



NATIONAL TYPE EVALUATION PROGRAM

Certificate of Conformance

for Weighing and Measuring Devices

For:

Meter Indicating Mass
Digital Electronic
Sensor Model: SITRANS FCS400-DNZZ
Transmitter Model: SITRANS FCT030
Accuracy Class 0.3

Submitted By:

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Standard Features and Options

- Dual Parallel Flow Tube Construction in Stainless or Hastelloy Material
- Sensor Part Number Designations (See Page 2)
- Integral Transmitter has a Category 2 Method of Sealing (See “Sealing” Starting on Page 2)
- Full Graphical Local Display HMI (Human-Machine Interface)
- Universal Serial Bus (USB) Service Interface
- Flow Coriolis Sensor (FCS)
- Flow Coriolis Transmitter (FCT)

Options:

- SIMATIC Process Device Manager (PDM) Communication Software for a Personal Computer (PC) for Parameter Setup and Diagnostics
- Remotely Configured Transmitter has a Category 2 Method of Sealing (See “Sealing” Starting on Page 2)

This device was evaluated under the National Type Evaluation Program and was found to comply with the applicable technical requirements of “NIST Handbook 44: Specifications, Tolerances and Other Technical Requirements for Weighing and Measuring Devices.” Evaluation results and device characteristics necessary for inspection and use in commerce are on the following pages. *Editorial changes, not affecting the type or metrological content, corrected this certificate.

Jerry Buendel
Chairman, NCWM, Inc.

Ronald Hayes
Committee Chair, National Type Evaluation Program Committee
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Meter Indicating Mass / Sensor Model: SITRANS FCS400-DNZZ and Transmitter Model: SITRANS FCT030

Application: For use in stationary installation applications. The mass flowmeter may be used to measure all normal liquids in units of mass and volume that fall within the specific gravity range of 0.59 and 1.1.

Products for Sensor Models		
Product Groups	Typical Products*	Specific Gravity Range
Normal Liquids	Water, Alcohols, Glycols, Water Mixes, Agricultural Liquids, Fertilizers, Chemicals, Petroleum Products, Solvents, Herbicides and Suspensions	0.59 – 1.1 (For Mass and Volume Units)

***Note:** Not all "typical products" listed in this table are covered by this certificate. Only those products falling within the specific gravity range listed in the last column are covered. Some products may have a specific gravity that falls into more than one product group. Only products, that fall into the product groups, and specific gravity ranges listed in this table are covered by this certificate.

Identification: The identification tag is located on the right side of the housing on the transmitter and also on the sensor body. The only variation of the sensor number is the last two digits represented by ZZ indicate tube size in mm.

Sensor Model Number Designations: (e.g., SITRANS FCS400-DN15)

SITRANS FCS400-DNZZ	Tube Inlet Diameter (Inch)	Flow Rates		Minimum Measured Quantity	
		lb/min	gal/min	lb	gal
ZZ = 15	0.50	12.6 – 225	1.5 – 27	4	0.48
ZZ = 25	1.0	40 – 560	4.8 – 67	40	4.8
ZZ = 50	2.0	162 – 1 950	19.4 – 234	160	19.2
ZZ = 80	3.0	205 – 7 500	24.6 - 899	200	24.0

Sealing: The sensor has no adjustable components that require the use of a physical security seal or audit trail. Mass flow transmitter Model SITRANS FCT030 is locked in Custody Transfer (CT) mode by breaking the wire security seal, unscrewing the front lid of the transmitter, and removing the display module. This allows access to the CT Duel In-Line Package (DIP) switch group as shown in Figure 1. The transmitter is then set into CT mode by setting the number 4 DIP switch in the "ON" position as shown in Figure 2.

To security seal the transmitter:

1. Remove lid-lock screw and detach the display lid.
2. Carefully pull out local display.
3. Set the DIP switch to CT mode.
4. Carefully push the display back into housing.
5. Remove the O-ring gasket from lid.
6. Reinstall the display lid until mechanical stop.
7. Rotate the display lid one complete revolution.
8. Mount the O-ring by pulling it over the display lid and rotate the lid in until friction is felt from the O-ring on both sides.
9. Rotate the display lid by one quarter of a turn to seal the O-ring.
10. Reinstall and tighten lid lock screw.
11. Verify the DIP switch transmitter software indicates the DIP switch is "ON" (See the procedure on the next page).

The transmitter may be remotely connected or physically installed on top of the sensor. The integral transmitter has a Category 2 method of sealing with two wire security seals and a CT DIP switch (Figure 3.). The remotely configured transmitter also has a Category 2 method of sealing with three wire security seals and a CT DIP switch (Figure 4.). The transmitter is set in the CT mode when the CT DIP switch is in the "ON" position. When the DIP switch is set in the "ON" position, the transmitter display will indicate "yes" for "ON" and "no" for "OFF" (Figure 6.).



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To verify that the transmitter software screen indicates the DIP switch is in the “ON” condition (so the transmitter is sealed properly) perform the following procedures:

1. Starting from the home screen where values are displayed, press the right-hand arrow to access the read-only option. Toggle up or down with the arrows until “read only” is highlighted, then press the right-hand arrow until you get to the main menu. This is Menu 1.
2. Press the up or down arrows until “Maintenance and Diagnostics” is highlighted. This is Menu 3. Press the right-hand arrow until you get to the “maintenance and diagnostics” menu. This is Menu 3.1.
3. Press the up or down arrows until “Characteristics” is highlighted. This is Menu 3.5. Press the right-hand arrow until you get to the “Characteristics” menu. This is Menu 3.5.1.
4. Press the up or down arrows until “CT Active” is highlighted. This is Menu 3.5.3. Press the right-hand arrow until you access the CT Settings. CT Active “YES” indicates that the device is in the CT mode and cannot be configured. CT Active “NO” indicates that the device is not in the CT mode and can be configured.
5. Once complete, (ensure CT Active “YES”) press the left-hand arrow until the device returns to the home screen where values are displayed.

The remotely configured transmitter also has a M12 plug variant that also has five wire security seals (Figure 5). For remote variants with M12 plugs, it is necessary to use the plug seal supplied with the flow sensor. The plug seal encases the M12 plug that prevents unauthorized removal of the sensor cable at either end.

The M12 plug is sealed in the following manner:

1. Ensure that the M12 plug is correctly installed and tight in its socket.
2. Clip the two halves of the plug seal together around the plug and sensor cable.
3. Ensure that the plug seal is free to rotate without catching on the plug or cable. The seal assembly prevents unauthorized access by disabling the ability to unscrew the plug from its socket.
4. Close the security seal with a seal wire and crimp it.

Test Conditions: The emphasis of the evaluation was on the performance and operation of the mass flow meter operating in a stationary mounted application. Initial and permanence examination was performed gravimetrically at both contracted and factory facilities using Model SITRANS FCT030 transmitters. The Models SITRANS FCS400-DN15, 25, 50, and 80 sensors were also evaluated at the same two facilities. Each sensor was tested using water as the test liquid (specific gravity of 1.0). The system was sealed after the initial test using water was performed. The system was retested after higher than the required 2000 x the max. flow rate was completed for each sensor model. Mass and volume tests were also conducted both times with four test drafts at five different flow rates per meter model. At a later date, a model SITRANS FCT030 transmitter and SITRANS FCS400-DN80 sensor was used to test volumetrically with the product Natural Gasoline at a specific gravity of 0.6 at a field location. The results were within applicable tolerances for mass flow meters.

Evaluated By: J. Roach (CA), D. Reiswig (CA), N. Ingram (CA)

Type Evaluation Criteria Used: *NIST Handbook 44 Specifications, Tolerances, and Other Technical Requirements for Weighing and Measuring Devices*, 2016 Edition. *NCWM Publication 14 Measuring Devices*, 2015 Edition.

Conclusion: The results of the evaluation and information provided by the manufacturer indicate the device complies with applicable requirements.

Information Reviewed By: J. Truex (NCWM)

Examples of Device:



SITRANS FCS400-DNZZ Series Sensor and SITRANS FCT030 Integral Transmitter



SITRANS FCS400-DNZZ Series Sensor with Remote SITRANS FCT030 Transmitter and M12 Plugs

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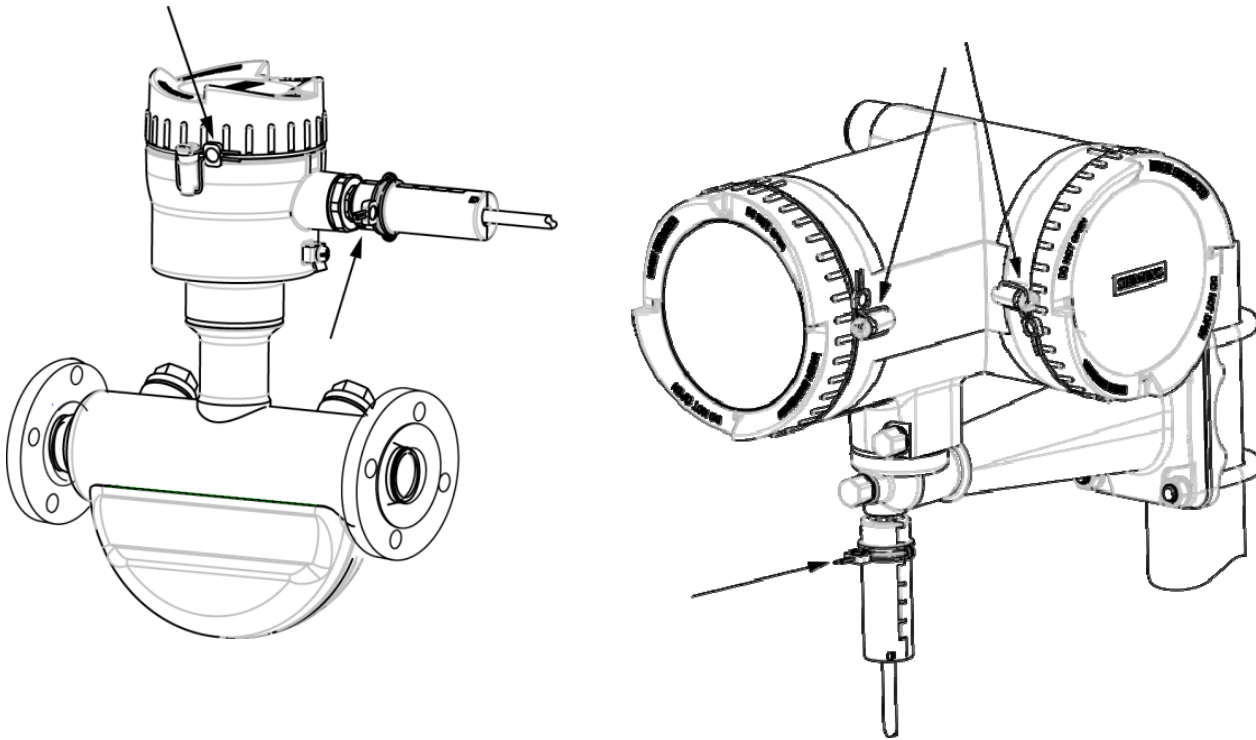


Figure 5: Remote transmitter and sensor with the M12 configuration. Arrows indicate the seal points of the three lock screws and two M12 plug variant wire security sealing provisions.

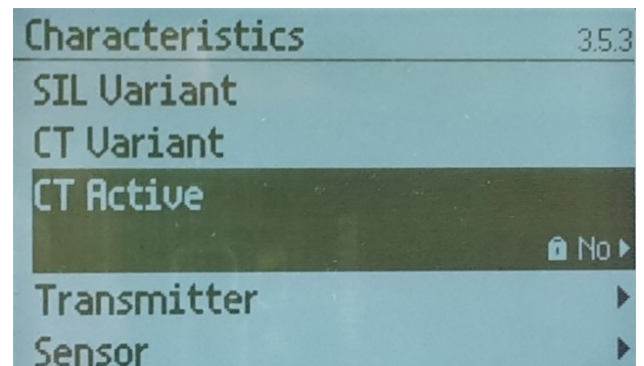
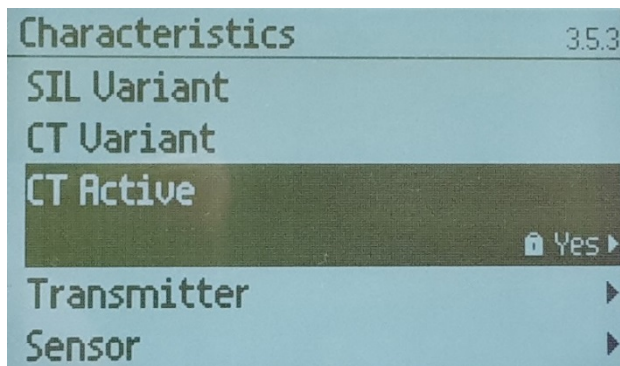


Figure 6: Menu 3.5.3. Custody Transfer Mode - Enabled and Disabled Display