

# 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)

# 760S Chlorine-Trak™



## DESCRIPTION

**T**he 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 wastewater 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.



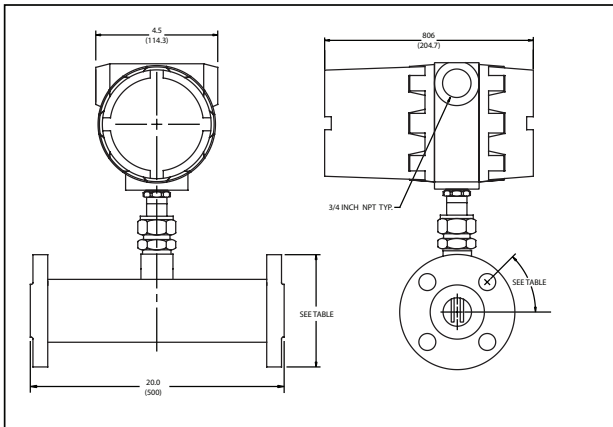
**SIERRA®**

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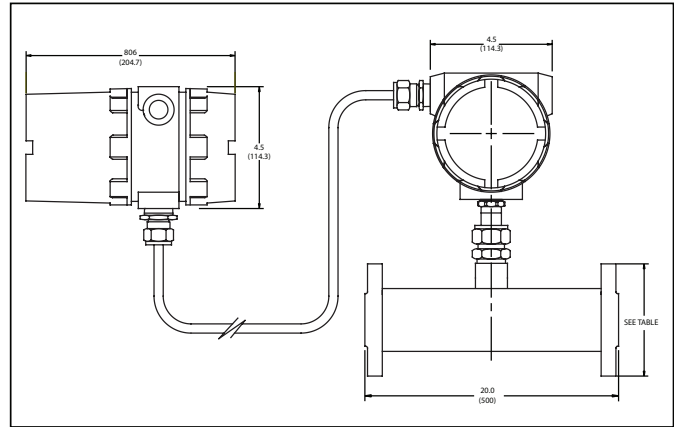


## DIMENSIONAL SPECIFICATIONS - ELECTRONIC & PROBE

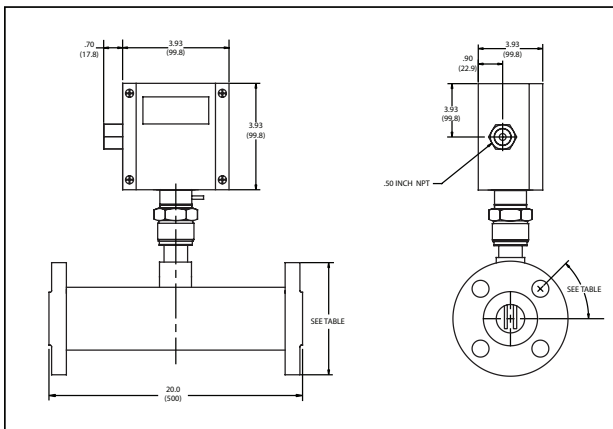
E2



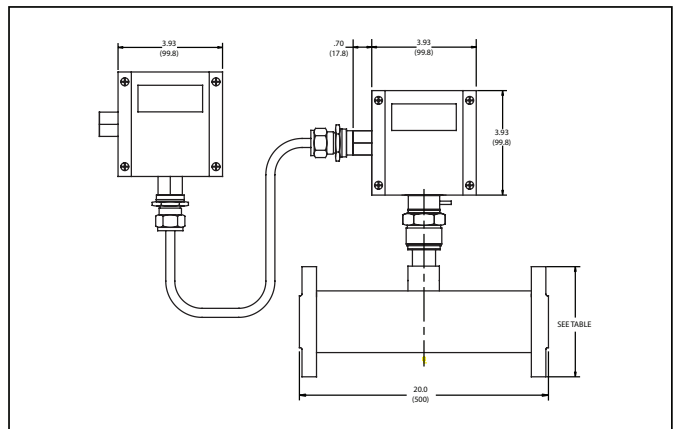
E2 Remote



EN2



EN2 Remote



## DIMENSIONAL SPECIFICATIONS - FLOW BODY

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

Kynar Flow Body			
Size	Flange Diameter	Number/ Diameter of Holes	Bolt Circle Diameter
1" (25)	4.25" (106.25)	4.62 (15.5)	3.12 (78)
1.5" (37.5)	5.0" (125)	4.62 (15.5)	3.88 (97)
2" (50)	6.0" (150)	4.75 (18.75)	4.75 (118.75)
3" (75)	7.25" (181.25)	4.75 (18.75)	6.0 (150)
4" (100)	9.0" (225)	4.75 (18.75)	7.5 (187.5)

## PIPING REQUIREMENTS

Minimum required straight piping before the flow meter. NOTE: Unlike the the Sierra 708S, the 760S Series does not contain built-in flow conditions. 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)

### Mechanical design pressure:

Hastelloy® C-276 Compression fittings: 500 psig (34.5 barg)

150 lb flange and Kynar body (-40° F to 100° F): 230 psig (15.9 barg)

### 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

### 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 probe and 1" Swagelok®

Hastelloy® 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)

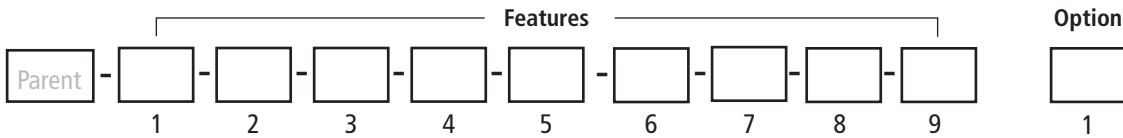
K7: 3" ANSI 150 lb Flange-Kynar Flow body with 6" Hastelloy probe (max flow 175 scfm, 276 nm3/hr)

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.

## ORDERING INFORMATION



Instructions: To order a 820S/840 please fill in each number block by selecting the codes from the corresponding features below and following pages.

Parent Number	
<b>760S</b>	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 diam 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	
<b>NAA</b>	Non-Agency Approved Meter

Feature 2: Body Size-ANSI 150	
<b>K4</b>	1-inch ANSI class 150 Flange-Kynar flow body with 6-inch Hastelloy probe (max flow 20 scfm, 32 nm3/hr)
<b>K5</b>	1.5-inch ANSI class 150 Flange-Kynar flow body with 6-inch Hastelloy probe (max flow 45 scfm, 71 nm3/hr)
<b>K6</b>	2-inch ANSI class 150 Flange-Kynar flow body with 6-inch Hastelloy probe (max flow 75 scfm, 118 nm3/hr)
<b>K7</b>	3-inch ANSI class 150 Flange-Kynar flow body with 6-inch Hastelloy probe (max flow 175 scfm, 276 nm3/hr)
<b>K8</b>	4-inch ANSI class 150 Flange-Kynar flow body with 6-inch Hastelloy probe (max flow 300 scfm, 473 nm3/hr)

Note: Smaller bodies are not available. For larger bodies > 4 inch submit RFQ.  
Application limits: 15°F -90°F (-9°C to 32°C); up to 120 psig (8 barg)

Feature 3: Enclosure	
<b>E2</b>	Hazardous-area location enclosure (IP66). Mounted directly on probe.
<b>E4 ( )</b>	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
<b>EN2</b>	NEMA 4X (IP65) Enclosure. Mounted directly on probe.
<b>EN4 ( )</b>	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 mounting bracket and 1/2-inch Female NPT connection.  Specify cable length between brackets

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

Feature 5: Output Power	
<b>V1</b>	0-5 VDC, linear
<b>V3</b>	0-10 VDC, linear
<b>V4</b>	4-20 mA, linear

Feature 6: Display	
<b>NR</b>	No readout
<b>DD</b>	Digital display. 2 x 12 digit, backlit, LCD display indicates flow rate and totaled mass in engineering units. Simplifies configuration settings and provides system status information

Feature 8: Gas	
<b>3</b>	Chlorine (correlation: Accuracy +/- 5.0%)
<b>99</b>	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	
<b>Pulse</b>	Totalizer pulse output (Only available with E2/E4 enclosures WITH DD. Available on ALL EN2 Enclosures)
<b>DP1</b>	Profibus DP using an M12 connector (available E2/ E4-P2, NAA only) with full device description
<b>DP2</b>	Profibus DP using a 2-wire terminal block connection (available E2/ E4-P2 config only) with full device description
<b>MB</b>	Modbus RTU with full device description (P2 only)
<b>FF</b>	Foundation Fieldbus with full device description (available E2/ E4-P2 config only)
<b>HART</b>	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.

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