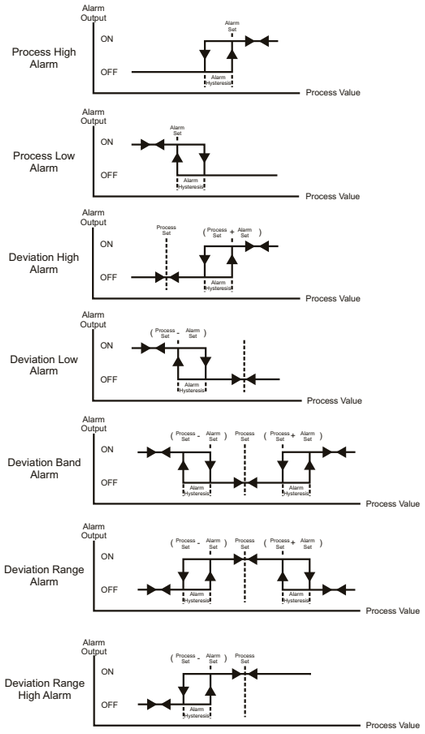
6.5 Alarm Types



7. Specifications

Device Type	Temperature Controller
Housing & Mounting	76mm x 34.5mm x 71mm plastic housing for panel
Protection Class	Mounting. Panel cut-out is 71x29mm. NE MA 4X (Ip65 at front, Ip20 at rear).
Weight	Approximately 0.20 Kg.
Environmental Ratings	Standard, indoor at an altitude of less than 2000 meters with none condensing humidity.
Storage / Operating Temperature	-30 “C to +80 “C / -20 “C to +70 “C
Storage / Operating Humidity	90 % max. (None condensing)
Installation	Fixed installation
Overvoltage Category	II.
Pollution Degree	II, office or workplace, none conductive pollution
Operating Conditions	Continuous
Supply Voltage and Power	115V~ (±%15) 50/60Hz- 1.5VA
Temperature Sensor Input	NTC Thermister (mL-DTC100) PTC Thermister (mL-DTC150)
NTC input type	NTC (10 kΩ@25 “C)
PTC input type	PTC (1000 kΩ@25 “C)
Accuracy	± 1 % of full scale
Sensor Break Protection	Upscale
Sampling Cycle	3 samples per second
Control Form	PIO or ON / OFF
Relay Output	8 A@250 VAC for Resistive load (Compressor Output)(Electrical life100.000 switching at full load)
Display	14 mm Red 4 digits LED Display
Internal Buzzer	>83dB
Approvals	EAC, CE

8.Ordering Information

Model Number	Description
mL-DTC100	Digital Temperature Controller 115 VAC (±15%) 50/60Hz - 1.5VA NTC Thermistor Input Type with -50 to 100°C (-58 to 212°F) Scale 1 Form A Relay Control Output (8A@250VAC with Resistive Load) (1 NO) 1 Form A Relay Alarm Output (5A@250VAC with Resistive Load) (1 NO)
mL-DTC150	Digital Temperature Controller 115 VAC (±15%) 50/60Hz - 1.5VA PTC Thermistor Input Type with -50 to 150°C (-58 to 302°F) Scale 1 Form A Relay Control Output (8A@250VAC with Resistive Load) (1 NO) 1 Form A Relay Alarm Output (5A@250VAC with Resistive Load) (1 NO)

NOTES

KEPmLINE

10 INDUSTRIAL WAY EAST
EATONTOWN, NJ 07724
Office : 800-631-2165 Direct:
732-935-1320
FAX: 732-935-9344

mL-DTC Series 77x35 DIN Size Digital Temperature Controller

mL-DTC100 & mL-DTC150 Digital Temperature Controllers

- 4 Digits Display
- mL-DT100: NTC Input (-50 to 100°C scale)
- mL-DT150: PTC Input (-50 to 150°C scale)
- Adjustable temperature offset
- PIO or ON/OFF temperature control
- Selectable heating or cooling function
- Selection of operation with hysteresis
- Set value low limit and set value high limit boundaries
- Operation selection of compressor operates continuously, stops or operates periodically in case of sensor defect
- Compressor protection delays
- Alarm parameters
- Adjustable internal buzzer according to sensor defect status.
- Password protection for programming section
- CE compliant according to European Norms

1.3 Installation

A visual inspection of this product for possible damage occurred during shipment is recommended before installation. It is your responsibility to ensure that qualified mechanical and electrical technicians install this product.

If there is danger of serious accident resulting from a failure or defect in this unit, power off the system and the electrical connection of the device from the system.

The unit is normally supplied without a power switch or a fuse. Use power switch and fuse as required.

Be sure to use the rated power supply voltage to protect the unit against damage and to prevent failure.

Keep the power off until all of the wiring is completed so that electric shock and trouble with the unit can be prevented.

Never attempt to disassemble, modify or repair this unit. Tampering with the unit may results in malfunction, electric shock or fire.

Do not use the unit in combustible or explosive gaseous atmospheres. During the equipment is put in hole on the metal panel while mechanical installation some metal burrs can cause injury on hands, you must be careful.
Mounting of the product on a system must be done with it's mounting clamp. Do not do the montage of the device with inappropriate mounting clamp. Be sure that device will not fall while doing the mounting.

It is your responsibility if this equipment is used in a manner not specified in this instruction manual.

1.4 Warranty

Kessler-Ellis Products warrants that the equipment delivered is free from defects in material and workmanship. This warranty is provided for a period of two years. The warranty period starts from the delivery date.
This warranty is in force if duty and responsibilities which are determined in warranty document and instruct on manual performs by the customer completely.

1.5 Maintenance

Repairs should only be performed by trained and specialized personnel. Cut power to the device before accessing internal parts. Do not clean the case with hydrocarbon-based solvents (Petrol, Trichlorethylene etc.). Use of these solvents can reduce the mechanical reliability of the device. Use a cloth dampened in ethyl alcohol or water to clean the external plastic case.

1.6 Other Information

Manufacturer Information:
Kessler-Ellis Products, Inc.
10 Industrial Way East, Eatontown, NJ 07724
USA

Phone: 732-935-1320 • Fax: 732-935-9344
www.KEPmLINE.com

1.Preface

mL-DTC series temperature controllers are designed for measuring and controlling temperature.They can be used in many applications with their control form, heating and cooling control form and easy-use properties. Some application fields which they are used are below:

Application Fields	Applications
Glass	Heating
Food	Baking Ovens
Plastic	Incubators
Petro-Chemistry	Storages
Textile,	Automative Air Conditioning
Machine Production Industries Etc...	Etc...

1.1 Environmental Ratings

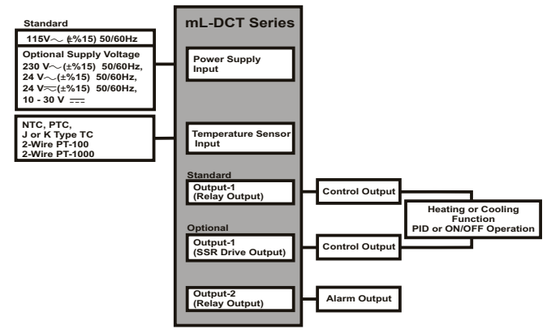
Operating Temperature : -20 to 70 °C

Max. Operating Humidity : 90% Rh (non-condensing)

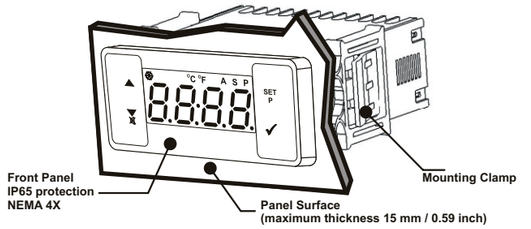
Altitude : Up to 2000 m.

Forbidden Conditions:
Corrosive atmosphere
Explosive atmosphere
Home applications (The unit is only for industrial applications)

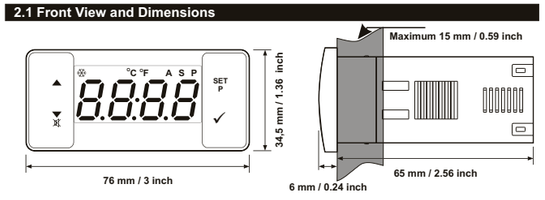
1.2 General Specifications



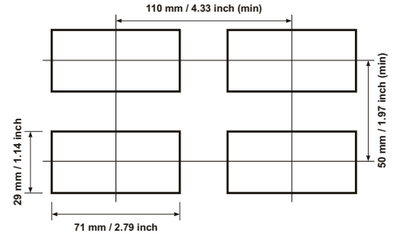
2. General Description



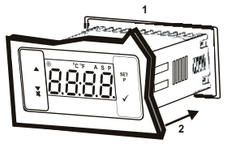
2.1 Front View and Dimensions



2.2 Panel Cut-Out

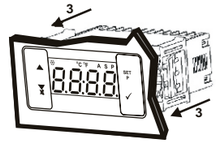


2.3 Panel Mounting



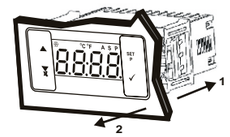
1-Before mounting the device in your panel, make sure that the cut-out is of the right size.

2-Insert the device through the cut-out. If the mounting clamps are on the unit, put out them before inserting the unit to the panel.



3- Insert the mounting clamps to the fixing sockets that located left and right sides of device and make the unit completely immobile within the panel

2.4 Removing from the Panel



1-Pull mounting clamps from left and right fixing sockets.

2-Pull the unit through the front side of the panel

Before starting to remove the unit from panel, power off the unit and the related system.

3. Using Prokey

TO USE PROKEY, VALUE OF THE PrC PARAMETER MUST BE '0'.
IF PrC=1 AND ▼BUTTON IS PRESSED Err MESSAGE WILL BE SHOWN. 10s. LATER DEVICE TURNS BACK TO THE MAIN OPERATION SCREEN OR YOU CAN PRESS SET BUTTON TO TURN BACK TO MAIN OPERATION SCREEN.

DOWNLOADING FROM DEVICE TO PROKEY

1.The device is programmed by using the parameters.
2.Energize the device then put in PROKEY and press ▼ button. UPL Message is shown on the display. When the loading has finished, End message is shown.
3.Press any button to turn back to main operation screen.
4.Remove the PROKEY.

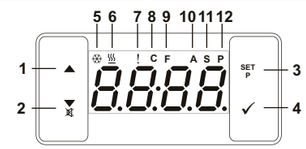
NOTE: Err message is shown when an error occurs while programming. If you want to reload, put in PROKEY and press ▼ button. If you want to quit, remove PROKEY and press ▼ button. The device will turn back to main operation screen.

DOWNLOADING FROM PROKEY TO DEVICE

1.Switch off the device.
2.Put in PROKEY then energize the device.
3.When the device is energized, the parameter values in PROKEY, start downloading to the device automatically. At first, dOL message is shown on the display, when loading has finished, End message is shown.
4.After 10 seconds device starts to operate with new parameter values.
5.Remove the PROKEY.

NOTE: Err message is shown when an error occurs while programming. If you want to reload, switch off the device and put in PROKEY then energize the device. If you want to quit remove PROKEY and press ▼ button. The device will turn back to main operation screen.

5.Front Panel Definition and Accessing to the Menus



BUTTON DEFINITIONS

1. Increment Button :
** It is used to increase the value in the Set screen and Programming mode.
2. Decrement, Silencing Buzzer and Downloading to Prokey Button :
** It is used to decrease the value in the Set screen and Programming mode.
** It is used to silence the buzzer.
** If Prc =0, it is used to download from device to prokey.
3. Set Button :
** In the main operation screen; if this button pressed, temperature set value will be displayed. Value can be changed using increment and decrement buttons. When Enter button pressed, value is saved and alarm set value is displayed. Value can be changed using increment and decrement buttons. When Enter button pressed, alarm set value is saved and returns back to main operating screen.
** To access the programming screen; in the main operation screen, press this button for 5 seconds.
4. Enter Button :
** It is used to saving value in the Set screen and programming screen.
**In the main operation screen; press ENTER button for 3 seconds to start Auto Tune operation.,

LED DEFINITIONS

5. Cooling led :
** This led indicates that cooling control is selected and process output relay is active. If any of compressor protection time active, this led blinks.
6.Heating led :
** This led indicates that heating control is selected and process output relay is active.
7.Alarm led :
** This led indicates that alarm output relay is active.
8.Celcius led :
** Indicates that device is in °C mode.
9.Fahrenheit led :
** Indicates that device is in °F mode.
10.Auto Tune / Self Tune led :
** Indicates that device is operating Auto Tune or Self Tune.
11.Set led :
** Indicates that device is in Set value changing mode.
12.Program led :
**Blinks in programming mode .

6. Changing and Saving Temperature Set Value And alarm Set Value

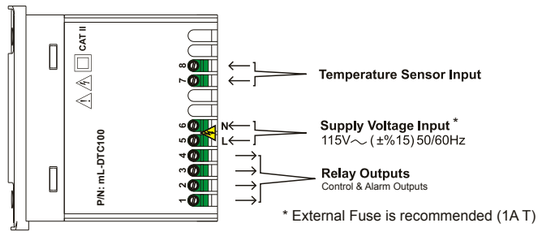
Main Operation Screen

When SET button pressed ''S'' led will be active and temperature set value will be displayed.

SET Value Screen

Temperature set value can be changed with increment and decrement buttons.

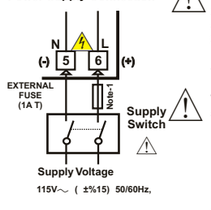
4. Electrical Wiring Diagram



* External Fuse is recommended (1A T)

4.1 Supply Voltage Input Connection of the Device

Power Supply Connection



Make sure that the power supply voltage is the same indicated on the instrument.
Switch on the power supply only after that all the electrical connections have been completed.
Supply voltage range must be determined in order. While installing the unit, supply voltage range must be controlled and appropriate supply voltage must be applied to the unit.

There is no power supply switch on the device. So a power supply switch must be added to the supply voltage input.
Power switch must be two poled for seperating phase and neutral, On/Off condition of power supply switch is very important in electrical connection.
External fuse that on ~ power supply inputs must be on phase connection.
External fuse that on ⎓ power supply inputs must be on (+) connection.

Note-1 External fuse is recommended.

Alarm Set Value Screen

When ENTER button pressed temperature set value can be saved.

Alarm set value can be changed with increment and decrement buttons.

Main Operation Screen

When ENTER button pressed alarm set value can be saved.

''S'' will be inactive and goes back to main operation screen.

Temperature set value parameter (Default=50) MODBUS ADDRESS:40001
Temperature set value, can be programmed between minimum temperature set value SuL and maximum temperature set value SuH.

6.1 Programming Mode Parameter List

C-F **Temperature Unit Selection Parameter (Default = 0) MODBUS ADDRESS:40002**
0 °C selected.
1 °F selected.

Pnt **Decimal Seperator Enabling Parameter (Default = 0) MODBUS ADDRESS:40003**
0 Disable.
1 Enable.

Note: If sensor input type is selected J, K, PT-100 or PT-1000 (BC =05,10,11 or 14) Pnt parameter is skipped.

HCS **Operating Type Parameter (Default = 0) MODBUS ADDRESS:40004**
0 Heating
1 Cooling

Note: If operating type is selected cooling P-o parameter and PID parameters are skipped.Device operates with On-Off control.

P-o **Temperature Control Selection Parameter On/Off or PID (Default = 0) MODBUS ADRES:40005**
0 On - Off selected.
1 PID selected

Note: If this parameter is select 0, PID parameters will be not observed.If this parameter select 1, HSt Parameter will be not observed.

tun **Tune Selection Parameter (Default = no) MODBUS ADRES:40006**
no Device does not do Tune operation.
Auto Device does Auto-Tune operation
SELF Device does Self-Tune operation

Note-1: If this parameter is select Auto the temperature must be lower than temperature set value. If this condition is not okey Err is seen on the main screen for 10 seconds.
Note-2: If this parameter is select SELF the temperature must be greater than temperature set value at least 5% of the full scale. If this condition is not okey Err is seen on the main screen for 10 seconds.

P **PID - Proportional Control Parameter (Default = 10.0) MODBUS ADRES:40007**
This parameter can be adjusted from %1.0 to %100.0

I **PID-Integral Parameter(Default = 100) MODBUS ADRES:40008**
This parameter value can be adjusted from 0 to 3600.

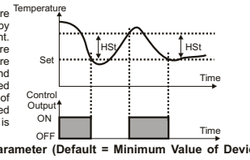
d **PID-Derivatvel Parameter (Default = 25.0) MODBUS ADRES:40009**
This parameter value can be adjusted from 0.0 to 999.9

t **PID-Period parameter(Default = 10) MODBUS ADRES:40010**
This parameter value can be adjust from 0 to 150 second.

PuL **Operation Scale Minimum Parameter (Default = Minimum Value of Device Scale) MODBUS ADDRESS:40011**
This parameter value can be adjusted from minimum value of device scale to operation scale maximum parameter PuH

PuH **Operation Scale Maximum Parameter (Default = Maximum Value of Device Scale) MODBUS ADDRESS:40012**
This parameter value can be adjusted from operation scale minimum parameter PuL to maximum value of the device scale.

HSt **Hysteresis Parameter for Compressor Output (Default = 3) MODBUS ADDRESS:40013**
from 1 to 20°C for NTC (-50°C, 100°C) or PTC (-50°C, 130°C) or J Type TC (0°C, 800°C) or K Type TC (0°C, 1000°C or PT-100 Type (-50°C,400°C) or PT-1000 Type (-50°C,400°C) or PT-100 Type (-20°C,100°C),
from 1 to 36°F for NTC (-58°F, 212°F) or PTC (-58°F, 266°F) or J Type TC (32°F,1472°F)or K Type TC (32°F,1830°F) or PT-100 Type (-58°F,752°F) or PT-1000 Type (-58°F,752°F) or PT-100 Type (-4°F,212°F)
from 0.1 to 10.0°C for NTC(-50.0°C,100.0°C) or PTC (-50.0°C,130.0°C) or PT-100 (-19.9°C,99.9°C),
from 0.1 to 18.0°F for NTC (-58.0°F,212.0°F) or PTC (-58.0°F,266.0°F) or PT-100 (-4.0°F,212.0°F),
In ON/OFF control algorithm, temperature value is tried to keep equal to set value by opening or closing the last control element. ON/OFF controlled system, temperature value oscillates continuously. Temperature value's oscillation period or amplitude around set value changes according to controlled system. For reducing oscillation period of temperature value, a threshold zone is formed below or around set value and this zone is named hysteresis.



SuL **Minimum Temperature Set Value Parameter (Default = Minimum Value of Device Scale) MODBUS ADDRESS:40014**
Temperature set value can not be lower than this value.
This parameter value can be adjusted from operation scale minimum parameter PuL to maximum temperature set value parameter SuH

SuH **Maximum Temperature Set Value Parameter (Default = Maximum Value of Device Scale) MODBUS ADDRESS:40015**
Temperature set value can not be bigger than this value.
This parameter value can be adjusted from minimum temperature set value parameter SuL to operation scale maximum parameter PuH

oFt **Sensor Offset Parameter (Default = 0) MODBUS ADDRESS:40016**
from -20 to 20 °C for NTC(-50°C, 100°C) or PTC(-50°C, 130°C) or J Type TC (0°C,800°C) or J Type TC (0°C,1000°C) or PT-100(-50°C, 400°C)or PT-1000 (-50°C, 150°C) or PT-100 (-20°C, 100°C),
from -36 to 36 °F for NTC(-58°F, 212°F) or PTC(-58°F, 266°F) or J Type TC (32°F,1472°F) or K Type TC (32°F,1830°F) or PT-100(-58°F, 752°F) or PT-1000(-58°F, 752°F) or PT-100(-4°F, 212°F),
from -10.0 to 10.0°C for NTC(-50.0°C,100.0°C) or PTC(-50.0°C,130.0°C) or PT-100 (-19.9°C,99.9°C),
from -18.0 to 18.0°F for NTC(-58.0°F,212.0°F) or PTC(-58.0°F,266.0°F) or PT-100 (-4.0°F,212.0°F),

AoF **Temperature Alarm Off Delay Time Parameter(Default = 0)MODBUS ADDRESS:40029**
Temperature alarm off delay time can be defined with this parameter.
It can be adjusted from 0 to 99 minutes. If it is higher than 99 LCH is seen on the screen and alarm latching output is selected. In alarm latching output mode, in order to make passive alarm output, press DECREMENT button at main screen.

APd **Temperature Alarm Delay After Power On Parameter (Default = 0) MODBUS ADRES:40030**
When power is first applied to the device, this time delay must be expired for activation of temperature alarm. It can be adjusted from 0 to 99 minutes.

buF **Buzzer Function Selection Parameter (Default = 0) MODBUS ADDRESS:40031**
0 Buzzer is inactive.
1 Buzzer is active during sensor failures.
2 Buzzer is active if an alarm occurs.
3 Buzzer is active if an alarm occurs or sensor failures.

bon **Buzzer is active during this time (Default = ---) MODBUS ADDRESS:40032**
If buzzer function selection parameter value buF =0, this parameter can not be observed. Buzzer stays active during this time. It can be adjusted from 1 to 99 minutes When this parameter is 1, if decrement button is pressed, --- is observed. In this condition buzzer is active till buzzer silence button is pressed.

IdS **Increment/Decrement Mode Selection Parameter (Default = 0) MODBUS:40033**
0 Mode-1
1 Mode-2

PrC **Communication Mode Selection Parameter (Default = 0) MODBUS ADDRESS:40034**
0 PROKEY communication selected.
1 Rs485 communication selected.

SAd **Slave ID Parameter (Default = 1) MODBUS ADDRESS=40035**
Device communication address parameter (1 to 247).

PAS **Programming Section Accessing Password (Default = 0) MODBUS ADDRESS:40036**
It is used for accessing to the programming section. It can be adjusted from 0 to 9999. If it is selected 0, password will not be asked.

PoS SPd Std PdF Pon and PoF Parameters are observed if Operation type is selected "Cooling". If operation type is selected "Heating" ,skip to the buF parameter.

6.2 Modbus Adresses of Device Status Parameters (Read Input Register)

MODBUS ADDRESS:30001	Temperature Value	
MODBUS ADDRESS:30002	Empty	
MODBUS ADDRESS:30003	Led Status :	0.bit °C Led, 1.bit °F Led, 3.bit °Auto Tune Led, 5.bit Heating Led, 6.bit Compressor Led, 7.bit Alarm Led, 13.bit Program Led, 14.bit Set Led
MODBUS ADDRESS:30004	Device Status :	0.bit Alarm Status 1.bit Buzzer Status 2.bit Sensor Break Status
MODBUS ADDRESS:30005	Output Status:	0.bit Control Output 1.bit Alarm Output
MODBUS ADDRESS:30006	Device Type and Device Version	

6.3 Failure Messages

Sbr Screen Blinking
Sensor failure . Sensor connection is wrong or there is no sensor connection. If buzzer function selection parameter buF is 1, internal buzzer starts to operate.

PoS **Compressor Start Delay at Power On Parameter (Default = 0) MODBUS ADDRESS:40017**
When power is first applied to the device, compressor is on when this time delay is expired. It can be adjusted from 0 to 20 minutes.

SPd **Compressor Stop-Start Delay Parameter (Default = 0) MODBUS ADDRESS:40018**
When compressor is inactive, this time delay must be expired for activation of the compressor. It can be adjusted from 0 to 20 minutes.

Std **Compressor Start-Start Delay Parameter (Default = 0) MODBUS ADDRESS:40019**
This time delay must be expired between two activation of the compressor. It can be adjusted from 0 to 20 minutes.

PdF **Sensor Defect Parameter (Default = 0) MODBUS ADRES:40020**
0 Compressor is OFF in case of sensor defect.
1 Compressor is ON in case of sensor defect.
2 Compressor operates periodically according to Pon and PoF Time periods in case of sensor defect.

Pon **Compressor is active during this time period in case of probe defect (Default = 0) MODBUS ADRES:40021**
If probe defect parameter PdF is 2, then this parameter is observed. It can be adjusted from 0 to 99 minutes.

PoF **Compressor is inactive during this time period in case of probe defect (Default = 0)MODBUS ADRES:40022**
If probe defect parameter PdF is 2, then this parameter is observed. It can be adjusted from 0 to 99 minutes.

ALS **Temperature Alarm Function Selection Parameter (Default =1) MODBUS ADRES:40023**
0 Alarm function is inactive.
1 Process High alarm selected.
2 Process Low alarm selected.
3 Deviation High alarm selected.
4 Deviation Low alarm selected.
5 Deviation Band alarm selected.
6 Deviation Range alarm selected.
7 Deviation Range High alarm selected.

Note: If this parameter is select 0, ASt AlH AuL AuH Aon AoF and dPd parameters will be not observed

ASt **Temperature Alarm Set Parameter (Default =80) MODBUS ADRES:40024**
This parameter value can be programmed between temperature minimum alarm set AuL parameter and temperature alarm set maximum AuH parameter.

ALH **Temperature AlarmHysteresisParameter (Default =3) MODBUS ADDRESS:40025**
This parameter value can be adjusted form 0.1 to %50 of the device scale if Pnt parameter is 1, 1 to %50 of the device scale if Pnt parameter is 0.

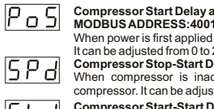
AuL **Temperature Minimum Alarm Parameter (Default =Minimum Value of Device Scale) MODBUS ADRES:40026**
If temperature alarm is active, this parameter value can be adjusted from operation scale minimum parameter PuL to temperature alarm set maximum parameter value AuH.

AuH **Temperature Alarm Maximum Parameter (Default = Maximum Value of Device Scale) MODBUS ADDRESS:40027**
If temperature alarm is active, this parameter value can be adjusted from temperature alarm set value parameter AuL to operation scale maximum parameter PuH

Aon **Temperature Alarm On Delay Time Parameter(Default = 0)MODBUS ADDRESS:40028**
Temperature alarm on delay time can be defined with this parameter.
It can be adjusted from 0 to 99 minutes.

6.4 Entering To The Programming Mode, Changing and Saving Parameter

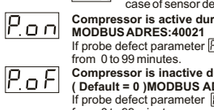
Main Operation Screen



When SET button is pressed for 5 seconds, "P" led starts to blink. If programming mode entering password is different from 0, programming mode entering screen Pro will be observed.

Note1: If programming mode accessing password is 0, C-F Temperature Unit screen is observed instead of programming screen Pro

Programming Mode Entering Screen
Press OK button for accessing to the password entering screen.



Password Entering Screen
Enter programming mode accessing password with increment and decrement buttons.

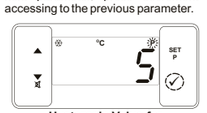
Password Entering Screen
Press OK button for entering the password.

Note2: If programming mode accessing password is 0, only three parameters are accessible, and the parameter values can be changed.

Programming Screen

Press SET button for accessing to the parameter value. Press increment button for accessing to the next parameter, press decrement button for accessing to the previous parameter.

Hysteresis Value for Compressor Output
Change the value with increment and decrement buttons.



Hysteresis Value for Compressor Output
Press OK button for saving the parameter.

Hysteresis Parameter for Compressor
Press increment button for accessing to the next parameter, press decrement button for accessing to the previous parameter

If no operation is performed in programming mode for 20 seconds, device turns to main operation screen automatically..