-S2J-400	TRIO-27.6-TL-OUTD-S2J-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

ABB string inverters

PRO-33.0-TL-OUTD

33 kW



ABB string inverters cost-efficiently convert the direct current (DC) generated by solar modules into high quality three-phase alternating current (AC) that can be fed into the power distribution network (i.e. grid). Designed to meet the needs of the entire supply chain – from system integrators and installers to end users – these transformerless, three-phase inverters are designed for decentralized photovoltaic (PV) systems installed in commercial and industrial systems up to megawatt (MW) sizes.

A new inverter from the world's leading power technology company

ABB, a global leader in power and automation technologies, brings decades of experience, technology leadership and application know-how from renewable energies to this new string inverter. Such experience and technology ensures high quality, safe and reliable solar inverters are delivered every time.

High power package for decentralized PV systems

ABB's three-phase PRO-33 string inverter is designed for medium and large decentralized PV systems either on large-scale commercial and industrial rooftops or ground-mounted PV plants. The inverter offers cost-efficiency in a high power, wall-mountable package with very high conversion efficiency. The all-in-one design with built-in and monitored PV plant protection devices reduces the need of costly external devices.

The single maximum power point tracker (MPPT) and optimized MPPT window are suitable for uniform-shaped PV plants with long strings connected to the inverter. The high maximum DC input voltage of up to 1100 V gives PV plant designers extra flexibility and allows more PV modules to be connected in series to reduce cabling costs.



Configurable all-in-one design

The ABB PRO-33.0 string inverter comes in three product variants. The standard model with or without DC switch is designed for use with an external string combiner box. The all-in-one model with built-in string combiner box includes a DC switch, string current monitoring with alarm, PV fuses, monitored surge protection devices and tool-less solar quick connectors. The inverter's all-in-one design, with built-in and monitored PV plant protection devices, reduces the need of costly external devices.

High total efficiency maximizes return on investment

The PRO-33.0 inverter offers a high conversion and MPP tracking efficiency in all conditions. A flat efficiency curve provides high revenues in low and high radiation conditions.

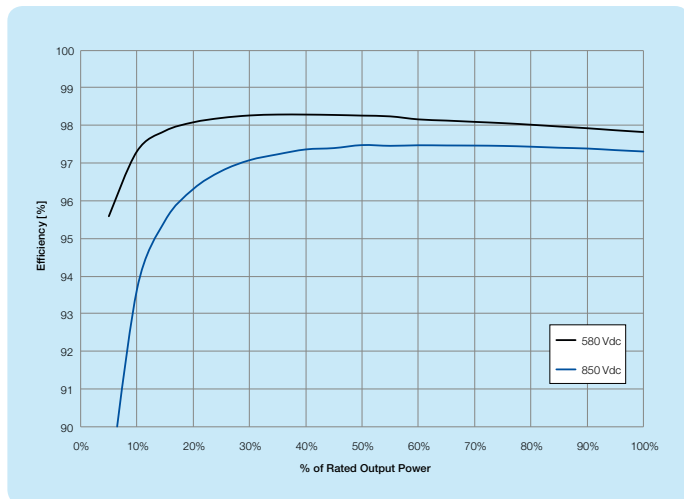
Fast and easy commissioning

Fast PV plant commissioning is enabled via pre-programmed country grid code settings that are easily selectable. Extensive certification ensures wide grid code compatibility. Plug and Play DC and AC connectors enable fast and safe cabling. A touch protected installation area provides additional safety and comfort for inverter installation and maintenance.

Highlights

- Compact, high power wall-mountable package
- High maximum DC input voltage of up to 1100 V
- Configurable all-in-one design
- Advanced grid support functions
- Safe and intuitive user interface
- Robust enclosure, with IP65 rating suitable for outdoor installation

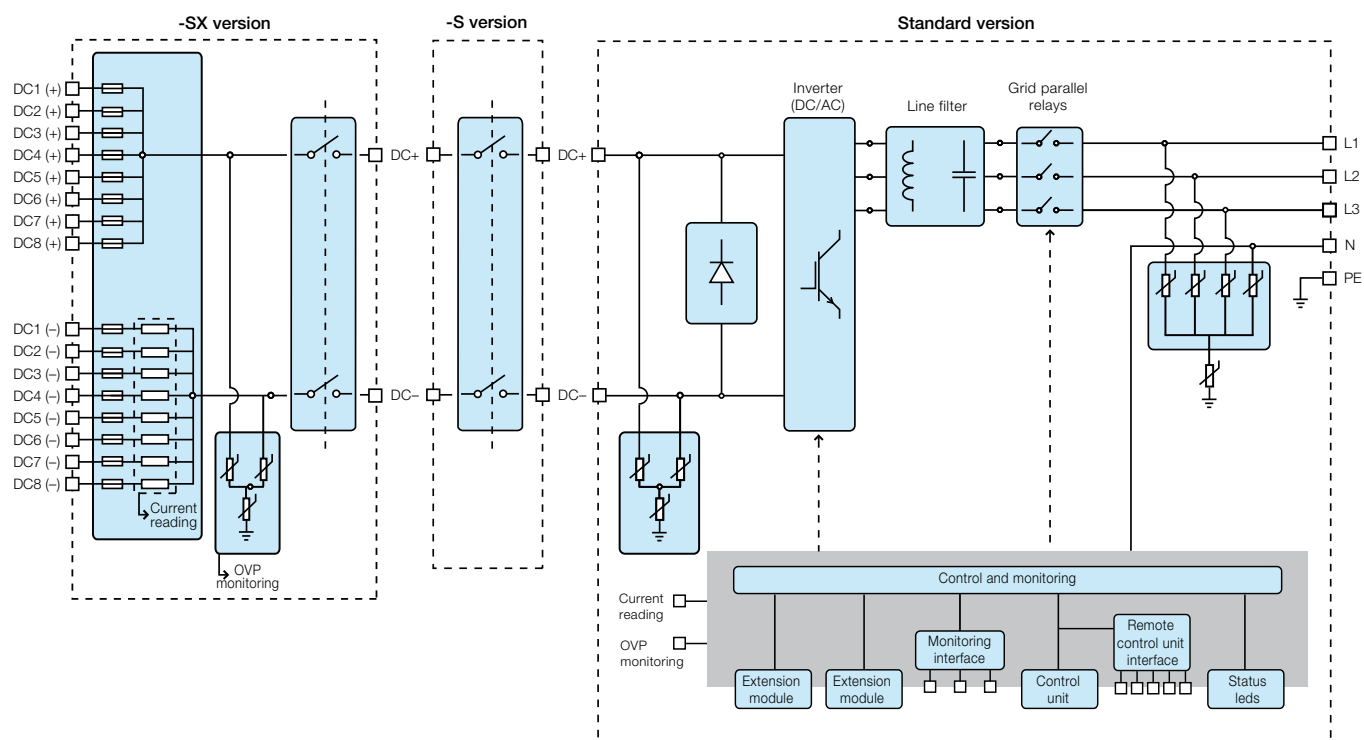
Efficiency curves of PRO-33.0-TL-OUTD



Technical data and type

Type designation	33 kW PRO-33.0-TL-OUTD
Input side	
Absolute maximum DC input voltage ($V_{max,abs}$)	1100 V ⁴⁾
Startup DC input voltage (V_{start})	610 V
Operating DC input voltage range ($V_{demin...V_{dmax}}$)	580 to 950 V
Rated DC input voltage (V_{dcr})	580 V
Rated DC input power (P_{dcr})	33 700 W
Number of independent MPPT	1
MPPT input DC voltage range ($V_{MPPTmin...V_{MPPTmax}}$) at P_{dcr}	580 to 850 V
Maximum DC input current ($I_{dcr,max}$)/for each MPPT ($I_{MPPTmax}$)	58 A
Maximum input short circuit current for each MPPT	80 A
Number of DC inputs pairs for each MPPT	1 in Standard and -S version/8 in -SX version
DC connection type	PV quick fit connector ³⁾ on -SX version / Screw terminal block on Standard and -S version
Input protection	
Reverse polarity protection	Yes, from limited current source
Input over voltage protection for each MPPT - varistor (-/S) version	Yes
Input over voltage protection - plug in modular surge arrester (-SX version)	Type 2
Photovoltaic array isolation control	According to local standard
DC switch rating for each MPPT (version with DC switch)	58 A / 1000 V, 50 A / 1200 V
Fuse rating (versions with fuses)	15 A / 1100 V
Output side	
AC grid connection type	Three-phase 3W+PE or 4W+PE
Rated AC power ($P_{acr,@cos\phi>0.99}$)	33 000 W
Maximum apparent power (S_{max})	33 000 VA
Rated AC grid voltage ($V_{acr,l}$)	400 V
AC voltage range	320 to 480 V ¹⁾
Maximum AC output current ($I_{ac,max}$)	50.3 A
Contributory fault current	50.3 A
Rated output frequency (f_r)	50 Hz/60 Hz
Output frequency range ($f_{min...f_{max}}$)	47 to 53 Hz/57 to 63 Hz ²⁾
Nominal power factor and adjustable range	> 0.995, with $P_{acr} = 33.0$ kW, adj. ± 0.9 with $P_{acr} = 29.7$ kW, adj. ± 0 to 1 with $S = 33.0$ kVA
Total current harmonic distortion	< 3%
AC connection type	Fixed plug type connector

Block diagram of PRO-33.0-TL-OUTD



Technical data and type

Type designation	33 kW PRO-33.0-TL-OUTD
Output protection	
Anti-islanding protection	According to local standard
Maximum external AC overcurrent protection	80 A
Output overvoltage protection - varistor	5
Operating performance	
Maximum efficiency (η_{max})	98.3%
Weighted efficiency (EURO/CEC)	98.0% / 98.1%
Feed in power threshold	20 W
Night consumption	< 1 W
Communication	
Remote monitoring	VSN700 Data Logger (opt.)
User interface	Detachable graphical display
Environmental	
Ambient temperature range	-25 to +60°C / -13 to 140°F with derating above 45°C/113°F
Relative humidity	0 to 100% condensing
Sound pressure level, typical	67 dBA @ 1 m
Maximum operating altitude without derating	3000 m / 9840 ft
Physical	
Environmental protection rating	IP65 (IP54 fans)
Cooling	Forced
Dimension (H x W x D) mm/inch	740 x 520 x 300 mm / 29.1" x 20.5" x 11.8"
Weight kg / lb	< 66.0 kg / 146 lbs (standard version)
Mounting system	Wall bracket
Safety	
Isolation level	Transformerless
Marking	CE, RCM
Safety and EMC standard	IEC/EN 62109-1, IEC/EN 62109-2, EN61000-6-2, AS/NZS 3200, EN61000-6-3, EN61000-3-11, EN61000-3-12
Grid standard (check availability)	CEI 0-21, CEI 0-16, DIN V VDE V 0126-1-1, VDE-AR-N 4105, G59/3, C10/11, EN 50438 (not for all national appendices), PPC Greece, RD 1699, RD 413, RD 661, P.O. 12.3, UNE206007-1, AS 4777, BDEW, NRS-097-2-1, SAGC, MEA, PEA, IEC 61727, IEC 62116, ABNT NBR16149/16150, VFR-2014
Available product variants	
Standard	PRO-33.0-TL-OUTD-400
With DC switch	PRO-33.0-TL-OUTD-S-400
With DC switch, fuses and DC surge arresters	PRO-33.0-TL-OUTD-SX-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

⁴⁾ Inverter does not start >1000 V

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

ABB string inverters

TRIO-50.0-TL-OUTD

50 kW



The new TRIO-50.0 inverter is ABB's three-phase string solution for cost efficient large decentralized photovoltaic systems for both commercial and utility applications.

The most powerful ABB string inverter available today, this new addition to the TRIO family has been designed with the objective to maximize the ROI in large systems with all the advantages of a decentralized configuration for both rooftop and ground-mounted installations.

Modular design

TRIO-50.0 has a landscape modular design to guarantee maximum flexibility.

The separate and configurable AC and DC compartments increase the ease of installation and maintenance with their ability to remain separately wired from the inverter module inside the system.

The TRIO comes with the most complete wiring box configurations available including up to 16 DC inputs with fast connectors, monitored fuses, AC and DC switches and monitored type II AC and DC surge arresters.

String inverters

PV + Storage

Central inverters

Packaged solutions

Monitoring and communications



Flexibility of installation

The forced air cooling system, designed for a simple and fast maintenance allows for the maximum flexibility of installation. The inverter comes with mounting supports for both horizontal and vertical positions which allow for the best use of space available beneath the solar panels.

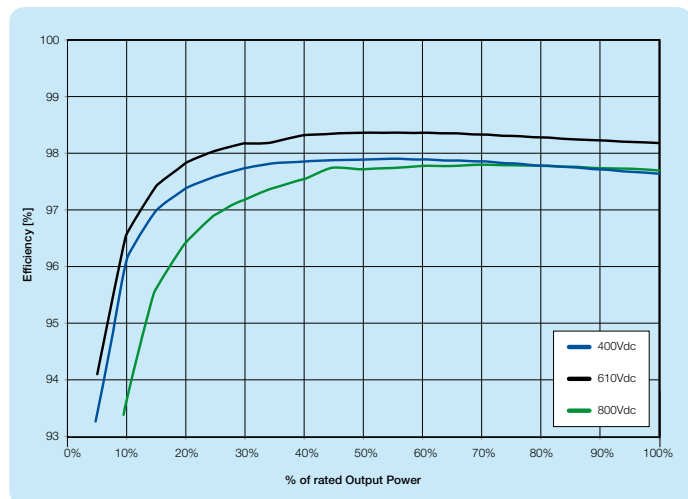
Design flexibility

The double stage conversion topology offers the advantage of a wide input voltage range for maximum flexibility of the system design.

Highlights

- Transformerless topology
- Each inverter is set on specific grid codes which can be selected directly in the field
- Separate AC and DC compartments are available in different configurations
- Wide input range
- Both vertical and horizontal installation

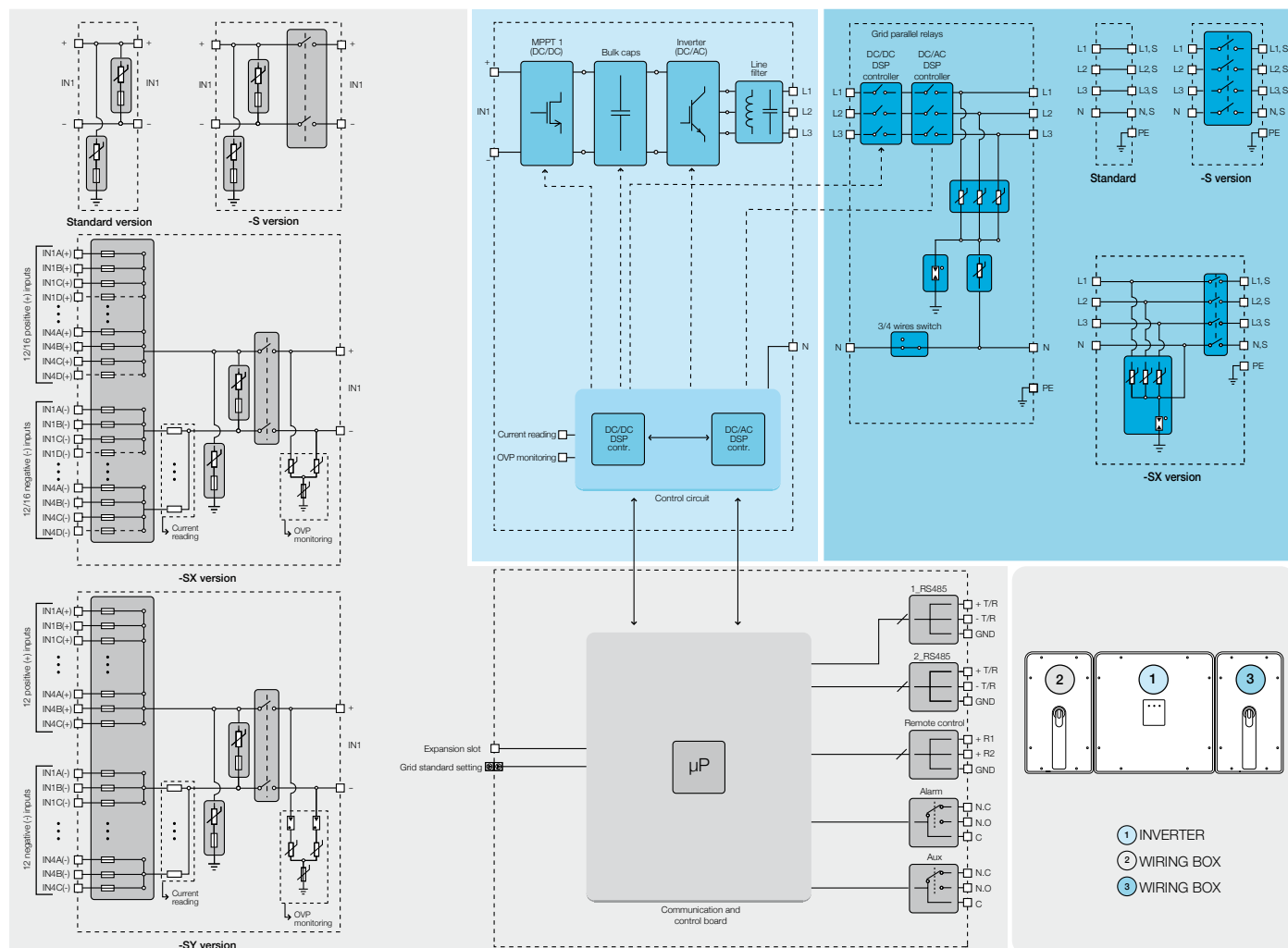
Efficiency curves of TRIO-50.0-TL-OUTD



Technical data and types

Type code	TRIO-50.0-TL-OUTD
Input side	
Absolute maximum DC input voltage ($V_{max,abs}$)	1000 V
Start-up DC input voltage (V_{start})	360...500 V (Default 420 V)
Operating DC input voltage range ($V_{dmin}...V_{dmax}$)	0,7x V_{start} ... 950 V (min 300 V)
Rated DC input voltage (V_{dcr})	610 Vdc
Rated DC input power (P_{dcr})	51200 W
Number of independent MPPT	1
MPPT input DC voltage range ($V_{MPPTmin} ... V_{MPPTmax}$) at P_{dcr}	480-800 Vdc
Maximum DC input current ($I_{dcr,max}$)	110 A
Maximum input short circuit current	160 A
Number of DC inputs pairs	12 or 16 (-SX version) / 12 (-SY version)
DC connection type	PV quick fit connector ³⁾ on -SX and -SY version / Screw terminal block on Standard and -S version
Input protection	
Reverse polarity protection	Yes, from limited current source
Input over voltage protection for each MPPT - varistor	Yes, 2
Input over voltage protection for each MPPT - plug In modular surge arrester	-SX: Type 2; -SY: Type 1+2
Photovoltaic array isolation control	According to local standard
DC switch rating for each MPPT (version with DC switch)	200 A / 1000 V
Fuse rating (version with fuses)	15 A / 1000 V
Output side	
AC grid connection type	Three-phase (3W+PE or 4W+PE)
Rated AC power ($P_{acr} @ \cos\phi=1$)	50000 W
Maximum AC output power ($P_{ac,max} @ \cos\phi=1$)	50000 W
Maximum apparent power (S_{max})	50000 VA
Rated AC grid voltage ($V_{acr,r}$)	400 V
AC voltage range	320...480 V ¹⁾
Maximum AC output current ($I_{ac,max}$)	77 A
Contributory fault current	92 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; 0...1 inductive/capacitive with maximum S_{max}
Total current harmonic distortion	<3%
AC connection type	Screw terminal block, cable gland PG42
Output protection	
Anti-islanding protection	According to local standard
Maximum external AC overcurrent protection	100 A
Output overvoltage protection - varistor	Yes, 4
Output overvoltage protection - plug in modular surge arrester (-SX version)	4, Type 2
Operating performance	
Maximum efficiency (η_{max})	98.30%
Weighted efficiency (EURO/CEC)	98.0% / -
Communication	
Remote monitoring	VSN300 Wifi Logger Card (opt.), VSN700 Data Logger (opt.)
Wireless local monitoring	VSN300 Wifi Logger Card (opt.)
User interface	LEDs
Communication interface	2 (RS485)

Block diagram of TRIO-50.0-TL-OUTD



Technical data and types

Type code	TRIO-50.0-TL-OUTD
Environmental	
Ambient temperature range	-25...+60°C / -13...140 °F with derating above 50 °C / 122 °F
Relative humidity	4%... 100% condensing
Sound pressure level, typical	75 dB(A) @ 1 m
Maximum operating altitude without derating	2000 m / 6560 ft
Physical	
Environmental protection rating	IP65 (IP54 for cooling section)
Cooling	Forced air
Dimension (H x W x D)	725 mm x 1491 mm x 315 mm / 28.5" x 58.7" x 12.4"
Weight	95 kg / 209 lbs overall, 66 kg / 145 lbs electronic compartment, 15 kg / 33 lbs AC wiring box (full optional), 14kg / 31 lbs DC wiring box (full optional)
Mounting system	Wall bracket, horizontal support
Safety	
Isolation level	Transformerless
Marking	CE
Safety and EMC standard	IEC/EN 62109-1, IEC/EN 62109-2, EN 61000-6-2, EN 61000-6-3, EN 61000-3-11, EN 61000-3-12
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, G59/3, EN 50438 (not for all national appendices), RD 1699, RD 413, RD 661, P.O. 12.3, AS 4777, BDEW, NRS-097-2-1, MEA, PEA, IEC 61727, IEC 60068, IEC 61683, VFR-2014, IEC 62116
Available product variants	
Inverter power module	TRIO-50.0-TL-OUTD-POWER MODULE
DC wiring box options	
Input connections with terminal blocks	DCWB-TRIO-50.0-TL-OUTD
Input connections with terminal blocks + DC switch	DCWB-S-TRIO-50.0-TL-OUTD
12 quick Input connections + fuses + DC switch + surge arresters Type 2	DCWB-SX-TRIO-50.0-TL-OUTD/12 INPUTS
16 quick Input connections + fuses + DC switch + surge arresters Type 2	DCWB-SX-TRIO-50.0-TL-OUTD/16 INPUTS
12 quick Input connections + fuses + DC switch + surge arresters Type 1 + 2	DCWB-SY-TRIO-50.0-TL-OUTD
AC wiring box options	
AC output connections with terminal blocks	ACWB-TRIO-50.0-TL-OUTD
AC output connections with terminal blocks + AC switch	ACWB-S-TRIO-50.0-TL-OUTD
AC output connections with terminal blocks + AC switch + surge arrester Type 2	ACWB-SX-TRIO-50.0-TL-OUTD

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



PV + Storage



ABB PV + Storage

REACT-3.6/4.6-TL

3.6 to 4.6 kW



REACT stores and allows you to make the most of the energy produced by your photovoltaic system.

REACT is an innovative photovoltaic inverter, equipped with a built-in 2 kWh battery that lets you store your unused energy generated during the day for use later when you really need it.

Taking full advantage of the energy generated by your photovoltaic system, REACT allows you to achieve greater energy self-sufficiency.



The advantages of REACT are:

- Coordination of all the energy flows with the goal of aligning PV energy production and home consumption
- Integrated load manager for control of energy consumption
- Auxiliary AC back-up output
- MyREACT: dedicated mobile app for control and monitoring
- Integrated Li-Ion battery with 2 kWh capacity, expandable up to 3x (6kWh)

Highlights

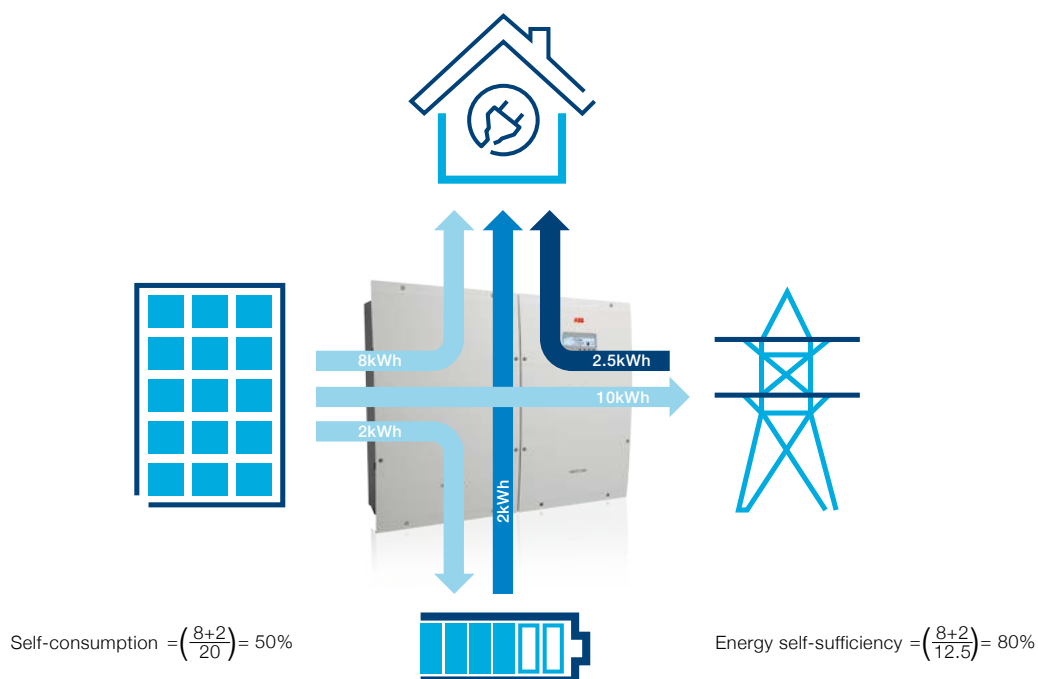
- Single-phase grid-connected inverter
- Two independent MPPT inputs
- Transformerless topology
- Energy meter for management of energy flows and control of energy production

REACT-3.6/4.6-TL



Technical data and types

Solar and storage inverter system	REACT-3.6-TL	REACT-4.6-TL
System components	REACT-UNO-3.6-TL	REACT-UNO-4.6-TL
	REACT-BATT-AP1	
	REACT-MTR-1PH or REACT-MTR-3PH	
	REACT-UNO-3.6-TL	REACT-UNO-4.6-TL
Inverter		
Input side		
Absolute maximum DC voltage - $V_{dc \text{ max}}$	600 V	
Start-up DC voltage - V_{start}	200 V (adj. 120...350 V)	
Operating DC voltage range - $V_{dc \text{ MPP}}$	0.7 x V_{start} ...580 V (min 90 V)	
Rated DC voltage - V_{acr}	360 V	
Rated DC power - P_{dcr}	5000 W	6000 W
Number of independent MPPT	2	
Maximum DC power for each MPPT - $P_{MPPT \text{ max}}$	2500 W Linear derating [520 V≤ V_{MPPT} ≤580 V]	3000 W Linear derating [520 V≤ V_{MPPT} ≤580 V]
DC voltage range with parallel configuration of MPPT at P_{acr} , not operative battery - $V_{dc \text{ FULL POWER}}$	160...520 V	180...520 V
Maximum DC current - $I_{dc \text{ max}}$ / for each MPPT	24 A / 12 A	27 A / 13.5 A
Maximum short circuit current for each MPPT - $I_{sc \text{ max}}$	15 A	
Number of DC inputs pairs for each MPPT	2	
DC connection type	PV quick fit connector ³⁾	
Input protection		
Reverse polarity protection	Yes, from limited current source	
Over voltage protection for each MPPT - varistor	Yes	
Photovoltaic array isolation control	According to local standard	
DC switch rating for each MPPT	25 A / 660 V	
Battery charger		
Maximum charging power (with at least 3 x battery unit)	3000 W	3000 W
Maximum discharging power (with at least 2 x battery unit)	3000 W	3000 W
Output side		
AC Grid connection type	Single-phase	
Rated AC power - P_{acr} ($\cos\phi = 0.9 - 1$, over/under excited)	3600 W	4600 W
Maximum AC power - $P_{ac \text{ max}}$	3600 W	4600 W
Maximum apparent power - S_{max}	4000 VA	5100 VA
Rated AC grid voltage - V_{acr}	230 V	
AC voltage range	180...264 V ¹⁾	
Maximum AC current - $I_{ac \text{ max}}$	19 A	24 A
Contributory fault current	23 A	29 A
Rated frequency - f	50 Hz	
Frequency range	47...53 Hz ²⁾	
Adjustable $\cos\phi$	0.1 - 1 (over/under excited)	
Total current harmonic distortion	< 2%	
AC connection type	Screw terminal block, cable gland M25	
Output protections		
Anti-islanding protection	According to local standard	
Maximum external AC overcurrent protection	25 A	32 A
Output overvoltage protection - varistor	2 (L - N / L - PE)	



Technical data and types

Inverter	REACT-UNO-3.6-TL		REACT-UNO-4.6-TL
Backup output			
AC connection type	Single-phase		
Rated apparent power - S_{acr}	3000 VA		
Rated AC Voltage - V_{acr}	230 V		
Maximum AC current - $I_{ac\ max}$	13 A		
Contributory fault current	27 A rms (60 ms)		
Maximum external AC overcurrent protection	16 A		
Rated frequency - f_r	50 Hz		
AC connection type	Screw terminal block, cable gland M25		
Operating performance			
Maximum efficiency - η_{max}	97.1 %		
Weighted efficiency (EURO/CEO)	96.6 % / -		
Typical battery efficiency (full cycle)	94.0 %		
Communication			
Remote monitoring	Integrated WiFi datalogger		
Wireless local monitoring	WiFi with webserver, mobile APP		
User interface	Mobile APP, Webserver UI, Graphic display		
Wired local monitoring	PVI-USB-RS232_485 (opt.)		
Environmental			
Ambient temperature range	-20...+55°C with derating above 50°C	-20...+55°C with derating above 45°C	
Relative humidity	4...100 % condensing (5...95 % no condensing; with at least 1 battery unit)		
Sound pressure level, typical	50 dBA @ 1 m		
Maximum operating altitude without derating	2000 m / 6560 ft		
Physical			
Environmental protection rating	IP65 (inverter), IP21 (battery unit)		
Cooling	Natural		
Dimension (H x W x D)	740 mm x 490 mm x 229 mm		
Dimension (H x W x D), equipped with 1 battery unit	740 mm x 983 mm x 229 mm		
Weight	< 30 kg		
Weight, equipped with 1 battery unit	< 67 kg		
Mounting system	Wall bracket		
Safety			
Isolation level	Transformerless		
Marking	CE		
Safety and EMC standard	IEC/EN 62109-1, IEC/EN 62109-2, EN 61000-6-2, EN 61000-6-3, EN 61000-3-2, EN 61000-3-3, EN61000-3-11, EN61000-3-12		
Grid standard (check your sales channel for availability)	CEI 0-21 (V1; 2014-12), DIN V VDE V 0126-1-1, VDE-AR-N 4105, G83/2, G59/3, VFR 2014, 4777.2:2015		
Other features			
Load manager	Yes, with load manager box		
AC backup output, off grid	Yes, automatic or manual restart in case of power outage		
Grid support	Yes, where it is required		

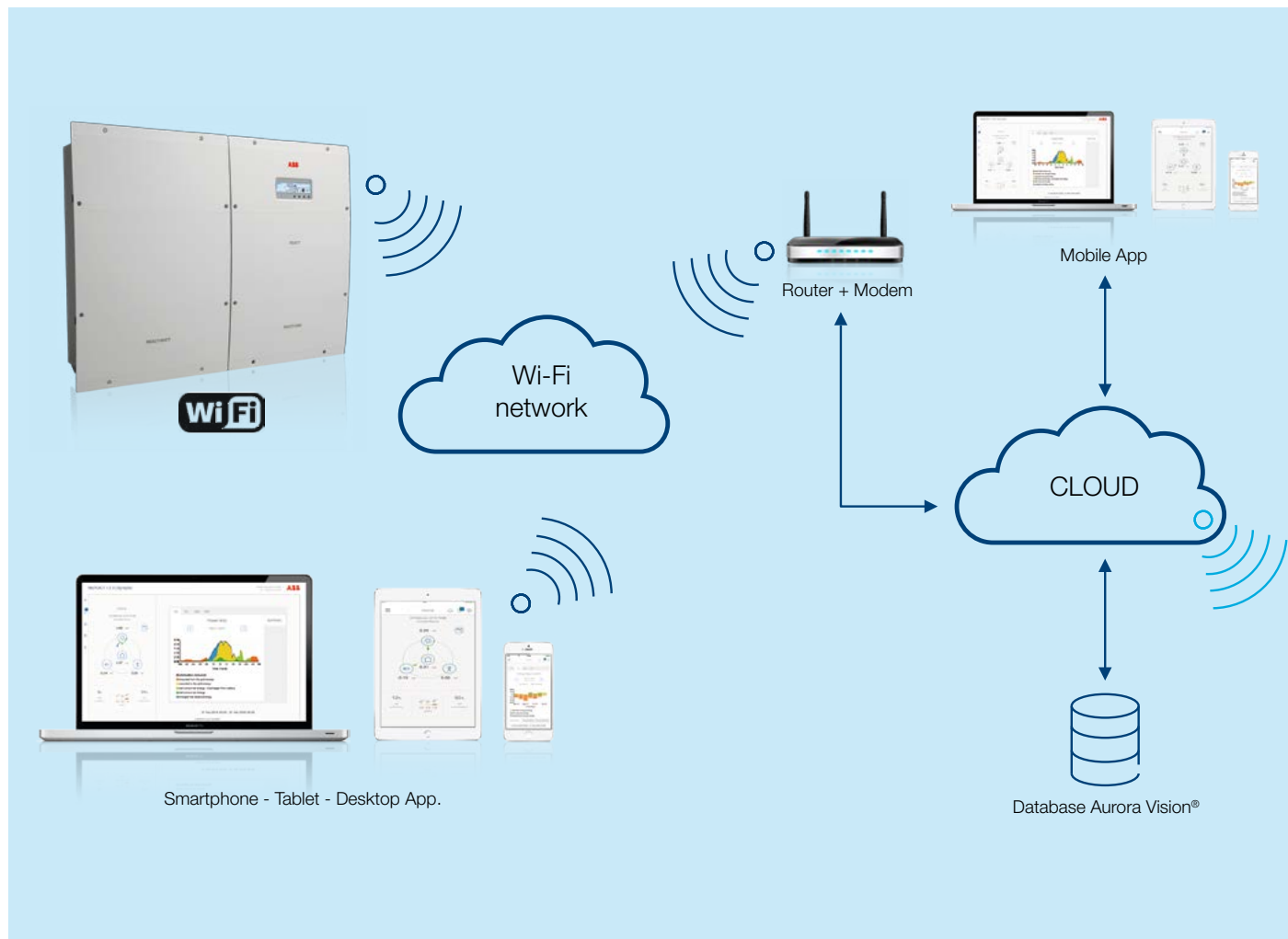
¹⁾ The AC voltage range may vary depending on specific country grid standard

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

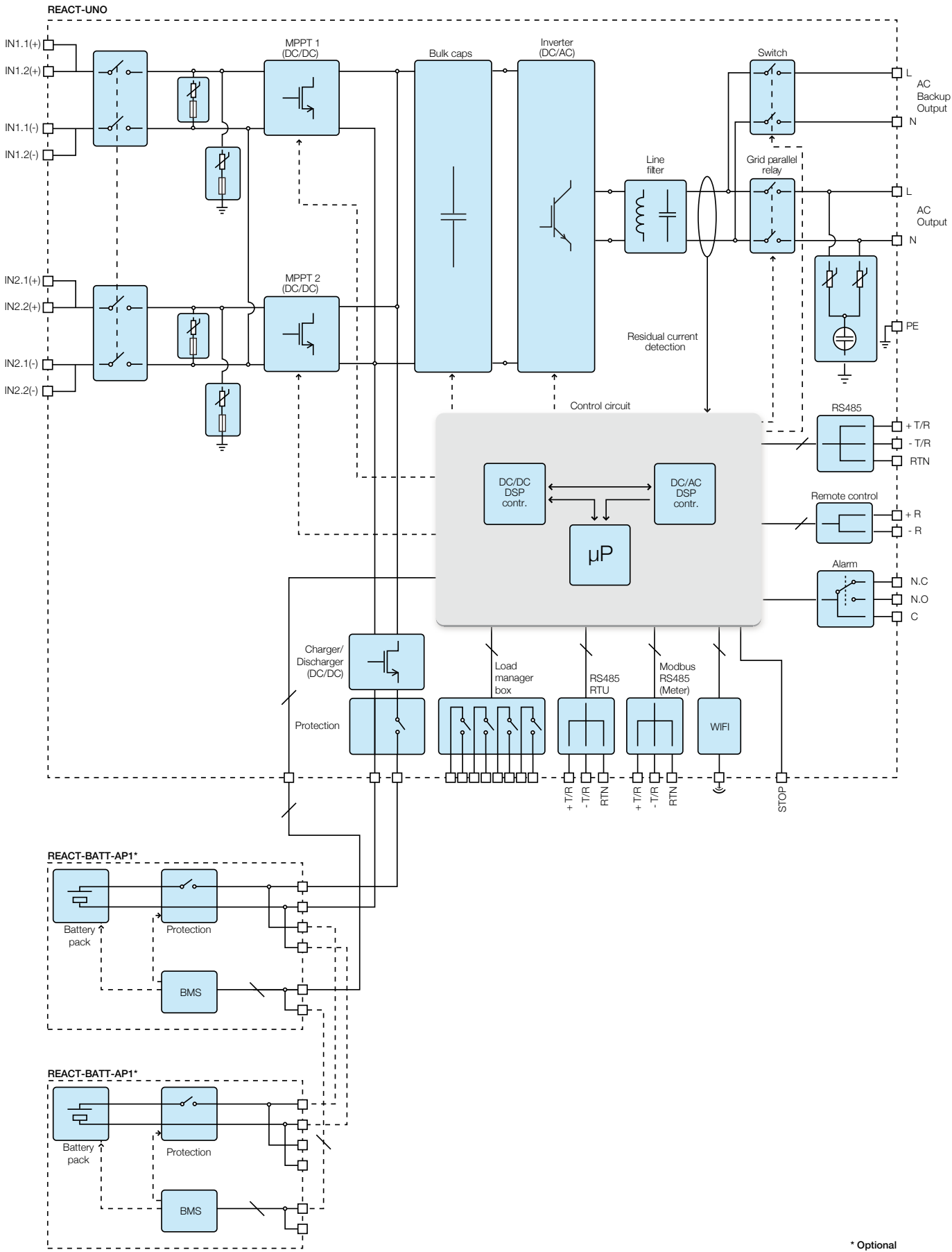
Block diagram of REACT-4.6



Technical data and types

Battery unit	REACT-BATT-AP1	
Manufacturer	Panasonic	
Battery type	Li-Ion	
Typical/Max power discharge	1.5 kW / 1.8 kW	
Max power charge	1.1 kW	
Nominal capacity	2 kWh (6 kWh, with 3x battery unit)	
Battery lifetime	> 4500 cycles	
Battery calendar lifetime, typical	10 years (Max 9 MWh discharged)	
Depth of Discharge (DOD)	100%	
Dimension (H x W x D)	740 mm x 490 mm x 229 mm	
Weight	< 37 kg	
Environmental protection rating	IP21	
Optimal battery operational temperature range	+5...+35°C	
Full battery function operational temperature range charge	0...+40°C	
Full battery function operational temperature range discharge	-10...+45°C	
Relative humidity	5...95 % without condensing	
Safety and EMC	EN62109-1, EN62109-2, compliance to applicable requirements of EN60950-1, EN61000-6-2, EN61000-6-3, UN38.3, UN3480	
Meter	REACT-MTR-1PH	REACT-MTR-3PH
Measures	P/ Q/ A/ V/ I	
Measures accuracy and resolution	< 1%, 1%	
Current capability	30 A	65 A
AC phases	1	3
Rated grid voltage / voltage range	230 V / 85...265 V	400 V / 380 V...415 V
Rated grid frequency	50 Hz	
Communication	RS485	
Power supply and consumption	Integrated, < 1 W	
Protection class	IP20	
Installation	DIN rail	
Operational temperature range	-20...+55°C	
Safety and EMC	IEC 61010-1, IEC 61326-1	
Marking	CE	

Block diagram of REACT-4.6





Central inverters



ABB central inverters

PVS800

100 to 1000 kW



ABB central inverters raise reliability, efficiency and ease of installation to new levels. The inverters are aimed at system integrators and end users who require high performance solar inverters for large photovoltaic (PV) power plants. The inverters are available from 100 up to 1000 kW, and are optimized for cost-efficient multi-megawatt power plants.

World's leading inverter platform

The ABB central inverters have been developed on the basis of decades of experience in the industry and proven technology platform. Unrivalled expertise from the world's market and technology leader in frequency converters is the hallmark of this solar inverter series.

Based on ABB's highly successful platform and the most widely used frequency converters on the market – the inverters are the most efficient and cost-effective way to convert the direct current (DC) generated by solar modules into high-quality and CO₂-free alternating current (AC) that can be fed into the power distribution network.

Solar inverters from ABB

ABB central inverters are ideal for large PV power plants but are also suitable for large-sized power plants installed in commercial or industrial buildings. High efficiency, proven components, compact and modular design and a host of life cycle services ensures ABB central inverters provide a rapid return on investment.

Highlights

- High total performance
- Modular and compact product design
- Extensive DC and AC side protection
- Full grid support functionality
- Fast and easy installation
- Complete range of industrial-type data communication options, including remote monitoring
- Life cycle service and support through ABB's extensive global service network

String inverters

PV + Storage

Central inverters

Packaged solutions

Monitoring and
communications



Maximum energy and feed-in revenues

ABB central inverters have a high total efficiency level. Optimized and accurate system control and a maximum power point tracking (MPPT) algorithm together with high efficiency power converter design ensure that maximum energy is delivered to the power distribution network from the PV modules. For end users this generates the highest possible revenues from the feed-in tariffs.

Proven ABB components

The inverters comprise proven ABB components with a long track record of performance excellence in demanding applications and harsh environments. Equipped with extensive electrical and mechanical protection, the inverters are engineered to provide a long and reliable service life of at least 20 years.

Compact and modular design

The inverters are designed for fast and easy installation. The industrial design and modular platform provides a wide range of options like remote monitoring, fieldbus connection and modular and flexible DC input cabinet. The integrated DC cabinet saves space and costs as the solar array junction boxes can be connected directly to the inverter DC cabinet

fused busbars. The inverters are customized to meet end user needs and are available with short delivery times.

Effective connectivity to power distribution network

ABB's transformerless central inverter series enables system integrators to design the PV power plant using optimum combination of different power rating inverters. Inverters are connected to the medium voltage (MV) power distribution network either centrally or in a distributed manner depending on the plant size and shape and network connection position.

Advanced grid support features

ABB central inverter software includes all the latest grid support and monitoring features including active power limitation, low voltage ride through (LVRT) with current feed-in and reactive power control. Active and reactive power output can be limited by using an external source. Active power can also be limited automatically as a function of grid frequency.

All grid support functions are parameterized allowing easy adjusting for local utility requirements. ABB central inverters are also able to support grid stability even at night by providing reactive power with the DC input disconnected.

ABB central inverters

PVS800

100 to 1000 kW



Technical data and types

Type designation	-0100kW-A	-0250kW-A	-0315kW-B	-0500kW-A	-0630kW-B	-0875kW-B	-1000kW-C
PVS800-57	100 kW	250 kW	315 kW	500 kW	630 kW	875 kW	1000 kW
Input (DC)							
Maximum input power ($P_{PV, max}$) ¹⁾	120 kWp	300 kWp	378 kWp	600 kWp	756 kWp	1050 kWp	1200 kWp
DC voltage range, mpp ($U_{DC, mpp}$)	450 to 825 V	450 to 825 V	525 to 825 V	450 to 825 V	525 to 825 V	525 to 825 V	600 to 850 V
Maximum DC voltage ($U_{max(DC)}$)	1000 V	1000 V	1000 V	1100 V	1100 V	1100 V	1100 V
Maximum DC current ($I_{max(DC)}$)	245 A	600 A	615 A	1145 A	1230 A	1710 A	1710 A
Number of protected DC inputs	1 (+/-) / 4 ²⁾	2, 4, 8 (+/-)	2, 4, 8 (+/-)	4 to 15 (+/-)	4 to 15 (+/-)	8 to 20 (+/-)	8 to 20 (+/-)
Output (AC)							
Nominal power ($P_{N(AC)}$) ³⁾	100 kW	250 kW	315 kW	500 kW	630 kW	875 kW	1000 kW
Maximum output power ⁴⁾	100 kW	250 kW	345 kW	600 kW	700 kW	1050 kW	1200 kW
Power at $\cos\varphi = 0.95$ ⁵⁾	96 kW	240 kW	300 kW	475 kW	600 kW	830 kW	950 kW
Nominal AC current ($I_{N(AC)}$)	195 A	485 A	520 A	965 A	1040 A	1445 A	1445 A
Nominal output voltage ($U_{N(AC)}$) ⁵⁾	300 V	300 V	350 V	300 V	350 V	350 V	400 V
Output frequency	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz
Harmonic distortion, current ⁶⁾	< 3%	< 3%	< 3%	< 3%	< 3%	< 3%	< 3%
Distribution network type ⁷⁾	TN and IT	TN and IT	TN and IT	TN and IT	TN and IT	TN and IT	TN and IT
Efficiency							
Maximum ⁸⁾	98.0%	98.0%	98.6%	98.6%	98.6%	98.7%	98.8%
Euro-eta ⁸⁾	97.5%	97.6%	98.3%	98.2%	98.4%	98.5%	98.6%
Power consumption							
Own consumption in operation	310 W	310 W	310 W	490 W	490 W	650 W	650 W
Standby operation consumption	60 W	60 W	60 W	65 W	65 W	65 W	65 W
External auxiliary voltage ⁹⁾	230 V, 50 Hz	230 V, 50 Hz	230 V, 50 Hz	230 V, 50 Hz	230 V, 50 Hz	230 V, 50 Hz	230 V, 50 Hz
Dimensions and weight							
Width/Height/Depth, mm (W/H/D)	1030/2130/690	1830/2130/680	1830/2130/680	2630/2130/708	2630/2130/708	3630/2130/708	3630/2130/708
Weight appr. ¹⁰⁾	550	1100	1100	1800	1800	2320	2320

¹⁾ Recommended maximum input power

²⁾ Optional MCB inputs, 80 A inputs

³⁾ 100 and 250 kW units at 40°C. 315 and 630 kW at 45°C. 500, 875 and 1000 kW at 50°C.

⁴⁾ At 25°C. See the user manual for details.

⁵⁾ +/- 10%

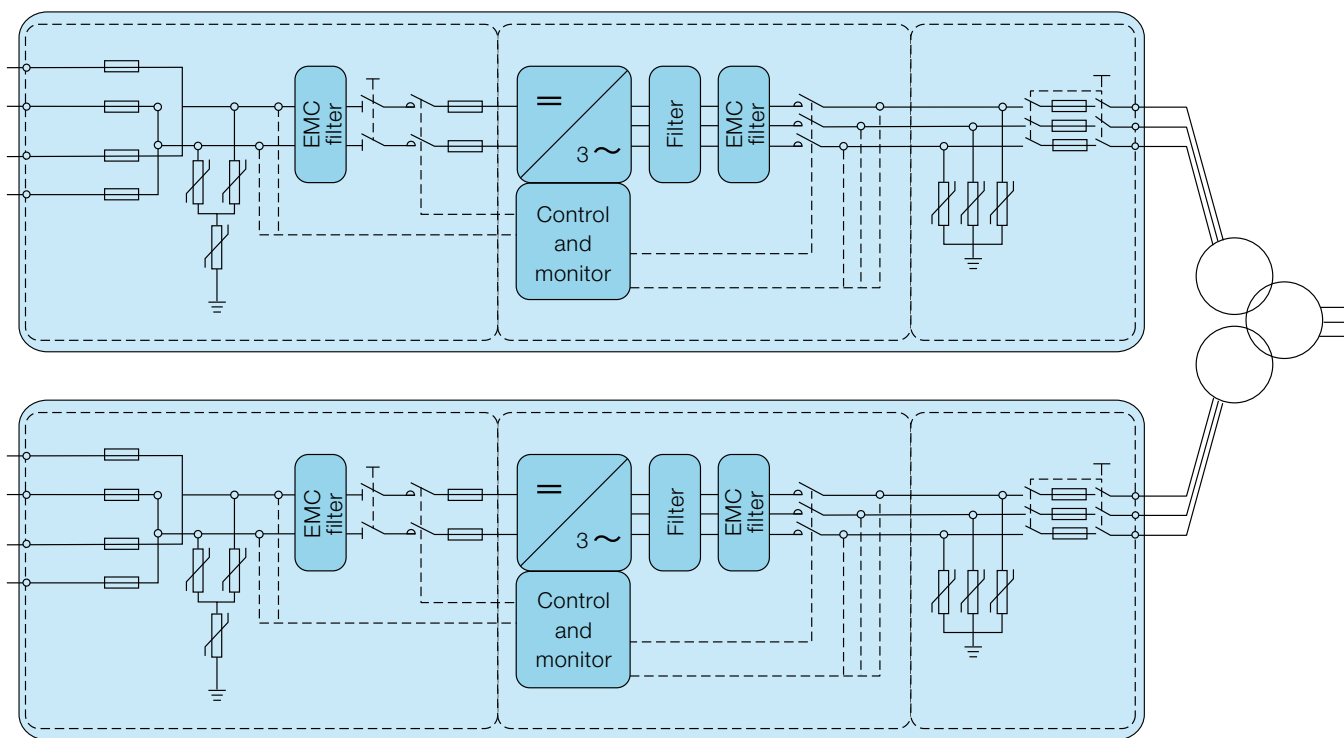
⁶⁾ At nominal power

⁷⁾ Inverter side must be IT type

⁸⁾ Without auxiliary power consumption at min U_{DC}

⁹⁾ 115 V, 60 Hz optional

¹⁰⁾ For the smallest number of protected inputs
See the user manual for details



Technical data and types

Type designation	-0100kW-A	-0250kW-A	-0315kW-B	-0500kW-A	-0630kW-B	-0875kW-B	-1000kW-C
PVS800-57	100 kW	250 kW	315 kW	500 kW	630 kW	875 kW	1000 kW
Environmental limits							
Degree of protection	IP42	IP42	IP42	IP42	IP42	IP42	IP42
Ambient temp. range (nom. ratings) ¹¹⁾	-15 to +40°C	-15 to +40°C	-15 to +45°C	-15 to +50°C	-15 to +45°C	-15 to +50°C	-15 to +50°C
Maximum ambient temperature ¹²⁾	+50°C	+50°C	+55°C	+55°C	+55°C	+55°C	+55°C
Relative humidity, not condensing	15 to 95%	15 to 95%	15 to 95%	15 to 95%	15 to 95%	15 to 95%	15 to 95%
Maximum altitude (above sea level) ¹³⁾	2000 m ¹⁴⁾	2000 m ¹⁴⁾	2000 m ¹⁴⁾	4000 m	4000 m	4000 m	4000 m
Maximum noise level	75 dBA	75 dBA ¹⁵⁾	75 dBA ¹⁵⁾	75 dBA ¹⁵⁾	75 dBA ¹⁵⁾	75 dBA ¹⁵⁾	75 dBA ¹⁵⁾
Maximum air flow of the inverter section	1300 m³/h	2500 m³/h	2500 m³/h	5000 m³/h	5000 m³/h	7950 m³/h	7950 m³/h
Protection							
Ground fault monitoring ¹⁶⁾	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Grid monitoring	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Anti-islanding	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DC reverse polarity	Yes	Yes	Yes	Yes	Yes	Yes	Yes
AC and DC short circuit and over current	Yes	Yes	Yes	Yes	Yes	Yes	Yes
AC and DC over voltage and temperature	Yes	Yes	Yes	Yes	Yes	Yes	Yes
User interface and communications							
Local user interface	ABB local control panel						
Analog inputs/outputs	1/2	1/2	1/2	1/2	1/2	1/2	1/2
Digital inputs/relay outputs	3/1	3/1	3/1	3/1	3/1	3/1	3/1
Fieldbus connectivity	Modbus, PROFIBUS, EtherNet						
Product compliance							
Safety and EMC	CE conformity according to LV and EMC directives						
Certifications and approvals ¹⁷⁾	VDE, CEI, UNE, RD, EDF, P.O. 12.3, BDEW, GOST, AS, ZA						
Grid support and grid functions	Reactive power compensation ¹⁸⁾ , power reduction, LVRT, HVRT, anti-islanding						

¹¹⁾ Frosting is not allowed. May need optional cabinet heating.

¹²⁾ Power derating after 40°C/45°C/50°C

¹³⁾ Power derating above 1000 m

¹⁴⁾ With option 2000 to 4000 m

¹⁵⁾ At partial power typically < 70 dBA

¹⁶⁾ Optional

¹⁷⁾ More detailed information, please contact ABB

¹⁸⁾ Also during the night

ABB central inverters

PVS800

100 to 1000 kW



High total performance

- High efficiency
- Low auxiliary power consumption
- Efficient maximum power point tracking
- Long and reliable service life of at least 20 years

Modular industrial design

- Compact and easy-to-maintain product design
- Fast and easy installation
- Integrated and flexible DC input cabinet

Full grid support functionality

- Reactive power compensation also during the night time
- Active power limitation
- Low voltage ride through with current feed in

Extensive protections

- DC and AC side protection with built-in fuses, surge protection and filters
- Increased reliability and safety with DC and AC side contactors
- Heavy-duty surge protection

Grid code compatibility

- Wide country-specific grid code compliance
- Adjustability to various local utility requirements

Proven technology

- Based on ABB's market-leading technology platform used in frequency converters

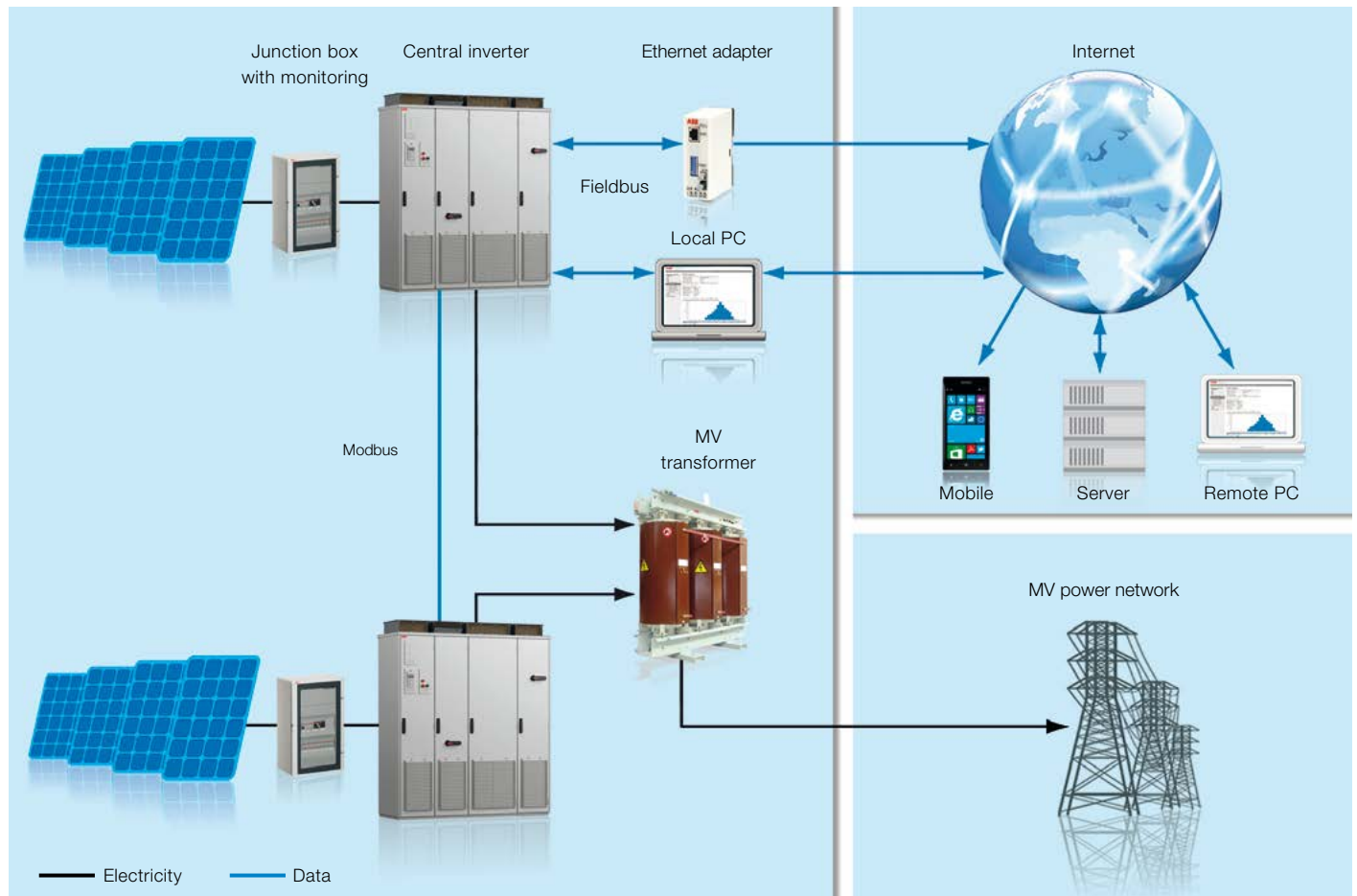
Life cycle service and support

- ABB's extensive global service network
- Extended warranties
- Service contracts
- Technical support throughout the service life

Wide communication options

- Complete range of industrial-type data communication options
- Ethernet/Internet protocol
- Remote monitoring

Data communication principle for ABB central inverters



Options

- Integrated and flexible DC input extension cabinets
- Cabinet heating
- I/O extensions
- DC grounding (negative and positive)
- Fieldbus and Ethernet connections
- Current measurement to each DC input
- Warranty extensions
- Solar inverter care contracts

Accessories

- Solar array junction boxes with string monitoring
- Remote monitoring solutions

ABB central inverters

CORE-500.0/1000.0-TL

500 to 1000 kW



Specifically tailored for the fast growing Chinese market, the CORE-500.0 and 1000.0 incorporate a number of key features including a maximum input voltage of up to 1000 Vdc, enabling high design flexibility and reduced DC distribution losses for large-scale PV applications.

With a best in class MPPT voltage range: 500...950 V@320 Vac and 2 independent MPPT (CORE-1000.0-TL) this new line of central inverters enables maximum flexibility in the configuration of the PV plant, ensuring a fast return on the investment.

The CORE-500.0 and 1000.0-TL inverters, aimed at system integrators and end users who require high performance solar inverters for large photovoltaic power plants, offer the combination of maximum performance with an affordable capital expenditure.

Easy to use and install

Delivered fully equipped for connection to the grid, the CORE inverters are designed for a fast and easy installation with no additional accessories required. Moreover, the user-friendly interface and modular design enable ease of operation and maintenance.

Reverse polarity detection minimizes potential damage caused by incorrect wiring of the array

The CORE product is a transformerless inverter for direct connection to the MV transformer leading to longer MTBF (mean time between failures).

Operates in any conditions

The CORE's compact chassis and indoor enclosure with its IP20 construction allow for optimal operation in extreme weather conditions and environments. CORE has a -25°C to 45°C ambient temperature range as well as a 3000 m maximum operating altitude.

String inverters

PV + Storage

Central inverters

Packaged solutions

Monitoring and communications



Highlights

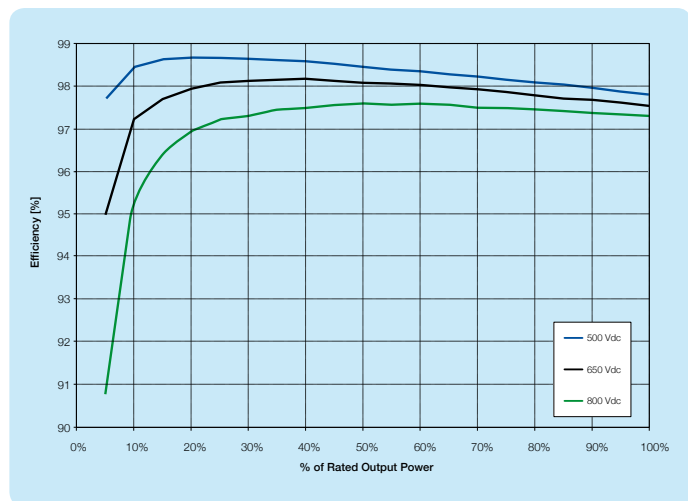
- High efficiency with electrolytic-free capacitor leading to longer MTBF (mean time between failures)
- Integrated DC and AC distribution and protection
- Fully equipped for connection to the grid without the need of additional accessories
- Two independent RS-485 communication interfaces for inverter and intelligent string combiner monitoring
- Compact size and weight
- 7" LCD touchscreen display (optional)
- 1000 Voc (open circuit voltage) rating
- IP20 construction for indoor applications allows operation in any weather conditions and environments
- Compliant with Chinese grid standards GB/T-19964-2013 and GB/T-29319-2012
- Complete grid support: LVRT, ZVRT capability
- 12 pairs of DC inputs for CORE-1000.0-TL, 6 for CORE-500.0-TL for maximum flexibility in fuse rating

Solar inverters from ABB

ABB central inverters are the result of more than 40 years of industry experience and proven technology.

ABB central inverters are ideal for large PV power plants as well as PV systems installed on commercial or industrial buildings. ABB central inverters provide a rapid return on investment with their compact and modular design, high efficiency and proven components.

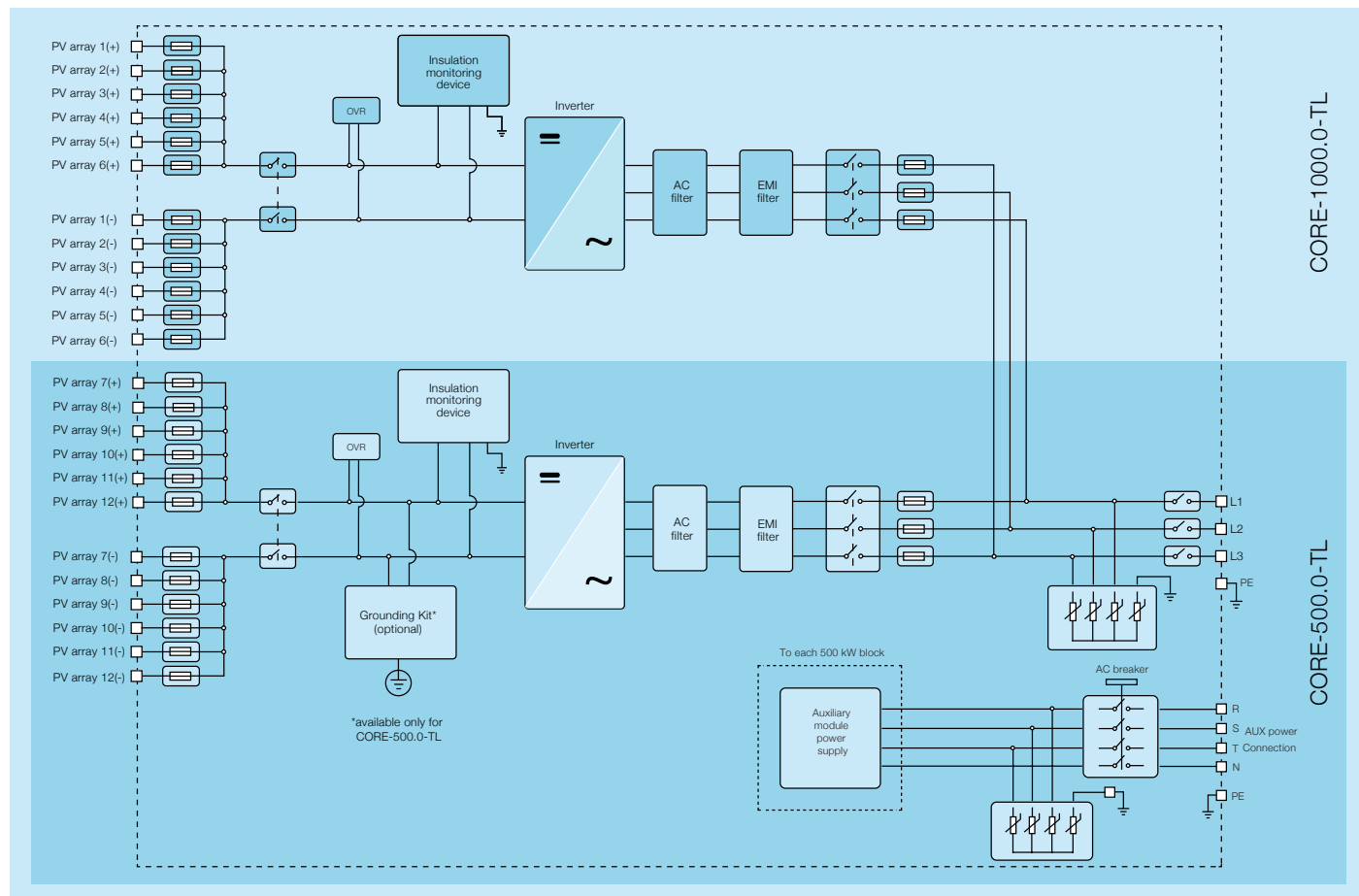
Efficiency curves of CORE-500.0/1000.0-TL in accordance with IEC-61683



Technical data and types

Type code	CORE-500.0-TL	CORE-1000.0-TL
Input side		
Absolute maximum DC input voltage ($V_{max,abs}$)	1000 V	
MPPT input DC voltage range ($V_{MPPTmin} \dots V_{MPPTmax}$) at V_{acr}	500...950 V@320 Vac Linear derating from MAX to 36%Pout [$850<V_{MPPT}<950$ V] ⁵⁾	
MPPT input DC range ($V_{MPPTmin} \dots V_{MPPTmax}$) at P_{acr} and V_{acr}	500...850 V @ 320 V ⁵⁾	
Number of independent MPPT multi-master	1	2
Possibility of input poles configuration	Floating / negative or positive grounding ³⁾	Floating
Maximum combined DC input current ($I_{dcmax,c}$)	1150 A	2300 A (2 x 1150A)
Maximum DC input current for each module ($I_{dcmax,m}$)	1150 A	
Number of DC inputs pairs	6	12
DC connection type	6 x 300 mm ² (maximum lug width 30 mm) M10	12 x 300 mm ² (maximum lug width 30 mm) M10
Input protection		
Reverse polarity detection	YES, in accordance with NBT32004-2013	
Input over voltage protection - SPD	1 for each input (Class II)	
Photovoltaic array isolation control	YES, in accordance with NBT32004-2013	
Fuse size each input poles	250...400 A	
DC switch each input module	1250 A	
Ground fault fuse size	5 A...1000 V ⁴⁾	
Output side		
AC grid connection type	Three-phase 3W+PE	
Rated AC power (P_{acr} @ $\cos\phi=1$)	500 kW	1000 kW
Maximum AC output power (P_{acmax} @ $\cos\phi=1$)	550 kW@30°C	1100 kW@30°C
Maximum apparent power (S_{max})	550 kVA@30°C	1100 kVA@30°C
Rated grid voltage (V_{acr})	320 V	
AC voltage range ($V_{acmin}...V_{acmax}$)	272...368 V ¹⁾	
Maximum output current (I_{acmax})	992 A	1984 A
Rated frequency (f_r)	50 Hz	
Frequency range ($f_{min}...f_{max}$)	47...53 Hz ²⁾	
Nominal power factor and adjustable range	> 0.995 (adj. \pm 0.90)	
Total harmonic distortion	< 3%	
AC connection type (for each phase)	2 x 300 mm ² (maximum lug width 30 mm) M10	4 x 300 mm ² (maximum lug width 30 mm) M10
Standard installation type	IT	
Output protection		
Anti-islanding protection	According to local standard	
Output overvoltage protection - SPD	Yes (Class II)	
Night time disconnect	Yes	
AC switch	1250 A	2000 A
AC fuse for each module	1800 A	

Block diagram of CORE-500.0/1000.0-TL



Technical data and types

Type code	CORE-500.0-TL	CORE-1000.0-TL
Auxiliary AC voltage		
Auxiliary AC power supply connection	Three-phase 3W+N+PE	
Nominal auxiliary AC power supply voltage	400 Vac	
Nominal auxiliary AC power supply frequency	50 Hz	
Auxiliary power supply consumption	700 W	1400 W
Type of auxiliary AC connections	Screw terminal block - max cross-section 16 mm²	
Input over voltage protection - SPD	Yes (Class II)	
Operating performance		
Maximum efficiency (η_{max})	98.7% ⁶⁾	
Weithted efficiency (η_{EURO} / η_{CEC})	98.4% / - ⁶⁾	
Stand-by consumption	180 W	200 W
Inverter switching frequency	5 KHz	
Communication		
Wired local monitoring	PVI-USB-RS232_485 (opt.)	
Remote monitoring	VSN700 Data Logger (opt.)	
User interface	7" LCD touchscreen display (opt.)	
Communication port	RS485 (Aurora Protocol), RS485 (Modbus)	
Environmental		
Ambient temperature range	-25...+ 50°C / -13...122°F without derating ⁵⁾	
Relative humidity	0...95% non condensing	
Sound pressure level, typical	83 dB(A) @ 1m	
Maximum operating altitude without derating	3000 m / 9840 ft ⁵⁾	
Environmental pollution classification for external environment	2	
Environmental category	Indoor	
Physical		
Environmental protection rating	IP20	
Cooling	Air forced	
Required air cooling flow	2100 m³/h - 1236 cfm	4030 m³/h - 2372 cfm
Dimension (H x W x D)	1800 mm x 1600 mm x 800 mm / 70.8" x 63.0" x 31.5"	1800 mm x 2600 mm x 800 mm / 70.8" x 102.3" x 31.5"
Weight	1100 Kg / 2425 lb	2005 Kg / 4420 lb
Safety		
Safety class	I	
Transformer	Trasformerless	
Marking	CQC	
Safety and EMC standard	NB/T-32004-2013	
Grid standard	GB/T-19964-2013, GB/T-29319-2012	

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⁾ The input configuration (floating; negative or positive pole grounded) must be specified on the special form upon placement of the order for the CORE inverter

⁴⁾ The ground fault fuse is installed only if one of the input poles is connected to ground

⁵⁾ Refer to the application curve on the Product Manual

⁶⁾ Tests performed in accordance with IEC-61683

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

ABB central inverters

ULTRA-700.0/1050.0/1400.0/1500.0-TL OUTD

780 to 1560 kW



ABB's ULTRA utility-scale inverters optimize energy harvesting across a wide array of operating conditions with their industry-leading power conversion efficiencies of up to 98.7% combined with their high-speed Maximum Power Point Tracking (MPPT) channels.

The new liquid-cooled, high-powered ULTRA-1500.0 unit is designed with large utility-grade installations in mind.

This large inverter system significantly reduces the wiring requirements and on-site testing thanks to the presence of separated and dedicated compartments for DC and AC.

Up to four independent MPPT input channels for maximum flexibility and energy harvesting

Up to four, independent Maximum Power Point Tracking (MPPT) input channels offer maximum flexibility and energy harvesting.

The compact chassis gives maximum power for the minimum footprint and the outdoor enclosure enables unrestricted use under any environmental conditions.

String inverters

PV + Storage

Central inverters

Packaged solutions

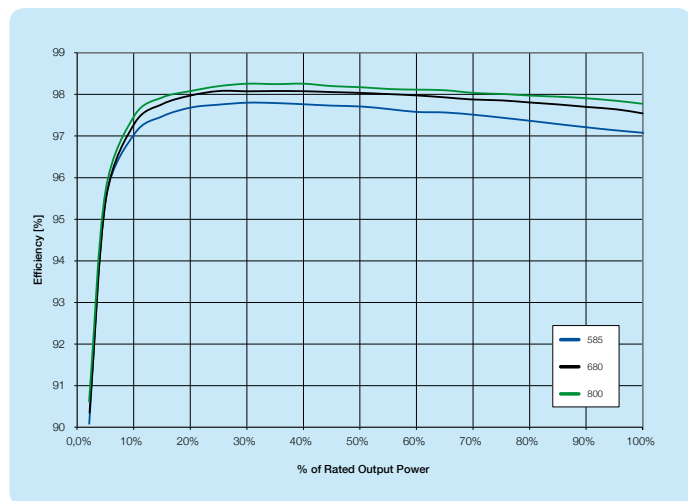
Monitoring and
communications



Highlights

- Maximum DC input voltage up to 1000 V, high design flexibility and reduced DC distribution losses for large-scale PV plants
- Reduced susceptibility to a single fault; in case of a component failure, a maximum of 350 kW will be lost
- Integrated DC and AC distribution and protection; fully equipped for connection, additional accessories not required
- Direct transformerless conversion to the 690 Vac output reduces AC distribution cost
- Extended MPPT input voltage range
- Liquid cooling with total segregation of internal compartments assuring a 5-year maintenance cycle
- Easy installation and maintenance procedure; front extractable DC/AC converters and accessibility to all critical parts
- Two independent RS-485 communication interfaces for inverter and intelligent string combiner monitoring
- Compliance to BDEW, FERC 661 and other relevant grid standards allows installation in most of the countries worldwide

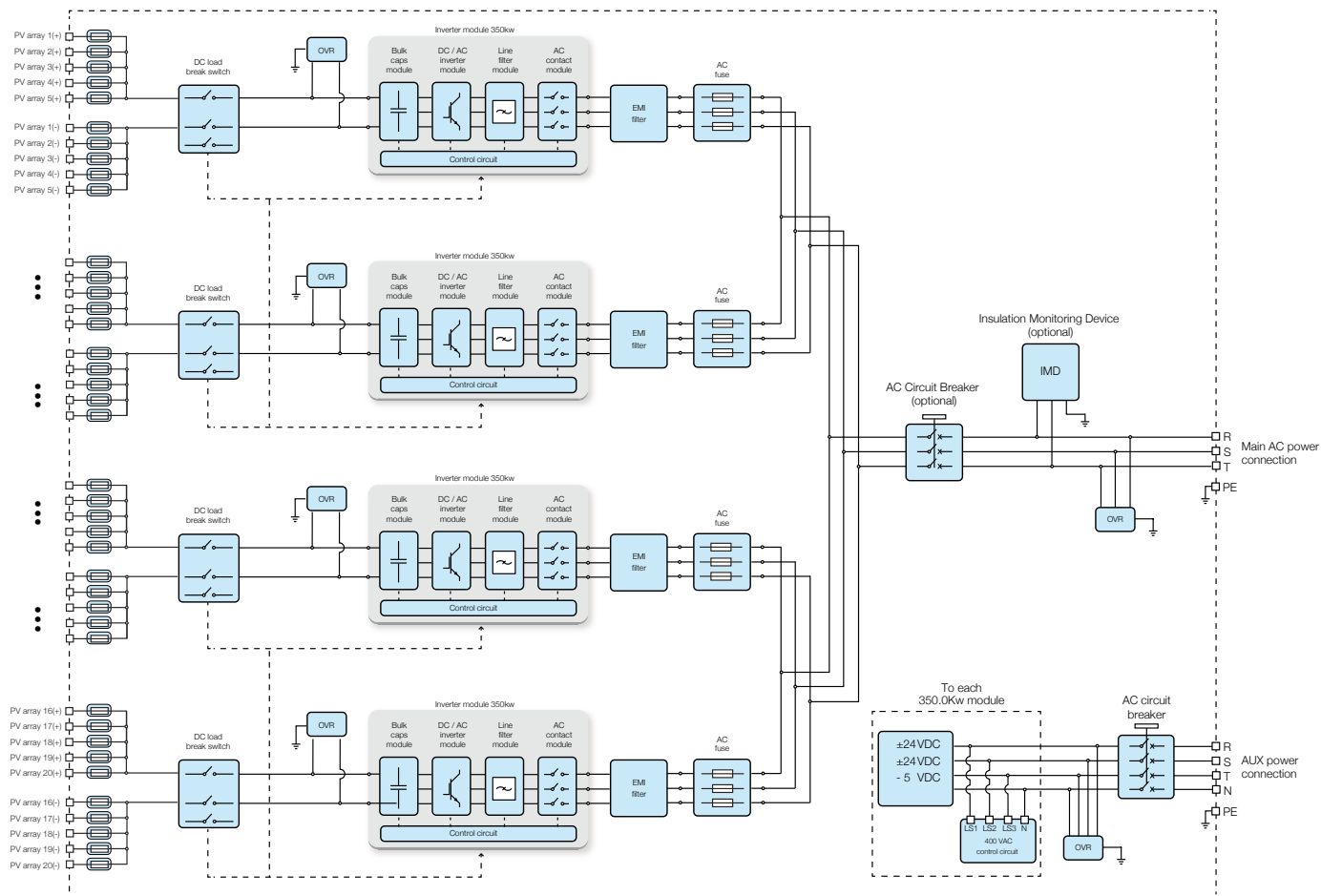
Efficiency curves of ULTRA



Technical data and types

Type code	ULTRA-700.0-TL	ULTRA-1050.0-TL	ULTRA-1400.0-TL	ULTRA-1500.0-TL
Input side				
Absolute maximum DC input voltage (V _{max,abs})	1000 V			
MPPT input DC voltage range (V _{MPPTmin} ... V _{MPPTmax}) at V _{acr}	470...900 V Linear derating from max to 15 kW [850 V<V _{MPPT} <900 V] 560 kW @ 470 V	470...900 V Linear derating from max to 22.5 kW [850 V<V _{MPPT} <900 V] 840 kW @ 470 V	470...900 V Linear derating from max to 30 kW [850 V<V _{MPPT} <900 V] 1120 kW @ 470 V	
MPPT input DC range (V _{MPPTmin} ... V _{MPPTmax}) at P _{acr} and V _{acr}	585...850 V @ 700 kW 645...850 V @ 780 kW	585...850 V @ 1050 kW 645...850 V @ 1170 kW	585...850 V @ 1400 kW 645...850 V @ 1560 kW	
Number of independent MPPT multi-master	2	3	4	4
Maximum combined DC input current (I _{dcmax,c})	1388 A (2 x 694 A)	2082 A (3 x 694 A)	2776 A (4 x 694 A)	2776 A (4 x 694 A)
Maximum DC input current for each module (I _{dcmax,m})	694 A			
Number of DC inputs pairs	10	15	20	20
DC connection type	20 x 50 mm ² ... 240 mm ² (M12)	30 x 50 mm ² ...240 mm ² (M12)	40 x 50 mm ² ...240 mm ² (M12)	
Input protection				
Reverse polarity protection	Yes			
Input overvoltage protection	Type I voltage surge protection, 1 for each module			Type II voltage surge protection, 1 for each module
Photovoltaic array leakage control, floating neutral, floating panels	Optional			
Residual current protection, grounded neutral, floating panels	Not included; recommended 10 A ground fault protection with time and current adjustable			
Fuse size for each input pair	160...400 A			
Output side				
AC grid connection type	Three-phases 3W+PE			
Rated AC power (P _{acr} @cosφ=1)	780 kW	1170 kW	1560 kW	1560 kW
Maximum apparent power (S _{max})	780 kVA	1170 kVA	1560 kVA	1560 kVA
Rated grid voltage (V _{acr})	690 V			
AC voltage range (V _{acmin} ...V _{acmax})	621...759 V ¹⁾			
Maximum output current (I _{acmax})	650 A	975 A	1300 A	1300 A
Contributory fault current	1036 A	1554 A	2072 A	2072 A
Rated frequency (f _i)	50/60 ⁴⁾ Hz			
Frequency range (f _{min} ...f _{max})	47...53 / 57...63 Hz ²⁾			
Nominal power factor and adjustable range	> 0.995 (adj. ± 0.10)			
Total harmonic distortion	< 3% (@ P _{ac,r})			
AC connection type (for each phase)	6 x 240 mm ² (M12)			
Output protection				
Anti-islanding protection	According to local standard			
Output overvoltage protection	Type II voltage surge protection			
AC switch	Yes, AC switch / AC circuit breaker (optional)			
AC fuse for each module	3x450 A / 200 kA			

Block diagram of ULTRA



Technical data and types

Type code	ULTRA-700.0-TL	ULTRA-1050.0-TL	ULTRA-1400.0-TL	ULTRA-1500.0-TL
Operating performance				
Maximum efficiency (η_{max})	98.7% ³⁾			
Weighted efficiency (η_{EURO} / η_{CEC})	98.2% / 98.0% ³⁾			
Stand-by consumption/night-time power loss	< 90 W	< 110 W	< 180 W	< 180 W
AC auxiliary supply	3 x 400 Vac +N, 50/60 Hz			
Auxiliary supply consumption	< 0.50% of $P_{ac,r}$	< 0.60% of $P_{ac,r}$	< 0.50% of $P_{ac,r}$	< 0.50% of $P_{ac,r}$
Auxiliary supply consumption without cooling	< 0.05% of $P_{ac,r}$	< 0.06% of $P_{ac,r}$	< 0.05% of $P_{ac,r}$	< 0.05% of $P_{ac,r}$
Inverter switching frequency	9 kHz			
Communication				
Wired local monitoring	PVI-USB-RS232_485 (opt.)			
Remote monitoring	VSN700 Data Logger (opt.)			
String Combiner	PVI-STRINGCOMB (opt.)			
User interface	TFT LCD 5.7"			
Environmental				
Ambient temperature range	-20...+ 60°C/-4...140°F with derating above 50°C/122°F			
Relative humidity	0...100% condensing			
Sound pressure level, typical	78 dB(A) @ 1 m			
Maximum operating altitude without derating	2000 m / 6560 ft			
Physical				
Environmental protection rating	IP65			IP54
Cooling	Liquid cooling with on-board heat exchanger			
Required air cooling flow	Not applicable			
Dimension (H x W x D)	2920 x 3020 x 1520 mm / 114.9 x 118.9 x 59.9"	2920 x 3720 x 1520 mm / 114.9 x 146.5 x 59.9"	2920 x 4420 x 1520 mm / 114.9 x 174.0 x 59.9"	2734 x 4840 x 1128 mm / 107.64 x 190.55 x 44.41"
Weight	< 3000 kg / 6613 lbs	< 3800 kg / 8377 lbs	< 4600 kg / 10141 lbs	< 4000 Kg / 8818 lbs
Weight of the module	< 55 kg / 121 lbs			
Safety				
Transformer	No			
Marking	CE (50 Hz only)			
Safety and EMC standard	EN 50178, IEC/EN 62109-1, IEC/EN 62109-2, EN61000-6-2, EN61000-6-4			
Grid standard (check your sales channel for availability)	CEI-0-16, BDEW, P.O.12.3, Ordinul 30/2013			

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

Remark. Features not specifically listed in the present data sheet are not included in the product
For the available options refer to the configuration module and verify with ABB technical support

³⁾ Power consumption of the auxiliary services not included

⁴⁾ Check availability with ABB

ABB central inverters

PVS980

1818 to 2000 kVA



ABB central inverters raise reliability, efficiency and ease of installation to new levels. The inverters are aimed at system integrators and end users who require high-performance solar inverters for large photovoltaic (PV) power plants. PVS980 central inverters are available from 1818 kVA up to 2000 kVA, and are optimized for cost-effective, multi-megawatt power plants.

World's leading inverter platform

Like other ABB central inverters, the PVS980 has been developed on the basis of decades of experience in the industry and proven technology platform. Unrivalled expertise from the world's market and technology leader in frequency converters is the hallmark of this solar inverter series.

The PVS980 inverter is one of the most efficient and cost-effective ways of converting the direct current (DC) generated by solar modules into high-quality and CO₂-free alternating current (AC) that can be fed into the power distribution network.

PVS980 central inverters from ABB

ABB PVS980 central inverters are ideal for large PV power plants. The high DC input voltage, high efficiency, proven components, compact and modular design and a host of life cycle services ensure ABB PVS980 central inverters provide a rapid return on investment.

Highlights

- High total performance
- Outstanding endurance for outdoor use
- Compact, modular product design
- High DC input voltage up to 1500 V_{DC}
- Extensive DC and AC side protection
- Self-contained cooling system with high efficiency
- Versatile design for large-scale PV plants to minimize system costs
- Complete range of industrial data communication options, including remote monitoring
- Life cycle service and support through ABB's extensive global service network

String inverters

PV + Storage

Central inverters

Packaged solutions

Monitoring and
communications



Maximum energy revenues

ABB central inverters have a high total efficiency. Precise, optimized system control and maximum power point tracking (MPPT) combine with the unit's highly efficient power converter design to deliver the maximum energy from the PV modules to the power distribution network. For end users, this generates the highest possible revenues from the energy sales.

Self-contained, low-maintenance cooling system

PVS980 inverters feature a proven closed loop cooling system used in other ABB industrial applications. This innovative, truly low-maintenance cooling solution is designed for demanding applications and harsh environments, cutting maintenance costs and ensuring outstanding endurance.

Compact and modular design

PVS980 inverters are designed for fast and easy installation. The industrial design and modular platform provide a wide range of options, such as remote monitoring, fieldbus connection and modular and flexible DC input connections. The integrated DC saves space and costs as the solar array junction boxes can be connected directly to the fused busbars in the DC cabinet.

PVS980 inverters are customized for the needs of end users and will be available with short delivery times.

Versatile design for large-scale PV plants to minimize system costs

ABB's PVS980 central inverter enables system integrators to design PV power plants that use the optimum combination of inverters with different power ratings. Equipped with extensive electrical and mechanical protection, the inverters are engineered to provide a long and reliable service life of at least 25 years.

Advanced grid support features

The PVS980 software includes all the latest grid support and monitoring features, including active power limitation, fault ride through (FRT) with current feed-in and reactive power control. Active and reactive power output can be controlled by an external control system or automatically by the inverter.

All grid support functions are parameterized, allowing easy adjusting for local utility requirements. ABB central inverters are also able to support grid stability at night by providing reactive power with the DC input disconnected.

Maximum energy revenues



Technical data and types

Type designation	-1818kVA-I	-1909kVA-J	-2000kVA-K
PVS980-58	1818 kVA	1909 kVA	2000 kVA
Input (DC)			
Maximum input power ($P_{PV,max}$) ¹⁾	2910 kWp	3055 kWp	3200 kWp
DC voltage range, mpp ($U_{DC, mpp}$) at 50 °C	850 to 1100 V	893 to 1100 V	935 to 1100 V
DC voltage range, mpp ($U_{DC, mpp}$) at 35 °C	850 to 1500 V	893 to 1500 V	935 to 1500 V
Maximum DC voltage ($U_{max(DC)}$)	1500 V	1500 V	1500 V
Number of MPPT trackers	1	1	1
Number of protected DC inputs	8 ²⁾ to 24 (+/-)	8 ²⁾ to 24 (+/-)	8 ²⁾ to 24 (+/-)
Output (AC)			
Nominal power ($S_{N(AC)}$) ³⁾	1818 kVA	1909 kVA	2000 kVA
Maximum output power ($S_{max(AC)}$) ⁴⁾	2000 kVA	2100 kVA	2200 kVA
Nominal AC current ($I_{N(AC)}$)	1750 A	1750 A	1750 A
Nominal output voltage ($U_{N(AC)}$) ⁵⁾	600 V	630 V	660 V
Output frequency	50/60 Hz	50/60 Hz	50/60 Hz
Harmonic distortion, current ⁶⁾	< 3%	< 3%	< 3%
Distribution network type ⁷⁾	TN and IT	TN and IT	TN and IT
Efficiency			
Maximum ⁸⁾	98.8%	98.8 %	98.8%
Euro-eta ⁸⁾	98.6%	98.6 %	98.6%
Power consumption			
Own consumption in operation	2500 W	2500 W	2500 W
Standby operation consumption	225 W	225 W	225 W
Auxiliary voltage type	Internal	Internal	Internal
Dimensions and weight			
Width/Height/Depth, mm (W/H/D)	3180/2366/1522	3180/2366/1522	3180/2366/1522
Weight appr.	3850 kg	3850 kg	3850 kg

¹⁾ DC/AC ratio over 1.6 might decrease time between maintenance intervals

²⁾ As standard

³⁾ At 50 °C

⁴⁾ At 35 °C

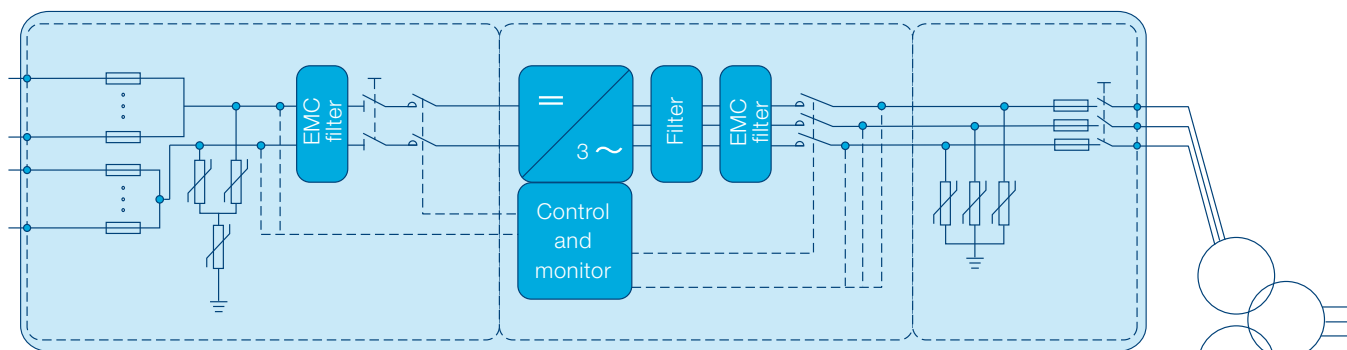
⁵⁾ ±10%

⁶⁾ At nominal power

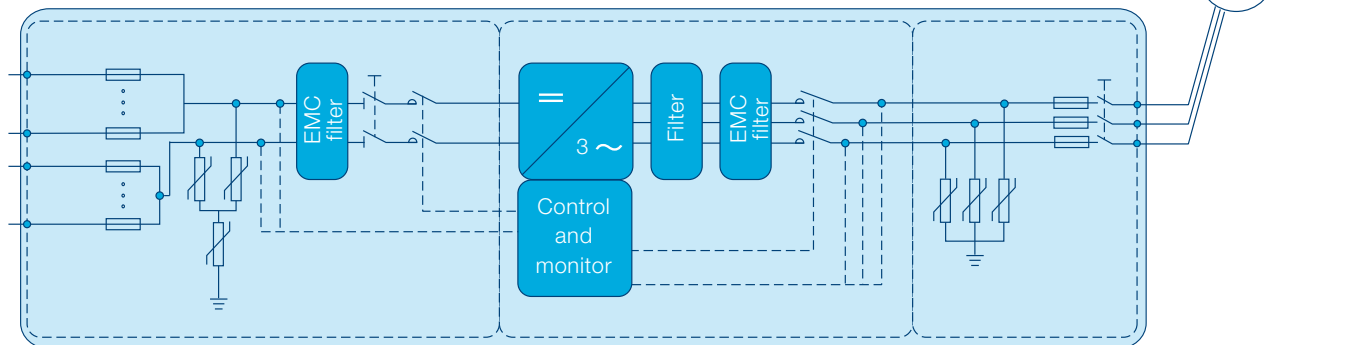
⁷⁾ Inverter side must be IT type

⁸⁾ Without auxiliary power consumption at min U_{DC}

PVS980-58-2000kVA-K



PVS980-58-2000kVA-K



Technical data and types

Type designation	-1818kVA-I	-1909kVA-J	-2000kVA-K
PVS980-58	1818 kVA	1909 kVA	2000 kVA
Environmental limits			
Degree of protection	IP65 ⁹⁾ /Type 4X		
Ambient temp. range (nom. ratings) ¹⁰⁾	-20 °C to +50 °C		
Maximum ambient temperature ¹¹⁾	+60°C		
Relative humidity	5% to 100%		
Maximum altitude (above sea level)	4000 m ¹²⁾		
Maximum noise level	88 dBA ¹³⁾		
Protection			
Ground fault monitoring ¹⁴⁾	Yes		
Grid monitoring	Yes		
Anti-islanding	Yes		
DC reverse polarity	Yes		
AC and DC short circuit and overcurrent	Yes		
AC and DC overvoltage and temperature	Yes		
User interface and communications			
Local user interface	ABB local control panel		
Analog inputs/outputs	Extendable as option		
Digital inputs/relay outputs	Extendable as option		
Fieldbus connectivity	Modbus, Profinet, Ethernet ¹⁴⁾		
Product compliance			
Safety and EMC ¹⁵⁾	CE conformity according to LV and EMC directives		
Certifications and approvals ¹⁵⁾	IEC, UL, CEI, RD, EDF, P.O. 12.3, BDEW, GOST, AS		
Grid support and grid functions	Reactive power compensation ¹⁶⁾ , Power reduction, LVRT, Anti-islanding		

⁹⁾ Excluding underpressure testing

¹⁰⁾ -40 °C as option

¹¹⁾ Power derating after 50 °C

¹²⁾ Derating above 1000 m

¹³⁾ At partial power typically < 75 dBA

¹⁴⁾ More communication options as engineered option

¹⁵⁾ Approvals pending, contact ABB for more information

¹⁶⁾ Also at night

ABB central inverters

PVS980

1818 to 2000 kVA



High total performance

- High efficiency
- Low auxiliary power consumption
- Innovative controlled cooling
- Efficient maximum power point tracking
- Long and reliable service life of at least 25 years

Outstanding endurance for outdoor use

- Water- and dustproof outdoor enclosure
- Designed to withstand the toughest environments
- Long and reliable service life following the ABB life cycle model

Modular industrial design

- Compact and easy-to-maintain product design
- Fast and easy installation
- Integrated and flexible DC input section

Life cycle service and support

- ABB's extensive global service network
- Extended warranties
- Service contracts
- Technical support throughout the service life

ABB self-contained cooling system

- Closed loop cooling system based on phase transition and thermosiphon technology
- Liquid-cooled inverter power ratings with the simplicity of air cooling
- No fillable liquids, pumps, valves, inhibitors or leaks
- Low maintenance

Versatile design for large-scale PV plants

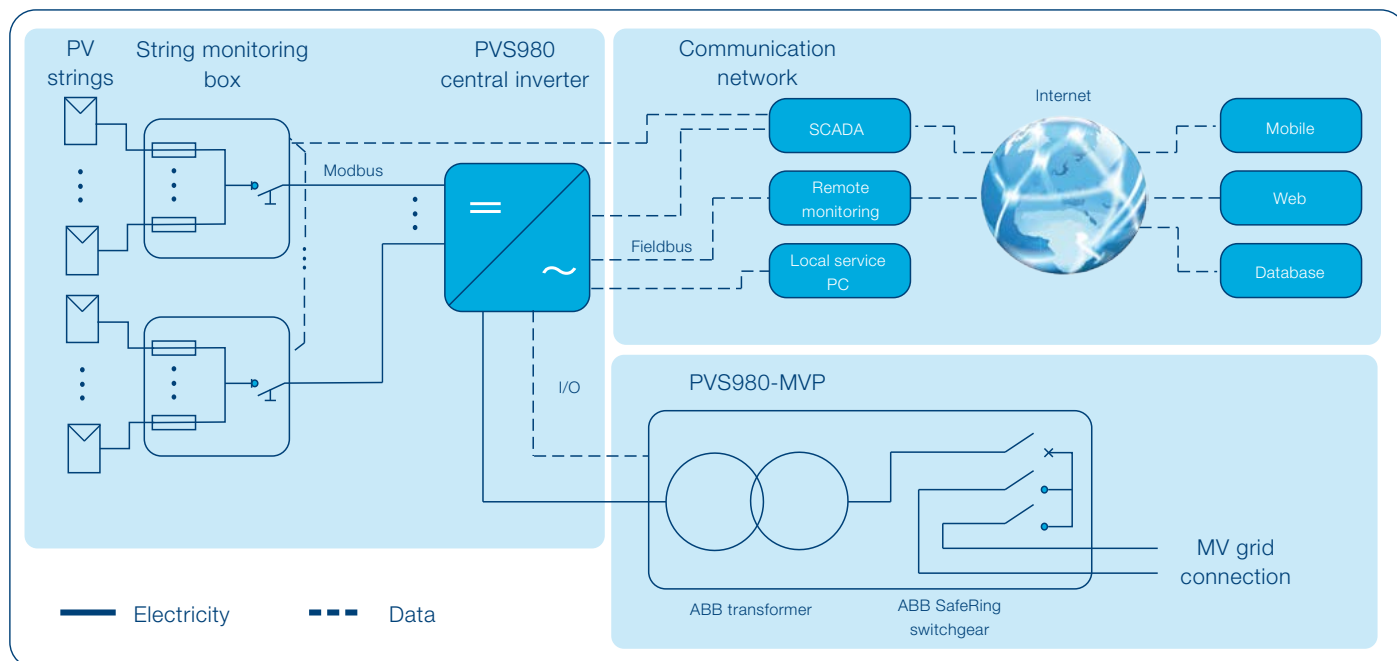
- Integrated DC connection with variable number of inputs
- Wide standard option palette for tailoring
- Versatile AC connection methods

Minimizes system costs

- 1500 V_{DC} system voltage
- Wide ranged and highly efficient MPPT algorithm
- Integrated protection to minimize external components
- Fast and easy installation and commissioning

Wide communication options

- Complete range of industrial data communication options for SCADA connections
- Ethernet/Internet Protocol
- Remote monitoring



Options

- Integrated and flexible DC input extension
- AC breaker
- AC busbar interface
- DC grounding (negative and positive)
- Fieldbus and Ethernet connections
- Current measurement to each DC input
- High altitude version
- Warranty extensions
- Solar inverter care contracts

Related products

- Medium voltage station (transformer and switchgear) as outdoor or containerised solution
- String monitoring junction boxes
- Remote monitoring solutions



Packaged solutions



ABB packaged solutions

780 to 4000 kW



Superbly cost effective, for best return on investment.

ABB packaged inverter solutions utilize decades of experience and advances in inverter and power converter technology and development and manufacturing of secondary substations and medium voltage (MV) components. Together with ABB's engineering know-how and complete product portfolio for PV power plants, ABB packaged solutions provide optimized plug-and-play experience for quick and reliable connection of the PV plant to MV grid.

Combined with the global service network of ABB and life-cycle service concepts, the high-performance all-ABB packages provide highly reliable, cost-effective and bankable solution for utility-scale PV power plants.

ABB packaged solutions offering includes complete plug-and-play stations with inverters and MV components, inverter stations for indoor inverters as well as separate MV stations to supplement the outdoor inverters and inverter stations. Both complete stations and MV stations are available in different designs, to provide the most feasible solutions for every weather and site condition.

Complete stations are available as container-built on a skid, and MV stations additionally as a pad-mounted solution. ABB offering is complemented with string monitoring junction boxes, control and monitoring solutions and complete range of life-cycle services.

Packaged solutions are available for both string and central inverters, with nominal power ratings from 780 kW up to 4 MW power blocks.

String inverters

PV + Storage

Central inverters

Packaged
solutionsMonitoring and
communications

String packages

Inverter	Inverter solution	MV solution	Nominal ratings (MWac)
TRIO-50.0, outdoor	N/A	STRING-MVC for TRIO-50.0	1.0, 1.6, 2.0

Central packages

Inverter	Inverter solution	MV solution	Nominal ratings (MWac)
PVS800	ABB inverter station, PVS800-IS	ABB medium voltage housing, PVS800-MVH	1.75, 2.0, 3.0
PVS800	ABB inverter station, PVS800-IS	ABB medium voltage pad, PVS800-MVP	1.75, 2.0
PVS800	ABB megawatt station, PVS800-MWS	(integrated)	1.0, 2.0
ULTRA, outdoor	N/A	ABB medium voltage compartment, ULTRA-MVC-S	0.780, 1.16, 1.55, 1.94, 2.330, 2.720, 3.110
ULTRA, outdoor	N/A	ABB medium voltage kit, ULTRA-MVK	0.780, 1.16, 1.55, 1.94, 2.330, 2.720, 3.110
PVS980, outdoor	N/A	ABB medium voltage pad, PVS980-MVP	2.0, 4.0
PVS980, outdoor	ABB compact skid, PVS980-CS	(integrated)	2.0, 4.0
CORE-TL*	ABB inverter station, CORE-IS	N/A	1.0, 2.0
CORE-TL*	ABB megawatt station, CORE-MWS	(integrated)	1.0, 2.0

*Available only for Chinese market

ABB packaged solutions – features and benefits

- Plug-and-play solutions, designed for large-scale solar power generation
- All-in-one design – ensuring maximum uptime of the plant with minimum total investment
- High total performance – high reliability and efficiency with low auxiliary power consumption
- Increased uptime – modular and serviceable systems
- Proven technology and reliable components – securing long operating life and attractive return on investment
- Global life cycle services and support – bankable solution
- ABB packaged solutions are available for solar plants realized with both string inverters and central inverters



Monitoring and communications



Aurora Vision® Plant Management Platform

ABB is the leading provider of enterprise asset management systems focused on renewable energy generation systems. Aurora Vision® Plant Management Platform is a unified management platform that brings together the benefits of a traditional solar monitoring system and a comprehensive asset management system. As a software as a service platform, it is flexible, scalable and expandable.

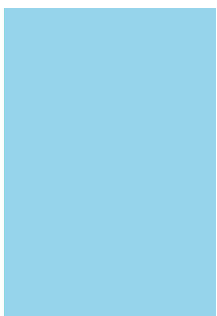
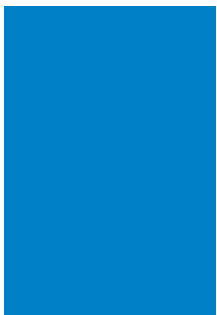
No matter if the customer is a home owner or an independent power producer, Aurora Vision® Plant Management Platform, provides the solution. Our business is to make our customers' businesses operate more efficiently.

- Home owners that purchase a residential solar system with built-in monitoring can sign up for free portal access, without the need for an installer or ABB technical support

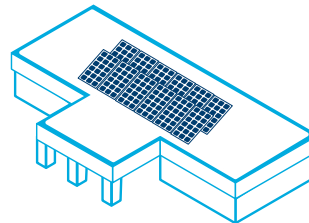
- Installers that provide preventative maintenance services can manage their portfolio of residential and commercial customers in one single portal
- Third-party operations and maintenance providers can obtain third-party access to any plant of any size across any customer group
- Third-party software as a service providers can access data through our platform API to provide any additional services, such as public displays and web kiosks

Customers selecting to use Aurora Vision® Plant Management Platform monitoring, benefit from not only the tools available in the portal, but also added level of support from ABB, since we are able to directly monitor and manage the assets from remote. This results in shorter mean time to repair, improved cost of service and ultimately lower cost of ownership.

Any inverter size

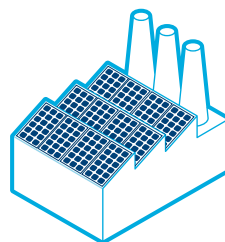


Any market segment



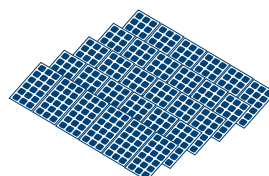
Residential

Always-on access with Plant Viewer



Commercial

Share data with Plant Viewer and maintain a portfolio with Plant Portfolio Manager



Utility

Asset management with Plant Portfolio Manager in parallel with SCADA systems

One management platform



Aurora Vision® Plant Management Platform is a scalable web-based platform enabling customers to remotely manage their PV plants in all market segments. According to the specific customer needs, it is available in three different versions:

- **Plant Portfolio Manager** which helps operators to manage a portfolio of power plants
- **Plant Viewer** for viewing residential and commercial sites in an easy to view manner
- **Plant Viewer for Mobile** which is a mobile version of Plant Viewer

Plant Portfolio Manager reduces mean time to repair

Optimizing mean time to repair of a solar plant includes early fault detection by real-time data acquisition and email alerting. By down to string level granularity of monitoring and intelligent fault descriptions, the type of repair needs and potential spare parts can be identified, minimizing the need for multiple truck rolls. Identification of fault locations minimizes the time on plant. Automatic reset of alarm events after a repair is completed provides instant feedback to the stakeholders.

Plant Portfolio Manager improves portfolio management

With the availability of tools, such as the map based portfolio overviews and innovative severity analysis charting, optimization of routing of maintenance personnel could lead to dramatic reductions in cost and improved customer satisfaction.

Plant Portfolio Manager reduces cost of service operation

Designed not only for the end-user, but also for collaboration with ABB's service team, Plant Portfolio Manager can be

used by ABB service personnel to remotely diagnose and troubleshoot inverters and other on-site equipment, such as energy meters, combiner boxes and weather stations.

Plant Portfolio Manager improves lost energy

With the innovative analysis tool Symmetry Analysis, locating underperforming plants, inverters, strings or even panels, is available to any user. The sooner a fault or an issue is detected, the sooner it can be fixed which results in a better overall yield. Instant key performance indexes promote teams to keep plants running optimally.

Plant Portfolio Manager self-service with Plant Viewer

Even home owners benefit directly from the unified plant management platform, by selecting to self-register their system or having their installer manage their system for them. There is no need to install software in the home owner's computer, no need to backup energy performance data. Everything is accessible through a standard web browser, tablet or smart phone.

Plant Portfolio Manager

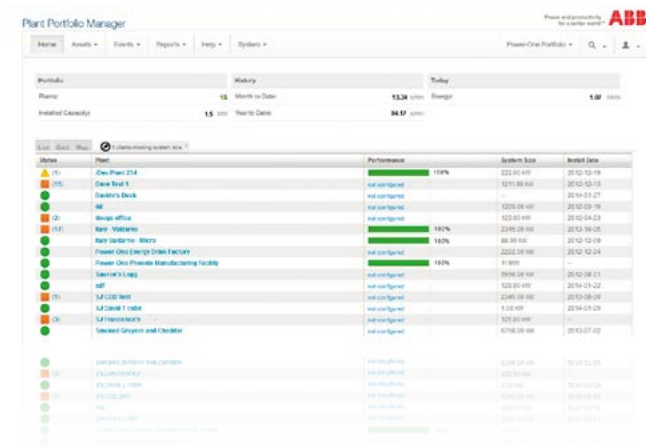


The Plant Portfolio Manager gives the installer all the information needed to monitor and operate a fleet of residential PV plants. It can be configured to allow customers and installers to jointly manage any plant or to allow customers complete control of their site at the end of an installation.

Users of Plant Portfolio Manager can see aggregate information about all the plants they have under management. They can quickly triage installation and operational issues across different plants to give project teams the details they need to quickly prioritize actions to minimize truck rolls. Users can drill down into any plant under management to track plant assets.

Portfolio Management

Plant Portfolio Manager's Portfolio View tracks the performance of all plants under management for executive, financial and operations teams by providing a portfolio summary view of the entire fleet of PV plants, allowing drill down into highest priority performance challenges, as well as identifying assets that are not meeting desired performance ratios. By the use of Key Performance Indicators, asset



managers can focus on the most urgent problems first to minimize lost energy production.

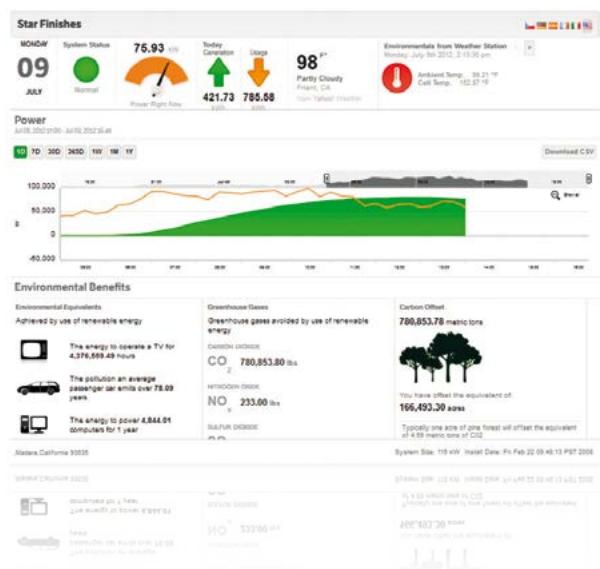
Plant Summary and Diagnostics

Plant Portfolio Manager's Plant Summary tool tracks and reports on all the key information about your plant's assets such as meters, combiners, inverters, environmental units and loggers. Meter data is especially important to plant operators to maximize plant operational efficiency because it provides the information needed to do detailed root cause production analysis. Root cause production analysis can track issues based on such things as asset dependencies, energy production, irradiance and temperature to improve operational efficiency by reducing effort and time to resolution for plant operation issues. Some performance issues such as dirty or partially obscured panels are more difficult to diagnose than others. However, when comparing inverters to one another, operators can more readily identify performance trends leading to better inverter maintenance and higher energy yields. Using Symmetry Analysis, plant operators can identify and fix these challenging performance issues by comparing devices with each other.

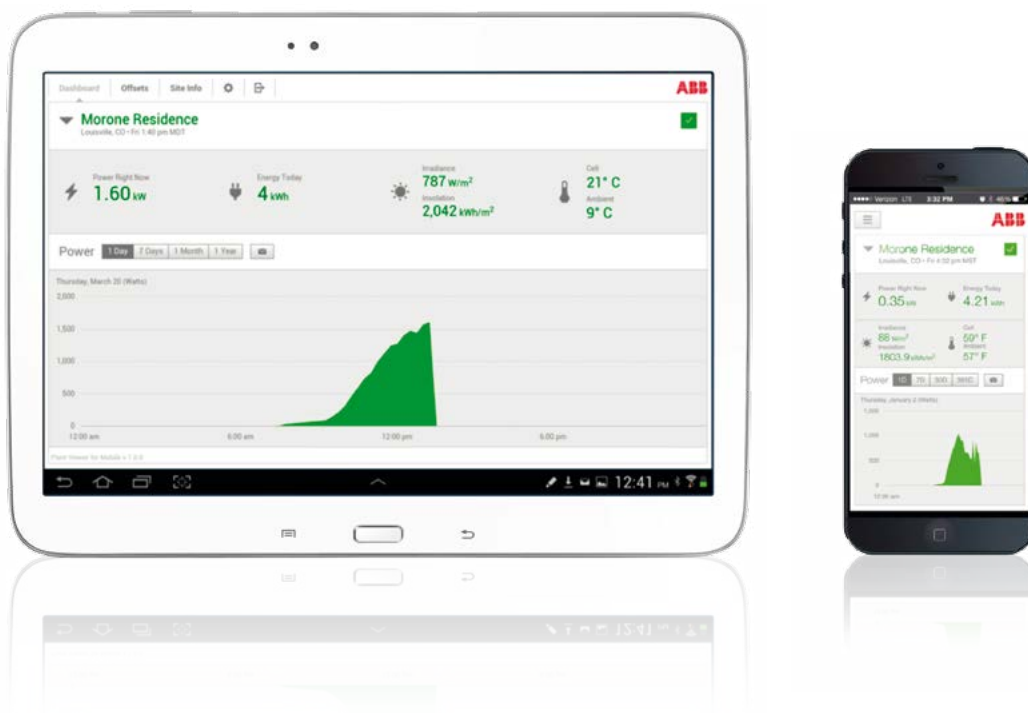
Plant Viewer

Plant Viewer is a web based tool designed for residential customers. Home owners using Plant Viewer can see how well their solar power plant is operating. They can view plant information over the course of a day, week, month or year, without interfering with how the plant is being operated. It is an easy way for the home owner to demonstrate the environmental benefits of their home PV plant to family and friends. Clear and dynamic graphics show how much potential pollution is being prevented by generating solar electricity.

Access to Plant Viewer is controlled by the plant installer to give the home owner as much access to the plant as the installer wants to provide.



Plant Viewer for Mobile



The Plant Viewer for Mobile gives solar power plant owners a flexible and cost-effective solution for monitoring their solar power systems “on the go”.

This application enables existing Plant Portfolio Manager or Plant Viewer users to track their solar power system production using the iOS/Android smart phone or tablet of their choice.

This meets future mobile device power plant monitoring needs using any Aurora Vision® enabled logger with ABB micro, string, and central inverters.

Accessing Plant Viewer for Mobile is as easy as 123:

- 1) Install Plant Viewer for Mobile app from the Apple Store (for Apple devices) or Google Play (for Android devices)
- 2) Login to your newly installed application using your user Plant Portfolio Manager or Plant Viewer user account and password
- 3) View your solar system's energy production on the smart phone or tablet of your choice!

Highlights

- Integrates with the full line of ABB monitoring and communication products to remotely diagnose and address customer issues
- Use established Plant Portfolio Manager or Plant Viewer to user login account
- Use a PC web browser and a favourite mobile device; both options can be used simultaneously
- This solution works with solar power systems self-registered by homeowners
- Integrates with Aurora Vision® Plant Management Platform to enable or disable access to system information
- See current and past energy generation values to track energy production over the life of one or more plants
- Mail yourself detailed energy information for further investigation
- Displays weather information from weather stations installed at the solar power plant site
- Works on iOS and Android devices that support iOS 8.x and Android 4.x

ABB monitoring and communications

VSN700 Data Logger



The high-performance VSN700 Data Logger provides simple and quick commissioning with device discovery and automatic IP addressing as well as remote management features.

This SunSpec compliant datalogger records data and events from inverters, energy meters, weather stations, and other photovoltaic plant devices, and acts as an Internet gateway to send the data securely and reliably to the Aurora Vision® Plant Management Platform for performance monitoring, condition monitoring and data reporting.

The VSN700 Data Logger is also available integrated in turnkey solutions, such as VSN730 System Monitor or VSN750 Plant Manager.

Three performance levels

The VSN700 Data Logger is available in three performance levels to fit anyone's budget and functionality:

VSN700-01 Data Logger is available to those residential customers who only need to monitor up to five (5) single-phase inverters.

VSN700-03 Data Logger is a cost-optimized logger for small commercial installations up to ten (10) single and three-phase string inverters and one weather station (VSN800 Weather Station).

VSN700-05 Data Logger provides both customer data management and inverter command and control for commercial and utility PV system operation, as well as SCADA integration.

String inverters

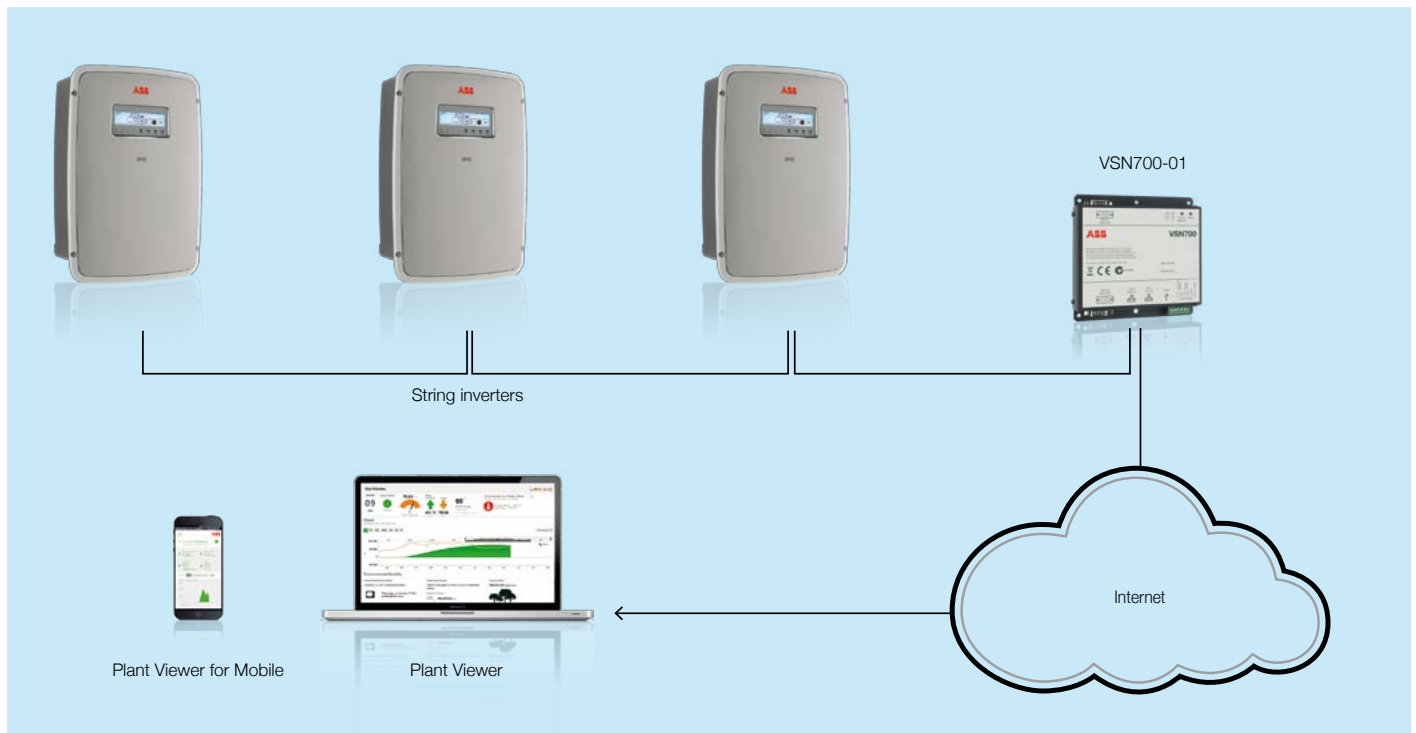
PV + Storage

Central inverters

Packaged solutions

Monitoring and communications

Residential application with VSN700-01



Highlights

All VSN700 Data Logger models include:

- Data management system with serial and Ethernet ports for data and event logging
- Quick installation and fast plug-n-play commissioning with device discovery mechanism
- Network Provisioning with dynamic IP addressing (DHCP client and server)
- Reliable and secure transmission of operational data to Aurora Vision® Plant Management Platform
- Remote configuration and management capabilities, including firmware upgrades over the Internet using Plant Portfolio Manager
- Simple end-user UI using Plant Viewer

VSN700-05 Data Logger (Max) includes the following additional functionality:

- No software limitation on number of devices logged
- Modbus TCP server using SunSpec compliant Modbus maps for easy SCADA system integration, data collection, and inverter command execution
- Support for most ABB inverters, meters, smart combiners and weather stations (see VSN700 Data Logger model comparison table)

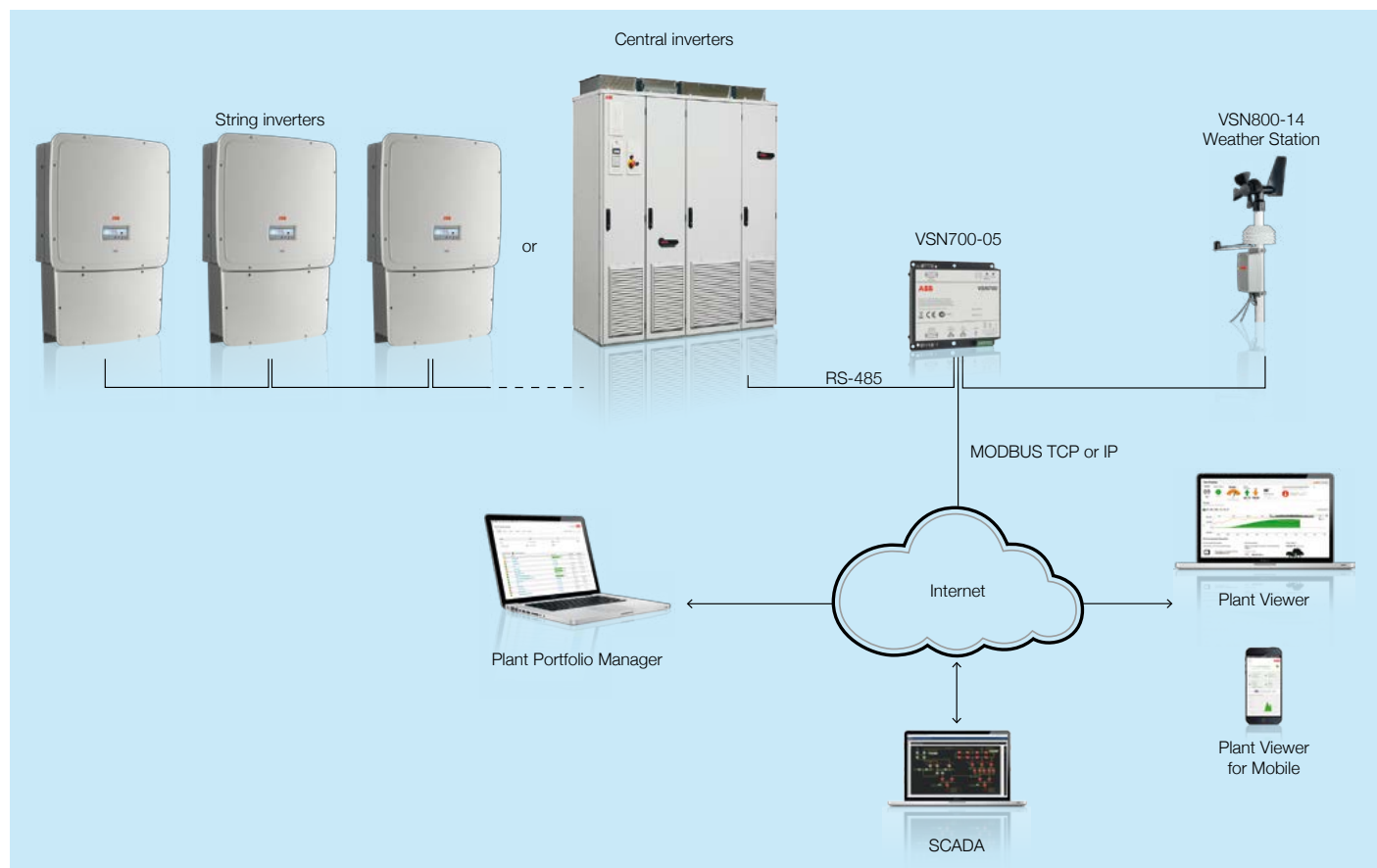
VSN700 Data Logger



Technical data and types

Type code	VSN700 Data Logger
Communication interfaces	
Serial port interface	(2) RS-485 + (2) RS-232
Maximum devices per serial port	Physical limitation of 32 (reduced by poll rate, inverter data set size and logger type)
Fieldbus cable	RS-485 Shielded Twisted Pair. Recommend Belden # 1120A cable or # 3106A for 3 conductors
Ethernet port 0	Firewall protected Ethernet WAN port for Internet connection
Ethernet port 1	Local LAN with static IP address
Ethernet connections	RJ-45 Ethernet 10/100 base-T (LAN/WAN)
Communication protocols	
Plant fieldbus protocols	Aurora Protocol, Modbus RTU (SunSpec)
LAN/WAN protocols	HTTP, DHCP, SSL, SSH, XML
Data logging specifications	
Data sampling rate	High frequency data sampling (less than 1 minute average)
Local storage	Log data for 30 days based on 15-minute intervals (Days logged may be reduced by intervals shorter than 7 minute)
Upgradeability	Field upgradable over the Internet or locally via USB memory stick
Power supply	
AC power supply input	100 - 240 VAC
DC power supply output	12 VDC, 1 A
Environmental parameters	
Ambient temperature range	Logger only -40°F to 185°F (-40°C to 85°C); power supply 32°F -104°F (0°C-40°C)
Environmental protection	IP20
Relative humidity	< 85% Non-condensing
Mechanical parameters (per unit)	
Dimensions (H x W x D)	1" x 5.5" x 5.25" (.03 m x .14 m x .13 m)
Weight	2 lbs (0.91 kg)
Mounting system	Screws through flanges
Warranty	
Standard warranty	Two years
Accessories	
VSN-MGR-DIN	Din rail mount kit to mount logger on a din rail
VSN800-12	Weather Station with sensors: ambient temperature, panel temperature, global irradiance
VSN800-14	Weather Station with sensors: ambient temperature, panel temperature, global irradiance, plane of array irradiance, wind speed and direction
Compliance	
Emissions	FCC Part 15 Class B, CISPR 22, EN 55022 conducted and radiated emission, EN55024

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



VSN700 Data Logger model comparison

Type code	VSN700-01	VSN700-03	VSN700-05
Logging real-time power values	15-minute intervals only	1, 3, 5, 15 minute configurable intervals	1, 3, 5, 15 minute configurable intervals
Modbus/TCP server	No	No	Yes
Inverter control commands	No	No	Yes
Devices supported	5 x ABB single-phase inverters	10 x all ABB string inverters 1 x VSN800-XX Weather Station	All ABB inverters Other ABB devices and third-party devices (Consult latest supported list)

VSN700 Data Logger Accessories




VSN-MGR-DIN	Din rail kit to mount logger on a din rail	
VSN800-12	Weather station with sensors: ambient, panel, global irradiance	
VSN800-14	Weather station with sensors: ambient, panel, global irradiance, plane of array irradiance, wind speed and direction	

ABB monitoring and communications

VSN300 Wifi Logger Card



The VSN300 Wifi Logger Card is a new, advanced expansion board for ABB's UNO and TRIO string inverters which provides residential and commercial users with an advanced and cost-effective solution for monitoring and controlling their photovoltaic system.

The VSN300 Wifi Logger Card is easy to install, for new and most existing string inverters by using the inverter's internal expansion slot.

The built-in IP networking connectivity and innovative Wi-Fi commissioning techniques enable this card to be easily configured for most Wi-Fi networks and access points without installing any additional external devices.

Complete, remote and local monitoring with Wifi Logger Card and new free mobile app.

Users have a complete remote and local monitoring experience when combining VSN300 Wifi Logger Card with ABB's new free mobile app; "Plant Viewer for Mobile". It is available for both iOS and Android based devices.

The local web server in VSN300 Wifi Logger Card adds the ability to use a standard web browser to access inverter data.

The Wi-Fi Certified™ mark assures interoperability, security, easy installation and reliability. With innovative commissioning and upgrade features, the VSN300 Wifi Logger Card provides the best user experience for ABB's customers.

Not only is the VSN300 Wifi Logger Card suitable for most of ABB's string inverters currently deployed, it takes advantage of the Hyperlink bus found in new inverters for obtaining real-time data that can be used for grid control power management.

String inverters

PV + Storage

Central inverters

Packaged solutions

Monitoring and communications



Highlights

- The Wi-Fi Certified™ mark assures interoperability with IEEE 802.11b/g/n networks over the 2.4 GHz band
- Easily installed on new and existing UNO and TRIO string inverters
- IEEE 802.11b/g/n (2.4 GHz) support
- Local, remote monitoring in one solution
- High performance non-volatile data logging
- High-speed inverter data exchange through Hyperlink [where available]
- Modbus TCP server for SCADA integration
- SunSpec certified Modbus mapping for easy integration
- Secured and encrypted data transfer to Aurora Vision® Plant Management Platform
- Remote reading and writing of inverter parameters for advanced operations
- California Rule 21 ready

VSN300 Wifi Logger Card



Technical data and types

Type code	VSN300 Wifi Logger Card
Communication interfaces	
Inverter interface	Hyperlink (CAN@1 Mbps + RS485@115 kBaud) / Legacy (Serial link TTL @ 19.2 KBaud)
User interface	Wi-Fi Certified™ IEEE 802.11 b/g/n (2,4 GHz)
Communication protocols	
Protocolli LAN/WAN	HTTPS, DHCP, NTP, SSL, SSH, XML, Modbus TCP (Sunspec)
Monitoring	
Web user interface (WUI)	Integrated
Local monitoring	Wirelessly allowed via any Wi-Fi® device connecting the integrated WUI or running Plant Viewer for Mobile
Remote monitoring	Plant Portfolio Manager® / Plant Viewer™ / Plant Viewer for mobile
Data logging specifications	
Data sampling rate	High frequency data sampling (1 minute sample rate)
Local data storage	Log data for 30 days based on 15-minute intervals
Upgradeability	Remotely via Aurora Vision® Plant Management Platform / locally via integrated Web User Interface ¹⁾
Advanced functionalities	
Remote O&M operations	Inverter's parameters setting ²⁾ / inverter's firmware upgrade ²⁾
Smart grid functionalities	Grid control power-management enabled ²⁾
Power supply	
DC power supply output	~ 2 W
Environmental parameters	
Ambient temperature range	[-20; +85]°C
Environmental protection	IP20
Relative humidity	< 85% Non-condensing
Mechanical parameters (per unit)	
Dimensions (H x W x D)	3.81' x 1.81' x 0.63' (97 mm x 46 mm x 16 mm)
Weight	0.06 lbs (26 g)
Mounting System	Inverter's expansion slot
Warranty	
Standard warranty	Two years
Compliance	
Marking	CE / RCM / Wi-Fi Certified™
Emissions	47 CFR FCC Part 15 Subpart C, EN 55022 Conducted and radiated emission
Immunity	EN55024

¹⁾ Available from FW version FW 1.8.x

²⁾ Check for availability

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

Application with VSN300 Wifi Logger Card



Inverter matrix compatibility

Inverter family	Monitoring	Remote O&M Operations ¹⁾
UNO-2.0/2.5-I	Yes	No
PVI-3.0/3.6/4.2-TL	Yes	No
UNO-2.0/3.0/3.6/4.2-TL	Yes	Yes
PVI-3.8/4.6-TL	Yes	No
PVI-5000/6000-TL	Yes	No
PVI-6.0/8.0-TL	Yes	No
UNO-7.6/8.6	Yes	Yes
PVI-10.0/12.5-TL	Yes	No
TRIO-5.8/7.5/8.5-TL	Yes	Yes
TRIO-20.0/27.6-TL	Yes	No
PRO-33.0	No	No
TRIO-50.0	Yes	Yes

¹⁾ Inverter's parameters setting and inverter's firmware upgrade (from FW version 1.8.x)

ABB monitoring and communications

VSN730 System Monitor / VSN750 Plant Manager



The VSN730 System Monitor and VSN750 Plant Manager are turnkey solutions for high-performance data collection and communication for a wide range of commercial, industrial or utility PV plant applications.

They contain several components, prewired and preinstalled in an outdoor rated enclosure allowing installer to save time and money.

The VSN750 Plant Manager can be used as a flexible modular system block to create large and geographically distributed utility-scale monitoring designs that require customization.

The VSN730 System Monitor is the “lite” version of the VSN750 Plant Manager, offering a basic set of features at the lowest price possible for a monitoring turnkey solution.

Quality equipment for reliable monitoring

Included in these systems is the VSN700-05 Data Logger (-03 also available for VSN730 System Monitor) enabling data collection and uploading information over the Internet in near real-time to the Aurora Vision® Plant Management Platform.

The built-in Modbus TCP server feature in the VSN700-05 Data Logger both acts as a pass through for Modbus RTU or converts the proprietary inverter communication protocol to SunSpec compliant Modbus maps for easy SCADA system interface, data collection and inverter command execution.

A RS-485 surge protection is also provided, offering protection against logger damage in electrically “dirty” environments. The 277 VAC capable input power supply is ideal for commercial installations where only three-phase 480 VAC is easily available.

A wide range of accessories for VSN750 Plant Manager

A range of networking options include fiber and copper ethernet for building distributed pv-plant monitoring networks spread over large geographical areas. The revenue grade metering is eligible for US performance-based incentives as well as other US REC-aggregators.

String inverters

PV + Storage

Central inverters

Packaged solutions

Monitoring and communications



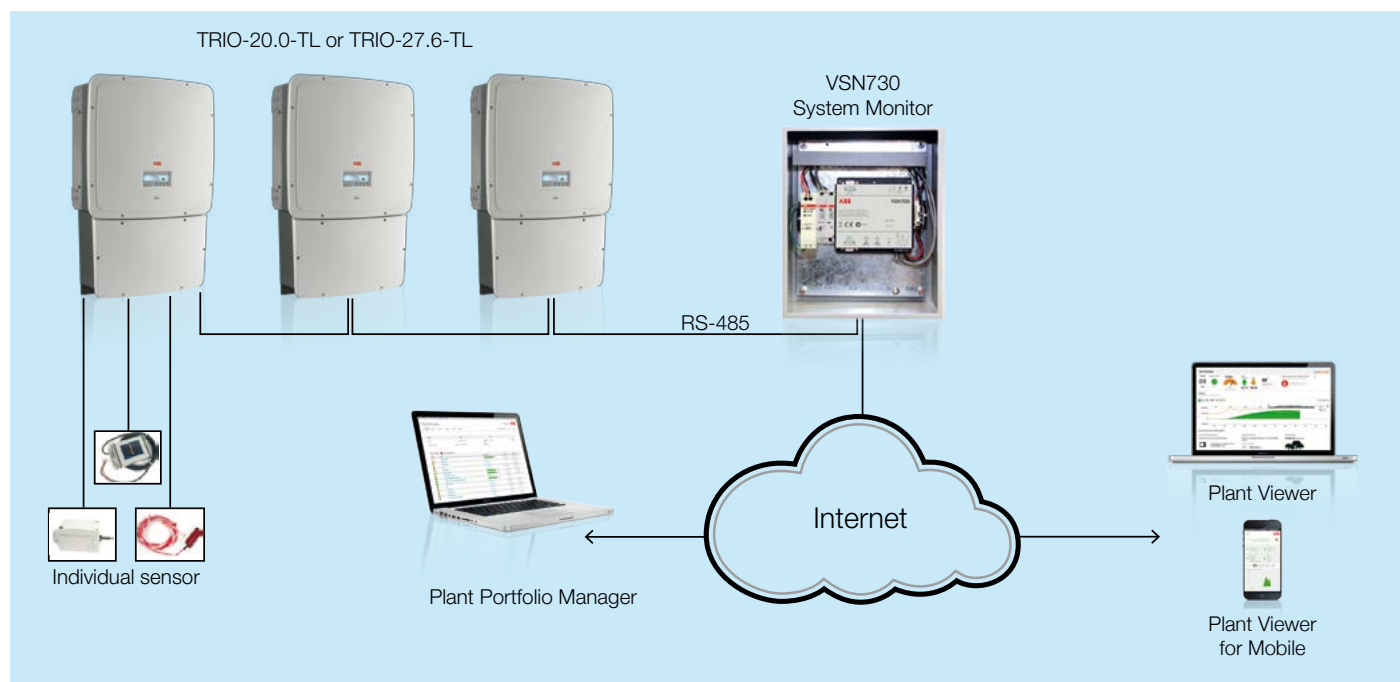
Highlights VSN730 System Monitor

- VSN700-03 or VSN700-05 Data Logger
- Enclosed in a painted, steel NEMA 4/ IP65 enclosure
- 85 VAC to 305 VAC / 24 VDC, 1 A power supply
- Supports 10 ABB string inverters and a VSN800 Weather Station
- RS-485 surge protection
- Easy installation
- Remote performance and asset management through the Aurora Vision® Plant Management Platform
- The turnkey solution saves the installer time (and money) by providing several components, prewired and preinstalled in a outdoor rated enclosure
- Remote management capabilities minimize truck rolls by providing configuration, upgrades and debug over the Internet using the Aurora Vision® Plant Management Platform

Highlights VSN750 Plant Manager

- VSN700-05 Data Logger
- RS-485 repeater with galvanic isolation
- 85 VAC to 305 VAC / 24 VDC, 1.25 A power supply
- NEMA 4 / IP65 enclosure
- Revenue grade energy metering options
- Copper, Fiber, Cellular and RS-485 communications options
- Easy installation
- Monitoring support for all ABB inverters and many meters, combiners and weather stations
- An ideal companion for monitoring and networking a large plant of TRIO inverters
- The turnkey solution saves the installer time (and money) by providing several components, prewired and preinstalled in a outdoor rated enclosure
- Remote management capabilities minimize “truck rolls” or service visits by providing configuration, upgrades, and debug over the Internet using the Aurora Vision® Plant Management Platform

Commercial application with VSN730 System Monitor using individual weather sensors



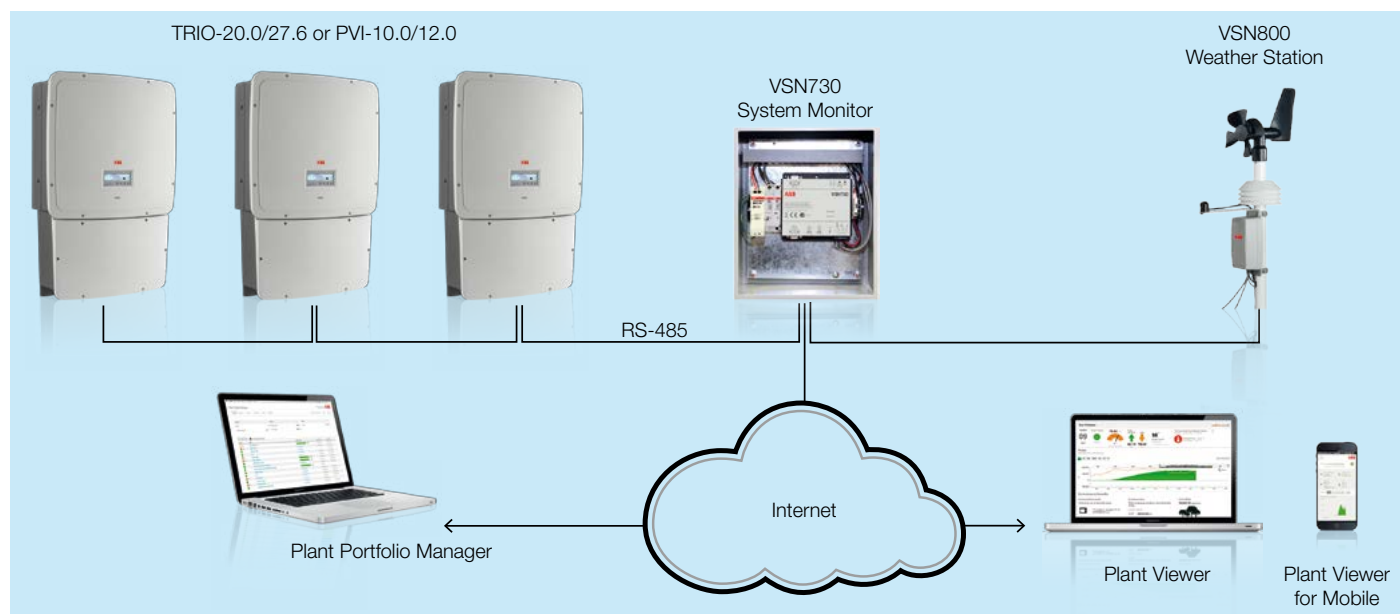
Technical data and types

Type code	VSN730 System Monitor	
	VSN730-03	VSN730-05
Platform		
Devices supported	10 x string inverters ABB + 1 x VSN800-XX Weather Station	All ABB inverters + any ABB as well as third-party devices ¹⁾
Monitoring	Inverter direct, environmental sensors	
Inverter control	None	
Communication interfaces		
Serial port interface	(2) RS-485 + (1) RS-232	
RS-485 port 1 configuration	Optically isolated repeater for Modbus or Aurora Protocol support	
RS-485 port 2 configuration	Non-isolated Modbus or Aurora Protocol support	
Maximum devices per serial port	11 devices, depending on poll rate and configuration	
Fieldbus cable	RS-485 shielded twisted Pair. Recommend Belden # 1120A cable or # 3106A for 3 conductors	
Ethernet port 0	Firewall protected Ethernet WAN port for internet connection	
Ethernet port 1	Local LAN with static IP address	
Ethernet connections	RJ-45 Ethernet 10/100 base-T (LAN/WAN)	
Communication protocols		
Plant fieldbus protocols	Aurora Protocol, Modbus RTU, SunSpec	
LAN/WAN protocols	Modbus/TCP, HTTP, DHCP, SSL, SSH, XML	
Data logging specifications		
Data sampling rate	High frequency data sampling (less than 1 minute average)	
Logging	Real time power values at 1, 3, 5, 15 minute configurable intervals	
Local storage	Log data for 30 days based on 15-minute intervals. (Days logged may be reduced by intervals shorter than 7-minute)	
Upgradeability	Field upgradable over the Internet or locally via USB memory stick	
Communications surge protection		
Replaceable cartridge	Citel DLAM-06D3	
Power supply		
DC power supply input	90 VAC to 264 VAC	
DC power supply output	24 VDC, 1 A	
Environmental protection rating		
Ambient temperature range	-20°C to 60°C	
Environmental protection rating	NEMA 4	
Relative humidity	0 to 100% condensing	
Mechanical parameters		
Dimensions H x W X D	12" x 10" x 5" (.30 m x .25 m x .13 m)	
Enclosure options	Painted steel	
Weight	14 lbs (6.4 kg)	
Mounting System	Screws through flanges	
Compliance		
Safety	UL508A	
Marking	cCSAus / CE	
Altitude	Operate below 3000 m	
Emission	FCC Part 15 Class A, CISPR 22, EN 55022 Conducted and Radiated Emission	
Immunity	EN 61000, EN55024	
Telecom	N/A	

¹⁾ Consult latest supported devices list

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

Commercial application with VSN730 System Monitor using VSN800 Weather Station



VSN730/VSN750 - Accessories

VSN800-12

Weather Station with sensors: ambient temperature, panel temperature, global irradiance



VSN800-14

Weather Station with sensors: ambient temperature, panel temperature, global irradiance, plane of array irradiance, wind speed and direction



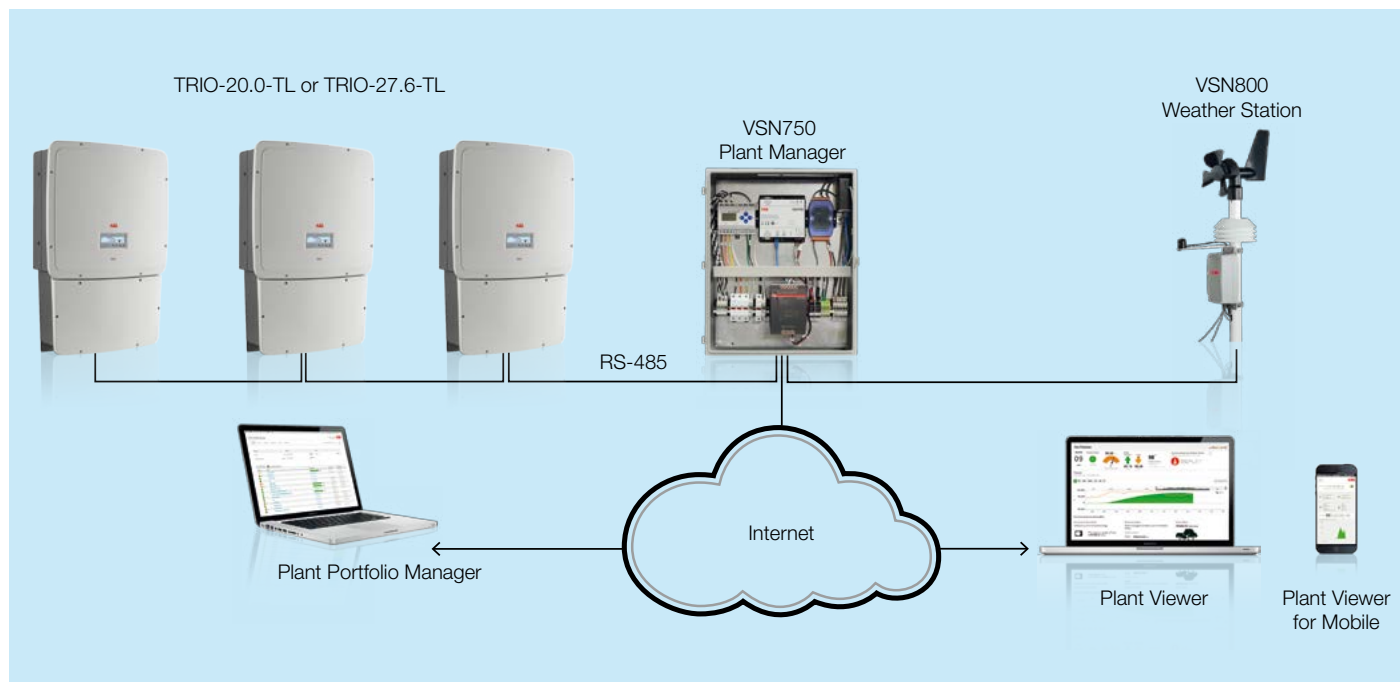
VSN750 - Accessories

VSN-MGR-AUX-CT100	Current transformer 100 A, 0.333 VAC output, 1% accuracy, solid core, 1.0" window diameter
VSN-MGR-AUX-CT200	Current transformer 200 A, 0.333 VAC output, 1% accuracy, solid core, 1.0" window diameter
VSN-MGR-AUX-CT200SC	Current transformer 200 A, 0.333 VAC output, 1% accuracy, split core, 1.25" window diameter
VSN-MGR-AUX-CT400SC	Current transformer 400 A, 0.333 VAC output, 1% accuracy, split core, 2.5" x 2.9" window diameter
VSN-MGR-AUX-CT600SC	Current transformer 600 A, 0.333 VAC output, 1% accuracy, split core, 2.5" x 2.9" window
VSN-MGR-AUX-CT800SC	Current transformer 800 A, 0.333 VAC output, 1% accuracy, split core, 2.5" x 2.9" window
VSN-MGR-AUX-CT1000SC	Current transformer 1000 A, 0.333 VAC output, 1% accuracy, split core, 2.5" x 5.50" window
VSN-MGR-AUX-CT1200SC	Current transformer 1200 A, 0.333 VAC output, 1% accuracy, split core, 2.5" x 5.5" window
VSN-MGR-AUX-CT1600SC	Current transformer 1600 A, 0.333 VAC output, 1% accuracy, split core, 2.5" x 5.5" window
VSN-MGR-AUX-CT2000SC	Current transformer 2000 A, 0.333 VAC output, 1% accuracy, split core, 2.5" x 5.5" window
VSN-MGR-AUX-CT2400SC	Current transformer 2400 A, 0.333 VAC output, 1% accuracy, split core, 2.5" x 5.5" window



VSN750 Plant Manager models comparison

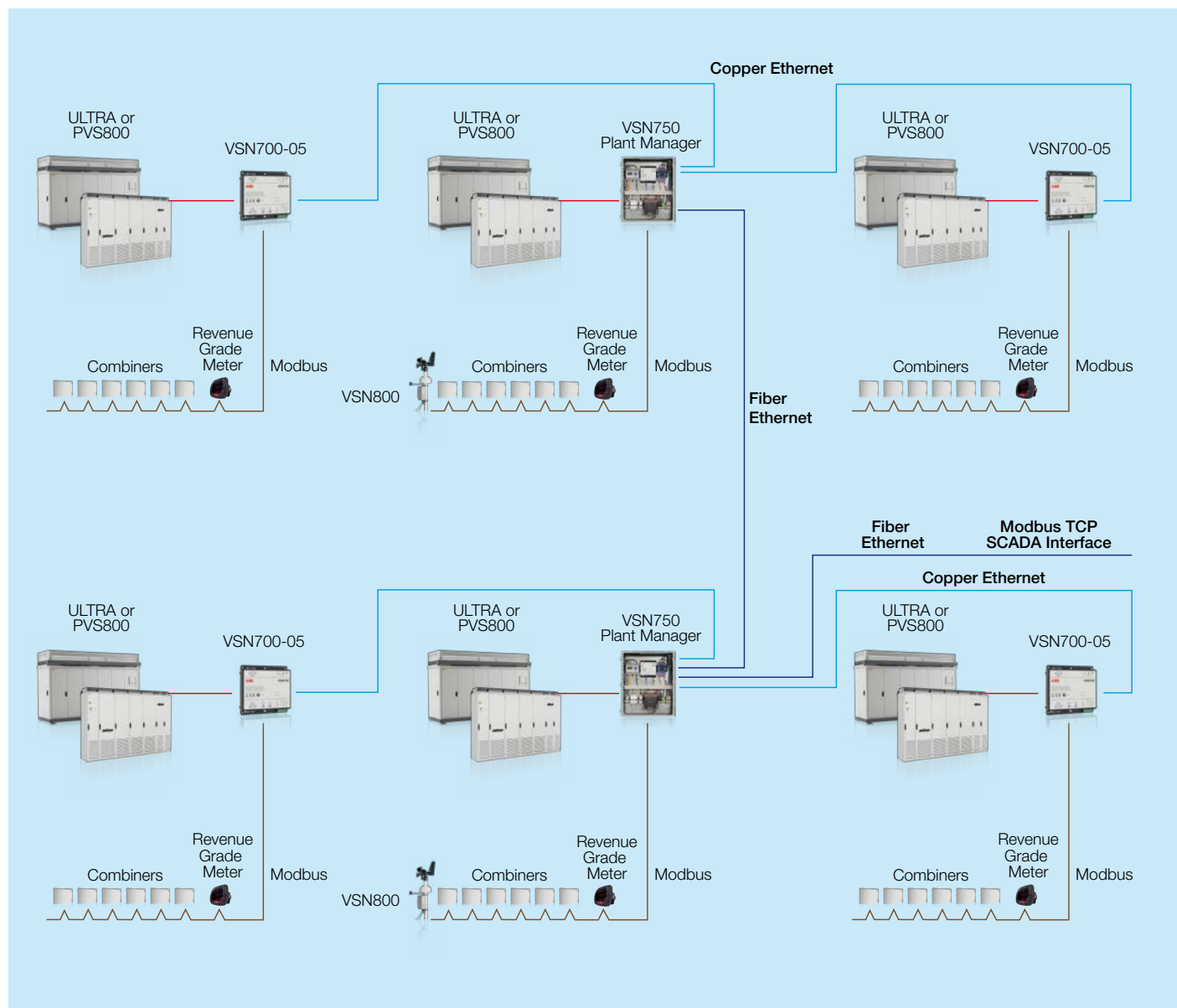
	VSN700 model	Revenue Grade Meter	Ethernet Switch	Cell Router	Optical Isolated Repeater	Pwr Supply
VSN750-N00010	VSN700-05				1 port	Yes
VSN750-N00110	VSN700-05			Yes	1 port	Yes
VSN750-N05110	VSN700-05		5 Port	Yes	1 port	Yes
VSN750-N00130	VSN700-05			Yes	3 port	Yes
VSN750-N05030	VSN700-05		5 Port		3 port	Yes
VSN750-N06060	VSN700-05		4 Port Copper, 2 Port Fiber		(2) 3 port	Yes
VSN750-N10010	VSN700-05	Veris E51C2			1 port	Yes
VSN750-N10110	VSN700-05	Veris E51C2		Yes	1 port	Yes
VSN750-N15110	VSN700-05	Veris E51C2	5 Port	Yes	1 port	Yes
VSN750-N10130	VSN700-05	Veris E51C2		Yes	3 port	Yes
VSN750-N15030	VSN700-05	Veris E51C2	5 Port		3 port	Yes
VSN750-N10030	VSN700-05	Veris E51C2			3 port	Yes



Technical data and types

Type code	VSN750 Plant Manager
Platform	
Devices supported	All ABB devices, third-party meters and other modbus devices (Consult latest supported list)
Monitoring	Power/Energy generation and demand, Inverter Direct, Environmental Sensors *
Inverter control	Power reduction, reactive power, COS ϕ by Modbus TCP (Available commands are inverter dependent)
Communication interfaces	
Serial port interface	(2) RS-485 + (1) RS-232
RS-485 port 1 configuration	Optically isolated repeater for Modbus or Aurora Protocol support
RS-485 port 2 configuration	Non-isolated Modbus or Aurora Protocol support
Maximum devices per serial port	Physical limitation of 32 (reduced by poll rate and inverter data set size)
Fieldbus cable	RS-485 shielded twisted Pair. Recommend Belden # 1120A cable or # 3106A for 3 conductors
Ethernet port 0	Firewall protected Ethernet WAN port for internet connection
Ethernet port 1	Local LAN with static IP address
Ethernet connections	RJ-45 Ethernet 10/100 base-T (LAN/WAN)
Communication protocols	
Plant fieldbus protocols	Aurora Protocol, Modbus RTU, SunSpec
LAN/WAN protocols	Modbus/TCP, HTTP, DHCP, SSL, SSH, XML
Data logging specifications	
Data sampling rate	High frequency data sampling (less than 1 minute average)
Logging	Real time power values at 1, 3, 5, 15 minute configurable intervals
Local storage	Log data for 30 days based on 15-minute intervals. (Days logged may be reduced by intervals shorter than 7-minute)
Upgradeability	Field upgradable over the Internet or locally via USB memory stick
Ethernet switch	
CAT-5 connections	RJ-45 Ethernet 10/100 base-T ports
Fiber connections	10/100 BaseFX ST ports
Managed	Unmanaged
Copper max distance	100 meters
Fiber max distance	2 km
Cell router	
Network	GSM Class 12 GPRS /Class 10 Edge
Internet connection	Firewall protected Ethernet WAN
Antenna connection	50 ohm SMA (f)
Revenue grade energy metering	
Meter input range	0 bis 0.333 Voltage CTs.
Current scaling input	5 A to 32,000 A
Voltage input	UL:90 V_{L-L} to 600 V_{L-L} ; CE90 V_{L-N} to 300 V_{L-L}
Active power accuracy	IEC 62053-22 (0.5% accuracy), ANSI C12.20 (0.5% accuracy)
Reactive power accuracy	IEC 62053-23 class 2 (2% accuracy)
Fieldbus	Modbus RTU RS-485 (sunspec)
CT integration	Wide Range of CTs must be ordered separately. See user guide for full specifications.

Utility application with VSN750 Plant Manager – 10MW installation example



Technical data and types

Type code	VSN750 Plant Manager
Power supply	
DC power supply input	From 85 VAC to 304 VAC
DC power supply output	24 VDC, 1.25 A
Environmental protection rating	
Ambient temperature range	-40°C to 50°C
Environmental protection rating	NEMA 4
Relative humidity	0 to 100% condensing
Mechanical parameters	
Dimensions H x W X D	20" x 16" x 6" (.51 m x .41 m x .15 m)
Enclosure options	Painted steel
Weight	40 lbs (18.2 kg)
Mounting system	Screws through flanges
Compliance	
Safety	UL/CSA/EN/IEC 61010-1
Marking	cCSAus / CE
Altitude	Operate below 3000 m
Emission	FCC Part 15 Class A, CISPR 22, EN 55022 Conducted and Radiated Emission
Immunity	EN 61000, EN55024
Telecom	FCC Part 68

* see ABB's web site for supported devices

** see ABB's web site for other supported programs

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

ABB monitoring and communications

VSN800 Weather Station



The VSN800 Weather Station automatically monitors site meteorological conditions and photovoltaic panel temperature in real-time, transmitting sensor measurements to the Aurora Vision® Plant Management Platform.

The VSN800 contains the essential environmental sensor set needed for solar monitoring.
The expanded sensor set enables plant management across a broad range of plant sizes.

VSN800 is a companion to the VSN700 Data Logger, the VSN730 System Monitor, or the VSN750 Plant Manager where it is fully compatible and integrates seamlessly with the Aurora Vision® Plant Management Platform.

Shipped preconfigured and ready for installation requiring no special tools

The VSN800 Weather Station is delivered ready for installation and when used requires the installer to mechanically mount the modules on a user-supplied mast, connect power and communication, and initialize the automatic system commissioning process from the VSN700. No special software, or on-site calibration is required.

The all-in-one weather station reduces the installation, support and maintenance cost as well as improves the

robustness and manageability of the PV plant monitoring solution.

The basic sensor set provides data needed to calculate a performance ratio allowing a plant operator to track solar array performance against expected energy production

The advanced sensor set improves monitoring of weather conditions that can effect energy production. The extra irradiance sensor for mounting at the plane of the array allows more accurate measurement of irradiance that is incident in the plane of the solar panels.

Wind speed and direction sensor gives the operator information about how the wind may be cooling the panels and some indication of how much dust may be accumulating on the panels.

Highlights

- Two models offered for basic and advanced sensor sets
- VSN800-12 includes a basic sensor set: ambient temperature, solar irradiance, and back of module temperature
- VSN800-14 includes a additional advanced sensors: plane of array irradiance and wind direction and speed
- Sensors, data acquisition unit, and RS-485 communication all in a single unit

String inverters

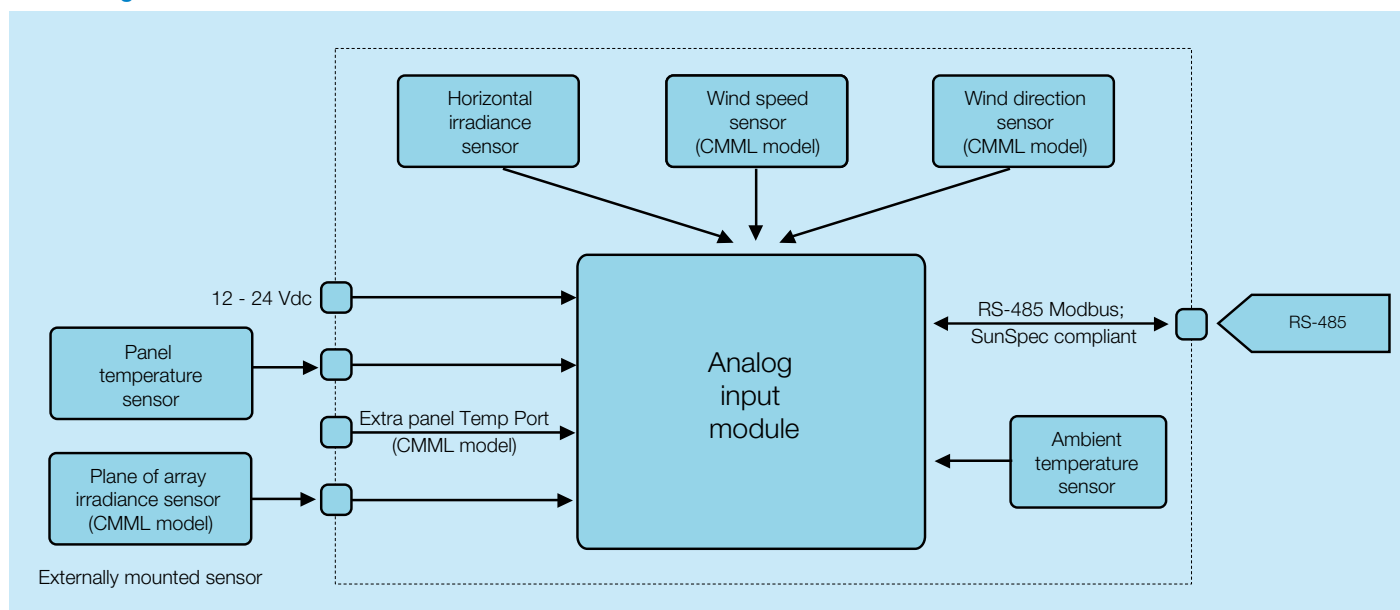
PV + Storage

Central inverters

Packaged solutions

Monitoring and
communications

Block diagram of VSN800 Weather Station



Technical data and types

Type code	VSN800 Weather Station	
	VSN800-12	VSN800-14
Sensors		
Ambient temperature	Range -40°F to 176°F (-40°C to 80°C) Accuracy +/- 0.54°F (0.3°C)	
PV panel temperature	Range -40°F to 176°F (-40°C to 80°C) Accuracy +/- 0.54°F (0.3°C) Cable length 25 ft (7.62 m)	
Solar radiation	Range 0 to 1750 W/m2 Accuracy +/- 5% Temperature range -13°F to 131°F (-25°C to 55°C)	
Number of radiation sensors	1 horizontal	1 horizontal, 1 plane of array
Wind direction	N/A	Range 360 degrees Accuracy +/- 22.5° Threshold 2 MPH (0.89 m/s) Temp range -40°F to 140°F(-40°C to 60°C)
Windspeed	N/A	Range 0 to 150 MPH (0 to 67 m/s) Accuracy is Greater of 1 mph (0.45 m/s) or 5% Threshold 2 MPH (0.89 m/s) Temp range -40°F to 140°F (-40°C to 60°C)
Communication		
Serial port	RS-485 2 wire, modbus RTU, SunSpec compliant	
Terminal block	#22 - #18 AWG	
Recommended cable	Belden #1120A or equivalent	
Power supply		
DC power supply input	10-30 VDC, 50mA	
Terminal block	Accepts AWG #22 - #18	
Compliance		
EMC	FCC Part 15, Subpart B; ICES-003; EN 61326-1:2006; Emission class B, Immunity is class A	
Enclosure	UL 94 V-2, ROHS compliant, IP65	
Humidity	0 to 100% Condensing	
Physical parameters		
Dimensions H x W x D	20.9" x 5.1" x 4.7" (0.53 m x 0.13 m x 0.12 m)	24.8" x 9.8" x 13" (0.63 m x 0.25 m x 0.33 m)
Weight	1.75 lbs (0.8 kg)	7 lbs (3.2 kg)
Ambient temperature range	-13°F to 131°F (-25°C to 55°C)	
Mounting	Pole or tripod	
Warranty		
Standard warranty	Two years	

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

ABB monitoring and communications

PVI-PMU



ABB's PVI-PMU enables customers to control active and reactive power of the inverters in accordance with eeG-2009§6 and BDEW norms.

Thanks to its two RS485 ports, the PVI-PMU can be used for controlling the power generated by ABB Inverters in PV plants where an external data acquisition system has been installed too.

The proprietary Aurora Protocol is the communication protocol the PVI-PMU uses to exchange data with all ABB Inverters; meanwhile, the power control management commands, sent by an external source, are received through a dedicated analog and digital inputs.

The PMU provides three different control functions for the implementation of active power limitation and two different operating modes for reactive power control.

This combination of the "digital" input status and the signals received from the analog inputs enables one of the three active power control functions.

- 1) Active power limitation in four steps
- 2) Active power limitation in 11 steps
- 3) Continuous active power limitation

Reactive power is controlled using the 4-20 mA analog inputs.

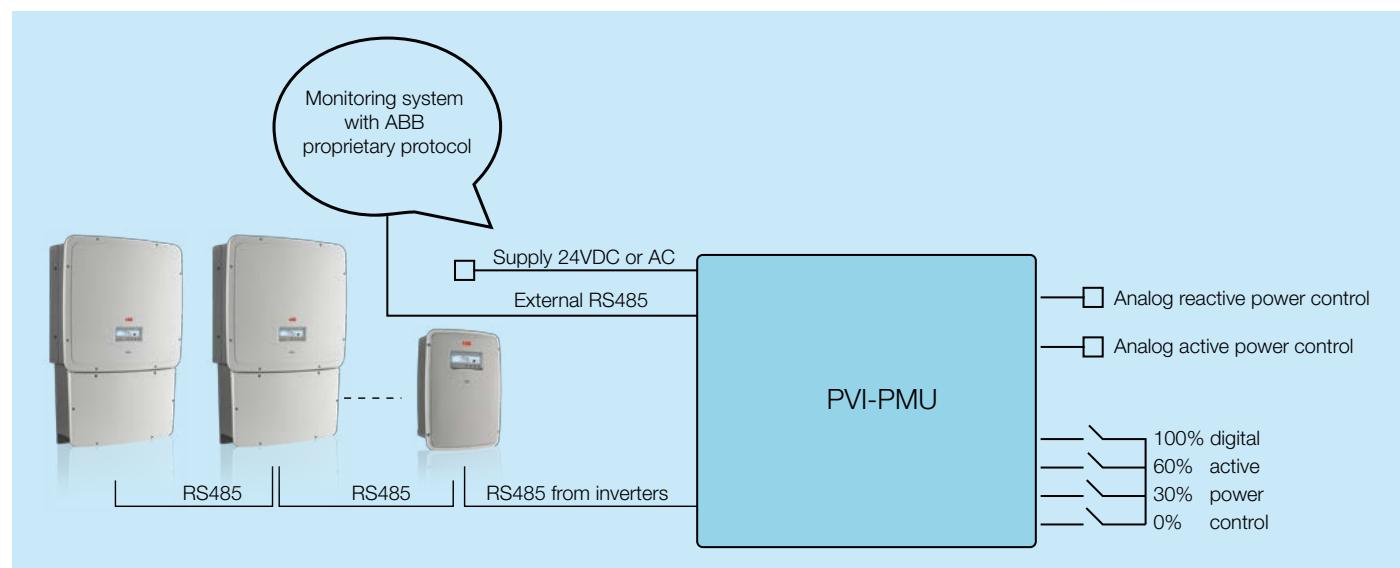
Using the combination of analog and digital inputs, two different reactive power management operating modes are selectable:

- 1) Fixed $\cos(\phi)$ based on the inverters nominal power
- 2) Fixed $\cos(\phi)$ based on inverter instantaneous power

Highlights

- An external isolated power supply unit is provided
- This unit is capable of controlling up to 32 Inverters or 55 kW modules with each PVI-PMU unit
- ABB's PVI-PMU enables active and reactive power control according to eeG-2009§6 and BDEW
- It is easy to be integrated in an existing data acquisition system.
- DIN rail mountable device
- The PVI-PMU is compatible with all ABB string and central inverters

Block diagram of PVI-PMU



Technical data and types

Type code	PVI-PMU
Power entry characteristic	
AC Input voltage range ($V_{ac,min} \dots V_{ac,max}$)	15...36 V
Nominal AC input voltage ($V_{ac,n}$)	24 V
Nominal frequency (f_n)	50/60 Hz
DC input voltage range ($V_{dc,min} \dots V_{dc,max}$)	18...48 V
Nominal DC input voltage ($V_{dc,n}$)	24 V
Power consumption	< 10 W
RS485 section	
Ports	RS485 inverter / RS485 external
Serial interface type	Half-Duplex
Baud rate	19200 bps
Protocol	ABB proprietary
Number of inverters	32 ¹⁾
Power factor range	± 0.9
Line biasing resistor (where necessary)	1 k Ω between +5V/+D and RTN/-D
Termination resistor	120 Ω ²⁾
Isolation	100 V _{dc} ⁴⁾
Analog input section	
Active power control	4...20 mA (max 22 mA)
Reactive power control	4...20 mA (max 22 mA)
Digital input section	
Number of inputs for active power control	4 ³⁾
Rating voltage	15 V
Rating current	50 mA
Isolation	100 V _{dc} ⁴⁾
Physical and environmental	
Environmental protection	IP20
Ambient temperature range	-20...+60°C
Relative humidity	0...95%
Dimension	53 x 90 x 57 mm
Weight	180 g
Compliance	
Marking	CE
Safety and EMC standard	EN55011; EN61000-6-2

¹⁾ Max 32 X ABB string inverters or 55 kW power modules (PRO-33 and PVS-xxx ABB inverters not supported)

²⁾ Adjustable

³⁾ Alternative to the analog input

⁴⁾ Between input and serial port

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

ABB monitoring and communications

PVI-RS485 MODBUS Converter



PVI-RS485-MODBUS is the ABB devices family able to convert the proprietary Aurora Protocol to ModBus RTU or ModBus TCP communication protocol.

The PVI-RS485-MODBUS enables ABB inverters to exchange data with third-party devices such as controller as well as datalogger supporting ModBus (RTU or TCP) communication protocol.

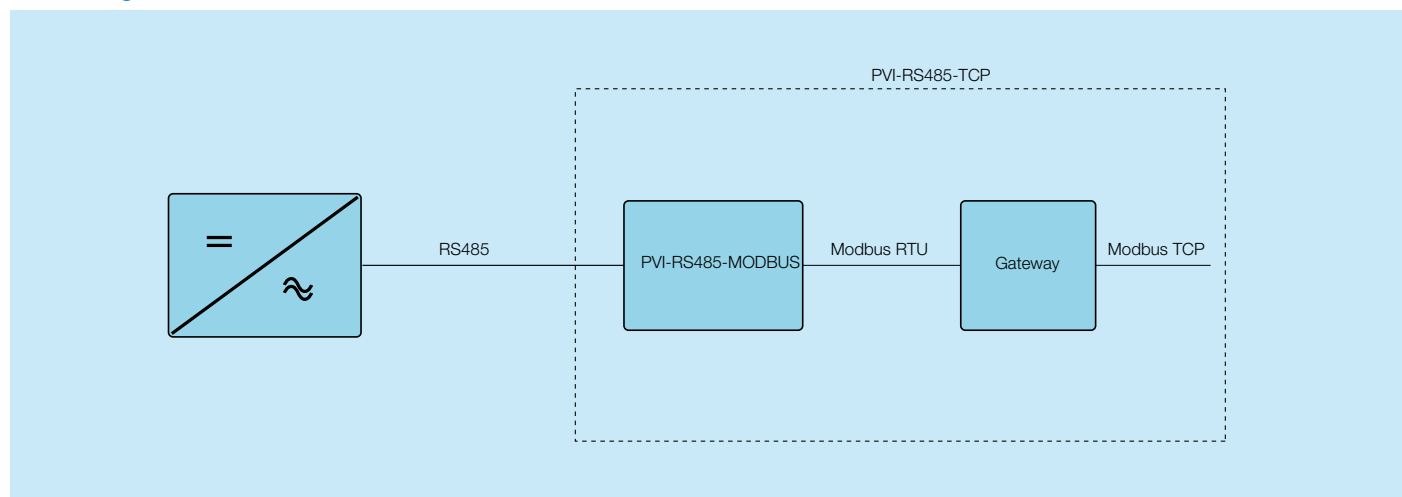
The PVI-RS485-MODBUS is a DIN rail mounted device and can be configured and upgraded locally by simply using a PC (connected to the RS485 port through ABB PVI-USB-RS232-485 Adapter) running a common testing application able to operate as a ModBus master for accessing data in the PVI-RS485-MODBUS connected as slave device.

The PVI-RS485-MODBUS is capable to manage up to 32 ABB string inverters or 32 ABB 55 kW inverter modules and, according to the specific product model, it allows customer to manage inverter power control in range of Smart Grid functionalities.

Highlights

- Converters from ABB proprietary Aurora Protocol to MODBUS RTU
 - PVI-RS485-MODBUS-STRING (for ABB string inverters)
 - PVI-RS485-MODBUS-CENTRAL (for ABB central inverters)
- Converters from ABB proprietary Aurora Protocol to MODBUS TCP
 - PVI-RS485-MODBUS-TCP-STRING (for ABB string inverters)
 - PVI-RS485-MODBUS-TCP-CENTRAL-xx (for ABB central inverters)
- Up to 32 inverters or 55 kW modules manageable
- Multi-drop bus connection allowed for RTU
- 50 Hz transformer and cables are provided
- Active-reactive power control allowed by some Modbus RTU models

Block diagram of PVI-RS485-MODBUS Converter



Technical data and types

Type code	PVI-RS485-MODBUS
Power entry characteristic	
AC input voltage range ($V_{ac,min}...V_{ac,max}$)	15...36 V
Nominal AC input voltage ($V_{ac,n}$)	24 V
Rated frequency (f_i)	50 or 60 Hz
DC input voltage range ($V_{dc,min}...V_{dc,max}$)	18...48 V
Nominal DC input voltage ($V_{dc,n}$)	24 V
RS485 section	
Serial interface type	RS485 Half-Duplex
Baud rate	19200 bps not modifiable
Protocol	ABB Proprietary
Number of devices	32
Line biasing resistor (where necessary)	1 k Ω between +5 V/+D and RTN/-D
Termination resistor	120 Ω settable via switch
RS485 MODBUS section	
Serial interface type	RS485 Half-Duplex
Baud rate	19200 bps
Protocol	MODBUS RTU - MODBUS/TCP
Number of devices	32
Line biasing resistor (where necessary)	1 k Ω between +5 V/+D and RTN/-D
Termination resistor	120 Ω settable via switch
Physical and environmental	
Environmental protection rating	IP20 (Indoor use only)
Ambient temperature range	-40...+ 60°C/-40...140°F
Relative humidity	0...95%
Compliance	
Isolation	Yes, 2500 V _{DC}
Marking	CE
Safety and EMC standard	EN55022; EN61000-6-2/3; EN61000-4-2/3/4/5/6/8/11/14/16
Available products variants	
RTU STRING	PVI-RS485-MODBUS-STRING (for ABB string inverters)
TCP STRING	PVI-RS485-MODBUS-TCP-STRING (for ABB string inverters)
RTU CENTRAL	PVI-RS485-MODBUS-CENTRAL (for ABB central inverters)
TCP CENTRAL EU version	PVI-RS485-MODBUS-TCP-CENTRAL-EU (for ABB central inverters)
TCP CENTRAL US version	PVI-RS485-MODBUS-TCP-CENTRAL-US (for ABB central inverters)
TCP CENTRAL Core CN version	PVI-RS485-MODBUS-TCP-CENTRAL-CORE (for ABB central Core inverter)

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

ABB monitoring and communications

PVI-USB-RS232_485 Converter



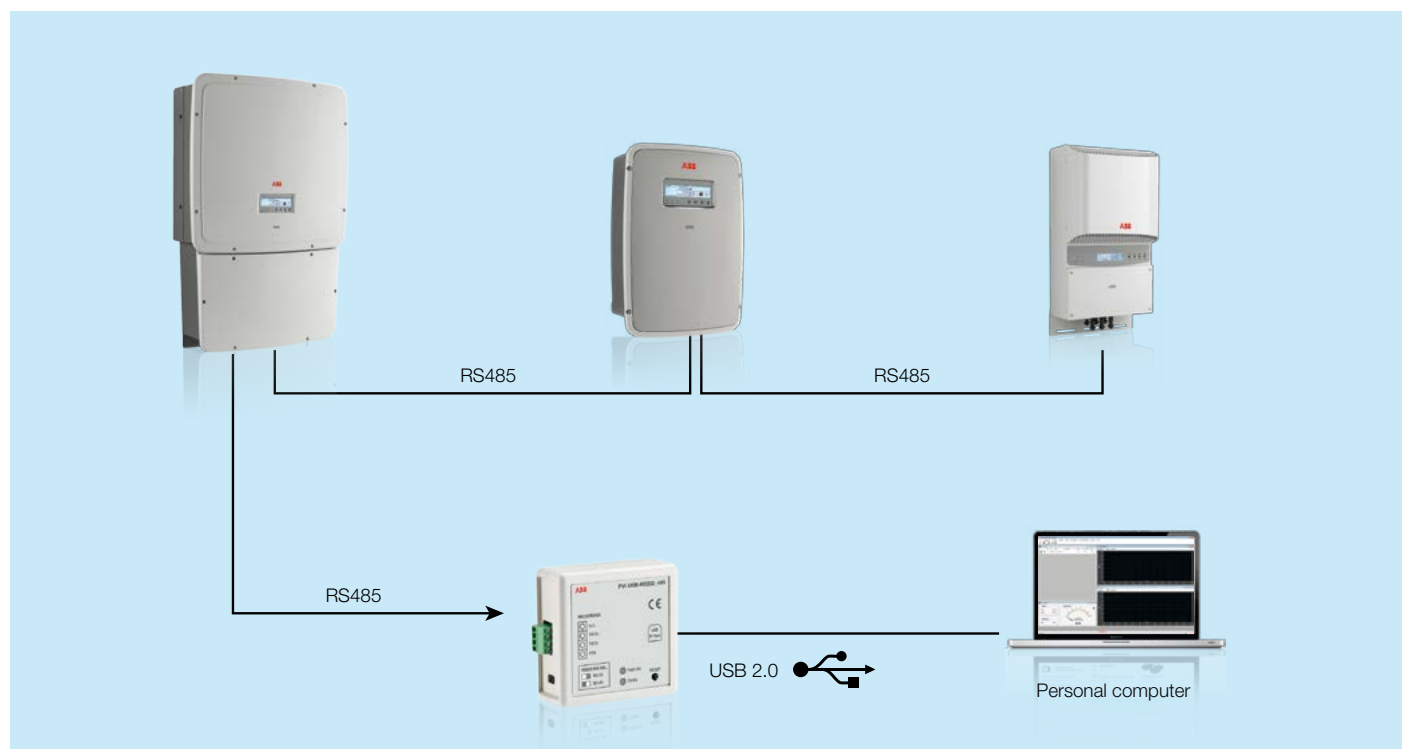
A needful device enabling customer to connect a PC to all ABB inverters via RS485 port

- Allows serial interfacing between photovoltaic or wind inverters and computer via RS485 link
- Operating systems supported: Win XP, Win 7, and Linux based
- Works with centralized and string inverters
- No power supply needed (auto-supplied via USB port)

Compatible ABB softwares:

- Aurora Communicator – Monitoring of string and centralized inverters
- Aurora PVI Central - Managing and Monitoring of centralized inverters
- Aurora Stringcomb Installer – Managing and Monitoring of String combiner
- Aurora Manager – Configuration and Monitoring Software

Block diagram of PVI-USB-RS232_485 Converter



Technical data and types

Type code	PVI-USB-RS232_485
USB side	
Standard	2.0
Connection	B-Type
RS485/232 side	
RS485/232 function	selectable via switch
RS485	Half-Duplex
Status led (Tx/Rx)	Yes
O. S.	Windows 7, Windows XP, Linux Based ¹⁾
Supply	
Auto-supply	Yes, via USB port
Maximum current	150 mA
Status led (Power On)	Yes
Environmental	
Ambient temperature range	-25...+ 50°C/-13...122°F
Physical	
Environmental protection rating	IP20 (Indoor use only)
Dimension (H x W x D)	66 mm x 66 mm x 28 mm
Compliance	
Isolation	2500 V _{DC}
Marking	CE
Safety and EMC standard	EN55022; EN55024
Accessories	
B-type/A-type USB cable	Included
485 side mating part plug screw terminal block	Included

¹⁾ For a complete list, please refer to: <http://www.ftdichip.com/Drivers/VCP.htm>

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

ABB solar inverter service



Life cycle management

ABB has developed a solar inverter life cycle management model aimed at providing proactive services to maximize availability and performance. This model not only provides optimum support to end users but also a smooth transition to a new solar inverter when the inverter has come to the end of its lifetime.

The model divides a product's life cycle into four phases: active, classic, limited and obsolete. Each phase has different implications for the end user in terms of services provided.

Benefits of life cycle management

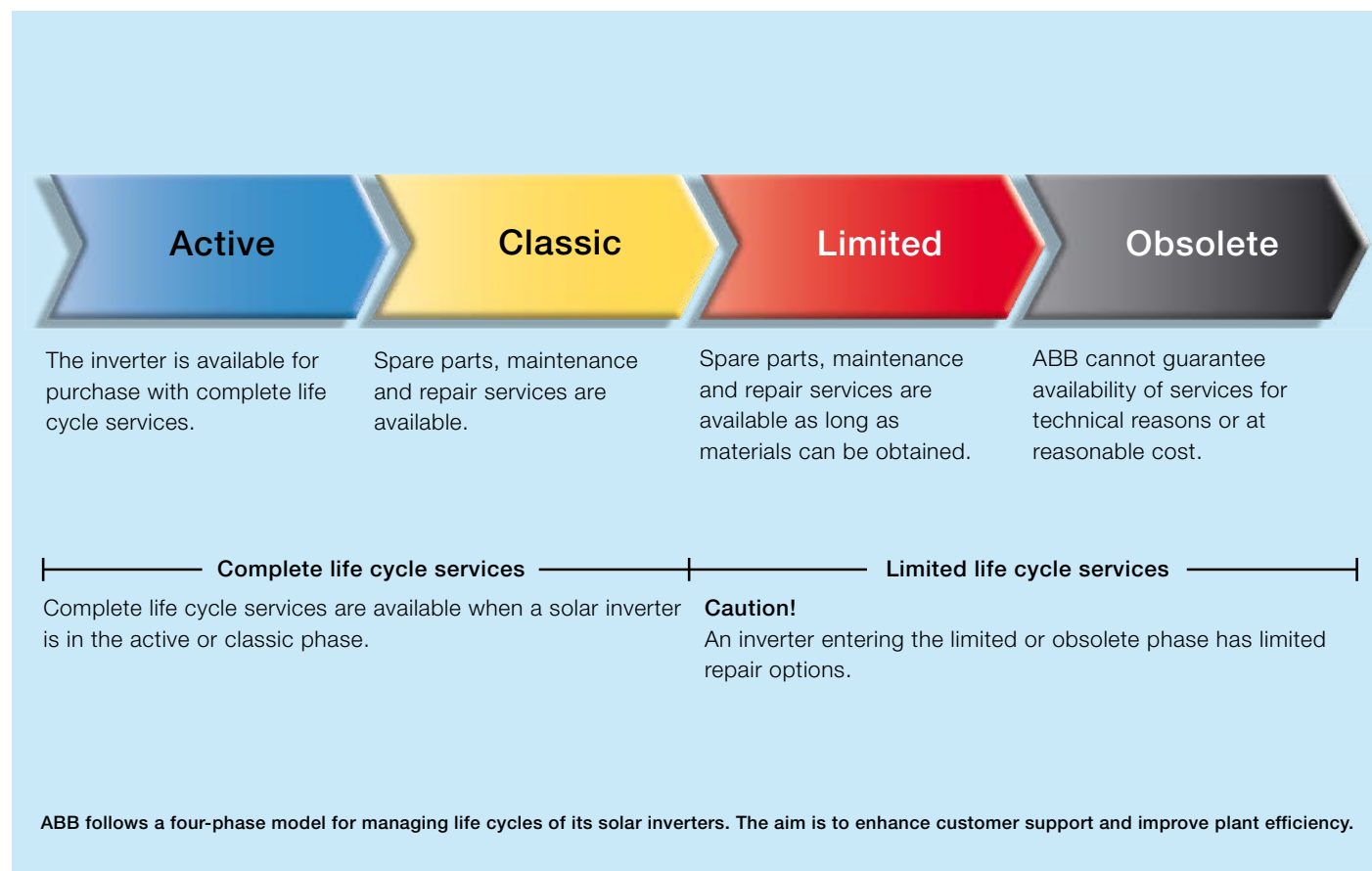
Life cycle management maximizes the value of the solar inverter and its maintenance investments by:

- ensuring spare parts and ABB competence availability throughout the lifetime
- enabling efficient product support and maintenance for improved reliability
- adding functionality to the initial product by upgrading or retrofitting
- providing a smooth transition to new technology at the end of the product lifetime

The ABB offer adapted to the life cycle management:

- ABB Service agreements
- Tailor-made Service contract
- Technical availability
- Spares availability
- Training
- Technical support
- Extended warranties
- ABB global service network

ABB solar inverter life cycle phases



Active phase

The active phase starts when the inverter is launched. In the active phase the end user benefits from different warranty options and other services such as training and technical support, including inverter adjustment for optimum performance. Complete life cycle services from spare parts and preventive maintenance to repairs and service contracts are also provided. The active phase ends when the volume production of the inverter ceases. ABB issues an announcement of the life cycle phase change.

Classic phase

ABB solar inverter users continue to benefit from complete life cycle services throughout the classic phase.

Even though ABB solar inverters are no longer marketed in the classic phase, spare parts, maintenance and repair services remain available.

ABB solar inverter maintenance is straightforward. By following ABB's maintenance schedules, life cycle costs can usually be minimized. Maintenance schedules, which are available for every solar inverter, are based on ABB's four decades of experience in inverter and power converter technology. Throughout the classic phase, ABB reviews the availability of services. Should there be any changes in the availability of services for the inverter, ABB issues a life cycle announcement. This keeps end users fully informed.

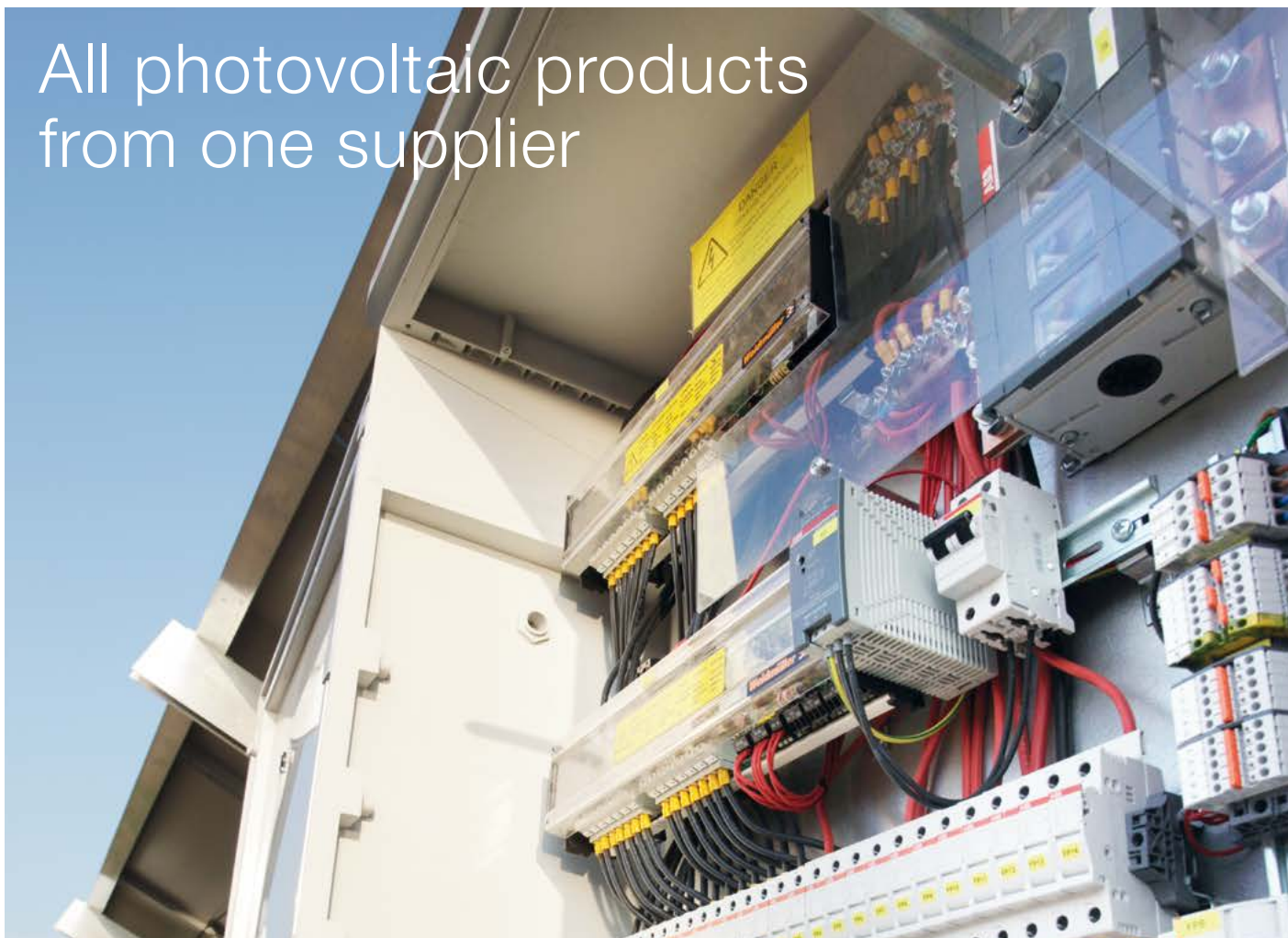
Limited phase

In the limited phase, services gradually become obsolete. Spare parts are available as long as components and materials can be obtained. In addition to the annual life cycle status reviews, ABB issues a life cycle phase change announcement half a year prior to the product becoming obsolete. This is the last opportunity to transfer to new technology before product services end.

Obsolete phase

The ABB solar inverter is transferred to the obsolete phase when it is no longer possible to provide services at reasonable cost, or when ABB can no longer support the product technically, or the old technology is not available.

All photovoltaic products from one supplier



Turnkey solutions for monitoring and control

ABB's long experience in developing solar inverters and automation systems along with the proven capacity to offer innovative solutions in line with the needs of professionals and utilities, find their highest expression in the new range of pre-engineered solutions for advanced monitoring and plant control.



Prewired monitoring and control turnkey solution

Products for inverter stations

ABB manufactures and supplies a broad range of high quality medium voltage (MV) products suitable for connecting solar inverters to power distribution network.

These products include dry-type and liquid-filled transformers and a wide range of switchgear suitable to almost any

requirement. Additionally our offering includes products for high voltage (HV) grid connection.



MV switchgear
e.g. ABB SafeRing,
SafePlus and UniSec.



Transformers
Dry-type and liquid-filled
transformers

Products for tracking

Our product portfolio for photovoltaic (PV) tracking devices includes all key components, such as drives, motors, PLCs and other low voltage (LV) products required by the tracker manufacturer for accurate and reliable performance.



Asynchronous and
brushless motors
M3AA, 9C



Low voltage AC drives
ACS55, ACS150,
ACS355 and ACSM1
- Range 0.18 to 160 kW



Programmable logic
controllers
AC500 CPU

Low voltage products

Our complete range of reliable LV products dedicated for PV applications are able to meet all PV specific installation requirements. Our products cover among other things switching, protection, metering and monitoring as well as enclosures.



Fuse holders
E 90 PV



Miniature circuit
breakers
S800 PV-S



Residual current
devices
F200 PV-B



Surge protective
devices
OVR PV QS



Switches and breakers
OT and Tmax PV



Junction boxes

Contact us

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

www.abb.com/solarinverters

www.abb.com/solar

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