iCon

Installation Manual

Title Page

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Product Support Department
Comeragh Controls Ltd
Upper Irish Town
Clonmel
Co. Tipperary

WARNING!

DO NOT ATTEMPT TO INSTALL THE ICON WITHOUT SWITCHING OFF THE ELECTRICAL SUPPLY.

A QUALIFIED ELECTRICIAN AND/OR PLUMBER SHOULD CARRY OUT INSTALLATION OF THE ICON.

POWER MUST BE DISCONNECTED BEFORE OPENING THE I/O CONTROLLER ENCLOSURE.

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1. Introduction

1.1 Scope

The scope of this document covers the installation of the iCon Heating Control System.

1.2 Purpose

The purpose of the document is to provide the relevant information to enable the distributor install the iCon Heating Control System.

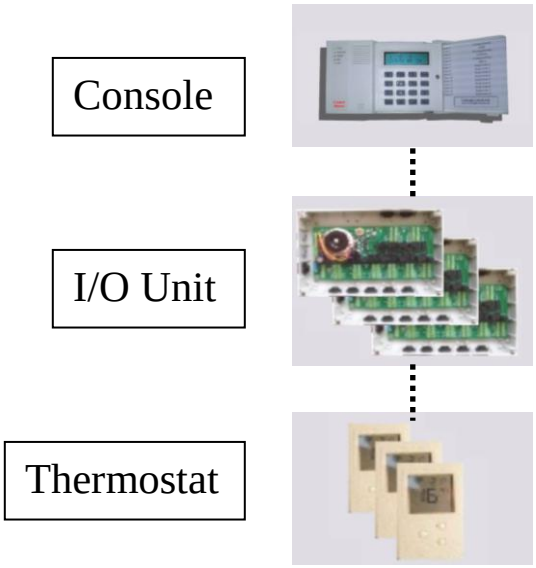
1.3 Product Description

The ***iCon*** is a complete heating & hot water management system. The system controls energy sources such as a boiler, geothermal pump, and solar panels through to energy exchangers such as underfloor heating, radiators and hot water cylinder in a single package. Management is from a central console, which schedules up to 32 zones.

1.4 System Components

The system comprise of the following components

System Component	Model Number	Description
Console	CC757	The Console is the central point of control and programming.
Thermostat	CC762	Serial Thermostats monitor temperature in a zone and communicate over a wired serial network.
I/O Controller or, Logic Controller	CC771	The I/O Controller is the wiring point to all pumps, 2 port valves, actuators etc.



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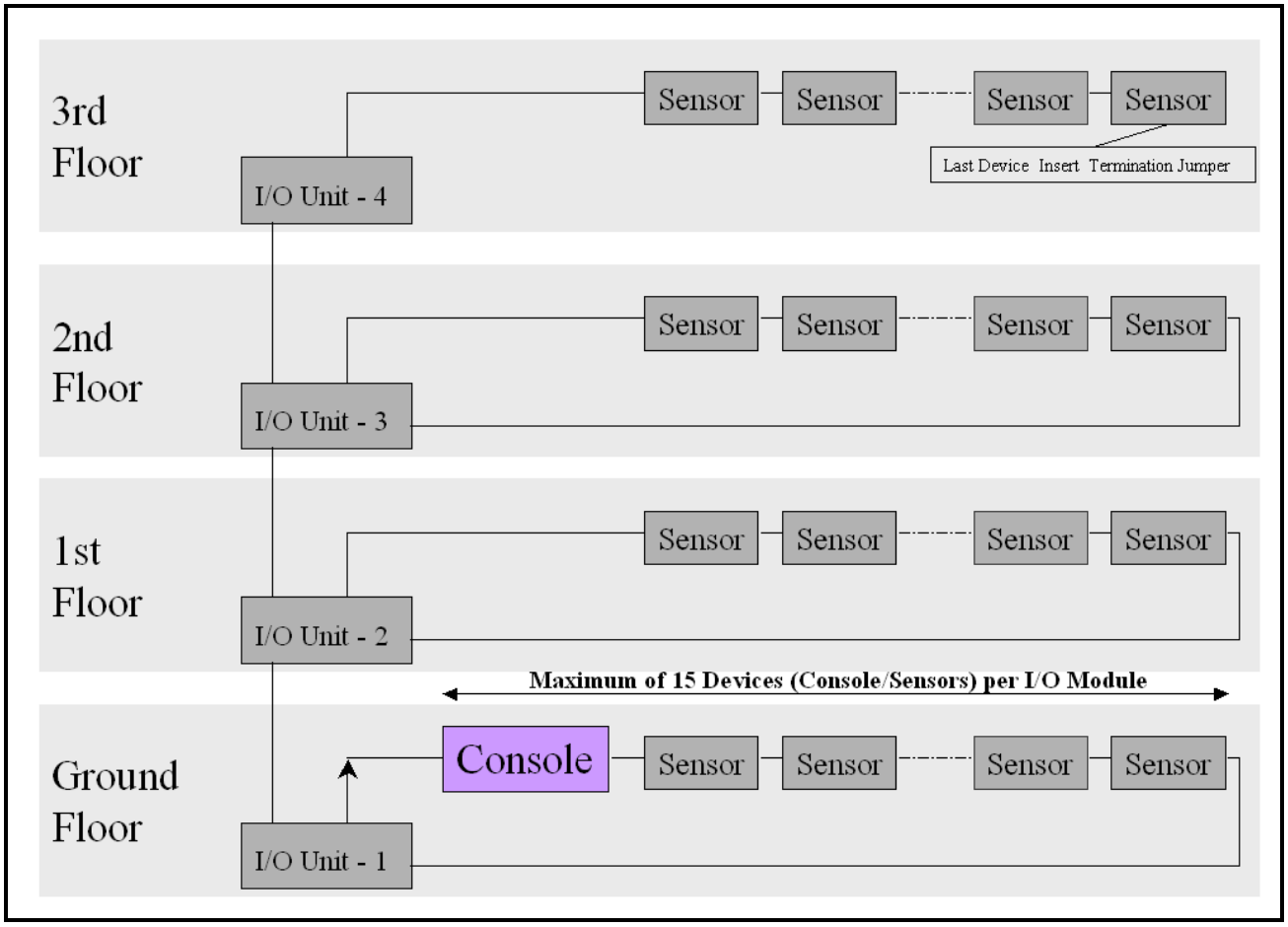
2. System Wiring

2.1 Communication Wiring

2.1.1 Communication Wiring Layout



Notes:

- **Maximum of 15 Devices (Console / Sensors) per I/O Module**
- **Last Device Insert Termination Jumper**

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2.1.2 Cable Type

0-250 meter installations - Domestic Applications)

Cable Type	General Data Cable
Number Of Cores	4
Core Strands	7 / 0.2
Cable O-D	3.4mm
Conductor Material	Tinned Copper

Reel Length	RS Stock no.
100 Meter	365-571
500 Meter	365-600

250 –1500 meter installations - Commercial Applications)

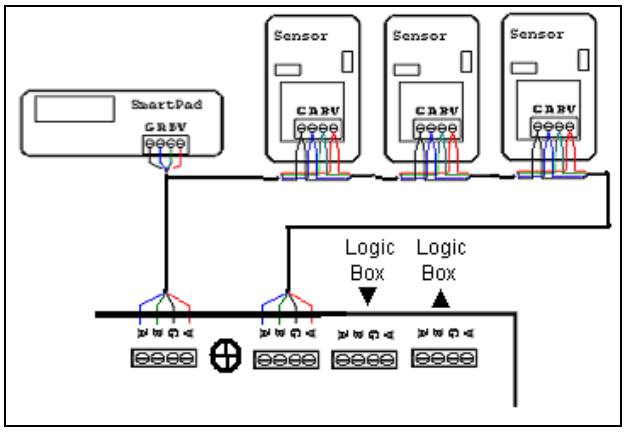
Cable Type	RS422 / RS485 Data Cable
Number Of Cores	4
Core Strands	7 / 0.2
Cable O-D	3.4mm
Conductor Material	Tinned Copper

Reel Length	RS Stock no.
500 Meter	528-2178

Supplier

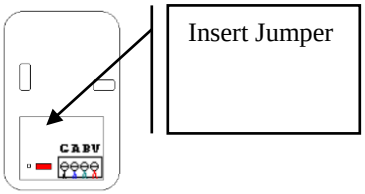
RS Components
Web: www.rswww.com
Tel: UK Orderline: 08457 201201
Tel: UK Online Help: 01536 444222

2.1.3 Communication Connection – Pin Outs



2.1.4 Termination

Last Device - Insert 120 ohm Termination Jumper



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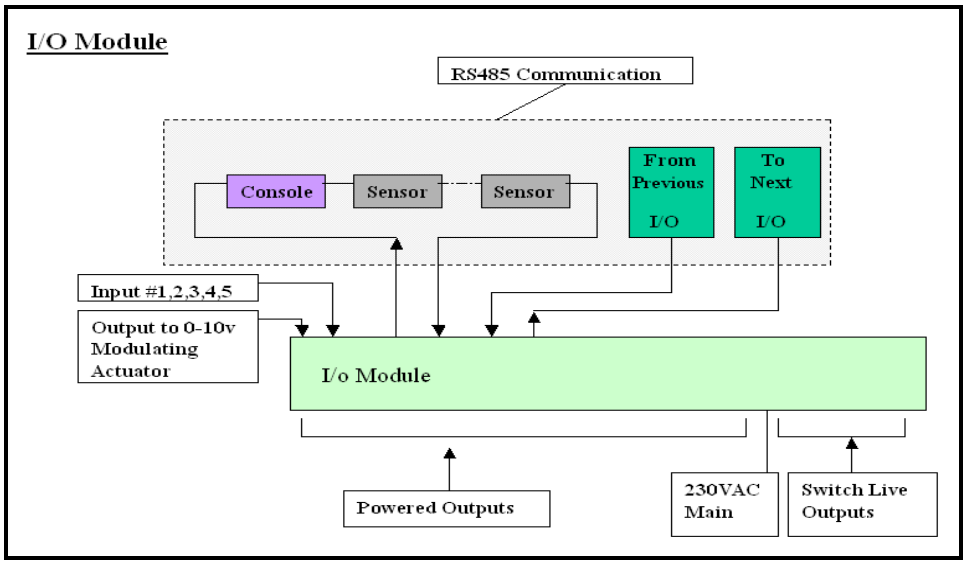
2.2 Logic I/O Unit Wiring

2.2.1 I/ O Wiring (Rev 11)



Powered Outputs	Output Voltage	220v AC or 24 v AC
	Fuse	Pairs
	Max Load	2 Amps
	Terminations Per Relay	3
Switch Live	Max Load	4 Amp
	Facility to convert to Individual Powered Outputs	Yes
Inputs	Type	Volt Free
	Satisfied (Short Circuit)	S/C
	Not Satisfied (Open Circuit)	O/C
Modulation Actuator Output (0-10v)	Output	0-10v
	Supply	24v AC (+/- 10%)
	Max Supply Load	3 Watts
Communications	Communications	RS485
	Range	1500 M
	Max qty linked to a console	1 to 8
Supply Voltage	Supply Voltage / Frequency	220v AC (50/60 Hz)
	Fuse (Slow Blow)	1Amp
Dimensions (In mm)		D (60), L 300, H 200
LED Indicators		Yes
Boiler Interlock		Yes

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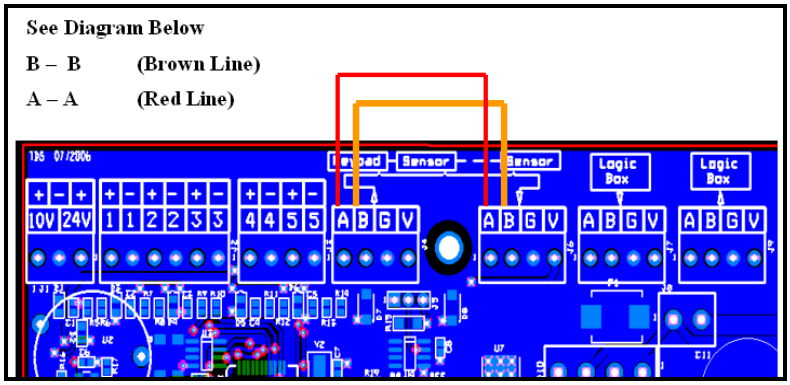
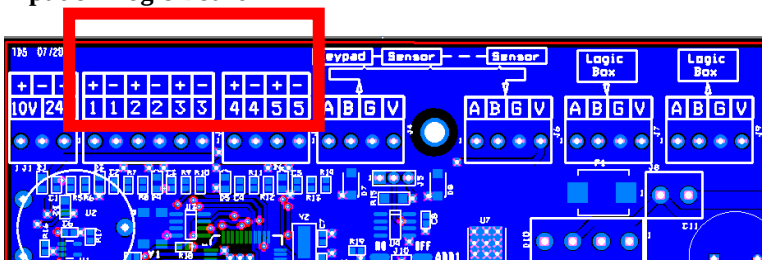
2.2.2 Wiring a Logic Box with no Sensors or console

If no console or sensor connected to a logic box the RS485 network connection must be jumper



2.2.3 Wiring Inputs

Input on Logic Board



Comments
All inputs must be VOLT FREE

Operation
Inputs can be use at Activation, Overrides or Enables
Input are operate similar to stat

Example:
Input signal from cylinder stat is used to overriding a pump, lets use input I on Logic Box 1 (I1:1)
If the cylinder is not satisfied the input should be short circuited (e.g. input [1+] [1-] joined)
When the cylinder is satisfied the input should go open circuit (e.g. input [1+] [1-] unconnected)

Summary
Call for Heat = Short Circuit
Satisfied = Open Circuit

Technical Comment
The logic board set the input High (+5v).
If Open Circuit or nothing attached the input are activate
If Closed Circuit the input is de-activate (Satisfies)

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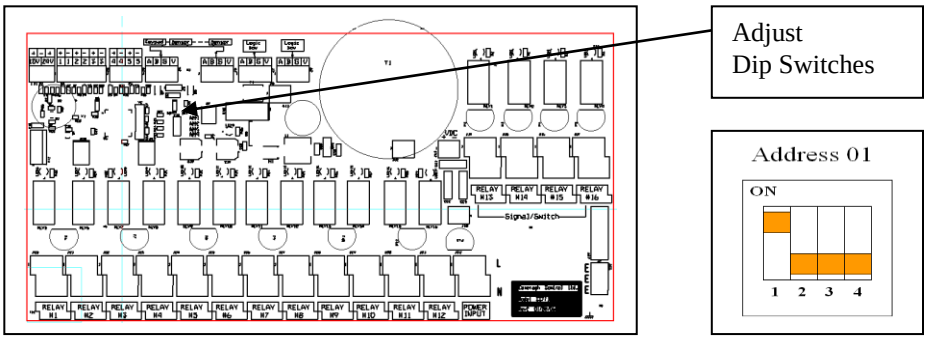
2.2.4 Addressing I/O Module

I/O Addressing (Rev 11)



Dip Switch Table

Logic Box Number	Dip Switch Settings			
	1	2	3	4
1	ON	OFF	OFF	OFF
2	OFF	ON	OFF	OFF
3	OFF	OFF	ON	OFF
4	OFF	OFF	OFF	ON
5	ON	OFF	OFF	ON
6	OFF	ON	OFF	ON
7	ON	ON	OFF	ON
8	ON	OFF	ON	ON

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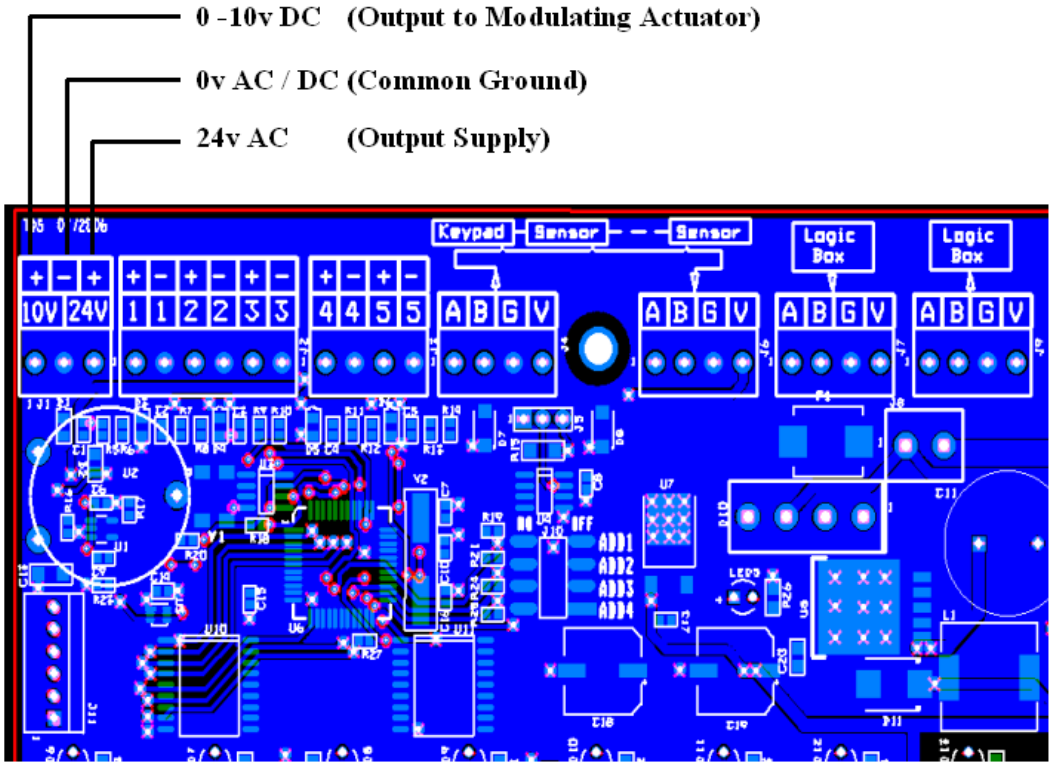
2.2.5 Modulation Actuator Output

Overview: **Weather Compensation Facility via 0-10v output**
Software algorithms compare the External Temp, Max External Temp, Max Flow Temp, Min Flow Temp and derive the required flow temp and the desired flow temp is achieved by regulating the flow temp via the 0-10v output.
This output regulates a Modulating Actuator on the manifold. (Modulating Actuator not included)
The system is Self-Compensating via a manifold pipe stat.

Specifications

Supply Output	24v AC (± 10%)
Max Load	3 Watt
Modulation Output	0v 10v DC

Connections
Outline below are the relevent connection



3.

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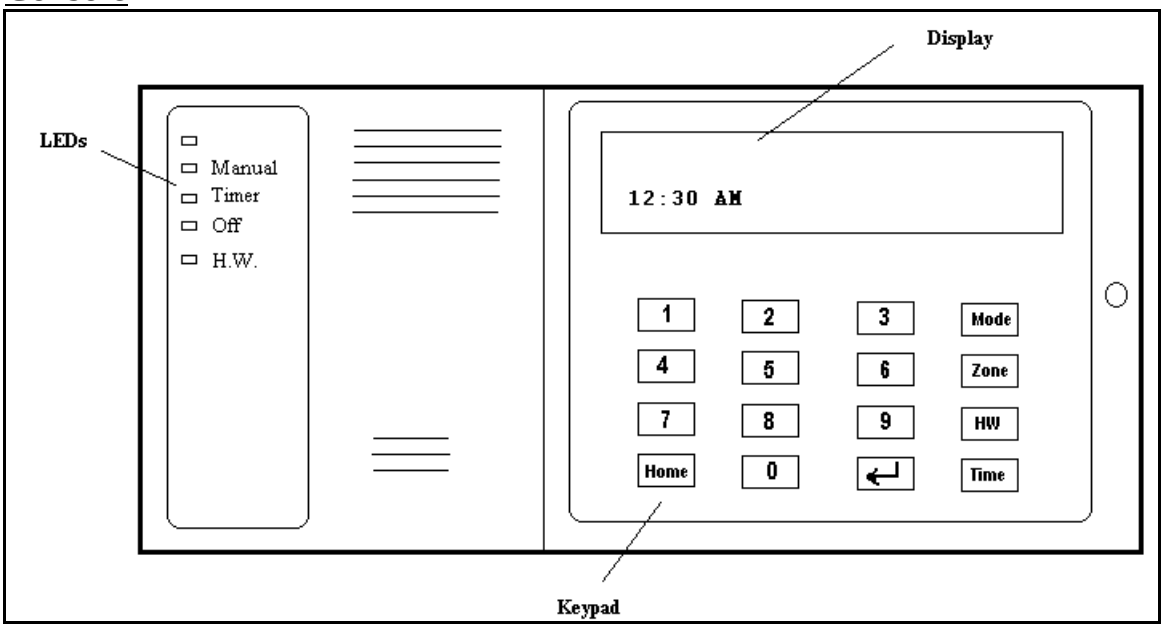
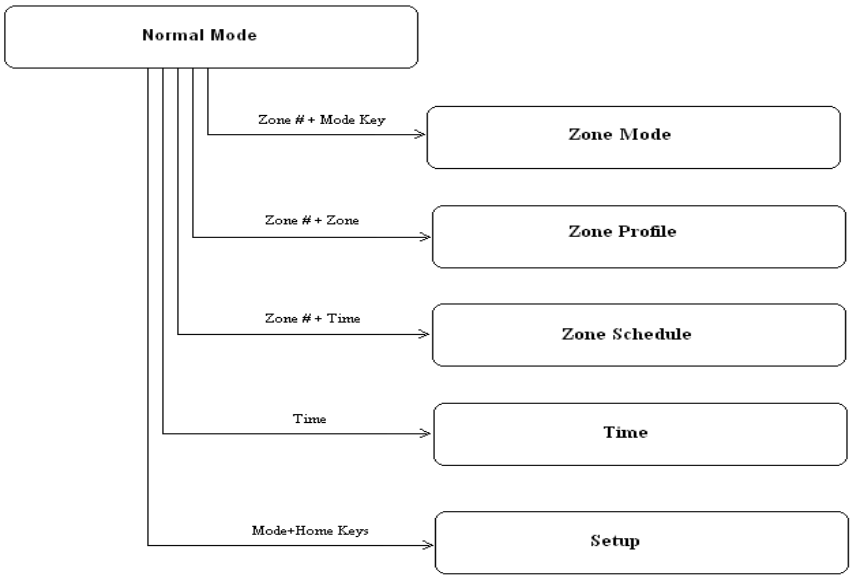
4. Console



There are 3 Modes of Operation:

1. Normal (End User)
2. Setup
3. Calibration.

Navigation between the modes is illustrated as follows:



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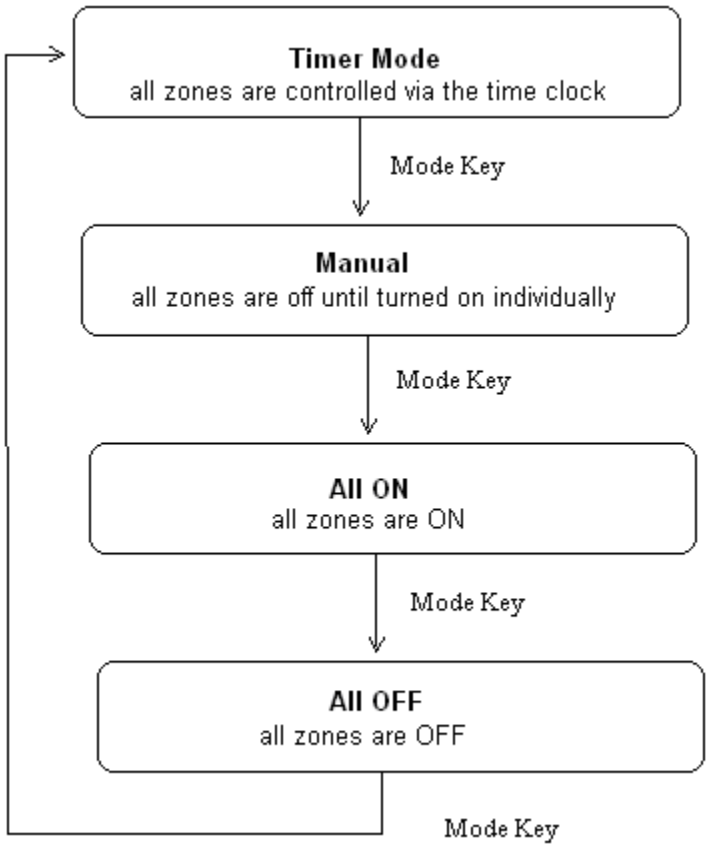
3.1 Normal (End User) Mode of Operation

3.1.1 Mode Control

The system has 4 zone modes of operation. The MODE key is used to switch between modes. An LED on the console indicated the current mode.



3.1.2 HW (DHW Boost)

The HW key turns the DHW Boost ON/OFF.
An LED on the console indicates the state of the DHW boost.
Boost is active for 2 hours.

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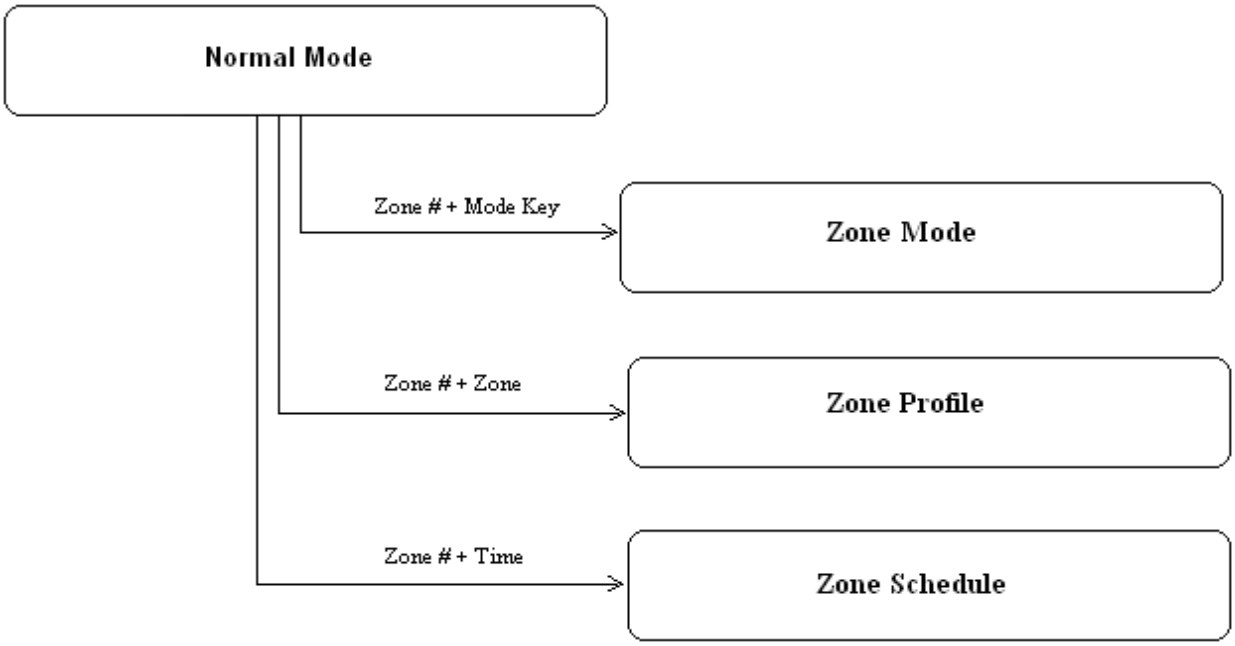
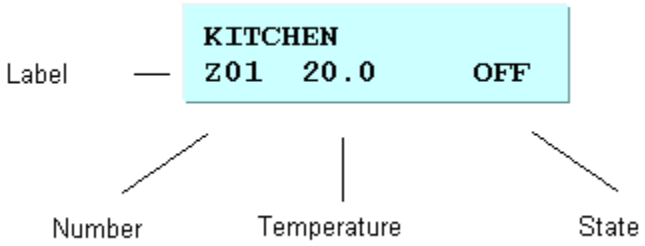
3.1.3 Zone Control

Heating is controlled through the zone Mode, Profile and Schedule. Selecting a zone number via the numerical keypad followed by the Mode key allows access to the zone mode. Likewise, for the zone profile and schedule.



The zone label, number, temperature and state are displayed when a zone number is selected.



"ZONE ##" will be displayed in the place of an un-programmed label. The  key toggles the zone state between OFF/ON. "?" is displayed in place of the temperature if communication with the sensor cannot be established.

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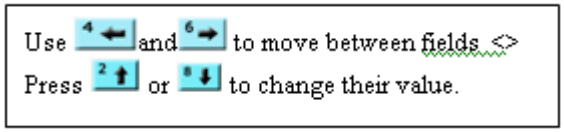
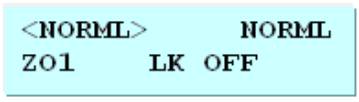
3.1.4 Zone Mode

Zone Mode is entered by selecting the Zone followed by the Mode key. In Zone Mode Optimization, Scheduling Override and Lockout may be changed.

Optimisation is a mechanism of ensuring zone temperatures are achieved according to the programmed schedule. Scheduling Override allows “disabling” or “stopping” of a zone. Lockout disabled zone normal sensor key functions.



Optimisation	This is a mechanism of ensuring zone temperatures are achieved according to the programmed schedule.
NORML	No optimisation - Follows the timed schedule for the Zone
CRV 1	Preheats Zone **1 Hr** prior to the scheduled ON time [c1 displayed on sensor when overriding ON time]
CRV 2	Preheats Zone **2 Hr** prior to the scheduled ON time [c2 displayed on sensor when overriding ON time]
CRV 3	Preheats Zone **3 Hr** prior to the scheduled ON time [c3 displayed on sensor when overriding ON time]
AUTO	This setting will self-learn the thermal inertia of the room and adjust the start time from memory [cA displayed on sensor when overriding ON time]



Scheduling	
NORML	Follows Zone Schedule
DIS	Frost Protection Mode. Sensor is blanked. Revert to Normal at console or press power button at stat
STOP	Ignores Schedule – Move to Set Back Sensor displays SB

Zone Sensor Button Lockout	
LK ON	Sensor Buttons will **not** respond (Public Areas)
LK OFF	Sensor Buttons will respond
Lockout	Allows the zone to function as normal but prevents the settings being altered from the zone sensor.

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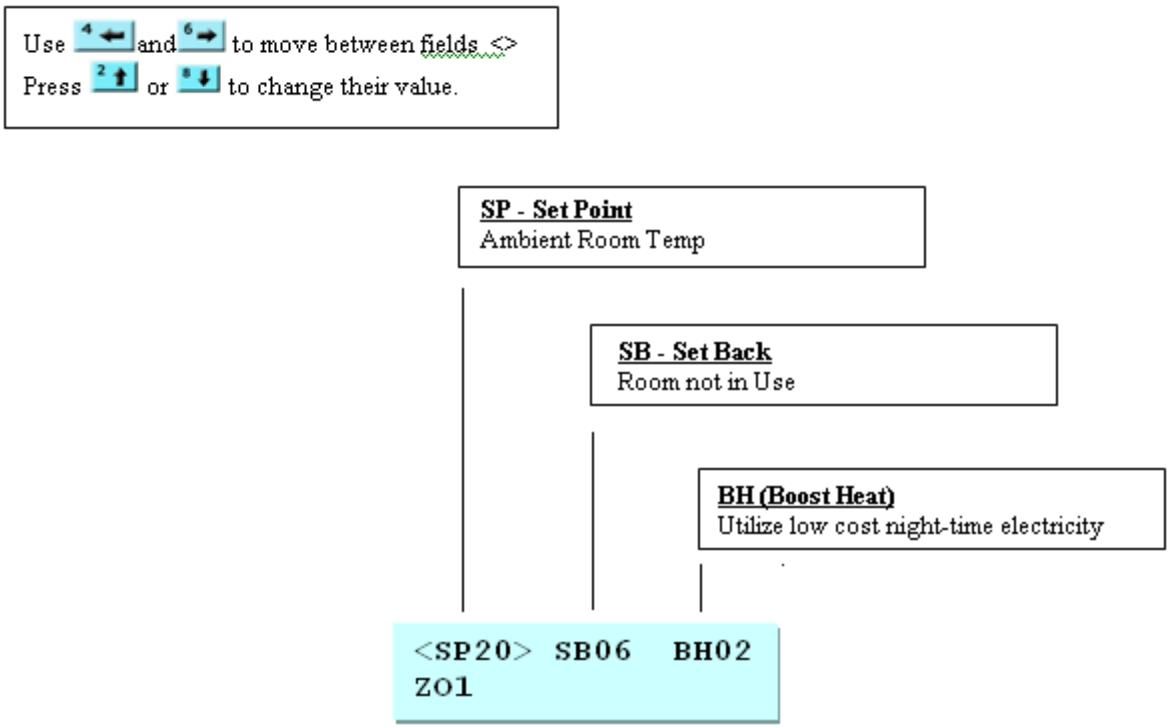
4.1.4 Zone Temp

Zone Profile is entered by selecting the Zone followed by the Zone key. In Zone Profile the Set-point, Set-Back and Boost Heat changed. Set-Back and Boost Heat are not applicable when the sensor is configures for DHW



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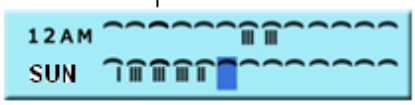
4.1.5 Zone Scheduling

Zone Scheduling is entered by selecting the zone followed by the Time key. Each zone maintains a 7day/24 hour timer schedule.

Use the 4 ← and 6 → buttons to move to the desired hour

Press HW to select **Boost Heat**. Note ^ symbol will be displayed for that hour.



Press ↵ to move to the next **Zone**

Press 8 ↓ to move to the next **Day**

To time heat for the 1st 20 minute period press 1	Shown as ^
To time heat for the 2nd 20 minute period press 2	Shown as ^
To time heat for the 3rd 20 minute period press 3	Shown as ^
To time heat for the entire hour press 5	Shown as ^

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3.2 Setup/Diagnostic

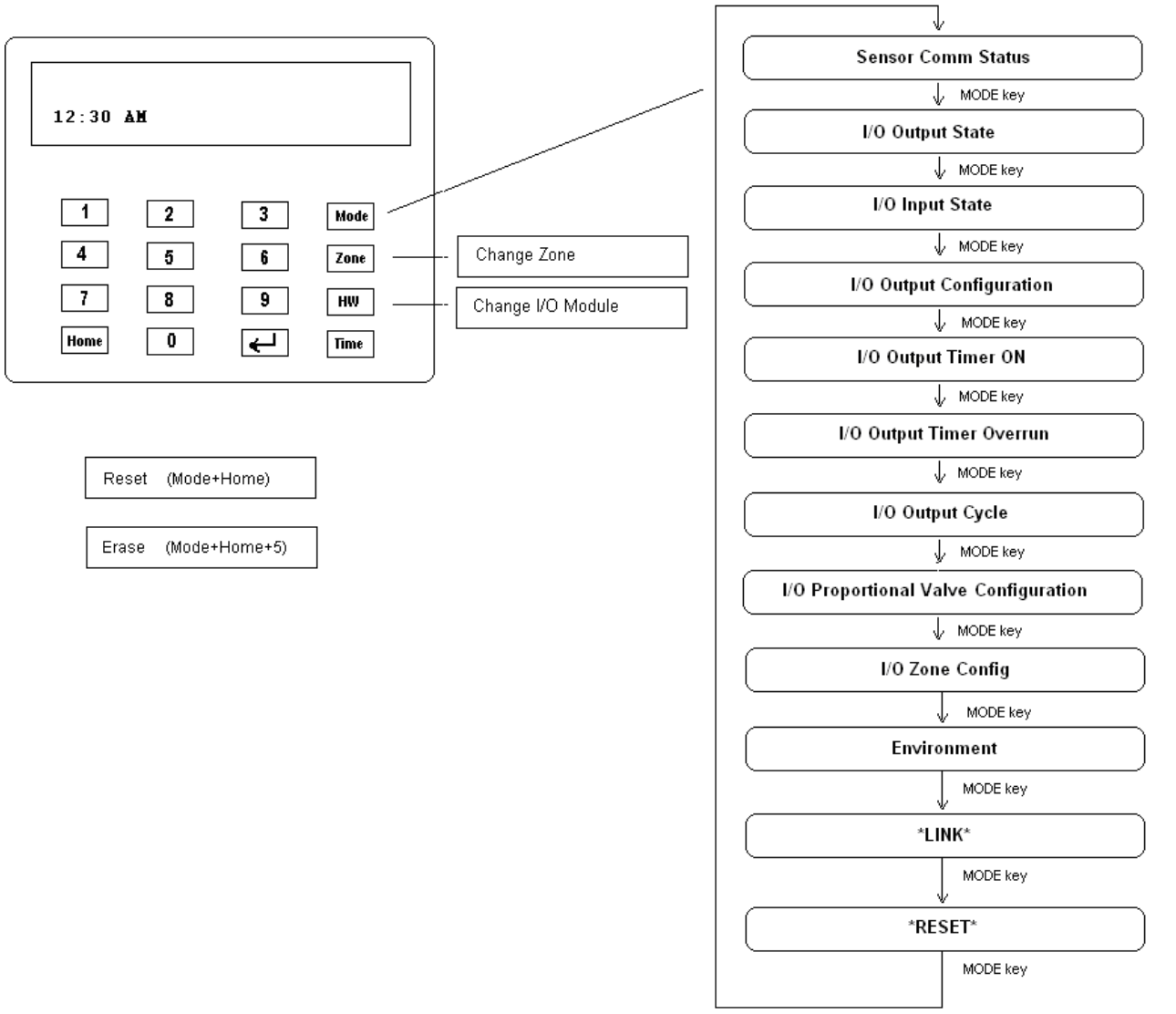
3.2.1 Accessing Setup/Diagnostic

The Setup/Diagnostic menus are entered by simultaneously pressing the MODE and HOME keys.

The MODE key changes the context (e.g. moving from Sensor Communication States to I/O module output statues).

Simultaneously pressing the HOME and MODE keys will force a reset. Simultaneously pressing the HOME and MODE and "5" keys will force a complete system erase.

The ZONE key increments the zone when viewing zone configuration information and the HW key increments the module when viewing module related data (e.g. I/O Output State or I/O Input State etc).



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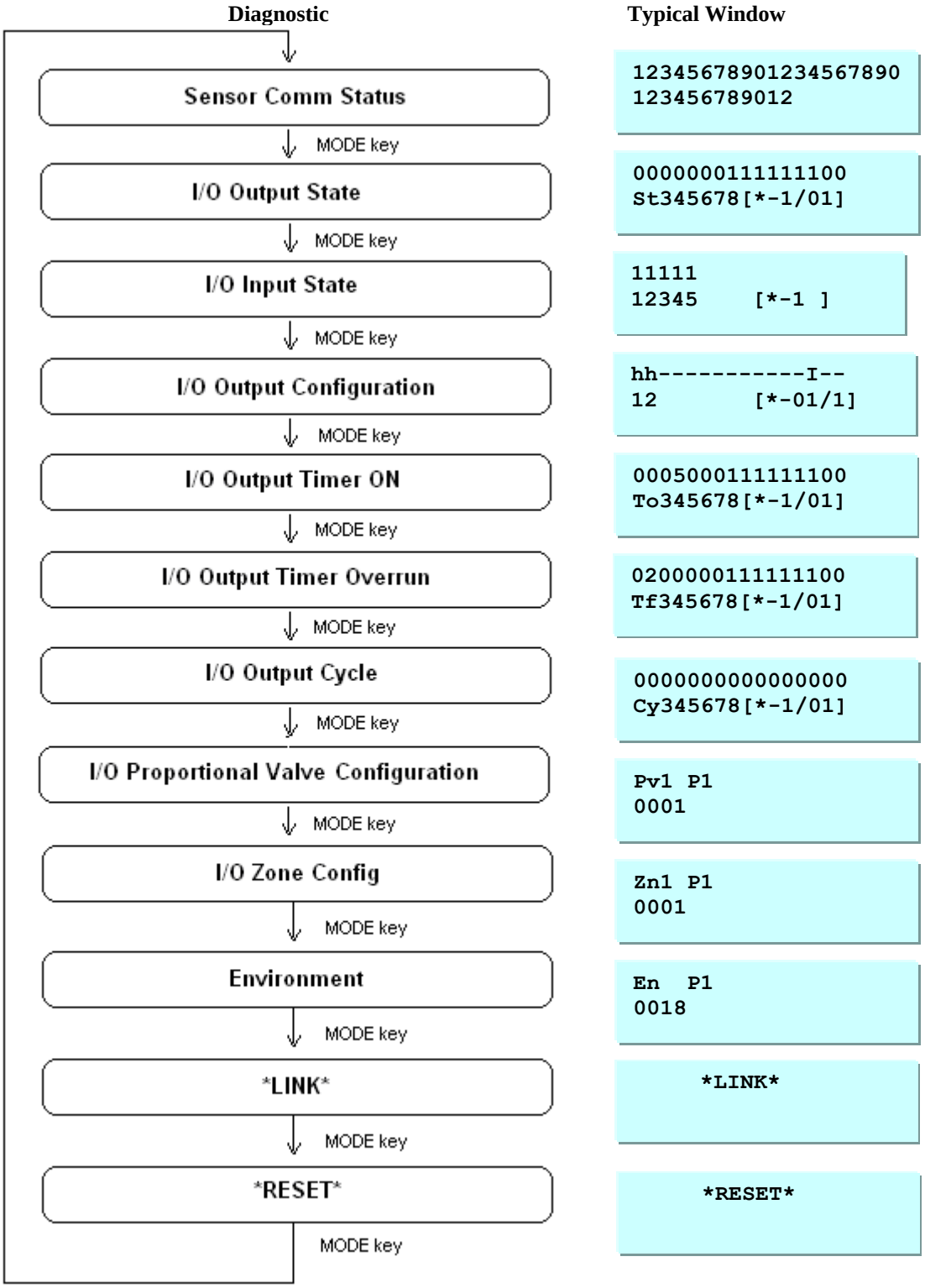

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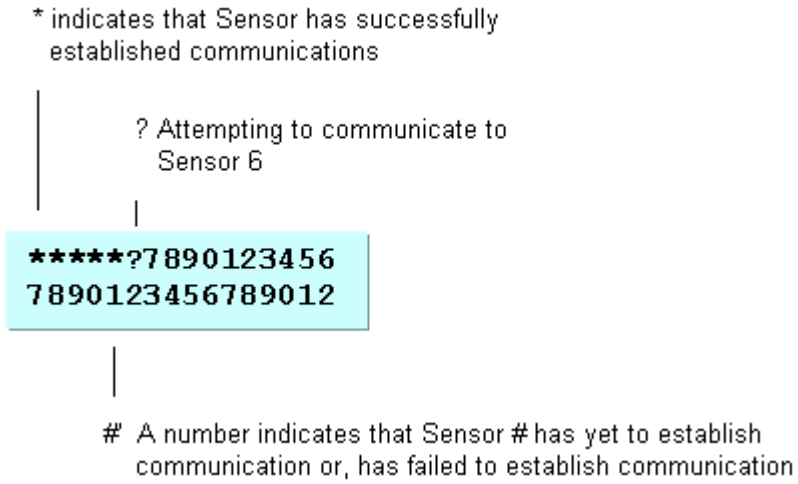
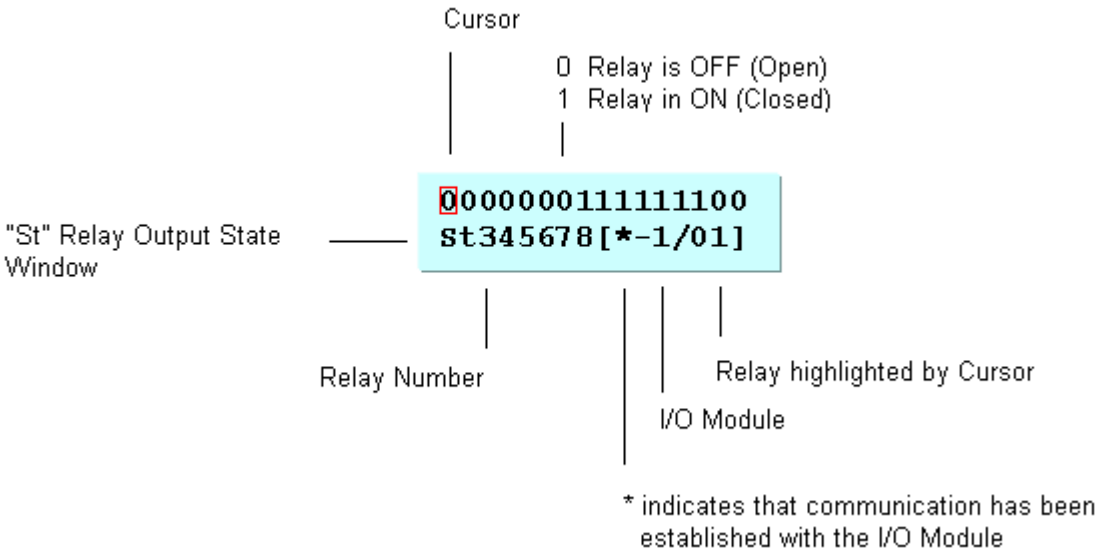
3.2.2 Sensor Comm Status



3.2.3 I/O Output State



Press 4 ← and 6 → to move the cursor. Press ↵ to Activate or Deactivate a relay.

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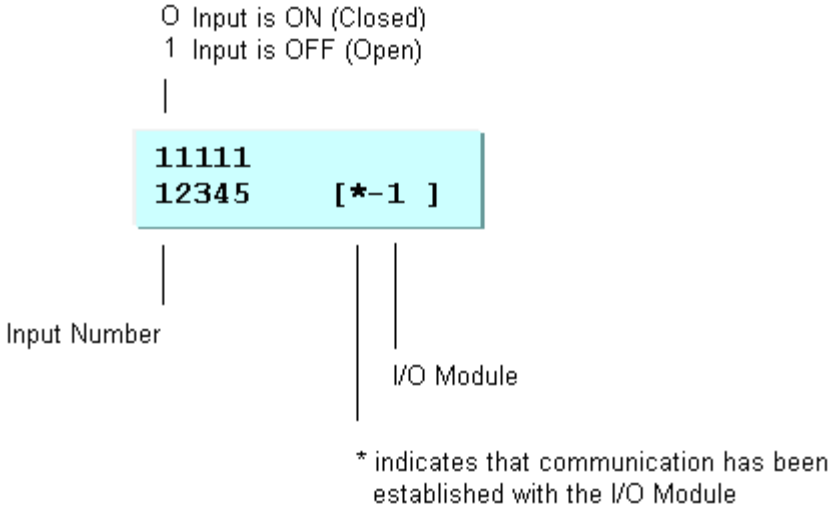
3.2.4 I/O Input State



Press HW to change I/O Module

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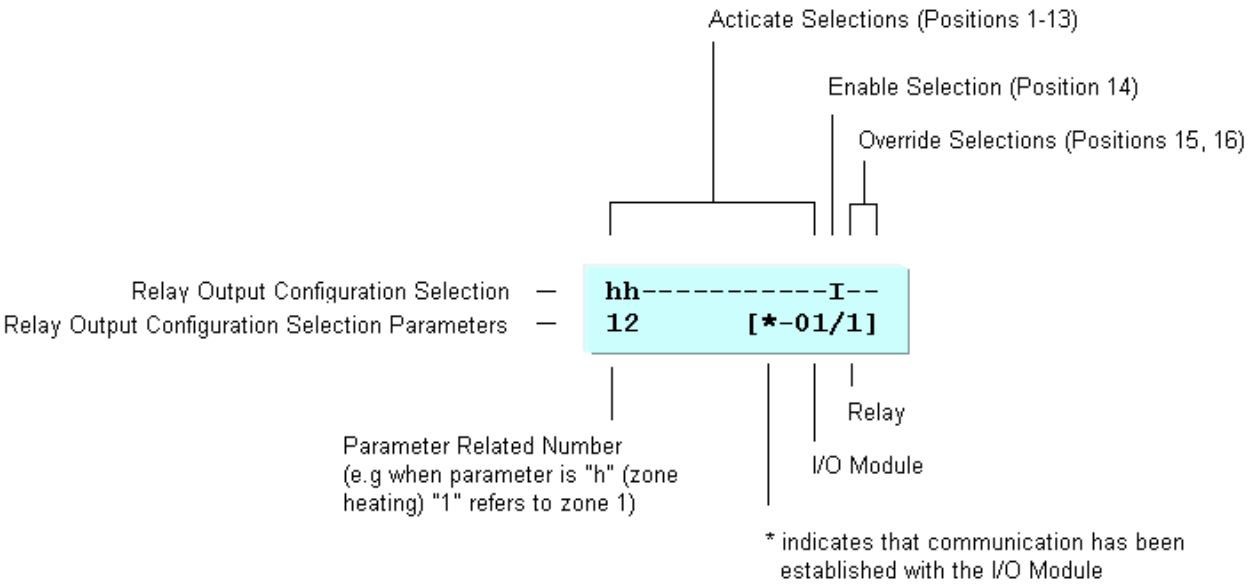
3.2.5 I/O Output Relay Configuration



Press HW to change I/O Module. Press 4 ← and 6 → to change I/O Module Relay. Press 7 and 9 to change I/O Module Relay Configuration position.

Any of 13 Activation selections will activate a relay. An Enable, if programmed, enables activations turn on a relay. Either Override, if programmed, will override activations and turn off a relay.

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Configuration Selections

The following table identifies the Configuration Selections and associated parameters. Refer to the "*iCon System Relay Output Configuration Selections*" document for a detailed description of each selection.

Configuration Selection	**Description**	**Configuration Selection Parameters**	
Press  to Change		Press  to Change	Press  to Change
h	Zone Space Heating	Zone Number (1-32)	
c	Zone Space Cooling	Zone Number (1-32)	
|	Zone Space Cooling Fan 1	Zone Number (1-32)	
||	Zone Space Cooling Fan 2	Zone Number (1-32)	
|||	Zone Space Cooling Fan 3	Zone Number (1-32)	
&	Zone Space Heating & Cooling	Zone Number (1-32)	
D	Zone DHW	Zone Number (1-32)	
E	Zone DHW Energy Saver	Zone Number (1-32)	
A	Zone Sensor Channel 1 Set-point	Zone Number (1-32)	
B	Zone Sensor Channel 2 Set-point	Zone Number (1-32)	
I	I/O Input	Input (1-5)	I/O (1-8)
R	I/O Relay	Relay (1-16)	I/O (1-8)
P	Proportional Valve minimum		I/O (1-8)
H	Boost		
C	Space Heating & Cooling		

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Configuration Selection Detailed Description

Note: Ch1 measures the AIR temperature, Ch2 measures the PROBE temperature.

Symbol	Manager Label	ON State Requirements
‘ ‘	Blank	Unused
h	Heat	**SENSOR TYPE: UFH/RAD**

Minimum Heating Set point
If Set-Point (SP) or the Set-Point minus the Set-Back (SP-SB) or the Set-Point plus the Boost (SP+BH) results in a value that is less then the programmed Minimum Heating Temp then the value is clamped to the Minimum Heating Temp value.

Heating Optimization
An optimization offset is included in setting the zone state when the system is in the timer mode and optimization is enabled and the zone is OFF.

Secondary (e.g. Screed) ON (SP) OVERRIDE
For ALL Sensor States**,** if Secondary Minimum is programmed (is greater than 0), and Ch2 is less then the Secondary Minimum then Override ON

i.e. During ON (SP) time
If a zone has reached it’s air SP but the floor is below it’s “Min Screed” value, then the zone will continue to request heat (actuator will remain open).
Once the screed temp has reached it’s “Min Screed” value, (& air temp is above SP) then the zone will switch off.
If the air SP temp has not been reached but the screed temp goes above the “Max Screed” temp the zone will switch off, (actuator will close).

Secondary (e.g. Screed) OFF (SB) OVERRIDE
For ALL Sensor States**,** if Secondary Maximum is programmed (is greater than 0), and Ch2 is greater then the Secondary Maximum turn override OFF

i.e. During OFF (SB) time
If a zone has reached it’s air SB but the floor is below it’s “Min Screed” value, then the zone will continue to request heat (actuator will remain open).
Once the screed temp has reached it’s “Min Screed” value, (& air temp is above SB) then the zone will switch off.
If the air SB temp has not been reached but the screed temp goes above the “Max Screed” temp the zone will switch off, (actuator will close).

Screed Min & Max are *not* Time related
If “Min Screed” is set, the system will always kept the floor at the min screed temp.
If “Max Screed” is set, the system will always kept the floor below the max screed temp.
If “Max & Min Screed” is set, the system will always kept the floor between the max &min screed temp.

SENSOR STATE is DISABLE
Ch1 Temperature is less than the Frost Protection

SENSOR STATE is OFF (STOP)
Ch1 (Air) temperature is greater than the Set-Point (SP) minus the Set-Back (SB) minus the

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Optimization Offset AND greater than the Minimum Temperature.

SENSOR STATE is ON
Ch1 (Air) temperature is greater than the Set-Point (SP) AND greater than the Minimum Temperature.

SENSOR STATE is ON with Boost Heat
Ch1 (Air) temperature is greater than the Set-Point (SP) plus the Boost Heat (BH) AND greater than the Minimum Temperature.

SENSOR TYPE: PROBE

Heating Optimization
An optimization offset is included in setting the zone state when the system is in the timer mode and optimization is enabled and the zone is OFF.

SENSOR STATE is DISABLE
Ch2 (Probe) temperature is greater than the Frost Protection

SENSOR STATE is OFF (STOP)
Ch2 (Probe) temperature is greater than the Set-Point (SP) minus the Set-Back (SB) minus the Optimization Offset

SENSOR STATE is ON
Ch2 (Probe) temperature is greater than the Set-Point (SP)

SENSOR STATE is ON with Boost Heat
Ch2 (Probe) temperature is greater than the Set-Point (SP) plus the Boost Heat (BH).

Minimum Cooling Set point
If Set-Point (SP) or the Set-Point plus the DeadBand (SP+DB) results in a value that is less than the programmed Minimum Cooling Temp then the value is clamped to the Minimum Cooling Temp value.

Enabling Cooling
Cooling operation is enabled when the minimum Cooling Set-Point is set (a value greater than 0) AND Cooling has been locally enabled at the sensor

c	Cl	**Zone Air Cooling** Zone temperature is greater than the Set-Point (SP) plus the A/C Deadband
|	Cl Fan 1	**Zone Air Cooling Fan 1** Zone temperature is greater than the Set-Point (SP) plus the Deadband plus the Cl Fan 1 Offset
||	Cl Fan 2	**Zone Air Cooling Fan 2** Zone temperature is greater than the Set-Point (SP) plus the Deadband plus the Cl Fan 2 Offset
|||	Cl Fan 3	**Zone Air Cooling Fan 3** Zone temperature is greater than the Set-Point (SP) plus the Deadband plus the Cl Fan 3 Offset
&	Z-H/C	**Zone Heating & Cooling**

ANY zone calling for heat when **NO** zone is calling for cooling OR, **ANY** zone is calling for cooling.

(Note: Cooling has priority)

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D	DHW	**Zone DHW** **When Boost is OFF** Ch2 temperature is less than the Set-Point (SP) AND less then the DHW Max (Dh) AND the Zone is ON (or calling). **When Boost is ON** Ch2 temperature is less than 70 Deg C AND less then the DHW Max (Dh) AND the Zone is ON (or calling). **Override OFF** If the Temperature drops below the Energy Saver set-point the output will turn OFF.
e	DHW-E	D**HW Energy Saver** Ch2 temperature is less than the Energy Saver Set-Point (Es) AND less then the DHW Max (Dh) AND the Zone is ON (or calling).
A	Ch1 SP	C**h1 (Air) Set-Point** Ch1 temperature is less than the Set-Point (SH). The frost protection, minimum temperature parameters, secondary minimum & maximum, and zone scheduling are ignored.
B	Ch2 SP	**Ch2 (Aux) Set-Point** Ch2 temperature is less than the Set-Point (SH). The frost protection, minimum temperature parameters, secondary minimum & maximum, and zone scheduling are ignored.
C	H/C	**Heating & Cooling** **ANY** zone is calling for cooling**.**
I	Input	Input (1-5) on Logic Box (1-8) is ON.
R	Relay	Relay (1-16) on Logic Box (1-8) is ON. *A I/O module MUST be used if a module relay uses Timer ON or Timer OFF*
f	Flow Temp	Flow Temp on Logic Box (1-8) is less then the minimum flow temp reference (if the Flow Temp Ref b is less than Flow Temp Ref a then Flow Temp Ref b is the minimum flow temp reference). The minimum flow temp reference from load line B is selected if a load-line switch-over active. The flow temp activation is deactivated if there is a loss of communication with the flow temp sensor.
H	HW Key	The Hot Water Boost is ON Hot Water Boost ON is indicated by the HW LED at the console.

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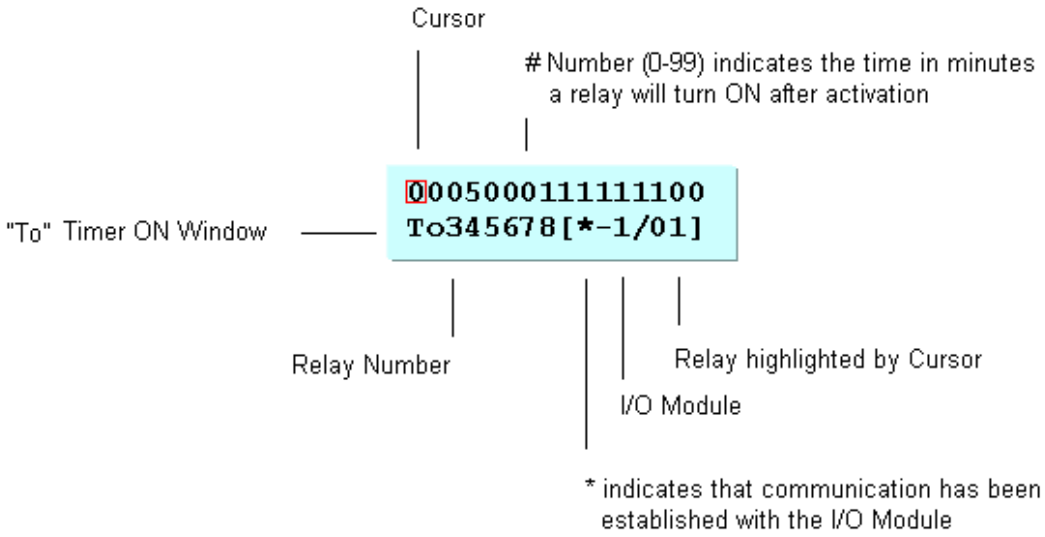
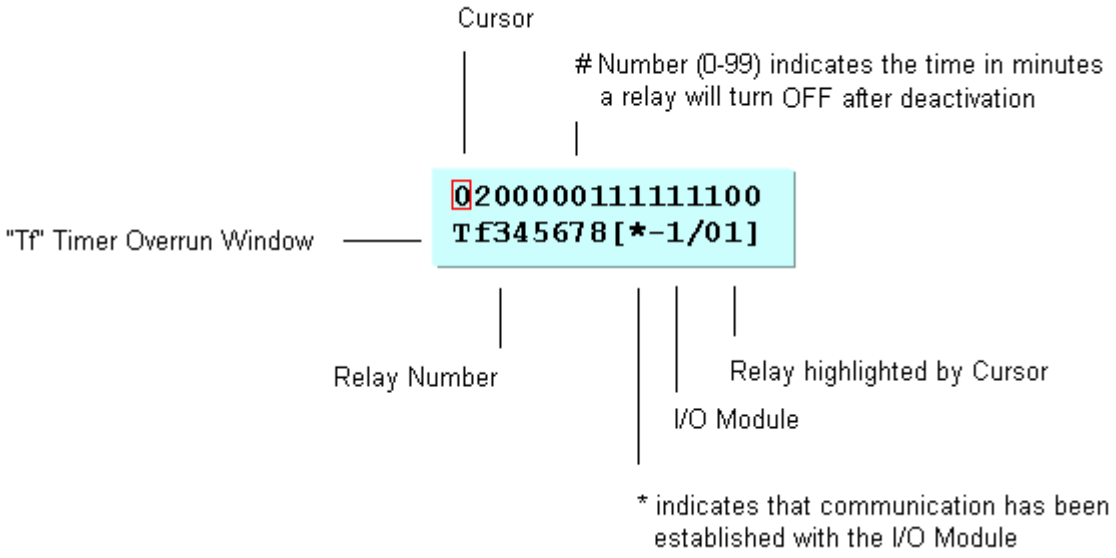
3.2.6 I/O Output Timer ON



Press HW to change I/O Module. Press 4 ← and 6 → to move the cursor.

An output transition will have a 30 second time response.

3.2.7 I/O Output Timer OFF (Overrun)



Press HW to change I/O Module. Press 4 ← and 6 → to move the cursor.

An output transition will have a 30 second time response.

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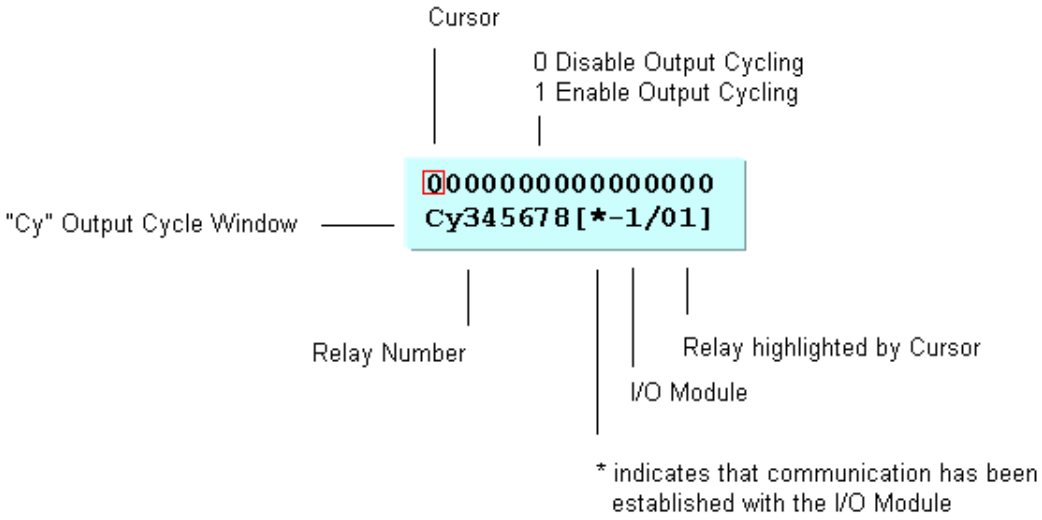
3.2.8 I/O Output Cycle



Press HW to change I/O Module. Press 4 ← and 6 → to move the cursor.

Operation

If relay has not been active for a period the system will automatically cycle the relay if the relay has be set to cycle

Intervals: 7 days

Duration: 30 Sec

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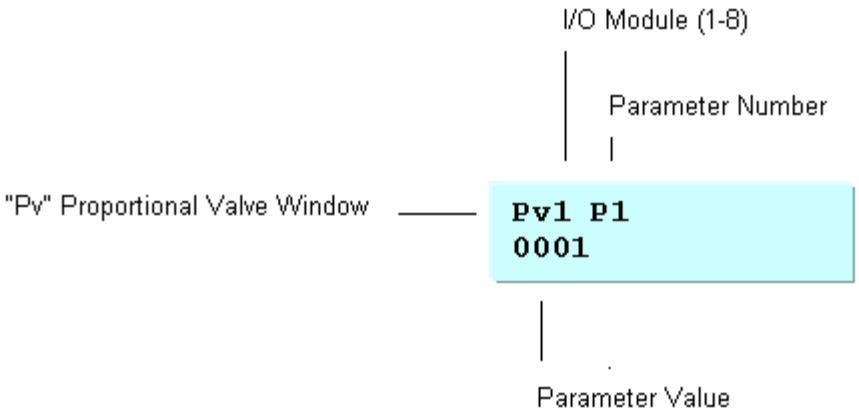
3.2.9 I/O Proportional Valve



Press HW to change I/O Module. Press ↵ to change the proportional valve parameter number. Use Numerical keys to enter the parameter value.

#	Load Line	Parameter	Valve
1	A	Reference Type 0 External Temperature Reference 1 Return Temperature 2 Zone Temperature 3 Hottest Underfloor Heating Zone	0-4
2	A	Flow Temp a (Min)	0-90
3	A	Flow Temp b (Max)	0-90
4	A	Ref a (Min) Type: 0 Value 1 Set-Point 2 Set-Point plus DeadBand 3 Set-Point plus DeadBand plus F1 4 Set-Point plus DeadBand plus F2 5 Set-Point plus DeadBand plus F3 6 Set-Point minus Set-Back	0-4
5	A	Ref a (Min)Value	0-90
6	A	Ref b (Max)Type: 0 Value 1 Set-Point 2 Set-Point plus DeadBand 3 Set-Point plus DeadBand plus F1 4 Set-Point plus DeadBand plus F2 5 Set-Point plus DeadBand plus F3 6 Set-Point minus Set-Back	0-4
7	A	Ref b (Max) Val	0-90
8	B	Reference Type 0 External Temperature Reference 1 Return Temperature	0-4

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		2 Zone Temperature	
		3 Hottest Underfloor Heating Zone	
9	B	Flow Temp a (Min)	0-90
10	B	Flow Temp b (Max)	0-90
11	B	Ref a (Min) Type:	0-4
		0 Value	
		1 Set-Point	
		2 Set-Point plus DeadBand	
		3 Set-Point plus DeadBand plus F1	
		4 Set-Point plus DeadBand plus F2	
		5 Set-Point plus DeadBand plus F3	
		6 Set-Point minus Set-Back	
12	B	Ref a (Min)Val	0-90
13	B	Ref b (Max) Type:	0-4
		0 Value	
		1 Set-Point	
		2 Set-Point plus DeadBand	
		3 Set-Point plus DeadBand plus F1	
		4 Set-Point plus DeadBand plus F2	
		5 Set-Point plus DeadBand plus F3	
		6 Set-Point minus Set-Back	
14	B	Ref b (Max) Val	0-90
15	A&B	Zone	0-32
16	A&B	0 No Switch	
		1 Cooling ON	
		2 Zone ON	
		3 Zone OFF	
		Zone ON/OFF refers o the requested zone state (e.g. a scheduled zone ON or manually turning the zone ON). It does not activate or de-activate based on whether or not a zone is calling for heat (A zone may be ON but will only call for heat when the zone temperature drops below the set-point).	
		4 Relay 16 ON	
		Relay 16 refers to the relay on the I/O module associated with the Proportional valve.	
		5 Input 1 ON	
		Input 1 refers to the Input on the I/O module associated with the Proportional valve.	
17	A&B	Curve	0
18	A&B	DAC MIN	0-90

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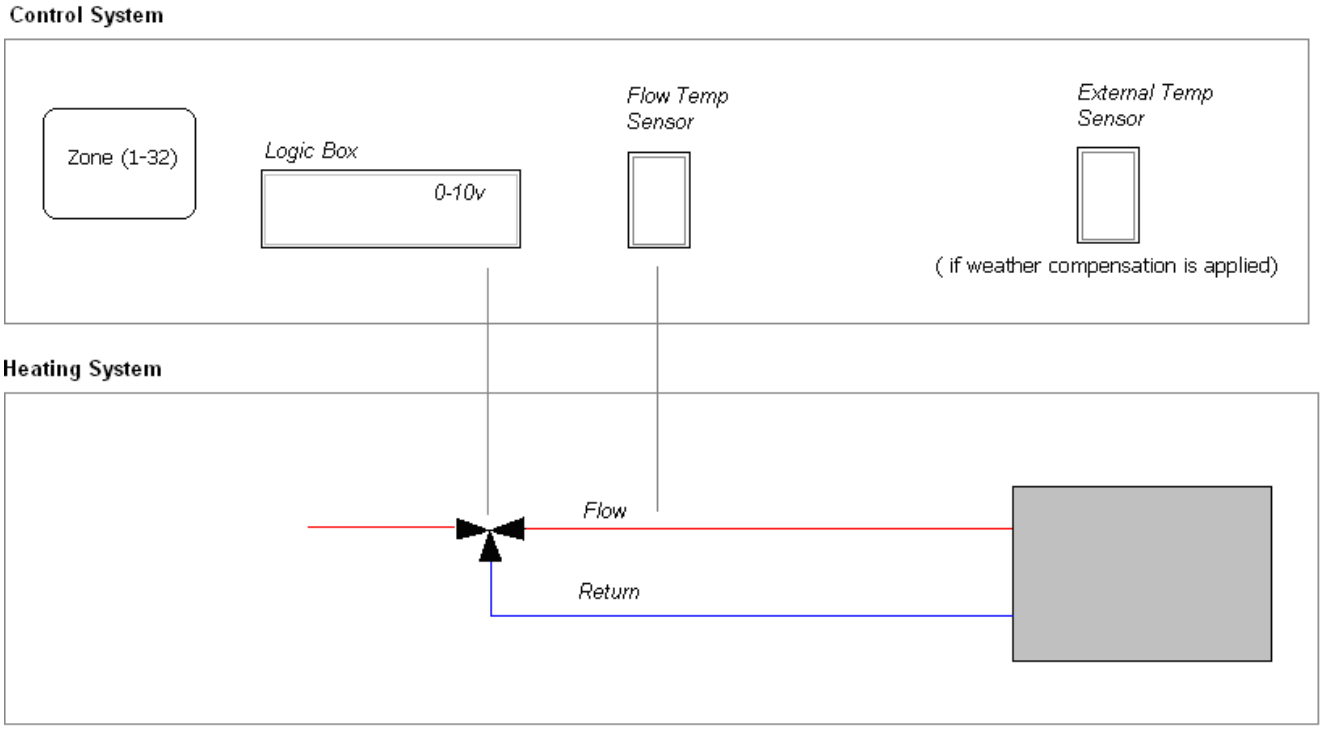
Proportional Valve Operation



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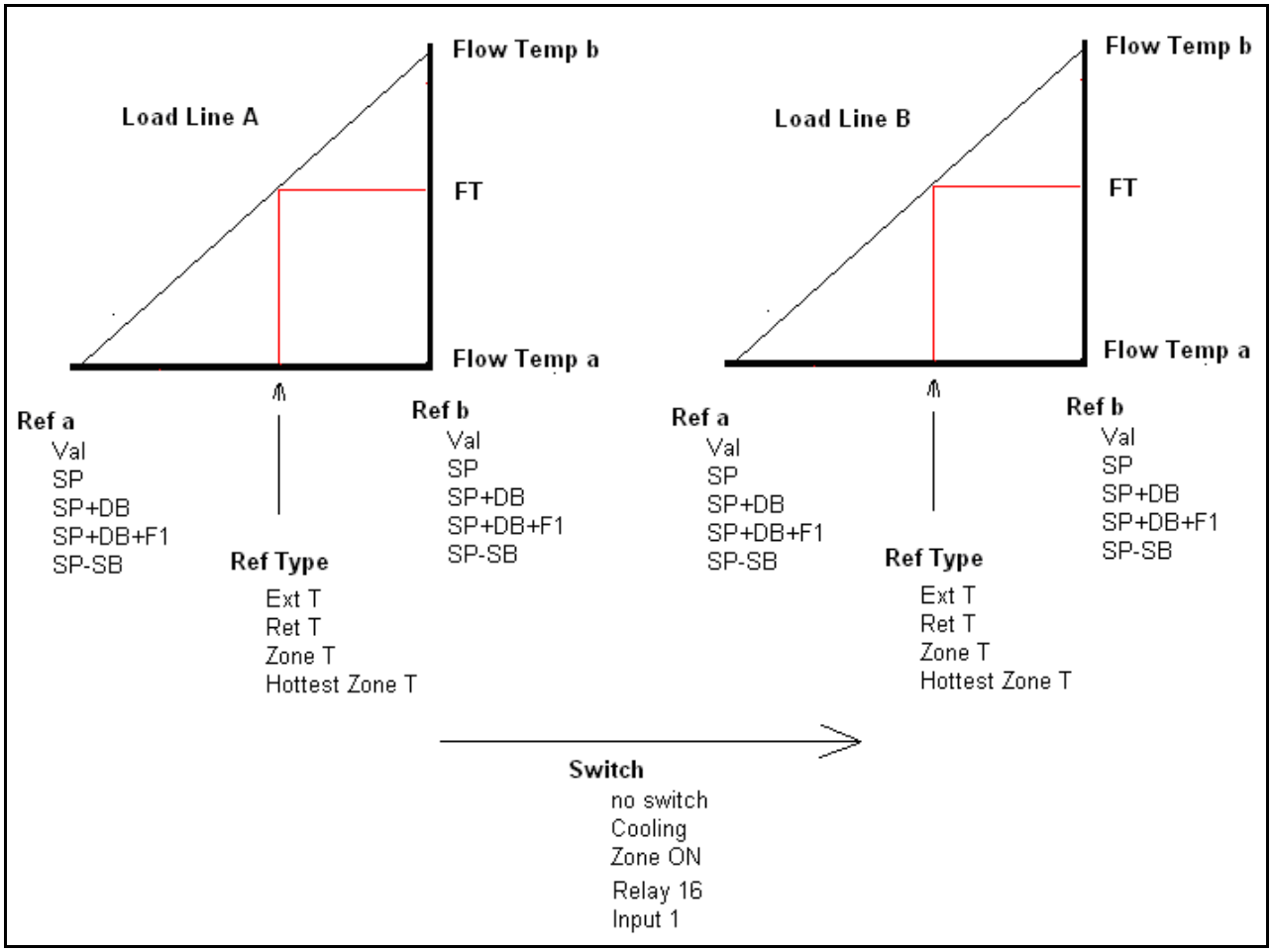

Care should be taken in a configuration using H/C zones in conjunction with the Cooling flag to cool a zoning arrangement using a geothermal heat-pump. The cooling flag is set when any H&C zone calls for cooling. A H&C zone may be UFH, RAD of PROBE type zone but only the UFH type zones will be scanned for the Hottest zone.

The 0-10v proportional valve (mixer) output is controlled by the difference between the pipe flow temperature and the calculated flow temperature.

Delta T = Pipe Flow Temperature – Required Calculated Flow Temperature

Voltage deviations versus Delta T:

Delta T	**Adjustment DAC Counts**	**Adjustment Voltage**
>3 Deg C	-20	-0.8 v
<3 Deg C	20	0.8 v
>2 Deg C	-10	-0.4 v
<2 Deg C	10	0.4v
>1 Deg C	-5	-0.2 v
<1 Deg C	5	0.4v

Table 1.0 Proportional Valve Adjustment for Delta T

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A utility is provided in the iCon System Manager that enables proportional valve output emulation (under "Tools" select "Emulation – Proportional Valve). Actual proportional valve operation in real-time may be monitored by selecting the "Remote" checkbox.

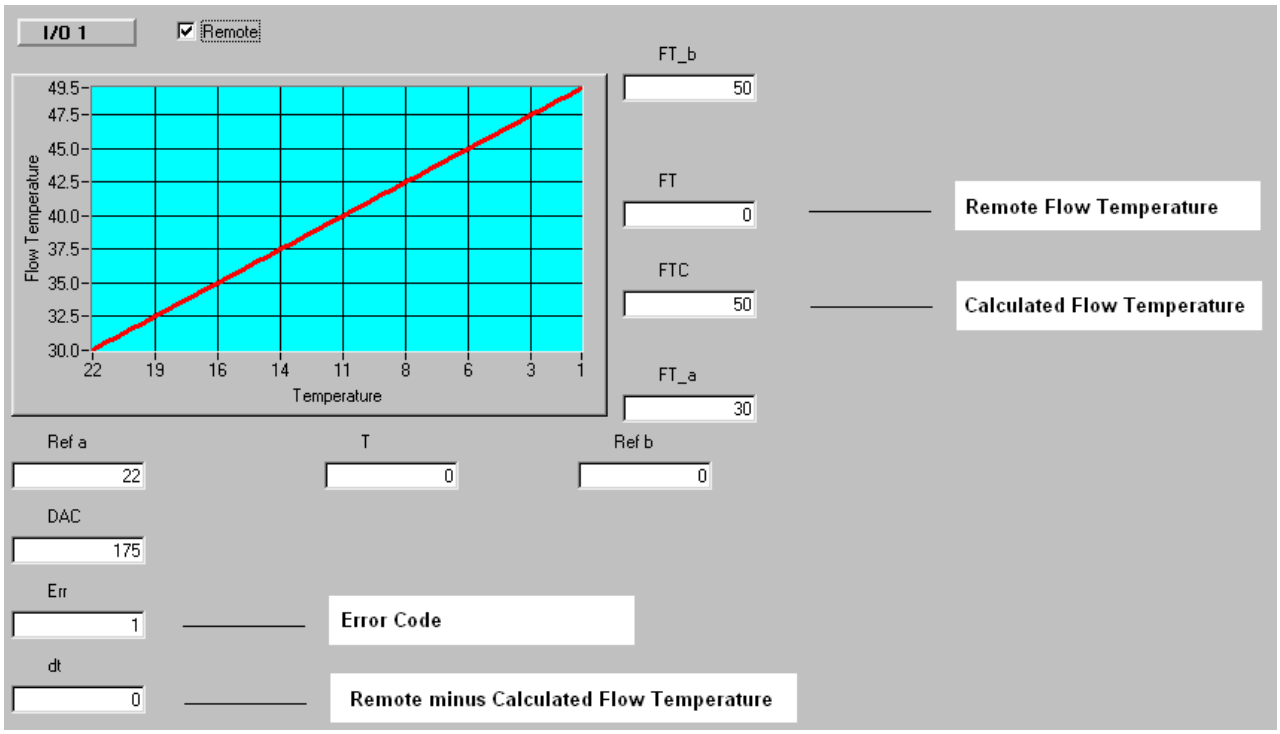

Figure 1 Proportional Valve Emulation and Remote Monitoring

Err #	Error	Proportional Valve Output
0	No Error	
1	Loss of communication to the Flow Temperature Sensor	5v (Half Open)
2	Flow Temperature Exceeds the Max Flow Heating Flow Temperature	0v (Full Close)
	The greater of Flow Temp reference is used (i.e if Flow Temp reference "a" is greater than the Flow Temp reference "a"). Flow Temp references are used from the active load line (i.e Load-line "a" references are used if switch over is not active). This test does not apply when the reference type is the "hottest zone."	
3	Loss of communication to the Return Temperature Sensor.	Flow Temp set to Flow Temp b
4	Loss of communication to the External Temperature Sensor	Flow Temp set to Flow Temp b
5	Loss of communication to the Zone Temperature Sensor	Flow Temp remains unchanged
6	The reference type "Hottest Zone" but no hot zone has been detected.	Flow Temp remains unchanged
7	The Reference temp (External, Return of Zone) is greater than ref b when ref b is greater than ref a	Reference Temp is clamped to ref b
8	The Reference temp (External, Return of Zone) is less than ref a when ref b is greater than ref a	Reference Temp is clamped to ref a
9	The Reference temp (External, Return of Zone) is greater than ref a when ref a is greater than ref b	Reference Temp is clamped to ref a
10	The Reference temp (External, Return of Zone) is less than ref b when ref a is greater than ref b	Reference Temp is clamped to ref b
11	Ref a is equal to ref b	Load line is not engaged

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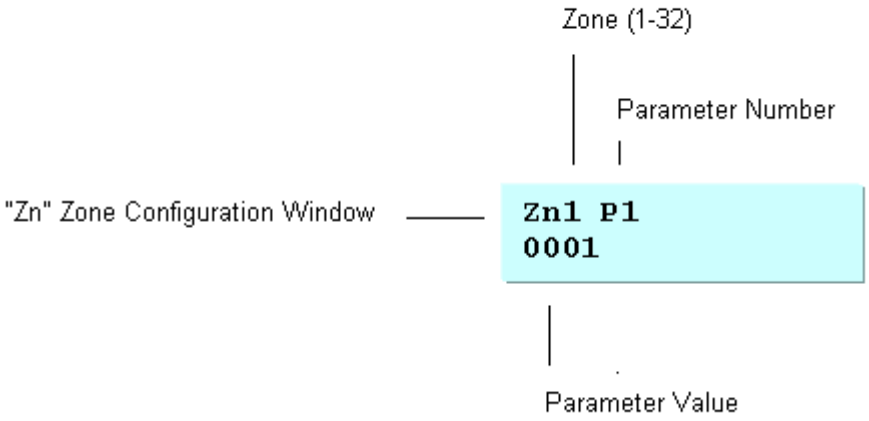
3.2.10 Zone Configuration



Press ZONE to change Zone. Press ↵ to change the zone parameter number. Use Numerical keys to enter the parameter value.

The following Table identifies the Zone parameters. Refer to the "iCon Sensor Operation" document for a detailed description of the use of the parameters.

#	Parameter	Max Valve
1	Zone Type 0: UFH 1: RAD 2: DHW 3: PROBE (SP Range 0-80) (Calibration Range +/- 20)	3
2	Zone Deadband	20
3	Zone Cooling Fan 1 Offset	20
4	Zone Cooling Fan 2 Offset	20
5	Zone Cooling Fan 3 Offset	20
6	Zone Secondary Maximum Zone will be forced to the OFF state if the temperature of the secondary channel is greater than the Secondary Maximum. The override condition is not applied if the Screed Maximum is 0.	80
7	Zone Secondary Minimum Zone will be forced to the ON state if the temperature of the secondary channel is less than the Secondary Maximum. The override condition is not applied if the Screed Minimum is 0.	80
8	Zone DHW Energy Saver	80

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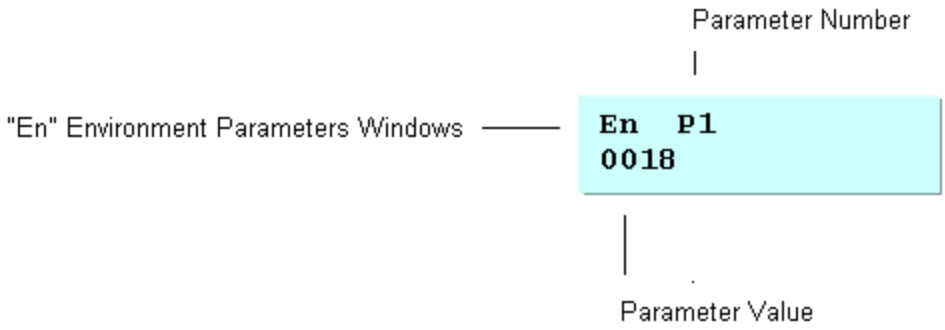
3.2.11 Environment Parameters



Press  to change the system parameter number. Use Numerical keys to enter the parameter value.

#	Parameter	Max
1	Frost Protection	18
2	Minimum Heating Set-point	18
3	Minimum Cooling Set-point	35
	A cooling set-point cannot be set below the Minimum Cooling Set-point (e.g if the Minimum Cooling Set-point is 23 and a zone set-point plus Deadband is 21, then cooling set-point is set to 23).	
	Cooling is disabled if the Minimum Cooling Set-point is 0.	
4	Module 1 Input 5	1
5	Max Zones	32
	If not programmed (“0”) then the default number of zones (32) is assumed.	
6	Max I/O	8
	If not programmed (“0”) then the default number of I/Os (8) is assumed.	
	Virtual I/O modules must be included.	

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3.2.12 LINK (Download from PC to Console)

```
*LINK*
```

"*LINK*" placed the system in the communications enable mode in which the Manager (the PC hosted application) may communicate with the console (e.g. download setup information (e.g. zone labels).

3.2.13 RESET

```
*RESET*
```

Press  to Reset the system

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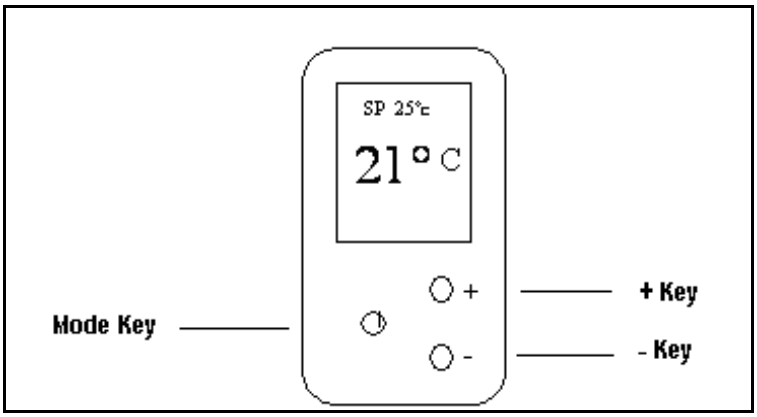
5. Sensor

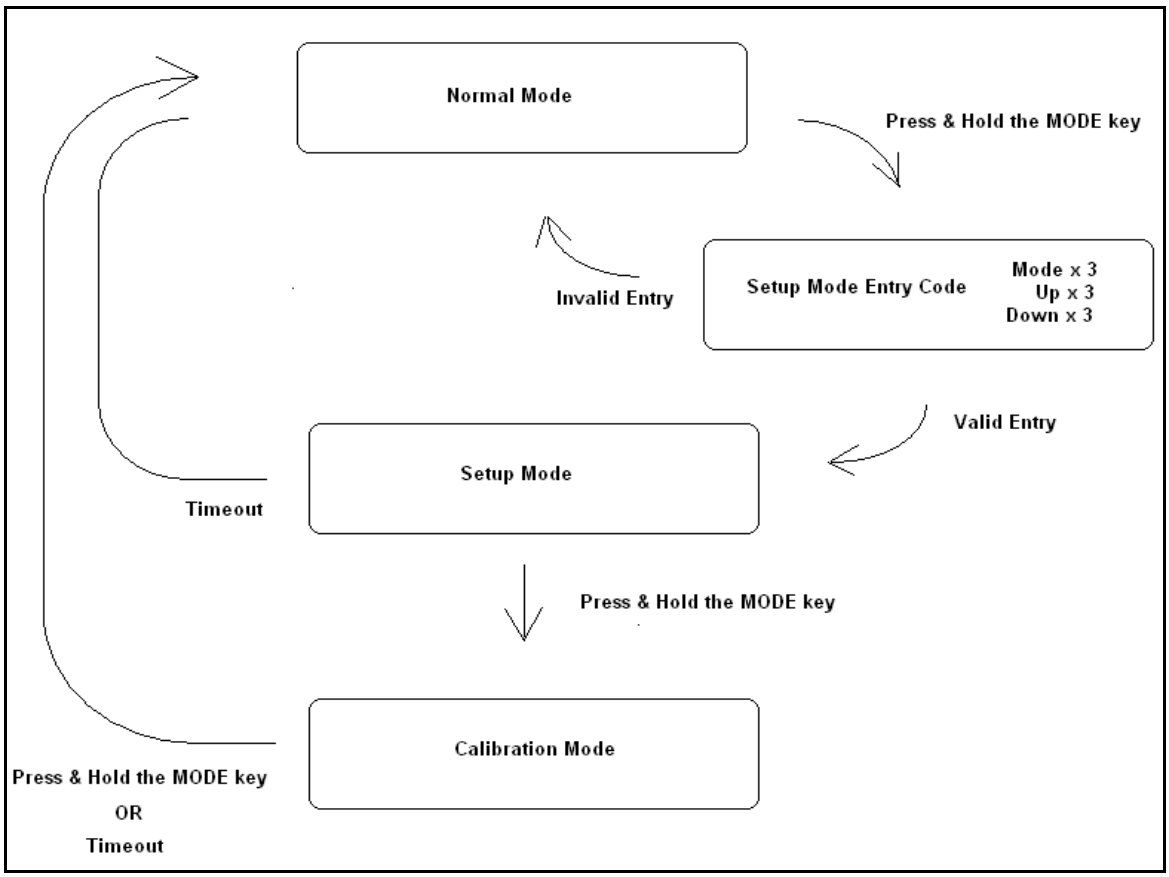
Sensor Buttons



There are 3 Modes of Operation:

1. Normal (End User),
2. Setup
3. Calibration.

Navigation between the modes is illustrated as follows:



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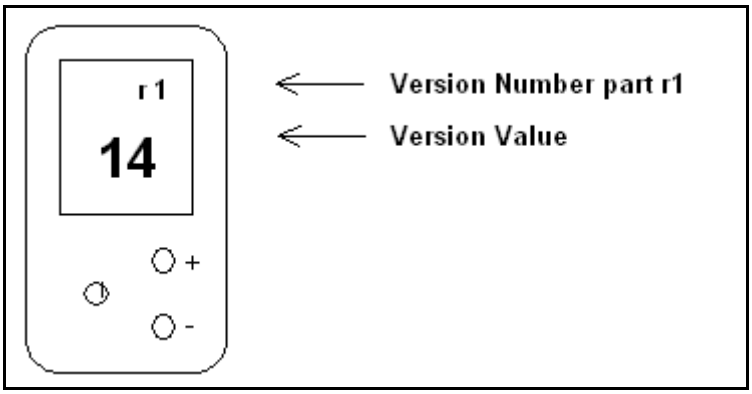
Version Number

Version data is displayed in the top right corner of the display when pressing the mode key during the setup entry code mode. The version information is r1.r2.r3



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4.1 Normal (End User) Mode of Operation

Normal Operation of a sensor differs for each sensor type. The following sensor types are supported:

Type	Description
0	UFH (Under-floor heating) / RAD (Radiators)/ DHW (Domestic How Water)/Probe
1	Flow
2	Return
3	ExtT (External Temperature)

UFH is the default sensor type. The Sensor Type is set in the Setup mode. The Setup Mode of Operation is entered by pressing and holding the mode key.

The backlight is activated for approximately 8 seconds when a key is pressed.

4.1.1 Normal (End User) Mode of Operation – UFH, RAD & Probe type sensor

There is only one difference between a UFH and RAD type sensor. The setback parameter limit is greater for a RAD sensor. The probe type sensor uses channel 2 as the temperature source and has no screed option.

The set-point, setback and Boost-heat may be increased and decreased by pressing the "+" and "-" keys. The mode key is used to select set-point, setback and Boost-heat.

Changes to mode, set-point, setback or Boost-heat are only possible when the zone has been set (greater than 0) and communications with the sensor have been established.

Pressing the Mode key will change the Sensor State from Timer (Heating Only) to Timer (Heating & Cooling – when cooling is enabled at the console by setting to cooling Minimum setting to a value greater than "0") to STOP to DISABLE. As the mode key is presses the display will appear as follows:

Timer (Heating Only)

Timer (Heating & Cooling)

"CL" symbol is displayed momentarily.

STOP (Heating in SetBack, Cooling OFF)

DISABLE (Heating in Frost Protection, Cooling OFF)

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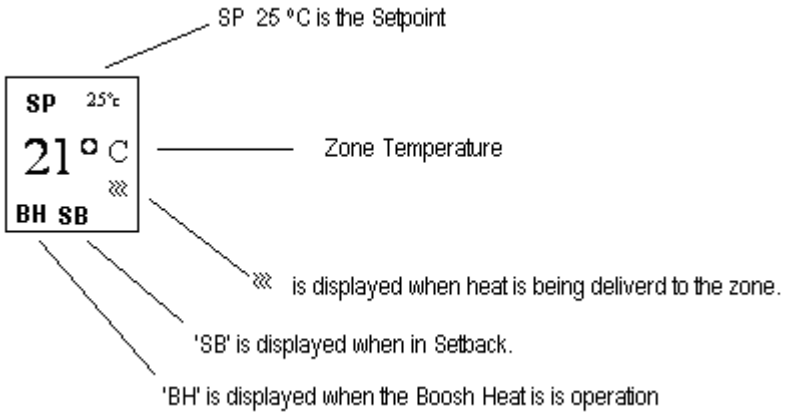
The symbols in the various modes are described in the following table:

State **UI Operation**

Timer



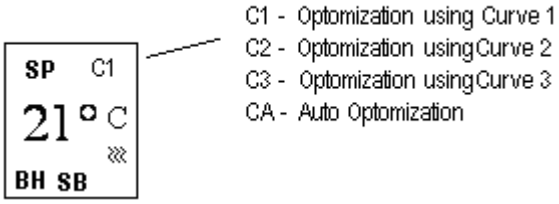
The temperature source (channel 1 or 2) that is displayed is set by the type of the thermostat.

Type	**Channel**
UFH	1
RAD	1
PROBE	2

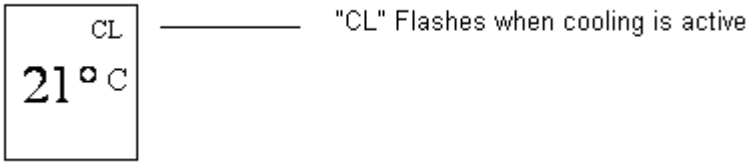
The Set-Point, Setback and Boost Heat limits (where applicable):

Type	SP		SB		BH	
	Max	Min	Max	Min	Max	Min
UFH	30	16	8	3	5	1
RAD	85	10	85	1	5	1
PROBE	85	10	70	3	5	1

The Symbols ‘C1’, ‘C2’, ‘C3’ and ‘CA’ are displayed when the sensor is in optimization.



If the sensor enters the Cooling mode of operation the display becomes:



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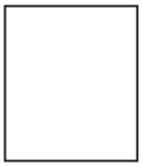
Cooling is available at the sensor via the mode key if cooling is enabled at the console.

Stop

Only the 'SB' symbol is displayed

Normal timer scheduling is ignored and the sensor forces the zone to stay above the set-back limit.

Disable



The diplay is blank

Normal timer scheduling is ignored and the sensor forces the zone to stay above the frost protection setting

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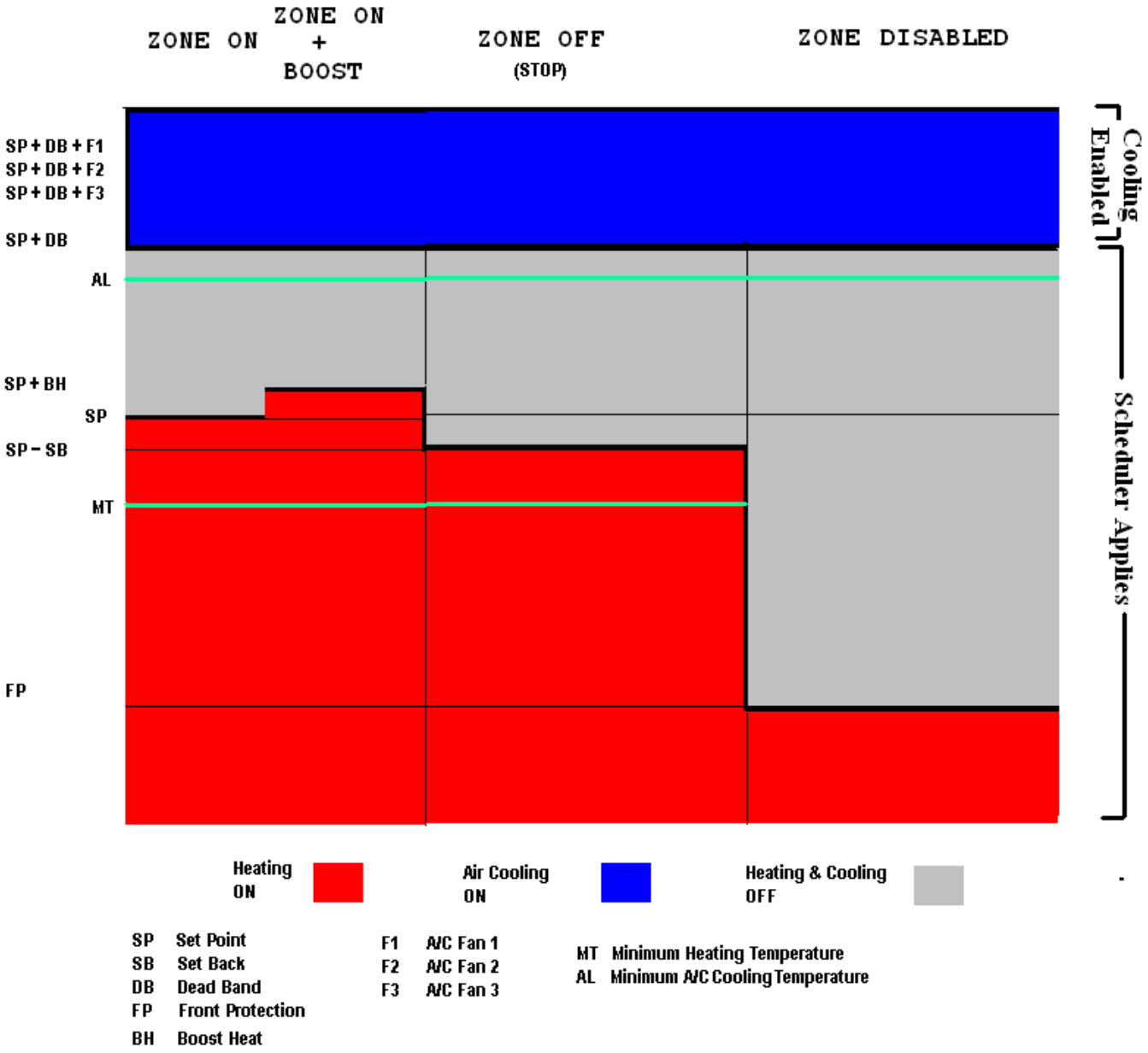
UFH, RAD & PROBE State Control

Zone control is essentially identical for UFH, RAD and PPROBE zone types. A screed limiting parameter may be applied to UFH and RAD zone types. Minimum Heating Set-point does not apply to the PPROBE zone type. The following diagram illustrated the operation for the ON, OFF and DISABLED zone states.



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Zone Space Optimization

Optimization is the control of temperature in the zone space by means of optimization curves. An optimization curve increases temperature at a controlled rate such that the required ON temperature is attained at the scheduled ON time. The curves differ with respect to temperature gradient and control time.

Curve 1		Curve 2		Curve 3	
Time Offset (mins)	**Temp Offset (Deg C)**	**Time Offset (mins)**	**Temp Offset (Deg C)**	**Time Offset (mins)**	**Temp Offset (Deg C)**
20	0.5	20	0.5	20	0.5
40	1.0	40	1.0	40	1.0
60	1.5	60	1.5	60	1.5
		80	2.0	80	2.0
		100	2.5	100	2.5
		120	3.0	120	3.0
				140	3.5
				160	4.0
				180	5.0

Zone optimization may also be set to AUTO mode. In this mode the sensor uses curve 1 but added and additional offset based on the delta T difference between the requested temperature and the actual temperature an ZONE ON time. If the actual temperature is less then the requested temperature then the AUTO offset is incremented by 0.5 Deg C. If the actual temperature is greater than the requested temperature then the AUTO offset is decremented by 0.5 Deg C. The AUTO optimization Curveis therefore:

Time Offset (mins)	**Temp Offset (Deg C)**
20	0.5 + AUTO OFFSET
40	1.0 + AUTO OFFSET
60	1.5 + AUTO OFFSET

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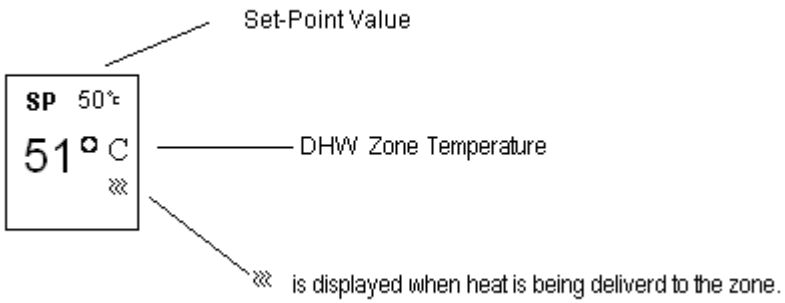
Normal Mode of Operation – DHW type sensor

There are 2 normal sates: “Timer” and “Disable.” The display state is changed by pressing the MODE key.

State **UI Operation**

Timer



The temperature source channel 2

The Set-Point limits are:

	Max	Min
Setpoint	80	20

Disable Display is blank. Temperature control is disabled.

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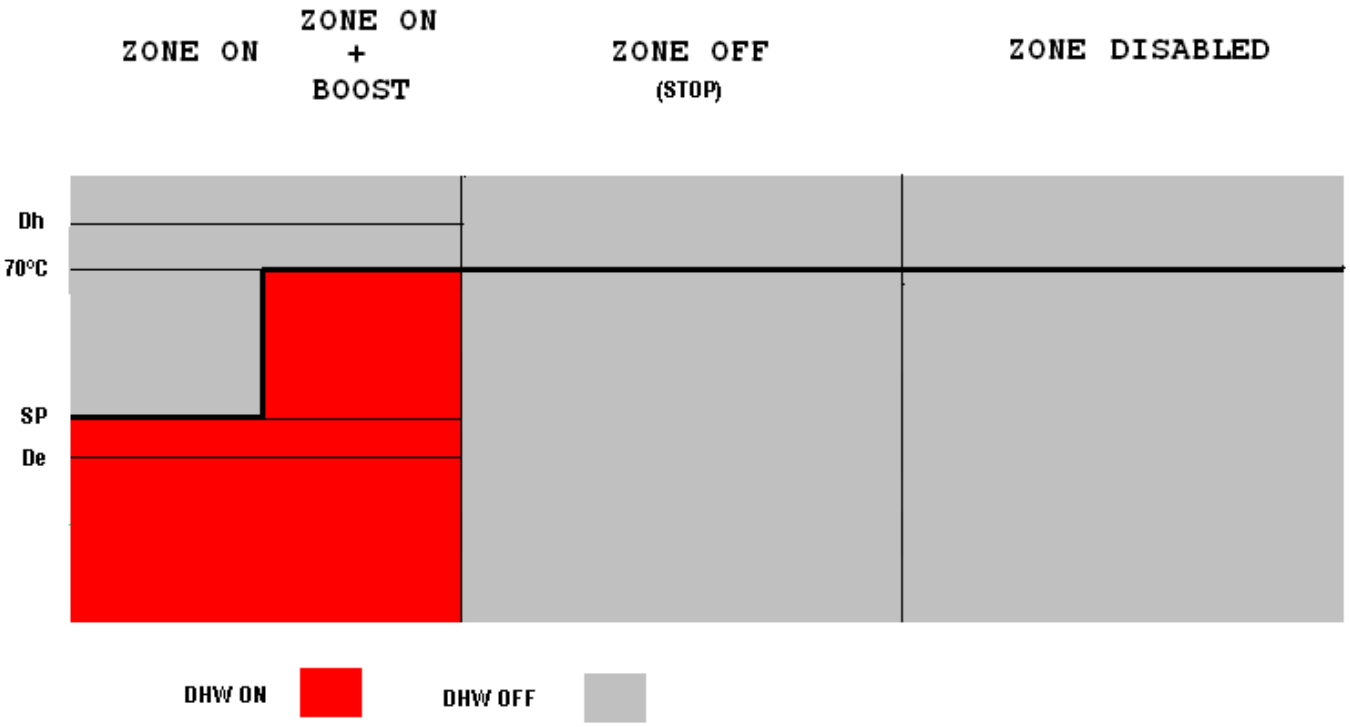
DHW State Control

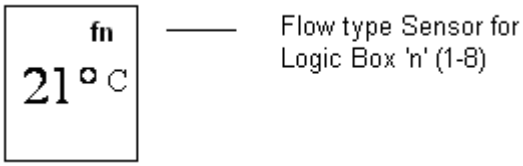
Zone space control is illustrated in the following diagram:



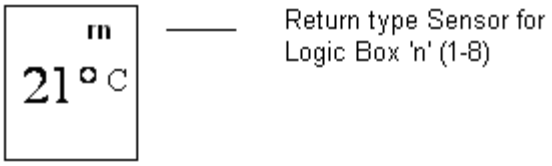
SP Set Point
Dh DHW Maximum Limit
De DHW Energy Saver Limit

Normal Mode of Operation – Flow or Return type sensor

If the sensor is setup as a FLOW Sensor, the display in normal operation becomes:



If the sensor is setup as RETURN Sensor, the display in normal operation becomes:



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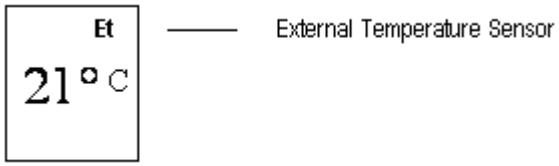
Channel 2 is the temperature source for both flow and return type sensors.

Normal Mode of Operation – External Temperature type sensor

If the sensor is setup as External Sensor, the display in normal operation becomes:



Channel 2 is the temperature source External Temperature type sensor.

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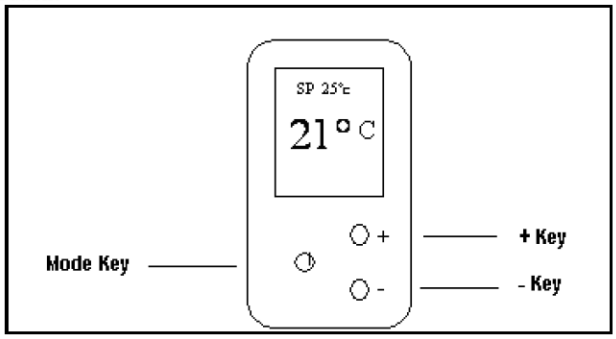
Setup Mode of Operation

The following table identifies the possible sensor types supported and the associated parameter where applicable.

Sensor Type (St)	Associated Parameter
0: zone (ufh/rads/DHW/probe)	ZN (0-32)
1: Flow	IO (0-8)
2: Return	IO (0-8)
3: External Temperature	None

Calibration Mode of Operation

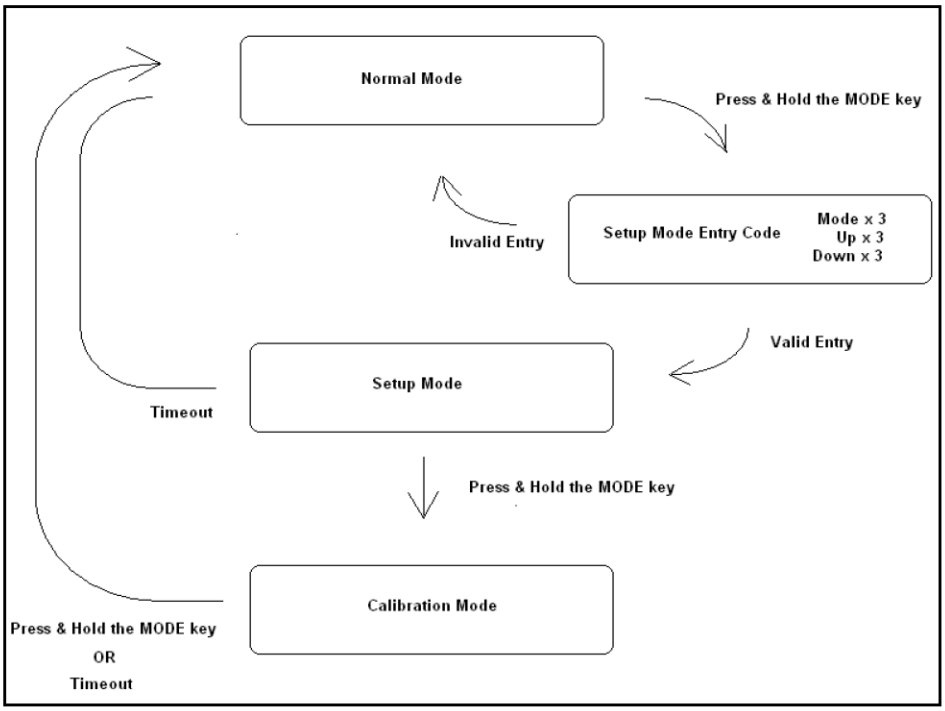
Sensor Buttons



There are 3 Modes of Operation:

1. Normal (End User),
2. Setup
3. Calibration.

Navigation between the modes is illustrated as follows:



To calibrate any iCon sensor first of all enter the "calibration" mode (see left). Once you are in calibration mode the screens as shown at the bottom of the page will appear. To change the calibration of the sensor use the plus and minus buttons.

C1 is the air sensor and C2 is for the probe if you have a sensor with a probe e.g. floor probe or external air sensor. To move from C1 to C2 press the mode button.

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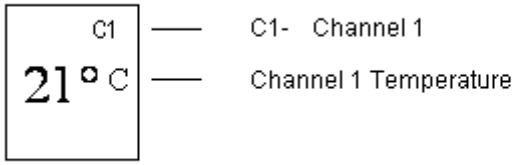
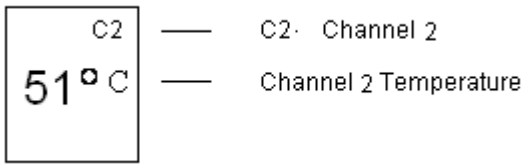
The Calibration mode of operation allows calibration of temperature channels 1 and 2. The display appears as follows when calibrating channel 1:



The display appears as follows when calibrating channel 1:



The '+' and '-' keys increment and decrement a temperature calibration offset by 0.5 Deg C.

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6. Weather Compensation - Attaching 0-10v Modulating Actuator

Overview: **Weather Compensation Facility via 0-10v output**
Software algorithms compare the External Temp, Max External Temp, Max Flow Temp, Min Flow Temp to derive the desired flow temperature. This desired flow temp is achieved by regulating the flow temp via the 0-10v output.
This output regulates a Modulating Actuator on the manifold. (Modulating Actuator not included)
The system is Self-Compensating via the manifold pipe stat.

Attached 0-10v Modulating Actuator

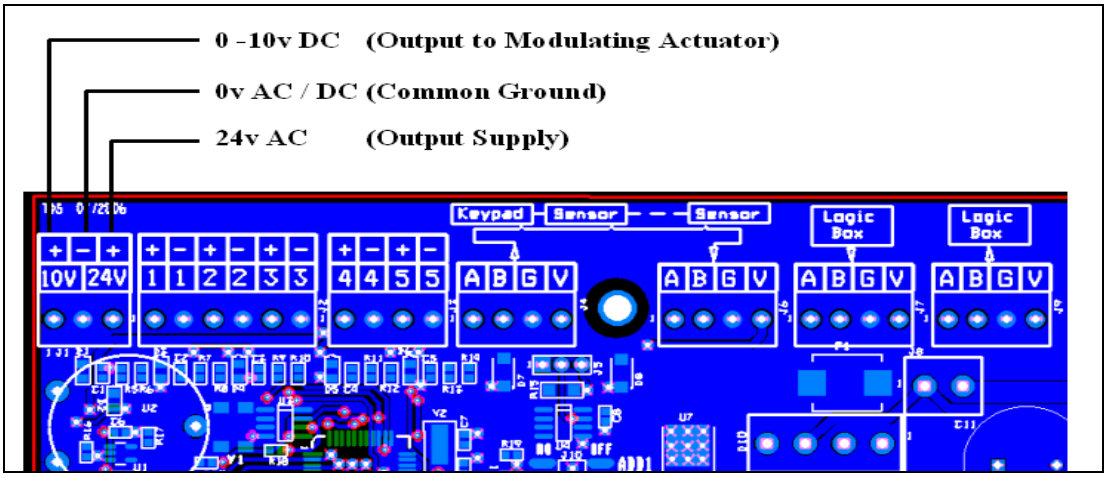
Modulation Actuator Output

Specifications

Supply Output	24v AC (± 10%)
Max Load	3 Watt
Modulation Output	0v 10v DC

Connections
Outlined below are the relevent connections.

WARNING: Cables must be wired as show, failure to do so will result in the 0-10v port failure



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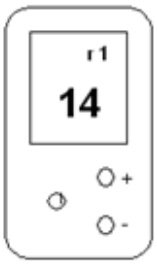
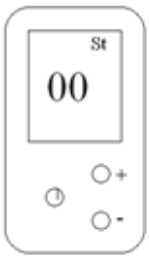
Setting up the Flow & External Sensors

Engineering Mode Icons



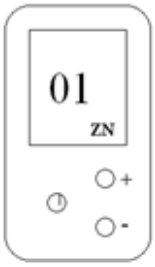
←Version Revision
← Version Number

Access Eng Mode	Press & Hold Power Key Press Power x 3 Press Up x 3 Press Down x 3



St - Stat Type

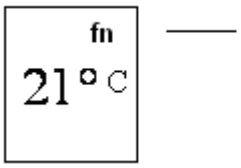
Type	Sensor Type (St)	Setting
0	Zone (ufh/rads/DHW/probe)	ZN (0-32)
1	Flow	IO (0-8)
2	Return	IO (0-8)
3	External Temperature	None



State Setting
ZN = Zone Number (Range 1-32)
IO = I/O Module (Manifold) Address 1-8
F4 = "F" Flow Stat . "4" I/O Box No. 4
R6 = "R" Return Stat . "6" I/O Box No. 6
Et = External Temp

Return type sensor

If the sensor is setup as a FLOW Sensor, the display in normal operation becomes:

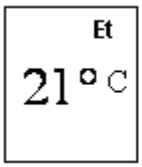


——— Flow type Sensor for Logic Box 'n' (1-8)

For Flow Temperature sensor type, channel 2 is the temperature source.

External Temperature type sensor

If the sensor is setup as External Sensor, the display in normal operation becomes:



——— External Temperature Sensor

For External Temperature sensor type, channel 2 is the temperature source.

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7. Cooling

Overview:

Any sensor within the system has the ability to control both the heating & cooling of a zone.
The system must be informed that cooling is required. This is achieved by setting parameter 3 in the Environmental settings.
Secondly, each zone must be allocated a Deadband (DB) . This is to ensure heating and cooling do not conflict. This is achieved by setting Deadband value in the Zone Profile.
The system can be used to activate passive cooling (Zone Temp above SP+DB) or activate cooling (Zone Temp above SP+DB+F1/2/3)

Cooling Operation

Cooling is activated when the zone temperature goes above SP + DB,
Cooling can either be enable / disabled at the sensor – see sensor section below.

If two levels of cooling devices are installed e.g. Passive Cooling & Active Cooling, the system can be configured in the following manor.

Passive Cooling
Activated above Zone SP + DB

Active Cooling
Activated above Zone SP + DB + F1
Activated above Zone SP + DB + F2
Activated above Zone SP + DB + F3
F1, F2, F3 can be used to bring in more devices or increase fan speed.

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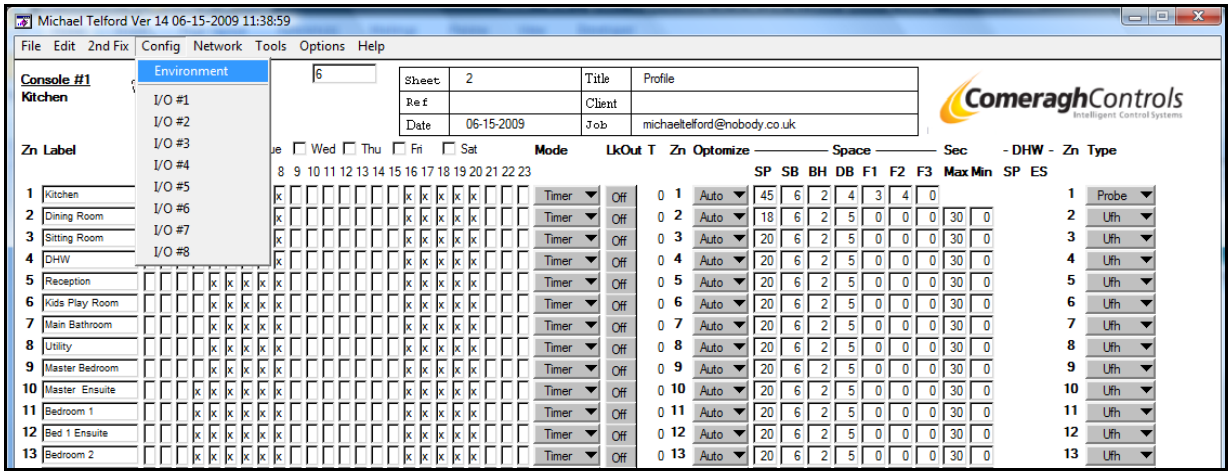
Configuring Cooling on the system - Steps a & b & c

Comment:
The system must be informed that cooling is required. This is achieved by setting parameter 3 in the Environmental settings.

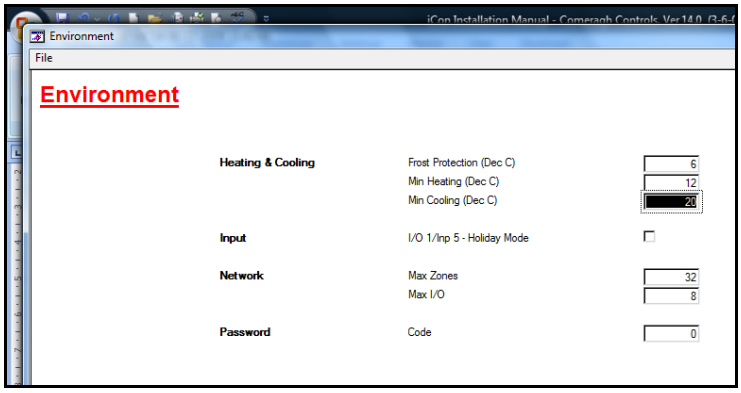
a) Overall System Cooling Setting - Environmental setting

Via CM Application

1. Select Environment Under Config. tab



2. **Enter the min cooling cut of point**



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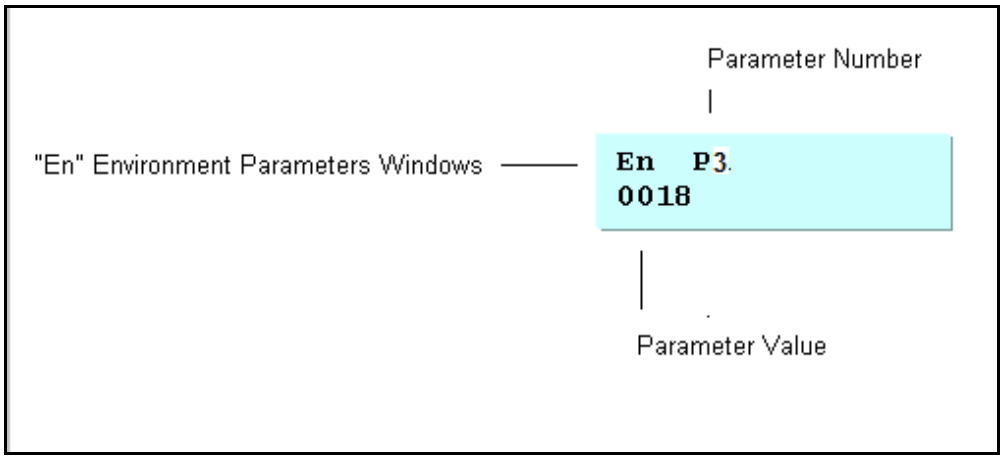
Via Console
See Section 3.2.11 Environment Parameters



Press  to change the system parameter number. Use Numerical keys to enter the parameter value.

#	Parameter	Max
3	Minimum Cooling Set-point	35

A cooling set-point cannot be set below the Minimum Cooling Set-point (e.g. if the Minimum Cooling Set-point is 23 and a zone set-point plus Deadband is 21, then cooling set-point is set to 23).

Cooling is disabled if the Minimum Cooling Set-point is 0.

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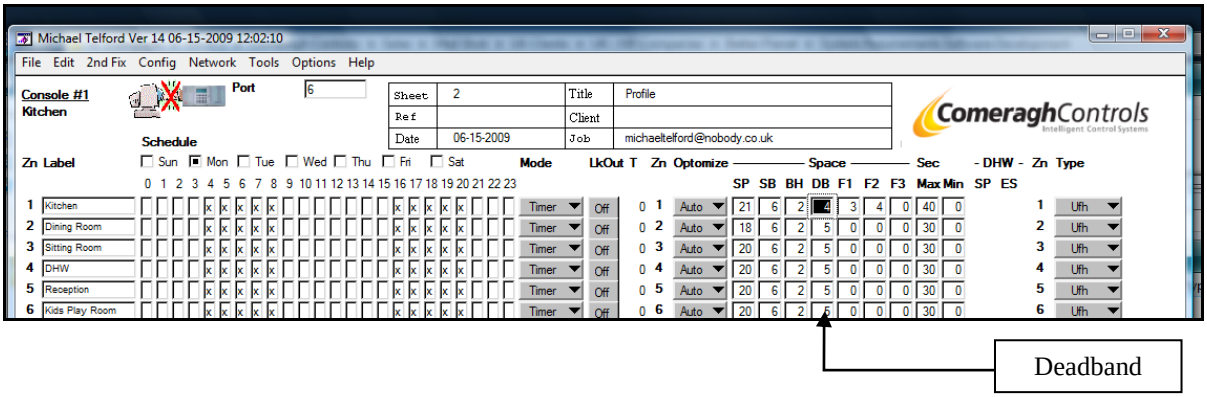
b) Setting the individual zone cooling activation threshold level – Deadband

Comment:

Each zone has the ability to have a separate Deadband Value
This Deadband value ensures heating and cooling do not conflict.

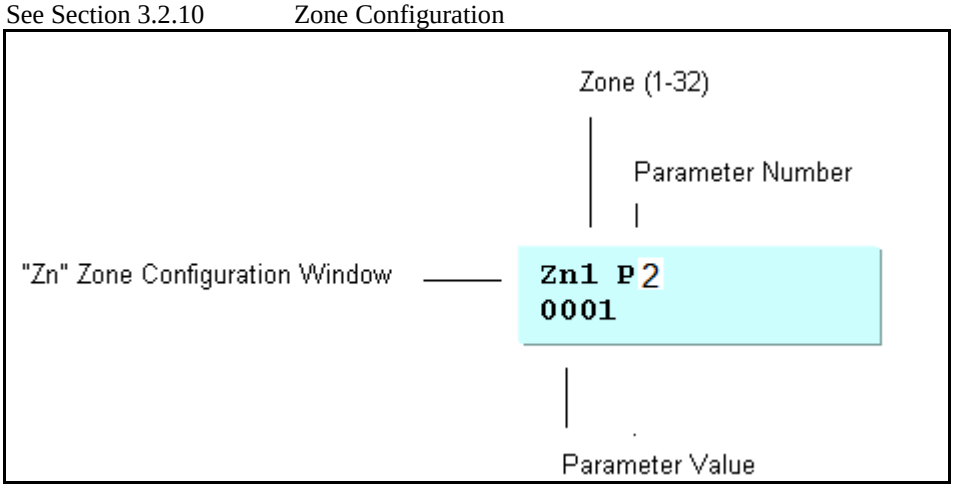
Via CM Application

In Zone Profile



Via Console

See Section 3.2.10 Zone Configuration



Press ZONE to change Zone. Press ↵ to change the zone parameter number. Use Numerical keys to enter the parameter value.

The following Table identifies the Zone parameters. Refer to the "iCon Sensor Operation" document for a detailed description of the use of the parameters.

#	Parameter	Max Valve
2	Zone Deadband	20
3	Zone Cooling Fan 1 Offset	20
4	Zone Cooling Fan 2 Offset	20
5	Zone Cooling Fan 3 Offset	20

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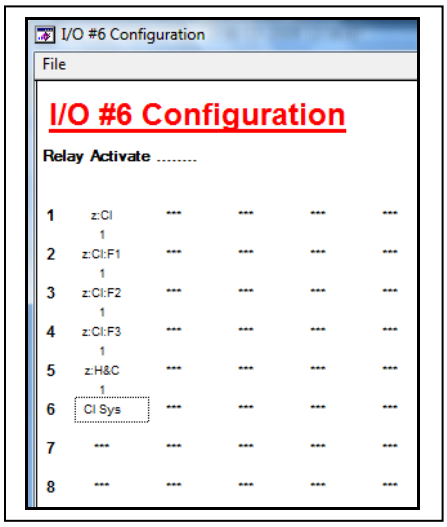
c) Configuring relays:

Comment:
Any relay can be configured to be activated by the following list.

Via CM Application
In CONFIG.



c Cl **Zone Air Cooling**
Zone temperature is greater than the Set-Point (SP) plus the A/C Deadband

| Cl Fan 1 **Zone Air Cooling Fan 1**
Zone temperature is greater than the Set-Point (SP) plus the Deadband plus the Cl Fan 1 Offset

|| Cl Fan 2 **Zone Air Cooling Fan 2**
Zone temperature is greater than the Set-Point (SP) plus the Deadband plus the Cl Fan 2 Offset

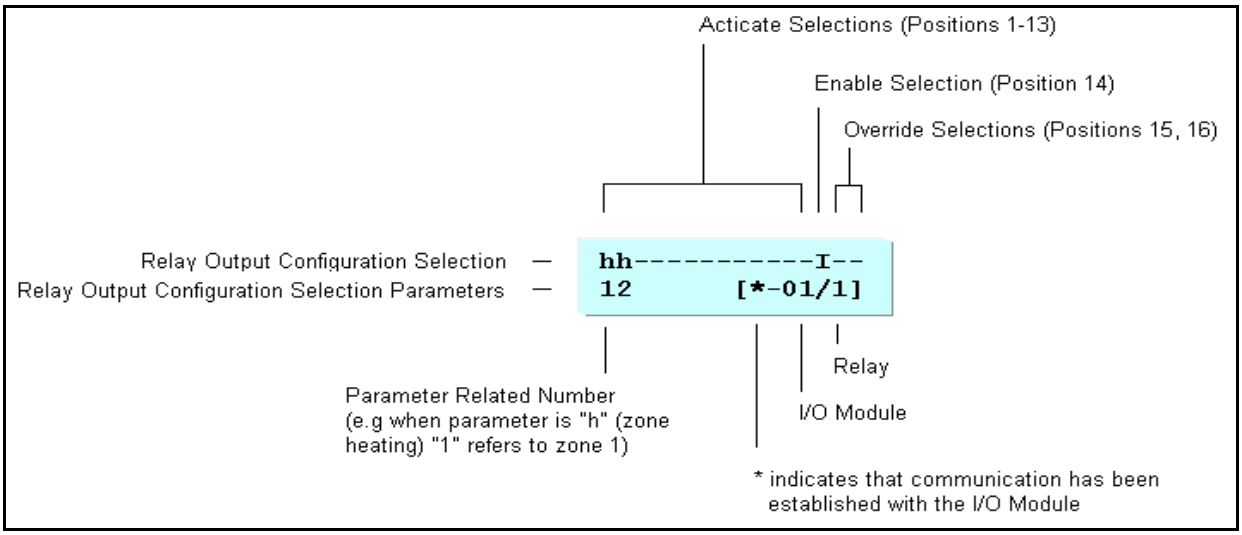
||| Cl Fan 3 **Zone Air Cooling Fan 3**
Zone temperature is greater than the Set-Point (SP) plus the Deadband plus the Cl Fan 3 Offset

& Z-H/C **Zone Heating & Cooling**

ANY zone calling for heat when **NO** zone is calling for cooling OR,
ANY zone is calling for cooling.

(Note: Cooling has priority)

Via Console
See Section 3.2.5 I/O Output Relay Configuration



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Cooling at Sensor

Pressing the Mode key will change the Sensor State from

- Timer (Heating Only) to
- Timer (Heating & Cooling – when cooling is enabled at the console by setting to cooling Minimum setting to a value greater than "0") to
- STOP to
- DISABLE.

As the mode key is presses the display will appear as follows:

Timer (Heating Only)

Timer (Heating & Cooling)

"CL" symbol is displayed momentarily.

STOP (Heating in SetBack, Cooling OFF)

DISABLE (Heating in Frost Protection, Cooling OFF)

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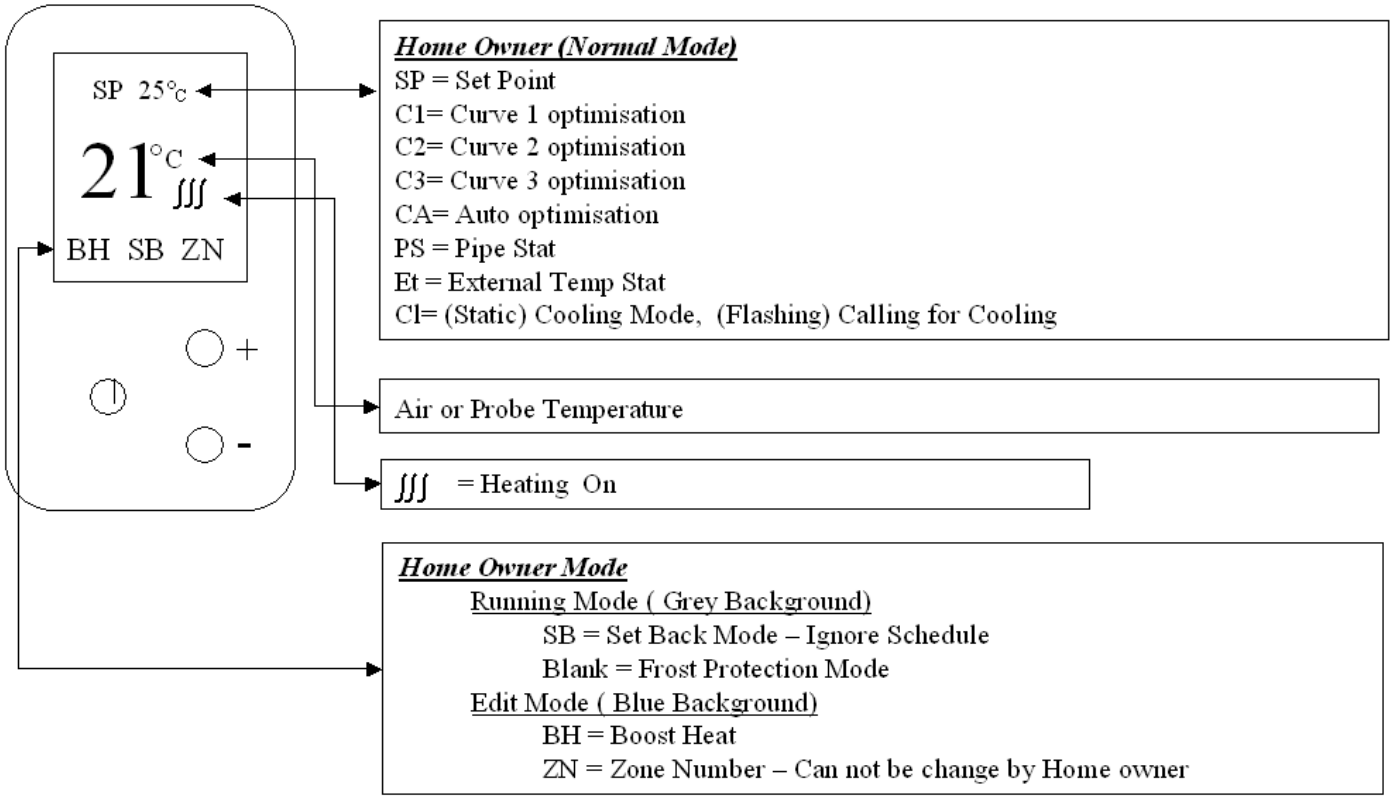
8. Stat Symbols

Home Owner (Normal Mode) Icons

Home Owner (Normal Mode) Icons



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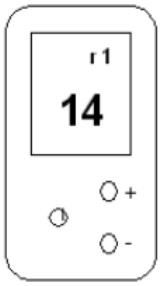
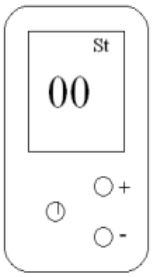
Engineering Mode Icons



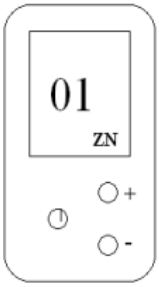
←Version Revision

← Version Number



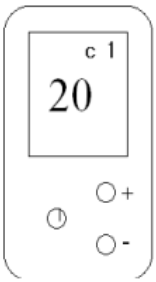
St - Stat Type

Type	Sensor Type (St)	Setting
0	Zone (ufh/rads/DHW/probe)	ZN (0-32)
1	Flow	IO (0-8)
2	Return	IO (0-8)
3	External Temperature	None



State Setting

ZN = Zone Number (Range 1-32)
IO = I/O Module (Manifold) Address 1-8
F4 = "F" Flow Stat . "4" I/O Box No. 4
R6 = "R" Return Stat . "6" I/O Box No. 6
Et = External Temp



Calibration

c1= Channel 1 Temp – Air Temp
c2= Channel 2 Temp – Probe Temp

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9. Set Time

Press TIME key .

Console Displays

```
Time          09:40
25/02/06    < FRI >
```

Move brackets press 4 and 6.

Change value press 2 or 8

10. Set Service Date

Press TIME key .

Console Displays

```
Time          09:40
25/02/06    < FRI >
```

Press ↵ key

3 Times

Console Displays

Service Time

```
Service       <09>40
25/02/06
```

Service Date

Move brackets press 4 and 6.

Change value press 2 or 8

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11. Vacation Activation

Setting Vacation Date in Console

Press TIME key . Console Displays

```
Time          09:40
25/02/06    < FRI >
```

Vacation Begin — *Start Time*

Press ↵ key Console Displays

```
VAC BEG       <00>00
01/01/01
```

Start Date

Move brackets press 4 ← and 6 →.

Change value press 2 ↑ or 8 ↓

Vacation Ends

Press ↵ key Console Displays

```
VAC END       <00>00
01/01/01
```

Move brackets press 4 ← and 6 →.

Change value press 2 ↑ or 8 ↓

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Activating Vacation Through Phone

Overview:

The system allows a volt free sign to be attached to Input 5 on the 1st logic box and this can be used to activate vacation mode .
In vacation mode all zones will move to Setback and the DHW will be switched off.
As the phone facility is required Input 1:5 (Logic Box 1, Input 5), must be set up for Vacation mode this is activated in the Engineering mode, outlined below.

Access Engineering Mode

Press MODE & HOME together.

Enter the Engineering Code **3105** & Press ↵

Console Displays the following

```
1234567890123456
1234567890123456
```

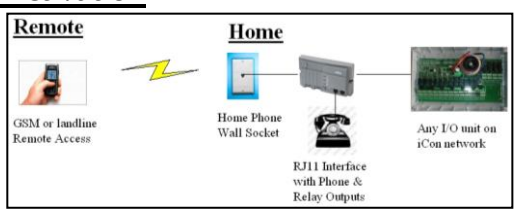
While in Engineering Mode – Press MODE until you access Environment Parameters

Press ↵ to change the system parameter number.

Parameter no 4 is use to tell the system that a remote vacation activation signal will be connected to Logic box 1 input 5

Use Numerical keys to enter the parameter value.
0 = Input **NOT** used for holiday activation
1 = Input used for holiday activation

Wiring Phone Activation



Using a Phone Interface Unit (PUI) , the relay output muts be attached to Input 1:5 (Logic Box 1, Input 5).
The relay output from the Phone Interface Unit (PUI) muste be Volt Free.

Operation

Closed Circuit = Normall Operation
Open Circuit = Holiday Mode

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12. Connecting PC to a RS485 Serial Adaptor

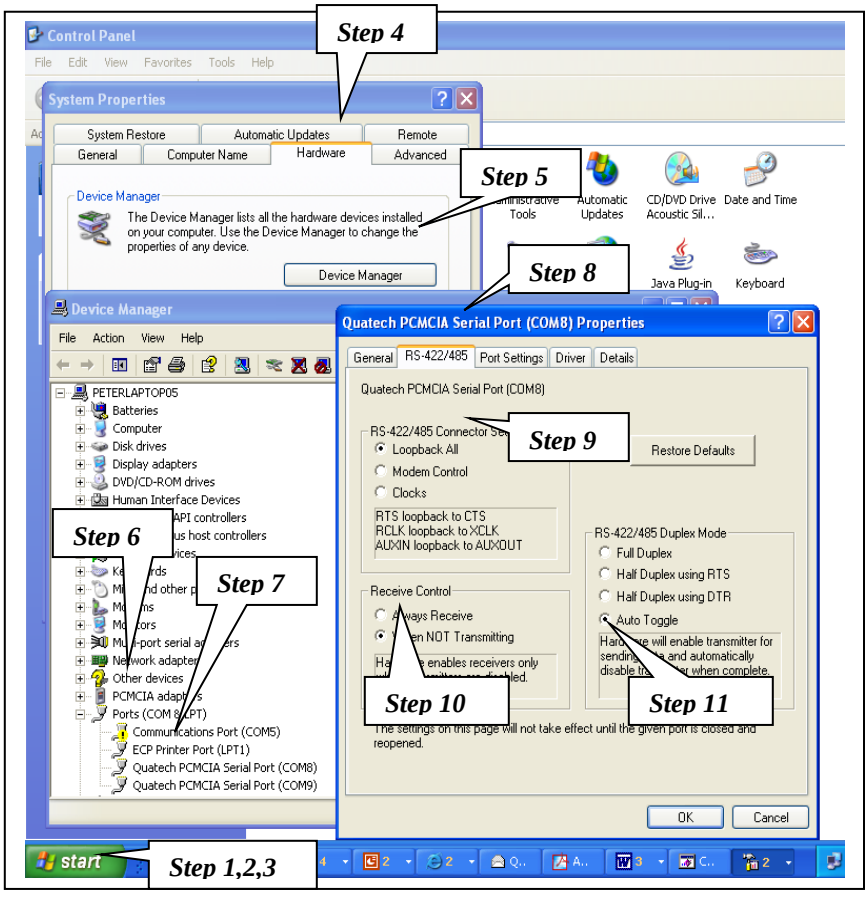
Warning:	Do Not attached RS485 Adaptor to Logic Box until the adaptor has been Configure (Green Led on Front of Adaptor- Do not attach if Red.)

Overview: An RS485 serial adaptor is required to download the configuration setting from the PC to the Console.

Equipment Required					
Item	Model	Part No	Supplier	Address	Cost
1	2 port USB to RS-422/485 serial adapter	DSU2-400	Quatech	www.quatech.com	€179
2	3 Core Serial Cable with 9way Connector	CC 100	Comeragh Controls	www.comeraghcontrols.com	€28

Step 1: **Do Not attached RS485 Adaptor to Logic Box until the adaptor has been Configure**
Connected the RS485 adaptor to your PC USB Port

Step 2. Configure the setting on the PC Port **Model DSU200-300 (2006)**



Steps

1. Click START
2. Select Control Panel
3. Select System
4. Select Hardware
5. Select Device Manager
6. Click Ports
7. Right Click on RS485 attached
8. Select 5S-422/485 Tab
9. Set RS422/485 Connectors Setup to Loopback All
10. Set RS422/485 Receive Control to When NOT Receiving
11. Set RS422/485 Duplex Mode to Auto Toggle

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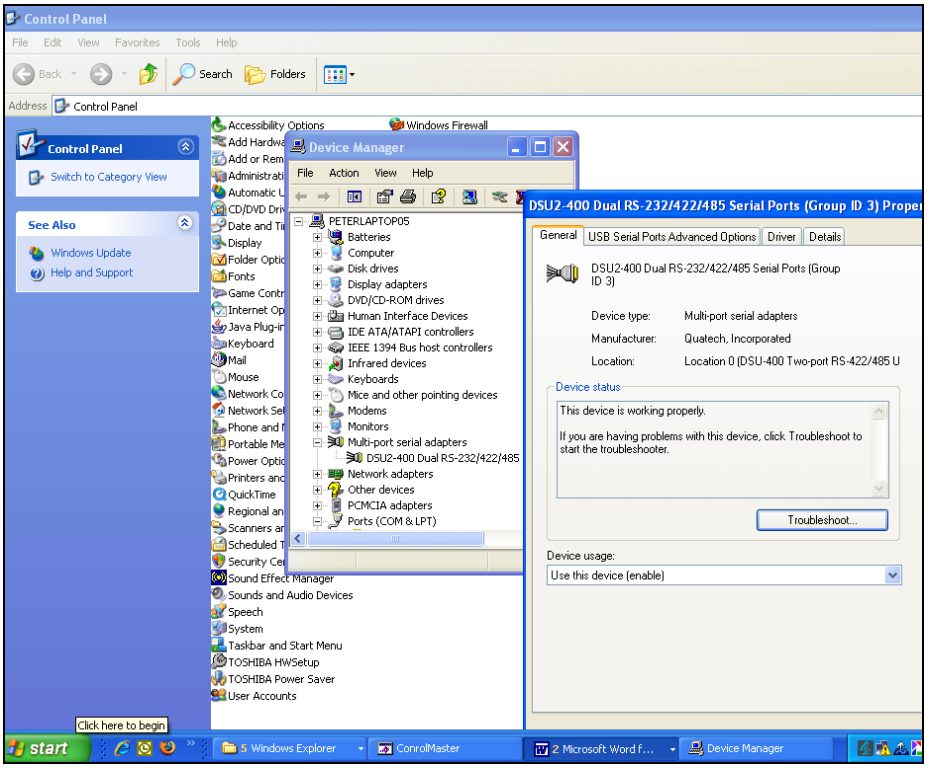
Step 2. Configure the setting on the PC Port **Model DSU2-400 (2007)**

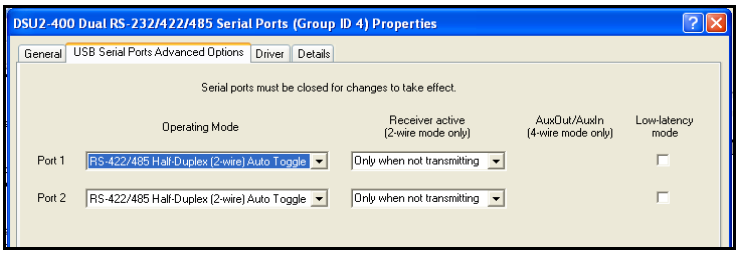
Step 21. Configure Multi Port Serial Adaptor



Steps

1. Click START
2. Select Control Panel
3. Select System
4. Select Hardware
5. Select Device Manager
6. Click Multi Port Serial Adaptors
7. Double Left click on DSU2-400Dual RS232/422/485(Serial Port)
8. Select "USB Serial Port Advanced Options" Tab
9. See Setting on following Image

Settings



13. System Erase

The System Erase function erases ALL setup data including zone names, output relay configurations, user password, minimum temperature, frost protection temperature and all TSTAT settings. Press the keys 5, HOME and MODE simultaneously.

IMPORTANT - ALL SETTINGS WILL BE LOST

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