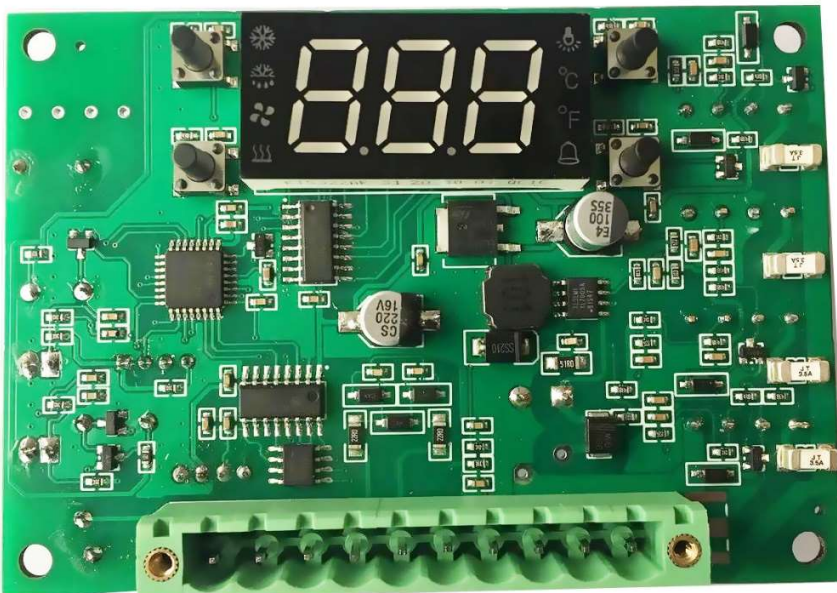


## User Manual

(Version V1.2)

### Introduction

The FCSD\* integrated fan speed controller (hereinafter referred to as the speed controller) is a control solution for Climate Unit for cabinet cooling. It supports up to 4 EC fans for independent speed closed-loop control, which can be controlled according to temperature or host computer instructions. Independent or linkage control with external equipment to ensure the effective and stable operation of the system.



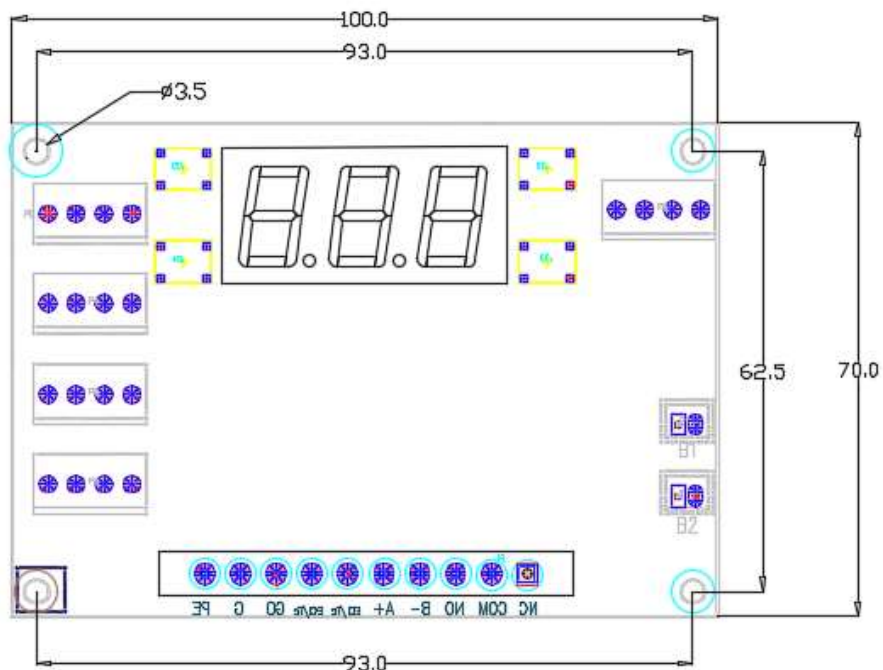
### Features

- Supports max 4 EC fans close-loop control
- Supports max 3 NTC probes
- 2 build-in relays, can be used as alarm or AUX heater output
- Isolated RS485 with standard Modbus RTU protocol
- LED display and 4 keys for easily parameters configuration
- Work alone mode and A/C unit linkage mode

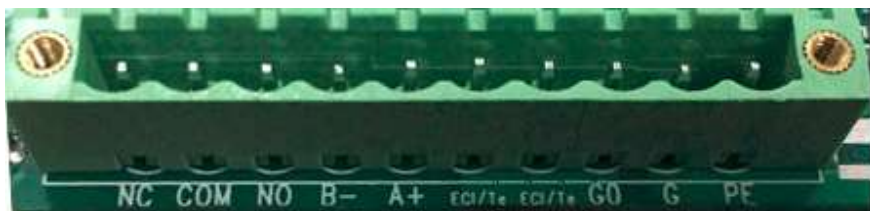
### Typical application

- Telecom Cabinet & Enclosures
- Climate Unit for cabinet cooling
- TEC(Thermoelectric Cooler ) system control

## Dimensions and pin definition







## Output pin definition:



PE	Protection Earth
G GO	Power supply, when using DC power supply, G means V+, GO means V-
RCI/Te	The 3 <sup>rd</sup> NTC or remote control digital input
RCI/Te	The 3 <sup>rd</sup> NTC or remote control digital input
A+	Isolated RS485 A+
B-	Isolated RS485 B-
NO	Digital output normal open
COM	Digital output common
NC	Digital output normal close

## LED display and keys definition



Key	Short press	Long (3s) press
	--back to menu	-- Parameters setup (password 22)
	--Menu down --Value decrease	--Value fast decrease
	--Menu up --Value increase	--Value fast increase
	-- Save changes to RAM, will lose if reboot --Show value --Back to parameters 'code	Save changes to EEPROM

## Parameters List

CODE	Description	default	Min	Max	Unit	type	R/W	Modbus Register
<i>P5</i>	Password entering	22						
<i>P1</i>	Probe 1 reading	0	0	9999	°C	I	R	
<i>P2</i>	Probe 2 reading	0	0	9999	°C	I	R	
<i>P3</i>	Probe 3 reading	0	0	9999	°C	I	R	
<i>rd1</i>	Fan 1 speed	0	0	9999	rpm	I	R	
<i>rd2</i>	Fan 2 speed	0	0	9999	rpm	I	R	
<i>rd3</i>	Fan 3 speed	0	0	9999	rpm	I	R	
<i>rd4</i>	Fan 4 speed	0	0	9999	rpm	I	R	
<i>ALN</i>	Alarm status	0	0	1	-	I	R	
<i>UOL</i>	Power supply voltage	0	24	60	V	A	R	
<b>NEED</b> input correct password to query or modify below parameters,								
<i>St</i>	Temperature control set point	30	10	45	°C	A	R/W	
<i>rd</i>	Control differential	10	2	20	°C	A	R/W	
<i>AD</i>	Temperature alarm differential	2	-5	5	°C	A	R/W	
<i>AeH</i>	High temperature alarm threshold	55	22	75	°C	A	R/W	
<i>AeL</i>	Low temperature alarm threshold	-30	-40	10	°C	A	R/W	
<i>Aed</i>	Temperature alarm delay	10	0	199	S	I	R/W	
<i>AUH</i>	High power supply alarm threshold	57	24	60	Vdc	I	R/W	
<i>AUL</i>	Low power supply alarm threshold	36	20	48	Vdc	I	R/W	
<i>IFO</i>	Number of pulses per revolution of the internal fan	2	0	6	-	I	R/W	

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<b>IF1</b>	Max speed of internal fan	3000	0	9999	rpm	I	R/W	
<b>IF2</b>	Min speed of internal fan	1000	0	9999	rpm	I	R/W	
<b>IF3</b>	Stop duty cycle of internal fan	8	0	30	%	I	R/W	
<b>IF4</b>	Start duty cycle of internal fan	30	0	50	%	I	R/W	
<b>EFD</b>	Number of pulses per revolution of the external fan	2	0	6	-	I	R/W	
<b>EF1</b>	Max speed of external fan	3000	0	9999	rpm	I	R/W	
<b>EF2</b>	Min speed of external fan	1000	0	9999	rpm	I	R/W	
<b>EF3</b>	Stop duty cycle of external fan	8	0	30	%	I	R/W	
<b>EF4</b>	Start duty cycle of external fan	30	0	50	%	I	R/W	
<b>F5</b>	Max fan speed regulation error	30	5	50	5	I	R/W	
<b>F6</b>	Fan speed regulation dead band	100	10	500	rpm	I	R/W	
<b>F1E</b>	Fan 1 enable	1	0	1	-	D	R/W	
<b>F2E</b>	Fan 2 enable	1	0	1	-	D	R/W	
<b>F3E</b>	Fan 3 enable	1	0	1	-	D	R/W	
<b>F4E</b>	Fan 4 enable	1	0	1	-	D	R/W	
<b>HD</b>	Modbus address	1	1	207	-	I	R/W	
<b>H1</b>	Modbus baud rate	3	0	4	-	I	R/W	
<b>H2</b>	Aux relay function config	0	0	3	-	I	R/W	reserved
<b>H3</b>	The 3 <sup>rd</sup> analogue input function config	0	0	3	-	I	R/W	reserved

## Alarms and management

Alarms	Why	code	Reset method	Management
probe P1	NTC probe 1 error	<i>P 1</i>	auto	Check probe wiring
FAN 1	The error between the measured fan 1 speed and the target speed exceeds 30%	<i>R F 1</i>	auto	-Check fan wiring. -check related parameters:
FAN 2	The error between the measured fan 2 speed and the target speed exceeds 30%	<i>R F 2</i>	auto	-Check fan wiring. -check related parameters:
FAN 3	The error between the measured fan 3 speed and the target speed exceeds 30%	<i>R F 3</i>	auto	-Check fan wiring. -check related parameters:
FAN 4	The error between the measured fan 4 speed and the target speed exceeds 30%	<i>R F 4</i>	auto	-Check fan wiring. -check related parameters:
EEPROM damage	EEPROM damaged	<i>E E P</i>	Replace with new one/ contact after service	Replace with new one/ contact after service
Power failure	Power supply higher/lower than threshold	<i>b P r</i>	auto	-Make sure AVH/AVL value reasonable -check power supply is ok
High temperature	Temperature inside cabinet higher than threshold	<i>H I</i>	auto	-Check if threshold is reasonable -Check if fan works well
Low temperature	Temperature inside cabinet lower than threshold	<i>L O</i>	auto	-Check if threshold is reasonable -Check if fan works well

## Technical specifications

Power supply	24/48Vdc (+10/-15%)
Max power consumption	3.5 W;
Digital input	Digital input to be activated from voltage-free contact or transistor to GND. Closing current 5 mA; Max length 30 m
NTC probes	<ul style="list-style-type: none"> <li>• 10 K<math>\Omega</math> at 25°C, -50T90 °C;</li> <li>• measurement error: 1°C in range -50T50 °C; 3°C in range +50T90 °C</li> </ul>
Relay output	SPDT, 5A, 250 Vac resistive load ; 2 A, 250 Vac inductive load
Aux relay output	SPST, normally open contact: 5A, 250 Vac resistive load; 2 A, 250 Vac inductive load
RS485 serial connection	Max length 1000m with shielded cable
Assembly	Plastic tower
10Pin terminal block	Removable , pitch 5.08mm
4P connector	VH , pitch 3.96mm ,
2P connector	VH , pitch 2.54mm ,
Operating conditions	-25 to 60°C <90% RH, non-condensing
Storage conditions	-35 to 60°C <90% RH, non-condensing
Index of protector	IP20
Conformity	Electrical safety : : EN 60730-1, EN 61010-1, UL873, VDE 0631-1 EMC: EN 61000-6-1, EN 61000-6-2, EN 61000-6-3, EN 61000-6-4; EN61000-3-2, EN55014-1, EN55014-2, EN61000-3-3.