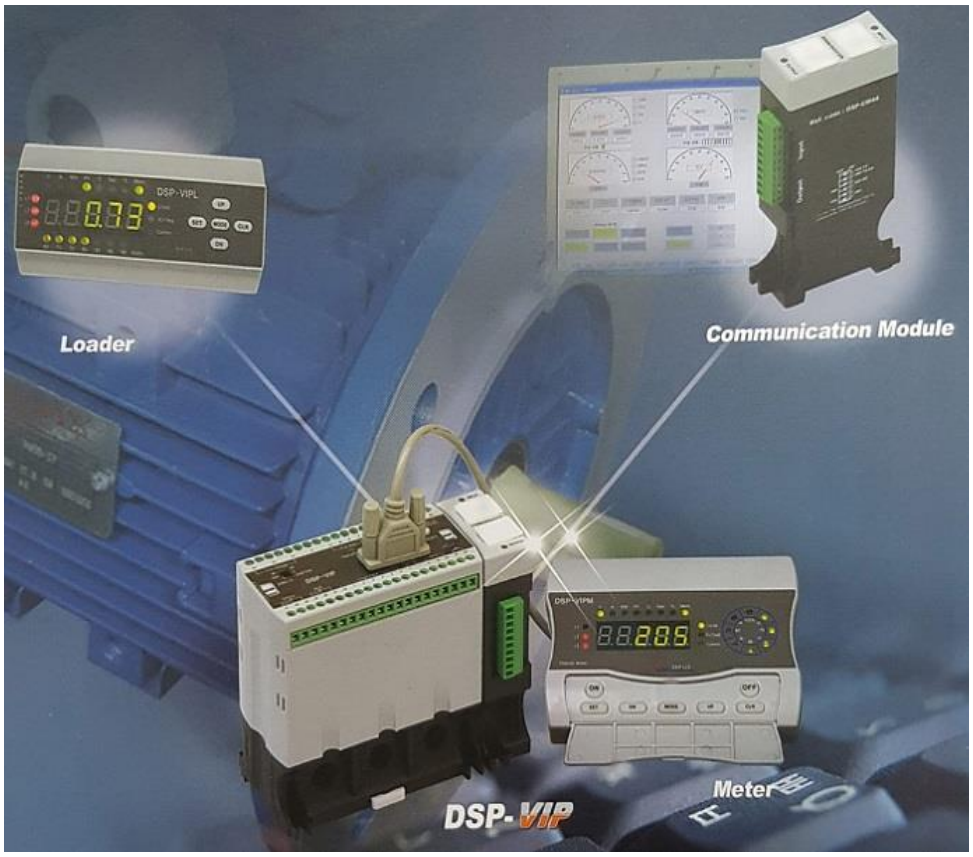
Digital Motor Protection Relay

<DSP-AOM>

<New Display Meter : DM Ⅱ>



Sam Wha DSP Ltd.


DM-II

Contents

Digital Motor Protection Relay

<DSP-AOM>

<New Display Meter : DM II>

1.Abstraction

Installation	Model	Protection	Description
Panel Flush Mounting Type	DSP-AOM	*Over/Under Current *Phase Loss *Reverse Phase *Locked Rotor *Current Unbalance, *Ground Fault	Password, Self-diagnostics,Alarm

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/Current unbalance,Ground fault
*Indication :Current/L1-L2- L3 , earth current, Bar Graph[operating/preset “oc”] ,Alarm ,Trip
◯ To cover a wide and precised current range for the protection
*10 Type
▸0.5A～10A:definite T-I
▸0.5A~6A:inverse T-I/800% or exclusively for external CT
*70 Type : 5A～70A
▸5A～70A:definite T-I
▸5A~ 40A:inverse T-I/800%
*Extended current range with external CT : 1A～1200A
◯ To show a trip cause and operation information in character and/or number : 5 Digit Window
◯ To indicate a necessasary information in every 3 sec
◯ Possible to use various rated ZCT to sense a zero phase current for GF protection
*Standard type : to use external ZCT

Type	External ZCT
DSP-AOM-V	200mA/100mV
DSP-AOM-A	200mA/1.5mA

*Optional type : to use embedded ZCT**(not available for external CT application)**
◯ Highly sensitive level and wide range for ground fault protection : 50mA～2A/ Zero-phase sequence current
◯ Active low pass filter for Z1-Z2 input/to be stable from induced current from power system
◯ Alarm for disconnection with ZCT:in case ZCT is not connected with Z1,Z2 of the converter in motor stopping state after the control power is on initially, “Ec-ct” is flickered 3 times as a alarm, and the preset is continued to next mode → Only available for AOM-A Type
◯ Various way to reset after trip: Manual,Electrical or Automatic /to response flexibly for applied sequence system
◯ To keep a stable operation under frequency variation from Inverter : 30Hz ～ 300Hz
◯ Self-diagnostic test by one touch for "CLR" key
◯ Alarm before Tripping by over current
◯ Latest 8 trip events
◯ To have stable state under the noise environment :connection cable with line noise filter between display 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
Ground fault	Edt:1～25sec, Eot:1～30sec/def	·to protect GF by zero phase sequence current sensed through ZCT
Indication	**Description**	
Rotated indication during the operation	*Indication in every 3 sec :3 phase current >> Earth current *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 10sec 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 flickeing in such order of alarmed phase in the rotation	

4. Technical Specification

DIV		Description
Load Current range	10 Type	*0.5A～10A:definite T-I *0.5A~6A:inverse T-I/800% or exclusively for external CT
Load Current range	70 Type	*5A～70A:definite T-I *5A~ 40A:inverse T-I/800%
Load Current range	With External CT	1A～1200A

Ground fault Current	Zero phase current		*50mA～2A *sensed through external ZCT or embeded ZCT *External CT type is not possible to use embeded ZCT *External ZCT ▹V Type : 200mA/100mV ▹A Type : 200mA/1.5mA
Time preset	Starting trip delay time(dt)		1～300 sec/def.
	Over current trip delay time(ot)		*1～60 sec/def. *5～30 Class/inverse
	Under current trip delay time(ut)		1～30sec/def.
	Ground fault starting delay time(Edt)		OFF,1～25 sec/def.
	Ground fault trip delay time(Eot)		1～30 sec/def.
	Phase loss trip delay time(PLc)		1~5sec/def
	Shock/Stall		0.5~3sec/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 (DC 90V ～ 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
Current tollerance against changeable frequency from inverter			Average +,- 5%,30Hz～300Hz
Max Main Conductor Size			25SQ
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°,90°,180°,270°)

Conducted Disturbence Test:IEC-61000-4-6	10V,Level 3
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(1000unit) 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:1~240 *2t:twice winding through CT hole/ available range:0.3A~3A *4t:four times winding through CT hole/ available range:0.2A~2A *1:to sense a current through its own CT or external CT with 5/5 ratio *”UC” mode is naturally “OFF” if 2t ,4t is preset , so it is necessary to try to preset “UC” mode again	1
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 time	*Trip delay time to prevent unwanted trip caused by starting current *1～300sec *available for sensing current over 0.2A , 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 : 800% -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 *This mode becomes disable if “dt=0” and “Inv” preset in “otc” mode,so this function is processed by “Inv” chracteristics	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%～[210/"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 *This function is available after 2 min(120sec) if “dt=0” and “Inv” preset in “otc” mode	"--"
PLc /oFF/ setting value	to protect phase loss by load current	*OFF:disable *1～5sec/adjustable:to make a trip to protect phase loss based on load current	OFF
RPc /oFF/ setting value	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	*to protect for ground fault protection *OFF:disable *sensitive range:50mA～2A *Possible to select one of both rating for ZCT :AOL/M-V type:200mA/100mV :AOL/M-A type:200mA/1.5mA *Possible to make alarm for ZCT disconnection in motor stop state: “Ec-ct” is flickered 3 times as a alarm, and the preset is continued to next mode	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”	"--"
Eot /setting value	to preset operating trip delay time for GF protection	*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 • 10Type : 0.4A～under "OC" preset value • 70Type : 4.9A～under "OC" preset value *”UC” mode is naturally “OFF” if 2t ,4t is preset , so it is necessary to try to preset “UC” mode again	OFF
ut/setting value	to preset trip delay time for under current	*trip in preset time after dt is elapsed *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/ AL/uc/ Ec-tb	to preset a kind of AUX (07-08-10) trip output	*oFF:to make same output as main trip *trip output for AL/Uc 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 *AL:only for alarm to oc before trip *Ec-tb: only for ground fault protection,but this is not reset even if trip cause is clear,also main trip is acted with this aux trip together	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 trip is come out in case the condition of preset alarm % is keeping for 3sec or more → “95”% point LED in bar graph and “AL” are flickering together	"--"
rESEt/Hr/Er/ A-rE	to decide how to reset trip state	*Hr: manual reset/Password input *Er:electrical reset :"Reset" key :"CLR" Key :Control power-off *A-rE:auto reset	Er
Aut/ setting value	to preset auto reset time	*time range :0(instant),1～300sec *If Hr is 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 operators press 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

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		0

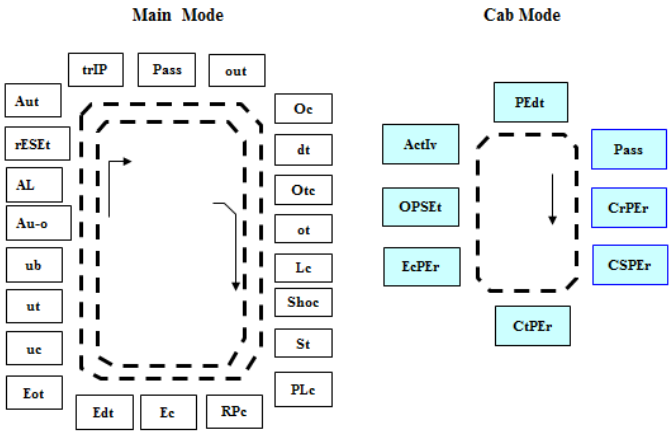
CSPEr	to have a calibration for phase "S" current	*Possible to adjust within +,- 0.1A~10A by using "UP"."DN" key.	0
CtPEr	to have a calibration for phase "T" current		0
EcPEr	to have a calibration for GF current	*Possible to adjust within +,- 50% by using "UP"."DN" key.	100
oPSEt/ON /OFF	to decide if it is possible to preset during the operation	*ON : it is possible for operator to change a preset value during motor normal operation except “out”mode * OFF : it is not possible for operator to change a preset value during motor normal operation	OFF
ActIv/50/60	to select frequency of power system	*to eliminate the input noise from Z1-Z2 *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	

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 the operation is executed normally, because the unwanted trip may be happend

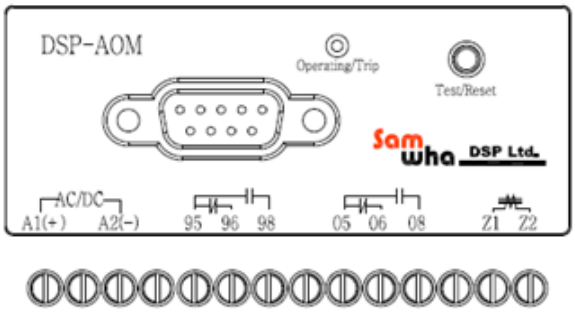
2.The operator can not preset “out” mode in any case concerned with “OPSET” mode

6. The order of Rotated Mode

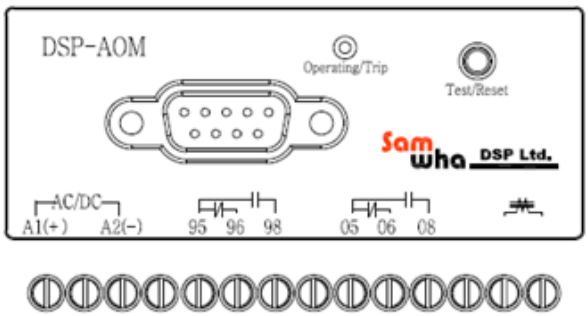


7.Input-Output terminal

‣Standard type/with external ZCT

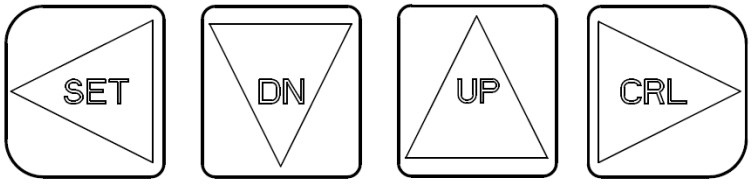


‣Optional type/with Embeded ZCT



DIV	Feature	Terminal	Description	
Input	Control power	A1(+),A2(-)	*85～260VAC,50/60Hz *90～370VDC	
Input	Z1,Z2	ZCT	*External ZCT ▹V Type : 200mA/100mV ▹A Type : 200mA/1.5mA *with Embeded ZCT :Optional Type	
State Indication	RED		Operating	Available for converter with 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	
Output	Aux	*1c:05-06-08	*Au-o/oFF/Ec/AL/uc/Ec-tb *Selected factor is excluded from main trip except OFF/Ec-tb	

8. Operation of Control key

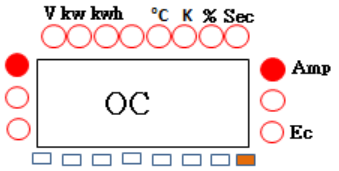
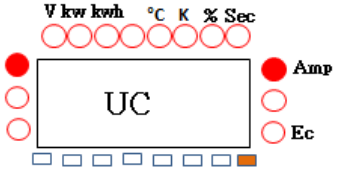
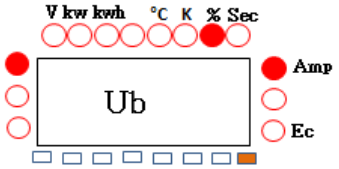
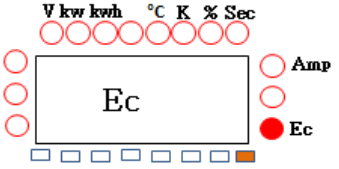
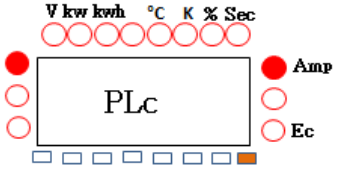


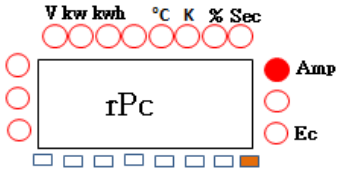
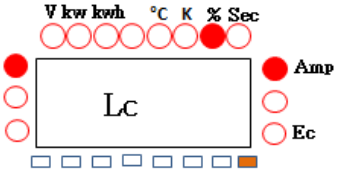
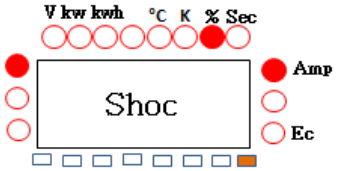
1."SET" key	*Press "SET" Key to enter into setting mode, then "P0000" (factory default password) is shown *Move cursor from first digit to right end digit by pressing "CLR" key,finally press once more, if password is not changed from factory default value, but if password is changed, then make required 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 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 *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

9. Trip Indication

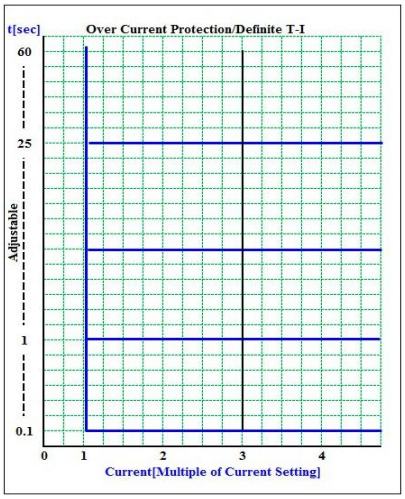
Trip cause and caused value are appeared alternatively,and “100%” point LED in bar graph is flickering in the same time

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 L2 in load part

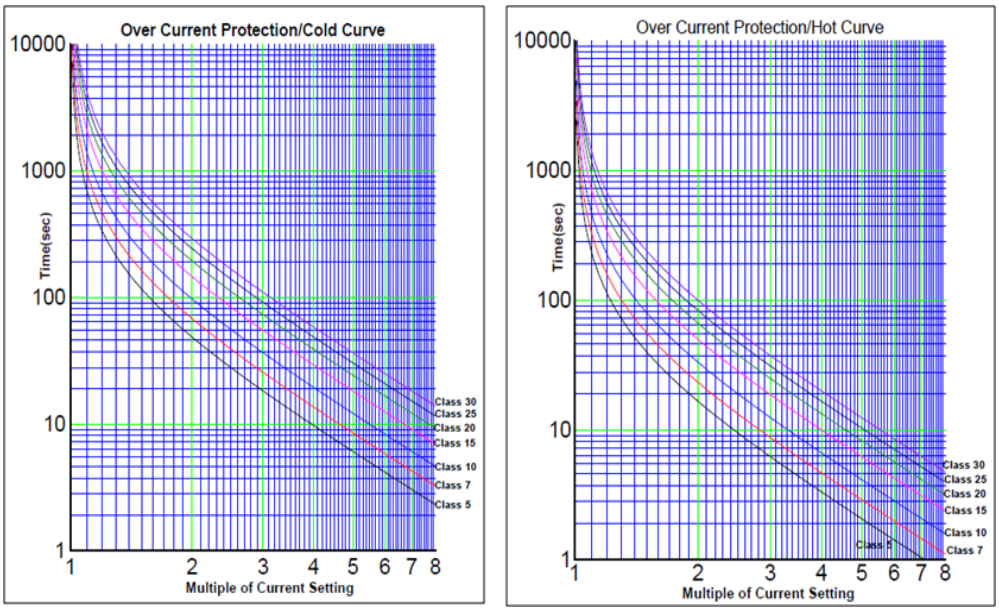
Reverse phase		*trip caused by reverse phase in load part
Locked Rotor		*trip caused by locked rotor current in phase L2 during motor start
Shock/stall		*trip caused by instant shocking current in load part

10.T-I Characteristcs

▸Definite

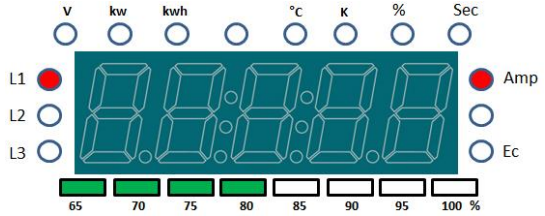


▸Inverse

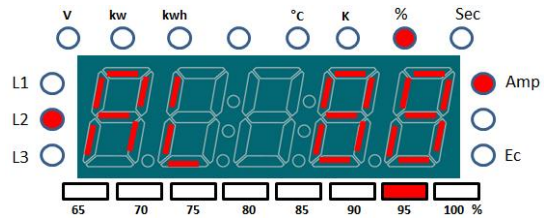


11. Rotated indication

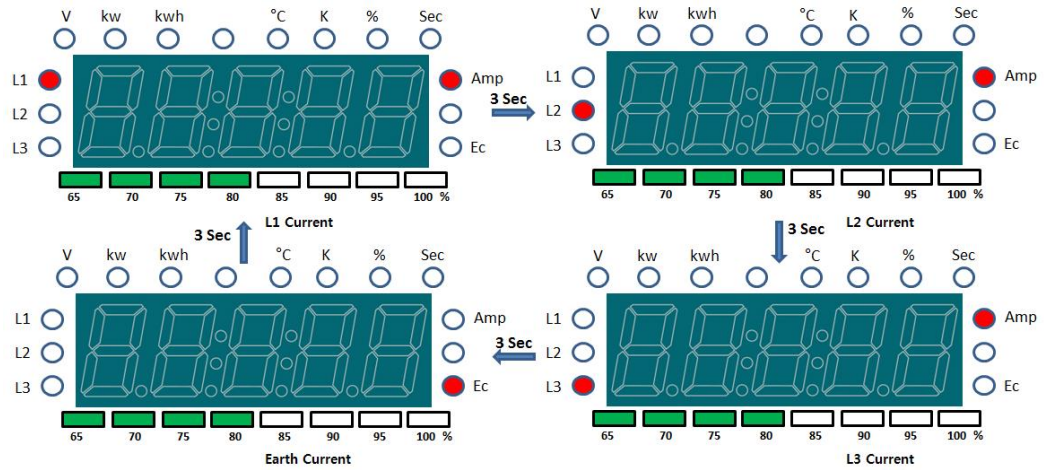
▸ Bar Graph : the % value with 5% point unit is shown based on the formular, [(actual current value/“OC” preset value)*100], under the range of 65~100% while a motor is working



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

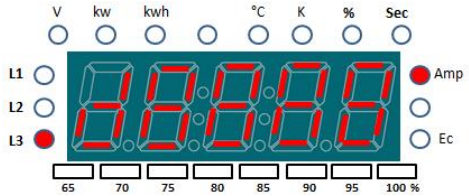


▸ Each phase current(L1,L2,L3) > GF current



▸ Indication during d-time for mortor starting

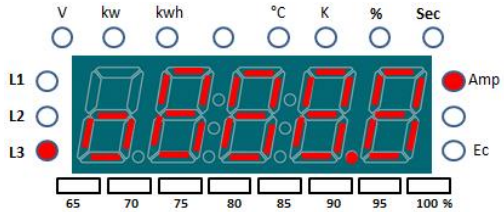
→“d & Current value” is indicated if “d-time” is executed for mortor starting & “d” is flickering in every 1sec



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

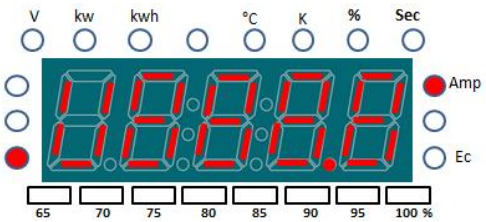
- “OC” trip

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



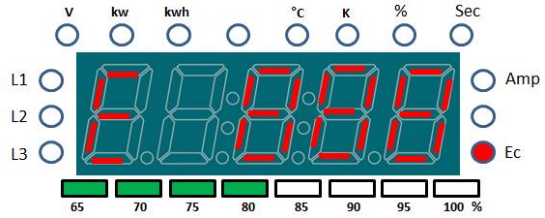
- “UC” trip

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



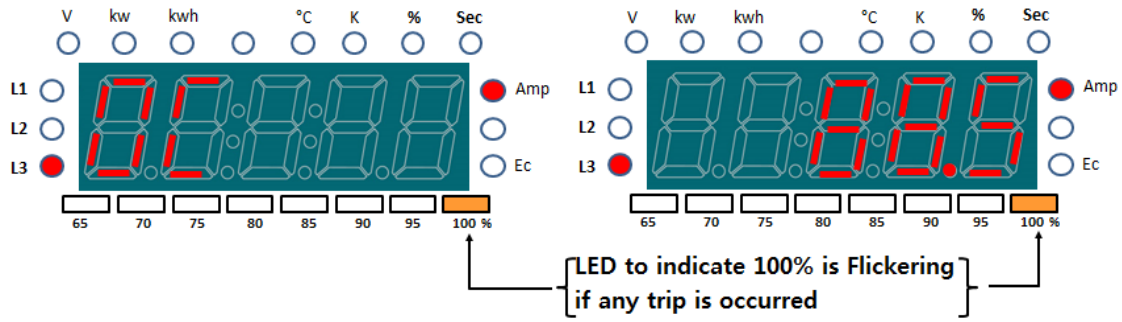
- “Ec” trip

⟶ “E & Ec Current value” is indicated if “Eot/time” is executed for earth current protection ,but “E”-“value” is flickering in every 1 sec



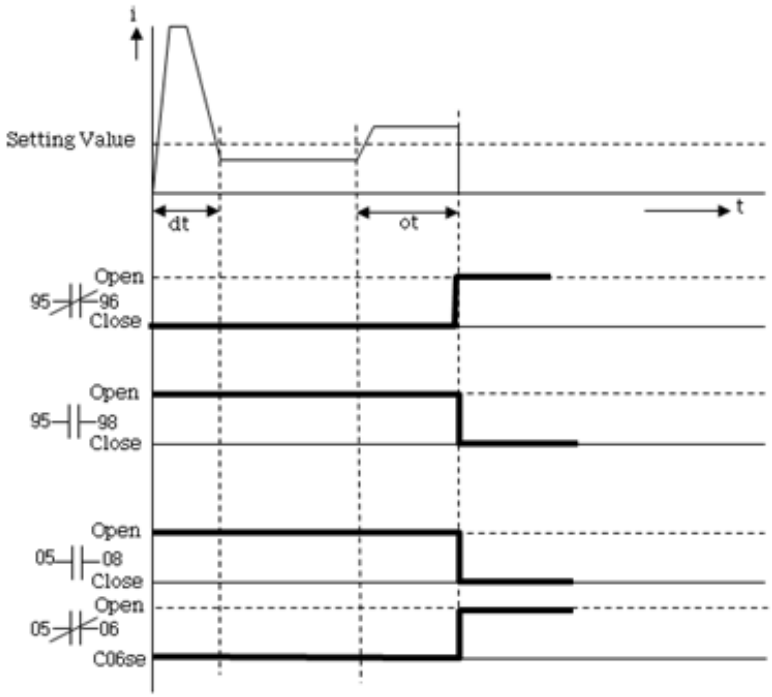
☞ "Ec-ct" is flickering if ZCT is not connected with a terminal of Z1-Z2 in motor stop state while the condition of "Ec" is available

▸ 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

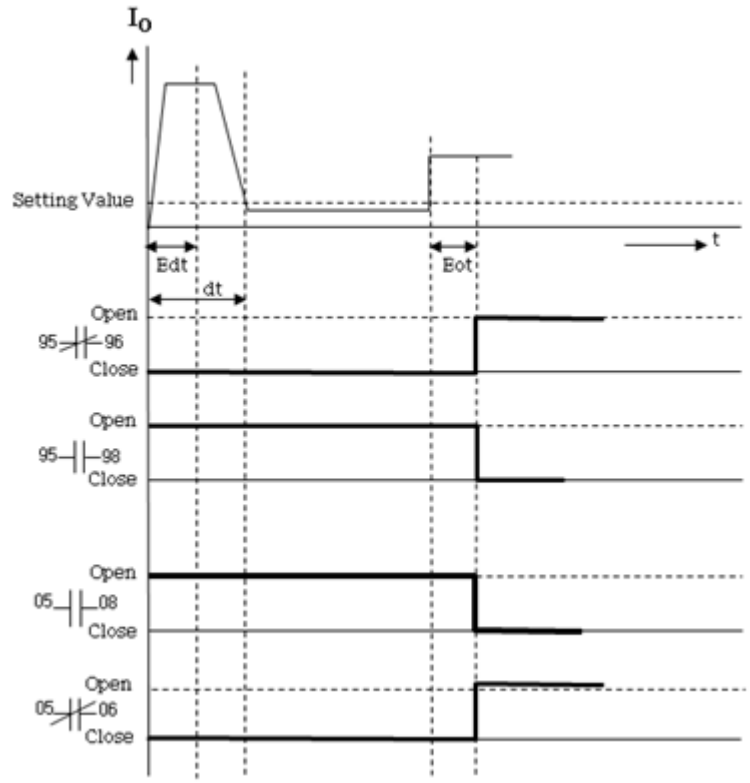


12. Time Based Trip relay Output

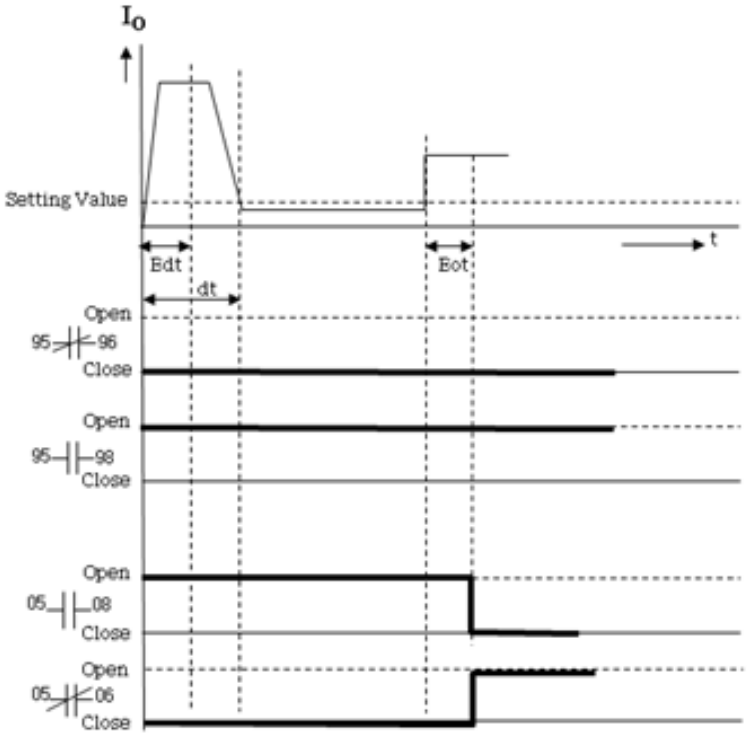
▸ Over current protection/"Au-o" mode:OFF/”out”mode:b



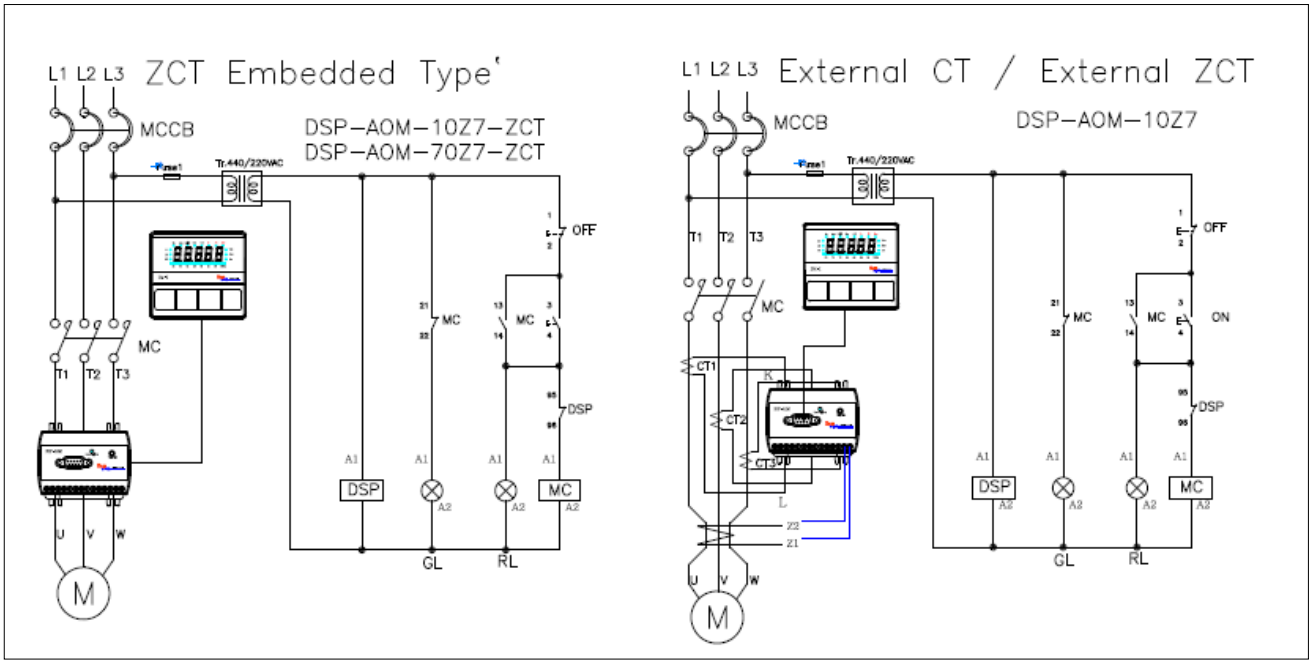
- GF protection/"Au-o" mode:Ec(05-06-08)



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

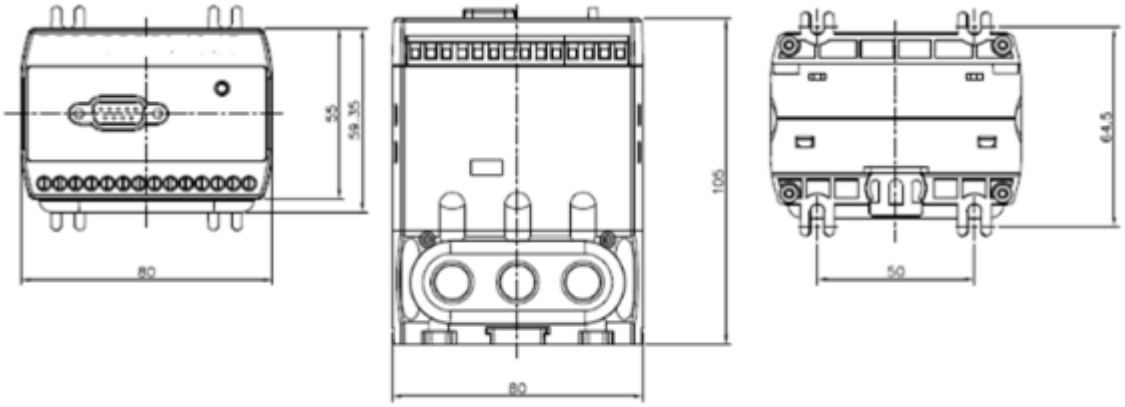


13. Application Sequence Diagram

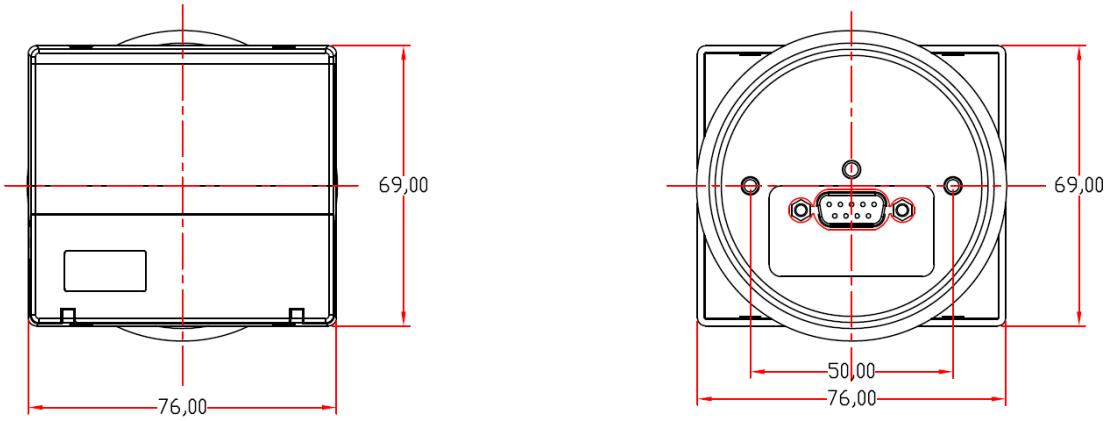


14. Dimension

- Converter



- Display Meter



15. Order form

DSP-1(Type)-2(Rating current)-3(Control power)-4(ZCT rating)- 5(ZCT Embedded)
-6(Optional condition)

Item	Reference Code	Description
DSP-AOM	DSP-AOM-10B-V- I	Panel Flush Mounting Type,0.5A～10A, External CT/0.5A～6A , 24VDC with Isolation Mode , available for external ZCT/200mA :100mV,LPF for ZCT input
	DSP-AOM-70B-V- I	Panel Flush Mounting Type,5A～70A, 24VDC with Isolation Mode,available for external ZCT/ 00mA : 100mV,LPF for ZCT input
	DSP-AOM-10B-A- I	Panel Flush Mounting Type,0.5A～10A,External CT/0.5A～6A, 24VDC with Isolation Mode ,available for external ZCT/200mA :1.5mA,LPF for ZCT input
	DSP-AOM-70B-A- I	Panel Flush Mounting Type,5A～70A, 24VDC 24VDC with Isolation Mode,available for external ZCT/200mA:1.5mA,LPF for ZCT input
	DSP-AOM-10B-ZCT-I	Panel Flush Mounting Type, 0.5A～10A, 24VDC with Isolation Mode, ZCT embeded/not posible to use external CT,LPF for ZCT input
	DSP-AOM-70B-ZCT-I	Panel Flush Mounting Type, 5A～70A, 24VDC with Isolation Mode , ZCT embeded/not posible to use external CT,LPF for ZCT input
	DSP-AOM-10B-V	Panel Flush Mounting Type,0.5A～10A, External CT/0.5A～6A , 24VDC with Direct Mode , available for external ZCT/200mA :100mV,LPF for ZCT input
	DSP-AOM-70B-V	Panel Flush Mounting Type,5A～70A, 24VDC with Isolation Mode,available for external ZCT/ 200mA :100mV,LPF for ZCT input
	DSP-AOM-10B-A	Panel Flush Mounting Type,0.5A～10A,External CT/0.5A～6A, 24VDC with Direct Mode ,available for external ZCT/200mA :1.5mA,LPF for ZCT input
	DSP-AOM-70B-A	Panel Flush Mounting Type,5A～70A, 24VDC 24VDC with Direct Mode,available for external ZCT/200 mA :1.5mA,LPF for ZCT input
	DSP-AOM-10B-ZCT-I	Panel Flush Mounting Type, 0.5A～10A, 24VDC with Direct Mode, ZCT embeded/not posible to use external CT
	DSP-AOM-70B-ZCT	Panel Flush Mounting Type, 5A～70A, 24VDC with Direct Mode , ZCT embeded/not posible to use external CT,LPF for ZCT input
	DSP-AOM-10Z7-V	Panel Flush Mounting Type,0.5A～10A, External CT/0.5A～6A , AC100V ～ AC240V ,50/60Hz(90～370VDC) , available for externalZCT/200mA :100mV , LPF for ZCT input
	DSP-AOM-70Z7-V	Panel Flush Mounting Type,5A～70A, AC100V ～ AC240V , 50/60Hz(90～370VDC),available for external ZCT/ 200mA :100mV,LPF for ZCT input
	DSP-AOM-10Z7-A	Panel Flush Mounting Type,0.5A～10A,External CT/0.5A～6A, AC100V ～AC240V ,50/60Hz(90～370 VDC) ,available for external ZCT/200mA :1.5mA,LPF for ZCT input
	DSP-AOM-70Z7-A	Panel Flush Mounting Type,5A～70A, AC100V ～ AC240V , 50/60Hz(90～370 VDC),available for

		external ,LPF for ZCT input ZCT/200mA :1.5mA	
	DSP-AOM-10Z7-ZCT	Panel Flush Mounting Type, 0.5A～10A, AC100V ～ AC240V, 50/60Hz(90～370 VDC),ZCT embeded/not posible to use external CT,LPF for ZCT input	
	DSP-AOM-70Z7-ZCT	Panel Flush Mounting Type, 5A～70A, AC100V ～ AC240V, 50/60Hz(90～370 VDC),ZCT embeded/not posible to use external CT,LPF for ZCT input	
	DSP-AOM-02-70Z7	Optional ,0.1A~2A, AC100V～AC240V, 50/60Hz(90～370 VDC)	
	DSP-AOM-02-B	Optional ,0.1A~2A, 24VDC	
Terminal Type	Basic code+T	3 Terminal through each CT Hole	
Combined with 3CT	Basic code + C1	with 100/5 CT	Not use for ZCT embeded
	Basic code + CC	with150/5 CT	Not use for ZCT embeded
	Basic code + C2	with200/5 CT	Not use for ZCT embeded
	Basic code + C3	with300/5 CT	Not use for ZCT embeded
	Basic code + C4	with400/5 CT	Not use for ZCT embeded

*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-A-XX	100mA/1.5mA	XX:Inner diameter of ZCT
Display Meter	DSP -ID-AOM-DM2	Input device/Display Meter	DM II