CM-E Range

Current & voltage monitoring relays

Current & voltage monitoring relays
Single phase

Current and voltage monitoring relays, single phase
Benefits and advantages

Characteristics current monitoring relays

Monitoring of DC and AC currents: 3 mA to15 A [1)]

- TRMS measuring principle
- One device includes 3 measuring ranges
- Over- and undercurrent monitoring[1)]
- ON or OFF delay configurable[1)]
- Open- or closed circuit principle configurable[1)]
- Latching function configurable[1)]
- Thresholds for >I and/or <I adjustable[1)]
- Fixed hysteresis of 5 %[1)]
- Start-up delay T_v adjustable 0; 0.1 - 30 s[1)]
- Tripping delay T_v adjustable 0; 0.1 - 30 s[1)]
- 1 x 2 c/o contacts (common signal) or 2 x 1 c/o contact (separate signals for >I and <I) configurable[1)]
- 22.5 mm width
- 3 LED's for status indication

[1)] depending on device

Characteristics voltage monitoring relays

- Monitoring of DC and AC voltages from 3 - 600 V
- TRMS measuring principle
- One device includes 4 measuring ranges: 3 - 30 V; 6 - 60 V; 30 - 300 V; 60 - 600 V
- Over- and undervoltage monitoring[1)]
- ON or OFF delay configurable[1)]
- Open- or closed circuit principle configurable[1)]
- Latching function configurable[1)]
- Threshold values for >U and/or <U adjustable[1)]
- Fixed hysteresis of 5 %[1)]
- Start-up delay T_v adjustable 0; 0.1 - 30 s[1)]
- Tripping delay T_v adjustable 0; 0.1 - 30 s[1)]
- 1 x 2 c/o contacts (common signal) or 2 x 1 c/o contact (separate signals for >U and <U) configurable[1)]
- 22.5 mm width
- 3 LED's for status indication

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 pre-selected. 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
Selection and conversion

	Predecessor																							
	Catalog 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
	Reference code	CM-SRS.11S	CM-SRS.11P	CM-SRS.11S	CM-SRS.11P	CM-SRS.11S	CM-SRS.11P	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.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		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■			
Windows 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 or 0,1 - 30 s											adj	adj	adj	adj	adj	adj	adj	adj	adj	adj	adj	adj			
ON or OFF delay																							sel	sel	sel
Output																									
c/o contact		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
Connection type																									
Easy Connect Technology			■		■		■					■		■		■					■			■	
Double-chamber cage connection terminals		■		■		■		■	■	■	■		■		■		■	■	■	■		■	■		■

Current and voltage monitoring relays, single phase
Selection and conversion

	Predecessor																
	Catalog number	1SVR730831R0300	1SVR740831R0300	1SVR730831R0300	1SVR740831R0300	1SVR730831R1300	1SVR740831R1300	1SVR730830R0400	1SVR740830R0400	1SVR730831R0400	1SVR740831R0400	1SVR730831R1400	1SVR740831R1400	1SVR730830R0500	1SVR740830R0500	1SVR730750R0400	1SVR740750R0400
	Reference code	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 or 0,1 - 30 s								adj	adj	adj	adj	adj	adj	adj	adj		
ON or OFF delay																sel	sel
Output																	
c/o contact		1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2
Connection type																	
Easy Connect Technology			■		■		■		■		■		■		■		■
Double-chamber cage connection terminals		■		■		■		■		■		■		■		■	

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


CM-SRS.22S


CM-SFS.22P

Description

Single phase voltage and current monitors protect sensitive equipment and control systems against undervoltage, undercurrent events, overvoltage or overcurrent events. Different units with adjustable or fixed threshold values (trip points) are available.

Ordering details

Rated control supply voltage	Tripping delay T_v	Measuring range	Reference code	Catalog number	Weight (1 pce) kg (lb)
24-240 V AC/DC	without	3-30 mA 10-100 mA 0.1-1 A	CM-SRS.11S	1SVR730840R0200	0.145 (0.320)
110-130 V AC				1SVR730841R0200	0.161 (0.355)
220-240 V AC				1SVR730841R1200	0.161 (0.355)
24-240 V AC/DC			CM-SRS.11P	1SVR740840R0200	0.137 (0.302)
110-130 V AC				1SVR740841R0200	0.153 (0.337)
220-240 V AC				1SVR740841R1200	0.153 (0.337)
24-240 V AC/DC	without	0.3-1.5 A 1-5 A 3-15 A	CM-SRS.12S	1SVR730840R0300	0.137 (0.302)
110-130 V AC				1SVR730841R0300	0.168 (0.370)
220-240 V AC				1SVR730841R1300	0.168 (0.370)
24-240 V AC/DC	adjustable 0 or 0.1-30 s	3-30 mA 10-100 mA 0.1-1 A	CM-SRS.21S	1SVR730840R0400	0.152 (0.335)
110-130 V AC				1SVR730841R0400	0.179 (0.395)
220-240 V AC				1SVR730841R1400	0.179 (0.395)
24-240 V AC/DC			CM-SRS.21P	1SVR740840R0400	0.141 (0.311)
110-130 V AC				1SVR740841R0400	0.168 (0.370)
220-240 V AC				1SVR740841R1400	0.168 (0.370)
24-240 V AC/DC	adjustable 0 or 0.1-30 s	0.3-1.5 A 1-5 A 3-15 A	CM-SRS.22S	1SVR730840R0500	0.144 (0.399)
110-130 V AC				1SVR730841R0500	0.181 (0.399)
220-240 V AC				1SVR730841R1500	0.181 (0.399)
24-240 V AC/DC	adjustable 0 or 0.1-30 s	3-30 mA 10-100 mA 0.1-1 A	CM-SRS.M1S	1SVR730840R0600	0.153 (0.337)
			CM-SRS.M1P	1SVR740840R0600	0.142 (0.313)
24-240 V AC/DC	adjustable 0 or 0.1-30 s	0.3-1.5 A 1-5 A 3-15 A	CM-SRS.M2S	1SVR730840R0700	0.155 (0.342)
24-240 V AC/DC	adjustable 0 or 0.1-30 s	3-30 mA 10-100 mA 0.1-1 A	CM-SFS.21S	1SVR730760R0400	0.150 (0.331)
			CM-SFS.21P	1SVR740760R0400	0.139 (0.306)
24-240 V AC/DC	adjustable 0 or 0.1-30 s	0.3-1.5 A 1-5 A 3-15 A	CM-SFS.22S	1SVR730760R0500	0.158 (0.348)

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


CM-ESS.MP


CM-EFS.2

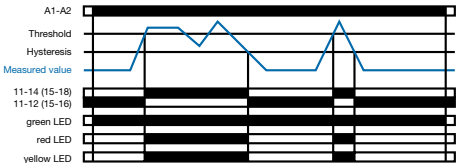
Ordering details

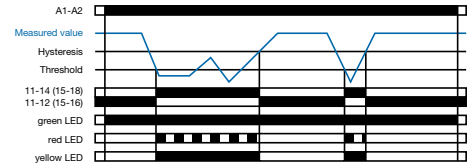
Rated control supply voltage	Tripping delay TV	Measuring range	Reference code	Catalog number	Weight (1 pce) kg (lb)
24-240 V AC/DC	without	3-30 V 6-60 V 30-300 V 60-600 V	CM-ESS.1S	1SVR730830R0300	0.135 (0.298)
110-130 V AC				1SVR730831R0300	0.164 (0.362)
220-240 V AC				1SVR730831R1300	0.164 (0.362)
24-240 V AC/DC			CM-ESS.1P	1SVR740830R0300	0.126 (0.278)
110-130 V AC				1SVR740831R0300	0.155 (0.342)
220-240 V AC				1SVR740831R1300	0.155 (0.342)
24-240 V AC/DC	adjustable 0 or 0.1-30 s	3-30 V 6-60 V 30-300 V 60-600 V	CM-ESS.2S	1SVR730830R0400	0.153 (0.337)
110-130 V AC				1SVR730831R0400	0.181 (0.399)
220-240 V AC				1SVR730831R1400	0.181 (0.399)
24-240 V AC/DC			CM-ESS.2P	1SVR740830R0400	0.142 (0.313)
110-130 V AC				1SVR740831R0400	0.170 (0.375)
220-240 V AC				1SVR740831R1400	0.170 (0.375)
24-240 V AC/DC	adjustable 0 or 0.1-30 s	3-30 V 6-60 V 30-300 V 60-600 V	CM-ESS.MS	1SVR730830R0500	0.154 (0.340)
			CM-ESS.MP	1SVR740830R0500	0.143 (0.320)
24-240 V AC/DC	adjustable 0 or 0.1-30 s	3-30 V 6-60 V 30-300 V 60-600 V	CM-EFS.2S	1SVR730750R0400	0.157 (0.346)
			CM-EFS.2P	1SVR740750R0400	0.146 (0.322)

Current and voltage monitoring relays, single phase
Function diagrams

Function diagrams CM-SRS.1

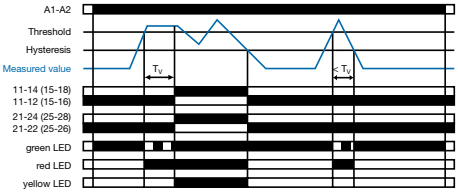
Overcurrent monitoring

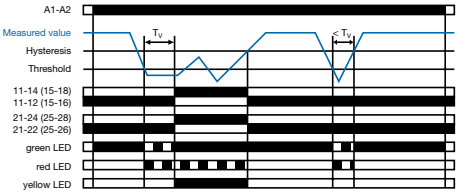




Function diagrams CM-SRS.2

Overcurrent monitoring

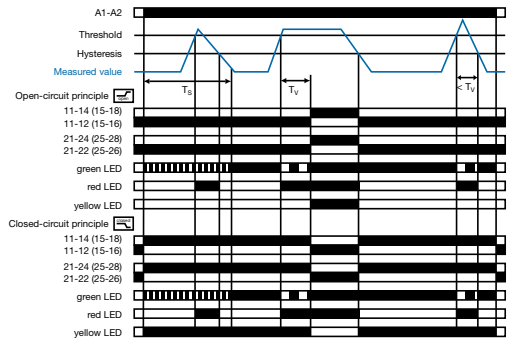




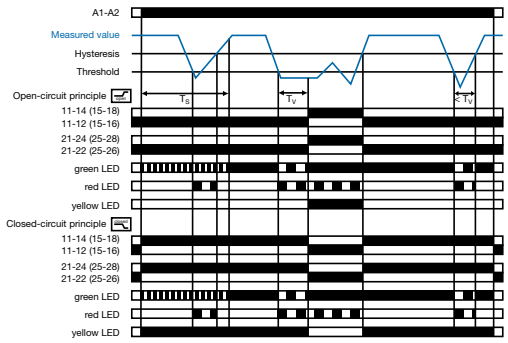
If the measured value exceeds resp. drops below the adjusted threshold value, the output relay(s) energize(s): on the CM-SRS.1 immediately, on the CM-SRS.2 after the set tripping delay T_V. If the measured value exceeds resp. drops below the threshold value plus resp. minus the adjusted hysteresis, the 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

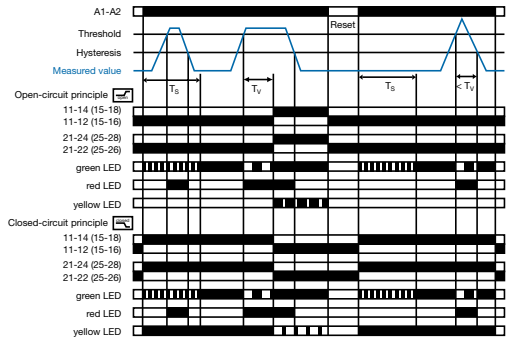
Overcurrent monitoring without latching



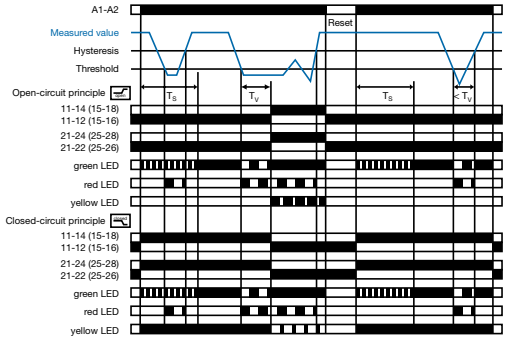
Undercurrent monitoring without latching



Overcurrent monitoring with latching



Undercurrent monitoring with latching



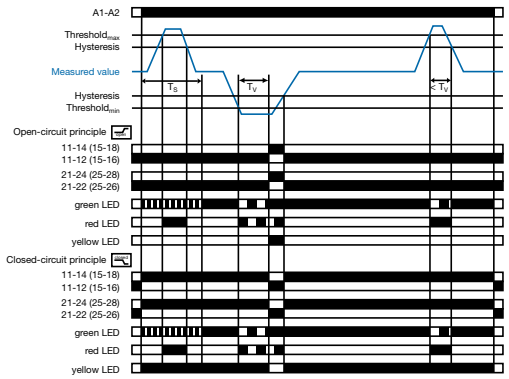
If the measured value exceeds resp. drops below the adjusted threshold value before the set start-up delay T_S is complete, the output relays do not change their actual state. If the measured value exceeds resp. drops below the adjusted threshold value when T_S is complete, the tripping delay T_V starts. 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 (open) / de-energize (closed).

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 (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.

Current and voltage monitoring relays, single phase
Function diagrams

Function diagrams CM-SFS.2

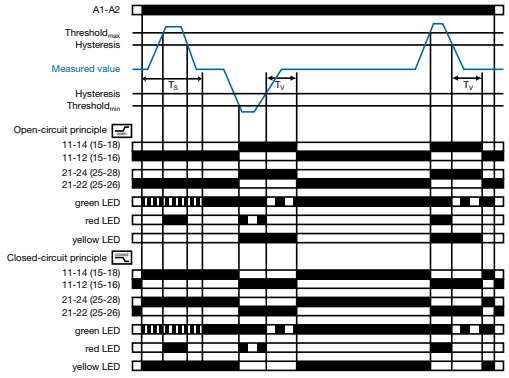
Current window monitoring 1x2 c/o contact 1x2 c/o
ON-delayed ⊠ **without latching**



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.

Further function diagrams see data sheet.

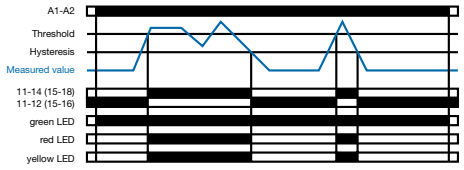
Current window monitoring 1x2 c/o contact 1x2 c/o
OFF-delayed ■ **without latching** ⊠



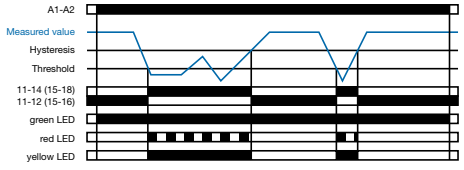
OFF-delayed ■ current window monitoring with parallel switching c/o contacts 1x2 c/o:
If the measured value exceeds resp. drops below the adjusted threshold value when the set start-up delay T_S is complete, the output relays energize open / de-energize closed, when ■ is configured, and remain in this 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

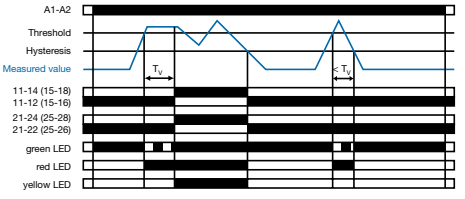


Undervoltage monitoring

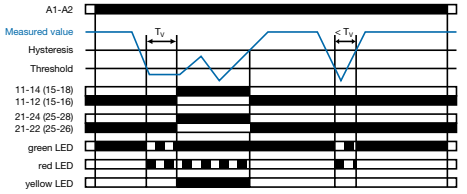


Function diagrams CM-ESS.2

Overvoltage monitoring



Undervoltage monitoring

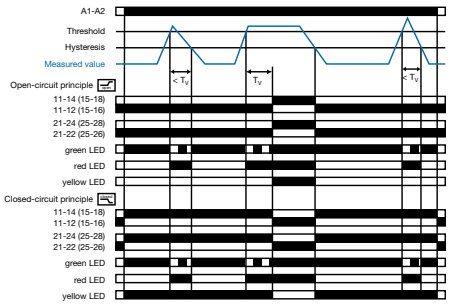


Depending on the configuration, the voltage monitoring relays **CM-ESS.1** and **CM-ESS.2** can be used for over- or undervoltage monitoring in single-phase AC and/or DC systems. The voltage to be monitored (measured value) is applied to terminals B-C. The devices work according the open-circuit principle. 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.

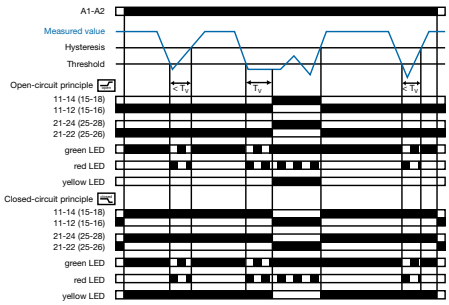
Current and voltage monitoring relays, single phase
Function diagrams

Function diagrams CM-ESS.M

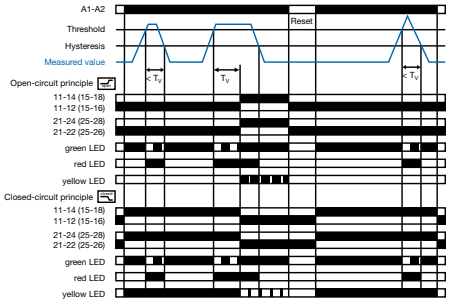
Overvoltage monitoring without latching



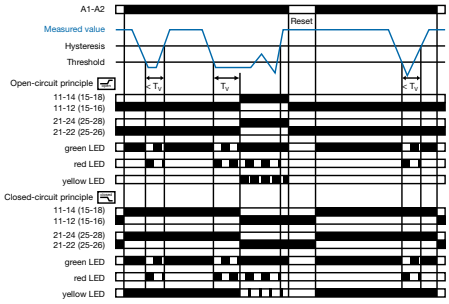
Undervoltage monitoring c without latching



Overvoltage monitoring with latching



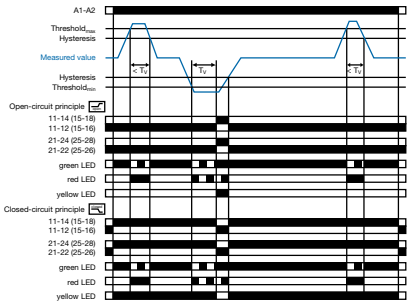
Undervoltage monitoring c with latching



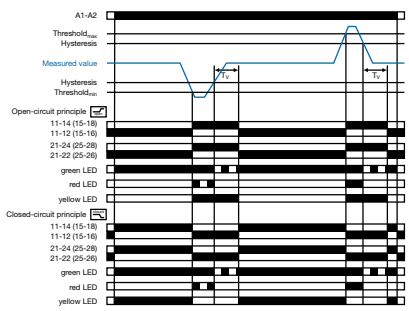
If the measured value exceeds resp. drops below the adjusted threshold value, the tripping delay TV starts. If TV is complete and the measured still exceeding resp. below the threshold value plus resp. minus the set hysteresis, the output relays energize h / de-energize g.
If the measured value exceeds resp. drops below the threshold value plus resp. minus the set hysteresis and the latching function is not activated the output relays de-energize h / energize g. With activated latching function f the output relays remain energized h and de-energize the supply voltage is interrupted / the output relays remain de-energized g and energize only, when the supply voltage is switched off and then 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 1x2 c/o
ON-delayed without latching



Voltage window monitoring 1x2 c/o contact 1x2 c/o
OFF-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 /de-energize .

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 / 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.

OFF-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 output relays energize / de-energize , 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 / energize , provided that the latching function is not activated . 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.

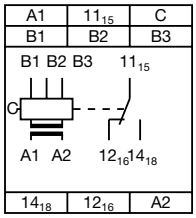
When 2x1 c/o is adjusted on the device, the functionality is equivalent to the one described above. There is only to consider that in this case, instead of both output relays, only one output relay each will be switched.

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

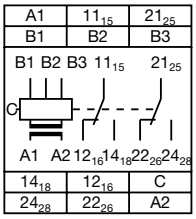
Current and voltage monitoring relays, single phase

Connection diagrams
DIP switches

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



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}	Output contacts - open-circuit principle



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

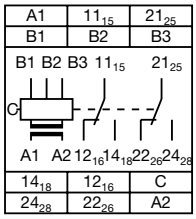
DIP switch functions CM-SRS.1, CM-SRS.2

Position	2	1
ON ↑		I
OFF		I

1 ON Undercurrent monitoring
OFF Overcurrent monitoring

OFF = Default

Connection diagram CM-SRS.M



A1-A2	Control supply voltage
B1-C	Measuring range 1: 3-30 mA bzw. 0.3-1.5 A
B2-C	Measuring range 2: 10-100 mA bzw. 1-5 A
B3-C	Measuring range 3: 0.1-1 A bzw. 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

Position	4	3	2	1
ON ↑			closed	I
OFF			open	I

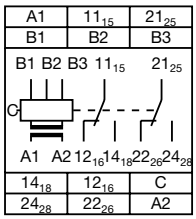
1 ON Undercurrent monitoring
OFF Overcurrent monitoring

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



A1-A2	Control supply voltage
B1-C	Measuring range 1: 3-30 mA or 0.3-1.5 A
B2-C	Measurign 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

OFF = Default

Position	4	3	2	1
ON ↑	2x1 c/o		closed	
OFF	1x2 c/o		open	

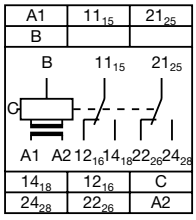
1 ON OFF-delay
OFF ON-delay

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

Connection diagram CM-ESS.M



A1-A2	Control supply voltage
B-C	Measuring ranges: 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

Position	4	3	2	1
ON ↑			closed	V
OFF			open	V

1 ON Undervoltage monitoring
OFF Overvoltage monitoring

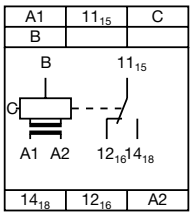
2 ON Closed-circuit principle
OFF Open-circuit principle

3 ON Latching function activated
OFF Latching function not activated

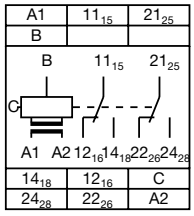
OFF = Default

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

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



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



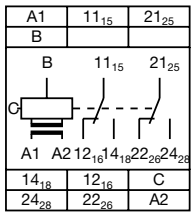
A1-A2 Control supply voltage
B-C Measuring ranges: 3-30 V; 6-60 V; 30-300 V; 60-600 V
11_{15}-12_{16}/14_{18}
21_{25}-22_{26}/24_{28} Output contacts - open-circuit principle

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

Position	2	1
ON ↑		V
OFF		V

1 ON Undervoltage monitoring
OFF Overvoltage monitoring
OFF = Default

Connection diagram CM-EFS.2



A1-A2 Control Supply voltage
B-C Measuring ranges: 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-EFS.2

Position	4	3	2	1
ON ↑	2x1 c/o		closed	
OFF	1x2 c/o		open	

OFF = Default

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 2 x 1 c/o contact
1 x 2 c/o contacts

Current and voltage monitoring relays, single phase
Technical data

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 [2]
	Input resistance	3.3 q	1 q	0.1 q	0.05 q	0.01 q	0.0025 q
	Pulse overload capacity t < 1 s	500 mA	1 A	10 A	15 A	50 A	100 A
	Continuous capacity	50 mA	150 mA	1.5 A	2 A	7 A	17 A
Threshold value(s)		adjustable within the indicated measuring range			
Setting accuracy of threshold value		10 %			
Repeat accuracy (constant parameters)		0.07 % of full scale			
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			
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			
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, ⎍⎍⎍: start-up delay TS active, ⎍⎍: tripping delay TV 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 [1]		open-circuit principle		open- or closed-circuit principle configurable	
Contact material		AgNi			
Rated operational voltage U_e	IEC/EN 60947-1	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 (IEC/EN 60947-5-1)	AC12 (resistive) at 230 V	4 A			
	AC15 (inductive) at 230 V	3 A			
	DC12 (resistive) at 24 V	4 A			
	DC13 (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 (AC12, 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

Current monitoring relays, single phase
Technical data

Type			CM-SRS.1	CM-SRS.2	CM-SRS.M	CM-SFS.2
General data						
MTBF			on request			
Duty time			100%			
Dimensions (W x H x D)		product dimensions	22.5 x 85.6 x 103.7 mm (0.89 x 3.37 x 4.08 in)			
		packaging dimensions	97 x 109 x 30 mm (3.82 x 4.29 x 1.18 in)			
Weight		net weight	depending on device, see ordering details			
		gross weight	depending on device, see ordering details			
Mounting			DIN rail (IEC/EN 60715), snap-on mounting without any tool			
Mounting position			any			
Minimum distance to other units			10mm (0.39in) at measured current > 10 A			
Material of housing			UL 94 V-0			
Degree of protection		housing / terminals	IP50 / IP20			
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 20-14 AWG) 2 x 0.5-1.5 mm² (2 x 20-16 AWG)		2 x 0.5-1.5 mm² (2 x 20-16 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 (5.31-7.08 lb.in)		-
Environmental data						
Ambient temperature range		operation / storage	-20...+60 °C / -40...+85 °C			
Damp heat (IEC 60068-2-30)			55 °C, 6 cycles			
Vibration (sinusoidal) (IEC/EN 60255-21-1)			Class 2			
Shock (IEC/EN 60255-21-2)			Class 2			
Isolation data						
Rated insulation voltage (VDE 0110, IEC 60947-1, IEC/EN 60255-5)		supply / measuring circuit / output	600 V			
		supply / output 1/2	250 V			
Rated impulse withstand voltage U_{imp} (IEC/EN 60947-1, IEC/EN 60255-5)		supply / measuring circuit / output	6 kV 1.2/50 µs			
		supply / output 1/2	4 kV 1.2/50 µs			
Pollution degree (VDE 0110, IEC 664, IEC/EN 60255-5)			3			
Overvoltage category (VDE 0110, IEC 664, IEC/EN 60255-5)			III			
Standards						
Product standard			IEC/EN 60255-6			
Low Voltage Directive			2006/95/EC			
EMC Directive			2004/108/EC			
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			

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

Voltage monitoring relays, single phase
Technical data

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			
Setting accuracy of threshold value		10 %			
Repeat accuracy (constant parameters)		±0.07 % of full scale			
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			
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		
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 ⎍⎍⎍: 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 [1]		open-circuit principle		open- or closed-circuit principle configurable	
Contact material		AgNi			
Rated operational voltage U_e	IEC/EN 60947-1	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 (IEC/EN 60947-5-1)	AC12 (resistive) at 230 V	4 A			
	AC15 (inductive) at 230 V	3 A			
	DC12 (resistive) at 24 V	4 A			
	DC13 (inductive) at 24 V	2 A			

[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[2]

Voltage monitoring relays, single phase
Technical data

Type			CM-ESS.1	CM-ESS.2	CM-ESS.M	CM-EFS.2
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 (AC12, 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		
General data						
MTBF			on request			
Duty time			100%			
Dimensions (W x H x D)		product dimensions	22.5 x 85.6 x 103.7 mm (0.89 x 3.37 x 4.08 in)			
		packaging dimensions	97 x 109 x 30 mm (3.82 x 4.29 x 1.18 in)			
Weight		net weight	depending on device, see ordering details			
		gross weight	depending on device, see ordering details			
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			
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 mm^2 (1 x 20-14 AWG) 2 x 0.5-1.5 mm^2 (2 x 20-16 AWG)		2 x 0.5-1.5 mm^2 (2 x 20-16 AWG)	
	rigid		1 x 0.5-4 mm^2 (1 x 20-12 AWG) 2 x 0.5-2.5 mm^2 (2 x 20-14 AWG)		2 x 0.5-1.5 mm^2 (2 x 20-16 AWG)	
Stripping length			8 mm (0.32 in)			
Tightening torque			0.6-0.8 Nm (5.31-7.08 lb.in)		-	
Isolation data						
Rated insulation voltage (VDE 0110, IEC 60947-1, IEC/EN 60255-5)		supply / measuring circuit / output	600 V			
		supply / output 1/2	250 V			
Rated impulse withstand voltage U_{imp} (IEC/EN 60947-1, IEC/EN 60255-5)		supply / measuring circuit / output	6 kV 1.2/50 µs			
		supply / output 1/2	4 kV 1.2/50 µs			
Pollution degree (VDE 0110, IEC 664, IEC/EN 60255-5)			3			
Overvoltage category (VDE 0110, IEC 664, IEC/EN 60255-5)			III			
Standards						
Product standard			IEC/EN 60255-6			
Low Voltage Directive			2006/95/EC			
EMC Directive			2004/108/EC			
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			