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Virdis Energy

Virdis Energy GP3 Series

Hot Water Service

Packaged Plate Heat Exchangers

Installation, Operation & Maintenance Manual

Contents

General Description:

The Virdis Energy GP series of packaged plate heat exchangers are available in 3 ranges covering a total of some 40+ units with outputs ranging from 51kW up to 1120kW (when fed with primary water at 80°C, secondary temperatures 10-60°C).

The GP 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. The GP Series 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 GP 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 GPPH Models(RECIRC 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 PH Models (TRANSFER units).

In addition to the PID controller, the control panel on the GPPH 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 GP Series Controller). Units with Duplex (twin-head) primary pump include duty share facility and auto-changeover on pump fault as standard.

All GP 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 – GP3-40-80

Chassis Components	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
Operating Criteria	Maximum Primary Side Temperature:	110°C
	Maximum Primary Side Pressure:	10.0bar
	Maximum Secondary Side Pressure:	6.0bar
Connections	Primary Side Water Connections (standard):	Inlet - Cast Iron, DN40, PN10 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)
Primary Components	Primary Pump (c/w Volt Free Trip Terminals):	Magna3 40-80F (1-phase) (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
Control Panel	Control Panel (standard): • ABS enclosure. • Electronic PID temperature controller. • 7-day time clock control of 2 temperature settings or 1 temperature and night "off", per day. • Safety extra low voltage (SELV) circuit for external "clock" control of 2 temperatures of operation or 1 temperature set point and "off". • Safety extra low voltage (SELV) circuit for an external interlock. • Adjustable high limit and low limit temperature alarms, temperature alarm lamp, common volt free temperature alarm and selectable high temperature lockout modes. • Functional indication of: primary pump enable (P1 or P2) and valve open/closing. • LCD digital display of day and time, secondary flow temperature and any faults. • Pump mode selecion including Duplex primary pump duty share and auto-changeover on pump fault (if fitted). • Full menu driven interrogation of parameters and operating modes. • 500mA control fuse, 10A ouput fuse.	

Optional Extras:

• Duplex (Twin-Head) Primary Pump: (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), UPS32-55N (1-phase), UPS32-80N (1-phase)
• Additional Primary Shut Off Kit: Valve Actuator c/w Additional High Limit Thermostat	 2-port, DZR Cast Brass Body, RP 1½", PN40 230V, motor open/spring close 230V, manual reset, IP54
• Additional High Limit Thermostat Only:	230V, manual reset, IP54
• Primary Control Valve Actuator Positional Indication:	• Auxiliary Changeover Contacts Only • Potentiometer Only (1 or 2 kΩ) • Auxiliary Changeover Contacts and Potentiometer (1 or 2 kΩ)
• 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 121.2 litres per minute of hot water at 60°C. (based on a primary supply temperature of 80°C and a cold feed temperature of 10°C)

Performance & Selection Guide – GP3-40-80

Primary Supply Temperature = 80°C, Secondary Temperatures = 10-60°C

		GP3-40-80												
		GP3 05	GP3 07	GP3 09	GP3 11	GP3 13	GP3 15	GP3 17	GP3 19	GP3 21	GP3 23	GP3 25	GP3 27	GP3 29
Heat Load Required / Max. Duty	kW	51	91	132	167	208	241	272	301	330	354	380	397	416
Secondary Flow Rate at 60°C	ℓ/s	0.24	0.44	0.63	0.80	0.99	1.15	1.30	1.44	1.58	1.69	1.82	1.90	1.99
	m³/h	0.9	1.6	2.3	2.9	3.6	4.1	4.7	5.2	5.7	6.1	6.6	6.8	7.2
Secondary Pressure Drop at Peak Output	kPa	21	28	32	33	35	35	35	35	35	34	33	31	29
Primary Flow Rate at 80°C	ℓ/s	0.48	0.71	0.96	1.14	1.38	1.56	1.72	1.85	1.99	2.10	2.21	2.26	2.33
	m³/h	1.7	2.6	3.5	4.1	5.0	5.6	6.2	6.7	7.2	7.6	8.0	8.1	8.4
Primary Min. Head Available	kPa	6	6	6	6	6	6	6	6	6	6	6	6	6
Primary Return Temp. at Peak Output	°C	55	50	47	45	44	43	43	42	41	40	39	38	37
Approximate Head Available from Optional Secondary Recirculation Pump at:														
Recirculation Rate of 0.5m³/h	kPa	25	30	34	36	36	37	37	38	38	38	38	38	38
Recirculation Rate of 1.0m³/h	kPa	-	7	20	25	28	29	30	31	31	32	32	32	32
Recirculation Rate of 2.0m³/h	kPa	-	-	-	-	2.5	7	10	12	13	14	15	16	17

	GP3 05	GP3 07	GP3 09	GP3 11	GP3 13	GP3 15	GP3 17	GP3 19	GP3 21	GP3 23	GP3 25	GP3 27	GP3 29
"Tourist Hotel" by No. of Rooms	4	7	12	17	23	30	35	40	46	53	59	63	68
"Luxury Hotel" by No. of Rooms	-	5	8	12	16	21	24	28	31	35	39	42	45
Number of "Standard Flats"	2	6	11	18	27	37	48	59	71	80	92	98	107
Number of "Luxury Flats"	-	4	7	12	19	26	32	39	48	54	61	66	73
Hospital or Nursing Home by No. of Rooms	-	7	13	21	35	48	61	73	85	97	108	116	128
Leisure Centre or Sports Stadium by No. of Showers	-	-	-	5	7	11	14	18	21	26	30	32	35

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 Packaged Heat for an alternative sizing/selection.

Technical Specification – GP3-40-120:

Chassis Components	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
Operating Criteria	Maximum Primary Side Temperature:	110°C
	Maximum Primary Side Pressure:	10.0bar
	Maximum Secondary Side Pressure:	6.0bar
Connections	Primary Side Water Connections (standard):	Inlet - Cast Iron, DN40, PN10 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)
Primary Components	Primary Pump (c/w Volt Free Trip Terminals):	Magna3 40-120F (1-phase) (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
Control Panel	Control Panel (standard): • ABS enclosure. • Electronic PID temperature controller. • 7-day time clock control of 2 temperature settings or 1 temperature and night "off", per day. • Safety extra low voltage (SELV) circuit for external "clock" control of 2 temperatures of operation or 1 temperature set point and "off". • Safety extra low voltage (SELV) circuit for an external interlock. • Adjustable high limit and low limit temperature alarms, temperature alarm lamp, common volt free temperature alarm and selectable high temperature lockout modes. • Functional indication of: primary pump enable (P1 or P2) and valve open/closing. • LCD digital display of day and time, secondary flow temperature and any faults. • Pump mode selecion including Duplex primary pump duty share and auto-changeover on pump fault (if fitted). • Full menu driven interrogation of parameters and operating modes. • 500mA control fuse, 10A ouput fuse.	

Optional Extras:

• Duplex (Twin-Head) Primary Pump: (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):	Magna3 40-80FN (1-phase)
• Additional Primary Shut Off Kit: Valve Actuator c/w Additional High Limit Thermostat	 2-port, DZR Cast Brass Body, RP 1½", PN40 230V, motor open/spring close 230V, manual reset, IP54
• Additional High Limit Thermostat Only:	230V, manual reset, IP54
• Primary Control Valve Actuator Positional Indication:	• Auxiliary Changeover Contacts Only • Potentiometer Only (1 or 2 kΩ) • Auxiliary Changeover Contacts and Potentiometer (1 or 2 kΩ)
• 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 103.2 to 181.2 litres per minute of hot water at 60°C. (based on a primary supply temperature of 80°C and a cold feed temperature of 10°C)

Performance & Selection Guide – GP3-40-120

Primary Supply Temperature = 80°C, Secondary Temperatures = 10-60°C

		GP3-40-120												
		GP3 21	GP3 23	GP3 25	GP3 27	GP3 29	GP3 31	GP3 33	GP3 35	GP3 37	GP3 39	GP3 41	GP3 43	GP3 45
Heat Load Required / Max. Duty	kW	360	395	430	456	478	502	523	542	563	581	600	619	632
Secondary Flow Rate at 60°C	ℓ/s	1.72	1.89	2.06	2.18	2.29	2.40	2.50	2.59	2.70	2.78	2.87	2.96	3.02
	m³/h	6.2	6.8	7.4	7.8	8.2	8.6	9.0	9.3	9.7	10.0	10.3	10.7	10.9
Secondary Pressure Drop at Peak Output	kPa	40	40	40	39	38	36	35	34	33	32	31	30	30
Primary Flow Rate at 80°C	ℓ/s	2.28	2.47	2.67	2.77	2.85	2.95	3.05	3.10	3.17	3.23	3.30	3.39	3.42
	m³/h	8.2	8.9	9.6	10.0	10.3	10.6	11.0	11.2	11.4	11.6	11.9	12.2	12.3
Primary Min. Head Available	kPa	6	6	6	6	6	6	6	6	6	6	6	6	6
Primary Return Temp. at Peak Output	°C	43	42	42	41	40	40	39	39	38	38	37	37	36
Approximate Head Available from Optional Secondary Recirculation Pump at:														
Recirculation Rate of 0.5m³/h	kPa	38	38	38	38	38	38	38	38	38	38	38	38	38
Recirculation Rate of 1.0m³/h	kPa	32	32	32	32	32	32	32	32	32	32	32	32	32
Recirculation Rate of 2.0m³/h	kPa	13	14	15	16	16	17	17	17	17	18	18	18	18

	GP3 21	GP3 23	GP3 25	GP3 27	GP3 29	GP3 31	GP3 33	GP3 35	GP3 37	GP3 39	GP3 41	GP3 43	GP3 45
"Tourist Hotel" by No. of Rooms	55	62	71	77	82	90	97	103	108	113	120	126	130
"Luxury Hotel" by No. of Rooms	36	42	48	53	57	61	65	69	73	76	80	85	88
Number of "Standard Flats"	85	98	114	125	135	149	161	171	182	190	201	212	220
Number of "Luxury Flats"	56	65	77	88	95	107	116	123	133	139	146	155	160
Hospital or Nursing Home by No. of Rooms	100	115	136	155	168	185	198	210	226	239	251	264	272
Leisure Centre or Sports Stadium by No. of Showers	27	32	37	41	45	50	55	58	62	65	70	75	77

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 Packaged Heat for an alternative sizing/selection.

Technical Specification – GP3-50-120:

Chassis Components	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
Operating Criteria	Maximum Primary Side Temperature:	110°C
	Maximum Primary Side Pressure:	10.0bar
	Maximum Secondary Side Pressure:	6.0bar
Connections	Primary Side Water Connections (standard):	Inlet - Cast Iron, DN50, PN10 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)
Primary Components	Primary Pump (c/w Volt Free Trip Terminals):	Magna3 50-120F (1-phase) (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
Control Panel	Control Panel (standard): • ABS enclosure. • Electronic PID temperature controller. • 7-day time clock control of 2 temperature settings or 1 temperature and night "off", per day. • Safety extra low voltage (SELV) circuit for external "clock" control of 2 temperatures of operation or 1 temperature set point and "off". • Safety extra low voltage (SELV) circuit for an external interlock. • Adjustable high limit and low limit temperature alarms, temperature alarm lamp, common volt free temperature alarm and selectable high temperature lockout modes. • Functional indication of: primary pump enable (P1 or P2) and valve open/closing. • LCD digital display of day and time, secondary flow temperature and any faults. • Pump mode selecion including Duplex primary pump duty share and auto-changeover on pump fault (if fitted). • Full menu driven interrogation of parameters and operating modes. • 500mA control fuse, 10A ouput fuse.	

Optional Extras:

• Duplex (Twin-Head) Primary Pump: (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):	Magna3 40-80FN (1-phase) or Magna3 40-120FN (1-phase)
• Additional Primary Shut Off Kit: Valve Actuator c/w Additional High Limit Thermostat	 2-port, DZR Cast Brass Body, RP 2", PN40 230V, motor open/spring close 230V, manual reset, IP54
• Additional High Limit Thermostat Only:	230V, manual reset, IP54
• Primary Control Valve Actuator Positional Indication:	• Auxiliary Changeover Contacts Only • Potentiometer Only (1 or 2 kΩ) • Auxiliary Changeover Contacts and Potentiometer (1 or 2 kΩ)
• 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 148.2 to 321.6 litres per minute of hot water at 60°C. (based on a primary supply temperature of 80°C and a cold feed temperature of 10°C)

Performance & Selection Guide – GP3-50-120

Primary Supply Temperature = 80°C, Secondary Temperatures = 10-60°C

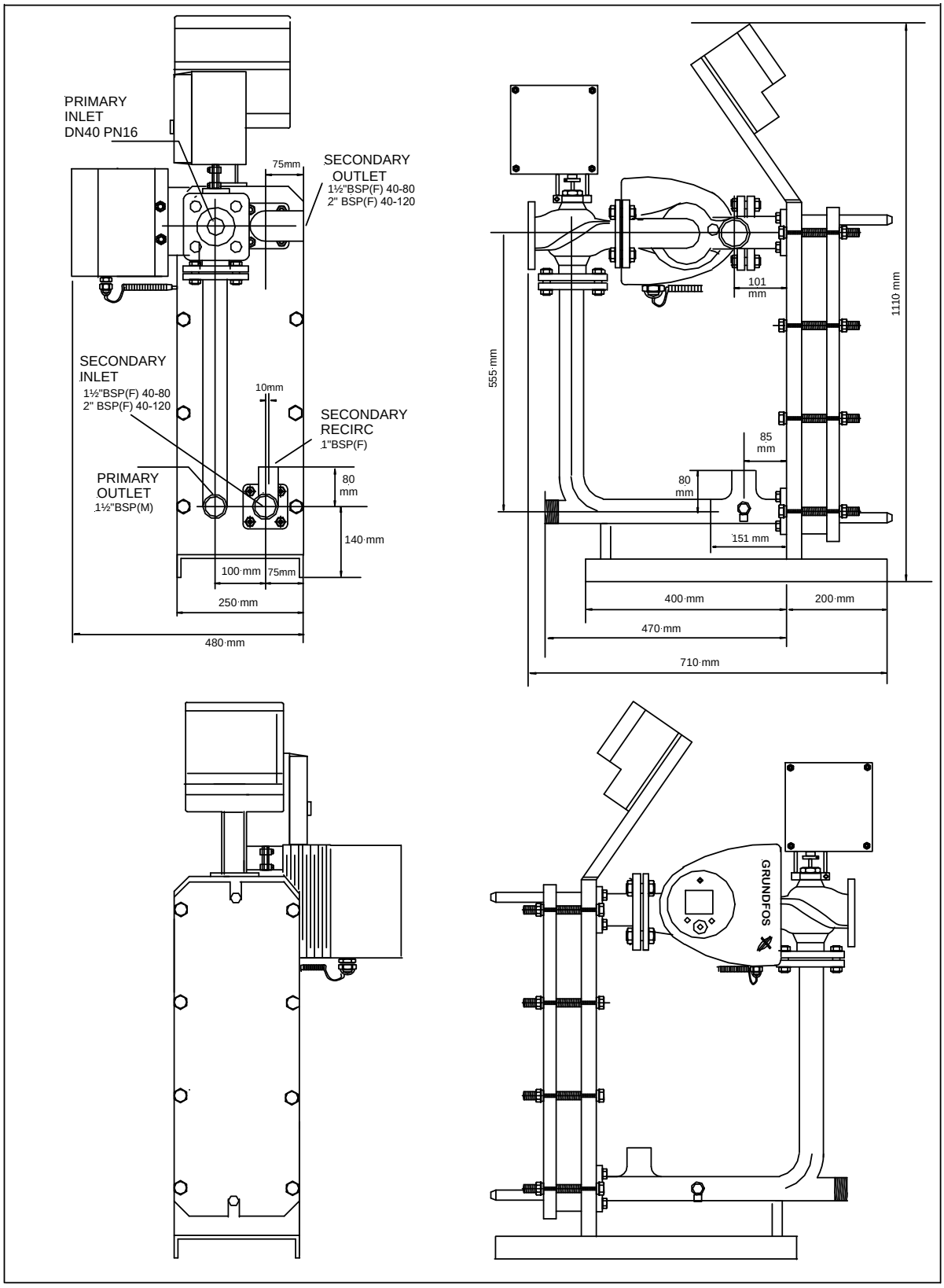
		GP3-50-120													
		GP3 22	GP3 26	GP3 30	GP3 34	GP3 38	GP3 42	GP3 46	GP3 50	GP3 54	GP3 58	GP3 62	GP3 66	GP3 70	GP3 74
Heat Load Required / Max. Duty	kW	517	600	678	740	802	849	892	943	988	1015	1045	1078	1099	1120
Secondary Flow Rate at 60°C	ℓ/s	2.47	2.87	3.24	3.54	3.84	4.06	4.27	4.51	4.73	4.86	5.00	5.16	5.26	5.36
	m³/h	8.9	10.3	11.7	12.7	13.8	14.6	15.4	16.2	17.0	17.5	18.0	18.6	18.9	19.3
Secondary Pressure Drop at Peak Output	kPa	23	22	21	20	19	18	17	16	16	15	14	13	12	12
Primary Flow Rate at 80°C	ℓ/s	3.79	4.24	4.65	4.90	5.18	5.35	5.47	5.70	5.86	5.90	6.00	6.10	6.15	6.18
	m³/h	13.6	15.3	16.7	17.6	18.6	19.3	19.7	20.5	21.1	21.2	21.6	22.0	22.1	22.2
Primary Min. Head Available	kPa	6	6	6	6	6	6	6	6	6	6	6	6	6	6
Primary Return Temp. at Peak Output	°C	48	47	46	44	43	42	41	41	40	39	39	38	37	37
Approximate Head Available from Optional Secondary Recirculation Pump at:															
Recirculation Rate of 1.0m³/h	kPa	48	49	49	49	49	49	49	49	49	49	49	49	49	49
Recirculation Rate of 3.0m³/h	kPa	39	40	41	41	42	42	42	42	42	42	42	42	42	42
Recirculation Rate of 5.0m³/h	kPa	22	24	26	28	29	30	31	31	31	32	32	32	32	32

	GP3 22	GP3 26	GP3 30	GP3 34	GP3 38	GP3 42	GP3 46	GP3 50	GP3 54	GP3 58	GP3 62	GP3 66	GP3 70	GP3 74
"Tourist Hotel" by No. of Rooms	94	120	147	171	193	212	229	249	269	281	295	312	321	333
"Luxury Hotel" by No. of Rooms	64	80	97	110	127	139	149	161	175	183	191	201	207	215
Number of "Standard Flats"	158	201	248	289	332	367	398	434	469	492	520	552	569	587
Number of "Luxury Flats"	113	146	183	213	245	272	295	325	352	369	390	414	427	441
Hospital or Nursing Home by No. of Rooms	194	251	307	357	405	446	481	522	561	589	620	653	674	691
Leisure Centre or Sports Stadium by No. of Showers	53	70	88	103	121	133	144	160	175	186	197	208	217	225

Notes:

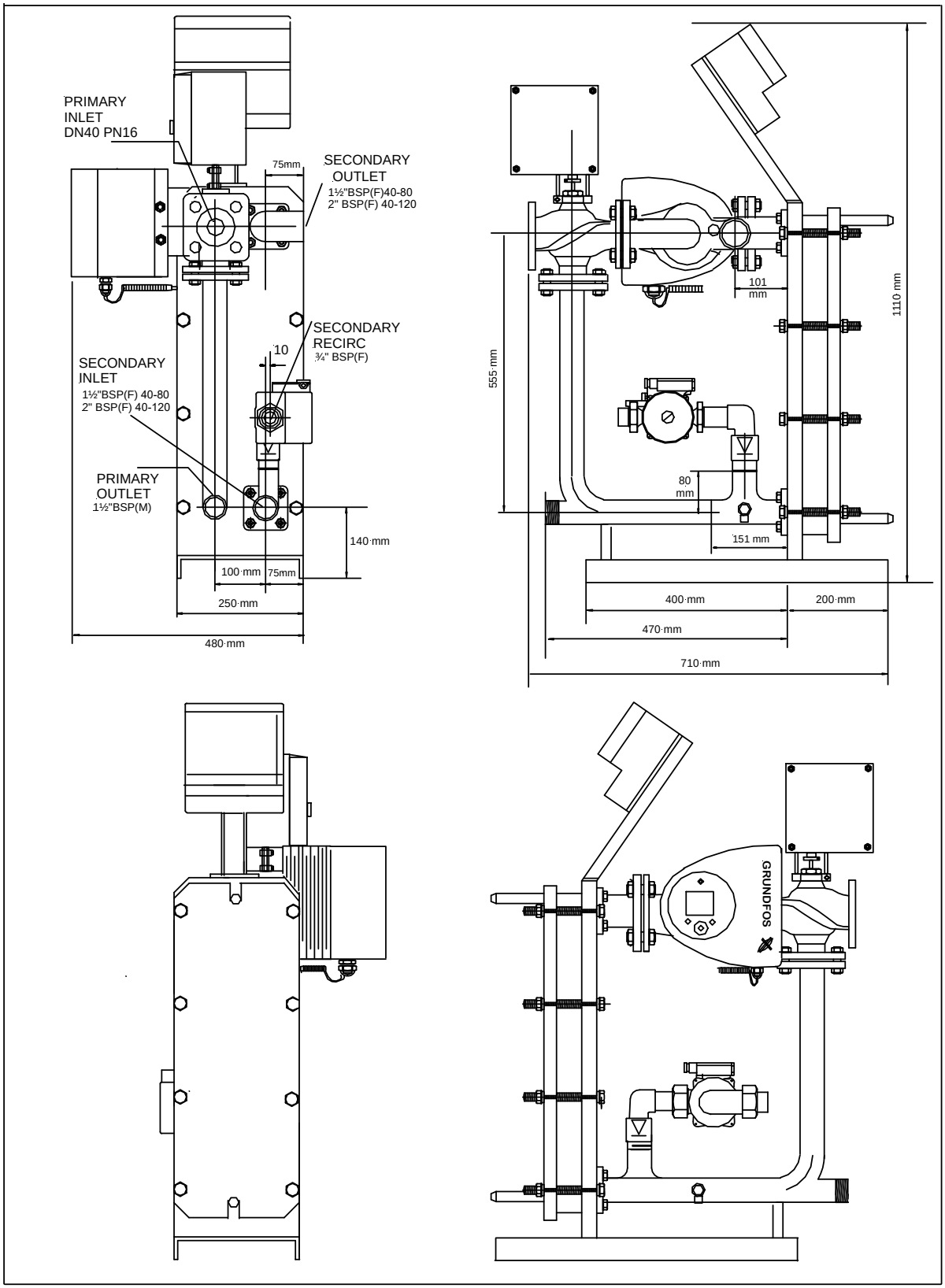
- This selection guide uses diversity factors; actual site requirements should always be checked. For simultaneous operation of outlets calculate separately.
- “Tourist Hotel” assumes a room with one shower and one wash hand basin.
- “Luxury Hotel” assumes a room with one bath or one shower and one wash 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 Packaged Heat for an alternative sizing/selection.

Mechanical Drawing – GP3 40-80/40-120 +0R Instantaneous Excluding Secondary Pump:



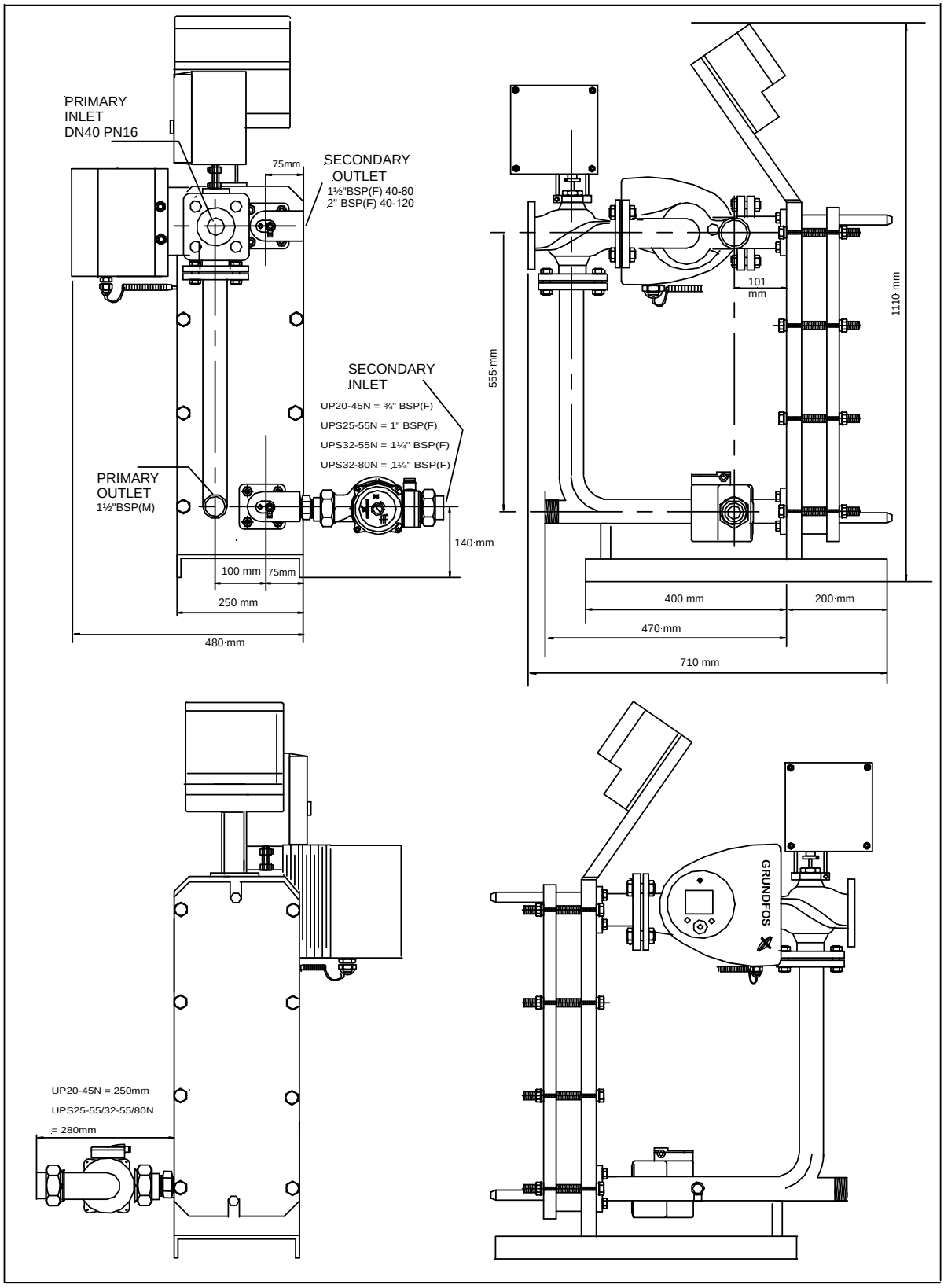
Recommended Minimum Clearances for Maintenance:
450mm front, 300mm pump side, 150mm other side

Mechanical Drawing – GP3 40-80/40-120 +1R Instantaneous Including UP20-45N Secondary HWS Recirculation Pump:



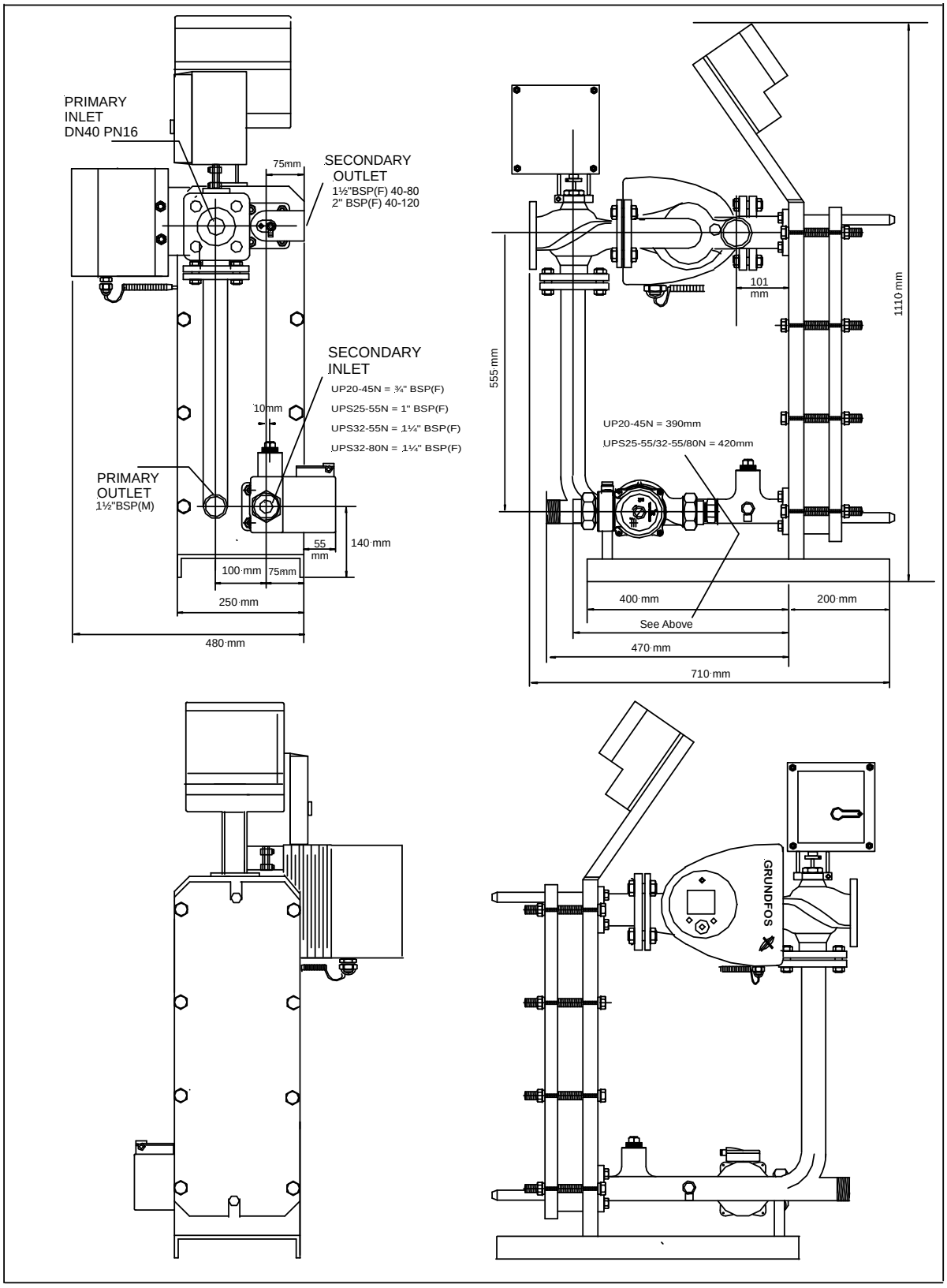
Recommended Minimum Clearances for Maintenance:
450mm front, 300mm pump side, 150mm other side

Mechanical Drawing – GP3 40-80/40-120 +1T Semi-Instantaneous Including UP/UPS Secondary Transfer Pump on Angled Secondary Inlet:



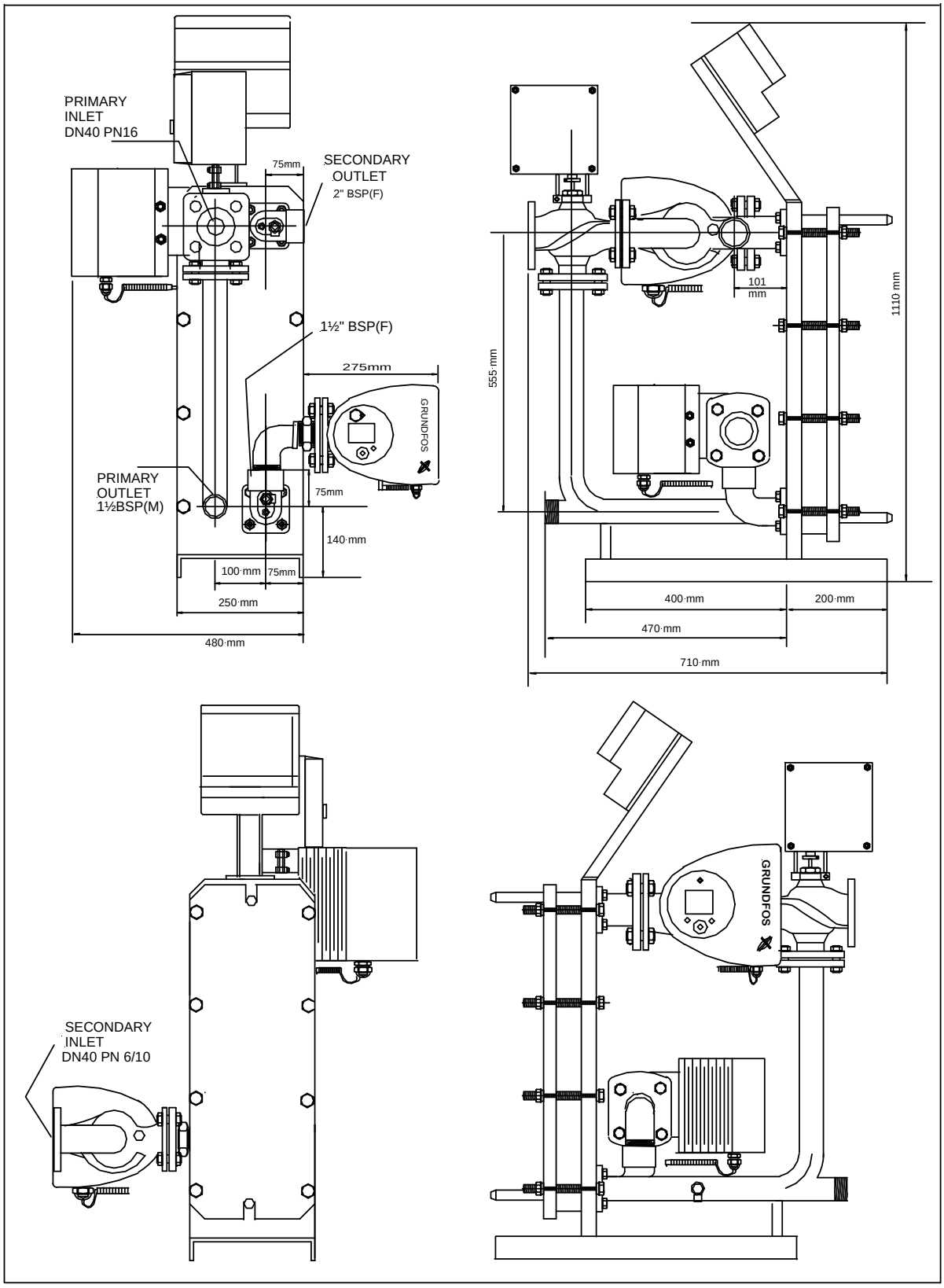
Recommended Minimum Clearances for Maintenance:
450mm front, 300mm pump side, 150mm other side

Mechanical Drawing – GP3 40-80/40-120 +1T Semi-Instantaneous Including UP/UPS Secondary Transfer Pump on Straight Secondary Inlet:



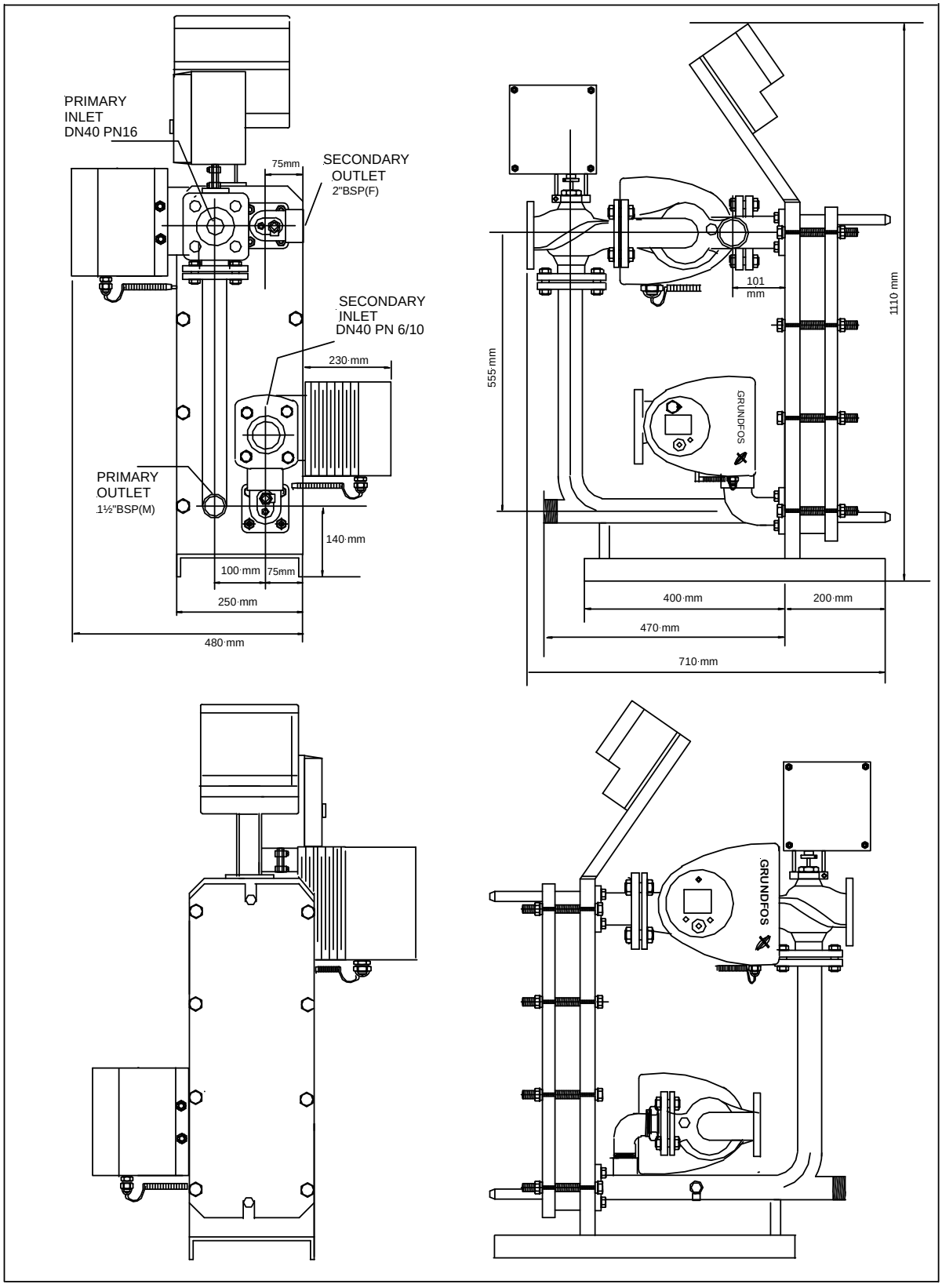
Recommended Minimum Clearances for Maintenance:
450mm front, 300mm pump side, 150mm other side

Mechanical Drawing – GP3 40-120+1T Semi-Instantaneous Including Magna3 FN Secondary Transfer Pump on Angled Secondary Inlet:



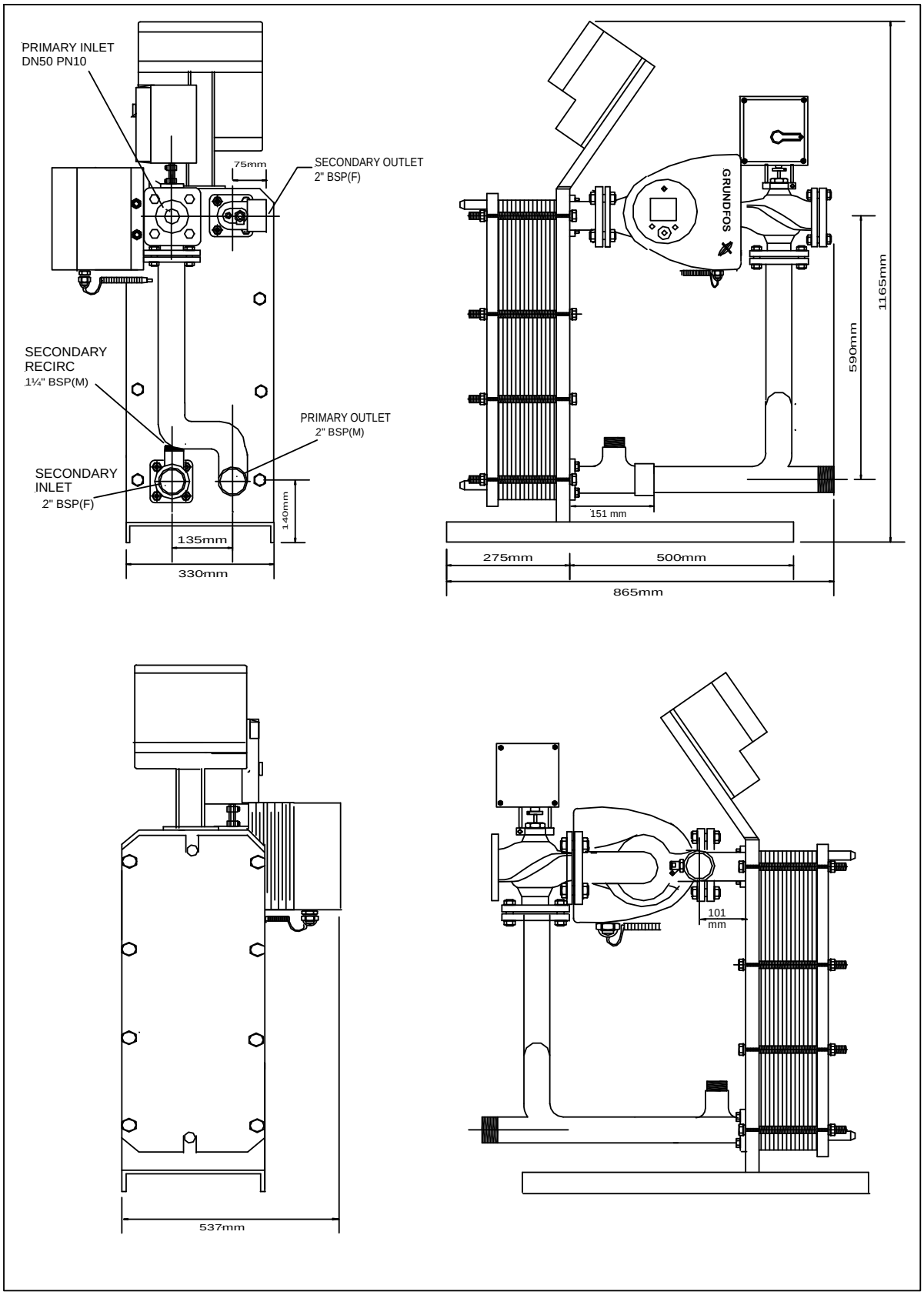
Recommended Minimum Clearances for Maintenance:
450mm front, 300mm pump side, 150mm other side

Mechanical Drawing – GP3 40-120+1T Semi-Instantaneous Including Magna3 FN Secondary Transfer Pump on Straight Secondary Inlet:



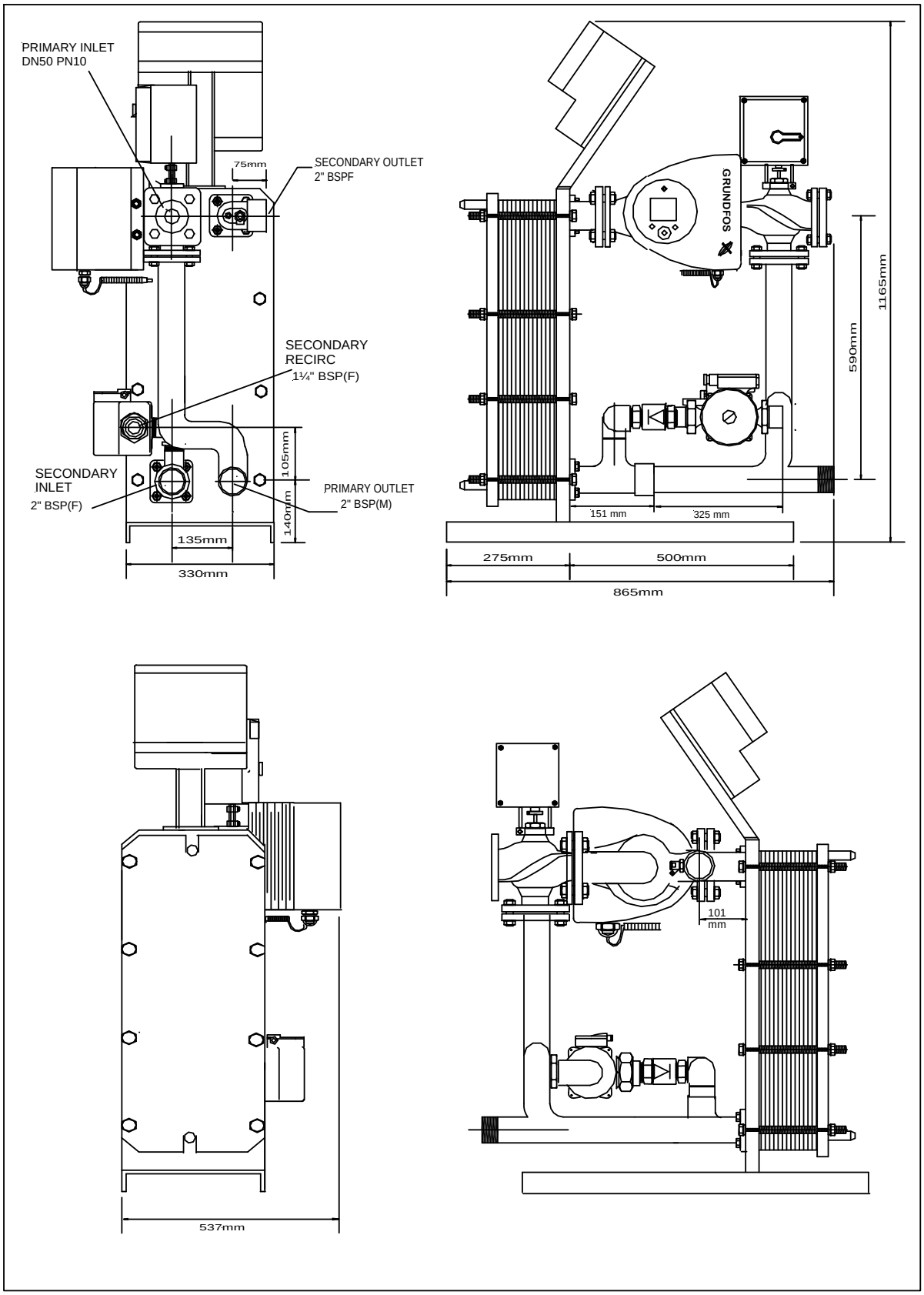
Recommended Minimum Clearances for Maintenance:
450mm front, 300mm pump side, 150mm other side

Mechanical Drawing – GP3 50-120+0R Instantaneous Excluding Secondary Pump:



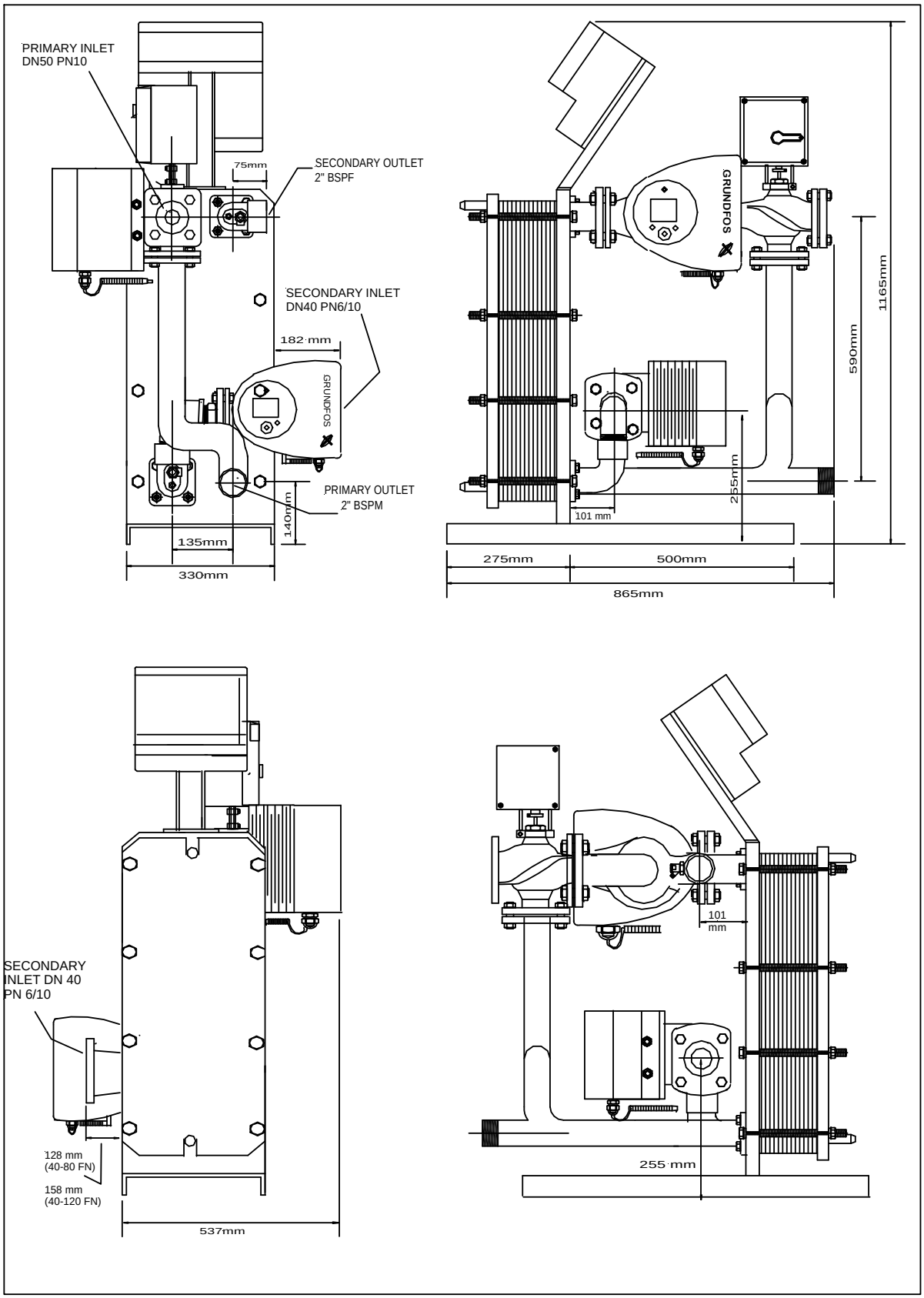
Recommended Minimum Clearances for Maintenance:
450mm front, 300mm pump side, 150mm other side

Mechanical Drawing – GP3 50-1201R Instantaneous Including UPS32-55N Secondary HWS Recirculation Pump:



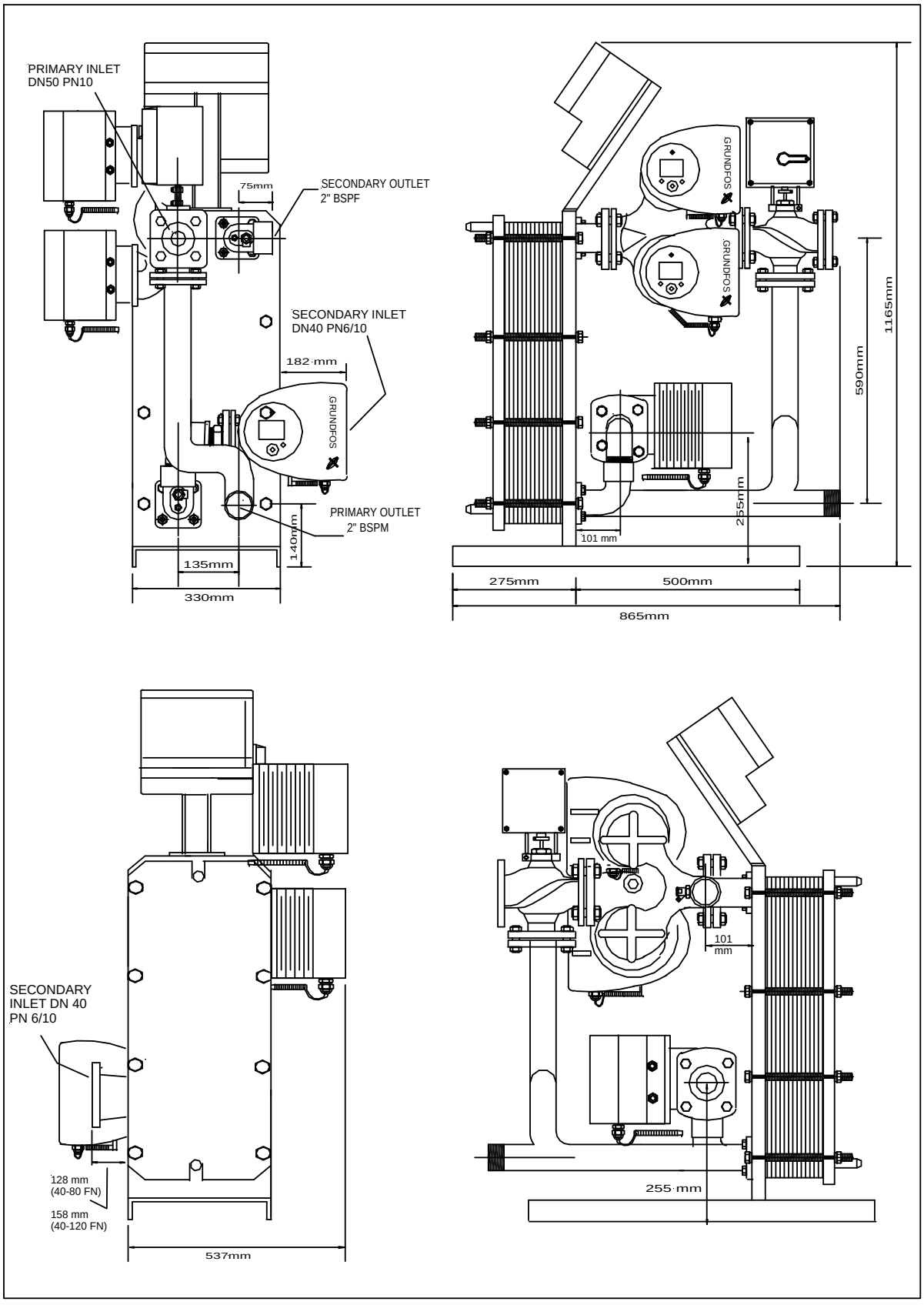
Recommended Minimum Clearances for Maintenance:
450mm front, 300mm pump side, 150mm other side

Mechanical Drawing – GP3 50-120+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 – GP3 50-120 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:

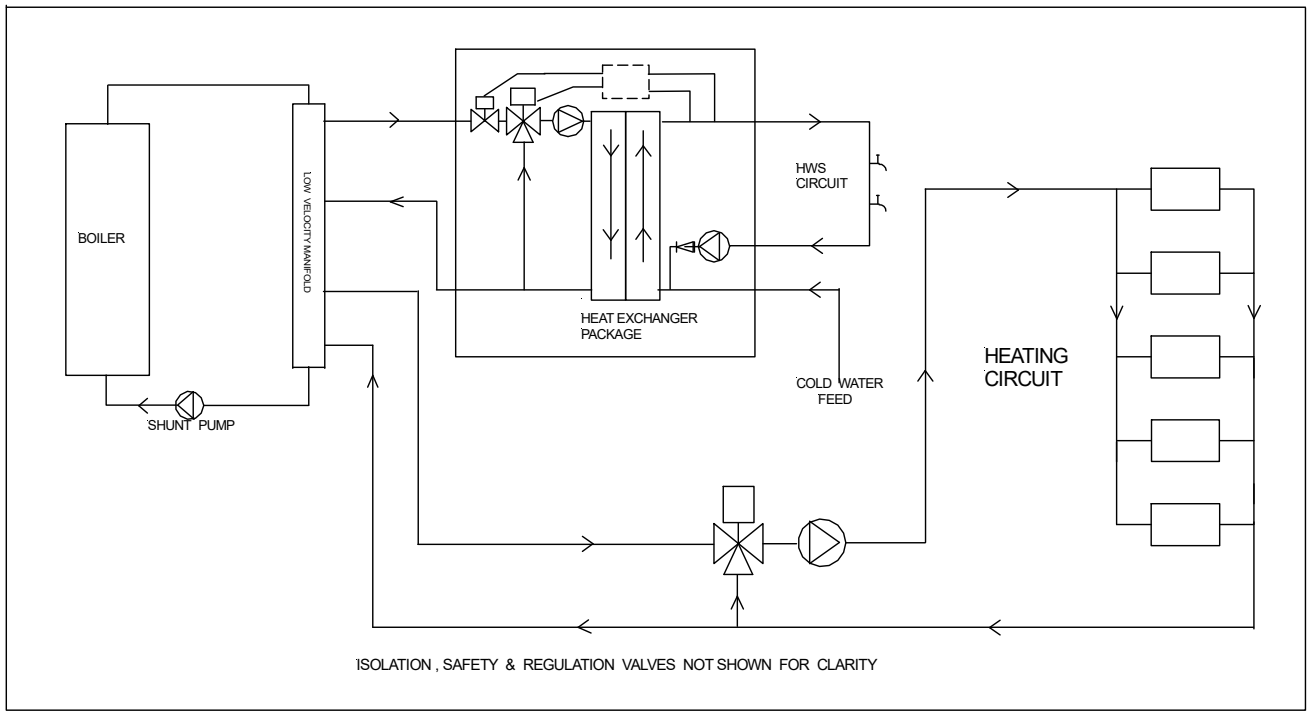
The flow from the primary heat source is connected to the 3-port valve and the return to the lower primary outlet BSP threaded connection. Connections should be made using the correct counter flanges/unions, and suitable isolating valves should be installed to enable servicing of the unit after installation.

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 GP Series 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 a GP 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 plate heat exchanger into the distribution system to the taps.

The cold water feed is connected to the bottom horizontal bronze connection on the rear of the GP Series. 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 GP Series. 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 GP Series. For this purpose, a tee connection is provided in the lower bronze cold feed casting, or alternatively if the optional secondary recirculation pump (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 GP Series – 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)).

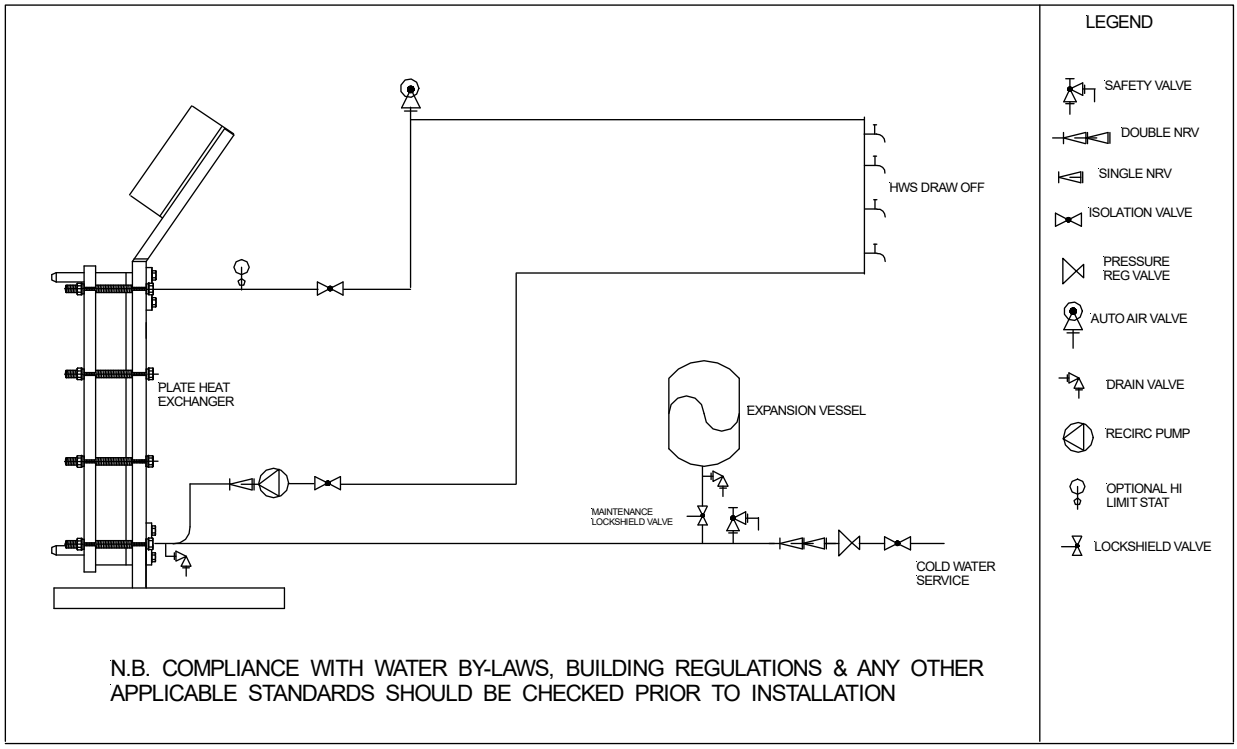
The GP Series can be supplied with an optional secondary transfer pump which draws water from the bottom of the vessel at the design flow rate of the unit. This water enters the GP Series through the lower bronze connection and is heated to the desired temperature. It is then pumped from the top bronze 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 GP Series 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.

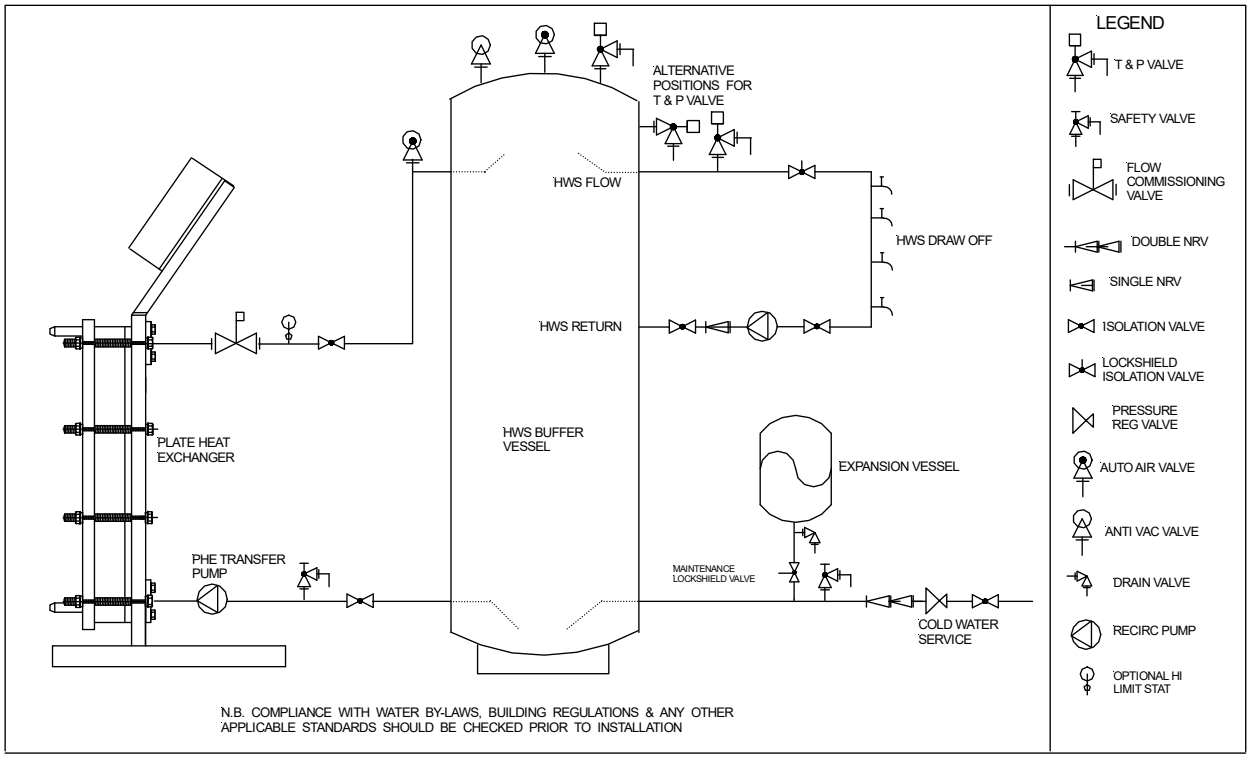
Recommended Minimum Clearances for Maintenance:
450mm front, 300mm pump side, 150mm other side

Installation – Secondary Schematics:

Instantaneous System with Mains/Boosted Cold Feed Connection:



Semi-Instantaneous System with Mains/Boosted Cold Feed Connection and Buffer Vessel Storage:



Electrical Details:

GPPH3-40-80 (230V, 1-phase): Full-load current = 1.40A (Magna3 40-80F)
GPPH3-40-120 (230V, 1-phase): Full-load current = 2.15A (Magna3 40-120F)
GPPH3-50-120 (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 or a secondary transfer pump 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 GP Series 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.

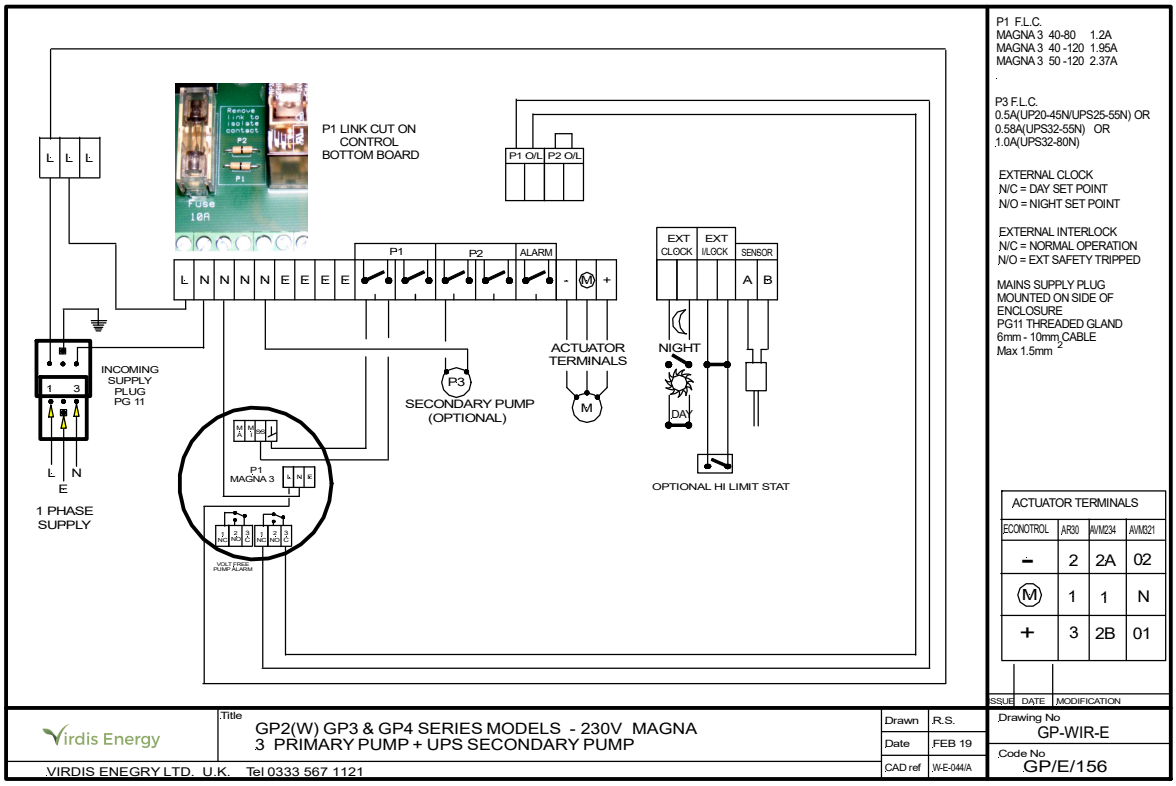
External “Clock”:
An external device can be connected to switch between 2 temperatures of operation, or to switch between a single set point and “off”. A closed contact across this safety extra low voltage (SELV) circuit gives the “day” setting (EXT Clock Day) and an open circuit the “night” setting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

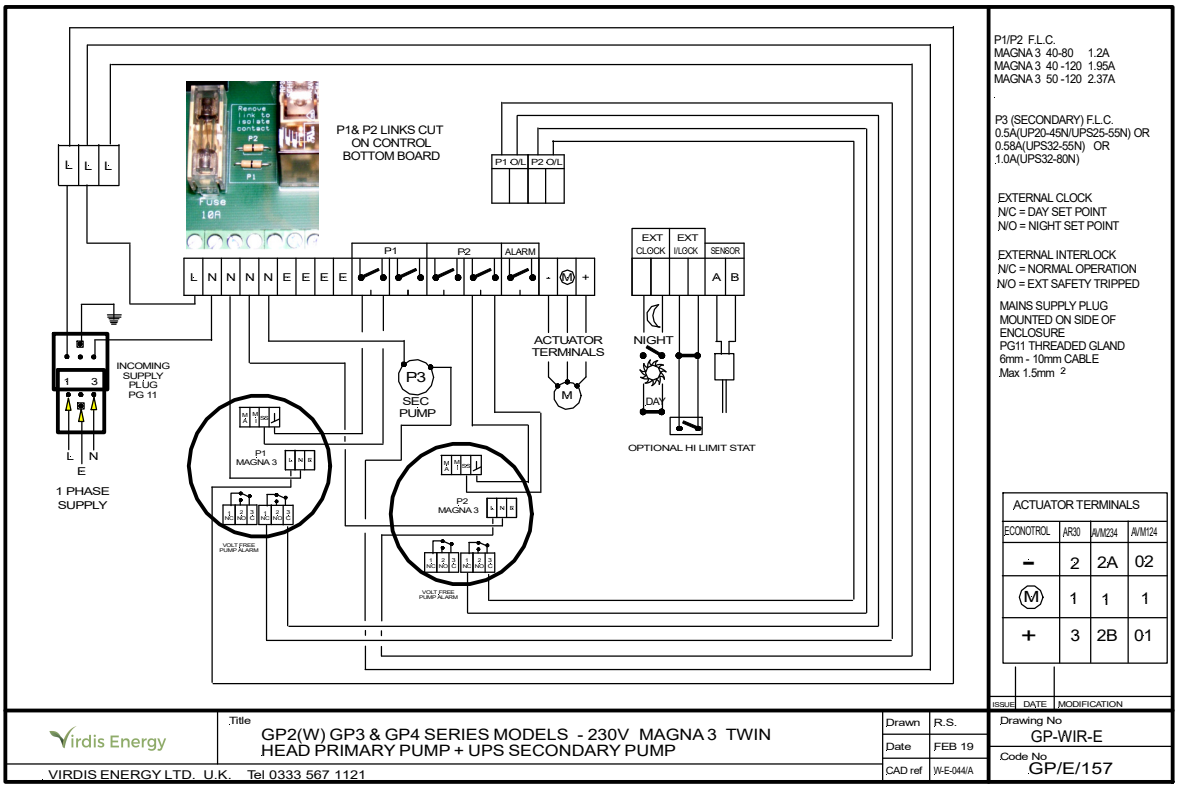
Fuse Protection:
The electronic controller is protected by a 500mA fuse and the main PCB output side is protected by a 10A fuse; both are located on the main PCB.

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

Electrical Wiring Schematic (standard) – GP3
Single-Head Magna3 Primary Pump & UP/UPS Secondary Pump:



Electrical Wiring Schematic (standard) – GP3
Twin-Head Magna3 D Primary Pump & UP/UPS Secondary Pump:



Operation:

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

Once this is complete and the unit is on, the GPSeries Controller should be set up as described in the GP Series Controller Instruction Manual 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 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 AVM105 or an AVM321 actuator.

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

The AVM 105 actuator is connected to the valve body and spindle by a clamp ring which is tightened after fitting. The AVM321 is connected a clamp ring secured by allen 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.
For more detailed information refer to the Sauter documentation provided.

Maintenance:

If the installation is set up as per the above instructions, and if the pre-set factory values are unchanged, the GP Series 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:

- **GP3-40-80 & 40-120 (GL-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 1st intermediate plate, upwards on the 2nd 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 odd number plate packs, the blank/end plate will be chevron pattern facing upwards.
- **GP3-50-120 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 1st intermediate plate (left hand), upwards on the 2nd 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.

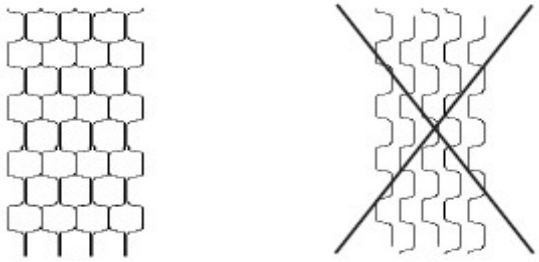
2. Reduce the pressure by opening the vents and drain both primary and secondary.

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.

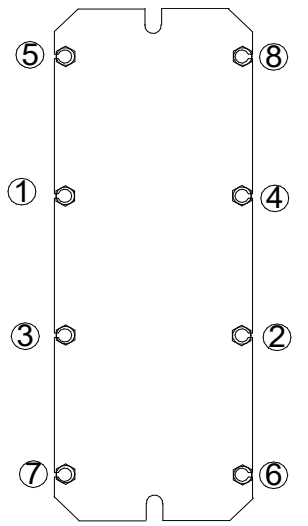
5. Carefully clean the plates using a nylon brush and warm water (do not use a metallic device). A proprietary de-scaling agent may be used if necessary. Rinse thoroughly with clean fresh water. Always follow the correct safety procedures when handling chemicals. Reassemble the plates in the same order 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 next page:



Recomended bolt
tightening sequence
View from front

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:

GP3-40-80-120:
GL-009 – 2.9mm +/- 0.05mm x the number of plates

GP3-50-120:
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 GP Series to give temporary hot water by manually opening the valve actuator 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. For UPE Magna 40-80 pumps the Grundfos R100 remote control may be used. 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 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 Controller 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 ΔT 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 Controller and reverse the + and - valve motor connections on the PCB. Reinstate 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.

Parts List

Controller & Sensor (All):

GP8133	GP Series Controller exc. Enclosure
GP6600/1	Adjustable Temperature Sensor 1/8" BSP PT100

Valve & Actuator:

BUE040F300	– 3-port Valve Sauter BUE040F300
BUE050F200	– 3-port Valve Sauter BUE050F200
AVM105F100	– Sauter Actuator AVM105F100
AVM321F110	-- Sauter Actuator AVM321F110

Heat Transfer Plates & Liners:

GL009H START	– 4-hole First/Start Plate GPPH-40-80 & 40-120
GL009H INT	– Intermediate Plate GPPH-40-80 & 40-120
GL009H BLANK	– No-hole Blank/End Plate GPPH-40-80 & 40-120
GPPH4647	– 43mm Through-Frame Liner GPPH-40-80 & 40-120
GL009L INT	– Intermediate Plate (low pressure drop) GPPH-40-80 & 40-120
GL13H START	– 4-hole First/Start Plate GPPH-50-120
GL13H LH	– Left-Hand Intermediate Plate GPPH-50-120
GL13H RH	– Right-Hand Intermediate Plate GPPH-50-120
GL13H BLANK	– No-hole Blank/End Plate GPPH-50-120
GPPH8127	– 52mm Through-Frame Liner GPPH-50-120
GL13L LH	– Left-Hand Intermediate Plate (low pressure drop
GL13L RH	– Right-Hand Intermediate Plate (low pressure drop)

Primary Pumps:

Primary Pump	– Magna3 40-80F (1-phase)	(97924268)
Primary Pump	– Magna3 40-120F (1-phase)	(97924270)
Primary Pump	– Magna3 50-120F (1-phase)	(97924284)
Primary Pump twin head	– Magna3 D 40-80F (1-phase)	(97924463)
Primary Pump twin head	– Magna3 D 40-120F (1-phase)	(97924465)
Primary Pump twin head	– 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)

Optional Extras:

2-port Primary Shut Off Valve – Sauter VKR040F300-FF40mm, Rp 1½", PN40
2-port Primary Shut Off Valve – Sauter VKR050F300-FF50mm, Rp 2", PN40
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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