Please read this document carefully before using this product. The guarantee will be invalidated if the device is damaged by not following instructions detailed in the manual. The company shall not be responsible for any damage or losses however caused, which may be experienced as a result of the installation or use of this product.

CAL EDT2423 TEMPERATURE CONTROLLER

Thank you for choosing **CAL EDT2423** temperature controller.

CE **RoHS Compliant**

* 35x77mm.
* On-Off control.
* Three relay outputs for cooling,defrost and fan control.
* Two NTC probe inputs for cooling and defrost control.
* Offset value can be entered for NTC input.
* Compressor protection parameters.
* On probe failure, output status can be set to ON, OFF or periodic.
* Defrost initiated by evaporator temperature, time dependent or manual operation.
* Upper and lower limits of the setpoint adjustment.
* Defrost duration and interval can be adjusted.
* Deviation high and low alarm values.
* Temperature unit can be selected °C or °F.
* Digital input (Optional).
  - External alarm.
  - Initiate defrost.
* Transfer device parameter settings with CAL key - no power-up required.
* RS485 ModBus protocol communication feature (optional).
* Real Time Clock for defrost and energy-saving feature.
* CE marked according to European Norms.

Order Code: EDT2423 - □□□ - □ - □□□ - □□ - □
1 2 3 4 5

1 - Supply Voltage
110.....110V AC
230.....230V AC
24.....24V AC/DC
12.....12V AC/DC
SM.....9-30V DC/7-24V AC

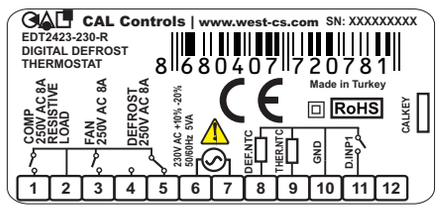
2-Output
R..... 8A relay output

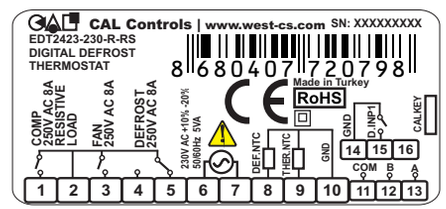
3- RTC
Real time clock (optional)

4- ModBus
RS.....ModBus (optional)

5- Temperature Unit Selection
None.....Celsius
F.....Fahrenheit

CAL EDT2423 is intended for installation in control panels. Make sure that the device is used only for intended purpose. The electrical connections must be carried out by a qualified staff and must be according to the relevant locally applicable regulations. During an installation, all of the cables that are connected to the device must be free of electrical power. The device must be protected against inadmissible humidity, vibrations, severe soiling and make sure that the operation temperature is not exceeded. The cables should not be close to the power cables or components.

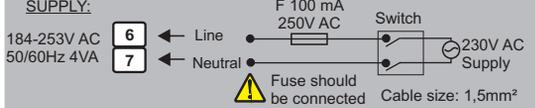




Equipment is protected throughout by DOUBLE INSULATION

Holding screw 0.4-0.5Nm.

NOTE:
SUPPLY:



Note:
1) Mains supply cords shall meet the requirements of IEC 60227 or IEC 60245.
2) In accordance with the safety regulations, the power supply switch shall bring the identification of the relevant instrument and it should be easily accessible by the operator.

ENVIRONMENTAL CONDITIONS	
Ambient/storage temperature	0 ... +50°C/-25 ... 70°C (without icing)
Relative humidity	Max. humidity 80% for temperatures up to 31°C decreasing linearly to 50% relative humidity at 40°C.
Protection class	According to En60529; Front panel: IP65 Rear panel : IP20
Height	Max. 2000m

⚠ Do not use the device in locations subject to corrosive and flammable gasses.

ELECTRICAL CHARACTERISTICS	
Supply voltage	230V AC +%10 -%20, 50/60Hz or 12/24 V AC/DC ± %10
Power consumption	Max. 5VA
Connection	2.5mm² screw-terminal connections
Scale	-60.0 ... +150.0°C (-76.0 ... +302.0°F)
Sensitivity	0.1°C (Can be selected as 0.1ºC or 1ºC.)
Accuracy	±1°C
Time accuracy	±1%
Display	4 digits, 12.5mm, 7 segment LED
EMC	EN 61326-1: 2012
Safety requirements	EN 61010-1: 2010 (Pollution degree 2, overvoltage category II)

OUTPUTS	
Compresor relay output	For EDT2423-X-R ; Relay:NO 250V AC,8A (resistive load), 1/2HP, 0.37KW 240V AC (inductive load)
Defrost relay output	For EDT2423-X-R ; Relay:NO+NC 250V AC,8A (resistive load), 1/2HP, 0.37KW 240V AC (inductive load)
Fan relay output	For EDT2423-X-R Relay; :NO 250V AC,8A (resistive load), 1/2HP, 0.37KW 240V AC (inductive load)
Life expectancy for relay	For EDT2423-X-R ; Without load 30.000.000 switching; 250V AC, 8A resistive load 100.000 electrical operation.

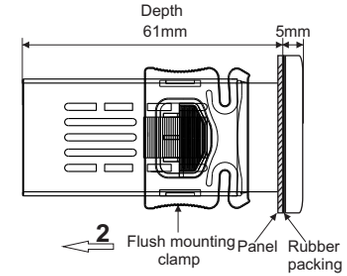
CONTROL	
Control type	Single set-point, alarm and fan control
Control algorithm	On-Off control
Hysteresis	Adjustable between 1 ... 20.0°C.

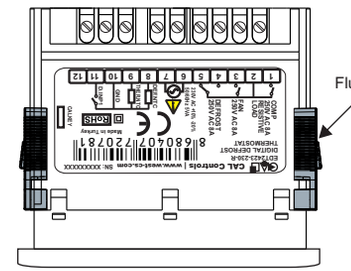
HOUSING	
Housing type	Suitable for flush -panel mounting
Dimensions	W77xH35xD61mm
Weight	Approx. 190g (After packing)
Enclosure material	Self extinguishing plastics.

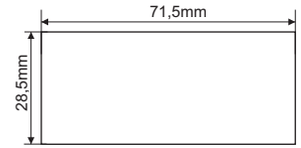
⚠ While cleaning the device,solvents (thinner,benzine,acid etc.) or corrosive materials must not be used.

DIMENSIONS

For removing mounting clamps:
- Push the flush-mounting clamp in direction **1** as shown in the figure below.Then,pull out the clamp in direction **2** .







Note :
1) Panel thickness should be maximum 7mm.
2) If there is not 60mm free space at the back side of the device,it would be difficult to remove it from the panel.

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°F FAHRENHEIT LED: In parameter value or the measured temperature value **"°F"** unit while this LED lights up. In the hidden menu, at the same time the user menu parameter is shown the LED lights up.

FAN LED: Fan control is being checked; while the output is active, the LED lights. While fan delays are expected.

DEFROST LED: With the defrost lights up.

COMPRESSOR LED: If compressor output is active, this LED lights up. While these compressor delays expected, this LED flashes.

SET While in the operating mode set value, while in the programming mode shows selected parameter's value.

While in programming mode, provides the transition to the next parameter. If parameter is being adjusted, it increases parameter's value. Constantly holding this key, the parameter value rapidly increases.

While in programming mode, provides the transiton to the previous parameter. If parameter is being adjusted, it decreases parameter's value. Constantly holding this key, the parameter value rapidly decreases.

FRONT PANEL COMMANDS

1.Viewing and Changing The Set Value

-24.0 Measurement value → SET → -30.0 → ▼ → -29.9 → ▲ → -30.0

While in the running mode, if SET key is pressed set value is displayed for 3 seconds. While in this case,the set value is changed with ▼▲ keys.

2.Viewing Defrost Measurement Value

-24.0 Measurement value → SET ▲ → -9.0 While in the running mode; if SET ▲ keys are pressed,defrost probe measurement value is displayed for 3 seconds

3.Locking and Unlocking Keys

-24.0 Measurement value → SET ▼

- Loc — Keys are locked.
- unL — Keys are unlocked.

While in the operating mode, if SET ▼ keys are pressed together among 2 seconds the Loc message is displayed and the keys are locked. If the keys are locked SET ▼ keys are pressed for 2 seconds again unL message is displayed and key lock is opened and is returned to the normal way of working. While keys are locked, if SET key is pressed, the set value can be displayed but the value can not be changed. While the keys are locked, SET key outside if a key is pressed the Loc message is seen.

4.Manual Defrost Process

While in the operating mode, if ▲ key is pressed for 2 seconds the defrost process is started as manual. If d.dur = 0 ,the manual defrost will also be disabled.

5.Activating / Inactivating The Control Outputs

-24.0 Measurement value → ▼

- C.dis — The control ouput becomes inactive.
- C.Enb — The control output becomes active.

* When in the running mode, if the control outputs are inactive, oFF message displays periodically.

When in the running mode, if ▼ key is pressed for 2 seconds, C.dis message is displayed and control outputs becomes to the inactive position, the device works as the indicator. When the control outputs are disabled; if ▼ key is pressed for 2 seconds C.Enb is disabled and the device continues to do control function.

6. Changing Parameter Values

▲ ▼ Keys are pressed together for 2 seconds LP1 is displayed and the user menu is entered,afterwards first parameter's name is displayed in the user menu.

While a parameter was selected, by pressing to SET key parameter's value is displayed, the displayed this parameter can be changed with ▼▲ keys. When the parameter name is shown, no action is done after 3 seconds or to the SET key is pressing again to return to the parameter's name. When the parameter name is shown, ▼▲ keys are pressed together immediately without waiting to get out of this process.

Program mode

LP1 → LP2

7. The Hidden Menu

While in the user menu, if ▼ key is pressed for 7 seconds the LP2 message is displayed and is entered the hidden menu. Then uPL parameter is displayed. Selected the parameter's value, by pressing the SET key is displayed and with ▼▲ keys can be changed. Parameter access and saving functions ,user menu is like. All parameters can be accessed from this menu.

8. How can we to transfer parameter between menus?

If SET ▼ keys are pressed together for 2 seconds; parameter is transferred to the user menu. In this way the user menu up to 8 parameters can be transferred.

In the user menu SET ▼ keys are pressed together along the 2 seconds the parameter is removed from the user menu.

When a parameter is displayed in the user menu °F LED lights up in the hidden menu.

If the user menu have not any parameter nP message is displayed.

uPL … HYS

uPL … C.Fos

ERROR MESSAGES

PFA	Means, thermostat probe is broken.	P5C	Means, thermostat probe is short circuit.	PFA2	Means, thermostat probe is broken.
----	Temperature value is higher than the scale.	____	Temperature value is lower than the scale.	P5C2	Means, thermostat probe is short circuit.

ALARM SITUATION

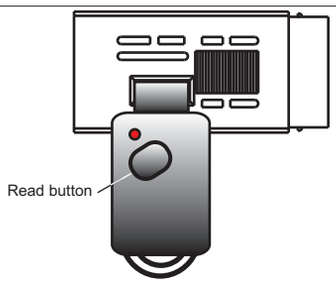
-24.0 1.When the alarm situation occured, the measured value flashes in the indicator and if "Snd" parameter is not "0" is given audible alarm by the device. While there are a audible warning ; ▲ key is pressed, the audible warning will be disabled.

EA 2.External alarm is activated but output's is not affected by this situation.

SA 3.Except that the alarm has been activated and external alarm output relay is active when the show shut down. (off situation).

HOW CAN WE RETURN THE DEVICE TO THE FACTORY SETTINGS

▼ Key is held down while the device is powered up the d.PAr message will see and restore the factory parameters.



HOW CAN WE DOWLOAD THE PARAMETERS FROM CALKEY TO THE DEVICE?

While in the running mode; if ▼ key or "Read" button (in CALKEY) are pressed; is displayed "dL'' message and parameters are read in CALKEY. "dL" message appears when the ▼ key is pressed again, reading parameter values from the CALKEY are transferred to the device.If the parameter transfer is successful,"rEF" message is displayed and the device begins to work with downloaded parameters value. The parameter in the CALKEY, while belonging to a different device of if there is a malfunction in the CALKEY "Err" message is displayed and the parameters of the device unchanged.

HOW CAN WE UPLOAD THE PARAMETERS FROM DEVICE TO THE CALKEY?

While in the running mode; if ▲ key is pressed "uL" message is displayed and again ▲ key is pressed; if there is no error ,the parameters in the device are loaded in to the CALKEY and "suc" message is displayed. If there is a malfunction in the device and the installation failed "Err" message is displayed.

NOTE 1: To the device without energy, the parameter transfer is done with CALKEY. The battery inside the CALKEY for a longer period of time; after the parameter transfer process, the connection between the CALKEY and the device should be disconnected.

NOTE 2: CALKEY device, is supplied with orders if requested.

CONTROL PARAMETERS		MIN.	MAX.	UNIT	DEF. SET
uPL	The upper limit of the setpoint	-60.0	uPL	°C /°F	150
LoL	The lower limit of the setpoint	LoL	150.0	°C /°F	-60
HYS	Switch hysteresis for compressor (hysteresis)	0.1	20.0	°C /°F	2
oFF	The offset value for the refrigeration	-20.0	20.0	°C /°F	0
CONFIGURATION PARAMETERS					
Unit	Temperature unit (Devices with part code suffix 'F' have deg F as the default 'Unit').	°C	°F		°C
dPnt	Decimal point (no= decimal point isn't shown 22°C,YES=decimal point is shown 22.3°C.)	no	YES		no
d.inP	Digital input types. nd: Digital input unused. EA: External alarm. EA message flashes in the display. Output unchanged. bA: Important external alarm. bA message flashes in the display. Relay output is turned off. **Fan:** Enable or disable dF: Defrost operation is started .	nd	dF		nd
did	Digital input delay. The period of the digital inputs to be active.	00:00	99:00		1:00
dPo	Digital input polarity. cL = While a digital input contact is closed,it is activated. oP= While a digital input is opened, it is activated.	CL	oP		CL
COMPRESSOR PROTECTION PARAMETERS					
C.Pon	Delay time for the compressor after power is on.	00:00	99:00	min:sec	1:00
C.Fob	Delay time required for the compressor to restart following a stop.	00:00	99:00	min:sec	1:00
C.PPn	On time for the compressor output in the case of probe failure.	00:00	99:00	min:sec	0:00
C.PPF	Off time for the compressor output in the case of probe failure	00:00	99:00	min:sec	1:00
DEFROST CONTROL PARAMETERS					
d.tYP	Defrost type selection. (ELC=Electrical defrost, GAS=Hot gas defrost)	ELC	GAS		ELC
d.dur	Defrost duration (If d.dur=0 , automatic and manual defrost are disabled.)	00:00	99:00	min:sec	1:00
d.int	The time between 2 consecutive defrosts.	1:00	99:00	hr:min	1:00
d.tkP	Defrost shutdown temperature. (If evaporator temperature is bigger than this value, defrost is disable.)	-60	150	°C/°F	2
d.dsP	During defrost, display configuration (rE= Real temperature is displayed during defrost. (Lc= The temperature which is measured before defrost is displayed during defrost.	Lc.	rE		Lc.
d.drE	Delay time for display real temperature after defrost is over.	00:00	99:00	min:sec	1:00
dPon	Defrosting process when the device is powered (no=Defrost process doesn't start when the device is powered. YES=Defrost process starts when the device is powered.)	no	YES		no
d.dPo	Delay time for defrosting after power is on.	00:00	99:00	min:sec	1:00
d.drt	Spotting-water discharge time	00:00	99:00	min:sec	2:00
ALARM CONTROL PARAMETERS					
A.uPL	Limit for upper alarm level. When A.tYP is changed, A.uPL should be readjusted.	A.LoL	150.0	°C/°F	150
A.LoL	Limit for lower alarm level. When A.tYP is changed, A.LoL should be readjusted.	-60.0	A.uPL	°C/°F	60
A.HYS	Switch hysteresis for alarm.	0.1	20.0	°C/°F	2
A.tYP	Alarm configuration. (Abs=Absolute alarm. Alarm values are A.LoL and A.uPL .) (rEF= Relative alarm. Alarm values are SET-A.LoL and SET+A.uPL .) NOTE: Upper and Lower alarm level variables are determined according to the "A.tYP'' parameter. If A.tYP = Abs , A.LoL and A.uPL . If A.tYP =rEF,LoL =SET-A.LoL and A.uPL .	Abs	rEF		Abs
A.dFL	Time delay to display alarm message after alarm is on.	00:00	99:00	min:sec	0:00
A.dPo	Time delay to display alarm message after power is on.	00:00	24:00	hr:min	1:00
c.br	The holding parameter of control outputs state when the supply is powered off.	no	YES		YES
t.br	The holding parameter of keypad lock state when the supply is powered off.	no	YES		no
FAN CONTROL PARAMETERS					
F.Con	Operation of the fan with the thermostat (no=Fan runs continuously independent of the thermostat, YES=Fan works with the thermostat	no	YES		YES
F.StP	The stop temperature of the fan	-60.0	150.0	°C/°F	1
F.HYS	The Fan differential	0.1	20.0	°C/°F	2
F.cSt	When the compressor stops operation of the fan. (no= retains status of the fan. YES= Fan stops with the compressor)	no	YES		YES
F.dSt	Operation of the fan during defrost process.(no=retains status of the fan. YES= Fan stops during the defrost process)	no	YES		YES
F.Pon	Delay time for the fan after power is on.	00:00	99:00	min:sec	1:00
F.Std	After defrost ,the period for the introduction of the fan.	00:00	99:00	min:sec	3:00
F.ctr	Fan control to get to the room temperature? (no=evaporator temperature is higher F.StP, the fan doesn't work. YES=Room temperature difference between the temperature of the evaporator temperature is below of F.StP. If the difference between room temperature and evaporator temperature is higher than F.StP+F.HYS , the fan runs again.	no	YES		no

CAL EDT2423 DIGITAL THERMOSTAT MODBUS PROTOCOL ADDRESS MAP

1.1 HOLDING REGISTERS

Holding Register Addresses		Data Type	Data Content	Parameter Name	Read/Write Permission	Status Value
Decimal	Hex					
0000d	0x0000	word	Set value	-	Readable/Writeable	-20
0001d	0x0001	word	Set point upper limit	uPL	Readable/Writeable	150
0002d	0x0002	word	Upper level alarm	A.uPL	Readable/Writeable	150
0003d	0x0003	word	Set point lower limit	LoL	Readable/Writeable	-60
0004d	0x0004	word	Lower level alarm	A.LoL	Readable/Writeable	-60
0005d	0x0005	word	The offset value for the cooling	oFF	Readable/Writeable	0
0006d	0x0006	word	Cooling hysteresis	HYS	Readable/Writeable	2
0007d	0x0007	word	Switch hysteresis for alarm	A.HYS	Readable/Writeable	2
0008d	0x0008	word	Digital input types .0=nd; 1=EA; 2=bA; 3=HC; 4=dF	d. inP	Readable/Writeable	nd
0009d	0x0009	word	Digital input delay	dd i	Readable/Writeable	1:00(60 sec)
0010d	0x000A	word	Delay time for the compressor after power is on.	C.Pon	Readable/Writeable	1:00(60 sec)
0011d	0x000B	word	Delay time required for the compressor to restart following a stop.	C.Fob	Readable/Writeable	1:00(60 sec)
0012d	0x000C	word	On time for the compressor output in the case of probe failure	C.PPn	Readable/Writeable	0:00(0 sec)
0013d	0x000D	word	Off time for the compressor output in the case of probe failure	C.PPF	Readable/Writeable	1:00(60 sec)
0014d	0x000E	word	Defrost duration	d.dur	Readable/Writeable	1:00(60 sec)
0015d	0x000F	word	The time between 2 consecutive defrosts.	d. int	Readable/Writeable	1:00(60 min)
0016d	0x0010	word	Delay time for defrosting after power is on.	d.dPo	Readable/Writeable	1:00(60 sec)
0017d	0x0011	word	After the cooling process of cooling start-up delay	d.drP	Readable/Writeable	1:00(60 sec)
0018d	0x0012	word	Time delay to display alarm message after alarm is on.	A.dFL	Readable/Writeable	0:00(0 sec)
0019d	0x0013	word	Time delay to display alarm message after power is on.	A.dPo	Readable/Writeable	1:00(60 min)
0020d	0x0014	word	Defrost shutdown temperature. (If evaporator temperature is bigger than this value, defrost is disable.)	d.btP	Readable/Writeable	2
0021d	0x0015	word	Spotting-water discharge time	d.drt	Readable/Writeable	2:00
0022d	0x0016	word	The stop temperature of the fan	F.btP	Readable/Writeable	1
0023d	0x0017	word	The fan differential	F.hYS	Readable/Writeable	2
0024d	0x0018	word	Delay time for the fan after power is on.	F.Pon	Readable/Writeable	1:00
0025d	0x0019	word	After defrost, the period for the introduction of the fan	F.btd	Readable/Writeable	3:00
0026d	0x001A	word	RS485 Network address for the connection of the device. Adjutable between 1-247.	Adr5	Readable/Writeable	1
0027d	0x001B	word	Baudrate (0=Off; 1=1200; 2=2400; 3=4800;4=9600; 5=19200)	bAud	Readable/Writeable	9600

1.2 INPUT REGISTERS

Input Register Addresses		Data Type	Data Content	Parameter Name	Read/Write Permission
Decimal	Hex				
0000d	0x0000	word	Prob-1 temperature value (°C / °F)	- -	Only Readable
0001d	0x0001	word	Prob-2 temperature value (°C / °F)	- -	Only Readable

1.3 DISCRETE INPUTS

Discrete Input Addresses		Data Type	Data Content	Parameter Name	Read/Write Permission
Decimal	Hex				
00d	0x00	Bit	Output situation -1 (Defrost relay)	- -	Only Readable
01d	0x01	Bit	Output situation -2 (Compressor relay)	- -	Only Readable
02d	0x02	Bit	Output situation -3 (Fan relay)	- -	Only Readable

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1.4 COILS

Coil Addresses		Data Type	Data Content	Parameter Name	Read/Write Permission	Status Value
Decimal	Hex					
00d	0x00	Bit	Temperature unit. OFF=°C ON=°F	Unit	Readable/Writeable	°C
01d	0x01	Bit	Decimal point . OFF=no ON=YES	dPnt	Readable/Writeable	no
02d	0x02	Bit	During defrost, display configuration. OFF=The temperature which is measured before defrost is displayed. (Lc) ON=Real temperature is displayed during defrost process. (rE)	ddSP	Readable/Writeable	Lc
03d	0x03	Bit	Defrosting process begins with energy. OFF=Defrost process doesn't start when, the energy comes. (no) ON=Defrost process starts when the energy comes. (YES)	dPon	Readable/Writeable	no
04d	0x04	Bit	Alarm configuration .OFF=Absolute alarm (Abs) ON=Relative alarm (rEF)	AtYP	Readable/Writeable	Abs
05d	0x05	Bit	Digital input polarity. OFF=While a digital input contact is closed, it is activated. (cL) ON=While a digital input is opened, it is activated(oP)	dPo	Readable/Writeable	cL
06d	0x06	Bit	Defrost type (OFF=Electrical defrost (ELC) ON=Hot gas defrost (GAS)	dtYP	Readable/Writeable	ELC
07d	0x07	Bit	Operation of the fan with the thermostat. OFF=no ON=YES	FCon	Readable/Writeable	YES
08d	0x08	Bit	When the compressor stops operation of the fan. OFF=no ON=YES	FcSt	Readable/Writeable	YES
09d	0x09	Bit	Operation of the fan during defrost process. OFF=no ON=YES	FdSt	Readable/Writeable	YES
10d	0x0A	Bit	Fan control to get to the room temperature? OFF=no ON=YES	Fctr	Readable/Writeable	no