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Low Voltage Control Components

Datasheet 2015

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Planning Efficiency - CA-x Applications

Save Time. Save Money.

Available for:

- 3TF contactors
- 3UA/3UC thermal overload relays
- 3VU MPCB

2D dimension drawing | 3D model | Device circuit diagram | Data sheet | Manuals / operating... | Certificate | Product image

Index

Contactor Relays 3TH30

Reliability and safety are pre-requisites in the choice of the control contactor. Siemens 3TH30 contactor relays satisfy these criteria and thus offer the right choice to the customer.

Applications

3TH30 are used in control circuits for switching and signaling purpose. Also they are used for interfacing with the electronic circuits.

Standards

Contactor relay conforms to IS /IEC 60947-5-1.

They also carry CE mark.

Range

Air break contactor relays are suitable for 10A, (AC15/AC14 rating) at 240V AC and 10A, (DC13 rating) at 24V DC.

Benefits and features

Flexibility

- **Choice of auxiliary contacts**

  3TH30 contactor relays comes with 4 contacts as a basic unit (4NO, 3NO+1NC, 2NO+2NC). However the contacts can be extended upto 8 contacts by adding maximum 4 auxiliary contact blocks to this basic unit. This offers flexibly in selection and configuration.

- **Choice of mounting**

  3TH30 can be mounted on 35mm DIN rail and they are also suitable for screw mounting.

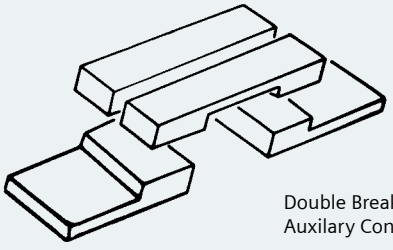
Long Life

Superior design of current carrying parts, contact system and the magnet system increases the reliability which also results into higher **electrical and mechanical endurance**.

High reliability

- **Double Break Parallel Bridge contact mechanism**

  This mechanism is available with 3TH30. Such contact mechanism ensures reliable contact at low voltage and low currents (5mA at 17V DC). It also offers unmatched reliability as well as capability to integrate directly into PLC or instrumentation circuits.



Double Break Parallel Bridge Auxilary Contacts

User friendliness and safety

- **Positively driven contacts**

  3TH30 auxiliary contactors satisfy the conditions **for positively driven operation** between NO and NC contacts. NO and NC contact do not close at the same time. This is extremely important when they are used in safety circuits of critical applications. This ensures operator safety even during abnormal condition.

- **SIGUT Termination**
  - **Finger touch proof terminals**

    It protects against accidental contact with live parts which ensures operator safety.

  - **Funnel shaped cable entries**

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

  - **Cable end-stop**

    It decides the insertion depth of the connecting wires. 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 auxiliary contactors 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.

Selection and ordering data

Contacts in basic unit	MLFB - With AC coil	MLFB - With DC coil	Std. pkg. (nos.)
4NO	3TH30 40-0A..	3TH30 40-0B..	1
3NO+1NC	3TH30 31-0A..	3TH30 31-0B..	
2NO+2NC	3TH30 22-0A..	3TH30 22-0B..	

.. Please add coil voltage code

AC Coil voltages

Coil voltage	24	42	110	230	415
Code	B0	D0	F0	P0	R0

DC Coil voltages

Coil voltage	24	42	48	110	220	250
Code	B4	D4	W4	F4	M4	N4

(Other coil voltages are also available.)

Technical data

Type		3TH30			3TX40..		
Standards		IS/IEC 60947-5-1					
Rated Operational Voltage		690V					
Rated Impulse withstand voltage		8kV					
Permissible ambient temp.	Storage Service	-50 to +80°C -25 to +55°C					
Mechanical endurance cycles		30 mill			10 mill		
Rated operating current Ie/AC12		16A			10A		
Rated operating current Ie/AC15/AC14 at operating voltage							
	230V 415V 690V	10A 4A 2A			5.6A 3.6A 1.8A		
Rated operating current Ie/DC13 at operating voltage		Current paths in series			Current paths in series		
		1	2	3	1	2	3
	24V 110V 220V 440V	10 A 0.9 A 0.45A 0.2 A	10A 2.5A 0.75A 0.5A	10A 10A 2A 0.9A	10 A 0.8 A 0.2 A 0.11A	10A 3.8A 0.85A 0.2A	10A 10A 2A 0.5A
Coil Voltage tolerance		0.8 to 1.1 x Ue					
Rated coil input AC operated, 50Hz DC operated Closing=when closed	 Closing VA/p.f. When closed VA/P.f. W	 68 / 0.82 10 / 0.29 6.2					
Frequency of operation at AC15/DC13 duty	cycles/hr	3600					
Short circuit protection HRC fuse-links Miniature circuit breakers, (C-char.)		 16A 16A			 16A 10A		
Degree of protection		IP 20					

For 3TH30

Operating time at 1.0*Us		AC	DC
Closing	Closing Delay NO	10-25 ms	30-70ms
	Opening Delay NC	7-20ms	28-56 ms
Opening	Opening Delay NO	5-18ms	10-20 ms
	Closing Delay NC	7-20ms	15-25 ms

Accessories and ordering data

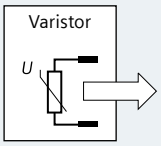
1. Surge suppressor

It is used to reduce the effect of switching overvoltages created during the opening of inductive circuits. Typically they are mounted outside the body of the contactor relay, and are connected in parallel with the coil terminals. Various techniques for the suppression of switching overvoltages can be employed. For example: RC element, Varistor etc

2. Add on blocks

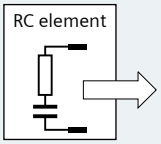
Auxiliary Contact Block	Type Reference	Std. pkg. (nos.)
1NO	**3TX40 10 2A**	**10**
1NC	**3TX40 01 2A**	
1NO extended	**3TX40 10 4A**	
1NC extended	**3TX40 01 4A**	

Extended contacts (NO/NC) is *early make NO and late break NC* combination.



Surge Suppressor (Varistor)

Coil voltage		MLFB	Std. pkg. (nos.)
AC	DC		
24 - 48 V	24 - 70 V	3TX7 402-3GY1	10
48 - 127 V	70 - 150 V	3TX7 402-3HY1	
127 - 240 V	150 - 250 V	3TX7 402-3JY1	
240 - 400 V	–	3TX7 402-3KY1	
400 - 460 V	–	3TX7 402-3LY1	

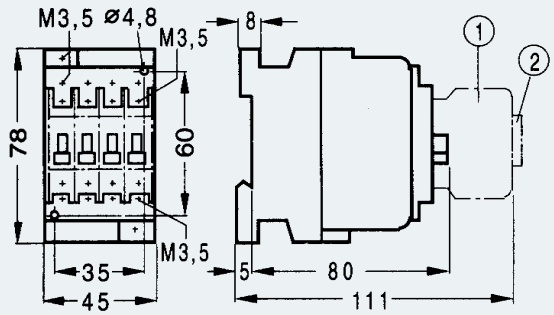


Surge Suppressor (RC Element)

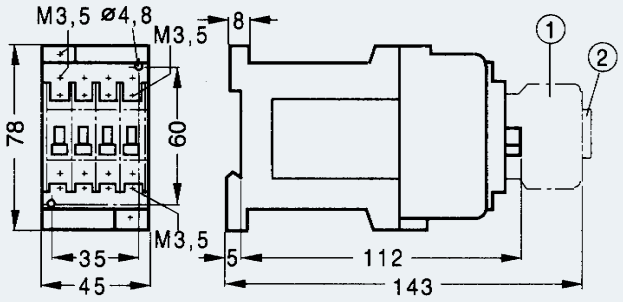
Coil voltage		MLFB	Std. pkg. (nos.)
AC	DC		
24 - 48 V	24 - 70 V	3TX7 402-3RY2	10
48 - 127 V	70 - 150 V	3TX7 402-3SY2	
127 - 240 V	150 - 250 V	3TX7 402-3TY2	
240 - 400 V	–	3TX7 402-3UY2	
400 - 460 V	–	3TX7 402-3VY2	

Dimensional drawings

3TH30 - 0A

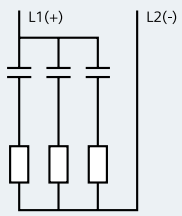


3TH30 - 0B

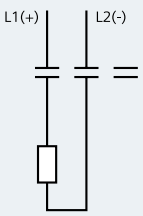


① Auxiliary Contact Block
② Identification tag

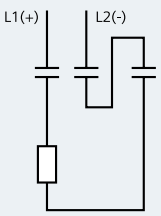
Useful technical information
Variety of connections for DC applications



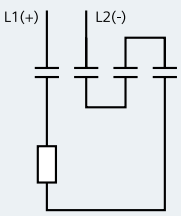
Single pole operation



Two poles in series



Three poles in series



Four poles in series

Power Contactors 3TF

For more than 110 years, Siemens has been developing and manufacturing industrial control products. We offer a wide product range which fulfills the demands of our customers regarding performance and reliability. Our aim is to make industrial operation easier ensuring flexible mounting, modular construction and high functionality. With 3TF contactors Siemens has been offering a tried tested trusted solution to control, switch and protect your motors upto 250kW.

Applications

3TF power contactors are suitable for switching and controlling squirrel cage and slip-ring motors as well as other AC loads, such as solenoids, capacitors, lighting loads, heating loads and transformer loads.

Standards

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

Coordinated feeder

Contactors and bi-relays have been tested for type-2 coordination at Iq = 50kA, 415V AC, 50Hz as per IS/IEC 60947-4-1, for both fuse protected as well as fuseless motor feeders.

Range

Air break contactors are available from 9 A to 475A in 3 pole version.

Also available in 2 pole AC version from 45A to 400A.

Benefits and features

Flexibility

- **Choice of Auxiliary contacts**

Contactor	Aux. contacts on basic unit	Permissible add-on contact blocks
9A / 12A	1 NO	Upto 4NO or 4NC
9A / 12A	1 NC	Upto 4NO or 2NC
16A/22A	-	Upto 4NO or 4NC
32A/38A	-	Upto 4NO or 4NC
45A to 475A	2NO+2NC	2 x (1NO+1NC)

The customer can order desired number of contacts thereby reducing the cost.

- **Choice of mounting**

  Contactor can be mounted on 35mm DIN and they are also suitable for screw mounting (9-38A – DIN / Screw mounting and 45-475A – Screw mounting).

- **Choice of coil voltages**

AC 50Hz coil code: 3TF30 to 3TF56

Coil voltage (V)	24	42	**110**	**230**	**415**
Code	B0	D0	**F0**	**P0**	**R0**

Wide band AC 50 Hz coil code: 3TF30 to 3TF35

Coil voltage (V)	70-140	150-280	260-460
Code	W110	W220	W415

AC 50/60 Hz coil code: 3TF57

Coil voltage (V)	110-132	220-240	380-460
Code	F7	M7	Q7

DC coil code: 3TF30 to 3TF57

Coil voltage (V)	**24**	42	48	**110**	**220**	**250+**
Code	**B4**	D4	W4	**F4**	**M4**	**N4**

+ For 3TF3 only

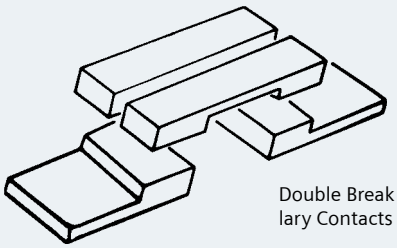
(Other coil voltages are also available.)

High performance

- **No duration upto 55°C**
  Contactors are suitable for operation in service temperature upto 55°C without derating. This avoids selection of higher rated contactor, thereby reducing cost.
- **Long Life**
  Superior design of current carrying parts, contact system and the magnet system increases the reliability results into **higher electrical and mechanical endurance**.
- **High short-time rating**
  Contactors have a high short-time rating, which makes them suitable for applications having high starting currents and long run-up times.

High reliability

- High insulation voltage and impulse withstand voltage capacity ensures reliable performance during occasional abnormal increase in supply voltage.
- **Double break parallel bridge contact mechanism**
  This mechanism is available for auxiliary contacts. Such contact mechanism ensures reliable contact at low voltage and low currents (5mA at 17VDC). It also offers unmatched reliability. (Chances of 2 mal-operations in 100 mill. operations as against 4460 for single bridge contacts)



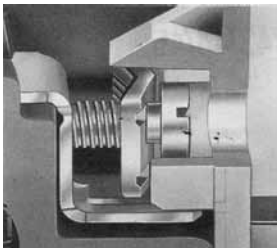
Double Break Parallel Bridge Auxiliary Contacts

User friendliness and safety

- **Arc Chamber Interlock** (45A and above)
  It prevents the contactor from switching ON, if the arc chamber is not fitted properly. Thus avoids accidents to plant and personnel.

- **Positively driven contacts**
  3TF contactors satisfy the conditions **for positively driven operation** between the main power contacts and the NC contacts. NC contacts positively open before the main contact closes. This is extremely important when power contactors are used in safety circuits of critical applications.

- **SIGUT Termination**



  – **Finger touch proof terminals***
    It protects against accidental contact with live parts which ensures operator safety.

  – **Funnel shaped cable entries**
    Reduce wiring time by facilitating quick location of the connecting wire.

  – **Cable end-stop**
    It decides the insertion depth of the connecting wires. 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 contactors 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.

* Finger touch proof terminals are available upto 85 A

Selection and ordering data

Contactor size	Rated current (A) Ie AC3 at 415V, 50Hz, 3ph	Motor kW at 415V 50Hz, 3ph	Auxiliary contacts	AC 50 Hz coil Type Pl. fill in coil voltage code	DC coil Type Pl. fill in coil voltage code	Std. pkg. (nos.)
0	**9**	**4**	1NO[$] 1NC[$]	**3TF30 10-0A..** **3TF30 01-0A..**	**3TF30 10-0B..** **3TF30 01-0B..**	**1**
	12	**5.5**	1NO[$] 1NC[$]	**3TF31 10-0A..** **3TF31 01-0A..**	**3TF31 10-0B..** **3TF31 01-0B..**	
1	**16**	**7.5**	–[$]	**3TF32 00-0A..**	**3TF32 00-0B..**	
	22	**11**	–[$]	**3TF33 00-0A..**	**3TF33 00-0B..**	
2	**32**	**15**	–[$]	**3TF34 00-0A..**	**3TF34 00-0B..**	
	38	**18.5**	–[$]	**3TF35 00-0A..**	**3TF35 00-0B..**	
3	**45**	**22**	2NO + 2NC[$]	**3TF46 02-0A..ZA01[@]**	**3TF46 02-0D..ZA01[@]**	
	63	**30**	2NO + 2NC[$]	**3TF47 02-0A..ZA01[@]**	**3TF47 02-0D..ZA01[@]**	
	70	**37**	2NO + 2NC[$]	**3TF47 72-0A..**	**3TF47 72-0D..**	
4	**75**	**42**	2NO + 2NC[$]	**3TF48 22-0A..ZA01[@]**	**3TF48 22-0D..ZA01[@]**	
	85	**45**	2NO + 2NC[$]	**3TF49 22-0A..ZA01[@]**	**3TF49 22-0D..ZA01[@]**	
6	**110**	**55**	2NO + 2NC[$]	**3TF50 02-0A..**	**3TF50 02-0D..**	
	140	**75**	2NO + 2NC[$]	**3TF51 02-0A..**	**3TF51 02-0D..**	
8	**170**	**90**	2NO + 2NC[$]	**3TF52 02-0A..**	**3TF52 02-0D..**	
	205	**110**	2NO + 2NC[$]	**3TF53 02-0A..**	**3TF53 02-0D..**	
10	**250**	**132**	2NO + 2NC[$]	**3TF54 02-0A..**	**3TF54 02-0D..[1)]**	
	300	**160**	2NO + 2NC[$]	**3TF55 02-0A..**	**3TF55 02-0D..[1)]**	
12	**400**	**200**	2NO + 2NC[$]	**3TF56 02-0A..**	**3TF56 02-0D..[1)]**	
	475	**250**	2NO + 2NC[$]	**3TF57 02-0C..**	**3TF57 02-0D..[1)]**	

[1)] Please connect DC coil circuit as recommended on page 16

[$] For more auxiliary contacts please refer table below - "auxiliary contact blocks"

[@] For box type (SIGUT) terminal, order 2 nos. 3TX7 460-0E

Coil voltage code AC 50Hz: 3TF30 to 3TF56

Coil voltage	24	42	**110**	**230**	**415**
Code	B0	D0	**F0**	**P0**	**R0**

Coil voltage code AC 50/60 Hz: 3TF57

Coil voltage (V)	110-132	220-240	380-460
Code	F7	M7	Q7

Coil voltage code DC: 3TF30 to 3TF57

Coil voltage (V)	**24**	42	48	**110**	**220**	**250+**
Code	**B4**	D4	W4	**F4**	**M4**	**N4**

+ For 3TF3 only

[2)] Coil voltage code AC 50Hz: 3TF (2 Pole AC Contactor)

Coil voltage	110	230	415
Code	F0	P0	R0

(Other coil voltages are also available)

Auxiliary contact blocks

For Contactor	Description	Type	Std. pkg. (nos.)
3TF30 to 35	1NO 1NC 1NO ext 1NC ext	**3TX4 010-2A** **3TX4 001-2A** **3TX4 010-4A** **3TX4 001-4A**	**10**
3TF46 to 57	Second 1NO+1NC Left Second 1NO+1NC Right	**3TY7 561-1KA00 8K**	**1**

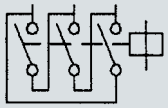
2 Pole AC contactors - 3TF

For single phase and 2 phase applications with AC coils

Contactor Size	Rated current Ie (A) AC3, 415V	Type[2)]	Std. pkg. (nos.)
3	45	**3TF46 02-0A..ZB01**	**1**
3	63	**3TF47 02-0A..ZB01**	
3	70	**3TF47 72-0A..ZB01**	
6	110	**3TF50 02-0A..ZB01**	
6	140	**3TF51 02-0A..ZB01**	
8	170	**3TF52 02-0A..ZB01**	
8	205	**3TF53 02-0A..ZB01**	
10	250	**3TF54 02-0A..ZB01**	
10	300	**3TF55 02-0A..ZB01**	
12	400	**3TF56 02-0A..ZB01**	

Technical data

Contactor		Size	0		1		2	
		Type	3TF30	3TF31	3TF32	3TF33	3TF34	3TF35
Permissible ambient temperature	**Storage**	°C	-55 to +80					
	Service	°C	-25 to +55					
Maximum operating voltage		V	690					
Rated insulation voltage *Ui* (At Pollution Degree 3)[1]		V	690					
Rated impulse strength *Uimp*		kV	8					
Mechanical endurance (make/break operations)	AC	Cycles	15×10^6				10×10^6	
	DC	Cycles	15×10^6				10×10^6	
Rating of contactors for AC loads								
AC-1 duty, switching resistive load								
Rated operational current ***Ie***	at 40°C upto 690V	A	21		32		65	
	at 55°C upto 690V	A	20		30		55	
Ratings of three-phase loads								
p.f.=1 at 55°C	at 415V	kW	13		19.7		36	
	500V	kW	17		26		47.5	
	690V	kW	22		34		62.7	
AC-2 and AC-3 duty								
Rated operational current ***Ie***[2]	**upto 415V**	**A**	**9**	**12**	**16**	**22**	**32**	**38**
	500V	A	9	12	16	17	32	38
	690V	A	6.6	8.8	12.2	12.2	27	27
Nominal rating of slipring or squirrel-cage motors at 50/60 Hz.	**at 415V**	**kW**	**4**	**5.5**	**7.5**	**11**	**15**	**18.5**
	500V	kW	5.5	7.5	10	11	21	25
	690V	kW	5.5	7.5	11	11	23	23
AC-4 duty (contact endurance approx. 2×10^5 make-break operations at Ia=6Ie)								
Rated operational current ***Ie***	upto 690V	A	3.3	4.3	7.7	8.5	15.6	18.5
Rating of squirrel-cage motors at 50/60Hz.	at 415V	kW	1.54	2.1	3.5	4	8.2	9.8
	500V	kW	1.7	2.5	4.6	5.2	9.8	11.8
Max. permitted rated operational current Ie/AC-4 = Ie/AC-3 upto 500V. Ref. life curve for the life.	690V	kW	2.54	3.45	6	6.6	13	15.5
Used as stator contactor (upto 690V) (AC-2 duty)								
Stator currents ***Ies***	20%	A	20	20	25(46*)		85	
On-load factor (ED)[3] with intermittent duty	40%	A	20	20	25(37*)		67	
	60%	A	20	20	25(33*)		60	
* Applicable up to 500V	80%	A	20	20	25(30*)		55	
Used as rotor contactor (upto 690V) (AC-2 duty)								
Rotor current ***Ier***	20%	A	31		73		125	
On-load factor (ED)[3]	40%	A	31		58		106	
with intermittent duty	60%	A	31		52		95	
	80%	A	31		47		87	
Locked rotor voltage Uer	Starting	V	1320		1320		1320	
	Plugging / Control	V	660		660		660	
AC-6b duty, switching low-inductance individual three-phase capacitors at 50/60Hz[4] (we also offer special capacitor duty contactors)	415V	kVAR	4		7.5		16.7	
	500V	kVAR	4		7.5		16.7	
	690V	kVAR	4		7.5		16.7	
Thermal loading	10 s current	A	90	96	130	176	400	400
Power loss per current path at Ie/AC-3		W	0.6	1.1	1	1.6	2	2.5
Rating of contactors for DC loads								
DC-1 duty, switching resistive load (L/R < 1mS)								
Rated operational current ***Ie*** (at 55°C)								
Number of current paths in series connection			1 2 3		1 2 3		1 2 3	
	at 24V	A	20 20 20		30 30 30		55 55 55	
	110V	A	2.1 12 20		4.5 30 30		6 55 55	
	220V	A	0.8 1.6 20		1 5 30		1 6 45	
	440V	A	0.6 0.8 1.3		0.4 1 2.9		0.4 1.1 2.9	
DC-3 and DC-5 duty, shunt & series motors (L/R < 15mS)								
Rated operational current ***Ie*** (at 55°C)								
Number of current paths in series connection			1 2 3		1 2 3		1 2 3	
	at 24V	A	20 20 20		20 30 30		20 55 55	
	110V	A	0.15 0.35 20		0.75 7 30		0.75 7 55	
	220V	A	- - 1.75		0.2 1 3.5		0.2 1 3.5	
	440V	A	- - 0.2		0.09 0.27 0.6		0.1 0.27 0.6	



1) As per IS/IEC 60947-1

2) Ratings at 1000V AC - upon enquiry.

3) On-load factor (ED) in % = $\frac{\text{ontime} \times 100}{\text{cycle time}}$
Max. switching freq. z = 50 per hour. Ratings at higher frequency upon enquiry.

	3			4		6		8		10		12	
3TF46	**3TF47**	**3TF47 7**	**3TF48**	**3TF49**	**3TF50**	**3TF51**	**3TF52**	**3TF53**	**3TF54**	**3TF55**	**3TF56**	**3TF57**
			-55 to +80 -25 to +55									
1000			1000									
1000			1000									
8			8									
10×10^6 3×10^6			10×10^6 3×10^6									
90 80	100 90	100 90	120 100	120 100	170 160		230 210	240 220	325 300	325 300	425 400	600 550
52 67 91	52 67 91	52 67 91	66 86 114	66 86 114	105 138 183		132 173 228	138 181 240	195 260 340	195 260 340	262 345 457	381 476 657
45 45 45	**63** 63 63	**70** 70 70	**75** 75 75	**85** 85 75	**110** 110 110	**140** 140 110	**170** 170 170	**205** 205 170	**250** 250 250	**300** 300 250	**400** 400 400	**475** 475 400
22 30 40	**30** 41.4 57.2	**37** 46 60.1	**42** 50.7 70	**45** 59 70	**55** 76.3 105	**75** 98 105	**90** 118 163	**110** 145 163	**132** 178 245	**160** 210 245	**200** 284 392	**250** 329 392
24	28	31	34	42	54	68	75	96	110	125	150	150
13.1 15.8	15.3 18.4	16.9 20.4	18.6 22.4	23 27	29.5 35.5	38 46	42 50	54 65	63 76	72 86	88 107	88 107
21.8	25.4	28.2	30.9	38	49	63	69	90	105	119	147	147
123	138	138	154		246		323	339	462		617	800
98	110	110	122		195		256	268	367		490	670
87	98	98	109		174		229	240	327		436	600
80	90	90	100		160		210	220	300		400	550
150	219	219	243		389		510	535	729		972	1336
150	174	174	193		309		405	425	579		772	1061
138	155	155	172		275		361	378	516		688	946
126	142	142	158		253		332	348	474		632	869
1500	1500	1500	2000		2000		2000	2000	2000		2000	2000
750	750	750	1000		1000		1000	1000	1000		1000	1000
30 35 30			50 62.5 50		60 80 60		100 130 100		150 190 150		200 265 200	
360	500	500	800	800	880	1140	1360	1640	2500	2500	3400	4200
3.5	6	6	7.5	10	10	14	14	20	16	23	40	40
1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
80 6 1.2 0.48	80 80 7 1.2	80 80 80 3	100 12 2.5 0.8	100 100 13 2.4	100 100 100 6	160 18 3.4 0.8	160 160 20 3.2	160 160 160 11.5	200 18 3.4 0.8	200 200 20 3.2	200 200 200 11.5	300 33 3.8 0.9	300 300 300 4	300 300 300 11	400 33 3.8 0.9	400 400 400 4	400 400 400 11
1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
5 0.75 0.2 0.1	80 12.5 1.1 0.27	80 80 3.5 0.6	6 1.25 0.35 0.15	100 100 1.75 0.42	100 100 4 0.8	160 2.5 0.6 0.17	160 160 2.5 0.65	160 160 160 1.4	200 2.5 0.6 0.17	200 200 2.5 0.65	200 200 200 1.4	300 3 0.6 0.18	300 300 2.5 0.65	300 300 300 1.4	400 3 0.6 0.18	400 400 2.5 0.65	400 400 400 1.4

4) Ratings for capacitor - banks in parallel - upon enquiry. Minimum inductance of 6µH required between parallel connected capacitors.

Power Contactors Technical Data

Contactor			Size	0		1		2		3		
			Type	3TF30	3TF31	3TF32	3TF33	3TF34	3TF35	3TF46	3TF47	3TF47 7
Switching frequency *z* (Contactors without overload relay)			Operation									
	No load	AC	Cycles/hr	10,000	10,000	5000	5000	5000	5000	5000	5000	5000
		DC	Cycles/hr	1,500	1,500	1,500	1,500	1,500	1,500	1,000	1,000	1,000
	at AC-1		Cycles/hr	2,000	2,000	1,500	1,500	1,200	1,200	1,000	1,000	1,000
	at AC-2		Cycles/hr	1,000	1,000	750	750	750	600	600	400	400
	at AC-3		Cycles/hr	1,000	1,000	750	750	750	600	1200[5]	1000	1000
	at AC-4		Cycles/hr	250	250	250	250	250	200	400	300	300
Coil ratings (cold coil 1.0 x Us)		Supply frequency	Hz	50		50		50		50		
AC operation 50Hz		Closing	VA	68		68		101		183		
		p.f.		0.79		0.82		0.83		0.6		
		Closed	VA	10		10		12.1		17		
		p.f.		0.29		0.29		0.28		0.29		
DC operation		Closing	W	6.2		6.2		11.7		400		
		Closed	W	6.2		6.2		11.7		2.1		
Coil voltage tolerance		Operation AC/DC		0.8 to 1.1 x Us		0.8 to 1.1 x Us						
		at 24V DC		0.8 to 1.2 x Us								
Operating times at 1 x Us [8]												
AC operation		Closing	ms	10 - 25		10 - 25		13 - 32		17 - 30		
		Opening	ms	4 - 18		5 - 20		5 - 10		5 - 25		
DC operation		Closing	ms	30 - 70		40 - 80		58 - 107		22 - 40		
		Opening	ms	12 - 20		10 - 20		13 - 17		105 - 115		
Auxiliary contacts												
Rated thermal current I_{th} = rated operational current *Ie* / AC-12			A	Inbuilt Aux Contact 10		Contact Block 3TX4 10				Contact Block 3TY7 10		
Rated operational current ***Ie / AC-15/AC-14***												
at rated operational voltage *Ue*		upto 125V	A	10		6				10		
		220V	A	10		6				6		
		415V	A	5.5		3.6				3.6		
		500V	A	4		2.5				2.5		
Rated operational current ***Ie / DC12***												
at rated operational voltage *Ue*		upto 48V	A	10		10				10		
		110V	A	2.1		5.5				3.2		
		220V	A	0.8		1.2				0.9		
		440V	A	0.6		0.28				0.33		
Rated operational current ***Ie / DC13***												
at rated operational voltage *Ue*		upto 24V	A	10		10				10		
		48V	A	5		4.6				5		
		110V	A	0.9		0.80				1.14		
		220V	A	0.45		0.30				0.48		
		440V	A	0.25		0.11				0.13		
Conductor cross-sections												
Main conductor												
Solid			mm^2	2 x (0.5 to 1, 1 to 2.5), 1x4		2 x (2.5 to 6)		1 to 16		2 x (6 to 16)		
Finely stranded with end sleeve			mm^2	2 x (0.75 to 2.5)		2 x (1.5 to 4)		1 x (5 to 16, 2.5 to 10)		1 x (10 to 35), 2 x (10 to 25)		
Pin end connector			mm^2	1 x (1 to 2.5)		1 x (1 to 6)		2 x (1 to 6)		–		
Solid or stranded			AWG	2 x (18 to 12)		2 x (14 to 10)		2 x (14 to 6)		2 x (10 to 1/10)		
Tightening torque			Nm	0.8 to 1.4		1 to 1.5		2.5 to 3.0		4 to 6		
Finely stranded with cable lug			mm^2							10 to 35		
Terminal bar (max. width)			mm							12		
Solid or stranded			AWG							7 to 1/0		
Tightening torque			Nm							4 to 6		
Auxiliary conductor				Inbuilt Aux Contact		Contact Block 3TX4				Contact Block 3TY7		
Solid			mm^2	2 x (0.5 to 1, 1 to 2.5), 1 x 4		2 x (0.5 to 1, 1 to 2.5),				2 x (0.5 to 1, 1 to 2.5), 1 x 4		
Finely stranded with end sleeve			mm^2	2 x (0.75 to 2.5)		2 x (0.75 to 2.5)				2 x (0.75 to 2.5)		
Pin end connector			mm^2	1 x (1 to 2.5)		2 x (1 to 1.5)				2 x (1 to 1.5)		
Solid or stranded			AWG	2 x (18 to 12)		2 x (18 to 12)				2 x (18 to 12)		
Tightening torque			Nm	0.8 to 1.4		0.8 to 1.4				0.8 to 1.4		
Short-circuit protection												
Main circuit (Fuse type 3NA3)		Co-ordination Type - 1	A	35	35	63	63	80	80	160	160	160
		Type - 2	A	25	25	32	32	80	80	125	125	160
Auxiliary circuits			A	16								
			A	6, if overload relay auxiliary contacts are in the contactor coil circuit								

5) With AC coil. With DC coil: 1000 oprs/hr.

6) Including switching contactor.

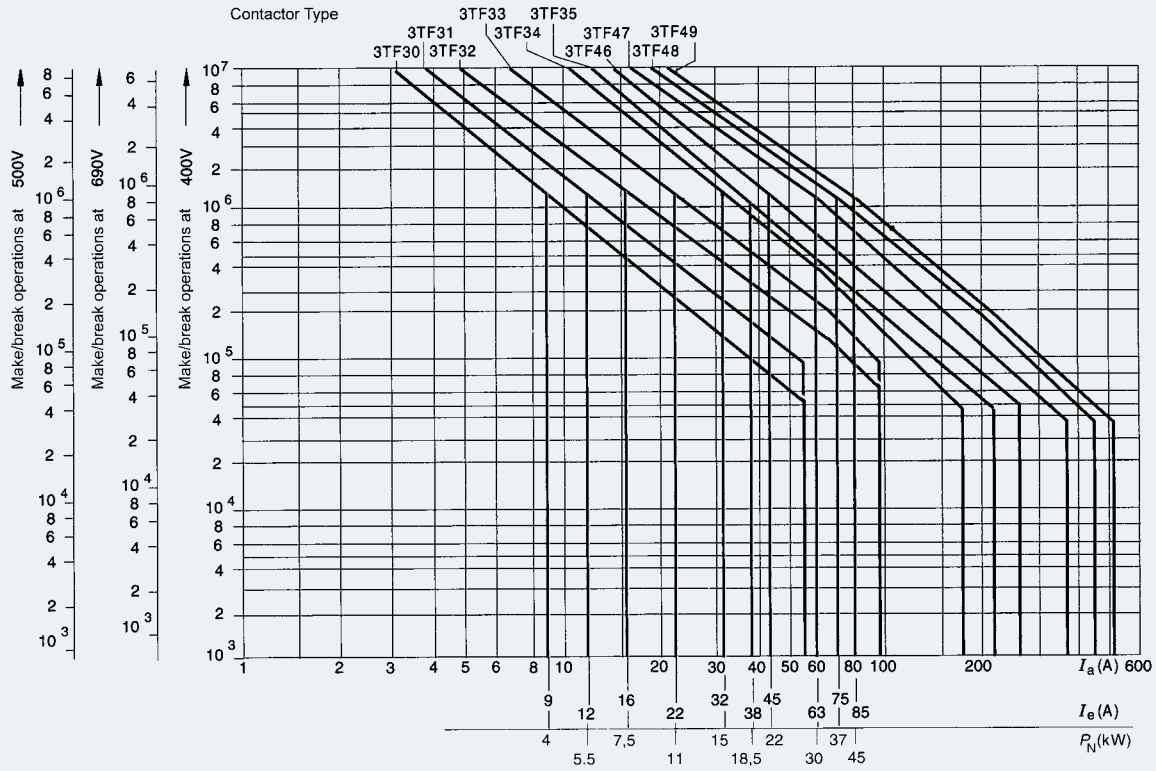
7) Rated value of the control voltage.

4		6		8		10		12		
3TF48	3TF49	3TF50	3TF51	3TF52	3TF53	3TF54	3TF55	3TF56	3TF57	
5000	5000	5000	5000	5000	5000	3000	3000	3000	2000	
1,000	1,000	1000	1000	1000	1000	1000	1000	1000	1000	
900	900	800	800	800	750	800	750	700	500	
400	350	400	300	300	250	300	250	200	170	
1000	850	1000	750	700	500	700	500	500	420	
300	300	300	200	200	130	200	130	150	150	
50		50		50		50		50	50/60	
									Lower[7]	Upper[7]
330		550		910		1430		2450	1136	1900
0.5		0.45		0.38		0.34		0.21	1	1
32		39		58		84		115	16	45
0.23		0.24		0.26		0.24		0.33	0.34	0.16
420		500		876[6]		1216[6]		1306[6]	1110[6]	
2.7		2.7		11[6]		13.3[6]		14[6]	24[6]	
0.8 to 1.1 x Us										
22 - 35		22 - 37		25 - 50		25 - 40		25 - 40	48 - 70	
5 - 30		8 - 30		10 - 30		10 - 30		8 - 30	80 - 100	
32 - 40		28 - 32		32 - 45		36 - 45		40 - 55	44 - 60	
95-105		185 - 195		10 - 20		10 - 20		10 - 20	12 - 15	
10				10				10		
10				10				10		
6				6				6		
3.6				3.6				3.6		
2.5				2.5				2.5		
10				10				10		
3.2				3.2				3.2		
0.9				0.9				0.9		
0.33				0.33				0.33		
10				10				10		
5				5				5		
1.14				1.14				1.14		
0.48				0.48				0.48		
0.13				0.13				0.13		
		16 to 70	35 to 95	35 to 95	50 to 240	50 to 240	50 to 240	50 to 240	50 to 240	
		15	20	20	25	25	25	25	30	
		3 to 2/0								
		6 to 8	10 to 14	10 to 14	14 to 24	14 to 24	14 to 24	14 to 24	14 to 24	
2 x (0.5 to 1, 1 to 2.5), 1 x 4 2 x (0.75 to 2.5) 1 x (1 to 2.5) 2 x (18 to 12) 0.8 to 1.4				2 x (0.5 to 1, 1 to 2.5) 2 x (0.75 to 2.5) 1 x (1 to 2.5) 2 x (18 to 12) 0.8 to 1.4				2 x (0.5 to 1, 1 to 2.5) 2 x (0.75 to 2.5) 1 x (1 to 2.5) 2 x (18 to 12) 0.8 to 1.4		
250	250	400	400	400	400	500	500	800		800
160	160	200	250	250	250	400	400	500		500

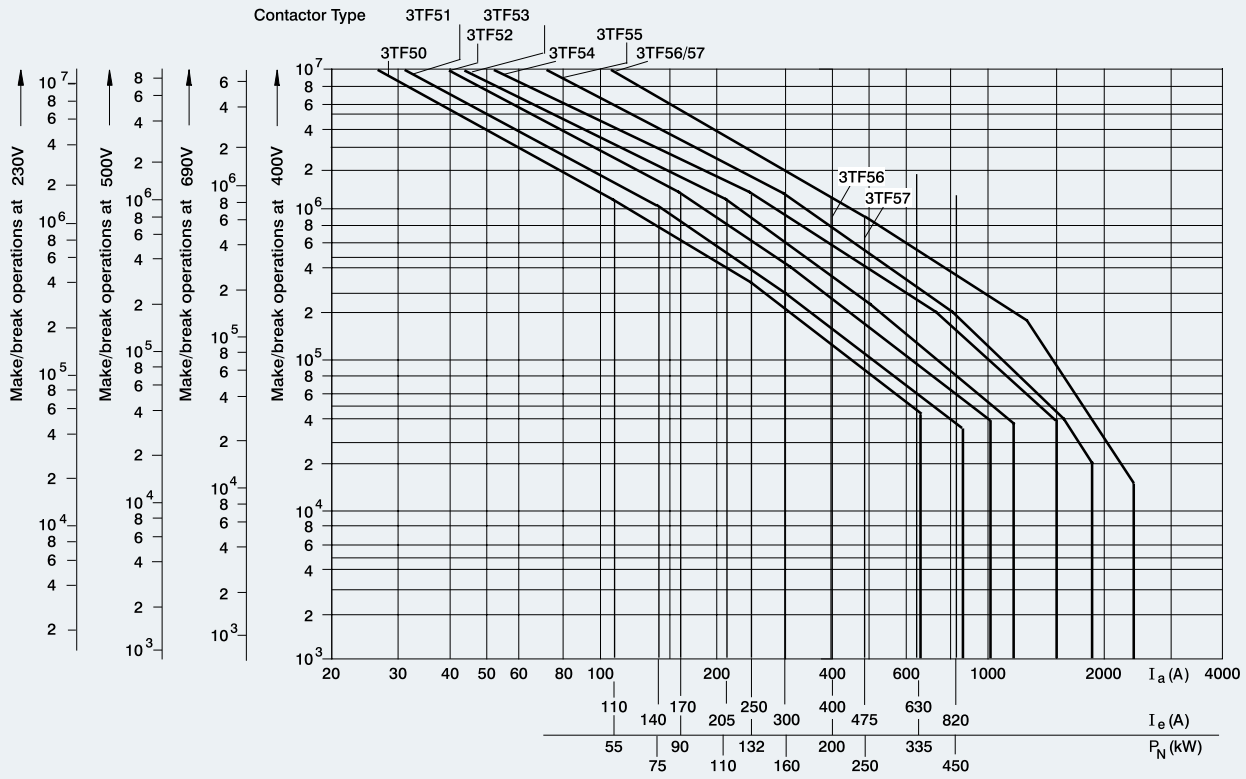
8) The opening time delay increases when the contactor coil is protected against voltage peaks. (e.g. Varistor: +2 to +5ms)

Electrical Life Curves

3TF30 to 3TF49 contactors

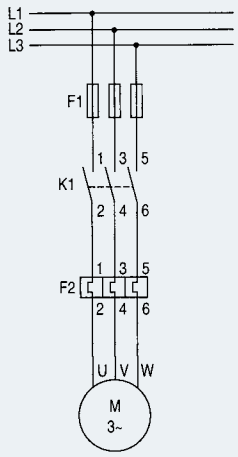


3TF50 to 3TF57 contactors

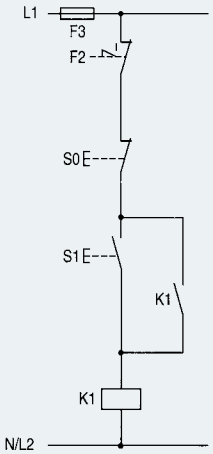


Typical Circuit Diagrams

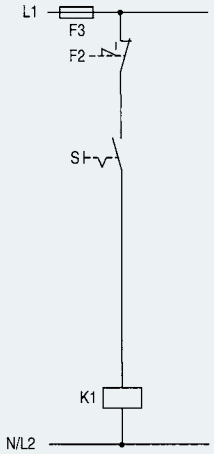
Direct On Line starter



a) Main circuit



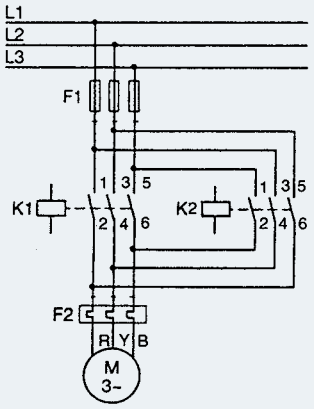
b) Control circuit for momentary-contact control



c) Control circuit for maintained-contact control

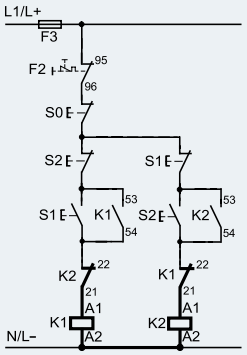
S0 = 'OFF' Push button
S1 = 'ON' Push button
S = Maintained command switch
K1 = Main contactor
F1 = Main circuit fuse
F2 = Overload relay
F3 = Control circuit fuse

Forward / Reverse starter (Electrical Interlocking)



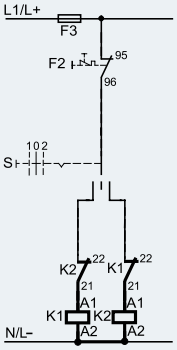
Main circuit

S0 : 'OFF' Push button
S1 : 'ON Clockwise' Push button
S2 : 'ON Anti-clockwise' Push button
S : Selector Switch 'Clockwise - OFF - Anti-clockwise'



Push button control (momentary command)

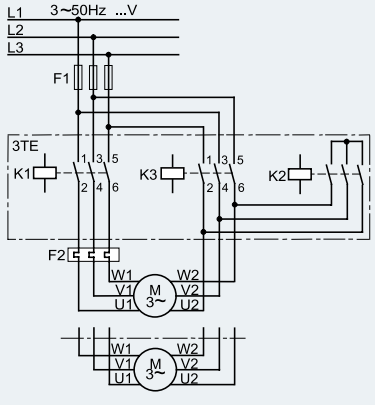
K1 : Clockwise contactor
K2 : Anti-clockwise contactor



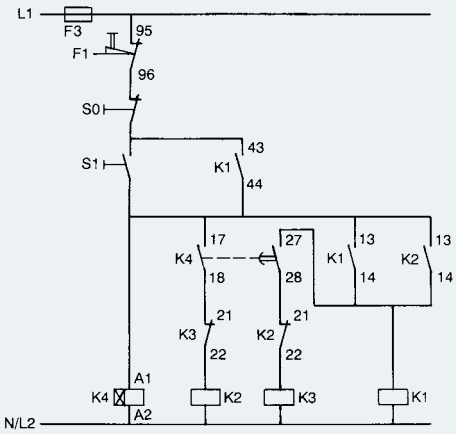
Selector switch control (command needs to be maintained)

F1 : Main circuit fuses
F2 : Overload relay
F3 : Control circuit fuse

Star Delta starter



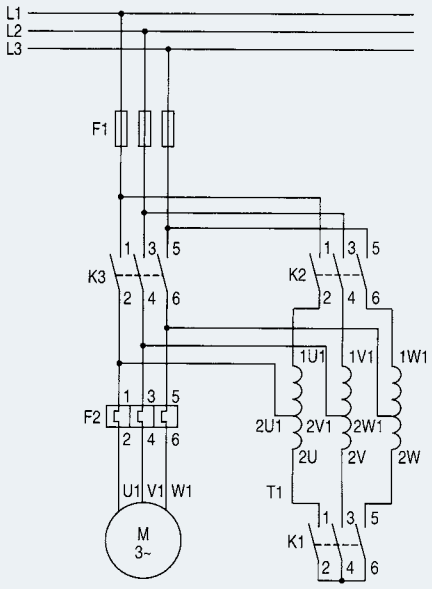
Main circuit



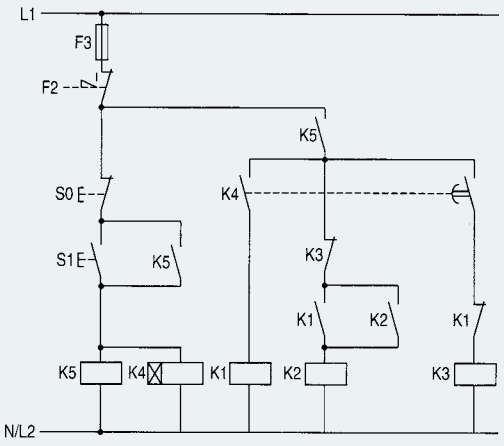
Control circuit for push button control (momentary command)

S0 = 'OFF' Push button
S1 = 'ON' Push button
K1 = Line contactor
K2 = Star contactor
K3 = Delta contactor
K4 = Star delta timer (7PU60 20)
F2 = Overload relay
F1 = Backup fuse
F3 = Control circuit fuse

Auto Transformer starter



a) Main Circuit

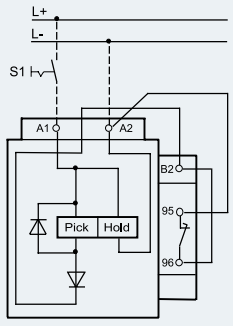


b) Auxiliary circuit for momentary-contact control

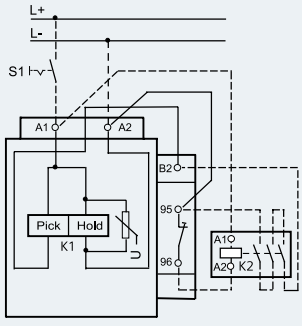
S0 = 'OFF' Push button
S1 = 'ON' Push button
K1 = Star contactor
K2 = Transformer contactor
K3 = Main contactor
K5 = Contactor relay (2NO + 2NC)
K4 = Time relay (7PU6020)
F1 = Main circuit fuses
F2 = Overload relay
F3 = Control circuit fuse

Please refer page no. 70 for selection of switchgear for autotransformer starting method

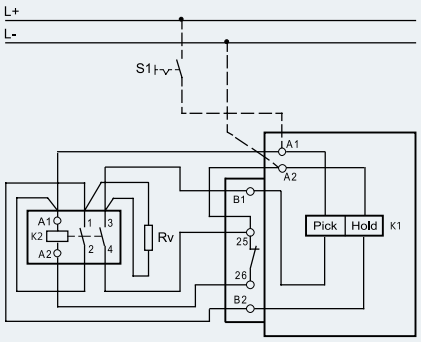
Internal connection diagram for DC coil circuits



K1 : Sizes 3 to 6,
3TF46 to 3TF51



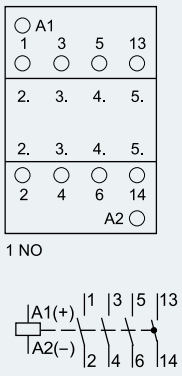
K1 : Sizes 8 to 12
3TF52 to 3TF56
K2 : 3TF30 10 OB.. for 3TF52-55
3TF32 00-OB.. for 3TF56



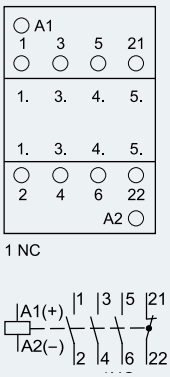
K1 : Size 12
3TF57
K2 : 3TC44 17 4A..

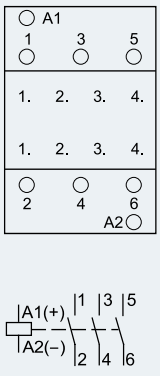
The control circuits indicated by dotted lines are to be wired by customer.

Terminal Designation

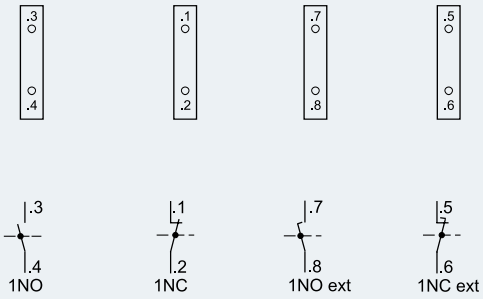


Size 0, 3TF30/31
AC and DC Coil

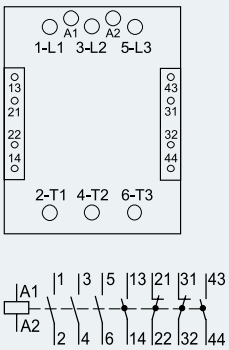




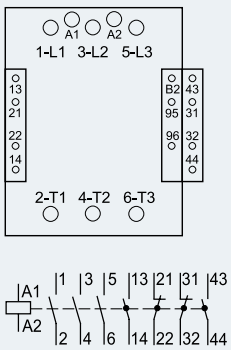
Size 2, 3TF32/33/34/35
AC and DC Coil



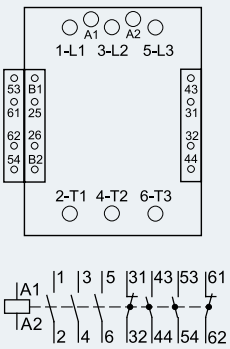
Add-on contact block for 3TF30/31/32/33



Size 3 to 12, 3TF46 to 3TF57
AC Coil

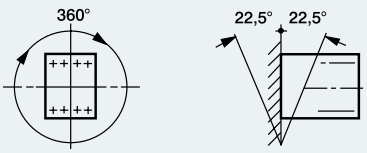


Size 3 to 12, 3TF46 to 3TF56
DC Coil

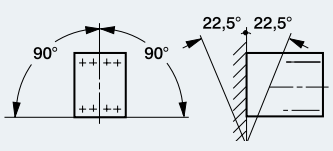


Size 12, 3TF57
DC Coil

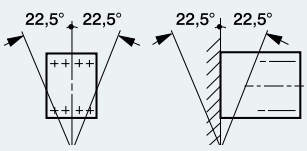
Permissible Mounting Position



3TF30 to 3TF33 - AC operation



3TF30 to 3TF33 - DC operation
3TF34 to 3TF57 - AC operation
3TF46 to 3TF57 - DC operation



3TF34/35 - DC operation

Accessories and ordering data

1. Mechanical interlocking kit

Mechanical interlock is required when the supply from two different sources is available. Also the same is required for the application involving reversing of motor. Here two contactors are mechanically interlocked with the help of mechanical interlock kit. This ensures closing of only one contactor at a time. Thus prevents a short circuit upon load changeover from one contactor to another.

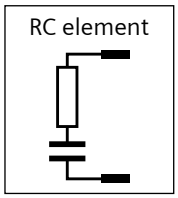
For Contactor		MLFB	Std. pkg. (nos.)
AC3 Rating	Contactor		
9 to 38A	3TF30 to 35	**3TX4 091-1A #**	**10**
45/63/70A	3TF46/47/47-7	**3TX7 466-1YA0**	**2**
75/85A	3TF48/49	**3TX7 486-1YA0**	**2**
110/140A	3TF50/51	**3TX7 506-1YA0**	**2**
170/205A	3TF52/53	**3TX7 526-1YA0**	**2**
250/300A	3TF54/55	**3TX7 546-1YA0**	**2**
400 A	3TF56	**3TX7 566-1YA0**	**2**
110/170 A	3TF50/52	**3TX7 526-1YA09**	**1**
170/250 A	3TF52/54	**3TX7 546-1YA09**	**1**

#: W/O base plate (not required)

2. Surge suppressor

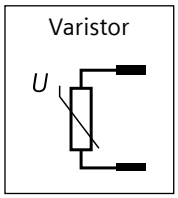
It is used to reduce the effect of switching overvoltages created during the opening of inductive circuits. Typically they are mounted outside the body of the contactor, and are connected in parallel with the coil terminals. Various techniques for the suppression of switching overvoltages can be employed. For example: RC element, Varistor etc.

RC Element:



The effective increase in the capacitance of the coil circuit reduces the amplitude and rate of rise of switch off overvoltage spikes to such an extend that no rapid restriking occur.

Varistor:



Varistor limit the maximum value of the overvoltage because they become highly conductive above a threshold value. Until this threshold value is reached shower discharge occurs for small duration.

Selection table:

Surge suppressor (Varistor) for 3TF30-3TF35

Coil Voltage		Type	Std. pkg. (nos.)
AC	DC		
24 - 48 V	24 - 70V	**3TX7 402-3GY1**	
48 - 127V	70 - 150V	**3TX7 402-3HY1**	
127 - 240V	150 - 250V	**3TX7 402-3JY1**	**10**
240 - 400V	–	**3TX7 402-3KY1**	
400 - 600V	–	**3TX7 402-3LY1**	

Surge suppressor (Varistor) for 3TF46-56

Coil Voltage		Type	Std. pkg. (nos.)
AC	DC		
Less than 48V	24 - 70V	**3TX7 462-3GY1**	
48 - 127V	70 - 150V	**3TX7 462-3HY1**	
127 - 240V	150 - 250V	**3TX7 462-3JY1**	**10**
240 - 400V	–	**3TX7 462-3KY1**	
400 - 600V	–	**3TX7 462-3LY1**	

Surge suppressor (RC Element) for 3TF30-3TF35

Coil Voltage		Type	Std. pkg. (nos.)
AC	DC		
24 - 48V	24 - 70V	**3TX7 402-3RY2**	
48 - 127V	70 - 150V	**3TX7 402-3SY2**	
127 - 240V	150 - 250 V	**3TX7 402-3TY2**	**10**
240 - 400V	–	**3TX7 402-3UY2**	
400 - 460V	–	**3TX7 402-3VY2**	

3. Connector

The 3TS90 **connector** is used to mount the motor protection circuit breaker 3VU on the contactor 3TF with screw terminals. It enables mechanical and electrical connection between contactor and motor protection circuit breaker.

Range:

Size of connector	MPCB		Contactor		MLFB of Connector	Std. pkg. (nos.)
	MLFB	Current Rating	MLFB	AC3 Current Rating		
I	**3VU13**	0.16 to 20A	**3TF30 / 31**	9 / 12 A	**3TS90 01-8K**	**1**
II	**3VU13**	6 to 25A	**3TF32 / 33**	16 / 22A	**3TS90 02-8K**	**1**

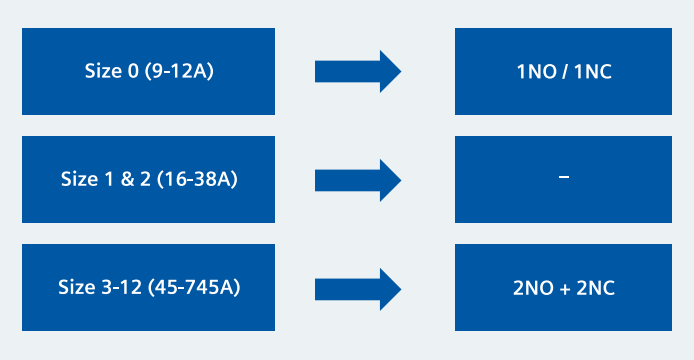
Benefits:

Direct mounting of 3VU MPCB on 3TF contactor eliminates the need of power wiring and ensures secure connection. In addition, the assembly time and size of the feeder is reduced which results in cost saving. The overall assembly also looks contemporary.

Spares and ordering data

1. Auxiliary Contact Blocks

In-built contact configuration



Add – on Contact Blocks:

For Contactor	Add on contact blocks	Type	Std. pkg. (nos.)
3TF30-35	1NO 1NC 1NO ext 1NC ext	**3TX40 10-2A** **3TX40 01-2A** **3TX40 10-4A** **3TX40 01-4A**	**10**
3TF46-57	1NO+1NC Left 1NO+1NC Right 1NO + 1NC (Extd) Right	**3TY7 561-1A** **3TY7 561-1B** **3TY7 561-1E**	**1**
3TF46-57	Second 1NO+1NC Left Second 1NO+1NC Right	**3TY7 561-1K** **3TY7 561-1L**	**1**
3TF46/47/477	Special block for DC Coil Circuit	**3TY7 461-1F**	**1**
3TF48 to 57	Special block for DC Coil Circuit	**3TY7 481-1F**	**1**

2. Main contact kits / arc chambers / AC-DC coils

For contactor type (AC3 rating)	Main contact kits (6 fixed & 3 moving contacts)	Arc chambers	AC coils[1)]	DC coils[1)]	Std. pkg. (nos.)
3TF30 (9A)	–	–	**3TY7 403-0A..**	**3TY4 803-0B..**	**1**
3TF31 (12A)	–	–			
3TF32 (16A)	**3TY7 420-0A**	–			
3TF33 (22A)	**3TY7 430-0A**	–			
3TF34 (32A)	**3TY7 340-0C**	**3TY7 342-0C**	**3TY7 443-0A..**	**3TY7 443-0B..**	
3TF35 (38A)	**3TY7 350-0C**	**3TY7 352-0C**			
3TF46 (45A)	**3TY7 460-0YA**	**3TY7 462-0YA**	**3TY7 463-0A..**	**3TY7 463-0D..**	
3TF47 (63A)	**3TY7 470-0YA**	**3TY7 472-0YA**			
3TF477 (70A)	**3TY7 477-0YA**	**3TY7 477-0YD**			
3TF48 (75A)	**3TY7 480-0A**	**3TY7 482-0A**	**3TY7 483-0A..**	**3TY7 483-0D..**	
3TF49 (85A)	**3TY7 490-0A**	**3TY7 492-0A**			
3TF50 (110A)	**3TY7 500-0YA**	**3TY7 502-0YA**	**3TY7 503-0A..**	**3TY7 503-0D..**	
3TF51 (140A)	**3TY7 510-0YA**	**3TY7 512-0YA**			
3TF52 (170A)	**3TY7 520-0YA**	**3TY7 522-0YA**	**3TY7 523-0A..**	**3TY7 523-0D..**	
3TF53 (205A)	**3TY7 530-0YA**	**3TY7 532-0YA**			
3TF54 (250A)	**3TY7 540-0YA**	**3TY7 542-0YA**	**3TY7 543-0A..**	**3TY7 543-0D..**	
3TF55 (300A)	**3TY7 550-0YA**	**3TY7 552-0YA**			
3TF56 (400A)	**3TY7 560-0YA**	**3TY7 562-0YA**	**3TY7 563-0A..**	**3TY7 563-0D..**	
3TF57 (475A)	**3TY7 570-0YA**	**3TY7 572-0YA**	**3TY7 573-0C**	**3TY7 573-0D..**	

[1)] Please fill in coil voltage code from table below

Coil voltage code AC 50Hz: 3TF30 to 3TF56

Coil voltage	24	42	110	230	415
Code	B0	D0	F0	P0	R0

Coil voltage code AC 50/60 Hz: 3TF57

Coil voltage (V)	110-132	220-240	380-460

Code	F7	M7	Q7

Coil voltage code DC: 3TF30 to 3TF57

Coil voltage (V)	24	42	48	110	220	250+
Code	B4	D4	W4	F4	M4	N4

+ For 3TF3 only

(Other coil voltages are also available)

SIEMENS

Introducing a revolutionary system to check the authencity of SICOP 3TF Main Contact Kits

Join us in the campaign against fake contact kits.

To avoid duplicity of contact kits, a new security label will be used on the cartons of the main contact kit. A special UV torch can be used to check the authenticity of the contact kits. Once this special UV light is focused on the label, the Siemens logo turns pink. This can be ordered from DF CS. Contact your local CS partner for ordering this UV torch.

This can be ordered from your local service support team. Alternatively, you can contact at 1800 209 0987 or email us at ics.india@siemens.com.

Disadvantage of duplicate contact kits:

Early worn-out of contacts

- Inconsistent current rating increases wear and tear of contacts
- This results in frequent changing of contact kits
- Loss of time and money

Contactor Burns

- Arching at duplicate contacts causes excessive heat generation
- Such heat generation leads to failure of contactor

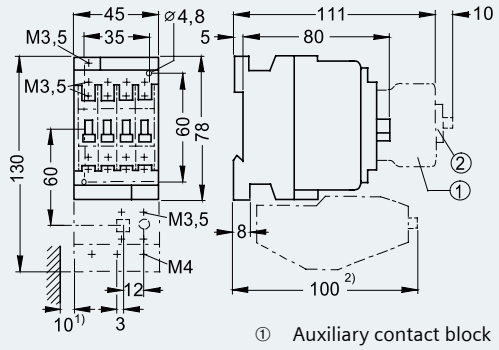
Panel Burns

- Unexpected excessive heating results in malfunctioning of other components in panel
- Incidents of burning of panels have been observed

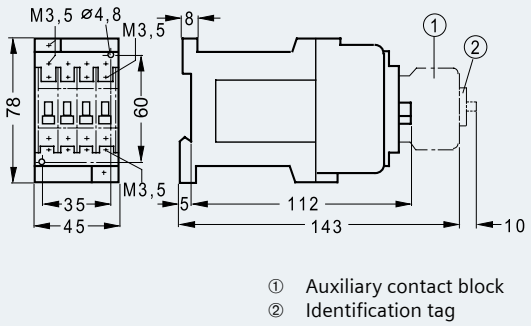
www.siemens.co.in

Dimensional drawing

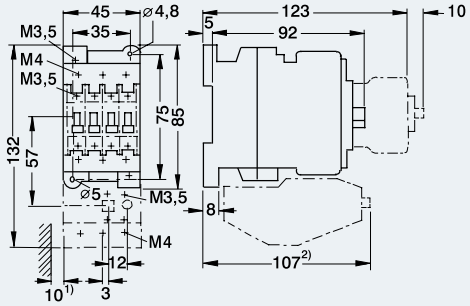
3TF30/31 AC Coil



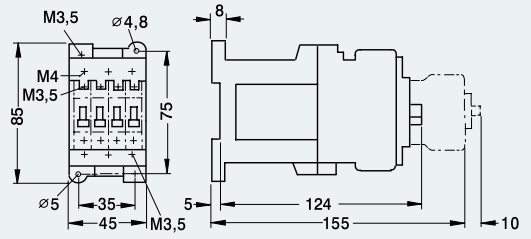
3TF30/31 DC Coil



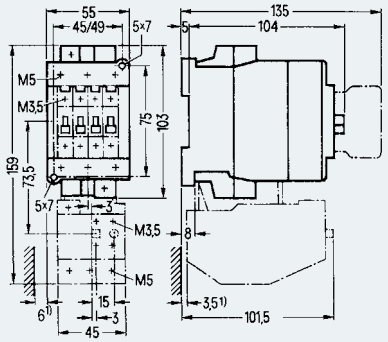
3TF32/33 AC Coil



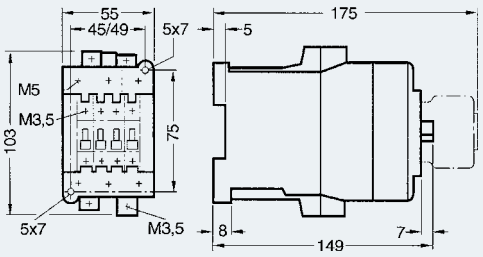
3TF32/33 DC Coil



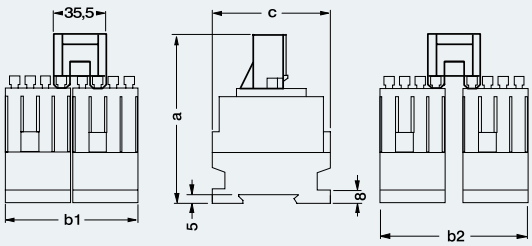
3TF34/35 AC Coil



3TF34/35 DC Coil



3TF30 to 3TF32, with mechanical interlock kit

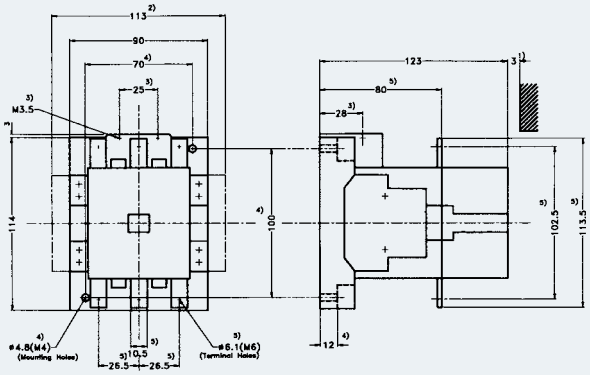


Type	a (AC coil)	a (DC coil)	b1	b2	c
3TF30/31	116	148	90	100	78
3TF32/33	127	159	91	101	85

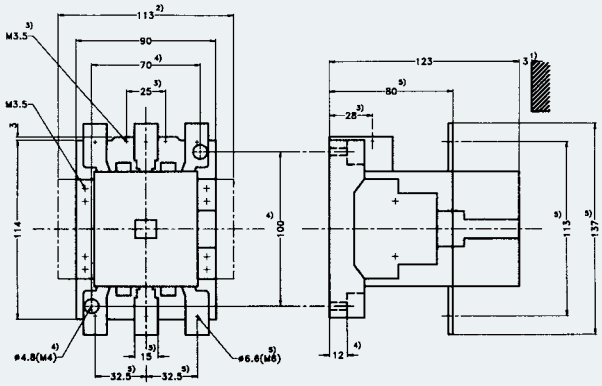
Notes

1) Dimensions for coil terminals
2) Dimensions for mounting terminals
   Minimum clearance from insulated components = 5mm
   Minimum clearance from earthed components = 10mm
3) size of power terminals
4) Size of auxiliary terminals

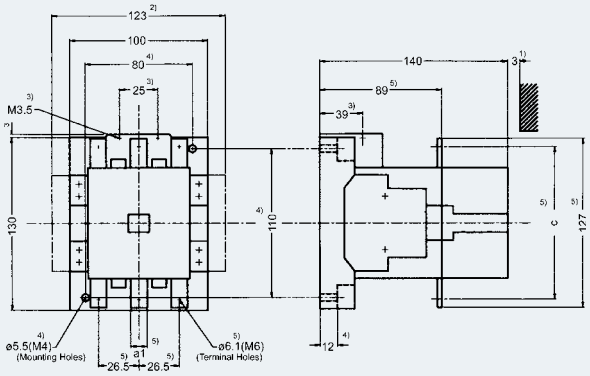
3TF46 and 3TF47



3TF47 7

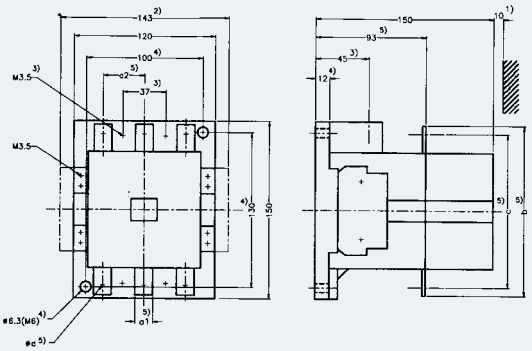


3TF48 and 3TF49



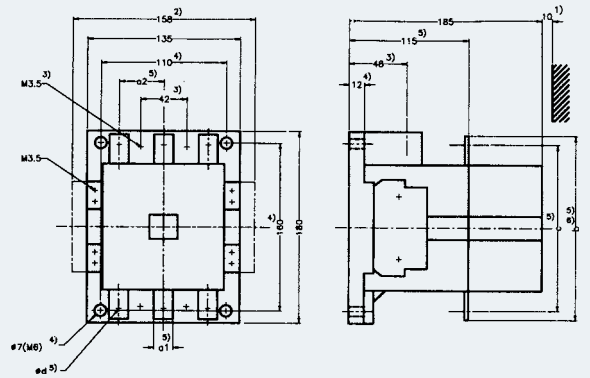
Type	a1	c
3TF48	8	107
3TF49	10.5	116

3TF50 and 3TF51



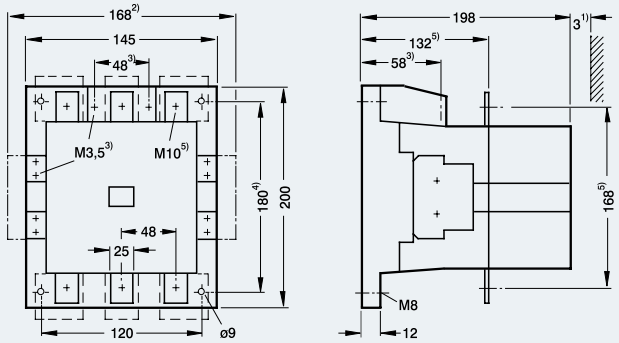
Type	a1	a2	b	c	ϕd
3TF50	15	37	149	134	6.6(M6)
3TF51	20	42	159	139	9(M8)

3TF52 and 3TF53



Type	a1	a2	b	c	ϕd
3TF52	20	42	174	154	9 (M8)
3TF53	25	48	184	159	11 (M10)

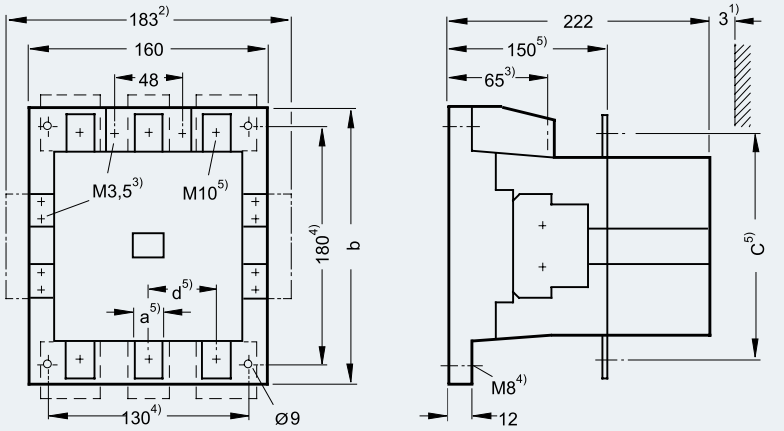
3TF54/55



Notes

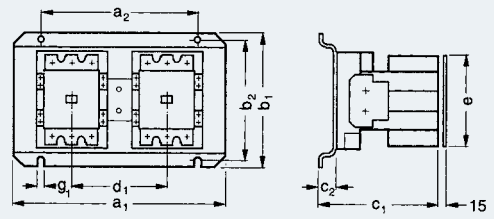
1) Minimum clearance from insulated components = 3mm
   Minimum clearance from earthed components = 10mm
2) Dimension with second auxiliary contact block on both sides
3) Dimension for coil terminal.
4) Dimension for mounting.
5) Dimension for power terminal.
6) 3TF53 The conductor bars protrude over the contactor edges on top and bottom by 2mm each.

3TF56/57



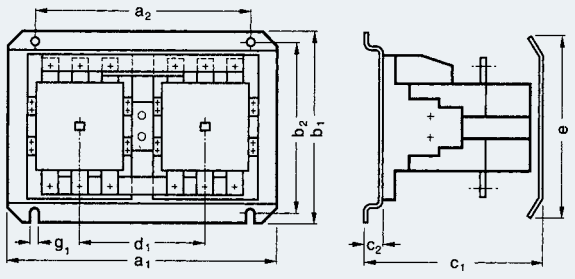
Type	a	b	c	d
3TF56	25	200	178	48
3TF57	30	209.5	182	52

3TF46/47/477/48/49 with Mechanical Interlock Kit



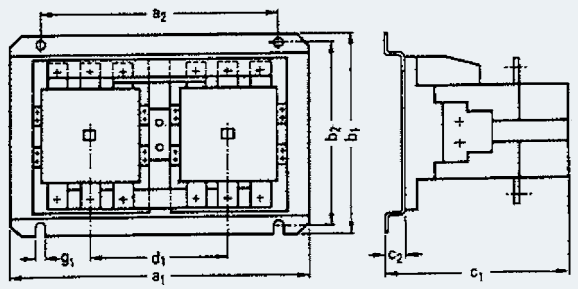
For Contactor	a_1	a_2	b_1	b_2	c_1	c_2	d_1	e	g_1
3TF46/47/477	240	180	165	145	141	18	117	150	7 (M6)
3TF48/49	260	200	175	155	158	18	127	160	7 (M6)

3TF50 to 3TF57 with Mechanical Interlock Kit



For Contactor	a_1	a_2	b_1	b_2	c_1	c_2	d_1	e	g_1
3TF50/51	300	240	210	185	160	18	147	260	9 (M8)
3TF52/53	330	270	240	215	203	18	162	315	9 (M8)
3TF54/55	350	290	265	240	219	21	172	375	11 (M10)
3TF56/57	380	310	265	240	243	21	187	385	11 (M10)

3TF50 and 3TF52 with Mechanical Interlock Kit
3TF52 and 3TF54 with Mechanical Interlock Kit



Type	a1	a2	b1	b2	c1	c2	d1	g1
3TF52 & 50	330	270	240	215	203	18	154.5	11
3TF54 & 52	350	290	265	240	219	21	167	11

Notes

1) Minimum clearance from insulated components = 3mm
   Minimum clearance from earthed components = 10mm
2) Dimension with second auxiliary contact block on both sides
3) Dimension for coil terminal.
4) Dimension for mounting.
5) Dimension for power terminal.

Useful information

Categories of duty - as per IEC 947 / IS 13947

Current	Utilisation Categories	Typical Application
AC	AC1	Non-inductive or slightly inductive loads, resistance furnances
	AC2	Slipring motors; starting, switching off
	AC3	Squirrel-cage motors; starting, switching off motors during running(1)
	AC4	Squirrel-cage motors; starting, plugging, inching
	AC5a	Switching of electric discharge lamp controls
	AC5b	Switching of incandescent lamps
	AC6a	Switching of transformers
	AC6b	Switching of capacitor banks
	AC7a	Slightly inductive loads in household appliances and similar applications
	AC7b	Motorloads for household applications
	AC8a	Hermetic refrigerant compressor motor(2) control with manual resetting of overload releases
	AC8b	Hermetic refrigerant compressor motor(2) control with automatic resetting of overload releases
DC	DC1	Non-inductive or slightly inductive loads, resistance furnaces
	DC3	Shunt-motors: starting, plugging, inching, dynamic braking of d.c motors
	DC5	Series-motors: starting, plugging, inching, dynamic braking of d.c motors
	DC6	Switching of incandescent lamps

(1) AC3 category may be used for occasional inching (jogging) or plugging for limited time periods such as machine set-up; during such limited time periods the number of such operations should not exceed five per minute or more than ten in a 10-min period.

(2) Hermetic refrigent compressor motor is a combination consisting of a compressor and a motor, both of which are enclosed in the same housing, with no external shaft or shaft seals, the motor operating in the refrigent

(3) Selection of contactors for utilisation categories from AC-5a to AC-8b and DC6 upon enquiry.

Contact life calculation:

Contactors have bounce free operation. Electrical life is influenced by the breaking currents. For normal AC3 duty the breaking current is the rated operational current and for AC4 duty, the typical breaking current is 6 times the rated operational current. In case of mixed duty, the expected life is determined as under

$$X = \frac{A}{1 + \frac{C}{100}\left(\frac{A}{B} - 1\right)}$$

Where

X = expected life for mixed duty

A = expected life for normal AC3 duty

B = expected life for 100% AC4 duty

C = proportion of inching operations as a percentage of total operations.

Recommended selection of contactors for hoisting duty (upto 85A)

In hoisting operation, slipring motors are generally used. For this typical hoisting duty, we recommend the contactors listed in the following table.

Contactor Type	Stator Protection Maximum load current with hoisting motor. For intermittent duty S3				Rotor Protection Maximum load current with hoisting motor (Delta circuit). For intermittent duty S3				Max rotor standstill voltage
	25%	40%	60%	100%	25%	40%	60%	100%	
	A	A	A	A	A	A	A	A	V
3TF31	10	10	9	8	15	14	13	12	660
3TF33	17	16	15	13	25	24	22	20	660
3TF45	28	25	23	20	42	38	35	30	660
3TF47	49	45	40	30	73	68	60	45	750
3TF49	68	62	54	45	100	95	80	68	1000

Contactors for Hoisting Duty

AC slipring motors are most commonly used for the hoisting applications. AC2 duty pertains to starting and switching off the slipring motors. In case of hoisting duty breaking current is the starting current and frequency of switching is high.

The table shows the making and breaking capacity at normal and at hoisting application where Ie indicates the rated full load current.

	Making	Breaking
During Normal operation at full load	2.5 * Ie	Ie
Hoisting application at full load	2.5 * Ie	2.5 * Ie
During Normal operation at partial load	less than 2.5 * Ie	Less than Ie

Application

AC-2 operation is the typical duty for starting and switching off fully-loaded slipring motors in the starting phase. The rating of the contactor, to switch the motors, is selected primarily on the basis of rated make & break capacity and desired electrical endurance.

Standard

The contactors comply with the "Regulations to low voltage switchgear" of DIN VDE 0660 and IS/IEC 60947-4-1.

Range

Hoisting duty contactors are available from 110A to 400A (AC2/AC3 rating).

Benefits and features

Long life

- "Hoisting Duty "Contactors are provided with new design of contacts ($AgSnO_2$ instead of AgCdO) resulting in **high electrical and mechanical life**.
- They are electrically superior in taking care of excessive stresses coming on contactors during their operations in crane applications.

Reliability

- The "Hoisting Duty" Contactors have vacuum impregnated coils which are suitable for high frequency switching and high vibrations. This helps in reducing coil failures.
- Side mounted auxiliary contact blocks are screw mounted and not snap fitted to withstand vibrations and high frequency operation.

Operator safety

- **Arc Chamber Interlock**
  It prevents the contactor from switching ON, if the arc chamber is not fitted properly. Thus avoids accidents to plant and personnel.
- **Finger touch proof terminals**
  It protects against accidental contact with live parts which ensures operator safety.

High performance

- **No duration upto 55°C**
  Contactors are suitable for operation in service temperature upto 55°C without derating. This avoids selection of higher rated contactor, thereby reducing cost.

Selection and ordering data

Hoisting duty contactors –
For high switching frequency / inching applications with AC coils, 2NO+2NC aux. contacts

Contactor size	Rated current Ie (A) AC2/AC3 at 415V	Type	Std. pkg. (nos.)
6	110	**3TF50 00-0A..**	**1**
8	170	**3TF52 00-0A..**	
10	250	**3TF54 00-0A..**	
12	400	**3TF56 00-0A..**	

Coil voltages:

Coil voltage - 50Hz	110V	230V	415V
Code	F0	P0	R0

(Other coil voltages are also available)

Technical Information

A. Recommended selection of contactors for hoisting duty

In hoisting operation, slipring motors are generally used. For this typical hoisting duty, we recommend the contactors listed in the following table.

Contactor Type	Stator Protection Maximum load current with hoisting motor. For intermittent duty S3				Rotor Protection Maximum load current with hoisting motor (Delta circuit). For intermittent duty S3				Max rotor standstill voltage
	25%	40%	60%	100%	25%	40%	60%	100%	
3TF50 00 0A	100	88	78	65	150	130	115	95	1000
3TF52 00 0A	145	130	115	95	220	195	170	150	1000
3TF54 00 0A	225	200	180	160	340	300	270	240	1000
3TF56 00 0A	355	325	290	250	530	490	435	375	1000

When 3 conducting paths are connected in parallel, the maximum load current rises to 2.5 times the value given in this table. When 2 conducting paths are connected in parallel, it rises to 1.8 times the value given in this table.

B. Selection of contactors for contact endurance: with normal and inching operation

Contactors suffer more erosion during inching operation than when stopping motors from a steady speed, i.e. normal operation. With slipring motors the starting current can be up to 2.5 times the rated current of the motor which means that this current has to be broken when inching is taking place. During normal operation, on the other hand, only the rated current has to be broken under full-load; under part-load it is even less. Determining contact endurance from AC-2 duty (Ic = 2.5 x Ie) will only give correct results when 100% inching operation is involved.

Max. permissible current and attainable contact endurance when braking starting current given below PF ≥ 0.4 (2.5 x Ie)		Contact life when breaking the stator contactor load currents for S3-100% duty, Ic = Ie, no inching		Contactor Type
A	Operating cycles Approx.	A	Approx. Operating cycles	
275	280,000	65	3,500,000	3TF5000
425	250,000	95	3,100,000	3TF5200
625	250,000	160	2,700,000	3TF5400
1000	150,000	250	2,500,000	3TF5600

The maximum permitted current (e.g. locked-rotor current of motor) must not exceed the values given in the “Max. starting current and attainable contact endurance” column. The values cannot be increased by paralleling pole assemblies.

C. Selection of contactors for contact endurance: with mixed operation

When mixed operation is involved, i.e. primarily breaking of the motor rated current but with some breaking of higher currents due to inching, the endurance of the contacts can be calculated approximately from the following equation:

$$X = \frac{A}{1 + \frac{C}{100}\left(\frac{A}{B} - 1\right)}$$

Where

X = Contact endurance with mixed operation cycles.

A = Contact endurance with normal operation (Ia = Ie) in operating cycles, from Fig. 1.

B = Contact endurance with inching operation (Ia = Multiple of Ie) in operating cycles, from Fig. 2, Breaking current Ia/AC-2 = 2.5xIe.

C = Proportion of inching in total operating Cycles in %.

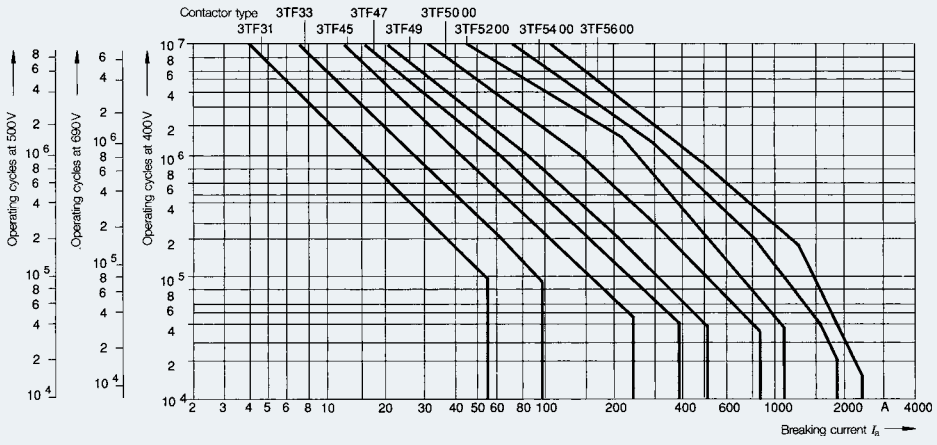


Fig. 1 Contact endurance of 3TF contactors as a function of breaking current when switching resistive and inductive AC loads.

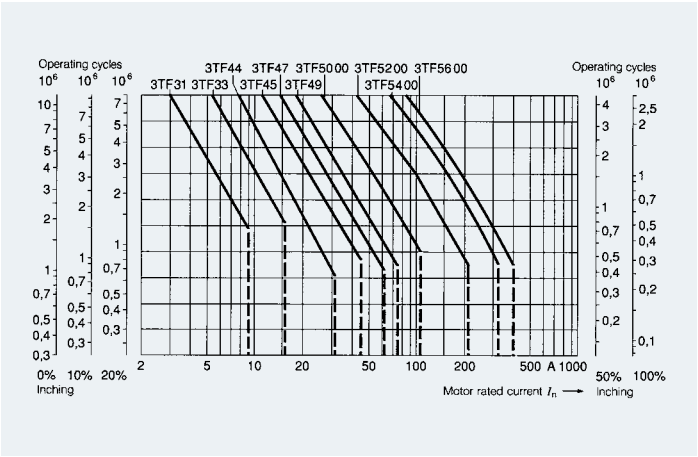


Fig. 2 Contact endurance for mixed operation as a function of motor rated current. Motor on rated load, inching at 2.5 times motor rated current (slipring motor).

The contact endurance as a function of the motor rated current with mixed operation can be determined from Fig. 2 for proportions of inching of 0, 10, 20, 50 and 100%. The values obtained are only applicable if rated motor load is used continuously. In practice therefore, the contact endurance should be greater.

Example 1

Motor rated current 150A. Selected contactor: **3TF5600**

Contact endurance in operating cycles at 400V with inching of				
0%	10%	20%	50%	100%
5.4 x 106	4.6 x 106	3.9 x 106	2.3 x 106	1.4 x 106

Example 2

Maximum permitted motor rated current for a contact endurance of 2,000,000 operating cycles at 400V.

Stator contactor	Permitted rated current of slipring motor with inching			
Type	10% approx. A	20% approx. A	50% approx. A	100% approx. A
3TF50 00	75	68	48	33
3TF52 00	110	95	66	48
3TF54 00	175	160	125	80
3TF56 00	240	230	160	120

D. NOMOGREM

Apart from knowing the figure for **contact endurance in operating cycles**, users are also interested to know what **period of time** this amounts to before the contacts have to be changed. The value can be ascertained from the nomogram in Fig. 3. **using the Nomogram**

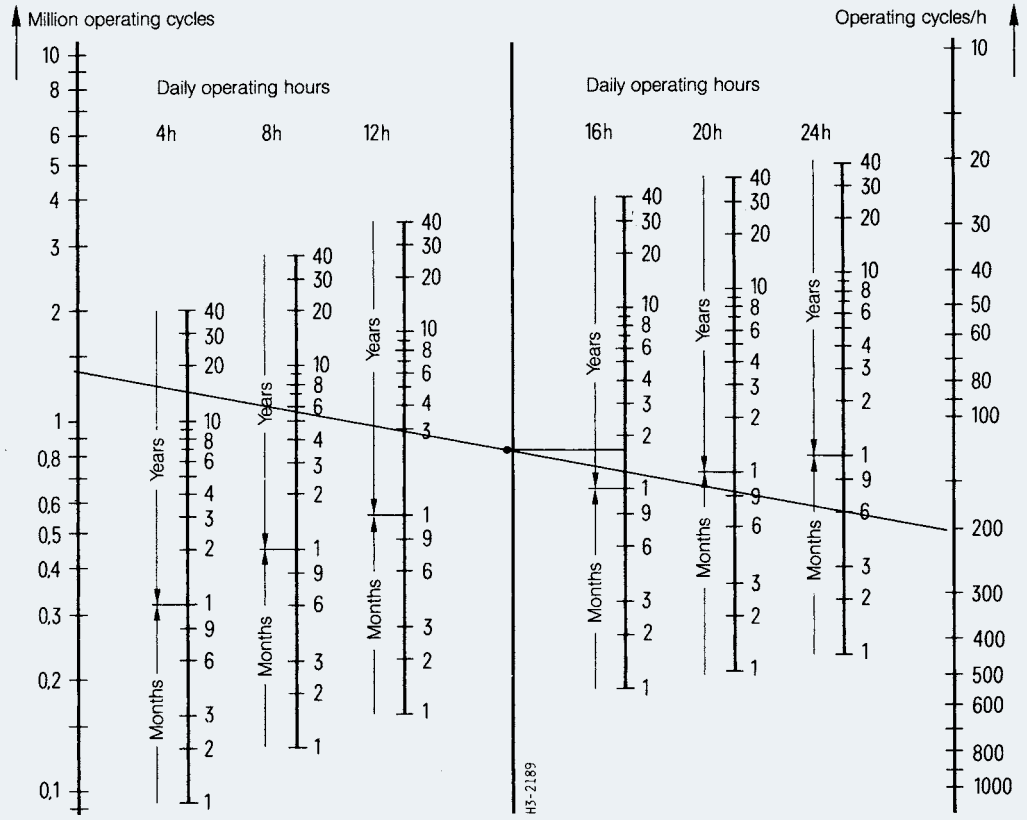


Fig. 3 Nomogram for determining contact endurance in year (250 working days) and months with daily operating hours of 4, 8, 12, 16, 20 and 24 h.

Draw a line from the point on the left-hand scale indicating the required number of operating cycles to the point on the right hand scale indicating the required number of operating cycles per hour. Then, from the point where this line intersects with the centre axis, draw a horizontal line to the left or right scale for the actual number of daily operating hours.

Note: If a figure of 365 days per annum is being employed instead of 250, the total operating time obtained from the nomogram must be multiplied by 0.68.

Example:

Service requirements: 1.4 million operating cycles endurance, 200 operating cycles per hour, 16 hours service per day.

Result:

Total operating time approx =18 months.

Accessories and ordering data:

AC Coils:

Spare coils for	Type[1)]	Std. pkg. (nos.)
3TF50 00 0A..	**3TY7 503-0A ..0-0H**	**1**
3TF52 00 0A..	**3TY7 523-0A ..0-0H**	
3TF54 00 0A..	**3TY7 543-0A ..0-0H**	
3TF56 00 0A..	**3TY7 563-0A ..0-0H**	

[1)] Coil voltage code AC 50Hz:

Coil voltage	110	230	415
Code	F0	P0	R0

(Other coil voltages are also available)

Spares and ordering data

Contact kits:

Spare contact kit for	Type	Std. pkg. (nos.)
3TF50 00 0A..	**3TY7 500-0ZA**	**1**
3TF52 00 0A..	**3TY7 520-0ZA**	
3TF54 00 0A..	**3TY7 540-0ZA**	
3TF56 00 0A..	**3TY7 560-0ZA**	

Dimensional drawing

The "Hoisting Duty" Contactors are mechanically similar to our existing 3TF power contactors. Therefore they have exactly same dimensions as the corresponding 3TF power contactors.

Please refer page nos. 21 and 22.

Useful technical information

Starting method of Slip ring motor (AC2 duty):

Three types of the contactors are used to control the three phase slip-ring motors: the stator contactor, the acceleration contactor and the rotor short circuit contactor.

Stator contactor

Initially the stator contactor (K1) is closed to energize the motor. None of the rotor contactor (K2 or K3) is closed yet. Hence all the resistances are present in the rotor circuit. The starting current can reach to 1.5 to 4 times of the rated operational current. The AC2 rating of the stator contactor is selected as per the load factor of the motor.

$$\text{Load factor} = \frac{\text{on time} * 100}{\text{Cycle time (on time + rest time)}}$$

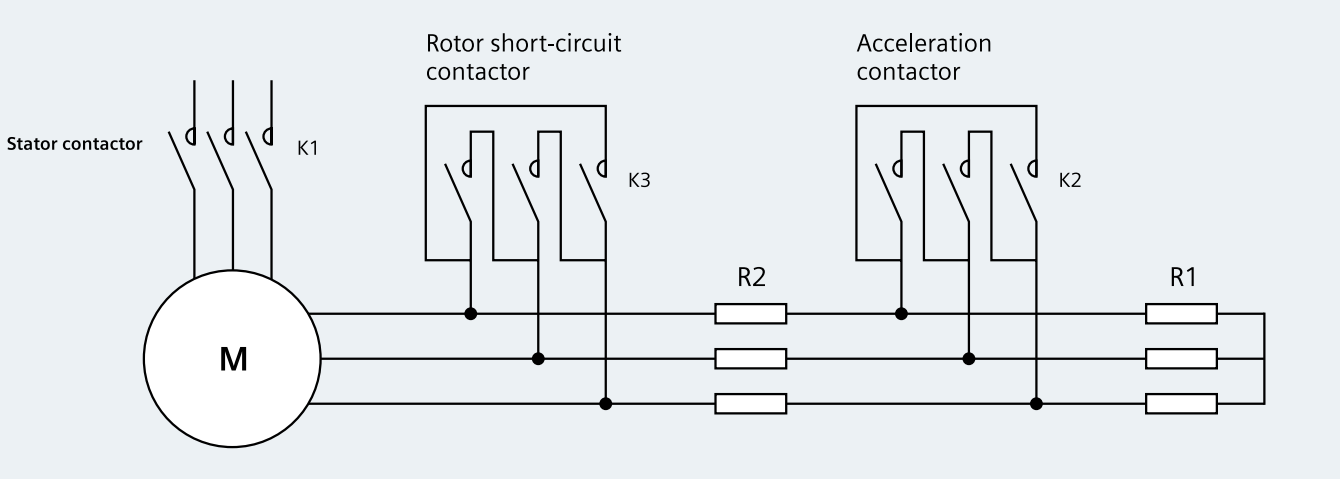
Acceleration contactor

Now acceleration contactor (K2) is closed which short circuits the resistances (R1). The sizing of this contactor (K2) is as per AC1 rated operational current. The current flow time per cycle and the number of cycles per hour has to be considered for the selection.

Rotor short circuit contactor

At the end, the rotor short circuit contactor (K3) closes, short circuiting the last resistance bank (R2) thus remove all the resistances from the rotor circuit. The starting period is hence completed. The duty of this contactors is characterized by the small closing stress. the decisive factor is the thermal stress. The duty factor is considered while finding out the permissible values of the rated operational rotor current for rotor contactors.

Picture below shows the acceleration (K2) and the rotor short circuiting contactor (K3) in the delta connection. If they are connected in star then the ratings are reduced by 35%.



AC1 Duty Contactors 3TK5

When contactors are not required to make or break current but only carry the current, the contactors can be used to its full AC1 rating. Siemens 3TK5 AC1 duty contactors can be offered in such cases.

Application

3TK5 AC1 duty contactors are widely used in sugar mills, DC drives and changeover applications. Also they can be offered for the applications like switching resistive loads, battery charging etc where the AC1 rating of the contactor is suitable.

Standards

3TK5 contactors conform to IS/IEC 60947-4-1.

Range

3TK5 AC1 duty air break contactors are available from 190A (AC1) to 500A (AC1) in 3 pole version.

Benefits and features

High performance

- **No duration upto 55°C**
  SICOP contactors are suitable for operation in service temperature upto 55°C without derating. This avoids selection of higher rated contactor, thereby reducing cost.
- **Long Life**
  Superior design of current carrying parts, contact system and the magnet system increases the reliability results into **higher electrical and mechanical endurance**.

High reliability

- High insulation voltage and impulse withstand voltage capacity ensures reliable performance during occasional abnormal increase in supply voltage.

User friendliness and safety

- **Arc Chamber Interlock**
  It prevents the contactor from switching ON, if the arc chamber is not fitted properly. Thus avoids accidents to plant and personnel
- **Positively driven contacts**
  3TF contactors satisfy the conditions **for positively driven operation** between the main power contacts and the NC contacts. NC contacts positively open before the main contact closes. This is extremely important when power contactors are used in safety circuits of critical applications.

Selection and ordering data

Contactor size	Rated current Ie (A) AC1 at 415V	Type[1)]	Std. pkg. (nos.)
6	190	**3TK50 02-0A..**	**1**
8	315	**3TK52 02-0A..**	
10	380	**3TK54 02-0A..**	
12	500	**3TK56 02-0A..**	

[1)] Coil voltage code AC 50Hz:

Coil voltage	110	230	415
Code	F0	P0	R0

Technical data

Contactor		Type	3TK50	3TK52	3TK54	3TK56
Mechanical Endurance (make/break operations)		Oprns	10 million			
Electrical Endurance in acc. with ACI duty at Ie (make/break operations)		Oprns	0.5 million			
Rated insulation voltage Ui		V	1000			
Permissible ambient temperature	storage service	°C °C	-55 to +80 -25 to +55			
Rated impulse withstand voltage Uimp		KV	8			
Rating of contactors for AC loads						
AC-1 duty, switching resistive load						
Raed operational current Ie	40 deg C upto 690V 55 deg C upto 690V	A A	200 190	340 315	400 380	530 500
Rating of three-phase loads p.f = 1 at 55 deg C	415V 500V 690V	kW kW kW	125 164 217	207 272 360	250 329 434	329 433 571
AC-2 and AC-3 duty						
Rated operational current Ie	upto 690V	A	85	105	138	170
Maximum rating of slipring or squirrel cage otors at 50/60Hz	415V 500V 690V	kW kW kW	45 59 78	55 72 96	75 98 130	90 118 156
Thermal loading **Power loss per current path** at Ie/AC3	10 s current	A W	990 13	1450 19	1725 30	2300 38
Switching frequency z (contactors without overload relay)	No load AC at AC1 at AC3	1/hr 1/hr 1/hr	5000 650 1000	5000 650 1000	3000 650 1000	3000 650 1000
Coil ratings AC operation 50Hz	closing closed	VA p.f VA P.f	550 0.45 39 0.24	910 0.38 58 0.26	1430 0.34 84 0.24	2450 0.21 115 0.33
Coil voltage tolerances			0.8 to 1.1 x Us			
Operating times at 1.0 X Us AC operation	closing time opening time	ms ms	22 to 37 8 to 30	25 to 40 10 to 30	25 to 40 10 to 30	25 to 40 8 to 20
Short circuit protection of contactors						
Main circuit	Co-ordination Type 1 Type2	 A A	 315 250	 355 350	 500 500	 800 500

Accessories and ordering data:

Auxiliary contact blocks:

For Contactor	Description	Type	Std. pkg. (nos.)
3TK5	Second 1NO+1NC Left	**3TY7 561-1K**	**1**
	Second 1NO+1NC Right	**3TY7 561-1L**	

Coils:

For Contactor	Type *	Std. pkg. (nos.)
3TK50	**3TY7 503-0A..**	**1**
3TK52	**3TY7 523-0A..**	
3TK54	**3TY7 543-0A..**	
3TK56	**3TY7 563-0A..**	

*Please fill in coil codes from table below

Coil voltage code AC 50Hz:

Coil voltage	110	230	415
Code	F0	P0	R0

Spares and ordering data

Contact kits:

Spare contact kit for	Type	Std.pkg. (nos.)
3TK50 02-0A..	**3TY7 500-0KA**	**1**
3TK52 02-0A..	**3TY7 520-0KA**	
3TK54 02-0A..	**3TY7 540-0KA**	
3TK56 02-0A..	**3TY7 560-0KA**	

Dimensional drawing

The "3TK5 AC1 duty" Contactors are mechanically similar to our existing 3TF5 power contactors. Therefore they have exactly same dimensions as the corresponding 3TF power contactors. 3TK50, 3TK52, 3TK54 and 3TK56 are having exactly same dimensions as those of 3TF50, 3TF52, 3TF54 and 3TF56 respectively.

Please refer page nos. 21 and 22.

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

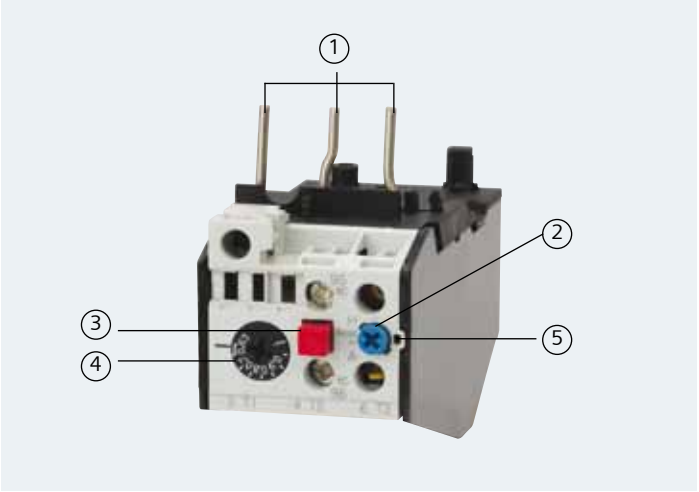
3UA5: 0.1 to 120A, (Class 10A, without CT)

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 accidently 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.

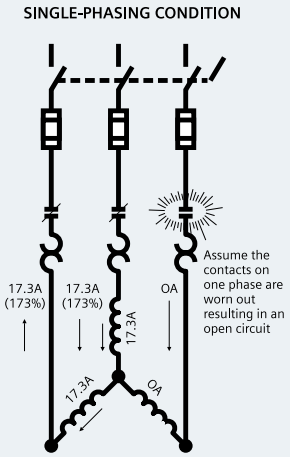
Recovery time

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

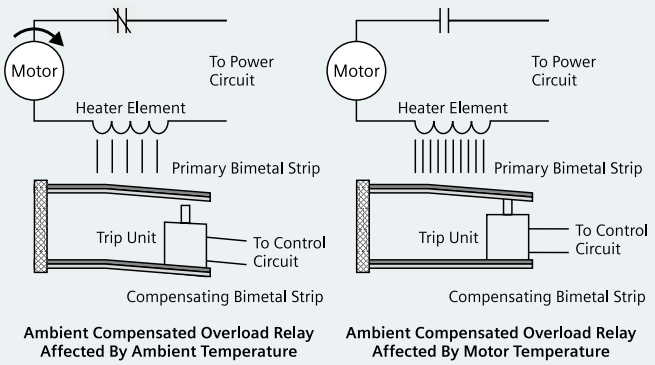
High performance

- **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 birelays 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	3UA50 00-0A	2	With Contactor 3TF30/31	1
0.16 - 0.25	3UA50 00-0C	2		
0.25 - 0.4	3UA50 00-0E	2		
0.4 - 0.63	3UA50 00-0G	2		
0.63 - 1	3UA50 00-0J	2		
0.8 - 1.25	3UA50 00-0K	4		
1 - 1.60	3UA50 00-1A	6		
1.25 - 2	3UA50 00-1B	6		
1.6 - 2.5	3UA50 00-1C	6		
2 - 3.2	3UA50 00-1D	10		
2.5 - 4	3UA50 00-1E	10		
3.2 - 5	3UA50 00-1F	16		
4 - 6.3	3UA50 00-1G	16		
5 - 8	3UA50 00-1H	20		
6.3 - 10	3UA50 00-1J	25		
8 - 12.5	3UA50 00-1K	25		
10 - 14.5	3UA50 00-2S	25		
3UA52				
1 - 1.6	3UA52 00-1A	6	With Contactor 3TF32/33	1
1.25 - 2	3UA52 00-1B	6		
1.6 - 2.5	3UA52 00-1C	6		
2 - 3.2	3UA52 00-1D	10		
2.5 - 4	3UA52 00-1E	10		
3.2 - 5	3UA52 00-1F	16		
4 - 6.3	3UA52 00-1G	16		
5 - 8	3UA52 00-1H	20		
6.3 - 10	3UA52 00-1J	25		
8 - 12.5	3UA52 00-1K	25		
10 - 16	3UA52 00-2A	32		
12.5 - 20	3UA52 00-2B	50		
16 - 25	3UA52 00-2C	50		
3UA55				
10 - 16	3UA55 00-2A	32	With Contactor 3TF34/35	1
12.5 - 20	3UA55 00-2B	50		
16 - 25	3UA55 00-2C	50		
20 - 32	3UA55 00-2D	80		
25 - 36	3UA55 00-2Q	80		
32 - 40	3UA55 00-2R	80		
36 - 45	3UA55 00-8M	80		
3UA58				
16 - 25	3UA58 00-2CZ1	50	With Contactor 3TF46 3TF47 3TF48 3TF49	1
20 - 32	3UA58 00-2DZ1	63		
25 - 40	3UA58 00-2EZ1	80		
32 - 50	3UA58 00-2FZ1	100		
40 - 57	3UA58 00-2TZ1	100		
50 - 63	3UA58 00-2PZ1	125		
57 - 70	3UA58 00-2VZ1	125		
63 - 80	3UA58 00-2UZ1	160		
70 - 95	3UA58 00-8YZ1	160		
16 - 25	3UA58 00-2CZ2	50	With Contactor 3TF47 7	
20 - 32	3UA58 00-2DZ2	63		
25 - 40	3UA58 00-2EZ2	80		
32 - 50	3UA58 00-2FZ2	100		
40 - 57	3UA58 00-2TZ2	100		
50 - 63	3UA58 00-2PZ2	125		
57 - 70	3UA58 00-2VZ2	125		
63 - 80	3UA58 00-2UZ2	160		

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		

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 *Ui* (Pollution degree 3)	V	690	690	690	1000	1000	1000	1000	1000	1000	1000	1000
Rated impulse withstand *Uimp*	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 AC15	V	24	60	125	230	415	500					
capacity	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										

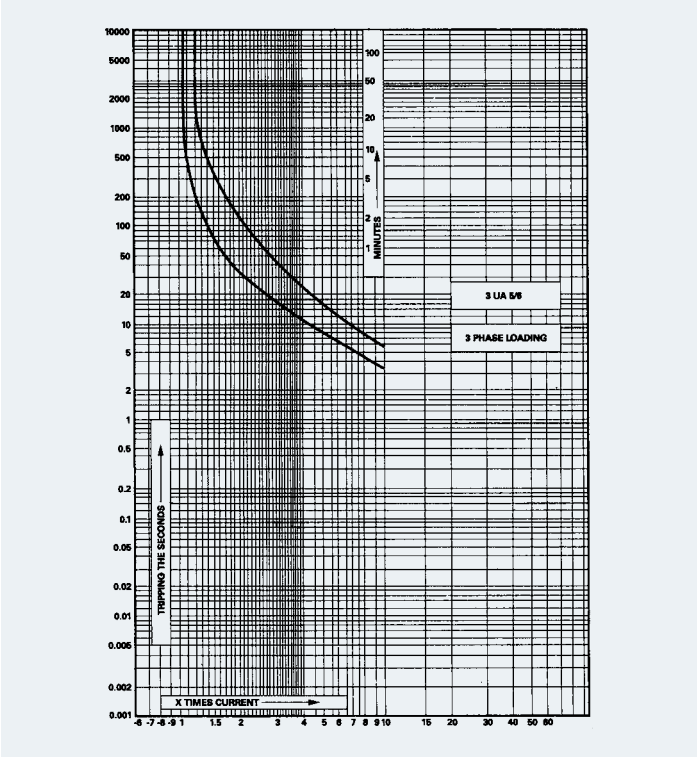
* For relay above 180 A

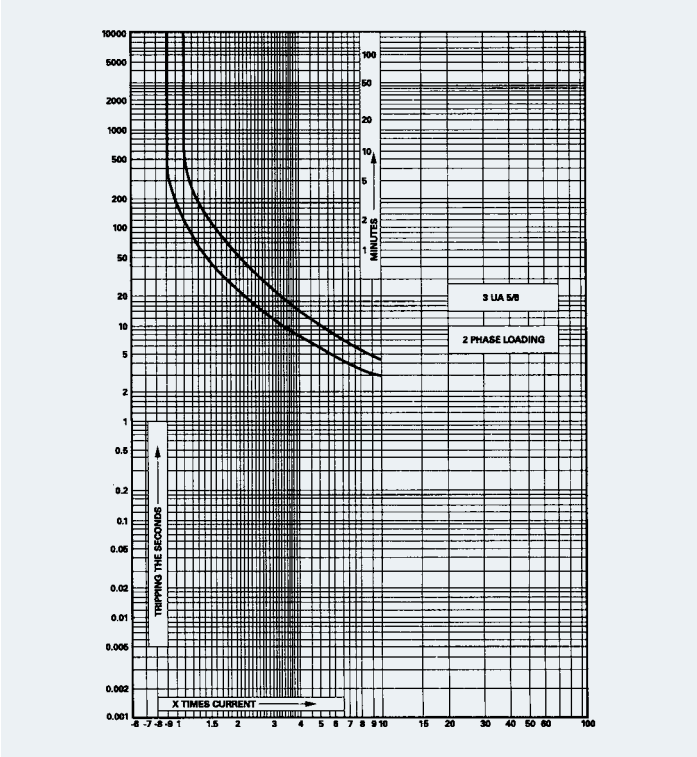
Characteristic Curves

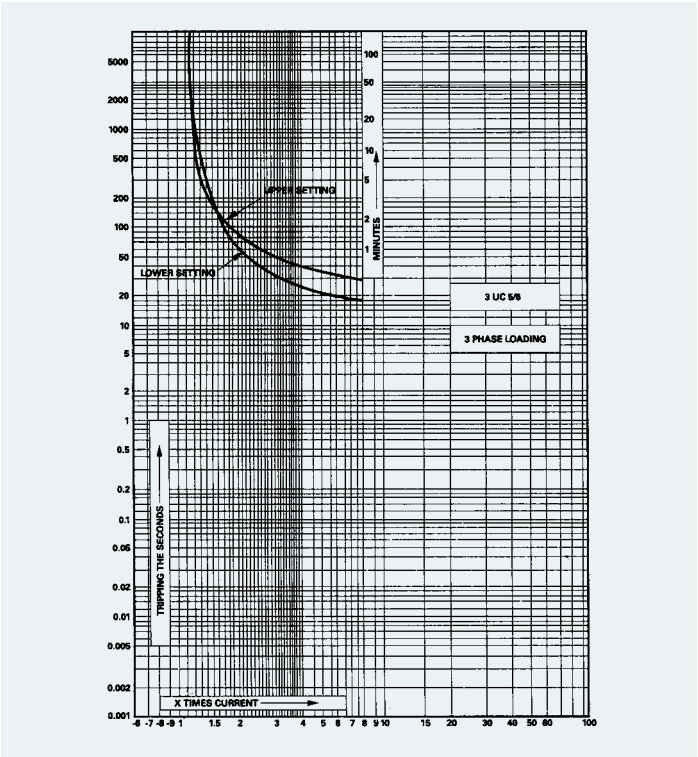
Tripping characteristics

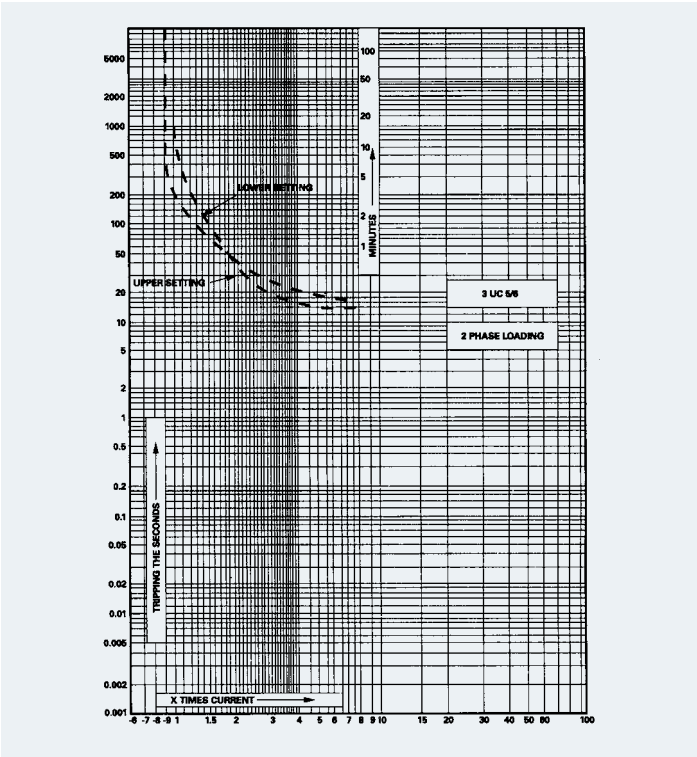
The current/time curves show the relationship between the tripping time from cold state and multiples of the set current Ie. When the relay is at operating temperature and carrying 100 % Ie, the tripping times are reduced to approximately 25 %. Tripping curve is applicable to 3-pole loads and 2-pole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

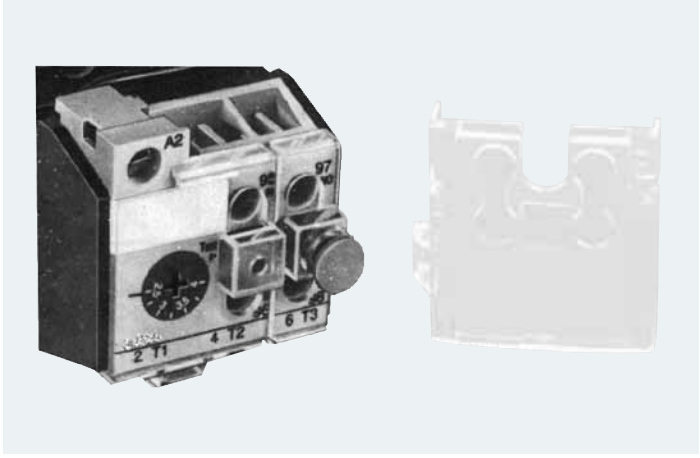


Fig. 2: Protective cover

Fig. 3: Reset cord with holder

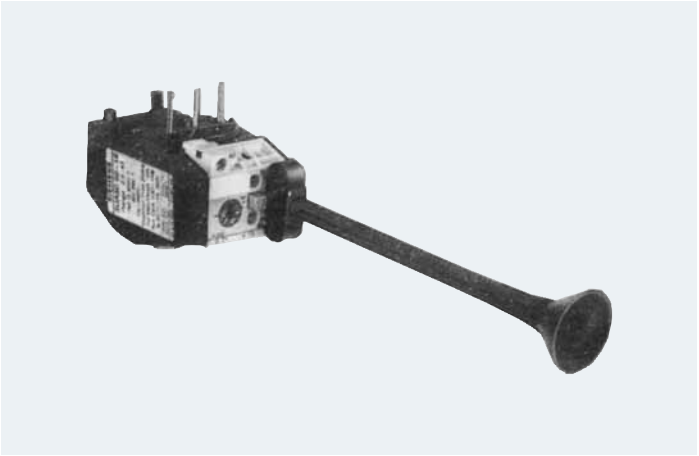


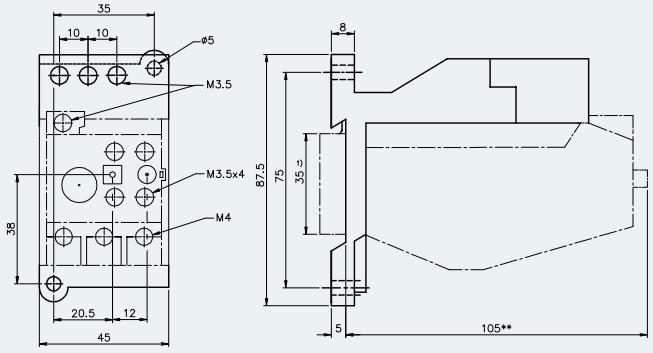
Fig. 4: Reset plunger + Funnel

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

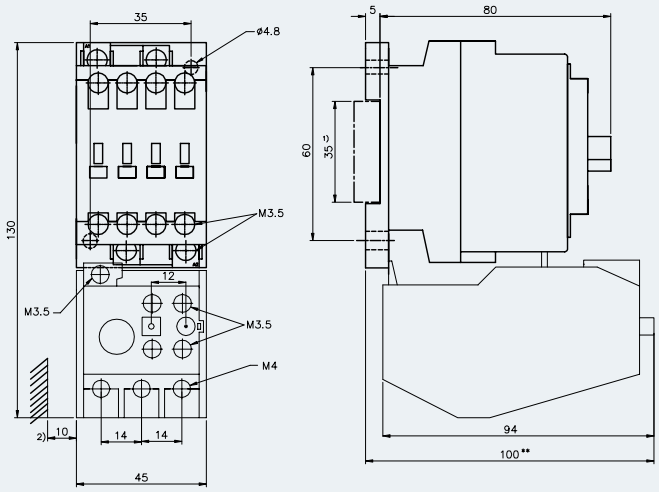
3UA50 with independent Mounting Adapter Type 3UX1 418



** 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



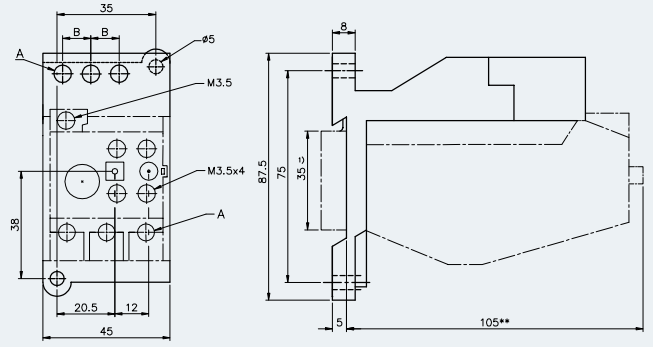
Auxiliary Contact	a	b	c	d
1NO or 1NC	125	85	108	55
1NO + 1NC or 2NO + 2NC	130	100	100	60

** 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

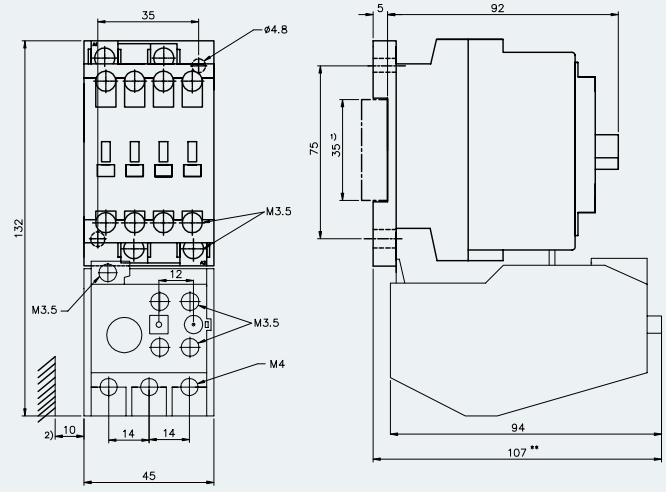


Type	Dim	
	a	b
3UA52 + 3UX1420	M4	14.3
3UA55 + 3UX1425	M5	18.2

** 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

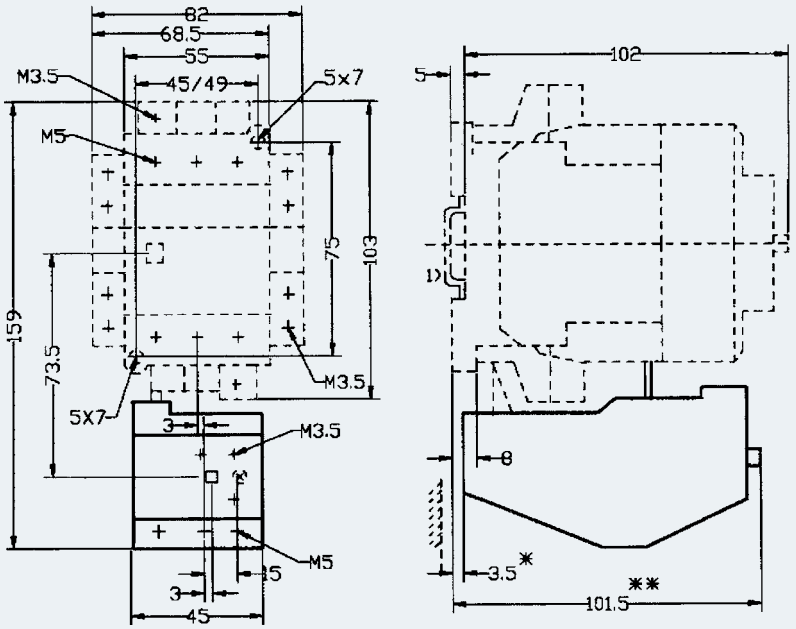


** Dimension for square OFF-button (stroke 3mm)
Dimension for round RESET-button (stroke 2.5mm)

1) For 35mm standard (DIN) mounting rail

2) Minimum clearance from earthed components

3UA55 mounted on 3TF 34/35



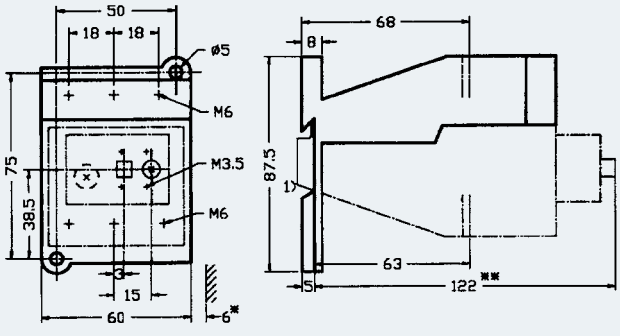
* Minimum clearance from the earthed components

** 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

3UA58 with independent mounting adaptor type 3UX1 421



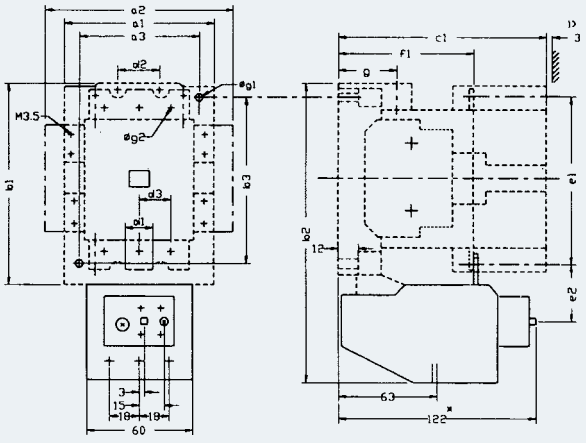
* Minimum clearance from the earthed components

** 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

3UA5800 mounted on 3TF46/47
3UA5800_.. Z1 mounted on 3TF48/49



* Dimension – For square OFF button (Stroke 3mm)

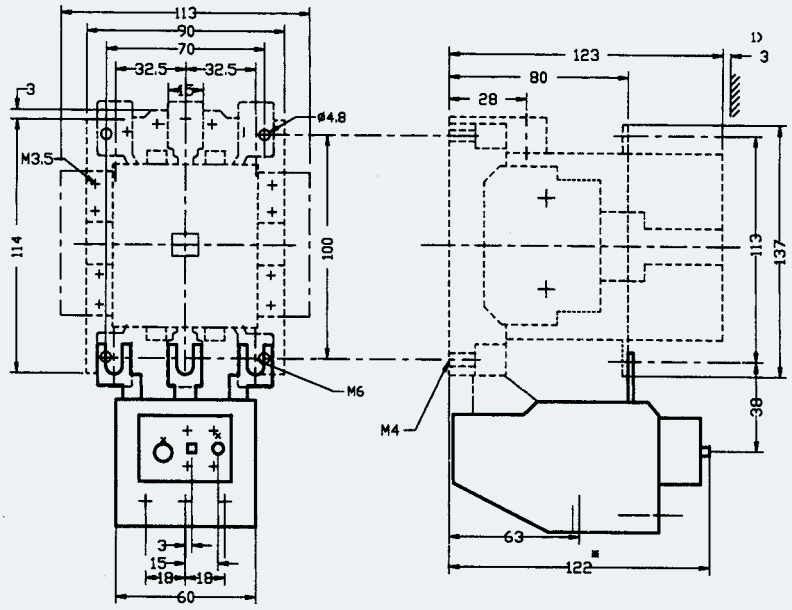
– For round RESET button (Stroke = 2.5mm) less 2.5mm

1) Minimum clearance from insulated components : 3mm

Minimum clearance from earthed components: 10mm

3UA58+	a1	a2	a3	b1	b2	b3	c1	d1	d2	d3	e1	e2	f1	f2	f3	g	ϕg1	ϕg2
3TF46/47	90	113	70	117	175	100	123	8	25	25	94	34	80	63	122	28	4.8	6.1
3TF48/49	100	123	80	133	194	110	140	10.5	25	26.5	116	31.5	89	71	132	39	5.5	6.1

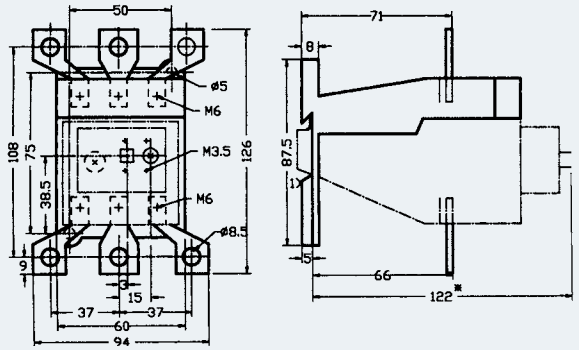
3UA5800_.. Z2 mounted on 3TF47 7



* 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

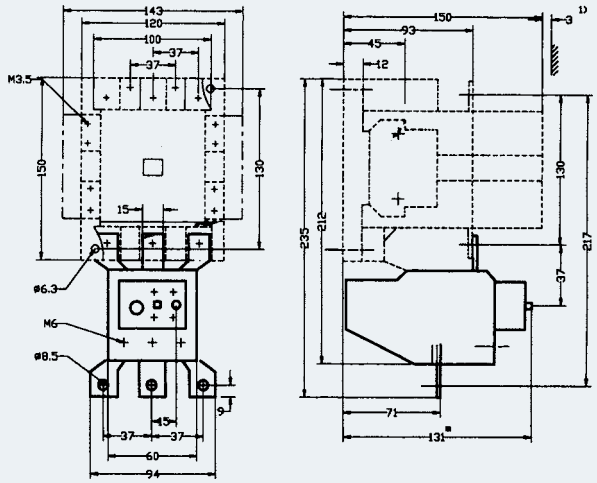
3UA5830 with individual mounting adaptor type 3UX1 421 - OXA



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

1) Suitable for DIN RAIL 35mm as per DIN 50022

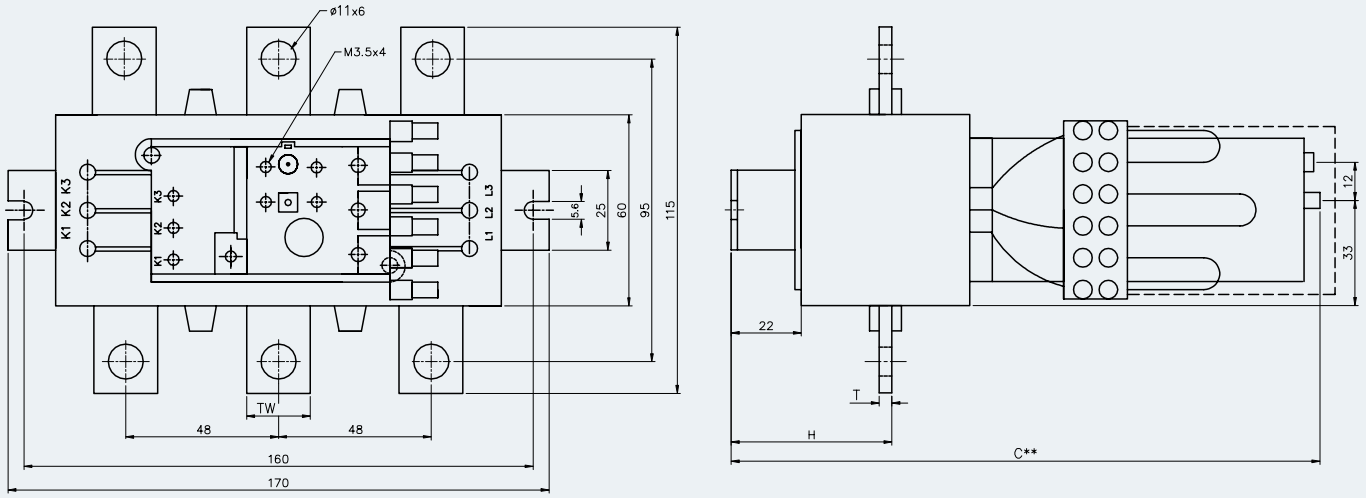
3UA5830 mounting on 3TF50



* 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

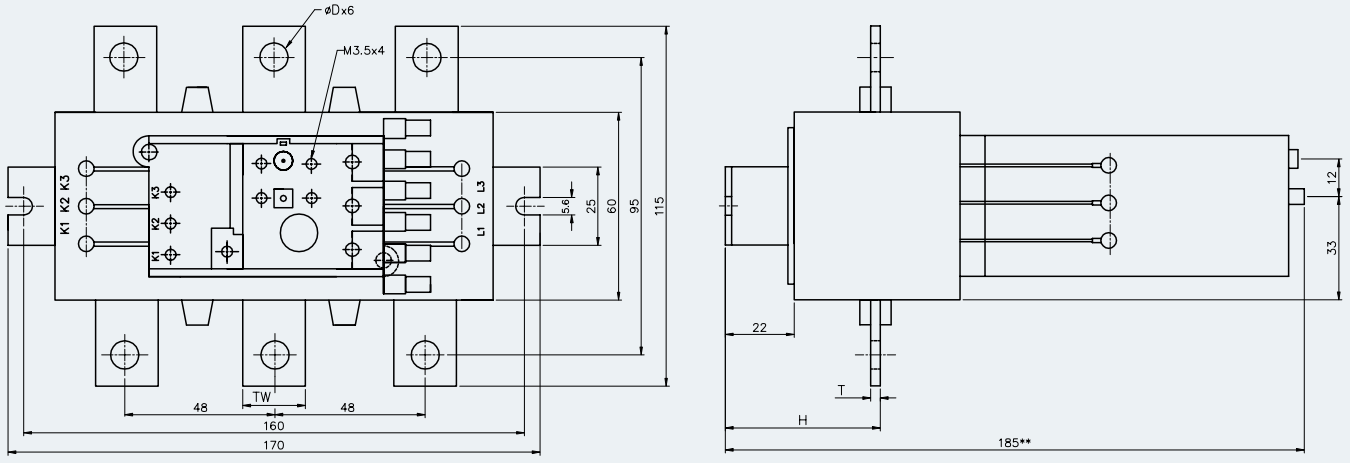
3UA6230 / 3UA6830 CT operated Birelay



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

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

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



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

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

Motor Protection Circuit Breakers 3VU13 and 3VU16

3VU13/3VU16 is suitable for use in fuseless motor feeders upto 11KW/22KW (25A/63A) respectively. 3VU motor protection circuit breakers are used for protection of motor against overload, single phasing and short-circuit faults.

Applications

- **Motor Protection**

  Circuit breakers type 3VU13 & 3VU16 offer overload, short circuit and phase loss protection for 3 phase motors upto 11kW and 22 kW respectively. The breaker has a toggle switch for ease of operation and can be offered with auxiliary contacts, trip indicating contacts, U/V or Shunt release. High breaking capacity of 100kA is available in 3VU13 upto 6A and in 3VU16 upto 25A.

- **Distribution Feeder Protection**

  Standard version of 3VU13 and 3VU16 has adjustable O/L and fixed S/C release. Main application is for disconnection and protection of the distribution feeders, upto 25A and 63A respectively. A large number of overlapping ranges are available for offering closer protection to various loads.

- **Transformer protection**

  A separate 3VU13 range can be offered to protect the primary side of the transformers. The range is available upto 20A. To take care of the inrush current due to transformer switching, the S/C release is set at 19 times the rated current unlike 12 times of the rated current available in standard range.

- **Fuse Monitoring**

  3VU1340-1MS00 is offered for Fuse Monitoring application. This device is connected in parallel to the fuses. In case one of the fuses blows, the rated current will flow through the corresponding phase of this MPCB. MPCB, through its auxiliary contacts, provides a tripping signal to the contactor and thus the motor will be switched off. Hence, the motor will be protected from single phasing. (Refer page 51 for connection diagram)

Fuse Monitoring MPCB - 3VU1340-1MS00

3VU13/16

Standard

3VU motor protection circuit breakers confirm to IS/IEC 60947-1, IS/IEC 60947-2, IS/IEC 60947-4-1, DIN VDE 0660

Range

3VU13: 0.16 - 25A

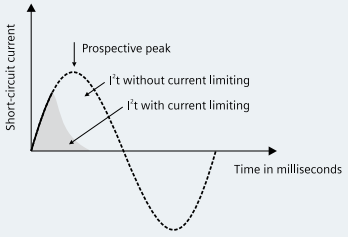
3VU16: 10 - 63A

Benefits and features

High performance

- **Instantaneous Tripping**
  3VU circuit breakers operate on the **Current Limiting Principle**.

  Current Limiting Principle
  In case of short-circuit condition motor protection circuit breaker trips before the short-circuit current reaches the prospective peak. Hence, for circuit breaker to be current limiting it must interrupt the short-circuit current in half cycle or less as shown below.



Current Limiting is achieved in 3VU as follows
In case of a short circuit, the contacts are opened electro-dynamically by the short circuit current. The instantaneous overcurrent release, through the switching mechanism, trips all the three poles of the breaker. A large arc voltage is quickly built up in the arc chamber limiting the short circuit current. Thus ensures faster fault clearing.

- Ambient temperature compensation upto 55°C hence no deration required upto 55°C.

Safety

- **Trip Free Mechanism**
  The breakers have a trip-free mechanism. Even by holding the toggle, tripping operation can not be stopped or blocked once it is started. Thus ensure positive opening in the event of fault.
- **Positive ON/OFF indication through toggle switch**
- **Compact and space saving**

User friendliness and safety

- SIGUT® connection technique ensures ease of wiring (can obviate use of lug)
- Fingers touch proof terminals ensures operator safety
- Separate trip indication on short circuit and overload fault using alarm contact

Flexibility

- Can be used as a main and EMERGENCY STOP switch.
- Identical accessories reduce stock levels

Selection and ordering data

3VU13 Circuit - breakers with 1NO+1NC auxiliary contacts for motor and plant protection

Rated Current In A	Overload release range A	Shortcircuit release setting A	Type[$]	Recommended 415V Motor Rating in Kw/HP (DOL)	Std. pkg. (nos.)
0.16	0.1 - 0.16	1.9	3VU1340-1MB00	–	1
0.24	0.16 - 0.24	2.9	3VU1340-IMC00	–	
0.4	0.24-0.4	4.8	3VU1340-1MD00	–	
0.6	0.4-0.6	7.2	3VU1340-1ME00	–	
1	0.6-1	12	3VU1340-1MF00	0.25/0.33	
1.6	1-1.6	19	3VU1340-1MG00	0.37/0.5	
2.4	1.6-2.4	29	3VU1340-1MH00	0.75/1	
3.2	2-3.2	38	3VU1340-1NH00	1.1/1.5	
4	2.4-4	48	3VU1340-1MJ00	1.5/2	
5	3.2-5	60	3VU1340-1NJ00	2.2/3	
6	4-6	72	3VU1340-1MK00	3/4	
8	5-8	96	3VU1340-1NK00	3.7/5	
10	6-10	120	3VU1340-1ML00	4/5.4	
13	8-13	156	3VU1340-1NL00	5.5/7.5	
16	10-16	190	3VU1340-1MM00	7.5/10	
20	14-20	240	3VU1340-1MN00	9.3/12.5	
25	18-25	300	3VU1340-1MP00	11/15	

3VU13 Circuit - breakers with 1NO+1NC auxiliary contacts for line-side protection of transformers with high inrush current

Rated Current In A	Overload release range A	Shortcircuit release setting A	Type	Std. pkg. (nos.)
0.6	0.4-0.6	12	3VU1340-1TE00	1
1	0.6-1	15	3VU1340-1TF00	
1.6	1-1.6	29	3VU1340-1TG00	
2.4	1.6-2.4	48	3VU1340-1TH00	
4	2.4-4	72	3VU1340-1TJ00	
6	4-6	120	3VU1340-1TK00	
10	6-10	190	3VU1340-1TL00	
16	10-16	300	3VU1340-1TM00	
20	14-20	300	3VU1340-1TN00	

Fuse monitoring motor protection circuit - breakers with 1NO+1NC auxiliary contacts

Rated Current In A	Overload release range A	Shortcircuit release setting A	Type	Std. pkg. (nos.)
0.2	0.2	1.2	3VU1340-1MS00	1

3VU16 Circuit - breakers with 1NO+1NC auxiliary contacts for motor and plant protection

Rated Current In A	Overload release range A	Shortcircuit release setting A	Type[$]	Recommended 415V Motor Rating in Kw/HP (DOL)	Std. pkg. (nos.)
10	6-10	120	3VU1640-1ML00	4/5.4	1
16	10-16	190	3VU1640-1MM00	7.5/10	
25	16-25	300	3VU1640-1MN00	11/15	
32	22-32	380	3VU1640-1MP00	15/20	
40	28-40	480	3VU1640-1MQ00	18.5/25	
52	36-52	600	3VU1640-1MR00	22/30	

3VU16 Circuit - breakers for plant protection

Rated Current In A	Overload release range A	Shortcircuit release setting A	Type[$]	Std. pkg. (nos.)
63	45-63	600	3VU1640-1LS00	1

[$] The 3VU13 and 3VU16 circuit breakers are also available without auxiliary contacts. To order the same, the 8th place of the type number is to be replaced with the digit 0.

Technical Data

According to DIN VDE 0660; IS/IEC 60947-1; IS/IEC 60947-2; IS/IEC 60947-4-1

Type		3VU13		3VU16	
Number of poles		3		3	
Max. rated current I_n					
• motor protection	A	25		52	
• distribution	A	25		63	
Permissible ambient temperature					
• at full rated current	°C	-20 ... +55			
• in storage	°C	-50 ... +80			
Rated operational voltage U_e	V	690			
Rated frequency	Hz	50/60			
Rated insulation voltage U_i	V	750			
Rated impulse withstand voltage U_{imp}	kV	6			
Utilization category					
• to IS/IEC 60947-2 (motor starter protection)		A			
• to IS/IEC 60947-4-1 (motor starters)		AC-3			
Mechanical endurance	Operating cycles				
• up to 25 A	1/h	100,000		100,000	
• 25 A upwards	1/h	–		30,000	
Number of operating cycles/h (on load)	1/h	25		25	
Degree of protection with open terminals/with conductors connected		IP00/IP20			
Temperature compensation	to IS/IEC 60947-4-1	Yes			
Phase failure sensitivity	to IS/IEC 60947-4-1	Yes			
Auxiliary contact for 3VU13 and 3VU16					
Rated operational voltage U_e	AC V	230	400	500	
Rated operational current I_e	A	3	1.5	1.2	
Utilization category		AC-15			
Rated operational voltage U_e DC L/R 200 ms	DC V	24	60	220	
Rated operational current I_e	A	2.3	0.7	0.3	
Utilization category		DC-13			
Wattloss Per Breaker					
		Current rating	**Watt**	**Current rating**	**Watt**
		0.6	5	2.4	8
		4	6	6	7
		6	7	25	14
		25	9	63	23
Cross-section for main conductors					
Solid or stranded	mm^2	2 x (1 ... 6)		1 x 1.5 ... 2 x 16 or 1 x 25 + 1 x 10	
Finely stranded with end sleeve	mm^2	2 x (1 ... 4)		1 x 1.5 ... 2 x 10 or 1 x 16 + 1 x 10	
Cross-sections for auxiliary and control connecting leads					
Solid or stranded	mm^2	1 x 0.5 ... 2 x 2.5			
Finely stranded with end sleeve	mm^2	1 x 0.5 ... 2 x 2.5			

Technical data for accessories:

		3VU13	3VU16
Undervoltage Release			
Consumption During Pick-up	VA/W	10/6	
Consumption During Running	VA/W	4.7/2	
Dropout	V	0.7 to 0.35 X Ue	
Pickup	V	85 to 110% of Ue	
Max Operating Time	ms	20	
Shunt Release			
Consumption	VA/W	10/6	
Max Continuous Rating	Sec	5	
Pickup	V	0.7 to 1.1 X Ue	
Current Limiter for 3VU13			
Rated current In		56 Amps	
Rated Voltage Ue		500 V, 50 / 60 Hz.	
Power Connection	mm^2	2 x (1 to 6)	
Mounting			
		on DIN Rail in any position.	

Table 1 3VU13/3VU16 breaking capacity at 415V

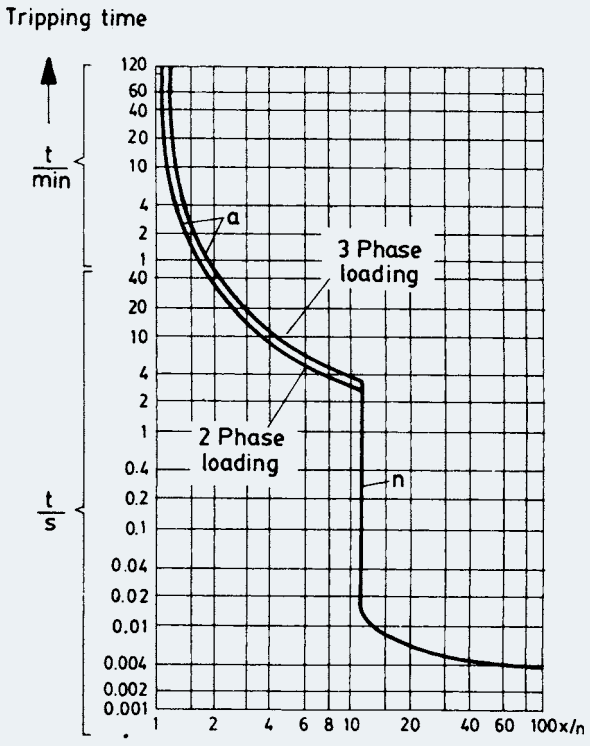
3VU13

Rated current	A	0.16-1	1.6	2.4	3.2-4	5-6	8-10	13-16	20-25
Rated Short circuit breaking capacity @ 415V									
Icu	kA	100	100	100	100	100	10(50)	6(50)	6(50)
Ics	kA	100	100	100	100	100	10(50)	6(50)	6(50)
Maximun back up fuse (gL/gG)									
Diazed	A	*	*	*	*	*	80	80	80
NH	A	*	*	*	*	*	80	80	80
( ) Values in bracket are with current limiter; * Fuse not required									
For 3VU13 breakers of ratings 8A & above, in place of fuses, the Current Limiter can be used to increase the S/C breaking capacity.									
Rated Breaking Capacity DC; t = 15ms									
1 Contact		2 Contacts in series	3 Contacts in series	**10 kA**					
110-150V		220-300V	330-450V						

3VU16

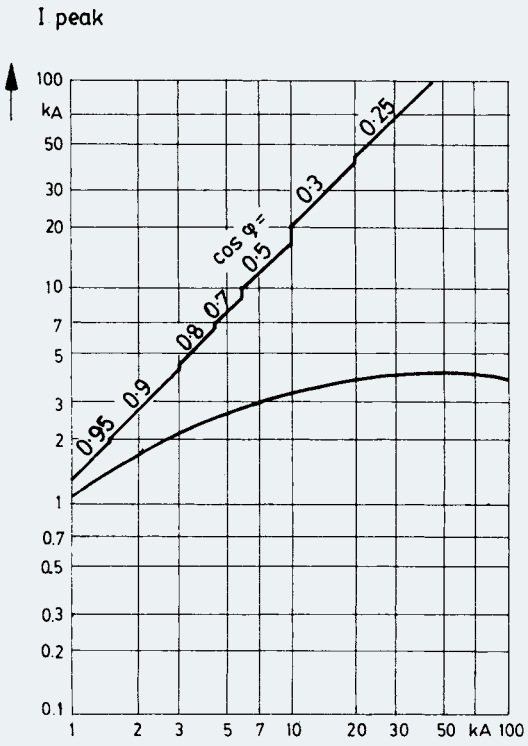
Rated current	A	1.6-2.4	4	6	10	16	25	32-63
Rated Short circuit breaking capacity @ 415V								
Icu	kA	100	100	100	100	100	100	35
Ics	kA	100	100	100	100	100	50	17
Maximun back up fuse (gL/gG); * Fuse not required								
Diazed	A	*	*	*	*	*	*	-
NH	A	*	*	*	*	*	*	200
Rated Breaking Capacity DC; t = 15ms, upon enquiry								

Characteristic Curves



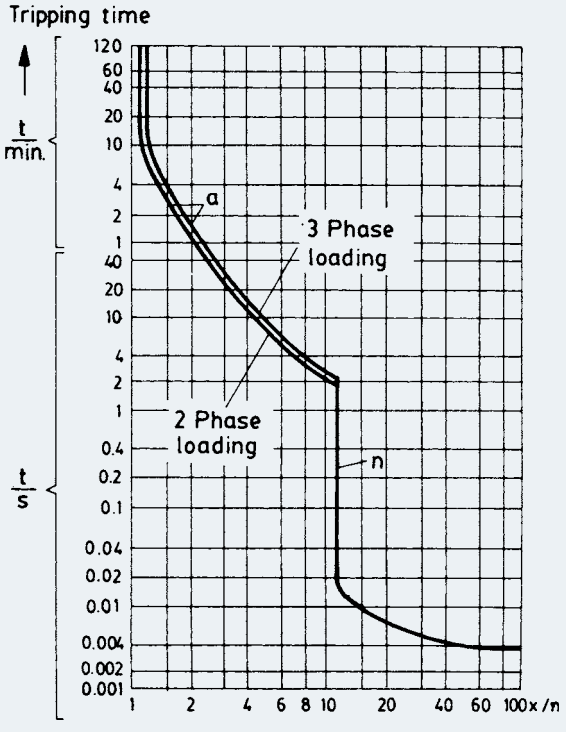
Times set current

Time current characteristics of 3VU13



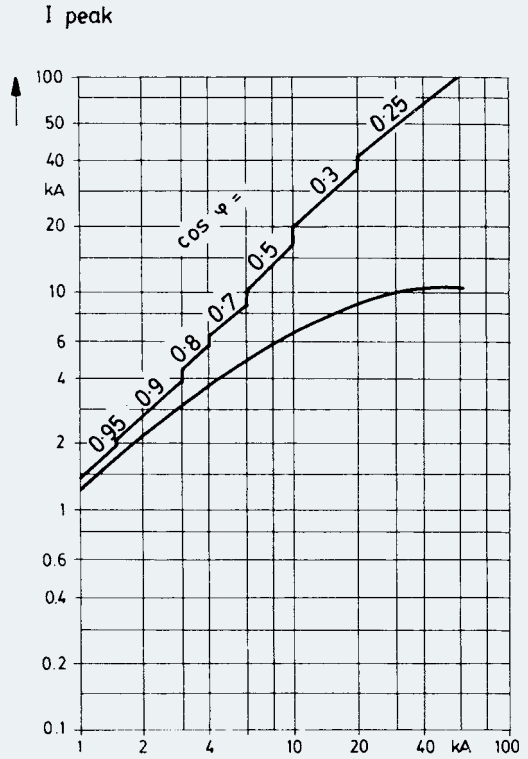
Short circuit current Ik (effective)

Cut off characteristics of 3VU1300-0MK00



Times set current

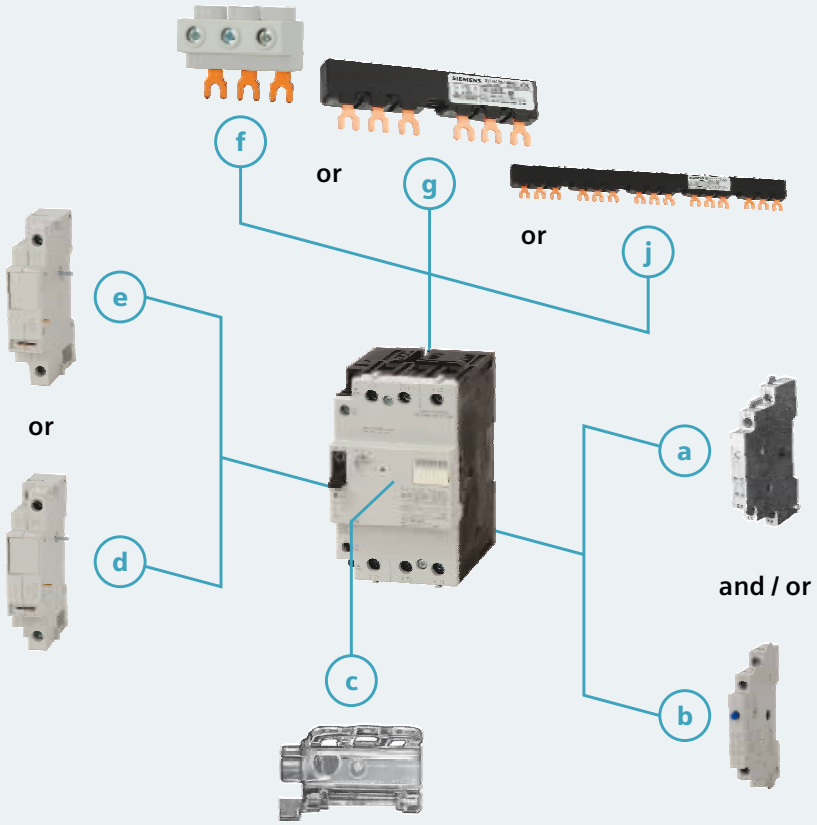
Time current characteristics of 3VU16



Short circuit current Ik (effective)

Cut off characteristics of 3VU1600-0MN00

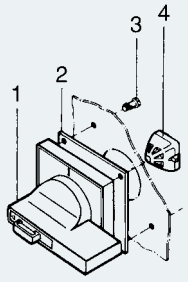
Accessories:



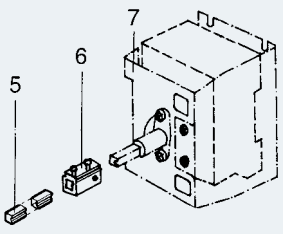
	Accessory	MLFB	Configuration	Description
a	Add-on auxiliary block	3VU9131-3AA0	1NO+1NC	This contact can be added to the MPCB with or without built -in 1NO+1NC contact
b	s/c trip indicating contact	3VU9131-7AA00	1NO+1NC	When short circuit (and not overload) occurs, alarm contact 1NO+1NC changes over which can be used to give indication.
c	Padlocking for toggle	3VU9168-0KA00	–	Handle of 3VU13/16 can be padlocked to prevent unauthorized operation
d	Under-voltage release	3VU9132-0AB15	220/230V 50Hz	It trips the MPCB on voltage interruption, preventing the undesirable restart of the motor
e	Shunt release	3VU9132-0AB55 3VU9132-0AB50 3VU9132-0AB73	220/230V 50Hz 24V/50Hz DC 110-240V	Shunt trip is used for remotely tripping the MPCB
f	3-phase in-feed terminal	3RV19 25-5AB	Max. 63Amps	It provides a convenient means of energy supply and distribution
g	3-phase bus-bar (2 breakers)	3VU9135-1AB02	Max. 63Amps	It provides a convenient solution for connecting group of MPCB's together
h	3-phase bus-bar (3 breakers)	3VU9135-1AB03	Max. 63Amps	It provides a convenient solution for connecting group of MPCB's together
i	3-phase bus-bar (4 breakers)	3VU9135-1AB04	Max. 63Amps	It provides a convenient solution for connecting group of MPCB's together
j	3-phase bus-bar (5 breakers)	3VU9135-1AB05	Max. 63Amps	It provides a convenient solution for connecting group of MPCB's together
k	Current limiter	3VU9138-2AB00	Max. 56Amps	This accessory can used to provide a higher breaking capacity up to 50kA

Door operating mechanism for 3VU13/16*

8UC616



3VU9133-Z/63-Z



1. Handle with masking frame
2. Gasket
3. Fixing screws
4. Drive coupling
5. Extension shaft-300mm
6. Adaptor
7. Breaker Operator

* 1 set available with breaker operator kit and 8UC front drive together

Breaker Operating Kit for 3VU13 – 3VU9133-Z

Breaker Operating Kit for 3VU16 – 3VU9163-Z

Note : All the above accessories have a standard package no. = 1

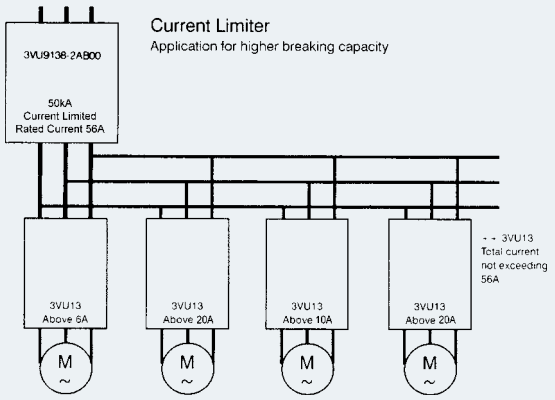
Current-Limiter

The breaking capacity of 3VU13 is 100kA upto 6A. However for 3VU circuit breakers with rated current of 8A and 10A the short-circuit breaking capacity is 10kA. For circuit breakers with rated current from 16A to 25A the short-circuit breaking capacity is 6kA. In order to enhance the breaking capacity to 50kA, for these ratings (8A to 25A), the current limiter can be used. Thus the need of back up fuses is obviated.

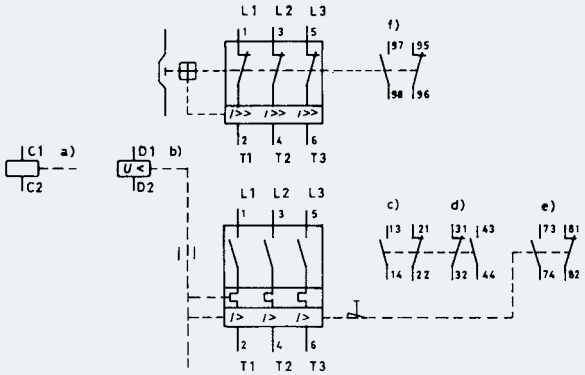
The current limiter is connected in series with 3VU13 MPCB.

When a short circuit occurs, the limiter trips and in turn opens the downstream MPCB. The auxiliary contacts of the current limiter (1NO+1NC) can be used for signaling whether the limiter has tripped or not.

Several MPCBs can also be connected at the output of a current limiter. However the summation of current ratings of individual MPCBs should not be greater than 56A.

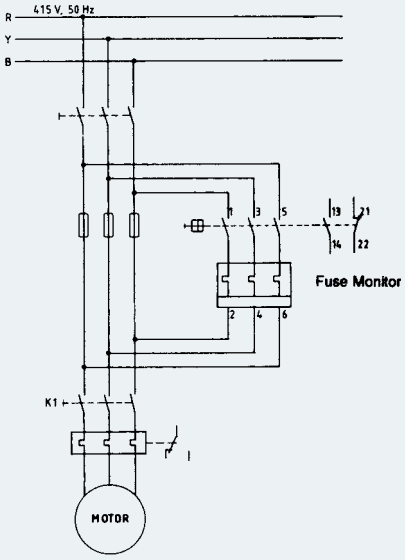


Connection diagrams

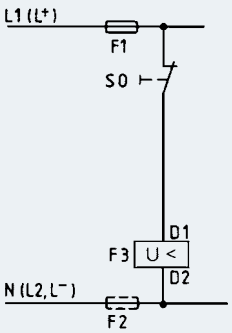


a) Shunt release
b) Under voltage release
c) Integral auxiliary contacts
d) Additional auxiliary contact for separate mounting
e) Short circuit signaling contact
f) Auxiliary contact of current limiter

Diagram for 3VU13/16 and current limiter (applies for 3VU13 only)

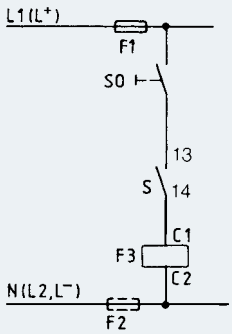


Fuse Monitor 3VU1300-IMS00



Shunt release

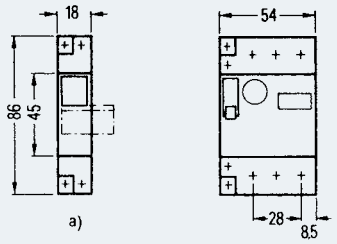
Wiring diagram for Shunt release for 3VU13/16



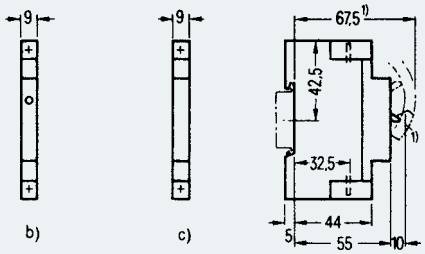
Wiring diagram for under voltage release of 3VU13/16

Dimensional Drawings

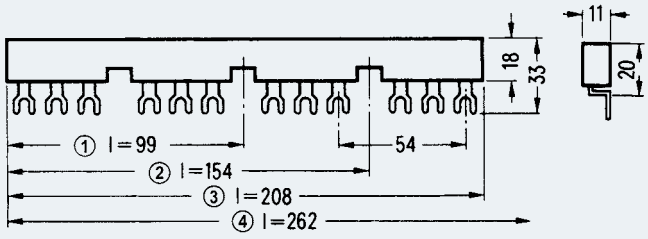
3VU13 circuit-breakers and accessories



3VU13 circuit-breakers
can be combined with
a) undervoltage or shunt release and/or
b) short-circuit signalling switch and/or
c) auxiliary contacts

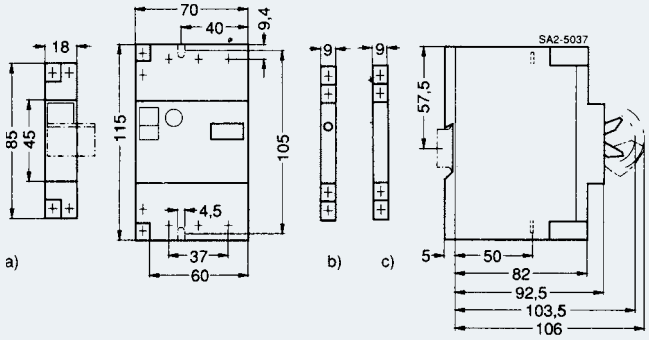


3VU9 138–2AB00 limiter
The limiter has the same dimensions as the standard version of the 3VU13 circuit-breaker



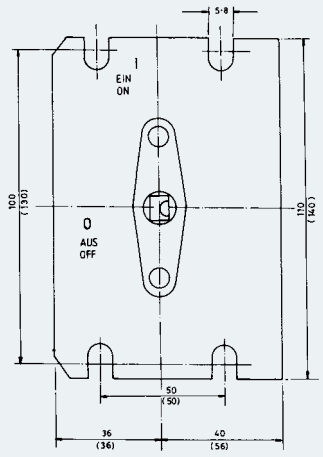
3VU9 135–1AB02,
3VU9 135–1AB03,
3VU9 135–1AB04,
3VU9 135–1AB05
three-phase busbar

① For 2 devices: 3VU9 135–1AB02
② For 3 devices: 3VU9 135–1AB03
③ For 4 devices: 3VU9 135–1AB04
④ For 5 devices: 3VU9 135–1AB05



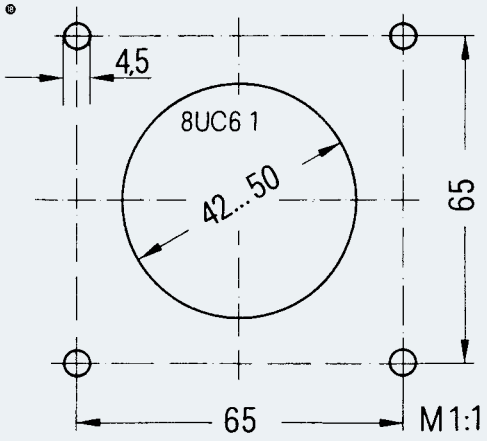
3VU16 circuit-breakers
can be combined with
a) undervoltage or shunt release and/or
b) short-circuit signalling switch and/or
c) auxiliary contacts

Door operating mechanism with extension shaft (300mm) with door interlock & padlocking facilities.



Mounting bracket of 3VU 13/16
3VU9133-1PA01 for 3VU 13
3VU9163-1PA02 for 3VU 16

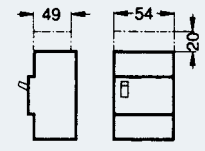
(Figures in bracket are for 3VU 16)
Mounting bracket



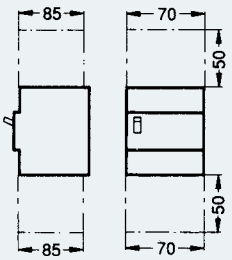
Handle

Required space above arc chutes for 3VU13 and 3VU16

Minimum clearance to adjacent parts as well as non-insulated live parts.



3VU13



3VU16

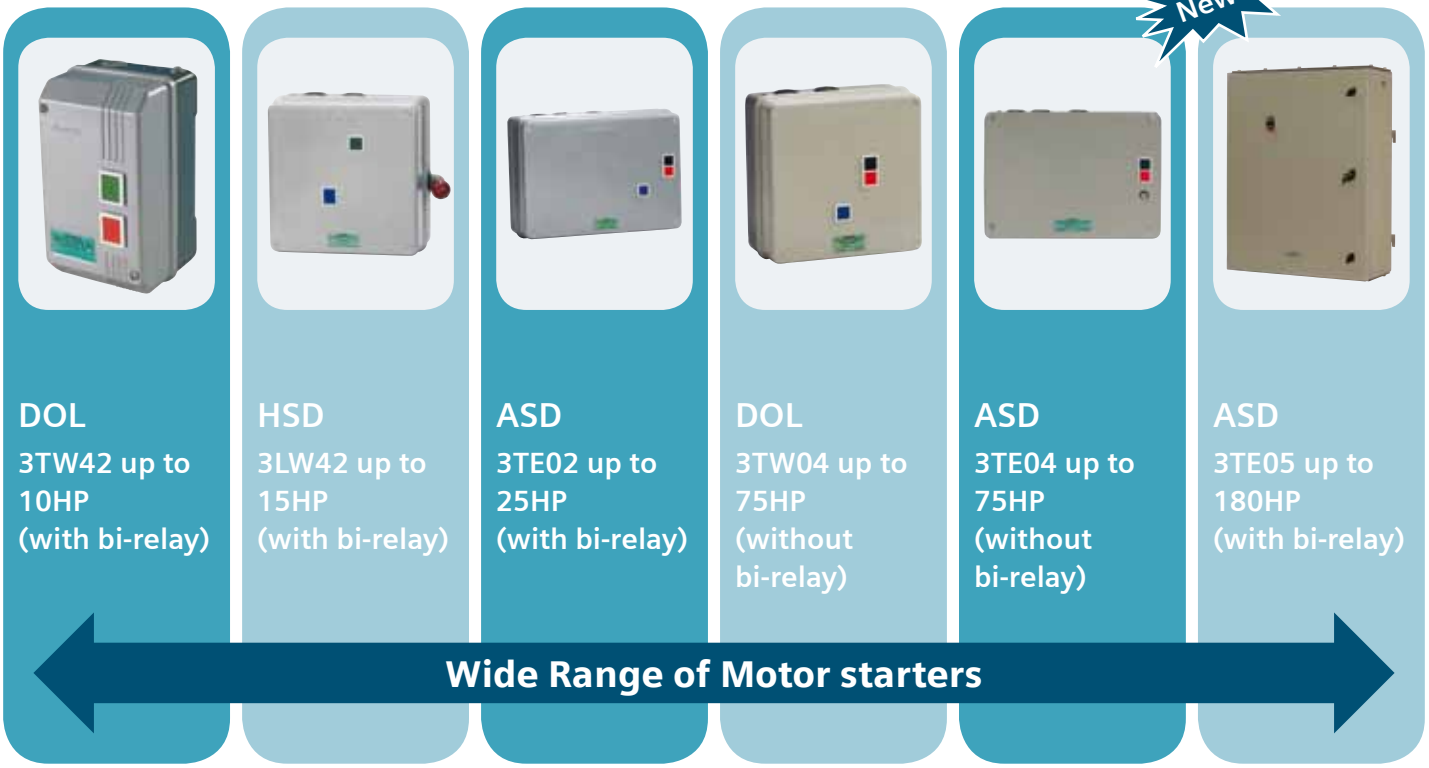
Get the right start with Siemens

Range of ready to use Motor starters

For more than 125 years, Siemens has been developing and manufacturing world-class, control products. Siemens offers a wide range of starters to cater to diversified demands from various sectors. These products are specially designed to provide smart, easy and reliable motor starting solution.

They employ tried and tested Siemens contactors and relays and this ensures the right start for motors requiring direct online starting or star delta starting.

Range:



Applications:

DOL: As we know, a direct on line starter can be used if the high inrush current of the motor does not cause excessive voltage drop in the supply circuit. It can be used to start small water pumps, compressors, fans and conveyor belts etc.

ASD: As these starters are available up to 180HP, wide range of applications can be catered for example - Textiles, Food and Beverages, Sugar Plants, Small scale machine tools, Paper & Printing, Cold Storages, Plastic Welding Machines etc.

Features and Benefits

Flexibility:

- 3TW04 and 3TE04 has provision for mounting relay but the relay is not provided in the starter. Thus offering flexibility of selecting relay range as per requirement

Reliability:

- 3RW42 range of DOL starters are having option of 200-400 V and 3TE02 star delta starters are having option of 230-400 V coil voltage which takes care of wide fluctuations in the supply voltage occurring especially in the remote places
- Accurate protection under single phasing & overload

High performance:

- Compliance to latest standard IS 13947 (3TW04, 3TE04, 3TE05)
- Assembly of world class contactor and relays inside each of the starter gives high mechanical and electrical life
- Easy to maintain
- Field tested for adverse conditions and many more advantages

---

New

Fully automatic star delta starters (ASD: Range extension)

ASD starters with bi-relay from 75kW to 132kW (100HP to 180HP)

Key highlights:

Ordering data

RAJA DOL - Direct online starters (with bi relay)

Motor rating at 415V, 3ph, 50Hz		Type [1] (DOL)	Relay range A	Std. pkg. (nos.)
HP	kW			
0.33	0.25	**3TW42 90-1A.64**	0.63-1	1
0.75	0.55	**3TW42 90-1A.66**	1-1.6	
1	0.75	**3TW42 90-1A.68**	1.6-2.5	
1.5	1.1	**3TW42 90-1A.69**	2-3.2	
2	1.5	**3TW42 90-1A.71**	3.2-5	
3	2.2	**3TW42 90-1A.72**	4-6.3	
5	3.7	**3TW42 90-1A.74**	6.3-10	
–	–	**3TW42 90-1A.75**	8-12.5	
7.5	5.5	**3TW42 90-1A.77**	10-16	
10	7.5	**3TW42 90-1A.78**	12.5-20	

[1] Enter code for coil voltage, 50Hz (B for 200-400V, W for 415V)

HSD - Handle operated star delta starters (with bi relay)

Motor rating at 415V, 3ph, 50Hz		Type [1] (HSD)	Relay range	Std. pkg. (nos.)
HP	kW			
5	3.7	**3LW42 90-0A.72**	4-6.3	1
10	7.5	**3LW42 90-0A.74**	6.3-10	
12.5	9.3	**3LW42 90-0A.75**	8-12.5	
15	11	**3LW42 90-0A.77**	10-16	

[1] Enter code for coil voltage, 50Hz (B for 200-400V, W for 415V)

ASD - Fully automatic star delta starters (with bi relay)

Motor rating at 415V, 3ph, 50Hz		Type [2] (ASD)	Relay range	Std. pkg. (nos.)
HP	kW			
12.5	9.3	**3TE02 90-0A.75**	8-12.5	1
15	11	**3TE02 90-0A.77**	10-16	
20	15	**3TE02 90-0A.78**	12.5-20	
25	18.5	**3TE02 90-0A.79**	16-25	

[2] Enter code for coil voltage, 50Hz (D for 230-400V, W for 415V)

DOL - Direct online starters (without bi relay)

Motor rating at 415V, 3ph, 50Hz		Type [3] (DOL)	Birelay (recommended)	Std. pkg. (nos.)
HP	kW			
20	15	■ **3TW04 94-2A..**	3UA55 (20-32A)	1
25	18.5	■ **3TW04 95-2A..**	3UA55 (25-36A)	
30	22	■ **3TW04 96-2A..**	3UA58 (32-50A)	
40	30	**3TW04 97-2A..**	3UA58 (40-57A)	
50	37	**3TW04 98-2A..**	3UA58 (57-70A)	
75	55	**3TW05 90-2A..**	3UA5830 (85-105A)	

[3] Enter code for coil voltage, 50Hz ("RO" for 415V, "PO" for 230V)

ASD - Fully automatic star delta starters (without bi relay)

Motor rating at 415V, 3ph, 50Hz		Type [3] (ASD)	Birelay (recommended)	Std. pkg. (nos.)
HP	kW			
30	22	**3TE04 94-2A..**	3UA55 (16-25A)	
40	30	**3TE04 94-2A..**	3UA55 (20-32A)	
50	37	**3TE04 95-2A..**	3UA55 (32-40A)	**1**
60	45	**3TE04 96-2A..**	3UA58 (32-50A)	
75	55	**3TE04 97-2A..**	3UA58 (40-57A)	

[3] Enter code for coil voltage, 50Hz ("RO" for 415V, "PO" for 230V)

New

ASD - Fully automatic star delta starters (with bi relay)

Motor rating at 415V, 3ph, 50Hz		Type ASD †	Std. pkg. (nos.)
HP	kW		
100	75	3TE05 94-2AR0	1
125	90	3TE05 95-2AR0	1
150	110	3TE05 96-2AR0	1
180	132	3TE05 97-2AR0	1

Contactor & Birelay list for 3TE04/ 3TE05 type ASD starter

HP	KW	3TE04/ 3TE05 type starter	Contactor Line/ Delta	Contactor Star	Bi-relay †††
30	22	**3TE04 94-2A....**	**3TF34**	**3TF34**	**3UA55 (16-25A)**
40	30	**3TE04 94-2A....**	**3TF34**	**3TF34**	**3UA55 (20-32A)**
50	37	**3TE04 95-2A....**	**3TF35**	**3TF34**	**3UA55 (32-40A)**
60	45	**3TE04 96-2A....**	**3TF46**	**3TF34**	**3UA55 (32-50A)**
75	55	**3TE04 97-2A....**	**3TF47**	**3TF34**	**3UA55 (40-57A)**
100	75	**3TE05 94-2A....**	**3TF49**	**3TF47**	**3UA58 (70-95A)**
125	90	**3TE05 95-2A....**	**3TF50**	**3TF47**	**3UA58 (70-95A)**
150	110	**3TE05 96-2A....**	**3TF50**	**3TF50**	**3UA58 (95-120A)**
180	132	**3TE05 97-2A....**	**3TF51**	**3TF50**	**3UA62 (115-180A)**

††† 3TE05 have in-built birelay whereas 3TE04 doesn't have in-built birelay

Spares for starters

Spares for 3TW42/3LW42 starters

Description	Type	Std. pkg. (nos.)
Contactor	**3TW0 290-0A.51** [1]	**1**
Main contact kit - single pole	**3TX0 200-0YA1**	**1**
Main contact kit - 3 pole	**3TX0 200-0YA0**	**1**
Coil	**3TX0 203-0Y.6** [1]	**1**
Moving contact carrier	**3TX0 200-0YD0**	**10**
Arc chamber	**3TX0 202-0YA0**	**10**
Aux. fixed contacts	**3TX0 200-1YB0**	**10**
Aux. moving contacts	**3TX0 200-1YC0**	**10**
Birelay	**3UW5 002..$**	**1**
'On' actuator for 3TW42	**3TX0 204-1YA0**	**1**
'Off' actuator for 3TW42	**3TX0 204-1YB0**	**1**
'Reset' actuator for HSD	**3TX0 204-1YR0**	**1**
On/Off contact	**3SX1 551-1YA**	**1**
Switch for HSD starter	**3LA0 204-4YB**	**1**

Spares for 3TE02 starters

Description	Type	Std. pkg. (nos.)
Contactor (1NO+1NC)	**3TW0 311-0A&51**	**1**
Contactor (2NO)	**3TW0 320-0A&51**	**1**
Main contact kit three pole	**3TX0 300-0YA0**	**1**
Main contact kit single pole	**3TX0 300-0YA1**	**1**
Coil	**3TX0 303-0Y&6**	**1**
Aux. fixed contacts (NO)	**3TX0 300-1YB0**	**10**
Aux. fixed contacts (NC)	**3TX0 300-1YD0**	**10**
Aux. moving contacts	**3TX0 300-1YC0**	**10**
Birelay	**3UW5 002..$**	**1**
Star-delta timer	**3RP15 76 1N#20 8K**	**1**

& Enter code for coil voltage, 50Hz (D for 230-400V, W for 415V)

Enter control voltage code (M for 200-240V / 380-440V, P for 230-400V)

Spares for 3RW04, 3TE04, 3TE05

Description	Type	Std. pkg. (nos.)
Main, aux contacts & spare coils	**Refer page 42**	**–**
On/Off actuators	**3SX1 552-1YA**	**1**
On/Off contact	**3SX1 551-1YA**	**1**
On/Off actuator for 3TE05 only	**3SB5201-7EC01**	**1**
Electronic Timer	**3RP15 76-1NM20 8K**	**1**
Accessory for independent mounting of 3UA58	**3UX1421-0XA**	**1**

† Enter code for coil voltage F0 (110V), P0 (230V), R0 (415V)

For replacing 3TF44 order 3TF3422 and for replacing 3TF45 order 3TF3522

1NO + 1NC @ 2NO + 2NC

$ Coil codes for relay 3UW5:

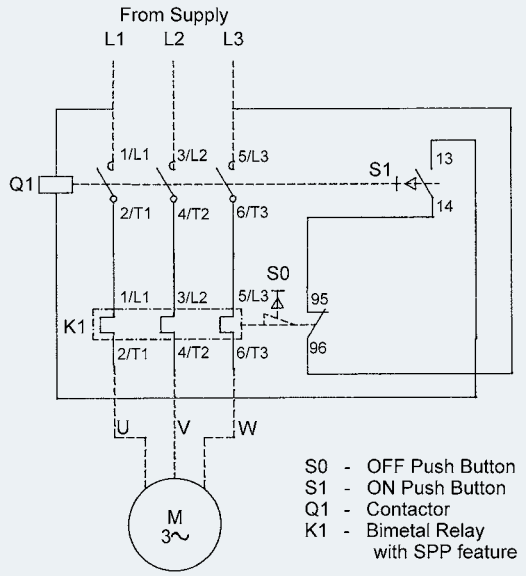
Relay range	0.63-1	1-1.6	1.6-2.5	2-3.2	3.2-5	4-6.3	6.3-10	8-12.5	10-16	12.5-20	16-25
Code	0J	1A	1C	1D	1F	1G	1J	1K	2A	2B	2C

Single line diagram SLD

A: DOL - in S.S. Housing SLD– 3phase motor

RAJA Direct-On-Line Starter

3TW42 90-1A

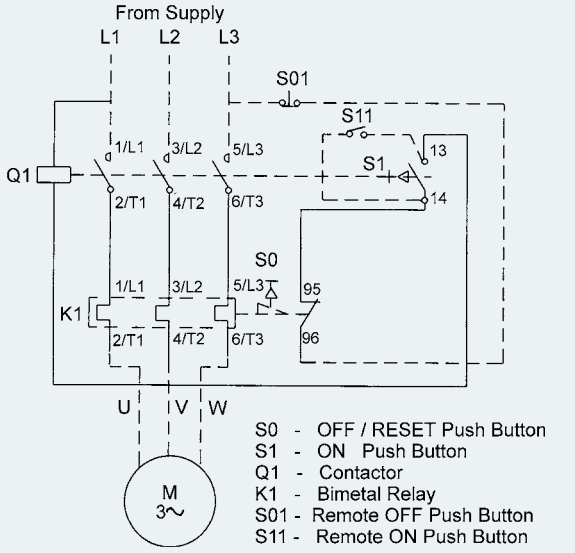


- Diagram shows connections made for contactor coils rated 200-400V (wide-band), 415V (320-455V), 50Hz, 440V (330-485V), 50Hz.
- For coils rated between 220V and 250V 50Hz, disconnect the wire between L3-96 and connect the neutral of the supply system to the terminal 96 of the relay.

DOL – Remote reset - SLD

RAJA Direct-On-Line Starter (for Remote Operation)

3TW42 90-1A

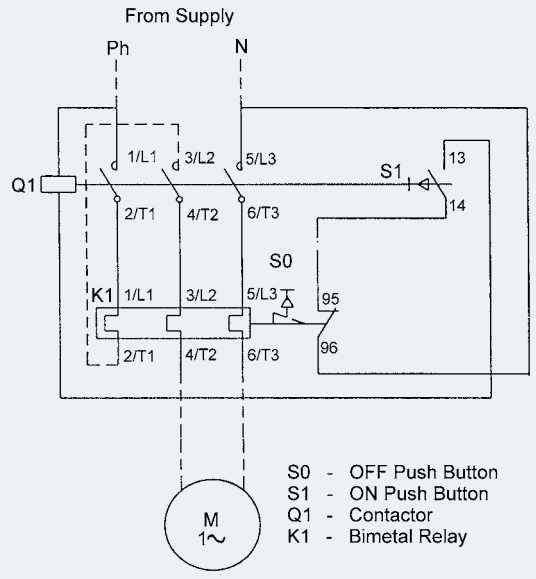


- Diagram shows connections made for contactor coils rated 200 - 400V (wide-band), 415V (320-455V), 50Hz.
- For remote operation disconnect the wire between terminal 5/L3 on contactor and terminal 96 on the relay. Connect the remote 'OFF' S01 push button as shown. Connect remote 'ON' S11 push button parallel to S1 as shown.

DOL - in S.S. Housing SLD– 1phase motor

RAJA Direct-On-Line Starter (for Single Phase connection)

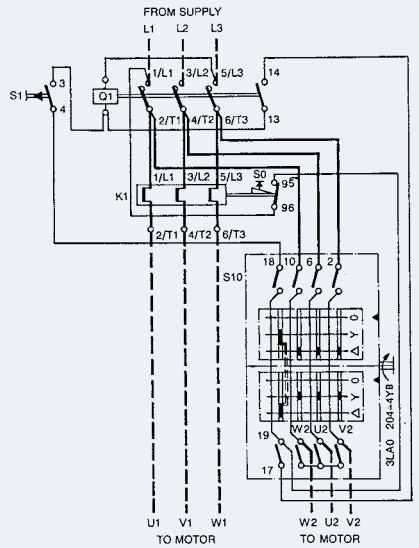
3TW42 90-1A



- Wiring Diagram for Single-Phase Motors

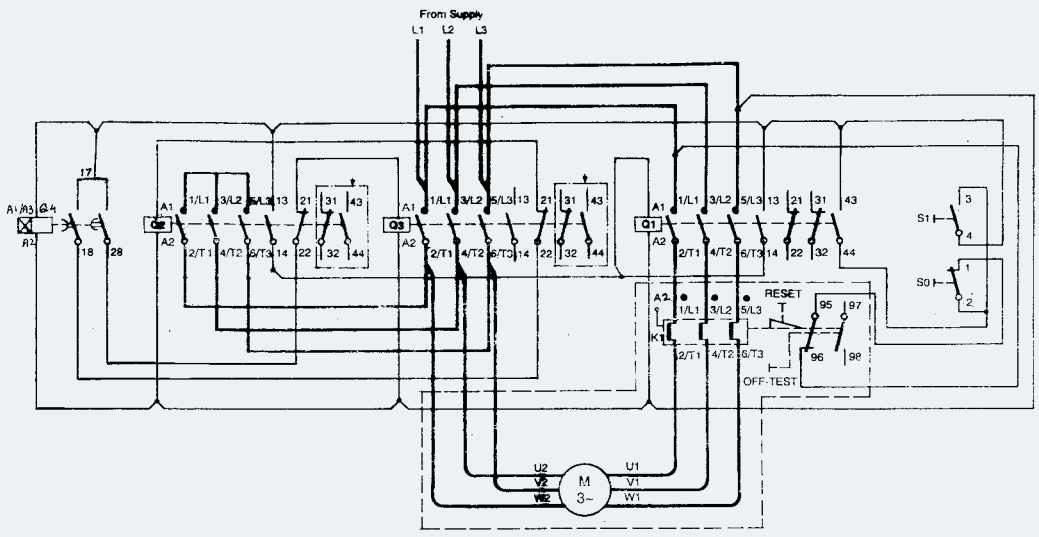
Note :
Connect 3/L2 to 2/T1 by cable of suitable size. (max 4 mm²)

B2: Handle Operated Star delta starter



S1 = ON Push Button
S0 = Reset Push Button
Q1 = Contactor
K1 = Bimetal Relay with SPP Feature
S10 = 3LA0 switch

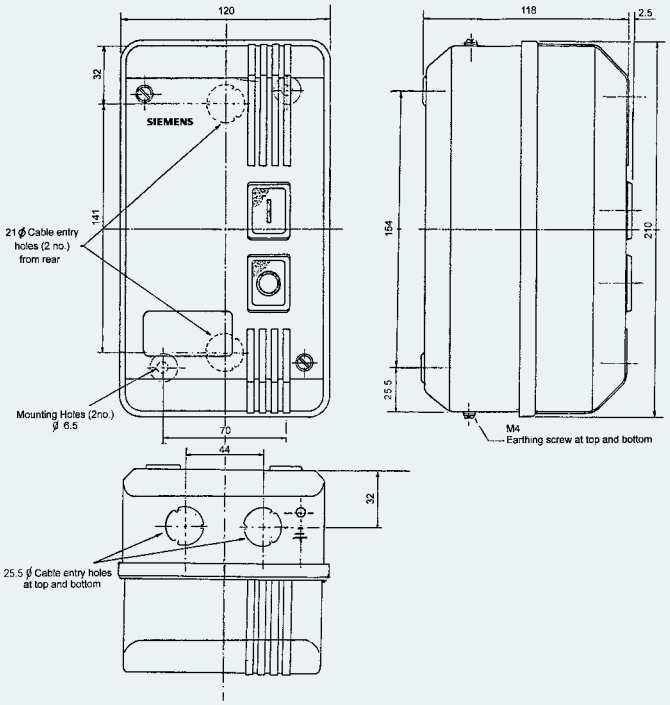
Star delta Starter



Q1 : Line Contactor
Q2 : Star Contactor
Q3 : Delta Contactor
S1 : 'ON' Push Button-I
S0 : 'OFF' Push Button-O
S4 : 'Reset' Button (of relay)
K1 : Bimetal Relay
Q4 : Star Delta Timer

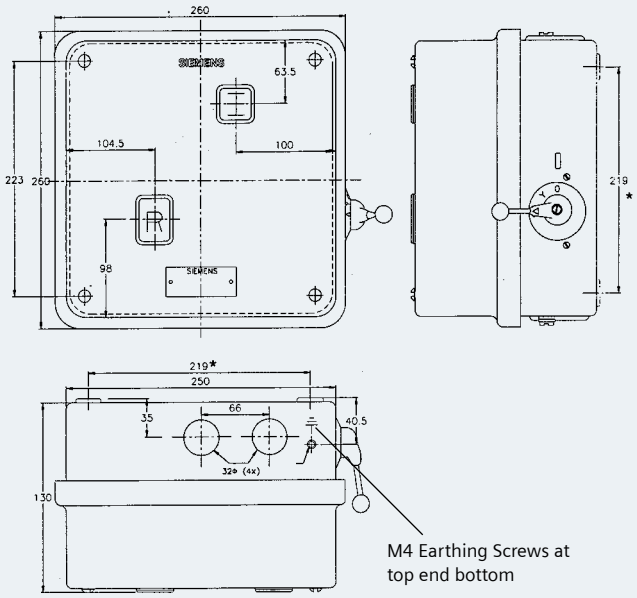
Dimensional drawings

RAJA DOL starter 3TW42



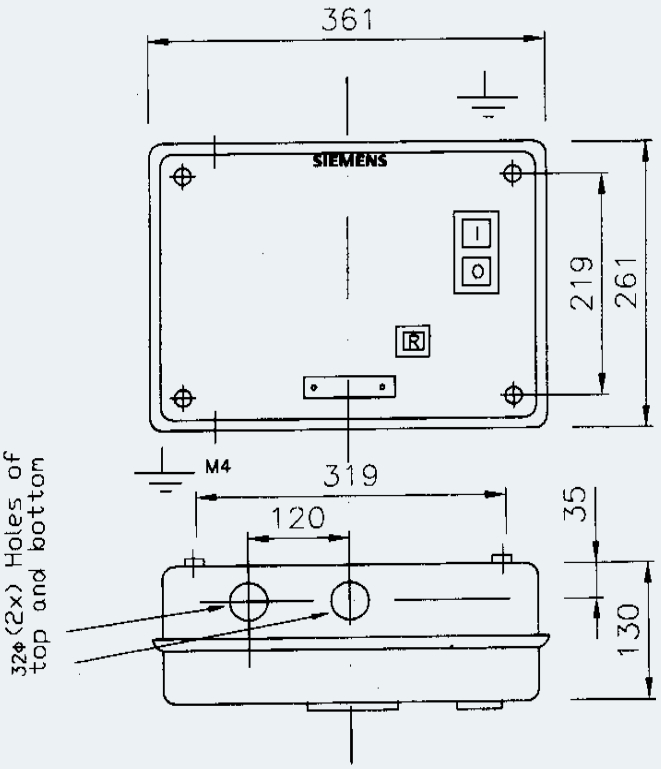
* Mounting dimensions 154 x 70

Handle operated Star delta starter 3LW4



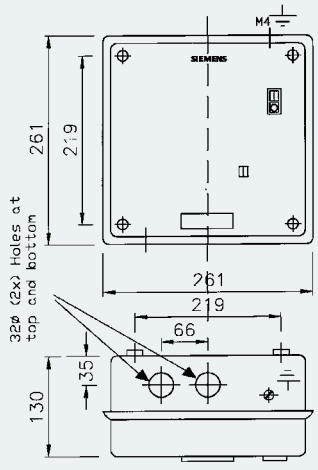
* Mounting dimensions 219 x 219
Use M4 screws for mounting

Fully automatic star delta starter 3TE02

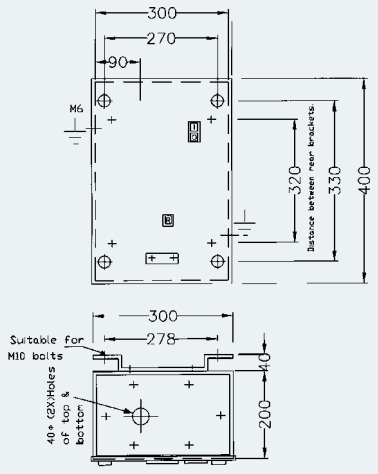


DOL without relay 3TW04

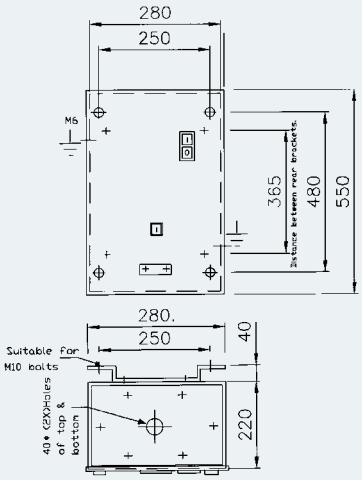
3TW04 95-2A..



3TW04 96-2A..
3TW04 97-2A..
3TW04 98-2A..

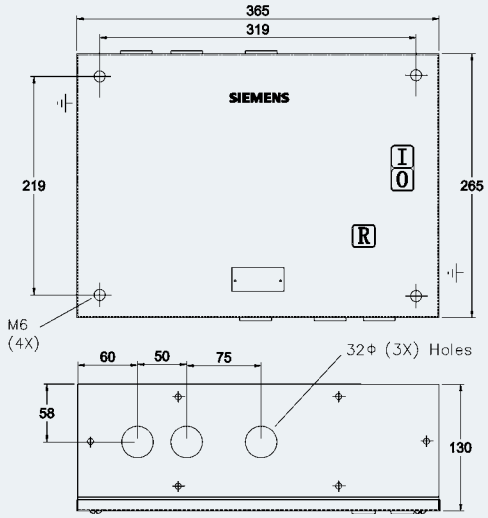


3TW05 90-2A..
3TW05 91-2A..

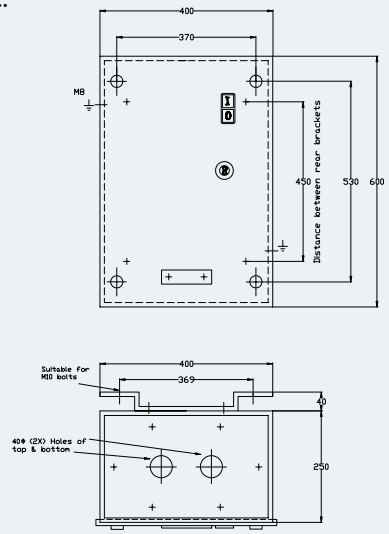


Fully automatic star delta starter with out bi relay (3TE04)

3TE04 94-2A..
3TE04 95-2A..

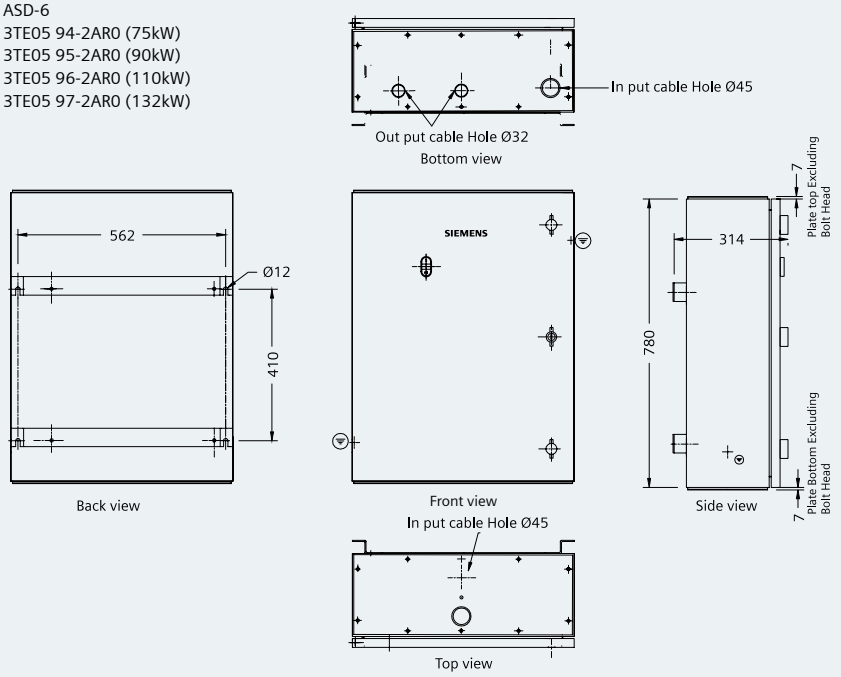


3TE04 96-2A..
3TE04 97-2A..



Fully automatic star delta starter with bi relay (3TE05)

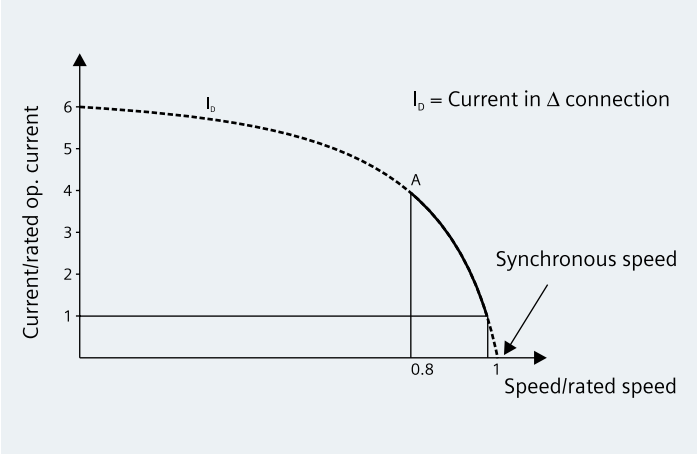
ASD-6
3TE05 94-2AR0 (75kW)
3TE05 95-2AR0 (90kW)
3TE05 96-2AR0 (110kW)
3TE05 97-2AR0 (132kW)



Useful technical information

Method of starting

A. DOL starting method:



The most economical and popular method of starting squirrel cage induction motors, is direct-on-line, where the starter is connected directly across the supply. However, the starting current at the moment of switching Direct-on-line can be as high as 6-8 times the rated current.

Advantages: High starting torque, shorter starting time, simple construction and wiring, space saving etc.

Disadvantages: High starting current

DOL: RAJA 3TW42

Construction

Contactor:

The DOL starter up to 10 HP is fitted with 3TW02 contactor. This contactor is specially designed by Siemens considering the requirements of industry as well as agriculture. Considering the specific need of the agricultural pump set applications, Siemens has designed a special wide band coil (200- 400V). This coil operates reliably even when there is wide voltage fluctuation. The contact rating of this contactor is 20 A. This high contactor rating has made RAJA starter the most suitable starter for applications where current for given HP is higher than that of the conventional motors' e.g.. Submersible pumps etc.

DOL: 3TW04

This starter is similar to RAJA DOL starter with sheet steel housing (3TW42901A). In order to offer flexibility of selecting exact 3UA relay range by the customer, this starter has only provision for mounting the bi-relay but the birelay is not provided in the starter. Customer is required to select the suitable bi-relay and mount it in the starter before putting it in service.

Bimetal Overload Relay:

The RAJA direct-on-line starter is fitted with 3UW50 relay. These relays are computer calibrated and therefore, offer accurate protection. The main benefit of this bimetal relay is the built-in single phasing protection in addition to the overload protection. This relay is automatic reset type and can not be reset by hand.

Push buttons

Push buttons are used for switching 'ON' and 'OFF' the starter.

Operation:

In DOL starting, the 'ON' push button is pressed, which energizes the contactor coil, thus switching on the circuit. When the OFF' push button is pressed, the contactor is de-energized, switching off the circuit. The bimetal relay under normal functioning of motor plays no active part in the starter. But under overload, single phasing or locked rotor conditions of Motor, the bimetal relay cuts-off the supply to the contactor coil, tripping the circuit. The contactor itself provides the necessary 'no-voltage' protection in so far as it will drop out in the case of a supply failure, and for restarting on resumption of supply, the 'ON' push button will have to be pressed again.

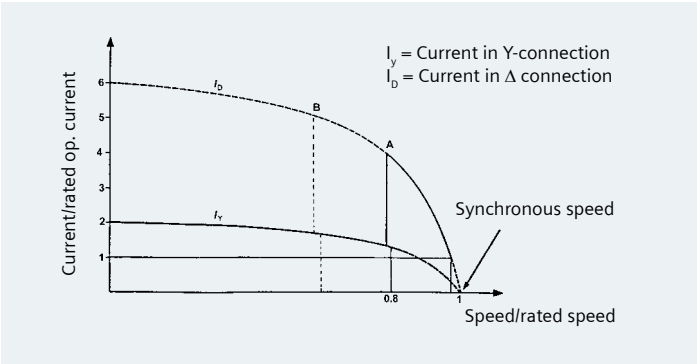
B. Star delta starting method:

In star delta starting, initially the motor windings are connected in star. This reduces the starting current by 1/3 rd of the full load current also the voltage by (1/√3) of the rated value. As the torque is proportional to the square of the voltage, the starting torque also get reduced to 1/3 rd of it's full load value. Once the motor attains approximately 80% of the rated speed, the windings get connected in the delta formation.

Thus by star delta starting, the starting current is reduced to 2 to 2.5 times the rated current unlike DOL starting, where it is 7 to 8 times of the rated current.

Advantages: low starting current

Disadvantages: Low / medium starting torque, longer starting time, less simpler construction and wiring, requires more space etc.



In this starter, the changeover from 'star' to 'delta' is done automatically after a preset time by using a timer.

B1. Handle Operated Star Delta Starter (3LW42)

In this starter, the changeover from 'star' to 'delta' is done manually through a control switch.

Construction:

It consists of a star-delta switch (3LAO), contactor (3TW02), an overload relay (3UW50), "Reset" push button and a safety 'ON' push button.

Operation:

To start the motor, move the 3LAO switch handle from 'O' position to 'star' (Y) position with the right hand and press the start' - (I) push button with your left hand. The motor starts and when it has almost come to its rated speed (indicated when the motor hum reaches a steady pitch), turn the handle to 'delta' position, still ensure to keep the push button pressed. After switching to delta, the push button and the switch handle can be released. To stop the motor, bring the handle of the switch to 'O' position. If the starter trips automatically due to any fault, the switch handle is first to be brought to 'O' position and the bimetal relay has to be reset.

ASD: 3TE04 and 3TE05

These starters are similar to star delta starter (3TE02). 3TE04 starters offers flexibility of selection of 3UA relays. The new range extention starters of ASD 3TE05 starters come with inbuilt bi relays.

Fuse protected selection type 2, Iq = 50kA, IS/IEC: 60947-4-1

- The selection is valid only for complete Siemens combinations i.e. SDF + DIN Fuse + Contactor + Birelay (+ timer).
- **In case this combination is changed to accommodate another brand/rating of SDF/DIN Fuse/Contactor/BMR, it shall be the responsibility of the person making such a change to assure type 2 performance.**
- Selection is for **normal starting** conditions with starting time ≤ 6 seconds. For **heavy starting** applications (e.g. ID/FD fans, reciprocating compressors, ball mills etc.), please **consult Siemens**.
- At 60°C service temperature the bi-relay has to be derated. The bi-relay can be used upto the maximum current setting indicated. For example - A bi-relay with setting 32-50A, at 60°C can be used only upto 47A. This however does not mean that at 60°C, the 50A setting corresponds to 47A. It means that, the bi-relay should not be set beyond 47A.
- **The electronic star-delta timer type 3RP should be used in star-delta feeders.**
- SDF: Switch Disconnector Fuse. **All fuses are DIN HRC type**.
- Tested Type 2 combinations
- Low LCC = Low Life Cycle Cost

Direct-on-line feeder, for Low LCC

SL Motor	Motor	SDF		HRC Fuse		Contactor		Bi-Relay		Bi-Relay	
kW/HP 415V, 3ph, 50Hz	IL Amp	Type	Rating	Type 3NA7	Amp	Type	Amp	Type (50°C)	Set-Range Amp	Type (60°C)	Available Set-Range Amp
0.37/0.5	1	3KL811	20	3NA7804	4	3TF30	9	3UA5000-0K	0.8 - 1.25	3UA5000-0K	0.8 - 1.17
0.55/0.75	1.3	3KL811	20	3NA7804	4	3TF30	9	3UA5000-1A	1 - 1.6	3UA5000-1A	1 - 1.5
0.75/1	1.9	3KL811	20	3NA7801	6	3TF30	9	3UA5000-1B	1.25 - 2	3UA5000-1C	1.6 - 2.3
1.1/1.5	2.6	3KL811	20	3NA7801	6	3TF30	9	3UA5000-1D	2 - 3.2	3UA5000-1D	2 - 3
1.5/2	3.7	3KL811	20	3NA7803	10	3TF30	9	3UA5000-1E	2.5 - 4	3UA5000-1E	2.5 - 3.7
2.2/3	4.8	3KL811	20	3NA7805	16	3TF30	9	3UA5000-1F	3.2 - 5	3UA5000-1G	4 - 5.9
3.7/5	7.8	3KL811	20	3NA7807	20	3TF30	9	3UA5000-1H	5 - 8	3UA5000-1J	6.3 - 9.4
5.5/7.5	11.2	3KL812	32	3NA7810	25	3TF31	12	3UA5000-1K	8 - 12.5	3UA5000-1K	8 - 11.7
7.5/10	16	3KL812	32	3NA7812	32	3TF32	16	3UA5200-2A	10 - 16	3UA5200-2B	12.5 - 18.7
9.3/12.5	19	3KL815	63	3NA7820	50	3TF34	32	3UA5500-2B	12.5 - 20	3UA5500-2C	16 - 23.4
11/15	20.8	3KL815	63	3NA7820	50	3TF34	32	3UA5500-2C	16 - 25	3UA5500-2C	16 - 23.4
15/20	28	3KL815	63	3NA7822	63	3TF34	32	3UA5500-2D	20 - 32	3UA5500-2D	20 - 30
18.5/25	34	3KL815	63	3NA7822	63	3TF35	38	3UA5500-2Q	25 - 36	3UA5500-2R	32 - 37.4
22/30	40	3KL821	100	3NA7824	80	3TF46	45	3UA5800-2FZ1	32 - 50	3UA5800-2FZ1	32 - 47
30/40	53	3KL821	100	3NA7830	100	3TF47	63	3UA5800-2TZ1	40 - 57	3UA5800-2PZ1	50 - 59
37/50	65	3KL822	125	3NA7832	125	3TF477	70	3UA5800-2VZ2	57 - 70	3UA5800-2VZ2	57 - 65.5
45/60	78	3KL822	125	3NA7832	125	3TF49	85	3UA5800-8YZ1	70 - 95	3UA5800-8YZ1	70 - 88.9
55/75	96	3KL823	160	3NA7836	160	3TF50	110	3UA5830-5C	85 - 105	3UA5830-5C	85 - 98.2
75/100	131	3KL831	200	3NA7140	200	3TF51	140	3UA6230-5A	85 - 135	3UA6230-5B	115 - 168
90/125	156	3KL832	250	3NA7144	250	3TF52	170	3UA6230-5B	115 - 180	3UA6230-5B	115 - 168
110/150	189	3KL832	250	3NA7144	250	3TF53	205	3UA6230-5C	160 - 250	3UA6230-5C	160 - 234
132/180	227	3KL833	315	3NA7252	315	3TF54	250	3UA6230-5C	160 - 250	3UA6230-5C	160 - 234
160/215	271	3KL834	400	3NA7260	400	3TF55	300	3UA6230-5D	200 - 320	3UA6230-5D	200 - 299
200/270	339	3KL841	500	3NA7365	500	3TF56	400	3UA6230-5E	250 - 400	3UA6230-5E	250 - 374
250/335	398	3KL841	500	3NA7365	500	3TF57	475	3UA6830-3F	320 - 500	3UA6830-5F	320 - 468

Star-Delta feeder, for Low LCC

SL Motor	Motor		SDF		HRC Fuses		Contactor Line/Delta		Contactor Star		Bi-Relay		Bi-Relay		Timer
kW/HP 415V, 3ph, 50Hz	IL Amp.	Iph Amp	Type	Rating	Type 3NA7	Amp	Type	Amp	Type	Amp	Type (50°C)	Set-Range Amp	Type (60°C)	Available Set-Range Amp	Type
2.2/3	4.8	2.8	3KL811	20	3NA7801	6	3TF30	9	3TF30	9	3UA5000-1D	2-3.2	3UA5000-1D	2-3	3RP15
3.7/5	7.8	4.5	3KL811	20	3NA7803	10	3TF30	9	3TF30	9	3UA5000-1F	3.2-5	3UA5000-1F	3.2-4.7	3RP15
5.5/7.5	11.2	6.5	3KL811	20	3NA7805	16	3TF30	9	3TF30	9	3UA5000-1H	5-8	3UA5000-1H	5-7.5	3RP15
7.5/10	16	9.2	3KL811	20	3NA7807	20	3TF31	12	3TF30	9	3UA5000-1J	6.3-10	3UA5000-1J	6.3-9.4	3RP15
9.3/12.5	19	11	3KL812	32	3NA7810	25	3TF31	12	3TF30	9	3UA5000-1K	8-12.5	3UA5000-1K	8-11.7	3RP15
11/15	20.8	12	3KL812	32	3NA7810	25	3TF31	12	3TF30	9	3UA5000-1K	8-12.5	3UA5000-2S	10-13.6	3RP15
15/20	28	16.2	3KL812	32	3NA7812	32	3TF33	22	3TF32	16	3UA5200-2B	12.5-20	3UA5200-2B	12.5-18.7	3RP15
18.5/25	34	19.7	3KL815	63	3NA7820	50	3TF34	32	3TF34	32	3UA5500-2B	12.5-20	3UA5500-2C	16-23.4	3RP15
22/30	40	23.2	3KL815	63	3NA7820	50	3TF34	32	3TF34	32	3UA5500-2C	16-25	3UA5500-2D	22-30	3RP15
30/40	53	30.6	3KL815	63	3NA7822	63	3TF34	32	3TF34	32	3UA5500-2D	20-32	3UA5500-2Q	25-33.7	3RP15
37/50	65	37.5	3KL821	100	3NA7824	80	3TF35	38	3TF34	32	3UA5500-2R	32-40	3UA5500-8M	36-45	3RP15
45/60	78	45	3KL821	100	3NA7830	100	3TF46	45	3TF34	32	3UA5800-2FZ1	32-50	3UA5800-2FZ1	32-47	3RP15
55/75	96	55.4	3KL821	100	3NA7830	100	3TF47	63	3TF34	32	3UA5800-2TZ1	40-57	3UA5800-2PZ1	50-59	3RP15
75/100	131	75.6	3KL823	160	3NA7836	160	3TF49	85	3TF47	63	3UA5800-8YZ1	70-95	3UA5800-8YZ1	70-88.9	3RP15
90/125	156	90.1	3KL823	160	3NA7836	160	3TF50	110	3TF47	63	3UA5830-5B	70-95	3UA5830-5C	85-98.2	3RP15
110/150	189	109	3KL831	200	3NA7140	200	3TF50	110	3TF50	110	3UA5830-5D	95-120	3UA5830-5D	95-112	3RP15
132/180	227	131.1	3KL832	250	3NA7144	250	3TF51	140	3TF50	110	3UA6230-5B	115-180	3UA6230-5B	115-168	3RP15
160/215	271	156.5	3KL833	315	3NA7252	315	3TF52	170	3TF50	110	3UA6230-5B	115-180	3UA6230-5B	115-168	3RP15
200/270	339	195.7	3KL834	400	3NA7260	400	3TF54	250	3TF52	170	3UA6230-5C	160-250	3UA6230-5C	160-234	3RP15
250/335	398	229.8	3KL841	500	3NA7260	400	3TF54	250	3TF54	250	3UA6230-5C	160-250	3UA6230-5D	200-299	3RP15

Fuseless selection type 2, Iq = 50kA, IS/IEC: 60947-4-1

- The selection is valid only for complete Siemens combinations i.e. MPCB / MCCB + contactor + bi-relay (+timer).
- **In case this combination is changed to accommodate another brand/rating of MPCB/MCCB/contactor/BMR, it shall be the responsibility of the person making such a change to assure Type 2 performance.**
- Selection is for **normal starting** conditions with starting time ≤ 6 seconds. For **heavy starting** applications (e.g. ID/FD fans, reciprocating compressors, ball mills etc.), please **consult Siemens**.
- **The electronic star-delta timer type 3RP should be used in star-delta feeders.**
- Truly tested Type 2 combinations at neutral authorities.
- Low LCC = Low life cycle cost

Direct-on-line feeder, for low LCC

SL motor		Circuit breaker		Contactor		Bi-relay	
kW/HP 415V, 3ph, 50Hz	IL A	Type	A	Type	A	Type (50°C)	Range (A)
0.37/0.5	1	**3RV11 21-0KA10**	1.25	**3TF30**	9	#	0.9 - 1.25
0.55/0.75	1.3	**3RV11 21-1AA10**	1.6	**3TF30**	9	#	1.1 - 1.6
0.75/1	1.9	**3RV11 21-1BA10**	2	**3TF30**	9	#	1.4 - 2
1.1/1.5	2.6	**3RV11 21-1DA10**	3.2	**3TF31**	12	#	2.2 - 3.2
1.5/2	3.7	**3RV11 21-1EA10**	4	**3TF32**	16	#	2.8 - 4
2.2/3	4.8	**3RV11 21-1FA10**	5	**3TF32**	16	#	3.5 - 5
3.7/5	7.8	**3RV11 21-1HA10**	8	**3TF32**	16	#	5.5 - 8
5.5/7.5	11.2	**3RV11 21-1KA10**	12.5	**3TF34**	32	#	9 - 12.5
7.5/10	16	**3RV11 21-4AA10**	16	**3TF34**	32	#	11 - 16
9.3/12.5	19	**3RV11 21-4BA10**	20	**3TF34**	32	#	14 - 20
11/15	20.8	**3RV11 21-4CA10**	22	**3TF34**	32	#	17 - 22
15/20	28	**3RV11 31-4EA10**	32	**3TF35**	38	#	22 - 32
18.5/25	34	**3RV11 31-4FA10**	40	**3TF46**	45	#	28 - 40
22/30	40	**3RV11 31-4GA10**	45	**3TF48**	75	#	36 - 45
30/40	53	**3RV11 42-4JA10**	63	**3TF48**	75	#	45 - 63
37/50	65	**3RV11 42-4KA10**	75	**3TF50**	110	#	57 - 75
45/60	78	**3RV11 42-4LA10**	90	**3TF50**	110	#	70 - 90
55/75	96	**3RV11 42-4MA10**	100	**3TF52**	170	#	80 - 100
75/100	131	**3VL27 16-1DK36-0AA0**	160	**3TF52**	170	**3UA62 30-5A**	85-135
90/125	156	**3VL37 25-1DK36-0AA0**	250	**3TF53**	205	**3UA62 30-5B**	115-180
110/150	189	**3VL37 25-1DK36-0AA0**	250	**3TF53**	205	**3UA62 30-5C**	160 - 250
132/180	227	**3VL37 25-1DK36-0AA0**	250	**3TF54**	250	**3UA62 30-5C**	160 - 250
160/215	271	**3VL47 31-1DK36-0AA0**	315	**3TF55**	300	**3UA62 30-5D**	200 - 320
200/270	339	**3VL57 50-1DK36-0AA0**	500	**3TF57**	475	**3UA62 30-5E**	250 - 400
250/335	398	**3VL57 50-1DK36-0AA0**	500	**3TF57**	475	**3UA68 30-5F**	320 - 500

3RV11 comes with integral relay function, hence external birelay is eliminated.

MPCB with 'standard release' can also be used.

Star-delta feeder, for low LCC

SL motor			Circuit breaker		Contactor line/delta		Contactor star		Bi-relay		Timer
kW/HP 415V, 3ph, 50Hz	IL A	Iph A	Type	A	Type	A	Type	A	Type (50°C)	Range (A)	Type
2.2/3	4.8	2.8	**3RV13 21-1FC10**	5	**3TF32**	16	**3TF30**	9	**3UA52 00-1D**	2 - 3.2	**3RP15**
3.7/5	7.8	4.5	**3RV13 21-1HC10**	8	**3TF32**	16	**3TF30**	9	**3UA52 00-1F**	3.2 - 5	**3RP15**
5.5/7.5	11.2	6.5	**3RV13 21-1KC10**	12.5	**3TF34**	32	**3TF30**	9	**3UA52 00-1H**	5 - 8	**3RP15**
7.5/10	16	9.2	**3RV13 21-4AC10**	16	**3TF34**	32	**3TF30**	9	**3UA52 00-1J**	6.3 - 10	**3RP15**
9.3/12.5	19	11	**3RV13 21-4CC10**	22	**3TF34**	32	**3TF30**	9	**3UA52 00-1K**	8 - 12.5	**3RP15**
11/15	20.8	12	**3RV13 21-4CC10**	22	**3TF34**	32	**3TF30**	9	**3UA52 00-1K**	8 - 12.5	**3RP15**
15/20	28	16.2	**3RV13 31-4EC10**	32	**3TF35**	38	**3TF32**	16	**3UA52 00-2B**	12.5 - 20	**3RP15**
18.5/25	34	19.7	**3RV13 31-4FC10**	40	**3TF46**	45	**3TF34**	32	**3UA52 00-2C**	16 - 25	**3RP15**
22/30	40	23.2	**3RV13 31-4GC10**	45	**3TF48**	75	**3TF34**	32	**3UA52 00-2C**	16 - 25	**3RP15**
30/40	53	30.6	**3RV13 41-4JC10**	63	**3TF48**	75	**3TF34**	32	**3UA55 00-2D**	20 - 32	**3RP15**
37/50	65	37.5	**3RV13 41-4KC10**	75	**3TF50**	110	**3TF34**	32	**3UA55 00-2R**	32 - 40	**3RP15**
45/60	78	45	**3RV13 41-4LC10**	90	**3TF50**	110	**3TF34**	32	**3UA55 00-8M**	36 - 45	**3RP15**
55/75	96	55.4	**3RV13 41-4MC10**	100	**3TF52**	170	**3TF34**	32	**3UA58 00-2TZ1**	40 - 57	**3RP15**
75/100	131	75.6	**3VL27 16-1DK36-0AA0**	160	**3TF52**	170	**3TF47**	63	**3UA58 00-8YZ1**	70 - 95	**3RP15**
90/125	156	90.1	**3VL37 25-1DK36-0AA0**	250	**3TF53**	205	**3TF47**	63	**3UA58 30-5B**	70 - 95	**3RP15**
110/150	189	109	**3VL37 25-1DK36-0AA0**	250	**3TF53**	205	**3TF50**	110	**3UA58 30-5D**	95 - 120	**3RP15**
132/180	227	131.1	**3VL37 25-1DK36-0AA0**	250	**3TF54**	250	**3TF50**	110	**3UA62 30-5B**	115 - 180	**3RP15**
160/215	271	156.5	**3VL47 31-1DK36-0AA0**	315	**3TF55**	300	**3TF50**	110	**3UA62 30-5B**	115 - 180	**3RP15**
200/270	339	195.7	**3VL57 50-1DK36-0AA0**	500	**3TF57**	475	**3TF52**	170	**3UA62 30-5C**	160 - 250	**3RP15**
250/335	398	229.8	**3VL57 50-1DK36-0AA0**	500	**3TF57**	475	**3TF54**	250	**3UA62 30-5D**	160 - 250	**3RP15**

Recommended Selection of Switchgear for Autotransformer Starter - Fuseless

SL Motor, 415V, 3Ph, 50Hz		MPCB / MCCB*		Line contactor K3		Transformer contactor K2 for Tranformer tapping % star contactor K1 = same as transformer contactor K2								Overload Relay	
kW / HP	IL Amp	MLFB	Range Amp	Type	A	80%		70%		65%		50%		Type	A
						Type	A	Type	A	Type	A	Type	A		
2.2 / 3	4.8	3RV10211FC10	5	3TF30	9	3TF30	9	3TF30	9	3TF30	9	3TF30	9	–	–
3.7 / 5	7.8	3RV10211HC10	8	3TF30	9	3TF30	9	3TF30	9	3TF30	9	3TF30	9	–	–
5.5 / 7.5	11.2	3RV10211KC10	12.5	3TF31	12	3TF30	9	3TF30	9	3TF30	9	3TF30	9	–	–
7.5 / 10	16	3RV10214AC10	16	3TF32	16	3TF31	12	3TF30	9	3TF30	9	3TF30	9	–	–
9.3 / 12.5	19	3RV10214BC10	20	3TF33	16	3TF32	16	3TF31	12	3TF30	9	3TF30	9	–	–
11 / 15	20.8	3RV10214CC10	22	3TF33	22	3TF32	16	3TF31	12	3TF31	12	3TF30	9	–	–
15 / 20	28	3RV10314EC10	32	3TF34	32	3TF33	22	3TF32	16	3TF32	16	3TF30	9	–	–
18.5 / 25	34	3RV10314FC10	40	3TF35	38	3TF34	32	3TF33	22	3TF32	16	3TF31	12	–	–
22 / 30	40	3RV10314GC10	45	3TF46	45	3TF34	32	3TF33	22	3TF33	22	3TF31	12	–	–
30 / 40	53	3RV10414JC10	63	3TF47	63	3TF35	38	3TF34	32	3TF34	32	3TF32	16	–	–
37 / 50	65	3RV10414KC10	75	3TF477	70	3TF46	45	3TF35	38	3TF34	32	3TF33	22	–	–
45 / 60	78	3RV10414LC10	90	3TF49	85	3TF47	63	3TF46	45	3TF35	38	3TF34	32	–	–
55 / 75	96	3RV10414MC10	100	3TF50	110	3TF477	70	3TF47	63	3TF46	45	3TF34	32	–	–
75 / 100	131	3VL2716-1DK36-0AA0	160	3TF51	140	3TF49	85	3TF48	75	3TF47	63	3TF46	45	3UA6230-5A	85 - 135
90 / 125	156	3VL3725-1DK36-0AA0	250	3TF52	170	3TF50	110	3TF49	85	3TF477	70	3TF47	63	3UA6230-5B	115 - 180
110 / 150	189	3VL3725-1DK36-0AA0	250	3TF53	205	3TF51	140	3TF50	110	3TF49	85	3TF47	63	3UA6230-5C	160 - 250
132 / 180	227	3VL3725-1DK36-0AA0	250	3TF54	250	3TF52	170	3TF51	140	3TF50	110	3TF477	70	3UA6230-5C	160 - 250
160 / 215	271	3VL4740-1DK36-0AA0	400	3TF55	300	3TF53	205	3TF51	140	3TF51	140	3TF50	110	3UA6230-5D	200 - 320
200 / 270	339	3VL4740-1DK36-0AA0	400	3TF56	400	3TF54	250	3TF52	170	3TF52	170	3TF50	110	3UA6230-5E	250 - 400
250 / 335	398	3VL5763-2DK36-0AA0	630	3TF57	475	3TF55	300	3TF53	205	3TF53	205	3TF51	140	3UA6830-3F	320 - 500

* 3RV10 MBCB comes with built in overload protection hence no need to use an external overload relay; 3RV13 Mag only MPCB can also be used, however an external overload relay is required

1. Please use Electronic Star delta time type 3RP15 for the changeover from star to main.
2. Selection valid for Normal starting of the motors with starting time upto 10 seconds
3. Minimum auxiliary contacts for K1= 1NO+1NC, for K2=1NO, for K3=1NC and for contactor relay K5=2NO
4. Selection for higher ratings upon request.

Recommended Selection of Switchgear for Autotransformer Starter - Fuse Protected

SL Motor, 415V, 3Ph, 50Hz		SDF		FUSE		Line contactor K3		Transformer contactor K2 for Tranformer tapping % star contactor K1 = same as transformer contactor K2								Overload Relay	
kW / HP	IL Amp	MLFB	Rating Amp	MLFB	Rating Amp	Type	A	80%		70%		65%		50%		Type	A
								Type	A	Type	A	Type	A	Type	A		
2.2 / 3	4.8	3KL812	32	3NA78010RC	6	3TF30	9	3TF30	9	3TF30	9	3TF30	9	3TF30	9	3UA5000-1F	3.2 - 5
3.7 / 5	7.8	3KL812	32	3NA78030RC	10	3TF30	9	3TF30	9	3TF30	9	3TF30	9	3TF30	9	3UA5000-1H	5 - 8
5.5 / 7.5	11.2	3KL812	32	3NA78050RC	16	3TF31	12	3TF30	9	3TF30	9	3TF30	9	3TF30	9	3UA5000-1K	8 - 12.5
7.5 / 10	16	3KL812	32	3NA78070RC	20	3TF32	16	3TF31	12	3TF30	9	3TF30	9	3TF30	9	3UA5200-2A	10 - 16
9.3 / 12.5	19	3KL812	32	3NA78100RC	25	3TF33	16	3TF32	16	3TF31	12	3TF30	9	3TF30	9	3UA5500-2B	12.5 - 20
11 / 15	20.8	3KL812	32	3NA78100RC	25	3TF33	22	3TF32	16	3TF31	12	3TF31	12	3TF30	9	3UA5500-2C	16 - 25
15 / 20	28	3KL815	63	3NA78120RC	32	3TF34	32	3TF33	22	3TF32	16	3TF32	16	3TF30	9	3UA5500-2D	20 - 32
18.5 / 25	34	3KL815	63	3NA78200RC	50	3TF35	38	3TF34	32	3TF33	22	3TF32	16	3TF31	12	3UA5500-2Q	25 - 36
22 / 30	40	3KL815	63	3NA78200RC	50	3TF46	45	3TF34	32	3TF33	22	3TF33	22	3TF31	12	3UA5800-2FZ1	32 - 50
30 / 40	53	3KL815	63	3NA78220RC	63	3TF47	63	3TF35	38	3TF34	32	3TF34	32	3TF32	16	3UA5800-2TZ1	40 - 57
37 / 50	65	3KL821	100	3NA78240RC	80	3TF477	70	3TF46	45	3TF35	38	3TF34	32	3TF33	22	3UA5800-2VZ1	57 - 70
45 / 60	78	3KL821	100	3NA78300RC	100	3TF49	85	3TF47	63	3TF46	45	3TF35	38	3TF34	32	3UA5800-8YZ1	70 - 95
55 / 75	96	3KL821	100	3NA78300RC	100	3TF50	110	3TF477	70	3TF47	63	3TF46	45	3TF34	32	3UA5830-5C	85 - 105
75 / 100	131	3KL831	200	3NA78360RC	160	3TF51	140	3TF49	85	3TF48	75	3TF47	63	3TF46	45	3UA6230-5A	85 - 135
90 / 125	156	3KL831	200	3NA78360RC	160	3TF52	170	3TF50	110	3TF49	85	3TF477	70	3TF47	63	3UA6230-5B	115 - 180
110 / 150	189	3KL831	200	3NA71400RC	200	3TF53	205	3TF51	140	3TF50	110	3TF49	85	3TF47	63	3UA6230-5C	160 - 250
132 / 180	227	3KL832	250	3NA71440RC	250	3TF54	250	3TF52	170	3TF51	140	3TF50	110	3TF477	70	3UA6230-5C	160 - 250
160 / 215	271	3KL833	315	3NA72520RC	315	3TF55	300	3TF53	205	3TF51	140	3TF51	140	3TF50	110	3UA6230-5D	200 - 320
200 / 270	339	3KL834	400	3NA72600RC	400	3TF56	400	3TF54	250	3TF52	170	3TF52	170	3TF50	110	3UA6230-5E	250 - 400
250 / 335	398	3KL834	400	3NA72600RC	400	3TF57	475	3TF55	300	3TF53	205	3TF53	205	3TF51	140	3UA6830-3F	320 - 500

1. Please use Electronic Star delta time type 3RP15 for the changeover from star to main.
2. Selection valid for Normal starting of the motors with starting time upto 10 seconds
3. Minimum auxiliary contacts for K1= 1NO+1NC, for K2=1NO, for K3=1NC and for contactor relay K5=2NO
4. Selection for higher ratings upon request.

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