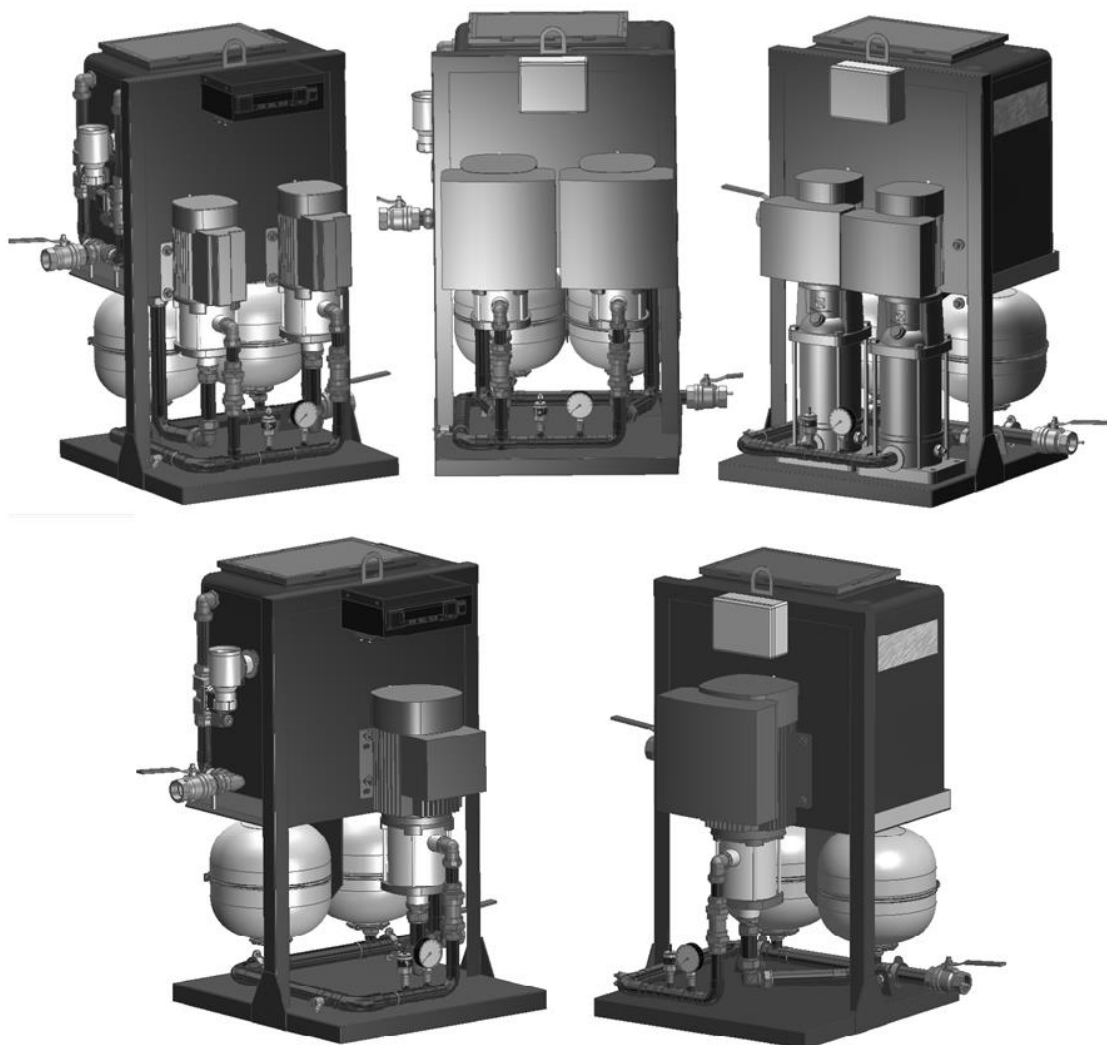


# Operation & Maintenance Manual



## Hydro GTI Booster Equipment

### Models

(1CM3-4, 1CM3-5, CM3-6, 1CM5-2, 1CM5-3, 1CM5-4, 1CM5-5, 1CM5-6, 2CM3-4, 2CM3-5, 2CM3-6,  
2CM5-2, 2CM5-3, 2CM5-4, 2CM5-5, 2CM5-6, 1CME3-2)

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## About this Manual

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This Operation and Maintenance Manual contains all the necessary information to install, commission, operate and maintain the Hydro GTI Booster set. This Operation and Maintenance Manual should be used in conjunction with the relevant Grundfos pump/ pump system installation and operation Manual.

Hydro GTI-S – This manual + CM pump installation and operation manual.

Hydro GTI-E – This manual + CM pump + Hydro multi-E installation and operation manuals

It is recommended to read all parts of this manual before undertaking any work on the equipment.

## Conventions used in this Manual

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This manual makes use of symbols to identify key pieces of information. Please take note of the following symbols and their meaning:



**DANGER** – Important safety related information intended to prevent injury and/or damage to the equipment, system or property.



**CAUTION** - Important information intended to prevent damage to the equipment, system or property.



**IMPORTANT** - Important information intended to ensure that the equipment functions correctly.



**USEFUL** – Useful information which may be helpful, but is not necessarily required for the unit to function correctly.

## Typography

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This manual makes use of different typography to identify different types of information.

<i>Italics</i>	Key words and phrases
(Round Brackets)	Used to identify a button on the digital controller
[Square Brackets]	A parameter on the digital controller
<Inequality Symbols>	A message/fault code displayed on the digital controller

For further information please visit the Grundfos pumps website at the following URL:

**[www.grundfos.co.uk](http://www.grundfos.co.uk)**

Alternatively, please contact the Grundfos Pumps Limited head office using the details below:

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**Fax:** 01525 850011  
**Email:** [grundfosuk@grundfos.com](mailto:grundfosuk@grundfos.com)



## Equipment Overview

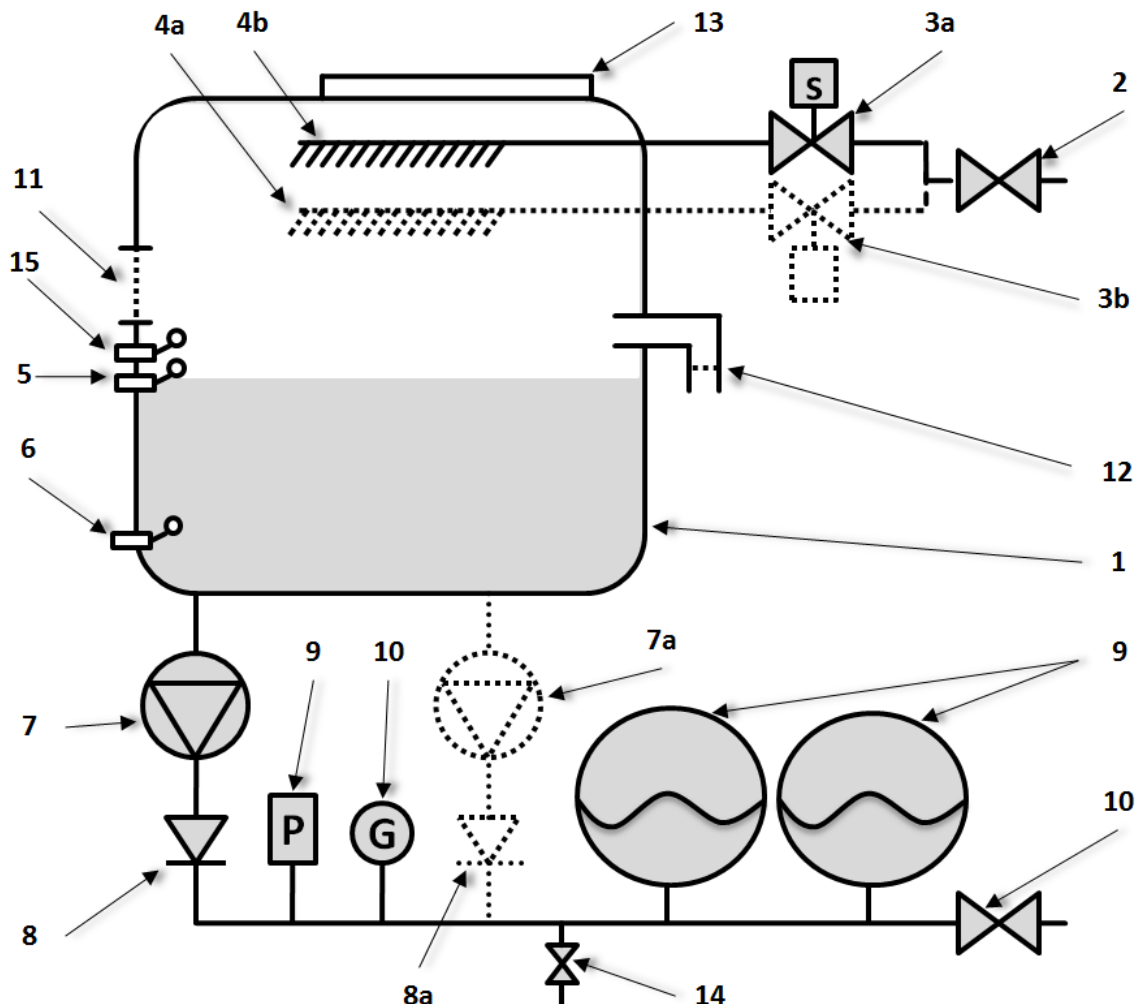
The Hydro GTI is a flexible family of 1- and 2- pump variable speed (Hydro GTI E) and fixed speed (Hydro GTI S) booster sets for a range of commercial and industrial applications. The function of the Hydro GTI is to provide a means of maintaining adequate pressure for water system supply applications. The break tank has been designed to provide fluid Category 5 back flow prevention by the use of an AB air gap in accordance with the water regulations. The cistern comes with a screen weir making it suitable for drinking water applications that may require a type AB air gap.



This equipment is not designed to give a higher flow rate than that can be supplied by the water mains to the inlet of the GTI. The cistern stores 45 litres of fluid and it is recommended that the unit is supplied with no less than **1 bar** water mains pressure to achieve pump set nominal flow rate.

## Principal of Operation

The following schematic shows the internal mechanical arrangement of a Hydro GTI Booster Set:



The booster unit is fitted with a break tank (1) which is filled from the mains water supply inlet ball valve (2) via the solenoid valve/s (3a, 3b) and baffle/s (4a, 4b). The inlet solenoid valves (3a, 3b) are controlled by float switch (5). Access to the inside of the break via lid (13)

The break tank is fitted with an access lid (13), screened overflow warning pipe (12) and screened weir (11). In the event of a failure, water will flow out of the overflow warning pipe (12). If the

overflow warning pipe (12) were to also fail, the water will flow out of the screened weir (11). A high level switch will trigger (15) if the water level approaches the overflow pipe (12).

The booster set is connected into the system via the isolation valve (10), pressure sensor (9) is connected to the pump control unit and mechanical pressure gauge (10) gives a visual indication of system pressure.

Upon a system pressure drop, water is firstly supplied via the accumulator vessels (16), when enough pressure has dropped past the set point the digital control unit will activate the pump/s (7, 7a). The pump draws water from the break tank (1) and pumps the water to the system via a non-return valve (8, 8a), until the pressure set point is achieved.

A drain valve (14) is provided for draining down the unit and for commissioning purposes.

## General Data

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### Delivery & Handling

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The Hydro GTI booster set is supplied from the factory mounted on a wooden pallet (made by an environmental friendly wood supplier) suitable for handling by forklift equipment.

The weight and size of the Hydro GTI Booster may require the use of proprietary lifting equipment in order to be handled safely. During installation ensure the recommended procedures for lifting pallet mounted equipment are observed.

### Inspection

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On delivery, the Hydro GTI booster should be unpacked and inspected; any damage must be reported to the supplier within seven days in writing.



It is important that these installation and operating instructions are studied carefully before any installation takes place. The installation and operation should also be in accordance with local regulations and accepted codes of practice.

### Warranty

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1. The Grundfos warranty covers all defects within the Hydro GTI booster originating from faulty workmanship and/or materials for a period of one year from the date of installation or thirty months from the date of despatch from the factory, whichever is the shorter. 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 booster set or any secondary losses arising from the failure.
2. Under no circumstances should faulty equipment be dismantled. Failure to comply with this instruction could invalidate the warranty.
3. Defects arising from incorrect installation, water containing debris, or harmful chemicals, inadequate electrical protection, faulty ancillary equipment, lightning or other circumstances beyond our control, are not covered by the warranty.

## Site Storage

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It is strongly recommended once the Hydro GTI booster has been delivered to site, that it is placed immediately into a dust, moisture and frost-free area which has been secured to prevent unauthorised interference.

## Applications

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The Hydro GTI Booster has been designed to be compact, reliable, simple to install, maintain and to provide many years of efficient, reliable service. There are a wide range of applications for which the Grundfos Hydro GTI booster is suitable. For example, Domestic pressure boosting, commercial pressure boosting, industrial pressure boosting and CAT5 wash-down application.



Booster sets must not be used in an environment which has been classified as hazardous and could therefore cause an explosion if there is a danger of ignition by a flame path. Grundfos Pumps Ltd do not accept any responsibility for the use of booster sets to pump liquids which could be construed as being hazardous to health either by touch, ingestion or inhalation of fumes or gases given off by the liquid.



## Quick Guide

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This is a simplified guide to the installation and commissioning of the Grundfos Hydro GTI booster. Please refer to the individual sections in this document for precise details for each step.

### Installation

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- Install the Hydro GTI Booster on to a flat and level solid foundation.
- Connect the mains water supply.
- Connect the overflow pipe work.
- Connect the discharge pipe work.
- Connect the electrical supply cable (adequately rated)

### Commissioning

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Note:- For variable speed GTI-E units. Before initial electrical supply switch on remove the enable link from between terminals 2 and 3, on each pump. Only replace the link once the pump(s) have been fully vented. Please refer to the hydraulic commissioning section.



Note:- For fixed speed GTI-S units. Before initial electrical supply switch on, ensure the low level switch is in the down position (to prevent the pumps running) replace the link once the pump(s) have been fully vented. Please refer to the hydraulic commissioning section.

- Spend some time venting the pump carefully, if the pump contains air it will not generate pressure.
- To vent the pump open the discharge valve and an outlet fitting (tap) at low level.
- Vent the pump for 30 to 60 seconds, using the vent screw located on side of the pump.





## Testing

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- Switch on the electrical supply.
- The pump(s) will start, and the pressure will begin to increase; actual pressure reading is visible on the Controller screen at any time.
- Once the pressure has built up, close the isolating valve within the booster set. The pump(s) will run-on for several tens of seconds and then stop.
- Open the isolating valve within the Hydro GTI booster, the pressure will begin to fall if the outlet fitting has been left open. The pump will then start again and the pressure increase. The pump(s) will continue to run while there is a flow demand.
- Close the outlet fitting; the pump will stop after a short time. If the pump does not stop, then there is a flow demand which is causing the pump(s) to continue operating.
- If the pump(s) continues to run even though the outlet fitting is closed, then close the isolating valve within the Hydro GTI Booster, the pump(s) should stop again.
- Investigate the cause of the flow demand, for example filling toilet cisterns etc.

## Installation

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This booster set should only be installed by a competent person. Please ensure when installing the booster set all relevant regulations are adhered to.



Please take care when lifting the booster set, the sets weigh between 37kg and 100kg dry. Please do not lift the set by the control box or pipe work. Where possible always use the lifting lug located at the top of the set.



Please refer to the appropriate datasheet for the maximum working pressure and temperature, and weight of the Booster Set.



Before installing the set, check that the booster set type and parts are as ordered.



Do not attempt to start the pump until the storage tank has been filled with water and the pump primed and 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. The Hydro GTI booster must be earthed. It is strongly recommended that an Earth Leakage Circuit Breaker (ELCB) is fitted on the incoming electrical supply.



Do not remove pump motor terminal box, motor fan or PM2 covers unless electrical cables or any other electrical protective covering without first ensuring that the electrical supply is suitably isolated and cannot be switched on.



Do not attempt to supply electricity to the Hydro GTI and run the pump without ensuring that all electrical fittings, cables and enclosures are intact and suitably electrically isolated from human touch during operation.



Do not attempt to supply electricity to the Hydro GTI without first ensuring that the motor fan covers are correctly fitted and held securely in place.

## General Information

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1. The discharge pipework must be at least the same size as the booster set connection size 32mm, as a smaller size may result in reduced pressure and flow at the outlets.
2. The installation discharge pipework must be properly supported **before** being connected to the booster set so that the booster set internal pipe work is not stressed.
3. The pipework installation from the booster set should be in accordance with local water authority regulations.
4. The electrical installation of the booster set should be in accordance with the latest issue of the I.E.E. regulations.
5. Check that the cold water storage tank has adequate capacity to meet the water consumption demand.

## Water Quality

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Consideration must be given to maintaining the quality of the water stored within the Hydro GTI tank, and indeed any other stored water arrangement, in order to ensure that the water remains fit for use. The quality of any stored water will deteriorate with time, bacterial growth is dependent on the ambient air temperature, and growth rates will be higher when the conditions are warm. The tank should be drained and flushed, if the water remains unused for an extended period.

As with any stored water arrangement, it is recommended that the storage tank(s) is cleaned and disinfected annually, in order to remove accumulated debris which could provide a habitat for bacterial growth. The water within the unit should be sampled periodically to check bacterial levels, generally between two and four times a year is recommended.

## Location

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To ensure adequate cooling of motor and electronics, the following must be observed:

- Place the Hydro GTI in such a way that adequate cooling is ensured
- The temperature of the cooling air must not exceed 40°C
- Motor cooling fins and fan blades must be kept clean
- Noise level of the Hydro GTI Booster: 65 dB(A)
- Relative Humidity: up to 95 % non-condensing



This Booster Set is not designed to be installed in an outdoor environment. The unit must be installed in a frost free environment, away from precipitation and water sprays/jets. (Heated outdoor enclosures are available).



To avoid damaging the solenoid valves, the mains water supply pipe must be flushed before connection to the Booster Set.

## Mechanical Installation

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Arrows on the pump valves show the direction of flow of water through the booster set. The pipe connected to the Hydro GTI must be of adequate size.

To avoid resonance, expansion joints should be fitted in the discharge and suction pipes. Connect the pipes/flexible to the inlet outlet of the booster set. The booster set should be tightened up prior to start-up.



All pipe connections must be made with appropriate jointing compound/PTFE tape. If PTFE tape is used, care must be taken to ensure that the tape does not obstruct the orifice of the fitting.

If booster sets are installed in blocks of flats or the first consumer on the line is close to the booster set, it is advisable to fit pipe hangers, expansion joints, or flexible hoses on the suction and discharge pipes to prevent vibration being transmitted through the pipe work.



If flexible braids are being used to connect to the system please ensure the hose is not kinked or stressed. Ensure all union nuts are tight and that a fibre washer has been used.

Position the booster set on a plane and solid surface, e.g. a concrete floor or foundation. If the booster set is not fitted with vibration dampers, it must be bolted to the floor or foundation. The pipes must be fastened to parts of the building to ensure that they cannot move or be twisted. Vibration pads, flexible, expansion joints are available upon request, please see optional extras.



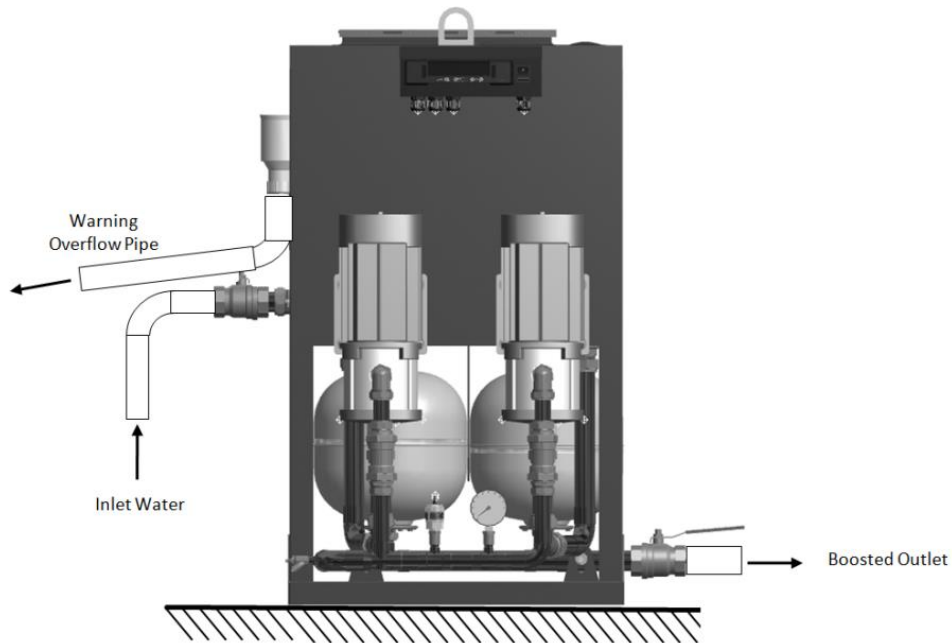
Non-return valves, RPZ valves must not be installed between the Hydro GTI and the system. These devices will prevent the pressure sensor from reading the system pressure.



We recommend that inlet pressures to the booster set should be no less than **1 bar**. (Additional inlet manifolds available for single pump units). Please refer to the pump data sheet for pump curve and inlet pressure figures.



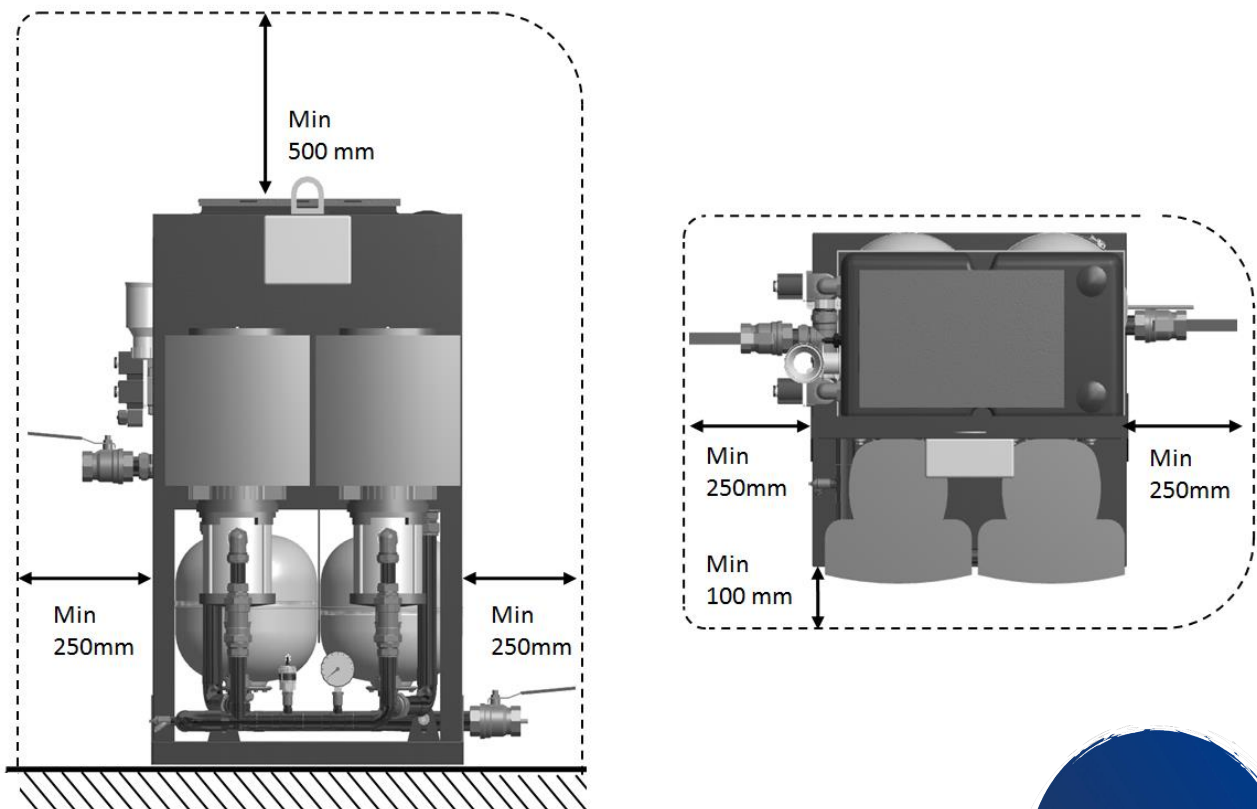
## Typical Installation Diagram



## Overflow / Warning pipe

Two different flow restrictors are supplied with the equipment, both of which include an integral filter. Do not decrease the size of warning overflow pipe at any point.

## Hydro GTI Clearances and Connection Requirements



Connection	Size	Notes
Mains Water Feed	1 1/4 " BSP F	All units single and twin come with this standard connection size.
Break Tank Overflow/Warning	DN32	Guidance on drainage requirements should be obtained from the local water authority.
System Connection	1 1/4" BSP F	<p>The Hydro GTI booster and expansion vessel should be connected to the system at the same point.</p> <p>The point of connection should be in the system return, on the suction side of the circulation pump.</p> <p>Non-return valves, pressure reducing valves and RPZ valves must not be used.</p>



# Electrical Connection - Hydro GTI with single phase

## Mains Switch – Hydro GTI CM, CME, CRIE Single phase

The electrical connection 230 / 240V single phase 50Hz. The electrical mains supply must be via a circuit breaker and isolator. The wires in the Hydro GTI terminal cabinet must be as short as possible. The mains power supply to the booster set must be connected into the fused terminal block as shown below which is located within the terminal block housing. Feed a minimum of 1.5mm<sup>2</sup> three core cable to the control box via the gland. Strip 10mm of insulation off each wire and insert into the terminal block. Ensure both terminal blocks and glands are fully tightened.



Never make any connections in the Hydro GTI junction box or in the junction box of each individual pump unless the electricity supply has been switched off for at least 5 minutes.



Cables connected to the controller volt free contacts may be supplied from another source and may remain live after the unit is isolated. These must be isolated elsewhere.



The user or the installer is responsible for the installation of the correct earthing and protection according to valid national and local standards. All operations must be carried out by a qualified electrician.



This equipment can be damaged by the high voltages produced by electrical installation testing equipment. When performing electrical installation tests, the equipment must be isolated from the supply.

Check the mains voltage frequency corresponds to the valves on the booster set name plate. Before connecting the booster set to the electrical mains supply, please ensure the supply is via a circuit breaker and mains switch as in Figure 1

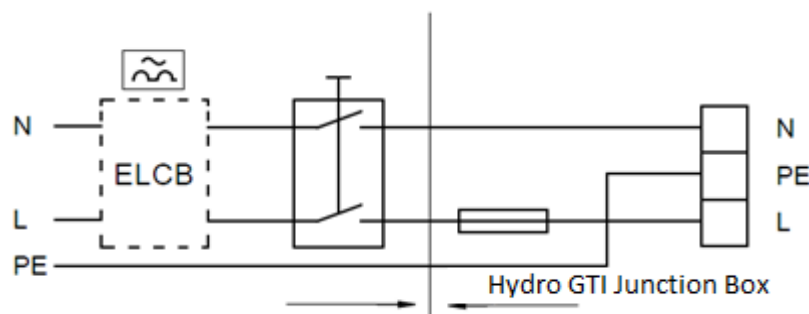


Figure 1 Mains-connected pump with mains switch, backup fuse, additional protection and protective earthing.

## Mains Switch

The Hydro GTI must be fitted with a mains isolator switch, please ensure switches being fitted comply with current electrical standards.



It is recommended the switch should be installed within 2m of the equipment.

## Additional Protection

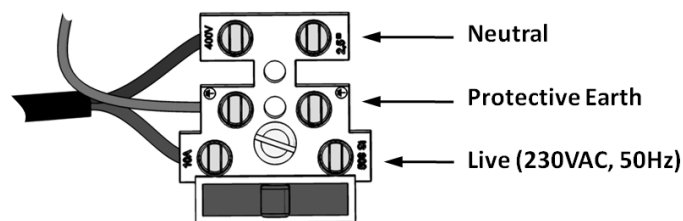
If the pump is connected to an electric installation where an earth leakage circuit breaker (ELCB) is used as additional protection, the circuit breaker must be of a type marked with the following symbol:



The total leakage current of all the electrical equipment in the installation must be taken into account. Please refer to the pump documentation for earth leakage values. During start and at asymmetrical supply systems, the leakage current can be higher than normal and may cause the ELCB to trip.

## Terminal Block

The mains power supply to the booster set must be connected into the fused terminal block as shown below which is located within the junction box. Feed a minimum of 1.5 mm<sup>2</sup> three core cable to the control box via the gland. Strip 10mm of insulation off each wire and insert into the terminal block. Ensure both terminal blocks and glands are fully tightened.



## Backup Fuses

All Hydro GTI sets are fitted with backup fuses please see data sheet for replacement fuse sizes.

## Motor protection

The pump requires no external motor protection. The motor incorporates thermal protection against slow overloading and blocking (IEC 34-11, TP 211).

## Protection against mains voltage transients



The digital controller can be adversely affected by EMI and power spikes. A power filter has been fitted to all the fixed speed Hydro GTI models to protect against electrical supply anomalies ( or is fitted with a backup generator).

The power filter is connected between the transformer and the digital controller, on the 12VAC line, as shown in the diagram below:

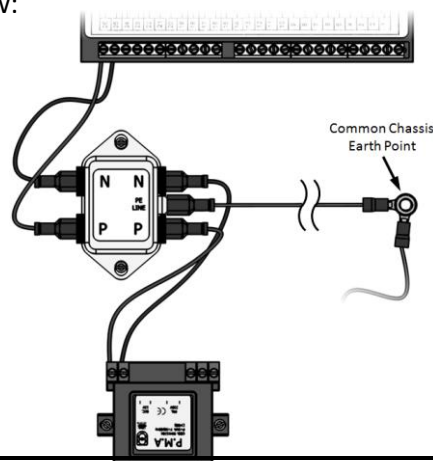




Figure 2

For the filter to function correctly, the “PE LINE” terminal must be connected to the unit common earth point

### Alarm Fault Contacts – Hydro GTI-S CM

There are 6 volt free fault contacts which can be used for connection to a BMS system, or as a boiler interlock. These are terminals 1-12, located on the digital controller:

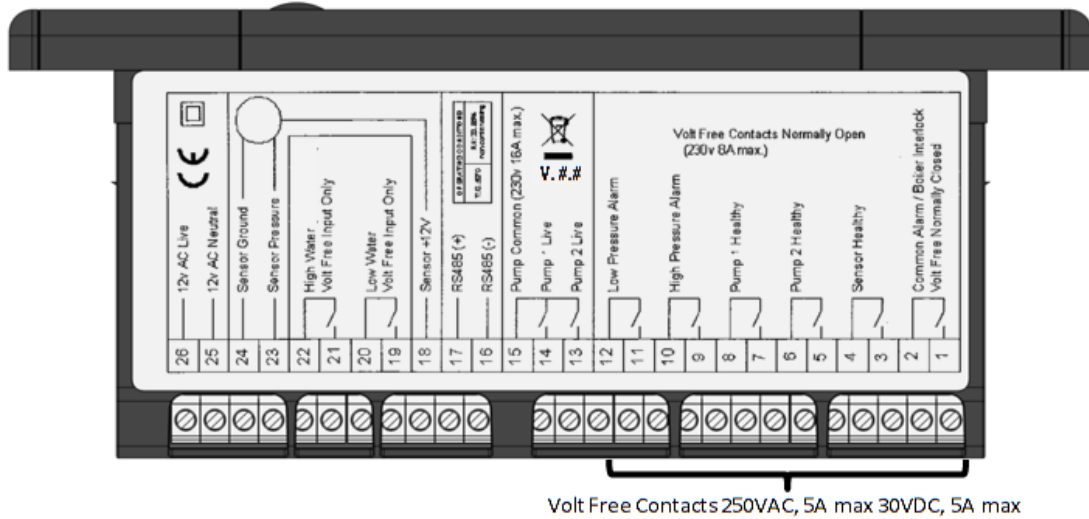


Figure 2



With the exception of the Common Alarm (NC), it is possible to convert all other fault contacts (NO) to Normally Closed. For further information please refer to the commissioning section of this manual.





# Electrical Connection - Hydro GTI Three phase

## Mains Switch – Hydro GTI CM, CME, CRIE Single phase

The electrical mains supply must be via a circuit breaker and Isolator see figure 4. The wires in the Hydro GTI terminal cabinet must be as short as possible. Excepted from this is the protective earth conductor which must be so long that it is the last one to be disconnected in case the cable is inadvertently pulled out of the junction box. The mains power supply to the booster set must be connected into the fused terminal block as shown below which is located within the junction box. Feed a minimum of 1.5 mm<sup>2</sup> 5 cored cable to the control box via the gland. Strip 10mm of insulation off each wire and insert into the terminal block. Ensure both terminal blocks and glands are fully tightened.



Never make any connections in the Hydro GTI junction box or in the junction box of each individual pump unless the electricity supply has been switched off for at least 5 minutes.



Cables connected to the controller volt free contacts may be supplied from another source and may remain live after the unit is isolated. These must be isolated elsewhere.



The user or the installer is responsible for the installation of the correct earthing and protection according to valid national and local standards. All operations must be carried out by a qualified competent electrician.



This equipment can be damaged by the high voltages produced by electrical installation testing equipment. When performing electrical installation tests, the equipment must be isolated from the supply.

Check the mains voltage frequency corresponds to the valves on the booster set name plate. Before connecting the booster set to the mains, please ensure the supply is via a circuit breaker and mains switch as in Figure 3:

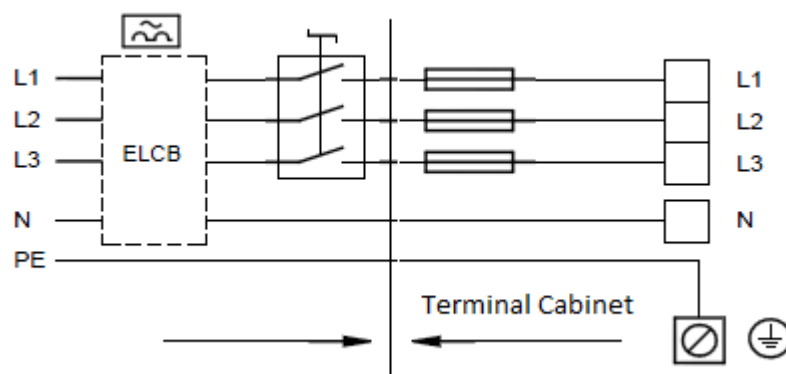


Figure 3

## Mains Switch

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The Hydro GTI must be connected to an external all pole mains switch with a contact separation of at least 3mm in each pole according to IEC.



It is recommended the switch to should be installed within 2m of the equipment.

## Additional Protection

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If the Hydro GTI-E is connected to an electric installation where an earth leakage circuit breaker is used as additional protection, this circuit breaker must be of the type:

- Which is suitable for handling leakage currents and cutting-in with short pulse-shaped leakage.
- Which trips out when alternating fault currents and fault currents with DC content, i.e. pulsating DC and smooth DC fault currents occur.

For these booster sets an earth leakage circuit breaker **type C** must be used.

This circuit breaker must be marked with the following symbols:



**Note:** When an earth leakage circuit breaker is selected, the total leakage current of all the electrical equipment in the installation must be taken into account.

## Terminal Block

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The mains power supply to the booster set must be connected into the fused terminal block as shown below which is located within the junction box. Feed the correct sized 5 core cable to the junction box via the gland. Strip 10mm of insulation off each wire and insert into the terminal block. Ensure both terminal blocks and glands are fully tightened.

## Controller Overview GTI-S CM Range

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The following image shows the front of the Hydro GTI booster set digital controller. 4 buttons are provided for programming, and an LED display which shows scrolling messages.





When the controller is first powered up, it will display the controller version number. This manual relates to controller version 6.3. If the controller is of a different version, there may be differences in the menu items available.

When in normal operation, the controller will display the current system pressure. If a fault occurs, the controller will display a fault code and produce an audible alarm.

In normal operation, the functions of the buttons are as follows:

Button	Function	
	Press	Hold
SET	-	Show Current System Pressure
MUTE	Mute Audible Alarm	Reset Unit
+	-	Enter Programming Menu
-	-	-

## Controller Programming

---



Do not alter any settings without first understanding the implications of doing so. Incorrect settings may cause damage to the equipment, system or property.

To enter the programming menu, hold the (+) button until “enter code” appears on the screen, followed by “0000” with a flashing cursor after the first digit.

To gain access to the programming menu, the following code must be entered:

Customer Code	Standard set of options	<b>2601</b>
Engineer Code (V6.3)	Extended set of options	<b>4706</b>

To enter the code, change the first digit with the (+) and (-) buttons, then press (SET) to move onto the next digit. Repeat for all digits, then once the correct code is shown on the display, press (SET) to enter the programming menu.

Once a correct code has been entered, the first option [COLD FILL] will appear on the screen.

Once in the menu, the value of the current menu item can be changed using the (+) and (-) buttons. Once the current value has been set, pressing the (SET) button will move on to the next option.



It is not possible to navigate backwards through the menu. To return to a previous setting in the menu, press the (SET) button repeatedly to scroll through to the end of the menu, and then re-enter the appropriate code.



If the controller loses power while in the programming menu, all changes made will be erased. To confirm all changes, the end of the menu must be reached, and the “SAVING...” message must be displayed.



The table below gives details of all menu items, in the order that they will appear:

#	Menu Item	Function	Default Value
1	<b>COLD FILL</b>	<p>This value is the cut out pressure</p> <p>It is not possible to enter a value higher than the current [HIGH SET] or lower than the current [LOW SET] values.</p>	1.0 Bar
2	<b>HIGH SET</b>	<p>The high pressure alarm setting.</p> <p>If the pressure in the system reaches this value, the &lt;HIGH PRESSURE&gt; alarm and common alarm will be activated.</p> <p>It is not possible to enter a value lower than the current [COLD FILL] value.</p>	2.7 Bar
3	<b>LOW SET</b>	<p>The low pressure alarm setting.</p> <p>If the pressure in the system falls below this value, the &lt;LOW PRESSURE&gt; alarm and common alarm will be activated, and the pressurisation pumps will not run. It is not possible to enter a value higher than the current [COLD FILL] value.</p>	0.5 Bar
4	<b>DIFFERENTIAL</b>	<p>The differential between the 'cut-in' and 'cut-out' pressures.</p> <p>The cut-in pressure will be equal to the [COLD FILL] pressure, minus the differential pressure.</p> <p>For example, if the [COLD FILL] pressure is set to 1.5 bar, and the differential set to 0.2 Bar, the pump 'cut-in' pressure will be 1.3 Bar (<math>1.5 - 0.2 = 1.3</math>)</p>	0.2 Bar
5	<b>FLOOD LIMIT</b>	<p>The maximum continuous run time for each of the pumps.</p> <p>If a pump runs continuously for longer than this period, the pump will stop and a &lt;FLOOD LIMIT&gt; alarm will be activated.</p> <p>This is to prevent the unit from pumping large amounts of water in the event of a large leak/burst pipe.</p> <p>F.</p> <p>The value can be changed in increments of 10 minutes, to a maximum of 990.</p>	10 MINS
6	<b>PUMP 1 COUNT</b>	<p>The cumulative number of pump starts for pump 1.</p> <p>This is a cumulative counter, the value of which cannot be</p>	-

		modified. If using the engineer's code, the counter can be reset to zero by holding the (MUTE) button.	
7	<b>PUMP 1 HOURS</b>	The cumulative run time in hours for pump 1.  This is a cumulative timer, the value of which cannot be modified. If using the engineer's code, the counter can be reset to zero by holding the (MUTE) button.	-
8	<b>PUMP 2 COUNT</b>	The cumulative number of pump starts for pump 2.  This is a cumulative counter, the value of which cannot be modified. If using the engineer's code, the counter can be reset to zero by holding the (MUTE) button.	-
9	<b>PUMP 2 HOURS</b>	The cumulative run time in hours for pump 2.  This is a cumulative timer, the value of which cannot be modified. If using the engineer's code, the counter can be reset to zero by holding the (MUTE) button.	-
10	<b>ALARM COUNT</b>	The cumulative number of all alarm incidents.  This is a cumulative counter, the value of which cannot be modified. If using the engineer's code, the counter can be reset to zero by holding the (MUTE) button.	-
11	<b>POWER INTERRUPTED</b>	The cumulative number of power interruptions (i.e. controller turned off/ power cut).  This is a cumulative counter, the value of which cannot be modified. If using the engineer's code, the counter can be reset to zero by holding the (MUTE) button.	-
12	<b>PULSE</b>	When enabled, if a pump has been inactive for 60 days, it will start and run for 2 seconds.  This is to prevent the pumps from seizing.	NO
13	<b>EXCESSIVE START</b>	When enabled, if there are more than 3 individual pump runs within an 8 hour period, the unit will register an <EXCESSIVE DEMAND> alarm.  Enabling this option may cause false alarms on some systems.	NO
14	<b>SERVICE</b>	When enabled, a service reminder will be displayed after 12 months from when the option was enabled.  To reset the service reminder, set the value to 'NO' and exit the menu. Then, re-enter the menu and set the value to 'YES' again.	NO
15	<b>FILL SYSTEM</b>	When enabled, the <LOW PRESSURE> and <FLOOD LIMIT> alarms will be disabled, and pump 1 will run continuously for up to 24 hours until the cold fill pressure has been reached.	NO

		<p>Once the cold fill pressure has been reached, this option will automatically be deactivated, and the low pressure alarm and flood limit will be reactivated.</p> <p>This function is used to fill a system that is empty or at low pressure.</p> <p>Care must be taken using this option as the flood limit alarm is disabled, increasing the risk of flooding.</p>	
--	--	--	--



If using the customer code, the menu will end at this point. After pressing (SET) once more, the controller will display “SAVING...” and return to normal operating mode. If using the engineer’s code, additional menu items will be displayed.



The following settings are all pre-programmed in the factory and should not need to be modified on site. If these settings appear to have been reset, the most likely cause is a power spike. If this problem persists, a power filter may be required.



The following settings are for experienced engineers only. Incorrect configuration of these settings can cause the equipment not to function correctly, and may cause damage to the equipment, system or property.

#	Menu Item	Function	Default Value
16	<b>PUMPS NUMBER</b>	The number of pumps installed in the Booster Set. This can be set to either 1 or 2.	2
17	<b>PUMP TYPE</b>	The type of pump installed in the Booster Set. There are two options, which are as follows: 0 – Centrifugal Pump 1 – Piston Pump (mini units only)	1
18	<b>PUMP SENSE</b>	Disabling this option will stop the controller from monitoring the pumps and generating <PUMP FAIL> faults. It is not recommended to disable this option. Please consult Grundfos before doing so.	YES
19	<b>SENSOR TYPE</b>	The type of pressure sensor installed in the unit. There are four options which are as follows: 0 – 0-5V Output, 0-10 Bar Range 1 – 1-6V Output, 0-10 Bar Range 2 – 1-6V Output, 0-16 Bar Range 3 -	3
20	<b>SPC CONTROLLER</b>	Do not activate	NO
21	<b>GLYCOL UNIT</b>	. Do not activate.	NO
22	<b>ID NUMBER</b>	A user configurable identification number. This option does not serve any functional purpose.	12
23	<b>RELAY INVERSION</b>	When enabled, all normally open fault contacts (i.e. all except the common alarm) are converted to Normally Closed.	NO
24	<b>OVERRUN</b>	Allows the pump to continue running for a set period of time after the required pressure has been reached. This will prevent the pumps from ‘hunting’. The value can be set from 0 – 10 seconds.	5
25	<b>PRESSURE ALARM AUTO</b>	When enabled, the <HIGH PRESSURE> and <LOW PRESSURE> alarms will be cleared automatically if and when the pressure	YES



	<b>RESET</b>	returns to normal.  If disabled, the alarms must be manually reset.	
26	<b>BOOST</b>	When enabled, the controller will allow the pumps to run even if the system pressure is zero.	OFF
27	<b>CASCADE</b>	Allows the pumps to operate in duty/assist or duty/duty mode.  After either pump starts, the other pump will start after a set period of time.  This option can be set to OFF, or 5 – 30 seconds.	00 sec
28	<b>FLOMAT</b>	Do not activate  T	NO

## Commissioning



It is highly recommended that you have this equipment commissioned by a Grundfos approved engineer. Any damage or loss incurred through incorrect commissioning by an unapproved engineer will not be covered by the warranty.

### Pre-Commissioning Checklist



The following conditions must be met before starting the commissioning process. Failure to meet these conditions may result in injury or damage to the equipment, system and property.

Equipment is sited in a frost free area, away from precipitation and water sprays/jets or very highly rated power generators or highly rated inverters (min 10m clearance)

All necessary pipe/electrical connections have been made to a satisfactory standard

The temperature and pressure at the point of connection are within the operating limits of the Booster Set.

The wholesome sealed system is fitted / protected with a safety relief valve and expansion vessel



The following conditions must be met for the booster set. If these conditions have not been met, it is not advisable to proceed with the commissioning process.

The system connection has been made.





Appropriate Electrical connection and Earthing was provided for the unit.

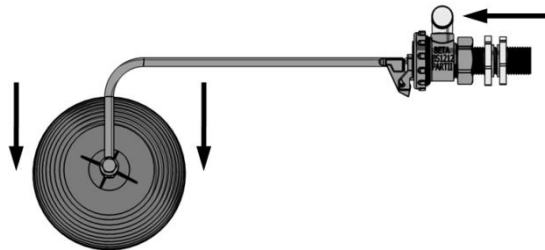


The expansion vessel is pre-charged to the correct / required pressure before hydraulic installation Grundfos recommends 0.7x setpoint for variable speed boosters and 0.9x setpoint for fixed speed boosters.

## Hydraulic Commissioning

### 1 – Float Valve Setting & Break tank connections

Ensure that the break tank float valve is set to its lowest position. Check for the horizontal level of antisiphon assembly at the top of the valve:



*Each Hydro GTI Booster Unit*

If a drain valve is fitted to the break tank, ensure that it is closed. Then, turn on the mains water supply and allow the break tank to fill. Once complete make sure the mains water isolation valve, feeding the break tank is fully open.



When the float valve operates for the first time, it may not close immediately, causing the break tank to overflow. Once the internals of the valve have been fully wetted this should not occur again.

### 2 – Priming the pump(s)

The CM and CME pumps are horizontal pumps mounted vertically. The specific pump instructions and operational data are supplied separately to this document as an attachment. The vertically mounted horizontal pumps have a bleed screw at the head of the pump, pointing vertically down, and at the rear side if required. Please refer to the accompanying pump installation and operation manual for further information.

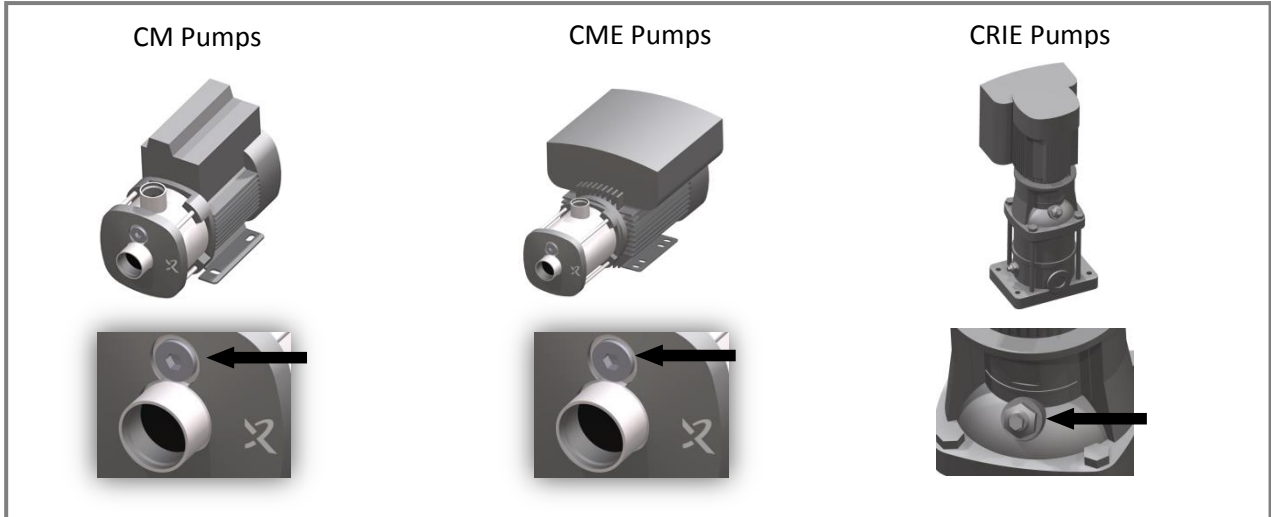
This step is necessary for any unit containing any water pump.



Make sure that the internal isolation valve within the booster set is closed by following the steps below. Failure to do this may cause injury or damage to the equipment, system or property.



Locate the bleed screw on the pump. The following diagrams show examples of typical bleed screw locations for most pumps:





Do not use excessive force when tightening the bleed screw as this may damage the pump casing or threading.

### Forcing Pumps to Run



Turn on the power supply to the digital controller and wait for the system pressure to appear on the display. Then, enter the code 2601 and go to the first setting in the menu, cold fill. While at this point in the menu, holding down the (MUTE) button will force pump 1 to run, and holding down the (SET) button will force pump 2 to run.



If the controller is older than V6.1 then there is no way to force pump 2 to run via the controller. To force the second pump to run, the unit must be isolated and the live wires in terminals 13 and 14 must be swapped over. The second pump then becomes “pump 1” and can be forced to run via the controller.



Before allowing the pumps to run ensure the pumps are primed.



To bleed the pumps, the pumps must be started. Then while the pump is running, the bleed screw must be opened until all the air has been removed and only water is being discharged. The bleed screw can then be closed.



Failure to bleed the pumps may result in damage to the equipment, system and property.



After bleeding the pumps, close the drain valve and remove the hose from the hose tail.

### 3 – Initial Start-up

1. Open the Hydro GTI booster set system isolation valve.

Once the isolation valve is open, the pressure sensor will be able to read the system pressure.

Turn on the power supply to the booster set. Depending on the current system pressure, the unit will respond in one of the following ways:



If the system pressure is below the low pressure alarm setting, the controller will display a “LOW PRESSURE” fault and the pumps will not run. To clear this fault, either increase the system pressure using a filling loop, or enable the system fill option on the booster set.



If the system pressure is above the high pressure alarm setting, the controller will display a “HIGH PRESSURE” fault. To clear this fault, use a suitable drain point to remove water from the system until the system pressure equals the cut out pressure.



If the system pressure is above the low pressure alarm setting, but below the cut out pressure (by an amount equal to the differential setting), the pumps will start. Once the system pressure has reached the , cut out pressure the pump will stop.

Once the required system pressure has been reached, the controller will display the current system pressure. The unit is now in normal operation.

#### 4 – Testing

To test the operation of the Hydro GTI booster set while connected to the system, the system pressure must be lowered slowly to simulate a minor leak.

This can be achieved by using a drain point on the system, the drain point on the booster set, or by manually opening the safety relief valve.



Care must be taken not to let the pressure drop too quickly. If the system pressure falls below the low pressure set point, a low pressure fault will be displayed and the pumps will not run. The Booster Set is not designed to cope with a sudden loss of system pressure, which would be symptomatic of a catastrophic failure such as a burst pipe.

Once the system pressure has fallen below the cut in value, (by an amount equal to the differential setting), the pump should start refilling the system. The pump will continue to run until the pressure has been reached.

This test demonstrates the primary function of the Booster Set. This test may be repeated at any time to confirm the operation of the booster set.

**Commissioning Record**

Site Reference:

PU Reference:

Date Commissioned:  /  /

Site Contact Name:

Contact No.:

Engineer Name:

Grundfos Accredited: YES / NO Delete as appropriate

Company:

Contact No.:

COLD FILL:  Bar

FILL SYSTEM: YES / NO Delete as appropriate

HIGH SET:  Bar

PUMPS NUMBER: 1 / 2 Delete as appropriate

LOW SET:  Bar

PUMP TYPE: 0 / 1 Delete as appropriate

DIFFERENTIAL:  Bar

PUMP SENSE: YES / NO Delete as appropriate

FLOOD LIMIT:  Minutes

SENSOR TYPE: 0 / 1 / 2 Delete as appropriate

PUMP 1 COUNT:

SPC CONTROLLER: YES / NO Delete as appropriate

PUMP 1 HOURS:

GLYCOL UNIT: YES / NO Delete as appropriate

PUMP 2 COUNT:

ID NUMBER:

PUMP 2 HOURS:

RELAY INVERSION: YES / NO Delete as appropriate

ALARM COUNT:

OVERUN:

POWER INTERRUPTED:

PRESSURE ALARM AUTO RESET: YES / NO Delete as appropriate

PULSE: YES / NO Delete as appropriate

CASCADE:

EXCESSIVE START: YES / NO Delete as appropriate

BOOST: YES / NO Delete as appropriate

SERVICE: YES / NO Delete as appropriate

FLOMAT: YES / NO Delete as appropriate

COMMENTS:

Engineer Signature:

Dated:  /  /

Customer Signature:

Dated:  /  /

# GTI-S CM Operation

Once commissioned, the Hydro GTI booster set should operate without any user intervention.

Under normal operating conditions, the display will show the current system pressure in Bar.

While the unit is running, the display will show <PUMP 1 RUN> or <PUMP 2 RUN> depending on which pump is currently running.

If the unit identifies a fault, the display will show the relevant fault code.



If the booster set is showing a fault code on the display, holding down the [SET] button will cause the current system pressure to be temporarily shown on the display.

## Fault Codes

The following table gives the meanings of all fault codes used on the digital controller:

Fault Code	Description	Auto/Manual Reset
LOW PRESSURE	The system pressure is below the [LOW PRESSURE] set point.	User Defined
HIGH PRESSURE	The system pressure is above the [HIGH PRESSURE] set point.	User Defined
LOW H2O	The break-tank low level float switch has been activated	Auto Reset
HIGH H2O	The break-tank high level float switch has been activated	Auto Reset
P1 FAIL	The controller has detected a fault (incorrect current draw) on the respective pump	Manual Reset
P2 FAIL		
P1 FLOOD LIMIT	The respective pump has run for longer than the [FLOOD LIMIT] period	Manual Reset
P2 FLOOD LIMIT		
ERR. 1	The signal from the pressure sensor is out of range	Manual Reset
LOW GLYCOL	The low glycol switch has been activated (glycol units only)	Auto Reset
EXCESSIVE DEMAND	There have been 4 pump starts within an 8 hour period	Manual Reset
SERVICE	The Booster Set is due an annual service	Manual Reset



For practical guidance on diagnosing and rectifying faults, please refer to the Troubleshooting section of this manual.

# GTI-E CME and CRiE Operation

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Once commissioned, the Hydro GTI booster set should operate without any user intervention. Under normal operating conditions, the gauge will show the current system pressure in Bar.

## CM, CME, CRiE Shutdown Procedure

---

The booster set must be shut-down during any of the following scenarios:



- Work is being carried out on the system.
- Work is being carried out on the booster set

To shut down the Hydro GTI set, please follow the steps below:

1. Isolate the electrical power supply to the booster set
2. Isolate the mains water supply to the Booster Set
3. Isolate the booster set from the system using the internal isolation valve
4. If it is anticipated that the unit will be out of commission for more than 24 hours, it is advisable to drain the water from the break tank.

## CM, CME, CRiE Start-Up Procedure

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Attention – This procedure is for restarting the unit after being shutdown (as described above). For initial start-up and commissioning procedures, please refer to the Commissioning section of this manual.

To restart the Booster Set, please follow the steps below:

1. Perform a visual inspection of the unit and installation to check for signs of damage
2. Check the break-tank for debris/deposits and remove if necessary
3. Turn on the mains water supply to the Booster Set and allow the break tank to fill
4. Open the internal isolation valve
5. Turn on the mains power supply and wait for the controller to start
6. Depending on the conditions in the system, the unit may display one or more fault codes at this point. If this happens, please refer to the Troubleshooting section of this manual for guidance. (CM version) Or using Grundfos Go or the R100 programming tool, setup the variable speed pump (CME and CRiE).





# Troubleshooting

If for any reason the booster set does not seem to be functioning correctly, please refer to the table below for a list of solutions to known problems.



If the booster set is showing a fault code on the display, holding down the [SET] button will cause the current system pressure to be temporarily shown on the display.

Symptom	Problem	Solution
LOW PRESSURE fault is displayed and the pumps do not run	The internal isolation valve within the unit is closed	Open the internal isolation valve
	The system pressure has fallen below the LOW PRESSURE set point	Increase system pressure using a filling loop, or enable the SYSTEM FILL option
	The SPC CONTROLLER option is enabled	Disable the SPC CONTROLLER option
	The LOW PRESSURE set point is too high	Review the system specifications
HIGH PRESSURE fault is displayed	The internal isolation valve within the unit is closed	Open the internal isolation valve
	The system pressure has risen above the HIGH PRESSURE set point	Decrease system pressure using a suitable drain point
	The expansion vessel has failed or lost its pre-charge	Check the expansion vessel pre-charge and re-charge if necessary
	The expansion vessel is undersized	Review the expansion vessel selection
	The HIGH PRESSURE set point is too low	Review the system specifications
P1 and/or P2 FLOOD LIMIT is displayed	A large amount of water has been lost from the system	Investigate cause
	The relevant pump is air-locked and not pumping water	Bleed the pump
	The unit is undersized for the system	Review unit selection
	The FLOOD LIMIT time is too short.	Consult Grundfos

Symptom	Problem	Solution
P1 and/or P2 FAIL is displayed	The PUMP TYPE option is set incorrectly.	Review PUMP TYPE setting
	The relevant pump has failed	Replace pump
P2 FAIL is displayed but the unit is a single pump model	The PUMPS NUMBER option is incorrectly set to 2	Set PUMPS NUMBER to 1
LOW H2O fault is displayed	The mains water supply to the unit has been isolated	Turn on the mains water supply
	The mains pressure is poor	The fault will clear once the break tank has been re-filled
	A non-standard electrical connection has been made into terminals 19 & 20	Remove all non-standard electrical connections
	The low water float switch has failed	Replace low water float switch
	The digital controller has failed	Replace digital controller
HIGH H2O fault is displayed	A non-standard electrical connection has been made into terminals 21 & 22	Remove all non-standard electrical connections
	The digital controller has failed	Replace digital controller
Pressure reading does not match actual system pressure.	The internal isolation valve within the unit is closed	Open the internal isolation valve
	The SENSORE TYPE option is set incorrectly	Review SENSOR TYPE setting
	A non-return valve has been installed between the unit and the system	Remove non-return valve
	The pressure sensor has failed	Replace pressure sensor
ERROR 1 fault is displayed	The SENSORE TYPE option is set incorrectly	Review SENSOR TYPE setting
	The pressure sensor has failed	Replace pressure sensor
Pump runs but does not make up pressure	The pump is air-locked and not pumping water	Bleed the pump



Symptom	Problem	Solution
The pump is repeatedly running continuously.	A pump non-return valve has failed	Replace non-return valve
	The expansion vessel has failed or lost its pre-charge	Check the expansion vessel pre-charge and re-charge if necessary
The buttons on the digital controller do not respond	The plastic housing of the digital controller has come apart and the PCB has moved	Reassemble the digital controller housing and ensure that the PCB is properly seated
The digital controller parameters are being corrupted	The controller is being subject to power spikes	Fit a suitable power filter
The digital controller does not power up when the unit is switched on	The fuse has blown	Replace the fuse
	The mains power supply is at an incorrect voltage or frequency	Check mains power supply
	The 12V transformer has failed	Replace Transformer
	The digital controller has failed	Replace digital controller
SERVICE is displayed on the screen	The unit is due an annual service	Contact service engineer

# Maintenance

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Due to variations in operating conditions, and the varying loads placed on booster sets, it is not feasible to provide accurate predictions of component lifespan. The most effective method of maintenance is to inspect the Hydro GTI booster set for early signs of component failure and take action accordingly.

The following maintenance procedures should be performed at least once a year:

## Visual Inspection

A basic visual inspection will highlight the majority of potential faults on a booster set. It is recommended to perform a visual inspection annually. However, due to the simplicity of performing these checks, frequent inspections are encouraged.

- Check the digital display for fault codes
- Check for signs of leakage (e.g. water, mineral deposits, corroded components/cabinet)
- Check the break tank overflow for signs of water discharge
- Check flexible hoses for signs of degradation.
- Check that the pressure reading on the digital display corresponds to the actual system pressure (read off another gauge)

## Interrogate Controller CM version

The digital controller keeps a log of the number of pump starts and total hours run for each pump, as well as the number of alarm activations and power interruptions. It is advisable to take a note of these figures when servicing the unit, as they may be helpful in diagnosing potential issues. Fields are provided in the service log for these figures.

It is advisable to scroll through all the settings (including engineers setting) and check them against the figures on the commissioning report. If there are any discrepancies, check first with on-site staff to see if the changes are deliberate. If not, reconfigure appropriately.



If settings are persistently becoming corrupted, a power filter may be required. Please refer to the Installation section of this manual for more information.

## Interrogate Controller CME and CRiE version

The pump controller keeps a log of the number of pump starts and total hours run for each pump. It is advisable to take a note of these figures when servicing the unit, as they may be helpful in diagnosing potential issues.

Access the pump data using either the Grundfos GO tool or the R100 programming tool.

Fields are provided in the service log for these figures.

Check settings against the figures on the commissioning report. If there are any discrepancies, check first with on-site staff to see if the changes are deliberate. If not, reconfigure appropriately.

### **Test Unit Operation**

The best way to test the operation of the booster set is to drain water from the system, allowing the pressure to drop slowly. Once the pressure starts falling below the pump cut-in pressure ([COLD FILL] – [DIFFERENTIAL]) the pump should start. As soon as the pump starts, close the drain point and allow the system pressure to rise. Once the [COLD FILL] pressure is reached, the pump should stop.

If the unit is a twin pump model, this test should be repeated until both pumps have run and successfully re-pressurised the system.

### **Check Float Valve Operation**

To test the operation of the break tank float valve, first ensure that the break tank overflow has a suitable path to drain.

Gently push down on the arm of the float valve until it starts to discharge water, then release the float valve arm. Once the arm has been released, the flow of water should stop within a few seconds.

### **Check Float Switch Operation**

To test the operation of the break tank low level float switch, reach into the break tank and gently push the float switch down into the horizontal position.

The digital controller should now display a <LOW H2O> fault.

Release the float switch and observe the display. The fault should clear after a delay of a few seconds.

### **Check Break Tank Water Condition**

Perform a visual check of the water in the break tank. If there is any dirt or debris in the water, or deposits on the sides of the tank, the tank should be drained down and cleaned.

### **Check Strainer**

Booster Sets are fitted with a mesh strainer in the connection at the bottom of the break tank. This should be removed and inspected. Depending on the condition, this part may need to be cleaned or replaced.

### **Check Expansion Vessels Pre-Charge**

Many of the problems experienced with pressure boosting equipment can be traced back to the expansion vessel.

The expansion vessel pre-charge pressure must be checked after 2 years and annually thereafter.

To perform this test, the expansion vessel must first be drained of water, then a gauge can be connected to the Schrader valve on the vessel to measure the pre-charge pressure. The pre-charge should be 0.7x setpoint for variable speed boosters and 0.9x setpoint for fixed speed boosters.

The pressure can be increased using a foot pump, air compressor or pressurised air/nitrogen cylinder.



If any faults are identified during these checks, please refer to the Troubleshooting section of this manual. If replacement parts are required, please refer to the Spares section for part codes.

# Service Log

This service log should be completed by full trained and competent engineer after each annual service.

Date		P1 COUNT	
Engineers Name		P1 HOURS	
Company		P2 COUNT	
Contact Number		P2 HOURS	
		ALARM COUNT	
		POWER INTERRUPTIONS	
Comments			

Date		P1 COUNT	
Engineers Name		P1 HOURS	
Company		P2 COUNT	
Contact Number		P2 HOURS	
		ALARM COUNT	
		POWER INTERRUPTIONS	
Comments			

Date		P1 COUNT	
Engineers Name		P1 HOURS	
Company		P2 COUNT	
Contact Number		P2 HOURS	
		ALARM COUNT	
		POWER INTERRUPTIONS	
Comments			

Date		P1 COUNT	
Engineers Name		P1 HOURS	
Company		P2 COUNT	
Contact Number		P2 HOURS	
		ALARM COUNT	
		POWER INTERRUPTIONS	
Comments			

Date		P1 COUNT	
Engineers Name		P1 HOURS	
Company		P2 COUNT	
Contact Number		P2 HOURS	
		ALARM COUNT	
		POWER INTERUPTIONS	
Comments			

Date		P1 COUNT	
Engineers Name		P1 HOURS	
Company		P2 COUNT	
Contact Number		P2 HOURS	
		ALARM COUNT	
		POWER INTERUPTIONS	
Comments			

Date		P1 COUNT	
Engineers Name		P1 HOURS	
Company		P2 COUNT	
Contact Number		P2 HOURS	
		ALARM COUNT	
		POWER INTERUPTIONS	
Comments			

Date		P1 COUNT	
Engineers Name		P1 HOURS	
Company		P2 COUNT	
Contact Number		P2 HOURS	
		ALARM COUNT	
		POWER INTERUPTIONS	
Comments			

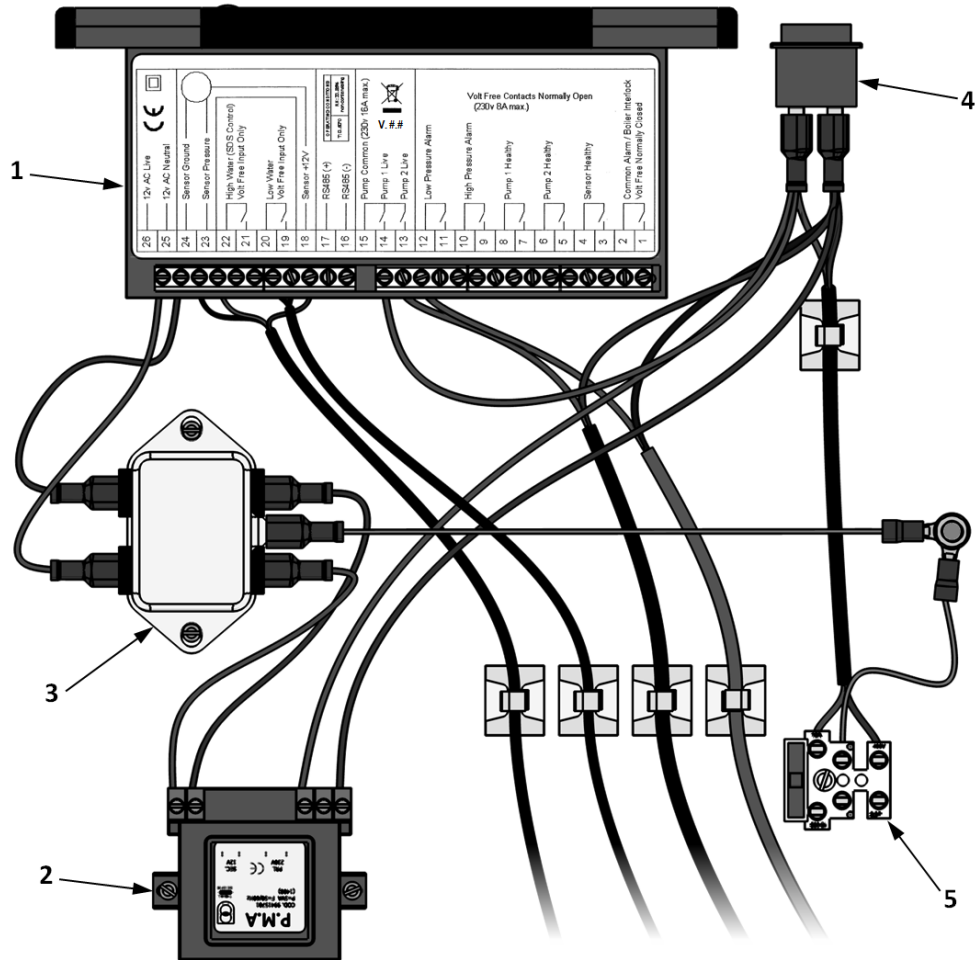


# Spare Parts



The drawings on the following pages show the internal components for a range of fixed speed Hydro GTI-S booster equipment. Due to continuing development and minor design changes, some components may be changed without notice. Therefore, the drawings may not accurately reflect the current production design. If in any doubt about the compatibility of replacement parts, please contact Grundfos.

## Electrical Items (All Models)



\*Image for indication only

#	Description	Part Code
1	Digital Controller	MICRO CONTROL
2	12V Mini Transformer	BSS MINI TRANS
3	1A Power Filter (optional)	FC 100
4	Power Switch	BSS F014
5	Fused Terminal Block	BSS R002



# Declaration of Conformity

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We GRUNDFOS declare under our sole responsibility that the Hydro GTI packaged booster sets referenced in these installation instructions to which this declaration relates are in conformity with the Council Directives on the approximation of the laws of the EEC Member States relating to:

- Machinery Directive (2006/42/EC)
  - EN 809:1998
  - EN 60204-1:2006
- EMC Directive (2004/108/EC)
  - EN 61000-6-2:2005
  - EN 61000-6-3:2007

Leighton Buzzard, 24<sup>th</sup> July 2013



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Person authorised to compile technical file and empowered to sign the EC declaration of conformity





