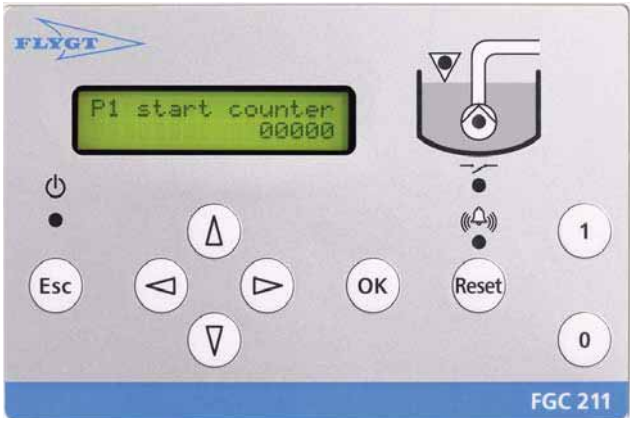
FGC 211

Installation and user manual



This manual is applicable to the following versions:

Hardware: FGC 211

Display board: AFH1901 Rev 1.01
Main board: AHH1901 Rev 1.01

System Software: 2.42 or later

Contents

Contents

1. Read This First!

1.1. Introduction

Before starting to use the FGC 211, read this chapter carefully. It contains general information on documentation, safety and guarantee.

1.2. Safety Regulations for Owner/ Operator

- All government regulations, local health and safety codes shall be complied with.
- All danger due to electricity must be avoided. 1.3. Guarantee
- Modifications or changes to the unit/installation should be carried out only after consulting Xylem Inc.
- Original spare parts and accessories authorized by the manufacturer are essential for compliance with the terms of the guarantee. The use of other parts may invalidate any claims for warranty or compensation.

1.4. Used Symbols

Safety instruction

Personal safety

Safety instruction

Personal safety - dangerous voltage

Special attention value

Apparatus or component damage

Special information

Special information about a function.

Special information

Special information about alarms.

1.5. Safety Instruction

Electrical wiring must be carried out only by a qualified electrician. All electrical installation work must be carried out with the equipment disconnected from the power supply, without any possibility of being made live, and in accordance with local regulations.

Observe all precautions for handling electrostatic sensitive devices before opening the unit.

The FGC has a high degree of protection against moist and dirt, but should always be installed so that it will not be unnecessarily exposed to water or the risk of external physical damage.

A FGC may be used only in the manner specified by the manufacturer.

The manufacturer does not allow any internal modifications to be made in the unit.

Always keep this manual with the installed unit.

Use cables that minimize interference from electrical and magnetic fields. Run the cables in a way that further minimize interference.

The many potential sources of such interference include relay coils, solenoid valves, switches, thyristor units, earth (ground) currents and static discharges.

Susceptibility to interference also varies with the electrical environment i.e. to factors such as cable lengths, screening and the use, or otherwise, of interference suppression. Many problems can be prevented by good planning.

2. Short Guides

2.1. Installation Checklist

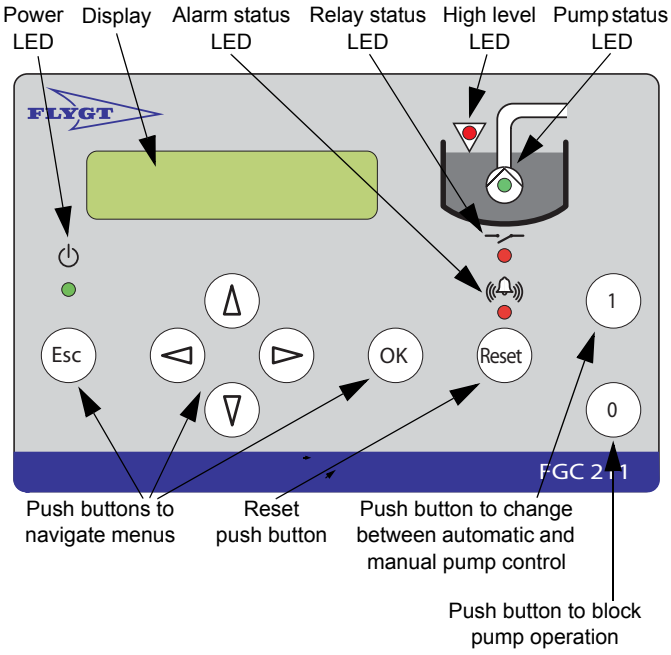
This is a short installation checklist. It is included for convenience only, and is in no way a replacement for the Installation manual.

Check-mark	Installation step	More information
	Plan the installation of the FGC to: • Avoid all danger due to electricity • Comply with the safety regulations • Comply with the guarantee regulations • Observe precautions for electrostatic sensitive devices • Avoid unnecessary exposure of the FGC • Minimize interference from electrical/magnetic fields	Chapter “Read This First” on page 4, especially Chapter “Safety Instruction” on page 4.
	Make sure the main power supply for the FGC is off.	
	Mount the FGC. Ensure that the temperature in any equipment cubicle will be neither too high, nor too low.	Chapter “Installing the FGC” on page 9.
	Install desired level sensor or switches in the pump sump, and connect them to the FGC.	Chapter “Installing Sensor or Switches” on page 10.
	If used, connect the thermal contact for the pump to the FGC. If not used, make sure to place a jumper lead on the thermal contact input in the FGC.	Chapter “Connecting Thermal Contact” on page 12.
	If used, connect an external alarm device to the common alarm output.	Chapter “Connecting Alarm Output” on page 12.
	Make sure a separate fuse is used for the main power supply.	Chapter “Power Supply” on page 13.
	Connect an earthing (grounding) conductor to the FGC.	Chapter “Earthing (Grounding)” on page 13.
	(Recommended) Provide the main power supply with overvoltage protection.	Chapter “Overvoltage Protection” on page 13.
	Connect the FGC both to the main power supply and to the pump.	Chapter “Installing Power Supply” on page 13.
	Check that all connections are correctly installed.	
	Turn on the main power supply.	
	Configure the FGC.	Chapter “Getting Started” on page 6.

2.2. Getting Started

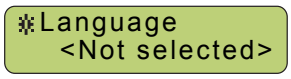
This is a short description on how to get started with the FGC 211. The description is included for convenience only, and is in no way a replacement for the Installation manual.

The figure below shows the front panel of FGC 211.



Selecting Language

When the FGC is started for the first time, the display will show the following:



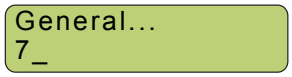
To proceed:

1. Press the ▽ button repeatedly until the display shows the desired language, for example "English".
2. Press the OK button to save selected language. The display will show "Value stored", and then change its text to the specified language.

Set Default Values - Browsing to the Menu

At delivery, the FGC is set to factory defaults. (They are listed in “Menu Descriptions” on page 30-32) . To use a different set of default values:

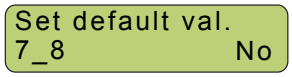
1. Press the ▽ button repeatedly until the display shows the following:



2. The underscore after the menu indicator (7_) indicates that there are submenus.

   Press the OK button to access them.

3. Press the ▽ button repeatedly until the display shows the following:



The following information is shown in the menu:

- **Menu name**: "Set default val."
- **Menu indicator**: "7_8". This indicator is shown for 3 seconds only.
- **Parameter value**: "No".

Set Default Values - Changing Values

One of the following sensor configurations is installed in the pump sump:

- **An analogue level sensor (4-20 mA)**. The sensor measures the level in the pump sump. When the sump level exceeds a specified start level, the pump starts. It runs until the sump level drops below a specified stop level.
- **Start and stop level switches**. When the level in the pump sump exceeds the start level switch, the pump starts. It runs until the sump level drops below the stop level switch.
- **Only start level switch**. When the level in the pump sump exceeds the start level switch, the pump starts. It runs a specified time, and then stops.

For each configuration, there is a set of default values.

If the following is installed..	Use the following default values...
4-20 mA level sensor	Compit analogue
Start and Stop level switches	Level regulator
Only Start level switch	Level reg. time
FGC is used in LPSS application	PC Pump

To select defaults:

1. Press the (OK) button to be able to change the value in the displayed **Set default val.** menu.

2. Press the (▽) button repeatedly to until the name of the defaults is displayed.

   For example, if the installation includes both start and stop level switches, select "Level regulator".

3. Press the (OK) button to save the changes.

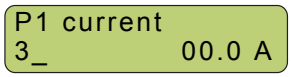
   The FGC is restarted and initialised with the selected set of default values.

Specify Maximal Motor Current

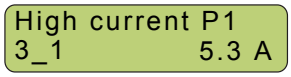
If the motor current for the pump exceeds this limit, the pump is stopped and blocked. An alarm is also generated.

To specify the maximal current:

1. Press the (▽) button repeatedly until the display shows the **P1 current** menu. (The shown current can differ from 0.0 A).

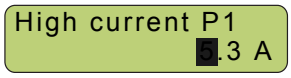
   

2. Press the (OK) button to access the submenu. The display will show the **High current P1** menu:

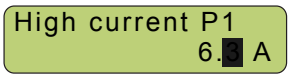
3. Press the (OK) button to be able to change the value in the displayed menu.

   A flashing cursor will appear.

4. Press the (▽) button repeatedly to specify the first digit. For example, if the maximal current for the pump is 6.0 A, enter the digit "6".

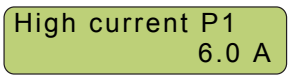
5. Press the (▷) button to move the cursor a step to the right.

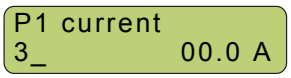
6. Press the (▽) button repeatedly to specify the last digit. For example, if the maximal current for the pump is 6.0 A, enter the digit "0".

7. Press the (OK) button to save the changes.

   The display will show "Value stored", and then the new parameter value.

8. Press the (Esc) button to exit the submenu. The display will again show the **P1 current** menu. (The shown current can differ from 0.0 A).

Checking the Installation

When the above configuration is complete, the unit is in automatic mode, and should be ready for operation.

The LEDs on the front panel indicate unit status, including potential problems. If there is a problem, check that everything is installed and configured correctly.

For information on how to interpret the LEDs and troubleshoot, refer to:

- “LED Descriptions” on page 28
- “Alarm Descriptions” on page 29
- “Troubleshooting” on page 26

What’s Next

When ready:

- FGC is now initialized with default values for the specific installation
- Pump is now ready to run.

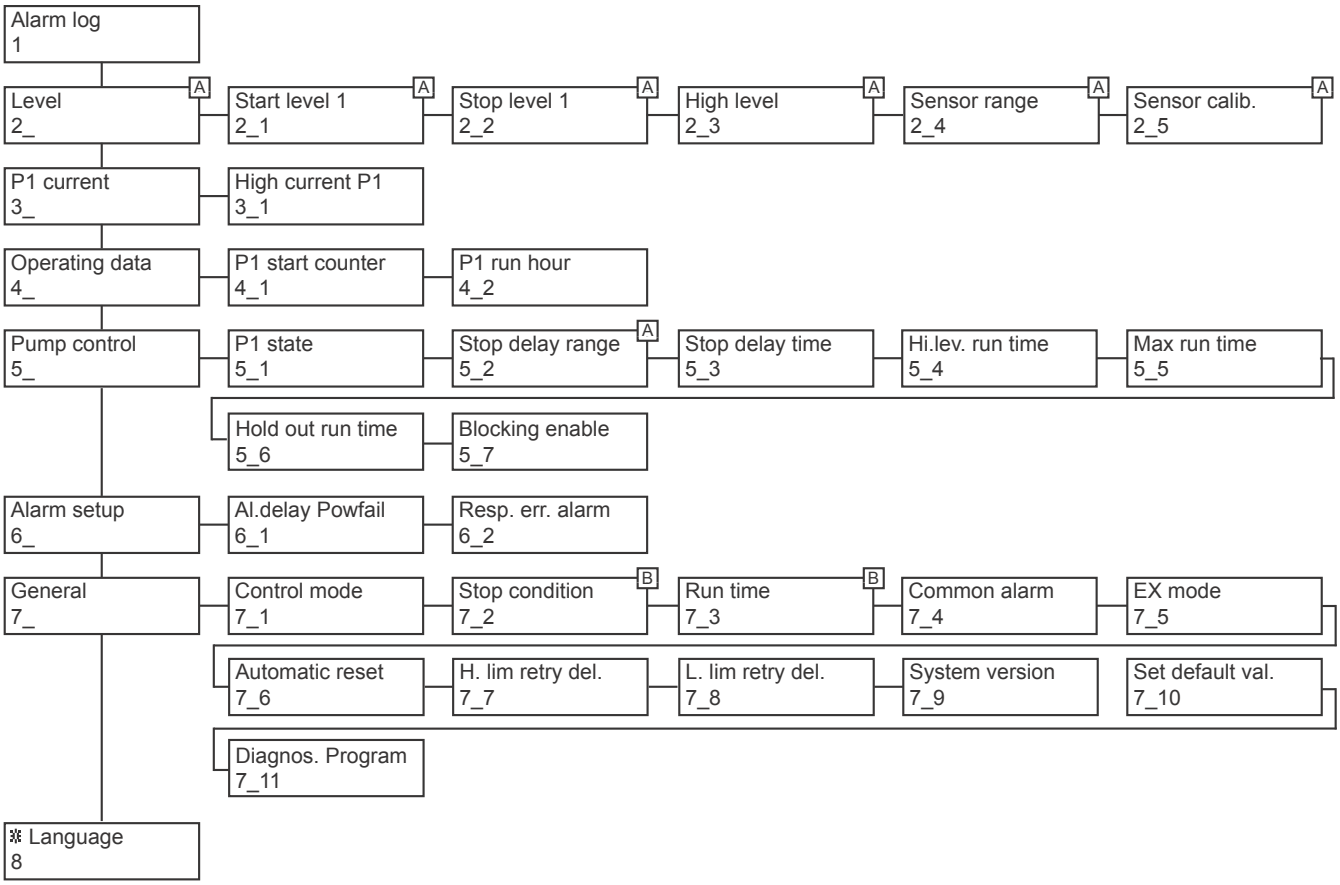
Trimming the FGC

If necessary, use the FGC menus to trim the installation, see also:

- “Menu Reference Chart” on page 8
- “Configuration” on page 19
- “Additional Configuration” on page 22

2.3. Menu Reference Chart

This chart shows the menu structure in the FGC.



[A] Only shown when the Control mode menu (7_1) is set to “Analogue”. (4-20 mA level sensor)

[B] Only shown when the Control mode menu (7_1) is set to “Digital”. (Level switches)

3. Installation

3.1. Introduction

The installation descriptions and figures can refer to terminals on the main board. For information on locations, see also “Wiring Diagram” on page 15. The following symbols can also be used in the figures:

Normally open

Normally closed

3.2. Installing the FGC

3.2.1. Explosive or Flammable Environment

The FGC must not be installed in an explosive or flammable environment.

3.2.2. Equipment Cubicle

The FGC can be installed in an equipment cubicle. Ensure that its operating temperature is between -4°F to +113°F:

- Heating will normally be required in winter if the cubicle is located outdoors or in a similarly cold environment.
- Heating of the cubicle is also recommended to avoid condensation.
- The cubicle temperature may become too high in summer if ventilation is inadequate.

3.3. Installing Sensor or Switches

Use either a level sensor, a start level switch, or both start and stop level switches. As backup, a high level switch can be used together with the start and stop level switches, as well as with a level sensor.

FGC 211 in LPSS application

The components recommended for employing FGC 211 in a LPSS application are highlighted in the following texts by this light-bulb symbol.

3.3.1. Cabling

Cables carrying different types of signals must be run separately. For example, make sure cables to an analogue level sensor are run separately from cables to digital level switches.

3.3.2. Pneumatic Sensor LTU 301

The pneumatic sensor LTU 301 is used together with an open bell system. The system includes a cast bell and a pneumatic tube.

Suitable for LPSS application

In the standard LPSS application, the digital terminals 15 and 16 normally reserved for Start level and Stop level regulators are occupied by a pressure switch and a stop relay. Instead an analog sensor is used. LTU 301 is ideally suited for this application.

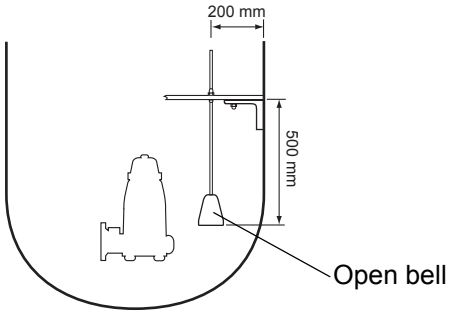
There are two versions of LTU 301. One is for ATEX-installations.

If the ATEX version is used, the open bell and only the open bell can be installed in an explosive or flammable environment

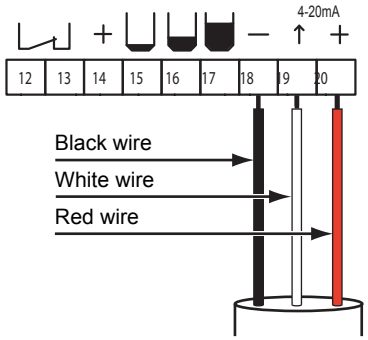
To install LTU 301:

1. Install the open bell system in the pump sump, see also example in figure below.

   For more information, refer to the Installation and operation manual for the open bell system.



2. Check that the open bell is free from solid matter.
3. Make sure that no solid matter collects at the bottom of the sump below the open bell.
4. Mount LTU 301 in the FGC.
5. Connect the pneumatic tube from the open bell system to LTU 301.
6. Connect LTU 301 as follows, see also figure below:
   - Connect the **black** wire to terminal 18 (-).
   - Connect the **white** wire to terminal 19.
   - Connect the **red** wire to terminal 20 (+).



3.3.3. 4–20 mA Level Sensor

To install a 4–20 mA level sensor:

1. Install the level sensor in the pump sump.

   For more information, refer to the Installation and operation manual for the sensor.

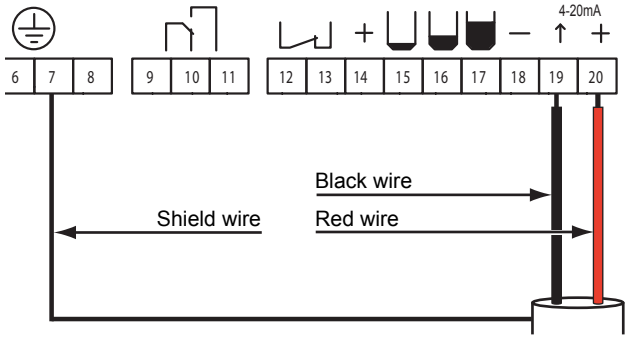
2. Connect the sensor shield to the earth (ground) terminal of the FGC, that is, connect the **shield** cable to one of terminals 5–8.

3. The analogue input in the FGC (terminals 18–20) has its own power supply, and can carry a maximum total load of 12 V.

   Connect the sensor as follows, see also figure below:

   – Connect the **black** wire to terminal 19.

   – Connect the **red** wire to terminal 20 (+).

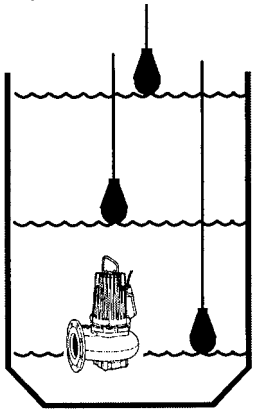


3.3.4. ENM-10 Level Regulators (Level Switches)

To install one or more ENM-10 level regulators:

1. Install the level regulators in the pump sump

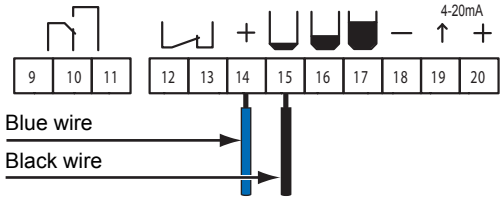
   For more information, refer to the Installation and operation manual for the regulators.



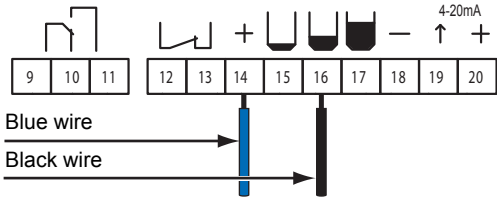
2. Connect the ENM-10 level regulators to FGC as follows:

> For normal operation, use the **blue** and the **black** wires. (The switches will be normally open ⌐ ⌐).
> Terminal 14 is the common power supply terminal for all level switches.

– If used, connect the Stop level switch to terminals 14 and 15.

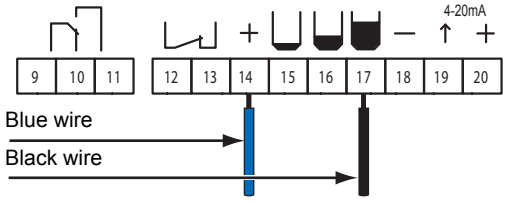


– If used, connect the Start level switch to terminals 14 and 16.



– If used, connect the High level float to terminals 14 and 17.

> ***Suitable for LPSS application***
>
> *In the standard LPSS application, the High level switch is used.*

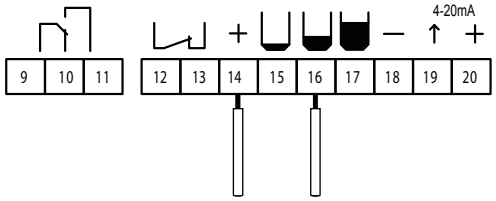


3.3.5. Pressure Switch

> ***Suitable for LPSS application***
>
> *In the standard LPSS application, a pressure switch can be used.*

An optional pressure switch can be connected to the pumping outlet, preventing the FGC from starting the pump while the pressure in the sewage system is high.

– If used, connect to terminals 14 and 16. (Switch open ⌐ ⌐ = high pressure, closed ⌐ ⌐ = low).



– For more information, refer to the installation instruction of the pressure switch.

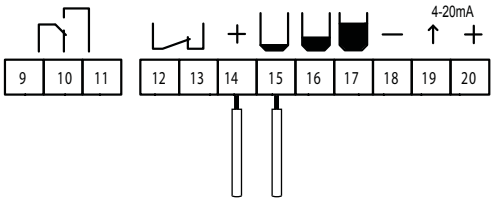
3.3.6. Flush timer or similar start blocking relay

Suitable for LPSS application

In the standard LPSS application, a flush timer (essentially a type of stop relay) can be used.

A flush timer allows the sewage level to rise in the well above the normal start level. The increased sewage volume is then used for purging the sewage system.

– If used, connect to terminals 14 and 15. (Switch open ⌐ ¬ = blocking, closed ⌙ = not blocking).



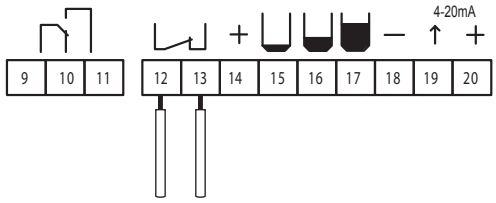
– For more information, refer to the installation instruction of the flush timer.

3.4. Connecting Thermal Contact

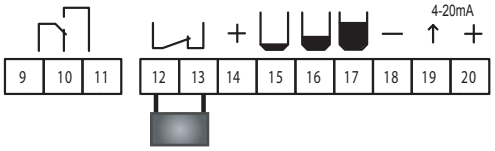
When a pump is installed in an explosive environment, the thermal contact for the pump must be connected to the FGC.

If the thermal contact for the pump is:

- used, connect the wires from the thermal contact to terminal 12 and 13 in the FGC.



- not used, make sure a jumper lead is placed between terminal 12 and 13 in the FGC.



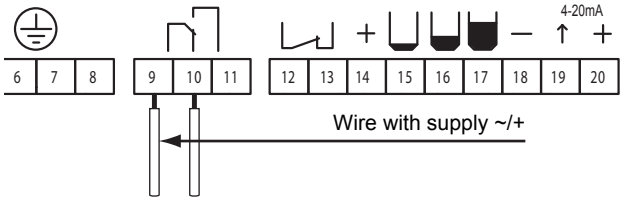
The thermal contact in the pump is normally closed ⌙.

3.5. Connecting Alarm Output

The common alarm output is a potential free, alternating relay with a maximum rating of 250 VAC (5 A). The output can be used to activate an audible or visual alarm device, for example a lamp or a siren.

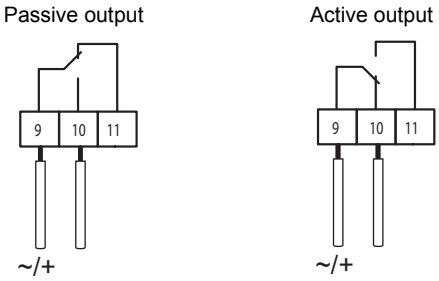
The common alarm output does not supply power for the external device. It must be must be supplied from another source.

Connect the external device to terminals 9 and 10.



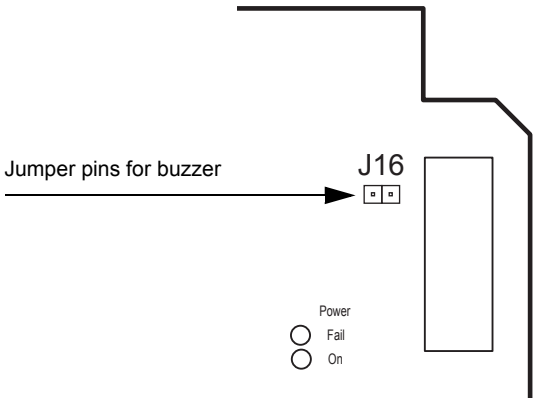
When the common alarm output is:

- passive, the relay closes between terminals 9 and 11.
- activated, or the power supply is off, the relay closes between terminals 9 and 10.



3.6. Internal Buzzer

When an alarm is generated, the internal buzzer sounds automatically. To deactivate the buzzer functionality, remove the jumper to the buzzer, see also below.



3.7. Installing Power Supply

Make sure to comply with the "Safety Instruction" on page 4.

3.7.1. Cabling

Make sure to run power and signal cables separately.

3.7.2. Power Supply

A separate fuse must protect the FGC power supply. Flygt recommends the use of automatic switch acting on all poles.

If a Flygt pump is connected in accordance with the instructions for its electrical connection, its direction of rotation will always be correct.

When connecting a pump of a different brand, the direction of rotation must always be checked, even if the Phase fault LED does not light up.

3.7.3. Earthing (Grounding)

An equipment earthing (grounding) conductor must be connected to one of the earth terminals in the FGC (terminal 5–8).

The earthing conductor should be connected to the best possible earth, such as an earthed mounting plate or an earth rod. Remember that the earthing conductor must be as short as possible.

The shields of all shielded cables must be earthed by connecting them to one of the earth terminals in the FGC.

3.7.4. Overvoltage Protection

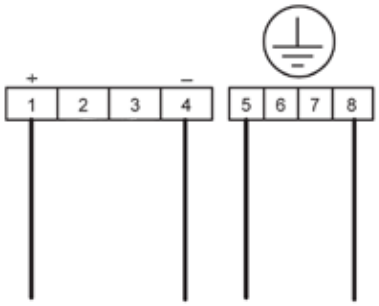
Flygt recommends that the mains power supply unit be provided with overvoltage protection (with lightning protection). Since this will make the FGC less sensitive to overvoltage, the FGC can be used in more severe environments.

The protection should be connected in series with the power supply, preferably to a separate earth (ground), such as an earth rod, although connection to the earth busbar in the distribution box may sometimes suffice.

A 6–10 mm² conductor should be used to connect the overvoltage protection to earth.

3.7.6. FGC 24 VDC Power Supply

Below describes how to connect the power supply to the FGC.



Power Supply
24 VDC

3.8. FGC 211 in a LPSS application

3.8.1. Background

In response to demands for a simple, efficient and reliable solution for a LPSS system, Xylem Inc. proposes an application where FGC 211 is used in combination with a Flygt PC-pump (i.e. a Progressive Cavity -pump).

The application presented here is typically intended for situations where a number of family houses (e.g. villas), each with its individual sewage tank, are connected to a common pressurised sewage system. The FGC controls the pump that empties the sewage tank into the system.

A few problems that need to be addressed are presented here, in order to demonstrate how certain functions and component accessories are employed in the application.

3.8.2. Preventing over pressure in system

Problem: The individual pump controls must prevent dangerous pressure levels by regulating the number of pumps allowed to operate simultaneously.

Solution: High pressure in the system is detected by a pressure switch connected to the pumping outlet. When pressure is too high, the FGC is prevented from starting the pump. As a result, some units may have to wait for other units to finish pumping.

High pressure is also detected indirectly by the FGC, while monitoring the pump current. Should the work load on the pump be too high, the current protection (i.e. motor protection) trips the pump. This not only protects the pump from damage but also protects the whole system from high pressure.

Note: Using over current protection in this manner is viable for PC-pumps. For centrifugal pumps on the other hand, over current is more likely caused by solids or debris clogging the pump, necessitating a service stop.

3.8.3. Avoiding simultaneous pump starts

Problem: The work load on the system is highly variable; Many households will be pumping sewage during approximately the same morning and evening hours.

Should a power down occur, the situation will be further aggravated; When power is re-established, many pumps may attempt to start pumping simultaneously, causing sudden pressure increases in the system.

Solution: This problem is already handled in the FGC by the power-on delay (see “Fixed Pump Delays” on page 22) which randomizes the start of individual pumps within a 120 s time frame.

3.8.4. Handling pressure increases during operation

Problem: When the pump starts, pressure in the outflow increases and may exceed the sensor’s limit.

Solution: The pressure switch may only block the pump start, i.e. when the pump is already running, only over current protection can stop the pump prematurely.

3.8.5. Preventing over flow at high pressure

Problem: A high sewage level suggests that the tank may be in danger of over flowing. This must be avoided!

Solution: When the high sewage level is reached, the pressure switch signal is no longer allowed to block the pump start and the FGC can start the pump normally.

Note: Over current will still block the pump from running. In order for the pump control to operate appropriately, the blocking function is modified by the settings for number of restart attempts described under the next heading.

3.8.6. Resetting over current protection

Problem: In the LPSS applicationit is likely that over current protection will occasionally stop a pump. Previously FGC 211 could only handle a single restart attempt. If this failed, due to the over current state still remaining, restarting would be permanently blocked and a service technician would be required before the pump could be started again.

Solution: It is now possible to enter a value for the number of allowed restarts from 1 to 200. As soon as the FGC successfully restarts the pump, the internal counter of the number of consecutively blocked start attempts is nullified.

3.8.7. Flushing sewage from the system

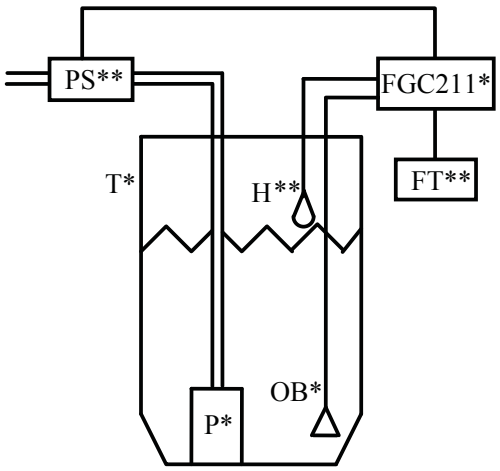
Problem: In normal operation, sewage in the tank seldom rises above the start level. This may cause residue to build up around the tank wall. Additionally, the limited volumes pumped out of the tank with each pumping cycle may not create sufficient flush to clear out the sand that may be settling in the pipes.

Solution: A flush timer is used for blocking pump start for a given time period. (Xylem Inc. does not advocate any particular settings for time delay or interval, as these are determined by the actual situation.) In this way, the sewage is occasionally allowed to rise above the start level. The increased sewage volume aids in flushing the system.

To prevent over flow, the high level switch over rides the flush timer and may initiate the flush when necessary.

3.8.8. System overview

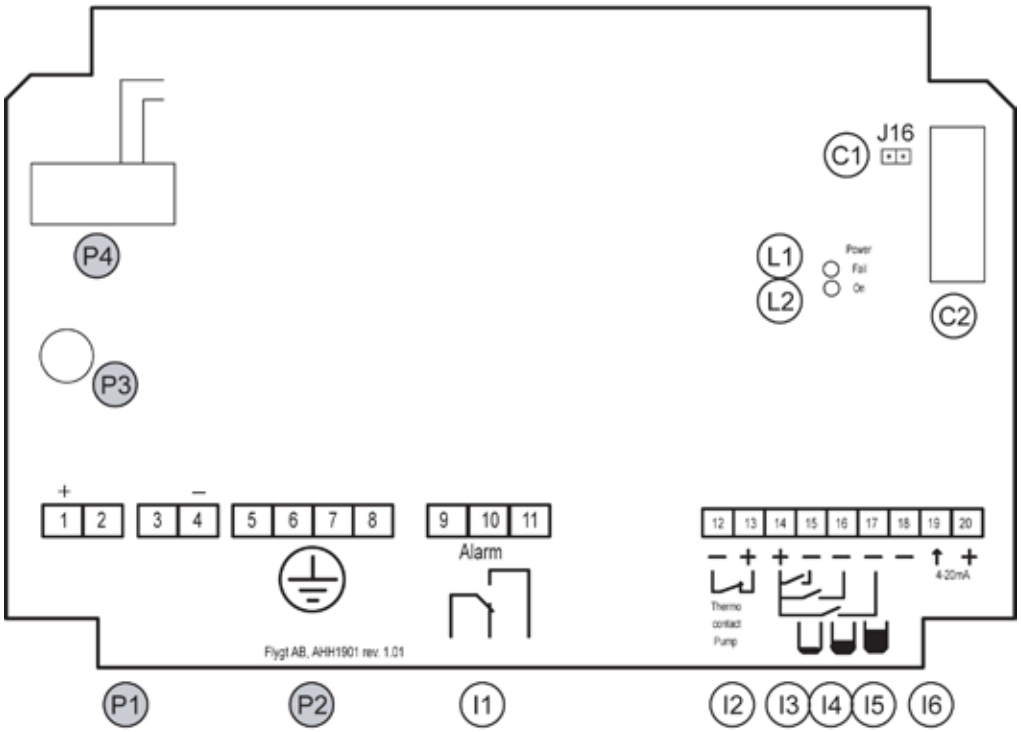
This is a schematic view of the standard (*) and optional (**) components of the LPSS application:



Standard components are the Tank (T), Pump (P), FGC 211 and Open Bell level system (OB), with LTU 301 sensor. Optionally a High level float (H), Pressure Switch (PS) and Flush Timer (FT) may be fitted.

3.9. Wiring Diagram

Main board AHH 1901 is used to control 1 pump. The layout and contents are specified below.



Location	Description	Terminal
Power		
P1	Power supply 24 VDC	1, 4
P2	Earth terminal: 4 pcs 6 mm^2.	5–8
P3	Fuse F2: T100mA L for internal use.	
P4	Current transformer for the pump	
I/O		
I1	Common alarm output, potential-free contact. Max. 250 VAC / 5 A.	9 –11
I2	Thermal contact input for the pump. If not used, make sure a jumper lead is placed on the input	12–13
I3	Stop level switch input Terminal 14 is a common terminal for all level switches (stop, start and high level)	14, 15
I4	Start level switch input Terminal 14 is a common terminal for all level switches (stop, start and high level)	14, 16
I5	High level switch input Terminal 14 is a common terminal for all level switches (stop, start and high level)	14, 17
I6	Analogue level sensor input, 4-20 mA	18–20
Connector		
C1	Jumper pins for internal buzzer. (Main board version 1.00 has no internal buzzer, and no pins).	
C2	Connection for display unit	
LED		
L2	Power on indicator	
L1	Power Fault Indicator	

3.10. Controller Specification

Denomination

Model	Part. no	Pumps	LCD Display
FGC 211-200000[1]	40-501830	1	Yes

[1]Consists of:
Qty. 1 – Circuit Board
Qty. 1 – Display Card
Qty. 1 – Ribbon Cable
Qty. 1 – Overlay

Power Supply

Rated voltage 24 VDC (20-28 VDC)
Current consumption, internal 100 mA at 24 VDC

Rated pump current
1-phase Max. 9.9 A, Min. 0.5 A

Basic fuses
Internal fuse 100 mA (non-replaceable)

Approvals and Standards

EMC emission standard EN61000-6-3
EMC immunity standard EN61000-6-2
LVD electrical safety EN/IEC 61010-1
CE Marking

Environment

Operational temperature[2] - 4° F to +113° F
Storage Temperature - 4° F to +158° F
Humidity (non-condensing) 90% RH
Operator Panel Class 1, IP 54, CAT II
Altitude Max. 6562 ft
Pollution degree 2

[2] The LCD display will update slower below 32° F.

Material

Operator Panel ABS V0

Data Processing Power

Processor PIC18F4620
Executed word length 8 bits
Clock frequency 32 MHz
Text memory 64 kB
Watchdog Yes

User Interface

Display LCD 2x16 characters
Push buttons 9 pcs
Alarm indications 4 LEDs
FGC status indications 3 LEDs

Digital Inputs

Start switch
Stop switch
High level switch
Thermal contact

Relay Outputs

Common alarm Voltage free, Max load 230 VAC (5 A)

Analogue input

Analogue level 4-20 mA[3]
[3] The supply from the FGC can carry max 12 VDC.

Terminals

Signal 1.5 mm^2
Power 6 mm^2
Earth Terminal 6 mm

Type of level sensors to be used

Pneumatic sensor LTU 301 (4-20 mA) with 0-2.5 m sensor range.

External level sensor (4-20 mA)
ENM-10 external level regulator

Options and Accessories

Level control accessories:

- Level regulators ENM-10. Different level switches (start, stop and high level) that provide digital input signals.
- Open bell system, and pneumatic sensor LTU 301. The open bell system includes a cast bell and a tube that can be connected to a pneumatic sensor. It transforms the generated pressure to an analogue signal (4-20 mA).
- Pressure sensor. It transforms the measured pressure to an analogue signal (4-20 mA).
- High water module. It is used to detect a high level in the pump sump.

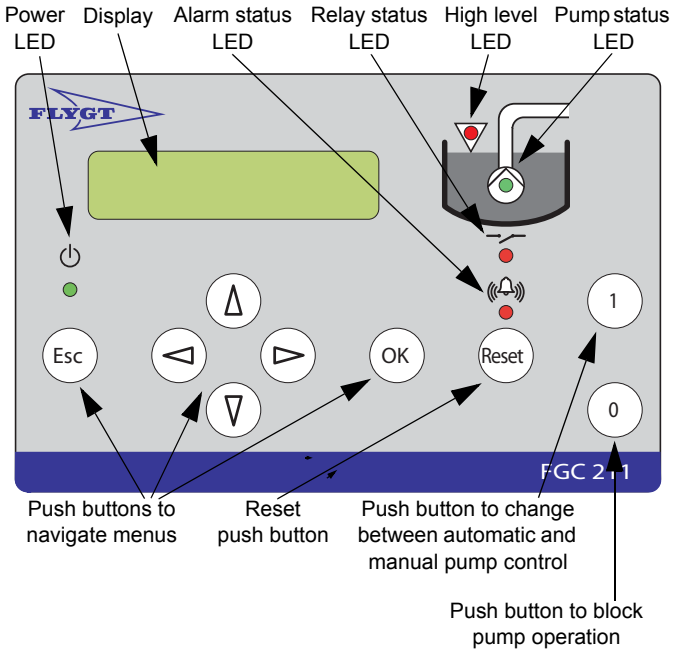
4. Operator Panel

4.1. Introduction

FGC 211 is a pump controller designed for single pump installations and household usage.

4.2. Front Panel

The figure below shows the front panel of FGC 211.



The panel contains:

- **Display** to show the different menus.
- **Push buttons** to navigate menus and change values.
- A set of **LED indications**, see also “LED Descriptions” on page 28.

4.3. Display

The display shows the current menu. When the display has been idle for 10 minutes:

- Light is switched off.
- Any open menu is closed.

4.4. Push Buttons

Available push buttons are listed below.

Escape

Left arrow

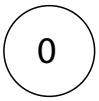
Right arrow

Up arrow

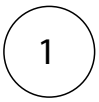
Down arrow

OK

Reset



Manual pump stop and block



Automatic mode and manual pump start

4.5. Menus

You use the menus to configure the FGC, and view relevant information, such as runtime data and alarms.

The following information is generally shown in a menu:

- Menu name, for example **Pump Control**.
- Menu indicator, for example "5_" or "5_1". It is shown for 3 seconds only. If the indicator ends with an underscore, there are submenus.
- Parameter value.

For a complete list of menus, see also “Menu Descriptions” on page 30.

4.5.1. Using the Menus

1. Display the desired menu:
   - Press the ▽ button to browse forwards one menu at a time.
   - Press the △ button to browse backwards one menu at a time.
   - Press the OK button to show the first menu in a group of submenus.
   - Press the Esc button to exit a group of submenus.
2. You can now view the parameter value in the menu, and change it if necessary.

   To change the value, press the OK button. A flashing cursor will appear. (If a value cannot be changed, the message "Read-only" will be displayed instead).
3. Enter or select the new value:
   - Press the △ button to increase the value.
   - Press the ▽ button to decrease the value.
   - Press the ▷ button to move the cursor a step to the right. (Only valid when you enter a text or a numerical value).
   - Press the ◁ button to move the cursor a step to the left. (Only valid when you enter a text or a numerical value).
4. Either:
   - Press the OK button to save the changes.
   - Press the Esc button to exit the menu without saving the value.
5. When a parameter value is saved, a message will show the result:
   - "Value stored". The value has been saved.
   - "High value". The value is too high. Enter a lower value.
   - "Low value". The value is too low. Enter a higher value.

For information on allowed values, see also “Menu Descriptions” on page 30.

4.6. Pump Control

Use the 1 and 0 buttons to change between automatic and manual pump control, see also “Controlling the Pump” on page 24.

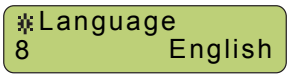
4.7. Reset Function

With the Reset button, you can acknowledge a new alarm or remove a pump fault block, see also:

- “Pump Failure Block” on page 25.
- “Acknowledge an Alarm” on page 25.

4.8. Display Language

The display language is changed in the **Language** menu (8_). Look for the ✲ symbol. It is shown in the top-left corner of the **Language** menu.

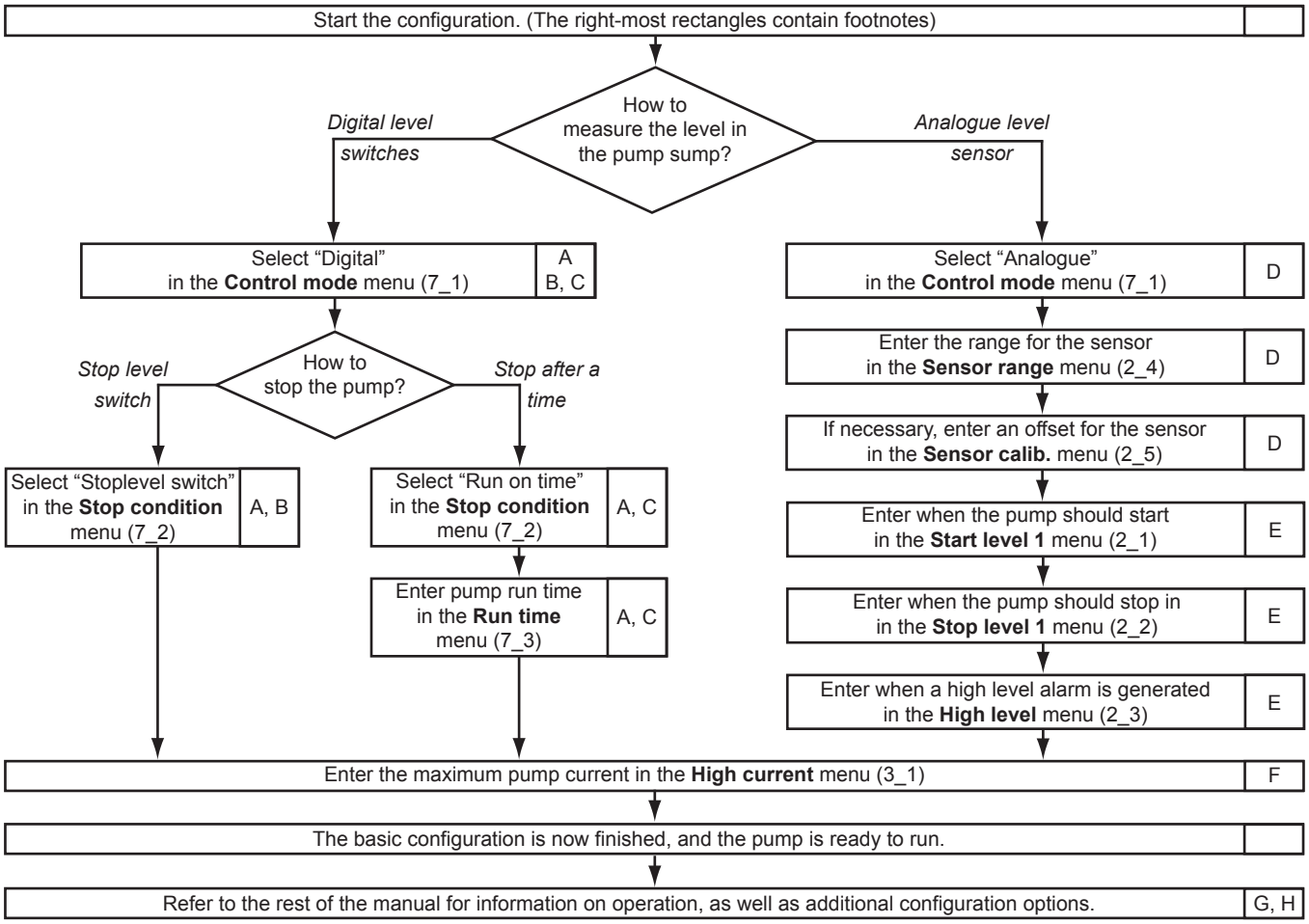


5. Configuration

5.1. Introduction

This chapter describes how to configure basic parameters and set-points in the FGC. (For simpler configuration, refer to “Getting Started” on page 6).

To configure the FGC, follow the flow chart below:



For more information, refer to:

A “Configuring Level Switches” on page 20

B “Using a Stop Level Switch” on page 20

C “Stopping a Pump After a Time” on page 20

D “Configuring a Level Sensor” on page 20

E “Start, Stop and High Levels” on page 21

F “Maximum Motor Current” on page 21

G “Additional Configuration” on page 22

H “Basic Operation” on page 24

For a complete list of menus, refer to “Menu Descriptions” on page 30-32.

5.2. Startup

To measure the level in the pump sump, you can use either:

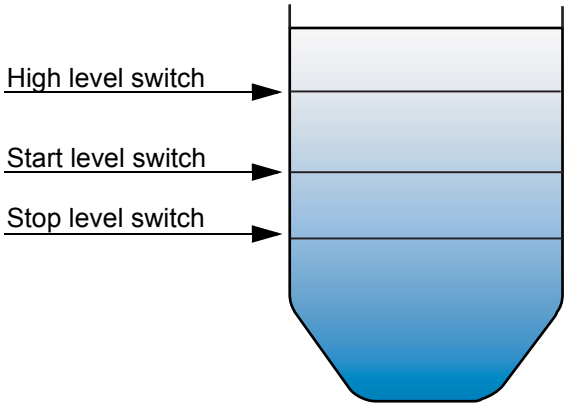
- Digital level switches. Continue with “Configuring Level Switches” on page 20.
- Analogue level sensor. Continue with “Configuring a Level Sensor” on page 20.

5.3. Configuring Level Switches

When the level in the pump sump:

- Exceeds the start level switch, the pump is started.
- Drops below the stop level switch, the pump is stopped. (In some installations, there is no stop level switch, as described below).
- Exceeds the high level switch, a "High level" alarm is generated.

Since a pump is used to drain a pump sump, the stop level switch is installed below any start level switch, which is installed below the high level switch.



When there is no stop level switch in an installation, the pump instead can be stopped after a specified time. This time starts to run once the level in the pump sump drops below the start level switch. That is, the start level switch first have to revert to its normal position.

5.3.1. Using a Stop Level Switch

To use a stop level switch:

1. Select "Digital" in the **Control mode** menu (7_1).
2. Select "Stoplevel switch" in the **Stop condition** menu (7_2).

When ready, continue with “Maximum Motor Current” on page 21.

5.3.2. Stopping a Pump After a Time

To specify after how long time a pump should be stopped:

1. Select "Digital" in the **Control mode** menu (7_1).
2. Select "Run on time" in the **Stop condition** menu (7_2).
3. Enter the time in the **Run time** menu (7_3).

When ready, continue with “Maximum Motor Current” on page 21.

5.4. Configuring a Level Sensor

To configure a level sensor:

1. Select "Analogue" in the **Control mode** menu (7_1).
2. Enter the sensor range in the **Sensor range** menu (2_4). For information on the range, refer to the documentation delivered with the sensor.
3. In the pump sump, raise the sensor from the water.
4. Return to the FGC, and read the current level in the **Level** menu (2_).

   Since the sensor is raised from the water, the level should read "0.00" or some other acceptable value, for example "0.01". Since values are rounded, it is not necessary to have "0.00".
5. Optionally, you can calibrate the sensor:
   a. Make a note of the displayed level value, for example "00.20 m".
   b. Calculate the offset needed to display the level "0.00 m". For example, if the displayed level is "00.20 m", the offset needed is "-00.20 m".
   c. Enter the offset in the **Sensor calib.** menu (2_5).
   d. Read the current level in the **Level** menu (2), and make sure the displayed level is acceptable.
5. In the pump sump, lower the sensor in the water.

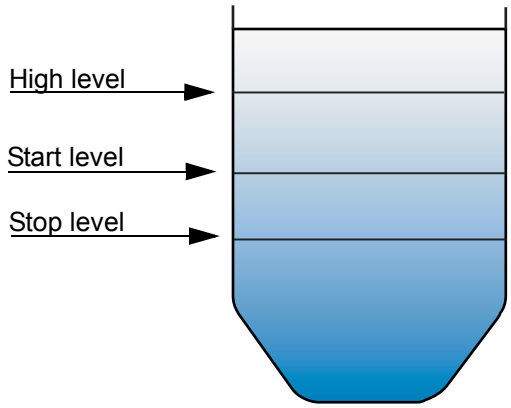
When ready, continue with “Start, Stop and High Levels” on page 21.

5.4.1. Start, Stop and High Levels

When the level in the pump equals specified:

- Start level, the pump is started.
- Stop level, the pump is stopped.
- High level, a "High level" alarm is generated.

Since the pumps are used to empty or drain a pump sump, stop level < start level < high level.



To specify the levels:

1. Enter the start level in the **Start level 1** menu (2_1).
2. Enter the stop level in the **Stop level 1** menu (2_2).
3. Enter when the high level alarm is generated in the **High level** menu (2_3).

When ready, continue below.

5.5. Pump Configuration

5.5.1. Maximum Motor Current

This is the maximum allowed current for a pump motor, and is normally the same as the nominal current of the pump. The FGC automatically adds a 5% margin to the specified value.

If the motor current exceeds this limit after a calculated delay, the pump is stopped and blocked from restarting. (An alarm is also generated). However, if the FGC is set to "Automatic reset", the FGC will attempt to restart the pump up to the specified number of times. This is specified in the **Automatic reset** menu (7_6). Should all attempts fail, the pump will remain blocked.

If restart is successful, but the motor protection is tripped again during the following pump cycle, the pump is again stopped (and possibly also blocked from restarting, as explained above).

To specify the maximum motor current:

1. Enter the maximum current in the **High current P1** menu (3_1).
2. To use automatic reset, enter "1" in the **Automatic reset** menu (7_6). Otherwise, enter "0" in this menu to disable automatic reset.

When ready, the basic configuration is complete. If desired, you can continue with:

- “Additional Configuration” on page 22.
- “Basic Operation” on page 24.

5.6. Restoring Default Values

If needed, you can restore the FGC to a set of default values. Available are:

- "Compit analogue" – a set of default values for an analogue level sensor installed in a Compit pump sump.
- "Level regulator" – a set of default values when using both start and stop level switches.
- "Level reg. time" – a set of default values when using a start level switch, but no stop level switch.

To restore default values:

1. Select the relevant set in the **Set default value** menu (7_10).
2. Wait while the FGC restarts.

6. Additional Configuration

6.1. Introduction

Besides the basic parameters and set-points described in “Configuration” on page 19. you may want to change the ones described in this chapter.

6.2. Level Configuration

6.2.1. Backup Pump Control

As backup, an installation can include a high level switch. It can be used together with start and stop level switches, as well as with a level sensor.

If the start switches or the level sensor malfunctions, the pump is started when the level in the pump sump exceeds the high level switch. (A "High level" alarm is also generated).

When the level in the pump sump drops below the high level switch, the pump will continue to run for some additional time.

Specify this additional run time in the **Hi. lev. run time** menu (5_4).

6.2.2. Stop Delay

If a level sensor or level switch cannot be installed low enough in a pump sump, a stop delay allows the pump to empty the sump completely.

If the pump is installed in an EX-classified environment, check the pump approvals before pumping below the stop level.

A pump stop can be delayed until:

- The specified time has elapsed.
- The pump has lowered the level in the pump sump a specified height. (Only available for an analogue level sensor).

To delay the pump stop a specific time:

1. If you use an analogue level sensor, enter "0.0" in the **Stop delay range** menu (5_2). This will disable the stop delay based on a specific height.
2. Enter the time in the **Stop delay time** menu (5_3).

To set the pump to lower the level in the pump sump a specific height:

1. Enter the desired height in the **Stop delay range** menu (5_2).
2. The FGC calculates the pump run time necessary to lower the level the required height. To prevent the pumps from running dry, enter a maximum run time in the **Stop delay time** menu (5_3).

6.3. Pump Control

6.3.1. Fixed Pump Delays

Fixed delays are used to smoothen pump operation. They cannot be re-configured.

Minimum Stop Time. When a pump is stopped, it cannot be restarted until after at least 5 seconds.

Power-on Delay. This delay prevents pumps in different sumps from restarting simultaneously after a power failure. When power is turned on after the power fault, pump start is delayed 0–120 seconds. During the delay, the Relay status LED  displays a flashing red light.

6.3.2. Automatic Maintenance Run

If a pump has not been started within 96 hours, the FGC will start the pump for a maintenance run that lasts 1 second. This is useful to keep the mechanical seals in the pump in shape.

Make sure to disconnect mains power supply before any maintenance work, since the pump will start automatically every 96 hours as long as mains power supply is on.

6.3.3. High Temperature

The thermocontact in the pump can be connected to the FGC. When the temperature in the pump is too high, the pump is stopped, and blocked from restarting.

Wait a while for the pump to cool down, and then press the Reset button to remove the block. If the pump has cooled down, it will be allowed to start. Otherwise, try again a little later.

6.3.4. EX-classified Environment

When a pump is used in an EX classified environment, you can set the FGC to EX mode. If no liquid is detected in the pump sump, the FGC will prevent the pump from starting. The starting method will not matter, that is, any manual start attempt, or maintenance run will be blocked.

To configure Ex mode:

1. Display the **Ex mode** menu (7_5).
2. Select either:
   - "On" to set the FGC to EX mode.
   - "Off" to disable EX mode.

6.3.5. Maximum Run Time for a Pump

This is the maximum time a pump can run continuously. When this time has elapsed, the pump is stopped and blocked from restarting. (An alarm is also generated).

This limit is useful, for example, to stop a clogged pump from running too long. The alarm indicates that something is wrong, for example, that the pump impeller is damaged and delivers insufficient flow, or that a level sensor is faulty.

The specified limit must exceed one pumping cycle. Consider that the following settings can add time to a pumping cycle:

- If the pump is set to run on time, see also “Stopping a Pump After a Time” on page 20.
- High level run time, see also “Backup Pump Control” on page 22.
- If a stop delay is used, see also “Stop Delay” on page 22.

To specify the maximum run time:

1. Display the **Max run time** menu (5_5).
2. Enter either:
   - Maximum run time
   - "00:00" to disable the function. (There will be no limit for how long a pump can run).

6.3.6. Pump Response

When the FGC has set the pump to start and the pump current exceeds 0,5 A, the pump is considered to have started.

When the FGC has set the pump to start, but the pump current remains below 0,5 A, the pump is considered not to have started. An alarm can be generated.

To disable pump response alarms, select "0" in the **Automatic reset** menu (7_6). Otherwise, enter a number from "1" to "200" in this menu.

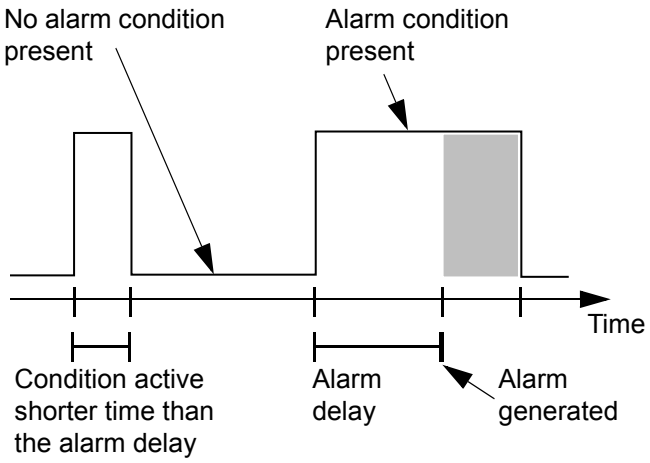
6.4. Alarm Configuration

An alarm alerts the receiver that something needs attention. The FGC can generate alarms, for example, if the temperature in a pump motor is too high. For a complete list of possible alarms, see also “Alarm Descriptions” on page 29.

6.4.1. Alarm Delay

When the condition for an alarm is fulfilled, for example if the level in the pump sump exceeds the configured high level alarm limit, the alarm is generated.

However, alarm generation can be delayed for a specified time. The alarm condition then has to be fulfilled during this time for an alarm to be generated. For example, if the level in the pump sump drops below the configured high level alarm limit before the delay time has elapsed, no alarm will be generated.



There are two delay types:

- General alarm delay that affects all alarms, except power fault alarms. This delay is 3 seconds.
- Alarm delay for power failure alarms.

To specify the alarm delay for power failures, enter the delay time in the **Al.delay Powfail** menu (6_1).

6.4.2. Audible or Visual Alarm Indication

The common alarm output can be connected to an audible or visual device, for example a lamp or siren. The output turns on the device when an alarm is generated.

To configure the output:

1. Display the **Common alarm** menu (7_4).
2. Select either:
   - "Continuous" for a steady indication.
   - "Intermittent" for a flashing indication.

7. Basic Operation

7.1. Introduction

This chapter describes basic operation. For information on configuration, refer to previous chapters.

7.2. Viewing Runtime Data

The following runtime data can be shown in the FGC.

- Level in the pump sump. When a level sensor is used, you can view the current level in the **Level** menu (2_). (When level switches are used, this menu is hidden).
- Pump current. View the present current in the **P1 current** menu (3_).
- Number of pump starts. View how many times the pump has started in the **P1 start counter** menu (4_1).
- Run time for a pump. View how long time the pump has run in the **P1 run hour** menu (4_2).

7.3. Resetting Runtime Data

You can reset the following runtime data:

- Number of pump starts shown in the **P1 start counter** menu (4_1).
- Run time for a pump shown in the **P1 run hour** menu (4_2).

To reset runtime data:

1. Display the relevant menu, for example, the **P1 start counter** menu.
2. Reset the value, that is:
   a. Press the OK button to be able to reset the value. The message "Reset value?" is displayed.
   b. Press the △ button to select "Yes".
   c. Press the OK button to reset the value.

7.4. Controlling the Pump

7.4.1. Automatic Control (Auto Mode)

Normally, the FGC starts and stops the pump automatically. This is called Auto mode.

7.4.2. Manual Control (Manual Mode)

In Auto mode, you can manually start the pump. This changes the mode to Manual mode.

The exception is EX-mode, see also “EX-classified Environment” on page 22.
In Ex-mode, the pump will not start if there is no liquid detected in the pump sump.

Start the Pump Manually

Press the 1 button for 5–10 seconds until the display briefly shows "Manual mode".

Example:

How Long Will the Pump Run?

The pump will now run until the level in the pump sump drops below the stop level.

If the level in the pump sump already is below the stop level, the pump will run for 5 minutes.

Return to Auto Mode

When the pump cycle is complete, the FGC returns to Auto mode.

To return immediately, press the 0 button.

7.4.3. Blocked Pump (Blocked Mode)

In Auto mode, you can manually block the pump. This changes the mode to Blocked mode.

Block the Pump Manually

Press the 0 button. The display will briefly show "Blocked".

How Long Will the Pump Remain Blocked?

The pump will now remain blocked until the 1 button is pressed.

Return to Auto Mode

Press the 1 button. The display will briefly show "Auto".

7.4.4. View Control Status

View control status in the **P1 state** menu (5_1).

7.5. Pump Failure Block

The pump can also be blocked due to a pump failure. For example, the motor temperature is too high or the pump has run longer that the configured maximum time.

When the problem is corrected, press the Reset button to remove the automatic block.

7.6. Handling Alarms

An alarm alerts the receiver that something needs attention. The FGC can generate alarms, for example, when the temperature in a pump motor is too high, or the pump has run longer that the configured maximum time.

For a complete list of alarms, see also “Alarm Descriptions” on page 29.

With alarms, you can:

- Acknowledge that you have received an alarm
- View recorded alarms in the alarm log
- Clear the alarm log from inactive alarms

7.6.1. Acknowledge an Alarm

The FGC can be connected to both a buzzer, and another audible or visual device, for example a lamp or siren. The devices will be turned on when an alarm is generated.

Press the Reset button to acknowledge that you have received the alarm. This will also silence any connected buzzer or other device.

7.6.2. Viewing Alarms

The last 50 alarms are recorded in the alarm log. It shows both inactive and active alarms.

To view the alarm log:

1. Display the **Alarm log** menu (1). It shows the number of recorded alarms.
2. View the log, that is:
   a. Press the OK button to show the log. The first alarm shown is the oldest alarm.
   b. Either, press the Δ button to display the latest alarm,

      or, press the ∇ button repeatedly to browse the log.
   c. Press the Esc button to exit the log.

7.6.3. Clear the Alarm Log

To remove one or more inactive alarms from the log:

1. Display the **Alarm log** menu (1). It shows the number of recorded alarms.
2. Clear the log of the alarms, that is:
   a. Press the OK button to show the log.
   b. If necessary, press the ∇ button repeatedly until desired alarm is displayed.
   c. Press the OK button.
   d. Press the ∇ button to select either:

      "Current" - Only the displayed alarm will be deleted.

      "All" - All inactive alarms will be deleted.
   e. Press the OK button to delete the inactive alarms. The message "Log cleared" is displayed.

8. Troubleshooting

8.1. Introduction

This chapter describes troubleshooting.

> *Make sure mains power supply is disconnected before any maintenance work on the FGC or pump.*

8.2. Basic Problems

8.2.1. Power Supply

Problem:

Power LED  is not lit.

Checklist:

1. The main power supply is off. Check the external main switch and main fuse.
2. If the error cannot be found after following the instructions above, contact a FLYGT service agent.

8.2.3. Pump Failure

Problem:

Pump status LED  is continuously lit red.

Checklist:

1. Check if the **Alarm log** menu (1) contains the alarm "P1 high temp".
2. If the log contains the alarm, the thermal contact in the motor winding has opened due to high temperature. (The contact is normally closed).
   a. Check that the thermal contact is wired as shown in the wiring diagram, see also “Connecting Thermal Contact” on page 12.
   b. Check if the pump is damaged, for example, bearing or winding failure.
   c. Check if pump impeller is jammed.
   d. When the problem is corrected, press the 

button. If the pump has cooled down, the LED should no longer be continuously lit. Otherwise, wait a while for the pump to cool down and then press the button again.
3. Check if the **Alarm log** menu (1) contains the alarm "P1 High cur".
4. If the log contains the alarm, the pump current has exceeded its configured maximum.
   a. Check that the **High current P1** menu (3_1) is set to the correct maximum current, see also “Maximum Motor Current” on page 21.
   b. Check if the pump is damaged, for example bearing failure or winding fault.
   c. Check if the pump impeller is jammed.
   d. When the problem is corrected, press the 

button. The LED should no longer be continuously lit.
5. Check if the **Alarm log** menu (1) contains the alarm "P1 Max run".
6. If the log contains the alarm, the pump has run longer than the configured maximum time:
   a. Check that the **Max run time** menu (5_5) is set to the correct maximum current, see also “Maximum Run Time for a Pump” on page 23.
   b. Check if the pump is clogged.
   c. Check if the impeller is jammed or damaged.
   d. If used, check if the level sensor is faulty.
   e. When the problem is corrected, press the 

button. The LED should no longer be continuously lit.
7. If the error cannot be found after following the instructions above, contact a FLYGT service agent.

8.2.4. Blocked Pump

Problem:

Relay status LED  is continuously lit red.

Checklist:

1. If the pump fails to start:
   a. Check if "Auto" is selected in the **P1 State** menu (5_1).
   b. If not, select "Auto" in the **P1 State** menu (5_1). The LED should stop being lit red.
   c. If the LED still is lit red, check if "On" is selected in the **Ex mode** menu (7_5).
   d. If selected, the FGC is set to Ex mode, see also “EX-classified Environment” on page 22. The pump will be blocked as long as there is no liquid in the pump sump. When there again is liquid in the pump sump, the LED should stop being lit red.
5. If the pump starts with the LED continuously lit red, contact a FLYGT service agent.

8.3. Diagnostic Programs

Diagnostic programs are used to test the hardware.

- All other functions are disabled when a diagnostic program is run, that is, normal pump control and operation are prevented.
- After 10 minutes of idle time the FGC will automatically revert to normal operation.

To run a diagnostic program:

1. Display the **Diagnos. Program** menu (7_9).
2. Select one of the diagnostic programs. Available programs are listed below. (The rest of the programs are for future use).

To manually stop a diagnostic program, select "Off" in the **Diagnosis. Program** menu.

Program	Description	Results
10	Digital inputs	Shows the digital input states, for example 1001100100000000
11	• LED output • Common alarm output	Flashes at 1 second **interval**.
20	Analogue input	Shows the raw input values (0-16383).
24	P1 current input	Shows the raw input values (0-16383). This starts the pump.

9. Appendix A: FGC Descriptions

9.1. LED Descriptions

The front panel of an FGC includes a set of LEDs, see also “Front Panel” on page 17. The LEDs are described in the table below.

LED	Indication	Cause
 Power	Green (on)	The power supply is on.
	Off	The power supply is off, or a fuse is blown.
 Alarm status	Red (flashing)	A new alarm has occurred.
	Red (on)	The new alarm has been acknowledged, but is still active.
 Relay status	Green (on)	The pump relay is activated.
	Red (on)	The pump is stopped and blocked from restarting. Possible causes: • Pump is blocked manually, see also “Blocked Pump (Blocked Mode)” on page 24. • The FGC is set to Ex mode, and there is no liquid in the pump sump, see also “EX-classified Environment” on page 22.
	Red (flashing	Pump failure. Possible causes: • Pump start is delayed, see also “Fixed Pump Delays” on page 22.
 Pump status	Green (on)	The pump is running.
	Red (on)	The pump is stopped and blocked from restarting. Possible causes: • Pump current exceeds its configured maximum, see also “Maximum Motor Current” on page 21. • Temperature in the pump is too high, see also “High Temperature” on page 22. • Pump has run longer than the configured maximum time, see also “Maximum Run Time for a Pump” on page 23.
 High level	Red (on)	The level in the pump sump is high. Possible causes: • Level exceeds a high level switch. The pump is started automatically, see also “Backup Pump Control” on page 22. • Level exceeds the configured high level limit, see also “Start, Stop and High Levels” on page 21. This is only relevant if a level sensor is used.

9.2. Alarm Descriptions

The FGC can generate the alarms listed in the table below. The columns describe the following:

- The alarm text shown in the Alarm log menu (1).
- The event or error that caused the alarm.
- Whether the pump is stopped and blocked from restarting due to the event or error.
- Whether any LED, except the Alarm status LED, is lit due to the event or error.

Text in Alarm Log	Alarm Cause	Pump is Blocked	LED Indication
High level	High level in pump sump. Alarm from the level sensor.	No	High level
Mains error	The main power has been disrupted	Yes	Relay status (for phase failures)
Hi.lev.float	The level in the sump reaches the high level switch. The pump will be started.	No	High level
P1 Tripped	High current pump 1. Alarm from the analogue current measurement. The pump is blocked by this alarm.	Yes	Pump status
P1 No resp.	There is no response signal from pump 1. The pump has probably not started despite activation of the power relay.	No	
P1 high temp	High temperature in pump 1.	Yes	Pump status
Inval. setp.	The level setpoints are incorrect. The specified setpoints for Start, Stop or High level is either outside the calibration range or they are mutually not corresponding, i.e. the high level setpoint is lower than the start level setpoint.	No	
P1 Max. run	The pump 1 has exceeded the maximum allowed run time. The pump is blocked by this alarm. See also the Max run time set-point.	Yes	Pump status
Sensor Fault	An error in the analogue sensor has been detected. The measured level is outside the sensor range.	No	

9.3. Menu Descriptions

The table below describes available menus.

No		Menu Name	Menu Options	Factory Settings	Compit Analogue	Level Regulator	Level Reg. Time	PC Pump	Description
1		Alarm log	**Writable**						Number of recorded alarms.
2_	1	Level m	**Read only**	NA	00.00 m	NA	NA	NA	Level in pump sump
2_1	1	Start Level 1 m	**Writable Interval** -99.99 To 99.99	NA	00.15 m	NA	NA	00.50 m	Start level for the pump.
2_2	1	Stop Level 1 m	**Writable Interval** -99.99 To 99.99	NA	00.10 m	NA	NA	00.20 m	Stop level for the pump.
2_3	1	High Level m	**Writable Interval** -99.99 To 99.99	NA	00.25 m	NA	NA	00.70 m	High level alarm limit.
2_4	1	Sensor range m	**Writable Interval** 0.00 To 20.00	NA	02.50 m	NA	NA	02.50 m	Sensor range.
2_5	1	Sensor calib. m	**Writable Interval** -99.99 To 99.99	NA	00.00 m	NA	NA	00.00 m	Sensor calibration offset.
3_		P1 current A	**Read only Interval** 0.0 To 99.9						Measured current for the pump.
3_1		High current P1 A	**Writable Interval** 0.0 To 9.9	5.3 A	5.3 A	5.3 A	5.3 A	5.3 A	High current alarm limit for the pump.
4_		Operating data	**Read only**						Menu group for operating data
4_1		P1 start counter	**Writable**	0	0	0	0	0	Number of start for the pump
4_2		P1 run hour h:min	**Writable**	0:00	0:00	0:00	0:00	0:00	Run hour for the pump
5_		Pump control...	**Read only**						Menu group for pump control
5_1		P1 state	**Writable Alternative** • Auto • Blocked • Manual mode	Auto	Auto	Auto	Auto	Auto	Program controlled automatic or blocked state for Pump 1
5_2	1	Stop delay range m	**Writable Interval** 0.00 To 2.50	0.00	0.22	0.00	0.00	0.00	Specifies an additional height, below the Stop level, to be pumped down. The RTU calculates the stop delay time required to lower this height. 0 - Inhibits the function
5_3		Stop delay time min:s	**Writable Interval** 00:00 To 59:59	00:00	00:45	01:00	00:00	00:01	Delays the stop of the pump with the set time. NOTE: If the calculated stop delay function is activated, this set-point defines the maximum allowed calculated stop delay time

No		Menu Name	Menu Options	Factory Settings	Compit Analogue	Level Regulator	Level Reg. Time	PC Pump	Description
5_4		Hi.lev. run time min:s	**Writable Interval** 00:00 To 59:59	01:00	00.20	01:00	02.00	01.00	Backup control activated when there is a level sensor failure. The high level switch activates the start of the pump, which will then run for the period set in this menu.
5_5		Max run time min:s	**Writable Interval** 00:00 To 59:59	30.00	30.00	30.00	30.00	30.00	The maximum time the pump is allowed to run continuously. 0 - disables the function.
5_6		Hold out run time min:s	**Writable Interval** 00:00 To 59:59	00:00	00:00	00:00	00:00	00:00	The pump will continue running for the duration of the interval. 0 - disables the function.
5_7		Blocking enable	**Writable Alternative** • No • Yes	No	No	No	No	No	'Yes' enables blocking by an external blocking relay, such as a purge timer.
6_		Alarm setup...	**Read only**						Menu group for alarms
6_1		Al.delay Powfail min	**Writable Interval** 0 To 960	1 min	1 min	1 min	1 min	1 min	The delay of a Power failure alarm before it is recorded.
6_2		Resp. err. alarm	**Writable Alternative** • No • Yes	Yes	Yes	Yes	Yes	Yes	When the pump current is below 0.5 A the RTU will register a pump response error alarm. To disable the pump response error alarm function, select 'No'.
7_		General...	**Read only**						Menu group for general set-points
7_1		Control mode	**Writable Alternative** • Digital • Analogue	Digital	Anal.	Digital	Digital	Anal.	Selects if an analogue sensor or level switches are used for starting and stopping the pumps. Also referred to as analogue and digital mode.
7_2	2	Stop condition	**Writable Alternative** • Run on time • Stoplevel switch	Stop level switch	NA	Stop level switch	Run on time	NA	Selects if a stop level switch is present or the pump is stopped after a time. Applies to digital mode only.
7_3	2	Run time min:s	**Writable Interval** 00:00 To 59:59	00.00	00.00	00.00	00:20	00:00	The pump running time when configured to Run on time, i.e. no stop level switch is used. Applicable to digital mode only.
7_4		Common alarm	**Writable Alternative** • Continuous • Intermittent	Cont.	Inter.	Cont.	Inter.	Cont.	Type of common alarm output. Continuous or pulsating.
7_5		EX mode	**Writable Alternative** • Off • On	Off	On	Off	Off	Off	When EX-mode is on, the pumps are not allowed to start unless water can be detected in the sump. The function is used primarily in explosive environment
7_6		Automatic reset	**Writable Interval** 0 To 200	1	0	1	1	1	Automatic reset of the pump following an Over current failure. 0: Inactivated function. The RTU blocks the pump on first Over current. 1 - 200: Activated function. The RTU will attempt to start the pump 1 - 200 times before blocking.

No		Menu Name	Menu Options	Factory Settings	Compit Analogue	Level Regulator	Level Reg. Time	PC Pump	Description
7_7		H. lim retry del. min:s	**Writable Interval** 00:00 To 59:59	00:00	00:00	00:00	00:00	30:00	The value entered is the highest possible value for the randomized start retry delay.
7_8		L. lim retry del. min:s	**Writable Interval** 00:00 To 59:59	00:00	00:00	00:00	00:00	10:00	The value entered is the lowest possible value for the randomized start retry delay.
7_9		System version	**Read only**						The RTU system version. Please have this number ready when calling Flygt support.
7_10		Set default val.	**Writable Alternative** • No • Compit analogue • Level regulator • Level reg. time						Restores all parameter values to the selected set of default values. Operating data and the language setting are not affected
7_11		Diagnos. Program	**Writable Alternative** • Off • 1-39						Diagnostic program for test of the RTU
8		¤ Language	**Writable Alternative** • English • Deutsch • Nederlands • Français • Dansk • Svenska • Norsk • Español • Magyar • Suomi • Italiano • PycckNN • Polski						Select display language

[1] Menu shown only when **Control mode** menu (7_1) is set to "Analogue". (4–20 mA level sensor)

[2] Menu shown only when **Control mode** menu (7_1) is set to "Digital". (Level switches)

10. Appendix B: LPSS Scenarios

10.1. Operation variants

The scenarios presented below, each describing a complete cycle, assume that the equipment is set up as described in chapter **3.8. FGC 211 in a LPSS application**

In these examples, pumping stops when the sewage level gets below the stop level. Alternatively or in addition to this, FGC 211 can be configured to stop the pump after a certain run time. This may cause pumping to stop while the sewage level is still above the stop level. In case the sewage is also above the start level, this will result in a new count down to pump start.

10.2. Permanent blocking

Should the maximum number of allowed pump start attempts be exceeded, the FGC will block the pump permanently. (Otherwise "blocking" is just temporary.)

10.3. Start, run and stop

The following describe the possible LPSS scenarios.

10.3.1. Scenario A - Normal pressure

1. Sewage level in the well rises above the start level.
2. Pressure at the pump outlet is below the pressure sensor’s threshold value.
3. FGC starts the pump.
4. Pumping lowers the sewage level in the well below the start level.
5. FGC stops the pump.

10.3.2. Scenario B - High pressure at start

1. Sewage level in the well rises above the start level.
2. Pressure at the pump outlet is above the pressure sensor’s threshold value.
3. FGC blocks the pump from starting.
4. Count down to next start attempt begins.
5. The pressure at the pump outlet is checked:
   – Pressure is above sensor’s threshold - Continued blocking (3).
   – Pressure is below sensor’s threshold - Blocking no longer in effect (6).
6. FGC starts the pump.
7. Pumping lowers the sewage level in the well below the start level.
8. FGC stops the pump.

10.3.3. Scenario C - High level

1. Pressure at the pump outlet is above the pressure sensor’s threshold value.
2. FGC blocks the pump.
3. Sewage level in the well rises above the High level.
4. FGC ignores the high pressure blocking.
5. FGC starts the pump.
6. Pumping lowers the sewage level in the well below the start level.
7. FGC stops the pump.

10.3.4. Scenario D1 - Over current at start

1. FGC starts the pump.
2. FGC immediately registers over current and the over current protection trips the pump.
3. FGC blocks the pump.
4. The "number of consecutive blocks" counter is updated by +1 in the FGC.
   – Total number of allowed start attempts is exceeded - Permanent blocking (5).
   – Total number of allowed start attempts is not exceeded - Count down to start (6).
5. FGC blocks the pump permanently - Alarm! (end)
6. Count down to next start attempt begins:
   – Motor protection trips the pump - Blocking (3).
   – Current is below motor protection threshold - Blocking no longer in effect (7).
7. FGC starts the pump.
8. The "number of consecutive blocks" counter in the FGC is reset to 0.
9. Pumping lowers the sewage level in the well below the start level.
10. FGC stops the pump.

10.3.5. Scenario D2 - Current rising

1. During pumping, resistance in the system increases.
2. FGC registers over current and the over current protection trips the pump.
3. FGC blocks the pump - Updating of consecutive blocks counter (Scenario D1, 4, etc.)