Elitech

Microcomputer Temperature Controller ETC-60 Operation Instructions

1、General description:

ETC-60 is a temperature controller suitable for M.T. or L.T. ventilating refrigeration applications. Three-channel outputs control compressor, fan and electric heating or thermal defrost; Two sensors measure the storage temperature and evaporator temperature separately , NTC and PTC sensor can be exchanged; Celsius, Fahrenheit can be switched; Display Resolution is optional; Three menus may avoid unreasonably setting of the user; Support many kinds of digital input (door switch, exterior alarm, refrigeration/heating mode switching, pressure switch protection ,etc.), and copy key function.

2、Specification:

2.1 Panel size: 75×34.5 (mm) Depth is 58 mm

2.2 Mounting size: 71×29 (mm)

3、Technical parameters:

3.1 Temperature measuring and controlling range:
NTC -50℃~120℃/-58℉~248℉
PTC -50℃~150℃/-58℉~302℉

3.2 Resolution: NTC 0.1℃/1℃/0.1℉/1℉
PTC 0.5℃/1℃/1℉

3.3 Accuracy:
NTC -50℃~70℃, ±1℃/±2℉
PTC -50℃~100℃, ±3℃/±5℉

3.4 Temperature calibration: ±10℃/±18℉

3.5 Power supply: 220VAC+10%/-15%;
110VAC+10%/-10%, 50/60Hz (optional)

3.6 Power consumption: ≤ 3W

3.7 Relay output capacity: ◇Compressor:16A/250VAC
◇Fan:10A/250VAC ◇Deforst:10A/250VAC

3.8 Environment temperature range: 0℃~60℃

3.9 Storing temperature: -30℃~75℃

3.10 Relative humidity: 20~85% (No condensate)

4、Controller frontal:

4.1 Keystroke function:

Items	Normal mode	Menu mode	Parameter adjustment
SET	Check set value or confirm the operation	Enter into parameter adjustment	Quit from parameter adjustment
SET+···3s	Enter into set value adjustment or cancel the Temp. alarm information		
❄···3s	Manual defrost		
➤	Check exceeding Tem. Limit information or copy card upload	Menu item turns upward	Parameter increase by degrees
➤···1s	Continuous cycle	Menu item turn upward promptly	Parameter increase by degrees promptly
➤···3s	Check exceeding Temp. Limit information	Menu item turn downward	Parameter decrease by degrees
➤+➤···3s	Switching keyboard lock status	Menu item turn downward promptly	Parameter decrease by degrees promptly
SET+➤	Enter into user menu	Adjust menu display layers	
SET+➤···3s		Enter into administrator menu	
SET+➤···10s		Exit menu mode	

4.2 Description of indicator lights:

Indicator light	Status	Function
❄	Constant light	Compressor startup
❄	Wink	Compressor delay start;Parameter adjustment mode
❄	Constant light	Allow defrost to start
❄	Wink	Defrost delay start; dripping water
❀	Constant light	Allow fan to start
❀	Wink	Fan delay start
❄+❄	Wink	Menu mode
🔔	Constant light	Under or after exceeding temp. limit alarming records

5、Operation instruction:

5.1 Check temp. set value

◇Press and loosen SET key, display the temp. set value

◇Press any key or wait for 5s to return to normal temp. display

5.2 Modify temp. set value

◇Press SET for more than 3s to display temp. set value , and the parameter indicating light winks.

◇Press ▲ or ▼ in order to adjust temp. set value.

◇Press SET to store the current parameters modification with blinking display. Return to display normal temp. 3s later

◇If there isn't press operation in 15s, the machine stores the current parameters set value and return to display normal temp.

5.3 Check or cancel exceeding temp. limit records

◇Press ▲ or ▼ key and loosen. If there isn't exceeding temp. limit records, display the noA, and return to display normal temp.. Otherwise, display HAL (exceeding upper limit) /LAL (exceeding lower limit), the maximum temperature exceeding limit point, tiM, and exceeding temperature limit last time, then return to a normal temperature display.

◇When display HAL/LAL, press SET for more than 3s and display rSt glisteningly and cancel the alarm records.

◇When exceeding time is less than 999min, the unit displays as MINUTE. While more than 999min, the unit displays as HOUR, and the second decimal point on the left lights on.

5.4 Enter into menu or modify the menu layer

◇Press SET+▼ for more than 3s into user menu, and under this menu press SET+▼ for more than 10s into administrator menu.

◇After entering into menu mode, it will display the first menu item which can be displayed, menu-mode indicator light flickers. If there isn't menu item could be displayed, display noP.

◇Under the administrator menu, press SET key and hold on, then press ▼ in order to confirm whether the current menu items present in user menu or not. If the current menu item can display in user menu, the second decimal point on the left will light on.

◇Press SET + ▲ Key or wait 15s without key operation, the machine return to the normal temp. display.

5.5 Modify the parameters set value

◇When under the menu mode, press SET to display the parameter. And the parameter indicator light ❄ winks.

◇Press ▲ or ▼ to adjust parameters

◇Press SET to save the current modified parameters and glisteningly display. It will display the next menu item in 3s.

◇If there isn't press operation in 15s, the machine stores the current parameters set value and return to display normal temp. automatically

5.6 Manual defrost

◇Press ❄ key for more than 3s If there is no external urgent alarm or pressure switch alarm at present, the temperature of evaporator is lower than defrost termination temperature dtE and the Maximum Length for Defrost time MdF is not ZERO, the manual defrost function can be started in one sampling cycle of temperature (set by parameter SFt or solidified)

5.7 Continuous cycle

◇Press ▲ for more than 3s. If there is no external urgent alarm or pressure switch alarm at present and the continuous cycle CCt is not ZERO, the machine will enter into continuous cycle mode in one sampling cycle of temperature (set by parameter SFt or solidified). And at the moment, the third decimal point on the left is on or winks along with the display screen.

◇Compressor can still work in continuous CCt, not restricted by storage temperature.

◇Press ▲ for more than 3s to enforce to quit from continuous cycle in one sampling cycle of temperature(set by parameter SFt or solidified).

5.8 Key-board lock

◇Press ▲ +▼ for more than 3s to glisteningly display PoF and will return to normal temperature display in 3s, at this time, the key board is locked. Other keystroke are invalid except the set value checking, excessive temp. limits and key-board unlock functions.

◇Under key-board locked mode, press ▲+▼ for more than 3s to glisteningly display Pon and will return to normal temperature display in 3s, at this time, the key board is unlocked.

5.9 Upload the parameters in the controller to the copy card

◇When the controller normally works, plug in copy card and then press ▲ , to display UPL, awaiting confirmation of parameter uploading.

◇Press SET to glisteningly display UPL and upload the parameters in the controller into the copy card, otherwise, the machine will return to normal temperature display in 3s

◇The machine displays End and returns to normal temperature display in 2s after successful uploading.

◇The machine glisteningly displays Err and returns to normal temperature display in 5s if failure

5.10 Download the parameters in the copy card to the controller

◇Plug into the copy card after turning off the controller and then restart it, if the product info in the copy card is the same as that in the controller, then download the parameters in the copy card to the controller. At this time, the machine glisteningly displays doL.

◇The machine displays End after successful downloading and normally works in 2s

◇The machine glisteningly displays Err till remove the copy card if failure

6、Control output:

6.1 Compressor

◇Under normal working mode, if the storage temperature P1 is higher than the set value SEt + differential Hy the compressor starts; if the storage temperature is lower than the set value SEt, the compressor stops. The controller turns into heating mode due to digit input when the storage temperature P1 is lower than the set value SET, the compressor starts, if it is higher than the set value SET + differential Hy, the compressor stops.

◇When the storage temperature sensor is invalid, the compressor will work as the set Con and CoF time.

◇Defrost is unavailable during continuous cycle CCt, When the continuous cycle CCt runs out or enforced to stop, defrost starts after the set Defrost Delay dAF.

◇After electrified, the compressor will start as per the output delay at start-up odS. Under normal working and thermal defrost mode, the compressor will start as per the anti-short circuit Delay AC.

6.2 Defrost

◇Parameter tdF decides that the defrosting type is electric heating defrost or thermal defrost.

When neither the defrost cycles IdF nor the Maximum length for Defrost MdF is ZERO，the controller can start defrosting according to defrosting cycle IdF or after continuous cycle. Manual defrost and external digit input to start defrosting are allowed when Maximum Length for Defrost MdF is not ZERO.

◇The defrost cycle is set as per the parameter dtC It works as per the accumulative time after electrify (AbS)、the compressor's accumulative on-time after electrify (ont) and the compressor's continuous on-time (onC).

◇The longest continuous defrosting time is controlled by MdF，if the evaporator probe is invalid and started (P2P=y), then it will stop when the evaporator's temperature P2 is higher than the defrosting termination temperature dtE.

◇According to the set display type dFd when defrosting, the controller's display modes are as ff. during defrosting:

dFd=rt: Real-time and direct display of storage temperature;

dFd=it: Display of the storage temperature at initial defrosting;

dFd=SEt: Display of the set value SEt;

dFd=dEF: Display of the character dEF.

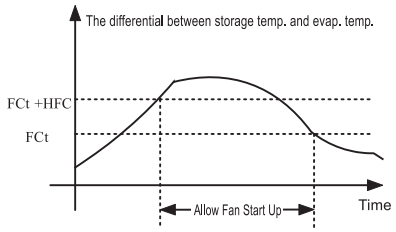
When dFd is set as it, the machine displays the storage temperature at initial defrost both during defrosting and water dripping time. If the storage temperature P1 is always higher than the storage temperature at initial defrost when defrosting and water dripping, then after water dripping, the machine will recover to display the normal temperature till the delay time parameter dAd runs out or the storage temperature P1 is lower than the storage temperature at initial defrost.

◇After water dripping, new exceeding temperature info is forbidden to take place when the temperature alarming delay time AAd is running.

◇After defrosting, the dripping water produced during defrosting will be discharged during Draining Time Fdt.
◇Refrigeration output is forbidden during defrosting and water dripping.
◇After electrify the controller, defrost output keeping to the output delay at start-up odS. After running out of odS, immediate defrost or defrost after defrosting cycle is determined by the First Defrost after Start-up dPo. After start-up of defrost, the machine will firstly starts the Defrost Start Delay (dSd) function, but it is exceptional when manual defrost or external digit input to start defrosting.

6. 3 Fan:

◇Fan has four working types as per the set of parameter FnC.
FnC=C-n: Starts/stops simultaneously with the compressor, stops when defrosting
FnC=o-n: Continuous work, stops when defrosting
FnC=C-y: Starts/stops simultaneously with the compressor, starts when defrosting
FnC=o-y: Continuous work, starts when defrosting
◇When the evaporator's temperature P2 is lower than the Fan Stop Temperature FSt, fan will work as the set value of FnC.
◇When the evaporator's temperature P2 is higher than the Fan Stop Temperature FSt, fan stops to ensure not to blow air with higher temperature than FSt into the storage. But it is exceptional when the difference between the room temperature P1 and evaporator's temperature P2 meet the parameters FCt + HFC, at this time, the fan is allowable to be started.



◇After electrify the controller, fan starts as per the output delay at start-up odS and starts according to the Fan Startup Delay FSd after runs of odS. After defrosting, fan starts up delay, and during Fnd time stops.

6. 4 Alarm when exceed temperature limits

◇When the Temperature Alarm Configuration ALC is set as rE, the exceeding temperature upper limit alarming is SEt + ALU, and the exceeding temperature lower alarming is SET-ALL; When the Temperature Alarm Configuration ALC is set as AbS, the Maximum Temperature Alarm is ALU, the Minimum Temperature Alarm is ALL.
◇When the storage temperature P1 is higher than the alarming temperature's upper limit or lower than the alarming temperature's lower limit and the alarming delay time has run out, the machine will glisteningly display HA(exceed upper limit)/LA(exceed lower limit) and will record the exceeding alarming temperature info after the room temperature returns to normal.
◇After electrify the controller, the alarming output will run as per the Delay of Temperature Alarm at Start-up (dAo) and then according to the Temperature Alarm Delay (ALd) after running out of dAo. After defrosting, new alarming info will not take place during the Maximum Alarm Delay after Defrost (AAd).

7、Digital input:

◇Digital input can be set by i1P: open valid or closed valid
◇The function of digital input can be set by the parameter i1F:
i1F=EAL: Normal external alarm, the machine will display EA alarming info after did time but this will have no effect on the output.
i1F=bAL: Urgent external alarm, the machine will display CA alarming info after did time and close all the output and alarming info.
i1F=PAL: Pressure switch alarm, each digital input can close all the output. The machine will display CA alarming info and lock the controller after nPS times digital input during did time. The controller will return to normal only if re-electrify.
i1F=dor: Door switch alarm; according to parameter odC, digital input operation to turn off the fan or the compressor, the machine will display dA alarming info after did time.
i1F=dEF: Start-up once defrost.
i1F=Htr: Heating/Reverse direction movement
i1F=no: Digital input invalid.

8、Parameter List:

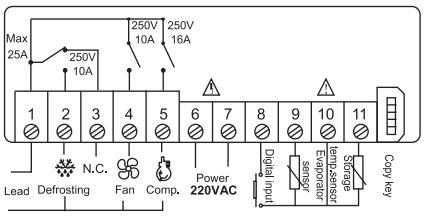
Menu	Menu items	Setting range	Unit	Default
SEt	Temp. Set Point	LS~US	℃/℉	-5.0℃
Hy	Differential	0.1℃~25.5℃ 1℃~26℃ 0.1℉~45.9℉ 1℉~46℉	℃/℉	2.0℃
LS	Minimum Set Point	-50.0℃~SET -58.0℉~SET	℃/℉	-50.0℃
US	Maximum Set Point	SET~150℃ SET~302℉	℃/℉	110℃
ot	Storage Sensor Calibration	-10.0℃~10.0℃ -18.0℉~18.0℉	℃/℉	0.0℃
P2P	Evaporator Sensor Presence	n: not present y: present		y
oE	Evaporator Sensor Calibration	-10.0℃~10.0℃ -18.0℉~18.0℉	℃/℉	0.0℃
odS	Output Delay at Start-up	0~255min	min	1min
AC	Anti-short of Compressor delay	0~50min	min	1min
CCt	Continuous Cycle	0.0~24.0h	hour.10min	0.0h
Con	Compressor ON time with fault storage-sensor	0~255min	min	15min
CoF	Compressor OFF time with fault storage-sensor	0~255min	min	30min
SFt	Sampling cycle of temperature	1~60sec	sec	3sec
CF	Temp. unit	℃: Celsius ℉: Fahrenheit		℃
rES	Temp. resolution	dEC: Decimal int: Integra		dEC
Lod	Sensor or data Displayed	P1:storage temp. P2:Evaporator temp. SET: Set value		P1
tdF	Type of Defrost	EL:Electric-heating HtG:Thermal		EL
dtC	Defrost Cycles Counter mode	AbS: accumulative time after electrify ont: compressor's accumulative on-time after electrify onC: Compressor continuous ON time		AbS
dtE	Defrost termination temperature	-50℃~50℃ -58℉~122℉	℃/℉	8℃
idF	Defrost Cycles	0h~120h	h	6h
MdF	Maximum length for Defrost	0~255min	min	30min
dSd	Defrost Start Delay	0~255min	min	0min
dFd	Display mode during defrost	SEt:Set value rt: Real-time and direct display of Room temp. it:Room temp. at defrost start-up dEF:dEFcharacter		it
dAd	Maximum Display delay after Defrost	0~255min	min	30min
Fdt	Draining time	0~255min	min	0min
dPo	First Defrost after Start-up	n:After defrosting cycle y:Immediate		n
dAF	Defrost delay after continuous cycle time	0.0~24.0h	hour.10min	0.0h
FnC	Fan operating mode	C-n:Starts/stops simultaneously with the compressor, stops when defrosting o-n:Continuous work, stops when defrosting C-y:Starts/stops simultaneously with the compressor, starts when defrosting o-y:Continuous work, starts when defrosting		o-n
FSd	Fan Start Delay	0~255min	min	0min
Fnd	Fan Delay after Defrost	0~255min	min	10min
FCt	Temp. differential between storage and evaporator for forced activation of Fans	0:invalid 0~50℃ 0~90℉	℃/℉	10℃
HFC	FCt Temp. differential between fan's ON and OFF	0℃~10℃ 0℉~18℉	℃/℉	2℃
FSt	Fan Stop Temperature	-50℃~50℃ -58℉~122℉	℃/℉	2℃
ALC	Temp. Alarm Configuration	rE:Relative AbS:Absolute		AbS
ALU	Temp. alarm upper limit	Relative mode: 0.0℃~150℃ 0.0℉~270℉ Absolute mode: SEt~150℃ SEt~302℉	℃/℉	110℃
ALL	Temp. alarm lower limit	Relative mode: 0.0℃~150℃ 0.0℉~270℉ Absolute mode: -50.0℃~SEt -58.0℉~SEt	℃/℉	-50.0℃
ALd	Temp. Alarm Delay	0~255min	min	15min
dAo	Delay of Temp. Alarm at Start-up	0.0~24.0h	hour.10min	1.3h
AAd	Temp. alarm Delay After Defrost	0~255min	min	20min
i1P	Digital Input 1 polarity	CL:Cosed valid oP:Open valid		CL
i1F	Digital Input 1 Function	dEF:Start defrost Htr:Heating mode EAL:Normal External Alarm bAL:Urgent External Alarm PAL:Pressure Switch Alarm dor:Door Switch Alarm no:Forbid		dor
did	Digital Input Alarm Delay	0~255min	min	15min
nPS	Number of activation of Pressure Switch	1~15		15
odC	Compressor and fan status when Open Door	no:No effect FAn:Fan OFF CPr:Comp. OFF F-C:Fan and Compressor OFF		F-C
PbC	Kind of sensor	ntC:NTC sensor PtC:PTC sensor		ntC
dP1	Display storage temperature	---		---
dP2	Display evaporator temperature	---		---
rEL	Software version	---		---
Ptb	Parameter table code	0~25.5		---
PEt	Sensor error alarm delay	1~60sec	sec	3sec

NOTE: Parts of the shadow only display in administrator menu.

9、Alarming description:

Code	Reason	Output
P1	Storage temperature sensor error	Compressor works as Con and CoF
P2	Evaporator sensor error	Defrost termination only works at MdF time
HA	Alarm when storage temperature exceeds upper limit	---
LA	Alarm when storage temperature exceeds lower limit	---
dA	Door switch operation, door open	Per odC to set operation mode
EA	External alarm	---
CA	Urgent alarm or pressure switch alarm	Close all the output
Err	Copy card visit or parameter stored error	---

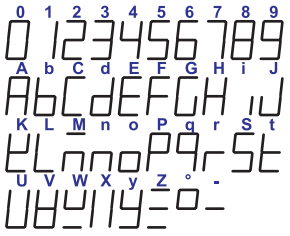
10、Elementary wiring diagram:



11、Safety regulations:

◆Danger:
◇Strictly distinguish the sensor down-lead, power wire and output relay interface from one another, prohibit wrong connections or overloading the relay.
◇All connections should be modified under electricity cut-off state
◆Warning:
Prohibit to using the machine in water or under the environment of over damp, high temperature, strong electromagnetism interference or strong corrosion.
◆Caution:
◇The power supply should conform to the one labeled on the machine, and ensure the stability of the power voltage;
◇Sensor down-lead and power wire should be kept for a proper distance to avoid possible interferences
◇When installing the evaporator, the sensor tip should be put close to the copper pipe where is 5cm away from the evaporator entrance. to ensure that it can be well connected to the copper pipe.

Appendix 1 Character Set:



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