

Everything in Digital Power Regulator

01 All Products

Selecting Guide

Product																	
Type	MINI		ECONOMY		SPECIAL		P-TYPE		FLEX		SMART						
Model	PS	TS	SE	TE	SES	TES	SP(SZ)	TP(TZ)	1P3L	3P3L	1P1L	1P2L	1P3L	3P2L	3P3L	3P6L	
No. of phase	Single phase	Three phase	Single phase	Three phase	Single phase	Three phase	Single phase	Three phase	Single phase	Three phase	Single phase	Single phase	Single phase	Three phase	Three phase	Three phase	
Rated voltage (VAC)	~500VAC		110V, 220V, 380V, 440V * Other rated voltage, please consult us.						110V, 220V, 380V, 440V * Other rated voltage, please consult us.								
Rated current (A)	15, 25, 40	25, 40 55, 70	25, 40, 55, 70		25, 40 55, 70 90 110 130	25, 40 55, 70 90 110 130 160	25, 40, 55, 70 90, 110, 130 160, 200, 250 320, 400, 500		25, 40, 55, 70, 90, 110, 130, 160		25, 40, 55, 70, 90, 110, 130, 160, 200, 250, 320, 400, 500, 700, 1000, 1500, 2000						
Control method	Zero-crossing		Both zero-crossing & phase angle		Both zero-crossing & phase angle (incl. current, voltage, power feedback)		Select zero-crossing or phase angle on ordering		Both zero-crossing & phase angle (current feedback)		Both zero-crossing & phase angle (incl. current, voltage, power feedback/PZM)						
Option	Cooling fan		Fuse Cooling fan		Cooling fan PSD		Feedback RS-485 COMM, 60 °C temp sensor PLF DC fan		RS-485 EtherCAT PSD MPD		Separated PSD-1000 or PSD-2000 RS-485, analogue output (RS-485 and analogue output can not be compatible)						
Control power	DC24V		Dependent on main power		DC24V		AC220V		DC24V		DC24V						
PSD 1000	X	X	X	X	O	O	X	X	O	O	O	O	O	O	O	O	O
PSD 2000	X	X	X	X	X	X	X	X	X	X	O	O	O	O	O	O	O
Page	4~5P	6~7P	8~9P		10~11P	12~13P	14~17P		18~19P		20~29P						

Everything in Digital Power Regulator

02 Mini Power Regulator – Single phase

The Smallest Digital Power Regulator (26mm) – Mini Single Phase



Specification

Contents	Specification	Remark
Rated Voltage	50 ~ 500VAC	
Rated Current	15A, 25A, 40A	
Input Signal	Choose one among Current(4~20mA), Voltage(0~10V) and SSR(10~30V)	
Alarm	Over Current, Load Failure, SCR Failure, Over Temperature (60°C – Warning, 80°C – Alarm)	
Display	1 three color LED shown each alarm	Refer to alarm table
Control Power	24VDC	
Approval	CE	

Ordering Code

P **S** - **0** **1** **5** - **I** - **FN**
 ① ② ③ ④

① Model	② Rated Current	③ Input Signal	④ Cooling Fan
PS : MINI Single Phase	015 : 15A	I : 4~20mA	FN : Cooling Fan (Only for 40A)
	025 : 25A	V : 0~10V	NONE : Without cooling fan
	040 : 40A	S : SSR	

Alarm Table

Alarm	Alarm Condition	LED	Output	Alarm Output
Normal	Normal operating	Green Blinking	RUN	-
Stand-by	Control power is on and input signal is zero.	Green On	STOP	-
Over Current	Current exceeding more than 100% of rated current	Red On	STOP	AL1
Load Failure	Input signal is more than 40% and output current is less than 1A.	Red/Yellow Blinking in turn	Auto Clear	AL2
Over Temp.(60°C)	Temp. of heatsink is more than 60°C	Yellow Blinking	RUN	AL2
Over Temp.(80°C)	Temp. of heatsink is more than 80°C	Yellow On	STOP	AL1
SCR Failure	Input signal is 0% or main power is off and output current is more than 1A.	Red Blinking	STOP	AL1

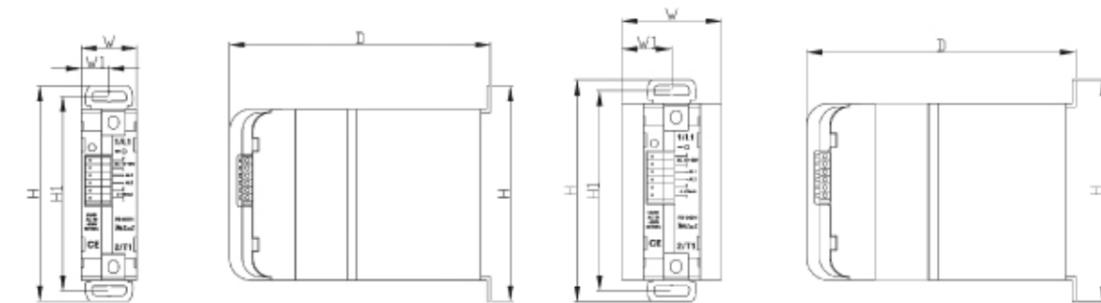
Benefits of Mini against SSR

Contents	Mini	SSR	Remark
Load Failure Alarm	Basically installed	Should install a C/T outside of SSR	Mini has a C/T inside
Over Current Alarm	Basically installed	No Function	
Over Temp. Alarm	60°C Warning 80°C Alarm	Bi-Metal	
SCR Failure Alarm	Basically installed	No Function	
Input Signal	4~20mA, 0~10V, SSR	Only SSR Input	Select one input signal when ordering
Alarm	2 points	No Alarm Relay	
Display	1 Three color LED	LED	
Control Power	DC24V		

Dimension

→ 15A, 25A

→ 40A



Type	Rated Current(A)	W	W1	H	H1	D	Bolt	Remark
PS	15, 25	26	13	100.5	91	122	M4	
	40	45	22.5	100.5	91	122	M4	

Everything in Digital Power Regulator

03 Mini Power Regulator – Three phase

The Smallest Digital Power Regulator – Mini Three Phase



Specification

Contents	Specification	Remark
Rated Voltage	50 ~ 500VAC	
Rated Current	25A, 40A, 55A, 70A	
Input Signal	Choose one among Current(4~20mA), Voltage(0~10V) and SSR(10~30V)	
Alarm	Over Current, Load Failure, SCR Failure, Over Temperature (60°C – Warning, 80°C – Alarm)	
Display	3 color LED 1EA / 1 color LED 3EA	Refer to alarm table
Control Power	24VDC	
Approval	CE	

Ordering Code

T S - 0 2 5 - I - FN
 ① ② ③ ④

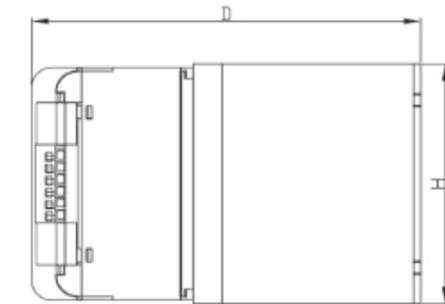
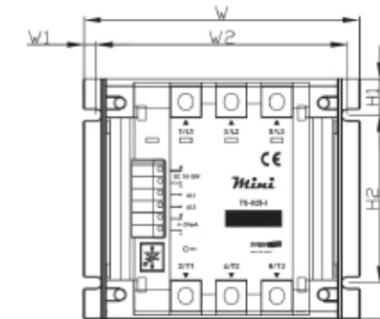
① Model	② Rated Current	③ Input Signal	④ Cooling Fan
TS : MINI Three Phase	025 : 25A	I : 4~20mA	FN : Cooling fan (Cooling fan is basically installed for 40A, 55A and 70A) NONE : Without cooling fan
	040 : 40A	V : 0~10V	
	055 : 55A	S : SSR	
	070 : 70A		

Alarm Table

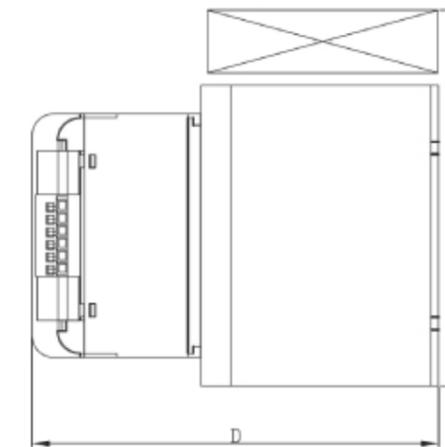
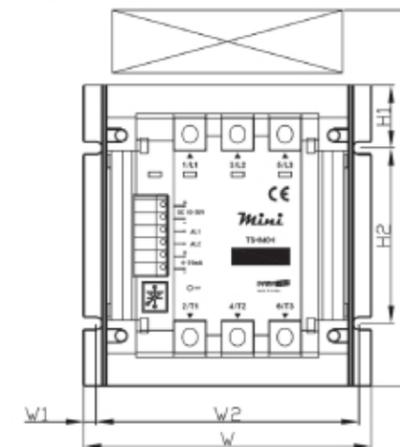
Alarm	Alarm Condition	Pilot LED	Each Phase LED	Output	Alarm Output
Normal	Normal operating	Green Blinking		RUN	-
Stand-by	Control power is on and input signal is zero.	Green On		STOP	-
Over Current	Current exceeding more than 100% of rated current	Red On	Relative LED Red On	STOP	AL1
Load Failure	Input signal is more than 40% and output current is less than 1A.	Red/Yellow Blinking in turn	Relative LED Red On	Auto Clear	AL2
Main Power					
Over Temp.(60°C)	Temp. of heatsink is more than 60°C	Yellow Blinking	-	RUN	AL2
Over Temp.(80°C)	Temp. of heatsink is more than 80°C	Yellow On	-	STOP	AL1
SCR Failure	Input signal is 0% or main power is off, output current is more than 1A.	Red Blinking	Relative LED Red On	STOP	AL1
Unbalanced Load	Input signal is more than 30% and unbalanced load ratio is more than 30%	Green/Red Blinking in turn	Red Blinking	Auto Release	AL2

Dimension

→ 25A



→ 40A, 55A, 70A



Unit : mm

Type	Rated Current(A)	W	W1	W2	H	H1	H2	D	Bolt	Remark
TS	25	115	5	105	100	15	70	163	M4	
	40, 55, 70	115	5	105	150	25	70	163	M4	

Everything in Digital Power Regulator

04 E-Type Power Regulator

E – Type : Economical Power Control



Ordering Code

S E 2 - 0 2 5 - F - FN
 ① ② ③ ④ ⑤

① No. of Phase	② Rated Voltage	③ Rated Current	④ Option - 1	⑤ Option - 2
SE : Single Phase TE : Three Phase	1 : 110V 2 : 220V 3 : 380V 4 : 440V	025 : 25A 040 : 40A 055 : 55A 070 : 70A	F : With fuse inside NONE : Without fuse	FN : With cooling fan NONE : Without cooling fan

Function

- Alarm
 - Over Temperature (O.T.)
 - Over Current (O.C.)
 - Load Failure
 - SCR Module Failure
- Soft start (Fixed 15 seconds)
- Soft up/down (Fixed 15 second, phase angle control)
- Error message display by LED
- 50/60Hz auto detect
- Used for both resistive and transformer coupled load
- Auto phase detect
- Max power control volume
- Current limit

Features

- Economical product
- Compact design
- Soft start with phase angle control and turning into zero-crossing control, on selecting zero-crossing mode.
- Test mode (Alarm functions are stopped)

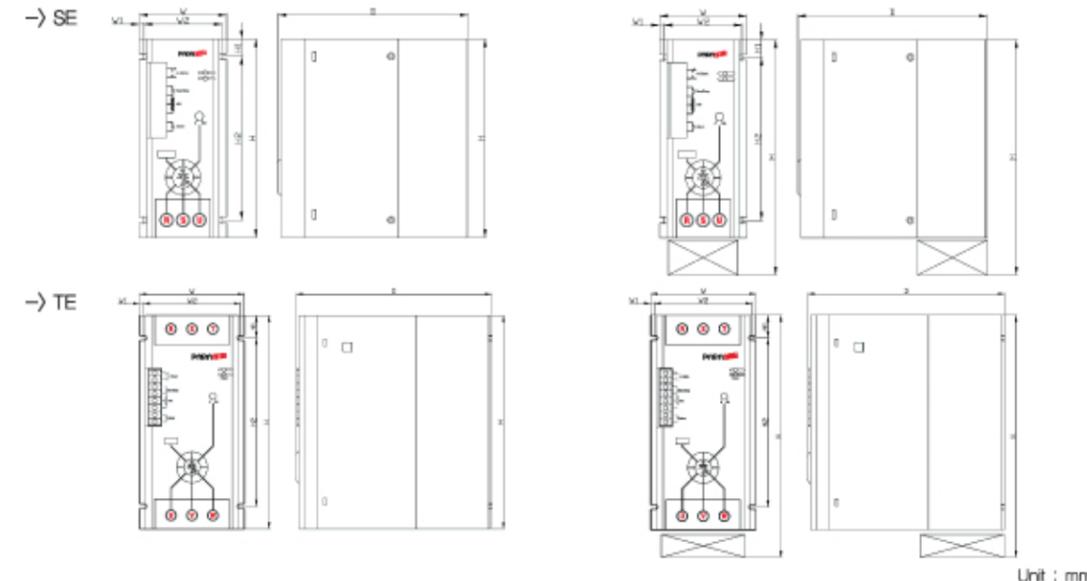
Specification

Contents	Specification		Contents	Specification	
	SE (Single Phase)	TE (Three Phase)		SE (Single Phase)	TE (Three Phase)
Rated Voltage	110V, 220V, 380V, 440V		Withstand Voltage	2,3KVAC (1 Min.)	
Allowable Voltage Difference	± 10% of Rated voltage		Insulation Resistance	220MΩ	
Rated Current	25A, 40A, 55A, 70A		Control Power	Dependent voltage	
Frequency	50/60Hz Auto detect		Product WT	1,5KGS	3,3KGS
Input Signal	Auto : 4~20mA (Default) 0~5V/1~5V/0~10VDC(Option)		Operating Temperature	Performance guarantee Temp. : 0~50℃ Operating guarantee Temp. : -5~60℃	
Control Method	Phase angle (Standard, current limit) Zero-crossing (Advanced fixed 8 mode)		Operation Humidity	5~80% (No dew condensation)	
Applicable Load	Resistive load (Zero-crossing or phase angle) Transformer coupled load - phase angle		Cooling Method	Natural cooling With cooling fan (Option)	
Control Mode Select	Dip switch		Alarm	N.O. (Normal open)	
Output Range	Zero-crossing 0~100% Phase angle 0~97%		Recommended Load Capacity	80% of rated current	70% of rated current
Display	1 Three Color LED		Minimum Load	1A	

Alarm Table

Alarm	SE (Single Phase)	TE (Three Phase)	Status
Over Current	Red On	Red On	Output current is more than 120%(SE), 130%(TE) of rated current
Over Temperature	Yellow On	Yellow On	Temp. of heatsink is more than 85℃
SCR Failure	Red Blinking	Yellow Blinking	Input signal is 0% and output current is more than 1A
Load Failure	Yellow Blinking	Red Blinking	Input signal is more than 50% but output current is less than 1A
Unbalanced Load		Green/Red Blinking in turn	Unbalanced load ratio among three phases exceeding 20%

Dimension



Unit : mm

Type	Rated Current(A)	W	W1	W2	H	H1	H2	D	Bolt	Remark
SE	25, 40, 55, 70	75	4	67	170	15	140	163	M4	
	25, 40, 55, 70	75	4	67	202	15	140	163	M4	With fan
TE	25, 40, 55, 70	115	4	107	235	25	185	215	M4	
	25, 40, 55, 70	115	4	107	265	25	185	215	M4	With fan

Everything in Digital Power Regulator

05 SES Power Regulator

SE – Special Digital Power Regulator



Ordering Code

S **E** **S** **2** - **0** **2** **5** - **PA** - **I** - **FN** - **PSD**
 ① ② ③ ④ ⑤ ⑥ ⑦

① Model	② Rated Voltage	③ Rated Current	④ Control Method	⑤ Input Signal	⑥ FAN (Option)	⑦ PSD (Option)
SES : SE Special	1 : 110V 2 : 220V 3 : 380V 4 : 440V	025 : 25A 040 : 40A 055 : 55A 070 : 70A 090 : 90A 110 : 110A 130 : 130A	PA : Phase Angle PI : Current Feedback PV : Voltage Feedback PW : Power Feedback ZC : Zero-Crossing	I : 4~20mA V : 0~10V	FN : With cooling fan NONE : Without fan	PSD : With PSD NONE : Without PSD

* Control method is only default. User can change control method with PSD or RS-485 communication

Features

- All control methods installed (Zero-crossing, phase angle, current feedback, voltage feedback, power feedback all included)
- Communication basically installed (Read/write) RS-485, Modbus RTU
- Two alarm relays (Warning - 1, Alarm - 1)
- Smart partial load failure detecting function installed (By simple operation - DIP switch on and off)
- Double heatsink temperature detection (60°C - Warning, 80°C - Alarm)
- PSD(PARA Smart Display) attachable - Option
- User-oriented product - every parameter can be changeable by users

Specification

Contents	Specification	Contents	Specification
Rated Voltage	110V, 220V, 380V, 440V	Withstand Voltage	2.3KVAC (1 Min.)
Allowable Voltage Difference	±10% of Rated voltage	Insulation Resistance	220MΩ
Rated Current	25A, 40A, 55A, 70A, 90A, 110A, 130A	Control Power	24VDC (Max 9W, Fan not included)
Frequency	50/60Hz Auto detect	Product WT	25A, 40A, 55A : 1.5KGS 70A, 90A, 110A, 130A : 2.6KGS
Input Signal	Auto : 4~20mA (Default) 0~5V/1~5V/0~10VDC(Optional)	Operating Temperature	Performance guarantee Temp. : 0~50°C Operating guarantee Temp. : -5~60°C
Control Method	Phase angle (Standard, current F/B, voltage F/B, power F/B), zero-crossing	Operating Humidity	5~80% (No dew condensation)
Applicable Load	Resistive load (Zero-crossing or phase angle) Transformer coupled load - phase angle	Cooling Method	25A, 40A, 55A : Natural cooling Above 55A : With cooling fan (Option)
Control Mode Select	By communication or PSD	Alarm	N.O. (Normal open)
Output Range	0~98%	Recommended Load Capacity	80% of rated current
Display	1 Three color LED & PSD(Optional)	Minimum Load	1A

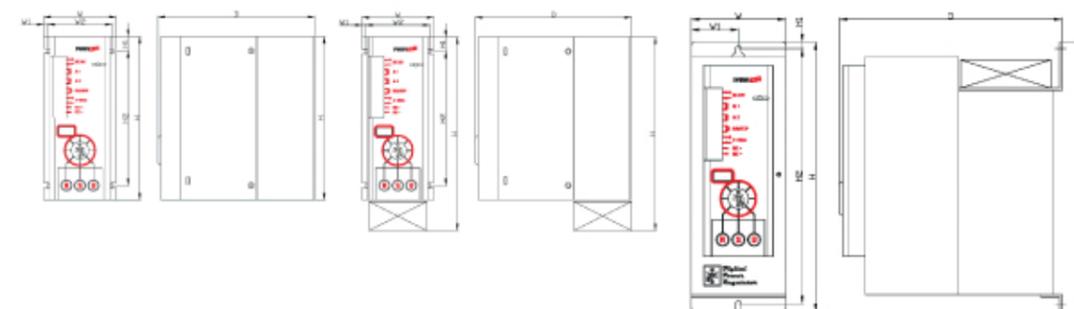
Alarm Table

Alarm	Alarm Condition	LED	Output	Alarm Output
Normal Operation	Normal Status	Green Blinking	Run	-
Stand By	Control power is on and input signal is zero.	Green On	Stop	-
Over Current	Output current is more than rated current.	Red On	Stop	AL 1
Over Temp.(60 °C)	Temperature of heatsink is more than 60°C	Yellow On	Run	AL 2
Over Temp.(80 °C)	Temperature of heatsink is more than 80°C	Yellow On	Stop	AL 1
SCR Failure	Input signal is 0% or main power is off and output current is more than 1A.	Red Blinking	100% Output regardless input signal	AL 1
Load Failure	Load failed	Yellow Blinking	Stop	AL 1
Fuse Failure	Fuse is blown	Red/Yellow Blinking in turn	Stop	AL 1
PLF	After auto-tuning for detecting partial load failure, when one or more loads are failed in parallel loads	Green/Yellow Blinking in turn	Run	AL 2
Fan Disorder	When cooling fan is out of order.	Green/Red Blinking in turn	Stop	AL 1
MPF (Main Power Failure)	When main power is not allowed to power regulator	Green/Yellow/Red Blinking in turn	-	-

Dimension

-> SES (25A, 40A, 55A)

-> SES (70A, 90A, 110A, 130A)



Unit : mm

Type	Rated Current(A)	W	W1	W2	H	H1	H2	D	Bolt	Remark
SES	25, 40, 55	75	4	67	170	15	140	163	M4	
	25, 40, 55	75	4	67	202	15	140	163	M4	With fan
	70, 90, 110, 130	84	42	-	240	6.5	227	198	M4	

Everything in Digital Power Regulator

06 TES Power Regulator

TE – Special Digital Power Regulator



Ordering Code

TES 2 - 025 - PA - I - 1P3L - PSD
 ① ② ③ ④ ⑤ ⑥ ⑦

① Model	② Rated Voltage	③ Rated Current	④ Control Method	⑤ Input Signal	⑥ Wiring (Option)	⑦ PSD (Option)
TES : TE Special	1 : 110V 2 : 220V 3 : 380V 4 : 440V	025 : 25A 040 : 40A 055 : 55A 070 : 70A 090 : 90A 110 : 110A 130 : 130A 160 : 160A 200A : 200A	PA : Phase Angle PI : Current Feedback PV : Voltage Feedback PW : Power Feedback ZC : Zero-Crossing	I : 4~20mA V : 0~10V	1P3L : Three single phase 3P3L : One three phase	PSD : With PSD NONE : Without PSD

* Control method is only default. User can change control method with PSD or RS-485 communication

Features

- Three single phase or one three phase product can be selected when ordering.
- All control methods installed (Zero-crossing, phase angle, current feedback, voltage feedback, power feedback all included)
- Communication basically installed (Read/write) RS-485, Modbus RTU
- Two alarm relays (Warning - 1, Alarm - 1)
- Smart partial load failure detecting function installed (By simple operation - DIP switch on and off)
- Double heatsink temperature detection (60°C - Warning, 80°C - Alarm)
- PSD(PARA Smart Display) attachable - Option
- User-oriented product - Every parameter can be changeable by user through communication or PSD.
- Cooling fan is basically installed.

Specification

Contents	Specification	Contents	Specification
Rated Voltage	110V, 220V, 380V, 440V	Withstand Voltage	2.3KVAC (1 Min.)
Allowable Voltage Difference	±10% of Rated voltage	Insulation Resistance	220MΩ
Rated Current	25A, 40A, 55A, 70A, 90A, 110A, 130A, 160A, 200A	Control Power	24VDC (Max 9W, Fan not included)
Frequency	50/60Hz Auto detect	Product WT	25A, 40A, 55A : 4.3KGS 70A, 90A, 110A, 130A, 160A, 200A : 9.0KGS
Input Signal	Auto : 4~20mA (Default)-3 input signal 0~5V/1~5V/0~10VDC(Optional)	Operating Temperature	Performance guarantee Temp. : 0~50°C Operating guarantee Temp. : -5~60°C
Control Method	Phase angle (Standard, current F/B, voltage F/B, power F/B), Zero-crossing	Operating Humidity	5~80% (No dew condensation)
Applicable Load	Resistive load (Zero-crossing or phase angle) Transformer coupled load - phase angle	Cooling Method	With cooling fan (Basically installed)
Control Mode Select	By Communication or PSD	Alarm	3 Relays / N.C.(Normal close) changeable to N.O.
Output Range	0~98%	Recommended Load Capacity	70% of rated current
Display	2 Three color LED & PSD(Optional)	Minimum Load	1A

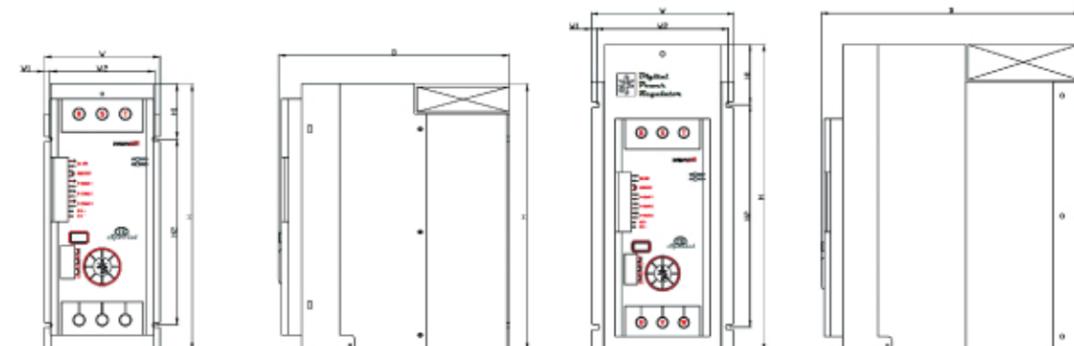
Alarm Table

Alarm	Alarm Condition	LED 1	LED 2	Output	Alarm Output
Normal Operation	Normal Status	Green Blinking	-	Run	-
Stand By	Control power is on and input signal is zero.	Green On	-	Stop	-
Over Current	Output current is more than rated current	Red On	Red On	Stop	AL 1
Over Temp,60°C	Temperature of heatsink is more than 60°C	Yellow On	Yellow On	Run	AL 2
Over Temp,80°C	Temperature of heatsink is more than 80°C	Red On	Yellow On	Stop	AL 1
SCR Failure	Input signal is 0% or main power is off, output current is more than 1A.	Red Blinking	Red Blinking	100% Output regardless input signal	AL 1
Load Failure	Load failed	Red On	Yellow Blinking	Stop	AL 1
Fuse Failure	Fuse is blown	Red On	Red/Yellow Blinking in turn	Stop	AL 1
PLF	After auto-tuning for detecting partial load failure, when one or more loads are failed in parallel loads	Yellow On	Yellow/Green Blinking in turn	Run	AL 2
Fan Disorder	Control Power is on but fan is not working	Red On	Red/Green blinking in turn	Stop	AL 1
MPF (Main Power Failure)	When main power is not allowed to power regulator	Green On	Yellow Blinking	-	-

Dimension

-> TES (25A, 40A, 55A, 70A)

-> TES (90A, 110A, 130A, 160A)



Unit : mm

Type	Rated Current(A)	W	W1	W2	H	H1	H2	D	Bolt	Remark
TES	25, 40, 55, 70	115	5	105	265	55	185	230	M4	
	70, 90, 110, 130, 160, 200	154	6	142	330	185	215	280	M5	

Everything in Digital Power Regulator

07 P – Type Power Regulator

P – Type : Premium Power Control



Ordering Code

S P P 2 - 0 2 5 - 0 0 0 0 - 0 0 0 0
 ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪ ⑫ ⑬

① Phase	② Control Method	③ Model	④ Rated Vltage	⑤ Rated Current	⑥ Feedback Option	⑦ Communication Option
S : Single phase	P : Phase angle	P : P-Type	1 : 110V 2 : 220V 3 : 380V 4 : 440V	25A ~ 500A	I : Current feedback V : Voltage feedback W : Power feedback	C : With RS485 Communication
T : Three phase	Z : Zero-crossing					

⑧ PLF Option	⑨ T option	⑩ Fan disorder detect	⑪ ⑫ ⑬
PLF : Partial Load Failure	T : Additional 60°C Temp. sensor attached	DCFN : Fan disorder detect - DC24V should be supplied	Customer's other requirement

Features

- Alarm and output current is displayed on FND.
- Parameter setting value can be seen on FND window
- Easy and cost saving maintenance

Specification

Contents	Specification		Contents	Specification	
	SP / SZ (Single phase)	TP / TZ (Three phase)		SP / SZ (Single phase)	TP / TZ (Three phase)
Rated Voltage	110V, 220V, 380V, 440V		Withstand Voltage	2.3KVAC (1 Min.)	
Allowable Voltage Difference	±10% of Rated voltage		Insulation Resistance	220MΩ	
Rated Current	25A ~ 500A		Control Power	AC220V	
Frequency	50/60Hz Auto detect		Product WT	Refer to dimension	
Input Signal	Auto : 4~20mA (Default) 0~5V/1~5V/0~10VDC(Optional)		Operating Temperature	Performance guarantee Temp. : 0~50°C Operating guarantee Temp. : -5~60°C	
Control Method	Select phase angle or zero-crossing on ordering		Operation Humidity	5~80% (No dew condensation)	
Applicable Load	Resistive load (Zero-crossing or phase angle) Transformer coupled load - phase angle		Cooling Method	25A~70A : Natural cooling 25A~55A : Natural cooling Above 70A : Cooling fan Above 55A : Cooling fan	
Control Mode Select	Should change PCB's		Alarm	N.O. (Normal open)	
Output Range	Zero-crossing 0~99% Phase angle 0~98%		Recommended Load Capacity	70% of Rated current	70% of Rated current
Display	1 FND, 4 LED's		Minimum Load	10% of Rated current	

FND Display Message

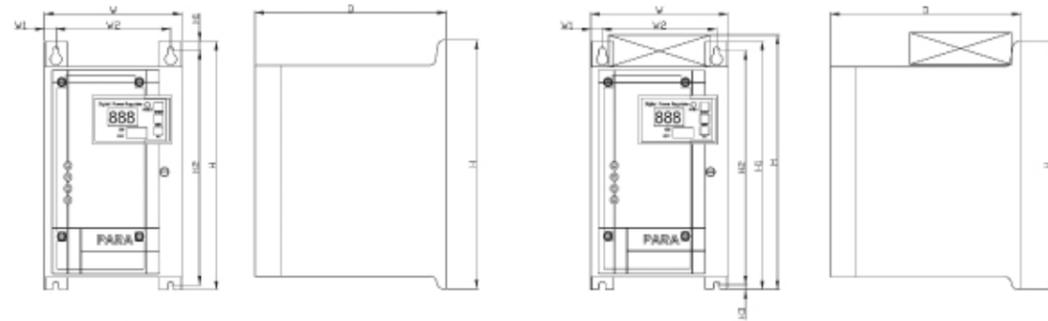
Display Messag	Description
SPP	Single phase/Phase angle
SPZ	Single phase/Zero-crossing
TTP	Three phase/Phase angle
TTZ	Three phase/Zero-crossing
FES	Resistive load
EFF	Transformer coupled load
OFF	Main power is OFF
BOE	Over current ALARM
BSO	Over temperature ALARM
LFA	Load failure ALARM
SCA	SCR failure ALARM
FUS	FUSE failure ALARM
FAN	FAN failure ALARM (Option)

Alarm Table

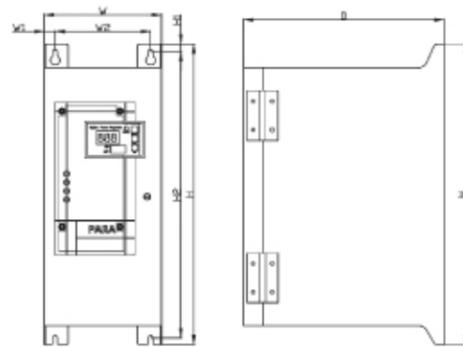
Explanation	PILOT LED	OC LED	OT LED	UL LED	ALARM
Normal Operation	Green Blinking	-			
O.C (100~120%)	Yellow Blinking	Red Blinking			WARNING
O.C (More than 120%)	Red ON	Red ON			ALARM
O.T (60°C) (OPTION)	Yellow Blinking		Red Blinking		ALARM
O.T (85°C)	Red ON		Red ON		ALARM
U.L. (Unbalanced Load)	Yellow Blinking			Red Blinking	ALARM
LIN	Red ON			Red ON	ALARM
FUSE	Red ON	Red ON	Red ON	Red ON	ALARM
SCR	Red ON	Red ON		Red ON	ALARM
Partial Load Failure (OPTION)	Yellow Blinking			Red Blinking	ALARM
FAN (OPTION)	Red ON		Red ON	Red ON	ALARM

Dimension

→ Single phase (25A, 40A, 55A, 70A)



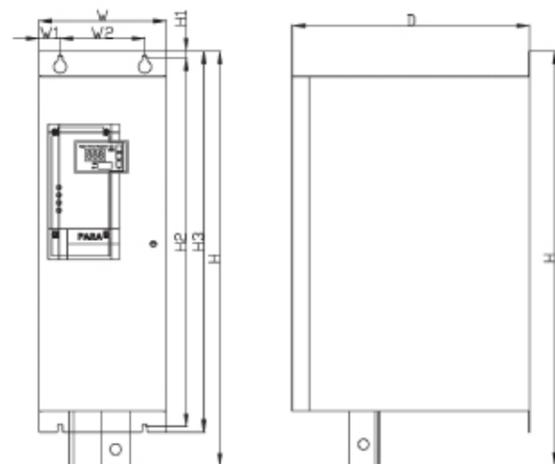
→ Single phase (90A~320A)



Unit : mm

Type	Rated Current(A)	W	W1	W2	H	H1	H2	D	Bolt	Net WT.	Remark
P-Type Single phase	25, 40, 55, 70	108	9	90	195	7	184	150	M4	2.2Kgs	
	25, 40, 55, 70	108	9	90	200	7	184	150	M4	2.5Kgs	With fan
	90, 110, 130, 160, 200	123	11.5	100	315	8	300	210	M4	90,110,130 : 4.7Kgs 160,200 : 5.9Kgs	
	250, 320	127	13.5	100	325	10	305	260	M5	7.6Kgs	

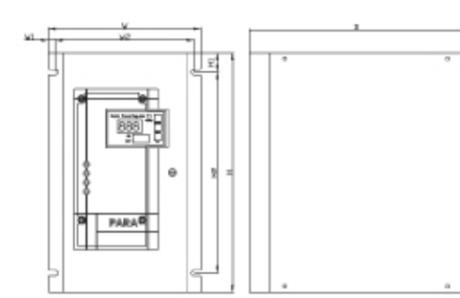
→ Single phase (400A, 500A)



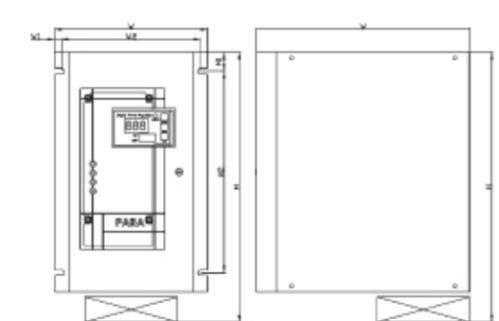
Unit : mm

Type	Rated Current(A)	W	W1	W2	H	H1	H2	H3	D	Bolt	Net WT.	Remark
P-Type Single phase	400, 500	150	25	100	526	8	435	450	280	M4	14.2Kgs	

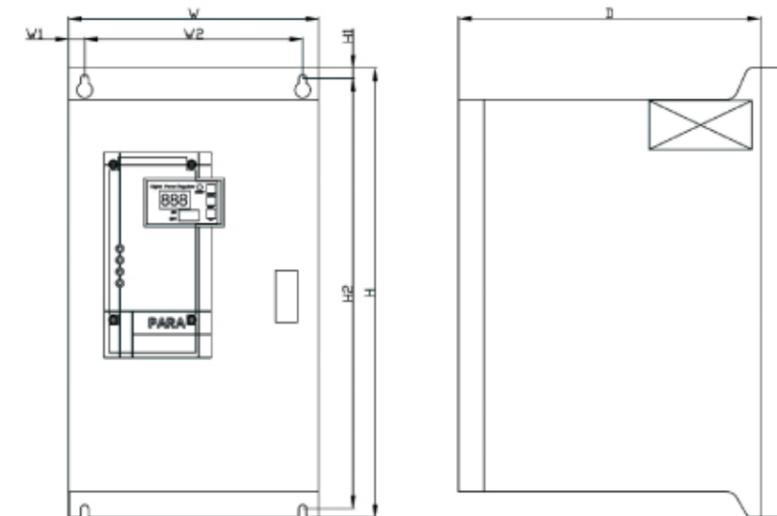
→ Three phase (25A~55A)



→ Three phase (70A / 25A, 40A, 55A with cooling fan)



→ Three phase (90~500A)



Unit : mm

Type	Rated Current(A)	W	W1	W2	H	H1	H2	D	Bolt	Net WT.	Remark
P-Type Three phase	25, 40, 55	152	7	138	238	19	200	212	M4	25, 40, 55A : 4.6Kgs 70A : 4.9Kgs	
	25, 40, 55, 70	152	7	138	268	19	200	212	M4	25, 40, 55A : 4.9Kgs 70A : 5.2Kgs	With fan
	90, 110, 130, 160, 200	196	8	170	350	8	335	235	M5	90,100A : 9.3Kgs 130,160,200A : 10.2Kgs	
	250, 320	250	25	200	415	10	395	285	M5	17.2Kgs	
	400, 500	330	55	220	530	10	510	310	M6	400A : 34.1Kgs 500A : 40.6Kgs	



Everything in Digital Power Regulator

08 FLEX Power Regulator

FLEX : EtherCAT Communication



Ordering Code

FLEX 2 0 2 5 - 1P3L - PSD - RS - E - MPD
 ① ② ③ ④ ⑤ ⑥ ⑦ ⑧

① Model	② Rated Voltage	③ Rated Current	④ Wiring	⑤ PSD Option	⑥ RS-485 Option	⑦ EtherCAT Option	⑧ MPD Option
FLEX	1 : 110V 2 : 220V 3 : 380V 4 : 440V	025 : 25A 040 : 40A 055 : 55A 070 : 70A 090 : 90A 110 : 110A 130 : 130A 160 : 160A	1P3L : Three single phase 3P3L : One three phase	PSD : With PSD NONE : Without PSD	RS : With RS-485 NONE : Without RS-485	E : With EtherCAT NONE : Without EtherCAT	MPD : With MPD NONE : Without MPD

Features

- Read and write function through EtherCAT communication.
- Both phase angle and zero-crossing control.
- Current feedback is basically installed.

Specification

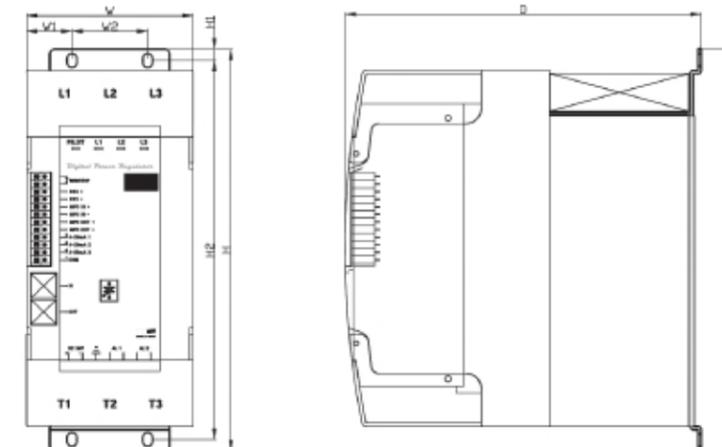
Contents	Specification	Contents	Specification
Rated Voltage	110V, 220V, 380V, 440V	Withstand Voltage	2,3KVAC (1 Min.)
Allowable Voltage Difference	± 10% of Rated voltage	Insulation Resistance	220MΩ
Rated Current	25A, 40A, 55A, 70A, 90A, 110A, 130A, 160A	Control Power	24VDC (Max 8W, Fan not included)
Frequency	50/60Hz Auto detect	Product WT	25A, 40A, 55A, 70A : 4.3KGS 90A, 110A, 130A, 160A : 9.0KGS
Input Signal	Auto : 4~20mA (Default)-3 Input Signal 0~5V/1~5V/0~10VDC(Optional)	Operating Temperature	Performance guarantee Temp. : 0~50°C Operating guarantee Temp. : -5~60°C
Control Method	Phase angle (Standard, current F/B) zero-crossing	Operating Humidity	5~80% (No dew condensation)
Applicable Load	Resistive load (Zero-crossing or phase angle) Transformer coupled load - phase angle	Cooling Method	With cooling fan (Basically installed)
Control Mode Select	By EtherCAT, RS-485 communication or PSD	Alarm	2 Relays / N.C.(Normal close) changeable to N.O.
Output Range	0~90%	Recommended Load Capacity	70% of rated current
Display	2 Three color LED's & PSD(Optional)	Minimum Load	1A

Alarm Table

Alarm	Alarm Condition	PILOT LED	LED 1	LED 2	LED 3	Output	Alarm Output
Main Power On	Main Power is On	Green Blinking		Green Blinking	-	Run	-
Main Power Off	Main Power is Off	Green Blinking		Green On	-	Stop	-
Over Current 1	Output current is more than rated current	Red On	Red On for relative channel			Relative Channel Stop	AL 1
Over Current 2	Output current is less than rated current by 3A	Red Blinking	Red Blinking for relative channel			Relative Channel Run	AL 2
Over Temp.(60 °C)	Temperature of heatsink is more than 60 °C		Red Blinking	Red Blinking	Red Blinking	Run	AL 2
Over Temp.(80 °C)	Temperature of heatsink is more than 80 °C		Red On	Red On	Red On	Stop	AL 1
SCR Failure	Input signal is 0% or main power is off, output current is more than 1A.	Red On	Red On for relative channel			Relative channel-100% Output regardless input signal	AL 1
Load Failure	Load failed	Red Blinking	Red Blinking for relative channel			Relative Channel Stop	AL 2
Fuse Failure	Fuse is blown	Red On	Red On for relative channel			Relative Channel Stop	AL 1
PLF	After auto-tuning for detecting partial load failure, when one or more loads are failed in parallel loads	Red Blinking	Red Blinking for relative channel			Run	AL 2
Fan Disorder	Control power is on but fan is not working		Red On	Red On	Red On	Stop	AL 1

Dimension

-> FLEX



Unit : mm

Type	Rated Current(A)	W	W1	W2	H	H1	H2	D	Bolt	Remark
FLEX	25, 40, 55, 70	110	30	50	265	7.5	163	235	M5	

Everything in Digital Power Regulator

09 SMART Power Regulator



Nothing is smarter than SMART



Ordering Code



Model	① Control Method	② Wiring	③ Option
SMC (Smart Main Controller)	PA, Phase Angle (P,A-N) PI, Current Feedback (P,A-I) PV, Voltage Feedback (P,A-V) PW, Power Feedback (P,A-W) ZC, Zero-Crossing (ZCS) PZ, Mixed Control (PZM)	1P 1L 1P 2L 1P 3L 2P 2L 3P 2L 3P 3L 3P 4L 3P 6L	C, Communication R, Analogue output S1000, Separated PSD-1000 S2000, Separated PSD-2000 (D-SUB Cable-5m)

- * Control method can be changeable to any of said above by users
- * One designated control method by user is only for factory default.
- * Communication option and analogue output option can not be compatible.



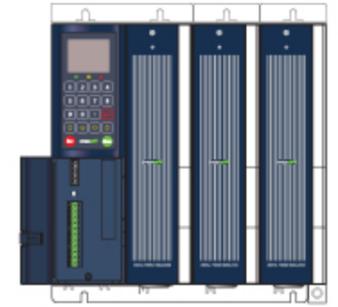
PM	① Rated Voltage	② Rated Current
PM (Power Module)	1, 110V 2, 220V 3, 380V 4, 440V * Other than above, please consult us	10A~2000A

Specification

Contents	Specification	Contents	Specification
Rated Voltage	110V, 220V, 380V, 440V (Min. 50V, Max 500V)	Withstand Voltage	3.0KVAC (1 Min.)
Allowable Voltage Difference	±10% of Rated voltage	Insulation Resistance	10MΩ
Rated Current	25A ~ 2000A	Control Power	24VDC (Max 15W, Fan not included)
Frequency	50/60Hz Auto detect	Product WT	Refer to fuse and WT table
Input Signal	Auto : 4~20mA (Default) 3 Input signal (1P3L)	Operating Temperature	Performance guarantee Temp. : 0~50°C Operating guarantee Temp. : -5~60°C
Control Method	Phase angle (Standard, current F/B, voltage F/B, power F/B), zero-crossing	Operating Humidity	5~80% (No dew condensation)
Applicable Load	Resistive load (Zero-crossing or phase angle) Transformer coupled load - phase angle	Cooling Method	Less than 55A : Natural Cooling Above 55A : Cooling Fan
Control Mode Select	RS-485 communication or PSD	Alarm	6 Relays / 3 for alarm & 3 for fan control
Output Range	Phase angle 0~99.8% Zero-crossing : 0~99.8%	Recommended Load Capacity	70% of rated current
Display	Detachable color LCD	Minimum Load	1A

Pictures



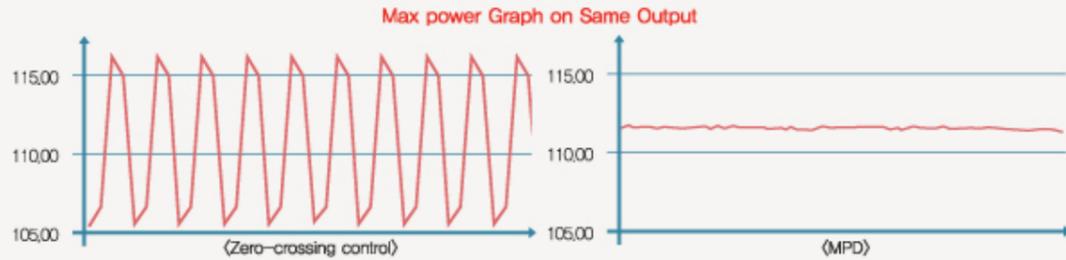


Everything in Digital Power Regulator

Features

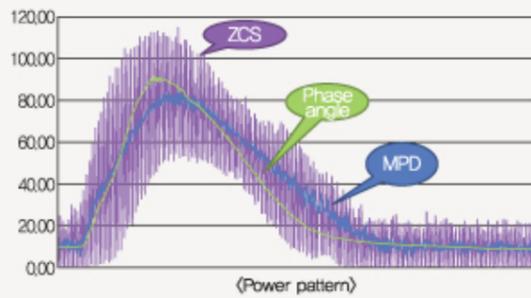
01 SMART MPD (Max Power Distribution—Patent)

A. Distributing momentary maximum output power by sequential control through synchronization among SMART power regulators, when many power regulators are operated at the same time.

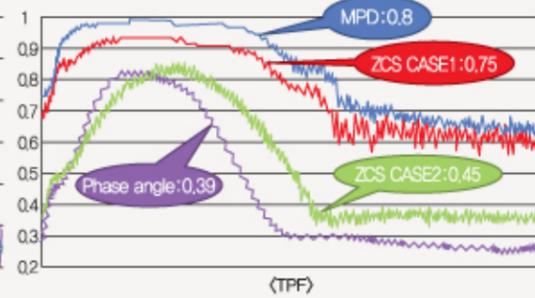


B. Power Pattern Comparison to Control Method

- Standard Zero-Crossing : Much difference between max power and min. power.
- MPD Zero-Crossing : Stable power is used by synchronization among power regulators.

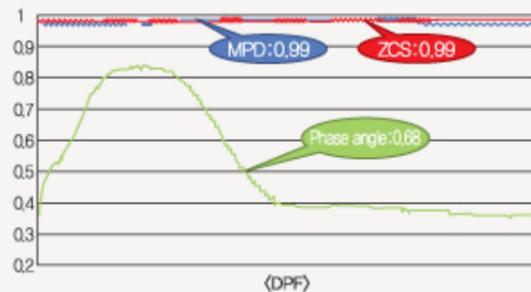


C. TPF Power Factor Comparison to Control Method



- MPD : Average power factor is more than 0.8 (Stable and High Efficient).
- Standard Zero-Crossing (CASE1/CASE2) : Different power factor to overlapping of output power.
- CASE1 & CASE2 : Data from same machine on the same condition
- Phase angle : Low power factor by chopping the sinusoidal wave

D. DPF Comparison to Control Method

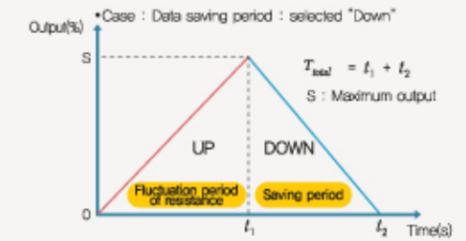


- MPD & standard zero-crossing : 0.99 almost close to 1
- Phase angle : Low power factor by chopping the sinusoidal wave

* Field test date : Jan, 2014
 Test Equipment : Watt-hour meter - ROOTECH ACCURA2300
 Power analyzer - FLUKE435
 * Power Factor
 1) TPF (Total Power Factor) : Power factor considering harmonic contents.
 2) DPF (Displacement Power Factor) : Phase difference(cosθ) between current and voltage.

02 SMART PLF (Partial Load Failure—Patent)

After saving output current, output voltage and resistance value of each phase through allowing output from 1% to 100% automatically, SMART power regulator detects partial load failure and alarms when multiple loads are connected in parallel.

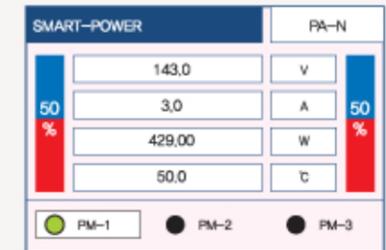


03 SMART Control

Selectable any kind of control method according to type of load, ambient circumstances and user's convenience. Phase angle control(Current feedback, voltage feedback, power feedback), zero-crossing and PZM(Phase angle + zero-crossing) can be selectable. Especially PZM control is operating on phase angle control and switching to zero-crossing control automatically(Or zero-crossing control to phase angle control) by user's options such as outer event relay, period of time or resistance value of load.

04 SMART Display

Displaying voltage/current/power/temperature of Heat sink (or resistance value) enhancing user's convenience. And both graphs of input signal and output power increase visibility.



05 SMART CPU

Powerful 32Bit CPU (12Bit ADC). High speed, stable and optimal control.

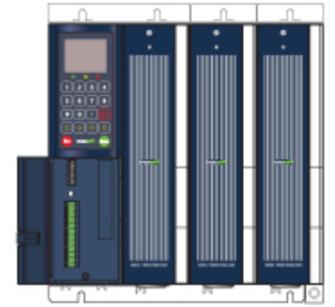
06 SMART Self Diagnosis Function

Self diagnosing the status of power regulator such as wiring and each parameter.

07 SMART Test Function

Testing power regulator with small load by allowing temporary input signal when actual load can not be installed.

Everything in Digital Power Regulator

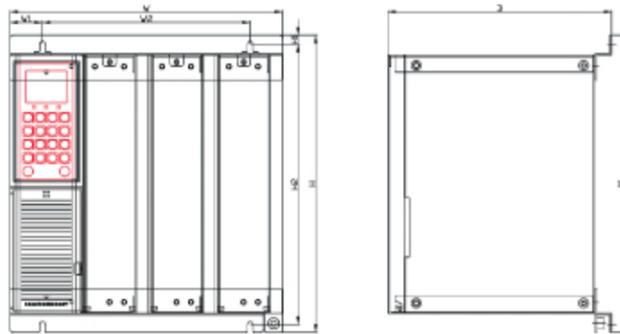


Fuse and Weight of Product

Model	10A	25A	40A	55A	70A	90A	110A	130A
Fuse	Bussmann 35FE	Bussmann 50FE	Bussmann 80ET	Bussmann 100FE	Bussmann 170M 1367 100A	Bussmann 170M 1368 125A	Bussmann 170M 1369 160A	Bussmann 170M 1370 200A
Net WT. (SMC1+PM1)	4.2	4.2	4.2	4.2	5.1	5.1	5.1	5.1
Net WT. (SMC1+PM2)	6.8	6.8	6.8	6.8	8.6	8.6	8.6	8.6
Net WT. (SMC1+PM3)	9.4	9.4	9.4	9.4	12.1	12.1	12.1	12.1
Model	160A	200A	250A	320A	400A	500A	Over 500A	
Fuse	Bussmann 170M 1371 250A	Bussmann 170M 1372 315A	Bussmann 170M 2620 350A	Bussmann 170M 2621 400A	Bussmann FWH-500A	Bussmann FWH-600A	Consult Us	
Net WT. (SMC1+PM1)	5.1	5.1	8.3	8.3	12.1	12.1		
Net WT. (SMC1+PM2)	8.6	8.6	14.9	14.9	22.5	22.5		
Net WT. (SMC1+PM3)	12.1	12.1	21.5	21.5	32.9	32.9		

Dimension

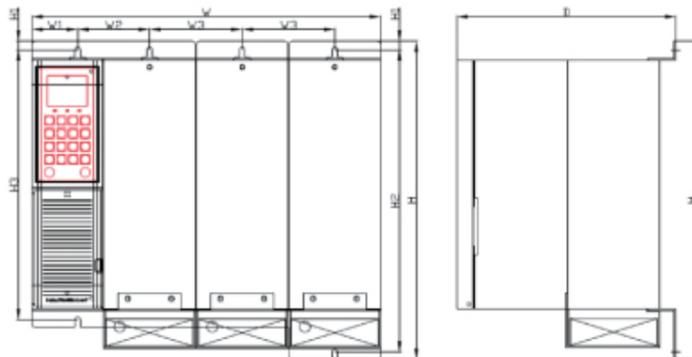
→ 10-55A



Unit : mm

Type	Rated Current(A)	W	W1	W2	H	H1	H2	D	Bolt	Remark
SMART	10, 25, 40, 55	244	29	186	265	8	250	201	M4	

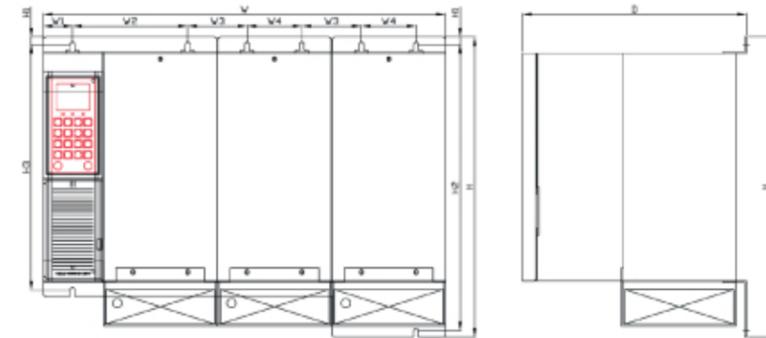
→ 70-200A



Unit : mm

Type	Rated Current	W	W1	W2	W3	H	H1	H2	H3	D	Bolt	Remark
SMART	70, 90, 110, 130, 160, 200	320	42	66	85	295	8	280	250	201	M4	

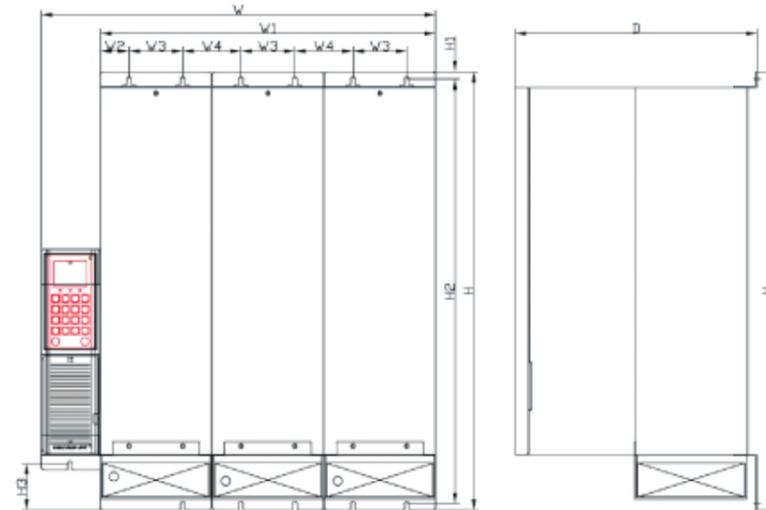
→ 250-320A



Unit : mm

Type	Rated Current	W	W1	W2	W3	W4	H	H1	H2	H3	D	Bolt	Remark
SMART	250, 320	440	32	126	65	60	330	8	315	270	245	M4	

→ 400-500A



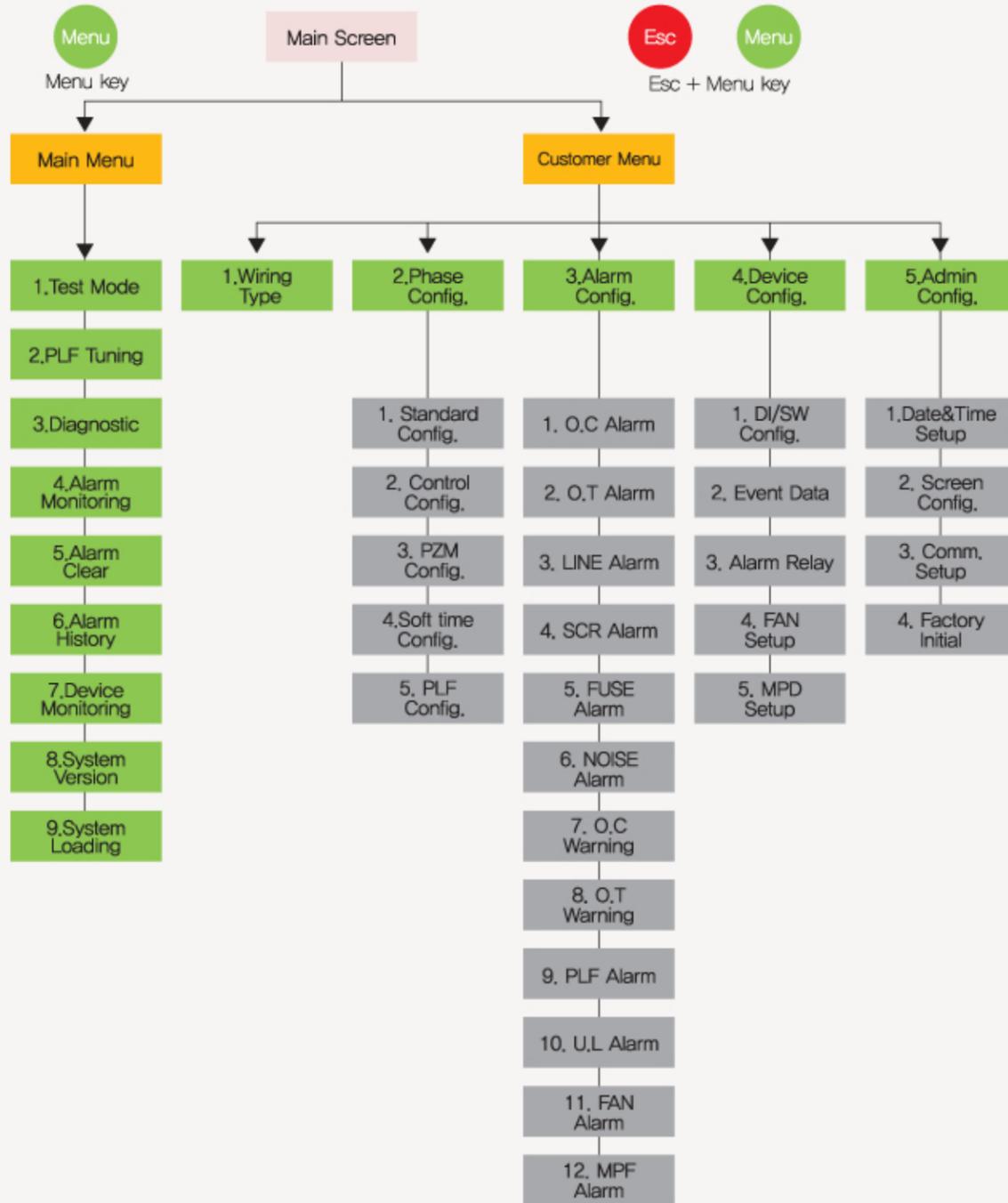
Unit : mm

Type	Rated Current	W	W1	W2	W3	W4	H	H1	H2	H3	D	Bolt	Remark
SMART	400, 500	440	374	32	60	65	490	8	475	52	270	M4	

Everything in Digital Power Regulator

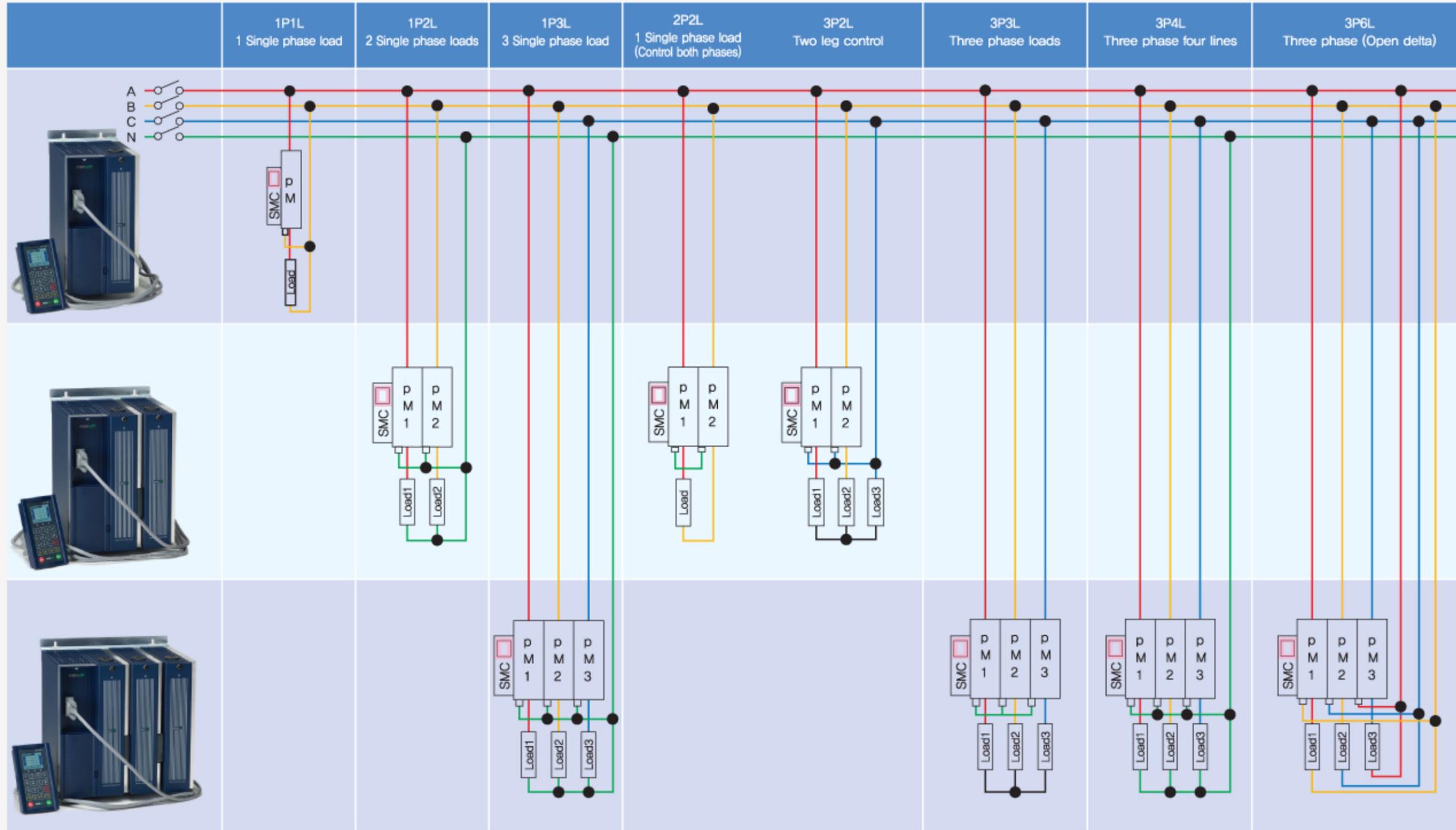
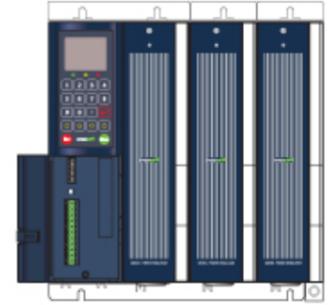


Menu Block Diagram



Everything in Digital Power Regulator

Load Wiring

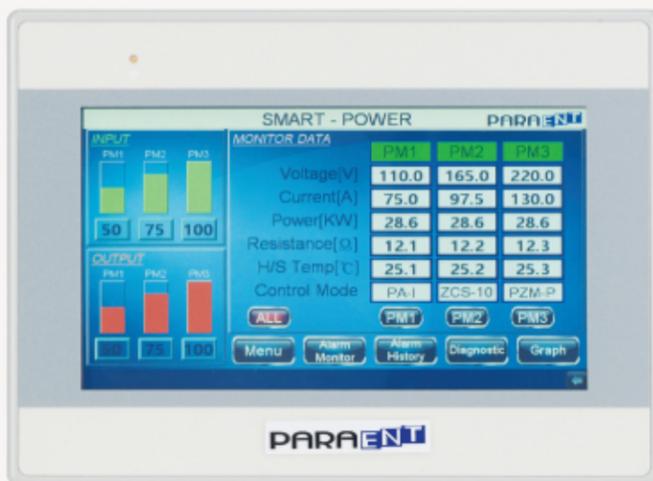


Everything in Digital Power Regulator

10 PARA Smart Display : PSD – 2000

Look wider : PSD – 2000 !!!

Exchangeable for PSD – 1000



PARA Smart Display : PSD – 2000

Wider Screen

- 7 Inch full touch screen –Easy look, easy operation
- Direct move to MENU, ALARM MONITOR, ALARM HISTORY, DIAGNOSTIC & GRAPH by one touch on screen.
- Output status against input signal is easily shown on bar graph.
- All parameters can be monitored on one screen
- Alarm message is shown on popup window and alarm status display bar below



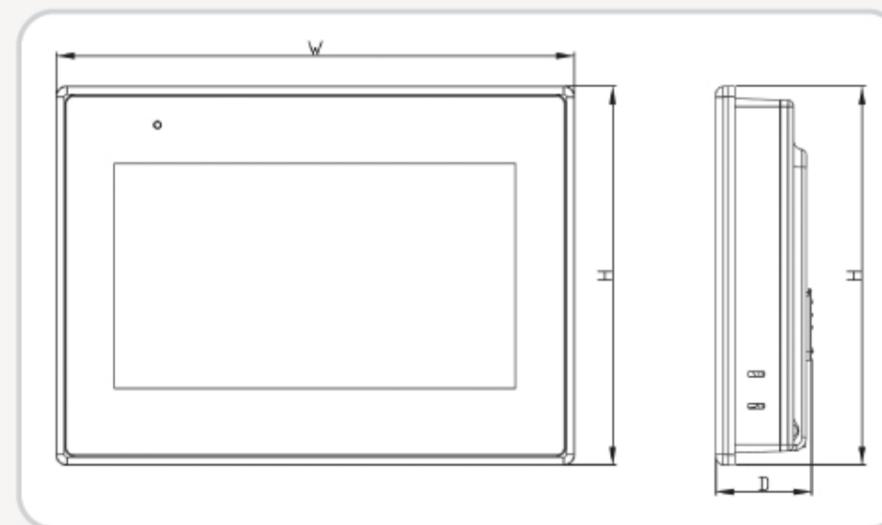
Increased Memory

- Basic RAM 128MB and flash memory 128MB
- Four day data can be saved into inner memory when saving period is selected 1 second. And expandable to 65G with USB
- For 128GB USB memory can save almost one month data when saving period is selected 1 second.

More Flexible

- Applicable not only for Smart power regulator but other models like SES/TES.
- All data can be converted to CVC file through exclusive tool
- 10 alarm history is saved.
- Expandable to use RS485 and Ethernet in near future.

Dimension



Unit : mm

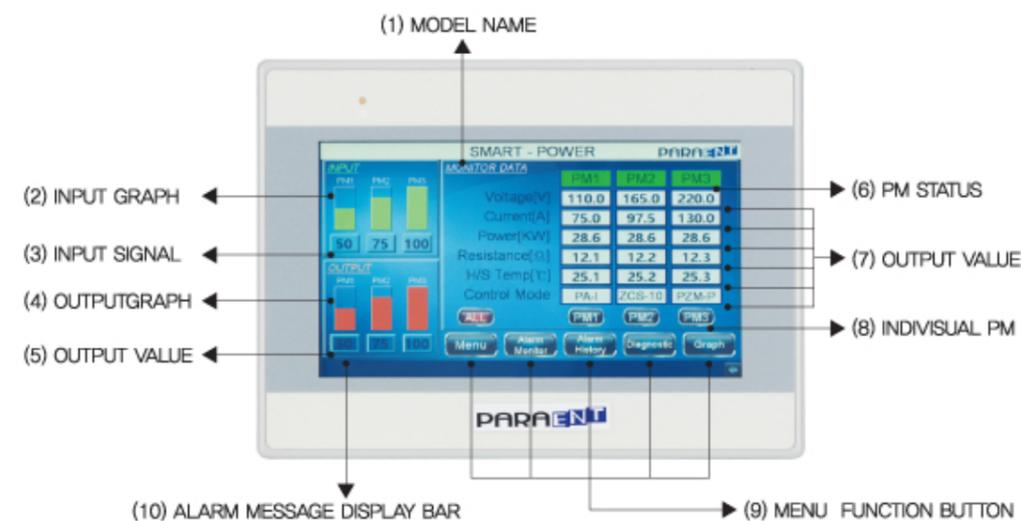
Type	W	H	D	Remark
PSD-2000	200,3	146,3	37	

Everything in Digital Power Regulator

Specification

Display	Resolution	800 X 480
	Brightness(cd/m)	350
	Contrast Ratio	500:1
	Backlight Type	LED
	Backlight Life Time	>30,000Hrs
	Colors	16.7M
Touch Panel	Type	4 Wires resistive type
	Accuracy	Active Area Length(X) 2%, Width(Y) ±2%
Memory	Flash	128MB
	RAM	128MB
I/O Ports	USB Host	USB2.0X 1
	Ethernet	10/100 BASE T X 1
	COM Port	COM1 : RS232 COM2 : RS485 2W/4W COM3 : RS485 2W
RTC		Built in
Power	Control Power	24±20%VDC
	Power Isolation	Built in
	Power Consumption	350mA@24VDC
	Voltage Resistance	500VAC (1Min.)
	Isolation Resistance	Exceed 50MΩ at 500VDC
Physical Dimension	Vibration Endurance	10 to 25Hz(X,Y,Z direction 2G 30Min.)
	PCB Coating	Yes
	Enclosure	Plastic
	Dimension	(W)200.3 X (H)146.3 X (D)34.0 mm
	Panel Cutout	192 X 138 mm
Environment	Weight	Approx. 0.6Kgs
	Mount	Panel Mount
	Protection Structure	NEMA4/IP65 Compliant Front Panel
	Storage Temp.	20°C ~ 60°C
	Operating Temp.	0°C ~ 50°C
	Relative Humidity	10%~90% (Non condensing)

Main Screen



Menu Block Diagram

