•DSP-VIP-PL/PM

Power Type(Voltage-Current based) Digital Multi-function Motor Protection Relay/High-end Class
VIP-PL : Panel Mounting Type(Converter + Loader)
VIP-PM : Panel Flush Mounting Type(Converter + Display meter)

Technical Specification

Division		Description
Lre Voltage		3 phase, AC 100V ~ 600V, 50/60Hz
Voltage setting range	AC 110V	over : 110V~150V, under : 70~110V
	AC 220V	over : 220V~290V, under : 150~220V
	AC 380V	over : 380~450V, under : 310~380V
	AC 440V	over : 440V~500V, under : 370~440V
	AC 480V	over : 480V~550V, under : 410~480V
Current setirg range	70 Type	0.2~7CA/0.2KW~52.4KW(AC 480V) / 0.2~6A(0.2KW~4.4KW/AC480V) with external CT
	External CT	Refer Table
Ground protection	Zero Sequence Current	30mA~10A
Time setting	Starting deay time(dt)	OFF, 0.1 ~300 sec/def, "OFF" selection means inverse curve
	over/urder voltage trip delay time (ouPt)	0.1~30 sec/def
	over load/current trip delay time(ot)	0.1~60 sec/def, 5~30class/rv:refer curve
	urder cad/current trip delay time(ut)	0.1~30 sec/def
	Shock/stall trip delay time(st)	0.05 sec/irstart, 0.1~3 sec/def
	Ground fault starting deay time(Edt)	OFF, 1~25 sec/def
	Ground fault trp delay time(Et)	*0.05(irstant), 0.1~30 sec/def *1~10 Class/Irverse, refer curve
	Voltage Unbalance	0.5~10scc/Ad ustable
	SC/F-MC/R starting transfer time(ydt)	1 sec~5 min/def(Transf irterval time/SC-erd~MC-start : 0.2 sec)
	Man contactor Auto Close	*Shut down delay Time : 1 sec~5 sec *Dcay On Make Time : 0(instant)~25 scc
Allowable tolerance	Voltage	+,- 3%
	Current	0<=2A : 0.1A,0>2A : +,- 5%
	Time	1<=2 sec : +-0.1sec, t>2 sec : +,-,5%
	Fower factor	+,- 5%
	KW, KWH	+,- 5%, Cos phi>0.6
Control power		*85VAC~260VAC, 50/60Hz(90VDC~370VDC) *24VAC/DC(optional)
Trp output Relay	01-SC/F-MC/R	1a *3(3-SPST), 3A/Resistive
	Man	1a(1-spst), 3A/Resistve
	Aux	1a(1-spst), 3A/Resistve
	OV/UV	1a(1-spst), 3A/Resistve/pcssible to use for 2rd alarm(lower level alarm to "OC") urder "Line" mode is OFF or short circuit trip urder both OP & UP is OFF
	GR	1a, 3A/Resistive(Aux output must be set "GR" in Au-o" mode)
Application envirornment	Temperature	Operation -25℃ ~ +70℃ Storage -40℃ ~ +80℃
	Relative humidity	30 ~ 85%, nor-condersirg
Current tollerance against chargeab e frequency in inverter		Avg ± 3% in 10Hz ~ 400Hz
Max Corductor Size		25sq
Irsulation Resistence		10Mohm or more/500VDC, circuit-case
High Voltage Insulation Test		*circuit-case : AC 2000V, 60Hz, 1 min *contact-cortact : AC 1500V, 60Hz, 1 min
Logic Irput		90~220 VAC,DC
Screw Torque		Max 0.6 N.m
Frame : EC/EN 60695-2-12		650℃
Shock : EC/EN 60068-2-27		1/2 sire wave, 15g/11ms
Trp Output : IEC/EN60947-1		690V(Vrms : 2KV/1 min)
Electrostatc Discharge : IEC/EN 61000-4-2		Ar : Level 3, 8KV, Contact : Level 3, 6KV
Rad ated Electromagretic Field Dis urbance : EC/EN 6000-4-3		Level 3, 10V/m
Electric Fast Transient Burst : EC/EN 6000-4-4		Fower, relay output : Level 4, 4KV, others : Level 3, 2KV
Surge : EC/EN 61000-4-5		relay output : 1.2 X 50uS, 2KV (0°, 90°, 180°, 270°)
Immun ty to corducted disturbence : EC/EN6000-4-6		10V, Level 3
Voltage variation : EC-61000-4-11		3ms/0, 300ms/70%
Egital Commun cation wih commun cation module/recorder	Physical feature	2 wire RS 485
	Address	1 ~ 250
	Speed	9.6/19.2/38.4/57.6/76.8/115.2kbps
	wiring connection	*Irput/Output : RJ 45 ot Screw Terminal *RJ45 and Screw Termira(5P) is commored physically *RJ45 is recommended for the test by "Samcsp"
	Termination resstence	*DP S/W selecton / 200 Ohm
	Cable	Sheathed cable, 2 Pair
Current Loop Communication : 4 ~ 20mA		20mA for maximum value n 3 phase current
Corsuming power		10W / Max

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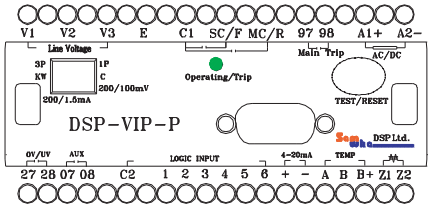
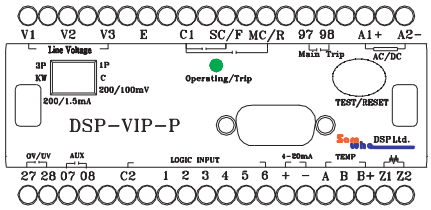
Input/Output

▶ Embeded ZCT type/not possible with external CT



▶ External ZCT applied type/possible with external CT



Protection Range

70 Type	0.2~7CA	* Possible matched with external CT/0.2~6A based * 5A must be selected in "Ctc" mode for external CT

Trip Output Operation Pattern with Logic Input

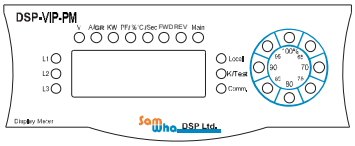
Trip output : main/97-98(a), C1-SC/F(a)-MC/R(a)/co-worked with logic input, aux/07-08(a)

b is seected in "out" mode : factory default
CN(start) : C1-SC/F → Closed(b), 97-98 → Open(a), 07-08 → Open(a)
Trip : C1-SC/F → Open(a), 97-98 → Close(b), 07-08 → Close(b)

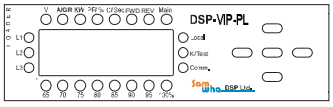
a is seected in "out" mode
CN(start) : C1-SC/F → Closed(b), 97-98 → Close(b), 07-08 → Open(a)
Trip : C1-SC/F → Open(a), 97-98 → Open(a), 07-08 → Close(b)

Display window

▶ Panel Flush Mounting Type : Display meter



▶ Panel Mounting Type : Loader

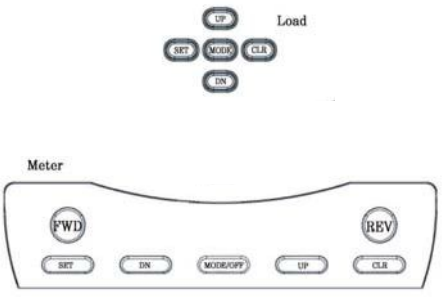


Protection

DIV	Description	Operation time	Remark
Over voltage(OF)	In case the fore voltage greater than preset value is sensed	Definite time:0.1~30 sec/adjustable	
Under voltage(UF)	In case the fore voltage lower than preset value is sensed	Definite time:0.1~30 sec/adjustable	
Over current(OC)	In case the load current greater than preset value is sensed	Definite time:0.1~60 sec/adjustable	
Under current(LC)	In case the load current lower than preset value is sensed	Definite time:0.1~30 sec/adjustable	
Phase loss(FL)	In case one of three phase is a state of phase loss/confirmed by fore voltage	0.5sec	
Phase loss(FLc)	In case one of three phase is a state of phase loss/confirmed by load current	2sec	
reverse phase(rF)	In case the order of incoming phase is changed like "RTS" from "RST"/confirmed by fore voltage	0.5 sec	
reverse phase(rFc)	In case the order of incoming phase is changed like "RTS" from "RST"/confirmed by load current	0.5 sec	
Locked rotor(LC)	In case the starting current greater than 300% of 'OC' preset value is kept after dt is elapsed	0.1sec	
Shock/Stall	In case the 180~700% running current of preset 'CC' value is sensed	0.05sec	
Current unbalance(Iub)	[(max current-min current)/max current] *100%	8sec	
Voltage unbalance(Vub)	[(max voltage-min voltage)/max voltage] *100%	0.5~10sec/adjustable	
Ground fault(EC)	In case the ground fault current greater than preset value is sensed	Definite time : 0.05Sec, 0.1 ~30sec	
Short circuit(SS)	In case shot circuit current greater than preset value to 800~2000% of 'OC' is sensed	0.05Sec	MCCB Trip

Possible alarm cuput through AUX

Preset Key Operation



Preset Key	Description
SET	Start to preset : password 'PCCOC" is shown by one touch → press 4 times → enter into mode : flickered character → preset by "UP" or "DN" * Press SET button to return to operation state, or press CLR button to move to next mode
CLR	* move to next mode as pressing CLR * Self diagnostic test as pressing CLR for 3sec : trip output is energized after preset C-Time * Make reset after a trip
MODE	* LED 'Main" is turned on in Main mode & is turned off in Sub mode * return to operation state during preset as pressing MODE button
UP / DN	* change a character and/or a digit number for the preset
SET & CLR	* return to operation state as pressing both SET & CLR after preset, or * wait for 15sec or more
To check preset value of each mode during operation	* possible to check value and mode as pressing "SET" key once during operation, * preset vae and mode are appeared alternatively * possible to check next mode as pressing "CLR" key * return to operating mode as pressing "Mode" key once again or waiting for 15 sec * make reset after trip is happened as pressing CLR key or test button of the converter

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Logic Input Application

Logic	(1)	(2)	(3)	(4)	(5)	(6)
Application	CN(FWD)	CFF	CN(REV)	rCS	MCC	EFI(External fault Input)
	LOP			FC		

LOP Duty

Logic nput	High	Low	State	Output reay trip by Logic input
1	Low → High		Motor Sart	C1-SC/F → Close
2	O	–		
1	–	O	Motor Sop	C1-SC/F → Cpen
2	High → Low			

rcs(Remote Control Sensor)Duty

Logic nput	High	Low	State	Output reay trip by Logic input
1	O	–	Motor Sart	C1-SC/F → Close
4	O	O		
1	–	–	Motor Sop	C1-SC/F → Cpen
4	O	O		

Display Meter Duty(MCC)

Logic nput	High	Low	State	Output reay trip by Logic input
5	O	–	Start/Stop n Display Meter	C1-SC/F → Close(Start) C1-SC/F → Cper(Stop)

rcs-FWD/REV

Logic nput	High	Low	State	Output reay trip by Logic input
1	O		Forward Start	C1-SC/F
4	O			
1		O	Forward Stop	C1-SC/F
4	O			
3	O		Reverse Start	C1-SC/R
4	O			
3		O	Reverse Stop	C1-SC/R
4	O			

PC Duty

Logic Input	High	Low	State	Output relay trip by Logic input
4	O	–	Motor Start/Stop in FC	C1-SC/F → Cose(Start) C1-SC/F → Oper(Stop)
5	O	–		

LOP-FWD/REV

Logic Input	High	Low	State	Output relay trip by Logic input
1	Low → High		Forward Start	C1-SC/F
2	O	–		
2	–	O	Forward Stop	
3	Low → High		Reverse Start	C1-SC/R
2	O	–		
2	–	O	Reverse Start	

EFI(External Fault Input(Available for VIP)

Logic Input	High	Low	State	Output relay trip by Logic input
6	O	–	*Motor *Stop Dispayed : OUT-F(auLt)	97-98(Close, seected "b" on "out" mode), C1-SC/F → Open 97-98(Open, selecec "t" on "ou" mode), C1-SC/F → Open

※ In case selected operaton mode is charged by Selector SW, the motor will be continued to work according to new selected mode after the motor is stopped shortly
※ It would be easy to understand as referring the application sequence diagram
※ In order to use Logic input #3 for FWD-REV operation, 'yct" mode in sub menu group must be prese "OFF"
※ In case motor is stopped by the command of ON-OFF(Rmote sensor or external fault nput, not by the rip cuputsigna), LOF, MCC, rcs(remote control sensor), cut-F(External fault Input) or FC is appeared n the front wirdow to indicate originated command source
※ It is required that logic nput from org cistance sensor must be connected through the output of external aux relay because input ine could keep unwanted voltage by induced current

Trip cause indication

- Check for preset value in running state/Such mode and preset value are shown alternatively as pressing SET buton, and next mode is shown as pressng CLR button
- f trip is happened, trip cause and current vaue of each phase are stored and indicaed on he display meter
- The nformation of 8 rp is stored and this is abe to be checked in "trip" mode orderly

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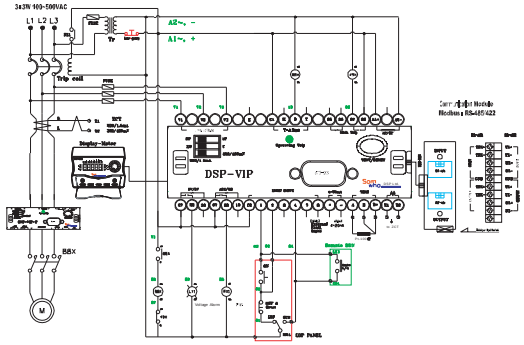
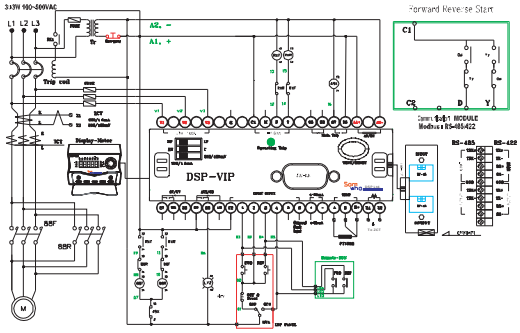
Application sequence diagram

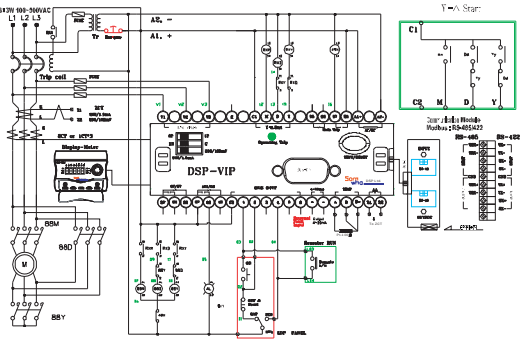
▶ DOL



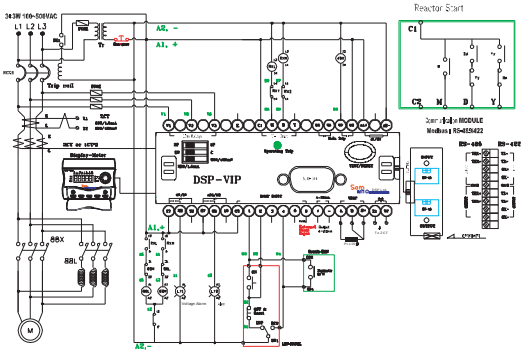
▶ FWD-REV



▶ Y-D



▶ Reactor



Preset Description

Main Mode

Mode	Function	Description	Factory
PASS	Password	P0000 is shown as pressing SET and need CLR 4 times to enter into mode to be preset	P0000
LIrE	to select a value of line voltage	selection for line voltage(first mode after pressing CLR 4 times in password state)	440
OC[OL]	to preset a range to proect over current	0.2~70A/adjustable(0.2~6A with external CT)	10
CtO	to sense a current through DSP itself or combined with external CT	5A for external CT, 1t for current sersed through its own CT	1t
Ct	to preset a ratio for external CT	preset for CT ratio based on 5A in secondary current of CT : eg, if CT is 100:5, preset value is 20	--
dt	to preset starting trip deay time	0.1~300Sec/adjustable	5
OtC	to select time-current chracterstcs for over current prtecton	dEF : definte, Inv : inverse	dEF
Ot	to preset operating trip deay time	0.1~60Sec/adjustable	5
LC	to prtect Locked Rotor	t is available for selecting CN [operaticn time : 01sec after dt is elapsed]	OFF
SS	to prtect short circut	t is available for selecting CN [operaticn time : 0.05Sec)	OFF
SSC	to preset short prtecton % to OC	protecton range to CC : 800~2000%/acjusable	OFF
ShOC	to prtect mechanical shock during motor is working	protecton range to CC : 180~700%/adjustable	OFF
St	to preset a time for shock protecton	0.05Sec, 0.1~3.0Sec/adjustable	--
PLC	to prtect phase loss by oad current	ON : avalabe, OFF : not available	ON
rPC	to prtect reverse phase by load current	ON : avalabe, OFF : not available	OFF
OP	to prtect over voltage	protecton range : within +70V from selected line vctage, eg : 440~510V if 440V is selected	OFF
UP	to prtect under voltage	protecton range : within -70V from selected line voltage, eg : 370~440 if 440V is selected	OFF
OUPt	to preset trip deay time to prtect over /under votage	0.1~30sec/adjustable	1t
PL	to prtect phase loss by ine voltage	ON : avalabe, OFF : not available	OFF
rp	to prtect reverse phase by line voltage	ON : avalabe, OFF : not available	OFF
EC	to preset a range of zero phase current to protect ground fault	protecton range : 0.03A~10A/adjustable	10
Edt	to preset starting trip deay time	0.1~25Sec/adjustable	2
EtC	to select time-current chracterstcs to protect ground fault	dEF:definite, nv : inverse	dEF
ECt	to preset operating trip deay time to protect ground fault	0.05Sec, 0.1~30Sec/acjustable	0.5

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Sub Mode

Out	to decide initial state of main trip relay	*to make initial state(a or b) of main trip output(97–98) when control power is powered *a : normal energized type(open-->close) *b : normal deenergized type(not changed)	b
Fr-ty/a/b	to decide transferred pattern for SC/F-MC/Fy	*a : C1-MC/R is closed after C1-SC/F is opened as preset time of Frdt mode is elapsed *b : C1-MC/R is closed after C1-SC/F is kept close as preset time of Frdt mode is elapsed	
Frdt	to preset transferred time for SC/F-MC/R	1~300Sec/adjustable, OFF : not available, but useful for reverse start by logic input #3 protection	OFF
LCtUL)	to preset a range to protect under current/load	range : 0.3A ~ under preset value for "Cc"	OFF
Lt	to preset trip delay time to protect under load/current	0.1~30Sec/adjustable	--
Lb	to preset current unbalance rate(%) among 3 phase	*even if Load is selected, this function is available by actual current *formular : [(max-min)/max] *100 [%] *range:30% ~ 90% * minimum available current:0.3A	50
AL-O	to preset a kind of AUX trip output	*oFF/Ec/Lc/Shcc/AL/tEP/Ec-E/SS-t/Ec-ta/Ec-tb * oFF : samw as main output	OFF
ALHC	to preset higher alarm level rate(%) to CCIOL)	65~100%/adjustable	95
ALLC	to preset lower alarm level rate(%) to CC	The preset in this mode is possible only in case 'LIrE' mode is in 'CFF', 65%~under 'ALHC" %/adjustable	--
Alt	to preset a limit of accumulated working time necessary to give alarm	0.1 hr ~ 6553.5 hr in 0.1 hr step	6500
dC	to decide max current to change into 20mA	*to transfer maximum current of 3 phase current into 20mA, and 4mA means zero ampere output	5
tEP	to preset temperature value to protect temperature rising	1~150℃/adjustable	OFF
Cn	to count tripped number of main contactor	*Fixed Value : to show accumulated number of actual trip *max value is 65535 *To clear : press 'UP' firstly-->keeping pressed 'UP'-->nexly, press 'DN' key, then keep 1 sec under pressed state of both key, finally release 'DN' key earlier than "UP" key	0
rOtA	to indicate additional factor besides basic factor to indicate running operation value in order	OFF : basic factor, ON : basic factor + additional factor	OFF
hP-C	to start to accumulate KWH or to clear accumulated KWH	*to accumulate KWH from timed position in every 6 min *max accumulated KWH is 99999999 *To clear : press 'UP' firstly-->keeping pressed 'UP' -->nexty, press "DN" key, then keep 1 sec under pressed state of both key, finally release 'DN' key earlier than "UP" key	0
rESEt	to decide how to reset trip state	*Fr:manual reset * AuL-#(n times):Auto reset by followed condition :n=1:possible to do only by entering password :n>1 ▶1(once)~(r-1) times : reset automatically according to preset reset time without entering password ▶n(last times) : possible to do only by entering password : trip state is kept on until making password reset even though the control power is off(password lock) *Password reset : reset is done by coming out from operating mode after inputs password	hr
Aut-t	to preset auto reset time	*time range : 0(instant), 0.1sec, 1~300sec	0
t-Aut	to preset total possible time available for executing defined times of auto reset	30min~60min	--
trIP	to show latest number of 8 trip cause	trip information in order : faulty phase and faulty value is appeared alternatively	--
Addr	to put self-address to communicate with pc	range of number : #1 ~ #250	1
bPS	to decide communication speed	9.6/19.2/38.4/57.6/76.8/115.2kbps	115.2
tCvEr	Main contactor Auto Close	*Shut Down Delay Time : 1~5sec/Adjustable * Delay On Make Time : 0(instart)~25sec	OFF

Cab Mode

This mode is appeared as pressing "SET" key for 5 sec or more and is disappeared as pressing 'SET' key shortly once more
Also it is not recommered that user makes a calibraion without checking by accurate source

Mode	Function/range	Description	Factory setting value
P0C00	Password Input	* need to input factory value "0C00" to enter into this mode group * to calibrate slight difference between indication and actual value within +,-12.7% * next mode by pressing right direction key "CLR"	0
CrPEr	to have a caribration for phase 'R' current	* possible to adjust within +, – 12.7% from indicated value by using 'UP' or 'DN' key	0
CsPEr	to have a caribration for phase 'S' current		0
CtPEr	to have a caribration for phase 'T' current		0
vrPEr	to have a caribration for phase 'R' voltage		0
vsPEr	to have a caribration for phase 'S' voltage		0
vtPEr	to have a caribration for phase 'T' voltage		0
EcPEr	to have a caribration for ground fault current		0
tEPEr	to have a caribration for temperature		0
tranS/OFF/d-Ear	to select indication pattern of incomming voltage	* OFF : to indicate line voltage:v1,v2,v3 * d-Ear : to indicate average voltage	OFF
PEdt/setting Value(P****)	to change password	* possible to enter new digit by using 'UP' or 'DN' key after positoning a curser on the required digit * possible to enter into main mode or sub mode as pressing 'mode" key	0000
vUb/CFF/setting value	to preset voltage unbalance protection rate(%)	* trip in case preset rate condition is kept on preset time or more * rate : (Max V-Min V)-Min V)/Max V]*100 [%] * adjustable range : 2%~40%	OFF
v-uT/setting value	to preset operating trip delay time for voltage unbalance	* to preset a operating trip time for voltage unbalance * Adjustable range : 0.5~10 sec	3
PF/Pa/va	To preset a condition for kW calcuation	* Pa : to adopt actual power factor measured from running state * va : to fix to 1(100%) as power factor//useful for the operation under the inverter	pa
Comm/auto/slave	To decide a qualification of VIP in case of the communication	* auto : VIP always dispatches a data * Save : VIP dispatches a data only in case the master requires	auto

•DSP-VIP-PL/PM

Order Form

DSP-VIP-1-2-3-4-5-XX

DIV		Description	Remark
1	FL	Loader	Data Input Device/Panel Mounting Type
	FM	Display Meter	Data Input Device/Panel Flush Mounting Type
2	7	0A ~ 70A(0.2A~6A with external CT)	Current rating
3	B	24VAC/DC(Optional : order made)	Control Power
	Z	85VAC~260VAC(90VDC~370VDC)	
4	7	50/60Hz	Frequency/Control Power
5	ZCT	ZCT Embeded	
XX	Option	Exclusive Customer Order	* Available for Package type 1)None : Standard Software 2)P : Optional software 3)PC : Optional Software with Comm. Module 4)Others except above : Customer Order Made

Reference Code

Item	Reference Code	Data Input Device	Current Rating	Description
DSP-VIP	DSP-VIP-PL7Z7	Loader	0.2~70A/0.2~6A with external CT	85VAC~260VAC,50/60Hz(90VDC~370VDC), with external ZCT
	DSP-VIP-PM7Z7	Display Meter		85VAC~260VAC,50/60Hz(90VDC~370VDC), with external ZCT
	DSP-VIP-PL7Z7ZCT	Loader		85VAC~260VAC,50/60Hz(90VDC~370VDC), ZCT Embeded
	DSP-VIP-PM7Z7ZCT	Display Meter		85VAC~260VAC,50/60Hz(90VDC~370VDC), ZCT Embeded
Converter Only	DSP-VIP-7Z7			85VAC~260VAC,50/60Hz(90VDC~370VDC), with external ZCT
	DSP-VIP-7Z7ZCT			85VAC~260VAC,50/60Hz(90VDC~370VDC), ZCT Embeded
Package Type	DSP-VIP-PM7Z7-P			Converter+DisplayMeter/OptionalFunction program/85VAC~260VAC,50/60Hz, (90VDC~370VDC), with external ZCT
	DSP-VIP-PM7Z7-PC			Converter+Display Meter+Comm.Module/Optional Function program/85VAC~260VAC, 50/60Hz (90VDC~370VDC), with external ZCT
	DSP-VIP-PM7Z7-TC			Converter + Display Meter + Comm. Module + Terminal/85VAC~260VAC,50/60Hz, (90VDC~370VDC), with external ZCT
	DSP-VIP-PM7Z7ZCT-P			Converter + DisplayMeter/OptionalFunction program/85VAC~260VAC,50/60Hz,(90VDC~370VDC), ZCT embeded
	DSP-VIP-PM7Z7ZCT-PC			Converter + Display Meter + Comm.Module /Optional Function program/85VAC~260VAC, 50/60Hz, (90VDC~370VDC),ZCT embeded
	DSP-VIP-PM7Z7ZCT-TC			Converter + Display Meter + Comm. Module + Terminal/85VAC~260VAC, 50/60Hz, (90VDC~370VDC), ZCT Embeded

Accessory

Item	Reference code	Description	Remark
Cable	DSP-CABLE-1H	1.5m	
	DSP-CABLE-03	3m	
	DSP-CABLE-XX	longer than 3m	
ZCT	DSP-ZCT-XX	100mA/1.5mA	XX : Inner diameter of ZCT
	DSP-ZCT-V-XX	100mA/100mV	
Loader	DSP-ID-FL	Input Device/Loader	
Display Meter	DSP-ID-FM	Input device/Display Meter	
CT Terminal	DSP-TB-3T	Terminal through CT hole	
Communication Module	DSP-CM-44	* Modul RS 485/422( )RS 485/422	RS485,422 Serial Comm.
Matching Converter	DSP-MC-42	* Module RS 485/422()RS 232 : USB	Other manufacturer product
Protocol converter	DSP-CMB	* Multi-1U/USB Combo @ Cross cable * 485(CM-44)( )232 USB(Note PC)	