selec CH403B
Operating Instructions

OP3255-V01

36 x 72

PARAMETER	SPECIFICATIONS
Display	: 2½ digit, 7 Segment Display parameters
Key	: 4 (Capacitive Touch)
Resolution	: 0.1°C, 1°C
Accuracy	: ±1°C
Measuring Range	: -45°C to 99°C
Control Action	: ON/OFF (with hysteresis programmable)
Display Offset	: -10°C to 10°C
Restart time delay	: Programmable from 0 to 99 minute
Relay action	: CH403B-1-NTC ; CH403B-2-NTC a)Heat mode b)Cool mode
Sensor Break	: "PP" indicated on display
Output	: CH403B-1-NTC : 1) Main output : SPDT,10(4)A@250VAC/30VDC CH403B-2-NTC : 1) Main output : SPST,20(8)A@250VAC/30VDC
Power supply	: 230VAC@50/60Hz
Temperature	: Operating : 0 to 60°C (Non-Condensing) Operating temperature for ambient and Surface T=Ta ⎍ 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	: 150g
Power consumption	: 3VA maximum
Operating time	: Continuous
Purpose of control	: Temperature sensing control
Extent of sensing element	: Temperature Sensor
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 blockage of ventilating parts.
2. Please clean the equipment with a clean soft cloth. Do not use Isopropyl alcohol or any other cleaning agent.

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 1mm² or greater. These wires shall have insulation capacity made of at least 1.5KV.

INSTALLATION GUIDELINES

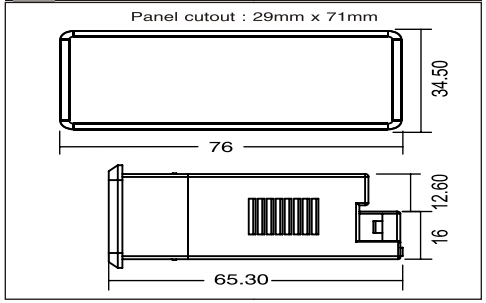
CAUTION :

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 :

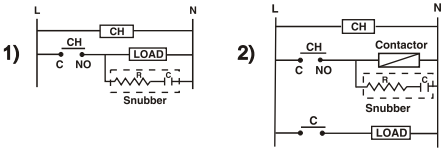
1. The equipment shall not be installed in environmental conditions other than those mentioned in this manual.
2. Fuse Protection :
   The equipment does not have a built-in-type fuse.
   Installation of external fuse of rating 275VAC/1Amp for electrical circuitry is highly recommended.
3. Thermal dissipation 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

MECHANICAL INSTALLATION



TYPICAL CONNECTIONS FOR LOADS

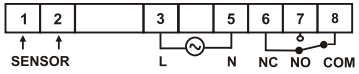
1) For load current less than 0.5A.
2) For bigger loads use interposing relay/contactor.



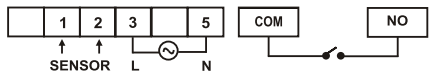
NOTE : Use snubber as shown above to increase life of internal relay of temperature controller.

TERMINAL CONNECTIONS

CH403B-1-NTC



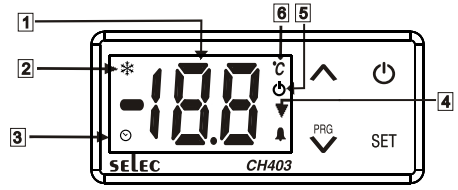
CH403B-2-NTC



USER INTERFACE

^	UP	In Program mode : Scroll through parameters & change parameters value. In Online mode : Touch & hold for 2sec for LL & LH logged values. In Set mode : Increases parameter value.
PRG v	Down/ Program	Touch and hold for 2sec to enter into program mode. In Program mode : To store user defined values. In program mode and set mode : Decreases parameter value.
⏻	Stand by	Touch and hold for 2sec to switch ON / OFF the Controller. Also used to acknowledge the alarm & to exit program or set mode.
SET	Set	Touch and hold for 2sec to enter into Set mode. In program mode and set mode: set/save the changed value of parameter.

CH403B-1-NTC / CH403B-2-NTC



1 Process-Value / Parameter / Display / Set Point Display	1) Displays process value and its error Condition. 2) Displays parameter symbols in configuration menu for 1 sec and then the parameter value 3) Displays set point value
2 Compressor	Indicates Compressor ON/OFF condition Flashing : Defrost in progress.
3 Time Delay	ON : Compressor is ON and in time delay for switching off.(ot parameter) FLASHING : Compressor is in time delay and about to start.
4 Alarm	ON : Alarm is ON. OFF : Alarm is OFF.
5 Power	ON : Controller in stand by mode. OFF : Controller in active mode.
6 Temperature	Indication for Temperature Unit , when ON = °C ; OFF = °F

OPERATIONAL MENU

Parameter	Description	Default Value	Range
SET Point	Compressor relay set point.	0	LS+1 to HS-1
P1	Control mode(Set Heating or Cooling mode).	0	0 to 1
P2	High alarm.	99	P3+1 to 99
P3	Low alarm.	-40	-40 to P2-1
HS	Maximum setpoint limit.	99	SP+1 to 99
LS	Minimum setpoint limit.	-40	-40 to SP-1
P4	Hysteresis(Differential for compressor relay ON condition).	2	1 to 20
P5	Display offset(Probe calibration).	0	-10 to 10
P6	Time delay(Compressor relay restart after cutoff).	3	0 to 99
RS	To change the resolution	1	0.1 & 1
Ot	Minimum ON time for compressor relay.	0	0 to 20
E1	Compressor relay status in probe fail.	2	0 to 2
Cn	Compressor relay OFF time during probe fault.	4	1 to 99
Cy	Compressor relay ON time during probe fault.	10	1 to 99
P7	Defrost time.	0	0 to 99 min
P8	Defrost frequency.	1	0 to 99 min
P9	Defrost frequency Unit.	H	H / M / S
PU	Temp. Unit	°C	°C / °F
dd	Delay the display of temperature.	0	0 to 36
Ad	Time delay at Power ON for alarm indication.	0	0 to 99
PO	Enable / Disable Power ON/OFF.	0	0 to 2
PA	Change password.	0	-99 to 99
LP	Keypad lock.	0	0 to 1
FN	Relay 2 function.	AL	OF / AL
F5	Reset all (Set to factory default).	0	0 to 2
EP	End programming.	NA	NA

Parameter List :

Set point	Function: To set compressor relay set point.
Touch & hold SET key for 2 seconds.	
modified by using the UP/DOWN key. After selecting the desired value, touch the set key the set point has been stored in memory.	
P1 Parameter	Function: To set controller for heating or cooling.
To change value use ∧ PRG ∨ keys & To set value touch "**SET**" key	
0 = Cooling mode 1 = Heating mode.	
P2 Parameter	Function: To set maximum allowable high temperature limit.
Example: If this parameter is set to 50°C and the temperature reaches or goes above 50°C, display will show Ht (High Temp.) indicating that the temperature has reached or gone above the value set in this parameter.	Ht (Message on display)
P3 Parameter	Function: To set minimum allowable low temperature limit.
Example: If this parameter is set to -10°C and the temperature reaches or goes below -10°C, display will show Lt (Low temp) indicating that the temperature has reached or gone below the value set in this parameter.	Lt (Message on display)
HS Parameter	Function: To set Maximum set point limit.
Example: Setting this parameter at 25°C will not allow the set point to go above 24°C (HS-1).	
LS Parameter	Function: To set Minimum set point limit.
Example: Setting this parameter at -10°C will not allow the set point to go below -9°C (LS+1).	
P4 Parameter	Function: To set the differential for compressor relay ON condition.
Example : If the set point is set at 10°C and differential is set at 2°C, then when the system reaches 10°C, the compressor relay will go OFF. Since the differential is 2°C, the compressor relay will be ON (restart) at 12°C (10C +2°C).	
P5 Parameter	Function: To set probe calibration.
Example : The temperature on the display is 28°C, whereas the actual temperature is 30°C. User will have to set the P5 parameter to 2, which means that once out of the programming mode, the temperature on display will be 30°C (28°C + 2°C)	
P6 Parameter	Function: To set time delay between compressor relay restart.
Example: If this parameter is set at 3 minutes, the relay will cut off at the set temperature, but will not restart for a minimum of 3 minutes, even if the differential is achieved earlier.	Flashing Time delay in progress
RS Parameter	Function : To change the resolution.
If this parameter when set to 0,it will take all parameter in 0.1°C resolution. If this parameter when set to 1,it will take all parameter in 1°C resolution. **Note :** Temperature and parameter range will also change accordingly.	

Ot Parameter	Function: Minimum ON Time For Compressor relay.
This parameter is used to protect the compressor so that there is enough time for oil to return back to the compressor. This delay starts once the compressor relay is ON. **Example:** If this parameter is set at 1Min and even if the temperature is achieved before 1 minute, the compressor relay will remain ON for minimum 1 minute.	
E1 Parameter	Function : Compressor relay status in case of Probe Failure.
When set to 0 = Compressor relay status is OFF. 1 = Compressor relay status is ON. 2 = Compressor relay performs a duty cycle for Cn for minutes OFF and Cy for minutes ON.	
Cn Parameter	Function : Compressor relay OFF Time during probe fault.
(This will be considered only when E1 is selected 2) . **Example :** If this parameter is set to 4 minutes, then compressor relay will be OFF for 4 minutes while performing the duty cycle.	
Cy Parameter	Function : Compressor relay ON Time during probe fault.
(This will be considered only when E1 is selected 2) . **Example :** If this parameter is set to 10 minutes, then compressor relay will be ON for 10 minutes while performing the duty cycle.	
P7 Parameter	Function: To set defrost duration & manual Defrost.
Defrost is valid only for cool mode. During defrost, Relay remain OFF for a period = P7, Defrost is disabled if defrost Frequency = 0 or Defrost time = 0. To enable manual defrost press key ∧ + PRG ∨ continuously for 4sec. **Example:** If P7 parameter is set to 3min. Defrost will take Place for 3min.	
P8 Parameter	Function : To set defrost frequency.
This is the amount of time between two defrost cycles. **Example:** If P8 parameter is set to 5min. Defrost will take place after every 5min.	❄ Flashing
P9 Parameter	Function : To set defrost frequency unit.
Example: If P9 parameter is set to H. Defrost will take place after P8 Hours. If P9 parameter is set to M. Defrost will take place after P8 Minutes. If P9 parameter is set to S. Defrost will take place in after P8 Seconds.	
PU Parameter	Function : To set Temperature unit.
Example: If PU parameter is set to °C. Then temperature Is in °C. If PU parameter is set to °F. Then temperature Is in °F .	
dd Parameter	Function : This parameter is used to delay the display of temperature by the set in this parameter.
Each value corresponds to 5 seconds, if the value is set to 1, it corresponds to 5 seconds, if it is set to 2, it corresponds to 10 seconds and so on. For example, if this parameter is set to 1, temperature on the display will be updated after 5 seconds. The same value will be considered for calculation and logging. Display delay parameter is applicable only when temperature is increasing (rising). When temperature 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 20 minutes, once the controller is powered ON, no fault indication will be activated for 20 minutes. Alarm delay is used only for High Temperature and Low Temperature, but not for Room Sensor fail.	
PO Parameter	Function : To enable/disable Power ON/ OFF of the controller through Power key.
Controller has a power key, which if enabled, puts controller in active or stand by state 0 = Power ON/OFF is disabled. 1 = Power ON/OFF is enabled. ON/OFF Status will not be stored. 2 = Power ON/OFF is enabled. ON/OFF Status will be stored. If user presses the Power Key for 2 seconds, controller will go into Standby Mode. Display will be OFF and Power LED icon will be ON. Controller will be in Standby Mode. Again if user presses the Power key for 2 seconds, controller will start normal functioning.	
PA Parameter	Function : To change Password.
User cannot enter into program mode & set mode, if correct password is not entered. If the password is kept other than 0, user need to enter correct password to enter into set/program mode. If password is 0, user can directly access set/program mode.	
LP Parameter	Function: To lock keypad.
This parameter is used to lock the keypad so that tampering is not possible by by-standers. 0 = keypad unlocked 1 = keypad locked When locked all parameters can only be viewed and not modified. **Note :** If LP parameter is set to 1 and if user tries to change any parameter value, " LP" will flash on the display.	LP Flashing
FN Parameter	Function : To enable / disable alarm.
Once set to AL, the alarm relay will come on incase the temperature reaches or goes above or below the points set in parameter P2 & P3 or if the probe fails. If set to Of, All alarm will be disabled	Alarm (Ht, Lt or PP)
F5 Parameter	Function : To restore default settings of the controller.
When set to 1 all parameters are programmed to factory set values. Useful to debug setting related Problems. When set to, 0 = F5 is disable. 1 = F5 as per default value. 2 = F5 as per user define	
EP Parameter	Function: To end programming
To end programming press "**SET**" key	Once the key is pressed, the controller goes into the normal mode and displays the temperature and all settings are recorded.

OPERATING MESSAGES (Normal Mode)

Ht **High temperature alarm** Temperature above the maximum high temperature limit.	**Lt** **Low temperature alarm** Temperature below the minimum low temperature limit.
PP **Probe fail** Probe short circuit, circuit open or without probe, or temp. is > 99°C or <-45°C.	**LP** **Keypad lock** Keypad is locked.
LL **Last low temperature** Last low temperature logged.	**LH** **Last high temperature** Last high temperature logged.
rS In log function: When LL and LH values are cleared.	

Password function

In Program mode:
Touch & hold " PRG ∨ " key for 2sec. Display will flash "P1" parameter if "PA" value is kept "0". If other than "0", then "PA' and "0" will flash. Use " ∧ "and " PRG ∨ " keys to enter the password. On entering correct value, display will flash the first parameter "P1". User can scroll through parameters using " ∧ " or " PRG ∨ " keys.

In Set mode:
Touch & hold "SET" key for 2sec. Display will flash set point value if "PA" parameter value is kept to "0". If other than "0", then display will flash "PA" and "0". Use " ∧ " or " PRG ∨ " to enter the password. On entering correct value, display will flash set point value. User can set desired value using " ∧ "or " PRG ∨ " keys. To save the modified value use "**SET**" key.

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 2sec. display will flash "LL" and the corresponding temperature for 4 seconds. After this, display will flash "LH" and the corresponding temperature for 4 seconds 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 touches & holds 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 ∨ " 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.)

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

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