

Electronic Measuring Relays for Current, Voltage and Overfrequency

ALME Catalog

Edition 3.12



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Electronic Measuring Relays

Contents and housing data

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V Agencies and distributors

This catalog contains a selection of the most important measuring relays for current, voltage and overfrequency from our extensive product range.

The electrical level isolation between the measured circuit and the power supply provided by the low mutual capacitance 2-window transformer in the power supply provides these sturdy, long lasting measuring relays for switching cabinet mounting with immunity to interference.

The measuring relays are normally equipped with one relay with one changeover switch. The housing is of fibreglass reinforced plastic, providing a high resistance to shock, weather, and fire. The devices can be snapped onto a standard mounting rail or screwed onto a mounting plate.

In addition, we manufacture measuring relays precisely to your specifications.

Declaration of conformity

The devices described in this catalog have been developed and manufactured in accordance with the regulations set down by following Directives:

- 73 / 23 / EWG Directive for low voltage operation
- 89 / 336 / EWG Electromagnetic conformity

Safety regulations, product liability

The measuring relays presented in this catalog may be installed and commissioned only by appropriately trained persons. Valid safety regulations must be adhered to. The systems must be disconnected from power and measures taken to prevent them from being unintentionally switched on again. Normal and interference-free operation of the components can only be guaranteed for the specifications defined in this catalog or in single descriptions. No liability is assumed for damages resulting from inappropriate or improper use.

All characteristics presented in this catalog are for information purposes only and imply no legally binding assurance thereof.

Specifications and testing procedure

The sensors and devices included in this selected list are manufactured in accordance with the following Standards and IEC, EN, VDE Specifications and Guidelines:

- DIN VDE 0660 part 208, part 100, part 100 A3, part 200,
- DIN EN 50 081 and -082,
- DIN VDE 0838,
- DIN EN 55 011, -014, -022, -025,
- DIN EN 50 217,
- DIN VDE 0847,
- DIN VDE 0453 / 303,
- IEC 801 1 ... 4,
- IEC 255 - 4,
- IEC 947.

Certification and CE marking

Our company has been certified according to DIN EN ISO 9001 since 1994. The EMC tests are performed in our own testing laboratory, which is also available to our customers for testing their products.

Technical data

Housing

- designation .60
- protection rating IP 40 (acc. to DIN 40 050)
- dielectric strength 500 kV / cm (acc. to DIN 53 481)
- colour light grey (acc. to RAL 7035)

Terminals

- number acc. to VDE 0100 part 750
- clamp screw 2 rows à 7 terminals
- diameter of the connecting lead undetachable, self-releasing
- nominal current max. 4 qmm
- protection rating max. 20 A
- contact protection IP 20 (acc. to DIN 40 050)
- colour acc. to VBG 4
- anthracite

Mounting

- standard rail can be snapped onto standard rail
- acc. to DIN 46 277, sheet 3

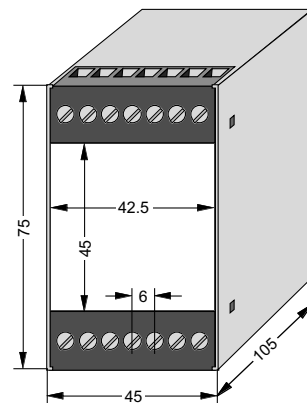
Temperature range

- 40 ... + 110 °C

Creepage and

clearance distances

IGr C / 380 V AC (acc. to VDE 0110)



Ref. no.	Type designation	Page	Ref. no.	Type designation	Page
16.27-01-003	AIN1/410ca - 1.60 - 42 VAC	1.1.1	16.28-02-003	AUN1/511cq - 1.60 - 42VAC	2.1.2
16.27-01-005	AIN1/410ca - 1.60 - 24 VAC	1.1.1	16.28-02-005	AUN1/511cq - 1.60 - 24VAC	2.1.2
16.27-01-007	AIN1/410ca - 1.60 - 115/230 VAC	1.1.1	16.28-02-007	AUN1/511cq - 1.60 - 115/230VAC	2.1.2
16.27-02-003	AIN1/411cq - 1.60 - 42 VAC	1.1.2	16.28-03-003	AUNF1/510ca - 1.60 - 42VAC	2.1.3
16.27-02-005	AIN1/411cq - 1.60 - 24 VAC	1.1.2	16.28-03-005	AUNF1/510ca - 1.60 - 24VAC	2.1.3
16.27-02-007	AIN1/411cq - 1.60 - 115/230 VAC	1.1.2	16.28-03-007	AUNF1/510ca - 1.60 - 115/230VAC	2.1.3
16.27-03-003	AINF1/410ca - 1.60 - 42 VAC	1.1.3	16.28-04-003	AUNF1/510cq - 1.60 - 42VAC	2.1.4
16.27-03-005	AINF1/410ca - 1.60 - 24 VAC	1.1.3	16.28-04-005	AUNF1/510cq - 1.60 - 24VAC	2.1.4
16.27-03-007	AINF1/410ca - 1.60 - 115/230 VAC	1.1.3	16.28-04-007	AUNF1/510cq - 1.60 - 115/230VAC	2.1.4
16.27-04-003	AINF1/410cq - 1.60 - 42 VAC	1.1.4	17.04-54-006	FUR1/210ab - 2.60 - 24VDC	3.1.1
16.27-04-007	AINF1/410cq - 1.60 - 115/230 VAC	1.1.4	17.04-54-007	FUR1/210ab - 2.60 - 115/230VAC	3.1.1
16.28-01-003	AUN1/510ca - 1.60 - 42VAC	2.1.1	17.04-54-016	FUR1/210ab - 2.60 - 24VDC 5-100Hz	3.1.1
16.28-01-005	AUN1/510ca - 1.60 - 24VAC	2.1.1			
16.28-01-007	AUN1/510ca - 1.60 - 115/230VAC	2.1.1			

Articles sorted by type

Type designation	Ref. no.	Page	Type designation	Ref. no.	Page
AIN1/410ca - 1.60 - 42 VAC	16.27-01-003	1.1.1	AUN1/511cq - 1.60 - 42VAC	16.28-02-003	2.1.2
AIN1/410ca - 1.60 - 24 VAC	16.27-01-005	1.1.1	AUN1/511cq - 1.60 - 24VAC	16.28-02-005	2.1.2
AIN1/410ca - 1.60 - 115/230 VAC	16.27-01-007	1.1.1	AUN1/511cq - 1.60 - 115/230VAC	16.28-02-007	2.1.2
AIN1/411cq - 1.60 - 42 VAC	16.27-02-003	1.1.2	AUNF1/510ca - 1.60 - 42VAC	16.28-03-003	2.1.3
AIN1/411cq - 1.60 - 24 VAC	16.27-02-005	1.1.2	AUNF1/510ca - 1.60 - 24VAC	16.28-03-005	2.1.3
AIN1/411cq - 1.60 - 115/230 VAC	16.27-02-007	1.1.2	AUNF1/510ca - 1.60 - 115/230VAC	16.28-03-007	2.1.3
AINF1/410ca - 1.60 - 42 VAC	16.27-03-003	1.1.3	AUNF1/510cq - 1.60 - 42VAC	16.28-04-003	2.1.4
AINF1/410ca - 1.60 - 24 VAC	16.27-03-005	1.1.3	AUNF1/510cq - 1.60 - 24VAC	16.28-04-005	2.1.4
AINF1/410ca - 1.60 - 115/230 VAC	16.27-03-007	1.1.3	AUNF1/510cq - 1.60 - 115/230VAC	16.28-04-007	2.1.4
AINF1/410cq - 1.60 - 42 VAC	16.27-04-003	1.1.4	FUR1/210ab - 2.60 - 24VDC	17.04-54-006	3.1.1
AINF1/410cq - 1.60 - 115/230 VAC	16.27-04-007	1.1.4	FUR1/210ab - 2.60 - 115/230VAC	17.04-54-007	3.1.1
AUN1/510ca - 1.60 - 42VAC	16.28-01-003	2.1.1	FUR1/210ab - 2.60 - 24VDC 5-100Hz	17.04-54-016	3.1.1
AUN1/510ca - 1.60 - 24VAC	16.28-01-005	2.1.1			
AUN1/510ca - 1.60 - 115/230VAC	16.28-01-007	2.1.1			

Electronic Measuring Relays

Measuring relays for AC/DC / over- and undercurrent



Measuring relays for AC/DC

Type AIN1/410ca - 1.60 - (Uv)

Ref. no 16.27-01

Type AIN1/411cq - 1.60 - (Uv)

Ref. no 16.27-02

Task

Monitors AC or DC circuits for under- and overcurrent of an adjustable threshold S.

Use

Monitor for drives, electroplating baths, valves, electro-magnetic clutches and brakes, electromagnetic chucks, etc.

Range extensions

Currents exceeding 15 A: with NWN shunt resistor according to DIN 43 703 and measuring relay AUN for voltage range 4 ... 60 mV. For AC, also using SWN current converter according to DIN 42 600.

Hysteresis H and times X, Y and Z

Version /410ca: H fixed 5 % of S, no times.

Version /411cq: H adjustable 5 ... 50 % of S, start time delay X adjustable up to approx. 5 s, pull-in delay Y and dropout delay Z adjustable together up to approx. 0.5 s.

See catalog pages 1.1.1 and 1.1.2

Measuring relays for over- and undercurrent

Type AINF1/410ca - 1.60 - (Uv)

Ref.no. 16.27-03

Type AINF1/410cq - 1.60 - (Uv)

Ref.no. 16.27-04

Task

Monitors AC or DC circuits for under- and overcurrent by using a window comparator.

Use

Monitor for drives, electroplating baths, valves, electro-magnetic clutches and brakes, electromagnetic chucks, etc.

Range extensions

Currents exceeding 15 A: with NWN shunt resistor according to DIN 43 703 and AUNF measuring relay for voltage range 4 ... 60 mV. For AC, also using SWN current converter according to DIN 42 600.

Hysteresis H and times X, Y and Z

Version /410ca: H fixed 5 % of S, no times.

Version /410cq: H fixed 5 % of S, start time delay X adjustable up to approx. 5 s, pull-in delay Y and dropout delay Z adjustable together up to approx. 0.5 s.

See catalog pages 1.1.3 and 1.1.4

Measuring relays for AC/DC

Type	Ref. no.	Page	Current range	Operating voltage U _v	Version
AIN1/410ca - 1.60 - 42 VAC	16.27-01-003	1.1.1	1 mA ... 15 A	42 V AC	threshold adjustable, H fixed, no times
AIN1/410ca - 1.60 - 24 VAC	16.27-01-005	1.1.1	1 mA ... 15 A	24 V AC	threshold adjustable, H fixed, no times
AIN1/410ca - 1.60 - 115/230 VAC	16.27-01-007	1.1.1	1 mA ... 15 A	115 / 230 V AC	threshold adjustable, H fixed, no times
AIN1/411cq - 1.60 - 42 VAC	16.27-02-003	1.1.2	1 mA ... 15 A	42 V AC	threshold adjustable, H adjustable
AIN1/411cq - 1.60 - 24 VAC	16.27-02-005	1.1.2	1 mA ... 15 A	24 V AC	threshold adjustable, H adjustable
AIN1/411cq - 1.60 - 115/230 VAC	16.27-02-007	1.1.2	1 mA ... 15 A	115 / 230 V AC	threshold adjustable, H adjustable

Measuring relays for over- and undercurrent

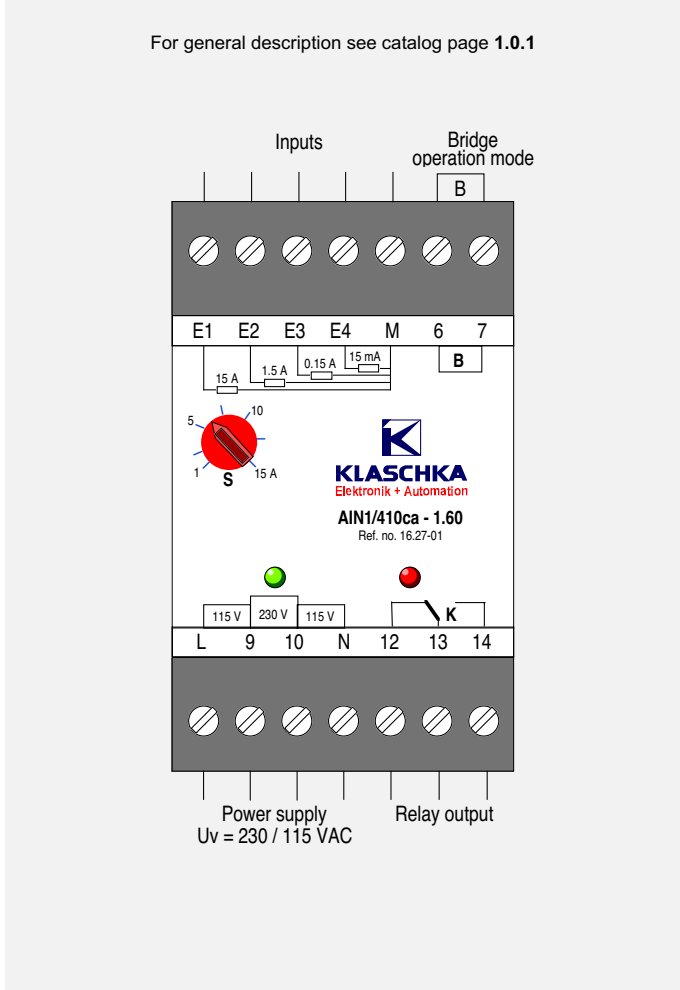
Type	Ref. no.	Page	Current range	Operating voltage U _v	Version
AINF1/410ca - 1.60 - 42 VAC	16.27-03-003	1.1.3	1 mA ... 15 A	42 V AC	threshold adjustable, H fixed, no times
AINF1/410ca - 1.60 - 24 VAC	16.27-03-005	1.1.3	1 mA ... 15 A	24 V AC	threshold adjustable, H fixed, no times
AINF1/410ca - 1.60 - 115/230 VAC	16.27-03-007	1.1.3	1 mA ... 15 A	115 / 230 V AC	threshold adjustable, H fixed, no times
AINF1/410cq - 1.60 - 42 VAC	16.27-04-003	1.1.4	1 mA ... 15 A	42 V AC	threshold adjustable, H fixed
AINF1/410cq - 1.60 - 115/230 VAC	16.27-04-007	1.1.4	1 mA ... 15 A	115 / 230 V AC	threshold adjustable, H fixed

Electronic Measuring Relays

AIN measuring relays for AC and DC current

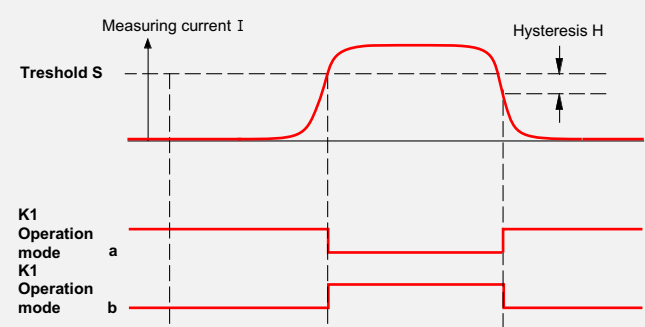
Device	measuring relay for AC/DC current
For the exact type designation and ref. no. please see page 1.0.2	AIN1/410ca-1.60 - (Uv) 16.27-01-xxx

Technical data	
Line voltage Uv	please indicate when ordering
Alternating voltage	230 / 115, 42, 24 V AC
Tolerance	± 10 %
Frequency	50 ... 60 Hz
Operating temperature	0 ... + 60 °C
Power consumption	approx. 4 VA
Housing	.60 (page 0.0.1)
Weight	approx. 300 g
(see table) Input (E)	4 current ranges selectable
Output	
Relay	1 changeover switch
Switching voltage	24 ... 250 V AC or DC
Switching current	0.05 ... 6 A
Switching capacity, AC	max. 1250 VA
Switching capacity, DC	max. 50 W
Switching frequency	max. 5000 / h
Switching cycles	30 x 10 ⁶
Response times	
Exceeding threshold / falling below threshold	approx. 25 ms / approx. 100 ms
Indicators	
1 green LED	Power ON
1 red LED	Relay pulled-in
Accuracy	
Setting accuracy	± 5 %
Repeatability	± 0.5 %
Temperature dependance	± 0.1 % / °C
Operation mode	
a Overcurrent monitor	without bridge B between the terminals 6-7 the relay drops out when exceeding treshold S.
b Undercurrent monitor	with bridge B between the terminals 6-7 the relay pulls-in when exceeding treshold S.
Hysteresis (H)	fixed 5 % of S, no times

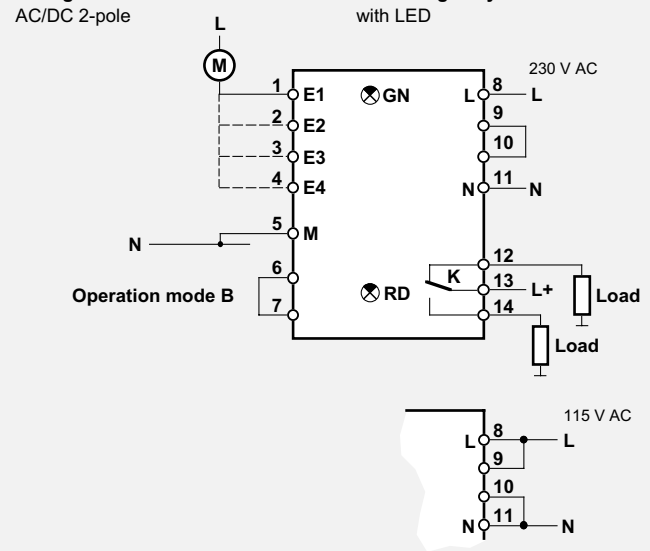


Input	Range	Input resistance	Overload capacity	
			continuous	3 s, 5 % DF*1
E1	1 ... 15 A	5 mΩ	20 A	33 A
E2	0.1 ... 1.5 A	50 mΩ	3 A	6 A
E3	10 ... 150 mA	0.5 Ω	1.2 A	2 A
E4	1 ... 15 mA	5 Ω	0.3 A	0.5 A

Diagram



Wiring

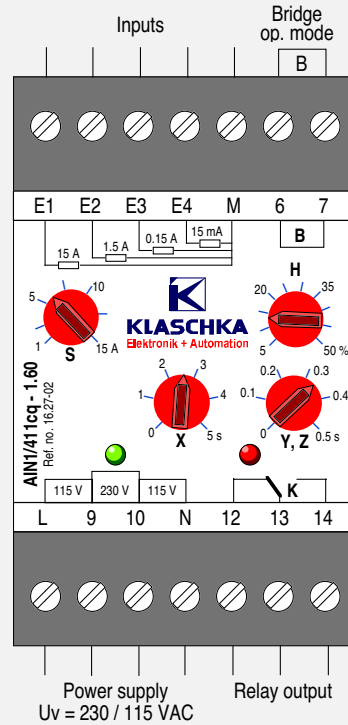


AIN measuring relays for AC and DC current

Device	Measuring relay for AC/DC
For the exact type designation and ref. no. please see page 1.0.2	AIN1/411cq-1.60 - (Uv) 16.27-02-xxx

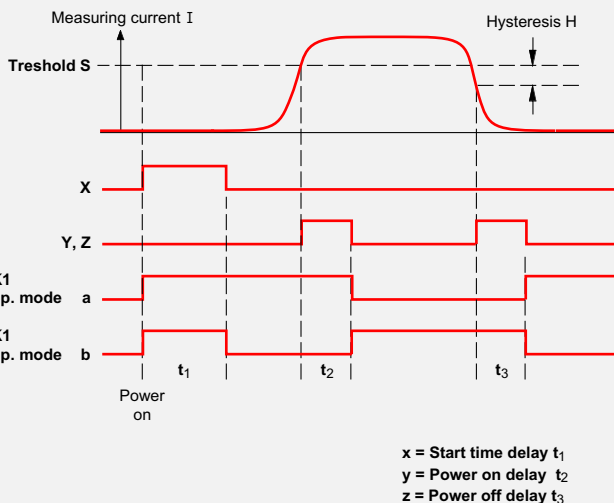
Technical data	
Line voltage Uv	please indicate when ordering
Alternating voltage	230 / 115, 42, 24 V AC
Tolerance	± 10 %
Frequency	50 ... 60 Hz
Operating temperature	0 ... + 60 °C
Power consumption	approx. 4 VA
Housing	.60 (page 0.0.1)
Weight	approx. 300 g
(see table) Input (E)	4 current ranges selectable
Output	
Relay	1 changeover switch
Switching voltage	24 ... 250 V AC or DC
Switching current	0.05 ... 6 A
Switching capacity, AC	max. 1250 VA
Switching capacity, DC	max. 50 W
Switching frequency	max. 5000 / h
Switching cycles	30 x 10 ⁶
Response times	
Exceeding threshold / falling below threshold	approx. 25 ms / approx. 100 ms
Indicators	
1 green LED	Power ON
1 red LED	Relay pulled-in
Accuracy	
Setting accuracy	± 5 %
Repeatability	± 0.5 %
Temperature dependence	± 0.1 % / C°
Operation mode	
a Overcurrent monitor	without bridge B between the terminals 6-7 the relay drops out when exceeding treshhold S.
b Undercurrent monitor	with bridge B between the terminals 6-7 the relay pulls-in when exceeding treshhold S.
Hysteresis (H)	adjustable 5 ... 50 % of S
Start time delay (X)	adjustable up to approx. 5 s
Pull-in (Y) / drop out delay (Z)	tog. adjustable up to approx. 0.5 s

For general description see catalog page 1.0.1



Input	Range	Input resistance	Overload capacity	
			continuous	3 s, 5 % DF
E1	1 ... 15 A	5 mΩ	20 A	33 A
E2	0.1 ... 1.5 A	50 mΩ	3 A	6 A
E3	10 ... 150 mA	0.5 Ω	1.2 A	2 A
E4	1 ... 15 mA	5 Ω	0.3 A	0.5 A

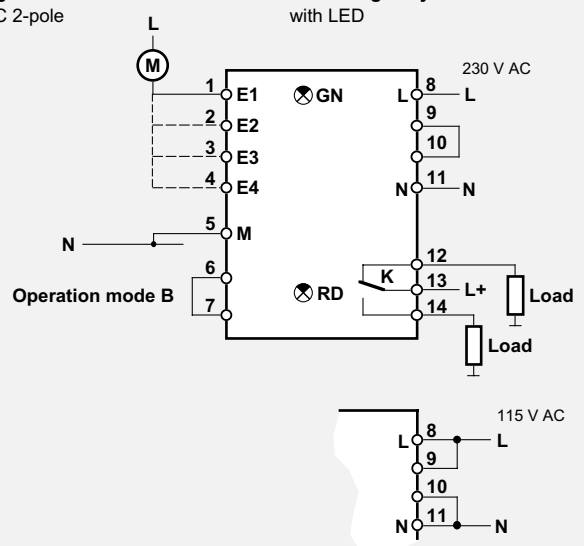
Diagram



Wiring

AC/DC 2-pole

AC/DC measuring relay with LED

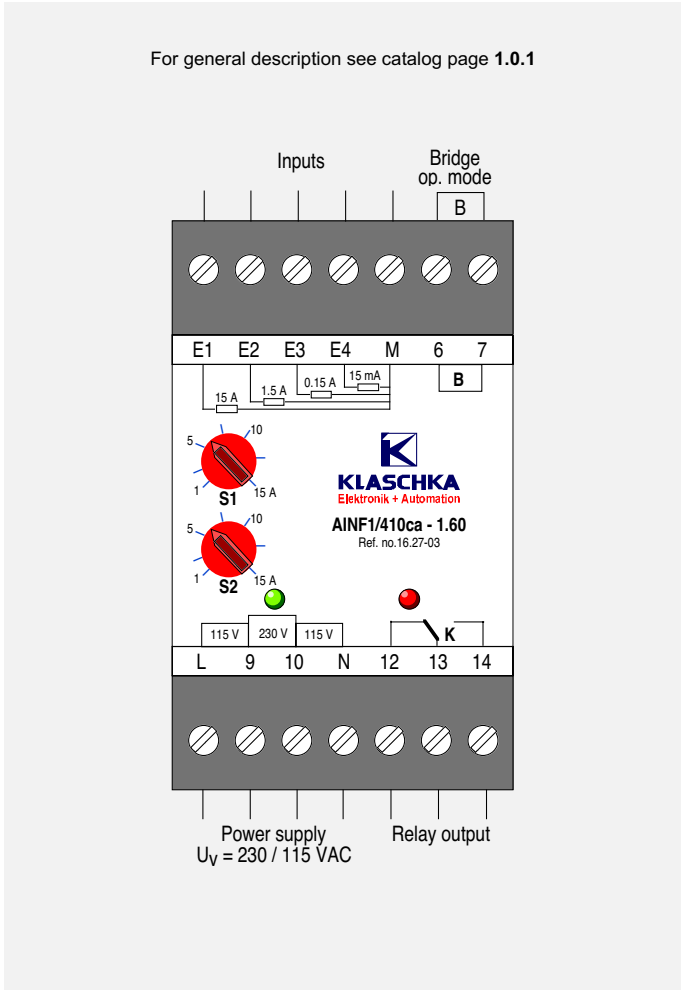


Electronic Measuring Relays

AINF measuring relays for AC and DC current

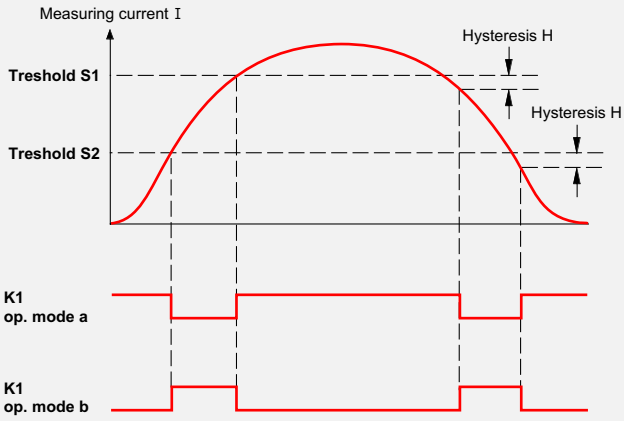
Device	AINF measuring relay for over- and undercurrent
For the exact type designation and ref. no. please see page 1.0.2	AINF1/410ca-1.60 - (Uv) 16.27-03-xxx

Technical data	
Line voltage Uv	please indicate when ordering
Alternating voltage	230 / 115, 42, 24 V AC
Tolerance	± 10 %
Frequency	50 ... 60 Hz
Operating temperature	0 ... + 60 °C
Power consumption	approx. 4 VA
Housing	.60 (page 0.0.1)
Weight	approx. 300 g
(see table) Input (E)	4 current ranges selectable
Output	
Relay	1 changeover switch
Switching voltage	24 ... 250 V AC or DC
Switching current	0.05 ... 6 A
Switching capacity AC / DC	max. 1250 VA / max. 50 W
Switching frequency / cycles	max. 5000 / h / 30 x 10 ⁶
Response times	
Exceeding threshold / falling below threshold	approx. 25 ms / approx. 100 ms
Indicators	
1 green LED	Power ON
1 red LED	Relay pulled-in
Accuracy	
Setting accuracy	± 5 %
Repeatability	± 0.5 %
Temperature dependance	± 0.1 % / °C
Operation mode	
a	without wire bridge between the terminals 6-7 the relay drops out when exceeding the low treshold and pulls-in when exceeding the high one
b	with wire bridge between the terminals 6-7 the relay pulls-in when exceeding the low treshold and drops out when exceeding the high one
Hysteresis (H)	fixed 5 % of S, no times

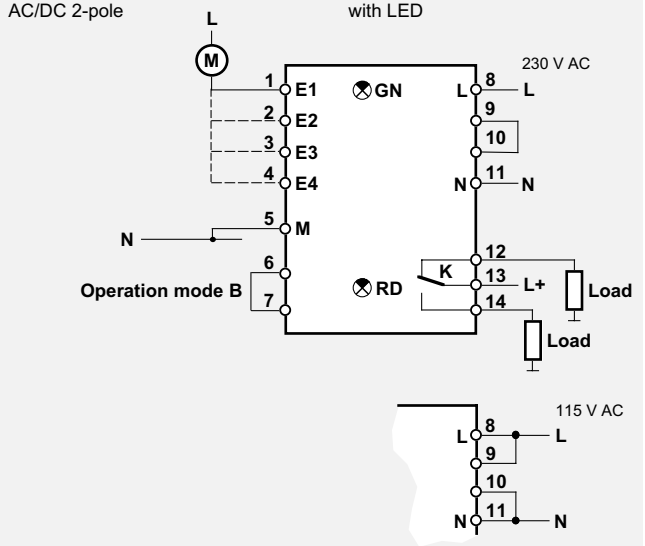


Input	Range	Input resistance	Overload capacity	
			continuous	3 s, 5 % DF
E1	1 ... 15 A	5 mΩ	20 A	33 A
E2	0.1 ... 1.5 A	50 mΩ	3 A	6 A
E3	10 ... 150 mA	0.5 Ω	1.2 A	2 A
E4	1 ... 15 mA	5 Ω	0.3 A	0.5 A

Diagram

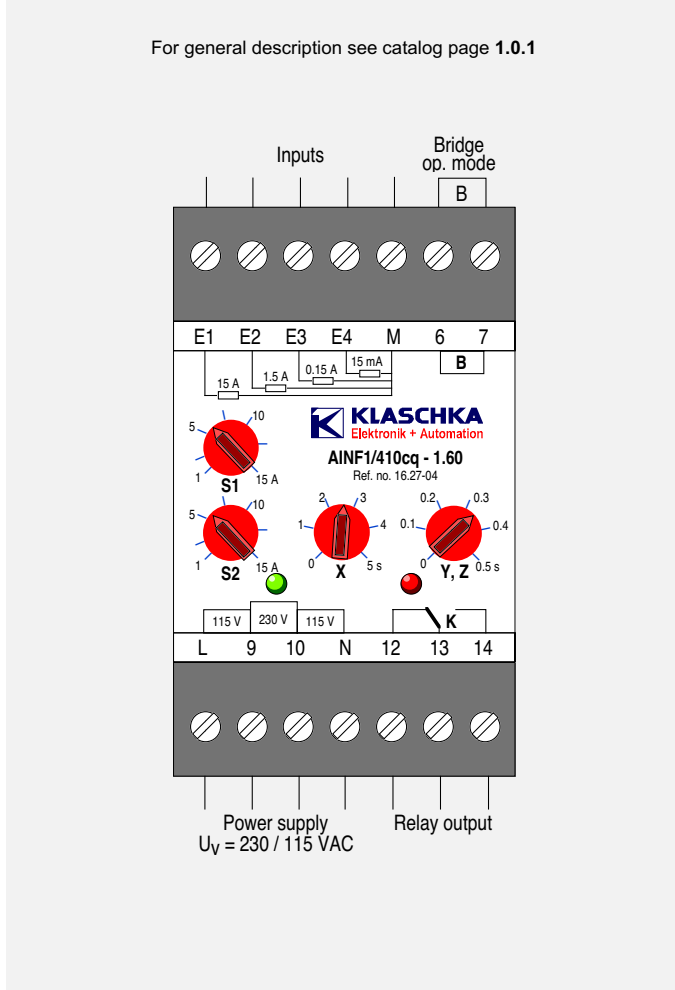


Wiring

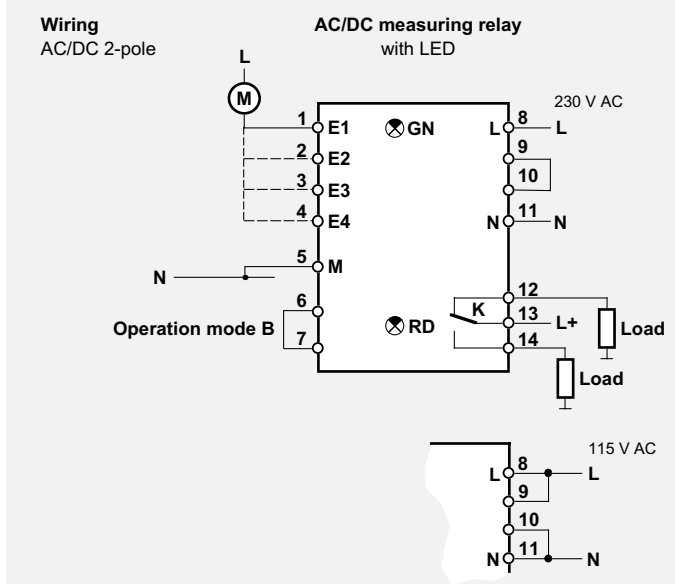
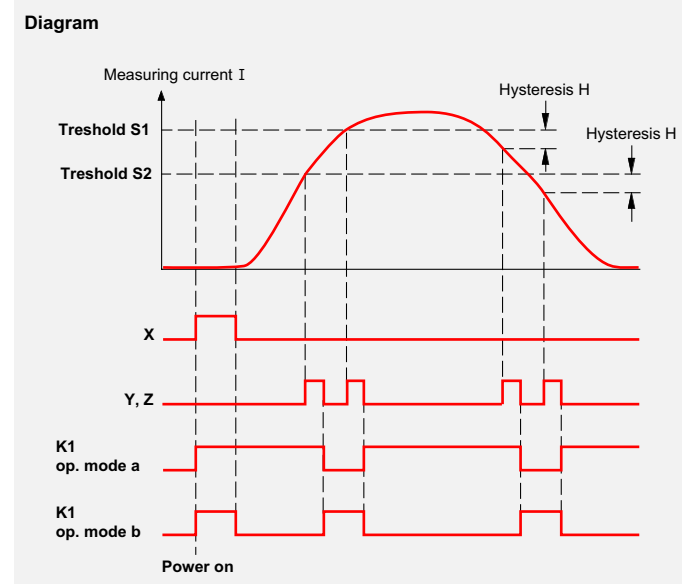


Device	AINF measuring relay for over- and undercurrent
For the exact type designation and ref. no. please see page 1.0.2	AINF1/410cq-1.60 - (Uv) 16.27-04-xxx

Technical data	
Line voltage U _v	please indicate when ordering
Alternating voltage	230 / 115, 42, 24 V AC
Tolerance /frequency	± 10 % / 50 ... 60 Hz
Operating temperature / power consumption	0 ... + 60 °C / approx. 4 VA
Housing	.60 (page 0.0.1)
Weight	approx. 300 g
(see table) Input (E)	
4 current ranges selectable	
Output	
Relay	1 changeover switch
Switching voltage	24 ... 250 V AC or DC
Switching current	0.05 ... 6 A
Switching capacity AC / DC	max. 1.250 VA / max. 50 W
Switching frequency / cycles	max. 5000 / h / 30 x 10 ⁶
Response times	
Exceeding threshold / falling below threshold	approx. 25 ms / approx. 100 ms
Indicators	
1 green LED	Power ON
1 yellow LED	Relay pulled-in
Accuracy	
Setting accuracy	± 5 %
Repeatability	± 0.5 %
Temperature dependence	± 0.1 % / C°
Operation mode	
a	without wire bridge between the terminals 6-7 the relay drops out when exceeding the low threshold and pulls-in when exceeding the high one
b	with wire bridge between the terminals 6-7 the relay pulls-in when exceeding the low threshold and drops out when exceeding the high one
Hysteresis (H)	fixed 5 % of S
Start time delay (X)	adjustable up to approx. 5 s
Pull-in (Y) / dropout delay (Z)	adj. together up to approx. 0.5 s



Input	Range	Input resistance	Overload capacity	
			continuous	3 s, 5 % DF
E1	1 ... 15 A	5 mΩ	20 A	33 A
E2	0.1 ... 1.5 A	50 mΩ	3 A	6 A
E3	10 ... 150 mA	0.5 Ω	1.2 A	2 A
E4	1 ... 15 mA	5 Ω	0.3 A	0.5 A



Electronic Measuring Relays

Measuring relays for AC/DC voltages / over- and undervoltages



Measuring relays for AC/DC voltages

Type AUN1/510ca - 1.60 - (Uv)

Ref. no 16.28-01

Type AUN1/511cq - 1.60 - (Uv)

Ref. no 16.28-02

Task

Monitors voltages of AC or DC circuits for exceeding or falling below an adjustable treshold S.

Use

Monitor for dry and storage batteries, emergency power sources, solar generators; monitoring electrical drives for standstill.

Range extensions

Voltages exceeding 300 V with series resistor at terminal 1 (3.67 kΩ per 1 V range extension).

Hysteresis H and times X, Y and Z

Version /510ca: H fixed 5 % of S, no times.

Version /511cq: H adjustable 5 ... 50 % of S, start time delay X adjustable up to approx. 5 s, pull-in delay Y and dropout delay Z adjustable together up to approx. 0.5 s.

See catalog pages 2.1.1 and 2.1.2

Measuring relays for over- and undervoltages

Type AUNF1/510ca - 1.60 - (Uv)

Ref. no 16.28-03

Type AUNF1/510cq - 1.60 - (Uv)

Ref. no 16.28-04

Task

Monitors over- and undervoltages of AC/DC circuits by using a window comparator.

Use

Monitor for dry and storage batteries, emergency power sources, solar generators; monitoring electrical drives for standstill.

Range extensions

Voltages exceeding 300 V with series resistor at terminal1 (3.67 kΩ per 1 V range extension).

Hysteresis H and times X, Y and Z

Version /510ca: H fixed 5 % of S, no times.

Version /510cq: H fixed 5 % of S, start time delay X adjustable up to approx. 5 s, pull-in delay Y and dropout delay Z adjustable together up to approx. 0.5 s.

See catalog pages 2.1.3 and 2.1.4

Measuring relays for AC/DC voltages

Type	Ref. no.	Page	Voltage range	Operating voltage U_V	Version
AUN1/510ca - 1.60 - 42VAC	16.28-01-003	2.1.1	4 mV ... 300 V	42 V AC	threshold adjustable, H fixed, no times
AUN1/510ca - 1.60 - 24VAC	16.28-01-005	2.1.1	4 mV ... 300 V	24 V AC	threshold adjustable, H fixed, no times
AUN1/510ca - 1.60 - 115/230VAC	16.28-01-007	2.1.1	4 mV ... 300 V	115 / 230 V AC	threshold adjustable, H fixed, no times
AUN1/511cq - 1.60 - 42VAC	16.28-02-003	2.1.2	4 mV ... 300 V	42 V AC	threshold adjustable, H adjustable
AUN1/511cq - 1.60 - 24VAC	16.28-02-005	2.1.2	4 mV ... 300 V	24 V AC	threshold adjustable, H adjustable
AUN1/511cq - 1.60 - 115/230VAC	16.28-02-007	2.1.2	4 mV ... 300 V	115 / 230 V AC	threshold adjustable, H adjustable

Measuring relays for over- and undervoltages

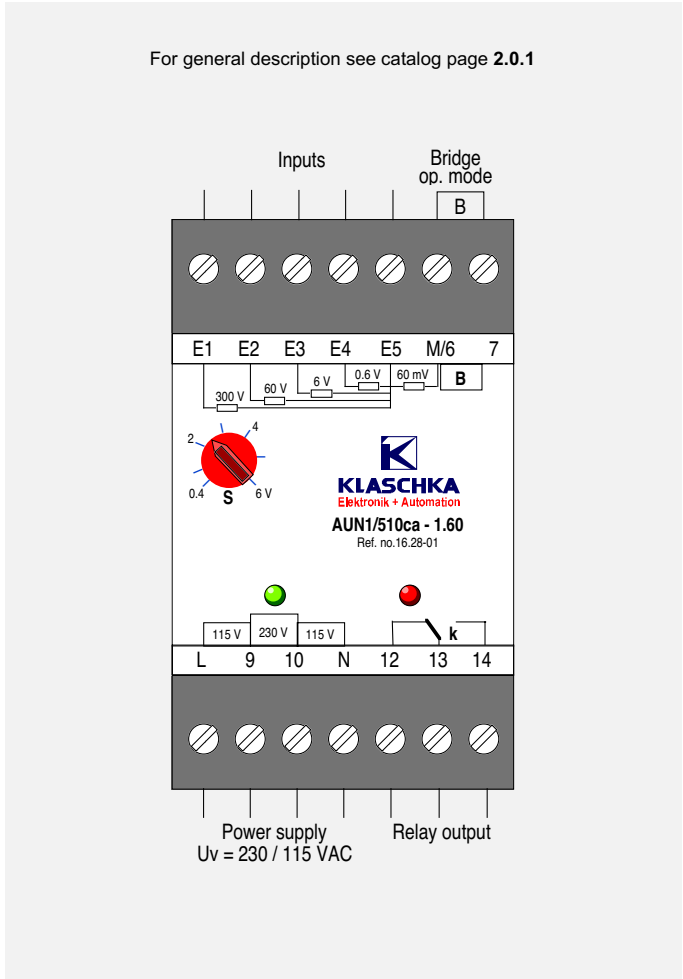
Type	Ref. no.	Page	Voltage range	Operating voltage U_V	Version
AUNF1/510ca - 1.60 - 42VAC	16.28-03-003	2.1.3	4 mV ... 300 V	42 V AC	threshold adjustable, H fixed, no times
AUNF1/510ca - 1.60 - 24VAC	16.28-03-005	2.1.3	4 mV ... 300 V	24 V AC	threshold adjustable, H fixed, no times
AUNF1/510ca - 1.60 - 115/230VAC	16.28-03-007	2.1.3	4 mV ... 300 V	115 / 230 V AC	threshold adjustable, H fixed, no times
AUNF1/510cq - 1.60 - 42VAC	16.28-04-003	2.1.4	4 mV ... 300 V	42 V AC	threshold adjustable, H fixed
AUNF1/510cq - 1.60 - 24VAC	16.28-04-005	2.1.4	4 mV ... 300 V	24 V AC	threshold adjustable, H fixed
AUNF1/510cq - 1.60 - 115/230VAC	16.28-04-007	2.1.4	4 mV ... 300 V	115 / 230 V AC	threshold adjustable, H fixed

Electronic Measuring Relays

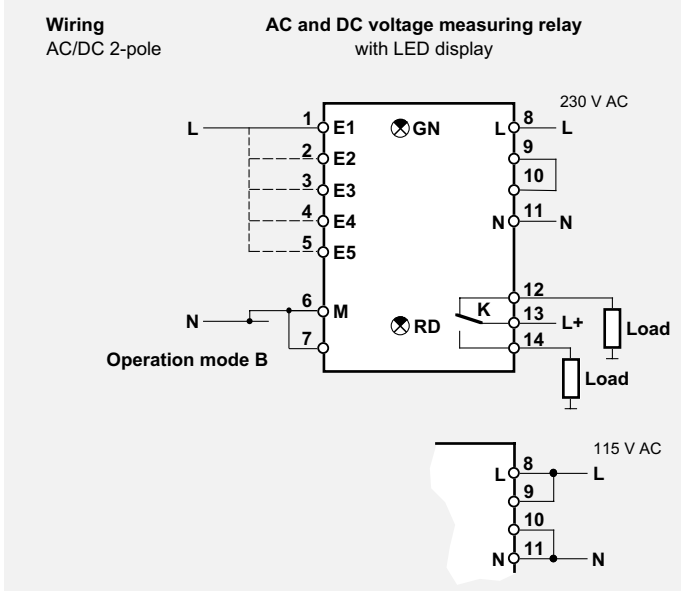
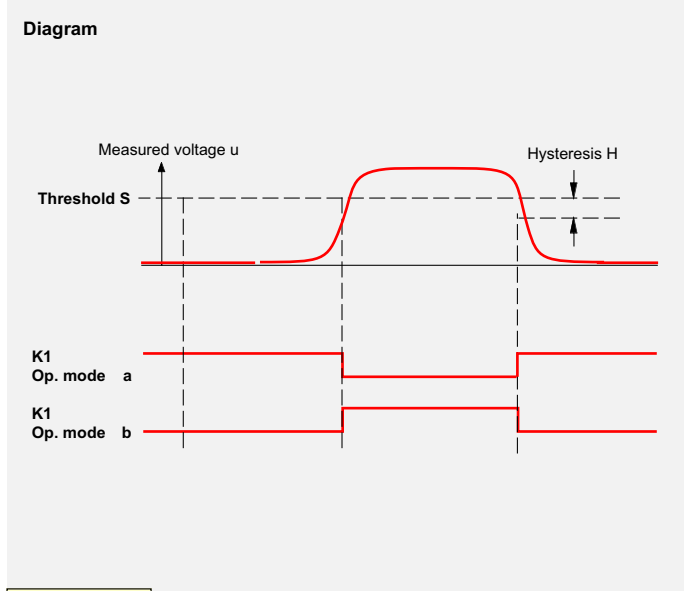
AUN measuring relays for AC/DC voltages

Device	measuring relay for AC and DC voltages
For the exact type designation and ref. no. please see page 2.0.2	AUN1/510ca-1.60 - (Uv) 16.28-01-xxx

Technical data	
Line voltage Uv	please indicate when ordering
Alternating voltage	230 / 115, 42, 24 V AC
Tolerance	± 10 %
Frequency	50 ... 60 Hz
Operating temperature	0 ... + 60 °C
Power consumption	approx. 4 VA
Housing	60 (page 0.0.1)
Weight	approx. 300 g
(see table) Input (E)	5 voltage ranges selectable
Output	
Relay output	1 changeover switch
Switching voltage	24 ... 250 V AC or DC
Switching current	0.05 ... 6 A
Switching capacity for AC	max. 1250 VA
Switching capacity for DC	max. 50 W
Switching frequency	max. 5000 / h
Switching cycles	30 x 10 ⁶
Response times	
Exceeding threshold / falling below threshold	approx. 25 ms / approx. 100 ms
Indicators	
1 green LED	Power ON
1 red LED	Relay pulled-in
Accuracy	
Setting accuracy	± 5 %
Repeatability	± 0.5 %
Temperature dependence	± 0.1 % / °C
Operation mode	
a Overvoltage monitor	without bridge B between the terminals 6-7 the relay drops out when exceeding treshold S
b Undervoltage monitor	with bridge B between the terminals 6-7 the relay pulls in when exceeding treshold S
Hysteresis (H)	fixed 5 % of S, no times



Input	Range	Input resistance	Overload capability	
			continuous	3 s, 5 % DF
E1	20 ... 300 V	1 MΩ	400 V	400 V
E2	4 ... 60 V	220 kΩ	250 V	330 V
E3	0.4 ... 6 V	22 kΩ	80 V	100 V
E4	40 ... 600 mV	2.2 kΩ	25 V	33 V
E5	4 ... 60 mV	220 Ω	8 V	10 V

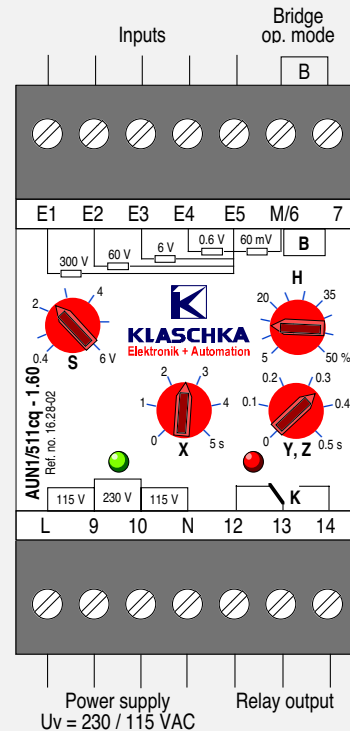


AUN measuring relays for AC and DC voltages

Device	measuring relay for AC and DC voltages
For the exact type designation and ref. no. please see page 2.0.2	AUN1/511cq-1.60 - (Uv) 16.28-02-xxx

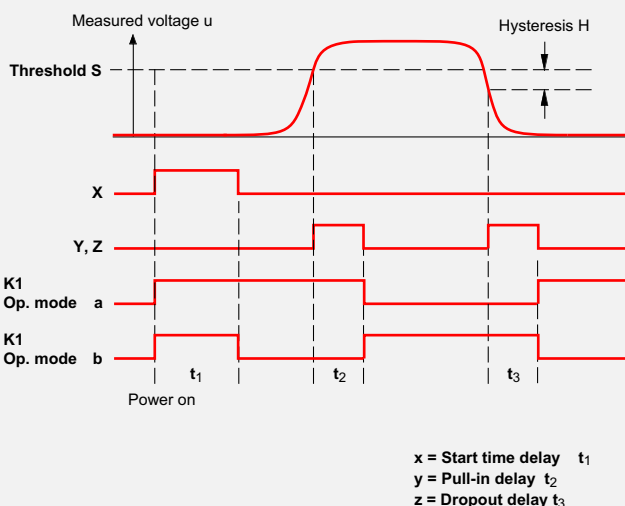
Technical data	
Line voltage Uv	please indicate when ordering
Alternating voltage	230 / 115, 42, 24 V AC
Tolerance	± 10 %
Frequency	50 ... 60 Hz
Operating temperature	0 ... + 60 °C
Power consumption	approx. 4 VA
Housing	60 (page 0.0.1)
Weight	approx. 300 g
(see table) input (E)	5 voltage ranges selectable
Output	
Relay output	1 changeover switch
Switching voltage	24 ... 250 V AC or DC
Switching current	0.05 ... 6 A
Switching capability, AC	max. 1.250 VA
Switching capability, DC	max. 50 W
Switching frequency	max. 5000 / h
Switching cycles	30 x 10 ⁶
Time delays	
Exceeding threshold / falling below threshold	approx. 25 ms / approx. 100 ms
Indicators	
1 LED green	Power ON
1 LED yellow	Relay pulled-in
Accuracy	
Setting accuracy	± 5 %
Repeatability	± 0.5 %
Temperature dependence	± 0.1 % / °C
Operation mode	
a Overvoltage monitor	without bridge B between the terminals 6-7 the relay drops out when exceeding treshhold S
b Undervoltage monitor	with bridge B between the terminals 6-7 the relay pulls in when exceeding treshhold S
Hysteresis (H)	adjustable 5 ... 50 % of S
Start time delay (X)	adjustable up to approx. 5 s
Pull-in (Y) / dropout delay (Z)	adjust. together up to approx. 0.5 s

For general description see catalog page 2.0.1



Input	Range	Input resistance	Overload capability	
			continuous	3 s, 5 % DF
E1	20 ... 300 V	1 MΩ	400 V	400 V
E2	4 ... 60 V	220 kΩ	250 V	330 V
E3	0.4 ... 6 V	22 kΩ	80 V	100 V
E4	40 ... 600 mV	2.2 kΩ	25 V	33 V
E5	4 ... 60 mV	220 Ω	8 V	10 V

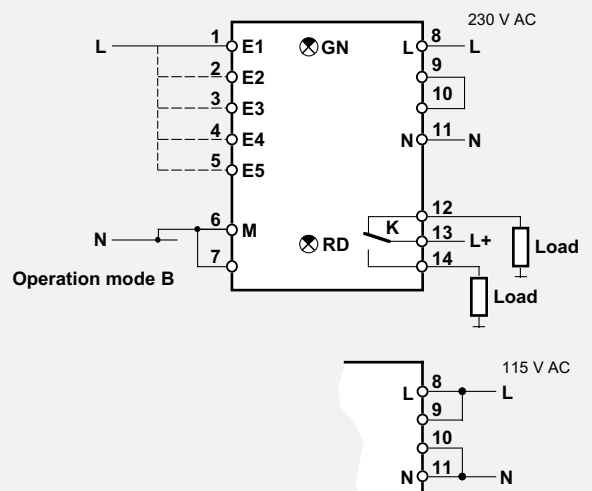
Diagram



Wiring

AC/DC 2-pole

AC and DC voltage measuring relay with LED display

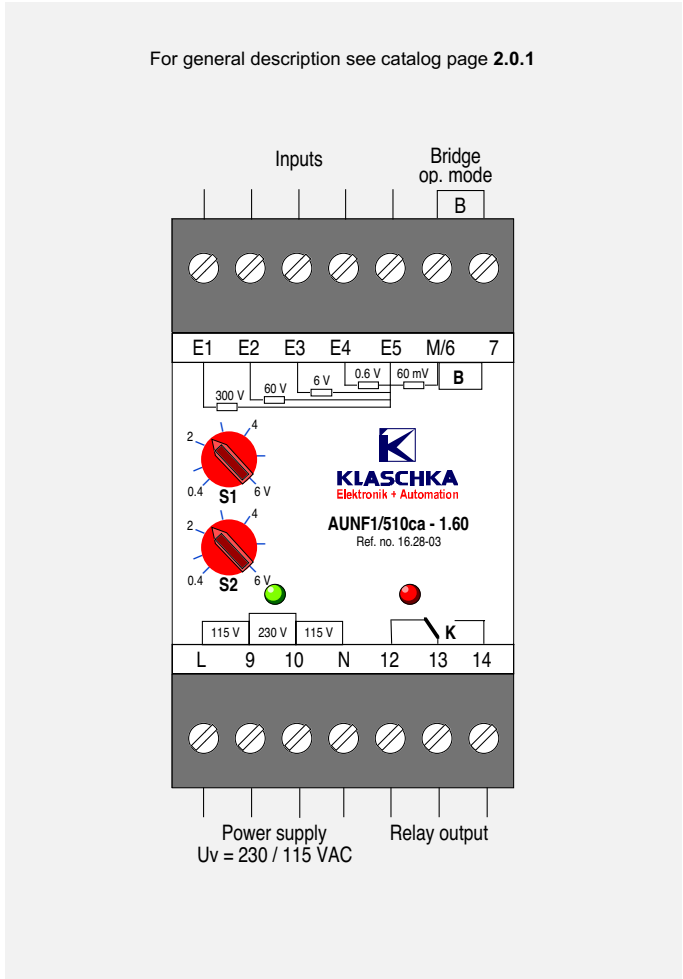


Electronic Measuring Relays

AUNF measuring relays for over- and undervoltages

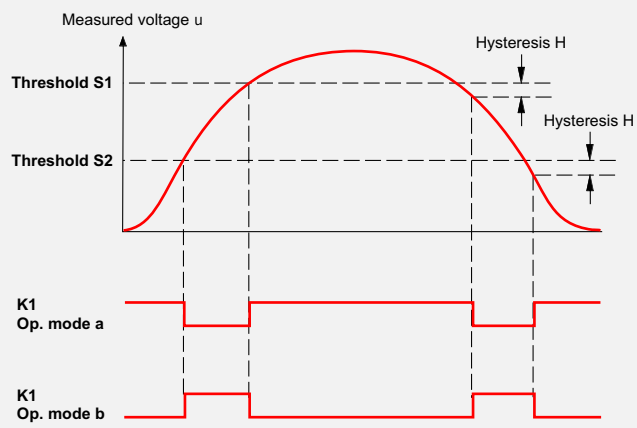
Device	AUNF measuring relay for over- and undervoltages
For the exact type designation and ref. no. please see page 2.0.2	AUNF1/510ca-1.60 - (Uv) 16.28-03-xxx

Technical data	
Line voltage Uv	please indicate when ordering
Alternating voltage	230 / 115, 42, 24 V AC
Tolerance / frequency	± 10 % / 50 ... 60 Hz
Operating temperature	0 ... + 60 °C
Power consumption	approx. 4 VA
Housing	.60 (page 0.0.1)
Weight	approx. 300 g
(see table) Input (E)	
Output	
Relay output	1 changeover switch
Switching voltage	24 ... 250 V AC or DC
Switching current	0.05 ... 6 A
Switching capacity, AC	max. 1250 VA
Switching capacity, DC	max. 50 W
Switching frequency / switching cycles	max. 5000 / h / 30 x 10 ⁶
Response times	
Exceeding threshold / falling below threshold	approx. 25 ms / approx. 100 ms
Indicators	
1 green LED	Power ON
1 red LED	Relay pulled-in
Accuracy	
Setting accuracy	± 5 %
Repeatability	± 0.5 %
Temperature dependence	± 0.1 % / °C
Operation mode	
a	without wire bridge B between the terminals 6-7 the relay drops out when exceeding the low threshold S and pulls-in again when exceeding the high one.
b	without wire bridge B between the terminals 6-7 the relay pulls-in when exceeding the low threshold S and drops out again when exceeding the high one.
Hysteresis (H)	fixed 5 % of S, no times



Input	Range	Input resistance	Overload capability	
			continuous	3 s, 5 % DF
E1	20 ... 300 V	1.1 MΩ	400 V	400 V
E2	4 ... 60 V	220 kΩ	250 V	330 V
E3	0.4 ... 6 V	22 kΩ	80 V	100 V
E4	40 ... 600 mV	2.2 kΩ	25 V	33 V
E5	4 ... 60 mV	220 Ω	8 V	10 V

Pulse diagram

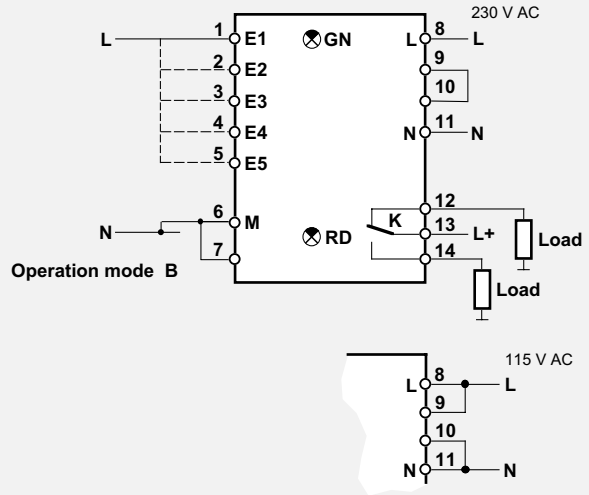


Wiring

AC/DC 2-pole

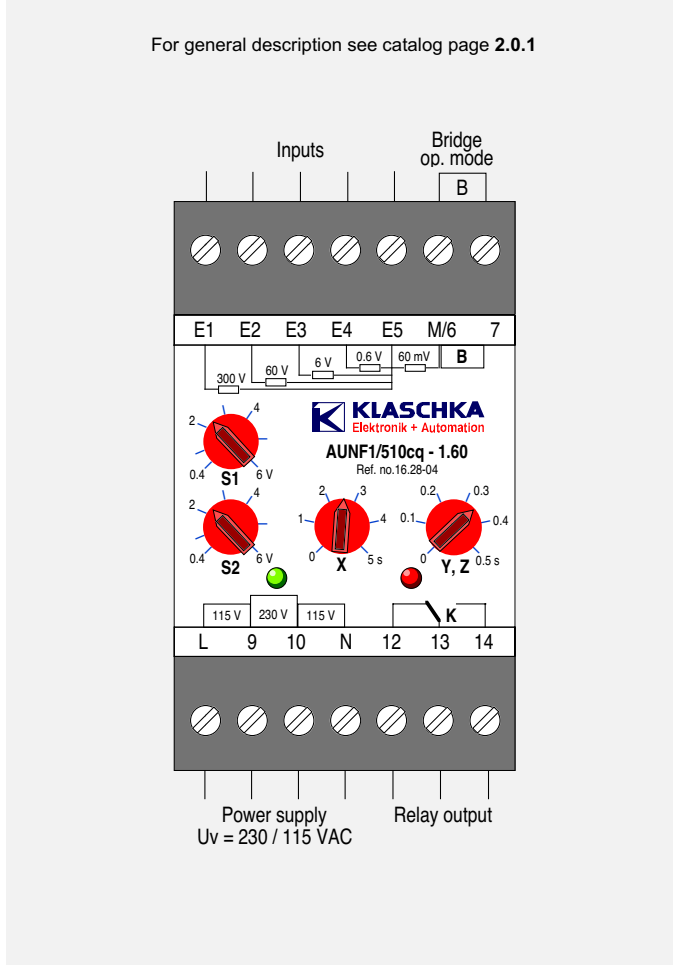
AC and DC voltage measuring relay

with LED display



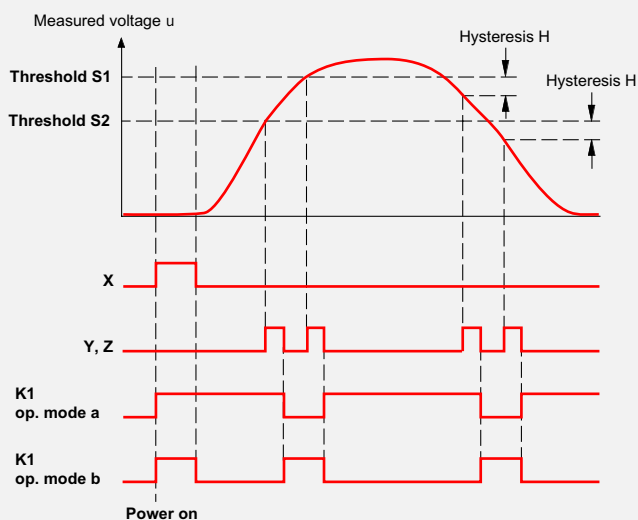
Device	AUNF measuring relay for over- and undervoltages
For the exact type designation and ref. no. please see page 2.0.2	AUNF1/510cq-1.60 - (Uv) 16.28-04-xxx

Technical data	
Line voltage Uv	please indicate when ordering
Alternating voltage	230 / 115, 42, 24 V AC
Tolerance / frequency	± 10 % / 50 ... 60 Hz
Operating temperature / power consumption	0 ... + 60 °C / approx. 4 VA
Housing	.60 (page 0.0.1)
Weight	approx. 300 g
(see table) Input (E)	
5 voltage ranges selectable	
Output	
Relay output	1 changeover switch
Switching voltage	24 ... 250 V AC or DC
Switching current	0.05 ... 6 A
Switching capability AC / switch. capability DC	max. 1.250 VA / max. 50 W
Switching frequency / switching cycles	max. 5000 / h / 30 x 10 ⁶
Response times	
Exceeding threshold / falling below threshold	approx. 25 ms / approx. 100 ms
Indicators	
1 LED green	Power ON
1 LED yellow	Relay pulled-in
Accuracy	
Setting accuracy	± 5 %
Repeatability	± 0.5 %
Temperature dependence	± 0.1 % / °C
Operation mode	
a	without wire bridge B between the terminals 6-7 the relay drops out when exceeding the low threshold S and pulls-in again when exceeding the high one.
b	without wire bridge B between the terminals 6-7 the relay pulls-in when exceeding the low threshold S and drops out again when exceeding the high one.
Hysteresis (H)	adjustable 5 % of S
Start time delay (X)	adjustable up to approx. 5 s
Pull-in (Y) / dropout delay (Z)	adjust. together up to approx. 0.5 s



Input	Range	Input resistance	Overload capability	
			continuous	3 s, 5 % DF
E1	20 ... 300 V	1.1 MΩ	400 V	400 V
E2	4 ... 60 V	220 kΩ	250 V	330 V
E3	0.4 ... 6 V	22 kΩ	80 V	100 V
E4	40 ... 600 mV	2.2 kΩ	25 V	33 V
E5	4 ... 60 mV	220 Ω	8 V	10 V

Pulse diagram

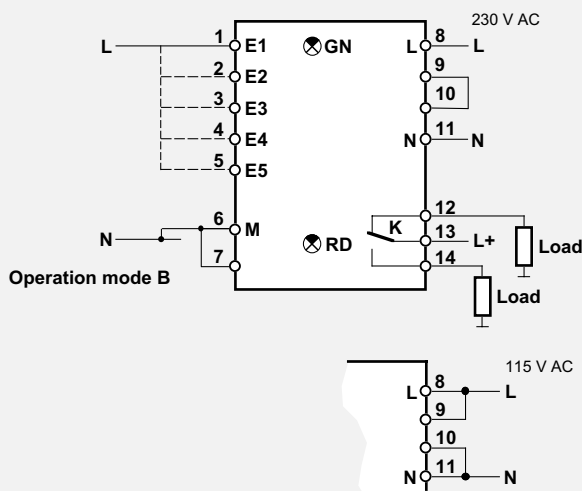


Wiring

AC/DC 2-pole

AC and DC voltage measuring relay

with LED display



Electronic Measuring Relays for Automation

FUR frequency measuring relays for converters



Type FUR1/210ab - 2.60 - (Uv) Ref. no. 17.04-54

Task

Monitors frequencies for exceeding an adjustable threshold S.

Application

Overfrequency monitor for motors driven by static frequency converters or other quasi sinusoidal or rectangular wave power sources.

Function

The motor voltage is connected directly to E0 and E1 (up to 250 V AC or E0 and E2 (up to 500 V AC)). The device can be operated with or without latching behaviour. In latching mode, a recognized overfrequency is reset by means of either an electrically isolated contact between terminals P and E3 or an external voltage (e. g. the output of a PLC) on terminals E3 and M. For operation without latching, terminals P and E3 must be bridged.

Operating mode

Relay drops out when threshold S is exceeded.

Measuring relays for DC and AC voltages

Type	Ref. no.	Page	Frequency range (version)	Operating voltage U_V
FUR1/210ab - 2.60 - 24VDC	17.04-54-006	3.1.1	30 ... 400 Hz (B)	24 V DC
FUR1/210ab - 2.60 - 115/230VAC	17.04-54-007	3.1.1	30 ... 400 Hz (B)	115 / 230 V AC
FUR1/210ab - 2.60 - 24VDC	17.04-54-016	3.1.1	5 ... 100 Hz (A)	24 V DC

FUR frequency measuring relays for converters

Device	FUR frequency measuring relays for converters
Please see on page 3.0.1 for the exact type designation and ref. no.	FUR1/210ab-2.60 - (Uv) (range B) 17.04-54-xxx

Technical Data

Line voltage Uv	please indicate when ordering
Alternating voltage	230 / 115, 42, 24 V AC
Tolerance	± 10 %
Direct voltage	24 V DC
Tolerance range	± 10 %
Ripple voltage	max. 10 %
Power consumption	approx. 4 VA
Housing size	.60 (page 0.0.1)
Weight	approx. 300 g

(see table) **Inputs E1, E2**

Range B (100, 400)	please indicate when ordering
Version A: Threshold S (adjustable)	5 ... 100 Hz
Version B: Threshold S (adjustable)	30 ... 400 kHz
- Fine adjustment	± 5 % of S
Input current	max. 10 mA
Electrical isolation	yes
max. input frequency	800 Hz
min. clock frequency of the converter	3 kHz

Input E3

Signal level lo	0 ... 4 V DC
Signal level hi	18 ... 30 V DC
Input current	approx. 10 mA

Output

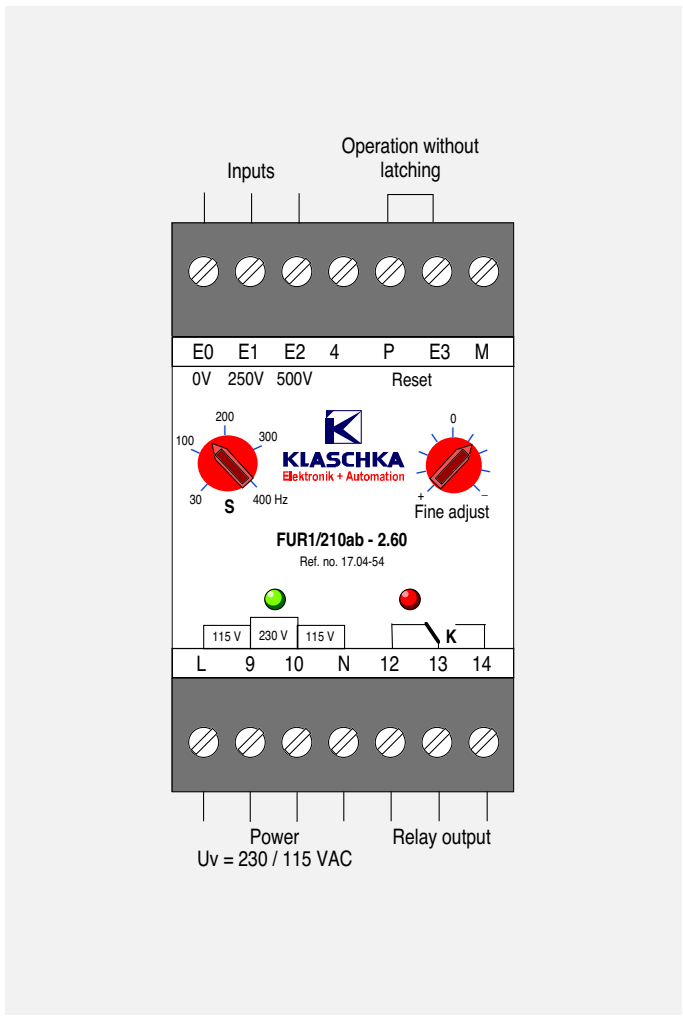
Relay output	1 changeover switch
Switching voltage	24 ... 250 V AC or DC
Switching current	0.05 ... 6 A
Switching capability, AC	max. 1250 VA
Switching capability, DC	max. 50 W
Switching frequency	max. 5.000 / h
Mech. lifetime	30 x 10 ⁶

Indicators

1 green LED	power on
1 red LED	relay pulled-in

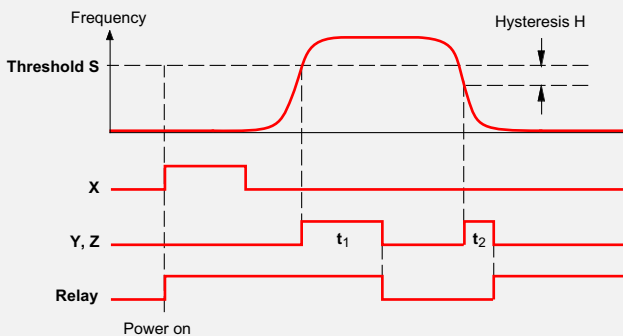
Hysteresis H (operation without fault memory) fixed approx. 10 % of S

Start time delay X	approx. 150 ms
Pull-in delay Y	approx. 50 ms
Dropout delay Z	approx. 150 ms



Input	Input voltage	Input resistance	Range (Version)	Frequency
E1	25 ... 250 V AC	30 kΩ	100 (A)	5 ... 100 Hz
			400 (B)	30 ... 400 Hz
E2	50 ... 500 V AC	60 kΩ	100 (A)	5 ... 100 Hz
			400 (B)	30 ... 400 Hz

Diagram

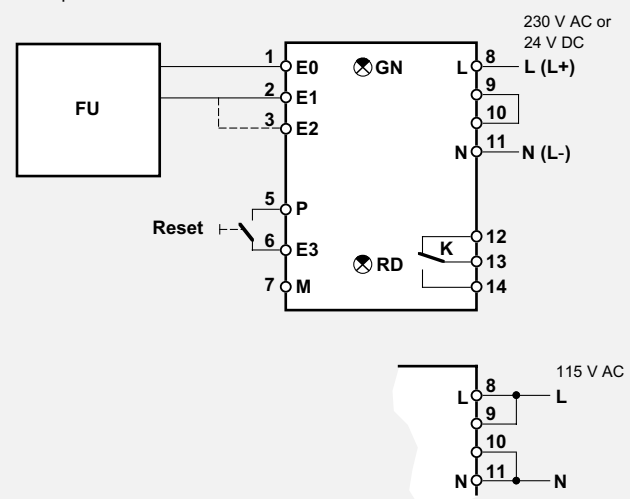


x = Start time delay t₁
y = Pull-in delay t₂
z = Dropout delay t₃

Wiring

AC 2-pole

Frequency and pulse rate measuring relay with LED



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