



## Guidelines on the Declaration of Conformity

A conformity evaluation has been carried out for the product in terms of the EU Low Voltage Directive 2014/35/EU and the Electromagnetic Compatibility (EMC) Directive 2014/30/EU. The Declaration of Conformity is laid out in writing in a separate document and can be requested if required.

## Guidelines on the EMC Directive (2014/30/EU)

The product cannot be operated independently according to the EMC directive. Only after integration of the product into an overall system can this be evaluated in terms of the EMC. For electronic equipment, the evaluation has been verified for the individual product in laboratory conditions, but not in the overall system.

## Guidelines on the Machinery Directive (2006/42/EC)

The product is a component for installation into machines according to the Machinery Directive 2006/42/EC. The product can fulfil the specifications for safety-related applications in coordination with other elements. The type and scope of the required measures result from the machine risk analysis. The product then becomes a machine component and the machine manufacturer assesses the conformity of the safety device to the directive. It is forbidden to start use of the product until you have ensured that the machine accords with the regulations stated in the directive.

## Guidelines on the ATEX Directive

Without a conformity evaluation, this product is not suitable for use in areas where there is a high danger of explosion. For application of this product in areas where there is a high danger of explosion, it must be classified and marked according to Directive 2014/34/EU.

## Safety and Guideline Signs

### Danger



Immediate and impending danger, which can lead to severe physical injuries or to death.

### CAUTION



Danger of injury to personnel and damage to machines



Guidelines on important points

## General Safety Guidelines

### DANGER



Danger of death! Do not touch voltage-carrying lines and components.

### DANGER



Danger of burns when touching hot surfaces

### CAUTION



- Danger from devices caused by short-circuits and earth short-circuits at the terminals
- Electronic devices cannot be guaranteed fail-safe.

During the risk assessment required when designing the machine or system, the dangers involved must be evaluated and removed by taking appropriate protective measures.

To prevent injury or damage, only professionals and specialists are allowed to work on the devices. They must be familiar with the dimensioning, transport, installation, initial operation, maintenance and disposal according to the relevant standards and regulations.

## General Safety Guidelines



Only carry out installation, maintenance and repairs in a de-energised, disengaged state and secure the system against inadvertent switch-on.



Before product installation and initial operation, please read the Installation and Operational Instructions carefully and observe the Safety Regulations. Incorrect operation can cause injury or damage.

# Installation and Operational Instructions for ROBA®-multiswitch Type 019.\_00.2

(B.019+002.EN)

## Application

ROBA®-multiswitch fast switching modules are used to connect DC consumers to alternating voltage supplies, for example electromagnetic brakes and clutches (ROBA-stop®, ROBA®-quick, ROBATIC®) as well as electromagnets, electrovalves, etc.

### Fast acting rectifier ROBA®-multiswitch 019. 00.2

- Consistently controlled output voltage in the entire input voltage range
- Consumer operation with overexcitation or power reduction
- Input voltage: 100 – 500 VAC
- Maximum output current  $I_{\text{eff}}$ : 2 A; 4.5 A
- UL-approved



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

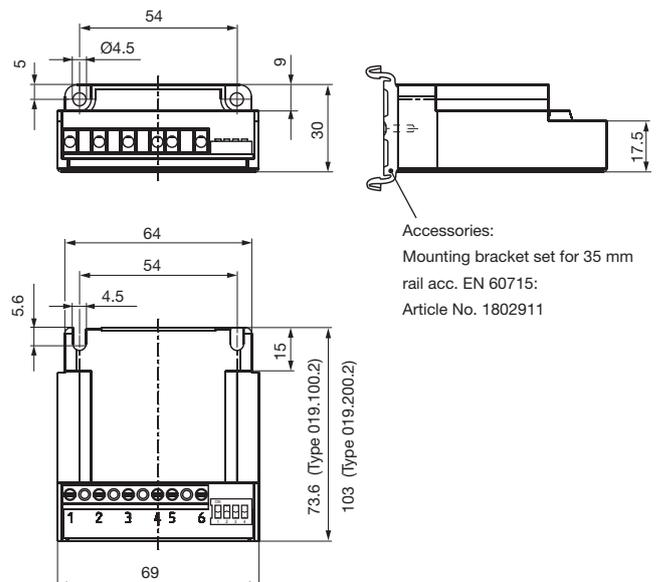
The ROBA®-multiswitch is used for operation at an input voltage of between 100 and 500 VAC, depending on the size. After switch-on, it emits the rectified bridge voltage for 50 ms and then adjusts automatically to a pre-programmed overexcitation voltage. After the overexcitation time ends, it regulates to the permanently programmed holding voltage. For the overexcitation voltage and holding voltage values of the standard design, please see the Table at the bottom of page 3.

On special designs, deviating values are possible. The overexcitation time can be adjusted via a DIP switch to 150 ms, 450 ms, 1 s, 1.5 s and 2 s.

## Electrical Connection (Terminals)

- 1 + 2 Input voltage (fitted protective varistor)
- 3 + 4 Connection for external contact for DC-side switch-off (with an installed bridge, switch-off only takes place AC-side with a longer brake engagement time)
- 5 + 6 Output voltage (fitted protective varistor)

## Dimensions (mm)



Accessories:  
Mounting bracket set for 35 mm rail acc. EN 60715: Article No. 1802911

# Installation and Operational Instructions for ROBA®-multiswitch Type 019.\_00.2

(B.019+002.EN)

Technical Data				Type 019.100.2		Type 019.200.2
				Size 10	Size 20	Size 20
Frequency	Input voltage		[Hz]	50 – 60	50 – 60	50 – 60
Output current	at $\leq 45\text{ °C}$	$I_{\text{eff}}$	[A]	2.0	2.0	4.5
	at max. $70\text{ °C}$	$I_{\text{eff}}$	[A]	1.0	1.0	2.25
Fitted protective varistors		$U_{\text{RMS}}$	[V]	300	550	550
Device fuses				T 5 A (H) 5 x 20 mm	T 5 A (H) 6.3 x 32 mm	T 10 A (H) 6.3 x 32 mm
Protection				IP65 components / IP20 terminals / IP20 DIP switch		
Terminals				Nominal cross-section $1.5\text{ mm}^2$ (AWG 22-14), screws M3, max. tightening torque 0.5 Nm		
Ambient temperature			[°C]	-25 to +70		
Storage temperature			[°C]	-40 to +70		
Conformity markings						
Installation conditions				The installation position can be user-defined. Please ensure sufficient heat dissipation and air convection! Do not install near to sources of intense heat!		

## DANGER



Danger of death! Do not touch voltage-carrying lines and components.

### No mains separation!

Voltage control through phase angle control system

Sizes	Type	Input voltage * $\pm 10\%$ acc. EN 50160 [VAC]	Output voltage * $\pm 10\%$		Article number
			Overexcitation voltage $U_o$ [VDC]	Holding voltage $U_h$ [VDC]	
			10	019.100.2	
20	019.100.2	200 – 500	180	104	8185591
	019.200.2	200 – 500	180	104	8242954
	019.100.2	230	207	30	8225580
	019.200.2	230	207	30	8237887
	019.100.2	300 – 500	240	52	8220914

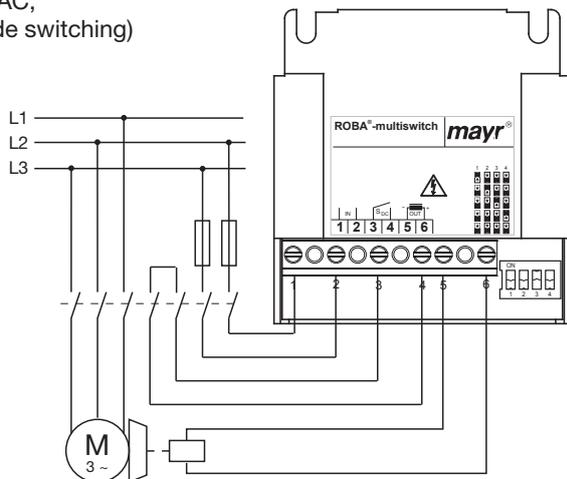
\* On special designs, deviating values are possible. The values stated on the Type tag are decisive.



Special designs with other input and output voltages as well as longer overexcitation times are available on request!

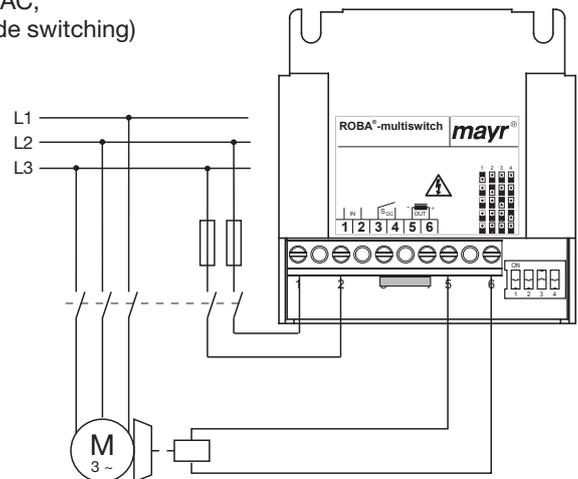
## Wiring Example

(400 VAC,  
DC-side switching)



## Wiring Example

(400 VAC,  
AC-side switching)



## Protection circuit



When using DC-side switching, the coil must be protected by a suitable protection circuit according to VDE 0580, which is integrated in *mayr*®-rectifiers. Nevertheless, the high voltage induced on circuit interruption produces switching sparks, which lead to contact consumption. Therefore, only use the main contacts of a contactor suitable for inductive loads with a minimum contact opening of 3 mm for switching the DC-side contact  $S_{DC}$ . Connecting the main contacts in series reduces wear.

## Switch-ON

Switch-on always takes place AC-side, as only then is the overexcitation activated.

## 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.

## Device Fuses

To protect against damage from short-circuits or earth short-circuits, please add suitable device fuses to the mains cable. As an alternative, a motor protection switch can be used. This must be adjusted to the holding current of the brake; at the same time it serves as overload protection for the brake.

Short-circuits or earth short-circuits can lead to ROBA®-multiswitch failures. After fuse elements have reacted to a malfunction, the ROBA®-multiswitch must be checked for functional and operational safety (overexcitation voltage, switch-off voltage, response delay time, holding voltage). The same procedure is to be carried out after coil failure.

## Recovery Time 100 ms

The recovery time is the amount of time the ROBA®-multiswitch requires in order to reach its starting position after switch-off. Therefore, the device may be switched on again at the earliest after 100 ms.

During cycle operation, please take suitable measures to ensure that the recovery time of 100 ms is maintained.

## Operation on Transformers

During operation on a transformer, please ensure sufficient rigidity on transformers (min.  $3 \times P_N$  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.

## Overexcitation Time $t_o$



Increased wear (enlarged air gap) as well as coil heat lengthen the brake separation time  $t_2$ . Therefore, when dimensioning the overexcitation time  $t_o$ , please select at least double the separation time  $t_2$  on each brake Type and size (catalogue values).

The overexcitation time can be adjusted via the DIP switch to 150 ms, 450 ms, 1 s, 1.5 s and 2.15 s  $\pm$  20 %. The switches may only be switched in de-energised state and may only be adjusted as depicted.

DIP switch	Overexcitation time $t_o$ [s]
	0.15
	0.45
	1.00
	1.50
	2.15

Manufacturer-side setting

## Coil Capacity



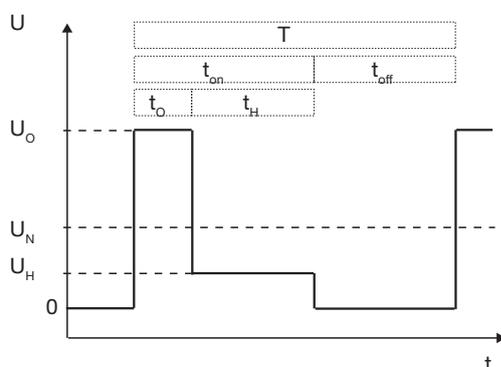
If the switching frequency is larger than 1 cycle per minute or if the overexcitation time  $t_o$  is longer than double the separation time  $t_2$ , please observe the following:

$$P \leq P_N$$

The coil capacity  $P$  must not be larger than  $P_N$  or the nominal current  $I_{RMS}$  which flows through the ROBA®-multiswitch must not be exceeded, as otherwise the coil and the ROBA®-multiswitch can fail due to thermal overload.

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

### Time Diagram:



### Calculations:

$P$  [W] RMS coil capacity dependent on switching frequency, overexcitation, reduction in capacity and duty cycle

$$P = \frac{P_o \times t_o + P_H \times t_H}{T}$$

$P_N$  [W] Coil nominal capacity (catalogue values, Type tag)

$P_o$  [W] Coil capacity on overexcitation

$$P_o = \left( \frac{U_o}{U_N} \right)^2 \times P_N$$

$P_H$  [W] Coil capacity at reduced capacity

$$P_H = \left( \frac{U_H}{U_N} \right)^2 \times P_N$$

$t_o$  [s] Overexcitation time

$t_H$  [s] Time of operation with reduction in capacity

$t_{off}$  [s] Time without voltage

$t_{on}$  [s] Time with voltage

$T$  [s] Total time ( $t_o + t_H + t_{off}$ )

$U_o$  [V] Overexcitation voltage (bridge voltage)

$U_H$  [V] Holding voltage (half-wave voltage)

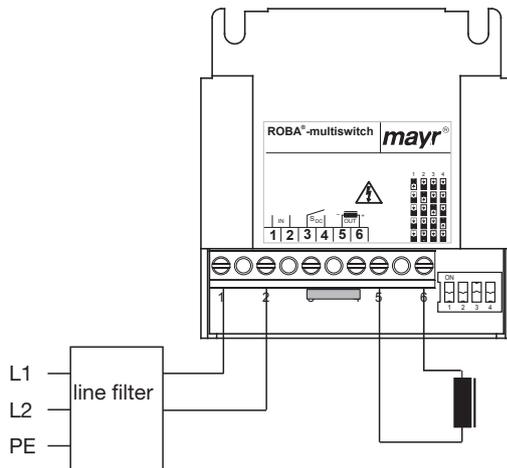
$U_N$  [V] Coil nominal voltage

$I_{eff}$  [A] RMS current dependent on switching frequency, overexcitation time and duty cycle

$$I_{RMS} = \sqrt{\frac{P \times P_N}{U_N^2}}$$

## EMC-compatible Installation

The measure described for compliance with the EMC directive is examined under laboratory conditions, and cannot necessarily be bindingly transferred onto the condition of a machine or equipment in case of deviations. The inspection tests the individual components *mayr*®-ROBA®-multiswitch and the *mayr*®-brake and is applicable for an input voltage of up to 500 VAC.



## Measure

Installation of a line filter in the AC-supply line  
(e.g. Schaffner FN 2415-10-29)



- Avoid an antennae effect: Keep the supply cables as short as possible; do not form rings or loops with the cables!
- Mount good earth connections onto the metal body of the brake!
- Lay control cables separately from power cables or from strongly pulsating supply cables!
- During 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

### Product standard

VDE 0160/DIN EN 50178:1998-04

Electronic equipment for use in power installations

### EMC inspections

EN 61000-6-2:2006-03

Interference immunity

EN 61000-6-4:2007-09

Interference emission

### Insulation coordination

acc. VDE 0110 / EN 60664:2008-01

Overvoltage category III

Pollution degree 2

Rated insulation voltage 500 V<sub>RMS</sub>

## Intended Use

*mayr*®-rectifiers have been developed, manufactured and tested as electronic equipment in compliance with the DIN EN 50178 standard and in accordance with the EU Low Voltage Directive. During installation, operation and maintenance of the product, the requirements for the standard must be observed. *mayr*®-rectifiers are for use in machines, systems and devices and must only be used in the situations for which they are ordered and confirmed. The products are designed for installation into electrical control cabinets and terminal boxes. Using them for any other purpose is not allowed.