

## 3-phase voltage monitoring relay

### EMR SU31D



EMR SU31D

- Voltage monitoring in 3-phase mains
- Measuring range 400/230 Vac 3Ph
- Monitoring of phase sequence and phase failure
- Detection of reverse voltage
- Connection of neutral wire optional
- 2 changers

#### Functions

Monitoring of phase sequence, phase failure and detection of return voltage (by means of evaluating the asymmetry).

#### Indicators

Green LED ON: indication of supply voltage  
Yellow LED ON/OFF: indication of relay output

#### Output relay

1 NC contact / 1 NO contact  
Rated voltage: 250 Vac  
Switching capacity: 1250 VA (5 A / 250 Vac)  
Fusing: 5A fast acting

#### Connecting voltages

3(N) ~400/230 V, Terminals (N)-L1-L2-L3 (= supply voltage)  
100% duration of operation

#### Reference data

Selectron® EMR		Article no.
SU31D	400/230 Vac 3Ph	41230019
(Order data see chapter 1)		

## 3-phase voltage monitoring relay

EMR DU31D

Technical data		
Nominal voltage	3(N) ~400/230 V, 9 VA / 2 W	
Nominal frequency	48 ... 63 Hz	
Drop-out voltage	>20% of the nominal voltage	
Recovery time	500 ms	
Measuring circuit:	Input:	
	3(N) ~400/230 V	terminals (N)-L1-L2-L3 (= supply voltage)
	Overload capacity:	
	3(N) ~400/230 V	-30% ... +30%
	Input resistance:	
	3(N) ~400/230 V	according to nominal voltage 9 VA / 2 W
	Asymmetry:	
	fix circa 30%	

### Type key

EMR S U 3 1 D ...		
<b>Construction</b> <b>D</b> Industrial design 22.5 mm <b>S</b> pluggable 11 poles		<b>Special functions</b> 1 = Additional asymmetry monitoring
<b>Function</b> <b>U</b> Voltage <b>I</b> Current <b>P</b> CosPhi <b>T</b> Temperature <b>S</b> Star-Delta		<b>Measuring circuit</b> <b>A</b> No measuring circuit <b>B</b> 3(N)~115/66 Vac <b>C</b> 3(N)~230/132 Vac <b>D</b> 3(N)~400/230 Vac <b>E</b> 1 ≅ 30/60/300 Vac/dc <b>F</b> 1 ≅ 100mA/1A/10A ac/dc <b>G</b> PTC <b>H</b> CosPhi <b>I</b> 12 Vdc <b>J</b> 24 Vdc <b>K</b> 36 Vdc <b>L</b> 48 Vdc <b>M</b> 1~110 Vac <b>N</b> 1~230 Vac <b>O</b> 1 A <b>P</b> 5 A
<b>Output</b> <b>1</b> 1 changer <b>2</b> 2 changers <b>3</b> 1 NC contact / 1 NO contact		<b>Connecting voltage</b> <b>1</b> Measuring circuit <b>2</b> 24...240 Vac/dc <b>3</b> 230 Vac

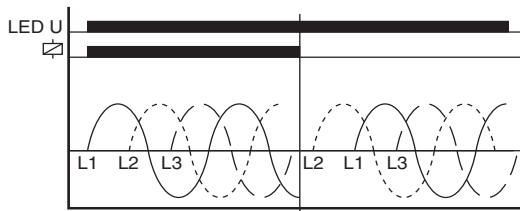
## 3-phase voltage monitoring relay

EMR DU31D

### Function description

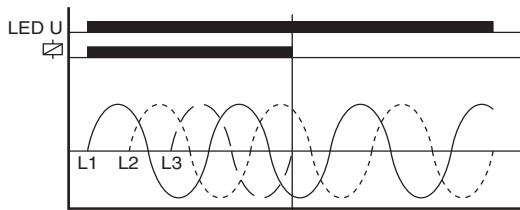
#### Phase sequence monitoring

When all the phases are connected in the correct sequence and the measured asymmetry is less than the fixed value, the output relays switch into on-position (yellow LED illuminated). When the phase sequence changes, the output relays switch into off-position (yellow LED not illuminated).



#### Phase failure monitoring

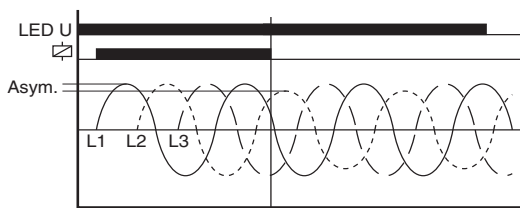
When one of the three phases fails, the output relays switch into off-position (yellow LED not illuminated).



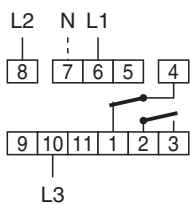
#### Detection of reverse voltage (by means of evaluation of asymmetry)

The output relays switch into off-position (yellow LED not illuminated) when the asymmetry between the phase voltages exceeds the fixed value of the asymmetry.

An asymmetry caused by the reverse voltage of a consumer (e.g. a motor which continues to run on two phases only) does not effect the disconnection.

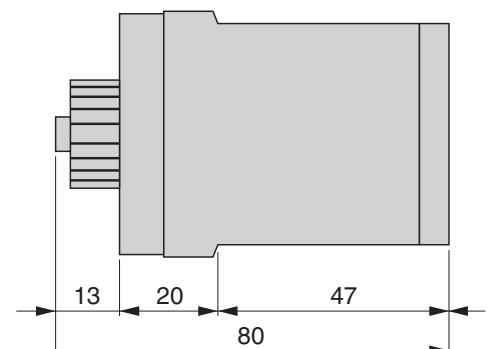
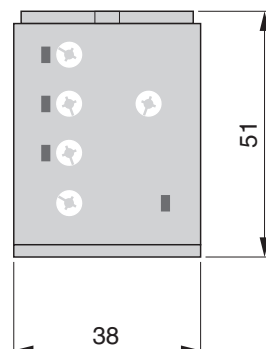


### Connection



Measuring range 3 (N) 400/230 Vac  
Supply voltage = measuring range

### Dimensions





## 3-phase voltage monitoring relay (Multifunction)

EMR SU31C1, SU31D1



EMR SU31C1



EMR SU31D1

- Voltage monitoring in 3-phase mains
- Measuring range 230/132 / 400/230 Vac 3Ph
- Multifunction
- Monitoring of phase sequence and phase failure
- Additional asymmetry monitoring
- Connection of neutral wire optional
- 2 changers

### Functions

Voltage monitoring in 3-phase mains with adjustable thresholds, adjustable tripping delay, monitoring of phase sequence and phase failure, monitoring of asymmetry with adjustable threshold and the following functions (selectable by means of rotary switch)

- Undervoltage monitoring
- Undervoltage monitoring and monitoring of phase sequence
- Monitoring of window between Min and Max
- Monitoring the window between Min and Max and monitoring of phase sequence.

### Time ranges

Start-up suppression time:

-

Tripping delay:

Adjustment range 0.1 ... 10 s

### Indicators

Red LED ON/OFF:

indication of failure of the corresponding threshold

Red LED flashes:

indication of tripping delay of the corresponding threshold

Yellow LED ON/OFF:

indication of relay output

### Output relay

1 NC contact / 1 NO contact

Rated voltage:

250 Vac

Switching capacity:

1250 VA (5 A / 250 Vac)

Fusing:

5A fast acting

### Connecting voltages

3 (N) ~ 230/132 V, terminals (N)\_L1\_L2\_L3 (= Measuring voltage)

3 (N) ~ 400/230 V, terminals (N)\_L1\_L2\_L3 (= Measuring voltage)

100% duration of operation

### Reference data

Selectron® EMR		Article no.
SU31D1	400/230 Vac 3Ph	41230018
SU31C1	230/132 Vac 3Ph	41230017
(Order data see chapter 1)		

## 3-phase voltage monitoring relay (Multifunction)

EMR SU31C1, SU31D1

Technical data		
Nominal voltage		3(N) ~230/132 V, 6 VA (2 W)
		3(N) ~400/230 V, 9 VA (2 W)
Nominal frequency		48 ... 63 Hz
Drop-out voltage		>20% of the nominal voltage
Base accuracy		±5% (of maximum nominal value)
Adjustment accuracy		±5% (of maximum nominal value)
Repetition accuracy		≤2% (of maximum nominal value)
Temperature influence		≤0.1% / °C
Recovery time		500 ms
Measuring circuit:	Measured variable	ac sine (48 ... 63 Hz)
	Input:	
	3(N) ~132/230 V	Terminals (N)-L1-L2-L3
	3(N) ~230/400 V	Terminals (N)-L1-L2-L3
	Overload capacity:	
	3(N) ~132/230 V	-30% ... +30%
	3(N) ~230/400 V	-30% ... +30%
	Input resistance:	
	3(N) ~132/230 V	according to nominal voltage 6 VA / 2 W
	3(N) ~230/400 V	according to nominal voltage 9 VA / 2 W
	Switching threshold:	
	Max:	80% ... 130% von $U_N$
	Min:	70% ... 120% von $U_N$
	Asymmetry:	5% ... 30%

### Type key

EMR S U 3 1 C 1		
<b>Construction</b> <b>D</b> Industrial design 22.5 mm <b>S</b> pluggable 11 poles		<b>Special functions</b> 1 = Additional asymmetry monitoring
<b>Function</b> <b>U</b> Voltage <b>I</b> Current <b>P</b> CosPhi <b>T</b> Temperature <b>S</b> Star-Delta		<b>Measuring circuit</b> <b>A</b> No measuring circuit <b>B</b> 3(N)~115/66 Vac <b>C</b> 3(N)~230/132 Vac <b>D</b> 3(N)~400/230 Vac <b>E</b> 1 ≙ 30/60/300 Vac/dc <b>F</b> 1 ≙ 100mA/1A/10A ac/dc <b>G</b> PTC <b>H</b> CosPhi <b>I</b> 12 Vdc <b>J</b> 24 Vdc <b>K</b> 36 Vdc <b>L</b> 48 Vdc <b>M</b> 1~110 Vac <b>N</b> 1~230 Vac <b>O</b> 1 A <b>P</b> 5 A
<b>Output</b> <b>1</b> 1 changer <b>2</b> 2 changers <b>3</b> 1 NC contact / 1 NO contact		<b>Connecting voltage</b> <b>1</b> Measuring circuit <b>2</b> 24...240 Vac/dc <b>3</b> 230 Vac

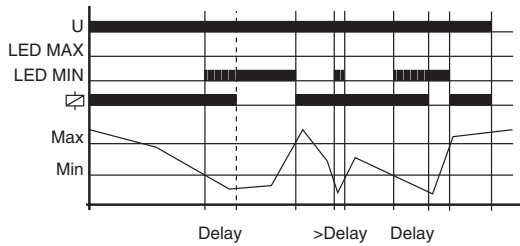
## 3-phase voltage monitoring relay (Multifunction)

EMR SU31C1, SU31D1

### Function description

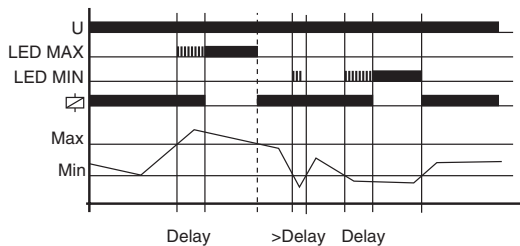
For all the functions the LEDs MIN and MAX are flashing alternatingly, when the minimum value for the measured voltage was chosen to be greater than the maximum value.

If a failure already exists when the device is activated, the output relays remain in off-position and the LED for the corresponding threshold is illuminated.



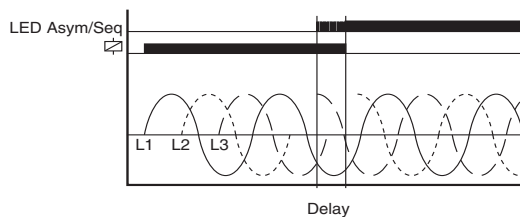
### Under voltage monitoring (UNDER, UNDER+SEQ)

When the measured voltage (one of the phase voltages) falls below the value adjusted at the MIN-regulator, the set interval of the tripping delay (DELAY) begins (red LED MIN flashes). After the interval has expired (red LED MIN illuminated), the output relays switch into off-position (yellow LED not illuminated). The output relays again switch into on-position (yellow LED illuminated), when the measured voltage exceeds the value adjusted at the MAX-regulator.



### Window function (WIN, WIN+SEQ)

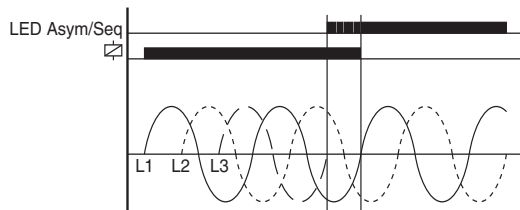
The output relays switch into on-position (yellow LED illuminated) when the measured voltage (one of the phase voltages) exceeds the value adjusted at the MIN-regulator. When the measured voltage exceeds the value adjusted at the MAX-regulator, the set interval of the tripping delay (DELAY) begins (red LED MAX flashes). After the interval has expired (red LED MAX illuminated), the output relays switch into off-position (yellow LED not illuminated). The output relays again switch into on-position (yellow LED illuminated) when the measured voltage falls below the value adjusted at the MAX-regulator (red LED MAX not illuminated). When the measured voltage falls below the value adjusted at the MIN-regulator, the set interval of the tripping delay (DELAY) begins again (red LED MIN flashes). After the interval has expired (red LED MIN illuminated), the output relays switch into off-position (yellow LED not illuminated).



### Phase sequence monitoring (SEQ)

Phase sequence monitoring is selectable for all functions.

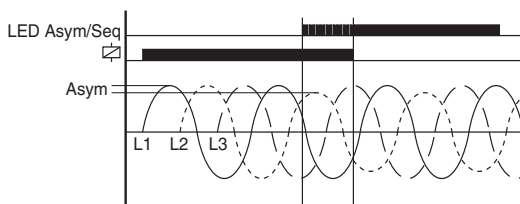
If a change in phase sequence is detected (red LED Asym./SEQ flashes), the output relays switch into off-position after the interval has expired (yellow LED not illuminated, red LED Asym./SEQ illuminated).



### Phase failure monitoring (SEQ)

If one of the phase voltages fails, the set interval of the tripping delay (DELAY) begins (red LED SEQ flashes). After the interval has expired (red LED SEQ illuminated), the output relays switch into off-position (yellow LED not illuminated).

Reverse voltages of a consumer (e.g. a motor which continues to run on two phases only) do not effect the disconnection but can be monitored by using a proper value for the asymmetry.



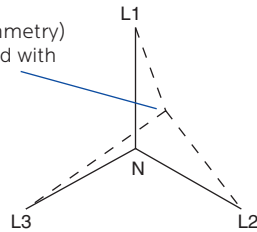
### Asymmetry monitoring

If the asymmetry between the phases exceeds the value set at the ASYM-regulator, the set interval of the tripping delay (DELAY) begins (red LED ASYM flashes). After the interval has expired (red LED ASYM illuminated), the output relays switch into off-position (yellow LED not illuminated).

## 3-phase voltage monitoring relay (Multifunction)

EMR SU31C1, SU31D1

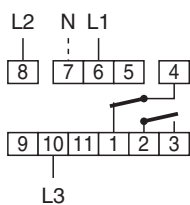
Shift of the star-point (asymmetry)  
through unequal phase-load with  
missing neutral wire



### Loss of neutral wire by means of evaluation of asymmetry

A break of the neutral wire between power line and machinery is detected as soon as asymmetry between phase-to-phase voltage and neutral wire occurs. If the asymmetry exceeds the value set at the ASYM-regulator, the set interval of the tripping delay (DELAY) begins (red LED ASYM flashes). After the interval has expired (red LED ASYM illuminated), the output relays switch into off-position (yellow LED not illuminated). A break of the neutral wire between our device and the machinery can not be detected.

## Connection



Measuring range 3 (N) 400/230 Vac  
Supply voltage = measuring range

## Dimensions

