

Simple Type

3Φ Power Regulator TRL Series

Input Signal | 0~5V, 1~5V, 0~10V, 1~10V, 0~20mA, 4~20mA -- 6 options

Indicator | PL – Aux. power indicator (LED turned on when aux. power is connected)
 IN – Signal input indicator (LED will flash with the intensity of signals)
 OUT – SCR output indicator (LED will flash with the output rate)
 FUSE – Fuse breaking indicator (LED will go on if the main power isn't fed, phase failure or broken fuse occurs)
 O.H. – Heat sink overheat indicator (LED will go on if the temperature of heat sinks is higher than 80° C)

Adjustment | MIN Minimum adjustment: 0 ~ 40% (Default = 0)
 MAX Maximum adjustment: 50% ~ 100% (Default = 100)
 SOFT Soft-start time: 0~10 sec. (Default = 5 sec.)
 Maximum output = Panel max. value x External VR max. value

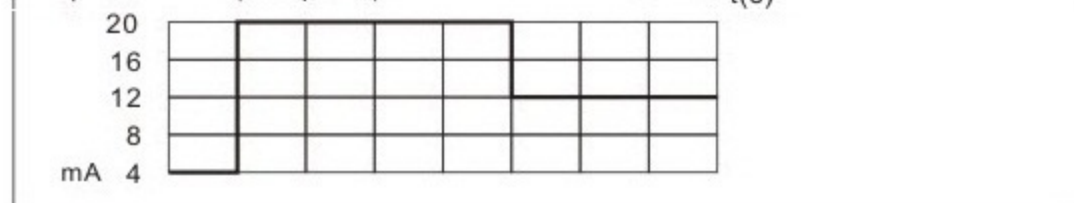
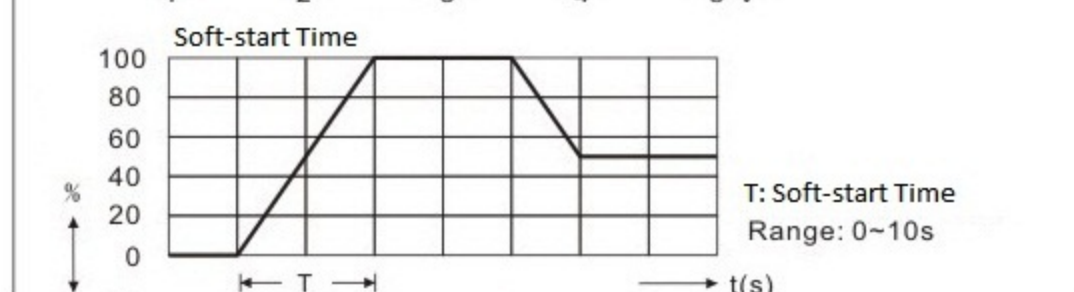
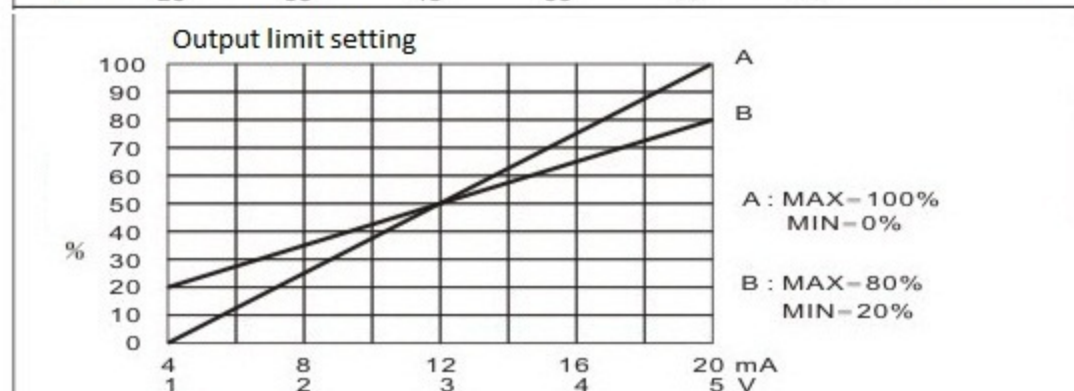
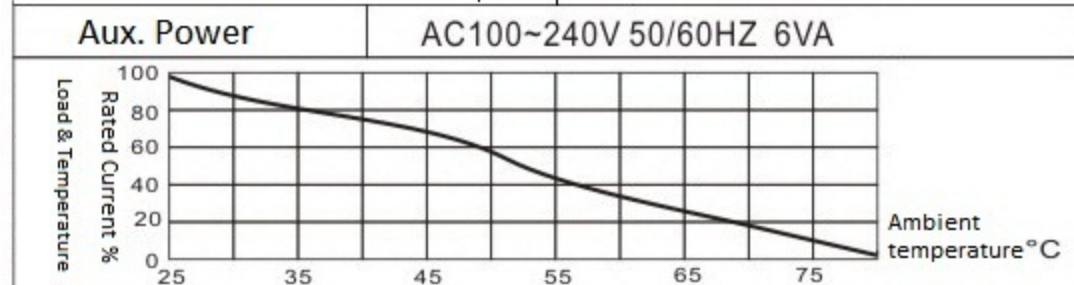
Alarm contact | Contact capacity: 250VAC/3A

Determining Specification | Calculation of current and determination of specifications:
 $3\Phi \rightarrow 1 \text{ (Amper)} = P \text{ (Watt)} \div \sqrt{3} \div 0.85 \text{ (15\% safety reservation)}$
 Example: $3\Phi \text{ 380V 15KW heating element (main power supply is 380V)}$
 $15000 \div 380 \div 1.732 \div 0.85 = 26.8 \rightarrow$ (select the type of 35A)

Note | Before changing the fuses or alter the input mode, please cut off the power supply first and follow the following steps:
 1. Dismount the top terminal cover
 2. Take off the fixing screws on the both side of the topo cover
 3. Lift the top cover about 45° (60° at most less the connecting wire should break)

Model Explanation

TRL 4 035 P			
① Model TRL 3Φ 3L			
② Main Power	2	AC180~260V	
	4	AC340~480V	
③ Rated Current	025	25A	Fuse Type
	035	35A	
	050	50A	
	060	60A	
④ Control Mode	P	Phase Control	
	Z	Zero Crossing Control	



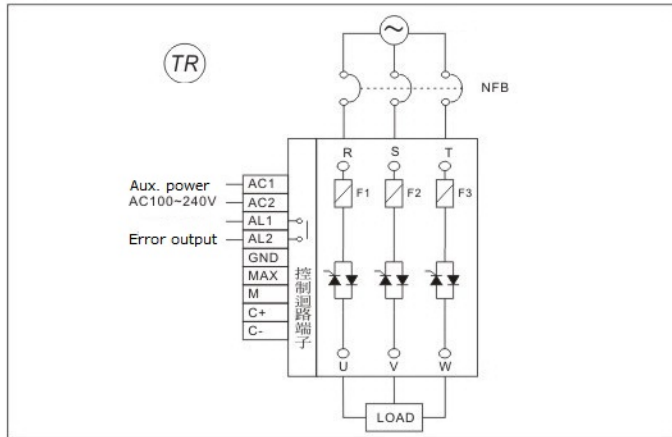
Mode Selection

Control Mode	Input Signal	J4	J3	J2	J1	Marking
Phase Control	0~5V	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	■ : ON □ : OFF → Default
	1~5V	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
	0~10V	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
	2~10V	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
	0~20mA	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
	4~20mA	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Zero Crossing Control	0~5V	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	※ If mode is changed, please reboot to activate the change.
	1~5V	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	0~10V	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
	2~10V	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	0~20mA	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
	4~20mA	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Output Method and Application

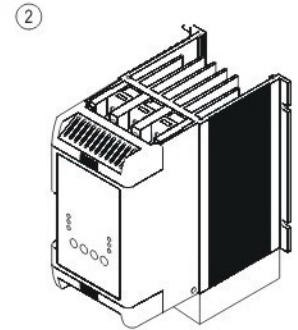
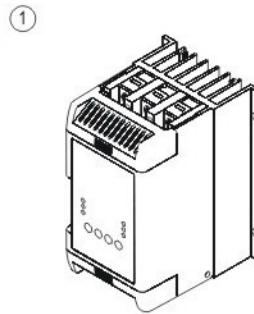
Phase Control	10%	50%	90%
Advantages: Can be applied to such load types as fixed resistance, variable resistance and lighting adjusting. No interrupted signal in continuous output.			
Disadvantages: May cause harmonic interference when triggered.			
Zero Cross Control	10%	50%	90%
Advantages: Won't cause harmonic interference. No components of half waves so as to reach the highest power factor.			
Disadvantages: Only applicable to heaters of fixed resistive type. When outputting, the current indicator might appear with dithering. Likely to cause burn-in to the heating element.			

Power Wiring Diagram

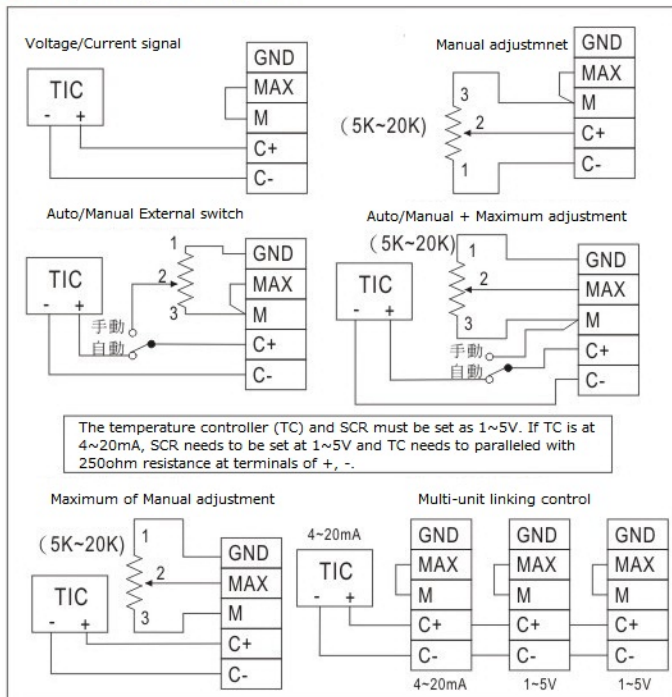


Dimension

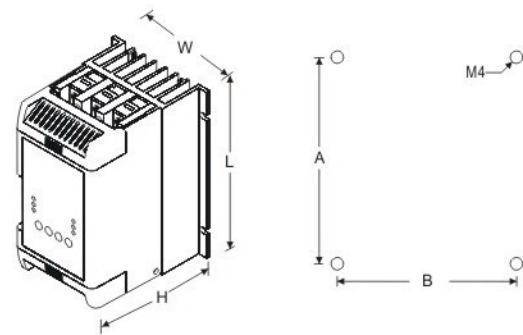
Model	Rated Current	L (mm)	W (mm)	H (mm)	Fixed Size A & B (mm)	Cooling Method	Fig.
TRL 3φ 3W	25A	145	96	110	100,88	Self-cooling	1
	35A	175	96	110	100,88		Fan cooling
	50A	175	96	152	100,88	2	
	60A	175	96	152	100,88	2	



Input Signal Diagram



Installing Instruction



- Adopts vertical installing so as to achieve the best radiating effect.
- Notice the width of the interspace between two heat sinks to assure the best radiating capability.
- Keep sufficient space for ventilation at the upper and lower side.
- Control cabinet should have vent holes and be mounted with cooling fans so as to make ventilation better.
- If the internal temperature is too high, please use the current lower than 70% of the rated current

Error Display & Troubleshooting

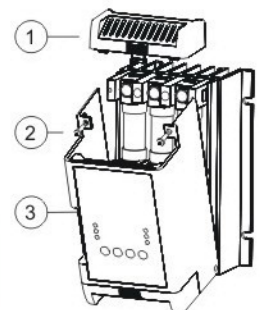
PL Power Lamp is not alit	<ol style="list-style-type: none"> 1. Aux. power is not connected or the voltage is abnormal - check if the power at AC 1, 2 terminal is normal 2. Over-voltage or exceptional surge causes power protecting circuit of the control board burnt.
FUSE Indicator alit	<ol style="list-style-type: none"> 1. Main power disconnected, under phase with the power, supply voltage or phase sequence abnormal. 2. Fuse breaks.
O. H Indicator alit	<ol style="list-style-type: none"> 1. Ambient temperature too high or bad air circulation in the cabinet. 2. The fan is not switched on - breaks down or jammed by a foreign body. 3. Wrong specification or over-current at the load. 4. Terminal unfastened which caused high contact resistance and heat at the contact.
Output Voltage doesn't coordinate with input command	<ol style="list-style-type: none"> 1. Check if the VRs of Min and Max. on the panel are adjusted. 2. External input signal is not corresponding to mode setting.
SCR does not output	<ol style="list-style-type: none"> 1. Aux. power disconnected - PL lamp does not turn on. 2. Input signal disconnected - IN lamp does not turn on. 3. Main power disconnected or under phase - FUSE lamp turns on. 4. Heat sink overheated - O.H. lamp turns on. 5. IN lamp on, OUT lamp off and no error message - M and Max signal is not short-circuited
SCR fails to shut down	<ol style="list-style-type: none"> 1. VR of MIN (minimum adjustment) changed. Please switch to minimum counter-clockwise. 2. External input signal is not corresponding to mode setting. 3. Check if the load and housing short-circuited. 4. Check the common point of the load and N-phase short-circuited. 5. Harmonics interference (i.e.generator) causes SCR unable to be shut down. 6. The power components of SCR are short-circuited or the controlling board fails.
3F current unbalanced	<ol style="list-style-type: none"> 1. Check if the 3-phases of the impedance at load resistance are balanced. 2. 3 Voltage unbalanced - inadequate power capacity, or caused by the generator. 3. SCR'S sync signal is abnormal due to harmonic interference, like the generator

If trouble can't be solved after even though the above troubleshooting is completely taken, please contact our staff for advanced solutions.

Instruction of changing the fuse

1. Dismount the top terminal cover.
2. Take down the two M3 screws.
3. Pull up the cover about 45 degree.

Don't let the angle exceed 60 degree when opening the cover in case the wires inside should break



Safety Notice



Caution



Dangerous

- Please connect lines according to National Electrical Code to prevent hazard to human and equipment.
- To prevent electric shock, please make sure that power is turned off before replacing the fuse.
- Please do not use beyond the rated current. If the power is unsteady, please retain sufficient current safety reservation.
- Please lock terminal screws tightly to prevent components from being burned due to the surge of overheat of contacts.
- The internal parts of the device are components with high voltage and high temperature. Do not touch any terminal to prevent hazard if it is electrified.

單相電力調整器

Mono-phase SCR power regulator

BRL、BRD、BRA TYPE

特點 Features (Some of features are depends on the model no.)

- 可選擇輸出方式:1.相位控制 2.零位控制
- 可選擇6種輸入訊號 4~20mA, 0~20mA, 1~5V, 0~5V, 2~10V, 0~10V
- 內建FUSE保護,節省空間且更換容易
- 內建散熱片超溫保護及溫度顯示功能
- 內建RS-485通訊功能
- 可顯示輸入命令、輸出電流、輸出百分比、散熱片溫度、異常訊息
- 可設定緩衝啟動時間、過載、輕載準位
- 具備試運轉功能
- 具有異常輸出接點且可設定規劃
- 全功能機種具備SCR打穿、FUSE熔斷、Heater低電流、Heater過電流保護功能
- Output mode: Phase trigger control & Zero cross trigger control
- 6 input signal of option 0~5V, 1~5V, 0~10V, 2~10V, 0~20mA, 4~20mA
- Built-in FUSE protect for saving the space and repair a new easier
- Built-in overheat protect and temperature indicator of heat sink
- Built-in RS-485 communication function
- Can be displayed input commands, output current, output percentage, the temperature of heat sick and error message
- Can set the cushion start time, overload and under load level
- Have the function of error output contact and plan
- Full function model includes thyristor puncture, fuse melting, heater wire-burn and heater overload protect



規格 Specification

輔助電源 Aux. Power	90~240VAC±15% 50/60HZ(約5W功率消耗) Power sumpcion: 5W
主電源 Main Power	單相(110~440V)±15% 50/60HZ Single Phase (110, 220, 380, 440) ±15% 50/60Hz
額定電流 Rated Current	30A, 60A
控制方式 Control Mode	相位控制/零位控制(可切換) Phase Control/ Zero Control (please switch to another mode)
輸入信號 Input Signal	0~5V, 1~5V, 0~10V, 2~10V, 0~20mA, 4~20mA
輸出控制範圍 Output Control Range	0~100.0%
解析度/線性度 Resolution/Linear	0.1% / 1%
冷卻方式 Cooling Way	自然冷卻(若盤內溫度過高時須加裝風扇) Nature cooling(if the inside temperature is overheat, please build-in the fans)
環境溫度/溼度 Ambient Temperature/ Humidity	-10~+50°C / 90% RH 以下 -10~+50°C / under 90%RH
耐壓強度 Hi-pot Test	AC2000V/1分鐘(電源端、訊號端及散熱片間) AC2000V/1 min. (between the power/signal terminal and heat sinks)
耐雜訊 Noise Susceptibility	2KV 5KHZ
絕緣阻抗 Isolation Resistor	20MΩ以上/500V(電源端、訊號端及散熱片間) over 20MΩ/50V (between the power/signal terminal and heat sinks)
外殼材質 Housing material	ABS (UL94V)

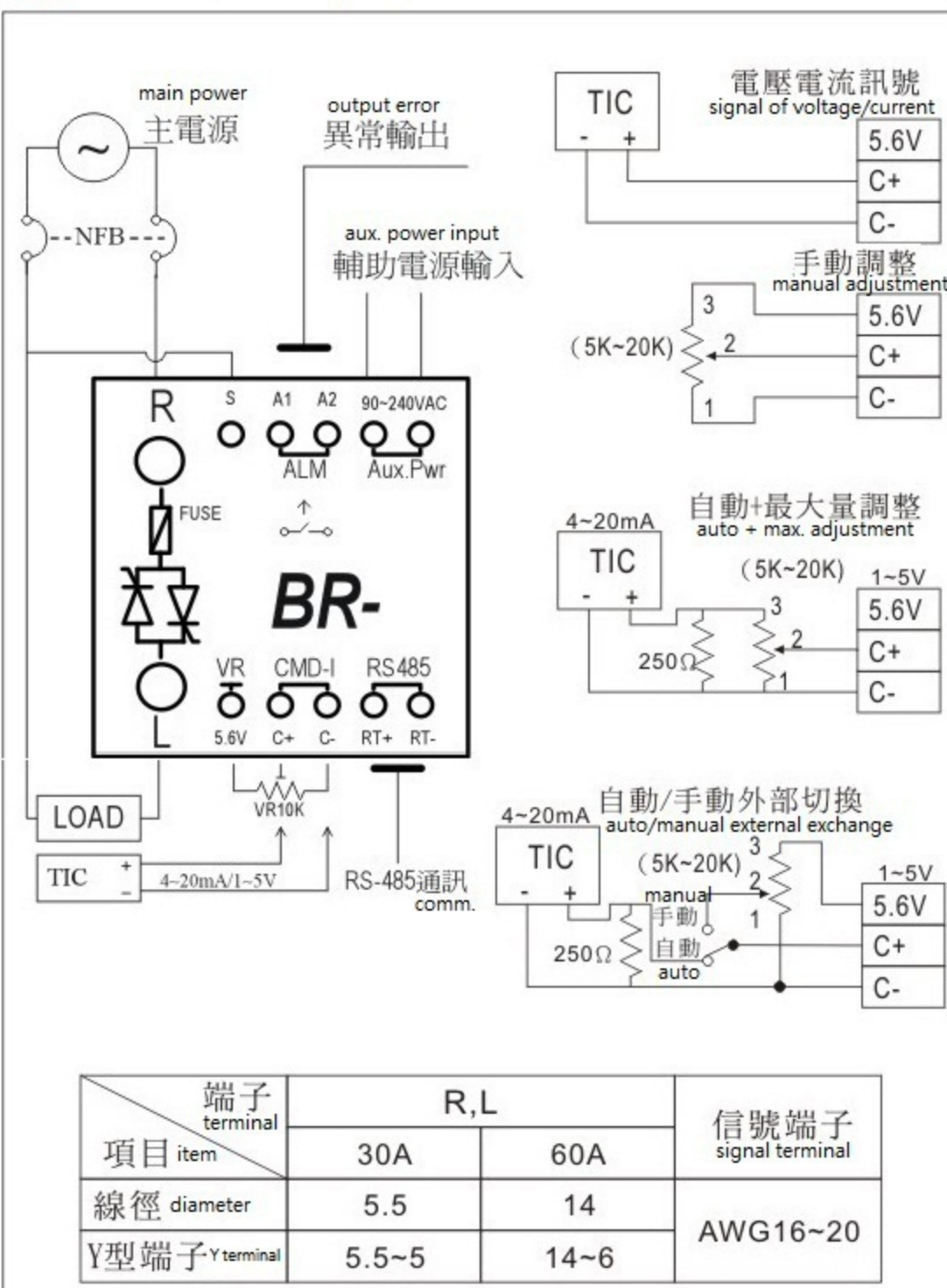
型號說明 Model Explanation

BRL 4 030				
型號 Model	BRL	簡易型 SIMPLE TYPE		
	BRD	顯示型(含顯示) DISPLAY TYPE (INCLUDED DISPLAY)		
	BRA	全功能型(含顯示、通訊、偵錯) FULL (INCLUDED DISPLAY, COMMUNICATION, DETECT ERROR)		
主電源 Mains	4	AC 110V ~ 440V ※ BRL: AC 200V ~ 440V		
額定電流 Rated Current	030	30A	FUSE 選用	FWC-32A10F
	060	60A		80FE
<p>負載&周溫曲線圖 Curve chart of load & ambient temperature</p> <p>Rate current 額定電流 %</p> <p>周圍溫度 °C Ambient temperature °C</p>				

模式選擇 Mode Select

控制模式 control mode	輸入訊號 Input signal	S4	S3	S2	S1	標示 Marked
相位控制 Phase control	0~5V	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	■ : ON <input type="checkbox"/> : OFF → 出廠預設 default
	1~5V	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
	0~10V	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
	2~10V	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
	0~20mA	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
	4~20mA	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
零位控制 zero cross control	0~5V	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	■ 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input checked="" type="checkbox"/> 1 → ON
	1~5V	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	0~10V	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
	2~10V	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	0~20mA	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
	4~20mA	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

接線圖 Wiring diagram



操作及顯示功能(BRD&BRA) Operation & Display function

面板說明 Panel explanation



顯示模式選擇
Display model selection
按一下[MODE]啟動
Press [MODE] to start

測試模式
Test Mode
按[SEL]2秒啟動
Press [SEL] 2 secs. to start

Manual output test
0~100%

第2階參數設定(MODE按2秒啟動,再按MODE鍵選下一參數項,結束設定請按MODE 2秒退出)
STEP 2, Parameter setting (Press MODE key for 2 sec. to start and re-press MODE key for the next parameter. When finished setup, please press MODE key for 2 sec. to exist)

P.00	輸入命令選擇 Input command option 0-5, 1-5, 0-10, 2-10, 0.20, 4.20	4~20
P.01	緩衝啟動時間 Soft start time 1~60S	10
P.02	反應速度時間 Response speed time 1~10S	2
P.03	最大值設定 Max. value setting 0~100%	100
P.04	最小值設定 Min. value setting 0~50%	0
P.05	異常選項 / MNU: 停止工作 Stop working ATO: 只有警報繼續工作 Only alarm keep working	ATO
P.06	Relay 指定輸出 relay specified output ALM: 異常時(abnormal) / FAN: 過熱時(overheated)	Alm
P.07	過載設定 Overload setting 0~99A (0=OFF)	OA
P.08	輕載設定 Under load setting 0~99A (0=OFF)	OA
P.09	通訊逾時 3~99秒 Communication delay 3~99 secs.	5秒
P.10	通訊位址 Communication address 1~99	1
P.11	通訊速率 Communication frequency 2.4, 4.8, 9.6, 19.2 KBPS	9.6
P.13	電流異常偵測功能 Current anomaly detection function On: open / OFF: function closed	ON
P.14	定電流比率帶 Rated current ratio 0: 關閉定電流 Close rated current (啟動定電流功能, 系統一律以相位控制 Start rated function, the system should be the phase controlled)	OA

異常碼 ERROR CODE

E.01	過電流(額定電流1.3倍), 輸出50%以上開始判斷 Overload current 1.3X of the rated current Start to judge when exceed 50% output
E.02	電源/保險絲斷 Power/Fuse broke
E.03	過載超過POS設定值, 輸出50%以上開始判斷 Overload exceed POS setting value, start to judge when exceed 50% output
E.04	散熱片 (Heat Sink) > 80°C
E.05	負載斷線 Load disconnection, start to start to judge when exceed 35% output
E.06	SCR打穿, 無輸出時判斷 Thyristor puncture, when there is not output, start to judge
E.07	輕載低於POS設定值, 輸出50%以上開始判斷 Under load lower POS setting value, start to judge when exceed 50% output
E.08	溫度SENSOR故障, 輸出10%以上, 10分 鐘後溫度還是0度 Temperature sensor, fault, when the output exceed 10%, the temperature is still 0° after 10 mins

全功能機種
All function model

異常碼狀態取消: 同時按 [V] + [SEL] 鍵, 清除異常顯示, 重新偵測狀態
Cancelled the error code: Press [V] + [SEL] at the same time to clean the anomaly display, re-detect the status

參數設定: 啟動參數設定狀態, 選擇需要改變的項目, 按[SEL]載入數值, 利用[UP][DOWN]鍵, 遞增或遞減數值, 最後再按住[SEL]1秒完成變更
Parameters setting: To start the parameter setting status and select the changed projects, press [SEL] to load the value, use [UP][DOWN] button to add or delete the value, and then re-press [SEL] for 1 sec. to finish the changing.

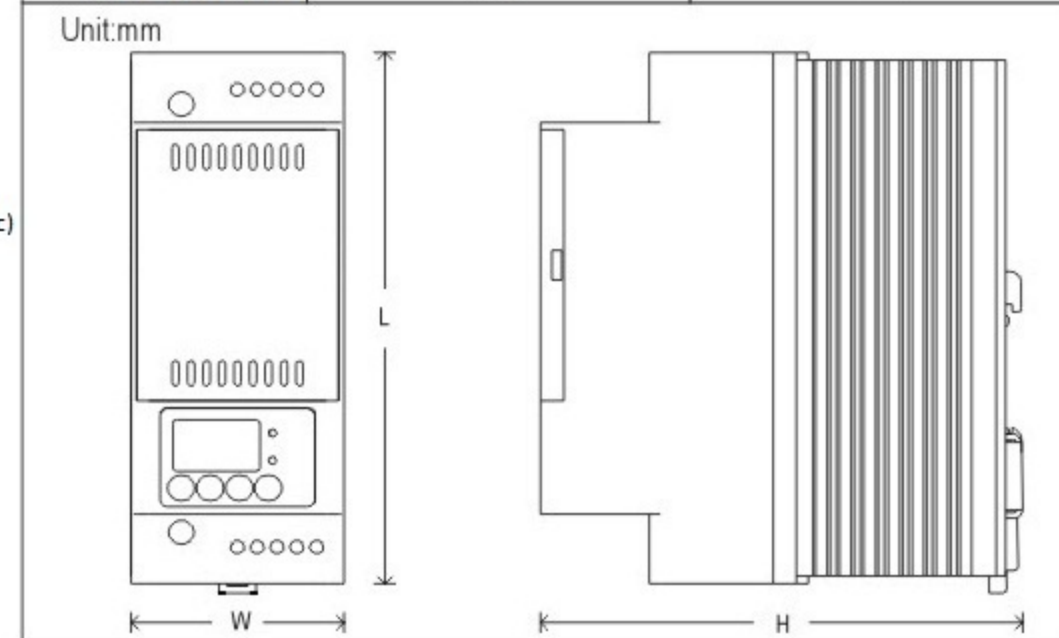


通訊功能 Communication Function

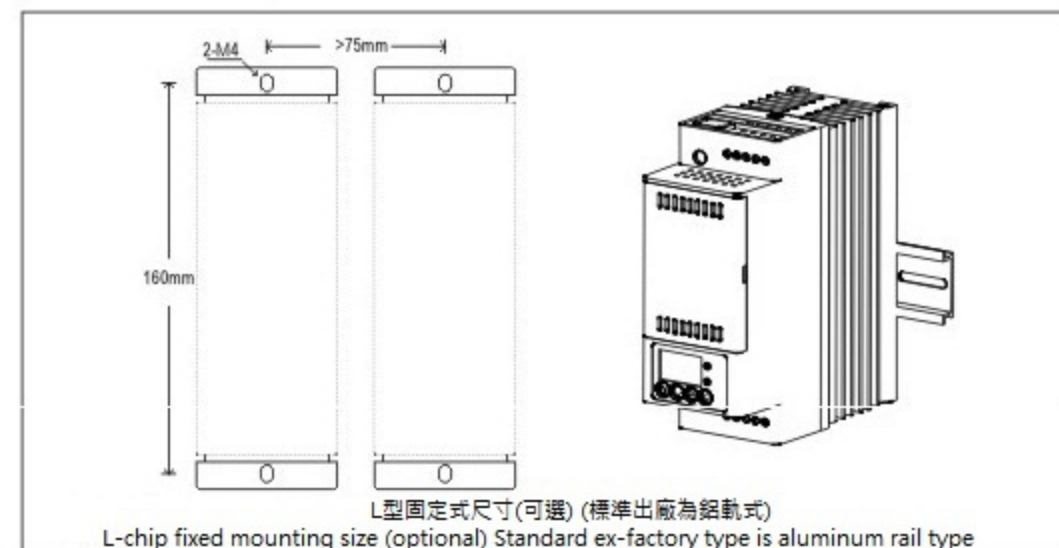
動作說明 Operation Discription	位址 (Add.)	Modbus 位址/Add.	資料 Data	讀/寫 Read/Write
異常輸出狀態 Output error status 1: 異常 Error	0000	00001	bit	R
控制模式選擇 Select control mode 1: 通訊/ 0: 外部控制 1: communication/0: external	0001	00002	bit	R/W
輸出啟動狀態 Output status 1: 啟動 0: 停止 1: ON / 0: OFF	0002	00003	bit	R
解除異常狀態 Exceptional status clearing 1: 解除異常警報 Clear the error alarm	0003	00004	bit	R/W
緩衝啟動時間 Soft start time 範圍: 0~100秒 Range: 0~100 secs.	0000	40001	word	R/W
輸出反應速度 Output responding time 範圍: 0~10.0秒 Range: 0~10.0 sec.	0001	40002	word	R/W
輸出量上限值 Max. of output value 範圍: 0~100% Range: 0~100%	0002	40003	word	R/W
輸出量下限值 Min. of output value 範圍: 0~20% Range: 0~20%	0003	40004	word	R/W
過載設定 Overload setting 範圍: 50~125% (126=OFF)/ Range	0004	40005	word	R/W
輕載設定 Under load setting 範圍: 0~50% (0=OFF)/ Range	0005	40006	word	R/W
輸出百分比設定 Output percentage setting 範圍: 0~100% Range: 0~100%	0006	40007	word	R/W
讀取外部命令 Reading external command 範圍: 0~99% Range: 0~99%	0007	40008	word	R
散熱片溫度 Heat Sink Temperature 範圍: 0~100°C (Range: 0~100° C)	0008	40009	word	R
輸出電流 Output current 範圍: 0~100A Range: 0~100A	0009	40010	word	R
異常狀態 Exceptional status 異常碼: 00~08 (0: normal)	0010	40011	word	R

外觀尺寸及安裝說明 Appearance, Dimension and Installation

電流/Current	30A	60A
長/Length (L)	145	145
寬/Width (W)	55	55
高/Height (H)	105	125
重量/Weight (kgs)	0.8	1.0



固定方式 Fixation	可選擇鋁軌或雙螺絲固定 Can select the aluminum rail or double-screw to fixed
注意事項 NOTE	採用垂直安裝方式, 可達最佳散熱效果 注意間隔距離, 以確保最佳散熱能力 上下方需有足夠通風距離 控制箱須有通風孔, 並加強風扇以利空氣對流 當箱內溫度過高時, 請低於額定70%使用 Adopts vertical installing so as to achieve the best radiation effect Notice the width of the inter space between two heat sinks to ensure the best radiation ability Keep the sufficient space for ventilation at the upper and lower side Control cabinet should have vent holes and mounted with fans so as to make ventilation better If the internal temperature is too high, please use the current lower than 70% of rated current



Digital 3φ Power Regulator

CR-Series



Feature (Functions are subject to models)

- All digital operation displaying, various error-detection and protection functions
- Provided with phase-sequence tracing functions to avoid such problem
- Having detecting functions for power phase failure, fuse blowout, SCR puncture and heater breakdown (x035 and x050 types do not have the functions of SCR puncture and heater breakdown.)
- 6 input signal types for option: (4~20mA, 0~20mA, 1~5V, 0~5V, 2~10V, 0~10V)
- Soft-start time, response speed, maximum value and minimum value all can be set
- Having command inputting and heat sink temperature displaying function
- All function model includes RS-485 communication function and current displaying, can set overload, under load and 3-phase unbalanced detection function

Model Explanation

CR3 - A 2 035 P

Output	Function	voltage spec.	Current spec.	Control Mode
1. 1φ1W	D: Standard	2: 220V	035: 35A	P: Phase trigger control
2. 3φ2W	A: Current detector	4: 440V	:	Z: Zero cross control
1φ2W	V: Voltage detector	(380V)	:	C: 3φ Half-wave
3. 3φ3W	W: Power detector		450: 450A	(Blank): 1φ self-setup
	(V/W: developing)			



Main Power	220, 380, 440V±15% 50/60HZ
Control Power	200~240VAC (fan included) · 90~240V AC/DC (fan non-included)
Rated Current	35A, 50A, 75A, 100A, 125A, 150A, 180A, 225A, 300A, 380A, 450A
Control Mode	Phase trigger control or Zero cross control (only 1φ1W can self-setup)
Control signal Vcmd	0~5V, 1~5V (impedance 20K) 0~10V, 1~10V (impedance 100K) 0~20mA, 4~20mA (impedance 250Ω)
Output Control Range	0.0~100.0%
Resolution/Linear	0.1% / 1%
E. ADJ Control Signal	Analog control: 0~5V (impedance 20K) respond to 0.0~100.0% On/off control: Hi = 3.4V, Lo = 2.2V
Serial communication	RS-485 interface, support ModBus protocol RTU or ASCII format
Cooling Method	Natural air circulation or fan cooling
Ambient temperature & humidity	-10~+50°C / under 90% RH
Hi-pot Test	AC 2000V/1 min. (between the power, signal terminal & heat sinks)
Noise susceptibility	2KV 5KHZ
Isolation Resistor	Over 20MΩ/500VW(between the power, signal terminal & heat sinks)
Housing Material	ABS (UL94V)

1. If the optional model is with full function (A, V, W) and the control mode is with phase control, the controller can be planned as a constant current (or constant voltage, constant power) control mode. Please refer to the parameter settings.
2. Current has a wide range of specifications. Please refer to the product specifications.
3. Single-phase control can be planned to phase / zero control.
4. 3φ phase control [control mode] with P-type and C-type two options.
P-type(standard):
Using 6sets SCR to control each phase' +/- phase voltage. This is called "3φ full-wave controlled". Its characteristics is to control the output line current without DC component (average = 0). It's suitable for inductive (or resistive) load. Such as motors, transformers and so on. The controllable phase angle only have 0~150 degrees control range.
C-type
Using 3sets SCR & 3sets diodes to control each phase' half-circumference phase voltage. This's called "3φ half-wave controlled". It has a wide phase angle control range (0~120 degree). It's suitable for micro voltage adjustment. Due to line current has DC component, therefore, it's only suitable for resistive load.
5. The optional function model is included the serials communication (RS-485) which can support ModBus protocol in RTU or ASCII format. Please refer to the communication spec. (Standard type is not included RS-485 and it's only for display.)
6. Current calculation and specifications used
 $(3\phi)I(\text{AMP}) = P(\text{watt}) \div V(\text{voltage}) \div \sqrt{3} \div 0.85$ (15% safety reservation)
 $(1\phi)I(\text{AMP}) = P(\text{watt}) \div V(\text{voltage}) \div \sqrt{3} \div 0.85$ (15% safety reservation)

Fuse Spec.

Please use the available fuses, the below is mode# for Bussmann & (I²t)

Current	Fuse Model# 240V (I ² t) /415V (I ² t)	Current	Fuse Model# 240V (I ² t) /415V (I ² t)	Current	Fuse Model# 240V (I ² t) /415V (I ² t)	Current	Fuse Model# 240V (I ² t) /415V (I ² t)
35A	50LET(1400)/50FE(380)	100A	125LET(7500)/NIDEC660GH125(10600)	180A	200LMT(20000)/200FM(10500)	380A	----/NIDEC 660GH400(112000)
50A	63LET(2200)/63FE(480)	125A	160LET(16000)/100FE(1800)2PCS	225A	250LMT(40000)/280FM(10500)	450A	----/280FM(30500)2PCS
75A	80LET(3800)/100FE(1800)	150A	180LET(29000)/100FE(1800)2PCS	300A	355LMT(100000)/350FM(60000)		

Input / Output setting

Make sure the control signals based on the input type and then adjust by the below table accordingly to avoid control errors.

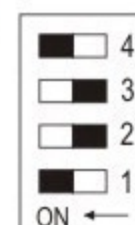
■ : ON □ : OFF ☒ : Don't Care

Input signal	S4	S3	S2	S1	Input signal	S4	S3	S2	S1
0~5V	□	□	■	☒	2~10V	□	■	□	☒
1~5V	□	□	□	☒	0~20mA	■	□	■	☒
0~10V	□	■	■	☒	4~20mA	■	□	□	☒

1φ(CR1)phase/zero cross control settings

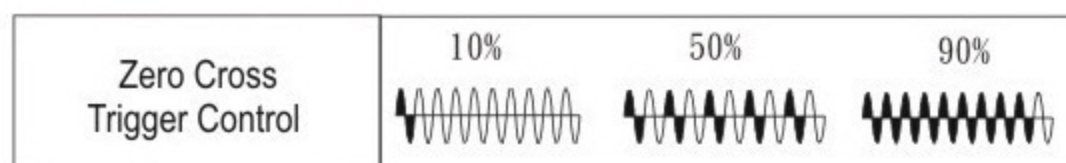
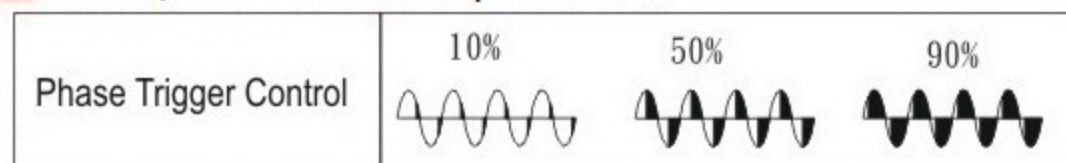
Note: Change control mode must be rebooted

Control Mode	S4	S3	S2	S1
Output Control	□	□	□	☒
Phase Control	☒	☒	☒	■
Zero Cross control	☒	☒	☒	□



DIP switches SW1 on the main control panel

Phase / Zero Control Output waveform



Parameter setting / operating

Panel Description

Key operation:
Press [MODE] key to start the parameter setting, and then [SET] to call out the parameters, using the up / down key to change the parameter value. To press [SET] button for 1 second to write the parameters into the memory. To cancel the change of the parameters, press the [MODE] key to exit before written by pressing the [SET] key. Press and hold the [MODE] key for 3 seconds or don't press any key more than 120 seconds to end the set-up function of parameters to return to the display mode.

[Step 1] Parameter, press [MODE] to start		
Display	Description	Default Value
dISP	disp: when select the normal condition, what types of value will be displayed pert: output percentage Vcmd: control signal Heat: heat sink temperature Ir: R (1 φ) phase current IS: S phase current T-phase current average current	PERt
STUP	stup: 1st time to start or standby over 5 minutes, soft start time (See [control signal modulation])	10Sec.
rESP	resp: control signal (Vcmd, Ccmd) response time (See [control signal modulation]) range: 1~60 seconds	2Sec.
[Step 2] Press the [MODE] key for 3 seconds to start		
Display	Description	Default Value
HLtd	Hltd: maxi. output limit setting (constant current mode, maxi. output current). range: 50~100%	100%
LLtd	LLtd: Vcmd=0 (see Vcut parameter), mini. output limit setting (constant current mode, mini. output current). range: 0~50%	0%
ALtr	Altr: alarm output delay time when Abnormal. range: 0~20 seconds	1Sec
Cool	Cool: Fan start temperature. range: 5~60 degree C	45度
ERAdj	Eadj: Select external control to control Vcmd null: no effect MUL: Vcmd x Eadj Add: Vcmd+Eadj Sub: Vcmd - Eadj Avg: (Vcmd+Eadj)/2 Strt: On/Off control	nULL
uCuT	Vcut: when Vcmd (Ccmd)=0, select Lltd output or close output. Stop: close output Lltd: output by mini. of output value	StoP
HCur	Hcur: (optional) high current. when current value bigger than set value, error occurred. see [F HC] parameter. (phase: above 30%, zero cross 50% above start detect. set 0 as close function) range: 0~500A	0A
LCur	Lcur: (optional) low current. when current value lower set value, error occurred. see [F LC] parameter. (phase: above 30%, zero cross 50% above start detect. set 0 as close function) range: 0~500A	0A
bALn	bALn: (optional) 3 φ current no-balance setting. when 3 φ current is unbalance, the value between maxi. current & mini. current bigger than set value, error occurred. see [F bL] parameter. (phase: above 30%, zero cross 50% start detect. set 0 as close function) range: 0~500A	0A
HP	Kp: (optional) constant current (voltage/power) control deviation magnification settings. the greater the value the more sensitive response. range: 10~100%	100%
PLtd	Pltd: (optional) constant current control, limit the maximum phase angle. inductive load due to voltage phase is ahead current phase, this feature can prevent failure of SCR trigger. range: 50~100%	100%

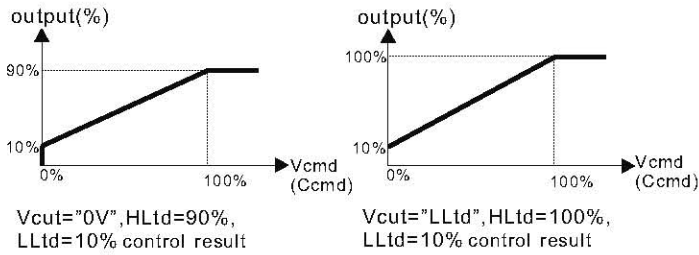
[Step 3] Press [MODE]+[UP] key for 3 seconds to start		
Display	Description	Default Value
uCnd	Vcmd: setup Vcmd display value to response the control signal. See [inout/output setting] 4-20 → 0-20 → 0-5 → 1-5 → 0-10 4~20mA 0~20mA 0~5V 1~5V 0~10V 2-10 2~10V	4-20
nA in	Main: Main power anomaly occurs disposal. 3 options. null: ignore this anomaly ALAM: alarm output. keep working Stop: alarm output. shutdown the machine	StoP
FUSE	Fuse: The fuse blown anomaly occurred disposal. option is same.	StoP
F Ld	F Ld: (LOAD) disconnection occurred disposal. option is same as above. standard type under 75A (non-included) has not this feature, please must set	ALAN
SEnS	SENS: temperature switch failure occurred disposal. option is same as above. when output 10 minutes continuously, temperature value is still on 0 degree C.	ALAN
F HC	F HC: high current anomaly occurred disposal. option is same as above.	ALAN
F LC	F LC: low current anomaly occurred disposal. option is same as above.	ALAN
F bL	F bL: 3 phase unbalance anomaly disposal. option is same as above.	ALAN
F SCR	F SCR: SCR breakdown anomaly occurred disposal. option is same as above.	StoP
Ctrl	Ctrl: (optional) control options, phase/constant current/ constant voltage/constant power controlled PHAS → ioUe → uoUe → PoUe Phas: phase control iout: constant current vout: constant voltage Pout: constant power	PHAS
id	id: (optional) communication station setting range: 1~99	1
baUD	baud: (optional) communication speed range: 2.4, 4.8, 9.6, 19.2, 38.4. kbit/sec	9.6
daRA	data: (optional) communications serial format. range: 8n1, 8n2, 8e1, 8o1.	8n1
noDE	mode: (optional) ModBus communications format range: RTU, ASCII.	RTU
toUe	tout: (optional) communication timeout setting. when the communication disconnection time exceeds, then the remove communication output control will transfer to the vcmd to control. range: 2~99S	5Sec.
[Other]		
LoCt	Press [MODE]+[DOWN] key for 3 seconds to start Lock: parameter protection setting. range: 0~3 0: all cannot setup 1: open step 1, 2: open step 1, 2, 3: all open	3
tEST	Press [SET] key for 3 seconds to start test: manual output testing. range: 0~100%	0%

Anomaly display (press [SET]+[UP] key to clear)

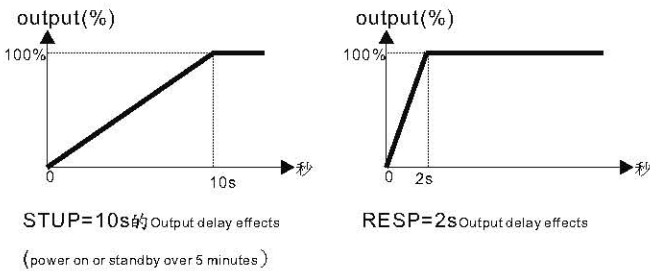
Display	Description	Comm. code
oC	OC: (optional) over-current, when the current value exceeds rated value more than 1.2 times, the controller will stop output. please check the load whether short-circuit.	1
nA in	Main: the main power anomaly. check the input switch or the controller fuse if it is normal.	2
HCur	Hcur: (optional) high current	3
Sint	Sink: heat sink temperature exceeds 80 degrees, the controller will stop output. check the fan spins and environmental ventilation.	4
FUSE	Fuse: fuse breakdown. please confirm fuse spec. & load power or if the connection screws has locked tight (heat fuse)	5
LoAd	Load: Load Break	6
LCur	LCur: (optional) low current.	7
tHER	Ther: temperature sensor anomaly. check the pig plug of temperature sensor whether bad connection, (impedance is about 3K ~ 10K ohm) range: 8n1, 8n2, 8e1, 8o1.	8
SCR	SCR: (optional) SCR breakdown. please return for repairing.	9
UnbL	Unbl: (optional) 3 phase unbalance	10

Modulation for control signals

- The relations between mini./maxi. output and Vcmd (Ccmd)
Remarks: Ccmd is the communication signal. See [comm. control]



- Soft start time (STUP), the relations between response time (RESP) & output



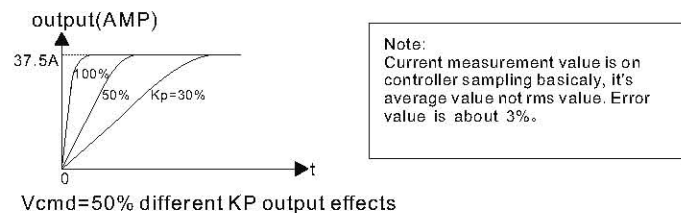
Constant current/voltage/power (optional functions)

If parameter "CTRL" setup as IOUT current control/vOUT voltage control or pOUT power control (below is the current example), the controller will enter the constant current control mode and Vcmd (Ccmd) will also convert to current target value (SV) automatically.

Ex: model #CR3-A4075P (3 phase trigger control 440V/75A)
when Vcmd=50%, current target value=75x50%=37.5A, and so on
if HLtd=90%, LLtd=10%, which means the maxi. SV value is limited in 67.5A, the mini. SV start from 7.5A.

The controller adopted a proportional - integral (PI) as a constant current control operation. Parameters "Kp" is for the proportional gain, the greater output response sensitive the more value setting, please see the load characteristics adjusted to the best value.

Below is the diagram shows:



Comm. control output Ccmd (optional function)

The controller can use the communication to control the SCR output value to replace Vcmd.

- Method:
- Set the contacts (coil) IP0x01 to 1 (comm. control).
The first decimal point on the display start flashes.

- Change the register (reg. Ip4x016) value, SCR output immediate change.

Note:
Under the communication control mode, even if no change the output, which must keep the communicate status with the controller, for example, keep reading the register or contacts address value. Otherwise, the controller will determine the communication disconnection. If the disconnection time longer than Tout, the controller will automatically remove the communication control function to avoid danger.

Description for communication address

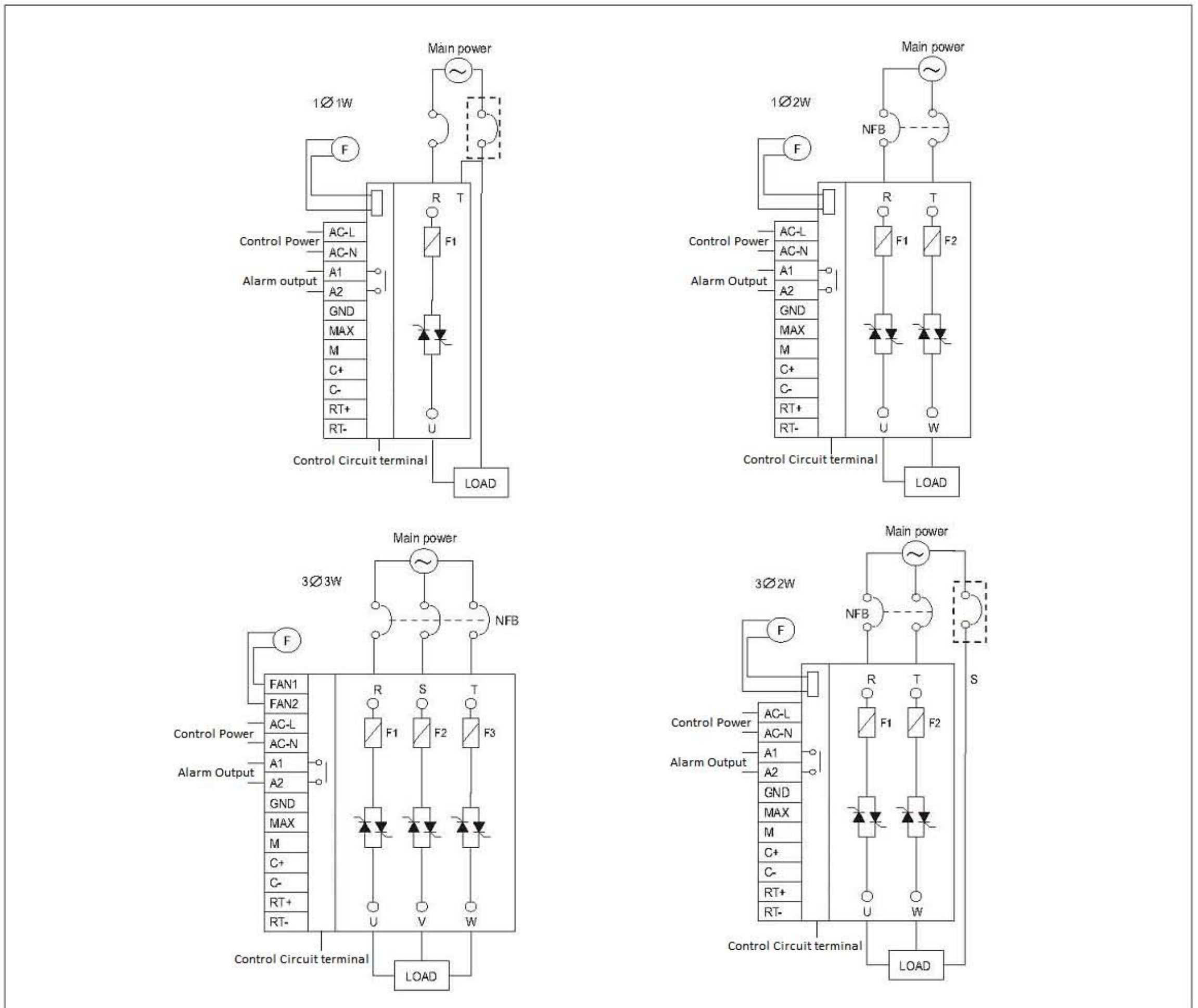
Explanation	Modbus address	Data length	R/W
Unexpected condition cleared 1: Lift the unusual alarm (Automatic recovery to 0)	00001	bit	R/W
Select control mode 1: communication 0: external	00002	bit	R/W
Output mode 1: start 0: stop	00003	bit	R
Fan spinning mode 1: start 0: stop	00004	bit	R

Explanation	Modbus Address	Data Length	R/W
R-phase Abnormal signal 1: on 0: off	00005	bit	R
S-phase Abnormal signal 1: on 0: off	00006	bit	R
T-phase Abnormal signal 1: on 0: off	00007	bit	R
Over current (OC) abnormal status 1: Abnormal 0: normal	00008	bit	R
Over temperature (SINK) abnormal status 1: Abnormal 0: normal	00009	bit	R
High current (HCUR) abnormal status 1: Abnormal 0: normal	00010	bit	R
Low current (LCUR) abnormal status 1: Abnormal 0: normal	00011	bit	R
3 phase unbalance (UNBL) abnormal status 1: Abnormal 0: normal	00012	bit	R
Main power (MAIN) abnormal status 1: Abnormal 0: normal	00013	bit	R
Fuse (FUSE) abnormal status 1: Abnormal 0: normal	00014	bit	R
Load (LOAD) abnormal status 1: Abnormal 0: normal	00015	bit	R
SCR (SCR) abnormal status 1: Abnormal 0: normal	00016	bit	R
Soft start time (STUP) Range: 1-99 second	40001	word	R/W
Response speed time (RESP) Range: 1-30 second	40002	word	R/W
Maximum of output value (HLtd) Range: 50-100%	40003	word	R/W
Manimum of output value (LLtd) Range: 0-50%	40004	word	R/W
High current setting (HC) Range: 0-600A	40005	word	R/W
Low current setting (LC) Range: 0-600A	40006	word	R/W
3 phase unbalance current setting (BALN) Range: 0-600A	40007	word	R/W
Proportional gain value setting (Kp) Range: 10-100%	40008	word	R/W
the maximum phase angle limited setting (PLTD) Range: 50-100%	40009	word	R/W
Alarm output delay time setting (ALTR) Range: 0-20 second	40010	word	R/W
Fan start temperature setting (COOL) Range: 5-60 degree	40011	word	R/W
Communication control signal (Ccmd) Range: 0-1000 (unit 0.1%)	40016	word	R/W
Analog control signal (Vcmd) Range: 0-input spec. (unit 0.1 mA or V)	40017	word	R
SCR present output Range: 0-1000 (unit: 0.1%)	40018	word	R
Heat sink temperature Range: 0-100 degree C	40019	word	R
R-phase current Range: 0-see spec. (unit: 0.1A)	40020	word	R
S-phase current Range: 0-see spec. (unit: 0.1A)	40021	word	R
T-phase current Range: 0-see spec. (unit: 0.1A)	40022	word	R
3 phase average current Range: 0-see spec. (unit: 0.1A)	40023	word	R
Output voltage Range: 0-see spec. (unit: 0.1V)	40024	word	R
Output power Range: 0-see spec. (unit: 0.1kW)	40025	word	R
Unexpected condition Unusual code: 0-10 (0: usual)	40026	word	R
Contacts (coil) Status string pattern LSB(0x01)-MSB(0x16) accordingly	40027	word	R

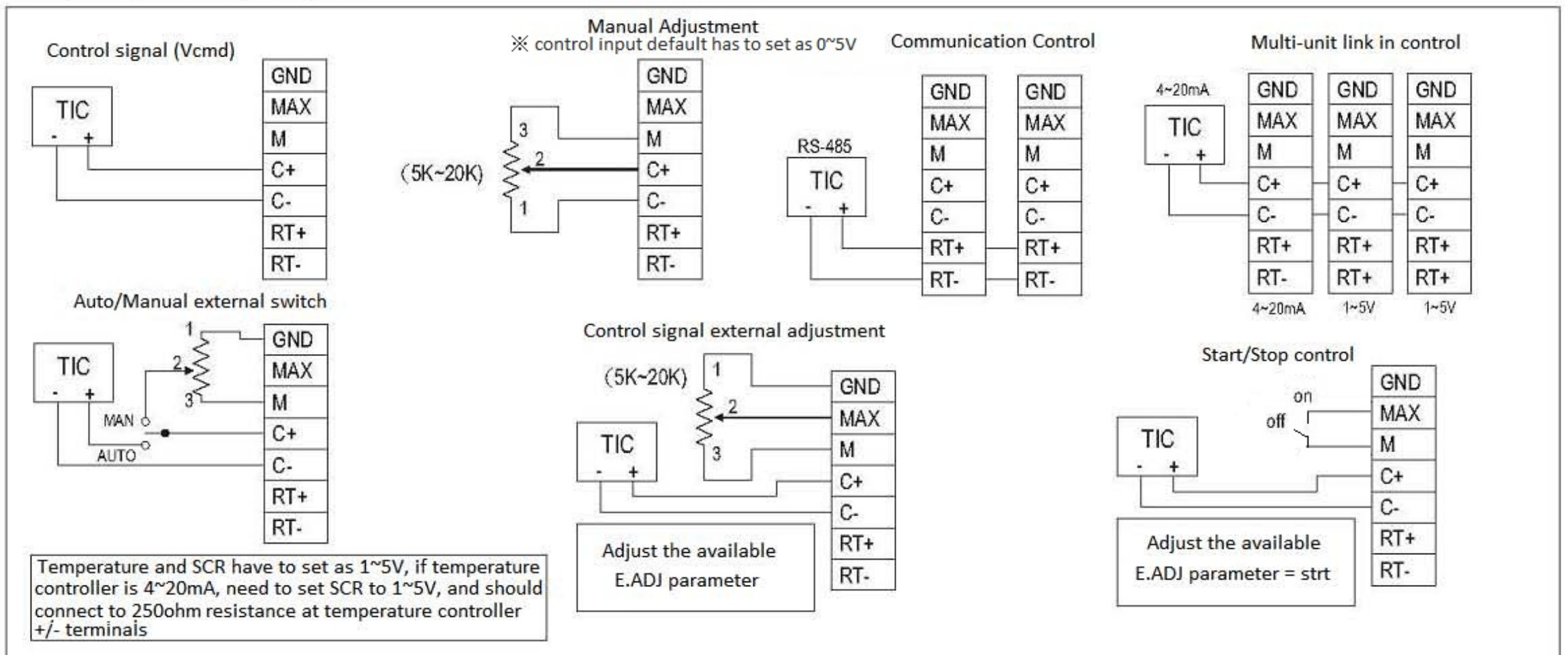
Communication can support RTF or ASCII format, allows up to continuously 8 data for reading/writing, the above address is 10 hex.

Read and write please refer to the ModBus protocol. *

Wiring Diagram



Input signal wiring diagram



Dimension

Type	Current	Length L(mm)	Width W(mm)	Height H(mm)	A & B(mm)	Cooling Way	P
Cr1 1φ1W	75A	203	80	180	215,50	Nature cooling	1
	100A 125A 150A	241	80	180	215,50	Fan cooling	1
	180A 225A	306	80	180	280,50		2
	300A 380A	306	120	220	280,80		5
Cr2 3φ2W or 1φ2W	35A	203	80	180	215,50	Nature cooling	1
	50A 75A	241	80	180	215,50	Fan cooling	1
	100A 125A 150A	241	120	220	215,80		4
	180A 225A	306	120	220	280,80		5
	300A 380A	310	245	220	295,160		6
Cr3 3φ3W	35A	203	120	153	215,80	Nature cooling	3
	50A	228	120	153	215,80	Fan cooling	3
	75A 100A	241	120	220	215,80		4
	125A 150A	306	120	220	280,80		5
	180A 225A	310	245	220	295,160		6
	300A 380A	395	245	220	380,160		7
	450A	395	365	220	380,280		8

Installation Instruction

