selec

CH403C-4-NTC
Operating Instructions

OP3064-V01



36 x 72

PARAMETER	SPECIFICATIONS
Display	: 3 Digit, 7 Segment Display.
Key	: 4 (Capacitive Touch)
Input	: 2 NTC Probes
Resolution	: 0.1°C, 1°C
Accuracy	: ±1°
Measuring Range	: -50°C to 100°C
Control Action	: ON/OFF (with hysteresis programmable)
Display Offset	: -10°C to 10°C
Restart time delay	: Programmable from 0 to 99 minutes
Sensor Break	: "PP & CPP" indicated on display.
Output	: **1) Defrost** : SPST,7(2)A@250VAC/30VDC **2) Fan** : SPST,7(2)A@250VAC/30VDC **3) Comp** : SPDT,10(3)A@250VAC/30VDC
Power supply	: 85 to 270V AC/DC,50/60Hz
Temperature	: Operating : 0 to 60°C (Non-Condensing) Operating temperature for ambient and Surface T=Ta л Ts=0 to 60°C
Storage Temp.	: -25°C to 60°C (Non-condensing)
Data Storage	: Non-Volatile EEPROM memory
Humidity	: 95% RH(Non-condensing)
Weight	: 129g
Power consumption	: 3VA maximum
Rated Impulse Voltage	: 2500V
Alarm Indication	: a) High Alarm : "Ht/PV" Displayed alternatively. b) Low Alarm : "Lt/PV" Displayed alternatively.

SAFETY PRECAUTIONS

All safety related codifications, symbols and instructions that appear in this operating manual or on the equipment must be strictly followed to ensure the safety of the operating personnel as well as the instrument.

If the equipment is not handled in a manner specified by the manufacturer it might impair the protection provided by the equipment.

CAUTION : Read complete instructions prior to installation and operation of the unit.

WARNING : Risk of electric shock.

MAINTENANCE

1. The equipment should be cleaned regularly to avoid

WIRING GUIDELINES

WARNING :

1. To prevent the risk of electric shock power supply to the equipment must be kept OFF while doing the wiring arrangement. Use lugged terminals to meet M3 screws.
2. Wiring shall be done strictly according to the terminal Layout with shortest connections. Confirm that all connections are correct.
3. To eliminate electromagnetic interference use of short wire with adequate ratings and twists of the same in equal size shall be made.
4. Cable used for connection to power source, must have a cross section of 1mm^2 or greater. These wires shall have insulation capacity made of at least 1.5KV.

INSTALLATION GUIDELINES

CAUTION :

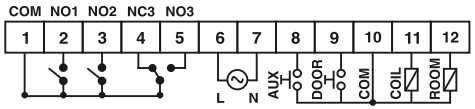
1. This equipment, being built-in-type, normally becomes a part of main control panel and in such case the terminals do not remain accessible to the end user after Installation and internal wiring.
2. Conductors must not come in contact with the internal Circuitry of the equipment or else it may lead to a safety hazard that may in turn endanger life or cause electrical shock to the operator.
3. Circuit breaker or mains switch must be installed between power source and supply terminals to facilitate power 'ON' or 'OFF' function. However this switch or breaker must be installed in a convenient position normally accessible to the operator.

CAUTION :

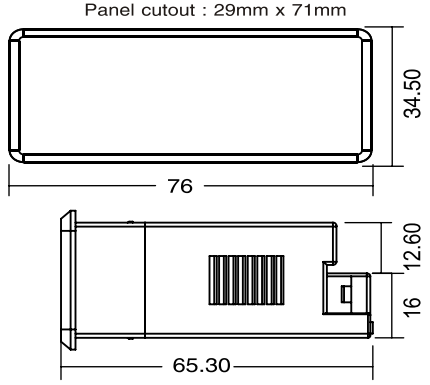
1. The equipment shall not be installed in environmental conditions other than those mentioned in this manual.
2. Fuse Protection:
   The equipment does not have a built-in-type fuse. Installation of external fuse of rating 275VAC/1Amp for electrical circuitry is highly recommended.
3. Thermal dissipation of equipment is met through ventilation holes provided on chassis of equipment. Such ventilation holes shall not be obstructed else it can lead to a safety hazard.
4. The output terminals shall be strictly loaded to the manufacturer specified values/range.

TERMINAL CONNECTIONS

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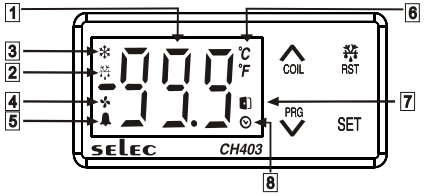
MECHANICAL INSTALLATION



OPERATIONAL MENU

Parameter	Description	Default Value	Min Range	Max Range
SET Point	Setpoint	0	LS+1	HS-1
P2	High Temperature Limit	99	P3+1	99
P3	Low Temperature Limit	-50	-50	P2-1
HS	Maximum Setpoint Limit	99	SP+1	99
LS	Minimum Setpoint Limit	-50	-50	SP-1
P4	Differential for compressor relay ON condition.(Hysteresis)	2	1	20
P5	Probe calibration for room.	0	-10	10
P6	Time Delay (Comp.Rly restart after cut-off)	3	0	99
OT	Minimum on time for compressor relay	0	0	20
E1	Compressor relay status in probe fail	Cyc	Off	Cyc
Cn	Compressor relay OFF time during probe fault.	4	1	99
Cy	Compressor relay ON time during probe fault.	10	1	99
E2	Set type of defrost	Ele	Ele	Hot
E3	Set drip time for defrost water to drain out	3	0	99
E4	Set post drip time.	1	0	99
E5	Defrost duration during coil probe fail.	5	1	10
E6	Computation method for defrost.	Ret	Ret	Crh
P7	Defrost duration (Auto & manual).	30	0	99
P8	Defrost frequency.	6	1	31
P9	Power ON defrost delay.	30	0	99
L1	Evap. fan stop temp Coil.	2	-50	99
L2	To set time delay between Evap. fan relay restart time	1	0	20
L3	Evap. Fan operation when compressor is OFF	On	Off	On
L4	Evap. Fan differential (Hysteresis).	2	1	20
L5	Probe 2 offset calibration (Evap. fan coil probe)	0	-10	10
L6	Evap. fan status during defrost.	Off	Off	On
L7	Defrost stop temperature (Evap Coil probe).	8	-50	99
do0	Activate or deactivate door open digital input.	Dis	Opn	Dis
do1	Door Open fault Sensing delay.	5	0	99
do2	Compressor / Fan Status on Door Open Fault.	Noa	Noa	Fcf
do3	Delay time for temp updating at door open fault (DI)	10	0	180
CF0	Activate or deactivate Compressor Fault digital Input.	Dis	Opn	Dis
CF1	Compressor Fault digital input Sensing delay.	5	0	99
CF2	Compressor / Fan Status on Compressor Fault digital input.	Noa	Noa	Fcf
CF3	Set reset mode for Compressor output, on Compressor Fault digital input.	Aut	Aut	Man
CF4	No of retrials of compressor when Manual reset is selected.	5	1	10
ddF	Display during defrost.	Pr1	Pr1	Df
nd	Default (Normal) Display.	Pr1	Pr1	Sp
dd	Delay the display of temperature	0	0	36
Ad	Time delay at Power ON for alarm indication.	20	0	99
rS	To set controller Resolution	-	0.1	1
PA	Change Password	-	-999	999
PU	Display Unit	°C	°C	°F
LP	Keypad Lock	Unl	Unl	Loc
FS	Factory Reset	0	0	2
EP	End Programming	-	-	-

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1 Process-value/ Parameter display/ Set point display	1) Display process value and its error condition 2) Display parameter symbols in configuration menu for 1 sec and then the parameter value 3) Displays set point value
2 Defrost	ON : Defrost in progress. FLASHING : Drip or Post Drip time or defrost is In time delay.
3 Compressor	Indicates Compressor ON/OFF condition
4 Fan	ON : Evaporator Fan is ON. OFF : Evaporator Fan is OFF. FLASHING : Evaporator fan is in Time Delay.
5 Alarm	Indicates Alarm Condition ON : Ht,Lt,PP,CF,do,CPP
6 Temperature Unit	Indication for selected temperature unit °C: Temperature in degree Celsius °F: Temperature in degree Fahrenheit
7 Door Open	Indicates Door Open Condition ON : Door Open
8 Time Delay	ON : Compressor is ON and in time Delay for switching OFF FLASHING : Compressor is in time delay and About to start.

USER INTERFACE

COIL **UP/COIL**	In Program mode : To scroll through parameters & increase parameter values. To Increase setpoint value in online mode. To view coil temperature.Also used to check LL & LH logged.
PRG **DOWN/PRG**	Touch & hold for 2sec to enter into program mode. In program mode : To scroll through parameters. To decrease parameter values. To decrease setpoint value in online mode.
RST **DEFROST/ RESET**	To mute the visual CF alarm.To start a manual defrost cycle, if pressed for 2 sec. Press again for 2 sec, it will come out of defrost mode and STOP defrost cycle.If P7 parameter is set to 0, or Coil temp. is greater than defrost stop temp., This key will remain inactive.
SET	Touch & hold for 2sec to enter into setpoint mode. Program mode: SET/SAVE the value of parameter.
COIL + RST	If "nd" parameter is set to Pr2 or SP and these keys are pressed simultaneously, display will show room temperature.

PARAMETER LIST :

Set point	Function: To set compressor relay set point.
P2 Parameter	Function: To set maximum allowable high temperature limit.
Example: If this parameter is set to 30 °C and the temperature reaches or goes above 30°C, display will show **Ht (High Temp.)** indicating that the temperature has gone above set value.	
P3 Parameter	Function: To set minimum allowable low temperature limit.
Example: If this parameter is set to 20 °C and the temperature reaches or goes below 20 °C, display will show **Lt (Low temp)** indicating that the temperature has gone below set value	
HS Parameter	Function: To set Maximum set point limit.
Example: Setting this parameter at 50°C will not allow the set point to go above 49°C (HS-1).	
LS Parameter	Function: To set Minimum set point limit.
Example: Setting this parameter at -40°C will not allow the set point to go below -39°C (LS+1**)**.	
P4 Parameter	Function: To set the differential for compressor (Comp.) relay ON condition.
Example: If the set point is 17°C and P4 is 5°C,then when the room temp reaches 17°C, the compressor relay will cut out. Since the differential is 5°C, the compressor relay will restart at 22°C.	
P5 Parameter	Function: To set room probe calibration.
Example: The room temperature on the display is 24°C,but the actual room temperature is 26°C. User will have to set the P5 parameter to 2, which means that once out of the programming mode, the room temperature on display will be 26°C.	
P6 Parameter	Function: To set time delay between compressor (Comp.) Relay restart.
Example: If this parameter is set at 1 min, the comp. Relay goes OFF at the set point, it will not restart for a minimum of 1 min, even if the differential is achieved earlier. To protect the life of comp.	
OT Parameter	Function: Minimum ON Time for compressor relay.
To protect the comp. so that there is enough time for oil to return back to the comp. This delay starts once the comp relay is ON. **Example:** If OT is set at 1min and if the temperature is achieved before 1 min, then the comp. relay will remain ON for minimum 1 min, though set point is achieved.	
E1 Parameter	Function: Compressor relay status in case of Control Probe Failure .
oFF = Comp. relay status is OFF. on = Comp. relay status is ON. CYC = Comp. relay performs a duty cycle of Cn min OFF & Cy min ON	
Cn Parameter	Function: Compressor relay OFF time during Control probe fault (Applicable only if E1=CYC).
Example: If this parameter is set to 2 minutes, then compressor relay will be OFF for 2 minutes while performing the duty cycle.	
Cy Parameter	Function: Compressor relay ON time during Control probe fault (Applicable only if E1=CYC).
Example: If this parameter is set to 4 minutes, then compressor relay will be ON for 4 minutes while performing the duty cycle.	

E2 Parameter	Function: To set type of defrost.
ELE = Electric defrost in which case compressor is OFF. Hot = Hot gas defrost where compressor is ON.	
E3 Parameter	Function: To set drip time for defrost water to drain out.
Example: This is the time for which the fan, compressor, heater will stay OFF so that the defrost water can drip & drain out.	
E4 Parameter	Function: To set post drip time.
Example: This is the time where comp**.** goes ON after drip time. **Note :** In electric defrost comp. will ON only if Room temp >SP + diff. But it will not check this in hot gas defrost.	
E5 Parameter	Function: Defrost duration during coil probe failure (Only manual).
Example: If this is set to 2 min, then manual defrost for 2 min will take place during Coil probe fail. **Note :** Defrost parameter totally depend on Coil Sensor	
E6 Parameter	Function: To set computation method for defrost.
rEt=Defrost freq. time calculation will start once the controller is ON. **Example:** If E6 is set to 6Hrs, then defrost will happen at every 6Hrs. CrH=Defrost freq.time will be calculated only when comp. is ON. **Example:** If this parameter is set to 6Hrs, then after every 6Hrs of Comp. ON defrost will take place.	
P7 Parameter	Function: To set defrost duration & manual defrost.
Example: If P7 is set to 11mins, E6 is set to rEt and P8 is set to 1Hr then after every 1 Hr defrosting will take place for 11 mins.	
P8 Parameter	Function: To set defrost frequency.
This is the amount of time between two defrost cycles. **Example:** If P8 is set to 1Hr, E6 is set to rEt and P7 is set to 11mins then after every 11min defrosting will be off for 1Hr.	
P9 Parameter	Function: To set power ON defrost delay.
Example: If P9 parameter is 30mins then at power on , after 30mins defrosting will take place once.	
L1 Parameter	Function: Evap. fan stop temp (Coil).
To limit the max temp. beyond which the evaporator fan will cut OFF. **Example:** If L1 is set to 30ºC, then Evap. Fan will cut OFF at 30ºC.	
L2 Parameter	Function: To set time delay between Evap. Fan relay restart time
Example: If L2 set at 2 mins, the Evap. Fan relay will cutoff at the temp.L1 but the fan will be OFF for minimum of 2 mins even if L1 is achieved earlier.	
L3 Parameter	Function: Evap. Fan operation when comp. Is OFF.
oFF = Evap. fan is OFF when comp. is OFF, and it will be ON depending on Coil Temp. and its set point . on = Evap. Fan will be ON /OFF according to coil probe temp. & independent of comp. status .	
L4 Parameter	Function: Evap. Fan differential (hysterisis).
Example: If L1 parameter is set to 2°C, and the L4 is set to 2°C, then Evap. fan will cut OFF at 2°C and restart only at 0°C	
L5 Parameter	Function: To set Evap. fan coil probe offset calibration.
If the temp. on the display is offset by some degrees; to compensate this error, you may need to add or subtract the degrees required to achieve the correct temp.by setting L5 value from -10°C to 10°C	
L6 Parameter	Function: Evaporator Fan status during Defrost.
oFF = Fan will be OFF (In Manual/Auto Defrost (Hot gas/Heater)). on = Fan will be ON. (In Manual/Auto Defrost (Hot gas/Heater)).	
L7 Parameter	Function: To set Defrost stop temp.(Evap. coil probe)
L7 is the max. temp. allowable at which the defrost process will stop. **Example:** If L7 is set to 20ºC, then if defrosting is in progress then when temp. reaches 20ºC, the defrost process will stop. **Defrost will stop according to P7 & E5 parameter, whichever is applicable.**	
do0 Parameter	Function: To activate or deactivate door open digital input function (**DO** flashing on Display).
dIS = Door open digital input is disabled. oPn = Door open digital input is activated when contact is open. CLo = Door open digital input is activated when contact is closed.	
do1 Parameter	Function: To set door open fault sensing Delay.
Example: If d01 = 12 seconds and if digital input (Fault) is present more than 12 seconds , then fault is detected.	

do2 Parameter	Function: To set comp./fan status on Door open fault.
noA = No action will be performed. CoF = Compressor will be OFF. FoF = Fan will be OFF. FCF = Fan and Compressor will be OFF.	
do3 Parameter	Function: To set delay time for temperature updating at Door open digital input fault.
Example: If do3 is set to 60secs, Room temp. is 24°C & Door open condition occurs then the Room temp value 24°C at Door open condition will be held for the 60secs even if Room temp. is rising. After that the temp. Hold duration display temp. will be increased by 0.1°C at every 1sec until it reaches current Room temp.	
CF0 Parameter	Function: To activate or deactivate comp. fault Digital Input(DI). (**CF** flashing on display)
dIS = Compressor fault digital input is disabled. oPn = Compressor fault digital input is activated when contact is open. CLo = Compressor fault digital input is activated when contact is closed.	
CF1 Parameter	Function: To set comp. fault DI sensing delay.
Example: If CF1 = 21 secs and if comp. DI(Fault) is present more than 21 secs then fault is detected.	
CF2 Parameter	Function: To set comp./fan status on Comp. Fault DI.
noA=No action will be performed. CoF=Compressor will be OFF. FoF=Fan will be OFF. FCF=Fan and Compressor will be OFF.	
CF3 Parameter	Function: To set reset mode for Comp. output, on Comp fault DI.
Aut = Auto Reset. MAn= Manual Reset after CF4 retrials in 1 hour. **Example :** If CF3 set to "MAN" mode & CF4 is set to 5 then, Comp. fault will be cleared after 5 retrials only after pressing reset key for 2 secs & if it is set to "AUTO" mode then Comp. fault will be cleared automatically. **Note :** Only applicable if CF2 = CoF/FCF & Comp is ON	
CF4 Parameter	Function: No of retrials of comp. when CF3=MAN
Example: As Mentioned in CF3.	
ddF Parameter	Function: This parameter is used to select display while the Defrost Cycle is in Progress.
Pr 1= Room Temperature dF = Defrost Label (**DF** flashing on display)	
nd Parameter	Function: Default (Normal) display
Pr 1 = Room Temperature. Pr2 = Coil Temperature. SP = Set Point	
dd Parameter	Function: To delay the display updation of temp. as per the value set by this parameter.
Each value corresponds to 5 secs, if it is set to 1, it corresponds to 5 secs,and if set to 2, it corresponds to 10secs and so on.Display delay parameter is applicable only when temp.is increasing (rising). When temp. is decreasing (falling) this parameter will not be applicable.If this parameter is set to 0, this feature will be disabled.	
Ad Parameter	Function: This parameter is used to set the time delay at Power ON for Alarm Indication.
Example: If this parameter is set to 2 mins, once the controller is powered ON, no fault indication will be activated for 2 mins. Alarm delay is used only for High Temp. and Low Temp., but not for Room Sensor fail. Diferential of 1ºC is considered for clearing the fault.	
rS Parameter	Function: To set controller resolution.
If rS is set to 1,it will take all parameters in 1ºC resolution. If rS is set to 0.1, it will take all parameters in 0.1ºC resolution. **Note :** Temperature and setpoint will also change accordingly.	
PA Parameter	Function: To change password.
User can't enter into program mode & set mode, if correct password is not entered. If password is 0, user can directly access set/program mode. If the password is kept other then 0, user need to enter correct password to enter into set/program mode.	
PU Parameter	Function: To display unit
Example: If set to °C then temp. displayed is in Celsius and when set to °F displayed temp is in Fahrenheit	
LP Parameter	Function: To lock keypad.
Example: To lock the keypad so that tampering is not possible by by-standers unL = keypad locked (View & Edit) LoC = keypad unlocked(View Only) & **LP** is flashed if attempted to edit.	

FS Parameter	Function: To restore default settings of the controller.
When set to 1 all parameters are programmed to factory set values. 0 = FS is disable. 1 = FS as per default values. 2 = FS as per user defined values(Only if user-defined values are saved)	
EP Parameter	Function: To end programming.
Press "**SET**" key to exit configuration mode.	

OPERATING MESSAGES

PP Room Probe fail Probe short circuit, circuit Open/without probe, or Temp. is > 100ºC or <-50ºC.	**CPP Coil Probe fail** Probe short circuit, circuit Open/without probe, or Temp. is > 100ºC or <-50ºC.

Password Function :

While entering into program mode or set mode, if the value of parameter PA is not equal to 0; display will flash 'PA' and '0' alternatively. Use "^" and "PRG v" keys to enter the password. On entering the correct value you can enter into respective modes (Program/Set mode)

High and Low temperature logging function

- **How to see the logged values:**

  LL : Last Low temperature

  LH : Last High temperature

  Touch and hold "^" key for 1sec. display will flash "LL" and the corresponding temperature for 4 times. After this, display will flash "LH" and the corresponding temperature for 4 times and come out of Log mode and will display Control probe temperature.

- **How to reset the Logged values**

  While the display is showing the logged values, if user touch & hold the "**SET**" key for 1sec, the logged values will be cleared and "**rS**" will be displayed.

  Log Values will get reset after Power ON/OFF.

User selectable Default values

User can set their own set of Default Set values for all parameters. If user wants to activate this feature, Program mode must be accessed and then change Factory set (FS) parameter accordingly. This can be done by following steps:

- Modify values of set point and other parameters as desired by entering set mode and program mode respectively.
- Select FS parameter and touch "**SET**" key. While display flashing "0" , touch and hold " PRG v " for 10sec. Controller will flash "-2". Then touch "**SET**" key. All the user defined parameter values will be stored as 'User Default set'.
- If user wants to use this set of parameters, access Program mode and set the FS parameter to "2". Controller will restore the user defined parameter values.

  (**Note:** Keypad parameter LP and User lock parameter will be taken into consideration while modifying this parameter.)

(Specifications are subject to change, since development is a continuous process.)

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