



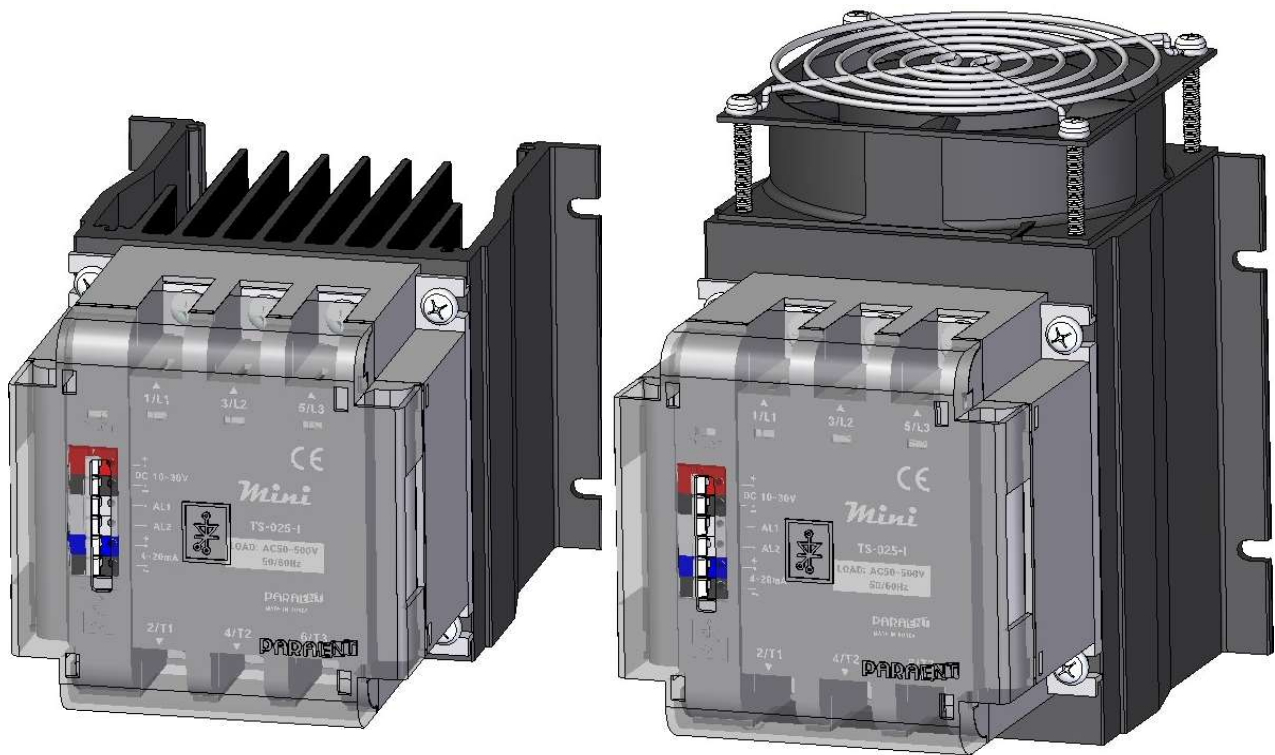
DIGITAL
power
REGULATOR

Mini

PARAENT[®]

MUG1500612001

Mini Three Phase Power Controller
(User's Manual)



▲ 25A

▲ 40A / 55A / 70A

- Three phase & Slim TYPE -

Right people make PARA

1. Notices for Safety

1. Before installing this product, install main power circuit breaker(NFB) and magnetic switch for safety.
2. To prevent any electric shock, make sure to connect ground.
3. Check out supplying voltage and load current is within the range of recommended rated voltage and current of this product.
4. Make sure PCB power, main power and load are firmly connected before supplying main power.
5. Installation of a fast-acting fuse is recommended to prevent fire or damage.
6. Environments
 - Adjust ventilation and temperature not exceeding operating guarantee temperature of 0°C~40°C. The basis of rated current of the product is 25°C. When temperature is higher then, derate the current.
 - Do not use this product in high humidity place. Recommended humidity is 40~85%RH.
 - Keep away from any product which generates heat.
 - Avoid any place where there is a risk of inflammability, explosiveness, corrosion or conductivity.
7. Disassembling or remodeling
 - Never disassemble, remodel or change any component of product voluntarily. If done, product can not be guaranteed its operation and safety.
8. Check and repair
 - Before checking the product, turn of main power.
 - Check fastening condition of bolts, nuts and terminals periodically.
(Loosened connection generates heat, which can be a cause of wiring damage or a fire).
9. Responsibility and guarantee
 - Must preserve notices for safety. If not, no responsibility no guarantee.
 - Unforeseeable usage of product, damage from natural disaster can not be taken any responsibility or guaranteed.
10. Please keep this manual in your attention. Manual can be changed without pre-notice for better performance of product.

2. Ordering Code

TS	-	<div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 2px 5px; border-radius: 50%; width: 25px; height: 25px; display: flex; align-items: center; justify-content: center;">①</div> <div style="border: 1px solid black; padding: 2px 5px; border-radius: 50%; width: 25px; height: 25px; display: flex; align-items: center; justify-content: center;">①</div> <div style="border: 1px solid black; padding: 2px 5px; border-radius: 50%; width: 25px; height: 25px; display: flex; align-items: center; justify-content: center;">①</div> </div>	-	<div style="border: 1px solid black; padding: 2px 5px; border-radius: 50%; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center;">②</div>	-	<div style="border: 1px solid black; padding: 2px 5px; border-radius: 50%; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center;">③</div>
TS		① Rated Current		② Input Signal		③ Cooling Fan (Option)
Three phase Slim TYPE		025 : 25A 040 : 40A 055 : 55A 070 : 70A		I : 4~20mA V : 0~10V S : SSR		NONE : Without Fan FN : With Fan (More than 40A: Fan installed basically)

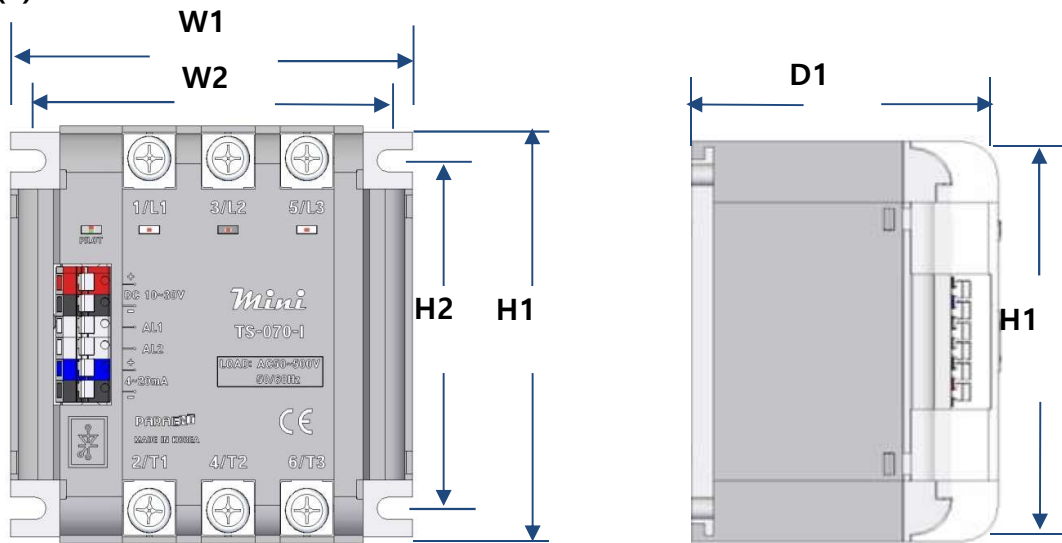
※ Above rated current is based on surrounding temperature 25°C. When surrounding temperature is over than 25°C, lower the current of load. (Refer to 9.surrounding temperature and allowable current)

3. 제품 주요 사양

Rated Voltage	50 ~ 500VAC		
Rated Current	90A (Surrounding Temperature less than 25°C)		
Rated Frequency	50/60Hz (Auto Detect)		
Type of Load	Resistive Load		
Minimum Load	1A		
Output Range	Zero-Crossing Control 0 ~ 98%		
PCB Power	DC 10V ~ 30V		
Power Consumption	MAX 4W (FAN power is not included)		
Input Signal	SSR (10~30V)	4~20mA	0~10V
Output Relay	NPN Open Collector 2CH ($V_C < 30V$, $I_C \leq 50mA$)		
Control Method	Zero-Crossing control with compensation algorithm		
Cooling	Cooling FAN recommended		
Alarm	OC, Heater Failure, Over Temp. SCR Failure		
Operating Guarantee Temp.	0 ~ 40°C		
Usage Humidity	40 ~ 85%RH (Without condensation)		
Display	3 Color LED(1EA), 1 Color LED(3EA)		
Fuse	For safety reason, install a fast acting fuse outside of SCR.		
Weight	Net Weight 25A : 1.1Kgs / 40A, 55A, 70A : 1.3Kgs (With cooling fan)		

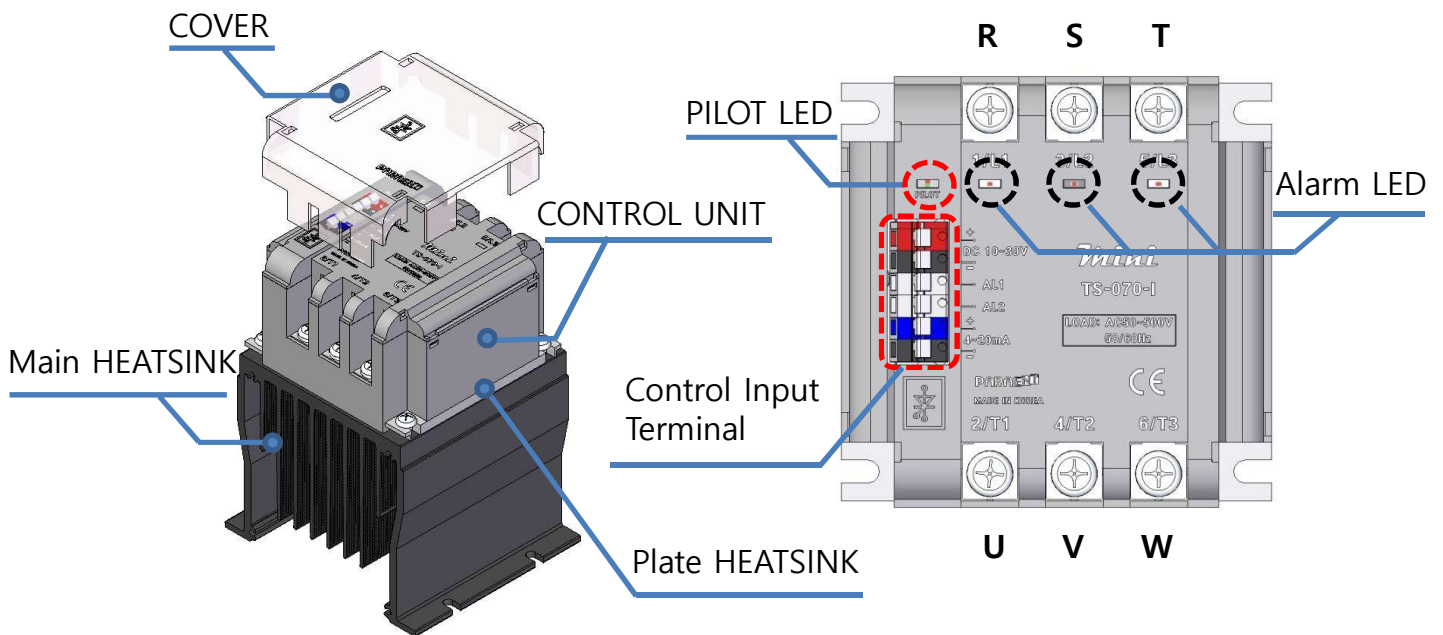
4. Dimension

(1) Dimension



Rated Current	Main Heatsink	W1	W2	H1	H2	D1
90A	Without	97	85	98	80	68

5. Name of each part



6. Wiring

(1) PCB power and input signal

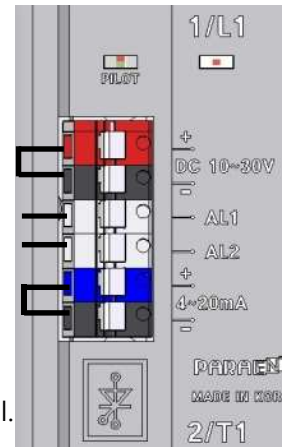
- PCB power (1, 2) : DC 10~30V
- Alarm Output (3,4) : NPN Open Collector
- Input Signal (5,6) : SSR, 4~20mA, 0~10V
- Recommended Core end terminal



Wire		Dimension	
AWG	mm ²	A(mm)	B(mm)
#20	0.75	1.5	8

※ Please pay attention not to change polarity(+,-) of PCB power and input signal.

1. PCB Power +
2. PCB Power -
3. Alarm 1
4. Alarm 2
5. Input Signal +
6. Input Signal -

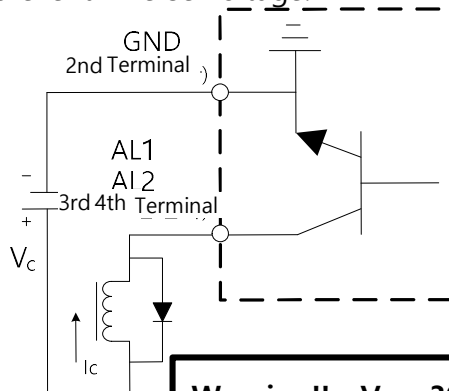


(2) Alarm output

- Alarm output is NPN Open Collector type.

- DC Relay

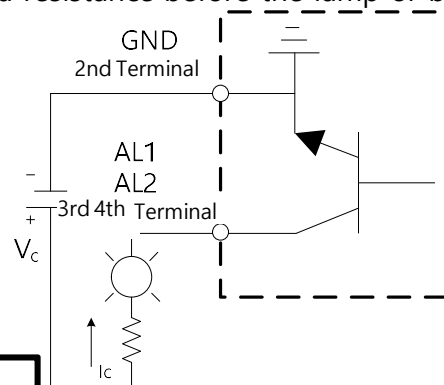
Recommend to put a diode on ends of relay to prevent inverse voltage.



Warning!! $V_c < 30V$, $I_c \leq 50mA$

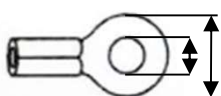
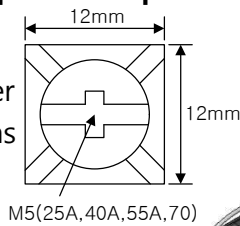
- Lamp or buzzer

For the safety reason(safe from over current), put a resistance before the lamp or buzzer.



(3) Main power input and load power output

- Use SEMS bolts for main power input and load power output as shown picture left.
- Select the thickness of wiring to applicable to rated current.
- O Type terminal specification

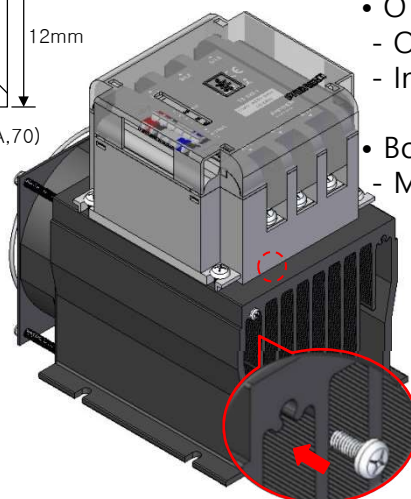


O TYPE

Outer	Inner
mm	mm
$D < 12.5$	$5 \leq d \leq 6$

(4) Ground

- Ground cable
 - More than 1.6mm
- O Type terminal
 - Outer : More than 6.5mm
 - Inner : $4 < d \leq 5$
- Bolt
 - M4 * 8mm

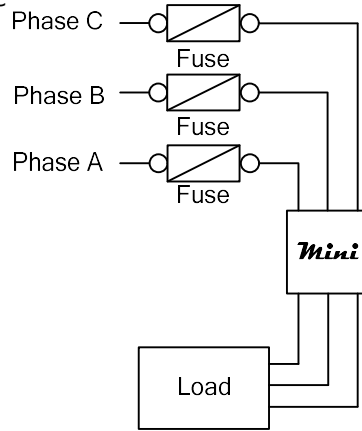


6. Wiring (Continued)

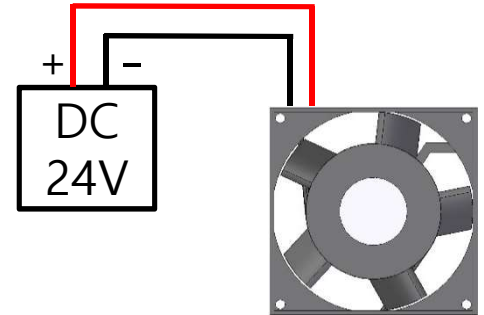
(5) FUSE Recommended (FUSE is not installed)

- Install a fast acting fuse before the product for the safety
- Fuse recommended

Rated Current	Fuse
25A	50A
40A	80A
55A	100A
70A	125A



(6) FAN (when required)



※ Separate power of DC 24V
< RED : +, BLACK : - >

7. Display and alarm

Alarm	Explanation	PILOT LED	Phase LED	Output	Alarm
Normal operation	-	Green Blinking	-	RUN	-
Stand-By	PCB power is on and no output because of no input signal.	Green On	-	STOP	-
SCR failure	When input signal is 0% or off, output current is more than 1A	Red Blinking	Relative LED Red On	Output Cut-off	AL1
Over Current	When output is more than 100% of rated current.	Red On	Relative LED Red On	Output Cut-off	AL1
Load Failure	When input signal is more than 40%, output current is less than 1A.	Red & orange blinking by turns	Relative LED Red On	Auto Clear	AL2
Main power off					
Over Temp. 60°C	Temp. of heat-sink is more than 60°C	Orange Blinking	-	RUN	AL2
Over Temp. 80°C	Temp. of heat-sink is more than 80°C	Orange On	-	Output Cut-off	AL1
Unbalance Load	Input signal is more than 30% & 30% current difference among three phases	Green & Red blinking by turns	Relative LED Red Blinking	Auto Clear	AL2

- The speed of green blinking LED is faster in proportion to input signal.
- When AL1(Serious alarm) is on, output is cut off and restart only when PCB power is reset.
- When AL2(Minor alarm) is on, output is still on and alarm is automatically cleared 10 seconds after the cause of alarm is removed.

- Alarm output - AL2(Minor Alarm)

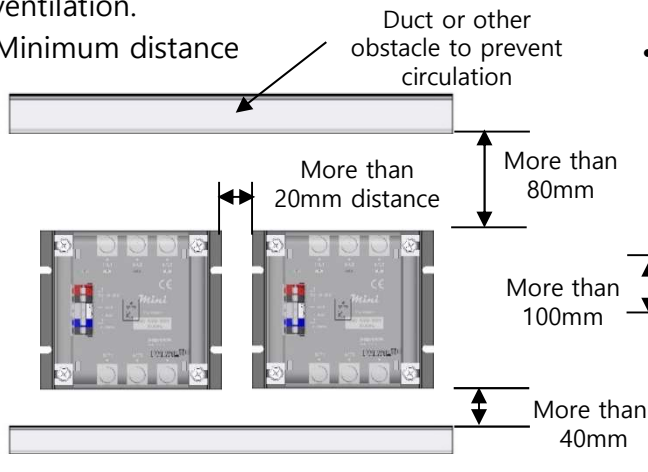
Alarm	Alarm Output
OT 60	

Alarm	Alarm Output
LINE	High
MAIN OFF	-----

8. Pre-notice for installing products

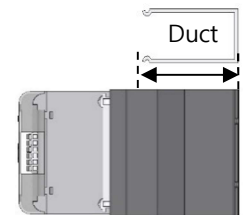
- Because of heat generated by other devices, the functional capability of product can be decreased in blocked panel. Make holes on top and bottom of panel and install cooling fans for ventilation.

- Minimum distance



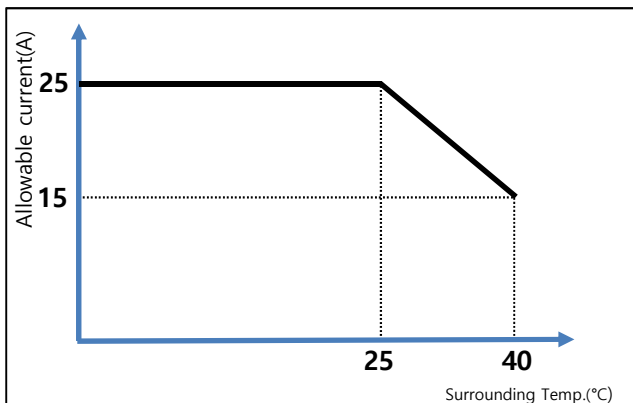
- Install the product vertically.

- If there is a duct above or under the product, the duct should not cover the half of product as shown picture above for better circulation.

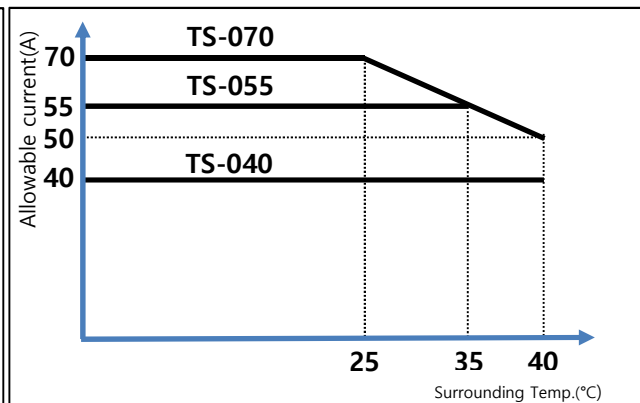


9. The feature between surrounding Temp. & allowable current

- TS-025



- TS-040, TS-055, TS-070 (With Fan)



- The rated current of this product is based on 25°C of surround temperature. Main power module of this product is semiconductor device which generates heat when operating.
- When surrounding temperature is higher, lower the rated current.

10. Disorder and Mal-function

- Do not drop the product or give it a shock on transportation or installation. A shock to the product can cause mal-function or deterioration of the product.
- Check the status of bolt fastening on main power input and load power output periodically. When any bolt is loosen, it damages wiring and causes fire.
- Never allow overvoltage. Overvoltage causes damage or disorder to the product.
- Do not use the product in places said below.
 - Place where there is electric static or noise.
 - Place where there is strong electric, magnetic field, electromagnetic wave, high voltage or high frequency.
 - Place where there is a lot of dust with conductivity.
 - Place where there is equipment generating high temperature(furnace/heater).
 - Place where there is a lot of vibration.

11. Product warranty & After service

1. Service in warranty period

Warranty period of this product is 1 year from the date of purchase. During warranty period, unpaid- service is valid.

2. Paid-Service

Even in warranty period, cases said below are imposed to pay for services including travelling expenses and service charge.

- Disorder by user's mistake or mishandling. (Inundation or electric short by mistake)
- Disorder by user's arbitrary repair or alteration.
- Disorder caused by a worker's repair who is not PARA-ENT's technician nor a designated one.
- Disorder caused by different rated voltage or current from the stated on the product.
- Disorder caused by a user who do not follow any instruction in this manual.
- Disorder by natural calamities(lightning, fire, damage from sea wind(water), flood, earthquake etc.)

3. Service in abroad

After service for the product limits to only Republic of Korea.

When the product is exported, it should be returned and sent back on user's expenses for the after service no matter what it is within warranty period or not.

- When placing order, inform us the country where the product will be exported to.
- PARA-ENT is not responsible for any disorder caused by voltage or frequency difference due to arbitrary export.

12. Pre-caution of manual

1. Please deliver this manual to end-user and ask him to keep it in a place where he can easily find.
2. Revision or copy of this manual partially or totally without pre-confirmation is prohibited.
3. This manual may be revised without pre-notification for improvement of product.

Product	Digital Power Regulator <i>Mini</i>	Model	
Purchase Date		S/N	
Place to purchase			

We appreciate for purchasing *Mini* product.

We promise to supply you with better products in electric power control.

PARA-ENT

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