

Digital Motor Protection Relay

<DSP-SS1 : 2CT based>



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Order

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Digital Motor Protection Relay

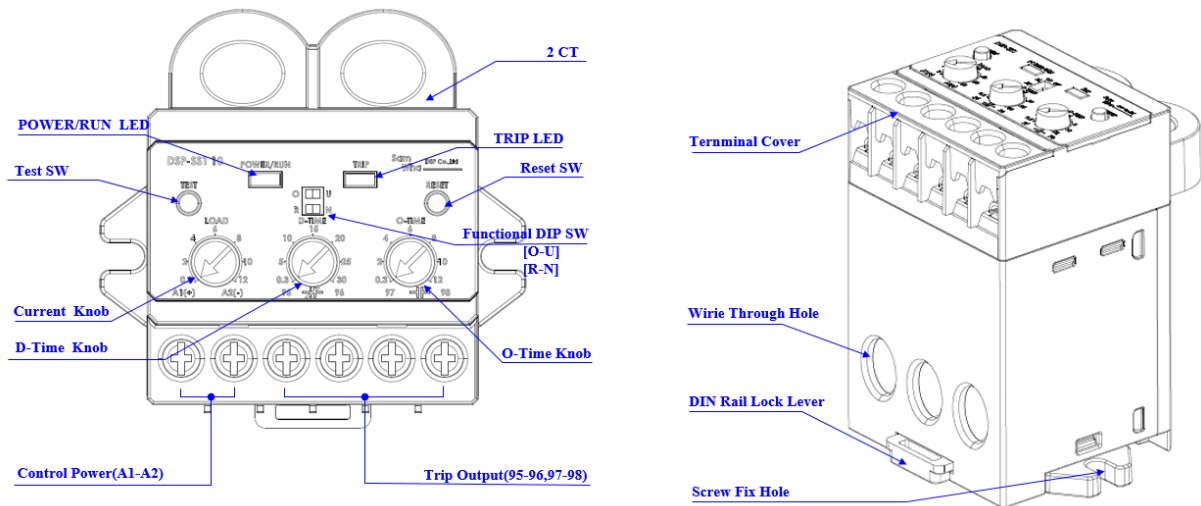
<DSP-SS1 : 2CT based>

1. Abstraction

Installation	Model	Protection	Auxiliary
Panel Mounting Type	DSP-SS1	► Over current ► Under current ► Locked Rotor	► Self-diagnostics



2.Outward Structure



3. Main Features

- MCU based digital control : optimized protection
- Compact size, Practical simple application
 - * Protection : Over current/Under current, Phase Loss ,Locked rotor
 - ▶ Protection for Phase loss and Locked rotor is executed based on over current
 - * Possible to check actual current and trip state based on LED indication
- 3 phase load protection through 2 CT
- To cover wide and precise current range for the protection
 - *10 Type
 - ▶ Definite T-I: 0.3A ~ 12A(0.3~6A for external CT)
 - ▶ Matched with external CT :1~600A, secondary rating of external CT is 5A
 - *60 Type
 - ▶ Definite T-I: 2A ~ 60A
- Trip cause indication by LED
 - *Control power is loaded : Green
 - *Normal operation : Red
 - *Trip is happened : Yellow
- Convenient functional selection by DIP SW
 - * N type : trip output(95-96,97-98) is energized in case control power is loaded
 - * R type : trip output(95-96,97-98) is not energized in case control power is loaded
 - ▶ trip output is not responded for selection of DIP SW in case normal operation is processed
 - * RP ON : able state to protect reverse phase protection
 - * RP OFF : disable state to protect reverse phase protection
- Reset after tripped
 - * Manual : press “RESET” SW
 - * Electrical : control power(A1-A2) off → possible to make remote control by power switch with remote distance
- Self-diagnostic function : “TEST” SW

4. Operational Function

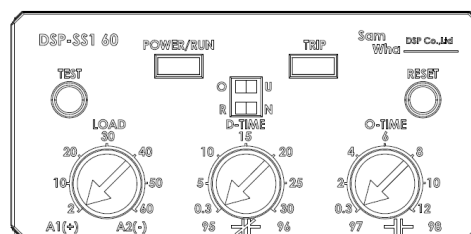
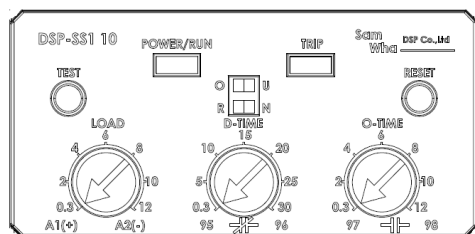
Protection	Operation Time	Description
Over Current	*d-time:0.3 ~ 30sec, *o-time:0.3 ~ 12sec/def T-I	Tripped based on max current among L1,L2 and L3 current
Under Current		
Phase Loss	5sec	To protect phase loss of each phase based on load current
Locked Rotor	d-time + 0.1sec	Tripped in case actual current is greater than 200% of "OC" preset value
Indication	Description	
Operation,Trip	* "POWER/RUN" LED ▶ Control power : Green LED ▶ Normal operation : Red LED ▶ Red LED is flickered in motor starting state ▶ Red LED is flickered in case over current is detected during normal operation * "Trip" LED ▶ "Trip" LED is turned on after o-time is elapsed from over current detection ▶ "Trip" LED is flicked on after is elapsed [d-time + 0.1sec] from locked rotor detection	

5. Technical Specification

Division		Description
Current range	10 Type	▶0.3A ~ 12A : Definite T-I ▶0.3A~6A with external CT
	60 Type	2A ~ 60A: Definite T-I
	External CT Type	1A ~ 600A
Time Preset	Starting trip delay Time(d-time)	0.3~ 30 Sec
	Over current trip delay time(o-time)	0.3 ~ 12 Sec
	Phase loss trip delay time(PLc)	5 Sec
	Locked rotor trip delay time	d-time + 0.1sec
Allowable tollerance	Current	±10%
	Time	±15%
Control power		24 ~ 240VAC
Trip output	Main:95-96,97-98	1a-1b(1-SPDT),250VAC/2A,30VDC/1A, Resistive
Application environment	Temperature	Operation -25°C~+70°C
		Storage -40°C~+80°C
	Humidity	30 ~ 85%,non-condensing

Max Main Conductor Size	25SQ
Screw Torque	Max0.6N.m
Insulation Resistance/IEC-60255-5	100Mohm or more/500VDC, circuit-case
High Voltage Withstand Test/IEC-60255-5	*circuit-case:AC2000V,60Hz, 1 min *contact-contact:AC1000V,60Hz,1min
Lightning Impulse Voltage Withstand Test/IEC-60255-5	*Circuit-Ground,Circuit-Circuit:1.2/50uS, 5KV *Contact-Contact:1.2/50uS, 5KV
1 MHz Burst Immunity Test:IEC 61000-4-18	2.5KV,Positive/Negative under 2sec
Electrostatic Discharge :IEC-61000-4-2	*Air :Level 3, 8KV *Contact:Level 3, 6KV
Radiated Electromagnetic Field Disturbance: IEC-61000-4-3	Level 3, 10V/m
Electric Fast Transient Burst:IEC-61000-4-4	Power, Realy output:Level 4, 4KV
Surge Immunity test:IEC-61000-4-5	Relay output:1.2X50uS,2KV(0 ⁰ ,90 ⁰ ,180 ⁰ ,270 ⁰)
Conducted Disturbence Test :IEC-61000-4-6	10V,Level 3
Installation	DIN rail/Screw
Power Consumption	1W Max

6.Input/Output



Division		Terminal	Description
Input	Control power	A1(+),A2(-)	*24 ~ 240VAC
Output	Main Trip	1a-1b: 95-96,97-98	*Over Current *Locked Rotor *Phase Loss

7. DIP SW Function



Division	Description
O	Over current protection
U	Under current protection
N	Trip output is energized in case control power is loaded(95-96:Open, 97-98:Close)
R	Trip output is not energized in case control power is loaded(95-96: Open, 97-98:Close)
※trip output is not responded for selection of DIP SW in case normal operation is processed	

8. LED Indication

DIV		LED Indication	Description
Control Power		POWER/RUN	Green LED is turned on
Motor operation			Red LED is turned on
Over/Under current protection		POWER/RUN	Red LED is flickerd with 1sec interval during o-time
		TRIP	Yellow LED is turned on
Trip Cause Indication			
Cause		POWER(Green)/RUN(Red)	
Phase Loss	L1	Red LED is turned on continuously by the pattern with 1sec(on)-1sec(off)-1sec(on)	
	L2	Red LED is turned on continuously by the pattern with 1sec(on)-0.5sec(off)-0.5sec(on)	
	L3	Red LED is turned on continuously by the pattern with 1sec(on)-0.5sec(off)-0.5sec(on)-0.5sec(off)-0.5sec(on)	
Locked Rotor		Trip Yellow LED is flickered by the pattern with 1sec(on)-1sec(off)-1sec(on)	

9. How to adjust load knob for over/under current protection

► Over current : select “O” in DIP SW

- ① Fix load knob in the point of max value as rotating a knob clockwise
- ② Make working state for motor, then
- ③ Fix load knob in the point of flickering position for “POWER/RUN” LED as rotating a knob anti-clockwisely, so this point will be matched with 100% load current
- ④ Lastly, fix load knob in the point of turned-off point for “POWER/RUN” LED as rotating load knob clockwise, so this point will be matched with 110%~120% for actual load current which means a completion for protection job

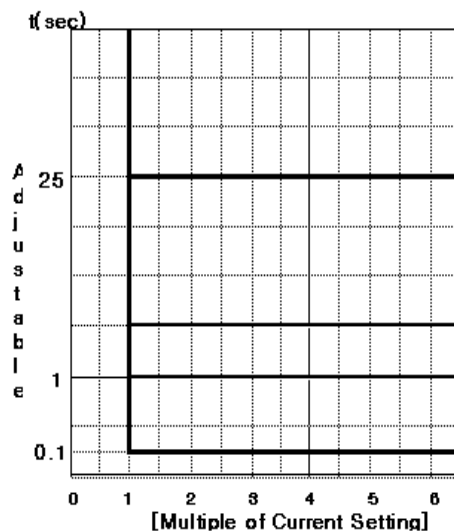
► Under current: select “U” in DIP SW

- ① Fix load knob in the point of min value as rotating a knob anticlockwisely
- ② Make working state for motor, then
- ② Fix load knob in the point of flickering position for “POWER/RUN” LED as rotating a knob clockwise, so this point will be matched with 100% load current
- ③ Lastly, fix load knob in the point of turned-off point for “POWER/RUN” LED as rotating load knob anticlockwisely, so this point will be matched with 80%~90% for actual load current which means a completion for protection job

10. How to do self-diagnostic

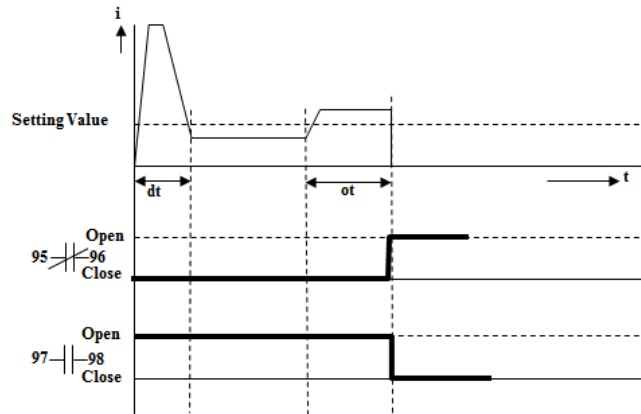
- ① Press “Test” SW for 3sec or more after completing wire connection and presetting o-time
- ② “POWER/RUN” LED is flickered with 1sec interval while o-time is elapsed
- ③ “TRIP” yellow LED is turned on after o-time, simulatenously trip output is energized(output state is changed)
- ④ Make reset as pressing “Reset” SW in order to be ready to operation

11. Time-Current Characteristic : definite

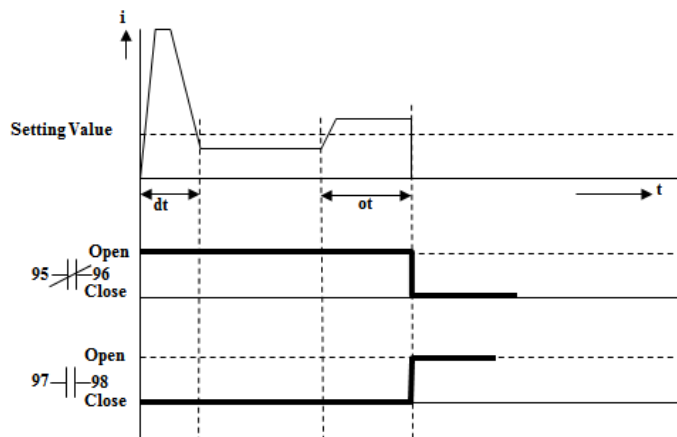


12. Time Based Trip Relay Output

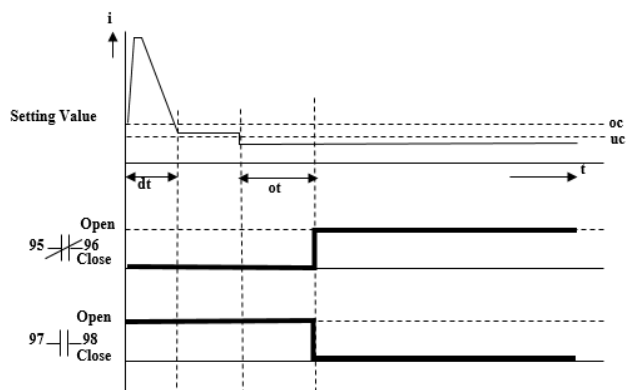
- Over current protection/ “DIP SW” : R



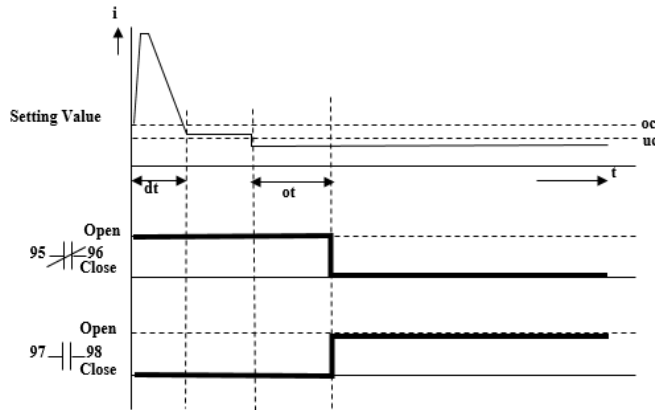
- Over current protection/ “DIP SW” : N



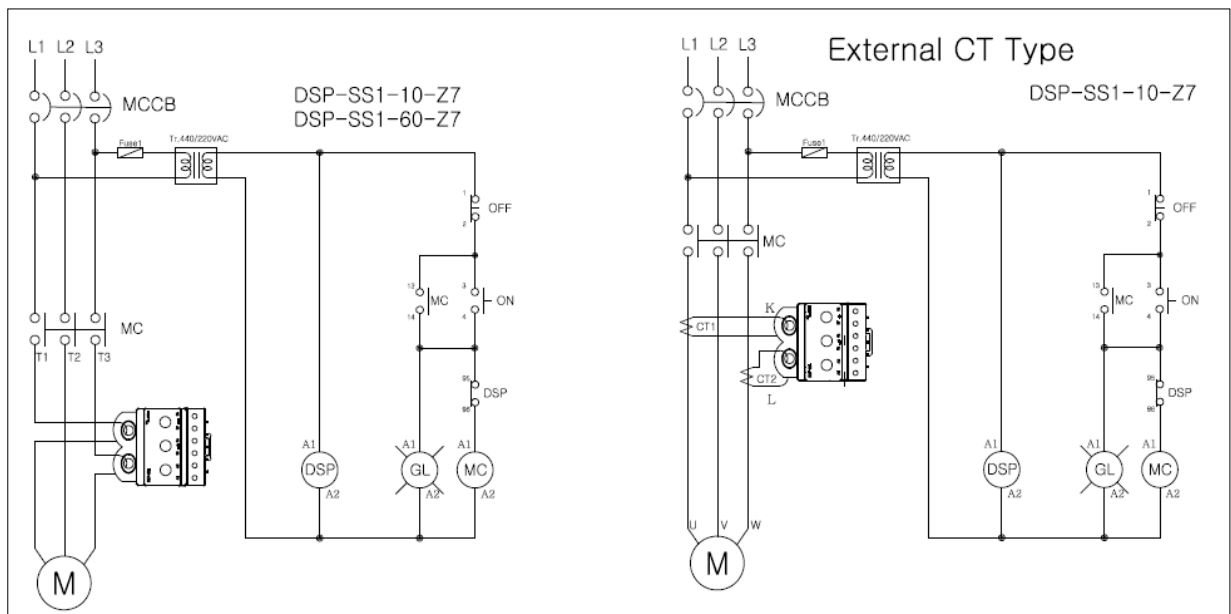
- Under current protection/ “DIP SW” : R



- Over current protection/ “DIP SW” : N



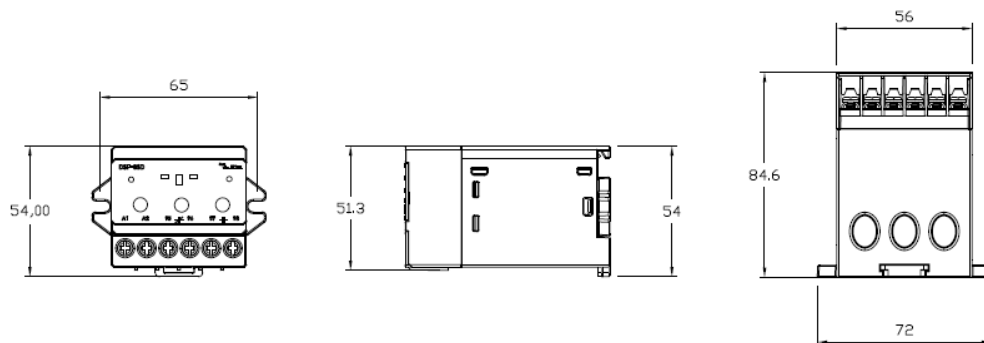
13.Application Sequence Diagram



Note

It is required that external auxiliary power relay shall be matched with trip output of DSP in order to meet large capacity of contactor

14. Dimension



15. Order Form

Item	Reference Code	Description
DSP-SS1	DSP-SS1-10-Z7	Panel Mounting Type, 0.3~12A, assembled with external CT, $\varphi 4 \sim \varphi 40VAC$
	DSP-SS1-60-Z7	Panel Mounting Type, 2~60A, $\varphi 4 \sim \varphi 40VAC$
DSP-SS1-10 + external CT	Basic code + C12	100/5 CT
	Basic code + CC2	150/5 CT
	Basic code + C22	200/5 CT
	Basic code + C32	300/5 CT