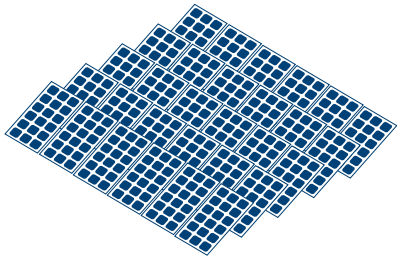
ABB solar inverters for photovoltaic systems

Helping you get more energy out of every day

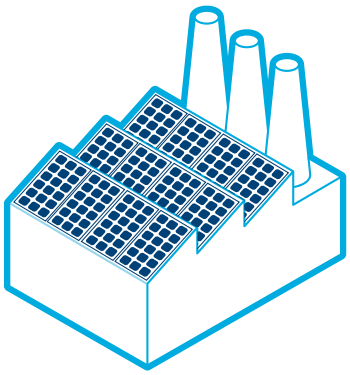
Power and productivity for a better world™

ABB’s solar inverter portfolio
Your brightest choice for everything under the sun



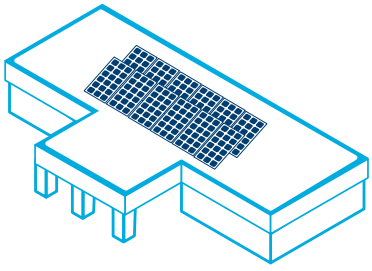
Power plants

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 (ie 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.

Inverter size (kW) **0**

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

10 100 2000

Micro inverters

ABB micro inverters

MICRO-0.25/0.3-I-OUTD, CDD and accessories
250 to 300 W

MICRO

The ABB MICRO inverter system is the perfect solution suitable for photovoltaic applications when flexibility and modularity are required.

The ABB MICRO inverter enables individual panel output control reducing shading and mismatching effect.

It offers increased flexibility and maximizing energy harvesting thanks to ABB's proprietary MPPT algorithm, which works at the level of each solar panel.

This system offers the best alternative to the traditional string inverters.

ABB MICRO inverter plants enable a simple installation thanks to a proprietary wireless communication protocol between the ABB MICRO and the ABB CDD.

CDD

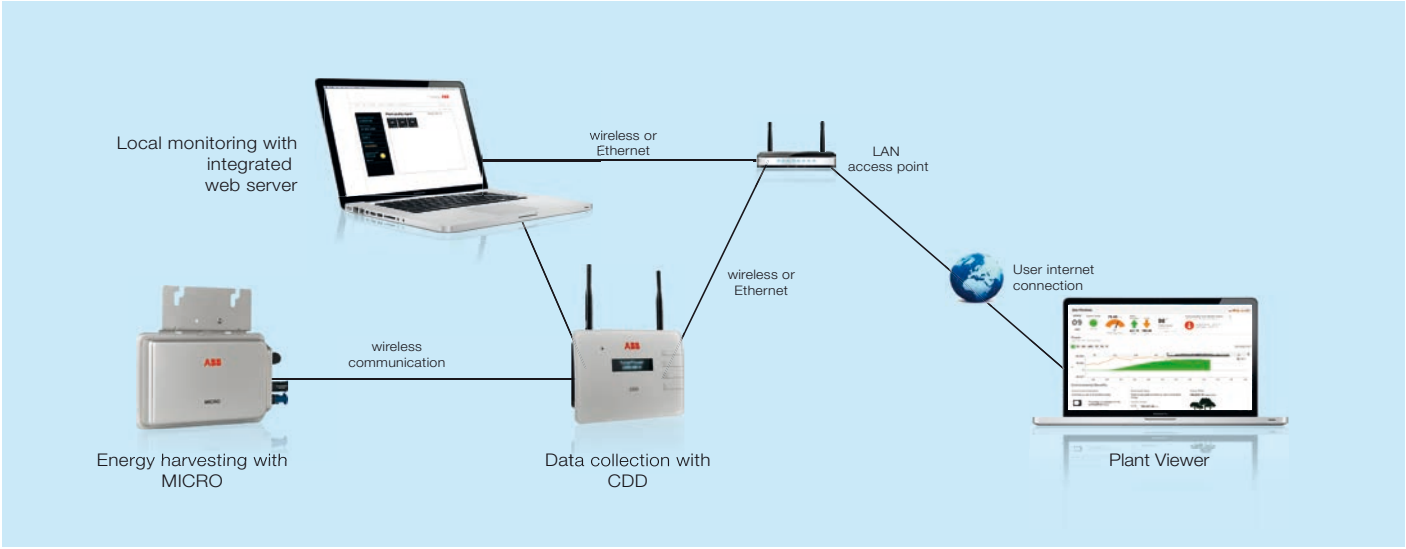
The ABB Concentrator Data Device (CDD) is the communication hub between the MICRO inverter system and plant owner.

The ABB CDD is able to provide immediate and complete feedback of the plant status in the front LED display panel, which helps with more concise monitoring and troubleshooting; thereby, reducing service calls.

For a complete and detailed status report, the integrated web server provides a local view of plant status.

Finally for remote and complete historical data presentation ABB offers the Aurora Vision® Plant Management Platform.

ABB MICRO inverter system communication



Highlights

- Available in 250W and 300W versions that can be used with most common PV modules
- Enhanced MPPT control with reduced DC input current ripple
- Easy to set up
- Individual panel level control
- Single PV module energy harvesting and monitoring
- Secure wireless interface for system monitoring and configuration means no wiring needed
- 10-year system warranty for all parts (MICRO, CDD and cabling)

Accessories

ABB MICRO inverters are connected to the AC using an AC–TRUNK BUS or with single cable drop extender.

The AC-TRUNK BUS is a 4 mm² cross section cable homologated for outdoor applications with preinstalled connectors for ABB MICRO inverters.

Once connected to the ABB MICRO inverters or terminated using the specific water-tight caps, the AC-TRUNK cable connectors guarantee IP67 environmental protection grade.

The AC accessories complete the range, making it possible to create extension cables, terminations and connections to other cables. This simplifies the installation of small and large systems alike.

Thanks to the broad temperature range and the high mechanical strength, there are no particular restrictions on the type of installation, thus increasing the design flexibility.

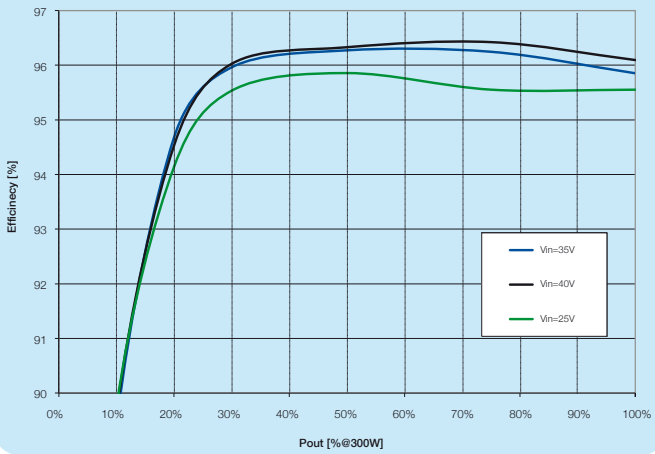
In addition to single accessories, ABB has created two kits to simplify the order procedure and reduce the excess number of components: a mounting accessories kit and an extension accessories kit.

The mounting accessories kit includes all the necessary accessories (except the AC-TRUNK BUS that has to be ordered separately) to easily proceed with the installation.

The extension accessories kit includes all the necessary accessories to extend the AC-TRUNK BUS cable with an installer's cable.

The single drop extender cable is a 0.75 mm² cross section cable, homologated for all ABB MICRO inverter products. The single drop extension cable offers maximum flexibility to the installer with 5m length and terminating with loose end.

Efficiency curves of MICRO-0.25/0.3-I



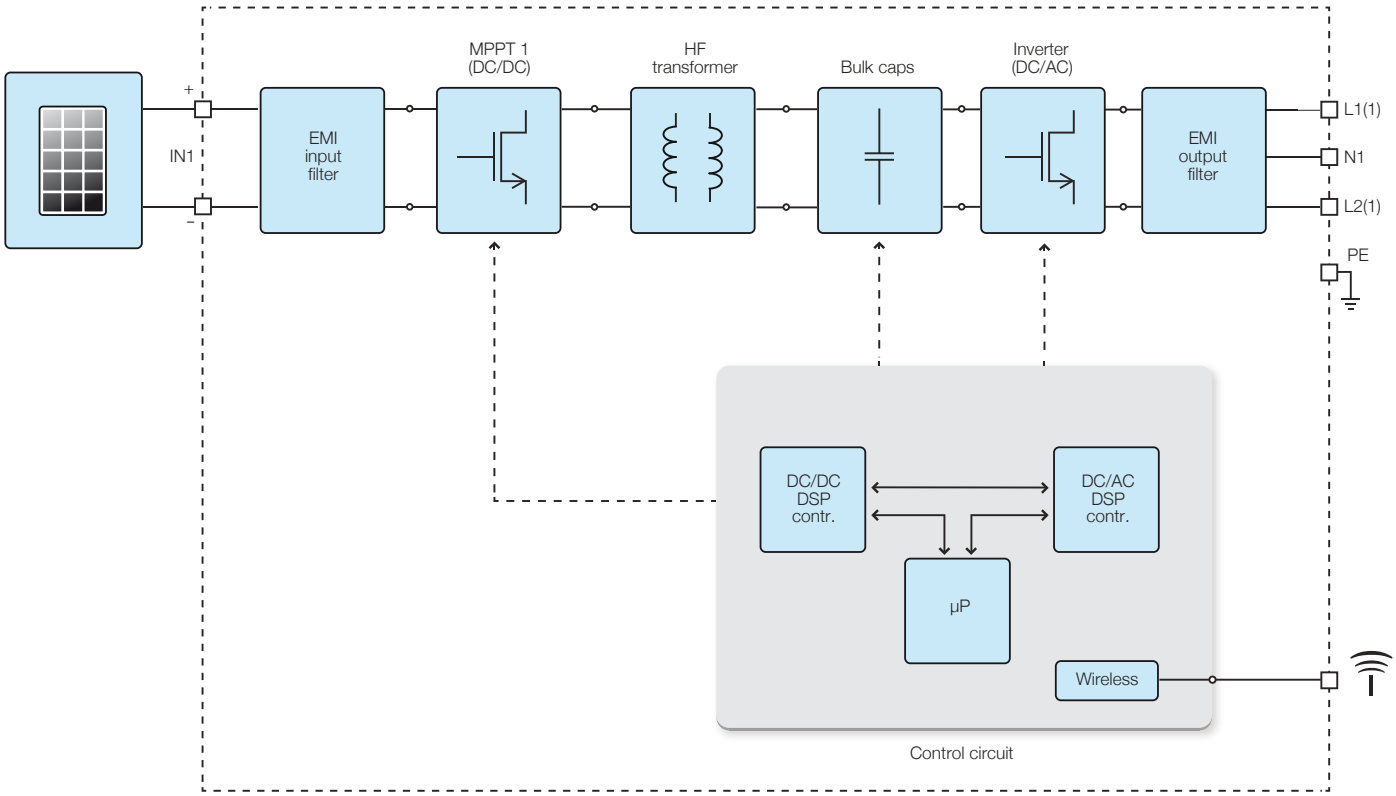
Technical data and types

Type code	MICRO-0.25-I-OUTD	MICRO-0.3-I-OUTD
Input side		
Maximum DC input power (P_{dcmax})	265 Wp	320 Wp
Operating DC input voltage range (V_{dcmin}...V_{dcmax})	12...60 V	
MPPT input DC voltage range ($V_{MPPTmin}$... $V_{MPPTmax}$)	25...50 V	30...50 V
Absolute maximum DC input voltage ($V_{max,abs}$)	65 V	
Maximum DC input current (I_{dcmax})	10.5 A	
Number of DC inputs pairs for each MPPT	1	
DC connection type	PV connector MC4	
Start-up DC input voltage (V_{start})	25V	
Output side		
AC grid connection type	Single phase	
Rated AC power ($P_{ac,r}$)	250 W	300 W
Maximum apparent power (S_{max})	250 VA(3)	300 VA(3)
Rated AC grid voltage ($V_{ac,r}$)	230 V	
AC voltage range (V_{acmin}...V_{acmax})	180...264 V (1)	
Maximum AC output current ($I_{ac,max}$)	1.3 A	1.5 A
Contributory fault current	3 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 ($Cosphi_{ac,r}$) and adjustable range	> 0.995(3)	
Maximum number of units per phase	17	
Output protection		
Anti-islanding protection	According to local standard	
Output overvoltage protection - varistor	Yes	
Operating performance		
Maximum efficiency (η_{max})	96.5%	
Weighted efficiency (η_{EURO}/η_{CEC})	95.4% / -	95.5% / -
Stand-by consumption	< 50mW	
Communication		
Monitoring system (PC/Data logger)	Wireless	
Remote monitoring	Wireless	
Environmental		
Ambient temperature range	-40...+75°C / -40...167°F with derating above 65°C (149°F)	
Relative humidity	0...100 % condensing	
Noise emission	< 30 db(A) @ 1 m	
Maximum operating altitude without derating	2000 m / 6560 ft	
Physical		
Environmental protection rating	IP 65	
Cooling	Natural	
Dimension (H x W x D)	266mm x 246mm x 35mm / 10.5" x 9.7" x 1.37"	
Weight	< 1.65 kg / 3.5 lb	
Safety		
Isolation level	HF transformer	
Marking	CE (5)	
Safety and EMC standard	EN61000-6-2, EN61000-6-3, EN61000-3-2, EN61000-3-3, EN 50178, EN62109-1, EN62109-2	
Grid standard (4)	CEI 0-21, VDE 0126-1-1, VDE-AR-N 4105, G83/2, RD1699, AS 4777	
Available products variants		
Standard	MICRO-0.25-I-OUTD-230	MICRO-0.3-I-OUTD-230

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 unit has not reactive power capability
4. The unit has not an internal disconnection device
5. Take care that an external device (i.e. CDD) shall be used in the end system installation to indicate faults.

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

Block diagram of MICRO



Technical data and types

Type code	CDD
Communication to inverter	
Type	Radio IEEE 802.15.4
Sample rate	1 min.
Max distance (free space)	50 m(1)
Max number of devices	30
Communication to modem/pc	
Wireless communication	Radio IEEE 802.11 / b - 2.4GHz / 10 Mbps
Wired communication	Ethernet RJ45 10/100 Mbps
Connectivity	
Wired ports	1x RJ45 Ethernet, (1x RS485, 1x Go-Go Relè)
Features	
Operation	Integrated web server
Power supply	
Type	External plug-in adapter
Adapter input	100...240 Vac ; 50/60 Hz
Adapter output	5 Vdc - 1 A
Power consumption	typ. 2.5W/ max. 5W
Battery	coin battery, 3Vdc, replaceable
Environmental	
Ip degree	IP20 / NEMA 1
Ambient temperature	-20...+55 °C / -4...131°F
Relative humidity	< 90% non condensing
Physical	
Dimensions (h/w/d)	150x180x25 mm / 5.9x7x1"
Weight	0.6 kg / 1.32lbs
Mounting	Wall mounting (screws provided)
Interface	
Display	16 Characters x 2 lines OLED
Display language	IT-EN-ES-DE-FR
Led	Bicolor (red and green)
Safety	
Marking	CE, cCSAus, FCC
Safety and EMC standard	EN 62311; EN 60950-1; EN 301489-1 V1.8.1;EN 301489-17 V2.1.1; EN 55022; EN 55024; FCC Part 15 Class B / Class C ; RTTE 1999/5/EC
Accessories	
Antenna extension cable	Optional
Plug-in power adapter	Included

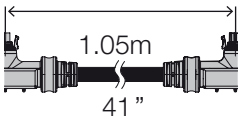
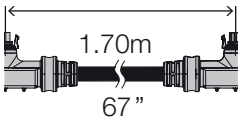
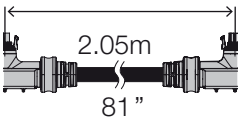
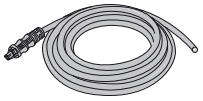
1. Actual distance is function of enviromental condition. Please refer to dedicated technial note for further information
2. Cabling and plug available but not used

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

Cable system list and details

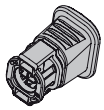
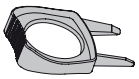
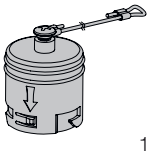
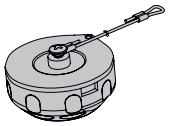
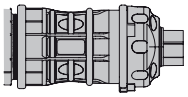
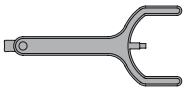
The AC-TRUNK BUS is available in three different lengths, with different pitch as shown in table below. In addition to the standard AC-TRUNK BUS, ABB provides the cable drop extender*; this cable gives the possibility to connect a single MICRO inverter to a junction box (not provided).

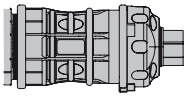
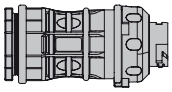
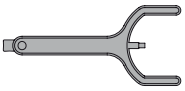
AC-TRUNK-BUS
4 junctions

AC-TRUNK-BUS-1.05m	AC-TRUNK-BUS-1.70m	AC-TRUNK-BUS-2.05m	CABLE DROP EXTENDER
 1.05m 41”	 1.70m 67”	 2.05m 81”	 5m

Accessories list and details

ABB accessories are available as discrete component for installers and now in two aggregated kits*: a mounting accessories kit and an extension accessories kit. The mounting accessories kit is used to complete the installation for a block of 4 MICRO and one AC-TRUNK BUS. The extension accessories kit is used to connect two not adiacent AC-TRUNK BUS.

MOUNTING ACCESSORIES KIT					
PLUG CAP	UNLOCK TOOL	FEMALE EXTENSION CAP	MALE EXTENSION CAP	FEMALE EXTENSION	EXTENSION UNLOCK TOOL
 4x	 1x	 1x	 1x	 1x	 1x

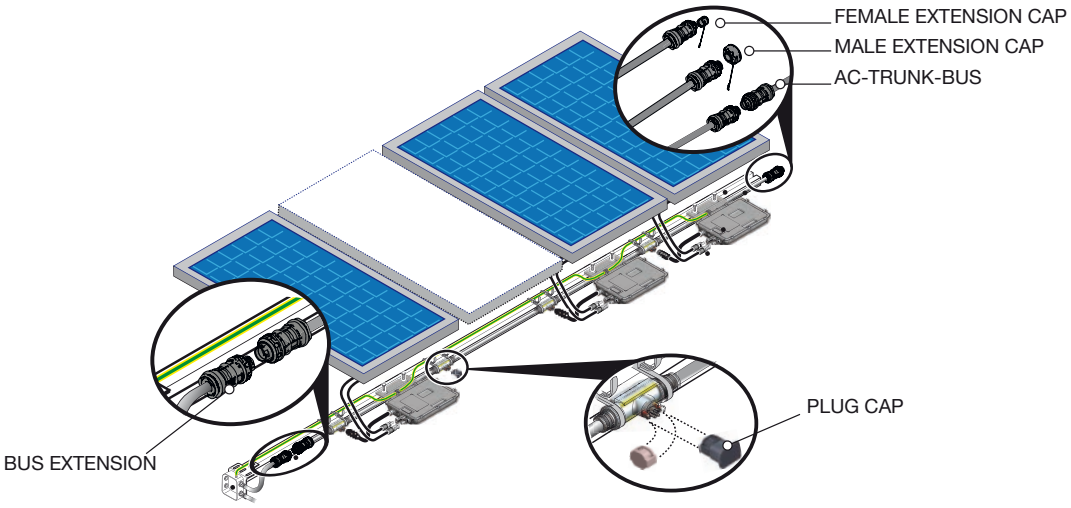
EXTENSION ACCESSORIES KIT		
FEMALE EXTENSION	MALE EXTENSION	EXTENSION UNLOCK TOOL
 1x	 1x	 1x

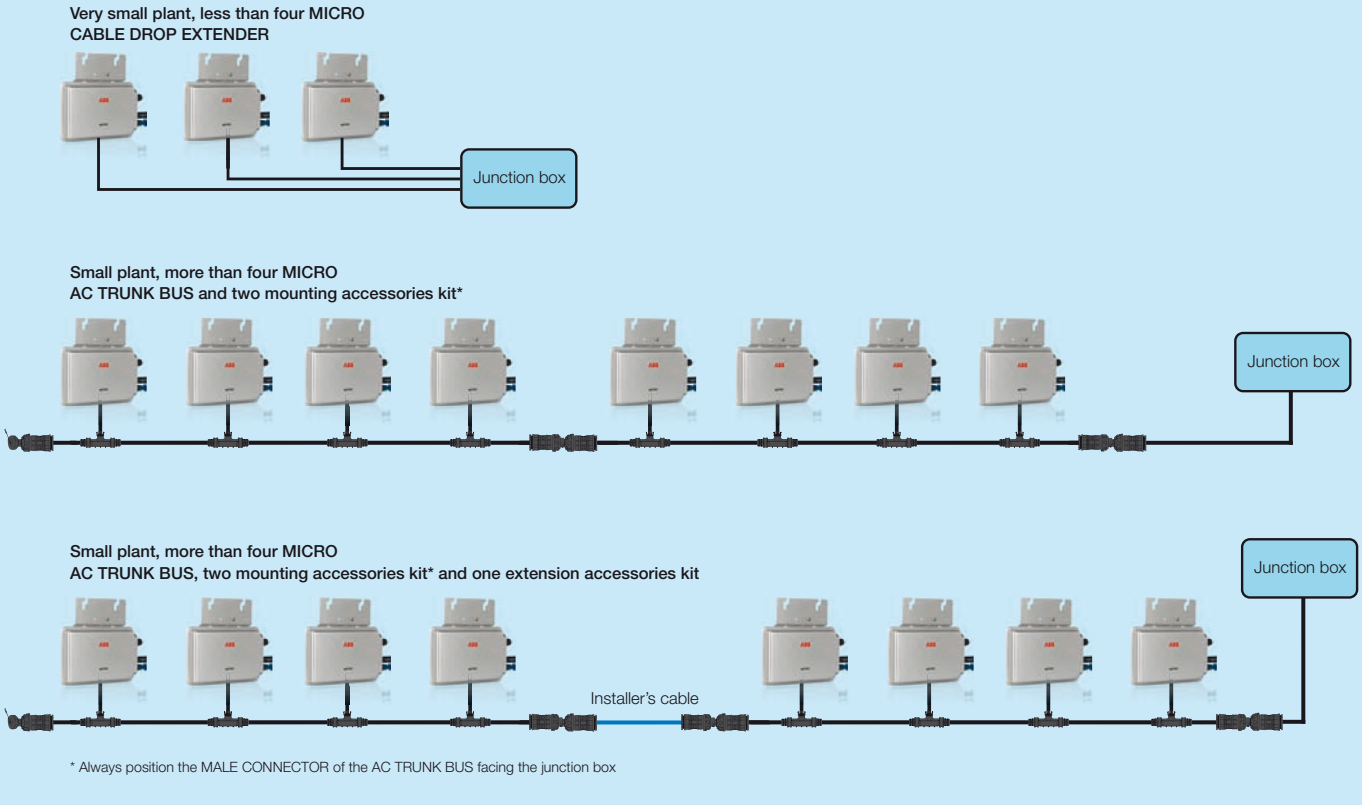
*Product availability may vary in different countries.

Technical data and types

Technical specifications of the cable	AC TRUNK BUS	CABLE DROP EXTENDER
Number of conductors and cross section	3G4 mm²	3G0.75mm²
Minimum radius of curvature for fixed installation	48 mm	40 mm
Operating temperature (mobile installation)	-40 to +90°C	-40 to +90°C
Rated voltage u0/u	450 / 750 V	450 / 750 V
Specific resistance of the insulation	>10 GΩ·cm	> 100 G ·cm
Test voltage	3 kV	6.5 kV
External sheathing	Black PUR Black	XLPO Jacket
Cable type	H07BQ-F	2pfg 1940
Specifications of the connectors		
Operating temperature	-40°C to +90°C	-40 to + 105°C
Protection class	IP67	IP67
Connector rated current	5 A	5 A
Connector rated voltage	300 V	300 V
Extension connector rated current	25 A	-
Extension connector rated voltage	660 V	-

Installation examples





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 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.

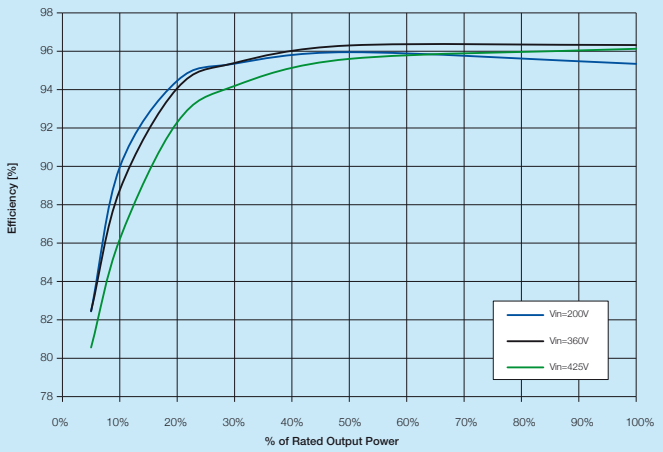
In addition to its new look, this inverter has new features including a special built-in heat sink compartment and front panel display system.

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

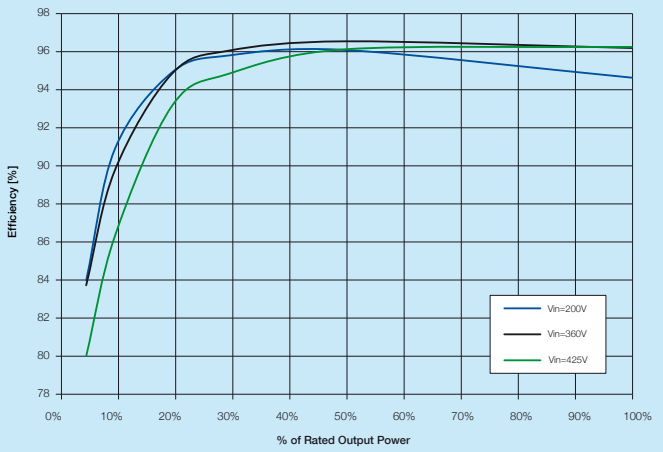
Highlights

- Single phase output
- High frequency isolated topology
- Each inverter is set on specific grid codes which can be selected in the field
- Wide input 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



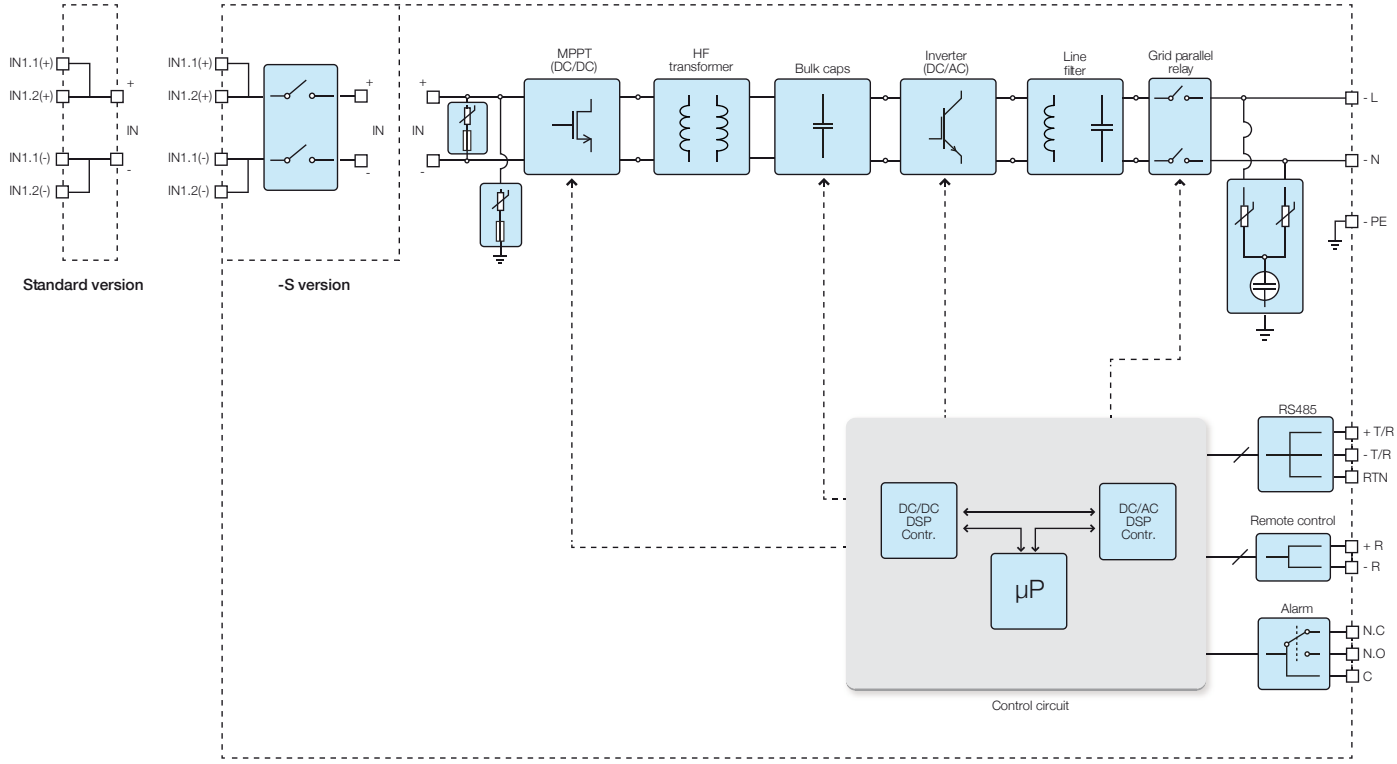
Efficiency curves of UNO-2.5-I-OUTD



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_{dcmin}...V_{dcmax})	0.7 x V_{start}...520 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 [470V≤V_{MPPT}≤520V]	2900 W Linear derating from max to null [470V≤V_{MPPT}≤520V]
MPPT input DC voltage range ($V_{MPPTmin}$ ... $V_{MPPTmax}$) at P_{acr}	200...470 V	200...470 V
Maximum DC input current (I_{dcmax}) / 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	Tool Free PV connector WM / MC4	
Input protection		
Reverse polarity protection	Yes, from limited current source	
Input over voltage protection for each MPPT - varistor	2	
Photovoltaic array isolation control	According to local standard	
DC switch rating for each MPPT (version with DC switch)	16 A / 600 V	
Output side		
AC grid connection type	Single phase	
Rated AC power (P_{acr} @cosϕ=1)	2000 W	2500 W
Maximum AC output power (P_{acmax} @cosϕ=1)	2200 W (4)	2750 W (5)
Rated AC grid voltage ($V_{ac,r}$)	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_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	> 0.990(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 AC overcurrent protection	15.0 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	
Stand-by consumption	< 8.0 W [3]	
Communication		
Wired local monitoring	PVI-USB-RS232_485 (opt.)	
Remote monitoring	VSN300 Wifi Logger Card[9] (opt.), PVI-AEC-EVO (opt.), VSN700 Data Logger (opt.)	
Wireless local monitoring	VSN300 Wifi Logger Card[9] (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	
Noise emission	< 50 dB(A) @ 1 m	
Maximum operating altitude without derating	2000 m / 6560 ft	
Physical		
Environmental protection rating	IP 65	
Cooling	Natural	
Dimension (H x W x D)	518mm x 367mm x 161mm / 20.4" x 14.4" x 6.3"	
Weight	< 17 kg / 37.4 lb	
Mounting system	Wall bracket	
Safety		
Isolation level	HF transformer	HF transformer
Marking	CE (50 Hz only)	CE (50 Hz only)
Safety and EMC standard	EN 50178, EN62109-1, EN62109-2, AS/NZS3100, AS/NZS 60950, EN61000-6-2, EN61000-6-3, EN61000-3-2, EN61000-3-3	
Grid standard (check your sales channel for availability)	CEI 0-21[6], VDE 0126-1-1, VDE-AR-N 4105[7], G83/2, EN 50438 (not for all national appendices), RD1699, AS 4777, C10/11, IEC 61727, ABNT NBR 16149, CLC/FprTS 50549	
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. Night time consumption < 0.6W
4. Limited to 2000 W for Germany
5. Limited to 2500 W for Germany
6. Limited to plant power ≤3kW
7. Limited to plant power ≤3.68kVA
8. The unit has not reactive power capability
9. Check availability before to order

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.

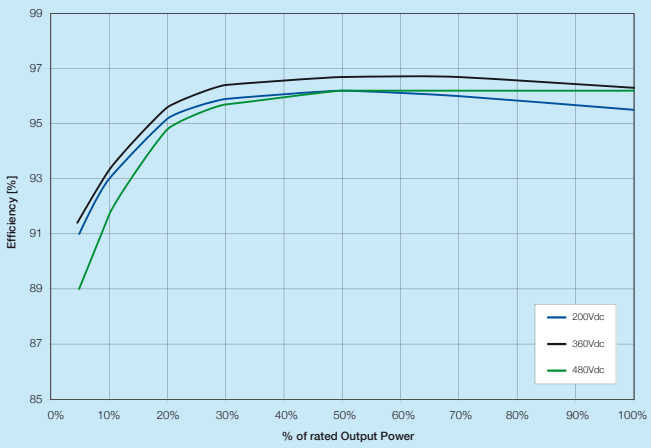
This rugged outdoor inverter has been designed as a completely sealed unit to withstand the harshest environmental conditions.

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

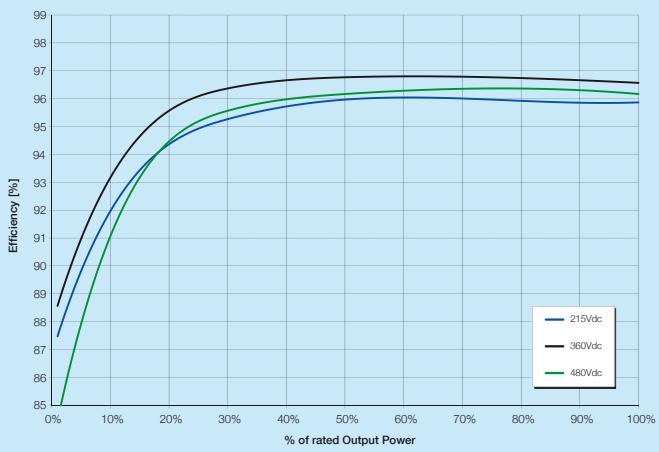
Highlights

- Single phase output
- Transformerless topology
- Each inverter is set on specific grid codes which can be selected in the field
- Wide input range
- High speed and precise MPPT algorithm for real time power tracking and improved energy harvesting
- Dual input section with independent MPP tracking, 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



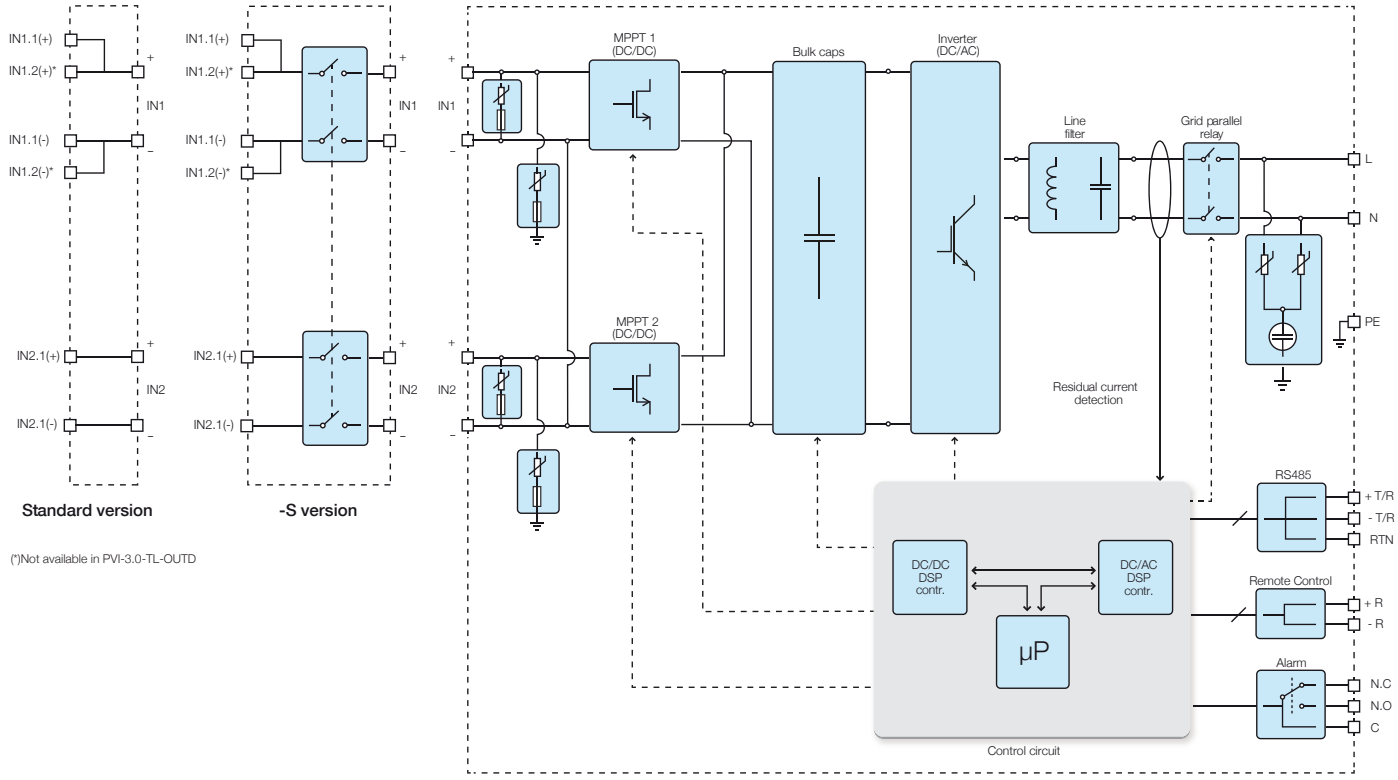
Efficiency curves of PVI-4.2-TL-OUTD



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_{dcmin}...V_{dcmax})	0.7 x V_{start}...580 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 [530V≤V_{MPPT}≤580V]		
DC power limitation for each MPPT with independent configuration of MPPT at P_{acr}, max unbalance example	2000 W [200V≤V_{MPPT}≤530V] the other channel: P_{dcr}-2000W [112V≤V_{MPPT}≤530V]	3000 W [190V≤V_{MPPT}≤530V] the other channel: P_{dcr}-3000W [90V≤V_{MPPT}≤530V]	
Maximum DC input current (I_{dcmax}) / 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	2 for MPPT1 and 1 for MPPT2
DC connection type	Tool Free PV connector WM / MC4		
Input protection			
Reverse polarity protection	Yes, from limited current source		
Input over voltage protection for each MPPT - varistor	2		
Photovoltaic array isolation control	According to local standard		
DC switch rating for each MPPT (version with DC switch)	25 A / 600 V		
Output side			
AC grid connection type	Single phase		
Rated AC power (P_{acr} @cosϕ=1)	3000 W	3600 W	4200 W
Maximum AC output power (P_{acmax} @cosϕ=1)	3300 W (4)	4000 W (5)	4600 W (6)
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(3)		
Nominal power factor and adjustable range	> 0.995, adj. ± 0.9 with P_{acr}=3.0 kW	> 0.995, adj. ± 0.9 with P_{acr}=3.6 kW	> 0.995, adj. ± 0.9 with P_{acr}=4.2 kW
Total current harmonic distortion	< 3.5 %	< 3.5 %	< 3.5 %
AC connection type	Screw terminal block, cable gland M25		
Output protection			
Anti-islanding protection	According to local standard		
Maximum AC overcurrent protection	16.0 A	19.0 A	22.0 A
Output overvoltage protection - varistor	2 (L - N / L - PE)		

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



(*)Not available in PVI-3.0-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		
Stand-by consumption	< 8.0 W		
Communication			
Wired local monitoring	PVI-USB-RS232_485 (opt.)		
Remote monitoring	VSN300 Wifi Logger Card[7] (opt.), PVI-AEC-EVO (opt.), VSN700 Data Logger (opt.)		
Wireless local monitoring	VSN300 Wifi Logger Card[7] (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		
Noise emission	< 50 dB(A) @ 1 m		
Maximum operating altitude without derating	2000 m / 6560 ft		
Physical			
Environmental protection rating	IP 65		
Cooling	Natural		
Dimension (H x W x D)	618mm x 325mm x 222mm / 24.3” x 12.8” x 8.7”		
Weight	17.5 kg / 38.5 lb		
Mounting system	Wall bracket		
Safety			
Isolation level	Transformerless		
Marking	CE (50 Hz only)		
Safety and EMC standard	EN62109-1, EN62109-2, AS/NZS3100, AS/NZS 60950, EN61000-6-1, EN61000-6-3, EN61000-3-2, EN61000-3-3	EN62109-1, EN62109-2, AS/NZS3100, AS/NZS 60950, EN61000-6-1, EN61000-6-3, EN61000-3-11, EN61000-3-12	EN62109-1, EN62109-2, AS/NZS3100, AS/NZS 60950, EN61000-6-1, EN61000-6-3, EN61000-3-11, EN61000-3-12
Grid standard (check your sales channel for availability)	CEI 0-21, VDE 0126-1-1, VDE-AR-N 4105, G83/2, EN 50438 (not for all national appendices), RD1699, AS 4777, C10/11, IEC 61727, ABNT NBR 16149, CLC/FprTS 50549	CEI 0-21, VDE 0126-1-1, VDE-AR-N 4105, G83/2, G59/3, EN 50438 (not for all national appendices), RD1699, AS 4777, C10/11, IEC 61727, ABNT NBR 16149, CLC/FprTS 50549, PEA, MEA	CEI 0-21, VDE 0126-1-1, VDE-AR-N 4105, G59/3, EN 50438 (not for all national appendices), RD1699, AS 4777, C10/11, IEC 61727, ABNT NBR 16149, CLC/FprTS 50549
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 3.68kW.
3. The Frequency range may vary depending on specific country grid standard
4. Limited to 3000 W for Germany
5. Limited to 3600 W for Germany
6. Limited to 4200 W for Germany
7. Check availability before to order

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

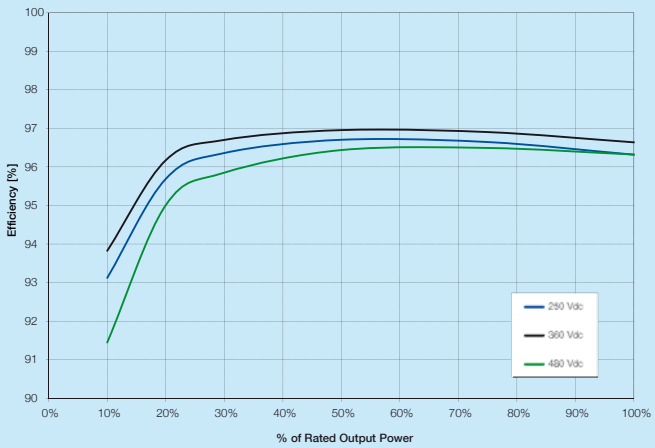
The wide input voltage range makes the inverter suitable for low power installations with reduced string size.
Flat efficiency curves ensure high efficiency at all output levels ensuring consistent and stable performance across the entire input voltage and output power range.

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

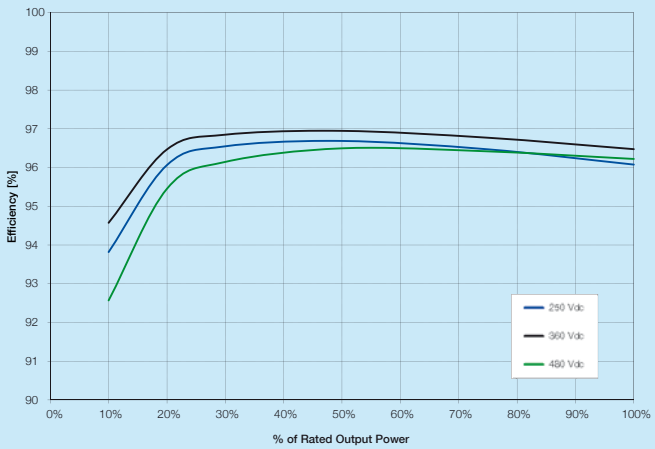
Highlights

- 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 MPP tracking, allows optimal energy harvesting from two sub-arrays oriented in different directions
- Wide input 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



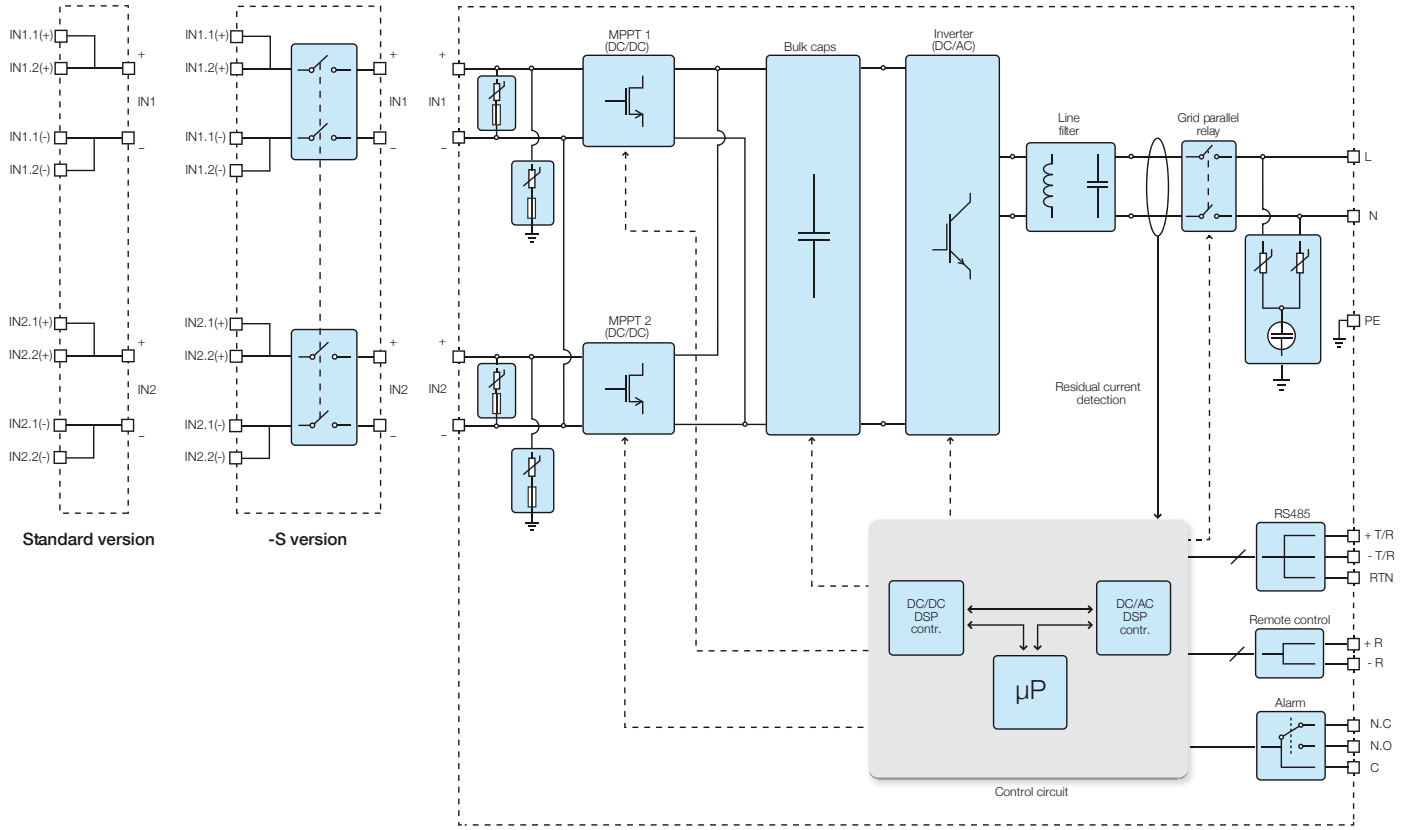
Efficiency curves of PVI-6000-TL-OUTD



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_{dcmin}...V_{dcmax})	0.7 x V_{start}...580 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 [530V≤V_{MPPT}≤580V]	
DC power limitation for each MPPT with independent configuration of MPPT at P_{acr}, max unbalance example	4000 W [220V≤V_{MPPT}≤530V] the other channel: P_{dcr}-4000W [90V≤V_{MPPT}≤530V]	4000 W [220V≤V_{MPPT}≤530V] the other channel: P_{dcr}-4000W [120V≤V_{MPPT}≤530V]
Maximum DC input current (I_{dcmax}) / 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	Tool Free PV connector WM / MC4	
Input protection		
Reverse polarity protection	Yes, from limited current source	
Input over voltage protection for each MPPT - varistor	2	
Photovoltaic array isolation control	According to local standard	
DC switch rating for each MPPT (version with DC switch)	25 A / 600 V	
Output side		
AC grid connection type	Single phase	
Rated AC power (P_{acr} @cosφ=1)	5000 W	6000 W
Maximum AC output power (P_{acmax} @cosφ=1)	5000 W	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. ± 0.9 with P_{acr}=5.0 kW	> 0.995, adj. ± 0.9 with P_{acr}=6.0 kW
Total current harmonic distortion	< 3.5%	
AC connection type	Terminal block, cable glande M32	

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



Technical data and types

Type code	PVI-5000-TL-OUTD	PVI-6000-TL-OUTD
Output protection		
Anti-islanding protection	According to local standard	
Maximum AC overcurrent protection	32.0 A	40.0 A
Output overvoltage protection - varistor	2 (L - N / L - PE)	
Operating performance		
Maximum efficiency (η_{max})	97.0%	
Weighted efficiency (EURO/CEC)	96.4% / -	
Feed in power threshold	10.0 W	
Stand-by consumption	< 8.0 W	< 8.0 W
Communication		
Wired local monitoring	PVI-USB-RS232_485 (opt.)	
Remote monitoring	VSN300 Wifi Logger Card[3] (opt.), PVI-AEC-EVO (opt.), VSN700 Data Logger (opt.)	
Wireless local monitoring	VSN300 Wifi Logger Card[3] (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	
Noise emission	<50 dB(A) @ 1 m	
Maximum operating altitude without derating	2000 m / 6560 ft	
Physical		
Environmental protection rating	IP 65	
Cooling	Natural	
Dimension (H x W x D)	810mm x 325mm x 222mm / 31.9" x 12.8" x 8.7"	
Weight	< 26.0 kg / 57.3 lb	
Mounting system	Wall bracket	
Safety		
Isolation level	Transformerless	
Marking	CE (50 Hz only)	
Safety and EMC standard	EN62109-1, EN62109-2, AS/NZS3100, AS/NZS 60950, EN61000-6-1, EN61000-6-3, EN61000-3-11, EN61000-3-12	
Grid standard (check your sales channel for availability)	CEI 0-21, VDE 0126-1-1, G59/3, EN 50438 (not for all national appendices), RD1699, AS 4777, C10/11, IEC 61727, ABNT NBR 16149, CLC/FprTS 50549, PEA, MEA	CEI 0-21, VDE 0126-1-1, G59/3, EN 50438 (not for all national appendices), RD1699, AS 4777, C10/11, IEC 61727, ABNT NBR 16149, CLC/FprTS 50549
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. Check availability before to order

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

These new additions to the TRIO family are small, light and built smart. 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.

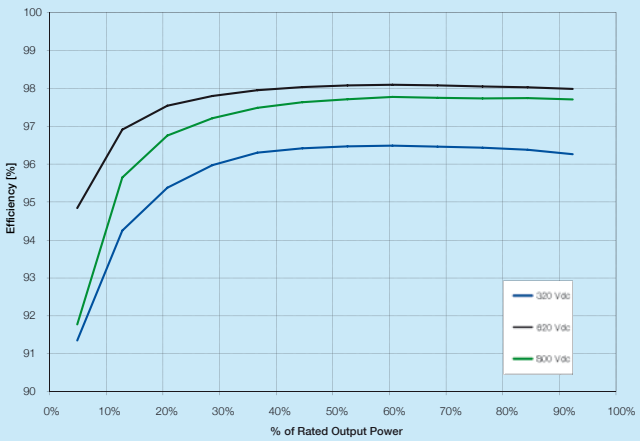
A compact Ethernet expansion card provides data logging functionality for monitoring the main parameters of the plant as well as advanced O&M operations both locally (with the integrated webserver) and remotely (with the AV Plant Portfolio Manager portal), via a LAN connection.

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.

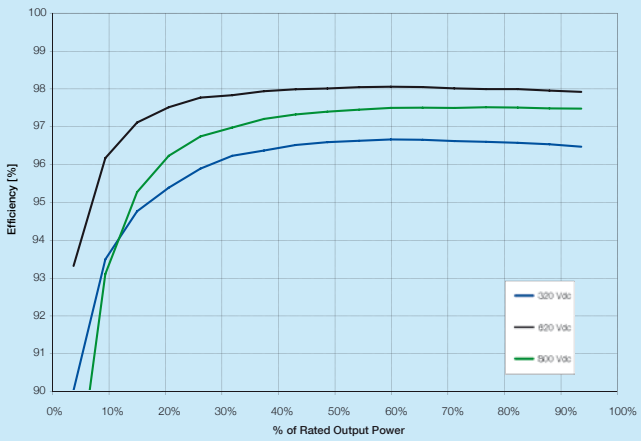
Highlights

- True 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 ensuring 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
- Datalogger 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 (24V, 100mA)

Efficiency curves of TRIO-5.8-TL-OUTD



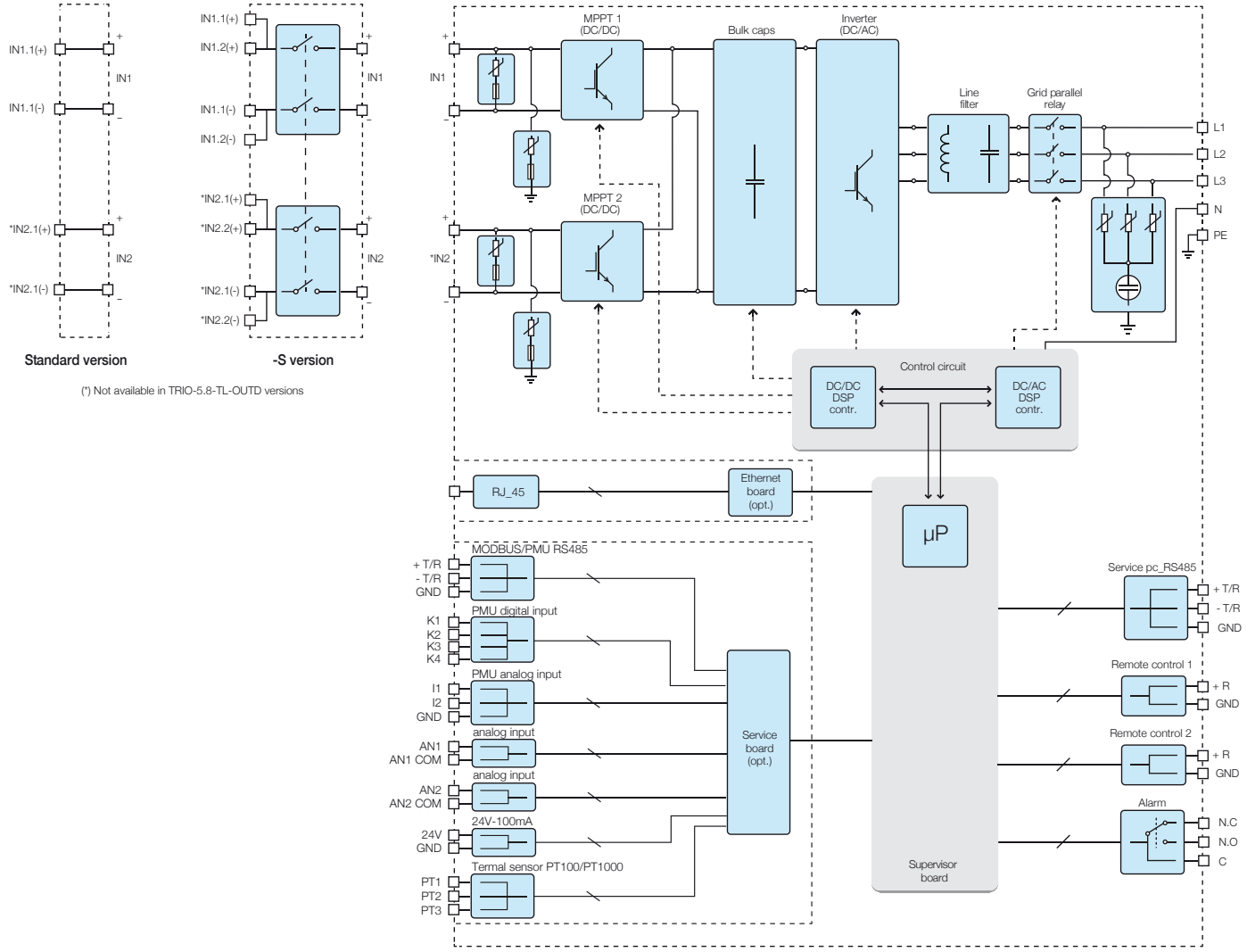
Efficiency curves of TRIO-8.5-TL-OUTD



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_{dcmin}...V_{dcmax})	0.7 x V_{start}...950 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 [800V≤V_{MPPT}≤950V]	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 [800V≤V_{MPPT}≤950V]	
DC power limitation for each MPPT with independent configuration of MPPT at P_{acr}, max unbalance example	-	4800 W [320V≤V_{MPPT}≤800V] the other channel: P_{dcr}-4800W [215V≤V_{MPPT}≤800V]	4800 W [320V≤V_{MPPT}≤800V] the other channel: P_{dcr}-4800W [290V≤V_{MPPT}≤800V]
Maximum DC input current (I_{dcmax}) / 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	Tool Free PV connector WM / MC4 (Screw terminal block on standard version)		
Input protection			
Reverse polarity protection	Yes, from limited current source		
Input over voltage protection for each MPPT - varistor	2		
Photovoltaic array isolation control	According to local standard		
DC switch rating for each MPPT (version with DC switch)	16 A /1000 V, 25 A / 800 V		
Output side			
AC grid connection type	Three phase 3W 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 ($V_{ac,r}$)	400 V		
AC voltage range	320...480 V (1)		
Maximum AC output current ($I_{ac,max}$)	10.0 A	12.5 A	14.5 A
Contributory fault current	12.0 A	14.5 A	16.5 A
Rated output frequency (f_r)	50 Hz / 60 Hz		
Output frequency range (f_{min}...f_{max})	47...53 Hz / 57...63 Hz(2)		
Nominal power factor and adjustable range	> 0.995, adj. ± 0.9 with P_{acr} =5.22 kW, ± 0.8 with max 5.8 kVA	> 0.995, adj. ± 0.9 with P_{acr} =6.75 kW, ± 0.8 with max 7.5 kVA	> 0.995, adj. ± 0.9 with P_{acr} =7.65 kW, ± 0.8 with max 8.5 kVA
Total current harmonic distortion	< 2%		
AC connection type	Screw terminal block, cable gland M32		
Output protection			
Anti-islanding protection	According to local standard		
Maximum AC overcurrent protection	10.5 A	13.0 A	15.0 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
Stand-by consumption	< 15W	< 15W	< 15W

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[3] (opt.), PVI-AEC-EVO (opt.), VSN700 Data Logger (opt.)		
Wireless local monitoring	VSN300 Wifi Logger Card[3] (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		
Noise emission	< 45 dB(A) @ 1 m		
Maximum operating altitude without derating	2000 m / 6560 ft		
Physical			
Environmental protection rating	IP 65		
Cooling	Natural		
Dimension (H x W x D)	641mm x 429mm x 220mm/ 25.2" x 16.9" x 8.7" (855mm x 429mm x 237mm/ 33.7" x 16.9" x 9.3"with open front cover)		
Weight	25.0 kg / 55.1 lb	28.0 kg / 61.7 lb	28.0 kg / 61.7 lb
Mounting system	Wall bracket		
Safety			
Isolation level	Transformerless		
Marking	CE (50 Hz only)		
Safety and EMC standard	EN62109-1, EN62109-2, AS/NZS3100, AS/NZS 60950, EN61000-6-2, EN61000-6-3, EN61000-3-2, EN61000-3-3		
Grid standard (check your sales channel for availability)	CEI 0-21, CEI 0-16, VDE 0126-1-1, VDE-AR-N 4105, G83/2, C10/11, EN 50438 (not for all national appendices), RD1699, RD 1565, ABNT NBR 16149, NRS-097-2-1, CLC/FprTS 50549		
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. Check availability before to order

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

ABB string inverters
PVI-10.0/12.0-I-OUTD
10 to 12 kW

Designed for commercial usage, this 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, precise Multiple Power Point Tracker (MPPT) algorithm enables real-time power tracking and improved energy harvesting.

This device has two independent MPPTs and efficiency ratings of up to 97.3%.

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

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

Dual input section with independent MPP tracking, allows for optimal energy harvesting from two sub-arrays oriented in different directions.

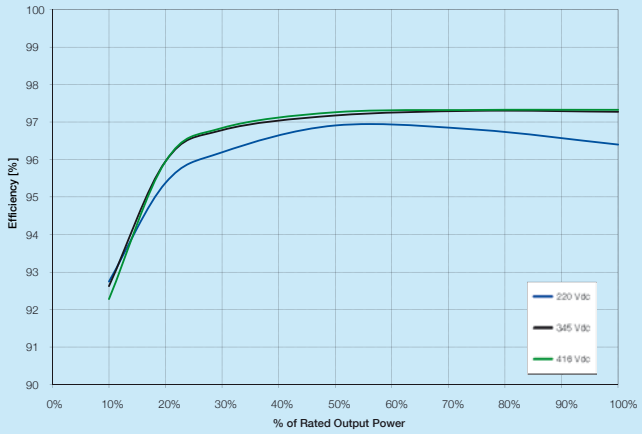
Each inverter is set on specific grid codes which can be selected in the field.

The outdoor enclosure provides unrestricted usage under any environmental condition.

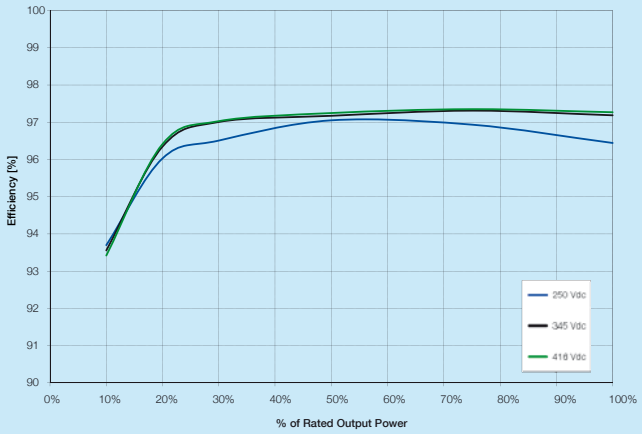
Highlights

- True three-phase bridge topology for DC/AC output converter
- The HF isolation allows positive or negative ground configuration
- The unit is free of electrolytic capacitors, leading to a longer product lifetime
- Night wake up button to access energy harvesting data and error log
- 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 (IP65)
- RS-485 communication interface (for connection to laptop or data logger)

Efficiency curves of PVI-10.0-I-OUTD



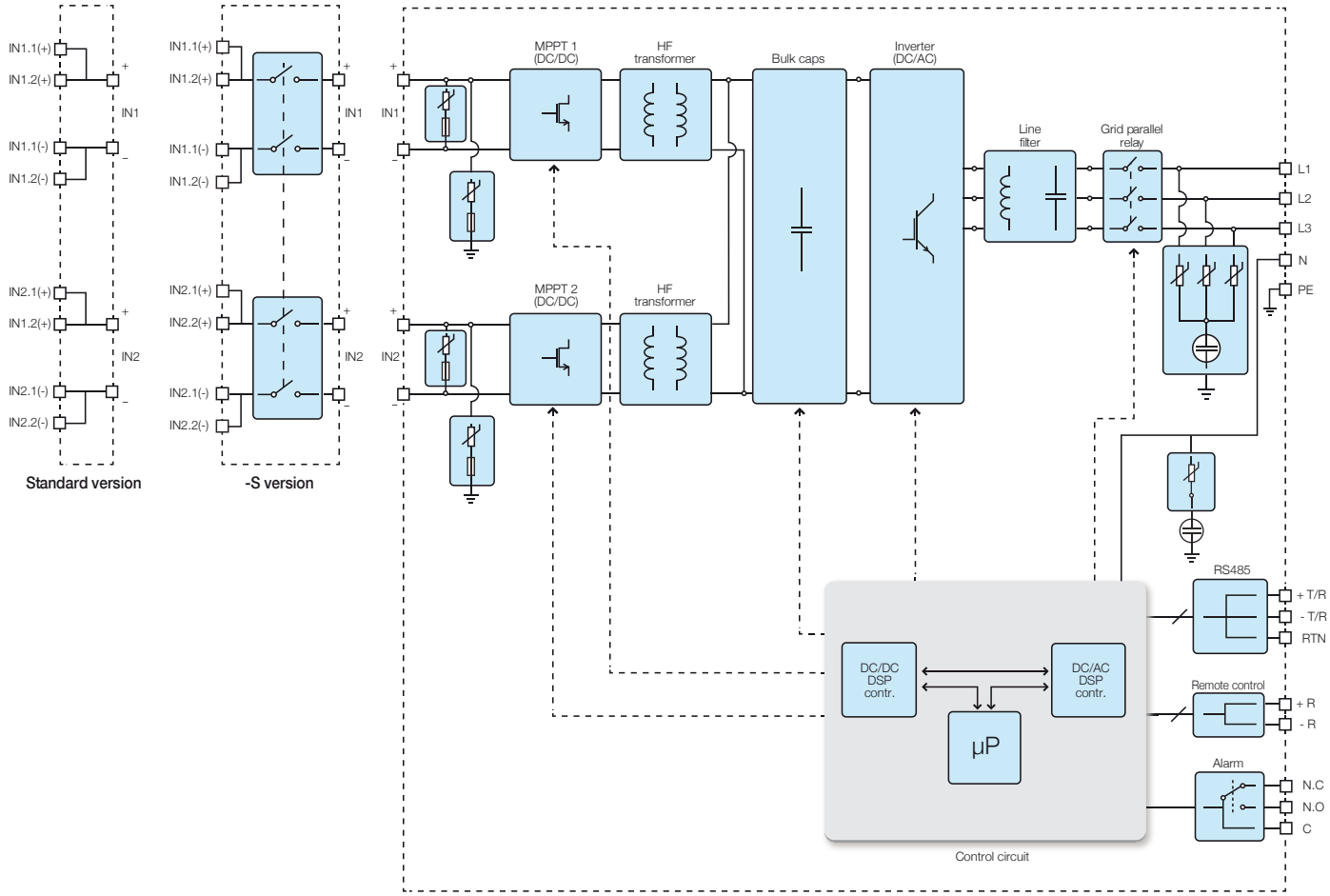
Efficiency curves of PVI-12.0-I-OUTD



Technical data and types

Type code	PVI-10.0-I-OUTD-400	PVI-12.0-I-OUTD-400
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_{dcmin}...V_{dcmax})	0.7 x V_{start}...520 V	
Rated DC input voltage (V_{dcr})	345 V	
Rated DC input power (P_{dcr})	10500 W	12300 W
Number of independent MPPT	2 (5)	
Maximum DC input power for each MPPT ($P_{MPPTmax}$)	6800 W	
DC input voltage range with parallel configuration of MPPT at P_{acr}	220...470 V	250...470 V
DC power limitation with parallel configuration of MPPT	Linear derating from max to null [470V≤V_{MPPT}≤520V]	
DC power limitation for each MPPT with independent configuration of MPPT at P_{acr}, max unbalance example	6800 W [285V≤V_{MPPT}≤470V] the other channel: P_{dcr}-6800W [155V≤V_{MPPT}≤470V]	6800 W [275V≤V_{MPPT}≤470V] the other channel: P_{dcr}-6800W [220V≤V_{MPPT}≤470V]
Maximum DC input current (I_{dcmax}) / for each MPPT ($I_{MPPTmax}$)	48.0 A / 24.0 A	50.0 A / 25.0 A
Maximum input short circuit current for each MPPT	29.0 A	
Number of DC inputs pairs for each MPPT	2	
DC connection type	Tool Free PV connector WM / MC4	
Input protection		
Reverse polarity protection	Yes, from limited current source	
Input over voltage protection for each MPPT - varistor	2	
Photovoltaic array isolation control	According to local standard	
DC switch rating for each MPPT (version with DC switch)	32 A / 600 V	
Output side		
AC grid connection type	Three phase 3W or 4W+PE	
Rated AC power (P_{acr} @cosϕ=1)	10000 W	12000 W
Maximum AC output power (P_{acmax} @cosϕ=1)	11000 W (3)	12500 W (4)
Maximum apparent power (S_{max})	11100 VA	13300 VA
Rated AC grid voltage ($V_{ac,r}$)	400 V	
AC voltage range	320...480 V (1)	
Maximum AC output current ($I_{ac,max}$)	16.0 A	18.0 A
Contributory fault current	25.0 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} =10.0 kW	> 0.995, adj. ± 0.9 with P_{acr} =12.0 kW
Total current harmonic distortion	< 2%	
AC connection type	Screw terminal block, cable gland M40	
Output protection		
Anti-islanding protection	According to local standard	
Maximum AC overcurrent protection	20.0 A	
Output overvoltage protection - varistor	3 plus gas arrester	

Block diagram of PVI-10.0/12.0-I-OUTD



Technical data and types

Type code	PVI-10.0-I-OUTD-400	PVI-12.0-I-OUTD-400
Operating performance		
Maximum efficiency (η_{max})	97.3%	
Weighted efficiency (EURO/CEC)	97.0% / -	
Feed in power threshold	30 W	
Stand-by consumption	< 8 W	
Communication		
Wired local monitoring	PVI-USB-RS232_485 (opt.)	
Remote monitoring	VSN300 Wifi Logger Card[6] (opt.), PVI-AEC-EVO (opt.), VSN700 Data Logger (opt.)	
Wireless local monitoring	VSN300 Wifi Logger Card[6] (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 45°C/113°F
Relative humidity	0...100% condensing	
Noise emission	< 50 dB(A) @ 1 m	
Maximum operating altitude without derating	2000 m / 6560 ft	
Physical		
Environmental protection rating	IP 65	
Cooling	Natural	
Dimension (H x W x D)	716mm x 645mm x 222mm / 28.2" x 25.4" x 8.7"	
Weight	< 45.8 kg / 99.0 lb	
Mounting system	Wall bracket	
Safety		
Isolation level	HF transformer	
Marking	CE (50 Hz only)	
Safety and EMC standard	EN 50178, EN62109-1, EN62109-2, AS/NZS3100, AS/NZS 60950, EN61000-3-2, EN61000-3-3, EN61000-6-2, EN61000-6-3	EN 50178, EN62109-1, EN62109-2, AS/NZS3100, AS/NZS 60950, EN61000-6-2, EN61000-6-3, EN61000-3-11, EN61000-3-12
Grid standard (check your sales channel for availability)	CEI 0-21, CEI 0-16, VDE 0126-1-1, VDE-AR-N 4105, G83/2, G59/3, C10/11, EN 50438 (not for all national appendices), RD1699, RD 1565, AS 4777, ABNT NBR 16149, CLC/FprTS 50549	CEI 0-21, CEI 0-16, VDE 0126-1-1, VDE-AR-N 4105, G59/3, C10/11, EN 50438 (not for all national appendices), RD1699, RD 1565, AS 4777, ABNT NBR 16149, CLC/FprTS 50549
Available products variants		
Standard	PVI-10.0-I-OUTD-400	PVI-12.0-I-OUTD-400
With DC switch	PVI-10.0-I-OUTD-S-400	PVI-12.0-I-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. Limited to 10000 W for Belgium and Germany
4. Limited to 12000 W for Germany
5. Independent MPPT just with negative ground
6. Check availability before to order

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%.

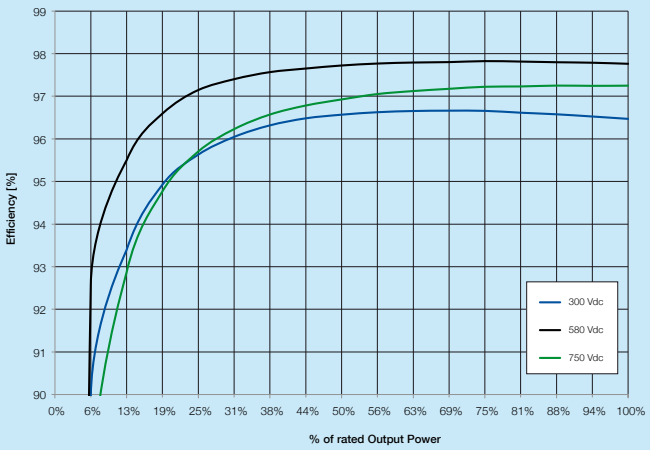
Flat efficiency curves ensure high efficiency at all output levels ensuring consistent and stable performance across the entire input voltage and output power range.

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

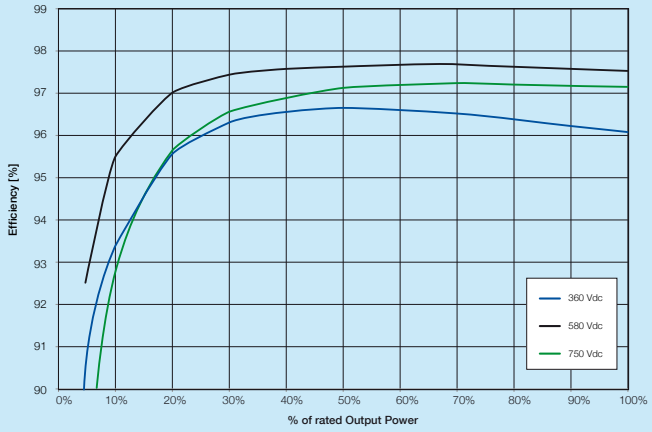
Highlights

- 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 range
- Dual input section with independent MPPT allows optimal energy harvesting from two sub-arrays oriented in different directions
- 'Electrolyte-free' power converter to further increase the life expectancy and long term reliability
- 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



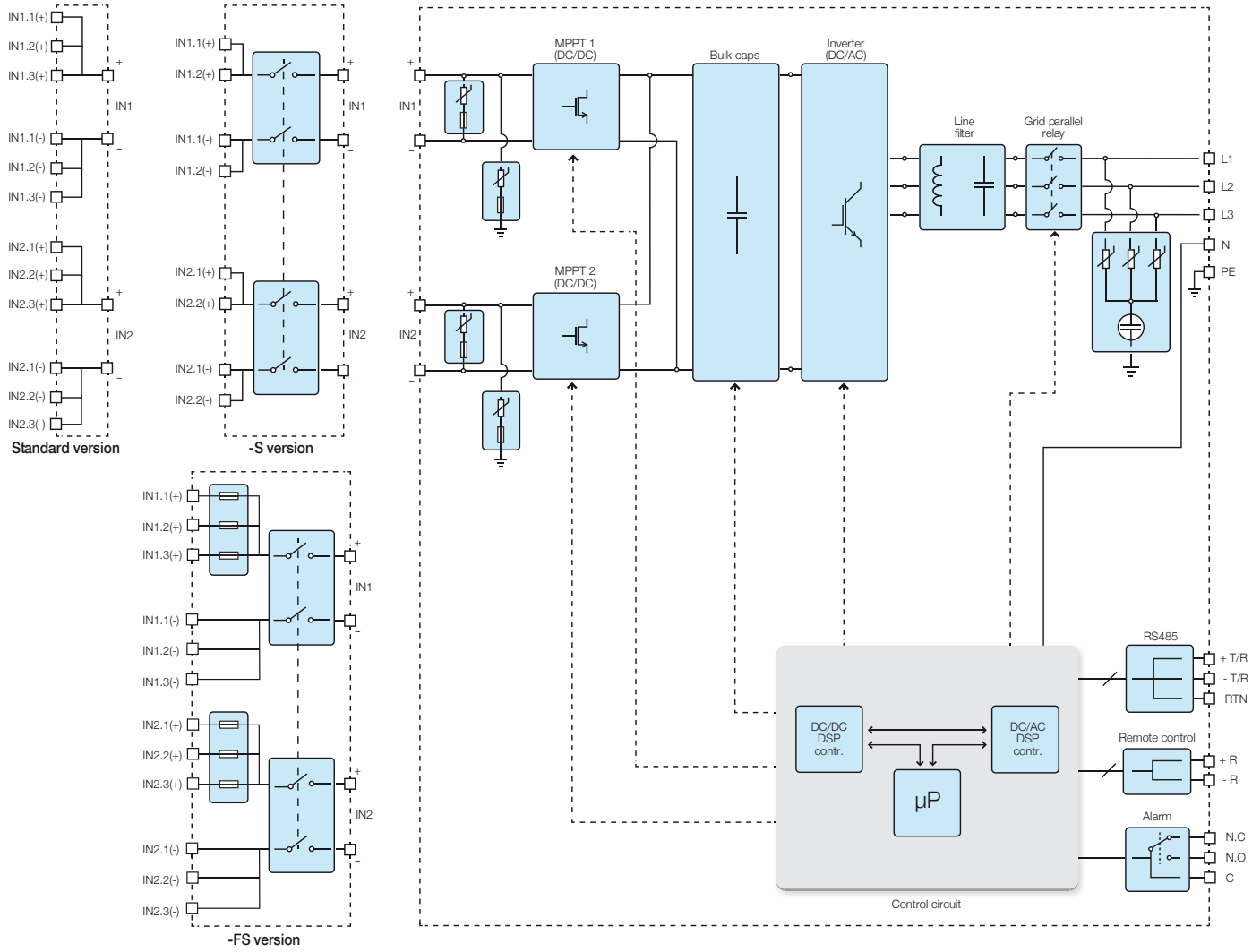
Efficiency curves of PVI-12.5-TL-OUTD



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_{dcmin}...V_{dcmax})	0.7 x V_{start}...850 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_{acr}	300...750 V	360...750 V
DC power limitation with parallel configuration of MPPT	Linear derating from max to null [750V≤V_{MPPT}≤850V]	
DC power limitation for each MPPT with independent configuration of MPPT at P_{acr}, max unbalance example	6500 W [380V≤V_{MPPT}≤750V] the other channel: P_{dcr}-6500W [225V≤V_{MPPT}≤750V]	8000 W [445V≤V_{MPPT}≤750V] the other channel: P_{dcr}-8000W [270V≤V_{MPPT}≤750V]
Maximum DC input current (I_{dcmax}) / 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 (-S version) 3 (Standard or -FS version)	
DC connection type	Tool Free PV connector WM / MC4	
Input protection		
Reverse polarity protection	Inverter protection only, from limited current source, for standard and -S versions, and for -FS version when max 2 strings are connected	
Input over voltage protection for each MPPT - varistor	2	
Photovoltaic array isolation control	According to local standard	
DC switch rating for each MPPT (version with DC switch)	25 A / 1000 V	
Fuse rating (versions with fuses)	12 A / 1000 V	
Output side		
AC grid connection type	Three phase 3W or 4W+PE	
Rated AC power (P_{acr} @cosϕ=1)	10000 W	12500 W
Maximum AC output power (P_{acmax} @cosϕ=1)	11000 W (3)	13800 W (4)
Maximum apparent power (S_{max})	11500 VA	13800 VA
Rated AC grid voltage ($V_{ac,r}$)	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_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} =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 AC overcurrent protection	19.0 A	22.0 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	
Stand-by consumption	< 10.0 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[5] (opt.), PVI-AEC-EVO (opt.), VSN700 Data Logger (opt.)	
Wireless local monitoring	VSN300 Wifi Logger Card[5] (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	
Noise emission	< 50 dB(A) @ 1 m	
Maximum operating altitude without derating	2000 m / 6560 ft	
Physical		
Environmental protection rating	IP 65	
Cooling	Natural	
Dimension (H x W x D)	716mm x 645mm x 224mm / 28.2" x 25.4" x 8.8"	
Weight	< 41.0 kg / 90.4 lb	
Mounting system	Wall bracket	
Safety		
Isolation level	Transformerless	
Marking	CE (50 Hz only)	
Safety and EMC standard	EN62109-1, EN62109-2, AS/NZS3100, AS/NZS 60950, EN61000-6-2, EN61000-6-3, EN61000-3-11, EN61000-3-12	
Grid standard (check your sales channel for availability)	CEI 0-21, CEI 0-16, VDE 0126-1-1, VDE-AR-N 4105, G59/3, C10/11, EN 50438 (not for all national appendices), RD1699, RD 1565, AS 4777, BDEW, ABNT NBR 16149, CLC/FprTS 50549, PEA, MEA	CEI 0-21, CEI 0-16, VDE 0126-1-1, VDE-AR-N 4105, G59/3, C10/11, EN 50438 (not for all national appendices), RD1699, RD 1565, AS 4777, BDEW, ABNT NBR 16149, CLC/FprTS 50549
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. Limited to 10000 W for Belgium and Germany
4. Limited to 12500 W for Germany
5. Check availability before to order

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

ABB string inverters

TRIO-20.0/27.6-TL-OUTD
20 to 27.6 kW

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

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

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

High efficiency at all output levels

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

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

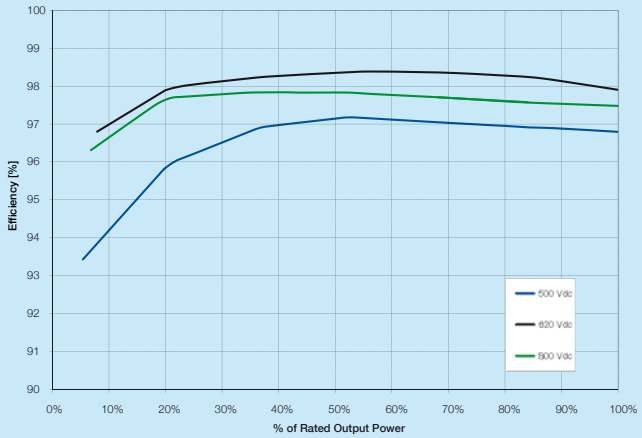
The very wide input voltage range makes the inverter suitable for installations with reduced string size.

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

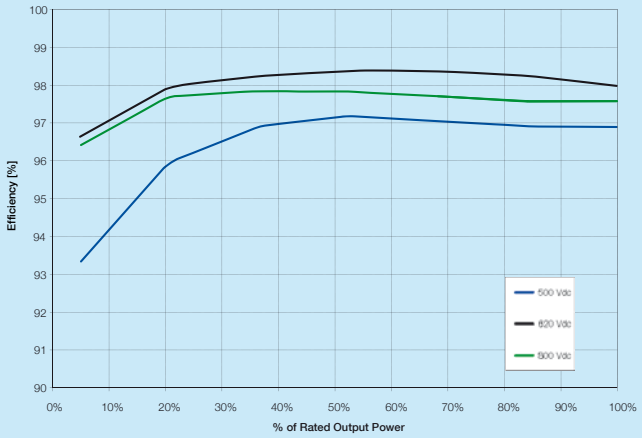
Highlights of the improved design – first time shown at Intersolar 2014

- True three-phase bridge topology for DC/AC output converter
- Transformerless topology
- Each inverter is set on specific grid codes which can be selected in the field
- Detachable wiring box to allow an easy installation
- Wide input range
- 'Electrolyte-free' power converter to further increase the life expectancy and long term reliability
- Integrated string combiner with different options of configuration which include DC and AC disconnect switch in compliance with international standards (-S2, -S2F and -S2X versions)
- Natural convection cooling for maximum reliability
- Outdoor enclosure for unrestricted use under any environmental conditions
- Capability to connect external sensors for monitoring environmental conditions
- Availability of auxiliary DC output voltage (24V, 300mA)

Efficiency curves of TRIO-20.0-TL-OUTD



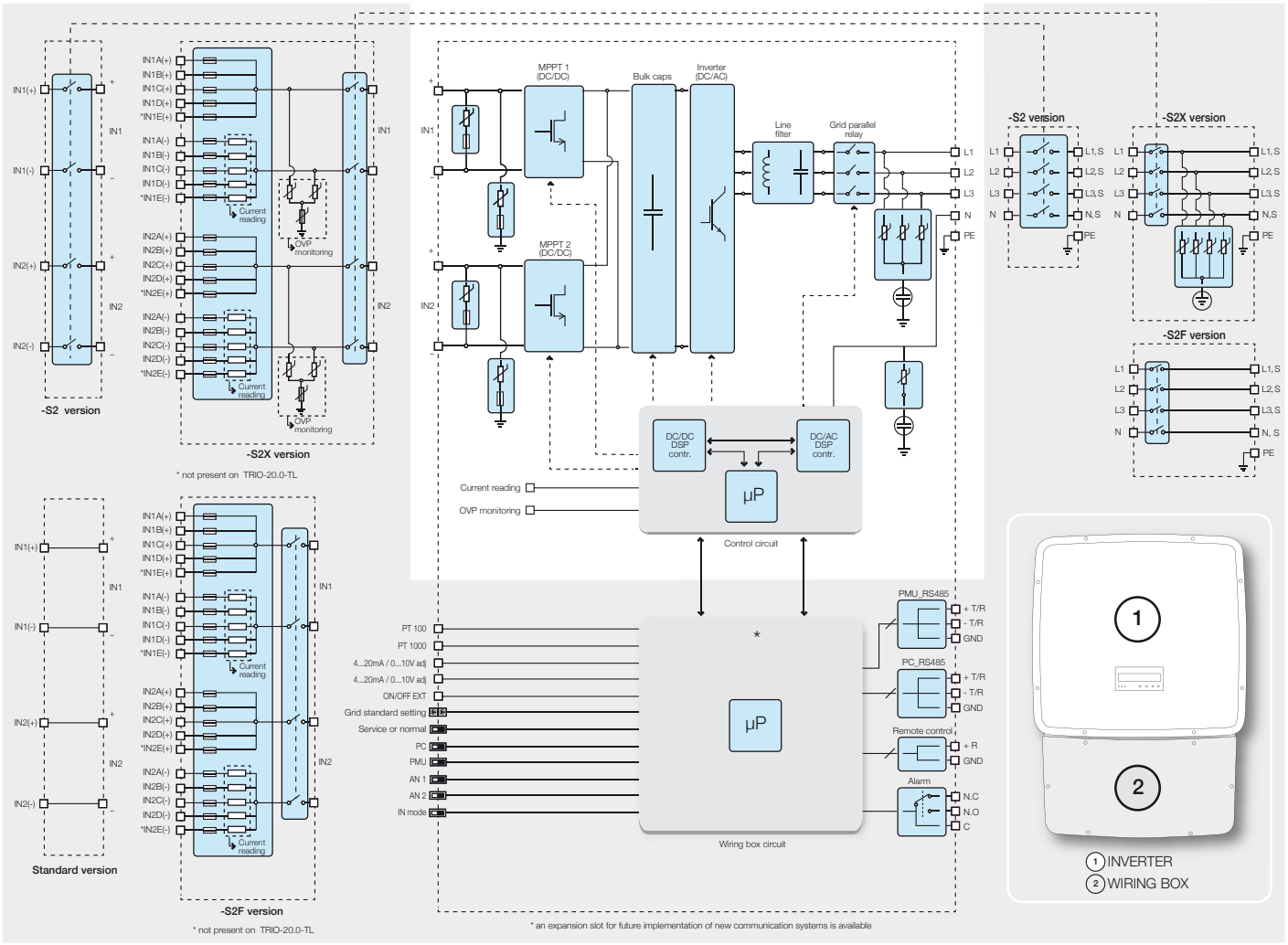
Efficiency curves of TRIO-27.6-TL-OUTD



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})	360 V (adj. 250...500 V)	
Operating DC input voltage range (V_{dcmin}...V_{dcmax})	0.7 x V_{start}...950 V	
Rated DC input voltage (V_{dcr})	620 V	
Rated DC input power (P_{dcr})	20750 W	28600 W
Number of independent MPPT	2	
Maximum DC input power for each MPPT ($P_{MPPTmax}$)	12000 W	16000 W
DC input voltage range with parallel configuration of MPPT at P_{acr}	440...800 V	500...800 V
DC power limitation with parallel configuration of MPPT	Linear derating from max to null [800V≤V_{MPPT}≤950V]	
DC power limitation for each MPPT with independent configuration of MPPT at P_{acr}, max unbalance example	12000 W [480V≤V_{MPPT}≤800V] the other channel: P_{dcr}-12000W [350V≤V_{MPPT}≤800V]	16000 W [500V≤V_{MPPT}≤800V] the other channel: P_{dcr}-16000W [400V≤V_{MPPT}≤800V]
Maximum DC input current (I_{dcmax}) / for each MPPT ($I_{MPPTmax}$)	50.0 A / 25.0 A	64.0 A / 32.0 A
Maximum input short circuit current for each MPPT	30.0 A	40.0 A
Number of DC inputs pairs for each MPPT	1 (4 in -S2X and -S2F Versions)	1 (5 in -S2X and -S2F Versions)
DC connection type	Tool Free PV connector WM / MC4 (Screw terminal block on standard and -S2 versions)	
Input protection		
Reverse polarity protection	Inverter protection only, from limited current source, for standard and -S2 versions, and for fused versions when max 2 strings are connected	
Input over voltage protection for each MPPT - varistor	2	
Input over voltage protection for each MPPT - plug in modular surge arrester (-S2X version)	3 (Class II)	
Photovoltaic array isolation control	According to local standard	
DC switch rating for each MPPT (version with DC switch)	40 A / 1000 V	
Fuse rating (versions with fuses)	15 A / 1000 V	
Output side		
AC grid connection type	Three phase 3W or 4W+PE	
Rated AC power (P_{acr} @cosϕ=1)	20000 W	27600 W
Maximum AC output power (P_{acmax} @cosϕ=1)	22000 W (3)	30000 W (4)
Maximum apparent power (S_{max})	22200 VA	30000 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 AC overcurrent protection	34.0 A	46.0 A
Output overvoltage protection - varistor	4	
Output overvoltage protection - plug in modular surge arrester (-S2X version)	4 (Class II)	
Operating performance		
Maximum efficiency (η_{max})	98.2%	
Weighted efficiency (EURO/CEC)	98.0% / 98.0%	
Feed in power threshold	40 W	
Stand-by consumption	< 8W	

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



Technical data and types

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

1. The AC voltage range may vary depending on specific country grid standard
2. The Frequency range may vary depending on specific country grid standard
3. Limited to 20000 W for Germany
4. Limited to 27600 W for Germany
5. Check availability before to order

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

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 (ie grid). Designed to meet the needs of the entire supply chain – from system integrators and installers to end users – these transformerless, threephase 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-33.0 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 (MPP) tracker and optimized MPPT window are suitable for the majority of PV plant designs. The high maximum DC input voltage of up to 1100 V increases PV system design flexibility giving extra margin in cold temperatures 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.

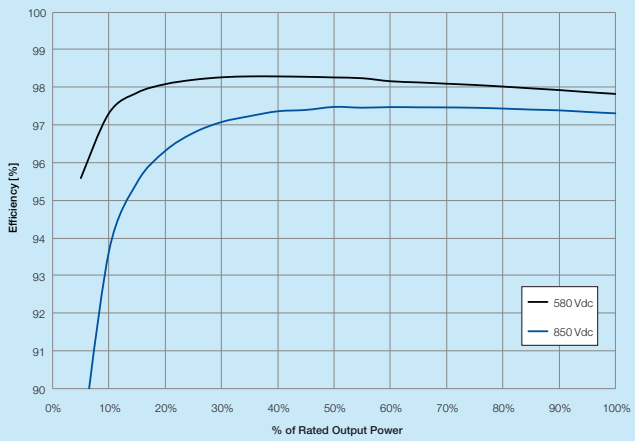
Fast and easy commissioning

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

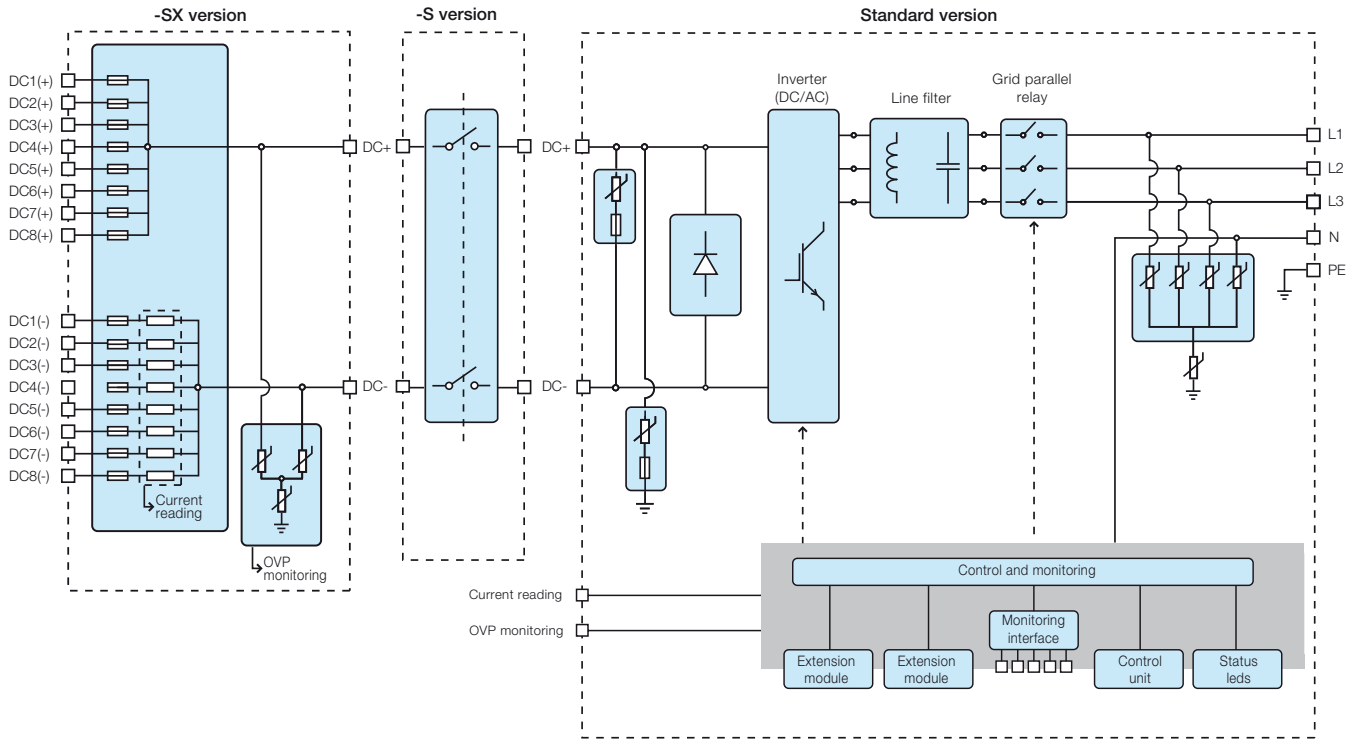
Efficiency curves of PRO-33.0-TL-OUTD (Preliminary)



Technical data and types

Type code	PRO-33.0-TL-OUTD
Input side	
Absolute maximum DC input voltage ($V_{max,abs}$)	1100 V [3]
Start-up DC input voltage (V_{start})	610 V
Operating DC input voltage range (V_{dcmin}...V_{dcmax})	580..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_{acr}	580...850 V
Maximum DC input current (I_{dcmax}) / for each MPPT ($I_{MPPTmax}$)	58 A
Maximum input short circuit current for each MPPT	64 A
Number of DC inputs pairs for each MPPT	1 in Standard and -S version (8 in -SX version)
DC connection type	Tool-less PV connector Phoenix Sunclix on -SX version (screw terminal block on standard & -S version)
Input protection	
Reverse polarity protection	Inverter protection only, from limited current source, for standard and -S versions, and for fused -SX versions when max 2 strings are connected
Input over voltage protection for each MPPT - varistor	2
Input over voltage protection for each MPPT - plug in modular surge arrester (-S2X version)	3 (Class II)
Photovoltaic array isolation control	According to local standard
DC switch rating for each MPPT (version with DC switch)	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 or 4W+PE
Rated AC power (P_{acr} @cosϕ>0.99)	33 000 W
Maximum apparent power (S_{max})	33 000 VA
Rated AC grid voltage ($V_{ac,r}$)	400 V
AC voltage range	320...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...53 Hz / 57...63 Hz [2]
Nominal power factor and adjustable range	> 0.995, with Pacr = 33.0 kW, adj. ± 0.9 with Pacr =29.7 kW, adj. ± 0..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 types

Type code	PRO-33.0-TL-OUTD
Output protection	
Anti-islanding protection	According to local standard
Maximum AC overcurrent protection	50.3 A
Output overvoltage protection - varistor	4
Operating performance	
Maximum efficiency (η_{max})	98.3% (*preliminary)
Weighted efficiency (EURO/CEC)	98.0%/98.1% (*preliminary)
Feed in power threshold	20 W
Stand-by consumption	< 1W
Communication	
Remote monitoring	VSN700 Data Logger (opt.)
User interface	Detachable graphical display
Environmental	
Ambient temperature range	-25...+60°C /-13...140°F with derating above 45°C/113°F
Relative humidity	0...100% condensing
Noise emission	<65dB(A) @ 1m
Maximum operating altitude without derating	2000 m / 6560 ft
Physical	
Environmental protection rating	IP 65 (IP54 fans)
Cooling	Forced
Dimension (H x W x D)	740 mm x 520 mm x 300mm/ 29.1" x 20.5" x 11.8"
Weight	< 65.0 kg / 143.3 lb
Mounting system	Wall bracket
Safety	
Isolation level	Transformerless
Marking	CE
Safety and EMC standard	EN62109-1, EN62109-2, EN61000-6-2, EN61000-6-3, EN61000-3-11, EN61000-3-12
Grid standard	CEI 0-21, VDE 0126-1-1, VDE-AR-N 4105, G59/3 (check flyer for additional grid standards)
Available products variants	
Standard	PRO-33.0-TL-OUTD-400
With DC switch	PRO-33.0-TL-OUTD-S-400
With DC switch and diode	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. Inverter does not start >1000V

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

Central inverters

ABB central inverters

PVI-55.0/110.0 - PVI-165.0/220.0 - PVI-275.0/330.0
55 to 330 kW

ABB's central inverters are extremely scalable, modular-inverter systems that are based on 55kW modular blocks. This increases usable power and improves availability. The reduction of performance in any individual module will not impact the energy harvesting capabilities of the other modules.

The product is available with and without a transformer. The industry-leading power conversion efficiencies of up to 98% (-TL), combined with high-speed Maximum Power Point Tracking (MPPT) channels, optimize energy harvesting across a wide array of operating conditions.

These commercial inverters provide maximum DC input voltage up to 1000 Vdc, high design flexibility and reduced DC distribution losses for large scale PV plants.

Delivered pre-configured and pre-tested which reduces on-site wiring and testing

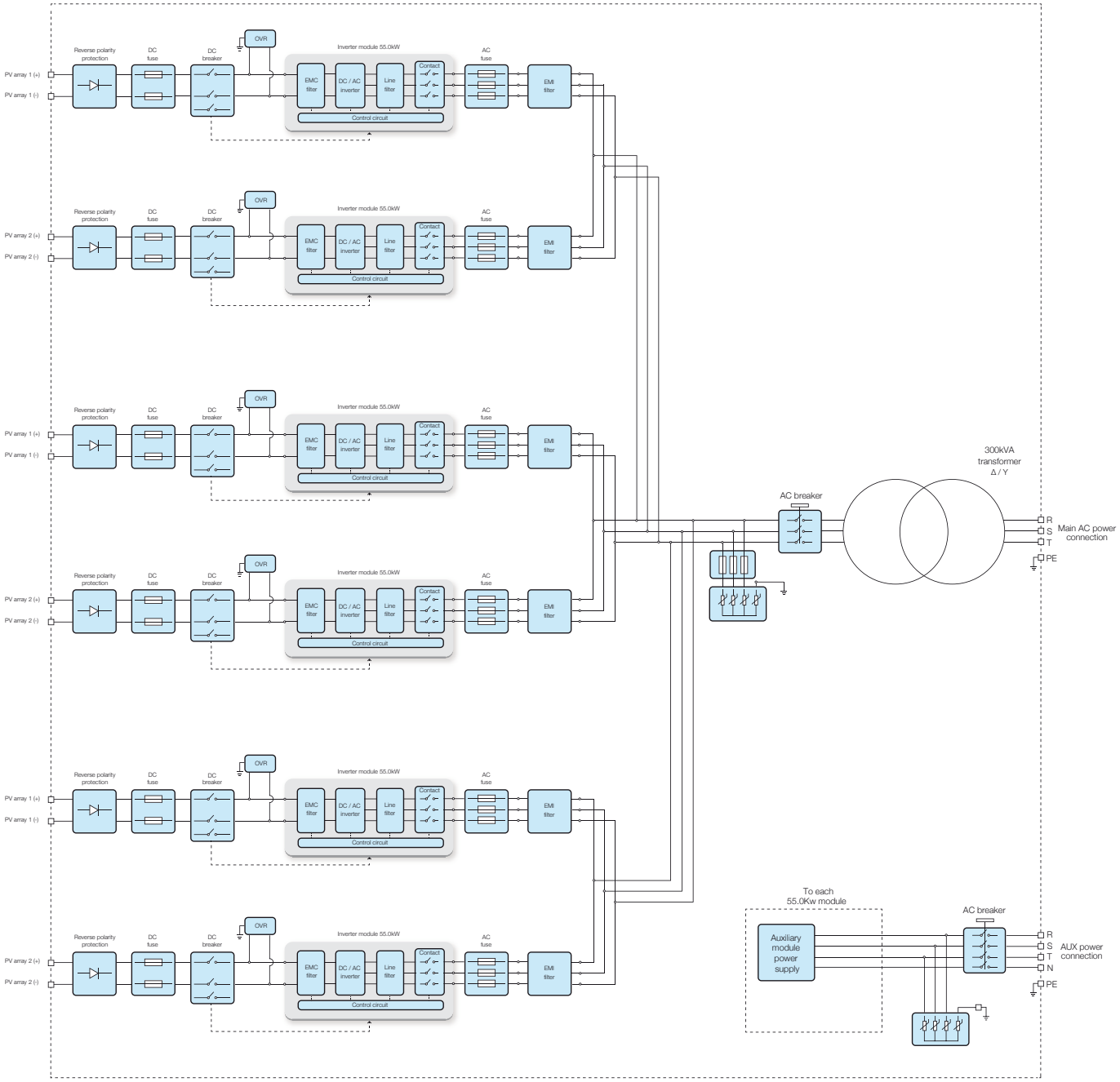
The inverter systems are delivered pre-configured and pre-tested, which significantly reduces on-site wiring and testing. In the case of an ungrounded application, the unit can be configured as a single or multiple MPPT (with the exception of the PVI-55.0/-TL).

These inverters provide easy installation and maintenance procedures due to the front extractible DC/AC converters and accessibility to all critical parts.

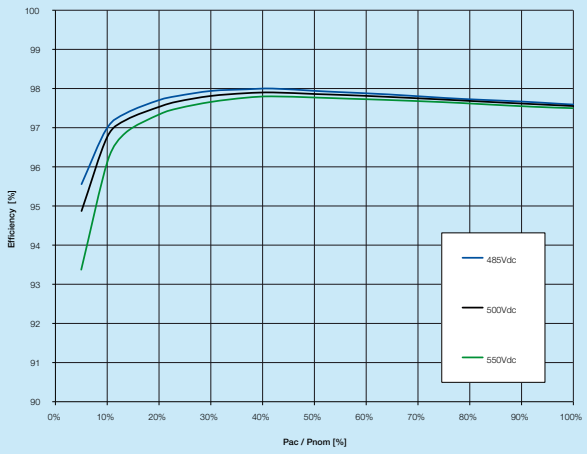
Highlights

- Reduced susceptibility to a single fault in case of a component failure, a maximum of 55kW will be lost
- Reduced acoustic noise due to the high switching frequency
- Reverse-polarity protection minimizes potential damage caused by array miswiring
- Integrated DC and AC distribution and protection fully equipped for connection, additional accessories not required

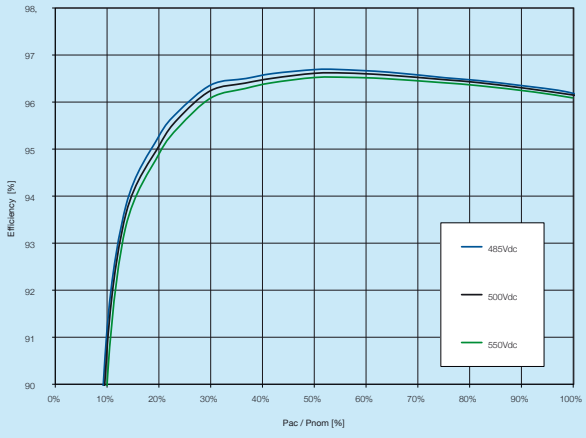
Block diagram of PVI-330.0 with transformer (multi master)



Efficiency curves of PVI-55.0/330.0-TL



Efficiency curves of PVI-275.0/330.0-TL



Technical data and types

Type code	PVI-55.0	PVI-55.0-TL	PVI-110.0	PVI-110.0-TL
Input side				
Absolute maximum DC input voltage ($V_{max,abs}$)	1000 V		1000 V	
MPPT input DC voltage range ($V_{MPPTmin}$ ... $V_{MPPTmax}$) at V_{acr}	485...950 V Linear derating from max to 31,8% [800<V_{MPPT}<950V]		485...950 V Linear derating from max to 31,8% [800<V_{MPPT}<950V]	
MPPT input DC range ($V_{MPPTmin}$ ... $V_{MPPTmax}$) at P_{acr} and V_{acr}	485...800 V		485...800 V	
Number of independent MPPT multi-master	1		2	
Number of independent MPPT multi-master/slave	Not applicable		Not applicable	
Number of independent MPPT master/slave	1		1	
Maximum combined DC input current (I_{dcmaxc})	123 A		246 A	
Maximum DC input current for each module ($I_{dcmax,m}$)	123 A		123 A	
Number of DC inputs pairs	1		2	
DC connection type	2x185mm² (M10)		2x185mm² (M10) + 2x300mm² (M10)	
Input protection				
Reverse polarity protection	Yes, with series diode		Yes, with series diode	
Input overvoltage protection - varistor	1 for each input pair, Class II		1 for each input pair, Class II	
Photovoltaic array leakage control, floating neutral, floating panels	No; proprietary control available (3)		No; proprietary control available (3)	
Residual current protection, grounded neutral, floating panels	Not included; dimension output ground fault device with ΔI=400mA/module		Not included; dimension output ground fault device with ΔI=400mA/module	
Fuse size for each input pair	125 A / 1000 V		125 A / 1000 V	
Output side				
AC grid connection type	Three phases 4W+PE	Three phases 3W+PE	Three phases 4W+PE	Three phases 3W+PE
Rated AC power (P_{acr} @cosϕ=1)	55 kW		110 kW	
Maximum AC output power (P_{acmax} @cosϕ=1)	55 kW		110 kW	
Maximum apparent power (S_{max})	61 kVA		122kVA	
Rated grid voltage (V_{acr})	400 V	320 V	400V	320 V
AC voltage range (V_{acmin}...V_{acmax})	320...480 V (1)	256...368 V (1)	320...480 V (1)	256...368 V (1)
Maximum output current (I_{acmax})	81 A	101 A	160 A	202 A
Contributory fault current	90 A	112,5 A	180 A	225 A
Rated frequency (f_r)	50/60 Hz		50/60 Hz	
Frequency range (f_{min}...f_{max})	47...53 / 57...63 Hz (2)		47...53 / 57...63 Hz (2)	
Nominal power factor and adjustable range	> 0.995 (adj. ± 0.90)		> 0.995 (adj. ± 0.90)	
Total harmonic distortion	< 3% (@ $P_{ac,r}$)		< 3% (@ $P_{ac,r}$)	< 3% (@ $P_{ac,r}$)
AC connection type (for each phase)	1 x 95 mm² (M8)	1 x 300 mm² (M12)	1 x 95 mm² (M8)	1 x 300 mm² (M12)
Output protection				
Anti-islanding protection	According to local standard		According to local standard	
Output overvoltage protection (varistor)	Yes, Class II		Yes, Class II	
Night time disconnect	Yes	No	Yes	No
AC circuit breaker	50 kA		50 kA	
Operating performance				
Maximum efficiency (η_{max})	96.3% (4)	98.0% (4)	96.4% (4)	98.0% (4)
Weighted efficiency (η_{EURO} / η_{CEC})	95.1% / 96.0% (4)	97.7% / 97.5% (4)	95.2% / 96.0% (4)	97.7% / 97.5% (4)
Stand-by consumption/night-time power loss	< 17 W	< 23 W	< 24 W	< 19 W
AC auxiliary supply	3x400 Vac +N, 50/60 Hz		3 x 400 Vac +N, 50/60 Hz	
Auxiliary supply consumption	< 0.36% of $P_{ac,r}$	< 0.24% of $P_{ac,r}$	< 0.31% of $P_{ac,r}$	< 0.24% of $P_{ac,r}$
Auxiliary supply consumption without cooling	< 0.25% of $P_{ac,r}$	< 0.22% of $P_{ac,r}$	< 0.23% of $P_{ac,r}$	< 0.22% of $P_{ac,r}$
Inverter switching frequency	18 kHz		18 kHz	
Communication				
Wired local monitoring	PVI-USB-RS232_485 (opt.)		PVI-USB-RS232_485 (opt.)	
Remote monitoring	PVI-AEC-EVO (opt.), VSN700 Data Logger (opt.)		PVI-AEC-EVO (opt.), VSN700 Data Logger (opt.)	
String Combiner	PVI-STRINGCOMB (opt.)		PVI-STRINGCOMB (opt.)	
User interface	16 characters x 2 line LCD display for each module		16 characters x 2 line LCD display for each module	
Environmental				
Ambient temperature range	-10...+ 60°C/+14...140°F with derating above 50°C/122°F		-10...+ 60°C/+14...140°F with derating above 50°C/122°F	
Relative humidity	0...95% non condensing		0...95% non condensing	
Noise emission	<62 dB(A) @ 1 m	<62 dB(A) @ 1 m	<65 dB(A) @ 1 m	< 63 db (A) @ 1 m
Maximum operating altitude without derating	1000 m / 3280 ft		1000 m / 3280 ft	
Physical				
Environmental protection rating	IP 20		IP 20	
Cooling	Air forced		Air forced	
Required air cooling flow	1600 m³/h - 944 CFM	1600 m³/h - 944 CFM	2800 m³/h - 1652 CFM	2400 m³/h - 1416 CFM
Dimension (H x W x D)	1675mm x 1250mm x 850mm / 69.5" x 49,2" x 33.5"	1077mm x 1250mm x 850mm / 42.4" x 49.2" x 33.5"	1675mm x 1250mm x 850mm / 65.9" x 49.2" x 33.5"	1077mm x 1250mm x 850mm / 42,4" x 49.2" x 33.5"
Weight	< 700 kg / 1543 lb	< 350 kg / 771 lb	< 800 kg / 1765 lb	< 480 kg / 1058 lb
Weight of the module	< 60 kg / 132 lb		< 60 kg / 132 lb	
Safety				
Transformer	Yes	No	Yes	No
Marking	CE (50 Hz only)		CE (50 Hz only)	
Safety and EMC standard	EN 50178, EN61000-6-2, EN61000-6-4, EN61000-3-11, EN61000-3-12		EN 50178, EN61000-6-2, EN61000-6-4, EN61000-3-11, EN61000-3-12	
Grid standard (check your sales channel for availability)	CEI 0-21, CEI 0-16, BDEW, RD 661/2007, RD 1565/2010, P.O.12.3	CEI-0-16, BDEW, RD 661/2007, RD 1565/2010, P.O.12.3	CEI 0-21, CEI 0-16, BDEW, RD 661/2007, RD 1565/2010, P.O.12.3	CEI-0-16, BDEW, RD 661/2007, RD 1565/2010, P.O.12.3

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. Missing symmetry with respect to ground results in AC disconnection (disabled function by default)
4. Power consumption of the auxiliary services not included

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

Technical data and types

Type code	PVI-165.0	PVI-165.0-TL	PVI-220.0	PVI-220.0-TL
Input side				
Absolute maximum DC input voltage ($V_{max,abs}$)	1000 V		1000 V	
MPPT input DC voltage range ($V_{MPPTmin}$ ... $V_{MPPTmax}$) at V_{acr}	485...950 V Linear derating from max to 31,8% [800<V_{MPPT}<950V]		485...950 V Linear derating from max to 31,8% [800<V_{MPPT}<950V]	
MPPT input DC range ($V_{MPPTmin}$ ... $V_{MPPTmax}$) at P_{acr} and V_{acr}	485...800 V		485...800 V	
Number of independent MPPT multi-master	3		4	
Number of independent MPPT multi-master/slave	2		2	
Number of independent MPPT master/slave	1		1	
Maximum combined DC input current (I_{dcmaxc})	369 A		492 A	
Maximum DC input current for each module ($I_{dcmax,m}$)	123 A		123 A	
Number of DC inputs pairs	3		4	
DC connection type	4x185mm² (M10) + 2x300mm² (M10)		4x185mm² (M10)+ 4x300mm² (M10)	
Input protection				
Reverse polarity protection	Yes, with series diode		Yes, with series diode	
Input overvoltage protection - varistor	1 for each input pair, Class II		1 for each input pair, Class II	
Photovoltaic array leakage control, floating neutral, floating panels	No; proprietary control available (3)		No; proprietary control available (3)	
Residual current protection, grounded neutral, floating panels	Not included; dimension output ground fault device with ΔI=400mA/module		Not included; dimension output ground fault device with ΔI=400mA/module	
Fuse size for each input pair	125 A / 1000 V		125 A / 1000 V	
Output side				
AC grid connection type	Three phases 4W+PE	Three phases 3W+PE	Three phases 4W+PE	Three phases 3W+PE
Rated AC power (P_{acr} @cosϕ=1)	165 kW		220 kW	
Maximum AC output power (P_{acmax} @cosϕ=1)	165 kW		220 kW	
Maximum apparent power (S_{max})	183 kVA		244 kVA	
Rated grid voltage (V_{acr})	400 V	320 V	400 V	320 V
AC voltage range (V_{acmin}...V_{acmax})	320...480 V (1)	256...368 V (1)	320...480 V (1)	256...368 V (1)
Maximum output current (I_{acmax})	240 A	303 A	320 A	404 A
Contributory fault current	270 A	337,5 A	360 A	450 A
Rated frequency (f_r)	50/60 Hz		50/60 Hz	
Frequency range (f_{min}...f_{max})	47...53 / 57...63 Hz (2)		47...53 / 57...63 Hz (2)	
Nominal power factor and adjustable range	> 0.995 (adj. ± 0.90)		> 0.995 (adj. ± 0.90)	
Total harmonic distortion	< 3% (@ $P_{ac,r}$)		< 3% (@ $P_{ac,r}$)	
AC connection type (for each phase)	1 x 185 mm² (M10)	2 x 300 mm² (M12)	1 x 185 mm² (M10)	2 x 300 mm² (M12)
Output protection				
Anti-islanding protection	According to local standard		According to local standard	
Output overvoltage protection (varistor)	Yes, Class II		Yes, Class II	
Night time disconnect	Yes	No	Yes	No
AC circuit breaker	50 kA		50 kA	
Operating performance				
Maximum efficiency (η_{max})	96.5% (4)	98.0% (4)	96.5% (4)	98.0% (4)
Weighted efficiency (η_{EURO} / η_{CEC})	95.3% / 96.0% (4)	97.7% / 97.5% (4)	95.3% / 96.0% (4)	97.7% / 97.5% (4)
Stand-by consumption/night-time power loss	< 31 W	< 26 W	< 28 W	< 33 W
AC auxiliary supply	3 x 400 Vac +N, 50/60 Hz		3 x 400 Vac +N, 50/60 Hz	
Auxiliary supply consumption	< 0.30% of $P_{ac,r}$	< 0.24% of $P_{ac,r}$	< 0.28% of $P_{ac,r}$	< 0.24% of $P_{ac,r}$
Auxiliary supply consumption without cooling	< 0.23% of $P_{ac,r}$	< 0.22% of $P_{ac,r}$	< 0.22% of $P_{ac,r}$	< 0.22% of $P_{ac,r}$
Inverter switching frequency	18 kHz		18 kHz	
Communication				
Wired local monitoring	PVI-USB-RS232_485 (opt.)		PVI-USB-RS232_485 (opt.)	
Remote monitoring	PVI-AEC-EVO (opt.), VSN700 Data Logger (opt.)		PVI-AEC-EVO (opt.), VSN700 Data Logger (opt.)	
String Combiner	PVI-STRINGCOMB (opt.)		PVI-STRINGCOMB (opt.)	
User interface	16 characters x 2 line LCD display for each module		16 characters x 2 line LCD display for each module	
Environmental				
Ambient temperature range	-10...+ 60°C/+14...140°F with derating above 50°C/122°F		-10...+ 60°C/+14...140°F with derating above 50°C/122°F	
Relative humidity	0...95% non condensing		0...95% non condensing	
Noise emission	< 68 db (A) @ 1 m	< 66 db (A) @ 1 m	< 72 db (A) @ 1 m	< 69 db (A) @ 1 m
Maximum operating altitude without derating	1000 m / 3280 ft		1000 m / 3280 ft	
Physical				
Environmental protection rating	IP 20		IP 20	
Cooling	Air forced		Air forced	
Required air cooling flow	4000 m³/h - 2360 CFM	3200 m³/h - 1888 CFM	4800 m³/h - 2832 CFM	4000 m³/h - 2360 CFM
Dimension (H x W x D)	2184mm x 1250mm x 850mm / 86.0" x 49.2" x 33.5"	1675mm x 1250mm x 850mm / 65,9" x 49,2" x 33.5"	2184mm x 1250mm x 850mm / 86.0" x 49.2" x 33.5"	1675mm x 1250mm x 850mm / 65,9" x 42,9" x 33.5"
Weight	< 1200 kg / 2646 lb	< 680 kg / 1500 lb	< 1300 kg / 2867 lb	< 780 kg / 1720 lb
Weight of the module	< 60 kg / 132 lb		< 60 kg / 132 lb	
Safety				
Transformer	Yes	No	Yes	No
Marking	CE (50 Hz only)		CE (50 Hz only)	
Safety and EMC standard	EN 50178, EN61000-6-2, EN61000-6-4, EN61000-3-11, EN61000-3-12		EN 50178, EN61000-6-2, EN61000-6-4, EN61000-3-11, EN61000-3-12	
Grid standard (check your sales channel for availability)	CEI 0-21, CEI 0-16, BDEW, RD 661/2007, RD 1565/2010, P.O.12.3	CEI-0-16, BDEW, RD 661/2007, RD 1565/2010, P.O.12.3	CEI-0-16, BDEW, RD 661/2007, RD 1565/2010, P.O.12.3	CEI-0-16, BDEW, RD 661/2007, RD 1565/2010, P.O.12.3

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. Missing symmetry with respect to ground results in AC disconnection (disabled function by default)
4. Power consumption of the auxiliary services not included

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

Technical data and types

Type code	PVI-275.0	PVI-275.0-TL	PVI-330.0	PVI-330.0-TL
Input side				
Absolute maximum DC input voltage ($V_{max,abs}$)	1000 V		1000 V	
MPPT input DC voltage range ($V_{MPPTmin}$ ... $V_{MPPTmax}$) at V_{acr}	485...950 V Linear derating from max to 31,8% [800<V_{MPPT}<950V]		485...950 V Linear derating from max to 31,8% [800<V_{MPPT}<950V]	
MPPT input DC range ($V_{MPPTmin}$ ... $V_{MPPTmax}$) at P_{acr} and V_{acr}	485...800 V		485...800 V	
Number of independent MPPT multi-master	5		6	
Number of independent MPPT multi-master/slave	3		3	
Number of independent MPPT master/slave	1		1	
Maximum combined DC input current (I_{dcmaxc})	615 A		738 A	
Maximum DC input current for each module ($I_{dcmax,m}$)	123 A		123 A	
Number of DC inputs pairs	5		6	
DC connection type	6x185mm² (M10) +4x300mm² (M10)		6x185mm² (M10) +6x300mm² (M10)	
Input protection				
Reverse polarity protection	Yes, with series diode		Yes, with series diode	
Input overvoltage protection - varistor	1 for each input pair, Class II		1 for each input pair, Class II	
Photovoltaic array leakage control, floating neutral, floating panels	No; proprietary control available (3)		No; proprietary control available (3)	
Residual current protection, grounded neutral, floating panels	Not included; dimension output ground fault device with ΔI=400mA/module		Not included; dimension output ground fault device with ΔI=400mA/module	
Fuse size for each input pair	125 A / 1000 V		125 A / 1000 V	
Output side				
AC grid connection type	Three phases 4W+PE		Three phases 3W+PE	
Rated AC power (P_{acr} @cosϕ=1)	275 kW	275 kW	330 kW	330 kW
Maximum AC output power (P_{acmax} @cosϕ=1)	275 kW	275 kW	330 kW	330 kW
Maximum apparent power (S_{max})	305 kVA	305 kVA	366 kVA	366 kVA
Rated grid voltage (V_{acr})	400 V	320 V	400 V	320 V
AC voltage range (V_{acmin}...V_{acmax})	320...480 V (1)	256...368 V (1)	320...480 V (1)	256...368 V (1)
Maximum output current (I_{acmax})	400 A	505 A	480 A	606 A
Contributory fault current	450 A	562,5 A	540 A	675 A
Rated frequency (f_r)	50/60 Hz		50/60 Hz	
Frequency range (f_{min}...f_{max})	47...53 / 57...63 Hz (2)		47...53 / 57...63 Hz (2)	
Nominal power factor and adjustable range	> 0.995 (adj. ± 0.90)		> 0.995 (adj. ± 0.90)	
Total harmonic distortion	< 3% (@ $P_{ac,r}$)		< 3% (@ $P_{ac,r}$)	
AC connection type (for each phase)	1 x 240 mm² (M12)	2 x 300 mm² (M12)	1 x 240 mm² (M12)	2 x 300 mm² (M12)
Output protection				
Anti-islanding protection	According to local standard		According to local standard	
Output overvoltage protection (varistor)	Yes, Class II		Yes, Class II	
Night time disconnect	Yes	No	Yes	No
AC circuit breaker	50 kA		50 kA	
Operating performance				
Maximum efficiency (η_{max})	96.7% (4)	98.0% (4)	96.7% (4)	98.0% (4)
Weighted efficiency (η_{EURO}/ η_{CEC})	95.5% / 96.0% (4)	97.7% / 97.5% (4)	95.5% / 96.0% (4)	97.7% / 97.5% (4)
Stand-by consumption/night-time power loss	< 45 W	< 40 W	< 52 W	< 47 W
AC auxiliary supply	3 x 400 Vac +N, 50/60 Hz		3 x 400 Vac +N, 50/60 Hz	
Auxiliary supply consumption	< 0.29% of $P_{ac,r}$	< 0.24% of $P_{ac,r}$	< 0.28% of $P_{ac,r}$	< 0.24% of $P_{ac,r}$
Auxiliary supply consumption without cooling	< 0.22% of $P_{ac,r}$	< 0.22% of $P_{ac,r}$	< 0.22% of $P_{ac,r}$	< 0.22% of $P_{ac,r}$
Inverter switching frequency	18 kHz		18 kHz	
Communication				
Wired local monitoring	PVI-USB-RS232_485 (opt.)		PVI-USB-RS232_485 (opt.)	
Remote monitoring	PVI-AEC-EVO (opt.), VSN700 Data Logger (opt.)		PVI-AEC-EVO (opt.), VSN700 Data Logger (opt.)	
String Combiner	PVI-STRINGCOMB (opt.)		PVI-STRINGCOMB (opt.)	
User interface	16 characters x 2 line LCD display for each module		16 characters x 2 line LCD display for each module	
Environmental				
Ambient temperature range	-10...+ 60°C/+14...140°F with derating above 50°C/122°F		-10...+ 60°C/+14...140°F with derating above 50°C/122°F	
Relative humidity	0...95% non condensing		0...95% non condensing	
Noise emission	< 75 db (A) @ 1 m	< 72 db (A) @ 1 m	< 78 db (A) @ 1 m	< 75 db (A) @ 1 m
Maximum operating altitude without derating	1000 m / 3280 ft		1000 m / 3280 ft	
Physical				
Environmental protection rating	IP 20		IP 20	
Cooling	Air forced		Air forced	
Required air cooling flow	6800 m³/h - 4012 CFM	4800 m³/h - 2832 CFM	7600 m³/h - 4484 CFM	5600 m³/h - 3304 CFM
Dimension (H x W x D)	2184mm x 1250mm x 850mm / 86.0" x 49.2" x 33.5" 1215mm x 1250mm x 870mm / 47.8" x 49.2" x 34.3" (Transf.)	2184mm x 1250mm x 850mm / 86.0" x 49.2" x 33.5"	2184mm x 1250mm x 850mm / 86.0" x 49.2" x 33.5" 1215 mm x 1250mm x 870mm / 47.8" x 49.2" x 34.3" (Transf.)	2184mm x 1250mm x 850mm / 86.0" x 49.2" x 33.5"
Weight	< 1600 kg / 3527 lb	< 1000 kg / 2205 lb	< 1750 kg / 3858 lb	< 1150 kg / 2535 lb
Weight of the module	< 60 kg / 132 lb		< 60 kg / 132 lb	
Safety				
Transformer	Yes	No	Yes	No
Marking	CE (50 Hz only)		CE (50 Hz only)	
Safety and EMC standard	EN 50178, EN61000-6-2, EN61000-6-4, EN61000-3-11, EN61000-3-12		EN 50178, EN61000-6-2, EN61000-6-4, EN61000-3-11, EN61000-3-12	
Grid standard (check your sales channel for availability)	CEI-0-16, BDEW, RD 661/2007, RD 1565/2010, P.O.12.3		CEI-0-16, BDEW, RD 661/2007, RD 1565/2010, P.O.12.3	

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. Missing symmetry with respect to ground results in AC disconnection (disabled function by default)
4. Power consumption of the auxiliary services not included

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

ABB central inverters

PVI-134.0/200.0/267.0/334.0/400.0-TL
134 to 400 kW

This new inverter system is based on extractable 67kW modules of power which reduces the inverter downtime and lowers service costs.

The new extractable module configuration increases power by 67kW.

The inverter systems are pre-configured and pretested before delivery which significantly reduces on-site wiring and testing operations.

Limited losses thanks to the output voltage increased to 380V

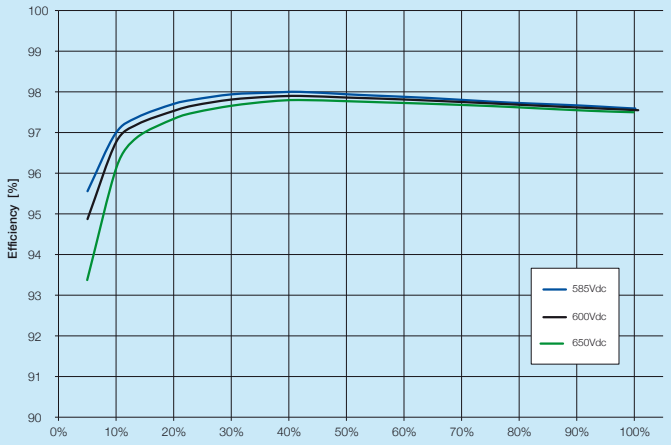
Each inverter can be configured in “multi-master” for up to 6 independent MPPT connections if mistmatching reduction is needed, or in” master slave” mode with a single MPPT to improve the harvest of the energy in case of single failure.

The inverter, without transformer, reaches 98% of peak efficiency.

Highlights

- Increased output voltage to 380V for limited losses
- Maximum input voltage up to 1000V, reduced DC distribution losses for large scale PV plants
- Reverse polarity protection for each module
- Front extractable DC/AC converters enable easy installation and maintenance procedure with front accessibility to all critical parts
- Integrated DC disconnect switch for each 67 kW module
- AC and DC side integrated protection (fuses and OVR) easily replaceable
- High efficiency for increased harvest energy
- Two independent RS-485 communication interfaces for inverter and intelligent string combiner monitoring
- Designed for the direct connection to the MV transformer
- Reduced acoustic noise due to high switching frequency

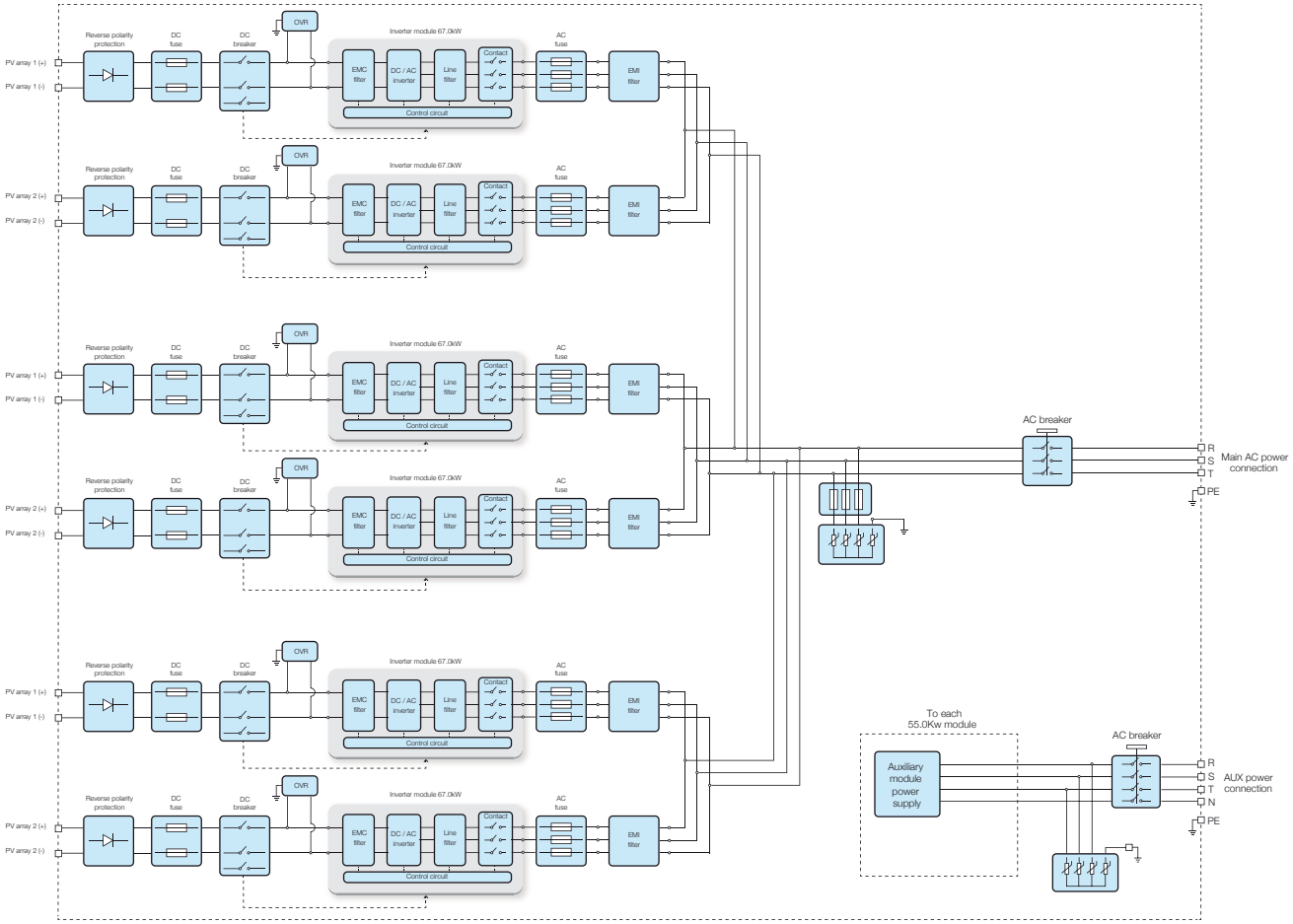
Efficiency curves of PVI-400.0-TL



Technical data and types

Type code	PVI-134.0-TL	PVI-200.0-TL	PVI-267.0-TL	PVI-334.0-TL	PVI-400.0-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}	570...950 V Linear derating from max to 30,6% [800<V_{MPPT}<950V]				
MPPT input DC range ($V_{MPPTmin}$ ... $V_{MPPTmax}$) at P_{acr} and V_{acr}	570...800 V				
Number of independent MPPT multi-master	2	3	4	5	6
Number of independent MPPT multi-master/slave	1	2	2	3	3
Number of independent MPPT master/slave	1				
Maximum combined DC input current (I_{dcmaxc})	246 A	369 A	492 A	615 A	738 A
Maximum DC input current for each module ($I_{dcmax,m}$)	123 A				
Number of DC inputs pairs	2	3	4	5	6
DC connection type	2x185mm² (M10) +2x300mm² (M10)	4x185mm² (M10) +2x300mm² (M10)	4x185mm² (M10) +4x300mm² (M10)	6x185mm² (M10) +4x300mm² (M10)	6x185mm² (M10) +6x300mm² (M10)
Input protection					
Reverse polarity protection	Yes, with series diode				
Input overvoltage protection - varistor	1 for each input pair, Class II				
Photovoltaic array leakage control, floating neutral, floating panels	No; Proprietary control available (3)				
Residual current protection, grounded neutral, floating panels	Not included; dimension output ground fault device with ΔI=400mA/module				
Fuse size for each input pair	125 A / 1000 V				
Output side					
AC grid connection type	Three phases 3W+PE				
Rated AC power (P_{acr} @cosϕ=1)	134 kW	200 kW	267 kW	334 kW	400 kW
Maximum AC output power (P_{acmax} @cosϕ=1)	134 kW	200 kW	267 kW	334 kW	400 kW
Maximum apparent power (S_{max})	148 kVA	222 kVA	296 kVA	371 kVA	440 kVA
Rated grid voltage (V_{acr})	380 V				
AC voltage range (V_{acmin}...V_{acmax})	323...437 V (1)				
Maximum output current (I_{acmax})	203 A	304 A	405 A	507 A	608 A
Contributory fault current	225 A	337,5 A	450 A	562,5 A	675 A
Rated frequency (f_r)	50/60 Hz				
Frequency range (f_{min}...f_{max})	47...53 / 57...63 Hz (2)				
Nominal power factor and adjustable range	> 0.995 (adj. ± 0.90)				
Total harmonic distortion	< 3% (@ P_{acr})				
AC connection type (for each phase)	2 x 300 mm² (M12)				
Output protection					
Anti-islanding protection	Yes (IEEE 1547)				
Output overvoltage protection (varistor)	Yes, Class II				
Night time disconnect	No				
AC circuit breaker	50 kA				

Block diagram of PVI-400.0 (multi master)



Technical data and types

Type code	PVI-134.0-TL	PVI-200.0-TL	PVI-267.0-TL	PVI-334.0-TL	PVI-400.0-TL
Operating performance					
Maximum efficiency (η_{max})	98.0% (4)				
Weighted efficiency (η_{EURO} / η_{CEC})	97.7% / 97.5% (4)				
Stand-by consumption/night-time power loss	< 19 W	< 26 W	< 33 W	< 40 W	< 47 W
AC auxiliary supply	3 x 400 Vac +N, 50/60 Hz				
Auxiliary supply consumption	< 0.19% of P_{acr}				
Auxiliary supply consumption without cooling	< 0.18% of P_{acr}				
Inverter switching frequency	18 kHz				
Communication					
Wired local monitoring	PVI-USB-RS232_485 (opt.)				
Remote monitoring	PVI-AEC-EVO (opt.), VSN700 Data Logger (opt.)				
String Combiner	PVI-STRINGCOMB (opt.)				
User interface	16 characters x 2 line LCD display for each module				
Environmental					
Ambient temperature range	-10...+ 60°C/+14...140°F with derating above 50°C/122°F				
Relative humidity	0...95% non condensing				
Noise emission	< 60 db (A) @ 1 m	< 66 db (A) @ 1 m	< 69 db (A) @ 1 m	< 72 db (A) @ 1 m	< 75 db (A) @ 1 m
Maximum operating altitude without derating	1000 m / 3280 ft				
Physical					
Environmental protection rating	IP 20				
Cooling	Air forced				
Required air cooling flow	2400 m³/h - 1416 CFM	3200 m³/h - 1888 CFM	4000 m³/h - 2360 CFM	4800 m³/h - 2832 CFM	5600 m³/h - 3304 CFM
Dimension (H x W x D)	1077mm x 1250mm x 850mm / 42,4" x 49,2" x 33.5"	1675mm x 1250mm x 850mm / 65,9" x 49,2" x 33.5"	1675mm x 1250mm x 850mm / 65,9" x 42,9" x 33.5"	2184mm x 1250mm x 850mm / 86.0" x 49.2" x 33.5"	2184mm x 1250mm x 850mm / 86.0" x 49.2" x 33.5"
Weight	< 480 kg / 1058 lb	< 680 kg / 1500 lb	< 780 kg / 1720 lb	< 1000 kg / 2205 lb	< 1150 kg / 2535 lb
Weight of the module	< 60 kg / 132 lb				
Safety					
Transformer	No				
Marking	CE (50 Hz only)				
Safety and EMC standard	EN 50178, EN62109-1, EN62109-2, EN61000-6-2, EN61000-6-4, EN61000-3-12				
Grid standard (check your sales channel for availability)	CEI-0-16, BDEW, RD 661/2007, IEEE 1547-2003 P.O.12.3				

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. Missing symmetry with respect to ground results in AC disconnection (disabled function by default)
4. Power consumption of the auxiliary services not included

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

ABB central inverters

PVI-500.0-TL-CN
500 kW

This product offers high performance with affordable capital expenditure and has been specifically designed for the fast growing Chinese market.

ABB's new 500kW utility-grade central inverters have a number of key features.

It offers high efficiency with electrolytic capacitor-free leading to longer MTBF (mean time between failures).

This product design is the result of the experience we have acquired with more than 100MW of installation in the challenging Chinese market.

Maximum input voltage up to 1000 Vdc, high design flexibility and reduced DC distribution losses for large scale PV plants.

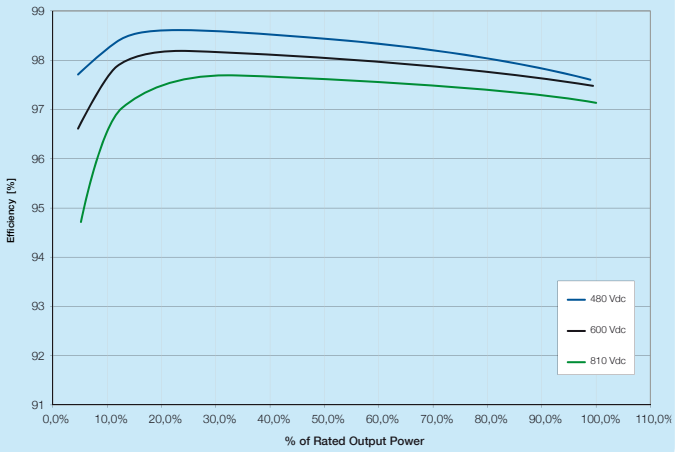
Reverse-polarity protection minimizes potential damage caused by array mis-wiring

Transformerless inverter for direct connection to MV transformer leading to longer MTBF (mean time between failures).

Highlights

- Integrated DC and AC distribution and protection
- Fully equipped for connection, additional accessories not required
- High efficiencies deliver more energy
- Two independent RS-485 communication interfaces for inverter and intelligent string combiner monitoring
- A compact size and weight
- Touch screen display
- 1000 Voc (open circuit voltage) rating

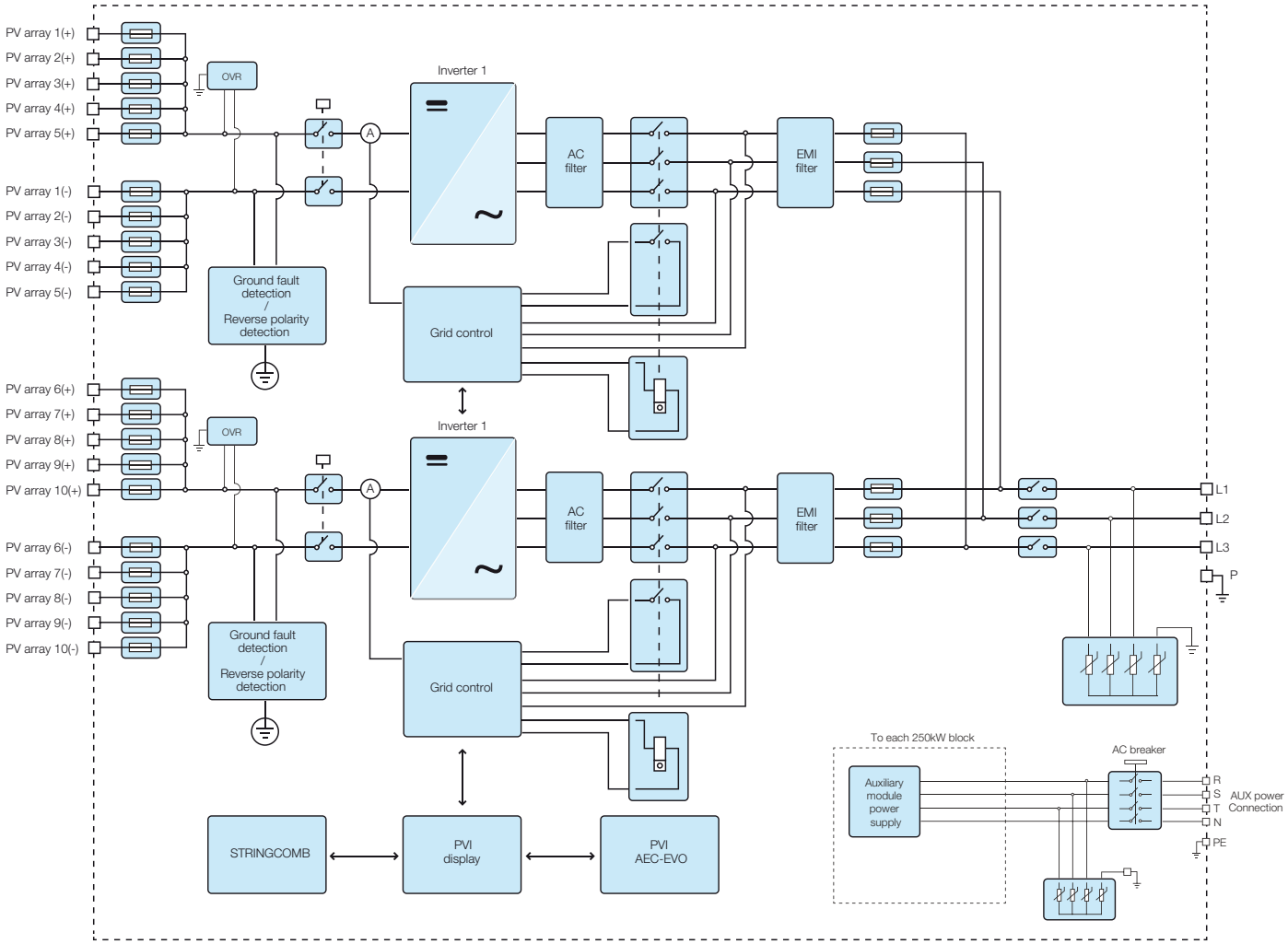
Efficiency curves of PVI-500.0-TL-CN



Technical data and types

Type code	PVI-500.0-TL-CN
Input side	
Absolute maximum DC input voltage ($V_{max,abs}$)	1000 V
MPPT input DC voltage range ($V_{MPPTmin}$ ... $V_{MPPTmax}$) at V_{acr}	465…900 V @300V 495…900 V @320V 500….900 V @340V 550…900 V @360V Linear derating from max to null [850<V_{MPPT}<900V]
MPPT input DC range ($V_{MPPTmin}$ ... $V_{MPPTmax}$) at P_{acr} and V_{acr}	465…850 V @300V 495…850 V @320V 500….850 V @340V 550…850 V @360V
Number of independent MPPT multi-master	2
Number of independent MPPT master/slave	1
Maximum combined DC input current (I_{dcmaxc})	1100 A
Maximum DC input current for each module ($I_{dcmax,m}$)	550 A
Number of DC inputs pairs	10
DC connection type	20 x 70 mm² (M10)
Input protection	
Reverse polarity protection	Yes, from limited current source
Input overvoltage protection - varistor	1 for each input, Class II
Photovoltaic array leakage control, floating neutral, floating panels	No; Proprietary control available (3)
Residual current protection, grounded neutral, floating panels	Not included
Fuse size for each input pair	125/160 A
Output side	
AC grid connection type	Three phases 3W+PE
Rated AC power (P_{acr} @cosϕ=1)	470 kW@300V / 500kW@320V / 530kW@340V / 560 kW@360V
Maximum AC output power (P_{acmax} @cosϕ=1)	470 kW@300V / 500kW@320V / 530kW@340V / 560 kW@360V
Maximum apparent power (S_{max})	522 kVA@300V / 555 kVA@320V / 588 kVA@340V / 620 kVA@360V
Rated grid voltage (V_{acr})	300/320/340/360 V (5)
AC voltage range (V_{acmin}...V_{acmax})	255…345 / 272…368 / 289…391 / 306…414 V (1)
Maximum output current (I_{acmax})	900 A
Rated frequency (f_r)	50/60 Hz
Frequency range (f_{min}...f_{max})	47…53 / 57…63 Hz (2)
Nominal power factor and adjustable range	> 0.995 (adj. ± 0.90)
Total harmonic distortion	< 3% (@ $P_{ac,r}$)
AC connection type (for each phase)	3 x 240 mm² (M10)
Output protection	
Anti-islanding protection	According to local standard
Output overvoltage protection (varistor)	Yes, Class II
Night time disconnect	Yes
AC circuit breaker	690 V / 1kA (T6)

Block diagram of PVI-500.0-TL-CN



Technical data and types

Operating performance	
Maximum efficiency (η_{max})	98.5% (4)
Weighted efficiency (η_{EURO} / η_{CEC})	98.2% / - (4)
Stand-by consumption/night-time power loss	< 66 W
AC auxiliary supply	3 x 400 Vac +N, 50/60 Hz
Auxiliary supply consumption	< 810 W
Auxiliary supply consumption without cooling	< 220 W
Inverter switching frequency	9 kHz
Communication	
Wired local monitoring	PVI-USB-RS232_485 (opt.)
Remote monitoring	PVI-AEC-EVO (opt.), VSN700 Data Logger (opt.)
String Combiner	PVI-STRINGCOMB (opt.)
User interface	TFT LCD 5.7"
Environmental	
Ambient temperature range	-20...+ 50°C/-4...122°F with derating above 45°C/113°F
Relative humidity	0...95% non condensing
Noise emission	<62 dB(A) @ 1 m
Maximum operating altitude without derating	1000 m / 3280 ft
Physical	
Environmental protection rating	IP 20
Cooling	Air forced
Required air cooling flow	8000 m³/h - 4720 CFM
Dimension (H x W x D)	2280mm x 2000mm x 800mm / 89.8" x 78.7" x 31.5"
Weight	< 1200 kg / 2645 lb
Safety	
Transformer	No
Marking	CQC
Safety and EMC standard	EN 50178, EN 61000-3-12, EN61000-6-2, EN61000-6-4
Grid standard (check your sales channel for availability)	CNCA/CTS0004-2009A, GB/T 19939, IEC 62116

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. Missing symmetry with respect to ground results in AC disconnection (disabled function by default)
4. Power consumption of the auxiliary services not included
5. Adjustable by factory

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

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 kW 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 CO_2-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

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

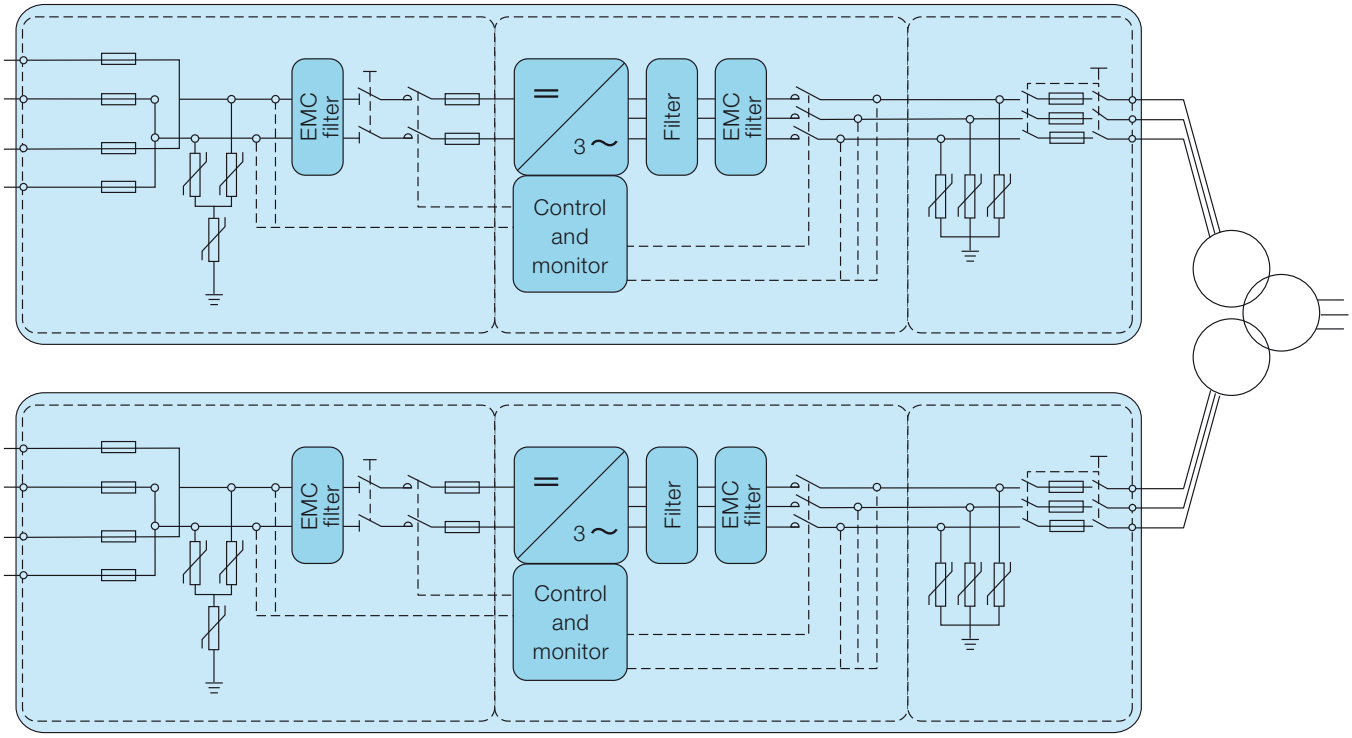
Technical data and types

Type code PVS800-57	-0100kW-A 100 kW	-0250kW-A*) 250 kW	-0315kW-B*) 315 kW	-0500kW-A*) 500 kW	-0630kW-B*) 630 kW	-0875kW-B*) 875 kW	-1000kW-C*) 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	1000 V	1000 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, 8, 12 (+/-)	4, 8, 12 (+/-)	8, 12, 16 (+/-)	8, 12, 16 (+/-)
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	500 kW	700 kW	1050 kW	1200 kW
Power at cosφ = 0.95 [3]	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	520 W	520 W	630 W	630 W
Standby operation consumption	60 W	60 W	60 W	70 W	70 W	45 W	45 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)	1030/2130/646	1830/2130/646	1830/2130/646	2630/2130/646	2630/2130/646	3630/2130/646	3630/2130/646
Weight appr. [10]	550	1100	1100	1800	1800	2600	2600

[1] Recommended maximum input power
[2] Optional MCB inputs, 80 A inputs
[3] 100, 250 and 500 kW units at 40 °C. 315 and 630 kW at 45 °C. 875 kW 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 UDC
[9] 115 V, 60 Hz optional
[10] For the smallest number of protected inputs. See the user manual for details.

***) Improved design, first shown at Intersolar 2014**

ABB central inverter design and power network connection



Technical data and types

Type code PVS800-57	-0100kW-A	-0250kW-A	-0315kW-B	-0500kW-A	-0630kW-B	-0875kW-B	-1000kW-C
	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 +40 °C	-15 to +45 °C	-15 to +50 °C	-15 to +50 °C
Maximum ambient temperature [12]	+50 °C	+50 °C	+55 °C	+50 °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]	2000m [14]	2000m [14]	2000m [14]	2000m [14]	2000m [14]	4000m	4000m
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 m^3/h	2500 m^3/h	2500 m^3/h	5000 m^3/h	5000 m^3/h	7950 m^3/h	7950 m^3/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, Golden Sun, BDEW, GOST, AS						
Grid support and grid functions	Reactive power compensation [18], Power reduction, LVRT, 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

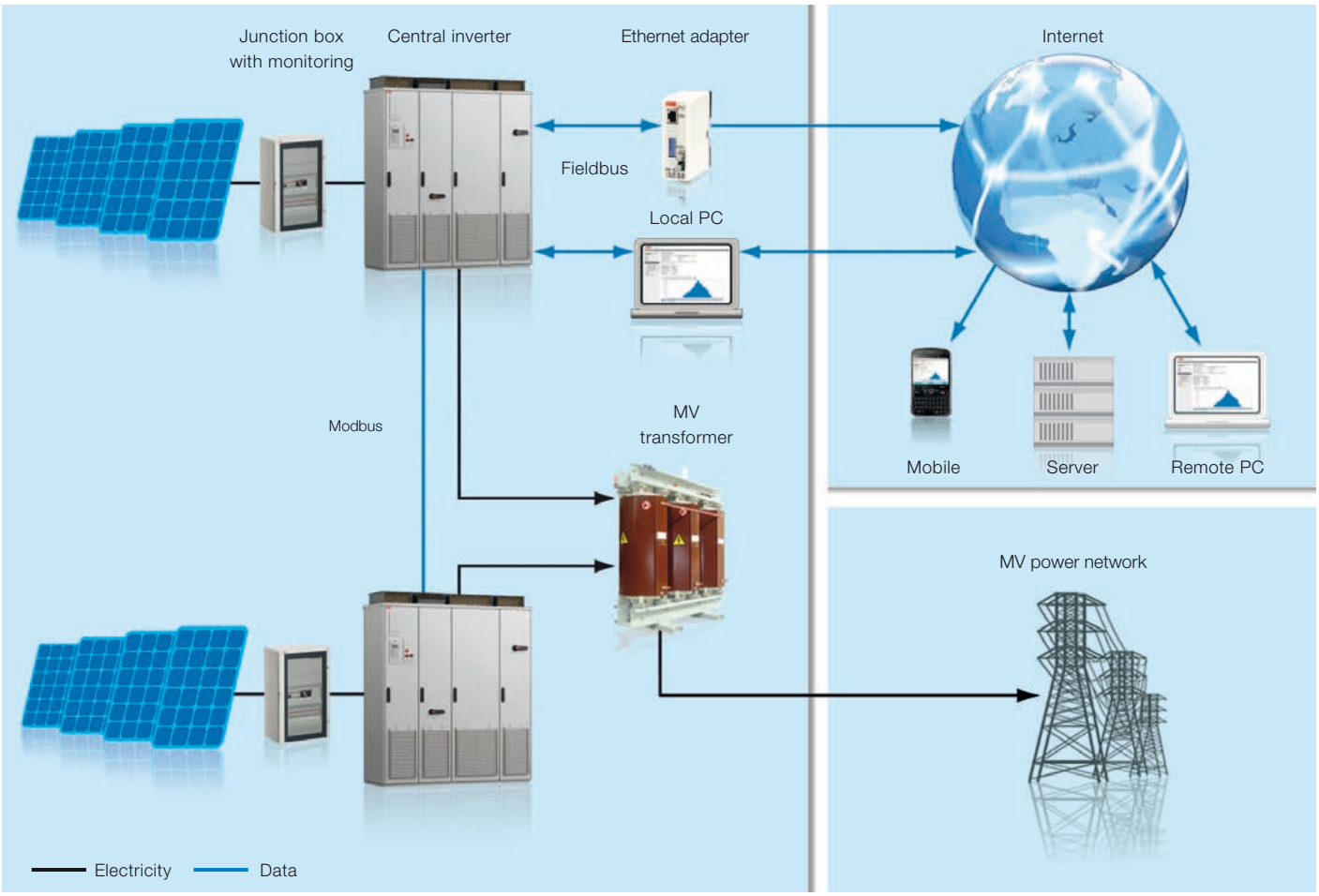
Life cycle service and support

- 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

ULTRA-700.0/1050.0/1400.0-TL OUTD
700 to 1400 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 largest solar power inverter in the ABB product range, the new ULTRA-1400.0 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.

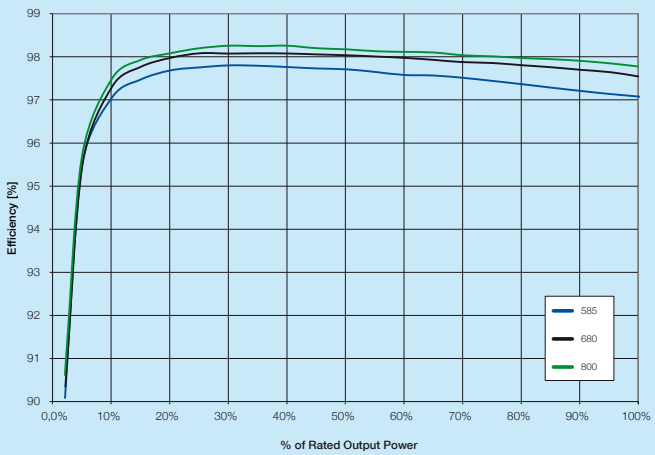
This liquid-cooled, high-powered inverter is the largest photovoltaic inverter available on the market.

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

Highlights

- Maximum DC input voltage up to 1000 V (optional 1100V), 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 350kW 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
- Passive liquid cooling with total segregation of internal compartments assuring a 5-year maintenance cycle
- Easy installation and maintenance procedure; front extractible 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

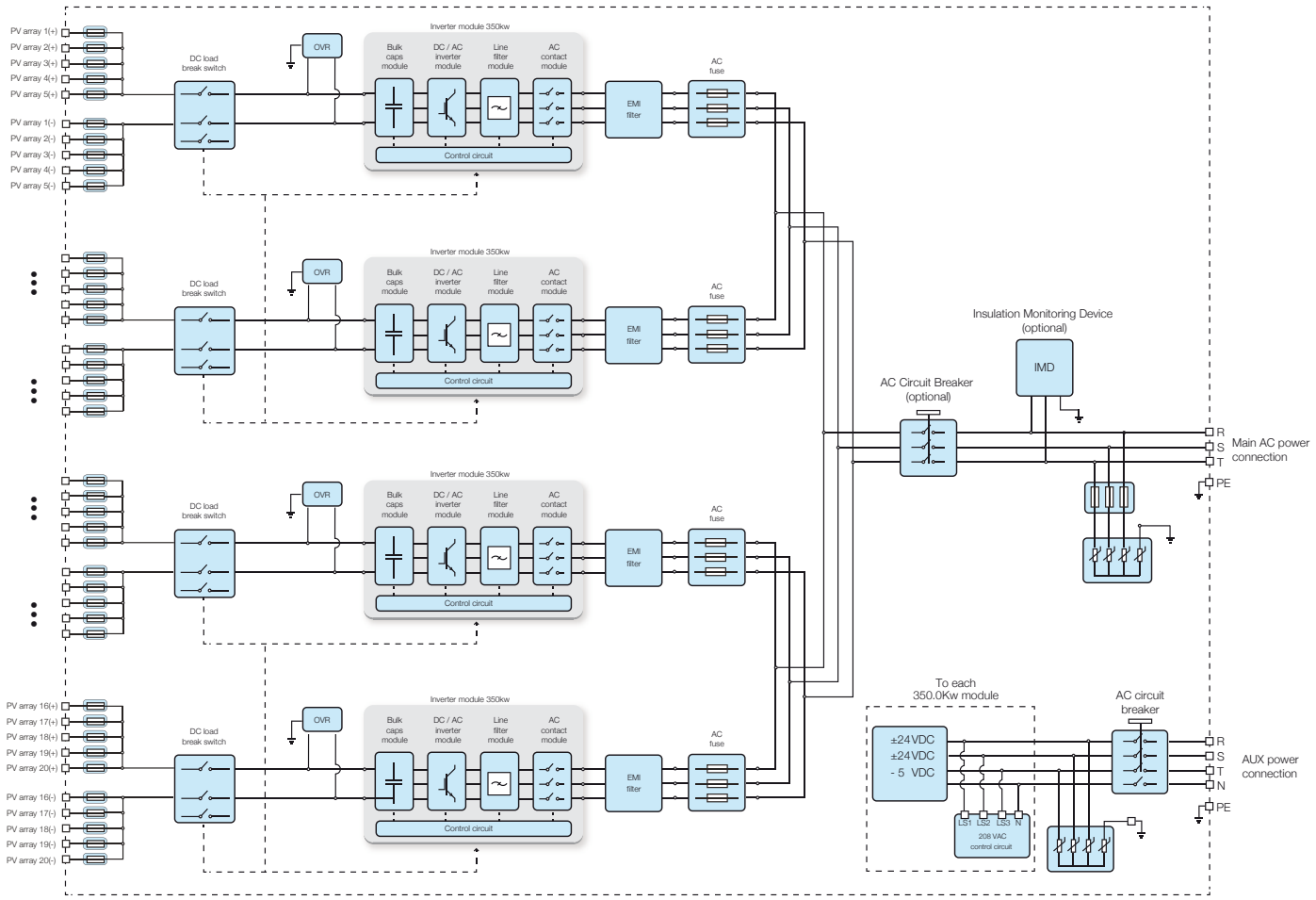
Efficiency curves of ULTRA-TL



Technical data and types

Type code	ULTRA-700.0-TL	ULTRA-1050.0-TL	ULTRA-1400.0-TL
Input side			
Absolute maximum DC input voltage ($V_{max,abs}$)	1000 V (1100 V opt.)		
MPPT input DC voltage range ($V_{MPPTmin}$ ... $V_{MPPTmax}$) at V_{acr}	470...900 V Linear derating from max to 15kW [850V<V_{MPPT}<900V] 560 kW @ 470 V	470...900 V Linear derating from max to 22.5kW [850V<V_{MPPT}<900V] 840 kW @ 470 V	470...900 V Linear derating from max to 30kW [850V<V_{MPPT}<900V] 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
Maximum combined DC input current (I_{dcmaxc})	1388 A (2 x 694A)	2082 A (3 x 694A)	2776 A (4 x 694A)
Maximum DC input current for each module ($I_{dcmax,m}$)	694 A		
Number of DC inputs pairs	10	15	20
DC connection type	20 x 50mm² ... 240mm²(M12)	30 x 50mm²...240mm²(M12)	40 x 50mm² ...240mm²(M12)
Input protection			
Reverse polarity protection	Yes, via input breaker		
Input overvoltage protection	Class 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 10A ground fault protection with time and current adjustable		
Fuse size for each input pair	200/250/315/400 A		
Output side			
AC grid connection type	Three phases 3W+PE		
Rated AC power (P_{acr} @cosφ=1)	780 kW	1170 kW	1560 kW
Maximum apparent power (S_{max})	780 kVA	1170 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
Contributory fault current	1036 A	1554 A	2072 A
Rated frequency (f_r)	50/60 Hz		
Frequency range (f_{min}...f_{max})	47...53 / 57...63 Hz (2)		
Nominal power factor and adjustable range	> 0.995 (adj. ± 0.90) (adj. ± 0.10)		
Total harmonic distortion	< 3% (@ $P_{ac,r}$)		
AC connection type (for each phase)	6 x 240 mm² (M12)		
Output protection			
Anti-islanding protection	According to local standard		
Output overvoltage protection	Class II voltage surge protection		
Night time disconnect	Yes		
AC switch	Yes		
AC fuse for each module	3x450A/200kA		

Block diagram of ULTRA-1400.0-TL



Technical data and types

Type code	ULTRA-700.0-TL	ULTRA-1050.0-TL	ULTRA-1400.0-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
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 $P_{ac,r}$
Auxiliary supply consumption without cooling	< 0.05% of $P_{ac,r}$	< 0.06% 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	PVI-AEC-EVO (opt.), 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 -40...+ 60°C/-40...140°F with derating above 50°C/122°F (opt.)		
Relative humidity	0...100% condensing		
Noise emission	< 78 dB(A) @ 1 m		
Maximum operating altitude without derating	2000 m / 6560 ft	2000 m / 6560 ft	2000 m / 6560 ft
Physical			
Environmental protection rating	IP 65		
Cooling	Passive liquid		
Required air cooling flow	Not applicable		
Dimension (H x W x D)	2920mm x 3020mm x 1520mm / 114,9 “ x 118.9” x 59.9”	2920mm x 3720mm x 1520mm / 114,9 “ x 146,5” x 59.9”	2920mm x 4420mm x 1520mm / 114,9 “ x 174,0” x 59.9”
Weight	< 3000 kg / 6613 lb	< 3800 kg / 8377 lb	< 4600 kg / 10141 lb
Weight of the module	< 55 kg / 121 lb		
Safety			
Transformer	No		
Marking	CE (50 Hz only)		
Safety and EMC standard	EN 50178, EN62109-1, EN61000-6-2, EN61000-6-4		
Grid standard (check your sales channel for availability)	CEI-0-16, BDEW, FERC661, P.O.12.3		

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. Power consumption of the auxiliary services not included

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

Turnkey stations

ABB turnkey stations

PLUS-STATION
ULTRA-STATION
CORE-STATION

ABB's turnkey solution allows large installation customers to select their power inverter solution to be custom-fitted into a prefabricated weatherproof cabin to allow for simple and speedy installation in the field. There are many tailor-made options available for rated power between 440kW and 3.1 MW.

The major benefit of this product is the high power-low space ratio and its ability to configure to specific customer requirements such as multiple MPPTs.

This product maximizes efficiencies and reliability by using the new modular central inverters with liquid filled MV transformers as well as the liquid cooled ULTRA inverter series.

The modular format of the central inverters along with a unique easy-out, easy-in rack system allows for simple maintenance in all weather conditions.

Modularity concept is kept for ULTRA series inverter with a 350kW modularity.

PLUS-STATION		ULTRA-STATION		CORE-STATION	
PLUS-STATION-530.0	2 x PVI-267.0-TL	ULTRA-STATION-770.0	1 x ULTRA-700.0-TL	CORE-STATION-1000.0	2 x PVI-500.0-TL-CN
PLUS-STATION-665.0	1 x PVI-400.0-TL 1 x PVI-267.0-TL	ULTRA-STATION-1160.0	1 x ULTRA-1050.0-TL	CORE-STATION-2000.0	4 x PVI-500.0-TL-CN
PLUS-STATION-800.0	2 x PVI-400.0-TL	ULTRA-STATION-1550.0	1 x ULTRA-1400.0-TL		
PLUS-STATION-930.0	1 x PVI-400.0-TL 2 x PVI-267.0-TL	ULTRA-STATION-1940.0	1 x ULTRA-700.0-TL 1 x ULTRA-1050.0-TL		
PLUS-STATION-1065.0	2 x PVI-400.0-TL 1 x PVI-267.0-TL	ULTRA-STATION-2330.0	2 x ULTRA-1050.0-TL		
PLUS-STATION-1200.0	3 x PVI-400.0-TL	ULTRA-STATION-2720.0	1 x ULTRA-1050.0-TL 1 x ULTRA-1400.0-TL		
		ULTRA-STATION-3110.0	2 x ULTRA-1400.0-TL		

Highlights

- Rated power between 440kW and 3.1 MW
- Very compact design
- Best in class efficiency thanks to the use of new generation ABB inverters and mineral liquid insulated MV transformers
- Maximum flexibility thanks to the different inverter size and technology
- Liquid cooled ULTRA inverters enhance efficiency, compactness and features
- New central inverters based on 67kW module allow more than 21% additional power with the same size as the 55kW modules

ABB megawatt station

PVS800-MWS
1 to 1.25 MW

The ABB megawatt station is a turnkey solution designed for large-scale solar power generation. It houses all the electrical equipment that is needed to rapidly connect a photovoltaic (PV) power plant to a medium voltage (MV) electricity grid. All the components within the megawatt station are from ABB's product portfolio.

Turnkey-solution for PV power plants

The ABB megawatt station design capitalizes on ABB's long experience in developing and manufacturing secondary substations for utilities and major end-users worldwide in conventional power transmission installations.

A station houses two ABB central inverters, an optimized transformer, MV switchgear, a monitoring system and DC connections from solar array. The station is used to connect a PV power plant to a MV electricity grid, easily and rapidly. To meet the PV power plant's demanded capacity, several ABB megawatt stations can be combined.

Compact design eases transportation

The steel-framed insulated container comes complete with a concrete foundation. A thermally insulated inverter compartment enables operation in harsh temperature and humidity environments and is designed for at least 25 years of operation.

The hollow concrete foundation has a double floor within the inverter compartment. This provides easy access for cabling. Additionally the small inverter footprint makes the container compact and easy to lift via a standard crane, thereby simplifying transportation.

The complete ABB megawatt station weighs only 20 tons. At 50 m^3, the container's volume is some 15 percent smaller than equivalent solutions.

Highlights

- Proven technology and reliable components
- Compact and robust design
- High total efficiency
- Modular and serviceable system
- Double-stage air pre-filtering for reduced maintenance
- Global life cycle services and support

Accessories

- Solar array junction boxes with string monitoring
- Remote monitoring solutions
- Warranty extensions
- Solar inverter care contracts

Options

- MV AC output voltages (6 to 24 kV)
- Different MV switchgear configurations
- Air-insulated MV switchgear
- Optional liquid-filled and dry-type transformers
- I/O extensions
- DC grounding (negative and positive)
- Fieldbus and Ethernet connections
- Auxiliary power supply from main power connections

ABB megawatt station

Solar inverters

ABB solar inverters are the result of decades of industry experience and the use of proven frequency converter technology. As such the solar inverters provide a highly efficient and cost-effective way to convert the direct current, generated by solar modules, into high-quality and CO_2 -free alternating current. Two ABB central inverters are used in the ABB megawatt station. The inverters provide high efficiency conversion with low auxiliary power consumption.

Transformer

The ABB megawatt station features an ABB vacuum cast coil dry-type transformer. The transformer is designed to meet the reliability, durability, and efficiency required in PV applications. It is specifically designed and optimized for ABB solar inverters to provide the best performance throughout the lifetime of the plant.

The transformer is environmentally safe, having no volatile liquids that can leak, and it carries no fire or explosion risk. It provides excellent mechanical and short-circuit characteristics.

As a major global transformer manufacturer, ABB offers a wide range of liquid-filled and dry-type transformers. Alternate power transformers are available to meet customer requirements. All ABB's transformers are manufactured in accordance with the most demanding industry and international standards.

Switchgear

ABB offers a complete range of medium voltage switchgear for secondary distribution, including air-insulated and gas-insulated switchgear.

The ABB megawatt station is equipped, as standard, with the widely proven ABB SafeRing, SF6-insulated switchgear. A sealed steel tank with constant atmospheric conditions ensures a high level of reliability as well as personnel safety. The virtually maintenance-free system comes in a compact and flexible design that allows for a versatile switchgear configuration. As an option ABB's gas-insulated SafePlus and air-insulated Unisec switchgear are also available.

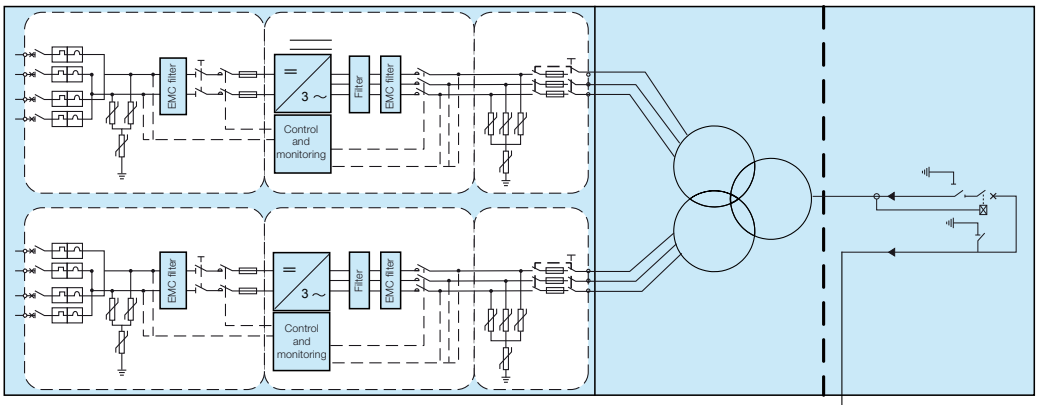
Technical data and types

Type code	PVS800-MWS-1000kW-20*)	PVS800-MWS-1250kW-20*)
	1 MW	1.25 MW
Input (DC)		
Maximum input power ($P_{PV, max}$)	2 × 600 kW	2 × 760 kW
DC voltage range, mpp ($U_{DC, mpp}$)	450 to 825 V	525 to 825 V
Maximum DC voltage ($U_{DC, max}$) [1]	1000 V	1000 V
Maximum DC current ($I_{DC, max}$)	2 × 1145 A	
Voltage ripple, PV voltage (U_{PV})	< 3%	< 3%
Number of protected DC inputs (parallel)	2 × 8 (+/-)	2 × 8 (+/-)
Number of mppt trackers	2	2
Output (AC)		
Nominal AC output power ($P_{AC, N}$)	1000 kW	1250 kW
Nominal AC current ($I_{AC, N}$)	28.9 A	36.1 A
Nominal output voltage ($U_{AC,N}$) [2]	20 kV	20 kV
Output frequency	50/60 Hz	50/60 Hz
Harmonic distortion, current [3]	< 3%	< 3%
Power factor compensation (cosφ)	Yes	Yes
Inverter type (2 x ABB central inverters)	PVS800-57-0500kW-A	PVS800-57-0630kW-B
Transformer type [4]	ABB Vacuum cast coil dry-type	
Medium voltage switchgear type [5]	ABB SafeRing type DeV with REJ603 protection relay (self-powered)	
Efficiency		
Maximum [6] (including transformer)	97.8%	97.8%
Euro-eta [6] (including transformer)	97.1%	97.3%

[1] If DC voltage is > 1000 V, the inverter will not be damaged, but will not start
[2] Voltages between 6 and 24 kV available as an option
[3] At nominal power
[4] Other ABB transformer types available as an option
[5] Other ABB switchgear types available as an option
[6] Efficiency without auxiliary power consumption, at lowest DC voltage
***) Improved design, first shown at Intersolar 2014**

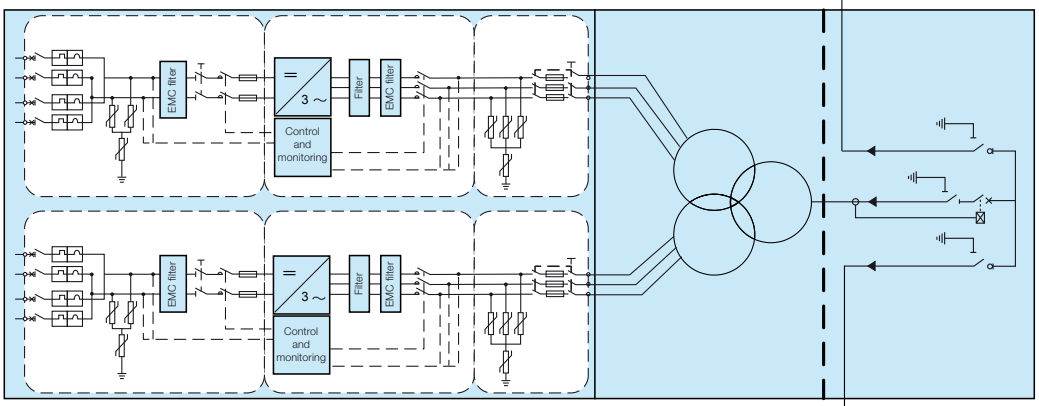
ABB megawatt station design and grid connection

1: PVS800-MWS

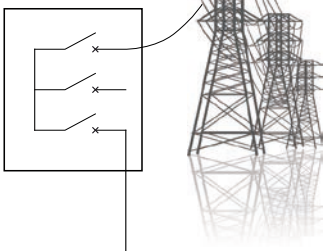


20 kV

2: PVS800-MWS



MV grid connection



20 kV

Type code	PVS800-MWS-1000kW-20	PVS800-MWS-1250kW-20
	1 MW	1.25 MW
Power consumption		
Own consumption in operation [7]	< 1200 W	< 1200 W
Standby operation consumption [7]	< 140 W	< 140 W
External auxiliary voltage	3 ~ 400 V/50 Hz	3 ~ 400 V/50 Hz
Dimensions and weight		
Width/Height/Depth, mm	W 6930/H 3070/D 2430	W 6930/H 3070/D 2430
Weight approx.	20 t	21 t
Environmental limits		
Degree of protection	IP54 (inverter section)/IP23d (transformer and switchgear section)	IP54 (inverter section)/IP23d (transformer and switchgear section)
Ambient temperature range (nominal ratings)	-20 to +40 °C	-20 to +40 °C
Maximum ambient temperature [8]	+50 °C	+50 °C
Relative humidity, non condensing	15 to 95%	15 to 95%
Maximum altitude (above sea level) [9]	2000 m	2000 m
Maximum cooling air flow	6720 m^3/h	6720 m^3/h
User interface and communications		
Local user interface	Inverter's control panel and PC interface through ABB Drive Window	
Fieldbus connectivity	Modbus, PROFIBUS, Ethernet	
Product compliance		
Conformity	IEC 62271-202 High-voltage/low-voltage prefabricated substation	
Certifications and approvals	BDEW	
Grid support	Reactive power compensation, Power reduction, Low voltage ride through	

[7] Without options and heating
[8] Power derating after 40 °C
[9] Power derating above 1000 m. Above 2000 m special requirements.

ABB inverter station

PVS800-IS
1.75 to 2 MW

The ABB inverter station is a compact turnkey solution designed for large-scale solar power generation. It houses all equipment that is needed to rapidly connect ABB central inverters to a medium voltage (MV) transformer station.

Turnkey solution for photovoltaic (PV) power plants

The ABB inverter station design capitalizes on ABB's long experience in the development and manufacture of secondary substations for electrical authorities and major end-users worldwide in conventional power transmission installations.

The station houses two ABB central inverters and embedded auxiliary power, monitoring and air filtration systems.
It enables easy and rapid connection to a MV transformer station. Depending on the size of the PV power plant, several ABB inverter stations can be used to meet the capacity need.

Proven design with long operating life

The housing is based on a standard, insulated, steel-framed 20-foot shipping container. The total package weighs only 10 metric tons. The optimized shipping container solution ensures cost-effective and safe transportability to the site. The station's optimized air circulation and filtering system together with thermal insulation enable operation in harsh temperature and humidity environments. The inverter station is designed for at least 25 years of operation.

Highlights

- Proven technology and reliable components
- Standard and robust design
- Protected working interior
- Modular and redundant system
- Easy connection to a MV station
- Extendable manufacturing footprint with fast deliveries
- Embedded auxiliary power distribution system
- Double-stage air pre-filtering for reduced maintenance
- Life cycle service and support through ABB's extensive global service network

Accessories

- Solar array junction boxes with string monitoring
- Remote monitoring solutions
- Warranty extensions
- Solar inverter care contracts

Options

- Auxiliary transformer
- Upgrades to match environmental conditions

ABB inverter station

Solar inverters

ABB's PVS800 central inverters are the result of decades of industry experience and the use of proven frequency converter technology. As such the central inverters provide a highly efficient and cost-effective way to convert the direct current generated by solar modules into high-quality and CO_2-free alternating current. Two ABB central inverters are used in the ABB inverter station. The inverters provide high efficiency conversion with low auxiliary power consumption.

Easy connection to a MV station

The inverter station is easy to connect to any MW station configuration to match specific country or project requirements. ABB can provide oil or dry type transformers to go with a wide selection of switchgear configurations. Mounting options can be selected to match exactly the environmental and project-specific needs.

Embedded auxiliary power distribution system

The embedded auxiliary power supply system supports needs of both inverter and MV stations. The system includes protected power supply terminals for stations accessories and signal terminals for alarm and control sensors.

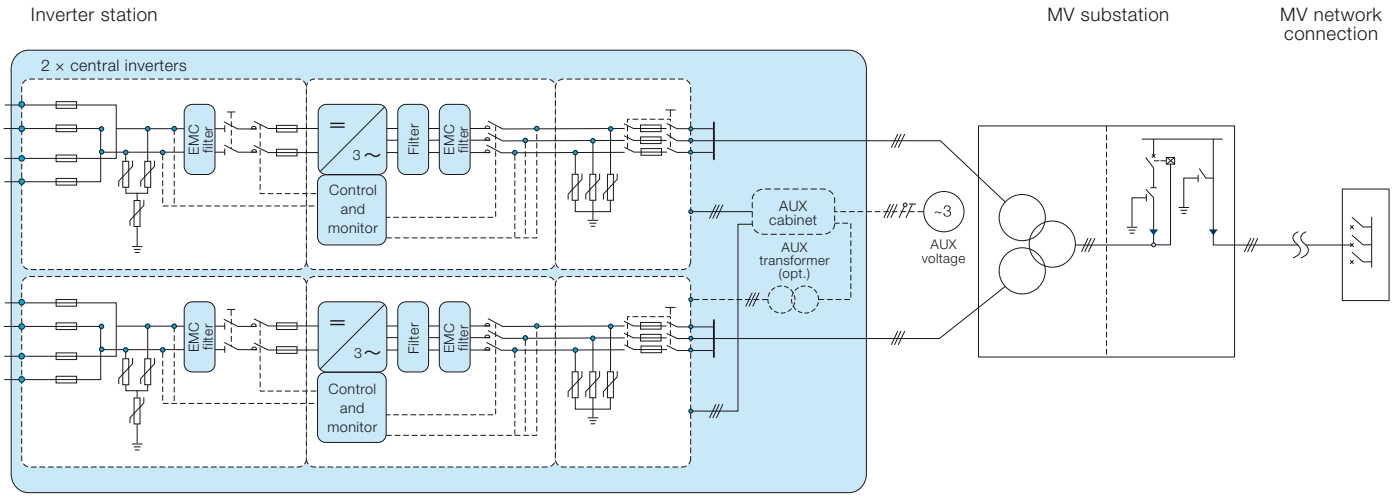
The embedded auxiliary transformer can be included if external power supply is not available at the plant.

Technical data and types

Type code	PVS800-IS-1750kW-B*)	PVS800-IS-2000kW-C*)
	1.75 MW	2 MW
Input (DC)		
Maximum input power ($P_{PV,max}$) [1]	2 × 1050 kW	2 × 1200 kW
DC voltage range, mpp ($U_{DC,mpp}$)	525 to 825 V	600 to 850 V
Maximum DC voltage ($U_{DC,max}$)	1100 V	1100 V
Maximum DC current ($I_{DC,max}$)	2 × 1710 A	2 × 1710 A
Number of protected DC inputs	2 × 12 (+/-)	2 × 12 (+/-)
Number of mpp trackers	2	2
Output (AC)		
Nominal AC output power ($P_{AC,N}$) [2]	2 × 875 kW	2 × 1000 kW
Power at cosφ = 0.95 [2]	2 × 830 kW	2 × 950 kW
Maximum AC output power ($P_{AC,max}$) [3]	2 × 1050 kW	2 × 1200 kW
Nominal AC current ($I_{AC,N}$)	2 × 1445 A	2 × 1445 A
Nominal output voltage ($U_{AC,N}$)	350 V	400 V
Output frequency	50/60 Hz	50/60 Hz
Harmonic distortion, current [4]	<3%	<3%
Power factor compensation	Yes	Yes

[1] Inverter limits power to safe level
[2] At 45 °C ambient temperature
[3] At 20 °C ambient temperature
[4] At nominal power
***) Improved design, first shown at Intersolar 2014**

ABB inverter station design and power network connection



Technical data and types

Type code	PVS800-IS-1750kW-B	PVS800-IS-2000kW-C
	1.75 MW	2 MW
Efficiency [5]		
Maximum	98.7%	98.8%
Euro-eta	98.5%	98.6%
Power consumption		
Own consumption in operation [6]	<1400 W	
Standby operation consumption [6]	<100 W	
External auxiliary voltage	3/N/PE AC 400 V 50 Hz	
Dimensions and weight		
Width/Height/Depth, (W × H × D)	6058 x 2896 x 2438 mm	
Weight appr.	10 t	
Environmental limits		
Degree of protection [7]	IP54	
Ambient temperature range (nominal ratings)	-20 °C to +45 °C	
Maximum ambient temperature [8]	+55 °C	
Relative humidity, not condensing	15 to 95%	

[5] Efficiency without auxiliary power consumption at min. U_{DC}
[6] Without options and heating
[7] After installation. During transportation IP55.
[8] Power derating after 45 °C

PV + Storage

ABB PV + Storage

REACT-3.6/4.6-TL

3.6 to 4.6 kW

The photovoltaic renewable energy source will gain a renewed success thanks to battery storage usage for enhancing self-consumption and energy self-sufficiency*.

One of the biggest challenges with solar energy is that it is unpredictable and its usage is not completely discretionary. The solution is to combine energy storage and load management capability with a traditional PV inverter.

In this way self-consumption and energy self-sufficiency can be improved to a further level.

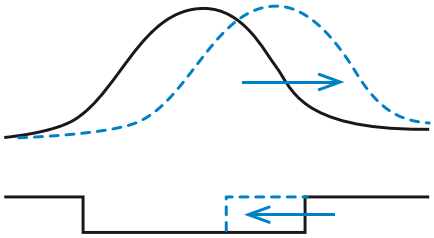
The advantages of a single, fully integrated device

- Coordination of all the energy flows with the goal of aligning PV energy production and home consumption
- Battery management and battery life are optimized
- One user interface, with remote capability, to monitor renewable energy production and manage home loads

*Self-consumption is how much PV energy is used at home and not exported to the grid with respect to the total energy production.
Energy self-sufficiency is how much PV energy is used at home and not exported to the grid with respect to the total energy consumption.

Highlights

- The REACT-4.6-TL (Renewable Energy Accumulator and Conversion Technology) is a PV single phase grid connected inverter able to store energy in a 2.0kWh useful capacity Li-Ion battery integrated within the same product enclosure, expandable up to 3x
- All features found in our family of string inverters are maintained: double fast MPPT, broad input voltage range, top class efficiency with TL topology, compactness, installation flexibility
- Up to four onboard load management outputs are included as well as an auxiliary AC back-up output for off grid capability in case of a black out
- The product is designed for a long life cycle with a 10 year expected battery life thanks to the Li-Ion technology
- Storage capacity can be further expanded up to three times adding further battery units



Align production to consumption

Technical data and types

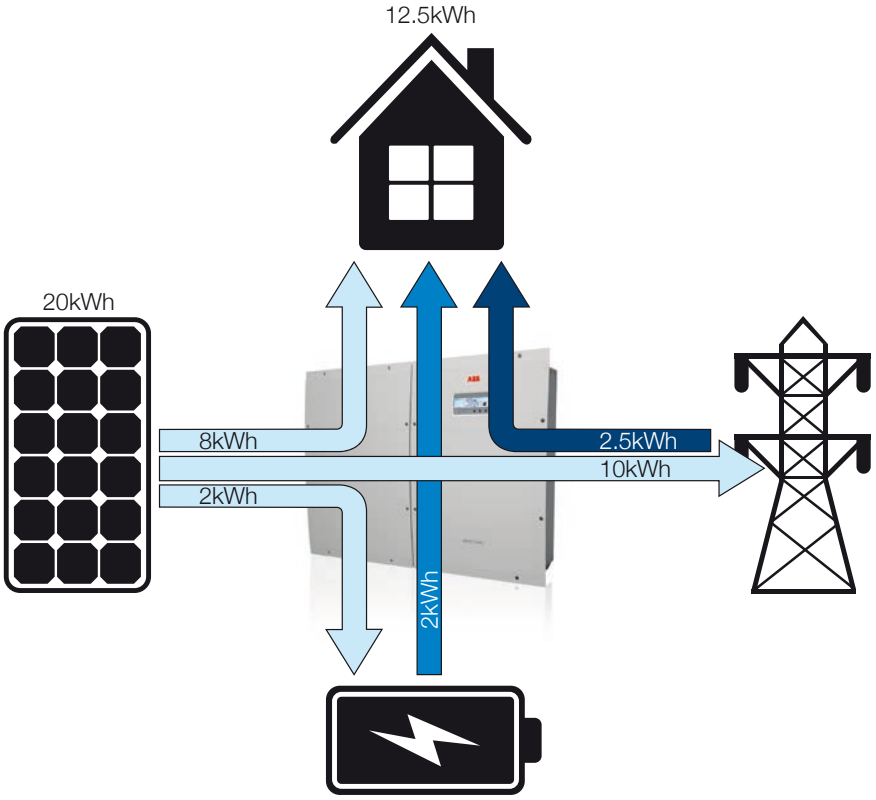
PV+Storage	REACT-3.6-TL	REACT-4.6-TL
System components	REACT-UNO-3.6-TL	REACT-UNO-4.6-TL
	REACT-BAT-AP1	REACT-BAT-AP1
	REACT-MTR-1PH (or -3PH)	REACT-MTR-1PH (or -3PH)

PV+Storage Inverter	REACT-UNO-3.6-TL	REACT-UNO-4.6-TL
Input PV		
Max. input voltage $V_{max,abs}$	600 V	
Max DC power	5000 W	6000 W
Input voltage range MPP at rated AC output power	160 ... 530 V	180 ... 530 V
Number of independent MPPT	2	
Output AC		
Rated AC power (Pacr @cosϕ=1)	3600 W	4600 W
Maximum apparent power (Smax)	3600 VA	4600 VA
Phases AC	Single phase	
Rated AC grid voltage	240 V	
AC voltage range	180...264 V	
Rated output frequency	50/60 Hz	
Anti-islanding protection	According to local standard	
Nominal Power Factor, adj range	>0.995, adj. ± 0.9 @Pacr, ± 0.8 with max 3.68 kVA	
Max/Eur efficiency PV to AC	97% / 96%	
Battery full cycle efficiency	93%	
Battery charger		
Battery converter, max charge	3 kW	
Battery converter, max discharge	3 kW	

Battery pack	REACT-BAT-AP1
Manufacturer	Panasonic
Battery type	Li-Ion
Max power discharge	1.5 kW
Max power charge	1.0 kW
Usable life average battery capacity	2 kWh (6 kWh, with 3x expansion)
Battery lifetime	>4500 cycles
Battery calendar lifetime	10 years
Safety and EMC	EN62109-1, EN62109-2, EN50178, EN60950-1, EN61000-6-2, EN61000-6-3, UN38.X

Meter	REACT-MTR-1PH or REACT-MTR-3PH
AC line meter	Necessary for optimum battery energy management.
	Order separately REACT-MTR-1PH or REACT-MTR-3PH
Measures	P/ Q/ A/ PF/ V/ I
Measures accuracy and resolution	<1%, 1%
Current capability	30 A, up to 5 Adc tolerant
Phases AC	1 or 3
Nominal voltage and range	110/230 Vac 85-265 Vac
Nominal frequency and range	50/60 Hz 45-65 Hz
Power supply and consumption	Integrated, <1W
Isolation and dielectric strength	4kVrms (for 1 minute) between AC measuring ports and communication port
Installation category	CAT III,
Protection class	Front IP40, screw terminals IP20
Installation	DIN 43880 Rail, 3 modules wide
Operational temperature range	-20...+55°C
Safety and EMC	IEC 61010-1, IEC 61326-1, CE mark

Daily energy flows example of REACT-4.6



Self-consumption $= \left(\frac{8+2}{20}\right) = 50\%$

Energy self-sufficiency $= \left(\frac{8+2}{12.5}\right) = 80\%$

Technical data and types

PV+Storage	REACT-3.6-TL	REACT-4.6-TL
Other features		
Load management function	Optional, four built in GOGO relays	
AC back up output, off grid	Optional, automatic or manual restart, even with no battery	
Enable battery charge from AC	Disabled by factory, can be enabled where allowed	
No PV input version	Optional special version, AC bus storage	
Display	Energy flow and GOGO relays activation indications	
Communication		
Available ports	RS485 ModBus RTU, RS485Service, WiFi or Ethernet	
Phisical		
Protection class	IP54 (inverter), IP21 (battery pack)	
Dimensions, WxHxD, equipped with 1 battery unit – weight (kg)	983mm x 740mm x 229mm – 60kg	
Battery unit dimensions, WxHxD – weight (kg)	490mm x 740mm x 229mm – 30kg	
Installation	Wall mount with provided brackets	
Cooling	Natural convection	
Environmental		
Operational temperature range	-20°C / +55C°	
Full battery function operational temperature range	+5°C / +40°C	
Relative humidity	Max 95%, no condensation	
Altitude	2000 m above sea level	
Recommended location	Indoor with ventilation opening	
Safety		
Marking	CE	
Grid connection standards	CEI 0-21, VDE-AR-N 4105, G83/2, VFR2014	
Safety and EMC standard	EN62109-1, EN62109-2, EN50178, EN60529, DIN VDE 0126-1-1, EN61000-6-2, EN61000-6-3, EN61000-3-11, EN61000-3-12	

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.

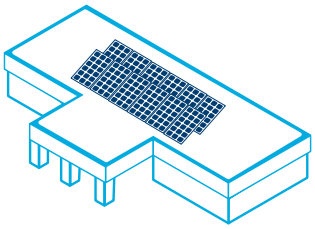
No matter if the customer is a home owner or an independent power producer, Aurora Vision® Plant Management Platform, provides the solution. Our business is to make our customers' businesses operate more efficiently.

- 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.

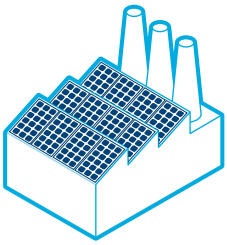
Any inverter size

Any market segment



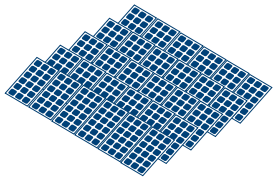
Residential

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.

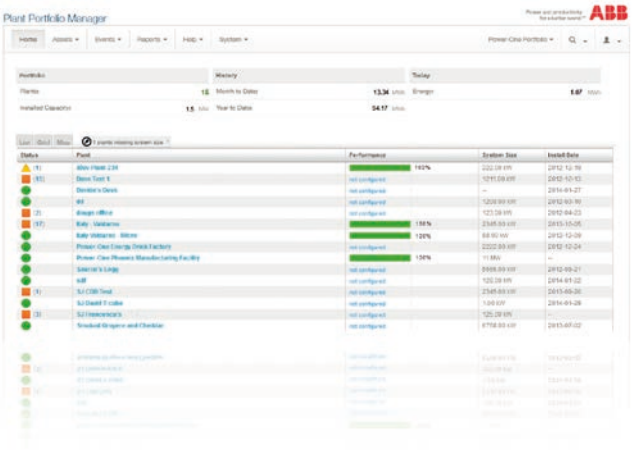
Plant Portfolio Manager improves lost energy

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.

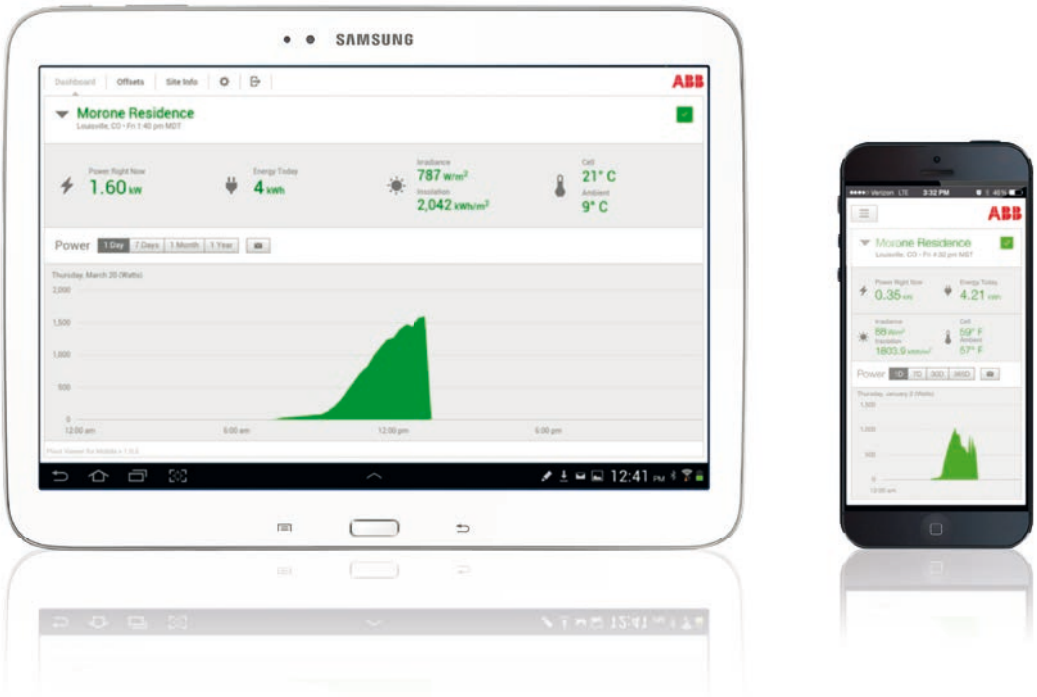
Plant Summary and Diagnostics

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 Aurora Vision® 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 Aurora Vision® Plant Management Platform 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 Aurora Vision 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 Management Platform 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 Aurora Vision® Plant Portfolio Manager or Aurora Vision® Plant Viewer to user login account
- Use a PC web browser and a favorite 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 7.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 data logger 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 turn-key solutions, such as VSN730 System Monitor.

Three performance levels

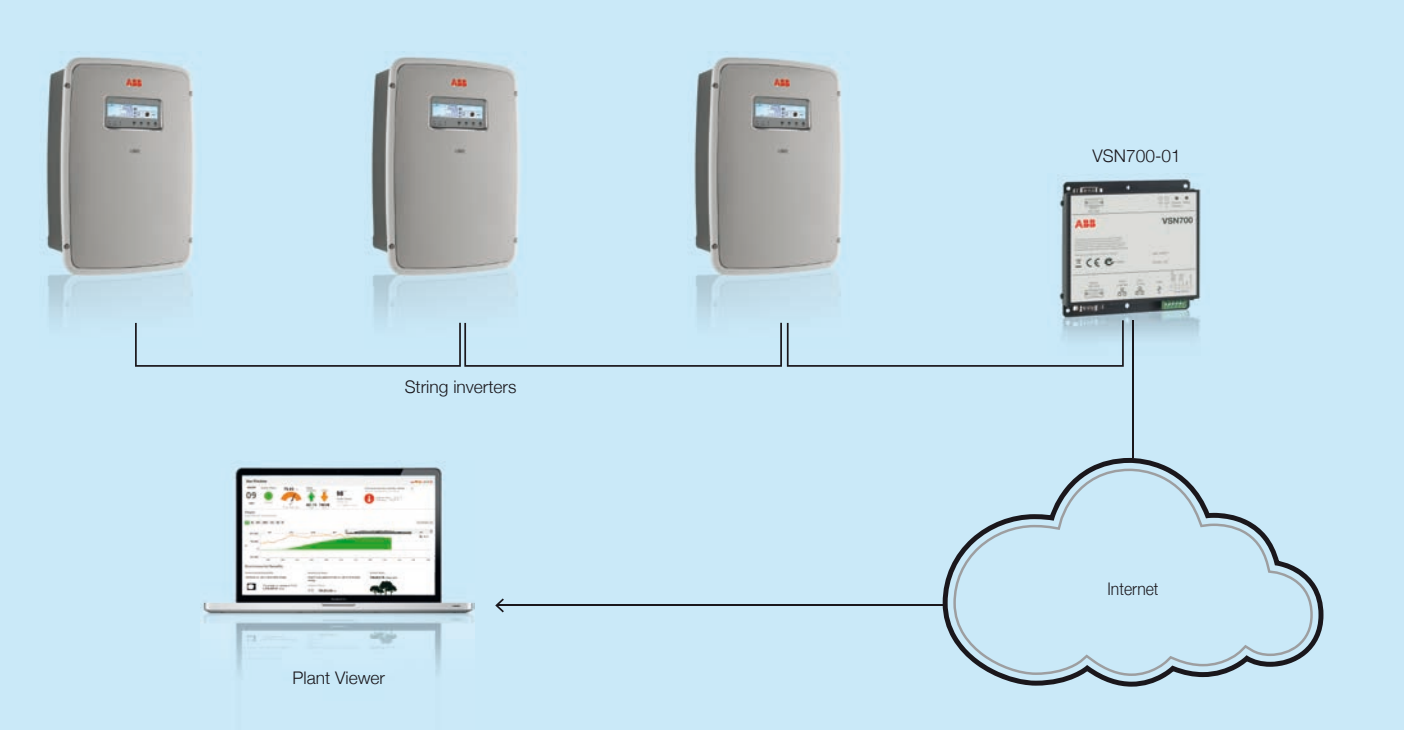
The VSN700 Data Logger is available in three performance levels to fit anyone's budget and functionality:

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).

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.

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 Aurora Vision® Plant Portfolio Manager
- Simple end-user UI using Aurora Vision® Plant Viewer

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

- No software limitation on number of devices logged
- Limitation is set by memory and bandwidth usage
- 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

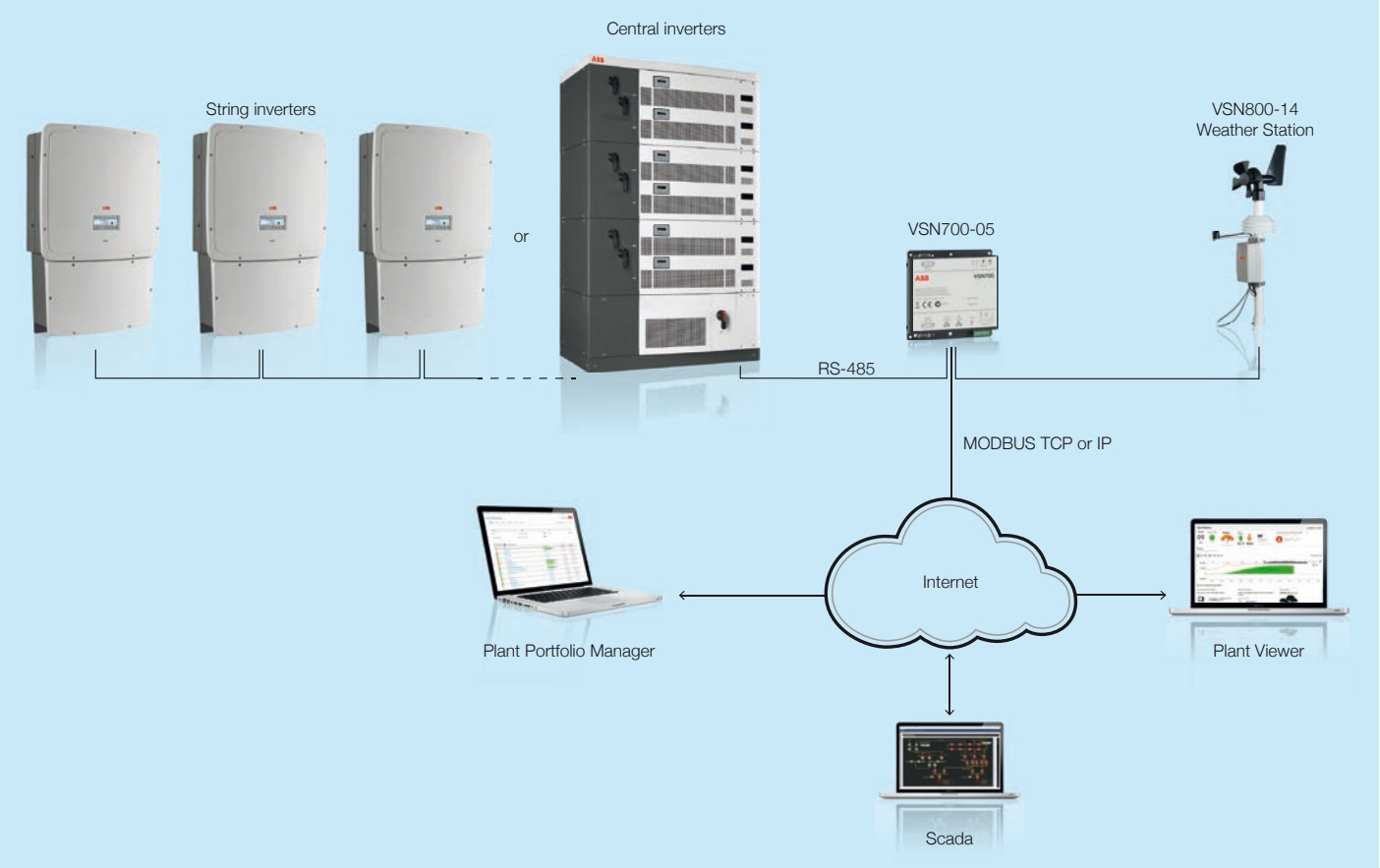
VSN700 Data Logger

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	12VDC, 1A
Environmental parameters	
Ambient temperature range	0 °C - 40 °C
Environmental protection	IP 20
Relative humidity	<85% Non-condensing
Mechanical parameters (per unit)	
Dimensions (H x W x D)	1” x 5.5” x 5.25” (.03m x .14m x .13m)
Weight	2 lbs (0.91kg)
Mounting system	Screws through flanges
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 & direction
Compliance	
Emissions	FCC Part 15 Class B, CISPR 22, EN 55022 Conducted and Radiated Emission
Immunity	EN55024

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

Commercial and utility application with VSN700-05



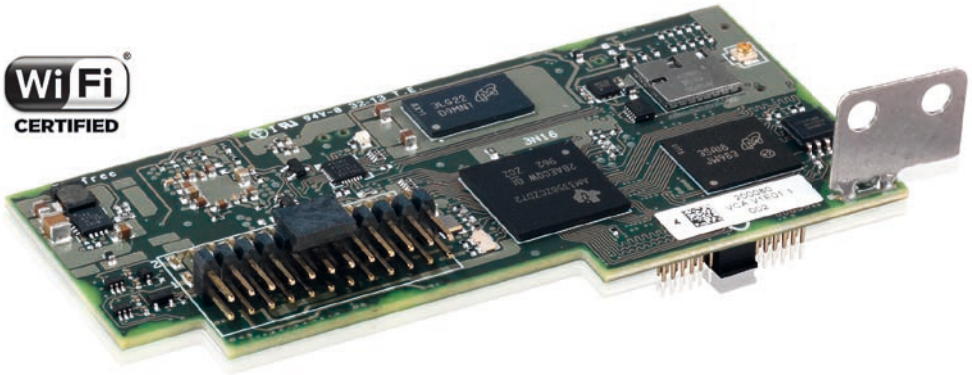
VSN700 Data Logger model comparison

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	5x ABB inverters	10x ABB inverters	All ABB inverters
	Single phase (only) string inverters	Three and single phase string inverters	Other ABB devices and third party devices (Consult latest supported list)
		1 x VSN800-XX Weather Station	

VSN700 Data Logger Accessories

VSN-MGR-DIN	Din rail kit to mount logger on a din rail	
VSN800-12	Weather Station with sensor: ambient, panel, global irradiance	
VSN800-14	Weather Station with sensor: 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.

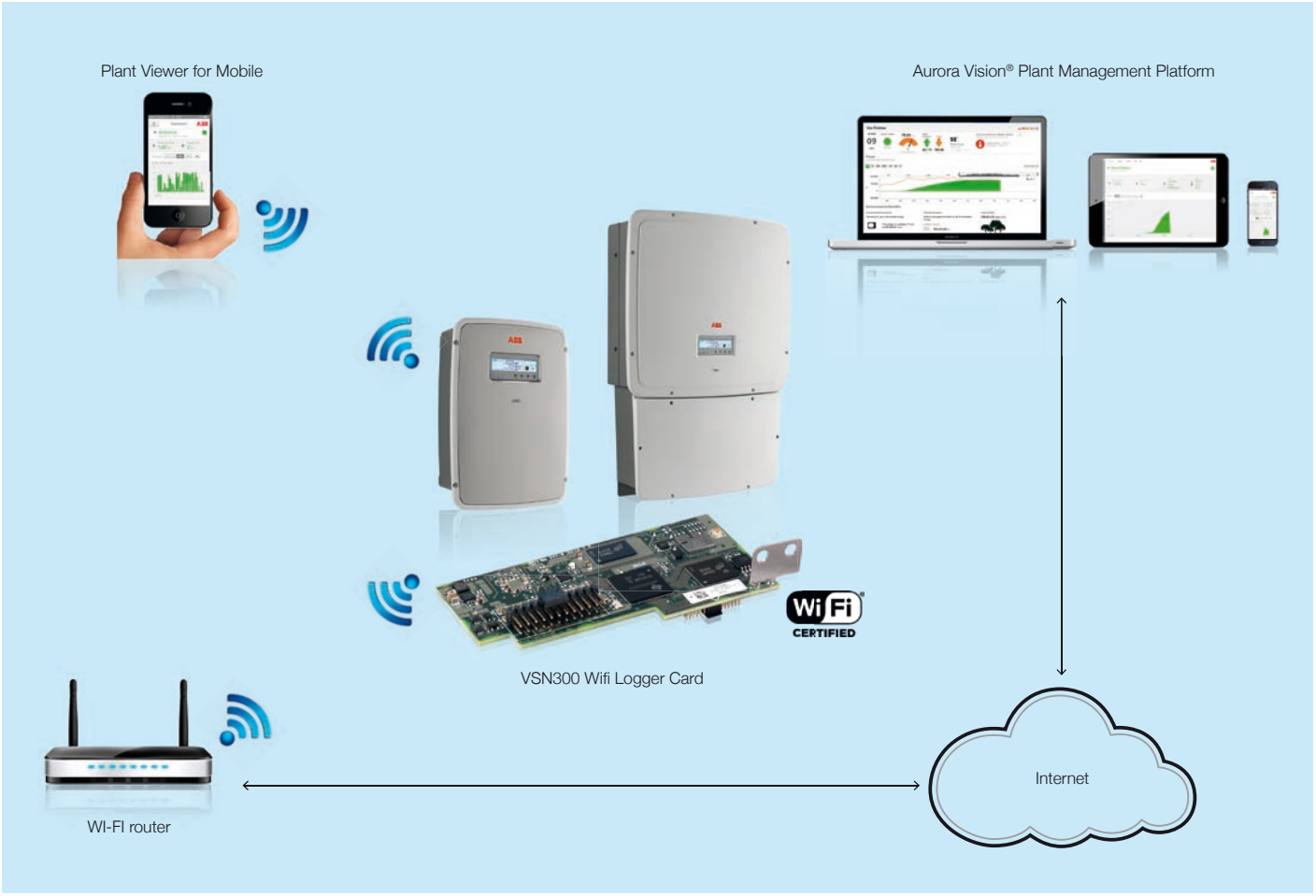
Complete, remote and local monitoring with Wifi Logger Card and new free mobile app.
Users have a complete remote and local monitoring experience when combining VSN300 Wifi Logger Card with ABB's new free mobile app; "Plant Viewer for Mobile". It is available for both iOS and Android based devices.

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.

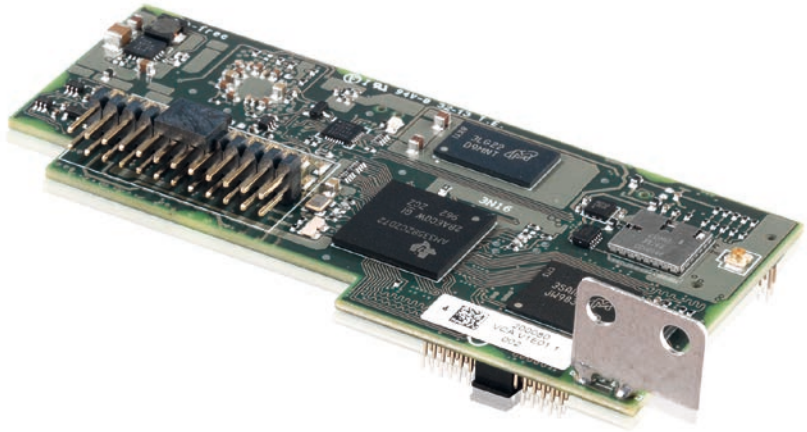
Application with VSN300 Wifi Logger Card



Highlights

- The Wi-Fi Certified™ mark assures interoperability with IEEE 802.11b/g/n networks over the 2.4GHz 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

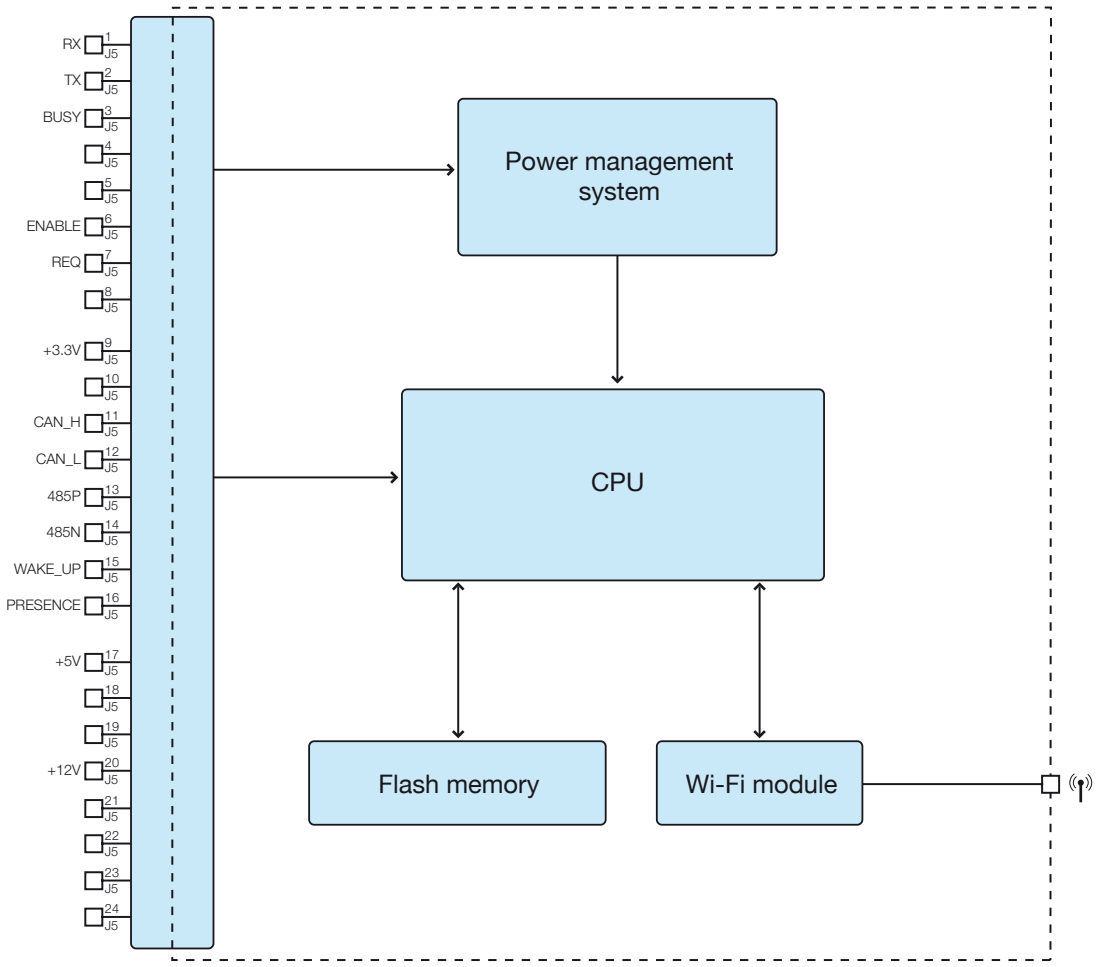


Technical data and types

Type code	VSN300 Wifi Logger Card
Communication interfaces	
Inverter interface	Hyperlink (CAN@1 Mbps + RS485@115 kBaud) / Legacy (RS232 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 (less than 1 minute average)
Local data storage	Log data for 30 days based on 15-minute intervals
Upgradeability	Remotely via Aurora Vision® Plant Management Platform / Locally via Web User Interface
Advanced functionalities	
Remote O&M operations	Inverter's parameters changing / Inverter's firmware upgrade
Smart grid functionalities	Grid control power-management enabled
Power supply	
DC power supply output	~ 2W
Environmental parameters	
Ambient temperature range	[-20; +85] °C
Environmental protection	IP 20
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 46mm x 16mm)
Weight	0.06 lbs (26g)
Mounting System	inverter's expansion slot
Compliance	
Marking	CE / FCC / RCM / Wi-Fi Certified™
Emissions	FCC Part 15 Class B, CISPR 22, EN 55022 Conducted and radiated emission
Immunity	EN55024

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

Block diagram of VSN300 Wifi Logger Card



Inverter matrix compatibility

Inverter family	Monitoring	Remote O&M Operations
UNO-2.0	Yes	No
UNO-2.5	Yes	No
PVI-3.0	Yes	No
PVI-3.6	Yes	No
PVI-3.8	Yes	No
PVI-4.2	Yes	No
PVI-4.6	Yes	No
PVI-5000	Yes	No
PVI-6000	Yes	No
PVI-6.0	Yes	No
PVI-8.0	Yes	No
PVI-10.0	Yes	No
PVI-12.5	Yes	No
TRIO-5.8	Yes	Yes
TRIO-7.5	Yes	Yes
TRIO-8.5	Yes	Yes
TRIO-20	Yes	No
TRIO-27.6	Yes	No

ABB monitoring and communications
PVI-AEC-EVO

PVI-AEC-EVO is the low cost solution for remote monitoring of PV plants with all ABB devices.

The modular and expandable architecture combined with the din-rail mounting system makes the PVI-AEC-EVO suitable for any kind of installation in PV plants where ABB inverters and Stringcomb have been installed.

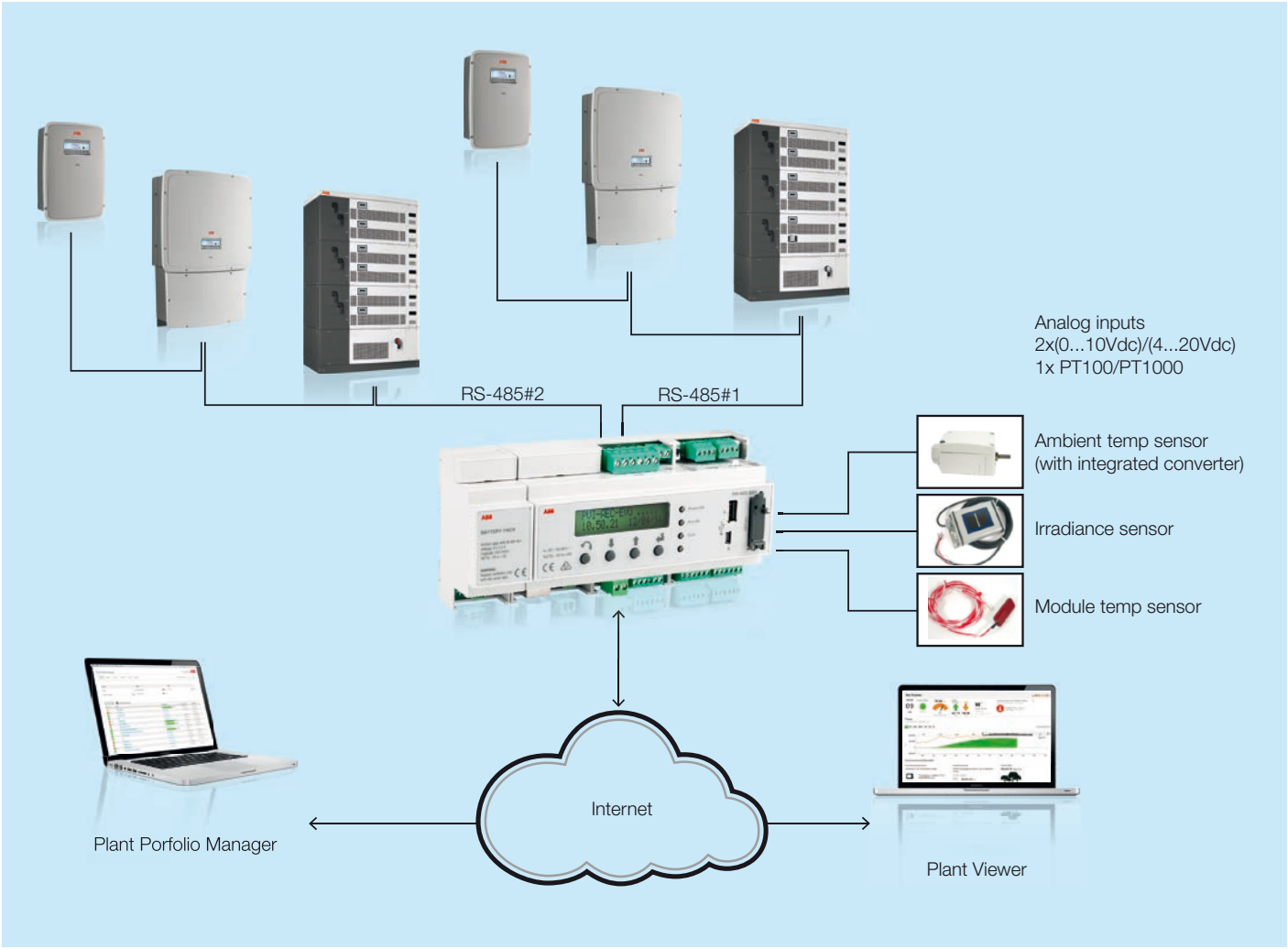
The communication between the PVI-AEC-EVO and all other ABB devices is based on the proprietary Aurora Protocol while environmental data can be obtained by connecting analog sensors directly to the three available analog inputs.

Six digital inputs are also provided by PVI-AEC-EVO to connect a pulse counting meter as well as to detect specific status inputs.

Moreover, the presence of digital outputs allows PVI-AEC-EVO to satisfy the need of generating impulse signals, status signals or relay outputs.

The built-in 2 x 16 characters display along with the integrated Web User Interface, accessible via LAN connection, makes the system to be easy configured
Operating as gateway the PVI-AEC-EVO sends all data collected securely and reliably to the Aurora Vision® Plant Management Platform for performance monitoring, condition monitoring and data reporting.

PVI-AEC-EVO application with weather sensors



Highlights

- An expansion bus enables easy connection of options for battery backup pack or GSM/GPRS module for remote connectivity when a wired LAN Ethernet is missing
- Connects up to 128 ABB inverters using Aurora Protocol over RS485 for low frequency data sampling
- A quick review of the main key performance parameter of the plant locally provided by WUI
- Removable 2GB capacity SD Card flash memory for backup data storing
- Remote configuration and management capabilities, including firmware upgrades over the Internet using Aurora Vision® Plant Portfolio Manager
- Light version available for cost effective residential / small commercial installation with all ABB string inverters (TRIO 20/27.6 kW excluded)
- Collects performance information such as energy harvest, power, voltage and inverter status
- Built-in display enables easy configuration of inputs, outputs, and communications
- Simple end-user UI using Aurora Vision® Plant Viewer

PVI-AEC-EVO

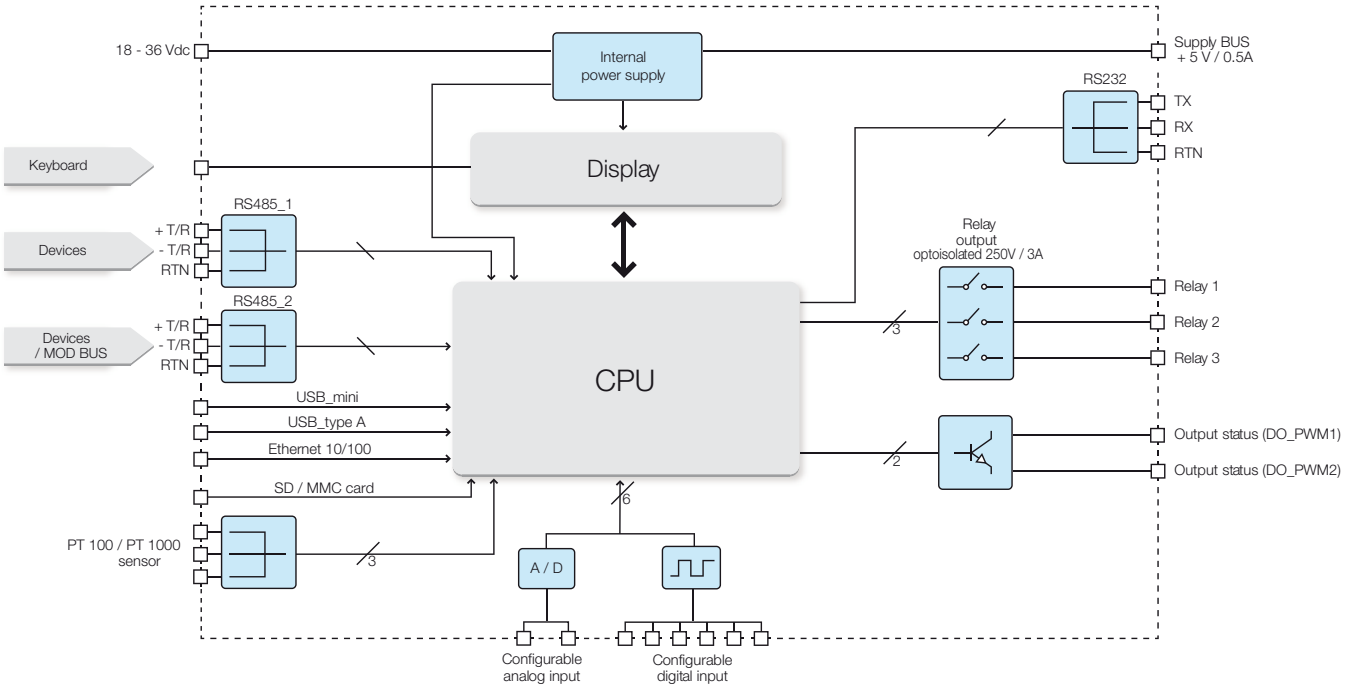
Technical data and types

Type code	PVI-AEC-EVO
Communication interfaces	
Inverter communication (port 1)	RS485 - Aurora Protocol
Additional inverter communication (port 2)	RS485 configurable to Aurora Protocol
Maximum number of ABB devices	64 x string inverters or 32 x 55kW conversion module (central inverter) for each RS485(1)
Ethernet connections	RJ-45 Ethernet 10/100 base-T (LAN/WAN)
Fieldbus cable	RS-485 Shielded twisted pair. Recomended Belden # 1120A cable or # 3106A for 3 conductors
Communication protocols	
Plant fieldbus protocols	Aurora Protocol, Modbus RTU
LAN/WAN protocols	HTTP, XML
Data logging specifications	
Data sampling rate	Continuous
Logging	15 min
Local storage	SD card (2GB)
Upgradeability	Field upgradable over the Internet or locally via SD card
Features	
Configurable analog inputs	2 x configurable as 0 to 10 Vdc or 4 to 20 mA
Temperature analog input	1 x PT100 or PT1000 sensor with autosetting
Configurable digital inputs	4 x opto isolated as status inputs (for alarms) or power management (PM) control signals(2) 2 x opto isolated as status inputs or pulse converter inputs (from energy meter)
Digital outputs	3 x relais power contacts 230 V / 3 A
Digital outputs configurable	2 x opto isolated (27 V, 50 mA) output status or power output
Power supply	
AC power supply input	100...240 VAC
DC power supply output	24 VDC, 1 A
Maximum consumption	<7.5 W
Battery for integrated clock	Lithium type Li2032
Environmental parameters	
Ambient temperature range	-20...+55 °C (-13... 131 °F)
Environmental protection	IP 20
Relative humidity	< 90% non condensing
Mechanical parameters (per unit)	
Dimensions H x W x D	190 mm x 90 mm x 63 mm / 93,54” x 6,30” x 2,48” -9 modules
Weight	< 0.36 kg /0.80 lb
Mounting system	35 mm top hat din rail (EN50022)
Available products	
Standard	PVI-AEC-EVO
Light	PVI-AEC-EVO-LIGHT(3)
Compliance	
Marking	CE
Safety and EMC standards	EN60950-1, EN 55022, EN 55024

1. Limited to 5 String Inverters for PVI-AEC-EVO-LIGHT
2. Check for availability
3. Available only for string inverters, TRIO-20.0/27.6 models excluded

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

Block diagram of PVI-AEC-EVO



PVI-AEC-EVO - Accessories

PVI-AEC-IRR	Irradiance reference cell 0 - 10 V		**PVI-AEC-T1000-integrated**	PT-100 temperature Sensor with integrated converter 0 to 10 V	
PVI-AEC-IRR-T	Irradiance reference cell 0 - 10 V & back of reference cell temperature				
PVI-AEC-IRR-T(30)	Irradiance reference cell 0 - 10 V & back of reference cell temperature with 30 m cable				
PVI-AEC-T100-ADH	PT-100 Self-Adhesive back of panel temperature sensor		**PVI-AEC-WIND-COMPACT**	Wind speed sensor	
PVI-AEC-T1000-BOX	Ambient temperature sensor with IP65 enlosure		**PVI-GSM/GPRS**	GPRS cellular module	
PVI-AEC-T100-24V	Convert PT-100 0 to 10 V (requires 24 V supply)		**BATTERY PACK**	Backup battery pack	

ABB monitoring and communications
VSN730 System Monitor

The VSN730 System Monitor is a high-performance data collection and communication system that is ideal for small to medium commercial PV plant applications.

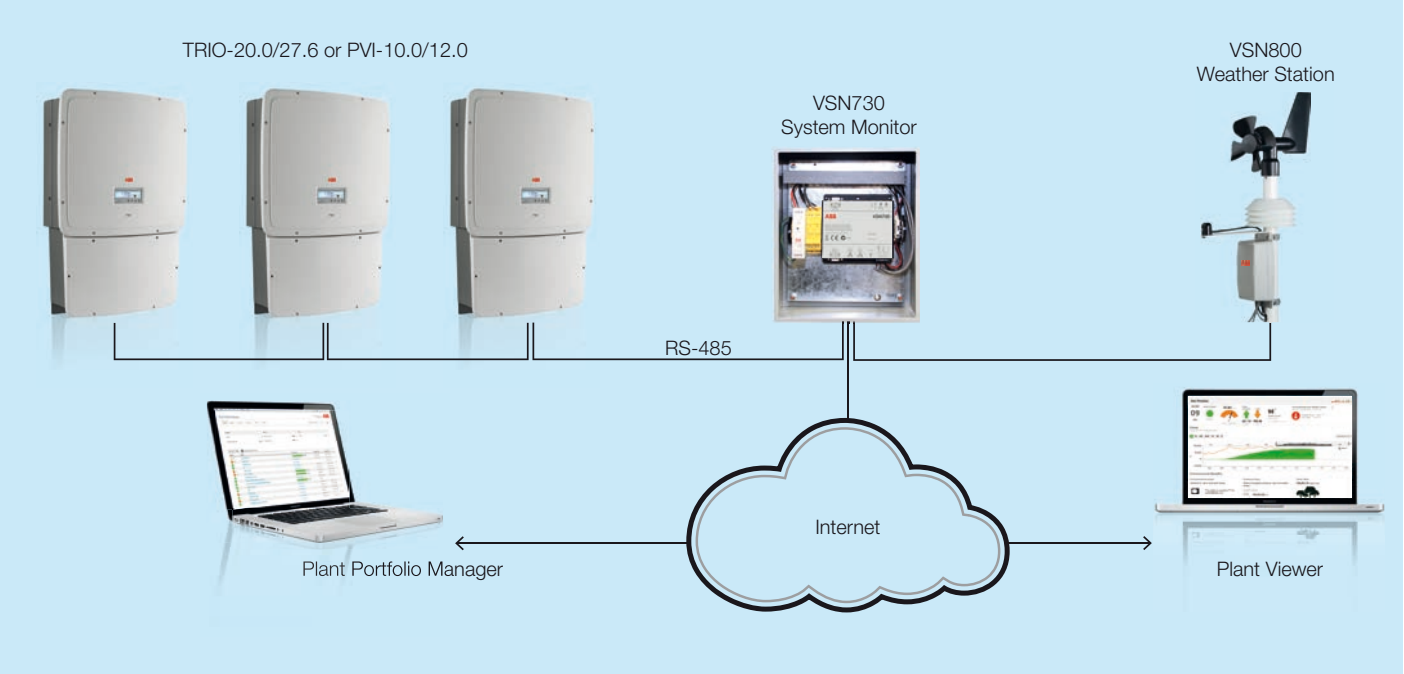
The VSN730 is the “lite” version of the VSN750 Plant Manager offering a basic set of features at the lowest price possible for a monitoring turnkey solution.

The turnkey solution saves the installer time (and money) by providing several components, prewired and preinstalled in an outdoor rated enclosure.
It collects data and uploads information over the Internet in near real-time to the Aurora Vision® Plant Management Platform.

VSN730 System Monitor includes quality equipment for reliabile monitoring

Included in this system is the VSN700 Data Logger (-03) which can monitor and provide data management for up to 10 ABB string inverters and one VSN800 weather station.
It also provides RS-485 surge protection, which on the RS-485 communication lines is a “must have” to offer protection against logger damage in electrically “dirty” environments.
The 277VAC capable input power supply is ideal for commercial installations where only 3 phase 480VAC is easily available and inverter command and control for commercial and utility PV system operation, as well as SCADA integration.

Commercial application with VSN730 System Monitor using VSN800 Weather Station



Highlights

- VSN700-03 Data Logger
- Enclosed in a painted, steel NEMA 4/ IP65 enclosure
- 85VAC to 305VAC / 24 VDC, 1A 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

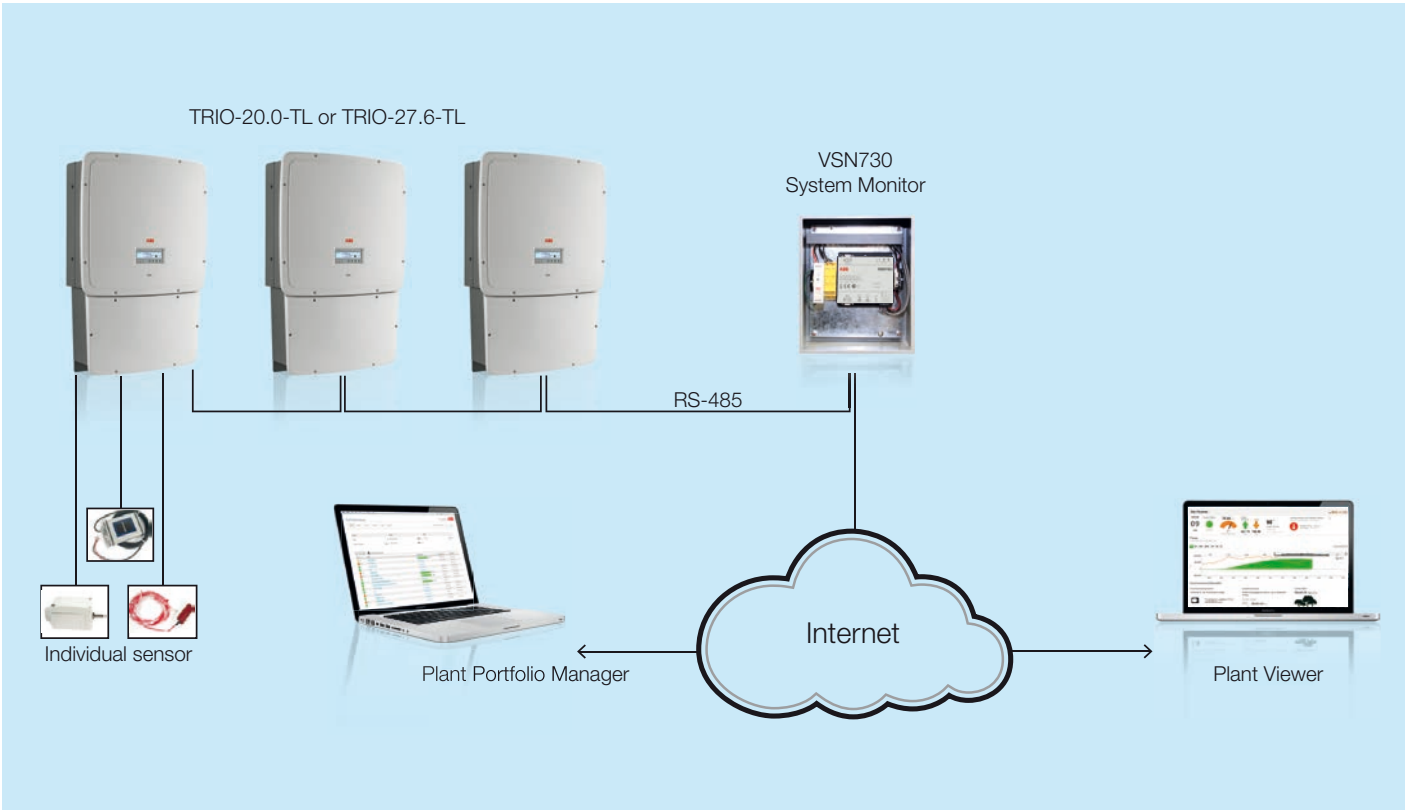
VSN730 System Monitor

Technical data and types

Type code	VSN730 System Monitor
Platform	
Devices supported	10x ABB string inverters + 1x VSN800 Weather Station
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 cartride	Citel DLAM-06D3
Power supply	
DC power supply input	90 VAC to 264 VAC
DC power supply output	24VDC, 1A
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” (.30m x .25m x .13m)
Enclosure options	Painted steel
Weight	14 lbs (6.4 kg)
Mounting System	Screws through flanges
Compliance	
Safety	UL508A
Marking	cCSAus / CE
Altitude	Operate below 3000m
Emission	FCC Part 15 Class A, CISPR 22, EN 55022 Conducted and Radiated Emmission
Immunity	EN 61000, EN55024
Telecom	N/A

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

Commercial application with VSN730 System Monitor using individual weather sensors



VSN730 - Accessories

VSN800-12	Weather Station with sensors: ambient temperature , panel temperture, global irradiance	
VSN800-14	Weather Station with sensors: ambient temperature, panel temperature, global irradiance, plane of array irradiance, wind speed & direction	

ABB monitoring and communications
VSN750 Plant Manager

The VSN750 Plant Manager is a high-performance, data collection and communication system for a wide range of commercial, industrial or utility PV plant applications.

The VSN750 Plant Manager contains all the components needed to monitor small or medium commercial PV plants in a single enclosure.

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

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.

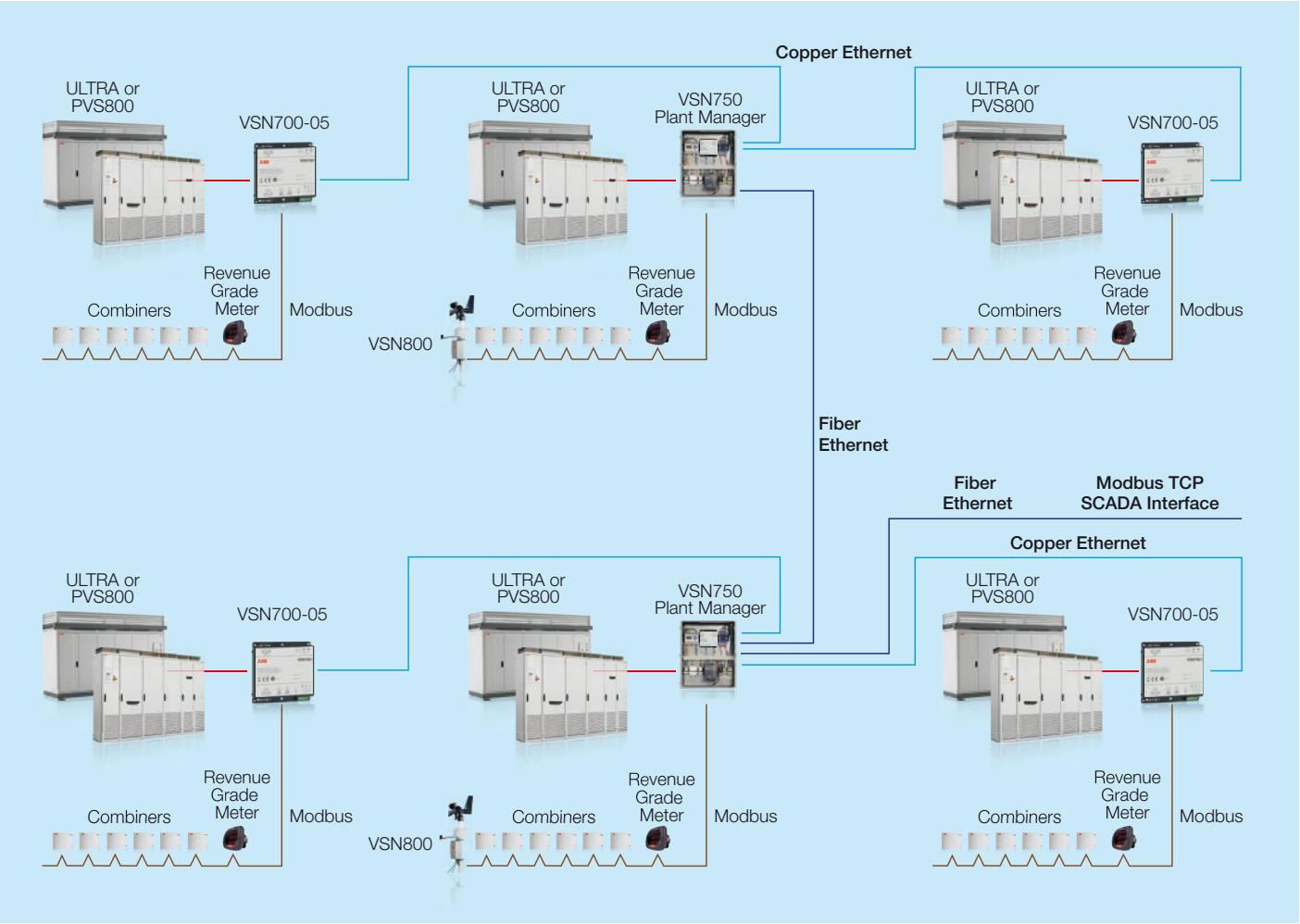
This Plant Manager includes quality equipment for reliabile monitoring

The included VSN700 Data Logger (-05) provides both customer data management and inverter command and control through either a utility SCADA system or through the Aurora Vision® Platform where it uploads information over the Internet in near real-time.

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.

The 277VAC capable wide input power supply is ideal for commercial installations where only three-phase 480VAC is easily available.

Utility application with VSN750 Plant Manager – 10MW installation example



Highlights

- VSN700-05 Data Logger
- RS-485 repeater with galvanic isolation
- 85VAC to 305VAC / 24 VDC, 1.25A 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

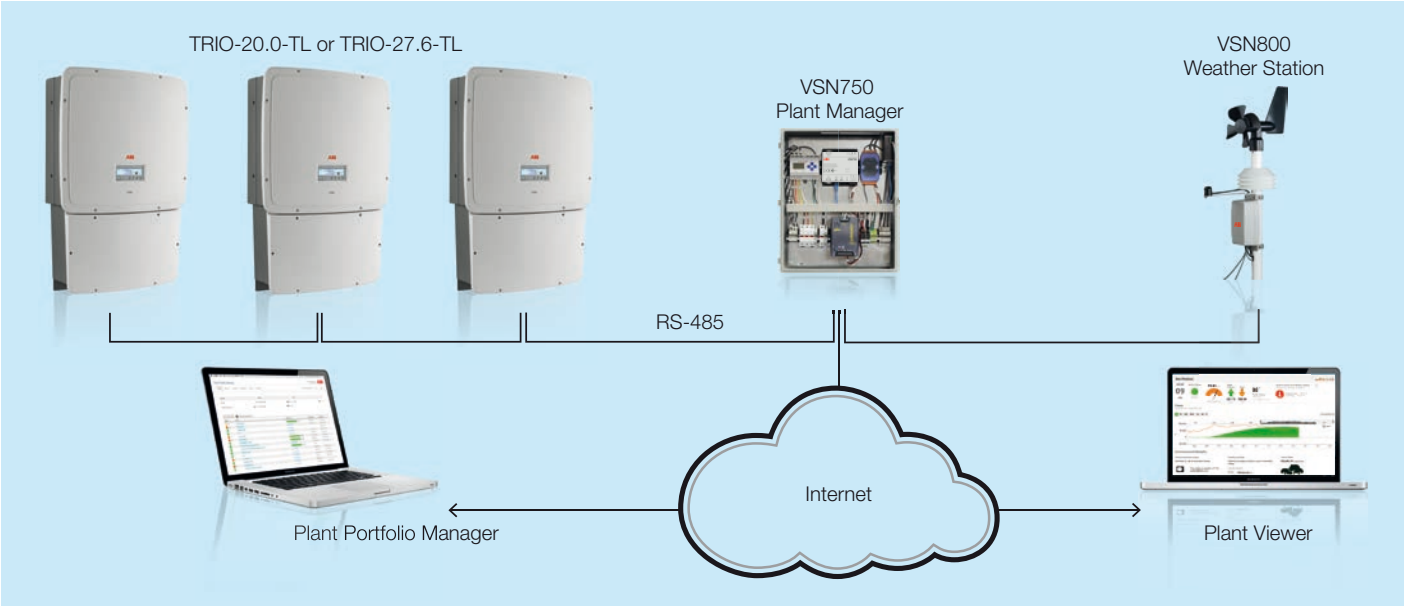
VSN750 Plant Manager models comparision

	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, 3rd party meters & 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 Ddstance	2km
Cell router	
Network	HSPA+/EV-DO Gobi (800/850/900/1700 (AWS)/1900/2100MHz)
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	5A to 32,000A
Voltage input	UL:90V_{L-L} to 600V_{L-L};CE90V_{L-N} to 300V_{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)
Feldbus	Modbus RTU RS-485 (sunspec)
CT integration	Wide Range of CTs must be ordered seperately. See user guide for full specifications.
Power supply	
DC power supply input	from 85 VAC to 304 VAC
DC power supply output	24VDC, 1.25A

Commercial application with VSN750 Plant Manager



Technical data and types

Type code	VSN750 Plant Manager
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” (.51m x .41m x .15m)
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 3000m
Emission	FCC Part 15 Class A, CISPR 22, EN 55022 Conducted and Radiated Emmission
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

VSN750 - Accessories

VSN800-12	Weather Station with sensors: ambient temperature , panel temperture, global irradiance	
VSN800-14	Weather Station with sensors: ambient temperature, panel temperature, global irradiance, plane of array irradiance, wind speed & direction	
VSN-MGR-AUX-CT100	Current transformer 100 A, 0.333VAC output, 1% accuracy, solid core, 1.0” window diameter	
VSN-MGR-AUX-CT200	Current transformer 200 A, 0.333VAC output, 1% accuracy, solid core, 1.0'' window diameter	
VSN-MGR-AUX-CT200SC	Current transformer 200 A, 0.333VAC output, 1% accuracy, split core, 1.25” window diameter	
VSN-MGR-AUX-CT400SC	Current transformer 400 A, 0.333VAC output, 1% accuracy, split core, 2.5” x 2.9” window diameter	
VSN-MGR-AUX-CT600SC	Current transformer 600 A, 0.333VAC output, 1% accuracy, split core, 2.5” x 2.9” window	
VSN-MGR-AUX-CT800SC	Current transformer 800 A, 0.333VAC output, 1% accuracy, split core, 2.5” x 2.9” window	
VSN-MGR-AUX-CT1000SC	Current transformer 1000 A, 0.333VAC output, 1.% accuracy, split core, 2.5” x 5.50” window	
VSN-MGR-AUX-CT1200SC	Current transformer 1200 A, 0.333VAC output, 1% accuracy, split core, 2.5” x 5.5” window	
VSN-MGR-AUX-CT1600SC	Current transformer 1600 A, 0.333VAC output, 1% accuracy, split core,2.5” x 5.5” window	
VSN-MGR-AUX-CT2000SC	Current transformer 2000 A, 0.333VAC output, 1% accuracy, split core, 2.5” x 5.5” window	
VSN-MGR-AUX-CT2400SC	Current transformer 2400 A, 0.333VAC output, 1% accuracy, split core, 2.5” x 5.5” window	

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

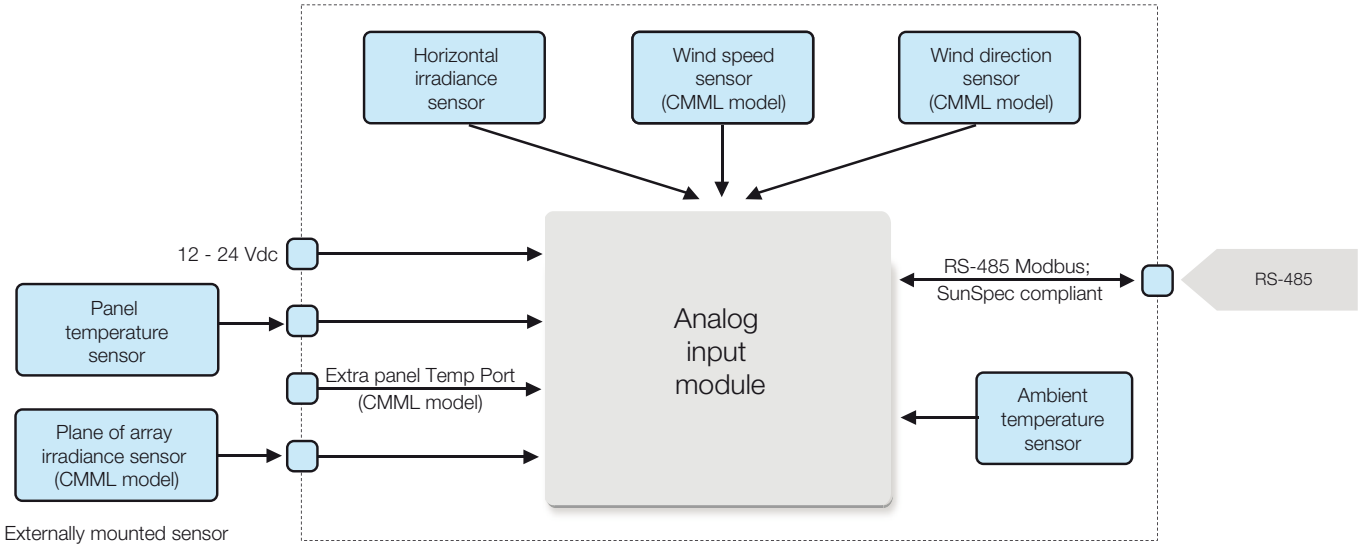
The advanced sensor set improves monitoring of weather conditions that can effect energy production. The extra irradiance sensor for mounting at the plane of the array allows more accurate measurement of irradiance that is incident in the plane of the solar panels.

Wind speed & 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

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 25ft (7.62m)	
Solar radiation	Range 0 to 1750W/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 (0.89m/s) Temp range -40°F to 140°F(-40°C to 60°C)
WindsSpeed	N/A	Range 0 to 150 MPH (0 to 67m/s) Accuracy is Greater of 1 mph (0.45m/s) or 5% Threshold 2 MPH (0.89m/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 (HxWxD)	20.9" x 5.1" x 4.7" (0.53m x 0.13m x 0.12m)	24.8" x 9.8" x 13" (0.63m x 0.25m x 0.33m)
Weight	1.75lbs (0.8kg)	7lbs (3.2kg)
Ambient temperature range	-13°F to 131°F (-25°C to 55°C)	
Mounting	Pole or tripod	

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

ABB monitoring and communications
PVI-STRINGCOMB

The String Combiner “PVI-STRINGCOMB”, ideal for commercial and utility-grade inverters, ensures the same monitoring accuracy of the PV generator typically achieved with string inverters.

This box can combine up to 10 channels of individual or paired string currents that can be accurately monitored via hall effect sensors.

The system supervisor enables prompt detection of the faulty strings. Any issue on the line is detected promptly and signaled to the managing inverter.

With PVI-STRINGCOMB, the connected strings are protected and controlled

All string combiner boxes include surge protection with removable elements as well as fuse protection for each couple of string channels.
It is available with a fully-integrated DC switch (optional on -S version), fuse and remote controlled DC disconnect function.

It has an integrated DC disconnection switch (-S version) with triggering current or minimum voltage release coil.

Highlights

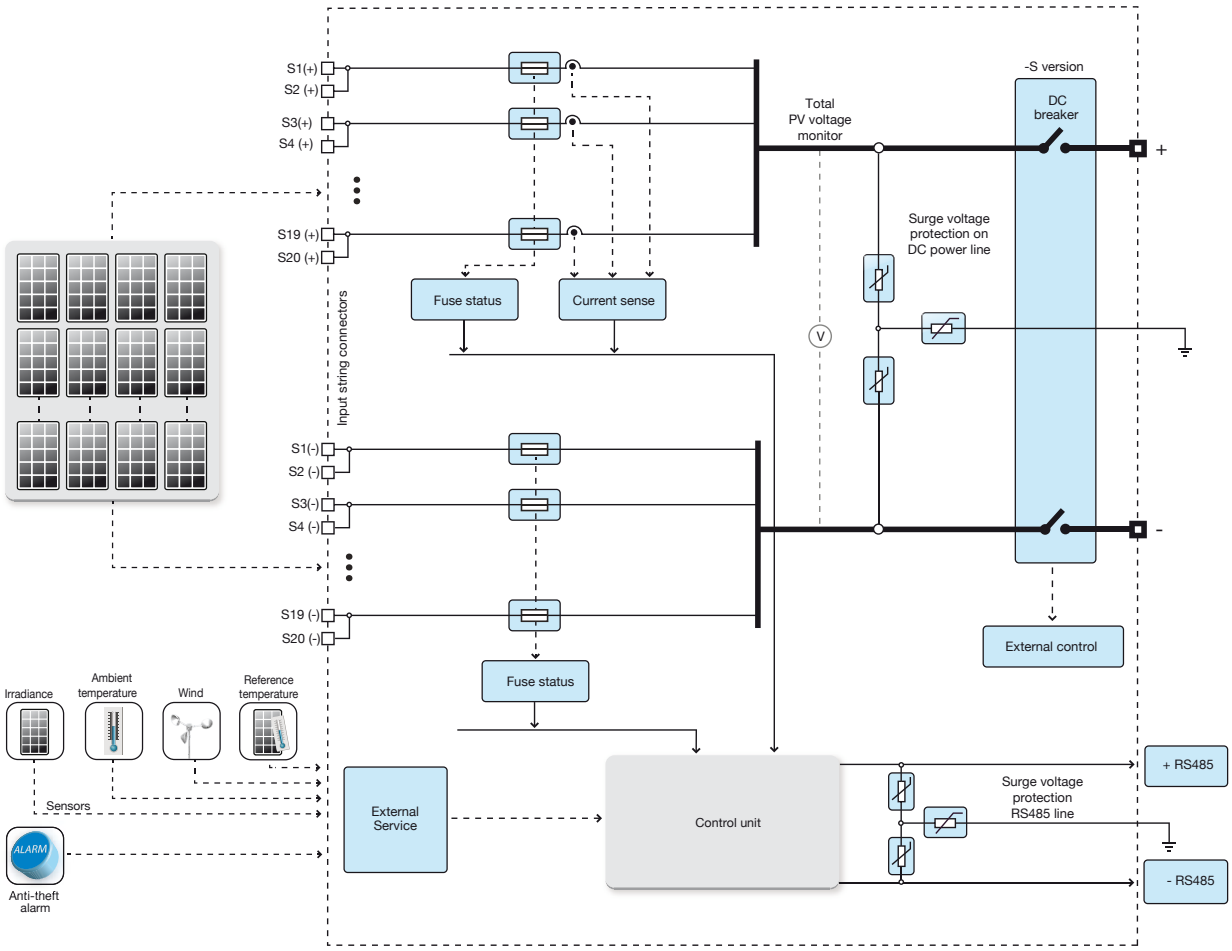
- Up to 20 strings can be directly connected
- The cartridge fuse on each input provides over-current protection
- 10 Hall-Effect current sensors for fast, precise monitoring and fault diagnostic
- Environmental protection rating of IP65
- RS485 serial bus for communication with ABB's PLUS and ULTRA inverter families
- It includes four analogue inputs for external sensors, one built-in cord-type anti-theft device, two digital inputs
- Available fuses: 12A, 16A, 20A, 25A
- Built-in power supply for ambient sensors
- Auxiliary input for external source ("night mode")
- Overvoltage protection on DC power line and RS485 communication line by means of overvoltage surge arresters

PVI-STRINGCOMB

Technical data and types

Type code	PVI-STRINGCOMB (125A)	PVI-STRINGCOMB (150A)
Input side		
DC input string voltage range	250…1000 V	250…1000 V
Absolute maximum DC input string voltage	1000 V	1000 V
Maximum DC current for each measurement channel	20 A	20 A
Measurement channels	10	10
DC connection for each measurement channel	2	2
Maximum number of DC connection	20	20
Number of input DC connections for each fuse	2	2
String cable cross section	6 mm^2 max.	6 mm^2 max.
Type of input DC connection	Multicontact MC4 connectors or PG cable gland	Multicontact MC4 connectors or PG cable gland
Output side		
Maximum output current	125 A (100A between 40° and 55°C)	150 A (125A between 40° and 55°C)
Output cable connection (1)	1 x M10 (copper or aluminium cable with M10 terminal)	1 x M10 (copper or aluminium cable with M10 terminal)
Ground cable connection (1)	1 x M8	1 x M8
Output DC switch rating (1)	160 A / 1000 V (opt.)	160 A / 1000 V (opt.)
Communication		
User interface	1 x RS485	1 x RS485
Features		
Anti-theft alarm	Yes	Yes
Anemometer sensor monitoring (opt.)	Yes	Yes
Temperature sensor monitoring (opt.)	Yes	Yes
Reference PV cell monitoring (opt.)	Yes	Yes
Data monitoring		
String currents	Yes	Yes
String fuse status	Yes	Yes
Ambient parameters	Yes	Yes
Overvoltage status	Yes	Yes

Block diagram of PVI-STRINGCOMB



Technical data and types

Type code	PVI-STRINGCOMB (125A)	PVI-STRINGCOMB (150A)
Environmental parameters		
Ambient temperature range	-25...+ 55°C/-13...131°F	-25...+ 55°C/-13...131°F
Relative humidity	0...100% condensing	0...100% condensing
Maximum operating altitude without derating	1000 m / 3280 ft	1000 m / 3280 ft
Environmental protection rating	IP65	IP65
Cooling	Natural	Natural
Enclosure [1]	Fiberglass	Powder-Coated Aluminum
Dimension (H x W x D)	559mm x 757mm x 250mm / 22.0" x 29.8" x 9.8"	650mm x 790mm x 250mm / 25.6" x 31.1" x 9.8"
Weight	< 23 kg / 50.7 lb	< 30 kg / 66.1 lb
Warranty	5 years standard 10/15/20 optional	5 years standard 10/15/20 optional
Compliance		
Marking	CE	CE
Safety and EMC standard	EN 50178, EN61000-6-2, EN61000-6-4	EN 50178, EN61000-6-2, EN61000-6-4
Available products variants		
With input PG cable gland	PVI-STRINGCOMB	PVI-STRINGCOMB
With multicontact MC4 connectors	PVI-STRINGCOMB-MC	PVI-STRINGCOMB-MC
With input PG cable gland and Output Disconnector	PVI-STRINGCOMB-S	PVI-STRINGCOMB-S
With multicontact MC4 connectors and Output Disconnector	PVI-STRINGCOMB-S-MC	PVI-STRINGCOMB-S-MC

1. For the available options refer to the configuration module

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 three different operating modes for reactive power control.

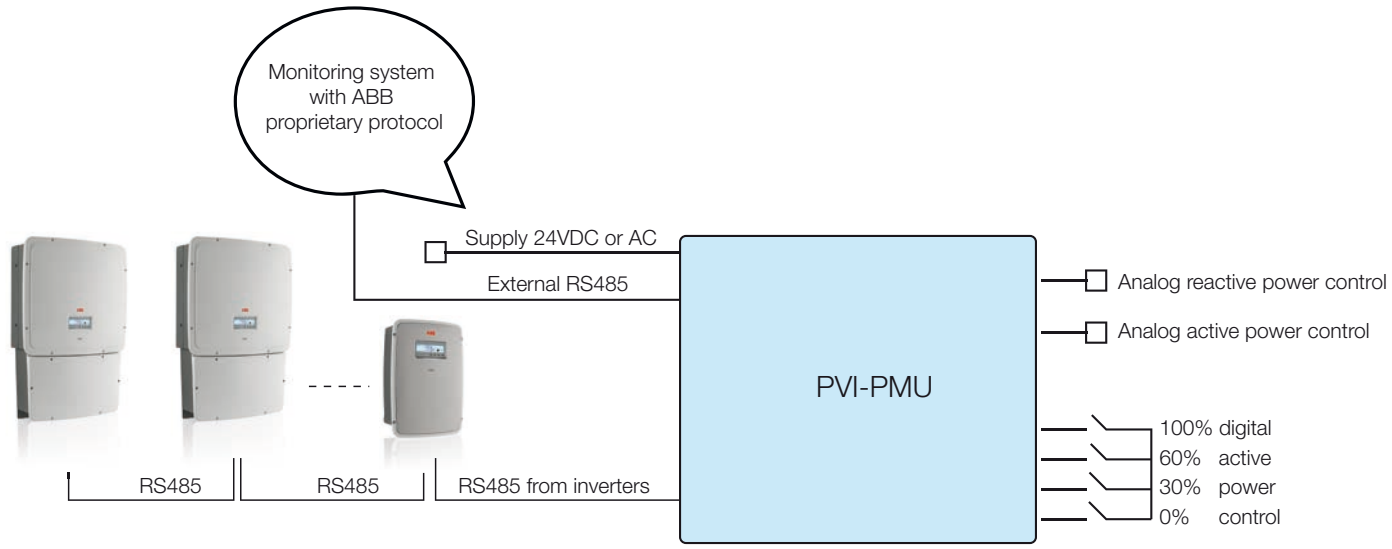
This combination of the "digital" input status and the signals received from the analog inputs enables one of the three active power control functions.
1. Active power limitation in four steps
2. Active power limitation in 11 steps
3. Continuous active power limitation

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

Using the combination of analog and digital inputs, three different reactive power management operating modes are selectable:
1. Fixed cos(φ) based on the inverters nominal power
2. Fixed cos(φ) based on inverter instantaneous power
3. Fixed tan(φ) 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 55kW 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 ($V_{ac,min}$...$V_{ac,max}$)	15...36 V
Nominal AC input voltage ($V_{ac,n}$)	24 V
Nominal frequency (f_n)	50/60 Hz
DC input voltage range ($V_{dc,min}$...$V_{dc,max}$)	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 kΩ 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)
Pysical and environmental	
Environmental protection	IP 20
Ambient temperature range	-20...+60 °C
Relative humidity	0...95%
Dimension	53x90x57 mm
Weight	180 g
Compliance	
Marking	CE
Safety and EMC standard	EN55011; EN61000-6-2

1. Max 32 string inverter or 55kW modules
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

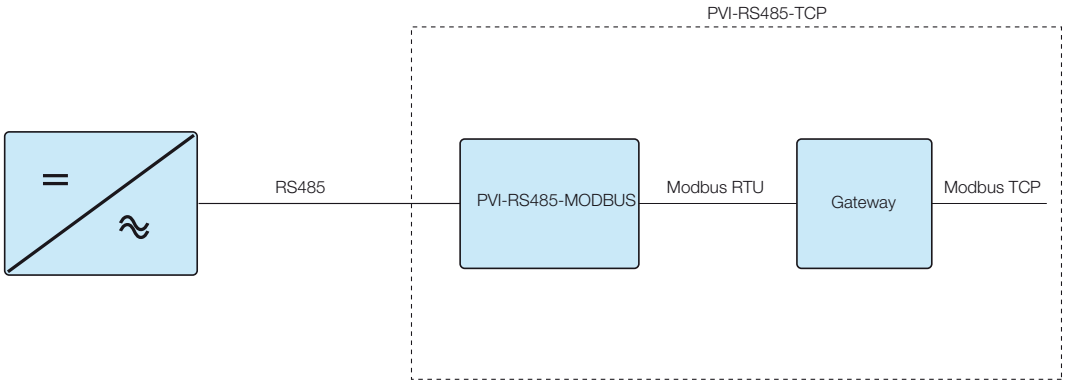
PVI-RS485-MODBUS is the ABB devices family able to convert the proprietary Aurora Protocol to ModBus RTU or ModBus TCP communication protocol.

The PVI-RS485-MODBUS enables ABB inverters to exchange data with third party devices such as controller as well as data logger supporting ModBus (RTU or TCP) communication protocol.
The PVI-RS485-MODBUS is a DIN rail mounted device and can be configured and upgrated 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 55kW 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 55kW 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_r)	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 ype	RS485 Half-Duplex
Baud rate	19200 bps not modifiable
Protocol	ABB Proprietary
Number of devices	32
Line biasing resistor (where necessary)	1 kΩ between +5V/+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 kΩ between +5V/+D and RTN/-D
Termination resistor	120 Ω settable via switch
Physical and environmental	
Environmental protection rating	IP 20 (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 central 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

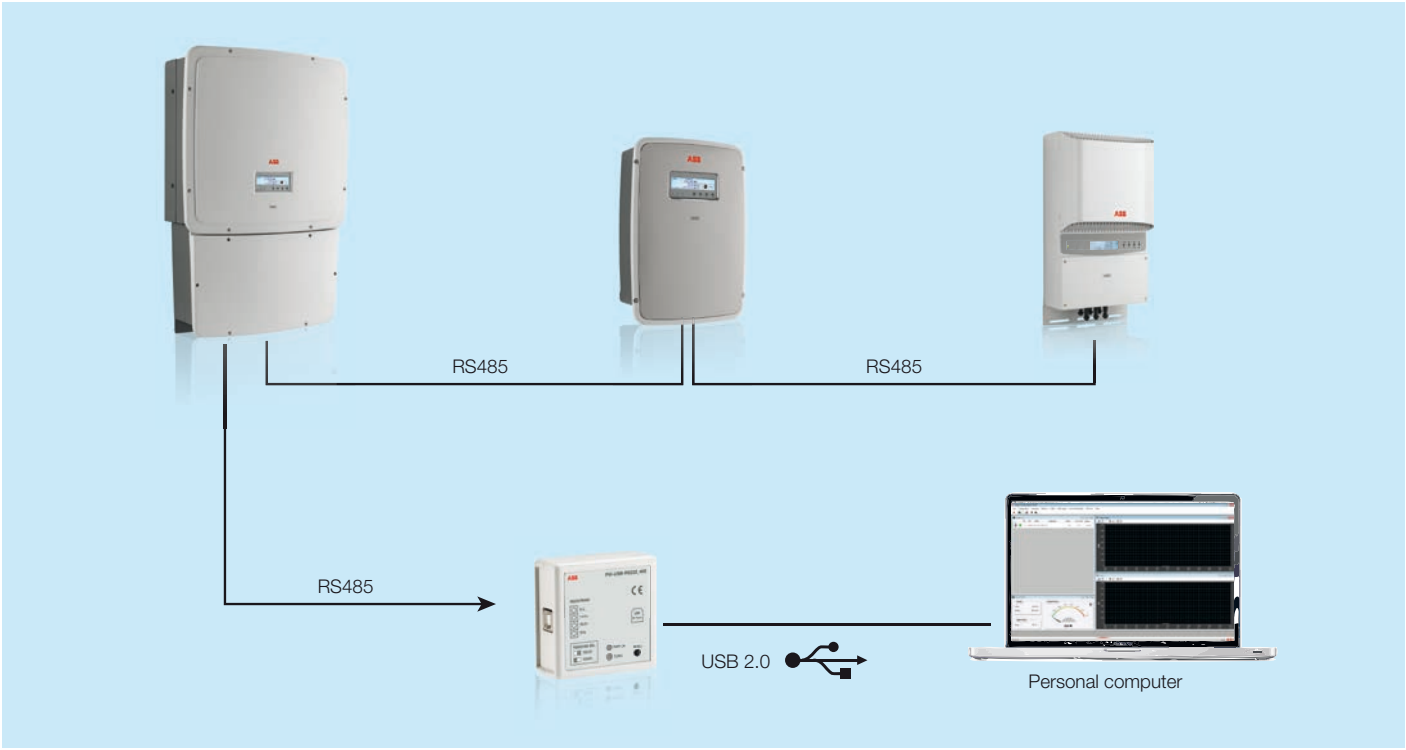
A needful device enabling customer to connect a PC to all ABB inverters via RS485 port

- 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 CVI 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	IP 20 (Indoor use only)
Dimension (H x W x D)	66mm x 66mm x 28mm
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 listplease 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

Life cycle services for solar inverters

Strong expertise with global presence

The services offered for ABB solar inverters span the entire value chain of the product from prepurchase to replacement and recycling. Throughout this value chain, ABB provides training, technical support and service contracts. With strong expertise, we ensure that our customers always get maximum return on investment.

Prepurchase

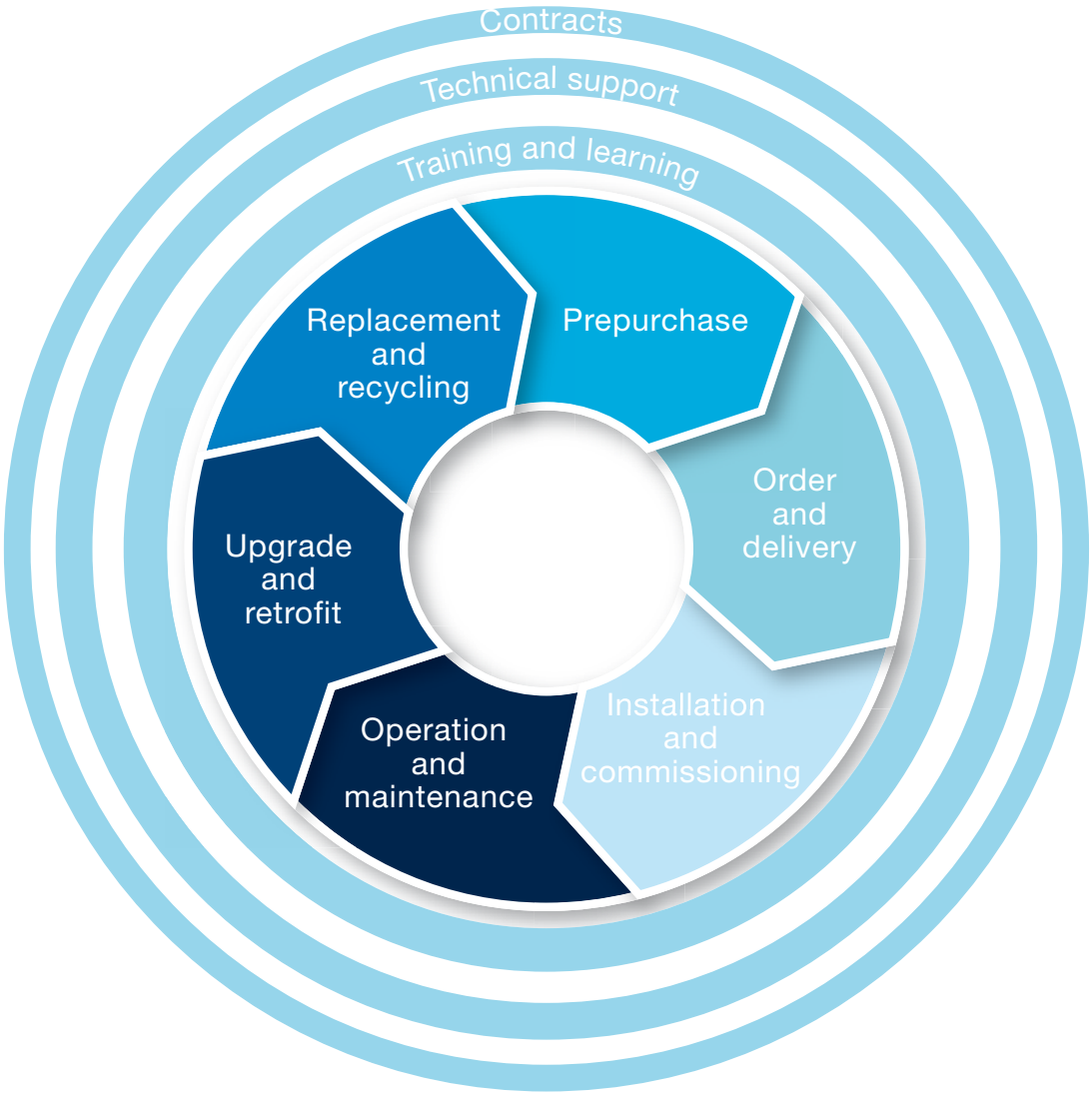
We help our customers to select the right inverter and services for their applications. This ensures higher yield and performance of the entire system.

Order and delivery

Orders can be placed through any ABB office or through ABB's channel partners. Ordering online through the web is also possible. Our sales and service network offers timely deliveries, including express delivery.

Installation and commissioning

ABB certified engineers can advise or undertake the installation and commissioning of the solar inverters.



Operation and maintenance

ABB helps ensure a long lifetime for its solar inverters by providing on-site preventive maintenance. Preventive maintenance consists of annual inspections and component replacements according to specific maintenance schedules.

Reconditioning provides more in-depth maintenance which is carried out at ABB's authorized service workshops. Reconditioning of the solar inverter includes full inspection, thorough cleaning, individual component analysis and replacement, and complete testing.

Upgrade and retrofit

We can advise on the latest hardware and software upgrades that can continue to maximize the performance of your solar inverters.

Replacement and recycling

We can also advise on the best replacement inverter while ensuring that the existing inverter is disposed of in a way that meets the local environmental regulations.

Value chain services

The services available throughout the entire value chain include:

- **Training** – We offer product and service training both in classrooms and on the Internet. Training comprises theoretical lessons as well as practical exercises
- **Technical support** – At each stage of the value chain, our expert is available to offer advice to keep your power plant operational
- **Contracts** – ABB supports its solar inverters through "solar inverter care" service contracts

All photovoltaic products from one supplier

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

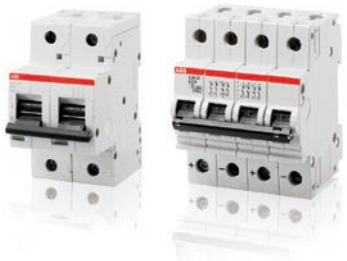
Low voltage AC drives
ACS55, ACS150, ACS355 and ACSM1
- Range 0.18 to 160 kW

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

Switches and breakers
OT and Tmax PV

Junction box

Contact us

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

www.abb.com/solarinverters
www.abb.com/solar
www.abb.com

BCB.00076 Rev. A EN 19.05.2014

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