Digital Motor Protection Relay

<DSP-COM , CTM>

<New Display Meter : DM Ⅱ>

Sam Wha DSP Ltd.


DM - II

Contents

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1.Abstraction

Installation	Model	Protection	Description
Panel Flush Mounting Type	DSP-COM	Over/Under Current, Phase Loss,Reverse Phase,Locked Rotor, Current unbalance, Ground Fault, Shock/Stall	Password,self-diagnostics, Alarm
	DSP-CTM		Password,self-diagnostics, Alarm , 4～20mA communication

Panel Flush Mounting Type	
Wire Through Type	Wire Terminal Type
	

2. Main Feature

◯ Access restricted to authorized operator: Password
◯ MCU based digital control : precised motor protection
◯ Compact size, Multi-function
*Protection : Over current/Under current/Phase loss/Reverse phase /Locked rotor/Shock(Stall)/Current unbalance,Ground fault
*Indication :Current/L1, L2, L3 , earth current, accumulated working time[AWT], Bar Graph[operating/“oc” preset],Alarm LED,Trip LED
*Current Loop communication
:4~20mA ⇢ CTM Type
◯ To cover a wide and precise current range for the protection
*10 Type : 0.5A ~ 10A or exclusively for external CT/ 0.5A~6A
*70 Type : 5A～70A
*Extended current range with external CT : 1A～3600A
◯ Display for trip cause and operational information in character and/or number : 5 Digit Window
◯ "Shock" protection : useful for instant mechanical shock due to over load when machine is running e.g. crasher, roller, conveyer, etc.
◯ Indication of necessary information every 3 sec
◯ Convenient installation of ZCT to sense a zero-phase current for GF protection
*Standard type : to use external ZCT(200mA/1.5mA)
*Optional type : to use embedded ZCT **(not suitable for external CT application)**
◯ Highly sensitive level and wide range for ground fault protection : 30mA～2A/Zero-phase sequence current
◯ Stable ZCT input from induced current due to variable frequency from other devices by internal active filter.
◯ 4～20mA DC Output for current loop communication :CTM Type
◯ Various trip reset options: Manual, Electrical or Automatic / flexible for automated and sequence machine operation.
◯ Self-diagonostic test by one touch of "SET" key
◯ Alarm before Tripping by over current
◯ Stable operation under frequency variation from Inverter: 30Hz ~ 400Hz.
◯ latest 8 trip events.
◯ To have stable state under the noise environment :connection cable with line noise filter between indication meter and converter/panel flush mounting type
◯ Convenient installation into existed meter hole:65Φ hole or rectangular hole/display meter of panel flush mounting type

3. Function

Protection	Operating time	Description
Over current	• d-time :1～300sec/def. • o-time :Definite/1～60sec :Inverse/5~30 Class	• to protect over current of each phase /L1,L2,L3
Under current	• U-time :1～30 sec/def.	• to protect under current of each phase/ L1,L2,L3
Current unbalance	8 sec	• adjustable:30%～90%: • rate=[(max-min)/max]*100[%]
Phase loss	1~5sec/def.	• to protect phase loss of each phase, L1,L2,L3, based on load current
Reverse phase	within 0.5 sec	• to ptotect reverse phase based on load current
Locked rotor	dt + 0.1 sec	• to protect locked rotor in starting state
Shock/ Stall	0.5～3sec/def.	• to make a trip if preset value is sensed during working • preset range to "OC" :180% ～700%
Ground fault	Edt:1～25sec, Eot:0.1～30sec/def	• to ptotect GF by zero phase sequence current sensed through ZCT
Indication	**Description**	
Rotated indication during the operation	*Indication every 3 sec :3 phae current >> Earth current >> AWT *Load factor : displayed in bar graph[operating current value/preset value of OC“] *AWT : accumulated working time *Possible to fix one of rotated factor or to release :repeated one touch with "CLR" key	
to check and/or to change preset value of each mode during the operation	*Possible to check a value and a mode as pressing "SET" key once during the operation ▸ preset value and mode are appeared alternatively ▸ next mode as pressing “CLR” Key or previous mode as pressing “SET” key *Possible to change a preset value after entering into working state if the preset value of “OPSET” mode belonged to “CAB” mode group is “ON”/ factory default value is “OFF” *Return to operating mode as pressing both “SET” and "CLR" key in the same time or waiting for 15sec(in case of “change”:1min) as storing adjusted value	
Alarm	*Able to make alarm before tripping if actual current is kept over preset alarm rate to "OC" preset value over 3 sec * "AL" & "Preset value %" is shown in the order of alarmed phase rotation as “AL”, % is flickering	
Aux	**Description**	
4～20mA	*Available only for CTM Type *Max current in 3 phase is transformed into 20mA	

	*Zero value is transformed into 4mA *The receiver for 4-20 signal does not need loop voltage

4. Technical Specification

DIV			Description
Load Current range	10 Type		0.5A～10A or external CT(0.5~6A)
	70 Type		5A～70A
	With External CT		1A～3000A
Ground fault Current	Zero phase current		*30mA～2A *sensed through external ZCT or embeded ZCT
Time preset	Starting trip delay time(dt)		1～300 sec/def.
	over current trip delay time(ot)		*1～60 sec/def. *5～30Class/inverse
	under current trip delay time(ut)		1～30sec/def.
	Ground fault starting trip delay time(Edt)		OFF,0.1～25 sec/def.
	Ground fault trip delay time(Eot)		0.1～30 sec/def.
	Shock/stall trip delay time(st)		0.5～3sec/def
	Phase loss trip delay time(PLc)		1~5sec/def
Allowable tollerance	Current		C<=2A:0.2A,C>2A:±5%
	Time		t<=2sec:± 0.2ec, t>2sec:±10%
Control power			*AC100V ～ AC240V,50/60Hz (DC90V ～ DC370V)
			*DC24V(Optional)
Trip output relay	Main:95-96-98		1c(1-SPDT),3A/Resistive
	Aux:05-06-08		1c(1-SPDT),3A/Resistive(possible to alarm output one of Ec/Ec-tb/AL/uc/ Shoc
Application environment	temperature	Operation	-25^{O}C～+70^{O}C
		Storage	-40^{O}C～+80^{O}C
	Humidity		30～85%/relative,non-condensing
Max Main Conductor Size			25SQ
Current tollerance against changeable frequency from inverter			Average +,- 5%,30Hz～400Hz
Screw Torque			Max 0.6 N.m
Insulation Resistence/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 *Control Circuits: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^O,90^O,180^O,270^O)
Conducted Disturbence Test: IEC-61000-4-6	10V,Level 3
Current Loop Communication/ only for CTM Type	Max current value in 3 phase is transformed into 20mA
Power consumption	4W Max

5.Preset Description

▶ Main Mode

Press "SET" key to enter into setting mode ,then enter password.
The more detail is described in "Operation of Control key "

Mode	Function/ range	Description	Factory Setting value
P****	Password	*need to input a number of digit ,"0000" to enter setting mode *need to move a cursor from first digit (1000 unit) to last unit(1unit) to pass over next mode as pushing CLR key(Enter function) 4 times. *possible to change password in "PEdIt" mode in CAB mode group	0000
Out/a/b	to define the pattern of main trip output in initial state	*Trip output : 1c(95-96-98) *a:output state is changed from the original state as the control power is ON/96-96⋯→open,95-98⋯→close *b:output state is not changed from the original state as the control power is ON/96-96⋯→close, 95-98⋯→open *Not possible to change the preset value of this mode in any case during operation even if "OPSET" mode of "CAB" mode group is "ON"	b
ct/setting value	to preset a ratio of external CT	*This mode is available for 10 Type *To preset CT ratio[primary value/5] *CT ratio :1~600 *2t:twice winding through CT hole/0.3~3A *4t:four times winding through CT hole/0.2~2A *1:to sense a current through its own CT or	1

		external CT with 5/5 ratio	
oc/ setting value	to preset a range to protect over current	*current range for over current protection *10 Type : 0.5A～10A or for external CT/ 0.5A～6A *70 Type: 5A～70A	*10:10A *70:70A
dt/OFF/ setting value	to preset starting delay trip time	*Trip delay time to prevent unwanted trip caused by starting current *1～300sec *available over 0.3A(10 Type) or 3A(70 type), otherwise preset dt is not adopted internally	5sec
Otc/deF/ Inv	to select time-current chracteristics for over current protection	*to decide T-I characteristics:deF/Inv *deF(definite):trip based on preset value for “OC” and “ot” *inverse ▸ dt=0 : trip based on cold curve ▸ dt>0 :trip based on hot curve after dt is elapsed (actually dt+calculated time in inverse curve) ▸ Available multiple value in each type to meet 800% in Inverse -10Type:0.5~6A -70Type:5~40A	deF
Ot/ setting value	to preset trip delay time	*to preset time to make a trip when a current exceeds preset value *definite:1sec～60sec *inverse:5～30 Class	5sec
Lc/oFF /on	to protect Locked Rotor	*OFF:disable for this mode *ON:to make a trip in 0.1sec after eleapsed dt("Otc"=def,inv) if starting current exceeds 300% to oc preset value during dt	OFF
Shoc/ oFF/setting value	Shock protection during working	*OFF:disable for this function *preset to "OC":followed calculation/max 700% -10Type:180%～[30/"OC"preset value] % -70Type:180%～[200/"OC" preset value] %	oFF
st/setting value	to preset a time for shock protection	*0.5～3sec/def. *this mode is shown as "--" if shock mode is disable	"--"
PLc /oFF/ on	to protect phase loss by load current	*OFF:disable *1～5sec/adjustable:to make a trip to protect phase loss based on load current	3
RPc /oFF/ on	to protect reverse phase by load current	*OFF:disable *ON:to make a trip to protect reverse phase based on load current within 0.5sec	OFF
Ec/oFF/ setting value	to preset zero phase current	*for ground fault protection *OFF:disable *sensitive range:30mA～2A	OFF

Edt/oFF/ setting value	to preset starting trip delay time	*definite T-I *preset range :1～25sec *this mode is shown alternatively as "Edt" & "--" if “Ec” mode is disable”	2
Eot /setting value	to preset operating trip delay time for GF protection	*0.1～30sec/def. *this mode is shown alternatively as "Eot" & "--" if "Ec" mode is disable”	"--"
uc/oFF/ setting value	to preset a range to protect under current	*preset range ▸10 type : 0.4A～under "OC" preset value ▸70 type : 4.9A～under "OC"preset value	OFF
ut/setting value	to preset trip delay time for under current	*1～30sec	"--"
ub/oFF/ value	to define current unbalance rate	*to protect current unbalance among each phase *calculation : [(max-min)/max]*100[%] *preset range : 30%～90%	OFF
Au-o/oFF/ Ec/Ec-tb/ AL/uc/ Shoc/	to preset a kind of AUX(07-08 -10) trip output	*oFF:to make same output as main trip *trip output for AL/Uc/Shoc/Ec is independent from main trip and selected factor is not available in main trip,also if trip cause is clear, this trip output is reset naturally *Ec:only for ground fault protection *Uc:only for under current protection *shoc:only for shock protection *AL:only for alarm to oc before trip *Ec-tb: only for ground fault protection ,but reset is not happened even though trip cause is clear, also trip is stored in “trip” mode as a one of 8 latest event	OFF
AL/ setting value	to preset alarm level rate(%) to “OC”	*if other factor except "AL" in ”Auo” mode is preset, this mode is shown “- -“ *preset range to"OC" :15%～100% *alarm is come out as the condition of preset alarm % is keeping for 3 sec or more → “95” point LED in bar graph and “AL” are flickering together	90
ALt/ setting value & Clear	to preset a limit of accumulated working time necessary to give alarm & clear	*possible to preset a value between 0.1 hr～6553.5 hr by 0.1 hr unit *able to accumulate time in case available current assumed normal operation is sensed at least *indicated value is flickering as preset value is elapsed *To clear and to preset new value:enter into “ALT” mode in motor stop state, then put new	6500

		required value by using "UP","DN" and come out the operation mode by pressing both "SET" & "CLR",lastly clear and new value preset is done in the same time	
dc	to decide max current to change into 20mA	*Available only for CTL/CTM Type *to transfer maximum current of 3 phase current into 20mA and 4mA means zero ampere output *Primary current is transformed in case external CT is used. *The receiver for 4-20 signal does not need loop voltage	5
rota/ oFF/on	to decide a number of indicated factor in the order	*OFF:3 phase current(L1,L2,L3),GF current *ON:[3 phase current] ,GF current] + [AWT] *interval time between each displayed factor : 3sec	oFF
rESEt/Hr/AuL-#	to decide how to reset trip state	*Hr:manual reset/Password input → main trip, Ec-tb trip(Aux) *Er:electrical reset :"Reset" key :"CLR" Key :Control power-off *AuL-#(n times):Auto reset by followed condition/max n=9 :n=1:possible to do only by entering password :n>1 ▸ 1(once)～(n-1) times: reset automatically according to preset reset time without entering password ▸ n(last times) :possible to do only by entering password :reset is done if control power is off, but trip state(password lock state) is kept on again if the control power is on *Password reset:reset is done by comming out from operating mode after input password *Auto:only available for "OC" trip	Er
Aut/ setting value	to preset auto reset time	*time range :0(instant),0.1sec,1～300sec *If Hr is preset in "rESEt" mode, this mode becomes disable	"--"
t-Aut/ setting value	to preset total possible time available for executing defined times of auto reset	*possible total allowable time to have the preset number of auto reset *time range:30min~60min *only possible for over current trip *the preset time is counted from the instant of first trip and return to the preset condition for auto reset after the allowable time is elapsed *Password lock in Auto Reset :able in case the preset number of auto trip is done within preset total reset time :otherwise, the counted number of trip time is initialized to previous preset value	"--"

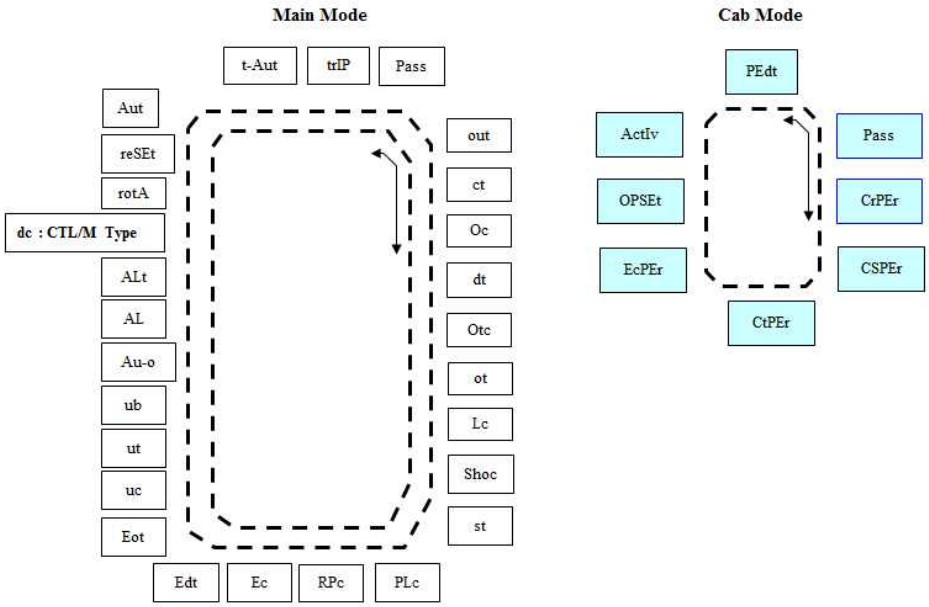
		*If Hr & Er are preset in "rESEt" mode,this mode becomes disable	
trIP /8 ~1/trip cause / trip value	to show latest number of 8 trip cause	*to show the number of 8 trip cause in the order *press "UP" or "DN" in the "trip" mode state, then trip cause and value is shown alternatively *press "CLR" or ""SET" to check next event or previous event *In order to enter setup state on the way of trip condition, press "DN" under pressing "UP" firstly and release "DN" firstly under pressing "UP", finally release "UP"	"--"
Test	*to check if this relay is ready to work normally or not. *"tESt" is appeared in case the operator presses test sw on the converter or "CLR" key for 3 sec or more, then release pressed test sw or "CLR" key *main(95-96-98) & aux trip(05-06-08) output will be trip after counting down preset o-time		

▶ Cab(calibration) Mode This mode is appeared as pressing "SET" key for 5 sec or moe ,and is disappeared as "SET' key once more is disappeared as "SET' key once more

Mode	Function/ range	Description	Factory Setting value
P****	Password Input	*need to input password to adjust this mode group so that authorized person may be able to adjust. *How to input is same as it of main mode	0000
CrPEr	to have a calibration for phase "R" current	*Possible to adjust within +,- 0.1A~ 10A by using "UP"."DN" key.	0
CSPEr	to have a calibration for phase "S" current		0
CtPEr	to have a calibration for phase "T" current		0
EcPEr	to have a calibration for GF current	*Possible to adjust within +,- 50% by using "UP"."DN" key.	100
OPSET /ON/ OFF	to decide if a preset value can be changed or not during	*ON:possible to change a preset value during normal operation *OFF: not possible to change a preset value during normal operation *This mode can not interfere “out” mode in any	OFF

	normal operation	case	
ActIv/ 50/60	to decide for power system frequency	*to decide a power system frequency for active filter (LPF) to be activated inside ZCT input to reduce induced current from next device *50 : 50Hz power system *60 : 60Hz power system	60
PedIt	to change Password	*Possible to enter new digit by using "UP" or "DN" key after positioning a cursor on the required digit as using “SET" & "CLR" key with directional job *How to complete password change:firstly press "CLR" key to come out "setting mode" ,then press both "SET" & "CLR" key	0000
42d04	to have a calibration for lower level of 4~20mA output	*adjustable range : ± 0 ~ 19	0
42d20	to have a calibration for upper level of 4~20mA output	*adjustable range : ± 0 ~ 19	0

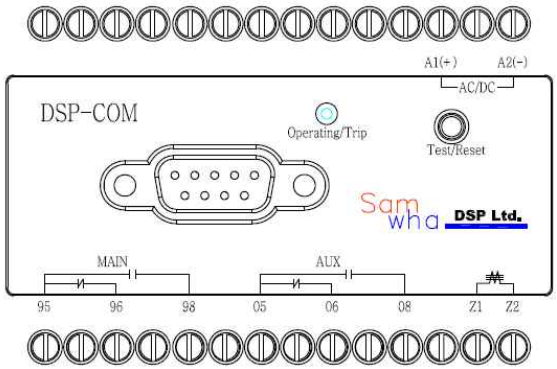
6. The order of Rotated Mode



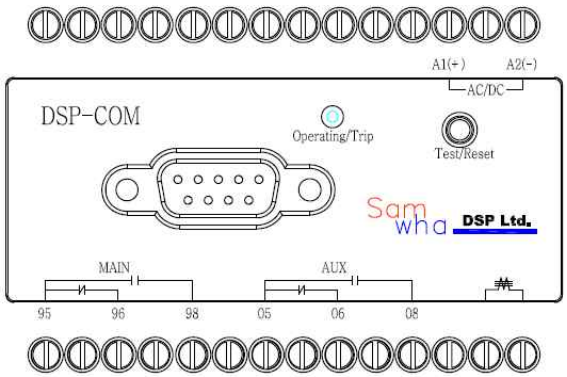
7.Input-Output terminal

○ DSP-COM/CTM

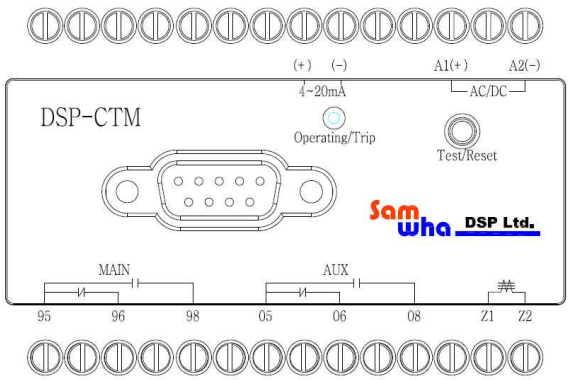
▸ External ZCT Type



▸ Embeded ZCT Type



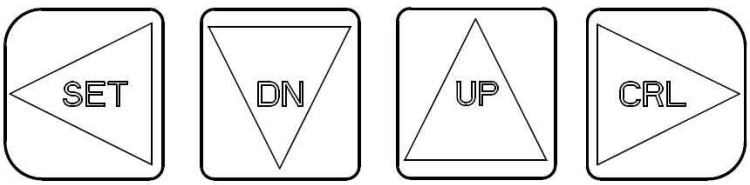
○ DSP-CTM/External ZCT Type



DIV	Feature	Terminal	Description
Input	Control	A1(+),A2(-)	*85～260VAC,50/60Hz

	power		*90～370VDC	
	Z1,Z2	ZCT	*200mA/1.5mA in case using external ZCT : Basic Type *with Embeded ZCT :Optional Type	
State Indication	RED		Operating	Available for the converter of display meter type
	Green		Power/Stop	
	Yellow		Trip	
Output	Main Trip	*1c:95-96-98	*Over Current *Under Current *Locked Rotor *Phase Loss *Reverse Phase *Ground Fault *Current Unbalance *Shock/Stall	
	Aux trip	1c:05-06-08	*Au-o/oFF/Ec/AL/uc/Shoc/Ec-tb *Selected factor is excluded from main trip	
	420	+ , -	*4～20mA/DC *Available for CTL/CTM Type	

8. Operation of Control key



1."SET" key	*Press "SET" Key to enter into setting mode, then "P0000" (factory default password) is shown *Move cursor from first digit to right end digit by pressing "CLR" key,finally press once more, if password is not changed from factory default value, but if password is changed, then make required digit by using "UP","DN“ key untill operator meets changed password. *If there is no input for 15sec or pressing both "SET" and "CLR"key, it can be entered into operating condition.
2.Changed feature of Setting Key	*After entering into posible state for preset , each key acts its job as follows :SET→backward direction ,CLR→foward direction,UP.DN→able to select number or character in preset mode. *The previous mode based on setting mode is come out as pressing "SET" key during doing a prest job

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 or after 15sec is elapsed
6."CLR" key	*While each factor is rotated, one of rotated factor is fixed by pressing "CLR" key *After fixing a operating factor, the operator is able to rotate manually one by one as pressing "UP"(forwardly),DN"(reversely)
to check and/or to change preset value of each mode during the operation	*Possible to check a value and a mode as pressing "SET" key once during the operation ▸ preset value and mode are appeared alternatively ▸ next mode as pressing “CLR” Key or previous mode as pressing “SET” key *Possible to change a preset value after entering into checking state if the preset value of “OPSET” mode belonged to “CAB” mode group is “ON”/factory default value is “OFF” *Return to operating mode as pressing both “SET” and "CLR" key in the same time or waiting for 15sec(in case of “change”:1min) as storing adjusted value
Test/Reset:"CLR" Key	*to check if this relay is ready to work normally or not. *"tESt" is appeared in case the operator presses test sw on the converter or "CLR" key for 3 sec or more, then release pressed test sw or "CLR" key *main(95-96-98) & aux trip(05-06-08) output will be trip after counting down preset o-time(definite T-I) *In case of display meter type, LED on the converter is turned on after a trip *After making trip, press "CLR" key for the reset action
The centered LED of Control key	This is turned on in case 485(for CCL type) is executed normally

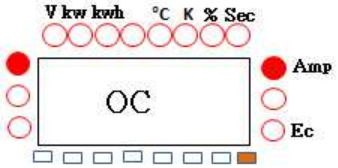
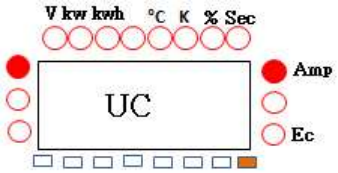
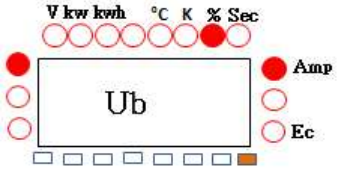
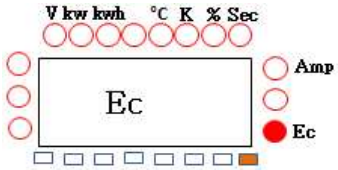
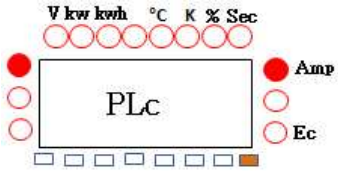
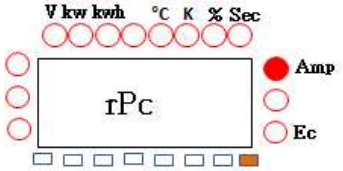
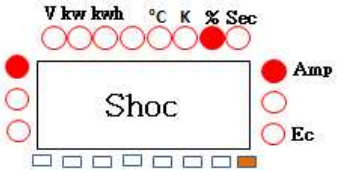
Note

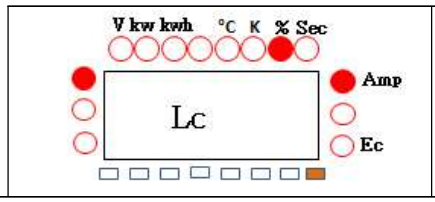
1.The operator will has to give an attention in order to apply for the function of preset “OPSET” mode which the operator is possible to change preset value of each mode while normal the operation is executed normally because the unwanted trip may be happend

2.The operator can not preset “out” mode in any case concerned with “OPSET” mode

9. Trip Indication

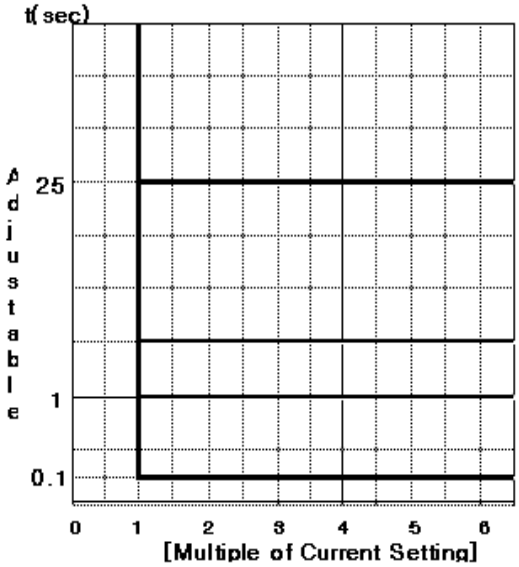
Trip cause and caused value is appeared alternatively,and “100%” point LED in bar graph is flickering in the same time

Trip	Display	Cause
Over current(oc)		*trip caused by over current in phase L1
Under current(Uc)		*trip caused by under current in phase L1
Current unbalance		*trip caused by unbalanced current in phase L1
GF		*trip caused by ground fault current
Phase loss		*trip caused by phase loss of phase L1 in load part
Reverse phase		*trip caused by reverse phase in load part
Shock/stall		*trip caused by instant shocking current in load part
Locked Rotor		*trip caused by locked rotor current in phase L1 during motor starts

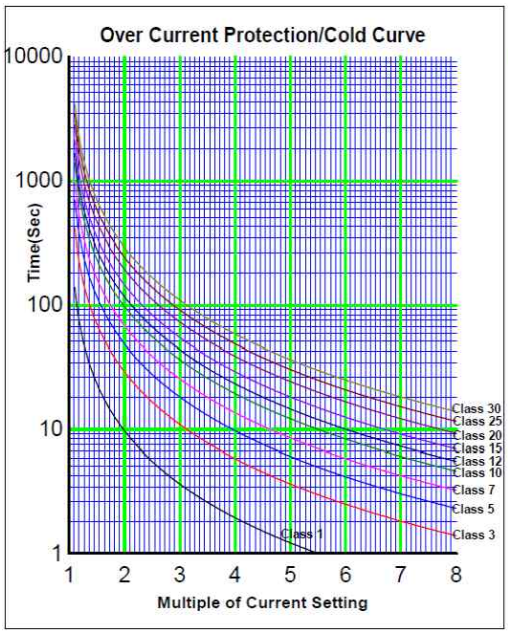


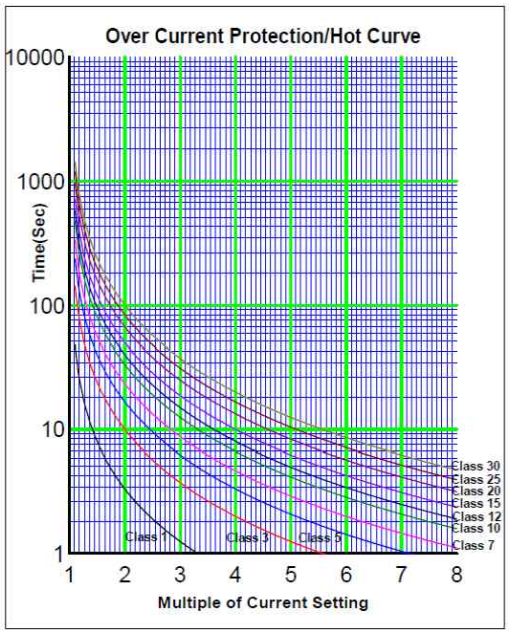
11.T-I Characteristcs

▸ Definite



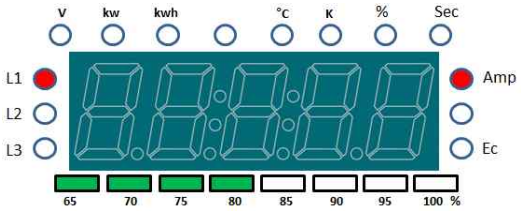
▸ Inverse



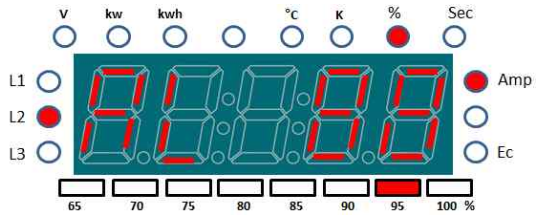


12. Rotated indication

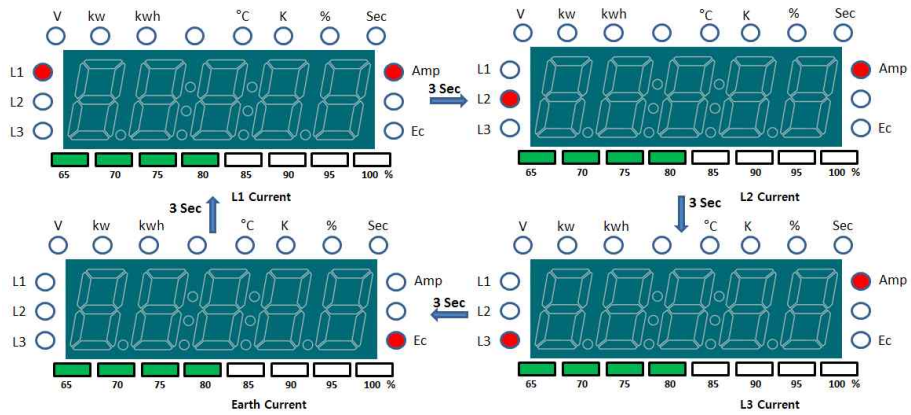
▸ Bar Graph : the % value with 5% point unit is shown based on the formular, [(actual current value/“OC” preset value)*100], under the range of 65~100% while a motor is working



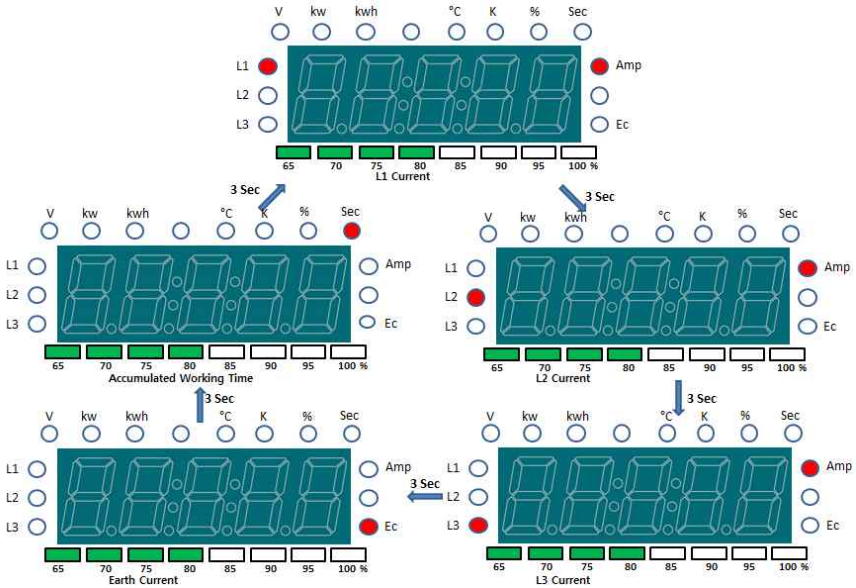
▸ “95%” point LED and “AL” are flickering without turning on bar graph LED if the preset alarmed level to “oc” is happened



▸ Each phase current(L1,L2,L3)>GF current:"rota" mode/OFF

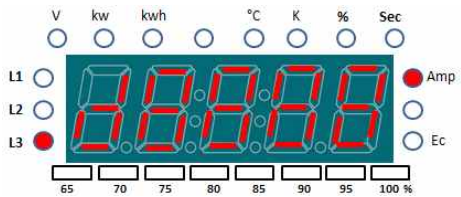


▸ Each phase current(L1,L2,L3)>GF current>AWT> :"rota" mode/ON



▸ Indication during d-time for mortor starting

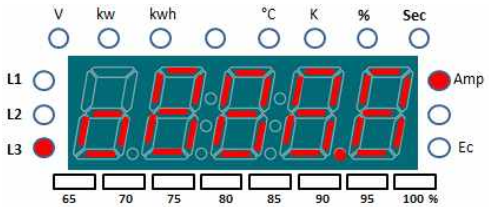
→ “d & Current value” is indicated if “d-time” is executed for mortor starting, but “d” is flickering in every 1sec



▸ Indication during preset operating time before trip in followed each case

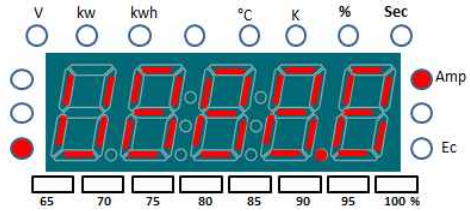
● “OC” trip

→ “o & Current value” is indicated if “o-time” is executed for over current protection ,but “o” is flickering in every 1 sec



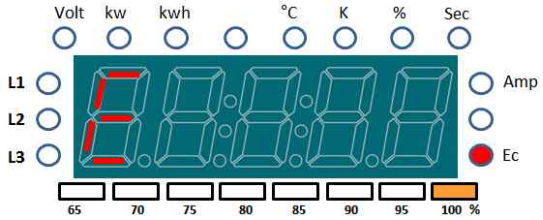
● “UC” trip

→ “u & Current value” is indicated if “u-time” is executed for under current protection ,but “u” is flickering in every 1 sec

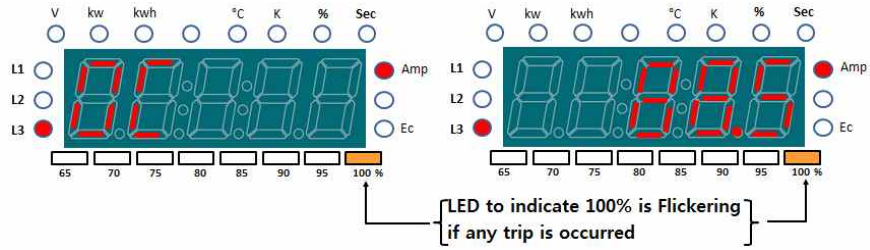


● “Ec” trip

→ “E & Ec Current value” is indicated if “u-time” is executed for under current protection ,but “u” is flickering in every 1 sec

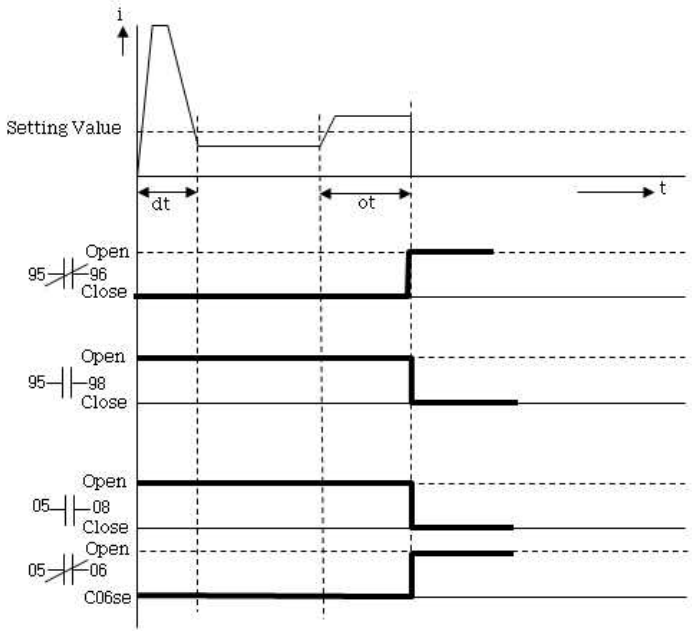


▸ Indication after trip in every each case is that “trip cause” and “trip value” are shown alternatively as “100%” point LED in bar graph is flickering

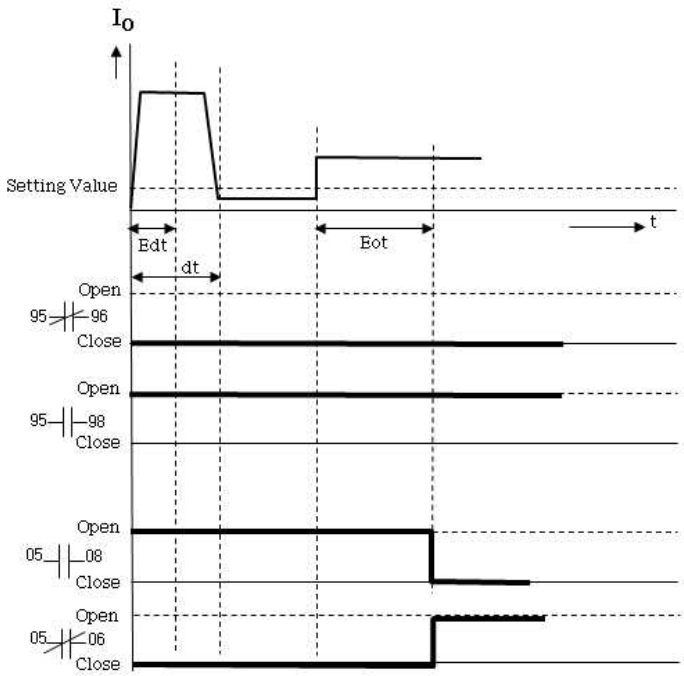


13. Time Based Trip relay Output

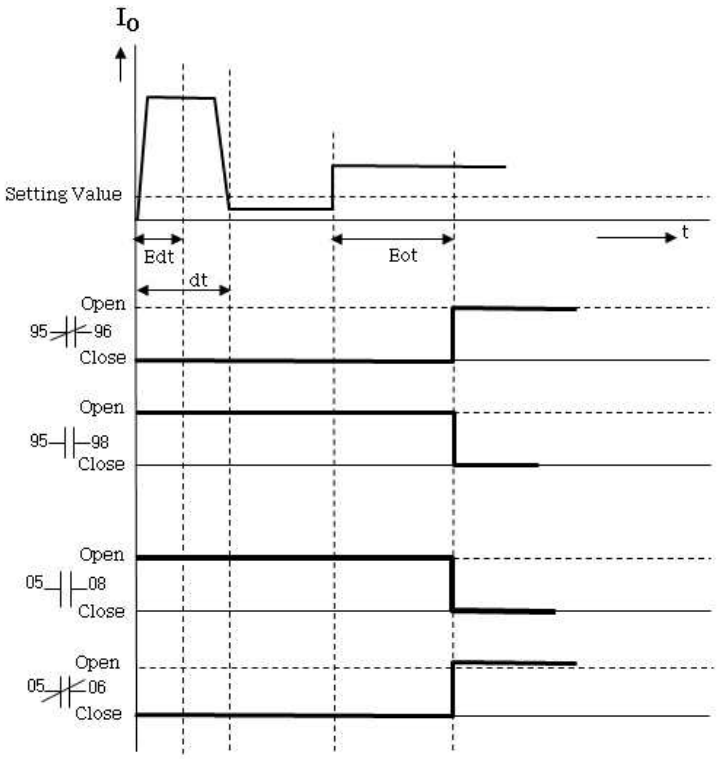
- Over current protection/"Au-o" mode:OFF/“out” mode:b



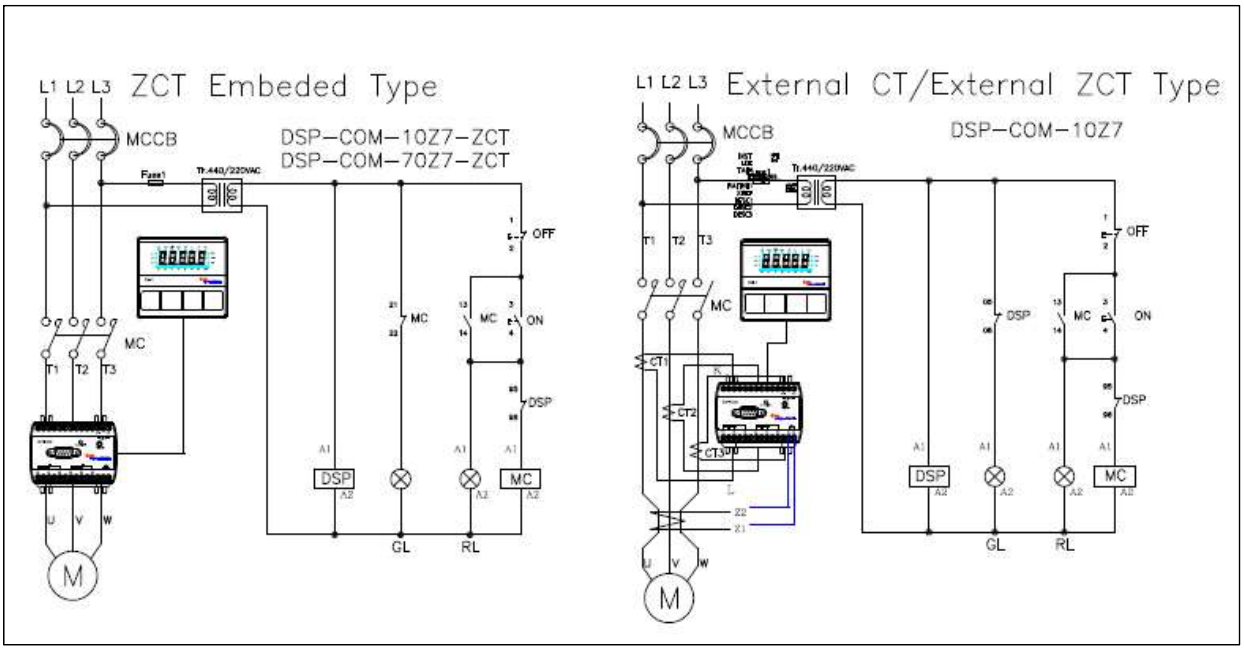
- GF protection/"Au-o" mode:Ec(05-06-08)



- GF protection/"Au-o" mode:OFF(05-06-08)

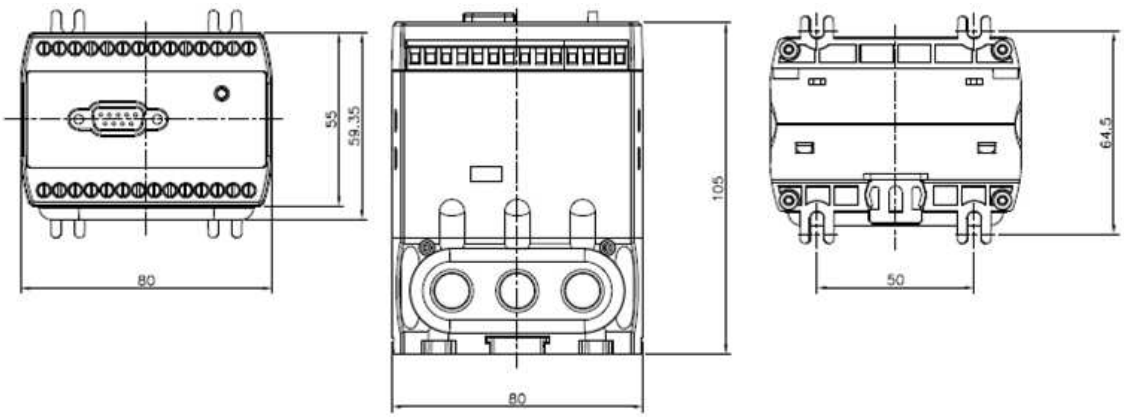


14. Application Sequence Diagram

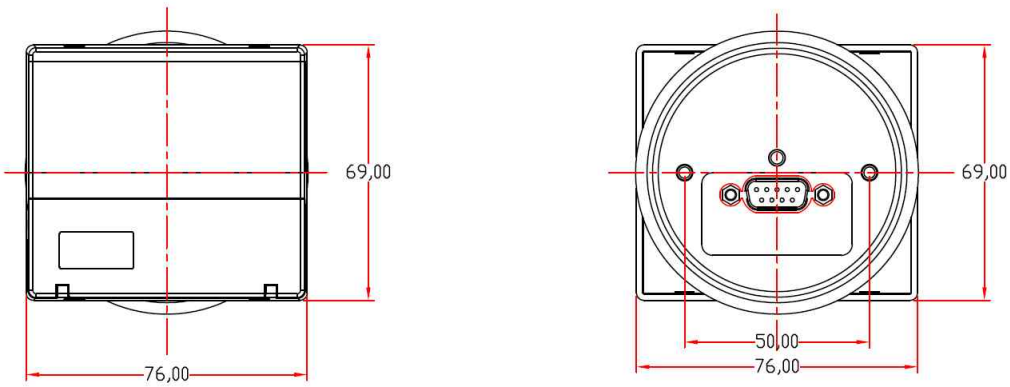


15. Dimension

- Converter



- Display Meter



16. Order form

DSP-1(Type)-2(Rating current)-3(Control Power)-4(ZCT Embeded)-P(Optional)

Item	Reference Code	Description
DSP-COM	DSP-COM-10B-I	Panel Flush Mounting Type,0.5A~10A, External CT/0.5A~6A , 24VDC with Isolation Mode,available for external ZCT/200mA/1.5mA
	DSP-COM-70B-I	Panel Flush Mounting Type,5A~70A,24VDC with Isolation Mode,available for external ZCT/200mA/1.5mA
	DSP-CTM-10B-I	Panel Flush Mounting Type,0.5A~10A, External CT/0.5A~6A , 24VDC with Isolation Mode,available for external ZCT/200mA/1.5mA, 4~20mA
	DSP-CTM-70B-I	Panel Flush Mounting Type,5A~70A,24VDC with Isolation Mode,available for external ZCT/200mA/1.5mA,4~20mA
DSP-CTM	DSP-COM-10B-ZCT-I	Panel Flush Mounting Type,0.5A~10A, External CT/0.5A~6A , 24VDC with Isolation Mode,ZCT embeded
	DSP-COM-70B-ZCT-I	Panel Flush Mounting Type,5A~70A,24VDC with Isolation Mode,ZCT embeded
	DSP-CTM-10B-ZCT-I	Panel Flush Mounting Type,0.5A~10A, External CT/0.5A~6A , 24VDC with Isolation Mode,ZCT embeded,4~20mA
	DSP-CTM-70B-ZCT-I	Panel Flush Mounting Type,5A~70A,24VDC with Isolation Mode,available for external ZCT/200mA/1.5mA,4~20mA
DSP-COM	DSP-COM-10Z7	Panel Flush Mounting Type,0.5A～10A, 85～260VAC,50/60Hz(90～370VDC),able to use external CT,able to use external ZCT
	DSP-COM-70Z7	Panel Flush MountingType, 5A～70A,85～260VAC,50/60Hz(90～370VDC),ble to use external ZCT
	DSP-COM-10Z7-ZCT	Panel Flush MountingType, 0.5A～10A,85～260VAC,50/60Hz(90～370VDC), Embeded ZCT/inable to use external CT
	DSP-COM-70Z7-ZCT	Panel Flush Mounting Type,5A～70A,85～260VAC,50/60Hz(90～370VDC), Embeded ZCT/inable to use external CT
DSP-CTM	DSP-CTM-10Z7	Panel Mounting Type,0.5A～10A, 85～260VAC ,50/60Hz(90～370VDC),able to use external CT,able to use external ZCT, 4～20mA
	DSP-CTM-70Z7	Panel MountingType, 5A～70A,85～260VAC, 50/60Hz(90～370VDC),able to use external ZCT,4～20mA
	DSP-CTM-10Z7-ZCT	Panel MountingType, 0.5A～10A,85～260VAC, 50/60Hz(90～370VDC), Embeded ZCT/inable to use external CT,4～20mA
	DSP-CTM-70Z7-ZCT	Panel Mounting Type,5A～70A,85～260VAC

		,50/60Hz(90～370VDC),Embeded ZCT/inable to use external CT,4～20mA
Optional Order	DSP-VIPXXX-XXXX XXX-P	*Customised Software
Terminal Type	Basic reference code +T	Three terminal through CT hole of each phase is composed with one body

*Accessory

Item	Refeence	Description	Remarks
Cable	DSP -CABLE-12	1.2m	
	DSP -CABLE-18	1.8m	
	DSP -CABLE-30	3m	
	DSP -CABLE-50	5m	
ZCT	DSP -ZCT--XX	100mA/1.5mA	XX:Inner diameter of ZCT
Display Meter	DSP −ID-DM II	Input device/Display Meter	