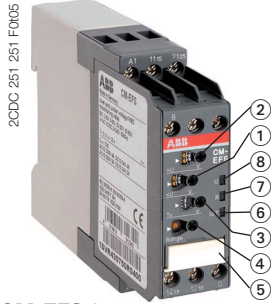


# Measuring and monitoring relay CM-EFS.2

## Voltage window monitoring relay, single-phase AC/DC

### Data sheet



**CM-EFS.2**

- ① Threshold value adjustment >U for overvoltage
- ② Threshold value adjustment <U for undervoltage
- ③ Adjustment of the tripping delay  $T_V$
- ④ Adjustment of the measuring range
- ⑤ DIP switches (see DIP switch functions)
- ⑥ U/T: green LED - control supply voltage, timing
- ⑦ R: yellow LED - relay status
- ⑧ U: red LED - over- / undervoltage

#### Characteristics

- Monitoring of DC and AC voltages from 3-600 V
- RMS measuring principle
- One device includes 4 measuring ranges: 3-30 V; 6-60 V; 30-300 V; 60-600 V
- Over- and undervoltage monitoring
- ON- or OFF-delay configurable
- Open- or closed-circuit principle configurable
- Latching function configurable
- Threshold values for >U and <U adjustable
- Fixed hysteresis of 5 %
- Tripping delay  $T_V$  adjustable 0; 0.1-30 s
- 1x2 c/o contacts (common signal) or 2x1 c/o contact (separate signals for >U and <U) configurable
- 22.5 mm width
- 3 LEDs for status indication

#### Approvals

- UL 508, CAN/CSA C22.2 No. 14
- GL (pending)
- GOST
- CB Scheme
- CCC
- RMRS

#### Marks

- CE CE
- C-Tick

#### Order data

Type	Control supply voltage	Order code
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Measuring range: 3-30 V; 6-60 V; 30-300 V; 60-600 V

<b>CM-EFS.2</b>	24-240 V AC/DC	<b>1SVR 430 750 R0400</b>
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#### Order data (Accessories)

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

#### Application

The window voltage monitoring relay **CM-EFS.2** can be used for the simultaneous monitoring of over- (>U) and undervoltages (<U) in single-phase AC and/or DC systems. Depending on the configuration, one c/o contact each  or both c/o contacts in parallel  can be used for the over- and undervoltage monitoring. Open-  or closed-circuit principle  as well as an adjustable ON  or OFF tripping  delay are configurable.

#### Operating mode

The **CM-EFS.2** has 2 c/o contacts and includes 4 measuring ranges: 3-30 V, 6-60 V, 30-300 V, and 60-600 V.

The unit is adjusted with potentiometers and switches on the top of the unit. The selection of: ON-delay  or OFF-delay , open-  or closed-circuit principle , latching function ON  or OFF  and 2x1 c/o  or 1x2 c/o contacts  is made with DIP switches. A potentiometer, with direct reading scale, allows the adjustment of the threshold value<sub>max</sub> (>U) for overvoltage and the threshold value<sub>min</sub> (<U) for undervoltage. There is also adjustment for the tripping delay  $T_V$ . The tripping delay  $T_V$  is adjustable over a range of instantaneous to a 30 s delay. The hysteresis is fixed at 5 %.

# Measuring and monitoring relay CM-EFS.2

## Voltage window monitoring relay, single-phase AC/DC

### Data sheet

#### Function diagrams

#### Voltage window monitoring 1x2 c/o contacts ON-delayed without latching

##### Open-circuit principle

The voltage to be monitored (measured value) is applied to terminals **B-C**. The supply voltage applied to terminals **A1-A2** is displayed by the glowing green LED.

If the measured value exceeds the threshold value<sub>max</sub> (>U) or drops below the threshold value<sub>min</sub> (<U), the tripping delay  $T_V$  starts and the red LED glows (overvoltage), or flashes  $\square\square\square$  (undervoltage) respectively. Timing of  $T_V$  is displayed by the flashing  $\square\square\square$  green LED.

When  $T_V$  is complete and the measured value still exceeds the threshold value<sub>max</sub> minus the fixed hysteresis (5 %) or is still below the threshold value<sub>min</sub> plus the fixed hysteresis (5 %), the output relays energize and the yellow LED (relay energized) glows.

If the measured value decreases below the threshold value<sub>max</sub> minus the fixed hysteresis (5 %) or exceeds the threshold value<sub>min</sub> plus the fixed hysteresis (5 %), the output relays de-energize and the red and yellow LEDs turn off.

If supply voltage is interrupted, the green LED turns off.

##### Closed-circuit principle

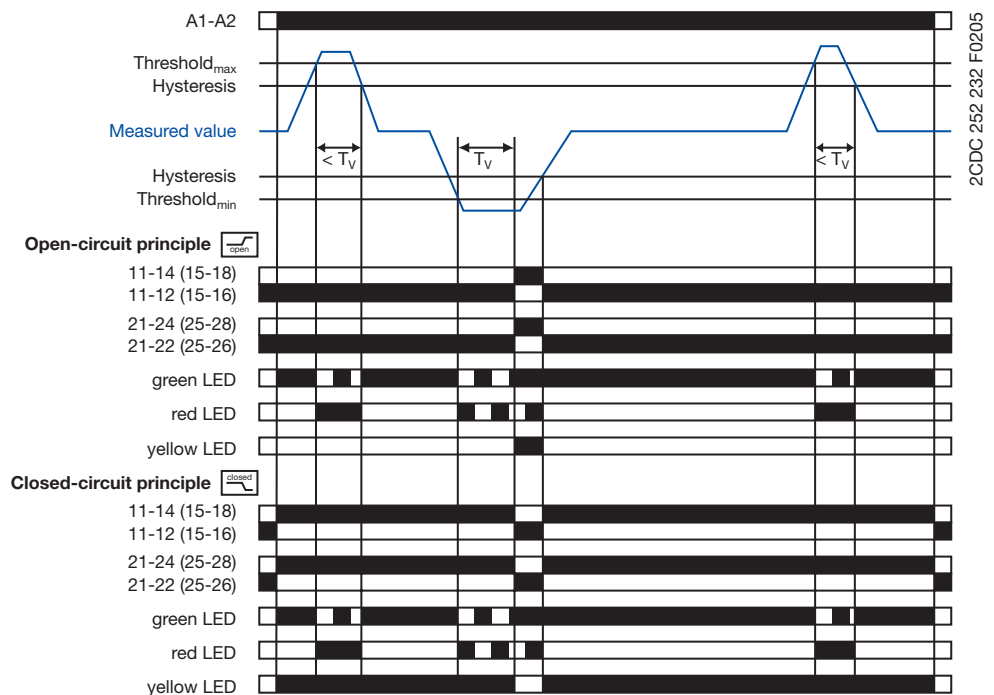
The voltage to be monitored (measured value) is applied to terminals **B-C**. When supply voltage is applied to terminals **A1-A2**, the output relays energize and the green and yellow LED (relays energized) glow.

If the measured value exceeds the threshold value<sub>max</sub> (>U) or drops below the threshold value<sub>min</sub> (<U), the tripping delay  $T_V$  starts and the red LED glows (overvoltage), or flashes  $\square\square\square$  (undervoltage) respectively. Timing of  $T_V$  is displayed by the flashing  $\square\square\square$  green LED.

When  $T_V$  is complete and the measured value still exceeds the threshold value<sub>max</sub> minus the fixed hysteresis (5 %) or is still below the threshold value<sub>min</sub> plus the fixed hysteresis (5 %), the output relays de-energize and the yellow LED (relays energized) turns off.

If the measured value decreases below the threshold value<sub>max</sub> minus the fixed hysteresis (5 %) or exceeds the threshold value<sub>min</sub> plus the fixed hysteresis (5 %), the output relays re-energize, the yellow LED glows and the red LED turns off.

If supply voltage is interrupted, the output relays de-energize and the yellow and green LEDs turn off.



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# Measuring and monitoring relay CM-EFS.2


## Voltage window monitoring relay, single-phase AC/DC


### Data sheet

#### Voltage window monitoring 1x2 c/o contacts OFF-delayed without latching

##### Open-circuit principle

The voltage to be monitored (measured value) is applied to terminals **B-C**. The supply voltage applied to terminals **A1-A2** is displayed by the glowing green LED.


If the measured value exceeds the threshold value<sub>max</sub> (>U) or drops below the threshold value<sub>min</sub> (<U), the output relays energize, the yellow LED (relays energized) glows and the red LED glows (overvoltage) , or flashes  (undervoltage) respectively.


If the measured value decreases below the threshold value<sub>max</sub> minus the fixed hysteresis (5 %) or exceeds the threshold value<sub>min</sub> plus the fixed hysteresis (5 %), the tripping delay  $T_V$  starts and the red LED turns off. Timing of  $T_V$  is displayed by the flashing  green LED. When  $T_V$  is complete, the output relays de-energize and the yellow LED (relay energized) turns off.

If supply voltage is interrupted, the green LED turns off.

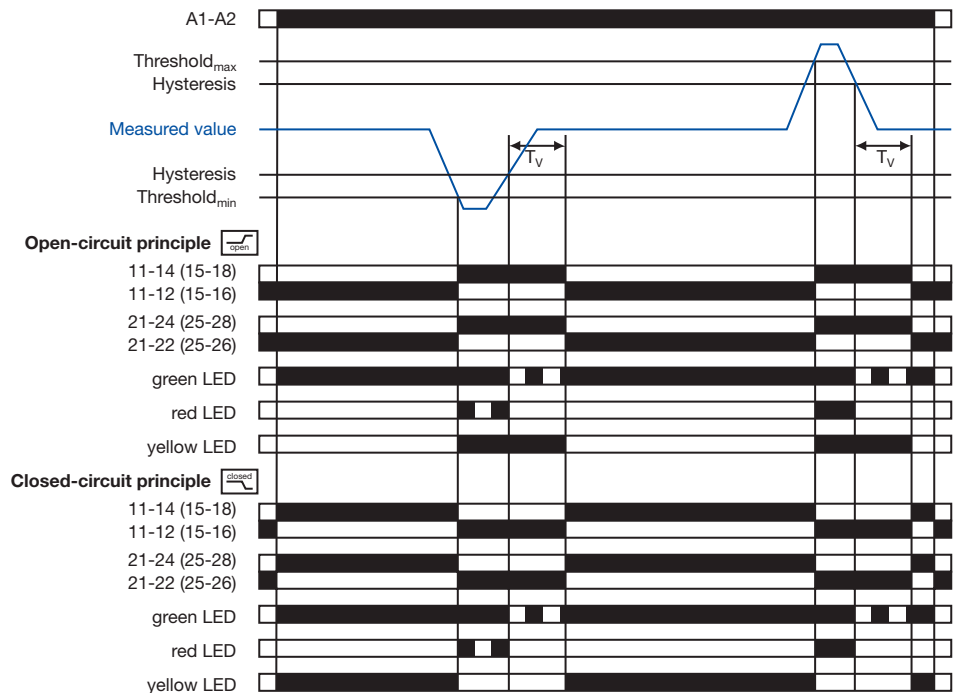
##### Closed-circuit principle

The voltage to be monitored (measured value) is applied to terminals **B-C**. When supply voltage is applied to terminals **A1-A2**, the output relays energize and the green and yellow LED (relays energized) glow.

If the measured value exceeds the threshold value<sub>max</sub> (>U) or drops below the threshold value<sub>min</sub> (<U), the output relays de-energize, the yellow LED turns off and the red LED glows (overvoltage), or flashes  (undervoltage) respectively.

If the measured value decreases below the threshold value<sub>max</sub> minus the fixed hysteresis (5 %) or exceeds the threshold value<sub>min</sub> plus the fixed hysteresis (5 %), the tripping delay  $T_V$  starts and the red LED turns off. Timing of  $T_V$  is displayed by the flashing  green LED. When  $T_V$  is complete, the output relays energize and the yellow LED (relay energized) glows.

If supply voltage is interrupted, the output relays de-energize and the yellow and green LEDs turn off.



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# Measuring and monitoring relay CM-EFS.2

## Voltage window monitoring relay, single-phase AC/DC

### Data sheet

#### Voltage window monitoring 1x2 c/o contacts ON-delayed with latching

##### Open-circuit principle

The voltage to be monitored (measured value) is applied to terminals **B-C**. The supply voltage applied to terminals **A1-A2** is displayed by the glowing green LED.

If the measured value exceeds the threshold value<sub>max</sub> (>U) or drops below the threshold value<sub>min</sub> (<U), the tripping delay  $T_V$  starts and the red LED glows (overvoltage), or flashes  $\square\square\square$  (undervoltage) respectively. Timing of  $T_V$  is displayed by the flashing  $\square\square\square$  green LED.

When  $T_V$  is complete and the measured value still exceeds the threshold value<sub>max</sub> minus the fixed hysteresis (5 %) or is still below the threshold value<sub>min</sub> plus the fixed hysteresis (5 %), the output relays energize and the yellow LED (relay energized) flashes  $\square\square\square$ .

If the measured value decreases below the threshold value<sub>max</sub> minus the fixed hysteresis (5 %) or exceeds the threshold value<sub>min</sub> plus the fixed hysteresis (5 %), the red LED turns off. The output relays remain energized (latching function).

If supply voltage is interrupted (reset), the output relays de-energize and the yellow and green LEDs turn off.

##### Closed-circuit principle

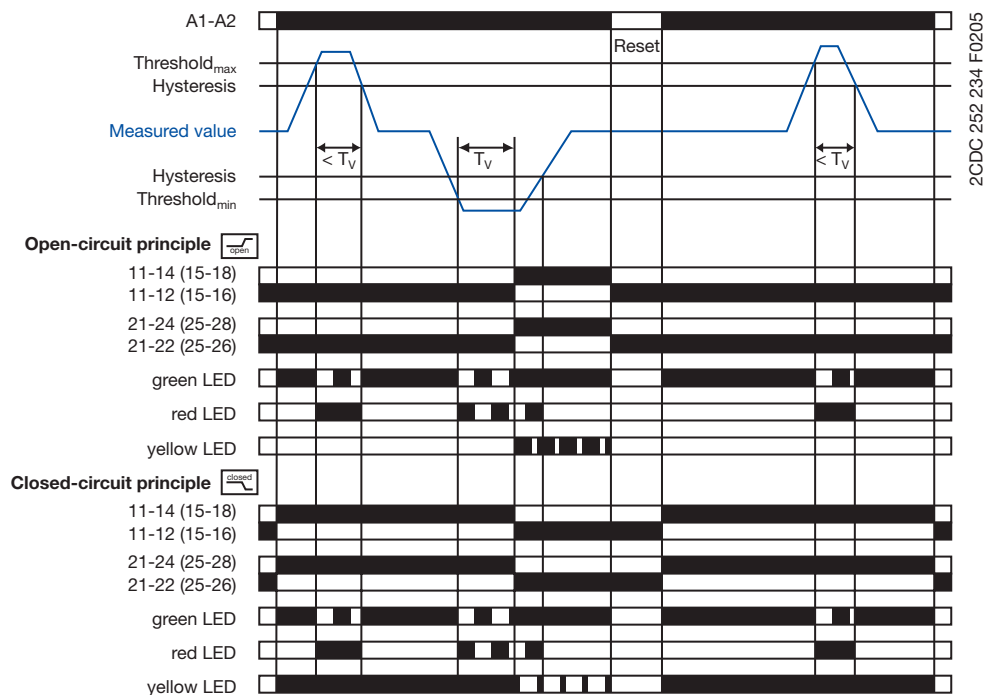
The voltage to be monitored (measured value) is applied to terminals **B-C**. When supply voltage is applied to terminals **A1-A2**, the output relays energize and the green and yellow LED (relays energized) glow.

If the measured value exceeds the threshold value<sub>max</sub> (>U) or drops below the threshold value<sub>min</sub> (<U), the tripping delay  $T_V$  starts and the red LED glows (overvoltage), or flashes  $\square\square\square$  (undervoltage) respectively. Timing of  $T_V$  is displayed by the flashing  $\square\square\square$  green LED.

When  $T_V$  is complete and the measured value still exceeds the threshold value<sub>max</sub> minus the fixed hysteresis (5 %) or is still below the threshold value<sub>min</sub> plus the fixed hysteresis (5 %), the output relays de-energize and the yellow LED (relays energized) flashes  $\square\square\square$ .

If the measured value decreases below the threshold value<sub>max</sub> minus the fixed hysteresis (5 %) or exceeds the threshold value<sub>min</sub> plus the fixed hysteresis (5 %), the red LED turns off. The output relays remain de-energized (latching function).

If supply voltage is interrupted (reset), the yellow and green LEDs turn off. The output relays energize again when supply voltage is re-applied.



# Measuring and monitoring relay CM-EFS.2



## Voltage window monitoring relay, single-phase AC/DC

### Data sheet

#### Voltage window monitoring 1x2 c/o contacts OFF-delayed with latching

##### Open-circuit principle

The voltage to be monitored (measured value) is applied to terminals **B-C**. The supply voltage applied to terminals **A1-A2** is displayed by the glowing green LED.



If the measured value exceeds the threshold value<sub>max</sub> (>U) or drops below the threshold value<sub>min</sub> (<U), the output relays energize, the yellow LED (relays energized) flashes  and the red LED glows (overvoltage), or flashes  (undervoltage) respectively.

If the measured value decreases below the threshold value<sub>max</sub> minus the fixed hysteresis (5 %) or exceeds the threshold value<sub>min</sub> plus the fixed hysteresis (5 %), the red LED turns off. The output relays remain energized (latching function).

If supply voltage is interrupted (reset), the output relays de-energize and the yellow and green LEDs turn off.

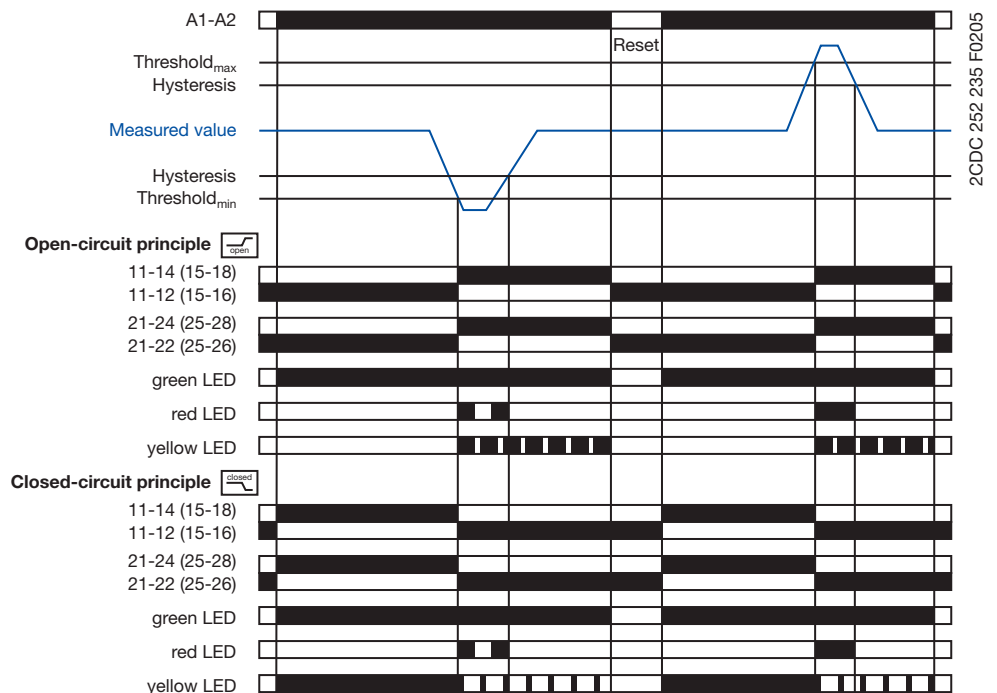
##### Closed-circuit principle

The voltage to be monitored (measured value) is applied to terminals **B-C**. When supply voltage is applied to terminals **A1-A2**, the output relays energize and the green and yellow LED (relays energized) glow.

If the measured value exceeds the threshold value<sub>max</sub> (>U) or drops below the threshold value<sub>min</sub> (<U), the output relays de-energize, the yellow LED (relays energized) flashes  and the red LED glows (overvoltage), or flashes  (undervoltage) respectively.

If the measured value decreases below the threshold value<sub>max</sub> minus the fixed hysteresis (5 %) or exceeds the threshold value<sub>min</sub> plus the fixed hysteresis (5 %), the red LED turns off. The output relays remain de-energized (latching function).

If supply voltage is interrupted (reset), the yellow and green LEDs turn off. The output relays energize again when supply voltage is re-applied.



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# Measuring and monitoring relay CM-EFS.2

## Voltage window monitoring relay, single-phase AC/DC

### Data sheet

#### Voltage window monitoring 2x1 c/o contact ON-delayed without latching

##### Open-circuit principle

The voltage to be monitored (measured value) is applied to terminals **B-C**. The supply voltage applied to terminals **A1-A2** is displayed by the glowing green LED.

If the measured value exceeds the threshold value<sub>max</sub> (>U) or drops below the threshold value<sub>min</sub> (<U), the tripping delay  $T_V$  starts and the red LED glows (overvoltage), or flashes  $\square\square\square$  (undervoltage) respectively. Timing of  $T_V$  is displayed by the flashing  $\square\square\square$  green LED.

When  $T_V$  is complete and the measured value still exceeds the threshold value<sub>max</sub> minus the fixed hysteresis (5 %) or is still below the threshold value<sub>min</sub> plus the fixed hysteresis (5 %), the output relay 11<sub>15</sub>-12<sub>16</sub>/14<sub>18</sub> (>U), or 21<sub>25</sub>-22<sub>26</sub>/24<sub>28</sub> (<U) respectively, energizes and the yellow LED (relay energized) glows.

If the measured value decreases below the threshold value<sub>max</sub> minus the fixed hysteresis (5 %) or exceeds the threshold value<sub>min</sub> plus the fixed hysteresis (5 %), the output relay 11<sub>15</sub>-12<sub>16</sub>/14<sub>18</sub> (>U), or 21<sub>25</sub>-22<sub>26</sub>/24<sub>28</sub> (<U) respectively, de-energizes and the red and yellow LEDs turn off.

If supply voltage is interrupted, the green LED turns off.

##### Closed-circuit principle

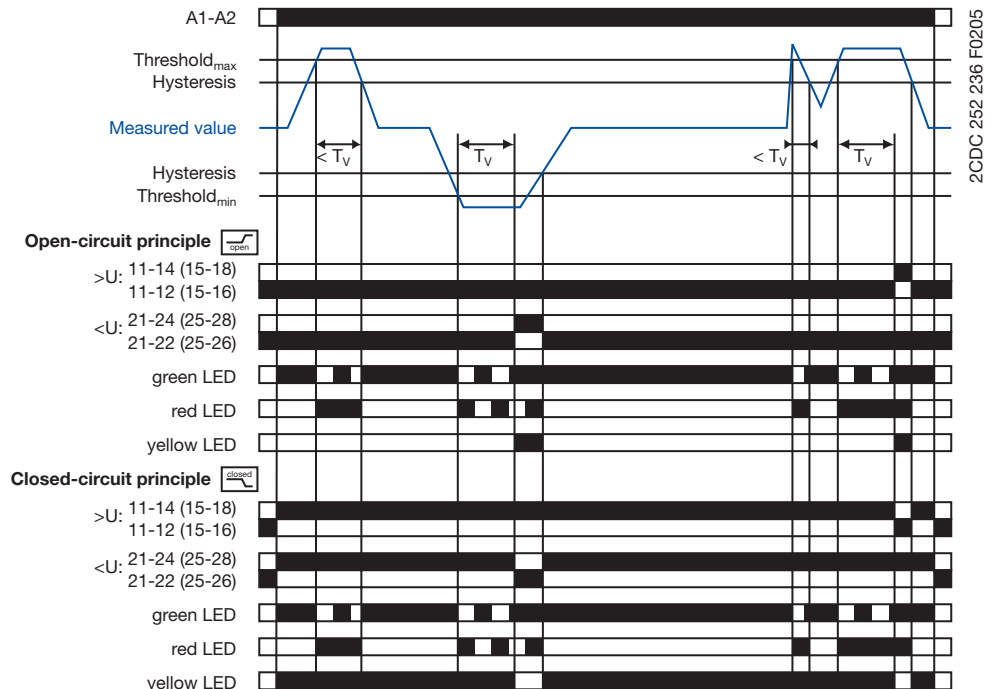
The voltage to be monitored (measured value) is applied to terminals **B-C**. When supply voltage is applied to terminals **A1-A2**, the output relays energize and the green and yellow LED (relays energized) glow.

If the measured value exceeds the threshold value<sub>max</sub> (>U) or drops below the threshold value<sub>min</sub> (<U), the tripping delay  $T_V$  starts and the red LED glows (overvoltage), or flashes  $\square\square\square$  (undervoltage) respectively. Timing of  $T_V$  is displayed by the flashing  $\square\square\square$  green LED.

When  $T_V$  is complete and the measured value still exceeds the threshold value<sub>max</sub> minus the fixed hysteresis (5 %) or is still below the threshold value<sub>min</sub> plus the fixed hysteresis (5 %), the output relay 11<sub>15</sub>-12<sub>16</sub>/14<sub>18</sub> (>U), or 21<sub>25</sub>-22<sub>26</sub>/24<sub>28</sub> (<U) respectively, de-energizes and the yellow LED (relays energized) turns off.

If the measured value decreases below the threshold value<sub>max</sub> minus the fixed hysteresis (5 %) or exceeds the threshold value<sub>min</sub> plus the fixed hysteresis (5 %), the output relay 11<sub>15</sub>-12<sub>16</sub>/14<sub>18</sub> (>U), or 21<sub>25</sub>-22<sub>26</sub>/24<sub>28</sub> (<U) respectively, re-energizes, the yellow LED glows and the red LED turns off.

If supply voltage is interrupted, the output relays de-energize and the yellow and green LEDs turn off.



# Measuring and monitoring relay CM-EFS.2


## Voltage window monitoring relay, single-phase AC/DC


### Data sheet

Voltage window monitoring 2x1 c/o contact  OFF-delayed  without latching 

Open-circuit principle :

The voltage to be monitored (measured value) is applied to terminals **B-C**. The supply voltage applied to terminals **A1-A2** is displayed by the glowing green LED.


If the measured value exceeds the threshold value<sub>max</sub> (>U) or drops below the threshold value<sub>min</sub> (<U), the output relay 11<sub>15</sub>-12<sub>16</sub>/14<sub>18</sub> (>U), or 21<sub>25</sub>-22<sub>26</sub>/24<sub>28</sub> (<U) respectively, energizes, the yellow LED (relays energized) glows and the red LED glows (overvoltage) , or flashes  (undervoltage) respectively.


If the measured value decreases below the threshold value<sub>max</sub> minus the fixed hysteresis (5 %) or exceeds the threshold value<sub>min</sub> plus the fixed hysteresis (5 %), the tripping delay  $T_V$  starts and the red LED turns off. Timing of  $T_V$  is displayed by the flashing  green LED. When  $T_V$  is complete, the output relay 11<sub>15</sub>-12<sub>16</sub>/14<sub>18</sub> (>U), or 21<sub>25</sub>-22<sub>26</sub>/24<sub>28</sub> (<U) respectively, de-energizes and the yellow LED (relay energized) turns off.

If supply voltage is interrupted, the green LED turns off.

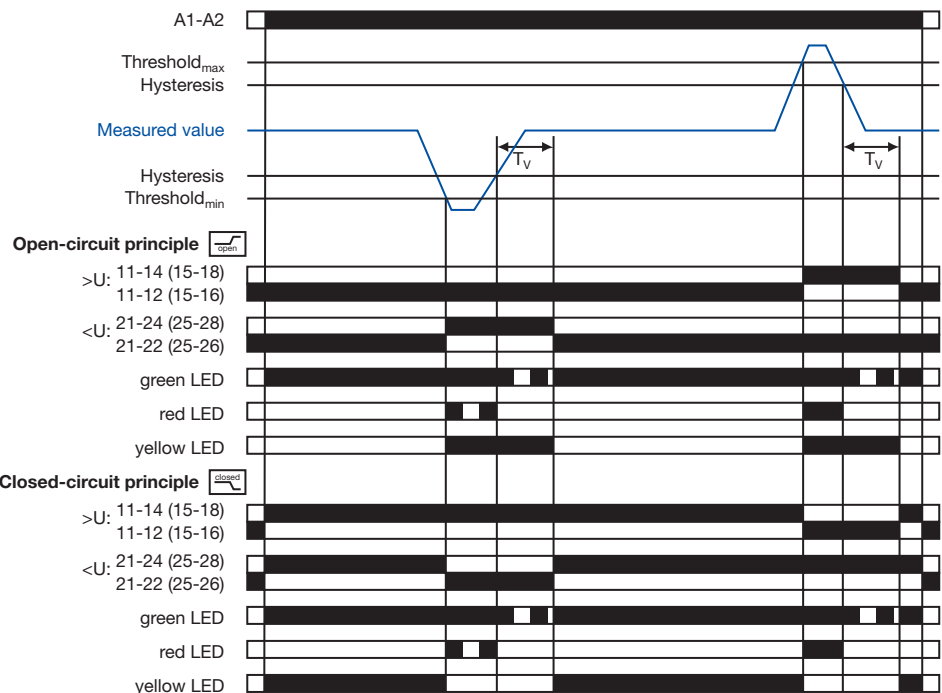
Closed-circuit principle :

The voltage to be monitored (measured value) is applied to terminals **B-C**. When supply voltage is applied to terminals **A1-A2**, the output relays energize and the green and yellow LED (relays energized) glow.

If the measured value exceeds the threshold value<sub>max</sub> (>U) or drops below the threshold value<sub>min</sub> (<U), the output relay 11<sub>15</sub>-12<sub>16</sub>/14<sub>18</sub> (>U), or 21<sub>25</sub>-22<sub>26</sub>/24<sub>28</sub> (<U) respectively, de-energizes, the yellow LED turns off and the red LED glows (overvoltage) , or flashes  (undervoltage) respectively.

If the measured value decreases below the threshold value<sub>max</sub> minus the fixed hysteresis (5 %) or exceeds the threshold value<sub>min</sub> plus the fixed hysteresis (5 %), the tripping delay  $T_V$  starts and the red LED turns off. Timing of  $T_V$  is displayed by the flashing  green LED. When  $T_V$  is complete, the output relay 11<sub>15</sub>-12<sub>16</sub>/14<sub>18</sub> (>U), or 21<sub>25</sub>-22<sub>26</sub>/24<sub>28</sub> (<U) respectively, energizes and the yellow LED (relay energized) glows.

If supply voltage is interrupted, the output relays de-energize and the yellow and green LEDs turn off.



# Measuring and monitoring relay CM-EFS.2

## Voltage window monitoring relay, single-phase AC/DC

### Data sheet

Voltage window monitoring 2x1 c/o contact  ON-delayed  with latching

Open-circuit principle :

The voltage to be monitored (measured value) is applied to terminals **B-C**. The supply voltage applied to terminals **A1-A2** is displayed by the glowing green LED.

If the measured value exceeds the threshold value<sub>max</sub> (>U) or drops below the threshold value<sub>min</sub> (<U), the tripping delay  $T_V$  starts and the red LED glows (overvoltage), or flashes  $\square\square\square$  (undervoltage) respectively. Timing of  $T_V$  is displayed by the flashing  $\square\square\square$  green LED.

When  $T_V$  is complete and the measured value still exceeds the threshold value<sub>max</sub> minus the fixed hysteresis (5 %) or is still below the threshold value<sub>min</sub> plus the fixed hysteresis (5 %), the output relay 11<sub>15</sub>-12<sub>16</sub>/14<sub>18</sub> (>U), or 21<sub>25</sub>-22<sub>26</sub>/24<sub>28</sub> (<U) respectively, energizes and the yellow LED (relay energized) flashes  $\square\square\square$ .

If the measured value decreases below the threshold value<sub>max</sub> minus the fixed hysteresis (5 %) or exceeds the threshold value<sub>min</sub> plus the fixed hysteresis (5 %), the red LED turns off. The output relay 11<sub>15</sub>-12<sub>16</sub>/14<sub>18</sub> (>U), or 21<sub>25</sub>-22<sub>26</sub>/24<sub>28</sub> (<U) respectively, remains energized (latching function).

If supply voltage is interrupted (reset), the output relay 11<sub>15</sub>-12<sub>16</sub>/14<sub>18</sub> (>U), or 21<sub>25</sub>-22<sub>26</sub>/24<sub>28</sub> (<U) respectively, de-energizes and the yellow and green LEDs turn off.

Closed-circuit principle :

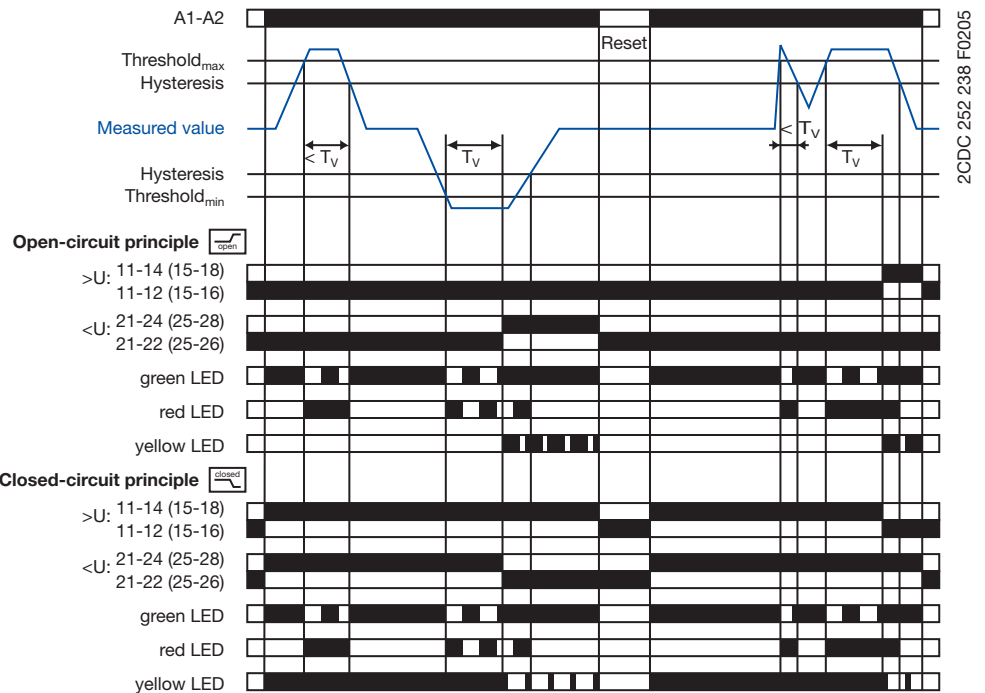
The voltage to be monitored (measured value) is applied to terminals **B-C**. When supply voltage is applied to terminals **A1-A2**, the output relays energize and the green and yellow LED (relays energized) glow.

If the measured value exceeds the threshold value<sub>max</sub> (>U) or drops below the threshold value<sub>min</sub> (<U), the tripping delay  $T_V$  starts and the red LED glows (overvoltage), or flashes  $\square\square\square$  (undervoltage) respectively. Timing of  $T_V$  is displayed by the flashing  $\square\square\square$  green LED.

When  $T_V$  is complete and the measured value still exceeds the threshold value<sub>max</sub> minus the fixed hysteresis (5 %) or is still below the threshold value<sub>min</sub> plus the fixed hysteresis (5 %), the output relay 11<sub>15</sub>-12<sub>16</sub>/14<sub>18</sub> (>U), or 21<sub>25</sub>-22<sub>26</sub>/24<sub>28</sub> (<U) respectively, de-energizes and the yellow LED (relays energized) flashes  $\square\square\square$ .

If the measured value decreases below the threshold value<sub>max</sub> minus the fixed hysteresis (5 %) or exceeds the threshold value<sub>min</sub> plus the fixed hysteresis (5 %), the red LED turns off. The output relay 11<sub>15</sub>-12<sub>16</sub>/14<sub>18</sub> (>U), or 21<sub>25</sub>-22<sub>26</sub>/24<sub>28</sub> (<U) respectively, remains de-energized (latching function).

If supply voltage is interrupted (reset), the yellow and green LEDs turn off. The output relays energize again when supply voltage is re-applied.



# Measuring and monitoring relay CM-EFS.2

## Voltage window monitoring relay, single-phase AC/DC

### Data sheet

#### Voltage window monitoring 2x1 c/o contact OFF-delayed with latching

##### Open-circuit principle

The voltage to be monitored (measured value) is applied to terminals **B-C**. The supply voltage applied to terminals **A1-A2** is displayed by the glowing green LED.

If the measured value exceeds the threshold value<sub>max</sub> (>U) or drops below the threshold value<sub>min</sub> (<U), the output relay 11<sub>15</sub>-12<sub>16</sub>/14<sub>18</sub> (>U), or 21<sub>25</sub>-22<sub>26</sub>/24<sub>28</sub> (<U) respectively, energizes, the yellow LED (relays energized) flashes  $\square\square\square\square$  and the red LED glows (overvoltage), or flashes  $\square\square\square$  (undervoltage) respectively. If the measured value decreases below the threshold value<sub>max</sub> minus the fixed hysteresis (5 %) or exceeds the threshold value<sub>min</sub> plus the fixed hysteresis (5 %), the red LED turns off. The output relay 11<sub>15</sub>-12<sub>16</sub>/14<sub>18</sub> (>U), or 21<sub>25</sub>-22<sub>26</sub>/24<sub>28</sub> (<U) respectively, remains energized (latching function).

If supply voltage is interrupted (reset), the output relays de-energize and the yellow and green LEDs turn off.

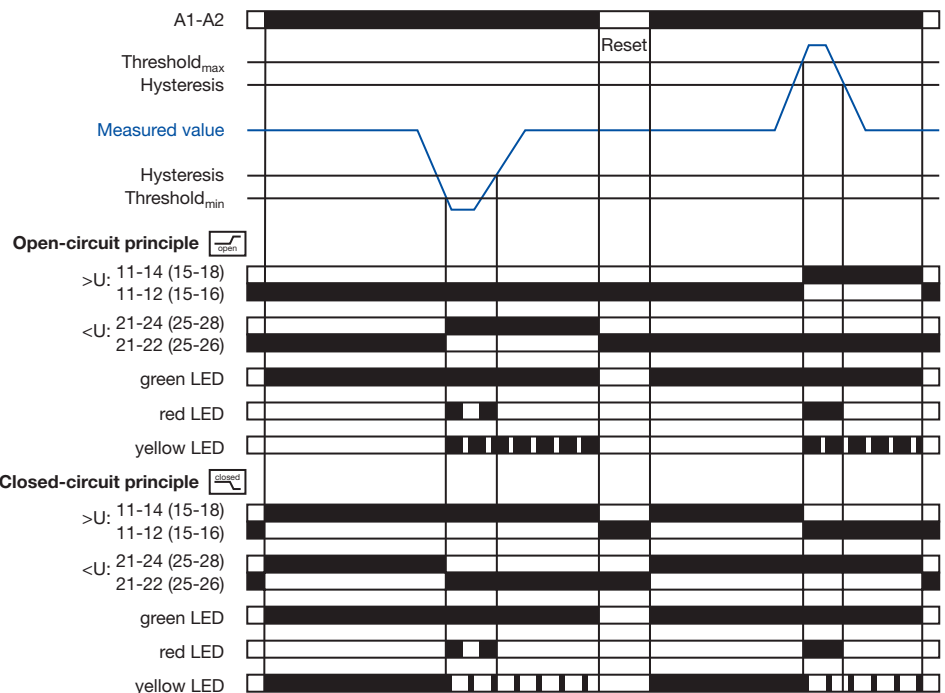
##### Closed-circuit principle

The voltage to be monitored (measured value) is applied to terminals **B-C**. When supply voltage is applied to terminals **A1-A2**, the output relays energize and the green and yellow LED (relays energized) glow.

If the measured value exceeds the threshold value<sub>max</sub> (>U) or drops below the threshold value<sub>min</sub> (<U), the output relay 11<sub>15</sub>-12<sub>16</sub>/14<sub>18</sub> (>U), or 21<sub>25</sub>-22<sub>26</sub>/24<sub>28</sub> (<U) respectively, de-energizes, the yellow LED (relays energized) flashes  $\square\square\square\square$  and the red LED glows (overvoltage), or flashes  $\square\square\square$  (undervoltage) respectively.

If the measured value decreases below the threshold value<sub>max</sub> minus the fixed hysteresis (5 %) or exceeds the threshold value<sub>min</sub> plus the fixed hysteresis (5 %), the red LED turns off. The output relay 11<sub>15</sub>-12<sub>16</sub>/14<sub>18</sub> (>U), or 21<sub>25</sub>-22<sub>26</sub>/24<sub>28</sub> (<U) respectively, remains de-energized (latching function).

If supply voltage is interrupted (reset), the yellow and green LEDs turn off. The output relays energize again when supply voltage is re-applied.

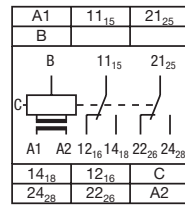


# Measuring and monitoring relay CM-EFS.2

## Voltage window monitoring relay, single-phase AC/DC

### Data sheet

#### Connection diagram



2CDC 252 207 F0005

A1-A2 Control supply voltage  
 B-C Measuring range: 3-30 V; 6-60 V; 30-300 V; 60-600 V  
 11<sub>15</sub>-12<sub>16</sub>/14<sub>18</sub> Output contacts - Open- or closed-circuit principle  
 21<sub>25</sub>-22<sub>26</sub>/24<sub>28</sub>

#### DIP switch functions

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

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

# Measuring and monitoring relay CM-EFS.2

## Voltage window monitoring relay, single-phase AC/DC

### Data sheet

#### Technical data

Type		CM-EFS.2																										
<b>Input circuit - Supply circuit</b>		<b>A1-A2</b>																										
Rated control supply voltage $U_s$		24-240 V AC/DC																										
Rated control supply voltage tolerance		-15...+10 %																										
Rated frequency AC/DC versions		50/60 Hz or DC																										
Current / power consumption		<table border="1"> <thead> <tr> <th>24 V DC</th> <th>115 V AC</th> <th>230 V AC</th> </tr> </thead> <tbody> <tr> <td>30 mA / 0.75 W</td> <td>17 mA / 1.9 VA</td> <td>11 mA / 2.6 VA</td> </tr> </tbody> </table>			24 V DC	115 V AC	230 V AC	30 mA / 0.75 W	17 mA / 1.9 VA	11 mA / 2.6 VA																		
24 V DC	115 V AC	230 V AC																										
30 mA / 0.75 W	17 mA / 1.9 VA	11 mA / 2.6 VA																										
On-period		100 %																										
Power failure buffering		20 ms																										
Transient overvoltage protection		Varistors																										
<b>Input circuit - Measuring circuit</b>		<b>B-C</b>																										
Monitoring function		over- and undervoltage monitoring																										
Measuring method		RMS measuring principle																										
Measuring inputs		<table border="1"> <thead> <tr> <th colspan="4">CM-EFS.2</th> </tr> <tr> <th>B-C</th> <th>B-C</th> <th>B-C</th> <th>B-C</th> </tr> </thead> <tbody> <tr> <td>3-30 V</td> <td>6-60 V</td> <td>30-300 V</td> <td>60-600 V</td> </tr> <tr> <td>600 k<math>\Omega</math></td> <td>600 k<math>\Omega</math></td> <td>600 k<math>\Omega</math></td> <td>600 k<math>\Omega</math></td> </tr> <tr> <td>800 V</td> <td>800 V</td> <td>800 V</td> <td>800 V</td> </tr> <tr> <td>660 V</td> <td>660 V</td> <td>660 V</td> <td>660 V</td> </tr> </tbody> </table>			CM-EFS.2				B-C	B-C	B-C	B-C	3-30 V	6-60 V	30-300 V	60-600 V	600 k $\Omega$	600 k $\Omega$	600 k $\Omega$	600 k $\Omega$	800 V	800 V	800 V	800 V	660 V	660 V	660 V	660 V
CM-EFS.2																												
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800 V	800 V	800 V	800 V																									
660 V	660 V	660 V	660 V																									
Terminal connection																												
Measuring range																												
Input resistance																												
Pulse overload capacity $t < 1$ s																												
Continuous capacity																												
Threshold values		>U and <U adjustable within the indicated measuring range																										
Tolerance of the adjusted threshold value		10 % of the range end value																										
Hysteresis related to the threshold value		5 % fixed																										
Maximum voltage within measuring circuit		factor 1.5 of full-scale																										
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																										
Measuring error within the control supply voltage tolerance		$\leq 0.5$ %																										
Measuring error within the temperature range		$\leq 0.06$ % / $^{\circ}\text{C}$																										
Transient overvoltage protection		Varistors																										
<b>Timing circuit</b>																												
Delay time $T_v$		0 or 0.1-30 s adjustable																										
Repeat accuracy (constant parameters)		$\pm 0.07$ % of full scale																										
Tolerance of the adjusted delay time																												
Timing error within control supply voltage tolerance		$\leq 0.5$ %																										
Timing error within temperature range		$\leq 0.06$ % / $^{\circ}\text{C}$																										
<b>Indication of operational states</b>																												
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																										
<b>Output circuits</b>		<b>11-12/14, 21-22/24</b>																										
Kind of output		relays, 2x1 c/o contacts (common signal) or 2x1 c/o contact (separate signal for >U and <U) configurable																										
Operating principle <sup>1)</sup>		open- or closed-circuit principle configurable																										
Contact material		AgNi																										
Rated voltage (VDE 0110, IEC 947-1)		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 (IEC 60947-5-1)		<table border="1"> <tbody> <tr> <td>AC12 (resistive)</td> <td>at 230 V</td> <td>4 A</td> </tr> <tr> <td>AC15 (inductive)</td> <td>at 230 V</td> <td>3 A</td> </tr> <tr> <td>DC12 (resistive)</td> <td>at 24 V</td> <td>4 A</td> </tr> <tr> <td>DC13 (inductive)</td> <td>at 24 V</td> <td>2 A</td> </tr> </tbody> </table>			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												
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																										

# Measuring and monitoring relay CM-EFS.2

## Voltage window monitoring relay, single-phase AC/DC

### Data sheet

Type		CM-EFS.2
Mechanical lifetime		30x10 <sup>6</sup> switching cycles
Electrical lifetime (AC12, 230 V, 4 A)		0.1x10 <sup>6</sup> switching cycles
Short-circuit capacity / maximum fuse rating	n/c contact	6 A fast-acting
	n/o contact	10 A fast-acting
<b>General data</b>		
MTBF		
Dimensions (W x H x D)		22.5 x 78 x 100 mm (0.89 x 3.07 x 3.94 in)
Mounting		DIN rail (EN 50022)
Mounting position		any
Material of enclosure		PA 6
Degree of protection	enclosure / terminals	IP50 / IP20
<b>Electrical connection</b>		
Wire size	fine-strand with wire end ferrule	2x0.75 mm <sup>2</sup> / 2x2.5 mm <sup>2</sup> (2x18 AWG / 2x14 AWG)
	fine-strand without wire end ferrule	2x0.75 mm <sup>2</sup> / 2x2.5 mm <sup>2</sup> (2x18 AWG / 2x14 AWG)
	rigid	2x0.5 mm <sup>2</sup> / 2x4 mm <sup>2</sup> (2x20 AWG / 2x12 AWG)
Stripping length		8 mm (0.31 in)
Tightening torque		0.8 Nm
<b>Environmental data</b>		
Ambient temperature range	operation	-20...+60 °C
	storage	-40...+85 °C
Damp heat (IEC 60068-2-30)		55 °C, 6 cycle
Vibration (sinusoidal) (IEC/EN 60255-21-1)		Class 2
Shock (IEC/EN 60255-21-2)		Class 2
<b>Isolation data</b>		
Insulation voltage (VDE 0110, IEC 947-1, IEC/EN 60255-5)	supply circuit / measuring circuit	600 V
	supply circuit / output circuit	250 V
	measuring circuit / output circuit	600 V
	output circuit 1 / output circuit 2	250 V
Pollution degree (VDE 0110, IEC 664, IEC/EN 60255-5)		2
Overvoltage category (VDE 0110, IEC 664, IEC/EN 60255-5)		III
Test voltage between all isolated circuits (type test)	Rated insulation voltage 250 V	2.0 kV, 50 Hz
	Rated insulation voltage 600 V	2.5 kV, 50 Hz
<b>Standards</b>		
Product standard		IEC 255-6, EN 60255-6
Low Voltage Directive		2006/95/EC
EMC Directive		2004/108/EC
<b>Electromagnetic compatibility</b>		
Interference immunity		IEC/EN 61000-6-2
	electrostatic discharge (ESD)	IEC/EN 61000-4-2 - Level 3
	electromagnetic field	IEC/EN 61000-4-3 - Level 3
	fast transients (Burst)	IEC/EN 61000-4-4 - Level 3
	powerful impulses (Surge)	IEC/EN 61000-4-9 - Level 3
	HF line emission	IEC/EN 61000-4-6 - Level 3
Interference emission		IEC/EN 61000-6-3
	electromagnetic field	IEC/CISPR 22; EN 55022 - Class B
	HF line emission	IEC/CISPR 22; EN 55022 - Class B

<sup>1)</sup> Open-circuit principle: output relay(s) energizes if the measured value exceeds  $\geq$  / falls below  $\leq$  the adjusted threshold value  
 Closed-circuit principle: output relay(s) de-energizes if measured value exceeds  $\geq$  / falls below  $\leq$  the adjusted threshold value

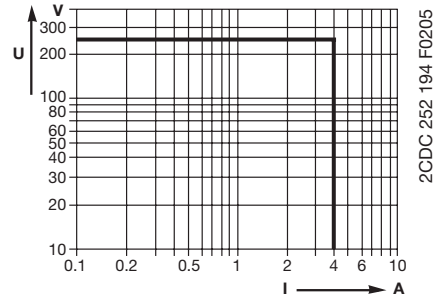
# Measuring and monitoring relay CM-EFS.2

## Voltage window monitoring relay, single-phase AC/DC

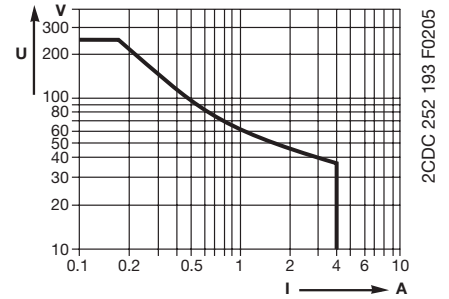
### Data sheet

#### Technical diagrams

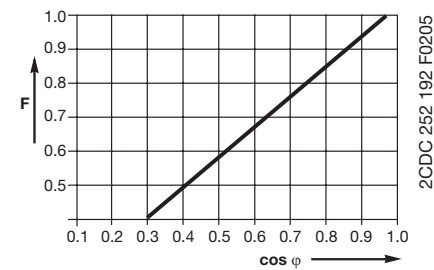
##### Load limit curves



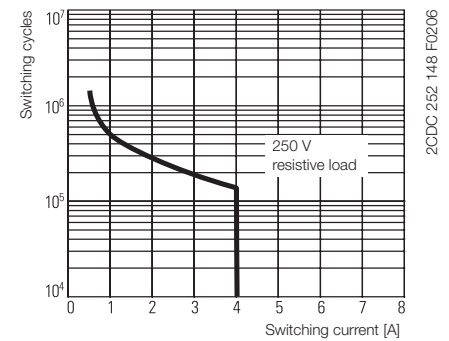
AC load (resistive)



DC load (resistive)



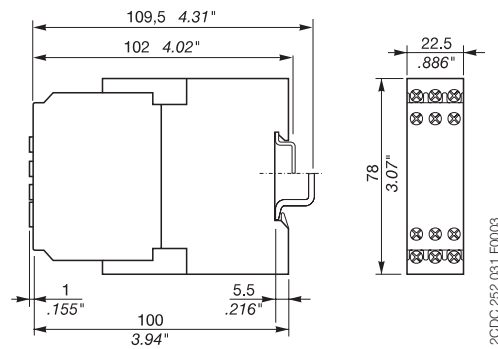
Derating factor F for inductive AC load



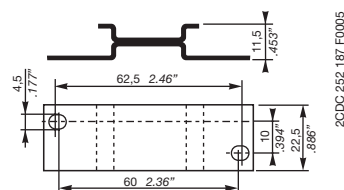
Contact lifetime

#### Dimensional drawing

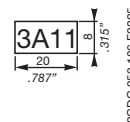
Dimensions in mm



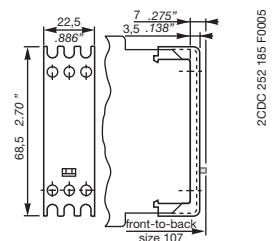
#### Dimensional drawings (Accessories)



ADP.01 - Adapter for screw mounting



MAR.01 - Marker label



COV.01 - Sealable transparent cover



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