WRL Thermal Overload Relays

Reset + Multifunction Key

The relay has a Reset button and on the same key four functions, as follows:
A - Automatic reset function only. The stop/test function is not allowed;
AUTO - Automatic reset function and stop/test function;
HAND - Manual reset function and stop/test function;
H - Manual reset function only. The stop/test function is not allowed.

Functions	H	HAND	AUTO	A
Relay reset	Manual[1)]	Manual[1)]	Automatic	Automatic
Auxiliary contact opening test 95-96 (NC)	Function is locked	Allows test/stop	Allows test/stop	Function is locked
Auxiliary contact opening test 97-98 (NO)	Function is locked	Allows test/stop	Allows test/stop	Function is locked

Note: 1) Allow cooling for a short time before resetting the relay.

Short-circuit Protection

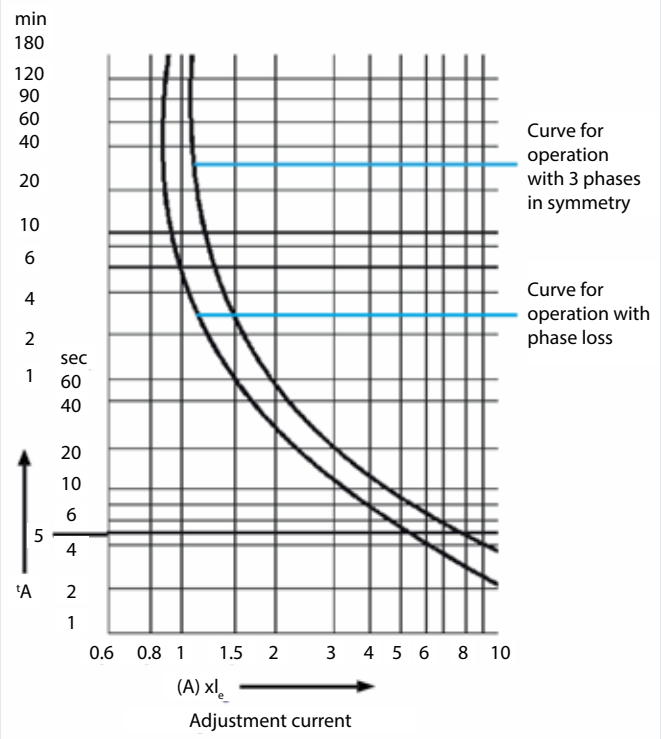
Fuses or circuit breakers must be used for short circuit protection.

Sensitivity Against Phase Loss

According to IEC/EN 60947-4-1, when two poles of the relay have overloads of 15%, and one of the poles have zero current, the overload relay must trip/open in less than 2 hours.
For effective protection against phase loss, specific products must be considered for this function, providing detection in a few seconds from a phase failure.

Characteristic Tripping Curve

The characteristic tripping curve is the ratio between time and tripping current, in the form of multiples of the adjustment current for symmetrical three-phase loads operating from the cold state. The tripping current limits on the WRL bimetallic overload relays for symmetrical three-phase loads are between 105% and 120% of the adjustment current. The characteristic tripping curve of an WRL overload relay is valid when all the three phases are under the same current strength.
In cases of phase loss, the tripping time tends to be longer or a higher current value will be needed to trigger the mechanism. This required higher current value may result in damage to the load if it remains for a long time.
To avoid that, the WRL overload protection relays have been developed with technology that makes them sensitive to phase loss, accelerating the action of the two active phases on the tripping mechanism, thus maintaining the characteristics of the appropriate tripping curve.
The following graph shows the characteristic tripping curves with the average values of the tolerance range, considering an ambient temperature of 20 °C and starting from the cold state. These curves show the tripping time in relation to the rated current in operating conditions with three and two phases.
For a different operating temperature, the thermal relay tripping time is reduced to approximately 25% of that shown.



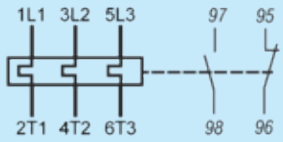
WRL Thermal Overload Relays

Selection Table

WRL27-1D

WRL67-2D

WRL117-1D

Direct mounting	Adjustment (A)	Diagram	Reference	Ref.No.	Weight (kg)
WCL9-45	0.28-0.4		WRL27-1D3-D004	W605050	0.165
WCL9-45	0.4-0.63		WRL27-1D3-C063	W605051	
WCL9-45	0.56-0.8		WRL27-1D3-D008	W605052	
WCL9-45	0.8-1.2		WRL27-1D3-D012	W605053	
WCL9-45	1.2-1.8		WRL27-1D3-D018	W605054	
WCL9-45	1.8-2.8		WRL27-1D3-D028	W605055	
WCL9-45	2.8-4		WRL27-1D3-U004	W605056	
WCL9-45	4-6.3		WRL27-1D3-D063	W605057	
WCL9-45	5.6-8		WRL27-1D3-U008	W605058	
WCL9-45	7-10		WRL27-1D3-U010	W605059	
WCL9-45	8-12.5		WRL27-1D3-D125	W605060	
WCL9-45	10-15		WRL27-1D3-U015	W605061	
WCL9-45	11-17		WRL27-1D3-U017	W605062	
WCL9-45	15-23		WRL27-1D3-U023	W605063	
WCL9-45	22-32		WRL27-1D3-U032	W605064	
WCL9-45	32-40		WRL27-1D3-U040	W605065	
WCL9-45	36-45		WRL27-1D3-U045	W605066	
WCL50-95	32-50		WRL27-1D3-U050	W605067	0.320
WCL50-95	40-57		WRL27-1D3-U057	W605068	
WCL50-95	50-63		WRL27-1D3-U063	W605069	
WCL50-95	57-70		WRL27-1D3-U070	W605070	
WCL50-95	63-80		WRL27-1D3-U080	W605071	
WCL50-95	80-100		WRL27-1D3-U100	W605072	
WCL110	75-97		WRL27-1D3-U097	W605073	0.490
WCL110	90-112		WRL27-1D3-U112	W605074	

Accessory

Individual Mounting Base - WBFD

Illustrative picture	Function	Use with relays	Reference	Ref.No.	Weight (kg)
	Relay mounting with screws or on a 35 mm DIN rail	WRL27-1D	WBFL27-1D	W605075	0.050
		WRL67-2D	WBFL67-2D	W605076	0.095
		WRL117-1D	WBFL117-1D	W605077	0.210

WRL Thermal Overload Relays

Technical Data

Basic Data

Model			WRL27	WRL67	WRL117
Compliance with the standards			IEC/EN 60947-1		
Frequency limits		(Hz)	25...400		
Use in direct current			Yes		
Maximum frequency of operation cycles		(operation./h)	15		
Degree of protection (IEC/EN 60529)	Main terminals		IP10		
	Auxiliary contacts		IP10		
	Other regions		IP20		
Resistance to mechanical shocks (IEC/EN 60068-2-27 - 1/2 sine wave)		(g/ms)	10/11		
Ambient temperature	Transport and storage		-50 °C...+80 °C		
	Operation		-20 °C...+70 °C		
	Temperature compensation		-20 °C...+60 °C		
Maximum operation altitude without modification in the rated values			2,000 m		

Main Contacts

Models			WRL27	WRL67	WRL117
Rated insulation voltage U_i (pollution degree 3)	IEC/EN 60947-4-1	(V)	690		
Rated impulse withstand voltage U_{imp} (IEC/EN 60947-1)		(kV)	6		
Current settings/maximum fuse (gL/gG)		(A)	0.28-0.4 / 2 0.4-0.63 / 2 0.56-0.8 / 2 0.8-1.2 / 4 1.2-1.8 / 6 1.8-2.8 / 6 2.8-4 / 10 4-6.3 / 16 5.6-8 / 20 7-10 / 25 8-12.5 / 25 10-15 / 35 11-17 / 40 15-23 / 50 22-32 / 63 32-40 / 90 36-45 / 100	32-50 / 100 40-57 / 100 50-63 / 100 57-70 / 125 63-80 / 125 80-100 / 225	75-97 / 225 90-112 / 250
Average power dissipation per pole		(W)	≤4	≤8	≤12

Weather Conditions

For temperatures above +60 °C to +80 °C, a ratio-corrector factor should be used, according to the table below.

Ambient temperature	Current correction factor
65°C	0.94
70°C	0.87
75°C	0.81
80°C	0.73

Altitude

Up to an altitude of 2,000 m, the relays do not undergo any changes in their specified performance.
As the altitude increases, the atmospheric properties vary in terms of dielectric withstand, cooling capacity and pressure.

Altitude/m	Current correction factor I_u/A	Voltage correction factor U_e/V
2,000	1 x In	690
3,000	0.96 x In	550
4,000	0.93 x In	480
5,000	0.9 x In	420

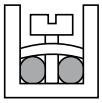
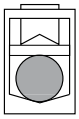
WRL Thermal Overload Relays

Technical data

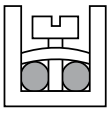
Auxiliary Circuit

Models			WRL27, WRL67, WRL117
Compliance with the standards			IEC/EN 60947-4-1
Rated insulation voltage U_i (pollution degree 3)	IEC	(V)	690
Rated operational voltage U_e	IEC	(V)	690
Conventional thermal current I_{th} (θ ≤55 °C)		(A)	6
Rated operational current I_e			
AC-14/AC-15 (IEC/EN 60947-5-1)	24 V	(A)	4
	60 V	(A)	3.5
	125 V	(A)	3
	230 V	(A)	2
	400 V	(A)	1.5
	500 V	(A)	0.5
	690 V	(A)	0.3
DC-13/DC-14 (IEC/EN 60947-5-1)	24 V	(A)	1
	60 V	(A)	0.5
	110 V	(A)	0.25
	220 V	(A)	0.1
Short circuit protection with fuse (gL/gG)		(A)	6
Minimum voltage/permissible current (IEC/EN 60947-5-4)			17 V / 5 mA

Terminal Capacity and Tightening Torque - Power Circuit

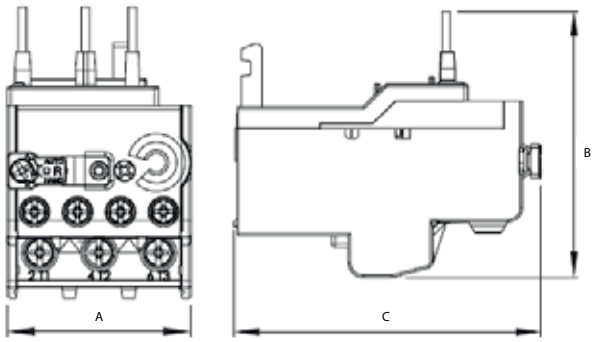
Models			WRL27	WBFL27D	WRL67	WBFL67	WRL117	WBFL117
Mounting system screw type			M4 Slot / Phillip	M4 Slot / Phillips	M6 Slot / Phillips	M6 Slot / Phillips	M10 Socket screw	M10 Socket screw
Conductor cross-section								
Flexible conductor	(mm^2)		-	1.5...10	-	-	-	-
Conductor with terminal/solid wire	(mm^2)		-	1.5...6.0	-	-	-	-
Wire / cable AWG			-	16...8	-	-	-	-
Torque	(Nm)		-	2.3	-	-	-	-
Flexible conductor	(mm^2)		1.5...10	-	-	-	-	-
Conductor with terminal/solid wire	(mm^2)		1.5...6.0	-	-	-	-	-
Wire / cable AWG			16...8	-	-	-	-	-
Torque	(Nm)		2.3	-	-	-	-	-
Conductor connection on bottom								
Flexible conductor	(mm^2)		-	-	6...35	6...35	25...35	25...35
Conductor with terminal/solid wire	(mm^2)		-	-	6...35	6...35	25...35	25...35
Flexible conductor	(mm^2)		-	-	6...35	6...35	25...35	25...35
Wire / cable AWG			-	-				
Torque	(Nm)		-	-	4	4	6	6

Terminal Capacity and Tightening Torque - Auxiliary Contacts

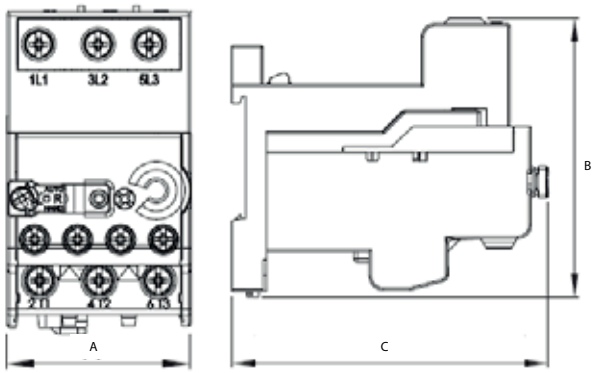
Models			WRL27, WRL67, WRL117
Mounting system screw type			M3.5 Slot / Phillips
Conductor cross-section			
Wire / cable with or without terminal	(mm^2)		2x 1...2.5
Torque	(Nm)		1.5

WRL Thermal Overload Relays

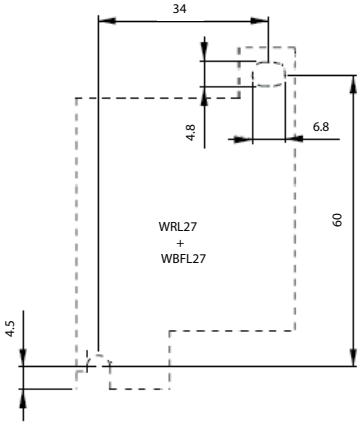
Dimensions (mm)

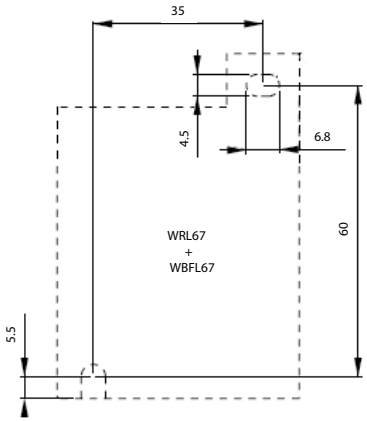


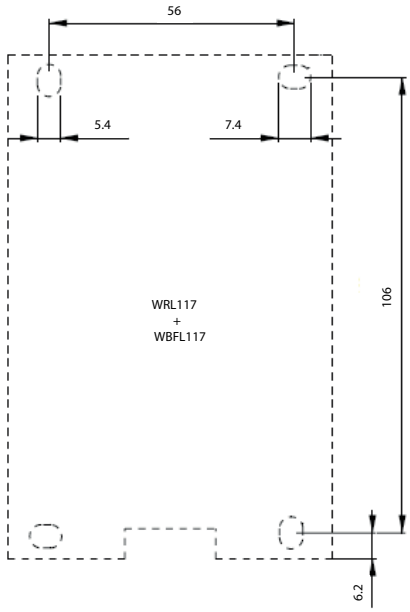
	WRL27-1D	WRL67-2D	WRL117-1D
A	45.0	50.0	75.0
B	71.5	81.5	99.5
C	83.5	106.5	98.8



	WRL27-1D + WBFL27-1D	WRL67-2D + WBFL67-2D	WRL117-1D + WBFL117-1D
A	45.0	50.0	75.0
B	80.0	81.5	116.4
C	92.5	106.5	106.2



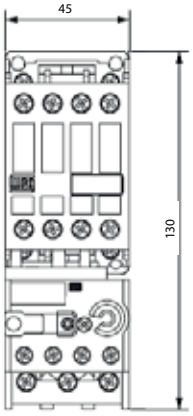


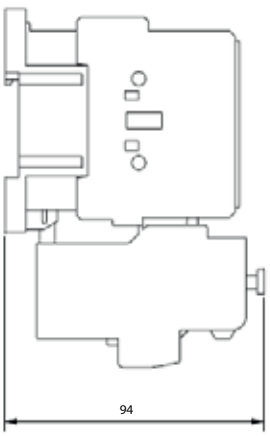


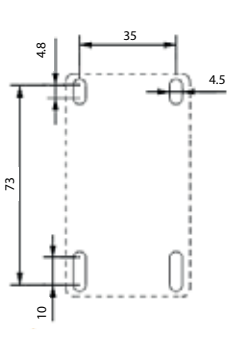
WRL Thermal Overload Relays

Dimensions (mm)

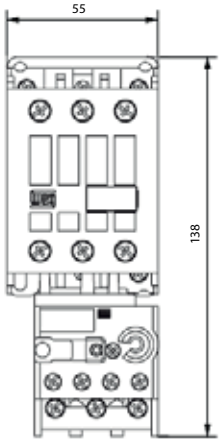
WCL9...32 + WRL27-1D

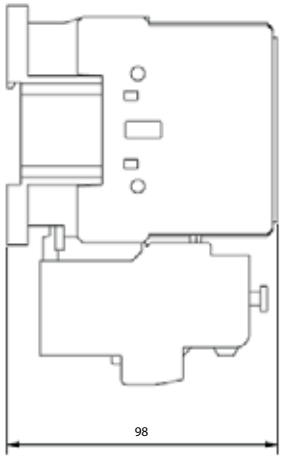


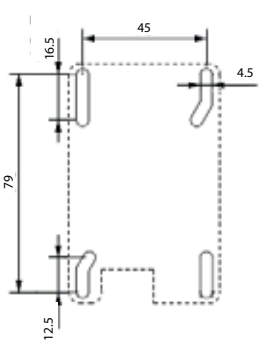




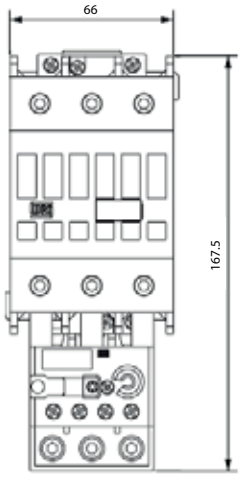
WCL40...45 + WRL27-1D

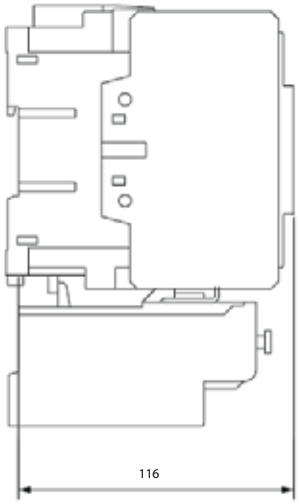


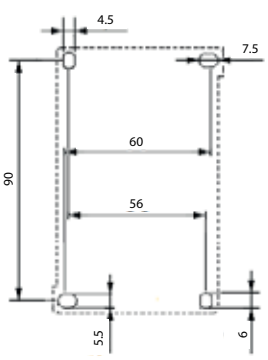




WCL50...95 + WRL67-2D







WCL110 + WRL117-1D