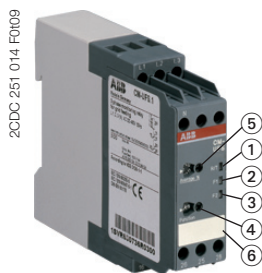


NEW

Three-phase monitoring relay for grid feeding

CM-UFS.1

Data sheet



CM-UFS.1

- ① R/T: yellow LED - relay status, timing
- ② F1: red LED - fault message
- ③ F2: red LED - fault message
- ④ Adjustment of the threshold value for the 10 minutes average value
- ⑤ Selection of neutral conductor, connected or not
- ⑥ Marker label

Features

- Monitoring of three-phase mains for grid feeding
- Type-tested in accordance with DIN V VDE V 0126-1-1: February 2006
- Neutral conductor connection configurable
- Can also be used to monitor single-phase mains
- Threshold value for the 10 minutes average value adjustable (110-115% of U_N)
- Start-up delay t_{S1} prior to first grid connection and after a short-term interruption, 30 s fixed
- Restart delay t_{S2} , 30 s fixed
- Powered by the measuring circuit
- True RMS measuring principle
- 2 c/o (SPDT) contacts
- 3 LEDs for status indication

Approvals

tÜV

Marks

CE CE

Order data

Type	Rated control supply voltage = Measuring voltage	Order code
CM-UFS.1	3 x 400 V AC (L-L) / 230 V AC (L-N)	1SVR 630 736 R0300

Order data - Accessories

Type	Description	Order code
ADP.01	Adapter for screw mounting	1SVR 430 029 R0100
MAR.01	Marker label	1SVR 366 017 R0100
COV.01	Sealable transparent cover	1SVR 430 005 R0100

Application

The CM-UFS.1 is a monitoring relay for feeding in three-phase mains. The device is connected between the grid connected, decentral electrical energy source such as photovoltaic systems, wind turbines, block-type thermal power stations, and the public grid. In case the public grid is disconnected due to any reason, for instance during maintenance work, the CM-UFS.1 recognizes this powerless situation. Then, in conjunction with a switching device, the CM-UFS.1 disconnects the decentral electrical energy source from the public grid. The device detects overvoltage and undervoltage (voltage increase and decrease protection) as well as any changes in grid frequency (frequency increase and decrease protection) in accordance with DIN V VDE V 0126-1-1. The connection of the neutral conductor is configurable. The threshold value for the 10 minutes average value is adjustable.

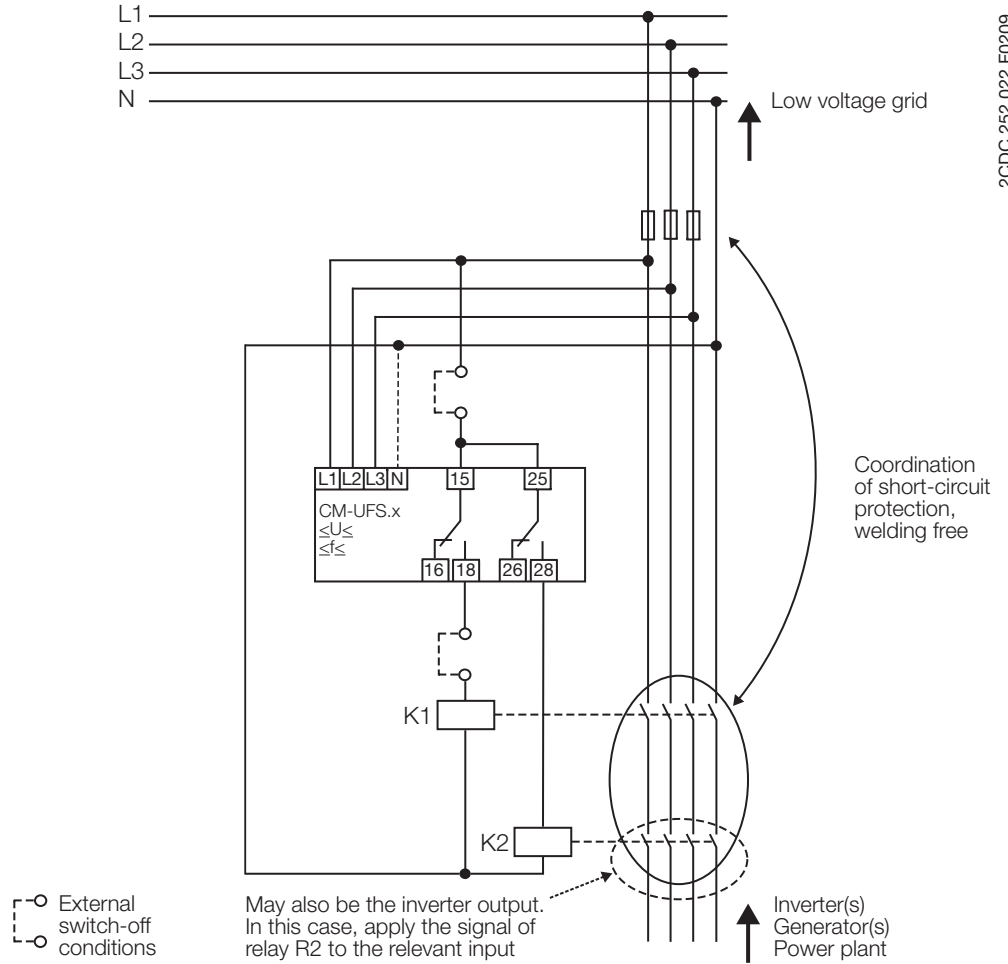
The CM-UFS.1 is also suitable for monitoring single-phase mains. For this, all three external conductors (L1, L2, L3) have to be jumpered and connected as one single conductor.

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Three-phase monitoring relay for grid feeding CM-UFS.1

Data sheet

Automatized grid connection instead of a permanently accessible switching point with a dis-connection function



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Three-phase monitoring relay for grid feeding

CM-UFS.1

Data sheet

Operating mode

Configuration of the device is made by means of setting elements accessible on the front of the unit and signalling is made by means of front-face LEDs.

Adjustment potentiometer

Threshold value for the 10 minutes average value

The threshold value for the 10 minutes average value can be adjusted within a range of 110-115 % of the rated control supply voltage U_s by means of the potentiometer „Average %“ with a linear scale. The value specified by the network provider has to be set!

Rotary switch

Neutral conductor connection

The connection of the neutral conductor is configurable by means of the rotary switch „Function“.



Neutral conductor not connected













Neutral conductor connected

To avoid any faulty tripping, the selection has to be made prior to commissioning. Do not change the switch setting during operation!

Threshold values according to DIN V VDE V 0126-1-1: February 2006

	Threshold value
Overvoltage	$\geq 115\%$ of U_s
Undervoltage	$\leq 80\%$ of U_s
Overfrequency	$> 50,2$ Hz
Underfrequency	$< 47,5$ Hz
10 minutes average value	110-115 % of U_s , adjustable Attention: The threshold value is specified by the network provider!

LEDs

Function	R/T: yellow LED	F1: red LED	F2: red LED
Output relay energized		-	-
Delay active		-	-
Overvoltage	-		-
Undervoltage	-	-	
Overfrequency	-		-
Underfrequency	-	-	
Exceedance of the average value	-		
Phase failure	-		

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Three-phase monitoring relay for grid feeding

CM-UFS.1

Data sheet

Function description / diagrams

Function diagram legend

- Control supply voltage not applied / Output contact open / LED off
- Control supply voltage applied / Output contact closed / LED glowing

Function of the yellow LED

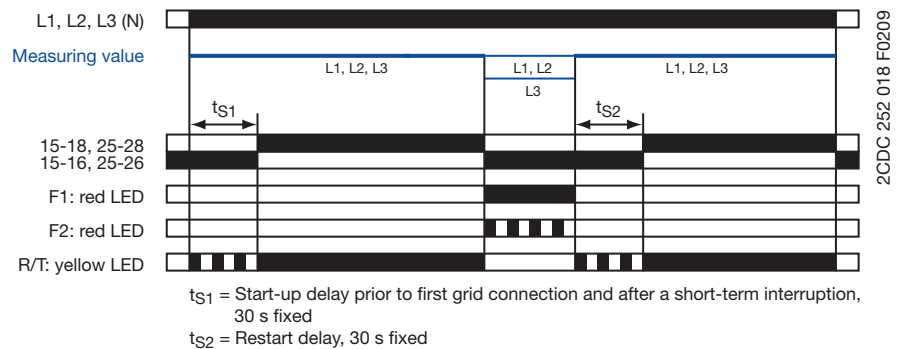
The yellow LED is flashing during timing and turns steady as soon as the output relays are energized.

Phase failure monitoring

Applying control supply voltage begins the fixed start-up delay t_{S1} . When t_{S1} is complete and all phases are present with correct voltage and frequency, the output relays energize.

They de-energize instantaneously if a phase failure occurs. The fault is indicated by LEDs.

As soon as all 3 phases are present again, the output relays re-energize automatically after the fixed re-start delay t_{S2} is complete.

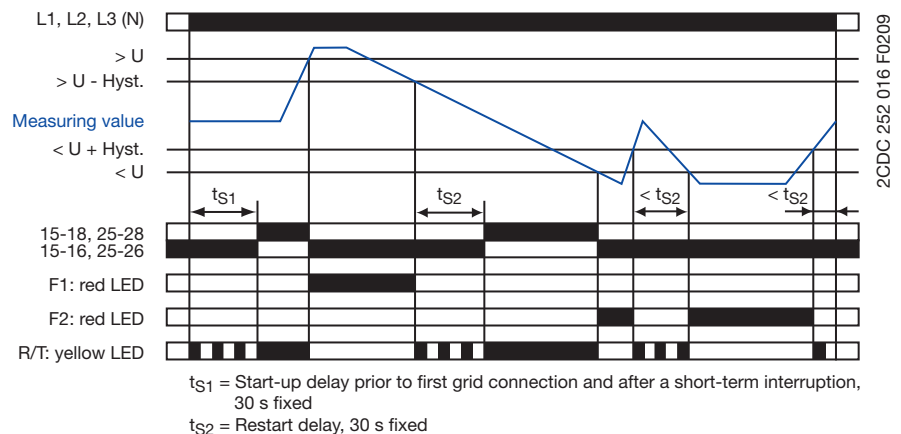


Over- and undervoltage monitoring

Applying control supply voltage begins the fixed start-up delay t_{S1} . When t_{S1} is complete and all phases are present with correct voltage and frequency, the output relays energize.

If the voltage to be monitored exceeds or falls below the fixed threshold value, the output relays de-energize instantaneously. The fault type is indicated by LEDs.

As soon as the voltage returns to the tolerance range, taking into account a fixed hysteresis of 5 %, the output relays re-energize after the fixed restart delay t_{S2} is complete.



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Three-phase monitoring relay for grid feeding CM-UFS.1

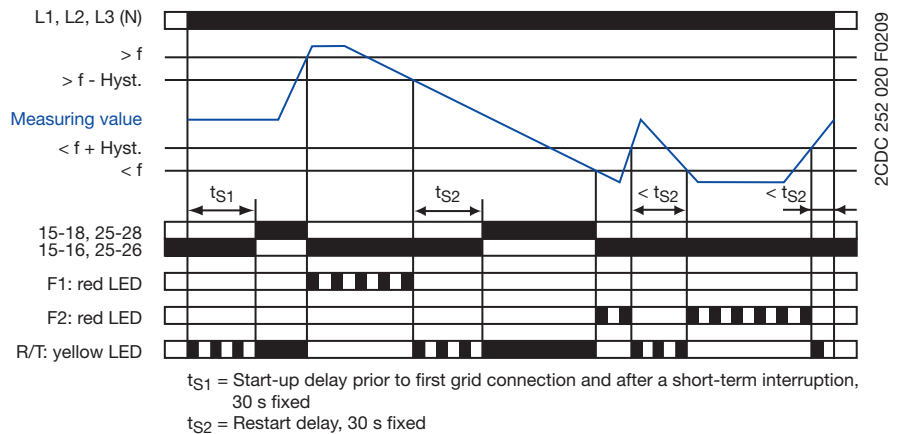
Data sheet

Over- and underfrequency monitoring

Applying control supply voltage begins the fixed start-up delay t_{S1} . When t_{S1} is complete and all phases are present with correct voltage and frequency, the output relays energize.

If the frequency to be monitored exceeds or falls below the fixed threshold value, the output relays de-energize instantaneously. The fault type is indicated by LEDs.

As soon as the frequency returns to the tolerance range, taking into account a fixed hysteresis, the output relays re-energize after the fixed restart delay t_{S2} is complete.

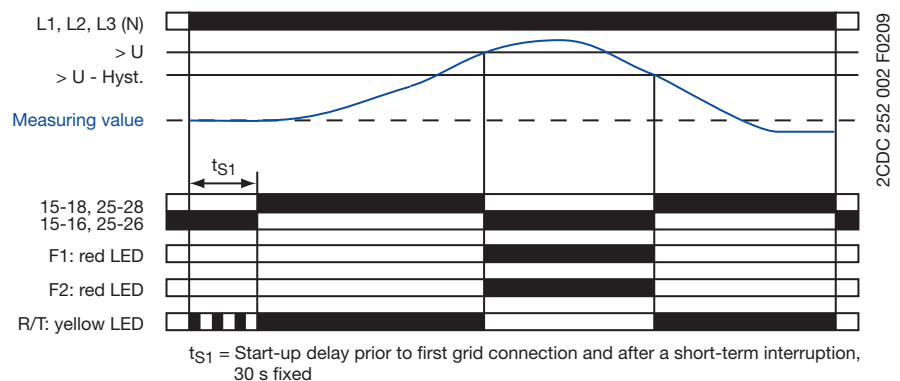


10 minutes average value monitoring

Applying control supply voltage begins the fixed start-up delay t_{S1} . When t_{S1} is complete and all phases are present with correct voltage and frequency, the output relays energize.

The voltages of the individual phases are measured over a period of 10 minutes and the average value is calculated. If the 10 minutes average value of a phase exceeds the set threshold value, the output relays de-energize instantaneously. The fault is indicated by LEDs.

As soon as the 10 minutes average value drops again below the set threshold value, the output relays re-energize instantaneously.



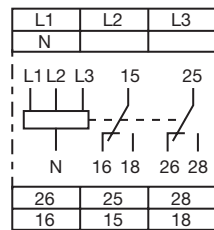
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Three-phase monitoring relay for grid feeding

CM-UFS.1

Data sheet

Connection diagram



2CDC 252 036 F0b08

L1, L2, L3, N Control supply voltage = Measuring voltage
15-16/18 Output contacts -
25-26/28 closed-circuit principle

CM-UFS.1

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Three-phase monitoring relay for grid feeding

CM-UFS.1

Data sheet

Data at $T_a = 25\text{ °C}$ and rated values, unless otherwise indicated

Type		CM-UFS.1	
Input circuit - Supply circuit		L1, L2, L3	L-N
Rated control supply voltage $U_s =$ Measuring voltage		3 x 400 V AC	3 x 230 V AC
Rated control supply voltage U_s tolerance		-20...+20 %	
Control supply voltage range		3 x 300-500 V AC	3 x 180-280 V AC
Rated frequency		50 Hz	
Frequency range		45-55 Hz	
Typical current / power consumption		23 mA / 16 VA	
Power failure buffering time		min. 20 ms	
Input circuit - Measuring circuit		L1, L2, L3	L-N
Monitoring functions	Phase failure	■	
	Over-/undervoltage	■	
	Over-/underfrequency	■	
	10 minutes average value	■	
Measuring range	Voltage range	3 x 320-460 V AC	3 x 184-264.5 V AC
	Frequency range	45-55 Hz	
Threshold values	Overvoltage	115 % of U_s , fixed	
	Undervoltage	80 % of U_s , fixed	
	Overfrequency	50.2 Hz fixed	
	Underfrequency	47.5 Hz fixed	
	10 minutes average value	110-115% of U_s , adjustable	
Hysteresis related to the threshold value	Over-/undervoltage	5 % fixed	
	Over-/underfrequency	20 mHz fixed	
Rated frequency of the measuring signal		50 Hz	
Frequency range of the measuring signal		45-55 Hz	
Maximum measuring cycle		50 ms	
Maximum reaction time (time between fault detection and change of switching status of the relay)	Over-/undervoltage	< 120 ms	
	Over-/underfrequency	< 100 ms	
	10 minutes average value	without delay	
Accuracy within the rated control supply voltage tolerance		$\Delta U \leq 0.5\%$	
Accuracy within the temperature range		$\Delta U \leq 0.06\% / \text{°C}$	
Measuring method		True RMS	
Timing circuit			
Start-up delay t_{S1} prior to first grid connection and after a short-term interruption		30 s fixed	
Restart delay t_{S2}		30 s fixed	
Accuracy within the rated control supply voltage tolerance		$\Delta t \leq 0.5\%$	
Accuracy within the temperature range		$\Delta t \leq 0.06\% / \text{°C}$	
Indication of operational states		1 yellow LED, 2 red LEDs Details see operating mode and function description/diagrams	
Output circuits		15-16/18, 25-26/28	
Kind of output		Relay, 1 x 2 c/o (SPDT) contacts	
Operating principle 1)		closed-circuit principle	
Contact material		AgNi alloy, Cd free	
Rated operational voltage U_e (IEC/EN 60947-1)		250 V	
Minimum switching voltage / switching current		24 V / 10 mA	
Maximum switching voltage / switching current		see load limit curve	
Rated operational current I_e (IEC/EN 60947-5-1)	AC12 (resistive) 230 V	4 A	
	AC15 (inductive) 230 V	3 A	
	DC12 (resistive) 24 V	4 A	
	DC13 (inductive) 24 V	2 A	
Mechanical lifetime		30 x 10 ⁶ switching cycles	
Electrical lifetime (AC12, 230 V, 4 A)		0.1 x 10 ⁶ switching cycles	
Short-circuit resistance, maximum fuse rating	n/c contact	6 A fast-acting	
	n/o contact	10 A fast-acting	

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Three-phase monitoring relay for grid feeding

CM-UFS.1

Data sheet

Data at $T_a = 25\text{ °C}$ and rated values, unless otherwise indicated

Type	CM-UFS.1	
General data		
Mean time between failures (MTBF)		
Duty time	100 %	
Repeat accuracy (constant parameters)	< $\pm 0,5\ %$	
Dimensions (W x H x D)	22.5 x 78 x 100 mm (0.89 x 3.07 x 3.94 in)	
Weight	0.14 kg (0.31 lb)	
Mounting	DIN rail (EN 60715), snap-on mounting without any tool	
Mounting position	any	
Minimum distance to other units	not necessary	
Degree of protection enclosure / terminals	IP50 / IP20	
Electrical connection		
Wire size	fine-strand with/without wire end ferrule	2 x 0.75-2.5 mm ² (2 x 18-14 AWG)
	rigid	2 x 0.5-4 mm ² (2 x 20-12 AWG)
Stripping length	7 mm (0.28 in)	
Tightening torque	0.6-0.8 Nm (5.31-7.08 in.lb)	
Environmental data		
Ambient temperature range	operation / storage	-25...+60 °C / -40...+85 °C
Damp heat, cyclic (IEC/EN 60068-2-30)	2 x 12 h cycle, 55 °C, 95 % RH	
Climatic category (IEC/EN 60721-3-1)	3K3	
Vibration, sinusoidal (IEC/EN 60255-21-1)	Class 2	
Shock (IEC/EN 60255-21-2)	Class 2	
Isolation data		
Rated insulation voltage U_i	input circuit / output circuit	600 V
	output circuit 1 / output circuit 2	300 V
Rated impulse withstand voltage U_{imp} (VDE 0110, IEC/EN 60664)	input circuit	6 kV; 1.2/50 μ s
	output circuit	4 kV; 1.2/50 μ s
Test voltage between all isolated circuits (type test)	2.5 kV, 50 Hz, 1 s	
Basis isolation	input circuit / output circuit	600 V
Protective separation (VDE 0106 part 101 and 101/A, IEC/EN 61140)	input circuit / output circuit	yes
Pollution degree (VDE 0110, IEC/EN 60664, UL 508)	3	
Overvoltage category (VDE 0110, IEC/EN 60664, UL 508)	III	
Standards		
Product standard	IEC/EN 60255-6, DIN V VDE V 0126-1-1: February 2006	
Further standards	EN 50178, EN 61727	
Low Voltage Directive	2006/95/EC	
EMC Directive	2004/108/EC	
RoHS Directive	2002/95/EC	
Electromagnetic compatibility		
Interference immunity	IEC/EN 61000-6-1, IEC/EN 61000-6-2	
Electrostatic discharge (ESD)	IEC/EN 61000-4-2	Level 3 (6 kV / 8 kV)
Electromagnetic field (HF radiation resistance)	IEC/EN 61000-4-3	Level 3 (10 V/m)
Fast transients (Burst)	IEC/EN 61000-4-4	Level 3 (2 kV / 5 kHz)
Powerful impulses (Surge)	IEC/EN 61000-4-5	Level 4 (2 kV L-L, L-N)
HF line emission	IEC/EN 61000-4-6	Level 3 (10 V)
Resistance to harmonics	IEC/EN 61000-4-13	Class 3
Interference emission	IEC/EN 61000-6-3, IEC/EN 61000-6-4	
Electromagn. field (HF radiation resistance)	IEC/CISPR 22, EN 50022	Class B
HF line emission	IEC/CISPR 22, EN 50022	Class B

1) Closed-circuit principle: Output relay(s) de-energize(s), if measured value exceeds or falls below the adjusted threshold value

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Three-phase monitoring relay for grid feeding

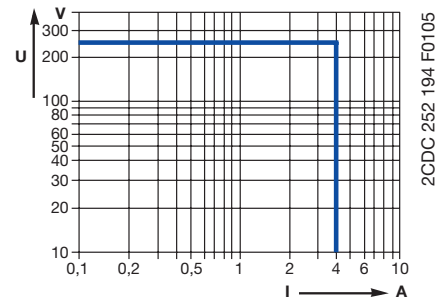
CM-UFS.1

Data sheet

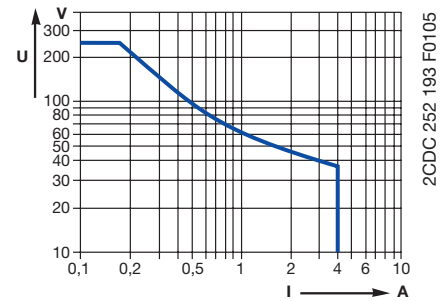
Technical diagrams

Load limit curve

AC load (resistive)

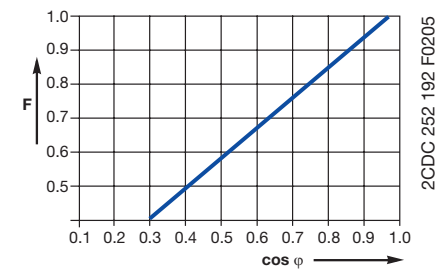


DC load (resistive)

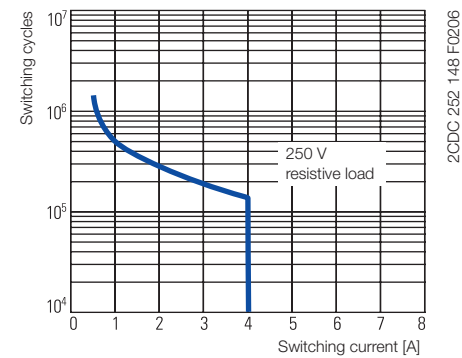


Derating factor F

at inductive AC load



Contact lifetime



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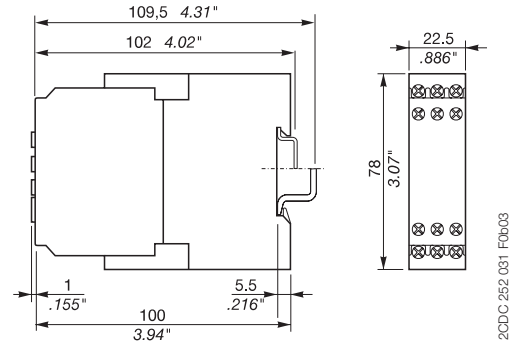
Three-phase monitoring relay for grid feeding

CM-UFS.1

Data sheet

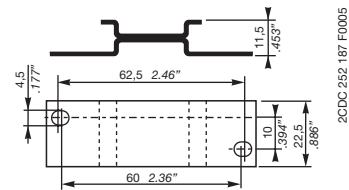
Dimensions

in mm

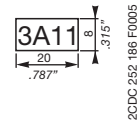


Dimensions - Accessories

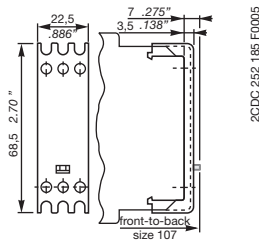
in mm



ADP.01 - Adapter for screw mounting



MAR.01 - Marker label



COV.01 - Sealable transparent cover

Further documentation

Document titel	Document type	Document number
Electronic Products and Relays	Technical catalogue	2CDC 110 004 C020x
CM-UFS.1; CM-UFS.2	Instruction manual	1SVC 630 540 M0000

You can find the documentation online at www.abb.com/lowvoltage → Control Products → ...



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