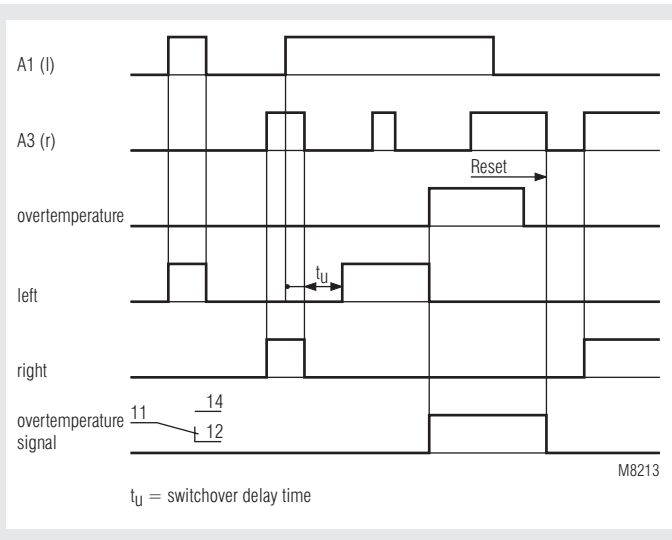


## POWERSWITCH Reversing Contactor BH 9253



- According to IEC/EN 60 947-1, IEC/EN 60 947-4-2
- Switching at zero-crossing
- To reverse 3 phase asynchronous motors up to 5.5 kW / 400 V (7.5 HP / 460 V)
- Electrical interlocking of both directions
- Temperature monitoring to protect the power semiconductors
- Measured nominal current up to 20 A
- LEDs for status indication
- Galvanic separation between control circuit and power circuit
- 45 mm; 67.5 mm; 112.5 mm width

### Function Diagram



### Approvals and Marking



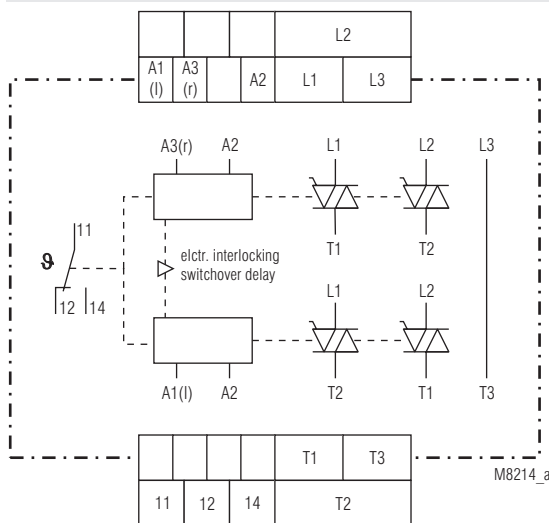
### Function

The reversing contactor BH 9253 is used to reverse the direction of 3-phase asynchronous motors by switching 2 phases. An electrical interlocking disables the control of both directions at the same time. The reversing contactor has a short on and off delay time. When reversing the phases a switchover delay is guaranteed.

### Temperature sensing

To protect the power semiconductors the unit incorporates temperature monitoring. When overtemperature is detected the power semiconductors switch off and an output relay as well as a red LED is activated. This state is stored. When the temperature is back to normal the semiconductors can be activated again by switching off and on the control voltage.

### Circuit Diagram



### Indication

- |                 |                                 |
|-----------------|---------------------------------|
| yellow LED "l": | on, when left direction active  |
| yellow LED "r": | on, when right direction active |
| red LED:        | on, when overtemperature        |

## Technical Data

### Input

#### Nominal voltage

**A1,A2 / A3,A2:** AC/DC 24 V;  
AC 110 ... 127 V, AC 220 ... 240 V, AC 288 V  
AC 400 V (no UL-devices)  
control voltage A1, A3 has to be connected to the same potential (see appl. example)

#### Voltage range:

AC: 0.8 ... 1.1  $U_N$   
DC: 0.8 ... 1.25  $U_N$

#### Nominal consumption

at AC 230 V: 4 VA, 0.8 W  
at DC 24 V: 0.3 W

#### Nominal frequency:

50 / 60 Hz

#### Switch on delay:

max. 30 ms

#### Switch off delay:

typically 25 ms

#### Switch-over delay $t_U$ :

100 ms (other values on request)

#### Permissible residual voltage:

30 %  $U_N$

### Load Output

	unit without heat sink	with heat sink width 67.5 mm	with heat sink width 112.5 mm
Rated continuous current $I_e$ <sup>1)</sup> [A]	4	12	20
Current reduction above 40 °C [A/°C]	0.1	0.2	0.2
max. motor power at 400 V [kW]	1.1	4	5.5
Nominal motor current $I_N$ [A]	2.6	8.5	11.5
max. locked rotor motor current [A]	15.6	51	69
Example for max. operat. freq. at 100 % duty cycle, 80 % motor load, starting time $t_A$ 2s, starting current $I_A = 6 \times I_N$ [1/h]	250	210	320
Operation mode	AC53a acc. to IEC/EN 60947-4-2		

<sup>1)</sup> The rated continuous current  $I_e$  is the max. permissible current of the unit in continuous operation.

**Note:** The max. permissible operating frequency of the motor can be less. See motor data!

**Load voltage range:** AC 24 ... 480 V

**Peak inverse voltage:** 1 200 Vp

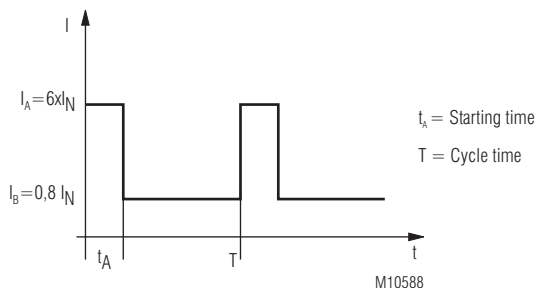
**Frequency range:** 50 / 60 Hz

**Surge current 10 ms:** 300 A

**Semiconductor fuse:** 450 A<sup>2</sup>s

**Varistor voltage:** AC 510 V

### Cycle diagram to calculate the operating frequency



Formula for selection of unit and motor

$$I_e \geq \frac{1}{T} [I_A t_A + I_B (T - t_A)] \quad \text{Device selection}$$

$$I_N^2 \geq \frac{1}{T} [I_A^2 t_A + I_B^2 (T - t_A)] \quad \text{Motor selection}$$

## Technical Data

### Monitoring Output

#### Contacts

BH 9253.11: 1 changeover contact  
5 A

#### Thermal current $I_{th}$ :

#### Switching capacity

at AC 15

NO:

3 A / AC 230 V

IEC/EN 60 947-5-1

NC:

1 A / AC 230 V

IEC/EN 60 947-5-1

#### Short circuit strength

max. fuse rating:

4 A gL

IEC/EN 60 947-5-1

### General Data

#### Operating mode:

Continuous operation

#### Temperature range:

- 20 ... + 60 °C

Current reduction over 40 °C: see table

#### Clearance and creepage distances

rated impuls voltage /

pollution degree:

4 kV / 2

IEC 60 664-1

#### EMC

Surge voltages: 5 kV / 0.5 J

HF-interference: 2.5 kV

Electrostatic discharge: 8 kV (air)

IEC/EN 61 000-4-2

HF irradiation: 10 V / m

IEC/EN 61 000-4-3

Fast transients: 4 kV

IEC/EN 61 000-4-4

Surge voltages between

wires for power supply:

1 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

#### Degree of protection

Housing:

IP 40

IEC/EN 60 529

Terminals:

IP 20

IEC/EN 60 529

#### Housing:

Thermoplastic with V0 behaviour

according to UL subject 94

#### Vibration resistance:

Amplitude 0.35 mm IEC/EN 60 068-2-6

frequency 10 ... 55 Hz

#### Climate resistance:

20 / 040 / 04

IEC/EN 60 068-1

#### Terminal designation:

#### Wire connection

Load terminals:

1 x 10 mm<sup>2</sup> solid or

1 x 6 mm<sup>2</sup> stranded ferruled

Control terminals:

2 x 2.5 mm<sup>2</sup> solid or

2 x 1.5 mm<sup>2</sup> stranded ferruled

DIN 46 228-1/-2/-3/-4

terminal screws M3.5; box terminals

with self-lifting wire protection

#### Wire fixing:

DIN rail

IEC/EN 60 715

#### Mounting:

#### Weight:

BH 9253 with 4 A:

420 g

BH 9253 with 12 A:

640 g

BH 9253 with 20 A:

1 040 g

### Dimensions

#### Width x height x depth:

BH 9253 with 4 A:

45 x 84 x 121 mm

BH 9253 with 12 A:

67.5 x 84 x 121 mm

BH 9253 with 20 A:

112.5 x 84 x 121 mm

## UL-Data

	unit without heat sink	with heat sink width 67.5 mm	with heat sink width 112.5 mm
Switching capacity			
Relay			
NO-contact [Vac]	230; 3A; GP		
NC-contact [Vac]	230; 1A; GP		
Short circuit current rating [Arms]	5000		
Ambient conditions	For usage at pollution degree 2; To be used in circuits that allows a max. current of 5000Arms at 460 V. The device has to be fused with a fuse class RK5 25A.		
Rated continuous current $I_e$ <sup>1)</sup> [A]	4	12	20
Ambient temperature [°C]	40 60	40 60	40 60
max. motor power at 460 V [HP]	1,5 0,75	5 3	7,5 5
Nominal motor current FLA (Full load current) [A]	3,0 1,6	7,6 4,8	11 7,6
max. locked rotor motor current LRA [A]	20 12,5	46 32	63,5 46
<sup>1)</sup> The rated continuous current $I_e$ is the max. permissible current of the unit in continuous operation.			

### Wire connection

#### Load terminals

**L1, L2, L3, T1, T2, T3:** 60°C / 75°C copper conductors only  
AWG 18 - 8 Sol Torque 0.8 Nm  
AWG 18 - 10 Str Torque 0.8 Nm

#### Control terminals

**A1, A2, A3, 11, 12, 14:** 60°C / 75°C copper conductors only  
AWG 20 - 12 Sol Torque 0.8 Nm  
AWG 20 - 14 Str Torque 0.8 Nm



Technical data that is not stated in the UL-Data, can be found  
in the technical data section.

## Standard Type

BH 9253.11/61 AC 220 ... 240 V 4 A 100 ms

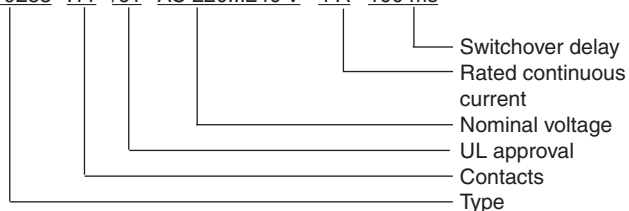
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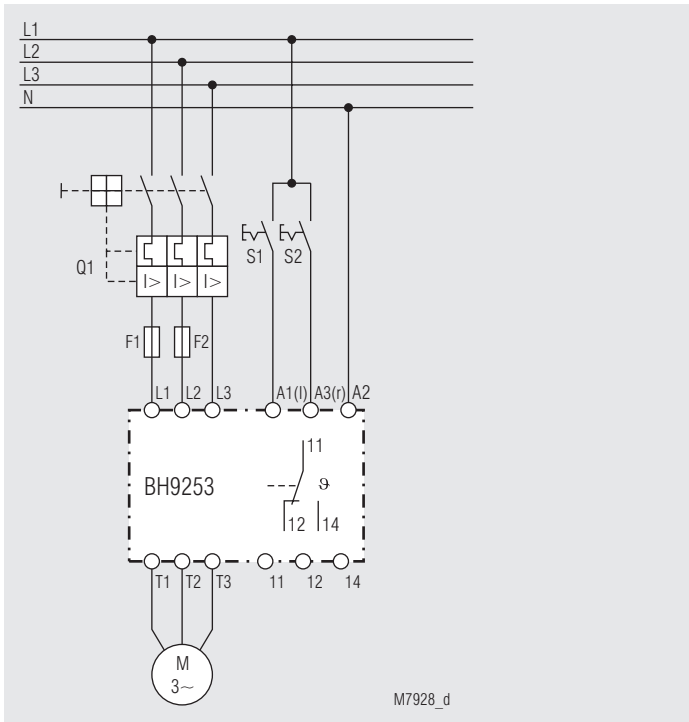
- Output: 1 changeover contact
- Nominal voltage  $U_N$ : AC 220 ... 240 V
- Rated continuous current: 4 A
- Switchover delay: 100 ms
- Width: 45 mm

## Ordering Example

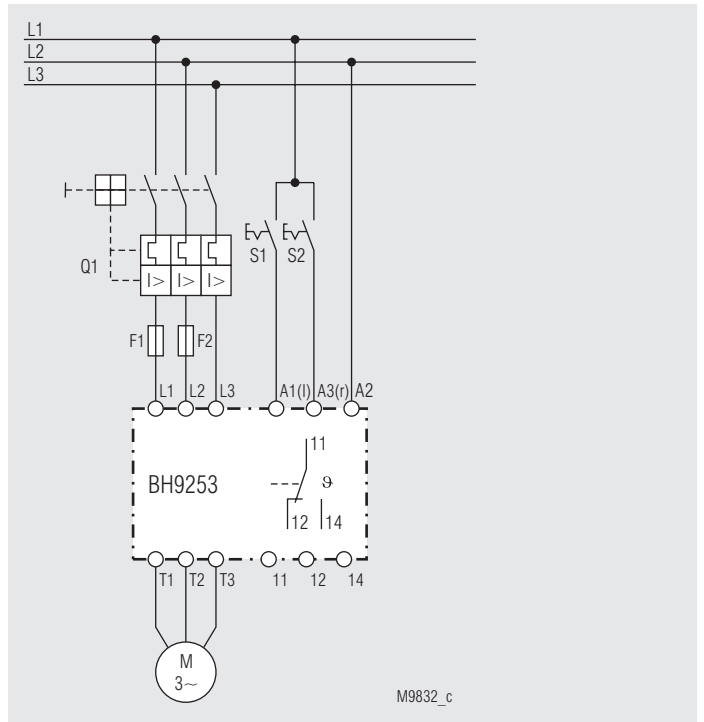
BH 9253 .11 /61 AC 220...240 V 4 A 100 ms



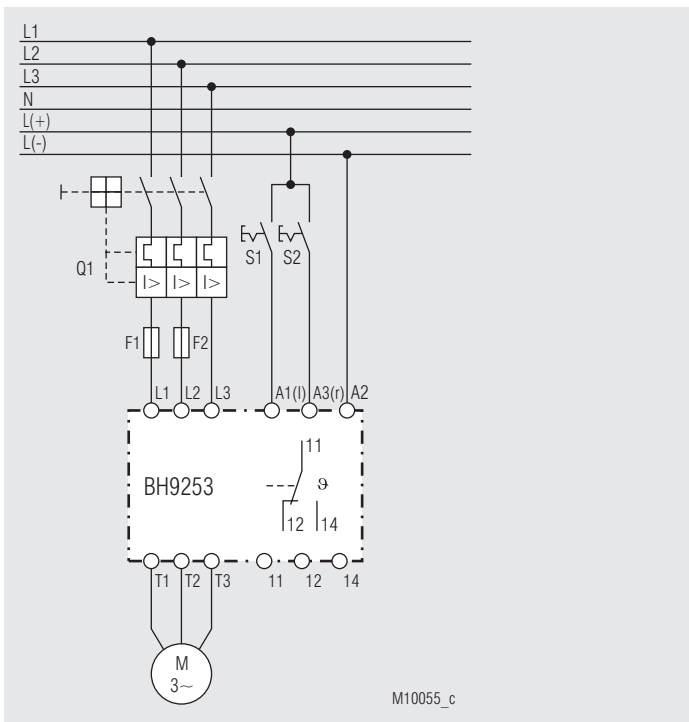
## Application Examples



230/400 V AC-Mains  
AC 230 V control voltage



230/400 V AC-Mains  
AC 400 V control voltage



230/400 V AC-Mains  
AC/DC 24 V control voltage

### ATTENTION!



A1 and A3 has to be connected to the same phase. The common connection is terminal A2.

Connecting a parallel load between A1 and A2 as well as A3 and A2 is not allowed