User Guide
00825-0100-8785, Rev AA
November 2019

Rosemount™ 8785 Calibration Standard

For Rosemount 8782 Transmitters

ROSEMOUNT™

EMERSON

1 Safety

⚠ WARNING

- Failure to follow instructions in this guide could result in serious injury or death.
- Instructions in this guide are for use by qualified personnel only. Do not perform any servicing other than that contained in this guide, unless qualified.
- The Calibration Standard cannot be used in a hazardous location nor can it be connected to transmitters that are operating in a hazardous location. A safe work permit shall be issued prior to connecting the Calibration Standard to an installed transmitter in a hazardous location. The safe work permit shall ensure that the user has taken the necessary steps to declassify the area as defined by the authority having jurisdiction for the installed transmitter.
- The Calibration Standard uses components that can be damaged by electrostatic discharge (ESD). When handling, care must be taken so that the device is not damaged. The following precaution should be taken: Always discharge yourself by touching a grounded bare metal surface before handling any ESD-sensitive electronic device.
- The user shall ensure that the Calibration Standard is properly grounded by connecting the black coil drive wire to coil shield terminal number 3 on the transmitter.

2 Introduction

The Rosemount 8785 Calibration Standard is a high-precision instrument exclusively designed for use with the Rosemount 8782 Slurry Magnetic Flow Meter Transmitter. It is a necessary tool for users to verify calibration of the 8782 Transmitter and to perform the digital trim calibration of the 8782 Transmitter.

2.1 Return policy

Emerson procedures must be followed when returning equipment. These procedures ensure legal compliance with government transportation agencies and help provide a safe working environment for Emerson employees. Failure to follow Emerson procedures will result in your equipment being refused delivery.

2.2 Emerson Flow customer service

Email:

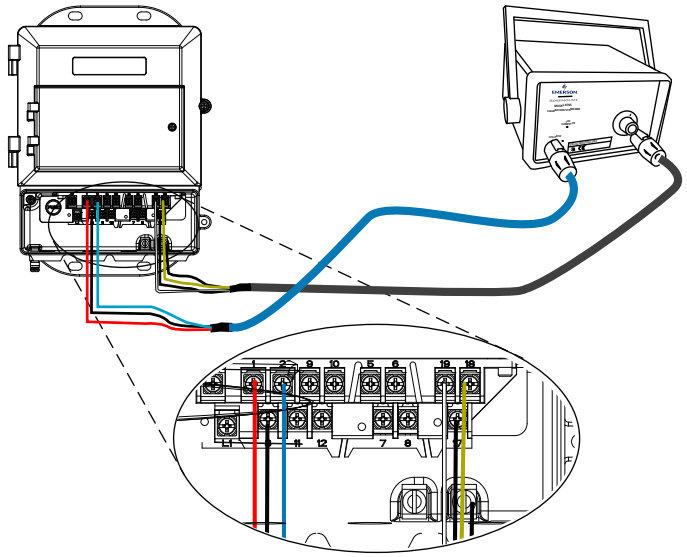
- Worldwide: flow.support@emerson.com
- Asia-Pacific: APflow.support@emerson.com

Telephone:

North and South America		Europe and Middle East		Asia Pacific	
United States	800 522 6277	U.K.	0870 240 1978	Australia	800 158 727
Canada	+1 303 527 5200	The Netherlands	+31 (0) 704 136 666	New Zealand	099 128 804
Mexico	+41 (0) 41 7686 111	France	0800 917 901	India	800 440 1468
Argentina	+54 11 4837 7000	Germany	0800 182 5347	Pakistan	888 550 2682
Brazil	+55 15 3413 8000	Italy	8008 77334	China	+86 21 2892 9000
Venezuela	+58 26 1731 3446	Central & Eastern	+41 (0) 41 7686 111	Japan	+81 3 5769 6803
		Russia/CIS	+7 495 995 9559	South Korea	+82 2 3438 4600
		Egypt	0800 000 0015	Singapore	+65 6 777 8211
		Oman	800 70101	Thailand	001 800 441 6426
		Qatar	431 0044	Malaysia	800 814 008
		Kuwait	663 299 01		
		South Africa	800 991 390		
		Saudi Arabia	800 844 9564		
		UAE	800 0444 0684		

3 Calibration Standard connections to transmitter

Figure 3-1: Wire connections from Calibration Standard to transmitter



⚠ WARNING

To prevent risk of electrical shock: The user shall ensure that the Calibration Standard is properly grounded by connecting the correct wire to coil shield terminal number 3 on the transmitter.

Table 3-1: Calibration Standard wiring to transmitter terminals

8785 Calibration Standard		8782 Transmitter terminal
Coil drive	Red	1
	Blue	2
	Black	3
Electrode	Drain	Drain
	Black	17
	Yellow	18
	White	19

3.1 Making cable connections

1. Insert the gray cable end into the gray receptacle marked "ELECTRODE SIGNAL" and the blue cable end into the blue receptacle marked "COIL DRIVE" on the calibration standard.
2. Twist the connectors clockwise to lock them into place.

   When the connector is fully locked into place, the lock symbol is visible on the calibration standard face plate.
3. Make the cable connections to the transmitter as indicated in Table 3-1.

4 Digital trim

LOI menu path	**Diagnostics → Trims → Digital Trim**

Digital trim is calibration of the transmitter. It is first performed at the factory with transmitters before they are shipped. It is only necessary for a customer to perform the digital trim when inaccurate measurement is observed or suspected.

Complete these steps to identify if a digital trim is needed, and then perform and verify it, when necessary.

NOTICE

To avoid electrical damage to equipment, use the 8785 Calibration Standard only with the Rosemount 8782 transmitter.

1. Set the loop to manual (if necessary).
2. Record the current transmitter configuration settings for Calibration Number, Units, PV URV, PV LRV, and Coil Drive Frequency.
3. Change the following transmitter configuration settings:
   - Calibration Number: 1000075010000000
   - Units-ft/s
   - PV URV-20mA = 30.00 ft/s
   - PV LRV-4mA = 0 ft/s
   - Coil Drive Frequency- Low Frequency setting

   Note
   The instructions for changing the calibration number, units, PV URV, PV LRV, and coil drive frequency can be found in the product reference manual.
4. Power down the transmitter.
5. Connect the transmitter to the Calibration Standard.
   See Calibration Standard connections to transmitter.
6. Power up the transmitter with the Calibration Standard connected.
7. Set the Calibration Standard to the 30 ft/s (9.1 m/s) setting.
8. Wait 30 minutes for accurate flow rate measurement.

   The electronics need 30 minutes to warm up and stabilize after the Calibration Standard is connected, oriented, and situated.

9. Read the flow rate.

   The flow rate reading after warm-up should be between 29.97 (9.1 m/s) and 30.03 ft/s (9.2 m/s).

10. If the reading is within the range, digital trim is not necessary.
    a) Power down the transmitter.
    b) Disconnect the Calibration Standard.
    c) Power up the transmitter.
    d) Return the transmitter to the original configuration parameters recorded in Step 2.
    e) Return the flow meter into service.

11. If the reading is not within this range, use the LOI or other configuration tool perform a digital trim.

    Performing the digital trim means simply executing the Digital Trim function and waiting for it to complete.

    - It takes about 90 seconds to complete. No transmitter adjustments are required.
    - You must use a Rosemount 8785 Calibration Standard to complete this procedure. Attempting a digital trim without a Rosemount 8785 Calibration Standard may result in an inaccurate transmitter or a “DIGITAL TRIM FAILURE” message.

12. After completing the digital trim, verify the calibration at each flow rate setting on the Calibration Standard:

    - Use the selector switch on the Calibration Standard to change the flow rate.
    - Use the transmitter LOI or other configuration tool to read the flow measurement.
    - The flow rate reading should be within ±0.1% of the simulated flow rate. For example, at 30 ft/s (9.14 m/s), the reading should be between 29.97 ft/s and 30.03 ft/s (between 9.13 m/s and 9.15 m/s).
    - If any of the verified values are not within ±0.1% of the simulated flow rate, replace the transmitter and/or contact an Emerson Flow representative for service (see back page).

    Note
    Only labeled and marked dial positions are used. The dial may turn to other positions but will not provide meaningful outputs.

13. After successful verification:

a) Power down the transmitter.

b) Disconnect the Calibration Standard.

c) Power up the transmitter.

d) Return the transmitter to the original configuration parameters recorded in Step 2.

e) Return the flow meter into service.

5 Product Specifications

5.1 Functional specifications

Ambient temperature limits

- Operating: +40 °F to 104 °F (+5 °C to 40 °C)
- Storage: –40 °F to 140 °F (–40 °C to 60°C)

Humidity Limits

0 to 95% relative humidity up to 13,000 ft (4000 m)

5.2 Performance specifications

Accuracy

- ±0.05% of rate at 30 ft/s
- ±0.10% of rate at 10 ft/s and 3 ft/s

Warm-up Time

5 minutes minimum; 30 minutes for best accuracy

Ambient Temperature Effect

< 0.015% of rate per 10 °F (< 0.027% per 10 °C)

Humidity Effect

- No effect from 0 to 60% relative humidity
- < 0.10% of rate from 60 to 95% relative humidity

5.3 Physical specifications

Electrical connections

Electrical connections are compatible with Model 8782 terminal blocks. Electrical connections are not compatible with other terminal blocks.

Orientation

Must be steady with all four feet firmly resting on a flat surface. Warm up time begins after the Calibration Standard is settled.

Materials of construction

Enclosure	Extruded aluminum and 316 stainless steel
Paint	Epoxy polyester

Weight

Approximately 10 lb (4.5 kg).

6 Troubleshooting

6.1 General troubleshooting

If the Calibration Standard does not seem to be working at all:

- Verify connections have been made properly, see Calibration Standard connections to transmitter.
- Inspect cables for wear and damage. Replacement cables can be ordered, see Replacement cables.
- Verify transmitter power supply and wiring, and correct if needed.

If the heat sink fins on the back of the Calibration Standard become bent or damaged, the Calibration Standard could overheat, which would affect its performance.

If the Calibration Standard appears to be working properly, but you suspect an inaccurate flow signal not caused by a faulty transmitter, the Calibration Standard may need to be calibrated at the factory. See Service.

7 Maintenance

7.1 Service

Replacement cables can be ordered and replaced in the field, see Replacement cables.

External and internal parts replacement and service cannot be performed in the field. The calibrator must be returned to the factory for these services.

The calibrator should itself be calibrated at the factory at least once per year, and any time you suspect that it is no longer producing an accurate flow signal.

See Emerson Flow customer service for service contact information.

7.2 Replacement cables

Table 7-1: Replacement cables part number

Part name	Part number
Cables (pair)	08785-0507

8 Product Certifications

For detailed approval certification information and installation drawings, please see the appropriate document listed below:

- Document number 00825-MA00-0009: *Rosemount 8782 and MS Approval Document - Class Division*
- Document number 00825-MA00-0010: *Rosemount 8782 and MS Approval Document - IECEx and ATEX*
- Document number 00825-MA00-0011: *Rosemount 8782 and MS Approval Document - North America Zone*
- Document number 00825-MA00-0012: *Rosemount 8785 Approval Document*
- Document number 00825-MA00-0013: *Rosemount 8782 and MS Approval Document - EAC EX*

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