POWERSWITCH
Reversing Contactor With Current Monitor
BH 9255

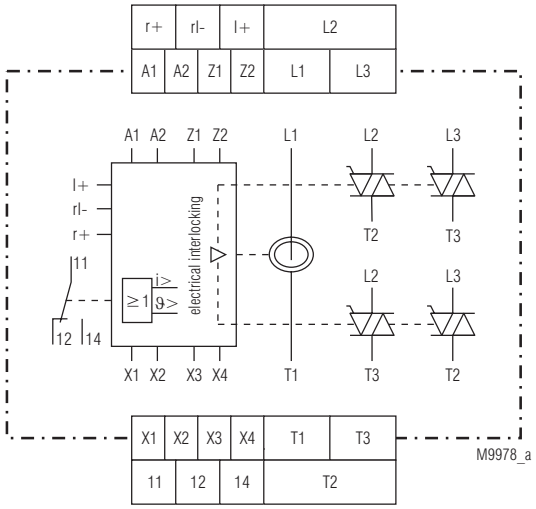
0255168

BH 9255 with
Rated continuous current 4 A

BH 9255 with
Rated continuous current 12 A

- According to IEC/EN 60 947-1, IEC/EN 60 947-4-2
- Switching at zero crossing
- To reverse 3 phase asynchronuos 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
- With current monitor
- 45 mm; 67.5 mm; 112.5 mm width

Circuit Diagram



Approvals and Marking

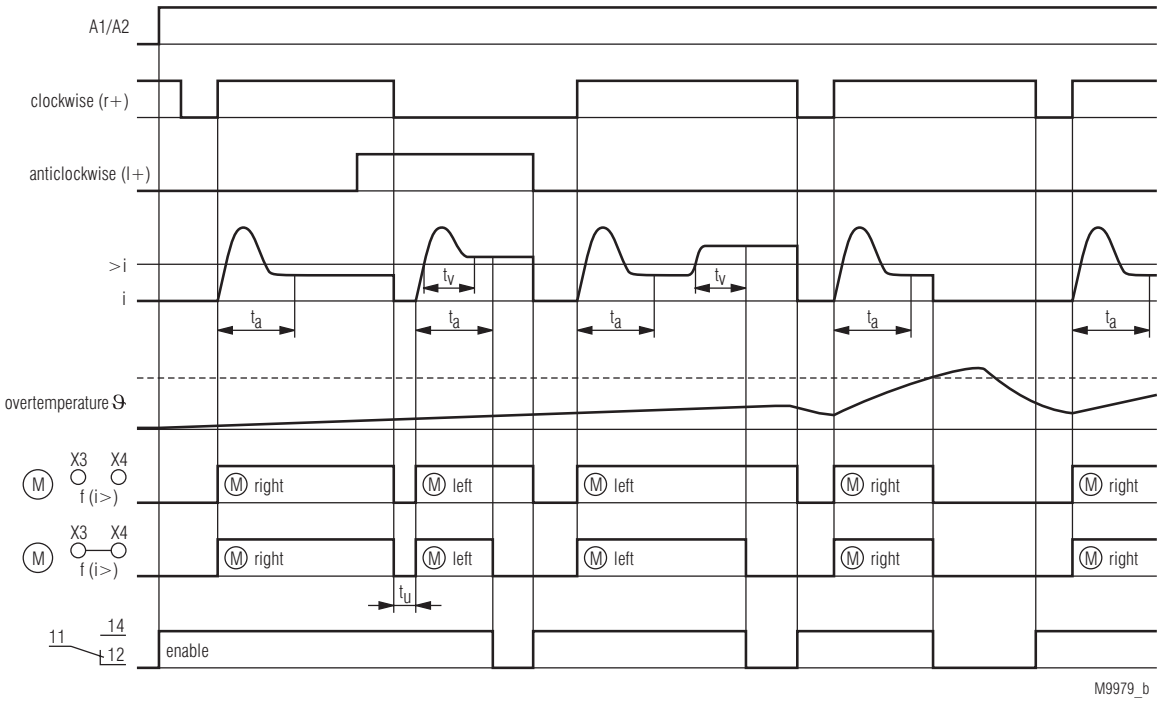
CE
c UL US LISTED
Canada / USA

Function

The reversing contactor BH 9255 is used to reverse the direction of 3-phase asynchronuos motors by switching 2 phases (L1 and L2). 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.

The motor current is monitored in phase L1. If the current rises above the tripping value the device is able to switch off the motor

Function Diagram



Function

Without bridge x3-x4 (plc control)
After connecting the power supply to A1/A2 the enabling contact 11-14 closes. The motor is now started with a positive edge of the signal on control input r+/rl- (clockwise) or l+/rl- (anti-clockwise).

The start up delay runs. If the start up delay is finished and the current is still over the adjusted value the relay contacts switch back to 11-12. This state is stored. It resets by switching off the motor on the control input.

If the motor current rises above the adjusted value during operation the time tv (switching delay) runs down. If the switching delay is finished and the current is still over the adjusted value the relay contacts switch back to 11-12. This state is stored. It resets by switching off the motor on the control input.

With bridge x3-x4 (preferred for manual control)
Same function as without bridge, but in addition to the relay contact 11-12 also the motor is switched off at the same time.

Bridge x1-x2: Switchover delay t_u 20 or 100 ms

Temperature sensing
To protect the power semiconductors the unit incorporates temperature monitoring. When overtemperature is detected e.g. because of reversing to often the power semiconductors swith off and an and the enabling relay switches back in position 11-12. 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.

Indication

green LED „ON“	on when auxiliary supply connected flushes if „t_a“ abläuft
yellow LED „r“	on, when right direction active
yellowLED „l“	on, when left direction active
red LED „i>“	on, when overtemperature and flushes during time elaspe of „t_v“
red LED „ϑ>“	on, when overtemperature
both red LEDs „i> + ϑ>“	flushes if a system fault is detected. A motor current is measured and while the semiconductors are off. The motor cannot be started.

Technical Data

Input

Auxiliary voltage U_H:	AC/DC 24 V; AC 110 ... 127 V, AC 230 V, AC 288 V, AC 400 V (no UL-devices)
Voltage range:	AC: 0.8 ... 1.1 U_H DC: 0.8 ... 1.25 U_H
Nominal consumption	
at AC 230 V:	5 VA, 1.1 W
at DC 24 V:	0.6 W
Nominal frequency:	50 / 60 Hz

Control input
r+ /rl / l+: DC 24 V preferred for plc control (short response time)
AC/DC 24 ... 80 V
AC/DC 80 ... 230 V

Input	**DC 24 V**	**AC/DC 24 ... 80 V AC/DC 80 ... 230 V**
Start up delay:	≤ 10 ms + max. 1 half-wave	≤ 15 ms + max. 1 half-wave
Release delay:	≤ 10 ms + max. 1 half-wave	≤ 60 ms + max. 1 half-wave

Switchover delay t_u:	programmable via bridge on terminals X1 - X2
without bridge:	20 ms
with bridge:	100 ms
Start up delay t_a:	0.1 ... 5 s, adjustable via potentiometer
Switching delay t_v:	0.1 ... 5 s, adjustable via potentiometer
Current measuring range:	2 ranges programmable via bridge on terminals Z1 -Z2

Technical Data

Unit for

measured nominal current	4 A	12 A	20 A
without bridge Z1 - Z2:	0.2 ... 2 A	0.4 ... 4 A	0.8 ... 8 A
with bridge Z1 - Z2:	1 ... 10 A	2 ... 20 A	4 ... 40 A

other measuring ranges on request

Load Output

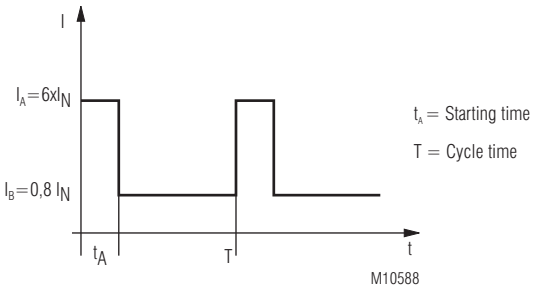
		unit without heat sink	with heat sink width 67.5 mm	with heat sink width 112.5 mm
Rated continuous current I_e [1]	[A]	4	12	20
Current reduction above 40 °C	[A/°C]	0.1	0.2	0.2
max. motor power at 400 V	[kW]	1.1	4	5.5
Nominal motor current I_N	[A]	2.6	8.5	11.5
max. locked rotor motor current [2]	[A]	15.6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

[1] The rated continuous current I_e is the max. permissible current of the unit in continuous operation.
[2] The max. locked rotor motor or starting current of 100 A for 1 s, 85 A for 2 s and 70 A for 5 s must not be exceeded.
[3] At t_A = 1 s

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:	350 A
Semiconductor fuse:	610 A^2s
Varistor voltage:	AC 510 V

Cycle diagram to calculate the operating frequency



Formula for selection of unit and motor

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

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

Monitoring Output

Contacts		
BH 9255.11:	1 changeover contact	
Thermal current I_{th}:	5 A	
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

Technical Data

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	
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 frequency 10 ... 55 Hz	IEC/EN 60 068-2-6
Climate resistance:	20 / 040 / 04	IEC/EN 60 068-1
Terminal designation:	EN 50 005	
Wire connection		
Load terminals:	1 x 10 mm² solid or 1 x 6 mm² stranded ferruled	
Control terminals:	2 x 2.5 mm² solid or 2 x 1.5 mm² stranded ferruled DIN 46 228-1/-2/-3/-4	
Wire fixing:	terminal screws M3.5; box terminals with self-lifting wire protection	
Mounting:	DIN rail	IEC/EN 60 715
Weight:		
BH 9255 with 4 A:	460 g	
BH 9255 with 12 A:	700 g	
BH 9255 with 20 A:	1160 g	

Dimensions

Width x heigth x depth:	
BH 9255 with 4 A:	45 x 84 x 121 mm
BH 9255 with 12 A:	67.5 x 84 x 121 mm
BH 9255 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. curent of 5000Arms at 460 V. The device has to be fused with a fuse class RK5 25A.					
Rated continuous current I_e [1]	[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

[1] 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

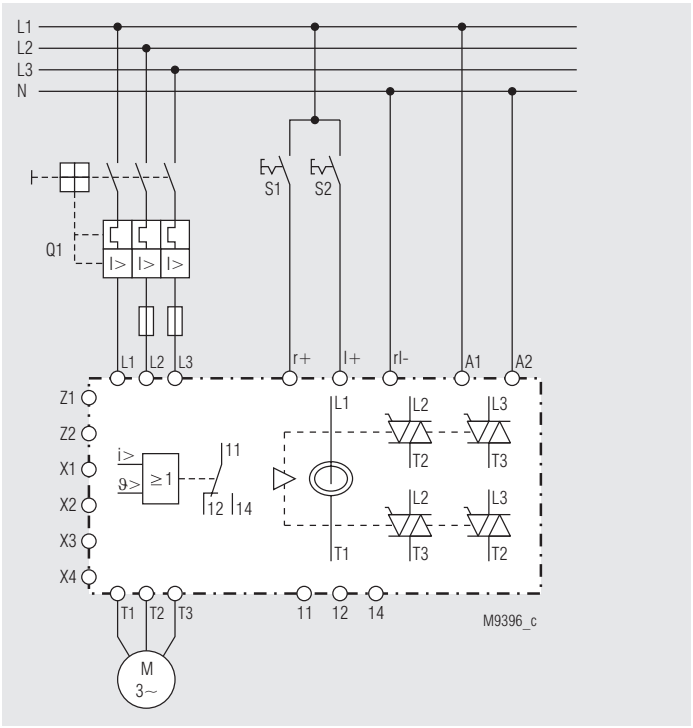
BH 9255.11 /61 AC 230 V 50 / 60 Hz 4 A AC/DC 80 ... 230 V

Artikelnummer:	0064648
• Output:	1 changeover contact
• Auxiliary voltage U_H:	AC 230 V
• Rated continuous current:	4 A
• Control input:	AC/DC 80 ... 230 V
• Width:	45 mm

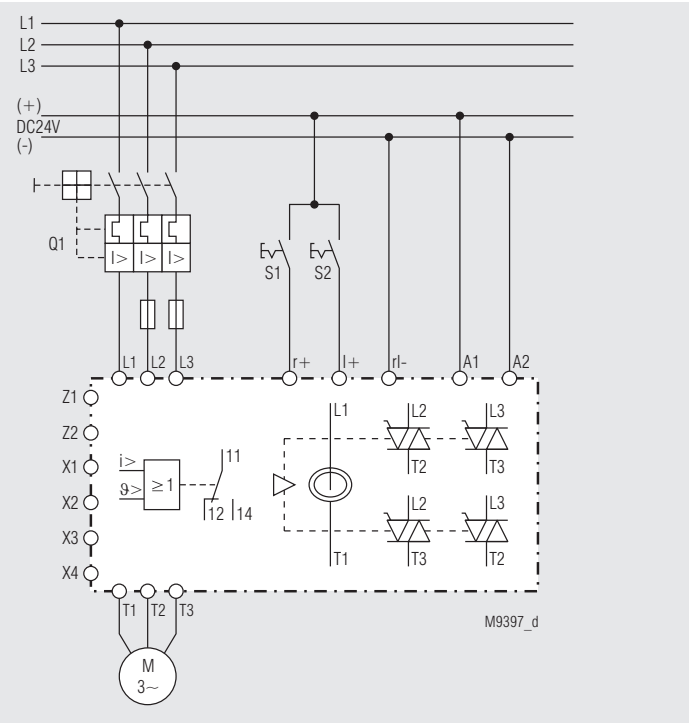
Ordering Example

BH 9255 .11 /61 AC 220...240 V 4 A AC/DC 24 ... 80 V

- Control input (r+, rl-, l+)
- Rated continuous current
- Nom. voltage A1/A2
- UL approval
- Contact
- Type



BH 9255 with A1/A2 = AC 230 V and control input AC/DC 80 ... 230 V



BH 9255 with A1/A2 = AC/DC 24 V and control input AC/DC 24 V or DC 24 V