

# Overloads

## Solid-State Overload Relays

### WR-E

The new WR\_E Solid State Overload relays are developed with cutting edge technology according to the most demanding standards worldwide. With its wide current/AMP setting; the WR\_E OL Relay can be used for protection of electric motors of different power ratings. The benefit is versatility and flexibility for manufacturers due to the possibility of standardization of control panels . This Solid State Overload Relay can be directly mounted on WESTINGHOUSE Contactors (WCM and WBC lines) providing very reliable and flexible motor starter units . The WR\_E counts on two independent and highly reliable built in auxiliary contacts that assure the motor is switched off when a failure occurs.

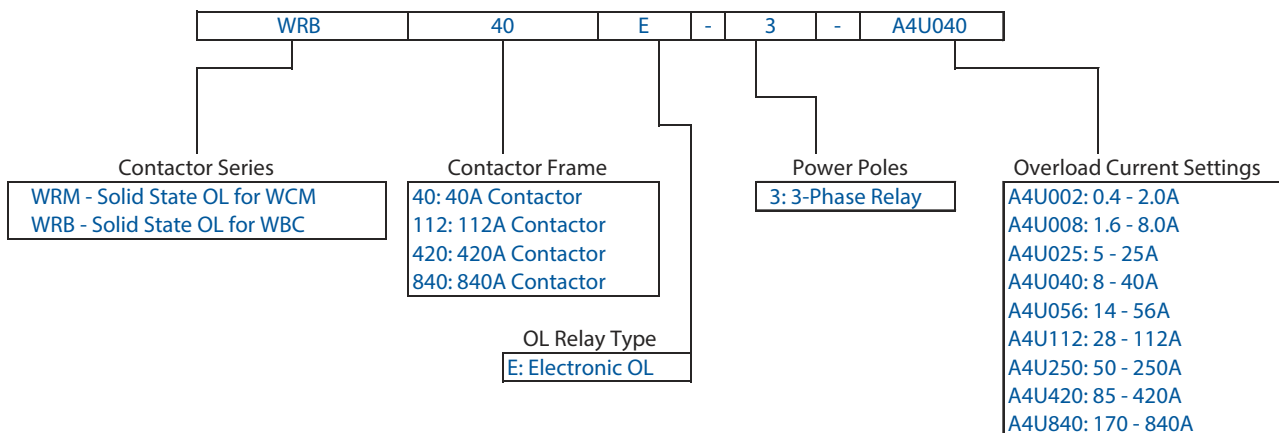
#### Standard Features:

- 3-pole solid state overload relays with adjustable trip class: 10, 20 and 30
- Self-powered
- Wide adjustment range (5:1)
- Thermal memory
- Phase loss protection (less than 5 seconds)
- Phase unbalance protection (>40% between phases)
- Temperature compensated (-20 °C up to +60 °C)
- Manual or automatic reset modes
- Direct mounting on WBC9 ... 38 and WCM9 ... 105 contactors
- Separate mounting is possible with accessories  
1NO + 1NC built in auxiliary contacts



UL File No . E189202

#### Solid-State Overload Relay Catalog Number Sequence



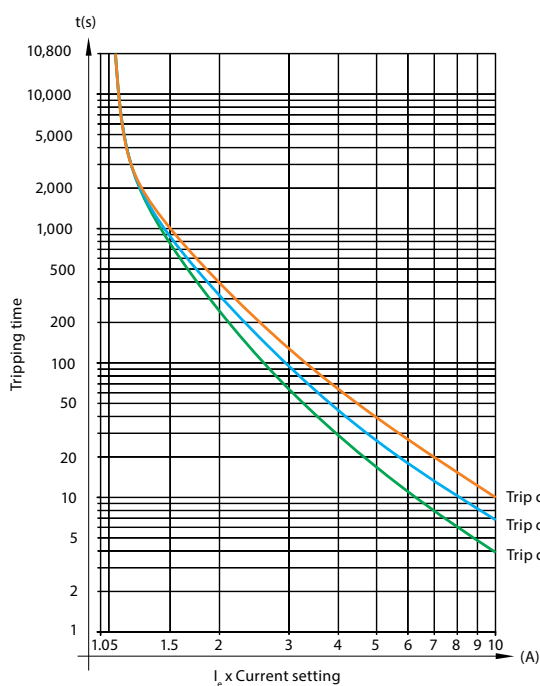
## Solid-State Overload Relays

### Suitable for Great Variety of Applications

The solid-state overload relays WR\_E are suitable to protect motors in a wide range of industrial applications including those where long starting time is required. This way, motors on low, medium or heavy duty applications can be properly protected just by selecting the proper trip class (10, 20 or 30 according to IEC 60947-4-1) in the DIP-switches.

Additionally, the microprocessed electronic circuits of WR\_E are temperature compensated according to IEC 60947-4-1, which means that throughout the temperature range of -20 °C up to +60 °C, the tripping point is not affected and it performs consistently without undesirable tripping.

The WR\_E also features thermal memory which assures that the heating and cooling effects of motors are modeled and proper protection is guaranteed even after downtime periods.



Trip class	Multiples of current setting			
	1.05 x I <sub>r</sub>	1.2 x I <sub>r</sub>	1.5 x I <sub>r</sub>	7.2 x I <sub>r</sub>
10	-	Tp < 2h	Tp < 4min	4 < Tp ≤ 10s
20	-	Tp < 2h	Tp < 8min	6 < Tp ≤ 20s
30	-	Tp < 2h	Tp < 12min	9 < Tp ≤ 30s

IEC 60947-4-1



Trip class dip-switch

# Overloads

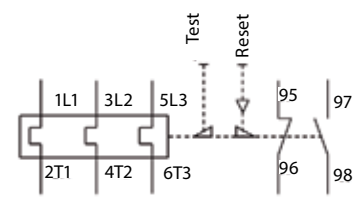
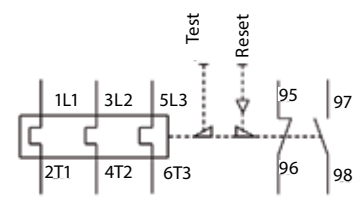
## Solid-State Overload Relays

### WR\_E Solid-State Overload Relays from 0.4 up to 840 A



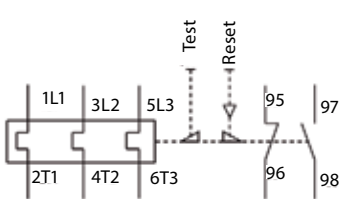
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WCM CONTACTOR

For direct mounting on contactors	Current range A	Diagram	Max fuse (gL/gG) A	Catalog Number	Weight kg	Ref.No.	Multiplier	
WBC9...38	0.4...2		16	WRB40E-3-A4U002	0.250		Z2	
WBC9...38	1.6...8		32	WRB40E-3-A4U008				
WBC9...38	5...25		63	WRB40E-3-A4U025				
WBC9...38	8...40		125	WRB40E-3-A4U040	0.250			
WCM9...40	0.4...2			16	WRM40E-3-A4U002	0.250		
WCM9...40	1.6...8			32	WRM40E-3-A4U008			
WCM9...40	5...25			63	WRM40E-3-A4U025			
WCM9...40	8...40			125	WRM40E-3-A4U040	0.918		
WCM50...105	14...56			160	WRM112E-3-A4U056	0.918		
WCM50...105	28...112			250	WRM112E-3-A4U112	0.918		

Note: Not to be used in single-phase applications.



For separate mounting or by connector links <sup>1)</sup>	Current range A	Diagram	Max fuse (gL/gG) A	Catalog Number	Weight kg	Ref.No.	Multiplier
WCM112...500	50...250		500	WRM420E-3-A4U250	2,520		Z2
	85...420		710	WRM420E-3-A4U420			
WCM150...800	170...840		1,250	WRM840E-3-A4U840	4,150		

Note: Not to be used in single-phase applications.

Note: 1) WRM840E model allows two different types of connection to contactor:



- a) By connecting the contactor cables to relay busbars;
- b) By removing the relay busbars and using the Ø32 mm window for the passage of the contactor cables.

## Overloads


### Solid-State Overload Relays

#### Accessories


##### Mounting Kit

Image	For use with relays	Description	Catalog Number	Weight kg	Ref.No.	Multiplier
	WRM40E		WBF27D	0.050		Z2
	WRB40E		WBF27D-2D			
	WRM112E	Enables the overload relay to be mounted directly to a panel via screws or 35 mm DIN rail	WBF112	0.230		


##### Connector Links for Direct Mounting of Overload Relay on Contactor

Image	For use with relays	For use with contactors	Catalog Number	Weight kg	Ref.No.	Multiplier
	WRM112E	WCM112/150	WGA117D	0.135		Z2
	WRM420E	WCM150	WGA317-1D	0.250		
		WCM180	WGA317-2D	0.270		
		WCM250/300	WGA317-3D	0.630		
		WCM400	WGA317-10D	0.500		

##### Phase Barriers

Image	For use with relays	Description	Catalog Number	Weight kg	Ref.No.	Multiplier
	WRM420E	Contains 1 set of plastic insulators (top / bottom) and fixing screws to be used where the overload relay power terminals external dimension exceed the busbar external dimension	WBIR317	0.044		Z2

##### Reset Pushbutton with Shaft

Image	For use with relays	Description	Catalog Number	Weight kg	Ref.No.	Multiplier
	WR_E	Blue Flush pushbutton - Engraved Reset - with shaft. Length: max. 250 mm and min. 22.5 mm	WCS-WBHF437	0.032		Z2

## Overloads

### Solid-State Overload Relays

#### Technical Data

##### General Data

Product model			WRM40E / WRB40E	WRM112E	WRM420E	WRM840E
Standards			IEC 60947-4-1, IEC 60947-5-1, IEC 60947-1, UL 60947-1, UL 60947-4-1A and UL 508			
Rated insulation voltage U (pollution degree 3)	IEC 60947-4-1	(V)	690		100	
	UL, CSA	(V)	600			
Rated impulse withstand voltage U <sub>imp</sub> (IEC 60947-1)		(kV)	6		8	
Rated operational frequency (sinusoidal networks)		(Hz)	50/60			
Suitable for use	Three phase loads		Yes			
	Single phase / two phase loads		No			
	DC current loads		No			
Trip class (IEC 60947-4-1)			10, 20 or 30 - selectable			
Additional featured protections	Phase loss		Yes / less than <5s			
	Phase unbalance		Yes / >40%			
Reset	Manual / minimum downtime for reset		Yes / instantaneous			
	Automatic / minimum downtime for reset		Yes / ≥90s			
Maximum operation per hour		(ops./h)	30			
Protection degree (IEC 60529)	Main contacts		IP10		IP00	
	Auxiliary contacts		IP20			
Mounting			1)		2)	
Mechanical shock resistance - 1/2 sinusoid			15 g / 11ms			
Vibration resistance (IEC 60068-2-6)			6 g / 30...300 Hz			
Ambient temperature	Transport and storage		-50 °C...+80 °C			
	Operating		-20 °C...+60 °C			
	Temperature compensation		-20 °C...+60 °C			
Altitude			2,000 m			

Notes: 1) Direct mounting on contactor or directly on the panel via screws or 35 mm DIN rail when using the mounting kit accessory (WBF27D and WBF112)  
2) Direct mounting on contactor when using the Connector Link WGA117 / WGA317 accessory or directly on the panel via screws.

##### Main Contacts

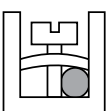
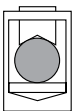
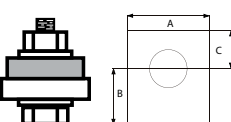
Product model			WRM40E / WRB40E	WRM112E	WRM420E	WRM840E
Rated operational voltage U <sub>e</sub>	IEC 60947-4-1	(V)	690		100	
	UL, CSA	(V)	600			
Current setting / max fuse (gL/gG)	(A)	0.4...2 / 16	14...56 / 160	28...112 / 250	50...250 / 500	85...420 / 710
		1.6...8 / 32				
		5...25 / 63				
Setting current / average power dissipation per pole	(W)	8...40 / 125	14...56 / 2	28...112 / 2.6	50...250 / 12	85...420 / 12
		0.4...2 / 0.07				
		1.6...8 / 0.06				
		5...25 / 0.38				
8...40 / 1.5					170...840 / 14.5	

Notes: 1) Direct mounting on contactor or directly on the panel via screws or 35 mm DIN rail when using the mounting kit accessory (WBF27D and WBF112);  
2) Direct mounting on contactor when using the Connector Link WGA117 / WGA317 accessory or directly on the panel via screws.

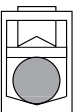
**Solid-State Overload Relays**
**Technical Data**
**Auxiliary Contacts**

Product model			WRM40...840E / WRB40E
Rated insulation voltage $U_i$ (pollution degree 3)	IEC 60947-4-1	(V)	250
	UL, CSA	(V)	600
Rated impulse withstand voltage $U_{imp}$ (IEC 60947-1)		(kV)	4
Rated operational voltage $U_e$	IEC 60947-4-1	(V)	250
	UL, CSA	(V)	600
Rated thermal current $I_{th} \leq 60^\circ\text{C}$		(A)	5
Rated operational current $I_e$			
AC-14/AC-15 (IEC 60947-5-1)	24 V	(A)	3
	120 V	(A)	3
	250 V	(A)	1.5
DC-13 (IEC 60947-5-1)	24 V	(A)	2
	60 V	(A)	0.4
	110 V	(A)	0.22
	125 V	(A)	0.22
	250 V	(A)	0.1
NEMA control circuit ratings	UL, CSA		C300 / R300
Short-circuit protection with fuse		(A)	6
Minimum voltage / admissible current (IEC 60947-5-4)			12 V / 10 mA

**Terminal Capacity and Tightening Torque - Main Contacts**

Product model		WBF27D	WRM40E / WRB40E	WR112E	WBF112
Type of screw		M4 Flat / Phillips #2	M3.5 Flat / Phillips #2	M10 Allen #4	M10 Allen #4
Cable size					
Flexible cable	(mm <sup>2</sup> )		1.5...10	-	-
Cable with terminal / rigid cable	(mm <sup>2</sup> )		1.5...6	-	-
AWG wire			16...10	-	-
Tightening torque	(Nm)		2.3	-	-
Flexible cable	(mm <sup>2</sup> )		-	1...10	2.5...35
Cable with terminal / rigid cable	(mm <sup>2</sup> )		-	1...10	2.5...35
AWG wire			-	16...8	14...2
Tightening torque	(Nm)		-	1.7	6
Product model			WRM420E	WRM840E	
Type of screw			M10 Hexagon Head		M12 Hexagon Head
Cable with terminal	(mm <sup>2</sup> )		2 x (25...150)		2 x (60 x 10)
Busbar (A x B x C)	(mm)		25 x 18.5 x 12.5		31.7 x 28.3 x 15
Tightening torque	(Nm)		26		26

**Terminal Capacity and Tightening Torque - Auxiliary Contacts**

Product model		WRM40...840E / WRB40E	
Type of screw		Flat / Phillips #1	
Cable size			
Cable with or without terminal	(mm <sup>2</sup> )		
AWG wire			1 x 1...2.5
Tightening torque	(Nm)		16...12
		0.8	

# Overloads

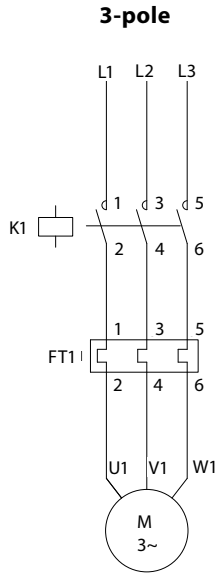
## Solid-State Overload Relays

### Technical Data

#### Motor Protection - Alternating Current

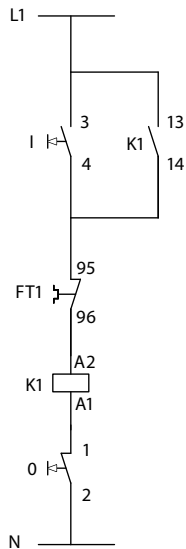
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WCM CONTACTOR

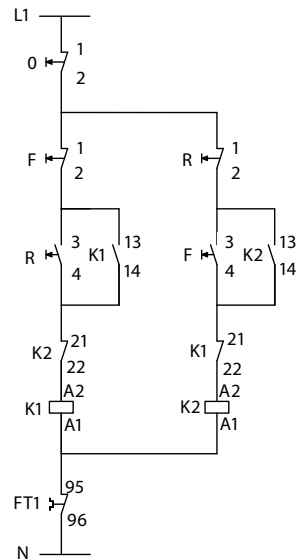


#### Typical Connection - Contactor + Overload Relay

##### Direct On Line Starter (1 Direction of Rotation)



##### Direct On Line Starter (2 Directions of Rotation)

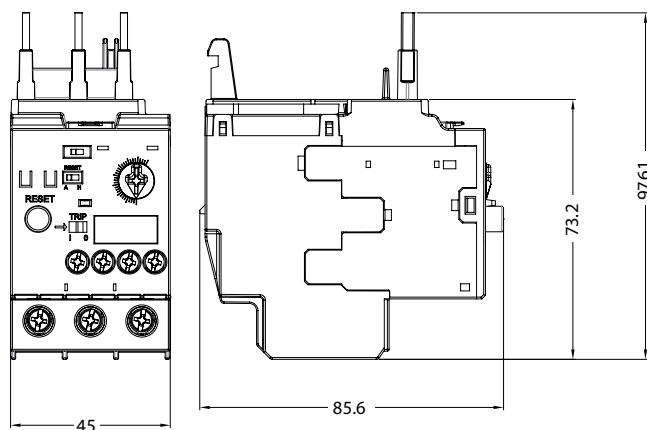


# Overloads

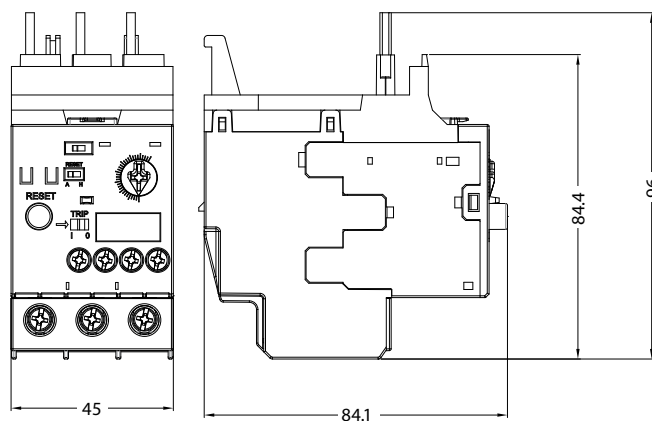
## Solid-State Overload Relays

### Dimensions (mm)

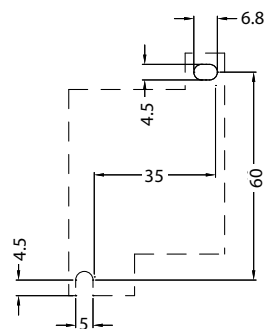
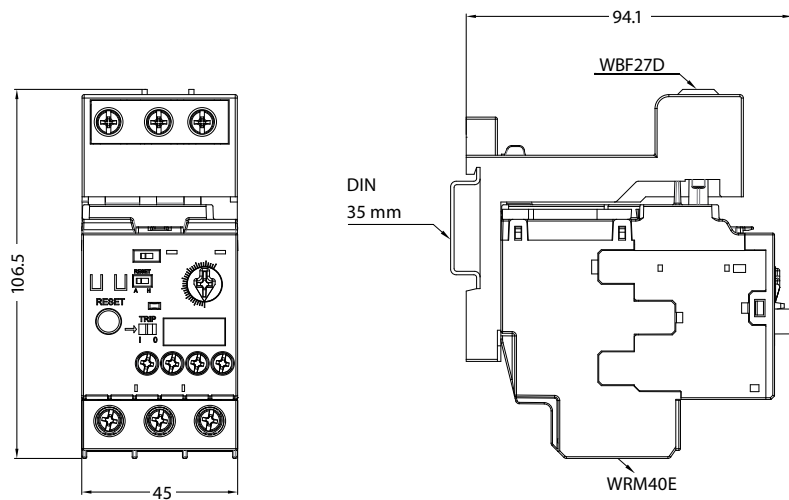
**WRM40E**



**WRB40E**



**WRM40E + WBF27**



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WCM CONTACTOR

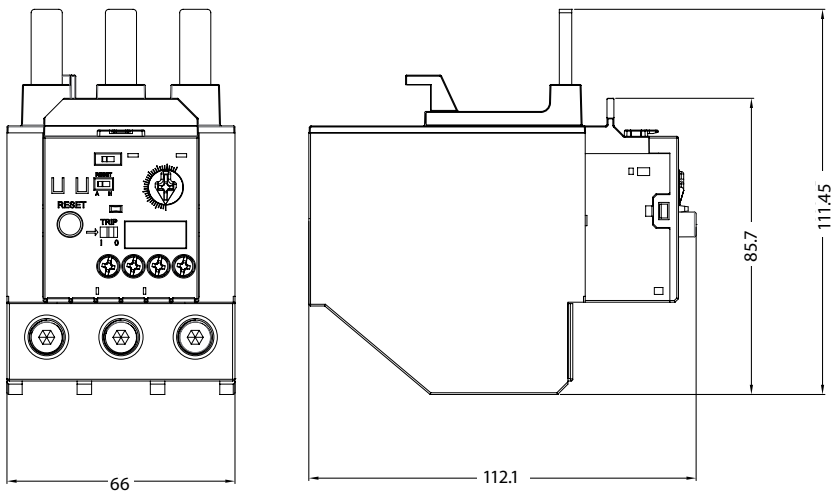


## Overloads

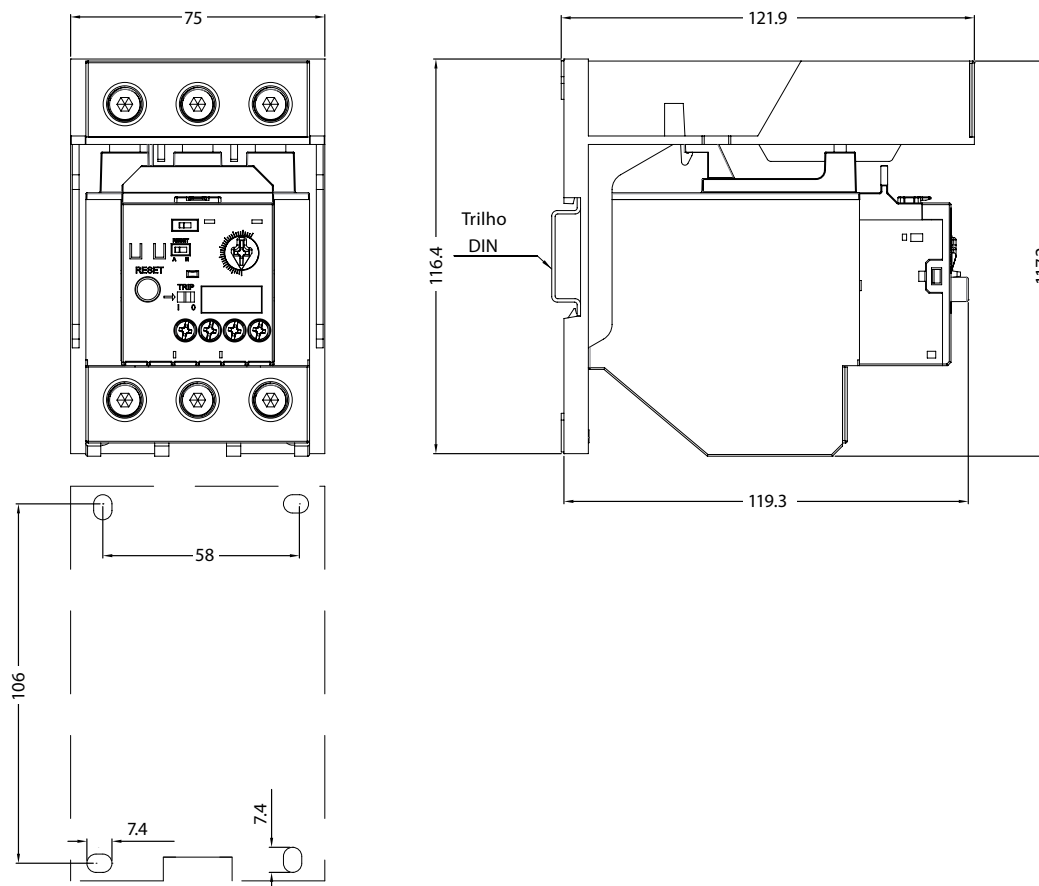
### Solid-State Overload Relays

#### Dimensions (mm)

##### WRM112E



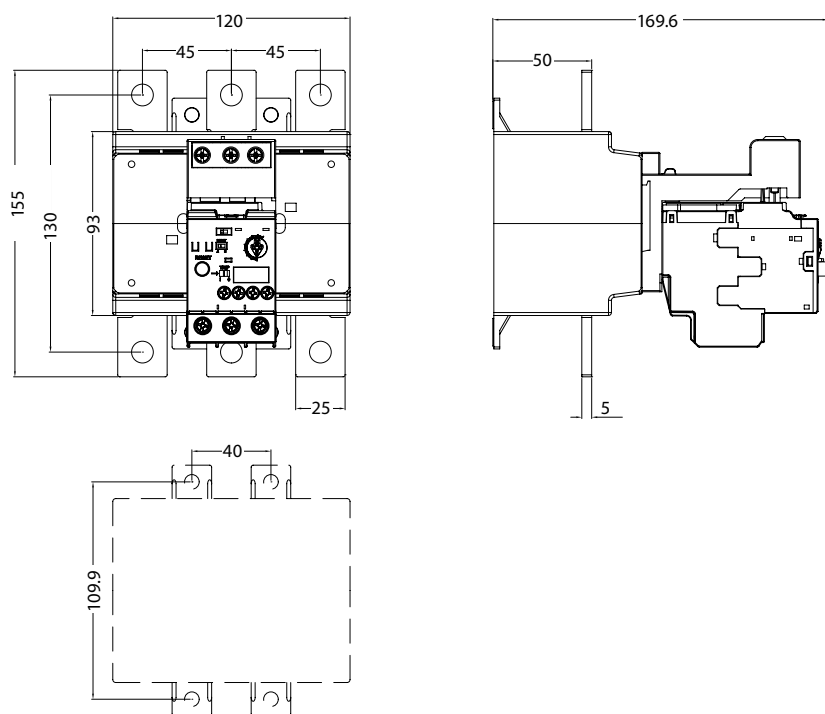
##### WRM112E + WBF112



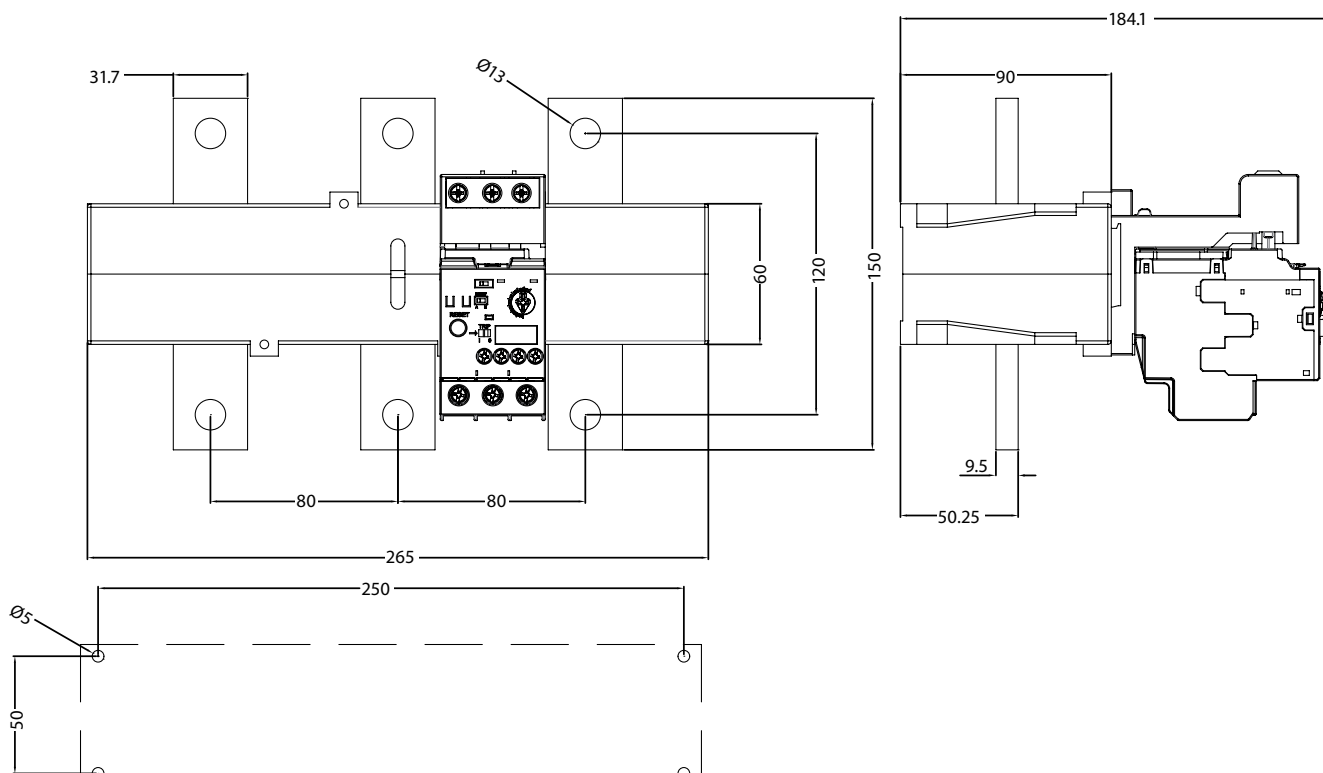
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WCM CONTACTOR

### Dimensions (mm)

#### WRM420E



#### WRM840E

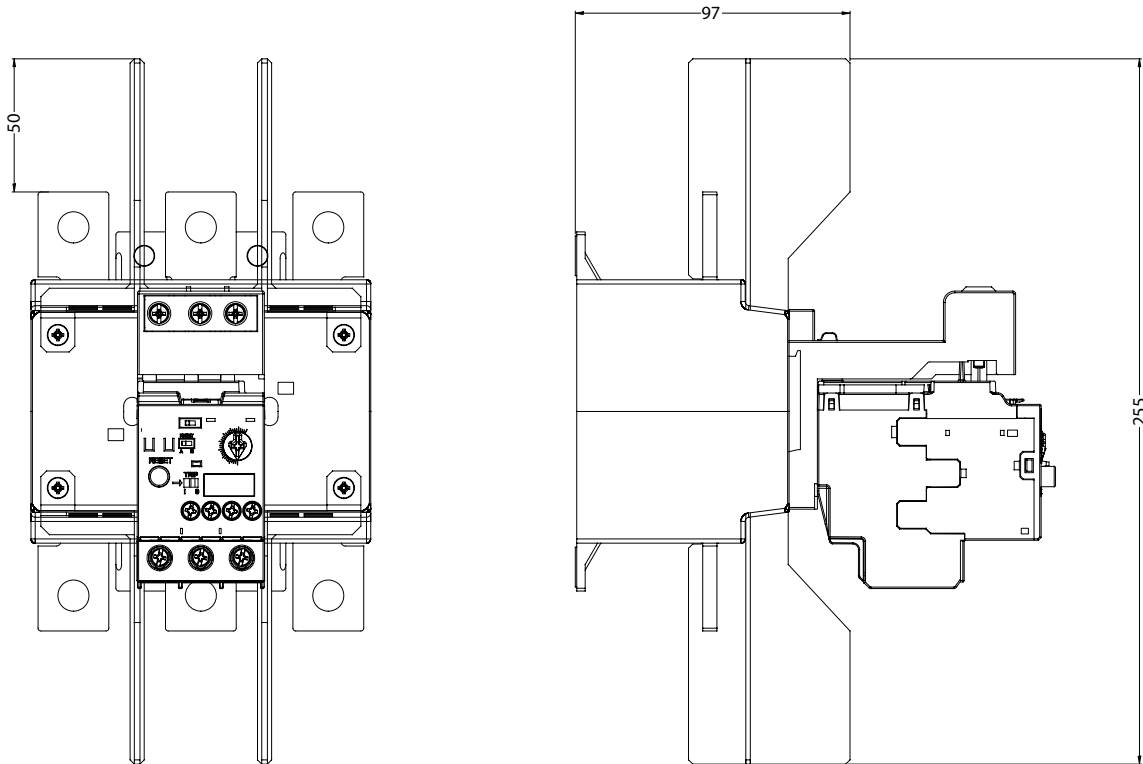


## Overloads

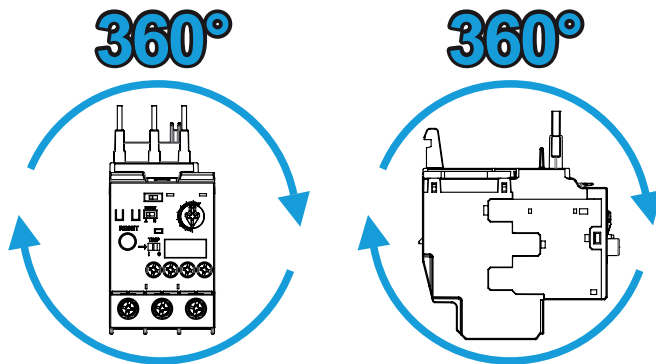
Solid-State Overload Relays

### Dimensions (mm)

WRM420E + WBIR317



WRM40...840E / WRB40E



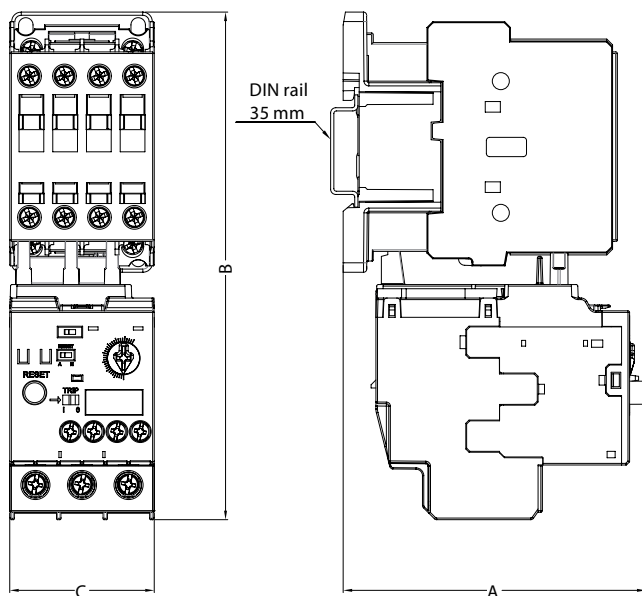
Mounting Position

1 WCM CONTACTOR

## Solid-State Overload Relays

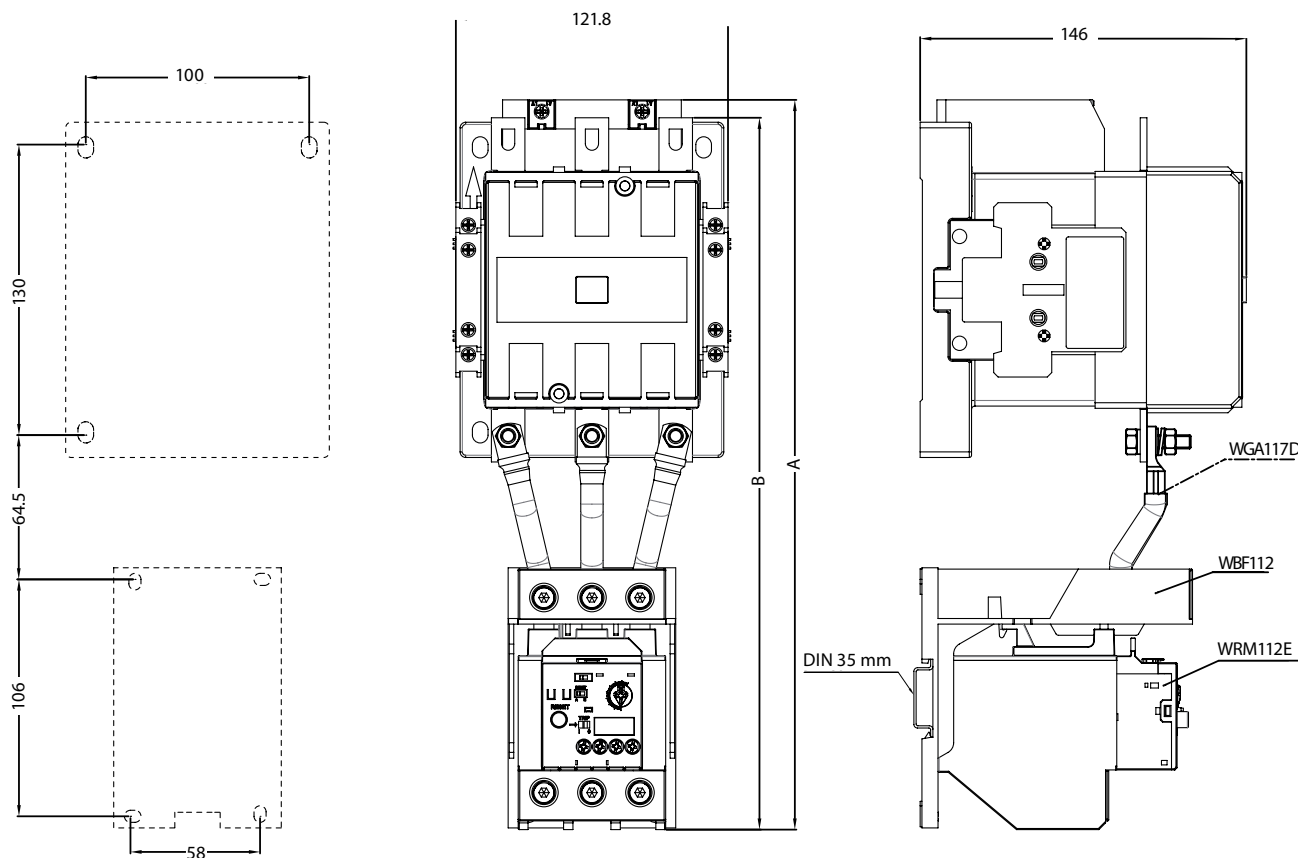
### Dimensions (mm)

#### WCM9...105 + WRM40...112E and WBC9...38 + WRB40E



Contactor	Type of contactor coil	A	B	C
WCM9...18	CA	94.3	158	45
	CC	125.1		
WCM25	CA	94.9	159.3	45
	CC	124.8		
WCM32/40	CA	98.6	166.5	55
	CC	118.6		
WCM50...80	CA	122.6	202.7	66
	CC	126		
WCM95/105	CA	126	201.1	75.4
	CC	126		
WBC9...18	CA	89.5	163.1	45
	CC	98.7		
WBC25...38	CA	93	166.5	
	CC	102.2		

#### WCM112 + WRM112E + WBF112



WCM112	A	B
AC conventional coil	-	318.5
Electronic coil	326.5	318.5

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WCM CONTACTOR

# Overloads

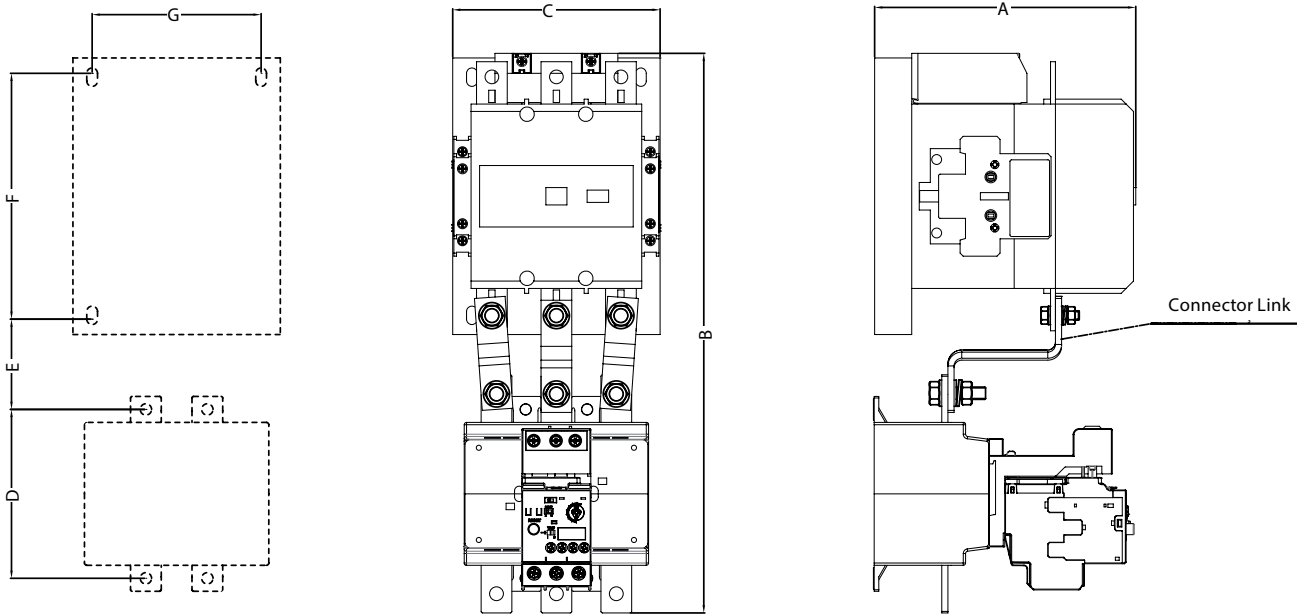
## Solid-State Overload Relays

### Dimensions (mm)

#### WCM112...300 + WRM112/420E

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WCM CONTACTOR



Contactor	Connector links	Overload relay	A	B	C	D	E	F	G
WCM112/150	WGA117D	WRM112E	147	325	121.5	106	64	130	100
WCM112/150	WGA317-1D	WR420E	166	343		110	60.5		
WCM180	WGA317-2D	WR420E	172	358	139	110	52.5	160	110
WCM250/300	WGA317-3D	WR420E	181	380	148.4		55	180	120

#### WCM400 + WRM420E

