Table of contents

Overview of electrical control equipment

HDG regulation and controlling technology

Product group 2 (PG2)		Full application range
	**Lambda Control 1 Plus microprocessor boiler regulation** • Lambda Control 1 plus log boiler controller	HDG R series HDG Turbotec
	**HDG Touch controller** •The central controller with touch screen operation for the	F Series, Euro, K series, Compact 25-80 and standalone controller
	**HDG Control, heating system extension centres** • Heating controller extension centres, EM 4 and EM 8 for up to 77 heating circuits with thousands of different system combinations	
	**HDG Control internal and standalone** **Heating system regulator with touch display** • Intelligent heating system regulation for mixed heating circuits, hot water, solar equipment. • For system expansion, an additional HDG control can be connected via CAN-Bus	
	**SPS control cabinet EMD-C 215 Exclusive** • Control cabinet technology with programmable logic controller, flexible for expansion • Control cabinet included in the equipment price of Compact 100-200 • Expandable with optionally available HDG remote control system (remote maintenance witH visualisation)	HDG Compact 100-200 kW
	**HDG remote control system** Remote access to SPS controller of Compact 100-200	HDG Compact 100-200 kW
	**Stand-by controller** Activation control for support oil/gas boiler linked commonly through low loss header. Low voltage switching for multiple district heating circuits	HDG R20, 25, 30 HDG F Series HDG Euro HDG Turbotec HDG Compact 25-200
	**Dual Boiler Main and Peak controller** Auto activation of 2 Compact boilers	HDG Compact 25-80 kW HDG Compact 100-200 kW
	**Sequencing controller** Activation of multiple boilers based on system demand	HDG Compact 100-200 kW

HDG touch controller & control modules

K Series, F Series, Euro, Compact 25-80

HDG drive module

The HDG Drive Module is an extension of the central module which powers the fuel feed system, ash removal and cleaning systems, and is governed by the HDG Touch via Mobus.
In addition to powering these systems the HDG Drive Module also monitors the motor power consumption, to protect the motors, or reverses them to prevent fuel blockages.

HDG pellet module

The HDG Pellet Module is used in the K10 – 25 range of boilers in the same way as the HDG Central Module and HDG Drive Module combined. It interfaces with the HDG Touch Control via Modbus and governs all aspects of combustion and fuel delivery.

Accumulator management and back end protection are provided by an on board EM4 extension module. If additional heating circuits or solar thermal systems also need to be controlled an onboard, or remote EM8 expansion module can be used.

Central module

The central module takes control of the information relevant for the The Compact 25-80 range of boilers use the central module to collect information about the combustion and hydraulic systems, this information is sent to the HDG Touch via MODBUS. The Processor in the HDG Touch then returns messages to the Central Module which implements combustion and hydraulic related commands.

It is this close control process that gives the Compact 25 – 80 ranger its clean burning efficiency, and reliability. Put simply the HDG Touch Control and Central Module enable the Compact boilers to react to variations in fuel calorific value.

This is achieved by closely monitoring the combustion chamber temperature and O2 percentage in the flue gas. The primary and secondary air flow rates are adjusted to maintain optimum combustion, without over airing, and therefore cooling the combustion with excess air. The monitoring of the combustion chamber also serves to indicate whether the fuel has lit from embers when relighting, negating the need to use the ignitor.

When the boiler is not in demand, and has burnt out, waiting for the energy in the accumulator to be used, the primary and secondary actuators close to reduce heat lost into the flue through natural draught.

The amount of fuel to be delivered to the boiler is sensed by the Central Module, determined by the HDG Touch, and actioned by the HDG Drive module which powers the feed system. This is all communicated through the MODBUS system.

The amount of fuel on the grate is not only governed by the combustion temperature, but also a mechanical device to prevent over-fuelling. When the device detects the maximum fuel quantity, the touch screen shows material stop, and prevents more fuel being introduced to the fire until it has burnt through, all without interrupting heat generation from the boiler.
Accumulator management and back end protection are also provided by the Central Module, Loading the accumulator only when needed, and ensuring that the return water from the accumulator does not drop below 60oC. An additional compensated heating zone and a Hot water service can be controlled from the Central Module, and if more zones are required the system can be expanded with EM4 and EM8 modules.

HDG Touch controller

Touch Controller

The HDG Touch Control is at the front of the entire control strategy for the F Series, Euro, Compact 25-80, K 10-25 and standalone heating controllers.

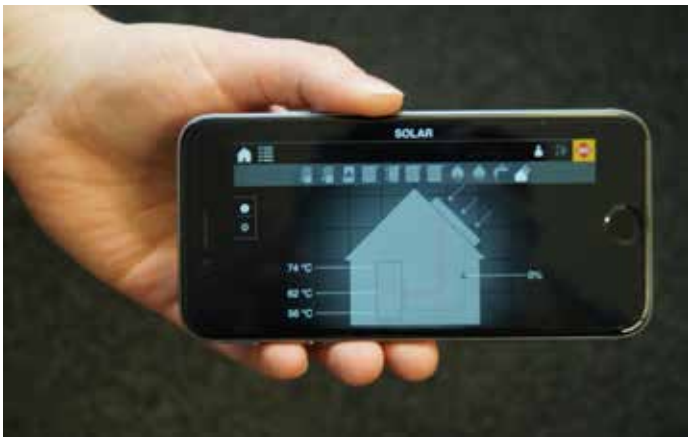
Connected via MODBUS to boiler specific control modules it receives information from all sensors and controls outputs to all electrical components in the boilers. The result is a clear and concise interface which displays and controls all functions including the fuel feed, combustion, power regulation of motors, automatic cleaning, ash removal, accumulator management and if installed heating distribution and solar thermal.

The standard 4.3" industrial quality touch screen is designed to work in boiler room conditions, in low light levels and a dusty environment, and can even be used while wearing gloves, unlike standard touch controls.

HDG Touch Control XL

The optional large touch screen offers additional features such as data logging and web access as well as a 7" 800 x 480 pixel industrial quality screen. The integrated webserver allows access to the boiler and heating controls from tablet's, computers or mobile phones from anywhere with web access.

The webserver comes ready to run, connect to a local network with internet access. The webserver will connect automatically to the HDG dedicated server on the internet. The user needs to register. This allows access from any internet device.



SPS control cabinet EMD-C 215

Compact 99, 100, 115, 150, 200

Included in the Compact 99, 100, 115, 150 & 200

The EMD-C 215 SPS control is the central control for the Compact 100-200 range of boilers. Based on information from analogue sensors throughout the boiler and accumulator it maintains optimum combustion efficiency and accurate accumulator loading.
The SPS control monitors the accumulator temperatures at the top and bottom of the vessel. When the top sensor detects that the energy has been used in the heating system, by the temperature dropping below an adjustable set point, the Compatronic starts the ignition process. Using pre-set parameters the fuel chamber is loaded with fuel, and ignited either by residual embers from the previous firing, or by the use of an electric igniter. The fire is then developed gradually by adding increasing amounts of fuel and primary air until it is established. Once the SPS control is satisfied that there is good fire bed it changes from pre-set parameters to dynamic combustion control using the lambda sensor and combustion chamber temperature.
During combustion control the fuel and primary air are adjusted to maintain the combustion chamber temperature, enabling the Compact range of boilers to work with a variety of fuel types and qualities. This ability is further enhanced by being able to re-commission the Compatronic with different fuel characteristics, when the available fuel changes, and store this information as a separate fuel type. The SPS Control can store up to three different fuel types. The Lambda sensor is a very important aspect of the boiler control. By sensing the amount of oxygen in the flue gas the SPS control delivers precisely the correct amount of secondary air to the wood gas being given off by the fuel in the combustion chamber. This is the second part of the gasification process, and is where the extremely efficient and clean burning characteristics are achieved. If too much secondary air is provided, the heat being developed during combustion is chilled and energy is lost. If too little secondary air is introduced the volatile gasses are not fully burnt, and pass through the boiler as smoke which can condense as tar in the flue. This leads to dirty and inefficient boilers, and wastes a lot of the volatile gas available in the fuel. Due to the nature of wood as a fuel the amount of volatile gas being produced varies greatly minute by minute, and so a boiler with fixed secondary air cannot burn efficiently.
Additional features of the SPS control are Lambda stop, where the fuel rate is paused due to the amount of volatile gas being produced, fuel stop to prevent over filling of the fuel chamber, and a number of safety features. Some of the safety features are boiler isolation when the fuel store has been entered, when there is low water pressure in the heating system, or if a foreign body forms a blockage in the feed system. The SPS also controls the heat exchanger cleaning system, walking grate and ash removal system to further reduce the amount of regular manual input required on site.

For power controller and sequencing controller see page H10

Design and features

- Control cabinet with wall-mounted housing 60 x 80 cm, including fasteners manufactured according to BS EN 60335 and BS EN 50156. Cable entry from above
- Emergency stop switch, operating switch, operation and error LED indicators
- PLC control with 16 digital inputs and outputs, measured value acquisition via CAN analogue module with 8 inputs and 4 outputs, connection for external requests
- Display (8 x 40 lines), regulator transformer 24 V-DC/24 V-AC/ 12 V-AC, with safety automatics, terminal strip with screw terminals for 24 V and 230 V, motor protection with auxiliary relays for feeding, reversing of feeding, discharging, ash removal, current transformer for the reverse feeding, automatic switch-on after a power outage, relays with plug sockets, everything hooks up in the control cabinet. The necessary connection cables are readily connected to the HDG Compact. The 10 m long connection cable must be connected to the control cabinet during installation

Functions

- Feeding system TBZ 150 or TBZ 80 via motor safety switch with motor current monitoring, automatic reverse
- Control of HDG discharge with "Overload discharge" safety end position switch
- Control of the suction turbine with level sensor for the TBZ 80 with pellet delivery system
- Control of the automatic clean-up procedure with end position monitoring and winding protection
- Control of the step grates with automatic ash removal via motor protection switch
- Control of return pump, return mixer with integrated residual heat utilisation
- Control of the primary and secondary air servo motors with air flap interlocks
- 7-day program with two adjustable boiler activation times daily
- Buffer tank management, boiler and chimney ventilation program
- 230V output for external error signals, cycled
- Control of the Rotation fans
- Level monitoring with "Material Stop" function
- Combustion chamber temperature monitoring with "Combustion chamber temperature stop" function
- Lambda sensor with automatic calibration and "Lambda stop" function
- Control of the burning air flow fan and the cyclone dust separator of the HDG Compact 150-200
- Integrated error message memory, store for three fuels, system clock
- Potential-free error output, operating time counter
- Connection of end position switch "Fuel store" and water flow failure protection

Expandable with HDG remote control systems.
HDG Hydronic Plus available as a standalone heating regulator.

Control cabinet expansions	Order code	£ ex VAT	PG
For additional drive motor	HDG3108	340.00	40
Additional control output requiring Epis extension, also fossil fuel boiler activation when extra drive motors fitted	HDG3109	595.00	
Program expansion for higher level regulation (error and operating messages, activation contact, capacity provision 0-10 V)	HDG3110	595.00	
Further control cabinet expansions upon request	On request	On request	

HDG controller expansion modules

EM4, EM8 & EM8+4 for internal or direct connection to HDG boiler

HDG Em extension description

Expansion module EM4
The EM4 has 4 inputs and outputs and can be used for: 1 mixing valve, 2 circulating pumps, 2 0-10V or PWM outputs, 4 PT1000 inputs, 1 digital output, 1 analogue output. This module must be installed either directly in the boiler (Compact 25-80 as hydraulic expansion or in K series (MK2). This module is not suitable for standalone applications.

EM8 expansion module
The EM8 has 8 inputs and outputs. They can be used for 2 mixing valves, 3 circulating pumps, 2 0-10V or PWM outputs, 8 PT1000 inputs, 1 digital output, 1 analogue output. It is installed in an purpose constructed external housing and is connected via BUS with the other control components. The EM8 can be operated via the installed HDG Control touch display as or with its own touch display.

EM8+4 external expansion module
HDG expansion module EM8 + 4. This expansion module is the factory combination of EM8 with EM4 and therefore has 12 inputs and outputs. (Inputs and outputs as EM4 & EM8 above). The EM8 + 4 can be operated via the Control touch display. Alternatively, it is available with its own display as a standalone version.

EM8 expansion module, with touch controller
The EM8 touch has 8 inputs and outputs. (Inputs and outputs as EM8 above). It is installed in a purpose constructed external housing. The EM8 can include a Touch controller. 4.3" touch 7" with remote access.

The HDG extension modules do not contain any sensor equipment. These must be ordered according to your requirements.

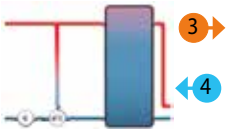
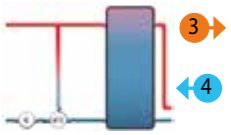
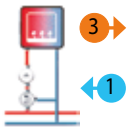
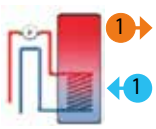
HDG control options		Boiler	Order code	£ ex VAT	PG
EM4 internal expansion		Compact 25-80 K (Mk2) Euro, F series	HDG3479	250.00	40
EM8 internal expansion K series MK2		K Series (Mk2)	HDG3510	510.00	
EM8 expansion external enclosure		Euro F Series Compact 25-80 K10-60 & Standalone	HDG3476	355.00	
EM8+4 external enclosure		Euro F Series Compact 25-80 K10-60 & Standalone	HDG3475	775.00	
EM4 upgrade for EM8 to EM8+4 internal card		EM 4 Expansion Module for EM8 Standalone	HDG3480	260.00	

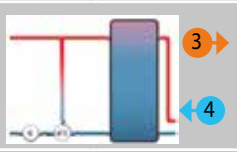
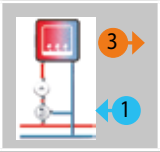
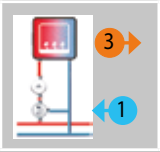
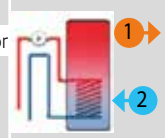
		Order code	£ ex VAT	PG
Star Hub RS485 A star BUS connection hub between HDG Control Touch displays or room controllers. The BUS hub can connect up to 7 devices from one master interface. Required when more than 1 BUS interface installed from one controller.		HDG4148	360.00	40
Room sensor simple Simple room temperature sensor without user interface. Integrated PT1000 sensor informs controller of current room temperature which adapts flow temperature to match set room temperature.		HDG4143	55.00	
Room sensor light Room controller light. Includes user interface with modes Off and Auto. Adjustable thumb wheel will influence flow temperature by adjusting set room temperature by ± 6°C. No local temperature sensor included.		HDG4147	155.00	
Room sensor BUS Room controller with integrated PT1000 temperature sensor which allows for the controller to know the current room temperature and adjust the supply temperature to suit demand. The heating mode can be adjusted using a thumbwheel for off, low temp, high temp, and automatic time modes. Another thumbwheel allows the room temperature set point to be adjusted by +/- 6°C for comfort. Two LEDs are present to display error messages from the controller or boiler. If more than one BUS device is to be fitted to a HDG controller a HDG Star Hub will be required.		HDG4144	260.00	

HDG Controller expansion options

HDG control installation designs

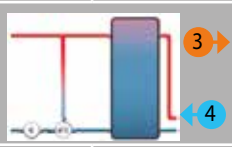
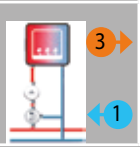
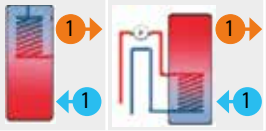
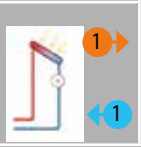
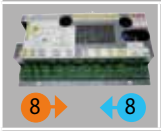
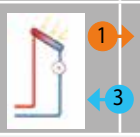
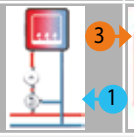
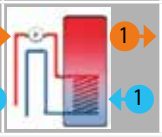
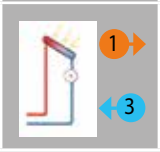
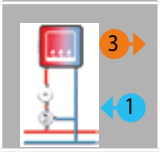
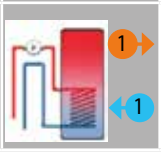
Number or input or output signals control or run a system.
Total of inputs or outputs cannot exceed the EM`s capacity. 1 = Signal Input 1 = Signal Output

K series 10-26	**K Series EM4 pack**		**K Series EM 8 pack**					
	Boiler return and accumulator management		Boiler return, accumulator management, 1 weather compensated heating circuit, 1 hot water cylinder, internal to accumulator or remote.					
System components	Boiler return temperature control	Accumulator management	Boiler return control	Accumulator management	1 mixed heating circuit 1	Hot water from accumulator or Remote hot water cylinder		Solar thermal 1 destination
								
Control equipment		K Series EM4 pack, includes 3 x accumulator, 1 x surface mounted return sensor		K Series EM 8 pack, includes 3 x accumulator & 1 x surface mounted return sensor for accumulator and return temperature control. Design notes EM8 can control 2 x mixing valves, power open power closed (2 outputs) 3 x circulating pumps				
Sensors & options	3 x file pockets		3 x file pockets		1 x PT1000 surface kit 1 x outside sensor	By using accumulator for DHW 1 input and 1 output not used	1 x PT1000 immersion kit	1 x PT1000 immersion kit high temp Recommend EM4 upgrade for 2nd PT1000 immersion kit in DHW
					1 x Room thermostat			
Location	Internal to boiler chassis		External wall mounted wiring centre					

	K series EM 8+4 pack						
	Boiler return, accumulator management, 1 weather compensated heating circuit 1 hot water cylinder internal to accumulator or remote. 1 solar thermal circuit						
System components	Boiler return control	Accumulator management	1 mixed heating circuit	2nd mixed heating circuit or 2nd solar destinations	Hot water from accumulator or Remote hot water cylinder		2 solar destinations or 2 mixed heating circuits
							
	1 x EM 8+4 pack. Suitable for boiler return and accumulator management 1 mixed heating circuit, 1 domestic hot water and 1 solar thermal						
Control equipment		K Series EM8+4 pack, includes 3 x accumulator, 1 x surface mounted return sensor Design notes EM8 + 4 can control 3 x mixing valves, power open power closed (6 outputs) 4 x circulating pumps (4 outputs)					
Sensors & options	3 x file pockets		1 x PT1000 surface kit 1 x outside sensor	1x PT1000 surface kit	By using accumulator for DHW 1 input and 1 output not used	2 x PT1000 immersion kit	1 x PT1000 immersion kit high temp	Sensor depends on solution
			Room thermostat	Room thermostat				
Location	External wall mounted wiring centre							

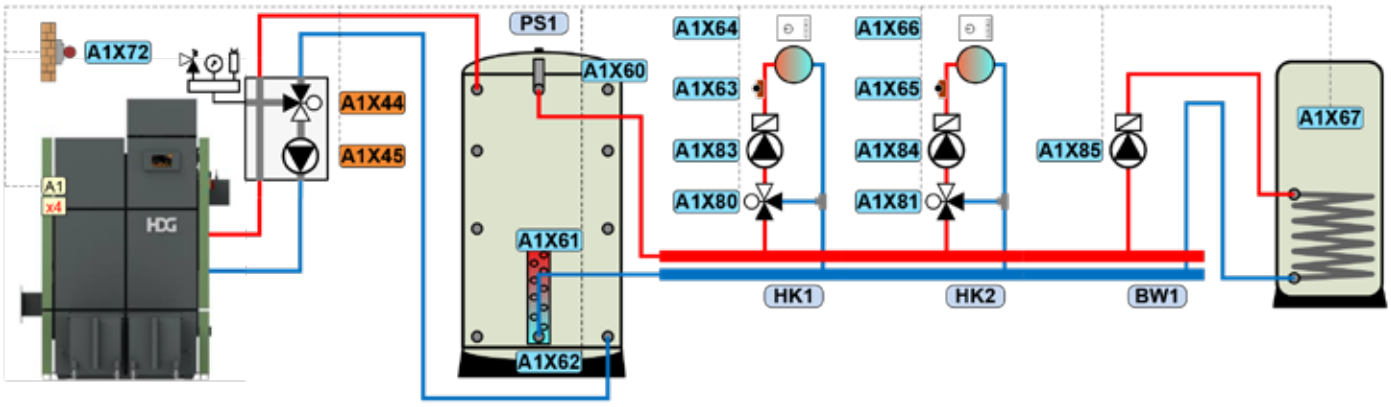
HDG controller expansion modules

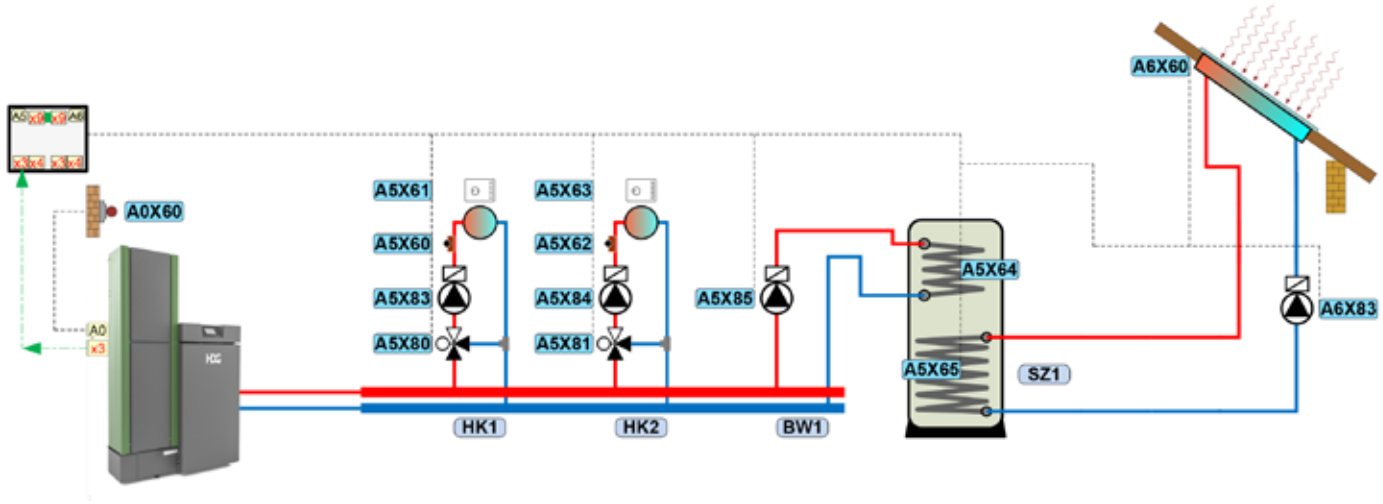
HDG control installation designs

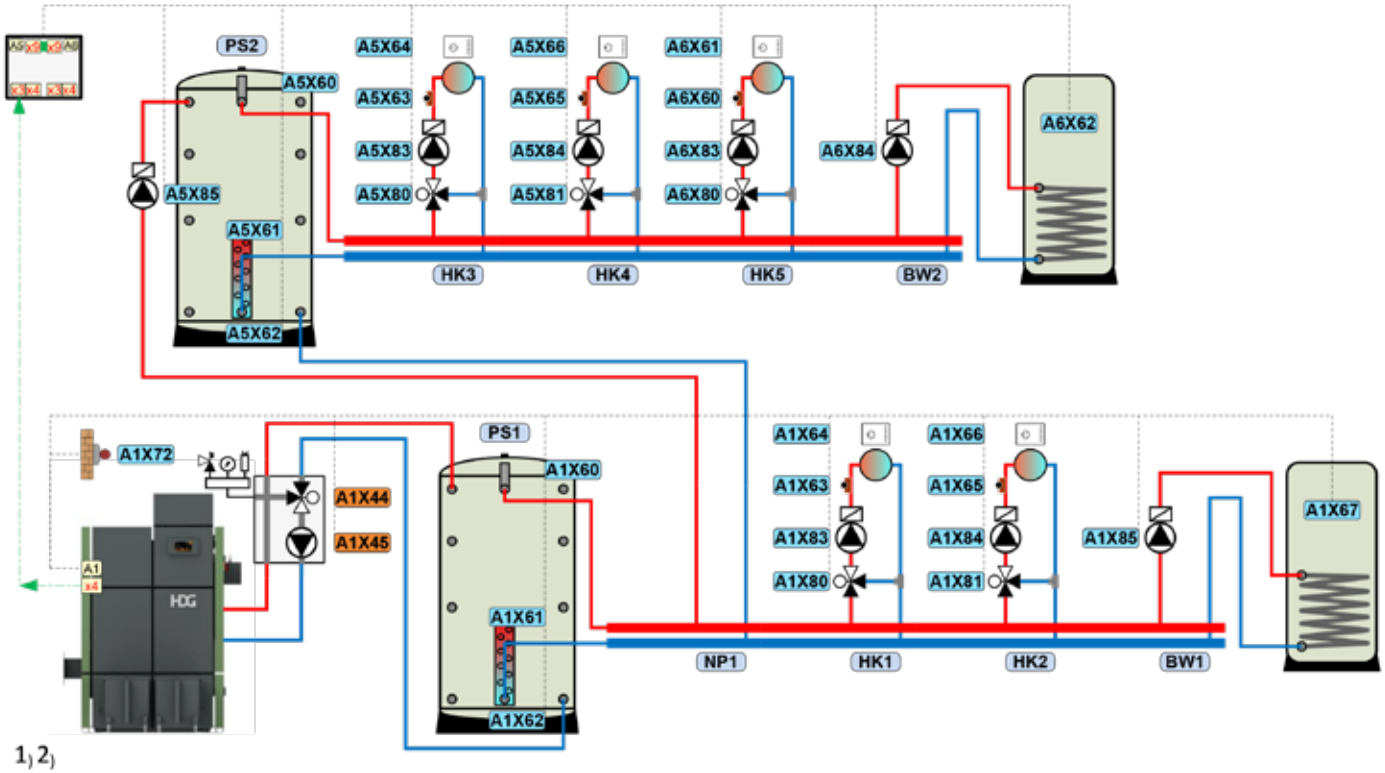
	Standard options of Compact 25-80 Examples						
System	Boiler return control	Accumulator management	1 mixed heating circuit	DHW from accumulator or Remote DHW cylinder		Solar thermal 1 destination		
								
Control equipment		HDG central module for the Compact 25-80. Includes 8 outputs and inputs for multiple heating control requirements. Included with supply of Compact 25-80 range					
Sensors & options	3 x PT1000 immersion kit		1 x PT1000 surface kit 1 x outside sensor		1 x PT1000 immersion kit	1 x PT1000 immersion kit Recommend EM4 upgrade for 2nd PT1000 immersion kit in DHW	Design notes Compact 25-80 can control 2x mixing valves, power open power closed (2 outputs) 3 x circulating pumps
			1 x Room thermostat				
Location	Internal to boiler chassis						
	Additional options Compact 25-80 plus EM4, internal mounted Examples						
	DHW 2 sensors &/or	Solar thermal 2 destinations, or	2nd mixed heating circuit or	2nd DHW cylinder	Design notes Compact 25-80 +EM4 can control 3x mixing valves, power open power closed (6 outputs) 4 x circulating pumps (4 outputs)		
							
	Additional options Compact 25-80 plus EM8, external mounted						
	DHW 2 sensors &/or	Solar thermal 2 destinations, &/or	2nd mixed heating circuit &/or	2nd DHW cylinder	District heating pump 1 &/or	District heating pump 2	Many other system options on request
							
	As an option the EM4 or EM8 is the EM8+4. This offers the ability to add more options such as heating circuits, solar, hot water cylinders, district etc. If more is needed just add an EM8 or EM8+4 with touch screen for up to 70 heating circuits, hot water or district circuits						

HDG controller expansion modules

HDG control installation designs







1) 2)

HDG controller standalone

HDG heating controller standalone

HDG EM standalone controllers

	HDG control standalone versions	Order code	£ ex VAT	PG
	HDG control Touch SAL standalone EM8	HDG3478	1035.00	40
	HDG control Touch XL 7" SAL standalone EM8	HDG3508	1395.00	
	HDG control Touch SAL standalone EM8+4	HDG3473	1295.00	
	HDG control Touch XL 7" SAL standalone EM8+4	HDG3509	1795.00	

Expansion module EM4
The EM4 has 4 inputs and outputs of which they can be used for:
1 mixing valve, 2 circulating pumps, 2 0-10V or PWM outputs, 4 PT1000 inputs, 1 digital output, 1 analogue output. This module can be installed either directly in the boiler (Compact 25-80 as hydraulic expansion or in K Series (Mk2). This module is not suitable for standalone applications.

EM8 Stanalone module, with touch controller
The EM8 touch has 8 inputs and outputs. (Inputs and outputs as EM8 above). It is installed in an purpose constructed external housing. The EM8 touch includes a 4.3" touch controller or the larger XL 7" which can be used to operate local and district heating circuits connected with another controller or as a standalone version.

EM8+4 expansion module, with touch controller
The EM8 touch has 12 inputs and outputs. (Inputs and outputs as EM4 & EM8 above). It is installed in an purpose constructed external housing. The EM8 touch includes a 4.3" touch controller which can be used to operate local heating circuits connected with another controller or as a standalone version.

The EM standalone controllers can be extended by adding EM8 extension modules.

Star Hub
RS485 A star BUS connection hub between HDG Control Touch displays or room controllers. The bus hub can connect up to 7 devices from one master interface. Required when more than 1 BUS interface is installed from one controller.

HDG4148 | 360.00

Room sensor simple
Simple room temperature sensor without user interface. Integrated PT1000 sensor informs controller of current room temperature which adapts flow temperature to match set room temperature.

HDG4143 | 55.00

Room sensor light
Room controller light. Includes user interface with modes Off and Auto. Adjustable thumb wheel will influence flow temperature by adjusting set room temperature by ± 6°C. No local temperature sensor included.

HDG4147 | 155.00

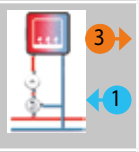
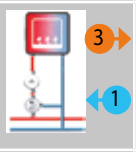
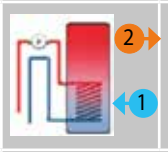
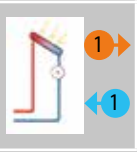
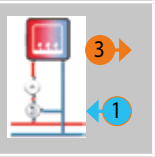
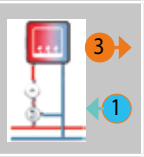
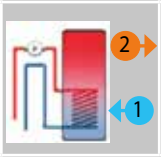
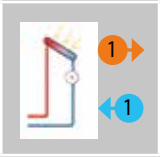
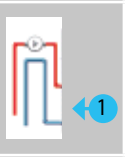
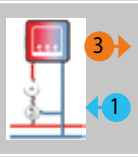
Room sensor BUS
Room controller with integrated PT1000 temperature sensor which allows for the controller to know the current room temperature and adjust the supply temperature to suit demand.
The heating mode can be adjusted using a thumbwheel for off, low temp, high temp, and automatic time modes. Another thumbwheel allows the room temperature set point to be adjusted by +/- 6°C for comfort. Two LEDs are present to display error messages from the controller or boiler.
If more than one BUS device is to be fitted to a HDG controller a HDG Star Hub will be required.

HDG4144 | 260.00

HDG controller standalone

Standalone EM equipment designs

Number or input or output signals to control or run a system.
Total of inputs or outputs cannot exceed the EM`s capacity. 1 = Signal Input 1 = Signal Output

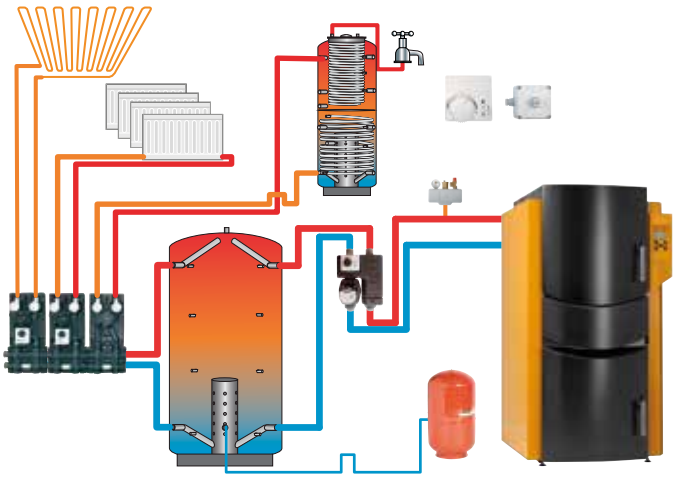
	EM 8 Standalone, for use without boiler, as heating control only Examples						
System components	1 mixed heating circuit or 2nd mixed heating circuit or solar		Remote hot water cylinder or Solar thermal or 2nd heating circuit				
							
Control equipment		EM8 with touch screen	Design notes EM8 can control 2x mixing valves, power open power closed (2 outputs) 3 x circulating pumps			Note: and / or Explained The maximum number of mixing valves, or circulating pumps cannot be exceeded	
	1 x PT1000 surface kit 1 x outside sensor	1 x PT1000 surface kit	1 x PT1000 immersion kit	1 x PT1000 immersion kit high temp			
	1 x Room thermostat	1 x Room thermostat					
	EM 8+4 Standalone, for use without boiler, as heating control only Examples						
System components	1 mixed heating circuit	&/or 2nd mixed heating circuit	&/or Remote hot water cylinder	&/or Solar thermal	&/or District heating pump	&/or 3rd mixed heating circuit	
							
Control equipment		EM8 + 4 with touch screen	Design notes EM8 + 4 can control 3x mixing valves, power open power closed (6 outputs) 4 x circulating pumps (4 outputs)			Note: and / or Explained. The maximum number of mixing valves, or circulating pumps cannot be exceeded	
Sensors & options	1x PT1000 surface kit 1 x outside sensor	1 x PT1000 surface kit	1 x PT1000 immersion kit	1 x PT1000 immersion kit high temp			
	1 x Room thermostat	1 x Room thermostat					
Location	External wall mounted wiring centre						

SHT Intelligent heating control extensions

For HV, PNA andTDA

SHT control extensions allow for improved heating efficiency as the demand of the heating system informs the boiler what the current and future requirements will be.
Zero Ridge would always advise that an integrated weather compensated heating controls are installed as part of the SHT`s boilers installation.

The simplest install is where the boiler controls the heating of the accumulator and no heating circuit.



The SHT system controller can control up to 6 heating circuits and 3 hot water cylinders when the suitable extensions have been added.
Control of the solar thermal can also be integrated as can the control over district heating temperatures and flow rates.
The new district mixing valve controller adjusts the temperature of the district flow based on the highest system demands. If a under floor heating circuit is running at 45°C the district temperature will be reduced to 50°C. The district pump speed is also controlled to help maintain a fixed Delta TΔ.
The SHT boilers can control two mixed heating circuits and one hot water circuit as standard. If the boiler is to be installed remote from the building being heated or more heating circuits are required, then a BUS extension module will be required.

Many options and designs are available please contact the Zero Ridge design team
for assistance.

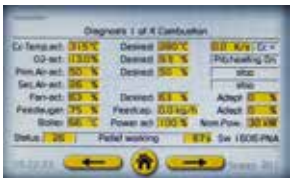
SHT control options		Order code	£ ex VAT	PG
	**Intelligent room device** Each heating circuit is fitted with the an Intelligent room device. The SHT controller uses the outside temperature to calculate the heating temperature required based on time of day and room temperature setting. The room device assists with the calculation by informing the controller of current temperature conditions. The preset temperature can be adjusted up or down by 3°C on the thermostat. The current heating cycle can also be changed. Options are: Off. Set back. Day and timed.	SHT4038	83.00	40
	**Intelligent room device with digital display** The intelligent room device with digital display is a low temp, high temp and timed modes device which also allows control of your heating system settings remotely from the boiler. This device is ideal for situations where multiple properties are heated from the same boiler, allowing independent, weather compensated, heating for each property. Additionally, the device will display all important boiler information including status, accumulator charge and indication of a error.	SHT4080	399.00	
	**Bus extension module** A BUS module is required when more than 2 mixed heating circuits are present, heating circuits which are remote from the boiler, district pump and temperature control or solar heating interface is to be used. It allows up to 2 mixed circuits, one hot water circuit and room thermostat to be connected remotely or locally. Two additional BUS modules can be added per installation.	SHT4077	449.00	

SHT Touch controller and remote access

Option or upgrade for SHT boilers HV, TDA and PNA

The latest in touch screen boiler operation

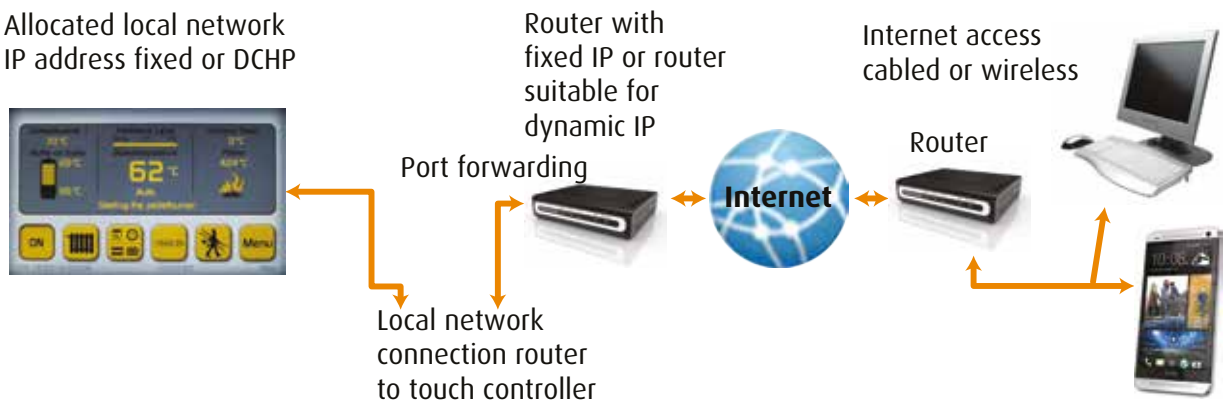
The SHT touch controller is the very latest in boiler touch screen technology. The purpose designed interface can be ordered as an alternative to the standard button controller or as an upgrade to current TC3 models.
The simple and easy menu is simple to navigate.
The home screen gives a clear overview of the current boilers status including boiler, buffer and heating temperatures, and bulk fuel store levels.
Simply pressing on the heating circuit button changes the screen where time or temperature settings can be changed.
The operating hours screen advises when next service is due or the diagnosis page for a more in depth over view of the combustion conditions.



Access your boiler from the internet or local house network

The SHT touch controller comes ready to be access from your local home network.
Connect an RJ45 patch cable from the back of the SHT touch interface into your local network or directly into your router. (If your network is wireless source a wireless repeater with a RJ45 connector. The controller will obtain IP address from your local DCHP server normally your internet router, and off you go for a local connection.

Access from the internet.
Remote boiler access requires internet access through fixed and secure connection. For most applications, a fixed IP address is required at the router to enable access from the internet. Dynamic IP connection maybe possible. Either a public IP routed directly to the boilers web interface or port forwarding implemented to a local IP which has been allocated to the visualisation unit. This type of installation may require an IT professional to implement.



SHT Touch interface HV, TDA, PNA		Order code	£ ex VAT	PG
	Touch screen surcharge with new boiler purchase instead of button controller. (Note this offer is only with initial boiler purchase. If a change is required after purchase choose the option below.	Suffix T to the part number ie SHT2031T	379.00	
	Retrospective Touch screen for TDA and TDA.HV. Use this option if you have the button TC3 controller and wish to upgrade to the Touch controller. Note a recommission of the boiler may be required.	SHT4117	849.00	40
	Retrospective Touch screen. for PNA. Use this option if you have the button controller and wish to upgrade to the Touch controller. Note a recommission of the boiler may be required.	SHT4118	849.00	

UVR16x2 Self programmable controller

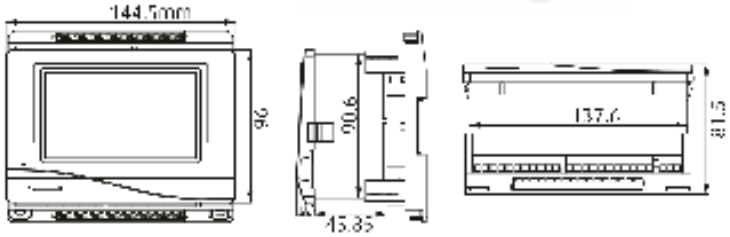
Freely programmable universal controller

Zero Ridge UVR controller provides a full freely programmable controller with a 4.3" touch screen user interface. This interface allows a graphical over view of the important control parameters i.e. heatingand hot water heating times and other useful information.
The freely available control library has over 40 different function modules which can be combined at random to create up to 128 separate actions. (An action carries out a purpose such as start pump for hot water cylinder).
In combination with the C.M.I remote access the UVR16x2 offers interactive visualisation via smart phone, tablet or PC. The CMI remiote access even allows remote update of operating actions.
The UVR can be programmed either directly on the controllers touch screen or with the free PC software TAPPS 2. The program is transferred to the controller via SD card or via remore access with the CMI control monitoring interface.

The UVR is available in four different installation forms.
1. Complete control including enclosure. 2. Complete control unit requiring enclosure. 3. Complete control system with sperate touch and transport module. 4. Transport module including processor with interface or enclosure.

Features

- 16 Sensor inputs of the following types
  PT1000, KTY (1 & 2 K Ω), PT100, PT500, Ni1000, Ni1000TK5000, room sensor RASPT, radition sensor GBS01, thermocouple THEL, humdity sensor RFS, rain sensor RES01, max pulse 10Hz, voltage up to 3.3V, resistance 1-100k Ω, Digital inputs 7,8: 2 x 0-10v, 1 x 4-20mA, inputs 15,16: 2 x pulse 20Hz
- 16 outputs of the following types
  4 speed-adjustable outputs and 7 relay outputs, 5 multifunction outputs, optional 0-10v, PWM, relay (with relay extension module)
  CAN BUS for data exchange with CAN BUS devices
  DL BUS to connect external sensors and for data evaluation
  24V power supply for industrial sensors and actuators (max 3W)



FMS 16x2 UVR controller		Order code	£ ex VAT	PG
	UVR 16x2 2K Controller combined touch interface including processor and power control plus input and output interface	PL2312	574.00	40
	UVR 16x2 2S Controller combined touch interface, including processor and power control plus input and output interface. For panel or DIN rail mounting (no enclosure)	PL2313	546.00	
	UVR 16x2 E-DE Separate touch interface with processor and power control including input and output interface. Includes 550mm ribbon cable	PL2314	596.00	
	UVR 16x2 E-NP Separate processor and power module for cabinet installation. Identical to performance but with integrated processor module without touch screen interface. Several can be integrated and then operated from the CMI or the CAN-Touch	PL2315	510.00	
	Housing for UVR16x2 E-NP, (without circuit board). Includes IP66 housing, template, 2 M20 glands, 2 x M32 grommets, 2x M40 grommets	PL2316	137.00	
	Relay module for UVR16x2 converts 2 of the 5 multifunctional outputs to relay outputs. Required for additional relay outputs	PL2317	35.00	
	Over voltage protection for CAN BUS. Designed for direct internal connection to the UVR16x2	PL2318	44.00	

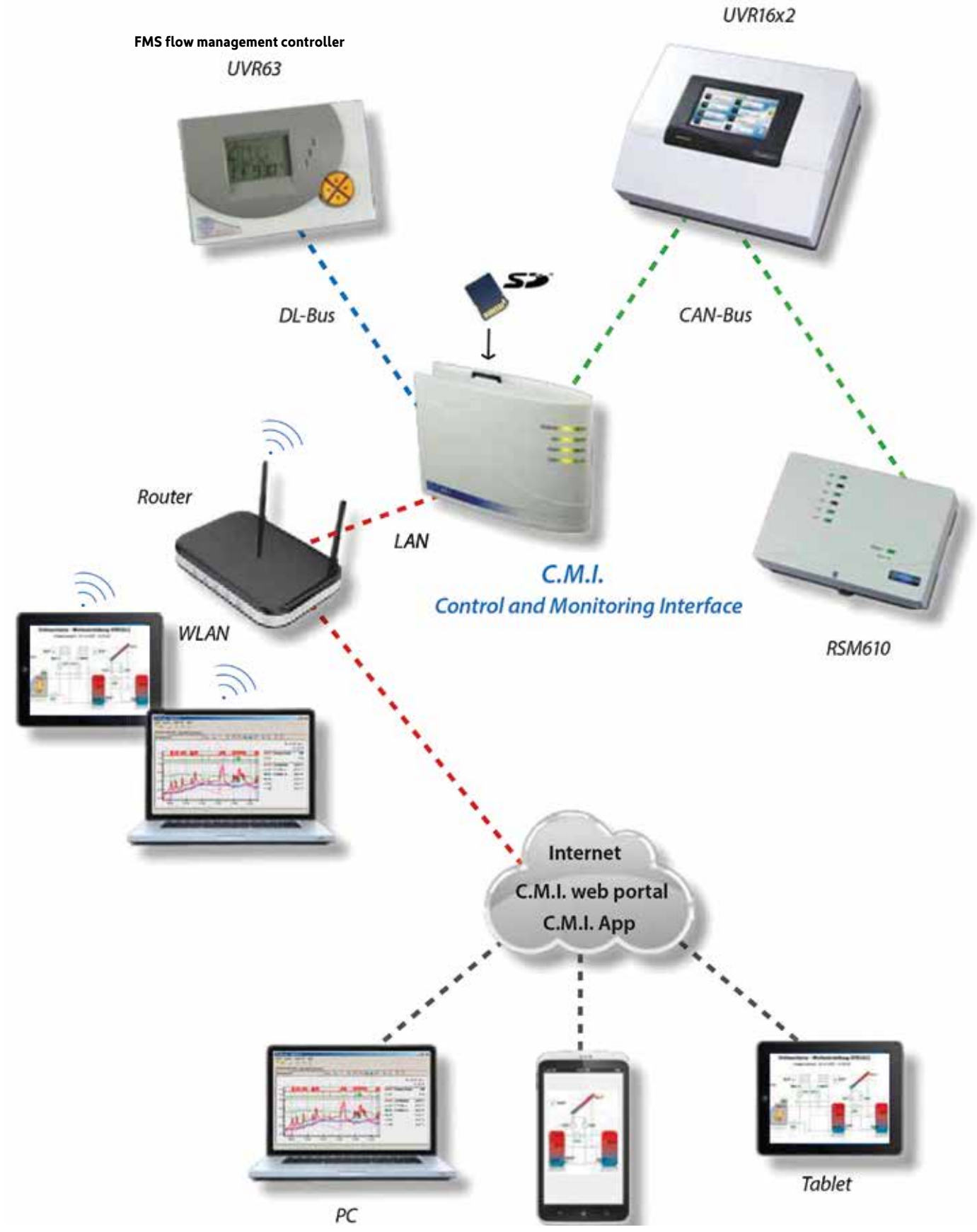
UVR16x2 Self programmable touch screen controller

Accessories, input and control

UVR6x2 Accessories		Order code	£ ex VAT	PG
	**RSM610** Freely programmable as the 16x2 controller but without a display or direct interface. It can be used as an extension for the UVR16x2 or standalone. Display, monitoring and updates while of site is via CMI (control and Monitoring interface), UVR16x2 or CAN-MTx2 Features 10 outputs, 6 relay, 4 multifunctional 0-10v, PWM or when using Hirel relay module multifunctional can increase outputs to 10 relays 6 inputs, sensors can be digital or impulse. Features DL BUS interface to connect to other devices and Can BUS. RSM610 directly to DIN rail or with its own Backing and power supply SK-RSM	PL2319	191.00	
		PL2320	19.00	
	**CAN-MTx2** With its 4.3" touchscreen is a control and display unit for the freely programmable universal controllers UVR16x2, RSM610 and all x2-compatible devices. It uses the same operating concept as the UVR16x2 controller and features a sensor unit for room temperature and humidity	PL2321	189.00	
	**CAN-Touch** This is a 10" LCD monitor with a touch-sensitive surface. It provides a display and operating interface for the freely programmable UVR1611 controller. Caution: The CAN-Touch is currently not yet compatible with the UVR16x2 or the RSM610. This is expected to be possible from the 2nd quarter of 2016	PL2322	389.00	
	**CAN-I/O 45 Can expansion module** Provides additional 4 input, 3 relay outputs and one analog output for the UVR16x2 and RSM610. The range of programming options, functions and output is the same as the RSM610 control module, but the device has no clock function, no own power supply and fewer inputs and outputs	PL2323	136.00	
	**Room sensor , RASPT** This PT1000 room sensor offers control of a weather compensated heating or a constant temperature heating circuit. The current temperature set point can be changed +/- 5°c, as can the heating mode from Normal (occupied), Lowered (unoccupied or night time), frost, or automatic	PL2324	34.00	
	**Room sensor with remote display, RAS-PLUS** This room sensor offers the same options as the RASPT. In addition it is possible to display controller sensor valves and output states. via the connected DL BUS. DL BUS load 10%	PL2325	59.00	
	**Wireless Room sensor , RAS-F** All the features of the RASPT room thermostat. Using the 868.5 MHz wireless system. Up to 8 wireless sensors can be coupled to 1 wireless receiver RCV-DL. In open air range approximately 1000 meters. In a building with at least 2 steel reinforced concrete walls reception should still be suitable. A single CR2032 battery will power the sensor for approximately 3 years	PL2326	79.00	40
	**Wireless Room sensor receiver, RCV-DL** The receiver forwards the signal via the DL BUS to the controller. During startup the transmitters link to the receiver are allocated a unique DL-BUS address. DL BUS load 43%	PL2327	59.00	
	**External Sensor, AUSPT** External air temperature sensor with integrated over voltage protection. PT1000, -30°c-50°c	PL2328	12.00	
	C.M.I. is an interface for convenient system monito-ring, remote control, data logging and visualisation of all controllers with DL or CAN BUS	PL2329	208.00	
	Features include. Remote maintenance of CAN BUS devices, Function data administration for CAN BUS devices, Operating system management for CAN BUS devices, System visualisation via PC, smart phone or tablet, Revision of parameters of CAN BUS devices, Data logging via CAN BUS or DL BUS, Event-controlled notification via e-mail, DIN rail or wall mount, Plug & play solution via server, Slot for GSM module MDC-GSM Operation and access can be directly via LAN network, via web portal https://cmi.ta.co.at or via web portal https://cmi.ta.co.at, Interfaces, Can BUS, Two DL BUS inputs, Ethernet RJ45, SD card Models. 01/CMI-NT with power unit. 01/CMI-GSM with GSM module	PL2330	347.00	

Control and monitoring interface

Options and uses



Control accessories

PT1000 sensors and accessories		Order code	£ ex VAT	PG
	PT1000 immersion Kit, includes PT1000 sensor with 2m cable and triple file pocket 140mm Suitable accumulator/buffer applications with thick insulation	MS2070	22.00	40
	PT1000 immersion Kit, includes PT1000 sensor with 2m cable and triple file pocket 60 mm Ideal hot water cylinder applications or in buffer with thin insulation	MS2069	20.00	
	PT1000 surface mount kit, includes PT1000 sensor with 2m cable and surface adaptor. Suitable for all applications where surface measurement such as pipe work is required. **Note:** Clamping strap not supplied due to multiple installation possibilities. Recommended strap type jubilee clip or similar	MS2068	13.00	
	PT1000 surface adaptor block. For use to convert existing PT1000 immersion sensors for surface applications. Suitable for 6 mm x 40 mm cap size sensors	MS2066	1.00	
	PT1000 sensor. Supplied with 2 metre cable. Cap size 6 mm x 40 mm	MS2065	11.00	
	PT1000 sensor high temperature. KEPT1000. Reliable temperature range 0c-160c sensor cap size 2 x 20 mm			
	Outdoor temperature sensor PT1000, with integrated over voltage protection. -30°c -50°c AUSPT	MS2067	24.00	
	Outdoor temperature sensor PT1000 with stainless steel external probe for faster respons.	MS2067	49.00	
	Sensor starter kit includes 10 x PT1000 sensors, 1 x high, 1 x medium, 8 x standard temperature, 6 immersion pockets 4 x 140 mm, 2 x 90mm, 2 x surface mount roll springs, 2 x room sensors, 1 x external sensor	PL2331	205.00	

FMS Flow management system

Controled flow temperature, pump speed and Delta ΔT

The Zero Ridge FMS flow management system is purpose built to control the pump speed and regulate the heating flow temperature.

The Zero Ridge FMS Flow Management System uses a 1-10V, or PWM, signal to control the pump speed based on the difference between the system flow and return temperatures. It also regulates the flow temperature by controlling a 3 port mixing valve to blend some of the cooler return water with the flow from the accumulator.

There are two main functions of the speed control. These are to regulate the amount of heat delivered based on the heating demand, and to improve stratification in the accumulator.

Heating systems in the UK are designed to cope with temperatures of -1ºC. At these outside temperatures the heating flow may be reduced by 10ºC - 20ºC as it has passed through all the heat emitters heating the building. It is estimated that in the UK 90% to 95% of the time the return temperature is less than its design temperature difference below flow temperature because low outside temperatures are rarely sustained for long periods of time, and as a building warms up the amount of heat it needs is reduced. Because the temperature difference between the heating flow and return is direct result of the amount of heat being transferred to the rooms it is the ideal measurement to control a pump and deliver the right amount of heat at the right time.

The purpose of an accumulator is to sore heat in the form of heated water for use on demand. Accumulators are designed to stratify, keeping the hot water at the top of the accumulator while cooler return water builds up at the bottom. If the accumulator is stirred the temper at the top of the accumulator falls as the return is mixed with stored high temperature water. The two most common causes of stirring are the velocity of the water entering and leaving the accumulator, and the temperature difference between the water leaving the accumulator and that entering. If this temperature difference is too small (<5ºC) the difference in density is too small for the cooler water to sink, and so mixes with the desired high temperature water. The FMS regulates the pump speed to maintain the temperature difference between the heating flow and return, usually to 20K, and ensures reduced velocity and greater temperature during lower demand, and responds instantly to higher demands, but maintaining the same temperature difference. The regulation of the flow temperature saves energy by reducing heat loss, and can be used to reduce emitter surface temperature. The amount heat lost into the ground around district heating mains is a function of the temperature difference between water flowing in the pipes and the ground around it. By limiting the flow temperature to 70ºC the heat loss will also be reduced. In addition to this many manufacturers of underground heating pipe work reduce the predicted usable life of the pipe when the flow temperature is greater than 70ºC and my void the warranty.

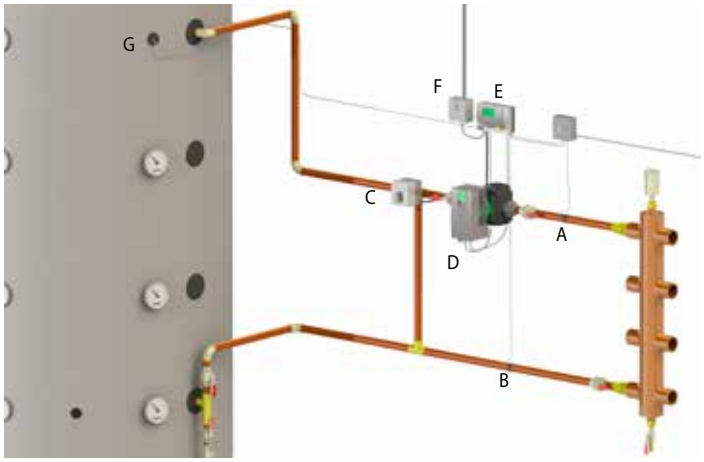
The FMS kit consists of two main components:

Main controller and a 3 port mixing valve (size dependant on maximum heat demand) The main controller uses 3 x PT1000 sensors which can be strapped to pipes and the accumulator as required, or fitted with file pockets (recommended). See Section I for options.

One sensor is fitted to the system flow pipe, one to the system return pipe, system side of mixing valve and one to a suitable position in the accumulator.

The mixing valve is fitted accumulator side of the circulation pump.

For speed control the circulation pump must be one of the following 3 types: 1. Old style pre-inverter (triac), maximum of 1.5 amp. 2. Inverter with 0-10v module, 3. Inverter with PWM (Pulse width modulation).



A	Flow temperature sensor PT1000
B	Return temperature sensor PT1000
C	3 port mixing valve, L,L,N, 150 second rotation, Power open/close
D	Speed controlled circulation pump, 0-10v or PWM
E	Zero Ridge FMS 64 controller
F	Remote resistance switching
G	Accumulator temperature sensor

Operation

The demand signal (F) is a volt free resistance signal from the heating system. This can be from multiple points over a large distance. This activates the circulation pump as long as the temperature at PT1000 sensor (G) in the accumulator is above set point.

The FMS controller monitors the PT1000 sensor at flow (A) and controls the 3 port valve to maintain set flow temperature (default 70°c). If the temperature in the accumulator is above 70°c the return system water is mixed with the accumulator flow to maintain set point. If the flow temperature from accumulator is below set point the valve fully opens.

The return temperature PT1000 sensor monitors the system return. The FMS controls the circulation pump speed to maintain the set delta T (ΔT), default 20°K (difference between flow and return). If the temperature difference increases to more than 20°K, it recognises that more energy is demanded by system and the circulation pump speed increases, the difference is less than 20°K the pump speed reduces as less energy is demanded.

This control system works well when linked with a Zero Ridge stratification accumulator which includes stratification column and snorkel flow and returns.

Most circulation pumps operate in a range of 30-100%. If demand is 30% or less the circulation pump cannot reduce its speed (and thus energy). In these circumstances as long as the accumulator is above set flow temperature the system water by-passes the accumulator to prevent stirring and returns it to Wthe system.

This low demand is a common problem when only small energy demands occur such as hot water cylinders and under floor demands in warmer weather.

FMS Flow management system

Other uses for the FMS 64 controller

FMS controllers	Order code	£ ex VAT	PG
FMS Controller without 3 port mixing valve	PL2076	147.00	
FMS Controller with DN15 3 port mixing valve and 6 Nm servo motor	PL2096	254.00	
FMS Controller with DN20 3 port mixing valve and 6 Nm servo motor	PL2097	256.00	
FMS Controller with DN25 3 port mixing valve and 6 Nm servo motor	PL2077	265.00	
FMS Controller with DN32 3 port mixing valve and 6 Nm servo motor	PL2078	275.00	40
FMS Controller with DN40 3 port mixing valve and 10 Nm servo motor	PL2079	328.00	
FMS Controller with DN50 3 port mixing valve and 10 Nm servo motor	PL2080	339.00	
FMS Controller with DN65 3 port mixing flanged valve and 30 Nm servo motor	PL2081	497.00	
FMS Controller with DN80 3 port mixing flanged valve and 30 Nm servo motor	PL2120	561.00	

Alternative options for FMS control

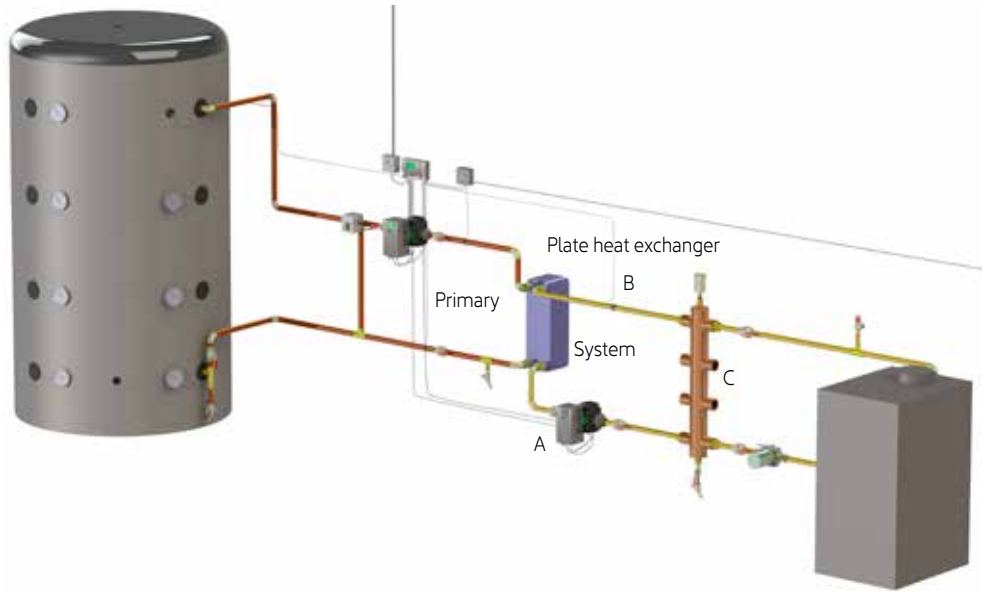
The FMS is based on our successful UVR63 control. This control can offer many different options within the heating system. Two examples follow.

Controlling 2 circulation pumps

In this example a traditional installation of FMS controlling mixing valve and 0-10v (PWM) controlled circulation pump.

Plus speed control over a 2nd circulating pump 0-10v (PWM) (A) on the system side of plate heat exchanger. This is based on a set flow temperature monitored by an additional PT1000 sensor, (B).

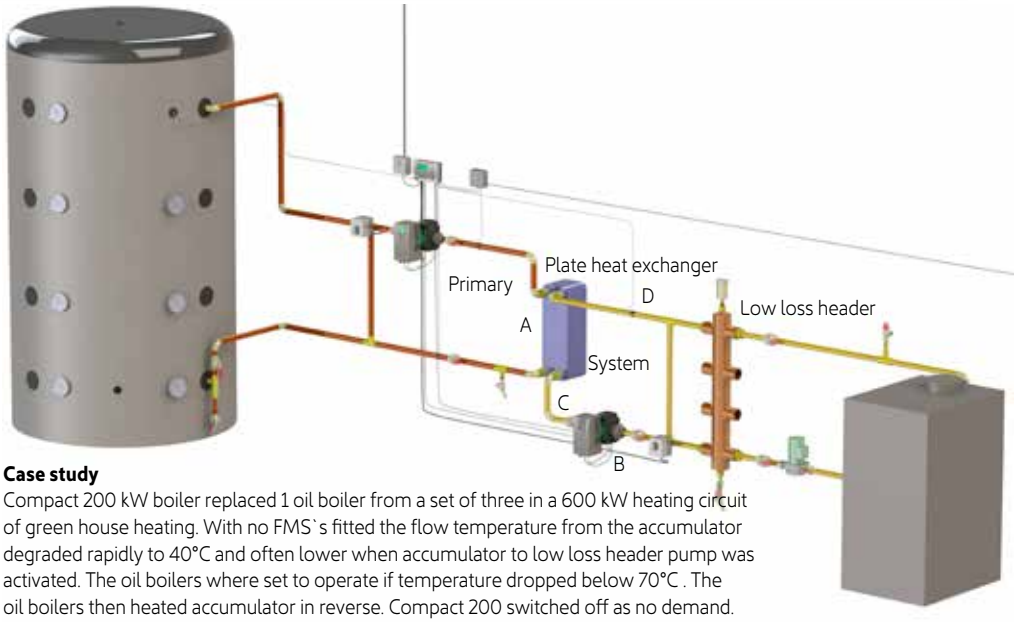
The purpose of this installation is to ensure a fixed flow temperature to the low loss header (C). If the temperature fails below set point, pump reduces speed if the temperature rises above set point pump increases in speed. This allows for system demand changes and prevents stiring of low loss header.



Two x FMS controllers, 2 circulation pumps and 2 x 3 port mixing valves.

In this example there is a traditional installation of FMS controlling mixing valve and 0-10v (PWM) circulation pump on the primary side of the heat exchanger (A).

The 2nd FMS is under taking the same function as the primary circuit FMS though in reverse. The pumps speed is determined by the delta T (ΔT) set between the flow sensor (D) and return sensor (C). For example, Delta T (ΔT) set 20°K, if this gap widens pump speed increases if the gap reduces the pump speed falls.
The 3 port valve is set to maintain a minimum flow temperature if it falls below set point example 75°C the valve closes maintaining set flow temperature. This allows installation into systems with larger kW demand than the FMS`s primary circuit can provide. The combination of the 3 port valve and the pump speed control reduces the degradation of the flow temperature as it mixes with other energy inputs such as an oil boiler.



Case study

Compact 200 kW boiler replaced 1 oil boiler from a set of three in a 600 kW heating circuit of green house heating. With no FMS`s fitted the flow temperature from the accumulator degraded rapidly to 40°C and often lower when accumulator to low loss header pump was activated. The oil boilers where set to operate if temperature dropped below 70°C . The oil boilers then heated accumulator in reverse. Compact 200 switched off as no demand. Installed 2 x FMS as described and Compact 200 has a continuous operating life feeding the low loss header at 75°C and the oil boilers automatically starting and stopping to assist with energy demand. This has also improved the DeltaT (ΔT) across the boiler flow and return increasing efficiency.

District Heating Interface and Standby Boiler Control

Integration of multiple heating loads, and activation of an oil or gas boiler back-up

What the District interface and Standby Boiler Control have in common is that they both integrate multiple heating zones, buildings or even types of heating system, and deliver heating when any one of these requires it. To achieve this safely a 24V signal is sent out to each building, zone or system, and when the 24V signal is returned the appropriate pump and/or valve is activated. A single unit can run multiple district pumps and interface with an almost unlimited number of heating systems up to 1km away.

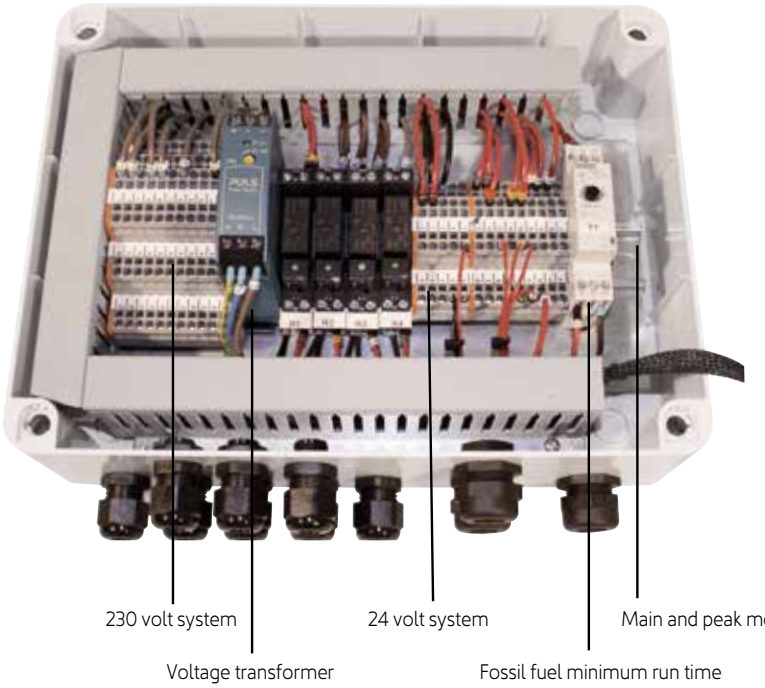
In addition to the function of District Interface the Standby Boiler Control will also activate a standby boiler. This is usually a fossil fuel boiler, but could also be a wood pellet or chip boiler. The most common application is when a Log Boiler is installed and an automatic alternative is desired. The Standby Boiler

Control will only fire the back-up system when there is a call for heat and the heat source, usually an accumulator, is below a given set point temperature. It will also maintain a minimum run time for the fossil fuel boiler to prevent cycling, and saves energy by only firing the boiler when there is
a genuine need for heat, rather than simply heating up the accumulator.

With the addition of the peak load kit the Standby Boiler Control will also activate a fossil fuel boiler when there is heat in the accumulator, but not enough for the current heating demand. This Peak load function can be used in conjunction with the standby function, or on its own, and also incorporates the anti-cycling minimum boiler run time. The peak load function is not available with the system interface.

Features of the System Interface and Standby Boiler Control:

- A 24V signal integrated multiple buildings, zones or systems safely
- Robust construction and commercial standard components
- The System Interface has a heating demand LED indication on the casing, and the Standby Boiler Control also indicates whether that demand is being met by the Biomass, Fossil Fuel or both. A remote patress with Biomass and Fossil Fuel indication is also included with the Standby Boiler Control
- Run Back timer to run the fossil fuel boiler for up to 2 hours during servicing. (Standby Boiler Control Only)
- Adjustable anti-cycling control for the minimum run time of the boiler (Standby Boiler Control Only)
- Adjustable Peak Load switching to suit the system characteristics (Standby Boiler Control Only)
- Greatly reduced electricians time on site due to simple and quick connection of control and distribution equipment



Remote face plate included as standard advises the user which fuel is currently heating the property

Standby main/peak module

Immersion thermostat

Isolator relay unit

Standby equipment	Order code	£ ex VAT	PG
District heating interface , 24V signal to multiple buildings	MS9278	231.70	40
Standby Control panel, fossil fuel (oil/gas) & interface. Includes remote 1 gang surface panel for fuel type 24V	MS9255	474.00	
Standby Control panel main/peak extension kit. Includes immersion thermostat for temperature regulation	MS9267	133.00	
Isolator relay unit 24V. Remote switching in double pole switch box	MS9268	25.00	
Isolator relay unit 230V. Remote single in a double pole switch box	MS9270	25.00	

Zeroridge Biomass Ed 17A

Single boiler with oil/gas boiler integration

Compact 25-80, C99-C200, M Series

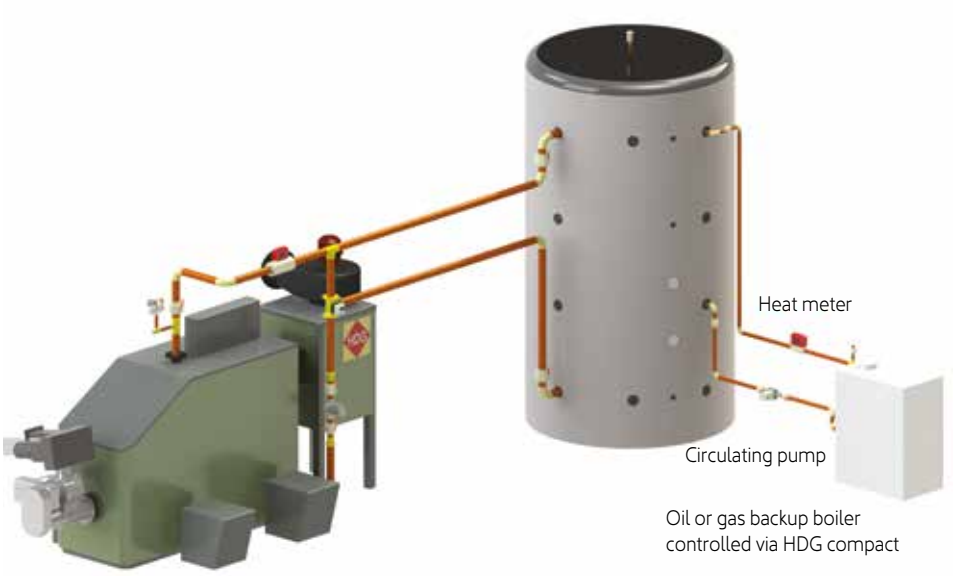
HDG Compact range 100-200, M Series controller can include full integration with a gas or oil boiler

The fossil fuel boiler is connected directly to the accumulator normally with the flow at the top and the return approximately 33% lower down.
An additional middle accumulator sensor is installed at the same level or above of the fossil fuel boiler return.

When the top temperature sensor drops below a pre-set temperature (normally 55c) a delay timer starts. This delay time (normally 10 minutes) allows for the Compact boiler to try and recover the temperature. If after the set period the temperature is below set temperature point the backup boiler will start. The backup boiler will run for a minimum period of time to prevent cycling (normally 15 minutes). After this period if the middle accumulator temperature sensor has risen above the set point the fossil fuel boiler will stop if not it will continue until set point is reached.
The Compact 100-200, M Series requires an additional control module, circuits and relays. See options below.

HDG Compact range 25-80 controller can include full integration with a gas or oil boiler

The Compact 25-80 range utilizes the existing upper accumulator sensor to activate the backup boiler.
When the top sensor drops below a pre-set temperature (normally 55-60c) a delay timer starts. This delay time (normally 10 minutes) allows for the Compact boiler to try and recover the temperature. If after the set period the temperature is below set temperature point the backup boiler will start. The backup boiler will run for a minimum period of time to prevent cycling (normally 15 minutes). After this period if the temperature has risen above the set point the fossil fuel boiler will stop if not it will continue until set point is reached.
All control and connections are included with the Compact 25-80 range as standard. The compact will provide a signal 230V which in most cases needs to be connected via a relay. See relay option below.



Oil or gas backup boiler controlled via HDG compact

The ability to operate an external fossil fuel boiler depends on the available external potential free connections of the HDG Controller.
The following table advises which part number and price relates to different design configurations

Compact 100-200 - M Series	Order code	£ ex VAT	PG
Compact/M + Standard chip/pellet feed system FRA or GRA	HDG3504	335.00	40
Compact/M + Transfer auger (TFQ) with fuel feed system FRA or GRA. (requires additional interface board)	HDG3109	595.00	
Compact/M + Vacuum pellet system with fuel feed system PSS or FRA/PSS			
Compact/M + Walking floor fuel feed system			
Compact/M + Special designed external feed system or extra controller			
Compact 25-80	**Order code**	**£ ex VAT**	**PG**
Activation and control of additional oil/gas boiler includes additional sensors comes as standard. This must be specified at time of ordering. Additional isolator relay required for potential free switching of the fossil fuel boiler			40
Isolator relay unit 230v. Double pole in switch box	MS9270	25.00	

Power controller & Sequencing of 2-5 boilers

Combination of Compact 99-200 or M series

Power controller

The HDG power controller is an advanced boiler activation and heat output control. It has two main purposes.

1. It monitors the temperatures in the accumulator and determines the ignition and burnout of the attached boiler.
2. It monitors the current temperature range across the accumulator by 3 PT1000 sensors on the C200 and 5 on the M300-500. By accurately monitoring the available heat the boilers output is controlled, from partial (low output) to full output automatically. The power controller can be linked with a single oil or gas boiler for peak and main or backup.

Sequencing controller

The boiler sequencing control which includes the power controller is used in multiple boiler installations and where the output from the primary heating needs to modulate to match the heating load.

Due to the nature of biomass as a fuel, whether it be wood pellet or wood chip, it is not possible to modulate the boiler down very low, lower than 30% of maximum. For example an 800 kW boiler might have a turndown ratio of 50% (400 kW) some of the very best boilers like the HDG M 400 have turndown ratio of 30% (120 kW). In many cases this is still far more than is needed in the warmer spring and autumn period.

The HDG Boiler sequencing control increases and decreases the amount of heat being delivered to an accumulator depending on the current demand.

How it works

Each boiler has its own set of accumulator sensors and independent control software. An additional data cable is added which links all the sequenced boilers together so they can communicate. From 2-6 boilers can be sequenced and any mixture of 99 kW to 500 kW HDG boilers. The only other requirement is they all feed into 1 common linked accumulator system. On one of the controllers the sequence of connecting boilers is added. For example 3 boilers, 2 x 200 kW and 1 x 400 kW from a drop down list. By selecting the boilers and there terminal position the setup is completed.

The sequencer now controls all the boilers depending on the accumulator heat degradation or increases boiler output automatically from partial load. Example 100 kW to maximum output 800 kW (in this example) and any output in between to maintain the demand.

The chart on the right hand page shows the smooth increase and decrease of kW controlled via the advanced sequencing controller of a 3 boiler install, 2 x C200 and 1 x M400. In this example the turn own ration is 88% with a ignition to burnout cycle of just 249 minutes.

Oil or Gas boiler integration.

Instead of a biomass boiler an oil or gas boiler can be included in the controller chain. In this case the fossil fuel boiler can be set to only work as peak load or back up rather than as part of the sequence.

Additional features of the Sequencing Control:

- Automatic rotation of the lead boiler. For even operating hours
- Automatic redundancy . If for some reason communication is lost to any of the connected boilers the system automatically switches over to independent boiler control to continue heat production though no longer under sequence control. This would automatically occur if one boiler had been switched off for servicing
- Energy saving. By controlling the linked boilers in such an accurate system energy saving and fuel volumes can be greatly reduced
- Fully adaptable for a range of building types and uses. Any type of heating profile can be matched by the Sequencing Control by reacting to actual current temperatures and heating demands
- Fully compatible with all HDG Compact boilers. The Sequencing Control will operate with any of the rage of from the Compact 99 to M series 400
- Fully compatible with any type of LPHW heating or hot water system
- If a fossil fuel boiler (oil/gas) is required this can be connected as a alternative for one of the biomass boilers in the sequenced chain. So its possible to have 5 biomass and 1 oil or gas or 3 biomass and 2 oil or gas
- Life cycle control. Different product ranges have different annual operation cycles. For example the C200 has design maximum of 2,000 hours while the M400 is 4,000 hours. This information is provided to the controller so running are correctly balanced annually

Dual boiler main and peak control	Order code	£ ex VAT	PG
HDG Compact 25-80 dual boiler controller	HDG3240	1,210.00	40

Power controller	Order code	£ ex VAT	PG
Power controller for C99-C200 and M Series	HDG3498	110.00	40

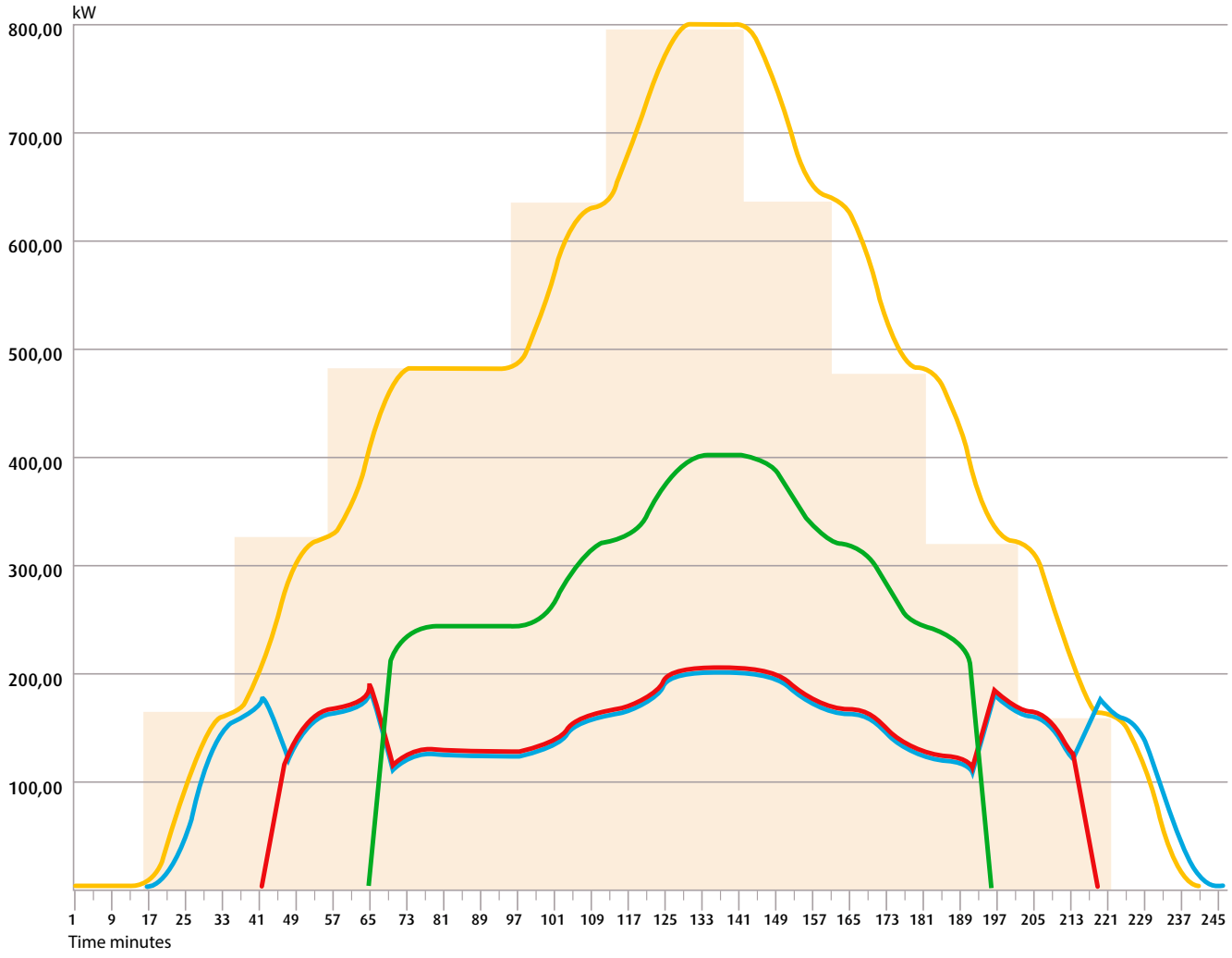
Sequencing controller	Order code	£ ex VAT	PG
Sequencing controller for 2 compatible HDG Compact boilers	HDG3486	655.00	40
Sequencing controller for 3 compatible HDG Compact boilers	HDG3487	1090.00	
Sequencing controller for 4 compatible HDG Compact boilers	HDG3488	1310.00	
Sequencing controller for 5 compatible HDG Compact boilers	HDG3489	1525.00	

Sequencing power controller 2-5 boilers

Stepless power increase

Each boiler is fitted with from 3-5 accumulator sensors to accurately monitor the current energy stored or being used. The power controller determines the current energy demand and activates the most suitable boiler to supply the demand or combination of boilers operating at partial load.
The controller controls the running hours to maintain and even hours across the boiler sizes.

It will also operate boilers with longer annually design working hours such as the M Series to take more of the load.
The sequencing control will ensure energy supply whatever the demand, reduce running costs in maintenance and fuel.



Demand max 800 kW

Boiler one 200 kW
actual output

Boiler two 200 kW
actual output

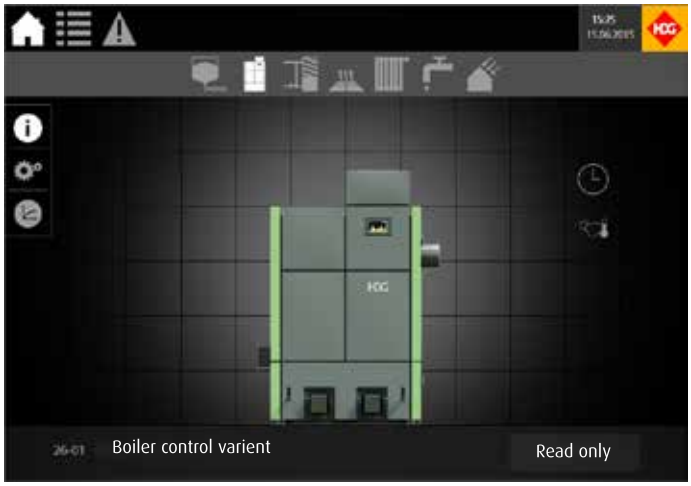
Boiler three 400 kW
actual output

Combined Boiler output
actual output max 800 kW

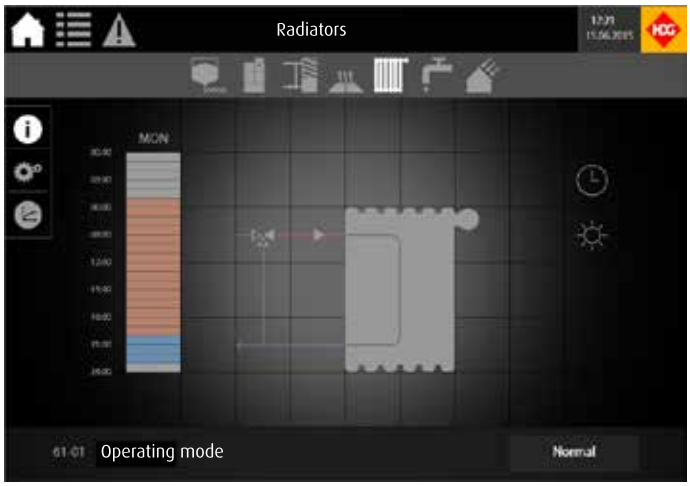
Remote access and control systems

K Series, Compact 25-80

HDG remote maintenance and visualisation



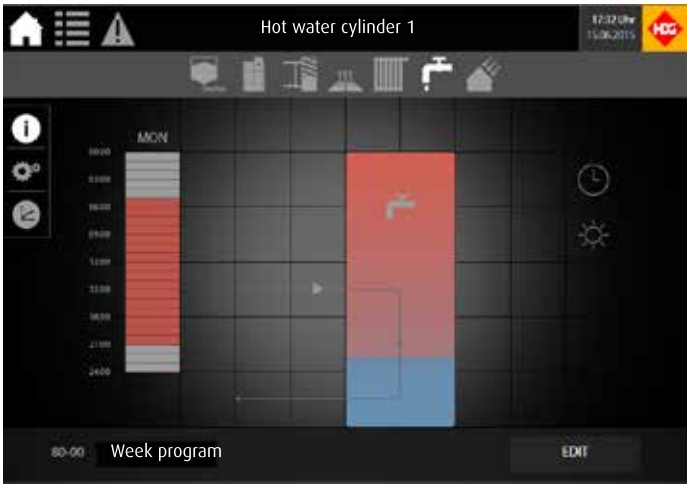
Access to the boiler and heating visualisation and control from any HTML phone, tablet or PC.



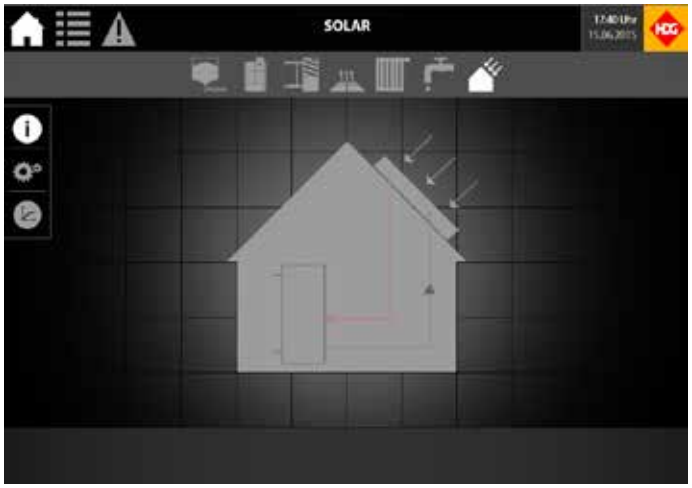
See current room temperatures with radiator heating, operating mode and operating times, change from night setback to day or even party mode via web screen.

View current heating state of accumulators, change heating start and stops, activate or setup different time clock cycles.

As with radiator circuits change the way your under floor heating system operates.



As with accumulator change how and when hot water cylinder is heated remotely.



Solar thermal operation can be monitored which can heat up to 3 destinations ie hot water cylinder 1 first, hot water cylinder 2 second, accumulator as a third option.

Remote access and control systems

K Series, F Series, Euro, Compact 25-80, Standalone controller

HDG remote access visualization allows access both locally and remotely anywhere in the world via internet connection (HTTPS) to the operation of the boiler.
The interface acts as a web server so no local software needs to be installed on the device from which you wish to remotely access the boiler. It is possible to view the boiler from any operating PC, phone, or tablet. It does not require any special type of plug-in because it's compatible with the latest HTML 5 protocols.
Different levels of access are available depending on user or engineer access requirements.
An e-mail function allows operational information to be set depending on type.
Operating parameters for the user such as temperatures, time clocks, and for the installer more advanced options such as fuel and combustion air.

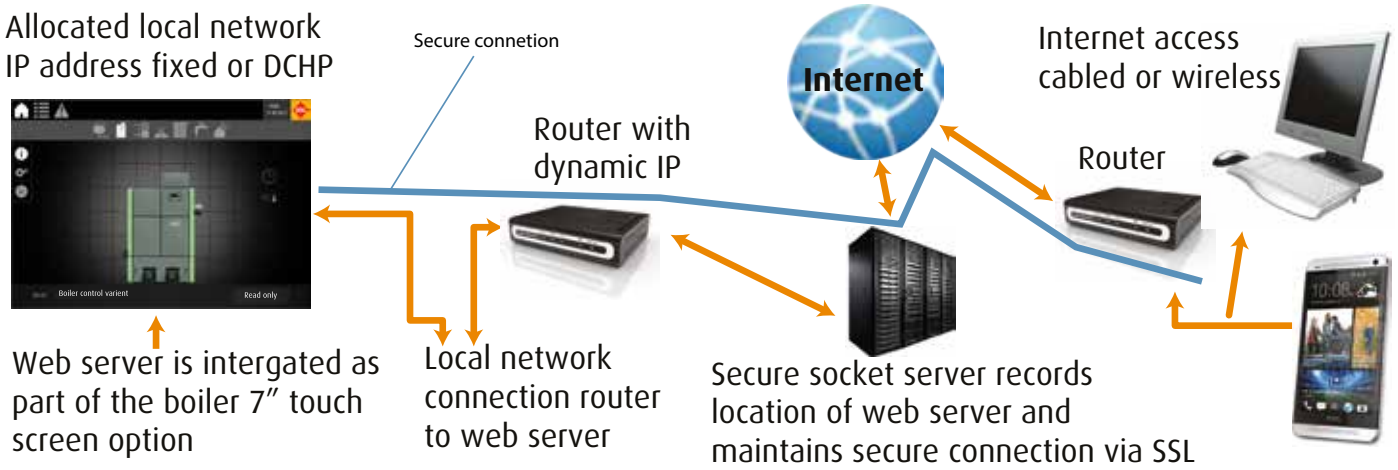
Live reporting of all aspects of operation including:

- Combustion temperatures
- Fuel feed rates
- Boiler and accumulator temperatures
- Current operation condition of attached drive motors, pumps and valves
- Current burning status from ignition to burnout
- Operational errors are reported on screen and can be e-mailed to user and service engineer
- Viewing and control over heating controls and time clock operation

Installation requirements

The web server is only available with the K series and Compact 25-80 when fitted with the optional 7" touch screen controller.
The 7" controller has to be specified at time of boiler purchase or can be purchased latter at additional cost.

Remote visualisation requires internet access through a local broadband router. Dynamic IP connection is suitable.
Local connection is via fixed cable over Cat 5 or equivalent with RJ45 connection to the boiler and router. This allows for connections up to 100 metres from router to boiler. Alternatives for distances over 100 metres and wireless are available.



HDG web server K Series and Compact 25-80 options	Order code	£ ex VAT	PG
7" screen option which includes web server and remote access purchased with original boiler	See boiler product page		
7" screen as above, purchased after original installation. (Will require on site recommission)	Price on request		

Remote access and control systems

Compact 100-200 & M Series

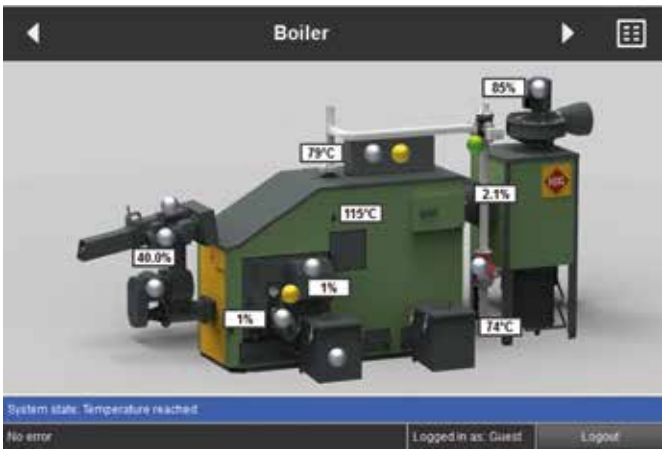
HDG remote maintenance and visualisation

HDG remote access visualization software allows access both locally and remotely anywhere in the world via internet connection (HTTPS) to the operation of the boiler.
The interface acts as a web server so no local software needs to be installed on the device from which you wish to remotely access the boiler. It is possible to view the boiler from any operating PC, phone touchpad or tablet which is flash compatible.

Different levels of access are available depending on user or engineer access requirements.
Up to 5 people can be e-mailed with operational information.
Operating parameters from time clock conditions to fuelling and oxygen levels can be adjusted remotely.

Live reporting of all aspects of operation including:

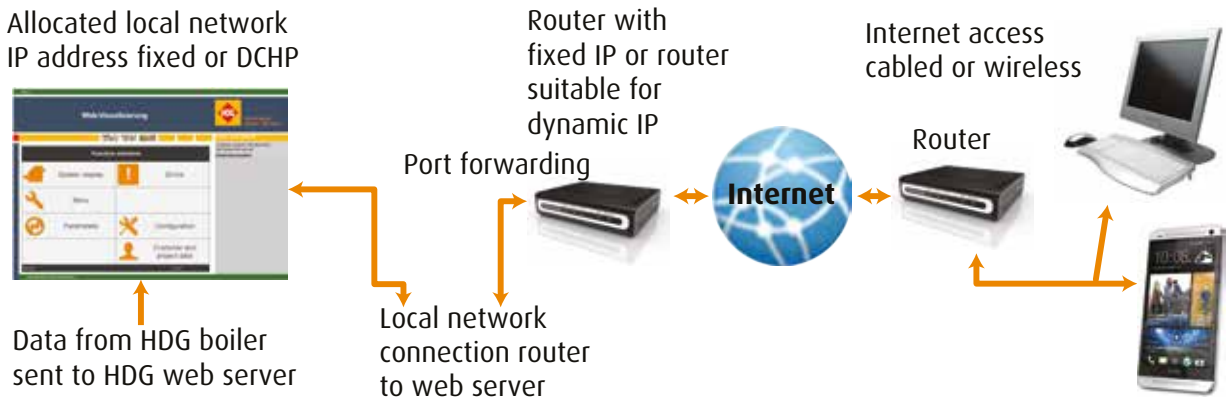
- Combustion temperatures
- Fuel feed rates
- Boiler and accumulator temperatures
- Current operation condition of attached drive motors, pumps and valves
- Current burning status from ignition to burnout
- Operational errors are reported on screen and can be e-mailed to user and service engineer



Installation requirements

Remote visualisation requires internet access through fixed and secure connection. For most applications, a fixed IP address is required at the router to enable access from the internet. Dynamic IP connection maybe possible. Either a public IP routed directly to the Visualisation controller or port forwarding implemented to a local IP which has been allocated to the visualisation unit.

Local connection is via fixed cable over Cat 5 or equivalent with RJ45 connection to visualisation unit which is wall mounted next to the main HDG compact control panel. 13 amp (socket) power supply is required for the visualisation unit.



Remote visualization extensions

In addition to the standard local network or remote visualization access additional modules can be installed to expand the remote access options.
These include:

- Extension to a communication module.
- Extension to data logger.
- Extension with GSM module.

Extension to a communication module
With this module the extension allows the HDG web server to be used both remote visualization and as Modbus over TCP module.
The Modbus protocol allows the passage of data, over an Ethernet or TCP connection, to and from external control or monitoring equipment. One of the most common applications of this is a local BMS system.

Extension to data logger
This extension allows the user to download the recorded data of the boiler as a CSV formatted file.
This allows the input of data to suitable software, such as spread sheet application, where the data can be utilized to produce reports and graphical illustrations.
This also enables archiving of historic data to secure locations.

Extension with GSM module
For the default reporting of boiler incidents via e-mail and transmission by SMS over GSM module of alarm messages.
In addition, if sufficient network band width is available, access via mobile phone to the web interface. The prerequisite is an internet browser on the mobile phone which has flash installed.

Note The GSM module does not include a SIM card. This can be obtained locally and may incur costs from the mobile service provider.

Extensions to the web interface can be implemented easily by using the built in upgrade module. The installation of the software enhancements is through an activation code and/or software update.

HDG remote operation and visualisation		Order code	£ ex VAT	PG
Web server visualisation Includes visualisation panel, connection cable to HDG Compact control panel. Circuit board connector for PDI controller. Mains power cable and 2 metres Ethernet cable with RJ45 connector	Single Boiler or up to 5 local boilers	HDG3248	1,720.00	42
Extension to data logger Complete on board data logging. Included free of charge with fully paid web server visualisation other wise at amount shown		HDG3248	299.00	

Remote connection options, equipment and email services	Order code	£ ex VAT	PG
Pre configured managed router, port forwarding, SMPT mail services and DNS Supply of router (type wired). Remote support from BCNS and hardware replacement in case of failure for a period of 12 months Suitable for up to 4 HDG web servers (20 boilers)	MS9403	275.00	42
Support and hardware replacement warranty for subsequent years for Pre configured managed router MS9403	MS9404	*145.00	
Sim card router with local wireless connection (Fixed IP SIM card not included, needs to be sourced by user)	MS9412	229.00	
Antenna for SIM card modem 3G Type Radome with 5 metre cable	MS9413	78.00	
Antenna for SIM card modem 3G Type Dome panel mount with 3 metre cable	MS9414	65.00	
Antenna extension cable 5 metre	MS9415	27.00	
Setup of SIM card router with user provided SIM by Zero Ridge	MS9418	75.00	

Email and DNS only services	Order code	£ ex VAT	PG
Pre-configured managed SMTP mail service, DNS and HTTPS certificate 1. Fully accredited email address @hdg.Zero Ridge.co.uk 2. DNS common internet name such as 111anyone.hdg.Zero Ridge.co.uk: 3. HTTPS Certificate issued by a trusted authority. 4. With three years telephone support	MS9410	185.00	42
Email, DNS and certificate for subsequent years*	MS9411	135.00	
HTTPS Certificate per installation 3 years separately purchased	MS9452	95.00	

Remote connection options	Order code	£ ex VAT	PG
Upgrade to wireless router	MS9407	75.00	42
Additional micro filter	MS9408	6.00	
Switch for applications of more than 4 x RJ45 connections such as cameras Requires additional power socket	MS9409	149.00	

On site the following is required for installation
PSTN telephone socket, double gang 230v power socket. Web server should be no more than 2m from HDG control panel. Direct connection or cable connection to router. If there is more than one phone socket on the line ADSL line then each must be fitted with a micro filter.
* Recurring charges will be revised annually

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