



**Econoplate C3i Series  
Hot Water Service  
Packaged Plate Heat Exchangers  
C3Ai100/C3Ai300/C3Ci**

**Installation, Operation & Maintenance  
Documentation**

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## **General Description:**

The Stokvis Econoplate C3i series of packaged plate heat exchangers are based on our proven E series packages but specifically designed to operate with a lower primary supply temperature, as provided by condensing boilers. They are available in 3 ranges covering a total of some 35+ units with outputs ranging from 50kW up to 765kW (when fed with primary water at 70°C, secondary temperatures 10-60°C).

The C3i series units are designed, where necessary, to operate up to a maximum primary side temperature of 110°C (see Installation – Primary), and to provide hot water instantaneously, without the need for storage, up to their maximum rated output. 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. Plates can be readily added, up to the chassis limit, 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 primary and secondary water both make a single pass across the heat exchanger, in opposing directions, enabling required heat exchange to take place.

The C3i series units are supplied with fast acting 3-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 modulates the valve in response. The primary water is constantly circulated around the unit by an integral primary pump which has been matched to the heat exchanger, having an additional allowance of at least 6 kPa to overcome external pipework losses. Systems which utilise an existing primary feed pump, when connected directly to a unit, require an additional bypass.

For instantaneous hot water service usage, an optional secondary hot water service return/recirculation pump and non-return valve can be supplied, fitted and wired to the Econoplate (+1R units). For semi-instantaneous hot water service usage, an optional secondary transfer pump can be provided to pump water to and from a storage vessel to the Econoplate (+1T units).

In addition to the PID controller, the control panel on the C3i series plate heat exchanger contains: indicator lamps for valve opening/closing, P1/P2 primary pump enabled and high/low temperature alarm, a 500mA control fuse, a 10A output fuse, Duplex pump duty share (if fitted), volt free common temperature alarm terminals, high temperature lockout and a safety extra low voltage (SELV) external interlock circuit. In addition, volt free pump fault is available on all Magna3 pumps. 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 pumps have, as standard, fault indication which is displayed locally on the pump’s display screen (and on the Econotrol). Units with Duplex (twin-head) primary pump include duty share facility and auto-changeover on pump fault as standard.

All 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.

## Technical Specification – Econoplate C3Ai100:

|                           |  |  |
|---------------------------|--|--|
| <b>Chassis Components</b> | Rear Chassis Plate (Stationary):   | Epoxy coated steel 25mm thick  |
|                           | Front Chassis Plate (Moveable):  | Epoxy coated steel 20mm thick  |
|                           | Heat Transfer Plate:   | 316 grade stainless steel  |
|                           | Gaskets:   | EPDM   |
|                           | Retaining Bolts:   | 16mm carbon steel  |
| <b>Operating Criteria</b> | Maximum Primary Side Temperature:  | 110°C  |
|                           | Maximum Primary Side Pressure:   | 10.0bar  |
|                           | Maximum Secondary Side Pressure:   | 6.0bar   |
| <b>Connections</b>        | Primary Side Water Connections (standard):   | Inlet - Cast Iron, DN40, PN10<br>Outlet - 1½" BSPM                           |
|                           | Secondary Inlet Connection (Cold Water Feed):  | Bronze 1½" BSPF  |
|                           | Secondary Outlet Connection (Hot Water Service Flow):  | Bronze 1½" BSPF  |
|                           | Secondary Hot Water Service Return Connection:   | Bronze 1" BSPF (or ¾" BSPF when +1R HWS secondary recirculation pump fitted) |
| <b>Primary Components</b> | Primary Pump (c/w Volt Free Trip Terminals):   | Magna3 40-80F (1-phase)<br>(or Magna3 D 40-80F on Duplex units)              |
|                           | Primary Control Valve:   | 3-port, Cast Iron, DN40, PN10  |
|                           | Primary Control Valve Actuator:  | 230V, modulating, motor open/close   |
| <b>Control Panel</b>      | Control Panel (standard): <ul style="list-style-type: none"> <li>• ABS enclosure.</li> <li>• Electronic PID temperature controller.</li> <li>• 7-day time clock control of 2 temperature settings or 1 temperature and night "off", per day.</li> <li>• Safety extra low voltage (SELV) circuit for external "clock" control of 2 temperatures of operation or 1 temperature set point and "off".</li> <li>• Safety extra low voltage (SELV) circuit for an external interlock.</li> <li>• Adjustable high limit and low limit temperature alarms, temperature alarm lamp, common volt free temperature alarm and selectable high temperature lockout modes.</li> <li>• Functional indication of: primary pump enable (P1 or P2) and valve open/closing.</li> <li>• LCD digital display of day and time, secondary flow temperature and any faults.</li> <li>• Pump mode selection including Duplex primary pump duty share and auto-changeover on pump fault (if fitted).</li> <li>• Full menu driven interrogation of parameters and operating modes.</li> <li>• 500mA control fuse, 10A output fuse.</li> </ul> |  |

### Optional Extras:

|  |   |
|--|---|
| • Duplex (Twin-Head) Primary Pump:<br>(c/w Duty Share and Auto-changeover on Pump Fault as standard) | Magna3 D 40-80F (1-phase)   |
| • HWS Secondary Recirculation Pump (+1R):  | UP20-45N (1-phase) (c/w bronze NRV)   |
| • HWS Secondary Transfer Pump (+1T) (dependent on model):  | UP20-45N (1-phase), UPS25-55N (1-phase) or UPS32-55N (1-phase)  |
| • Additional Primary Shut Off Kit:<br>Valve<br>Actuator<br>c/w Additional High Limit Thermostat      | 2-port, DZR Cast Brass Body, RP 1½", PN40<br>230V, motor open/spring close<br>230V, manual reset, IP54  |
| • Additional High Limit Thermostat Only:   | 230V, manual reset, IP54  |
| • Primary Control Valve Actuator Positional Indication:  | <ul style="list-style-type: none"> <li>• Auxiliary Changeover Contacts Only</li> <li>• Potentiometer Only (1 or 2 kΩ)</li> <li>• Auxiliary Changeover Contacts and Potentiometer (1 or 2 kΩ)</li> </ul> |
| • ISO Flexible Thermal Insulation Jacket.  |   |
| • Additional Metal Cover to suit ISO Flexible Thermal Insulation Jacket.                             |   |

### Dimensions and Weight (excluding options):

|                                       |                     |
|---------------------------------------|---------------------|
| Dimensions - Length x Width x Height: | 710 x 480 x 1110 mm |
| Weight (maximum):                     | 150kg               |

### Performance - for full details see "Performance Guide" overleaf:

From 14.4 to 79.2 litres per minute of hot water at 60°C.  
(based on a primary supply temperature of 70°C and a cold feed temperature of 10°C)

## Performance & Selection Guide – Econoplate C3Ai100:

Primary Supply Temperature = 70°C, Secondary Temperatures = 10-60°C

|  |      | Econoplate Model |             |             |             |             |             |             |             |             |             |             |
|--|------|------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
|  |      | C3Ai<br>106      | C3Ai<br>108 | C3Ai<br>110 | C3Ai<br>112 | C3Ai<br>114 | C3Ai<br>116 | C3Ai<br>118 | C3Ai<br>120 | C3Ai<br>122 | C3Ai<br>124 | C3Ai<br>126 |
| Heat Load<br>Required /<br>Max. Duty         | kW   | 50               | 79          | 109         | 133         | 157         | 180         | 201         | 222         | 240         | 259         | 276         |
| Secondary<br>Flow Rate<br>at 60°C            | ℓ/s  | 0.24             | 0.38        | 0.51        | 0.64        | 0.75        | 0.86        | 0.96        | 1.06        | 1.15        | 1.24        | 1.32        |
|  | m³/h | 0.9              | 1.4         | 1.8         | 2.3         | 2.7         | 3.1         | 3.5         | 3.8         | 4.1         | 4.5         | 4.8         |
| Secondary<br>Pressure Drop<br>at Peak Output | kPa  | 20               | 22          | 23          | 23          | 22          | 22          | 21          | 20          | 20          | 19          | 19          |
| Primary<br>Flow Rate<br>at 70°C              | ℓ/s  | 0.73             | 0.96        | 1.22        | 1.39        | 1.56        | 1.72        | 1.86        | 2.00        | 2.10        | 2.23        | 2.30        |
|  | m³/h | 2.6              | 3.5         | 4.4         | 5.0         | 5.6         | 6.2         | 6.7         | 7.2         | 7.6         | 8.0         | 8.3         |
| Primary<br>Min. Head<br>Available            | kPa  | 6                | 6           | 6           | 6           | 6           | 6           | 6           | 6           | 6           | 6           | 6           |
| Primary<br>Return Temp.<br>at Peak Output    | °C   | 54               | 51          | 48          | 47          | 46          | 45          | 45          | 44          | 43          | 43          | 42          |

Approximate Head Available from Optional Secondary Recirculation Pump at:

|                                  |     |    |    |    |     |    |    |    |    |    |    |    |
|----------------------------------|-----|----|----|----|-----|----|----|----|----|----|----|----|
| Recirculation<br>Rate of 0.5m³/h | kPa | 30 | 34 | 36 | 36  | 37 | 37 | 38 | 38 | 38 | 38 | 38 |
| Recirculation<br>Rate of 1.0m³/h | kPa | 7  | 20 | 25 | 28  | 29 | 30 | 31 | 31 | 32 | 32 | 32 |
| Recirculation<br>Rate of 2.0m³/h | kPa | -  | -  | -  | 2.5 | 7  | 10 | 12 | 13 | 14 | 15 | 16 |

|  | C3Ai<br>106 | C3Ai<br>108 | C3Ai<br>110 | C3Ai<br>112 | C3Ai<br>114 | C3Ai<br>116 | C3Ai<br>118 | C3Ai<br>120 | C3Ai<br>122 | C3Ai<br>124 | C3Ai<br>126 |
|--|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| "Tourist Hotel"<br>by No. of Rooms                       | 3           | 6           | 9           | 12          | 15          | 19          | 22          | 26          | 29          | 32          | 36          |
| "Luxury Hotel"<br>by No. of Rooms                        | -           | 4           | 6           | 8           | 11          | 13          | 15          | 18          | 20          | 23          | 25          |
| Number of<br>"Standard Flats"                            | 2           | 5           | 8           | 12          | 16          | 21          | 25          | 31          | 37          | 43          | 49          |
| Number of<br>"Luxury Flats"                              | -           | 3           | 5           | 7           | 10          | 14          | 18          | 22          | 25          | 29          | 33          |
| Hospital or<br>Nursing Home<br>by No. of Rooms           | -           | 5           | 9           | 13          | 19          | 26          | 33          | 40          | 47          | 55          | 62          |
| Leisure Centre or<br>Sports Stadium<br>by No. of Showers | -           | -           | -           | -           | -           | 6           | 7           | 9           | 10          | 13          | 15          |

Notes:

- This selection guide uses diversity factors; actual site requirements should always be checked. For simultaneous operation of outlets calculate separately.
- "Tourist Hotel" assumes a room with one shower and one wash hand basin.
- "Luxury Hotel" assumes a room with one bath or one shower and one wash hand basin.
- "Standard Flats" are classed as having one sink, one wash hand basin and one shower.
- "Luxury Flats" are classed as having one sink, two wash hand basins and one bath.
- Standard fittings are assumed in all cases.
- For applications, kW duties, temperatures and pressure drops not listed, please contact Stokvis for an alternative sizing/selection.

## Technical Specification – Econoplate C3Ai300:

|                           |  |  |
|---------------------------|--|--|
| <b>Chassis Components</b> | Rear Chassis Plate (Stationary):   | Epoxy coated steel 25mm thick  |
|                           | Front Chassis Plate (Moveable):  | Epoxy coated steel 20mm thick  |
|                           | Heat Transfer Plate:   | 316 grade stainless steel  |
|                           | Gaskets:   | EPDM   |
|                           | Retaining Bolts:   | 16mm carbon steel  |
| <b>Operating Criteria</b> | Maximum Primary Side Temperature:  | 110°C  |
|                           | Maximum Primary Side Pressure:   | 10.0bar  |
|                           | Maximum Secondary Side Pressure:   | 6.0bar   |
| <b>Connections</b>        | Primary Side Water Connections (standard):   | Inlet - Cast Iron, DN40, PN10<br>Outlet - 1½" BSPM                           |
|                           | Secondary Inlet Connection (Cold Water Feed):  | Bronze 2" BSPF   |
|                           | Secondary Outlet Connection (Hot Water Service Flow):  | Bronze 2" BSPF   |
|                           | Secondary Hot Water Service Return Connection:   | Bronze 1" BSPF (or ¾" BSPF when +1R HWS secondary recirculation pump fitted) |
| <b>Primary Components</b> | Primary Pump (c/w Volt Free Trip Terminals):   | Magna3 40-120F (1-phase)<br>(or Magna3 D 40-120F on Duplex units)            |
|                           | Primary Control Valve:   | 3-port, Cast Iron, DN40, PN10  |
|                           | Primary Control Valve Actuator:  | 230V, modulating, motor open/close   |
| <b>Control Panel</b>      | Control Panel (standard): <ul style="list-style-type: none"> <li>• ABS enclosure.</li> <li>• Electronic PID temperature controller.</li> <li>• 7-day time clock control of 2 temperature settings or 1 temperature and night "off", per day.</li> <li>• Safety extra low voltage (SELV) circuit for external "clock" control of 2 temperatures of operation or 1 temperature set point and "off".</li> <li>• Safety extra low voltage (SELV) circuit for an external interlock.</li> <li>• Adjustable high limit and low limit temperature alarms, temperature alarm lamp, common volt free temperature alarm and selectable high temperature lockout modes.</li> <li>• Functional indication of: primary pump enable (P1 or P2) and valve open/closing.</li> <li>• LCD digital display of day and time, secondary flow temperature and any faults.</li> <li>• Pump mode selection including Duplex primary pump duty share and auto-changeover on pump fault (if fitted).</li> <li>• Full menu driven interrogation of parameters and operating modes.</li> <li>• 500mA control fuse, 10A output fuse.</li> </ul> |  |

### Optional Extras:

|  |   |
|--|---|
| • Duplex (Twin-Head) Primary Pump:<br>(c/w Duty Share and Auto-changeover on Pump Fault as standard) | Magna3 D 40-120F (1-phase)  |
| • HWS Secondary Recirculation Pump (+1R):  | UP20-45N (1-phase) (c/w bronze NRV)   |
| • HWS Secondary Transfer Pump (+1T) (dependent on model):  | UPS32-80N (1-phase)   |
| • Additional Primary Shut Off Kit:<br>Valve<br>Actuator<br>c/w Additional High Limit Thermostat      | 2-port, DZR Cast Brass Body, RP 1½", PN40<br>230V, motor open/spring close<br>230V, manual reset, IP54  |
| • Additional High Limit Thermostat Only:   | 230V, manual reset, IP54  |
| • Primary Control Valve Actuator Positional Indication:  | <ul style="list-style-type: none"> <li>• Auxiliary Changeover Contacts Only</li> <li>• Potentiometer Only (1 or 2 kΩ)</li> <li>• Auxiliary Changeover Contacts and Potentiometer (1 or 2 kΩ)</li> </ul> |
| • ISO Flexible Thermal Insulation Jacket.  |   |
| • Additional Metal Cover to suit ISO Flexible Thermal Insulation Jacket.                             |   |

### Dimensions and Weight (excluding options):

|                                       |                     |
|---------------------------------------|---------------------|
| Dimensions - Length x Width x Height: | 710 x 480 x 1110 mm |
| Weight (maximum):                     | 170kg               |

### Performance - for full details see "Performance Guide" overleaf:

|   |
|---|
| From 82.2 to 129.6 litres per minute of hot water at 60°C.<br>(based on a primary supply temperature of 70°C and a cold feed temperature of 10°C) |
|---|

## Performance & Selection Guide – Econoplate C3Ai300:

Primary Supply Temperature = 70°C, Secondary Temperatures = 10-60°C

|  |      | Econoplate Model |             |             |             |             |             |             |             |             |             |             |             |
|--|------|------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
|  |      | C3Ai<br>324      | C3Ai<br>326 | C3Ai<br>328 | C3Ai<br>330 | C3Ai<br>332 | C3Ai<br>334 | C3Ai<br>336 | C3Ai<br>338 | C3Ai<br>340 | C3Ai<br>342 | C3Ai<br>344 | C3Ai<br>346 |
| Heat Load<br>Required /<br>Max. Duty         | kW   | 287              | 308         | 325         | 339         | 356         | 372         | 389         | 402         | 415         | 430         | 441         | 452         |
| Secondary<br>Flow Rate<br>at 60°C            | ℓ/s  | 1.37             | 1.47        | 1.56        | 1.62        | 1.70        | 1.78        | 1.86        | 1.92        | 1.99        | 2.06        | 2.11        | 2.16        |
|  | m³/h | 4.9              | 5.3         | 5.6         | 5.8         | 6.1         | 6.4         | 6.7         | 6.9         | 7.2         | 7.4         | 7.6         | 7.8         |
| Secondary<br>Pressure Drop<br>at Peak Output | kPa  | 22               | 22          | 21          | 20          | 20          | 19          | 19          | 18          | 18          | 17          | 17          | 17          |
| Primary<br>Flow Rate<br>at 70°C              | ℓ/s  | 2.62             | 2.76        | 2.84        | 2.90        | 2.99        | 3.10        | 3.20        | 3.25        | 3.28        | 3.36        | 3.40        | 3.45        |
|  | m³/h | 9.4              | 9.9         | 10.2        | 10.4        | 10.8        | 11.2        | 11.5        | 11.7        | 11.8        | 12.1        | 12.2        | 12.4        |
| Primary<br>Min. Head<br>Available            | kPa  | 6                | 6           | 6           | 6           | 6           | 6           | 6           | 6           | 6           | 6           | 6           | 6           |
| Primary<br>Return Temp.<br>at Peak Output    | °C   | 44               | 44          | 43          | 42          | 42          | 42          | 41          | 41          | 40          | 40          | 39          | 39          |

Approximate Head Available from Optional Secondary Recirculation Pump at:

|                                  |     |    |    |    |    |    |    |    |    |    |    |    |    |
|----------------------------------|-----|----|----|----|----|----|----|----|----|----|----|----|----|
| Recirculation<br>Rate of 0.5m³/h | kPa | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 |
| Recirculation<br>Rate of 1.0m³/h | kPa | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 |
| Recirculation<br>Rate of 2.0m³/h | kPa | 15 | 16 | 16 | 17 | 17 | 17 | 17 | 18 | 18 | 18 | 18 | 18 |

|  | C3Ai<br>324 | C3Ai<br>326 | C3Ai<br>328 | C3Ai<br>330 | C3Ai<br>332 | C3Ai<br>334 | C3Ai<br>336 | C3Ai<br>338 | C3Ai<br>340 | C3Ai<br>342 | C3Ai<br>344 | C3Ai<br>346 |
|--|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| "Tourist Hotel"<br>by No. of Rooms                       | 38          | 42          | 46          | 49          | 54          | 57          | 61          | 64          | 68          | 71          | 74          | 76          |
| "Luxury Hotel"<br>by No. of Rooms                        | 26          | 29          | 31          | 33          | 36          | 38          | 41          | 43          | 45          | 48          | 51          | 52          |
| Number of<br>"Standard Flats"                            | 54          | 62          | 69          | 74          | 82          | 89          | 95          | 101         | 107         | 114         | 119         | 123         |
| Number of<br>"Luxury Flats"                              | 36          | 41          | 47          | 50          | 55          | 59          | 64          | 68          | 73          | 77          | 82          | 86          |
| Hospital or<br>Nursing Home<br>by No. of Rooms           | 67          | 76          | 83          | 90          | 98          | 105         | 112         | 121         | 128         | 136         | 144         | 152         |
| Leisure Centre or<br>Sports Stadium<br>by No. of Showers | 16          | 19          | 21          | 23          | 26          | 29          | 31          | 33          | 35          | 37          | 39          | 40          |

Notes:

- This selection guide uses diversity factors; actual site requirements should always be checked. For simultaneous operation of outlets calculate separately.
- "Tourist Hotel" assumes a room with one shower and one wash hand basin.
- "Luxury Hotel" assumes a room with one bath or one shower and one wash hand basin.
- "Standard Flats" are classed as having one sink, one wash hand basin and one shower.
- "Luxury Flats" are classed as having one sink, two wash hand basins and one bath.
- Standard fittings are assumed in all cases.
- For applications, kW duties, temperatures and pressure drops not listed, please contact Stokvis for an alternative sizing/selection.



## Technical Specification – Econoplate C3C*i*:

|                           |  |  |
|---------------------------|--|--|
| <b>Chassis Components</b> | Rear Chassis Plate (Stationary):   | Epoxy coated steel 25mm thick  |
|                           | Front Chassis Plate (Moveable):  | Epoxy coated steel 25mm thick  |
|                           | Heat Transfer Plate:   | 316 grade stainless steel  |
|                           | Gaskets:   | EPDM   |
|                           | Retaining Bolts:   | 20mm carbon steel  |
| <b>Operating Criteria</b> | Maximum Primary Side Temperature:  | 110°C  |
|                           | Maximum Primary Side Pressure:   | 10.0bar  |
|                           | Maximum Secondary Side Pressure:   | 6.0bar   |
| <b>Connections</b>        | Primary Side Water Connections (standard):   | Inlet - Cast Iron, DN50, PN10<br>Outlet - 2" BSPM                              |
|                           | Secondary Inlet Connection (Cold Water Feed):  | Bronze 2" BSPF   |
|                           | Secondary Outlet Connection (Hot Water Service Flow):  | Bronze 2" BSPF   |
|                           | Secondary Hot Water Service Return Connection:   | Bronze 1¼" BSPM (or 1¼" BSPF when +1R HWS secondary recirculation pump fitted) |
| <b>Primary Components</b> | Primary Pump (c/w Volt Free Trip Terminals):   | Magna3 50-120F (1-phase)<br>(or Magna3 D 50-120F on Duplex units)              |
|                           | Primary Control Valve:   | 3-port, Cast Iron, DN50, PN10  |
|                           | Primary Control Valve Actuator:  | 230V, modulating, motor open/close   |
| <b>Control Panel</b>      | Control Panel (standard): <ul style="list-style-type: none"> <li>• ABS enclosure.</li> <li>• Electronic PID temperature controller.</li> <li>• 7-day time clock control of 2 temperature settings or 1 temperature and night "off", per day.</li> <li>• Safety extra low voltage (SELV) circuit for external "clock" control of 2 temperatures of operation or 1 temperature set point and "off".</li> <li>• Safety extra low voltage (SELV) circuit for an external interlock.</li> <li>• Adjustable high limit and low limit temperature alarms, temperature alarm lamp, common volt free temperature alarm and selectable high temperature lockout modes.</li> <li>• Functional indication of: primary pump enable (P1 or P2) and valve open/closing.</li> <li>• LCD digital display of day and time, secondary flow temperature and any faults.</li> <li>• Pump mode selection including Duplex primary pump duty share and auto-changeover on pump fault (if fitted).</li> <li>• Full menu driven interrogation of parameters and operating modes.</li> <li>• 500mA control fuse, 10A output fuse.</li> </ul> |  |

### Optional Extras:

|  |   |
|--|---|
| • Duplex (Twin-Head) Primary Pump:<br>(c/w Duty Share and Auto-changeover on Pump Fault as standard) | Magna3 D 50-120F (1-phase)  |
| • HWS Secondary Recirculation Pump (+1R):  | UPS32-55N (1-phase) (c/w bronze NRV)  |
| • HWS Secondary Transfer Pump (+1T) (dependent on model):  | UPS32-80N (1-phase)<br>or Magna3 40-80FN (1-phase)  |
| • Additional Primary Shut Off Kit:<br>Valve<br>Actuator<br>c/w Additional High Limit Thermostat      | 2-port, DZR Cast Brass Body, RP 2", PN40<br>230V, motor open/spring close<br>230V, manual reset, IP54   |
| • Additional High Limit Thermostat Only:   | 230V, manual reset, IP54  |
| • Primary Control Valve Actuator Positional Indication:  | <ul style="list-style-type: none"> <li>• Auxiliary Changeover Contacts Only</li> <li>• Potentiometer Only (1 or 2 kΩ)</li> <li>• Auxiliary Changeover Contacts and Potentiometer (1 or 2 kΩ)</li> </ul> |
| • ISO Flexible Thermal Insulation Jacket.  |   |
| • Additional Metal Cover to suit ISO Flexible Thermal Insulation Jacket.                             |   |

### Dimensions and Weight (excluding options):

|                                       |                     |
|---------------------------------------|---------------------|
| Dimensions - Length x Width x Height: | 865 x 537 x 1165 mm |
| Weight (maximum):                     | 250kg               |

### Performance - for full details see "Performance Guide" overleaf:

|  |
|--|
| From 100.2 to 219.6 litres per minute of hot water at 60°C.<br>(based on a primary supply temperature of 70°C and a cold feed temperature of 10°C) |
|--|



## Performance & Selection Guide – Econoplate C3Ci:

Primary Supply Temperature = 70°C, Secondary Temperatures = 10-60°C

|  |      | Econoplate Model |            |            |            |            |            |            |            |            |            |            |            |            |            |
|--|------|------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
|  |      | C3Ci<br>22       | C3Ci<br>26 | C3Ci<br>30 | C3Ci<br>34 | C3Ci<br>38 | C3Ci<br>42 | C3Ci<br>46 | C3Ci<br>50 | C3Ci<br>54 | C3Ci<br>58 | C3Ci<br>62 | C3Ci<br>66 | C3Ci<br>70 | C3Ci<br>74 |
| Heat Load<br>Required /<br>Max. Duty         | kW   | 350              | 409        | 450        | 493        | 542        | 572        | 603        | 632        | 660        | 688        | 703        | 725        | 745        | 765        |
| Secondary<br>Flow Rate<br>at 60°C            | l/s  | 1.67             | 1.96       | 2.15       | 2.36       | 2.59       | 2.74       | 2.89       | 3.02       | 3.16       | 3.29       | 3.36       | 3.47       | 3.57       | 3.66       |
|  | m³/h | 6.0              | 7.1        | 7.7        | 8.5        | 9.3        | 9.9        | 10.4       | 10.9       | 11.4       | 11.8       | 12.1       | 12.5       | 12.9       | 13.2       |
| Secondary<br>Pressure Drop<br>at Peak Output | kPa  | 14               | 13         | 12         | 11         | 11         | 10         | 9          | 9          | 9          | 8          | 8          | 8          | 7          | 7          |
| Primary<br>Flow Rate<br>at 70°C              | l/s  | 4.00             | 4.45       | 4.65       | 4.89       | 5.30       | 5.42       | 5.50       | 5.65       | 5.75       | 5.90       | 5.93       | 6.00       | 6.05       | 6.10       |
|  | m³/h | 14.4             | 16.0       | 16.7       | 17.6       | 19.1       | 19.5       | 19.8       | 20.3       | 20.7       | 21.2       | 21.3       | 21.6       | 21.8       | 22.0       |
| Primary<br>Min. Head<br>Available            | kPa  | 6                | 6          | 6          | 6          | 6          | 6          | 6          | 6          | 6          | 6          | 6          | 6          | 6          | 6          |
| Primary<br>Return Temp.<br>at Peak Output    | °C   | 49               | 48         | 47         | 46         | 46         | 45         | 44         | 44         | 43         | 43         | 42         | 42         | 41         | 40         |

Approximate Head Available from Optional Secondary Recirculation Pump at:

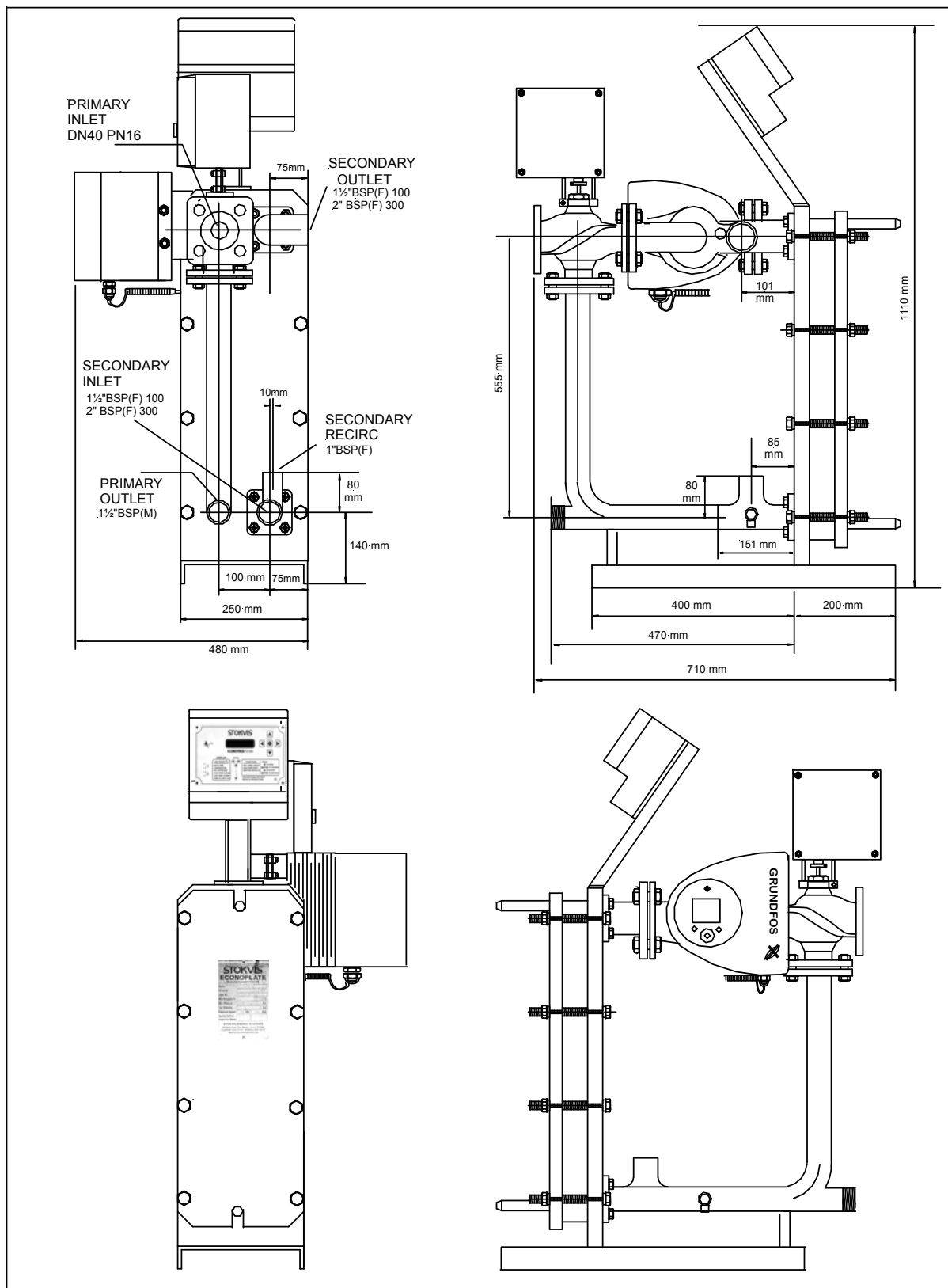
|                                  |     |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
|----------------------------------|-----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Recirculation<br>Rate of 1.0m³/h | kPa | 48 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 |
| Recirculation<br>Rate of 3.0m³/h | kPa | 39 | 40 | 41 | 41 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 |
| Recirculation<br>Rate of 5.0m³/h | kPa | 22 | 24 | 26 | 28 | 29 | 30 | 31 | 31 | 31 | 32 | 32 | 32 | 32 | 32 |

|  | C3Ci<br>22 | C3Ci<br>26 | C3Ci<br>30 | C3Ci<br>34 | C3Ci<br>38 | C3Ci<br>42 | C3Ci<br>46 | C3Ci<br>50 | C3Ci<br>54 | C3Ci<br>58 | C3Ci<br>62 | C3Ci<br>66 | C3Ci<br>70 | C3Ci<br>74 |
|--|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| "Tourist Hotel"<br>by No. of Rooms                       | 52         | 66         | 76         | 87         | 103        | 111        | 121        | 130        | 140        | 151        | 156        | 165        | 172        | 180        |
| "Luxury Hotel"<br>by No. of Rooms                        | 34         | 44         | 52         | 60         | 69         | 75         | 81         | 88         | 93         | 99         | 103        | 108        | 111        | 117        |
| Number of<br>"Standard Flats"                            | 79         | 104        | 123        | 144        | 171        | 187        | 203        | 220        | 238        | 255        | 265        | 281        | 293        | 307        |
| Number of<br>"Luxury Flats"                              | 53         | 71         | 86         | 103        | 123        | 136        | 147        | 160        | 175        | 188        | 196        | 207        | 215        | 226        |
| Hospital or<br>Nursing Home<br>by No. of Rooms           | 95         | 124        | 151        | 179        | 210        | 233        | 253        | 272        | 294        | 314        | 329        | 346        | 361        | 378        |
| Leisure Centre or<br>Sports Stadium<br>by No. of Showers | 25         | 34         | 40         | 48         | 58         | 64         | 71         | 77         | 84         | 91         | 94         | 100        | 104        | 111        |

Notes:

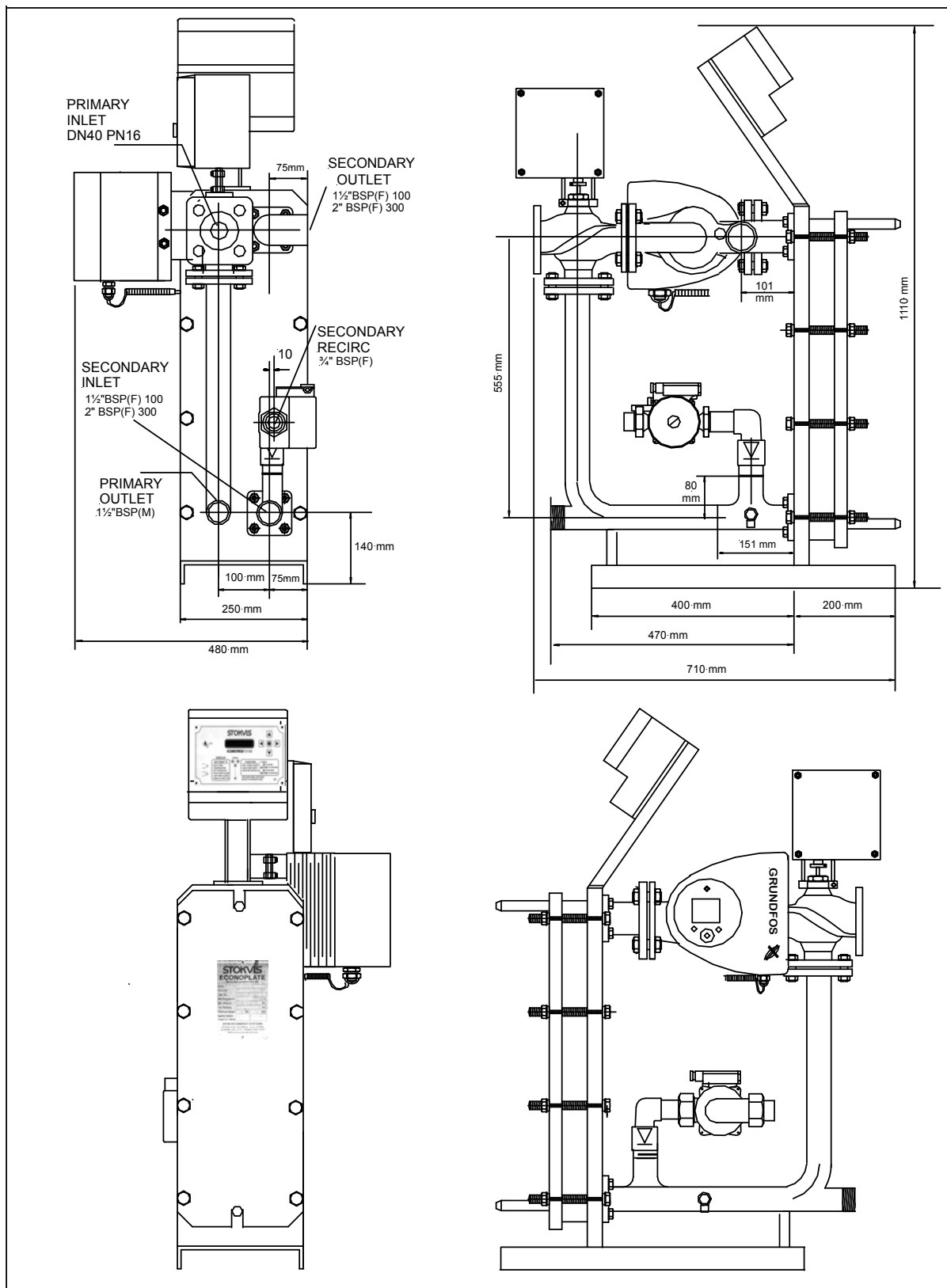
- This selection guide uses diversity factors; actual site requirements should always be checked. For simultaneous operation of outlets calculate separately.
- "Tourist Hotel" assumes a room with one shower and one wash hand basin.
- "Luxury Hotel" assumes a room with one bath or one shower and one wash hand basin.
- "Standard Flats" are classed as having one sink, one wash hand basin and one shower.
- "Luxury Flats" are classed as having one sink, two wash hand basins and one bath.
- Standard fittings are assumed in all cases.
- For applications, kW duties, temperatures and pressure drops not listed, please contact Stokvis for an alternative sizing/selection.

## Mechanical Drawing – Econoplate C3Ai100/300+0R Instantaneous Excluding Secondary Pump:



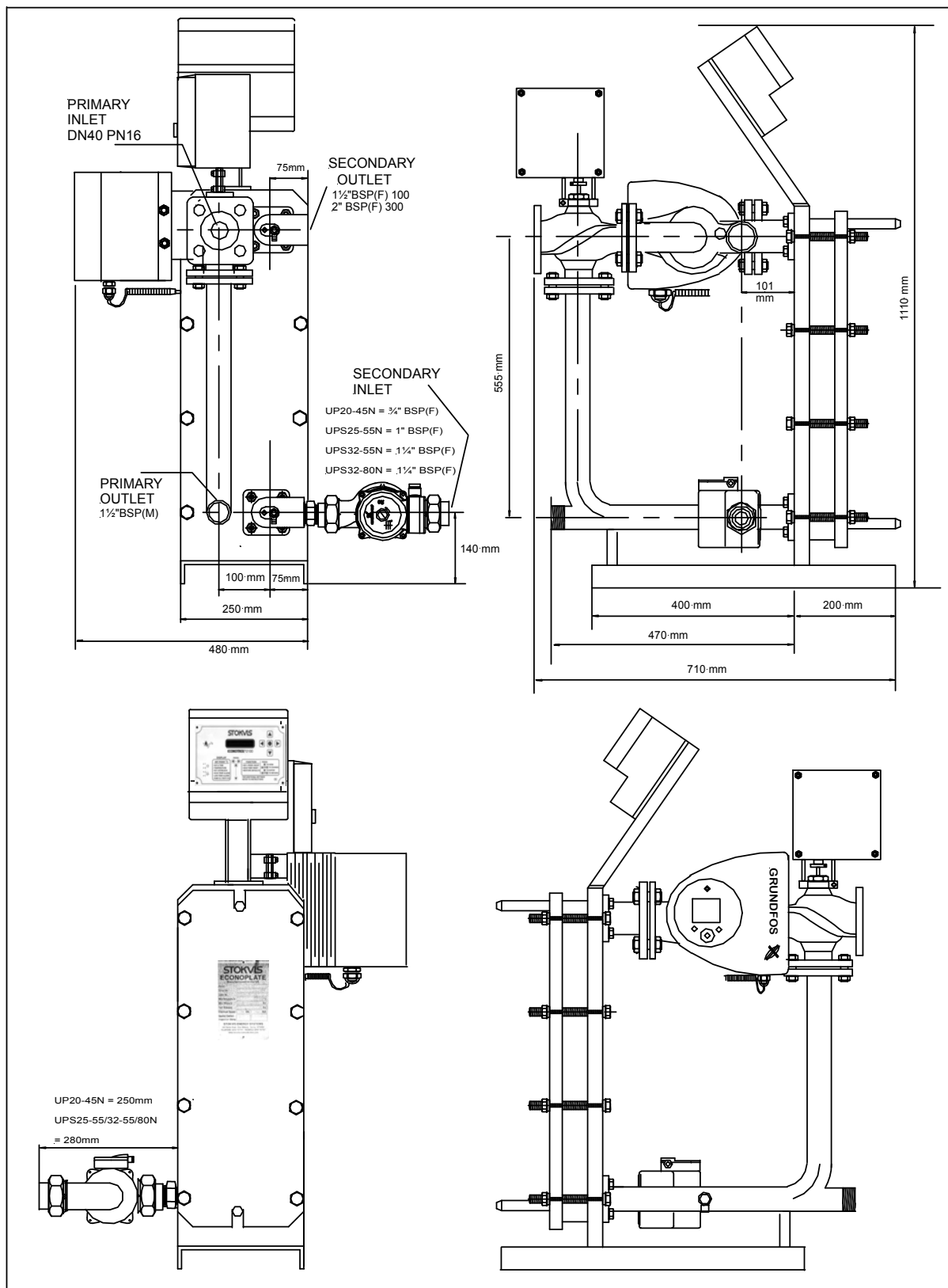
Recommended Minimum Clearances for Maintenance:  
450mm front, 300mm pump side, 150mm other side

**Mechanical Drawing – Econoplate C3Ai100/300+1R Instantaneous**  
**Including UP20-45N Secondary HWS Recirculation Pump:**



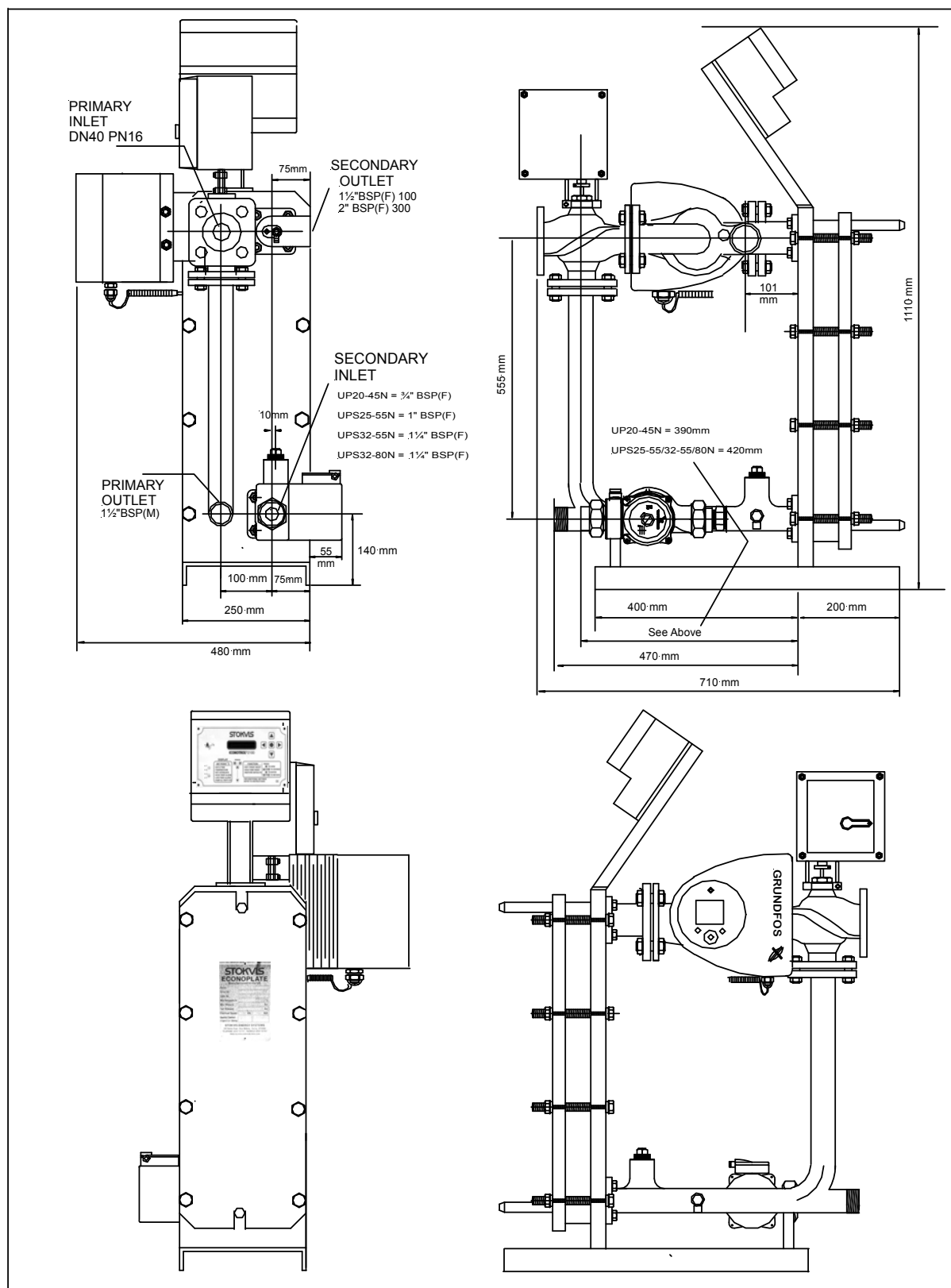
**Recommended Minimum Clearances for Maintenance:**  
450mm front, 300mm pump side, 150mm other side

# **Mechanical Drawing – Econoplate C3Ai100/300+1T Semi-Instantaneous Including UP/UPS Secondary Transfer Pump on Angled Secondary Inlet:**



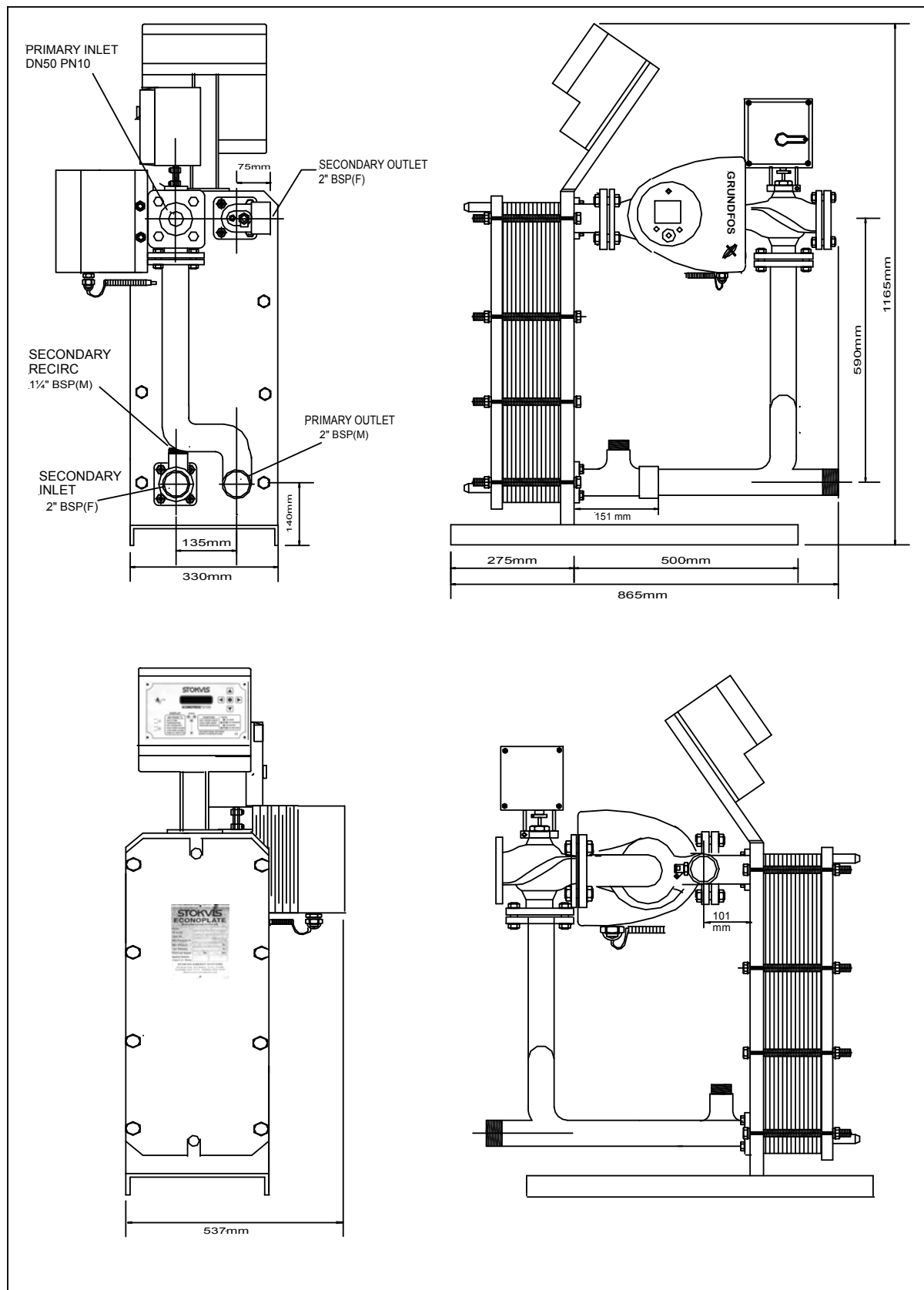
**Recommended Minimum Clearances for Maintenance:**  
450mm front, 300mm pump side, 150mm other side

# **Mechanical Drawing – Econoplate C3Ai100/300+1T Semi-Instantaneous Including UP/UPS Secondary Transfer Pump on Straight Secondary Inlet:**



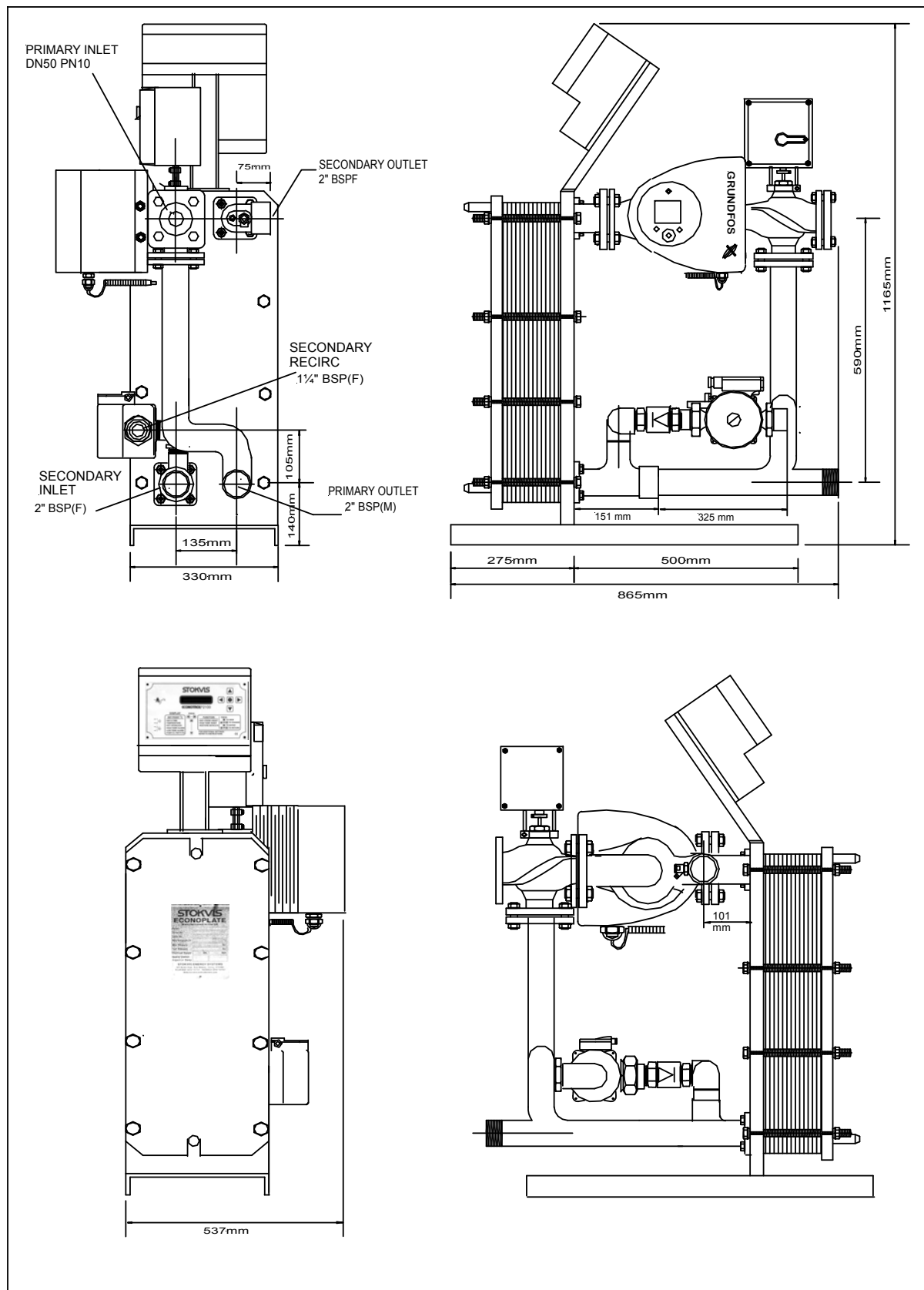
**Recommended Minimum Clearances for Maintenance:**  
450mm front, 300mm pump side, 150mm other side

## Mechanical Drawing – Econoplate C3Ci+0R Instantaneous Excluding Secondary Pump:



Recommended Minimum Clearances for Maintenance:  
450mm front, 300mm pump side, 150mm other side

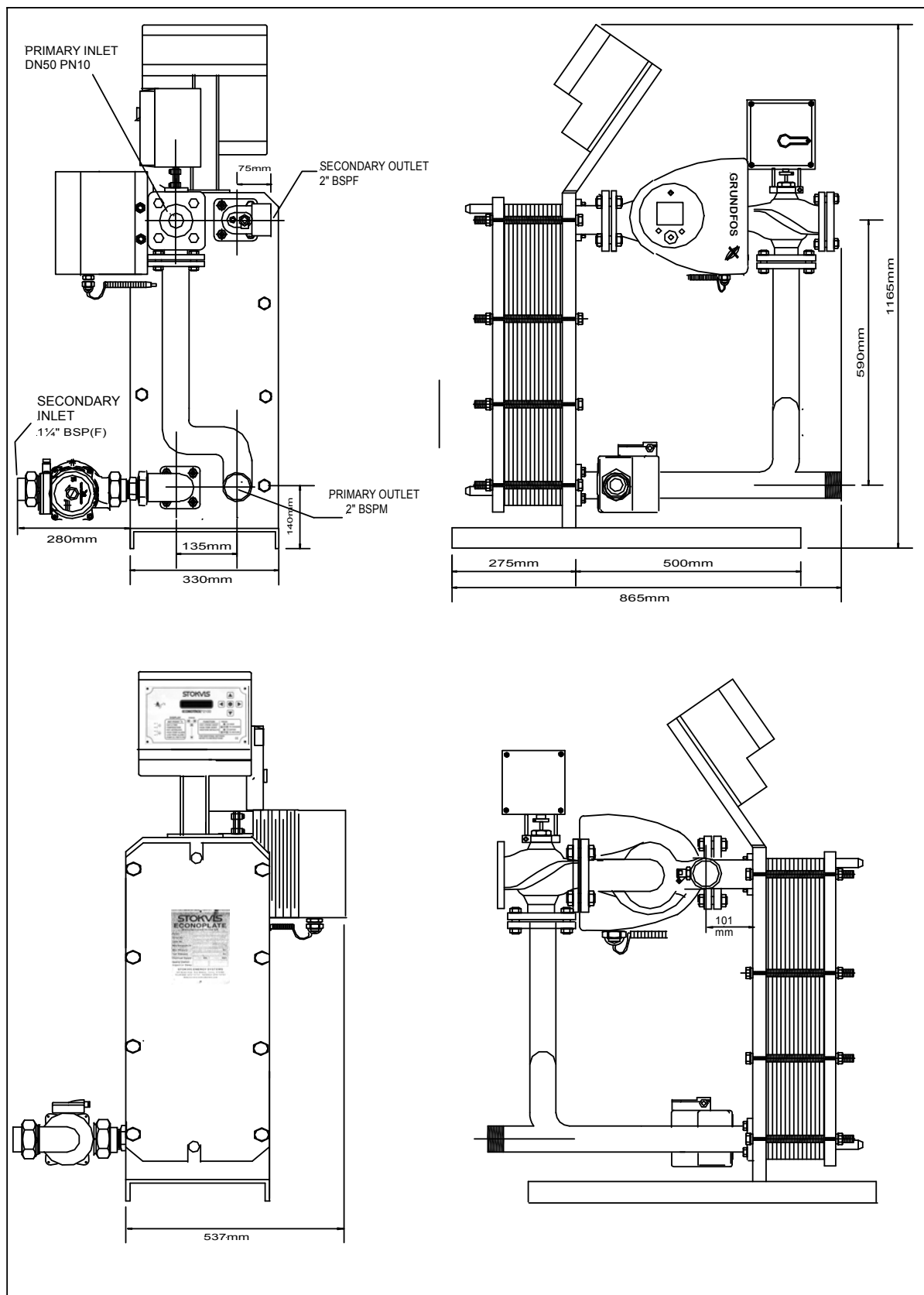
**Mechanical Drawing – Econoplate C3Ci+1R Instantaneous**  
**Including UPS32-55N Secondary HWS Recirculation Pump:**



**Recommended Minimum Clearances for Maintenance:**  
 450mm front, 300mm pump side, 150mm other side

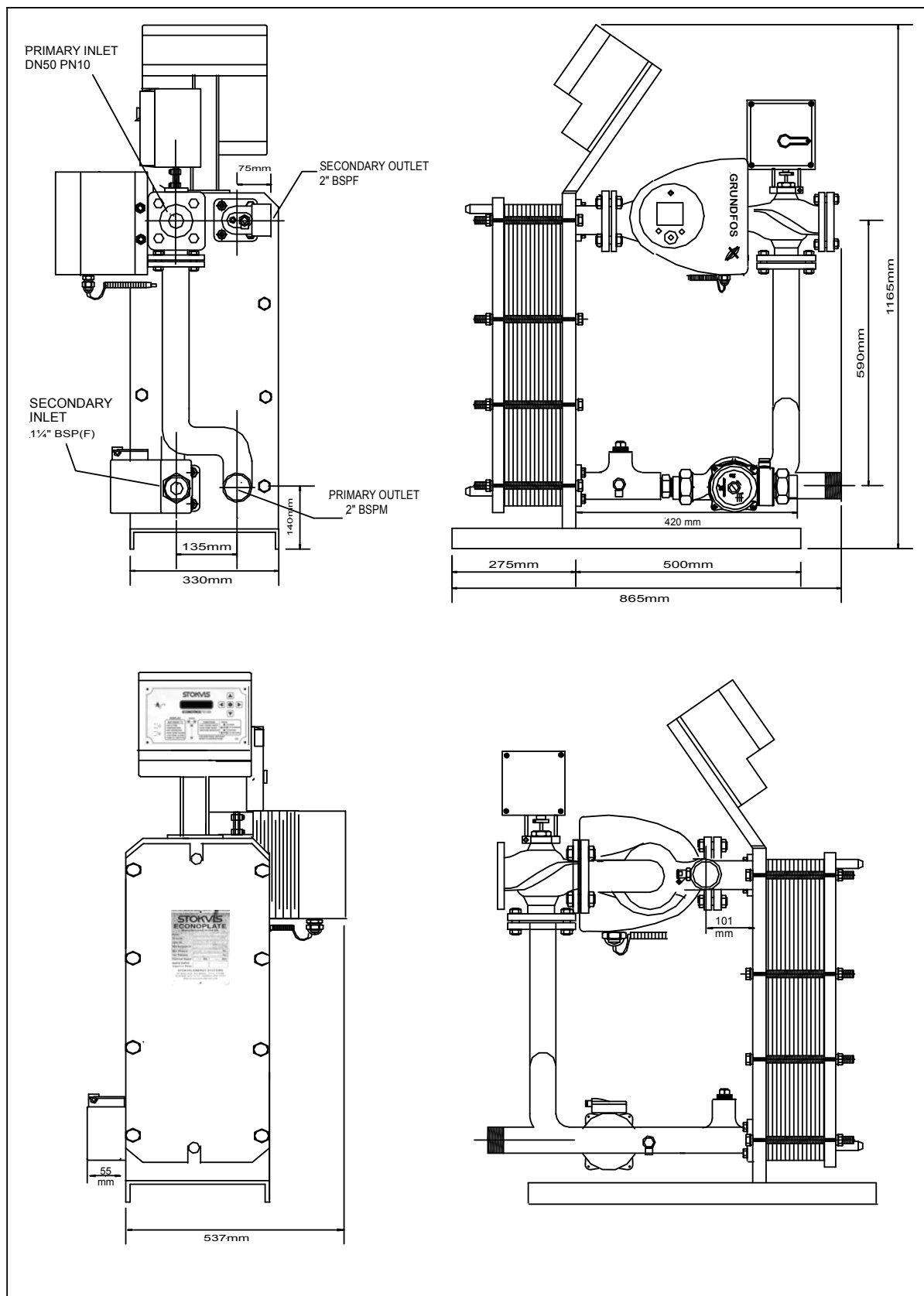


**Mechanical Drawing – Econoplate C3Ci+1T Semi-Instantaneous**  
**Including UPS32-80N Secondary Transfer Pump on Angled Secondary Inlet:**



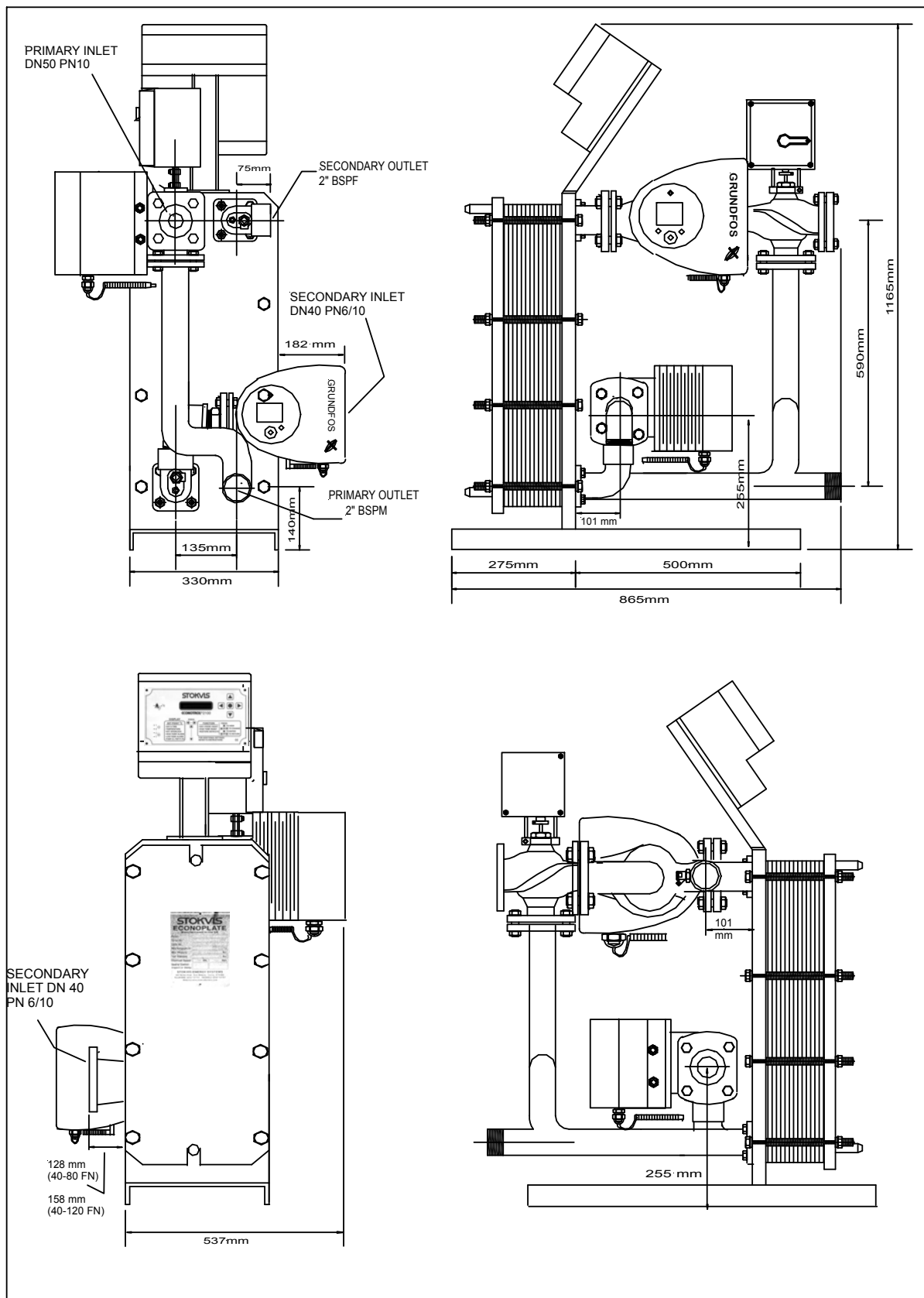
**Recommended Minimum Clearances for Maintenance:**  
450mm front, 300mm pump side, 150mm other side

**Mechanical Drawing – Econoplate C3Ci+1T Semi-Instantaneous**  
**Including UPS32-80N Secondary Transfer Pump on Straight Secondary Inlet:**



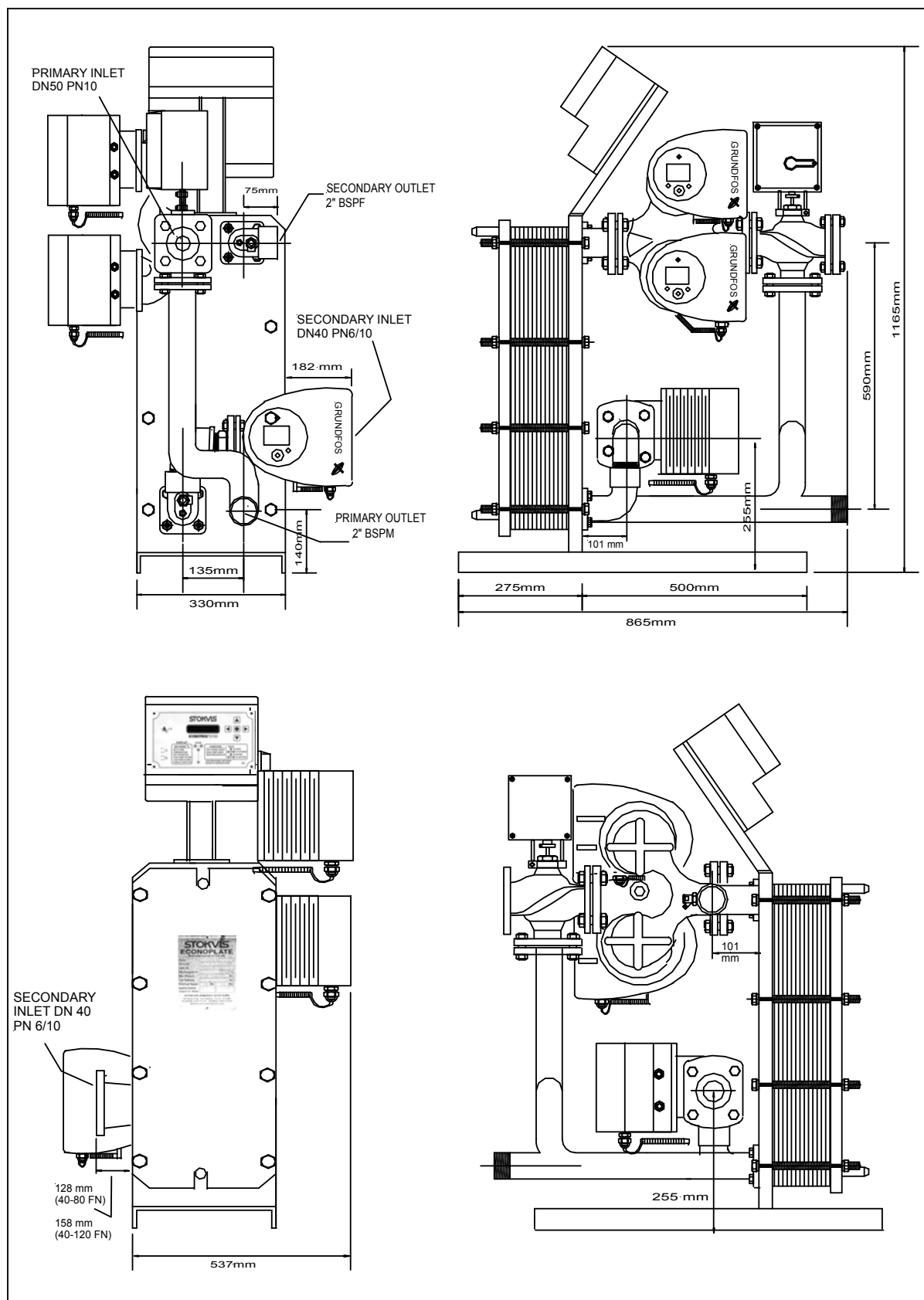
**Recommended Minimum Clearances for Maintenance:**  
 450mm front, 300mm pump side, 150mm other side

**Mechanical Drawing – Econoplate C3Ci+1T Semi-Instantaneous**  
**Including Magna3 FN Secondary Transfer Pump on Angled Secondary Inlet:**



**Recommended Minimum Clearances for Maintenance:**  
 450mm front, 300mm pump side, 150mm other side

**Mechanical Drawing – Econoplate C3Ci..D+1T (Duplex Primary) Semi-Instantaneous Including Magna3 FN Secondary Transfer Pump on Angled Secondary Inlet:**



**Recommended Minimum Clearances for Maintenance:**  
 450mm front, 300mm pump side, 150mm other side

## **Installation – Primary:**

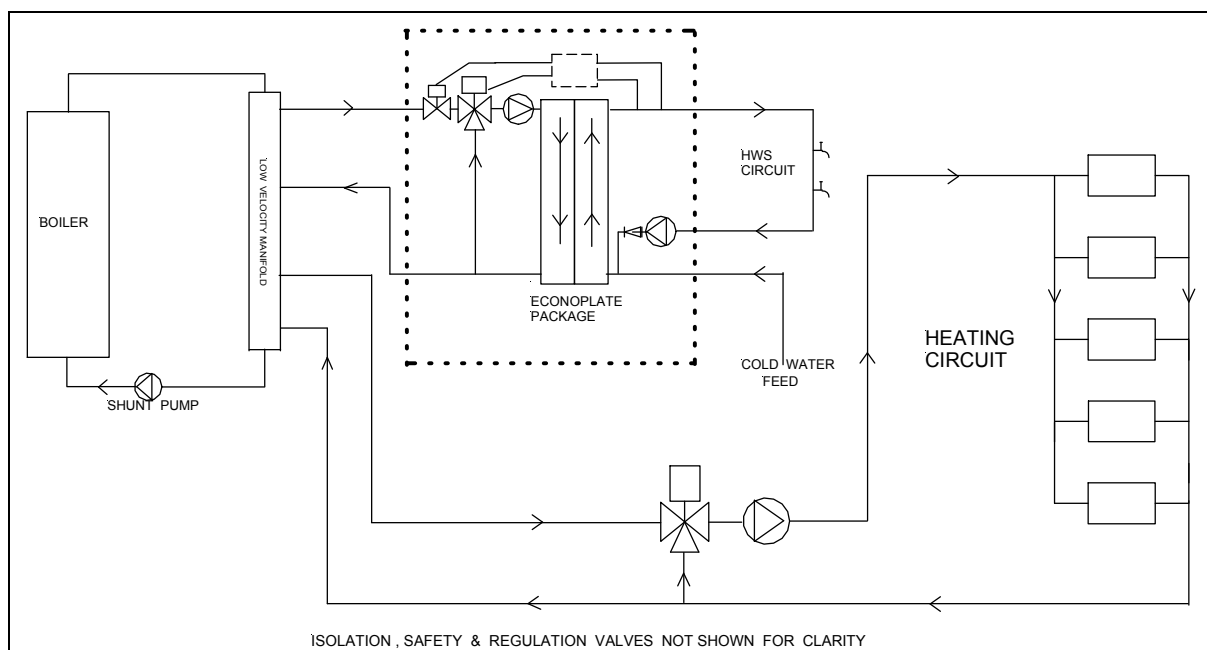
The flow from the primary heat source is connected to the 3-port valve and the return to the lower primary outlet BSP threaded connection. Connections should be made using the correct counter flanges/unions, and suitable isolating valves should be installed to enable servicing of the unit after installation.

To ensure correct operation, water at the design flow temperature should be available to the plate heat exchanger at all times. This is necessary because the plate heat exchanger itself, under no load conditions, does not flow water through the boiler. Consequently when a demand for hot water occurs the boiler would be unable to respond fast enough to prevent temperatures dropping.

Avoid having additional primary pumps pumping to the Econoplate, unless either a full bore bypass or a low loss header is included across the primary flow and return.

\*\*On unvented systems, where the heat source is capable of raising the temperature over 100°C, a manual reset high limit thermostat set to 90°C can be provided to interrupt the supply of energy to the primary of the heat exchanger. Where a flow can persist, even when the high limit thermostat has switched off the primary pump, an additional spring return primary shut off valve, operated by the same manual reset high limit thermostat set to 90°C, can be provided. This valve will also interrupt the supply of energy if the electrical power supply is interrupted.

### **Typical Installation of an Econoplate C3i Series Plate Heat Exchanger on a combined heating and hot water system with HWS priority (Including additional spring return primary shut off kit):**



## **Installation – Secondary:**

### **Instantaneous Hot Water Applications:**

Instantaneous hot water generation is when water is being drawn directly from the Econoplate into the distribution system to the taps.

The cold water feed is connected to 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 mains fed.

An unvented kit of components, required by Part G3 of the Building Regulations 2000 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 tee connection is provided in the lower bronze cold feed casting, or alternatively if the optional secondary recirculation pump (+1R) (complete with non-return valve) is provided, then the connection is made directly onto the pump.

### **Semi-Instantaneous Hot Water Applications:**

Semi-Instantaneous hot water generation is 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 type of installation particularly suits applications which have low cold feed pressures, sporadic usage or insufficient boiler power available.

The cold water feed is connected to the bottom of the vessel; the cold feed can still be either from a cold feed storage tank, which can itself be boosted if required, or it can be directly mains fed. The same restrictions/requirements as above apply, with the additional requirement of Temperature & Pressure protection (T&P Valve(s)).

The Econoplate can be supplied with an optional secondary transfer pump (+1T) which draws water from the bottom of the vessel at the design flow rate of the unit. 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.

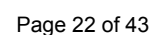
### **Other Applications:**

Many other applications other than hot water service can be catered for. The lower secondary connection on the unit is the inlet and the top is the outlet.

### **Recommended Minimum Clearances for Maintenance:**

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

### Instantaneous System with Mains/Boosted Cold Feed Connection:





## **Electrical Details:**

C3Ai100+0R (230V, 1-phase): Full-load current = 1.40A (Magna3 40-80F)

C3Ai300+0R (230V, 1-phase): Full-load current = 2.15A (Magna3 40-120F)

C3Ci+0R (230V, 1-phase): Full-load current = 2.57A (Magna3 50-120F)

Note: above figures are applicable for both single and twin-head primary pump models.

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.

|                 |                  |               |
|-----------------|------------------|---------------|
| UP20-45N        | (230V, 1-phase): | + 0.52A, 120W |
| UPS25-55N       | (230V, 1-phase): | + 0.38A, 85W  |
| UPS32-55N       | (230V, 1-phase): | + 0.46A, 105W |
| UPS32-80N       | (230V, 1-phase): | + 0.98A, 220W |
| 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 single 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 (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).

### **Magna3 Pump Fault Indication:**

Volt free changeover contacts from pump relay 1 (wire free from the factory).  
Screened cable should be used.

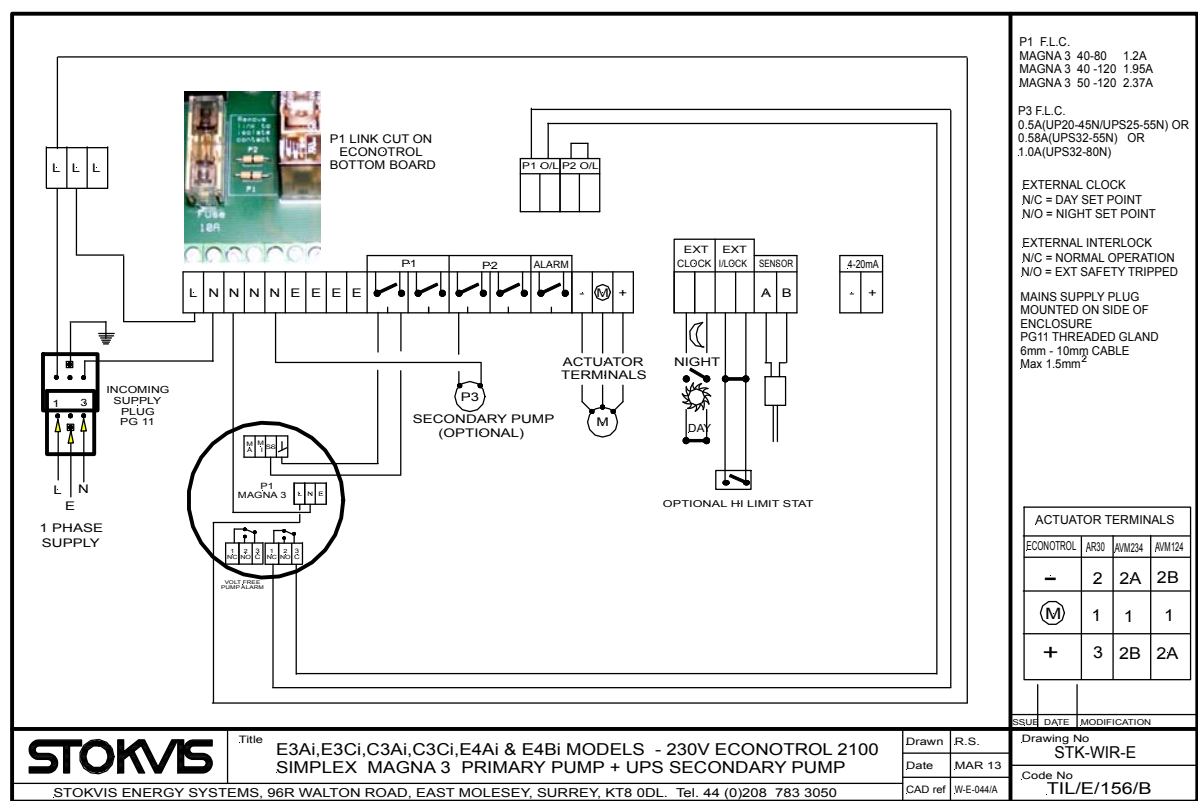
### **Fuse Protection:**

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.

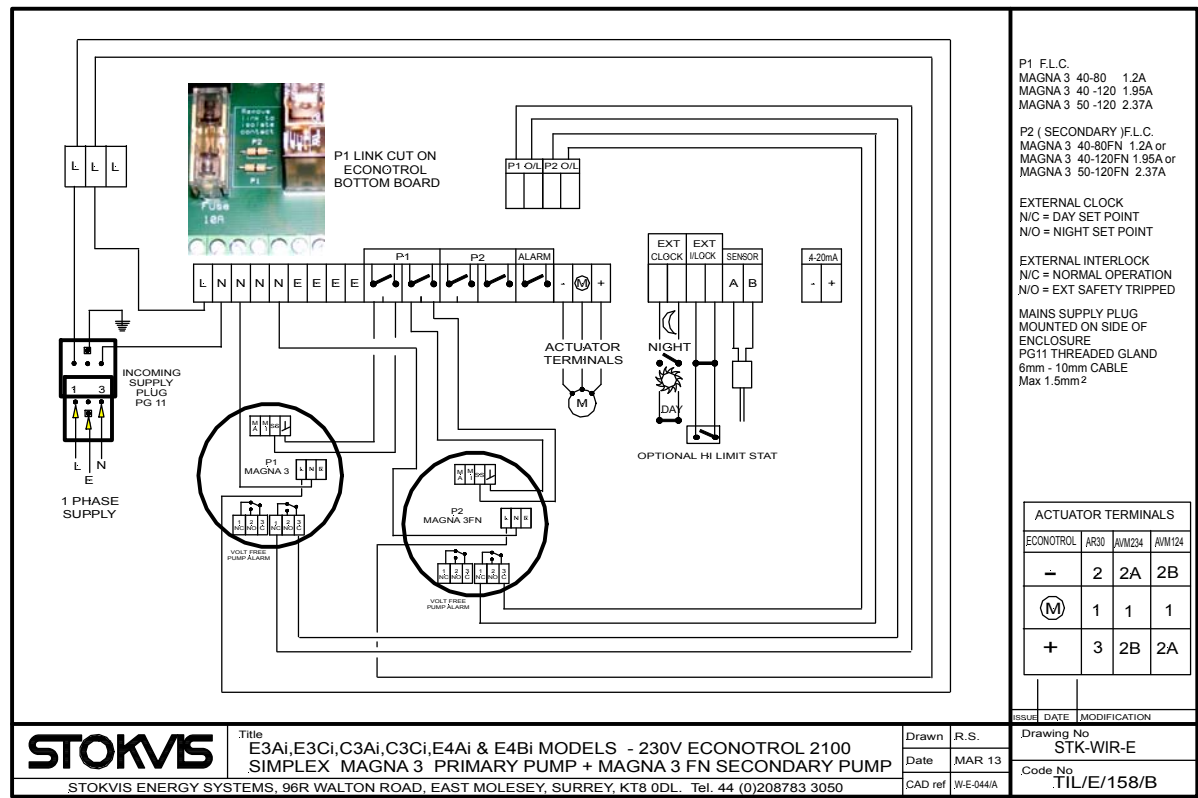
## **WARNING**

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

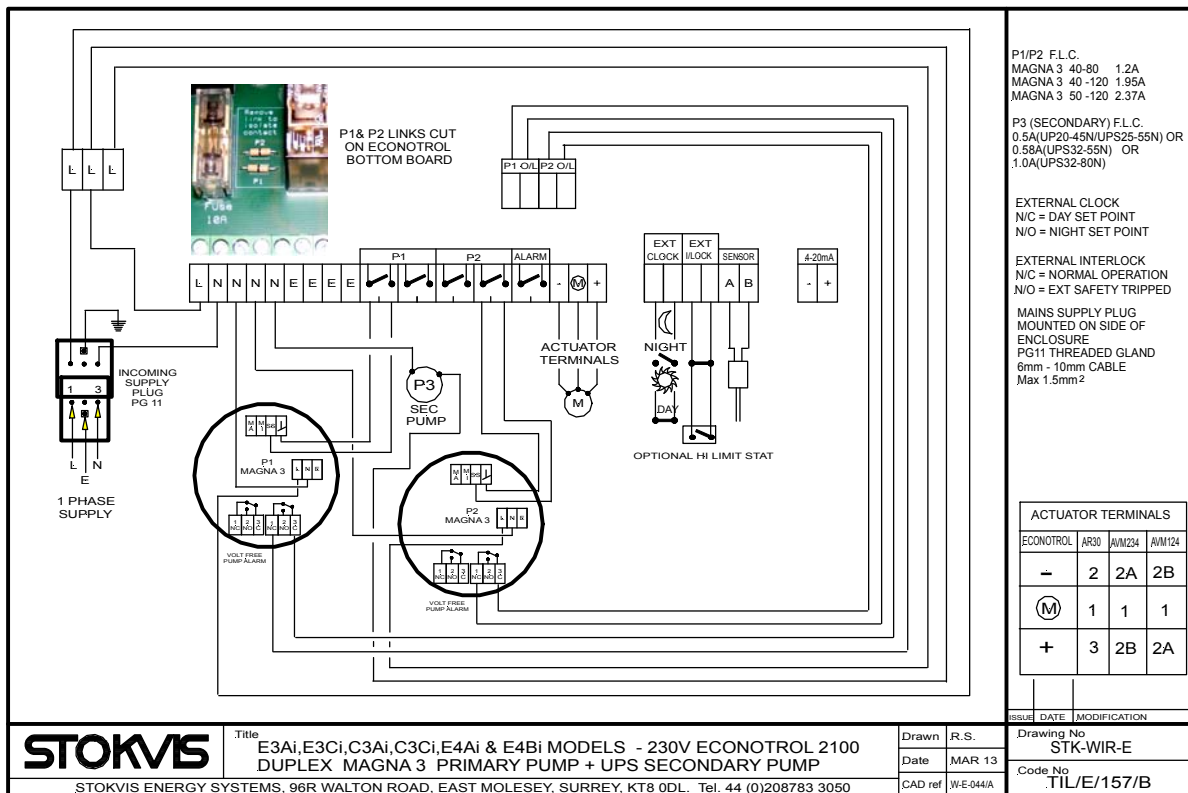
Electrical Wiring Schematic (standard) – Econoplate C3Ai100/C3Ai300/C3Ci  
Simplex Single-Head Magna3 Primary Pump & UP/UPS Secondary Pump:



Electrical Wiring Schematic (standard) – Econoplate C3Ci  
Simplex Single-Head Magna3 Primary Pump & Magna3 FN Secondary Pump:

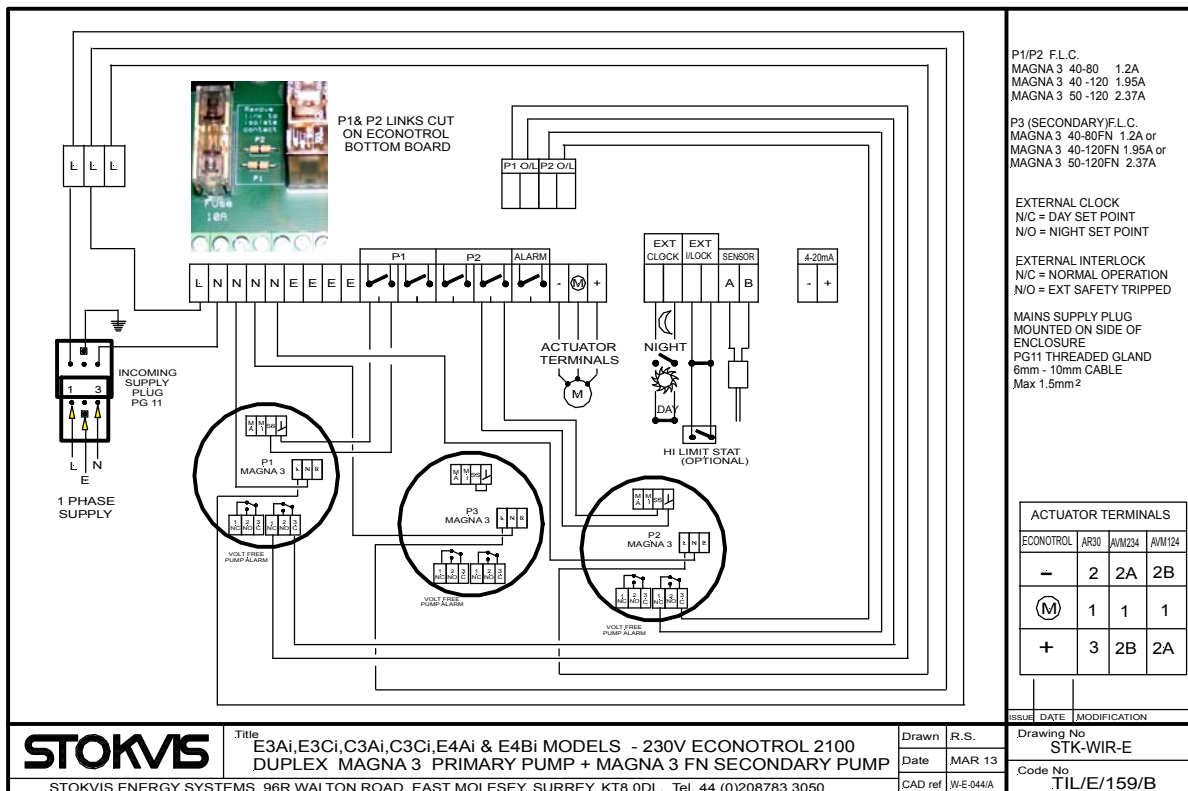


**Electrical Wiring Schematic (standard) – Econoplate C3Ai100D/C3Ai300D/C3CiD Duplex Twin-Head Magna3 D Primary Pump & UP/UPS Secondary Pump:**



### **Electrical Wiring Schematic (standard) – Econoplate C3CiD**

#### **Duplex Twin-Head Magna3 D Primary Pump & Magna3 FN Secondary Pump:**



## **Operation:**

Prior to switching the Econoplate on it must be ensured that the unit is filled with water and that all pipework, Duplex primary pumps and fixed speed secondary pumps have been vented.

Once this is complete and the unit is on, the Econoplate Controller should be set up as described in the Econotrol 2100 Controller Instruction Manual (see later) to suit the particular requirements of the client.

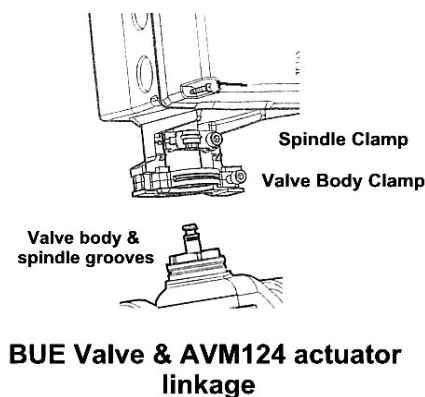
Magna3 pumps have been set for optimum operation and should not require adjustment. The status and settings can be viewed on the pump display. The flow rate should be checked in the status menu with the valve open and closed and compared with the design flow rate for the heat exchanger supplied. In all cases the pump run current or energy consumption should be recorded. Primary pump fault is indicated on the pump display screen and on the Econotrol LCD display. On Duplex twin-head primary pump units, duty share facility and auto-changeover on primary pump fault are included as standard. In addition, these functions should be checked.

On all units, the motorized valve should be checked for correct connection and travel by simulating a load / no load situation.

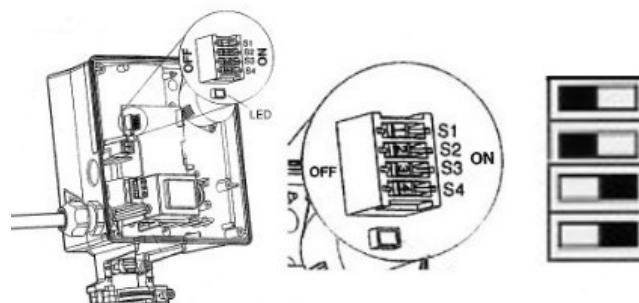
Units are fitted with a Sauter BUE valve with an AVM124F130 actuator.

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

The AVM124 actuator is connected to the valve body and spindle by two clamps which are secured with hexagon head screws. The upper clamp (drive spindle) can be released and the spindle can be checked for up and down movement by hand without removing the bottom clamp (valve body). Once the valve spindle movement is checked, ensure that both clamps are refitted correctly in the location grooves on the spindle and valve body and are not loose.



The AVM124 actuator has automatic self-adjusting valve spindle travel. AVM124 actuators also have a switch coding for valve speed inside the actuator cover, which can be seen through the clear lid, and these should be set as below:



There is also a single green LED just below the switch block which gives indication of the following functions of the actuator:

|   |  |
|---|--|
| Quick intermittent flashing                         | Initialization procedure                           |
| Illumination when being driven                      | Actuator moving to set point                       |
| Short flashing with longer delay between flashing   | Set point reached                                  |
| Longer flashing with shorter delay between flashing | Too much force detected<br>(possible valve seized) |
| Rapid flashing                                      | Actuator in manual mode                            |

### **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 small temperature drop between inlet and outlet of the primary circuit (under 20°C at full load) indicates the exchanger is clogged.
- A lack of water at the design temperature on the secondary circuit.

A plate pack consists of a first/start plate, a number of intermediate plates and a blank/end plate:

#### • **C3Ai100/C3Ai300 (GCP-009 Plates – Parallel Units):**

- First/Start Plate (4 gasketed holes): Fitted against the fixed rear frame chassis plate with the chevron pattern facing upwards and the gasket facing towards the fixed rear frame chassis plate.
- Intermediate Plates: The chevron pattern, stamped on the plates, must alternate downwards on the 1<sup>st</sup> intermediate plate, upwards on the 2<sup>nd</sup> intermediate plate and so on, with the gasket facing towards the fixed rear frame chassis plate.
- Blank/End Plate (no holes): The chevron pattern will be in the opposite direction to the final intermediate plate, with the gasket facing towards the fixed rear frame chassis plate. The moveable chassis plate sits against this end plate.  
Note: For even number plate packs, the blank/end plate will be chevron pattern facing downwards.

#### • **C3Ci (GLD-013 Plates – Diagonal/Cross Flow Units):**

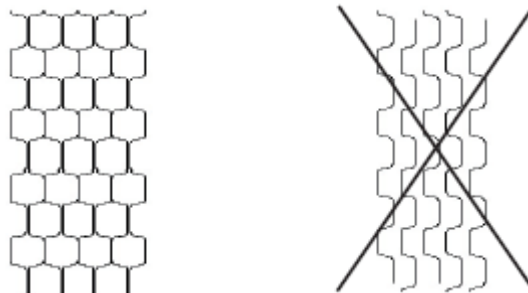
- First/Start Plate (4 gasketed holes): Fitted against the fixed rear frame chassis plate with the chevron pattern facing upwards and the ½ thickness gasket facing towards the fixed rear frame chassis plate.
- Intermediate Plates: The chevron pattern, stamped on the plates, must alternate downwards on the 1<sup>st</sup> intermediate plate (left hand), upwards on the 2<sup>nd</sup> intermediate plate (right hand) and so on, with the full thickness gasket facing towards the fixed rear frame chassis plate.
- Blank/End Plate (no holes): The chevron pattern will be in the opposite direction to the final intermediate plate, with the full thickness gasket facing towards the fixed rear frame chassis plate and the ½ thickness gasket facing towards the moveable chassis plate, which sits against this end plate.  
Note: For even number plate packs, the blank/end plate will be chevron pattern facing downwards.

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

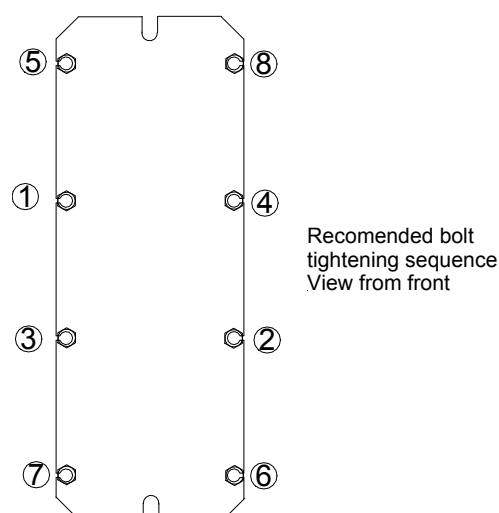
1. Isolate the exchanger, primary side first, allowing the temperature to fall below 40°C and then isolate the secondary side.
2. Reduce the pressure by opening the vents and drain both primary and secondary.
3. Carefully release the securing bolts between the frame and front plate. Slacken the bolts in sequence to reduce stress on individual bolts.
4. 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. Specific instructions are available on request for all plate types.
5. 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.

The following visual checks can be made to ensure correct assembly:

- A pattern resembling a honeycomb should always be seen:



- The stamped chevron pattern should alternate up and then down from one plate to another.
  - The gasket around the top plate ports should alternate left to right from one plate to another.
6. 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 chassis plate and the fixed rear chassis plate and should be calculated as follows:

- C3Ai100 & C3Ai300:
  - GCP-009 – 3.1mm +/- 0.05mm x the number of plates
- C3Ci:
  - GLD-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.

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

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

### **Fault Finding:**

#### **Little or No Hot Water at Outlets:**

- Check the external electrical supply to the unit – reinstate if necessary. Check control panel isolator switch is in the ON position.
- Check for the LCD display on the control panel – if not on, check/replace 500mA control fuse.
- If the 500mA fuse blows repeatedly, set the Econoplate to give temporary hot water (see Temporary Operation) and replace the PCB as soon as possible.
- If there is an LCD display but no apparent outputs to pumps etc, check the 10A output fuse on the PCB. If it is blown, make electrical checks on all pumps and valves fitted to the unit. Repair/replace or isolate faulty item and replace fuse.
- Check that the primary pump is operating – check the pump status and operating mode settings either on the pump display or with a Grundfos GO module/app. Also check that there is a start signal and/or electrical supply to the pump. Replace pump head or switch permanently to standby pump if available. If a Duplex twin-head Magna3 D primary pump is fitted and if both pump heads are at fault, once the fault has been cleared on the pump heads, the Econotrol will need to be powered off and back on to reset.
- Check that the primary supply temperature is correct and that there is nothing in the external pipe work that could restrict flow e.g. faulty pumps, strainers, non-return valves, isolating valves, air locks etc. This would show as a large temperature drop on the primary but with a lack of hot water.
- Check the secondary pump is operating, particularly if the display indicates set point achieved, but no hot water available.
- Check to ensure correct connection of valve and actuator as described previously in the Operation section.



- 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.
- Check that the valve motor is electrically operating – raise and lower the set point and observe. If the motor does not work, see Temporary Operation.
- Check the  $\Delta T$  across inlet and outlet of the primary circuit; a small temperature drop (under 20°C at full load) indicates that the heat exchanger is contaminated with debris causing clogging.

#### Fluctuating Temperatures at Outlets:

- 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.
- 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.
- 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.
- 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 PCB. Reinstall the electrical supply and check again.
- 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:

- A reduced output may be as a result of a blockage of the heat exchanger, as well as any of the above mentioned causes. A small temperature drop across the heat exchanger at full output would confirm. See Maintenance for cleaning.
- A large temperature drop between inlet and outlet of the primary circuit, but a lack of hot water indicates a lack of primary flow, possibly due to an external blockage.

#### Leaking from the Plate Heat Exchanger:

- Check that the heat exchanger is bolted up fully – measure the space occupied by the plates, next to each bolt. The gap between the rear fixed chassis plate and front moveable plate should be checked (see Maintenance for figures). If incorrect, relieve the pressure on primary and secondary side and tighten to the correct figure. If the unit still leaks, the affected plates should be replaced.
- Check that the maximum operating pressure has not been exceeded at any time.

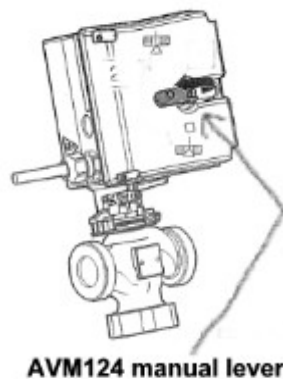
### No Hot Water from Highest Outlet:

- 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 AVM124 open the 3-port valve fully by hand using the fold out lever on the outside of the actuator as shown below:



On AVM124 actuators, the single LED will flash off and on rapidly; this indicates manual override is in operation.

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

- b) Ensure that there is an electrical supply to a primary and secondary pump and link the start/stop terminals for pump(s) if not already made.
- c) Reduce the boiler flow temperature to a maximum of 65°C to prevent excess secondary temperatures.
- d) Set the high temperature alarm to automatic – refer to “Econotrol 2100 Instruction Manual” for procedure (see later).

**N.B. If fitted with an additional high temperature primary shut off 2-port VKR valve and AKF actuator, this will also need to be in the open position. To do this, ensure that the electrical feed from the Econotrol to the limit stat (and subsequently to the AKF actuator) is live or made live. If either the valve/actuator/high limit/auxiliary relay has failed, then manually open the valve (remove drive).**

## Parts List

### Controller & Sensor (All):

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

### Valve & Actuator:

BUE040F300 – 3-port Valve Sauter BUE040F300 (C3Ai100/C3Ai300)  
BUE050F200 – 3-port Valve Sauter BUE050F200 (C3Ci)  
AVM124F130 – Sauter Actuator AVM124F130

### Heat Transfer Plates & Liners:

GCP009H START – 4-hole First/Start Plate (C3Ai100/C3Ai300)  
GCP009H INT – Intermediate Plate (C3Ai100/C3Ai300)  
GCP009H BLANK – No-hole Blank/End Plate (C3Ai100/C3Ai300)  
ESS4647 – 43mm Through-Frame Liner (C3Ai100/C3Ai300)  
GCP009L INT – Intermediate Plate (low pressure drop) (C3AixxxL)  
  
GL13H START – 4-hole First/Start Plate (C3Ci & C3CixxL)  
GL13H LH – Left-Hand Intermediate Plate (C3Ci)  
GL13H RH – Right-Hand Intermediate Plate (C3Ci)  
GL13H BLANK – No-hole Blank/End Plate (C3Ci & C3CixxL)  
ESS8127 – 52mm Through-Frame Liner (C3Ci & C3CixxL)  
GL13L LH – Left-Hand Intermediate Plate (low pressure drop) (C3CixxL)  
GL13L RH – Right-Hand Intermediate Plate (low pressure drop) (C3CixxL)

### Primary Pumps:

Primary Pump Simplex C3Ai100 – Magna3 40-80F (1-phase) (97924268)  
Primary Pump Simplex C3Ai300 – Magna3 40-120F (1-phase) (97924270)  
Primary Pump Simplex C3Ci – Magna3 50-120F (1-phase) (97924284)  
Primary Pump Duplex C3Ai100D – Magna3 D 40-80F (1-phase) (97924463)  
Primary Pump Duplex C3Ai300D – Magna3 D 40-120F (1-phase) (97924465)  
Primary Pump Duplex C3CiD – Magna3 D 50-120F (1-phase) (97924479)

### Optional Secondary Pumps:

Secondary Pump – UP20-45N (1-phase) (98057222)  
Secondary Pump – UPS25-55N (1-phase) (95906772)  
Secondary Pump – UPS32-55N (1-phase) (95906773)  
Secondary Pump – UPS32-80N (1-phase) (98057247)  
Secondary Pump – Magna3 40-80FN (1-phase) (97924349)  
Secondary Pump – Magna3 40-120FN (1-phase) (97924351)  
**N.B.** UP and UPS Pumps have "commando" type electrical connections.

Continued overleaf...

### Chassis Components:

|                                    |                                     |
|------------------------------------|-------------------------------------|
| Guide Pin M16 x 200mm (TIL/M/009A) | – C3Ai100/C3Ai300 (up to 34 plates) |
| Guide Pin M16 x 250mm (TIL/M/068A) | – C3Ai100/C3Ai300 (36-48 plates)    |
| Guide Pin M16 x 330mm (TIL/M/016A) | – C3Ai100/C3Ai300 (50-58 plates)    |
| Guide Pin 150mm (TIL/M/033A)       | – C3Ci (up to 24 plates)            |
| Guide Pin 250mm (TIL/M/034A)       | – C3Ci (26-38 plates)               |
| Guide Pin 350mm (TIL/M/035A)       | – C3Ci (40-74 plates)               |
| Bolt/Hex Set Screws M16 x 130mm    | – C3Ai100/C3Ai300 (up to 18 plates) |
| Bolt/Hex Set Screws M16 x 180mm    | – C3Ai100/C3Ai300 (20-26 plates)    |
| Bolt/Hex Set Screws M16 x 200mm    | – C3Ai100/C3Ai300 (28-44 plates)    |
| Bolt/Hex Set Screws M16 x 250mm    | – C3Ai100/C3Ai300 (46-54 plates)    |
| Bolt/Hex Set Screws M16 x 300mm    | – C3Ai100/C3Ai300 (56-58 plates)    |
| Bolt/Hex Set Screws M20 x 180mm    | – C3Ci (22-24 plates)               |
| Bolt/Hex Set Screws M20 x 280mm    | – C3Ci (26-34 plates)               |
| Bolt/Hex Set Screws M20 x 380mm    | – C3Ci (36-74 plates)               |
| Non-Return Valve                   | – Watts 1¼" (F-F) (EC270032160)     |
| Non-Return Valve                   | – Watts ¾" 230020165 (M-F) (NN020)  |
| Drain Cock                         | – Altecnic ½" male                  |

### Optional Extras:

2-port Primary Shut Off Valve – Sauter VKR040F300-FF40mm, Rp 1½", PN40 (C3Ai)  
2-port Primary Shut Off Valve – Sauter VKR050F300-FF50mm, Rp 2", PN40 (C3Ci)  
Primary Shut Off Valve Actuator – Sauter AKF112F120  
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.)

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# **Econotrol 2100 Controller**

## **Operating Instructions**

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## 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.

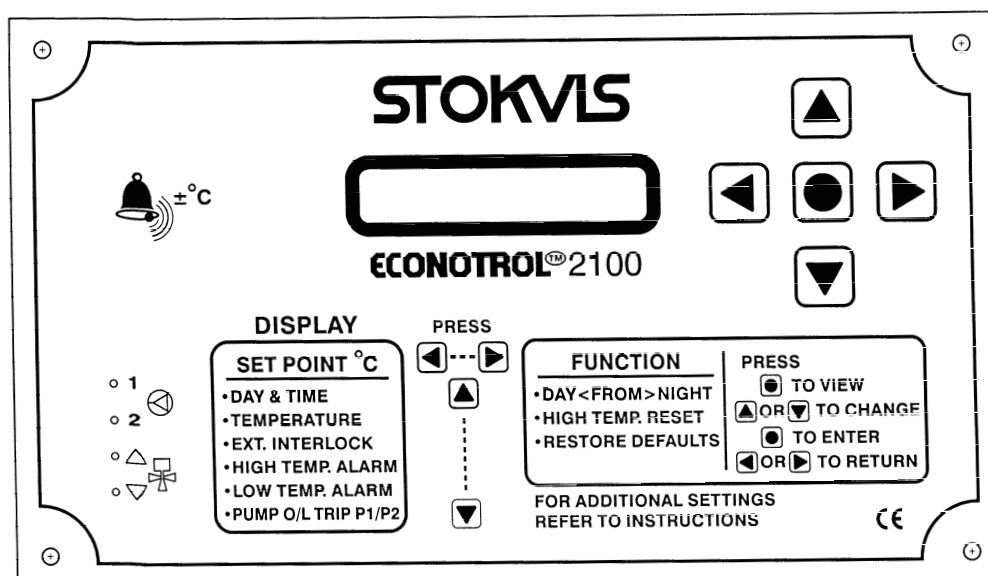
**Time control** can be by: either the internal inbuilt 7 day time clock for either 2 temperatures of operation or a single temperature set point and night “off” per day, or externally using the safety extra low voltage (SELV) external clock circuit for either 2 temperatures of operation or a single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

### 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:

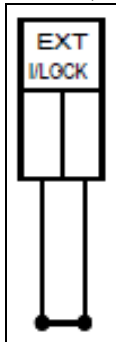
The electronic controller is protected by a 500mA fuse and the main PCB output side is protected by a 10A fuse; both are located on the main PCB.

### 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 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":

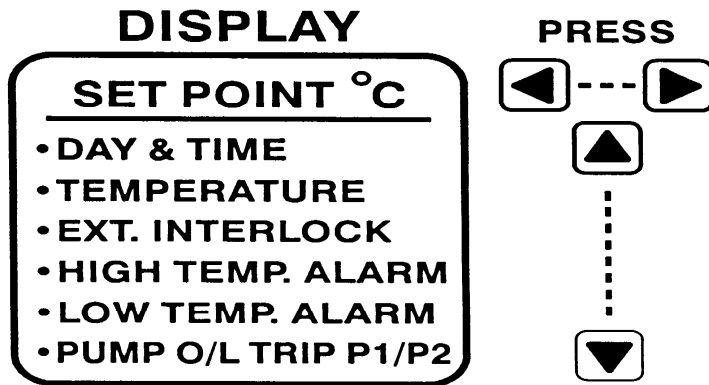
An external device can be connected to switch between 2 temperatures of operation, or to switch between a single set point and "off". A closed contact across this safety extra low voltage (SELV) circuit gives the "day" setting (EXT Clock Day) and an open circuit the "night" setting (EXT Clock Night).



## **WARNING**

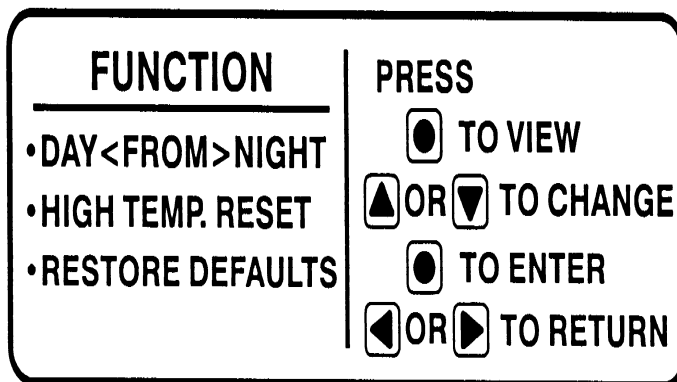
Never run control cables using low voltages with power cables – induced voltages can affect the operation of the controller.

## Summary of Display Menu:



## Summary of Function Menu:

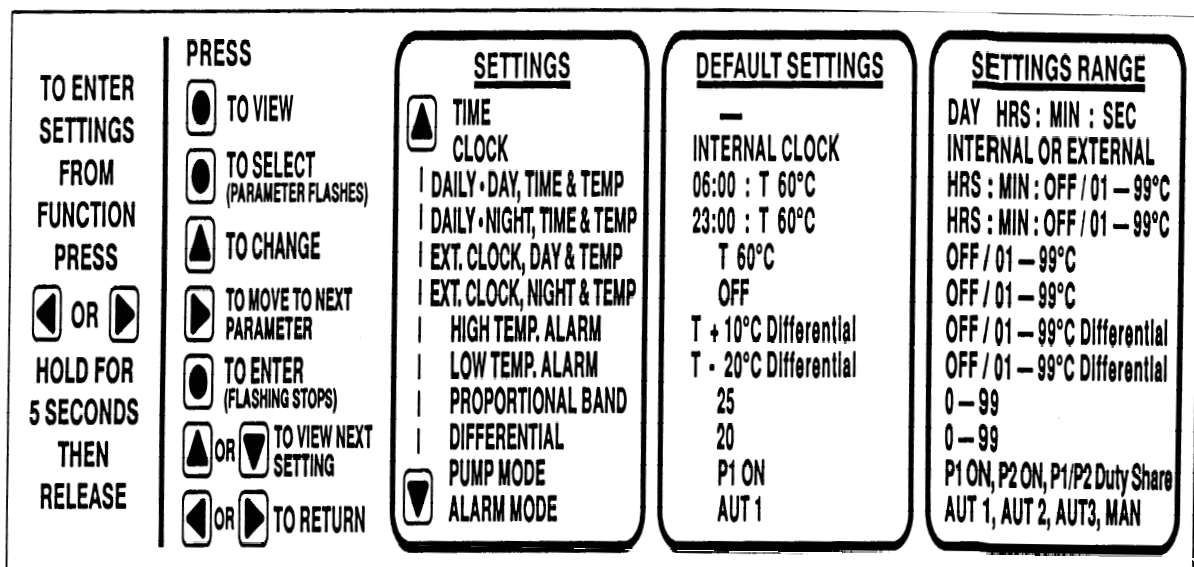
The FUNCTION options are accessed from the default SET POINT display menu by pressing either the ◀ or ▶ key once.



## 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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