

IMPRESS AND IMPRESS ADVANCED PRESSURISATION SETS

INSTALLATION AND OPERATING INSTRUCTIONS



GRUNDFOS 

EC Declaration of Conformity

Name of manufacturer: Grundfos Manufacturing Limited

Address: Ferryboat Lane, Sunderland, SR5 3JL, UK

Declares, in sole responsibility, that the following assembly

Model: Impress and Impress Advanced

Conforms to the Essential Requirements of the following Directives:

- **Low Voltage Directive 2006/95/EEC**
- **EMC Directive 2004/108/EC**

by inspection of the assembly, the individual Declarations from the component manufacturers, and assessment against the following standards:

BS EN 60335-1:2002	Household and similar electrical appliances - Safety - Part 1: General requirements
BS EN 60335-2-41:2003	Household and similar electrical appliances —Safety —Part 2-41: Particular requirements for pumps
BS EN 60730-1+A2:2008	Automatic electrical controls for household and similar use — Part 1: General requirements
BS EN 1717:2000	Protection against pollution of potable water in water installations and general requirements of devices to prevent pollution by backflow.
BS EN 60439-1:1999;	Low-voltage switchgear and control gear assemblies — Part 1: Type-tested and partially type-tested assemblies.
BS EN 60335-1:2002 +A2:2006	Household and similar electrical appliances – Safety – Part 1 General Requirements
BS EN 61000-6-1	Immunity requirements for Residential , Commercial, Light Industrial environment
BS EN 61000-6-3	Emission requirements for Residential , Commercial, Light Industrial environment
BS EN 61000-3-2	Harmonics emissions for equipment <16A
BS EN 61000-3-3	Flicker
BS EN 61000-4-5	Surge
BS EN 61000-4-11	Power Quality test
BS EN 61000-4-4	Fast Transient Burst Immunity
BS EN 61000-4-2	Static Discharge Immunity

The manufacturer named above will keep the Technical Files required by EC Directives for review by authorized persons. This Declaration becomes invalid if modifications are introduced without the manufacturer's specific approval.

Authorised signature:


Mr. L. Carlin, General Manager, 1st February 2010

GENERAL DATA

These installation, operation and maintenance instructions are given as a guide to good practice in the installation, putting into service, operation and maintenance of the Grundfos Impress and Impress Advanced, units. Service instructions and procedures for future service requirements of the Impress units are not contained in these instructions.

The services of a qualified engineer should be employed to install and maintain these units.

APPLICATIONS

The Impress Pressurisation units have been designed as automatic top up units suitable for maintaining pressure in:-

Sealed heating water systems

Sealed chilled water systems

The Impress units create a permanent hydraulic separation between the cold water mains and the sealed water in the heat transfer system. The Impress units contain a "break tank" with a standard overflow and emergency weir overflow. This ensures that there is an AB air gap, Category 5 protection in accordance with the Water Byelaws.

DELIVERY AND HANDLING

On arrival, inspect the unit(s) for signs of damage before signing the delivery note and report any damage to the supplier within 7 days. The unit is supplied from the factory on a wooden pallet suitable for handling with forklift equipment. The weight and the size of the unit may require the use of proprietary lifting equipment in order to be handled safely.

Dimensions for all units 450mm Width x 800mm Height x 480mm Depth

Single Pump unit weighs up to 46 Kg

Twin Pump unit weighs up to 61 Kg

WARRANTY

1. The Grundfos warranty covers all defects within the unit originating from faulty workmanship and/or materials for a period of one year from the date of installation or eighteen months from the date of manufacture whichever is sooner.
2. The warranty covers the replacement of any faulty parts and our labour cost to replace the faulty parts. It does not cover the cost of removing, returning and refitting the unit or any secondary losses arising from the failure.
3. Under no circumstances should faulty equipment be dismantled. Failure to comply with this instruction could invalidate the warranty.
4. Defects arising from the incorrect installation, water containing debris, or harmful chemicals, inadequate electrical protection, faulty ancillary equipment, lighting or other circumstances beyond our control are not covered by this warranty.

SITE STORAGE

It is a statutory requirement that once the unit has been delivered to site, that it be placed immediately into a secure dust free, moisture free and frost-free area.

MAXIMUM OPERATING CONDITIONS

Liquid temperature range	: 3 to +90°C
Ambient temperature	: Maximum +40°C
Relative Humidity	: Maximum 95 %
Operating pressure	: Maximum 6 Bar

NOISE LEVEL

The noise level of the Impress unit is lower than the limiting values stated in the EEC machinery directive.

To avoid any environmental noise issues with Impress units they should never be installed in close proximity to any residential or office working environment.

LOCATION

1. The unit should be sited in a dry, well ventilated but frost-free position where it will not be subjected to extremes of temperature.
2. The environment should be non-aggressive and the atmosphere non-explosive.
3. The unit should be installed on a concrete base, which is both horizontal and flat to avoid distortion of the base plate.
4. Ensure that there is sufficient clearance around the unit to allow maintenance operations to take place without obstruction. Please allow a minimum clearance of 1m above the unit for servicing the float valve and break tank, and 2m in front of the unit for servicing pump(s) and the control panel.
5. For the safe maintenance and service of the unit ensure that adequate lighting is made available.
6. The pipe work connections of the unit should be carried out in accordance with any local water authority regulations.

EXPANSION VESSEL(S)

On heating/chilled systems it is important that the expansion vessel(s) have more than sufficient capacity for the potential thermal expansion of the liquid in the system.

A neutral pipe connection should be made between the “mains water supply” and the sealed heat transfer system. General practice would indicate that this neutral pipe be connected on the suction side of the system just before the main heat generators and the main circulation pumps. The top up pressurisation set acts as break between the cold water mains and the neutral top up line. The expansion vessel(s) would be connected into this neutral line and be fitted with lock shield isolation valves and suitable drain cocks. This is so that the pre-charge gas pressure in the vessel(s) can be commissioned and periodically checked without having to drain down the main system.

It is important to have the correct pre-charge gas pressure in the expansion vessel(s). This gas pressure will be determined in accordance with the respective calculations made by the system designer. The expansion vessel gas pressure should be set before any other operating values are entered into the Impress unit controller.

INSTALLATION

Do not attempt to start an Impress unit until the break tank has been filled with water and the pump(s) have been vented.

All electrical connections should be carried out by a qualified and authorised electrician in accordance with the latest issue of the I.E.E. regulations.

REMOVAL OF IMPRESS CABINET COVERS

The front and top covers of the Impress cabinets are designed to be removed in order to allow access for making the appropriate pipe work connections to the system.

Remove the screws from the top cover, and remove it.

Remove the screws on the side panel, and remove the front panel.

PIPE WORK CONNECTIONS

The service connections to the Impress unit are all on the right hand side on the unit and should be made as follows.

1. Connect the mains cold water supply to the ½" BSP male ball valve connection on the side of the unit.
2. It is recommended that a separate isolating valve be fitted to the mains cold water supply pipe work supplying the Impress break tank.
3. Connect the discharge pipe (15mm compression) to the side of the unit*.
4. Connect the over flow pipe (¾" bsp male) from the side of the unit break tank to a suitable drain.
5. Ensure the unit is not stressed by the external pipe work connections and that the pipe work is properly supported.

*Depending on the length of the neutral line and the volume of thermal expansion that will occur it may prove prudent to increase the discharge pipe size to a size larger than the 15 mm connection size. This would be done outside of the Impress cabinet enclosure.

If the bore size of neutral pipe is too small then the Impress controller may tend to stop and start pumps in short operational bursts. This would be as a result of too much back pressure in the neutral line between the Impress controller and the expansion vessels.

ELECTRICAL CONNECTION AND ELECTRICAL SAFETY

The Impress units are supplied with a 4 m length of electrical cable. This is suitable for permanent connection to a single phase 220-240V 50 Hz supply via a suitable fuse protected junction box.

There is an electrical isolator positioned on the Impress control panel and accessible through the front panel of the Impress cabinet. This is intended to isolate the main power supply to the Impress controller but **Will Not Isolate** any additional BMS voltage inputs used to the respective warning relays (VFC's) inside the Impress control panel. The VFC's therefore must be separately electrically isolated.

In the interests of electrical safety; **Do Not**

- Remove any motor terminal box covers.
- Remove the front cover of the main control panel.
- Touch any interconnecting electrical cables.
- Or any other electrical protective covering.

Without first ensuring that the electrical power supply and any voltages applied to the messaging relays are safely isolated.

Circuit breakers are mounted inside the control panel to protect the motor contactors and the source of the power supply for the respective PLC components. See the respective wiring diagram for details.

The pump(s) are protected by motor rated contactors with suitable thermal overloads. The overload values can be adjusted by rotating the dial indicators mounted on the thermal overload. If the overload has been set to too low a value the contactor will trip. The overload value therefore should be checked and adjusted to the correct value. There is also a reset button mounted on the overload unit.

The Overload protection will be factory set according to the size of the pump unit chosen the standard sizes are:-

CH2-30 – 2.4 Amps

CH2-40 – 2.9 Amps

CH2-60 – 3.9 Amps

VOLT FREE CONTACTS

If a BMS signaling connection to any the volt free contacts (VFC's) is required, it will be necessary to shut off the mains isolator and remove the cover from the electrical control box within the Impress cabinet. The display unit is connected to a PLC unit by a communication cable. The Comms cable is mechanically fixed at both ends and should not be separated. Enough cable exists for the cover to be placed to one side or on top of the unit.

Any BMS messaging cable(s) should be fed into the control box via any available cable glands through the cable trunking and terminated at the respective outgoing PLC terminal.

The VOLT FREE Contacts are two terminal contacts mounted on the respective PLC inside the electrical control box. The designated terminal connection detail and function are identified on the appropriate wiring diagram contained within this document. There are four principal designs.

Impress Standard Single Pump
Impress Standard Twin Pump
Impress Advanced Single Pump
Impress Advanced Twin Pump

Standard Unit Relays

1. Common Alarm - Including: Pump(s) Tripped, High Pressure, Low Pressure, Low Water, Leak and Sensor failure.
2. Combined Low and High Pressure Alarm.

Advanced Unit Relays

1. Pump 1 Running
2. Pump 2 Running
3. Pump 1 Tripped
4. Pump 2 Tripped
5. High Pressure Alarm
6. Low Pressure Alarm
7. Water Leak Alarm
8. Water Low Alarm
9. Service Due
10. System Healthy - Common Alarm including Pump(s) Tripped, High Pressure, Low Pressure, Low Water, Leak and Sensor failure.

The VFC contacts are Normally Closed and will Open on fault or run as appropriate. To reverse the function of the contacts so they are Normally Open can be done at the commissioning stage by choosing the Alarm "On Make/On Brake" in the engineers menu.

The maximum contact rating of the VFC's is 240V AC 5A.

SYSTEM FILLING

The main system should initially be filled via a filling loop. Once the system is full and up to the design fill pressure then water supply the impress can be connected. Fill the Impress break tank and ensure the tank fills and the ball valve rises and stops the inflow. Ensure there are no water leaks. Make sure that the pump(s) and interconnecting pipe work is adequately vented.

COMMISSIONING GUIDE

Do not attempt to electrically start the pump(s) until the system has been filled with water and both the pump and the system have been primed/vented.

Once the power supply has been energized the commissioning engineer can then program in the "system designers" operating and alarm values. This is via a "touch screen" mounted on the front of the electrical control box and accessed through the Impress front panel.

Simply "touch the screen" to reveal the main menu page. Note that the screen colour may change to identify the following common conditions.

Green	No alarms are present.
Red	Indicates an alarm is present
Amber	Changing a parameter or a non-critical Alarm.

Common Button Definition and Operation.

- >>> - Next screen.
- <<< - Previous screen.
- Menu – to previous sub-menu or main menu.
- + - Increments values.
- - - Decrements value.
- Save & Exit – Saves value and exits screen.
- Default – Restores factory default values
- Alarm Reset – clears all alarm messages only.
- System reset – usually follows Alarm reset to clear the effects of any Alarm.
- Mute – mutes the audible alarm.
- Exit – reverts to previous menu.
- Touching the number of Pump Starts/Trips/Mins run resets the value to 0
- Touching the flashing password box allows the engineer to enter a four digit password followed by the carriage return symbol.

User Options

- Set Pressure.
- Differential pressure.
- Hold Off time.

Alarms -

Viewing and clearing of Alarms

History -

- Review and clear no. of pump starts
- Review and clear Pump Run time
- Review and clear no. of Pump Trips

Engineers Menu –

The following shows an example of the touch screen format.



Wizard

Password protected - touch the password box then key in 8500 followed by enter key.
(note it is easier to use a blunt non marking object such as a pen top)

All of the key parameters are called for sequentially.
The Default button can be used to add the factory default parameter.
Pages cannot be bypassed without entering a value.
Negative numbers or numbers outside of the maximum range cannot be added.

Individual pages exist for each parameter. The wizard will not allow you to go to the next page without entering a value. At the end of the set up Wizard the option to switch the pump test and the system ON/OFF is available.

Settings

This replicates the Wizard screens individually and is used to change/check an individual parameter.

Manual Control

Allows for manual operation of the pumps as a service check.

BMS

Allows the VFC outputs to be pulsed to check their configuration within the BMS system and to configure the outputs as Alarm "On Make" or On Break".

Definitions and Parameters

Set Pressure

The system fill pressure and the stop condition for the top up pump(s).

Differential Pressure

This is the allowable reduction from the fill pressure. This is the start condition for the top up pump(s). The value for differential pressure should never be zero.

Pump Hold off time

Pump delay after the differential pressure value has been reached.

This can be used to reduce the risk of quick start/stop times by inhibiting the pumps from restarting immediately as the pressure just dips below the differential pressure setting. Care needs to be taken not to set too long a delay as the risk of reaching the Low Pressure Alarm is then increased.

Low Pressure Alarm OFF

Value at which the system resets Low pressure alarm.

Low Pressure Alarm ON

Value at which the system reports a Low pressure alarm.

High Pressure Alarm OFF

Value at which the system resets High pressure alarm.

High Pressure Alarm ON

Value at which the system reports High pressure alarm.

Leak Alarm Preset Time

Used in conjunction with the **Leak Alarm Window**. A cumulative time limit for the total allowable running time of the pump(s) within a specific time window. If this value is exceeded in the Leak Alarm Window then the system will report a Leak Alarm.

No. of Pumps

Tells the control system the number of pumps that are available (either 1 or 2).

Service Hours

Defines the period for a warning to appear that indicates that a service check is to be carried out on the Impress unit and the expansion vessels.

Low Water Reset time

This allows the pump(s) to be held off for a period of time after the Low water alarm has occurred. Low water alarm is created by the low water switch fitted in the break tank.

If pumps are activated too quickly and the break tank is continually running out of water the top up pumps will introduce too much dissolved air into the main system pipe work.

Leak Alarm Window

Used in conjunction with the **Leak Alarm Preset Time**. Defines the rolling period of operation.

Pump Test

Test pulse designed to rotate pump(s) every set number of days at 11.59 pm to prevent pump seizure. Pulse duration is 0.1 seconds.

Pump Run On

A feature that allows the pumps to run ON after the Set pressure has been reached.

This may be necessary in order to compensate for any high frictional pressure losses in the neutral top up line connecting the top up pump pressurisation set to the expansion vessels and the main system pipe work.

Pump Test ON/OFF

Enables/Disables the Pump Test operation.

Turn ON/OFF System

Enables/Disables the system operation.

SERVICING

While the unit requires minimal maintenance it should be inspected on a regular basis to

1. Check for any corrosion.
2. Check pump function and that the unit operates quietly and smoothly.
3. Check that the electrical mains lead to the unit is not damaged.
4. Check for water leaks.
5. Check the ball valve function in the break tank.
6. Check the function of the low water switch in the tank.
7. Check alarm history.
8. Check for pump function.
9. Ensure that the number of pump stop/starts are not excessive when topping up the system.
10. Recheck the original settings in the display and that they have not been altered.
11. Clean any dirt or dust from the controller and pump motors.
12. Check expansion vessel(s) gas pressure.

It is recommended that a Grundfos maintenance contract be taken out to cover these maintenance checks. Please contact Grundfos Europump Service department on 0845 508 100 for further details.

FAULT FINDING GUIDE

HIGH PRESSURE

The system pressure has exceeded the High Pressure Alarm.

Check that the Pressure-High Alarm setting has not been set too low.

Check that the capacity of the expansion tanks is adequate for the system.

Check that the pre-charge gas pressure in the expansion vessel(s) has been set correctly.

If pump run on has been selected then make sure that the pump maximum pressure is lower than the high pressure alarm value.

LOW PRESSURE

The system pressure has dropped below the Low Pressure Alarm setting.

Check that the Pressure-Low Alarm setting has not been set too low.

Check that the water supply to the break tank is adequate.

Check for any contaminants in the break tank which might lead to blockage in the break tank or pipe connections to the top up pumps.

Check that the pre-charge gas pressure in the expansion vessel(s) has been set correctly.

PUMP 1/2 TRIP

Indicates that the respective motor overload has tripped.

Check that the overload value is correct for the pump size.

Check that the pump has not stuck due to the set being powered off (i.e summer shutdown)

SENSOR ERROR

Pressure sensor fault or a disconnection at terminal or manifold fitting.

Check the cable connection between the pressure sensor and the control panel.

Check and replace the pressure sensor.

SERVICE DUE

The unit has reached the SERVICE DUE interval.

Check the service interval has been set correctly and is not too short a period.

Request that an engineer attends site to inspect the unit.

WATER LEAK

The pumps have exceeded the maximum time they are allowed to run in the given period.

Check that the timings are adequate for normal top-up conditions.

Check for water leaks in the Impress pipe work.

Isolate the Impress unit from the main system pipe work and then pressure test the system pipe work to establish if a leak is occurring.

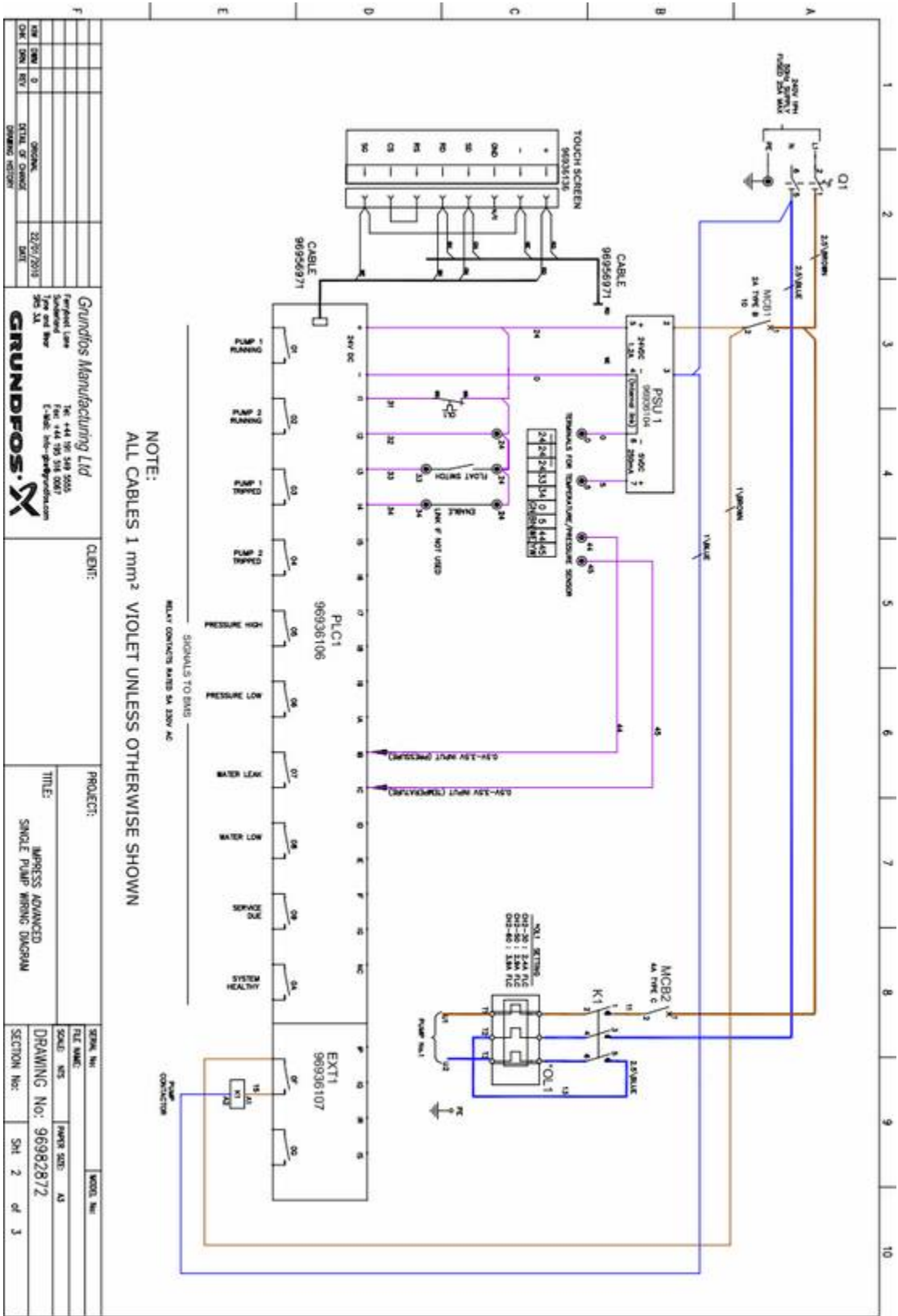
WATER LOW

The float switch in the break tank has activated.

Check water level and the function of the ball valve.

Check float switch function.

WIRING CONNECTION DIAGRAMS



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It is the continuing policy of Grundfos to develop and improve our products, and we reserve the right to amend prices and specification without prior notice.

97645211 - Instr. Manual and quick guide Impress