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### Important Note

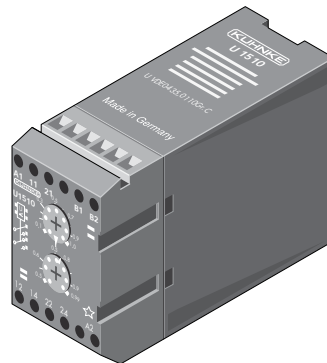
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## Single-phase Voltage Monitoring Relay U 1510

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



### Order Code

<b>Order code</b>	<b>U</b>	<b>1510.</b>	<b>2</b>	<b>-</b>	<b>10 - 100 mV</b>	<b>230 VAC</b>	<b>50 / 60 Hz</b>
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

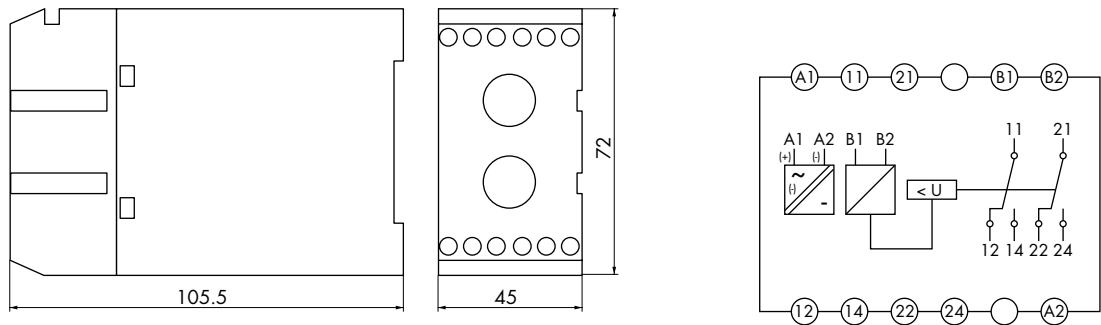
\* See page 65 for series resistors for the 24 VDC device (for supply voltages above 24 VDC)

### Contact Data

	<b>U 1510</b>
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

<b>U 1510</b>	
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 <sup>2</sup>
flexible conductor with ferrule	2 x 1.5 mm <sup>2</sup>
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 $\varphi$ = 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.		

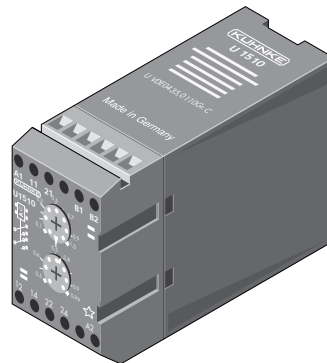
## Series Resistance for the 24 VDC Device

Supply voltage $U_v$ in VDC	48 VDC	60 VDC	110 VDC	220 VDC
Series resistance $R_v$ in $\Omega$	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

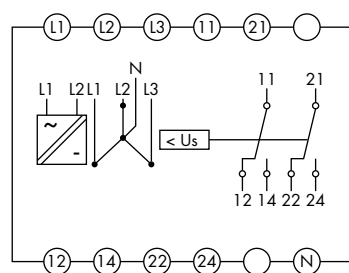
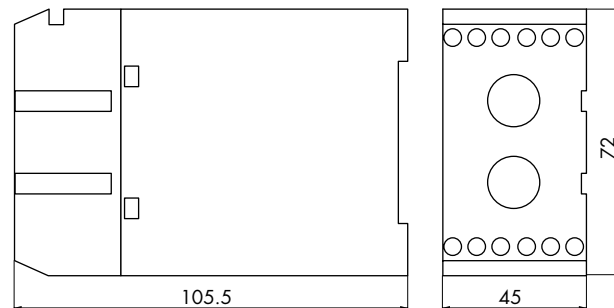
<b>Order code</b>	<b>UD</b>	<b>1525.</b>	<b>2</b>	<b>-</b>	<b>230 / 240 V</b>	<b>50 Hz</b>
Three-phase voltage						
UD	UD					
Monitored variable						
1515 Three-phase undervoltage		1515.				
1525 Asymmetric three-phase angle		1525.				
1535 Three-phase sequence		1535.				
Contact arrangement						
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

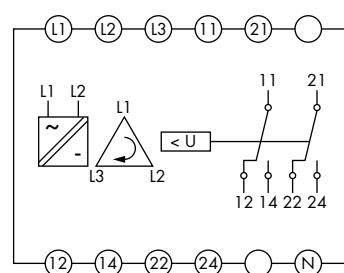
	<b>UD1515 / UD1525 / UD1535</b>
Contact arrangement	2 C/O
Type of contact	Single contact
Contact material	AgCdO
Nominal contact current	5 A
Inrush current	≤ 5 A
Max. switching capacity	1100 VA
Nominal contact voltage	250 VAC



## 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 <sup>2</sup>
flexible conductor with ferrule	2 x 1.5 mm <sup>2</sup>
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

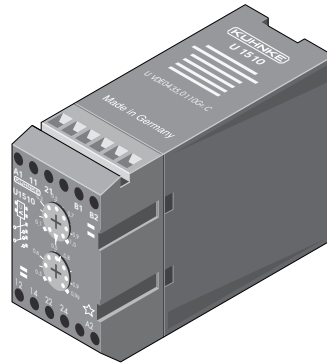
	UD1515	UD1525	UD1535
Nominal line voltages	see order code		
Nominal line frequency	50 / 60 Hz	50 Hz $\pm 0.5\%$	50 / 60 Hz
Overload rating	1.2 x $U_N$ continuous 1.5 x $U_N$ 10 s at 10 % ED		
Rated power	2.4 VA $\cos \varphi = 0.7$		
Monitored value	Voltage reading	Phase angle	Phase sequence
Drop-out 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  $\text{GL}$
- 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

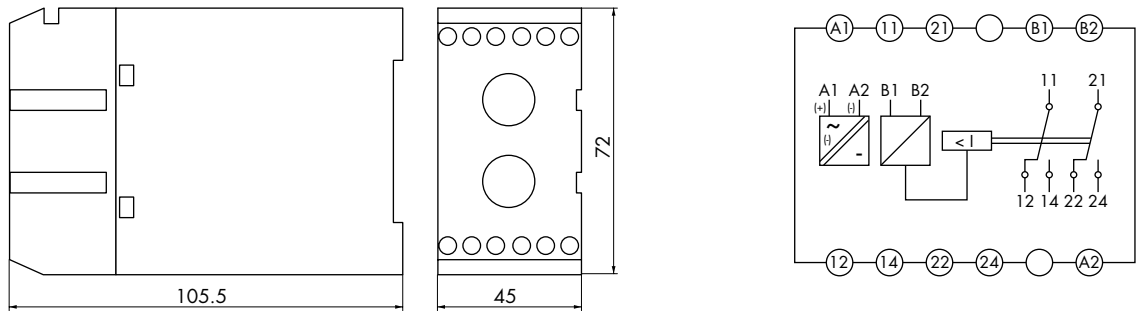
\* See page 71 for series resistors for the 24 VDC device (for supply voltages above 24 VDC)

### 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

	<b>I1540</b>
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 <sup>2</sup>
flexible conductor with ferrule	2 x 1.5 mm <sup>2</sup>
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 $\Omega$	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 x $I_{an}$ 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.		

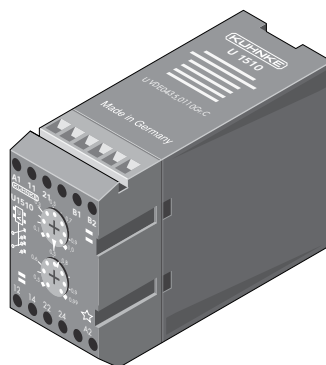
## Series Resistance for the 24 VDC Device

Supply voltage $U_v$ in VDC	48 VDC	60 VDC	110 VDC	220 VDC
Series resistance $R_v$ in $\Omega$	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

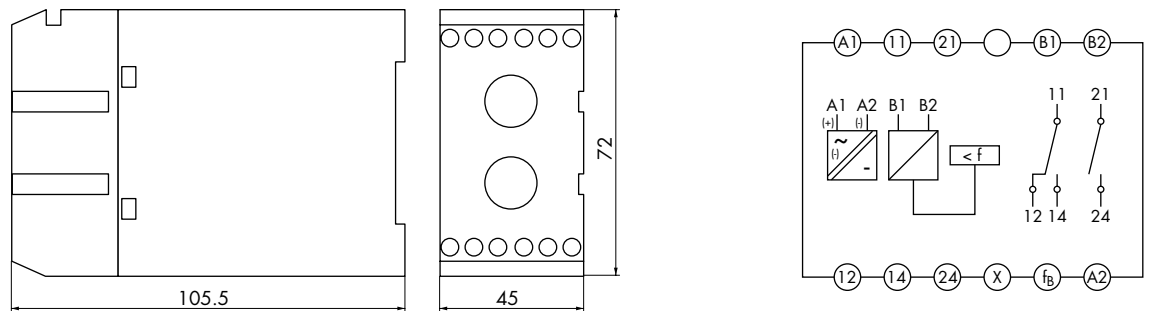
\* See page 74 for series resistors for the 24 VDC device (for supply voltages above 24 VDC)

## 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

	<b>F1570</b>
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 <sup>2</sup>
flexible conductor with ferrule	2 x 1.5 mm <sup>2</sup>
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 $1.1 \times f_{ab}$ 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"> <li>• 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.</li> <li>• 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.</li> </ul>	

## 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 $\Omega$	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