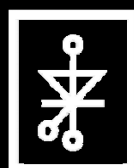


**DIGITAL**  
power  
**REGULATOR**



**USER MANUAL**

– DPR M TYPE –

2007. 09. 12

**PARA**ENT

**\* Contents \***

1. Notice	-----	3
2. General Specification	-----	6
3. Each part & Function	-----	7
4. Control Part	-----	8
5. Alarm Display	-----	9
6. Terminal Block & Wiring		
①. Control Signal & PCB Power Wiring	-----	10
②. Alarm & "S" Phase Wiring	-----	11
③. Connection of Main Power & Load	-----	12
7. Dimensions	-----	14
8. Maintenance	-----	17

## ABOUT PRODUCTS & SERVICES

\* Term of guarantee of this product is 1 year from the purchase date.

### Charged Services




-Please read the manual in advance, as a service charge will be imposed for any service request on a product without defects.

When a defect occurs due to mishandling or improper repair.	<ul style="list-style-type: none"> <li>A defect because a user doesn't follow the instructions in the manual.</li> <li>A defect caused by not following rating, current capacity, or using abnormal voltage or power.</li> <li>A defect caused by using components that our company doesn't designate.</li> <li>A defect caused by repair work of non-specialists.</li> <li>Alternation of fuse and consumption goods.</li> <li>A defect caused by natural calamities.</li> </ul>
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### Product installation environments

- Install this product vertically to activate ventilation and do not use it in or around flammable, explosive, corrosive, and humid environments.

### Symbol explanation

Mark	Name	Explanation
	Notice for electric shock	This symbol marks the parts where there is danger of electric shock. Power must be turned off for maintenance or repair of the product.
	Notice Warning Danger	This symbol indicates risk of death or serious injury. When the product is used incorrectly, it could cause property damage.
	Grounding	To prevent malfunction, you must operate grounding. To prevent electric shock or noise from the outside.

**NOTICES FOR SAFETY**

1. Install
  - 1) Before installing this machine, install main power circuit breaker (NFB) and Magnetic switch on the outside of the main body for safety.
  - 2) If, after transport or storage in humid conditions, equipment could fail to meet all the safety requirement, the install instruction shall 4 hour of operation to dry out the equipment and restore it to normal condition.
2. Ground type 1 grounding or special type 3 grounding in the exterior box of the machine to prevent electric shock.
3. Check that voltage of provided power is same as the voltage of the machine and the rated current is not exceeding proper capacity of load current. Then, provide the power.  
(It is recommended that you do not use a machine at over 70% of the rated current condition.)
4. Fuse
  - 1) To prevent fire and to protect the machine, use a fast-acting fuse, which is designated by our company. **(Refer to the product label)**
  - 2) Must turn off the main power to exchange the fuse.
  - 3) The fuse used must be of the specified rating (current, voltage, type) in order to prevent a fire hazard.
5. Environments
  - 1) Adjust ventilation and temperature so that temperature inside the control panel is not over 45°C.
  - 2) Do not operate the machine where there is a risk of inflammability, explosiveness, corrosion or humidity. (RH 70% below at 40°C)
  - 3) The equipment must not be mounted on a surface of flammable material.
  - 4) Live parts may need to be accessible, a statement requiring the fitting of a residual current-opened circuit-breaker.
6. Disassembly or remodeling of the machine
  - 1) Never change components voluntarily with the exception of changes of fuse or thyristor.
  - 2) Our company can not guarantee operation of the machine when the volume of the machine or component is altered voluntarily. When a problem occurs, please contact our company's A/S Department.
7. Check and repair
  - 1) Before checking the machine, cut off the power and beware of electric shock.
  - 2) Check fastening condition of bolts and nuts of terminal parts.
  - 3) When bolts of terminal are loose, it could generate heat so wiring can be damaged or fire can occur. Check this condition periodically.
8. This manual could be revised without notification for improvements of functions of the machine.
9. Responsibilities and guarantee
  - 1) Must preserve notices for handling, maintenance, and repair of the machine.
  - 2) Our company is not responsible for damage, which occurs due to not following these instructions.



**Must preserve notices during handling the machine to ensure safety.**

**NOTICES FOR SAFETY**

10. Cleaning

- 1) Do not spray water directly at the product. (A fire and electric shock will be occurred)
- 2) Please unplug the product
- 3) Do not use chemical liquid. Discoloration will be occurred.
- 4) Appropriate decontamination is carried out if hazardous material is split onto or into the equipment.
- 5) Cleaning and decontamination necessary as a safeguard when laboratory heating equipment and any accessories are maintained, required and transferred.

11. Protection against electric shock

- 1) The hazardous live parts are supplied from a circuit protected by a residual current operated circuit-breaker which interrupts the supply at a differential current of 30mA or less, or the installation such a circuit-breaker.
- 2) Conveyor belts, muffles, etc. which are conductive are connected to the protective conductor terminal.
- 3) Please express clearly the necessary method to be carried for protection and method for protection on where operator or other personnel can be contacted such as rechargeable part or terminal connected to conductive circuit.  
(ex. Isolation tools, isolation cable)

12. A/S Request

**A/S Department**

**TEL : +82-31-831-8312**

**FAX : +82-31-831-8314**

**Mail : [paratec@paratec.co.kr](mailto:paratec@paratec.co.kr)**



**Must preserve notices during handling the machine to ensure safety.**

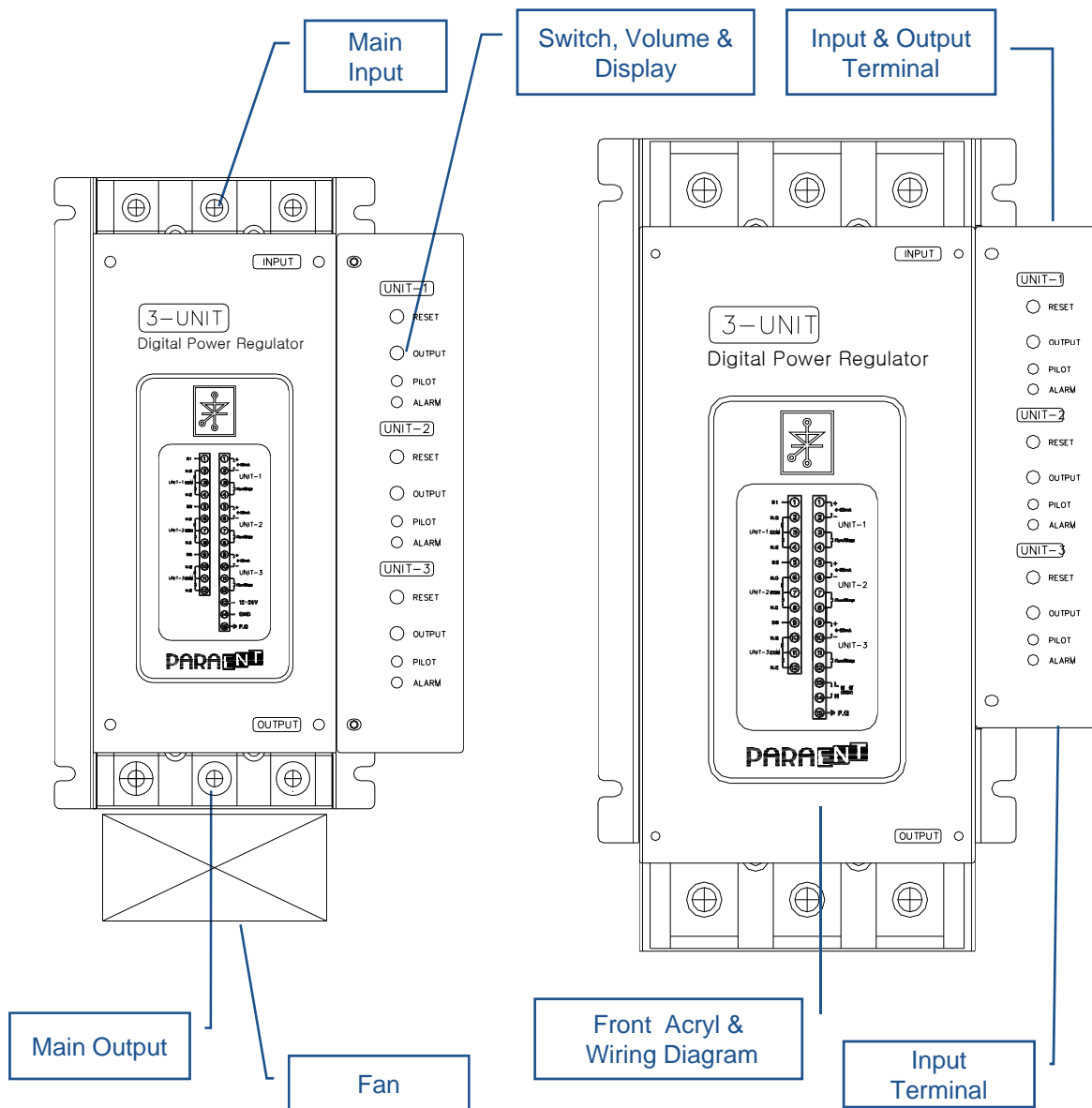
## 2. General Specification

General specification is as below.

<b>Rated Voltage</b>	110,220,380,440V AC	<b>NO. of Phase</b>	Single Phase
<b>Frequency</b>	50/60Hz Auto Selectable	<b>Input Signal</b>	4 ~ 20mA, 1~5V
<b>Rated Current</b>	10 ~ 160A	<b>PCB Power</b>	220V AC(More than 90A) 12 ~ 24V DC(Less than 70A) or 12V DC (Less than 70A)
<b>Control Method</b>	Zero Crossing (advanced Fixed 16 mode) Phase Angle	<b>Required Minimum Load</b>	1A
<b>Applicable Load</b>	Resistive Load : (Zero Crossing, Phase Angle)  Transformer coupled Load : (Phase Angle)	<b>Output Range</b>	0 ~ 98%
<b>Allowed Ambient Temp.</b>	Operation Guarantee Temp. : 0 ~ 50℃  Available Operating Temp. : -15 ~ 55 ℃	<b>Allowed Ambient Humidity</b>	5 ~ 85%
<b>Cooling Method</b>	10 ~ 70A :Fan Cooling or Natural Cooling  90 ~ 160 : Fan Cooling	<b>Output Range</b>	Inner Output Volume (0 ~ 100%)
<b>Additional Function</b>		<b>Other</b>	Alarm Function

### 3. Each Part & Function

Below is front view of product.



## 4. Control Part

Control part is as below.

⊙ **Reset Button**

Reset Button	Explanation
UNIT-1	•Re-start the 1 <sup>st</sup> unit when warning and alarm status.
UNIT-2	•Re-start the 2 <sup>nd</sup> unit when warning and alarm status.
UNIT-3	•Re-start the 3 <sup>rd</sup> unit when warning and alarm status.

⊙ **Volume**

Output Volume	Explanation
UNIT-1	•Setting Maximum output range for 1 <sup>st</sup> unit •Clockwise : Maximum •Counter Clockwise : Minimum
UNIT-2	•Setting Maximum output range for 2 <sup>nd</sup> unit •Clockwise : Maximum •Counter Clockwise : Minimum
UNIT-3	•Setting Maximum output range for 3 <sup>rd</sup> unit •Clockwise : Maximum •Counter Clockwise : Minimum

⊙ **LED**

LED	내 용
1 <sup>st</sup> LED of Unit 1,2 & 3	•Display operating and alarm status •Color : Green
2 <sup>nd</sup> LED of Unit 1,2 & 3	•Display operating and alarm status •Color : Red



Control part is exposed. Please do not take apart or change any part or component of this product which can cause property damage.



## 5. Alarm Display

Alarm function is as below.

☉ Alarm

Type	Explanation
Normal / RUN	<ul style="list-style-type: none"> <li>•System is normal</li> <li>•PILOT(GREEN) : BLINK</li> <li>ALARM(RED) : OFF</li> </ul>
SCR	<ul style="list-style-type: none"> <li>•When SCR module is failed</li> <li>•PILOT(GREEN) : ON</li> <li>ALARM(RED) : BLINK</li> </ul>
Fuse	<ul style="list-style-type: none"> <li>•When fuse is failed</li> <li>•PILOT(GREEN) : BLINK</li> <li>ALARM(RED) : BLINK</li> </ul>
O.C. (Over Current)	<ul style="list-style-type: none"> <li>•When output current is more than product's rated current by 20%</li> <li>•PILOT(GREEN) : OFF</li> <li>ALARM(RED) : ON</li> </ul>
O.T. (Over Temperature)	<ul style="list-style-type: none"> <li>•When temperature of heat sink is more than 85 °C</li> <li>•PILOT(GREEN) : OFF</li> <li>ALARM(RED) : BLINK</li> </ul>
Load Failure	<ul style="list-style-type: none"> <li>•When load is failed</li> <li>•PILOT(GREEN) : BLINK</li> <li>ALARM(RED) : ON</li> </ul>
STOP	<ul style="list-style-type: none"> <li>•When there is no signal for "RUN"</li> <li>•PILOT(GREEN) : ON</li> <li>ALARM(RED) : OFF</li> </ul>
Main Power Failure	<ul style="list-style-type: none"> <li>•When main power is cut off</li> <li>•PILOT(GREEN) : ON</li> <li>ALARM(RED) : ON</li> </ul>

STATUS	PILOT	ALARM	STATUS	PILOT	ALARM
Normal	BLINK	OFF	O.T.	OFF	BLINK
SCR	ON	BLINK	Load	BLINK	ON
Fuse	BLINK	BLINK	Stop	ON	OFF
O.C.	OFF	ON	Main Power	ON	ON

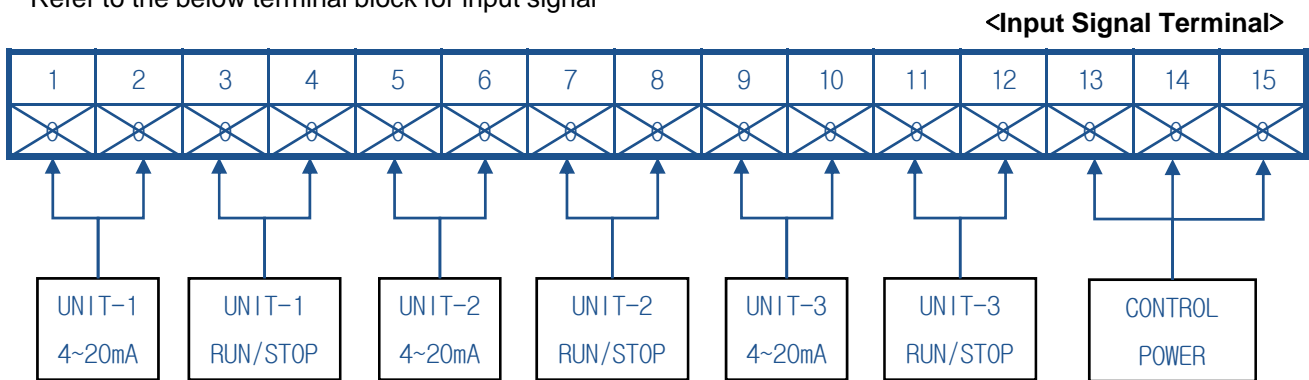


When alarm status, output is cut off and alarm signal is on.  
To re-start, push the reset button or turn down the main power and on.

## 6. Terminal Block & Wiring

### 6.1.1 Control Signal & PCB Power Wiring

Refer to the below terminal block for input signal



● Explanation

NO	Explanation
1	'+' Connector for Input Signal (4~20mA) of UNIT-1
2	'-' Connector for Input Signal (4~20mA) of UNIT-1
3	RUN/STOP Connector for UNIT-1
4	RUN/STOP Connector for UNIT-1
5	'+' Connector for Input Signal (4~20mA) of UNIT-2
6	'-' Connector for Input Signal (4~20mA) of UNIT-2
7	RUN/STOP Connector for UNIT-2
8	RUN/STOP Connector for UNIT-2
9	'+' Connector for Input Signal (4~20mA) of UNIT-3
10	'-' Connector for Input Signal (4~20mA) of UNIT-3
11	RUN/STOP Connector for UNIT-3
12	RUN/STOP Connector for UNIT-3
13	PCB Power AC L (AC220V) or "+" 24VDC. +12VDC
14	PCB Power AC L (AC220V) or "-" 24VDC. +12VDC
15	Connector for FG

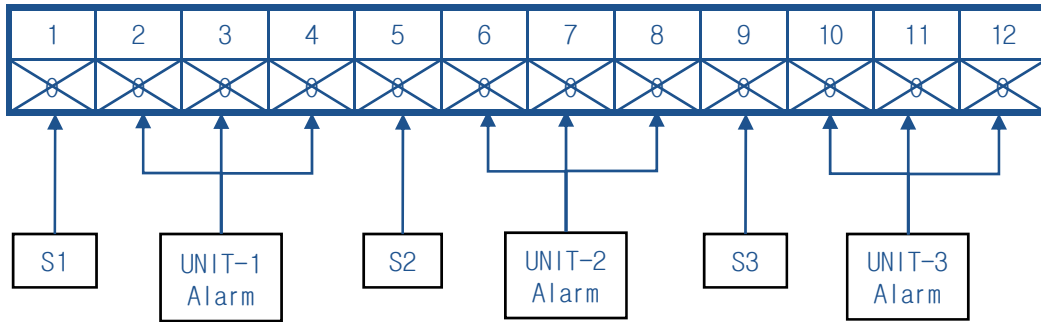


**Connectors of 13, 14 and 15 are for supplying PCB power.**

6.1.2 Alarm & “S” Phase Wiring

Wiring for alarm and “S” phase is as below.

<“S” Phase & Alarm Output Terminal>



⦿ Explanation

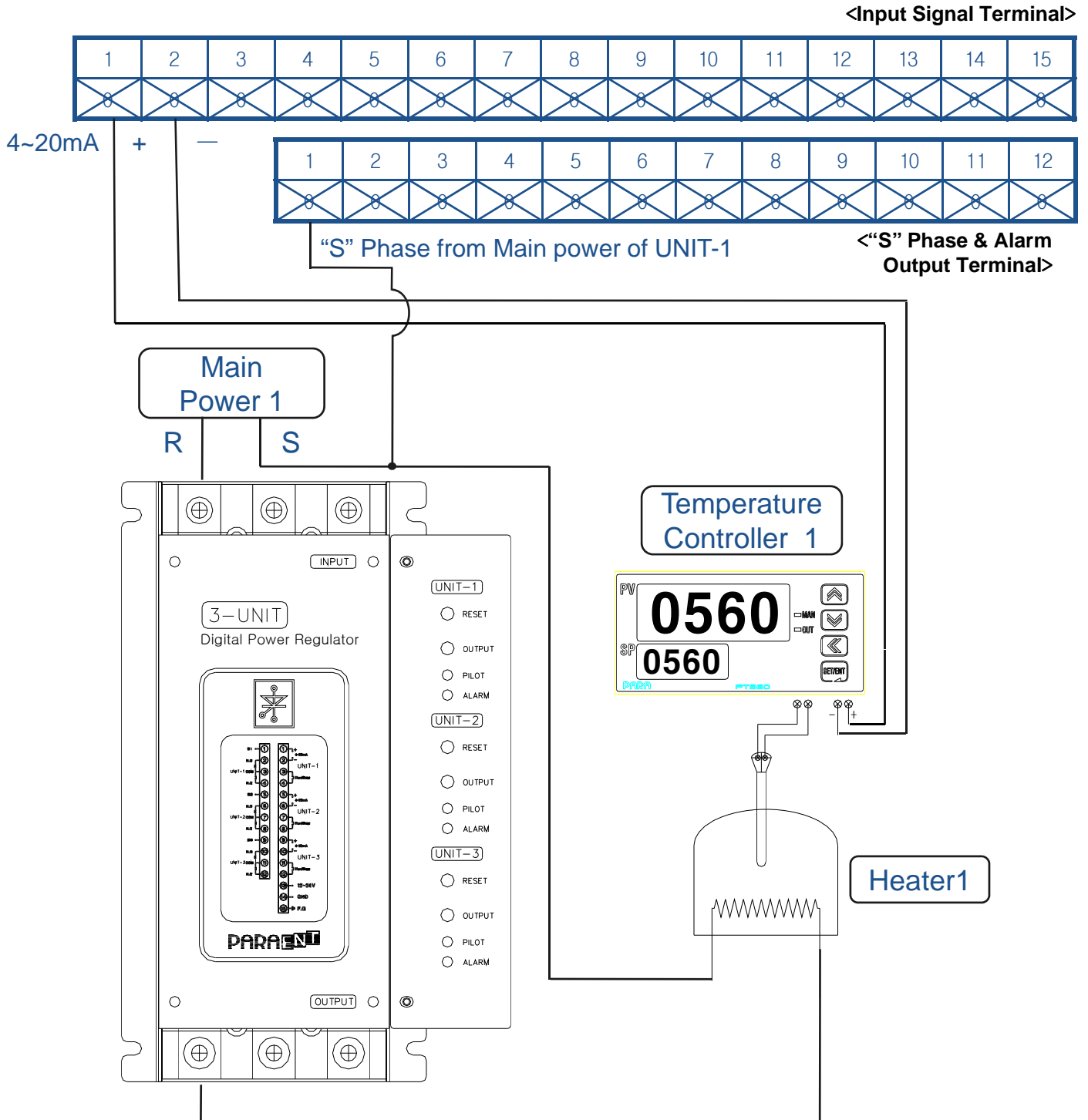
NO	Explanation
1	Connector for “S” phase of main power for UNIT-1
2	Connector for Alarm UNIT-1 Normal Open (N.O. for UNIT-1)
3	Common Connector of Alarm for UNIT-1
4	Connector for Alarm UNIT-1 Normal Close (N.C. for UNIT-1)
5	Connector for “S” phase of main power for UNIT-2
6	Connector for Alarm UNIT-1 Normal Open (N.O. for UNIT-2)
7	Common Connector of Alarm for UNIT-2
8	Connector for Alarm UNIT-1 Normal Close (N.C. for UNIT-2)
9	Connector for “S” phase of main power for UNIT-3
10	Connector for Alarm UNIT-1 Normal Open (N.O. for UNIT-3)
11	Common Connector of Alarm for UNIT-3
12	Connector for Alarm UNIT-1 Normal Close (N.C. for UNIT-3)



- Please pay attention to wiring said-above.
- Wrong wiring can damage the product.

6.2 Connection of Main Power and Load

Refer to below for connection of main power and load. (UNIT-2 and UNIT-3 are the same as UNIT-1)

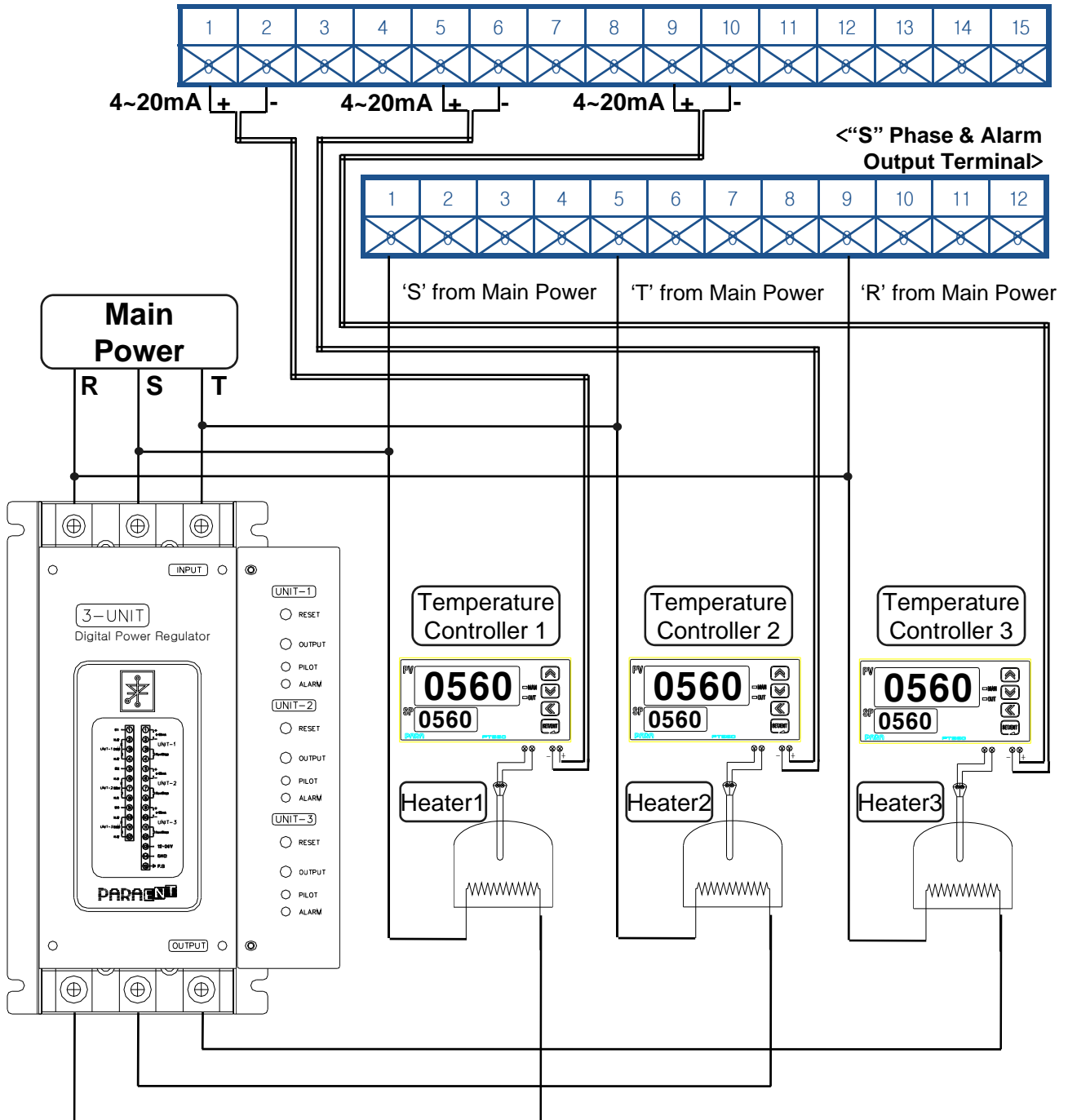


• Please pay attention to wiring for "S" Phase from main power.

6.2 Connection of Load (For Three Phase)

Refer to connection for three phase.

<Input Signal Terminal>

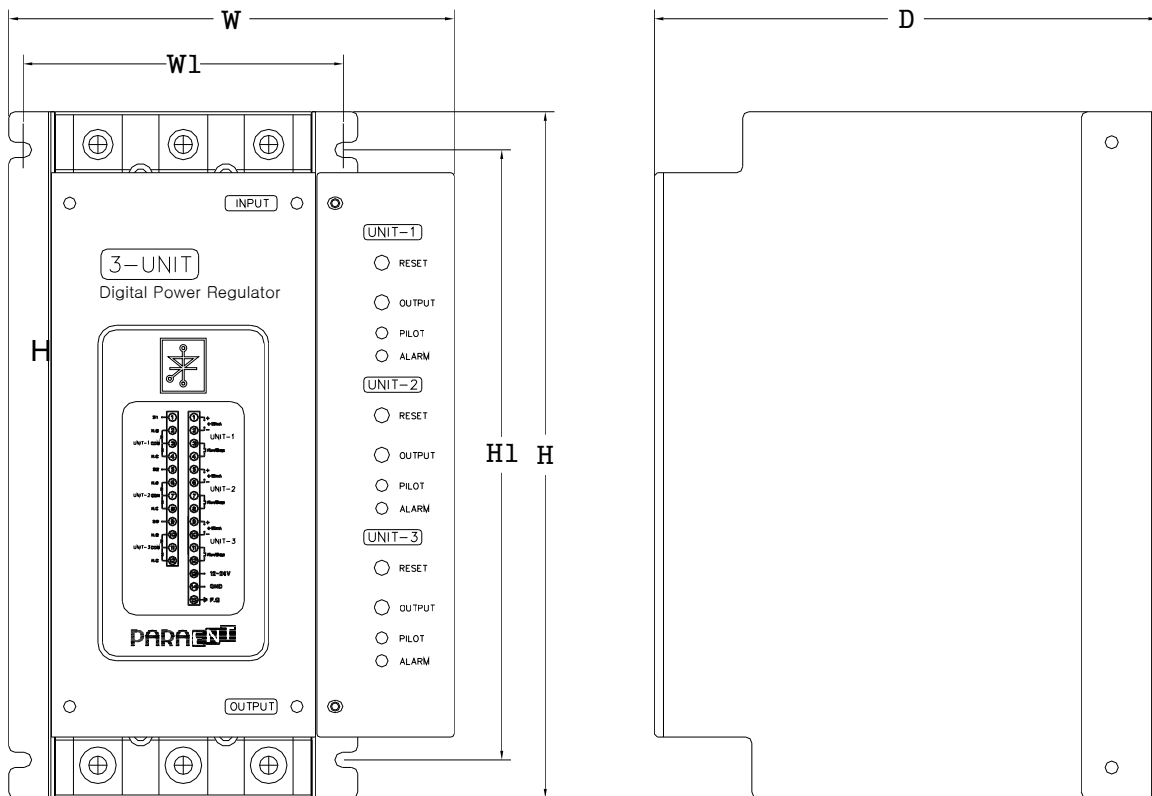


• Please pay attention to wiring from main power.

## 7. DIMENSIONS

Dimensions are as below.

1) Rated Current: 25A, 40A



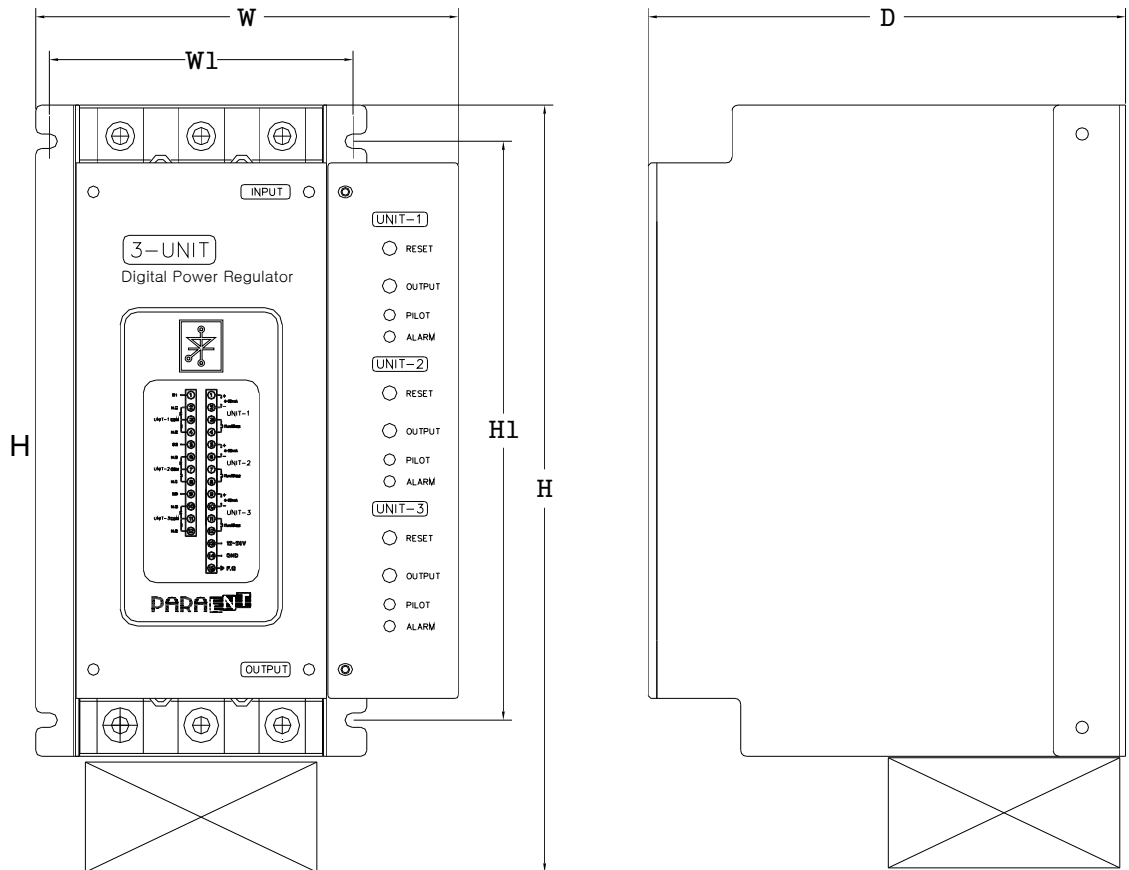
W	H	D	W1	H1	Bolt	Remark
146	225	165	105	200	4mm	Terminal Block



• Above dimensions can be changed without pre-notification for improving functions.

## 7. DIMENSIONS

2) Rated Current: 55A, 70A



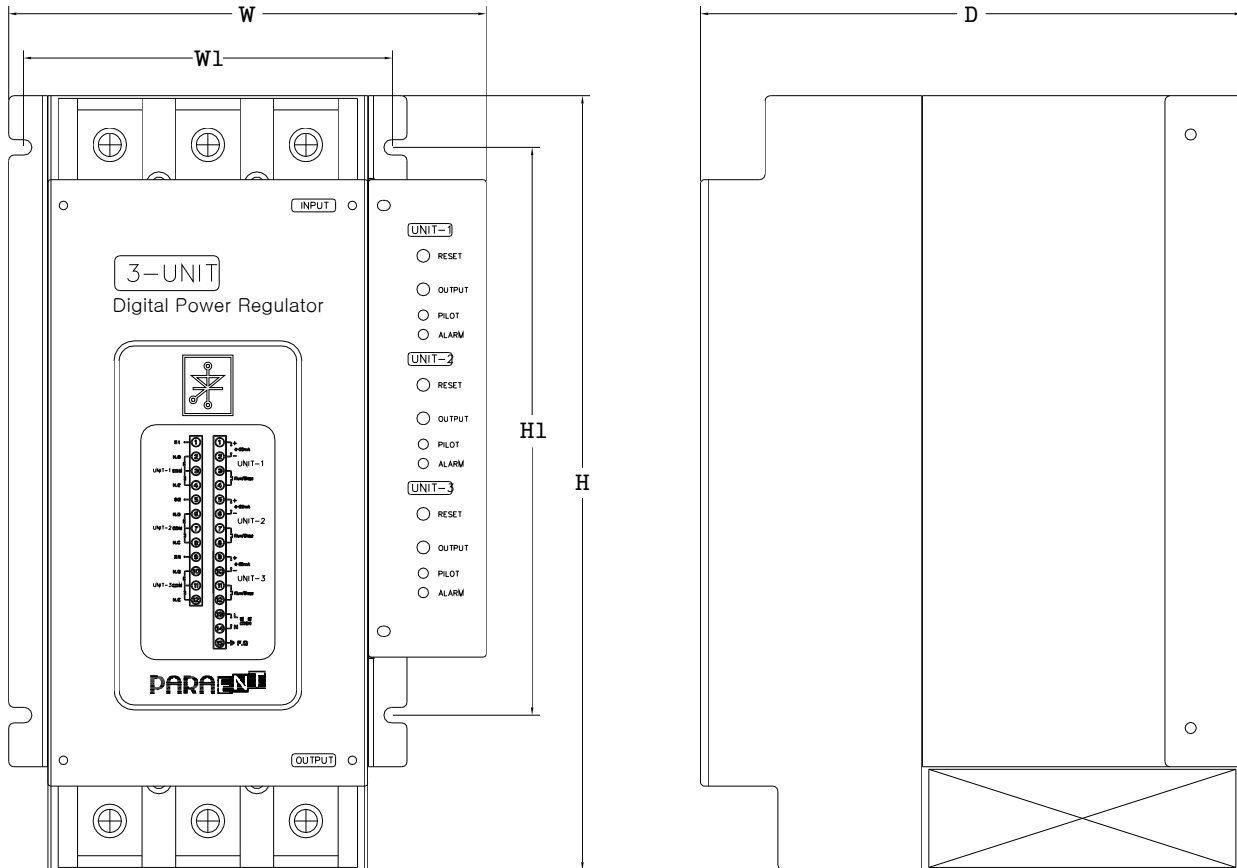
W	H	D	W1	H1	Bolt	Remark
146	265	165	105	200	4mm	Terminal Block



• Above dimensions can be changed without pre-notification for improving functions.

**7. DIMENSIONS**

3) Rated Current: 100A, 130A and 160A



W	H	D	W1	H1	Bolt	Remark
185	300	210	143	220	5mm	Terminal Block



• Above dimensions can be changed without pre-notification for improving functions.



## 8. MAINTENANCE

### FUSE Exchange



- The main power must be turned off to change the fuse.
- A fuse designated by our company must be used.
- Check that the fuse is fastened correctly after it is changed.

### SCR Exchange



- The main power must be turned off to change the SCR element.
- An SRC designated by our company must be used.
- Check that the SCR is fastened correctly after changing it.

### PCB UNIT



- The main power must be turned off to check PCB UNIT.
- PCB UNIT is manufactured through our company's precise inspections.
- When a problem occurs in the PCB UNIT, please contact our company's A/S Department.

### Danger, Warning/ Notice



**Danger, Warning:** This symbol is displayed when there is risk of death or serious injury.

**Notice:** When the product is used incorrectly, it could cause property damage.



- The main power must be turned off to operate periodic inspection.
- There is a risk of defect, electric shock, or fire.

**Periodic Inspection**

Please operate the periodic inspection, the following items, once every 6 months to maintain the best condition and functions of the machine.

1. Cleaning



Dust may come from the outside. When there is dust, such as iron powder, insulation is worse and causes inferiority of operation. So please clean the attached materials. Remove the dust, on the components, using a soft brush or air.

2. Components fastening condition



Check the screw fastening condition of each connection part. The screw could be loosened with time.

Fastened screw could cause damage by heat so it could cause control instability or defects.

So, periodic inspection is necessary to keep the normal condition.

3. Wiring condition check



Must check abnormality or modification of insulating covering of input and output wires of the machine. When there is abnormality, please change the part.

4. Other check items



Must check the fastening and connection condition of connector and terminals in the machine.

**Danger, Warning/ Notice**



**Danger, Warning:** This symbol is displayed when there is risk of death or serious injury.

**Notice:** When the product is used incorrectly, it could cause property damage.

**PARA**ENT

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