

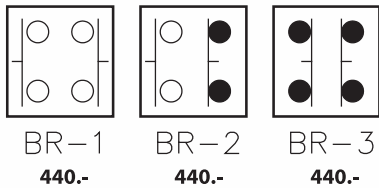
tend MONOLEVER SWITCH

สวิตช์เกียร์

 ISO 9002  A009142

FEATURES

1. You can smoothly and swiftly, handle the lever in four directions-upward, rightward downward, and leftward.
2. Three alternatives of movement are attainable in each direction: Go-on, auto-return, and blockade-enforcing.
3. You are free as you like to operate in four, three or two directions with the switch.
4. Rubber bushing is water-proof, oil-resistant, and dust preventive.

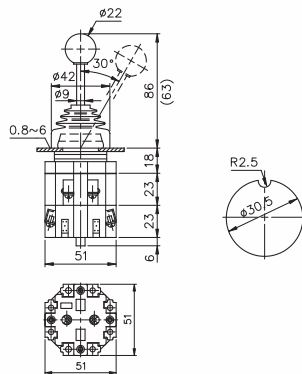


TMR-301 (Code no 0101-10001000) 1,470.-
2NO โยก 2 ทิศทาง

TMR-302 (Code no 1111-10101010) 1,650.-
4NO โยก 4 ทิศทาง

TMR-301A (Code no 0202-10001000) 1,470.-
2NO โยก 2 ทิศทาง spring return

TMR-302A (Code no 2222-10101010) 1,650.-
4NO โยก 4 ทิศทาง spring return



RATINGS

AC	Rated voltage	110 VAC	220 VAC	440 VAC	
	Rated current	5 A	3 A	1 A	
	Breaking current capacity	50 A	30 A	10 A	
DC	Resistance load	Rated voltage	110 V DC	220 V DC	600 V DC
		Rated current	2.2 A	1.1 A	0.4 A
	Inductive load	Breaking current capacity	2.42 A	1.21 A	0.44 A
		Rated current	1.2 A	0.45 A	0.2 A
Breaking current capacity		1.32 A	0.5 A	0.22 AA	
Continuous passable current		10 A			
Insulation resistance		Over 100 MΩ			
Dielectric strength		2,200V AC for duration of 1min.			
Service life	Mechanically	500,000 operations min			
	Electrically	500,000 operations min			
Ambient temperature		-20°C + 50°C			

MODEL

THR - 30 2 1111 10,10,10,10

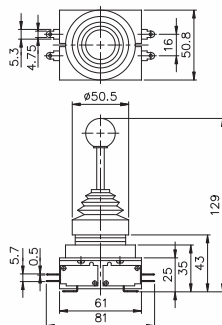
① ② ③ ④ ⑤

NOTE : When you place order, please kindly designate clockwise the movement way and type of contact blocks fitted.

Designation	Signal	Description
1.Type	TMR	Round Type
	TMS	Square Type
2.Mounting hole	30	Ø30 mm
3.No. of contact blocks fitted	1~4	1 ~ 4
4.Movement way	1	Go-on
	2	Auto-Return
	0	Blockade-enforcing
5.Type of contact blocks fitted	00	None
	10	1a (1NO)
	20	2a (2NO)
	01	1b (1NC)
	02	2b (2NC)
11	1a1b (1NO-1NC)	

TMRS-304 (Code no 1111-11111111) 2,140.-
4NO 4NC โยก 4 ทิศทาง

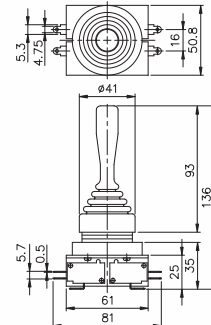
TMRS-304A (Code no 2222-11111111) 2,140.-
4NO 4NC โยก 4 ทิศทาง spring return



TMS-302 (Code no 0101-10001000) 1,875.-
2NO โยก 2ทิศทาง

TMS-302A (Code no 0202-1111-10101010) 1,875.-
2NO โยก 2 ทิศทาง Spring return

TMS-304A (Code no 2222-11111111) 2,000.-
4NO 4NC โยก 4 ทิศทาง spring return



*ขอสงวนสิทธิ์ในการเปลี่ยนแปลงราคา

MODEL DESIGNATIONS

TO - 11 B

1 2 3

Designation	Signal	Description
1.Type	T0	10A 250 VAC
	T0R	10A 250 VAC Spring return
	T5	15A 250 VAC
	T5R	15A 250 VAC Spring return
2.Contact	11	Single pole Single Throw ON-OFF
	12	Single pole Double Throw ON-ON
	13	Single pole Double Throw (Central OFF) ON-OFF-ON
	131	Single pole Double Throw (Central OFF Single return) ON-OFF-ON
	21	Double pole Single Throw ON-OFF
	22	Double pole Single Throw ON-OFF
	23	Double pole Double Throw (Central OFF) ON-OFF-ON
3.Terminal	A	Solder and Tab Terminal
	B	Screw Terminal

CHARACTERISTICS

Contact resistance	15 mΩ max. (initial)
Insulation resistance	100 MΩ min. (at 500 V DC)
Dielectric strength	2,000 VAC, 50/60 Hz for 1 minute
Vibration	10 to 50 Hz, 1.5 mm double amplitude
Operating temperature	-25° ~ +80° C
Humidity	85% RH max
Service life	Mechanically : 500,000 operations/min Electrically : 100,000 operations/min.
Handle strength	11.5 kg for 1 minute
Terminal strength	2.5 kg for 1 minute

RATINGS

Load	Type	AC Rating	DC Rating
Resistive load	T0	10A 250V 15A 125V	0.4A 250V 0.8A 125V
	T5	15A 250V 20A 125V	0.5A 250V 0.9A 125V
Inductive load	T0	10A 250V 15A 250V	0.2A 250V 0.4A 125V
	T5	15A 250V 20A 125V	0.3A 250V 0.5A 125V 15A 30V
Lamp load	T0	300W 100V 500W 200V	-----
	T5	400W 125V 800W 250V	7A 30V
Motor load	T0	200W 125V 300W 250V	-----
	T5	400W 125V (1 Phase)	
	T0	550W 250V (3 Phase)	
	T5	750W 250V (3 Phase)	

● Mounting hole : Ø 12m/m.

NAME PLATE

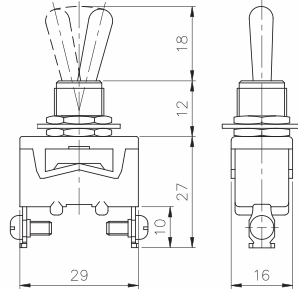


tend TOGGLE SWITCH

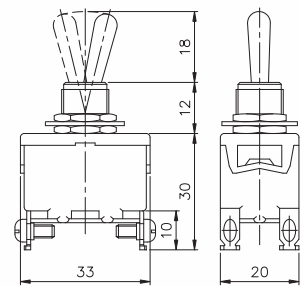
ท็อกเกิ้ลสวิตช์

 ISO 9002   A009142

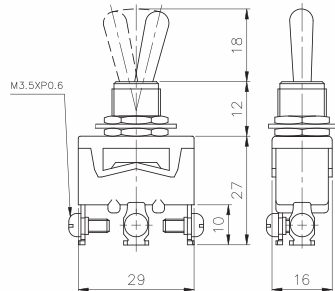
TO11B 2P10A (ON-OFF) 70.-
 T511B 2P15A (ON-OFF) 105.-
 TOR11B 2P10A (ON-OFF SPRING RETURN) 96.-
 T5R11B 2P15A (ON-OFF SPRING RETURN) 140.-



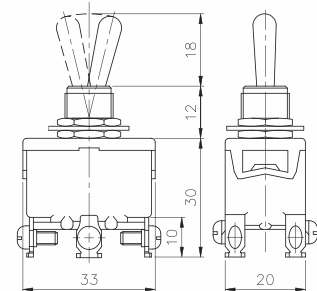
TO21B 4P10A (ON-OFF) 105.-
 T521B 4P15A (ON-OFF) 150.-
 TOR21B 4P10A (ON-OFF SPRING RETURN) 125.-
 T5R21B 4P15A (ON-OFF SPRING RETURN) 190.-



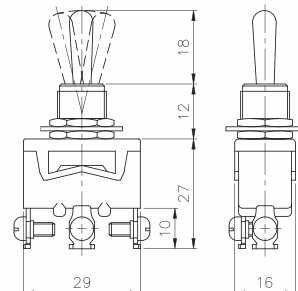
TO12B 3P10A (ON-ON) 85.-
 T512B 3P15A (ON-ON) 120.-
 TOR12B 3P10A (ON-ON SPRING RETURN) 115.-
 T5R12B 3P15A (ON-ON SPRING RETURN) 155.-



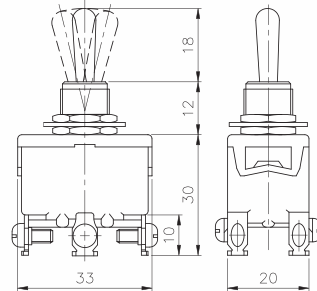
TO22B 6P10A (ON-ON) 110.-
 T522B 6P15A (ON-ON) 160.-
 TOR22B 6P10A (ON-ON SPRING RETURN) 145.-
 T5R22B 6P15A (ON-ON SPRING RETURN) 200.-



TO13B 3P10A (ON-OFF-ON) 100.-
 T513B 3P15A (ON-OFF-ON) 135.-
 TOR13B 3P10A (ON-OFF-ON SPRING RETURN) 135.-
 T5R13B 3P15A (ON-OFF-ON SPRING RETURN) 160.-



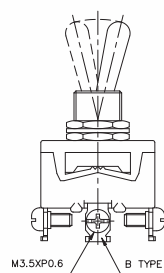
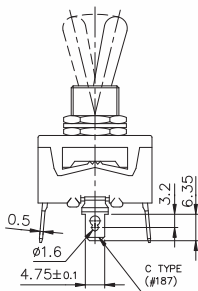
TO23B 6P10A (ON-OFF-ON) 110.-
 T523B 6P15A (ON-OFF-ON) 165.-
 TOR23B 6P10A (ON-OFF-ON SPRING RETURN) 145.-
 T5R23B 6P15A (ON-OFF-ON SPRING RETURN) 200.-



■ TERMINAL TYPE

Solder And Tab Type

Screw Type



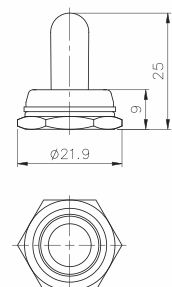
RAINPROOF CAP หมวกท็อกเกิ้ล กันน้ำ

TOW

TOW-E ชนิดกันยูวี

65.-

70.-



tend FOOT SWITCH

สวิตซ์เท้าเหยียบ

TEND

BANDEX

TAKAMURA

TEEFLEX

KENION

NISSEI

ROSI

APEKS

LKEW

TAC

MARLOW

HARU

WIND SPEED

COMMAX

ADVANTE

UNIVERSAL ADAPTER

ALION

EXOWELD

CONTROL MAX

JKN

SYLVIA

WANG

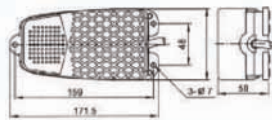
MACCON

FEATURES

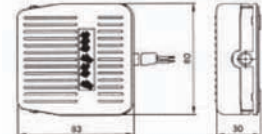
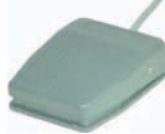
Designation	Type	Rating	Type of switch enclosed & contact arrangement	Cable type / Length	Contact	Actuation force	Material of rind	Price
Standard type Momentary action	TFS-101	10A 250V AC	TMV-10 micro-switch momentary	0.75 mm ² , 3C/0.5M ~ 3M	1A1B	3.5 kg	Plastics aluminium cast	660.-
	TFS-102	15A 250V AC	TM-1704	0.75 mm ² , 3C/1M ~ 2M	1A1B	3.5 kg		800.-
	TFS-103	10A 250V AC	TMV-10 micro-switch momentary 2 pcs.	0.75 mm ² , 6C/1M ~ 2M	2A2B	3.5 kg		865.-
	TFS-104	15A 250V AC	TM-1704*2	0.75 mm ² , 6C/1M ~ 2M	2A2B	3.5 kg		1,340.-
Standard type Alternate action	TFS-105	6A 250V AC	TS-105 Push switch alternate action	0.75 mm ² , 2C/1m, 1.5m-2m	PUSH ON PUSH OFF	3.5 kg	Plastics aluminium cast	880.-
	TFS-105Z	6A 250V AC		0.75 mm ² , 3C/1M	PUSH ON PUSH OFF	3.5 kg		1,100.-
	TFS-106	6A 250V AC	Imported micro-switch	0.75 mm ² , 3C/1.5m-2m	PUSH 1A PUSH 1B	3.5 kg		1,200.-
Mini foot switch front end push	TFS-201	10A 250V AC	TMV-10 micro-switch momentary	0.5 mm ² , 3C/1M ~ 3M	1A1B	1 kg	Plastics	530.-
Front end push with metal mounting plate	TFS-202	10A 250V AC	TMV-10 micro-switch momentary	Accessory : Cable gland (No cable)	1A1B	1 kg	Plastics	560.-
Mini foot switch	TFS-203	10A 250V AC	TMV-10 micro-switch momentary	0.5 mm ² , 3C/1M ~ 3M	1A1B	1 kg	Plastics	610.-
Protective guard foot switch	TFS-302	10A 250V AC	TM-1704		1A1B	3.5 kg	Plastics aluminium cast	1,790.-
	TFS-302R	15A 250V AC	ชนิดกันน้ำ			3.5 kg		2,070.-
	TFS-304	15A 250V AC	TM-1704*2		2A2B	3.5 kg		2,470.-
	TFS-304R	15A 250V AC	ชนิดกันน้ำ			3.5 kg		2,800.-
	TFS-305	15A 250V AC	TS-105 Push button switch alternate action	Accessory : Cable gland (No cable)	Push On Push Off	3.5 kg		1,860.-
	TFS-305R	6A 250V AC	ชนิดกันน้ำ			3.5 kg		2,130.-
	TFS-306	6A 250V AC	Imported micro-switch		Push 2A Push 2B	3.5 kg		2,600.-
	TFS-306R	6A 250V AC	ชนิดกันน้ำ			3.5 kg		2,920.-
Large type	TFS-402	15A 250V AC	TM-1704	Accessory : Cable gland (No cable)	1A1B	3.5 kg	Plastics aluminium cast	1,700.-
	TFS-402R	15A 250V AC	ชนิดกันน้ำ			3.5 kg		1,970.-
	TFS-404	15A 250V AC	TM-1704*2		2A21B	3.5 kg		2,380.-
	TFS-404R	15A 250V AC	ชนิดกันน้ำ			3.5 kg		2,700.-
	TFS-405	6A 250V AC	TS-105 Push button switch alternate action		Push On Push Off	3.5 kg		2,180.-
	TFS-405R	6A 250V AC	ชนิดกันน้ำ			3.5 kg		2,490.-
	TFS-406	6A 250V AC	Imported micro-switch		Push 2A Push 2B	3.5 kg		2,560.-
	TFS-406R	6A 250V AC	ชนิดกันน้ำ			3.5 kg		2,920.-
Full shield	TFS-502	15A 250V AC	TM-1704		1A1B	3.5 kg	Aluminum cast	4,040.-
	TFS-504	15A 250V AC	TM-1704*2			3.5 kg		4,940.-
	TFS-505					3.5 kg		4,780.-
	TFS-506			Accessory : Cable gland (No cable)		3.5 kg		5,340.-
	TFS-602	15A 250V AC	TM-1704*2		2A21B	3.5 kg		6,870.-
	TFS-604	15A 250V AC	TM-1704*4		4A4B	3.5 kg		8,000.-
	TFS-605	6A 250V AC	TS-105x2		Push On Push Off	3.5 kg		9,750.-
	TFS-606	6A 250V AC	Imported micro-switchx2		Push 2A Push 2B	3.5 kg		10,140.-

- Add "R" for waterproof. Available in TFS3 & TFS4
- Add "Z" for aluminium housing. Available in TFS1, TFS3 & TFS4
- TFS5 series has TFS-504, TFS-505, TFS-506. Inside Micro-Switch is the same as TFS3 series. • TFS-602 DURING THE DESIGNING

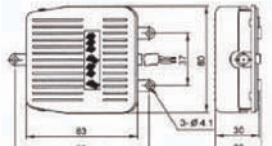
TFS-101, 102, 103, 104, 105, 106, 105Z



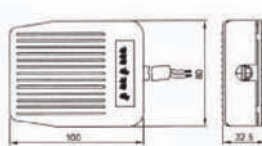
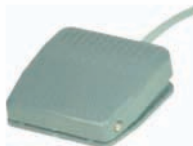
TFS-201



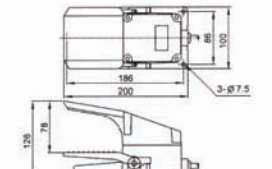
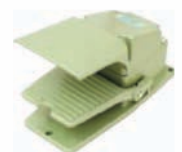
TFS-202



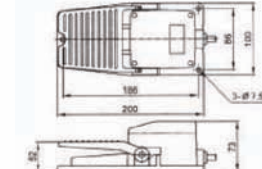
TFS-203



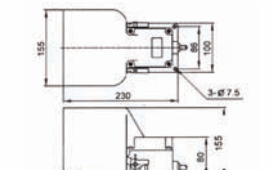
TFS-302, 304, 305, 306



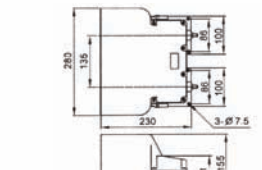
TFS-402, 404, 405, 406



TFS-502, 504



TFS-602, 604, 605, 606



หมายเหตุ TFS-105, TFS-305, TFS-405 เป็นรุ่นกดที่ติด กดที่ถัด

tend POWER PUSH BUTTON SWITCH

สวิตช์กดตาม

ISO 9002

MODELS AVAILABLE

Type	Rating	Mounting type	Screw terminal	Material
TBSN-310	3ø 10 A 1.5 KW	Flush mounting	M 3.5	Iron
TBSN-315	3ø 15 A 2.2 KW	Flush mounting	M 4	Iron
TBSN-330	3ø 30 A 3.7 KW	Flush mounting	M 5	Iron
TBSY-315	3ø 15 A 2 KW	Surface mounting	M 4	Iron
TBSY-330	3ø 30 A 3.7 KW			
TBSS-315	3ø 15 A 2 KW	Surface mounting	M 4	Iron
TBSS-330	3ø 30 A 3.7 KW			
TBSP-315	3ø 15 A 2.2 KW	Flush mounting	M 3.5	Plastic
TBSP-330	3ø 30 A 3.7 KW	Flush mounting	M 4	Plastic

TBSY-315
TBSY-330

235.-
385.-



DIMENSIONS

TBSN-310

200.-



TBSS-315
TBSS-330

255.-
395.-



TBSN-315
TBSP-315

230.-
215.-



TPB-2

145.-



TBSN-330
TBSP-330

365.-
300.-



TPB-3

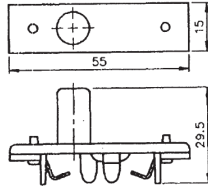
270.-



*ขอสงวนสิทธิ์ในการเปลี่ยนแปลงราคา

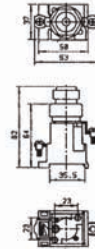
TFB-101N 110V/220V/24V

35.-



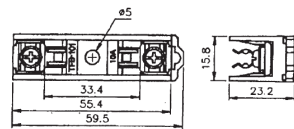
TFE-16N

115.-



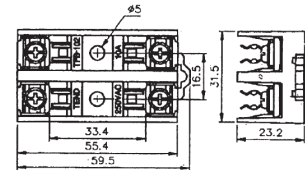
TFBR-101

40.-



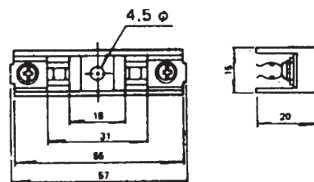
TFBR-102

60.-



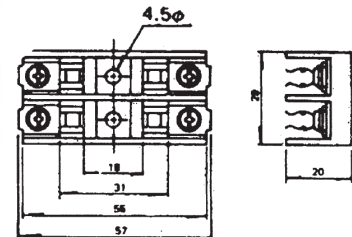
TFB-101

40.-



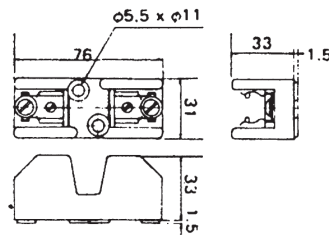
TFB-102

60.-



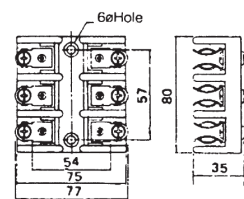
TFB-301

115.-



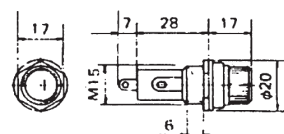
TFB-303

330.-



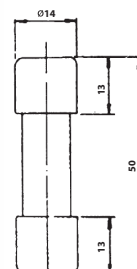
TFB-15

10.-



TFU-50(1A-50A)

54.-



tend CONTACTOR

คอนโทรลเลอร์

TEND



MODEL DESIGNATION

TC 11 A 2

1 2 3 4

Designation	Signal	Description
1.Type	TC	Magnetic Contactor
	TCR	Reversing Contactor
2.Model	11	12A
	16	16A
	21	24A
	30	30A
	35	35A
	40	44A
	50	58A
	60	68A
3.Auxiliary contacts	(none)	1a1b,2a2b (For TC50-80)
	A	1a
	B	1b

(Rated Capacity Based on AC3 3 ph, 220 VAC)

Designation	Signal	Description	
		50 Hz	60 Hz
4.Coil voltage	1	100 VAC	110 VAC
	2	200 VAC	220 VAC
	3	346 VAC	380 VAC
	4	380-400 VAC	440 VAC
	5	110 VAC	120 VAC
	6	240 VAC	260 VAC
	7	24 VAC	24 VAC
	8	48 VAC	48 VAC
	9	415 VAC	460 VAC
	a	220 VAC	240 VAC
	b	500 VAC	550 VAC
	c	32 VAC	32 VAC

RATING AND CHARACTERISTICS

Type no.	Auxiliary contacts		Rated operating current (AC1) ith	IEC 60947 rated capacity (AC3)					Rated insulation voltage	Weight
				1 Phases		3 Phases				
				100V	200V	200V	380V	500V		
				120V	220V	220V	440V	550V		
NO	NC	A	A/kw/hp	A/kw/hp	A/kw/hp	A/kw/hp	A/kw/hp	V	kg	
TC11A	1	-	25	12	12	12	12	9	600	0.32
TC11B	-	1								
TCR11AB	1	1								
TCR112A	2	-	30	0.75	1.5	4	7.5	7.5	600	0.66
TCR112B	-	2								
TC16A	1	-								
TC16B	-	1	40	16	16	16	16	12	600	0.32
TCR16AB	1	1								
TCR162A	2	-								
TCR162B	-	2	50	24	24	24	24	18.4	600	0.39
TC21	1	1								
TCR21	2	2								
TC30	1	1	60	30	30	30	30	23	600	0.85
TCR30	2	2								
TC35	1	1								
TCR35	2	2	80	35	35	35	35	28.5	600	0.85
TC40	1	1								
TCR40	2	2								
TC50	2	2	100	58	58	58	52	41	600	1.21
TCR50	4	4								
TC60	2	2								
TCR60	4	4	130	68	68	68	65	52	600	1.21
TC80	2	2								
TCR80	4	4								

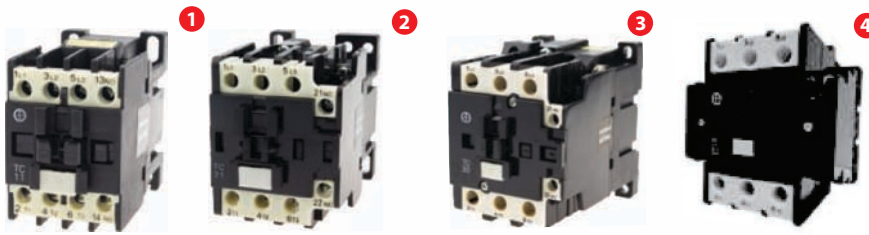
*Mechanical Service Life 5,000,000, Operations.
*For track mounting on DIN rail or panel mounting

*Electrical Service Life 1,000,000 Operations.
*UL Pending

BANDEX
TAKAMURA
TEEFLEX
KENION
NISSEI
ROSI
APEKS
LKEW
TAC
MARLOW
HARU
WIND SPEED
COMMAX
ADVANTE
UNIVERSAL ADAPTER
ALION
EXOWELD
CONTROL MAX
JKN
SYLVIA
WANG
MACCON

tend CONTACTOR

คอนโทรลเลอร์



- 1 TC11/16
- 2 TC21
- 3 TC30/ 35/ 40
- 4 TC50/ 60/ 80

Type no.	Auxiliary contact		Rated operating current (Ac1) ith	Type no.						Rated insulation voltage	Unit price
				Rated capacity (AC3)							
				3 Phases 200-220V			3 Phases 380-440V				
NO	NC	A	A	kw	hp	A	kw	hp	V	Bath	
TC11A	1	-	20	12	3	4	9	4	5.5	600	595.-
TC11B	-	1	20	12	3	4	9	4	5.5	600	595.-
TC16A	1	-	30	16	3.7	5	12	5.5	7.5	600	700.-
TC16B	-	1	30	16	3.7	5	12	5.5	7.5	600	700.-
TC21	1	1	40	24	5.5	7.5	21	11	15	600	1,130.-
TC30	1	1	50	30	7.5	10	27	15	20	600	1,615.-
TC35	1	1	60	35	9	12.5	33	18	25	600	1,880.-
TC40	1	1	65	44	11	15	40	22	30	600	2,015.-
TC50	2	2	80	58	15	20	52	30	40	600	2,550.-
TC60	2	2	100	68	19	25	65	37	50	600	3,220.-



- 1 TCR11/16
- 2 TCR21
- 3 TCR30/ 35/ 40
- 3 TCR50/ 60/ 80

Type no.	Auxiliary contact		Rated operating current (Ac1) ith	Type no.						Rated insulation voltage	Unit price
				Rated capacity (AC3)							
				3 Phases 200-220V			3 Phases 380-440V				
NO	NC	A	A	kw	hp	A	kw	hp	V	Bath	
TCR112A	2	-	20	12	3	4	9	4	5.5	600	1,640.-
TCR112B	-	2	20	12	3	4	9	4	5.5	600	1,640.-
TCR162A	2	-	30	16	3.7	5	12	5.5	7.5	600	2,000.-
TCR162B	-	2	30	16	3.7	5	12	5.5	7.5	600	2,000.-
TCR21	2	2	40	24	5.5	7.5	21	11	15	600	2,695.-
TCR30	2	2	50	30	7.5	10	27	15	20	600	3,425.-
TCR35	2	2	60	35	9	12.5	33	18	25	600	4,110.-
TCR40	2	2	65	44	11	15	40	22	30	600	4,225.-
TCR50	4	4	80	58	15	20	52	30	40	600	5,300.-
TCR60	4	4	100	68	19	25	65	37	50	600	6,640.-

MODEL DESIGNATIONS

TA4 40 2
1 2 3

Designation	Signal	Description
1.Type	TA4	4P type Contactor for 4HP
	TB4	4P type Contactor for 5HP
	TR4	4P type Control relay
2.Contacts	40	4a
	31	3a1b
	22	2a2b

Designation	Signal	Description	
		50 Hz	60 Hz
3.Coil voltage	1	100V AC	110V AC
	2	200V AC	220V AC
	3	346V AC	380V AC
	4	380-400V AC	440V AC
	5	110V AC	120V AC
	6	240V AC	260V AC
	7	24V AC	24V AC
	8	48V AC	48V AC
	9	415V AC	460V AC
	a	220V AC	240V AC
	b	500V AC	550V AC
	c	32V AC	32V AC

RATING AND CHARACTERISTICS (CONTACTORS)

Type no.	contacts		Rated operating current (Ac1) lth	Rated capacity (AC3)					Rated insulation voltage	Weight
				1 Phase		3 Phases				
				100V 120V	200V 220V	200V 220V	380V 440V	500V 550V		
	NO	NC	A	A/kw/hp	A/kw/hp	A/kw/hp	A/kw/hp	A/kw/hp	v	kg
TA440	4	-	25	12	12	12	12	9	600	0.32
TA431	3	1		0.55	1.1	3	5.5	5.5		
TA422	2	2		0.75	1.5	4	7.5	7.5		
TB440	4	-	30	16	16	16	16	12	600	0.32
TB431	3	1		0.75	1.5	4	7.5	7.5		
TB422	2	2		1	2	5.5	10	10		

RATING AND CHARACTERISTICS (CONTACTORS)

Type no.	contacts		Rated operating current (Ac1) lth	Rated capacity (AC15)						Rated operating current lth	Rated capacity (AC3)					Rated insulation voltage	Weight
				120 V	240 V	380 V	480 V	500 V	600 V		125 V	250 V	400 V	500 V	600 V		
				A	A	A	A	A	A		A	A	A	A	A		
TR440	4	-	10	6	3	1.9	1.5	1.4	1.2	5	1.1	0.55	0.31	0.27	0.2	600	0.32
TR431	3	1															
TR422	2	2															

DIMENSIONS

Type no.	Description	Price
TA4	4P TYPE CONTACT FOR 4HP	-
TB4	4P TYPE CONTACT FOR 5HP	-
TR4	4P TYPE CONTROL RELAY	-



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■ USER'S INSTRUCTION

ATTENTION :

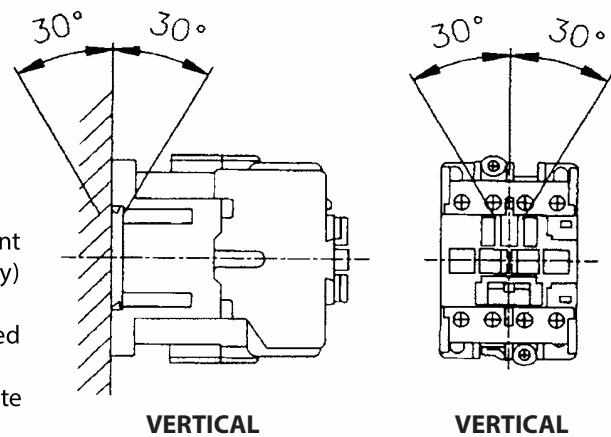
- Turn off power before carrying out any maintenance.
- Please handle carefully and avoid abnormal vibration and shock
- The dust-proof lable on the side of frame must be tear off clearly, if side-mounted auxiliary contact block or mechanical interlock is used.
- To dismantle the magnetic contactors which is mounted by DIN 35mm rail, right " _ " screw driver shall be applied and handled in running direction.
- A minimum clearance of 8mm and a minimum creepage distance of 12mm has to be ensured by the installation.

1. Service environment :

- 1.1 Operational Temperature : -20°C - 50°C
- 1.2 Storage Temperature : - 40°C - 70°C
- 1.3 Relative Humidity : 45% - 85%
- 1.4 Altitude : below 2000 m.

2. Installation and wiring :

- 2.1 Ensure that the specifications (Rated power, arrangement of auxiliary contact, rated coil voltage and frequency) meet the requirements.
- 2.2 Mounting positions shall be within the ranges specified below.
- 2.3 Select appropriate conductor and tighten with appropriate torque with right tool.
- 2.4 Tightening torques for contactors are given below:



Type	Item	Screw/blot	Tighting torque (kgf.cm)
TC11	Main terminal	M3.5	8-12
TC16	Main terminal	M3.5	8-12
TC21	Main terminal	M4	12-20
TC30/35/40	Main terminal	M5	20-25
TC50/60	Main terminal	M6	35-40
All series	Auxi contact & coil terminal	M3.5	8-12

*Tightening torque shall be within the values given above to avoid deteriorating the screws.

3. Maintenance :

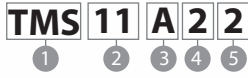
- 3.1 Turn off power before conducting any maintenance.
- 3.2 Disconnect the wires in sequence.
- 3.3 Dismantle contactor as required for maintenance.
- 3.4 Assemble and connect the contactor in reverse procedures conducted in step 3.3 and 3.2
- 3.5 Check the contactor in a good condition.

4. Replacement of the coil :

Follow the instructions if replacement of the coil is carried out.

- 4.1 Dismantle the contactor in appropriate means.
- 4.2 Replace the coil to requested coil.
- 4.3 Assemble the contactor in a reverse sequence conducted in step 4.1
- 4.4 Check that the contactor can be operated normally.

MODEL DESIGNATIONS



Designation	Signal	Description
1.Type	TMS	Open Type
	TMR	Reversing Type
	TES	Enclosed Type
	TEB	Enclosed Type With pushbutton
	TEL	Enclosed Type With indicator
	TEW	Enclosed Type With rainproof (IEC144 IP 65)
2.Model	11	12A
	16	16A
	21	24A
	30	30A
	35	35A
	40	44A
	50	58A
	60	68A
3.Auxiliary contacts	(none)	1a1b, 2a2b (For TMS50, 60)
	A	1a
	B	1b

Designation	Signal	Description	
		50 Hz	60 Hz
4.Coil voltage	1	100V AC	110V AC
	2	200 V AC	220 V AC
	3	346V AC	380V AC
	4	380-400 V AC	440 V AC
	5	110 V AC	120 V AC
	6	240 V AC	260 V AC
	7	24 V AC	24 V AC
	8	48 V AC	48 V AC
	9	415 V AC	460 V AC
		a	220 V AC
	b	500 V AC	550 V AC
	c	32 V AC	32 V AC
5.Number of heaters	2	2 Heaters	
	3	3 Heaters	
	P	Phase-Failure (3 Heaters)	

RATING AND CHARACTERISTICS

Type no.	Auxiliary contact		Rated operating current (Ac1) lth	ICE 60947 rated capacity (AC3)					Rated insulation voltage v	Weight kg
				3 Phases 200-220V		3 Phases 380-440V				
				100V	200V	200V	380V	500V		
	120V	220V		220V	440V	550V				
NO	NC	A	A/kw/hp	A/kw/hp	A/kw/hp	A/kw/hp	A/kw/hp			
TMS11A	1	-	25	12	12	12	12	9	600	0.43
TMS11B	-	1								
TMR11AB	1	1								
TMR112A	2	-								
TMR112B	-	2								0.88
TMS16A	1	-	30	16	16	16	16	12	600	0.43
TMS16B	-	1								
TMR16AB	1	1								
TMR162A	2	-								
TMR162B	-	2								0.88
TMS21	1	1	40	24	24	24	24	18.4	600	0.51
TMR21	2	2		1.1	2.2	5.5	11	11		1.04
TMS30	1	1	50	30	30	30	30	23	600	1.03
TMR30	2	2		1.5	3	7.5	15	15		2.08
TMS35	1	1	50	35	35	35	35	28.5	600	1.03
TMR35	2	2		1.8	4	9	15	18.5		2.08
TMS40	1	1	60	44	44	44	44	33	600	1.03
TMR40	2	2		2.2	5.5	11	22	22		2.08
TMS50	2	2	80	58	58	58	52	41	600	1.55
TMR50	4	4		3	5.5	15	30	30		2.76
TMS60	2	2	100	68	68	68	65	52	600	1.55
TMR60	4	4		3.7	7.5	19	37	37		2.76
				5	10	25	50	50		

tend MAGNETIC SWITCH

แบบกานต์สวิทช์

ISO 9002



1



2



3

1 TMS11/16

2 TMS21

3 TMS30/ 35/ 40

3 TMS50/ 60/ 80

Type no.	Auxiliary contacts		Rated operating current (Ac1) lth	Rated capacity (AC3)						Overload range	Price	
	NO	NC		3 Phases 200-220V			3 Phases 380-440V				A	2 Heater elements
TMS11A	1	-	20	12	3	4	9	4	5.5	0.1-0.15, 0.15-0.24 0.24-0.36, 0.36-0.54 0.48-0.72, 0.64-0.96	1,100.-	1,250.-
TMS11B	-	1	20	12	3	4	9	4	5.5	0.8-1.2, 0.95-1.45	1,100.-	1,250.-
TMS16A	1	-	30	16	3.7	5	12	5.5	7.5	1.4-2.2, 1.7-2.6, 4-6	1,230.-	1,370.-
TMS16B	-	1	30	16	3.7	5	12	5.5	7.5	5-8, 6-9.7, 11.9-13, 12-18	1,230.-	1,370.-
TMS21	1	1	40	24	5.5	7.5	21	11	15	1.4-2.2, 1.7-2.6, 2.2-3.4, 2.8-4.2, 4-6, 5-8, 6-9, 7-11, 9-13, 12-18, 16-22, 20-26	1,795.-	1,880.-
TMS30	1	1	50	30	7.5	10	27	15	20	-	-	-
TMS35	1	1	60	35	9	12.5	33	18	25	7-11, 9-13, 12-18, 16-22, 20-26, 22-34, 28-38, 32-48	2,725.-	2,838.-
TMS40	1	1	65	44	11	15	40	22	30	-	2,855.-	2,970.-
TMS50	2	2	80	58	15	20	52	30	40	16-22, 20-26, 22-34, 28-38,	3,920.-	4,070.-
TMS60	2	2	100	68	19	25	65	37	50	32-48, 43-65, 54-80	4,590.-	4,750.-

REVERSING MAGNETIC SWITCH



1



2



3

1 TMR11/16

2 TMR21

3 TMR30/ 35/ 40

3 TMR50/ 60/ 80

Type no.	Auxiliary contacts		Rated operating current (Ac1) lth	Rated capacity (AC3)						Overload range	Price	
	NO	NC		3 Phases 200-220V			3 Phases 380-440V				A	2 Heater elements
TMR11	1	1	20	12	3	4	9	4	5.5	0.1-0.15, 0.15-0.24	2,140.-	2,160.-
TMR112A	2	-	20	12	3	4	9	4	5.5	0.24-0.36, 0.36-0.54	2,140.-	2,160.-
TMR112B	-	2	20	12	3	4	9	4	5.5	0.48-0.72, 0.64-0.96,	2,140.-	2,160.-
TMR16	1	1	30	16	3.7	5	12	5.5	7.5	0.8-1.2, 0.95-1.45, 1.4-2.2,	2,400.-	2,400.-
TMR162A	2	-	30	16	3.7	5	12	5.5	7.5	1.7-2.6, 4-6, 5-8, 6-9.7,	2,120.-	2,270.-
TMR162B	-	2	30	16	3.7	5	12	5.5	7.5	11.9-13, 12-18	2,120.-	2,270.-
TMR21	2	2	40	24	5.5	7.5	21	11	15	1.4-2.2, 1.7-2.6, 2.2-3.4, 2.8-4.2, 4-6, 5-8, 6-9, 7-11, 9-13, 12-18	3,120.-	3,205.-
TMR30	2	2	50	30	7.5	10	27	15	20	-	4,365.-	4,380.-
TMR35	2	2	60	35	9	12.5	33	18	25	7-11, 9-13, 12-18, 16-22, 20-26, 22-34, 28-38, 32-48	4,800.-	4,920.-
TMR40	2	2	65	44	11	15	40	22	30	-	5,590.-	5,755.-
TMR50	4	4	80	58	15	20	52	30	40	16-22, 20-26, 22-34, 28-38,	6,670.-	6,820.-
TMR60	4	4	100	68	19	25	65	37	50	32-48, 43-65, 54-80	8,010.-	8,170.-

*ขอสงวนสิทธิ์ในการเปลี่ยนแปลงราคา

tend MAGNETIC SWITCH

แม่เหล็กสวิตช์

ISO 9002

TEND

BANDEX

TAKAMURA

TEEFLEX

KENION

NISSEI

ROSI

APEKS

LKEW

TAC

MARLOW

HARU

WIND SPEED

COMMAX

ADVANTE

UNIVERSAL ADAPTER

ALION

EXOWELD

CONTROL MAX

JKN

SYLVIA

WANG

MACCON

ENCLOSED TYPE



TES 11/16



TES 21

Type no.	Rated capacity (AC3)						Price	
	1 Phase 220V			3 Phase 380V			2 Heater elements	3 Heater elements
	A	kw	hp	A	kw	hp		
TES11	11	1.1	1.5	9	4	5.5	1,330.-	1,390.-
TES16	14	1.5	2	12	5.5	7.5	1,540.-	1,690.-
TES21	20	2.2	3	21	11	15	2,175.-	2,290.-

ENCLOSED TYPE WITH PUSH BUTTON SWITCH



TEB 11/16



TEB 21

Type no.	Rated capacity (AC3)						Price	
	1 Phase 220V			3 Phase 380V			2 Heater elements	3 Heater elements
	A	kw	hp	A	kw	hp		
TEB11	11	1.1	1.5	9	4	5.5	1,400.-	1,540.-
TEB16	14	1.5	2	12	5.5	7.5	1,665.-	1,810.-
TEB21	20	2.2	3	21	11	15	2,480.-	2,490.-

ENCLOSED TYPE WITH PUSH BUTTON SWITCH AND INDICATOR LAMP



TEL 11/16



TEL 21

Type no.	Rated capacity (AC3)						Price	
	1 Phase 220V			3 Phase 380V			2 Heater elements	3 Heater elements
	A	kw	hp	A	kw	hp		
TEL11	11	1.1	1.5	9	4	5.5	1,560.-	1,705.-
TEL16	14	1.5	2	12	5.5	7.5	1,810.-	1,960.-
TEL21	20	2.2	3	21	11	15	2,505.-	2,620.-

ENCLOSED TYPE WITH PUSH BUTTON SWITCH AND INDICATOR LAMP (RAIN PROOF) กันน้ำ



TEW 11/16/21

Type no.	Rated capacity (AC3)						Price	
	1 Phase 220V			3 Phase 380V			2 Heater elements	3 Heater elements
	A	kw	hp	A	kw	hp		
TEW11	11	1.1	1.5	9	4	5.5	1,830.-	1,970.-
TEW16	14	1.5	2	12	5.5	7.5	2,015.-	2,160.-
TEW21	20	2.2	3	21	11	15	2,785.-	2,900.-

TA4 40 2

MODEL DESIGNATIONS

THR 1 3 - 3.6

① ② ③ ④

Designation	Signal	Description	Designation	Signal	Description
1.Type	THR	Overload Protection	4.Heater setting range (A)	1.8	1.4 - 1.8 - 2.2
	THP	Phase Failure Protection		2.1	1.7 - 2.1 - 2.6
2.Contacts	1	for TC11 & TC16		2.8	2.2 - 2.8 - 3.4
	2	for TC21		3.6	2.8 - 3.6 - 4.2
	3	for TC30/35 & 40		5	4 - 5 - 6
	4	for TC50&TC60		6.5	5 - 6.5 - 8
3.Number of heaters	2	2 Heater Elements		7.5	6 - 7.5 - 9
	3	3 Heater Elements		9	7 - 9 - 11
4.Heater setting range (A)	0.12	0.1 - 0.12 - 0.15		11	9 - 11 - 13
	0.2	0.16 - 0.2 - 0.24		15	12 - 15 - 18
	0.3	0.24 - 0.3 - 0.36		19	16 - 19 - 22
	0.44	0.36 - 0.44 - 0.54		23	20 - 23 - 26
	0.6	0.48 - 0.6 - 0.72		28	22 - 28 - 34
	0.8	0.64 - 0.8 - 0.96		33	28 - 33 - 38
	1	0.8 - 1 - 1.2		40	32 - 40 - 48
	1.2	0.95 - 1.2 - 1.45		54	43 - 54 - 65
			67	54 - 67 - 80	

THR1/THP1



สำหรับรุ่น TC11 และ TC16

Type no.	Description	For contactor	Setting range (A)	Price
THR-12	2 Heater Elements	TC11, TC16	0.1-0.15, 0.15-0.24, 0.24-0.36, 0.36-0.54, 0.48-0.72, 0.64-0.96, 1.4-2.2, 1.7-2.6, 2.2-3.4, 2.8-4.2, 4-6, 5-8, 6-9, 7-11, 9-13, 12-18	525.-
THR-13	3 Heater Elements			640.-
THP-1	Phase Failure Protection			675.-

THR2/THP2



สำหรับรุ่น TC21

Type no.	Description	For contactor	Setting range (A)	Price
THR-22	2 Heater Elements	TC21	1.4-2.2, 1.7-2.6, 2.2-3.4, 2.8-4.2, 4-6, 5-8, 6-9, 7-11, 16-22, 20-26	635.-
THR-23	3 Heater Elements			730.-
THP-2	Phase Failure Protection			750.-

THR3/THP3



สำหรับรุ่น TC30, TC35, TC40

Type no.	Description	For contactor	Setting range (A)	Price
THR-32	2 Heater Elements	TC30, TC35, TC40	7-11, 9-13, 12-18, 16-22, 20-26, 22-34, 28-38, 32-48	850.-
THR-33	3 Heater Elements			960.-
THP-3	Phase Failure Protection			960.-

THR4/THP4



สำหรับรุ่น TC50, TC60

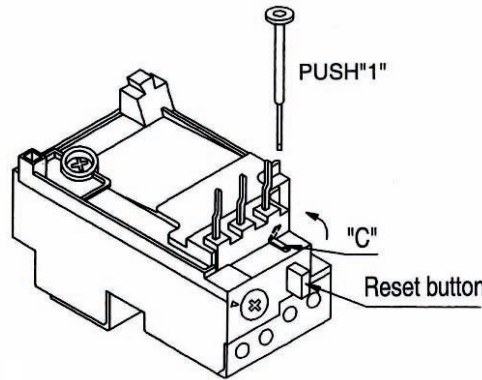
Type no.	Description	For contactor	Setting range (A)	Price
THR-42	2 Heater Elements	TC50, TC60,	16-22, 20-26, 22-34, 28-38, 32-48, 43-65, 54-80	1,370.-
THR-43	3 Heater Elements			1,530.-
THP-4	Phase Failure Protection			1,530.-

tend THERMAL OVERLOAD RELAY

เทอร์โมลโหลดรีเลย์

ISO 9002

THR (THP)



Manual reset :

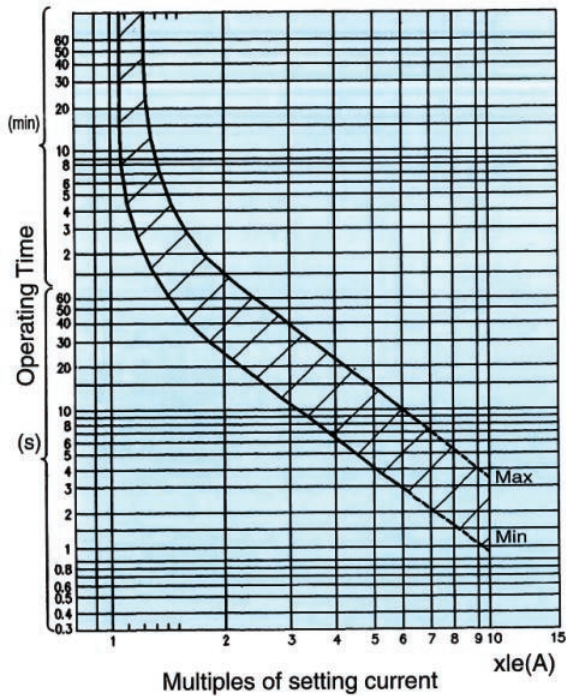
Press reset button to reset the Thermal Overload Relay

Auto reset :

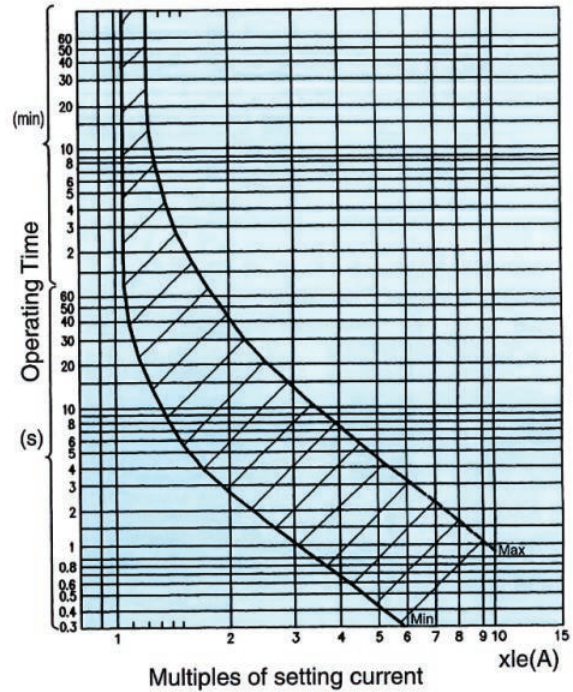
Take off "C"
Then press reset button and push "1" (flat screw driver) to lock the button to become autoreset.

OPERATING CHARACTERISTICS OF THERMAL OVERLOAD RELAYS

Cold State Curves



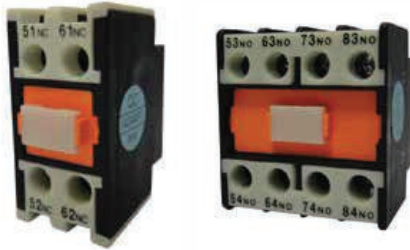
Hot State Curves



STAR-DELTA STARTER SELECTION TABLE

Type	Y-TC21	Y-TC35	Y-TC50	Y-TC60	
Motor output KW (HP)	200-220 V	11 (15)	19 (25)	22 (30)	30 (40)
	380 V	19 (25)	30 (40)	45 (60)	55 (75)
	440 V	19 (25)	30 (40)	45 (60)	55 (75)
Contactor used	MC M	TC21	TC35	TC50	TC60
	MC D	TC21	TC35	TC50	TC60
	MC S	TC11	TC16	TC21	TC21

AUXILIARY CONTACT BLOCKS (FRONT MOUNTED)



Type no.	NO	NC	Weight	Suitable for	Price
TCF-211	1	1	0.034	TC11 - TC80	200.-
TCF-220	2	-			
TCF-202	-	2			
TCF-440	4	-	0.034	TC11 - TC80	325.-
TCF-431	3	1			
TCF-422	2	2			
TCF-413	1	3			
TCF-404	-	4			

AUXILIARY CONTACT BLOCKS (FRONT MOUNTED)



Type no.	NO	NC	Weight	Suitable for	Price
TCS-111	1	1	0.034	TC11 - TC80	190.-
TCS-120	2	-			
TCS-102	-	2			
TCS-221	1	1	0.034	TC21	190.-
TCS-220	2	-			
TCS-202	-	2			

MECHANICAL INTERLOCK



Type no.	NO	NC	Suitable for	Price
*TCL-1	-	2	TC11-TC21	205.-
TCL-1N	-	-	TC-11-TC21	165.-
*TCL-3	-	2	TC30-TC40	205.-
TCL-3N	-	-	TC30-TC40	165.-
*TCL-4	-	2	TC50-TC80	205.-
TCL-4N	-	-	TC50-TC80	165.-

* : with electrical interlock

Type no.	Rated operating current (Ac1) Ith	Rated capacity (AC15)						Rated operating current Ith	Rated capacity (DC13)					Rated insulation voltage	Weight
		120 V AC	240 V AC	380 V AC	480 V AC	500 V AC	600 V AC		125 V AC	250 V AC	400 V AC	500 V AC	600 V AC		
		A	A	A	A	A	A		A	A	A	A	A		
TCF-2	10	6	3	1.9	1.5	1.4	1.2	5	1.1	0.55	0.31	0.27	0.2	600	0.034
TCF-4															0.054
TCS-1(2)															0.034
TCS-3															0.040
TCL															0.036

■ SPARE COIL



Spare coil	Suitable for	Price
TCC-11	TC11-21	305.-



Spare coil	Suitable for	Price
TCC-30	TC30-40	510.-



Spare coil	Suitable for	Price
TCC-50	TC50-480	535.-

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FEATURES

- Wide load voltage range : 24~380 VAC & 90~480VAC
- Load current : 10, 25 and 40 amperes.
- Long service life and high reliability.
- LED indicates the operating of the device. (Except phase controller)
- Low EMI/RFI & surge by zero-cross trigger.
- DC type can be driven by IC such as TTL&CMOS.



MODEL DESIGNATIONS

TSSR **25 D H**

① ② ③

Designation	Signal	Description
1.Load current	10	10A
	25	25A
	40	40A
2.Input type	A	AC input
	D	DC input
	V	Phase trigger control
3.Output voltage range	-	24-380 VAC
	H	90-480 VAC

Phase controller only has 48~380VAC for output voltage range.

SPECIFICATIONS : AC INPUT

Input characteristics

Model	TSSR-10A	TSSR-25A	TSSR-40A	TSSR-10AH	TSSR-25AH	TSSR-40AH
Input characteristics	700.-	855.-	1,300.-	730.-	945.-	1,300.-
Control voltage range	90~250 V AC 50/60 Hz					
Control current	3mA Max.					
Pickup voltage	AC 70V					
Dropout voltage	AC 30V					

Output characteristics

Voltage range	24~380 VAC			90~480 VAC		
Peak voltage (t=1min)	600 V AC (reference)					
Maximum current (rms)	10A	25A	40A	10A	25A	40A
Maximum surge current (t=10ms)	100A	250A	400A	100A	250A	400A

General characteristics (@ 25°C)

Operate time	1/2 of load power source cycle + 1 ms max.
Release time	1/2 of load power source cycle + 1 ms max.
Output ON voltage drop	1.6 V (rms) max.
Leakage current	4 mA max. (at V max.)
Insulation resistance	100 MΩ min. (at 500 V DC)
Dielectric strength	2,500 VAC, 50/60Hz for 1 minute
Vibration resistance	Mechanical durability : 10 to 55Hz, 1.5 mm double amplitude
Shock resistance	Mechanical durability : 1,000 m/s (approx. 100G)
Storage temperature	-30° C to 100° C (with no icing nor condensation)
Ambient temperature	-20° C to 80° C (with no icing nor condensation)
Ambient humidity	45 to 85% RH
Weight	Approx. 80g

■ SPECIFICATIONS : DC INPUT

● Input characteristics

Characteristics / Model	TSSR-10D	TSSR-25D	TSSR-40D	TSSR-10DH	TSSR-25DH	TSSR-40DH
Price	620.-	760.-	1,190.-	675.-	835.-	1,190.-
Control voltage range	3~32V DC					
Control current	6mA / 12V DC					
Pickup voltage	DC 3V max.					
Dropout voltage	DC 2V max.					

● Output characteristics

Voltage range	24~380 V AC			90~480 V AC		
Peak voltage (t = 1 min)	600 V AC (reference)					
Maximum current (rms)	10A	25A	40A	10A	25A	40A
Maximum surge current (t = 10 ms)	100A	250A	400A	100A	250A	400A

● General characteristics (@ 25°C)

Operating time	1/2 of load power source cycle + 1 ms max	
Release time	1/2 of load power source cycle + 1 ms max	
Output ON voltage drop	1.6 V (rms) max.	
Leakage current	4 mA max. (at V max.)	8 mA max. (at V max.)
Insulation resistance	100 MΩ min. (at 500 V DC)	
Dielectric strength	2,500 V AC, 50/60 Hz for 1 minute	
Vibration resistance	Mechanical durability : 10 to 55 Hz, 1.5 mm double amplitude	
Shock resistance	Mechanical durability : 1,000 m/s ² (approx. 100G)	
Storage temperature	-30°C to 100°C (with no icing nor condensation)	
Ambient temperature	-20°C to 80°C (with no icing nor condensation)	
Ambient humidity	45 to 85% RH	
Weight	Approx. 80g.	

■ SPECIFICATIONS : PHASE CONTROLLER

● Input characteristics

Characteristics/ Model	TSSR-10V	TSSR-25V	TSSR-40V
Variable resistor range	100kΩ to 48V, 250kΩ to 110V 500kΩ to 220V, 1MΩ to 380V		
Control method	Phase trigger control		
Price	640.-	730.-	1,070.-

● Output characteristics

Voltage range	24~380 V AC		
Peak voltage (t = 1 min)	600 V AC (reference)		
Maximum current (rms)	10A	25A	40A
Maximum surge current (t = 10 ms)	100A	250A	400A
Price	640.-	730.-	1,070.-

● General characteristics (@ 25°C)

Output ON voltage drop	1.6V (rms) max.	
Leakage current	10 mA max. (at V max.)	
Dielectric strength	2,500 V AC, 50/60 Hz for 1 minute	
Vibration resistance	Mechanical durability : 10 to 55 Hz, 1.5 mm double amplitude	
Shock resistance	Mechanical durability : 1,000 m/s ² (approx. 100G)	
Storage temperature	-30°C to 100°C (with no icing nor condensation)	
Ambient temperature	-20°C to 80°C (with no icing nor condensation)	
Ambient humidity	45 to 85% RH	
Weight	Approx. 80g.	

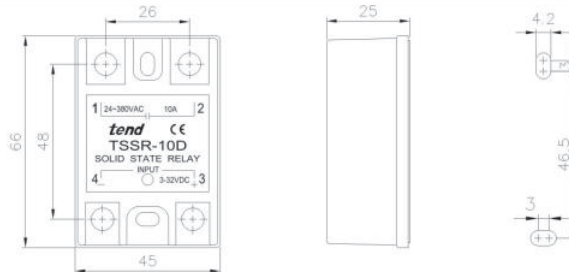
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■ DIMENSION

TSSR - □□□

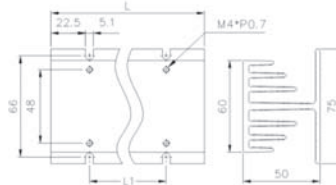
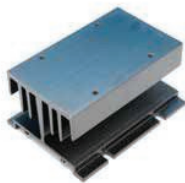


■ ACCESORIES

There are 5 different lengths of heat sink available. It can be chosen based on the quantity of TSSR used. Put the number of TSSR used in the □ such as TSSR01-□P

TSSR01 - □

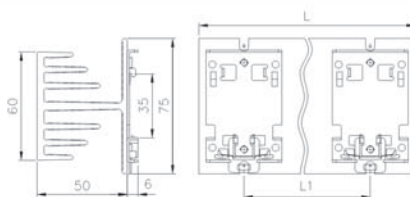
HEAT SINK ชุดระบายความร้อน



Signal	L	L1	Price
1P	50 mm		235.-
2P	100 mm	50 mm	465.-
3P	150 mm	100 mm	710.-
4P	200 mm	150 mm	930.-
5P	250 mm	200 mm	1,190.-

TSSR02 - □

DIN RAIL MOUNTED HEAT SINK ชุดระบายความร้อนชนิดใช้กับราง



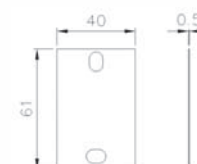
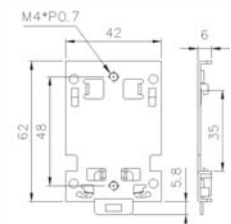
Signal	L	L1	Price
1P	50 mm		290.-
2P	100 mm	50 mm	585.-
3P	150 mm	100 mm	890.-
4P	200 mm	150 mm	1,190.-
5P	250 mm	200 mm	1,460.-

TSSR03
DIN RAIL MOUNTED

60.-

TSSR04
HEAT CONDUCTION RUBBER

35.-



- Used between bottom of TSSR and heat sink.
- Tear off protection film before using.

■ PRECAUTIONS FOR SAFE USE

1. The TSSR and heat sink will be hot and may occasionally cause minor burns. Do not touch the TSSR or heat sink either while the power supply is ON, or immediately after the power is turned OFF.
2. Be sure to conduct wiring with the power supply turned OFF. Touching the terminals when they are charged may occasionally result in minor electric shock.
3. The internal snubber circuit is charged and may occasionally cause minor electric shock. Do not touch the TSSR's main circuit terminals immediately after the power is turned OFF.
4. Do not apply a short-circuit to the load side of the TSSR. The TSSR may rupture.
5. TSSR malfunction or fire damage may occasionally occur. Do not apply excessive voltage or current to the TSSR terminals.
6. To protect against short-circuit accidents, install a quick-burning fuse that is rated 80% current maximum on the output line.
7. Abnormal heat generated by terminals may occasionally result in fire damage. Do not operate if the screws on the output terminal are loose.
8. Do not obstruct the air flow to the TSSR or heat sink.
9. When installing the TSSR directly into a control panel so that the panel can be used as a heat sink, use a panel material with low thermal resistance, such as aluminum or steel.
10. The TSSR should be installed with a heat sink when the load current is more than 15A. Heat generated from a TSSR error may occasionally cause the output element to short, or cause fire damage.

