



# 數位式電力調整器

Digital Thyristor Power Regulator

Satisfy thermal load control needs by one single device

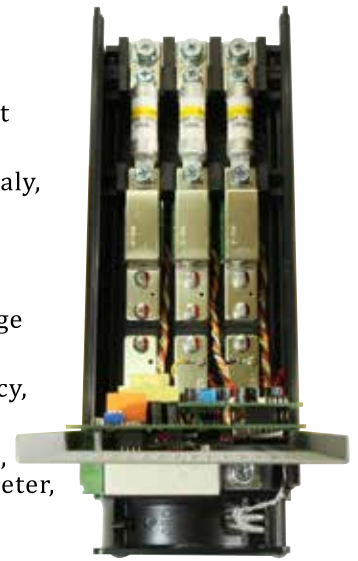
**W7**  
SERIES



Professional, Durable

## Product Features

- ◆ Downward-opened panel designed, Convenient for fuse replacement.
- ◆ Top and bottom designation with good looking covers, convenient to open and pug-in for wiring.
- ◆ Control wire is connected to the European style terminals, Re-wiring shall be not needed in case of replacement.
- ◆ A High-speed Fuse is provided for protecting the main elements during an anomaly, eliminating external wiring, and minimizing the space for installation.
- ◆ Stops output immediately after a 0.5Hz transient blackout, followed by buffered output. (This prevents abnormal Fuse Blowout caused by a power surge.)
- ◆ Activating circuit is independent from the main PCB circuit to prevent the damage occurred in case of main circuit malfunction.
- ◆ Automatic self-detecting function enables the availability for 45~65Hz frequency, Manual selecting or switching shall be not needed.
- ◆ Operation Box Display provides real-time information for convenient operation, which allows an external connection to substitute for a voltage meter, current meter, or power meter.
- ◆ Voltage, Current, and Power have active RMS control.
- ◆ Insulated RS-485 (MODBUS RTU) is used for communication, capable of connecting up to 250 units.
- ◆ Capable of connecting multiple units for even distribution of power.
- ◆ During normal operation of the controller, information from the Operation Box Display can be planned as: By Input Percentage, Output Percentage, Buffered Rise Time, Buffered Drop Time, Maximum Output Limit, Voltage Output, Current Output, Power Output, Fin Temperature, Power Source Frequency, External Analog Input Percentage, Value of Digital Input, Operation Time, etc.
- ◆ Single Chip Control, input resolution 10-bit, output resolution 0.1%, multiple parameters to accommodate user settings to meet requirements.
- ◆ One port is provided for attaching an RS-485 Com, an Analog Output (0-20 or 4-20mA), or an additional multi-function contact (electronic contact).
- ◆ Signals such as 4-20mA, 1-5VDC, 2-10VDC, 0-20mA, 0-5VDC, 0-10VDC, isolated contact, Operation Box Input, COM Command (actual value or percentage)...etc. , available for any kind of control signal.
- ◆ Two Analog Signal Inputs can be defined for multiple functions: Anomaly Reset, Basic Output, Manual Setting, Maximum Output Limit, Manual/Auto Switch-over, Phase/Zero Distribution Switch-over, Phase/Zero Sampling Switch-over, Voltage Limit, Current Limit, etc.
- ◆ Nine Control Modes: Phase Angle Control Proportion Output, Zero Cycle Sampling, Zero Time Sampling, Phase Start Up? Zero Cycle Operation, Phase Start Up? Zero Time Operation, Constant Phase Voltage, Phase Current Limit, and Constant Phase Power for meeting various applications - one single machine satisfies all your thermal load needs.
- ◆ Equipped with Anomaly Detection including Fuse break, over-current, over-temperature, Temperature Sensor Anomaly, Current Detection, Low-current Detection, Load Decline Detection, load wire breakage, phase unbalance, voltage feedback anomaly, EEPROM Anomaly, etc., providing real-time protection against anomalies, together with 4 sets of anomaly records.
- ◆ Multi-function Dry Contact can be defined as a Dry Anomaly Contact (NO), a Dry Anomaly Contact (NC), an Operation Contract, or a Current Detection Contact.



## Product Appearance



IN : Input Indicator  
 OUT : Output Indicator  
 TRX : COM Indicator  
 ALM : Anomaly Indicator

- Mode Key and Exit Key
- Input Key
- Up Key
- Down Key

### Mains Power Cover

The energized parts of main power were hidden by shield covers to prevent shocking of the power source and enhance the safety and outside appearance.

### Digital Operation Box

For setting user-defined parameters and displaying the current status.

### Control Signal Terminal Block

Terminal band of control signals (Temperature controller, control signal ...etc.) contains the connectors for output alarm signal.

### Load Side Protection Cover

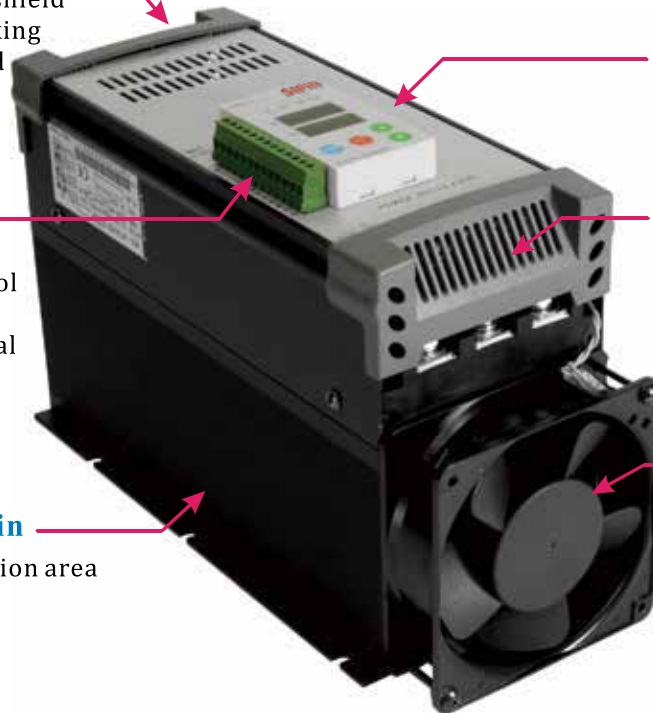
The energized parts of load were hidden by shield covers to prevent shocking of the power source and enhance the safety and outside appearance.

### Heat Dissipation Fin

Increases heat dissipation area of the SCR Module.

### Heat Dissipation Fan

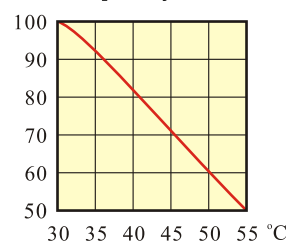
Effective ventilation fan always running to cool down the facility which assure the Power regulator works in proper condition.



## Installation Precautions and Surrounding Conditions

- ※ Power Regulator generates internal heat during operation. Install the unit vertically with sufficient space reserved on both sides, otherwise heat dissipation may be hindered and the internal temperature of the Power Regulator may rise continuously.
- ※ The Control Box shall be provided with vents or a ventilation fan for an air convection base on the principle that hot air rises from bottom to top.
- ※ DO NOT install the device in a hot position or where the ventilation is poor, otherwise use it at 70% of the rated capacity.
- ※ Avoid installing the device at a location with heavy steam, acid, alkali or corrosive vapor.
- ※ Humidity in the surrounding:  $R_h < 90\%$  (without condensation).
- ※ Temperature in the surrounding:  $-10^{\circ}\text{C} \sim 45^{\circ}\text{C}$

Rated Capacity %



- ※ The above data are for conditions where the heat dissipation fin is installed for maintaining heat convection and without corrosion or oil stains on the fin.

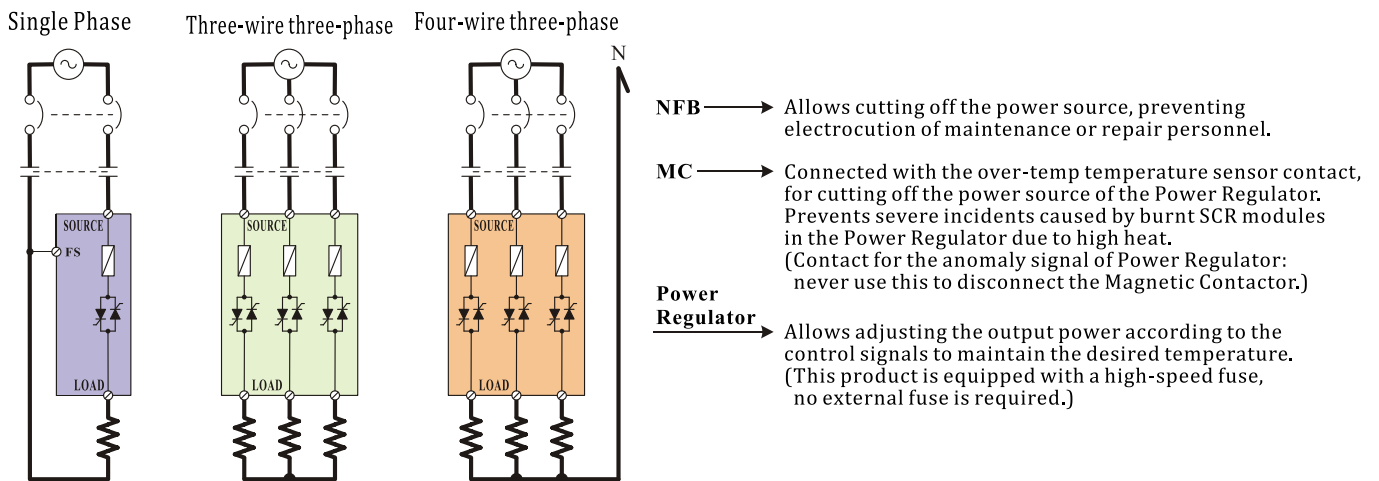


## Control Method and Applicable Loads

Output Control mode	Output wave		
	20% Output	50% Output	90% Output
Phase angle control			
Zero crossing control (Cycle sampling)	 1 cycle ON and 4 cycle OFF	 1 cycle ON and 1 cycle OFF	 9 cycle ON and 1 cycle OFF
Zero crossing control (Time sampling)	 T	 T	 T

- ※ Phase Angle Control : Continuous Phase Angle Control, steady output, no fluctuation in the current meter, but harmonic waves occur.  
Applicable Loading : Load with constant impedance, load with variable impedance, reactant load, IR Lamp.
- ※ Zero Cycle Sampling : Distributive Zero Control (variable cycle), minimum resolution 1Hz - number of harmonic waves is lower than Phase Angle Control - current meter fluctuates during output.  
Applicable Loading : Load with constant impedance.
- ※ Zero Time Sampling : Time Sampling Zero Control, (constant period) minimum resolution 1Hz - control in low harmonic wave - output is in a full continuous wave.  
Applicable Loading : Load with constant impedance.  
Remarks : Zero Cycle Sampling low harmonic control, THID harmonic wave lower than 5%, comply with USA IEEE-519 specifications. (TPC adopts USA IEEE codes.)

## Wiring and Planning Precautions



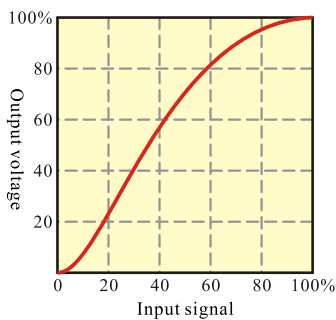
- ※ Planning of the standard mains circuit: Main power → NFB → MC → Power Regulator → Load
- ※ Make sure all the screws are tightened for the wiring, otherwise poor contact may result in a temperature rise.
- ※ On completion of wiring, make sure all the cover plates are installed before engaging the power source, otherwise electrocution may occur, or a short-circuit may occur due to a conductive object falling in.

# Table of Product ID

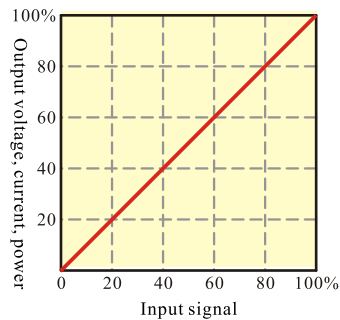
<b>Product Series</b>	W7	W7 Series
<b>Specification Type</b>	S	Single phase
	T	3 phase (3Ph 3W, 3Ph 4W)
<b>Mains Voltage</b>	1V	40~120VAC
	4V	180~480VAC
	6V	460~690VAC
		45~65Hz
<b>Rated Current</b>	030	30A
	045	45A
	060	60A
	080	80A
	100	100A
	125	125A
	150	150A
	180	180A
	230	230A
	300	300A
	380	380A
	450	450A
580	580A	
720	720A	
<b>Serial Number</b>	-	
<b>Auxiliary Power</b>	1	1 $\phi$ 110VAC
	2	1 $\phi$ 220VAC
<b>Add-on Card (DX terminal output)</b>	0	No card
	1	RS485 COM (MODBUS RTU 2W)
	2	Analog output (0-20mA or 4-20mA)
	3	Electronic Contact
<b>Digital Operation Box</b>	K	With Digital Operation Box
	N	W/O Digital Operation Box
<b>Product Type</b>	P	Standard (Proportion control)
	V	Voltage Feedback (Voltage Feedback control)
	F	Full Function (Voltage/ Current/ Power Feedback Control, Error Detection and Protection)
	C	Customized
<b>Special Function</b>	S	Special (for low harmonic wave control transformer only)
	Subject to customized design if required.	

Control mode	Phase control (proportional)	Zero crossing cycle sampling (Variable cycle)	Zero crossing time sampling (Constant cycle)	Phase start→ Zero crossing cycle sampling	Phase start→ Zero crossing time sampling	Constant Voltage RMS	Limit Current RMS	Constant Current RMS	Constant Power RMS
P (Standard model)	⊙	⊙	⊙	⊙	⊙				
V (Voltage feedback model)	⊙	⊙	⊙	⊙	⊙	⊙			
F (Full function model)	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙

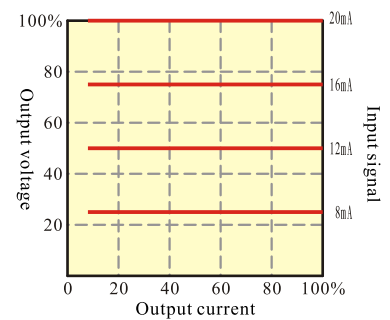
**Proportion control**



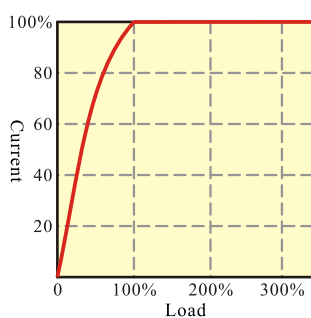
**Feedback control**



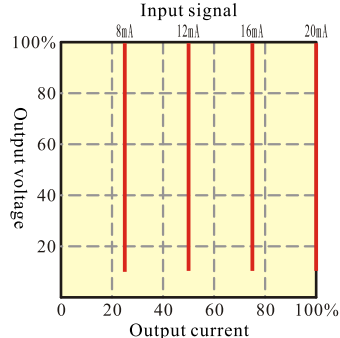
**Constant voltage**



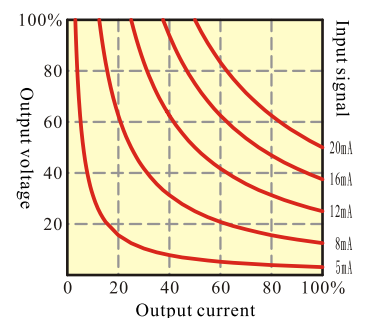
**Limit current**



**Constant current**



**Constant power**



# Terminals

## Single Phase (W7S)

Terminal Code	Description	Remarks
FS	FUSE blowout test	Direct wire from power supply to load must connected back to FS Terminal.
M	+5VDC	For this PCB only. No use elsewhere.
+	Control Signal Positive Input	See setting of SW1 Control PCB
-	Base level of analog signal	
S1	External analog signal 1, positive input	External VR:2~10KΩ Voltage signal: 0~5VDC
S2	External analog signal 2, positive input	
GND	External analog signal Baseline Level	
DX+	Add-on Card Terminal	See Table-1
DX-		
M1	Multi-function Dry Contact output	Contact Capacity: 250VAC 2A 24VDC 2A
M2		
AC1	AUX Power Supply	See Specifications Tab for voltage of AUX Power Supply.
AC2		

## Three Phase (W7T)

Terminal Code	Description	Remarks
•	Empty pin	No connection
M	+5VDC	For this PCB only. No use elsewhere.
+	Control Signal Positive Input	See setting of SW1 Control PCB
-	Base level of analog signal	
S1	External analog signal 1, positive input	External VR:2~10KΩ Voltage signal: 0~5VDC
S2	External analog signal 2, positive input	
GND	External analog signal Baseline Level	
DX+	Add-on Card Terminal	See Table-1
DX-		
M1	Multi-function Dry Contact output	Contact Capacity: 250VAC 2A 24VDC 2A
M2		
AC1	AUX Power Supply	See Specifications Tab for voltage of AUX Power Supply.
AC2		

**Table-1 Add-on Card Terminal Functions**

Add-on Card Terminal Code	0 : None	1 : COM	2 : Analog output	3 : Electronic Contact
DX+	Empty pin	RS-485 Com MODBUS RTU	Analog output +	Electronic Contact output Capacity: 24VDC 0.1A
DX-			Analog output base	
Description	No add-on card: empty pin, no connection.	Com Card, connect 220Ω resistor 1/2W for multiple unit communication	Analog Output Card: Isolated 0~20mA or 4~20mA output.	Electronic Contact Card: Isolated Electronic Contact output.

## Input Signal Selection

SW1 can be seen when cover plate is opened.



**4~20mA**  
ON  
Input Impedance 249Ω  
S1 : ON  
S2 : OFF  
S3 : OFF

**1~5VDC**  
ON  
Input Impedance 200KΩ  
S1 : OFF  
S2 : OFF  
S3 : OFF

**2~10VDC**  
ON  
Input Impedance 20KΩ  
S1 : OFF  
S2 : ON  
S3 : OFF

**0~20mA**  
ON  
Input Impedance 249Ω  
S1 : ON  
S2 : OFF  
S3 : ON

**0~5VDC**  
ON  
Input Impedance 200KΩ  
S1 : OFF  
S2 : OFF  
S3 : ON

**0~10VDC**  
ON  
Input Impedance 20KΩ  
S1 : OFF  
S2 : ON  
S3 : ON

## High-speed Fuse corresponding to Power Regulator

<b>Rated Current</b>	30A	45A	60A	80A	100A
<b>Fuse</b>	40ET	63ET	80ET 660GH-80	660GH-100	660GHX125
<b>Brand</b>	EATON (Bussmann)	EATON (Bussmann)	EATON (Bussmann) HINODE	HINODE	HINODE

<b>Rated Current</b>	125A	150A	180A	230A	300A
<b>Fuse</b>	80ET*2 660GH-80*2	660GH-100*2	660GHX125*2	250FM	315FM
<b>Brand</b>	EATON (Bussmann) HINODE	HINODE	HINODE	EATON (Bussmann)	EATON (Bussmann)

<b>Rated Current</b>	380A	450A	580A	720A
<b>Fuse</b>	660GH-400	250FM*2	315FM*2	660GH-400*2
<b>Brand</b>	HINODE	EATON (Bussmann)	EATON (Bussmann)	HINODE

## Accessories

### Add-on Card

Add-on Card No.	Description	Remarks
WTCM10	RS-485 Com Card	Com Card, connect 220Ω 1/2W resistor for multiple unit communication.
WTCM20	Analog output Card (0-20 or 4-20mA)	Connect to 1 unit only. (Vmax: 5VDC)
WTCM30	Electronic contact card	Contact Capacity: 24VDC 0.1A

### Operation Box and Connection Wires

Product No.	Description	Remarks
KP-WTDOP-01	W7 Digital Operation Box	
PMF-DOP01-200	2m length	Length subject to customization, max. 10m.
PMF-DOP01-500	5m length	
PMF-DOP01-1000	10m length	

#### Add-on Card

WTCM10



WTCM20



WTCM30



#### Operation Box

KP-WTDOP-01



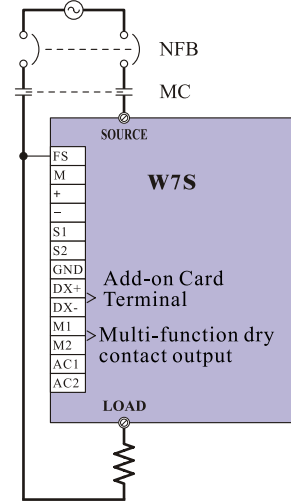
#### Connection Wire

PMF-DOP01-XXXX



# Single Phase Wiring Example

## Single Phase

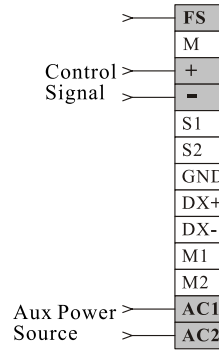


Main Circuit Diagram

※ Installed on Source side if MC is used

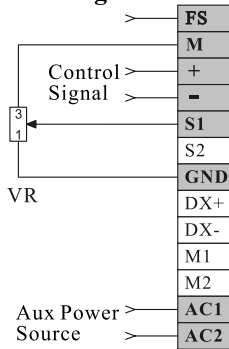
※ Use 220Ω 1/2W termination resistor for multiple unit communication

## Wiring 1:



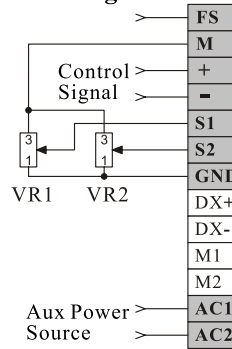
FS	R.F.F	⊕ Control Signal Input
M	00	

## Wiring 2:



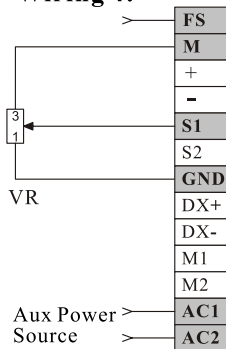
FS	R.F.F	⊕ Control Signal Input
M	01	S1 Max. output limit setting
+		
-	R.F.F	⊕ Control Signal Input
S1	12	S1 Voltage limit setting
S2		
GND	R.F.F	⊕ Control Signal Input
DX+	13	S1 Current limit setting
DX-		
M1		
M2		
AC1		
AC2		

## Wiring 3:



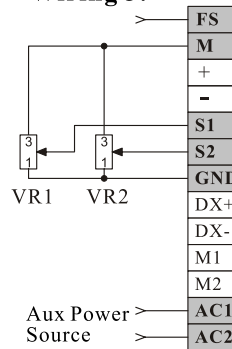
FS	R.F.F	⊕ Control Signal Input
M	02	S1 Max. output limit setting
+		S2 Basic Output Setting
-	R.F.F	⊕ Control Signal Input
S1	14	S1 Voltage limit setting
S2		S2 Current limit setting
GND		
DX+		
DX-		
M1		
M2		
AC1		
AC2		

## Wiring 4:



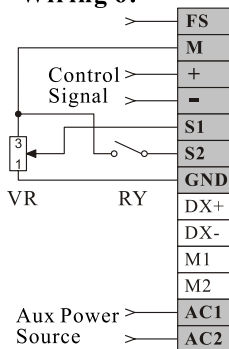
FS	R.F.F	S1 Manual Setting
M	03	
+		
-		
S1		
S2		
GND		
DX+		
DX-		
M1		
M2		
AC1		
AC2		

## Wiring 5:



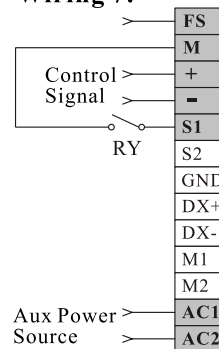
FS	R.F.F	S1 Manual Setting
M	04	S2 Basic Output Setting
+		
-		
S1		
S2		
GND		
DX+		
DX-		
M1		
M2		
AC1		
AC2		

## Wiring 6:



FS	R.F.F	⊕ Control Signal Input
M	05	S1 Manual Setting (ineffective in Auto) S2 Open: Auto; Close: Manual
+		
-	R.F.F	⊕ Control Signal Input
S1	06	S1 Manual Setting (output limited in Auto) S2 Open: Auto; Close: Manual
S2		
GND	R.F.F	⊕ Control Signal Input
DX+	07	S1 Max. output limit setting ※Note2 S2 Open: Note 1; Close: Zero Cycle Sampling
DX-		
M1		
M2	R.F.F	⊕ Control Signal Input
AC1	08	S1 Max. output limit setting ※Note2 S2 Open: Note 1; Close: Zero Time Sampling
AC2		
	R.F.F	⊕ Control Signal Input
	09	S1 Max. output limit setting ※Note2 S2 Open: Stop; Close: Operation

## Wiring 7:



FS	R.F.F	⊕ Control Signal Input
M	10	S1 Open: Auto Close: Digital Input Setting ※Note3
+		
-		
S1		
S2		
GND		
DX+		
DX-		
M1		
M2		
AC1		
AC2		

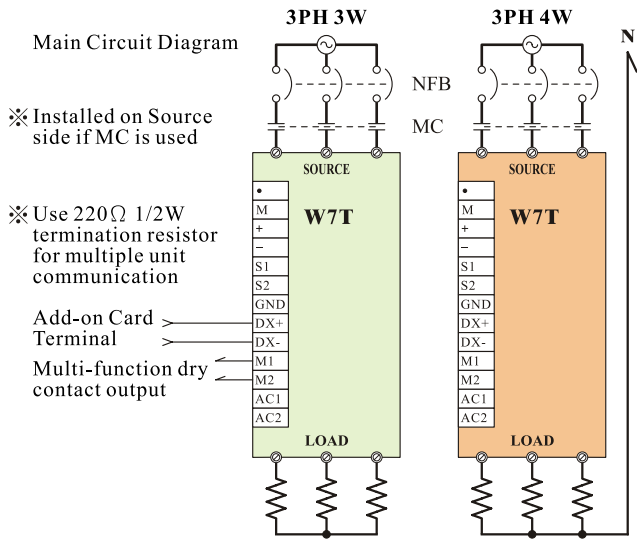
※ Note 3: Digital Input Setting  
 C.t.a.d = 0~4 setting is percentage  
 C.t.a.d = 5~8 setting is actual value

Note 1: Output according to CT. MD Control Mode when Contact is Open.

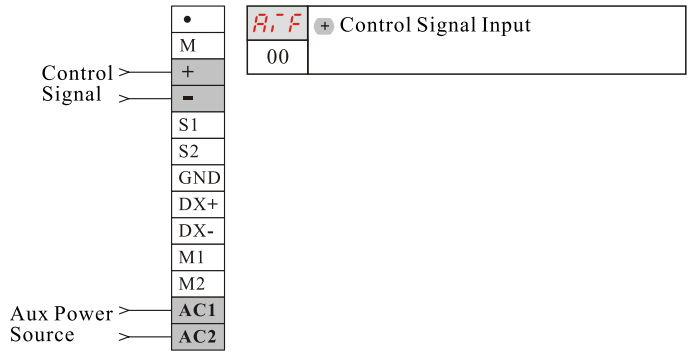
Note 2: Max. output limit setting, connect M and S1 when VR is not in use.



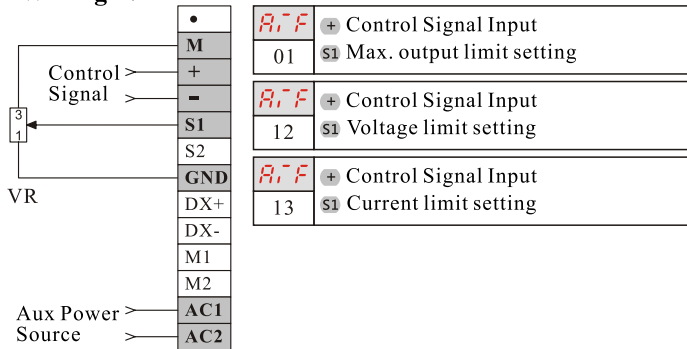
# 3-phase Wiring Example



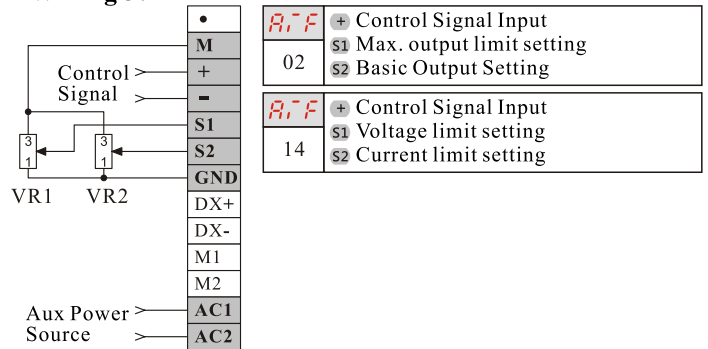
## Wiring 1:



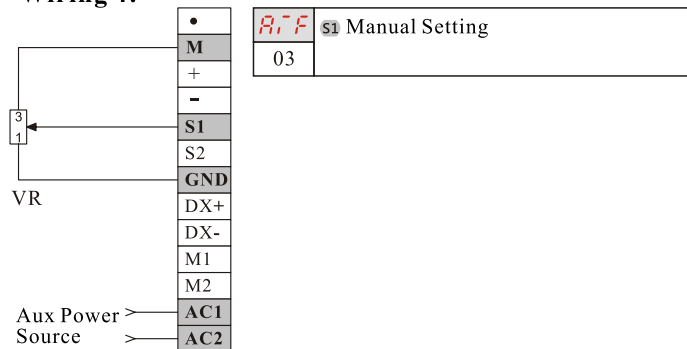
## Wiring 2:



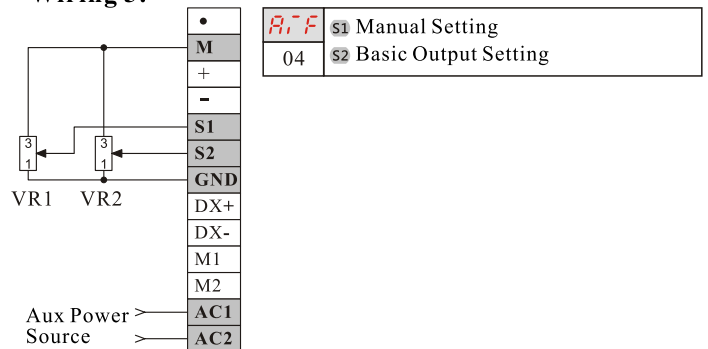
## Wiring 3:



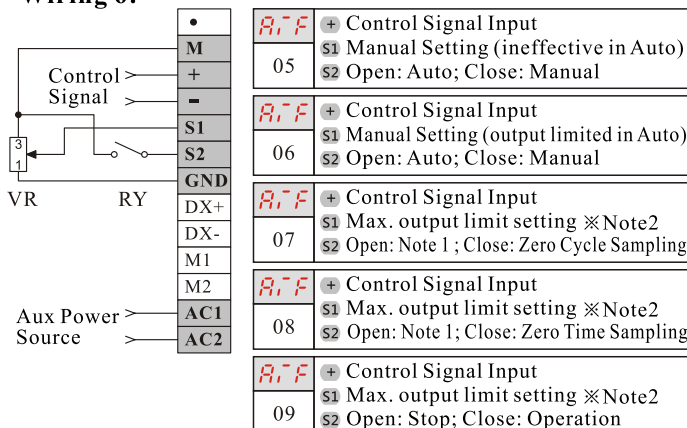
## Wiring 4:



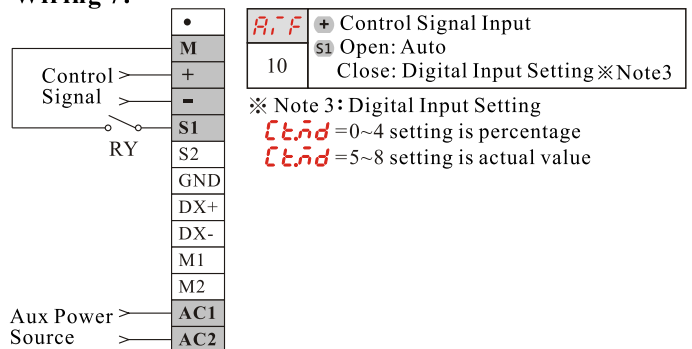
## Wiring 5:



## Wiring 6:



## Wiring 7:



Note 1: Output according to CT. MD Control Mode when Contact is Open.

Note 2: Max. output limit setting, connect M and S1 when VR is not in use.

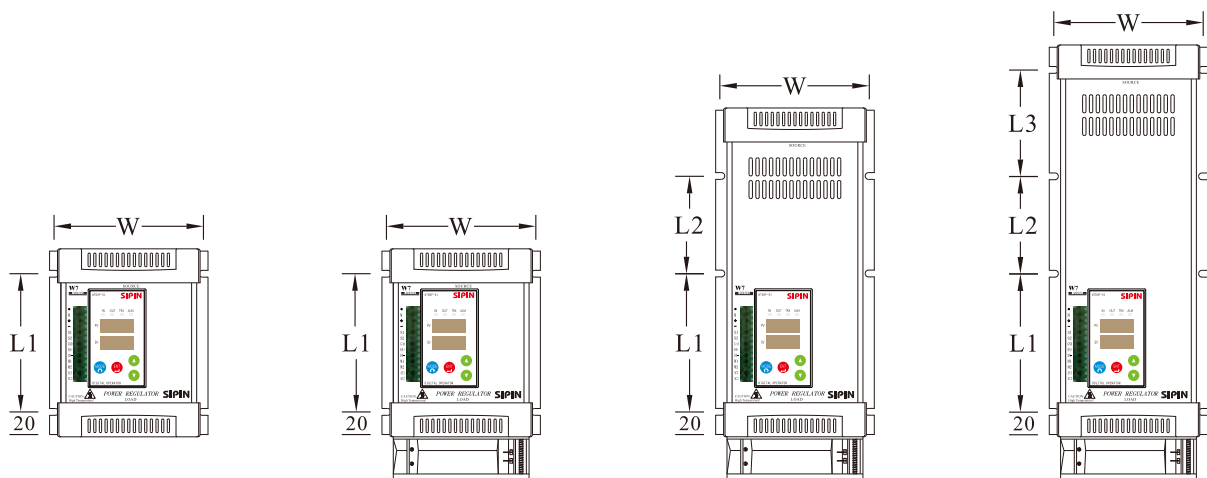
# Product Dimensions and Weight

## W7S Single Phase Controller

Rated Current	Drawing	Dimensions (mm)			Net weight (Kg)	Package Dimensions (mm)			Gross weight (Kg)	Fixing Holes Dia. (mm)				Mains Screw	Torque (kgf.cm)	Cooling Method
		L	W	H		L	W	H		L1	L2	L3	W			
30A	A	162	98	135	1.32	225	127	166	1.56	122	Ø	Ø	90	M6	50~60	Self-Cooled
45A	A	200	98	135	1.51	262	127	166	1.77	122	Ø	Ø	90	M6	60~70	Self-Cooled
60,80A	B	162	112	185	1.77	225	140	220	2.10	122	Ø	Ø	104	M6	70~90	Self-Cooled
100A	C	189	112	185	2.03	250	140	220	2.36	122	Ø	Ø	104	M6	70~90	Fan Cooled
125,150,180A	C	275	112	185	2.99	336	140	220	3.36	122	86	Ø	104	M8	160~200	Fan Cooled
230A	C	287	112	190	3.45	345	140	220	3.85	122	86	Ø	104	M10	250~280	Fan Cooled
300,380A	D	390	140	250	6.07	450	168	277	6.69	122	86	94	132	M10	280~320	Fan Cooled
450A	D	390	140	250	6.75	450	168	277	7.37	122	86	94	132	M10*2	320~360	Fan Cooled
580A	D	460	140	250	8.62	590	260	390	10.64	122	86	94	132	M10*2	320~360	Fan Cooled
720A	D	560	140	250	10.56	690	260	390	13.09	122	86	239	132	M10*2	320~360	Fan Cooled

## W7T Three Phase Controller

Normal rated current	Figure (Page10)	Outline dimensions (mm)			Net weights (Kg)	Packed dimensions (mm)			Packed weights (Kg)	Fixed-hole dimensions (mm)				Main power source screw	Torque (kgf.cm)	Way of cooling
		Length	Width	Height		Length	Width	Height		L1	L2	L3	W			
30A	E	200	140	150	2.63	262	168	182	2.98	122	Ø	Ø	132	M6	50~60	Air-cooling
45A	F	200	140	210	3.11	262	168	245	3.49	122	Ø	Ø	132	M6	60~70	Air-cooling
60,80,100A	G	242	140	210	3.59	302	168	245	3.97	122	Ø	Ø	132	M6	70~90	Fan-cooling
125,150A	G	326	140	210	5.13	388	168	245	5.62	122	86	Ø	132	M8	180~200	Fan-cooling
180A	G	382	140	210	5.95	443	168	245	6.46	122	86	94	132	M8	200~220	Fan-cooling
230A	H	322	215	210	15.44	445	320	400	17.39	230	Ø	Ø	203	M10	250~280	Fan-cooling
300,380A	H	402	215	270	20.48	530	320	400	22.81	230	80	Ø	203	M10	280~320	Fan-cooling
450A	I	390	380	250	18.77	515	500	390	21.83	122	86	94	372	M10*2	320~360	Fan-cooling
580A	I	460	380	250	24.30	590	500	390	28.01	122	86	94	372	M10*2	320~360	Fan-cooling
720A	I	560	380	250	29.00	690	500	390	32.60	122	86	239	372	M10*2	320~360	Fan-cooling



# Product Figures



