Automatic Pump Pilot   APP 521

APP 521

FLYGT

a **xylem** brand

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Read This First

Read This First

This manual is applicable to the following versions

- Hardware:APP 521
- Operator panel: AFH1801 Rev 1.02 or later
- I/O-module: AHH1801 Rev 1.02 or later
- Com-module: TMX1801 Rev 1.00 or later
- System Software: 2.73 or later
- Application: 1.44 or later

Introduction

Before starting to use APP 521, read this chapter carefully. It contains general information on documentation, safety and guarantee.

Product Overview

APP 521 is a pump controller that consists of an I/O module and an operator panel.

APP 521 can use a PSTN, GSM, GPRS or radio modem to communicate with a SCADA system, for example AquaView. A special communication module is available for this purpose.

Safety rules for the owner/operator

- All government regulations, local health and safety directives must be observed.
- All danger due to electricity must be avoided.

Guarantee

- Modifications or changes to the unit/installation should be done only after consulting Xylem.
- Genuine 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 the guarantee.

This manual

- In this manual, APP 521 is generally referred to as the RTU.
- In order to avoid repetition of information, the manual describes how one pump P1, should be read or entered.
- If a second pump P2 is included in the installation, the instructions must be repeated for this pump.

Symbols used

NOTICE:
- *Special information about a function.*
- *Information concerning the Central system.*
- *Information about alarms.*

Terminology

The table below describes the terms and abbreviations that are used in this manual.

Abbreviation	Full Term	Description
CS	Central System	Used in menus. The term means SCADA system.

Abbreviation	Full Term	Description
RTU	Remote Terminal Unit	Unit for supervising and controlling a pump station, for example APP 521.
SCADA	Supervisory Control And Data Acquisition	PC based system aiming to create an overview; the operator can monitor process information and influence and change the process values. The system allows logging, trending and remote commands as well as presenting process data as significant digits, staples, curves, trends, or as symbols varying in colors and sizes.

Shortguides

Shortguides

Front panel
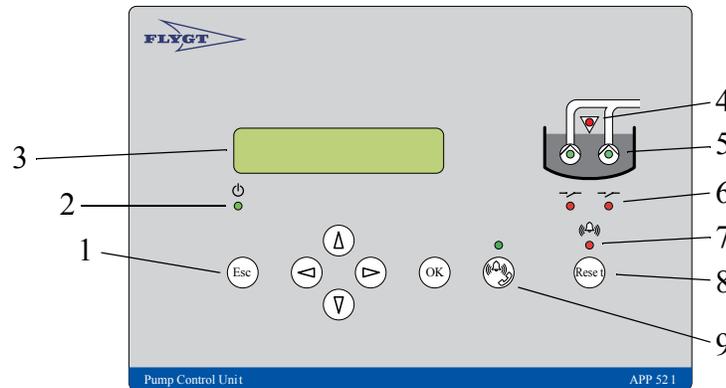
1. Display
2. Power LED
3. Push buttons
4. High level LED
5. Pump status LED
6. Relay status LED
7. Alarm status LED
8. Reset
9. Remote alarm On/Off

Push buttons

Esc	Escape: Exit a menu without saving any changes. Exit a sub-menu.	△	Up arrow: Scroll backwards one menu at a time. Edit a value.
◁	Left arrow: Go back. Move the cursor to the left, while editing a value.	OK	OK: Display the first menu in a sub-menu group. Save a specified value.
▷	Right arrow: Advance. Move the cursor to the right, while editing a value.	🔔	Remote alarm On/Off: When remote is on, alarms are transmitted to CS/SMS.
▽	Down arrow: Advance one menu at a time. Edit a value.	Reset	Reset: Acknowledge a new alarm. It is not removed from the alarm log.

View pump running hours and number of starts

1. Display the Operating data (5_) menu, and press OK.
2. Repeat for P1 Start counter (5_1), and P1 Run hour (5_2)to P2 Start counter (5_3) and P2 Run hour (5_4) respectively.

View and delete alarms

1. Display the Alarm log (1) menu and press OK.
2. Browse the log by repeatedly pressing the Down button.

3. Scroll to the required alarm and press OK.Result: A "Delete alarm?" message appears and "Current" is displayed.
4. Choose between "Current" and "All" by pressing the Down button and then OK. Result: The alarm is cleared and the text "Log cleared" message is displayed.

Change a parameter value, for example a level setpoint

1. Display the Level (2_) menu and press OK.
2. Select the menu you want to change (Start / Stop level 1–2 or High / Low level). Press OK.
3. Select a new parameter value or alternative. Press OK.

Show installation and service menus

To show menus that are used only during installation or service, select "Yes" in the Show more menus menu (16). The backlight is switched off when the display has been idle for ten minutes.

Menu reference chart

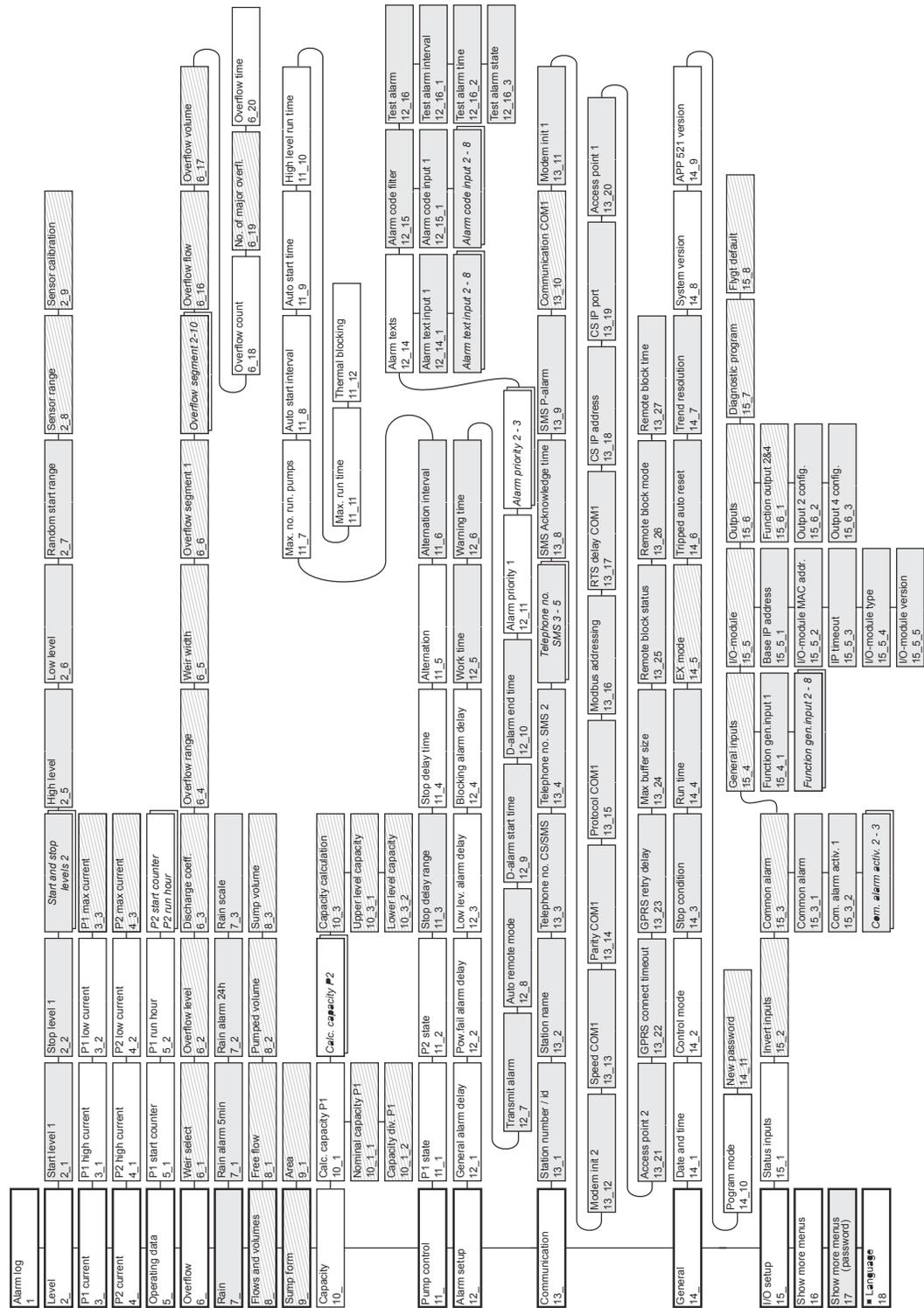Legend (Flygt default settings):

Always shown:

Normally hidden:
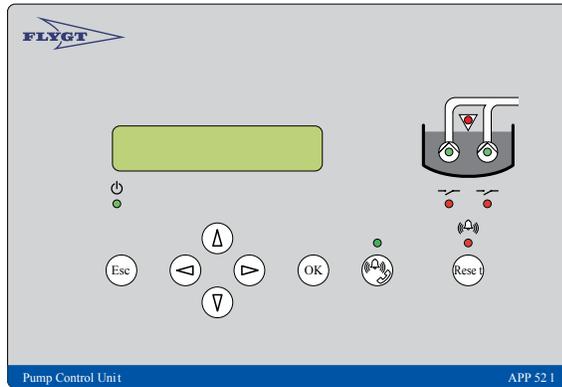
Shown depending on configuration:

(Reference: For a detailed menu list, refer to Appendix A).

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Front Panel

Front Panel

Illustration: Front panel

LEDs on front panel

⏻ 🟢	Power LED	🔻	High level LED
🟢 📞	Communication status LED	🟢	Pump status LED
🔔 🔴	Alarm status LED	🔴	Relay status LED

(Reference: "Monitor Status on Front Panel" for an explanation of LED functions).

Push buttons on front panel

The push buttons are used to browse menus, and edit parameter values. Each menu has an indicator, for example "18".

- The indicator is shown for 3 seconds only.
- An underscore after the last number indicates a submenu, for example "2_".

Viewing a menu

△	Use the Up arrow to scroll backwards one menu at a time.
▽	Use Down arrow to advance one menu at a time.
OK	Press OK to display the first menu in a submenu group.

Esc	Press ESC to return to the last menu shown in the previous menu group.

Changing a parameter

Display the relevant menu as described above, and then:

OK	Press OK. Either: A flashing cursor appears, *or* The text "Read only" is displayed.

If the value is numerical, move cursor to relevant position.

▷	Advance with the Right arrow
◁	Move backwards with the Left arrow.
△	To select a higher value, press the Up arrow.
▽	To select a lower value press the Down arrow.

For text menus, the next available alternative is displayed instead of a value.

OK	Press OK to save the specified value.
Esc	Press Escape to exit the menu without saving.

When you save a value, the result is displayed:

Value stored	Value has been saved.
Low value (xx)	Value is below permissible range (xx). Enter a higher value.
High value (yy)	Value is above permissible range (yy). Enter a lower value.

Show installation and service menus

To show menus that are used only during installation or service:
- Select "Yes" in the Show more menus menu (16).
- If the password function is in use, enter the password instead.

NOTICE:

When the display has been idle for ten minutes:

Backlight is switched off.

Only default menus are shown.

Miscellaneous buttons

○	Shift between remote and local alarm handling. (Reference: "Disable Alarms Temporarily").
Reset	Acknowledge a new alarm. It is not removed from the alarm log. (Reference: "Monitor and Erase Alarms in the Alarm Log").

Language

The display language is changed in the Language menu. Look for the

¤

symbol. It is shown in the top-left corner of the Language menu.

Configure Basics

Configuration Startup

To access to the configuration menus:
- Select "Yes" in the Show more menus menu (16).
- If the password function is in use, enter the password instead.

Configure I/O-module Communication

Communication between the I/O-module and the operator panel must be set up.

Before using this function
- Obtain MAC address. (Reference: Bar code on I/O-module housing).
- If the I/O-module is connected to an intranet, obtain two consecutive IP-addresses from the network administrator.

Bar code with MAC address

The MAC address is the last 9 digits of the bar code.

Example:

Bar code	10.255.240.017
MAC address	255.240.017

Type of communication

The operator panel and I/O-module can be connected in two ways:
- Local network: direct connection with cable.
- Intranet: both modules are connected to an intranet.

Types of IP addresses

The RTU uses two consecutive IP addresses:
- First address is called BaseIPaddress. It is used by the operator panel.
- Second address is derived from the first. It is used by the I/O-module.

Local network

In this case, the default Base IP address is sufficient. If desired, any of the following free addresses can be used instead:
- 10.0.0.0 to 10.255.255.255
- 172.16.0.0 to 172.31.255.255
- 192.168.0.0 to 192.168.255.255

Configure I/O module communication

Specify the MAC address in the I/O-module MAC addr. menu (15_5_2).

1. If necessary, specify the first of the two consecutive IP addresses in the Base IP address menu (15_5_1).

   Keep in mind: If the modules form a local network, the default Base IP address is sufficient.

2. If necessary, specify a new IP communication timeout in the IP timeout menu (15_5_3).

   Keep in mind: the default value is appropriate for most installations.

Configure Level Control

Basically, there are two ways to detect the sump level:
- Analogue level sensor, *or*
- Digital start and stop level switches.

Configure Digital Start and Stop Level Switches

Start and stop level switches determine when a pump normally starts and stops. An installation includes a start level switch for each pump, and optionally a stop level switch.

Function: Stop level switch

Phase	Description
1	Sump level exceeds Start level 1 switch. Result: First pump is started.
2	Sump level exceeds Start level 2 switch. Result: Second pump is started.
3	Sump level drops below the stop level switch. Result: Both pumps are stopped.

Function: No stop level switch

Phase	Description
1	Sump level exceeds Start level 1 switch. Result: First pump is started.
2	Sump level drops below the Start level 1 switch. Result: Timer for the pump is started.
3	Timer exceeds the specified run time. Result: Pump is stopped.

Configure stop condition (stop level switch)

1. Select "Digital" in the Control mode menu (14_2).
2. Select "Stop level switch" in the Stop condition menu (14_3).

Configure stop condition (no stop level switch)

1. Select "Digital" in the Control mode menu (14_2).
2. Specify "Run on time" in the Stop condition menu (14_3).
3. Specify how long time a pump should run in the Run time menu (14_4).

Configure Analogue Level Sensor

An analogue level sensor can detect the sump level.

Before using this function

Obtain data on maximum sensor range. (Reference: Sensor documentation).

Zero-level

When the sump level is below the sensor range, the RTU should show "0.00" or some other acceptable value as sump level.

Since value are rounded, it is not necessary to have exactly "0.00". For example, "0.01" can be acceptable as zero-level.

Sensor calibration

It may be necessary to trim the zero-level.

Example: If the displayed zero-level is -0.20, required offset is 0.20.

Configure analogue level sensor

1. Select "Analog" in the Control mode menu (14_2).
2. Specify the maximum sensor range in the Sensor range menu (2_8).
3. Raise the sensor out of the liquid.
4. Level menu (2_) should read "0.0". If not, specify the offset in the Sensor calibration menu (2_9). (This is usually the distance between the sump bottom and the sensor).
5. Lower the sensor into its proper location.

Related configuration

Configure also analogue levels. (Reference: "Start, Stop, High and Low Levels".)

Start, Stop, High and Low Levels

The specified levels determine when a pump normally starts and stops.

Before using this function

This function is only available if an analogue level sensor is used (and configured).

Illustration: Type of levels
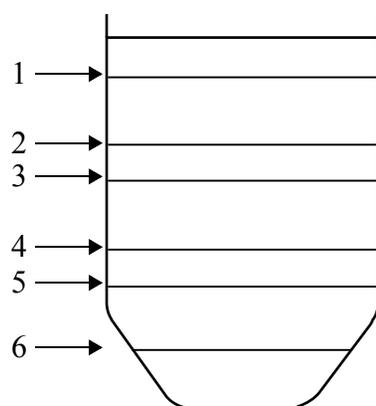
1. High level
2. Start level 2
3. Start level 1
4. Stop level 2
5. Stop level 1
6. Low level

Function: Analogue levels

If sump level...	Then...
exceeds High level limit	high level alarm is generated
exceeds a Start level	one pump is started
drops below a Stop level	one pump is stopped
drops below Low level limit	the following takes place: All pumps are temporarily blocked Low level alarm is generated

Configure analogue levels

Specify the lowest start level in the Start level 1 menu (2_1).

1. Specify the lowest stop level in the Stop level 1 menu (2_2).
2. If there is a second pump, specify Start/Stop level 2.
3. Specify alarm limits in:
   - High level menu (2_5).
   - Low level menu (2_6).

Disable a pump

1. Set a start level to "0".
2. Set the corresponding stop level to "0".

Disable low level block

Set low level alarm limit to "0".

Configure I/O

Configure General Purpose Inputs

General purpose input 1–8 can be connected to several types of external equipment.

Types of functions

Function	Description
Blocking	When the input is activated: • All pumps are blocked. They remain blocked as long as the blocking signal remains active. • A blocking alarm is generated.
External alarm	General purpose input 1–8 can be assigned as Alarm input 1–8. When an input is activated, the corresponding external alarm is generated. For example, "Alarm input 3".
High level	When the input is activated: • Available pumps are started. • A high level alarm is generated.
Px leakage (P1 – P2 leakage)	The input is connected to the leakage sensor for the pump through a CAS, mini-CAS or MAS unit. The Motor protector input for the pump is also connected to the same unit. When the General purpose input is activated, a leakage alarm for the pump is generated.
Low level float	When the input is activated: • Pumps are temporarily blocked until start conditions are fulfilled • A low level alarm is generated.
Px manual (P1 – P2 manual)	The input is used as manual mode input for a pump.
Overflow	The input from the overflow sensor is used to: • Measure number of overflows, and major overflows. • Measure accumulated overflow time. • Estimate overflow flow and volume. (If an analogue level sensor is used).
Personnel	The input is connected to a selector switch, usually a light switch in the pump station. When flipped, the personnel alarm function is activated.
Power failure	The input is connected to a device supervising mains power supply. When the input is activated: • Mains error alarm is generated. • All pumps are blocked.
Rain meter	Used to measure rain fall.
Px Spare alarm (P1 – P2 Spare alarm)	When the input is activated, a spare alarm is generated.

Exception: Digital start and stop level switches

When the RTU is set to use digital start and stop level switches, General purpose input 1–4 are assigned automatically as inputs for the following switches: Stop level, Start level 1–2, and High level.

Exception: EX-mode

In EX-mode, General purpose input 7–8 are assigned automatically as manual mode input for pump 1–2. (Reference: "EX-classified Environment").

Menus to use

Function gen.input 1–8 menus (15_4_1 – 15_4_12).

Related configuration

- External alarms can have local alarm texts. (Reference).
- If a high level switch is used, configure the high level runtime. (Reference).
- Manual mode is further described.
- If used, configure the personnel alarm. (Reference).
- Optionally, configure overflow calculations.(Reference)
- If used, configure the rain meter. (Reference).

Other Inputs

Automatic/Manual Mode for a Pump

An external device can be used to switch between automatic, manual and blocked mode for a pump. Example: manual-0-auto switch.

Before using this function

- Optionally, configure a General purpose input as manual mode input.
- Optionally, the Automatic mode input for a pump can be connected to the device.

Keep in mind: If the Automatic mode input for a pump is not used, the input must be jumpered.

Input configurations

Manual input	Auto input	Pump state
Both inputs are used:		
Active	Passive	Running
Passive	Active	Controlled automatically
Passive	Passive	Blocked
Only a manual mode input is used:		
Active	Jumpered	Running
Passive	Jumpered	Controlled automatically
Only an automatic mode input is used:		
Not connected	Active	Controlled automatically
Not connected	Passive	Blocked
No inputs are used:		
Not connected	Jumpered	Controlled automatically

Motor Protection

A pump can use motor protection.

Before using this function

This function requires that the motor protection is connected to the Motor protector input for the pump.

Function: Motor protection

When the input is activated:
- Pump is blocked.
- A tripped motor protection alarm is generated.

Related configuration

A tripped motor protection can be reset. (See Reference).

Feedback from Pump Relay

When the RTU tries to start a pump by activating its pump relay, the relay can provide feedback.

Before using this function

The pump relay has to be connected to the Start feedback input for the pump.

Function: No feedback from pump relay

Phase	Description	
1	RTU tries to start a pump.Result: RTU receives no feedback.	
2	There is no idle pump. Result: RTU: - Generates a No response alarm. - Keeps the first pump set to run.	There is another idle pump. Result: RTU: - Generates a No response alarm. - Blocks the first pump. - Tries to start the next idle pump.

Power Failure

The power supply is supervised by the I/O-module.

Types of I/O modules

There are two types of I/O modules. They have different power supplies:
- 24 V, *or*
- 230 V. This type may have a 24 V battery backup.

Types of alarms.

Condition	Generated alarm
230 V power supply fails.	Mains error
24 V power supply is low or dead.	Low 24 V supply
24 V battery is low.	Low 24 V supply

Considerations

If a 230 V unit is supplied only through the 24 V battery backup supply, the 230 V fail signal must be inverted in order to avoid the mains error alarm. (Reference: "Troubleshooting").

Thermal Contact

The RTU can block the pump when the pump temperature is high.

Before using this function

- This function requires that a thermal contact is connected to the Thermal contact input for the pump.
- If no thermal contact is connected, the input must be jumpered.

Configure thermal blocking

In the Thermal blocking menu (11_12), select:
- "Yes" to enable persistent thermal blocking.
- "No" to disable persistent thermal blocking.

With "persistent blocking" is meant that an unblock command is required; Unblocking is done by pushing the "Reset" button or by means of the remote reset command, provided the thermal contact has closed.

Function: Thermal contact

The thermal contact is normally closed. When the input is activated:

- Pump is blocked. It remains blocked as long as the contact remains open.
- High temperature alarm is generated.

Configure Outputs

Common Alarm Output

When an alarm is generated, alarm equipment such as a lamp or a siren can be turned on as well.

Before using this function

This function requires that the alarm equipment is connected to the common alarm output.

Function: Common alarm output

The output is affected by selected alarms. When an alarm is:

- Not acknowledged, the output is active.
- Acknowledged, the output is passive.

Configure Common alarm output

1. Select continuous or intermittent output in the Common alarm menu (15_3_1).
2. Specify alarms that will activate the output in the Com. alarm activ. 1–3 menus (15_3_2 –15_3_4).

For each alarm that can activate the output, select:

- 1 to enable the condition.
- 0 to disable the condition.

Reset Motor Protection

A tripped motor protection can be reset.

Before using this function

This function requires that the Reset circuit output for a pump is connected to the reset input in the motor protection.

Type of reset

- RTU can try to reset the motor protection automatically, *or*
- Personnel can try to reset the motor protection manually.

Function: Automatic reset

1. RTU waits three minutes for the protection to cool.
2. RTU tries to reset the motor protection once.Result: The table shows possible results.

If reset...	Then...
is successful.	pump can now restart.
is successful, but the motor protection is tripped again the following pump cycle.	no further reset attempts are made. Pump remains blocked.
fails.	pump remains blocked.

Configure motor protection reset

1. Select "Motorprotect. reset" in the Function output 2&4 menu (15_6_1).
2. In the Tripped auto reset menu (14_6), select:
   - "Yes" to enable automatic reset.
   - "No" to disable automatic reset.

Extra Options When Motor Protection Reset is Not Used

Terminals 13–14 and 17–18 on the MIO 501 I/O board can be used as general outputs:
- Terminals 13–14 is referred to as Output 2.
- Terminals 17–18 is referred to as Output 4.

Function: General output

The General output is affected by selected conditions. When:
- At least one condition is true, the output is active.
- All conditions are false, the output is passive.

Conditions that can affect a General output

Condition	Description
Power failure	There is a mains power failure.
High level	Sump level is high.
High level float	High level float is active.
Low level	Sump level is low.
Low level float	Low level float is active.
Overflow	There is an overflow
P1 failure	Pump 1 is blocked by a pump failure.
P1 blocked	Pump 1 is blocked.
P2 failure	Pump 2 is blocked by a pump failure.
P2 blocked	Pump 2 is blocked.
Leakage P1	Leakage sensor for pump 1 is active.
Leakage P2	Leakage sensor for pump 2 is active.
No response P1	There is no response from pump 1.
No response P2	There is no response from pump 2.

Pump failures

The following pump failures can block a pump:
- High temperature
- Tripped motor protection
- Exceeded max run time (results in a temporary block)

Configure the General output

1. Select "General output" in the Function output 2&4 menu (15_6_1).
2. Specify conditions in the Output. 2 config menu (15_6_2).
   Select:
   - **1** to enable a condition.
   - **0** to disable a condition.
3. Specify conditions in the Output. 4 config menu (15_6_3).

Other Outputs

Emergency Operation

If the RTU fails, an emergency operation circuit can take control of the pumps.

Before using this function

This function requires that the Emergency operation output is connected to an emergency operation circuit. (Reference: Installation manual).

Extended Configuration

Trim Level Control

Pump Stop Delay

It may not be possible to install a level sensor or switches low enough in the sump. Thus, the sump is not emptied completely when the last running pump is stopped.

Before using this function

The delay "stop delay range" is only available if an analogue level sensor is used.

Type of stop delay

The following stop delays can be used:

- Stop delay time, *or*
- Stop delay range.

Function: Stop delay time

1. Sump level drops below the normal stop level for the last running pump.

   Result: Timer is started.
2. Timer exceeds the stop delay time.

   Result: The last running pump is stopped.

Function: Stop delay range

1. Sump level drops below the normal stop level for the last running pump.

   Result: The additional height starts to count.
2. Sump level has dropped the additional height.

   Result: The pump is stopped.

Configure Stop delay time

1. Enter "0" in the Stop delay range menu (11_3).

   Keep in mind: This step is only relevant if an analogue level sensor is used.
2. Specify the time in the Stop delay time menu (11_4).

Configure Stop delay range

1. Specify the Stop delay range.
2. As Stop delay time, specify the maximum additional time a pump is allowed to run.

   Keep in mind: Prevents the pump from running dry.

Disable a stop delay

Enter "0" as Stop delay time.

High Level Runtime

A high level switch is a backup used to start the pumps during a high sump level.

Before using this function

Configure a General purpose input as high level switch input.

Function: High level runtime

Phase	Description
1	Sump level exceeds the high level switch. Result: Available pumps are started. A high level alarm is generated.
2	Sump level drops below the high level switch. Result: Timer starts.

Phase	Description	
3	Timer exceeds the high level run time. Result: Pumps are stopped.	The sump level drops below a low level switch. Result: Pumps are stopped, Remaining high level run time is skipped.

Specify high level runtime

Specify the runtime in the High level run time menu (11_10)

Configure Pump Control

EX-classified Environment

NOTICE:

This function should be enabled when the RTU is used in an EX-classified environment.

Function: EX-mode

When no liquid is detected in the sump, all pumps are blocked. The starting method will not matter, that is, any manual start attempt, maintenance run, or remote start command will be blocked.

Configure EX-mode

- To enable EX-mode, select "On" in the EX mode menu (14_5).
- To disable EX-mode, select "Off".

Related configuration

EX-mode affects General purpose inputs.

Trim Pump Control

Delay a Pump Start

The RTU can delay the start of a pump.

Type of start delay

Start delay	Condition	Delay for next pump
Minimum pump stop time	A pump has stopped.	5 seconds
Time between starts	A pump has started.	5 seconds
Power failure	Power supply has been restored after a power failure.	10 seconds

Limit Pump Operation

The RTU can limit:

- Number of pumps running at the same time.
- Maximum time any pump is allowed to run continuously.

Example: The maximum runtime is useful to stop a clogged pump from running too long.

Function: Maximum number of running pumps

When the maximum number of pumps are running at the same time, no idle pump is allowed to start.

Function: Maximum runtime

When a pump has run longer than the maximum run time:
- Pump is temporarily stopped.
- Maximum runtime alarm is generated.

Considerations: Maximum runtime

To avoid a flooded pump sump, the maximum runtime must exceed one pump cycle. Consider that the following can add time to a pump cycle:
- High level runtime. (Reference: see page14).
- Stop delay. (Reference: see page14).

Limit pump operation

1. Specify maximum number of running pumps in the Max. no. run. pumps menu (11_7).
2. Specify maximum runtime for pumps in the Max. run time menu (11_11).

Disable runtime limit

Set maximum runtime to "0".

Maintenance run

A pump that stands still for a long time can be run automatically with regular intervals. This is useful to keep the mechanical seals in the pump in shape.

Function: Maintenance run

When a pump has been standing still for a specified number of hours, the RTU starts the pump for a maintenance run.

Configure maintenance run

1. Specify the time between each maintenance run in the Auto start interval menu (11_8).
2. Specify the pump run time during a maintenance run in the Auto start time menu (11_9).

Disable maintenance run

Set auto start time to "0".

Operating Sequence

If a pump always start at the lowest sump level, this pump will normally run more than the other pumps.

Type of operating sequence

Sequence	Description
P1 primary	Pump 1 always starts on the lowest start level.
P2 primary	Pump 2 always starts on the lowest start level.
Start alternation	Pumps alternate start levels after each pump cycle.
Run hour alternation	Pumps alternate start levels after specified hours of operation.

Configure operating sequence

1. Specify type of operating sequence in the Alternation menu (11_5).
2. For "Run hour alternation", specify hours of operation in the Alternation interval menu (11_6).

Configure Extra Functions

Current Measurement

The RTU can measure pump currents.

Before using this function

This function requires that a current transformer is connected to the current transformer input. (Reference: Installation manual).

Type of current

The following currents can be measured:

- Pump 1 current
- Pump 2 current

Function: Current alarm limits

When the current:

- Exceeds High current limit, a high current alarm is generated.
- Drops below Low current limit, a low current alarm is generated.

Configure current measurement:

1. Specify the current transformer rating for pump 1 in the P1 max current menu (3_3).
2. Specify high current alarm limit for pump 1 in the P1 high current menu (3_1).
3. Specify low current alarm limit for pump 1 in the P1 low current menu (3_2).
4. Repeat step 1–3 for any additional pump.

Disable alarm limit

Set the alarm limit to "0".

Rain Measurement

The RTU can measure the rain fall based on pulses from a rain meter.

Before using this function

- Configure a General purpose input as rain meter input.
- Obtain scale factor for rain meter. (Reference: Rain meter documentation).

Function: Rain alarm limits

When the average rain fall during:

- 5 minutes exceeds its rain alarm limit, a high rain 5 min alarm is generated.
- 24 hours exceeds its rain alarm limit, a high rain 24 h alarm is generated.

Configure rain measurement:

1. Specify the scale factor for the rain meter in the Rain scale menu (7_3).

   Example: if the rain meter is specified to give 1.2 mm/pulse, enter 1.2 as scale factor.
2. Specify the rain alarm limit for a 5 minute period in the Rain alarm 5min menu (7_1).
3. Specify the rain alarm limit for a 24 hour period in the Rain alarm 24h menu (7_2).

Configure Communication

Systems

Direct communication with the SCADA system

In this system the RTU communicates directly with the SCADA (central) system.

A modem, a radio or a signal cable is used for the transmission of information between the units in the system.

Either the factory settings or the first user profile of the modem (profile 0) can be used. In the first case no special configuration of the modem is required but in the second case the user profile has to be configured prior to use with the RTU.

Communication via MTC-COM

In this system the RTU communicates with the SCADA system, via the communication unit, MTC-COM.

A modem, a radio or a signal cable is used for the transmission of information between the units in the system.

Prior to use with the RTU the first user profile of the modem (profile 0) has to be configured.

NOTICE:

The factory settings of the modem cannot be used in this case.

Modems

Communication is possible using PSTN, GSM, GPRS, or radio modem.

The modem can either use factory settings or user profile 0, which must then be pre-configured.

Example: Configuring a TD-33 modem

To configure the modem:

1. Start Windows Hyperterminal program.
2. Select and configure the COM port to which the modem is connected:
   - Bits per second: 9600 (or another speed you want to use)
   - Data bits: 8
   - Parity: Use the same setting as in the modem (none, even, or odd).
   - Stop bits: 1
   - Flow control: Hardware
3. Type "AT&F" and press **Enter**.The modem will answer **"OK".**
4. Type in the initialization string: E.g. AT&F E0V0 &K3 &D2\\N3 %E0 S36=3 S0=0 and press **Enter**.

NOTICE:

The initialization string must be permanently stored in the modem. Either:

- Append "&W" to the initialization string, *or*
- Type "AT&W" after entering the initialization string.

NOTICE:

Important! Configuring a User modem

(See "User modem")

NOTICE:

When entering the initialization string in Modem init, the RTU provides the following initial sequence by default: "AT&F V1E0S0=0" This auto-generated sequence is not displayed, however!

- The relevant string values must still be entered manually and appended to the initial sequence, e.g. "&K0S1=2". (The string must not be preceded by "AT".)

Configuration

Fixed line FDX (Full Duplex)

Communication using a fixed line modem, radio modem, or directly to a PC.

Menu	Values	Description
Communication COM1 (13_10)	RS232 FDX	Normally, FDX can be used if the SCADA system has not specially been set-up to use HDX.
Speed COM1 (13_13)	1200-115200 bps	Set this value to the same as the port baudrate in the SCADA system.
Parity COM1 (13_14)	None, Even or Odd	Use the same setting as in the communication equipment.
Protocol COM1 (13_15)	AquaCom polled fixed Modbus fixed Comli fixed	
Max buffer size (13_24)	120-4000	If your radio has a limited buffer or there are disturbances decrease this value. e.g. 200.
Station number / id (13_1)	001–899	In the SCADA system, the station number is a unique number for the RTU. When fixed communication is used, the station number and fixed line id both have the same value in Aquaview.

Fixed line HDX (Half Duplex)

Communication using a fixed line modem, radio modem, or directly to a PC.

Menu	Values	Description
Communication COM1 (13_10)	RS232 HDX	Will work with normal settings in the SCADA system.
Speed COM1 (13_13)	1200-115200 bps	Set this value to the same as the port baudrate in the SCADA system.
Parity COM1 (13_14)	None, Even or Odd	Use the same setting as in the communication equipment.

Menu	Values	Description
Protocol COM1 (13_15)	AquaCom polled fixed Modbus fixed Comli fixed	
RTS delay COM1 (13_17)	25-1000 ms	Low delay means faster communication. Use higher value if required by the radio, i.e. if there are problems with the communication.
Max buffer size (13_24)	120-4000	If your radio has a limited buffer or there are disturbances decrease this value. e.g. 200.
Station number / id (13_1)	001–899	In the SCADA system, the station number is a unique number for the RTU. When fixed communication is used, the station number and fixed line id both have the same value in Aquaview.

GPRS modem

Communication using a GPRS modem

Menu	Values	Description
Communication COM1 (13_10)	GPRS	The RTU automatically initializes the modem. However, the modem speed needs to be manually configured.
Speed COM1 (13_13)	IPR=19200 bps	This is the default speed used by the modem after a power on reset. Do not use the default "AT&F" as this will increase the speed to 115200 bps. Note! Sometimes a lower value is required.
Parity COM1 (13_14)	None, Even or Odd	Use the same setting as in the communication equipment.
Protocol COM1 (13_15)	AquaCom unpolled fix	
CS IP address (13_18)		Enter the IP address to the SCADA system.
CS IP port (13_19)		Enter the IP port of the SCADA system.
Access point 1 (13_20)		Enter the access point name. It describes the telephone provider, for example **internet.<some telephone company name\>.net**. If the name is longer than 20 characters, the name can be split in two. Enter the first piece in the **Access point 1** menu, and the second piece in the **Access point 2** menu.
Access point 2 (13_21)		
Station number / id (13_1)	001–899	In the SCADA system, the station number is a unique number for the RTU.

NOTICE:

If you connect a terminal to the service port in the RTU, you can specify the access point name with the command **setcomdata**.

Format: **setcomdata <access point name\>**

Telephone modem

Communication using a Hayes compatible telephone modem, or GSM modem. (Reference: Observe the limitations for combinations of modems and their configuration strings as described in the Modem Configuration manual).

Menu	Values	Description
Communication COM1 (13_10)	Hayes modem GSM/Hayes predef.	Select Hayes modem when using TD33 for communication directly to the SCADA system. In all other cases configure the modem using a PC and select GSM/Hayes predefined. Select this option if an MTC-COM is included in the system.
Speed COM1 (13_13)	1200-115200 bps	If your modem supports autobauding, set this as high as possible to get the best communication performances. Otherwise set this value to the same as the value used in the pre-configuration of the modem.
Parity COM1 (13_14)	None, Even or Odd	Use the same setting as in the communication equipment.
Protocol COM1 (13_15)	AquaCom dialled Modbus dialled Comli dialled	
Station number / id (13_1)	001–899	In the SCADA system, the station number is a unique number for the RTU.
Telephone no. CS/SMS (13_3)		Enter the telephone number to the SCADA system or MTC-COM.

GSM modem

Communication using a GSM or telephone modem. (Reference: Observe the limitations for combinations of modems and their configuration strings as described in the Modem Configuration manual).

Menu	Values	Description
Communication COM1 (13_10)	GSM/Hayes predef.	Configure the modem using a PC and select GSM/Hayes predefined.
Speed COM1 (13_13)	1200-115200 bps	If your modem supports autobauding, set this as high as possible to get the best communication performances. Otherwise set this value to the same as the value used in the pre-configuration of the modem.
Parity COM1 (13_14)	None, Even or Odd	Use the same setting as in the communication equipment.
Protocol COM1 (13_15)	AquaCom dialled Modbus dialled Comli dialled	
Station number / id (13_1)	001–899	In the SCADA system, the station number is a unique number for the RTU.
Telephone no. CS/SMS (13_3)		Enter the telephone number to the SMS recipient, i.e. the personnel.

User modem

Communication using a GSM modem or a telephone modem when you want the RTU to configure the modem. (Reference: Observe the limitations for combinations of modems and their configuration strings as described in the Modem Configuration manual).

Menu	Values	Description
Communication COM1 (13_10)	User modem	
Modem init 1 (13_11)		Enter the initialization string for the modem. The string can be split in two. Enter the first piece in the **Modem init 1** menu, and the second piece in the **Modem init 2** menu. Note! See "Systems" on page17.
Modem init 2 (13_12)		
Speed COM1 (13_13)	1200-115200 bps	If your modem supports autobauding, set this as high as possible to get the best communication performances. Otherwise set this value to the same as the value used in the initialization string for the modem.
Parity COM1 (13_14)	None, Even or Odd	Use the same setting as in the communication equipment.
Protocol COM1 (13_15)	AquaCom dialled Modbus dialled Comli dialled	
Station number / id (13_1)	001–899	In the SCADA system, the station number is a unique number for the RTU.
Telephone no. CS/SMS (13_3)		Enter the telephone number to the SCADA system or MTC-COM.

NOTICE:

If you connect a terminal to the service port in the RTU, you can specify the modem initialization with the command **setcomdata**.

Format: **setcomdata <modem init\>**

GSM modem and SMS

Communication using a GSM modem. The RTU can be monitored by the SCADA system in this configuration. However, alarms are sent directly to cell phones as SMS. (Reference: Observe the limitations for combinations of modems and their configuration strings as described in the Modem Configuration manual).

Menu	Values	Description
Communication COM1 (13_10)	GSM/Hayes predef.	Configure the modem using a PC and select GSM/Hayes predefined.
Speed COM1 (13_13)	1200-115200 bps	If your modem supports autobauding, set this as high as possible to get the best communication performances. Otherwise set this value to the same as the value used in the pre-configuration of the modem.
Parity COM1 (13_14)	None, Even or Odd	Use the same setting as in the communication equipment.
Protocol COM1 (13_15)	AquaCom/SMS	

Menu	Values	Description
Station name (13_2)		Enter a name that will be sent in the SMS alarm message.
Telephone no. CS/SMS (13_3)		Enter the first telephone number to the SMS recipient, i.e. the personnel.
Telephone no. SMS 2 (13_4)		Telephone number to SMS receiver. The telephone number is required for alarm handling to more than one SMS receiver. Only applicable when alarm handling using SMS is selected.
..		..
Telephone no. SMS 5 (13_7)		Telephone number to SMS receiver. The telephone number is required for alarm handling to more than one SMS receiver. Only applicable when alarm handling using SMS is selected.

Configure Alarm Handling

About Alarms

When an alarm is generated, the alarm is:
- Indicated on the RTU front panel, *and*
- Listed in the RTU alarm log.

If the RTU is equipped for communication, the alarm is sent to:
- SCADA system, *or*
- SMS receivers.

General

Alarm Delay

Alarm generation can be delayed.

Before using this function

To delay a mains error alarm, the RTU has to be connected to a 24 V battery backup that can supply the RTU during the delay time.

Restriction: Mains power failure
- The pumps are blocked directly at mains power failure. This block is not delayed.
- The maximum delay for a mains error alarm is 960 minutes.

Function: Alarm delay

When the alarm condition is fulfilled longer time than the alarm delay, the alarm is generated.

Configure alarm delays
1. Specify general delay in the General alarm delay menu (12_1).
2. Specify delays for:
   - Mains error alarms in the Pow.fail alarm delay menu (12_2).
   - Low level alarms in the Low level alarm delay menu (12_3).
   - Blocking alarms in the Blocking alarm delay menu (12_4).

Alarm Priority

The alarm priority determines what happens with the alarm.

Function: Alarm priorities

Priority	Description
A	Alarm is sent to: SCADA system, *or* SMS receivers
B	Same as for priority A.
C	Alarm is only local in the RTU.
D	Alarm is sent to: SCADA system according to its D-alarm time frame, *or* SMS receivers according to the D-alarm time frame in the RTU.
F	Alarm is not recorded.
H	For future use.

Configurealarm priorities

Select priorities in the Alarm priority 1–3 menus (12_11 – 12_13).

Alarm Texts and Alarm Codes for External Alarms

Alarm texts for external alarms are used in:

- RTU alarm log, *and*
- Alarms sent to SMS receivers.

Alarm codes for external alarms are only used when alarms are sent to a SCADA system.

Before using this function

Configure General purpose inputs as external alarm inputs.

Considerations: Alarm texts

- Extended ASCII characters can be used. Example: öøé.
- If the first character is left blank, the standard alarm text is used. Example: "Alarm Input 1".

Function: Alarm codes

1. An alarm is sent to the SCADA system. The alarm contains an alarm code.
2. SCADA system uses the alarm text that corresponds to the alarm code.

Keep in mind: Alarm texts in the SCADA system may differ from the alarm texts in the RTU.

Configure alarm texts

1. Specify alarm texts in the Alarm text input 1–8 menus (12_14_1 –12_14_8).
2. Specify alarm code in the Alarm code input 1–8 menus (12_15_1 –12_15_8).

Keep in mind: Only relevant when alarms are sent to a SCADA system.

Alarms Sent to SCADA System

The RTU can send alarms to a SCADA system.

Function: Sending fails

Phase	Description
1	RTU sends an alarm to the SCADA system.
2	Result: Sending fails. Example: SCADA system is busy or do not reply.
3	RTU waits one minute before the next attempt.
4	After each successive failure, the RTU waits one minute longer than before until 10 attempts have failed.
5	The RTU waits three hours before recommencing the dialing sequence.

Alarms Sent to SMS Receivers

Alarm Acknowledgement

The RTU can send SMS with alarms to one recipient at a time or to all at once.

Function: Alarm acknowledgement time

Phase	Description	
1	RTU sends an SMS with an alarm to a recipient.	
2	Result: RTU receives an acknowledgement within specified time.	Result: RTU receives no acknowledgement within specified time.

Phase	Description	
3	No more SMS are sent.	RTU tries to sends the SMS to the next recipient.

NOTICE:

If all numbers have been dialled, but no alarm acknowledgement has been received, the specific alarm will not be sent again.

Function: No alarm acknowledgement time

When the acknowledge request is disabled, SMS alarms are sent to all listed phone numbers.

Configure SMS alarm acknowledgement

- Specify acknowledgement time in the SMS Acknowledge time menu (13_8).
- To disable acknowledge requests, set acknowledgement time to "0".

Passive Alarms

When alarms become passive, SMS can be sent out.

Specify passive alarm handling

- To send out SMS with passive alarms, select "Yes" in the SMS P-alarm menu (13_9).
- To disable SMS with passive alarms, select "No".

Time Frame for Sending D-alarms

Function: D-alarm time frame

SMS with D-alarms are sent only during a specified time frame. If the alarm occurs at any other time, the RTU will wait until the D-alarm time frame begins and then send the alarm.

Function: No D-alarm time frame

If the D-alarm time frame is disabled, D-alarms are treated as A-alarms.

Configure time frame

1. Specify when to start sending SMS in the D-alarm start time menu (12_9).
2. Specify when to stop sending SMS in the D-alarm end time menu (12_10).

Disable time frame

Set both start and end times to "0".

Special Alarms

Personnel Alarm

The personnel alarm is used when work of any kind is carried out in a pump station, and alerts to the risk that an accident may occur.

Before using this function

Configure a General purpose input as personnel alarm input.

Restriction

NOTICE:

The personnel alarm always has alarm priority **A and cannot be prevented from being sent.**

Function: Personnel alarm

Phase	Description	
1	The input is activated by a selector switch, usually a light switch in the pump station. Result: Work time begins.	
2	The input has been activated longer than the Work time. Result: Common alarm outputs are activated. Warning time begins.	
3	Personnel acknowledge their presence within the Warning time. Result: Work time is restarted. Common alarm outputs are set to passive.	No acknowledge is received within the Warning time. Result: Personnel alarm is generated.

Configure the personnel alarm:

1. Enter a time in the Work time menu (12_5).
2. Enter a time in the Warning time menu (12_6).

Measure Flow Rate and Capacity

Estimate Pump Capacity

The RTU can estimate the pump capacity. This estimation is useful since capacity changes may indicate pump problems, such as a clogged pump.

Before using this function

- This function is only available if an analogue level sensor is used.
- Obtain data on nominal capacities for all pumps. (Reference: Pump documentation).

Restriction

The pump capacity can only be estimated under certain circumstances. Thus it may take a while for the estimations to be updated.

Types of capacities

Capacity	Description
Nominal capacity	The flow a pump is designed to handle.
Calculated capacity	Pump capacity can diverge from the nominal capacity. Over time, the RTU can estimate the pump capacity.
Capacity divergence	How much the calculated capacity is allowed to diverge from the nominal capacity.
Upper/Lower level capacities	Pump capacity is estimated between these two limits.

Function: Calculated capacity

When the calculated capacity:

- Exceeds nominal capacity + capacity divergence, a high capacity alarm is generated.
- Drops below nominal capacity - capacity divergence, a low capacity alarm is generated.

Configure capacity calculations

1. Specify a sump level in the Upper level capacity menu (10_3_1).

   Keep in mind. Enter a level below the lowest pump start level.
2. Specify a sump level in the Lower level capacity menu (10_3_2).

   Keep in mind. Enter a level above the highest pump stop level, and below the upper level capacity.
3. Specify nominal capacity for pump 1 in the Nominal capacity P1 menu (10_1_1).
4. Specify capacity divergence for pump 1 in the Capacity div. P1 menu (10_1_2).
5. Repeat step 3–4 for any other pump.
6. Specify sump area in the Area menu (9_1).

Disable capacity calculations

Set both upper and lower level capacities to "0".

Estimate Overflow Flow and Volume

The RTU can estimate the overflow flow and volume.

Before configuring the function

Optionally, configure a General purpose input as overflow input.

Types of overflow monitoring

Overflow calculations starts when:
- Overflow activates the overflow sensor, *or*
- Sump level exceeds a specified overflow level.

Keep in mind: Overflow level is only relevant if an analogue level sensor is used.

Types of weir

Overflow calculations are based on:
- Rectangular spillway,
- V-shaped spillway, *or*
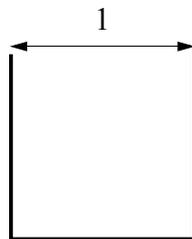- Any type of spillway where the overflow flows are known for 2–10 sump levels.

Disable overflow calculations

Select "No" in the Weir select menu (6_1).

Details: Rectangular Weir

(Reference for general information and requirements: "Estimate Overflow Flow and Volume").

**Illustration:** Rectangular spillway

1. Weir width

Configure rectangular weir

1. Select "Rectangular" in the Weir select menu (6_1).
2. Specify a sump level in the Overflow level menu (6_2).
    Keep in mind. Enter "0" to only use the overflow sensor to trigger calculations.
3. Specify the weir discharge coefficient in the Discharge coeff. menu (6_3).
    Reference: Spillway supplier.Example: A typical value is 0.62.
4. Specify a width in the Weir width menu (6_5).

Details: V-shaped Weir

(Reference for general information and requirements: "Estimate Overflow Flow and Volume").

Illustration: V-shaped spillway
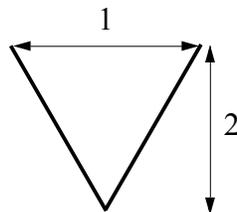
1. Weir width
2. Overflow range

Configure v-shaped spillway

1. Select "V-notch" in the Weir select menu (6_1).
2. Specify a sump level in the Overflow level menu (6_2).
    Keep in mind. Enter "0" to only use the overflow sensor to trigger calculations.
3. Specify the weir discharge coefficient in the Discharge coeff. menu (6_3).
    Reference: Spillway supplier.Example. A typical value is 0.58.

4. Specify a range in the Overflow range menu (6_4)
5. Specify a width in the Weir width menu (6_5).

Details: Any Weir with 2–10 Known Overflow Flows

(Reference for general information and requirements: "Estimate Overflow Flow and Volume").

Considerations

For accurate estimations:

• Levels should be uniformly distributed within the overflow range.
• Top-most level should be the maximum overflow flow.
• The more known overflow flows, the greater the accuracy.

Example: Two known overflow flows

• Overflow 2 are the flow at top of the overflow range.
• Overflow 1 are the flow at 1/2 of the overflow range.
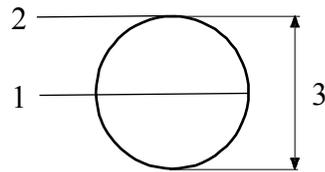
1. Overflow 1: 72.6 l/s
2. Overflow 2: 138.6 l/s
3. Overflow range

Example: Five known overflow flows

• Overflow 5 are the flow at top of the overflow range.
• Overflow 4 are the flow at 4/5 of the overflow range.
• ...
• Overflow 1 are the flow at 1/5 of the overflow range.
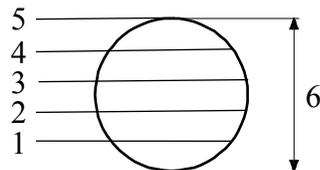
1. Overflow 1: 13.8 l/s
2. Overflow 2: 38.6 l/s
3. Overflow 3: 94 l/s
4. Overflow 4: 128.2 l/s
5. Overflow 5: 138.6 l/s
6. Overflow range

Specify a weir manually

1. Select "Manual" in the Weir select menu (6_1).
2. Specify a sump level in the Overflow level menu (6_2).

   Keep in mind. Enter "0" to only use the overflow sensor to trigger calculations.
3. Specify a range in the Overflow range menu (6_4).
4. Specify overflow 1 in the Overflow segment 1 menu (6_6).
5. Repeat Step 4 for any other known overflow flow.

   Keep in mind. Enter "0" not to use a level.

Lire les données de fonctionnement

Read Operational Data

Available Functions

Functions that may be available are described below. Whether a function is available or not, depends on previous installation and configuration.

Menus to use

Menu name	No.	Description	Comment	Value can be reset?
Level	2_	Sump level		No
P1 current – P2 current	3_– 4_	Current for Pump 1–2.		No
P1 start counter	5_1	Total number of starts for pump 1.		Yes
P1 run hour	5_2	Total runtime for pump 1.		Yes
P2 start counter	5_3	Total number of starts for pump 2.		Yes
P2 run hour	5_4	Total runtime for pump 2.		Yes
Overflow flow	6_16	Estimated overflow flow.		No
Overflow volume	6_17	Estimated overflow volume.		Yes
Overflow count	6_18	Number of overflows		Yes
No. of major overfl.	6_19	Number of major overflows	An overflow is also a major overflow when no other overflow has occurred for the last 24 hours.	Yes
Overflow time	6_20	Total overflow time		Yes
Rain	7_	Daily rain value		No
Free flow	8_1	Estimated free flow.	The free flow is also called the inflow, and is the flow into the sump.	No
Pumped volume	8_2	Estimated volume pumped away from sump.		Yes
Sump volume	8_3	Estimated volume remaining in sump.		Yes
Calc. capacity P1 – P2	10_1 – 10_2	Capacity for Pump 1–2.		No

Reset operational data

1. View the relevant operation menu.

   Example: P1 start counter menu.
2. Press OK.

   Result: Menu window shows "Reset value? No".

3. Press the Up arrow.
   Result: Menu window shows "Reset value? Yes".
4. Press OK.
   Result: Data is reset.

Monitor Status and Alarms

Monitor Status on Front Panel

The status is shown with LEDS on the RTU front panel.

Illustration: LEDs on the front panel
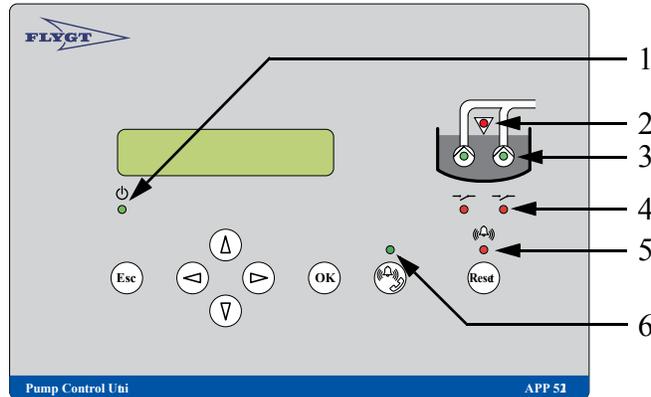
1. Power LED
2. High level LED
3. Pump status LED
4. Relay status LED
5. Alarm status LED
6. Communication LED

Monitor Status

LED	Description	Comments
⏻ ● Green	Power supply is on.	
⏻ ○ Off		Possible causes: Power supply is off Fuse is blown.
▽● Red	Sump level is high.	Sump level exceeds: High level switch, *or* High level alarm limit for analogue sensor
◉ Green	There is feedback from the pump relay.	The pump is running.
⏻ ○ Red	There is a pump fault.	Possible causes: High temperature in pump Motor protection has tripped.

LED	Description	Comments
Green	RTU has set the pump to run.	The pump relay is activated.
Flashing red	Pump is blocked.	Possible causes: 230 V mains power failure Pump start is delayed after a power failure.
Red	Pump is blocked.	Possible causes: External blocking signal is active. External Manual-0-Auto switch is set to blocked. (Ex-classified environment) No liquid is detect in the sump. Remote block from SCADA system. Sump level is low.
Flashing red	New alarm has occurred.	The alarm is not acknowledged.
	An alarm remains active.	The alarm is acknowledged.
Off	No active alarms	
Flashing green	An alarm is being sent to: SCADA system, or SMS receivers.	
Green	RTU is set to send alarms to: SCADA system, or SMS receivers.	
Off	No alarm is sent outside the RTU.	

Monitor Alarms in the RTU

Acknowledge/Silence an Alarm

When a new alarm is generated, the common alarm output may be turned on. Example:

- Siren
- Lamp

When the alarm is acknowledged, the output is silenced as well. The alarm is not removed from the alarm log.

Acknowledge a new alarm

Press Reset.

Monitor and Erase Alarms in the Alarm Log

The last 100 alarms are listed in the Alarm log.

Restriction

Only passive alarms can be deleted from the Alarm log.

Example: Mains error alarm has become passive

Text in alarm log: "Mains error 2007-09-12 06:45 PB"

Structure: Alarm in alarm log

Field	Text in example	Comment
Alarm text	Mains error	
Date	2007-09-12	
Time	06:45	
Alarm type	P	Legend: (A) is active alarm (P) is passive alarm
Alarm priority	B	A, B, C or D

Open the alarm log

1. Display the Alarm log menu (1).

    Result: The number of alarms in the alarm log are also shown in the menu window.
2. Press OK.

    Result: The first alarm is displayed in the menu window.

Navigate the Alarm log

Press the Up or Down arrow.

Delete alarms

1. When an alarm is displayed in the menu window, press OK.

    Result: The text "Delete alarm?" is displayed.
2. Press the Up or Down arrow to select either:
    - "Current" – only the current alarm will be deleted.
    - "All" – all alarms will be deleted.
3. Press OK.

    Result: The text "Log cleared" is displayed.

Close the Alarm log

Press Esc.

Disable Alarms Temporarily

When working in a pump station, you can temporarily prevent new alarms from being sent. Example: Avoid false alarms during sump cleaning.

Function: Remote alarm handling

Alarm handling	Description
Local	New alarms are not sent, but buffered in the RTU.
Clear (buffer)	The following takes place: 1. Alarm buffer is cleared. 2. Alarm handling is set to Remote.
Remote	Any alarm is sent.

Temporarily disable sending alarms
1. Select "Local" in the Transmit alarm menu (12_7).
2. When ready, set Transmit alarm to:
   - "Clear", or
   - "Remote"

Monitor Alarms Sent as SMS

The RTU can send alarms to SMS receivers.

Example: Mains error alarm has become passive

SMS text: 1 - Kristianstadvägen 2007-09-12 06:45 B Mains error (P)

Structure: Alarm sent as SMS

Field	Text in example	Comment
Station number	1	
Station name	Kristianstadvägen	
Date	2007-09-12	
Time	06:45	
Alarm priority	B	
Alarm text	Mains error	
Alarm type	(P)	Legend: (A) is active alarm (P) is passive alarm

Acknowledge alarm
- Make a telephone call to the RTU, or
- Reply to the SMS
  Keep in mind: No text is required.

Special Alarms

Acknowledge Presence

The personnel alarm function is activated by a selector switch, usually a light switch in the pump station.

Function: Personnel alarm

When the alarm indications are turned on, you have to acknowledge your presence within a Warning time.

Acknowledge presence

- Press Reset on the RTU front panel, *or*
- Flip the selector switch twice.

  Example: Switch the lights off and on.

Motor Protection

You can try to reset a tripped motor protection manually.

Reset motor protection manually

- Press Reset on the RTU front panel, *or*
- Use remote control from the SCADA system.

Keep in mind: Reset can only be done when the pumps are stopped.

Miscellaneous

Change Between Automatic, Manual and Blocked Mode

Normally, the RTU controls the pumps.

Function: Manual control

You can override the automatic control, and manually:

- Block a pump, *or*
- Start and run a pump.

When ready, you can return control to the RTU.

Types of manual control

You can control a pump manually with:

- Menu in the RTU, *or*
- External switch used to switch between automatic, manual and blocked mode (if installed).

    Example: Manual-0-Auto switch.

Menus to use

P1 state – P2 state menus (11_1 – 11_2)

Change pump state

To block a pump manually:

- Set the pump state to "Blocked", *or*
- Set the switch to blocked mode.

To start and run a pump manually:

- Set the pump state to "Manual", *or*
- Set the switch to manual mode.

To return control to the RTU:

1. Set the pump state to "Auto", *and*
2. Set the switch to automatic mode.

Troubleshooting

Types of troubleshooting

- View status of digital inputs.
- Invert digital inputs from normally open to normally closed, or vice versa.
- Run diagnostic program
- Reset RTU default settings.

    Exception: MAC-address remains the same.

Function: Diagnostic program

- When a program is run, normal pump control operation is deactivated.
- After 10 minutes the RTU will automatically revert to normal operation.

Menu value	Function	Result
Off	None	The RTU is in normal operation.
10	Digital inputs	The states of the digital inputs are displayede.g. 1001100100000000
11	LED output Common alarm output	Flashes at 1 second interval.

Menu value	Function	Result
20	Analogue input	Shows the raw input values (0-16383).
24	P1 current input	Shows the raw input values (0-16383). This starts P1.
25	P2 current input	Shows the raw input values (0-16383). This starts P2.

View status of digital inputs

View the Status inputs menu (15_1):

- 0 = passive
- 1 = active

Invert inputs

For an input in the Invert inputs menu (15_2), select:

- "1" to invert the input.
- "0" for no inversion. (Default state).

Run a diagnostic program

Select the program in the Diagnostic program menu (15_7).

Reset RTU to default settings

1. Select "Yes" in the Flygt default menu (15_8).

   Result: RTU restarts, and the text "Restart" is shown in the display.
2. Wait until the restart is complete, and the text have disappeared.

Appendix A: RTU Descriptions

List of Alarms

Alarm Code	Default priority	Local text	SCADA System Text	Description
1	A	High level	High level	High level in pump sump. Alarm from the level sensor.
2	C	Low level	Low level	Low level in pump sump. Alarm from the level sensor.
3	B	Mains error	Mains error	The main power has been disrupted or the phase sequence is incorrect or one phase is missing.
4	A	High level float	High level float	The level in the sump reaches the high level switch. The pumps will be started.
5	A	Pers. alarm	Personal alarm	Personal alarm warning time has run out without reset. Personnel in danger !
11	B	Tripped motor P1	Tripped motor protector P1	The Pump 1 has a tripped motor protection. The pump is blocked by this alarm.
12	B	Tripped motor P2	Tripped motor protector P2	The Pump 2 has a tripped motor protection. The pump is blocked by this alarm.
15	B	High current P1	High current P1	High current pump 1. Alarm from the analogue current measurement.
16	C	Low current P1	Low current P1	Low current pump 1. Alarm from the analogue current measurement.
17	B	High current P2	High current P2	High current pump 2. Alarm from the analogue current measurement.
18	C	Low current P2	Low current P2	Low current pump 2. Alarm from the analogue current measurement.
27	C	Setpoint changed	Setpoint changed	At least one menu has been changed on the local display. The alarm reverts when new set points are sent to the RTU.
30	C	No response P1	No response P1	There is no response signal from pump 1. The pump has probably not started despite activation of the power relay.
31	C	No response P2	No response P2	There is no response signal from pump 2. The pump has probably not started despite activation of the power relay.
34	A	Overflow	Overflow	Overflowing. The station is now overflowing.
35	A	High temp. P1	High temperature P1	High temperature in pump 1.
36	A	High temp. P2	High temperature P2	High temperature in pump 2.
40	C	Low level float	Low level float	Low level float. The pumps will be stopped.
41	C	Inval.setpoints	Invalid setpoints	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.
54	C	Leakage P1	Leakage P1	Water in oil. Alarm from pump 1.

Alarm Code	Default priority	Local text	SCADA System Text	Description
55	C	Leakage P2	Leakage P2	Water in oil. Alarm from pump 2.
81	C	Alarm input 1	Alarm digital input 1	Alarm from digital input 1. The alarm is user defined.
82	C	Alarm input 2	Alarm digital input 2	Alarm from digital input 2. The alarm is user defined.
83	C	Alarm input 3	Alarm digital input 3	Alarm from digital input 3. The alarm is user defined.
84	C	Alarm input 4	Alarm digital input 4	Alarm from digital input 4. The alarm is user defined.
85	C	Alarm input 5	Alarm digital input 5	Alarm from digital input 5. The alarm is user defined.
86	C	Alarm input 6	Alarm digital input 6	Alarm from digital input 6. The alarm is user defined.
87	C	Alarm input 7	Alarm digital input 7	Alarm from digital input 7. The alarm is user defined.
88	C	Alarm input 8	Alarm digital input 8	Alarm from digital input 7. The alarm is user defined.
8214	B	Low 24V Supply	Low 24V external supply	Low 24V supply.
8378	A	Blocked	Blocked	All the pumps have been blocked.
8460	C	P1 Spare alarm	P1 Spare alarm	P1 spare alarm.
8461	C	P2 Spare alarm	P2 Spare alarm	P2 spare alarm.
8484	B	P1 max run time	P1 max run time	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.
8485	B	P2 max run time	P2 max run time	The pump 2 has exceeded the maximum allowed run time.See also the Max run time set-point.
8505	C	Sensor Fault	Sensor Fault	An error in the analogue sensor has been detected. The measured level is outside the sensor range.
8510	B	High capacity P1	High capacity P1	The RTU has calculated a capacity higher than the high capacity alarm level for pump 1.
8511	B	High capacity P2	High capacity P2	The RTU has calculated a capacity higher than the high capacity alarm level for pump 2.
8514	B	Low capacity P1	Low capacity P1	The RTU has calculated a capacity lower than the low capacity alarm level for pump 1.
8515	B	Low capacity P2	Low capacity P2	The RTU has calculated a capacity lower than the low capacity alarm level for pump 2.
8538	B	I/O-mod not resp	I/O-module(s) not responding	Communication problem with I/O-module. The I/O-module is not responding.
8539	C	Wrong I/O-module	Wrong type of I/O-module	Communication problems with I/O units. Wrong unit type.

Alarm Code	Default priority	Local text	SCADA System Text	Description
8630	B	Testcall !	Testcall !	A test alarm is sent in order to verify that the RTU and its communication are working properly. The alarm is sent at a regular interval, which is configurable.
8652	C	High rain 5 min	High rainfall 5 min	The RTU has calculated a rainfall higher than the rain alarm limit for 5 minutes.
8653	C	High rain 24 h	High rainfall 24 h	The RTU has calculated a rainfall higher than the rain alarm limit for 24 hours.

List of Menus

No.	Menu name	Specification	Description
1	Alarm log	**Writable**	Alarm log
2	Level m	**Read only**	Level indication.
2_1	Start level 1 m	**WritableCentral System TextStart level 1 (m)**	Start level for first pump.
2_2	Stop level 1 m	**WritableCentral System TextStop level 1 (m)**	Stop level for first pump.
2_3	Start level 2 m	**WritableCentral System TextStart level 2 (m)**	Start level for second pump.
2_4	Stop level 2 m	**WritableCentral System TextStop level 2 (m)**	Stop level for second pump.
2_5	High level m	**WritableCentral System TextHigh level (m)**	High level alarm limit.
2_6	Low level m	**WritableCentral System TextLow level (m)**	Low level alarm limit.0 - disables the function
2_7	Random start range m	**WritableCentral System TextRandom start range (m)**	Random start range
2_8	Sensor range m	**Writable**	Sensor range.
2_9	Sensor calibration m	**Writable**	Sensor calibration offset.
3	P1 current A	**WritableCentral System TextP1 current**	Measured current for first pump.
3_1	P1 high current A	**WritableCentral System TextP1 high current (A)**	High current alarm limit for first pump.
3_2	P1 low current A	**WritableCentral System TextP1 low current (A)**	Low current alarm limit for first pump.
3_3	P1 max current A	**Writable**	Current transformer range for first pump.
4	P2 CurrentA	**Read only**	Measured current for second pump.
4_1	P2 high current A	**WritableCentral System TextP2 high current (A)**	High current alarm limit for second pump.
4_2	P2 low current A	**WritableCentral System TextP2 low current (A)**	Low current alarm limit for second pump.

No.	Menu name	Specification	Description
4_3	P2 max current A	**Writable**	Current transformer range for second pump.
5	Operating data...	**Read only**	Menu group for operating data
5_1	P1 start counter	**Writable**	Number of start for first pump.
5_2	P1 run hour h:min	**Writable**	Run hour for first pump.
5_3	P2 start counter	**Writable**	Number of starts for second pump.
5_4	P2 run hour h:min	**Writable**	Run hour for second pump.
6	Overflow...	**Read only**	Menu group for overflow
6_1	Weir select	**Writable Alternative0 = No1 = Rectangular2 = V-notch3 = ManualCentral System TextWeir select**	Chose between different weir types:(0 = No, 1 = Rectangular, 2 = V-Notch and 3 = Manual)
6_2	Overflow level m	**WritableCentral System TextOverflow level (m)**	Overflow level alarm limit.0 - disables the function
6_3	Discharge coeff.	**WritableCentral System TextDischarge coefficient**	Discharge coefficient used by the rectangular and v-notch calculation method to calculate overflow flow and overflow volume.
6_4	Overflow range m	**WritableCentral System TextOverflow range (m)**	Overflow range (in m) used by the v-notch and manual calculation method to calculate overflow flow and overflow volume. NOTE! This is the maximumoverflow level relative to the overflow zero level.
6_5	Weir width m	**WritableCentral System TextWeir width (m)**	Weir width (in m) used by the rectangular and v-notch calculation method to calculate overflow flow and overflow volume.
6_6	Overflow segment 1 l/s	**WritableCentral System TextOverflow segment 1 (l/s)**	Overflow segment 1 used by the manual calculation method to calculate overflow flow and overflow volume.
6_7	Overflow segment 2 l/s	**WritableCentral System TextOverflow segment 2 (l/s)**	Overflow segment 2 used by the manual calculation method to calculate overflow flow and overflow volume.
6_8	Overflow segment 3 l/s	**WritableCentral System TextOverflow segment 3 (l/s)**	Overflow segment 3 used by the manual calculation method to calculate overflow flow and overflow volume.
6_9	Overflow segment 4 l/s	**WritableCentral System TextOverflow segment 4 (l/s)**	Overflow segment 4 used by the manual calculation method to calculate overflow flow and overflow volume.
6_10	Overflow segment 5 l/s	**WritableCentral System TextOverflow segment 5 (l/s)**	Overflow segment 5 used by the manual calculation method to calculate overflow flow and overflow volume.
6_11	Overflow segment 6 l/s	**WritableCentral System TextOverflow segment 6 (l/s)**	Overflow segment 6 used by the manual calculation method to calculate overflow flow and overflow volume.
6_12	Overflow segment 7 l/s	**WritableCentral System TextOverflow segment 7 (l/s)**	Overflow segment 7 used by the manual calculation method to calculate overflow flow and overflow volume.

No.	Menu name	Specification	Description
6_13	Overflow segment 8 l/s	**WritableCentral System TextOverflow segment 8 (l/s)**	Overflow segment 8 used by the manual calculation method to calculate overflow flow and overflow volume.
6_14	Overflow segment 9 l/s	**WritableCentral System TextOverflow segment 9 (l/s)**	Overflow segment 9 used by the manual calculation method to calculate overflow flow and overflow volume.
6_15	Overflow segment 10 l/s	**WritableCentral System TextOverflow segment 10 (l/s)**	Overflow segment 10 used by the manual calculation method to calculate overflow flow and overflow volume.
6_16	Overflow flow l/s	**Read only**	Overflow flow
6_17	Overflow volume m3	**Read only**	Overflow volume
6_18	Overflow count	**Writable**	Number of overflows.
6_19	No. of major overfl.	**Writable**	Number of major overflows.
6_20	Overflow time h:min	**Writable**	Overflow time.
7	Rain mm	**Writable**	Rain daily value.
7_1	Rain alarm 5min mm/5min	**Writable**	Rain limit for 5 minute period.
7_2	Rain alarm 24h mm/24h	**Writable**	Rain alarm limit for 24 hours.
7_3	Rain scale mm/pulse	**Writable**	Rain meter scale factor.
8	Flows and volumes	**Read only**	Flows and volumes
8_1	Free flow l/s	**Read only**	Free flow (inflow)
8_2	Pumped volume m3	**Read only**	Pumped volume
8_3	Sump volume m3	**Read only**	Sump volume
9	Sump form	**Read only**	Sump form
9_1	Area m2	**WritableCentral System TextArea (m2)**	This is the area that is used in the capacity calculations.
10	Capacity	**Read only**	Capacity
10_1	Calc. capacity P1 l/s	**Read only**	Calculated capacity P1.
10_1_1	Nominal capacity P1 l/s	**WritableCentral System TextNominal capacity P1 (l/s)**	Enter the nominal capacity of P1. Used for capacity alarms.
10_1_2	Capacity div. P1 l/s	**WritableCentral System TextCapacity divergation limit P1 (l/s)**	Divergation limit for high and low capacity alarms. Uses nominal capacity +/- this channel.
10_2	Calc. capacity P2 l/s	**Read only**	Calculated capacity P2.

No.	Menu name	Specification	Description
10_2_1	Nominal capacity P2 l/s	**WritableCentral System TextNominal capacity P2 (l/s)**	Enter the nominal capacity of P2. Used for capacity alarms.
10_2_2	Capacity div. P2 l/s	**WritableCentral System TextCapacity divergation limit P2 (l/s)**	Divergation limit for high and low capacity alarms. Uses nominal capacity +/- this channel.
10_3	Capacity calculation	**Read only**	Capacity calculation
10_3_1	Upper level capacity m	**WritableCentral System TextUpper level capacity (m)**	Upper level for capacity calculation. Has to be below the lowest start level.
10_3_2	Lower level capacity m	**WritableCentral System TextLower level capacity (m)**	Lower level for capacity calculation. Has to be higher than the stop level.
11	Pump control...	**Read only**	Menu group for pump control
11_1	P1 state	**Writable Alternative0 = Auto1 = Blocked**	Program controlled automatic or blocked state for first pump.
11_2	P2 state	**Writable Alternative0 = Auto1 = Blocked**	Program controlled automatic or blocked state for second pump.
11_3	Stop delay range m	**WritableCentral System TextStop delay range (m)**	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 - disables the function
11_4	Stop delay time min:s	**WritableCentral System TextStop delay time (min:s)**	Delays stopping of the pump by the preset time. Applicable to stop level 1 only. NOTE: This set point should not be entered if the calculated stop delay function is activated.
11_5	Alternation	**Writable Alternative0 = P1 primary1 = P2 primary2 = Start alt.3 = Run hour alt.Central System TextAlternation**	The Alternation menu specifies the pump operating sequence.0 - P1 primary1 - P2 primary2 - Start alternation3 - Run hour alternation
11_6	Alternation interval h	**WritableCentral System TextHour alternation time (h)**	Enter the interval at which the pumps shall alternate.Applicable only when run hour alternation is selected.
11_7	Max. no. run. pumps	**WritableCentral System TextMax. number of running pumps**	Specifies maximum number of pumps running at the same time
11_8	Auto start interval h	**WritableCentral System TextAuto start interval (h)**	If a pump has not been started within the set interval, the function will start the pump for a maintenance run, The running time is set in the Auto start time menu.
11_9	Auto start time min:s	**WritableCentral System TextAuto start time (min:s)**	The running time when started by the auto start function.0 - disables the function.
11_10	High level run time min:s	**WritableCentral System TextHigh Level run time (min:s)**	Backup control activated when there is a level sensor failure. The high level switch activates the start of a pump (or two), which will then run for the period set in this menu.
11_11	Max. run time min:s	**WritableCentral System TextMax. run time (min:s)**	The maximum time the pumps are allowed to run continuously. 0 - disables the function.

No.	Menu name	Specification	Description
11_12	Thermal blocking	**Writable Alternative**0 = No1 = Yes	When inactive (No), thermal blocking resets automatically by thermal contact. When active (Yes), blocking persists until manually reset.
12	Alarm setup...	**Read only**	Menu group for alarm
12_1	General alarm delay min:s	**Writable**Central System **Text**General alarm delay (min:s)	Delays the recording of an alarm. Used for all alarms except power failure alarm and low level.
12_2	Pow.fail alarm delay min	**Writable**Central System **Text**Power failure alarm delay (min)	The delay of a Power failure alarm before it is recorded.
12_3	Low lev. alarm delay min:s	**Writable**Central System **Text**Low level alarm delay (min:s)	The delay of a Low level alarm before it is recorded.
12_4	Blocking alarm delay min	**Writable**Central System **Text**Blocking alarm delay (min)	The time the blocking signal must be active before an alarm is generated.
12_5	Work timemin	**Writable**	Work time before an acknowledge is required from the personnel.
12_6	Warning time min	**Writable**	Warning time, during which an acknowledge from personnel is requested, before the personnel alarm is sent.
12_7	Transmit alarm	**Writable Alternative**0 = Local1 = Remote2 = Clear**Central System Text**Transmit alarm	Alarm transmission.0 - Local. Alarms are not transmitted.1 - Remote. Alarms are transmitted to the Central system/SMS receiver.2 - Clear. Clears the alarm buffer and changes to Remote.
12_8	Auto remote mode min:s	**Writable**	The time after which the controller will revert to remote alarming mode.0 - disables the function.
12_9	D-alarm start time h:min	**Writable Interval**0 To 0	The start time for dialling out alarms with priority D.
12_10	D-alarm end time h:min	**Writable Interval**0 To 0	The stop time for dialing out alarms with priority D.
12_11	Alarm priority 1	**Writable Alternative**1 = Mains error2 = High level float3 = High level4 = Sensor Fault5 = Inval.setpoints6 = High temp. P17 = High temp. P28 = Tripped motor P19 = Tripped motor P210 = P1 max run time11 = P2 max run time12 = High current P113 = High current P214 = Low current P115 = Low current P216 = No response P117 = No response P218 = Leakage P119 = Leakage P220 = Pers. alarm	Alarm priorities.

No.	Menu name	Specification	Description
12_12	Alarm priority 2	**Writable Alternative1 = Overflow2 = Low level float3 = Low level4 = Alarm input 015 = Alarm input 26 = Alarm input 37 = Alarm input 48 = Alarm input 059 = Alarm input 610 = Alarm input 711 = Alarm input 812 = High rain 5 min13 = High rain 24 h14 = I/O-mod not resp15 = Wrong I/O-module16 = Setpoint changed17 = Testcall !18 = Low 24V Supply19 = P1 Spare alarm20 = P2 Spare alarm**	Alarm priorities. Continuation.
12_13	Alarm priority 3	**Writable Alternative1 = Blocked2 = High capacity P13 = High capacity P24 = Low capacity P15 = Low capacity P2**	Alarm priorities. Continuation.
12_14	Alarm texts...	**Read only**	Menu group for alarm texts
12_14 _1	Alarm text input 1	**WritableCentral System TextAlarm text input 1**	Alarm text to use for general input 1.
12_14 _2	Alarm text input 2	**WritableCentral System TextAlarm text input 2**	Alarm text to use for general input 2.
12_14 _3	Alarm text input 3	**WritableCentral System TextAlarm text input 3**	Alarm text to use for general input 3.
12_14 _4	Alarm text input 4	**WritableCentral System TextAlarm text input 4**	Alarm text to use for general input 4.
12_14 _5	Alarm text input 5	**WritableCentral System TextAlarm text input 5**	Alarm text to use for general input 5.
12_14 _6	Alarm text input 6	**WritableCentral System TextAlarm text input 6**	Alarm text to use for general input 6.
12_14 _7	Alarm text input 7	**WritableCentral System TextAlarm text input 7**	Alarm text to use for general input 7.
12_14 _8	Alarm text input 8	**WritableCentral System TextAlarm text input 8**	Alarm text to use for general input 8.
12_15	Alarm code filter...	**Read only**	Menu group for alarm code filter
12_15 _1	Alarm code input 1	**Writable**	Alternative alarm code to use for general input 1
12_15 _2	Alarm code input 2	**Writable**	Alternative alarm code to use for general input 2
12_15 _3	Alarm code input 3	**Writable**	Alternative alarm code to use for general input 3
12_15 _4	Alarm code input 4	**Writable**	Alternative alarm code to use for general input 4

No.	Menu name	Specification	Description
12_15_5	Alarm code input 5	**Writable**	Alternative alarm code to use for general input 5
12_15_6	Alarm code input 6	**Writable**	Alternative alarm code to use for general input 6
12_15_7	Alarm code input 7	**Writable**	Alternative alarm code to use for general input 7
12_15_8	Alarm code input 8	**Writable**	Alternative alarm code to use for general input 8
12_16	Test alarm...	**Read only**	Menu group for test alarm
12_16_1	Test alarm interval days	**Writable**	Test alarm interval. How often the test alarm shall be sent.
12_16_2	Test alarm time	**Writable**	Test alarm time. The time of the day, at which the test alarm is sent.
12_16_3	Test alarm state	**Writable Alternative0 = Off1 = On**	Manual activation of test alarm.Also reflects the current state of the test alarm.
13	Communication... (Card not installed)	**Read only**	Menu group for communication with the Central system/SMS.
13_1	Station number / id	**Writable**	The unique number of the station within the system.
13_2	Station name	**WritableCentral System TextStation name**	Enter the station name. This name will be used in SMS calls to a GSM telephone.
13_3	Telephone no. CS/SMS	**WritableCentral System TextTelephone number to Central system / SMS**	Telephone number to central system or SMS receiver. T=Tone dial. The telephone number is required for alarm handling to the central system or SMS receiver.
13_4	Telephone no. SMS 2	**WritableCentral System TextTelephone SMS 2**	Telephone number to SMS receiver. The telephone number is required for alarm handling to more than one SMS receiver.Only applicable when alarm handling using SMS is selected.
13_5	Telephone no. SMS 3	**WritableCentral System TextTelephone SMS 3**	Telephone number to SMS receiver. The telephone number is required for alarm handling to more than one SMS receiver.Only applicable when alarm handling using SMS is selected.
13_6	Telephone no. SMS 4	**WritableCentral System TextTelephone SMS 4**	Telephone number to SMS receiver. The telephone number is required for alarm handling to more than one SMS receiver.Only applicable when alarm handling using SMS is selected.
13_7	Telephone no. SMS 5	**WritableCentral System TextTelephone SMS 5**	Telephone number to SMS receiver. The telephone number is required for alarm handling to more than one SMS receiver.Only applicable when alarm handling using SMS is selected.
13_8	SMS Acknowledge time min	**WritableCentral System TextSMS Acknowledge time (min)**	The time the RTU waits for an acknowledge re-calling or SMS before sending the SMS alarm to the next telephone number in the list.0 - disables the function. I.e. the SMS is send directly to all valid telephone numbers.Only applicable when alarm handling using SMS is selected.
13_9	SMS P-alarm	**Writable Alternative0 = No1 = YesCentral System TextSMS P-alarm**	Send SMS on deactivation of an alarm.Only applicable when alarm handling using SMS is selected.

No.	Menu name	Specification	Description
13_10	Communication COM1	**Writable Alternative0 = None1 = Hayes modem2 = GSM/Hayes predefined3 = RS232 HDX4 = RS232 FDX5 = User modem6 = GPRS**	Type of communication to use for the communication with the Central System/SMS.
13_11	Modem init 1	**Writable**	Initialization string for the modem. (part 1)Applies only when \qUser modem\q is selected as communication.
13_12	Modem init 2	**Writable**	Initialization string for the modem. (part 2)Applies only when \qUser modem\q is selected as communication.
13_13	Speed COM1 bps	**Writable Alternative0 = 12001 = 24002 = 48003 = 96004 = 192005 = 384006 = 576007 = 115200**	Speed to use for the communication with the Central System.
13_14	Parity COM1	**Writable Alternative0 = None1 = Even2 = Odd**	Parity COM1
13_15	Protocol COM1	**Writable Alternative0 = AquaCom polled fixed1 = AquaCom dialled2 = AquaCom/SMS3 = Modbus fixed4 = Modbus dialled5 = Comli fixed6 = Comli dialled7 = AquaCom unpolled fix**	Choice of transmission protocol to use for the communication with the Central System/SMS.
13_16	Modbus addressing	**Writable Alternative**0 = Standard1 = DNP3 WITS	This menu will remain hidden, unless 3 = Modbus fixed or 4 = Modbus dialled has been selected in the Protocol COM1 menu. (Also, Show more menus (16) must be active.)
13_17	RTS delay COM1 ms	**Writable**	Delay for the RTS signal (request to send) in the communication with the Central System. Only in choice of RS 232 HDX.
13_18	CS IP address	**Writable**	The IP address to the Central System.Applies to communication with GPRS only
13_19	CS IP port	**Writable**	The IP port of the Central systemApplies to communication with GPRS only
13_20	Access point 1	**Writable**	Access point name. (part 1)Applies to communication with GPRS only
13_21	Access point 2	**Writable**	Access point name. (part 2)Applies to communication with GPRS only
13_22	GPRS connect timeouts	**Writable**	Min. value = 10 s Max. value = 3600 s Default value = 120 s (It is recommended to keep the default or to set a low value.)
13_23	GPRS retry delay min	**Writable**	Min. value = 0 min Max. value = 120 min Default value = 0 min (It is recommended to keep the default or to set a low value.)
13_24	Max buffer sizebytes	**Writable**	Limits the data size when collecting trend.

No.	Menu name	Specification	Description
13_25	Remote block status	**Read only**	Shows the current remote block status, Off/On
13_26	Remote block mode	**Writable Alternative**0 = Auto revert1 = Manual revert **2 = Time revert**	Governs blocking behaviour when status picture (e.g. in AquaView) is down:Auto revert (= default) = APP 500 reverts to automatic control. Also, selecting Auto revert discards current remote blocking command.Manual revert = APP 500 remains blocked until a remote command discards blocking command.Time revert = APP 500 reverts to automatic control when Remote block time (13_27) has elapsed. Timer starts when status picture goes down.
13_27	Remote block time min	**Writable**	This menu will remain hidden, unless 2 =Time revert has been selected in the Remote block mode menu (13_26). Min. value = 0 min Max. value = 1440 min Default value = 0 min
14	General...	**Read only**	Menu group for general set-points
14_1	Date and time	**Writable**	Setting of date and time.
14_2	Control mode	**Writable Alternative**0 = **Digital1 = Analogue**	Selects if an analogue sensor or level switches are used for starting and stopping the pumps.Also referred to as analogue and digital mode.
14_3	Stop condition	**Writable Alternative**0 = **Run on time1 = Stoplevel switch**	Selects if a stop level switch is present or the pump is stopped after a time.Applies to digital mode only.
14_4	Run timemin:s	**WritableCentral System TextDigital run time (min:s)**	The pump running time when configured to Run on time, i.e. no stop level switch is used.Applicable to digital mode only.
14_5	EX mode	**Writable Alternative**0 = **Off1 = On**	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
14_6	Tripped auto reset	**Writable Alternative**0 = **No1 = YesCentral System TextTripped auto reset**	Automatic reset of the motor protection in the case of an overcurrent failure.0 - No. Inactivated function. The RTU blocks the pump.1 - Yes. Activated function. The RTU will make a second attempt to start the pump.
14_7	Trend resolution min	**Writable**	The granularity with which the trend data is stored and transmitted to the Central System.1 minute or 5 minute periods.
14_8	System version	**Read only**	The RTU system version. Please have this number ready when calling Flygt support.
14_9	APP 521 version	**Read only**	The RTU program version. Please have this number ready when calling Flygt support.
14_10	Program mode	**Writable Alternative**0 = **Run1 = Remote COM1**	Run - The RTU is in normal operation controlling the pumps.Remote - The controller is waiting for a remote connection to be established, in order to perform some management activity. E.g. loading a new application program
14_11	New password	**Writable**	Activates the service password, which prevents unauthorized access to service menus.The password is disable by the value 0000

No.	Menu name	Specification	Description
15	I/O setup...	**Read only**	Menu group for I/O setup
15_1	Status inputs	**Read onlyAlternative1 = 24V fail2 = 230V fail3 = P1 high temperature4 = P1 trip5 = P1 resp6 = P1 auto7 = P2 high temperature8 = P2 trip9 = P2 resp10 = P2 auto11 = General input 112 = General input 213 = General input 314 = General input 415 = General input 516 = General input 617 = General input 718 = General input 8**	Status of the digital inputs.
15_2	Invert inputs	**Writable Alternative1 = 24V fail2 = 230V fail3 = P1 high temperature4 = P1 trip5 = P1 resp6 = P1 auto7 = P2 high temperature8 = P2 trip9 = P2 resp10 = P2 auto11 = General input 112 = General input 213 = General input 314 = General input 415 = General input 516 = General input 617 = General input 718 = General input 8**	Inverts an input from being NO (normally open) to NC (normally closed).0 - not inverted1 - inverted
15_3	Common alarm...	**Read only**	Menu group for common alarm output
15_3_1	Common alarm	**Writable Alternative0 = Continuous1 = Intermittent**	Type of common alarm output.Continuous or pulsating.
15_3_2	Com. alarm activ. 1	**Writable Alternative1 = Mains error2 = High level float3 = High level4 = Sensor Fault5 = Inval.setpoints6 = High temp. P17 = High temp. P28 = Tripped motor P19 = Tripped motor P210 = P1 max run time11 = P2 max run time12 = High current P113 = High current P214 = Low current P115 = Low current P216 = No response P117 = No response P218 = Leakage P119 = Leakage P220 = Pers. alarm**	Selects which alarms that activates the common alarm output. (part 1)

No.	Menu name	Specification	Description
15_3_3	Com. alarm activ. 2	**Writable Alternative1 = Overflow2 = Low level float3 = Low level4 = Alarm input 015 = Alarm input 26 = Alarm input 37 = Alarm input 48 = Alarm input 059 = Alarm input 610 = Alarm input 711 = Alarm input 812 = High rain 5 min13 = High rain 24 h14 = I/O-mod not resp15 = Wrong I/O-module16 = Setpoint changed17 = Testcall !18 = Low 24V Supply19 = P1 Spare alarm20 = P2 Spare alarm**	Selects which alarms that activates the common alarm output. (part 2)
15_3_4	Com. alarm activ. 3	**Writable Alternative1 = Blocked2 = High capacity P13 = High capacity P24 = Low capacity P15 = Low capacity P2**	Selects which alarms that activates the common alarm output. (part 3)
15_4	General inputs...	**Read only**	Menu group for general inputs
15_4_1	Function gen.input 1	**Writable Alternative0 = None1 = P1 leakage2 = P2 leakage3 = Power failure4 = External alarm5 = Blocking6 = Personnel7 = Overflow8 = Low level float9 = P1 manual10 = P2 manual11 = Rain meter12 = P1 Spare alarm13 = P2 Spare alarm14 = High level**	Select function for general input 1.
15_4_2	Function gen.input 1	**Read onlyAlternative0 = Stop level**	Select function for general input 1.
15_4_3	Function gen.input 2	**Writable Alternative0 = None1 = P1 leakage2 = P2 leakage3 = Power failure4 = External alarm5 = Blocking6 = Personnel7 = Overflow8 = Low level float9 = P1 manual10 = P2 manual11 = Rain meter12 = P1 Spare alarm13 = P2 Spare alarm14 = High level**	Select function for general input 2.
15_4_4	Function gen.input 2	**Read onlyAlternative0 = Start level 1**	Select function for general input 2.
15_4_5	Function gen.input 3	**Writable Alternative0 = None1 = P1 leakage2 = P2 leakage3 = Power failure4 = External alarm5 = Blocking6 = Personnel7 = Overflow8 = Low level float9 = P1 manual10 = P2 manual11 = Rain meter12 = P1 Spare alarm13 = P2 Spare alarm14 = High level**	Select function for general input 3.

No.	Menu name	Specification	Description
15_4_6	Function gen.input 3	**Read onlyAlternative0 = Start level 2**	Select function for general input 3.
15_4_7	Function gen.input 4	**Writable Alternative0 = None1 = P1 leakage2 = P2 leakage3 = Power failure4 = External alarm5 = Blocking6 = Personnel7 = Overflow8 = Low level float9 = P1 manual10 = P2 manual11 = Rain meter12 = P1 Spare alarm13 = P2 Spare alarm14 = High level**	Select function for general input 4.
15_4_8	Function gen.input 4	**Writable Alternative0 = None1 = P1 leakage2 = P2 leakage3 = Power failure4 = External alarm5 = Blocking6 = Personnel7 = Overflow8 = Low level float9 = P1 manual10 = P2 manual11 = Rain meter12 = P1 Spare alarm13 = P2 Spare alarm14 = High level**	Select function for general input 4.
15_4_9	Function gen.input 5	**Writable Alternative0 = None1 = P1 leakage2 = P2 leakage3 = Power failure4 = External alarm5 = Blocking6 = Personnel7 = Overflow8 = Low level float9 = P1 manual10 = P2 manual11 = Rain meter12 = P1 Spare alarm13 = P2 Spare alarm14 = High level**	Select function for general input 5.
15_4_10	Function gen.input 6	**Writable Alternative0 = None1 = P1 leakage2 = P2 leakage3 = Power failure4 = External alarm5 = Blocking6 = Personnel7 = Overflow8 = Low level float9 = P1 manual10 = P2 manual11 = Rain meter12 = P1 Spare alarm13 = P2 Spare alarm14 = High level**	Select function for general input 6.
15_4_11	Function gen.input 7	**Writable Alternative0 = None1 = P1 leakage2 = P2 leakage3 = Power failure4 = External alarm5 = Blocking6 = Personnel7 = Overflow8 = Low level float9 = P1 manual10 = P2 manual11 = Rain meter12 = P1 Spare alarm13 = P2 Spare alarm14 = High level**	Select function for general input 7.

No.	Menu name	Specification	Description
15_4_12	Function gen.input 8	**Writable Alternative0 = None1 = P1 leakage2 = P2 leakage3 = Power failure4 = External alarm5 = Blocking6 = Personnel7 = Overflow8 = Low level float9 = P1 manual10 = P2 manual11 = Rain meter12 = P1 Spare alarm13 = P2 Spare alarm14 = High level**	Select function for general input 8.
15_5	I/O-module...	**Read only**	Menu group for I/O-module
15_5_1	Base IP address	**Writable**	Base IP address for the RTU and the I/O module.2 consecutive addresses are required. The first address is used by the RTU. The second address is used by the I/O-module and does not have to be entered.
15_5_2	I/O-module MAC addr.	**Writable**	The MAC address of the I/O-module
15_5_3	IP timeout	**Writable**	The timeout for the IP communication with the I/O module.
15_5_4	I/O-module type	**Read only**	Type of I/O-module.
15_5_5	I/O-module version	**Writable**	I/O-module version. The value is fetch from the I/O module
15_6	Outputs...	**Read only**	Menu group for Outputs
15_6_1	Function output 2&4	**Writable Alternative0 = Motorprotect. reset1 = General output**	Select if the outputs is to be used as motor protection reset or general purpose outputs.
15_6_2	Output 2 config.	**Writable Alternative1 = Power failure2 = High level3 = High level float4 = Low level5 = Low level float6 = Overflow7 = P1 failure8 = P1 blocked9 = P2 failure10 = P2 blocked11 = Leakage P112 = Leakage P213 = No response P114 = No response P2**	Select which signals that shall activate the output 2.Applies only if general purpose outputs have been selected.
15_6_3	Output 4 config.	**Writable Alternative1 = Power failure2 = High level3 = High level float4 = Low level5 = Low level float6 = Overflow7 = P1 failure8 = P1 blocked9 = P2 failure10 = P2 blocked11 = Leakage P112 = Leakage P213 = No response P114 = No response P2**	Select which signals that shall activate the output 4.Applies only if general purpose outputs have been selected.
15_7	Diagnostic program	**Writable Alternative0 = Off1 = 1-39**	Diagnostic program for test of the RTU
15_8	Flygt default	**Writable Alternative0 = No1 = Yes**	Resets all settings to default.

No.	Menu name	Specification	Description
16	Show more menus	**Writable Alternative0 = No1 = Yes**	Shows hidden menus
17	Show more menus(password)	**Writable**	Shows hidden menus when password function is enabled. Enter password!
18	¤ Language	**Writable Alternative0 = English1 = Deutsch2 = Nederlands3 = Français4 = Dansk5 = Svenska6 = Norsk7 = Español8 = Magyar9 = Suomi10 = Italiano11 = PycckNN12 = Polski13 = English US**	Select display language.

Appendix B: Tag List

Appendix B: Tag List

Addr	Object name	Type	Raw min	Raw max	Scale Unit system	Scale Multiply by…	Scale …to get unit	RW	Description
207	ALR_DigitalAlarmDelay	UNSIGNED INT	0	600	SI / US	1 / 1	s / sec	RW	Alarm delay.
208	ALR_Mode	UNSIGNED INT	0	2	SI / US	1 / 1		RW	Alarm distribution mode: 0 = local, 1 = remote and 2 = clear.
296	ANA1_Input	UNSIGNED INT	0	65535	SI / US	1 / 1		R	Raw value from the analog input 1.
297	ANA2_Input	UNSIGNED INT	0	65535	SI / US	1 / 1		R	Raw value from the analog input 2.
298	ANA3_Input	UNSIGNED INT	0	65535	SI / US	1 / 1		R	Raw value from the analog input 3.
93	LEV1_CalibLevel	SIGNED INT	-9999	9999	SI / US	0,01 / 0,03281	m / feet	RW	Calibration level (offset when to get zero level).
5	LEV1_Flow	UNSIGNED INT	0	65535	SI / US	1/60000 / 0,0044	m3/s / gallons/sec	R	Inflow rate sump.
98	LEV1_HighAlarmLimit	SIGNED INT	-9999	9999	SI / US	0,01 / 0,03281	m / feet	RW	High level alarm limit.
102	LEV1_LowAlarmDelay	UNSIGNED INT	0	600	SI / US	1 / 1	s / sec	RW	Low level alarm delay.
101	LEV1_LowAlarmLimit	SIGNED INT	-9999	9999	SI / US	0,01 / 0,03281	m / feet	RW	Low level alarm limit.
2	LEV1_Percent	UNSIGNED INT	0	100	SI / US	1 / 1		R	Level in percent.
3	LEV1_PumpedVolumeDaily	UNSIGNED INT	0	65535	SI / US	0,1 / 26,42	m3 / gallons	R	Pumped volume day sump.
4	LEV1_PumpedVolumeTotal	UNSIGNED INT	0	65535	SI / US	1 / 264,2	m3 / gallons	R	Total pumped volume.
92	LEV1_Range	UNSIGNED INT	0	9999	SI / US	0,01 / 0,03281	m / feet	RW	Measure range for the level sensor.
1	LEV1_Value	SIGNED INT	-9999	9999	SI / US	0,01 / 0,03281	m / feet	R	Level in meters.
58	OF1_ActiveCountTotal	UNSIGNED INT	0	65535	SI / US	1 / 1		R	Total number of overflows.
56	OF1_ActiveTimeTotal	UNSIGNED INT	0	65535	SI / US	60 / 60	s / sec	R	Total time in minutes of overflowing.
7	P1_CalculatedCapacity	UNSIGNED INT	0	65535	SI / US	1/60000 / 0,0044	m3/s / gallons/sec	R	Calculated capacity pump1.
6	P1_Current	UNSIGNED INT	0	9999	SI / US	0,1 / 0,1	A / A	R	Current pump 1.
121	P1_HighCurrent	UNSIGNED INT	0	9999	SI / US	0,1 / 0,1	A / A	RW	High current alarm limit pump 1.
123	P1_LowCurrent	UNSIGNED INT	0	9999	SI / US	0,1 / 0,1	A / A	RW	Low current alarm limit pump 1.

Addr	Object name	Type	Raw min	Raw max	Scale			RW	Description
					Unit system	Multiply by…	…to get unit		
34	P1_RunTimeDaily	UNSIGNED INT	0	65535	SI / US	60 / 60	s / sec	R	Run time in minutes of pump 1 in the present Day.
36	P1_StartCountDaily	UNSIGNED INT	0	65535	SI / US	1 / 1		R	Number of starts on pump 1 in the present day.
111	P1_StartLevel	SIGNED INT	-9999	9999	SI / US	0.01 / 0.03281	m / feet	RW	Start condition 1.
112	P1_StopLevel	SIGNED INT	-9999	9999	SI / US	0.01 / 0.03281	m / feet	RW	Stop condition 1.
9	P2_CalculatedCapacity	UNSIGNED INT	0	65535	SI / US	1/60000 / 0.0044	m3/s / gallons/sec	R	Calculated capacity pump2.
8	P2_Current	UNSIGNED INT	0	9999	SI / US	0.1 / 0.1	A / A	R	Current pump 2.
141	P2_HighCurrent	UNSIGNED INT	0	9999	SI / US	0.1 / 0.1	A / A	RW	High current alarm limit pump 2.
143	P2_LowCurrent	UNSIGNED INT	0	9999	SI / US	0.1 / 0.1	A / A	RW	Low current alarm limit pump 2.
38	P2_RunTimeDaily	UNSIGNED INT	0	65535	SI / US	60 / 60	s / sec	R	Run time in minutes of pump 2 in the present day.
40	P2_StartCountDaily	UNSIGNED INT	0	65535	SI / US	1 / 1		R	Number of starts on pump 2 in the present day.
131	P2_StartLevel	SIGNED INT	-9999	9999	SI / US	0.01 / 0.03281	m / feet	RW	Start condition 2.
132	P2_StopLevel	SIGNED INT	-9999	9999	SI / US	0.01 / 0.03281	m / feet	RW	Stop condition 2.
217	PF_AlarmDelay	UNSIGNED INT	0	600	SI / US	1 / 1	s / sec	RW	Power failure alarm delay.
53	RAIN_PulsCountDaily	UNSIGNED INT	0	9999	SI / US	0.0001 / 0.00003281	m / feet	R	The puls counter's value in the present day.
192	S1_AllowedPumpToRun	UNSIGNED INT	0	10	SI / US	1 / 1		RW	Number of allowed pump to run.
50	S1_AlternationType	UNSIGNED INT	0	3	SI / US	1 / 1		RW	Alternation type.
197	S1_DigitalRunTime	UNSIGNED INT	0	600	SI / US	1 / 1	s / sec	RW	Digital run time.
200	S1_HourRunInterval	UNSIGNED INT	1	200	SI / US	3600 / 3600	s / sec	RW	Forced pump start '96'-hour, interval 1 - 200 hours.
201	S1_HourRunTime	UNSIGNED INT	0	120	SI / US	1 / 1	s / sec	RW	Forced pump start '96'-hour, run time.
202	S1_MaxRunTime	UNSIGNED INT	0	3000	SI / US	1 / 1	s / sec	RW	Max Run time, Max: 50 min (30000).
204	S1_MinRunFloatHigh	UNSIGNED INT	0	3000	SI / US	1 / 1	s / sec	RW	High level float minimum run time sump.

Addr	Object name	Type	Raw min	Raw max	Scale			RW	Description
					Unit system	Multiply by…	…to get unit		
303	S1_RemoteBlkTime	UNSIGNED INT	0	1440	SI / US	60 / 60	s / sec	RW	The remote block time when time revert is chosen.
302	S1_RemoteMode	UNSIGNED INT	0	2	SI / US	1 / 1		RW	Remote block mode (0 = auto revert, 1 = manual revert, 2 = time revert).
196	S1_StopDelay	UNSIGNED INT	0	600	SI / US	1 / 1	s / sec	RW	Stop delay.
194	S1_StopDelaySpan	UNSIGNED INT	0	250	SI / US	0.01 / 0.03281	m / feet	RW	Stop delay span.
226	SYS_AppVerAqv	UNSIGNED INT	0	65535	SI / US	1 / 1		R	Version of the AquaView application.
304	SYS_GPRS_ConnectTimeout	UNSIGNED INT	10	3600	SI / US	1 / 1	s / sec	RW	The CONNECT timeout when using GPRS communication.
305	SYS_GPRS_RetryDelay	UNSIGNED INT	0	120	SI / US	60 / 60	s / sec	RW	The retry delay when using GPRS communication.
225	SYS_Language	UNSIGNED INT	0	12	SI / US	1 / 1		RW	Chosen language.
584	SYS_PlantNo	UNSIGNED INT	0	65535	SI / US	1 / 1		R	Plant identifier number
295	SYS_Version	UNSIGNED INT	0	65535	SI / US	1 / 1		R	System version.
100	D01_Active	DIGITAL	0	1				R	Digital input 1 is active.
101	D01_Alarm	DIGITAL	0	1				R	Alarm on digital input 1 is active.
106	D02_Active	DIGITAL	0	1				R	Digital input 2 is active.
107	D02_Alarm	DIGITAL	0	1				R	Alarm on digital input 2 is active.
112	D03_Active	DIGITAL	0	1				R	Digital input 3 is active.
113	D03_Alarm	DIGITAL	0	1				R	Alarm on digital input 3 is active.
118	D04_Active	DIGITAL	0	1				R	Digital input 4 is active.
119	D04_Alarm	DIGITAL	0	1				R	Alarm on digital input 4 is active.
124	D05_Active	DIGITAL	0	1				R	Digital input 5 is active.
125	D05_Alarm	DIGITAL	0	1				R	Alarm on digital input 5 is active.
130	D06_Active	DIGITAL	0	1				R	Digital input 6 is active.
131	D06_Alarm	DIGITAL	0	1				R	Alarm on digital input 6 is active.
136	D07_Active	DIGITAL	0	1				R	Digital input 7 is active.
137	D07_Alarm	DIGITAL	0	1				R	Alarm on digital input 7 is active.
142	D08_Active	DIGITAL	0	1				R	Digital input 8 is active.
143	D08_Alarm	DIGITAL	0	1				R	Alarm on digital input 8 is active.
148	D09_Active	DIGITAL	0	1				R	Digital input 9 is active.
154	D10_Active	DIGITAL	0	1				R	Digital input 10 is active.
160	D11_Active	DIGITAL	0	1				R	Digital input 11 is active.
166	D12_Active	DIGITAL	0	1				R	Digital input 12 is active.
172	D13_Active	DIGITAL	0	1				R	Digital input 13 is active.
178	D14_Active	DIGITAL	0	1				R	Digital input 14 is active.
184	D15_Active	DIGITAL	0	1				R	Digital input 15 is active.

Addr	Object name	Type	Raw min	Raw max	Unit system	Multiply by…	…to get unit	RW	Description
190	D16_Active	DIGITAL	0	1				R	Digital input 16 is active.
94	IOB_ErrorAlarm	DIGITAL	0	1				R	Base module I/O board communication fail.
5	LEV1_DigHighAlarm	DIGITAL	0	1				R	Digital high level sensor alarm after delay.
6	LEV1_DigLowAlarm	DIGITAL	0	1				R	Low level float alarm.
2	LEV1_HighAlarm	DIGITAL	0	1				R	High level alarm is active.
4	LEV1_LowAlarm	DIGITAL	0	1				R	Low level alarm is active.
10	LEV1_SensorAlarm	DIGITAL	0	1				R	Sensor failure alarm.
201	O01_Active	DIGITAL	0	1				R	Digital output 1 is active.
202	O02_Active	DIGITAL	0	1				R	Digital output 2 is active.
203	O03_Active	DIGITAL	0	1				R	Digital output 3 is active.
204	O04_Active	DIGITAL	0	1				R	Digital output 4 is active.
205	O05_Active	DIGITAL	0	1				R	Digital output 5 is active.
206	O06_Active	DIGITAL	0	1				R	Digital output 6 is active.
99	OF1_Alarm	DIGITAL	0	1				R	Overflow alarm is active.
15	P1_Blocked	DIGITAL	0	1				R	Pump 1 is blocked.
14	P1_Error	DIGITAL	0	1				R	Pump 1 has an error.
22	P1_ErrorResponseAlarm	DIGITAL	0	1				R	No responce alarm is active on pump 1.
20	P1_HighCurrentAlarm	DIGITAL	0	1				R	High current alarm is active on pump 1.
24	P1_LeakageAlarm	DIGITAL	0	1				R	Leakage alarm is active on pump 1.
21	P1_LowCurrentAlarm	DIGITAL	0	1				R	Low current alarm is active on pump 1.
26	P1_MaxRunAlarm	DIGITAL	0	1				R	Max run alarm is active on pump 1.
18	P1_RemoteRun	DIGITAL	0	1				RW	Manual or remote start of pump 1.
13	P1_Response	DIGITAL	0	1				R	Responce from pump 1.
12	P1_Run	DIGITAL	0	1				R	Pump 1 is running.
25	P1_SpareAlarm	DIGITAL	0	1				R	P1 Spare alarm.
23	P1_ThermAlarm	DIGITAL	0	1				R	High temperature alarm is active on pump 1.
19	P1_TripAlarm	DIGITAL	0	1				R	Tripped alarm on pump 1.
31	P2_Blocked	DIGITAL	0	1				R	Pump 2 is blocked.
30	P2_Error	DIGITAL	0	1				R	Pump 2 has an error.
38	P2_ErrorResponseAlarm	DIGITAL	0	1				R	No responce alarm is active on pump 2.
36	P2_HighCurrentAlarm	DIGITAL	0	1				R	High current alarm is active on pump 2.
40	P2_LeakageAlarm	DIGITAL	0	1				R	Leakage alarm is active on pump 2.
37	P2_LowCurrentAlarm	DIGITAL	0	1				R	Low current alarm is active on pump 2.
42	P2_MaxRunAlarm	DIGITAL	0	1				R	Max run alarm is active on pump 2.
34	P2_RemoteRun	DIGITAL	0	1				RW	Manual or remote start of pump 2.
29	P2_Response	DIGITAL	0	1				R	Responce from pump 2.
28	P2_Run	DIGITAL	0	1				R	Pump 2 is running.
41	P2_SpareAlarm	DIGITAL	0	1				R	P2 Spare alarm.
39	P2_ThermAlarm	DIGITAL	0	1				R	High temperature alarm is active on pump 2.
35	P2_TripAlarm	DIGITAL	0	1				R	Tripped alarm on pump 2.
87	PALR_PersonnelAlarm	DIGITAL	0	1				R	Personnel alarm.
88	PF_Alarm	DIGITAL	0	1				R	Power failure alarm is active.

Addr	Object name	Type	Raw min	Raw max	Scale			RW	Description
					Unit system	Multiply by…	…to get unit		
91	RAIN_24hAlarm	DIGITAL	0	1				R	The 24 h rain alarm is active.
90	RAIN_5minAlarm	DIGITAL	0	1				R	The 5 min rain alarm is active.
79	S1_AutoResetEnable	DIGITAL	0	1				RW	Over current auto reset function enable.
77	S1_RemoteBlock	DIGITAL	0	1				RW	P1/P2 Remote block pump.
207	S1_RemoteManualMode	DIGITAL	0	1				R	Restore remote conditional restorable IO when communication is terminated..
78	S1_RemoteReset	DIGITAL	0	1				RW	Remote reset (resets alarms and pump errors).
200	S1_RevertToAuto	DIGITAL	0	1				RW	Revert to automatic control of the pumps.
208	S1_ThermBlkEnable	DIGITAL	0	1				RW	Enables the thermal block function.
97	SYS_ParamErrorAlarm	DIGITAL	0	1				R	Parameter error alarm.
85	TSTALR_ActiveAlarm	DIGITAL	0	1				R	Test-alarm is active.

Appendix C: SCADA Systems

Flygt SCADA System (Aquaview)

The figure below shows an example of the AquaView status view.
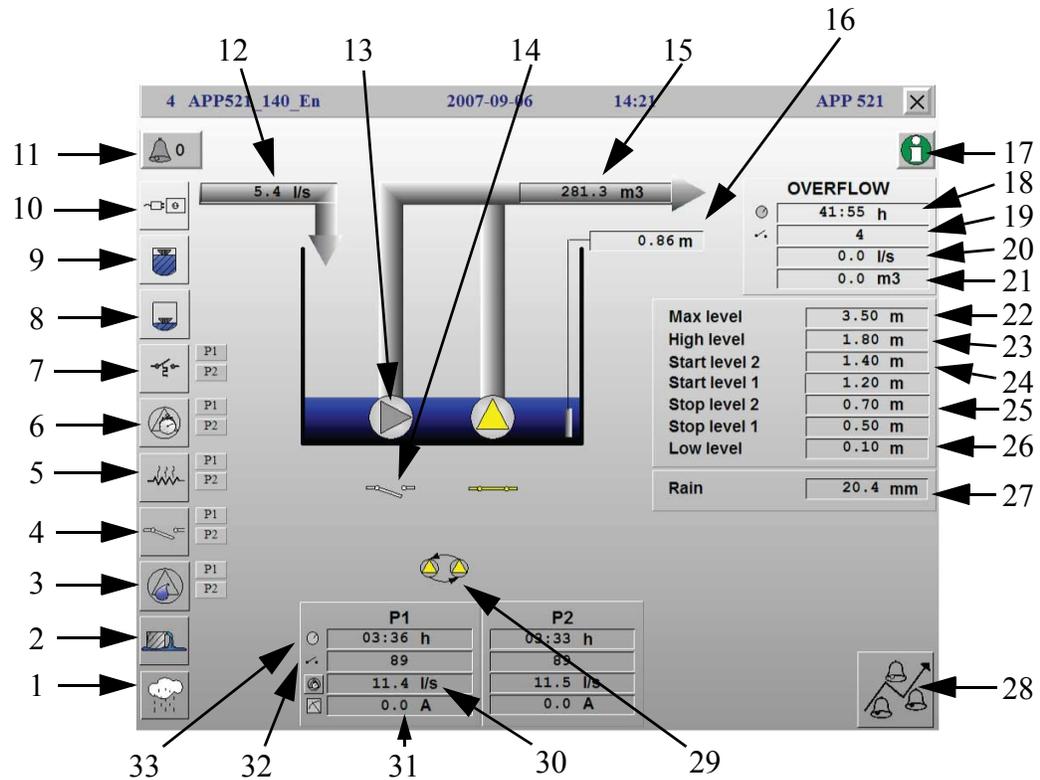
1. Rain alarm
2. Overflow
3. Leakage
4. Response err.
5. High temp.
6. Max runtime
7. Tripped
8. Low level
9. High level
10. Power failure
11. Active alarms
12. Free flow
13. P1 pump status
14. P1 relay Level status
15. Pumped volume
16. Level
17. RTU info
18. Overflow time
19. Overflow count
20. Overflow flow
21. Overflow volume

22. Max level
23. High level
24. Start level
25. Stop level
26. Low level
27. Rain
28. Alarm handling (local/remote)
29. Alternation
30. P1 capacity
31. P1 current
32. P1 starts
33. P1 run time

Status View

The status view shows:
- Momentary status of the station
- Daily operating data, *and*
- List of active alarms

Remote Control

The RTU can be controlled remotely:
1. Right-click in the status view to display a dialog box for remote control.
2. The RTU reverts to the automatic mode within 30 seconds after the modem has hung up.

Example: Object P1
- F1 = Start pump 1.
- F2 = Stop and block pumps.
- F3 = Return control to automatic.
- F4 = Reset unit.

RTU information

To show version information, click **RTU info.**

Setpoints

How to use setpoints:
- Setpoint values can be fetched and sent in random order.

  Keep in mind: Maximum is 500 transmitted characters.
- Alarm code filter can be fetched and sent in random order.
- Alarm priorities can be fetched and sent in random order.

NOTICE:

Fetching alarm code filter or alarm priorities requires at least AquaView 1.23.01.

Report

The report data consists of daily data divided into time segments:
- 00:00 - 06:00
- 06:00 - 09:00
- 09:00 - 16:00
- 16:00 - 24:00

Available data is listed in the table below. The RTU stores this data for 31 days.

Text1	Text2	Text3	Description
Run time	P1	h:min	Running time pump 1.
Run time	P2	h:min	Running time pump 2.
Overflow	time	h:min	Overflow time.
Starts	P1		Number of starts pump 1.
Starts	P2		Number of starts pump 2.
Rain		inch	Rain.
Overflow	count		Number of overflows.
Major	overflow	count	Major overflow count
Overflow	volume	gal	Overflow volume
Pumped	volume	gal	Pumped volume

Trend

The trend data consist of historical data with selectable sample resolution (1 or 5 minute average).

Available data is listed in the table below. The RTU stores this data for 4 days.

Text1	Text2	Text3	Description
Level		m	Level
Current	P1	A	P1 current. (Maximum value in period).
Current	P2	a	P2 current. (Maximum value in period).
Rain	P1	mm	Rain. 5 minute running average.
Calculated	cap. P1	l/s	Calculated capacity P1
Calculated	cap. P2	l/s	Calculated capacity P2
Overflow	Level	m	Overflow level
Overflow	Height	m	Overflow height
Free flow		l/s	Free flow (inflow)

To set trend resolution in the RTU:
- Enter the preferred resolution in the Trend resolution menu (14_7).
- Keep in mind: Use the same trend resolution in the RTU as in AquaView.

Other SCADA Systems

The figure on next page shows a status view example using Citect.

Communication Methods

The RTU supports several communication methods for communicating with other SCADA systems:

Protocol	Connection type
Comli	Fixed

Protocol	Connection type
Comli	Dialled
Modbus	Fixed
Modbus	Dialled
Aquacom	Fixed
Aquacom	Dialled
Aquacom	Dialled + SMS Alarms

(Reference: Open Manual for further information on protocols).

Status View

The status view can show, for example:

- Momentary status of the station
- Daily operating data, *and*
- List of active alarms

Additional parameters, alarms, and values supported by the RTU can be added to the status view.(Reference: "Appendix B: Tag List").

Remote Control

The following functions can be controlled remotely:

Start P1	Start Pump 1/Stop Pump 1
Start P2	Start Pump 2/Stop Pump 2
Block	Block all pumps
Reset	Reset motor protection
Resume to auto	Functions will no longer be controlled remotely

Keep in mind: If communication to the RTU is lost, the pump will return to automatic mode after 30 seconds.
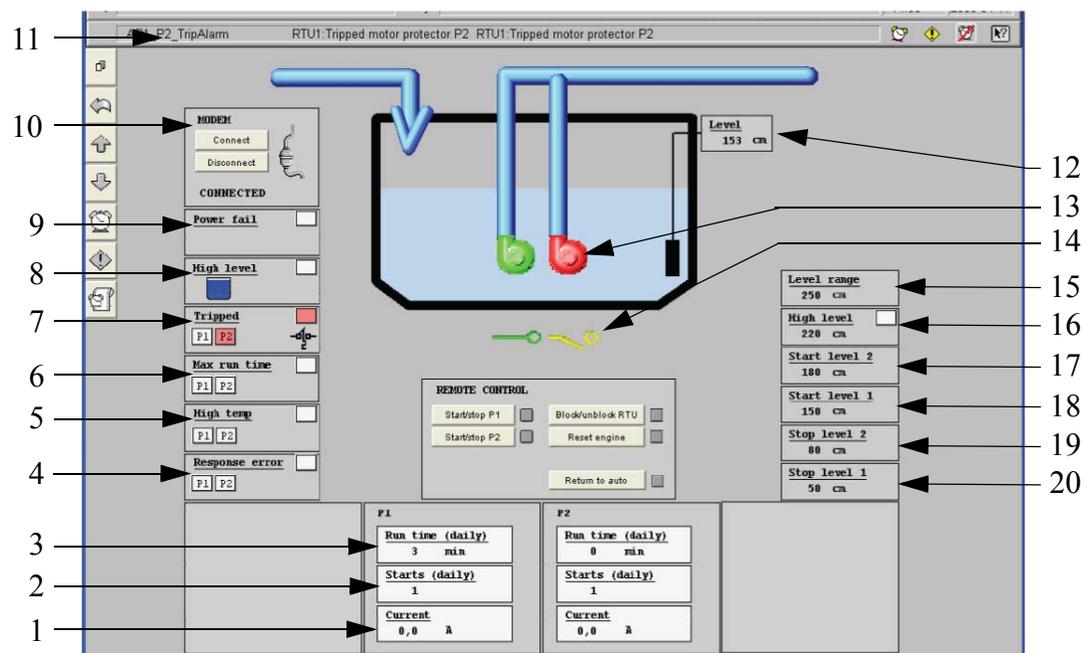
1. Current
2. Starts daily
3. Run time daily
4. Response error
5. High temp
6. Max run time
7. Tripped
8. High level
9. Power fail
10. Modem Connection
11. Alarm list
12. Level
13. Pump status
14. Relay status
15. Level range
16. High level
17. Start level 2
18. Start level 1
19. Stop level 2
20. Stop level 1

Dialled Alarm Handling

When an alarm is triggered in the RTU, it will call the SCADA system in order to be polled by the SCADA system for the alarm list. For the SCADA system to recognize which RTU that is making the call, a caller id is sent to the SCADA system.

Structure: Caller id

The caller id is generated automatically by the RTU.

- Syntax: FLYGT_<protocol\>_<station number\>
- Example 1: If the protocol is Modbus and the station number is 31, the RTU generates the Caller id: FLYGT_MODBUS_31
- Example 2: If the station number is changed from 31 to 32, the RTU generates a new Caller id: FLYGT_MODBUS_32

Function: Alarm call

The table below shows an outgoing alarm call from the RTU to the SCADA system.

Phase	RTU	SCADA system
1	Alarm is generated.	
2	Calls the SCADA system.	
3	Sends its caller id.	Caller id field in the SCADA system must correspond to the caller id sent from the RTU.
4		If caller id is not supported by the SCADA system, it will request a PLC_ID from the RTU.
5		Polls the RTU for active alarms.
6	Acknowledges the alarms.	
7		Terminates the connection.

NOTICE:

To prevent the RTU from sending alarms not included in the SCADA system, change the alarm priority to "C" for relevant alarms in the RTU.

Max Buffer Size (Advanced Settings)

The information provided below is intended for integration purposes and should be used together with the Open manual.

The Scada system must not exceed the Max buffer size in the RTU when requesting registers or other data.

Protocol	Max No. of registers in one reply	Max No. of digital I/O in one reply.
Modbus	47	760
Comli(*)	32	512

Keep in mind: The max reply Buffer Size is 100 bytes.

(*) The limitation is in Comli, where the data bytes are limited to 64.

When a GSM modem is used, GSM-network delays may cause the SCADA system to timeout. To solve this:

- Increase the timeout setting in the SCADA system, *or*
- Decrease the number of registers/IO in each request.

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1) The tissue in plants that brings water upward from the roots
2) A leading global water technology company

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