



**ECONOPLATE "E" SERIES  
SWIMMING POOL  
PACKAGED  
PLATE HEAT EXCHANGER**

**TECHNICAL  
DOCUMENTATION**

**STOKVIS ENERGY SYSTEMS  
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34 CENTRAL AVENUE  
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## STOKVIS ECONOPLATE E SERIES

### THE SWIMMING POOL PACKAGED PLATE HEAT EXCHANGER.

#### GENERAL DESCRIPTION.

The Stokvis Econoplate E series of packaged swimming pool heat exchangers is available in three ranges covering a total of some 39 units. The outputs range from 47kW to 1013kW, when fed with primary water at 82<sup>0</sup>C. They are designed to operate up to a maximum operating temperature of 110<sup>0</sup>C for the E4PA and E4PB and 120<sup>0</sup>C for the E3PC.

The Econoplate E series units are designed to provide swimming pool heating on a bypass arrangement of the main filtration loop with an imposed resistance of no more than 20 kPa.

All of the 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 can be readily added to, enabling the output capacity of an existing unit to be increased if required.

Plate Heat Exchangers have low water content and low thermal inertia making them ideal for use in systems with varying heat loads. The Econoplate E series units are supplied with 3 or 4 port motorised control valves fitted to the primary circuit. This valve is operated by an electronic temperature controller which senses the returning pool water temperature and opens or closes the valve in response.

The primary water is circulated around the unit by an integral pump which has been matched to the heat exchanger, with an allowance of 6 kPa for pipework losses also included. The pump is started and stopped by the electronic temperature controller in response to a heat demand.

Systems which utilise an existing primary feed pump, when connected to a unit with a 3 port valve, require an additional bypass. When using a 4 port valve, provided the external flow is no greater than that of the unit, a bypass is not necessary, due to the 4th port acting as the bypass under no/low load situations.

On the E4PB and E3PC models, primary pump overloads are included as standard . On duplex units a manual pump selector switch is included with auto changeover on primary pump fault available as an option. Volt free primary pump run and overload trip can also be added as an option.

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

## INSTALLATION.

The Econoplate is installed on a bypass to the swimming pool filtration loop, the secondary return to the Econoplate, is connected into the bottom horizontal bronze connection on the rear of the Econoplate. This can be identified by noting the electrical temperature probe fitted into it.

The flow back to the filtration loop is connected into the top bronze connection, again on the rear of the Econoplate. Suitable isolating valves should be fitted to both connections, with an additional valve on the filtration loop between the flow & return connections from the Econoplate. This valve is used to set the flow rate through the Econoplate by imposing a 20kPa resistance to the filtration loop.

Note :The maximum outlet temperature from an Econoplate unit is 60°C when operating with a primary temperature of 82°C at the design secondary flow rate and with the swimming pool at 30°C. A lower temperature can be achieved by increasing the secondary flow rate through the unit.

Primary connections on the E4PA and E4PB are made into the 4 port valve, the vertical facing connection is the inlet (boiler flow) and the horizontal connection is the outlet (boiler return). On the E3PC the primary inlet connection is made into the 3 port valve, whilst the outlet is from the lower 2" BSP threaded connection. Both primary connections should be made using the correct counter flanges and suitable isolating valves, to enable servicing of the unit after installation. To ensure correct operation, water at the design flow temperature should be available to the plate heat exchanger at all times. The "Typical installation schematic" shows an example.

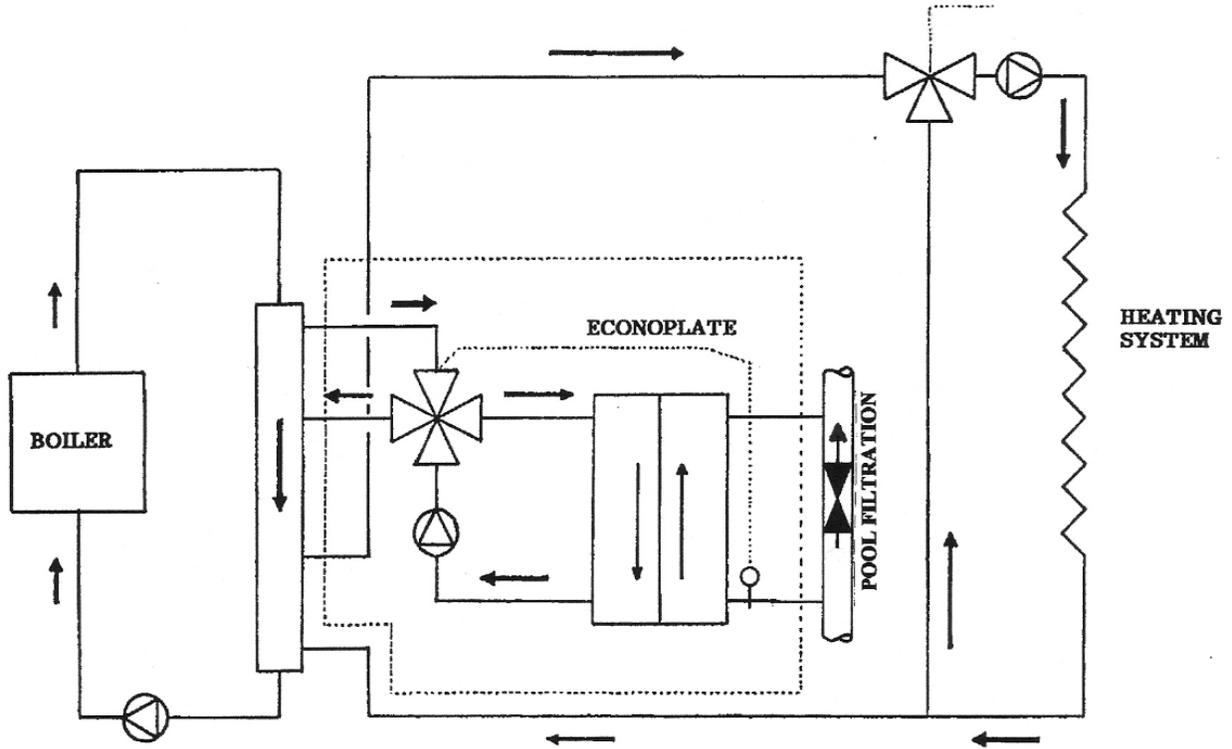
## RECOMMENDED MINIMUM CLEARANCES FOR MAINTENANCE.

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

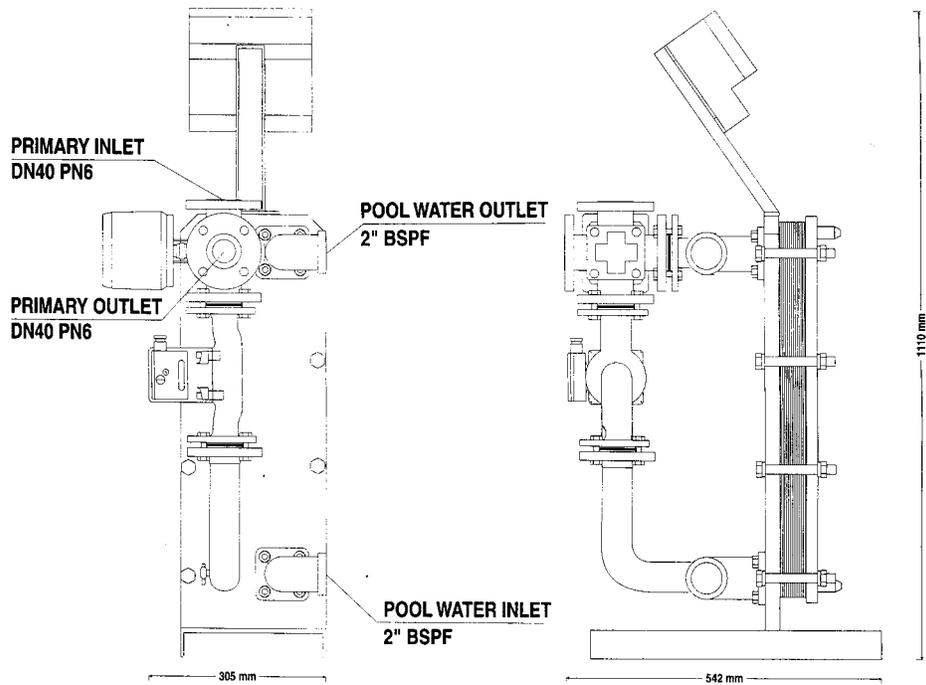
## ELECTRICAL DETAILS.

E4PA Range:	240V single phase : full load current 1 amp
E4PB Range:	240V single phase : full load current 2 amp
E3PC Range:	240V single phase : full load current 2 amp

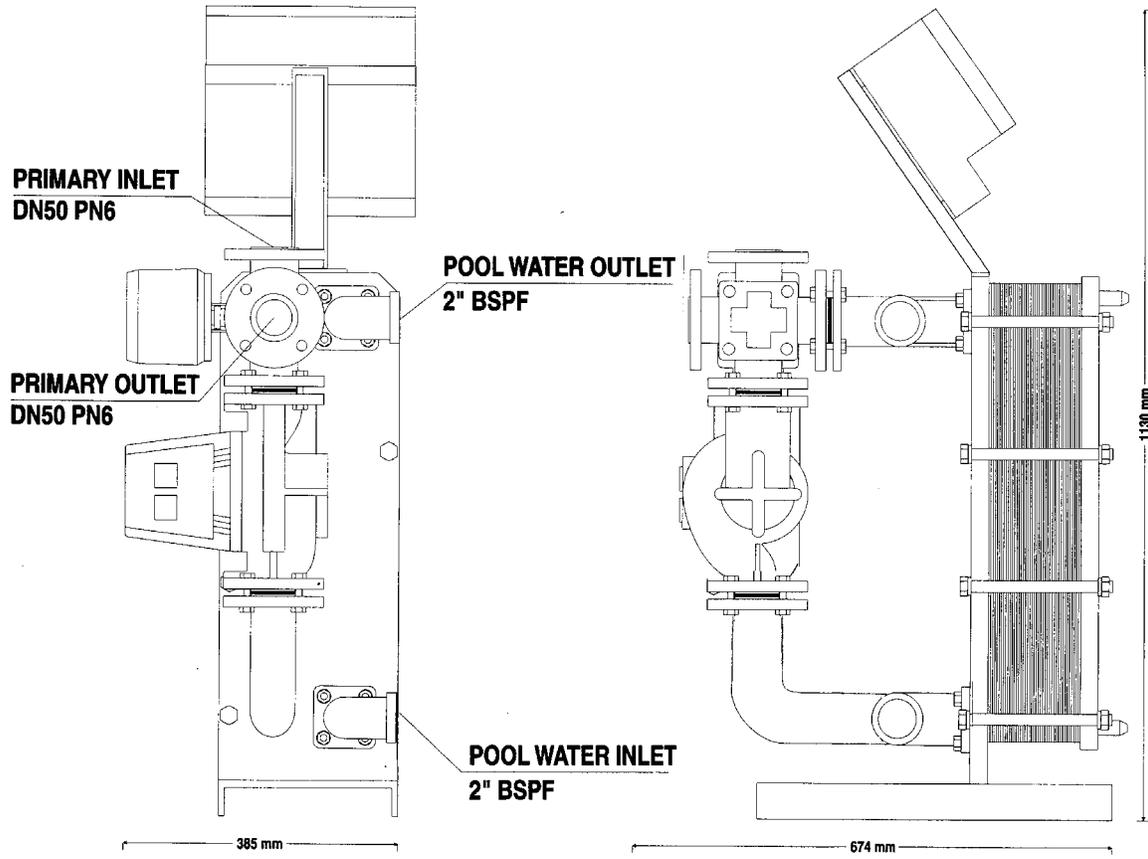
TYPICAL INSTALLATION OF ECONOPLATE E SERIES PLATE HEAT EXCHANGER ON A COMBINED HEATING AND SWIMMING POOL WATER SYSTEM.



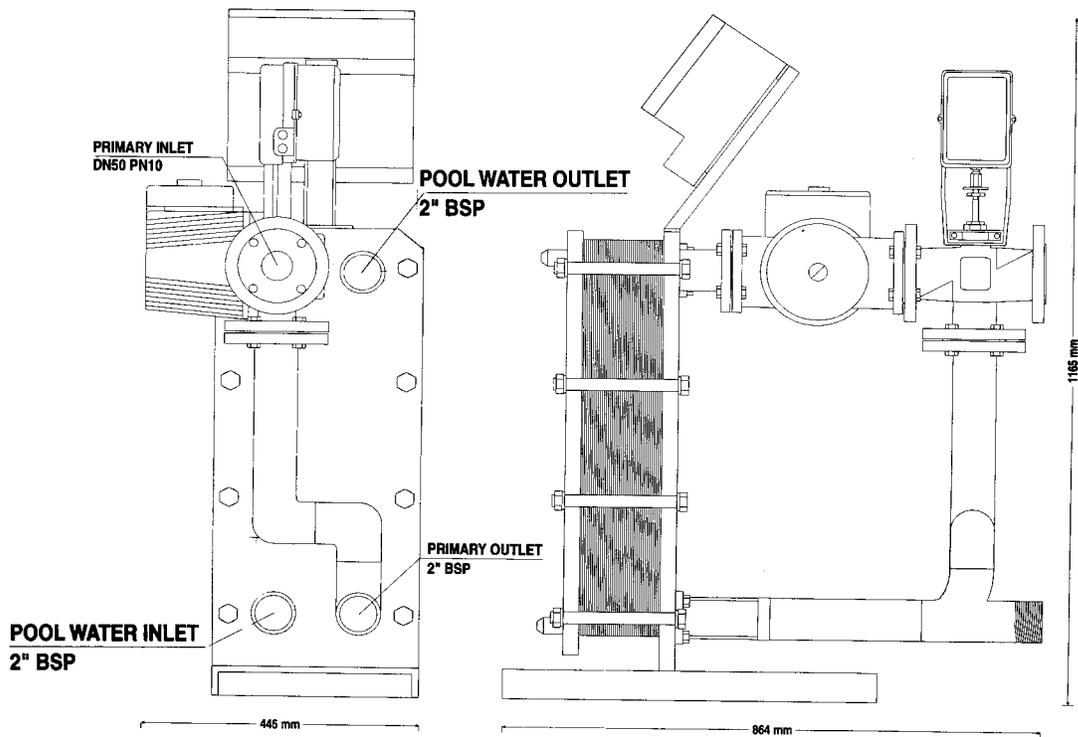
ASSEMBLY DETAILS : E4PA.



ASSEMBLY DETAILS :E4PB.



ASSEMBLY DETAILS :E3PC.



PERFORMANCE SPECIFICATION.

MODEL	E4PA5L	E4PA7L	E4PA9L	E4PA11L	E4PA13L	E4PA15L	E4PA17L	E4PA19L	E4PA21L	E4PA23L
OUTPUT IN Kw	47	78	108	133	161	187	212	237	257	276
PRIMARY FLOW RATE l/s	0.73	1.02	1.25	1.47	1.65	1.75	1.9	2.06	2.15	2.21
POOL FLOW RATE l/s	0.45	0.67	0.89	1.1	1.33	1.54	1.75	1.96	2.16	2.36

MODEL	E4PA25L	E4PA27L	E4PB29L	E4PB31	E4PB33L	E4PB35L	E4PB37L	E4PB39L	E4PB41L	E4PB43L
OUTPUT IN Kw	293	310	394	414	440	457	478	497	517	534
PRIMARY FLOW RATE l/s	2.3	2.35	3.8	3.95	4.15	4.25	4.35	4.45	4.55	4.7
POOL FLOW RATE l/s	2.55	2.75	2.95	3.1	3.25	3.42	3.58	3.72	3.87	4.01

MODEL	E4PB45L	E4PB47L	E4PB49L	E4PB51L	E4PB53L	E4PB55L	E4PB57L	E4PB59L	E3PC29L	E3PC31L
OUTPUT IN Kw	552	568	584	597	611	624	636	649	680	757
PRIMARY FLOW RATE l/s	4.75	4.84	4.9	4.95	4.99	5.05	5.1	5.15	5.3	5.6
POOL FLOW RATE l/s	4.13	4.25	4.37	4.47	4.57	4.67	4.76	4.86	5.25	6.02

MODEL	E3PC33L	E3PC35L	E3PC37L	E3PC39L	E3PC41L	E3PC43L	E3PC45L	E3PC47L	E3PC49L
OUTPUT IN Kw	792	824	851	887	913	929	966	988	1013
PRIMARY FLOW RATE l/s	5.75	5.83	5.9	6.07	6.14	6.19	6.3	6.35	6.4
POOL FLOW RATE l/s	6.38	6.75	7.1	7.45	7.8	8.01	8.47	8.8	9.15

## TECHNICAL SPECIFICATION

### E4PA 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 operating pressure. : 6 bar.
- Maximum primary operating temperature. : 110<sup>o</sup>C
- Minimum primary pump inlet pressure (at 82<sup>o</sup>C): 2.5 mwg
  
- Pool flow connection. : Bronze 2" BSPF.
- Pool return connection. : Bronze 2" BSPF.
- Primary water connections. : Cast Iron DN40 PN6
- Primary Pump. : UPS 40.80F , 1 Phase , 250 Watt.  
(UPSD40.80F on Duplex Units)

The Pump is fitted with an integral thermal protection relay.

- Control valve. : 4 port, Cast Iron, PN6.
- Valve Actuator. : 240V, motor open/motor close.
  
- Control Panel. : Polycarbonate enclosure.  
: Electronic temperature controller.  
: Heating on /off indicator lamps.  
: Adjustable high limit and low limit temperature alarms,  
: lamps & common volt free temperature alarm  
terminals.  
: LED Digital display of pool temperature.  
: Pump selection switch for duplex pump units.  
: 4A output fuse.  
: Optional volt free pump fault indication with pump  
overload  
: Optional automatic changeover on fault, duplex  
models

WEIGHT: 150Kg (Maximum)  
HEIGHT : 1110mm

LENGTH: 542mm  
WIDTH : 383mm

PERFORMANCE - From 47 to 310 kW (based on a primary temperature of 82<sup>o</sup>C)

## TECHNICAL SPECIFICATION

### E4PB 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 operating pressure. : 6 bar.
- Maximum primary operating temperature. : 110<sup>o</sup>C
- Minimum primary pump inlet pressure (at 82<sup>o</sup>C): 1.5 mwg

- Pool flow connection. : Bronze 2" BSPF.
- Pool return connection. : Bronze 2" BSPF.
- Primary water connections : Cast Iron DN50 PN6
- Primary Pump. :UPS 50.60/4 (1 Phase 430W).  
:UPSD 50.60/4 on duplex units

The pump is fitted with an integral thermal protection relay.

- Control valve. : 4 port, Cast Iron, PN6.
- Valve Actuator. : 240V, motor open/motor close.

- Control Panel. : Polycarbonate enclosure.  
: Electronic temperature controller.  
: Heating on /off indicator lamps.  
: Adjustable high limit and low limit temperature alarms,  
lamps & common volt free temperature alarm terminals.  
: LED Digital display of pool temperature.  
: Pump selection switch for duplex pump units.  
: 4A controller output fuse.  
: Primary pump overloads with optional volt free trip and  
optional automatic pump changeover on fault for duplex  
models

WEIGHT: 190Kg (Maximum)  
HEIGHT: 1130mm

LENGTH: 620mm  
WIDTH: 394mm

PERFORMANCE - From 394kW to 649 kW (based on a primary temperature of 82<sup>o</sup>C)

## TECHNICAL SPECIFICATION

### E3PC 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 primary operating pressure. : 10 bar
- Maximum secondary operating pressure. : 6 bar
- Maximum primary operating temperature. : 120<sup>0</sup>C
- Minimum primary pump inlet pressure (at 82<sup>0</sup>C): 1.5 mwg
  
- Pool flow connection. : Stainless steel 2" BSP.
- Pool return connection. : Stainless steel 2" BSP.
- Primary water connections. : Cast Iron DN50 PN10 inlet , 2" BSP outlet
- Primary Pump. : UPS 50.60/4 (1 Phase 430 W)  
: UPSD 50.60/4 on duplex units

The pump is fitted with an integral thermal protection relay.

- Control valve. : 3 port, Cast Iron, PN10.
- Valve Actuator. : 240V, motor open/motor close.
  
- Control Panel. : Polycarbonate enclosure.  
: Electronic temperature controller.  
: Heating on /off indicator lamps.  
: Adjustable high limit and low limit temperature alarms,  
lamps & common volt free temperature alarm terminals.  
: LED Digital display of pool temperature.  
: Pump selection switch for duplex pump units.  
: 4A controller output fuse.  
: Primary pump overloads with optional volt free trip and  
optional automatic pump changeover on fault for duplex  
models

WEIGHT: 250Kg (Maximum)  
HEIGHT: 1165mm

LENGTH:865mm  
WIDTH: 475mm

PERFORMANCE - From 680kW to 1013kW(based on a primary temperature of 82<sup>0</sup>C)

## MAINTENANCE

If the installation is set up as per the above instructions, the Stokvis Econoplate Unit should not need dismantling for service for many years.

Any clogging, may be detected as follows:

- An increased pressure drop between inlet and outlet of the secondary circuit.
- A reduced temperature drop between inlet and outlet of the primary circuit at full load (smaller units are designed for a 20°C drop, larger units for 30°C at full load) indicates that the exchanger is clogged).

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

- Isolate the exchanger, primary first, then allow the primary 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. If plates are stuck together they should be gently prised apart with a non-metallic device.
- Plates can be identified in the following way.  
G30, all have gaskets on one side of each plate, the gaskets around the ports are octagonal and the corners of each plate are cut at 45°.  
GX12, alternate plates have either no gasket or a gasket on both sides of the plate, the gasket is circular around the ports and the corners of each plate are cut at 45°. In addition there are letters stamped into the plates next to the guide pins.
- A plate pack always has a 4 hole first plate which has a gasket around all 4 ports. This plate sits against the fixed chassis plate. Next are a number of intermediate plates and finally a blank plate with no ports. G30 plates have one type of intermediate plate, the direction of the chevron pattern, on the face of the plate, alternates across the whole assembly and alternate left and right top ports have a gasket around their circumference. GX12 plates have 2 types of intermediate plates, those with gaskets on both sides and those with no gasket, these alternate and the correct orientation is given by the letter stamped at the top of each plate. This sequence must be noted prior to dismantling as it will ensure the correct re-assembly. The plate pack arrangement for the E3PC is 0LS +XLD on both sides.

- Carefully clean the plates. Use a nylon brush with soapy water (Do not use a metallic device). A proprietary descaling agent may be used if necessary, always rinse thoroughly with clean fresh water. Always follow the correct safety procedures when handling chemicals.
- Re-assemble the plates in the same order that they were removed. Replace the 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 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.

### FAULT FINDING

#### FLUCTUATING POOL TEMPERATURES.

1. Check the temperature controller has been set correctly, in particular the switching differential.
2. Check that the motorised valve is opening and closing in response to changes in demand - raise and lower the set point on the controller. Also check that the linkages between the valve and motor are secured.
3. 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 open/close signal to the motor connections on the p.c.b.- reinstate the electrical supply and check again.
4. Check that the temperature sensor is not scaled - isolate the secondary side of the unit and remove the sensor, clean as appropriate. If heavily scaled the Plate Heat Exchanger will probably be similarly affected, strip and clean as necessary. (see maintenance procedure).

## NO HEATING TO THE POOL

1. Check the electrical supply to the unit-reinstate if necessary.
2. Check for the LED display on the control panel - if it is not on, check the control panel isolator switch is in the ON position.
3. Check the temperature controller has been set correctly, in particular the set point.

### TEMPORARY OPERATION TO PROVIDE HEATING IN THE EVENT OF COMPONENT FAILURE IS ACHIEVED AS FOLLOWS:

- a. Open the motorised valve fully by hand.
  - b. Ensure that there is an electrical supply to a primary pump and link the start/stop terminals for that pump, if not already made.
3. If there is an LED display but no apparent outputs to pumps etc. check the 4A 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 4A fuse
  4. Check that the motorised valve is free - place in manual operation and move the valve through its travel to check for seizure, strip and clean or replace as required.
  5. Check that all linkage arms are secure and not slipping on their shafts-tighten with the motor at the end of its travel and check limits.
  6. Check that the valve motor is operating - raise and lower the set point on the controller and observe. -If the motor does not work, perform the procedure above for the temporary heating.
  7. Check that the primary pump is operating - check the pump overload (E4PB & E3PC) - check the pump rotation by removing the pump end cap –check that there is a start signal to the pump, replace pump head or switch permanently to standby pump if available.

LEAKING  
FROM THE  
PLATE HEAT  
EXCHANGER

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

PARTS LIST

<u>Part No</u>	<u>Description</u>
ESS4620	GC30L Blank Plate for E4PA/E4PB
ESS4621	GC30L Intermediate Plate for E4PA/E4PB
ESS4627	G30 First 4 hole plate for E4PA/E4PB
ESS6614	GX12L Half Gasket Front 4 Hole Plate for E3PC
ESS6615	GX12L Gaskets Both Sides Intermediate Plate for E3PC
ESS6616	GX12L No Gasket Intermediate Plate for E3PC
ESS6617	GX12L Half Gasket Back Blank Plate for E3PC
ESS8118	Temperature Controller HP17 - Valve Relay - Telemecanique overload 1 phase LR2-K 0308 E4PB/E3PC
ESS8125	Telemecanique contactor LC1K-0610-U7 E4PB/E3PC
ESS8117	Temperature Sensor 1/8" BSP
ESS7024	4 Port Valve Sauter MH42F40 E4PA
ESS7022	4 Port Valve Sauter MH42F50 E4PB
ESS7025	E4PA/E4PB Valve Actuator Sauter AR30W21-F001
ESS7026	Sauter actuator mounting kit Z361775 for AR30W21
ESS6603	3 port valve Sauter type B16E50F300 for E3PC
ESS7052	Sauter actuator type AVR32W30-F001 for B16E valve
ESS7805	E4PA Primary Pump Motor UPS40-80 1 Phase - E4PB/E3PC Primary Pump Motor UPS50-60/4 1 Phase - E4PB/E3PC Primary Pump Motor UPS50-60/4 3 Phase - Terminal Box 96405868 with internal speed control & indicator lights for UPS50-60/4 1 Phase. - Terminal Box 96404874 with internal speed control & indicator lights for UPS50-60/4 3 Phase.

Note: Plate Channel Arrangement for E3PC is 0LS +XLD on both sides

**ECONOPLATE  
E0B/E4PA CONTROLLER  
INSTRUCTIONS**

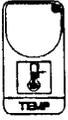
**STOKVIS ENERGY SYSTEMS  
96R WALTON ROAD  
EAST MOLESEY  
SURREY  
KT8 0DL**

**TELEPHONE : 08707 707 747  
TELEFAX: 08707 707 767**



## CONTROLLER TYPE HP17

### MAIN SETTING (Run Mode)

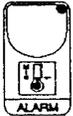


#### TEMPERATURE SETTING

Press TEMP SET (key lamp flashes): the following message will be displayed alternating with the set temperature value.

F.5E.F

Press + or - to modify, press TEMP SET to escape.



#### MINIMUM ALARM TEMPERATURE

Press ALARM MIN (Key lamp flashes): the following message will be displayed alternating with the set Minimum temperature value.

AL.\_.\_

Press + or - to modify, press MIN ALARM to escape\*.



#### MAXIMUM ALARM TEMPERATURE

Press ALARM MAX (key lamp flashes): the following message will be displayed alternating with the set Maximum temperature value.

AL.\_.\_

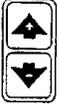
Press + or - to modify, press MAX ALARM to escape\*.

\* If alarm option o.ALA=1 (see COSt) the c.AL\_ or c.AL- message appears on display.

If alarm option o.ALA=2 (see COSt) the r.AL\_ or r.AL- message appears on display.

The alarm temperatures cannot be reset in the run mode if either of these alarm modes have been selected.

## VIEWING RECORDED TEMPERATURES



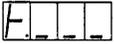
Press + and hold

The following will be displayed followed by the Maximum Temperature Recording



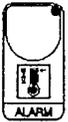
Press - and hold

The following will be displayed followed by the Minimum Temperature Recording



Values recorded are memory permanent : for memory clear keep the + key pressed for more than 3 seconds: CLEA message will be composed on the display before clearing.

## PRESET PROGRAMS



At delivery this processor is pre-programmed with the following (variable) settings. To return to these settings at any time: Power off the processor, press the ALARM MAX key. Keep it pressed and turn the power on: boot message will be displayed (now release the ALARM MAX key).

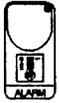
t.SET=25.0<sup>0</sup> AL\_\_ = 10.0<sup>0</sup> AL- - = 30.0<sup>0</sup>  
The COST values are shown in the COST Programming.

## **COSt PROGRAMMING** (System constants)

These settings refer to the mode of operation of the system and must be made on initial start-up.



Press - / + together for at least one second. The message C.O.S.t. will be displayed.



Press repeatedly ALARM MAX until the correct message is displayed (see table below). The value and message will be displayed alternately. Press + or - to input a new value and then ALARM to confirm. The next system constant will then appear. You can press ALARM MAX for at least two seconds to escape and return to the Run Mode.

Message.	Set Value	System Constant.	Note
diFF	0.2 <sup>0</sup>	<sup>0</sup> Switching Differential	*1)
o.ALA	=0	Alarm setting mode	*2)
C.AI	0.0 <sup>0</sup>	<sup>0</sup> Set temperature minimum alarm	*3)
C.AI-	40.0 <sup>0</sup>	<sup>0</sup> Set temperature maximum alarm	*3)
tEnP	=1	Temperature representation (1= <sup>0</sup> C 2 = <sup>0</sup> F)	*4)
Ad.tE	0.0 <sup>0</sup>	<sup>0</sup> Input temperature sensor correction (+ or-)	*5)

- \*1) The switching differential is evenly split either side of the set point
- \*2) o.ALA=0: Minimum and maximum alarm values user adjustable (see ALARM keys). (FACTORY SETTING).  
o.ALA=1: Minimum and maximum alarms as absolute values (see Note \*3).  
o.ALA+2: Minimum and maximum alarm as a differential setting (see Note \*3).
- \*3) If o.ALA=1: Minimum or maximum absolute alarm values can be set.  
If o.ALA=2: Minimum or maximum differential alarm values can be set
- \*4) :=1 : <sup>0</sup>C Temperature range  
:=2 : <sup>0</sup>F Temperature range
- \*5) You can correct the readings on the various sensors (+ or -)

## STATUS INDICATION LAMPS

The lights situated at the bottom of the display show the state of the various relays as set out below:

LAMP	State	Relay	Contact
HEAT	Heat On/Pump On	1	3-4
COOL	Heat Off/Pump Off	1	4-5
AL.MIN	Minimum Temperature Alarm On	2	6-7-8
AL.MAX	Maximum Temperature Alarm On	2	6-7-8

## INSTALLATION

### How to connect the supply to the controller

The electrical supply should be taken from a fused isolator in accordance with current IEE regulations. Connect the supply to the terminal strip L-N-E

### How to connect the sensor.

Connect the sensor provided as shown in the diagram. For remote connections use a standard 0.5 square millimeter two core wire, taking great care over the connections, by insulating and sealing the joints carefully. -0.C.- is displayed when the temperature sensor wiring is open, -S.C.- is displayed when the temperature sensor wiring is short circuit.

### How to connect to the alarm contacts

Connect to terminals on the HP17 (contacts up to 4AMP.AC1).

