



ABB solutions for photovoltaics Protection and other modular devices



ABB – Component supplier for residential and power plant application

ABB has been working for many years, as both a manufacturer and supplier, to offer products and solutions that reduce the environmental impact of energy systems. In a world of ever diminishing resources and soaring energy demand, the focus of ABB's research lies in developing efficient and sustainable ways to generate, transmit, distribute and use electrical energy.

With vast experience in Automation Products, ABB is constantly searching for new ways to expand and enhance existing technologies to meet the needs of its customers. In a society where climate change is becoming an ever stronger argument for increased use of clean energy, such as wind or solar power, ABB represents the best supplier for OEMs, installers and general contractors, offering a complete portfolio of products to support development of the renewable energy market.

For the photovoltaic market, ABB supplies a comprehensive range of high technology products for virtually every residential, commercial and power plant application to grant its customers access to renewable sources of energy.

ABB also offers training courses, technical support and customer service. Innovation, top quality and durability of products are the key factors which have made ABB one of the most versatile companies in the global market.

How can ABB help protect your solar plant?

An investment in a solar plant is an investment in and for the future. The profitability calculation derived from the amount invested, term of financing and amortisation is based on factors such as the size and output of the system, climatic conditions and the general conditions arising from the geographical/regional installation location.

Although the risk presented to the systems by lightning, over- and reverse currents and overvoltage can be defined statistically, there are always elements of uncertainty. Therefore, ABB sees integrated solutions for overvoltage protection as an absolute prerequisite. These take the form of tried-and-tested components which ensure that the level of income corresponds to the forecasts for your development.

The drawing below shows the basic structure of a full-scope protection concept for the complete installation. The functions of miniature circuit breakers, surge protection devices and switch disconnectors work with one another and together form an impenetrable barrier. All products are fitted to a DIN rail – the most effective arrangement for ensuring efficient applications.

In the following, the basic working methods of the individual components are explained.

Devices for photovoltaic applications

Miniature circuit breakers (MCBs)

MCBs protect installations and devices from overload and short circuit. On the DC side of a PV system they are responsible for reverse current protection from intact strings to defective strings and also protect against feeding of AC current in the event of inverter failure. All solar panel strings need to be individually protected. This then ensures that only the effected circuit is switched off in the event of any faults. The remaining strings will continue to supply power. If the MCB has tripped, it can simply be switched back on after eliminating the fault. The ease with which a part of the equipment can be switched off for maintenance procedures or extension of the system also increases the availability of the equipment significantly.

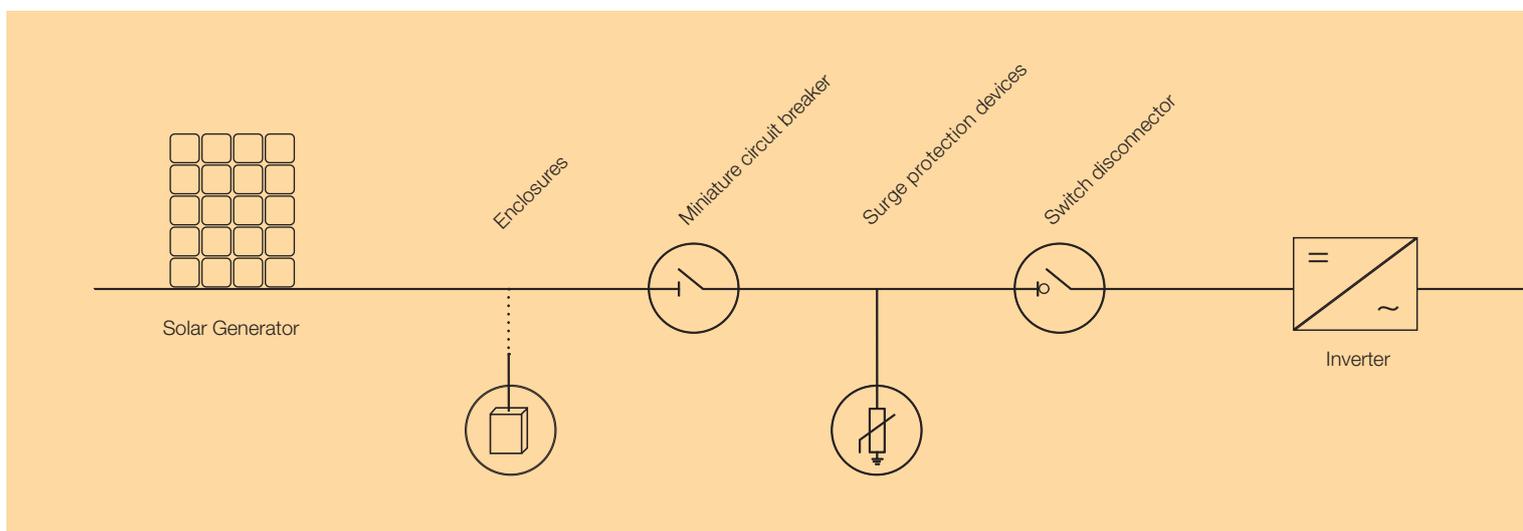
Surge protection devices (SPDs)

Cells and inverters are very sensitive to overvoltage and impulse currents, such as switching and lightning surges. The ABB surge arrester range for special DC limits the overvoltage to an acceptable level for the equipment to be protected and prevent damage to installations. Therefore, the risk of financial losses should be taken into account when considering an investment in solar panels. One of the benefits of using SPDs is a better return on investment.

Switch disconnecter

DC switch disconnectors are used for safe switching under load and have the required disconnector characteristics up to 1200 VDC as per IEC 60364-7-712 for PV installations. The simple handling of the devices enables easy implementation of routine maintenance and extension work. This also increases equipment availability and is an excellent investment in your PV system.

Devices for DC applications



Isolator

AC isolators are used for safe switching under load and for safe disconnection. The simple handling of the devices enables easy implementation of routine maintenance and extension work within the AC installation

Residual current devices (RCDs)

It is absolutely essential to protect people and installations from fault current to earth and the risk of fire. The type B ABB RCD range provides this protection with extremely fast reaction times as per IEC 62423.

Measurement devices

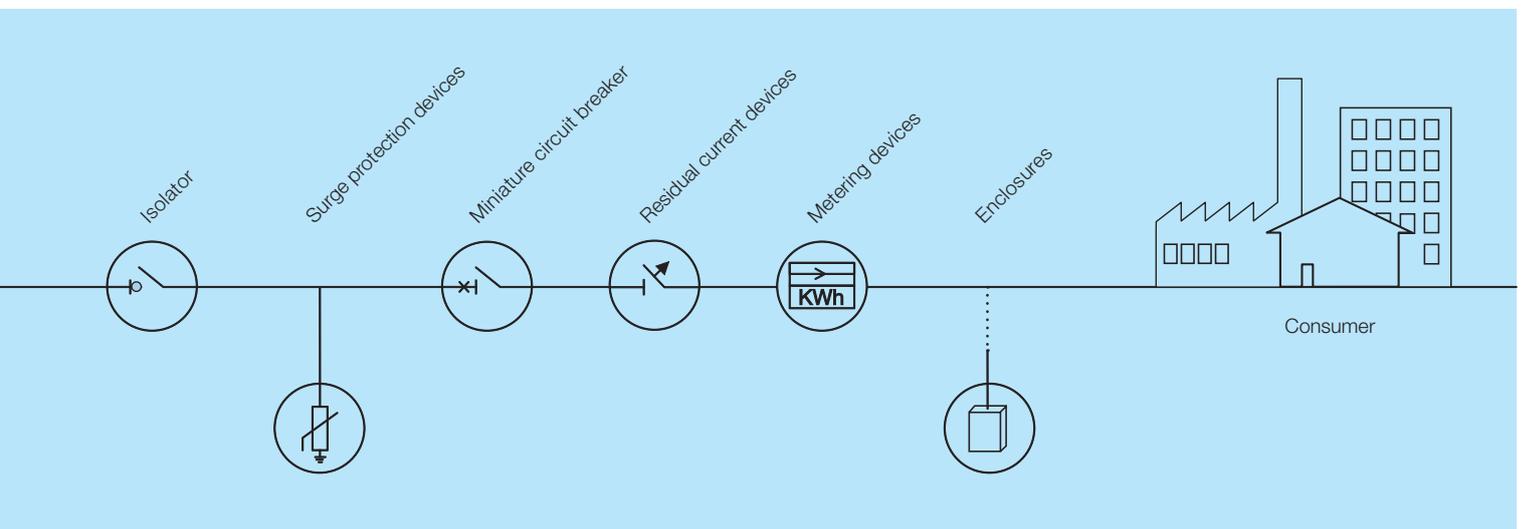
Compact meters measure the electrical energy produced in a photovoltaic installation. ABB meters can be fitted with DIN rails and be easily integrated into measured data collection systems via serial communication adapters. Meters are approved according to the Measuring Instruments Directive (MID), European Directive 2004/22/EC and IEC.

Enclosures

Enclosures can be used as combiners (DC side) and distribution boards (AC side). Thanks to their high protection class, they are ideally suited for outdoor installation. ABB supply a wide and versatile range of boxes with screwed and hinged covers. Devices can be fitted with DIN rail or mounting plate.



Devices for AC applications



High performance miniature circuit breaker for DC S800PV-S and S280 UC

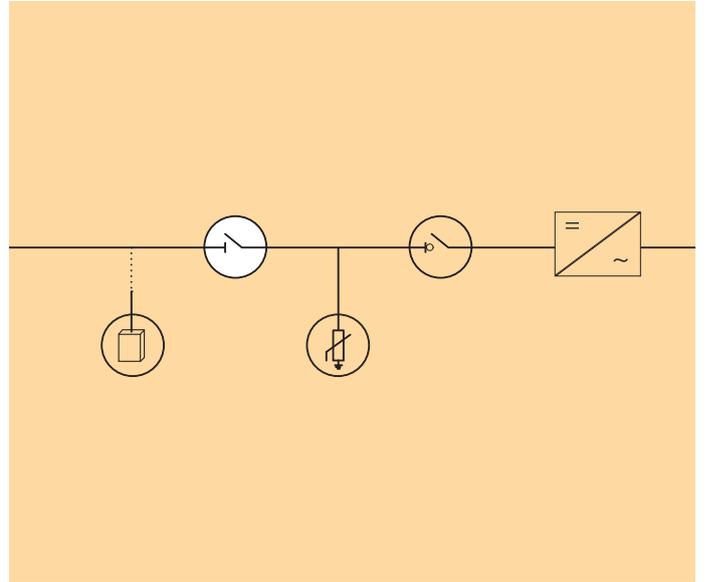
S800PV-S and S280 UC protect against reverse currents from intact strings to defective strings and – in the event of inverter failure – also protect against AC current feed. They are selectively switchable, even under load, in the event of a fault or for maintenance purposes. Miniature circuit breakers of these types are the optimum protection for cost-intensive system components. Their reset capability guarantees minimised downtimes, while the highest degree of reliability is ensured through 100% factory testing. Visual tripping indication offers exact information of the circuit breaker status. A wide range of accessories rounds off the high performance package.

The S800PV-S

providing maximum safety even in the event of reverse polarisation, the S800PV-S series offers high performance in a compact design. The interchangeable terminals (ring lugs or cage terminals) make the system even more convenient. In addition, busbars are available for fast and easy serial pole connection.

The S280 UC

impresses with its special quick fastening for easy removal of the device from the assembly without a screwdriver. Incoming supply is possible from above or below, also for busbars.



S800PV-S Specifications

Rated operating current	10 ... 125A
Rated operating voltage	– 2-pole: up to 800 VDC (earthed and unearthed system) – 3-pole: up to 1,200 VDC (earthed system) – 4-pole: up to 1,200 VDC (unearthed system)
Operating temperature	-25 ... +70°C
Reference standards	IEC / EN 60947-2

S280 UC Specifications

Rated operating current	10 ... 63A
Ultimate short-circuit breaking capacity	6, 10, 25 kA
Rated operating voltage	– 1-pole: 12V ... 220 VDC – 2–4 pole: 12V ... 440 VDC
Operating temperature	-40 ... +70°C
Reference standards	IEC 60947-2, IEC 60898, UL 489, UL 1077



Surge protection devices for DC

OVR PV and E90 PV fuse disconnector

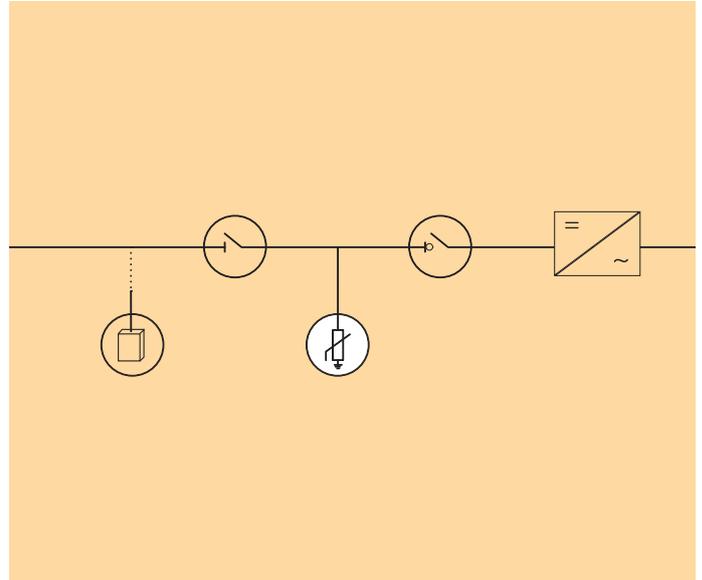
These units perform two important tasks - firstly, the protection of solar cells and inverters from overvoltages and impulse currents such as switching and lightning surges, and secondly the limitation of overvoltage to an acceptable level for the equipment to be protected.

The OVR PV

is suitable for the on-grid version and auto-protected up to 25 A for end of life. The device has remote signal control and removable cartridges for easy maintenance without needing to isolate the line.

The E90 PV fuse disconnector

offers backup protection of OVR PV and can be padlocked in its open position.



OVR PV Specifications

Nominal voltage	600V; 1000V DC
Voltage protection level	-2,8/1,4 kV under 600V DC -3,8kV under 1000V DC
Maximum discharge current	40 kA
Reference standards	IEC 61643-1/EN 61643-11

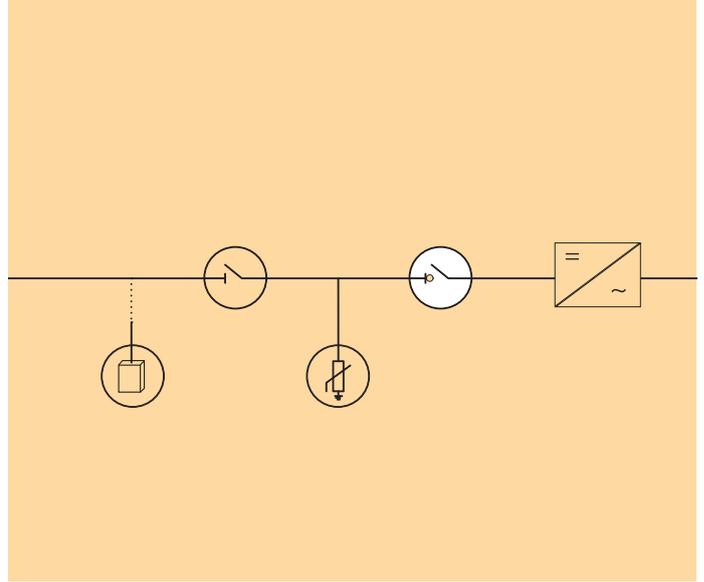
For current higher than 25 A, up to 1000V DC, essential use of E90 PV fuse disconnector.

E90 PV Fuse disconnector E90 Specifications

Rated operating voltage	1000V DC
Operating current	32A
Fuse size	10,3 x 38 mm



Switch disconnecter for DC S800PV-M



The switch disconnecter is used as a main switch for PV systems – the whole DC side can be safely isolated, either locally or remotely. The device offers safety-relevant isolation properties.

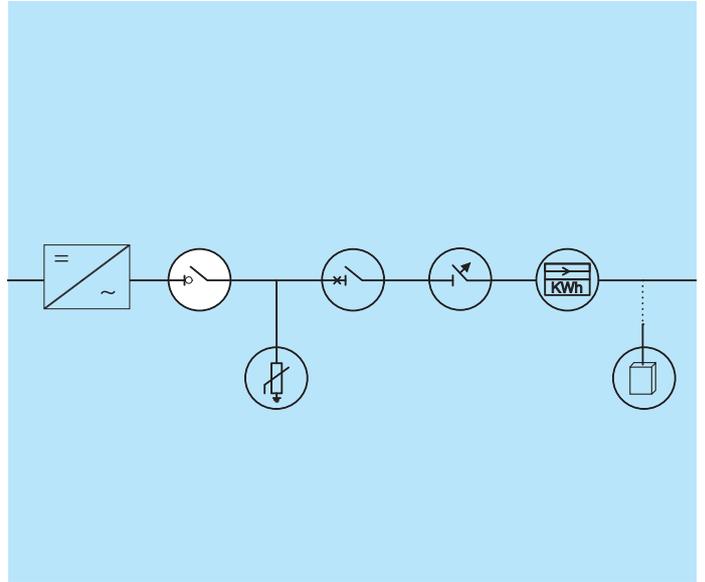
The disconnecter characteristics go up to 1200 VDC. Safe disconnection is guaranteed up to 125 A rated current up to 70°C ambient temperature. S800PV-M guarantees safe switching under load and is suitable for international use.

S800PV-M Specifications

Rated operating current	32, 63, 125A
Rated operating voltage	- 2-pole: 800 VDC (earthed and unearthed system) - 3-pole: 1,200 VDC (earthed system) - 4-pole: 1,200 VDC (unearthed system)
Standards	IEC 60947-3



Isolator for AC E200



The isolator is used as a master switch on the AC side. It offers reliable and safe switching under loads.

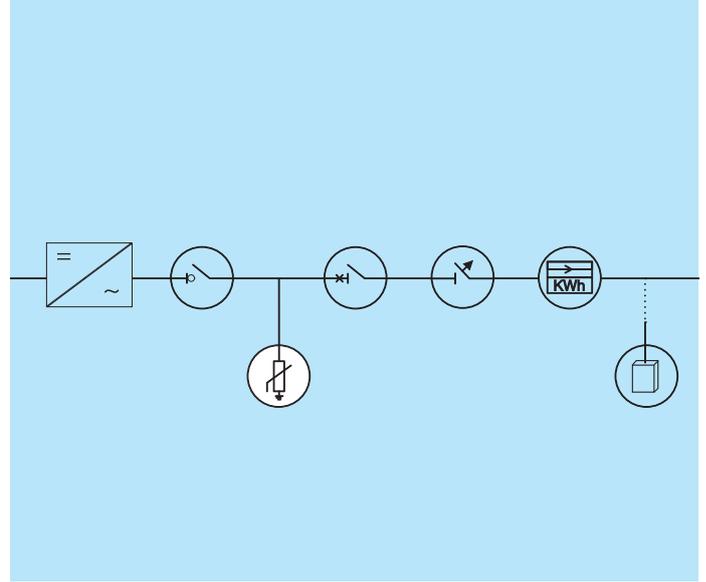
Ease of maintenance is guaranteed by a special fastening for easy removal of the device from its present installation. The wide range of accessories facilitates use in all applications.

E200 Specifications

Rated operating current	16 ... 125A
Rated operating voltage	230/400 VAC
Standards	IEC 947-3



Surge protection devices for AC OVR T2



The OVR T2 protects inverters and installations from overvoltages and impulse currents, such as switching and lighting surges. The device ensures the limitation of overvoltage to an acceptable level for the equipment to be protected.

The device has remote signal control and removable cartridges for easy maintenance without needing to isolate the line.

OVR T2 Specifications

Nominal voltage	230V and 400V AC
Number of poles	1, 2, 3 and 4 poles
Maximum discharge current	15, 40, 70kA
Voltage protection level	1,2 ... 3,8kV
Reference standards	IEC 61643-1
	EN 61643-11



Miniature circuit breaker for AC S200, S200 M, S200 P, S800

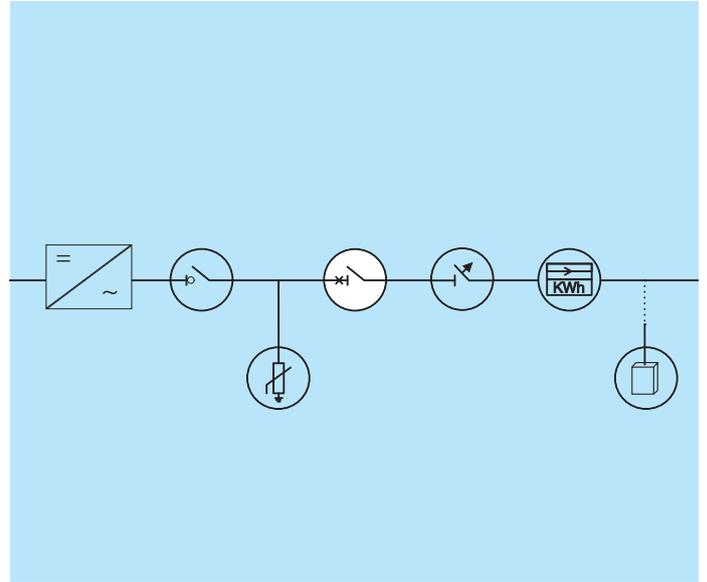
The S200 and S800 protect installations against overload and short circuit, ensuring reliability and safety for operations. They are selectively switchable, even under load, in the event of a fault or for maintenance purposes. The standstill times are minimised thanks to the devices' reclosing capability. These devices offer users confidence thanks to their 100% factory testing. The devices, with their wide range of accessories, are suitable for international use.

The S200, S200 M and S200 P

are known for their ease of maintenance – thanks to a special type of fastening for easy removal of the device from its present installation. Supply is possible from above or below, also for busbars. Without busbars, two terminal sections can be used. The tripping behaviour caters to customer requirements (B, C, D, K, Z characteristics)

The S800

offers high performance in a compact design. A wide variety of characteristics (B, C, D, K, KM, UCB, UCK, Z) round off the S800's portfolio. In addition, customers can choose either cage terminals or ring lug kits for the breaker's connection



S200, S200 M, S200 P Specifications

Rated operating current	0,5 ... 63 A
Ultimate short-circuit breaking capacity	6, 10, 25 kA
Rated operating voltage	– 1-pole: 12 ... 230 VAC – 2-4 pole: 12 ... 400 VAC
Motor operating device	
Reference standards	IEC 60898, IEC 60947-2 UL 489, UL 1077

S800 Specifications

Rated operating current	10 ... 125 A
Ultimate short-circuit breaking capacity	25 ... 50 kA
Number of poles	1 ... 4
Rated operating voltage	up to 690 VAC
Standards	IEC/EN 60947-2 EN 60898, UL489



Residual current devices for AC F202 PV B, F204 B, DDA204 B

Residual current devices ensure protection of people and installations against fault current to earth and fire risks. An RCD B type is required on the AC side in case of lack of electrical separation between the AC and DC side.

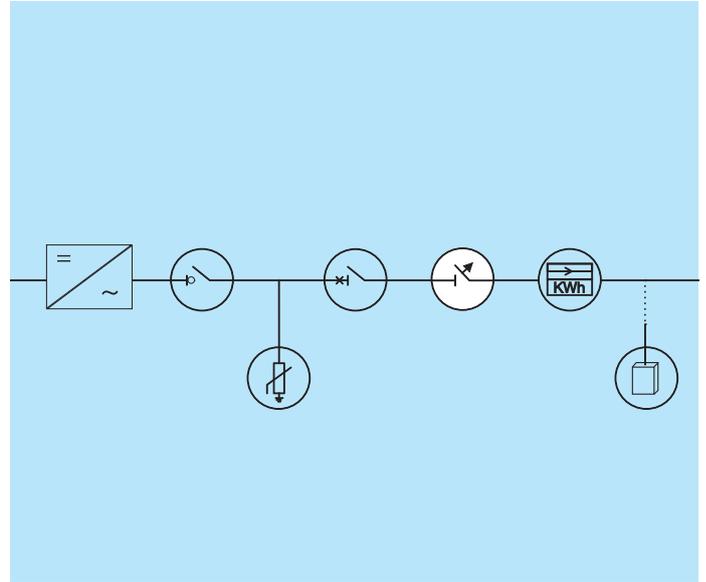
The devices save money and improve global efficiency by using PV converters without an internal insulation transformer. The devices, with their wide range of accessories, are suitable for international use.

The RCCBs F202 PV B and F204 B

are intended for installation of mono- and three-phase PV converters. They protect against fire risks and leakage currents.

The RCD-Blocks DDA204 B

are designed for installations of three-phase PV converters. In combination with S 200 series MCBs, the protection of people and installations against fire risks, leakage and over current is assured.

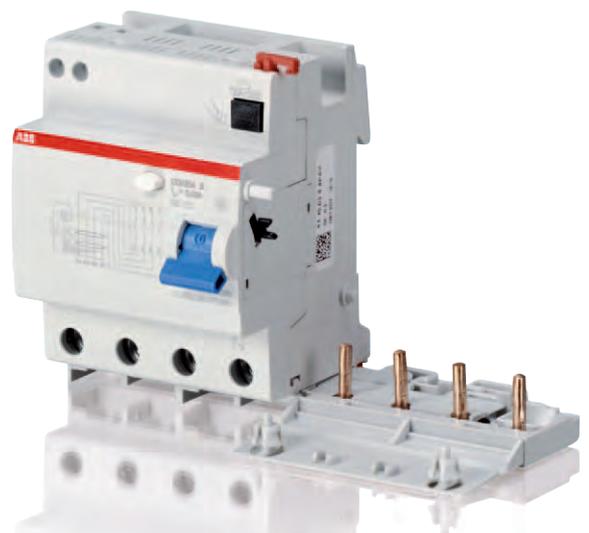


F202 PV B, F204 B Specifications

Rated operating current	25,40,63,125 A
Rated operating voltage	230 ... 400 VAC
Rated sensitivity current	30, 300, 500mA
Number of poles	2 ... 4
Type	B, B S (selective version)
Standards	IEC/EN 61 008 IEC62423

RCD-Blocks DDA204 B Specifications

Rated operating current	up to 63 A
Rated operating voltage	230, 400 VAC
Rated sensitivity current	30, 300mA
Number of poles	4
Type	B, B S (selective version)
Standards	IEC/EN 61 009 Ann. G IEC 62423



Metering devices for AC ODINsingle, DELTAmax

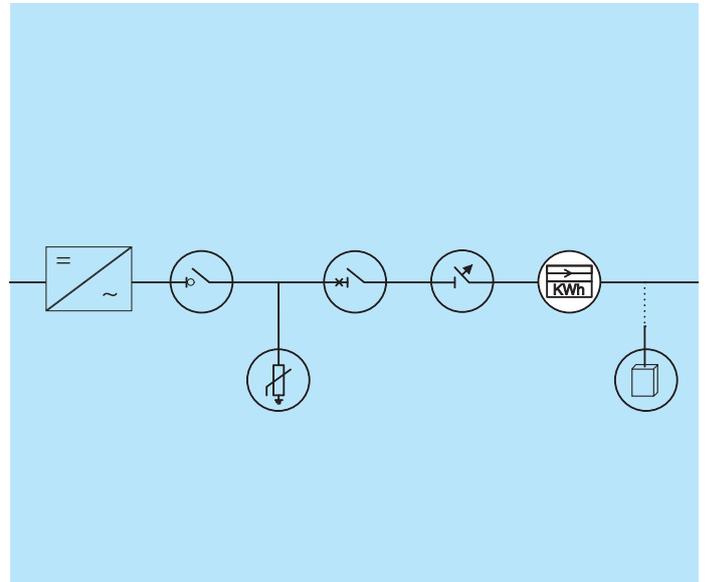
The compact meters measure the electrical energy produced in a photovoltaic installation. They can be easily integrated into measured data collection systems via serial communication adapters. The devices are approved to the Measuring Instruments Directive (MID) European Directive 2004/22/EC and IEC.

ODINsingle meters

are only 2 DIN modules wide and easy to use (no configuration needed). They are prepared for external communication via their serial communication adapter (SCA). A second, resettable counter is available as an option.

The DELTAmax types

are available in versions for 2 and 3 phase measurement. They allow active energy or combined (active and reactive) energy to be measured. DELTAmax measures in two directions, both import and export of energy. The meters are prepared for external communication via their built-in communication interface or via a serial communication adapter (SCA). I/O functions and a built-in clock function for data logging and control.



ODINsingle Specifications

Single phase measuring	
Active energy, accuracy class	B (MID Cl. 1)
Direct metering	up to 65A
Optional pulse output	
IR communication for SCA	
Memory back-up (EEPROM)	
Standards	IEC 62052-11, IEC 62053-21, EN 50470-1, EN 50470-3

DELTAmax Specifications

Active and reactive energy accuracy class	B (MID Cl. 1)
Direct metering	up to 80A
Transformer metering for	1, 2 or 5A
Wide voltage range	100 ... 500V
4 quadrant metering, import + export	
Instrumentation, load profiles, max demand, THD	
Automatic installation control	
Tariff versions	1, 2 or 4



Enclosures

Junction boxes, Europa IP65 Consumer units and Gemini

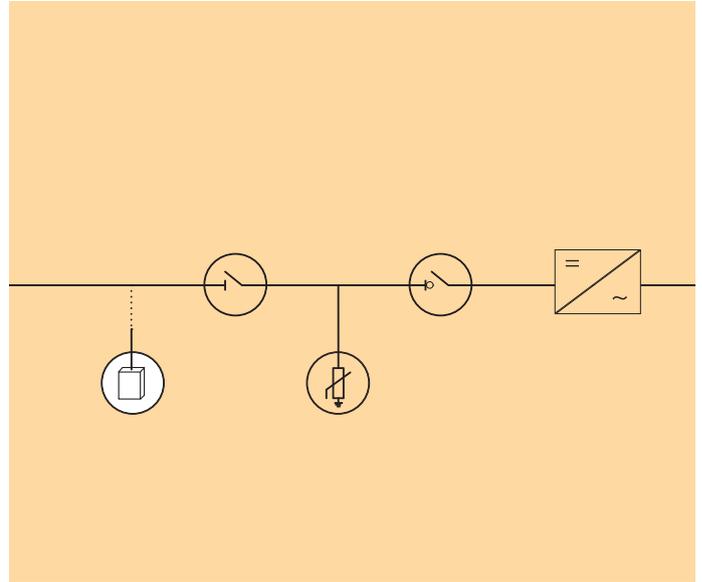
The enclosures can be used as combiners (DC side) and distribution boards (AC side) in indoor and outdoor installations. You have the choice between a wide and versatile range of boxes – screwed and hinged cover, transparent or opaque doors. The devices can be fitted with DIN rail or mounting plate and comply with the high protection class of IP 65.

Junction boxes

offer an insulation voltage of 1000 VAC – 1500 VDC and a glow wire test of 960°C as special features (100% recyclable).

Europa IP65 Consumer units

offer as special features an insulation voltage of 1000 VAC – 1500 VDC (100% recyclable).



Junction boxes Specifications

Insulation class	II
Installation temperature	-25°C ... +60°C
Shock resistance	20 Joule (IK10)
Resistance to heat	up to +125°C in compliance with EN 60695-10-2
Material	Polycarbonate
	Screwed cover
	Quick cable/conduit derivation through rubber flange connection
Standards	IEC60670

Europa IP65 Consumer units Specifications

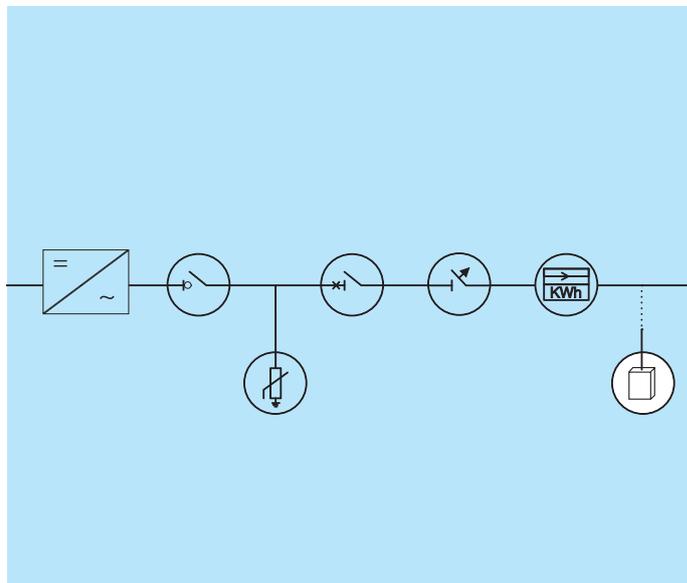
Insulation class	II
Installation temperature	-25°C ... +60°C
Shock resistance	6 Joule (IK08)
Resistance to heat	up to +85°C in compliance with EN 60695-10-2
Material	Thermoplastic ABS
	Hingeable cover
	Quick cable/conduit derivation through rubber flange connection
Standards	IEC60670



The Gemini is ideal for both indoor and outdoor installations, as well as for commercial and industrial applications. The devices prove their strength in severe operating conditions.

The special features of Gemini

are its IP66 protection, insulation voltage of 1000 VAC – 1500 VDC and GWT of 750°C. The devices are 100% recyclable and offer stable mechanical characteristics over a long period. Double insulation and an integral roof for additional protection against heavy rainy conditions round off the excellent features.



Gemini Specifications

Insulation class	II
Installation temperature	-25°C ... +100°C
Shock resistance	20 Joule (IK10)
Resistance to heat	up to +125°C in compliance with EN 60695-10-2
Material	Thermoplastic PP (co-injection)
Wide ranges of accessories	for distribution and automation applications
Standards	IEC 62208 IEC 60439 compliant



Auxiliary components and accessories

Signalization, remote control, installation material and rotary drive

The range of auxiliary elements is broad and allows countless installations to be created. The connection accessories range (busbars, connection terminals, feeder terminals) also allows any kind of wiring.

Auxiliary and signal contacts are the bridge between status signalling and protection devices, and help ensure the highest level of efficiency for PV applications.



Signalisation

Auxiliary contacts

indicate the position of the device's contacts.

Signal/auxiliary contacts

offer users a choice of application. Users can select between indication of the position of the device's contacts or signalling of the fault.

Bottom-fitting auxiliary contact

Existing installations can always be easily upgraded to include auxiliary switch functionality.

Remote control

Mechanical tripping device

causes the automatic tripping of the circuit-breakers to which it is assigned when the panel or the door of the electrical switchboard is opened or removed.

Shunt trip

offers remote opening of the device when a voltage is applied.

Undervoltage release

is the safe protection of the load in the event of a voltage drop; positive safety and emergency stop by means of a button.

Motor operating device

allows the remote control (opening or closing) of the coupled device.





Installation material

Plug-in base

It is possible to transform a standard circuit-breaker of the plug-in device which can be pulled out of the circuit where it is installed in one operation.

Busbars

Easy cross-wiring series connection enables time-efficient and cost-efficient wiring. We offer two kinds of busbars – one with fixed length and one suitable for customising.

Rotary drive

for assembly on the control panel door; makes switching almost effortless thanks to its ergonomic shape. The handle has a lock for the OFF position which prevents the power switch from being switched on when in this position.



More information with all details

All detailed information on the ABB products in the field of photovoltaics can be found in special catalogues. Whether diagrams, measured values, technical data or indeed anything else you need to know, please contact your local sales organisation. You can find the address of your local sales organisation on the ABB homepage: www.abb.com/contacts → Low Voltage Products and Systems

Technical catalogues

- System pro M compact® and other modular devices for low voltage installation
- Insulating enclosures and installation material
- Gemini, low voltage electric insulating switchboards



Complete range of photovoltaic products

ABB offers a complete range of high technology products for residential and commercial photovoltaic applications:

Moulded Case Circuit Breakers

Tmax

Moulded Case Switches

Tmax /D

Switch disconnectors

Tmax PV

Switch disconnectors OT series

Switch fuses OS series

Switch disconnectors OTM Series

Enclosed switches OTP series

Terminal Blocks

Screw terminal blocks

ADO system terminal blocks

Spring terminal blocks

ADO-screw terminal blocks

ADO-ADO terminal blocks

Low Voltage Motors

General performance motors

Industrial performance motors

Aluminium, cast iron and steel motors

Low Voltage AC Drives

ACS55 - Component Drives

ACS150 - Machinery Drives

ACS350 - General Machinery Drives

ACSM1 - High Performance Machinery Drives

Automation products

AC500 scalable PLC

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