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Important Note

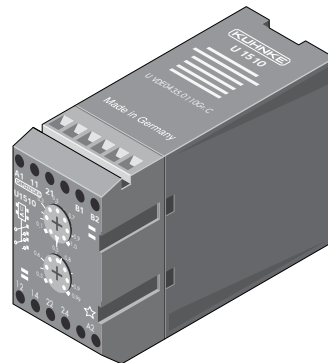
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Monitoring Relay 1500

Single-phase Voltage Monitoring Relay U 1510

- Standard type GL
- Operating range $-25\text{ }^{\circ}\text{C}$ to $+70\text{ }^{\circ}\text{C}$
- DC and AC undervoltage measuring



Order Code

Order code	U	1510.	2	-	10 - 100 mV	230 VAC	50 / 60 Hz
Voltage monitoring relay							
U	U						
Monitored variable							
1510 single-phase-undervoltage		1510.					
Contact arrangement							
2 C/O			2				
Monitored voltage range							
10 - 100 mV					10 - 100 mV		
50 - 500 mV					50 - 500 mV		
0.5 - 5 V					0.5 - 5 V		
5 - 50 V					5 - 50 V		
25 - 250 V					25 - 250 V		
50 - 500 V					50 - 500 V		
Supply voltage							
24 VAC						24 VAC	
110 / 115 VAC						110 / 115 VAC	
230 VAC						230 VAC	
240 VAC						240 VAC	
24 VDC* (no frequency stated)						24 VDC	
Frequency (at AC only)							
50 / 60 Hz							50 / 60 Hz

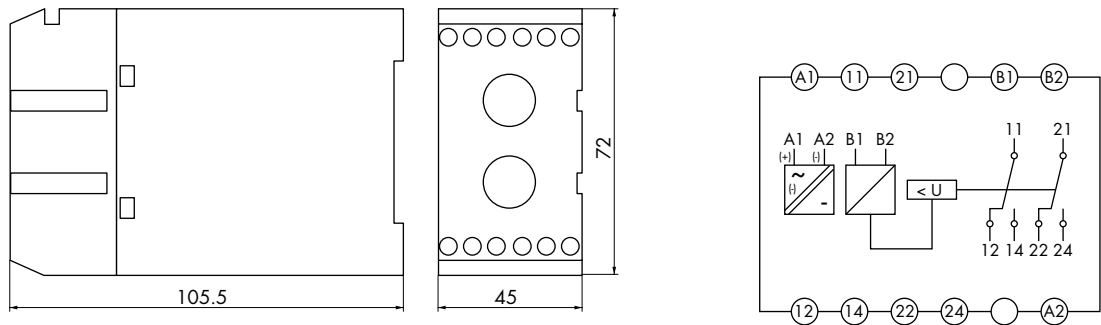
* See page 65 for series resistors for the 24 VDC device (for supply voltages above 24 VDC)

Contact Data

	U 1510
Contact arrangement	2 C/O
Type of contact	Single contact
Contact material	AgCdO
Nominal contact current	5 A
Inrush current	$\leq 5\text{ A}$
Max. switching capacity	1100 VA
Nominal contact voltage	250 VAC



Dimensions, Connection Diagram(s)



General Data

	U 1510
Display	1 green LED lights if the output relay is pulled up
Insulation group VDE 0110b/2.79	C250
Test voltage Auxiliary circuit - output circuit - monitoring circuit	2500 VAC
Vibration resistance	4 g at 25 - 100 Hz (in accordance with GL)
Terminals	Tension relief terminal with head screws metric M 2.6
Terminal torque	max. 0.6 Nm
Terminal capacity solid conductor	2 x 1.5 mm ²
flexible conductor with ferrule	2 x 1.5 mm ²
Operating temperature	-25 °C to +70 °C
Storage temperature	-25 °C to +85 °C
Protection in accordance with DIN 40050	IP40 Housing IP20 Screws IP10 Clamps
Mounting	Rail in accordance with EN50022-35 x 7.5/15 Screw mounting with mounting plate
Weight	approx. 300 g

Auxiliary Circuit

Nominal line voltages	see order code
Nominal line frequency	50 / 60 Hz if AC devices
Voltage ranges	AC = ± 20 % at 100 % ED +50 % for 10 s 10 % ED DC = 24 VDC +25 %/-10 %
Rated power	2.0 VA cos φ = 0.7



Monitoring Relay 1500

Monitoring Circuit


	U 1510		
Pull-in voltage U_{an} adjustable acc. to the upper scale	Input resistance in $k\Omega$	Continuous overload in V	Overload duration 10 s
10 - 100 mV	2	30	50 V
50 - 500 mV	20	100	140 V
0.5 - 5 V	82.5	200	280 V
5 - 50 V	511	500	700 V
25 - 250 V	1000	750	1000 V
50 - 500 V	1000	750	1000 V
Adjustment error	$\leq 4\%$		
Drop-out voltage U_{ab}	Permanently adjustable between 0.5 and $0.99 \times U_{an}$ acc. to the lower scale.		
Temperature dependence	$\leq 0.01\%/K$		
Variance of switching points under identical conditions	$\leq 0.5\%$		
Monitored value	The arithmetic mean value is measured. The scales are adjusted to sinusoidal AC voltage. If just DC voltages without any harmonic contents are measured, the desired switching point should be multiplied by 0.89 and the result set on the scale.		

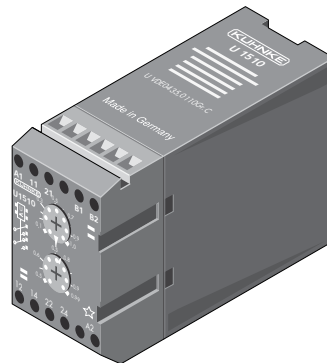
Series Resistance for the 24 VDC Device

Supply voltage U_v in VDC	48 VDC	60 VDC	110 VDC	220 VDC
Series resistance R_v in Ω	470	750	1800	3900
Power rating P of R_v in W	1.23	1.7	4.1	9.8
Max. power P of R_v in W	1.92	2.7	6.4	15.4



Three-phase Voltage Monitoring Relay UD1515 / UD1525 / UD1535

- Standard type 
- Operating range -25 °C to +70 °C
- Monitoring of three-phase systems



Order Code

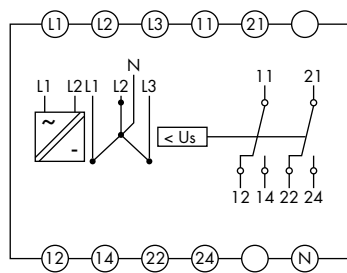
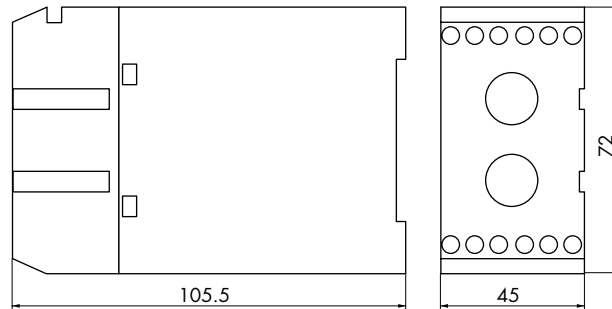
Order code	UD	1525.	2	-	230 / 240 V	50 Hz
Three-phase voltage						
UD	UD					
Monitored variable						
1515 Three-phase undervoltage		1515.				
1525 Asymmetric three-phase angle		1525.				
1535 Three-phase sequence		1535.				
Contact arrangement						
2 C/O			2			
Measuring and supply voltage (Voltage: Phase - N / Phase - Phase)						
57 / 100 V					57 / 100 V	
110 / 190 V					110 / 190 V	
127 / 220 V					127 / 220 V	
230 / 400 V					230 / 400 V	
240 / 415 V					240 / 415 V	
290 / 500 V					290 / 500 V	
Frequency						
50 / 60 Hz						50 / 60 Hz
50 Hz (for UD 1525 only)						50 Hz

Contact Data

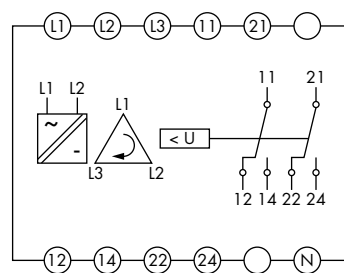
	UD1515 / UD1525 / UD1535
Contact arrangement	2 C/O
Type of contact	Single contact
Contact material	AgCdO
Nominal contact current	5 A
Inrush current	≤ 5 A
Max. switching capacity	1100 VA
Nominal contact voltage	250 VAC



Dimensions, Connection Diagram(s)



UD1515 / UD1525



UD1535

General Data

	UD1515 / UD1525 / UD1535
Display	1 green LED lights if the output relay is pulled up
Insulation group VDE 0110b/2.79	C250
Test voltage	2500 VAC
Monitoring circuit - output circuit	2500 VAC
Vibration resistance	4 g at 25 - 100 Hz (in accordance with GL)
Terminals	Tension relief terminal with head screws metric M 2.6
Terminal torque	max. 0.6 Nm
Terminal capacity	
solid conductor	2 x 1.5 mm ²
flexible conductor with ferrule	2 x 1.5 mm ²
Operating temperature	-25 °C to +70 °C
Storage temperature	-25 °C to +85 °C
Protection in accordance with DIN 40050	IP40 Housing IP20 Screws IP10 Clamps
Mounting	Rail in accordance with EN50022-35 x 7.5/15 Screw mounting with mounting plate
Weight	approx. 300 g

Auxiliary Circuit

- The supply input is internal connected to the monitoring input (L1 and L2).



Monitoring Circuit

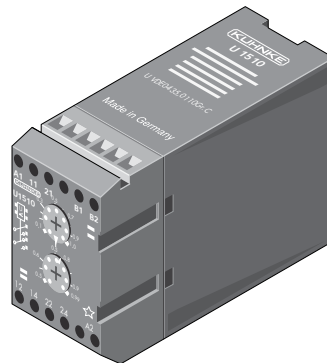
	UD1515	UD1525	UD1535
Nominal line voltages	see order code		
Nominal line frequency	50 / 60 Hz	50 Hz $\pm 0.5\%$	50 / 60 Hz
Overload rating	1.2 x U_N continuous 1.5 x U_N 10 s at 10 % ED		
Rated power	2.4 VA $\cos \varphi \approx 0.7$		
Monitored value	Voltage reading	Phase angle	Phase sequence
Drop-out voltage	U_{ob} permanently adjustable between 0.7 and 1.0 x U_N acc. to the upper scale	AS permanently adjustable between 3° and 30° asymmetry of angles	
Adjustment error	$\leq 1\%$	$\leq 2.5\%$	
Pull-in voltage	U_{an} permanently adjustable between 1.02 and 1.2 x U_{ob} acc. to the lower scale	fixed setting at 1 % approx.	
Adjustment error	$\leq 2.5\%$		
Variance of switching points at the three phases	$\leq 1\%$		
Temperature dependence	$\leq 0.01\%/K$	$\leq 0.01\%/K$	
Variance of switching points under identical conditions	$\leq 0.5\%$	$\leq 0.5\%$	



Monitoring Relay 1500

Single-phase Current Monitoring Relay I1540

- Standard type GL
- Operating range $-25\text{ }^{\circ}\text{C}$ to $+70\text{ }^{\circ}\text{C}$
- Monitoring of undercurrent for DC and AC voltages



Order Code

Order code	I	1540.	2	-	0.1 - 1 A	24 VAC	50 / 60 Hz
Current monitoring relay							
I	I						
Monitored variable							
1540 Single-phase - undercurrent		1540.					
Contact arrangement							
2 C/O			2				
Monitored current range							
2 - 20 mA					2 - 20 mA		
10 - 100 mA					10 - 100 mA		
50 - 500 mA					50 - 500 mA		
0.1 - 1 A					0.1 - 1 A		
0.5 - 5 A					0.5 - 5 A		
1 - 10 A					1 - 10 A		
Supply voltage							
24 VAC						24 VAC	
110 / 115 VAC						110 / 115 VAC	
230 VAC						230 VAC	
240 VAC						240 VAC	
400 VAC						400 VAC	
24 VDC* (no frequency stated)						24 VDC	
Frequency							
50 / 60 Hz							50 / 60 Hz

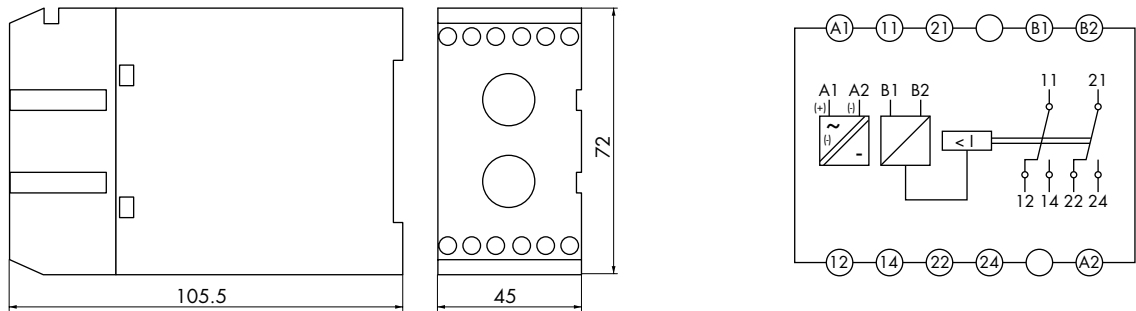
* See page 71 for series resistors for the 24 VDC device (for supply voltages above 24 VDC)

Contact Data

	I1540
Contact arrangement	2 C/O
Type of contact	Single contact
Contact material	AgCdO
Nominal contact current	5 A
Inrush current	$\leq 5\text{ A}$
Max. switching capacity	1100 VA
Nominal contact voltage	250 VAC



Dimensions, Connection Diagram(s)



General Data

	I1540
Display	1 green LED lights if the output relay is pulled up
Insulation group VDE 0110b/2.79	C250
Test voltage	2500 VAC
Auxiliary circuit - output circuit - monitoring circuit	
Vibration resistance	4 g at 25 - 100 Hz (in accordance with GL)
Terminals	Tension relief terminal with head screws metric M 2.6
Terminal torque	max. 0.6 Nm
Terminal capacity	
solid conductor	2 x 1.5 mm ²
flexible conductor with ferrule	2 x 1.5 mm ²
Operating temperature	-25 °C to +70 °C
Storage temperature	-25 °C to +85 °C
Protection in accordance with DIN 40050	IP40 Housing IP20 Screws IP10 Clamps
Mounting	Rail in accordance with EN50022-35 x 7.5/15 Screw mounting with mounting plate
Weight	approx. 300 g

Auxiliary Circuit

Nominal line voltages	see order code
Nominal line frequency	50 / 60 Hz if AC devices
Voltage ranges	AC = ± 20 % at 100 % ED +50 % for 10 s 10 %ED DC = 24 VDC +25 %/-10 %
Rated power	2.0 VA cos φ = 0.7



Monitoring Relay 1500

Monitoring Circuit

	I1540		
Pull-in current I_{an} adjustable acc. to the upper scale	Input resistance in Ω	Continuous overload in A	Overload duration 1 s in A
2 - 20 mA	3	0.5	0.63
10 - 100 mA	1	1	1.25
50 - 500 mA	0.25	2	2.5
0.1 - 1 A	0.11	3	3.7
0.5 - 5 A	0.01	10	12.25
1 - 10 A	0.005	15	15
Adjustment error	$\leq 4\%$		
Drop-out current I_{ab}	Permanently adjustable between $0.5 - 0.99 \times I_{an}$ acc. to the lower scale		
Temperature dependence	$\leq 0.01\%/K$		
Variance of switching points under identical conditions	$\leq 0.5\%$		
Monitored value	The arithmetic mean value is measured. The scales are adjusted to sinusoidal AC current. If just DC currents without any harmonic contents are measured, the desired switching point should be multiplied by 0.89 and the result set on the scale.		

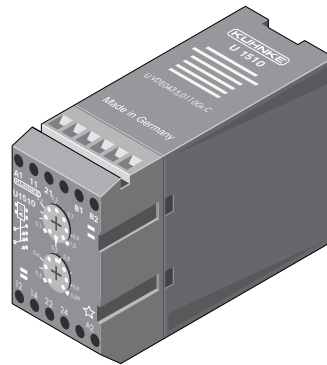
Series Resistance for the 24 VDC Device

Supply voltage U_v in VDC	48 VDC	60 VDC	110 VDC	220 VDC
Series resistance R_v in Ω	470	750	1800	3900
Power rating P of R_v in W	1.23	1.7	4.1	9.8
Max. power P of R_v in W	1.92	2.7	6.4	15.4



Frequency Monitoring Relay with Auxiliary Voltage F1570

- Operating range -25 °C to +70 °C
- Monitoring of underfrequency in AC current systems



Order Code

Order code	F	1570.	2	-	10 - 30 Hz	24 VAC	50 / 60 Hz
Frequency-monitoring relay							
F	F						
Monitored variable							
1570 underfrequency		1570.					
Contact arrangement							
1 C/O / 1 N/O			2				
Monitored frequency range							
10 - 30 Hz					10 - 30 Hz		
20 - 50 Hz					20 - 50 Hz		
40 - 65 Hz					40 - 65 Hz		
50 - 100 Hz					50 - 100 Hz		
Supply voltage							
24 VAC						24 VAC	
110 / 115 VAC						110 / 115 VAC	
230 VAC						230 VAC	
240 VAC						240 VAC	
400 VAC						400 VAC	
24 VDC* (no frequency stated)						24 VDC	
Frequency							
50 / 60 Hz							50 / 60 Hz

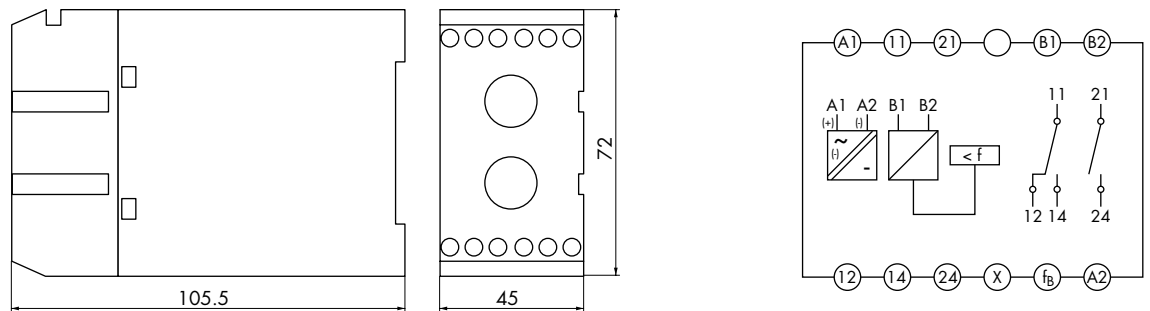
* See page 74 for series resistors for the 24 VDC device (for supply voltages above 24 VDC)

Contact Data

	F1570
Contact arrangement	1 C/O / 1 N/O
Type of contact	Single contact
Contact material	AgCdO
Nominal contact current	5 A
Inrush current	≤ 5 A
Max. switching capacity	1100 VA
Nominal contact voltage	250 VAC



Dimensions, Connection Diagram(s)



General Data

	F1570
Display	1 green LED lights if the output relay is pulled up
Insulation group VDE 0110b/2.79	C250
Test voltage	2500 VAC
Auxiliary circuit - output circuit - monitoring circuit	
Vibration resistance	4 g at 25 - 100 Hz (in accordance with GI)
Terminals	Tension relief terminal with head screws metric M 2.6
Terminal torque	max. 0.6 Nm
Terminal capacity	
solid conductor	2 x 1.5 mm ²
flexible conductor with ferrule	2 x 1.5 mm ²
Operating temperature	-25 °C to +70 °C
Storage temperature	-25 °C to +85 °C
Protection in accordance with DIN 40050	IP40 Housing IP20 Screws IP10 Clamps
Mounting	Rail EN50022-35 x 7.5/15 Screw mounting with mounting plate
Weight	approx. 300 g

Auxiliary Circuit

Nominal line voltages	see order code
Nominal line frequency	50 / 60 Hz if AC devices
Voltage ranges	AC = ± 20 % at 100 % ED +50 % for 10 s 10 % ED DC = 24 VDC +25 %/-10 %
Rated power	2.0 VA cos φ ≈ 0.7



Monitoring Circuit

	F1570	
Pull-in frequency f_{ab} adjustable acc. to the upper scale	Input resistance in $M\Omega$	Limiting frequency in Hz
10 - 30 Hz	1	120
20 - 50 Hz	1	120
40 - 65 Hz	1	120
50 - 100 Hz	1	120
Adjustment error	$\leq 2.5\%$	
Drop-out frequency f_{an}	Permanently adjustable between 1.01 and 1.1 x f_{ab} acc. to the lower scale	
Temperature dependence	$\leq 0.02\%/K$	
Variance of switching points under identical conditions	$\leq 0.5\%$	
Monitored value (10 - 500 V_{eff})	<ul style="list-style-type: none"> • Operation without bridge x-f: frequencies above the set pull-in value energise the output relay. The output relay is de-energised when the frequency falls below the set drop-out value. • Operation with bridge x-f: the output relay pulls in if the measuring voltage is above 8 V. The output relay remains pulled in if the voltage is applied at a frequency above the set switching point. Other functions same as operation without bridge x-f. 	

Series Resistance for the 24 VDC Device

Supply voltage U_v in VDC	48 VDC	60 VDC	110 VDC	220 VDC
Series resistance R_v in Ω	470	750	1800	3900
Power rating P of R_v in W	1.23	1.7	4.1	9.8
Max. power P of R_v in W	1.92	2.7	6.4	15.4