

Bimetal Overload Relays 3UA and 3UC

The 3UA / 3UC thermal overload relays are suitable for customers from all industries, who want guaranteed optimum inverse time delayed protection of their electrical loads. The relays meet the requirements of IS/IEC 60947-4-1.

Application

3UA overload relay: 3UA5/6 are 3 pole adjustable bi-metal overload relays mainly suitable for normal starting applications. They provide accurate and reliable protection to motors against overload as per CLASS 10A. They also offer protection against single phasing and unbalanced voltages.

3UC overload relay: 3UC5/6 are 3 pole adjustable, saturable CT operated bi-metal overload relays mainly suitable for heavy starting applications (i.e. when heavy masses are to be put in motion resulting in larger starting period). They provide accurate and reliable protection to motors against overload as per CLASS 30. They also offer protection against single phasing and unbalanced voltages.

If single-phase AC or DC loads are to be protected by the 3UA / 3UC thermal overload relays, all three bimetal strips must be heated. For this purpose, all main current paths of the relay must be connected in series.

Standards

Bimetal relays conform to IS/IEC 60947-4-1. They also carry the CE mark.

Range

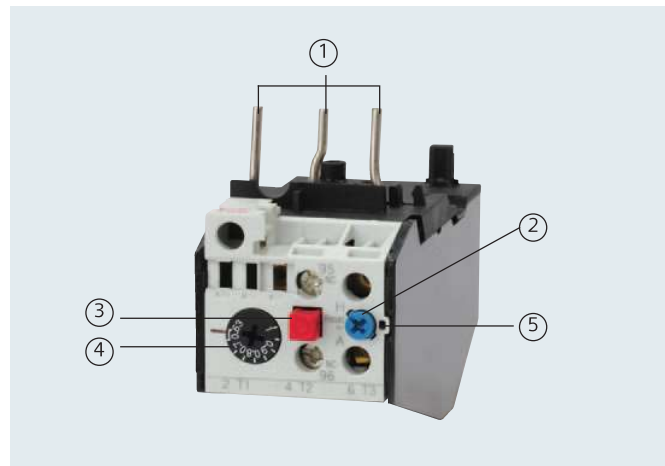
3UA5: 0.1 to 120A, (Class 10A, without CT)

3UA6: 85 to 630A, (Class 10A, CT operated)

3UC5/6: 2.4 to 400A (Class 30, CT operated)

Relay overview

Overload relay operates on the bi-metallic principle. The heater winding wound on the bimetal strips carry the current flowing through the motor. In case of overload, the current carried through the heater winding is more than the rated current. This heats up the bimetals. Due to this bi-metal strips bend and open the NC contact of the relay, which is connected in the control circuit of the contactor, thus disconnects the motor from the supply. The tripping time is inversely proportional to the current flowing through the bi-metal strips. Bi-relays are therefore, referred to as "current dependent" and inverse-time delayed relays.



- 1. Connection for mounting onto contactors:**
Optimally adapted in electrical, mechanical and design terms to the contactors, these connecting pins can be used for direct mounting of the overload relays. Stand-alone installation is possible as an alternative (in some cases in conjunction with a stand-alone installation module).
- 2. Selector switch for manual/automatic RESET (blue):**
With this switch you can choose between manual and automatic RESET. A device set to manual RESET can be reset locally by pressing the RESET button. A remote RESET is possible using the RESET modules (accessories), which are independent of size.
- 3. TEST button (red):**
Trip circuit can be manually checked by using this button. During this simulation the NC contact (95-96) is opened and the NO contact (97-98) is closed. This tests whether the auxiliary circuit has been correctly connected to the overload relay. The relay must be reset with the RESET button if it has been set to manual RESET. If the thermal overload relay has been set to automatic RESET, then the overload relay is automatically reset when the TEST button is released.
- 4. Motor current setting dial:**
Setting the device to the rated motor current is easy with the large rotary knob. (Recessed dial, hence no possibility of accidentally change in current setting.)
- 5. Trip indicator (Green):**
A separate mechanical Green Trip Indicator is provided on the front cover of the relay to indicate the tripped state of the 'manual reset' relay.

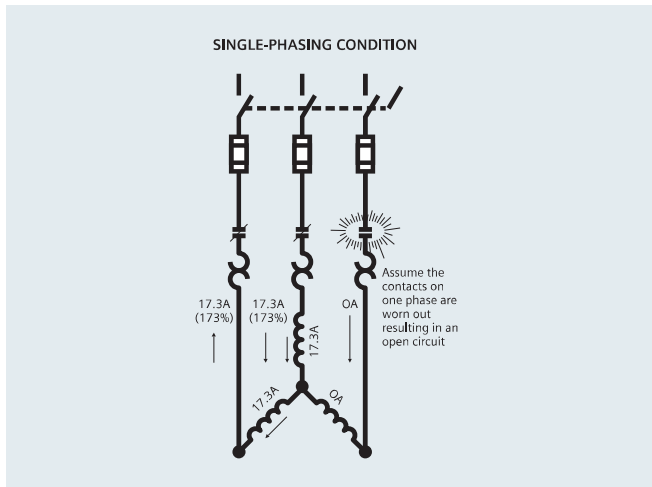
Recovery time

After tripping due to overload, the thermal overload relays require some time until the bimetal strips have cooled down. The device can only be reset after the bimetal strips have cooled down. This time (recovery time) depends on the tripping characteristics and strength of the tripping current. The recovery time allows the load to cool down after tripping due to overload.

Benefits and features

High performance

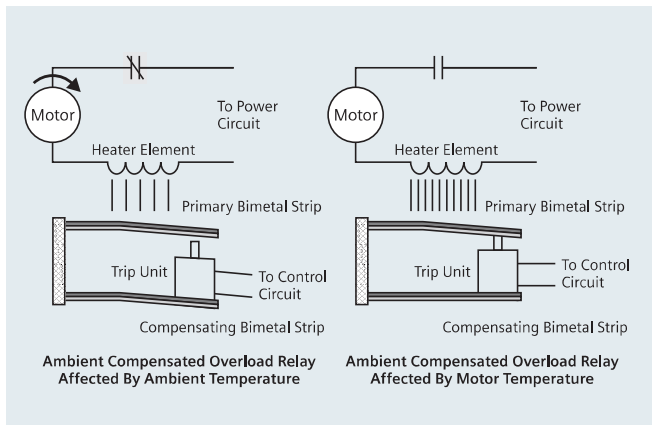
- **In-built single phasing protection**



In case of phase loss the current through the other two windings increases by 1.732 times the rated current of the motor. The current now flows only through the 2 bimetallic strips which should produce the required force on the tripping mechanism. This needs higher currents for longer time. As current is not too high so the relay might take higher time to trip. This can cause damage to the motor. Similar condition happens in case of phase unbalance. To take care of these conditions our relays are constructed such that they offer a built-in single phasing protection using differential slider principle.

- **Temperature compensation**

The temperature compensation feature reduces the effect of the ambient temperature on the tripping behavior. This ensures the minimum tripping current lies within the



specified range for -25 to 55° C. For this purpose the relays are temperature compensated between service temperatures of -25° C to +55° C.

User friendliness and safety

- **SIGUT termination Technique**

- **Shrouded auxiliary terminals**

Increases safety, as they protect against accidental contact with live parts.

- **Funnel shaped cable entries**

Reduce wiring time by facilitating quick location of the connecting wire.

- **Cable end-stop**

They decide the insertion depth of the connective wire. As the wire cannot now protrude into the relay housing, it does not hamper the movement of the auxiliary contacts. Since the insertion depth is predetermined, insulation of the cable can be cut accordingly and the possibility of insulation getting inadvertently caught under the terminal, is avoided.

- **Captive Screws**

This feature prevents the screws from falling down thereby facilitates the wiring. Hence, the relays are delivered with untightened terminals. This eliminates the operation of untightening terminals before wiring.

- **Lug less termination**

This feature helps in reducing the termination time.

- **Screw-driver guides** reduce wiring time as they allow the use of power screw-drivers.

Flexibility

- **Potential free Auxiliary Contacts**

Potential free 1NO + 1NC contact arrangement is provided as a standard feature. The 1NC contact is used in the control circuit of the contactor for disconnecting the motor in case of overload, whereas the 1NO contact can be used for various applications such as indication.

- **Mounting**

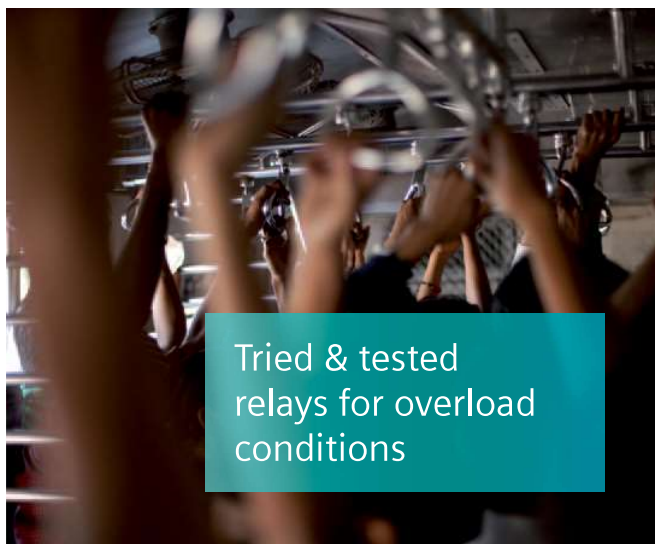
3UA5: suitable for direct mounting or independent mounting (with the help of independent mounting accessory)

3UA6 and 3UC5/6: suitable for Independent mounting.

Selection and ordering data:

Setting range (A)	Type reference	Backup HRC fuse 3NA A (max)	Mounting	Std. pkg. (nos.)		
Normal Motor Starting time						
3UA50						
0.1 - 0.16 0.16 - 0.25 0.25 - 0.4	3UA50 00-0A 3UA50 00-0C 3UA50 00-0E	2 2 2	With Contactor 3TF30/31	1		
0.4 - 0.63 0.63 - 1 0.8 - 1.25	3UA50 00-0G 3UA50 00-0J 3UA50 00-0K	2 2 4				
1 - 1.60 1.25 - 2 1.6 - 2.5 2 - 3.2	3UA50 00-1A 3UA50 00-1B 3UA50 00-1C 3UA50 00-1D	6 6 6 10				
2.5 - 4 3.2 - 5 4 - 6.3	3UA50 00-1E 3UA50 00-1F 3UA50 00-1G	10 16 16				
5 - 8 6.3 - 10 8 - 12.5 10 - 14.5	3UA50 00-1H 3UA50 00-1J 3UA50 00-1K 3UA50 00-2S	20 25 25 25				
3UA52						
1 - 1.6 1.25 - 2 1.6 - 2.5	3UA52 00-1A 3UA52 00-1B 3UA52 00-1C	6 6 6			With Contactor 3TF32/33	1
2 - 3.2 2.5 - 4 3.2 - 5	3UA52 00-1D 3UA52 00-1E 3UA52 00-1F	10 10 16				
4 - 6.3 5 - 8 6.3 - 10	3UA52 00-1G 3UA52 00-1H 3UA52 00-1J	16 20 25				
8 - 12.5 10 - 16 12.5 - 20 16 - 25	3UA52 00-1K 3UA52 00-2A 3UA52 00-2B 3UA52 00-2C	25 32 50 50				
3UA55						
10 - 16 12.5 - 20 16 - 25	3UA55 00-2A 3UA55 00-2B 3UA55 00-2C	32 50 50	With Contactor 3TF34/35	1		
20 - 32 25 - 36 32 - 40 36 - 45	3UA55 00-2D 3UA55 00-2Q 3UA55 00-2R 3UA55 00-8M	80 80 80 80				
3UA58						
16 - 25 20 - 32 25 - 40 32 - 50 40 - 57 50 - 63 57 - 70 63 - 80 70 - 95	3UA58 00-2CZ1 3UA58 00-2DZ1 3UA58 00-2EZ1 3UA58 00-2FZ1 3UA58 00-2TZ1 3UA58 00-2PZ1 3UA58 00-2VZ1 3UA58 00-2UZ1 3UA58 00-8YZ1	50 63 80 100 100 125 125 160 160			With Contactor 3TF46 3TF47 3TF48 3TF49	1
16 - 25 20 - 32 25 - 40 32 - 50 40 - 57 50 - 63 57 - 70 63 - 80	3UA58 00-2CZ2 3UA58 00-2DZ2 3UA58 00-2EZ2 3UA58 00-2FZ2 3UA58 00-2TZ2 3UA58 00-2PZ2 3UA58 00-2VZ2 3UA58 00-2UZ2	50 63 80 100 100 125 125 160	With Contactor 3TF47 7			

Setting range (A)	Type reference	Backup HRC fuse 3NA A (max)	Mounting	Std. pkg. (nos.)
3UA58 30				
70 - 95	3UA58 30-5B	160	With Contactor 3TF50	1
85 - 105	3UA58 30-5C	160		
95 - 120	3UA58 30-5D	200		
3UA62 30				
85 - 135	3UA62 30-5A	224	Independent	1
115 - 180	3UA62 30-5B	250		
160 - 250	3UA62 30-5C	400		
200 - 320	3UA62 30-5D	400		
250 - 400	3UA62 30-5E	500		
3UA68 30				
320 - 500	3UA68 30-5F	500	Independent	1
400 - 630	3UA68 30-5G	630		
Long Motor Starting time (Heavy duty)				
3UC50 30				
2.5 - 4	3UC50 30-5E	16	Independent	1
4 - 6.3	3UC50 30-5G	25		
6.3 - 10	3UC50 30-5J	25		
8 - 12.5	3UC50 30-5K	32		
3UC58 30				
10 - 16	3UC58 30-5A	32	Independent	1
16 - 25	3UC58 30-5C	63		
25 - 40	3UC58 30-5E	100		
40 - 63	3UC58 30-5G	125		
3UC62 30				
63 - 100	3UC62 30-5J	250	Independent	1
100 - 160	3UC62 30-5A	315		
3UC66 30				
125 - 200	3UC66 30-5B	500	Independent	1
160 - 250	3UC66 30-5C	630		
250 - 400	3UC66 30-5E	630		



Tried & tested
relays for overload
conditions

Technical Data

Type		3UA50	3UA52	3UA55	3UA58	3UA5830	3UA6230	3UA6830	3UC5030	3UC5830	3UC6230	3UC6630
Trip class		10A							30			
Phase failure protection		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Changeover to auto-reset at site		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
RESET button (trip-free) Blue		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Ambient temperature compensation		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Trip indicator Green		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
TEST button Red		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Terminal for contactor coil		✓	✓	✓	X	X	X	X	X	X	X	X
Permissible service temperature		-25°C to +55°C										
Mounting		Contactor/ 3TF30/31	Contactor/ 3TF32/33	Contactor/ 3TF34/35	Contactor/ 3TF46 to 49	Contactor/ 3TF50	Independent					
Main Circuit												
Rated current (Max)	A	14.5	25	45	95	120	400	630	12.5	63	160	400
Rated insulation voltage <i>Ui</i> (Pollution degree 3)	V	690	690	690	1000	1000	1000	1000	1000	1000	1000	1000
Rated impulse withstand <i>Uimp</i>	kV	6	6	6	8	8	8	8	8	8	8	8
Heating		Direct	Direct	Direct	Direct	Direct	Indirect	Indirect	Indirect	Indirect	Indirect	Indirect
Conductor cross-section												
Solid or stranded	sqmm	2.5 to 6	2.5 to 6	1.5 to 25	2.5 to 35	35 to 70	50 to 120/ 240*	2 x 240	1 to 4	–	–	–
Finely stranded with end sleeve	sqmm	1.5 to 4	1.5 to 4	1 to 16	1.5 to 25	–	–	–	1 to 2.5	35	120	240
Multi-conductors with cable lugs	sqmm	–	–	–	–	–	50 to 120/ 240*	2 x 240	–	–	–	–
Flats	sqmm	–	–	–	–	–	1 x 20 x 3	2 x 30 x 5	–	1 x 15 x 3	1 x 20 x 5	2 x 30 x 5 2 x 3- x 5*
Terminal screw		M4	M4	M5	M5	M8	M10	M10	M4	M6	M8	M10
Power loss per pole (max)												
Minimum setting	W(VA)	0.9	0.9	1.2	2.6	2.8	5	6(9)	2.5	2.5	3.5	5.5
Maximum setting	W(VA)	2.25	2.25	3	4	4	7	15(22)	6.5	6.5	9	14
Auxiliary Circuit (application for all types)												
Auxiliary contacts		1NO + 1NC (Potential free)										
Rated thermal current Ith	A	6										
Short circuit protection (max)	A	6 (HRC Fuse type 3NA7)										
Switching capacity	AC15	V	24	60	125	230	415	500				
		A	2	1.5	1.25	1.15	1	1				
	DC13	V	24	60	110	220						
		A	1	0.4	0.22	0.1						
Conductor cross-section												
Solid or stranded	sqmm	2 x (1 to 2.5)										
Finely started with end sleeve	sqmm	2 x (0.75 to 1.5)										
Terminal screw		M3.5										

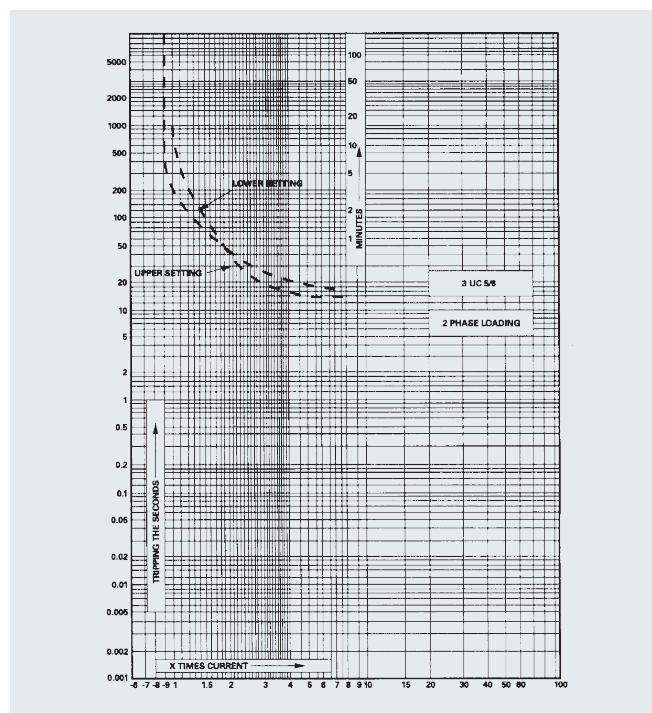
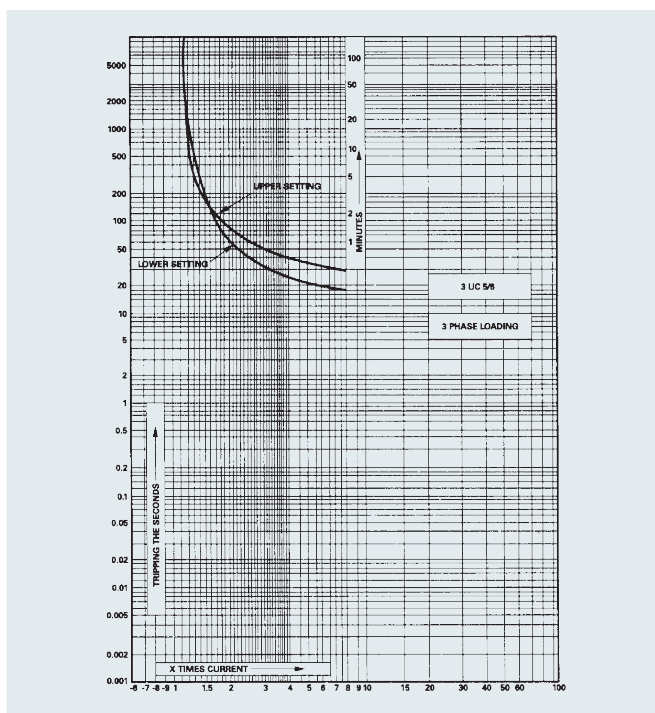
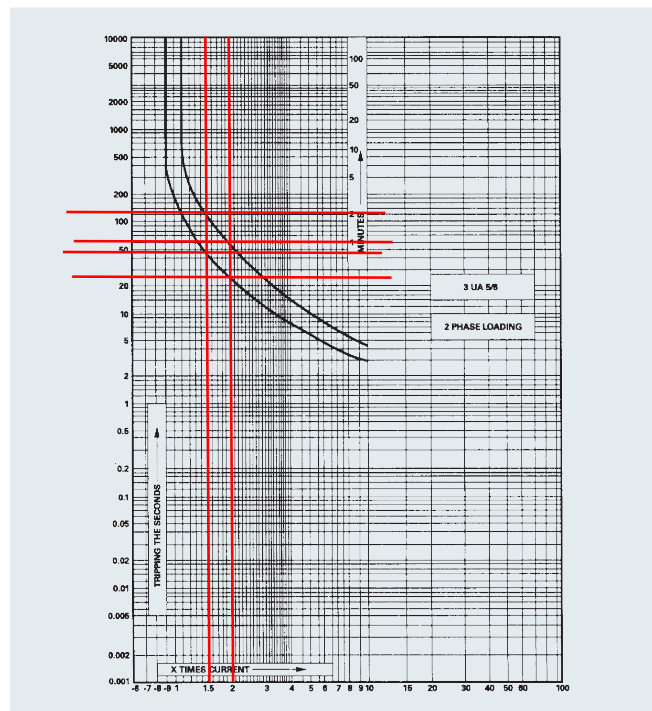
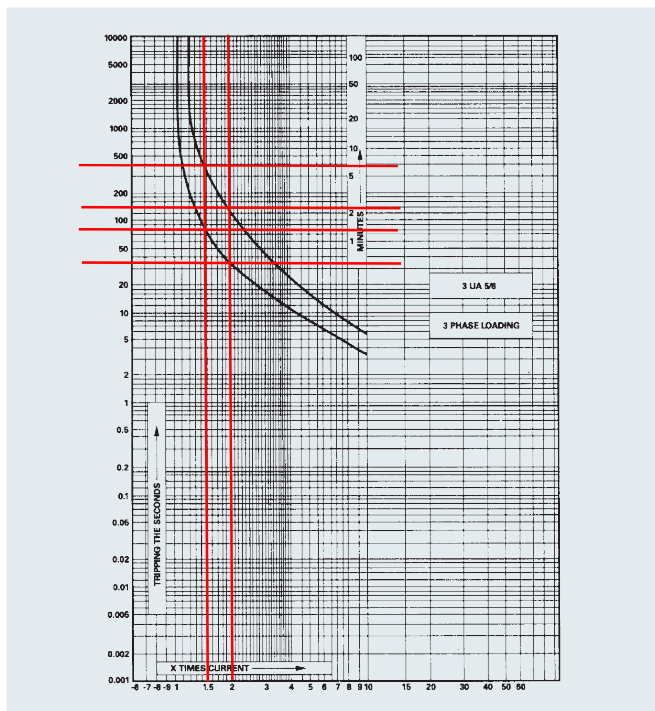
* For relay above 180 A

Characteristic Curves

Tripping characteristics

The current/time curves show the relationship between the tripping time from cold state and multiples of the set current I_e . When the relay is at operating temperature and carrying 100 % I_e , the tripping times are reduced to approximately 25 %. Tripping curve is applicable to 3-pole loads and 2-pole loads. For single-pole loads, the tripping curves lie between curves of 3-pole loads and 2-pole loads.

For normal operation, all 3 bimetallic strips of the overload relay must be heated. The overload relays 3UA / C are suitable for protecting motors with phase control. For protecting single-phase or DC-loads, therefore, all three main conducting paths must be connected in series. Tripping curve for 3 pole loads is then applicable. The release current with a 3-pole symmetrical load is between 105 % and 120 % of the set current.



The above curves are the general characteristics curves; for individual characteristics curves of each rating, please contact our nearest sales office.

Accessories and ordering data

1. **Adaptor:** To convert contactor mounting relay to independent mounting, (Fig. 1) suitable for screw type mounting and 35 mm DIN rail mounting.
2. **Protective cover*:** To avoid tampering of the setting, auto manual mode or test button. (Fig. 2)
3. **Reset cord*:** To reset the relay in switchboard with door closed. (Length: 600 mm) (Fig. 3)
4. **Reset plunger with funnel*:** Instead of reset cord for resetting the relay in switchboard with door closed. (Fig. 4)



Fig. 1: Adaptor

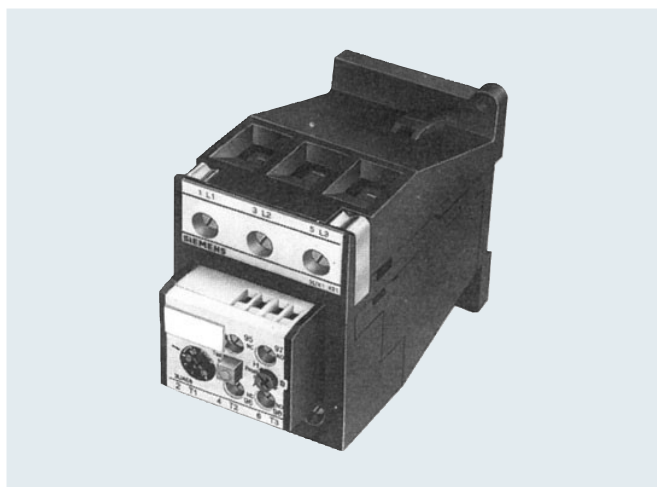


Fig. 1: Relay with adaptor for independent mounting

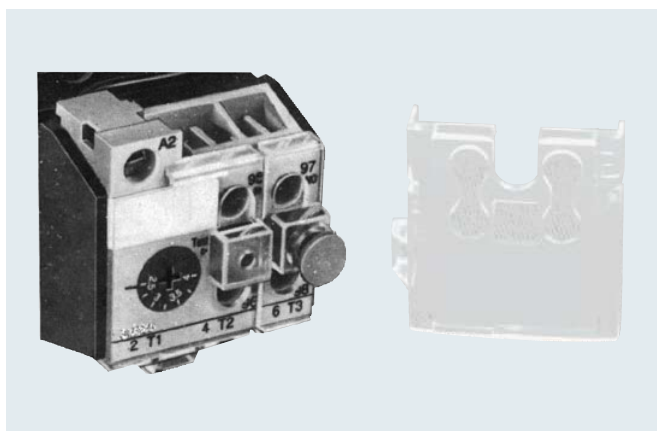


Fig. 2: Protective cover



Fig. 3: Reset cord with holder

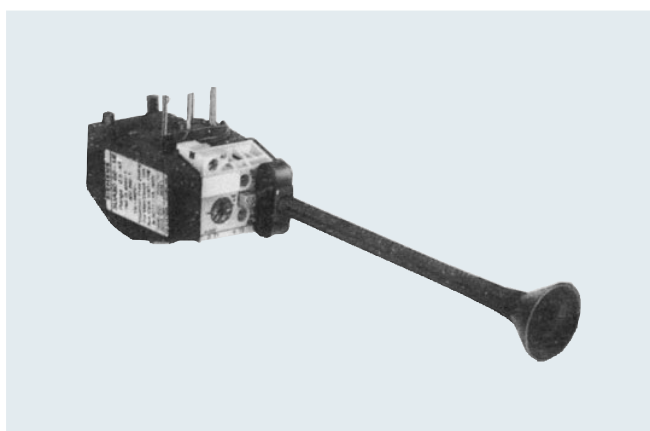


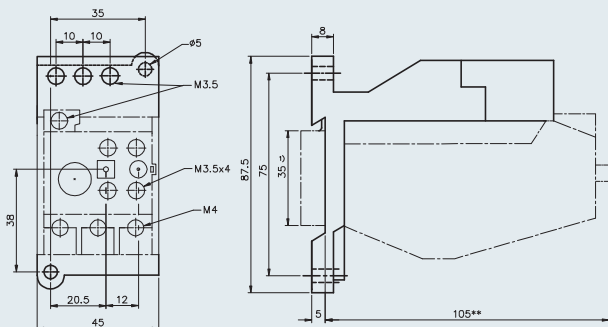
Fig. 4: Reset plunger + Funnel

Description	Type reference	Relay type	Std. pkg. (nos.)
Reset Plunger	3UX1 011	3UA5/6, 3UC5/6	10
Funnel	3UX1 013		
Reset cord with Holder (600mm)	3UX1 016	3UA5/6, 3UC5/6	5
Protection Cover	3UX1 111 - 1YA 3UX1 110 - 1YA	3UA5/6 3UA58/5830	10
Adaptor to convert to independent mounting	3UX1 418 3UX1 420 3UX1 425 3UX1 421 3UX1 421 - 0XA	3UA50 3UA52 3UA55 3UA58 3UA5830	1
Set of terminals to convert relay type	3UX58 11	3UA5800-2 or to 3UA5800-2 Z2 to 3UA5800-2 Z1	10
	3UX58 12	3UA5800-2 Z1 or 3UA5800-2 Z2 to 3UA5800-2	
	3UX58 13	3UA5800-2 or 3UA5800-2 Z1 to 3UA5800-2 Z2	

* Only one accessory at the time

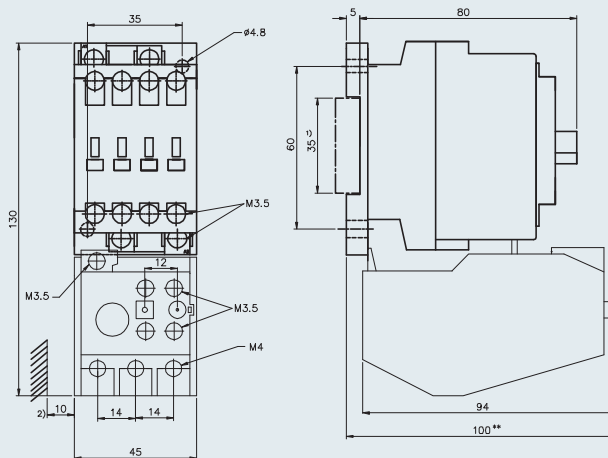
Dimensional Drawing

3UA50 with independent Mounting Adapter Type 3UX1 418



- ** Dimension for square OFF-button (stroke 3mm)
Dimension for round RESET-button (stroke 2.5mm)
- 1) For 35mm standard (DIN) mounting rail

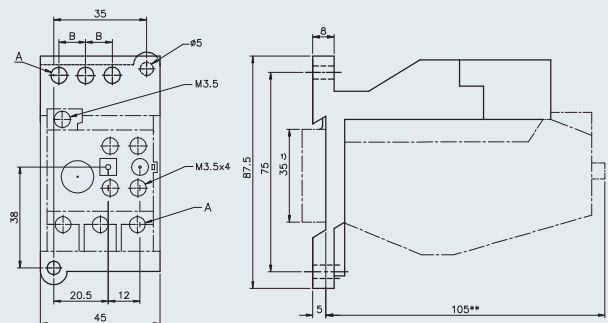
3UA50 mounted on 3TF30/31



Auxiliary Contact	a	b	c	d
1NO or 1NC	125	85	108	55
1NO + 1NC or 2NO + 2NC	130	100	100	60

- ** Dimension for square OFF-button (stroke 3mm)
Dimension for round RESET-button (stroke 2.5mm)
- 1) For 35mm standard (DIN) mounting rail
2) Minimum clearance from earthed components

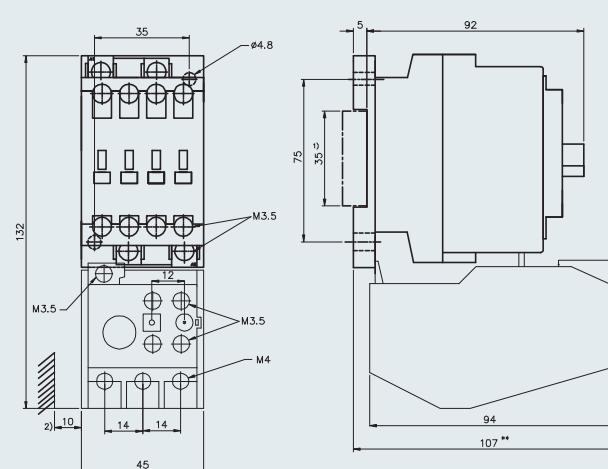
3UA52/55 with independent mounting



Type	Dim	
	a	b
3UA52 + 3UX1420	M4	14.3
3UA55 + 3UX1425	M5	18.2

- ** Dimension for square OFF-button (stroke 3mm)
Dimension for round RESET-button (stroke 2.5mm)
- 1) For 35mm standard (DIN) mounting rail

3UA52 mounted on 3TF 32/33



- ** Dimension for square OFF-button (stroke 3mm)
Dimension for round RESET-button (stroke 2.5mm)
- 1) For 35mm standard (DIN) mounting rail
2) Minimum clearance from earthed components

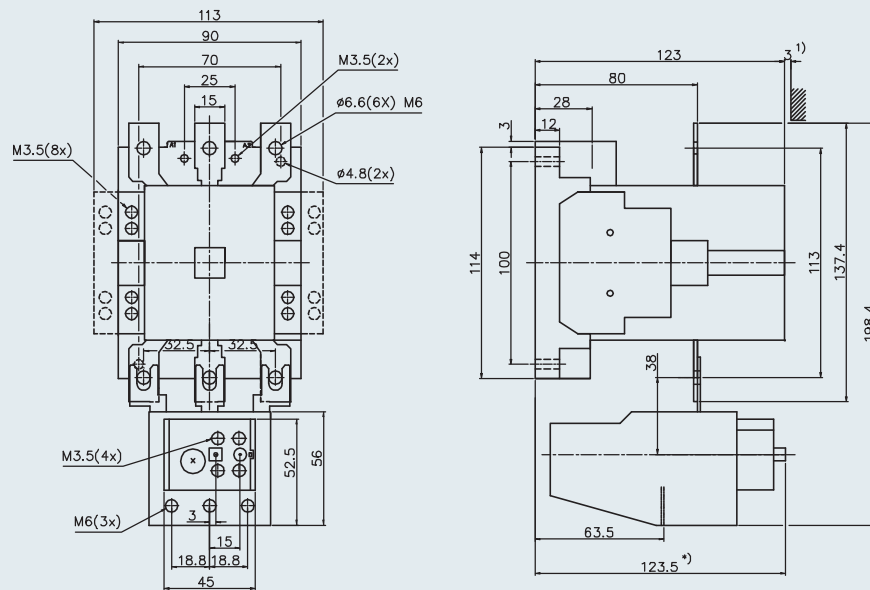
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1) * Dimension – For square OFF button (Stroke 3mm)
 – For round RESET button (Stroke = 2.5mm) less 2.5mm

2) Minimum clearance from insulated components : 3mm
 Minimum clearance from earthed components: 10mm

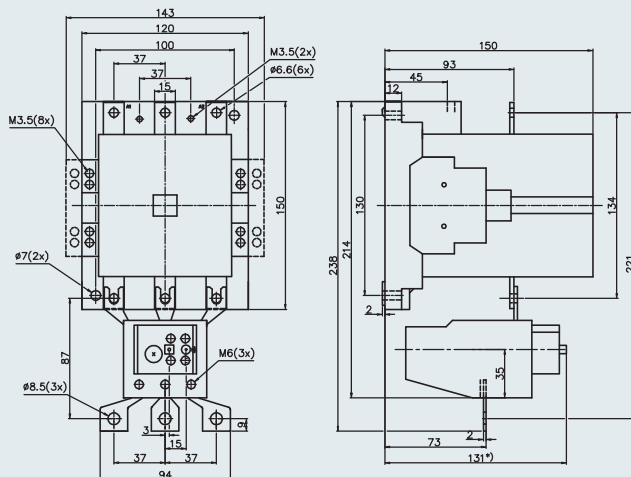
3UA58+	a1	a2	a3	b1	b2	b3	c1	d1	e1	f1	f2	f3	g	Og1
3TF46/47	90	113	70	114	178	100	123	10.5	102	80	63	123	28	4.8
3TF48/49	100	123	80	130	193	110	140	10.5	116	89	72	132	39	5.4

3UA5800_.. Z2 mounted on 3TF47 7



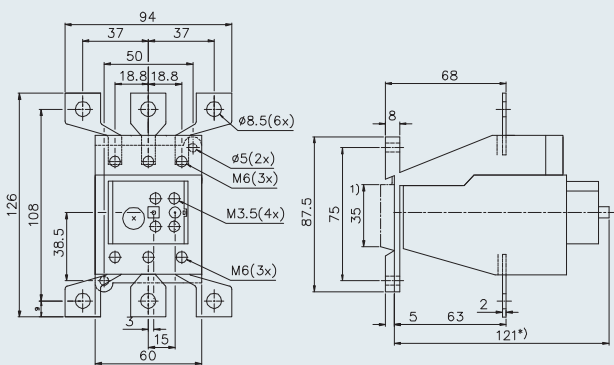
- * Dimension – For square OFF button (Stroke 3mm)
 – For round RESET button (Stroke = 2.5mm) less 2.5mm
- 1) Minimum clearance from insulated components : 3mm
 Minimum clearance from earthed components: 10mm

3UA5830 mounting on 3TF50



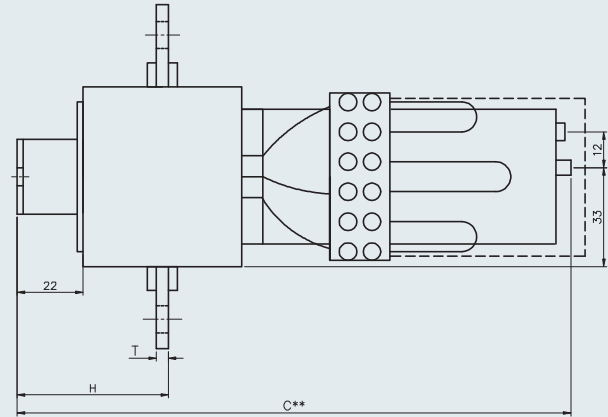
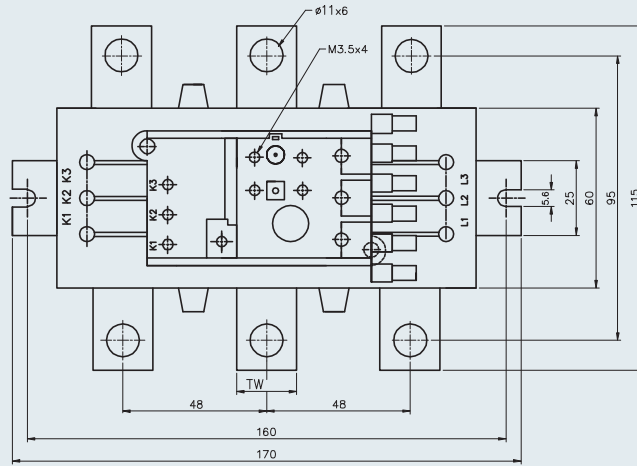
- * Dimension – For square OFF button (Stroke 3mm)
 – For round RESET button (Stroke 2.5mm) less 2.5mm
- 1) Suitable for DIN RAIL 35mm as per DIN 50022

3UA5830 with individual mounting adaptor type 3UX1 421 - OXA



- * Dimension – For square OFF button (Stroke 3mm)
 – For round RESET button (Stroke 2.5mm) less 2.5mm
- 1) Minimum clearance from insulated components : 3mm
 Minimum clearance from earthed components: 10mm

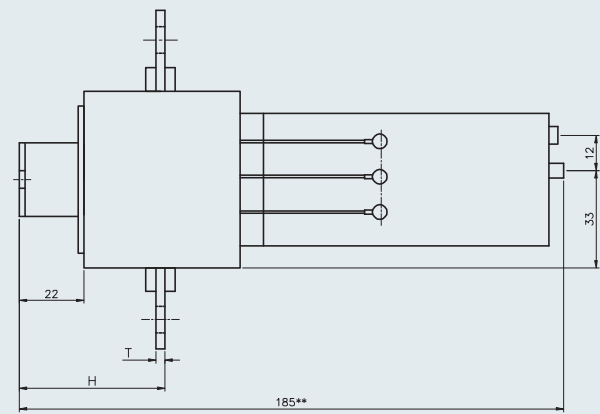
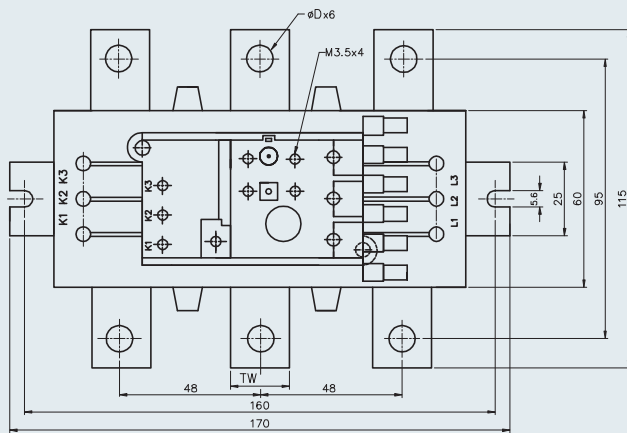
3UA6230 / 3UA6830 CT operated Birelay



** Dimension for square OFF-button (Stroke 3mm)
Dimension for round RESET-button (Stroke 2.5mm)

Type	TW	T	C	H
3UA6230-5A/5B	20	4	185	50.5
3UA6230-5C/5D/5E	25	4	185	50.5
3UA6830	30	5	192	54.5

3UC5030/ 3UC5830/ 3UC6230 / 3UC6630 CT operated Birelay



** Dimension for square OFF-button (Stroke 3mm)
Dimension for round RESET-button (Stroke 2.5mm)

Type	TW	T	H	D
3UC50	15	1.5	48	M4
3UC58	15	3	49.5	6.6
3UC62	20	3	49.5	9
3UC66	25	4	50.5	11