PCG100 Series Instruction Manual





Introduction

Subzero PCG is the programmable controller designed to be used for general application. It consists of input block to take input from probes, transducers, humidifier etc. and able to control various devices like compressor, control valves, heater etc. indicator to cover any type of application in the airconditioning sector, cooling sector and any relative area. As the system is one of the most technologically advanced, it is flexible and can be customized for it to be adapted to the user's particular requirements.

Caution for your Safety

ELECTRIC SHOCK: Please do not touch the relay terminal (live parts) or socket terminal (live parts) while the power is on. This may lead to electric shock.

WIRING: The probe and its corresponding wires should never be installed in a conduit next to control or power supply lines. The electrical wiring should be done as shown in the diagram. The power supply circuit should be connected to a protection switch. The terminals admit wires of upto 2.5sq mm.

WARNING: Improper wiring may cause irreparable damage and personal injury. Kindly ensure that wiring is done by qualified personnel only.

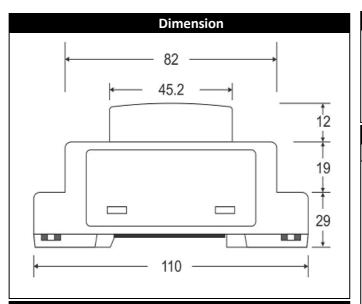
MAINTENANCE: Cleaning: Clean the surface of the controller with a soft moist cloth. Do not use abrasive detergents, petrol, alcohol or solvents.

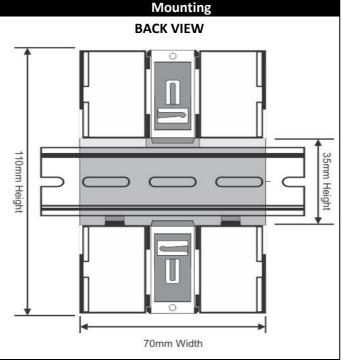
Controller: Controller should be installed in a place protected by vibration, water and corrosive gasses and where ambient temperature does not exceed the values specified in the technical data.

Probe: To give a correct reading, the probe must be installed in a place protected from thermal influences, which may affect the temperature to be controlled.

	lte	ms Included	
S. No.	Item	ns	Quantity
1	Controller with sig	de lock	1
2	Wire Harness	6 Way	1 No.
	Wife Hurriess	14 Way	1 No.
3	User Manual		1

Note: For PCG100 -121200001, PCG101 -121200701, PCG101 -121200702 wire harness not included.





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1. General Specification

- The Subzero PCG 24V operated programmable controller.
- 32-bit Cortex M3 ARM processor operating at 0.1 μs speed makes it highly officient.
- Has a large FLASH memory (150 KB) which makes it possible to have multiple control routines and test conditions in the software.
- Fast switching I/O are suitable to drive high speed inputs upto 50kHz and high-speed outputs upto 100kHz effectively.
- Software configurable RS485 Master Protocol or Slave Protocol provide maximum flexibility of integration with the outside world.
- All the analog inputs and outputs are fully configurable.

2. Field of Application

The possibility of all-round configuration allows the Subzero programmable controller to be used for any type of application. Following are the existing applications:

- HVACR
- · Plant Monitoring
- Automation

3. Technical Specification

Enclosure			
Housing	: Base & Top Cover	: ABS Plastic V0 Grade	
	Display Lens	: Polycarbonate V0 Grade	
	: Base	: Black	
Colour	Top Cover	: White	
	Lens	: Transparent Smoke Grey	
Mount	: DIN rail mount		
Dimension	: Width (W)	: 70 mm	
(Frontal)	Height (H)	: 110 mm	
(Frontal)	Depth (D)	: 59 mm	
Self-	: YES		
Extinguishing			

Electrical Specification			
Power Supply : 24 V DC, ± 10%			
	: Digital Input	: Microfit Type	
Connectors	High Speed Output	: Microfit Type	
	All Other Output	: Pluggable Connecter Type	

Note: For PCG100 -121200001, PCG101 -121200701, PCG105 -1212007N01 Plugin connecter - wire 1.0sqmm.

Software Specification				
Microprocessor	: 32-Bit Cortex M3 ARM			
Programmable FLASH	: 150 KB			
Memory				
Execution Speed	: 0.1 μs			
Language	: Ladder/C-Programming			
	(Functional Blocks)			
Modbus Protocol	: Modbus RTU, MITSUBISHI FX2N			
Programming	: Type A to Type A USB cable			
Onsite Programming	: via Pen drive FAT32			
Internal RTC	: Standard			
Operating Conditions				

Operating Conditions			
Operating Temperature	: -10°C to 60°C		
Relative Humidity	: 20 % to 85 %		

A	nalog Inpu	t		
Number of Inputs	: 7			
Type of Input	: NTC	: SZ make 10K at 25°C		
(Configurable via hardware	Range	: -35°C to 90°C		
jumpers)	: Voltage	: 0-5 VDC / 0-10 VDC		
5- 17	: Current	: 0-20 mA		
Resolution	: 12 Bit			K
Accuracy	: ± 1 % on F	.S.		L
Input Impedance	: 100 Ω			1-
lata: For DCG10F 121200701	all Analog inn	out is only NTC	+	+

Note: For PCG105 -121200701 all Analog input is only NTC

	Digital Input
Type 1	: High Speed Transistor* Opto-Isolated
Input Name	: X0, X1, X3, X4
No. of Inputs	: 4
Maximum Range	: 50 kHz
	* Σ (X0, X1, X3, X4) ≤ 50 kHz
Type 2	: Opto-Isolated 24 V Operated
No. of Inputs	:8
Input Name	: X2, X5, X6, X7, X10, X11, X12, X13
* High Speed Transisto	r Input can be used as Normal Input.
Type 3	: Opto-Isolated 24 V Operated
No. of Inputs	: 12
Input Name	: X0, X1, X2, X3, X4, X5, X6, X7, X10, X11,
	X12, X13

Distal Outer

	Digital Output
Type 1	: High Speed Transistor Output*
No. of Outputs	: 4
Output Name	: Y0, Y1, Y2, Y3
Maximum Range	: 100 kHz
	* (100 kHz X 2, 20 kHz X 2)
Maximum Load	: 0.5A
Type 2	: Relays with Normally Open (NO) contact
No. of Outputs	: 8
Output Name	: Y4, Y5, Y6, Y7, Y10, Y11, Y12, Y13
Maximum Load	: 5A 230V AC (Resistive)
* High Speed Transis	tor Output can be used as Normal Output.
Type 3	: Opto-Isolated Transistor Output & Relays
	with Normally Open (NO) contact
No. of Outputs	: 12
Output Name	: Y0, Y1, Y2, Y3, Y4, Y5, Y6, Y7, Y10, Y11,
	Y12, Y13
Maximum Load	: 0.5A - 5A 230V AC (Resistive)

4. Programming Environment

All Subzero PLC use the following software as a processing environment:

- SZ Logic Customized Programming Software which comes complementary. It uses popular Ladder Logic Diagrams and "C" Language.
- Key Feature of SZ Logic subzero make NTC sensor (10k @ 25deg C) is readily integrated.
- Online DEBUG allows user to block and force the value of the variables to speed up the testing and ease fault findings.

5. Onsite Programming

Following is the procedures for onsite USB Programming:

- Compile project in SZ Logic.
- A file with "projectname.szd" will be created in the project folder.
- Rename above file as "PLCPRG.szd" only.
- Insert a pendrive. Format the pendrive as FAT32.
- Copy the "PLCPRG.szd" file to Pendrive. Do not keep in any folder.
 Remove pendrive from PC.
- Power off the PLC and insert the pendrive in the PLC.
- Power on the PLC. Upon successful downloading of the program, the RUN LED on PLC will blink 6 times and then will remain ON.
- If RUN led doesn't blink, repeat previous 2 steps.
- When done, power off the PLC and remove the pendrive.

ь.	Connector Descri	ption	
	Power Supply		
	SYMBOL	DESCRIPTION	
		Earthing for Supply	
	-	Supply -24 V DC	
	+	Supply +24 V DC	

	Analog Input		
	Configurable		
	(NTC/ 4-20 mA/ 0-5 V/ 0-1	0 V)	
Terminal No.	Input Name	Description	
0 V	Ground	OV Reference for all	
		analog inputs	
Α0	Pb1	Input 1	
A1	Pb2	Input 2	
A2	Pb3	Input 3	
A3	Pb4	Input 4	
A4	Pb5	Input 5	
A5	Pb6	Input 6	
A6	Pb7	Input 7	

		Digit	tal Input
Terminal No.	Name	Input	Description
1	X0	DIO	Digital Input 0 (+24 V / High Speed
2	Х3	DI2	Digital Input 2 (+24 V / High Speed
3	X2	DI4	Digital Input 4 (+24 V)
4	Х6	DI6	Digital Input 6 (+24 V)
5	SS0	0V	0 V for ports X0 to X7
6	X10	DI8	Digital Input 8 (+24 V)
7	X12	DI10	Digital Input 10 (+24 V)
8	X1	DI1	Digital Input 1 (+24 V / High Speed
9	X4	DI3	Digital Input 3 (+24 V / High Speed
10	X5	DI5	Digital Input 5 (+24 V)
11	X7	DI7	Digital Input 7 (+24 V)
12	SS1	0 V	0 V for ports X10 to X13
13	X11	DI9	Digital Input 9 (+24 V)
14	X13	DI11	Digital Input 11 (+24 V)
		Analo	og Output
Terminal N	No.	Name	Description
V0		V OUT 0	Output 0 0-10 V
10		I OUT 0	Output 0 0-20 mA
0V		GND	0V reference for V0 & I0
V1		V OUT 1	Output 1 0-10 V
		1 OUT 1	Output 1 0-10 v
0V		GND	0V reference for V1, I1 and V2, I2
V2		V OUT 2	Output 2 0-10 V
12		1 OUT 2	Output 2 0-20 mA
			al Output
High Speed O	···tout·	Digito	ii Output
Terminal No.		Output	Description
1	Y0	OUT0	High Speed Digital Output 1
2		GND	0 V Common for Y0&Y3
3	COM Y3	OUT3	
<u>3</u>	Y3 Y1	0013 0UT1	High Speed Digital Output 4 High Speed Digital Output 2
			0 V Common for Y1&Y2
5 6	COM Y2	GND	
	Υ∠	OUT2	High Speed Digital Output 3
For Relay:		Nama	Description
Terminal No.		Name for OUT4 &	Description Common for Output V4 and V5
		OUT5	
Y4		OUT4	Relay 4 Normally open contact
Y5		OUT5	Relay 5 Normally open contact
C2		for OUT6 & OUT7	Common for Output Y6 and Y7
Y6		OUT6	Relay 6 Normally open contact
		00.0	Relay 7 Normally open contact

C3

Y10

Y11

C4

Y12

Y13

RS485 (1)

RS485 (2)

RS485 (3)

COM for OUT8 &

OUT9

OUT8

OUT9 COM for OUT10 &

> OUT11 OUT10

OUT11

Symbol

Common for Output Y10 and

Relay 8 Normally open contact

Relay 9 Normally open contact

Relay 12 Normally open contact

Relay 13 Normally open contact

Description RS485-1 -ve

RS485-1 +ve RS485-2 -ve

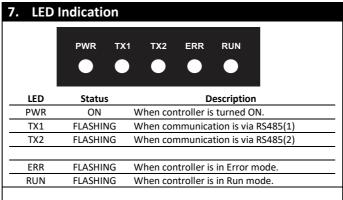
RS485-2 +ve RS485-3 -ve

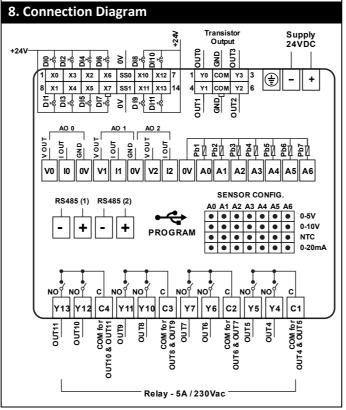
RS485-3 +ve

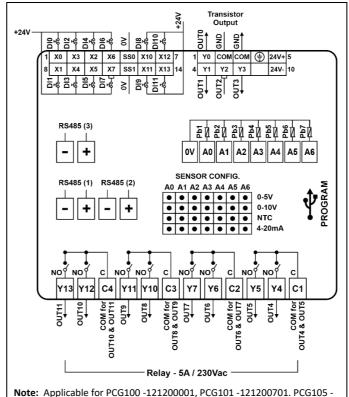
Common for Output Y12 and

Y11

Connectivity







1212007N01

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PLC Ordering Description										
Model No.	Housing	Display	Digital Input	Digital Output	High Speed Digital Input	High Speed Digital Output	Analog Input	Analog Output	Connectivity	Selected Model
PCG100-121200001	DIN 4	No Display	12	12	0	0	0	0	2 RS 485	
PCG101-121200701	DIN 4	No Display	12	12	0	0	7-NTC/4-20mA/0-10V/0-5V	0	2 RS 485	
PCG105-1212007N01	DIN 4	No Display	12	12	0	0	7-NTC	0	2 RS 485	
PCG101-121200731	DIN 4	No Display	12	12	0	0	7-NTC/4-20mA/0-10V/0-5V	3	2 RS 485	
PCG101-080844732	DIN 4	No Display	8	8	4	4	7-NTC/4-20mA/0-10V/0-5V	3	3 RS 485	