SHOCK RELAY®

TSBSC Series

INSTRUCTION MANUAL

TSUBAKIMOTO CHAIN CO.

2017.Oct.12.

1.Preface

Thank you for purchasing the Shock Relay TSBSC series.

The Shock Relay is a current monitoring device that quickly detects motor overload, thus protecting your equipment from costly damage.

This instruction manual describes everything from installation to adjustment.

Be sure to read this manual carefully before using your Shock Relay.

When delivering a device containing the Shock Relay, be sure that this instruction manual is included.

WARNING

1. Make sure you read this instruction manual thoroughly before installing, wiring, operation and inspecting this SHOCK RELAY.
2. Please make sure that this instruction manual accompanies the SHOCK RELAY to the end user.
3. Product specifications are subject to change for improvement without notice.
4. Disconnect power. Always lock out power switch before installing, removing, or servicing unit. Comply with Occupational Safety and Health Standards 1910. 147 “The Control of Hazardous Energy (Lock Out/Tag Out).”
5. Install in proper enclosure in accordance with NEMA 250-1991 “Enclosures for Electrical Equipment (1000Volts Maximum)” and NFPA496 1993 edition “Purged and Pressurized Enclosures for Electrical Equipment, 1993 Edition.” When revisions of these standards are published, the updated edition shall apply.
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10. Install in proper enclosure in accordance with NEMA 250-1991 “Enclosures for Electrical Equipment (1000Volts Maximum)” and NFPA496 1993 edition “Purged and Pressurized Enclosures for Electrical Equipment, 1993 Edition.” When revisions of these standards are published, the updated edition shall apply.

Guards must be provided on all power transmission and conveyor applications in accordance with provisions of ASME B15.1-1996 “Safety Standards for Conveyors and Related Equipment, or other applicable standards. When revision of these standards are published, the updated edition shall apply.

CAUTION

- If danger is expected from your application, take the necessary steps to ensure that it operates safely.
- If your Tsubaki product does not operate normally, take care to ensure that dangerous operating conditions do not occur.
- Wear suitable clothing and protective equipment (safety glasses, gloves, safety shoes, etc.)
- Keep your work place tidy and safe to prevent accidents.

3. TSBSC and TSB3CTC Identification

When purchasing the SHCCK RELAY, be sure to verify the following points.

(1) Verify the model number and specifications on the name plate are the same as those of which you ordered.

(2) Verify that product was not damaged during shipping.

All-in-one type

Main Unit

TSB SC B 06

- TSB: SHOCK RELAY
- SC: SC series
- B: All-in-one type
- 06: Load current 06:6A, 34:34A, 60:60A

External CT

TSB 3CT C 100

- TSB: SHOCK RELAY
- 3CT: 3Phase CT
- C: TSBSC series
- 100: Rated Primary Current 100:100A, 200:200A, 300:300A

All-in-one type

TSB SC S 06

- TSB: SHOCK RELAY
- SC: SC series
- S: Panel type
- 06: Load current 06:6A, 34:34A, 60:60A

Panel Unit

TSB SC D

- TSB: SHOCK RELAY
- SC: SC series
- D: Panel Unit

Cable

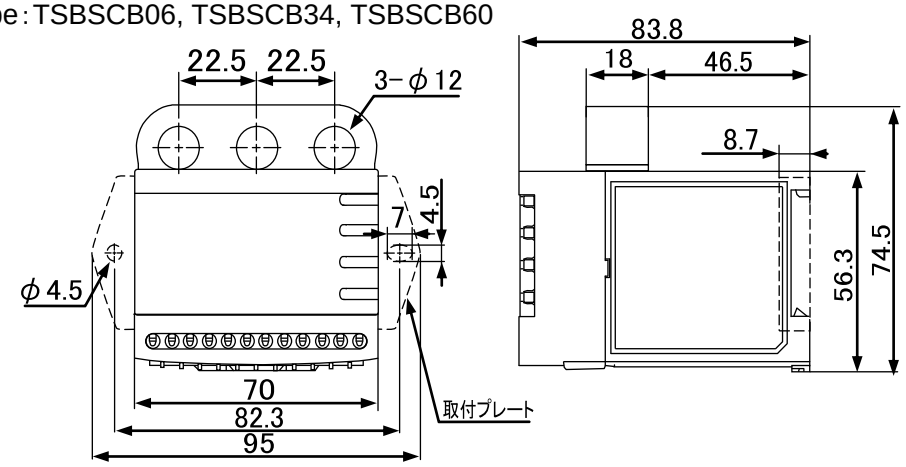
TSB SC C 05

- TSB: SHOCK RELAY
- SC: SC series
- C: Cable
- 05: 05:0.5m, 10:1.0m, 15:1.5m, 20:2m, 30:3m

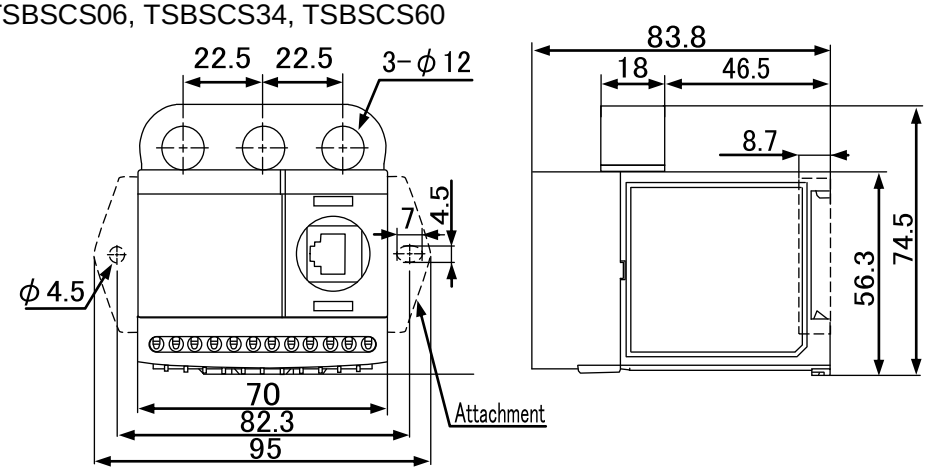
Note) In regard to Panel type, Main unit/Panel unit/Cable are used together as a set.

4． Outline

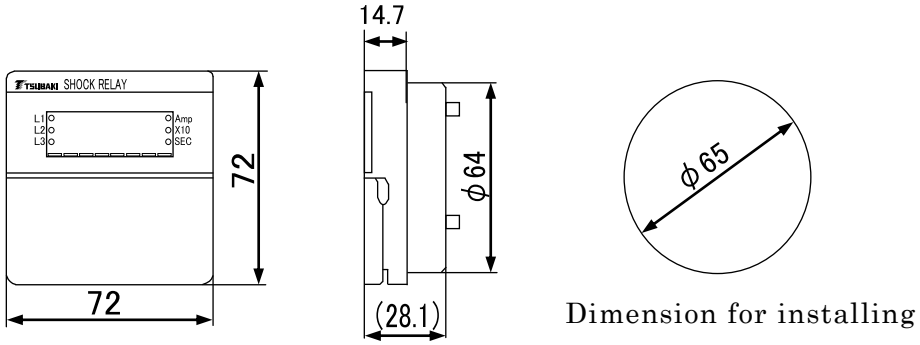
（1）All-in-one type：TSBSCB06, TSBSCB34, TSBSCB60



（2）Panel type：TSBSCS06, TSBSCS34, TSBSCS60



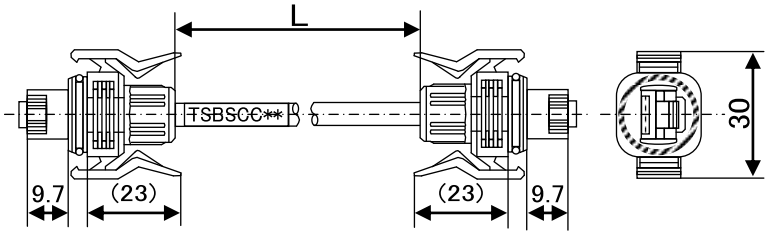
（3）Panel Unit：TSBSCD



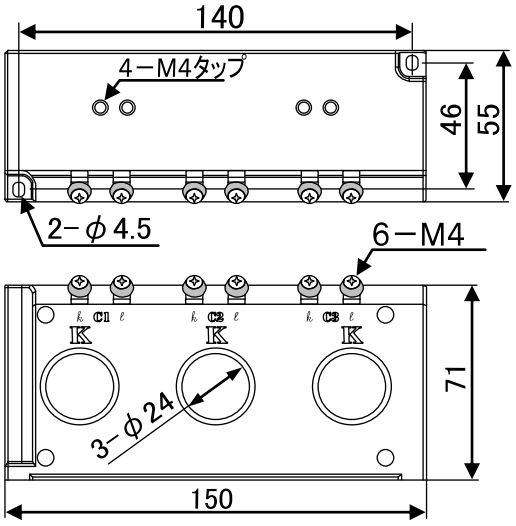
Dimension for installing

（4）Cable ： TSBSCC05, TSBSCC10, TSBSCC15, TSBSCC20, TSBSCC30

L＝0.5m，1m，1.5m，2m，3m



（5）External CT：TSB3CTC100, TSB3CTC200, TSB3CTC300



5. Specifications

Model no.	All-in-one type	TSBSCB06	TSBSCB34	TSBSCB60
	Panel type	TSBSCS06	TSBSCS34	TSBSCS60
Motor	Number of wires pass through the CT hole: 4t	0.1kW	—	—
200V Class	2t	0.2, 0.4kW	1.5, 2.2kW	—
	1t	0.75kW	3.7, 5.5kW	7.5, 11kW
400V Class	4t	0.2kW	—	—
	2t	0.4, 0.75kW	2.2, 3.7, 5.5kW	—
	1t	1.5kW	7.5, 11kW	15, 18.5, 22kW
Frequency of detect current		20～200Hz		
Maximum voltage		AC690V 50/60Hz		
Operational power source (A1－A2)		100～240VAC±10%, 50/60Hz		
Protection	Number of wires: 4t	0.15～1.60A (0.01A)	—	(): Increment
Over Current Setting :OC	2t	0.30～3.20A (0.02A)	3.00～17.0A (0.1A)	—
	1t	0.60～6.40A (0.04A)	6.00～34.0A (0.2A)	10.0～60.0A (0.4A)
Start time :dt		0 to 12.0s (0.2s and larger: Increment 0.1s)		
Shock time :ot		0.2 to 5.0.s (Increment 0.1s)		
Current detection Accuracy		±5% (Commercial power supply)		
Time Accuracy		±5%		
Under Currnet :UC		Current range: MIN≦UC Value <OC Value Shock time:0.2～5s(OFF: No action)		
Lock when starting up :Sc		2～8 times Over Current value, Trip within 0.5s after start time (OFF : No action)		
Lock when running :Ja		1.5～8 times Over Current value, Duration Value :0.2～5s(OFF : No action)		
Reverse Phase :rP		Within 0.15s(OFF : No action)		
Phase Loss :PL		Duration value : 0.5～5s(OFF : No action)		
Imbalance :Ub		10～50%、1～10s(OFF : No action)		
Alarm :ALo		Set value : A,F,H(OFF : No action)		
Running Hour :rh		10～9990hr(OFF : No action)		
Fail Safe :FS		Activated when setting ON (Conducting normally: Excited, Trip: Non-excited)		
Relay	Rated load	3A,250VAC ($\cos\phi$=1)		
	Minimum allowable load*1	DC24V、4mA		
	Life	Activation 100,000times at rated load		
	Arrangement	OC:1c, AL/UC/TO:1a		
	Re-set: Self-holding	E-r: Manual release or reset of power source, H-r: Only manual release		
	Re-set: Auto-reset	A-r: Auto-reset and set the return time at 0.2s to 20min		
Analog output		DC4～20mA		
Communication output		RS485 / Modbus		
Insulation resistance (Between housing-circuit)		DC500V 10MΩ		
De-electric Strength Voltage	Housing - Circuits	2000VAC 60Hz 1min.		
	Relay contacts	1000VAC 60Hz 1min.		
Environment	Place	Indoor, no water splash		
	Ambient temperature	-20～+60℃		
	Ambient humidity	30～85%RH (No dew condensation)		
	Altitude	2000m and below		
	Atmosphere	No corrosive gas, oil mist and dust		
	Vibration	5.9m/s^2 and below		
Power consumption		7VA and below		
Approximate Weight		0.3kg and below		

*1: In case inputting the output relay contact to programmable controller (PLC) directly, input through the relay for minute current, because contact failure may happen due to minute current.

6. Installation method

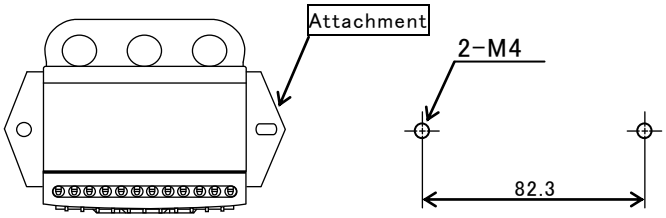
6.1 Installation environment

Make sure to install Shock Relay at the environmental condition shown in the attached table.

6.2 Main unit

(1) Installation with screw

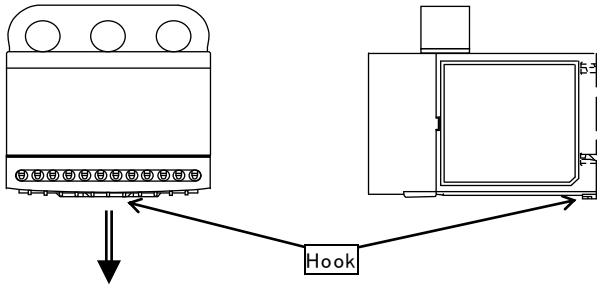
Put the plate for installation at the both side of Shock Relay, and install Main unit to the panel.



(2) Installation with DIN Rail

While pulling the hook of Shock Relay to the arrow direction, install Shock Relay to 35mm DIN rail.

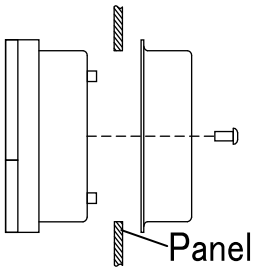
When removal, pull the hook to the arrow direction with flathead screwdriver.



6.3 Panel unit

(1) Loosen and remove the screw which fix the lid backside.

(2) Hold the panel with the panel unit and lid backside, and fix with screw.



7. Wiring method

(1) Use commercial power source for operation.

Set the insulation transformer in case that there is high frequency noise generator such as inverter.

(2) Make sure the followings after the completion of connection (wiring)

a. Wiring is correct?

b. Nothing forgetful on wiring?

C. No short-circuit or earth fault between terminals/wires?

(3) Suitable wire

Wire: ISO 1 to 2.5 mm^2, AWG#18 to 14 75℃ Copper wire

Strip length: 8 mm

Number of connection: At most 2 wires at 1 terminal

Tightening torque: 0.8 to 1.2 N・m

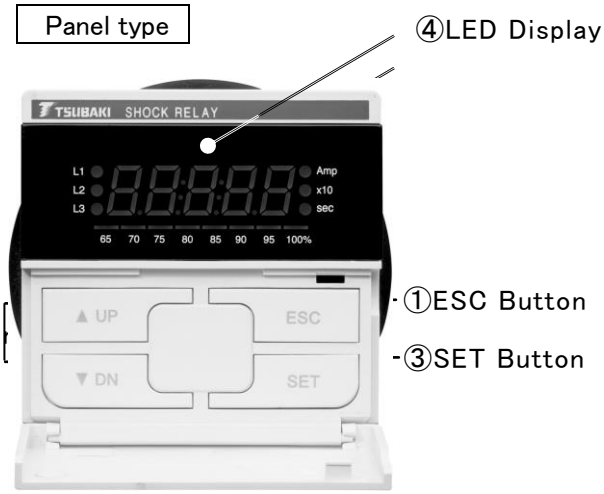
Warning	●wiring must be carried out by skilled and professional engineers. ●Before starting the operation, turn power on/off. Otherwise electrical shock may occur.

8. Explanation of each part

8.1 Operation portion

All-in-one type

Panel type



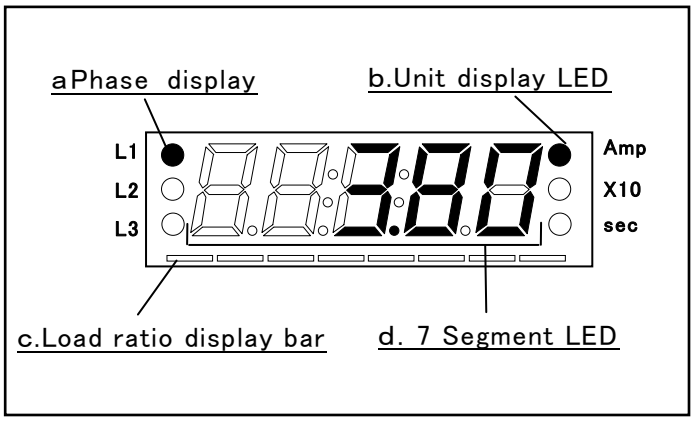
Operating instruction on each button

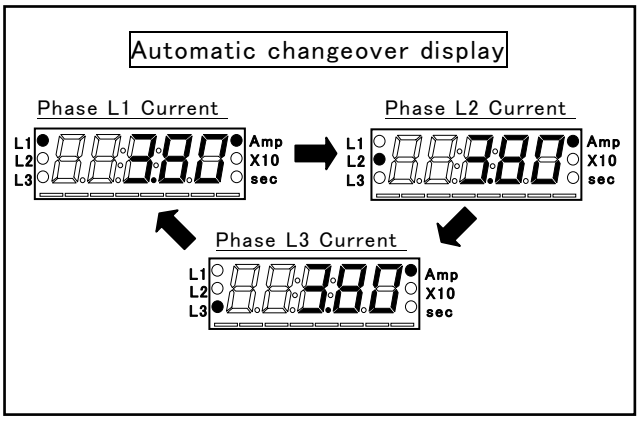
①ESC Button (Reset): Release trip condition and return to the initial display from that of setting.

②UP/DN Button (Up/Down): Switch to parameter display, and change the setting data.

③SET Button (Set): Memorize the setting data.

④LED Display





a. Phase display LED: Indicate the phase which shows the current L1(R)→L2(S)→L3(T), changes every 2 seconds.

b. Unit display LED: Indicate the unit shown by LED

c. Load ratio bar graph: Indicate monitoring current as a ratio against OC current setting at 65% and higher.

d. 7 Segment LED: Indicate monitoring current, setting value of parameter and cause of trip.

8.2 Display function

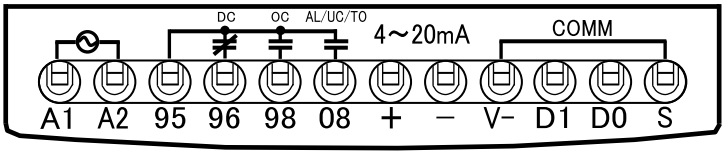
(1) Current at each phase

While normal operation, it is possible to confirm the current at each phase by pushing SET button, changes L1→L2→L3→L1→・・・. It is released by pushing ESC button.

(2) Trip record

Trip record (last 3 times) can be confirmed bi pushing ESC button 5 sec. and longer. When pushing UP/DN button one time each, detail of trip and current of 3 phase is shown. Order of trip record can be confirmed with bar graph; most latest: 100% light, second latest: 95 and 100% light, third latest: 90, 95 and 100 light. It is released by pushing ESC button.

8.3 Terminal arrangement



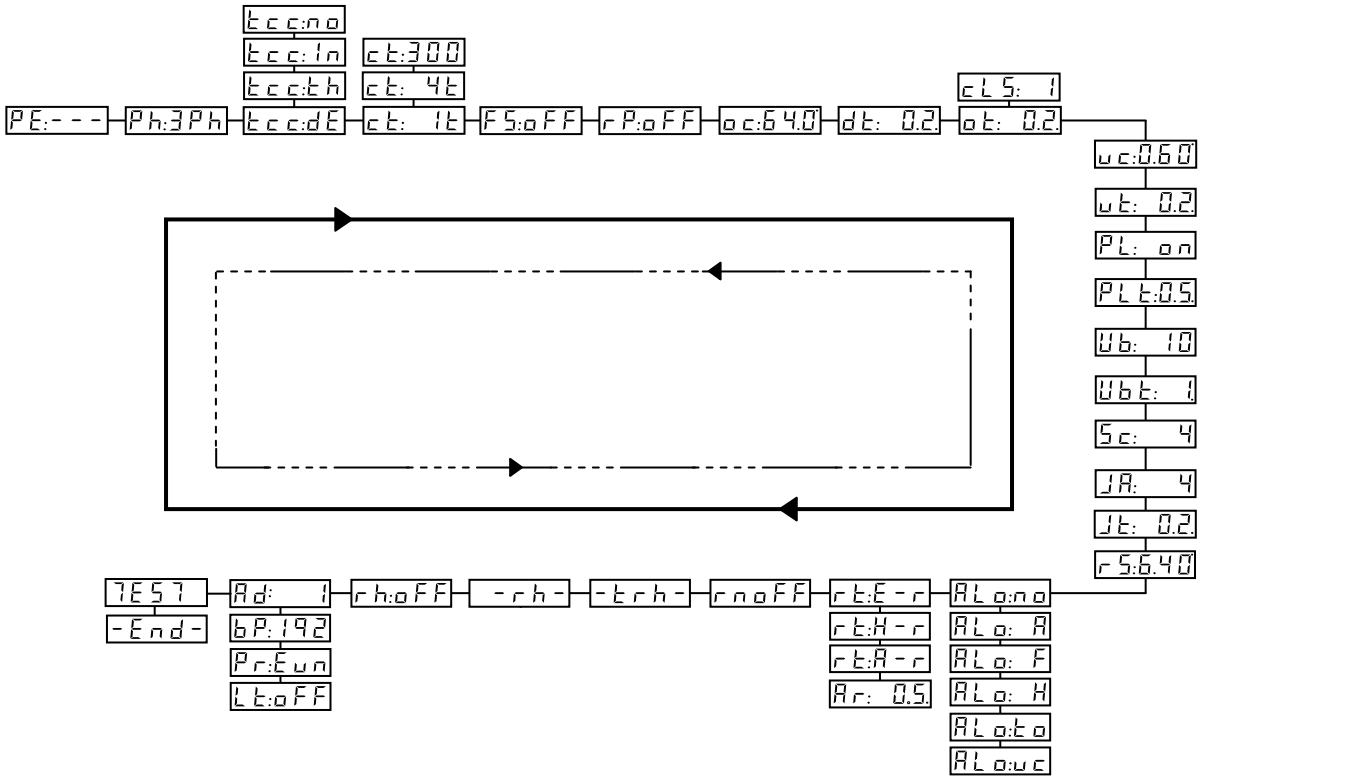
Terminal symbol	Function	Explanation
A1,A2	Operational power source	Connect AC100 to 240V, commercial power source
95	Common terminal	Terminal 96,98,08 common
96	OC output	b contact: Normal-close, Overcurrent-open (In case FS:OFF)
98		a contact: Normal-open, Overcurrent-close (In case FS:OFF)
08	AL/TO/UL output	Alarm output/Running hour output/Undercurrent output: close
+,-	Analog output	Output analog current DC4 to 20mA
V-,D1,D0,S	Terminal for communication	Connect when using communication function.

9.Setting procedure

Item	Button	Explanation
1. Parameter selection	UP/DN	Select parameter to set by pushing UP/DN button.
2. Preparation for setting	SET	Setting value blinks by pushing SET button after selecting parameter.
3. Selection of setting value	UP/DN	Push UP/DN button until thev required setting value is displayed.
4. Memorization of setting value	SET	When pushing SET button after selection of setting value, blinking display gets back to normal light display, and setting value is memorized.
5. Initial display	ESC	Push ESC button after the completion of setting to get back to initial dispaly. In case no button is pushed, display gets back to initial condition after 50 seconds.

<Operation of parameter>

When selecting parameter; it is operated forward direction by DN button ⟶, reverse direction by UP button ⟵ · · -



<Setting procedure of overcurrent function>

(1) Setting of Overcurrent "oc"

Set the required current value to trip. Shock Relay trips when the current exceeds the preset overcurrent value and continues to carry longer than Shock Time at the same time.

(2) Setting of Start Time "dt"

Set the Start Time (Inhibit time of initial operation)

Though the current which exceeds the preset overcurrent value carries, Shock Relay does not trip during Start Time.

(3) Overcurrent Shock Time "ot"

Set the Shock Time (Continuous overloaded time)

After Start Time setting period, when the current which exceeds the preset current value carries, Shock Relay starts to count and trips after Shock Time.

10. Number of wires that pass through the CT (Current Transformer) hole

Refer to the table below for the number of motor wires that pass through the CT.
Number in the table is just a guide when the motor is used at load ratio 80 to 100%.
In case that motor load ratio is low, increase the number to pass through to improve the setting accuracy.
In addition, in case of motors except for the table below (Small size, single phase, different voltage, etc.), select an appropriate Model and number of motor wires that pass through the CT based on the current value to set.

3 phase AC 200V class motor			3 phase AC 400V class motor		
kW	Number of motor wires that pass through the CT	Applicable Shock Relay Model No.	kW	Number of motor wires that pass through the CT	Applicable Shock Relay Model No.
0.1	4	TSBSCB06 TSBSCS06	—	—	—
0.2	2		0.2	4	TSBSCB06 TSBSCS06
0.4			0.4	2	
0.75	1		0.75		
1.5	2	TSBSCB34 TSBSCS34	1.5	1	
2.2			2.2	2	TSBSCB34 TSBSCS34
3.7	1		3.7		
5.5			5.5		
7.5	1	TSBSCB60 TSBSCS60	7.5	1	
11			11		
—	—	—	15	1	TSBSCB60 TSBSCS60
—	—	—	18.5		
—	—	—	22		

Note 1) Set the parameter "CT ratio" based on the number of motor wires that pass through the CT.
2) In case that the motor kW exceeds the above table, use external CT.

Specification of External CT

Model No.		TSB3CTC100	TSB3CTC200	TSB3CTC300
Class		Grade 3		
Rated primary current		100A	200A	300A
Rated secondary current		5 A		
Rated burden		5VA		
Rated frequency		50/60Hz		
Approx. mass		0.9kg		
Adapted motor	200V class	15 to 18.5 k W	22 to 37 k W	45 to 75 k W
	400V class	30 to 45 k W	55 to 90 k W	110 to 132 k W

１１．Parameter

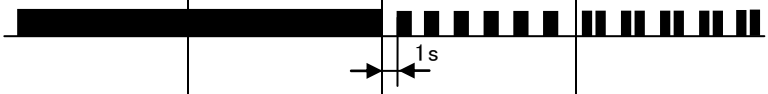
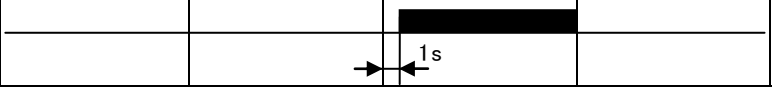
<table>
<tr><th rowspan="2">No.</th><th rowspan="2">Menu</th><th colspan="2">Parameter</th><th rowspan="2">Explanation of function</th></tr>
<tr><th>Initial Value</th><th>Setting Value</th></tr>
<tr><td>1</td><td>Parameter lock</td><td>PE: 0</td><td>0</td><td>All parameter setting is possible.</td></tr>
<tr><td></td><td></td><td></td><td>1</td><td>Setting in case of parameter lock.
After this setting, it is necessary to set “1” for setting screen in eac h time when parameter setting.
In case of release, continue to input after setting “1”, and setting is completed when PE:- - - is displayed.</td></tr>
<tr><td>2</td><td>Selection of phase No.</td><td>Ph:3Ph</td><td>3Ph</td><td>Monitoring 3 phase motor</td></tr>
<tr><td></td><td></td><td></td><td>1Ph</td><td>Monitoring single phase motor. In case of this setting, phase-reversal ”rP”, phase loss “PL” or imbalance “Ub” is not displayed.</td></tr>
<tr><td>3</td><td>Operation curve</td><td>tcc:dE</td><td>dE</td><td>It operates due to definite characteristic, and functions as overload protection.</td></tr>
<tr><td></td><td></td><td></td><td>th</td><td>It operates due to inverse time characteristic, and functions as motor protection. (Refer to page 12. Thermal characteristic chart)
Same as thermal relay, it is impossible to be back in by resetting right after the trip because current data is accumulated.
For this setting, set “0” because Start Time does not function.</td></tr>
<tr><td></td><td></td><td></td><td>In</td><td>It operates due to inverse time characteristic, and functions as motor protection. (Refer to page 12. Inverse characteristic chart)
Regarding the operation, refer to the item for Start Time.</td></tr>
<tr><td></td><td></td><td></td><td>no</td><td>Setting in case that overcurrent is not detected.</td></tr>
<tr><td>4</td><td>CT ratio *1</td><td>ct: 1t</td><td>1t,2t,4t</td><td>Setting the number of motor wires that pass through the CT
(1t: 1time, 2t: 2 times, 4t: 4 times)
Type 34; only 1t and 2t, Type 60; only 1t</td></tr>
<tr><td></td><td></td><td></td><td>100,200,300</td><td>Selection when Type 06 using External CT</td></tr>
<tr><td>5</td><td>Fail Safe</td><td>FS:oFF</td><td>oFF</td><td>Relay does not operate after the power is on (96-95: close, 98-95:ope n), while ON operation when tripping (96-95: open, 98-95:close).</td></tr>
<tr><td></td><td></td><td></td><td>on</td><td>Relay operates after the power is on (96-95: open, 98-95:close), while OFF operation when tripping (96-95: close, 98-95: open).Note) When changing the setting, it becomes effective by power resetting.</td></tr>
<tr><td>6</td><td>Reverse pha-se detection</td><td>rP:oFF</td><td>oFF</td><td>“on” setting when detecting phase-reversal.</td></tr>
<tr><td></td><td></td><td></td><td>on</td><td></td></tr>
<tr><td>7</td><td>Over current threshold</td><td>oc:6.40</td><td>See the right</td><td>Setting the current value for overcurrent.
Regarding type 34 and 60, when inverse characteristic ”th”, ”In” are set, the current value can not be set over 32A.
Current setting table Unit: (A)
<table>
<tr><th rowspan="2">CT Ratio</th><th colspan="2">06 type</th><th colspan="2">34 type</th><th colspan="2">60 type</th></tr>
<tr><th>Setting range</th><th>Increments</th><th>Setting range</th><th>Increments</th><th>Setting range</th><th>Increments</th></tr>
<tr><td>1t</td><td>0.60～6.40</td><td>0.04</td><td>6.00～34.0</td><td>0.2</td><td>10.0～60.0</td><td>0.4</td></tr>
<tr><td>2t</td><td>0.30～3.20</td><td>0.02</td><td>3.00～17.0</td><td>0.1</td><td></td><td></td></tr>
<tr><td>4t</td><td>0.15～1.60</td><td>0.01</td><td></td><td></td><td></td><td></td></tr>
<tr><td>100</td><td>12.0～128</td><td>1</td><td></td><td></td><td></td><td></td></tr>
<tr><td>200</td><td>24.0～256</td><td>1</td><td></td><td></td><td></td><td></td></tr>
<tr><td>300</td><td>36.0～384</td><td>1</td><td></td><td></td><td></td><td></td></tr>
</table></td></tr>
<tr><td>8</td><td>Start time</td><td>dt: 0.2</td><td>0</td><td>When setting inverse “In”, it operates Cold characteristic from motor start until the current becomes lower than OC setting, and Hot characteristic after that.</td></tr>
<tr><td></td><td></td><td></td><td>0.2～12.0s (0.1s unit)</td><td>Relay does not output within the time setting so that it does not ope rate when motor starts. When inverse “In” is set, it operates Hot characteristic after Start Time</td></tr>
</table>

＊1 When CT Ratio is changed, overcurrent setting “OC”, undercurrent setting “UC” and analog scale output scale “rS” are revised to initial value.

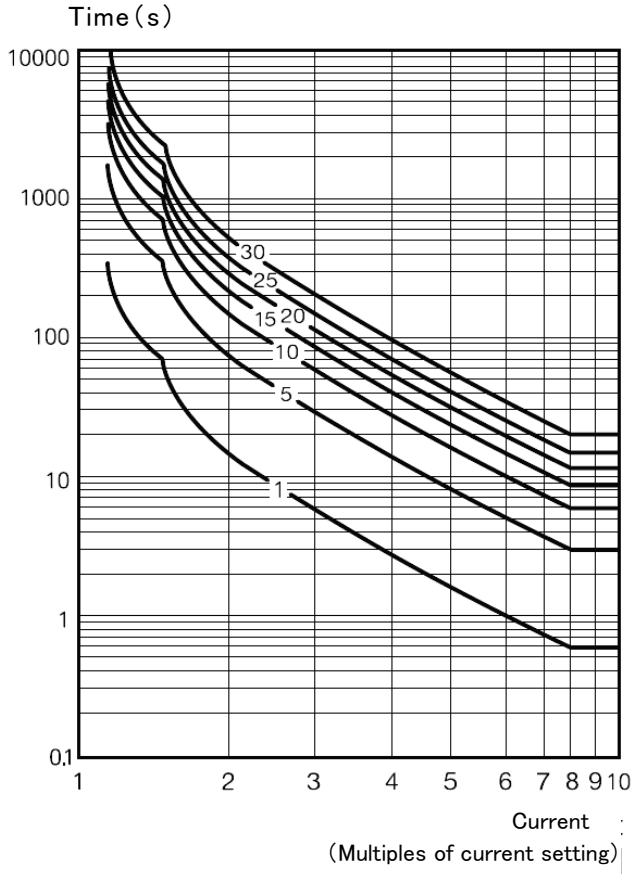
No.	Menu	Parameter		Explanation of function
		Initial Value	Setting Value	
9	Over current Shock time	oL: 0.2	0.2～5.0s (0.1s unit)	Setting continuous overloading time of overcurrent setting.
		cLS: 1	1～30	Selection of operation characteristic when inverse characteristic "th", "In" are set. (Refer to page 12. Thermal and inverse characteristic charts)
10	Under current threshold	uc:oFF	oFF See the right	Setting current value when detecting undercurrent. It can not be set higher than overcurrent value. Relay output for undercurrent is as follows; Setting alarm AL_o except uc: output at OC terminal Setting alarm AL_o at uc: output at AL/UC/TO terminals
11	Under current Shock time	uL: 0.2	0.2～5.0s (0.1s unit)	Setting continuous under-loading time of under-current setting. When under-current setting is set oFF, it does not display.
12	Phase loss	PL:oFF	oFF on	Setting "on" in case that phase loss is detected.
13	Phase loss time	PLt:0.5	0.5～5s (0.1s unit)	Setting operation time in case that phase loss is detected. When phase loss detection is set oFF, it does not display.
14	Imbalance threshold	Ub:oFF	oFF 10～50%	Setting 10～50% in case imbalance is detected. $\mathrm{Im}balanceratio(\%) = \frac{(\mathrm{Max.Current} - Min.Current)}{\mathrm{Max.Current}} \mathrm{X}100$
15	Imbalance duration	Ubt: 1	1～10s (1s unit)	Setting operation time in case detecting imbalance. When imbalance detection is set oFF, it does not display.
16	Stall threshold	Sc:oFF	oFF 2～8times	Setting the ratio against overcurrent setting in case detecting the lock when starting. Setting range; Sc setting value × OC ≦250A It trips within 0.5s after Star Time.
17	Jam threshold	JA:oFF	oFF 1.5～8times	Setting the ratio against overcurrent setting in case detecting the lock when running.Setting range; JA setting value × OC ≦250A
18	Jam fault duration	Jt: 0.2	0.2～5s (0.1s unit)	Setting the operating time in case detecting the lock when running.When lock JA is set oFF, it does not display.
19	Analog Output range	r5:640	See the right	Setting the current value as analog current output scale when 20mA output. Refer to P 9 Current setting chart for setting range.
			oFF	Analog current: 4mA fixed output
20	Alert	AL o:no	no	Setting in case that alarm does not function.
			A F H	Setting in case that alarm output. Refer to alarm output operation in page 11.
			to	Setting in case detecting running hour.
			uc	Setting in case detecting under-load.
		AL:oFF	oFF 50～100%	Setting the ratio against OC current when alarm outputting.
21	Reset	rt:E-r	E-r	Self-holding after trip, back in when power is reset or ESC button.
			H-r	Self-holding after trip, back in when ESC button. It does not be back in by power reset.
			A-r	Automatic reset after tripping.
		Ar: 0.5	0.2s～ 20min	Setting resetting time in case automatic reset "A-r" is set. <Setting unit> 0.2 to 1s: 0.1s unit 1 to 60s(1n): 1s unit 1 to 20min(1n to 20n): 1min unit
22	Reset limitation	rn:oFF	oFF 1 to 5times	Setting 1 to 5 times in case limiting the number of reset functions. In case the number of reset within 30 min. exceeds the setting value, it trips.

No.	Menu	Parameter		Explanation of function
		Initial Value	Setting Value	
23	Total running hour	-trh-		Display total running hour
24	Running hour	-rh-		Display operational time since inputting running hour setting time.
25	Running hour setting	rh:oFF	oFF 10～9990hr	Setting time in case running hour functions. Set alarm ALo "to" in case relay outputting.
26	Communication setting	Ad: 1	1～247	Setting communication address
		bP:19.2	See the right	Setting communication speed 1.2, 2.4, 4.8, 9.6, 19.2, 38.4kbps
		Pr:Eun	odd,Evn, non	Setting parity
		Lt:oFF	oFF, 1～999s	Setting waiting time until error is displayed when communication trouble.
27	Test mode	TEST		In case pushing set button when this is displayed, after 3 sec. + Shock Time, -End- is shown and relay is output.

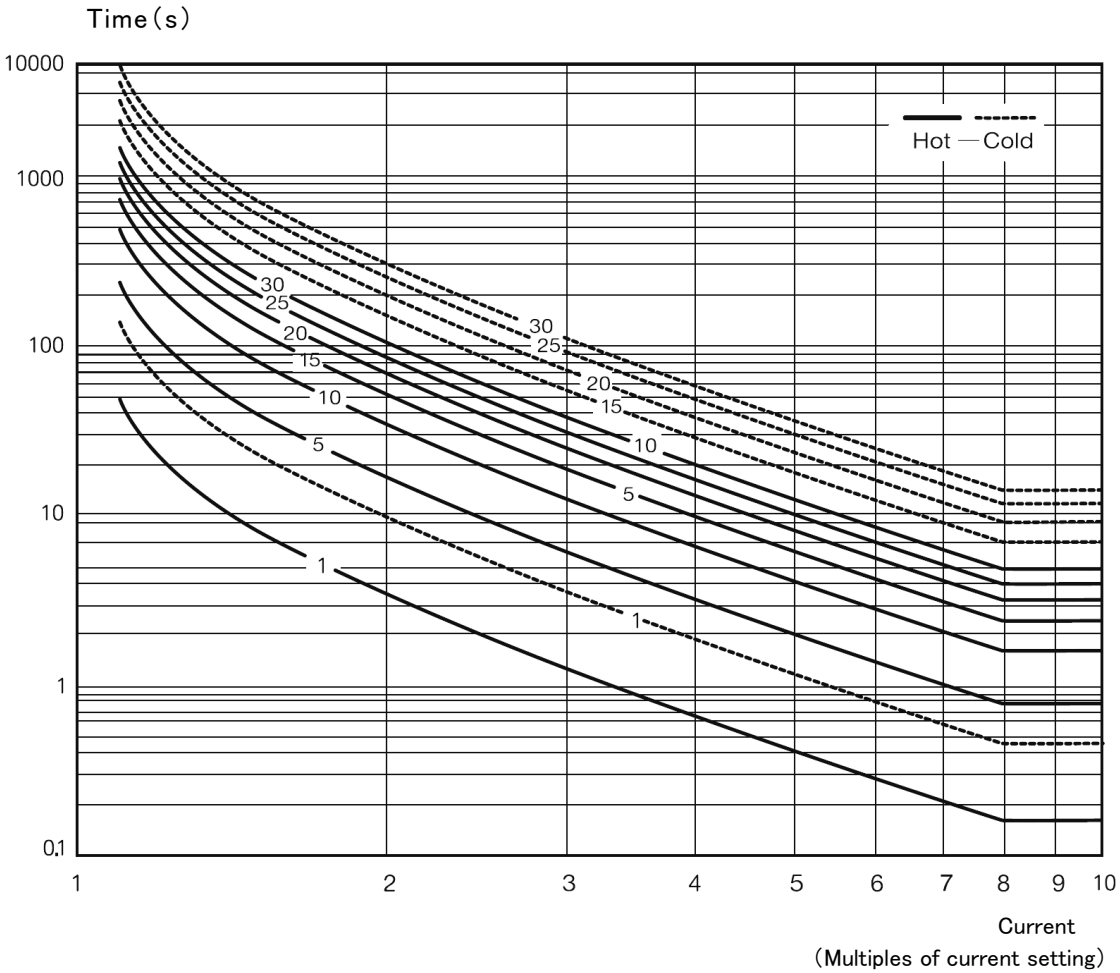
●Alarm

Operational mode / ALo selection	When motor starts	Normal operation	When exceeding alarm setting value	When trips	Action
Operational output ALo: A					When motor starts: close When trips: open
Flicker output ALo: F			1time/s 1s	2times/s	Flicker action; When exceeding the preset alarm value; 1 time/s. After tripping; 2 times/s.
Hold output ALo: H			1s		When exceeding alarm setting value: close When tripping: open

Thermal Charasteristic



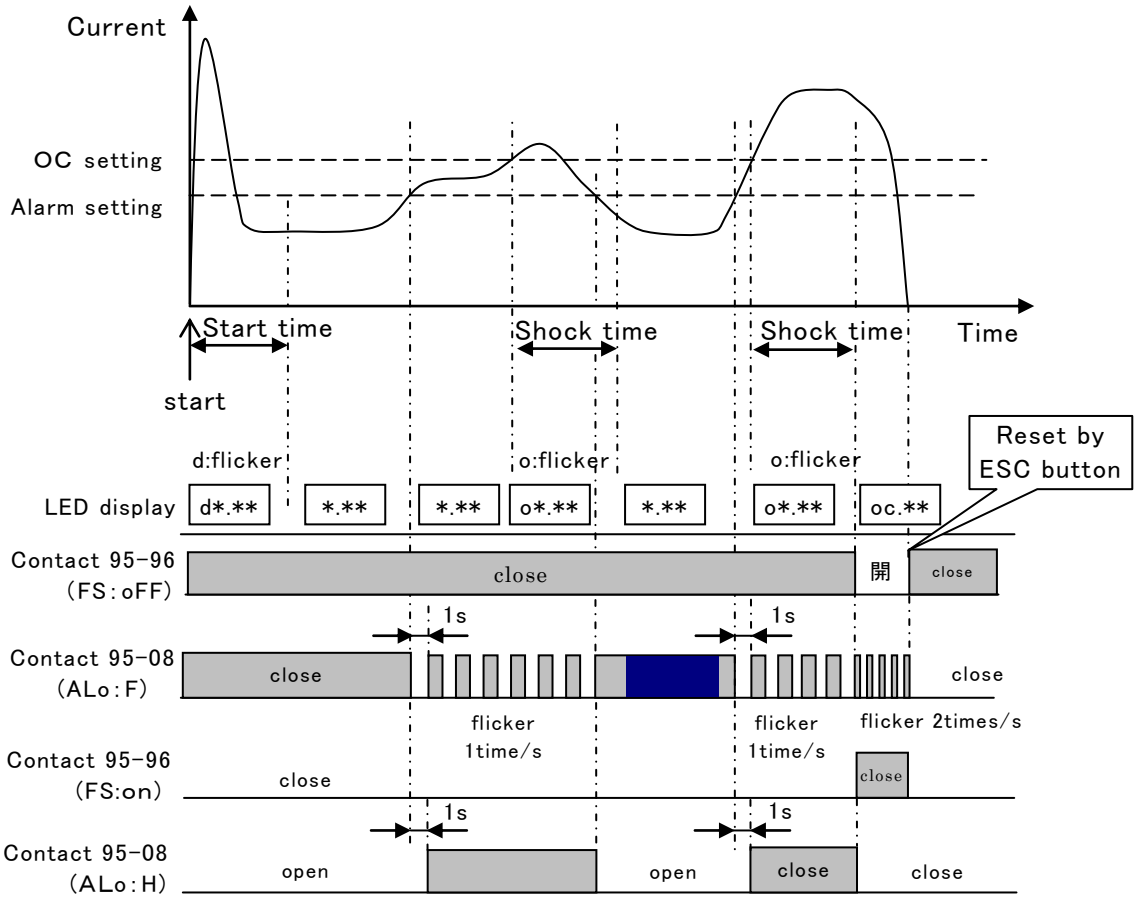
Inverse Characteristic



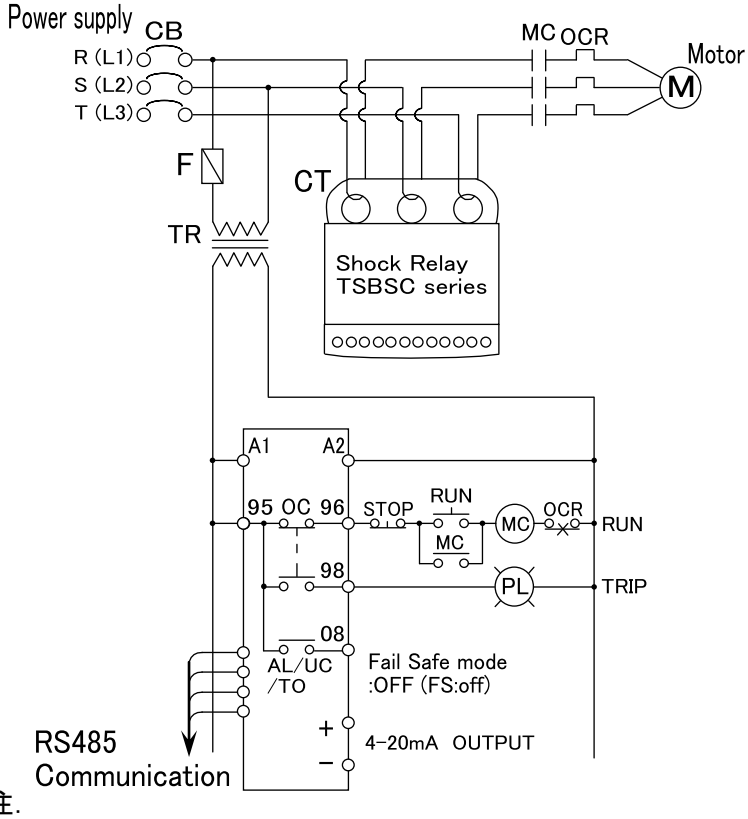
●Trip display

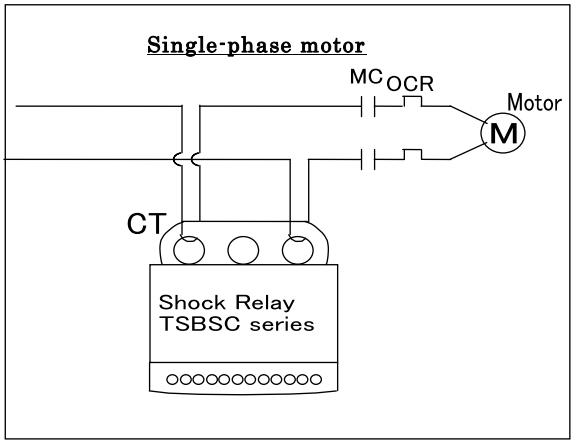
Trip function	Indication	Contents of indication	Solution
Over current	oc: 3.6	OC Trip caused by r(L1)-phase current	Check your machine
Phase loss	PL -r	Phase Loss caused by r(L1)-phase lost	
Reversed phase	-rP-	Phase reverse trip	Check phase sequence
Stall	St:35.0	Stall trip during motor starting caused by s(L2)-phase current	Check your machine
Jam	JA:15.8	Jam trip during motor running caused by t(L3)-phase current	
Imbalance	Ub: 4.2	Imbalance trip caused by t(L3)-phase current	Check wiring and motor
Under current	uc: 1.6	Under current trip caused by s(L2)-phase current	Check your machine
Limitation of auto-start	rnFuL	In 30 minutes, the number of auto-restart by auto-reset exceeds the setting	

●Explanation of Relay output



12. Wiring diagram





CB : Circuit breaker
OCR : Overcurrent relay
F : Fuse
MC : Magnetic contactor
TR : Transformer

注.

1. A transformer may be required, depending on the voltage of Motor(i.e. over 240VAC)
   Install an insulation transformer between the power line and terminal A1-A2 of the Shock Relay when harmonic noise is included in the power on
2. Output relay is normally de-energized. When Shock Relay works, it is ON (FS:oFF)
3. If the capacity of the operating electromagnetic coil of the electromagnetic contactor is above 200VA during closing time or 20VA during holding time, then drive a secondary relay with the relay output, and open and close the electromagnetic contactor with the contacts of the secondary relay.

13. Communication function

13. 1 Specifications

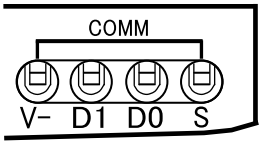
Item	Content
Standards	RS－485
system	Half duplex system　protocol:modbus
Speed	1.2k～38.4kbps
distance	1200m（dependence on speed）

13. 2 PCON Software

（1）Connection of converter

①For using TSBSC PCON Software, converter is prepared.

②Connect as below by twist cable.



Terminal	Signal	RS485 Terminal
V-	GND	GND
D1	Data(B)	Tx+
D0	Data(A)	Tx-
S	Shield	Shield

（2）PCON Software

PCCN Software will be sent on request.

14. Trouble shooting

Phenomenon	Check item	Check result	Treatment
LED indication isn't turned on	Wiring of the power source (A1-A2)	It isn't being wired	It is wired properly.
	Check a power source voltage by voltage tester	It is different from proper supply voltage (120-240V)	A proper power supply is input.
Relay does not trip even if current setting value is minimum.	Shock Relay Model No.	Model No. is different	Exchange Shock Relay
	Ratio of external CT	Ratio of external CT is wrong	Ratio is made correct. (CT , The number of penetration)
	TEST Function	Relay does not trip	Exchange Shock Relay
After the start over-load trip occurs.	Load of motor	Over-load	Motor capacity is reexamined.
		Inertia is too big.	
	Start time setup value is examined.	It is too short	It is set up a little long.
	Current setup value is examined.	It is too small	Proper value is established.
Over-load trip occurs though it is not an over-load.	Current setup value.	It is too small.	Proper value is established.
	Shock time setup value	It is too short.	Proper value is established.
Over-load trip doesn't occur in spite of the over-load.	Current setup value	It is too big.	Proper value is established.
	Shock time setup value	It is too long.	Proper value is established.
	Test function	Relay does not trip	Exchange Shock Relay

If replacement of the shock Relay is necessary, please make contact with our company office.

15. In the case of the maintenance, the check work.

(1) Do a cleanup around the machine, and make it safe condition as a secondary disaster does not occur.

(2) When check the installation and connection of the shock relay, turn off the power source, and do it under the condition that a machine stops completely, and the LCD of the shock relay turns off completely.Prevent it from turning on the power source by careless.

16. About the daily check, routine inspection.

A daily check

(1) Confirm that LCD is to be turned on during the power on, and motor current value is indicated during the motor running.

B routine inspection

(1) Confirm that there is no looseness in the installation of CT, Shock relay, and in the terminal connection.(In a half year, more than one time.)

(2) Check the movement of the relay output (terminal 95-96, terminal 97-98) by the test mode regularly. (In a half year, more than one time.)

(3) Add DC500V between the earth terminal and the circuit when you carry out a megger-test. Don't add a test voltage to the shock relay, and carry it out when you do a dielectric strength test of the outside circuit.

(4) As for the shock relay, a life time of electrolytic condenser is usually about 10 years in condition that ambient temperature is 30℃ in average during a year, though a life time varies in the ambient environment and the operating time when power is supplied. We recommend an exchanging it for the new product or overhaul, before a trouble occurs.

17. Point for safe use

(1) Take measures beforehand to prevent danger when using a TSUBAKI product.

(2) If our product begins to operate improperly, be sure to take measures to prevent a dangerous situation from arising.

■ Warranty

Tsubakimoto Chain Co.: hereinafter referred to as “Seller”
Customer: hereinafter referred to as “Buyer”
Goods sold or supplied by Seller to Buyer: hereinafter referred to as “Goods”

1. Warranty period without charge
   Effective 18 months from the date of shipment or 12 months from the first use of Goods, including installation of Goods to Buyer’s equipment or machines - whichever comes first.
2. Warranty coverage
   Should any damage or problems with the Goods arise within the warranty period, given that the Goods were operated and maintained according to the instructions provided in the manual, Seller will repair and replace at no charge once the Goods are returned to the Seller.
   This warranty does not include the following:
   1) Any costs related to removal of Goods from the Buyer’s equipment or machine to repair or replace parts.
   2) Costs to transport Buyer’s equipment or machines to the Buyer’s repair shop.
   3) Costs to reimburse any profit loss due to any repair or damage and consequential losses caused by the Buyer.
3. Warranty with charge
   Seller will charge a fee for any investigation and repair of Goods caused by:
   1) Improper installation due to not properly following the procedures in the instruction manual.
   2) Insufficient maintenance or improper operation by the Buyer.
   3) Incorrect installation of Goods to other equipment or machines.
   4) Any modifications or alterations of Goods by the Buyer.
   5) Any repair by engineers other than the Seller or those designated by the Seller.
   6) Operation in an inappropriate environment not specified in the manual.
   7) Force Majeure or forces beyond the Seller’s control such as natural disasters and injustices committed by a third party.
   8) Secondary damage or problems incurred by the Buyer’s equipment or machines.
   9) Defective parts supplied, or specified by the Buyer.
   10) Incorrect wiring or parameter setting by the Buyer.
   11) The end of life cycle of the Goods under normal usage.
   12) Loss or damage not liable to the Seller.
4. Dispatch service
   Service to dispatch a Seller’s engineer to investigate, adjust or trial test Seller’s Goods is at the Buyer’s expense.
5. Disclaimer
   1) In our constant efforts to improve, Tsubaki may make changes to this document or the product described herein without notice.Considerable effort has been made to ensure that the contents of this document are free from technical inaccuracies and errors. However, any such inaccuracies or errors reported will be gladly examined and amended as necessary.

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