

• DSP-POL/M, PTL/M

Power Type(Voltage-Current based) Digital Over Load Motor Protection Relay/Economic Class
 DSP-POL, PTL : Panel Mounting Type
 DSP-POM, PTM : Panel Flush Mounting Type

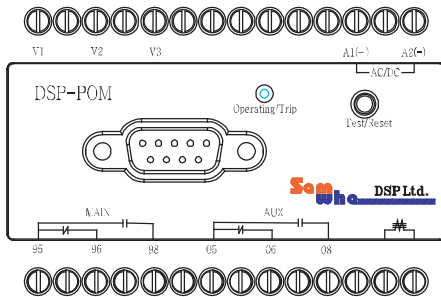
Technical Specification

Division		Description	
Line Voltage		3 phase, AC 100V ~ 600V, 50/60Hz	
Voltage setting range	AC 10V	cover : 10V~50V, under : 70~110V	
	AC 220V	cover : 220V~290V, under : 150~220V	
	AC 380V	cover : 380~450V, under : 310~380V	
	AC 440V	cover : 440V~550V, under : 370~440V	
	AC 480V	cover : 480V~550V, under : 410~480V	
Current setting range	10 Type	0.5 ~ 10A/0.4KW ~ 7.5KW(AC 480V) / 0.5 ~ 6A with external CT	
	70 Type	5 ~ 70A/3.7KW ~ 52KW(AC 480V)	
	External CT	Refer Table	
Ground protection	Zero Sequence Current	30mA~2A *Sensed through external ZCT or embedded ZCT *External CT type must be combined with external ZCT	
Time setting	Starting delay time(dt)	CFF,1 ~300 sec/def, "OFF" selection means inverse curve	
	cover load/current trip delay time(ot)	1~60 sec/def, 5~30class/inv : rdcr curve	
	under load/current trip delay time(ut)	1~30 sec/def	
	Shock/stall trip delay time(st)	0.5~3 sec/def	
	Ground fault starting delay time(Edt)	CFF,1~25 sec/def	
	Ground fault trip delay time(Eot)	0.5~30 sec/def	
	cover/under voltage trip delay time(cuPt)	0.5~30 sec/def	
Allowable tolerance	Current	C<=2A : 0.2A, C>2A : +,- 5%	
	Voltage	+,- 3%	
	Time	t<=2 sec : + - 0.1sec, t>2 sec : +,-,5%	
	Power factor	<±5%	
	KW/KWH	Cos Phi)0.6 : <3%	
Control power		*85VAC~260VAC, 50/60Hz(90VDC~370VDC) *24VAC/DC(optical)	
Trip output Relay	Main	1c(1-spdt), 3A/Resistive	
	Aux	1c(1-spdt), 3A/Resistive	
	GR	1c(1-spdt), 3A/Resistive(Aux output must be set "GR" in Au-c" mode)	
Application environment	Temperature	Operation	-25 OC ~ +70 OC
		Storage	-40 OC ~ +80 OC
	Relative humidity	30 ~ 85%,non-condensing	
Current tolerance against changeable frequency in inverter		Avg ± 3% in 20Hz ~ 400Hz	
Max Conductor Size		25sq	
Insulation Resistance		10Mchm or more/500VDC, circuit-case	
High Voltage Insulation Test		*circuit-case : AC 2000V, 60Hz, 1 min *contact-contact : AC 1500V, 60Hz, 1 minLevel 3 : 10V	
Screw Torque		Max 0.6 N.m	
Frame : IEC/EN 60695-2-12		650°C	
Trip Output : IEC/EN60947-1		690V(Vrms) : 2KV,1 min)	
Electrostatic Discharge : IEC/EN 61000-4-2		Air : Level 3, 8KV, Contact : Level 3, 6KV	
Radiated Electromagnetic Field Emission : IEC/EN 61000-4-3		Level 3, 10V/m	
Electric Fast Transient Burst : IEC/EN 61000-4-4		Power, relay output : Level 4, 4KV, others : Level 3, 2KV	
Surge : IEC/EN 61000-4-5		relay output : 1.2 X 50uS, 2KV (0°, 90°, 180°, 270°)	
Immunity to conducted disturbance : IEC/EN61000-4-6		10V, Level 3	
Voltage variation : IEC-61000-4-11		3ms/0, 300ms/70%	
Current Load Communication : 4 ~ 20mA		Maximum value in 3 phase current : PTM,PTL type	
Consuming power		6W / max	

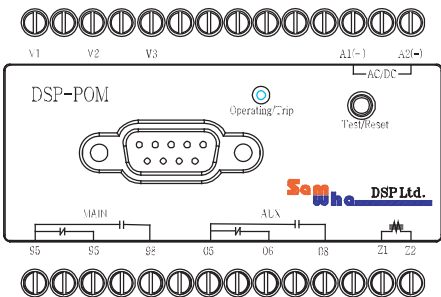
•DSP-POL/M, PTL/M

Input/Output : POL/M Type

▶ External ZCT applied type/possible with external CT



▶ Embedded ZCT type/not possible with external CT



Protection Range

10 Type	C5~1CA	*Possible matched with external CT/C, 2~6A based
70 Type	5~70A	

Trip Output Operation Pattern

Trip output : Main 95-96(b)-98(a), Aux 05-06(b)-08(a)

b is selected in "out" mode : factory default

*control power is "CN" → 95-96(b)-98(a)/output s ae is not changed, C5-C6(b)-C8(a)

*TRIP : 95-96(a)-98(b), C5-C6(a)-C8(b)

a is selected in "cut" mode

*control power is "CN" → 95-96(a)-98(b), 05-06(b)-08(a)

*TRIP : 95-96(b)-98(a), C5-C6(a)-C8(b)

AUX output → : AL/pre-alarm to OC preset value before trip

: Trip factor is selected in "AU-C" mode

: Independent output contact from main trip output

: "ALO" mode : CFF, AL, UC, SFCCK, EC, rP

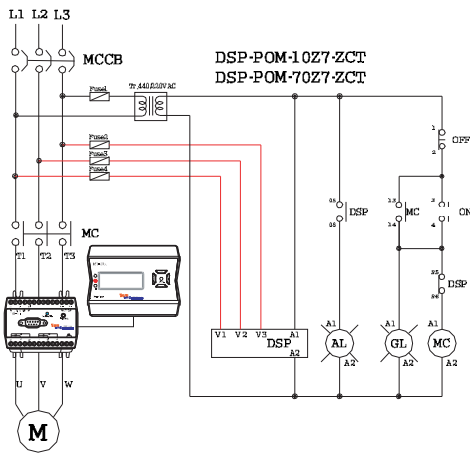
Protection

DIV	Description	Operation time	Remark
Over voltage(OF)	in case the line voltage greater than preset value is sensed	Definite time:0.5~30 sec/adjustable	
Under voltage(UF)	in case the line voltage lower than preset value is sensed	Definite time:0.5~30 sec/adjustable	not available in case of "FL" (Phase Loss)
Over current(OC)	in case the load current greater than preset value is sensed	Definite time:0.5~60 sec/adjustable	
Under current(LC)	in case the load current lower than preset value is sensed	Definite time:0.5~30 sec/adjustable	
Phase loss(FL)	In case one of three phase is a state of phase loss/confirmed by line voltage	1sec	
Phase loss(FLC)	In case one of three phase is a state of phase loss/confirmed by load current	3sec	
reverse phase(rF)	In case the order of incoming phase is changed like "RTS" from "RST"/confirmed by line voltage	0.5sec	
reverse phase(rFc)	In case the order of incoming phase is changed like "RTS" from "RST"/confirmed by load current	0.5sec	
Locked rotor(LC)	In case the starting current greater than 300% of "CC"	0.1sec	
Shock/Stall	In case the 180~700% running current of preset "CC"	0.5~3sec	
Current unbalance(ub)	$[(\text{max current} - \text{min current}) / \text{max current}] \times 100\%$	8sec/adjustable	
Ground fault(EC)	in case the ground fault current greater than preset value is sensed	Definite time:0.5~30 sec/adjustable	

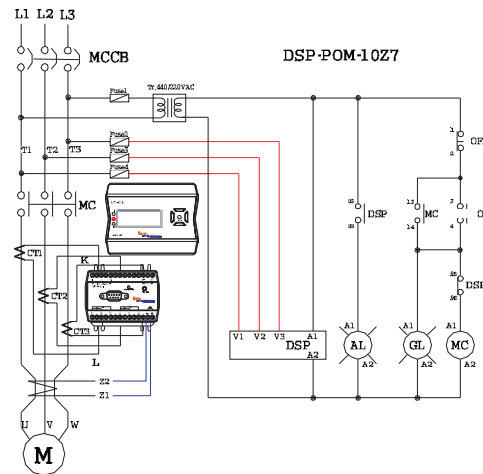
•DSP-POL/M, PTL/M

Application sequence diagram

► Embedded ZCT type/not possible with external CT



► External ZCT type



Trip cause indication

- Preset value check in running state/such mode and preset value are shown alternatively as pressing SET button, and next mode is shown as pressing CLR button
- If trip is happened, trip cause and current value of each phase are stored and able to indicate
- The information of 8 trip is stored and this is able to be checked in Trip mode orderly

Preset Key Operation



Preset Key	Description
1."SET" key	<p>*Press "SET" key to enter into setting mode, then "P0000"(factory default password) is shown</p> <p>*Move cursor from first digit to right end digit by pressing "CLR" key to input password, in the same time make required digit by using "UP","DN" key, finally press once more, then operator meets possible state for preset a number or character of mode.</p> <p>*If there is no input for 15sec or pressing both "SET" and "CLR" key, it can be entered into operating condition.</p>
2.Charged feature of Setting Key	<p>*After entering into possible state for preset, each key acts its job as follows : SET---> backward direction, CLR---> forward direction, UP, DN---> able to select number or character in preset mode.</p> <p>*The previous mode based on setting mode is come out as pressing "SET" key during doing a preset job</p>
3."SET" Key & "CLR" Key/to select MODE	Possible to select Mode by using "SET" or "CLR" key
4."UP" key & "DN" Key/Adjust	*Possible to preset required value as selection a character or number by using UP/DOWN
5."SET" & "CLR" Key/Store	*The storage for preset data is completed by pressing both SET and CLR key in the same time
6."CLR" key	<p>*While each factor is rotated, one of rotated factor is fixed by pressing "CLR" key</p> <p>*After fixing a operating factor, the operator is able to rotate manual one by one as pressing "UP"(forwardly), "DN"(reversely)</p>
To check preset value of each mode during operation	<p>*possible to check value and mode as pressing "SET" key once during operation,</p> <p>*preset value and mode are appeared alternatively</p> <p>*possible to check next mode as pressing "CLR" Key</p> <p>*return to operating mode as pressing both "SET" and "CLR" key or waiting for 15sec without any touch</p> <p>*Not possible to change existed preset value</p>
Test/Reset:"CLR" Key	<p>*to check if this relay is ready to work normally or not.</p> <p>*If "TEST" is appeared in case the operator presses test sw on the converter or "CLR" key or 3 sec or more, then release pressed test sw or "CLR" key</p> <p>*Main 95-56-98 & aux r pt 05-06-08) output will be trip after counting down preset o- time (define 1-1)</p> <p>*In case of display meter type, LED on the converter is flickering after a trip</p> <p>*After making trip, press "CLR" key for the reset action</p>

•DSP-POL/M, PTL/M

🔧 Preset Description

Mode	Function	Description	Factory
FC000	Password	FC000 is shown as pressing SET and need CLR 4 times to enter into mode to be preset	0
Out	to decide initial state of main trip relay	*to make initial state(a or b) of main trip output(95-96-98) when control power is powered *a : normal energized type(95-96(a)-98(b)) *b : normal deenergized type(95-96(b)-98(a)), not charged state	b
USAgE	to decide what kind of operation mode(V,A,V _A)	Power type : "VA", Current type : "A", Voltage type : "V"	VA
LrE	to select a value of line voltage	110/220/380/440/480V	440
PrASE	to select the phase of provided power into the motor	3 phase : "3P", Single phase : "P"	3P
LiArS	to select indication pattern of incoming voltage	*"L" : line voltage:v1,v2,v3 *"A" : average voltage	A
LOAd	To preset a condition for KW calculation for motor protection	*"Pr" : active power measured from V * I * Power factor *"VA" : apparent power/useful for the operation under the inverter	VA
Ct	to select or direct through CT or external CT	5-2((2 times through CT hole), 5-4((4 times through CT hole), 5-1 ~ 5-240(the value of CT ratio, eg: 5-20"→CT 100/5A)	1
CL	to preset a range to protect over load	*10 Type : 3P 440V/0.34[kW]~6.8[kW], *70 Type : 3P 440V/3.42[kW]~48[kW] *Basically calculated by rect 3*V * cos phi *0.9	OFF
OC	to preset a range to protect over current	*10 Type : 0.5A~10A, *70 Type : 5A ~70A	10
OIC	to select time-current characteristics for over current protection	dEF : definite, lrv : inverse	dEF
Ct	to preset operating trip delay time	0.2~60Sec/adjustable	5
dt	to preset starting trip delay time	1.0~300Sec/adjustable	5
LC	to protect Locked Rotor	it is available or selecting ON [operation time : 0.1sec after dt is elapsed], condition for "ON" : start running current is kept on 300% after dt is elapsed	OFF
ShCC	to protect mechanical shock during motor is working	*protection range to CC : followed as below calculation, max 700% •10 Type : 180~[30/CC" value, %] •70 Type : 180~[200/CC" value, %]	OFF
St	to preset a time for shock protection	0.1 ~ 3sec /definite	--
PL	to protect phase loss by line voltage	CN : available, OFF : not available	OFF
FLC	to protect phase loss by load current	CN : available, OFF : not available	OFF
rp	to protect reverse phase by line voltage	CN : available, OFF : not available	OFF
rPC	to protect reverse phase by load current	CN : available, OFF : not available	OFF
OP	to protect over voltage	*to preset a value to protect over voltage concerned with LrE mode *110V:110~150, 220V:220~290V, 380V:380~450V, 440V:440~510V, 480V:480~550V	OFF
UP	to protect under voltage	*to preset a value to protect under voltage concerned with LrE mode *110V:70~110, 220V:150~220, 380V:300~380, 440V:370~440, 480V:410~480V	OFF
CUPI	to preset trip delay time to protect over/under voltage	0.5~30sec/adjustable	2
EC	to preset a range of zero phase current to protect ground fault	protection range : 30mA~2A/adjustable, CFF : disable	OFF
Edt	to preset starting trip delay time	1 ~ 25/adjustable	2
EOt	to preset operating trip delay time to protect ground fault	0.1~30/adjustable	0.5
UL[UC]	to preset a range to protect under current	possible preset range: minimum possible preset current ~ under "OC" preset value	OFF
Ut	to preset trip delay time to protect under current	0.2 ~ 30/adjustable	2
Ub	to preset current unbalance rate(%) among 3 phase	*formular : [(max-min) /max] *100 [%] *range:30% ~ 50% *minimum available current : 0.3A	50
AL-O	to preset a kind of AUX trip output	CFF/EC/Uc/Shcc/AL/EC *CFF samw as main output	OFF
AL	to preset alarm level rate(%) to CC	% range:5%~90%/adjustable ("AL" is preset in "Auc" mode)	90
Alt	to preset a limit of accumulated working time necessary to give alarm.	0.1 hr ~ 65535 hr in 0.1 hr step	6500
rF-C	to start to accumulate KWH or to clear accumulated KWH	*KWH is accumulated in every 0.1hr(6 min) and max value is 9999 KWH *To clear:press "LP" firstly-->keeping pressed "LP"-->nextly,press "DN" key, then keep 1 sec under pressed state of both key, finally release "DN" key earlier than "LP" key	0
dc	to decide max current to charge into 20mA	*to transfer maximum current of 3 phase current into 20mA, and 4mA means zero ampere output/PTM-Type	5
IO-A	to decide additional factor besides basic factor to indicate value orderly	CFF : basic factor, ON : All of the operating factor	OFF
rESet	to decide how to reset trip state	hr : manual reset, AUT : auto reset, available for "CC" trip	hr
Aut	to preset auto reset time	0.1 ~ 300sec/adjustable	0
t-Aut	to preset total possible time available for executing defined times of auto reset	30 ~ 60min/adjustable	30
trIP	to show latest number of 8 trip cause	trip information in order : faulty phase and faulty value is appeared alternatively as controlling "UF" or "DN" key	

•DSP-POL/M, PTL/M

Order Form

DSP-1(Type)-2(Rating current)-3(Control Power)-4(ZCT Embedded)

Item	Reference Code	Description
DSF-PCL	DSF-POL-1CZ7	Farel Mctrlng Type, : 0.5~1CA[0.37 KW~7.5KW/3P 480V, 0.1KW~2KW /1F], 85~260VAC, 50/60Hz(90~370VAC), 0.5~6A with external CT
	DSF-POL-1CZ7ZCT	Farel MctrlngType, : 0.5~1CA[0.37 KW~7.5KW/3P 480V, 0.1KW~2.2KW/1F], 85~260VAC, 50/60Hz(90~370VAC), ZCT embedded/not possible to use external CT
	DSF-POL-70Z	Farel Mctrlng Type, 5A~70A[5.9KW~41.4 KW/3F, 380V], 85~260VAC, 50,60Hz(90~370VAC)
	DSF-POL-70Z7ZCT	Farel Mctrlng Type, 5A~70A[5.9KW~41.4 KW/3F, 380V], 85~260VAC, 50,60Hz(90~370VAC), ZCT embedded
	DSF-VIF5CL-7CZ7	/not possible to use external CT
DSF-PCM	DSF-POM-1CZ7	Farel Flush MctrlngType : 0.5~1CA [0.37 KW~7.5KW/3P 480V, 0.1KW~2.2KW/1F], 85~260VAC, 50,60Hz(90~370VAC), 0.5~6A with external CT
	DSF-POM-1CZ7ZCT	Farel Flush MctrlngType : 0.5~1CA [0.37 KW~7.5KW/3P 480V, 0.1KW~2.2KW/1F], 85~260VAC, 50,60Hz(90~370VAC), ZCT embedded /not possible to use external CT
	DSF-POM-70Z	Farel Flush Mctrlng Type, 5A~70A [5.9KW ~41.4 KW/3F, 380V], 85~260VAC, 50,60Hz(90~370VAC)
	DSF-POM-70Z7ZCT	Farel Flush Mctrlng Type : 0.5~1CA [0.37 KW~7.5KW/3P 480V, 0.1KW~2.2KW/1F], 85~260VAC, 50,60Hz(90~370VAC), ZCT embedded/not possible to use external CT
DSF-PTL	DSF-PTL-1CZ7	Farel MctrlngType, : 0.5~1CA[0.37 KW~7.5KW/3P 480V, 0.1KW~ 2.2KW/1F], 85~260VAC, 50,60Hz(90~370VAC), 0.5~6A with external CT, 4~20mA
	DSF-PTL-1CZ7ZCT	Farel MctrlngType, : 0.5~1CA[0.37 KW~7.5KW/3P 480V, 0.1KW~2.2KW/1F], 85~260VAC, 50,60Hz(90~370VAC), ZCT embedded/not possible to use external CT, 4~20mA
	DSF-PTL-70Z	Farel Mctrlng Type, 5A~70A[5.9KW~41.4 KW/3F, 380V], 85~260VAC, 50,60Hz(90~370VAC), 4~20mA
	DSF-PTL-70Z7ZCT	Farel Mctrlng Type, 5A~70A[5.9KW ~41.4 KW/3F, 380V], 85~260VAC, 50,60Hz(90~370VAC), ZCT embedded /not possible to use external CT, 4~20mA
DSF-PTM	DSF-PTM-0Z7	Farel Flush MctrlngType : 0.5~1CA [0.37 KW~7.5KW/3P 480V, 0.1KW ~ 2.2KW/1F], 85~260VAC, 50,60Hz (90~370VAC), 0.5~6A with external CT, 4~20mA
	DSF-PTM-0Z7ZCT	Farel Flush MctrlngType : 0.5~1CA [0.37 KW~7.5KW/3P 480V, 0.1KW~2.2KW/1F], 85~260VAC, 50,60Hz (90~370VAC), ZCT embedded /not possible to use external CT, 4~20mA
	DSF-PTM-7CZ	Farel Flush Mctrlng Type, 5A~70A [5.9KW~41.4 KW/3F, 380V], 85~260VAC, 50,60Hz(90~370VAC), 4~20mA
	DSF-PTM-7CZ7ZCT	Farel Flush Mctrlng Type : 0.5~1CA[0.37 KW~7.5KW/3P 480V, 0.1KW~2.2KW/1F], 85~260VAC, 50,60Hz(90~370VAC), ZCT embedded /not possible to use external CT, 4~20mA
DSF-XXX	DSF-VIF-XXX-XXXXXXP	Customer made product