



**ECONOPLATE  
E2 SERIES  
STEAM TO WATER  
PACKAGED  
PLATE HEAT EXCHANGER**

**INSTALLATION OPERATION  
& MAINTENANCE  
DOCUMENTATION**

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## STOKVIS ECONOPLATE E2 SERIES

### STEAM TO WATER PACKAGED PLATE HEAT EXCHANGER.

#### GENERAL DESCRIPTION.

The Stokvis Econoplate E2 series of packaged plate heat exchangers is available in three ranges covering a total of some 27 units with outputs ranging from 50kW to 850kW when fed with steam at 140<sup>0</sup>C.

The Econoplate E2 series units are designed to provide either hot water or LTHW heating up to their maximum rated output, when fed with a suitable supply of steam.

All of the Econoplate units are built around an epoxy coated chassis containing the heat exchanger. This heat exchanger is constructed from a number of gasketed stainless steel plates which form the channels for both the steam and the secondary water to flow through. Plate Heat Exchangers have low water content and low thermal inertia making them ideal for use in systems with varying heat outputs. The steam and water both make a single pass across the heat exchanger and the required heat exchange takes place during this pass.

The capacity of the heat exchanger is controlled by the size of steam valve and number of plates fitted to the heat exchanger chassis, and because the heat exchanger is constructed from a number of individual plates the capacity of the unit can be increased by altering the number of plates fitted, provided the steam valve has sufficient capacity.

The control panel houses the PID temperature controller which incorporates all functional indicator lamps, a control fuse, an output fuse, high and low temperature alarm indication, common volt free temperature alarm terminals and high temperature lockout, extra low voltage external interlock circuit, which can be used for an external safety disable circuit, 4-20 mA flow temperature indication, a 7 day time clock for either 2 temperatures of operation or a single temperature and 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. (e.g. day/night).

The Econoplate units are fully assembled and factory wired for ease of installation leaving only the electrical supply and primary steam/condensate system and secondary water circuits to be connected on site

## **CONTROL VALVE OPTIONS.**

The Econoplate E2 series units are supplied as standard with a fast acting 2 port motorised steam control valve & actuator, fitted to the primary circuit. This valve is modulated by a purpose built PID controller which senses the secondary water temperature and opens or closes the valve in response.

An alternative option is of a dual action actuator incorporating mechanical shut off in the event of power failure as well as electrical modulation.

A further option would be an additional high limit thermostat wired to the dual action actuator to shut of the steam supply in the event of a failure of the standard control unit or a loss of power to the system.

For enhanced safety, a double valve set incorporating both a standard valve and actuator and a dual action valve and actuator can be supplied with the additional high limit thermostat. This system gives the same high temperature protection as the single combined dual action actuator/valve, but has the added safety of two separate valve seats.

If a high limit thermostat/dual action valve option is included, the thermostat is supplied hard wired to the controller with 1 metre of flexible conduit. Mechanical installation of the thermostat pocket is required on site into the secondary pipe work close to the Econoplate flow and before any isolating valves.

## **OTHER OPTIONS AVAILABLE.**

For hot water service these include either a secondary hot water service return pump and non return valve or a transfer pump sized to match the duty of the unit and to overcome secondary circuit losses.

If required pump contactors and overloads are housed within the control panel, which can also be fitted with a timed overrun control to dissipate secondary temperature when the Econoplate is used with time switch control applications.

When a transfer pump is being used a flow setting device can be fitted to measure and set the secondary flow rate up to 180l/m.

Also available as optional extras are epoxy coated steel spray guards and insulation jackets purpose built for each model. These can be “retro” fitted to most existing models.

TECHNICAL SPECIFICATION  
E2A RANGE.

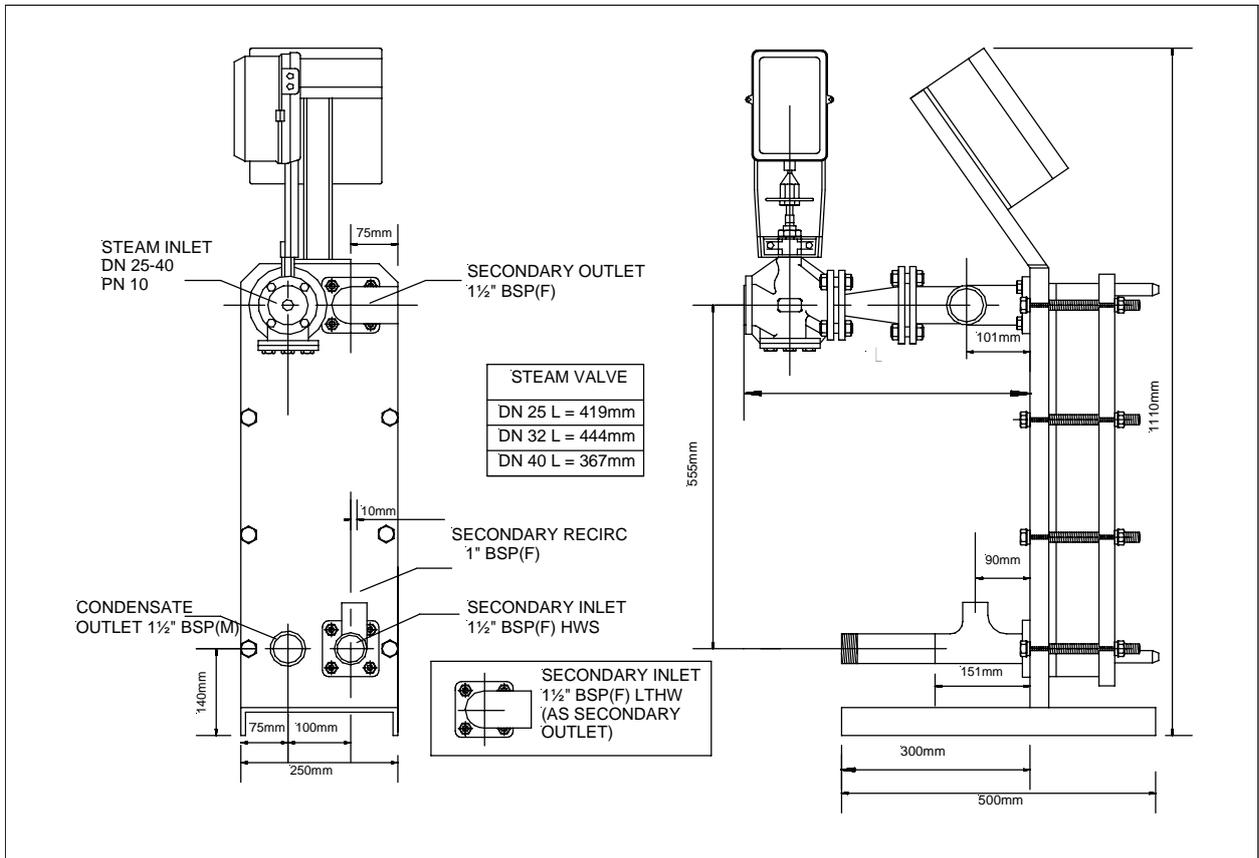
- Chassis Plate. : epoxy coated steel 25mm thick.
- Front Plate. : epoxy coated steel 20mm thick.
- Heat Exchanger Plate. : 316 grade stainless steel.
- Plate Gaskets. : EPDM.
- Retaining bolts. : 16mm carbon steel.
- Maximum secondary operating pressure. : 6 bar.
- Maximum primary operating conditions. : 140°C
- Maximum primary operating pressure :2.5 bar
- Safety valve setting required :3.75bar
- Secondary inlet HWS. : Bronze 1<sup>1</sup>/<sub>2</sub>" BSPF.
- Secondary outlet HWS. : Bronze 1<sup>1</sup>/<sub>2</sub>" BSPF.
- Hot water service return. : Bronze 1" BSPF (<sup>3</sup>/<sub>4</sub>" BSP when HWS secondary pump fitted).
  
- Primary steam connection. : Various PN16.
- Primary condensate connection. : 1<sup>1</sup>/<sub>2</sub>" BSP.
- HWS Secondary pump (optional). : UP20-45N, 1 phase, 115 Watt. (complete with non return valve).
- Semi-Instantaneous Transfer pump : various to suit heat exchanger
- Control valve. : 2 port, Cast Iron, PN16.
- Standard Valve Actuator. : 240V, modulating, motor open/motor close.

- CONTROL PANEL : Polycarbonate enclosure.
- : Electronic PID temperature controller.
- : 7 day time clock control of 2 temperature settings and/or one temperature/ off, per day.
- : Safety extra low voltage circuit for external "clock" control of 2 temperatures or one temperature and off.
- : Safety extra low voltage circuit for external interlock
- : Adjustable high limit and low limit temperature alarms, temp alarm lamp, common volt free temp. alarm and selectable high temp. lockout modes.
- : Functional indication of :pump enabled, valve opening or closing.
- : LCD display of day and time, secondary flow temperature and any faults.
- : 4-20 mA output of secondary flow temperature.
- : Pump mode selection including duplex pump duty share.
- : Full menu driven interrogation of parameters and operating modes.
- : 500mA control fuse, 10A output fuse

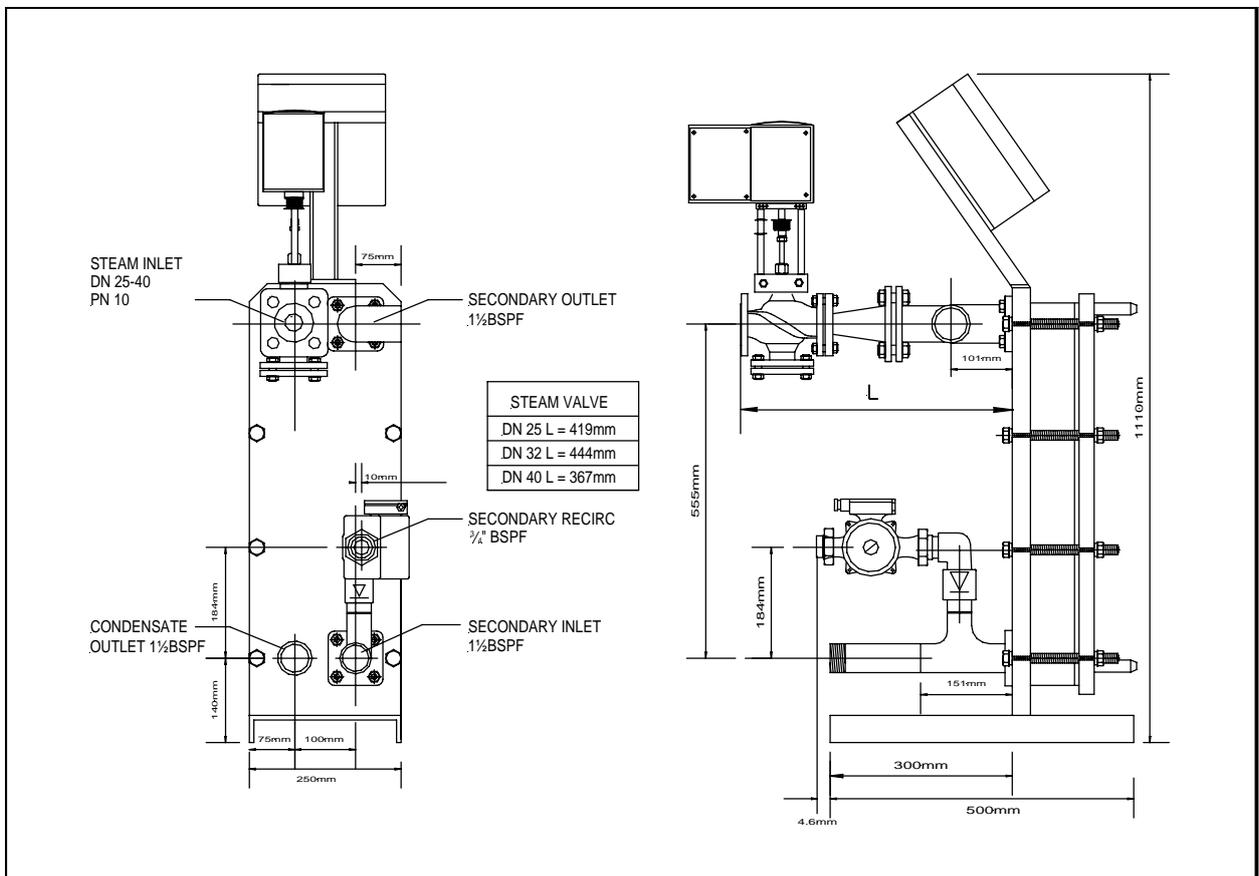
WEIGHT: 140Kg (Maximum)  
HEIGHT: 1110mm

LENGTH: 644mm (Maximum)\*  
WIDTH: 250mm\*  
\*(excluding optional secondary pump)

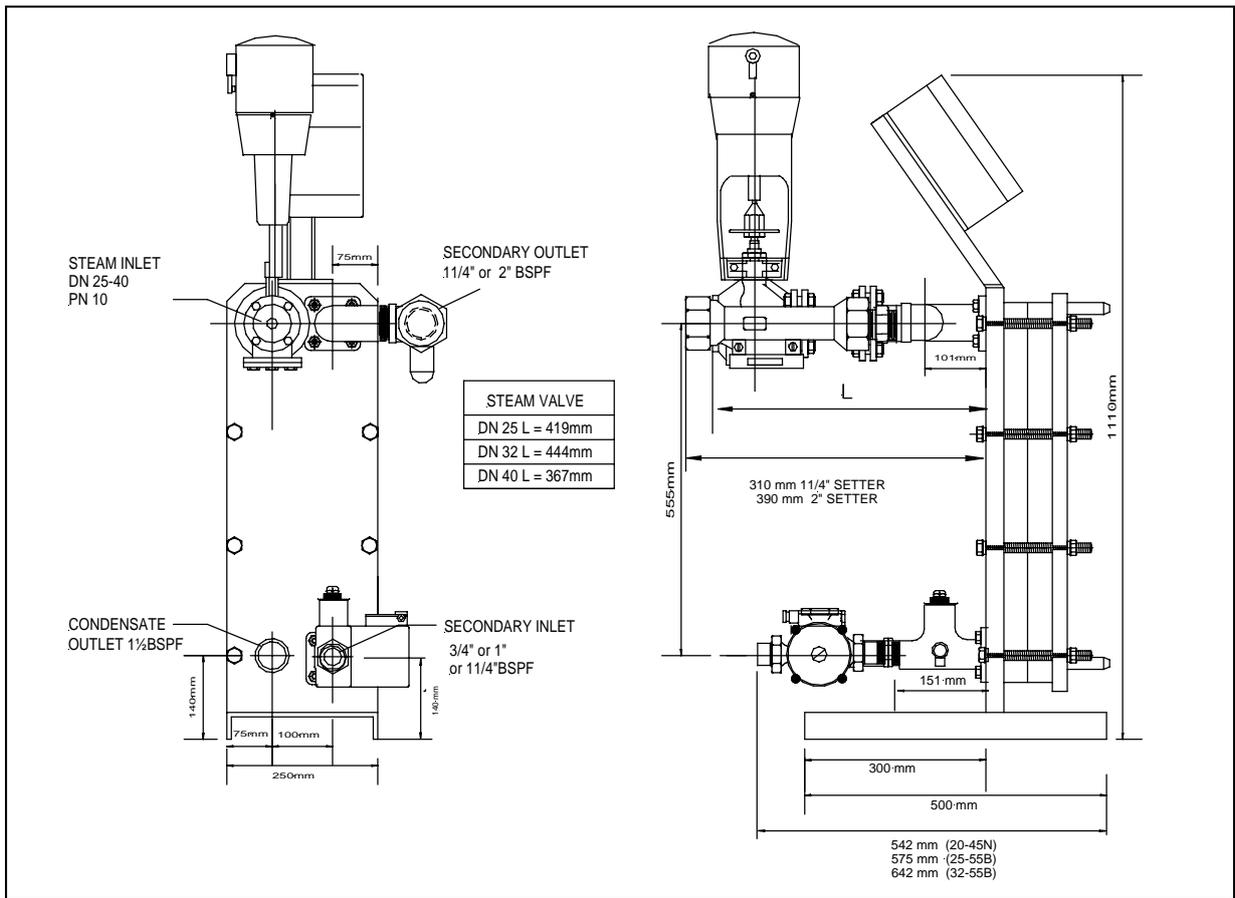
## E2A+0R: HOT WATER SERVICE MECHANICAL DETAILS (AVR Type Actuator)



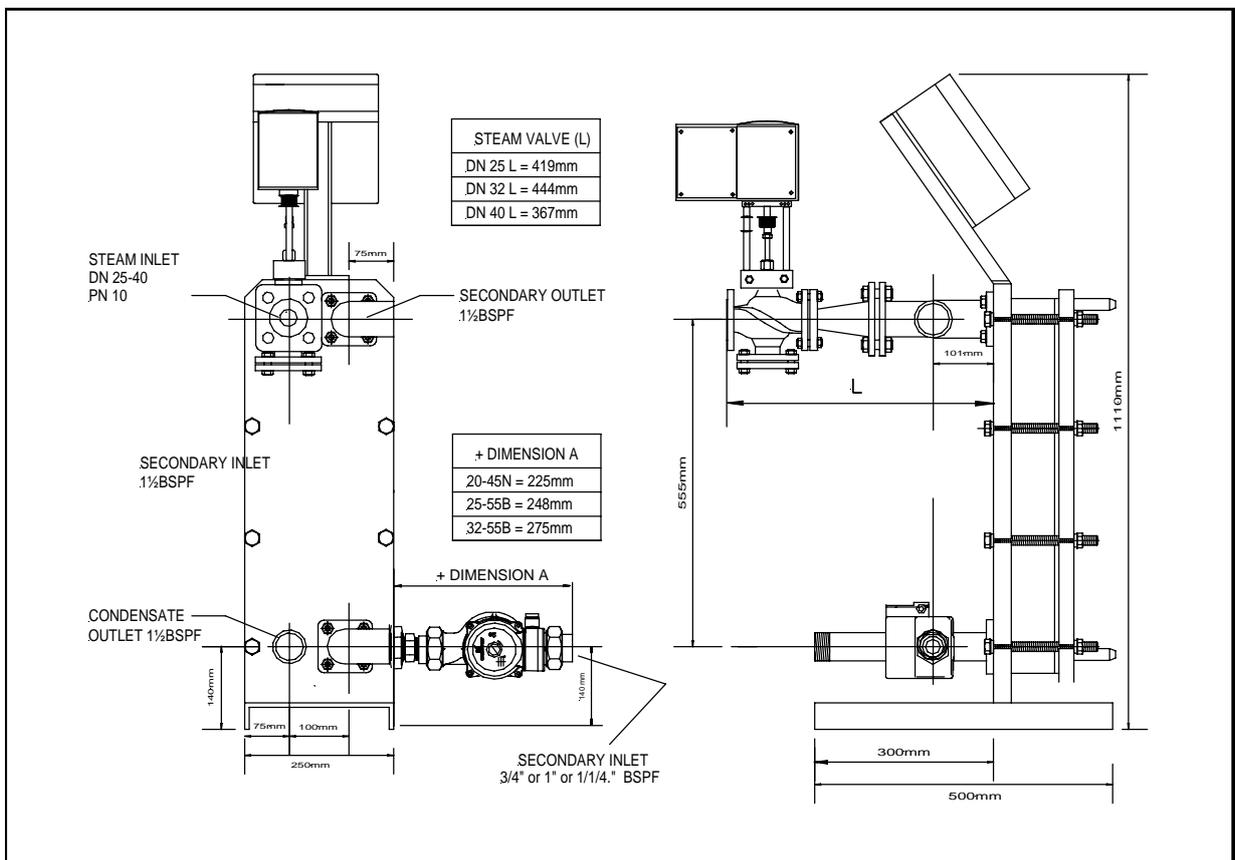
## E2A +1R: HOT WATER SERVICE MECHANICAL DETAILS WITH RECIRCULATION PUMP. (AVM Type Actuator)



**E2A+1T: HOT WATER SERVICE MECHANICAL DETAILS WITH TRANSFER PUMP (STRAIGHT) & FLOW RATE SETTER. (AVM Type Actuator)**



**E2A+1T: HOT WATER SERVICE MECHANICAL DETAILS WITH TRANSFER PUMP ON ANGLED CONNECTIONS. (AVM Type Actuator)**



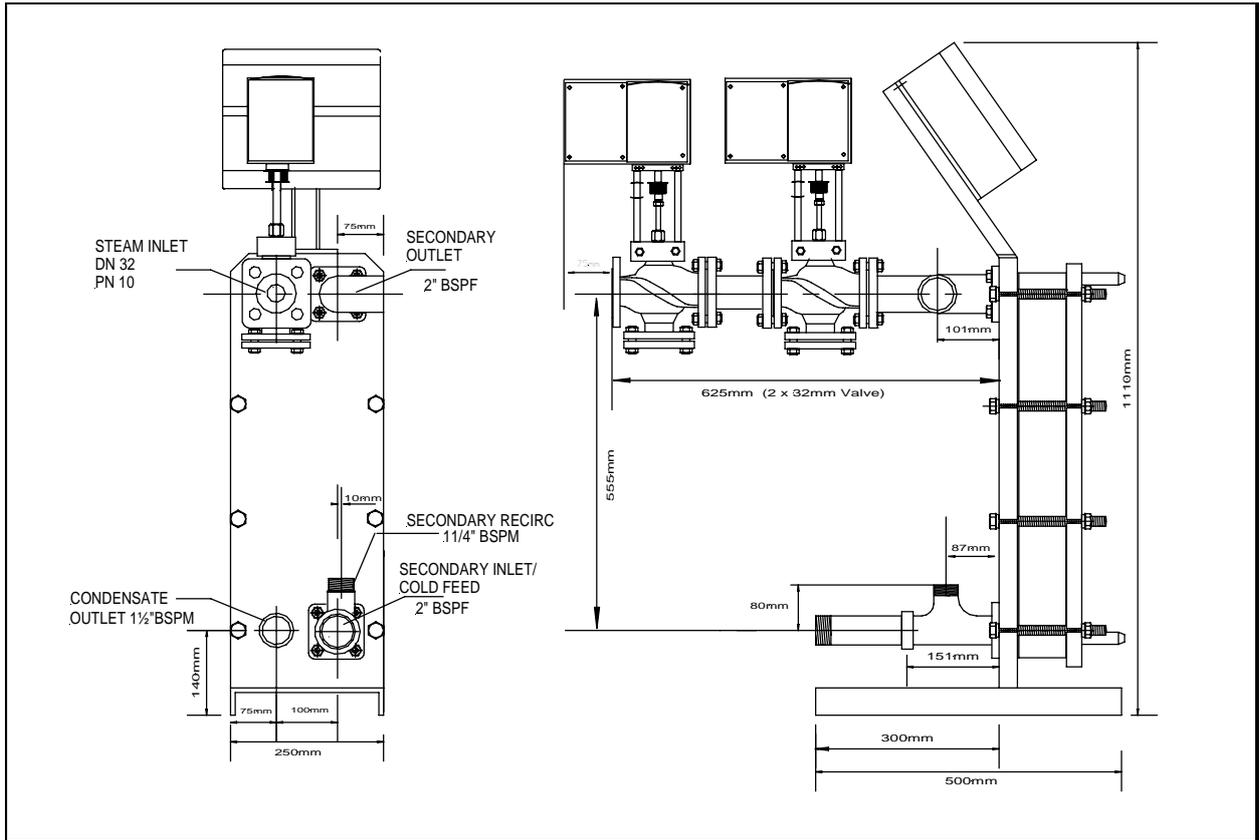
TECHNICAL SPECIFICATION  
E2B RANGE.

- Chassis Plate. : epoxy coated steel 25mm thick.
- Front Plate. : epoxy coated steel 25mm thick.
- Heat Exchanger Plate. : 316 grade stainless steel.
- Plate Gaskets. : EPDM.
- Retaining bolts. : 16mm carbon steel.
- Maximum secondary operating pressure. : 6 bar.
- Maximum primary operating conditions. : 140<sup>0</sup>C
- Maximum primary operating pressure :2.5 bar
- Safety valve setting required :3.75bar
- Secondary inlet HWS. : Bronze 2" BSPF.
- Secondary outlet HWS. : Bronze 2" BSPF.
- Secondary inlet LTHW. : Bronze 2" BSPF.
- Secondary outlet LTHW. : Bronze 2" BSPF.
- Hot water service return. : Bronze 1<sup>1</sup>/<sub>4</sub>" BSP.
- Primary steam connection. : Various PN16.
- Primary condensate connection. : 1<sup>1</sup>/<sub>2</sub>" BSP.
- HWS Secondary pump : UPS32-55B, 1 phase, 145 Watt.  
(optional). (complete with non return valve).
- Semi-Instantaneous Transfer pump : various to suit heat exchanger
- Control valve. : 2 port, Cast Iron, PN16.
- Standard Valve Actuator. : 240V, modulating, motor open/motor close.
  
- CONTROL PANEL : Polycarbonate enclosure.  
: Electronic PID temperature controller.  
: 7 day time clock control of 2 temperature settings and/or one temperature/ off, per day.  
: Safety extra low voltage circuit for external "clock control of 2 temperatures or one temperature and off.  
: Safety extra low voltage circuit for external interlock  
: Adjustable high limit and low limit temperature alarms, temp alarm lamp, common volt free temp. alarm and selectable high temp. lockout modes.  
:Functional indication of :pump enabled, valve opening or closing.  
: LCD display of day and time, secondary flow temperature and any faults.  
: 4-20 mA output of secondary flow temperature.  
: Pump mode selection including duplex pump duty share.  
: Full menu driven interrogation of parameters and operating modes.  
: 500mA control fuse, 10A output fuse

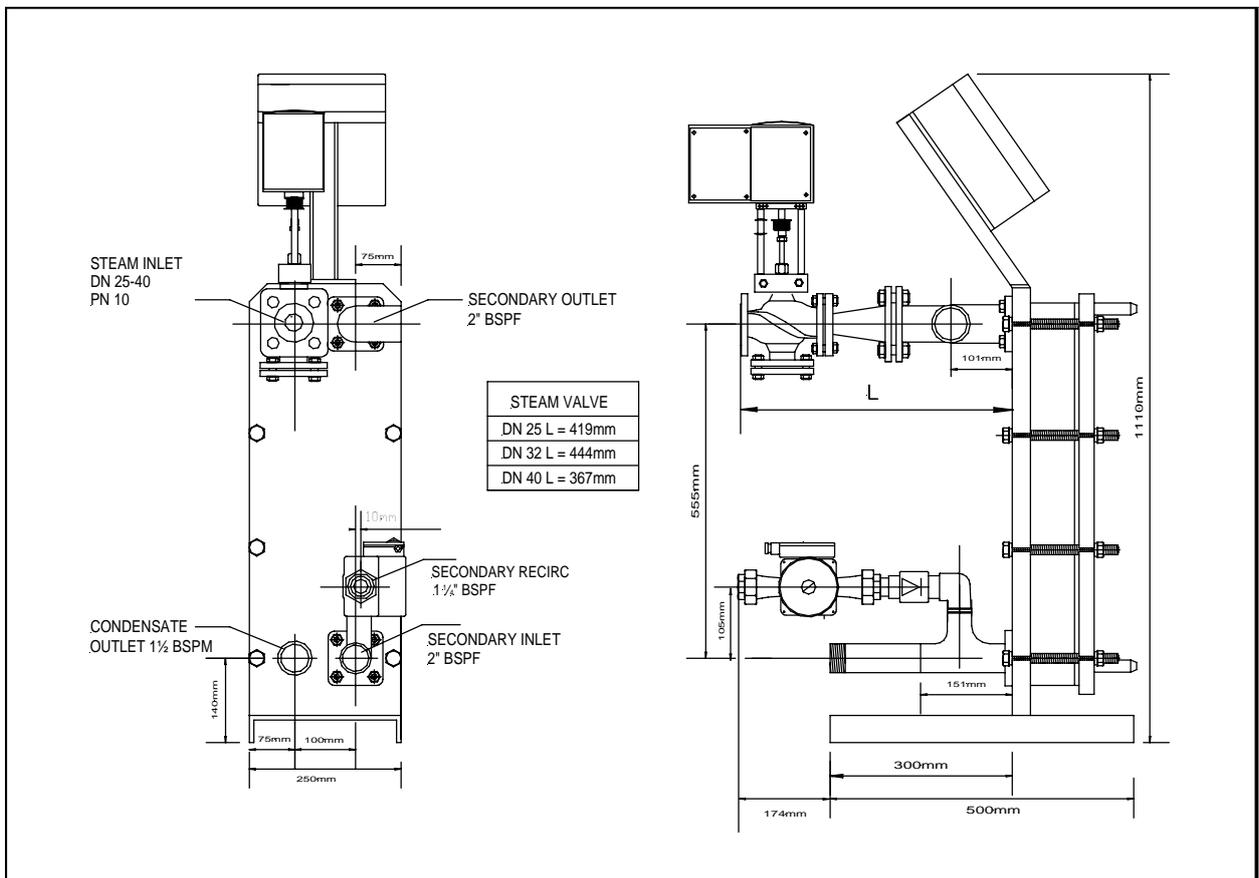
WEIGHT: 150Kg (Maximum)  
HEIGHT: 1110mm

LENGTH: 644mm (Maximum)\*  
WIDTH: 250mm\*  
\*(excluding optional secondary pump)

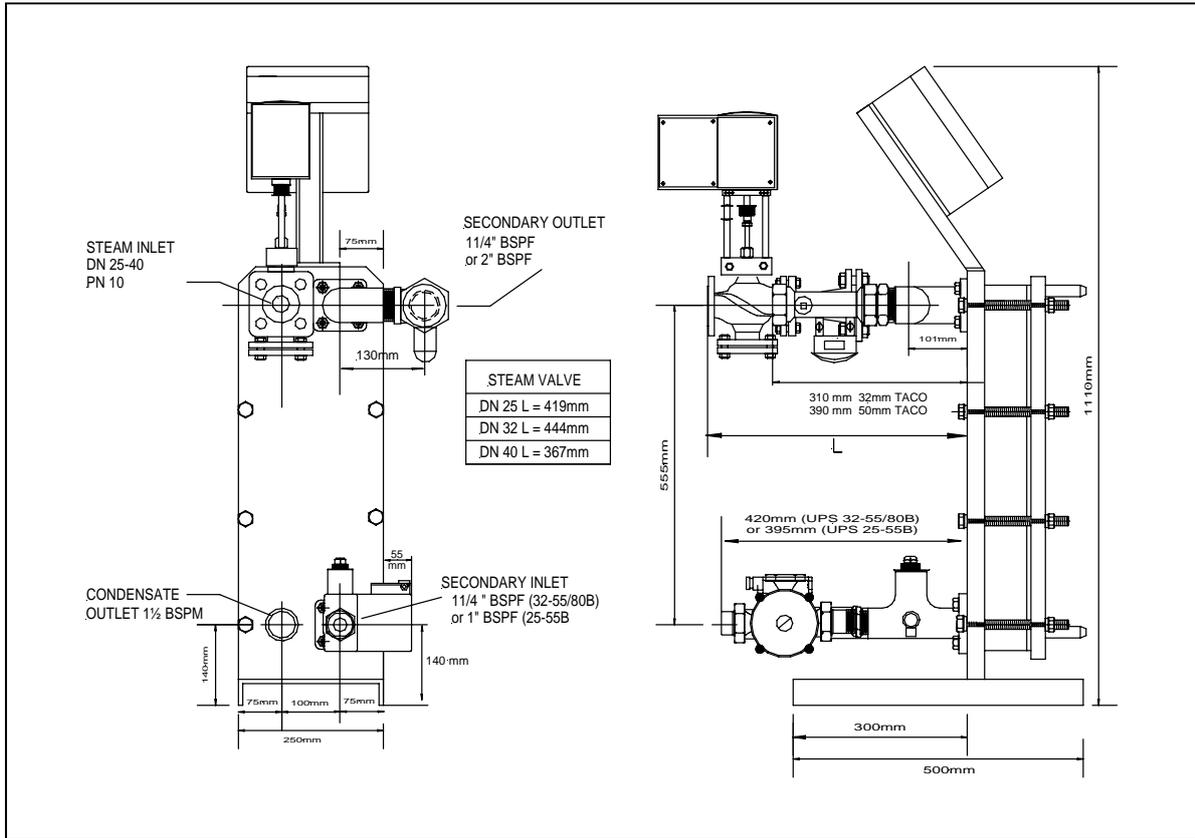
**E2B +0R (WITH DOUBLE 32mm VALVE OPTION): HOT WATER SERVICE / LTHW  
MECHANICAL DETAILS.(AVM/F Actuators).**



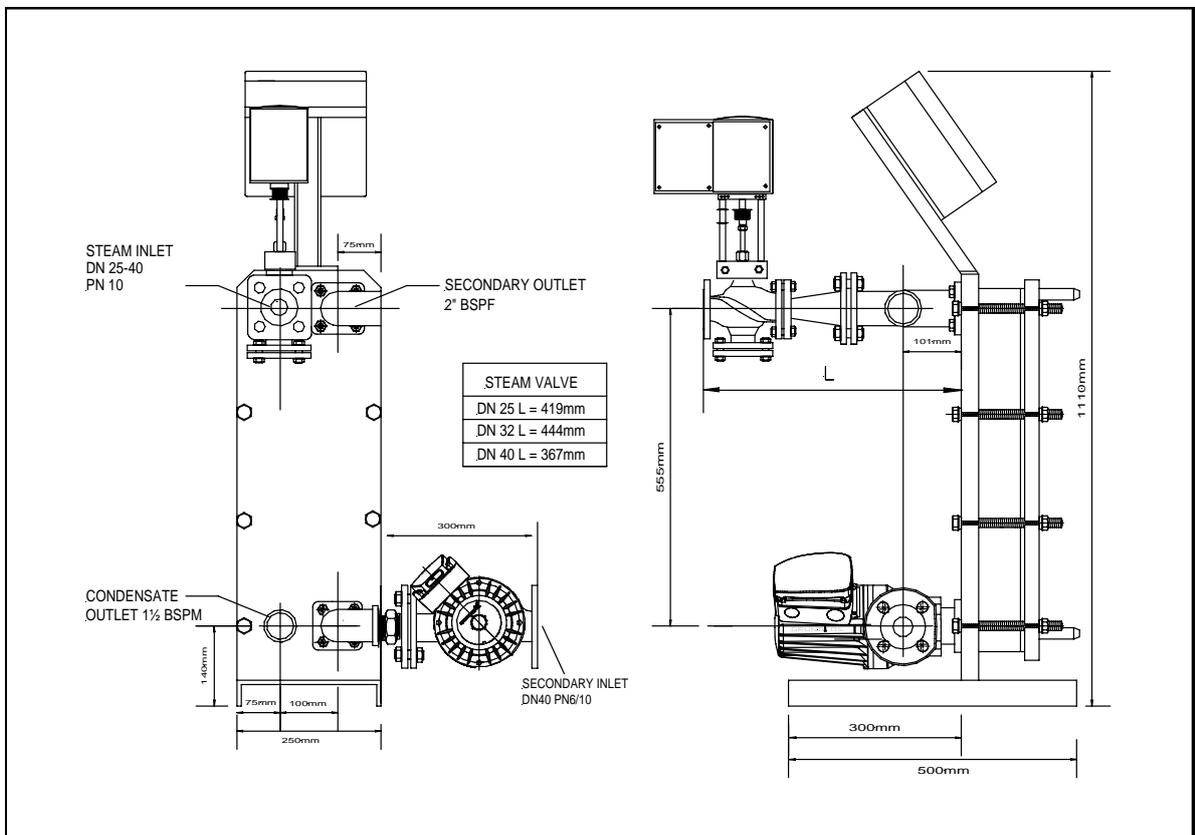
**E2B+1R: HOT WATER SERVICE MECHANICAL DETAILS WITH RECIRCULATION  
PUMP.(AVM Type Actuator)**



**E2B+1T: HOT WATER SERVICE MECHANICAL DETAILS WITH TRANSFER PUMP (STRAIGHT) & FLOW RATE SETTER. (AVM Type Actuator)**



**E2B+1T: HOT WATER SERVICE MECHANICAL DETAILS WITH TRANSFER PUMP ON ANGLED CONNECTIONS. (AVM Type Actuator)**



**TECHNICAL SPECIFICATION**  
**E2C RANGE.**

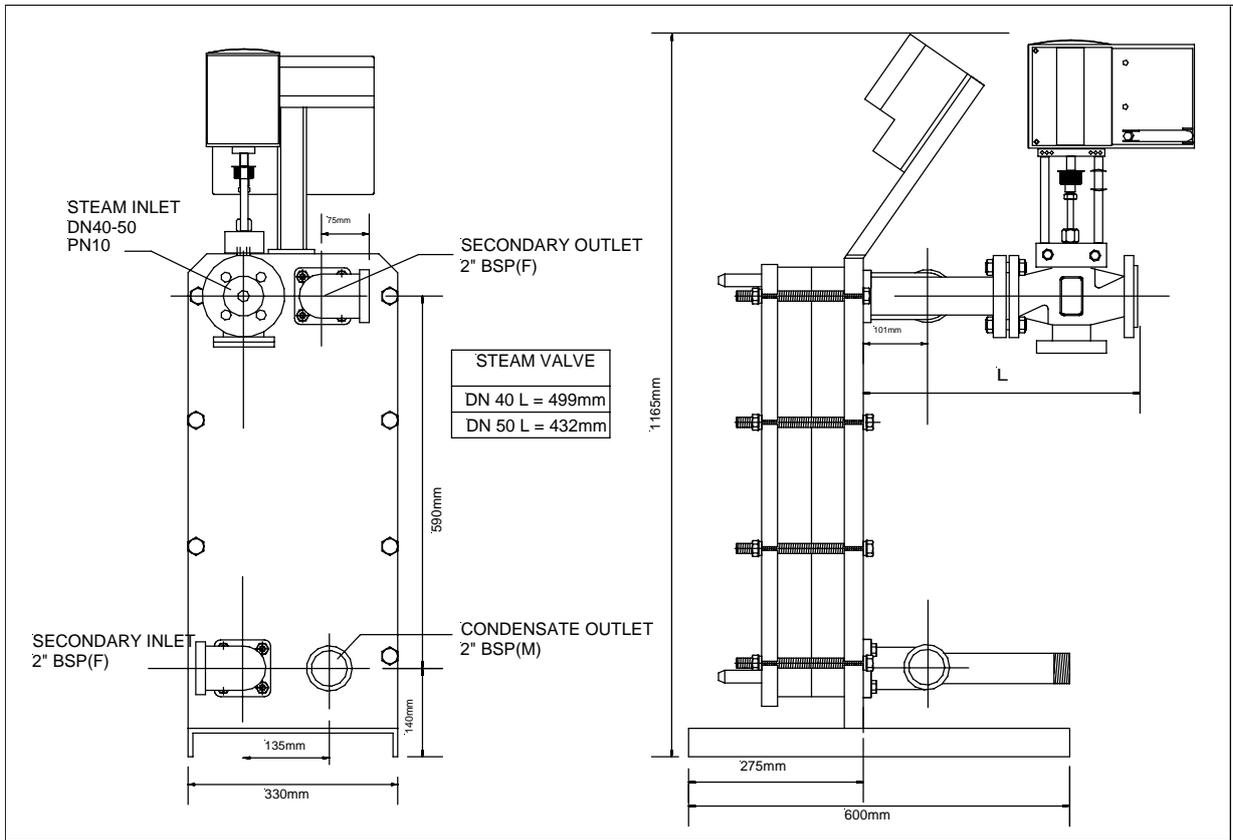
- Chassis Plate. : epoxy coated steel 25mm thick.
- Front Plate. : epoxy coated steel 25mm thick.
- Heat Exchanger Plate. : 316 grade stainless steel.
- Plate Gaskets. : EPDM.
- Retaining bolts. : 20mm carbon steel.
- Maximum secondary operating pressure. : 6 bar.
- Maximum primary operating conditions. : 140°C
- Maximum primary operating pressure :2.5 bar
- Safety valve setting required :3.75bar
- Secondary inlet HWS. : Bronze 2" BSPF.
- Secondary outlet HWS. : Bronze 2" BSPF.
- Secondary inlet LTHW. : Bronze 2" or 2 1/2" BSP on 10bar unit.
- Secondary outlet LTHW. : Bronze 2" or 2 1/2" BSP on 10bar unit.
- Hot water service return. : Bronze 1 1/4" BSP.
- Primary steam connection. : Various PN16.
- Primary condensate connection. : 2" BSP.
- HWS Secondary pump (optional). : UPS32-55B, 1 phase, 145 Watt. (complete with bronze non return valve).
- Semi-Instantaneous Transfer pump : various to suit heat exchanger
- Control valve. : 2 port, Cast Iron, PN16.
- Standard Valve Actuator. : 240V, modulating, motor open/motor close.

- CONTROL PANEL : Polycarbonate enclosure.
- : Electronic PID temperature controller.
- : 7 day time clock control of 2 temperature settings and/or one temperature/ off, per day.
- : Safety extra low voltage circuit for external "clock" control of 2 temperatures or one temperature and off.
- : Safety extra low voltage circuit for external interlock
- : Adjustable high limit and low limit temperature alarms, temp alarm lamp, common volt free temp. alarm and selectable high temp. lockout modes.
- Functional indication of :pump enabled, valve opening or closing.
- : LCD display of day and time, secondary flow temperature and any faults.
- : 4-20 mA output of secondary flow temperature.
- : Pump mode selection including duplex pump duty share.
- : Full menu driven interrogation of parameters and operating modes.
- : 500mA control fuse, 10A output fuse

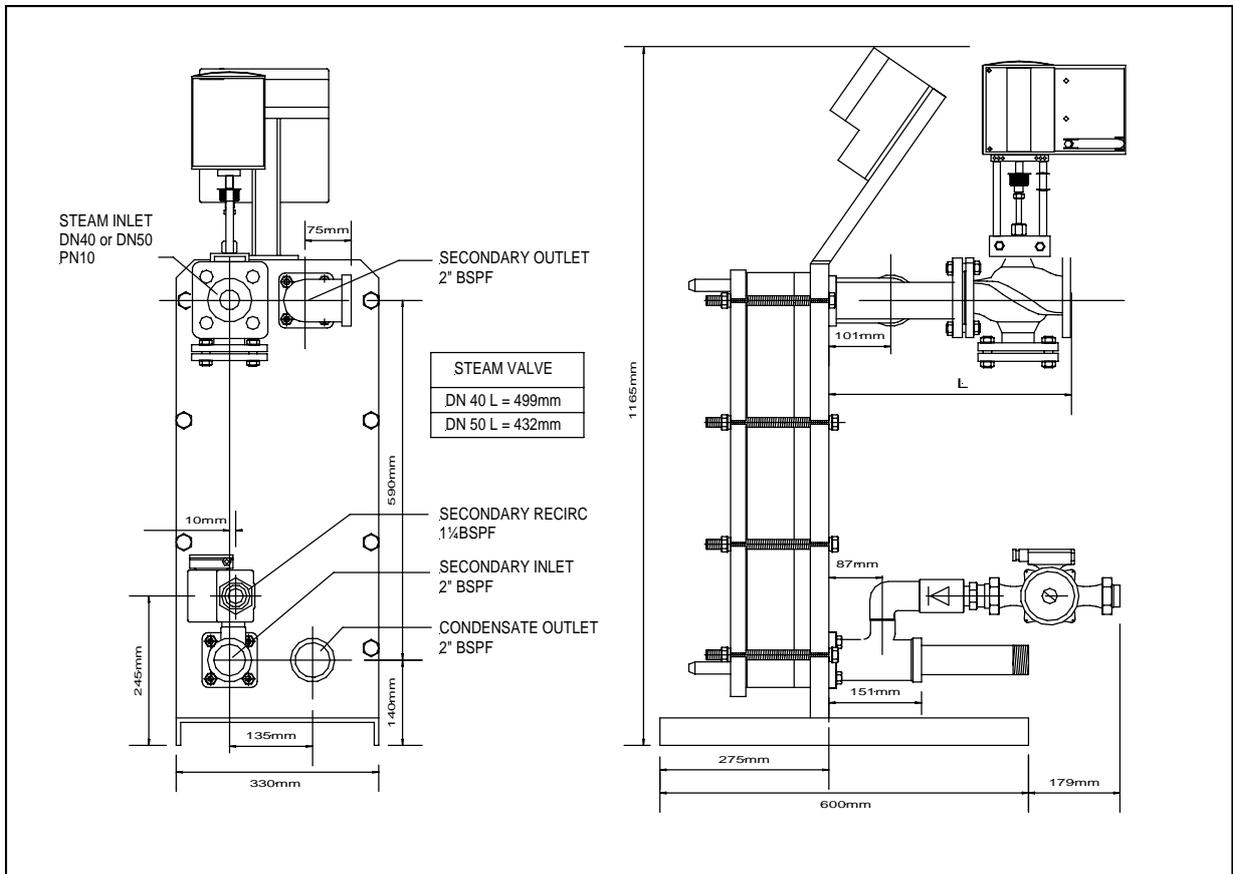
WEIGHT: 160Kg (Maximum)  
 HEIGHT: 1165mm

LENGTH: 774mm (Maximum)\*  
 WIDTH: 330mm\*  
 \*(excluding optional secondary pump)

**E2C+0R: LTHW 2" MECHANICAL DETAILS.(AVM Actuator).**

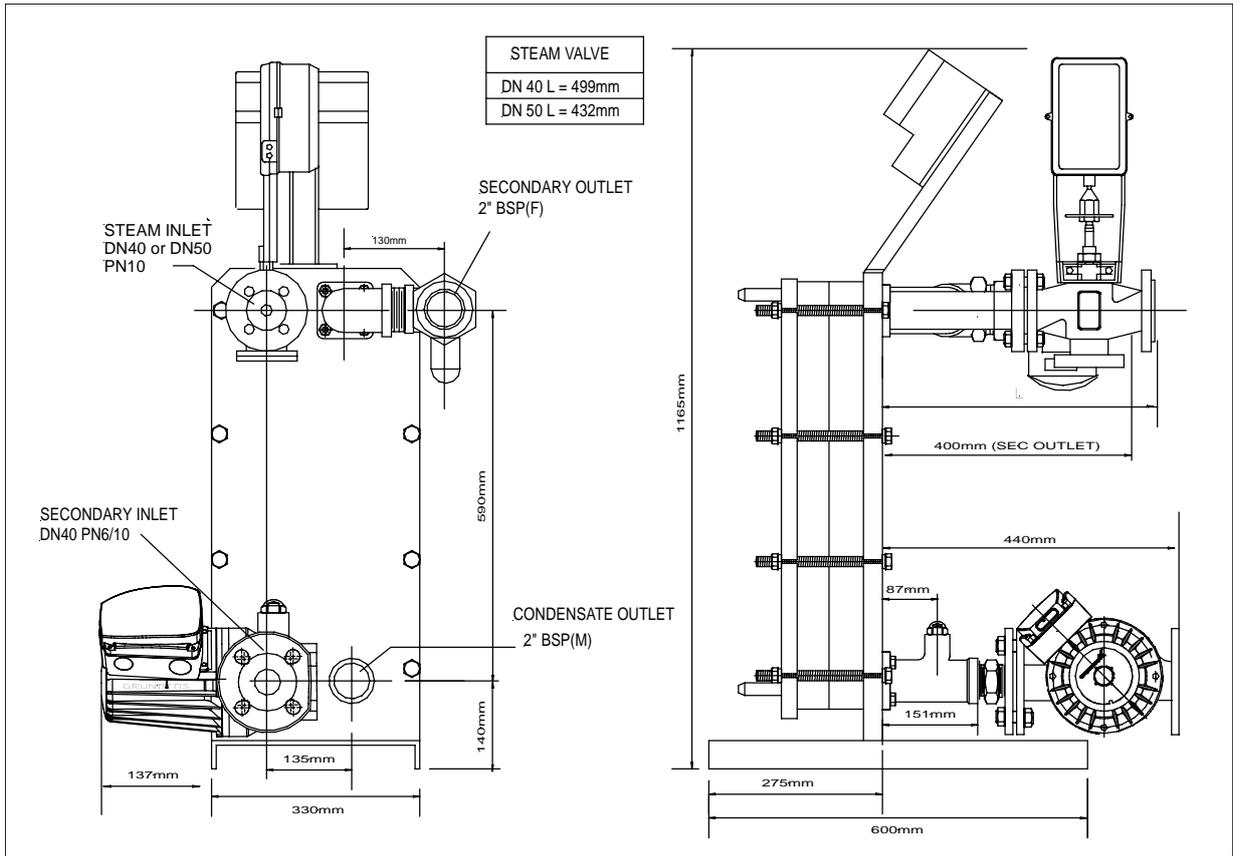


**E2C+1R: HOT WATER SERVICE MECHANICAL DETAILS WITH RECIRCULATION PUMP.(AVM Actuator).**

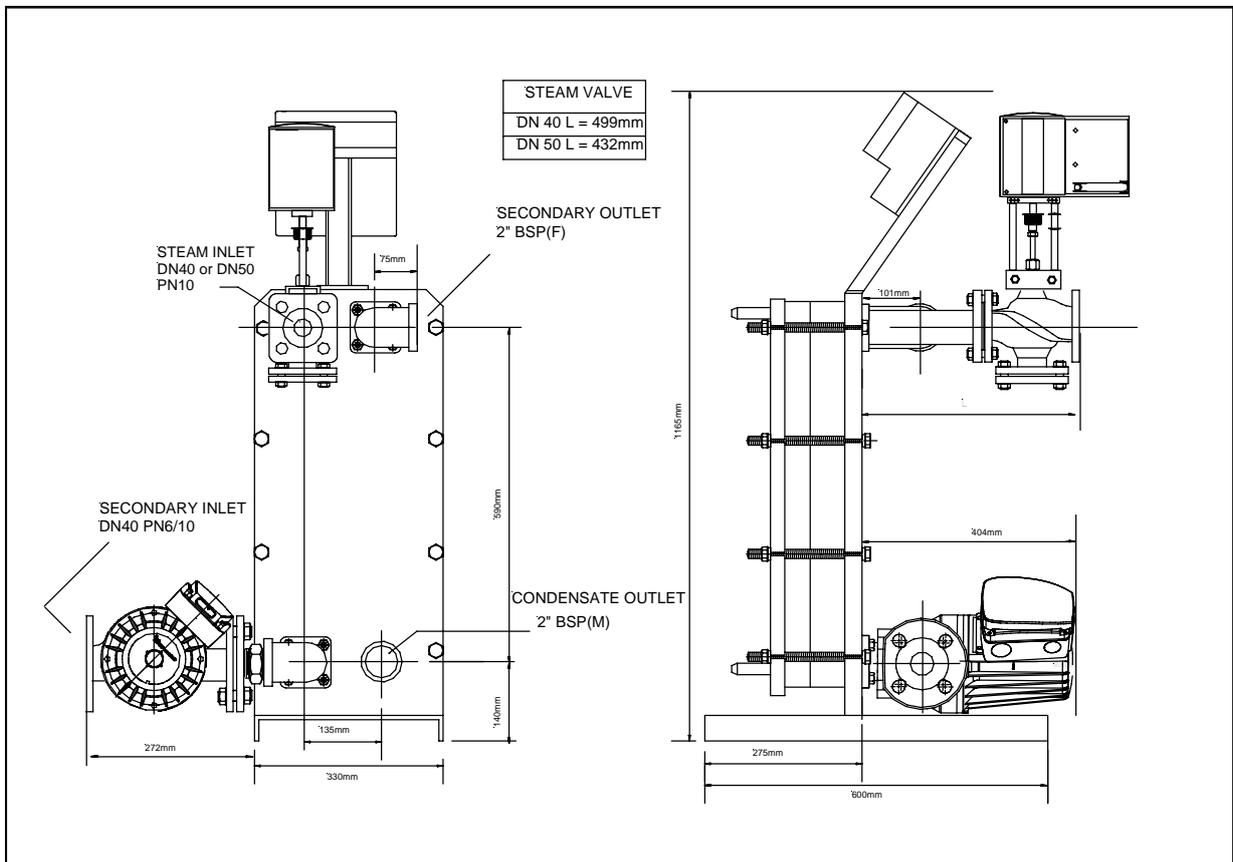


E2C+0R: HWS MECHANICAL DETAILS would be the same as above but with the secondary pump omitted.

**E2C+1T: HOT WATER SERVICE MECHANICAL DETAILS WITH TRANSFER PUMP & FLOW RATE SETTER. (AVR Actuator)**



**E2C+1T: HOT WATER SERVICE MECHANICAL DETAILS WITH TRANSFER PUMP ANGLED SECONDARY CONNECTIONS.(AVM Actuator)**



**PERFORMANCE GUIDE FOR E2 SERIES(PRIMARY STEAM 140°C , 10-60°C HOT WATER )**

**ECONOPLATE MODEL**

	E2A5	E2A9	E2A13	E2A15	E2A19	E2A23	E2A25	E2B27	E2B31	E2C20L	E2C24L	E2C28L	E2C32L	E2C36L
SECONDARY FLOW RATE AT 60°C l/min	14.3	28.7	43	57.4	72	85.8	100	114.6	129	144	172	201	230	258
SECONDARY PRESSURE DROP AT PEAK OUTPUT kPa	20	20	20	26	24	24	27	30	30	10	10	10	10	10
PRIMARY STEAM FLOW RATE kg/sec	0.023	0.046	0.069	0.092	0.115	0.138	0.161	0.184	0.207	0.230	0.276	0.322	0.369	0.415
PRIMARY STEAM CONNECTION PN16	15	20	25	25	32	32	40	40	40	40	50	50	50	50
PRIMARY PRESSURE DROP kPa	84	49	45	85	49	36	38	54	69	101	44	64	84	109
HEAT LOAD REQUIRED kW	50	100	150	200	250	300	350	400	450	500	600	700	800	900

**SELECTION GUIDE FOR E2 RANGE**

TOURIST HOTELS BY NUMBER OF ROOMS	3	8	14	22	31	40	50	64	76	90	120	155	192	234
LUXURY HOTELS BY NUMBER OF ROOMS	2	5	10	15	22	28	34	43	52	61	80	101	127	153
NUMBER OF STANDARD FLATS	2	7	14	25	40	59	77	100	124	150	201	262	332	408
NUMBER OF LUXURY FLATS	-	4	9	18	27	39	51	68	85	106	147	194	242	302
HOSPITALS & NURSING HOMES BY NUMBER OF ROOMS	-	8	17	32	52	72	92	120	150	185	250	325	405	492
SPORTS CENTRES OR STADIUMS BY NUMBER OF SHOWERS	-	-	4	7	12	18	24	33	40	50	70	93	120	148

Available pump head in kPa from optional secondary recirculation pump, at various flow rates

RECIRCULATION RATE OF 1m <sup>3</sup> /hr	22	30	33	34	35	36	36	48	48	48	49	49	49	49
RECIRCULATION RATE OF 3m <sup>3</sup> /hr	-	-	-	-	-	3	4	35	37	38	39	40	40	41
RECIRCULATION RATE OF 5m <sup>3</sup> /hr	-	-	-	-	-	-	-	14	18	21	23	25	27	29

**NOTES:**

- :Models with lower secondary resistance can be produced on request.
- :Figures based on a steam supply pressure of 2.25bar gauge
- :Steam pressure drops are with single control valve
- :The selection guide uses diversity factors . For simultaneous operation of outlets calculate separately.
- :For applications not listed or temperatures other than those above , contact Stokvis for a selection.
- :Tourist hotels assume a shower and wash hand basin are available in each room.
- :Luxury hotels assume a bath or shower and wash hand basin are available in each room.
- :Standard flats are classed as having 1 sink, 1 wash hand basin and 1 shower.
- :Luxury flats are classified as having 1 sink, 2 wash hand basins, and 1 bath.
- :Standard fittings are assumed in all cases.

**PERFORMANCE GUIDE FOR E2 SERIES(PRIMARY STEAM 140°C , LTHW 82-71°C )**

**ECONOPLATE MODEL**

	E2B9L	E2B17L	E2B27L	E2B33L	E2B47L	E2C28L	E2C32L	E2C38L	E2C42L	E2C48L	E2C52L	E2C62L	E2C68L
SECONDARY FLOW RATE l/min	65.4	130	196	261	325	391	456	522	586	652	717	804	848
SECONDARY PRESSURE DROP AT PEAK OUTPUT kPa	30	30	30	35	32	32	32	32	35	32	33	31	32
SECONDARY CONNECTION Inches	2	2	2	2	2	2	2	2	2	2.5	2.5	2.5	2.5
PRIMARY STEAM FLOW RATE kg/sec	0.023	0.046	0.069	0.092	0.115	0.138	0.161	0.184	0.207	0.230	0.253	0.276	0.300
PRIMARY STEAM CONNECTION PN10	15	20	25	25	32	32	40	40	40	40	50	50	50
PRIMARY PRESSURE DROP kPa	70	42	41	77	42	66	38	45	63	77	38	40	49
HEAT LOAD REQUIRED kW	50	100	150	200	250	300	350	400	450	500	550	600	650

NOTES:

- :Figures based on a steam supply pressure of 2.25bar gauge
- :Steam pressure drops are with single control valve
- :For applications not listed or temperatures other than those above , contact Stokvis for a selection.
- :Models with lower secondary resistance can be produced on request.

## INSTALLATION.

### PRIMARY

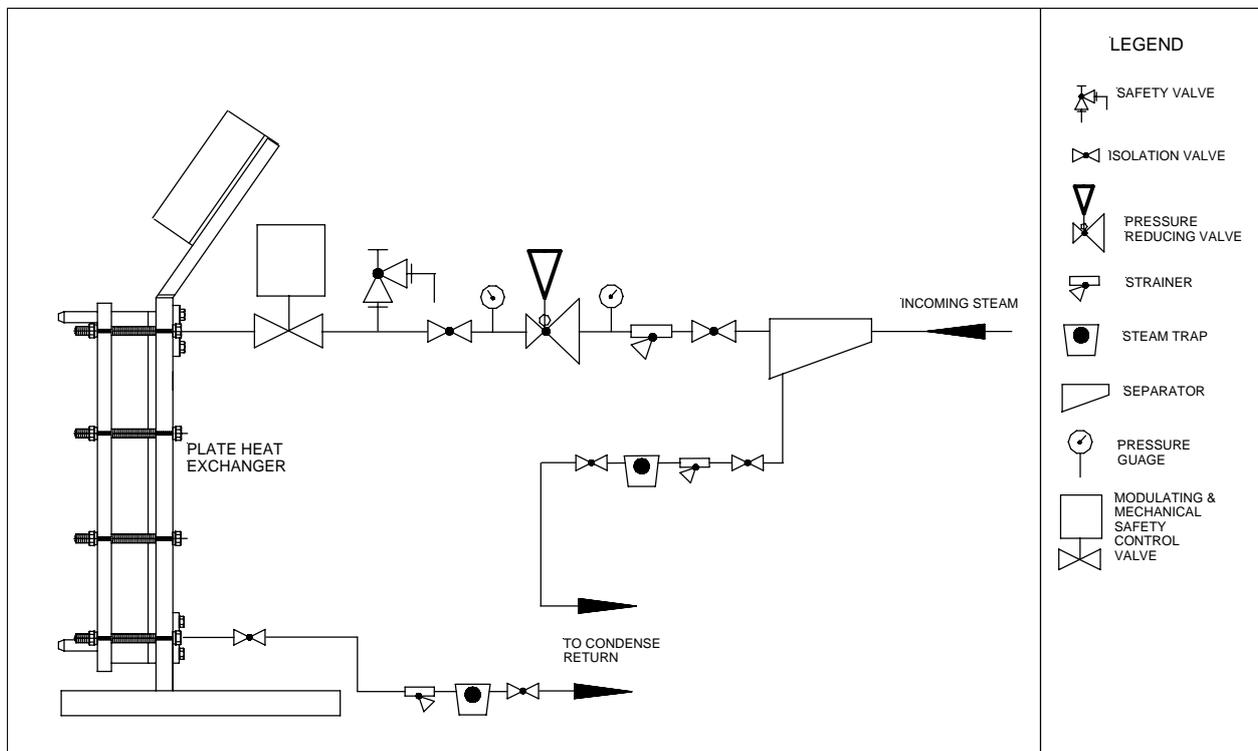
The steam supply is connected to the 2 port valve, the condensate return to the lower steel screwed connection. The steam supply must be controlled such that the maximum operating conditions are not exceeded. A pressure reducing valve should be used to achieve these conditions where necessary.

In addition where the steam pressure might exceed the maximum rating of the Econoplate a suitably sized safety valve should be fitted to the incoming steam supply set at 3.75bar.

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. This can be included by selection of one of the valve options or a completely independent system could be used

The condensate must be removed using an appropriate steam trap /pump set. The type selected should ensure that condensate can drain continuously & freely from the heat exchanger without any sub cooling. Ball float type steam traps generally fulfil these requirements, provided the stall point is not reached. Otherwise a pump set should be considered.

### TYPICAL PRIMARY INSTALLATION OF ECONOPLATE E2 SERIES PLATE HEAT EXCHANGER.



## SECONDARY CONNECTIONS.

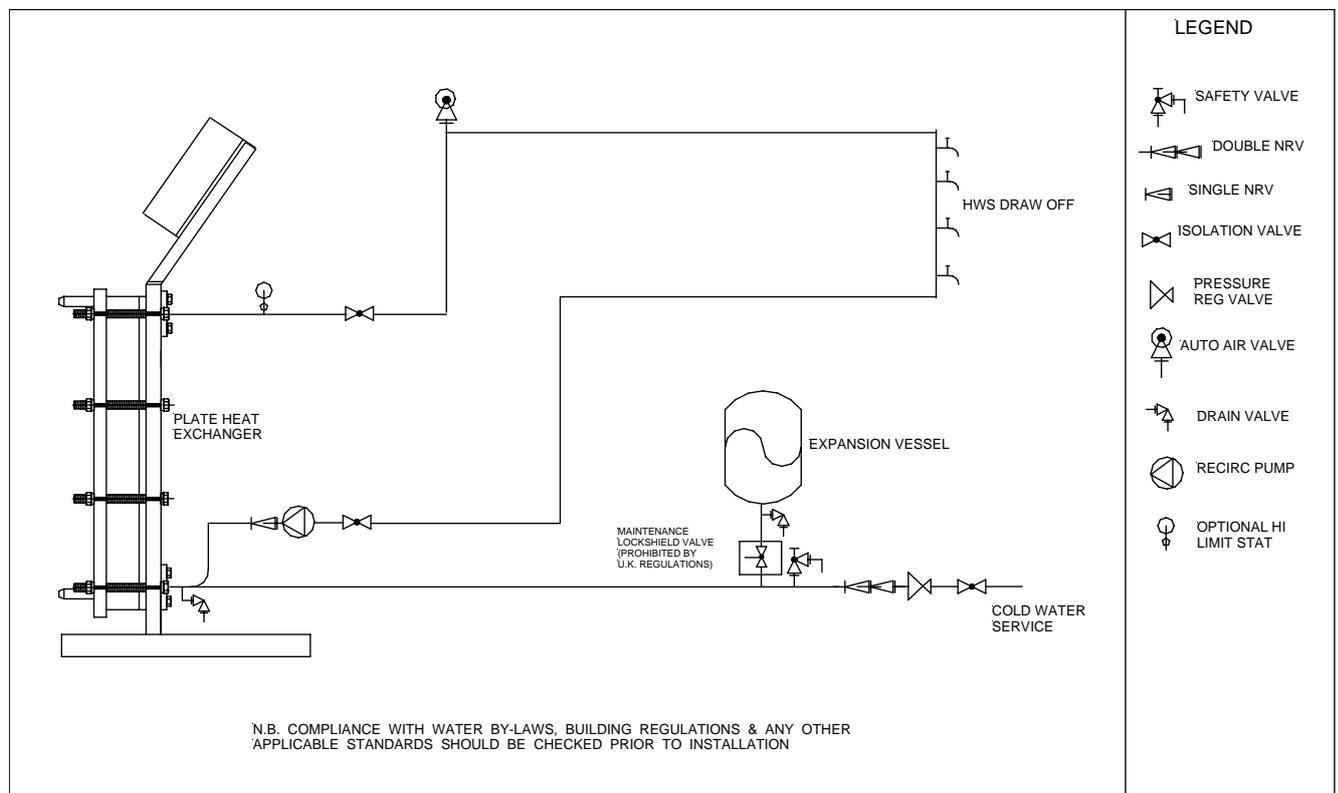
### INSTANTANEOUS HOT WATER APPLICATIONS.

When water is being drawn directly from the Econoplate into the distribution system to the taps this is termed instantaneous hot water generation.

The cold water feed connection is made into the bottom horizontal bronze connection on the rear of the Econoplate. The cold feed may be either from a cold feed storage tank which can itself be boosted if required. Alternatively the unit may be connected to the mains, a kit of components required by part G3 of the approved document of the Building Regulations 1985 and complying with any Installation Requirements for Bylaw Compliance, can be provided to complete the package.

The hot water service flow is connected into the top bronze connection, again on the rear of the Econoplate. It can be identified by noting the electrical temperature probe fitted into it.

A secondary re-circulation must be maintained at all times either around the installation or locally to the Econoplate. For this purpose, a connection is provided in the bronze cold feed casting, or alternatively if the optional secondary re-circulation pump (complete with non-return valve) is provided, then the connection is made into the pump. Isolating valves should be fitted to all circuits.

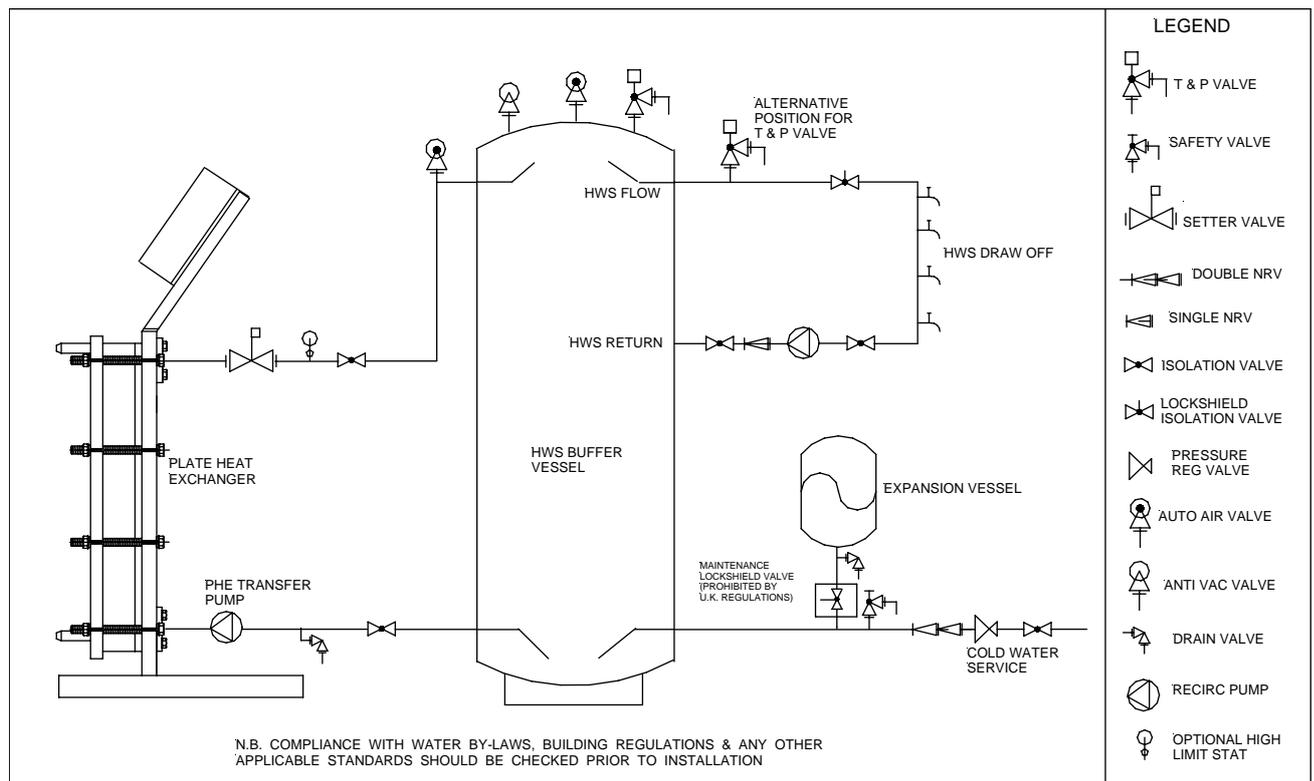


## SEMI-INSTANTANEOUS HOT WATER APPLICATIONS.

When hot water is drawn from a storage vessel, into the distribution system, to the taps and the vessel is heated directly by the Econoplate, this is termed semi instantaneous hot water generation. This type of installation particularly suits applications which have low cold feed pressures, sporadic usage or insufficient boiler power available.

The cold feed connection is made into the bottom, of the vessel. The cold feed can still be either from a cold feed storage tank which can itself be boosted or it can be mains fed. The same restrictions/requirements as for the instantaneous application apply, with the additional requirement of a T&P valve.

The Econoplate requires a transfer pump which draws water from the bottom of the vessel at the design flow rate of the Econoplate. This water enters the Econoplate through the lower bronze connection and is heated to the desired temperature. It is then pumped out of the top bronze connection into a top connection on the vessel. The flow rate should be set using the speed control on the pump. If a more accurate method is required a flow setting device can be supplied or a double regulating valve could be incorporated in the pipework. In many cases a simple lockshield valve may suffice. Hot water flows from the top of the vessel into the distribution system and to the taps.



## LTHW APPLICATIONS.

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

When operating, secondary recirculation must be maintained at all times, either around the installation or locally to the Econoplate. If the unit is shut down at any time a pump over run should be incorporated to dissipate any heat.

## RECOMMENDED MINIMUM CLEARANCES FOR MAINTENANCE.

450mm front, 300mm pump side, 150mm other side, 150 above

## ELECTRICAL DETAILS

E2Range:	240V single phase : electrical load 200 VA
Plus any pump:	
UP20-45N	0.48A flc
UPS25-55B	0.49A
UPS32-55B	0.58A
UPS32-80B	1.00A
UPS40-60/2FB	1.3A
UPS40-120/2FB	2.2A
UPS50-120/2FB	3.6A

Full load currents shown for single phase pumps

If optional secondary pumps are included the full load current and voltage requirements will vary according to the selected pump

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.

## EXTERNAL CONNECTIONS

### External Interlock.

An external safety device or switched circuit 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 to shut the unit down. This is utilised by all units which incorporate a dual action actuator incorporating mechanical shut off in the event of power failure, linked to a high limit thermostat.

### External "Clock".

An external device can be connected to switch between 2 temperatures (day/night), or to switch on and off. A closed contact across this safety extra low voltage circuit gives the day setting and an open circuit the night/off 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 (24V supply @ 470 ohm).

### 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 controller p.c.b.

## **WARNING**

NEVER RUN CONTROL CABLES USING LOW VOLTAGES WITH POWER CABLES, INDUCED VOLTAGES CAN AFFECT THE OPERATION OF THE CONTROLLER.

## ALARMS

**HIGH TEMPERATURE ALARM** - If the temperature measured by the sensor rises more than 10°C above the higher set point the LCD display indicates the fault, if this persists the common temperature alarm relay is energised and the alarm lamp is lit. The controller will automatically turn off all the pumps and close the valve if this occurs.

**LOW TEMPERATURE ALARM** - If the temperature measured by the sensor falls more than 20°C below the current set point the LCD display indicates the fault, if this persists the common temperature alarm relay is energised and the alarm lamp is lit.

Both alarms can be adjusted from these factory settings, and various alternative alarm modes can also be selected.

## SETTING INTO 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.

-The steam pressure onto the equipment should be checked to ensure it is correct

-Steam should be introduced gradually on to the unit.

-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 motorised valve should be checked for correct connection and travel by simulating a load / no load situation.

-First identify the actuator type as follows:

### **Single valve unit modulating valve:**

Current units are fitted with a Sauter VUG0 valve with an AVM234SF132 actuator.

Early models were fitted with Sauter V6F valves and an AVR32W30F001 actuator, which was later replaced by the AVM234SF132-5 actuator.

### **Single valve system, close on power fail (COPF) actuator:**

Current units use an AVF234SF132 actuator with a VUG0 valve.

Earlier V6F type valves were fitted with an AVN3H110F001 actuator, this being superseded by AVF234SF132-5 actuators on V6F valves.

### **Double valve systems with modulating and COPF actuators:**

Current units use AVF234SF132 and AVM234SF132 complete with VUG0 type valves.

Earlier units used an AVN3H110F001 actuator and an AVR32W30F001 actuator both fitted to V6F valves. These were later changed to a combination of AVF234SF132-5 and AVM234SF132-5 actuators fitted to V6F valves.

**Note:** All AVM and AVF type actuators also include additional factory fitted electronic modules. (see spares section )

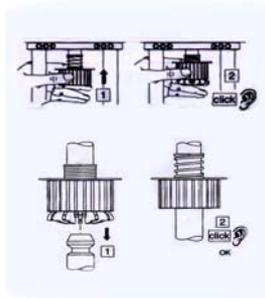
Double valve systems also incorporate auxiliary switches in the AVN and AVF type actuators which control the safety functions of the Econoplate. (see spares section)

-To check the correct connection of valve and actuator proceed as follows:

AVM/AVF type actuators.

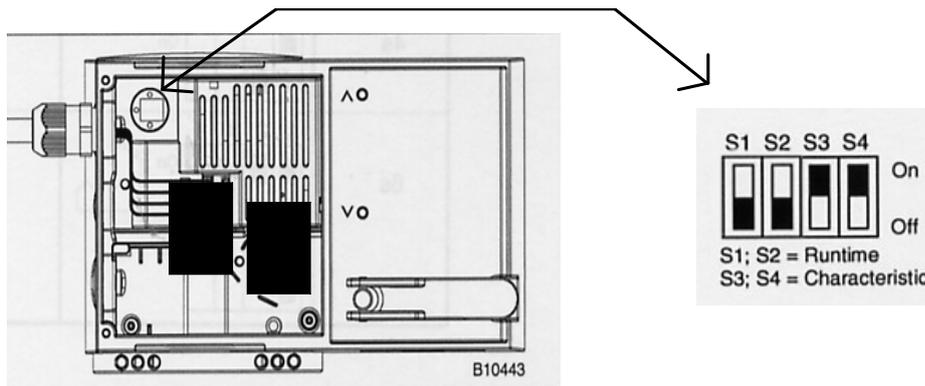
Units fitted with the **AVM/AVF** actuator have a connection which is self-catching. Disconnection is achieved by moving the actuator drive to fully closed (up) and then opening the catch mechanism by lifting the knurled section of the actuator shaft against the top spring, the claws of the catch should drop and release the valve spindle which should then drop downwards.

To reset the linkage the claws will be in the open exposed position following the above action. Push the valve spindle into the knurled section and the catch mechanism will "grab" the valve spindle. (see illustration)

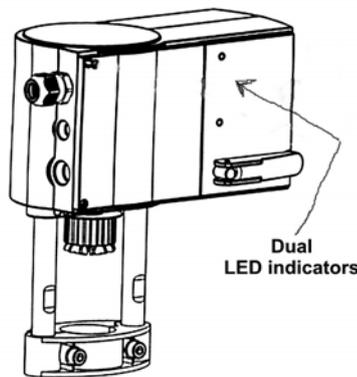


Units fitted with the **AVM/AVF** actuator also have automatic self adjusting valve spindle travel.

**AVM/AVF** actuators have switch coding for the actuator/valve speed and characteristics (which are on the inside of the actuator terminal box) should be as below.



**AVM/AVF** actuators have the following indicators on the outside of the actuator assembly whilst in operation.



The 2 dual (red/green) LEDs on the actuator indicate the following functions of the actuator: -

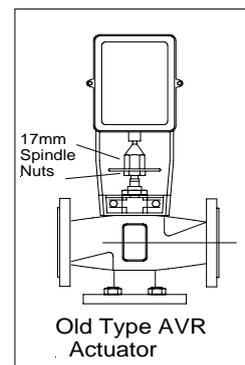
Both LEDs flashing red:	initialization procedure
Upper LED lit red:	upper limit stop or "CLOSED" position reached
Lower LED lit red:	lower limit stop or "OPEN" position reached
Upper LED flashing green:	drive running moving towards "CLOSED" position
Upper LED lit green:	drive stationary, last direction of running "CLOSED"
Lower LED flashing green:	drive running moving towards "OPEN" position
Lower LED lit green:	drive stationary, last direction of running "OPEN"
Both LEDs lit green:	waiting time after switch on, or after emergency function
No LED lit:	no voltage supply to terminals 2a or 2b
Both LEDs flashing red & green:	drive handle in manual mode with voltage to drive

### AVR type actuators.

Units fitted with the old type **AVR** type actuator may require adjusting via the spindle nuts as shown below.

When the valve is in the fully closed position (top of travel) the lower nut should be loosened and then the upper nut should be rotated clockwise until the valve plug is fully seated (this is checked by inserting a small screwdriver into the spindle and testing for any rotation of the valve spindle) when the spindle cannot rotate the lower nut should be locked to the upper nut.

When in operation electrically the actuator motor will continue to be driven for a period of 6 seconds once the valve is shut and this ensures that the valve plug is tight into the seat.



-Effective condensate removal should be checked once operational.

-Pumps should be checked and full load currents measured and over run tested if appropriate.

-Any high limits or other safety devices should be tested for correct operation. The high limit can be checked to ensure it has not operated (contacts NC when healthy) to reset press the black button below the setting dial.

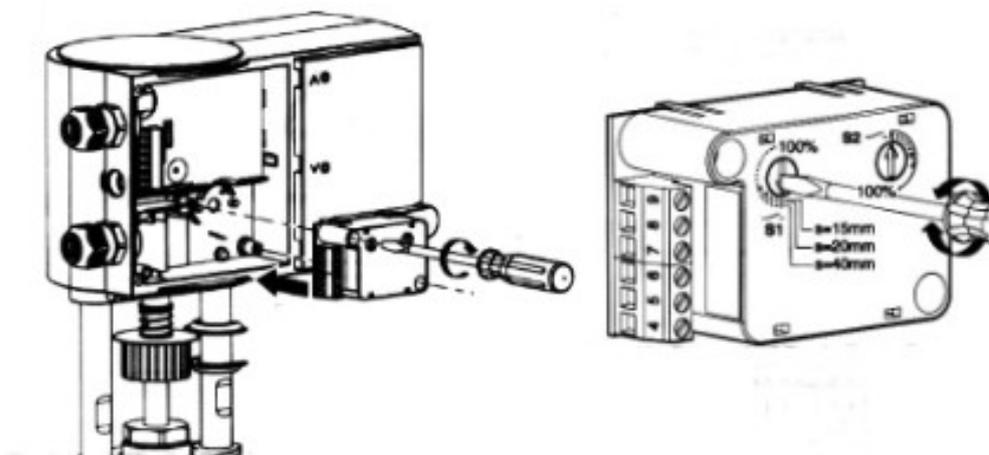
-On models which utilise the double control valve system an additional switch assembly is fitted to the AVF actuator inside the terminal box.

This is used to enable/disable the external interlock circuit on the Econotrol.

The switch should be set to enable the circuit just prior to the valve reaching full open position (bottom of travel)

This setting will also disable the circuit should a fault condition occur causing the valve to close.

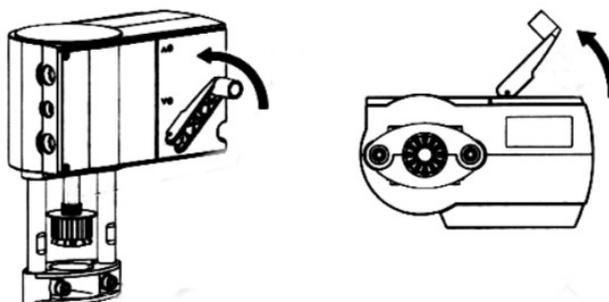
Fitting and adjusting the limit switch is as shown in the drawings below.



### MANUAL VALVE OPERATION.

To manually operate the valve proceed as follows:

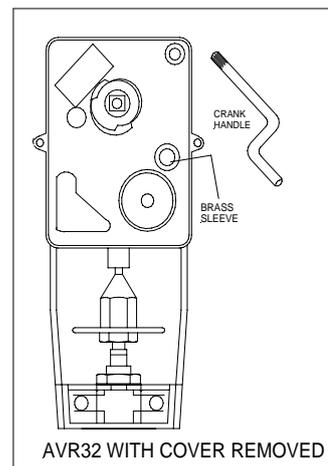
On AVM234 to open the valve by hand use the fold out lever on the outside of the actuator as shown below.



On AVM234 actuators both LEDs will flash green then red, this is to indicate manual override is in operation.

On AVR32 actuators the outer cover (secured by two screws on either side) needs to be removed, this will give access to actuator internals, a splined crank handle is provided on the top right hand side of the actuator. This can then be used to drive open the valve by inserting the crank into the actuator gearbox through the brass sleeve and turning.

When the unit is returned to normal operation ensure that the valve is driven to a mid way position manually, and ensure the splined crank is removed from the gearbox prior to re-establishing electrical power to the actuator.



**N.B. A Valve is closed when the valve spindle is uppermost on all types of valve**

## 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.  
GC30 plates are fitted to E2A & B units, all have gaskets on one side of each plate facing the fixed chassis.  
GC30 plates have octagonal gaskets around the ports and the corner of the plate is cropped at 45°.  
GL13 plates have round gaskets around the ports facing the front plate and the corner of the plate is cropped at 45° letter O is pressed into the one side at the top/bottom of each plate.

GX12 have round gaskets around the ports and the corner of the plate is cropped at 45° (2 gasketing styles exist) letters R,L,S,K are pressed into the top/bottom of each plate.

**GX12 plates are now obsolete and if replacements are required the complete plate pack must be replaced by GL13 plates**

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.

GC30 plates have one type of intermediate plate which have a single chevron pattern stamped on the surface, the pattern should alternate up then down across the whole assembly. GL13 and GX12 plates have 2 types of intermediate plate, which alternate, these are left hand and right hand intermediate gasketed plates.

On GL13 plates the letter O is stamped into either the top or bottom of each plate and alternate left and right top ports have a gasket around their circumference. **These sequences must be noted prior to dismantling as it will ensure the correct re-assembly.**

There are 2 styles of gasketing on the GX12 plates, one style has gaskets on both sides of one plate and then no gasket on the next. These alternate across the pack The correct orientation is given by the letter stamped at the top of each plate. **This sequence must be noted prior to dismantling as this will ensure the correct re-assembly.**

The other style has a gasket on one face of each intermediate plate and the correct orientation is again given by the letter stamped at the top of each plate. Alternate left and right top ports will have a gasket around their circumference. **These sequences 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 de-scaling 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 plates or 3.4 mm for GL13 and 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 HOT WATER TEMPERATURES

1. Check that the secondary pump is operating correctly and that the circulation exists – for HWS feel the temperature of the return pipe, if it is cool then there is no 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 for HWS open and close some hot water taps and observe the valve. Also check that the linkages between the valve and motor are secured (see section on Operation).
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 both primary and 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 section).

### OVERHEATING

In addition to the causes mentioned above overheating can result from any of the following:

1. Incorrect adjustment of valve travel and/or connection to the actuator (see Operation and Maintenance sections for details on adjustments),
2. Steam “let by” on 2 port valve. Ensure that valve is fully closed (spindle in uppermost position as detailed in previous sections). If overheating still occurs the valve seat may be damaged and should be replaced.
3. Check for pump over run on shut down.

NO HOT  
WATER AT  
OUTLETS /  
NO HEATING

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 pump or valve 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. The high limit can be checked to ensure it has not operated (contacts NC when healthy) to reset press the black button below the setting dial.
6. Check that all linkages are secure and limits are set (see Operation and Maintenance sections above).
7. Check that the valve motor is operating - raise and lower the set point on the controller and observe.
8. Check HWS Transfer pump particularly if display indicates set point achieved but no hot water available.
9. Condense water logging (stall condition) the bottom of the plate pack and the condense outlet from the Econoplate will generally be cool when this happens, check that all condense return lines are clear.
10. Lack of steam pressure / water logged steam

REDUCED  
OUTPUT.

1. A reduced output may be as a result of a blockage of the heat exchanger as well as any of the above mentioned causes. The heat exchanger can be cleaned by following the Instructions given in the Maintenance Section.

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 GC30 and 3.4mm for GX12 & GL13. 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 – correct fault.

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.

PARTS LIST CURRENT

Part No      Description

- ESS8133      Econotrol 2100 temperature controller.
- ESS6601      Temperature Sensor 1/8" BSP 65mm
- E2A/B Secondary re-circulating Pump UP20-45N 1 Phase
- E2C Secondary transfer Pump UPS32-55B 1 Phase
- Secondary transfer Pump UPS32-80B 1 Phase
- Secondary transfer Pump UPS40-60/2FB 1 Phase
- Secondary transfer Pump UPS40-120/2FB 1 Phase
- Primary Pump Motor UPS50-120 1 Phase-96406015
- Primary Pump Motor UPS50-120 3 Phase-96406017
- Sauter Actuator AVM234SF132 + module + shunt resistors
- Sauter Actuator AVF234SF132 + module + shunt resistors (on single valve blocks only)
- Limit Switch module for AVF234SF132 - 0372333001
- Telemecanique overload 1 phase LR2-K 0306
- Telemecanique overload 1 phase LR2-K 0308
- Telemecanique overload 1 phase LR2-K 0310
- Telemecanique overload 3 phase LR2-K 0307
- Telemecanique contactor LC1K-0610-U7
- High limit Thermostat TKR 3501 Range 25-95.C
- High limit Thermostat TKR 3504 Range 65-135.C
- Delay timer 365-0923
- High Limit Relay 211-1304

2 PORT VALVES

- Sauter VUG0 25F304
- Sauter VUG0 32F304
- Sauter VUG0 40F304
- Sauter VUG0 50F304

Non-return valve Watts EC270020160 ¾" (F-F)  
Non-return valve Watts ¾" 230020165 (M-F)  
Drain cock ½" male  
Through frame liner 43mm – E2A/B  
Through frame liner 52mm – E2C

#### E2A/B

Guide pins M16 x 200mm  
Guide pins M16 x 250mm  
Guide pins M16 x 330mm  
M16 Hex Set Screws x 130mm  
M16 Hex Set Screws x 180mm  
M16 Hex Set Screws x 200mm  
M16 Hex Set Screws x 250mm  
M16 Hex Set Screws x 300mm

#### E2C

Guide pins TIL/M/033/A 150mm  
Guide pins TIL/M/034/A 250mm  
Guide pins TIL/M/035/A 350mm  
M20 Hex Set Screws x 180mm  
M20 Hex Set Screws x 280mm  
M20 Hex Set Screws x 380mm

### HEAT EXCHANGER PLATES

ESS4625	E2A(L)/E2B(L) G30H End Blanking Plate
ESS4621	E2A(L)/E2B(L) G30L Intermediate Plate
ESS4627	E2A(L)/E2B(L) G30H 4 Hole First Plate
ESS4625	E2A/E2B G30H End Blanking Plate
ESS4626	E2A/E2B G30H Intermediate Plate
ESS4627	E2A/E2B G30H 4 Hole First Plate
GL13L FIRST	GL 13L start plate
GL13L LH	GL13L left hand intermediate plate
GL13L RH	GL13L right hand intermediate plate
GL13L BLANK	GL13L blank end plate

## PARTS LIST PREVIOUS MODELS

ESS8100/1	'E' Series Temp Regulator Micro (Square Type p.c.b.) from Oct'93
ESS8122	Integral 'E' series temperature controller
ESS8106	'E' Series 24 Hour Clock (Flash Type) for ESS8101
ESS6600	'E' Series Temperature Sensor 1/8" BSP 39mm
ESS7012	'E' Series Temperature Sensor 1/4" BSP
ESS7052	Sauter actuator type AVR32W30-F001 Sauter actuator type AVN3H110-F001- COPF Limit switch assembly for AVN3H – 0294711001
ESS7051	Sauter Actuator AVM234SF132-5 + module + shunt resistors Sauter Actuator AVF234SF132-5 + module + shunt resistors (on single valve blocks only) Limit Switch module for AVF234SF132 - 0372333001
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

**Please supply Econoplate Model & Serial No & Code number (from Data Badge)  
to ensure correct replacement**

### HEAT EXCHANGER PLATES FITTED TO PREVIOUS MODELS.

ESS6614	E2C GX12L Half Gasket Front 4 Hole Plate
ESS6615	E2C GX12L Gaskets Both Sides Intermediate Plate
ESS6616	E2C GX12L No Gasket Intermediate Plate
ESS6617	E2C GX12L Half Gasket Back Blank Plate
ESS6622	E2C GX12L Half +1 Gasket First 4 Hole Plate
ESS6623	E2C GX12L 1 Gasket LH Intermediate Plate
ESS6624	E2C GX12L 1 Gasket RH Intermediate Plate
ESS6625	E2C GX12L Half Gasket Back Blank Plate



**STOKVIS ENERGY SYSTEMS  
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SURREY  
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