FarSight

Instruction Manual

FarSight (FIRST EDITION REV 3)

March 2025

Part Number M-FS01-001-4P

COPYRIGHT

WARRANTY AND LIABILITY

Pulsar Measurement guarantees for a period of 2 years from the date of delivery that it will either exchange or repair any part of this product returned to Pulsar Measurement if it is found to be defective in material or workmanship, subject to the defect not being due to unfair wear and tear, misuse, modification or alteration, accident, misapplication, or negligence.

DISCLAIMER

Pulsar Measurement neither gives nor implies any process guarantee for this product and shall have no liability in respect of any loss, injury or damage whatsoever arising out of the application or use of any product or circuit described herein.

Every effort has been made to ensure accuracy of this documentation, but Pulsar Measurement cannot be held liable for any errors.

Pulsar Measurement operates a policy of constant development and improvement and reserves the right to amend technical details, as necessary.

The FarSight shown on the cover of this manual is used for illustrative purposes only and may not be representative of the actual device supplied.

CONTACT

For technical support, please contact:

Europe: **supporteurope@pulsarmeasurement.com**
Outside Europe: **supportnorthamerica@pulsarmeasurement.com**

If you have any comments or suggestions about this product, please contact:

Europe: **europe@pulsarmeasurement.com**
Outside Europe: **northamerica@pulsarmeasurement.com**

Pulsar Measurement website: **www.pulsarmeasurement.com**

United States	**Canada**	**United Kingdom**
11451 Belcher Road South Largo, FL 33773 888-473-9546	16456 Sixsmith Drive Long Sault, Ont. K0C 1P0 855-300-9151	Cardinal Building, Enigma Commercial Centre Sandy's Road, Malvern WR14 1JJ 00 44 (0)1684 891371

CONTENTS

CHAPTER 1: START HERE...

Congratulations on your purchase of a FarSight velocity sensor. This quality product has been developed over many years and represents the latest in non-contacting velocity monitoring technology.

It has been designed to give you years of trouble-free performance, and a few minutes spent reading this operating manual will ensure that your installation is as simple as possible.

About this Manual

It is important that this manual is referred to for correct installation and operation. There are various parts of the manual that offer additional help or information as shown.

Tips

TIP: Look for this icon throughout your Pulsar Measurement manual to find helpful information and answers to frequently asked questions.

Additional Information

Additional Information

At various parts of the manual, you will find sections like this that explain specific things in more detail.

References

— See Also

References to other parts of the manual.

About the FarSight

The FarSight is a non-contacting velocity sensor. The sensor provides reliable flow velocity measurements using short pulses of micro-waves, which are transmitted by an enclosed antenna. When reflected off a moving surface, the signal experiences a shift in frequency characteristics. The reflected signal is captured by the on-board microprocessor via the antenna and analysed to determine the velocity.

The FarSight's compact and versatile design allows easy installation. Housed in a robust enclosure coupled with a fully encapsulated microwave antenna, it provides an effective fit-and-forget flow velocity solution.

PC software is available to allow setup and run diagnostics using MicroFlow PC via a RS 485 connection. The FarSight is compatible for use with Pulsar Measurement's, FlowCERT, Velocity Interface and Ultimate controllers to obtain velocity readings. The FarSight can also be retrofitted to replace existing in-process contacting sensors. Overall, the device has outstanding stability, accuracy, and repeatability.

Benefits

Combined with the ease of programming there are many other benefits to using the FarSight, these are listed below:

- Non-contact velocity measurement.
- Retro-fit capability and low-cost installation.
- Monitors flow over natural channels such as streams and rivers.
- Measures flow in both directions.
- 'See through' capability for enclosed plastic pipes and concrete (not reinforced) channels.
- Resilient to liquid vapour, wind, or temperature.
- Storm mitigation when measuring in single direction.
- No minimum liquid level required for measurement.
- Virtually maintenance free; not affected by sedimentation, so there is no need for regular cleaning.
- Compatible with Pulsar Measurement's FlowCERT, Velocity Interface and Ultimate controllers, with retrofit capability for in-contact sensors.
- Can be installed in addition to existing in process contact measuring devices.
- Easily setup using MicroFlow PC.
- The sensor is capable of monitoring flow of very shallow liquid, mitigating the constraint associated with in-liquid techniques.
- Low power design.
- Fast boot sequence allowing a measurement within 10 seconds of power-up.

Functional Description

Based upon state-of-the-art microwave sensing technology, the FarSight integrates Pulsar Measurement's innovative and award-winning DSP (Digital Signal Processing) platform, offering you a cost-effective solution with excellent reliability and performance.

FarSight automatically matches to the protocol and Baud rate of the controller. When it is connected to a controller and powered up, after approximately 10 seconds the sensor will adjust to the Baud rate of the controller it is connected to.

FarSight has been designed to provide maintenance free performance.

Product Specification

PHYSICAL

Dimensions:	Height 195 x Diameter 145mm (7.64 x 5.7")
Weight:	Nominal 1.2 kg (2.6lbs)
Enclosure Material/Description:	PVDF main body, Valox 357 on cap and sub-shield
Mounting Connection:	Rear: 1-inch BSP or NPT thread with BReez™ adapter. Optional mounting bracket available.
Cable:	5-core screened
Cable Lengths:	10, 20 or 30m (32.8, 65.6 or 98.4ft) Optional: 50 m or 100 m (164 ft or 328 ft)
Maximum separation:	Up to 500m (1,640 ft) from FarSight to controller or RTU/logger

PERFORMANCE

Operational Range:	Up to vertical height of 15m (49ft)
Technology:	K-Band (ISM) Radar
Beam Angle:	10° inclusive
Velocity Range:	±0.2 m/s to ±6 m/s (±0.66 ft/s to ±19.7 ft/s) in most applications. Performance may vary depending on application. Ideal surface condition would include visually observable ripples
Accuracy	The greater of ±1.5% or 0.05 m/s (0.16 ft/s)
Max. Channel Width per sensor:	Up to 3m (9.8 ft)
Optimal Installation:	30° to 50° (from horizontal) with electronic tilt compensation.

ENVIRONMENTAL

Enclosure Protection:	IP68 / NEMA 6P
Vibration Protection	Fully Potted
Ambient Operating Temperature:	-40° to +80°C (-40°F to +176°F)
Humidity:	0 to 99% (non-condensing)
Pressure Connection Temperature:	-40° to +80°C (-40°F to +176°F)

APPROVALS

Regulatory Approvals:	FCC, RED, CE, UKCA
WEEE and ROHS:	Compliant

OUTPUT / COMMUNICATION

Connection:	RS485
Digital Communication:	Modbus RTU
Compatibility with Pulsar Controllers:	Integrates with FlowCERT, Ultimate Controller, and Flow Monitor

PROGRAMMING

PC Programming:	Via RS485 Modbus RTU, including free Pulsar Measurement MicroFlow/FarSight PC Software
Programming Security:	Support for passcode protection
Programmed Data Integrity:	Configuration stored in non-volatile memory
PC Setup & Monitoring Software:	MicroFlow/FarSight PC version 3.1 or newer – compatible with Windows 10 & 11

POWER SUPPLY

Operating Voltage:	10 – 28V DC
Power Consumption	0.42W
Power Conservation:	Support for complete power-down between measurements. Required power-on duration depends on application and field programming of FarSight. See manual for details.

ACCESSORIES

BReez™ Adapter:	Increases ease of use, supplied as standard. Greatly reduces installation time

Pulsar Measurement operates a policy of constant development and improvement and reserve the right to amend technical details, as necessary.

EU Certificate of Conformity

UK DECLARATION OF CONFORMITY

P U L S A R FarSight sensor.

This declaration of conformity is issued under the sole responsibility of the manufacturer.

Relevant legislation;	SI 2016:1091, as amended.	EMC regulations.
	SI 2017:1206, as amended.	Radio equipment regulations.
	SI 2012:3032, as amended.	RoHS regulations.
Manufacturer	Pulsar Process Measurement Ltd	
Address	Cardinal Building, Enigma Commercial Centre, Sandy's Road, Malvern, Worcestershire, WR14 1JJ, UK.	
Apparatus	DC powered velocity measurement sensor utilising radar technology.	
Models	FarSight.	
Equipment type	Measurement and process control.	
Standards applied	EN61326-1:2013 Electrical equipment for measurement, control & laboratory use, EMC requirements.	
	ETSI 300 440 V2.1.1 Short Range Devices; Radio equipment used in the 1GHz to 40GHz range; harmonised standard for access to radio spectrum.	

I declare that the apparatus named above has been tested and complies with the relevant sections of the above referenced standards & legislation.

Signed for and on behalf of;

18th September 2023

Rev. 1.0

Name & function: Tim Brown, electronics engineer.   Pulsar Process Measurement Ltd.

CHAPTER 2 POWER SUPPLY REQUIREMENTS

Unpacking

Important Information

All shipping cartons should be opened carefully. When using a box cutter, do not plunge the blade deeply into the box, as it could potentially cut or scratch equipment components. Carefully remove equipment from each carton, checking it against the packing list before discarding any packing material. If there is any shortage or obvious shipping damage to the equipment, report it immediately to Pulsar Measurement.

Power Supply Requirements

The FarSight can operate from a DC supply of 10 to 28V DC. In all cases the unit typically draws 0.42W.

Cable Screen and Earth Requirements

The FarSight cable supplied is a 5-core (individual core 2.5mm^2) overall screened cable. Various cable lengths are available, please contact Pulsar Measurement for the cable lengths available.
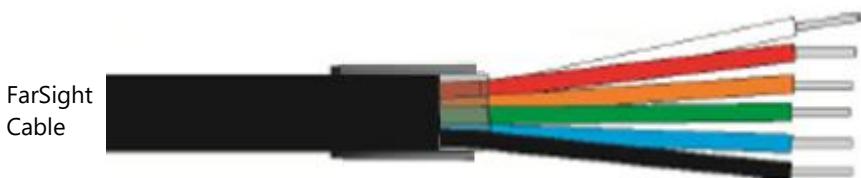
FarSight
Cable

Important Information

All electronic products are susceptible to electrostatic shock, so follow proper grounding procedures during installation.

Location

When choosing a location to mount the bracket and FarSight, note the following:

- For optimum readings, it is recommended that the FarSight should be positioned at an angle between 30° and 50° (45° being optimum) to the surface of the material being measured.
- The mounting surface must be vibration-free.
- The ambient temperature should be between -40ºC and 80ºC.
- Ensure that the Pulsar Measurement Controller is installed in a "Safe", non-hazardous, area.

Mounting

For the best results, it is highly recommended to use the FarSight angled bracket, which is available from your Pulsar Measurement distributor, which will ensure that the FarSight can be correctly installed. The bracket can be used if the FarSight sensor is to be mounted on its own in a specific location or along with a Pulsar Measurement dB transducer. Please see '**Angled Mounting Bracket**' for dimensions of this bracket, please note that the drawing is not to scale.

'**Mounting sensor to a bracket**' illustrates how you would install the sensor to one of Pulsar Measurement's angled brackets.

The bracket has 4 holes allowing mounting to a vertical surface by using suitable fixings, or to a pole by using U-bolts.

Angled Mounting Bracket

Part number: dBA0008MF

176mm

65mm

25mm

45°

Side view

R20mm

Ø 22mm

Ø 22mm

100mm

12mm

90mm

130mm

Top view

R20mm

4 off Ø 12mm
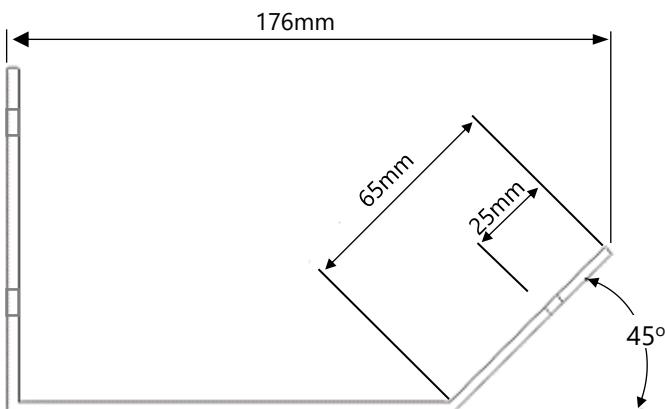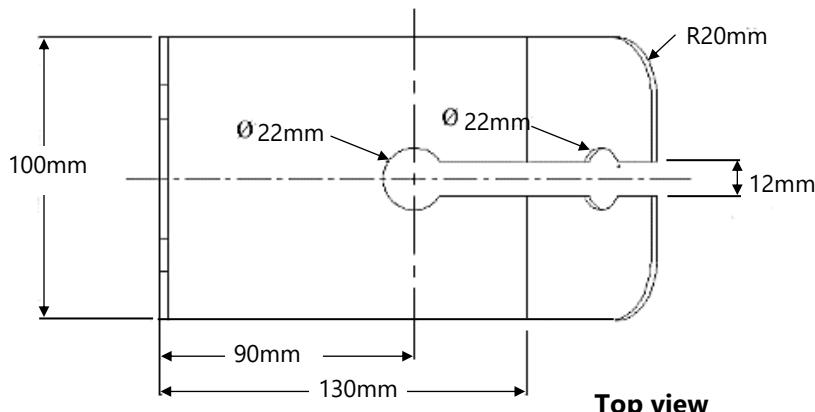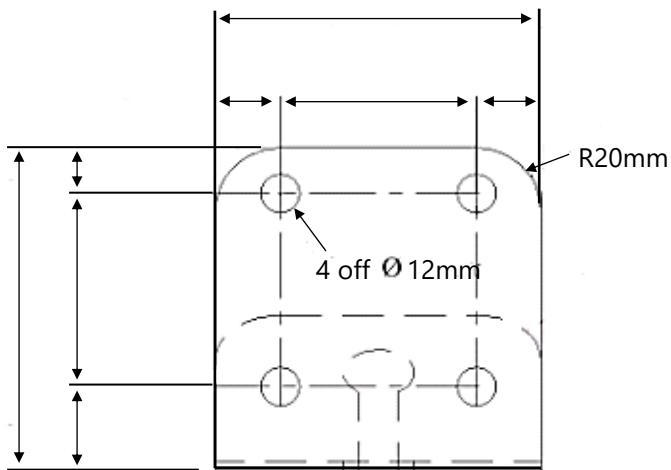
Important Information

Using a spirit level, ensure that the Mounting Bracket is level **before** attaching the sensor to the bracket.

FarSight Sensor

The dimensions of the sensor body are shown in the below diagram:

105mm (4.13")

1" BSP or NPT

194mm (7.64")

70mm (2.76")

BOTTOM

120mm (4.72")

30 -50°

Surface of measurement
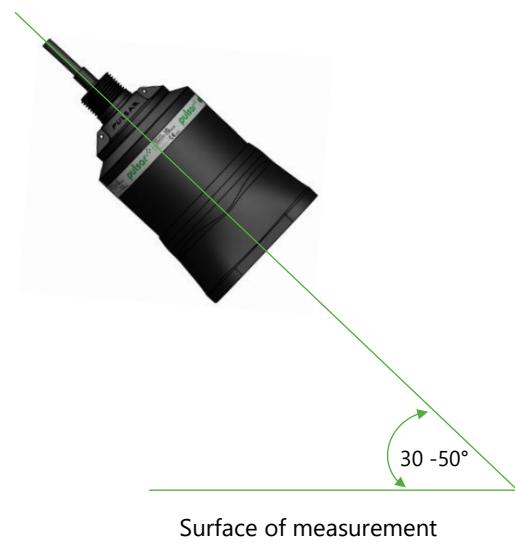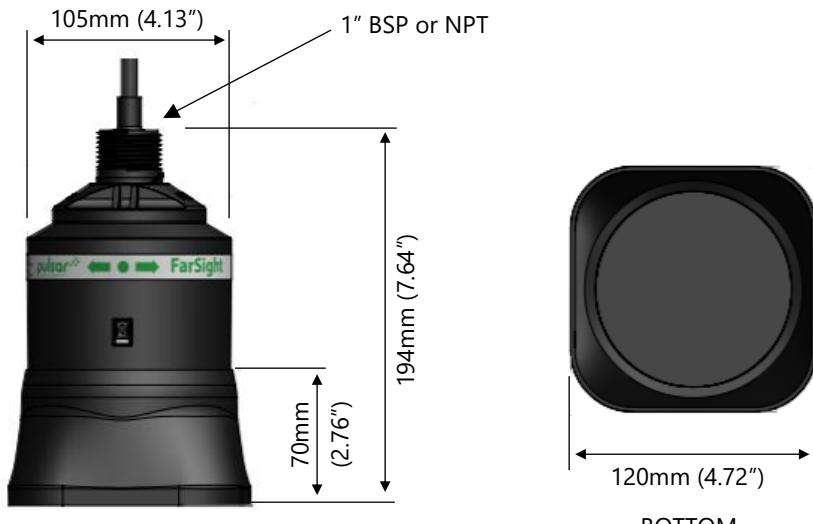
Mounting Sensor to a Bracket

Mounting the sensor to a Pulsar Measurement 45° bracket (or optional variable angled bracket) is done via an adapter and M20 nut, as shown in the diagram below (Pulsar Measurement 45° angled bracket used in example):
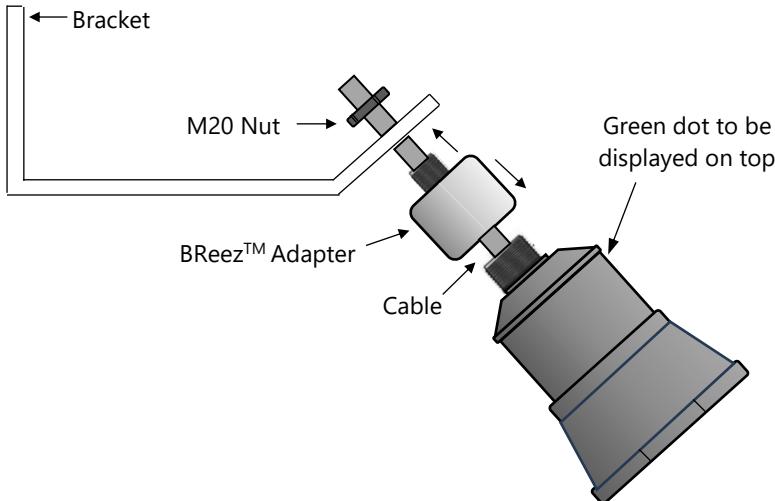
For correct installation, we recommend that the adapter or BReez™ is threaded on the cable, and carefully screwed onto the FarSight before fitting to the bracket. This will reduce the risk of any 'twisting' in the cable.

Ensure that the sensor is tightened, and the dot is in the correct position.

Important Information

When fixing the sensor to the adapter, ensure that care is taken when pulling the sensor cable through. And once attached to the adapter, and the M20 nut is tightened, the green dot should be central to the movement of flow as shown in Fig.4.

Central to the movement of flow in channel.

Important Information

Care should be taken not to overtighten the sensor when everything is connected, as seen in the diagram below, as this could cause damage to the housing.

340mm (13.39")

225mm (10.04")

205mm (8.07")
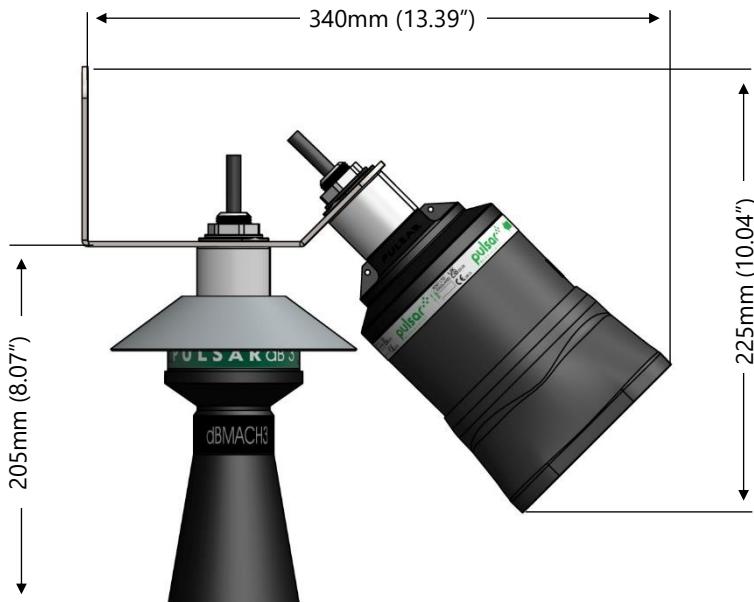
When the FarSight is mounted on the bracket with dB series level transducer, the level measurement is made directly below the sensor where the velocity measurement is taken from the water surface in view of the FarSight. As these are different locations, it is important to have a uniform channel shape when measuring flow via the Area*Velocity method.

Ideal installation for the FarSight would be when it has been installed to monitor the flow moving towards the sensor. By default, FarSight reports a positive reading when installed in this position.

Green dot to be displayed on top
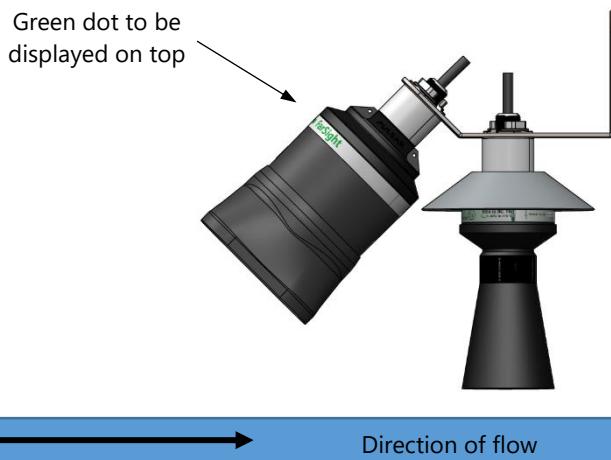
Direction of flow

For this installation method, please set P44 to 1 (Away)

Green dot to be
displayed on top
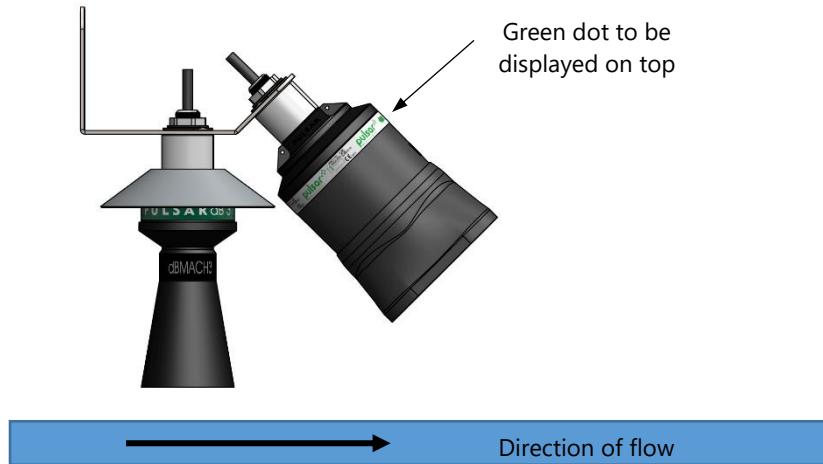
Direction of flow

By setting P44 to 1, this allows the sensor to output a positive flow reading
when the direction of flow is away from the FarSight.

Terminal Connection Details

Power

The FarSight operates from a DC voltage supply of 10-28 volts and should be installed and connected in accordance with '**Chapter 2–Power supply requirements**' and the instructions below. When wiring the FarSight the cable used is of a multicore design. The wire coding is shown below for ease of use when connecting the FarSight to a device to monitor flow velocity:

FarSight Cable

CABLE COLOUR	CABLE DETAILS
Red	(Power) +10-28 VDC
Black	0 Volts
Orange	RS485 +
White	RS485 -
Blue	RS485 Common
Green	Cable Screen

The FarSight can be used with the following Pulsar Measurement controllers to obtain flow and velocity readings:

- FlowCERT
- Velocity Interface
- Ultimate Controller.

You can also use the Pulsar Measurement MicroFlow PC software to interrogate and view/record readings from the device. Please refer to **Chapter 6 Microflow PC** Software for more details on how to use it. The RS485 termination is electronically controlled by parameter 57 (P57). Please refer to '**Chapter 7 Parameter Listing and Descriptions** - **RS485 Communications and Modbus**'.

> **Important Information**
>
> Power to the controller should be disconnected until the FarSight is connected correctly. If the equipment is installed or used in a manner not specified in this manual, then the protection provided by the equipment may be impaired.

FlowCERT

The terminal strip is as detailed below. There is also a wiring diagram inside the terminal access cover of the FlowCERT unit. For further information on how to operate a FlowCERT unit, please refer to the separate FlowCERT user manual. To set up a FarSight sensor with the FlowCERT please refer to **Chapter 5 – Setting up the FarSight** of this manual. The FlowCERT manual is also available for download from the Pulsar Measurement website: https://pulsarmeasurement.com/
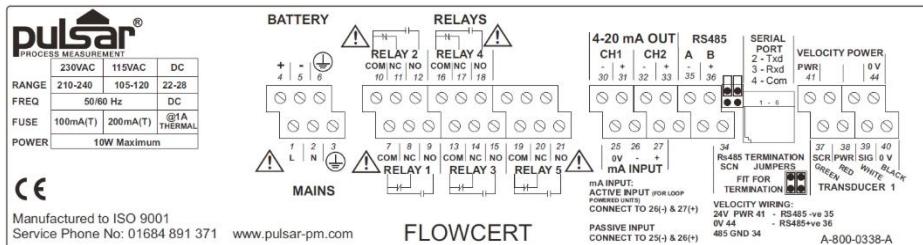
Connect the FarSight sensor to the FlowCERT terminals as follows:

| TERMINAL CONNECTION DETAILS					
Cable Type	Red Power	Black 0 Volts	Orange RS485+ (B)	White RS485- (A)	Blue RS485 Common
Terminal Number	41	44	36	35	34

The green cable (cable screen) should be connected to Earth such as terminal 44 (0V).

Velocity Interface

The Terminal strip is detailed as below. There is also a wiring diagram attached to the board directly underneath the terminal strip. For further information on how to setup a Velocity Interface unit, please refer to the Velocity Interface user manual.

To set up a FarSight sensor with the Velocity Interface please refer to **Chapter 5 – Setting up the FarSight** of this manual. The Velocity Interface manual is also available for download from the Pulsar Measurement website:

https://pulsarmeasurement.com/
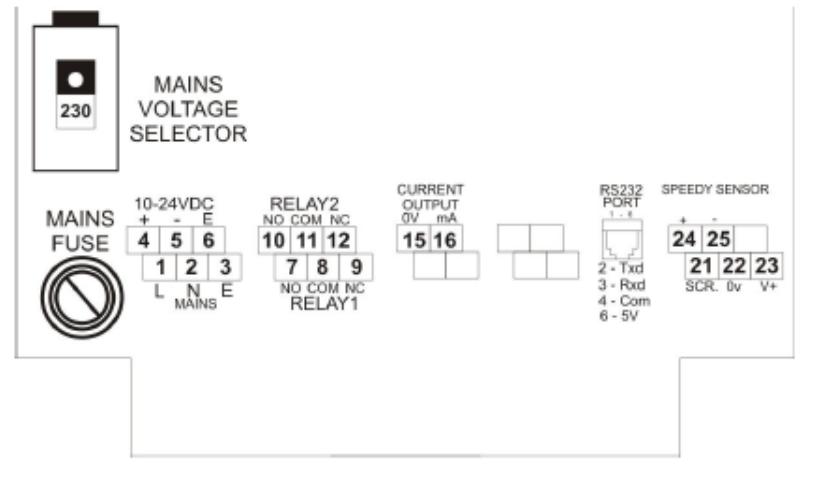
Connect the FarSight sensor to the Velocity Interface terminals as follows:

TERMINAL CONNECTION DETAILS					
Cable Type	Red Power	Black 0 Volts	Orange RS485+ (B)	White RS485- (A)	Blue RS485 Common
Terminal Number	23	22	24	25	21

The green cable (cable screen) should be connected to Earth such as terminal 44 (0V).

> **Important Information**
>
> If you require help in connecting the FarSight to any of the Pulsar Measurement controllers mentioned in this manual, then please contact your local Pulsar Measurement Distributor for assistance.

Ultimate Controller

The Terminal strip for both Wall and Fascia Mount is detailed as below. For further information on how to setup an Ultimate Controller unit, please refer to the Ultimate Controller user manual. To set up a FarSight sensor with the Ultimate Controller please refer to **Chapter 5 – Setting up the FarSight**. The Ultimate Controller manual is also available for download from the Pulsar Measurement website:

https://pulsarmeasurement.com/
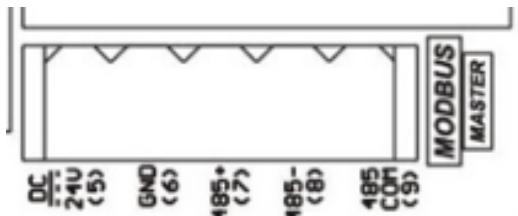
Connect the FarSight sensor to the Ultimate terminals as follows:

TERMINAL CONNECTION DETAILS					
Cable Type	Red Power	Black 0 Volts	Orange RS485+ (B)	White RS485- (A)	Blue RS485 Common
Terminal Number	5	6	7	8	9

The green cable (cable screen) should be connected to Earth such as terminal 44 (0V).

Important Information

If you require help in connecting the FarSight to any of the Pulsar Measurement controllers mentioned in this manual, then please contact your local Pulsar Measurement Distributor for assistance.

CHAPTER 3 LOCATING THE FARSIGHT

For optimum accuracy install the FarSight where the flow is not turbulent, and the flow direction is towards the sensor. An ideal location for the sensor is in the centre of a long straight channel. Vertical drops, baffles, curves, or junctions can cause the velocity profile to be distorted.

The FarSight sensor requires surface ripples to be present to provide a reliable measurement. If there are no surface ripples within the sensors field of view under any flow conditions, an alternative measurement point should be found, or ripples created.

Locating the FarSight
- If the width of the channel exceeds 3m. Multiple FarSight sensors are recommended to be used in conjunction with the Ultimate Controller.
- Ensure that there is an unobstructed path between the sensor and the surface of the moving liquid being measured.
- Position the sensor at a height of 1m above maximum liquid level or up to two times the channel width from the minimum liquid level, whichever is greater. As shown below:
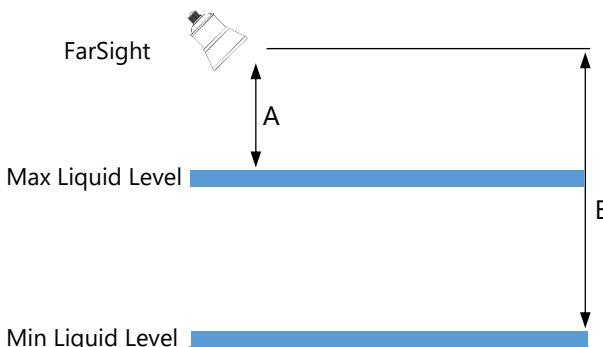
- A = Minimum 0.5m above Maximum Liquid level.
- B = Maximum 15m above Minimum Liquid Level.

In applications where the liquid surface has strong ripples/surface distortion, operating at vertical distance of less than 0.5 m may result in a reduction of measurement repeatability

Important Information

If the maximum width of the channel exceeds 3m, you may require more than one FarSight sensor for your application, please consult Pulsar Measurement for assistance.

In the instance where there are vertical drops, baffles, curves, or junctions, the sensor should then be positioned to aim at a straight part of the channel, at a minimum distance that is at least five times the width of the channel before a bend. Examples of positioning the sensor are shown in the below diagrams.

Diagram 1

Distance

Distance

Distance

Distance
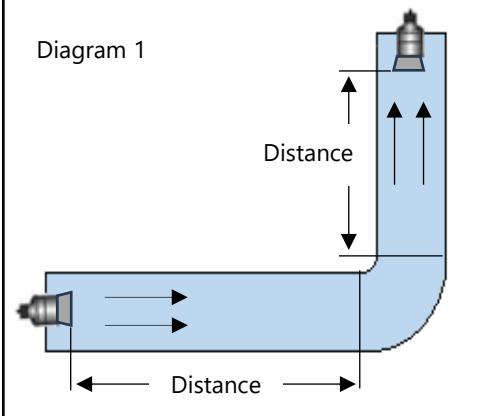
Diagram 2
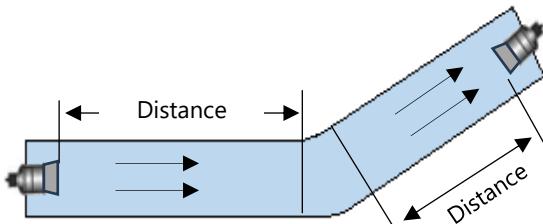
Installing the Sensor

- The Sensor housing is designed to accept a 1-inch BSP/NPT female threaded coupler for pipe or conduit.

- Ensure that the sensor is positioned at an angle between 30 - 50° to the surface of the measured application, as this will achieve the best results. An example of this is shown in the diagram below:

Green dot to be displayed on top

30-50°

Surface of measurement
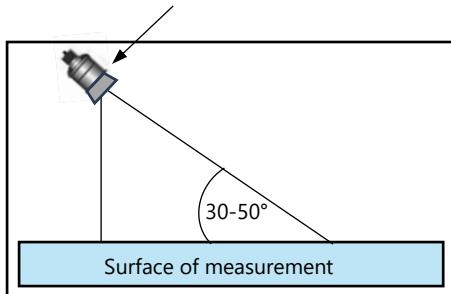
- When using one of the Pulsar Measurement Angled Mounting Brackets, secure the bracket using the correct size screws/bolts/U-bolts (12mm diameter thread).

- Fasten the Breez™ adaptor to the FarSight and then fix the 20mm thread of the Breez™ to the bracket with the slotted nut. **CAUTION: Extreme over-tightening may crack or cause damage to the unit or bracket.**

- Position the sensor so the green 'dot' that is shown on the label between the two green arrows is on the top of the device and is central to the movement of flow in the channel.

- If desired, the sensor cable may be extended up to a maximum of 500m. Install the sensor cables in grounded metal conduit. Do not run-in cable trays or duct banks with variable frequency drives or other high voltage sources.

- When connecting multiple FarSight sensors for use with the Ultimate controller. Ensure that all wiring in any junction /connector box is correct.

- The sensor can be positioned to obtain readings following the direction of the flow. Or it can be positioned to measure the oncoming flow as seen below:
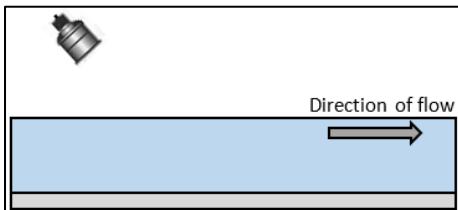
FarSight obtaining readings following the direction of the flow.
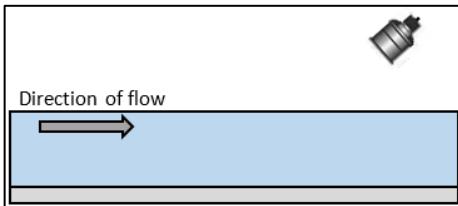
FarSight obtaining readings from the oncoming direction of the flow (default).

Preparation for Operation

Before switching on, ensure that the following is checked:

- ✓ FarSight is mounted correctly and is secure.
- ✓ All wiring is correct to a Pulsar Measurement controller.
- ✓ The power supply is correctly installed.

General Maintenance

There are no user serviceable parts inside FarSight. If you experience any problems with the unit, then please contact Pulsar Measurement for advice.

To clean the equipment, wipe with a damp cloth. Do not use any solvents on the enclosure.

Important Information
Care should be taken to not damage the device when removing and cleaning.

CHAPTER 4 UNDERSTANDING HOW THE FARSIGHT WORKS

To set up and obtain flow readings using the FarSight, it is advised to do this using a Pulsar Measurement controller.

Measuring streamflow / open channel flow

The calculation of flow using Area x Velocity is only possible when the FarSight sensor is used as part of an integrated system with either FlowCERT or Ultimate Controllers.

The calculation for the determination of discharge/flow in open channels consists of different factors:

- Velocity of the liquid in the channel.
- Depth of the liquid in the channel.
- Cross sectional channel dimensions.

The flow is then calculated using the formula $Q = V \times A(h)$

Where: Q   = Flow rate
V   = Velocity
A(h)   = Area at head

Once the controller and the FarSight have been powered up, you can now begin to program the controller to work effectively with the FarSight device.

On the Velocity Interface and the FlowCERT, the display provides different levels of runtime information and a simple, progressive menu system in program mode.

On the Ultimate Controller you can allocate up to 2 AUX displays to show different levels of run time information.

FarSight Protocol

The FarSight uses a unique protocol to Pulsar Measurement's non-contacting velocity sensors, which enables it to automatically work with the Baud rate of any appropriate Pulsar Measurement controller that it is connected to.

To enable the FarSight protocol to work successfully, please ensure that the controller's power is disconnected when connecting or disconnecting the sensor.

Once the sensor is connected to the controller and power is restored to the device, after a short period of time, the FarSight will automatically detect and adjust its protocol and Baud rate to match that of the appropriate Pulsar Measurement controller.

CHAPTER 5 SETTING UP THE FARSIGHT

This chapter explains the quickest way in which to get your FarSight sensor working with the Pulsar Measurement controllers that the sensor operates with.

FlowCERT Setup

1. Install and connect your FlowCERT controller as outlined in the FlowCERT user manual.
2. Install and connect your FarSight sensor to the FlowCERT as described in **Chapter 2 - FlowCERT Wall Mount** of this manual.
3. Power up the unit and enter program mode by keying in '**1997**' and pressing Enter to set-up an application for 'area velocity'. This can be done by choosing option 4 in Quick set-up or directly changing **P700 to 4** = '**Area velocity**'.
4. Continuing with the Quick setup, you now need to select the Primary Measuring Device (PMD) for your application from the options displayed on screen.
5. Once you have selected your application you will then be asked a series of questions, which are answered by selecting the appropriate option you require. For further information on the Quick set-up of a FlowCERT please refer to **Chapter 6 Quick Set-up Guide** in the FlowCERT user manual.
6. Once you have selected area velocity, set **P130** '**Device Mode**' to **2** = '**Speedy**' ('**Velocity**' in Ultra firmware versions 7.4.4 and onwards) to enable the velocity parameters.
7. To change the maximum flow velocity of your application you will need to set **P683** '**Maximum flow velocity**' to the desired value (in m/s)
8. To change the minimum flow velocity of your application you will need to set **P682** '**Minimum flow velocity**' to the desired value (in m/s)
9. All other velocity parameters can be left at their default values or can be adjusted to suit the application, i.e., 'P688 Gain' and 'P684 Damping' can be altered to the value range outlined in **Chapter 7 – Parameter Listing and Descriptions** of this manual.
10. When a level transducer is also connected, to view the instantaneous flow velocity measurement on the auxiliary display of the FlowCERT, **P815** '**Auxiliary Source**' should be set to **1** = **Velocity**.

The auxiliary display will then alternate between displaying the flow units and the current flow velocity. Please note that the instantaneous flow velocity cannot be displayed in the auxiliary display when the re-settable totaliser is selected.

11. If no further changes are required, return to run mode and after a short time the flow readings from the FarSight will be displayed on the FlowCERT screen.

Velocity Interface setup

1. Install and connect your Velocity Interface controller as outlined in the Velocity Interface user manual.

2. Install and connect your FarSight sensor to the Velocity Interface as shown in **Chapter 2 - Velocity Interface** of this manual.

3. Power up the unit and enter program mode by keying in '**1997**' and pressing Enter to begin setting up the unit for measurement.

4. If you wish to change or view the velocity measurement units, set **P130** '**Measurement units**' to the selection of your choice from the options given in the parameter list shown on the screen.

5. To change the maximum flow velocity of your application you will need to set **P683** '**Maximum flow velocity**' to the desired value (in m/s).

6. To change the minimum flow velocity of your application you will need to set **P682** '**Minimum flow velocity**' to the desired value (in m/s).

7. To change the velocity at which the high mA output (20mA) will occur, you will need to set **P835** '**Output High Level**' to the value you require in measurement units (**P104**).

8. All other parameters can be left at their default values, or adjusted to suit the application, i.e., '**P688 Gain**' and '**P684 Damping**' can be altered to the value range outlined in **Chapter 7 – Parameter Listing and Description** of this manual. For further information on the full parameter listing of a Velocity Interface, please refer to Chapter 5 - Parameter Guide in the Velocity Interface user manual.

9. If no further changes are required, return to run mode and after a short period of time, velocity, and mA readings from the FarSight will appear on the Velocity Interface's screen.

Ultimate Controller Fascia and Wall Mount setup

1. Install and connect your Ultimate Controller as outlined in the Ultimate Controller user manual.
2. Prior to installing and connecting your FarSight sensor to the Ultimate, you will need to set the sensors unique Modbus address by using FarSight PC. This is done by changing the Modbus ID value, which can be done by the Modbus ID box in the software or using the manual parameter box and change P52 to between 2 & 125 (Ensure multiple sensors have different addresses). For further details on changing parameters and using FarSight PC, please refer to **Chapter 6 – Microflow/FarSight PC** where details of how to use the software is explained.
3. Once a Modbus address is set, install, and connect your FarSight sensor to the Ultimate Controller as shown in **Chapter 2 – Installation – Ultimate Controller (Fascia** & **Wall Mount)** of this manual.
4. Power up the unit and enter program mode by pressing 'Menu' and keying in '**1997**' and pressing Enter to begin setting up the unit for measurement.
5. Select **Advanced Config.** > **Live List**, where the controller will now search for the Modbus ID of the FarSight unit(s) that have been connected.
6. In **Advanced Config.** > **Modules**, Select the amount of FarSight sensors and press the '<' button so that they appear in the '**Added**' column. Now select each MFL (FarSight) and select '**Edit**' to change the Modbus ID to what has already been set and discovered in the **Live List**. The controller will now reboot.
7. Re-enter program mode by pressing 'Menu' and keying in '**1997**'.
8. Select '**Setup** > **Application** > **Operation**' and press the '+' button to add a point of measurement, which you can rename to something of your choice.
9. Select '**Velocity**' where you will now be able to select the FarSight as a velocity measurement point.
10. Select '**Single**' when only using one sensor to obtain velocity measurements.

11. If more than one sensor is to be setup for different channels, then repeat '**step 8** and **9'** in these instructions. If multiple sensors are to be used on one channel, please select the appropriate sensors from the list on screen. You can now select '**Avg, Diff, or Sum**' as a mode of operation.

12. If no further changes are needed, you can exit the screen and save your changes.

13. Return to the '**Main menu**' and select '**Sensors** > MicroFlow' and enter the maximum velocity in m/s and adjust any other settings that are required.

14. Touching the FarSight picture will allow you to access the sensors trace screen. Here you can see the velocity (m/s), signal strength and confidence of the current reading obtained.

15. Return to the '**Main menu**' and select '**OCM**'.

16. In '**PMD Type**' select Area Velocity.

17. Below you will need to select from the options available, in **Primary PMD** choose the type of measuring device from the list available.

18. In '**Allocation**', select the point of level measurement that your transducer has been assigned to.

19. On the image of the channel/measuring device, insert the dimensions as required in measurement units.

20. Select the drop-down box '**Vel.Input**' and select the point of measurement that your FarSight has been assigned to.

21. If all other measurements have been applied, then a value will now appear in '**Max.Flow**'.

22. If no other changes are required, then exit the OCM (Open Channel Flow Measurement) setup and Save changes made.

23. To view the velocity obtained from the FarSight(s) on the main display in run mode, please continue to follow these instructions. If you do not require to view this information, and you have finished setting up your Ultimate then return to run mode.

24. To view the velocity and flow information obtained from your OCM application in run mode, from the '**Main menu**' select '**Display** > **Source**'. From the options available and select '**OCM Flow**'.

25. If no further programming is required exit the screen and save the changes made. Returning to run mode you will now see an image of your PMD and a FarSight symbol appear on the main display.

26. Once velocity and flow are obtained, this information will appear on the screen. Flow will appear in **measurement units** and will appear as the main value, and velocity values will appear in the green boxes under the FarSight symbol and above your PMD.

27. To view the information from your velocity measurement, point in an auxiliary display, select '**Display – Aux**', and in '**Source**' from the selection available, choose the point of measurement that the FarSight(s) are assigned to.

28. Exit the screen and save changes made and return to run mode if no further programming is required.

29. Once velocity is detected then this information can be viewed in the auxiliary display.

Important Information

For further information on how to set up the individual controllers, please refer to that controller's instruction manual. All of Pulsar's product manuals are available from the Pulsar Measurement website:
https://pulsarmeasurement.com/downloads

CHAPTER 6 MICROFLOW PC

The software that accompanies the FarSight can be used to setup, test, obtain and record readings from a sensor. To utilise the features of the software, an RS485 connector, which is available from Pulsar Measurement (as shown below), is required to communicate between the sensor and your machine.

If a Pulsar Measurement controller is installed, common setup parameters can be programmed directly from the controller, such as 'Gain' and 'Damping'.   This chapter outlines how to install the software onto your machine and how to use it with your FarSight.

Software installation

Insert the USB that accompanies the FarSight sensor into your PC/Laptop. If you do not have a USB on your laptop, then this software can be downloaded from the Pulsar Measurement website: https://pulsarmeasurement.com/downloads and choose Software and select to download Microflow PC from the list which will then be downloaded onto your machine. When setting up the RS485 connector for the first use, the necessary drivers for it to operate correctly with your OS will be installed from your installation of the MicroFlow PC software from the USB accompanying the sensor, or the software can be downloaded from our website for free. Once downloaded, a shortcut icon will be created onto your Desktop for ease of use. Double click on this icon to launch the program.

For optimum installation insert your RS485 connector to your PC whilst installing the drivers, where your PC should assign it to a Com Port.
Or if you have an internet connection, upon inserting the USB of the RS485 connector for the first time, Windows updates should install this onto your computer for you. Once the driver's installation has completed, remove the RS485 connector from your machine. Your RS485 connector is ready to be used when a connection to MicroFlow/FarSight PC is required.

Using MicroFlow/FarSight PC

To connect to the software using the RS485 connector, power to the sensor can be obtained from the compatible Pulsar Measurement controller is connected to.

Important Information

Ensure that power to the controller/sensor is switched 'OFF' before removing cables and any connection is made.

With the two FarSight RS485 cables removed, connect the **Red** wire with the **Red** crocodile clip on the connector, to the **Orange** (RS485+) wire of the FarSight. And connect the **Blue** wire with the **Black** crocodile clip on the connector to the **White** (RS485-) wire of the FarSight, as shown below:
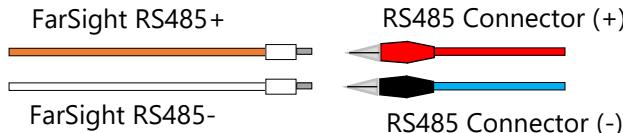
Once the sensor is connected to the RS485 connector, insert it into the PC/laptop ready for use, and ensure that your sensor is switched 'ON' to enable the software to communicate with the sensor.

If you know the Com port that the RS485 connector is assigned to, please select **Setup** > **Serial Port** to enter the Com port number to the device. Once you have selected the correct Com port number, selecting 'Connect to device' will allow the software to connect to the RS485 connector Com port. If the Com port number was not known, unchecking **Use Setting** under **Serial port** will search for and connect to it automatically.

After launching the program and connecting to FarSight, the application name will change to **FarSight PC**. The device parameters will be automatically extracted once a connection is established. Once connected you can now view the information received from the sensor on the Software's individual tabs: **Flow**, **Flow Record**, **Trace** and **Parameters**.

Flow Tab
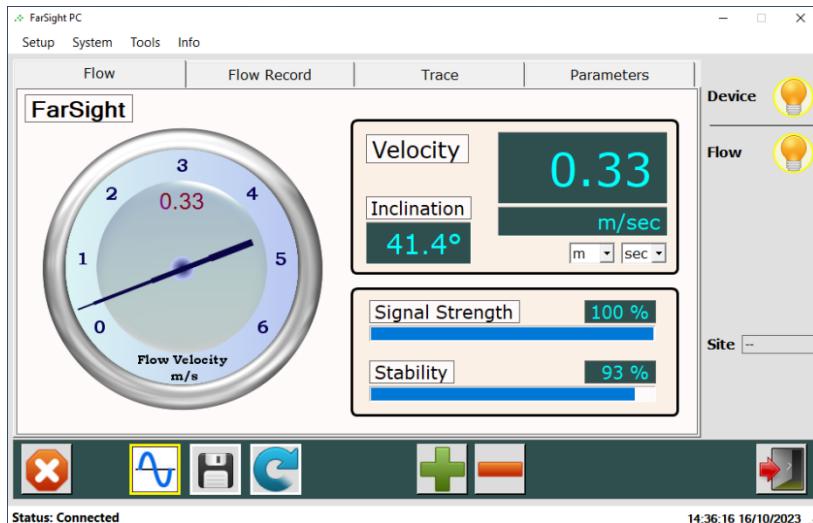
The above picture is the default screen of FarSight PC, which is the Flow tab. The dial on the left displays the reported flow velocity (up to 6m/s), which is in metres per second. The numerical display near the Velocity label shows the Reported velocity flow rate (in bi-directional mode the velocity moving away from the sensor will be indicated as a negative value) in different volume and time units. The values displayed on the right also appear on the PC software's other tabs to help diagnose the information seen on the individual tabs. Below the Reported Velocity, there are two dropdown boxes where you can adjust the values to read different measurement units and/or time units. Measurement units can be changed to either metres, millimetres, or feet. The time units can be changed to seconds, minutes, or hours. The default for distance and time units is **m/s**. Provided below are the various options shown under the Flow tab:

Velocity (Reported Flow Velocity)

The reported flow velocity is the flow reading reported by FarSight displayed in the larger numerical box near the Velocity label. It can show positive or negative flow value depending on the selected direction for reported flow. Refer "**Chapter 7 - Configuration parameters**" for more information.

Inclination

This indicates the angle (with the horizontal axis) at which the FarSight is mounted.

Signal Strength

The signal strength gives an indication of the actual strength of the velocity signal detected. A level of higher than 70% is desired for reliable operation.

Stability

The stability level is an indication of the consistency of flow reading, as derived from the combination of signal strength and statistical fluctuations of the flow reading. A high level of stability would indicate optimum condition, and relatively healthy flow within the channel and indicate higher levels of repeatability and better flow tracking. The stability does not necessarily indicate the accuracy of the flow reading, as this is subject to calibration.

ICON	DETAILS
✔	**Connect:** Click to connect to the FarSight device. • If known, set the serial port (Setup > Serial Port) for your RS485 connector. Otherwise, the software will search for and connect to it automatically. • The FarSight is interfaced using Modbus via the RS485 terminals. The default Modbus Slave ID is 126.
✖	**Disconnect:** This appears after a connection is established. Click this icon to disconnect from the FarSight.
∿	**Diagnostic Trace:** Requests for a diagnostic trace to be taken. • When activated, this icon border will light up yellow and 'live' traces can be observed on the 'Trace' tab. Click again to deactivate.
💾💾	**Save Data to File:** Click to record data from the FarSight device. When activated, this icon will light up yellow, clicking again will deactivate the feature. • To record diagnostic traces along with the flow data, please ensure that the trace icon is active and live traces are shown on the trace tab and a site ID has been entered. • The recording interval is set via the *Setup>Recording Interval* menu. The default is one record in every 2 seconds. • Files are automatically named with "FarSight…" prefix followed by the site name (empty if no site name is specified), current date & time stamp. Example: FarSight-PULMALVERN-20-01-2015-08-30-00.MLG. • If recording over a long duration, a new file will be automatically generated after 30 minutes. • The recorded data files are stored in the FarSight PC installation folder by default. • When recording is active, click on the icon again to stop.

ICON	DETAILS
	Replay Recorded Data: Click to replay recorded data. This can be performed without a connection to a FarSight sensor. • The program will disconnect from a sensor during replay. • A prompt will appear for choosing the data files to play. • Select the data files to replay, ensure that on FarSight PC recorded data files are selected. • To replay more than one file, select multiple files by holding down the 'CTRL' key on the keyboard while clicking additional files. • Recorded traces are shown in the Trace tab and the recorded flow is shown in the Flow tab. • During replay, click on the icon again to stop.
	Increase Replay Speed: During replay mode, clicking this icon will increase the replay speed. A prompt will appear when the maximum replay speed has been reached.
	Decrease Replay Speed: During replay mode, clicking this icon will decrease the replay speed. A prompt will appear when the minimum replay speed has been reached.
	Exit: Click on this icon to exit the program.

Setup Menu

This menu option enables you to perform the following actions:

Clear Flow Record

This option allows you to clear the Flow Record chart that has been obtained from the sensor since its connection.

Recording Interval

This controls the time interval before a new flow record and trace is saved to file when the save-to-feature is in use.

Serial Port

This allows you to setup the RS485 port. The default setting when interfacing with the software is 19200 Baud rate, 8 bits, No Parity, 1 Stop bit. There is normally no requirement to change the default parameters, as the COM port number is automatically detected.

Work Folder

Allows you to select the default folder for where the data files are to be saved to.

System menu

This menu provides the options to perform the following actions:

Save Device Parameters

Extract parameters are configured on the sensor and save them to PC as a parameter file. This will be saved to FarSight PC installation folder and prefixed with 'ParamFarSight'.

Load Parameters to Device

Load the parameters from a saved parameter file onto the FarSight sensor. This should only be used with a file prefixed with 'ParamFarSight'.

*Bootloader Control

This launches the Bootloader PC program, allowing you to upgrade the firmware on the FarSight sensor. Any customised parameters will be erased during a firmware upgrade, it is recommended to save parameters before performing an upgrade.

Switch Device into Bootloader

Resets the FarSight into Bootloader mode. The Bootloader PC program must be used to connect to the sensor in this mode. The FarSight will resume normal operation if no connection is established after approximately 30 seconds.

Parameter Factory Reset

This resets all the sensor's parameters to their factory default values.

> **Important Information**
>
> *These options are only available via service code access. If you require help in connecting the FarSight then please contact your local Pulsar Measurement Distributor for assistance.

Tools menu

This menu option allows you to choose the following options:

Export data to CSV

This allows you to export a saved data file (. MLG only) into CSV format. And once opened in Excel, the information recorded in this file can be viewed and each section is labelled at the top of the row: **Date**, **Time**, **Flow velocity (m/s)**, **Signal Strength** and **Stability**. This information from the FarSight could then be placed into a chart/graph format.

Chart Data file

This opens the directory folder on your computer where FarSight data is currently stored.

Info menu

Selecting this will allow you to view the following information:

FarSight PC

This displays information showing the version of software currently being used.

FarSight Device

When connected to a FarSight sensor the information regarding the firmware, hardware and the serial number of the device currently connected are displayed here.

Data Folder Path

This shows where all data files are currently stored when saved to your machine.

Flow Record Tab

The flow record provides a record of the Reported Flow over time. Each point on the graph represents a 1.2 second interval. However, when the trace button has been pressed and a trace is being retrieved from the sensor, this slows down and a point on the graph now represents a 2 second interval.
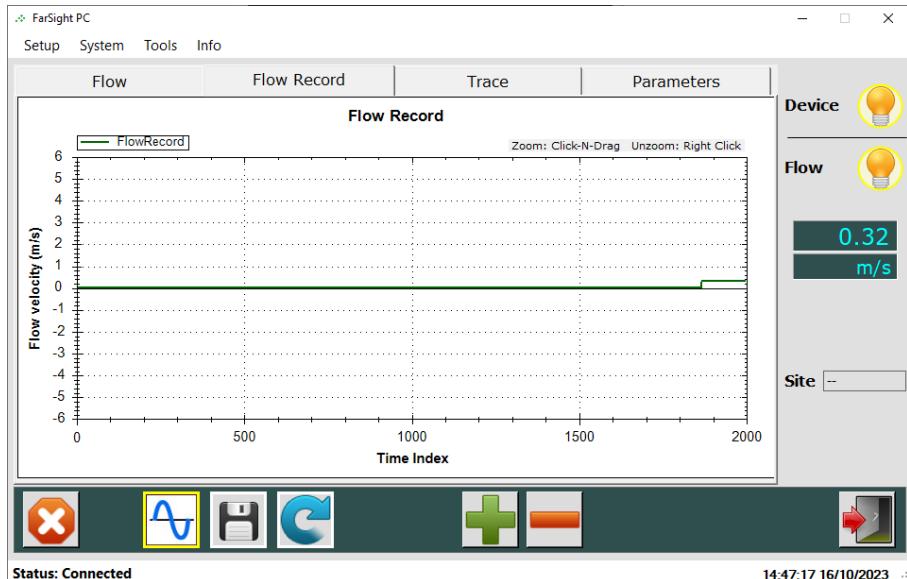
You can zoom in by clicking and holding the mouse to draw a box over the region to zoom in on. Zooming out can be done by right clicking on the chart and selecting "Undo All Zoom".

To clear the Flow Record chart, select Setup > Clear Flow Record Chart, while the chart is inactive.

Important Information

When the save data to file function is being used, flow information and traces will be written to file, at the fixed interval selected via 'Setup > Recording Interval'. See '**Recording Interval**' in the '**Using FarSight PC**' section of this manual.

Trace Tab
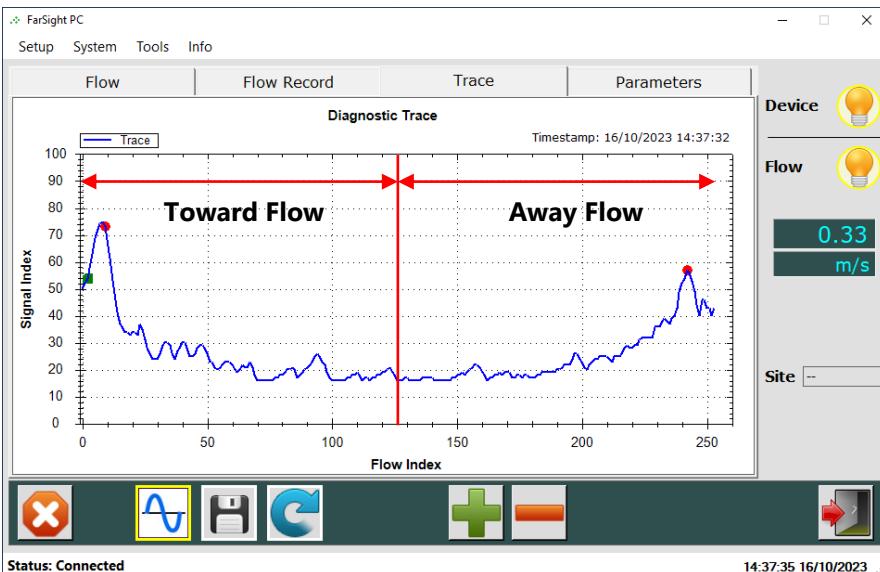
This displays the diagnostic traces from the sensor when the trace button is activated or when replaying a saved file. The vertical axis is related to the signal strength, while the horizontal axis is related to the detected flow.

Since the trace for FarSight includes bidirectional data, the toward directional trace is from the flow index 0 to 126, whereas the away directional trace is from the flow index 127 to 253.

When a signal is received, the 'green square indicator' will move down from 15 on the vertical axis. The further the 'green square indicator' moves from 15, the larger the strength of the received signal. During flow condition, the 'green square indicator' will normally be within the range of 25 to 80. Under no-flow conditions the 'green square indicator' will remain at 15.

When a flow is detected in the toward direction, the 'red circle indicator' (Toward index) will move horizontally from left to right (0 to 126) to indicate toward flow detection, whereas when a flow is detected in the away direction, the 'red circle indicator' (Away index) will move from right to the left (253 to 127) to indicate away flow detection. Both the 'red circle indicators' should stay at 0 under no-flow conditions and move along the horizontal axis when flow is detected.

Under flow condition, the line should still approach and flatten out at just below the signal index 15 line (By default).

If the trace remains flat or the indicators struggle to remain stable during flow, then increase the 'Gain' (P102) setting.

You are also able to see the current velocity measurement obtained by the sensor in the chosen volume and time units selected.

Parameter Tab
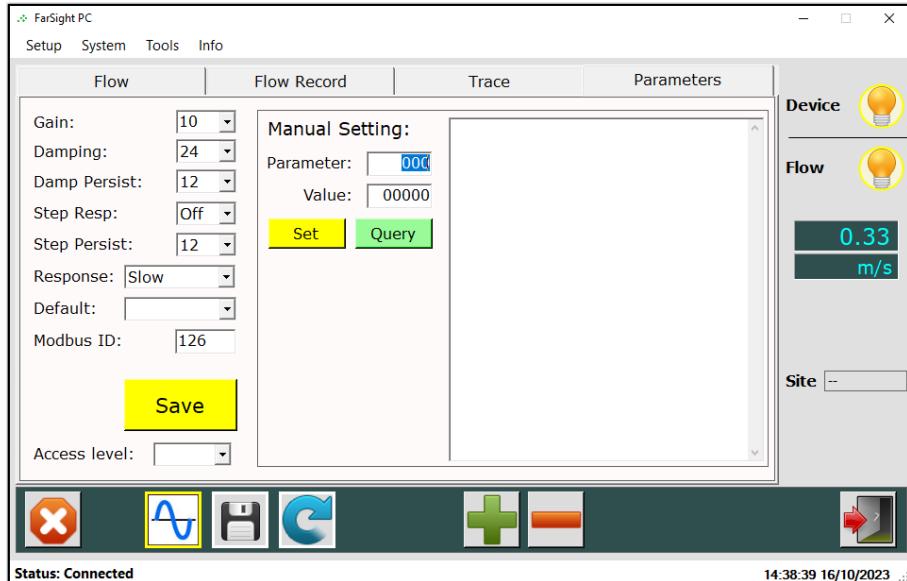
This tab enables the user to change parameter settings in the FarSight sensor. It is important to note the following to ensure that the sensor is correctly programmed.

Upon every connection to the sensor, FarSight PC will synchronise the values on the Parameter tab to that currently stored on the sensor, including the Modbus ID of the sensor. Changing a parameter can be done in one of two ways:

1. Selecting the parameter and then entering/choosing a value from the options available when highlighting the box.
2. Using the Manual Setting parameter box.

> **Important Information**
>
> Ensure that the correct parameter/register number is known before making changes to any of the parameters and their values.

The option for manually setting the parameters can be done by utilising the Manual Setting terminal on the parameters tab, as shown below:
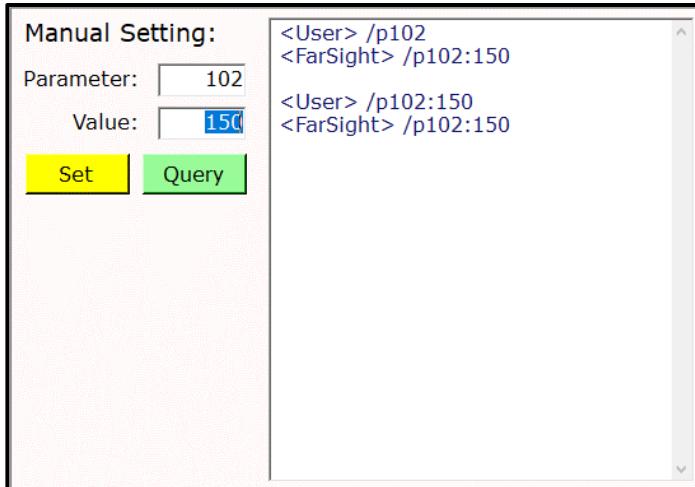
All parameters can be queried by entering the parameter address in the Parameter field and then clicking on the Query button. The FarSight will then reply with the current value of that parameter.

For setting a parameter, both the Address and Value must be entered before clicking on the Set button. 'User' will show the value you have changed in the manual setting box. And 'UI' will appear when changing a parameter via one of the parameter dropdown selection boxes. The appropriate access levels are required for setting parameters. After changing any parameter, the 'SAVE' button must be clicked to send and save the new values to the device. If the change is not successful, then the values that are shown on the Parameter tab will reflect the current parameter value on the sensor.

The values need to be valid and within the allowed range for that parameter change to be successful. Please refer to '**Chapter 7 Parameter listing and Descriptions**' in this manual, on the parameters available and the range each one can be set between. If a parameter has been incorrectly set, highlighting the 'Default' box, and selecting any of the options from the drop-down list will display that parameters default box. This shows the parameter number, its current value, and the default value of that individual parameter. Select 'OK' and then 'SAVE' to store that value.

If the FarSight is being controlled simultaneously on both FarSight PC and RS485 via Modbus interface, the values on the Parameter tab will not be instantly updated on FarSight PC if a parameter change is instructed via the RS485 Modbus.

CHAPTER 7 PARAMETER LISTING AND DESCRIPTION

Parameter Access

All the FarSight sensor parameters have factory default values which the user receives upon first use, or when the sensor is reset. The parameters consist of two main types: Output parameters and Configuration parameters.

Output parameters are read only and cannot be set by the user. Examples are the stability and signal strength. Configuration parameters can be queried and set, there is also an associated access level required for setting, either 'User' or 'Service'. Upon connection to a sensor, the access level is defaulted to 'User'.

The parameters are always stored and entered as whole numbers, please refer to the individual parameter for its individual value range.

The naming syntax for the parameters is with a prefix of 'P' before the address. For example, a parameter at address 102 is "P102". The value/content of the parameter is delimited by a colon ":", such that "P102:20" indicates that the parameter at address 102 has a value of 20.

The terms "parameter" and "register" are used interchangeably as the parameter number is the actual address of the storage register.

The parameters on the FarSight can be accessed using either:

- The parameters tab on FarSight PC.

- Modbus RTU communication protocol (RS485).

It is recommended that only one method of access is used at any point in time.

Output parameters

Using a Modbus Master, output parameters can be polled using Read Input Registers. For example: To view the flow velocity, you would read register (parameter) addresses 30020 and 30021.

Toward Flow Velocity P20 and P21

The current flow velocity in the toward direction (flowing towards the unit) can be read from registers 20 and 21, in the following format:

1.76

Register [20] = 1   Register [21] = 760
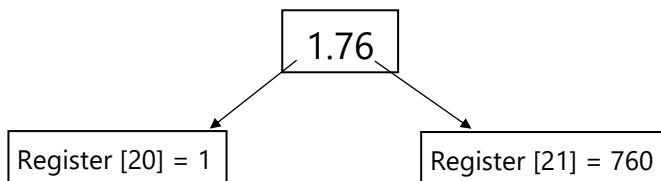
P20 contains the whole number part of the flow reading, while P21 contains the fractional part of the flow reading. P21 is stored as a whole number from 0 – 999 (allowing a fractional representation of 0.001 to 0.999).

Away Flow Velocity P30 and P31

The current flow velocity in the away direction (flowing away from the unit) can be read from registers 30 and 31, in the following format:

0.85

Register [30] = 0   Register [31] = 850
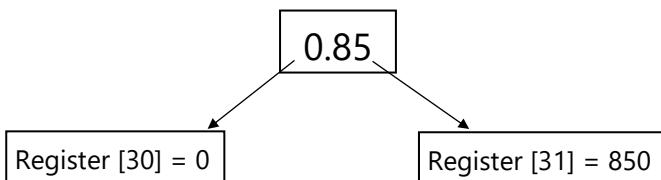
P30 contains the whole number part of the flow reading, while P31 contains the fractional part of the flow reading. P31 is stored as a whole number from 0 – 999 (allowing a fractional representation of 0.001 to 0.999).

P22 Signal Strength

This is a 'read only' parameter and gives you the current signal strength in a percentage, from 1 to 100.

P23 Stability

This is a 'read only' parameter and gives you the current stability in a percentage, from 1 to 100.

Toward Flow Velocity in 32-bit floating point representation P32 and P33

The user can query the toward flow reading in 32-bit floating point representation using Modbus polling (**Not available using FarSight PC**). By default, the value will be in Big Endian format. i.e., 32-bit floating point value AB CD can be queried as P32:AB and P33:CD.

Away Flow Velocity in 32-bit floating point representation P34 and P35

The user can query the away flow reading in 32-bit floating point representation using Modbus polling (**Not available using FarSight PC**). By default, the value will be in Big Endian format. i.e., 32-bit floating point value AB CD can be queried as P34:AB and P35:CD.

Reported Flow Velocity in 32-bit floating point representation P40 and P41

The user can query the reported flow reading in 32-bit floating point representation using Modbus polling (**Not available using FarSight PC**). By default, the value will be in Big Endian format. i.e., 32-bit floating point value AB CD can be queried as P40:AB and P41:CD.

Configuration parameters

RS485 Communication and Modbus

Use these parameters to setup the FarSight device to the appropriate Pulsar Measurement controller.

NAME	PAR NO.	OPTIONS	DEFAULT	DESCRIPTION
FarSight sensor Modbus Address	52	1 – 126	126	Unique Modbus device ID.
Baud Rate	53	0 = 1200 1 = 2400 2 = 4800 3 = 9600 4 = 19200 5 = 38400 6 = 57600 7 = 115200	6 = 57600	Baud rate for RS-485
Parity	54	0 = No parity 1 = Odd parity 2 = Even parity	0	Parity for RS-485
Stop Bit	55	1 = One stop bit 2 = Two stop bits	1	Stop bit for RS-485
Backup ID	56	1 – 126	126	Modbus device ID.
Modbus Terminations	57	0 = Off 1 = On	1	Select 1 = On, if termination is required.
Endianness	58	0 = Big Endian 1 = Little Endian	0	Endian selection for RS-485.

Important Information

For **Big Endian**, 16- bit integers are represented as AB (A = MSB B = LSB), whereas floats are represented as AB CD (A = MSB, D = LSB).
For **Little Endian**, 16-bit integers are represented as BA (A = MSB B = LSB), whereas floats are represented as DC BA (A = MSB, D = LSB).

Device Information Parameters

These parameters are read only.

NAME	PARAMETER NO.	DESCRIPTION
Serial Number	240 & 241	Registers 240 & 241 form a 32-bit number. Register 240 = Most significant 16-bit. Register 241 = Least significant 16-bit.
Firmware ID	261	A number associated with the version of firmware that is currently programmed onto the sensor.
Hardware ID	262	A number associated with the version of hardware that is currently used with the sensor.

Processing Parameters

These parameters are read only.

NAME	PAR NO.	OPTIONS	DEFAULT	DESCRIPTION
Direction persistence value	38	1 – 1000	50	Persistence used in Reported Flow value calculation.
Direction factor	42	0 – 100	20	Unit in percentage. Away highest peak should be X% (20% by default. i.e., 1.2 times) higher than toward highest peak to read the reverse flow (Only applicable in case P44 = 2)
Reported flow damping factor	43	0 – 6000	200	Factor used to increase/decrease the reported flow value (Only applicable in case P44 = 2)
Reported flow direction selection	44	0 – 2	0	0 = Toward 1 = Away 2 = Bidirectional
Bootup mode	100	0 – 1	1	0 – Normal bootup mode 1 – Fast bootup mode

NAME	PAR NO.	OPTIONS	DEFAULT	DESCRIPTION
Gain	102	10 – 160	150	Used to enter a fixed gain (sensitivity) value, a higher number means higher gain.
Low Damping Factor	104	10 – 999	940	HIGHER number represents MORE damping.
Average Count	105	1 – 1024	24	Denotes the number of times the traces are averaged.
Cal Factor	108	1 – 500	100	In percentage terms, default is 100 for 100%. 50% is half and 200% would be double.
High Damping Factor	109	0 – 30	24	This sets the damping applied to the FarSight sensor. A higher number represents more damping.
Step Response Mode	113	0 = Off 1 = On	0	When enabled, the high damping factor will be bypassed when a step change in velocity is detected.
No Signal Persist	117	1 – 5000	2	When reporting zero velocity, the number of valid velocity measurements to persist before reporting velocity
Signal Present state	118	1 – 5000	100	When reporting a valid velocity, the number of zero velocity measurements to persist before reporting zero velocity
Minimum Flow Cut-off	120	10 – 4000	100	In units of mm/s velocity for user input

NAME	PAR NO.	OPTIONS	DEFAULT	DESCRIPTION
Response	125	0 = Slow 1 = Fast 2 = River 3 = Medium 4 = Instant	Slow	Changing this to 'Fast' will automatically calibrate parameters in the FarSight sensor to track measurements faster. This is recommended for Pumped flow. 'Slow' is recommended when there is natural flow, as measurements will be tracked at a slower pace. River mode is recommended for river applications. Instant would be suitable for Battery Loggers. The fastest to the slowest response is as follows: Instant, Fast, Medium, Slow, River.
Multipoint Calibration @ ±0.2 m/s	152	1 – 500	100	In percentage terms, default is 100, for 100%. 50% would half and 200% would double.
Multipoint Calibration @ ±0.4 m/s	153	1 – 500	100	In percentage terms, default is 100, for 100%. 50% would half and 200% would double.
Multipoint Calibration @ ±0.8 m/s	154	1 – 500	100	In percentage terms, default is 100, for 100%. 50% would half and 200% would double.
Multipoint Calibration @ ±1.5 m/s	155	1 – 500	100	In percentage terms, default is 100, for 100%. 50% would half and 200% would double.

NAME	PAR NO.	OPTIONS	DEFAULT	DESCRIPTION
Multipoint Calibration @ ±3.0 m/s	156	1 – 500	100	In percentage terms, default is 100, for 100%. 50% would half and 200% would double.
Multipoint Calibration @ ±5.0 m/s	157	1 – 500	100	In percentage terms, default is 100, for 100%. 50% would half and 200% would double.
Multipoint calibration mode	158	0 = Off 1 = On	0 = Off	Turns the multipoint calibration on and off
Parameter Write Lock Toggle	165	0 = Unlocked 1 = Locked	0 = Off	Write permission when connected to a FlowCERT for the following parameters (125, 117, and 118).
Sensor Reset	297	1 – Reset runtime persistence memory. 2 – Reset fast boot up 7 – Reset parameter to factory default	0	1 – This resets the local variables used with runtime memory stored during power down. 2 – This resets the fast boot flag. 7 – This resets all FarSight parameters to their default values. (It does not affect any mA Trims applied).

If using the FarSight on an application where flow type is changed to 'Fast', this will reduce the damping to obtain better results. If there is natural flow and 'Slow' is chosen, then damping is increased to obtain better results.

Saving & Loading parameters

For a device where parameters are heavily customised, the user may wish to replicate such customisation on a second device. Saving and loading parameters can be used to avoid having to set-up the parameters individually again:

1. Connect FarSight PC to the first device, then select System->Save Device Parameters.
2. A confirmation message will appear, and the parameters saved to a file within the default folder (use Info > Data Folder Path to see the folder location). The filename is prefixed by "ParamFarSight-" followed by the date and time.
3. Connect the second device to FarSight PC, to load the parameters on to. Select 'System > Load Parameters to Device', then choose the parameter file to load.
4. The unit will disconnect from the software, and a message box will appear asking to confirm the parameter change, and once completed another message box will appear informing you that the parameters have been loaded onto the sensor correctly.
5. Once the parameters have been loaded onto the sensor, it will automatically re-connect to the FarSight PC software, where you are able to see the new parameter values.

Firmware Upgrade

Ensure that any customised parameters are saved before any firmware upgrade is undertaken. Firmware upgrades are performed in 'Bootloader' mode. Note that all flow measurement and output operation will be halted when the sensor is in the 'Bootloader'. Please follow these steps:

1. Please ensure that the sensor is connected to a PC via the RS485 port. Prior to reprogramming, you will need the firmware file, and the COM port number of the RS485 connector.

2. Establish a connection to the sensor, and it is advisable to save any customised parameters before beginning an upgrade.

3. You will require Service access to switch the device into Bootloader mode, and to activate Bootloader control.

4. First place the device into bootloader mode by selecting System > Switch Device into Bootloader.

5. Select System > Bootloader control, which will launch the Bootloader interface. As seen in Fig.9.

6. Once connected click 'Load Hex file' and choose the firmware file you are using to upgrade the sensor.

7. Click 'Erase-Program-Verify' and wait for the process to finish.

8. When the 'Verification Successful' message is displayed, click 'Run firmware' and the Bootloader Interface will close.

9. Select the 'connect' button on the software, and the sensor will reconnect to FarSight PC with the new firmware installed.
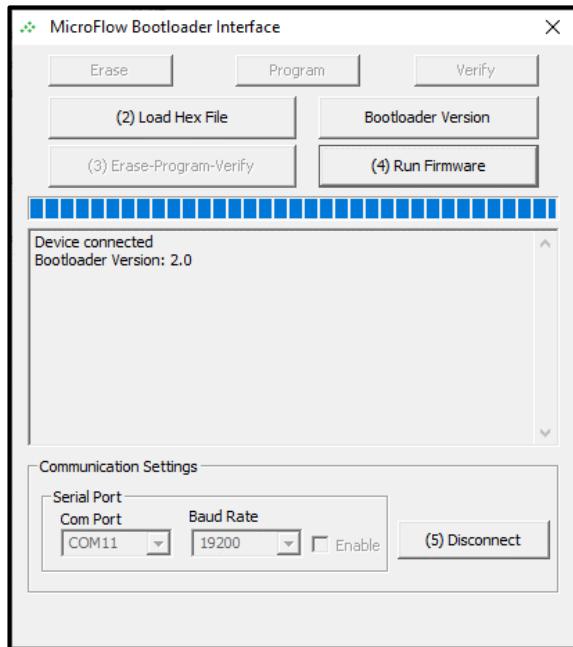
Important Information

If the sensor does not connect to the device within 40 seconds, it will resume its normal operation with its current firmware.
Do not switch off supply to the unit or close the software during the firmware upgrade.

CHAPTER 8 TROUBLESHOOTING

This section describes many common symptoms, with suggestions as to what to do. If the issue persists, please contact your local Pulsar Measurement distributor.

SYMPTOM	WHAT TO DO
FlowCERT/Velocity Interface/Ultimate shows 'Lost Comm'	Check power supply. Check wiring to the FarSight sensor. If sensor has been connected to a new unit, then it may require power cycling to sync with the controllers Baud rate.
Currently the velocity reads zero, but you know that there is flow movement.	Ensure that the sensor is mounted correctly in accordance with Chapter 2.
Current velocity reading is higher/lower than known movement of flow	Check that the sensor is mounted correctly. Adjust the Gain (P102) or Damping (P109) parameters to obtain correct measurements.
Unable to connect to FarSight PC	Check that wiring to the RS485 connector is correct. Close FarSight PC, cycle power on the sensor re-open FarSight PC and retry connection.
The velocity is not moving to the correct flow peak index/the flow peak index is jumping between peaks.	Adjust 'P125 Response' to match your requirements (Refer Chapter 7).
FlowCERT reading does not show the negative reported flow velocity.	FlowCERT parameter 'P682 Min Velocity' should be adjusted to show negative flow reading.
FlowCERT reading is increasing slowly on the display.	Adjust 'P687 Stability' on the FlowCERT controller, to a smaller number than 12, i.e., 8.

Important Information

If you experience any issues with our equipment, then please contact your local Pulsar Measurement Distributor for assistance.

CHAPTER 9 DISPOSAL

Incorrect disposal can cause adverse effects to the environment.

Dispose of the device components and packaging material in accordance with regional environmental regulations including regulations for electrical \ electronic products.

Transducers

Remove power, disconnect the Transducer, cut off the electrical cable and dispose of cable and Transducer in accordance with regional environmental regulations for electrical \ electronic products.

Controllers

Remove power, disconnect the Controller, and remove battery (if fitted). Dispose of Controller in accordance with regional environmental regulations for electrical \ electronic products.

Dispose of batteries in accordance with regional environmental regulations for batteries.

EU WEEE Directive Logo

This symbol indicates the requirements of Directive 2012/19/EU regarding the treatment and disposal of waste from electric and electronic equipment.

NOTES

www.pulsarmeasurement.com

SUPPORT@PULSARMEASUREMENT.COM