

Smart In-Line Thermal Gas Mass Flow Meter Designed for Chlorine Applications

FEATURES

- Specially designed Kynar® PVDF 1" to 4" flow body with ANSI 150 LB RF flanges and 1" NPTF probe connection offers economical corrosion resistance
- Hastelloy® C-276 probe / sensors and 1" Swagelok® NPT compression fitting on the flow body
- Remote or integral electronics with NEMA4x (IP 65) or explosion proof (IP66) enclosure
- Digital display (optional) with instantaneous and totalized flow
- Digital MODBUS interface (optional) for easy PLC/DAQ integration plus analog 4-20 mA output
- Pre-installed chlorine calibration (accuracy +/- 5% full scale)
- Outstanding range-ability of 100:1
- Field adjustment of critical flow meter settings via on-board switches or Smart Interface software (included)



www.sierrainstruments.com



Chlorine-Trak™ 760S



DESCRIPTION

The Chlorine-Trak™ 760S has been specifically designed to perform as an accurate and cost-effective mass flow measurement solution for chlorine injection processes found in typical waste-water treatment applications.

Given the corrosive nature of chlorine gas (particularly in the presence of moisture), finding an economical measurement solution posed a great challenge to the industry. To answer this challenge, Sierra has designed a flow body manufactured from Kynar® polyvinylidene fluoride resin (PVDF). This material offers excellent corrosion and chemical resistance at both ambient and elevated temperatures. PVDF is also inherently stable, mechanically tough, and abrasion and flame resistant.

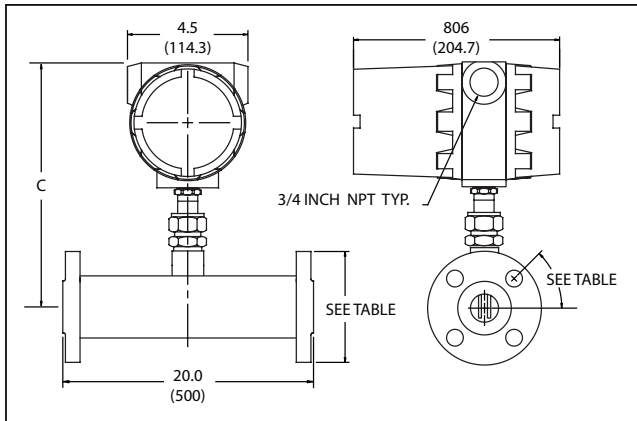
The 760S's flow sensor utilizes a 6" Hastelloy® C probe and 1" Swagelok® Hastelloy® NPT compression fitting to mate with the Kynar® PVDF flow body. Hastelloy C is highly resistant to pitting and crevice corrosion and is used extensively in the most corrosive environments.

With its sizable turndown (100:1) and a mass flow reading that requires no pressure or temperature compensation, Sierra's highly repeatable and stable sensor technology offers an accurate solution for chlorine flow measurement at an economical price.

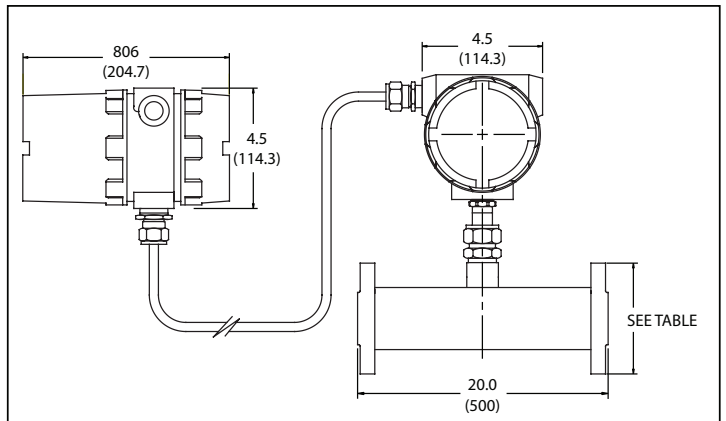
Sierra's Smart Interface™ software guides you through a procedure to fully validate instrument performance and allows for field adjustment of critical flow meter settings.

DIMENSIONAL SPECIFICATIONS - ELECTRONIC & PROBE

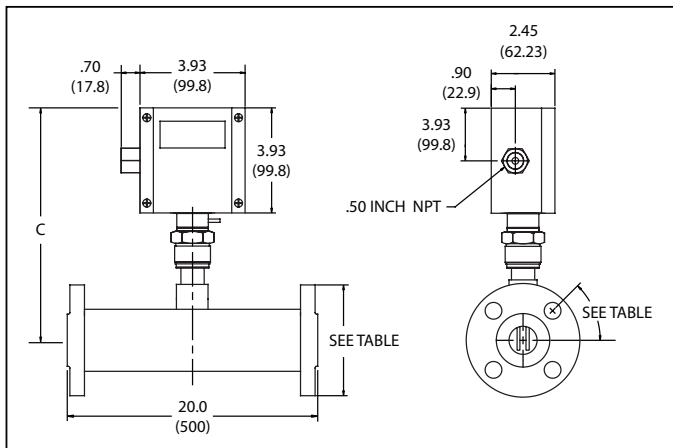
E2



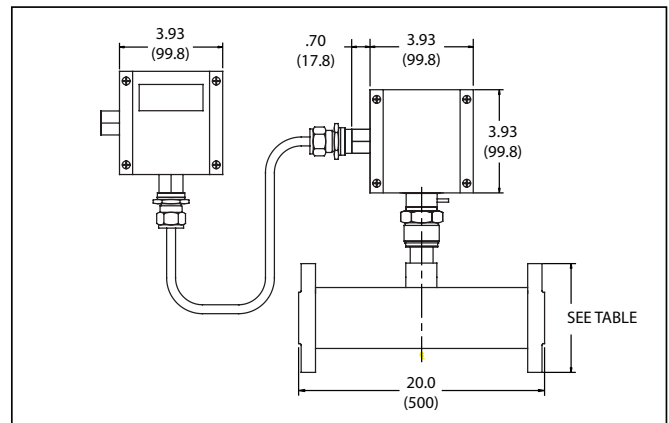
E4 Remote



EN2



EN4 Remote



DIMENSIONAL SPECIFICATIONS - FLOW BODY

Note: Face to face is 20" (500mm)

| Kynar Flow Body | | | | C | C |
|-----------------|-----------------|------------------------------|----------------------|---------------|---------------|
| Size | Flange Diameter | Number/ Diameter of Holes | Bolt Circle Diameter | E2 | EN2 |
| 1" (25) | 4.25" (108) | 4 .62 (15.7) | 3.12 (79) | 10.5 (267) | 10.0 (254) |
| 1.5" (38) | 5.0" (127) | 4 .62 (15.7) | 3.88 (99) | 11.6 (295) | 11.0 (279) |
| 2" (51) | 6.0" (152) | 4 .75 (19.1) | 4.75 (121) | 10.6 (269) | 10.1 (257) |
| 3" (76) | 7.5" (191) | 4 .75 (19.1) | 6.0 (152) | 11.6 (295) | 11.1 (282) |
| 4" (102) | 9.0" (229) | 8 .75 (19.1) | 7.5 (191) | 11.6 (295) | 11.1 (282) |

PIPING REQUIREMENTS

Minimum required straight piping before the flow meter. NOTE: Unlike the the Sierra 760S, the 760S Series does not contain built-in flow conditioners. Straight piping before the flow meter is therefore very important for proper operation. See table below.

| Piping Condition 760S | |
|-----------------------------------|-----|
| Single 90° Elbow or T-Piece | 28D |
| Reduction (4:1) | 14D |
| Expansion (4:1) | 30D |
| After Control Valve | 32D |
| Two 90° Elbows (In Same Plane) | 36D |
| Two 90° Elbows (Different Planes) | 62D |

Note: 5D Required after flow meter

OPERATING SPECIFICATIONS**Gases**

Dry Chlorine Gas (contact Sierra for other gases)

Gas Pressure limitations: up to 120 psig (8 barg)

Gas Temperature limitations: 15° F to 212° F (-9° C to 100° C)

Pressure Drop

Negligible

PERFORMANCE SPECIFICATIONS**Accuracy**

+/- 5.0 % of full scale (chlorine correlation)

Repeatability

+/- 0.2% of full scale

Temperature Coefficient

± 0.02% of reading per °F within ± 50° F of customer specified conditions

± 0.03% of reading per °F within ± 50° F to 100° F of customer specified conditions

± 0.04% of reading per °C within ± 25° C of customer specified conditions

± 0.06% of reading per °C within ± 25° C to 50° C of customer specified conditions

Pressure Coefficient

.02% per psi (.07 barg)

Response Time

One second to 63% of final velocity value

Gas & Ambient Temperature

Gas 15° F to 212° F (-9° C to 100° C)

Ambient -5° F to 120° F (-20° C to 50° C)

Leak Integrity

5 X 10⁻⁴ cc/sec of helium maximum

Power Requirements

18 to 30 VDC (regulated), 625 mA maximum

100 to 240 VAC, 50/60 hz, 15 watts maximum

Output Signal

Linear 4–20 mA proportional to mass flow rate,

700 ohms maximum resistance power supply dependent

User-selectable . . Active non-galvanically separated or

Passive galvanically separated (loop power required)

MODBUS RTU (optional)

Alarms

Hard contact user-adjustable high and low

Dead band adjustable with Smart Interface™ software

Relay ratings Maximum 400 VDC or VAC (peak), 140 mA

PERFORMANCE SPECIFICATIONS continued**Displays**

Alphanumeric 2 x 12 digit backlit LCD

Adjustable variables via on-board switches (password protected) or with Smart Interface™ software.

Adjustable variables Full scale (50 to 100 %)

. Time Response (1 to 7 seconds)

. Correction factor setting (0.5 to 5)

. Zero and span

. High and low alarm settings

Totalizer

Seven digits (9,999,999) in engineering units

Resettable by software, on-board switches

Software

Smart Interface™ Windows®-based software

Minimum 8 MB of RAM, preferred 16 MB of RAM RS 232 communication

Additional features Alarm dead band adjustment

. Zero cut-off adjustment

. Linearization adjustment

. Save / Load configurations

. Fully guided flow meter validation

PHYSICAL SPECIFICATIONS**Wetted Materials**

Flow Body: Kynar® polyvinylidene fluoride resin

Sensor Probe: 6" Hastelloy® C-276 probe and 1" Swagelok®

Hastelloy® C-276 NPT compression fitting to mate with the

Kynar® PVDF flow body.

Enclosure

NEMA 4X (IP65) powder-coated cast aluminum

IP66 explosion proof

Electrical Connections

One 1/2 inch NPT . . . NEMA 4X Enclosure (IP65)

Two 3/4 inch NPT on explosion proof

Body Specifications

K4: 1" ANSI 150 lb Flange-Kynar Flow body with 6" Hastelloy probe (max flow 20 scfm, 32 nm³/hr)

K5: 1.5" ANSI 150 lb Flange-Kynar Flow body with 6" Hastelloy probe (max flow 45 scfm, 71 nm³/hr)

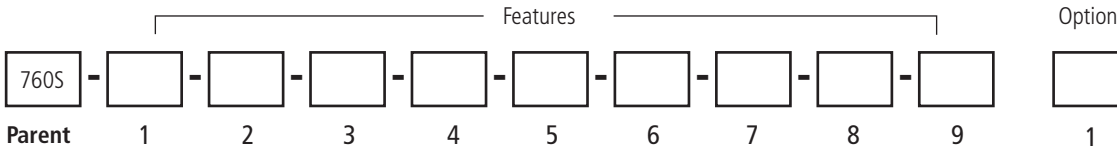
K6: 2" ANSI 150 lb Flange-Kynar Flow body with 6" Hastelloy probe (max flow 75 scfm, 118 nm³/hr)

K7: 3" ANSI 150 lb Flange-Kynar Flow body with 6" Hastelloy probe (max flow 175 scfm, 276 nm³/hr)

K8: 4" ANSI 150 lb Flange-Kynar Flow body with 6" Hastelloy probe (max flow 300 scfm, 473 nm³/hr)

Note: smaller bodies are NOT available.

For larger bodies >4" submit RFQ.



Instructions: To order a 760s please fill in each number block by selecting the codes from the corresponding features below.

| Parent Number | |
|---------------|--|
| 760S | Chlorine-Trak™ In-line Mass Flow Meter. Specially designed flow body manufactured from Kynar® polyvinylidene fluoride resin. 18-30 VDC or 100-240VAC input power with 3/4-inch diameter 6-inch long Hastelloy® probe. Includes "Smart Electronics" with PC configuration software. Application limits: 15°F to 212°F (-9°C to 100°C) and 120 psig (8.3 barg). CE approvals. Linear 0-5 VDC or 4-20 mA output signals. Modbus optional. |

| Feature 1: Approvals | |
|----------------------|---------------------------|
| NAA | Non-Agency Approved Meter |

| Feature 2: Body Size-ANSI 150 | |
|-------------------------------|---|
| K4 | 1-inch ANSI class 150 Flange-Kynar flow body with 6-inch Hastelloy probe (max flow 100 scfm, 157 nm ³ /hr) |
| K5 | 1.5-inch ANSI class 150 Flange-Kynar flow body with 6-inch Hastelloy probe (max flow 245 scfm, 386 nm ³ /hr) |
| K6 | 2-inch ANSI class 150 Flange-Kynar flow body with 6-inch Hastelloy probe (max flow 410 scfm, 646 nm ³ /hr) |
| K7 | 3-inch ANSI class 150 Flange-Kynar flow body with 6-inch Hastelloy probe (max flow 917 scfm, 1447 nm ³ /hr) |
| K8 | 4-inch ANSI class 150 Flange-Kynar flow body with 6-inch Hastelloy probe (max flow 1597 scfm, 2519 nm ³ /hr) |

Note: Smaller bodies are not available. For larger bodies > 4 inch submit RFQ.
Application limits: 15°F -212°F (-9°C to 100°C); up to 120 psig (8 barg)

| Feature 3: Enclosure | |
|----------------------|---|
| E2 | Hazardous-area location enclosure (IP66). Mounted directly on probe. |
| E4 () | Remote hazardous-area location enclosure (IP66) with junction box , specify cable length in parenthesis. Maximum 200 feet (61m) (IP66) housing mounted up to 200 feet (61m) from flow body; includes (IP66) junction box mounted on probe and mounting bracket (304SS) Specify cable length between brackets |
| EN2 | NEMA 4X (IP65) Enclosure. Mounted directly on probe. |
| EN4 () | Remote NEMA 4X (IP65) Enclosure with Junction Box. Specify cable length in parenthesis. Maximum 200 feet (61m). Mounted up to 200 feet (61m) away from the probe with junction box mounted on probe. Includes remote electronics enclosure and 1/2-inch Female NPT connection. Specify cable length between brackets |

| Feature 4: Input Power | |
|------------------------|---|
| P2 | 18-30 VDC |
| P3 | 100-240 VAC. Not available with EN enclosures |

| Feature 5: Output Power | |
|-------------------------|------------------|
| V1 | 0-5 VDC, linear |
| V3 | 0-10 VDC, linear |
| V4 | 4-20 mA, linear |

| Feature 6: Display | |
|--------------------|---|
| NR | No readout |
| DD | Digital display. 2 x 12 digit, backlit, LCD display indicates flow rate and totalized mass in engineering units. Simplifies configuration settings and provides system status information |
| DD-NRT | Totalizer cannot be reset in the field. |

| Feature 7: Gas | |
|----------------|---|
| 3 | Chlorine (correlation: Accuracy +/- 5.0%) |
| 99 | Other |

Application limits: See flow body for flow rate limits; 15° - 90°F (-9° to 32°C); up to 120 psig (8.3 barg). +/-5% full scale accuracy

| Option 1 : Digital Communications | |
|-----------------------------------|--|
| Pulse | Totalizer pulse output (Only available with E2/E4 enclosures WITH DD. Available on ALL EN2 Enclosures) |
| DP1 | Profibus DP using an M12 connector (available E2/ E4-P2, NAA only) with full device description |
| DP2 | Profibus DP using a 2-wire terminal block connection (available E2/ E4-P2 config only) with full device description |
| MB | Modbus RTU with full device description (P2 only) |
| FF | Foundation Fieldbus with full device description (available E2/ E4-P2 config only) |
| HART | HART universal variables; flow totalizer, K-factor, user full scale, and instantaneous flow (available E2-P2 /E4-P2) config only). |

Note: No FM approval with any 760S digital communications options.