



E636T Tennessee

Ethernet Case Controller

for Blighline Tennessee Display Cabinets

- Ethernet SNMP communications
- Cooling valve and Anti-Mist control
- Automatic scheduled lighting control of Upper and Lower Lighting
- Defrost control using Upper Lighting as heater
- Air off temperature alarms
- Lighting fuse fail
- PT1000 probes
- Local LED-4 panel display of status and product temperature
- Battery backed Real time clock fitted
- Optional Service Key Fobs with case cleaning and setup buttons
- Optional RS485 communications

Operation and Set-up Manual

GUARDIAN E636T Tennessee controllers combine temperature, lighting and defrost control of a single Blighline Tennessee display case with Ethernet SNMP protocol communication facilities as required by the Tesco SIIMS network.

The E636T Tennessee variant of the E636 controller restricts the menu and control facilities provided by the unit to simplify the setup of Blighline Tennessee Meat cases.

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Getting Started

Overview

GUARDIAN GC-E636T Tennessee Controllers are mains-powered, refrigeration temperature and defrost sequence controllers for Blighline Tennessee display cases.

The controller communicates using Ethernet SNMP protocol with the Guardian 'Consultant' Refrigeration Terminal and the Tesco SIIMS system.

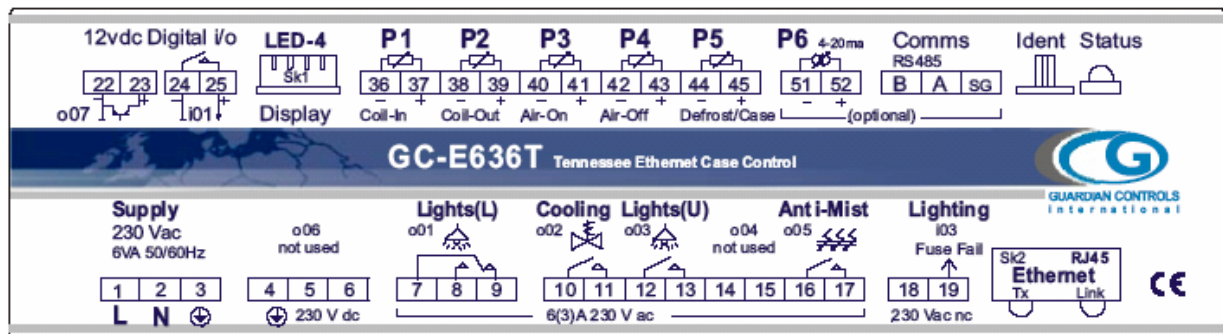
Both systems provide central alarm monitoring, editing of parameter settings, data recording and graph display facilities.

The default temperature or case operating mode for the case is displayed locally on a separate four digit LED-4 display unit connected to the controller by a 4 metre display lead .

The optional SKF-1 (Service Key Fob) 1-button unit may be plugged into the LED-4 display to select case cleaning modes STOP and Auto.

The optional SKF-3 (Service Key Fob) 3-button unit may be plugged into the LED-4 display to select case cleaning modes and case temperature values plus editing of control setpoints and defrost settings.

The GC-E636 controller has all the refrigeration facilities of its well proven 636 predecessor including energy saving automatic lighting control.



Communications

When the correct system number has been entered then the controller can communicate with the GUARDIAN 'Consultant' Refrigeration Terminal for central alarm monitoring and temperature display.

Control setpoints, defrost times and alarm limits may then be sent to the controller from the 'Consultant' rather than using the setup facilities at the case using the SKF-3 Service Key Fob unit.

Commissioned parameters for the case can be locked on the 'Consultant' to inhibit any settings being changed at the case using the SKF-3 Service Key Fob button unit.

For further details see SKF-3 page 8

HARDWARE

GC-E636 General Specification

GC-636	Case Control		SKF-3	Service Key Fob
Power	6 VA	(excluding ESV valve)	Key Fob buttons	3
	230vac	50/60HZ	User	Service engineer
Operation	0 to 55 °C		Cable length	0.75M
Dimensions			Functions	Case cleaning
length	155 mm			Values and alarms display
width	110 mm (including connectors)			Settings change & display
height off rail	55 mm		SKF-1	Service Key Fob
Mounting	DIN rail		Key Fob buttons	1
Terminals	2-part	screw clamp	Cable length	0.15M
Fuses			User	IST (In-store Technician)
F110 - Controller	20 x 5 mm	250V 250mA - T (Inner fuse)	Functions	Case cleaning
F100 - ESV Valve	20 x 5 mm	250V 1A - T (outer fuse)		
LED-4	Display		Display Leads	
LED digits	4		LED-4 standard	4M
Type	7-segment, decimal point		LED-4 optional	6M
size	14mm			
cutout hole size	29 x 71mm			
Approvals	CE			

Flash Reprograming

The flash memory of the controller can be reprogrammed remotely using the Ethernet connection. The reflash facility ensures the correct Tennessee application program is reloaded

Status LED

The Green Status LED indicates controller power is healthy
It flashes off briefly every communication TX response.

Ident button

When pressed during normal controller operation, the '**Ident**' Button is used to remotely identify a particular case with suspect identity. - flashes Power LED regularly until System Number identity is re-setup from the Consultant Refrigeration Terminal..

Real Time Clock

The controller real time clock is used to schedule lighting and defrost times.

The standard internal clock relies on network communications to keep correct time.

On power up the controller time and date are zero. The controller requests the correct time and weekday from the network server. The controller will keep this time updated whilst it is running.

If the controller fails to update the correct time and date because the network server is not available then the time and weekday default to midnight on Sunday.

Correct time and date may be entered using the SKF-3 service Key Fob button unit

The time and date are lost every time the controller is powered off.

For controllers not connected to an IP network, a plug-in option is available to have a battery-backed real time clock which generates the correct time even after being powered off. (See below)

Battery Backed Real Time Clock

For controllers not connected to an IP network, this plug-in option provides a battery-backed real time clock, which generates the correct time even after being powered off.

This option is fitted on all GC-E636T Tennessee controllers.

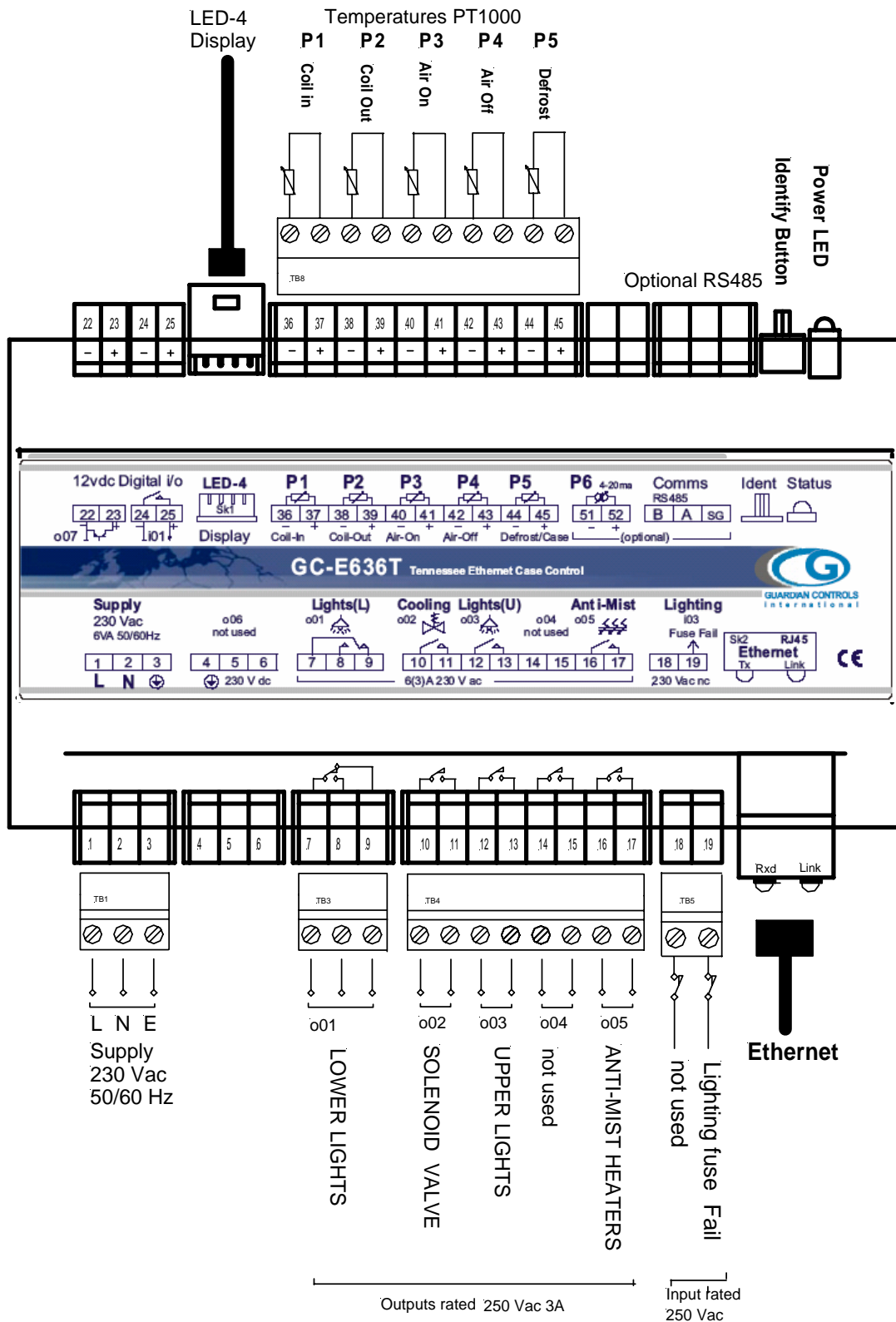
Optional RS485 Communications and P6 4-20ma input

A plug-in option **RS485 module** provides a Woodley third party protocol RS485 channel at 9600 baud.

GC-E636 Input/Output Signals

terminal			ident	error	unit	Signal Name	State
L	N	E				Supply 230Vac 6VA 50/60 Hz	
1	2	3	Status	LED Off		Mains input supply	
-	+					Analogue Inputs -40°C to +50°C (PT1000 RT)	
36	37		■P001	■E001	°C	P1 Evaporator coil inlet temperature	(If Fitted)
38	39		■P002	■E002	°C	P2 Evaporator coil outlet temperature	(If Fitted)
40	41		■P003	■E003	°C	P3 Air ON temperature	
42	43		■P004	■E004	°C	P4 Air OFF temperature	
44	45		■P005	■E005	°C	P5 Defrost Termination/Case temperature	(If Fitted)
-	+					Analogue Input 4-20ma -1 to 8 barg	
46	47		■P006	■E006	barg	P6 Optional suction Pressure in barg	(If Fitted)
c	n/o	n/c				Relay output (5 Amp 230VAC with suppressors)	
7	8	9	■001		c/o	Lower Lighting Relay state	(0=OFF 1=On)
10	11		■002		n/o	Cooling Relay state (TEV control)	(0=OFF 1=On)
12	13		■003		n/o	Upper Lighting (Defrost) Relay state	(0=OFF 1=On)
14	15		■004		n/o	Not used - no fans	(0=OFF 1=On)
16	17		■005		n/o	Anti-mist Heater Relay state	(0=OFF 1=On)
						Solid State relay pulse output (230Vdc 0.5 AMP)	
4	5	6	■006		%	Not used	0-100%
-	+					Status Output (12vdc 10 ma)	
22	23		■007			Digital Output o07 state (not used)	(0=OFF 1=On)
-	+					Status Input (contact loop 5 ma)	
24	25		■101	■A11		Digital Input i01 state (not used)	(0=Closed=ok 1=Open=alarm)
	230v					Alarm Trip Input (230vac only)	
	18		■102	■A12		input i02 state - (not used)	(0=Fail 1=OK)
	19		■103	■A13		input i03 state- lighting fuse supply	(0=Fail 1=OK)
Sk1	GE636					LED-4 Display Socket	
Sk1	LED-4				4way	Used for 4.0 metre 3-core LED-4 display lead	
						Communications	
Sk2	E636				RJ45	Ethernet SNMP protocol	
A	B	E			3-way	Optional RS485 Woodley 3 rd party comms @9600baud	
						Ident Pushbutton	
						Used to remotely identify a particular case with suspect identity. - flashes power LED regularly until System Number identity is re-setup.	
						Status LED indicator	
						Green LED indicates controller power is healthy. Flashes briefly every comms TX response	
						FUSES	
			FUSE 1	(outer)		DANFOSS ESV 10 Valve Supply Output	
			FUSE 2	(inner)		Controller Mains supply	
						LED-4 Display unit (cutout hole size compatible with Danfoss)	
						4-segment LED display with sockets for lead to GC-E636 and SKF-3 button unit	
SK1	LED-4				3-way	4 metre 3-core lead to GC-E636 compatible with Danfoss display lead for EKC	6 metre lead option available
						SKF-3 Service Keyfob	
S2	LED-4				2-way	0.75 metre 2-core lead	

GC-E636T Terminal Wiring

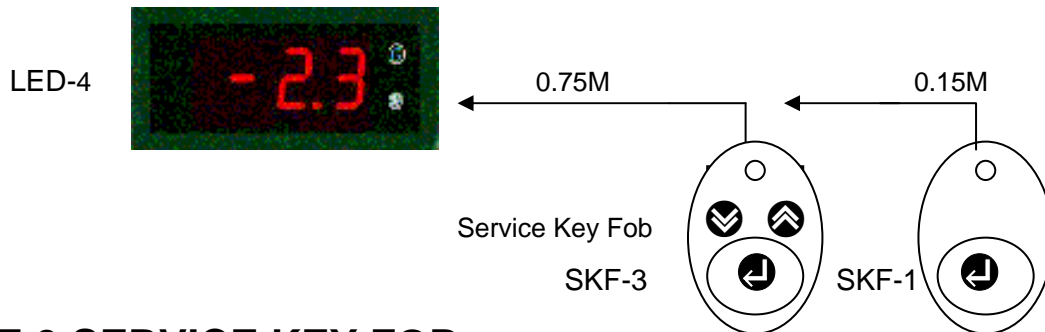


DISPLAY OPERATION

LED-4 DISPLAY

GUARDIAN GC-E636T controllers are normally supplied with a **LED-4** Display unit and a display lead. The LED-4 is mounted on the case fascia and connected to the GC-E636T controller by a 4.0 metre 3-core lead display lead. The LED-4 Display is a plastic enclosure housing a PCB with four LED displays and a socket for the SKF-3 setup unit.

The LED-4 normally displays the calculated product temperature for the case.(see page 9)



SKF-3 SERVICE KEY FOB

The SKF-3 Service Key Fob provides 3 buttons for authorised access of the controller at the case for:-

- Local display of measured values, case status, alarms and faults.
- Local Command actions for case cleaning and test.
- Local modification of control settings.

Temperature probe values and controller parameter settings can be displayed or changed locally at the case after the SKF-3 unit has been plugged into the LED-4. Socket.

The buttons which have the following functions

- ⬆ **'up' button** goes to next display or parameter selection in sequence or increases a parameter setting data value.
 Pressing ⬆ on the default display t1 steps in sequence through all Commands and Measured Values of temperature
- ⬇ **'down' button** goes to the previous display or parameter selection or decreases a parameter setting data value.
- ⬇ **'select / enter' button** selects a parameter for changing or enters the new mode or parameter data value.
 Pressing ⬇ on the flashing default display t1 shows the first active **Error or Alarm**.
- ⬆ ⬇ **Default settings on Power up.** When ⬇ ⬆ are pressed and held during the power up sequence, the controller returns to the default settings which are suitable for a Tennessee meat case.

SKF-1 SERVICE KEY FOB

The SKF-1 Service Key Fob provides a button at the case for case cleaning:- .

- ⬇ **'case clean' button** each button press sequences the case cleaning modes.

8000

5000

DEFAULT DISPLAY

When the SKF-3 unit is not connected or no SKF-3 buttons have been pressed for 3 minutes then the controller reverts to the Default display of the LED-4 to the calculated product temperature **t2**.

Calculated Product Temperatures

There are two different values of calculated product temperature:-

- a) the default display temperature value **t2** is displayed on the LED-4 at the case as an indication of the core temperature of the product within the case.
This value is derived from an adjustable ratio **c05 Display % of P4 Air OFF** compared to the P3 Air ON temperature.

e.g. if P3= +4C, P4= 0C, c05=25%, t1= 3C

- b) the control temperature value **t1** is compared to the cutout setpoint **c01** and used to control the cooling. This value is derived from an adjustable ratio **c04 Control % of P4 Air OFF** when compared to the P3 Air ON temperature.

(Tennessee Case are fixed at c04=25%,)

If either probe is faulty then 100% of the working probe is used.

Product Temperature display

88.8

Calculated Product Temperature in degrees Centigrade
Uses c5 Display % of P4 Air OFF compared to P3 Air ON

Case Status Display

The default display t1 is replaced by a status message if any of the following conditions occur.

8888

display segment check after power on restart

E7.00

Software version displayed after power on or selecting Auto after StoP

EE36

GC-E636 ethernet case or coldstore controller after power on restart

8482

Last 4 digits of MAC address for Controller

ALLO

After power on or case OFF waiting for restart delay before opening liquid solenoid or ESV valve.

1119

Countdown of remaining power up delay timer in seconds before automatic control is started after power on,

-FAN

If unit selected Fans only for case cleaning

StoP

If unit selected StoP for case cleaning

-DEF

displayed during Defrost

-Pd

Pull Down - displayed from end of defrost cycle until Air OFF temperature is within alarm band after defrost is complete



FAIL

Displayed instead of default Calculated product temperature t1 when probes Air On P3, Air Off P4 are both faulty


The display flashes whenever an Error or an Alarm is detected.

With the SKF-3 plugged in,

Alarms

- a) Pressing  on the flashing default display t1 shows the first active Error or Alarm.
b) Repeatedly pressing  steps in sequence through all other active Alarms and Errors present.

Commands and measured values

- a) Repeatedly pressing  on the default display t1 steps in sequence through all Commands and Measured Values of temperature.

ALARM DISPLAYS

The Default Temperature value **t1** flashes when a probe error or alarm is present.

Alarms may be investigated by using the SKF-3 plugged into the LED-4.

Pressing  on the default display **t1** followed by  allows all faults or alarms that are present to be viewed in the sequence as below.

The liquid solenoid /ESV valve is closed on failure of the control air probe.

Temperature alarms are inhibited during and after defrost cycles and during case cleaning.

Alarm Guardtime count is reset each time the Control air returns within limits.

Alarm states are automatically reset when the control air returns within limits.

Alarms are not displayed during Setup operation.



















All error messages are reset automatically when the fault has disappeared.

If the controller is on a system which does not have a central PC alarm monitor then

the **E00** communications message can be inhibited by selecting setting **u4=0** , i.e. Communications protocol = 'none'

Alarm and Error messages

Possible messages are as follows:-

	flash	
		Press  to view list of error or alarm messages present
		Press  to view next message (if held down -stops when 'End' is displayed)
		Press  to view previous message (if held down -stops when 'End' is displayed)
		Error -no communications to controller for more than 5 minutes
		Error Probe P1
		Error Probe P2
		Error Probe P3
		Error Probe P4
		Error Probe P5
		Error Probe P6
		P4 Air-off Temperature High Alarm Tesco spec (meat & dairy 3C)
		Digital Input 3 Lighting Fuse fail Alarm
		Press  to exit alarm display and return to default display t1

There are three ways to end ALARM display mode and return to default case display

a)

      is shorthand for:-

Hold down the 'up'  button to quickly sequence through the ALARM list until **End** identifier is displayed. Press  to end ALARM mode and return to default display **t1**.

b) ALARM display mode is automatically ended 3 minutes after the last button press.

c) Remove SKF-3 from LED-4 socket which immediately causes the case to revert back to default display **t1** and Auto control.

Remove SKF-3 from LED-4 socket until required again to view temperatures, change settings or subsequent case cleaning operations.

COMMANDS & MEASURED VALUES DISPLAY

Identifier	Value	error	Units	Description
	■■■.9	flash	°C	Default display t1 of Calculated Product Temperature °C
	⏸			Press ⏸ to view next command or identity / value (if held down -stops when 'End' is displayed)
	⏪			Press ⏪ to view previous command or value(if not default t1) (if held down -stops when 'End' is displayed)
COMMANDS				
SESE				Press ⏸ to enter parameter setup mode
EEEE				Press ⏸ to enter Output Relay and ESV % Test mode
AAAA				Press ⏸ to return to AUTO control after case cleaning
FFFF				Press ⏸ to go to Fans only mode prior to case cleaning
SSSS				Press ⏸ to go to StoP mode for case cleaning
DDDD				Press ⏸ to initiate a manual defrost
PROBE MEASURED VALUES				
P1	■32.1	■E01	°C	P1 Evaporator coil inlet probe temperature (If Fitted, skip if not)
P2	■12.3	■E02	°C	P2 Evaporator coil outlet probe temperature (If Fitted, skip if not)
P3	■12.0	■E03	°C	P3 Air ON probe temperature
P4	■23.6	■E04	°C	P4 Air OFF probe temperature
P5	FAIL	■E05	°C	P5 Defrost Termination probe temperature (If Fitted, skip if not)
CALCULATED VALUES				
E1	■77.9		°C	CPT Temperature - Control % of P4 Air OFF
E2	■77.9		°C	Calculated Display % of P4 Air OFF temperature
E3	■■7.4		°K	Superheat temperature
E4	■■7.9		°K	Superheat control setpoint
E5	■■nn			Control State sequence number. nn (see next page)
E6	■■79		mins	Defrost elapsed duration (mins)
CONTROL RELAYS & INPUTS				
o01	■■■1			Lower Lighting Relay state (0=OFF, 1=On)
o02	■■■1			Cooling Relay state (0=OFF, 1=On)
o03	■■■0			Upper Lighting(Defrost)Relay state (0=OFF, 1=On)
o04	■■■1			Not used
o05	■■■1			Anti-mist Heater Relay state (0=OFF, 1=On)
o06	■■79		%	Not used
o07	■■■0			Digital Output o07 state (0=OFF, 1=On)
i01	■■■0	■A21		Digital Input i01 state (0=OFF, 1=On)
i02	■■■1	■A22		Mains input i02 state (0=OFF, 1=On= (not used)
i03	■■■1	■A23		Mains input i03 state state (0=OFF, 1=On= Lighting fuse ok)
E00				Press ⏸ to exit value display and return to default display t1

There are three ways to end VALUES display mode and return to default case display **t1**

- Hold down the 'up' ⏸ button to quickly sequence through the VALUES list until **End** identifier is displayed. Press ⏸ to end VALUES mode and return to default display **t1**.
■■04 ⏪⏩ E00 ⏸ ■■■.9
- VALUES display mode is automatically ended 3 minutes after the last button press
- Default temperature **t1** is displayed when the SKF-3 is removed from the LED-4 socket.

Control State sequence no. (**Not available this software issue**)

COMMANDS

CASE CLEANING OPERATIONS

FANS ONLY


FANS ONLY mode is not relevant to E636T since there are no Fans on Tennessee cases


STOP for CLEANING

To switch from FANS mode to STOP prior to case cleaning:-

Plug SKF-3 into LED-4 setup socket

-FAAn  **StoP**  **StoP** is shorthand for:-

Keep pressing 'up'  button until **StoP** displayed

Then press 'enter'  button which changes the control mode from Fans only to Stop mode and displays **StoP**

When the unit displays **StoP** instead of the case temperature, all alarms, liquid valve control, trim heaters, defrost cycles and fan outputs are turned off.

StoP mode may be also selected remotely via a switch input or a communication command.

The case is switched back on by selecting **Auto** mode.


Remove SKF-3 from LED-4 socket until required again for Auto selection after cleaning is complete. The case is now safe for cleaning.


AUTO control after cleaning

To switch from -OFF mode to AUTO after case cleaning:-

Plug SKF-3 into LED-4 setup socket

StoP  **Auto**  **-15.6** is shorthand for:-

Keep pressing 'up'  button until displays **Auto**

Then press 'enter'  button which changes the control mode from **StoP** mode to **Auto** and displays calculated product temperature.

When the unit displays **Auto** instead of the case temperature, all alarms are allowed and fan outputs are turned on. Time scheduled defrosts are restarted immediately if required.

Liquid valve control is inhibited until the restart delay timer has finished.

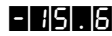
When the restart delay is complete, the liquid valve returns to automatic control and the case temperature value **t1** is displayed.


Remove SKF-3 from LED-4 socket until required again to view temperatures, change settings or subsequent case cleaning operations.


FORCE MANUAL DEFROST

To force a manual defrost

Plug SKF-3 into LED-4 setup socket

     is shorthand for:-

Keep pressing “up”  button until **idEF** displayed.

Then press ‘enter’  button which changes the control mode from Auto into **Defrost** mode.

When the unit displays **-dEF** instead of the case temperature, all alarms and liquid valve control are turned off.

The defrost cycle performed is dependent on the DEFROST setup of parameter d1 to d11

-dEF mode may be also selected remotely via a communication command.

The defrost may be terminated (after draindown delay) by selecting Auto mode.

Remove SKF-3 from LED-4 socket until required again to view temperatures, change settings or subsequent case cleaning operations.

TEST OUTPUTS

To test control outputs and Expansion Solenoid Valve manually:-
 Plug SKF-3 into LED-4 setup socket

is shorthand for:-

Keep pressing 'up' button until LED-4 displays **tEst**
 Then press 'enter' button which changes the control mode from Auto into **TEST** mode.
 When in Test Mode, all alarms, liquid valve control, trim heaters, defrost cycles, lighting and fan outputs are turned off. The first relay selection identity **o01** (lights) is displayed

is shorthand for:-

Keep pressing 'up' or 'down' buttons until identity displayed is the required output for test. eg **o04** Fans relay .
 After a pause, the latest state of the selected output alternating with its identity is displayed e.g. **o04** state = 1
 Then press 'enter' button which toggles the state of the selected output.
 e.g. **o04** state is now = 0
 The new state of the output i.e. 0=de-energised, 1= energised, is shown on the display.
 Press 'up' or 'down' buttons until the identity of the next output for **tEst** is displayed and then repeat as above.

Identifier	Value	Units	TEST RELAY & VALVE OUTPUTS
			Press to view next output and value. (if held down -stops when 'End' is displayed)
alternating	alternating		Press to view previous output and value. (if held down -stops when 'End' is displayed)
			Press to toggle displayed output state on and off.
			Lower Lighting Relay state (0=OFF 1=On)
			Cooling Relay state (0=OFF 1=On)
			Upper Lighting (Defrost) Relay state (0=OFF 1=On)
			(Not used)
			Anti-Mist Heater Relay state (0=OFF 1=On)
			Expansion Solenoid Valve position @100%
			Digital Output o7 state (0=OFF 1=On)
			All Outputs On except defrost, ESV @100%
			Press to exit and return to default display t1
			TEST ends automatically 3 minutes after the last button press. All outputs resume automatic control when TEST is ended.

There are three ways to end Test mode and return to default case display

a)

is shorthand for:-

Hold down the 'up' button to quickly sequence through the TEST identifier list until **End** identifier is displayed. Press to end TEST mode and return to default display **t1**.

d)

Test is automatically ended 3 minutes after the last button press.

e)

Remove SKF-3 from LED-4 socket which immediately causes the case to revert back to default display **t1** and Auto control.

Remove SKF-3 from LED-4 socket until required again to view temperatures, change settings or subsequent case cleaning operations.

SETUP

Controller settings can be changed locally at the case by using the SKF-3 unit plugged into the LED-4 in order to select Setup mode.

SETUP OPERATION

Setup mode operation lasts for a maximum of 3 minutes after which time it automatically ends setup mode and reverts to the default case display **t1**.

Enter Setup Mode

To enter setup mode Plug SKF-3 into LED-4 setup socket

is shorthand for:-

With default case temperature(-15.6C) on display, press 'up' button and **SEt** is displayed. Then press 'enter' button which changes the control mode to Setup mode and displays the first cooling setpoint identifier **c01**. Alternating with its value

Select and Change Setting Value

To select the parameter and enter the new value

winking winking

Using the and pushbuttons, sequence through the setup identifier list until the required identifier is displayed e.g. **c03**.

After a pause the latest value of the selected parameter is displayed alternating with its identity. e.g. **c03** value **61**. Pressing or displays adjacent identifiers in the setup list.

Press button if this is the setting value to be changed.

When in change setting mode the value being changed winks and alternates with its identifier.

Press and until new winking value is correct eg **c03** value raised to **68**.

Press to accept new setting value.

Holding or quickly reaches the maximum or minimum range limit for the setting, which is immediately followed by **ESSE**. No further change happens until the next button press.

Press on **ESSE** to exit from setting change mode without changing the value.

Press or to continue editing the value and then press to accept new setting value.

Using the and pushbuttons, repeat the above procedure to view or change other parameters

The list of settings which can be changed at the case is given on page 16

End Setup Mode

There are three ways to end setup mode and return to default case display **t1**

a) is shorthand for:-

Hold down the 'up' button to quickly sequence through the through the SETUP identifier list until **End** identifier is displayed then press 'enter' button

b) Setup is automatically ended 3 minutes after the last button press.

c) Remove SKF-3 from LED-4 socket which immediately causes the case to revert back to default display **t1** and Auto control.

Remove SKF-3 from LED-4 socket until required again to view temperatures, change settings or perform case cleaning operations.

The E636T Tennessee controller restricts the standard E636 range and settings available for change.

Values in green are displayed but not available for change. eg

c02	Cooling differential (cutin=cutout+differential)	°K	1.0	1.0	1.0
-----	--	----	-----	-----	-----

Lines in dark grey are not available for display or change. eg

c06	Valve Type (0=OFF,1=ESV 2=TEV)		2	2	2
-----	--------------------------------	--	---	---	---

Other settings may only be changed between the Max and Min limits shown below.

LED4	E636T Tennessee SETTINGS		Min.	Max.	defaults
CONTROL					
c01	Case Control Setpoint (Cut-out)	°C	1.0	3.0	2.0
c02	Cooling differential (cutin=cutout+differential)	°K	1.0	1.0	1.0
c03	Control Input Probe (3=P3,4=P4,5=P5, 6=CPT)		6	6	6
c04	Control % P4 Air OFF	%	25	25	25
c05	Display % P4 Air OFF	%	25	25	25
c06	Valve Type (0=OFF,1=ESV 2=TEV)		2	2	2
c07	Lighting Control Mode for c01 0=Lights N/C, 1= Lights N/O; 2=remote 3= standard schedule,		0	3	3
c08	Lighting relay wiring. 0=Lighting N/C, 1=Lighting N/O		1	1	1
DEFROST					
d01	Defrost termination probe 1 to 5=P1 to P5; 6=time only		6	6	6
d02	Defrost termination Temperature	°C	00	15	10
d03	Maximum Defrost duration	mins	90	130	120
d04	Defrost schedule Automatic (0=no 1=yes)		1	1	1
d05	Fans on during defrost (0=no, 1=yes)		0	1	1
d06	Heater on during defrost 0=no,		1	1	1
d07	Pumpdown delay time At Defrost Start,	mins	0	0	0
d08	Draindown period at the end of Defrost prior to opening Cooling Valve .	mins	0	0	0
d09	Fan delay time after Cooling Valves Open	mins	0	0	0
d10	Fan delay terminate on P5 Defrost (0= not used)	°C	0	0	0
d11	Number of defrosts per day		1	1	1
dt1	First Defrost time dt1 (0000= inhibit all defrosts)	time	0130	0130	0130
ESV Superheat					
h01	Superheat High. Maximum	°C	00	25	12
h02	Superheat Low. Minimum	°C	00	10	03
ALARMS					
A01	di01Door input Guardtime	Minutes	0	60	5
A02	di01Doort input use (contact)		0	0	0
A03	di02 input use -Fan Fuse (230vac)		0	0	0
A04	di03 input use LightsFuse;0=Not used 1=normally Closed		0	1	0
A05	P1 Coil In Temperature in Use (1=Yes 0= No)		0	1	1
A06	P2 Coil Out Temperature in Use (1=Yes 0= No)		0	1	1
A07	P5 Defrost Temperature in Use (1=Yes 0= No)		0	1	1
A08	Air Off High alarm limit	°C	-40	40	3
A09	Air On high alarm limit	°C	-40	40	40
A10	Alarm delay	Minutes	10	10	10
A11	Defrost/Pulldown Alarm delay	Minutes	150	200	190
UNIT					
u01	System No./ Modbus Slave Address		01	255	0
u02	Pack No. Panel No.		0	99	0
u03	Power on delay	minutes	0	1.0	0
u04	Wait for clock update for defrost before start		0	1	0
u06	Real Time Clock Hours Minutes		0000	2359	----
U07	Real Time Clock Weekday 1=sun;7=sat		1	7	----
u08	MAC Address - READ ONLY		READ	ONLY

CONTROL

Manual Modes

Stop Mode

When selected to Stop mode for case cleaning, all alarms are ignored and all control relays are de-energised. The case should be electrically fully isolated prior to case cleaning.

For command selection

STOP for CLEANING see page 12.

Fans Only Mode

When selected to Fans only mode for case cleaning, all alarms are ignored and all control relays are de-energised except for the fans relay which is permanently energised whilst in fans only mode .

FANS ONLY mode is not relevant to E636T since there are no Fans.

Force Defrost Mode

A manual request for a forced defrost can be initiated by command selection as described in FORCE MANUAL DEFROST page 13.

A normal defrost cycle is immediately initiated.

When the defrost cycle is complete, cooling control and defrost control return to automatic.

Test Outputs Mode

When selected to Test Outputs mode, all alarms are ignored and all control relays are de-energised except for the relay which is being toggled for test.

All outputs resume automatic control when Test Outputs mode is ended.

For command selection see TEST OUTPUTS page 14

Relay Outputs

o01 Lower Lights

The lights relay o01 has changeover contacts.

The contact state N/C or N/O used is specified in **c08**.where

Co8=0 Lights on N/C when lights connected to terminal 9

Co8=1 Lights on N/O when lights connected to terminal 8

The lighting modes available for selection are

Lights permanently on, permanently off, controlled remotely or controlled by the real time clock schedule.

For standard store opening times the lighting mode of control is setup in **c07** where

c07=0=Lights OFF - lights permanently **OFF**.

c07=1=Lights ON - lights permanently **ON**

c07=2=Remote Control - lights controlled by remote communications

when in 2=Remote then a 15min watchdog sets lights ON if no updates detected.

c07=3= standard schedule

Mon - Thur on 07:00 off 23:00

Fri - on 07:00 off 00:00

Sat - on 07:00 off 22:15

Sun - on 08:45 off 16:15

After power restart, if real time clock is not updated or setup then lights are forced on automatically.

On power up the clock defaults to midnight on Sunday.

o02 Liquid Solenoid Valve

The relay output is always energised and the valve open except when:-

- I) the Control % of P4 Air Off temperature **t1** is below the cutout temperature setpoint **c01**
- II) A defrost is in progress.
- III) The controller is in Stop mode
- IV) The controller is in Test Output mode.

A timing diagram is given in FIG.1 page 19

o03 Defrost / Upper lights

The Upper lighting relay is used to assist defrost.

The relay is energised when defrost is initiated..

The relay is de-energised at the end of the defrost duration period **d03**.

The relay may be toggled on and off in Test Outputs mode.

Timing diagrams are given in

Defrost Control Timing page 19

Defrost schedules for E636T are fixed at one per day at 0130

o04 Fans

*** * * Not used on E636T Tennessee Controller**

o05 Anti Mist Heaters

The Anti Mist heater relay output is always energised and heaters ON except when:-

- ii) The controller is in Stop mode
- iii) The controller is in Test Output mode

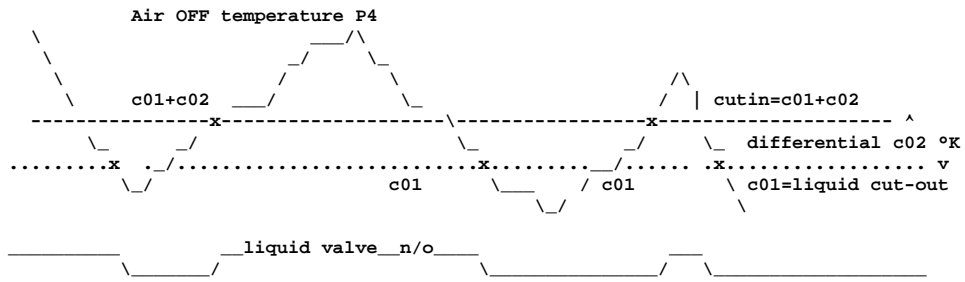
ESV Expansion Solenoid Valve

o06 ESV Control

*** * * Not used on E636T Tennessee Controller**

Control Timing

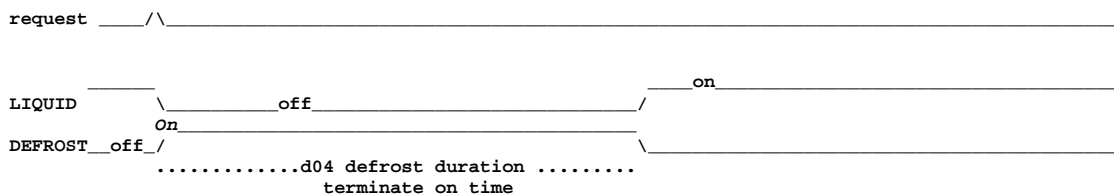
FIG.1 Liquid Valve Control



Defrost Control Timing

Case Defrost - Terminate on time

- d01=6** cases terminate defrost on time only.
- d05=0** case fans do not exist.
- d06=1** anti mist heaters Heater normally **ON** during defrost
- c01=6** Cases control the liquid valve on **CPT** probe
- c04=25%** Control % of **P4=25%** for Tennessee Cases



COMMUNICATIONS

Communication facilities are available for remote interrogation of temperatures, status and modification / display of setpoints, limits and timeclock settings.

Communication is via an Ethernet Link using TCP/IP SNMP protocol.

An option is available to provide RS485 using Woodley 3rd Party at 9600 baud.

Each GUARDIAN controller has a unique system number or MAC address which is used to select the appropriate unit for interrogation or modification.

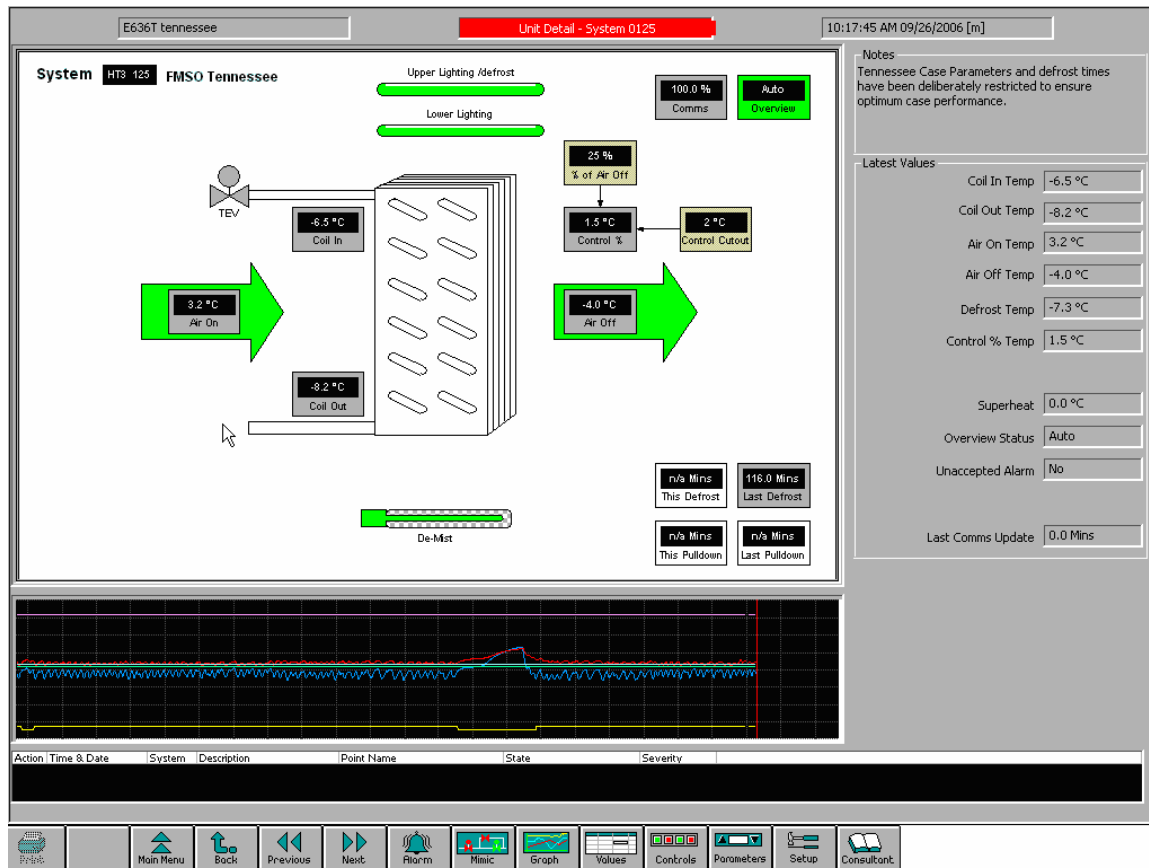
RS485 option systems use system number as Woodley address

GUARDIAN controllers are inactive until they are addressed.

GUARDIAN 'Consultant' or SIIMS proxy server SNMP communications provide:-

- a) GET latest temperature values, unit status, alarm and relay states and internal status
- d) GET/SEND setpoints and other settings values
- e) SEND Time and Date with new hours and minutes, week day for real time clock
- f) SEND remote command to Initiate or Terminate a defrost
- g) SEND remote command to change case mode selection for case cleaning Auto / FANsOnly / Stop

Typical 'Consultant' Mimic for Guardian E636T Tennessee Case



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