

Fluenta FlareCa™

User Manual

62.400.027.B | EN



Document Information

Described Product

Fluenta FlareCal™ (version 0.1)

Manufacturer

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Original Document

This document is an original document for Fluenta. We reserve the right to make technical changes to the documentation and the products, at any time.

Contents

Contents

Document Information	3
Product Certification	6
Further Information	7
Product Description	9
What's in the Box.	9
Product Overview	10
Technical Specifications.	11
Operation	12
Pre-calibration Procedure	14
Calibration Procedure	18
Recycling and Disposal	22
Warranty Statement.	23
Warranty Claims	25
Notes.	27

Thank you for purchasing the Fluenta FlareCal™ calibration box, offering the most rigorous way to verify your ultrasonic transducers.

Please review this document carefully before working with the Fluenta FlareCal™ instrument.

The Function of this Document

This manual overviews the Fluenta FlareCal™ and describes the device's configuration, installation, operation and maintenance.

Read these operating instructions carefully before starting any work to familiarise yourself with the product and its function.

A digital version of this user manual can be obtained by visiting the Fluenta website: <https://www.fluenta.com/downloads/product-information/>.

Symbols Used

- **Warning Symbols**



Immediate hazard of severe injuries or death



Hazard (general)



Voltage hazard



Hazard in potentially explosive atmospheres



Hazard through explosive substance(s) mixture(s)



Hazard by noxious substances



Hazard by toxic substances

- **Information Symbols**



Important technical information



Supplementary information



Recycling and disposal information

Product Certification

CE | EU declaration of Conformity

The manufacturer hereby declares that: Fluenta FlareCal™ fulfils all the relevant provisions of the following Directives:

- 2014/30/EU – Electromagnetic Compatibility Directive
- 2014/35/EU – Low Voltage Directive

And is in conformity with the applicable requirements of the following standards:

Standard	Description
EN61326-1:2013	Group 1, Class A equipment (emissions)
EN55011:20016 (+A1/A11)	Group 1, Class A equipment
EN55032:2015 (+A11)	Electromagnetic compatibility of multimedia equipment – Emission requirements, Class A Emissions
EN 61000-3-2:2014	Limits for harmonic current emissions
EN 61000-3-3:2013	Limits for voltage changes, fluctuations and flicker
EN61326-1:2013	Group 1, Class A equipment (immunity)
IEC61010-1 ed 3.1	Safety requirements for electrical equipment for measurement, control, and laboratory use - Part 1: General requirements

Technical documentation required to demonstrate that the product meets the requirements of the above directives is available for inspection by the relevant enforcement authorities.

UKCA | UK Conformity Assessed

The manufacturer hereby declares that: Fluenta FlareCal™ fulfils all the relevant provisions of the following Directives:

- 2014/30/EU – Electromagnetic Compatibility Directive
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Technical documentation required to demonstrate that the product meets the requirements of the above directives is available for inspection by the relevant enforcement authorities.

Further Information

Definitions

- FGM 160: Fluenta Flare Gas Meter 160
- UKCA: UK Conformity Assessed
- CE: Conformité Européenne
- EMCD: Electromagnetic Compatibility Directive
- RED: Radio Equipment Directive
- LVD: Low Voltage Directive (safety)

References

All references are available upon request.

For copy of available references, please email support@fluenta.com and quote the document number and title as show in the table above.

Ref	Document Number	Title
[1]	62.120.001	FGM 160 Installation and Hook-up Instructions
[2]	62.120.006	FGM 160 Hazardous Area Installation Guidelines
[3]	64.120.001	FGM 160 Maintenance Procedure
[4]	72.120.308	FGM 160 Data Sheet
[5]	72.120.601	FGM 160 Operating Instructions
[6]	61.310.100	UFM Manager User Manual
[7]	75.400.001	FLUENTA FlareCal™ EU Declaration of Conformity
[8]	75.400.002	FLUENTA FlareCal™ UK Conformity Assessed declaration

Product Description

The Fluenta FlareCal™ is a rigorous self-calibration solution to verify all Fluenta TFS transducers in lateral and Bias-90 configurations without requiring a certified engineer to be on-site.

Fluenta recommends carrying out at least an annual verification of ultrasonic transducers to ensure full compliance with regulations and global IECEx explosion-proofing standards.

Parameters such as gas composition, temperature, and pressure are constantly changing in flare lines, and fouling deposits, including wax, tar, carbon, and sand, can also be present on the transducers.

All these factors can lead a flare gas meter to misreport flow leading to direct financial consequences and potential enforcement from regulatory bodies. Regular meter verification can help mitigate these issues, reducing the risk of misreported measurements.

Intended Use

The Fluenta FlareCal™ is intended for use to verify and re-calibrate your flare meter as needed, without requiring a certified engineer to be present.

What's in the Box

Fluenta FlareCal™ Product n° 2000592 comes with

- Fluenta FlareCal™ calibration box
- Carry bag for the Fluenta FlareCal™
- 2x signal cables, 2m
- 4x blanking plates
- Depth stop rod
- USB 2.0 Cable Type A/B, 3m
- 2x Transducer carry bag

Product Overview

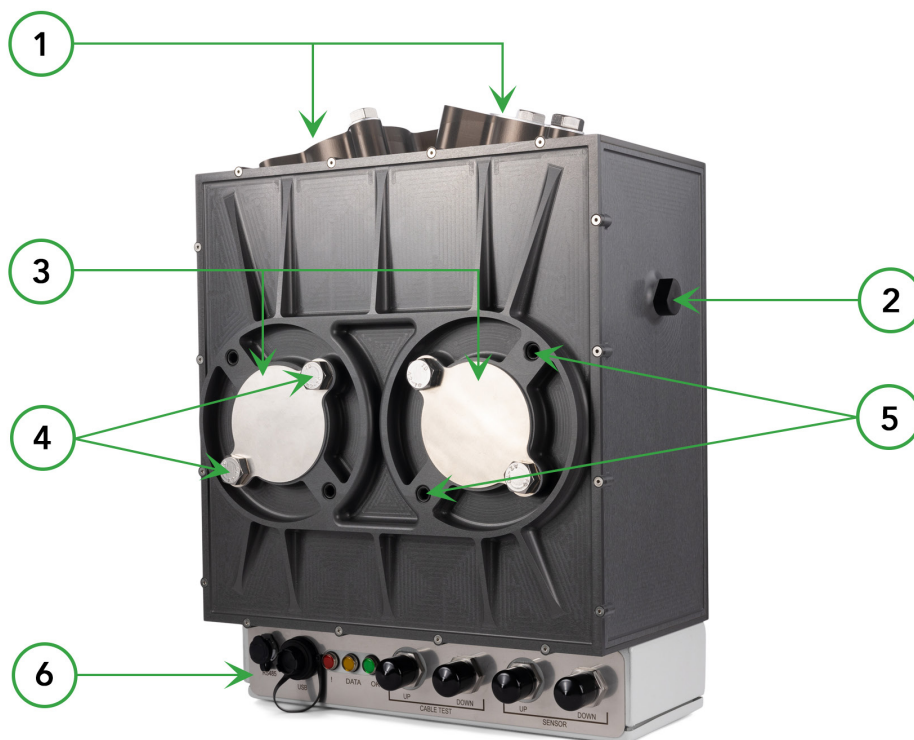


Figure 1. The Fluenta FlareCal™ System

1. Flange connections for transducers in lateral-45 configuration
2. Transducer depth stop rod
3. Flange connections for transducers in Bias-90 configuration
4. 2" Packing box connections
5. 3" Packing box connections
6. Electronic enclosure

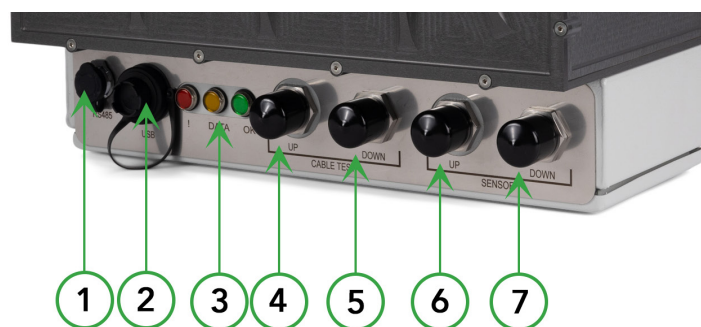


Figure 2. The Fluenta FlareCal™ Electronics Enclosure

1. RS485 Socket (not used currently)
2. USB socket
3. Display LEDs
4. Cable test "UP" socket
5. Cable test "DOWN" socket
6. Transducer "UP" socket
7. Transducer "DOWN" socket

Technical Specifications

Weight	17.6 Kg, including all accessories	
Dimensions	600 x 475 x 250 mm (in carry bag)	
Power	Voltage	Current
	5.0V (+0.25V, -0.6V)	0.5 A (Max)

Power is supplied to the instrument via a PC or laptop USB 2.0 port or later.

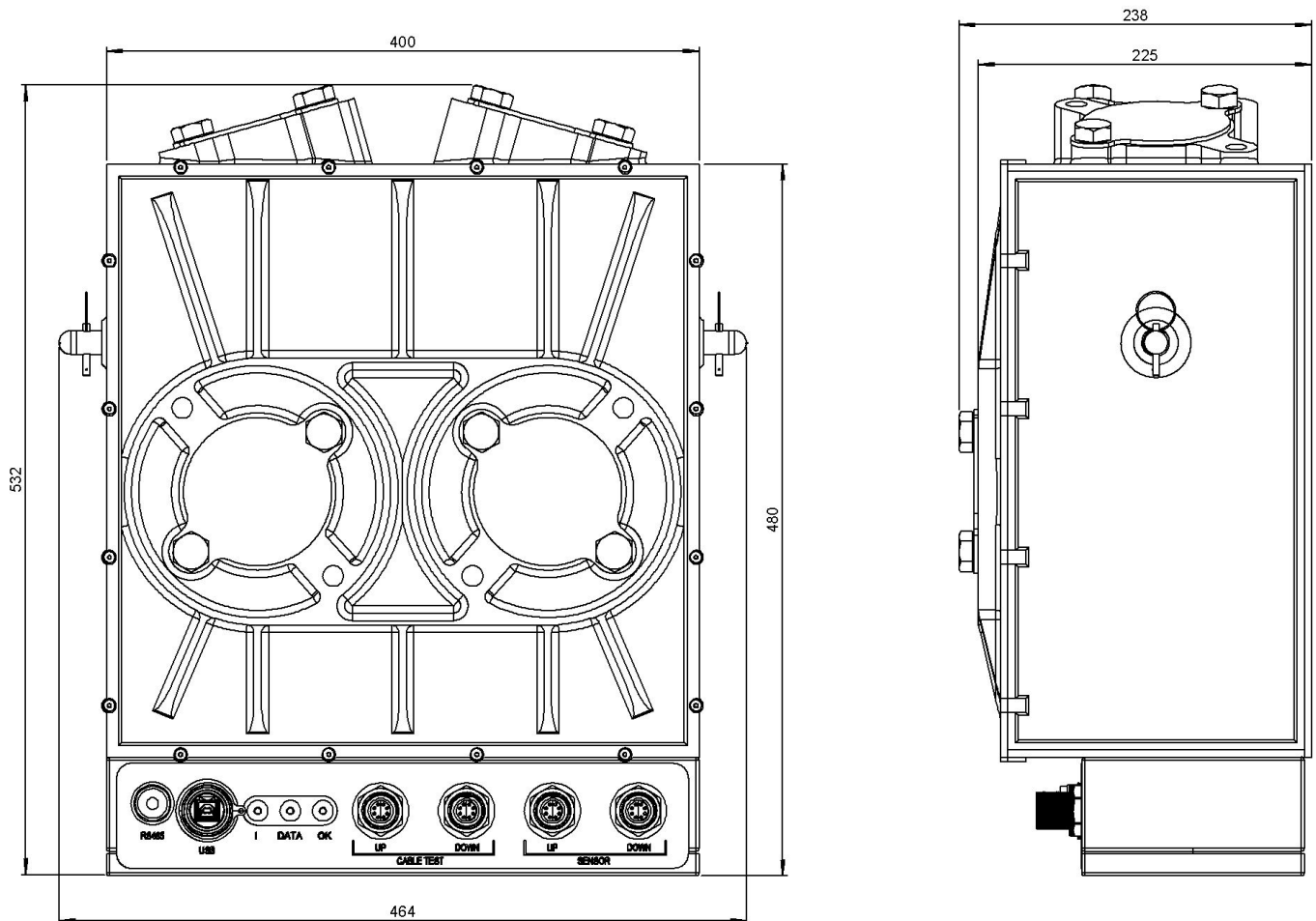


Figure 3. The Fluenta FlareCal™ Dimensions without the carry bag.

Operation

General Considerations

You should use the Fluenta FlareCal™ while still inside the protective bag. The bag contains several openings, pockets, and accessible flaps for easy transport and access.

Before each use, check the Fluenta FlareCal™ and its accessories for any signs of wear or damage.

Before you start, ensure you have the Fluenta UFM Manager software installed on your laptop and a valid user licence.

UFM Manager Software Installation

To verify and re-calibrate your Fluenta ultrasonic transducers, you must have the UFM Manager version 5.0.6 or greater installed on a laptop.

The Fluenta UFM Manager software is compatible with Windows 8.0 or later.

You can download the latest version of the UFM Manager for Fluenta FlareCal™ from the Fluenta website here: <https://www.fluenta.com/products/flarecal/>.


The standard UFM Manager can be downloaded from this page: <https://www.fluenta.com/products/ufm-manager/>.


 Request a Fluenta FlareCal™ enabled software licence by emailing support@fluenta.com.

Software Installation

To install the software, extract the downloaded file, run the “Setup.exe” and follow the instructions on the screen.


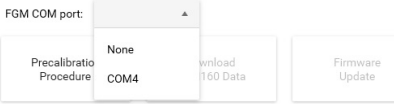

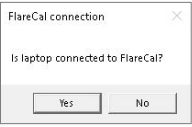





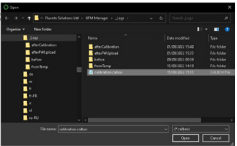
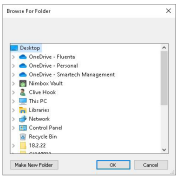
A software licence is required for the UFM Manager to be able to perform its transducer calibration functions. You can request a licence from your local Fluenta representative or by contacting Fluenta customer support at support@fluenta.com.

 During the UFM Manager installation, you may be prompted to download a newer version of “Microsoft .Net components” than currently installed on your computer. If that’s the case, follow the on-screen instructions.

 Access to internet connection is required to update the “Microsoft .Net components”.

User Interface

The UFM Manager software is a typical Windows application with indicators, buttons, toggle buttons, progress bars, and information displays. The table below indicates their use.

Symbol	Type	Operation
	Button	Selects an operation. Buttons may change colour to indicate status. (green: Pass/Complete, red: Fail)
	Drop Down Box	Used to select an item from a drop down list
	Toggle Button	Used to select from two options (normally Yes/No). Click the item once for the right hand option and twice for the left hand option.
	Information/Instruction Box	Used to prompt the user. A selection of feedback buttons may be available including Yes, No, OK and Cancel
	Help/Information Indicator	Click on this icon to display a relevant help topic.
	Progress Indicator	Indicates a test/process is in progress. Once a solid stationary colour is displayed the test/process is complete.
	In Progress/Incomplete Indicator	This icon indicates a test/process has not been started or is in progress
	Complete Pass Indicator	This icon indicates a test/process has completed or passed successfully
	Complete Fail Indicator	This icon indicates a test/process has completed unsuccessfully or failed
	File Open/Close Panel	Used to select a file name and directory to open or save a file.
	Directory Selection Panel	Used to select a directory in which to store data.

Running the Software

To perform a verification re-calibration of your Fluenta transducers, the UFM Manager will run through seven steps. These steps will run in order of operation and appear at the top of the screen.

To perform the verification, the user should follow the steps left to right, unlocking them one after the other.

The user can save their progress of working through the steps at any time by selecting the "Save Progress" button and can be resumed by selecting a pre-saved progress file using the "Load Progress" button. This feature is particularly useful when moving from the FGM 160 to the Safe Test Area and vice versa. It can also be used if the laptop battery power runs low or if the laptop requires a re-boot.

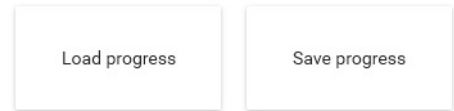


Figure 4. Loading and saving progress

Precalibration Procedure

Permit



All relevant site-specific permits should be in place before the commencement of any work.

Connect Modbus

To connect the UFM Manager (installed on a laptop) to the FGM 160, you need to use a USB-Modbus 485 converter. Fluenta recommends using Moxa 1130 or Moxa 1250.

Connect the USB-Modbus 485 converter to the laptop.

The connection between the FGM 160 and the Moxa can be either a two or a four wire configuration and can be made using an adaptor.

The diagram overleaf shows a two-wire connection. Note the common connections at the FGM 160 end.

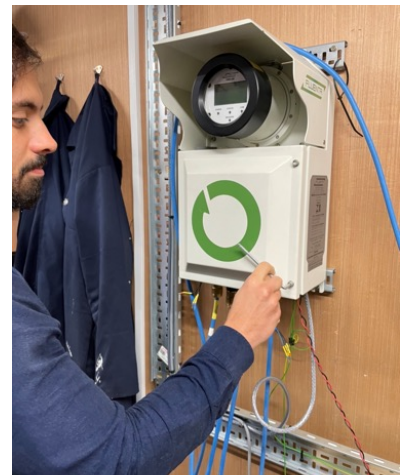


Figure 5. Access to the FGM 160



A 5mm Allen wrench is required to open the FGM 160 front cover.

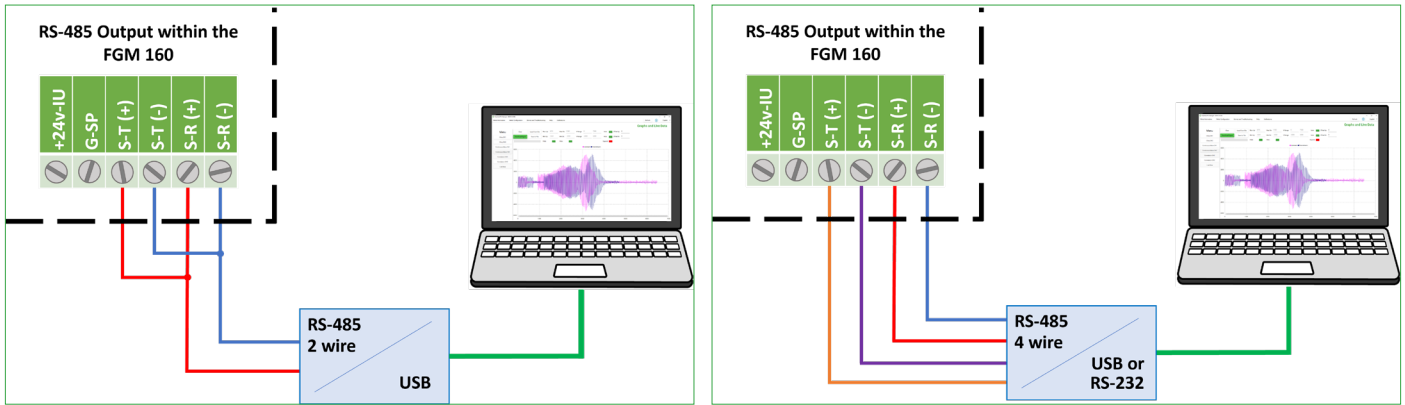


Figure 6. Modbus Connection Alternatives (2 and 4 wire connections)

Post Connection Steps

- Run the UFM Manager software on the laptop.
- Select Calibration with Fluenta FlareCal™ from the calibrations menu.

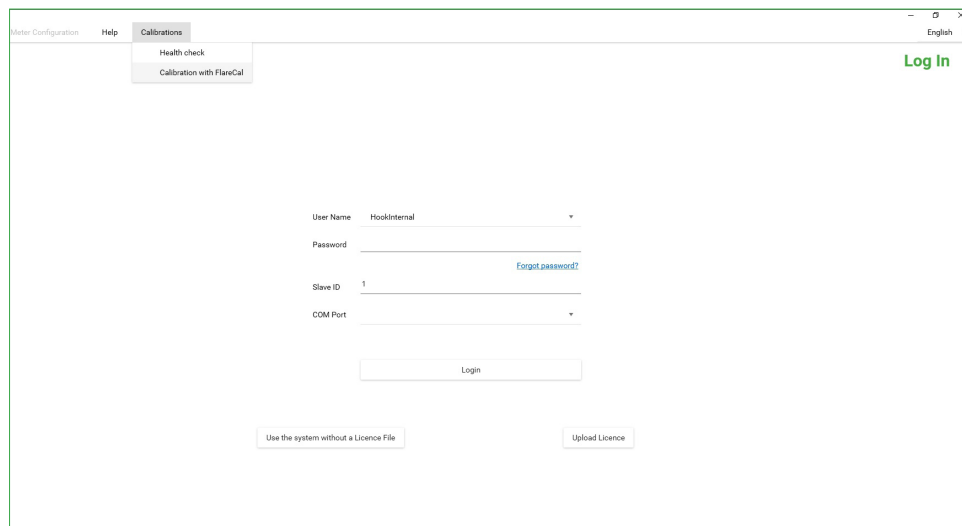


Figure 7. Select the Calibration with Fluenta FlareCal™

- Select COM port for the connected FGM 160 from the drop down list.

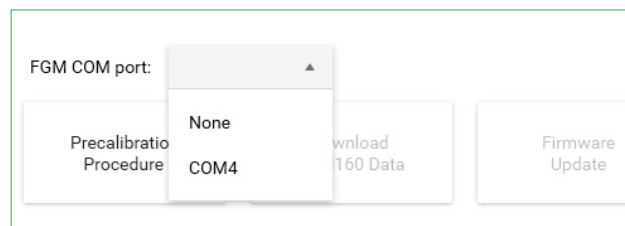


Figure 8. COM Port selection

- Select the "Precalibration Procedure" button and progress down the page. Many of the inspection points allow entry of a comment in the relevant box which will appear on the final report.
- Guidelines on the inspection criteria can be viewed by selecting the help/information indicator.
- On completion of each step within the calibration process, select the "Save progress" button located at the bottom of the screen. This allows you to continue the calibration process from the current stage even if operation of the UFM Manager software was interrupted.

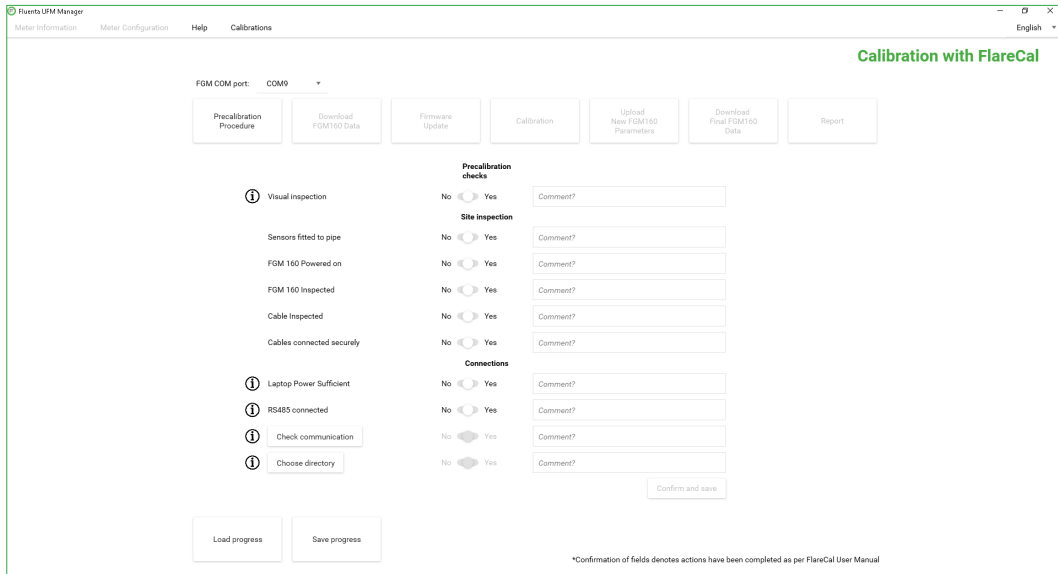


Figure 9. The first step of the pre-calibration procedure using the UFM Manager

- Once the Precalibration Procedure is completed successfully, then the “Download FGM 160 Data” button will be enabled.
- Fluenta advises the operator to save progress before proceeding.

Download FGM 160 Data

- Selecting the “Download FGM 160 Data” button, followed by pressing the start button prompts the download of the pre-calibration setup and configuration of the FGM 160. This includes signal waveform captures and a data log which can take up to 15 minutes. On completion the following screen will display. Assuming all tests have been successful the firmware update button will be enabled.

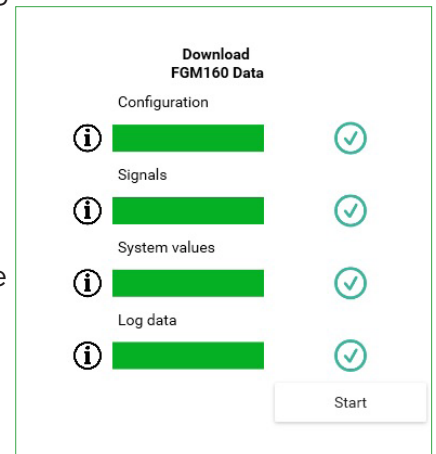


Figure 10. FGM 160 Data Download

Update the Firmware

- If a firmware update is required, the “Start” button will be enabled.
- The latest version of the FGM 160 firmware can be obtained from your local Fluenta representative or requested from support@fluenta.com.
- If a new firmware is loaded the “Download New FGM 160 Data” button will be enabled. This is identical to the previous section but confirms the configuration of the instrument following a firmware update.
- The “Refresh” button can be selected at any time to indicate the current version of FGM 160 firmware.
- Fluenta advises the operator to save progress before proceeding.

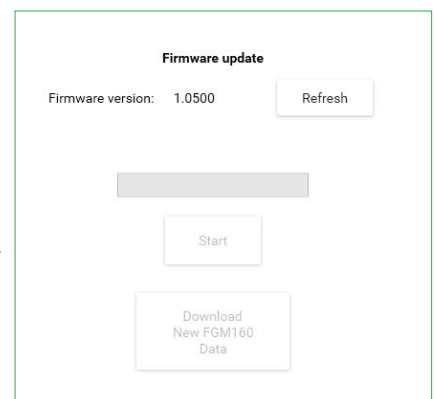


Figure 11. Firmware Update Panel

Transducer Removal and Cleaning



- The transducer DK Lok olive nut should be loosened, and the transducer withdrawn into the body of the packing box. The ball valve can now be closed and the 4 off (M16) nuts and bolts removed to allow removal of the transducers.



- Once removed, the transducer heads should be cleaned using a soft rag and an alcohol based cleaner to remove any fouling deposits.
- Visually inspect each transducer face for scratches or dents. Any observed damage should be photographed and appended to the service and calibration data sent to Fluenta.

Transducer Transportation

- Transducer carry bags are provided with the Fluenta FlareCal™ system and should be used whenever the ultrasonic transducers are moved from one location to another.
- The transducer head should be retracted and stored inside the packing box. The packing box should be placed in the bag.



The 2" packing box and transducer weigh 6.7Kg each.
The 3" packing box and transducer weigh 12.8 Kg each.



Figure 12. How to use the supplied transducer carry bags to transport transducers safely.

Calibration Procedure

Location



- The use of the Fluenta FlareCal™ to calibrate the transducers must be carried out in a designated safe area.

Mounting the transducers

- Remove the blanking plates for either lateral or bias-90 transducer mounting as appropriate.
- If using the three-inch packing boxes, remove the M16 grub screws and refit them to the two-inch threads.
- Align the transducers and use two M16 x 35mm bolts to secure them in either the two-inch or three-inch mounting holes.



Warning the bolts should only be tightened finger-tight.



Figure 13. Demonstration of how to mount the transducers onto the Fluenta FlareCal™ box.

- Push the transducer rod in until it hits the depth stop rod.
- Once the stop has been reached the tip-to-tip, transducer distance will be set.



Figure 14. Demonstration of transducers mounted with transducer tip-to-tip distance set.

Connecting the Fluenta FlareCal™ Calibration Box

- Connect the USB Type A/B cable from the laptop running UFM Manager software to the Fluenta FlareCal™ calibration box.
- The green LED on the Fluenta FlareCal™ box should flash approximately every second to indicate it has powered up.
- The Fluenta FlareCal™ box should now show up as a virtual Com port on the laptop and it can be selected from the “Calbox COM port” drop down list on the UFM manage calibration page.
- Using the UFM Manager software, the operator can initiate a series of actions detailed below.

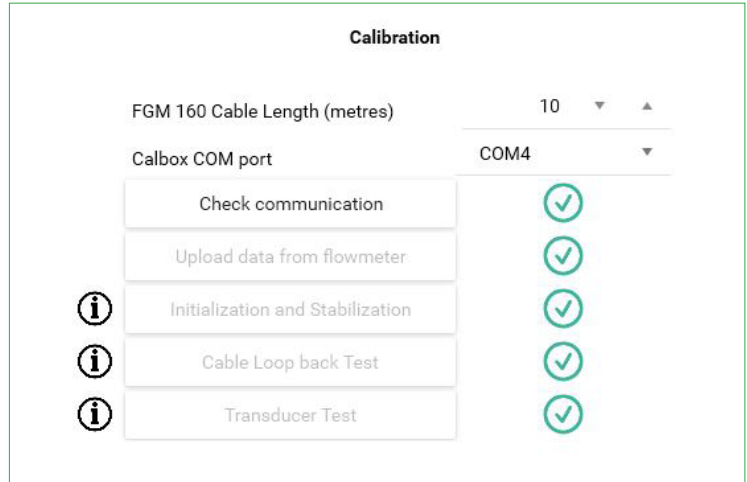


Figure 15. Fluenta FlareCal™ calibration sequence

Running the calibration using the Fluenta FlareCal™ Calibration Box

Once the transducers are located, the Fluenta FlareCal™ COM port should be selected from the drop down list box.

1. Check Communication

- Selecting the check communication button establishes communication with Fluenta FlareCal™ calibration box.
- In the event of failure, check the selected COM port and USB cable connection.
- If the communication can't be established contact support@fluenta.com.

2. Update Data from Flow meter

- Selecting “Update data from flow meter” is available once communication has been established. This procedure loads the pre-calibration configuration saved earlier from the FGM 160 into the Fluenta FlareCal™ calibration box.

3. Initialization and Stabilisation

- During this stage the recently powered up Fluenta FlareCal™ calibration box monitors its internal temperature, pressure and humidity.
- Once stability has been achieved the calibration process can continue. This may take up to 10 minutes to achieve. Please refer to the user manual or contact support@fluenta.com if stable values cannot be achieved within this time frame.

4. Cable Test

- During this stage the Fluenta FlareCal™ calibration box performs an internal calibration to correct for delays in cabling and internal electronics.
- These delays will vary over time and changes in ambient conditions.
- The operator will be prompted by the UFM Manager software to correctly connect the signal cables for this test.



Figure 16. Cable Test

5. Transducer Test

- During this stage the Fluenta FlareCal™ calibration box performs a transducer calibration correcting for the previously measured delays in cabling and internal electronics.
- The operator will be prompted by the UFM Manager software to correctly connect the signal cables to the transducers for this test.
- The depth stop rod should be removed before starting the test. Care should be taken not to move the transducers as any change in tip-to-tip distance will result in erroneous measurement.
- Fluenta advises the operator to save progress before proceeding.
- If unsuccessful please check correct insertion of the transducers and verify cabling is correct and secure. If failure persists please refer to the user manual or contact support@fluenta.com.

6. Testing in the safe area is now complete.

- Remove transducers from the calibration box and place back in carry bags.
- Refit blanking plates to the Fluenta FlareCal™ calibration box.
- Return the transducers to the FGM 160. Take appropriate precautions.
- Refit transducers into the line, which is the reverse of the removal procedure. Ensure that the upstream transducer is in the upstream path and the downstream transducer is in the downstream path.
- Ensure all locating bolts are tightly secured and cable refitted.



Figure 17. Refitting the transducers into the line

7. Upload new FGM 160 Parameters

- Reconnect the laptop to the FGM 160.
- Once connected, select the "Upload New FGM 160 Parameters" button. Navigate to and select the results file stored by the Fluenta FlareCal™ box and the calibration values will be transferred from the laptop to the FGM 160. This may take a few minutes to achieve.
- If failure persists, please verify connection to the FGM 160, refer to the user manual or contact support@fluenta.com.

8. Download the Final FGM 160 Parameters

- Selecting the "Download Final FGM 160 Data" button, followed by pressing the "Start" button, downloads the post calibration setup and configuration of the FGM 160. This includes signal waveform captures and a data log which can take up to 15 minutes. On completion the screen shown in figure 17 should be displayed. Assuming all tests have been successful.
- Fluenta advises the operator to save progress before proceeding.

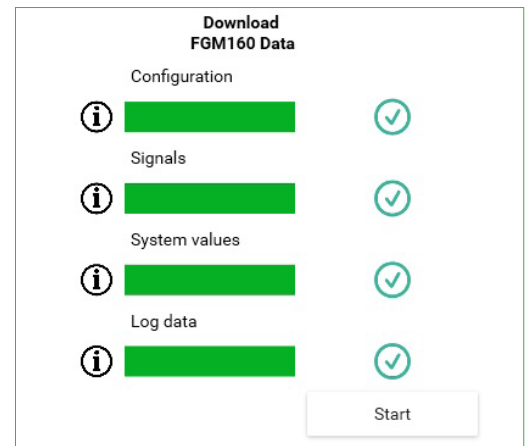


Figure 18. Download Final FGM 160 Data

9. Calibration Completion

- Work is now finished at the FGM 160.
- The Modbus connection to the test Laptop can be removed.
- The door of the FGM 160 should be closed and securely fastened using a 5mm Allen key.



  Any open work permits can now be closed in accordance with site working requirements.



Figure 19. Calibration Completion

10. Report

- Selecting the Report Button will open a directory selection panel on the screen. Select a new folder to store the results files.
- Once a directory is selected a "XXXXXXXX_YYYYYY_output.zip" file will be produced, where XXXXXXXX is the current date and YYYYYY is the current time. This .zip should be sent to support@fluenta.com.

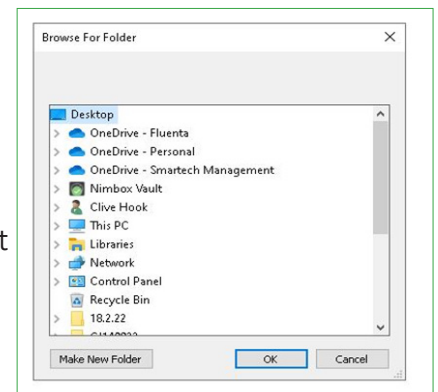


Figure 20. Selecting a results folder

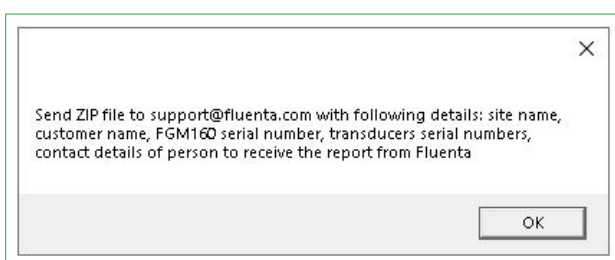


Figure 21. Instructions to send data to Fluenta

Spares and Replacement Parts

Part Number	Description
200595	Signal cables 2m
2000620	Blanking Plates
2000621	Depth Stop Rod

Storage of the Fluenta FlareCal™

- When not in use the Fluenta FlareCal™ instrument should be stored in a location that will not experience extremes of temperature or humidity.
- All four blanking plates should be fitted with the Depth Stop Rod in Place.
- All accessories and cables can be safely stored in the carry bag's lid.
- Keep the transducer carry bags stored in the side pockets of the main carry bag.

 Total weight of the Fluenta FlareCal™ and its accessories is over 17.5Kg

Transport of the Fluenta FlareCal™

- When moving the Fluenta FlareCal™ instrument it is recommended to do so in the carry bag provided.
- When moving transducers to and from the system to the test area, it is recommended to use the transducer carry bags provided.
- The bags are designed in such a way that weight can be distributed equally between the handles.



 The 2" packing box and transducer weigh 6.7Kg each.
The 3" packing box and transducer weigh 12.8 Kg each.



Figure 22. Transporting the Fluenta FlareCal™

Recycling and Disposal

 The materials used in the manufacturing of the Fluenta FlareCal™ instrument comply with all EU material directives and do not pose a particular danger to life, human health and the environment.

At end of life, The Fluenta FlareCal™ instrument should be disposed of according to local legislation by an organisation licensed to work with electrical and electronic equipment waste.

Self-disposal of the Fluenta FlareCal™ instrument is prohibited.

For territories outside the EU, follow local guidelines and legislations.

Warranty Statement

The Fluenta FlareCal™ is covered by the Fluenta Standard Warranty Statement (71.000.014D).

1. Fluenta will ensure that the goods delivered are suitable for the intended purpose as described in the scope of supplies. Fluenta will correct any defects that may arise from defective manufacturing or design as soon as possible.
2. This standard warranty is valid for 12 months after the installation of the Fluenta product or 18 months after delivery, whichever comes first. To qualify for standard warranty, the transducers must remain in their original packaging until installation.
3. The warranty is valid only if the installation, final commissioning and any further service activity is performed by Fluenta Service Engineer or other authorized personnel. Authorized personnel are: Fluenta Service Engineers (from our main or regional offices) or Fluenta trained and certified service engineers from our agents or distributors. In case of doubt please contact Fluenta.
4. To qualify for extended warranty;
 - a. The customer must have the product serviced before the standard warranty (as defined in paragraph 2) expires.
 - b. The product must be serviced by a Fluenta Service Engineer or other authorized person (as defined in paragraph 3).
 - c. The product must be confirmed as undamaged, correctly installed, and otherwise in good condition at the time of service.
5. Product meeting the terms of the extended warranty in paragraph 4 shall have the terms of the warranty extended by a further 12 months from the time of service. This warranty cannot be extended further by any means.
6. Any warranty claims should be submitted to Fluenta via email to quality@fluenta.com within one month from identifying the defect.

In case a repair or replacement is required before a warranty claim analysis is complete, customer should submit a new PO on standard conditions. Costs covered by this warranty will be credited after the warranty claim is accepted. This warranty covers:

- Defects due to manufacturing faults.
- Defects in material provided by Fluenta.
- Work done by a Fluenta service technician. Work done by technicians employed by our certified partners is subject to their warranty conditions.

This warranty does not cover:

- Defects due to normal wear and tear.
- Defects due to disregard of Fluenta's installation, storage, and operating instructions. This includes damage incurred after delivery.
- Any equipment installed or subject to service works by unqualified persons (as per the definition in paragraph 3).

If a warranty claim is accepted, Fluenta will cover:

- All costs directly related to the repair or replacement of any part of the goods.

If a warranty claim is accepted, Fluenta will not cover:

- Transportation of personnel to and from Fluenta's dedicated locations and accommodation costs.

If a warranty claim is denied, the customer shall cover:

- All costs reasonably incurred on part of Fluenta during the analysis, repair, service job or replacement of the product including retrieval, re-completion and transportation of the damaged goods if necessary.

7. Please note: The warranty will be deemed void if at any time

- a. The transducers are installed, commissioned, or serviced by an unauthorized person (as per the definition in paragraph 3).
- b. If the Fluenta FlareCal™ calibration box has been subject to voltage prior to installation without Fluenta authorized personnel present.
- c. If the Fluenta FlareCal™ calibration box has been subject to voltages other than those specified in the manual.

8. This document is legally binding under the jurisdiction of Norwegian law and the warranty conditions described are valid for all projects.

To submit a claim, please contact Fluenta on quality@fluenta.com.

Notes

WE'RE FLUENT. WE'RE FLUENTA.

With over 3,000 installs across 6 continents, Fluenta has the experience to help you more accurately measure flare gas, to make better business decisions and meet the most stringent regulations.

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