



Series 534HS Pressure Transmitter

General Instructions

General

These instructions provide information for installation, process connection, electrical connection and field calibration of SOR-Series 534HS Pressure Transmitters. The 534HS Pressure Transmitter consists of a field proven thin film pressure transducer and a reliable electronic circuit. The housing features external adjustments and stainless steel construction.

The 534HS is capable of powering long cable lengths. See Formulas 1 and 2 for maximum loop resistance formulas.

NOTE: This instrument is non-repairable. If you suspect that it is defective, contact the factory or the SOR representative in your area for a return authorization number.

Installation

Ensure that wiring conforms to all applicable local and national electrical codes and install unit(s) according to relevant national and local safety codes.

Normally, line mounting provides adequate support for the instrument. *When the installation is complete, the external adjustments must be accessible.* (See Figures 2 and 4.) Determine whether the process connection or the electrical connection will be made first.

Making the Process Connection First

The process connection is threaded onto a fitting within an adequately supported process piping system. Use two open end wrenches when connecting the pressure port to a process piping system: one wrench to hold the hex flats of the pressure connection, the other to tighten the process fitting. Electrical connection may be rigid or flexible conduit.

Making the Electrical Connection First

The electrical connection may be installed on an adequately supported rigid conduit system. Use suitable locknuts (not provided) when mounting the instrument to an unthreaded (knockout) hole. Process connection pipe or tubing may be rigid or flexible. Securely connect the conduit pipe or fitting by holding the hex on the electrical connection while tightening.

WARNING: Unit in Hazardous Locations - Prior to removal from service, make sure that the work area is declassified. Failure to do so could result in severe personal injury or substantial property damage.

Specifications

Design and specifications are subject to change without notice.

Accuracy (L, H, & R)	±0.25% of calibrated span
Temperature effects	
Compensated range	-20 to 160°F (-29 to 71°C)
Ambient limits	-40 to 185°F (-40 to 85°C)
Process limits	-40 to 250°F (-40 to 121°C)
Storage	-40 to 185°F (-40 to 85°C)
Zero shift per 100°F @ -20 to 160°F	±1% URL
Span shift per 100°F @ -20 to 160°F	±1% URL
Stability	≤0.5% URL / 12 months
Response time	≤ 25 ms
External adjustability	
Span turndown ratio	5:1
Zero	±10% URL
Supply voltage	Loop powered 11 to 30 VDC
Output	4 to 20 mA
Power supply effect	≤0.005% FSO/Volt
Max. current	35 mA
Max. load resistance	650 ohms @ 24 VDC
Housing	
Construction	316SS (CF8M)
Electrical connection	
Size	1/2 NPT(M)
Termination	24 AWG wire leads (optional terminal box)
Circuit protection	Reverse Polarity, EMI/RFI
Shipping weight	1.8 lbs (0.8 kg)

Electrical Termination 534HS-TN

Three 18" flying leads are provided for connection to a terminal strip within a cabinet or a splice within an outlet box:

Red (+) } Loop Voltage: 11 to 30 VDC; Output: 4 to 20 mA
Black (-) }
Case ground (bare wire) should be connected to earth ground.

Formula for determining maximum loop resistance

$$R_L (\text{MAX}) = \frac{V_{\text{Supply}} - 11V}{20\text{mA}}$$

FORMULA 1

Calibration

Two calibration screws (zero and span) are located underneath the adjustment cover. (See Figure 3.) Loosen the cover screws slightly (do not remove) and rotate the cover to reveal the adjustment screws.

Numbers on the enclosure identify the adjustment screws: 1, 2 and 3.

- Adjustment #1: Zero
- Adjustment #2: Not used
- Adjustment #3: Span

Unless specified otherwise, the transmitter is factory calibrated to 4 mA @ 0 psi and 20 mA at the upper limit of the adjustable range specified on the nameplate.

Calibration Procedure

The zero and span calibration procedure should be performed under ambient process temperature conditions.

A pressure source with a calibrated reference gage, a milliammeter and a DC voltage supply are required. Note the adjustable range on the instrument nameplate. For both zero and span adjustments, turn the adjustment screw clockwise to increase, counterclockwise to decrease.

1. Connect the transmitter as shown in Figure 1.
Case ground must be connected to earth ground to ensure EMI/RFI protection.
2. Apply pressure at which 4 mA output is desired. (Zero may be adjusted $\pm 10\%$ of the upper range limit.)
3. When zero is elevated above 0 psi, maintain 80% of the range of the transmitter range between the 4 mA and 20 mA points.
4. With pressure source steady at the desired zero level, rotate the zero adjustment (#1) for a 4 mA indication on the milliammeter.

5. Apply pressure at which 20 mA output is desired. Span may be adjusted from 20 to 100% of the upper range limit. (Maximum turndown is 5:1.)
6. With pressure source steady at the desired span level, rotate the span adjustment (#3) for a 20 mA indication on the milliammeter.
7. Repeat Steps 2 through 6 as needed if offsetting 4 mA from the normal zero point.

If interaction occurs, turn zero and span 15 turns counterclockwise. Repeat Steps 2 through 7 above.

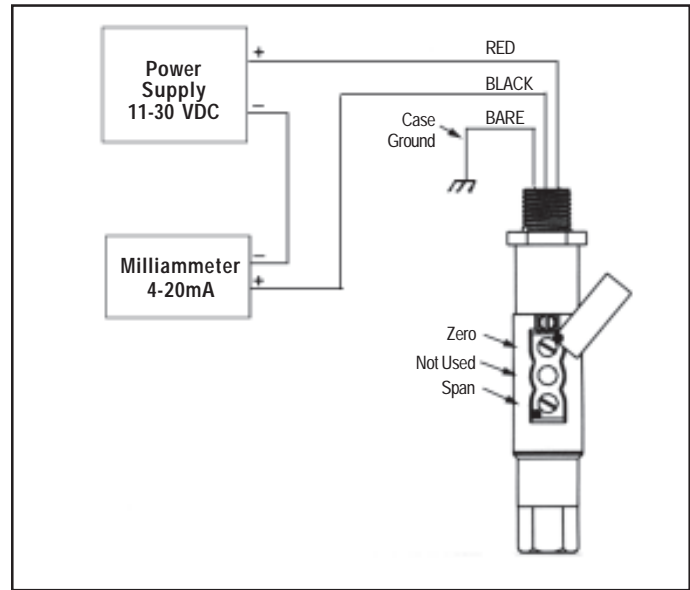


FIGURE 1

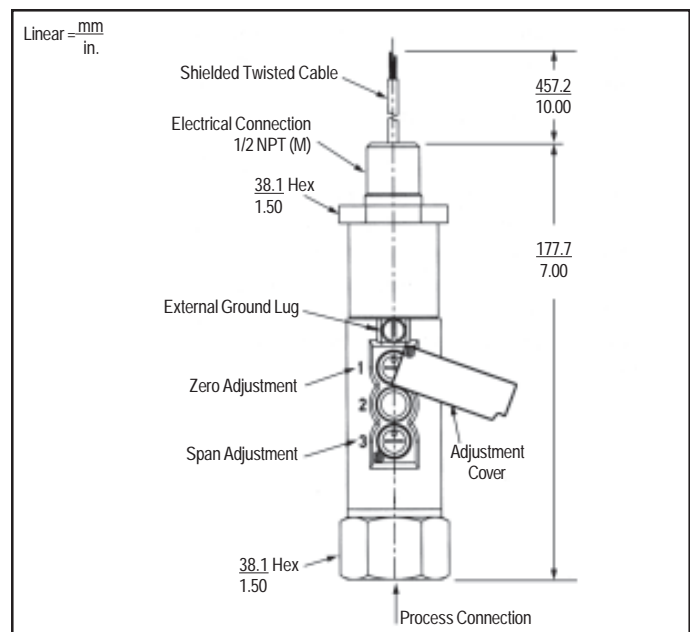


FIGURE 2

Electrical Termination - 534HS-VN

Three screw terminals and center ground are provided for electrical connection, labeled as follows:

- + 11-30 VDC + Power Connection
- Power supply ground

1-5 VDC Output

GND Case ground should be connected to earth ground

Formula for determining maximum loop resistance

$$R_L (\text{Max}) = \frac{V_{\text{Supply}} - 16V}{20\text{mA}}$$

FORMULA 2

Calibration

Two calibration screws (zero and span) are located underneath the adjustment cover. (See Figure 4.) Loosen the cover screws slightly (do not remove) and rotate the cover to reveal the adjustment screws.

Numbers on the enclosure identify the adjustment screws: 1, 2 and 3.

- Adjustment #1: Zero
- Adjustment #2: Not used
- Adjustment #3: Span

Unless specified otherwise, the transmitter is factory calibrated to 1 VDC @ 0 psi and 5 VDC at the upper limit of the adjustable range specified on the nameplate.

Calibration Procedure

The zero and span calibration procedure should be performed under ambient process temperature conditions.

A pressure source with a calibrated reference gage, a voltmeter and a DC voltage supply are required. Note the adjustable range on the instrument nameplate. For both zero and span adjustments, turn the adjustment screw clockwise to increase, counterclockwise to decrease.

1. Connect the transmitter as shown in Figure 3. Case ground must be connected to earth ground to ensure EMI/RFI protection.
2. Apply pressure at which 1 VDC output is desired. (Zero may be adjusted up to $\pm 10\%$ of the upper range limit.)
3. When zero is elevated above 0 psi, maintain 80% of the transmitter range between the 1 VDC and 5 VDC points.

4. With pressure source steady at the desired zero level, rotate the zero adjustment (#1) for a 1 VDC indication on the voltmeter.
5. Apply pressure at which 5 VDC output is desired. Span may be adjusted from 20 to 100% of the upper range limit. (Maximum turndown is 5:1.)
6. With pressure source steady at the desired span level, rotate the span adjustment (#3) for a 5 VDC indication on the voltmeter.
7. Repeat Steps 2 through 6 as needed if offsetting 1 VDC from the normal zero point.

If interaction occurs, turn zero and span 15 turns counterclockwise. Repeat Steps 2 through 7 above.

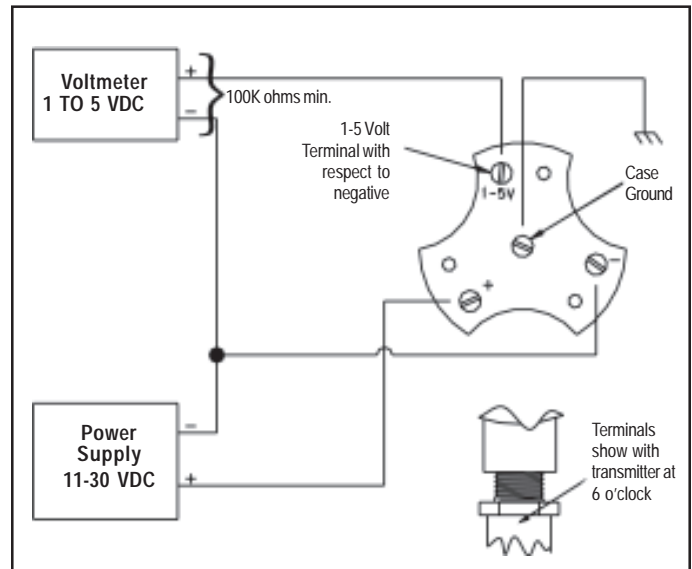


FIGURE 3

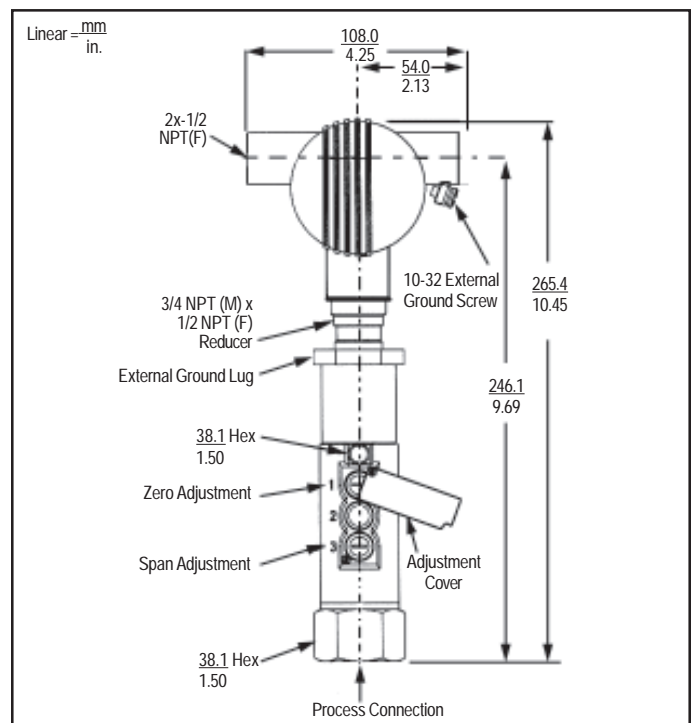


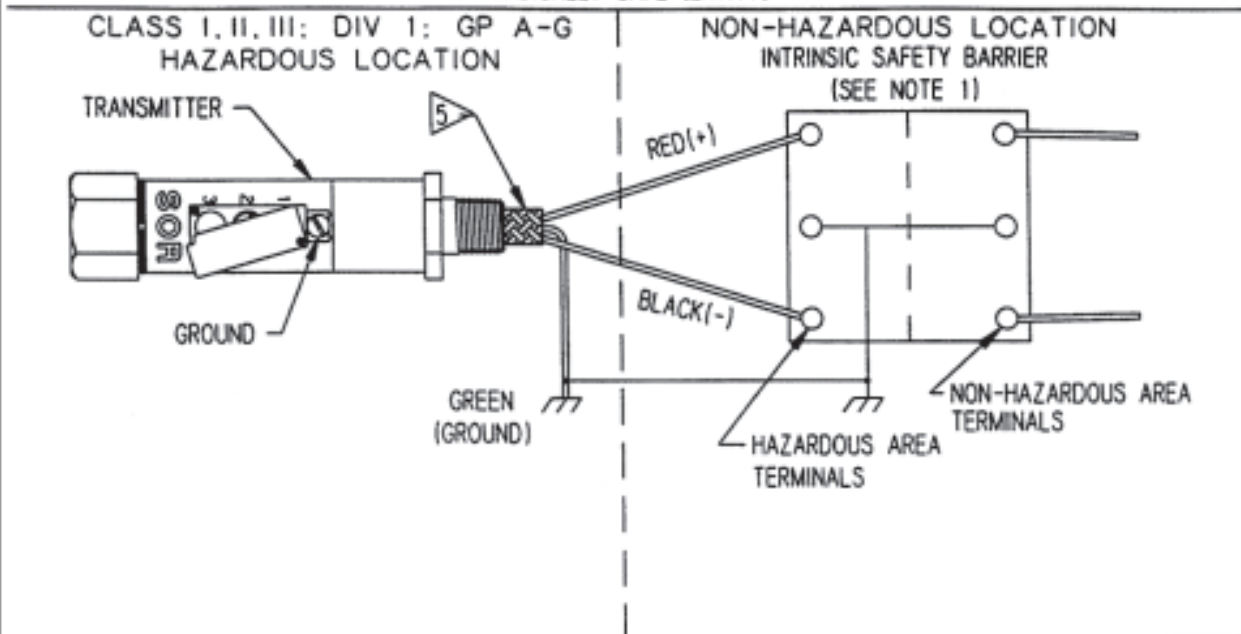
FIGURE 4

CONTROL DRAWING 9130-103

SERIES 534HS TRANSMITTER

FM APPROVED

INTRINSICALLY SAFE (ENTITY)



ENTITY PARAMETERS	
$V_{max} = 30V$	$V_{oc} \text{ or } V_t \leq 30V$
$I_{max} = 100ma \text{ (GP A-G)}$	$I_{sc} \text{ or } I_t \leq 100ma \text{ for CL I, II, III; DIV 1; GP A, B, C, D, E, F, G}$
$I_{max} = 150ma \text{ (GP C-G)}$	$I_{sc} \text{ or } I_t \leq 150ma \text{ for CL I, II, III; DIV 1; GP C, D, E, F, G}$
$P_{max} = 1W$	$\left(\frac{V_{oc} \text{ or } V_t \times I_{sc} \text{ or } I_t}{4} \right) \leq 1W$
$C_i = 60nf$	SEE NOTE 1
$L_i = 4\mu H$	SEE NOTE 1

NOTES:

1. FMRC ENTITY APPROVED BARRIER. USED IN AN APPROVED CONFIGURATION WHERE BARRIER V_{oc} OR V_t DOES NOT EXCEED TRANSMITTER V_{max} AND BARRIER I_{sc} OR I_t DOES NOT EXCEED TRANSMITTER I_{max} . C_i OF TRANSMITTER PLUS CAPACITANCE OF INTERCONNECTING WIRING MAY NOT EXCEED BARRIER C_a . L_i OF TRANSMITTER PLUS INDUCTANCE OF INTERCONNECTING WIRING MAY NOT EXCEED BARRIER L_a .
2. CONTROL EQUIPMENT CONNECTED TO BARRIER MUST NOT USE OR GENERATE MORE THAN 250 Vrms OR Vdc.
3. INSTALLATION SHOULD BE IN ACCORDANCE WITH ANSI/ISA PR12.6 "INSTALLATION OF INTRINSICALLY SAFE SYSTEMS FOR HAZARDOUS (CLASSIFIED) LOCATIONS" AND THE NATIONAL CODE (ANSI/NFPA 70).
4. ASSOCIATED APPARATUS MANUFACTURERS INSTALLATION DRAWING MUST BE FOLLOWED WHEN INSTALLING THIS EQUIPMENT.

5 BELDEN CABLE P/N 9501 NEC CM PCCPT4 OR EQUIVALENT RATED AT 300V, 80°C MINIMUM

MAXIMUM LENGTH 45M (150ft).
 CAPACITANCE OR 131 pF/M (40 pF/ft).
 INDUCTANCE OF 0.82 μH /M (0.25 μH /ft)
 RESISTANCE OF 78.7 $m\Omega$ /M (24 $m\Omega$ /ft).

THIS DRAWING NOT TO BE CHANGED WITHOUT FACTORY MUTUAL APPROVAL.

DRAWING NO. 9130-101

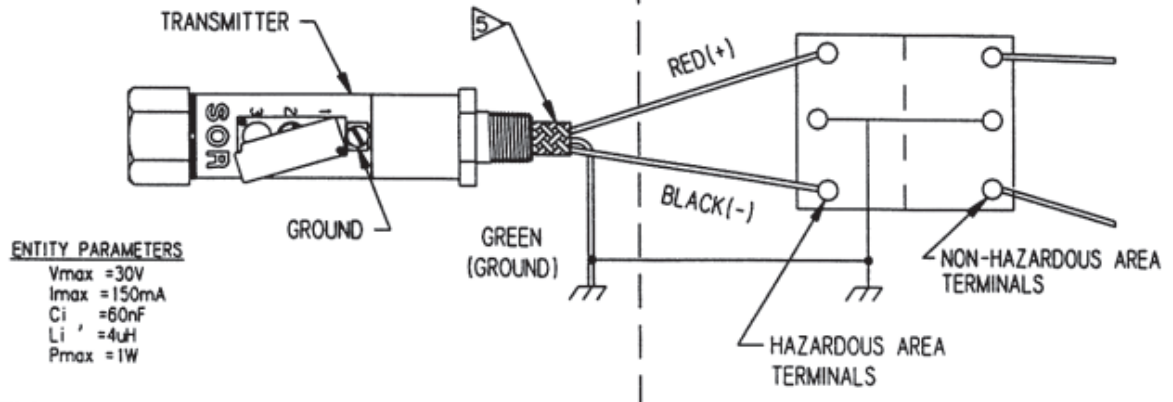
CONTROL DRAWING 9130-101

SERIES 534HS TRANSMITTER

CSA CERTIFIED

HAZARDOUS LOCATION
CLASS I, II, III; DIV 1; GP A-G

NON-HAZARDOUS LOCATION



FOR INTRINSICALLY SAFE INSTALLATION, USE ONLY WITH A CSA CERTIFIED BARRIER WITH RATINGS AS FOLLOWS:

ZENER DIODE BARRIER STYLE	U MAX	R MIN	APPROVED FOR CL I, II, III
SINGLE CHANNEL	30Vdc	330 OHM	GROUPS A, B, C, D E, F, G
	28.5Vdc	300 OHM	
	25Vdc	200 OHM	
	22Vdc	180 OHM	
DUAL CHANNEL-SUPPLY -RETURN	SAME AS SINGLE CHAN.	50 OHM	GROUPS C, D, E, F, G
SINGLE CHANNEL	30Vdc	150 OHM	
DUAL CHANNEL-SUPPLY -RETURN	30Vdc	150 OHM	
	10Vdc	50 OHM	

- NOTES: 1. FOR MULTI-BARRIER SYSTEMS, ALL BARRIERS MUST BE THE SAME POLARITY.
 2. BARRIER GROUND AND TRANSMITTER GROUND MUST BE AT THE SAME POTENTIAL.
 3. HYDROSTATIC TEST 10% OF EXPLOSION PROOF HOUSINGS TO 225 PSI FOR 1 MINUTE.

- BARRIERS MUST BE INSTALLED IN ACCORDANCE WITH MANUFACTURERS INSTRUCTIONS.
- BARRIER PARAMETERS MUST MEET THE FOLLOWING REQUIREMENTS:
 $V_{oc} \leq V_{max}$ $C_a \geq C_i + C_{Cable}$
 $I_{sc} \leq I_{max}$ $L_a \geq L_i + L_{Cable}$
- MAXIMUM NON-HAZARDOUS AREA VOLTAGE MUST NOT EXCEED 250V.
- INSTALL IN ACCORDANCE WITH CANADIAN ELECTRICAL CODE, PART 1.
- BELDEN CABLE P/N 9501 NEC CM PCPT4 OR EQUIVALENT RATED AT 300V, 80°C MINIMUM.
 MAXIMUM LENGTH 45M (150ft)
 CAPACITANCE OF 131 pF/M (40 pF/ft)
 INDUCTANCE OF 0.82 μH/M (0.25 μH/ft).
 RESISTANCE OF 78.7 mΩ/M (24 mΩ/ft).

Exia INTRINSICALLY SAFE/SECURITE INTRINSEQUE
 WARNING: SUBSTITUTION OF COMPONENTS MAY IMPAIR INTRINSIC SAFETY.
 ADVERTISSEMENT: LA SUBSTITUTION DE COMPOSANTS PEUT COMPROMETTRE LA SECURITE INTRINSEQUE

THIS DRAWING NOT TO BE CHANGED WITHOUT CSA APPROVAL.

1 EO-4120 WDE 10/23/98 MNS

TITLE CONTROL DRAWING CSA APPROVED SERIES 534HS TRANSMITTER	BY WDE	DATE 10/23/98	DRAWING NO. 9130-101	REV 1
	APPD JAC	DATE 10/23/98			SHEET 1 OF 1

DRAWING NO. 9130-102

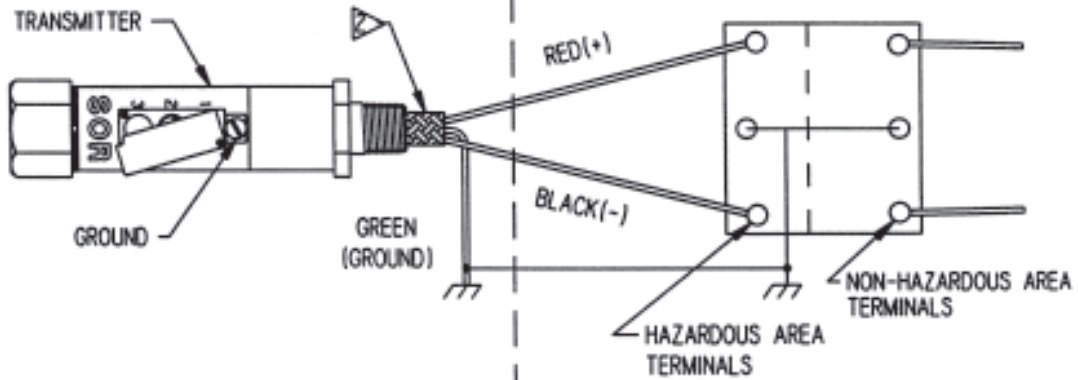
CONTROL DRAWING 9130-102

SERIES 534HS TRANSMITTER

CENELEC APPROVED

HAZARDOUS LOCATION
EEx ia IIC T4

NON-HAZARDOUS LOCATION



▷ ENTITY PARAMETERS:

- U_i = 30V
- I_i = 150mA
- P_i = 1W
- C_i = 60nF
- L_i = 4μH

▷ BELDEN CABLE P/N 9501 NEC CM PCC PT4 OR EQUIVALENT RATED AT 300V, 80°C MINIMUM

MAXIMUM LENGTH 45M (150ft).
 CAPACITANCE OF 131 pF/M (40 pF/ft).
 INDUCTANCE OF 0.82 μH/M (0.25 μH/ft).
 RESISTANCE OF 78.7 mΩ/M (24 mΩ/ft).

THIS DRAWING NOT TO BE CHANGED WITHOUT CENELEC APPROVAL.

1 | EO-4/86 | WDE | 8-26-99 | JAC

TITLE CONTROL DRAWING CENELEC APPROVED SERIES 534HS TRANSMITTER	BY WDE	DATE 8-26-99	DRAWING NO. 9130-102	REV 1
APPD JAC		DATE 8/26/99	SHEET 1 OF 1	

Model Number

534HS - - P9 - -

Output Function

4-20mA
 1-5VDC
 *requires TL accessory

TN
*VN

Pressure Range

	psi	bar	
0 to 1000	.....	0 to 70	1K
0 to 2000	.....	0 to 140	2K
0 to 5000	.....	0 to 350	5K
0 to 10000	.....	0 to 700	10K
0 to 15000	.....	0 to 1000	15K

Process Connection Material

316SS **C**

1A
2A**

Accessories

..... CENELEC Certified (Ex ia)
 CENELEC Certified (Ex d)
 CSA Certified
 FM Approved
 NACE MR-01-75 Compliance
 Pipe Mounting Kit

P/N 9003-308 Mag Driver for Tamper-Proof
 Zero and Span adjustments

Process Connection Size

..... 1/4"NPT(F)
 1/2"NPT(F)
 **N/A 10K and 15K

Over-Range Chart

Range	Range		Over-range	
	psi	bar	psi	bar
1K	0 to 1,000	0 to 70	1,500	105
2K	0 to 2,000	0 to 140	3,000	210
5K	0 to 5,000	0 to 350	7,500	525
10K	0 to 10,000	0 to 700	12,000	840
15K	0 to 15,000	0 to 1,000	18,000	1200

