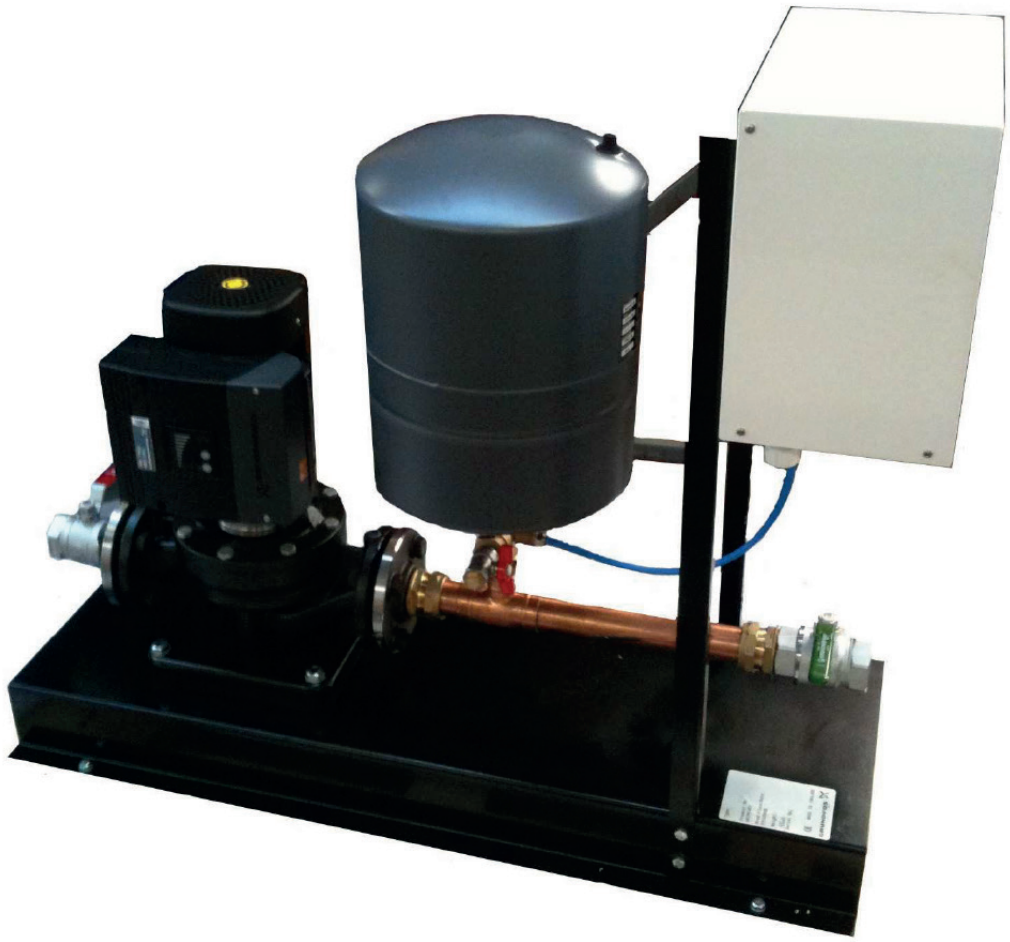


Reclaim Plus Pump Pack

Installation, Operation & Maintenance Manual

IOM 39 Issue 7

SPC

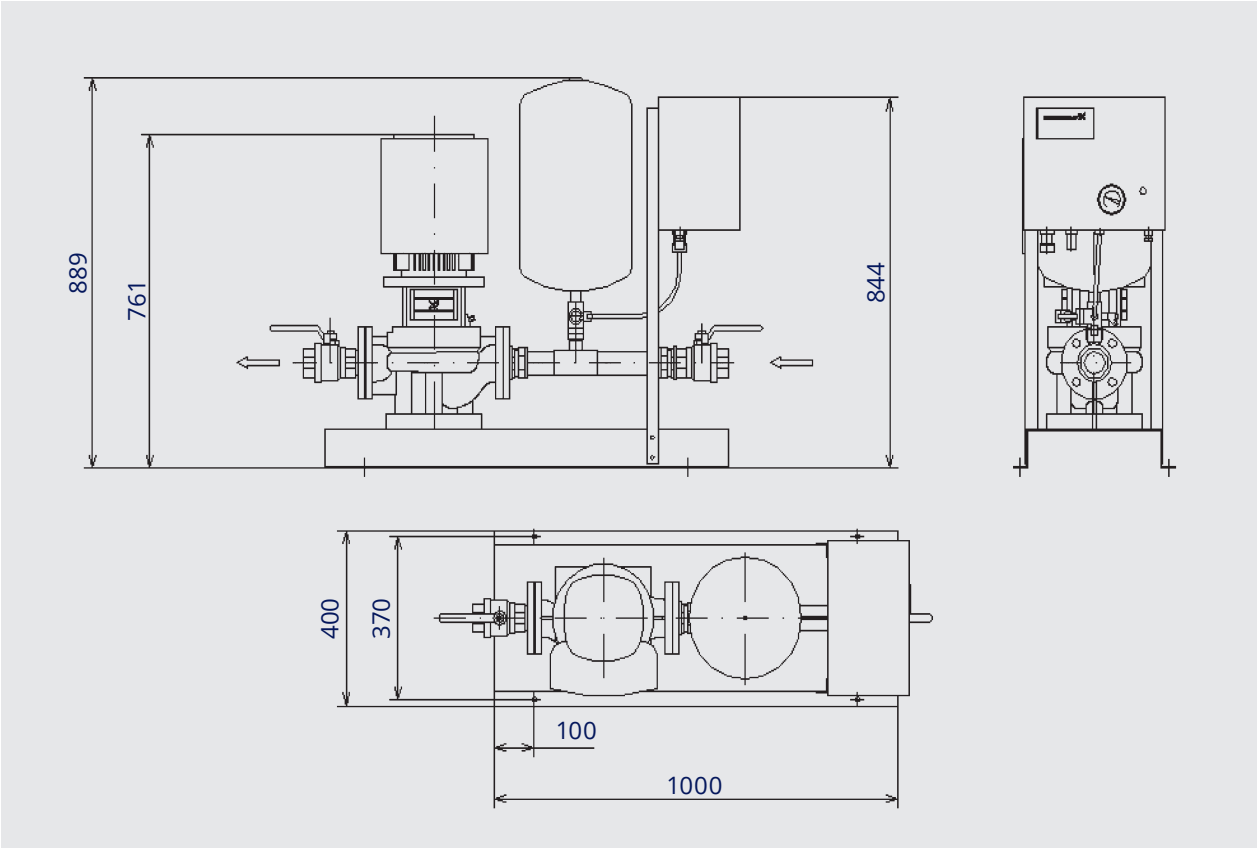
Contents

1. General description

The reclaim plus range of pump packs comprise the following features all mounted on a common skid base and pre-piped:

In-line circulation pump. This is a single stage in-line centrifugal pump with a mechanical shaft seal. The pump is of the close-coupled type i.e. pump and motor are separate units and hence insensitive to impurities. Pump motors are either single phase, 230V, 50Hz or 3 phase, 400V, 50Hz depending on the size. All pumps incorporate inverter technology for electronic speed control of the motors. Speed setting is affected using the buttons mounted on the control panel of the pump which also incorporates potential free contacts for remote switching. A remote control option can be separately purchased which communicates with the pump wirelessly or via a smart phone and allows extended control and monitoring features to be used.

The suction and discharge connections to the pump packs both terminate in isolating valves to allow complete isolation for servicing requirements. Dimensional details of the complete pump packs are shown on the diagram below.

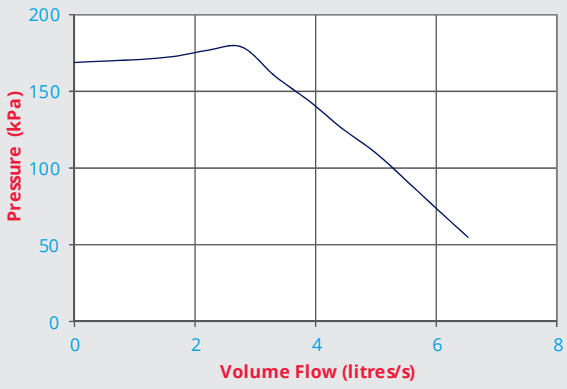


Off-line pressurisation station. This is frame mounted and housed within a white powder coated casing. The casing houses a small make-up tank and filling valve assembly, complying with the Water Regulations Guide, a hydraulic pump producing a pressure of between 0.7 and 2.4 bar, a pressure control switch, surface mounted pressure gauge and system and overflow connectors. The pressurisation unit is not intended to fill the entire system; an isolating valve/quick fill point is provided for use during system charging. Once the system is installed and operational, the inbuilt pressure switch controls intermittent-operation of the pump so as to regulate and maintain system pressure.

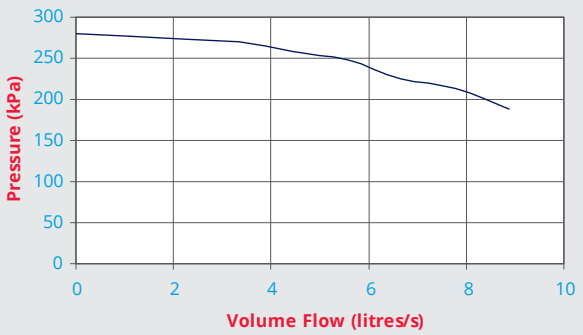
A 24 litre diaphragm expansion vessel accommodates volume changes in the closed system, caused by the variation of fluid temperature.

Two sizes of circulating pump are available and the flow pressure characteristics for each are shown in the charts below. These curves represent the performance of the pumps operating at maximum rated speed i.e. mains frequency and voltage. The pump motors incorporate electronically controlled inverter drives and the actual operating curves can be reduced to such a level as to precisely match the desired operating parameters.

Size 2L



Size 6L



The detailed specification of the units, performance and electrical details are given in the table below. See the operation section below for detailed electrical/electronic data.

	Unit size	2L	6L
Circulating pump	Type	TPE2 32-200N	TPE50-290/2
	Power supply (V/Ph/Hz)	230/1/50	400/3/50
	Housing	Cast iron	Cast iron
	Impeller	Stainless steel	Stainless steel
	Seal	Silicon carbide	Silicon carbide
	Motor rating (kW)	0.75	3.0
	FLC (A)	4.2	6.0
	Rotational speed (rpm)	2780	2900
Expansion tank	Type	Diaphragm	Diaphragm
	Preset pressure (bar)	1.5	1.5
	Capacity (litres)	24	24
Pressurisation unit	Power supply (V/Ph/Hz)	230/1/50	230/1/50
	Pump type	Piston type 508LA	Piston type 508LA
	Max. pressure (bar)	2.4	2.4
	Maximum flowrate (litres/hour)	80 80	
	Power consumption (W)	25	25
	FLC (A)	0.1	0.1
	Water inlet connection (BSPM)	1/2"	1/2"
	Overflow connection	3/4"	3/4"
	Pressure gauge	50mm, 0 to 6 bar	50mm, 0 to 6 bar
	Make up tank capacity (litres)	4.5	4.5
	Pressure switch range (bar)	0.7 to 6.0	0.7 to 6.0
General	Approximate weight (kg)	90	115
	Connection sizes (BSPF)	1,1/4	2"
	Fluid	Up to 30% glycol	Up to 30% glycol
	Sound pressure level (dB(A)) @ 1m	<70	59

2. Receipt and Storage

Units are delivered suitably wrapped/palletised and displaying all relevant SPC and customer references. Check all details prior to removing packaging and report any damage to the carrier and the SPC office immediately.

Packaging should be left in place and the unit(s) stored in a safe area until ready for installation. The pump packs can be safely stored in temperatures between -30°C and +40°C, the atmosphere should be non-condensing

3. Installation

3.1 Mounting

The pump set should be mounted on a flat, horizontal, solid surface. This will ensure that all component parts are correctly positioned. Site the equipment in a dry, well ventilated atmosphere, not subjected to extremes of temperature. The atmosphere must comply with safety requirements and be non-aggressive and non-explosive.

Ensure that pump terminal blocks and all wiring are away from heated surfaces, and that pump motors are away from heat sources.

The unit should be positioned within 3 metres in altitude from the high point of the system being supplied. If the set is at a considerable distance below the high point then fluid pressure at the pressurisation point will be artificially high. Every effort should be made to install the set away from the system's low point, to prevent sediment building up in the pumps.

When connecting the pump set between supply and exhaust "run-around" coils, it is imperative that the discharge pipe from the circulating pump is connected to the flow pipe of the supply coil, i.e. return pipe from exhaust coil connected to pump suction. This will ensure that during operation the pump sees the higher fluid temperature, thus reducing the risks associated with condensation forming on the pump motor windings.

The pump packs must be positioned such that there is an unimpeded flow of air across the motor casing to assist in cooling. Ambient air must be at a temperature of between -30°C and +40°C. If the pump pack is externally mounted then a suitable cover needs to be installed around it to ensure that the pump motor is protected from the elements and that no moisture or condensation can form on the electronic components. If housed inside a cover, louvres must be incorporated to ensure air is allowed to circulate across the motor.

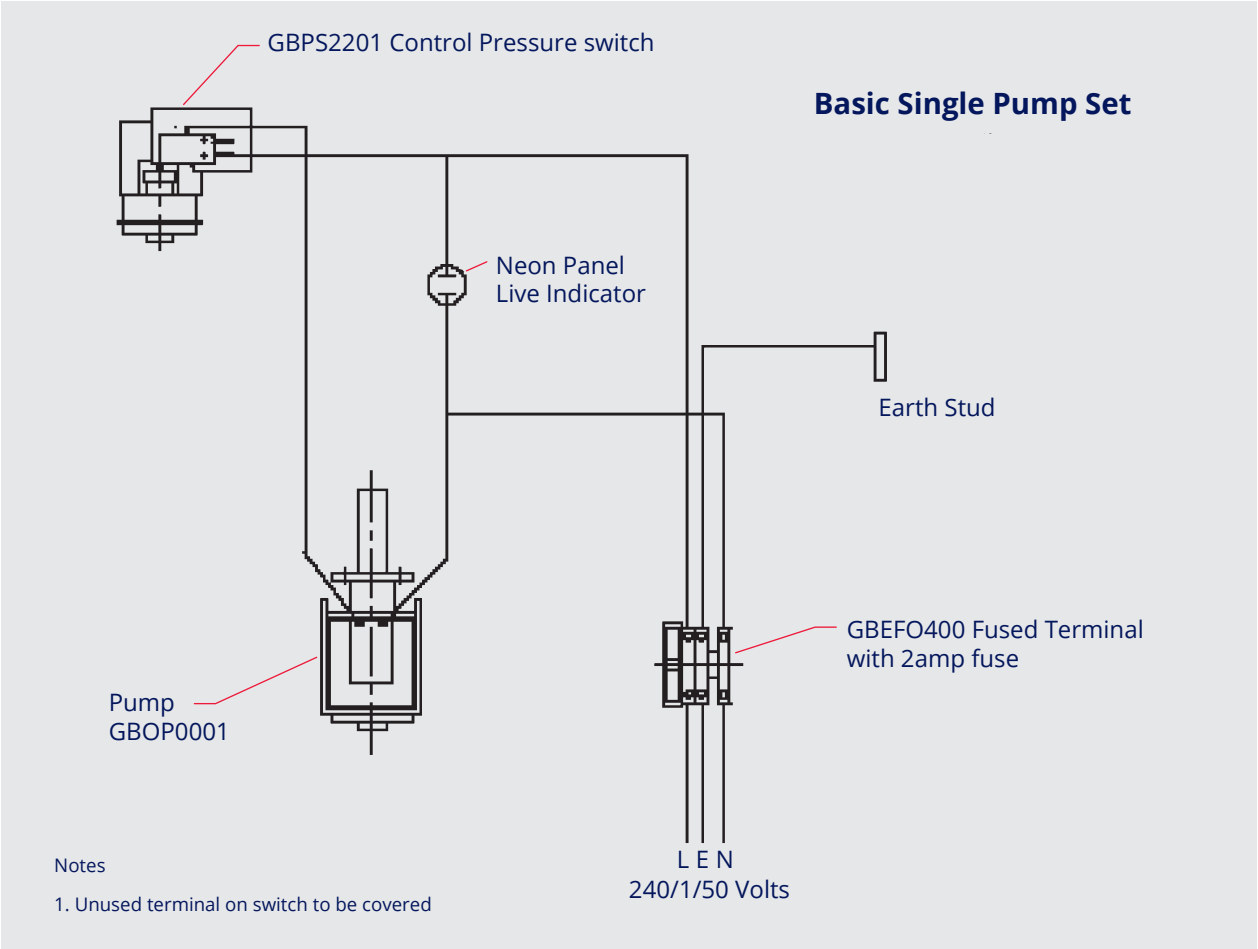
If the pump pack is mounted in a sensitive area then noise/vibrations from the motor/pump and flow through pipework and fittings may need to be dampened. This is best achieved by mounting on a concrete floor or base via vibration dampers and the installation of expansion joints in the pipework.

If an orifice plate is fitted in the pipework in order to measure flowrate then it is recommended that this is fitted in a straight length of piping of at least five diameters upstream and downstream of the measuring plane.

3.2 Wiring

Wiring to the pressurisation set and the circulating pump are made separately via the terminal blocks inside the relevant control panels.

3.2.1 Pressurisation Set



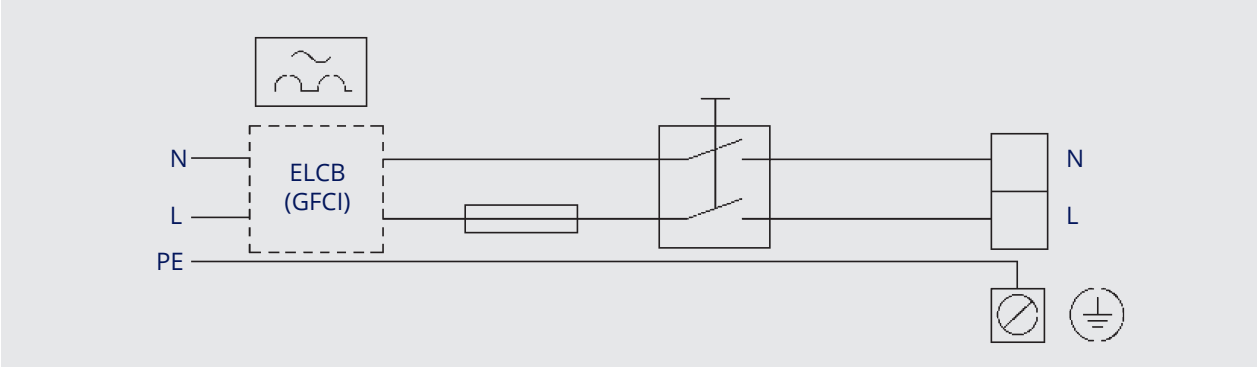
The unit should be connected to a single phase 220-240V supply as shown in the diagram above. The three core cable should be brought into the unit via the mains cable gland supplied and the unit is internally fused with a 2A fuse.

The casing has a neon in the front panel which is illuminated whenever power is supplied to the unit. The unit is also supplied with a panel mounted pressure gauge which displays the current system pressure.

3.2.2 Circulating pump

3.2.2.1 Size 2L unit

Mains wiring for the single phase size 2L pump is as the diagram below; having removed the cover of the pump control panel.



The mains connection to the pump should be via a suitably rated isolator/switch. Cables should be 1.5mm2 and backup fuses rated at 10A. The mains supply should enter the panel via the cable gland provided.

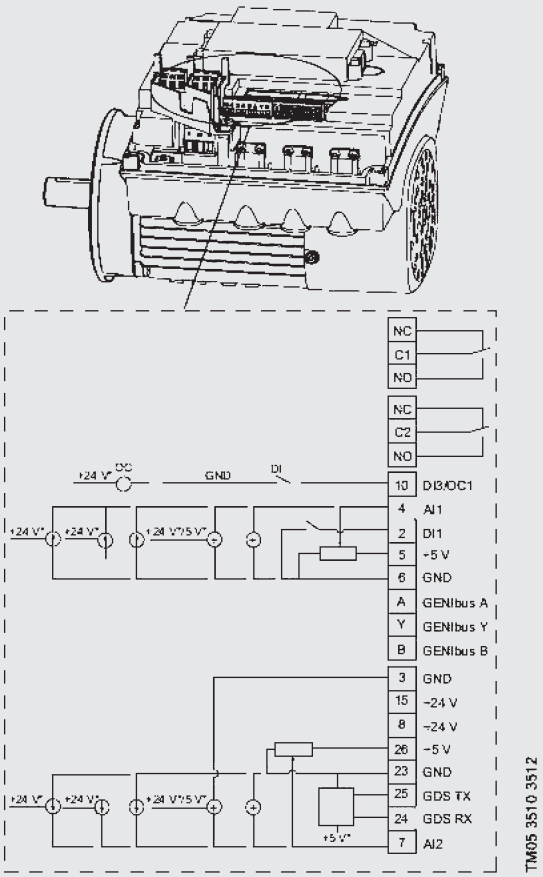
Do not make any connections in the pump terminal box unless all electric supply circuits have been switched off; note that the output signal relay used for remote run/fault indication may be connected to an external supply which may still be connected even though the mains supply is disconnected.

Note that the number of on/off starts and stops via the mains should be limited to a maximum of 4 per hour. If the pump is switched via the mains then it will start after approximately 5 seconds. If more regular starts are required then these should be made via the external on/off potential free contacts; in this case the pump starts immediately.

The auxiliary terminals are shown on the diagram below; remote on/off switching is made via the contacts at 2 and 6, signal cables should be a minimum of 0.5mm2. The output signal relay can be used for remote indication of run/fault; the common will be connected to the normally open terminal under fault conditions and to the normally closed terminal under run conditions. If no external on/off switching is used then terminals 2 and 6 need to be linked (factory set).

Other terminals shown would not normally be used unless the remote control option is supplied or BMS communication is used. If the optional remote controller has been purchased then the pump can be programmed to use remote analogue and digital inputs for set points etc., see separate documentation.

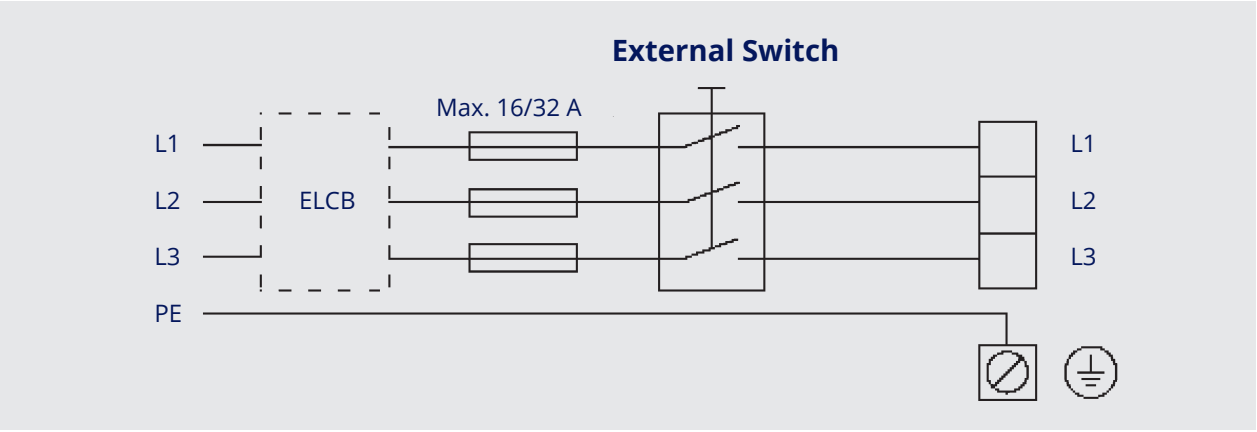
Note. The insulation resistance of the motor windings of the pump or the installation incorporating the pump must not be measured using high voltage megging equipment as this may damage the electronics of the inverter control.



Terminal	Type	Function
NC	Normally closed contact	Signal relay 1 (LIVE or SELV)
C1	Common	
NO	Normally open contact	
NC	Normally closed contact	Signal relay 2 (LIVE or SELV)
C2	Common	
NO	Normally open contact	
10	DI3/OC1	Digital input/output, configurable. Open collector: Max 24 V resistive or inductive
4	A/1	Analog input: 0-20 mA / 4-20 mA 0.5 - 3.5 V / 0-5 V / 0-10 V
2	DI1	Digital input, configurable
5	+5 V	Supply to potentiometer and sensor
6	GND	Ground
A	GENIbus. A	GENIbus. A (+)
Y	GENIbus. Y	GENIbus. GND
B	GENIbus. B	GENIbus. B (-)
3	GND	Ground
15	+24 V	Supply
8	+24 V	Supply
26	+5 V	Supply to potentiometer and sensor*
23	GND	Ground
25	GDS TX	Grundfos Digital Sensor output
24	GDS RX	Grundfos Digital Sensor input
7	AI2	Analog input: 0-20 mA / 4-20 mA 0.5 - 3.5 V / 0-5 V / 0-10 V

3.2.2.2 Size 6L unit

Wiring for the three phase size 6L pump is as the diagram below; having removed the cover of the pump control panel.



The mains connection to the pump should be via a suitably rated isolator/switch. Cables should be 1.5mm2 and backup fuses rated at 16A and the mains supply should enter the panel via the M20 cable gland provided. Three phase cables plus an earth are required (no neutral wire).

Do not make any connections in the pump terminal box unless all electric supply circuits have been switched off; note that the output signal relay used for remote run/fault indication may be connected to an external supply which may still be connected even though the mains supply is disconnected.

Note that the number of on/off starts and stops via the mains should be limited to a maximum of 4 per hour. If the pump is switched via the mains then it will start after approximately 5 seconds. If more regular starts are required then these should be made via the external on/off potential free contacts; in this case the pump starts immediately.

The auxiliary terminals are shown on the diagram below; remote on/off switching is made via the contacts at 2 and 3, signal cables should be a minimum of 0.5mm2. The output signal relay is in group 2 and can be used for remote indication of run/fault; the common will be connected to the normally open terminal under fault conditions and to the normally closed terminal under run conditions. If no external on/off switching is used then terminals 2 and 3 need to be linked (factory set).

Terminals 1,9,8,7 and 4,5,6 are for digital and analogue inputs from a BMS, B,Y,A are for communication via a bus protocol; these would not normally be used. If the optional remote controller has been purchased then the pump can be programmed to use remote analogue and digital inputs for set points etc., see separate documentation.

Note. The insulation resistance of the motor windings of the pump or the installation incorporating the pump must not be measured using high voltage megging equipment as this may damage the electronics of the inverter control.

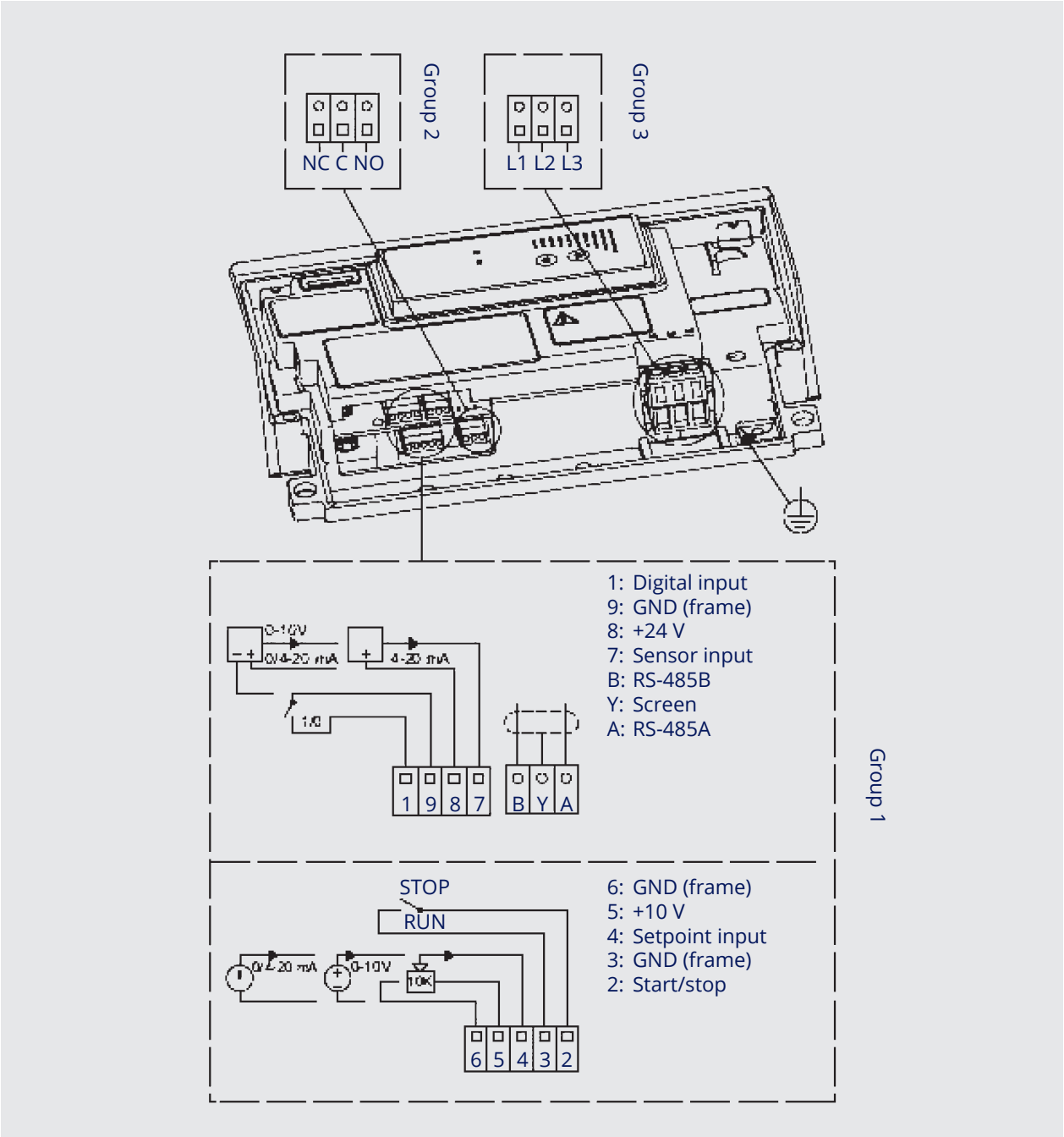
3.3 Filling

It is recommended that prior to filling, the system is flushed out using a proprietary chemical cleaner (Fernox or similar) to remove any dirt or burrs that may be present and would damage the pumps.

If the system is to be filled from the pump set then this should be accomplished via the system fill isolating valve located on the manifold below the expansion tank. During filling the system should be vented at its high points to purge any air that may prevent the system being completely filled. All isolating valves on the pump pack and the rest of the system should be fully open.

The water should be dosed with inhibitor or inhibited glycol solution to the concentration required to prevent system freezing (maximum 30%). A simple hydrometer gives sufficiently accurate measurements of glycol concentration, when referred to a table of densities/ concentrations.

Water should be introduced into the break tank of the pressurisation unit via the ½" BSPM water inlet connection on the base. The pressurisation unit may be used for fine tuning the system pressure by setting the pressure switch as follows:



Isolate the electrical connections to the pressurisation unit, remove cover screws and cover to access the internals of the casing in which the pressure switch is located. The pressure setting can be adjusted by turning the knurled knob on the pressure switch to the desired value (note that the maximum operating pressure of the pressurisation pump is 2.4 bar). Reclose the panel cover and reconnect the electrical supply, the pressurisation pump will run until the set pressure is achieved. It is recommended that the system be pressurised to 1 bar (maximum 2 bar) in order to ensure that any air is rapidly purged from the system.

The 24 litre expansion tank is preset to a pressure of 1.5 bar above the diaphragm. This can be reduced or increased via the valve on top of the tank but it is recommended that it is left at the factory setting if this is close to the operating pressure.

4. Operation

The circulation pump is operated either directly via the control panel on the pump casing. A remote control option is available which offers additional setting possibilities and status displays but is not part of the standard supply.

The circulating pump can be operated in one of four modes; normal, stop, min, max and is factory set in normal mode. Stop mode indicates that the pump has been stopped, minimum mode is useful for maintaining operation at minimum flowrates and maximum can be used during venting of the system.

In normal mode the pump control mode can be set to controlled or uncontrolled. In uncontrolled mode the pump will operate according to the constant operating curve (see below), in controlled mode the pump adjusts its performance according to the controlled parameter (pressure, differential pressure, temperature, differential temperature or flow). The control mode set from the factory is uncontrolled and the pump runs according to the selected constant curve. Note that a remote control option must be used in order to change the operating or control modes.

4.1 Control panel operation

The following describes operation of the circulating pump via the control panel mounted on the motor housing. If the remote control option is used then please consult separate documentation for details of the control features available.

The control panels and operation vary for the 2L and 6L pump packs.

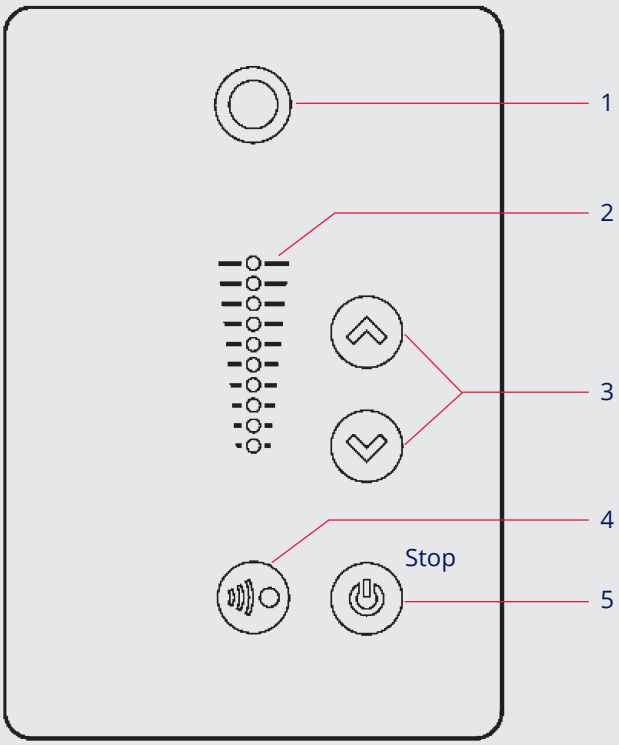
4.1.1 2L Control Panel

On the sketch below 1 is an illuminated indicator called the 'Grundfos Eye'. This indicates the status of the pump as shown in the table. 2 are light fields for indication of the setpoint operating curve. 3 are up and down keys for changing the setpoint and resetting of alarms. 4 is used to enable radio communication if supplied. 5 is the start/stop button.

The pump can be started by either pressing the start/stop button or continuously pressing the up key until the desired setpoint is indicated. The pump can be stopped by pressing the start/stop button (Stop text will be illuminated) or by continuously pressing the down key until no light fields are on. If the pump has been stopped using the start/stop button it can only be restarted by pressing this same button. If the pump has been stopped by pressing the down key then it can only be restarted be pressing the up key.

The light fields represent the speed at which the pump runs; the maximum is the speed of the pump at mains supply while the minimum represents approximately 25% of this maximum rotational speed.

Faults can be reset as follows: 1) briefly press the up or down key unless they are locked, 2) switch off the power supply until indicator lights are off, 3) Switch the external start/stop input off then on again.



Grundfos Eye	Indication	Description
	No lights on.	Power off. Motor not running.
	Two opposite green indicator lights rotating in the direction of rotation of the motor when seen from the non-drive end.	Power on. Motor running.
	Two opposite green indicator lights permanently on.	Power on. Motor not running.
	One yellow indicator light rotating in the direction of rotation of the motor when seen from the non-drive end.	Warning. Motor running.
	One yellow indicator light permanently on.	Warning. Motor stopped.
	Two opposite red indicator lights flashing simultaneously.	Alarm. Motor stopped.

4.1.2 6L Control panel

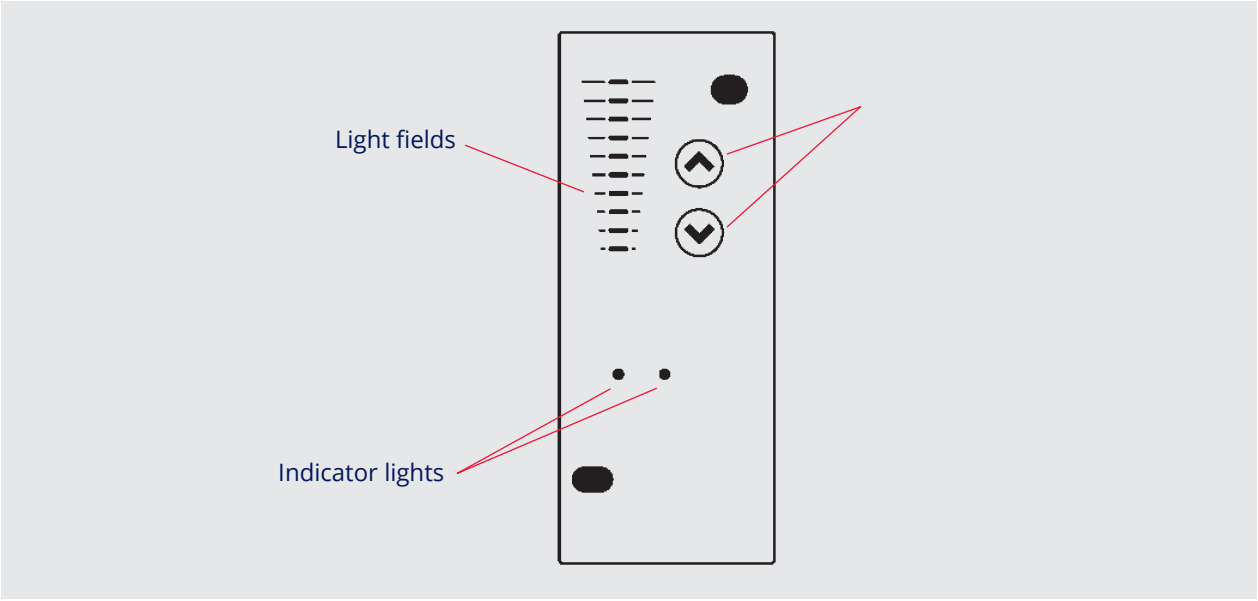
On the sketch below the up and down keys are used for changing the setpoint and for resetting alarms. There is a green (operation) and red (fault) indicator light. The light fields give setpoint indication.

The pump is started by continuously pressing the up key until the desired setpoint is indicated. The pump is stopped by continuously pressing the down key until none of the light fields are activated and the green indicator light flashes.

The light fields represent the speed at which the pump runs; the maximum is the speed of the pump at mains supply while the minimum represents approximately 25% of this maximum rotational speed.

Faults can be reset as follows: 1) briefly press the up or down key unless they are locked, 2)

switch off the power supply until indicator lights are off, 3) Switch the external start/stop input off then on again.



4.2 Remote control operation:

This is not available as standard but can be supplied via the Grundfos GO system. Options can also be offered for remote control via a BMS system. These control systems are beyond the standard supply.

5 Maintenance/ fault finding/spares

Under normal circumstances and assuming that the guidelines given above are adhered to, the apparatus should operate virtually maintenance free. Motor bearings are closed type and greased for life; they cannot be relubricated. It is advisable, however, to carry-out the following checks:

If fluid temperatures can drop below freezing and a glycol solution is being employed, ensure regularly that the concentration is sufficient to prevent freezing when exposed to worst case temperatures.

Check periodically that the connection from the mains to the break tank is clear to ensure that the pressurisation pump cannot run dry.

Clean the motor cooling fins as part of the regular maintenance schedule. This will ensure that the mechanical parts and electronics are effectively air cooled.

If the pressurisation pump runs too regularly this is an indication of a leak somewhere within the system. Check also the system pressure on the gauge provided. If this is falling at a slow but steady rate then there is likely to be a slow leak in the system. Check system pipework for evidence.

Vent system high points regularly to purge air that not only reduces effectiveness but causes noise and corrosion especially of pumps. Somewhat less frequently, it is appropriate to vent the pumps themselves via plugs provided.

If the equipment is not being used for long periods and freezing of the fluid is at all possible then it is imperative that the system be drained.

If the system is inactive during periods when drainage is deemed unnecessary then it is profitable to switch the pumps on for a few minutes each week to prevent sediment build-up.

Never run the pumps with isolating valves closed. Isolating valves are provided on the pump sets, for maintenance reasons and are sited on both the suction and discharge points of the pump packs.

Never run the pumps dry. Always check system pressure before switching on.

All enquiries for spare parts must be made via the company who will advise on your requirements.

6 Disposal

This product or parts of it must be disposed of in an environmentally sound way.

7 Recommendations for use with runaround coils

The Reclaim Plus pump packs are designed for incorporation within heat recovery systems, such that they circulate the heat transfer fluid between two heat exchangers; one fitted in the supply airstream and the other fitted within the extract airstream. The pumped fluid transfers heat from the warm extract air to the cool supply air.

The performance of a coupled coil system as described above will be a function of the flowrate of the fluid through the system. Unlike conventional pumped heating systems the performance of a runaround coil system will not continue to increase with increasing fluid flowrate. There is an optimized flowrate to match the selection of the two coils; this flowrate should be specified by the supplier of the matched coils and will have been used in the selection of the coils themselves.

As a result of the above it is recommended that the pump be run in uncontrolled mode. This mode is factory set or can be set on the remote controller if supplied. Uncontrolled mode only requires the selection of a constant operating curve on either the pump control panel or via the remote controller.

If there is the facility to measure the flowrate within the system, for example via an orifice plate measuring station or flow-setting valve, then this should be used in conjunction with the curve setting routine described above to give the optimum flowrate. If no measuring facilities are incorporated then an estimate of the correct operating curve can be made based on the maximum flow curves given under the general description heading.

It is recommended that the inverter control available on the pump to set its speed be utilized to adjust the flowrate rather than two or three port valves or commissioning sets as the electronic controller allows the pump to operate at close to its optimum efficiency irrespective of the flowrate set.

Should the system need to be switched off, for example in mid season where recovery is not required, then this is best achieved via the potential free, stop/run contacts on the pump terminals. This signal can be taken from a BMS monitoring the external temperature or via a local control system.

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