



**ECONOPLATE “E2 SW” SERIES
STEAM TO WATER
PACKAGED
PLATE HEAT EXCHANGER**

**INSTALLATION
OPERATION & MAINTENANCE
DOCUMENTATION**

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STOKVIS ECONOPLATE PACKAGED HEAT EXCHANGER

INSTALLATION

The steam supply is connected to the 2 port valve, the condensate return to the lower steel screwed connection. The steam must be controlled such that the maximum operating conditions are not exceeded. A pressure reducing valve should be used to achieve these conditions where necessary.

The condensate must be removed using an appropriate steam trap set. The type selected should ensure that condensate can drain continuously and freely from the heat exchanger without any sub cooling. Ball float type steam traps generally fulfil these requirements.

Other additional equipment required is for high limit protection of the secondary circuit. A mechanical type of system is recommended which will cut off the steam supply in the event of a failure of the control system or a loss of power.

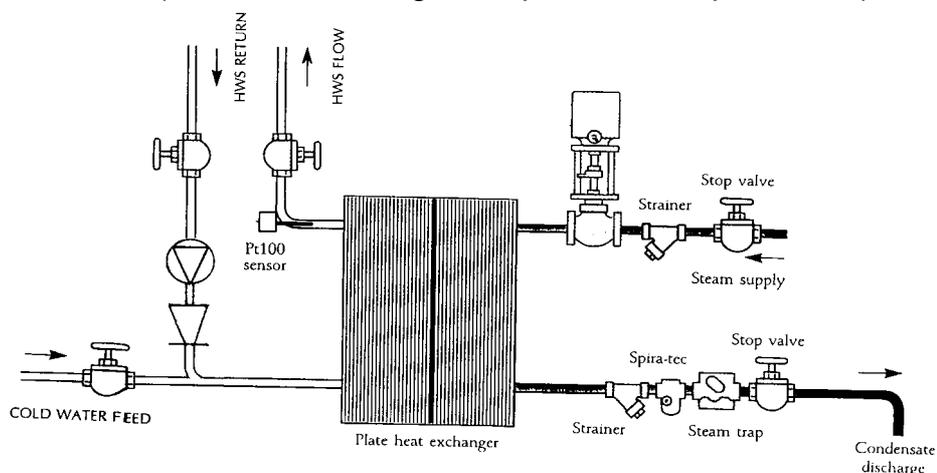
For hot water service units the cold water feed is connected to the bottom horizontal bronze connection, the hot water service flow to the top bronze connection, which also houses the sensor.

For LTHW units, the system return is connected to the bottom horizontal bronze connection the flow is connected to the top bronze connection.

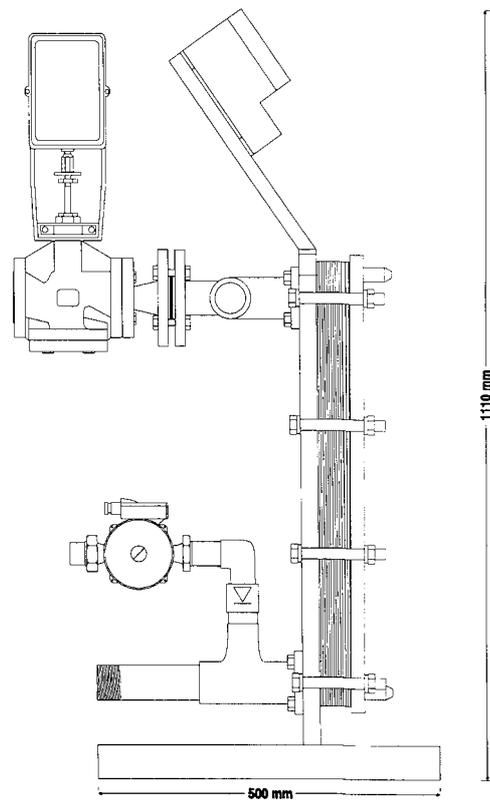
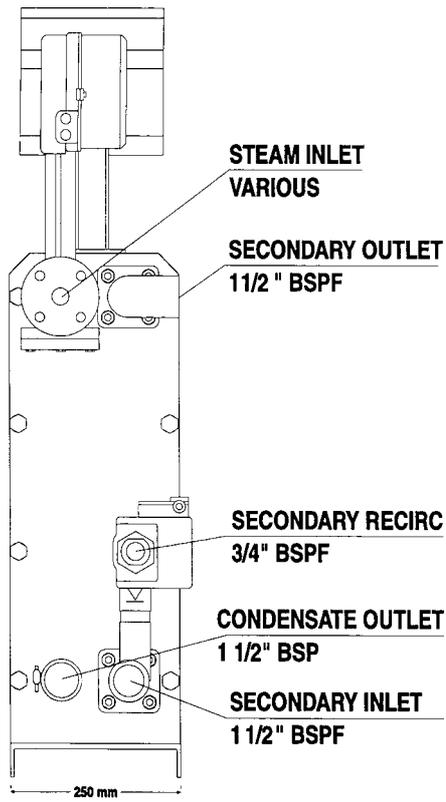
When operating secondary recirculation must be maintained at all times either around the installation or locally to the Econoplate. For hot water service units a connection is provided in the bronze cold feed casting for this purpose, or alternatively into the top of the recirculation pump if supplied.

Typical Installation of an Econoplate Heat Exchanger For Hot Water Service.

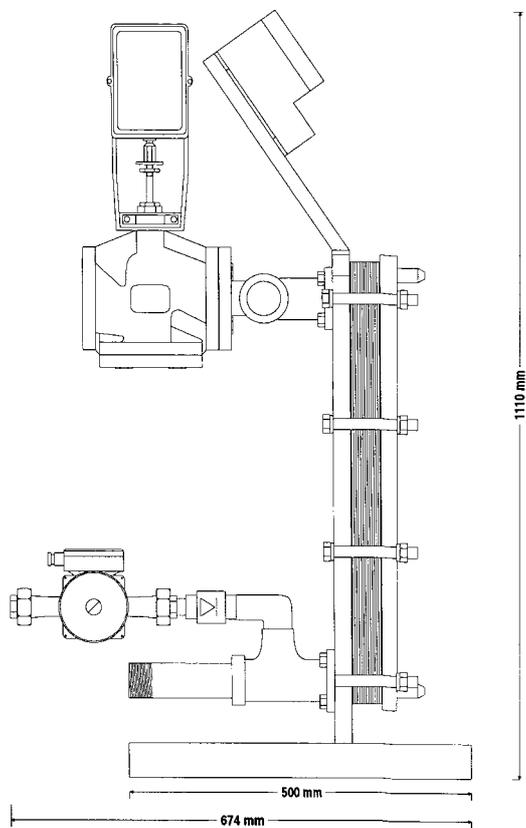
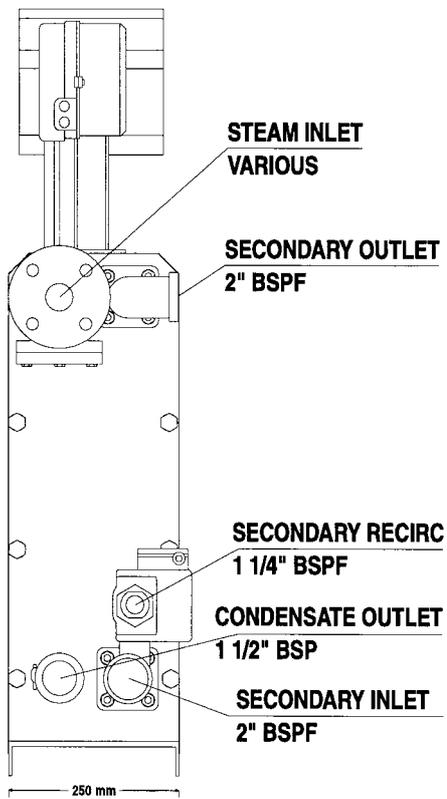
(refer to text for high limit protection requirements)



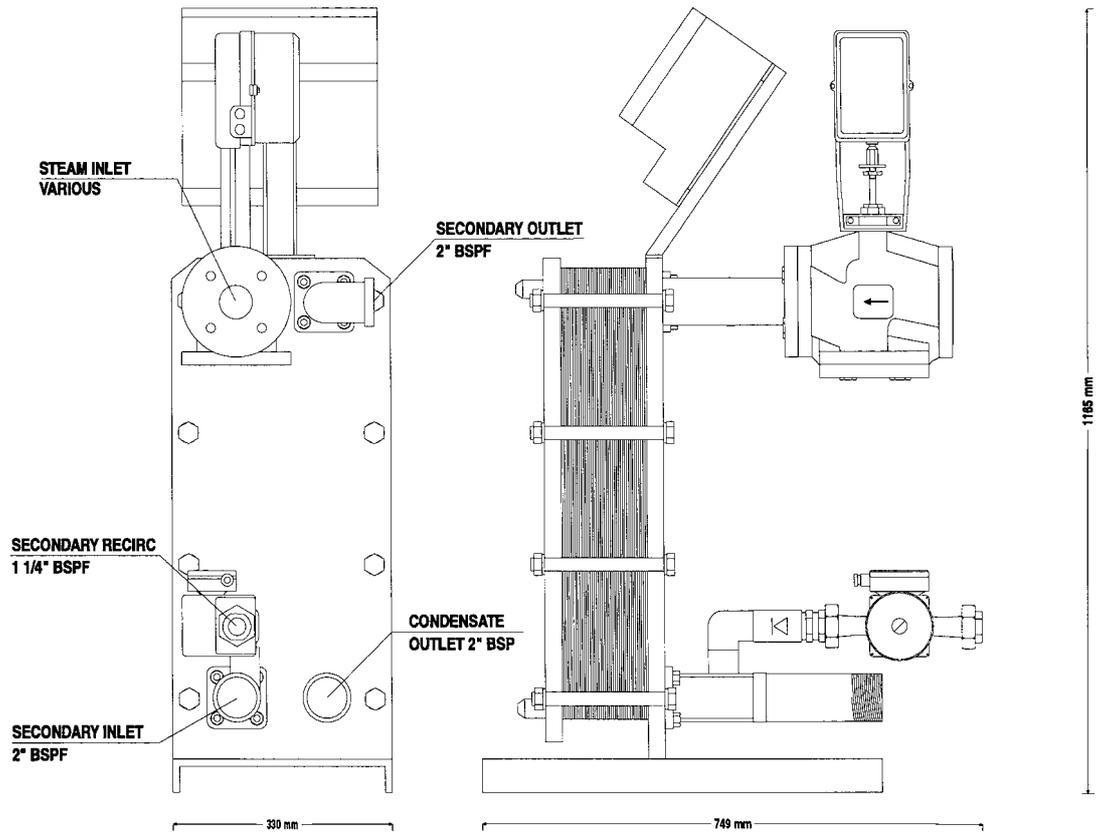
ASSEMBLY DETAILS E2A



ASSEMBLY DETAILS E2B



ASSEMBLY DETAILS E2C.



ELECTRICAL DETAILS

Electrical Supply : E2A 240V - Single Phase - 0.5A max.

E2B & E2C 240V - Single Phase - 0.6A max.

The electrical connection (L, N + Earth) is made directly to the control panel pcb. All interconnecting wiring has already been made at the factory.

External electrical isolation and protection must be provided in accordance with current IEE regulations and codes of practice.

EXTERNAL CONNECTIONS

Common Temperature Alarm.

A rise of 10°C above the set point or a fall of 20°C below the set point causes an alarm relay to be energised. A pair of volt free terminals, which close on a fault, are available for external indication.

External Interlock.

An external safety device can be connected to the Econoplate which will shut the unit down in case of a fault, it is a safety extra low voltage circuit, an open circuit should be used as a fault signal.

External "Clock".

An external device can be connected to switch between 2 temperatures ,or to switch between a single set point and off. A closed contact across this safety extra low voltage circuit gives the day setting and an open circuit the night.

External Temperature indication.

A 4-20mA output gives an indication of the secondary flow temperature, it is a linear scale, 4mA = 0°C, 20mA = 99°C.

Fuse Protection.

The electronic controller is protected by a 500mA fuse and the main p.c.b. output side is protected by a 10A fuse, both are located on the p.c.b.

OPERATION

Prior to switching the Econoplate on it must be ensured that the unit is filled with water and that all pipework and pumps are vented.

Once this is complete and the unit is on, the Econoplate Controller should be set, as described in the Econoplate Controller Instructions, to suit the particular requirements of the client.

On all units the travel of the motorised valve should be checked by simulating a load / no load situation and the limit switches adjusted if necessary to prevent the motor driving up against the mechanical stops. It should be noted that the steam valve should continue to drive for a period of 10/12 seconds once tension can be felt on the shaft to ensure that the valve plug is tight into the seat.

MAINTENANCE

If the installation is set up as per the above instructions, and if the pre-set factory values are unchanged, the Stokvis Econoplate Unit should not need dismantling for service for many years.

Any clogging, may be detected as follows:

- A high pressure drop between inlet and outlet of the secondary water circuit.
- A lack of water at the design temperature on the secondary circuit.

If it is required to clean the Plate Heat Exchanger the following instructions should be followed:

- Isolate the exchanger, primary first, then allow the temperature to fall below 40° C, then isolate the secondary.
- Reduce the pressure by opening the vents and drain both primary and secondary.
- Carefully release the securing bolts between the frame and front plate. Slacken the bolts in sequence to reduce stress on individual bolts.
- Remove the plates one at a time from the unit. If possible keep the plates in order ready for re-assembly, otherwise refer to the following notes.

- Plates can be identified in the following way.
G30, G50, VU8, VU12 all have gaskets on one side of each plate.
G30 and G50 have octagonal gaskets around the ports.
VU8 and VU12 have round gaskets around the ports.
For the GX12, alternate plates have either no gasket or a gasket on both sides of the plate.
- A plate pack always has a 4 hole first plate which has a gasket around all 4 ports. This plate sits against the fixed chassis plate. Next are a number of intermediate plates and finally a blank plate with no ports
G30, and VU8 plates, have one type of intermediate plate (they cannot however be mixed), G50 and VU8 plates have 2 types, which alternate, these are left hand and right hand gasketed plates. On all of these units the direction of the chevron pattern, on the face of the plate, alternates across the whole assembly and alternate left and right top ports have a gasket around their circumference. GX12 plates also have 2 types of intermediate plates, those with gaskets on both sides and those with no gasket these alternate and the correct orientation is given by the letter stamped at the top of each plate. This sequence must be noted prior to dismantling as it will ensure the correct re-assembly.
- Carefully clean the plates. (Do not use a metallic device). Use a nylon brush with water. A proprietary descaling agent may be used if necessary, always rinse thoroughly with clean fresh water. Always follow the correct safety procedures when handling chemicals.
- Re-assemble the plates in the same order that they were removed. Replace front plate and tighten the bolts in a similar manner to that used on an automobile cylinder head to ensure an even distribution of force over the surface of the plate. The distance between the front plate and the rear chassis plate should be between 3 and 3.1 mm per plate for G30 and G50 plates or 3.6 mm per plate for VU8 and VU12 plates or 3.4 mm for GX12 plates and should be measured next to each bolt to ensure even tightening of the bolts.
- If the plates are dirty it is important to also clean the temperature sensor.
- A visual check on the correct assembly can be made by looking at the edge of the plates. A pattern resembling a honeycomb should always be seen.

ECONOPLATE FAULT FINDING

FLUCTUATING TEMPERATURES AT OUTLET.

1. Check that the secondary pump is operating correctly and that the circulation exists - feel the temperature of the return pipe, if it is cool then there is not circulation.
2. Check that a non-return valve is fitted on the HWS return and that it is not letting by and so allowing the cold feed to pass up the HWS return - feel for a cool return pipe.
3. Check that the motorised valve is opening and closing in response to changes in demand - raise and lower the set point on the controller or open and close some hot water taps and observe the valve. Also check that the linkages between the valve and motor are secured.
4. Check that the motorised valve is responding by moving in the correct direction - test as above. If incorrect electrically isolate the Econoplate and reverse the + and - valve motor connections on the p.c.b. reinstate the electrical supply and check again.
5. Check that the temperature sensor is not scaled - isolate the secondary side of the unit and remove the sensor, clean as appropriate. If heavily scaled the Plate Heat Exchanger will probably be similarly affected- strip and clean as necessary. (see maintenance procedure).

NO HOT WATER AT OUTLETS

1. Check the electrical supply to the unit-reinstate if necessary.
2. Check for an LCD display on the control panel - if not illuminated check/replace 500mA control fuse - check control panel isolator switch is in the ON position.
3. If the 500mA fuse blows again,replace the printed circuit board

4. If there is an LED display but no apparent outputs to pumps etc. check the 10A output fuse on the p.c.b. If it is blown, make electrical checks on all pumps and valves fitted to the unit, repair, replace or isolate faulty item and replace 10A fuse
5. Check that all linkage arms are secure and not slipping on their shafts-tighten with the motor at the end of its travel and check limits.
6. Check that the valve motor is operating - raise and lower the set point on the controller and observe.

**NO WATER
FROM HIGHEST
OUTLET**

1. The resistance through the heat exchanger exceeds the static head/pressure of the cold feed.

If water flow has deteriorated from when originally installed strip and clean the Heat Exchanger as per the maintenance procedure, if scaled up also clean the temperature probe.

If new, investigate the effect of turning off HWS recirculation pumps, where they are installed on the HWS return. If it improves water flow try operating the pump on a lower speed or reinstall it on the HWS flow, perhaps with a bypass and non-return valve if the Econoplate flow exceeds the maximum flow of the pump.

**LEAKING
FROM THE
PLATE HEAT
EXCHANGER**

1. Check that the Heat Exchanger is bolted up fully - measure the space occupied by the plates, next to each bolt. The gap between the chassis and clamping plate should be between 3 and 3.1mm per plate for G30 and G50 plates and 3.6mm for VU8 and VU12 plates and 3.4mm for GX12 and it should be evenly spaced across the whole assembly - Relieve the pressure on primary and secondary side and tightened down to the correct figure. If the unit still leaks the affected plates should be replaced.
2. Check that the maximum operating pressure has not been exceeded at any time.

PARTS LIST

<u>Part No</u>	<u>Description</u>
ESS8122	Integral 'E' series temperature controller or use ESS8133.
ESS8133	Econotrol 2100 temperature controller.
ESS8100/1	'E' Series Temp Regulator (Square Type p.c.b.) from Oct'93
ESS7001	'E' Series Temp Regulator (Rectangular type p.c.b.) pre Oct'93
ESS8106	'E' Series 24 Hour Clock (Flash Type) for ESS8101
ESS7010	'E' Series 24 Hour Clock (Grasslin Type) for ESS7001
ESS6600	'E' Series Temperature Sensor 1/8" BSP 39mm
ESS6601	'E' Series Temperature Sensor 1/8" BSP 65mm
ESS7012	'E' Series Temperature Sensor 1/4" BSP
ESS4817	'E' Series Temperature Sensor 1/2" BSP
ESS7052	Sauter actuator type AVR32W30-F001
ESS7053	2 port valve Sauter type V6F50F304
ESS7054	2 port valve Sauter type V6F40F304
ESS7055	2 port valve Sauter type V6F32F304
ESS7056	2 port valve Sauter type V6F25F304
ESS4904	E2A Secondary Recirculating Pump UP20-45N 1 Phase
ESS7805	EJB/ESC Secondary Recirculating Pump Motor UPS40-80 1 Phase
ESS7049	E2B/E2C Secondary Recirculating Pump UPS32-55B 1 Phase

HEAT EXCHANGER PLATES

ESS4625	E2A/E2B/EJB G30H End Blanking Plate
ESS4626	E2A/E2B/EJB G30H Intermediate Plate
ESS4627	E2A/E2B/EJB G30H 4 Hole First Plate
ESS4611	EJB VU8 End Blanking Plate
ESS4612	EJB VU8 Intermediate Plate
ESS4613	EJB VU8 4 Hole First Plate
ESS4620	E2A(L)/E2B(L)/EJB(L) G30L End Blanking Plate
ESS4621	E2A(L)/E2B(L)/EJB(L) G30L Intermediate Plate
ESS4622	E2A(L)/E2B(L)/EJB(L)G30L 4 Hole First Plate
ESS4703	ESC G50H End Blanking Plate
ESS4704	ESC G50H Left Hand Intermediate Plate
ESS4705	ESC G50H Right Hand Intermediate Plate
ESS4706	ESC G50H 4 Hole First Plate
ESS4635	ESC G50L Blanking Plate
ESS4636	ESC G50L Left Hand Intermediate Plate
ESS4637	ESC G50L Right Hand Intermediate Plate
ESS4638	ESC G50L 4 Hole First Plate

ESS4699	ESC VU12 End Blanking Plate
ESS4700	ESC VU12 Left Hand Intermediate Plate
ESS4701	ESC VU12 Right Hand Intermediate Plate
ESS4702	ESC VU12 4 Hole First Plate
ESS6614	E2C(L) GX12L Half Gasket Front 4 Hole Plate
ESS6615	E2C(L) GX12L Gaskets Both Sides Intermediate Plate
ESS6616	E2C(L) GX12L No Gasket Intermediate Plate
ESS6617	E2C(L) GX12L Half Gasket Back Blank Plate
ESS6622	E2C GX12H Half +1 Gasket First 4 Hole Plate
ESS6623	E2C GX12H 1 Gaskets LH Intermediate Plate
ESS6624	E2C GX12H 1 Gasket RH Intermediate Plate
ESS6625	E2C GX12H Half Gasket Back Blank Plate

**ECONOTROL 2100
CONTROLLER
INSTRUCTIONS.**

MARCH2001
ECT32001

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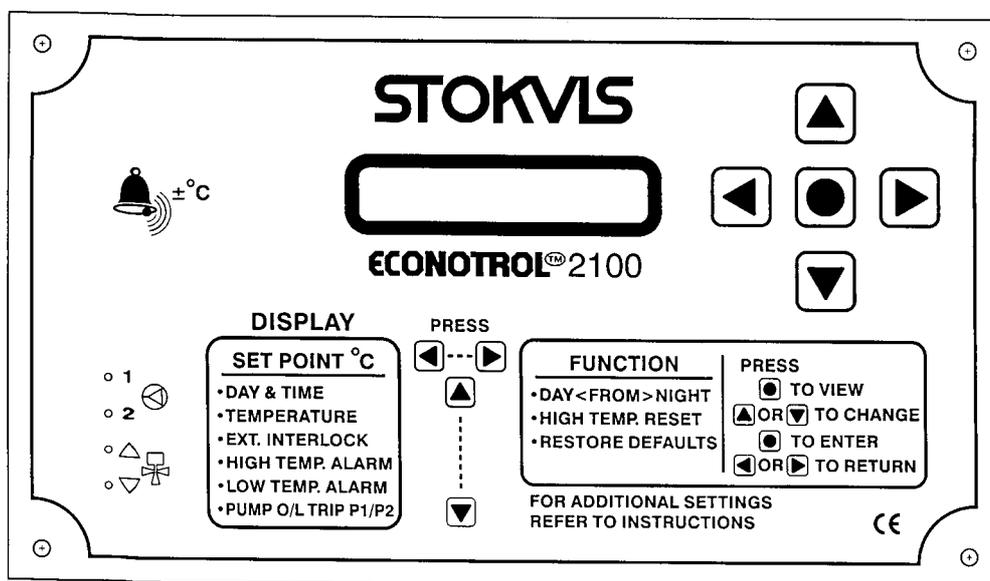
ECONOTROL 2100

GENERAL SPECIFICATION.

The Econotrol 2100 is a purpose designed PID regulator which controls temperature via a motorised modulating valve as well as operating a number of primary and secondary pumps, as can be fitted to the various Econoplate units.

In addition to the PID control it also contains all functional indicator lamps, a control fuse, an output fuse, duplex pump duty share (if fitted), high and low temperature alarm indication, common volt free temperature alarm terminals, and high temperature lockout, extra low voltage external interlock circuit with indication, 4-20 mA flow temperature indication, a 7 day time clock for either 2 temperatures of operation or a single temperature and night off, per day. Alternatively the extra low voltage "external time clock" circuit can be used for operation at 2 temperatures or for single temperature and off. If primary pump overloads are included, overload trip indication is available on the panel. On duplex units with overloads, auto changeover on primary pump fault is also possible.

ECONOTROL 2100 - FACIA LAYOUT.



ECONOTROL 2100 - DISPLAY.

The current SET POINT is always displayed, to view any one of the other display options press either the ▲ or ▼ key to move from one to the other DISPLAY options:

-DAY of the week & TIME, (24 hour clock).

-Secondary water flow TEMPERATURE, in °C

-EXTERNAL INTERLOCK, shown only if an external interlock has been connected and activated.

-HIGH TEMPERATURE ALARM, shown only if the alarm temperature has been exceeded (factory set at 10°C above the higher set point).

-LOW TEMPERATURE ALARM, shown only if the alarm temperature has been exceeded(factory set at 20°C below the current set point).

-PUMP OVERLOAD TRIP, shown only if a primary pump, P1 or P2, overload has tripped, only available on units fitted with contactor overloads, with auxiliary contacts.

ECONOTROL 2100 - FUNCTION.

The FUNCTION options are accessed by pressing either the ◀ or ▶ key.

To move from one option to the next press either the ▲ or ▼ key.

To view the current status of an option press the • key.

To change the current status press either the ▲ or ▼ key.

To enter/select this change press the • key.

To return to the DISPLAY press ◀ or ▶ key.

-The DAY<FROM>NIGHT function is used to change from one mode of operation to the other, e.g. if you were running in night mode and the unit was off, if you wanted hot water as you had during the day, by using this function you can swap over from the night setting to the day setting. When the unit next operates in the day mode the unit will revert back to normal operation.

-The HIGH TEMPERATURE RESET only operates if a high temperature lockout has occurred, using it restarts the unit and resets the external volt free temperature alarm.

-The RESTORE DEFAULTS option is used to return to the factory values for all settings. A further "Are You Sure" prompt appears on the display prior to this function being actioned.

ECONOTROL 2100 - SETTINGS.

The SETTINGS are used to set all of the parameters which have an influence on the way in which the controller will work, there are default values for all of these parameters, which are given in SUMMARY OF OPERATION.

The SETTINGS options are accessed from FUNCTION by pressing and holding either the ◀ or ▶ key for 5 seconds then releasing.

To view the current status of a setting press the • key.

To select a particular parameter within a particular setting press the • key (the parameter will now flash)

To change the current value of a parameter press the ▲ key.

To move to the next parameter press the ▶ key.

To enter this change press the • key (the parameter stops flashing).

To move to the next setting press the ▲ or ▼ key.

To return to FUNCTION then DISPLAY press the ◀ or ▶ key twice.

-TIME, this includes the current day of the week, time, in hours, minutes and seconds, based on a 24 hour clock.

-CLOCK, the unit can run on its internal clock or it can be controlled from an external source, (default setting is internal clock).

-DAILY DAY, TIME & TEMPERATURE, this is used , for each day of the week to set the start time for the day operation and the temperature. The temperature range is from 01°C to 99°C, alternatively OFF can be selected.

-DAILY NIGHT, TIME & TEMPERATURE, this is used for each day of the week, to set the start time for the night operation and the temperature. The temperature range is from 01°C to 99°C, alternatively OFF can be selected.

-EXTERNAL CLOCK DAY, TEMPERATURE, this is used to set the temperature for the day operation when controlled by an external source. The temperature range is from 01°C to 99°C, alternatively OFF can be selected.

-EXTERNAL CLOCK NIGHT, TEMPERATURE, this is used to set the temperature for the night operation when controlled by an external source. The temperature range is from 01°C to 99°C, alternatively OFF can be selected.

HIGH TEMPERATURE ALARM, this is used to set the temperature difference above the higher set point at which an alarm mode occurs. The temperature difference is from 01°C to 99°C, alternatively OFF can be selected.

LOW TEMPERATURE ALARM, this is used to set the temperature difference below the current set point at which an alarm mode occurs. The temperature difference is from 01°C to 99°C, alternatively OFF can be selected.

PROPORTIONAL BAND, a high proportional band will produce slow response but no overshoot, the set point may never be reached, a low proportional band will produce a fast response but a big temperature overshoot and prolonged oscillations in temperature may occur

DIFFERENTIAL, this term helps the controller approach the set point more rapidly with less overshoot. The higher the value the more the differential term works, and in theory the better the response, however there is a limit above which the system will respond too quickly to small errors and become unstable.

-PUMP MODE, this is used to determine which pump output is used. If a single primary pump is connected to the P1 terminals then P1 ON should be selected.

If a single primary pump is connected to the P2 terminals then P2 ON should be selected.

If a twin headed(duplex) pump is fitted, one will be connected to P1 the other to P2, P1/P2 should be selected which will then perform duty share on the 2 pumps

-ALARM MODE, there are 3 automatic and 1 manual reset high temperature alarm modes.

AUT1 - If the secondary temperature measured is greater than the high temperature alarm value, the LCD indicates this. If this persists, the unit is shut down, all pumps are turned off, and the modulating valve is closed. The common temperature alarm lamp is lit and the common temperature alarm volt free terminals are closed. Auto reset occurs once the temperature has fallen below the alarm temperature.

AUT2 - If the secondary temperature measured is greater than the high temperature alarm value, the LCD indicates this. If this persists, the unit is shut down, all pumps are turned off, and the modulating valve is closed. The common temperature alarm lamp is lit and the common temperature alarm volt free terminals are closed. Subsequent high temperatures cause an almost immediate shut down. Auto reset occurs once the temperature has fallen below the alarm temperature.

AUT3 - If the secondary temperature measured is greater than the high temperature alarm value, the LCD indicates this. If this persists the common temperature alarm lamp is lit and the common temperature alarm volt free terminals are closed, the unit is not shut down. Auto reset occurs once the temperature has fallen below the alarm temperature.

MAN - If the secondary temperature measured is greater than the high temperature alarm value, the LCD indicates this. If this persists, the unit is shut down, all pumps are turned off, and the modulating valve is closed. The common temperature alarm lamp is lit and the common temperature alarm volt free terminals are closed. To reset the alarm, go into FUNCTION and select HIGH TEMP. RESET.

EXTERNAL CONNECTIONS

Electrical Supply.

The controller operates with a 240V supply. An external electrical supply isolator should always be fitted adjacent to the unit. The supply itself should be provided with suitable protection in accordance with current IEE regulations and codes of practice.

Internal Fuse Protection.

The electronic controller is protected by a 500mA fuse and the main p.c.b. output side is protected by a 10A fuse, both are located on the p.c.b.

Common Temperature Alarm.

If either the high or low temperature alarm value is exceeded a relay is energised, closing a pair of volt free terminals for external indication.

External Interlock.

An external safety device can be connected to the Econoplate which will shut the unit down in case of a fault, it is a safety extra low voltage circuit, an open circuit should be used as a fault signal.

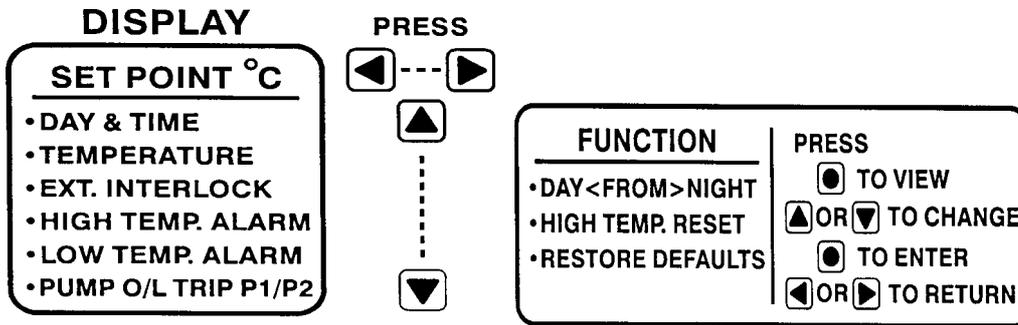
External "Clock".

An external device can be connected to switch between 2 temperatures, or to switch between a single set point and off. A closed contact across this safety extra low voltage circuit gives the day setting and an open circuit the night setting.

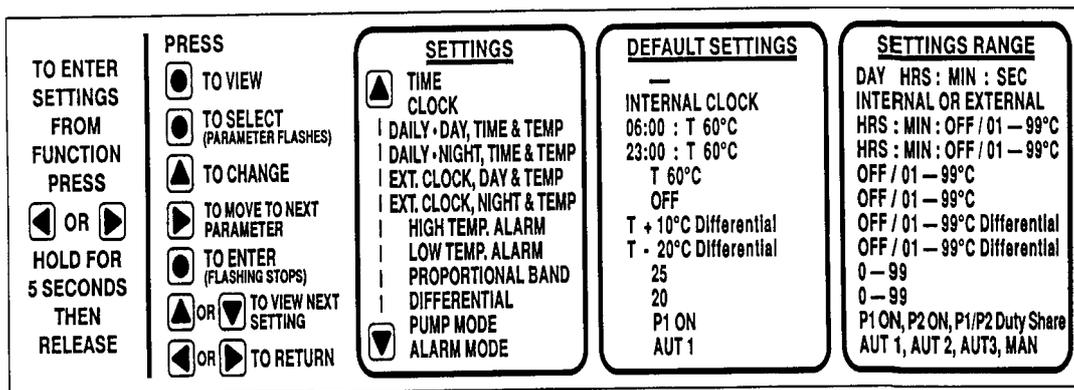
External Temperature indication.

A 4-20mA output gives an indication of the secondary flow temperature, it is a linear scale, 4mA = 0°C, 20mA = 99°C.

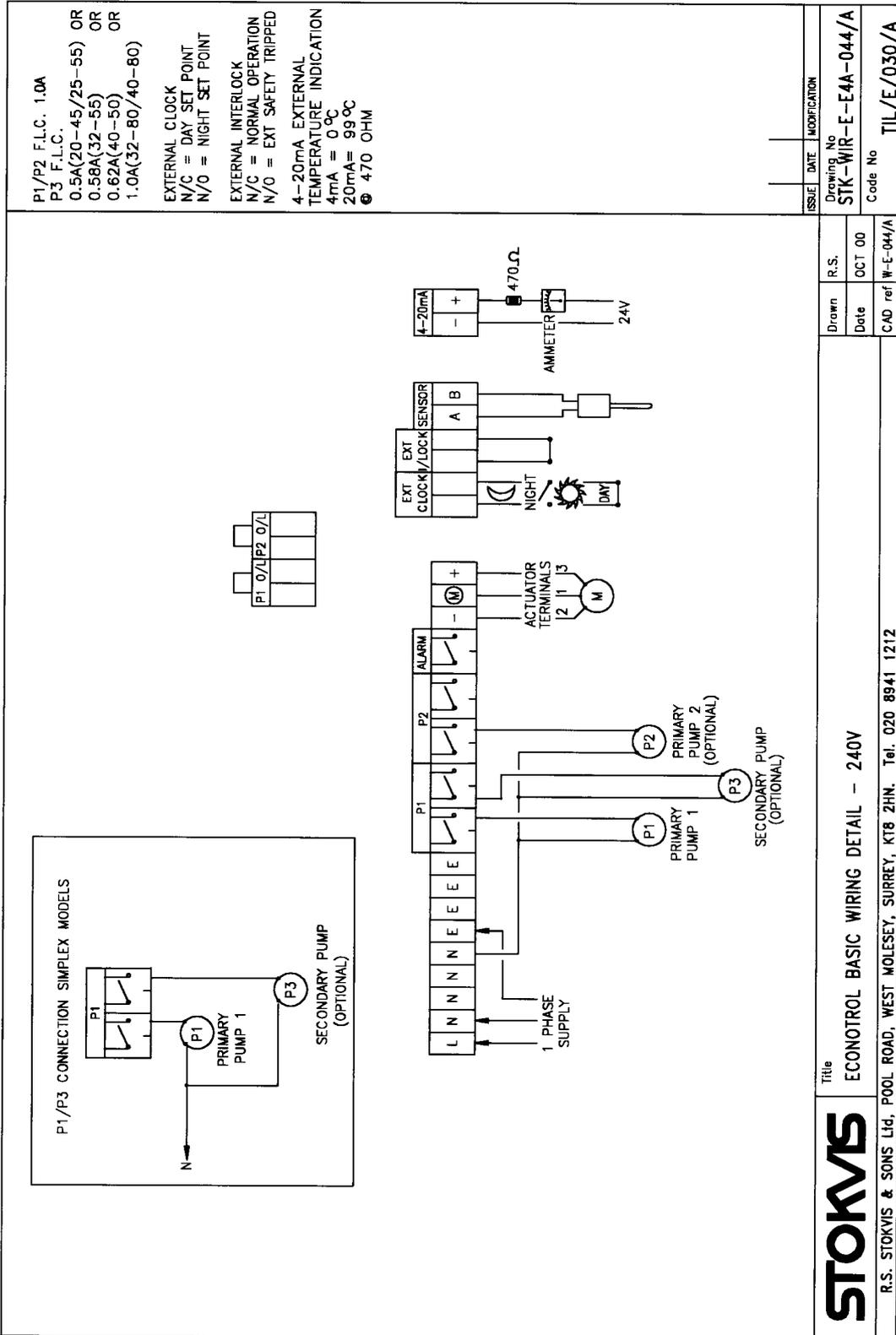
SUMMARY OF DISPLAY & FUNCTION.



SUMMARY OF SETTINGS



ECONOTROL BASIC WIRING.



Title		R.S.	
ECONOTROL BASIC WIRING DETAIL - 240V		Drawn	OCT 00
R.S. STOKVIS & SONS Ltd, POOL ROAD, WEST MOLESEY, SURREY, KT8 2HN. Tel. 020 8941 1212		Date	W-E-044/A
Code No		ISSUE	MODIFICATION
TIL/E/030/A		DATE	
		DRAWING No	STK-WIR-E-E4A-044/A

STOKVIS