	type Z	type S	type B
multifunction timer selectable timing intervals and timing functions - delay-on operate - delay-on release - pulse-on operate - pulse-on release - flasher beginning with on - flasher beginning with off - watchdog - pulse former	 17.5mm 1 or 2 changeover 8A switching current rail mounting according to DIN EN 50022 timing intervals: 8 intervals from 0,05s - 10h or 8 intervals from 0,05s - 30min function and timing intervals can be adjusted by DIP switches on the front panel. options: - remote potentiometer - galvanic isolation	 11.25mm 1 changeover 6A switching current rail mounting according to DIN EN 50022 timing intervals: 8 intervals from 0,05s - 10h or 8 intervals from 0,05s - 30min function and timing intervals can be adjusted by DIP switches on the front panel.	 22.5mm 2 changeover 6A switching current rail mounting according to DIN EN 50022 timing intervals: 8 intervals from 0,05s - 10h Absolutskala function and timing intervals can be adjusted by DIP switches on the front panel. options: - remote potentiometer - galvanic isolation
from side 10 / 25 / 32	from side 32	from side 10	side 25
singlefunction timer selectable timing intervals available functions: - delay-on operate - delay-on release - pulse-on operate - pulse-on release - flasher beginning with on - flasher beginning with off - watchdog - pulse former	 17.5mm 1 or 2 changeover 8A switching current rail mounting according to DIN EN 50022 timing intervals: 16 intervals from 0,05s - 100h all singlefunctions available	 11.25mm 1 changeover 6A switching current rail mounting according to DIN EN 50022 timing intervals: 16 intervals from 0,05s - 100h all singlefunctions available	 22.5mm 2 changeover 6A switching current rail mounting according to DIN EN 50022 timing intervals: 4 intervals from 0,01s - 30min only delay-on release without auxiliary supply
from side 13 / 29 / 35	from side 35	from side 12	from side 29
pulse generator adjustable beginning with pulse or pause	 17.5mm 1 or 2 changeover 8A switching current rail mounting according to DIN EN 50022 timing intervals: 4 intervals from 0,15sec - 60min	 11.25mm 1 changeover 6A switching current rail mounting according to DIN EN 50022 timing intervals: 4 intervals from 0,15sec - 60min	 22.5mm 2 changeover 6A switching current rail mounting according to DIN EN 50022 timing intervals: 4 intervals from 0,01 - 1000sec
side 12 / 29 / 35	side 35	side 12	side 29
star-delta relay start-up switching for three-phase motors with star delta switching changeover after switch on of control voltage to delta operation after adjustable time. switching time break star - delta: 100ms	 17.5mm 2 closers 8A switching current rail mounting according to DIN EN 50022 timing intervals: 4 intervals from 0,05min - 10min	 11.25mm 2 closers 6A switching current rail mounting according to DIN EN 50022 timing intervals: 4 intervals from 0,5sec - 300sec	
side 22 / 45	side 45	side 22	

	type Z	type S
thermistor protection relay for monitoring of motor temperature with standard PTC resistors alternatively thermistors from side 87	 17.5mm 1 or 2 changeover 8A switching current rail mounting according to DIN EN 50022 restart inhibitors and short-circuit monitoring are selectable by DIP switches PTC sensor according to DIN 44081/082 number of sensors 1 - 6 operating value 2,2 - 3,3kOhm total PTC resistance < 1,5kW sensor voltage < 7,5V side 92	 11.25mm 1 changeover 6A switching current rail mounting according to DIN EN 50022 restart inhibitors and short-circuit monitoring are selectable by DIP switches PTC sensor according to DIN 44081/082 number of sensors 1 - 6 operating value 2,2 - 3,3kOhm total PTC resistance < 1,5kW sensor voltage < 7,5V side 91
liquid-level relay for liquid level monitoring of different fluids - measuring circuit is galvanically isolated to the supply voltage - device can operate in two different modes: level monitoring or two-level-controller from side 79	 17.5mm 1 changeover 8A switching current rail mounting according to DIN EN 50022 universally response sensitivity - adjustable time delay - adjustable fill / clear side 85	 11.25mm 1 changeover 6A switching current rail mounting according to DIN EN 50022 response sensitivity 2,5...25kOhm 5...50kOhm 10...100kOhm 50...500kOhm universal - adjustable time delay - adjustable fill / clear from side 83
coupling relay for galvanic isolation and / or signal amplification from side 47	 17.5mm 1, 2 or 3 changeover 8A switching current rail mounting according to DIN EN 50022 optional semiconductor output side 50	 11.25mm 1 or 2 changeover 6A switching current rail mounting according to DIN EN 50022 optional semiconductor output side 49
contact protection relay for sensitive applications, contact bounce handling adjustable delay-on operate and delay-on release time adjustable side 21 / 44	 17.5mm 2 changeover 8A switching current rail mounting according to DIN EN 50022 timing intervals: 4 intervals from 0,05sec - 10min adjustable delay-on operate and delay-on release time adjustable side 44	 11.25mm 1 or 2 changeover 6A switching current rail mounting according to DIN EN 50022 timing intervals: 16 intervals from 0,05sec - 100h delay-on operate time = delay-on release time side 21

	type S	type Z & B
voltage- / current-measuring relays for AC or DC current measurement - undervoltage relay - overvoltage relay - range-voltage relay - undercurrent relay - overcurrent relay - adjustable response time - adjustable hysteresis 5 - 30% - measuring circuit is galvanically isola ted to the supply voltage from side 55	 11.25mm rail mounting according to DIN EN 50022 measuring ranges: voltage: 10 - 100mV; 50 - 500mV; 0,1 - 1V; 0,5 - 5V; 1 - 10V; 5 - 50V; 10 - 100V; 25 - 250V current: 2 - 20mA; 10 - 100mA; 50 - 500mA; 0,1 - 1A; 0,5 - 5A from side 55	 17.5mm rail mounting according to DIN EN 50022 measuring ranges: voltage: 50 - 500mV; 0,1 - 1V; 0,5 - 5V; 1 - 10V; 5 - 50V; 10 - 100V currant: 2 - 20mA; 10 - 100mA; 50 - 500mA; 0,1 - 1A; 0,5 - 5A; 1 - 10A; 1,6 - 16A; 25 - 250V from side 58
transducer / amplifyer for conversion of a standard electrical signal into another standard signal or / andelecric isolation. - input/output configuration is selected with the DIP switches - measuring circuit is galvanically isola ted to the supply voltage (three-way isolation) from side 93	 11.25mm rail mounting according to DIN EN 50022 input: 0 - 10VDC; 2 - 10VDC; 0 - 20mADC; 4 - 20mADC output: 0 - 10VDC; 2 - 10VDC; 0 - 20mADC; 4 - 20mADC side 96	 22.5mm rail mounting according to DIN EN 50022 input: 0 - 10VDC; 2 - 10VDC; 0 - 20mADC; 4 - 20mADC output: 0 - 10VDC; 2 - 10VDC; 0 - 20mADC; 4 - 20mADC from side 97
measuring transducer for linear conversion of a standard electrical signal into another standard signal customer specified measuring ranges from side 93	 11.25mm isolation transducer input: 10 - 2000µS; customer specified output: 2 - 10VDC; 4 - 20mADC side 93	 22.5mm current transducer voltage transducer input: customer specified; bis max. 5A / 500V output: 0 - 10VDC; 2 - 10VDC; 0 - 20mADC; 4 - 20mADC from side 100
rotary current measurement relays for monitoring of - undercurrent - overcurrent - phase asymmetry - phase sequence from side 70	 11.25mm 6A switching current rail mounting according to DIN EN 50022 3 x 400V + N undervoltage 170 - 230V AC overvoltage 230 - 230V AC window voltage with/without phase sequence controll asymmetry 10 -35° phase sequence for right rotating field control from side 70	 17.5mm 8A switching current rail mounting accor- ding to DIN EN 50022 3 x 400V + N under-/overvoltage: 1-phases / 3-phases switchable asymmetry 5 -40° phase sequence for right rotating field control three-phase current monitoring relay: under-voltage, phase failure from side 77

digital display

display of analog measurements
adjustable by software

display

display range	4 positions -1999 - 9999
digit size	10mm
measuring resolution	12Bit
measuring rate	2,5 measurements / sec

measuring range

current	20mA , 100mA , 500mA , 1A DC
voltage	10V , 50V , 100V , 250V DC
one limit contacts	programmable by user

calibration

calibration	by software

casing

casing	panel mounted housing
dimensions	48mm x 24mm

examples of special devices on base of our standard products

IMPULS
pulse measuring relay, with switches for a adjustable time in working position after a number of pulses

SOR2
power-off-controll-relay (three phases monitoring relay)

SOR17; SOR42; SOR46; SOR47, SOR48; ZANIP
compination of different singlefunctions in one divice

SOR45
timer with galv. isolation for speed montior

ZSR01
compination of pulse generator and timer with delay-on release function

ZAx2
double-stage timer with delay-on release function

by modify the microcontroller software of our standard devices it is possible to create your individual device

references of special devices

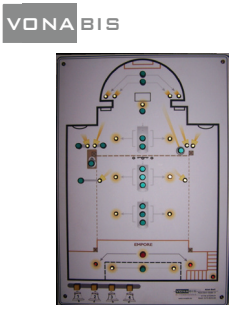
security devices

in cooperation with the company JMS Sicherheitssysteme we produce hardware and software to give more safety for cash transports

controller of wastewater treatment plants

on request of the business BLUEVITA we desigined different control systems for wastewater treatment plants

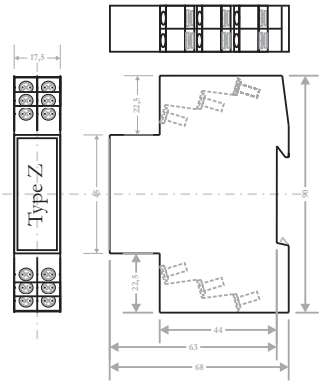
lightning controll



for the company VONABIS we create a central mounted tableau to controll lightning and peripheral devices

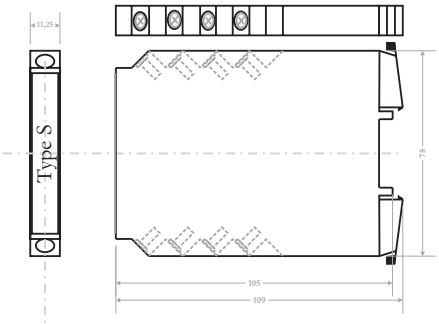
type Z (casing 17,5 mm)

- compact casing with up to 12 clamps
- standard machine casing



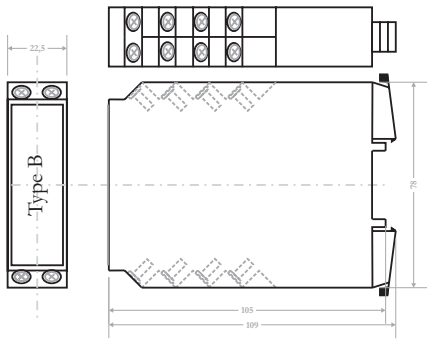
type S (casing 11,25 mm)

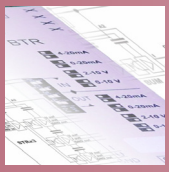
- improves space efficiency because of small design
- adjustment code has to be checked up with datasheet when installed



type B (casing 22,5 mm)

- direct readable adjustment when installed
- standard industrial housing
- modularly expandable for special solutions in 11,25 mm steps





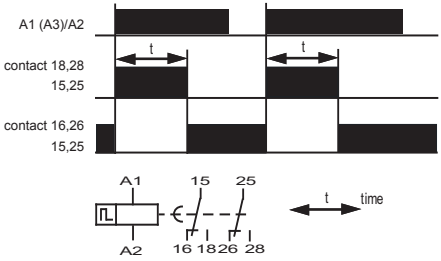
HSB-Industrieelektronik
www.hsb-electronics.de · info@hsb-electronics.de

timer

timer

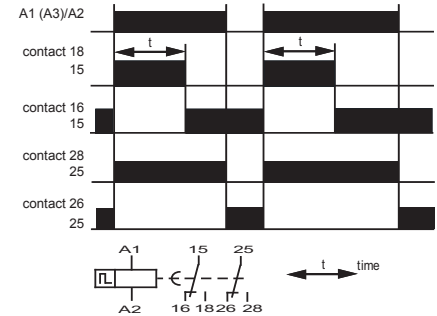
index timer

pulse-on operate



Time t starts when the device is connected to its power supply on A1/A2 (230VAC) or on A3/A2 (24VUC). The output relay switches into its working position when the device is connected to its power supply and stays in working position until holding time t elapses. This is indicated by the yellow LED on the front panel. The output relay falls back to its rest position when holding time t has eleapsed. Should the power supply be disconnected during recovery time, the timer returns to its original state. This also applies if the supply is disconnected during the timing period.

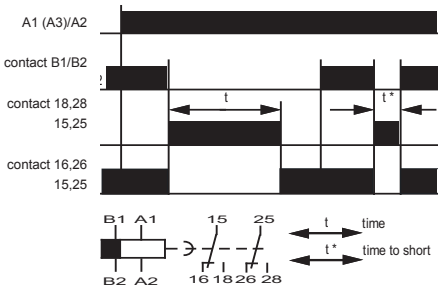
pulse-on operate with immediate-contact



1 changeover: pulse-on operate
1 changeover: remains in working position

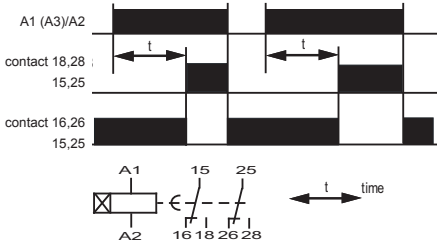
To activate immediate-contact function B1/B2 has to be bridged or voltage has to be applied on terminal B1.
Time t starts when the device is connected to its power supply on A1/A2 or A3/A2. The output relay switches into its working position when the device is connected to its power supply. This is indicated by the yellow LED on the front panel. One output relay (contacts 15,16,18) falls back to its rest position when holding time t has eleapsed, the second output relay (contacts 25,26,28) remains in working position until the power supply will disconnected. This also applies if the supply is disconnected during the timing period.

pulse-on release



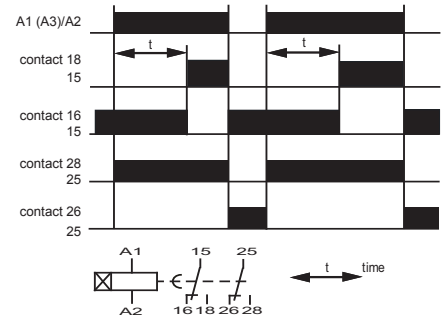
Continious presence of the power supply (A1/A2 or A3/A2) is required for timing. Activation of the timing function is accomplished by an external control contact which is connected to the terminals B1/B2 or by an control voltage which is connected to terminal B1. The output relay is set to its rest position as long as the control contact is closed or as long as a voltage is connected to B1. Time t beginns to run when opening the control contact or at a remove of the control voltage. The output relay switches to its working position when time t beginns to run and stays there as long as time t has eleapsed. A permanent on yellow LED indicates that the output relay has its working position. The output relay switches into its rest position after time t has elapsed. Delay time will start again if the control will be retriggered.

delay-on operate



Timing begins with the connection of the power supply. This is indicated by a flashing yellow LED. After set time has elapsed the output relay switches into ist working position. This is indicated by a permanent on yellow LED. This state will be set untill the supply voltage is disconnected. Should the power supply be disconnected during recovery time, the timer returns to its original state. This also applies if the supply is disconnected during the timing period.

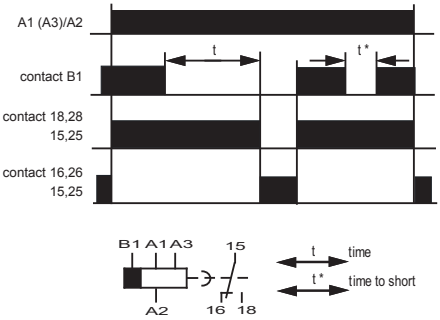
delay-on operate with immediate-contact



1 changeover: delay-on operate
1 changeover: no delay

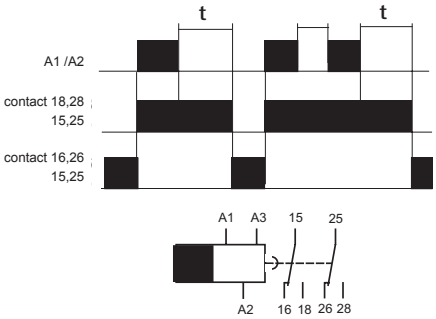
To activate immediate-contact function B1/B2 has to be bridged or voltage has to be applied on terminal B1.
Timing begins with the connection of the power supply. This is indicated by a flashing yellow LED. After set time has elapsed the output relay switches into ist working position. This is indicated by a permanent on yellow LED. This state will be set untill the supply voltage is disconnected. Should the power supply be disconnected during recovery time, the timer returns to its original state. This also applies if the supply is disconnected during the timing period.

delay-on release



Continious presence of the power supply (A1/A2 or A3/A2) is required for timing.
Activation of the timing function is accomplished by an external control contact which is connected to the terminals B1/B2 or by an control voltage which is connected to terminal B1. The output relay is set to its working position as long as the control contact is closed or as long as a voltage is connected to B1. A permanent on yellow LED indicates that the output relay has its working position. Delay time beginns by opening the control contact or at a remove of the control voltage. Activity of delay time is indicated by a flashing yellow LED. The output relay switches into ist rest position after delay time has elapsed. Delay time will start again if the control will be retriggered.

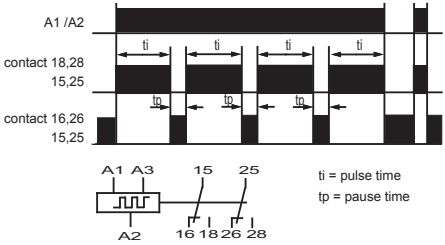
delay-on release without auxiliary supply



A connection to the power supply does the relay cause to switch immediately to its working position. This means contact 15(25) and 18(28) is closed. After a remove of the supply voltage A1(A3) does the relay switch to its rest position after adjusted delay time has elapsed. This means contact 15(25) and 16(26) is closed. If the supply voltage becomes reconnected again before delay time has elapsed, then does that cause a reset of delay time and delay time beginns to lapse again after the supply voltage becomes disconnected again.
Delay time can be adjusted by DIP switch on the front panel. Fine adjustment of delay time can be done by potentiometer on the front panel or by remote potentiometer.

BAB ..... side 31

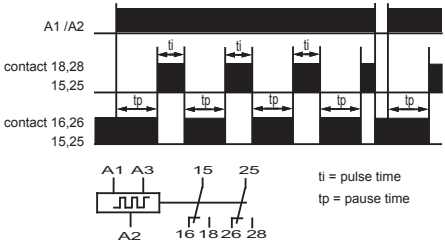
pulse generator, beginning with pulse



Timing begins with the connection of the power supply to the terminals A1/A2 or A3/A2. The timing begins with a pulse. Apulse is indicated by the yellow LED. Upon completion of the selected delay time on the potentiometer t, the output contact i switches into its rest position. After completion of the selected timing cycle on potentiometer t, the output relay again p switches into its working position. This sequence will repeat itself as long as the power supply is connected. Should the power supply be interrupted during the reset time, then the relay returns to its original state. This also applies if the power is disconnected during the timing period.

STG ..... side 12
BTG ..... side 29
BTGF ..... side 30
ZTG ..... side 35

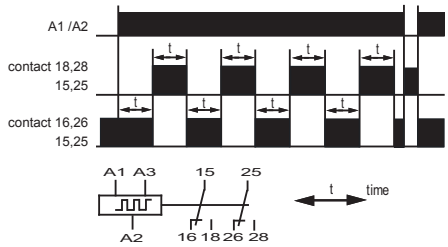
pulse generator, beginning with pause



Timing begins with the connection of the power supply to the terminals A1/A2 (230VAC) or A3/A2 (24VUC). The timing cycle begins with a pause. After completion of the selected time t the output relay switches to ist working position. This will be indicated by the yellow LED which is located on the front panel. The output relay switches back to its rest position after time t has elapsed again. switching between this two states of the output relay will repeat as long as the device is connected to its supply voltage. Should the power supply be disconnected during recovery time, the timer returns to its original state. This also applies if the supply is disconnected during the timing period.

STG ..... side 12
BTG ..... side 29
BTGF ..... side 30
ZTG ..... side 35

flasher, beginning with pause



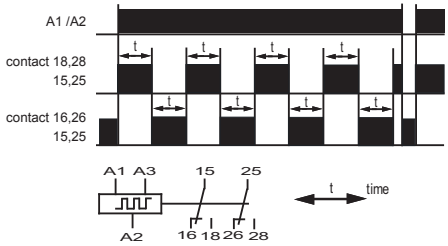
Timing begins with the connection of the power supply to the terminals A1/A2 (230VAC) or A3/A2 (24VUC). The timing cycle begins with a pause. After completion of the selected time t the output relay switches to ist working position. This will be indicated by the yellow LED which is located on the front panel. The output relay switches back to its rest position after time t has elapsed again. switching between this two states of the output relay will repeat as long as the device is connected to its supply voltage. Should the power supply be disconnected during recovery time, the timer returns to its original state. This also applies if the supply is disconnected during the timing period.

SMR, SMRS ..... side 10
SMRV, SMRVS ..... side 11
SBR ..... side 23

BMR ..... side 25
BMRV ..... side 26
BMRF ..... side 27
BMRFV ..... side 28

ZMR, ZMRS ..... side 32
ZMRV, ZMRVS ..... side 33
ZMRF, ZMRFS ..... side 34

flasher, beginning with pulse



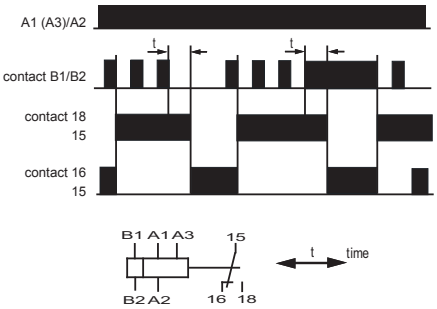
Timing beginns with the connection of the power supply to the terminals A1/A2 alternatively A3/A2.
The flasher beginns depending on the type of device with a pulse or a pause. The output relay of the device switches from working position to rest position and so on after adjusted time t has elapsed. The yellow LED on the front panel indicates that the relay holds its working position. The relay will switch repetitively between rest and working position as long as the supply voltage is connected to the device. Should the power supply be disconnected during recovery time, the timer returns to its original state. This also applies if the supply is disconnected during the timing period.

SMR, SMRS ..... side 10
SMRV, SMRVS ..... side 11
SBR ..... side 23

BMR ..... side 25
BMRV ..... side 26
BMRF ..... side 27
BMRFV ..... side 28

ZMR, ZMRS ..... side 32
ZMRV, ZMRVS ..... side 33
ZMRF, ZMRFS ..... side 34

watchdog / speed monitor



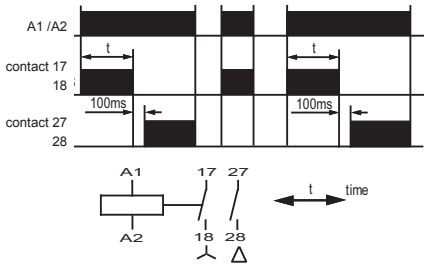
Continious presence of the power supply (A1/A2 or A3/A2) is required for timing. Activation of the timing function is accomplished by an external control contact which is connected to the terminals B1/B2 or by an control voltage which is connected to terminal B1.
After first removal of control source does time t start to run and the output relay switches to its working position. If control source won't be applied again during time range t, then the output relay switches to its rest position. But if control source will be applied again during time range t, then does time t start to run again and the output relay stays in working position. If the control source is longer applied than time t, does that cause the output relay to switch to its rest position. If the control source will be removed during time range t, does that cause the output relay to stay at its working position while time t starts to run again etc.

SMR, SMRS ..... side 10
SMRV, SMRVS ..... side 11
SWD ..... side 19

BMR ..... side 25
BMRV ..... side 26
BMRF ..... side 27
BMRFV ..... side 28

ZMR, ZMRS ..... side 32
ZMRV, ZMRVS ..... side 33
ZMRF, ZMRFS ..... side 34
ZWD ..... side 42

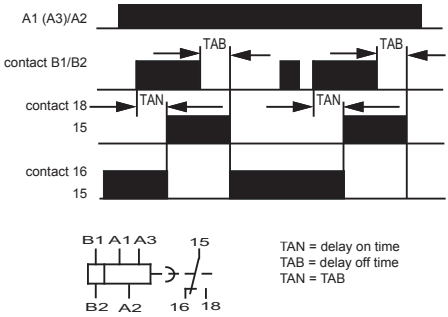
star-delta relay



Timing begins with the connection of the power supply to the terminals A1 and A2. The timing cycle is selected using the potentiometer and the DIP switches on the front panel of the unit. Upon the connection of the power supply, the contact 17/18 closes and the yellow LED turns on. Upon completion of the selected timing, the contact returns to its rest position and the yellow LED shuts off. After a set switching time of 100ms, the second contact 27/28 closes. If the power supply is interrupted during reset time, the relay returns to its original state. This also applies if the supply is disconnected during the timing period (see function diagram).

SSD ..... side 22
ZSD ..... side 45

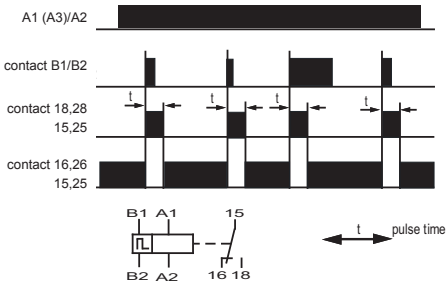
contact protection relay



Timing is controlled by potential-free control contact B1/B2 (not galvanically isolated). Time (ton) beginns to run after the control contact is closed. The output relay switches to its working position after time (ton) has elapsed. The yellow LED indicates that the output relay has its working position. An interrupt of time lapse (ton) by opening the control contact does reset timing to its original state. An reopen of the control contact does release the relays output from working position to its rest position after time (toff) has elapsed. If the control contact will be closed again before time toff has elapsed does that cause the relay to stay at its working position.
Delay times ton and toff are equal and can be adjusted by DIP-switch and potentiometer on the front panel.

SKS ..... side 21
ZKS ..... side 44

pulse former



Continious presence of the power supply (A1/A2 or A3/A2) is required.
Activation of the timing function is accomplished by an external control contact which is connected to the terminals B1/B2. The pulse former supplies an impulse with a defined, adjustable pulse t at the output. The output relay switches back to its rest position after time t has elapsed again. The output signal is triggered by rising flank.

SMR, SMRS ..... side 10
SMRV, SMRVS ..... side 11
SBR ..... side 23
SIFV ..... side 20

BMR ..... side 25
BMRV ..... side 26
BMRF ..... side 27
BMRFV ..... side 28

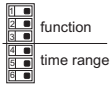
ZMR, ZMRS ..... side 32
ZMRV, ZMRVS ..... side 33
ZMRF, ZMRFS ..... side 34
ZIFV ..... side 43

timer
SMR, SMRS - multi function
serie 11,25mm with 1 changeover

functions (comments see from side 6)

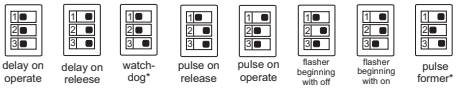
- delay-on operate
- pulse-on operate
- flasher beginning with on
- watchdog
- delay-on release
- pulse-on release
- flasher beginning with off
- pulse former

dip switch adjustment



function and timing intervals can be adjusted by DIP switches on the front panel of the relay

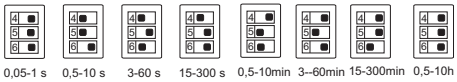
functions



* with timer control on B1 or B1/B2

time intervals

SMR



SMRS

part number

11.001.xx.xxx

time interval selection

001	SMR	0,05s - 10h
017	SMRS	0,05s - 30min

supply voltage selection

	A3-A2 / A1-A2
00	24V UC / 230V AC
09	12V UC / 24V UC
11	24V UC / 48V UC
12	24V UC / 110V AC

technical data

supply

supply voltage	A1-A2 or A3-A2 selection see below
frequency range	0/50 ... 60 Hz
power consumption	(max.) 1 W
operation mode	continuous
supply voltage influence	< 0,01% over voltage range
temperature influence	< 0,01% / °C
recovery time	> 100ms
repetitive accuracy	+/- 0,2%

contacts

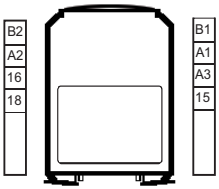
number of contacts;	1 changeover
contact material	$AgSnO_2$
max. switching voltage	250V AC *
max. switching current	6A *
max. switching power AC	1500VA
max. switching frequency	15Hz
mechanical contact life	*
drop-off time switching element	approx. 20ms

B1/B2 - for contact control

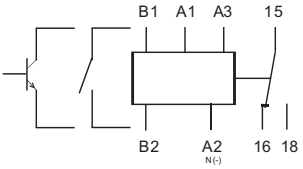
voltage (internal) B1(+) / B2(-)	5V DC
min. bridging time	10ms
max. load	25kOhm

* diagramms see on side 108

connections



connection diagramm



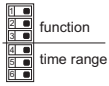
HSB-Industrieelektronik
www.hsb-electronics.de · info@hsb-electronics.de

functions

(comments see from side 6)

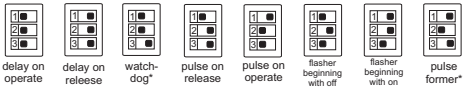
- delay-on operate
- pulse-on operate
- flasher beginning with on
- watchdog
- delay-on release
- pulse-on release
- flasher beginning with off
- pulse former

dip switch adjustment



function and timing intervals can be adjusted by DIP switches on the front panel of the relay

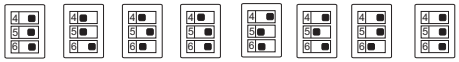
functions



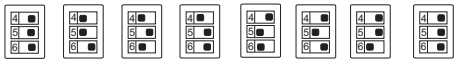
* with timer control on B1 or B1/B2

time intervals

SMRV



SMRVS



part number

11.101.xx.xxx

time interval selection

001	SMRV	0,05s - 10h
017	SMRVS	0,05s - 30min

supply voltage selection

	A3-A2 / A1-A2
00	24V UC / 230V AC
09	12V UC / 24V UC
11	24V UC / 48V UC
12	24V UC / 110V AC

technical data

supply

supply voltage	A1-A2 or A3-A2 selection see below
frequency range	0/50 ... 60 Hz
power consumption	(max.) 1 W
operation mode	continuous
supply voltage influence	< 0,01% over voltage range
temperature influence	< 0,01% / °C
recovery time	> 100ms
repetitive accuracy	+/- 0,2%

contacts

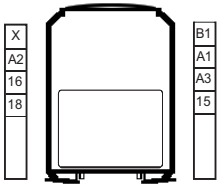
number of contacts;	1 changeover
contact material	$AgSnO_2$
max. switching voltage	250V AC *
max. switching current	6A *
max. switching power AC	1500VA
max. switching frequency	15Hz
mechanical contact life	*
drop-off time switching element	approx. 20ms

B1 - for voltage control

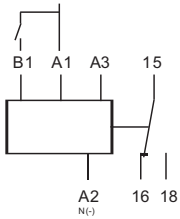
voltage range	20 -250V AC/DC
min. bridging time	60ms

* diagramms see on side 108

connections



connection diagramm



timer
STG - pulse generator
serie 11,25mm with 1 changeover

function (comments see from side 6)

pulse generator

dip switch adjustment

timing intervals (pulse and pause times) can be adjusted by DIP switches on the front panel of the relay

time intervals

part number

11.101.xx.009

voltage supply selection

	A3-A2 / A1-A2
00	24V UC / 230V AC
09	12V UC / 24V UC
11	24V UC / 48V UC
12	24V UC / 110V AC

other time intervals and voltage supplies on request

technical data

supply

supply voltage	A1-A2 or A3-A2 selection see below
frequency range	0/50 ... 60 Hz
power consumption	(max.) 1 W
operation mode	continuous
supply voltage influence	< 0,01% over voltage range
temperature influence	< 0,01% / °C
recovery time	> 100ms
repetitive accuracy	+/- 0,2%

contacts

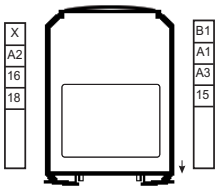
number of contacts;	1 changeover
contact material	$AgSnO_2$
max. switching voltage	250V AC *
max. switching current	6A *
max. switching power AC	1500VA
max. switching frequency	15Hz
mechanical contact life	*
drop-off time switching element	approx. 20ms

B1 - for voltage control

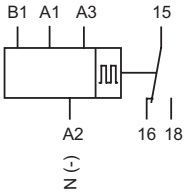
voltage at B1	beginning with pause
B1 blank	beginning with pulse
voltage range	20 -250V AC/DC
min. bridging time	60ms

* diagramms see on side 108

connections



connection diagramm



timer
SA - delay-on operate
serie 11,25mm with 1 changeover

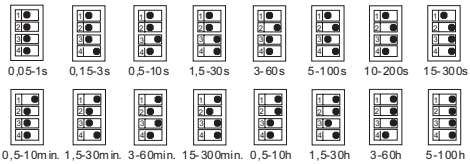
cunction (comments see from side 6)

delay-on operate

dip switch adjustment

timing intervals can be adjusted by DIP switches on the front panel of the relay

Time intervals



part number

11.101.xx.003

voltage supply selection

	A3-A2 / A1-A2
00	24V UC / 230V AC
09	12V UC / 24V UC
11	24V UC / 48V UC
12	24V UC / 110V AC

other time intervals and voltage supplies on request

technical data

supply

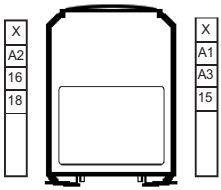
supply voltage	A1-A2 or A3-A2 selection see below
frequency range	0/50 ... 60 Hz
power consumption	(max.) 1 W
operation mode	continuous
supply voltage influence	< 0,01% over voltage range
temperature influence	< 0,01% / °C
recovery time	> 100ms
repetitive accuracy	+/- 0,2%

contacts

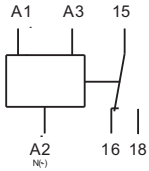
number of contacts	1 changeover
contact material	$AgSnO_2$
max. switching voltage	250V AC *
max. switching current	6A *
max. switching power AC	1500VA
max. switching frequency	15Hz
mechanical contact life	*
drop-off time switching element	approx. 20ms

* diagramms see on side 108

connections



connection diagramm



timer
SAB - delay-on release
serie 11,25mm with 1 changeover

function (comments see from side 6)

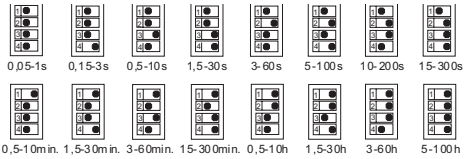
delay-on release

activation of the timing function is accomplished by an external control contact which is connected to terminals B1/B2

dip switch adjustment

timing intervals can be adjusted by DIP switches on the front panel of the relay

time intervals



part number

11.001.xx.004

voltage supply selection

	A3-A2 / A1-A2
00	24V UC / 230V AC
09	12V UC / 24V UC
11	24V UC / 48V UC
12	24V UC / 110V AC

other time intervals and voltage supplies on request

technical data

supply

supply voltage	A1-A2 or A3-A2 selection see below
frequency range	0/50 ... 60 Hz
power consumption	(max.) 1 W
operation mode	continuous
supply voltage influence	< 0,01% over voltage range
temperature influence	< 0,01% / °C
recovery time	> 100ms
repetitive accuracy	+/- 0,2%

contacts

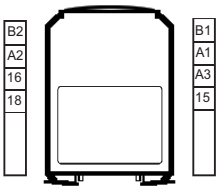
number of contacts	1 changeover
contact material	$AgSnO_2$
max. switching voltage	250V AC *
max. switching current	6A *
max. switching power AC	1500VA
max. switching frequency	15Hz
mechanical contact life	*
drop-off time switching element	approx. 20ms

B1/B2 - for contact control

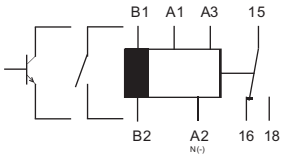
voltage (internal) B1(+) / B2(-)	5V DC
min. bridging time	10ms
max. load	25kOhm

* diagramms see on side 108

connections



connection diagramm



HSB-Industrieelektronik
www.hsb-electronics.de · info@hsb-electronics.de

timer
SABV - pulse-on release
serie 11,25mm with 1 changeover

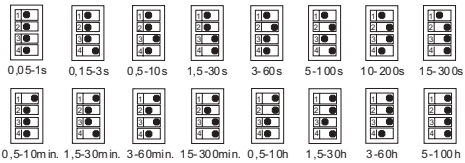
function
(comments see from side 6)

pulse-on release

dip switch adjustment

timing intervals can be adjusted by DIP switches on the front panel of the relay

time intervals



part number

11.101.xx.004

supply voltage selection

	A3-A2 / A1-A2
00	24V UC / 230V AC
09	12V UC / 24V UC
11	24V UC / 48V UC
12	24V UC / 110V AC

other time intervals and voltage supplies on request

technical data

supply

supply voltage	A1-A2 or A3-A2 selection see below
frequency range	0/50 ... 60 Hz
power consumption	(max.) 1 W
operation mode	continuous
supply voltage influence	< 0,01% over voltage range
temperature influence	< 0,01% / °C
recovery time	> 100ms
repetitive accuracy	+/- 0,2%

contacts

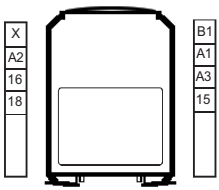
number of contacts	1 changeover
contact material	$AgSnO_2$
max. switching voltage	250V AC *
max. switching current	6A *
max. switching power AC	1500VA
max. switching frequency	15Hz
mechanical contact life	*
drop-off time switching element	approx. 20ms

B1 - for control voltage

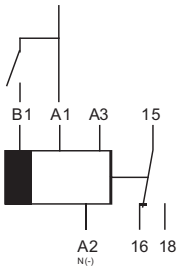
voltage range	20-250V AC/DC
min. bridging time	60ms

* diagramms see on side 108

connections



connection diagramm



timer
SEW - pulse-on operate
serie 11,25mm with 1 changeover

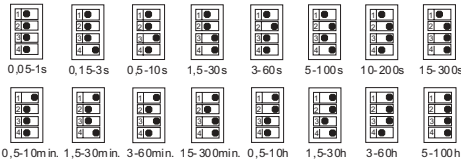
function
(comments see from side 6)

pulse-on operate

dip switch adjustment

timing intervals can be adjusted by DIP switches on the front panel of the relay

time intervals



part number

11.101.xx.005

supply voltage selection

	A3-A2 / A1-A2
00	24V UC / 230V AC
09	12V UC / 24V UC
11	24V UC / 48V UC
12	24V UC / 110V AC

other time intervals and voltage supplies on request

technical data

supply

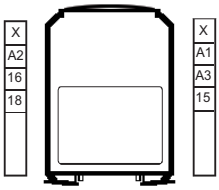
supply voltage	A1-A2 or A3-A2 selection see below
frequency range	0/50 ... 60 Hz
power consumption	(max.) 1 W
operation mode	continuous
supply voltage influence	< 0,01% over voltage range
temperature influence	< 0,01% / °C
recovery time	> 100ms
repetitive accuracy	+/- 0,2%

contacts

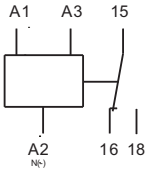
number of contacts	1 changeover
contact material	$AgSnO_2$
max. switching voltage	250V AC *
max. switching current	6A *
max. switching power AC	1500VA
max. switching frequency	15Hz
mechanical contact life	*
drop-off time switching element	approx. 20ms

* diagramms see on side 108

connections



connection diagramm



function

(comments see from side 6)

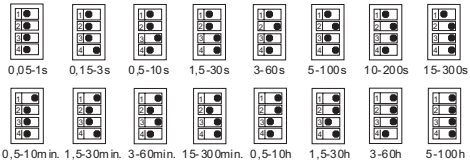
pulse-on release

activation of the timing function is accomplished by an external control contact which is connected to terminals B1/B2

dip switch adjustment

timing intervals can be adjusted by DIP switches on the front panel of the relay

time intervals



part number

11.001.xx.006

supply voltage selection

	A3-A2 / A1-A2
00	24V UC / 230V AC
09	12V UC / 24V UC
11	24V UC / 48V UC
12	24V UC / 110V AC

other time intervals and voltage supplies on request

technical data

supply

supply voltage	A1-A2 or A3-A2 selection see below
frequency range	0/50 ... 60 Hz
power consumption	(max.) 1 W
operation mode	continuous
supply voltage influence	< 0,01% over voltage range
temperature influence	< 0,01% / °C
recovery time	> 100ms
repetitive accuracy	+/- 0,2%

contacts

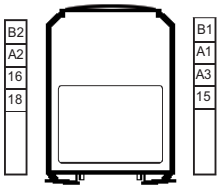
number of contacts	1 changeover
contact material	$AgSnO_2$
max. switching voltage	250V AC *
max. switching current	6A *
max. switching power AC	1500VA
max. switching frequency	15Hz
mechanical contact life	*
drop-off time switching element	approx. 20ms

B1/B2 - for contact control

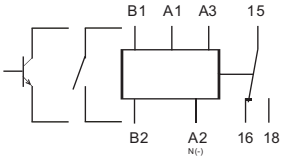
voltage (internal) B1(+) / B2(-)	5V DC
min. bridging time	10ms
max. load	25kOhm

* diagramms see on side 108

connections



connection diagramm



timer
SAWV - pulse-on release, voltage controlled
serie 11,25mm with 1 changeover

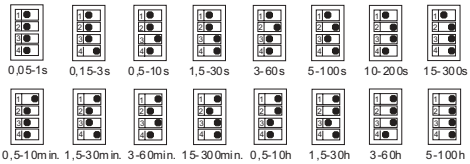
function
(comments see from side 6)

pulse-on release timer

dip switch adjustment

timing intervals can be adjusted by DIP switches on the front panel of the relay

time intervals



part number

11.101.xx.006

supply voltage selection

	A3-A2 / A1-A2
00	24V UC / 230V AC
09	12V UC / 24V UC
11	24V UC / 48V UC
12	24V UC / 110V AC

other time intervals and voltage supplies on request

technical data

supply

supply voltage	A1-A2 or A3-A2 selection see below
frequency range	0/50 ... 60 Hz
power consumption	(max.) 1 W
operation mode	continuous
supply voltage influence	< 0,01% over voltage range
temperature influence	< 0,01% / °C
recovery time	> 100ms
repetitive accuracy	+/- 0,2%

contacts

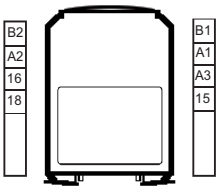
number of contacts	1 changeover
contact material	$AgSnO_2$
max. switching voltage	250V AC *
max. switching current	6A *
max. switching power AC	1500VA
max. switching frequency	15Hz
mechanical contact life	*
drop-off time switching element	approx. 20ms

B1 - for voltage control

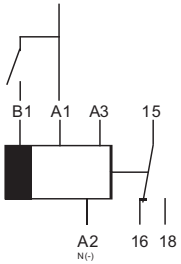
voltage range	20-250V AC/DC
min. bridging time	60ms

* diagramms see on side 108

connections



connection diagramm



function

(comments see from side 6)

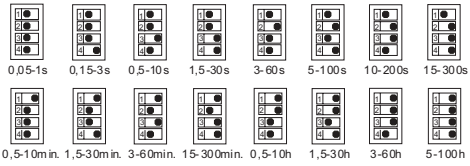
watchdog

activation of the timing function is accomplished by an external control contact which is connected to terminals B1/B2

dip switch adjustment

timing intervals can be adjusted by DIP switches on the front panel of the relay

time intervals



part number

11.001.xx.010

supply voltage selection

	A3-A2 / A1-A2
00	24V UC / 230V AC
09	12V UC / 24V UC
11	24V UC / 48V UC
12	24V UC / 110V AC

other time intervals and voltage supplies on request

technical data

supply

supply voltage	A1-A2 or A3-A2 selection see below
frequency range	0/50 ... 60 Hz
power consumption	(max.) 1 W
operation mode	continuous
supply voltage influence	< 0,01% over voltage range
temperature influence	< 0,01% / °C
recovery time	> 100ms
repetitive accuracy	+/- 0,2%

contacts

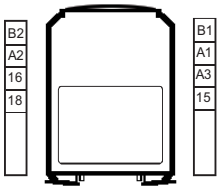
number of contacts	1 changeover
contact material	$AgSnO_2$
max. switching voltage	250V AC *
max. switching current	6A *
max. switching power AC	1500VA
max. switching frequency	15Hz
mechanical contact life	*
drop-off time switching element	approx. 20ms

B1/B2 - for contact control

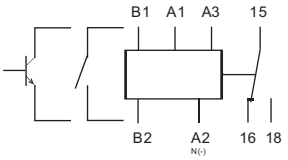
voltage (internal) B1(+) / B2(-)	5V DC
min. bridging time	10ms
max. load	25kOhm

* diagramms see on side 108

connections



connection diagramm



timer
SIFV - pulse former, voltage controlled
serie 11,25mm with 1 changeover

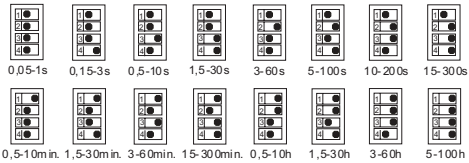
function
(comments see from side 6)

pulse former

dip switch adjustment

timing intervals can be adjusted by DIP switches on the front panel of the relay

time intervals



part number

11.101.xx.018

supply voltage selection

	A3-A2 / A1-A2
00	24V UC / 230V AC
09	12V UC / 24V UC
11	24V UC / 48V UC
12	24V UC / 110V AC

other time intervals and voltage supplies on request

technical data

supply

supply voltage	A1-A2 or A3-A2 selection see below
frequency range	0/50 ... 60 Hz
power consumption	(max.) 1 W
operation mode	continuous
supply voltage influence	< 0,01% over voltage range
temperature influence	< 0,01% / °C
recovery time	> 100ms
repetitive accuracy	+/- 0,2%

contacts

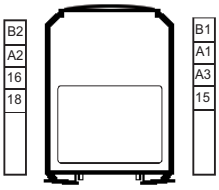
number of contacts	1 changeover
contact material	$AgSnO_2$
max. switching voltage	250V AC *
max. switching current	6A *
max. switching power AC	1500VA
max. switching frequency	15Hz
mechanical contact life	*
drop-off time switching element	approx. 20ms

B1 - for voltage control

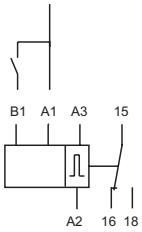
voltage range	20-250V AC/DC
min. bridging time	60ms

* diagramms see on side 108

connections



connection diagramm



timer
SKS - contact protection relay
serie 11,25mm with 1 changeover

function (comments see from side 6)

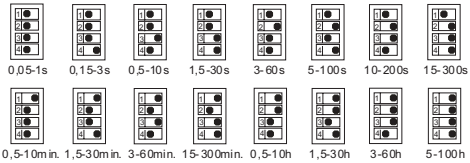
contact protection relay
delay-on operate, delay-on release

activation of the timing function is accomplished by an external control contact which is connected to terminals B1/B2

dip switch adjustment

timing intervals can be adjusted by DIP switches on the front panel of the relay

time intervals



part number

11.001.xx.020

supply voltage selection

	A3-A2 / A1-A2
00	24V UC / 230V AC
09	12V UC / 24V UC
11	24V UC / 48V UC
12	24V UC / 110V AC

other time intervals and voltage supplies on request

technical data

supply

supply voltage	A1-A2 or A3-A2 selection see below
frequency range	0/50 ... 60 Hz
power consumption	(max.) 1 W
operation mode	continuous
supply voltage influence	< 0,01% over voltage range
temperature influence	< 0,01% / °C
recovery time	> 100ms
repetitive accuracy	+/- 0,2%

contacts

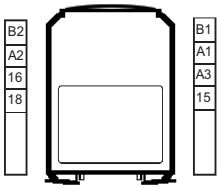
number of contacts	1 changeover
contact material	$AgSnO_2$
max. switching voltage	250V AC *
max. switching current	6A *
max. switching power AC	1500VA
max. switching frequency	15Hz
mechanical contact life	*
drop-off time switching element	approx. 20ms

B1/B2 - for contact controlled

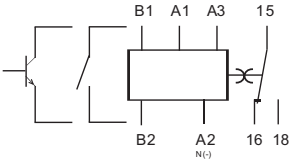
voltage (internal) B1(+) / B2(-)	5V DC
min. bridging time	10ms
max. load	25kOhm

* diagramms see on side 108

connections



connection diagramm



timer
SSD - star-delta relay
serie 11,25mm with 2 closers

function (comments see from side 6)

star-delta switching

start-up switching for three-phase motors with star-delta switching.

dip switch adjustment

timing intervals can be adjusted by DIP switches on the front panel of the relay

time intervals

part number

11.101.xx.019

supply voltage selection

	A1-A2
03	12V UC
01	24V UC
05	48V UC
06	110V AC
02	230V AC

other time intervals and voltage supplies on request

technical data

supply

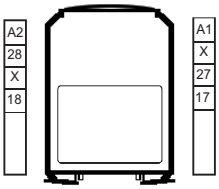
supply voltage	A1-A2 or A3-A2 selection see below
frequency range	0/50 ... 60 Hz
power consumption	(max.) 1 W
operation mode	continuous
supply voltage influence	< 0,01% over voltage range
temperature influence	< 0,01% / °C
recovery time	> 100ms
repetitive accuracy	+/- 0,2%

contacts

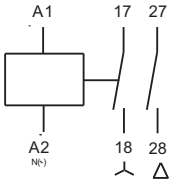
number of contacts	2 closers
contact material	$AgSnO_2$
max. switching voltage	250V AC *
max. switching current	6A *
max. switching power AC	1500VA
max. switching frequency	15Hz
mechanical contact life	*
drop-off time switching element	approx. 20ms

* diagramms see on side 108

connections



connection diagramm



function

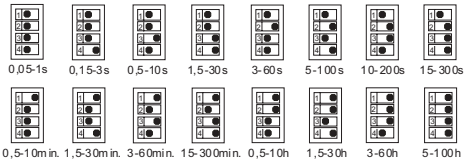
(comments see from side 6)

flasher with adjustable pulse break relationship.

dip switch adjustment

timing intervals can be adjusted by DIP switches on the front panel of the relay

time intervals



part number

11.101.xx.xxx

function selection

022	flasher, beginning with on
023	flasher, beginning with off

supply voltage selection

A3-A2 / A1-A2	
00	24V UC / 230V AC
09	12V UC / 24V UC
11	24V UC / 48V UC
12	24V UC / 110V AC

other time intervals and voltage supplies on request

technical data

supply

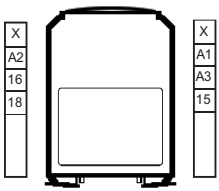
supply voltage	A1-A2 or A3-A2 selection see below
frequency range	0/50 ... 60 Hz
power consumption	(max.) 1 W
operation mode	continuous
supply voltage influence	< 0,01% over voltage range
temperature influence	< 0,01% / °C
recovery time	> 100ms
repetitive accuracy	+/- 0,2%

contacts

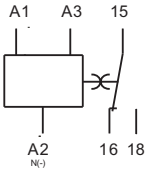
number of contacts	1 changeover
contact material	$AgSnO_2$
max. switching voltage	250V AC *
max. switching current	6A *
max. switching power AC	1500VA
max. switching frequency	15Hz
mechanical contact life	*
drop-off time switching element	approx. 20ms

* diagramms see on side 108

connections



connection diagramm

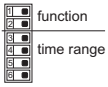


fimer
SAE - 4 function relay
serie 11,25mm with 2 changeover

function
(comments see from side 6)

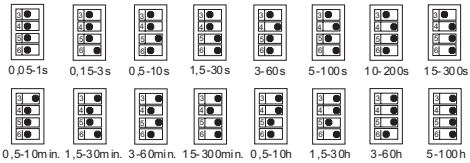
- pulse on operate for both change over
- pulse on operate with immediatly contact
- delay on operate with immediatly contact
- delay on operate for both change over

dip switch adjustment



function and timing intervals can be adjusted by DIP switches on the front panel of the relay

time intervals



part number

11.102.xx.002

supply voltage selection

	A1-A2
03	12V UC
01	24V UC
05	48V UC
06	110V AC
02	230V AC

other time intervals and voltage supplies on request

technical data

supply

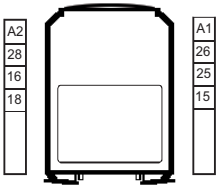
supply voltage	A1-A2 or A3-A2 selection see below
frequency range	0/50 ... 60 Hz
power consumption	(max.) 1 W
operation mode	continuous
supply voltage influence	< 0,01% over voltage range
temperature influence	< 0,01% / °C
recovery time	> 100ms
repetitive accuracy	+/- 0,2%

contacts

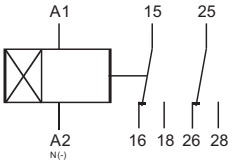
number of contacts	2 changeover
contact material	$AgSnO_2$
max. switching voltage	250V AC *
max. switching current	6A *
max. switching power AC	1500VA
max. switching frequency	15Hz
mechanical contact life	*
drop-off time switching element	approx. 20ms

* diagramms see on side 108

connections



connection diagramm



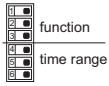
HSB-Industrieelektronik
www.hsb-electronics.de · info@hsb-electronics.de

functions

(comments see from side 6)

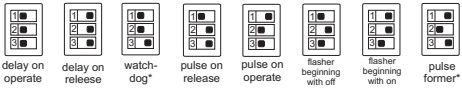
- delay-on operate
- pulse-on operate
- flasher beginning with on
- watchdog
- delay-on release
- pulse-on release
- flasher beginning with off
- pulse former

dip switch adjustment



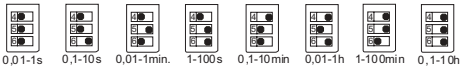
function and timing intervals can be adjusted by DIP switches on the front panel of the relay

functions



* with timer control on B1 or B1/B2

time intervals



part number

11.012.xx.001

supply voltage selection

	A3-A2 / A1-A2
00	24V UC / 230V AC
09	12V UC / 24V UC
11	24V UC / 48V UC
12	24V UC / 110V AC

other time intervals and voltage supplies on request

technical data

supply

supply voltage	A1-A2 or A3-A2 selection see below
frequency range	0/50 ... 60 Hz
power consumption	(max.) 1 W
operation mode	continuous
supply voltage influence	< 0,01% over voltage range
temperature influence	< 0,01% / °C
recovery time	> 100ms
repetitive accuracy	+/- 0,2%

contacts

number of contacts	2 changeover
contact material	AgNi
max. switching voltage	400V AC *
max. switching current	6A *
max. switching power AC	2000VA
max. switching frequency	15Hz
mechanical contact life	*
drop-off time switching element	approx. 20ms

B1/B2 - for contact controlled

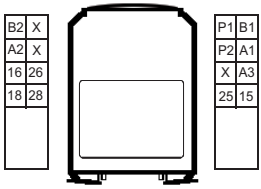
voltage (internal) B1(+) / B2(-)	5V DC
min. bridging time	10ms
max. load	25kOhm

external potentiometer P1/P2

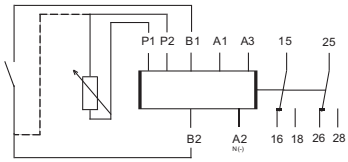
value	10kOhm linear
max. wire length	20m
resolution poti extern	128 steps
resolution poti intern	256 steps

* diagramms see on side 108

connections



connection diagramm



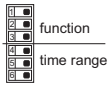
P2 can also used as B2

timer
BMRV - multi function, remote potentiometer
serie 22,5mm with 2 changeover

functions
(comments see from side 6)

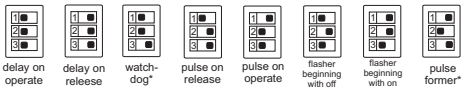
- delay-on operate
- pulse-on operate
- flasher beginning with on
- watchdog
- delay-on release
- pulse-on release
- flasher beginning with off
- pulse former

dip switch adjustment

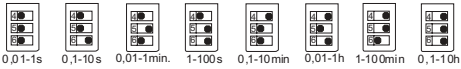


function and timing intervals can be adjusted by DIP switches on the front panel of the relay

functions



time intervals



part number

11.112.xx.001

supply voltage selection

	A3-A2 / A1-A2
00	24V UC / 230V AC
09	12V UC / 24V UC
11	24V UC / 48V UC
12	24V UC / 110V AC

other time intervals and voltage supplies on request

technical data

supply

supply voltage	A1-A2 or A3-A2 selection see below
frequency range	0/50 ... 60 Hz
power consumption	(max.) 1 W
operation mode	continuous
supply voltage influence	< 0,01% over voltage range
temperature influence	< 0,01% / °C
recovery time	> 100ms
repetitive accuracy	+/- 0,2%

contacts

number of contacts	2 changeover
contact material	AgNi
max. switching voltage	400V AC *
max. switching current	6A *
max. switching power AC	2000VA
max. switching frequency	15Hz
mechanical contact life	*
drop-off time switching element	approx. 20ms

B1 - -voltage controlled

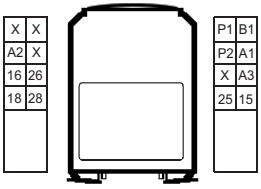
voltage range	20 -250V AC/DC
min. bridging time	60ms

external potentiometer P1/P2

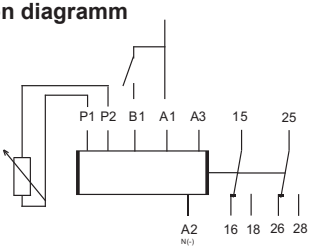
value	10kOhm linear
max. wire length	20m
resolution poti extern	128 steps
resolution poti intern	256 steps

* diagramms see on side 108

connections



connection diagramm

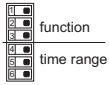


timer
BMRF - multi function, galvanic isolated
serie 22,5mm with 2 changeover

functions
(comments see from side 6)

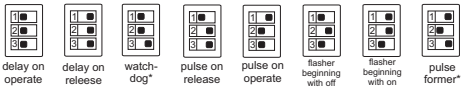
- delay-on operate
- pulse-on operate
- flasher beginning with on
- watchdog
- delay-on release
- pulse-on release
- flasher beginning with off
- pulse former

dip switch adjustment



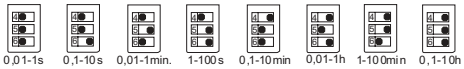
function and timing intervals can be adjusted by DIP switches on the front panel of the relay

functions



* for ext. potential free control contact

time intervals



part number

11.212.xx.001

supply voltage selection

	A3-A2 / A1-A2
00	24V UC / 230V AC
11	24V UC / 48V UC
12	24V UC / 110V AC

other time intervals and voltage supplies on request

technical data

supply

supply voltage	A1-A2 or A3-A2 selection see below
frequency range	0/50 ... 60 Hz
power consumption	(max.) 1 W
operation mode	continuous
supply voltage influence	< 0,01% over voltage range
temperature influence	< 0,01% / °C
recovery time	> 100ms
repetitive accuracy	+/- 0,2%

contacts

number of contacts	2 changeover
contact material	AgNi
max. switching voltage	400V AC *
max. switching current	6A *
max. switching power AC	2000VA
max. switching frequency	15Hz
mechanical contact life	*
drop-off time switching element	approx. 20ms

B1/B2 - for contact controlled

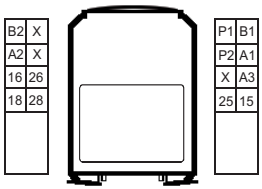
voltage (internal) B1(+) / B2(-)	5V DC
min. bridging time	10ms
max. load	25kOhm

external potentiometer P1/P2

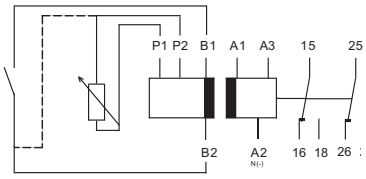
value	10kOhm linear
max. wire length	20m

* diagramms see on side 108

connections



connection diagramm



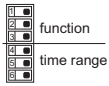
P2 can also used as B2

timer
BMRFV - multi function, galvanic isolated
serie 22,5mm with 2 changeover

functions
(comments see from side 6)

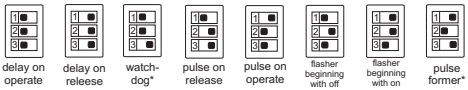
- delay-on operate
- pulse-on operate
- flasher beginning with on
- watchdog
- delay-on release
- pulse-on release
- flasher beginning with off
- pulse former

dip switch adjustment



function and timing intervals can be adjusted by DIP switches on the front panel of the relay

functions



time intervals

part number

11.312.xx.001

supply voltage selection

	A3-A2 / A1-A2
00	24V UC / 230V AC
11	24V UC / 48V UC
12	24V UC / 110V AC

other time intervals and voltage supplies on request

technical data

supply

supply voltage	A1-A2 or A3-A2 selection see below
frequency range	0/50 ... 60 Hz
power consumption	(max.) 1 W
operation mode	continuous
supply voltage influence	< 0,01% over voltage range
temperature influence	< 0,01% / °C
recovery time	> 100ms
repetitive accuracy	+/- 0,2%

contacts

number of contacts	2 changeover
contact material	AgNi
max. switching voltage	400V AC *
max. switching current	6A *
max. switching power AC	2000VA
max. switching frequency	15Hz
mechanical contact life	*
drop-off time switching element	approx. 20ms

B1 - voltage controlled

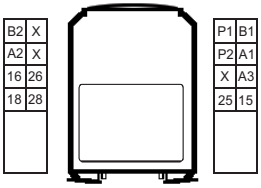
voltage range	20 -250V AC/DC
min. bridging time	60ms

external potentiometer P1/P2

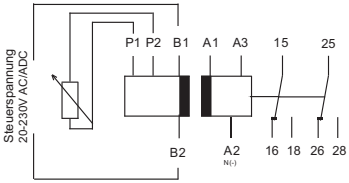
value	10kOhm linear
max. wire length	20m
resolution poti extern	128 steps
resolution poti intern	256 steps

* diagramms see on side 108

connections



connection diagramm



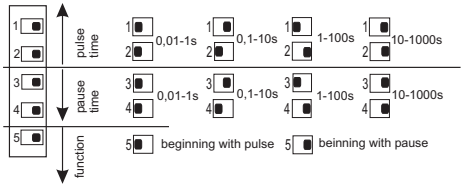
timer
BTG - pulse generator
serie 22,5mm with 2 changeover and remote potentiometer

function (comments see from side 6)

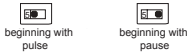
pulse generator

dip switch adjustment

timing intervals can be adjusted by DIP switches on the front panel of the relay

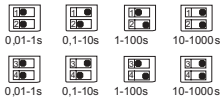


functions



time intervals

pulse and pause time can be adjusted with independent potentiometers



part number

11.112.xx.009

supply voltage selection	A3-A2 / A1-A2
00	24V UC / 230V AC
11	24V UC / 48V UC
12	24V UC / 110V AC

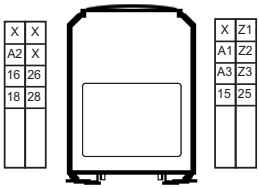
other time intervals and voltage supplies on request

technical data

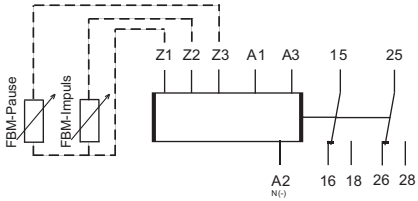
supply	
supply voltage	A1-A2 or A3-A2 selection see below
frequency range	0/50 ... 60 Hz
power consumption	(max.) 1 W
operation mode	continuous
supply voltage influence	< 0,01% over voltage range
temperature influence	< 0,01% / °C
recovery time	> 100ms
repetitive accuracy	+/- 0,2%
contacts	
number of contacts	2 changeover
contact material	AgNi
max. switching voltage	400V AC *
max. switching current	6A *
max. switching power AC	2000VA
max. switching frequency	15Hz
mechanical contact life	*
external potentiometer P1/P2	
value	10kOhm linear
max. wire length	20m
resolution poti extern	128 steps
resolution poti intern	256 steps

* diagramms see on side 108

connections



connection diagramm



finetuning of impuls- and pause time are also possible with external potentiometer

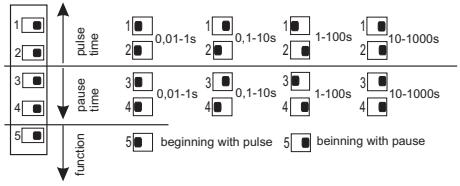
timer
BTGF - pulse generator, galvanic isolated
serie 22,5mm with 2 changeover and remote potentiometer

function
(comments see from side 6)

pulse generator with remote potentiometer connecting terminal

dip switch adjustment

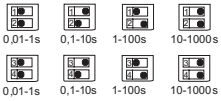
timing intervals can be adjusted by DIP switches on the front panel of the relay



functions

time intervals

pulse and pause time can be adjusted with independent potentiometers



part number

11.312.xx.009

supply voltage selection

	A3-A2 / A1-A2
00	24V UC / 230V AC
11	24V UC / 48V UC
12	24V UC / 110V AC

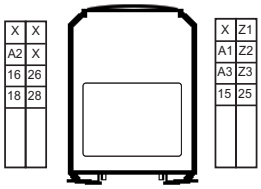
other time intervals and voltage supplies on request

technical data

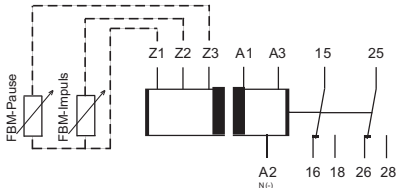
supply	
supply voltage	A1-A2 or A3-A2 selection see below
frequency range	0/50 ... 60 Hz
power consumption	(max.) 1 W
operation mode	continuous
supply voltage influence	< 0,01% over voltage range
temperature influence	< 0,01% / °C
recovery time	> 100ms
repetitive accuracy	+/- 0,2%
contacts	
number of contacts	2 changeover
contact material	AgNi
max. switching voltage	400V AC *
max. switching current	6A *
max. switching power AC	2000VA
max. switching frequency	15Hz
mechanical contact life	*
external potentiometer P1/P2	
value	10kOhm linear
max. wire length	20m
resolution poti extern	128 steps
resolution poti intern	256 steps

* diagramms see on side 108

connections



connection diagramm



finetuning of impuls- and pause time are also possible with external potentiometer

timer
BAB - delay-on release without auxiliary volt.
serie 22,5mm with 2 changeover

function (comments see from side 6)

delay-on release timer without auxiliary voltage

dip switch adjustment

timing intervals can be adjusted by DIP switches on the front panel of the relay

time intervals

0,1-10s 1-100s 0,1-10min. 0,3-30min.

part number

11.112.xx.013

supply voltage selection

	A3-A2 / A1-A2
00	24V UC / 230V AC
11	24V UC / 48V UC
12	24V UC / 110V AC

other time intervals and voltage supplies on request

technical data

supply

supply voltage	A1-A2 or A3-A2 selection see below
frequency range	0/50 ... 60 Hz
power consumption	(max.) 1 W
operation mode	continuous
supply voltage influence	< 0,01% over voltage range
temperature influence	< 0,01% / °C
recovery time	> 100ms
repetitive accuracy	+/- 0,2%

contacts

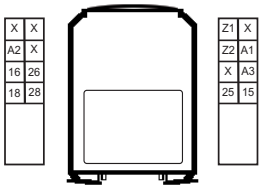
number of contacts	2 changeover
contact material	AgNi
max. switching voltage	400V AC *
max. switching current	6A *
max. switching power AC	2000VA
max. switching frequency	15Hz
mechanical contact life	*
type of relay	bistable (remanent relay)

external potentiometer P1/P2

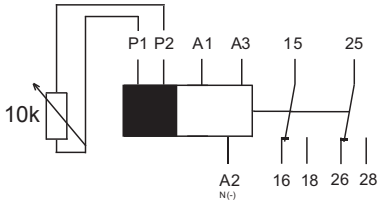
value	10kOhm linear
max. wire length	20m
resolution poti extern	128 steps
resolution poti intern	256 steps

* diagramms see on side 108

connections



connection diagramm

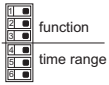


timer
ZMR, ZMRS - multi function
serie 17,5mm with 1 or 2 changeover

functions (comments see from side 6)

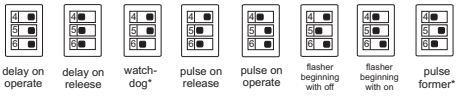
- delay-on operate
- delay-on release
- pulse-on operate
- pulse-on release
- flasher beginning with on
- flasher beginning with off
- watchdog
- pulse former
- pulse on operate with immediatly contact **
- delay on operate with immediatly contact **

dip switch adjustment



function and timing intervals can be adjusted by DIP switches on the front panel of the relay

functions

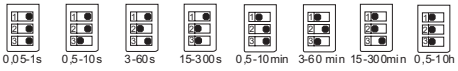


* for ext. potential free control contact

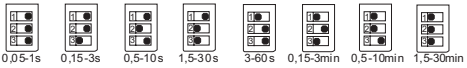
** immediatly contact only for devices with 2 change over

time intervals

ZMR



ZMRS



technical data

supply

supply voltage	A1-A2 or A3-A2 selection see below
frequency range	0/50 ... 60 Hz
power consumption	(max.) 1 W
operation mode	continuous
supply voltage influence	< 0,01% over voltage range
temperature influence	< 0,01% / °C
recovery time	> 100ms
repetitive accuracy	+/- 0,2%

contacts

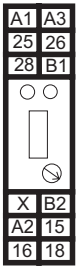
number of contacts	1 or 2 changeover
contact material	AgNi
max. switching voltage	400V AC *
max. switching current	8A *
max. switching power AC	2000VA
max. switching frequency	15Hz
mechanical contact life	*
drop-off time switching element	approx. 20ms

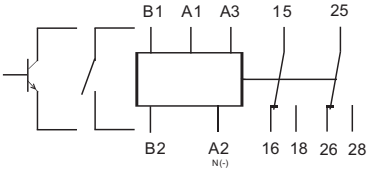
B1/B2 - for contact controlled

voltage (internal) B1(+) / B2(-)	5V DC
min. bridging time	10ms
max. load	25kOhm

* diagramms see on side 108

connections





part number

11.02x.xx.xxx

time interval selection

001	ZMR	0,05s - 10h
017	ZMRS	0,05s - 30min

supply voltage selection

	A3-A2 / A1-A2
00	24V UC / 230V AC
09	12V UC / 24V UC
11	24V UC / 48V UC
12	24V UC / 110V AC

changeover selection

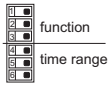
1	one changeover / outputs
2	two changeover / outputs

functions

(comments see from side 6)

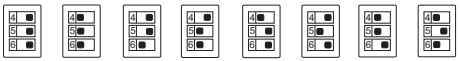
- delay-on operate
- delay-on release
- pulse-on operate
- pulse-on release
- flasher beginning with on
- flasher beginning with off
- watchdog
- pulse former
- pulse on operate with immediatly contact **
- delay on operate with immediatly contact **

dip switch adjustment



function and timing intervals can be adjusted by DIP switches on the front panel of the relay

functions

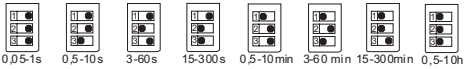


* for ext. potential free control contact

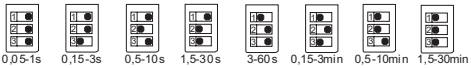
** immediatly contact only for devices with 2 change over

time intervals

ZMRV



ZMRVS



technical data

supply

supply voltage	A1-A2 or A3-A2 selection see below
frequency range	0/50 ... 60 Hz
power consumption	(max.) 1 W
operation mode	continuous
supply voltage influence	< 0,01% over voltage range
temperature influence	< 0,01% / °C
recovery time	> 100ms
repetitive accuracy	+/- 0,2%

contacts

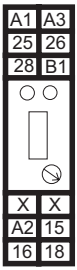
number of contacts	1 or 2 changeover
contact material	AgNi
max. switching voltage	400V AC *
max. switching current	8A *
max. switching power AC	2000VA
max. switching frequency	15Hz
mechanical contact life	*
Drop-off time switching element	approx. 20ms

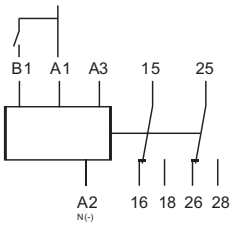
B1 - voltage controlled

voltage range	20 -250V AC/DC
min. bridging time	60ms

* diagramms see on side 108

connections





part number

11.12x.xx.xxx

Auswahl des Time intervalss

001	ZMRV	0,05s - 10h
017	ZMRVS	0,05s - 30min

supply voltage selection

A3-A2 / A1-A2

00	24V UC / 230V AC
09	12V UC / 24V UC
11	24V UC / 48V UC
12	24V UC / 110V AC

changeover selection

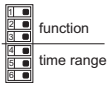
1	one changeover / outputs
2	two changeover / outputs

Timer
ZMRF, ZMRFS - multi function, rem. potentiometer
serie 17,5mm with 1 or 2 changeover

functions
(comments see from side 6)

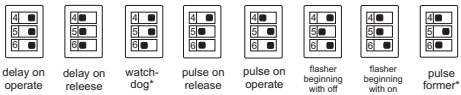
- delay-on operate
- pulse-on operate
- flasher beginning with on
- watchdog
- delay-on release
- pulse-on release
- flasher beginning with off
- pulse former

dip switch adjustment



function and timing intervals can be adjusted by DIP switches on the front panel of the relay

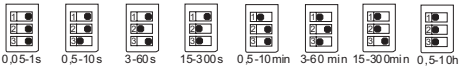
functions



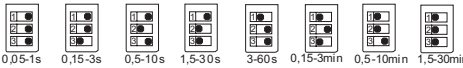
* for ext. potential free control contact

time intervals

ZMRF



ZMRFS



part number

11.22x.xx.xxx

time interval selection
001 ZMRF 0,05s - 10h
017 ZMRFS 0,05s - 30min

supply voltage selection
A3-A2 / A1-A2
00 24V UC / 230V AC
11 24V UC / 48V UC
12 24V UC / 110V AC

changeover selection
1 one changeover / outputs
2 two changeover / outputs

technical data

supply

supply voltage	A1-A2 or A3-A2 selection see below
frequency range	0/50 ... 60 Hz
power consumption	(max.) 1 W
operation mode	continuous
supply voltage influence	< 0,01% over voltage range
temperature influence	< 0,01% / °C
recovery time	> 100ms
repetitive accuracy	+/- 0,2%
isolation voltage	1000V DC

contacts

number of contacts	1 or 2 changeover
contact material	AgNi
max. switching voltage	400V AC *
max. switching current	8A *
max. switching power AC	2000VA
max. switching frequency	15Hz
mechanical contact life	*
drop-off time switching element	approx. 20ms

B1/B2 - for contact controlled

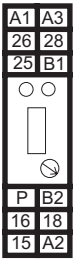
voltage (internal) B1(+) / B2(-)	5V DC
min. bridging time	10ms
max. load	25kOhm

external potentiometer P1/P2

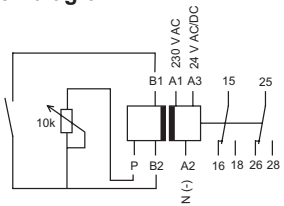
value	10kOhm linear
max. wire length	20m

* diagramms see on side 108

connections



connection diagramm



timer
ZTG - pulse generator
serie 17,5mm with 1 or 2 changeover

function
(comments see from side 6)

pulse generator

dip switch adjustment

pulse time range

pause time range

timing intervals can be adjusted by DIP switches on the front panel of the relay

time intervals

part number

11.12x.xx.009

supply voltage selection

	A3-A2 / A1-A2
00	24V UC / 230V AC
09	12V UC / 24V UC
11	24V UC / 48V UC
12	24V UC / 110V AC

changeover selection

1	one changeover / outputs
2	two changeover / outputs

other time intervals and voltage supplies on request

technical data

supply

supply voltage	A1-A2 or A3-A2 selection see below
frequency range	0/50 ... 60 Hz
power consumption	(max.) 1 W
operation mode	continuous
supply voltage influence	< 0,01% over voltage range
temperature influence	< 0,01% / °C
recovery time	> 100ms
repetitive accuracy	+/- 0,2%
isolation voltage	1000V DC

contacts

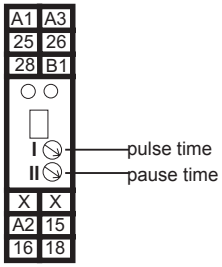
number of contacts	1 or 2 changeover
contact material	AgNi
max. switching voltage	400V AC *
max. switching current	8A *
max. switching power AC	2000VA
max. switching frequency	15Hz
mechanical contact life	*
drop-off time switching element	approx. 20ms

B1 - voltage controlled

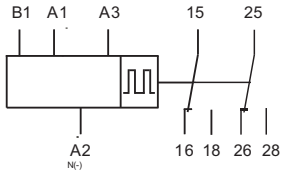
voltage at B1	beginning with pause
B1 blank	beginning with impuls
voltage range	20 -250V AC/DC

* diagramms see on side 108

connections



connection diagramm



timer
ZA - delay-on operate
serie 17,5mm with 1 or 2 changeover

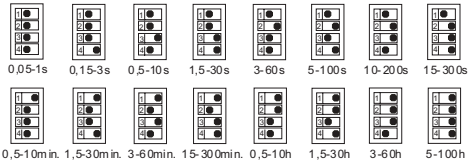
function
(comments see from side 6)

delay-on operate

dip switch adjustment

tming intervals can be adjusted with DIP switches on the front panel of the relay

time intervals



part number

11.12x.xx.003

supply voltage selection

	A3-A2 / A1-A2
00	24V UC / 230V AC
09	12V UC / 24V UC
11	24V UC / 48V UC
12	24V UC / 110V AC

changeover selection

1	one changeover / outputs
2	two changeover / outputs

other time intervals and voltage supplies on request

technical data

supply

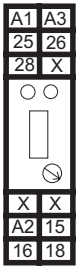
supply voltage	A1-A2 or A3-A2 selection see below
frequency range	0/50 ... 60 Hz
power consumption	(max.) 1 W
operation mode	continuous
supply voltage influence	< 0,01% over voltage range
temperature influence	< 0,01% / °C
recovery time	> 100ms
repetitive accuracy	+/- 0,2%
isolation voltage	1000V DC

contacts

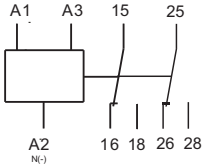
number of contacts	1 or 2 changeover
contact material	AgNi
max. switching voltage	400V AC *
max. switching current	8A *
max. switching power AC	2000VA
max. switching frequency	15Hz
mechanical contact life	*
drop-off time switching element	approx. 20ms

* diagramms see on side 108

connections



connection diagramm



HSB-Industrieelektronik
www.hsb-electronics.de · info@hsb-electronics.de

function

(comments see from side 6)

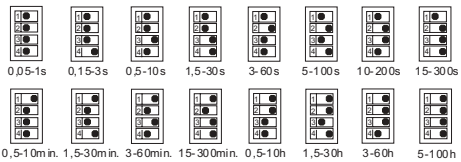
delay-on release

for ext. potential free control contact

dip switch adjustment

timing intervals can be adjusted by DIP switches on the front panel of the relay

time intervals



part number

11.02x.xx.004

supply voltage selection

	A3-A2 / A1-A2
00	24V UC / 230V AC
09	12V UC / 24V UC
11	24V UC / 48V UC
12	24V UC / 110V AC

changeover selection

1	one changeover / outputs
2	two changeover / outputs

other time intervals and voltage supplies on request

technical data

supply

supply voltage	A1-A2 or A3-A2 selection see below
frequency range	0/50 ... 60 Hz
power consumption	(max.) 1 W
operation mode	continuous
supply voltage influence	< 0,01% over voltage range
temperature influence	< 0,01% / °C
recovery time	> 100ms
repetitive accuracy	+/- 0,2%
isolation voltage	1000V DC

contacts

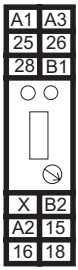
number of contacts	1 or 2 changeover
contact material	AgNi
max. switching voltage	400V AC *
max. switching current	8A *
max. switching power AC	2000VA
max. switching frequency	15Hz
mechanical contact life	*
drop-off time switching element	approx. 20ms

B1/B2 - for contact controlled

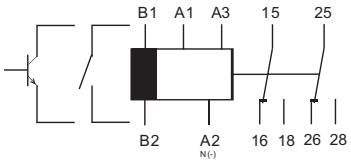
voltage (internal) B1(+) / B2(-)	5V DC
min. bridging time	10ms
max. load	25kOhm

* diagramms see on side 108

connections



connection diagramm



timer
ZABV - delay-on release, voltage controlled
serie 17,5mm with 1 or 2 changeover

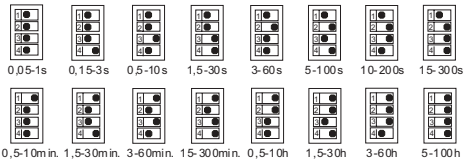
function
(comments see from side 6)

delay-on release

dip switch adjustment

timing intervals can be adjusted by DIP switches on the front panel of the relay

time intervals



part number

11.12x.xx.004

supply voltage selection

	A3-A2 / A1-A2
00	24V UC / 230V AC
09	12V UC / 24V UC
11	24V UC / 48V UC
12	24V UC / 110V AC

changeover selection

1	one changeover / outputs
2	two changeover / outputs

other time intervals and voltage supplies on request

technical data

supply

supply voltage	A1-A2 or A3-A2 selection see below
frequency range	0/50 ... 60 Hz
power consumption	(max.) 1 W
operation mode	continuous
supply voltage influence	< 0,01% over voltage range
temperature influence	< 0,01% / °C
recovery time	> 100ms
repetitive accuracy	+/- 0,2%
isolation voltage	1000V DC

contacts

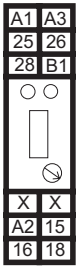
number of contacts	1 or 2 changeover
contact material	AgNi
max. switching voltage	400V AC *
max. switching current	8A *
max. switching power AC	2000VA
max. switching frequency	15Hz
mechanical contact life	*
drop-off time switching element	approx. 20ms

B1 - voltage controlled

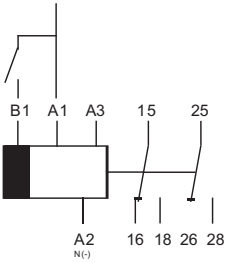
voltage range	20 -250V AC/DC
min. bridging time	60ms

* diagramms see on side 108

connections



connection diagramm



function

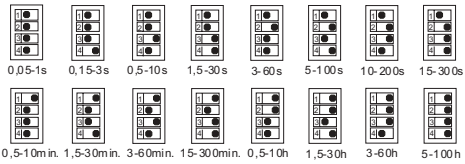
(comments see from side 6)

pulse-on operate

dip switch adjustment

timing intervals can be adjusted by DIP switches on the front panel of the relay

time intervals



part number

11.12x.xx.005

supply voltage selection

	A3-A2 / A1-A2
00	24V UC / 230V AC
09	12V UC / 24V UC
11	24V UC / 48V UC
12	24V UC / 110V AC

changeover selection

1	one changeover / outputs
2	two changeover / outputs

other time intervals and voltage supplies on request

technical data

supply

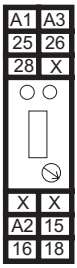
supply voltage	A1-A2 or A3-A2 selection see below
frequency range	0/50 ... 60 Hz
power consumption	(max.) 1 W
operation mode	continuous
supply voltage influence	< 0,01% over voltage range
temperature influence	< 0,01% / °C
recovery time	> 100ms
repetitive accuracy	+/- 0,2%
isolation voltage	1000V DC

contacts

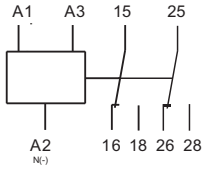
number of contacts	1 or 2 changeover
contact material	AgNi
max. switching voltage	400V AC *
max. switching current	8A *
max. switching power AC	2000VA
max. switching frequency	15Hz
mechanical contact life	*
drop-off time switching element	approx. 20ms

* diagramms see on side 108

connections



connection diagramm



timer
ZAW - pulse-on release
serie 17,5mm with 1 or 2 changeover

function
(comments see from side 6)

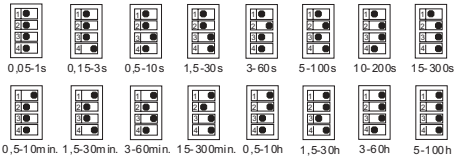
pulse-on release

for ext. potential free control contact

dip switch adjustment

timing intervals can be adjusted by DIP switches on the front panel of the relay

time intervals



part number

11.02x.xx.006

supply voltage selection

	A3-A2 / A1-A2
00	24V UC / 230V AC
09	12V UC / 24V UC
11	24V UC / 48V UC
12	24V UC / 110V AC

changeover selection

1	one changeover / outputs
2	two changeover / outputs

other time intervals and voltage supplies on request

technical data

supply

supply voltage	A1-A2 or A3-A2 selection see below
frequency range	0/50 ... 60 Hz
power consumption	(max.) 1 W
operation mode	continuous
supply voltage influence	< 0,01% over voltage range
temperature influence	< 0,01% / °C
recovery time	> 100ms
repetitive accuracy	+/- 0,2%
isolation voltage	1000V DC

contacts

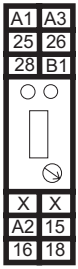
number of contacts	1 or 2 changeover
contact material	AgNi
max. switching voltage	400V AC *
max. switching current	8A *
max. switching power AC	2000VA
max. switching frequency	15Hz
mechanical contact life	*
drop-off time switching element	approx. 20ms

B1/B2 - for contact controlled

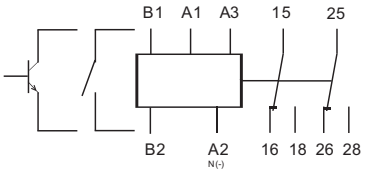
voltage (internal) B1(+) / B2(-)	5V DC
min. bridging time	10ms
max. load	25kOhm

* diagramms see on side 108

connections



connection diagramm



function

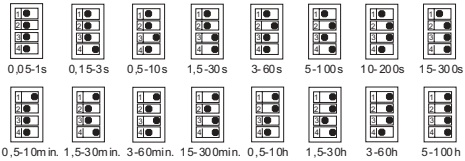
(comments see from side 6)

pulse-on release

dip switch adjustment

timing intervals can be adjusted by DIP switches on the front panel of the relay

time intervals



part number

11.12x.xx.006

supply voltage selection
A3-A2 / A1-A2
00 24V UC / 230V AC
09 12V UC / 24V UC
11 24V UC / 48V UC
12 24V UC / 110V AC

changeover selection
1 one changeover / outputs
2 two changeover / outputs

other time intervals and voltage supplies on request

technical data

supply

supply voltage	A1-A2 or A3-A2 selection see below
frequency range	0/50 ... 60 Hz
power consumption	(max.) 1 W
operation mode	continuous
supply voltage influence	< 0,01% over voltage range
temperature influence	< 0,01% / °C
recovery time	> 100ms
repetitive accuracy	+/- 0,2%

contacts

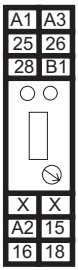
number of contacts	1 or 2 changeover
contact material	AgNi
max. switching voltage	400V AC *
max. switching current	8A *
max. switching power AC	2000VA
max. switching frequency	15Hz
mechanical contact life	*
drop-off time switching element	approx. 20ms

B1 - voltage controlled

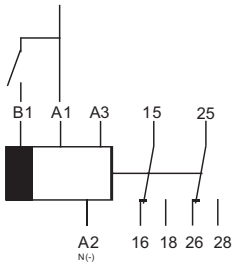
voltage range	20 -250V AC/DC
min. bridging time	60ms

* diagramms see on side 108

connections



connection diagramm



timer
ZWD - watchdog
serie 17,5mm with 1 or 2 changeover

function
(comments see from side 6)

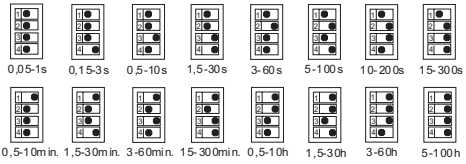
watchdog

for ext. potential free control contact

dip switch adjustment

timing intervals can be adjusted by DIP switches on the front panel of the relay

time intervals



part number

11.02x.xx.010

supply voltage selection

	A3-A2 / A1-A2
00	24V UC / 230V AC
09	12V UC / 24V UC
11	24V UC / 48V UC
12	24V UC / 110V AC

changeover selection

1	one changeover / outputs
2	two changeover / outputs

other time intervals and voltage supplies on request

technical data

supply

supply voltage	A1-A2 or A3-A2 selection see below
frequency range	0/50 ... 60 Hz
power consumption	(max.) 1 W
operation mode	continuous
supply voltage influence	< 0,01% over voltage range
temperature influence	< 0,01% / °C
recovery time	> 100ms
repetitive accuracy	+/- 0,2%

contacts

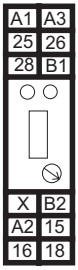
number of contacts	1 or 2 changeover
contact material	AgNi
max. switching voltage	400V AC *
max. switching current	8A *
max. switching power AC	2000VA
max. switching frequency	15Hz
mechanical contact life	*
drop-off time switching element	approx. 20ms

B1/B2 - for contact controlled

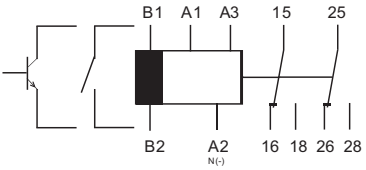
voltage (internal) B1(+) / B2(-)	5V DC
min. bridging time	10ms
max. load	25kOhm

* diagramms see on side 108

connections



connection diagramm



timer
ZIFV - pulse former, voltage controlled
serie 17,5mm with 1 or 2 changeover

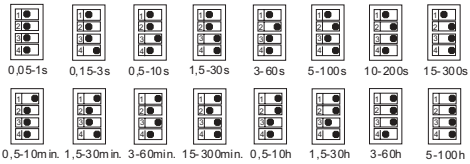
function
(comments see from side 6)

pulse former

dip switch adjustment

timing intervals can be adjusted by DIP switches on the front panel of the relay

time intervals



part number

11.12x.xx.018

supply voltage selection

	A3-A2 / A1-A2
00	24V UC / 230V AC
09	12V UC / 24V UC
11	24V UC / 48V UC
12	24V UC / 110V AC

changeover selection

1	one changeover / outputs
2	two changeover / outputs

other time intervals and voltage supplies on request

technical data

supply

supply voltage	A1-A2 or A3-A2 selection see below
frequency range	0/50 ... 60 Hz
power consumption	(max.) 1 W
operation mode	continuous
supply voltage influence	< 0,01% over voltage range
temperature influence	< 0,01% / °C
recovery time	> 100ms
repetitive accuracy	+/- 0,2%

contacts

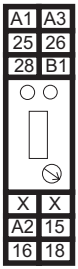
number of contacts	1 or 2 changeover
contact material	AgNi
max. switching voltage	400V AC *
max. switching current	8A *
max. switching power AC	2000VA
max. switching frequency	15Hz
mechanical contact life	*
drop-off time switching element	approx. 20ms

B1 - voltage controlled

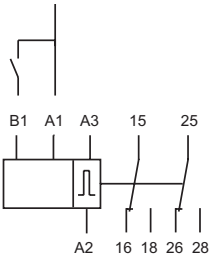
voltage range	20-250V AC/DC
min. bridging time	60ms

* diagramms see on side 108

connections



connection diagramm



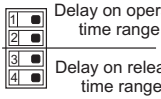
timer
ZKS - contact protection relay
serie 17,5mm with 1 or 2 changeover

function (comments see from side 6)

contact protection relay
delay-on operate, delay-on release

for ext. potential free control contact

dip switch adjustment



timing intervals can be adjusted by DIP switches on the front panel of the relay

time intervals

part number

11.02x.xx.020

supply voltage selection

	A3-A2 / A1-A2
00	24V UC / 230V AC
09	12V UC / 24V UC
11	24V UC / 48V UC
12	24V UC / 110V AC

changeover selection

1	one changeover / outputs
2	two changeover / outputs

other time intervals and voltage supplies on request

technical data

supply

supply voltage	A1-A2 or A3-A2 selection see below
frequency range	0/50 ... 60 Hz
power consumption	(max.) 1 W
operation mode	continuous
supply voltage influence	< 0,01% over voltage range
temperature influence	< 0,01% / °C
recovery time	> 100ms
repetitive accuracy	+/- 0,2%

contacts

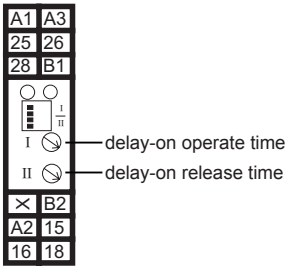
number of contacts	1 or 2 changeover
contact material	AgNi
max. switching voltage	400V AC *
max. switching current	8A *
max. switching power AC	2000VA
max. switching frequency	15Hz
mechanical contact life	*
drop-off time switching element	approx. 20ms

B1/B2 - for contact controlled

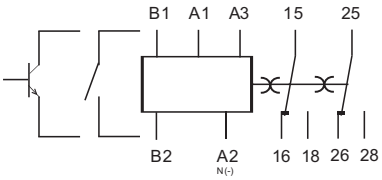
voltage (internal) B1(+) / B2(-)	5V DC
min. bridging time	10ms
max. load	25kOhm

* diagramms see on side 108

connections



connection diagramm



timer
ZSD - start-delta-relay
serie 17,5mm with 2 changeover

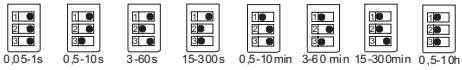
function
(comments see from side 6)

start-delta switching for three-phase motors.

dip switch adjustment

timing intervals can be adjusted by DIP switches on the front panel of the relay

time intervals



part number

11.122.xx.019

supply voltage selection

	A3-A2 / A1-A2
00	24V UC / 230V AC
09	12V UC / 24V UC
11	24V UC / 48V UC
12	24V UC / 110V AC

other time intervals and voltage supplies on request

technical data

supply

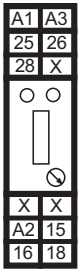
supply voltage	A1-A2 or A3-A2 selection see below
frequency range	0/50 ... 60 Hz
power consumption	(max.) 1 W
operation mode	continuous
supply voltage influence	< 0,01% over voltage range
temperature influence	< 0,01% / °C
recovery time	> 100ms
repetitive accuracy	+/- 0,2%

contacts

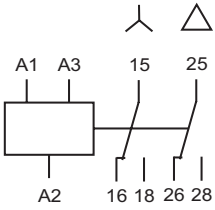
number of contacts	2 changeover
contact material	AgNi
max. switching voltage	400V AC *
max. switching current	8A *
max. switching power AC	2000VA
max. switching frequency	15Hz
mechanical contact life	*
drop-off time switching element	approx. 20ms

* diagramms see on side 108

connections



connection diagramm



coupling relay

index coupling relay

function

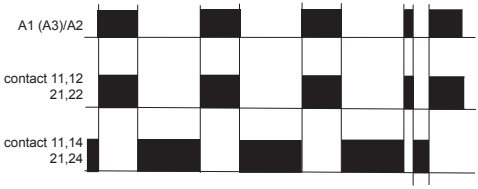
coupling relay

dip switch adjustment

No manuelly adjustment
The coupling relay switched to tis working position as soon as the relay voltage becomes connected to the device.

function

The output relay switches to its working position as soon as the supply voltage becomes connected to the device. This state is indicated by the green LED on the front panel. The output relay falls back to its rest position as sson as the supply voltage becomes disconnected.



part number

17.00x.xx.000

supply voltage selection

	A1-A2
03	12V UC
01	24V UC
05	48V UC
06	110V AC
02	230V AC

changeover selection

1	one changeover / output
2	two changeover / outputs

technical data

supply

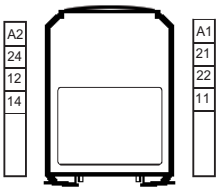
supply voltage	A1-A2 or A3-A2 selection see below
frequency range	0/50 ... 60 Hz
power consumption	(max.) 1 W
operation mode	continuous

contacts

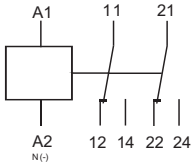
number of contacts	1 or 2 changeover
contact material	$AgSnO_2$
max. switching voltage	250V AC *
max. switching current	6A *
max. switching power AC	1500VA
max. switching frequency	15Hz
mechanical contact life	*
Drop-off time switching element	approx. 20ms

* diagramms see on side 108

connections



connection diagramm



coupling relay
ZKR
serie 17,5mm with 1, 2 changeover or 2 changeover and 1 closer

function

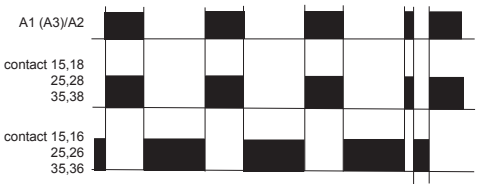
coupling relay

dip switch adjustment

No manuelly adjustment
The coupling relay switched to tis working position as soon as the relay voltage becomes connected to the device.

function

The output relay switches to its working position as soon as the supply voltage becomes connected to the device. This state is indicated by the green LED on the front panel. The output relay falls back to its rest position as sson as the supply voltage becomes disconnected.



part number

17.02x.xx.000

supply voltage selection

	A3-A2 / A1-A2
00	24V UC / 230V AC
09	12V UC / 24V UC
11	24V UC / 48V UC
12	24V UC / 110V AC

changeover selection

1	one changeover / output
2	two changeover / outputs
3	two changeover/one closer

for devices with two changeover and one closer only the supply voltage A1/A2 is present

technical data

supply

supply voltage	A1-A2 or A3-A2 selection see below
frequency range	0/50 ... 60 Hz
power consumption	(max.) 1 W
operation mode	continuous

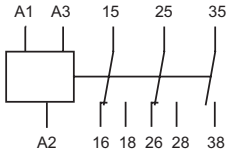
contacts

number of contacts	1 changeover or 2 changeover or 2 changeover / 1 closer
contact material	$AgSnO_2$
max. switching voltage	400V AC *
max. switching current	8A *
max. switching power AC	2000VA
max. switching frequency	15Hz
mechanical contact life	*
drop-off time switching element	approx. 20ms

* diagramms see on side 108

connections

connection diagramm



HSB-Industrieelektronik
www.hsb-electronics.de · info@hsb-electronics.de

measuring and monitoring relays

index measuring and monitoring relays

current measuring relay

voltage measuring relay

three phases measuring relay

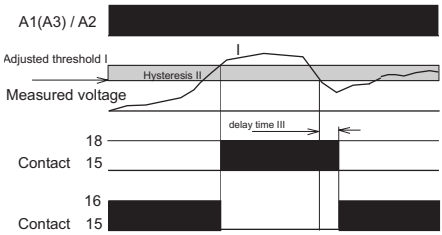
index measuring and monitoring relays

liquid level relay

temperature measuring relay

thermistor protection relay

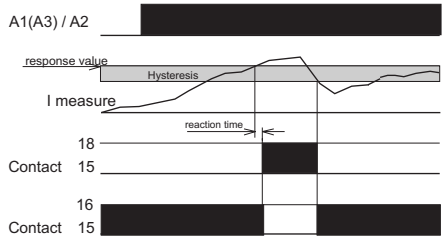
undercurrent



SIR ..... side 56
ZIR ..... side 59

The relay measures an AC or DC current connected to the terminals B1/B2.
If the current falls below the response value selected with the potentiometer I, then does the relay fall to its rest position after delay time has elapsed. This state is indicated by an off yellow LED. The relay switches to its working position as soon as the monitored current exceeds the selected value plus the selected hysteresis. This state is indicated by an on yellow LED. The response time of the relay can be adjusted between 0 and 10 sec. The yellow LED is flashing as long as delay/response time is running. The monitoring circuit is electrically isolated from the power supply. The relay continuously monitors the rectified value of the input signal.

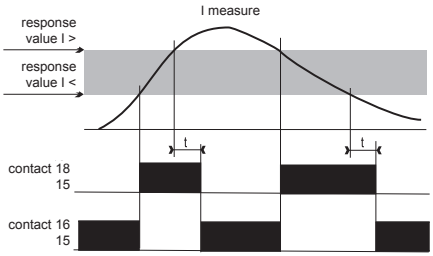
overcurrent



SIR ..... side 55
ZIR ..... side 58

The relay measures an AC or DC current connected to the terminals B1/B2.
If the current exceeds the response value selected with the potentiometer I >, then does the relay switch to its working position after delay time has elapsed. This state is indicated by the yellow LED. The relay returns to its rest position when the monitored current falls below the selected value and the selected hysteresis. The response time of the relay can be adjusted between 0 and 10 sec. The yellow LED is flashing as long as delay/response time is running. The monitoring circuit is electrically isolated from the power supply. The relay continuously monitors the rectified value of the input signal.

window current



SIR ..... side 57
ZIR ..... side 60

The relay measures an AC or DC current connected to the terminals B1/B2.
If the current exceeds the response value selected with the potentiometer I > and the potentiometer I <, then does the relay switch to its working position after delay time has elapsed. This state is indicated by the yellow LED.
The relay returns to its rest position when the monitored current falls below the selected value and the selected hysteresis. The response time of the relay can be adjusted between 0 and 10 sec. The yellow LED is flashing as long as delay/response time is running. The monitoring circuit is electrically isolated from the power supply. The relay continuously monitors the rectified value of the input signal.

function

(comments see from side 54)

overcurrent measuring relay

application

current measurment of AC and DC systems

dip switch adjustment

switching threshold, hysteresis and delay time can be adjusted on the front panel of the relay

part number

12.001.xx.xxx

measurement range selection

011	0	... 20mA
012	0	... 100mA
013	0	... 500mA
014	0	... 1A
015	0	... 5A

supply voltage selection

	A3-A2 / A1-A2
00	24V UC / 230V AC
11	24V UC / 48V UC
12	24V UC / 110V AC

other measurement ranges, timing ranges and supply voltages on request

technical data

supply

supply voltage	A1-A2 or A3-A2 selection see below
frequency range	0/50 ... 60 Hz
power consumption	1 W
operation mode	continuous
isolation voltage	1000V DC

measuring circuit

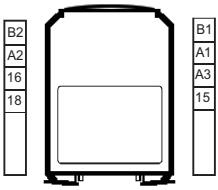
accuracy of measurement		2% over entire temp.- and voltage range	
repetitive accuracy:		+/- 2%	
meas. range	int. resistance	overload capacity	
0...20mA,	Ri - 10Ohm	0,4A - konst.	1,5A - 1s
0...100mA	Ri - 1Ohm	1A - konst.	5A - 1s
0...500mA	Ri - 0,2Ohm	3A - konst.	10A - 1s
0...1A	Ri - 0,1Ohm	5A - konst.	15A - 1s
0...5A	Ri - 0,02Ohm	7A - konst.	15A - 1s
hysteresis I :		5...30%	
response time t v :		0...10s	

contacts

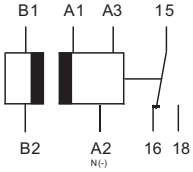
number of contacts	1 changeover
contact material	$AgSnO_2$
max. switching voltage	250V AC *
max. switching current	6A *
max. switching power AC	1500VA
max. switching frequency	15Hz
mechanical contact life	*

* diagramms see on side 108

connections



connection diagramm



measuring relay
SIR - undercurrent measuring relay
serie 11,25mm with 1 changeover

function
(comments see from side 54)

undercurrent measuring relay

application

current measurment of AC and DC systems

dip switch adjustment

switching threshold, hysteresis and delay time can be adjusted on the front panel of the relay

part number

12.001.xx.xxx

measurement range selection

021	0 ...	20mA
022	0 ...	100mA
023	0 ...	500mA
024	0 ...	1A
025	0 ...	5A

supply voltage selection

	A3-A2 / A1-A2
00	24V UC / 230V AC
11	24V UC / 48V UC
12	24V UC / 110V AC

other measurement ranges, timing ranges and supply voltages on request

technical data

supply

supply voltage	A1-A2 or A3-A2 selection see below
frequency range	0/50 ... 60 Hz
power consumption	(max.) 1 W
operation mode	continuous
isolation voltage	1000V DC

measuring circuit

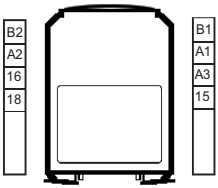
accuracy of measurement :		2% over entire temp.- and voltage range
repetitive accuracy:		+/- 2%
meas. range	int. resistance	overload capacity
0...20mA	Ri - 10Ohm	0,4A - konst. 1,5A - 1s
0...100mA	Ri - 1Ohm	1A - konst. 5A - 1s
0...500mA	Ri - 0,2Ohm	3A - konst. 10A - 1s
0...1A	Ri - 0,1Ohm	5A - konst. 15A - 1s
0...5A	Ri - 0,02Ohm	7A - konst. 15A - 1s
hysteresis I :		5...30%
response time t v :		0...10s

contacts

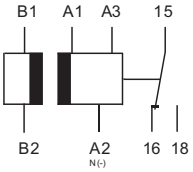
number of contacts	1 changeover
contact material	$AgSnO_2$
max. switching voltage	250V AC *
max. switching current	6A *
max. switching power AC	1500VA
max. switching frequency	15Hz
mechanical contact life	*

* diagramms see on side 108

connections



connection diagramm



function

(comments see from side 54)

window current measuring relay

application

current measurment of AC and DC systems

dip switch adjustment

switching thresholds and delay time can be adjusted on the front panel of the relay

part number

12.001.xx.xxx

measurement range selection

031	0 ...	20mA
032	0 ...	100mA
033	0 ...	500mA
034	0 ...	1A
035	0 ...	5A

supply voltage selection

	A3-A2 / A1-A2
00	24V UC / 230V AC
11	24V UC / 48V UC
12	24V UC / 110V AC

other measurement ranges, timing ranges and supply voltages on request

technical data

supply

supply voltage	A1-A2 or A3-A2 selection see below
frequency range	0/50 ... 60 Hz
power consumption	1 W
operation mode	continuous
isolation voltage	1000V DC

measuring circuit

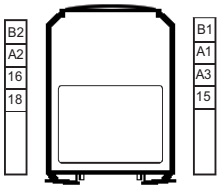
accuracy of measurement		2% over entire temp.- and voltage range
repetitive accuracy		+/- 2%
meas. range	int. resistance	overload capacity
0...20mA	Ri - 10Ohm	0,4A - konst. 1,5A - 1s
0...100mA	Ri - 1Ohm	1A - konst. 5A - 1s
0...500mA	Ri - 0,2Ohm	3A - konst. 10A - 1s
0...1A	Ri - 0,1Ohm	5A - konst. 15A - 1s
0...5A	Ri - 0,02Ohm	7A - konst. 15A - 1s
response time t v		0...10s

contacts

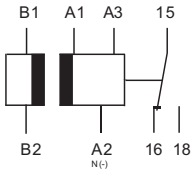
number of contacts	1 changeover
contact material	$AgSnO_2$
max. switching voltage	250V AC *
max. switching current	6A *
max. switching power AC	1500VA
max. switching frequency	15Hz
mechanical contact life	*

* diagramms see on side 108

connections



connection diagramm



measuring relay
ZIR - overcurrent measuring relay
serie 17,5mm with 1 changeover

function
(comments see from side 54)

overcurrent measuring relay

application

current measurment of AC and DC systems

dip switch adjustment

switching threshold, hysteresis and delay time can be adjusted on the front panel of the relay

part number

12.021.xx.xxx

measurement range selection

011	0	...	20mA
012	0	...	100mA
013	0	...	500mA
014	0	...	1A
015	0	...	5A
016	0	...	10A
017	0	...	16A

supply voltage selection

	A3-A2 / A1-A2
00	24V UC / 230V AC
11	24V UC / 48V UC
12	24V UC / 110V AC

other measurement ranges, timing ranges and supply voltages on request

technical data

supply

supply voltage	A1-A2 or A3-A2 selection see below
frequency range	0/50 ... 60 Hz
power consumption	1 W
operation mode	continuous
isolation voltage	1000V DC

measuring circuit

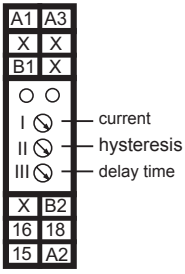
accuracy of measurement		2% over entire temp.- and voltage range
repetitive accuracy:		+/- 2%
meas. range	int. resistance	overload capacity
0...20mA	Ri - 10Ohm	0,4A - konst. 1,5A - 1s
0...100mA	Ri - 1Ohm	1A - konst. 5A - 1s
0...500mA	Ri - 0,2Ohm	3A - konst. 10A - 1s
0...1A	Ri - 0,1Ohm	5A - konst. 15A - 1s
0...5A	Ri - 0,02Ohm	10A - konst. 20A - 1s
0...10A	Ri - 0,01Ohm	15A - konst. 20A - 1s
0...16A	Ri - 0,005Ohm	20A - konst. 30A - 1s
hysteresis I :		5...30%
response time t v :		0...10s

contacts

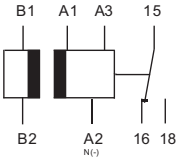
number of contacts	1 changeover
contact material	AgNi
max. switching voltage	400V AC *
max. switching current	8A *
max. switching power AC	2000VA
max. switching frequency	15Hz
mechanical contact life	*

* diagramms see on side 108

connections



connection diagramm



HSB-Industrieelektronik
www.hsb-electronics.de · info@hsb-electronics.de

function

(comments see from side 54)

undercurrent measuring relay

application

current measurment of AC and DC systems

dip switch adjustment

switching threshold, hysteresis and delay time can be adjusted on the front panel of the relay

part number

12.021.xx.xxx

measurement range selection

021	0	...	20mA
022	0	...	100mA
023	0	...	500mA
024	0	...	1A
025	0	...	5A
026	0	...	10A
027	0	...	16A

supply voltage selection

	A3-A2 / A1-A2
00	24V UC / 230V AC
11	24V UC / 48V UC
12	24V UC / 110V AC

other measurement ranges, timing ranges and supply voltages on request

technical data

supply

supply voltage	A1-A2 oder A3-A2 selection see below
frequency range	0/50 ... 60 Hz
power consumption	(max.) 1 W
operation mode	continuous
isolation voltage	1000V DC

measuring circuit

accuracy of measurement		2% over entire temp.- and voltage range
repetitive accuracy:		+/- 2%
meas. range	int. resistance	overload capacity
0...20mA	Ri - 10Ohm	0,4A - konst. 1,5A - 1s
0...100mA	Ri - 1Ohm	1A - konst. 5A - 1s
0...500mA	Ri - 0,2Ohm	3A - konst. 10A - 1s
0...1A	Ri - 0,1Ohm	5A - konst. 15A - 1s
0...5A	Ri - 0,02Ohm	10A - konst. 20A - 1s
0...10A	Ri - 0,01Ohm	15A - konst. 20A - 1s
0...16A	Ri - 0,005Ohm	20A - konst. 30A - 1s
hysteresis I :		5...30%
response time t v :		0...10s

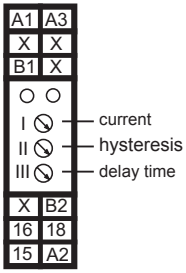
contacts

number of contacts	1 changeover
contact material	AgNi
max. switching voltage	400V AC *
max. switching current	6A *
max. switching power AC	1500VA
max. switching frequency	15Hz
mechanical contact life	*

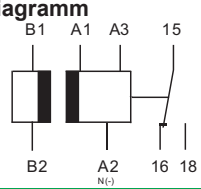
* diagramms see on side 108

measuring & monitoring relays

connections



connection diagramm



measuring relay
ZIR - window current measuring relay
serie 17,5mm with 1 changeover

function (comments see from side 54)

window current measuring relay

application

current measurment of AC and DC systems

dip switch adjustment

switching thresholds and delay time can be adjusted on the front panel of the relay

part number

12.021.xx.xxx

measurement range selection

031	0	...	20mA
032	0	...	100mA
033	0	...	500mA
034	0	...	1A
035	0	...	5A
036	0	...	10A
037	0	...	16A

supply voltage selection

	A3-A2 / A1-A2
00	24V UC / 230V AC
11	24V UC / 48V UC
12	24V UC / 110V AC

other measurement ranges, timing ranges and supply voltages on request

technical data

supply

supply voltage	A1-A2 oder A3-A2 selection see below
frequency range	0/50 ... 60 Hz
power consumption	1 W
operation mode	continuous
isolation voltage	1000V DC

measuring circuit

accuracy of measurement : 2% over entire temp.- and voltage range

repetitive accuracy: +/- 2%

meas. range	int. resistance	overload capacity	
0...20mA	Ri - 10Ohm	0,4A - konst.	1,5A - 1s
0...100mA	Ri - 1Ohm	1A - konst.	5A - 1s
0...500mA	Ri - 0,2Ohm	3A - konst.	10A - 1s
0...1A	Ri - 0,1Ohm	5A - konst.	15A - 1s
0...5A	Ri - 0,02Ohm	10A - konst.	20A - 1s
0...10A	Ri - 0,01Ohm	15A - konst.	20A - 1s
0...16A	Ri - 0,005Ohm	20A - konst.	30A - 1s

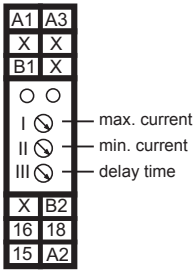
response time t v : 0...10s

contacts

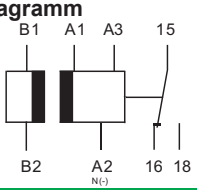
number of contacts	1 changeover
contact material	AgNi
max. switching voltage	400V AC *
max. switching current	6A *
max. switching power AC	1500VA
max. switching frequency	15Hz
mechanical contact life	*

* diagramms see on side 108

connections

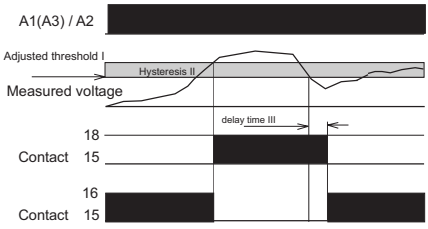


connection diagramm



HSB-Industrieelektronik
www.hsb-electronics.de · info@hsb-electronics.de

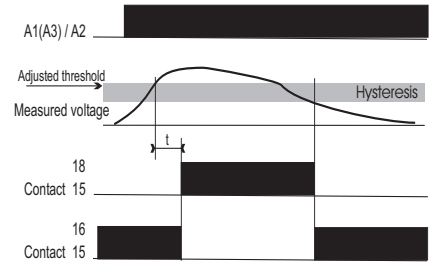
undervoltage



SUR ..... side 63
ZUR ..... side 66

The relay measures an AC or DC voltage connected to the terminals B1/B2. If the voltage falls below the response value selected with potentiometer I, then does the relay switch to its rest position after adjusted delay time (PIII) has elapsed. This state is indicated by an off yellow LED. The response time of the relay can be adjusted between 0 and 10 sec. The yellow LED is flashing as long as delay/response time is running. The relay switches to its working position as soon as the monitored voltage exceeds the adjusted value plus the adjusted hysteresis(PII). This state is indicated by an on yellow LED. The monitoring circuit is electrically isolated from the power supply. The relay continuously monitors the rectified value of the input signal.

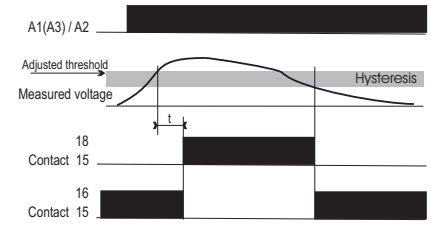
overvoltage



SUR ..... side 62
ZUR ..... side 65

The relay measures an AC or DC voltage connected to the terminals B1/B2. If the voltage exceeds the response value selected with potentiometer I, then does the relay switch to its working position after adjusted delay time (PIII) has elapsed. This state is indicated by the yellow LED. The relay returns to its rest position when the monitored voltage falls below the selected value and the selected hysteresis (PII). The response time of the relay can be adjusted between 0 and 10 sec. The yellow LED is flashing as long as delay/response time is running. The monitoring circuit is electrically isolated from the power supply. The relay continuously monitors the rectified value of the input signal.

window voltage



SUR ..... side 64
ZUR ..... side 67

The relay measures an AC or DC voltage connected to the terminals B1/B2. The relay switches to its working position when the monitored voltage has a value between the adjusted U> and U< values. An on yellow LED on the front panel indicates that the relay holds its working position. The relay falls back to its rest position when the monitored voltage falls below the adjusted value of U< or if the monitored voltage exceeds the adjusted value of U> after the adjusted response value has elapsed. The response time of the relay can be adjusted between 0 and 10 sec. The yellow LED is flashing as long as delay/response time is running. The monitoring circuit is electrically isolated from the power supply. The relay continuously monitors the rectified value of the input signal.

measuring relay
SUR - overvoltage measuring relay
serie 11,25mm with 1 changeover

function (comments see on side 61)

overvoltage measuring relay

application

voltage measurment of AC and DC systems

dip switch adjustment

switching threshold, hysteresis and delay time can be adjusted on the front panel of the relay

part number

12.101.xx.xxx

measurement range selection

110	0	...	100mV
111	0	...	500mV
112	0	...	1V
113	0	...	5V
114	0	...	10V
115	0	...	50V
116	0	...	100V
117	0	...	250V

supply voltage selection

	A3-A2 / A1-A2
00	24V UC / 230V AC
11	24V UC / 48V UC
12	24V UC / 110V AC

other measurement ranges, timing ranges and supply voltages on request

technical data

supply

supply voltage	A1-A2 or A3-A2 selection see below
frequency range	0/50 ... 60 Hz
power consumption	1 W
operation mode	continuous
isolation voltage	1000V DC

measuring circuit

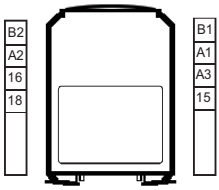
accuracy of measurement :	2% over entire temp.- and voltage range
repetitive accuracy:	+/- 2%
measurement range	internal resistance
0...100mV	Ri - 10MOhm
0...500mV	Ri - 10MOhm
0...1V	Ri - 10MOhm
0...5V	Ri - 220kOhm
0...10V	Ri - 170kOhm
0...50V	Ri - 130kOhm
0...100V	Ri - 130kOhm
0...250V	Ri - 680kOhm
hysteresis I :	5...30%
response time t v :	0...10s

contacts

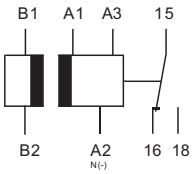
number of contacts	1 changeover
contact material	$AgSnO_2$
max. switching voltage	250V AC *
max. switching current	6A *
max. switching power AC	1500VA
max. switching frequency	15Hz
mechanical contact life	*

* diagramms see on side 108

connections



connection diagramm



function

(comments see on side 61)

undervoltage measuring relay

application

voltage measurment of AC and DC systems

dip switch adjustment

switching threshold, hysteresis and delay time can be adjusted on the front panel of the relay

part number

12.101.xx.xxx

measurement range selection

120	0	...	100mV
121	0	...	500mV
122	0	...	1V
123	0	...	5V
124	0	...	10V
125	0	...	50V
126	0	...	100V
127	0	...	250V

supply voltage selection

	A3-A2 / A1-A2
00	24V UC / 230V AC
11	24V UC / 48V UC
12	24V UC / 110V AC

other measurement ranges, timing ranges and supply voltages on request

technical data

supply

supply voltage	A1-A2 or A3-A2 selection see below
frequency range	0/50 ... 60 Hz
power consumption	1 W
operation mode	continuous
isolation voltage	1000V DC

measuring circuit

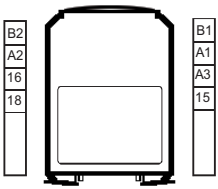
accuracy of measurement	2% over entire temp.- and voltage range
repetitive accuracy	+/- 2%
measurement range	internal resistance
0...500mV	Ri - 10MOhm
0...1V	Ri - 10MOhm
0...5V	Ri - 220kOhm
0...10V	Ri - 170kOhm
0...50V	Ri - 130kOhm
0...100V	Ri - 130kOhm
0...250V	Ri - 680kOhm
hysteresis I	5...30%
response time t v	0...10s

contacts

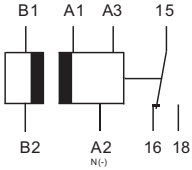
number of contacts	1 changeover
contact material	$AgSnO_2$
max. switching voltage	250V AC *
max. switching current	6A *
max. switching power AC	1500VA
max. switching frequency	15Hz
mechanical contact life	*

* diagramms see on side 108

connections



connection diagramm



measuring relay
SUR - window voltage measuring relay
serie 11,25mm with 1 changeover

function
(comments see on side 61)

window voltage measuring relay

application

voltage measurment of AC and DC systems

dip switch adjustment

switching thresholds and delay time can be adjusted on the front panel of the relay

part number

12.101.xx.xxx

measurement range selection

130	0	...	100mV
131	0	...	500mV
132	0	...	1V
133	0	...	5V
134	0	...	10V
135	0	...	50V
136	0	...	100V
137	0	...	250V

supply voltage selection

	A3-A2 / A1-A2
00	24V UC / 230V AC
11	24V UC / 48V UC
12	24V UC / 110V AC

other measurement ranges, timing ranges and supply voltages on request

technical data

supply

supply voltage	A1-A2 or A3-A2 selection see below
frequency range	0/50 ... 60 Hz
power consumption	1 W
operation mode	continuous
isolation voltage	1000V DC

measuring circuit

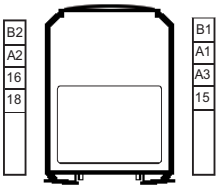
accuracy of measurement	2% over entire temp.- and voltage range
repetitive accuracy	+/- 2%
measurement range	internal resistance :
0...100mV	Ri - 10MOhm
0...500mV	Ri - 10MOhm
0...1V	Ri - 10MOhm
0...5V	Ri - 220kOhm
0...10V	Ri - 230kOhm
0...50V	Ri - 130kOhm
0...100V	Ri - 130kOhm
0...250V	Ri - 680kOhm
response time t v	0...10s

contacts

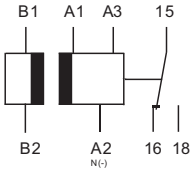
number of contacts	1 changeover
contact material	$AgSnO_2$
max. switching voltage	250V AC *
max. switching current	6A *
max. switching power AC	1500VA
max. switching frequency	15Hz
mechanical contact life	*

* diagramms see on side 108

connections



connection diagramm



function (comments see on side 61)

overvoltage measuring relay

application

voltage measurment of AC and DC systems

dip switch adjustment

switching threshold, hysteresis and delay time can be adjusted on the front panel of the relay

part number

12.121.xx.xxx

measurement range selection

110	0	...	100mV
111	0	...	500mV
112	0	...	1V
113	0	...	5V
114	0	...	10V
115	0	...	50V
116	0	...	100V
117	0	...	250V

supply voltage selection

	A3-A2 / A1-A2
00	24V UC / 230V AC
11	24V UC / 48V UC
12	24V UC / 110V AC

other measurement ranges, timing ranges and supply voltages on request

technical data

supply

supply voltage	A1-A2 or A3-A2 selection see below
frequency range	0/50 ... 60 Hz
power consumption	1 W
operation mode	continuous
isolation voltage	1000V DC

measuring circuit

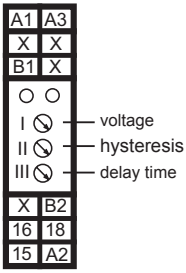
accuracy of measurement	2% over entire temp.- and voltage range
repetitive accuracy	+/- 2%
measurement range	internal resistance :
0...500mV	Ri - 10MOhm
0...1V	Ri - 360kOhm
0...5V	Ri - 200kOhm
0...10V	Ri - 350kOhm
0...50V	Ri - 47kOhm
0...100V	Ri - 120kOhm
0...250V	Ri - 500kOhm
hysteresis I	5...30%
response time t v	0...10s

contacts

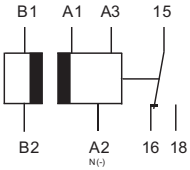
number of contacts	1 changeover
contact material	AgNi
max. switching voltage	400V AC *
max. switching current	8A *
max. switching power AC	2000VA
max. switching frequency	15Hz
mechanical contact life	*

* diagramms see on side 108

connections



connection diagramm



measuring relay
ZUR - undervoltage measuring relay
serie 17,5mm with 1 changeover

function (comments see on side 61)

undervoltage measuring relay

application

voltage measurment of AC and DC systems

dip switch adjustment

switching threshold, hysteresis and delay time can be adjusted on the front panel of the relay

part number

12.121.xx.xxx

measurement range selection

120	0	...	100mV
121	0	...	500mV
122	0	...	1V
123	0	...	5V
124	0	...	10V
125	0	...	50V
126	0	...	100V
127	0	...	250V

supply voltage selection

	A3-A2 / A1-A2
00	24V UC / 230V AC
11	24V UC / 48V UC
12	24V UC / 110V AC

other measurement ranges, timing ranges and supply voltages on request

technical data

supply

supply voltage	A1-A2 or A3-A2 selection see below
frequency range	0/50 ... 60 Hz
power consumption	1 W
operation mode	continuous
isolation voltage	1000V DC

measuring circuit

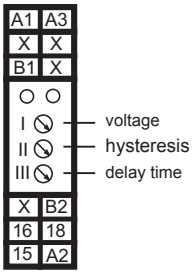
accuracy of measurement	2% over entire temp.- and voltage range
repetitive accuracy	+/- 2%
measurement range	internal resistance
0...500mV	Ri - 10MOhm
0...1V	Ri - 360kOhm
0...5V	Ri - 200kOhm
0...10V	Ri - 350kOhm
0...50V	Ri - 47kOhm
0...100V	Ri - 120kOhm
0...250V	Ri - 500kOhm
hysteresis I	5...30%
response time t v	0...10s

contacts

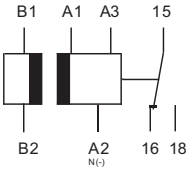
number of contacts	1 changeover
contact material	AgNi
max. switching voltage	400V AC *
max. switching current	8A *
max. switching power AC	2000VA
max. switching frequency	15Hz
mechanical contact life	*

* diagramms see on side 108

connections



connection diagramm



HSB-Industrieelektronik
www.hsb-electronics.de · info@hsb-electronics.de

function (comments see on side 61)

window voltage measuring relay

application

voltage measurment of AC and DC systems

dip switch adjustment

switching thresholds and delay time can be adjusted on the front panel of the relay

part number

12.121.xx.xxx

measurement range selection

130	0	...	100mV
131	0	...	500mV
132	0	...	1V
133	0	...	5V
134	0	...	10V
135	0	...	50V
136	0	...	100V
137	0	...	250V

supply voltage selection

	A3-A2 / A1-A2
00	24V UC / 230V AC
11	24V UC / 48V UC
12	24V UC / 110V AC

other measurement ranges, timing ranges and supply voltages on request

technical data

supply

supply voltage	A1-A2 or A3-A2 selection see below
frequency range	0/50 ... 60 Hz
power consumption	1 W
operation mode	continuous
isolation voltage	1000V DC

measuring circuit

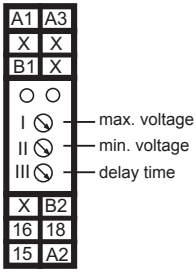
accuracy of measurement	2% over entire temp.- and voltage range
repetitive accuracy	+/- 2%
measurement range	internal resistance :
0...500mV	Ri - 10MOhm
0...1V	Ri - 360kOhm
0...5V	Ri - 200kOhm
0...10V	Ri - 350kOhm
0...50V	Ri - 47kOhm
0...100V	Ri - 120kOhm
0...250V	Ri - 500kOhm
response time t v	0...10s

contacts

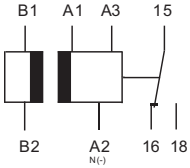
number of contacts	1 changeover
contact material	AgNi
max. switching voltage	400V AC *
max. switching current	8A *
max. switching power AC	2000VA
max. switching frequency	15Hz
mechanical contact life	*

* diagramms see on side 108

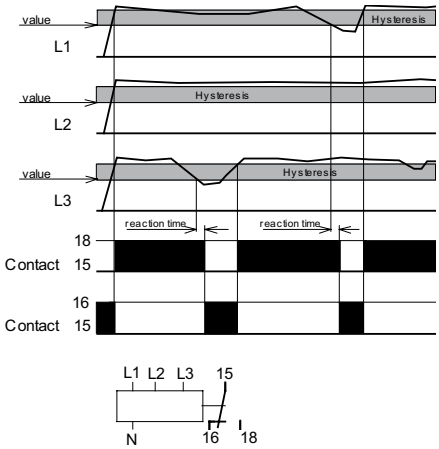
connections



connection diagramm



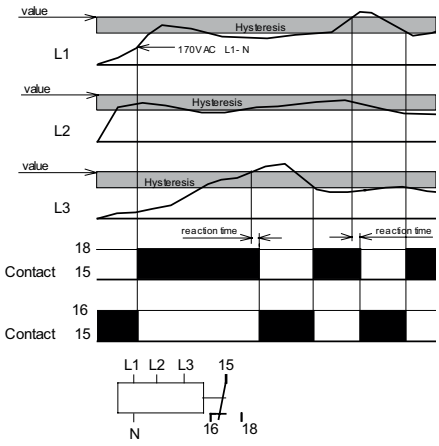
three phase undervoltage



If all three phases exceed the selected response value plus hysteresis (normal situation), the relay immediately switches into its operating position (relay energizes). This is indicated by the yellow LED. If at least one of the three phases fall below the threshold voltage for longer than the response time then does the relay return to its rest position.The exact value of this voltage can be adjusted with the upper potentiomer on the front panel. The response time of the relay can be adjusted between 0 and 10 seconds with the potentiometer in the middle of the front panel. The hysteresis can be set between 5 and 30% with the lower potentiometer on the front panel. The SMU senses the phase angle and will also switch off if other devices on circuit will generate a feed back.

SMU ..... side 71
MUU85% ..... side 80
ZMU ..... side 77

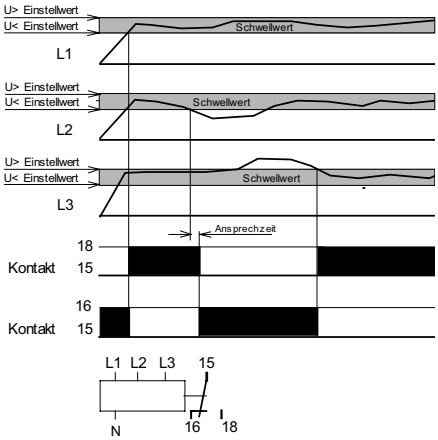
three phase overvoltage



The relay switches to ist working position as long as all three phases are below the selected values (relay is energized). This is indicated by the yellow LED. If at least one of the three phases exceed the threshold voltage then does the relay switch to its rest position after adjusted delay time has elapsed. As soon as the phase or phases are again under the adjusted value, less hysteresis, the relay re-energizes to its working position. The exact value of threshold voltage can be adjusted with the upper potentiomer on the front panel. The response time of the relay can be adjusted between 0 and 10 seconds with the lower potentiometer of the front panel. The hysteresis can be set between 5 and 30% with the potentiometer in the middle of the front panel. The SMU senses the phase angle and will also switch off if other devices on circuit will generate a feed back.

SMU ..... side 72
ZMU ..... side 77

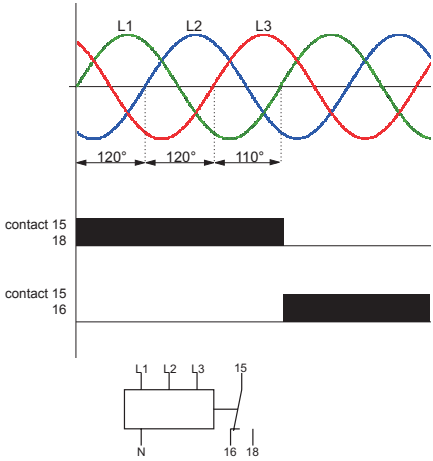
three phase window voltage



The relay switches into its working position as long as all three phases are within the selected threshold value window (relay is energized). This state is indicated by the yellow LED. If at least one of the phases falls below or exceeds the selected values, then does the relay switch to its rest position. The response time of the relay can be adjusted between 0 and 10 seconds. The SMU senses the phase angle and will also switch off if other devices on circuit will generate a feed back.

SMU ..... side 73

three phase asymmetry



The relay switches into its working position, as long as the phase sequence of the three phases is in the adjusted threshold value (10° - 35°).
Das relay compares the three phases and switches to its rest position as soon as one of the phase sequence is not in the allowed value (120° +/- (10° ... 35°))

120° phase sequence is conform to 0° asymmetry

SMA ..... side 76
ZMA ..... side 79
MMU85% ..... side 80

three-phase current measuring relay
SMP - phase sequence measuring relay
serie 11,25mm with 1 changeover

function

phase sequence
phase failures

application

monitoring of right rotating field inclusive phase failures

dip switch adjustment

no manuelly adjustment
the measuring relay switch to working position as soon as the phases will be in failure-free operation

part number

12.301.14.303

technical data

supply

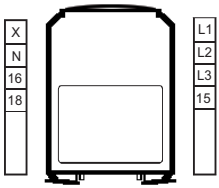
supply voltage :	3 x 400V AC / N
frequency range :	50 ... 60Hz
power consumption :	1W

contacts

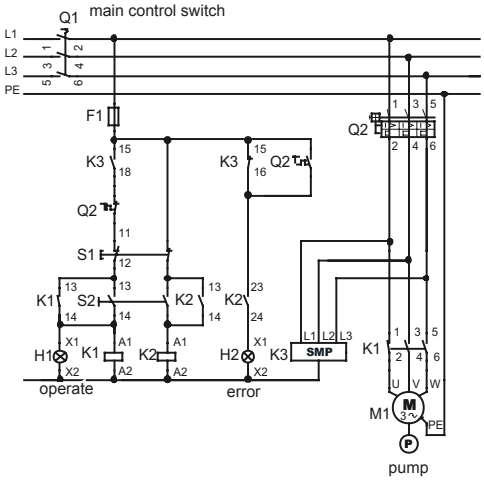
number of contacts	1 changeover
contact material	$AgSnO_2$
max. switching voltage	250V AC *
max. switching current	6A *
max. switching power AC	1500VA
max. switching frequency	15Hz
mechanical contact life	*
drop-off time switching element	approx. 20ms

* diagramms see on side 108

connections



application example



HSB-Industrieelektronik
www.hsb-electronics.de · info@hsb-electronics.de

function

(comments see from side 68)

under voltage monitoring relay
phase failures

application

monitoring of under voltage in right rotating fields inclusive phase failures

dip switch adjustment

switching threshold, hysteresis and response time can be adjusted by potentiometer on the front panel of the relay

part number

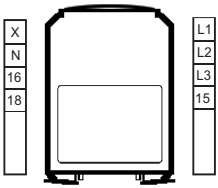
12.301.14.301

technical data

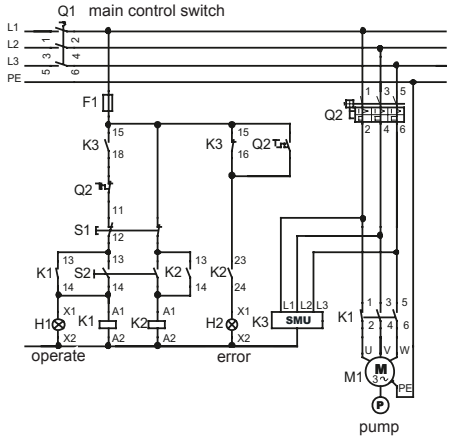
supply	
supply voltage	3 x 400V AC / N
frequency range	50 ... 60Hz
power consumption	1W
operation mode	continuous
adjustment range	
U <	170…230V AC
t	0...10sec
accuracy of measurement	2% over entire temp.- and voltage range
repetitive accuracy	+/- 2%
contacts	
number of contacts	1 changeover
contact material	$AgSnO_2$
max. switching voltage	250V AC *
max. switching current	6A *
max. switching power AC	1500VA
max. switching frequency	15Hz
mechanical contact life	*
drop-off time switching element	approx. 20ms

* diagramms see on side 108

connections



application example



three-phase current monitoring relay
SMU - overvoltage measuring relay
serie 11,25mm with 1 changeover

function
(comments see from side 68)

overvoltage monitoring relay
phase failures

application

monitoring of overvoltage in right rotating fields inclusive phase failures

dip switch adjustment

switching threshold, hysteresis and response time can be adjusted by potentiometer on the front panel of the relay

part number

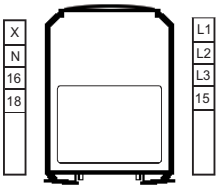
12.301.14.304

technical data

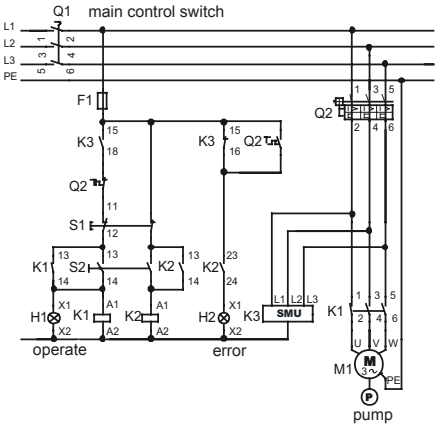
supply	
supply voltage	3 x 400V AC / N
frequency range	50 ... 60Hz
power consumption	1 W
operation mode	continuous
adjustment range	
U >	230...270V AC
t	0...10sec
accuracy of measurement	2% over entire temp.- and voltage range
repetitive accuracy	+/- 2%
contacts	
number of contacts	1 changeover
contact material	$AgSnO_2$
max. switching voltage	250V AC *
max. switching current	6A *
max. switching power AC	1500VA
max. switching frequency	15Hz
mechanical contact life	*
drop-off time switching element	approx. 20ms

* diagramms see on side 108

connections



application example



measuring & monitoring relays

function

(comments see from side 68)

window voltage monitoring
phase failures

application

monitoring of over- and under voltage in right rotating fields inclusive phase failures

dip switch adjustment

switching threshold, hysteresis and response time can be adjusted by potentiometer on the front panel of the relay

part number

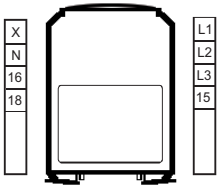
12.301.14.305

technical data

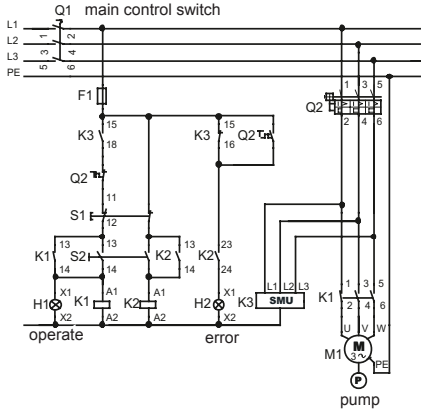
supply	
supply voltage	3 x 400V AC / N
frequency range	50 ... 60Hz
power consumption	8VA
operation mode	continuous
adjustment range	
U >	230...270V AC
U <	170…230V AC
t	0...10sec
accuracy of measurement	2% over entire temp.- and voltage range
repetitive accuracy	+/- 2%
contacts	
number of contacts	1 changeover
contact material	$AgSnO_2$
max. switching voltage	250V AC *
max. switching current	6A *
max. switching power AC	1500VA
max. switching frequency	15Hz
mechanical contact life	*
drop-off time switching element	approx. 20ms

* diagramms see on side 108

connections



application example



three-phase current measuring relay
SMU - window volt. with phase sequence measuring relay
serie 11,25mm with 1 changeover

function
(comments see from side 68)

window voltage monitoring
phase sequence
phase failure

application

monitoring of over- and under voltage, phase sequence and phase failure in three phase systems

dip switch adjustment

switching threshold, hysteresis and response time can be adjusted by potentiometer on the front panel of the relay.

part number

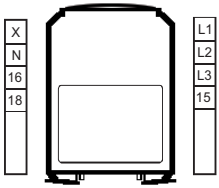
12.301.14.308

technical data

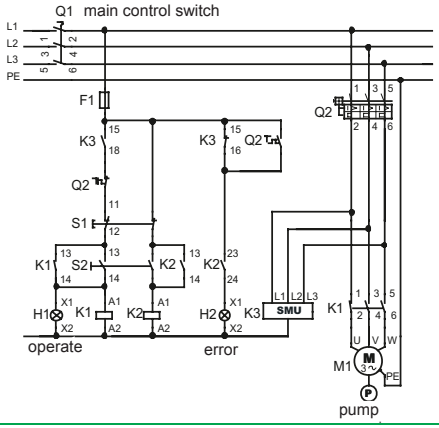
supply	
supply voltage	3 x 400V AC / N
frequency range	50 ... 60Hz
power consumption	8VA
operation mode	continuous
adjustment range	
U >	230...270V AC
U <	170…230V AC
t	0...10sec
accuracy of measurement	2% over entire temp.- and voltage range
repetitive accuracy	+/- 2%
contacts	
number of contacts	1 changeover
contact material	$AgSnO_2$
max. switching voltage	250V AC *
max. switching current	6A *
max. switching power AC	1500VA
max. switching frequency	15Hz
mechanical contact life	*
drop-off time switching element	approx. 20ms

* diagramms see on side 108

connections



application example



measuring & monitoring relays

HSB-Industrieelektronik
www.hsb-electronics.de · info@hsb-electronics.de

function

(comments see from side 68)

undervoltage monitoring
phase failure

application

monitoring of under voltage and phase failure in right rotating fields

dip switch adjustment

no manuelly adjustment
the measuring relay switch to working position as soon as the phases will be in failure-free operation

part number

12.301.14.309

technical data

supply

supply voltage	3 x 400V AC / N
frequency range	50 ... 60Hz
power consumption	8VA
operation mode	continuous

switching limits

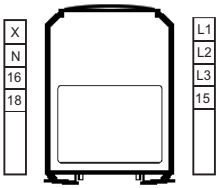
circuit breaking	< 195V AC (85%)
[L - N] switch on release	> 207V AC (90%)
[L - N] accuracy of measurement	2% over entire temp.- and voltage range
repetitive accuracy	+/- 2%

contacts

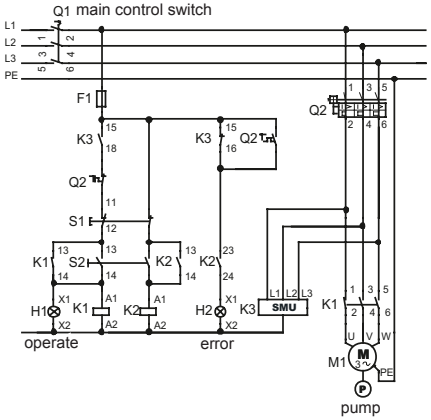
number of contacts	1 changeover
contact material	$AgSnO_2$
max. switching voltage	250V AC *
max. switching current	6A *
max. switching power AC	1500VA
max. switching frequency	15Hz
mechanical contact life	*
drop-off time switching element	approx. 20ms

* diagramms see on side 108

connections



application example



three-phase current measuring relay
SMA - phase asymmetry measuring relay
serie 11,25mm with 1 changeover

function
(comments see from side 68)

phase asymmetry measuring relay
phase failure

application

monitoring of asymmetry in three phase systems

dip switch adjustment

phase asymmetry can be adjusted by potentiometer on the front panel of the relay.

part number

12.301.14.302

technical data

supply

supply voltage	3 x 400V AC / N
frequency range	50 ... 60Hz
power consumption	8VA
operation mode	continuous

adjustment range

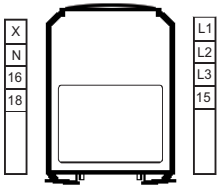
asymmetry	10 ... 35°
accuracy of measurement	15% over entire temp.- and voltage range
repetitive accuracy	+/- 2%

contacts

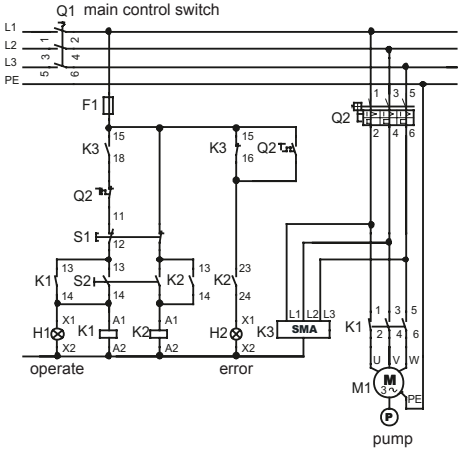
number of contacts	1 changeover
contact material	$AgSnO_2$
max. switching voltage	250V AC *
max. switching current	6A *
max. switching power AC	1500VA
max. switching frequency	15Hz
mechanical contact life	*
drop-off time switching element	approx. 20ms

* diagramms see on side 108

connections



application example



measuring & monitoring relays

function

(comments see from side 68)

undervoltage with hysteresis
undervoltage with time
overvoltage with hysteresis
overvoltage with time

application

monitoring of over- and undervoltage in three phase systems

dip switch adjustment

adjustment of the device functions can be done by dip switches of the front panel, fine tuning can be effected by potentiometer on the front panel

part number

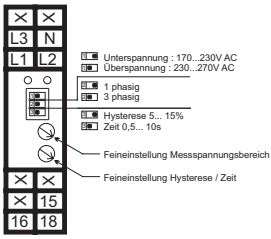
12.321.14.307

technical data

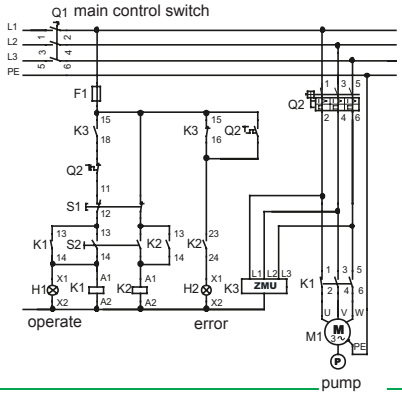
supply	
supply voltage	3 x 400V AC / N
frequency range	50 ... 60Hz
power consumption	1W
operation mode	continuous
adjustment range	
U (L-N) >	230...270V AC
U (L-N) <	170…230V AC
hysteresis U	5...15%
t	0,5...10sec
accuracy of measurement	5% over entire temp.- and voltage range
repetitive accuracy:	+/- 2%
contacts	
number of contacts	1 changeover
contact material	AgNi
max. switching voltage	400V AC *
max. switching current	6A *
max. switching power AC	1500VA
max. switching frequency	15Hz
mechanical contact life	*
drop-off time switching element	approx. 20ms

* diagramms see on side 108

connections



application example



three-phase current measuring relay
ZMP - phase sequence measuring relay
serie 17,5mm with 1 changeover

function
(comments see from side 68)

phase sequence
phase failure

application
monitoring of phase sequence and phase failure in three phase systems

dip switch adjustment
no manuelly adjustment
the measuring relay switch to working position as soon as the phases will be in failure-free operation.

part number
12.321.14.303

technical data

supply

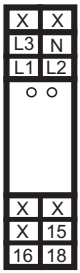
supply voltage	3 x 400V AC / N
frequency range	50 ... 60Hz
power consumption	1 W
operation mode	continuous

contacts

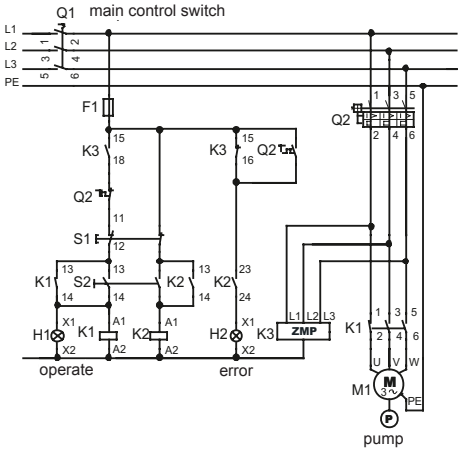
number of contacts	1 changeover
contact material	AgNi
max. switching voltage	400V AC *
max. switching current	6A *
max. switching power AC	1500VA
max. switching frequency	15Hz
mechanical contact life	*
drop-off time switching element	approx. 20ms

* diagramms see on side 108

connections



application example



measuring & monitoring relays

HSB-Industrieelektronik
www.hsb-electronics.de · info@hsb-electronics.de

function

(comments see from side 68)

asymmetry measuring relay
phase failure

application

monitoring of phase sequence in three phase systems

dip switch adjustment

adjustment of asymmetry range can be effected by potentiometer on the front panel

part number

12.321.14.302

technical data

supply

supply voltage	3 x 400V AC / N
frequency range	50 ... 60Hz
power consumption	1 W
operation mode	continuous

adjustment range

asymetry range	10 ... 35°
accuracy of measurement	15% over entire temp.- and voltage range
repetitive accuracy	+/- 2%

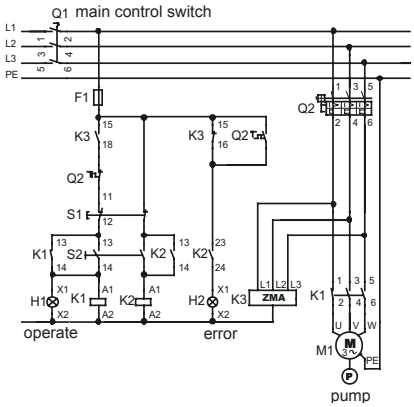
contacts

number of contacts	1 changeover
contact material	AgNi
max. switching voltage	400V AC *
max. switching current	6A *
max. switching power AC	1500VA
max. switching frequency	15Hz
mechanical contact life	*
drop-off time switching element	approx. 20ms

* diagramms see on side 108

connections

application example



measuring & monitoring relays

three-phase current measuring relay
MUU85% - undervolt., asym., phase failure meas. relay
serie 17,5mm with 1 changeover

function
(comments see from side 68)

undervoltage
asymmetry
phase failure

application

Überwachung von Drehstromsystemen bzgl. Unterspannung, Phasenlage und Phasenausfall.

dip switch adjustment

no manuelly adjustment
the measuring relay switch to working position as soon as the phases will be in failure-free operation.

part number

12.321.14.306

technical data

supply

supply voltage	3 x 400V AC / N
frequency range	50 ... 60Hz
power consumption	1W
operation mode	continuous

switching limits

circuit breaking	< 195V AC (85%)
[L - N] switch on release	> 207V AC (90%)
[L - N] asymmetry :	20° , 20%
accuracy of measurement	2% over entire temp.- and voltage range
repetitive accuracy:	+/- 2%

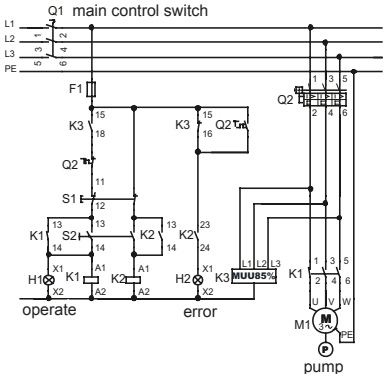
contacts

number of contacts	1 changeover
contact material	AgNi
max. switching voltage	400V AC *
max. switching current	6A *
max. switching power AC	1500VA
max. switching frequency	15Hz
mechanical contact life	*
drop-off time switching element	approx. 20ms

* diagramms see on side 108

connections

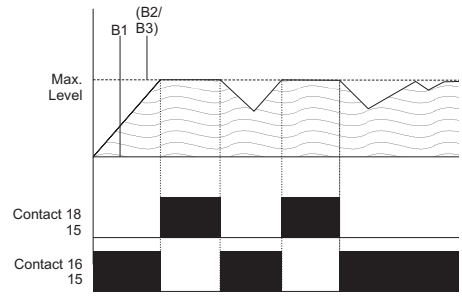
application example



measuring & monitoring relays

HSB-Industrieelektronik
www.hsb-electronics.de · info@hsb-electronics.de

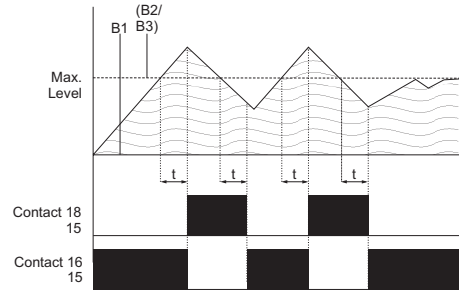
level monitoring



Terminal B1 forms the reference electrode terminals B2 and B3 are bridged and both form the sensing electrode. As soon as these electrode gets contact to the conducting liquid does the relay switch to its working position. The relay falls back to its rest position as soon as the sensing electrode does no longer touch the fluid.

SNR ..... side 83

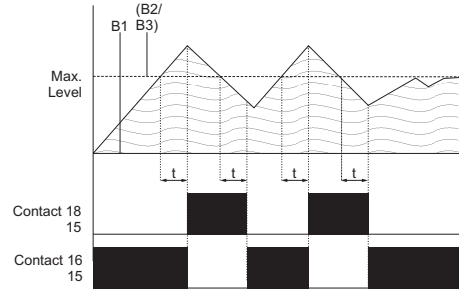
level monitoring - emptying



Terminal B1 forms the reference electrode terminals B2 and B3 are bridged and both form the sensing electrode. As soon as these electrode gets contact to the conducting liquid counts delay time. If the device is set up for “filling” then relay switches to its rest position after delay time has elapsed.
As soon as the liquid level sinks below the level of B2/B3, delay time counts again. If the device is set up for “emptying” then relay switches to its rest position after delay time has elapsed.

SNR-uni ..... side 84
ZNR-uni ..... side 85

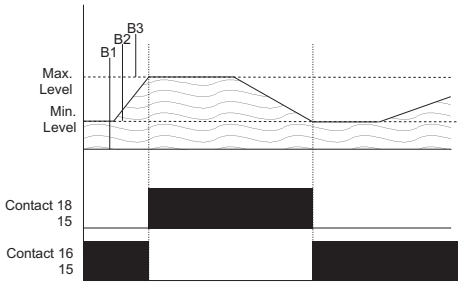
level monitoring - filling



Terminal B1 forms the reference electrode terminals B2 and B3 are bridged and both form the sensing electrode. As soon as these electrode gets contact to the conducting liquid counts delay time. If the device is set up for “emptying” then relay switches to its rest position after delay time has elapsed.
As soon as the liquid level sinks below the level of B2/B3, delay time counts again. If the device is set up for “filling” then relay switches to its working position after delay time has elapsed.

SNR-uni ..... side 84
ZNR-uni ..... side 85

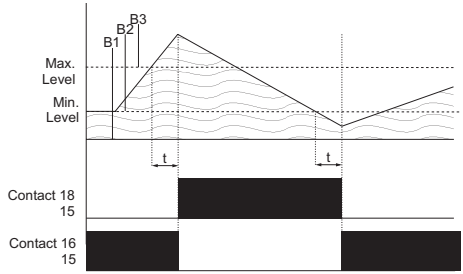
two-level-controller



Terminal B1 forms the reference electrode, terminal B2 the minimum electrode and terminal B3 the maximum electrode.
As soon as the three electrodes gets contact to the conducting liquid, the output relay switches to it´s working position.
The device switch in it´s rest position, when electodes B2 and B3 are out of the liquid.

SNR ..... side 83

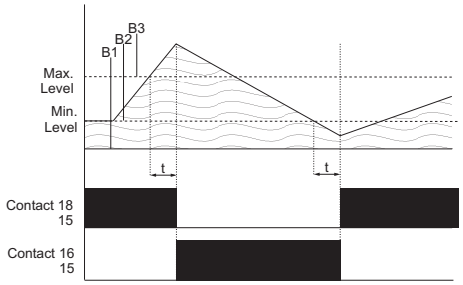
two-level-controller - emptying



Terminal B1 forms the reference electrode, terminal B2 the minimum electrode and terminal B3 the maximum electrode.
The device have to set up for “emptying”!
As soon as the three electrodes gets contact to the conducting liquid, delay time counts and the output relay switches to it´s working position.
As soon as the liquid level sinks below the level of B2, the delay time will start and the device switch in it´s rest position.

SNR-uni ..... side 84
ZNR-uni ..... side 85

two-level-controller - filling



Terminal B1 forms the reference electrode, terminal B2 the minimum electrode and terminal B3 the maximum electrode.
The device have to set up for “filling”!
As soon as the three electrodes gets contact to the conducting liquid, delay time counts and the output relay switches to it´s rest position.
As soon as the liquid level sinks below the level of B2, the delay time will start and the device switch in it´s working position.

SNR-uni ..... side 84
ZNR-uni ..... side 85

function

(comments see on side 81/82)

level monitoring
two-level-controller

application

level monitoring of leading liquids by stainless wires/ sensors

adjustment

adjustment of response sensitivity can be done by potentiometer on the front panel

part number

15.101.xx.xxx

response sensitivity selection

001	50	...	500kOhm
002	10	...	100kOhm
003	5	...	50kOhm
004	2,5	...	25kOhm

supply voltage selection

A1-A2	
01	24V UC
05	48V UC
06	110V AC
02	230V AC

other supply voltages and response sensitivity available on request.

technical data

supply

supply voltage	A1-A2 selection see below
frequency range	0/50 ... 60Hz
power consumption	approx. 2W
operation mode	continuous
isolation voltage	1000V DC

measuring circuit

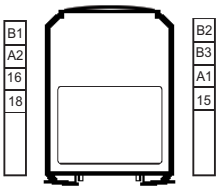
sensor voltage	< 2,5V AC
sensor current	approx. 1mA AC

contacts

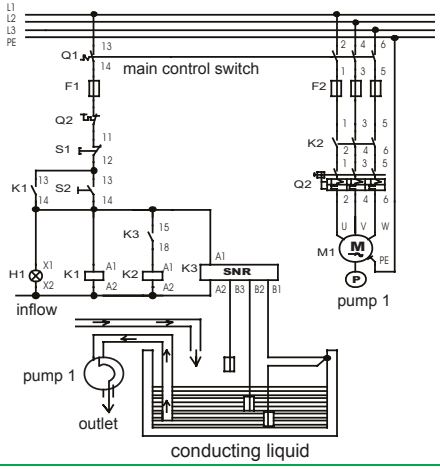
number of contacts	1 changeover
contact material	$AgSnO_2$
max. switching voltage	250V AC *
max. switching current	6A *
max. switching power AC	1500VA *
mechanical contact life	*

* diagramms see on side 108

connections



application example



monitoring relay
SNR - liquid level relay universal
serie 11,25mm with 1 changeover

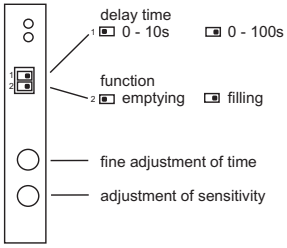
function
(comments see on side 81/82)

level monitoring - emptying
level monitoring - filling
two-level-controller - emptying
two-level-controller - filling

application

level monitoring of leading liquids by stainless wires/ sensors

dip switch adjustment



part number

15.101.xx.005

supply voltage selection

	A1-A2
01	24V UC
05	48V UC
06	110V AC
02	230V AC

technical data

supply

supply voltage	A1-A2 selection see below
power consumption	approx. 2W
operation mode	continuous
isolation voltage	1000V DC

measuring circuit

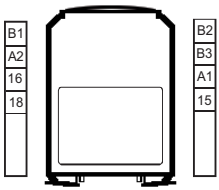
sensor voltage	< 2,5V AC
sensor current	approx. 1mA AC
response sensitivity	5...300kOhm
delay time	10: 0 - 10s 100: 0 - 100s

contacts

number of contacts	1 changeover
contact material	$AgSnO_2$
max. switching voltage	250V AC *
max. switching current	6A *
max. switching power AC	1500VA *
mechanical contact life	*

* diagramms see on side 108107

connections



function

(comments see on side 81/82)

level monitoring - emptying
level monitoring - filling
two-level-controller - emptying
two-level-controller - filling

application

monitoring of conducting liquids

dip switch adjustment

adjustment of sensitity and delay time occors by potentiometer on the front panel

part number

15.121.xx.005

supply voltage selection

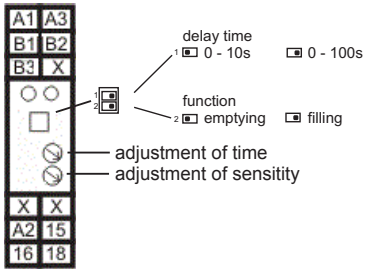
	A3-A2 / A1-A2
00	24V UC / 230V AC
11	24V UC / 48V UC
12	24V UC / 110V AC

technical data

supply	
supply voltage	A1-A2 oder A3-A2 selection see below
power consumption	approx. 2W
operation mode	continuous
isolation voltage	1000V DC
measuring circuit	
sensor voltage	< 6V AC
sensor current	approx. 1mA AC
response sensitivity:	5...300kOhm
delay time	10: 0 - 10s 100: 0 - 100s
contacts	
number of contacts	1 changeover
contact material	$AgSnO_2$
max. switching voltage	400V AC *
max. switching current	8A *
max. switching power AC	1500VA *
mechanical contact life	*

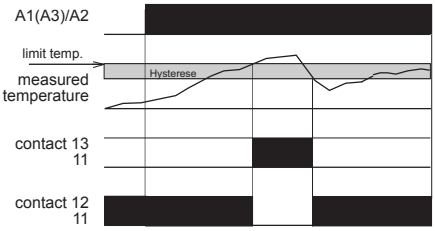
* diagramms see on side 108

connections



connection diagramm

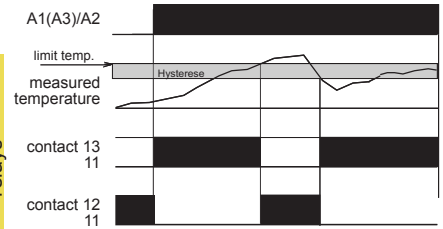
monitoring of temperature



The output relay switches to its working position as soon as the measured temperature rises above the adjusted temperature.
The output relay switches to its rest position as soon as the measured temperature falls below the adjusted temperature minus the adjusted hysteresis.

STE ..... side 87
ZTE ..... side 89

monitoring of temperature (heating)



The output relay switches to its rest position as soon as the measured temperature rises above the adjusted temperature.
The output relay switches to its working position as soon as the measured temperature falls below the adjusted temperature minus the adjusted hysteresis.

STE-heating ..... side 88
ZTE-heating ..... side 90

function (comments see on side 86)

monitoring of limit temperatures

application

temperature monitoring by external PT100 / PT1000 temperature sensor

dip switch adjustment

adjustment of temperature limit and hysteresis can done by potentiometer on the front panel

part number

12.201.xx.xxx

measurement range selection

01	-50	...	0°C
02	0	...	50°C
03	50	...	100°C
04	0	...	100°C
05	50	...	150°C

sensor selection

1	PT100
2	PT1000

supply voltage selection

A1-A2	
01	24V UC
05	48V UC
06	110V AC
02	230V AC

other supply voltages and measurement ranges available on request

technical data

supply

supply voltage	A1-A2 selection see below
frequency range	0/50 ... 60 Hz
power consumption	1 W
operation mode	continuous
isolation voltage :	1 kV DC

measuring circuit

input	Pt100 two-wire
accuracy of measurement	potentiometer scale
repetitive accuracy	+/- 0,5°C
hysteresis PII	1 - 10% of measurement range

operating indicators

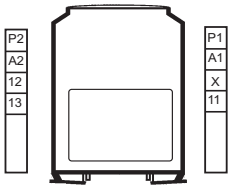
supply voltage	LED, green
relay in working position	LED, red

contacts

number of contacts	1 changeover
contact material	AgSnO2
max.switching voltage	250V AC *
max. switching current	6A *
max. switching power	1500VA
mechanical contact life	*

* diagramms see on side 108

connections



measuring relay
STE - temperature measuring relay (heating)
serie 11,25mm with 1 changeover

function
(comments see on side 86)

monitoring of limit temperatures (heating)

application

temperature monitoring by external PT100 / PT1000 temperature sensor

dip switch adjustment

adjustment of temperature limit and hysteresis can done by potentiometer on the front panel

part number

12.201.xx.xxx

measurement range selection

51	-50	...	0°C
52	0	...	50°C
53	50	...	100°C
54	0	...	100°C
55	50	...	150°C

sensor selection

1	PT100
2	PT1000

supply voltage selection

	A1-A2
01	24V UC
05	48V UC
06	110V AC
02	230V AC

other supply voltages and measurement ranges available on request

technical data

supply

supply voltage	A1-A2 selection see below
frequency range	0/50 ... 60 Hz
power consumption	1 W
operation mode	continuous
isolation voltage	1 kV DC

measuring circuit

input	Pt100 two-wire
accuracy of measurement :	potentiometer scala
repetitive accuracy	+/- 0,5°C
hysteresis PII	1 - 10% of measurement range

operating indicators

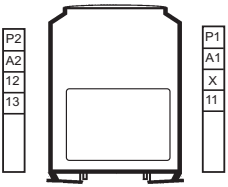
supply voltage	LED, green
relay in working position	LED, red

contacts

number of contacts	1 changeover
contact material	AgSnO2
maximale Schaltspannung	250V AC *
maximaler switching current	6A *
maximale Schaltleistung	1500VA
mechanical contact life	*

* diagramms see on side 108

connections



function

(comments see on side 86)

monitoring of limit temperatures

application

temperature monitoring by external PT100 / PT1000 temperature sensor

dip switch adjustment

adjustment of temperature limit and hysteresis can done by potentiometer on the front panel

part number

12.221.xx.xxx

measurement range selection

01	-50	...	0°C
02	0	...	50°C
03	50	...	100°C
04	0	...	100°C
05	50	...	150°C

sensor selection

1	PT100
2	PT1000

supply voltage selection

	A3-A2 / A1-A2
00	24V UC / 230V AC
11	24V UC / 48V UC
12	24V UC / 110V AC

other supply voltages and measurement ranges available on request

technical data

supply

supply voltage	A1-A2 oder A3-A2 selection see below
frequency range	0/50 ... 60 Hz
power consumption	1 W
operation mode	continuous
isolation voltage	1 kV DC

measuring circuit

input	Pt100 two-wire
accuracy of measurement	potentiometer scala
repetitive accuracy	+/- 0,5°C
hysteresis PII	1 - 10% of measurement range

operating indicators

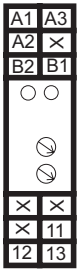
supply voltage	LED, green
relay in working position	LED, red

contacts

number of contacts	1 changeover
contact material	AgNi
max. switching voltage	400V AC *
max. switching current	8A *
max. switching power	2000VA
max. switching current	30A
mechanical contact life	*

* diagramms see on side 108

connections



measuring relay
ZTE - temperature measuring relay (heating)
serie 17,5mm with 1 changeover

function
(comments see on side 86)

monitoring of limit temperatures (heating)

application

temperature monitoring by external PT100 / PT1000 temperature sensor

dip switch adjustment

adjustment of temperature limit and hysteresis can done by potentiometer on the front panel

part number

12.221.xx.xxx

measurement range selection

51	-50	...	0°C
52	0	...	50°C
53	50	...	100°C
54	0	...	100°C
55	50	...	150°C

sensor selection

1	PT100
2	PT1000

supply voltage selection

	A3-A2 / A1-A2
00	24V UC / 230V AC
11	24V UC / 48V UC
12	24V UC / 110V AC

other supply voltages and measurement ranges available on request

technical data

supply

supply voltage	A1-A2 oder A3-A2 selection see below
frequency range	0/50 ... 60 Hz
power consumption	1 W
operation mode	continuous
isolation voltage	1000V DC

measuring circuit

input	Pt100 two-wire
accuracy of measurement	potentiometer scala
repetitive accuracy:	+/- 0,5°C
hysteresis PII :	1 - 10% of measurement range

operating indicators

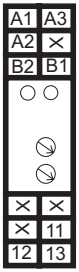
supply voltage	LED, green
relay in working position	LED, red

contacts

number of contacts	1 changeover
contact material	AgNi
max. switching voltage	400V AC *
max. switching current	8A *
max. switching power	2000VA
max. switching current	30A
mechanical contact life	*

* diagramms see on side 108

connections



HSB-Industrieelektronik
www.hsb-electronics.de · info@hsb-electronics.de

function

(Erläuterungen hierzu side 86)

thermistor protection relay monitors temperatures of commercial thermistors according to DIN 44081

application

protection relay for thermic motor protection by commercial thermistors / PTC according to DIN 44081

dip switch adjustment

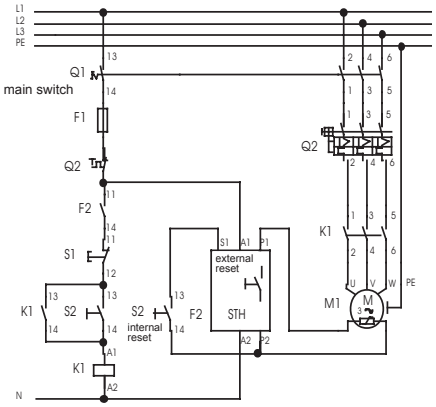
with re-start inhibitor (memory incl. reset button)
with short-circuit monitoring

without re-start inhibitor
with short-circuit monitoring

with re-start inhibitor (memory incl. reset button)
without short-circuit monitoring

without re-start inhibitor
without short-circuit monitoring

application example



technical data

supply

supply voltage	A1-A2 selection see below
frequency range	0/50 ... 60 Hz
power consumption	1 W
operation mode	continuous
isolation voltage	1000V DC

measuring circuit

temperature sensor	PTC sensor DIN 4081/082
number of sensors	1 - 6 units in series
operating value	3,3kOhm
disengaging value	2,2kOhm (approx. nominal shut-off temperature 5°C)
total PTC resistance	< 1,5kOhm
sensor voltage	< 7,5V
sensor current	approx. 1mA

line restistance

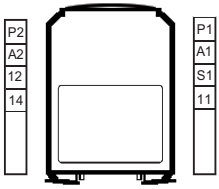
in sensor range	<100 without short-circuit monitoring <10 with short-circuit monitoring

contacts

number of contacts	1 changeover
contact material	$AgSnO_2$
max. switching voltage	250V AC *
max. switching current	6A *
max. switching power AC	1500VA
mechanical contact life	*

* diagramms see on side 108

connections



part number

15.001.xx.001

supply voltage selection
A1-A2

01	24V UC
05	48V UC
06	110V AC
02	230V AC

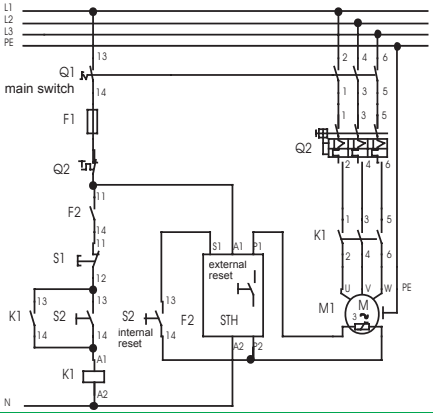
monitoring relay
ZTH - thermistor protection relay
serie 17,5mm with 1 or 2 changeover

function
(comments see on side 86)

thermistor protection relay monitors temperatures of commercial thermistors according to DIN 44081

application
protection relay for thermic motor protection by commercial thermistors / PTC according to DIN 44081

dip switch adjustment
- without re-start inhibitor
  without short-circuit monitoring
- with re-start inhibitor (memory incl. reset button)
  with short-circuit monitoring
- without re-start inhibitor
  with short-circuit monitoring
- with re-start inhibitor (memory incl. reset button)
  without short-circuit monitoring

application example


technical data

supply

supply voltage	A1-A2 oder A3-A2 selection see below
frequency range	0/50 ... 60 Hz
power consumption	1 W
operation mode	continuous
isolation voltage	1000V DC

measuring circuit

temperature sensor	PTC sensor DIN 44081/082
number of sensors	1 - 6 units in series
operating value	3,3kOhm
disengaging value	2,2kOhm (approx. nominal shut-off temperature 5°C)
total PTC resistance	< 1,5kOhm
sensor voltage	< 5V
sensor current	approx. 1mA

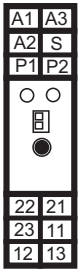
line restistance

in sensor range	<100 without short-circuit monitoring <10 with short-circuit monitoring

contacts

number of contacts	1 or 2 changeover
contact material	AgNi
max. switching voltage	400V AC *
max. switching current	8A *
max. switching power AC	2000VA
mechanical contact life	*

* diagramms see on side 108

connections


part number
15.02x.xx.001

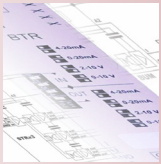
supply voltage selection
A3-A2 / A1-A2

00	24V UC / 230V AC
11	24V UC / 48V UC
12	24V UC / 110V AC

contact selection

1	one changeover
2	two changeover

HSB-Industrieelektronik
www.hsb-electronics.de · info@hsb-electronics.de



transducers and isolation converters

index transducers and isolation converters

function

transducing of conductifity to an applied 4-20mA/DC current- respectively a 2-10V/DC voltage signal.

dip switch adjustment

nor manually adjustment
test button on the front panel

part number

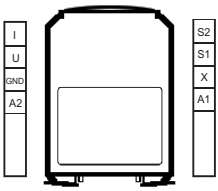
13.801.01.xxx

input S1-S2
002 10µS - 2000µS 1,0

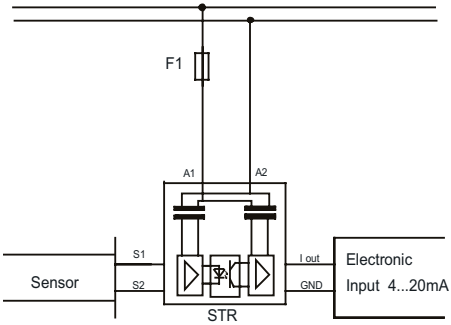
technical data

supply	
supply voltage	24V AC/DC
frequency range	0/50 ... 60 Hz
power consumption	approx. 2VA
operation mode	continuous
isolation voltage	1kV/DC
input	
measuring range	10µS - 2000µS
cell constant	1.0
measuring voltage	< 5V AC
isolation voltage I/O	1kV DC
output	
output signal	4 ... 20mA / DC 2 ... 10V / DC
load on current output	< 750 Ohm
load on voltage output	> 1kOhm
test-button	12mA / 6V
wire-break input :	3mA / 1,5V

connections



application example

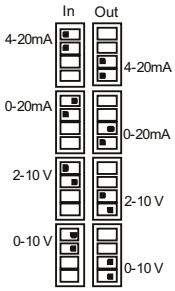


transducers and isolation converters
STR - current - voltage transducer
serie 11,25mm

function

conversion of a standard electrical signal into another standard signal and galvanic isolation

dip switch adjustment



input and output signal can be adjusted by DIP switches on the front panel of the relay

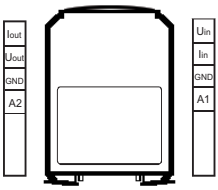
part number

16.001.01.000

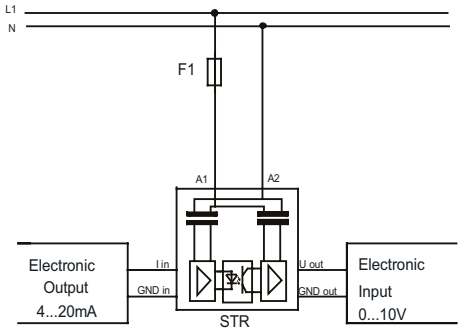
technical data

supply	
supply voltage	24V UC
frequency range	0/50 ... 60 Hz
power consumption	approx. 2VA
operation mode	continuous
isolation voltage	1kV DC
input / output	
accuracy of measurement	0,5% over entire temp.- and voltage range
input	0 (4) ... 20mA 0 (2) ... 10V
internal resistance	I : 237 Ohm U : 20 kOhm
overload capacity	100% continuous 500% for 1s
output	0 (4) ... 20mA 0 (2) ... 10V
correction time	< 0,7 s
load output	
current output	< 750 Ohm
voltage output	> 750 Ohm
isolation voltage I/O	3,75kV

connections

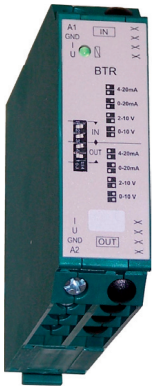


application example



transducers & isolation converters

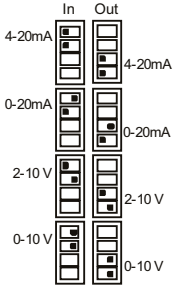
HSB-Industrieelektronik
www.hsb-electronics.de · info@hsb-electronics.de



function

conversion of a standard electrical signal into another standard signal and galvanic isolation

dip switch adjustment



input and output signal can be adjusted by DIP switches on the front panel of the relay

part number

16.011.xx.000

supply voltage selection

	A1-A2
01	24V UC
06	110V AC
02	230V AC

technical data

supply

supply voltage	A1-A2 selection see below
frequency range	0/50 ... 60 Hz
power consumption	approx. 2VA
operation mode	ontinious
isolation voltage	24V -> 1kV 110/230V -> 3,75kV

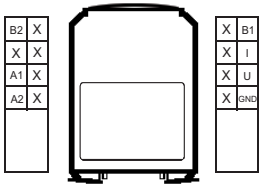
input / output

accuracy of measurement	0,5% over entire temp.- and voltage range
input	0 (4) ... 20mA 0 (2) ... 10V
internal resistance	I : 237 Ohm U : 20 kOhm
overload capacity	100% continiour 500% for 1s
output	0 (4) ... 20mA 0 (2) ... 10V
correction time	< 0,7 s

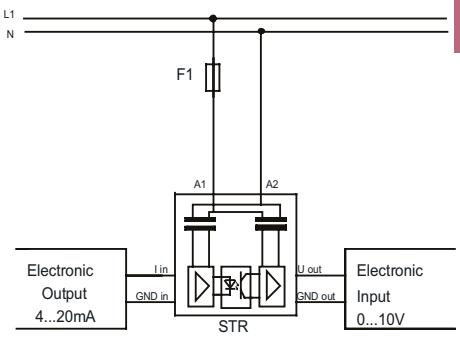
load output

current output	< 750 Ohm
voltage output	> 750 Ohm
isolation voltage I/O	3,75kV

connections



application example

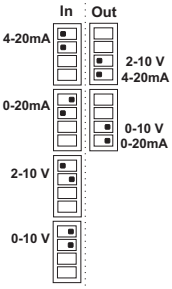


transducers and isolation converters
BTRx2 - current - voltage transducer
serie 22,5mm

function

conversion of a standard electrical signal into another standard signal and galvanic isolation

dip switch adjustment



input and output signal can be adjusted by DIP switches on the front panel of the relay

part number

16.012.01.000 — **supply voltage** 24V AC/DC

16.032.xx.000

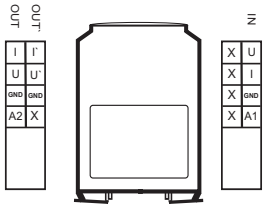
supply voltage selection A1-A2

06	110V AC
02	230V AC

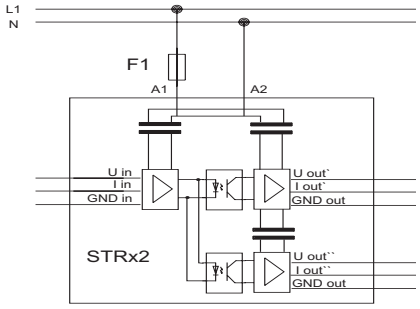
technical data

supply	
supply voltage	A1-A2 selection see below
frequency range	0/50 ... 60 Hz
power consumption	approx. 2VA
operation mode	continuous
isolation voltage	24V -> 1kV 110/230V -> 3,75kV
input / output	
accuracy of measurement	0,5% over entire temp.- and voltage range
input	0 (4) ... 20mA 0 (2) ... 10V
internal resistance	I : 237 Ohm U : 20 kOhm
overload capacity	100% continuous 500% for 1s
output	0 (4) ... 20mA 0 (2) ... 10V
correction time	< 0,7 s
load output	
current output	< 750 Ohm
voltage output	> 750 Ohm
isolation voltage I/O	3,75kV
casing	
supply voltage <= 24VUC	22,5mm
supply voltage > 24VUC	45mm

connections



application example

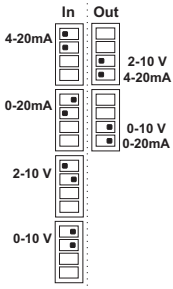


HSB-Industrieelektronik
www.hsb-electronics.de · info@hsb-electronics.de

function

conversion of a standard electrical signal into another standard signal and galvanic isolation

dip switch adjustment



input and output signal can be adjusted by DIP switches on the front panel of the relay

part number

16.013.01.000 — **supply voltage** 24V AC/DC

16.033.xx.000 — **supply voltage selection**

	A1-A2
06	110V AC
02	230V AC

technical data

supply

supply voltage	A1-A2 selection see below
frequency range	0/50 ... 60 Hz
power consumption	approx. 2VA
operation mode	continuous
isolation voltage	24V -> 1kV 110/230V -> 3,75kV

input / output

accuracy of measurement	0,5% over entire temp.- and voltage range
input	0 (4) ... 20mA 0 (2) ... 10V
internal resistance	I : 237 Ohm U : 20 kOhm
overload capacity	100% continuous 500% for1s
output	0 (4) ... 20mA 0 (2) ... 10V
correction time	< 0,7 s

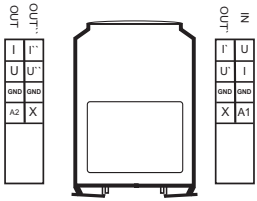
load output

current output	< 750 Ohm
voltage output	> 1000 Ohm
isolation voltage I/O	3,75kV

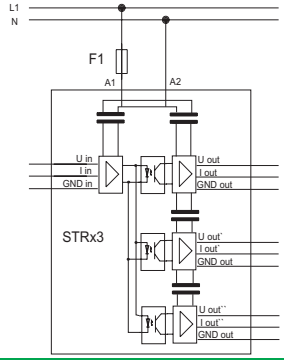
casing

supply voltage <= 24VUC	22,5mm
supply voltage > 24VUC	45mm

connections



application example

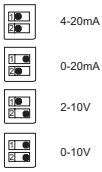


transducers and isolation converters
BIM - current transducer AC
serie 22,5mm

function

conversion of a AC current signal into a standard signal by shunt resistance and galvanic isolation

dip switch adjustment



output signal can be adjusted by DIP switches on the front panel of the relay

part number

13.211.xx.xxx

measurement range selection
0 ... max. 5A AC

supply voltage selection

	A1-A2
01	24V UC
06	110V AC
02	230V AC

example:
13.211.02.100mA
Voltage: 230V AC measurement range 0 ... 100mA AC
13.211.02.1A
voltage: 230V AC measurement range 0 ... 1A AC
13.211.01.5A
voltage: 24V UC measurement range 0 ... 5A AC

technical data

supply

supply voltage	A1-A2 selection see below
frequency range	0/50 ... 60 Hz
power consumption	approx. 2VA
operation mode	continuous
isolation voltage	1kV DC

measuring circuit

accuracy of measurement	0,5% over entire temp.- and voltage range
frequency	50Hz
internal resistance	< 20mA / 5 Ohm < 100mA / 1 Ohm < 500mA / 0,2 Ohm < 1A / 0,1 Ohm < 5A / 0,02 Ohm

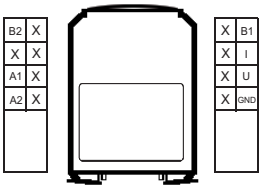
outputwerte

output	0 (4)...20mA DC 0 (2)...10V DC
correction time	< 0,7 s

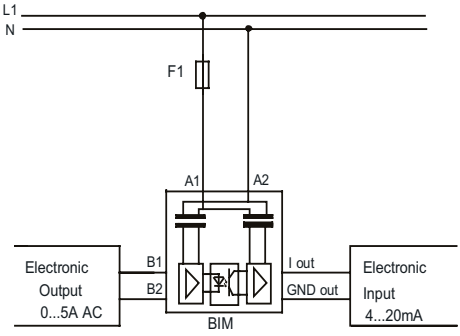
load output

current output	< 700 Ohm
voltage output	> 2 kOhm
isolation voltage I/O	3,75 kV DC

connections



application example



transducers & isolation converters

HSB-Industrieelektronik
www.hsb-electronics.de · info@hsb-electronics.de

function

conversion of a standard electrical signal into another standard signal and galvanic isolation

dip switch adjustment

4-20mA
0-20mA
2-10V
0-10V

output signal can be adjusted by DIP switches on the front panel of the relay

part number

13.x11.xx.xxx

measurement range selection
0 ... min. 60mV / max. 500V DC

supply voltage selection

	A1-A2
01	24V UC
06	110V AC
02	230V AC

Auswahl der Messart

0	AC
1	DC

example
13.111.02.500V
voltage: 230V AC measurement range: 0 ... 500V DC
13.011.02.1V
voltage: 230V AC measurement range: 0 ... 1V AC
13.011.01.100mV
voltage: 24V UC measurement range: 0 ... 100mV AC

technical data

supply

supply voltage	A1-A2 selection see below
frequency range	0/50 ... 60 Hz
power consumption	approx. 2VA
operation mode	continuous
isolation voltage	1kV DC

measuring circuit

accuracy of measurement	0,5% over entire temp.- and voltage range
overload capacity	50% continuous 200% for 5s
internal resistance :	< 5V / 690k Ohm < 10V / 20k Ohm < 50V / 110k Ohm < 500V / 700k Ohm

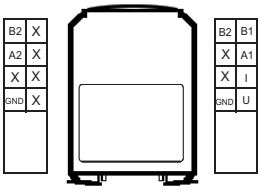
output values

output	0 (4)...20mA DC 0 (2)...10V DC
correction time	< 0,7 s

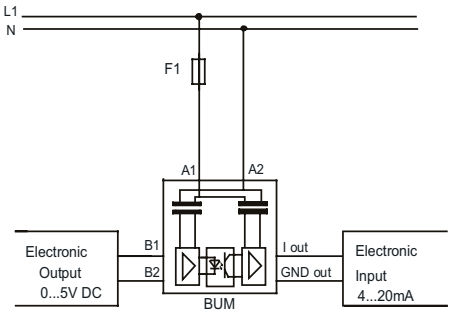
load output

current output	< 700 Ohm
voltage output	> 2 kOhm
isolation voltage I/O	3,75 kV DC

connections



application example



transducers and isolation converters
BUMs - voltage transducer
serie 22,5mm

function

conversion of a standard electrical signal into another standard signal and galvanic isolation

dip switch adjustment

output signal can be adjusted in range of +/- 5% by potentiometer on the front panel of the relay

technical data

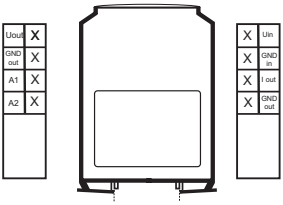
supply

supply voltage	A1-A2 selection see below
frequency range	45 ... 60 / 0Hz
power consumption	approx. 2VA
operation mode	continuous
isolation voltage	1kV

input / output

accuracy of measurement	0,5% over entire temp.- and voltage range
input	selection see below
internal resistance	50 kOhm
overload capacity	100% continuous 500% for 1s
output	Iout: 4 ... 20mA DC +/-5% load < 750 Ohm Uout: 0 ... 10V DC +/-5% load > 1500 Ohm
correction time	< 10ms
isolation voltage I/O	2,5kV

connections



part number

13.112.xx.xxx

Auswahl des inputsmessbereiches

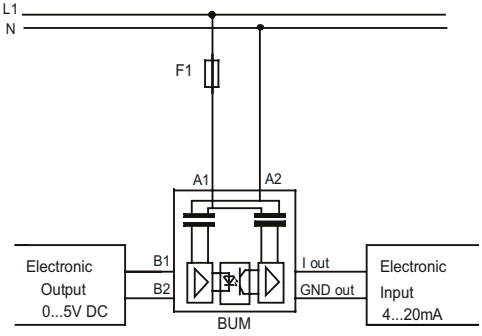
100 0 ... 10V DC

supply voltage selection

A1-A2

01 24V UC
06 110V AC
02 230V AC

application example



HSB-Industrieelektronik
www.hsb-electronics.de · info@hsb-electronics.de

digital display

digital display device
HSB4824D
48mm x 24mm

application

display of analog measurement DC from 0 ... 20mA DC respectively 4 ... 20mA DC and from 0...10V DC respectively 2...10V DC (adjustable by software)
input signals possible from 250V DC or 2A DC

description

The 3½ digit programmable display instrument HS-B4824D offers full electronic measuring and display capabilities insuring greater precision over existing electro-mechanical devices. This allows most all display values to be quickly and reliably represented. The alignment parameters are stored in a non-volatile EEPROM memory. Due to the improved technology the long-term drift is reduced to a minimum. In addition, unwanted readjustment of the device settings through external mechanical influences, such as vibration or by hand, are prevented. The device parameters and calibration are factory set according to customer demands. We also offer a computer interface and software for those customers who, at any time, wish to readjust and recalibrate the device to their own needs. The red LED display, with 10mm high digits is clearly readable even from a distance. A supply voltage of 24V DC is required to power the device. The auxiliary voltage is isolated from the measuring circuit using an internal switching power supply. The supply voltage can also be the measuring voltage, which means that an isolation of the voltages is not necessary. The device can be used for only one voltage supply.

technical data

supply

supply voltage	24V DC +/- 10%
power consumption	approx. 50mA
operation mode	continuous

measuring circuit

accuracy of measurement	0,5% over entire temp.- and voltage range
internal resolution	12Bit (2048)
measuring rate	2.5 measurements / s
input resistance	approx. 100 Ohm for 20mA-device approx. 86 Ohm for 10V-device

operation indicators

display	7 - segment LED - display, red
display range	$3^{1/2}$ units 1999 ... 9999
digit size	10mm
polarity display	automatic for „ +/- „
over flow display	none

contacts

number of limit contacts	1
contact material	$AgSnO_2$
max. switching voltage	250V
max. switching current	2A
drop-off time switching element	approx. 20ms

function

The positive, negative and bipolar display ranges, the display value of the input signal 0, the gain factor and the limit contact for the operate/release point are programmed by HSB. Please supply us with the above information when ordering.
If you have the HSB interface and software (Part No. 027010) you can programm and calibrate the device as needed.

part number

14.041.13.xxx

measurement range selection

001	-20 ... +20mA	[0(4)-20mA]
101	-10 ... +10V	[0(2)-10V]
010	-100 ... +100mA	
020	-500 ... +500mA	
030	-1 ... +1A	
110	-100 ... +100mV	

other measurement ranges available on request.

HSB-Industrieelektronik
www.hsb-electronics.de · info@hsb-electronics.de

accessories

1) program interface
2) SUB-D / connection cable: PC - Interface
3) power cable
4) connector for external calibration signal

application

for the programming of the HSB4824D digital display device

description

The interface with the accompanying software allows for individual programming of the HSB4824D digital display device. The interface is connected to a PC (min. Pentium I) using COM1 or COM2. Decimal point, scaling, offset and limit contacts can be programmed. The interface is powered by a connection to 230V AC. An internal supply unit powers the digital display device with 24V DC. The programming is accomplished with connection of a six pole plug-in.

function

All parameter values can be adjusted with the software and stored in the computer‘s memory. The software can also supply a read-out of the measuring device‘s parameter values, as well as the programming of the stored parameters from the PC data base. New calibration is possible using an external signal.
The software is user-friendly.

technical data

supply

supply voltage	230V AC +/-10%
frequency range	50 ... 60Hz
power consumption	4VA
operation mode	continuous

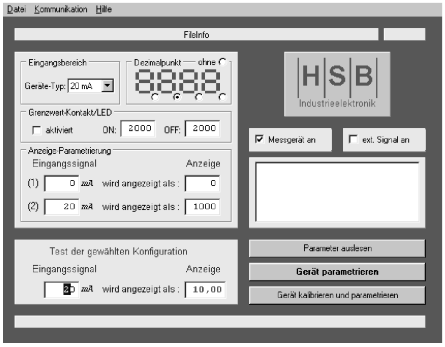
data internal switch relays for calibration signal

switching voltage	max. 60V DC / 125V AC
switching current	max. 2A
power capacity	max. 30W

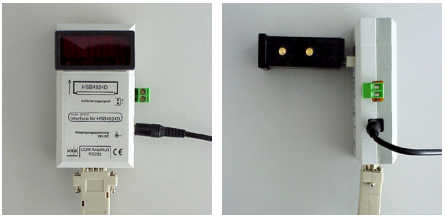
PC requirements

prozessor	min. Pentium I
memory	min. 4MB RAM
operating system	min. Windows 95

software



connection



part number

027010 interface + software + accessories

digital display

relay diagramms

technical specifications

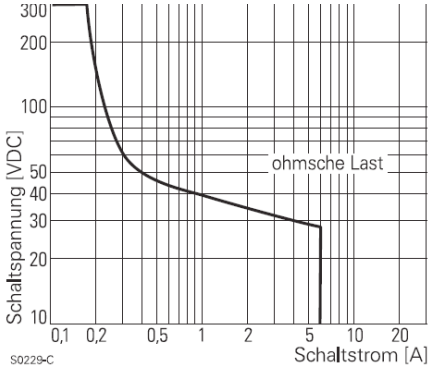
configuration of our part numbers

general conditions

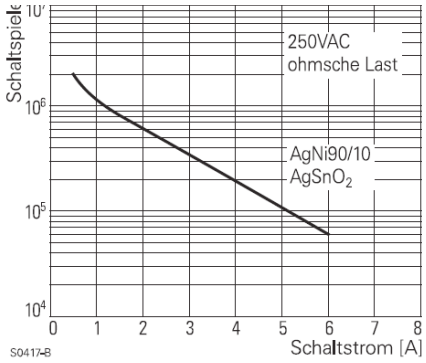
device index A to Z

relay serie S

DC - breaking capacity

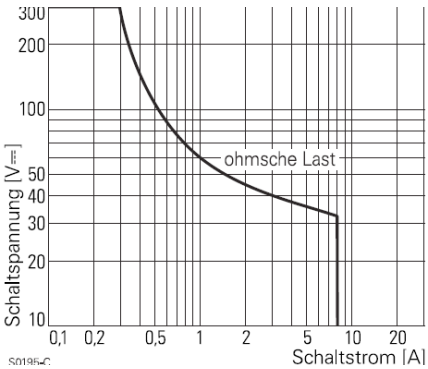


electric economic life-time

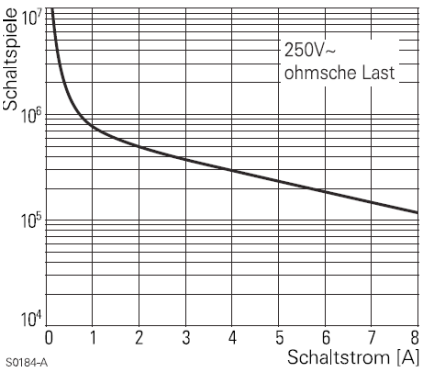


relay serie Z and B

DC - load limit curve



electric economic life-time



CE directive and declaration of conformity

All of our products have the CE label and are confirm to the follow guideline of safety-related quality.

The CE marking was primarily created to ensure safe products to the end user in the free movement of goods within the European Economic Area (EEA) and the European Community (EC).
Many groups of products are subject to a mandatory CE symbol ruling, such as building products, electrical appliances and toys.
When we apply the CE mark to packings or delivery documents (not to the product itself!) we are confirming that the product in question complies with the requirements of the Low Voltage Directive.

The EMC Directive 2004/108/EG particularly related to products with independent function such as electric motors, power supply units, timer or temperature controls. components, which are used in such deveices, for examble switch relays can have different functions in different deveices.
Consequently, all-or-nothing relays must be considered components without “direct function” which are not subject to the EMC Directive.

The Low Voltage Directive 2006/95/EG concerns electrical equipment intended for incorporation into a device as well as equipment intended for direct use.
The Guidelines specifically cite electro-mechanical basic components such as connectors, relays with terminals for printed circuit boards and micro switches. They are therefore not subject to the scope of the Low Voltage Directive.
In addition to the Low Voltage Directive defined the Europaischen Union on 31.1.2008 under the informationsnumber 2008/C 28/01, which products relating to electrical equipment designed for use within certain voltage limits.

RoHS RoHS directive
(Restriction of hazardous substances)

Directive 2002/95/EC of the European Parliament and of the Council, of 27 January 2003, on the restriction of the use of certain hazardous substances in electrical and electronic equipment
The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2006, implementing the European Directive, came fully into force on 1st July 2006.
These Regulations were replaced by The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2008, which came into force on 1st February 2008. There has subsequently been published The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment (Amendment) Regulations 2009, though this was mostly minor drafting corrections.

All of our products are RoHS compliant.

WEEE directive
(Waste Electrical and Electronic Equipment)

The WEEE directive is the European Community directive 2002/96/EC on waste electrical and electronic equipment which, together with the RoHS Directive 2002/95/EC, became European Law in February 2003, setting collection, recycling and recovery targets for all types of electrical goods.
The objective is the prevention, reduction and environmentally sustainable disposal of the increasing bulk of electronic waste through extended liability of the manufacturer for taking back the products.
Everything that is no equipment in the sense of the directive and is not subject of the waste electrical equipment, such as installations and integrated components in installations falls not under the WEEE directive

Under RoHS- and WEEE-directive falls:

- Large household appliances
- Small household appliances
- IT and telecommunications equipment
- Consumer equipment
- Lighting equipment
- Electrical and electronic tools
- Toys, leisure and sports equipment
- Medical devices
- Monitoring and control instruments
- Automatic dispensers
-

Our products are integrated in deveices, which underlie the RoHS directive and have to meet RoHS-requirements to meets the WEEE-directive.

Contact materials and it´s using for electromech electro-mechanical relays

material	description	advantage	using
AgNi + Au	silver-nickel-contact with electro-plated hard gilding	gold is not sensitive towards industrial environment	small and medium switching capacities, because of lower and constant contact resistance as other contact materials **low load range** 50 mW (5 V/2 mA) to 1,5 W /24 V (resistance load) gold layer will be contribute to a small proportion **medium load range** after a minimum number of switching operations the goldhard-plating will be removed and characteristics of AgNi will be active
AgNi	silver-nickel-contact standard contact material for relay switching tasks	high burn-off rates low oversweating area	resisting loads and low inductive loads for duration and switch-off currents up to 12 A and switch-on currents up to 25 A
$AgSnO_2$	silver-stannic oxide-contact the embedded SnO2 have lower oversweating area as AgCdO	low material migration for DC	circuits with high switch-on currents up to 120 A/5ms lamps, electronic ballasts, DC loads
AgCdO	silver-cadmium-contact the embedded CdO have lower oversweating area as AgNi	high burn-off rates for higher AC switching power	inductive AC loads for duration andnswitch-off currents up to 30 A and switch-on currents up to 50 A. not RoHS compliant because of included cadmium (Cd).

response time
time interval between connection of supply/signal voltage and switching operation of the output contact

working position
for monostable relays pre-set switching position at tightened state

load
load resistance of an output circuit, which is caused by attached circuits

continuous
constant operating at maximum load

input resistance
current inputs have a low input resistance.
this is importent for defined signal inputs DC 0/4-20 mA to load as little as possible the upstream measuring transducer and for high current inputs to keep the power dissipation to a minimum.
for the same reasons voltage outputs have as high as possible input resistance.

galvantic isolation
electric isolation between one or more electric circuit

hysteresis
hysteresis is the range between switch-on an switch-off in an electrical system

isolation resistance
lowest value of resistance, which is detected between isolated parts by ohmmeter or galvanometer at 500V DC.

contact, potential- free
dead-voltage opening or closing contact

contact material
for relay contacts used material, it depends on switching voltage und switching current

economic life-time, electric
number of switching times til continuous relay contact failure with defined electric load of output circuits and at defined operating conditions is available

economic life-time, mechanic
number of switching times til continuous relay contact failure without defined electric load of output circuits, but with defined operating conditions is available

transducers
device, which converts an input signal with a defined dependency to an output signal

power failure detection
recoveration of the previous state after an interruption of the circuit

opening contact (rest contact)
Steuer- oder Hilfskontakt der im spannungslosen Zustand geschlossen ist

bounce time
duration from first closing/opening til final closing/opening of a contact (approx. 5msec)

release time
duration between switching off of the defined input voltage of a relay in working position and the change of status of the last output circuit without consideration of bounce time

rest position
for monostable relays pre-set switching position at non-tightened state

switching frequency
quotient number of switching cycles per duraction

closing contact (working contact)
control or auxiliary contact, which is open at dead-voltage state

voltage influence
percentage variation of voltage over entire voltage range

temperature influence
percentage variation of the measured variable per change of temperature (degrees Celcius)

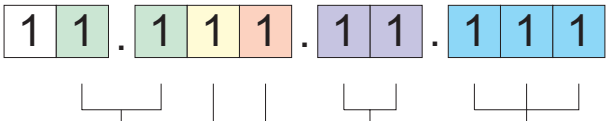
ambient temperature
permitted temperature range which is allowed in the nearest environment of the device

changeover (swiching contact)
compination of opening and closing contact by using of the same root

recovery time
minimal time range, which have to count after switching off of the excitation parameter, before a predetermined function can start again

repetitive accuracy
difference between maximum and minimun value of a defined range, which is defined of a number of measurements of timing from timers under same conditions

configuration of our part numbers



8. - 10. numeral: device specific data
e. g. function, measurement range, phase, ...

6. and 7. numeral: supply voltage

xx.xxx.00.xxx	24V AC/DC, 230V AC
xx.xxx.01.xxx	24V AC/DC
xx.xxx.02.xxx	230V AC
xx.xxx.03.xxx	12V AC/DC
xx.xxx.04.xxx	42V AC/DC
xx.xxx.05.xxx	48V AC/DC
xx.xxx.06.xxx	110V AC
xx.xxx.07.xxx	400V AC
xx.xxx.08.xxx	20-275V AC/DC
xx.xxx.09.xxx	12V AC/DC;24V AC/DC
xx.xxx.10.xxx	24V AC/DC;42V AC/DC
xx.xxx.11.xxx	24V AC/DC;48V AC/DC
xx.xxx.12.xxx	24V AC/DC;110V AC/DC
xx.xxx.13.xxx	24V AC
xx.xxx.14.xxx	3xLxN
xx.xxx.15.xxx	3xN
xx.xxx.16.xxx	12V DC

5. numeral: number of contacts

xx.xx1.xx.xxx	1 output
xx.xx2.xx.xxx	2 outputs
xx.xx3.xx.xxx	3 outputs

4. numeral: casing

xx.x0x.xx.xxx	11.25mm
xx.x1x.xx.xxx	22.5mm
xx.x2x.xx.xxx	17.5mm
xx.x3x.xx.xxx	45mm
xx.x4x.xx.xxx	48x24mm
xx.x5x.xx.xxx	72x36mm
xx.x6x.xx.xxx	96x48mm

2. und 3. numeral: device type

x0.0xx.xx.xxx	Sondergerät
x1.0xx.xx.xxx - x1.9xx.xx.xxx	timer
x2.0xx.xx.xxx - x2.9xx.xx.xxx	measuring relay
x3.0xx.xx.xxx - x3.9xx.xx.xxx	isolation converters
x4.0xx.xx.xxx - x4.9xx.xx.xxx	digital display
x5.0xx.xx.xxx - x5.9xx.xx.xxx	thermistor protection relay
x6.0xx.xx.xxx - x6.9xx.xx.xxx	transducers
x7.0xx.xx.xxx - x7.9xx.xx.xxx	coupling relay

I. GENERAL CONDITIONS

1. The scope of the supplies or services (hereinafter called ”Supplies“) shall be defined by the written declarations of both parties to the contract. General terms and conditions of the Purchaser shall apply only where expressly accepted in writing by the supplier or service provider (hereinafter called “Supplier”)

2. For cost estimates, drawings and other documents (hereinafter called “Documents“), the Supplier reserves all right, title and interest in the property and the copyright. Such Documents may not be made available to third parties without the prior consent of the Supplier and they shall, upon request, be immediately returned to the Supplier if he is not awarded the contract. Sentences 1 and 2 shall apply reciprocally to Purchaser’s Documents; however, these may be made available to those third parties to whom the Supplier may transfer Supplies.

3. The Purchaser shall have the non-exclusive tight to use standard software in unchanged form with the stipulated performance characteristics for the agreed equipment. The Purchaser is allowed to make two back-up copies without the Supplier’s express consent.

4. Partial Supplies shall be permissible where they can be reasonably expected of the Supplier.

II. PRICE AND TERMS OF PAYMENT

1. Prices shall be ex works and shall exclude packing and the sales tax payable under the applicable law.

2. No costs of delivery on orders more than 1000.00 € (CPT).

3. If the Supplier has undertaken the assembly or erection, the Purchaser shall bear all required incidental costs in addition to the agreed contract price unless otherwise agreed.

4. Payments shall be made free at Supplier’s paying office.

5. The Purchaser may set off only those claims that are undisputed or have been finally determined in a legally binding manner.

III. RETENTION OF TITLE

1. The items of Supplies (Secured Goods) shall remain the property of the Supplier until each and every claim against the Purchaser to which the Supplier is entitled under this business relationship has been duly satisfied. If the value of all security rights of the Supplier exceeds the value of all secured claims by more than 20 %, the Supplier shall release a corresponding part of the security rights at the Purchaser’s request.

2. For the duration of the retention of title, the Purchaser ist prohibited from giving the items of Supplies in pledge or as security, and resale shall be permissible only to resellers in the ordinary course of business and only on condition that the reseler receives payment from his customer or retains title so that the property is transferred to the customer only after fulfilment of his obligation to pay.

3. In case of seizure or other acts or interventions by third parties, the Supplier shall be immediately informed thereof in writing by the Purchaser.

4. In cases of fundamental non-performance of contractual obligations by the Purchaser, especially a delay in payment, the Supplier shall be entitled to take back the goods following a demand for payment. The Purchaser shall be obliged to return the purchased goods. The taking back, the assertion of the retention of title or the seizure of the Secured Goods by the Supplier does not mean termination of the contract except if expressly stated by the Supplier.

IV. TIME FOR DELIVERY AN DELAY

1. Observance of the stipulated time for delivery is conditional upon the timely receipt of all documents, necessary permits and releases, especially of plans to be provided by the Purchaser, as well as fulfilment of the agreed terms of payment and other obligations by the Purchaser. Unless these conditions are fulfilled on time, the time for delivery will be extended accordingly except where the Supplier is responsible for the delay.

2. If non-observance of the time for delivery is due to force majeure such as mobilisation, war, riot or similar events, e.g. strike or lockout, such time shall be extended accordingly.

3. If the Supplier is responsible for a delay in delivery, the Purchaser who can establish credibly that he suffered a loss from such delay may claim agreed compensation of 0.5 % for every completed week of delay but in no event shall the aggregate of such compensation exceed a total of 5 % of the price of that part of the Supplies which, because of the delay, could not be put to the intended use.

4. Purchaser’s claims for compensation which exceed the limits specified in para. IV.3. shall be excluded in all cases delayed delivery even after expiry of an extension of time that may have been granted to the Supplier. This exclusion shall not apply where in cases of wilful misconduct or gross negligence there is a legally binding liability on the part of the Supplier. No change in the burden of proof to

the detriment of the Purchaser is involved. Purchaser's right to terminate the contract shall remain unaffected after the expiry of an extension granted to the Supplier that did not result in delivery.

5. If dispatch or delivery is delayed at Purchaser's request by more than month after notice was given of the readiness for dispatch, the Purchaser may be charged storage costs for each month thereafter to the amount of 0.5 % of the price of the supplied goods but in no event shall the aggregate storage charges exceed a total of 5 % of the price. The parties to the contract are at liberty to furnish proof of higher or lower storage costs.

V. TRANSFER OF RISK

1. Even where "carriage paid" delivery has been agreed, the risk shall pass to the Purchaser as follows:

a) If the supply does not include assembly or erection, when goods have been delivered to or picked up by carrier. At the Purchaser's request and expense, upplies shall be insured by the Supplier against the ordinary risks of transport.
b) If the supply includes assembly or erection, the day on which they are taken over into Purchaser's own service or, if so stipulated, after a satisfactory trial run.

2. If the dispatch, the delivery, the beginning or completion of assembly or erection, the taking over into Purchaser's own service or the trial run is delayed for reasons within the Purchaser's responsibility, or if the Purchaser has failed for other reasons to accept delivery, the risk shall pass to the Purchaser.

VI. ASSEMBLY AND ERECTION

Unless otherwise agreed in writing, assembly and erection shall be subject to the following provisions:

1. The Purchaser shall provide at his own expense and in a timely manner:

a) all earth-moving and construction work and other ancillary services not specific to the Supplier's trade as well as the necessary skilled and unskilled labour, materials and tools,

b) the equipment and materials necessary for assembly, erection and commissioning such as scaffolds, lifting equipment etc., fuels and lubricants,

c) energy and water at the point of use, including connections, heating and lightning.

d) suitable, dry and lockable rooms of sufficient size at the site for the storage of machine parts, apparatus, materials, tools etc. and adequate working and recreation rooms for the assembly personnel including appropriate sanitary facilities. Furthermore, the Purchaser shall take all measures he would take for the protection of his own property to safeguard the property of the Supplier and of the site.

e) protective clothing and protective devices which are needed because of particular conditions on the site.

2. Before the start of assembly or erection, the Purchaser shall make available of his own accord all necessary information concerning the location of concealed electric power, gas and water lines of similar installations as well as the required data concerning statics and underlying conditions of the site.

3. Before the beginning of assembly or erection, the necessary materials and equipment to start work must be provided at the site and all preparations must have advanced to such a point that the assembly or erection can be started as agreed and carried out without interruption Access roads and the site itself must be level and clear.

4. If the assembly, erection or commissioning is delayed by circumstances for which the Supplier is no responsible, the Purchaser shall bear an appropriate amount of the costs of waiting periods and of any additional travelling of the Supplier or the assembly personnel that may be necessary.

5. The Purchaser shall attest to the Supplier at weekly intervals the hours worked by the assembly personnel and he shall immediately confirm in writing the completion of assembly, erection or commissioning.

6. If, after completion, the Supplier requests acceptance of the Supplies, it shall be carried out by the Purchaser within two weeks of the Supplier's request, failing which acceptance is deemed to have taken place. Acceptance is also deemed to have taken place if after completion of any agreed test phase the Supplies are put to use.

VII. TAKING DELIVERY

Deliveries, even with minor defects, have to be accepted by the Purchaser.

VIII. WARRANTY

For defects with include the absence of expressly warranted characteristics, the Supplier shall be liable as follows:

1. The Supplier shall, at his option and expense, repair, replace or newly provide any parts or services whose usefulness is impaired more than insignificantly within 24 months from the date of the transfer of risk – regardless of the period of operation – owing to circumstances that existed before the transfer of risk.

2. Warranty claims are subject to a limitation period of 12 month after notification of the defect. Notice in writing shall be given to the Supplier immediately after discovery of the defect.

3. In case of notification of a defect, Purchaser's payment may be withheld in reasonable proportion to the noticed defect. If the contract pertains to the conduct of a Purchaser's business, the Purchaser can withhold payments only if the legitimacy of the asserted complaint ca be established beyond doubt.

4. The Supplier shall be given adequate time and opportunity to remedy the defect. If he is refused these, the Supplier shall have no liability for the defect.

5. If an adequate extension granted to the Supplier expires without the defect being remedied, the Purchaser shall have the right to demand cancellation of the contract or a reduction of the purchase price.

6. The warranty does not cover natural wear and tear or damage arising, after the transfer of risk, from faulty or negligent handling, excessive strain, unsuitable equipment, defective workmanship, inappropriate foundation soil or from particular external influences not assumed under the contract, or from non-reproducible software errors. The warranty does not cover modifications or repairs carried out improperly by the Purchaser or by third parties.

7. The warranty period for repairs or replacement Supplies (of goods or services) shall be 6 months. It shall be the later of: (1) 6 months from the date of repair or replacement; or (2) the remaining length of the original warranty period for the Supplies. For those parts which cannot be put to the intended use because of the interruption of service, the warranty period shall be extended by the period of service interruption caused by the repair or replacement supply.

8. The periods specified in paras 1., 2. an 7. shall not apply where longer periods are provided by law according to § 638 BGB.

9. Except as provided above, any other warranty claims of the Purchaser against the Supplier and the Supplier's agent shall be excluded. However, clause XI (Further liability) shall remain unaffected.

IX. INDUSTRIAL PROPERTY RIGHTS AND COPYRIGHT

1. If a third party, because of an infringement of industrial property right or copyright (hereinafter called "Property Rights") by products furnished by the Supplier and used in conformity with the contract, asserts legitimate claims against the Purchaser, the Supplier shall be liable to the Purchaser as follows:

a) At his own option and expense, the Supplier shall either obtain a right to use the product, modify the product so as not to infringe the Property Rights or replace the product. If this is not possible to the Supplier on acceptable terms, he shall have to take back the product and refund the purchase price.

b) Supplier's aforesaid obligations shall exist only on condition that the Purchaser immediately notifies the Supplier in writing of the claims asserted by the third party, that he does not acknowledge an infringement and that all countermeasures and settlement negotiations are reserved to the Supplier. If the Purchaser stops using the product to reduce the damage or for other important reasons, he shall be obliged to make it clear to the third party that the suspended use does not mean acknowledgement of an infringement of Property Rights.

2. Claims of the Purchaser shall be excluded if he is responsible for an infringement of Property Rights.

3. Claims of the Purchaser shall also be excluded if the infringement of Property Rights was caused by specific demands of the Purchaser, by a use of the product being used together with products not provided by the Supplier.

4. Further claims against the Supplier shall be excluded. However, Clause XI (Further liability) shall remain unaffected and so shall be Purchaser's right to terminate the contract.

X. IMPOSSIBILITY OF PERFORMANCE, CONTRACT ADAPTATION

1. If it is impossible for the Supplier to carry out the Supplies for reasons for which he is responsible, the Purchaser shall be entitled to claim damages but the Purchaser's claim for damages shall be limited to 10 % of the value of that part of the Supplies which, owing to the impossibility, cannot be put to the intended use. This shall not apply where in cases of wilful misconduct, of gross negligence or of initial impossibility, there is a legally binding liability. No change in the burden of proof to the detriment of the Purchaser is involved. Purchaser's right to terminate the contract shall remain unaffected.

2. Where unforeseeable events as described in Clause IV, para. 2., substantially change the economic importance or the contents of the Supplies or considerably affect the Supplier's business, the contract shall be adapted accordingly with due regard to the principle of good faith. Where this is not economically reasonable, the Supplier shall have the right to terminate the contract. If the Supplier wants to make use of this right of termination, he shall notify the Purchaser in writing immediately after becoming aware of the significance of the event. This shall apply even where at first an extension of the delivery time had been agreed with the Purchaser.

XI. FUTHER LIABILITY

Except as provided herein, any other claims for damages of the Purchaser shall be excluded regardless of whether they are based on positive breach of contractual obligations, violation of obligations in contract negotiations, breach of warranty, tort or other legal theory. This exclusion shall not apply where e.g. under the product liability law or in cases of wilful misconduct, of gross negligence, of the absence of warranted characteristics or of the legally binding liabilitiy. However, liability for damages arising from the fundamental non-performance of contractual obligations shall be limited to the foreseeable demage normally covered by a contract except in cases of wilful misconduct or gross negligence. This limitation does not imply a change in the burden of proof to the detriment of the Purchaser.

XII. CHOICE OF FORUM

1. If the Purchaser is a businessman, the sole forum for all disputes arising directly or indirectly out of the contract shall be the place of the Supplier's head or branch office at the Supplier's option.

2. All relations arising out of the contract shall be governed by German law including the United Nations Convention on Contracs for the International Sale of Goods (CISG).

XIII. VALIDITY OF THE CONTRACT

Even in case of legal invalidity of individual items, the remaining parts of the contract shall remain binding save where adherence to the contract would mean an undue hardship on one of the parties.