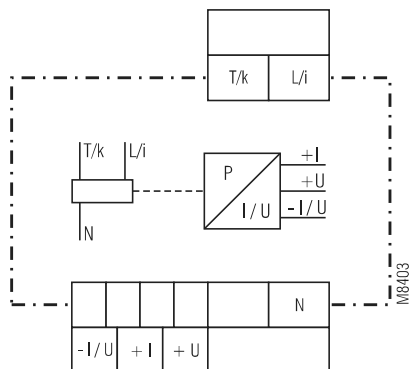
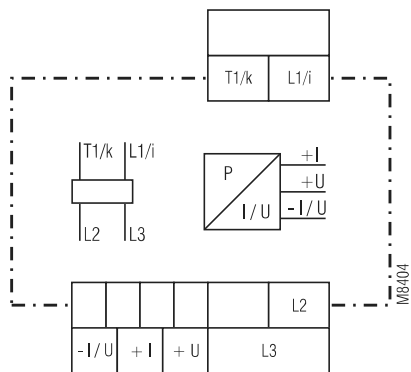


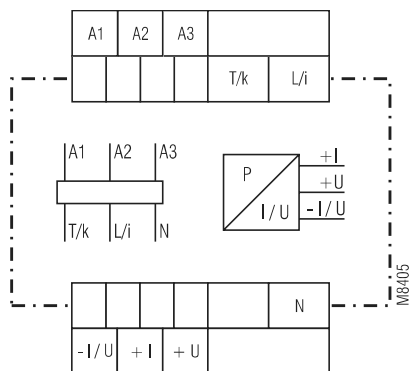
Circuit Diagrams



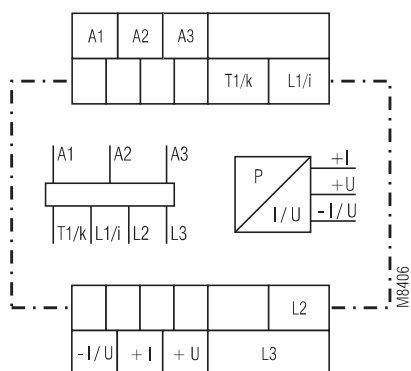
BH 9098.90



BH 9098.90/001

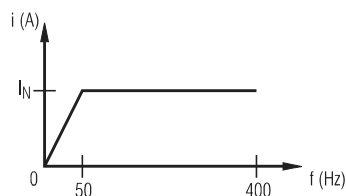


BH 9098.90/010



BH 9098.90/011

Characteristics



M7953

Max. input current curve in relation to input frequency

Technical Data

Input

Measuring voltage

Voltage range: without auxiliary voltage $0.8 \dots 1.1 \times U_N$
with auxiliary voltage, see setting ranges
300 k Ω ... 500 k Ω

Input resistance:

Measured current

Measuring range: see setting ranges

Rated current [A]	40	24	8	2.4	0.8	0.24
Permissible current range (overload) [A]						
continuously:	0 ... 40	0 ... 40	0 ... 16	0 ... 8	0 ... 4	0 ... 1
1 min. (10 min. break):	150	150	20	16	3	1.5
20 s (10 min. break):	200	200	25	20	4	2
Input resistance of current i-k [m Ω]:	≤ 1	≤ 1	7	14	150	500

Frequency range: 10 ... 400 Hz (see characteristics M7953)

Setting Ranges

P₁ and P₂ on absolute scale:

Upper Switch

load range

for P1 and P2:

lower range



upper range



Measuring accuracy

(in % at nominal load):

± 5 %

Harmonic distortion:

< 40 %

Start-up delay t_a:

0 ... 30 s (infinitely variable)

Analogue Output for Current 0 / +I

Galvanically isolated

to measuring input and auxiliary voltage:

4 kV eff.

Output current:

DC 0 ... 20 mA

DC 4 ... 20 mA

(selectable via DIP switch)

Output impedance (Load):

max. 500 Ω

Analogue Output for Voltage 0 / +U

Galvanically isolated

to measuring input and auxiliary voltage:

4 kV eff.

Output voltage:

DC 0 ... 10 V

DC 2 ... 10 V

(selectable via DIP switch)

Output impedance (Load):

min. 5000 Ω

Setting Ranges

Available variants	Measuring voltage U _N	Measuring current I _N [A]	selection of load range resistive
1-phase			
without auxiliary voltage			
BH 9098.90/000	AC 230 V	0.0024 ... 0.24	0.1 ... 60 W
	AC 230 V	0.024 ... 2.4	1 ... 600 W
	AC 230 V	0.24 ... 24	10 ... 6000 W
with auxiliary voltage			
BH 9098.90/010	AC 35...250 V	0.0024 ... 0.24	0.1 ... 60 W
	AC 35...250 V	0.024 ... 2.4	1 ... 600 W
	AC 35...250 V	0.24 ... 24	10 ... 6000 W
3-phase			
without auxiliary voltage			
BH 9098.90/001	3 AC 400 V	0.008 ... 0.8	0.1 ... 60 W
	3 AC 400 V	0.08 ... 8	10 ... 6000 W
	3 AC 400 V	0.4 ... 40	0.1 ... 30 kW
with auxiliary voltage			
BH 9098.90/011	3 AC 60 ... 440 V	0.008 ... 0.8	1 ... 600 W
	3 AC 60 ... 440 V	0.08 ... 8	10 ... 6000 W
	3 AC 100 ... 760 V	0.4 ... 40	0.1 ... 52 kW

Technical Data

Auxiliary Circuit

Auxiliary voltage U_H

only for BH 9098.90/010 and BH 9098.90/011:

AC 110 V (terminals A 1 - A 2),
AC 230 V (terminals A 1 - A 3),
DC 24 V

Voltage range:

0.8 ... 1.1 U_H

Frequency range of U_H :

45 ... 400 Hz

Input current

AC 110 V:

approx. 30 mA

AC 230 V:

approx. 15 mA

DC 24 V:

approx. 50 mA

General Data

Operating mode:

Continuous operation

Temperature range:

- 20 ... + 55°C

Clearance and creepage distances

rated impuls voltage /
pollution degree:

4 kV / 2

IEC 60 664-1

EMC

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

Degree of protection

Housing:

IP 40

IEC/EN 60 529

Terminals:

IP 20

IEC/EN 60 529

Housing:

Thermoplast with V0-behaviour
according to UL subject 94

Vibration resistance:

amplitude 0.35 mm

Climate resistance:

Terminal designation:

frequency 10 ... 55 Hz, IEC/EN 60 068-2-6

20 / 055 / 04

IEC/EN 60 068-1

EN 50 005

Wire connection

Load terminals:

1 x 10 mm² solid or

1 x 6 mm² stranded ferruled

Control terminals:

1 x 4 mm² solid or

2 x 1.5 mm² stranded ferruled or

1 x 2.5 mm² stranded ferruled or

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

Wire connection:

Box terminals with self-lifting
wire protection and plus-minus
terminal screws M3.5

Mounting:

DIN rail

IEC/EN 60 715

Weight:

430 g

Dimensions

Width x height x depth:

45 x 84 x 121 mm

Standard Type

BH 9098.90/001 3 AC 400 V AC 40 A

Article number:

• 3-phase, without auxiliary voltage

• Output: analogue

• Nominal voltage U_N : 3 AC 400 V

• Width: 45 mm

Variants

BH 9098.90/1__:

3-phase without auxiliary voltage with galvanically separated current path. For applications with current transformers grounded on the secondary side, current range limited to 25 A

BH 9098.90/011:

3-phase with auxiliary voltage

BH 9098.90/000:

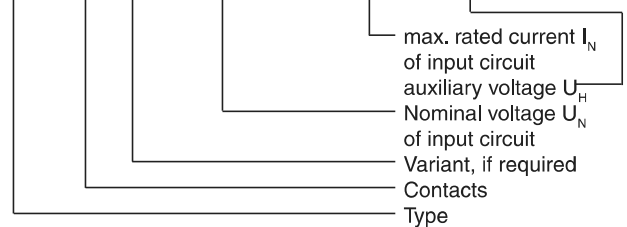
1-phase without auxiliary voltage

BH 9098.90/010:

1-phase with auxiliary voltage

Ordering example for variants

BH 9098 .90 /011 3 AC 100...760 V AC 40 A AC 230/110 V



Settings

Rotational switches P_1 and P_2 (2 digits) (calculation for resistive load) 48 kW

The switches are used to set the minimum and maximum load values P_1 and P_2 of the load characteristics. The scale shows the absolute value. On the 3-phase variant the max. possible power setting value is 52 kW (760 V x 40 A x 1.732). The setting resolution is 1 kW and the load range can be selected by DIP-switches. If the load range is reduced by factor 10 the setting resolution is 100 W.

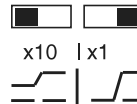
Potentiometer t_a

A start-up delay can be adjusted between 0 ... 30 s.

After mains voltage is connected the start-up delay begins. During this time the measurement is disabled and the LED flashes (see indicators).

Independent of the settings the analogue output is on min. value.

DIP-switches:



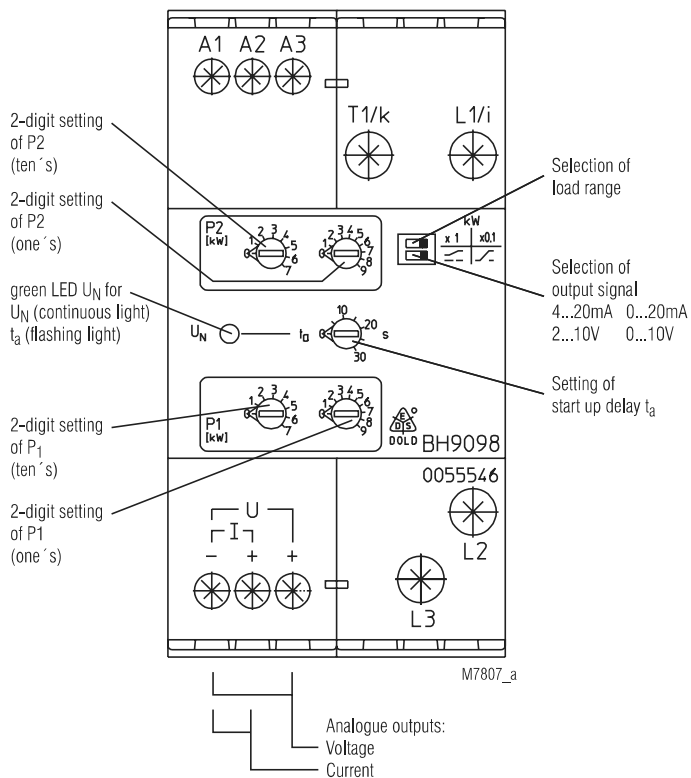
reduction of load range P_1 and P_2 by factor 10

Selection of output signal:

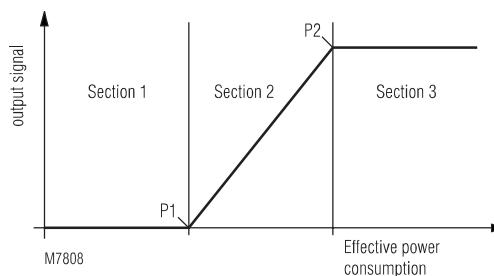
4 ... 20 mA	to	0 ... 20 mA
2 ... 10 V	to	0 ... 10 V

Connection

The connection has to be made according to the application drawings. The measuring current has to be connected to terminals L/i and T/k or L1/i and T1/k. The flow direction of the current must be correct. On reverse power the unit gives a failure indication. The maximum nominal motor current flowing directly through the load transmitter is 40 A. On higher current a current transformer with 2,5 VA burden capacity has to be used.



The load characteristic shows 3 sections:



Example 1

The smaller value is adjusted on P₁
The higher value is adjusted on P₂
Standard setting: positive characteristic

- If the effective power consumption of the load is in section 1 between 0 W and P₁ setting the analogue output signal is on minimum value.
- If the effective power consumption of the load is in section 2 between P₁ and P₂ setting the analogue output signal is proportional to the effective load following a **positive characteristic**.
- If the effective power consumption of the load is in section 3 between P₂ setting and P_{max} the analogue output signal is on maximum value.

Example 2

P₁ = 0 and P₂ = P_{max}

- Selection of the maximum possible load range span.
The whole load range of the unit is converted into a proportional output signal. Section 1 and 3 are missing.

Example 3

P₁ = P₂

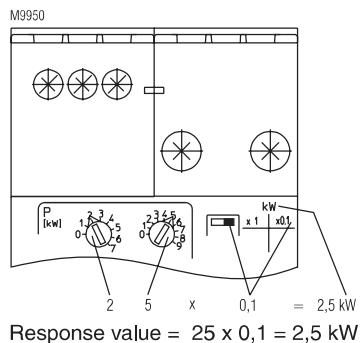
- If the **same** value is adjusted for P₁ and P₂ section 2 is missing, i.e. the output signal is either on minimum or maximum value. The unit works as limit switch.

Example 4

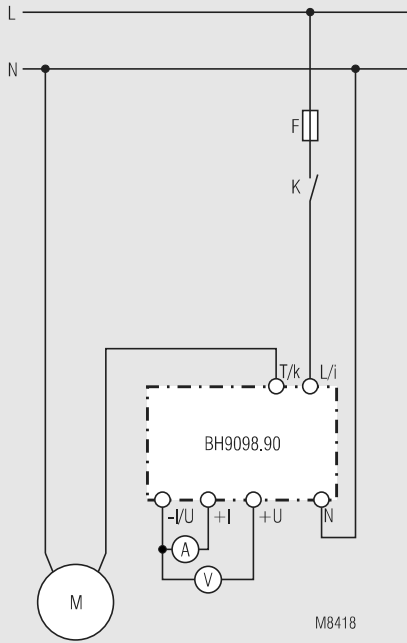
On P₁ the higher value is adjusted.
On P₂ the lower value is adjusted.

- Inverted output, negative characteristic

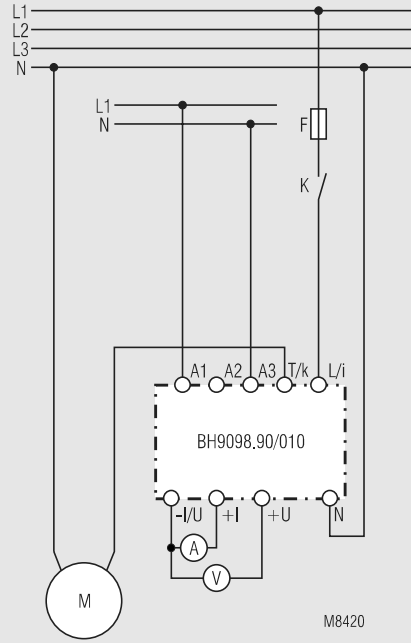
Adjustment example: response value: 2,5 kW



1-phase

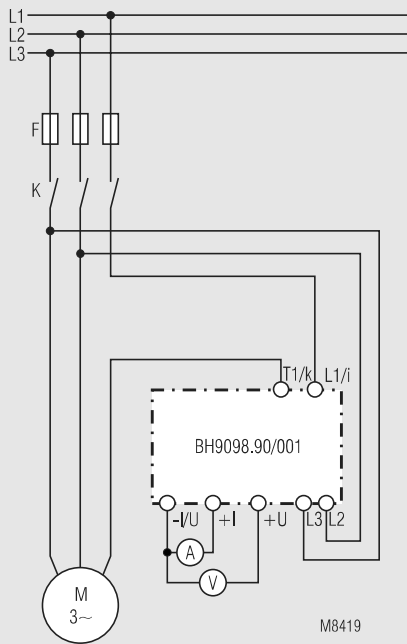


BH 9098.90

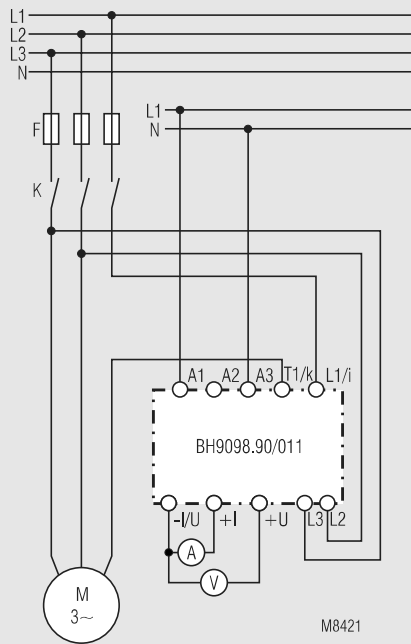


BH 9098.90/010

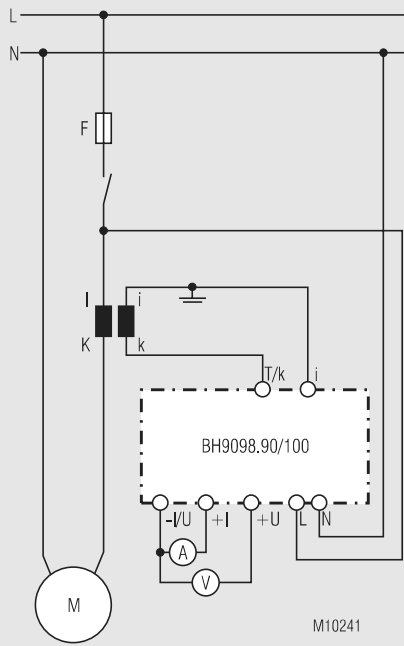
3-phase



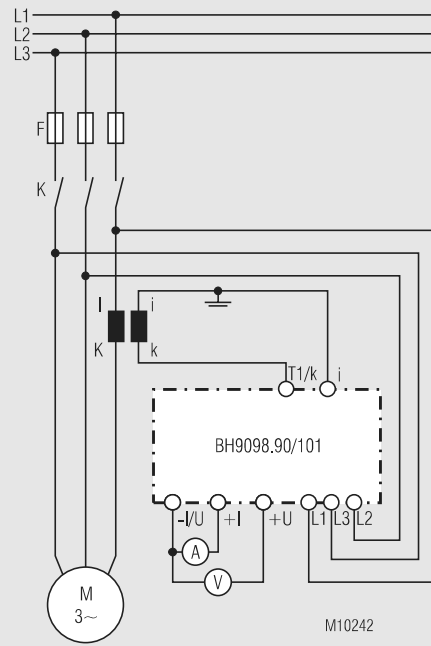
BH 9098.90/001



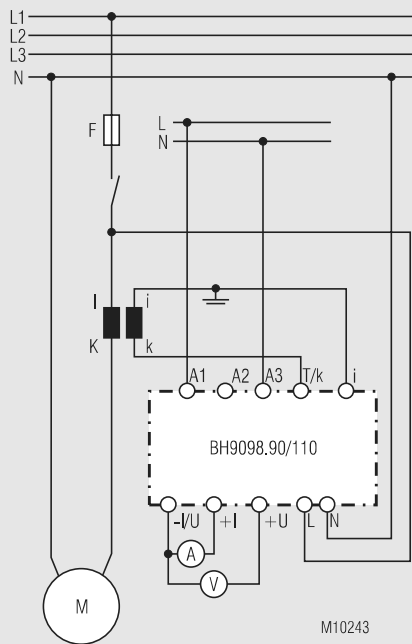
BH 9098.90/011



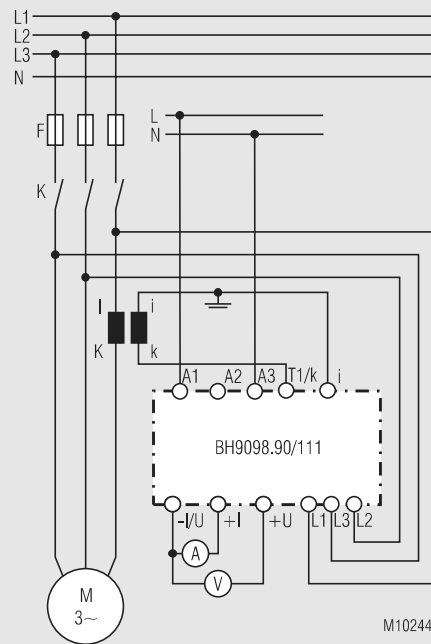
BH 9098.90/100



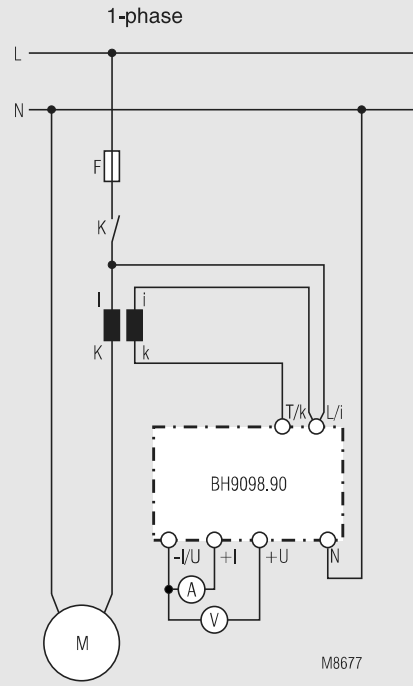
BH 9098.90/101



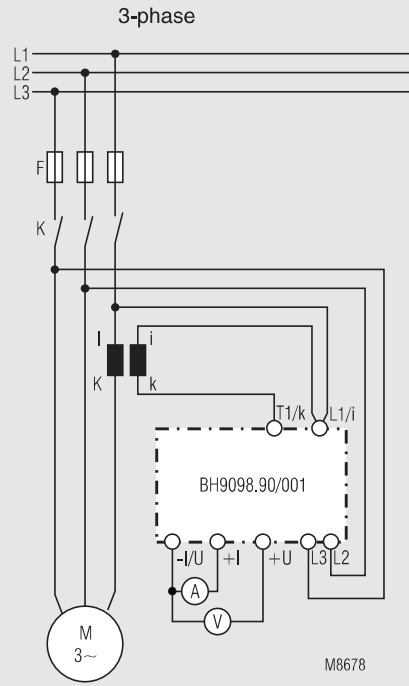
BH 9098.90/110



BH 9098.90/111



BH 9098.90



BH 9098.90/001

Note: When using external CTs the adjusted value has to be multiplied with the transmission ratio (\ddot{u}) of the CT.

Example: Switching value = Setting value (P1/P2) $\times \ddot{u}$ e.g. for 100/5A C/T $\ddot{u}=20$ (100 divided by 5)

