

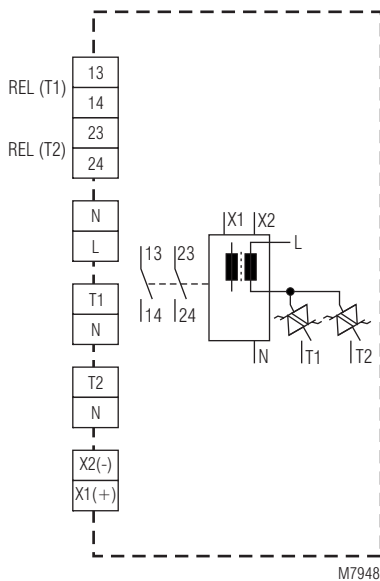
Semiconductor contactor SX 9241  
with Pump changing control

powerswitch



- According to IEC/EN 60 947-1, IEC/EN 60 947-4-2
- With integrated current monitoring
- 2-channels
- Switching at zero-crossing
- To switch, control and monitor single-phase loads up to 400 V
- Monitoring of under- and overcurrent
- Selector switch for auto or manual operation
- Automatic switchover in the case of failure
- Adjustable current value with setting aid via LEDs
- Indicator LEDs for status
- 2 relay outputs for failure deenergised on trip (failure)
- Fast disconnection on blocked motor or overtemperature
- Current up to 13 A
- 100 mm width

Circuit diagram



Approvals and marking



Application

The semiconductor contactor is used to control and monitor 2 pumps.

Function

When connecting the supply voltage both outputs T1 and T2 are switched off. T1 is switched on with the positive edge of a pulse on X1 and switched off with the negative edge. With the next pulse on X1 the positive edge triggers T2 to switch on. The SX 9241 provides a start-up delay, i. e. at the beginning of each switching cycle there is a delay of 3 sec. before current sensing is enabled. This delay makes sure, that the starting current is not detected as overcurrent,  $I_{start} = (typ.) 4 \times I_{Nom}$ .

If an overcurrent of  $> 1.2 I_{set}$  flows for more than 200 ms or an undercurrent of  $< I_{min} = 0,25 \dots 0,8 I_{set}$  for more than 40 sec in one channel, the semiconductor contactor switches over to the other channel. If the same fault occurs 2 times on the same channel, this channel will be blocked and the failure LED flashes. The blocked channel can only be reset after the failure is removed and acknowledged by switching the supply voltage off and on again.

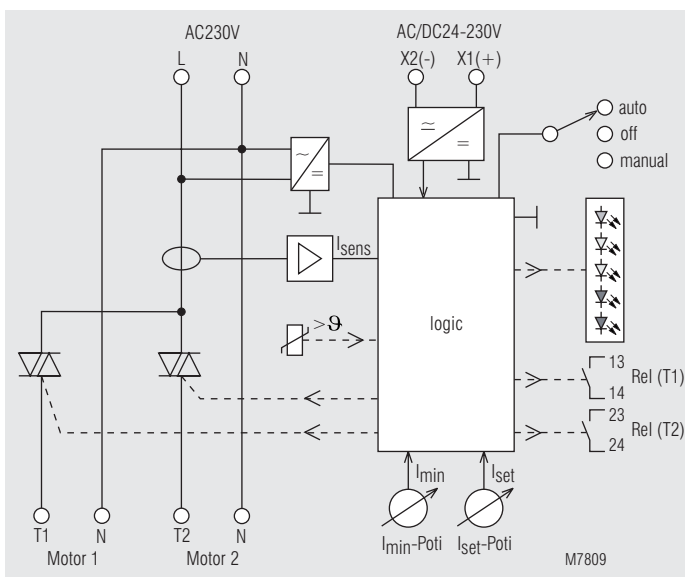
If a massive overcurrent of  $> 1,3 I_{set}$  and longer than 200 ms occurs in one channel, e. g. at blocked motor, the semiconductor contactor and both relays REL (T1) and REL (T2) are switched off. The semiconductor contactor can only be reset by switching the supply voltage off and on again.

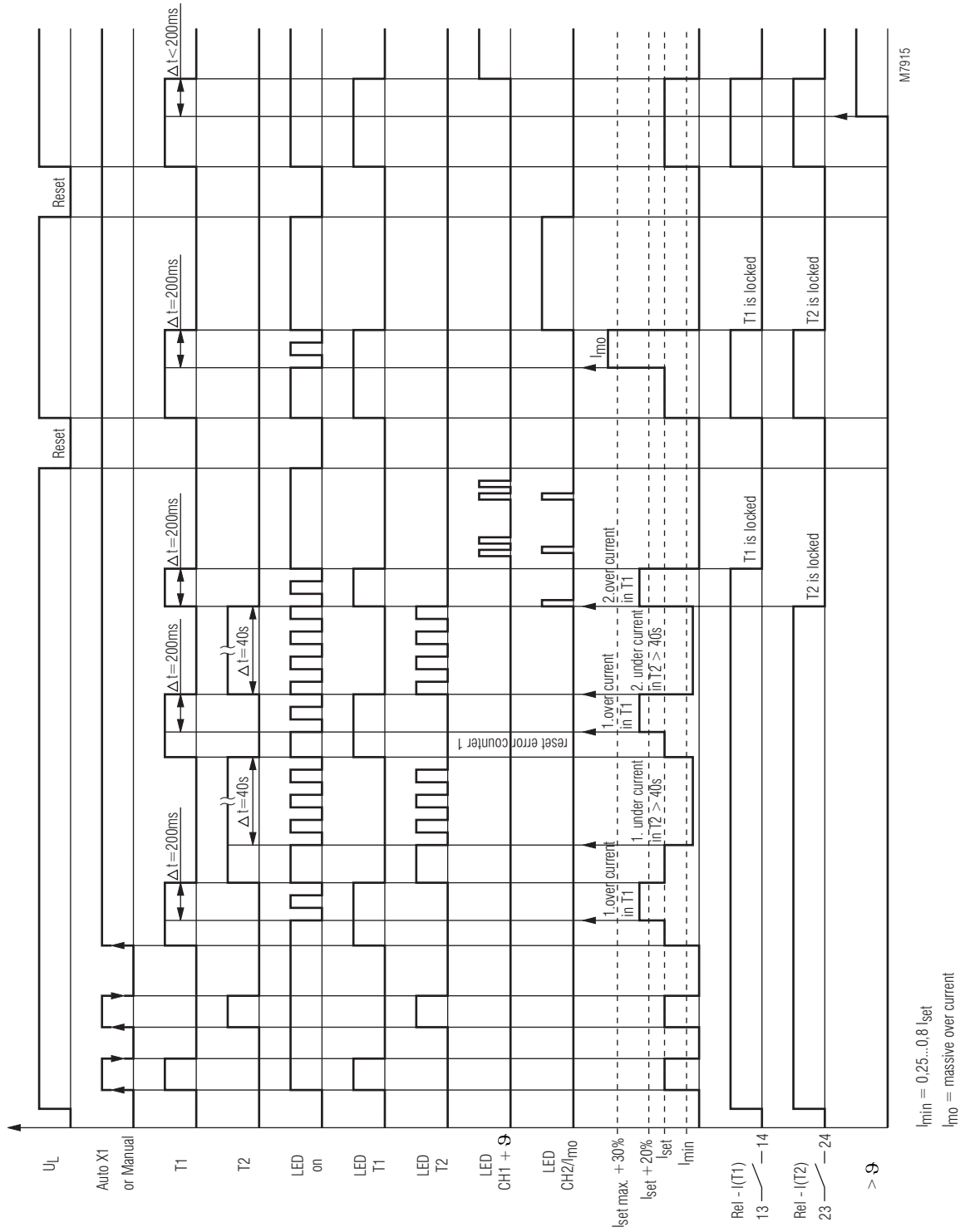
**Setting aid:** The green LED "Power" indicates with continuous light the current function of a channel. If the measured current varies more than 5 % of  $I_{set}$  the LED starts to flash.  $I_{set}$  = measured current  $I \pm 5 \%$ . On the unit the overcurrent setting value  $I_{max}$  must be adjusted first and then the undercurrent setting value  $I_{min}$ . When undercurrent is detected ( $I = < I_{min}$ ), the corresponding yellow LED T1 or T2 flashes.

Temperature monitoring

The temperature monitoring gets active if the temperature at the power semiconductors gets too high. The power semiconductor switches off and the monitoring relay also. This state is stored. If the temperature is lower than the tripping value, the semiconductors can be switched on again by switching the control signal off and on.

Block diagram

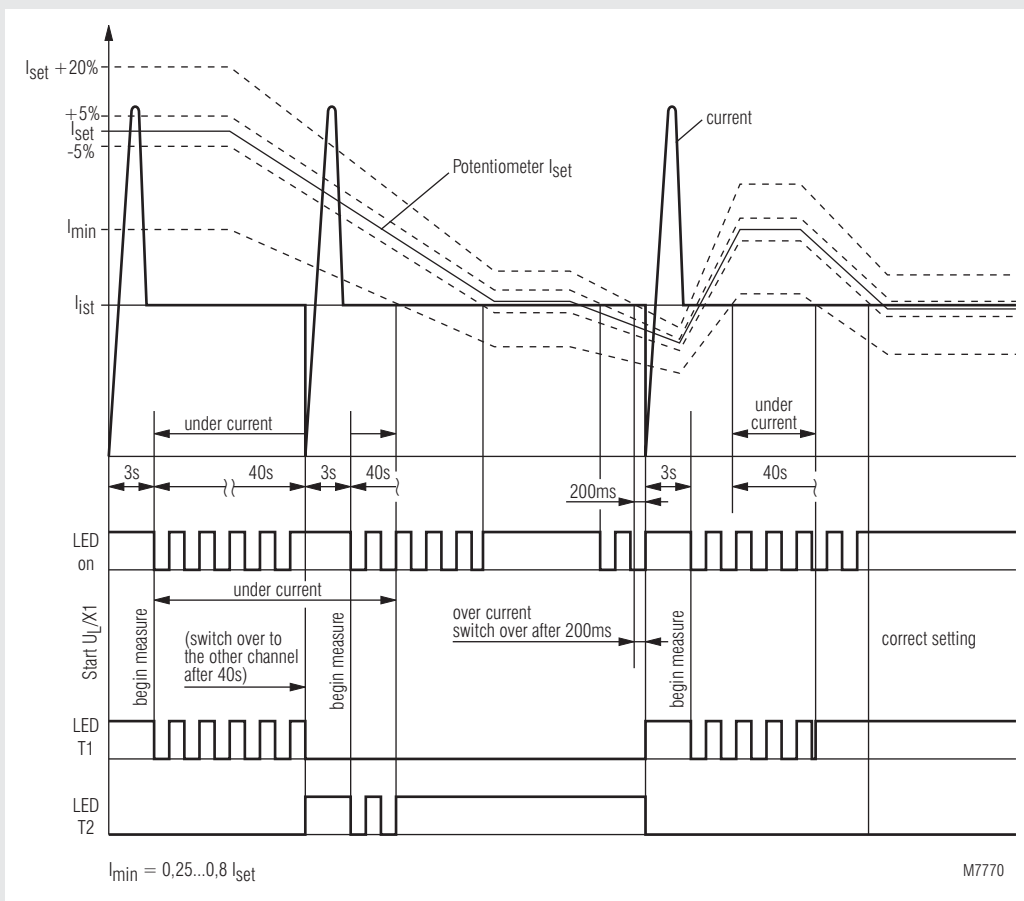




M7915

2-channel semiconductor contactor with integrated current monitoring

## Function diagram



### Setting aid

#### Indicators

- green LED "ON": flashing: Load current  $> 5\%$  of  $I_{set}$   
 continuous: Load current  $I_{ist}$  within setting range  $I_{set}$
- yellow LED T1: flashing: Undercurrent detected and time  $\Delta t$  runs  
 continuous: T1 switched on
- yellow LED T2: flashing: Undercurrent detected and time  $\Delta t$  runs  
 continuous: T2 switched on
- red LED CH1/∅>: flashing: 1 x short pulse/space = device is switched off and locked out because of undercurrent in CH 1.  
 2 x short pulse/space = device is switched off and locked out because of overcurrent.  
 continuous: Device is switched off because of overtemperature.
- red LED CH2/ $I_{mo}$ : flashing: 1 x short pulse/space = device is switched off and locked out because of undercurrent in CH 2.  
 2 x short pulse/space = device is switched off and locked out because of overcurrent.  
 continuous: Device is switched off because of blocked motor  $I > 1,3 I_{set}$

In the case of service, when load T1 or T2 is not connected, this can be selected by an internal 2-steps switch "T1 off - normal - T2 off".

In this case LED "CH1/∅>" flashes 3 times if T1 is disconnected and LED "CH2/ $I_{mo}$ " flashes 3 times if T2 is disconnected. A switch over to the other channel is not possible any more.

#### Technical Data

##### Input

<b>Nominal voltage <math>U_N</math>:</b>	AC 120, 230 V
<b>Voltage range:</b>	0,8 ... 1,1 $U_N$
<b>Nominal consumption</b> at AC 230 V:	2,5 VA
<b>Nominal frequency:</b>	50 / 60 Hz
<b>Control input X1-X2:</b>	galvanic separated
<b>Input voltage:</b>	AC/DC 19 ... 270 V
<b>Nominal current:</b>	approx. 1 mA, galvanic separated

##### Output

##### Load output $I_L$

<b>Load current</b>	
$T_u = 40\text{ °C}$ and 100 % ED:	10 A
$T_u = 40\text{ °C}$ and 80 % ED:	12 A
$T_u = 40\text{ °C}$ and 70 % ED:	13 A (100 % duty cycle is possible as variant with external attached heat sink)

##### Current reduction

at 40°C:	0,2 A / °C
<b>Load voltage:</b>	AC 24 ... 230 V AC 24 ... 400 V (on request)
<b>Cut-off voltage:</b>	1200 Vp
<b>Frequency range:</b>	50 / 60 Hz
<b>Surge current 10 ms:</b>	350 A
<b>Semiconductor fuse:</b>	610 A <sup>2</sup> s
<b>Varistor voltage:</b>	AC 510 V

##### Monitoring output

<b>Contacts:</b>	2 x 1 changeover contact
<b>Thermal current <math>I_{th}</math>:</b>	5 A
<b>Switching capacity</b> to AC 15	
NO contact:	3 A / AC 230 V IEC/EN 60 947-5-1
NC contact:	1 A / AC 230 V IEC/EN 60 947-5-1

## Technical Data

<b>Electrical life</b>	IEC/EN 60 947-5-1
to AC 15 at 1 A, AC 230 V:	3 x 10 <sup>5</sup> switching cycles
<b>Short circuit strength</b>	
<b>Max. fuse rating:</b>	6 A gL IEC/EN 60 947-5-1
<b>Mechanical life:</b>	>10 <sup>8</sup> switching cycles

## General data

<b>Operating mode:</b>	Continuous operation
<b>Temperature range:</b>	- 20 ... + 60°C
<b>Max. temperatur:</b>	60 °C (with current reduction)
<b>Stocking temperature:</b>	- 20 ... + 80°C
<b>Clearance and creepage distances</b>	
overvoltage category / contamination level:	4 kV / 2 IEC 60 664-1
<b>EMC</b>	
Surge voltage	5 kV / 0,5 J (class 3) DIN VDE 0435-303
HF Störung:	2,5 kV (class 3) DIN VDE 0435-303
Electrostatic discharge:	8 kV (air) IEC/EN 61 000-4-2
HF-irradiation:	10 V / m IEC/EN 61 000-4-3
Fast transients:	2 kV IEC/EN 61 000-4-4
Surge voltages between wires for power supply:	1 kV IEC/EN 61 000-4-5
between wire and ground:	2 kV IEC/EN 61 000-4-5
HF-wire guided:	10 V IEC/EN 61 000-4-6
Interference suppression:	Limit value class B EN 55 011
<b>Degree of protection:</b>	IP 65 IEC/EN 60 529
<b>Vibration resistance:</b>	Amplitude 0,35 mm frequency 10...55Hz IEC/EN 60 068-2-6
<b>Climate resistance:</b>	20 / 055 / 04 IEC/EN 60 068-1
<b>Wire connection</b>	
Load terminals:	4 mm <sup>2</sup> solid, or 2,5 mm <sup>2</sup> stranded
Control terminals:	1,5 mm <sup>2</sup> stranded
Relay terminals:	2,5 mm <sup>2</sup> stranded
<b>Leiterbefestigung:</b>	Box terminal with self-lifting wire protection
<b>Net weight:</b>	790 g

## Dimensions

**Width x height x depth:** 100 x 160 x 165 mm

## Standard type

SX 9241 AC 230 V 50/60 Hz 10 A

Article number:

- Nominal voltage: AC 230 V
- Load current: 10 A
- Width: 100 mm

## Ordering example

SX 9241 AC 230 V 50 / 60 HZ 10 A

