

AMBIFLEX *fOCUS* - INSTALLATION MANUAL

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fOCUS **PRODUCT OVERVIEW**

The *fOCUS* is an intelligent standalone or networking building management system with features normally available only in much more expensive systems.

The *fOCUS* incorporates a separate PSU board with field connection terminals which connects to the front panel/CPU via a ribbon cable. The front panel has a Keypad/LCD display which can show temperatures, alarms and generally what is happening with the system at the 'User' level and can be used for commissioning/servicing at the 'Engineer' level. There are two user levels, and two engineer levels. All levels except the lowest user level are password protected.

A modem may be plugged directly into the RS232 port of the PSU allowing automatic dial-out of alarm messages to a PC or standard off the shelf fax machine.

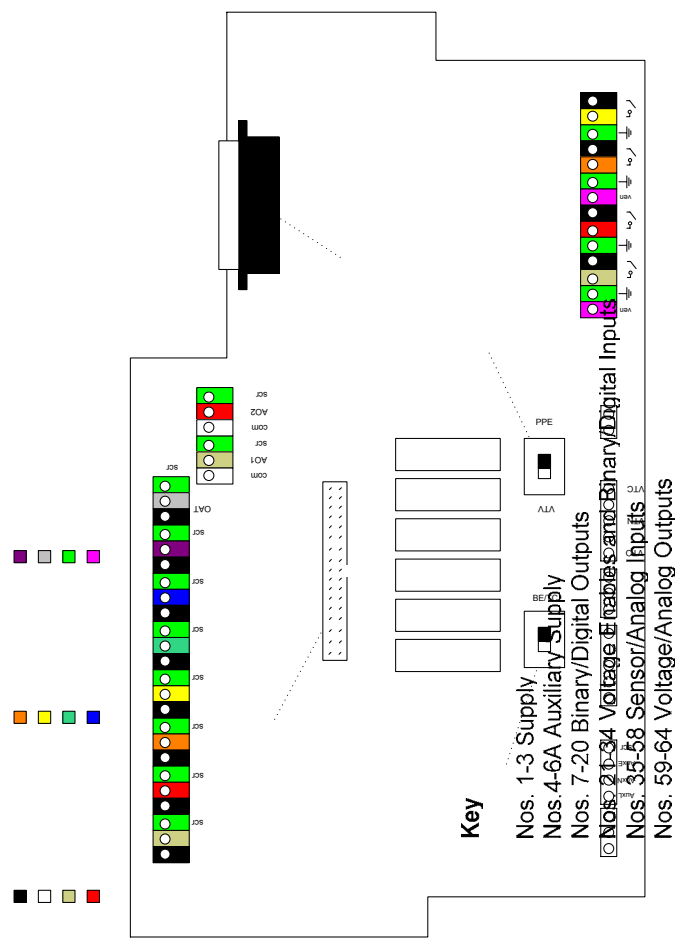
It has a range of pre-engineered applications for conventional heating systems. It features fully integrated control of up to two boilers (or more via an analog boiler sequencer), hot water services (direct fired or boiler linked) and a variable temperature circuit; with many other options to choose from, including night set back, averaging, direct boiler compensation, room reset, optimisation, boiler sequencing or fixed control etc. There are a possible three time channels to be utilised, one for the main heating circuit, one for hot water and one as an option available in certain applications for an independent channel, eg. Lighting. Each of the control routines can be used independently or integrated together.

There are four black pushbuttons on the right of the controller for the use of Heating Extension, Hot Water Extension, Summer Switch and Holiday Switch. If manual setting of the controller is required, adjustments can be made by following the prompts on the display. There is an Alarm/Event Review red button on the top right hand corner of the controller, which when pressed pulls up a list of alarms or events which the controller has recorded.

Easy installation and operation are of paramount importance on the *fOCUS*. After the sensors have been connected there are six basic applications which can be chosen. When one has been picked the system will then self-configure to the chosen application, including default parameters and time schedule. Finally only the time and date need to be programmed for the BMS to start controlling.

Power Supply Unit (PSU)

Common	3	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58
2	(RAT3)	HVMT	RRT	RFT	VTMXF	Sensor inputs											
7	Voltage Enable																



Switch 1 For future use - must be kept to the right for these applications

Switch 2 Right position - Relays 4 and 5 to be used for pump control

Switch 2 Left position - Relays 4 and 5 to be used for a mixing valve

fOCUS Inputs / Outputs

Analog Inputs
1 - Room Sensor (Optional) – Terminals 35-37 2 - Room Sensor (Optional) – Terminals 38-40 3 - Room Sensor (Optional) – Terminals 41-43 4 - HWS Sensor (Optional) – Terminals 44-46 5 - Boiler Return Sensor (Optional) – Terminals 47-49 6 - Boiler Flow Sensor – Terminals 50-52 7 - Mixed Flow Sensor (App.3-6) – Terminals 53-55 8 - Outside Air Sensor – Terminals 56-58
Analog Outputs
1 - Boiler Sequencer (Optional – App. 1,3,5) – Terminals 59-61 2 - Mixing Valve (App. 3&4) – Terminals 62-64
Digital Inputs
1 - Remote Htg Extension (Volt free contact) – Terminals 22-24 2 - Remote HW Extension (Volt free contact) – Terminals 25-27 3 - Maintenance Override (Volt free contact) – Terminals 29-31 4 - Plant FAULT (Volt free contact) – Terminals 32-34
Digital Outputs
1 - Boiler 1 – Terminals 7,8 2 - Boiler 2 (App. 2,4,6) or Ind. Time Channel (Optional – App. 1,3,5) – Terminals 10,11 3 - HW Heater – Terminals 11A,12 or HW Valve – Terminals 11A-13 4 - Sec Pump (App. 1-4) or Mixing Valve (App. 5&6) 5 - Ring Pump/Mix Valve 6 - Htg Pump/All Pumps

Specification

Electrical Supply – 240V

Fuse Rating

Relay Ratings

Ambient Temperature

Storage Temperature

Operating Humidity

Max. Sensor Temp. Range

Accuracy

Resolution

Weight

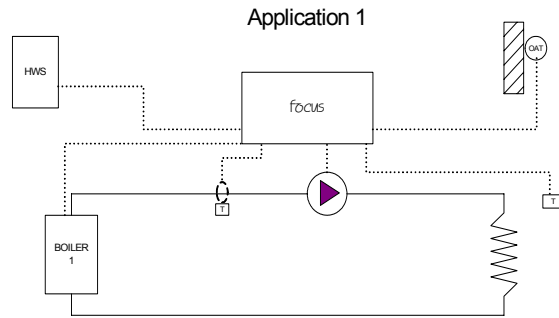
Complies with EC directives EMC, LVD

Applications

There are six basic applications for the installer to choose from. These incorporate control of one, two or more boilers, a single heating circuit, (constant temperature or variable temperature) and hot water services.

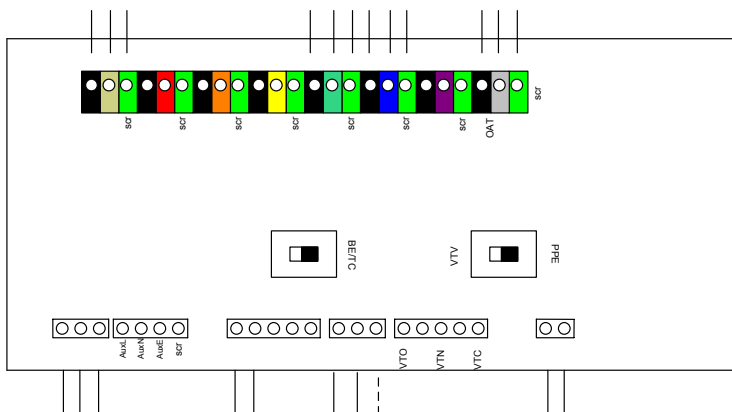
Application 1

This scheme allows for optimisation, direct compensation of the boiler and HWS time control. Options available are room averaging, HWS temperature control, boiler sequencer for multiple boilers (run through Analog Output 1), night depression and an independent time channel.



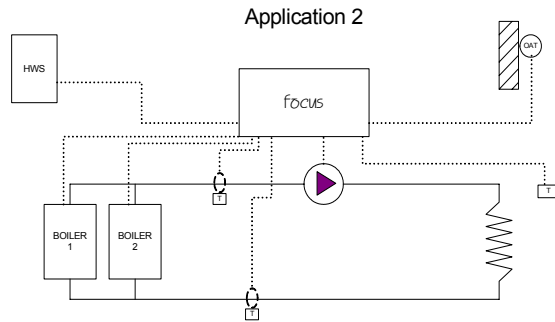
Set up -	Application #1
<p>Typical System Equipment –</p> <p>Note: Additional sensor/outputs can be added to this scheme – see notes starting on page 12 and Other Wiring Options on page 11.</p>	<p>MF focus RTN3060 - Room Sensor 2 x CTN/ITN0120 - Clamp On/Immersion Sensor ETN3060 - Outside Air Sensor</p>

Application 1 Terminal Connections



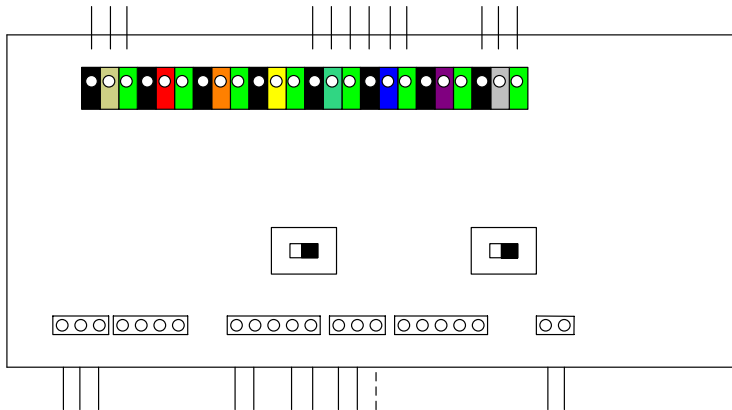
Application 2

This scheme allows for optimisation, direct compensation of the boilers and HWS time control. Options available are boiler sequencing room averaging, HWS temperature control and night depression.



Set up -	Application #2
Typical System Equipment – Note: Additional sensor/outputs can be added to this scheme – see notes starting on page 12 and Other Wiring Options on page 11.	MF focus RTN3060 - Room Sensor 2 x CTN/ITN0120 - Clamp On/Immersion Sensor ETN3060 - Outside Air Sensor

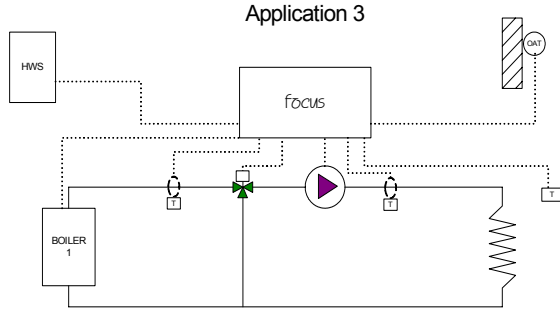
Application 2 Terminal Connections



Application 3

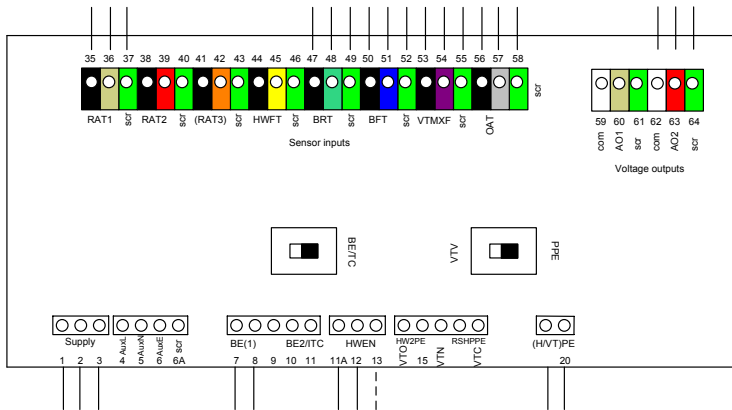
This scheme allows for optimisation, boiler and valve compensation and HWS time control.

Options available are room averaging, HWS temperature control, boiler sequencing for multiple boilers (run through Analog Output 1) night depression and an independent time channel.



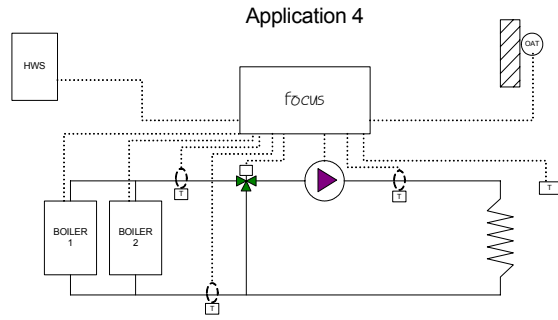
Set up -	Application #3
Typical System Equipment – Note: Additional sensor/outputs can be added to this scheme – see notes starting on page 12 and Other Wiring Options on page 11.	MF focus RTN3060 - Room Sensor 3 x CTN/ITN0120 - Clamp On/Immersion Sensor ETN3060 - Outside Air Sensor

Application 3 Terminal Connections



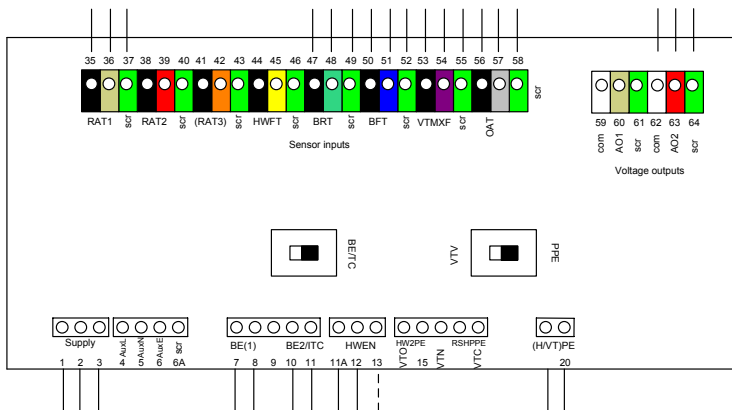
Application 4

This scheme allows for optimisation, boiler and valve compensation and HWS time control. Options available include room averaging, boiler sequencing night setback and HWS temperature control.



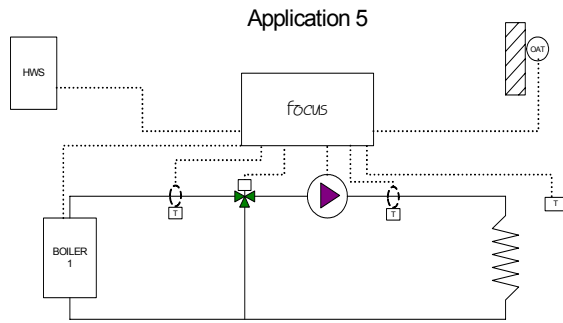
Set up -	Application #4
Typical System Equipment – Note: Additional sensor/outputs can be added to this scheme – see notes starting on page 12 and Other Wiring Options on page 11.	MF focus RTN3060 - Room Sensor 3 x CTN/ITN0120 - Clamp On/Immersion Sensor ETN3060 - Outside Air Sensor

Application 4 Terminal Connections



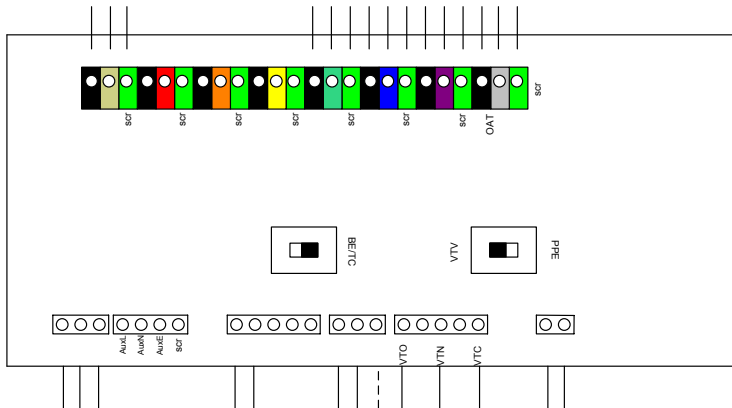
Application 5

This scheme allows for optimisation, boiler and valve compensation and HWS time control. Options available are room averaging, HWS temperature control, boiler sequencer for multiple boilers (run through Analog Output 1) night depression and an independent time channel.



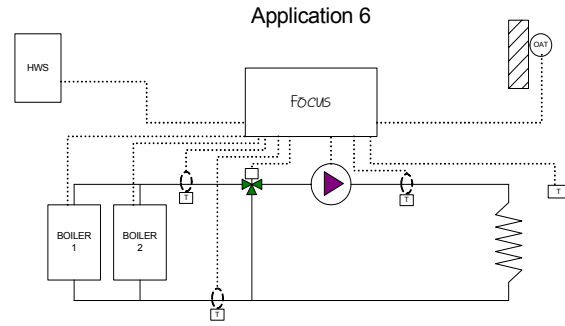
Set up -	Application #5
Typical System Equipment – Note: Additional sensor/outputs can be added to this scheme – see notes starting on page 12 and Other Wiring Options on page 11.	MF focus RTN3060 - Room Sensor 3 x CTN/ITN0120 - Clamp On/Immersion Sensor ETN3060 - Outside Air Sensor

Application 5 Terminal Connections



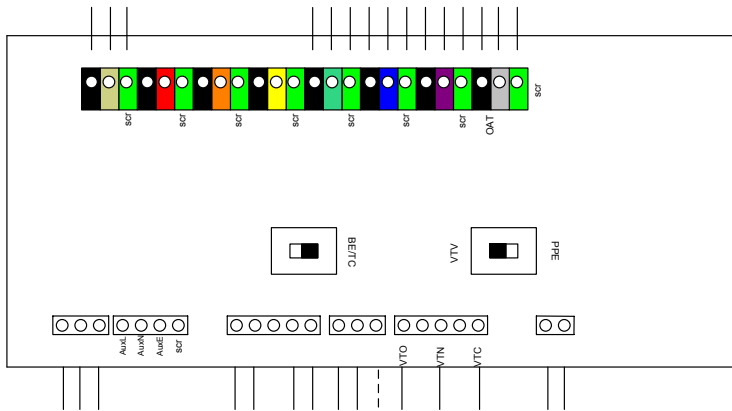
Application 6

This scheme allows for optimisation, boiler and valve compensation and HWS time control. Options available include room averaging, boiler sequencing, night setback and HWS temperature control.



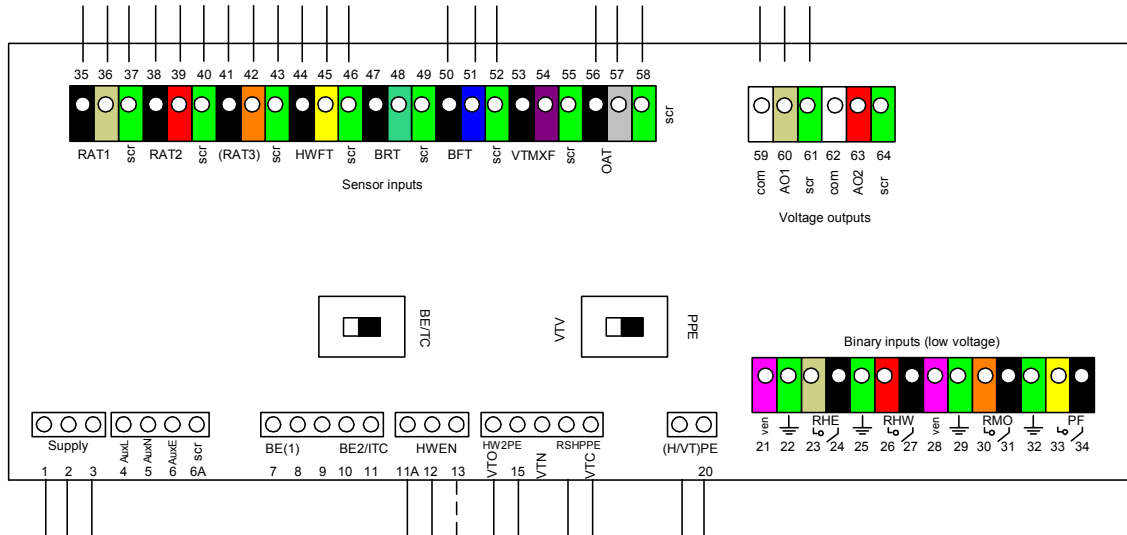
Set up -	Application #6
Typical System Equipment – Note: Additional sensor/outputs can be added to this scheme – see notes starting on page 12 and Other Wiring Options on page 11.	MF focus RTN3060 - Room Sensor 3 x CTN/ITN0120 - Clamp On/Immersion Sensor ETN3060 - Outside Air Sensor

Application 6 Terminal Connections



Other Wiring Options

Other options which could be used include DHW services. In applications 1-4 relays 4 and 5 are available for extra pump control if required ie. DHW secondary pump on terminals 14 and 15 and DHW primary pump on terminals 17 and 18.



The DHW enable can either be for a heater or a valve hence either connections 11A and 12 only or 11A, 12 and 13. Switch number 2 is always to the right unless applications 5 and 6 are used which changes the connections for a raise / lower valve application.

In applications 1, 3 and 5 – single boiler applications – terminals 10 and 11 can be utilised for an Independent Time Channel.

In applications 1, 3 and 5 a boiler sequencer can be used instead of onboard relay control this is used by wiring up to Analog Output 1.

In any of the applications up to three room sensors can be used. The auxiliary power terminals are used with the focus override unit.

Terminal connections 22, 23 and 24 - the remote heating extension; 25, 26 and 27 - the remote hot water extension; 29, 30 and 31 – the remote maintenance override; 32, 33 and 34 – the general plant fault.

Description of Operation

When the basic application has been chosen the *FOCUS* contains a number of control routines that can be completely independent, or may become interlocked by the programmer, these are set on soft switches (Configuration Switches) within the controller. The behaviour of a routine is determined by the setpoints and parameters (User Adjusts) instituted by the programmer. As default there are settings already in place that should in most circumstances give a good level of control. The main routines in the controller are the optimiser, compensator, boiler and hot water services control. The optimiser routine is self-learning; the controller will alter settings automatically depending on prevailing conditions in order to maintain the best level of control and achieve energy savings. The minimum sensor requirement is one flow sensor, one room sensor and an outside air sensor. A list of all configuration switch settings and their default values are on pages 22 and 23. A list of all available user adjusts with parameters and default values are on page 24.

Multiple Room Sensors

Up to three room sensors can be allocated on the controller, analog inputs one to three are used for room sensors one to three. These must be chosen within Configuration Switches five to seven, 'Sensor-room sensor one' and so on. If two or three room sensors are being utilised they can be used for monitoring only or they can be used for control purposes ('Sensor-averaging' Configuration Switch 8) by using the average for day control, and the lowest for optimisation and frost protection. The three room sensors are shown connected on page 11; RAT1, RAT2, RAT3.

Optimum Start

The optimum start facility ('Heating-optimisation' Configuration Switch 12) is a self learning routine which will search for the latest time to start the heating in order to achieve one degree below the desired 'Room day target' (User Adjust 1) for occupancy. The lowest room sensor reading is compared to the desired target. The performance of the optimiser is continually monitored throughout the preheat period and updated to ensure an accurate response in all conditions. Multiple programmable time periods are available for every day of the week. A room sensor must be connected; up to three may be connected.

The maximum optimum start preheat time is four hours. At optimum start the boiler(s) and heating pump are switched on and the Mixing Valve is fully opened as the *fOCUS* enters a boost mode. If used as an optimiser only then during the boost condition the flow temperature will be limited to the 'Normal high VT temp' (User Adjust 5). If used as an optimiser/compensator controller, the flow temperature will be limited to the 'Max VT flow limit' (User Adjust 11). The boost mode will continue until the room temperature reaches one degree below the desired 'Room day target' (User Adjust 1) and then the controller will begin to compensate.

Optimum Stop

Optimum stop is a self learning routine that predicts how long before the end of the occupation period the heating can be switched off whilst ensuring that the room temperature does not drop more than one degree below 'Room day target' (User Adjust 1) before the end of occupation. The optimum stop has a maximum search period of one hour; when the heating is switched off, pump run-on will commence. If the room temperature drops more than one degree below the 'Room day target' (User Adjust 1), the heating will switch back on.

Hi Limit

The Hi limit setting 'OFF above room-SP' (User Adjust 19) is a value (2° default) that is added to the 'Room day target' (User Adjust 1 - default 21°) in this case to give a Hi limit setting of 23°. If this Hi limit setting is reached the *fOCUS* will turn the heating off during an occupation period and pump run-on shall commence. If during occupation the room temperature drops half a degree below the 'OFF above room-SP' (User Adjust 19) then the heating will switch back on.

Outside Air Economy

This allows the programmer to input a setting at which the heating will be turned off if the 'Off above-outdr temp' (User Adjust 4) is exceeded (35° default). When this occurs, pump run-on shall commence. The heating will come back on if the outside air temperature drops one degree below the 'Off above-outdr temp' (User Adjust 4).

Frost Protection

This is a three stage frost protection system; the first stage will bring on the heating pump and open the mixing valve if the outside air temperature drops below the 'Outdoor FROST cutin' (User Adjust 16); the second stage occurs when either the boiler flow or boiler return sensor drops below the 'Boiler FROST cutin' (User Adjust 17), this will bring on the boiler(s); the third stage will bring on the boiler(s) and heating pump if the room temperature drops below the 'Room FROST cutin' (User Adjust 15).

The boiler return sensor is selected through Configuration Switch 9 'Sensor–boiler return' and is connected on analog input 5. The first two stages have a two degree differential and the third stage has a fifteen degree differential before the system will return to normal operation.

Pump Run-On

Pump run-on allows for the dissipation of heat from the boiler to the system by allowing the heating pump to continue running after the end of any heating period. Pump run-on will operate at the end of any heating period, extended time period, frost period or when the heating is overridden off ie, the Summer or Holiday Switches are activated. During the run-on period the VT valve (if fitted) is open, this will then close at the end of the run-on period to prevent gravity circulation during heating off periods. The boiler(s) will be switched off for the duration of the run-on period. The run-on period is ten minutes.

Boiler Control

Boiler control allows for controlling one or two boilers in sequence, if more boilers need to be controlled then an NSQ8032 sequence controller (up to eight stages) may be fitted via Analog Output 1 and Configuration Switch 18 'Boiler-control setup' – applications 1, 3 and 5 only; see page 11 for details. A boiler flow sensor must be connected. The boiler target is calculated on a demand basis, taking into account heating and hot water if required. Boiler control will maintain the boiler flow temperature at the boiler flow target with time and temperature differentials to prevent unnecessary cycling of the boiler. These preset settings are:

Applications 1, 3 & 5 Settings (Boiler sequencer if used via analog output 1 (AO1))

Fullband	6°	MinON	1min
Propband	0°	Min Off	4min
Deadband	0°	MinStep	1min
Speed	0°	ERTdelay	120min

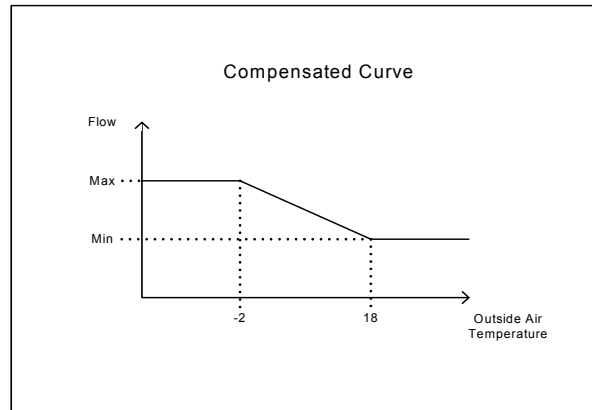
Applications 1 – 6 settings

Fullband	12°	MinON	1min
Propband	-3°	MinOff	2min
Deadband	3°	MinStep	2min
Speed	128°	ERTdelay	12min

Compensation

The compensator operates on the basis of a straight line curve between the outside air temperature and the required flow temperature to produce a calculated flow setpoint. An outside air sensor must be connected. This calculated flow setpoint can be linked to a room reset by activating the 'Heating-flow target' (Configuration Switch 13) and choosing

between a one in two degree reset or a one in five degree reset through the 'Heating-reset ratio' (Configuration Switch 14). The *FOCUS* will then take into account the room temperature and its target in re-setting the slope to suit the building.



The above outside air to flow settings can be adjusted to suit via User Adjusts 5 to 8 with minimum & maximum flow settings via User Adjusts 11, 12.

The resultant calculated flow setpoint is used to provide compensated control by valve compensation, boiler compensation or combined valve/boiler compensation. The compensator may be used in conjunction with the optimiser 'Heating-optimisation' (Configuration Switch 12) (combined system) or on its own, where the programmed heating times then become fixed time start/stops.

Valve Compensation

Control of the flow temperature will be achieved by modulating the mixing valve. During the optimum start boost period, the flow temperature is limited to the 'Normal high VT flow' (User Adjust 6) until the room temperature is one degree below the 'Room day target' (User Adjust 1). Once boost has terminated, compensated control begins and the valve is pulsed open or closed to maintain the desired target. The preset settings are as follows:

Applications 3&4 Settings (0-10v Mixing Valve)

Fullband	8	MinOn	0min
Propband	-8	MinOff	2min
Deadband	0.5	MinStep	1min
Speed	12	ERTdelay	0min

Applications 5&6 Settings (Raise/Lower Mixing Valve)

Fullband	12	MinOn	0min
Propband	8	MinOff	2min
Deadband	1	MinStep	1min
Speed	128	ERTdelay	0min

Night Setback

When enabled through the 'Heating-setback' (Configuration Switch 11) setback control will commence from the end of occupation and continue until the next optimum start or occupation period. In night setback the compensated flow temperature will be reduced because of the reduced room setpoint, 'Room night target' (User Adjust 2). The change from day setpoint to night setpoint will be smoothed gradually from one to the other and vice versa.

Variable Temperature Slope Shift

Occasionally it is necessary to fine tune a calculated slope to better suit a building, this is done through User Adjust 9 'VT parallel shift'. An installer can then add or subtract to or from a slope to move it parallel to its original settings.

This function is also available during night setback as User Adjust 10 'VT night shift'.

Low Return MV Override

The reason for this feature is to prevent low boiler return temperatures which can, with some boilers, cause condensation of the flue gases. This in turn may cause corrosion, especially if the boilers are oil fired. (Configuration Switch 10 'Heating-MV override')

User Adjust 18 'Low retn MV ovrd-SP' sets a boiler return temperature below which the mixed flow temperature control of the mixing valve is overridden. In action it modulates the mixing valve towards its closed position and in doing so the boiler return temperature rises. Once the return temperature is higher than the return override setpoint the mixing valve control is returned to normal control mode, which is to provide a flow temperature which varies in a direct relationship to outdoor temperature. Setting the low return override setpoint to a value to 42° or less disables this feature. A boiler return sensor is needed for this function, wired as shown on page 11 and Configuration Switch 9 'Sensor-boiler return'.

Boiler Compensation

Direct boiler compensation will fire the boiler(s) to maintain the calculated flow setpoint value. During the optimum start boost period, the flow temperature is limited to the 'Normal high VT temp' (User Adjust 6) until the room temperature is one degree below the 'Room day target' (User Adjust 1). Once boost has terminated, compensated control begins and the flow temperature is maintained with time delays and temperature differentials to prevent short cycling and provide stable conditions (See Boiler Control).

Hot Water System

Multiple programmable time periods for each day of the week are available under Time Channel 3. The output can be operated independently or be boiler linked to switch the boiler(s) during an HWS time period through 'DHW-heat source' (Configuration Switch 3). On 'DHW-control' (Configuration Switch 2) the programmer can choose to have temperature control over the hot water or not. If there is no temperature control and the hot water system is boiler linked and demanding then the boiler(s) will switch on regardless of the demands of the optimiser or compensator and control to a target of 70°. If there is temperature control (a hot water sensor on Analog Input 4 (see page 11 for wiring) is required) and the hot water system is demanding – it is within a time schedule and the hot water temperature is below the 'Hot Water target' (User Adjust 3) – then the boiler(s) will switch on until the demand has

been satisfied. When this occurs the boiler target will decrease back to compensation control, if there is no compensation demand either the boilers are switched OFF.

The hot water valve, primary pump and secondary pump can be controlled individually in applications 1-4.

The HWS can be linked into a Remote Extension facility (digital input 2) where if this is activated the HWS will be enabled and there is also a push button on the front of the controller for extending the normal time schedule. At the end of the HWS scheduled time period the primary pump will commence a heat dissipation run-on period of ten minutes.

Pump/Valve Exercise

The pump/valve exercise automatically operates the heating pump and mixing valve once every two days in order to reduce the possibility of sticking and corrosion. The pump will operate and the valve will be automatically opened (depending on the application) at midnight every two days for a period of two minutes and then stop/close.

Holidays and Summer Heating Off

Multiple holiday periods may be programmed into the controller. During a holiday period all of the heating and hot water is off, whilst frost protection remains active at all times. The first date entered should be the Start Holiday date and the second date should be the last date of the holiday. If the 'Summer-heating off' hot water time switch is activated, the hot water schedule remains active. (The controller can be put into holiday or summer automatically from the push buttons on the front of the controller.)

Alarms/Events

The controller has an alarm LED that will be triggered by the following:

Any of the sensor inputs are short/open circuit and/or out of range.

The boiler temperature is more than 20° lower than its target for one hour.

The compensated flow temperature is more than 20° lower than its target for one hour.

Common Plant Fault is activated on Digital Input 4

Events that are recorded but will not cause the alarm LED to flash are:

- Remote overrides activated
- Pushbuttons activated
- Outside Air Economy off enabled
- Frost conditions
- Room Hi Limit enabled

Pump Control

Certain assumptions are made about what pumps will be available, and how they may be used in the six different applications.

Applications 1&2

There is always a heating pump and no ring pump as such. When the system also includes hot water which is boiler dependent, it may be dealt with in three different ways (Scheme A, B or C). In each case there will be occasions where the boiler flow temperature has to be raised to a level which is higher than that needed to meet the demands of the weather compensation circuit, because of the need to give hot water temperature priority. The different options considered are described next.

Scheme A

This is where the flow from the boilers is pumped around the heating circuit and a separate pump is used to circulate water from the boilers around the primary of the hot water cylinder. This may be used to control the temperature of the domestic hot water. If this results in a higher boiler flow temperature than required for weather compensation, the heating control will rely on the heating pump being shut down on its 'OFF above' limit, still allowing higher temperature water from the boilers to be provided for the hot water cylinder.

Whilst the hot water temperature demand from the boiler is lower than the weather compensation, the weather compensation will have priority and there is no conflict; the hot water cylinder temperature being controlled by switching the hot water primary pump on and off.

Scheme B

This is where the flow from the boilers is pumped around both the heating circuit and the hot water primary using the same pump. A motorised valve may be used to control the hot water cylinder temperature. In this case the common pump has to remain on whenever there is a hot water demand on the boilers, even though the room temperature may be higher than its 'OFF above' limit setting.

A scheme like this would normally be used where radiator valves are fitted. Probably the room sensor would be positioned near a radiator which does not have a control valve, or one where the valve is locked at a higher temperature setting than the others in the heating circuit.

Scheme C

This scheme has both a hot water primary pump and a control valve. Like scheme A it allows the heating pump to go off with room temperature.

The hot water control valve is used to control the cylinder temperature. The hot water primary pump is separately controlled so that it can run on, if necessary after boiler shutdown, to dissipate heat without running the heating pump. The control of this pump is from Relay 5.

Applications 3&4 and 5&6

All these applications use a mixing valve and must have a 'ring'/primary pump to circulate water through the boiler circuit.

Applications 3&4

In these applications Relay 5 of the *focus* is available to control the 'ring'/primary pump and the normal setup is to use it to do this. Relay 4 is also available to control the hot water secondary pump on demand. If *focus* is being used to replace a controller which used a common output to control, say, a ring pump and a heating pump with common wiring going out, one option would be to retain and connect relays 5 & 6 in parallel.

Applications 5&6

In these applications Relays 4&5 of the *focus* are not available as they are used for the variable temperature valve control. As a compromise the ring/primary pump, which would normally be controlled by Relay 5, can be controlled by Relay 6, which is primarily used to

control the VT heating pump. If there is a demand from the system for either the VT heating pump or the ring pump to be run then Relay 6 will be on until both are satisfied. The mixing valve will still be able to regulate the VT heating circuit temperature normally. In these two applications the same Relay (6) may also be used to control the hot water secondary pump. If this option is selected Relay 6 would be on whenever there is a demand from either the VT circuit, or the ring pump control, or the hot water secondary.

Hot Water Temperature Control

In all applications where the *fOCUS* provides hot water temperature control, the temperature control relay (Relay 3), is held off if the boiler flow temperature is lower than the hot water temperature. This is to prevent residual heat being taken out of the hot water cylinder.

Applications 1-6

If the hot water has no temperature control (Configuration Switch 2 'DHW-control' is OFF) then Relay 3 is always controlled by the hot water time schedule. If hot water has no temperature control (Configuration Switch 2 'DHW-control' is OFF) and is boiler dependent (Configuration Switch 3 'DHW-heat source' is ON), then the boiler hot water demand is also controlled by the hot water time schedule. If the hot water has temperature control then Relay 3 is always controlled during occupancy by demand ie. if the temperature exceeds setpoint then the Relay will be turned off. If the hot water has temperature control and is boiler dependent then boiler hot water will be demand driven. If under these conditions the boiler flow reading is lower than the hot water reading then Relay 3 will be forced OFF until the boiler flow is greater than the hot water temperature.

Applications 1&2

If hot water temperature control is required and the hot water is boiler linked then Configuration Switches 21 and 22 become available, valve control and pump control.

If valve temperature control is required ('DHW-cylinder control', 'DHW-htg primary pump') and pump control is selected OFF then this makes Relay 5 available to be used as a Shunt Pump. On a call for hot water the boiler setpoint is raised, the valve is opened and relays 5 & 6 run. When the hot water is satisfied, the valve is closed. The boilers, Relays 5 and 6 will not go off until the heating demand is satisfied.

If pump temperature control is required. With this configuration relay 6 acts as a heating pump only, relay 5 is the hot water temperature control pump and relay 3 is not used. If the

heating demand is satisfied and there is a call for hot water then relay 6 the heating pump will go off, whilst relay 5 and the boilers stay on. Where there is a heating demand only then the boilers and the heating pump relay 6 will be on alone.

If both valve control and pump control are required (Configuration Switch 21 is ON, Configuration Switch 22 is ON). This allows the temperature control through valve control and relay 5 acts as a dedicated primary pump. If there is a hot water demand when the heating is satisfied then relay 5 is on, the boiler setpoint raised and the valve opens. If there is a heating demand only then the boiler is on and the heating pump, relay 6.

Configuration Switches

The configuration switches enable an engineer to configure the program very easily. Simply move through the list and set the switches as required.

By setting some switches these may have an effect on later configuration switches. For example, if the engineer has no hot water on his application then subsequent configuration switches dealing with hot water services will not be shown (Cg 02,03,04,21,22) as they are no longer applicable.

Also some switches are not applicable to the actual application chosen and are therefore hidden. For example, Applications 2, 4 and 6 have two boilers and so the independent time channel on relay 2 cannot be used - it is hidden (Cg 15,16,17).

In general the *focus* applications are set with default configuration switch settings which are shown as the highlighted boxes on page 22 i.e. with DHW time only control as an independent heater. One room sensor, a boiler return sensor, no night setback but with optimization on a 1:2 reset ratio. Channel 2 is an independent time and there is a single boiler on applications 1, 3 and 5. Applications 2, 4 and 6 have boiler sequencing on an equalized run time basis and all sensors are monitored for short circuit/out of range failure.

In the table on the following page the greyed boxes are the standard default switch settings.

CONFIGURATION SWITCHES

Switch:	Name:	On/Off Name:	If SET to:	Applications:
Cg 01	DHW-plant setup	-no DHW	Off	1,2,3,4,5,6
		-with DHW	On	
Cg 02	DHW-control	-with time only	Off	1,2,3,4,5,6
		-with time & temp	On	
Cg 03	DHW-heat source	-independent heater	Off	1,2,3,4,5,6
		-with link to boiler	On	
Cg 04	DHW-secondary pump	-no pump	Off	5,6
		-slaved with R6	On	
Cg 05	Sensor-room sensor 1	-not required	Off	1,2,3,4,5,6
		-included	On	
Cg 06	Sensor-room sensor 2	-not required	Off	1,2,3,4,5,6
		-included	On	
Cg 07	Sensor-room sensor 3	-not required	Off	1,2,3,4,5,6
		-included	On	
Cg 08	Sensor-averaging		Off	1,2,3,4,5,6
			On	
Cg 09	Sensor-boiler return	-not required	Off	1,2,3,4,5,6
		-included	On	
Cg 10	Heating-MV override	-not required	Off	3,4, 5,6
		-included	On	
Cg 11	Heating-setback		Off	1,2,3,4,5,6
			On	
Cg 12	Heating-optimisation		Off	1,2,3,4,5,6
			On	
Cg 13	Heating-flow target	-no room reset	Off	1,2,3,4,5,6
		-with room reset	On	
Cg 14	Heating-reset ratio	-room:flow ratio 1:5	Off	1,2,3,4,5,6
		-room:flow ratio 1:2	On	
Cg 15	Ch 2-Ind. timer		Off	1,3,5
			On	
Cg 16	Ch 2-link to heating	-no link	Off	1,3,5
		-works with heating	On	
Cg 17	Ch 2-link to DHW	-no link	Off	1,3,5
		-works with DHW	On	
Cg 18	Boiler-control setup	-single boiler	Off	1,3,5
		-0..10v sequencer	On	
Cg 19	Boiler-firing	-fixed firing	Off	2,4,6
		-sequence rotates	On	
Cg 20	Boiler-rotation	-equal run time	Off	2,4,6
		-weekly rotation	On	
Cg 21	DHW-cylinder control	-no control valve	Off	1,2,3,4
		-with control valve	On	
Cg 22	DHW-htg primary pump	-no pump control	Off	1,2
		-with pump control	On	
Cg 23	Not currently in use	Not currently in use	Off	1,2,3,4,5,6
		Not currently in use	On	
Cg 24	Sensor-monitoring		Off	1,2,3,4,5,6
			On	

USER ADJUSTS

	User Adjust Name	Min	Max	Default	Access Level	App'n
1	Room day target	16°	30°	21°	Free	1,2,3,4,5,6
2	Room night target	16°	30°	21°	Free	1,2,3,4,5,6
3	Hot water target	35°	60°	55°	Free	1,2,3,4,5,6
4	Off above-outdr temp	-10°	36°	35°	User	1,2,3,4,5,6
5	Outdr @ high VT temp	20°	20°	-2°	Installer	1,2,3,4,5,6
6	Normal high VT temp	20°	80°	80°	Installer	1,2,3,4,5,6
7	Outdr @ low VT temp	0°	20°	18°	Installer	1,2,3,4,5,6
8	Normal low VT temp	15°	80°	20°	Installer	1,2,3,4,5,6
9	VT parallel shift	-25°	20°	0°	Service	1,2,3,4,5,6
10	VT night shift	-25°	0°	-10°	Service	1,2,3,4,5,6
11	Max VT flow limit	83°	83°	80°	Service	1,2,3,4,5,6
12	Min VT flow limit	15°	80°	30°	Service	1,2,3,4,5,6
13	Maximum boiler flow	50°	87°	83°	Service	1,2,3,4,5,6
14	Minimum boiler flow	35°	87°	50°	Service	1,2,3,4,5,6
15	Room FROST cutin	5°	20°	12°	Installer	1,2,3,4,5,6
16	Outdoor FROST cutin	0°	8°	2°	Installer	1,2,3,4,5,6
17	Boiler FROST cutin	5°	25°	8°	Installer	1,2,3,4,5,6
18	Low retn MV ovrd-SP	20°	60°	20°	Service	3,4,5,6
19	OFFabove room-SP	0°	5°	2°	User	1,2,3,4,5,6

The above User Adjusts allow the installer to suit the parameters to the project within the confines of the preset minimum and maximum settings.

Please note that some user adjusts will not be shown if they are not required by the application or chosen through the configuration switch settings. For example, User Adjust 18 the low return mixing valve override setpoint is not available in applications 1 and 2 as they do not have a mixing valve. The 'VT night shift' setback override setpoint will not appear unless that option is chosen on Configuration Switch 11 'Heating-setback'.

Installation

Controller – Wall Mounting

The controller should be sited at eye level in a position free from excessive temperature variations and high humidity which may affect its operational stability. The site should be a flat vertical wall, with sufficient space to run conduit to the bottom of the enclosure. This enclosure, the RCP2500 can be ordered from Ambiflex by telephoning: 0161 941 1122, or by E-Mailing us on sales@ambiflex.com

Allow at least 100mm space below the enclosure when using Boston Entry Connections. Mount the controller within the enclosure and secure the enclosure to the wall using the fixing holes provided.

Knock out the appropriate cable entries and wire to the terminals in accordance with the wiring diagram for the chosen application. See pages 5-11. If * wall mounting * and short ribbon cable 330mm is provided

Controller – Panel Mounting

For panel mounting a cut-out 220mmx122mm (see Appendix) is required with at least 75mm clear space at the rear. A 1 metre length ribbon cable is provided. Mount the Power Supply Unit (PSU) into the panel (space required 242mm x 128 mm approx) using the mounting pillars provided and mount the Central Processing Unit (CPU – front display) into the front door of the control panel ensuring that the ribbon cable can reach the PSU comfortably when the door is open.

SAFETY INFORMATION

ALWAYS isolate the mains from the panel before opening and working within the control panel.

Power Supply

The controller requires a 230V AC 50Hz input connected to the power supply terminals.

Wiring

To avoid damage and as a safety precaution, ensure that the controller is isolated from the 230V supply whilst any wiring is undertaken. Wire the mains supply to the appropriate terminals on the PSU. (Terminals 1,2,3 – Live, Neutral, Earth). ALL input wiring must be run in screened cable, earthed at the controller end only. Typical cable would be Belden ???? or RS ????.

Room sensors should be located in a representative area for the zone of heating and not in areas subject to direct sunlight or draughts, or above heat sources or on cold external walls. They should be mounted approximately 1.5 metres above the floor and in accordance with current regulations.

Flow sensors should be positioned in a relevant location that will give a good representative temperature ie. not in a dead leg. Clamp on sensors should be positioned with the sensing element touching the pipework directly, ie. any lagging must be removed and the strap should be tight and the heat transfer paste?? should be used where sensing element touches the pipework.

Outside air sensors should be located on a north facing wall away from heat sources.

Output wiring must be sized in accordance with the load and the cable run. Analog Outputs must be in screened cable earthed at the controller end only.

UNLOCKING AND LOCKING THE *fOCUS*

TO UNLOCK

Press ***** to make sure the *fOCUS* is in standby display mode.

Press **#** hold and press ***** the *fOCUS* display will change to:

Access	Unlock
??????	Locked Key [9] to open

9 and the cursor moves to the bottom line over the leftmost '?'

INSTALLER LEVEL UNLOCK

Enter the installer level password. If left at its default setting enter display as follows:

0 **1** **2** **3** **4** **5**

or appropriate password if this has been changed. As each key entry is made, the '?' changes starting with the rightmost '?' to #.

When all six digits have been entered: press **#** hold and press **0** twice to accept.

If entered correctly, the bottom line of the display will read 'open, installer' to the right of the question marks.

***** to return to standby display.

LOCKING THE *fOCUS*

The *fOCUS* will lock itself automatically 20 minutes after the last keystroke. To lock it before this: key this sequence from the standby display

Press **#** hold and press ***** then **3** **9** **5** then press **#** hold and press **0**

***** to revert to standby display.

ENGINEERS DISPLAY

With the *fOCUS* unlocked **[*]** takes the user to the Engineers Display mode.

```
*fsHT620* 16:30 05/08/02 Mon C:-----  
UI3      12.9  52.5  10.1    B: .... R: * . * .....
```

This display shows the product, time, date, day, the current status of the time channels and the current status of the binary (digital) inputs and relays outputs. Finally the current status of the time channels. Channels 1-3 are being used in this set of applications. If there is a dash shown this means that the channel is inactive, a 'y' is occupancy, a 'b' shows a boost condition during optimisation and an 'o' stands for override.

The bottom line shows that the controller is unlocked to level three (Installer level of access), three temperatures – room 1 temperature, boiler flow temperature and outside air temperature, also the state of the binary input and the relay outputs. A dot denotes the contact energized and a star denotes the contact de-energised.

OTHER INFORMATION

A wide range of information regarding the status of the *fOCUS* can be displayed in more detail whilst the machine is unlocked as follows:

[0] The display will change to:

User	Display	Measured temperatures
------	---------	-----------------------

[#] To view everything in the menu – keep pressing until the display returns to the menu heading.

5 To Access the next menu.

: Measured temperatures

5 : Time channel info.

5 : What is happening now?

5 : Any problems?

5 : Info. for engineers

5 : Accumulator values

From the standby display press **#** hold and press **0** together to reach the User Adjust menu. Move the cursor to Adjust by pressing key **1** and move down by keying **5** to reach the Eventlist menu, press **#** to view all the alarms and events currently stored by the controller. The alarm and events list can also be reviewed by returning to the standby display and pressing the red button at the top right of the focus.

From the Eventlist menu, the Optimises menu can be reached by pressing **5** to go down. This menu holds a log of when the controller optimised on and off, any dates missing from the log are days when no optimisation occurred ie. The heating only came on at the pre-set occupancy time.

OVERRIDES

There are four black pushbuttons on the right hand of the controller, these are pre-set for a Heating extension, Hot water extension, Summer switch and Holiday switch.

Heating and hot water extensions:

Both of these overrides work in the same fashion; one press of the button brings up the display about the extension, and a second press of the button activates the extension for a period of half an hour. This period can be increased by pressing the button again as the extension will increase in half hourly increments with each press until the programmed maximum – four and a half hours is reached. These extensions are programmed such that they can be made active at any time but will only start timing out when the end of occupancy has been reached. When made active during un-occupation periods the time extension starts immediately. The green LED at the side of the push button is lit when the override is active and starts to flash when the timer starts to tick down.

The summer and holiday switches:

Both of these overrides work in the same fashion; one press of the pushbutton will bring up the switch display, another press of the button will change the switch from no to yes and this will work immediately. The green LED will start to flash immediately. This is a manual switch and needs to be reset when no longer required.

Keypad overrides

Accessed from the standby display by pressing key , or . These keys are respectively 'Shutdown til dd/mm', 'Heating off until dd/mm' and 'Maintenance override'. All of these overrides can be activated as a switch by pressing , alternatively end dates/times can be entered to switch automatically.

SETTING A PROGRAM

Setting a program into the controller is a simple process – in essence all the installer need do is choose the correct application, configure the switches, set the time/date and if necessary adjust parameters to suit the site.

SYSTEM CONFIGURATION

Application Selection

From the standby display press **#** hold and press **6** together and the Sysconfg main menu heading will be displayed automatically. Within this menu can be found both the Applications and Configuration Switches for setting a program.

Use the cursor keys to find column 2 and to move the cursor down to find Application this has the tag [Heating Set 1 rev 0] choose the correct application for your site (see pages 5 - 10 for more information on the individual applications)

Application # 1	1 boiler no mix valve (Default)
Application # 2	2 boiler no mix valve
Application # 3	1 boiler 0-10v mix valve
Application # 4	2 boiler 0-10v mix valve
Application # 5	1 boiler Rs/Lr mix valve
Application # 6	2 boiler Rs/Lr mix valve


To choose an application, key **9** to edit the default if required, then key **5** to find the application. Once an application has been chosen, press **#** hold and press **0** together to update the controller. This will automatically configure the controller for the application chosen.

Configuration Switches






Using the cursor key move up from Applctn to the ConfigSw menu. Each Configuration Switch has two states, on and off. Use the keys to move between the switches and alter them to suit, by using key **9** to edit and key **5** to choose between each state. Not all of the Configuration Switches shown will be applicable to all of the applications. If the application does not allow for a switch then the term 'Not currently in use' will appear.

Switch:	Name:	Switch:	Name:
Cg 01	DHW-plant setup	Cg 13	Heating-flow target
Cg 02	DHW-control	Cg 14	Heating-reset ratio
Cg 03	DHW-heat source	Cg 15	Ch 2-Ind. timer
Cg 04	DHW-secondary pump	Cg 16	Ch 2-link to heating
Cg 05	Sensor-room sensor 1	Cg 17	Ch 2-link to DHW
Cg 06	Sensor-room sensor 2	Cg 18	Boiler-control setup
Cg 07	Sensor-room sensor 3	Cg 19	Boiler-firing
Cg 08	Sensor-averaging	Cg 20	Boiler-rotation
Cg 09	Sensor-boiler return	Cg 21	DHW-cylinder control
Cg 10	Heating-MV override	Cg 22	DHW:htg-primary pump
Cg 11	Heating-setback	Cg 23	Not currently in use
Cg 12	Heating-optimisation	Cg 24	Sensor-monitoring

See pages 22-23 for further information about the switches.

Press  to escape to the standby display.

TIMEKEEP

From the standby display press  hold and press  together to display the Timekeep menu. The clock can be set up from here. Scroll through the menus within the second column by pressing key  until the cursor is over Clk Ctrl and key  to edit and change the clock from being stopped to normal. Then scroll through the menus to reach Clockset, again key  to edit and enter the time in 24 hour clock and the date in the day/month/year format.

BST dates can also be inserted, however, this is not absolutely necessary as the changeover is automatic as preset with the change taking place on the last Sunday in March and October.

USER ADJUSTS

From the default display press **#** hold and press **0** . These keys pressed together will take the installer to the User Adjust menu

User	Adjust	Room day target
21.0	9=change	5=nxtAdj

To change this **9** and the bottom line of the display changes to:

19.0 [2 = Up 5 = Down 0 = Reset # = OK]

2 takes the setpoint up. **5** takes the setpoint down.

0 takes the setpoint to the default setting. **#** accepts the changes made.

again to return to normal display.

When the cursor is flashing over the first setpoint, **5** will move the cursor to the next setpoint and so on.

User Adjust #	Name	User Adjust #	Name
1	Room day target	11	Max VT flow limit
2	Room night target	12	Min VT flow limit
3	Hot Water target	13	Maximum boiler flow
4	Off above-outdr temp	14	Minimum boiler flow
5	Outdr @ high VT temp	15	Room FROST cutin
6	Normal high VT temp	16	Outdoor FROST cutin
7	Outdoor @ low VT temp	17	Boiler FROST cutin
8	Normal low VT temp	18	Low retn MV ovrd-SP
9	VT parallel shift	19	OFF- above room-SP
10	VT night shift	20	

See page 24 for more information concerning the parameters available. Press ***** to escape to the standby display.

TIME SCHEDULING

From the standby display press **#** hold and press **2** together to reach the TimeTabl menu. There are default times set up for all three possible channels – Heating, Independent Time Channel and Hot Water. These are Start at 08:30 and Stop at 17:30 for Monday to Friday. These existing lines may be edited or new lines may be inserted. Key **9** is for editing and key **7** is for inserting.

If editing is required the line must first be viewed, **#** then move the cursor along to the section which requires the change and press key **9**. Command options are Start, Opsrt, Stop, Opstop, Cycle and Pulse (the latter options are for future use); Days of the week are numbers 1-7 with Monday being 1 and Sunday being 7; Time in 24 hour clock; Diary link groups – Holiday shutdown, this can be associated with three conditions, 'xcept', 'only' or 'ignore'. If 'xcept' is used with a start line then the start will be operational on any date except for the Holiday shutdown dates, if 'only' is used then the start line will only be operational for the Holiday shutdown dates, if 'ignore' is used then the command will be operational no matter what dates are inserted. Therefore if new start commands are to be inserted, the 'xcept' condition should be used in most circumstances and the 'ignore' condition should be used for stop commands.

Eg. Chnl 1 Opsrt 12345-- 08:30 xcept LG1
 Chnl 1 Opstop 12345-- 17:30 ignore LG

Inserting a new line is done in the same way as editing, only key **7** is pressed. When editing or inserting, press **#** hold and press **0** together to enter **7** new details all along the line. If any changes are made or any lines added, review any alterations in order to make sure no mistakes have been inputted.

To delete a line, view and edit the line by pressing **9** then remove all the days of the week by keying **0**. Once the days are removed press **#** hold and press **0** together to update the line, with no days in it the line will be automatically deleted by the controller.

Press ***** to return to the standby display.

CALENDAR SCHEDULES - Diary

From the standby display press **#** hold and press **3** together to access the Diary menu. Christmas Day and Boxing Day are set as a default holiday in a new controller, other dates can be added or deleted when installing or servicing the system.

To add a new date line press key **7**. This will automatically bring up Holiday shutdown. Holiday shutdown will shut all time schedules down which have the 'xcept' condition as described above. Frost protection continues no matter whether the controller is in Holiday or not.

Once the diary event appears press **#** hold and press **0** together to update the controller and then input the first date then the second following the same process. The first date is the date on which the event is to start and the second is the last date for the event, normal operation resumes the day after. These events can be year specific or for every year.

Eg. For every year a holiday on Christmas day and resuming work on the day after Boxing day:

Holiday shutdown 25/12/xx to 26/12

To achieve the xx in the line when keying in the first date press **#** hold and press **0**, after inputting the first four digits, ie, 2512 the xx characters will then appear automatically making the line current for every year.

Eg. For a year specific holiday at Easter:

Holiday shutdown 18/04/03 to 21/04

An event which is inputted for every year will stay in the controller until it is deleted manually, a year specific event will be automatically deleted once the event has occurred.

To delete a line, view the line to be deleted then key **9** to edit, then with the cursor over the event type key **0** the event will be replaced with *Not required: delete then accept the rest of the line as normal, press **#** hold and press **0** together for all sections. The line will then be automatically deleted.

Press ***** to return to the standby display.

DATA LOGS

From the default display press **#** hold and press **4** together, this will bring up the DataLogs menu. In this menu can be found the enable and sample rates of the data energy and performance logs. The energy log (Data log #1) is set to monitor the Heating time channel versus the degree day datum in the Syscnfg menu (default is 15.5°). The information for the energy log is collected on a weekly basis to the full extent of the log this will then give three years worth of information to the client. The performance logs (Data logs #2 and #3) are as follows:

Data Log #2

Field 1 – Analog input 1, Room*
Field 2 – Analog input 2, Room*
Field 3 – Analog input 3, Room*
Field 4 – Analog input 4, HWS*
Field 5 – Analog input 5, Return*
Field 6 – Analog input 6, Flow
Field 7 – Analog input 7, M Flow*
Field 8 – Analog input 8, Outside

Data Log #3

Field 1 - Mean Room Temp*
Field 2 - Analog input 6, Flow
Field 3 - Analog input 4, HWS*
Field 4 - Boiler Target
Field 5 - Mixed Valve Target*
Field 6 - HWS Target*
Field 7 - Analog input 7, M Flow*
Field 8 - Analog input 8, Outside

* Where applicable.

The defaults for Data logs #2 and #3 are 'run 2/hr', alternatively, the installation engineer can choose sample rates for these standard data logs #2 and #3 from the below list:

Sample Rate	Description
Run 2/hr	2 samples per hour (every ½ hour)
Run 1/hr	1 sample per hour (every hour)
Run 1/2hr	1 sample per 2 hours (every 2 hours)
Run /1min	1 sample per minute (every minute)
Run /2min	1 sample per 2 minutes (every 2 minutes)
Run /5min	1 sample per 5 minutes (every 5 minutes)
Run /15min	1 sample per 15 minutes (every 15 minutes)

Press ***** to return to the standby display.

COMMISSIONING

All points can be simulated (ie. Outputs can be overridden on and off, digital inputs overridden on and off and temperature readings overridden) and a fast clock can be initiated for testing purposes within the Cmission menu. From the standby display press **#** hold and press **8** together:

```
Cmission AnlgSimu Room 1
21.0`C real : [9] to override
```

Use the cursor keys to choose which point to simulate then key **9** to override; a test value can then be entered. Negative values can be entered by keying all **9** , positive values from negative can be achieved by keying all **0** . Then **#** and **0** together to accept the new value. The value can be altered to suit as described above or **7** will cancel the test.

The AnlgSimu menu contains the Analog Inputs (Measured Temperatures); BininSim contains the binary/digital inputs (remote overrides, faults etc); RelaySim contains the relays/digital outputs (boilers, pumps, etc); AnoutSim contains the analog outputs (VT valve and boiler sequencer).

Lastly the commissioning section contains a test clock feature to enable the Service/Commissioning engineer to test out time schedules and calendar schedules.

```
Cmission Testclok
clear
```

The testclok can be run in:

- mins+ 1
- mins+ 5
- mins+ 10
- mins+ 30
- Date+ 1

N.B. Remember to reset the above features when testing is concluded.

APPENDIX

COMMISSIONING TICK SHEET

Client:	
Site Address:	
COMMISSIONING CHECKS	<i>(tick as applicable)</i>
CONTROLLER - Check door seals and ingress of dirt/moisture into the panel	<input type="checkbox"/>
Test door interlocks, switch operations and indicators	<input type="checkbox"/>
Check controller power supply route; fuses, MCB's, earth connection and any special supply detail such as RFI filter, voltage transformer, isolating transformer	<input type="checkbox"/>
Check display and keypad, key actions and backlight settings	<input type="checkbox"/>
Check tightness of terminations and cable security	<input type="checkbox"/>
Check network (RS232) and sub-network (RS485) communications buses for error free operation	<input type="checkbox"/>
INPUTS/OUTPUTS - Check temperature sensors for mechanical damage, integrity of wiring. Confirm correct sensor allocation against programmed reference point	<input type="checkbox"/>
Check analog voltage output against controller calculated output. Check correct operation of controlled devices.	<input type="checkbox"/>
Check digital inputs for correct operation and interlocking action with controlled devices	<input type="checkbox"/>
Check digital output relays for correct operation and interlocking action with controlled devices (boilers, pumps, valves etc)	<input type="checkbox"/>
SOFTWARE/PROGRAM FUNCTIONS – Check system software, application, configuration switches set correctly	<input type="checkbox"/>
Check clock setting, day and date	<input type="checkbox"/>
Check data logs and event list for reporting	<input type="checkbox"/>
Check time/calendar schedules, step through days/weekend operation	<input type="checkbox"/>
Check operation of local/remote override switches and remote indication	<input type="checkbox"/>
Down load temperature data logs and review for performance	<input type="checkbox"/>
Consult with client for any operational changes required to system parameters/adjustments	<input type="checkbox"/>

COMMISSIONING COMPLETION CERTIFICATE

Client's Name:	
Site Address:	
Site Contact:	
Ambiflex Equipment Installed:	
CHECKS CARRIED OUT AT COMMISSIONING	
COMMENTS	
Date of Commissioning:	
Signed:	

PROGRAM SETTINGS

Application	Description	Cross (x)
1	1 boiler no mix valve (Default)	
2	2 boiler no mix valve	
3	1 boiler 0-10v mix valve	
4	2 boiler 0-10v mix valve	
5	1 boiler Rs/Lr mix valve	
6	2 boiler Rs/Lr mix valve	
Configuration Switch	Description	ON / OFF
1	DHW-plant setup	
2	DHW-control	
3	DHW-heat source	
4	DHW-secondary pump	
5	Sensor-room sensor 1	
6	Sensor-room sensor 2	
7	Sensor-room sensor 3	
8	Sensor-averaging	
9	Sensor-boiler return	
10	Heating-MV override	
11	Heating-setback	
12	Heating-optimisation	
13	Heating-flow target	
14	Heating-reset ratio	
15	Ch 2-Ind. timer	
16	Ch 2-link to heating	
17	Ch 2-link to DHW	
18	Boiler-control setup	
19	Boiler-firing	
20	Boiler-rotation	
21	DHW-cylinder control	
22	DHW:htg-primary pump	
23	Not currently in use	
24	Sensor-monitoring	
User Adjust	Description	Setting
1	Room day target	
2	Room night target	
3	Hot Water target	
4	Off above-outdr temp	
5	Outdr @ high VT temp	
6	Normal high VT temp	
7	Outdoor @ low VT temp	
8	Normal low VT temp	
9	VT parallel shift	
10	VT night shift	
11	Max VT flow limit	
12	Min VT flow limit	
13	Maximum boiler flow	
14	Minimum boiler flow	
15	Room FROST cutin	
16	Outdoor FROST cutin	
17	Boiler FROST cutin	
18	Low retn MV ovrd-SP	
19	OFF above room-SP	

QUICK KEYS

Cursor keys:

- 1 : left
- 3 : right
- 2 : up
- 5 : down

Useful keys:

- 7 : add
- 9 : edit
- # + 0 : update controller
- * : escape

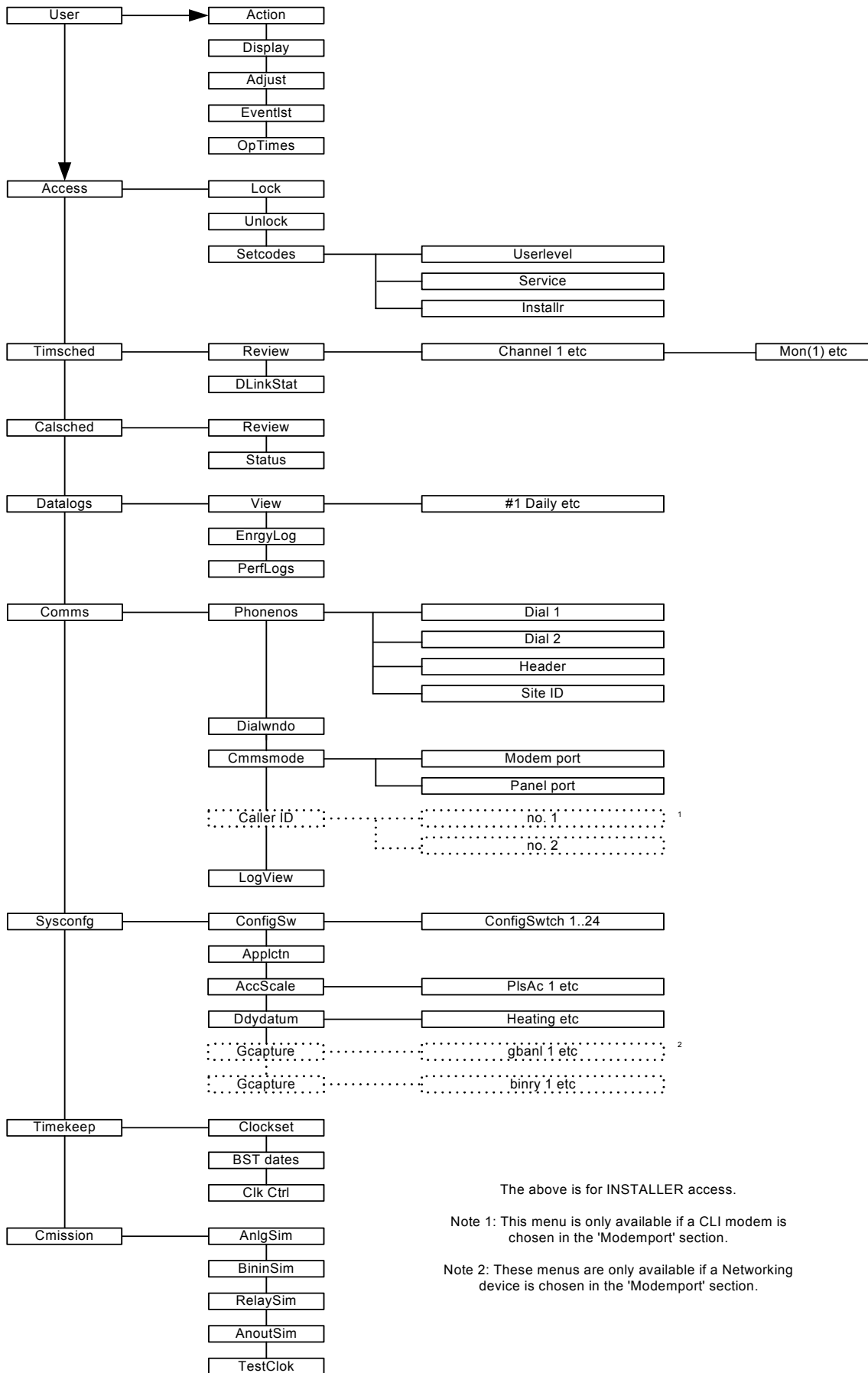
Menu headings:

- 0 + * : Access
- # + 2 : Timesched
- # + 3 : Calshed
- # + 4 : DataLogs
- # + 5 : Comms
- # + 6 : Sysconfig
- # + 7 : TimeKeep
- # + 8 : Cmission

User:

- # + 0 : Adjusts
- 0 : Display

Focus Menu Map



The above is for INSTALLER access.

Note 1: This menu is only available if a CLI modem is chosen in the 'Modempport' section.

Note 2: These menus are only available if a Networking device is chosen in the 'Modempport' section.

GLOSSARY

Term	Description
Analog Inputs	Inputs into the BMS that can be variable i.e. temperature sensors
Analog Outputs	Outputs out of the BMS that can be variable i.e. VT mixing valve
Binary	See Digital
BMS	Building Management System controller
BST	British Summer Time
Compensation	Weather compensation direct on the boilers or through a VT circuit. The BMS looks at the outside and internal temperatures and compensates the flow out into the heating circuits depending on prevailing conditions
CPU	Central Processing Unit - the front plate of the BMS with display and keypad on it
CT	Constant Temperature - a heating circuit without a VT mixing valve on it which is kept at the same temperature eg 60°.
Dead Band	A band around a setpoint where the plant will not change its status, prevents searching and unnecessary firing
Digital Inputs	Inputs into the BMS that are switched either on or off i.e. an override switch
Digital Outputs	Outputs out of the BMS that are switched either on or off i.e. a boiler
Economy Off	The BMS will switch off the heating if the outside air temperature goes higher than its setpoint
ERT	Equalised Run Time - a function used in boiler control where run time is shared equally between the boilers after a delay of twelve minutes
GMT	Greenwich Mean Time
DHW or HW or HWS	Hot Water Services
MV	Mixing Valve
Out of hours setback	The BMS will set back the heating to produce a lower room temperature at night and at the weekend
Optimisation	The BMS will turn the heating on earlier than the actual start time (if required) to achieve the set target temperature by occupancy
PSU	Power Supply Unit - the back plate of the BMS where the terminals are located etc
Room Reset	The BMS will reset the heating depending on the internal temperature throughout the day
VT	Variable Temperature – typically a heating circuit with a VT mixing valve on it where the temperature out to the radiators can be viewed to suit prevailing conditions.
VMD	

RESISTANCE TABLES

Temperature Resistance Table for RTN3060, ETN3060, ITN3060, CTN3060 & DTN3060

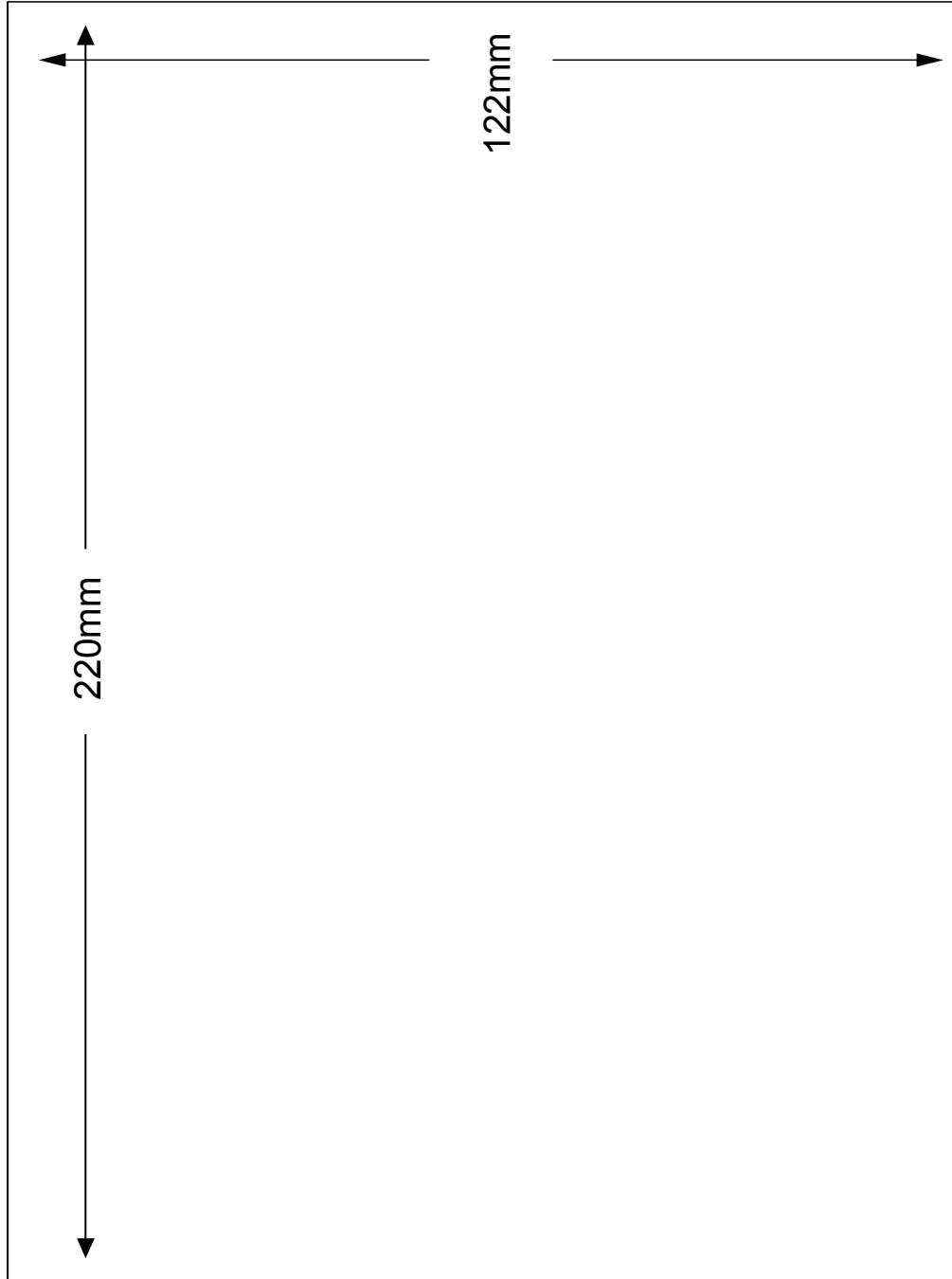
Temp (°C)	Resist.	Temp. (°C)	Resist.	Temp. (°C)	Resist.	Temp. (°C)	Resist.
-20	21860	-4	9044	12	4074	28	1976
-19	20631	-3	8582	13	3885	29	1893
-18	19478	-2	8150	14	3707	30	1814
-17	18397	-1	7740	15	3538	31	1739
-16	17381	0	7353	16	3378	32	1667
-15	16428	1	6988	17	3225	33	1598
-14	15534	2	6643	18	3081	34	1533
-13	14692	3	6317	19	2943	35	1470
-12	13902	4	6011	20	2813	36	1411
-11	13158	5	5718	21	2689	37	1355
-10	12460	6	5443	22	2572	38	1301
-9	11800	7	5182	23	2458	39	1249
-8	11181	8	4936	24	2353	40	1200
-7	10598	9	4702	25	2252		
-6	10048	10	4481	26	2156		
-5	9533	11	4272	27	2064		

Temperature Resistance Table for ITN0120, CTN0120 & DTN0120 Sensors

Temp (°C)	Resist.	Temp. (°C)	Resist.	Temp. (°C)	Resist.	Temp. (°C)	Resist.
20	12190	46	4200	72	1636	98	719.3
21	11940	47	4040	73	1582	99	698.7
22	11420	48	3890	74	1530	100	678.3
23	10920	49	3743	75	1479	101	659
24	10450	50	3503	76	1431	102	640.3
25	10000	51	3467	77	134	103	622
26	9573	52	3340	78	1340	104	604.3
27	9167	53	3217	79	1297	105	587.3
28	8777	54	3099	80	1255	106	571
29	8407	55	2986	81	1215	107	555
30	8057	56	2878	82	1177	108	539.7
31	7723	57	2774	83	1140	109	525
32	7403	58	2675	84	1104	110	510.3
33	7097	59	2579	85	1070	111	496.7
34	6807	60	2488	86	1036	112	483
35	6530	61	2400	87	1004	113	470
36	6267	62	2316	88	973.7	114	457.3
37	6017	63	2235	89	944	115	445
38	5777	64	2157	90	915.3	116	433.3
39	5547	65	2083	91	887.7	117	421.7
40	5327	66	2011	92	861	118	410.7
41	5117	67	1942	93	835.3	119	400
42	4917	68	1876	94	810.3	120	389.3
43	4727	69	1813	95	786.7		
44	4543	70	1752	96	763.3		
45	4370	71	1693	97	741		

CUT OUT TEMPLATE

Ambiflexfocus Template



NOTES

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