



**ECONOPLATE E2(SW) SERIES  
STEAM TO WATER  
PACKAGED PLATE HEAT EXCHANGERS  
E2A(SW)/E2B(SW)/E2C(SW)**

**INSTALLATION, OPERATION & MAINTENANCE  
DOCUMENTATION**

**STOKVIS ENERGY SYSTEMS**  
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## **GENERAL DESCRIPTION:**

The Stokvis Econoplate E2(SW) series of packaged plate heat exchangers are available in 3 ranges covering a total of some 23 Hot Water Service (HWS) units and 41 Low Temperature Hot Water (LTHW) heating units, with outputs ranging from 50kW to 900kW (when fed with primary steam at 140°C).

The Econoplate E2(SW) series units are designed, where necessary, to operate up to a maximum operating temperature of 140°C\*\* (see Primary Installation), and to provide either hot water instantaneously without the need for storage, or LTHW heating, up to their maximum rated output. For HWS applications, Econoplate units can be coupled to a buffer vessel for even greater outputs.

All units are built around an epoxy coated chassis containing the heat exchanger. This heat exchanger is made up of a number of gasketed stainless steel plates which form the channels for primary and secondary water to flow through. The capacity of the heat exchanger is dictated by the size of steam valve and the number of plates fitted to the heat exchanger chassis. Plates can be readily added, up to the chassis limit, enabling the output capacity of an existing unit to be increased if required, provided the steam valve has sufficient capacity.

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, in opposing directions, enabling required heat exchange to take place.

The E2(SW) series units are supplied with fast acting 2-port motorized control valves 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.

For instantaneous hot water service usage, a secondary hot water service return pump and non-return valve can be supplied, fitted and wired to the unit as an option. For semi-instantaneous hot water usage, a transfer pump can be provided to pump water from a storage vessel to the Econoplate.

In addition to the PID controller, the control panel on the E2(SW) series plate heat exchanger contains: valve opening/closing and secondary pump running functional indicator lamps, a 500mA control fuse, a 10A output fuse, duplex pump duty share (if fitted), high/low temperature alarm indication, volt free common temperature alarm terminals, high temperature lockout, an extra low voltage external interlock circuit and a 4-20mA flow temperature indication circuit.

Time control can be by: either the internal inbuilt 7 day time clock for either 2 temperatures of operation or a single temperature and night off per day, or externally using the extra low voltage "external time clock" circuit for either 2 temperatures of operation or a single temperature and night off.

All 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:**

Optional secondary pumps:

- For HWS, either a hot water service recirculation pump (c/w non-return valve), or a transfer pump sized to match the duty of the unit and to overcome secondary circuit losses, can be supplied.  
If required, pump contactors and overloads can be included and housed within the control panel. Overload trip indication is displayed on the panel.
- For LTHW, a secondary pump can be supplied. If required, pump contactors and overloads can be included and housed within the control panel. Overload trip indication is displayed on the panel. In addition, timed pump overrun can be incorporated to dissipate 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 also be retrofitted to most existing models.

## **E2A(SW) TECHNICAL SPECIFICATION:**

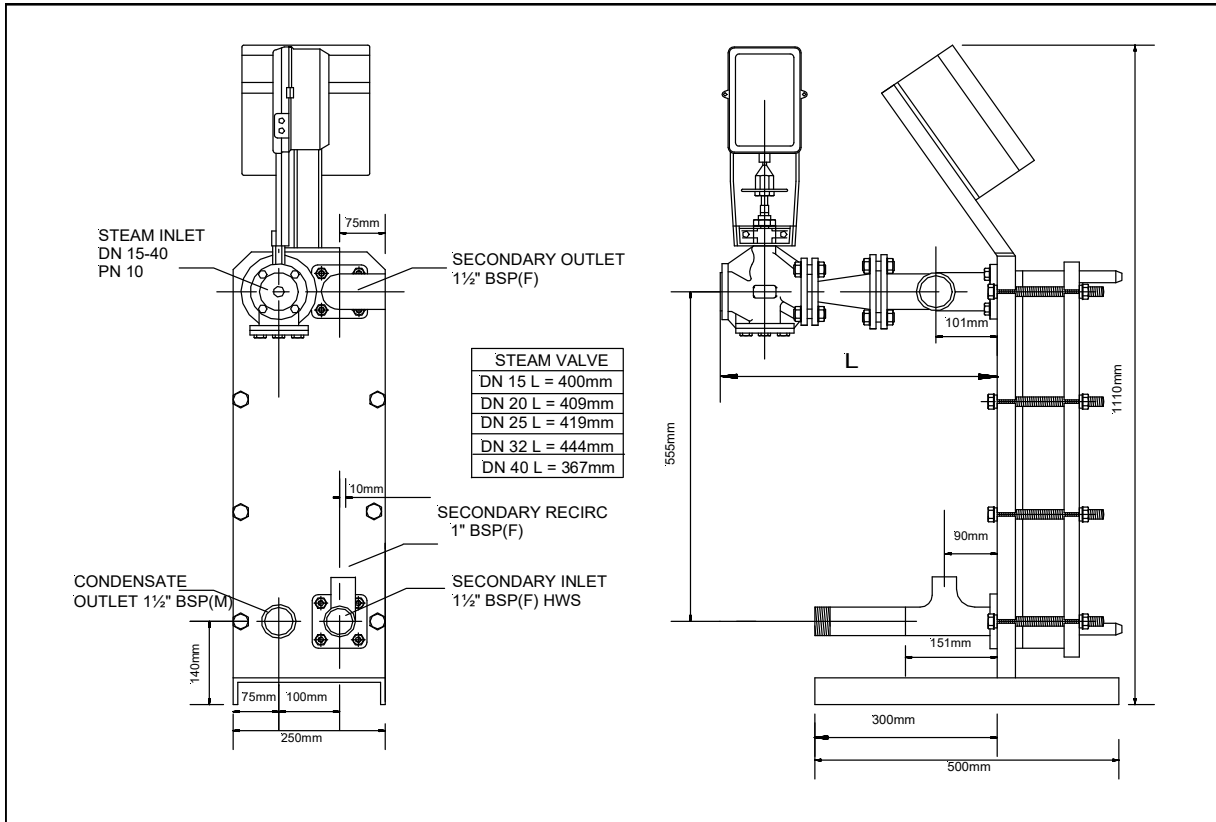
-Chassis Plate	: Epoxy coated steel 25mm thick
-Front Plate	: Epoxy coated steel 20mm thick
-Heat Exchanger Plate	: 316 grade stainless steel
-Plate Gaskets	: EPDM
-Retaining Bolts	: 16mm carbon steel
-Maximum Primary Operating Temperature	: 140°C
-Maximum Primary Operating Pressure	: 2.6 bar
-Maximum Secondary Operating Pressure	: 6 bar
-Steam Safety Valve Setting Required	: 3.75 bar
-Primary Inlet Steam Connection	: DN15-DN40, PN16
-Primary Outlet Condensate Connection	: 1½" BSPM
-Safety Valve Connection	: 1" BSPM
-Vacuum Break Connection	: ½" BSPF
-Secondary Inlet Cold Water Feed	: Bronze 1½" BSPF
-Secondary Outlet Hot Water Service Flow	: Bronze 1½" BSPF
-Secondary Hot Water Service Return	: Bronze 1" BSPF (or ¾" BSPF when HWS secondary recirc. pump fitted)
-Primary Control Valve	: 2-port, Cast Iron, PN16
-Primary Control Valve Actuator (standard)	: 230V, modulating, motor open/close
-Control Panel (standard):	
• ABS enclosure	
• Electronic PID temperature controller	
• 7 day time clock control of 2 temperature settings and/or 1 temperature and night off, per day	
• Safety extra low voltage circuit for external "clock" control of 2 temperatures or 1 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: secondary pump enabled and valve opening/closing	
• LCD digital display of day and time, secondary flow temperature and any faults	
• Pump mode selection including duplex pump duty share	
• Full menu driven interrogation of parameters and operating modes	
• 500mA control fuse, 10A output fuse	

### Options:

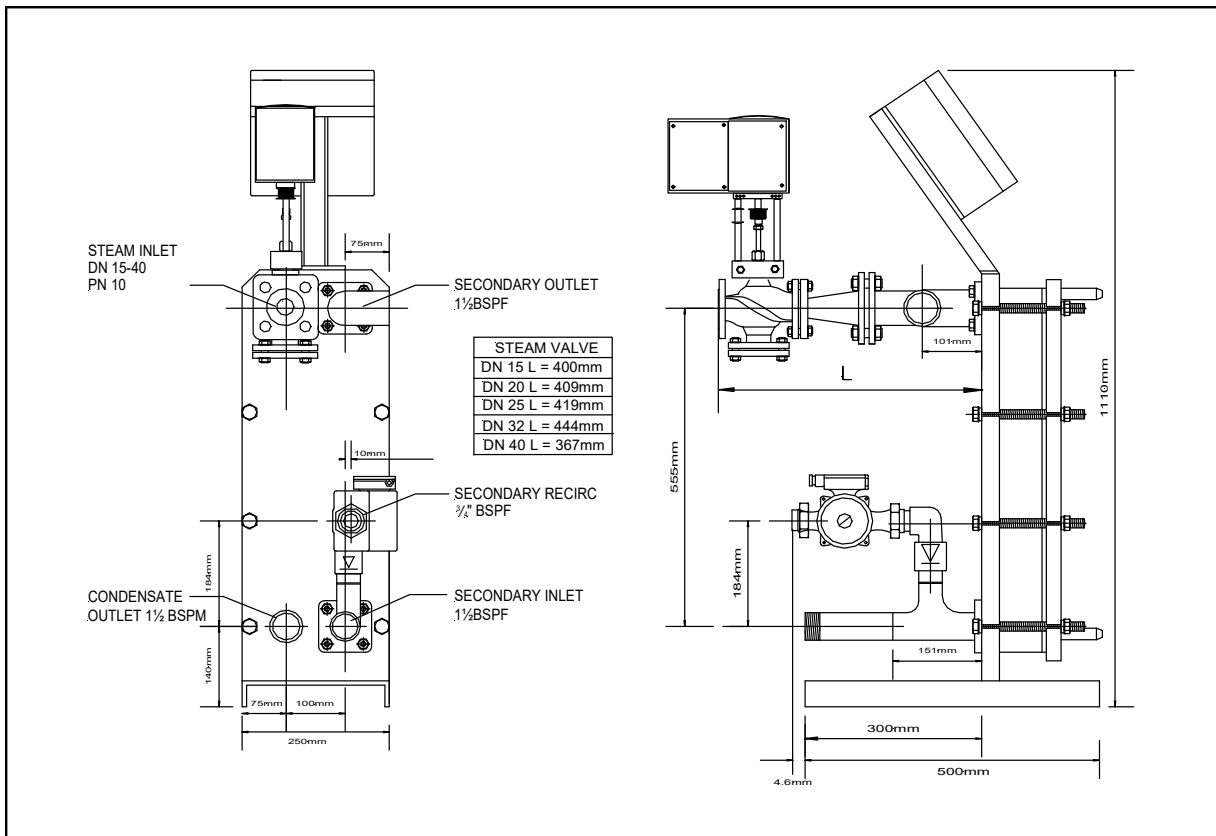
- HWS Secondary Recirc. Pump: UP20-45N (1-phase) (C/W Bronze NRV)
- HWS Secondary Transfer Pump : Various – Dependent on selection
- Dual function Actuator incorporating spring : 230V, modulating, spring close close function on loss of power (COPF)
- Additional mechanical High Limit Thermostat : Manual reset, 70°C-130°C range, IP54
- Additional Close on Power Fail (COPF) : 230V open, spring close, DN15-DN40, PN10 Actuator and 2-port Valve (Double-Valve)

WEIGHT: 140kg (max.) (excluding options)      LENGTH: 644mm (max.) (excluding options)  
HEIGHT: 1110mm (excluding options)      WIDTH: 250mm (excluding options)

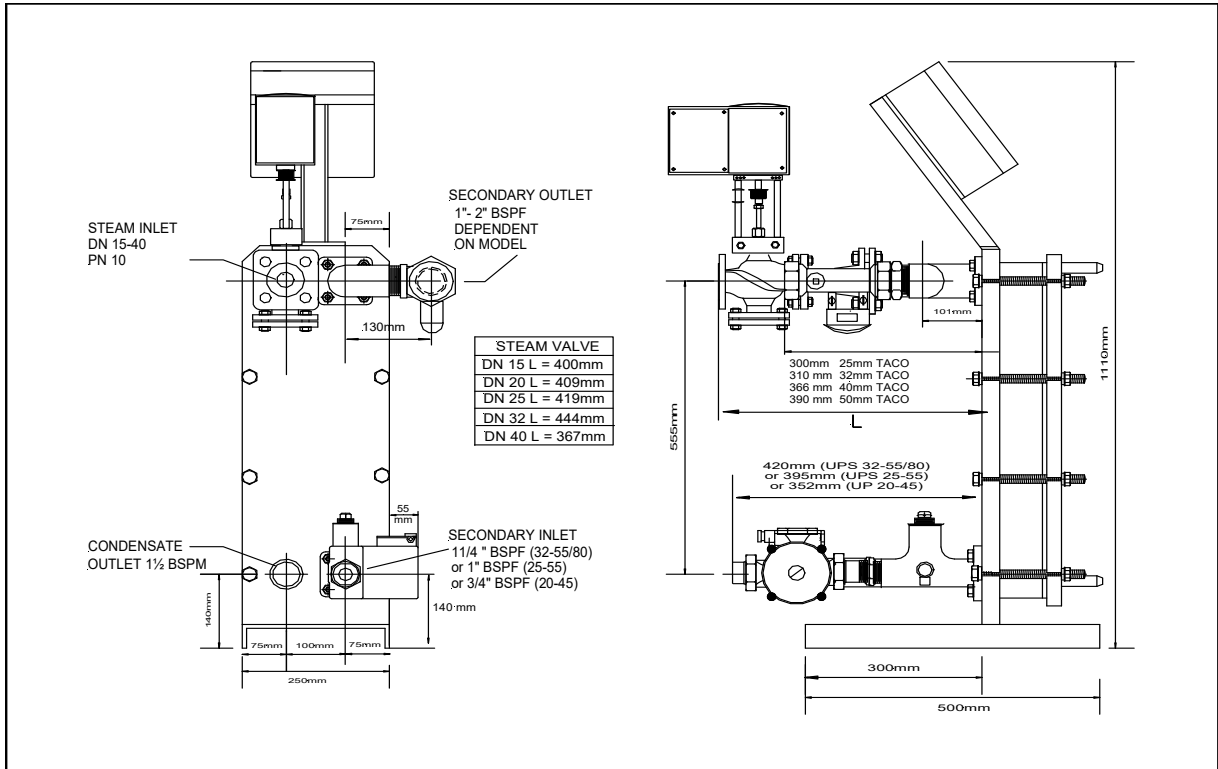
**E2A(SW)+0R (AVR32) HWS/LTHW MECHANICAL DETAILS  
EXCLUDING SECONDARY PUMP:**



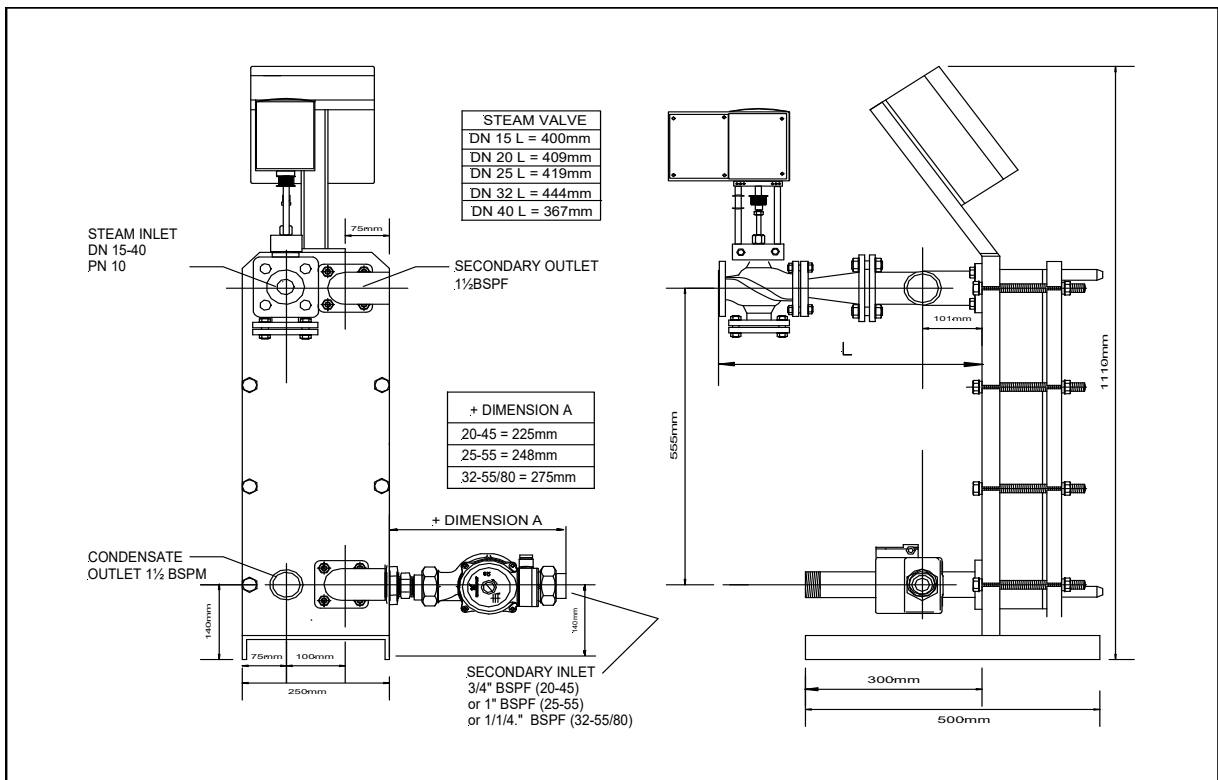
**E2A(SW)+1R HWS MECHANICAL DETAILS  
INCLUDING UP20-45N SECONDARY RECIRCULATION PUMP:**



**E2A(SW)+1T HWS SEMI-INSTANTANEOUS MECHANICAL DETAILS  
INCLUDING UP20-45N/UPS25-55N/UPS32-55/80N SECONDARY TRANSFER PUMP  
ON STRAIGHT SECONDARY INLET:  
(SECONDARY OUTLET C/W TACONOVA FLOW-RATE SETTER)**



**E2A(SW)+1T HWS SEMI-INSTANTANEOUS MECHANICAL DETAILS  
INCLUDING UP20-45N/UPS25-55N/UPS32-55/80N SECONDARY TRANSFER PUMP  
ON ANGLED SECONDARY INLET:**



## **E2B(SW) TECHNICAL SPECIFICATION:**

-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 Primary Operating Temperature	: 140°C
-Maximum Primary Operating Pressure	: 2.6 bar
-Maximum Secondary Operating Pressure	: 6 bar
-Steam Safety Valve Setting Required	: 3.75 bar
-Primary Inlet Steam Connection	: DN15-DN40, PN16
-Primary Outlet Condensate Connection	: 1½" BSPM
-Safety Valve Connection	: 1" BSPM
-Vacuum Break Connection	: ½" BSPF
-Secondary Inlet CWF	: Bronze 2" BSPF
-Secondary Outlet HWSF	: Bronze 2" BSPF
-Secondary Inlet (LTHW Application)	: Bronze 2" BSPF or Stainless Steel 2" BSPF
-Secondary Outlet (LTHW Application)	: Bronze 2" BSPF or Stainless Steel 2" BSPF
-Secondary Hot Water Service Return	: Bronze 1¼" BSPM (or 1¼" BSPF when HWS secondary recirc. pump fitted)
-Primary Control Valve	: 2-port, Cast Iron, PN16
-Primary Control Valve Actuator (standard)	: 230V, modulating, motor open/close
-Control Panel (standard):	
•ABS enclosure	
•Electronic PID temperature controller	
•7 day time clock control of 2 temperature settings and/or 1 temperature and night off, per day	
•Safety extra low voltage circuit for external "clock" control of 2 temperatures or 1 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: secondary pump enabled and valve opening/closing	
•LCD digital display of day and time, secondary flow temperature and any faults	
•Pump mode selection including duplex pump duty share	
•Full menu driven interrogation of parameters and operating modes	
•500mA control fuse, 10A output fuse	

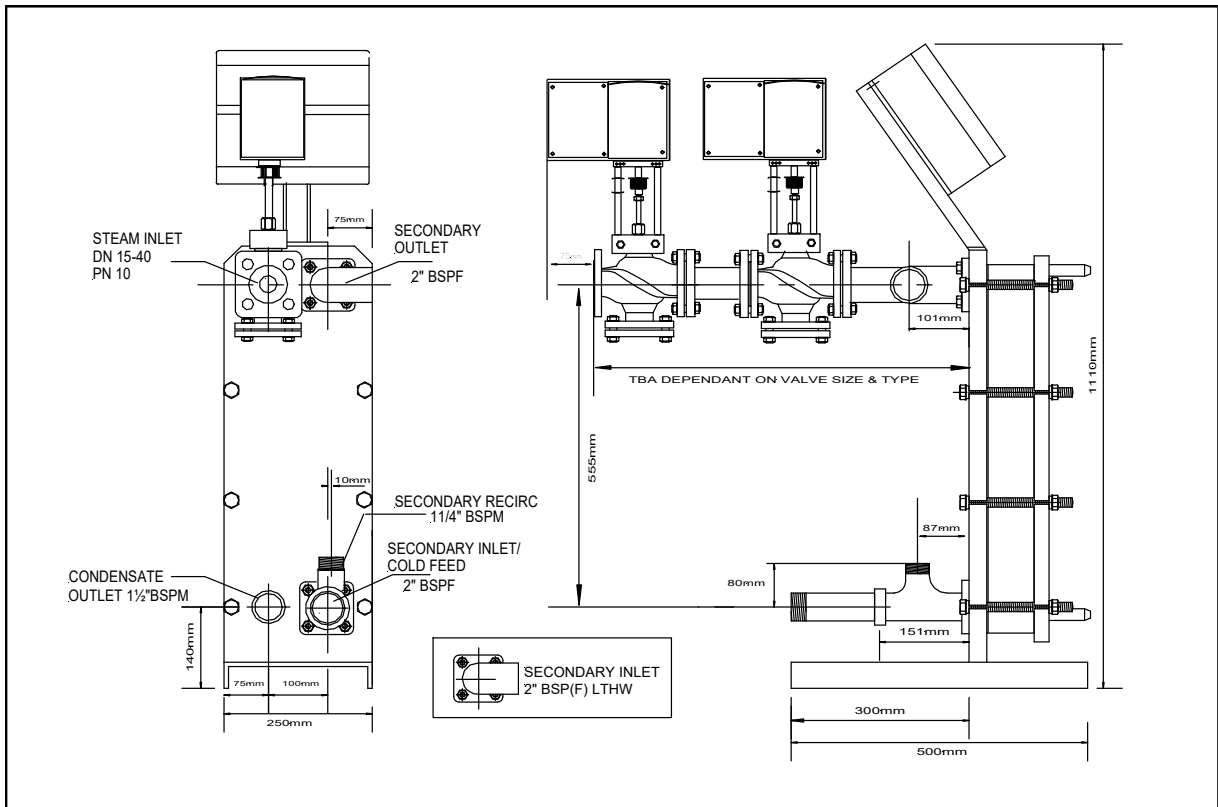
### Options:

•HWS Secondary Recirc. Pump: UP32-55N (1-phase) (C/W Bronze NRV)	
•HWS Secondary Transfer Pump	: Various – Dependent on selection
•LTHW Secondary Pump (c/w Overrun Timer)	: Various – Dependent on PHE model
•Dual function Actuator incorporating spring close function on loss of power (COPF)	: 230V, modulating, spring close
•Additional mechanical High Limit Thermostat	: Manual reset, 70°C-130°C range, IP54
•Additional Close on Power Fail (COPF) Actuator and 2-port Valve (Double-Valve)	: 230V open, spring close, DN15-DN40, PN10

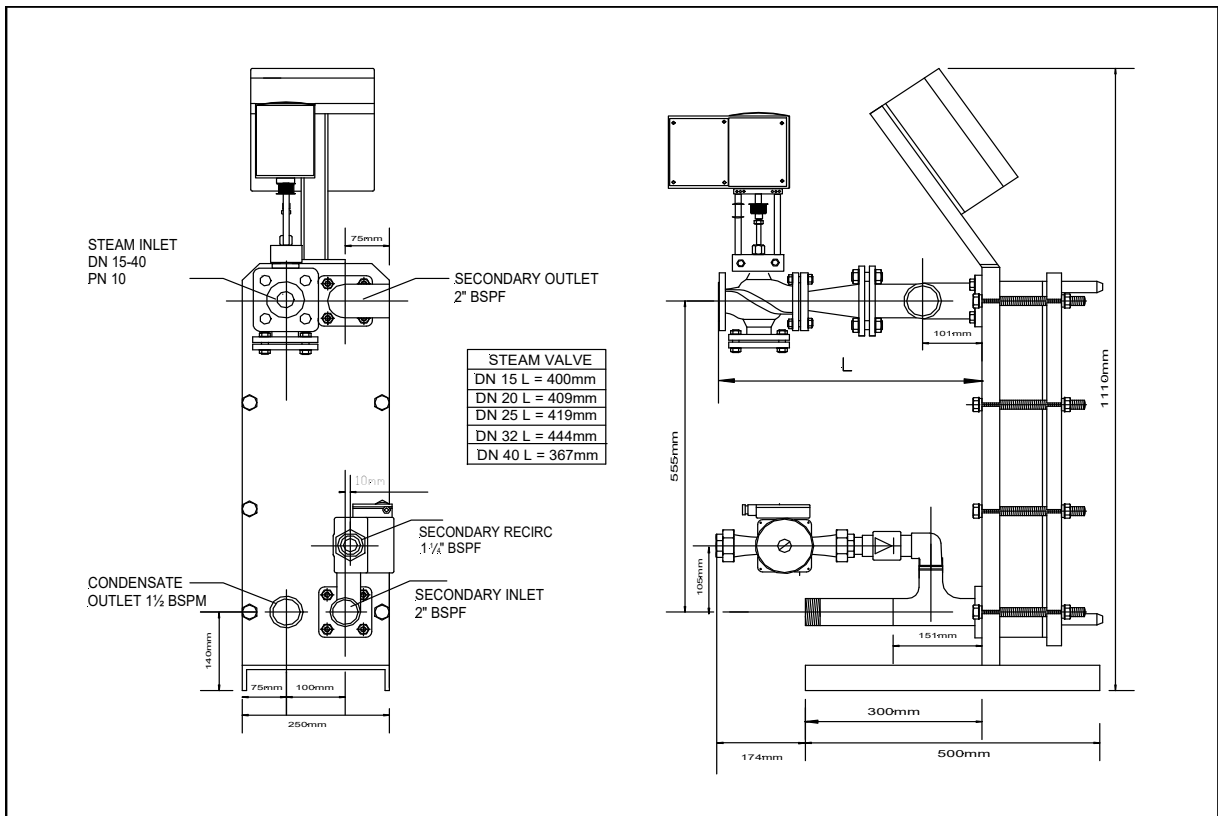
WEIGHT: 150kg (max.) (excluding options)      LENGTH: 644mm (max.) (excluding options)  
HEIGHT: 1110mm (excluding options)              WIDTH: 250mm (excluding options)



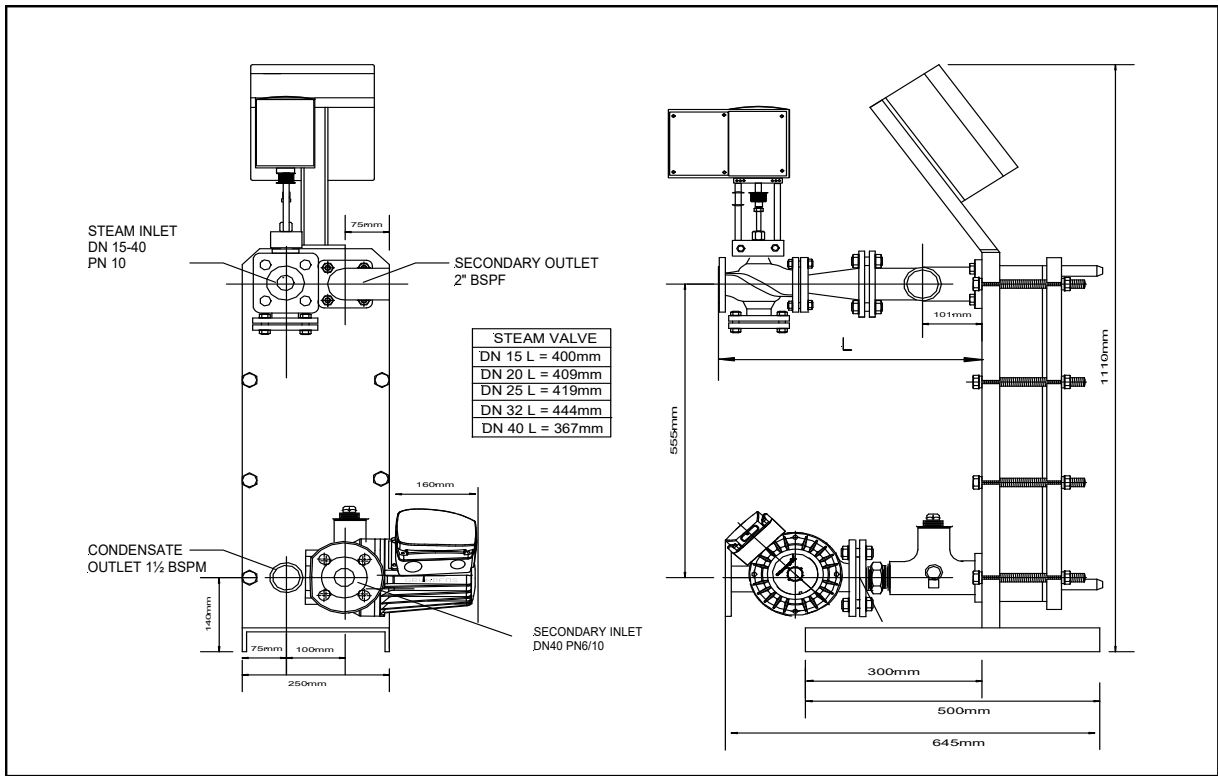
**E2B(SW)+0R HWS/LTHW MECHANICAL DETAILS**  
**INCLUDING OPTIONAL DOUBLE VALVE ASSEMBLY,**  
**EXCLUDING SECONDARY PUMP:**



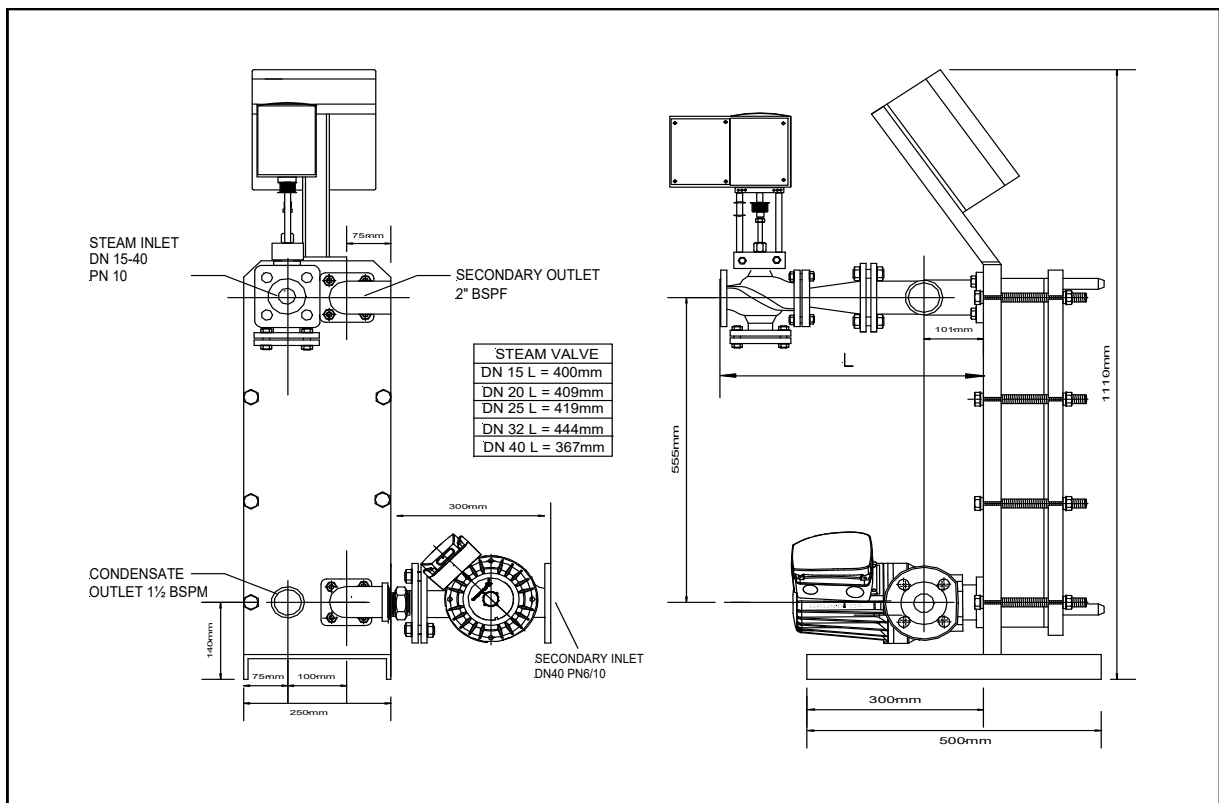
**E2B(SW)+1R HWS MECHANICAL DETAILS**  
**INCLUDING UPS32-55N SECONDARY RECIRCULATION PUMP:**



**E2B(SW)+1T HWS SEMI-INSTANTANEOUS MECHANICAL DETAILS INCLUDING UPS40-60/120 FB SECONDARY TRANSFER PUMP ON STRAIGHT SECONDARY INLET:**



**E2B(SW)+1T HWS SEMI-INSTANTANEOUS MECHANICAL DETAILS INCLUDING UPS40-60/120 FB SECONDARY TRANSFER PUMP ON ANGLED SECONDARY INLET:**



## **E2C(SW) TECHNICAL SPECIFICATION:**

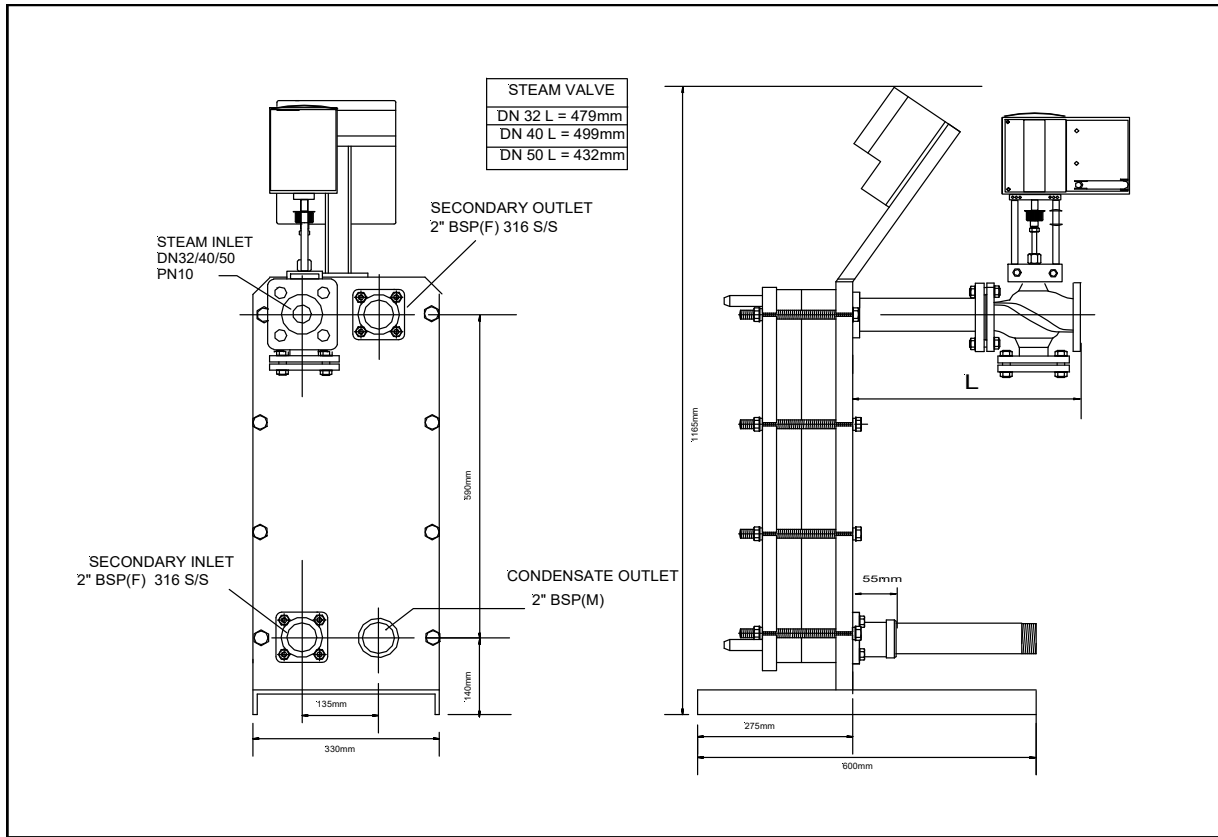
-Chassis Plate	: Epoxy coated steel 25mm thick
-Front Plate	: Epoxy coated steel 25mm thick
-Heat Exchanger Plate	: 316 grade stainless steel
-Plate Gaskets	: EPDM
-Retaining Bolts	: 20mm carbon steel
-Maximum Primary Operating Temperature	: 140°C
-Maximum Primary Operating Pressure	: 2.6 bar
-Maximum Secondary Operating Pressure	: 6 bar (optional 10 bar for LTHW application)
-Steam Safety Valve Setting Required	: 3.75 bar
-Primary Inlet Steam Connection	: DN32-DN65, PN16
-Primary Outlet Condensate Connection	: 2" BSPM
-Safety Valve Connection	: 1½" BSPM
-Vacuum Break Connection	: ½" BSPF
-Secondary Inlet CWF	: Bronze 2" BSPF
-Secondary Outlet HWSF	: Bronze 2" BSPF
-Secondary Inlet (LTHW Application)	: Stainless Steel 2" BSPF up to 11 l/s (or Stainless Steel 2½" BSPM on 10 bar unit)
-Secondary Outlet (LTHW Application)	: Stainless Steel 2" BSPF up to 11 l/s (or Stainless Steel 2½" BSPF on 10 bar unit)
-Secondary Hot Water Service Return	: Bronze 1¼" BSPM (or 1¼" BSPF when HWS secondary recirc. pump fitted)
-Primary Control Valve	: 2-port, Cast Iron, PN16
-Primary Control Valve Actuator (standard)	: 230V, modulating, motor open/close
-Control Panel (standard):	
•ABS enclosure	
•Electronic PID temperature controller	
•7 day time clock control of 2 temperature settings and/or 1 temperature and night off, per day	
•Safety extra low voltage circuit for external "clock" control of 2 temperatures or 1 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: secondary pump enabled and valve opening/closing	
•LCD digital display of day and time, secondary flow temperature and any faults	
•Pump mode selection including duplex pump duty share	
•Full menu driven interrogation of parameters and operating modes	
•500mA control fuse, 10A output fuse	

### Options:

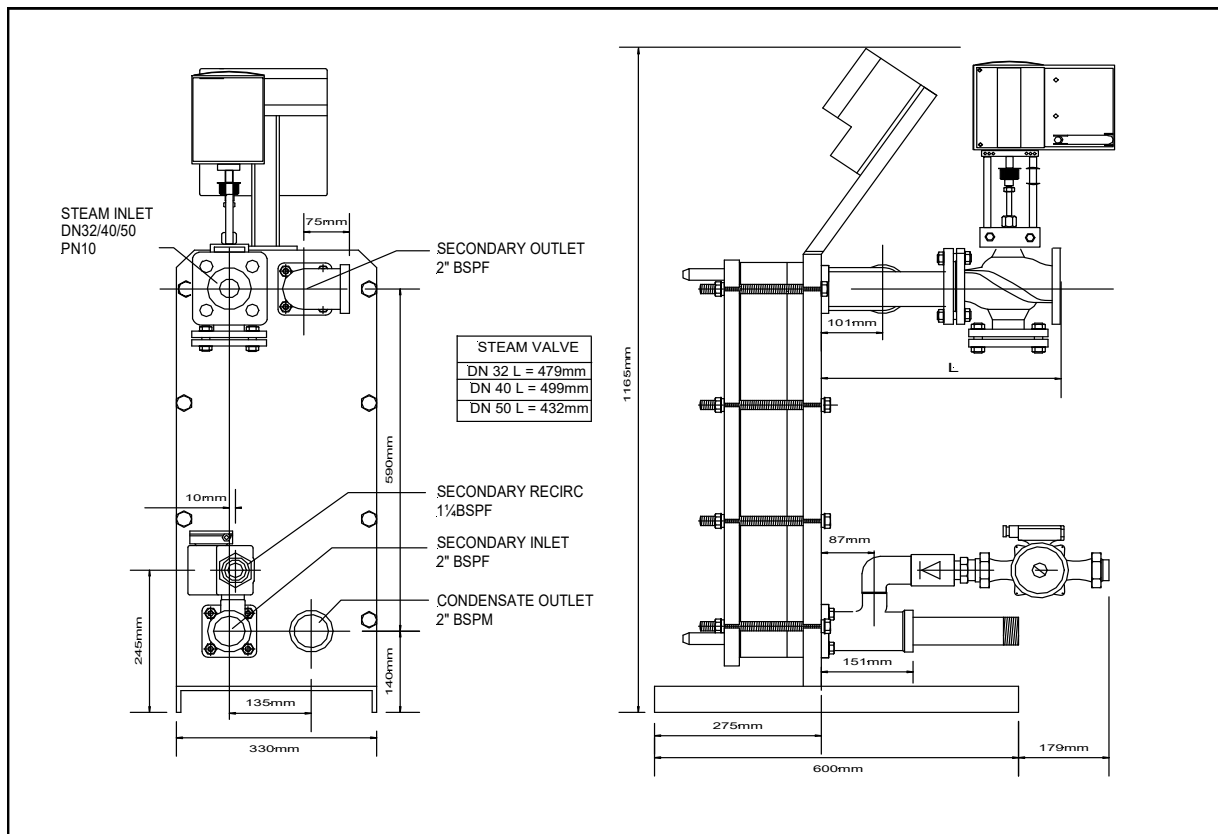
•HWS Secondary Recirc. Pump: UP32-55N (1-phase) (C/W Bronze NRV)	
•HWS Secondary Transfer Pump	: Various – Dependent on selection
•LTHW Secondary Pump (c/w Overrun Timer)	: Various – Dependent on PHE model
•Dual function Actuator incorporating spring close function on loss of power (COPF)	: 230V, modulating, spring close
•Additional mechanical High Limit Thermostat	: Manual reset, 70°C-130°C range, IP54
•Additional Close on Power Fail (COPF) Actuator and 2-port Valve (Double-Valve)	: 230V open, spring close, DN32-DN50, PN10

WEIGHT: 160kg (max.) (excluding options)      LENGTH: 707mm (excluding options)  
HEIGHT: 1165mm (excluding options)          WIDTH: 330mm (excluding options)

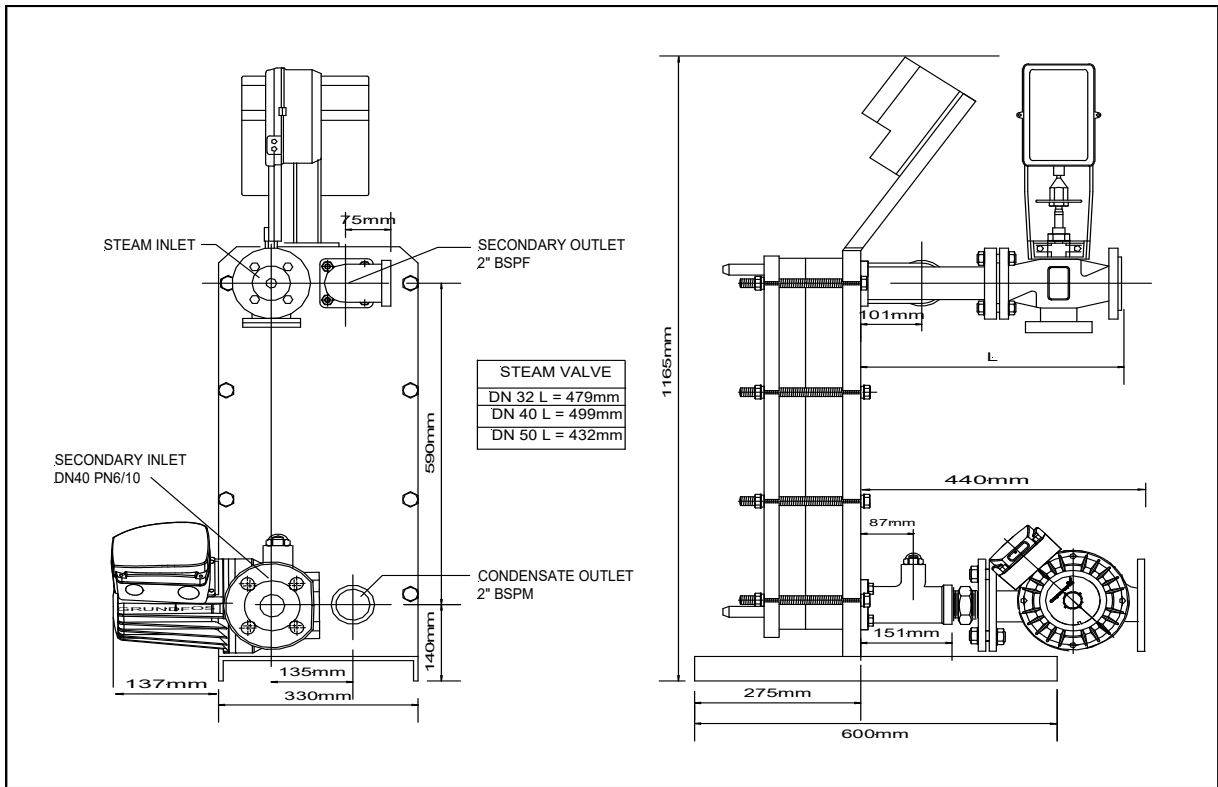
**E2C(SW)+0R LTHW MECHANICAL DETAILS  
EXCLUDING SECONDARY PUMP:**



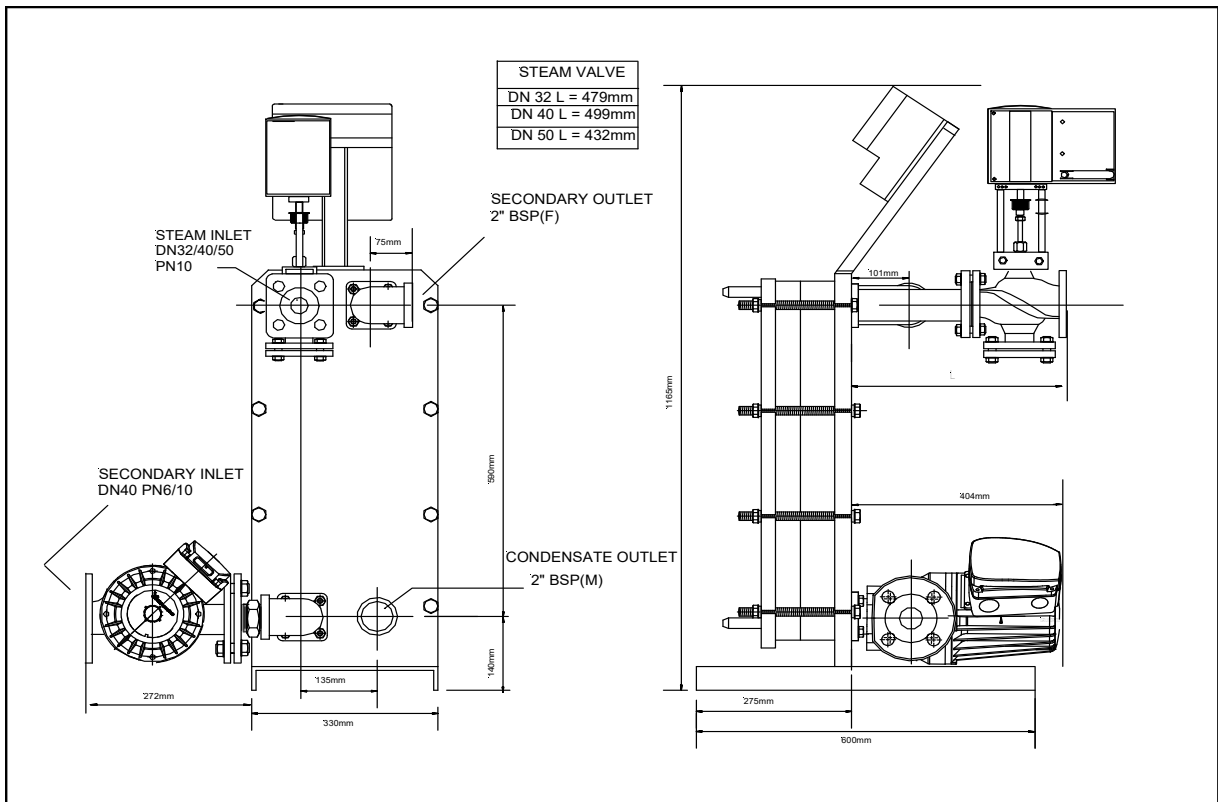
**E2C(SW)+1R HWS MECHANICAL DETAILS  
INCLUDING UPS32-55N SECONDARY RECIRCULATION PUMP:**



**E2C(SW)+1T (AVR) HWS SEMI-INSTANTANEOUS MECHANICAL DETAILS INCLUDING UPS40-60/120 FB SECONDARY TRANSFER PUMP ON STRAIGHT SECONDARY INLET:**



**E2C(SW)+1T HWS SEMI-INSTANTANEOUS MECHANICAL DETAILS INCLUDING UPS40-60/120 FB SECONDARY TRANSFER PUMP ON ANGLED SECONDARY INLET:**



PERFORMANCE GUIDE FOR E2(SW) SERIES (PRIMARY STEAM 140°C, HWS 10°C-60°C)

ECONOPLATE MODEL  
E2A(SW)XX/E2B(SW)XX/E2C(SW)XXL

	E2A5	E2A9	E2A13	E2A15	E2A19	E2A23	E2A25	E2B27	E2B31	E2C18L	E2C22L	E2C26L	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	287
SECONDARY PRESSURE DROP AT PEAK OUTPUT (kPa)	20	20	20	25	24	23	27	29	28	8	8	8	9	9	9
PRIMARY STEAM FLOW RATE (kg/sec)	0.023	0.046	0.069	0.092	0.115	0.138	0.160	0.184	0.207	0.229	0.275	0.320	0.366	0.412	0.458
PRIMARY STEAM VALVE -PN16 - SINGLE VALVE	15	20	25	25	32	32	32	40	40	40	50	50	50	50	65
PRIMARY STEAM VALVE -PN16 - DOUBLE VALVE	15	20	25	32	32	32	40	40	40	50	50	50	50/65	65	65
PRIMARY PRESSURE DROP SINGLE VALVE (kPa)	71	88	83	132	97	117	158	112	123	97	60	74	97	128	65
PRIMARY PRESSURE DROP DOUBLE VALVE (kPa)	98	137	125	110	144	192	129	162	197	75	102	141	132	94	114
HOT WATER DUTY(kW)	50	100	150	200	250	300	350	400	450	500	600	700	800	900	1000

SELECTION GUIDE FOR E2(SW) RANGE

TOURIST HOTELS BY NUMBER OF ROOMS	3	8	14	22	31	40	50	64	76	90	120	155	192	234	277
LUXURY HOTELS BY NUMBER OF ROOMS	2	5	10	15	22	28	34	43	52	61	80	101	127	153	180
NUMBER OF STANDARD FLATS	2	7	14	25	40	59	77	100	124	150	201	262	332	408	485
NUMBER OF LUXURY FLATS	-	4	9	18	27	39	51	68	85	106	147	194	242	302	363
HOSPITALS & NURSING HOMES BY NUMBER OF ROOMS	-	8	17	32	52	72	92	120	150	185	250	325	405	492	580
SPORTS CENTRES OR STADIUMS BY NUMBER OF SHOWERS	-	-	4	7	12	18	24	33	40	50	70	93	120	148	183

Available pump head (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	49
RECIRCULATION RATE OF 3m <sup>3</sup> /hr	-	-	-	-	-	3	4	35	37	38	39	40	40	41	41
RECIRCULATION RATE OF 5m <sup>3</sup> /hr	-	-	-	-	-	-	-	14	18	21	23	25	27	29	31

NOTES:

Models with lower secondary resistance can be produced on request.

Figures based on a steam supply pressure of 2.6bar gauge.

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(SW) SERIES (PRIMARY STEAM 140°C, LTHW 71°C-82°C)

**ECONOPLATE MODEL**  
**E2B(SW)XXL/E2C(SW)XXL**

	E2A7L	E2A13L	E2B19L	E2B25L	E2B33L	E2C24L	E2C30L	E2C34L	E2C38L	E2C44L	E2C54L	E2C66L
SECONDARY FLOW RATE (l/s)	1.08	2.17	3.25	4.34	5.42	6.5	7.59	8.67	9.76	10.84	13.01	15.08
SECONDARY PRESSURE DROP AT PEAK OUTPUT (kPa)	23	24	26	28	30	30	28	30	30	30	30	30
SECONDARY CONNECTION (inches)	2	2	2	2	2	2	2	2	2	2	2.5	2.5
PRIMARY STEAM FLOW RATE (kg/sec)	0.023	0.046	0.069	0.092	0.115	0.138	0.160	0.183	0.206	0.229	0.275	0.320
PRIMARY STEAM VALVE - PN16 - SINGLE VALVE	15	20	25	25	32	32	32	40	40	40	50	50
PRIMARY STEAM VALVE - PN16 - DOUBLE VALVE	15	20	25	32	32	32	40	40	40	50	50	50
PRIMARY PRESSURE DROP SINGLE VALVE (kPa)	29	47	42	82	46	69	105	49	63	82	43	59
PRIMARY PRESSURE DROP DOUBLE VALVE (kPa)	57	99	86	58	95	168	157	102	143	58	87	130
HEATING DUTY (kW)	50	100	150	200	250	300	350	400	450	500	600	700

NOTES:

Models with lower secondary resistance can be produced on request.

Figures based on a steam supply pressure of 2.6 bar gauge.

For applications not listed or temperatures other than those above, contact Stokvis for a selection.

## PRIMARY INSTALLATION:

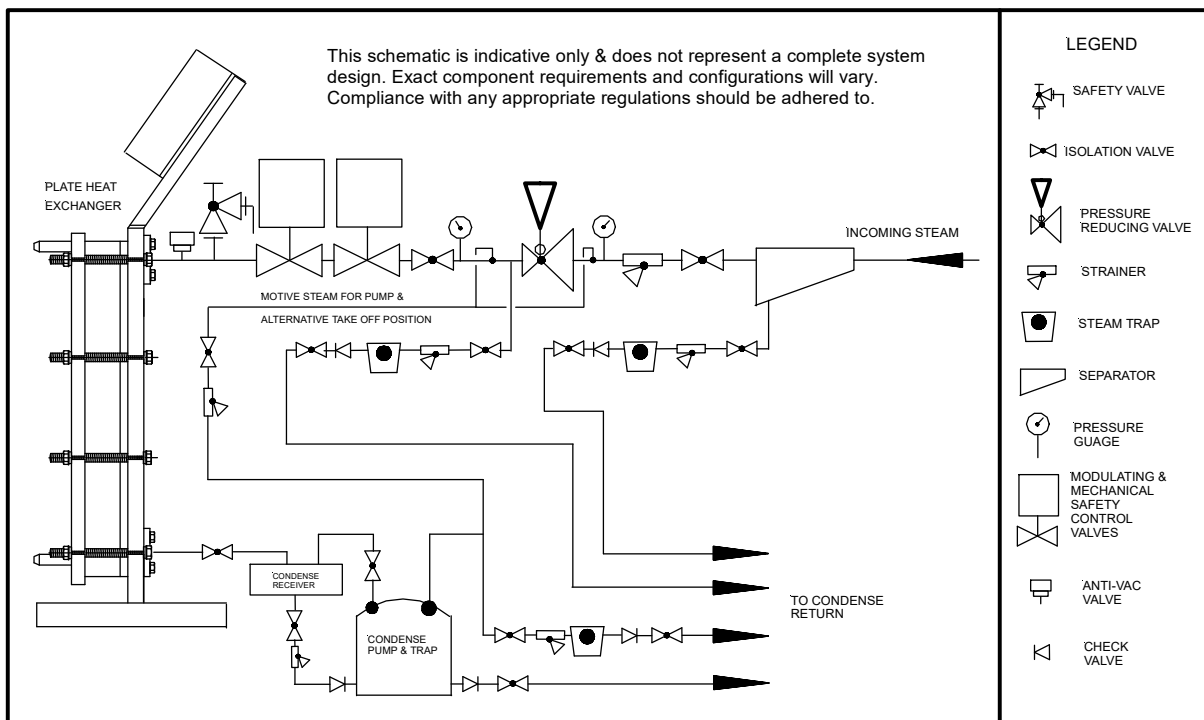
The steam supply is connected to the 2-port valve and the condensate return to the lower steel screwed connection. The steam supply must be controlled such that the maximum operating conditions are not exceeded. A pressure reducing valve should be used to achieve these conditions where necessary.

In addition, where the steam pressure might exceed the maximum rating of the Econoplate, a suitably sized safety valve, set at 3.75bar, should be fitted to the incoming steam supply. Connections are provided on the Econoplate to accommodate the safety valve and a vacuum break, if required.

Other additional equipment required is for high limit protection of the secondary circuit to prevent the temperature exceeding 95°C. This should be a manual reset mechanical type of system, which will cut off the steam supply in the event of a high temperature scenario, caused by a failure of the control system or a loss of power. This can be included by selection of one of the control valve options, or a completely independent system could be used.

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

## Example Primary Installation of an Econoplate E2(SW) Series Plate Heat Exchanger including pressure reducing valve & pump trap:





## **SECONDARY INSTALLATION DETAILS:**

### **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 either be from a cold feed storage tank, which can itself be boosted if required, or directly from the mains.

An unvented kit of components, required by Part G3 of the Building Regulations 2010 further amended in 2010 and complying with any Installation Requirements for Bylaw Compliance, can be provided to complete the package when the cold feed is boosted or mains fed.

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

A secondary recirculation 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 recirculation pump (complete with non-return valve) is provided, then the connection is made onto the pump.

### **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 above apply, with the additional requirement of a Temperature & Pressure relief valve(s) (T&P Valve).

The Econoplate is fitted with 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 from the top bronze connection into a top connection on the vessel. The flow-rate should be set using the speed control on the pump, or, 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. No hot water return is required for the operation of the Econoplate in this type of system.

N.B. Isolating valves should be fitted to all circuits.

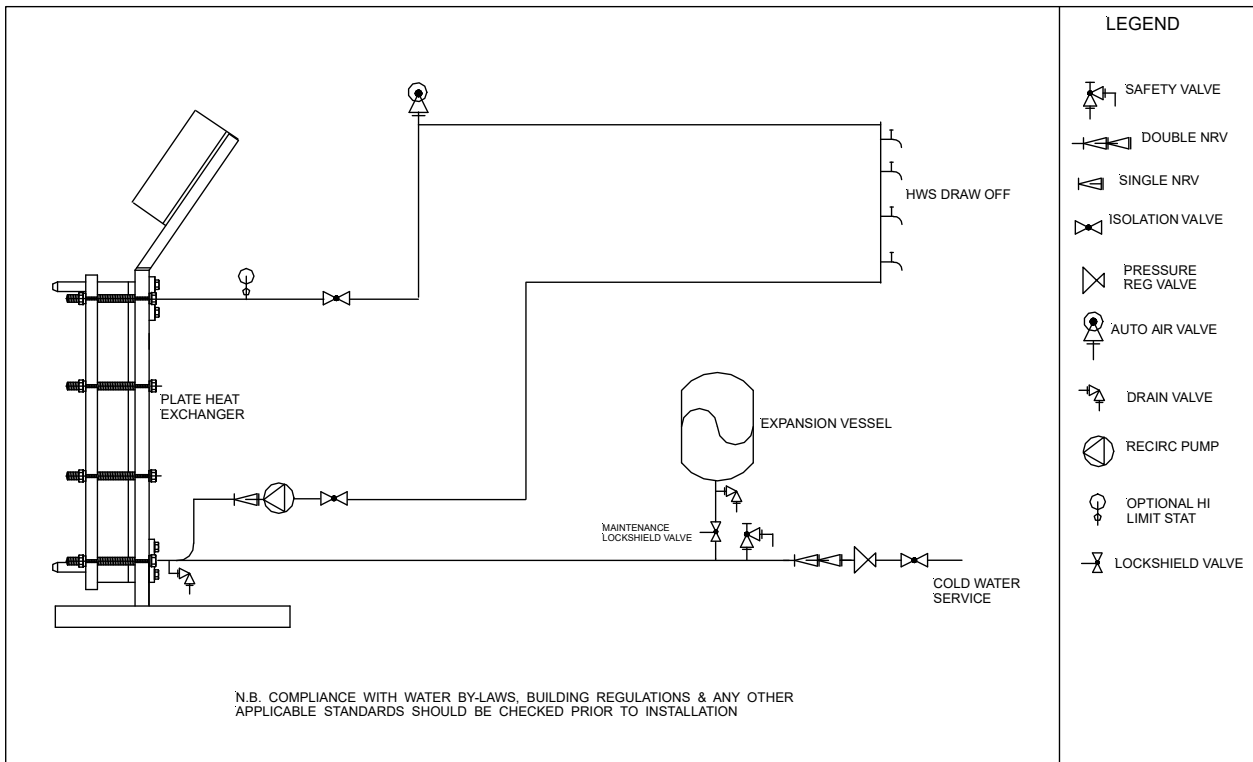
### **LTHW APPLICATIONS:**

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

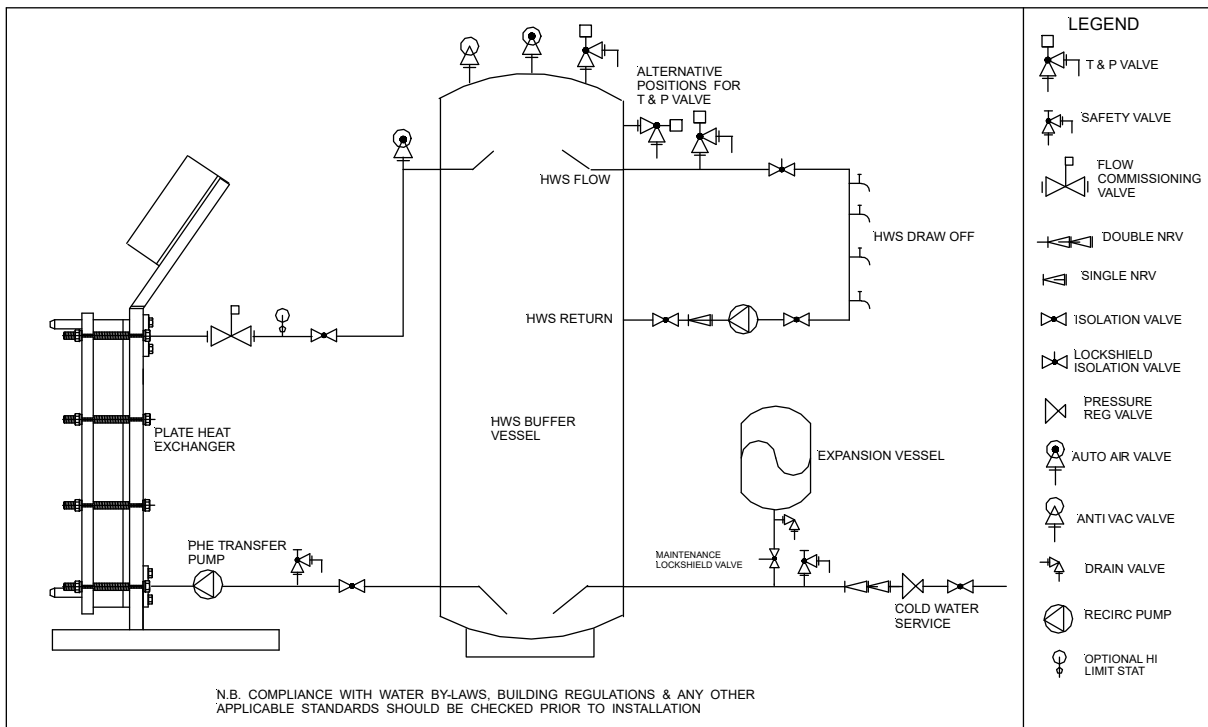
### **RECOMMENDED MINIMUM CLEARANCES FOR MAINTENANCE:**

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

## SECONDARY CONNECTIONS: INSTANTANEOUS SYSTEM WITH MAINS COLD FEED CONNECTION:



## SECONDARY CONNECTIONS: SEMI-INSTANTANEOUS WITH STORAGE AND MAINS COLD FEED CONNECTION:



## **ELECTRICAL DETAILS:**

E2(SW)+0R (230V, 1-phase): Full-load current = 0.2A

When a secondary HWS recirculation pump (+1R) or a secondary transfer pump (+1T) has been opted for, the corresponding amperage below must be added to the above figure for **total** full-load current.

UP 20-45N	(230V, 1-phase):	+ 0.52A, 120W
UPS 25-55N	(230V, 1-phase):	+ 0.38A, 85W
UPS 32-55N	(230V, 1-phase):	+ 0.46A, 105W
UPS 32-80N	(230V, 1-phase):	+ 0.98A, 220W
UPS 32-100N	(230V, 1-phase):	+ 1.52A, 280W
Magna3 40-80FN	(230V, 1-phase):	+ 1.20A, 265W
Magna3 40-120FN	(230V, 1-phase):	+ 1.95A, 440W

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. The electrical supply connection is made via a 3 pin plug on the side of the control panel. It will accept flexible cable up to 10mm with individual cores up to 1.5mm. A PG11 x M16 Adaptaflex conduit gland is also provided.

## **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 energized. A pair of volt free terminals, which close on a fault (after a given time), are available for external indication.

### 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, 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.

### 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.

## **WARNING**

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

## **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 Econotrol 2100 Controller Instructions (see later), 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 actuator:**

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

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

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

Current units are fitted with a Sauter VUG0 valve with a Sauter AVF234SF132 actuator.

Early models were fitted with a Sauter V6F valve and a Sauter AVN3H110F001 actuator, this being superseded by the Sauter AVF234SF132-5 actuator.

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

Current units are fitted with 2no. Sauter VUG0 valves, coupled with 1no. Sauter AVF234SF132 actuator and 1no. Sauter AVM234SF132 actuator.

Early models were fitted with 2no. Sauter V6F valves, coupled with 1no. Sauter AVN3H110F001 actuator and 1no. Sauter AVR32W30F001 actuator. These were later changed to a combination of AVF234SF132-5 and AVM234SF132-5 actuators fitted to the V6F valves.

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

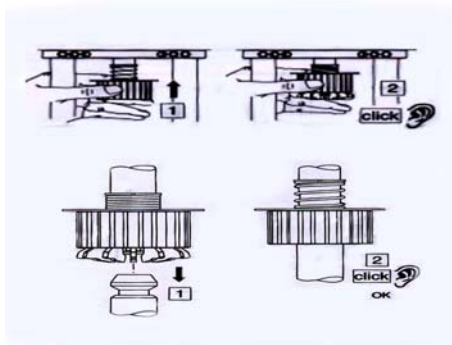
Double valve systems also incorporate auxiliary switches in the AVN and AVF type actuators which control the safety functions of the Econoplate (see spares section).

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

### **AVM/AVF type actuators:**

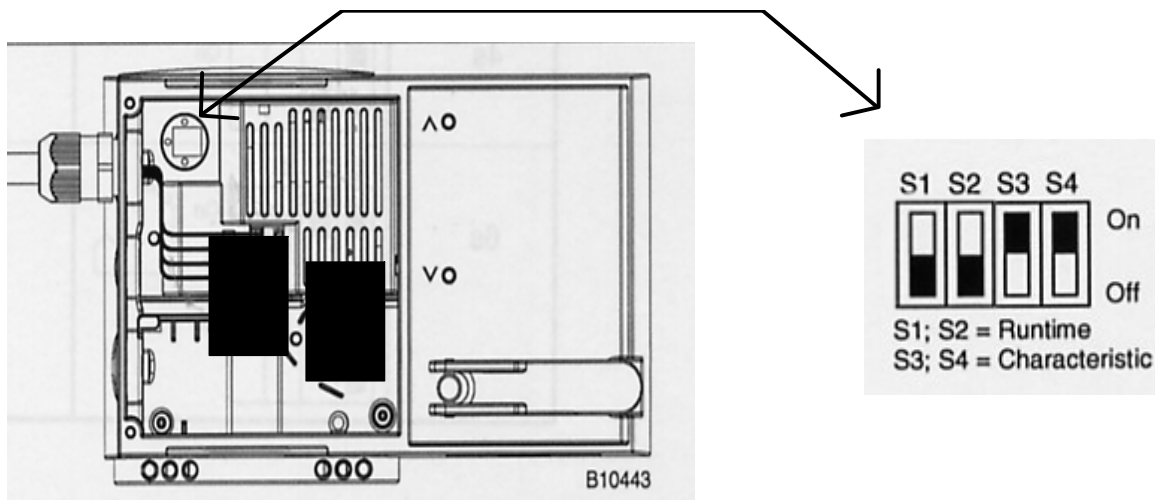
Units fitted with the **AVM/AVF** actuator have a connection which is self-catching. Disconnection is achieved by moving the actuator drive to fully closed (up) and then opening the catch mechanism by lifting the knurled section of the actuator shaft against the top spring, the claws of the catch should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

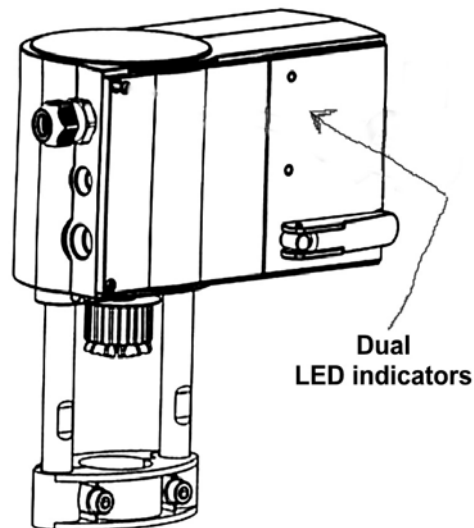


Units fitted with the **AVM/AVF** actuator also have automatic self adjusting valve spindle travel.

**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: -

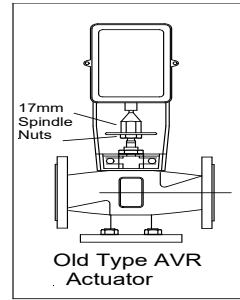
Both LEDs flashing red:	Initialization procedure
Upper LED lit red:	Upper limit stop or "CLOSED" position reached
Lower LED lit red:	Lower limit stop or "OPEN" position reached
Upper LED flashing green:	Drive running moving towards "CLOSED" position
Upper LED lit green:	Drive stationary, last direction 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:

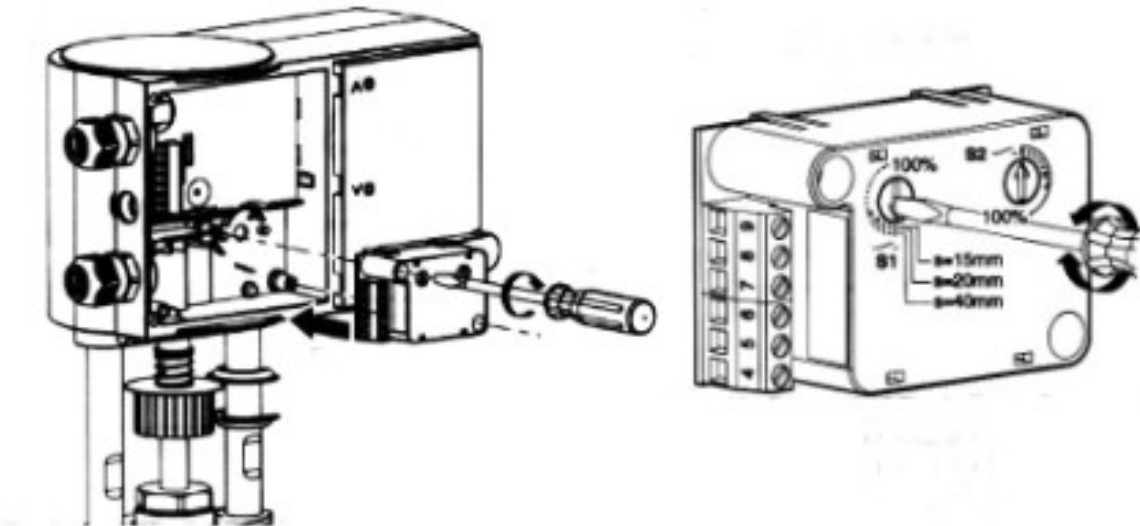
Units fitted with the old type **AVR** type actuator may require adjusting via the spindle nuts as shown below.

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:



## **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.

A large temperature drop between inlet and outlet of the primary circuit, but lack of hot water indicates a lack of primary flow, possibly due to an external blockage. Any internal clogging may be detected as follows:

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

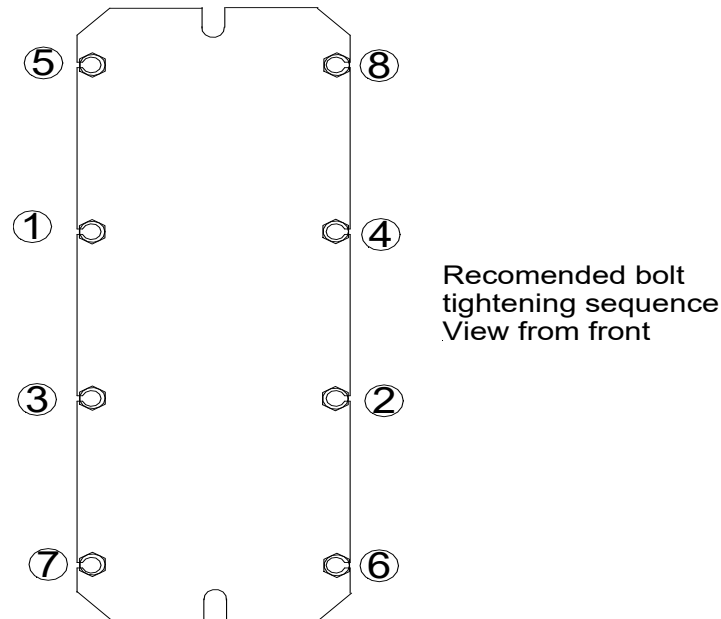
A plate pack consists of:

- Firstly, a 4-hole first/start plate, which has a gasket around all 4 ports; this plate sits against the fixed chassis plate.
- Next are a number of intermediate plates:
  - On the E2A(SW) & E2B(SW) (parallel units), intermediate plates should be fitted so that the chevron pattern, stamped on the plates, alternates up then down on adjacent plates, with the gasket facing the fixed chassis plate.
  - On the E2C(SW) (cross flow units), intermediate plates consist of left and right handed plates, which alternate throughout a plate pack (different plate types and gasket gluing configurations exist, see Plate Identification).
- Lastly, a no-hole blank/end plate, which has a gasket around all 4 ports; the moveable chassis plate sits against this end plate.

If it is required to clean the plate pack, the below instructions should be followed:

- Isolate the exchanger, primary side first, allowing the temperature to fall below 40°C and then isolate the secondary side.
- 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 leaving the last plate in situ against the fixed chassis, unless you have new chassis liners available. If possible, keep the plates in order ready for reassembly; otherwise refer to the following notes. Specific instructions are available on request for all plate types (see Plate Identification).
- Carefully clean the plates using a nylon brush and warm water (do not use a metallic device). A proprietary de-scaling agent may be used if necessary. Rinse thoroughly with clean fresh water. Always follow the correct safety procedures when handling chemicals. Reassemble 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, see below:

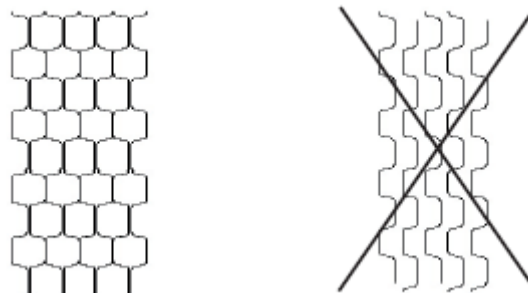


The correct tightening figure is checked by measuring the distance between the moveable front plate and the fixed rear chassis plate and should be calculated as follows:

- E2A(SW) & E2B(SW):
  - GCP-009 – 3.1mm +/- 0.05mm x the number of plates
- E2C(SW):
  - GL-013 – 3.4mm per plate x the number of plates

This distance should be measured next to each bolt to ensure even tightening of the plate pack.

- 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:

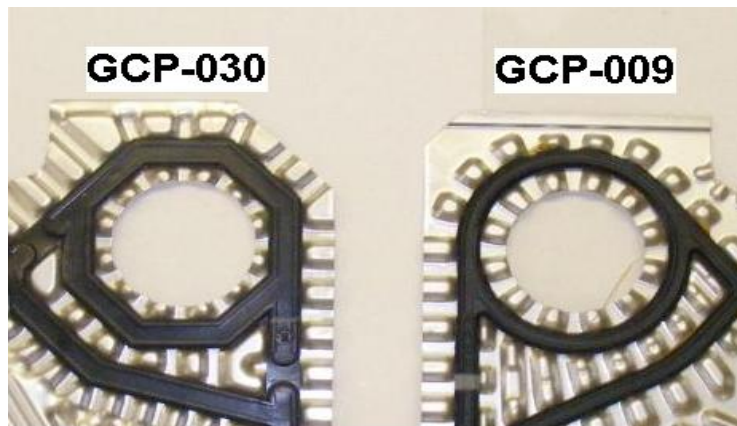


- If the plates are dirty, it is important to also clean the temperature sensor.



## PLATE IDENTIFICATION:

### E2A(SW) & E2B(SW):



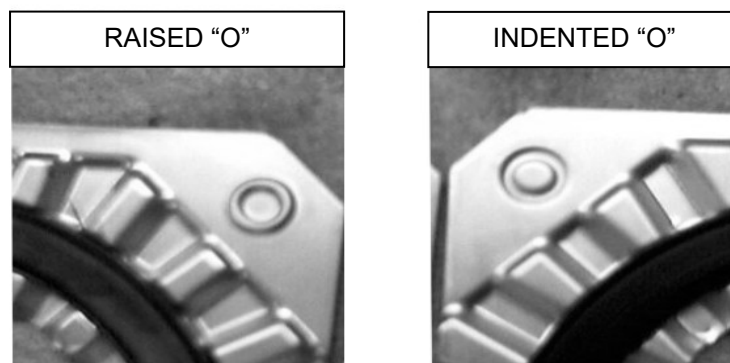
- Current GCP-009 plates have thinner circular gaskets around ports.
- Previous GC-030 plates have thicker octagonal gaskets around ports.
- GC-030 plates have more of the corner cropped than the GCP-009 plates.
- GCP-009 & GC-030 have gaskets which always face the fixed chassis plate.

N.B. GC-030 plates and GCP-009 plates **must not** be mixed. GC-030 plates are now obsolete; if replacements are required, the complete plate pack must be replaced with GCP-009 plates.

### E2C(SW):

Both current GL13 and previous GX12 plates have 2 types of intermediate plate, left hand and right hand, which alternate throughout a plate pack.

- Current GL13 plates have the letter “O” stamped onto one corner at the top/bottom of each plate and will be “indented” or “raised”, as shown below:



Alternate left and right top ports have a gasket around their circumference. Different gasket gluing configurations exist and are as follows:

- From Spring 2009:
  - “Indented” O left hand plate, “Raised” O right hand plate.
  - The O’s should be on the right hand side of the plates when viewed from the front moveable plate (data badge plate).
  - The “First/Start” plate has a ½ thickness 4-port gasket on the side facing the fixed chassis plate, and no gasket on the other side.
  - The “Blank/End” plate has a ½ thickness 4-port gasket on the side facing out towards the moveable chassis plate, and a full thickness 2-port gasket on the other side facing the fixed chassis plate.

- Autumn 2004 to Spring 2009:
  - “Raised” O left hand plate, “Indented” O right hand plate.
  - The O’s should be on the left hand side of the plates when viewed from the front moveable plate (data badge plate).
  - The “First/Start” plate has a ½ thickness 4-port gasket on the side facing the fixed chassis plate, and a full thickness 2-port gasket on the other side facing out towards the moveable chassis plate.
  - The “Blank/End” plate has only a ½ thickness 4-port gasket on the side facing out towards the moveable chassis plate, and no gasket on the other side.
- Pre Autumn 2004:
  - “Indented” O left hand plate, “Raised” O right hand plate.
  - The O’s should be on the right hand side of the plates when viewed from the front moveable plate (data badge plate).
  - The “First/Start” plate has a ½ thickness 4-port gasket on the side facing the fixed chassis plate, and a full thickness 2-port gasket on the other side facing out towards the moveable chassis plate.
  - The “Blank/End” plate has only a ½ thickness 4-port gasket on the side facing out towards the moveable chassis plate, and no gasket on the other side.

Total GL-13 plate packs should be an even number.

N.B. GL-13 plates with different gluing configurations **must not** be mixed; plate packs should be replaced in their entirety with current GL-13 plates.

- Previous GX-12 plates have the letters K, L, R and S stamped onto the corners of each plate.

There were 2 styles of gasketing on the GX-12 plates:

- One style had gaskets on both sides of one plate and then no gasket on the next. These plates alternate, and the correct orientation was given by the letter stamped at the top of each plate.
- The other style had a gasket on one face of each intermediate plate and the correct orientation was again given by the letter stamped at the top of each plate. Alternate left and right top ports had a gasket around their circumference.

Total GX-12 plate packs should be an odd number.

N.B. GX12 and GL13 plates **must not** be mixed. GX-12 plates are now obsolete; if replacements are required, the complete plate pack must be replaced with GL13 plates

N.B. Sequences must be noted prior to dismantling, to ensure correct reassembly.

## **FAULT FINDING:**

### **LITTLE OR NO HOT WATER AT OUTLETS / NO HEATING:**

1. Check the external electrical supply to the unit – reinstate if necessary. Check control panel isolator switch is in the ON position.
2. Check for the LCD display on the control panel – if not on, check/replace 500mA control fuse.
3. If the 500mA fuse blows repeatedly, if appropriate, set the Econoplate to give temporary hot water and replace the p.c.b. as soon as possible (see Temporary Operation). Units should never be left unsupervised when in Temporary Operation, or permanently left in Temporary Operation, due to the elevated temperature of steam.
4. If there is an LCD 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 for lack of steam pressure/water logged steam.
6. Check for primary flow restrictions e.g. faulty pressure reducing valves, blocked strainers, closed isolating valves etc. This would show as lack of pressure at the inlet of the control valve.
7. Check the secondary pump is operating, particularly if the display indicates set-point achieved, but no hot water available.
8. Check the high limit has not operated (contacts NC when healthy); to reset, press the black button below the setting dial.
9. Check to ensure correct connection of valve and actuator (see Operation).
10. Check that the motorized valve is mechanically operating – place in manual operation and move the valve through its travel to check for seizure. Strip and clean or replace as required.
11. Check that the valve motor is electrically operating – raise and lower the set point on the controller and observe. If the motor does not work, see Temporary Operation.

### **FLUCTUATING TEMPERATURES AT OUTLETS:**

1. Check that the secondary pump is operating correctly and that good circulation exists – carefully 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; if fitted, check that it is not letting by and so allowing the incoming cold water to enter the HWS distribution system return – carefully feel for a cool return pipe.
3. Check that the motorized 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. Reinststate the electrical supply and check again.

4. Check that the motorized 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 (see Operation).
5. Check for condense water logging of the heat exchanger (stall condition). The condense outlet from the Econoplate will generally be cooler than expected when this happens. Check that all condense return lines are clear and that there is no back-pressure on the outlet of the trap. Typically output will drop followed by a sudden rapid increase in temperature as the condense clears.
6. 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 is likely to be similarly affected. Strip and clean as necessary (see Maintenance).

#### 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. See Maintenance for cleaning.

#### 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 overrun on shut down.

#### 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 plate and front clamping plate should be checked (see Maintenance for figures). If this is not correct, relieve the pressure on primary and secondary side and tighten to the correct figure (see Maintenance). 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.

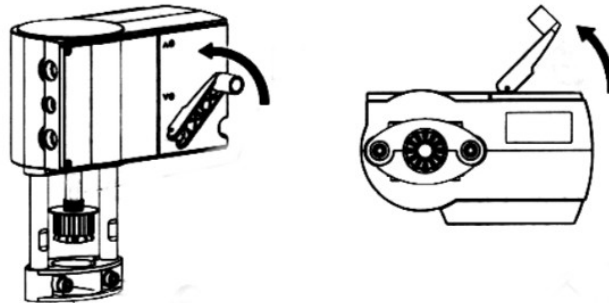
#### NO WATER FROM HIGHEST OUTLET:

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 (see Maintenance). 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 water flow is improved, 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. Another option could be to install a larger pump on the cold feed connection with the HWS return teed into the cold feed on the suction side of the pump.

## TEMPORARY OPERATION:

### TO PROVIDE HOT WATER IN THE EVENT OF COMPONENT FAILURE CAN BE ACHIEVED AS FOLLOWS:

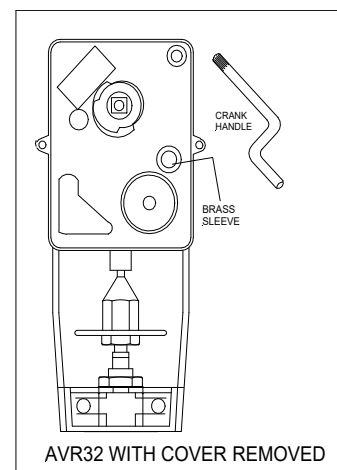
- a) On AVM234 actuators, partially open the valve slowly by hand using the fold out lever on the outside of the actuator as shown below:



On AVM234 actuators, both LEDs will flash green then red; this indicates 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 partially drive open the valve slowly 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 midway 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 2 port valves.**

- b) Ensure that the steam supply is readily available.  
c) Ensure that there is an electrical supply to any secondary pump, and link the start/stop terminals for the pump if not already made.  
d) Set the high temperature alarm to automatic – refer to “Econotrol 2100 Manual” for procedure (see later).

### **WARNING**

Units should never be left unsupervised when in Temporary Operation, or permanently left in Temporary Operation, due to the elevated temperature of steam.

## PARTS LIST: CURRENT MODELS

### CONTROLLER & SENSOR (ALL):

ESS8133 Econotrol 2100 controller exc. Enclosure  
ESS6600/1 E Series Adjustable Temperature Sensor 1/8" BSP PT100

### VALVE & ACTUATOR:

VUG0 15 F304 2-port Sauter Valve DN15 (E2A(SW)/E2B(SW))  
VUG0 25 F304 2-port Sauter Valve DN25 (E2A(SW)/E2B(SW))  
VUG0 32 F304 2-port Sauter Valve DN32 (E2A(SW)/E2B(SW)/E2C(SW))  
VUG0 40 F304 2-port Sauter Valve DN40 (E2A(SW)/E2B(SW)/E2C(SW))  
VUG0 50 F304 2-port Sauter Valve DN50 (E2C(SW))  
VUG0 65 F316 2-port Sauter Valve DN56 (E2C(SW))  
AVM234SF132 Sauter Actuator + module+ shunt resistors  
AVF234SF132 Sauter COPF Actuator + module + shunt resistors (on single valve blocks only)  
Sauter Limit Switch Module for AVF234SF132 (on double valve blocks only) (0372333001)

### HEAT EXCHANGER PLATES & LINERS:

GCP009H START 4-hole First/Start Plate (E2A(SW)/E2B(SW))  
GCP009H INT Intermediate Plate (E2A(SW)/E2B(SW))  
GCP009H BLANK No-hole Blank/End Plate (E2A(SW)/E2B(SW))  
ESS4647 43mm Through-Frame Liner (E2A(SW)/E2B(SW))  
GCP009L INT Intermediate Plate (low pressure drop) (E2B(SW)xxL)  
  
GL13H START 4-hole First/Start Plate (E2C(SW))  
GL13L LH Left-Hand Intermediate Plate (low pressure drop) (E2C(SW)xxL)  
GL13L RH Right-Hand Intermediate Plate (low pressure drop) (E2C(SW)xxL)  
GL13H BLANK No-hole Blank/End Plate (E2C(SW))  
ESS8127 52mm Through-Frame Liner (E2C(SW))

### PUMPS:

**N.B.** "New Style" pumps have "commando" type electrical connections.

Optional Secondary Pumps:

"New Style" UP20-45N 1-phase (95906472)  
"New Style" UPS25-55N 1-phase (95906772)  
"New Style" UPS32-55N 1-phase (95906773)  
"New Style" UPS32-80N 1-phase (95906448)  
UPS32-100N 1-phase (98057249)  
Magna3 40-80FN 1-phase (97924349)  
Magna3 40-120FN 1-phase (97924351)

### CHASSIS COMPONENTS:

E2A(SW)/E2B(SW) Guide pins M16 x 200mm (up to 35 plates)  
E2A(SW)/E2B(SW) Guide pins M16 x 250mm (37-49 plates)  
E2A(SW)/E2B(SW) Guide pins M16 x 330mm (51-59 plates)  
E2C(SW) Guide pins TIL/M/033/A 150mm (up to 24 plates)  
E2C(SW) Guide pins TIL/M/034/A 250mm (26-38 plates)  
E2C(SW) Guide pins TIL/M/035/A 350mm (40-70 plates)  
E2A(SW)/E2B(SW) M16 Hex Set Screws x 130mm (up to 17 plates)  
E2A(SW)/E2B(SW) M16 Hex Set Screws x 180mm (19-27 plates)  
E2A(SW)/E2B(SW) M16 Hex Set Screws x 200mm (29-43 plates)  
E2A(SW)/E2B(SW) M16 Hex Set Screws x 250mm (45-55 plates)  
E2A(SW)/E2B(SW) M16 Hex Set Screws x 300mm (57-59 plates)  
E2C(SW) M20 Hex Set Screws x 180mm (22-24 plates)  
E2C(SW) M20 Hex Set Screws x 280mm (36-34 plates)

E2C(SW) M20 Hex Set Screws x 380mm (36-70 plates)  
EC270032160 Non-Return Valve Watts 1¼" (F-F)  
NN020 Non-Return Valve Watts ¾" 230020165 (M-F)  
Drain cock ½" male

OPTIONAL EXTRAS:

AT603 – High Limit Thermostat – Jumo 603070/0070-5  
211-1304 – 230V Interlock Relay  
541-3120 – Box of 10A Fuses (10 No.)  
563-463 – Box of 500mA Fuses (10 No.)  
Delay/Overrun timer Bryce Control 300-5991

**PARTS LIST: PREVIOUS MODELS**

CONTROLLER & SENSOR (ALL):

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  
ESS6601 Temperature Sensor 1/8" BSP 65mm  
ESS7012 'E' Series Temperature Sensor ¼" BSP

VALVE & ACTUATOR:

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  
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)  
ESS7052 Sauter Actuator AVR32W30-F001  
Sauter COPF Actuator AVN3H110-F001  
Sauter Limit Switch assembly for AVN3H (0294711001)

PUMPS:

UPS40-60/2FB 1-phase (96401921)  
UPS40-60/2FB 3-phase (96401923)  
UPS40-120/2FB 1-phase (96401949)  
UPS40-120/2FB 3-phase (96401951)  
UPS50-120/2FB 1-phase (96402108)  
UPS50-120/2FB 3-phase (96402110)

CONTACTOR & OVERLOAD:

ESS8121 Telemecanique Overload 1-phase LR2-K0306 (0.8-1.2A)  
ESS8122 Telemecanique Overload 1-phase LR2-K0308 (1.8-2.6A)  
ESS8123 Telemecanique Overload 1-phase LR2-K0310 (2.6-3.7A)  
ESS8124 Telemecanique Overload 3-phase LR2-K0307 (1.2-1.8A)  
ESS8125 Telemecanique Contactor LC1-K0610U7

**Please supply Econoplate Model, Serial Number & Code Number (from Data Badge) to ensure correct replacement.**

HEAT EXCHANGER PLATES & LINERS:

ESS4627 G30H EPDM 4-hole First/Start Plate (E2A(SW)/E2B(SW))  
ESS4626 G30H EPDM Intermediate Plate (E2A(SW)/E2B(SW))  
ESS4625 G30H EPDM No-hole Blank/End Plate (E2A(SW)/E2B(SW))  
ESS4621 G30L EPDM Intermediate Plate (low pressure drop) (E2B(SW)xxL)

ESS6614 GX12L Half Gasket 4-hole First/Start Plate (low pressure drop) (E2C(SW))  
ESS6615 GX12L Gaskets Both Sides Intermediate Plate (low pressure drop) (E2C(SW)xxL)  
ESS6616 GX12L No Gasket Intermediate Plate (low pressure drop) (E2C(SW)xxL)  
ESS6617 GX12L Half Gasket last No-hole Blank/End Plate (low pressure drop) (E2C(SW)xxL)  
ESS6622 GX12L Half+Single Gasket 4-hole First/Start Plate (low pressure drop) (E2C(SW)xxL)  
ESS6623 GX12L Single Gasket LH Intermediate Plate (low pressure drop) (E2C(SW)xxL)  
ESS6624 GX12L Single Gasket RH Intermediate Plate (low pressure drop) (E2C(SW)xxL)  
ESS6625 GX12L Half Gasket No-hole Blank/End Plate (low pressure drop) (E2C(SW)xxL)

CHASSIS COMPONENTS:

EC270020160 Non-return valve Watts ¾" (F-F)

OPTIONAL EXTRAS:

High Limit Thermostat TKR 3501 Range 25-95°C  
High Limit Thermostat TKR 3504 Range 65-135°C  
Delay/Overrun timer 365-0923





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# **Econotrol 2100 Controller**

## **Operating Instructions**

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Page 4	Display Menu
Page 4	Function Menu
Page 5 & 6	Settings Menu
Page 7	External Connections
Page 8	Summary of Display Menu, Function Menu & Settings Menu

## General Specification:

The Econotrol 2100 is a purpose designed PID regulator which controls temperature via a motorized 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 regulation, the controller includes:

- Valve opening/closing and P1/P2 primary pump running functional indicator lamps.
- A 500mA control fuse and a 10A output fuse.
- Duplex twin-head pump duty share (if fitted).
- High/low temperature alarm indication.
- Volt free common temperature alarm terminals.
- High temperature lockout.
- A safety extra low voltage (SELV) external interlock circuit for connection of an external safety device or switched circuit.
- A safety extra low voltage (SELV) external time clock circuit for connection of BMS time control.

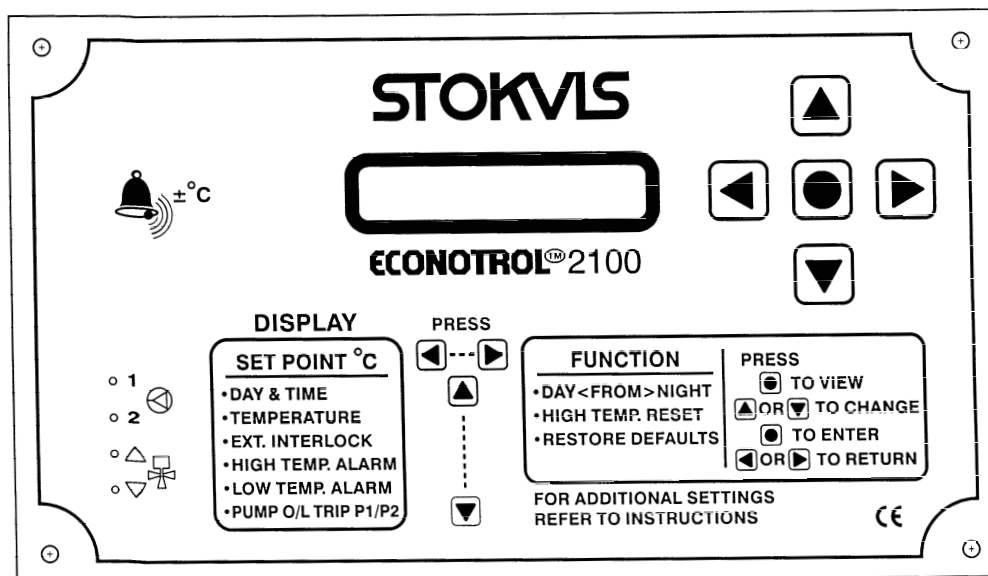
**Time control** can be by: either the internal inbuilt 7 day time clock for either 2 temperatures of operation or a single temperature set point and night “off” per day, or externally using the safety extra low voltage (SELV) external clock circuit for either 2 temperatures of operation or a single temperature set point and “off”.

**Primary pump fault indication/overload trip** is displayed on the Econotrol for units fitted with Magna3 variable speed pump(s) and UPS fixed speed pump(s) only when fitted with contactor and overload.

**Duplex twin-head primary pump duty share facility** is included as standard.

**Duplex twin-head primary pump auto-changeover on pump fault** is included as standard for units fitted with Magna3 D variable speed pumps, and for units fitted with UPSD fixed speed pumps only when fitted with contactor and overload.

## Fascia Layout:



## Display Menu:

### Default Display:

The current **SET POINT** (°C) and **DAY & TIME** (24 hour clock, 7 day week) are displayed; to view any one of the other display menu options below press either the ▲ or ▼ key to move from one to the other.

### Display Menu Options:

- **TEMPERATURE** – measured secondary water flow temperature (°C).
- **EXT INTERLOCK** – shown only if the External Interlock circuit is open.
- **HIGH ALARM** – shown only if the high temperature alarm setting has been exceeded (factory set at 10°C above the higher set point).
- **LOW ALARM** – shown only if the low temperature alarm setting has been exceeded (factory set at 20°C below the current set point).
- **P1 O/L or P2 O/L (Pump Fault)** – shown only if a primary pump, P1 or P2, overload has tripped (available on Magna3 variable speed pump(s) and UPS fixed speed pump(s) only when fitted with contactor and overload).

## Function Menu:

### Access:

The FUNCTION options are accessed from the default SET POINT display menu by pressing either the ◀ or ▶ key once.

### Navigation:

- To move from one function option to the next press either the ▲ or ▼ key.
- To view the current status of a function 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 default SET POINT display menu press the ◀ or ▶ key.

### Function Menu Options:

- **DAY<FROM>NIGHT** – this 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.
- **HIGH TEMP RESET** – only operates if a high temperature lockout has occurred; using it restarts the unit and resets the external volt free temperature alarm.
- **RESTORE DEFAULTS** – 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.

## Settings Menu:

### Description:

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 listed below and in the “Summary of Settings Menu” (see later).

### Access:

The SETTINGS options are accessed from the default SET POINT display menu by:

- First pressing and releasing the  $\blacktriangleright$  key to enter the FUNCTION menu,
- Then pressing **and holding** the  $\blacktriangleright$  key for >5 seconds and then releasing.

### Navigation:

- To move from one setting to the next press either the  $\blacktriangle$  or  $\blacktriangledown$  key.
- To view the current value of a setting, press the  $\bullet$  key.
- To change the value of a setting press the  $\bullet$  key again (a cursor will now flash).  
Settings parameters are changed digit by digit:
  - To change the current value of a parameter digit, press the  $\blacktriangle$  key.
  - To move to the next parameter digit, press the  $\blacktriangleright$  key.
  - To enter this setting value change, press the  $\bullet$  key (the cursor will stop flashing).
- To move to the next setting, press the  $\blacktriangle$  or  $\blacktriangledown$  key.
- To return to the default SET POINT display menu, press the  $\blacktriangleleft$  or  $\blacktriangleright$  key twice, or leave for 30 seconds.

### Settings Menu Options:

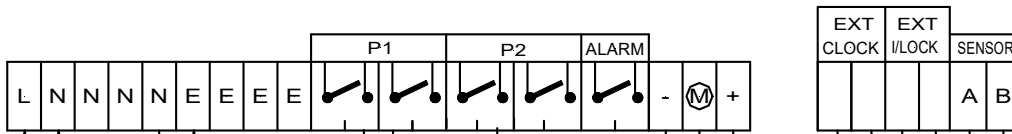
- **TIME** – this includes the current day of the week, time, in hours, minutes and seconds, based on a 24 hour clock.
- **CLOCK** – the unit can run on its internal time clock (INT) or it can be controlled from an external source (EXT).  
(Factory Setting = INT).
- **DAILY DAY, TIME & TEMPERATURE** – this is used, for each day of the week, to set the start time and temperature for the “day” operation when controlled by the internal time clock. The temperature range is from 01°C to 99°C; alternatively “OFF” can be selected.  
(Factory Setting = 06:00 : T 60°C).  
Note: values only adopted when CLOCK = “INT” (internal time clock control).
- **DAILY NIGHT, TIME & TEMPERATURE** – this is used, for each day of the week, to set the start time and temperature for the “night” operation when controlled by the internal time clock. The temperature range is from 01°C to 99°C; alternatively “OFF” can be selected.  
(Factory Setting = 23:30 : T 60°C).  
Note: values only adopted when CLOCK = “INT” (internal time clock control).
- **EXT CLOCK DAY, TEMPERATURE** – this is used to set the temperature for the “day” operation when controlled by an external device connected across the external time clock circuit. The temperature range is from 01°C to 99°C; alternatively “OFF” can be selected.  
(Factory Setting = T 60°C).  
Note: values only adopted when CLOCK = “EXT” (external time clock control).
- **EXT CLOCK NIGHT, TEMPERATURE** – this is used to set the temperature for the “night” operation when controlled by an external device connected across the external time clock circuit. The temperature range is from 01°C to 99°C; alternatively “OFF” can be selected.  
(Factory Setting = T OFF).  
Note: values only adopted when CLOCK = “EXT” (external time clock control).

- **HIGH 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.  
(Factory Setting = T +10°C).
- **LOW 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.  
(Factory Setting = T -20°C).
- **PROP (Proportional Band)** – a high proportional band will produce a 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.  
(Factory Setting = 25).
- **DIFF (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.  
(Factory Setting = 20).
- **PUMP MODE** – this is used to determine which pump output terminal is used. If a single-head primary pump is connected to the P1 terminals then “P1 ON” should be selected. If a single-head primary pump is connected to the P2 terminals then “P2 ON” should be selected. If a duplex twin-head primary pump is fitted, one will be connected to P1 terminals and the other to P2 terminals, “P1/P2” should be selected which will then perform duty share on the 2 pump heads.  
(Factory Setting = P1 ON).
- **ALARM** – there are 3 automatic and 1 manual reset high temperature alarm modes:  
(Factory Setting = AUT1).
  - **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. Auto reset occurs once the temperature has fallen below the alarm temperature. Subsequent high temperatures cause an almost immediate shut down.
  - **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 the FUNCTION menu and select HIGH TEMP RESET = “YES”.



## External Connections:

### Econotrol Terminal Detail:



### Electrical Supply:

The controller operates with a 230V 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:

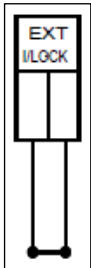
The electronic controller is protected by a 500mA fuse and the main PCB output side is protected by a 10A fuse; both are located on the main PCB.

### 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 energized. A single pair of volt free (ALARM) terminals, which close on a fault (after a given time), are available for external indication.

### 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 (SELV) circuit; an open circuit should be used to shut the unit down.

### External "Clock":

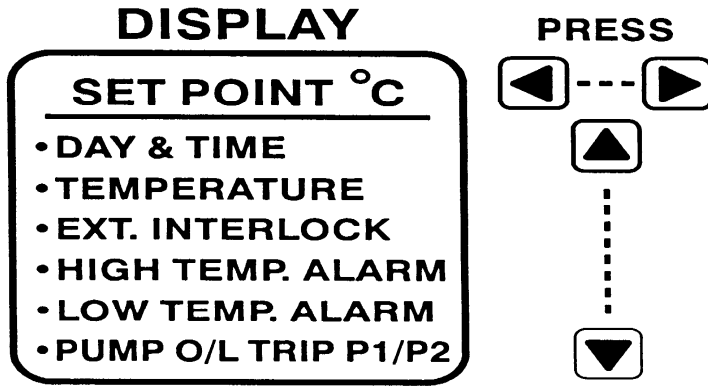


An external device can be connected to switch between 2 temperatures of operation, or to switch between a single set point and "off". A closed contact across this safety extra low voltage (SELV) circuit gives the "day" setting (EXT Clock Day) and an open circuit the "night" setting (EXT Clock Night).

## **WARNING**

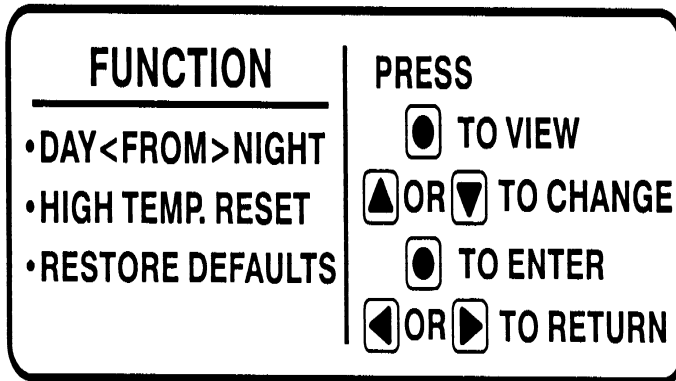
Never run control cables using low voltages with power cables – induced voltages can affect the operation of the controller.

Summary of Display Menu:



Summary of Function Menu:

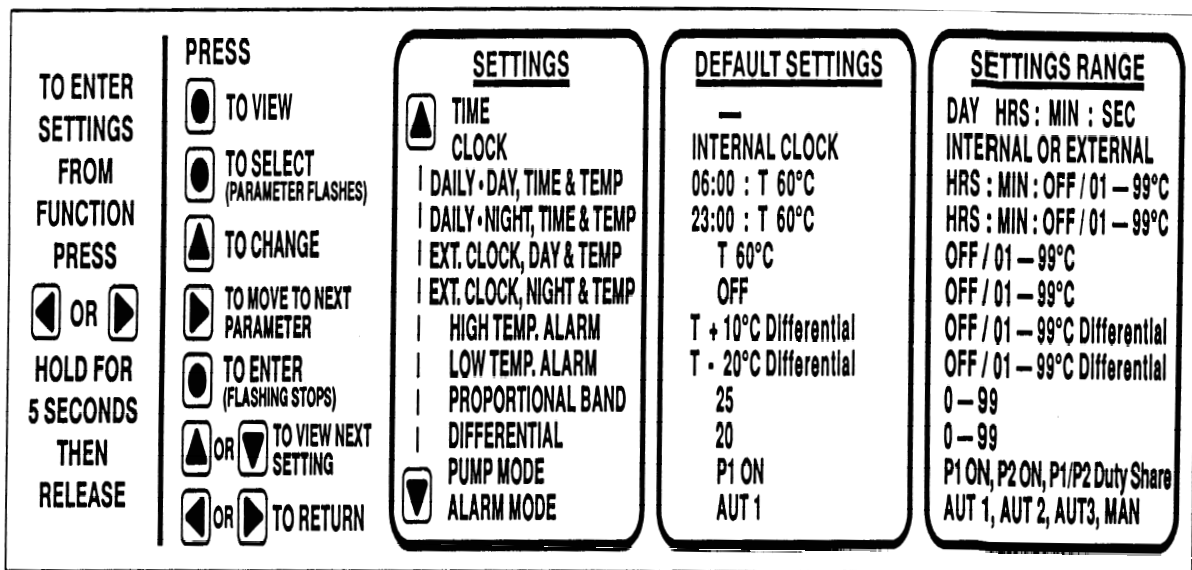
The FUNCTION options are accessed from the default SET POINT display menu by pressing either the ◀ or ▶ key once.



Summary of Settings Menu:

The SETTINGS options are accessed from the default SET POINT display menu by:

- First pressing and releasing the ▶ key to enter the FUNCTION menu,
- Then pressing **and holding** the ▶ key for >5 seconds and then releasing.



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