Current and voltage monitoring relays, single-phase
Product group picture

2

Current and voltage monitoring relays, single-phase
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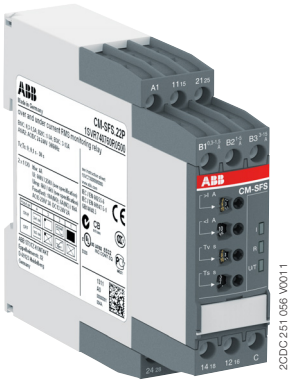
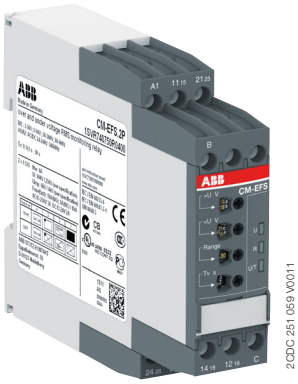
Current and voltage monitoring relays, single-phase

Current and voltage monitoring relays, single-phase
Benefits and advantages





Characteristics current and voltage monitoring relays [1)]

- Monitoring of DC and AC currents: 3 mA to 15 A
- Monitoring of DC and AC voltages from 3-600 V
- Suitable for railway applications
- TRMS measuring principle
- Device with 3 or 3 measuring ranges
- Over- and undercurrent monitoring
- Over- and undervoltage monitoring
- ON or OFF-delay configurable
- Open- or closed-circuit principle configurable
- Threshold values for >U and/or <U adjustable
- Latching function configurable
- Thresholds for >I and/or <I adjustable
- Fixed hysteresis of 5 %
- Start-up delay T_v adjustable 0; 0.1-30 s
- Tripping delay T_v adjustable 0; 0.1-30 s
- 1 x 2 c/o contacts (common signal) or 2 x 1 c/o contact (separate signals for >I and <I) configurable
- 1 x 2 c/o contacts (common signal) or 2 x 1 c/o contact (separate signals for >U and <U) configurable
- 22.5 mm width
- 3 LEDs for the indication of operational states
- Various approvals and marks

[1)] depending on device

Current monitoring, single-phase

The ABB current monitoring relays CM-SRS.xx reliably monitor the occurence of currents that exceed or fall below the selected threshold value. The functions overcurrent or undercurrent monitoring can be preselected. Single- and multifunction devices for the monitoring of direct or alternating currents from 3 mA to 15 A are available.

Current window monitoring (I_{min}, I_{max})

The window monitoring relay CM-SFS.2x is available if the application requires the simultaneous monitoring of over- and undercurrents.

Voltage monitoring, single-phase

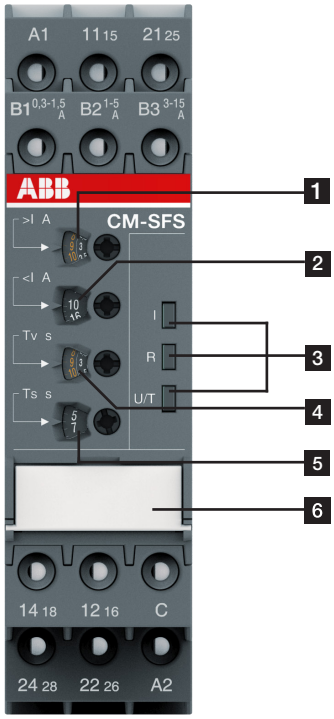
The ABB voltage monitoring relays CM-SRS.xx are used to monitor direct and alternating voltages within a range of 3-600 V. Over- or undervoltage detection can be preselected.

Voltage window monitoring (U_{min}, U_{max})

For the simultaneous detection of over- and undervoltages, the window monitoring relay CM-EFS.2 can be used.

Current and voltage monitoring relays, single-phase
Operating controls

Current monitoring relays



2CDC 253 018 F0013

1 **Adjustment of the threshold value >I for overcurrent**

2 **Adjustment of the threshold value <I for undercurrent**

3 **Indication of operational states**

U/T: green LED – control supply voltage/timing
R: yellow LED – relay status
I: red LED – over- / undercurrent

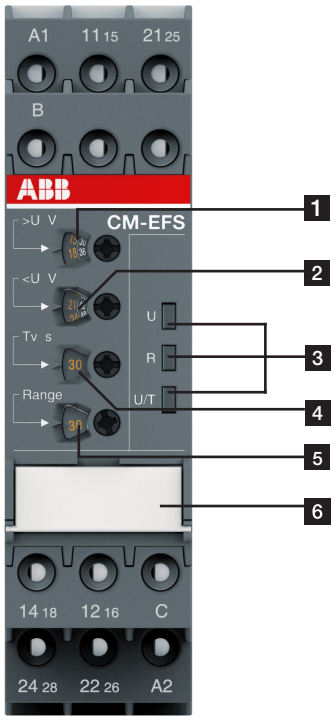
4 **Adjustment of the tripping delay T_v**

5 **Adjustment of the start-up delay T_s**

6 **DIP switches (see DIP switch functions on page 2/20)**

- ON-delay
- OFF-delay
- Closed-circuit principle
- Open-circuit principle
- Latching function activated
- Latching function not activated
- 2x1 c/o (SPDT) contact
- 1x2 c/o (SPDT) contacts

Voltage monitoring relays



2CDC 253 014 F0013

1 **Adjustment of the threshold value >U for overvoltage**

2 **Adjustment of the threshold value <U for undervoltage**

3 **Indication of operational states**

U/T: green LED – control supply voltage/timing
R: yellow LED – relay status
U: red LED – over- / undervoltage

4 **Adjustment of the tripping delay T_v**

5 **Adjustment of the measuring range**

6 **DIP switches (see DIP switch functions on page 2/20)**

- ON-delay
- OFF-delay
- Closed-circuit principle
- Open-circuit principle
- Latching function activated
- Latching function not activated
- 2x1 c/o (SPDT) contact
- 1x2 c/o (SPDT) contacts

Current and voltage monitoring relays, single-phase
Selection table - Current monitoring relays

	Order number	1SVR730840R0200	1SVR740840R0200	1SVR730841R0200	1SVR740841R0200	1SVR730841R1200	1SVR740841R1200	1SVR730840R0300	1SVR730841R0300	1SVR730841R1300	1SVR730840R0400	1SVR740840R0400	1SVR730841R0400	1SVR740841R0400	1SVR730841R1400	1SVR740841R1400	1SVR730840R0500	1SVR730841R0500	1SVR730841R1500	1SVR730840R0600	1SVR740840R0600	1SVR730840R0700	1SVR730760R0400	1SVR740760R0400	1SVR730760R0500
	Type	CM-SRS.11S	CM-SRS.11P	CM-SRS.11S	CM-SRS.11P	CM-SRS.11S	CM-SRS.11P	CM-SRS.12S	CM-SRS.12S	CM-SRS.12S	CM-SRS.21S	CM-SRS.21P	CM-SRS.21S	CM-SRS.21P	CM-SRS.21S	CM-SRS.21P	CM-SRS.22S	CM-SRS.22S	CM-SRS.22S	CM-SRS.M1S	CM-SRS.M1P	CM-SRS.M2S	CM-SFS.21S	CM-SFS.21P	CM-SFS.22S
Rated control supply voltage U_s																									
24 - 240 V AC/DC		■	■					■			■	■					■			■	■	■	■	■	■
110 - 130 V AC				■	■				■				■	■				■							
220 - 240 V AC						■	■			■					■	■			■						
Measuring ranges AC/DC																									
3 - 30 mA		■	■	■	■	■	■				■	■	■	■	■	■				■	■		■	■	
10 - 100 mA		■	■	■	■	■	■				■	■	■	■	■	■				■	■		■	■	
0.1 - 1 A		■	■	■	■	■	■				■	■	■	■	■	■				■	■		■	■	
0.3 - 1.5 A								■	■	■							■	■	■			■			■
1 - 5 A								■	■	■							■	■	■			■			■
3 - 15 A								■	■	■							■	■	■			■			■
Monitoring function																									
Over- or undercurrent		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■			
Window current monitoring																							■	■	■
Latching																				sel	sel	sel	sel	sel	sel
Open-circuit or closed-circuit principle																				sel	sel	sel	sel	sel	sel
Timing functions for tripping delay																									
ON-delay, 0.1 - 30 s											adj	adj	adj	adj	adj	adj	adj	adj	adj	adj	adj	adj			
ON- or OFF-delay, 0.1 - 30 s																							sel	sel	sel
Output																									
c/o contact		1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Connection type																									
Push-in terminals			■		■		■					■		■		■					■			■	
Double-chamber cage connection terminals		■		■		■		■	■	■	■		■		■		■	■	■	■		■	■		■

adj: adjustable
sel: selectable

Current and voltage monitoring relays, single-phase
Ordering details - Current monitoring relays


2CDC 251 054 V0011

CM-SRS.22S


2CDC 251 056 V0011

CM-SFS.22P

Description

The CM range current monitoring relays protect single-phase mains (DC or AC) from over- and undercurrent from 3 mA to 15 A.

Ordering details

Description	Type	Order code	Price 1 pc	Weight (1 pc) kg (lb)
See “Selection table - Current monitoring relays” on page 2/11.	CM-SRS.11S	1SVR730840R0200		0.145 (0.320)
		1SVR730841R0200		0.161 (0.355)
		1SVR730841R1200		0.161 (0.355)
	CM-SRS.11P	1SVR740840R0200		0.137 (0.302)
		1SVR740841R0200		0.153 (0.337)
		1SVR740841R1200		0.153 (0.337)
	CM-SRS.12S	1SVR730840R0300		0.137 (0.302)
		1SVR730841R0300		0.168 (0.370)
		1SVR730841R1300		0.168 (0.370)
	CM-SRS.21S	1SVR730840R0400		0.152 (0.335)
		1SVR730841R0400		0.179 (0.395)
		1SVR730841R1400		0.179 (0.395)
	CM-SRS.21P	1SVR740840R0400		0.141 (0.311)
		1SVR740841R0400		0.168 (0.370)
		1SVR740841R1400		0.168 (0.370)
	CM-SRS.22S	1SVR730840R0500		0.144 (0.399)
		1SVR730841R0500		0.181 (0.399)
		1SVR730841R1500		0.181 (0.399)
	CM-SRS.M1S	1SVR730840R0600		0.153 (0.337)
	CM-SRS.M1P	1SVR740840R0600		0.142 (0.313)
	CM-SRS.M2S	1SVR730840R0700		0.155 (0.342)
	CM-SFS.21S	1SVR730760R0400		0.150 (0.331)
	CM-SFS.21P	1SVR740760R0400		0.139 (0.306)
	CM-SFS.22S	1SVR730760R0500		0.158 (0.348)

S: screw connection
P: push-in connection

Current and voltage monitoring relays, single-phase
Selection table - Voltage monitoring relays

Order number	1SVR730830R0300	1SVR740830R0300	1SVR730831R0300	1SVR740831R0300	1SVR730831R1300	1SVR740831R1300	1SVR730830R0400	1SVR740830R0400	1SVR730831R0400	1SVR740831R0400	1SVR730831R1400	1SVR740831R1400	1SVR730830R0500	1SVR740830R0500	1SVR730750R0400	1SVR740750R0400
Type	CM-ESS.1S	CM-ESS.1P	CM-ESS.1S	CM-ESS.1P	CM-ESS.1S	CM-ESS.1P	CM-ESS.2S	CM-ESS.2P	CM-ESS.2S	CM-ESS.2P	CM-ESS.2S	CM-ESS.2P	CM-ESS.MS	CM-ESS.MP	CM-EFS.2S	CM-EFS.2P
Rated control supply voltage U_s																
24 - 240 V AC/DC	■	■					■	■					■	■	■	■
110 - 130 V AC			■	■					■	■						
220 - 240 V AC					■	■					■	■				
Measuring ranges AC/DC																
3 - 30 V	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
6 - 60 V	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
30 - 300 V	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
60 - 600 V	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Monitoring function																
Over- or undervoltage	■	■	■	■	■	■	■	■	■	■	■	■	■	■		
Windows voltage monitoring															■	■
Latching													sel	sel	sel	sel
Open-circuit or closed-circuit principle													sel	sel	sel	sel
Timing functions for tripping delay																
ON-delay, 0.1 - 30 s							adj	adj	adj	adj	adj	adj	adj	adj		
ON- or OFF-delay, 0.1 - 30 s															sel	sel
Output																
c/o contact	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2
Connection type																
Push-in terminals		■		■		■		■		■		■		■		■
Double-chamber cage connection terminals	■		■		■		■		■		■		■		■	

adj: adjustable
sel: selectable

Current and voltage monitoring relays, single-phase
Ordering details - Voltage monitoring relays


2CDC 251 060 V0011

CM-ESS.MP


2CDC 251 059 V0011

CM-EFS.2

Description

The CM range voltage monitoring relays provide reliable monitoring of voltages as well as detection of phase loss in single-phase mains.

Ordering details

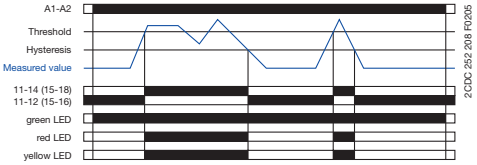
Description	Type	Order code	Price 1 pc	Weight (1 pc) kg (lb)
See “Selection table - Voltage monitoring relays” on page 2/13.	CM-ESS.1S	1SVR730830R0300		0.135 (0.298)
		1SVR730831R0300		0.164 (0.362)
		1SVR730831R1300		0.164 (0.362)
	CM-ESS.1P	1SVR740830R0300		0.126 (0.278)
		1SVR740831R0300		0.155 (0.342)
		1SVR740831R1300		0.155 (0.342)
	CM-ESS.2S	1SVR730830R0400		0.153 (0.337)
		1SVR730831R0400		0.181 (0.399)
		1SVR730831R1400		0.181 (0.399)
	CM-ESS.2P	1SVR740830R0400		0.142 (0.313)
		1SVR740831R0400		0.170 (0.375)
		1SVR740831R1400		0.170 (0.375)
	CM-ESS.MS	1SVR730830R0500		0.154 (0.340)
	CM-ESS.MP	1SVR740830R0500		0.143 (0.320)
	CM-EFS.2S	1SVR730750R0400		0.157 (0.346)
	CM-EFS.2P	1SVR740750R0400		0.146 (0.322)

S: screw connection
P: push-in connection

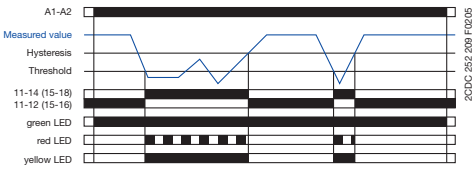
Current and voltage monitoring relays, single-phase
Function diagrams

Function diagrams - CM-SRS.1

Overcurrent monitoring

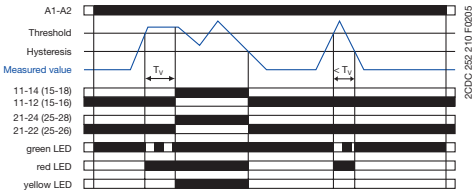


Undercurrent monitoring

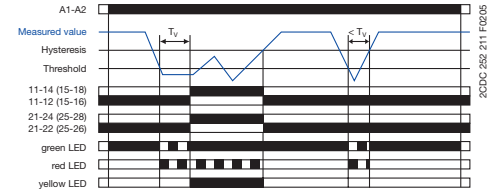


Function diagrams - CM-SRS.2

Overcurrent monitoring



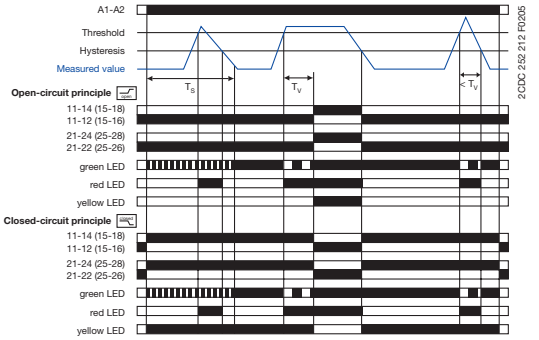
Undercurrent monitoring



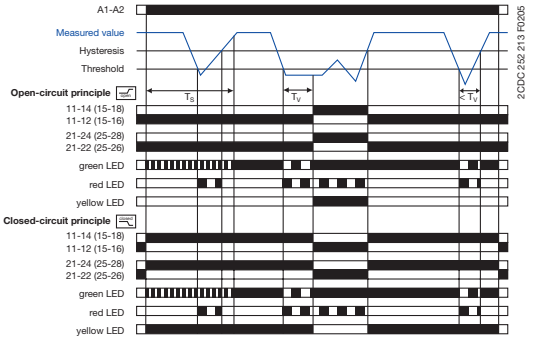
If the measured value exceeds resp. drops below the adjusted threshold value, the output relay(s) energize(s): on the CM-SRS.1 immediately, on the CM-SRS.2 after the set tripping delay T_V. If the measured value exceeds resp. drops below the threshold value plus resp. minus the adjusted hysteresis, the output relay(s) de-energize(s). The hysteresis is adjustable within a range of 3-30 % of the threshold value.

Function diagrams - CM-SRS.M

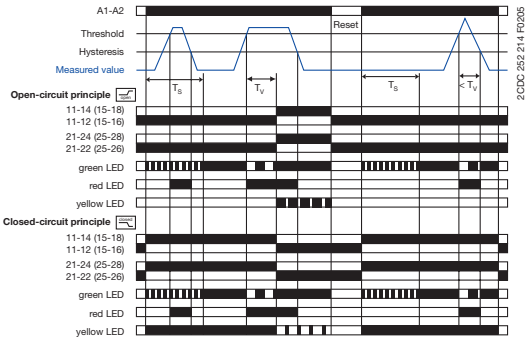
Overcurrent monitoring without latching



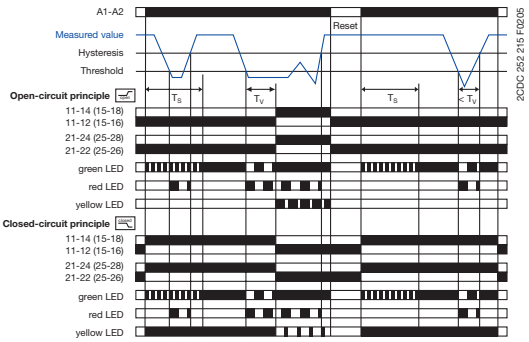
Undercurrent monitoring without latching



Overcurrent monitoring with latching



Undercurrent monitoring with latching

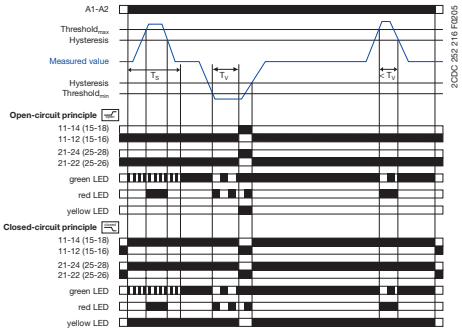


If the measured value exceeds resp. drops below the adjusted threshold value before the set start-up delay T_S is complete, the output relays do not change their actual state. If the measured value exceeds resp. drops below the adjusted threshold value when T_S is complete, the tripping delay T_V starts. If T_V is complete and the measured value is still exceeding resp. below the threshold value plus resp. minus the set hysteresis, the output relays energize / de-energize.
If the measured value exceeds resp. drops below the threshold value minus resp. plus the set hysteresis and the latching function is not activated, the output relays de-energize / energize. With activated latching function the output relays remain energized and de-energize only, when the supply voltage is interrupted / the output relays remain de-energized and energize only, when the supply voltage is switched off and then again switched on = Reset.
The hysteresis is adjustable within a range of 3-30 % of the threshold value.

Current and voltage monitoring relays, single-phase
Function diagrams

Function diagrams - CM-SFS.2

Current window monitoring 1x2 c/o contact 1x2 c/o
ON-delayed ⊠ without latching ▭

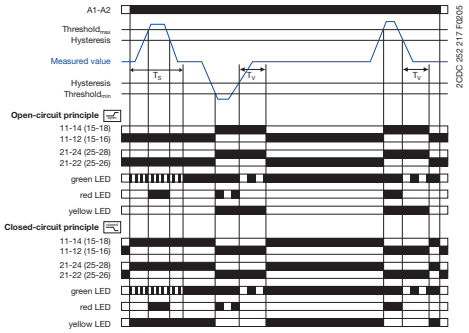


Further function diagrams see data sheet.

ON-delayed ⊠ current window monitoring with parallel switching c/o contacts 1x2 c/o**:**

If the measured value exceeds resp. drops below the adjusted threshold value before the set start-up delay T_S is complete, the output relays do not change their actual state.
If the measured value exceeds resp. drops below the adjusted threshold value when T_S is complete, the tripping delay T_V starts, when ⊠ is configured. If T_V is complete and the measured value is still exceeding resp. below the threshold value minus resp. plus the fixed hysteresis (5%), the output relays energize open /de-energize closed.
If the measured value exceeds resp. drops below the threshold value plus resp. minus the hysteresis and the latching function is not activated ▭, the output relays de-energize open / energize closed. With activated latching function ⊠ the output relays remain energized open and de-energize only, when the supply voltage is interrupted / the output relays remain de-energized closed and energize only, when the supply voltage is switched off and then again switched on = Reset.

Current window monitoring 1x2 c/o contact 1x2 c/o
OFF-delayed ■ without latching ⊠

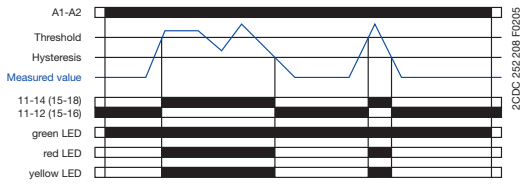


OFF-delayed ■ current window monitoring with parallel switching c/o contacts 1x2 c/o**:**

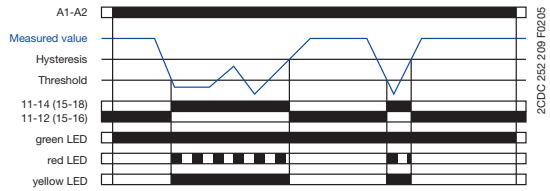
If the measured value exceeds resp. drops below the adjusted threshold value when the set start-up delay T_S is complete, the output relays energize open / de-energize closed, when ■ is configured, and remain in this position during the set tripping delay T_V. If the measured value exceeds resp. drops below the threshold value plus resp. minus the fixed hysteresis (5%) and the latching function is not activated ⊠, the tripping delay T_V starts. After completion of T_V, the output relays de-energize open / energize closed, provided that the latching function is not activated ⊠. With activated latching function ▭ the output relays remain energized open and de-energize only, when the supply voltage is interrupted / the output relays remain de-energized closed and energize only, when the supply voltage is switched off and then again switched on = Reset. When 2x1 c/o is adjusted on the device, the functionality is equivalent to the one described above. There is only to consider that in this case, instead of both output relays, only one output relay each will be switched.
"$>I$" = 11_{15}-12_{16}/14_{18} ; "$<I$" = 21_{25}-22_{26}/24_{28}

Function diagrams - CM-ESS.1

Overvoltage monitoring

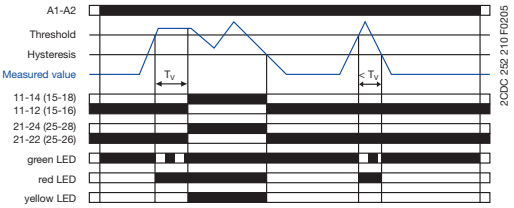


Undervoltage monitoring

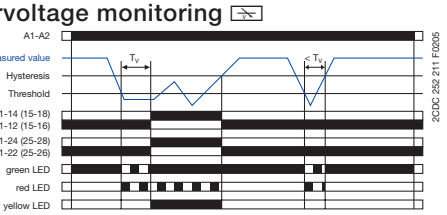


Function diagrams - CM-ESS.2

Overvoltage monitoring



Undervoltage monitoring

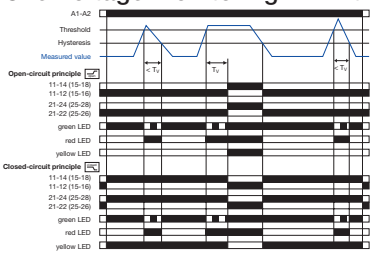


Depending on the configuration, the voltage monitoring relays CM-ESS.1 and CM-ESS.2 can be used for over- or undervoltage monitoring in single-phase AC and/or DC systems. The voltage to be monitored (measured value) is applied to terminals B-C. The devices work according the open-circuit principle. If the measured value exceeds resp. drops below the adjusted threshold value, the output relay(s) energize(s): on the CM-ESS.1 immediately, on the CM-ESS.2 after the set tripping delay T_V. If the measured value exceeds resp. drops below the threshold value plus resp. minus the adjusted hysteresis, the output relay(s) de-energize(s). The hysteresis is adjustable within a range of 3-30 % of the threshold value.

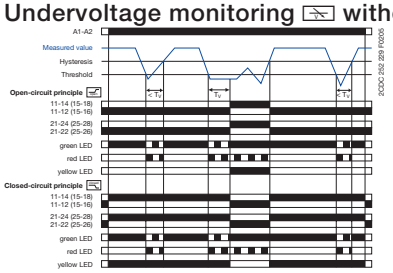
Current and voltage monitoring relays, single-phase
Function diagrams

Function diagrams - CM-ESS.M

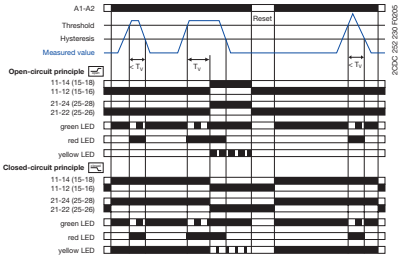
Overvoltage monitoring without latching



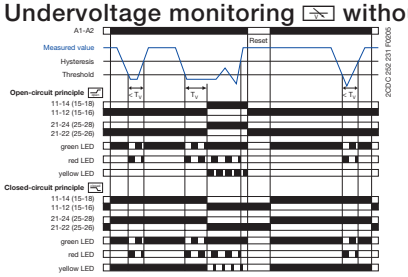
Undervoltage monitoring without latching



Overvoltage monitoring with latching



Undervoltage monitoring without latching



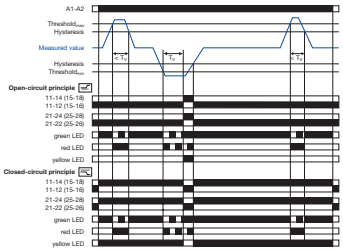
If the measured value exceeds resp. drops below the adjusted threshold value, the tripping delay T_V starts. If T_V is complete and the measured value is still exceeding resp. below the threshold value plus resp. minus the set hysteresis, the output relays energize (open) / de-energize (closed).

If the measured value exceeds resp. drops below the threshold value plus resp. minus the set hysteresis and the latching function is not activated, the output relays de-energize (open) / energize (closed). With activated latching function the output relays remain energized (open) and de-energize only, when the supply voltage is interrupted / the output relays remain de-energized (closed) and energize only, when the supply voltage is switched off and then again switched on = Reset. The hysteresis is adjustable within a range of 3-30 % of the threshold value.

Further function diagrams see data sheet.

Voltage window monitoring 1x2 c/o contact

ON-delayed without latching



ON-delayed voltage window monitoring with parallel switching c/o contacts 1x2 c/o:

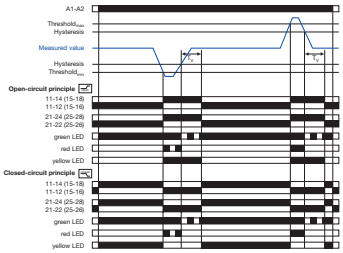
If the measured value exceeds resp. drops below the adjusted threshold value, the tripping delay T_V starts, when is configured. If T_V is complete and the measured value is still exceeding resp. below the threshold value minus resp. plus the fixed hysteresis (5%), the output relays energize (open) /de-energize (closed).

If the measured value exceeds resp. drops below the threshold value plus resp. minus the hysteresis and the latching function is not activated, the output relays de-energize (open) / energize (closed). With activated latching function the output relays remain energized (open) and de-energize only, when the supply voltage is interrupted / the output relays remain de-energized (closed) and energize only, when the supply voltage is switched off and then again switched on = Reset.

OFF-delayed voltage window monitoring with parallel switching c/o contacts 1x2 c/o:

Voltage window monitoring 1x2 c/o contact

OFF-delayed without latching



If the measured value exceeds resp. drops below the adjusted threshold value, the output relays energize (open) / de-energize (closed), when is configured, and remain in this position during the set tripping delay T_V.

If the measured value exceeds resp. drops below the threshold value plus resp. minus the fixed hysteresis (5%) and the latching function is not activated, the tripping delay T_V starts.

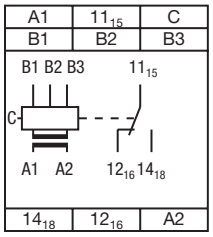
After completion of T_V, the output relays de-energize (open) / energize (closed), provided that the latching function is not activated. With activated latching function the output relays remain energized (open) and de-energize only, when the supply voltage is interrupted / the output relays remain de-energized (closed) and energize only, when the supply voltage is switched off and then again switched on = Reset.

When 2x1 c/o is adjusted on the device, the functionality is equivalent to the one described above. There is only to consider that in this case, instead of both output relays, only one output relay each will be switched.

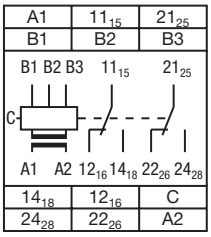
">U" = 11_{15}-12_{16}/14_{18} ; "<U" = 21_{25}-22_{26}/24_{28}

Current and voltage monitoring relays, single-phase
Connection diagrams, DIP switches

Connection diagram CM-SRS.1, CM-SRS.2



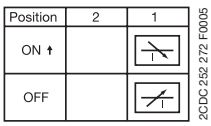
2CDC 252 204 F0005



2CDC 252 205 F0005

A1-A2 Control supply voltage
B1-C Measuring range 1: 3-30 mA or 0.3-1.5 A
B2-C Measuring range 2: 10-100 mA or 1-5 A
B3-C Measuring range 3: 0.1-1 A or 3-15 A
11_{15}-12_{16}/14_{18}
21_{25}-22_{26}/24_{28} Output contacts - open-circuit principle

DIP switch functions CM-SRS.1, CM-SRS.2

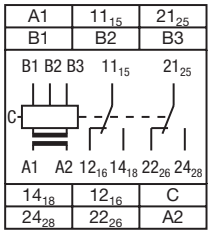


2CDC 252 272 F0005

1 ON Undercurrent monitoring
OFF Overcurrent monitoring

OFF = Default

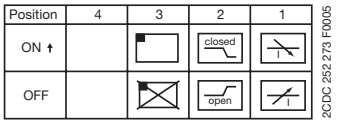
Connection diagram CM-SRS.M



2CDC 252 205 F0005

A1-A2 Control supply voltage
B1-C Measuring range 1: 3-30 mA or 0.3-1.5 A
B2-C Measuring range 2: 10-100 mA or 1-5 A
B3-C Measuring range 3: 0.1-1 A or 3-15 A
11_{15}-12_{16}/14_{18}
21_{25}-22_{26}/24_{28} Output contacts - open- or closed circuit principle

DIP switch functions CM-SRS.M

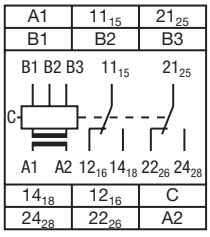


2CDC 252 273 F0005

1 ON Undercurrent monitoring
OFF Overcurrent monitoring
2 ON Closed-circuit principle
OFF Open-circuit principle
3 ON Latching function activated
OFF Latching function not activated

OFF = Default

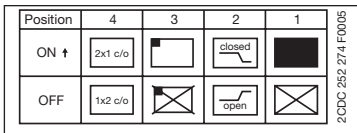
Connection diagram CM-SFS.2



2CDC 252 205 F0005

A1-A2 Control supply voltage
B1-C Measuring range 1: 3-30 mA or 0.3-1.5 A
B2-C Measuring range 2: 10-100 mA or 1-5 A
B3-C Measuring range 3: 0.1-1 A or 3-15 A
11_{15}-12_{16}/14_{18}
21_{25}-22_{26}/24_{28} Output contacts - open- or closed circuit principle

DIP switch function CM-SFS.2

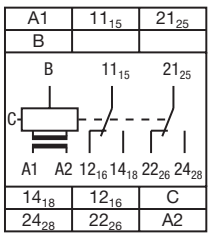


2CDC 252 274 F0005

1 ON OFF-delay
OFF ON-delay
2 ON Closed-circuit principle
OFF Open-circuit principle
3 ON Latching function activated
OFF Latching function not activated
4 ON 2x1 c/o contact
OFF 1x2 c/o contacts

OFF = Default

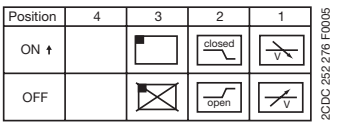
Connection diagram CM-ESS.M



2CDC 252 207 F0005

A1-A2 Control supply voltage
B-C Measuring ranges AC/DC:
3-30 V; 6-60 V
30-300 V; 60-600 V
11_{15}-12_{16}/14_{18}
21_{25}-22_{26}/24_{28} Output contacts - open- or closed circuit principle

DIP switch functions CM-ESS.M



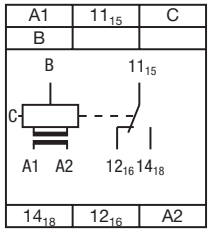
2CDC 252 276 F0005

1 ON Undervoltage monitoring
OFF Overvoltage monitoring
2 ON Closed-circuit principle
OFF Open-circuit principle
3 ON Latching function activated
OFF Latching function not activated

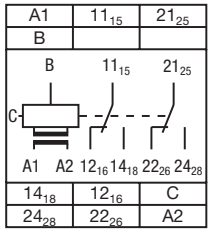
OFF = Default

Current and voltage monitoring relays, single-phase
Connection diagrams, DIP switches

Connection diagram CM-ESS.1, CM-ESS.2



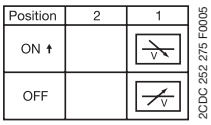
2CDC 252 206 F0005



2CDC 252 207 F0005

A1-A2 Control supply voltage
B-C Measuring ranges AC/DC:
3-30 V; 6-60 V; 30-300 V; 60-600 V
11_{15}-12_{16}/14_{18} Output contacts - open-circuit principle
21_{25}-22_{26}/24_{28}

DIP switch functions CM-ESS.1, CM-ESS.2

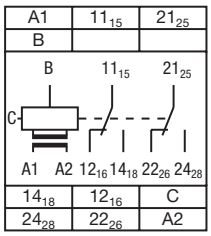


2CDC 252 275 F0005

1 ON Undervoltage monitoring
OFF Overvoltage monitoring

OFF = Default

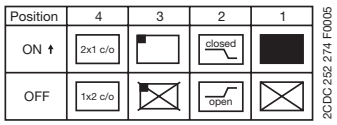
Connection diagram CM-EFS.2



2CDC 252 207 F0005

A1-A2 Control supply voltage
B-C Measuring ranges AC/DC:
3-30 V; 6-60 V; 30-300 V;
60-600 V
11_{15}-12_{16}/14_{18} Output contacts - open-
21_{25}-22_{26}/24_{28} or closed circuit principle

DIP switch functions CM-EFS.2



2CDC 252 274 F0005

1 ON ON-delay
OFF OFF-delay
2 ON Closed-circuit principle
OFF Open-circuit principle
3 ON Latching function activated
OFF Latching function not activated
4 ON 2x1 c/o contact
OFF 1x2 c/o contacts

OFF = Default

Current monitoring relays, single-phase
Technical data - Current monitoring relays

Type			CM-SRS.1	CM-SRS.2	CM-SRS.M	CM-SFS.2
Input circuit - Supply circuit			A1-A2			
Rated control supply voltage U_s		A1-A2	110-130 V AC			
		A1-A2	220-240 V AC			
		A1-A2	24-240 V AC/DC			
Rated control supply voltage U_s tolerance			-15...+10 %			
Rated frequency		AC versions	50/60 Hz			
		AC/DC versions	50/60 Hz or DC			
Current / power consumption			see data sheets			
Power failure buffering time			20 ms			
Transient overvoltage protection			Varistors			
Input circuit - Measuring circuit			B1/B2/B3-C			
Monitoring function			over- or undercurrent monitoring configurable			over- and under-current monitoring
Measuring method			true RMS measuring principle			
Measuring inputs			CM-SxS.x1			CM-SxS.x2
		terminal connection	B1-C	B2-C	B3-C	B1-C	B2-C	B3-C
		measuring ranges AC/DC	3-30 mA	10-100 mA	0.1-1 A	0.3-1.5 A	1-5 A	3-15 A [1]
		input resistance	3.3 Ω	1 Ω	0.1 Ω	0.05 Ω	0.01 Ω	0.0025 Ω
		pulse overload capacity t < 1 s	500 mA	1 A	10 A	15 A	50 A	100 A
		continous capacity	50 mA	150 mA	1.5 A	2 A	7 A	17 A
Threshold value(s)			adjustable within the indicated measuring range					
Tolerance of the adjusted threshold value			10 % of full-scale value					
Hysteresis related to the threshold value			3-30 % adjustable					5 % fixed
Measuring signal frequency range			DC / 15 Hz - 2 kHz					
Rated measuring signal frequency range			DC / 50-60 Hz					
Maximum response time			AC: 80 ms / DC: 120 ms					
Accuracy within the control supply voltage tolerance			ΔU ≤ 0.5 %					
Accuracy within the temperature range			ΔU ≤ 0.06 % / °C					
Timing circuit								
Start-up delay T_S			none		0 or 0.1-30 s adjustable			
Tripping delay T_V			none	0 or 0.1-30 s adjustable				
Repeat accuracy (constant parameters)			±0.07 % of full-scale value					
Accuracy within the control supply voltage tolerance			-	Δt ≤ 0.5 %				
Accuracy within the temperature range			-	Δt ≤ 0.06 % / °C				
Indication of operational states								
Control supply voltage		U/T: green LED	⎍: control supply voltage applied, ⎍⎍⎍: start-up delay T_S active, ⎍_⎍_: tripping delay T_V active					
Measured value		I: red LED	⎍: overcurrent, ⎍_⎍_: undercurrent					
Relay status		R: yellow LED	⎍: relay energized, no latching function ⎍⎍⎍: relay energized, active latching function ⎍_⎍_: relay de-energized, active latching function					
Output circuits			11(15)-12(16)/14(18), 21(25)-22(26)/24(28) - Relays					
Kind of output			1 c/o contact	2 c/o contacts		1x2 c/o contacts or 2x1 c/o contact configurable		
Operating principle			open-circuit principle [2]			open- or closed-circuit principle configurable [2]		
Contact material			AgNi					
Rated operational voltage U_e			250 V					
Minimum switching voltage / minimum switching current			24 V / 10 mA					
Maximum switching voltage / maximum switching current			250 V AC / 4 A AC					
Rated operational current I_e		AC-12 (resistive) at 230 V	4 A					
		AC-15 (inductive) at 230 V	3 A					
		DC-12 (resistive) at 24 V	4 A					
		DC-13 (inductive) at 24 V	2 A					
AC rating (UL 508)		utilization category (Control Circuit Rating Code)	B 300					
		max. rated operational voltage	300 V AC					
		max. continuous thermal current at B 300	5 A					
		max. making/breaking apparent power (make/break) at B 300	3600/360 VA					
Mechanical lifetime			30x10⁶ switching cycles					
Electrical lifetime (AC-12, 230 V, 4 A)			0.1x10⁶ switching cycles					
Max. fuse rating to achieve short-circuit protection		n/c contact	6 A fast-acting	10 A fast-acting		6 A fast-acting		
		n/o contact	10 A fast-acting					

[1] In case of measured currents > 10 A, lateral spacing has to be min. 10 mm

[2] Open-circuit principle: output relay energizes if the measured value exceeds ⧄ / falls below ⧅ the adjusted threshold value
Closed-circuit principle: output relay de-energizes if measured value exeeds ⧄ / falls below ⧅ the adjusted threshold value

Current monitoring relays, single-phase
Technical data - Current monitoring relays

Type		CM-SRS.1	CM-SRS.2	CM-SRS.M	CM-SFS.2
General data					
MTBF		on request			
Duty time		100%			
Dimensions		see 'Dimensional drawings'			
Mounting		DIN rail (IEC/EN 60715), snap-on mounting without any tool			
Mounting position		any			
Minimum distance to other units		10 mm (0.39 in) at measured current > 10 A			
Material of housing		UL 94 V-0			
Degree of protection	housing / terminals	IP50 / IP20			
Electrical connection					
Connecting capacity		Screw connection technology		Easy Connect Technology (Push-in)	
	fine-strand with(out) wire end ferrule	1 x 0.5-2.5 mm² (1 x 18-14 AWG) 2 x 0.5-1.5 mm² (2 x 18-16 AWG)		2 x 0.5-1.5 mm² (2 x 18-16 AWG)	
	rigid	1 x 0.5-4 mm² (1 x 20-12 AWG) 2 x 0.5-2.5 mm² (2 x 20-14 AWG)		2 x 0.5-1.5 mm² (2 x 20-16 AWG)	
Stripping length		8 mm (0.32 in)			
Tightening torque		0.6-0.8 Nm (7.08 lb.in)		-	
Environmental data					
Ambient temperature range	operation	-20...+60 °C			
	storage	40...+85 °C			
Damp heat (IEC/EN 60068-2-30)		55 °C, 6 cycles			
Vibration, sinusoidal		class 2			
Shock		class 2			
Isolation data					
Rated insulation voltage	input / measuring circuit / output	600 V			
	output 1 / output 2	250 V			
Rated impulse withstand voltage U_{imp}	input /measuring circuit / output	6 kV 1.2/50 µs			
	output 1 / output 2	4 kV 1.2/50 µs			
Pollution degree		3			
Overvoltage category		III			
Standards / Directives					
Standards		IEC/EN 60255-27, IEC/EN 60947-5-1, EN 50178			
Low Voltage Directive		2014/35/EU			
EMC Directive		2014/30/EU			
RoHS Directive		2011/65/EU			
Electromagnetic compatibility					
Interference immunity to		IEC/EN 61000-6-2			
electrostatic discharge	IEC/EN 61000-4-2	level 3			
radiated, radio-frequency, electromagnetic field	IEC/EN 61000-4-3	level 3			
electrical fast transient / burst	IEC/EN 61000-4-4	level 3			
surge	IEC/EN 61000-4-5	level 3			
conducted disturbances, induced by radio-frequency fields	IEC/EN 61000-4-6	level 3			
Interference emission		IEC/EN 61000-6-3			
high-frequency radiated	IEC/CISPR 22; EN 55022	class B			
high-frequency conducted	IEC/CISPR 22; EN 55022	class B			

Voltage monitoring relays, single-phase
Technical data - Voltage monitoring relays

Type			CM-ESS.1	CM-ESS.2	CM-ESS.M	CM-EFS.2
Input circuit - Supply circuit			A1-A2			
Rated control supply voltage U_s		A1-A2	110-130 V AC			
		A1-A2	220-240 V AC			
		A1-A2	24-240 V AC/DC			
Rated control supply voltage U_s tolerance			-15...+10 %			
Rated frequency		AC versions	50/60 Hz			
		AC/DC versions	50/60 Hz or DC			
Current / power consumption			see data sheet			
Power failure buffering time			20 ms			
Transient overvoltage protection			varistors			
Input circuit - Measuring circuit			B-C			
Monitoring function			over- or undervoltage monitoring configurable			over- and undervoltage monitoring configurable
Measuring method			true RMS measuring principle			
Measuring inputs			CM-ExS			
		terminal connection	B-C	B-C	B-C	B-C
		measuring range AC/DC	3-30 V	6-60 V	30-300 V	60-600 V
		input resistance	600 kΩ	600 kΩ	600 kΩ	600 kΩ
		pulse overload capacity t < 1 s	800 V	800 V	800 V	800 V
		continous capacity	660 V	660 V	660 V	660 V
Threshold value(s)			adjustable within the indicated measuring range			
Tolerance of the adjusted threshold value			10 % of full-scale value			
Hysteresis related to the threshold value			3-30 % adjustable			5 % fixed
Measuring signal frequency range			DC / 15 Hz - 2 kHz			
Rated measuring signal frequency range			DC / 50-60 Hz			
Maximum response time			AC: 80 ms / DC: 120 ms			
Accuracy within the control supply voltage tolerance			$\Delta U \leq 0.5$ %			
Accuracy within the temperature range			$\Delta U \leq 0.06$ % / °C			
Transient overvoltage protection			Varistors			
Timing circuit						
Delay time T_V			none	0 or 0.1-30 s adjustable		
Repeat accuracy (constant parameters)			±0.07 % of full-scale value			
Accuracy within the control supply voltage tolerance			-	$\Delta t \leq 0.5$ %		
Accuracy within the temperature range			-	$\Delta t \leq 0.06$ % / °C		
Indication of operational states						
Control supply voltage		U/T: green LED	⎍‾‾‾⎍: control supply voltage applied ⎍⎍⎍⎍: tripping delay T_V active			
Measured value		U: red LED	⎍‾‾‾⎍: overvoltage, ⎍⎍⎍⎍: undervoltage			
Relay status		R: yellow LED	⎍‾‾‾⎍: relay energized, no latching function ⎍⎍⎍⎍⎍: relay energized, active latching function ⎍⎍⎍⎍⎍: relay de-energized, active latching function			
Output circuits						
Kind of output			1 c/o contact	2 c/o contacts		1x2 c/o contacts or 2x1 c/o contact configurable
Operating principle			open-circuit principle [1]		open- or closed-circuit principle configurable [1]	
Contact material			AgNi			
Rated operational voltage U_e			250 V			
Minimum switching voltage / minimum switching current			24 V / 10 mA			
Maximum switching voltage / maximum switching current			250 V AC / 4 A AC			
Rated operational current I_e		AC-12 (resistive) at 230 V	4 A			
		AC-15 (inductive) at 230 V	3 A			
		DC-12 (resistive) at 24 V	4 A			
		DC-13 (inductive) at 24 V	2 A			
AC rating (UL 508)	utilization category (Control Circuit Rating Code)		B 300			
	max. rated operational voltage		300 V AC			
	max. continuous thermal current at B 300		5 A			
	max. making/breaking apparent power (make/break) at B 300		3600/360 VA			
Mechanical lifetime			$30x10^6$ switching cycles			
Electrical lifetime		AC-12, 230 V, 4 A	$0.1x10^6$ switching cycles			
Max. fuse rating to achieve short-circuit protection		n/c contact	6 A fast-acting	10 A fast-acting		6 A fast-acting
		n/o contact	10 A fast-acting			

1) Open-circuit principle: output relay energizes if the measured value exceeds ⎍‾‾‾⎍ / falls below ⎍‾‾‾⎍ the adjusted threshold value
Closed-circuit principle: output relay de-energizes if measured value exeeds ⎍‾‾‾⎍ / falls below ⎍‾‾‾⎍ the adjusted threshold value

Voltage monitoring relays, single-phase
Technical data - Voltage monitoring relays

Type		CM-ESS.1	CM-ESS.2	CM-ESS.M	CM-EFS.2
General data					
MTBF		on request			
Duty time		100%			
Dimensions		see 'Dimensional drawings'			
Mounting		DIN rail (IEC/EN 60715), snap-on mounting without any tool			
Mounting position		any			
Minimum distance to other units	vertical / horizontal	not necessary / not necessary			
Material of housing		UL 94 V-0			
Degree of protection	housing / terminals	IP50 / IP20			
Environmental data					
Ambient temperature ranges	operation	-20...+60 °C			
	storage	-40...+85 °C			
Damp heat, cyclic (IEC/EN 60068-2-30)		55 °C, 6 cycle			
Vibration, sinusoidal		Class 2			
Shock		Class 2			
Electrical connection					
Wire size		Screw connection technology		Easy Connect Technology (Push-in)	
	fine-strand with(out) wire end ferrule	1 x 0.5-2.5 mm² (1 x 18-14 AWG) 2 x 0.5-1.5 mm² (2 x 18-16 AWG)		2 x 0.5-1.5 mm² (2 x 18-16 AWG)	
	rigid	1 x 0.5-4 mm² (1 x 20-12 AWG) 2 x 0.5-2.5 mm² (2 x 20-14 AWG)		2 x 0.5-1.5 mm² (2 x 20-16 AWG)	
Stripping length		8 mm (0.32 in)			
Tightening torque		0.6-0.8 Nm (7.08 lb.in)		-	
Isolation data					
Rated insulation voltage	input / measuring circuit / output	600 V			
	output 1 / output 2	250 V			
Rated impulse withstand voltage U_{imp}	input / measuring circuit / output	6 kV 1.2/50 µs			
	output 1 / output 2	4 kV 1.2/50 µs			
Pollution degree		3			
Overvoltage category		III			
Standards / Directives					
Standards		IEC/EN 60255-27, IEC/EN 60947-5-1, EN 50178			
Low Voltage Directive		2014/35/EU			
EMC Directive		2014/30/EU			
RoHS Directive		2011/65/EU			
Electromagnetic compatibility					
Interference immunity to		IEC/EN 61000-6-2			
electrostatic discharge	IEC/EN 61000-4-2	level 3			
radiated, radio-frequency, electromagnetic field	IEC/EN 61000-4-3	level 3			
electrical fast transient / burst	IEC/EN 61000-4-4	level 3			
surge	IEC/EN 61000-4-5	level 3			
conducted disturbances, induced by radio-frequency fields	IEC/EN 61000-4-6	level 3			
Interference emission		IEC/EN 61000-6-3			
high-frequency radiated	IEC/CISPR 22; EN 55022	class B			
high-frequency conducted	IEC/CISPR 22; EN 55022	class B			