



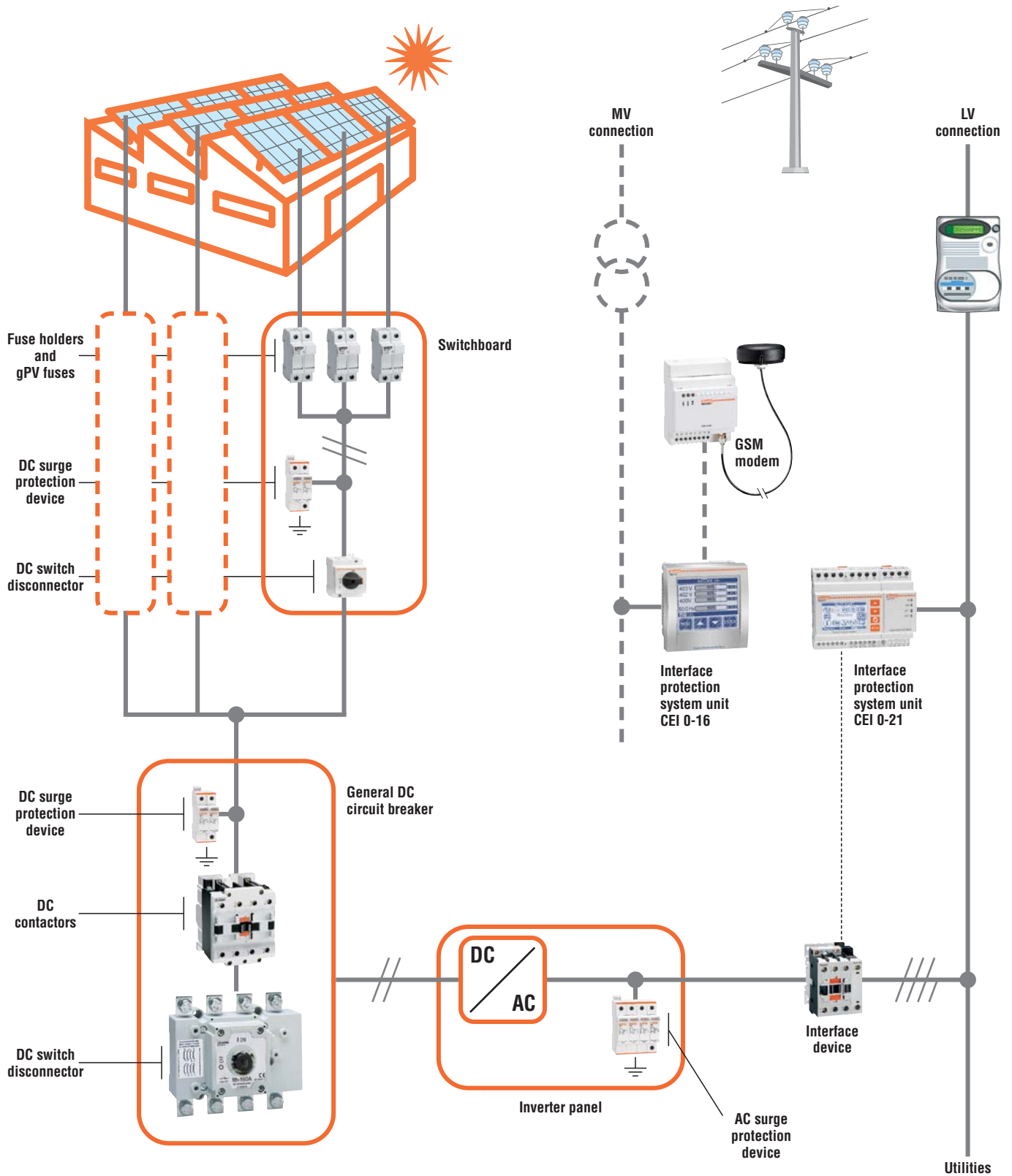
## Products and solutions for photovoltaic applications



**electric**

ENERGY AND AUTOMATION

# Products and solutions for



The range of LOVATO Electric components for photovoltaic installations provides the solution to issues related to the control of direct currents where the use of high performance products is needed to ensure essential isolation.

# photovoltaic applications

## Switch disconnectors ..... 4



Excellent design features have allowed the rated operational voltage upgrade of these switch disconnectors to 1000VDC in DC21 class, a characteristic increasingly in demand for modern photovoltaic systems.

## Surge protection devices ..... 6



Surge arresters with removable cartridges dedicated to protection from overvoltage for photovoltaic applications up to 1200VDC.

## Fuse holders and fuses ..... 7



Fuse holders and fuses for the photovoltaic sector, designed to protect strings up to 32A current and 1000VDC operational voltage rating.

## Contactors ..... 8



In photovoltaic systems, contactors are used to isolate the load between the photovoltaic panel and the AC/DC inverter. Versions specifically developed for use with DC-1 load up to 1000VDC are available.

Contactors are also used with the function of interface device between the AC/DC inverter output and the line; their dimensions must correspond to the AC-3 utilisation category as established by the Italian CEI 0-21 standard, June 2012 edition.

## Interface protection system units ..... 10



The PMVF 30 interface protection system unit has been designed in accordance with the Italian CEI 0-16 standard, 12-2012 edition, for medium voltage, the PMVF 20 and PMVF 51 system in accordance with the Italian CEI 0-21 standard, 06-2012 edition, for low voltage.

## GSM modem ..... 14



GSM modem for managing the disconnection of generation as envisaged by the Italian CEI 0-16 Standard, paragraph 8.8.6.5 a in annex M.

## Automatic battery chargers ..... 18



The battery chargers can be installed in auxiliary supply systems to permit the operation of the interface protection system units and keep the interface device and any backup control device closed for at least 5 seconds from loss of the main supply.

## Energy meters ..... 19



Single-phase types up to 63A, three-phase model with direct connection up to 63A or by current transformer and a data concentrator. Among the best on the market also because of the compact size, function expandability and a selection of monitored measurements. MID certified versions, as per EU Directive 2004/22/EC, also available.



## Switch disconnectors GA series



GA040 D



GAX42...D

Order code	IEC rated operational current Ie DC-21B			Qty per pkg	Wt [kg]
	conventional free air thermal current Ith	3 poles 500V	4 poles 600V 800V		
	[A]	[A]	[A]	no.	[kg]
Switch disconnector complete with black handle.					
<b>GA040 D</b>	40	12	—	1	0.135
Fourth pole.					
<b>GAX42 040D</b>	40	—	20	15	0.040

## Switch disconnectors GD series



GD040 AT4

Order code	IEC rated operational current Ie DC-21B			Qty per pkg	Wt [kg]
	conventional free air thermal current Ith	600V	800V 1000V		
	[A]	[A]	[A]	no.	[kg]
Switch disconnector complete with black handle.					
<b>GD025 AT2</b>	25	25	16	1	0.100
<b>GD032 AT3</b>	32	32	32	1	0.110
<b>GD040 AT4</b>	40	40	40	1	0.120

### General characteristics

- Up to 40A, 1000VDC
- Modular construction
- Jumpers for connecting the poles in series supplied as standard with GD series
- Screw or 35mm DIN (IEC/EN 60715) rail fixing.

### Operational characteristics

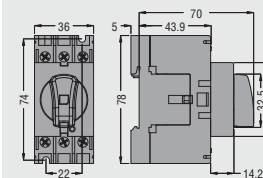
- IEC rated insulation voltage Ui for GA...D and GD...: 1000V (pollution degree 3)
- IEC rated insulation voltage Ui for GD...: 1500V (pollution degree 2)
- IEC rated impulse withstand Uimp: 8kV
- Mechanical life:
  - 100,000 cycles for GA040 D
  - 10,000 cycles for GD...
- Operating temperature: -25°C...+55°C
- Storage temperature: -40°C...+70°C
- Degree of protection: IEC/EN IP20.

### Certifications and compliance

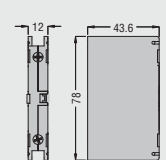
Compliant with standard: IEC/EN 60947-3, IEC/EN 60947-1. Certifications obtained: EAC, cULus to UL508, CSA C22.2 for GA...D only.

### Dimensions

GA040 D

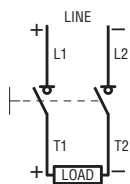


Fourth pole GAX42 040D

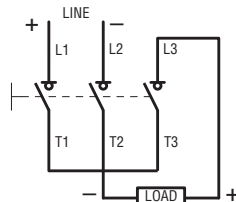


### Wiring diagram for GA... (poles in series to be wired)

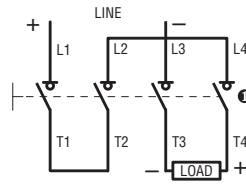
One-line control  
2 poles in series  
GA040 D



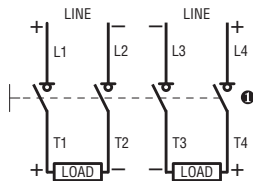
3 poles in series  
GA040 D



4 pole in series  
GA040 D + GAX42 040D



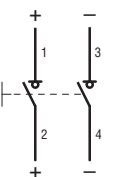
Two-line control  
2+2 poles in series  
GA040 D + GAX42 040D



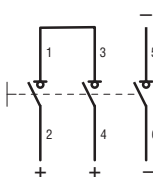
① The positive pole of the load is connected to the fourth pole of the switch disconnector on the right. If it is to be connected on the left, wiring needs to change accordingly.

### Wiring diagram for GD... (poles in series already wired with jumpers)

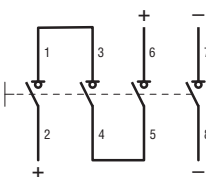
One-line control  
GD025 AT2



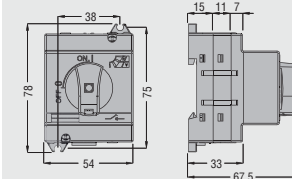
GD032 AT3



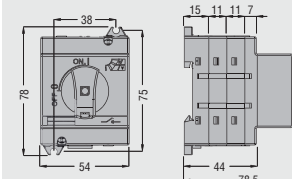
GD040 AT4



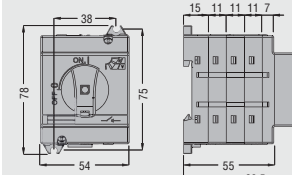
GA025 AT2



GD032 AT3



GD040 AT4



## Switch disconnectors GE series



GE...DT4

## Direct operating lever handle



GEX6 7ND

Order code	IEC conv. free air thermal current Ith		IEC rated operational current Ie DC-21B			Qty per pkg no.	Wt [kg]
	[A] (IEC)	[A]	[A]	[A]	[A]		
					1000V		
Switch disconnectors to be completed with handle.							
<b>GE0125 DT4</b>	125	125	125	100	1	1.900	
<b>GE0250 DT4</b>	250	250	250	200	1	2.000	
<b>GE0315 DT4</b>	315	315	280	250	1	4.000	
<b>GE0630 DT4</b>	630	630	600	500	1	4.500	
<b>GE0800 DT4</b>	800	700	630	630	1	4.500	
<b>GE1250 DT4</b>	1250	1250	1000	850	1	8.900	

① Connection of four poles in series.

Order code	Characteristics	Qty per pkg no.	Wt [kg]
DIRECT OPERATING LEVER HANDLE, PADLOCKABLE. Rotating type with screw fixing on switch disconnector. Complete with shaft insert.			
<b>GEX6 6ND</b>	115mm/4.5" black for GE0125 DT4, GE0250 DT4 and GE0315 DT4	1	0.216
<b>GEX6 7ND</b>	143mm/5.6" black for GE0630 DT4 and GE0800 DT4	1	0.322
<b>GEX6 8ND</b>	396mm/15.6" black for GE1250 DT4	1	0.328

### General characteristics

- Up to 850A, 1000VDC
- Screw fixing
- Padlockable at 0 position with no extra accessory.

### Operational characteristics

- IEC rated insulation voltage Ui: 1000V
- IEC rated impulse withstand Uimp:
  - 8kV for GE0125 DT4, GE0250 DT4, GE0315 DT4
  - 12kV for GE0630 DT4, GE0800 DT4, GE1250 DT4
- Mechanical life:
  - 20,000 cycles for GE0125 DT4, GE0250 DT4, GE0315 DT4
  - 10,000 cycles for GE0630 DT4, GE0800 DT4, GE1250 DT4.

### Certifications and compliance

Certifications obtained: EAC.  
Compliant with standard: IEC/EN 60947-1, IEC/EN 60947-3.

## Configuration

### UTILISATION IN DC-21B CATEGORY

Products to purchase and connect together	IEC operational voltage Ue					
	48V	110V	220V	400V	440V	500V
	Maximum current					
	[A]	[A]	[A]	[A]	[A]	[A]

#### 4 POLES IN SERIES

GE0125 DT4	125	125	125	125	125	125
GE0250 DT4	250	250	250	250	250	250
GE0315 DT4	315	315	315	315	315	315
GE0630 DT4	630	630	630	630	630	630
GE0800 DT4	800	800	800	800	750	700
GE1250 DT4	1250	1250	1250	1250	1250	1250

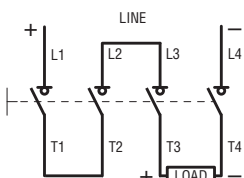
Products to purchase and connect together	IEC operational voltage Ue					
	600V	750V	800V	850V	900V	1000V
	Maximum current					
	[A]	[A]	[A]	[A]	[A]	[A]

#### 4 POLES IN SERIES

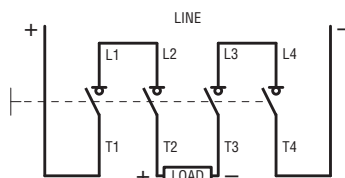
GE0125 DT4	125	125	125	125	125	<b>100</b>
GE0250 DT4	250	250	250	240	220	<b>200</b>
GE0315 DT4	315	290	280	270	260	<b>250</b>
GE0630 DT4	630	630	600	600	600	<b>500</b>
GE0800 DT4	700	650	630	630	630	<b>630</b>
GE1250 DT4	1250	1050	1000	940	870	<b>850</b>

### Wiring diagram for GE...DT4 (poles in series to be wired)

One-line control  
4 poles in series  
GE...DT4



4 (2+2) poles in series  
GE...DT4



## Surge protection devices Type 2 for photovoltaic applications with plug-in cartridge



SA2 DG...

SA2 DF...

Order code	Pole arrangement	Relay output	Number of DIN modules	Qty per pkg	Wt
		(SPDT)		no.	[kg]

VERSION WITH PLUG-IN CARTRIDGE.  
EN short-circuit current rating  $I_{scpv}$  100A.

SA2 DG 600M2	+, -, PE	NO	2	1	0.320
SA2 DG 600M2R	+, -, PE	YES	2	1	0.325
SA2 DG K00M3	+, -, PE	NO	3	1	0.420
SA2 DG K00M3R	+, -, PE	YES	3	1	0.425

EN short-circuit current rating  $I_{scpv}$  1000A.

SA2 DF 600M2	+, -, PE	NO	2	1	0.285
SA2 DF 600M3	+, -, PE	NO	3	1	0.305
SA2 DF K00M2	+, -, PE	NO	2	1	0.410
SA2 DF K00M3	+, -, PE	NO	3	1	0.500
SA2 DF K20M3	+, -, PE	NO	3	1	0.550

### Operational characteristics

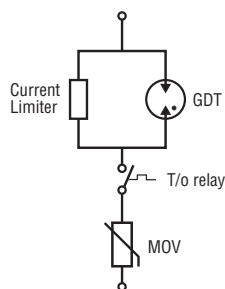
- EN maximum continuous voltage  $U_{cpv}$ : 600VDC, 1000VDC, 1200VDC
- Versions with or without relay output having changeover contact for remote status indication
- SA2 DG... backup protection (supply >100A) fuse A: 100gPV
- Degree of protection: IEC/EN IP20.

Type	EN rated voltage $U_n$ [VDC]	EN continuous voltage $U_{cpv}$ [VDC]	EN voltage protection level $U_p$ [kV]
SA2 DG 600M2	600	600	<1.9
SA2 DG K00M3	1000	1000	<3.6
SA2 DF 600M2	600	600	<2.0
SA2 DF 600M3	600	600	<3
SA2 DF K00M2	1000	1000	<4.0
SA2 DF K00M3	1000	1000	<4.0
SA2 DF K20M3	1200	1200	<4.0

### Certifications and compliance

Certifications obtained: cURus only for SA2 DF 600M2, SA2 DF K00M2 and SA2 DF K20M3.  
Compliant with standard: EN 50539-11 for all types; UL 1449, CSA C22.2 no. 8 only for SA2 DF 600M2, SA2 DF K00M2 and SA2 DF K20M3.

### Protection circuit for each module type SA2 DF... Self-protected surge protection devices



In case of short but intense overvoltage conditions, both the spark gap element (GDT – Gas Discharge Tube) and the varistor (MOV – Metal Oxide Varistor) simultaneously trigger. In case of weak but prolonged overvoltage conditions, the current limiter considerably reduces the current flowing through the varistor. This technological solution guarantees a longer varistor life.

Lastly, another particular mechanism of the surge arrester quickly extinguishes the electric arc during the thermal overload tripping phase.

## Surge protection devices Type 2 for AC applications



SA2 2P A320R

SA2 3N A320R

Order code	Pole arrangement	Relay output	Number of DIN modules	Qty per pkg	Wt
		(SPDT)		no.	[kg]

VERSION WITH PLUG-IN CARTRIDGE.  
IEC maximum discharge current  $I_{max}$  (8/20 $\mu$ s) 40kA per pole.

SA2 1P A320	1P	NO	1	1	0.140
SA2 1P A320R	1P	YES	1	1	0.145
SA2 1N A320	1P+N	NO	2	1	0.240
SA2 1N A320R	1P+N	YES	2	1	0.245
SA2 2P A320	2P	NO	2	1	0.260
SA2 2P A320R	2P	YES	2	1	0.265
SA2 3P A320	3P	NO	3	1	0.370
SA2 3P A320R	3P	YES	3	1	0.375
SA2 3N A320	3P+N	NO	4	1	0.465
SA2 3N A320R	3P+N	YES	4	1	0.470
SA2 4P A320	4P	NO	4	1	0.480
SA2 4P A320R	4P	YES	4	1	0.485

### Operational characteristics

- IEC maximum continuous operating voltage  $U_c$ : 320VAC/420VDC
- IEC rated discharge current  $I_n$  (8/20 $\mu$ s): 20kA per pole
- Versions with or without relay output having changeover contact for remote status indication
- Back-up protection (supply >125A) fuse A: 125gL/gG
- Maximum short circuit current (50Hz): 25kA
- Degree of protection: IEC/EN IP20.

Type	IEC rated voltage $U_n$ [VAC]	IEC voltage protection level $U_p$ [kV] L-N	Power installation
SA2 1P A320...	230	<1.5	TN-C, TN-S, TT <sup>①</sup>
SA2 1N A320...	230	<1.5/2	TT, TN-S
SA2 2P A320...	230	<1.5	TN-S
SA2 3P A320...	230 / 400	<1.5	TN-C
SA2 3N A320...	230 / 400	<1.5/2	TT, TN-S
SA2 4P A320...	230 / 400	<1.5	TN-S

① For L-PE only.

### Compliance standards

Compliant with standards: IEC/EN 61643-11.

### Characteristics

Type	IEC rated voltage $U_n$ [V]	IEC voltage protection level $U_p$ [kV] L-N	Power installation
SA0/SA2 1P A...	230	<1.5	TN-C, TN-S, TT <sup>①</sup>
SA0/SA2 1N A...	230	<1.5	TT, TN-S
SA0/SA2 2P A...	230	<1.5	TN-S
SA0/SA2 3P A...	230/400	<1.5	TN-C
SA0/SA2 3N A...	230/400	<1.5	TT, TN-S
SA0/SA2 4P A...	230/400	<1.5	TN-S

① For L-PE only.

## Fuse holders



FB01 D...  
FB01 D 1PL

Order code	Poles	Status indicator	DIN size	Qty per pkg	Wt
			no.	no.	[kg]

For 10x38mm fuses.  
IEC 32A rated current at 1000VDC.

<b>FB01 D 1P</b>	1P	—	1	12	0.064
<b>FB01 D 1PL</b>	1P	YES	1	12	0.065
<b>FB01 D 2P</b>	2P	—	2	6	0.127
<b>FB01 D 2PL</b>	2P	YES	2	6	0.130

### Operational characteristics

- IEC rated voltage  $U_e$ : 1000VDC
- IEC rated current  $I_e$ : 32A
- IEC utilisation category: DC20B 1000VDC
- Suitable for IEC fuse class: gPV
- IEC degree of protection: IP20.

### Certifications and compliance

Certifications obtained: UL, CSA.  
Compliant with standard: IEC/EN 60269-1, IEC/EN 60269-2, IEC/EN 60947-1, IEC/EN 60947-3, UL 4248-1, UL 4248-18, CSA C22.2 no. 4248.1, CSA C22.2 no. 4248.18.

## Fuses



FE01 D...

Order code	Rated current $I_n$	Qty per pkg	Wt
	[A]	no.	[kg]

For 10x38mm fuses.  
IEC 30kA breaking capacity at 1000VDC.

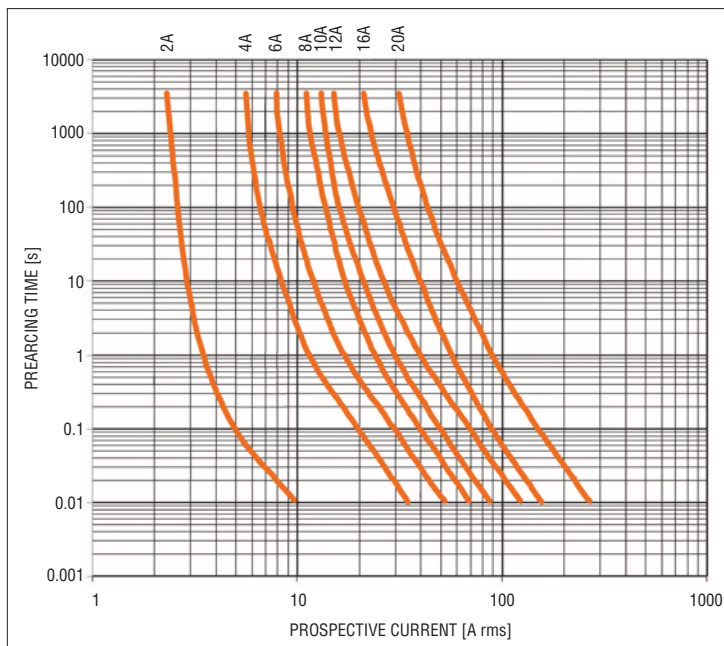
<b>FE01 D 00200</b>	2	10	0.008
<b>FE01 D 00400</b>	4	10	0.008
<b>FE01 D 00600</b>	6	10	0.008
<b>FE01 D 00800</b>	8	10	0.008
<b>FE01 D 01000</b>	10	10	0.008
<b>FE01 D 01200</b>	12	10	0.008
<b>FE01 D 01600</b>	16	10	0.008
<b>FE01 D 02000</b>	20	10	0.008

### Operational characteristics

- IEC rated voltage  $U_e$ : 1000VDC
- IEC rated current  $I_e$ : 2...20A
- IEC fuse class: gPV.

### Compliance standards

Compliant with standards: IEC/EN 60269-6.



## Accessories

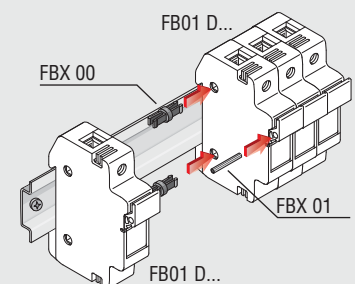


FBX 00



FBX 01

Order code	Description	Qty per pkg	Wt
	[A]	no.	[kg]
<b>FBX 00</b>	Coupling clip for 10x38mm fuse holders	100	0.003
<b>FBX 01</b>	Coupling pin for 10x38mm fuse holders	100	0.005



## Contactors for DC-1 loads



BFD80 40...

Order code	IEC rated operational current at 600V in DC-1 ≤55°C with 4 poles in series	Qty per pkg	Wt
	[A]	no.	[kg]

FOUR-POLE.  
AC coil.

<b>11 BFD80 40</b>	125	1	1.500
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DC coil.

<b>11 BFD80 C 40</b>	125	1	2.110
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❶ Complete with coil voltage digit if 50/60Hz or with voltage digit followed by 60 if 60Hz.

Standard voltages are:

– AC 50/60Hz 024 / 048 / 110 / 230 / 400V

– AC 60Hz 024 60 / 048 60 / 120 60 / 220 60 / 230 60 / 460 60 / 575 60 (V).

Example: 11 BFD80 40 024 for contactor BFD80 40, 4 NO power poles, with 24VAC 50/60Hz

❷ Complete with coil voltage digit.

Standard voltages are:

– DC 012 / 024 / 048 / 060 / 110 / 125 / 220V.

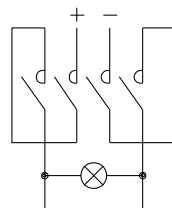
Example: 11 BFD80 C 40 024 for contactor BFD80 C 40, 4NO power poles, with 24VDC coil.

Other voltages available on request.

### USE IN IEC DC-1 DUTY

Type	IEC operational voltage Ue			
	400V	600V	800V	1000V
	IEC max current Ie in DC1 with L/R ≤1ms with 4 poles in series			
	[A]	[A]	[A]	[A]
BFD80...	125	125	95	75

### Wiring scheme



### General characteristics

These contactors are specifically made with magnetic elements in the arc extinction chambers to obtain high DC load operational capabilities. They are used to disconnect and isolate the load between the photovoltaic panel and the AC/DC inverter.

### Operational characteristics

Average consumption of the coil at ≤20°C:

- with 50/60Hz coil used at 50Hz:
  - on starting 220VA; in service 18VA
- with 50/60Hz coil used at 60Hz:
  - on starting 200VA; in service 15VA
- with 60Hz coil used at 60Hz:
  - on starting 220VA; in service 18VA
- with DC coil: start/service 15VA

### Compliance standards

Compliant with standard: IEC/EN 60947-1, IEC/EN 60947-4-1.

### Italian Fire Department Directives

These directives provide for a disconnecting device for all current-carrying elements, which can be operated by remote control switch, placed in an easily reached and marked position, in order to safely isolate each part of the installation within the fire system compartment including the photovoltaic (PV) generator.

As an alternative, the PV generator must be installed, either externally to the fire system compartment or internally but in a dedicated compartment with adequate fire-resistant features. For such function, specifically designed contactors for on-load use in IEC DC1 duty up to 1000VDC are available.



## Contactors for AC-3 and AC-1 loads



BF09 A-BF25 A



BF26 T4 A-BF38 T4 A



BF50-BF110



B115 4-B630 4

Order code	AC-3 usage data		AC-1 usage data		Qty per pkg	Wt [kg]
	Current I <sub>e</sub> ≤440V ≤55°C	Max power ≤440V ≤55°C	Current I <sub>th</sub> ≤400V ≤40°C	Max power ≤400V ≤40°C		
	[A]	[kW]	[A]	[kW]		
THREE-POLE with AC coil.						
BF09 10 AⓈ	9	4.2	25	16	1	0.367
BF12 10 AⓈ	12	5.7	28	18	1	0.367
BF18 10 AⓈ	18	7.5	32	21	1	0.367
BF26 00 AⓈ	26	13	45	30	1	0.437
BF38 00 AⓈ	38	18.5	56	36	1	0.437
11 BF50 00Ⓢ	50	25	90	59	1	1.350
11 BF65 00Ⓢ	65	33	110	72	1	1.350
11 BF80 00Ⓢ	80	41	125	82	1	1.360
FOUR-POLE with AC coil.						
BF09 T4 AⓈ	9	4.2	25	16	1	0.367
BF12 T4 AⓈ	12	5.7	28	18	1	0.367
BF18 T4 AⓈ	18	7.5	32	21	1	0.367
BF26 T4 AⓈ	26	13	45	30	1	0.508
BF38 T4 AⓈ	38	18.5	56	36	1	0.508
11 BF50 40Ⓢ	50	25	90	59	1	1.554
11 BF65 40Ⓢ	65	33	110	72	1	1.554
11 BF80 40Ⓢ	80	41	125	82	1	1.570
THREE-POLE with DC coil.						
BF09 10 DⓈ	9	4.2	25	16	1	0.494
BF12 10 DⓈ	12	5.7	28	18	1	0.494
BF18 10 DⓈ	18	7.5	32	21	1	0.494
BF26 00 DⓈ	26	13	45	30	1	0.559
BF38 00 DⓈ	38	18.5	56	36	1	0.559
11 BF50 C 00Ⓢ	50	25	90	59	1	1.885
11 BF65 C 00Ⓢ	65	33	110	72	1	1.885
11 BF80 C 00Ⓢ	80	41	125	82	1	1.895
FOUR-POLE with DC coil.						
BF09 T4 DⓈ	9	4.2	25	16	1	0.498
BF18 T4 DⓈ	18	7.5	32	21	1	0.498
BF26 T4 DⓈ	26	13	45	30	1	0.665
BF38 T4 DⓈ	38	18.5	56	36	1	0.665
11 BF65 C 40Ⓢ	65	33	110	72	1	2.035
11 BF80 C 40Ⓢ	80	41	125	82	1	2.100
THREE-POLE with AC/DC coil.						
11 B115 00Ⓢ	110	61	160	98	1	5.290
11 B145 00Ⓢ	150	80	250	150	1	5.400
11 B180 00Ⓢ	185	100	275	160	1	5.400
11 B250 00Ⓢ	265	140	350	214	1	9.575
11 B310 00Ⓢ	320	170	450	270	1	9.575
11 B400 00Ⓢ	420	225	550	345	1	9.575
11 B500 00Ⓢ	520	290	700	438	1	18.000
11 B630 00Ⓢ	630	335	800	500	1	18.620
FOUR-POLE with AC/DC coil.						
11 B115 4 00Ⓢ	110	61	160	98	1	6.220
11 B145 4 00Ⓢ	150	80	250	150	1	6.340
11 B180 4 00Ⓢ	185	100	275	160	1	6.340
11 B250 4 00Ⓢ	265	140	350	214	1	11.195
11 B310 4 00Ⓢ	320	170	450	270	1	11.195
11 B400 4 00Ⓢ	420	225	550	345	1	11.195
11 B500 4 00Ⓢ	520	290	700	438	1	20.910
11 B630 4 00Ⓢ	630	335	800	500	1	21.880

### General characteristics

In photovoltaic systems, contactors are used with the function of interface device between the DC/AC inverter output and the line.

The Italian CEI 0-21 standard, June 2012 edition, prescribes that contactors used as interface devices must have dimensions corresponding to the AC-3 utilisation category.

### Operational characteristics

Average consumption of the coil at ≤20°C:

- For types BF09-BF38 A... and BF09-BF38 T4 A...
  - with 50/60Hz coil used at 50Hz: on starting 75VA; in service 9VA
  - with 50/60Hz coil used at 60Hz: on starting 70VA; in service 6.5VA
  - with 60Hz coil used at 60Hz: on starting 75VA; in service 9VA
- For types BF50-BF80... and BF50-BF80 40...
  - with 50/60Hz coil used at 50Hz: on starting 220VA; in service 18VA
  - with 50/60Hz coil used at 60Hz: on starting 200VA; in service 15VA
  - with 60Hz coil used at 60Hz: on starting 22VA; in service 18 VA
- For BF09-BF38 D... and BF09-BF38 T4 D...
  - start/service 5.4V
- For BF50-BF80 C ... 3/4 poles
  - start / service 15VA
- For types B115-B400... 3/4 poles
  - on starting 300VA/W; in service 10VA/W
- For types B500-B630... 3/4 poles
  - on starting 400VA/W; in service 18VA/W.

### Certifications and compliance

Certifications obtained: cULus for BF..., B500... and B630... types; UL for B115-B400... types. Compliant with standard: IEC/EN 60947-1, IEC/EN 60947-4-1, UL508, CSA C22.2 no. 14 for all types; also UL 60947-1, CSA C22.2 no. 60947-1, UL 60947-4-1, CSA C22.2 no. 60947-4-1 for B115-B630 1000... types.

- 1 Complete order code with coil voltage digit or with voltage digit followed by 60 (if 60Hz). Standard voltages are as follows:
    - AC 50/60Hz 024 / 048 / 110 / 230 / 400V
    - AC 60Hz 024 60 / 048 60 / 120 60 / 220 60 / 230 60 / 460 60 / 575 60 (V).
 Example: 11 BF09 10 A230 (for contactor BF09, with 1 NO contact and 230VAC 50/60Hz coil).
  - 2 Complete order code with coil voltage digit. Standard voltages are as follows:
    - DC 012 - 024 - 048 - 060 - 110 - 125 - 220V.
 Example: BF09 10 D024 (for contactor BF09, three-poles, with one NO contact and 24VDC coil). 11BF80 C 40110 (for contactor BF80, four-poles, with 110VDC coil).
  - 3 The coil of the contactor can be powered in either in AC or DC. Complete the order code only with the digit of the coil voltage. Standard voltages are:
    - AC/DC 24 / 48 / 60 / 110-125 (indicate 110) / 220-240 (indicate 220) / 380-415 (indicate 380) / 440-480V (indicate 440).
 Example: 11 B145 00 110 (for contactor B145, with 110-125VAC/DC). 11 BF09 T4 A460 60 (for contactor BF09, four-poles, with 460VAC 60Hz coil). 11 B145 4 00 110 (for contactor B145, four-poles, with 110-125VAC/DC coil).
- The 24VAC/DC voltage is not possible for B500-B630 contactors. Other voltages available on request.

## Interface protection system units compliant with Italian standard CEI 0-16, December 2012 edition



PMVF 30...

Voltage threshold as per CEI 0-16

Order code	Rated voltage	Auxiliary	Qty per pkg	Wt
	Control			
	[V]	[V]	no.	[kg]
Medium-voltage system. Dual threshold minimum and maximum voltage and frequency protection. Flush mount type, 96x96mm.				
<b>PMVF 30</b>	Measurements via VTs in MV or direct in LV	100-400VAC/110-250VDC	1	0.566
<b>PMVF 30 D048</b>		12-48VDC	1	0.566

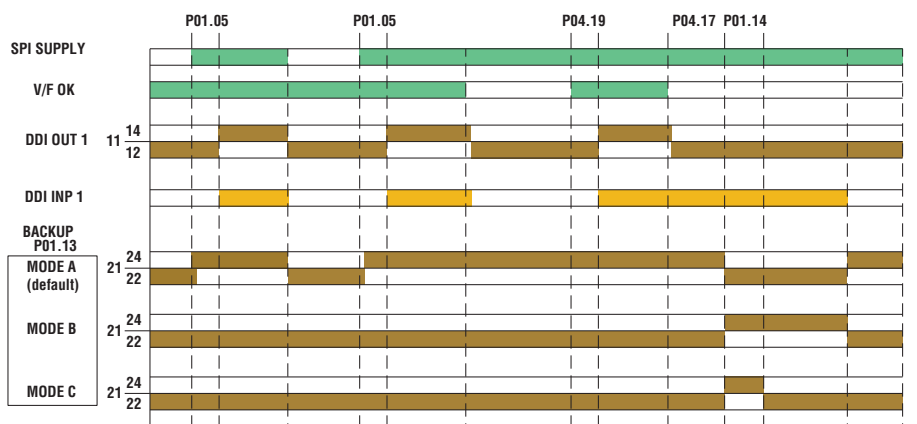
Type of protection	Tripping threshold	Tripping time
Maximum voltage 59.S2	1.2Un	0.6s
Maximum voltage 59.S1 (moving mean over 10min)	1.1Un	≤ 3s
Minimum voltage 27.S1	0.85Un	0.4s
Minimum voltage 27.S2	0.4Un	0.2s
Maximum residual voltage 59.V0 (59N)	5% √3 Un	25s

Frequency threshold as per CEI 0-16  
Frequency protection at voltage choice

Type of protection	Tripping threshold	Tripping time
<b>Configuration in standard conditions.</b>		
Maximum frequency 81>.S2	51.5Hz	1s
Minimum frequency 81<.S2	47.5Hz	4s
<b>Limited configuration in case of local control or voltage choice condition</b>		
Maximum frequency 81>.S1	50.2Hz	0.15s
Minimum frequency 81<.S1	49.8Hz	0.15s
– Voltage choice functions		
Maximum residual voltage 59.V0 (59N)	5% √3 Un	-
Minimum direct sequence voltage 27.Vd	70% Un	-
Maximum inverse sequence voltage 59.Vi	15% Un	-

### Operation graph

Activation modes for standby device



### General characteristics

The PMVF30 interface protection system unit has been developed according to the Italian CEI 0-16 standard prescriptions of the December 2012 edition. It is used when a local generating system is connected in parallel with the medium-voltage utility distribution grid. The controls refer to limits of voltage and frequency monitoring. In the case when either the voltage or the frequency are out of admissible limits, the interface protection system unit must step in by de-energising a relay output so that the interface device trips. PMVF30 is equipped with inputs having the following functions:

- Interface device status feedback
- Interface protection system unit exclusion
- Local control
- Remote tripping (forced interface device opening, independent of voltage and frequency values).

In addition, there are two relay outputs to configure as:

- Interface device opening
- Programmable (either as factory default for standby device opening or to set up as auto reclosing if the interface device is an automatic circuit breaker).

### Standby device opening

In installations with more than 400kW, the standard specifies there must be a command signal, which releases another standby device, given within 1 second whenever interface device opening fails or malfunctions.

### Automatic interface device reclosing

Whenever an automatic circuit breaker is used as the interface device, the PMVF30 is capable of controlling both the opening (according to the installation conditions indicated in the Italian CEI 0-16 standard) and the auto reclosing. The auto reclosing function includes defining the number of attempts and the time interval between an attempt and the following one as well as generating an alarm if the closing operation does not take place. This function can be carried out through a programmable output of the PMVF30 (unless it is already used for the standby device operation) or by installing an EXP10 03 expansion module.

### Operational characteristics

- Auxiliary voltage:
  - PMVF30: 100...400VAC/110...250VDC
  - PMVF30D048: 12...48VDC
- Voltage inputs (connection via VTs in MV or directly in LV end):
  - Primary: 400-150,000V
  - Secondary: 50-500V (for voltage/frequency); 50-150V (for residual voltage measurement)
- Relay outputs 5A 250VAC AC1 / 5A 30VDC
- 4 digital inputs
- 3 current inputs (for optional measuring): Use via CTs with selectable /5A or /1A secondary
- Support of EXP series communications ports (USB, RS232, RS485, Ethernet)
- Housing: Flush mount 96x96mm/3.78x3.78"
- Graphic touch-screen LCD display
- Degree of protection:
  - IP65 on front
  - IP20 on terminals.

### IEC 61850 protocol

The PMVFs ... are configured for the management of IEC 61850 signals via EXP10 18 expansion modules (see page 4) or an external module. The EXP10 18 module will be provided only when the relevant bodies have precisely defined the management of the specific commands (currently being studied, as indicated by the Italian CEI 0-16 standard).

### Compliance standards

Compliant with standards: Italian CEI 0-16; IEC/EN 60255-5, IEC/EN 61010-1, IEC/EN 61000-6-2, IEC/EN 61000-6-3.

### Expansion modules and accessories

See page 13.

## Interface protection system units compliant with Italian standard CEI 0-21, June 2012 edition



PMVF 20...



PMVF 51

Order code	Rated voltage Control	Auxiliary	Qty per pkg	Wt
	[V]	[V]	no.	[kg]

Three-phase system, with or without neutral, in low voltage. Dual threshold minimum and maximum voltage and frequency protection.

Flush mount type, 96x96mm.

<b>PMVF 20</b>	230VAC 400VAC	100...400VAC/ 110...250VDC	1	0.568
<b>PMVF 20 D048</b>		12...48VDC	1	0.580

Modular type (6U).

<b>PMVF 51</b>	230VAC 400VAC	100...240VAC/ 110...250VDC	1	0.470
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Voltage threshold as per CEI 0-21

Type of protection	Tripping threshold	Tripping time
Maximum voltage 59.S2	1.15Un	0.2s
Maximum voltage 59.S1 (moving mean over 10min)	1.10Un	≤ 3s
Minimum voltage 27.S1	0.85Un	0.4s
Minimum voltage 27.S2	0.4Un	0.2s

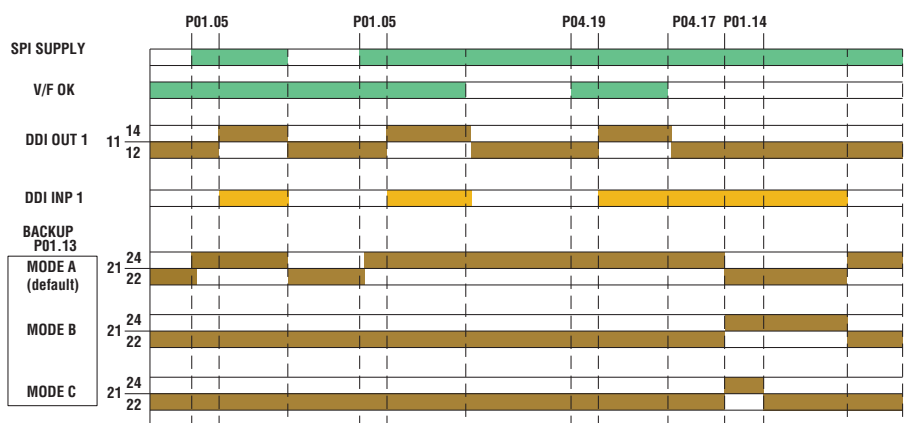
Frequency threshold as per CEI 0-21

Type of protection	Tripping threshold	Tripping time
<b>High external signal and low local control conditions.</b>		
Maximum frequency 81>.S2	51.5Hz	0.1s
Minimum frequency 81<.S2	47.5Hz	0.1s
<b>Low external signal and high local control conditions.</b>		
Maximum frequency 81>.S2	51.5Hz	1s
Minimum frequency 81<.S2	47.5Hz	4s
<b>High conditions for both external signal and local control.</b>		
Maximum frequency 81>.S1	50.5Hz	0.1s
Minimum frequency 81<.S1	49.5Hz	0.1s

NOTE: Low conditions for both external signal and local control are not taken into consideration by the standard.

### Operation graph

Activation modes for standby device



### General characteristics

PMVF20 and PMVF51 interface protection system units has been developed according to the Italian CEI 0-21 standard prescriptions of the June 2012 edition. They are used when a local generating system is connected in parallel with the low-voltage electric utility. The controls refer to limits of voltage and frequency monitoring.

In the case when either the voltage or the frequency are out of admissible limits, the interface protection system unit must step in by de-energising a relay output so that the interface device trips.

PMVF20 and PMVF 51 are equipped with 4 inputs having the following functions:

- Interface device status feedback
- External signal for frequency selection (communication network malfunction)
- Local control for frequency selection
- Remote tripping (forced interface device opening independent of voltage and frequency values)

Also, there are two relay outputs for:

- Interface device opening and closing
- Standby device opening (programmable: retentive normally energised, retentive normally de-energised or adjustable pulse).

The standby device control is compulsory in installations with more than 20kW and consists of a signal, with a 0.5s delay with respect to the interface device opening command, transmitted only if the interface device fails and does not complete the disconnection.

PMVF 51 has available two additional relay outputs (optional for PMVF 20) to:

- Autonomous signalling in case of phase power unbalance (LSP)
- Programmable alarm.

### Operational characteristics

- Auxiliary voltage:
  - PMVF 20: 100...400VAC/110...250VDC
  - PMVF 20 D048: 12...48VDC
  - PMVF 51: 100...240VAC/110...250VDC
- Voltage inputs:
  - 400VAC (three-phase connection)
  - 230VAC (sing-phase connection)
- Relay outputs 5A 250VAC AC1 / 5A 30VDC
- 4 digital inputs
- Current inputs (optional): use via CTs with selectable /5A or /1A secondary
- Support of EXP/EXM series communications ports (USB, RS232, RS485, Ethernet)
- Housing:
  - PMVF 20... type: Flush mount 96x96mm/3.78x3.78"
  - PMVF 50 type: modular (6U)
- Degree of protection:
  - on front: IP65 for PMVF20...; IP40 for PMVF51
  - on terminals: IP20.

### IEC 61850 protocol

The PMVFs ... are configured for the management of IEC 61850 signals via EXP10 18 / EXM10 18 expansion modules (see page 4) or an external module.

The EXP10 18 / EXM10 18 module will be provided only when the relevant bodies have precisely defined the management of the specific commands (currently being studied, as indicated by the Italian CEI 0-21 standard).

### Compliance standards

Compliant with standards: Italian CEI 0-21, IEC/EN 60255-5, IEC/EN 61010-1, IEC/EN 61000-6-2, IEC/EN 61000-6-3.

### Note for Italian CEI 0-21 standard, June 2012 edition:

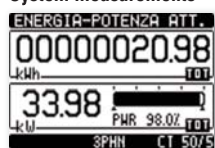
According to standard prescriptions, once the installation is completed, the interface protection system unit must be tested by the installer using a relay test box which controls the trip thresholds and timing.

### Expansion modules and accessories

See page 13.

## Display pages

### System measurements



**Additional measurements**  
(only with CTs connected)  
Currents  
Energies (kWh-kvarh-kVAh)  
Powers (kW-kvar-kVA)

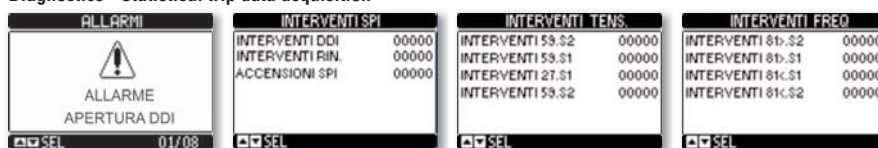


For low voltage only  
(PMVF 20... - PMVF 51)  
**Power imbalance (LSP)**  
Two thresholds with 1-minute and 30-minute tripping with possibility of opening interface device

### Main menu – Overview



### Diagnostics - Statistical trip data acquisition



## Technical characteristics

TYPE	PMVF 30	PMVF 30 D048	PMVF 20	PMVF 20 D048	PMVF 51
DESCRIPTION	For medium voltage		For low voltage		
AUXILIARY POWER SUPPLY					
Rated control supply voltage $U_s$	100...400VAC 110...250VDC	12...48VDC	100...400VAC 110...250VDC	12...48VDC	100...240VAC 85...250VDC
Operating limits	90...440VAC 93.5...300VDC	9...70VDC	90...440VAC 93.5...300VDC	9...70VDC	85...264VAC 93.5...300VDC
Frequency	45...55Hz	—	45...55Hz	—	45...55Hz
Power consumption	6VA at 110VAC; 8VA at 230VAC; 11VA at 400VAC	250mA at 12VDC; 120mA at 24VDC; 62mA at 48VDC	6VA at 110VAC; 8VA at 230VAC; 11VA at 400VAC	250mA at 12VDC; 120mA at 24VDC; 62mA at 48VDC	7.2VA max
Overload category	III		III		II
VOLTAGE INPUTS					
Maximum rated operating voltage	50...500V (for voltage/frequency) 50...150V (for residual voltage measurement)		Un = 400VAC L-L; 230VAC L-N 50Hz		
Measuring range	Un = 400...150,000V (VT primary)		20...480VAC L-L; 10...276V L-N		
Frequency range			45...55Hz		
Overload category			IV		
CURRENT INPUTS (optional)					
Rated operational current $I_n$	1A or 5A in AC				
RELAY OUTPUTS					
Number of outputs	2		2		4
Type of output	1 changeover contact				
Rated operating voltage	250VAC				
IEC/EN 60947-5-1 designation	5A 250VAC AC1; 5A 30VDC				
Overload category	III		III		II
DIGITAL INPUTS					
Number and type of inputs	4 negative (NPN)				
Input voltage	24VDC isolated				
Input current	7mA				



## EXM type expansion modules for PMVF 51



EXM10...

Order code	Description	Qty per pkg	Wt [kg]
		no.	[kg]
Communication ports.			
<b>EXM10 18</b>	IEC/EN 61850 interface	1	0.140
<b>EXM10 10</b>	Opto-isolated USB interface	1	0.140
<b>EXM10 11</b>	Opto-isolated RS232 interface	1	0.125
<b>EXM10 12</b>	Opto-isolated RS485 interface	1	0.140
<b>EXM10 13</b>	Opto-isolated Ethernet interface	1	0.140

### Maximum combination



MAX 1

### General characteristics

#### EXPANSION MODULES

The EXM... and EXP... expansion modules add further functions to the respective PMVF... interface protection system units.

Both types of expansion feature automatic recognition by the PMVF... to which it is connected.

The EXM... types connect to the PMVF 50 via IR port and side fitting.

The EXP... types are fitted on the back and supplied directly by the base PMVF20-30.

#### IEC 61850 protocol

The EXP10 18 and EXM10 18 modules will be provided only when the relevant bodies have precisely defined the management of the specific commands (currently being studied, as indicated in the Italian CEI 0-16 and CEI 0-21 standards).

## EXP type expansion modules for PMVF 20 and PMVF 30



EXP10...

Order code	Description	Qty per pkg	Wt [kg]
		no.	[kg]

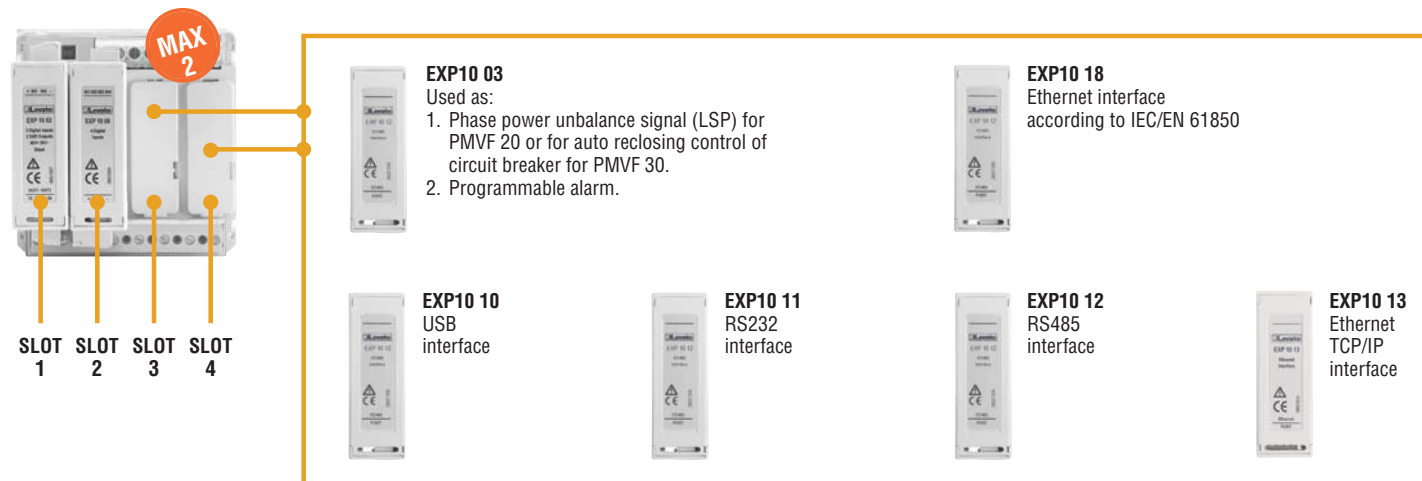
For independent signal in case of phase power unbalance (LSP) - PMVF 20 only.

For auto reclosing management of automatic circuit breakers (interface device) - PMVF 30 only.

<b>EXP10 03</b>	2 relay outputs 5A 250VAC	1	0.050
Communication ports.			
<b>EXP10 18</b>	IEC/EN 61850 interface	1	0.060
<b>EXP10 10</b>	Opto-isolated USB interface	1	0.060
<b>EXP10 11</b>	Opto-isolated RS232 interface	1	0.040
<b>EXP10 12</b>	Opto-isolated RS485 interface	1	0.050
<b>EXP10 13</b>	Opto-isolated Ethernet interface	1	0.140

### Maximum combination for PMVF 20 and PMVF 30 types

In addition to the two standard-supplied modules, another two expansion modules (one per type) can be installed from the following indicated below.



# GSM modem

Compliant with Italian CEI 0-16 Standard, paragraph 8.8.6.5 and annex M, resolution 421/2014 of the AEEGSI



PMVF GSM 1

Order code	Description
PMVF GSM 1	GSM Modem (modular - 4U). IP69K exterior aerial with 2.5 m cable. RJ45-USB programming cable (included).
	9.5...35VDC/9.5...27VAC

green LED:  
output status  
Off:  
exit de-energised  
On:  
exit energised



blue LED: GSM status  
Off:  
not supplied  
On constantly:  
not registered on the network (wrong or missing PIN)  
Flashing slowly: network registration OK  
Flashing quickly:  
communication in progress

Aerial connector

RJ45 connector for programming

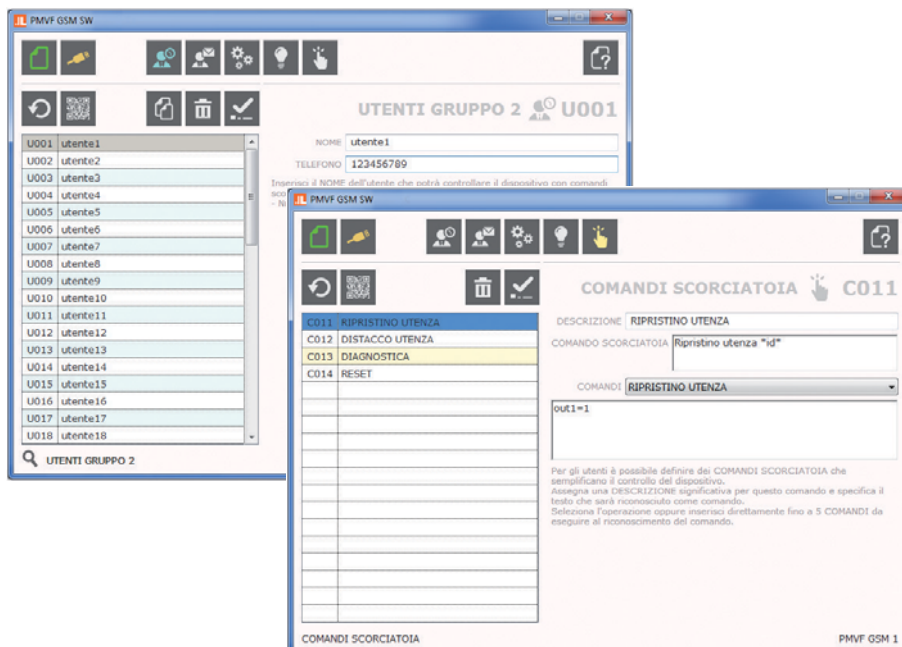
## Software

To configure the PMVF GSM 1 modem (using the RJ45-USB programming cable included), the PMVF GSM SW software must be used. This can be downloaded freely from the [www.LovatoElectric.com](http://www.LovatoElectric.com) website.

The software allows you to set:

- the users enabled to exchange messages with the modem
- the active customer code (POD)
- the functions assigned to the digital outputs and input
- the texts of the SMS associated with the commands.

Configuration is also possible off-line, creating a file to transfer to the modem at another time.



## Application requirements

The Italian CEI 0-16 Standard, in paragraph 8.8.6.5 and annex M, prescribes that electricity production systems powered by wind or the sun through photovoltaics with a power equal to or greater than 100kW, connected to or to be connected to medium-voltage networks, have a GSM modem.

The modem must be able to receive the signals sent by the electricity distributor for the management of generation disconnection.

Resolution 421/2014 of the Italian Regulatory Authority for Electricity Gas and Water (AEEGSI) prescribes that the above systems are adapted by 31 January 2016 or by the start of service date, should this be afterwards.

The resolution also envisages incentives for those who make this adaptation by 30 June 2015 or by 31 August 2015 to a lesser extent.

## Functional characteristics

- Connection to the GSM network for sending and receiving SMS messages
- Programmable message texts
- Control output controlled by SMS for sending of intertripping signal to the interface protection system unit
- Digital input for receiving the status of the interface device and sending of successful interface device opening and closing SMSs
- POD management (active user code)
- Management of the list of caller IDs (CLI) up to 50 callers enabled
- Detection of mobile network coverage
- Full compatibility with medium-voltage interface protection system unit LOVATO Electric PMVF 30: no software/hardware updates or programming required.
- Compatibility with third-party PIs where the remote disconnection signal is transmitted via digital input (dry contact). For additional information contact our Customer Service office Tel. + 39 035 4282422; E-mail: [service@LovatoElectric.com](mailto:service@LovatoElectric.com).

## Operational characteristics

### MODEM

- 35mm DIN (IEC/EN 60715) rail fixing
- 4 modules
- Supply: 9.5...35VDC / 9.5...27VAC
- Consumption: 200mW (5W peak)
- 2 digital outputs 3A 250VAC
- 1 self-supplied digital input
- Housing for 3V and 1.8V SIM card
- SIM PIN management
- Certified according to FCC rules, part 15
- Back-up battery 320mAh (3.7 V)
- Operating temperature: 0...45°C; -30...60°C with back-up battery disconnected (for disconnection procedure consult the manual supplied with the product)
- Protection rating: IP40 on front; IP20 on terminals.

### AERIAL

- Quad band 850/900/1800/1900MHz
- Exterior IP69K
- 2.5m cable
- Fixing via M10 hole:
  - with adhesive seal
  - with threaded pin and nut.

## Compliance standards

Compliant with standards: IEC/EN 60950-1 (≤2013-05); EN 50385; EN 301 489-7 V1.3.1; EN 301 489-1 V1.9.2; EN 301 511 V9.0.2

# GSM modem

Compliant with Italian CEI 0-16 Standard, paragraph 8.8.6.5 and annex M, resolution 421/2014 of the AEEGSI

## Thermal magnetic circuit breaker



P1 MB 1M C02

Order code	Description
	Thermal magnetic circuit breaker (modular - 1U). 1P+N - characteristic C.
<b>P1 MB 1M C02</b>	In=2A - Icn=6kA

### THERMAL MAGNETIC CIRCUIT BREAKER P1 MB 1M C02

#### General characteristics

- Rated current In: 2A
- Pole width 9mm (0.5 module)
- Contact position indicator
- Trip characteristic: C type curve
- 35mm omega-profile fixing (IEC/EN 60715).

#### Operational characteristics

- Rated insulation voltage Ui: 440V
- Rated pulse voltage Uimp: 4kV
- Normal operating voltage Ue: 230VAC.

#### Certifications and compliance

Certifications obtained: TÜV Rheinland.  
Compliant with standard: IEC/EN 60898-1, IEC/EN 60947-2.

## Switching power supply



PSL1M 010 24

Order code	Description
	Switching power supply (modular - 1U). Output current: 0.42A. Output power 10W.
<b>PSL1M 010 24</b>	100...240VAC/24VDC

### SWITCHING POWER SUPPLY PSL1M 010 24

#### Operational characteristics

- Rated supply voltage: 100...240VAC
- Rated output voltage: 24VDC
- Rated output current: 0.42A
- Network frequency: 50/60Hz
- High efficiency up to 89%
- Fitting on 35mm omega-profile (IEC/EN 60715)
- Screw-type terminal connection
- Terminal protection rating: IP20.

#### Certifications and compliance

Certifications obtained: cULus, EAC.  
Compliant with standard: IEC/EN 60950-1, IEC/EN 61000-6-2, IEC/EN 61000-6-3, UL 508, CSA C22.2 n° 107.1.

## Pre-wired box



Order code	Description
	GSM modem pre-wired in plastic box.
<b>PMVF GSM KIT 1</b>	PMVF GSM 1 pre-wired in IP65 plastic housing, complete with thermal magnetic circuit breaker (modular - 1U), 1P+N - characteristic C and switching power supply (modular - 1U) with 0.42A output current and 10W output power.

### PRE-WIRED BOX PMVF GSM KIT 1

#### Operational characteristics

- Rated supply voltage: 100...240VAC (in board)
- Consumption: 200mW (5W peak)
- 2 digital outputs 3 A 250VAC (in board)
- 1 self-supplied digital input (in board)
- Material: ABS
- Cable input: smooth sides, with holes to be made by client.
- Operating temperature: 0...45°C; -30...60°C with back-up battery disconnected  
(For disconnection procedure contact our Customer Service office; Tel. 035 4282422; E-mail: service@LovatoElectric.com)
- Protection rating: IEC IP65
- 5 DIN modules available for the addition of further devices such as, for example, an auxiliary relay.

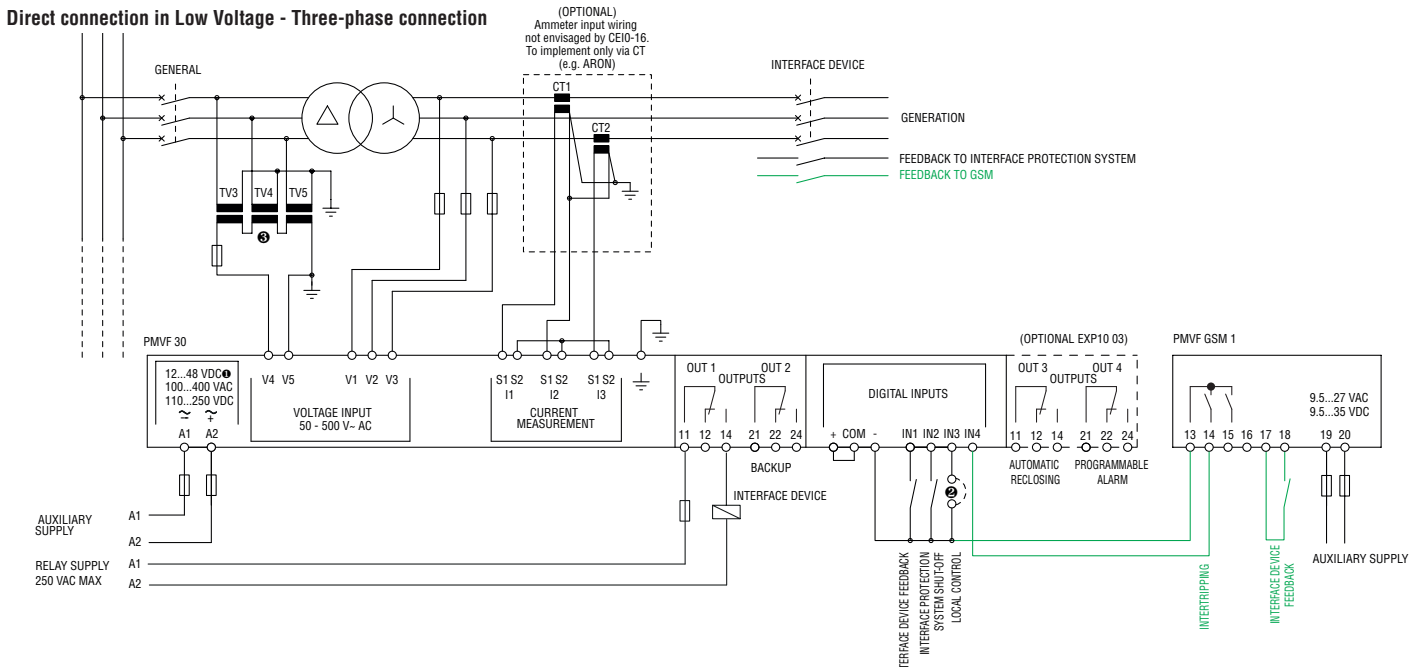
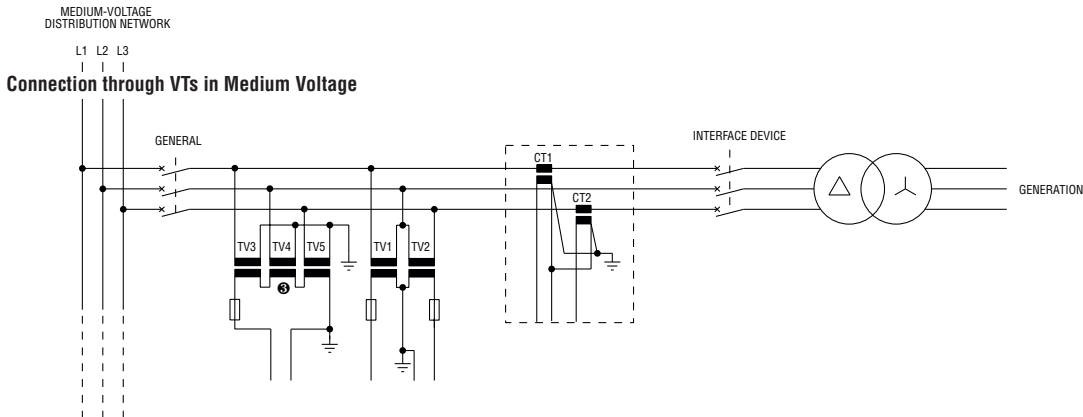
#### Compliance standards

Compliant with standard: IEC/EN 61439-2.



Terminal	Function
1	L
2	N
3	INTERTRIPPING (COM)
4	INTERTRIPPING (OUT1)
5	INTERFACE DEVICE FEEDBACK (COM)
6	INTERFACE DEVICE FEEDBACK (IN1)

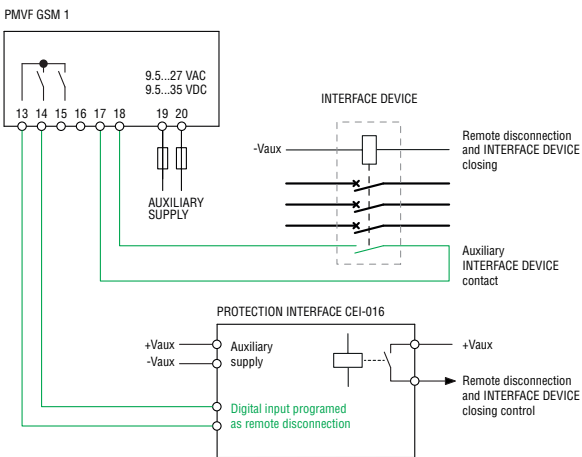
## Wiring diagrams - For low voltage PMVF 30...



- ❶ For PMVF 30 D048 only.
- ❷ Local control choice.
- ❸ VT in MV for residual voltage measurements.

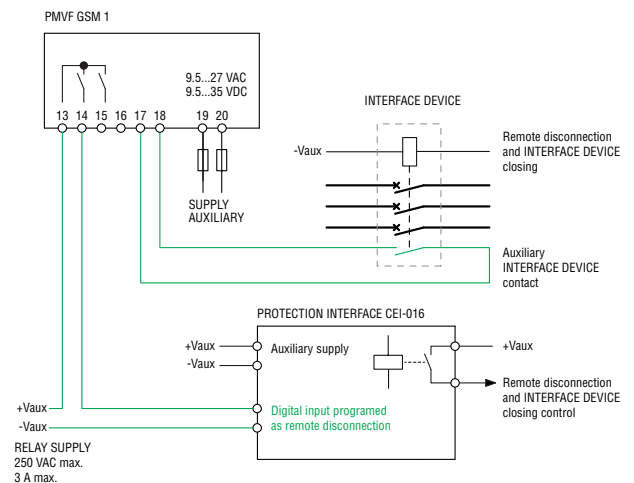
The connections coloured in GREEN, in addition to the GSM Modem, represent the only wiring necessary for the adaptation.

## PMVF GSM 1 modem wiring diagram with other interface protection system units with self-supplied remote disconnection input



The connections coloured in GREEN, in addition to the GSM Modem, represent the only wiring necessary for the adaptation.

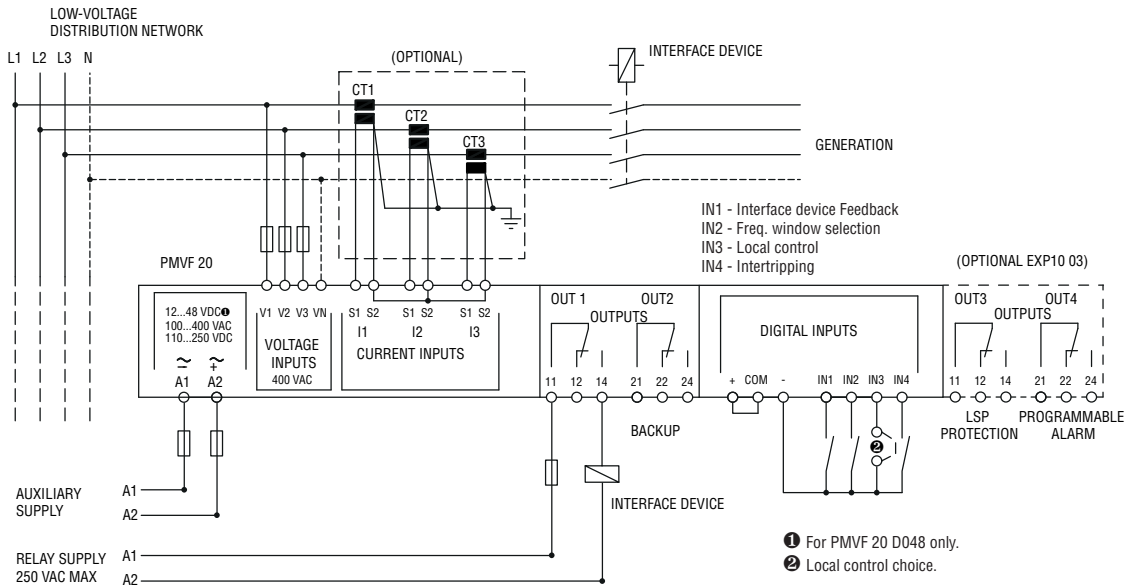
## PMVF GSM 1 modem wiring diagram with other interface protection system units with remote disconnection input to be supplied





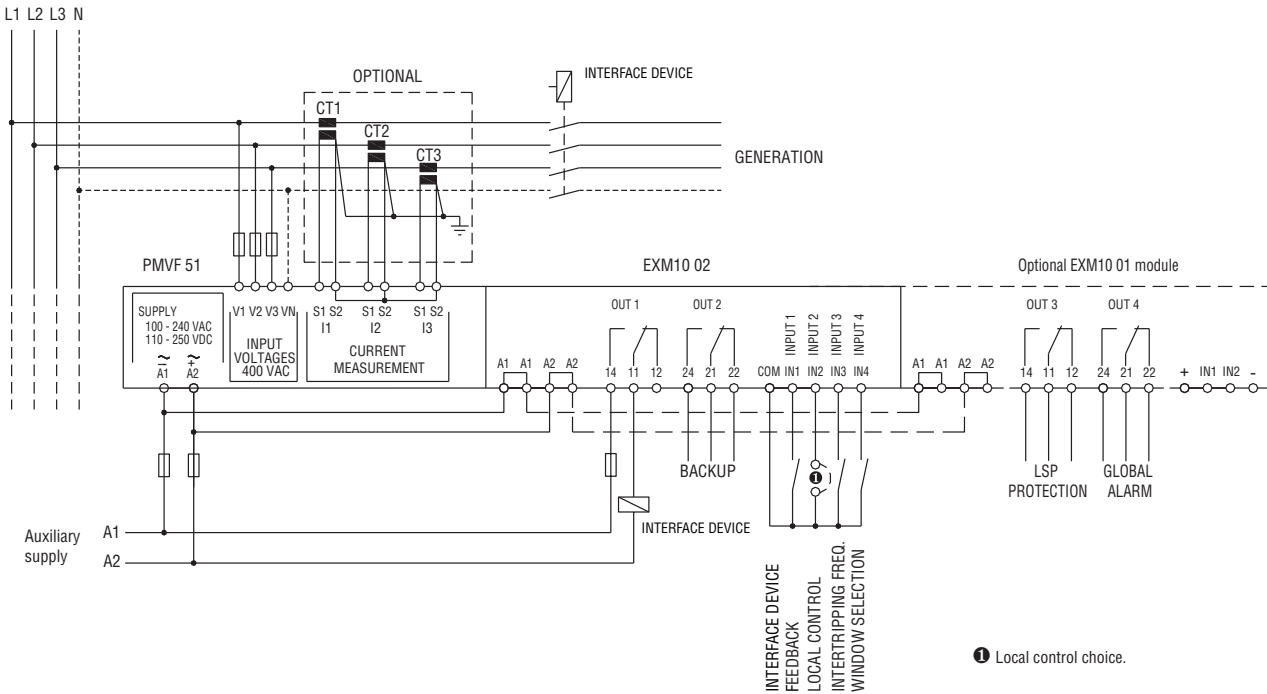
## Wiring diagrams - For low voltage PMVF 20...

Three-phase connection (for single-phase connection, connect the voltage to input V1 and the current to I1; also put a jumper between terminals V3 and VN)



## PMVF 51...

Three-phase connection (for single-phase connection, connect the voltage to input V1 and the current to I1; also put a jumper between terminals V3 and VN)

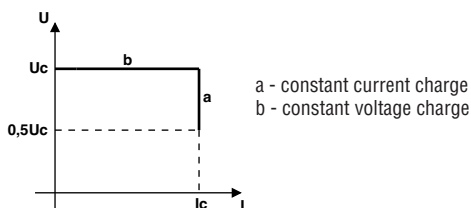


## Switching



BCF...

Order code	Rated output current	Rated output voltage in DC	Qty per pkg	Wt
	[A]	[V]	no.	[kg]
1 charging level.				
<b>BCF 0250 12</b>	2.5	12	1	0.332
<b>BCF 0450 12</b>	4.5		1	0.332
<b>BCF 0125 24</b>	1.25	24	1	0.332
<b>BCF 0250 24</b>	2.5		1	0.332



### General characteristics

#### Protection:

- Mains input fuse
- Battery output fuse
- Electronic lock in case of short circuit on battery terminals, reverse battery polarity, output overload ( $<0.5 U_e$ ) and disconnected battery
- Alarm output relay.

#### LED indications:

- Correct output voltage
- Reverse battery polarity.

### Operational characteristics

- Auxiliary supply voltage: 100...240VAC ( $\pm 10\%$ ) 50/60Hz ( $\pm 5\%$ )
- Charging current according to DIN 41773 standards
- Current limitation
- Overload category: II
- IEC degree of protection: IP20
- Fixed clamping screw terminal block with captive screws.

Type	Maximum power consumption dissipation		Internal fuse mains side
	[VA]	[W]	[A]
BCF 0250 12	96	40	2
BCF 0450 12	181	76	2
BCF 0125 24	96	39	2
BCF 0250 24	181	72	2

### Alarm output circuit

- Output: 3A 250VAC AC1 duty relay, normally energised.

### Certifications and compliance

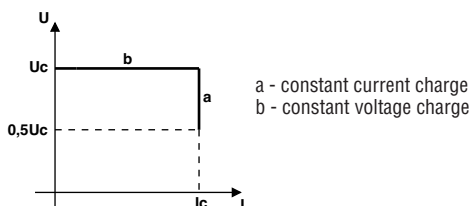
Certifications obtained: cURus, EAC.  
Compliant with standard: IEC/EN 60950-1, IEC/EN 60100-6-2, IEC/EN 61000-6-3.

## Linear



31 BCE 0312  
31 BCE 2V524

Order code	Rated output current	Rated output voltage in DC	Qty per pkg	Wt
	[A]	[V]	no.	[kg]
1 charging level.				
<b>31 BCE 0312</b>	3	12	1	1.984
<b>31 BCE 2V524</b>	2.5	24	1	1.992



### General characteristics

#### Protection:

- Battery output fuse
- Electronic lock in case of short circuit on battery terminals, reverse battery polarity, output overload ( $<0.5 U_e$ ) and disconnected battery.
- Alarm output:
  - Negative static; NPN transistor.

#### LED indications:

- Power on, charge ( $I > 0.2 I_c$ ), alarm for protection tripping.

### Operational characteristics

- Auxiliary supply voltage: 220...240VAC ( $\pm 10\%$ ), 50/60Hz ( $\pm 5\%$ )
- Charging current: 30-100%  $I_e$  adjustable
- Charging cycle according to DIN 41773 standards
- Current limitation
- Overload category: II
- IEC degree of protection: IP00
- Fixed clamping screw terminal block with captive screws.

Type	Maximum power consumption dissipation		Internal fuse mains side
	[VA]	[W]	[A]
BCE 0312	117	24	6.3
BCE 2V524	166	26	6.3

### Alarm output circuit

#### Type of output:

- Negative static; NPN transistor<sup>❶</sup>
- Max voltage applicable to load: +V battery terminal
- Maximum output current: 300mA
- Maximum overload current for 1 second: 2A
- Dynamic over-voltage protection with inductive load.

<sup>❶</sup> The output is not overload or short-circuit protected. It is however capable of switching on a 3W filament bulb.

### Certifications and compliance

Certifications obtained: EAC.  
Compliant with standard: IEC/EN 60335-2-29.

## Single phase, non expandable



DME D110 T1 MID



DME D120 T1 MID

Order code	Description	Qty per pkg	Wt
		no.	[kg]
DME D100 T1 MID	40A direct connection, 1U 1 pulse output, 230VAC	1	0.086
DME D110 T1 MID	40A direct connection, 1U 1 programmable static output, multi-measurements ①, 230VAC	1	0.090
DME D120 T1 MID	63A direct connection, 2U 1 programmable static output, multi-measurements ①, 230VAC	1	0.148

- ① Multi-measurements:
- Total and partial active energy
  - Total and partial reactive energy
  - Voltage
  - Current
  - Active and reactive power
  - Power factor
  - Frequency
  - Total and partial hour counter
  - Average active power (calculation on every last 15 minutes)
  - Maximum demand.

### General characteristics

The DME series energy meters, MID certified, are needed for billing purposes between electricity suppliers and consumers and for energy consumption measurement in directly connected single-phase installations. MID is the Measuring Instruments Directive of the European Union; instruments must be certified accordingly whenever used for monetary transactions in this territory.

### Operational characteristics

- Nominal supply voltage: 230VAC
- Voltage range: 187-264VAC 50Hz
- Active energy measurement and accuracy: Class B (EN 50470-3)
- Reactive energy measurement and accuracy: Class 2 (IEC/EN 62053-23)
- Energy meter with LCD display
- Metrological LED with pulse emission for consumption indication
- Clearable partial energy measurements
- Sealable terminal blocks, standard supplied
- EN protection degree: IP51 on front; IP20 at terminals.

### Certifications and compliance

Certifications obtained: MID Class B, certifications per module B (type tests) and per module D (production conformity).  
Compliant with standards: EN 50470-1, EN 50470-3.

## Three phase with neutral, non expandable



DME D300 T2 MID

## Three phase with or without neutral, expandable



DME D310 T2 MID

Order code	Description	Qty per pkg	Wt
		no.	[kg]
DME D300 T2 MID	63A direct connection, 4U 2 programmable static outputs, non expandable, multi-measurements ①	1	0.360
DME D310 T2 MID	Connection by CT /5A secondary, 2 programmable static outputs, 4U, multi-measurements ①, expandab.	1	0.332

- ① Multi-measurements:
- Total and partial active energy
  - Total and partial reactive energy
  - Voltage
  - Current
  - Active and reactive power
  - Power factor
  - Frequency
  - Total and partial hour counter
  - Average active power (calculation on every last 15 minutes)
  - Maximum demand.

### General characteristics

The DME series energy meters, MID certified, are needed for billing purposes between electricity suppliers and consumers and for energy consumption measurement in directly or CT connected three-phase installations. Expandable with up to 3 EXM series interfaced by infrared beam.

### Operational characteristics

- Nominal supply voltage: 230VAC (L-N); 400VAC (L-L)
- Voltage range: 187-264VAC (L-N); 323-456VAC (L-L) 50Hz
- Active energy measurement and accuracy: Class B (EN 50470-3)
- Reactive energy measurement and accuracy: Class 2 (IEC/EN 62053-23)
- Metrological LED with pulse emission for consumption indication
- Clearable partial energy measurements
- 1 programmable digital input
- Optic interface for EXM series expansion modules with DME D310 T2 MID
- Modular housing 4 module
- Sealable terminal blocks, standard supplied
- EN protection degree: IP51 on front; IP20 at terminals.

### Certifications and compliance

Certifications obtained: MID Class B, certifications per module B (type tests) and per module D (production conformity).  
Compliant with standards: EN 50470-1, EN 50470-3.

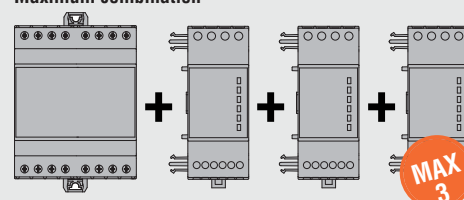
## Expansion modules

Order code	Description
DME D310 T2 MID EXPANSION MODULES. Inputs and outputs.	
EXM10 00	2 digital inputs and 2 static outputs, opto-isolated
EXM10 01	2 opto-isolated digital inputs and 2 relay outputs rated 5A 250VAC
Communication ports.	
EXM10 10	Opto-isolated USB interface
EXM10 11	Opto-isolated RS232 interface
EXM10 12	Opto-isolated RS485 interface
EXM10 13	Ethernet interface with Web server function
EXM10 20	Opto-isolated RS485 interface and 2 relay outputs rated 5A 250VAC
EXM10 30	Data storage, clock-calendar (RTC) with backup reserve energy for data logging



EXM 10 10

### Maximum combination



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