

Installation and Operational Instructions for ROBA[®] -multiswitch Type 019.100.2

(B.0191002.GB)

Manufacturer's Declaration

This product is intended for installation in a machine or system, based on the machine directive 2006/42/EC. It is forbidden to start use of the product until the machine or system into which it should be built is operating in accordance with the EC directives.

The product corresponds to the low voltage directive 2006/95/EC.



Safety Regulations

Danger!

To prevent injury or damage, only professionals and specialists should work on the devices, following the relevant standards and directives. Please read the Installation and Operational Instructions carefully before installation and initial operation of the device.

- Danger of death on touching voltage-carrying cables and components
- Danger of device failures caused by short circuits and earth short circuits at the terminals
- Electronic devices cannot be guaranteed fail-safe
- Danger of burns when touching hot surfaces



Please Observe:

Without a conformity inspection, the product is not suitable for use in areas where there is a high danger of explosion. This statement is based on directive 94/9/EC (ATEX directive).



Application

ROBA[®] -multiswitch fast acting rectifiers are used to connect DC units to alternating voltage supplies, for example electromagnetic brakes and clutches (ROBA-stop[®], ROBA[®] -quick, ROBATIC[®]) electromagnets, electrovalves etc.

Fast acting rectifier ROBA[®] -multiswitch 019.100.2

- Consistently controlled output voltage in the entire input voltage range.
- Consumer operation with overexcitation or power reduction
- Input voltage: 100 - 500 VAC
- Max. output current: 2 A



ROBA[®] -multiswitch units are not suitable for all applications, e.g. use of the ROBA[®] -multiswitch when operating noise-damped brakes is not possible without taking additional measures. The product's suitability should be checked before use.



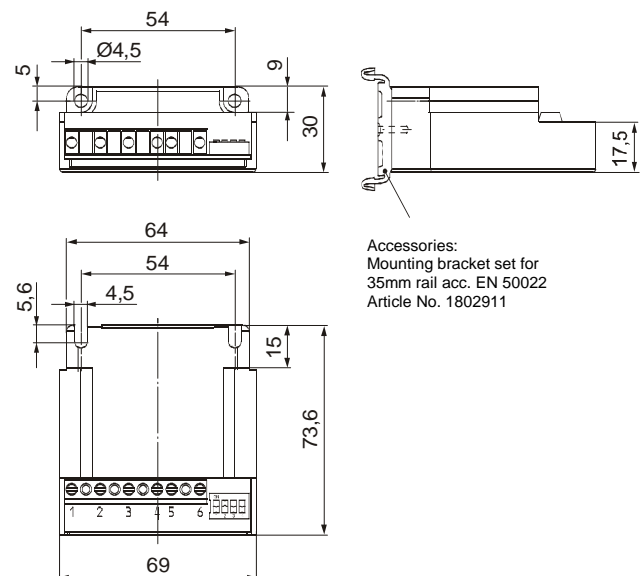
Function

The ROBA[®] -multiswitch units are (dependent on size) used for an input voltage of between 100 and 500 VAC. After switch-on, they emit the rectified bridge voltage for 50 ms and then control the 90 or 180 VDC overexcitation voltages. After the overexcitation period, they control the 52 or 104 VDC holding voltages. The overexcitation period can be adjusted via a DIP-switch to 150ms, 450ms, 1s, 1.5s and 2s.

Electrical Connection (Terminals)

- 1 + 2 Input voltage (built-in protective varistor)
- 3 + 4 Connection of external contact for DC-side switch-off
- 5 + 6 Output voltage (installed protective varistor)

Dimensions (mm)



Accessories:
Mounting bracket set for
35mm rail acc. EN 50022
Article No. 1802911

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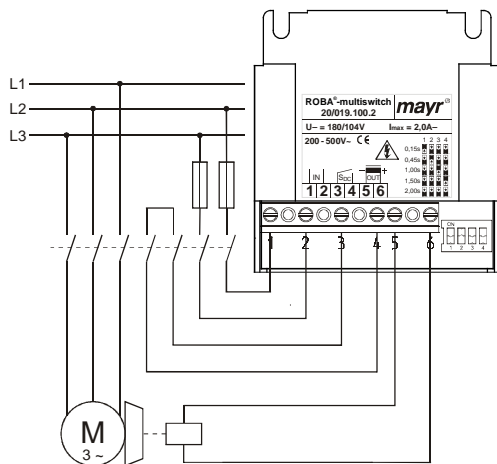
Technical Data

	Type 10/019.100.2	Type 20/019.100.2
Input voltage ±10 %, acc. EN 50160	100 - 275 VAC	200 - 500 VAC
Input voltage frequency	50 - 60 Hz	50 - 60 Hz
Output voltage U_{over} ±10 %	90 VDC	180 VDC
Output voltage U_{hold} ±10 %	52 VDC	104 VDC
Output current at ≤ 45 °C I_{RMS}	2,0 A	2,0 A
Output current at max. 70 °C I_{RMS}	1,0 A	1,0 A
Max. coil capacity on power reduction	312 W At coil nominal voltage 90V	623 W At coil nominal voltage 180 V
Max. coil capacity on overexcitation	104 W At coil nominal voltage 52 V	208 W At coil nominal voltage 104 V
Installed protective varistors U_{RMS}	300 V	550 V
Conformity markings	CE	CE
Protection fuse	FF 6,3 A (H) 5 x 20 mm	FF 6,3 A (H) 6,3 x 32 mm
Protection	IP65 components, IP20 terminals	
Terminals	Nominal cross-section 1,5 mm ² (AWG 22-14), screws M3, max. tightening torque 0,5 Nm	
Ambient temperature	-25 °C up to +70 °C	
Bearing temperature	-40 °C up to +105 °C	
Installation conditions	The installation position can be user-defined. Please ensure sufficient heat dissipation and air convection! Do not install this product near to sources of intense heat!	

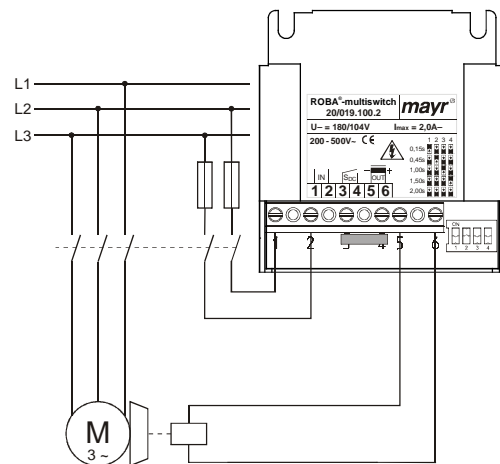


Special designs with other input and output voltages are available on request!

Wiring Example (400 VAC, DC-side switching)



Wiring Example (400 VAC, AC-side switching)



Switch-on

Switch-on always takes place AC-side. Only then is the overexcitation actuated.

Switch-off

If short switching times are required, please switch DC-side. The AC-side should always be switched as well, in order to activate the overexcitation.

If a longer brake engagement time or a quieter switching noise is required, please switch AC-side. For this, a bridge must be installed between terminals 3 and 4.

Protection fuse

In order to protect against damage caused by short circuits or earth contacts, please install suitable protection fuses in the mains supply.

Short circuits of earth contacts can cause failure of the ROBA® -multiswitch. After fuse elements have reacted, the ROBA® -multiswitch must be tested for functional and operational safety (overexcitation voltage, switch-off voltage, switch-off time, holding voltage): The same procedure is to be carried out after coil failure.

Overexcitation time t_{over}

Increased wear and therefore an enlarged air gap as well as coil heat lengthen the separation time t_2 of the brake. Therefore, as overexcitation time t_{over} please select at least double the release time t_2 on each brake size.

The overexcitation time can be adjusted via a DIP-Switch to 150ms, 450ms, 1s, 1,5s and 2s $\pm 20\%$. The switches may only be switched in a de-energised condition.

Overexcitation times

Separation time brake t_2	Overexcitation time t_{over}	DIP-switch
0,07 s	0,15 s	
0,22 s	0,45 s	
0,50 s	1,00 s	
0,75 s	1,50 s	
1,00 s	2,00 s	

Recovery time 100 ms

The recovery time is the amount of time the ROBA® -multiswitch requires in order to reach the start position after switch-off. The input voltage may therefore be switched on again at the earliest after 100 ms. During cycle operation, please take suitable measures to ensure that the recovery time is kept to.

Operation on Transformers

During operation on a transformer, please ensure sufficient rigidity on transformers (min. $3x P_{nom}$ of the brake). A filter or external varistor must be installed. Please ensure that the standard EN 50160 is kept to and that this is re-checked after installation of the ROBA® -multiswitch.

Maximum Coil Capacity P_{RMS}

The Table values are guidelines for a switching frequency pf max. 1 cycle per minute and for keeping to the permitted current I_{RMS} at $\leq 45\text{ }^\circ\text{C}$.

Please Observe!

If the switching frequency is larger than 1 cycle per minute or if the overexcitation time t_{over} is larger than the Table values, please observe the following:

$P_{RMS} \leq P_{nom}$

RMS coil capacity may not be larger than P_{nom} or the nominal current I_{RMS} which flows through the ROBA® -multiswitch may not be exceeded, otherwise the coil and the ROBA® -multiswitch may fail due to thermic overload.

At high input voltage and low brake performance, the initial bridge rectification of 50ms can lead to thermic overload.

Calculations:

P_{RMS} (W) RMS coil capacity, dependent on switching frequency, overexcitation, power reduction and switch-on time duration

$$P_{RMS} = \frac{P_{over} \times t_{over} + P_{hold} \times t_{hold}}{t_{tot}}$$

P_{nom} (W) Coil nominal capacity (Catalogue values or Type tag)

P_{over} (W) Coil capacity on overexcitation

$$P_{over} = \left(\frac{U_{over}}{U_{nom}}\right)^2 \times P_{nom}$$

P_{hold} (W) Coil capacity on power reduction

$$P_{hold} = \left(\frac{U_{hold}}{U_{nom}}\right)^2 \times P_{nom}$$

t_{over} (s) Overexcitation time

t_{hold} (s) Time of operation with power reduction

t_{off} (s) Time without voltage

t_{tot} (s) Total time ($t_{over} + t_{hold} + t_{off}$)

U_{over} (V) Overexcitation voltage (bridge voltage)

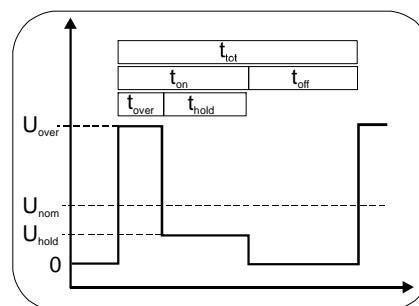
U_{hold} (V) Holding voltage (half-wave voltage)

U_{nom} (V) Coil nominal voltage

I_{RMS} (A) RMS current, dependent on switching frequency, overexcitation and switch-on duration

$$I_{RMS} = \sqrt{\frac{P_{RMS} \times P_{nom}}{U^2_{nom}}}$$

Time Diagram

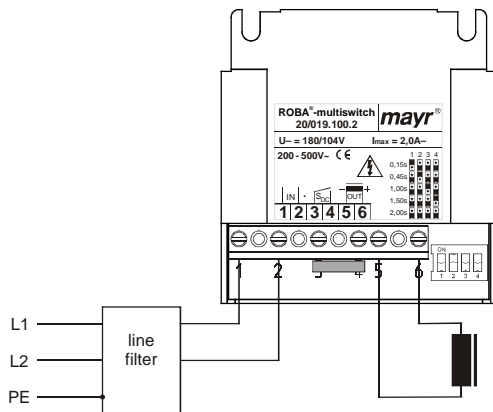


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EMC-compatible Installation

The measures described for keeping to the EMC directives are inspected under laboratory conditions and, due to possible deviations, cannot always be automatically transferred, as they are dependent on the condition of each machine or plant. The inspection tests the individual components *mayr*[®]-ROBA[®]-multiswitch and *mayr*[®]-brake and is applicable for an input voltage of up to 500 VAC.



Measures

- Installation of a line filter in the AC-supply line: (e.g. Epcos B84113-C-B30)

Please Observe!

- Avoid antennae effects: keep the supply cables as short as possible: do not form ring or bow shapes with the cables!
- Mount good bonding connections onto the metal body of the brake!
- Lay control cables separately from power cables or strongly pulsating cables!
- In operation with a frequency converter, please ensure EMC-compatible installation of the frequency converter!
- Please always check the holding voltage of the ROBA[®]-multiswitch during operation of all components in the system.
- For the operation of the ROBA[®]-multiswitch in living and small business areas, special precautions must be taken in order to keep to the correct limit values for this area with the complete system, e.g. by installing a capacitor. The device has been inspected individually only for industrial areas.

Standards

EMC-Inspections

DIN EN 61000-6-2:2006-03 Interference immunity
DIN EN 61000-6-4:2002-08 Noise emissions
VDE 0160 / DIN EN 50178:1998-04 Equipment from high-voltage current plants with electronic machinery materials

Insulation coordination acc. VDE 0110 / DIN EN 60664:2003-11

Overvoltage category III
Pollution degree 2
Rated insulation voltage 500 V_{RMS}

Appointed use:

Acc. to DIN EN 50178:1998-04