



MODEL K-705

CeraSEN TWO WIRE PRESSURE TRANSMITTER

OPERATION

AND

INSTRUCTION MANUAL



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INTRODUCTION

SWITZER K-705 **CeraSEN** Pressure Transmitters are low cost alternative to conventional stainless steel sensor pressure transmitters. This uses ceramic piezo-resistive sensor and high stability electronics resulting in exceptional performance and endurance to measure gauge pressure of liquids, gases and vapours. The process pressure is converted into standard analog dc signal of 4-20mA current proportional to the input pressure.

The ceramic sensors provide excellent chemical resistance and no additional protection are required.

PRINCIPLE OF OPERATION

The primary pressure sensing element for the detection is a ceramic sensor on which piezo-resistive elements are configured in a bridge form. The bridge elements are laser trimmed to unity ratio of corresponding arms.

When the diaphragm is subjected to a pressure, the stress on ceramic surface produces a strain on the deposited bridge to give an electrical output when excited. The sensor is temperature compensated to ensure minimal drift with ambient and process temperature changes.

The sensor output signal is suitably conditioned to generate the 4-20mA output current proportional to pressure. The minimum voltage compliance is 9VDC.

INSTALLATION INSTRUCTIONS

K-705 Pressure Transmitter with standard process connection can be installed directly on to the pressure line. The process pressure connection is 1/4"NPT(M). Use a 21mm A/F wrench at the flat surface above the 1/4"NPT process connection to fix the transmitter on a pressure line. See Fig-1 for Overall Dimensions. Overall dimensions for other type of process connection are in Fig-1b and Fig-1c.

*** CAUTION**

Do not rotate the unit by holding the top portion of enclosure or the cable connector which may cause irreparable damage to the enclosure and also to the internal wiring. Warranty service shall not be applicable in cases of violation.

Fig-1a Overall Dimensions - Standard

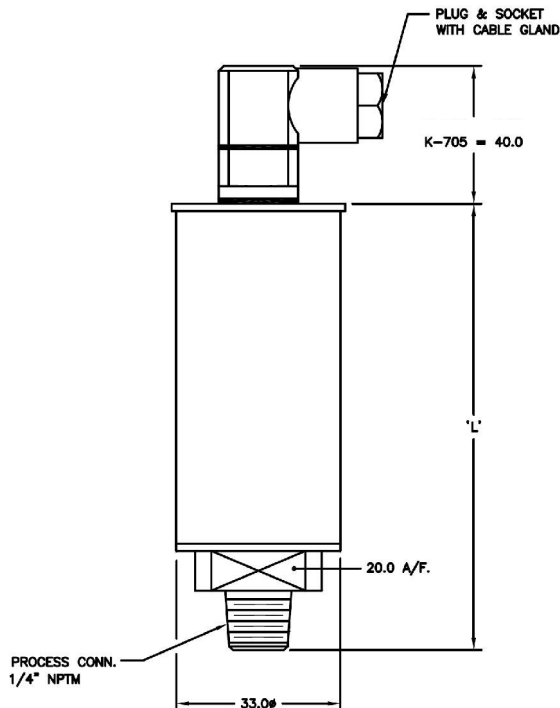


Fig-1b Overall Dimensions – Flush mount Screwed

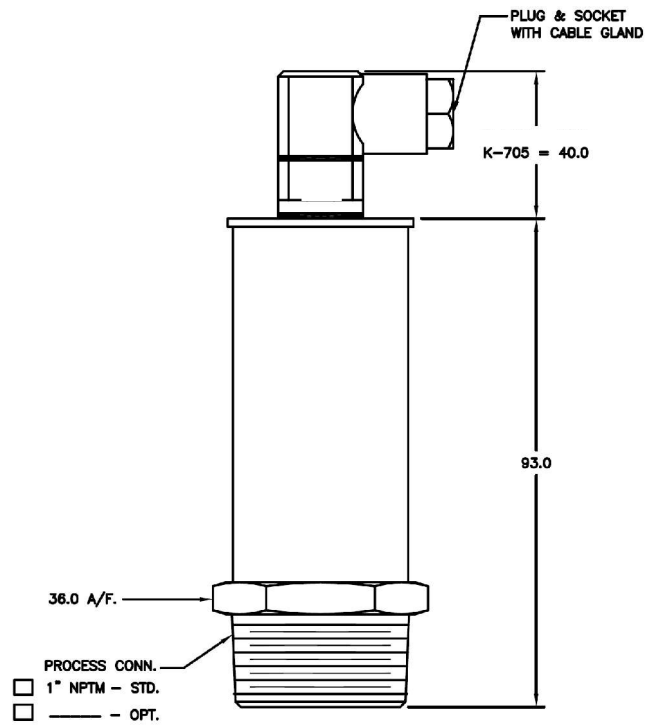
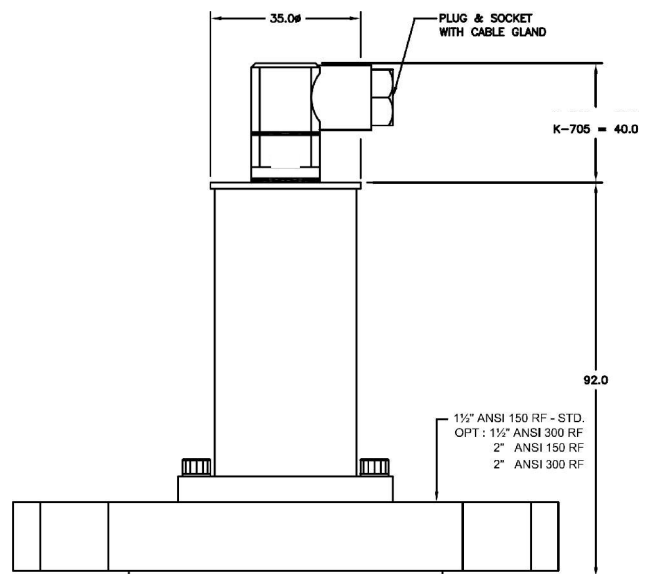


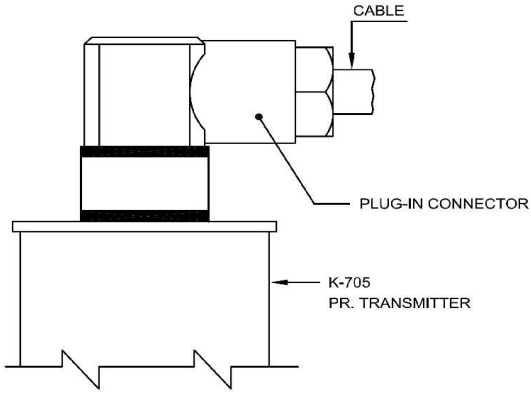
Fig-1c Overall Dimensions – Flush mount Flanged



Important installation notes:

- Enclosure is W/P only when all entries and joints are suitably sealed.
- Ensure the gasket is in place on the electrical connector after wiring is completed.
- Ensure top grub screws on enclosure are in place to provide proper W/P sealing.

ELECTRICAL WIRING



The electrical connection to the instrument is provided through a 3-way plug-in connector mounted on top of the instrument. The connector uses a PG-7 type of cable gland. Use appropriate wire OD to ensure proper sealing to satisfy weatherproof criteria. The recommended cable size is 2.5 to 6.5mm for proper clamping.

The connector is of 2 basic parts as represented below.

1. Bottom base: Fig-3

This is the male connector fixed on the top lid of enclosure to which the internal electronics are wired.



Fig-3

2. Top plug: Fig-4

This is the female connector which plugs onto the base. The external wire is screwed in the terminals of this plug. This plug is fixed and held with the base with a screw to avoid easy removal.



Fig-4

3. Wiring Method:

- Unscrew the plug screw, remove it fully. Refer to Fig-7.
- Pull out the top plug from its bottom base. The plug is of 2 sections – (a) female socket with screwed & solder tabs; (b) top cover with cable entry.
- Insert a screw driver tip in one corner slot of the socket by viewing at the mating side. Eject out the socket from the housing by giving a gentle push and no excess force is required. Refer Fig-5 below.

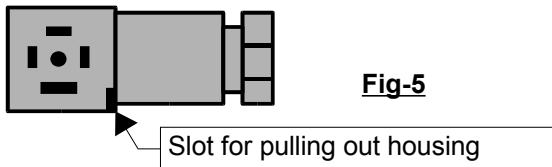


Fig-5

- Unscrew the cable gland nut and pull out the metal ring and grommet.
- Insert cable/wire through cable gland nut, metal ring and grommet in this sequence. Ensure grommet is inserted in correct direction for proper weather proof seal.
- Strip the insulation of wires appropriately prior to insertion of wire conductor into terminal cage.
- Insert each wire into appropriate terminal cage from its opening on top and tighten the screw which is on its side.

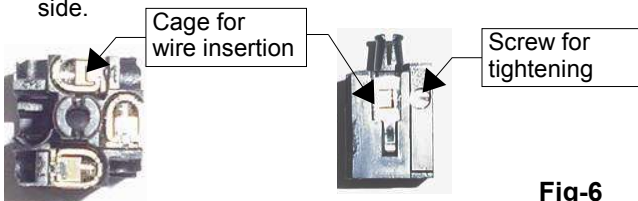
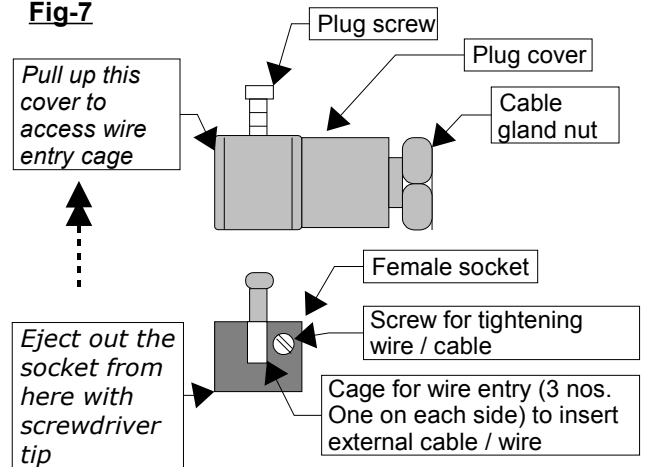


Fig-6

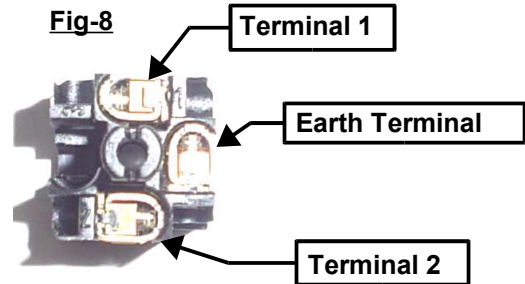
- Insert plug cover back in its place. The female socket will snap fit on the plug cover through its centre pin.
- Insert the plug on base and tighten the plug screw.
- Ensure gasket is in place to seal with the base when fixing and tightening the plug.

Fig-7



4. Terminal diagram:

See Fig-8 below containing the top view of the terminal after removal of plug cover. The 3 terminal wire cage are identified below.



5. Connection diagram:

Below drawing is a typical arrangement for electrical connection to the transmitter. There is no specific polarity to be considered for connecting transmitter terminals at **Terminals 1 & 2**. Necessary protection are provided in the instrument to function normally, even when the connection to transmitter terminals are reversed from what has been shown below.

The transmitter is provided with an Earth terminal to provide EMI / EMC suppression. This is to be used to connect to main Earth so that the internal EMI / EMC filters are active.

Note: The Transmitter will operate correctly, to generate 4-20mA, even without the Earth terminal connected. Only the EMI/EMC filter is made inactive.

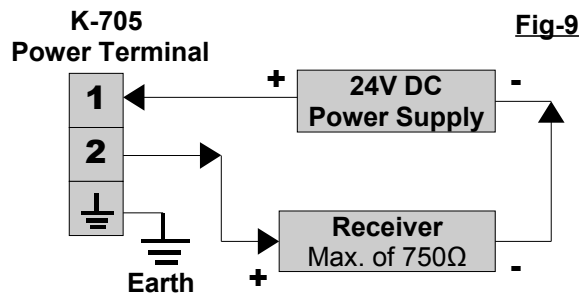


Fig-9

CALIBRATION INSTRUCTION

The pressure transmitter is factory calibrated to the required range and hence normally do not require any recalibration during installation. The following calibration procedure can be followed during any maintenance activity. Proper tools are to be used during calibration to ensure trouble free and precise performance of the transmitter.

Equipment required

1. A pressure source for the required range of the transmitter with an accuracy of 0.1% or better.
2. A 24VDC supply.
3. A 3-1/2 digit multimeter with 20.00 mA current range.

Calibration adjustment locations

See Fig-10 for location of calibration adjustment potentiometer. 3 pots are provided for calibration, which are accessible after removal of top lid.

1. ZERO for adjustment of 4 mA output
2. SPAN COARSE for coarse adjustment of 20 mA output
3. SPAN FINE for fine adjustment of 20 mA output

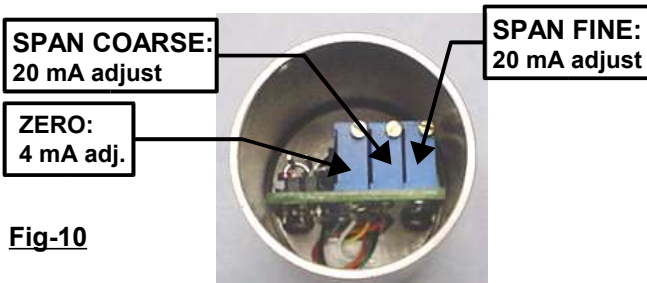


Fig-10

Procedure

1. Establish electrical connections to the transmitter at connector terminals. Refer to earlier Electrical Wiring section on method to carryout wiring.
2. Unscrew the 2 grub screws on either side of top end of enclosure. See Fig-11 for location. **Use 1.5mm allen key to unscrew.** Use of wrong size allen key will damage grub screw head preventing easy opening and removal.

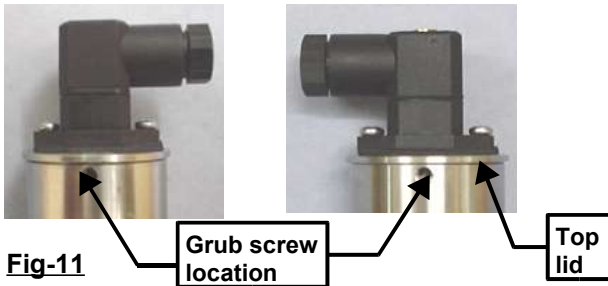


Fig-11

3. Pull out the top lid slowly with the entire connector. Due to the presence of weatherproof seal O-ring, there will be mild friction. Do not damage the O-ring during this handling.
4. Make sure that the connection to the internal connector from the top lid is intact.
5. Establish necessary pressure connection to the transmitter through 1/4" NPT(M) port.
6. Initially vent the pressure to atmosphere.
7. Power up the transmitter to measure the output current. Connect the current meter in series to the transmitter.
8. Without applying any pressure, adjust the ZERO pot, for multimeter to read 4.00 mA.
9. Apply a pressure of 99% of the full range pressure, marked on the body / label of the transmitter.
10. Adjust the COARSE SPAN pot for the meter to read between 19.79 mA and 19.89 mA.
11. Trim the FINE SPAN pot for the precise output current of

19.84 mA.

12. Vent the pressure to atmosphere and check for 4.00 mA. Trim if necessary.
13. Check at various intermediate values for linearity.
14. This ends calibration.

Maintenance Instructions:

There are no user serviceable parts in this transmitter. The transmitter may need only a recalibration occasionally. Recalibration can be done at site by following the procedure as described earlier.

Keep the sensor port clean to enable accurate measurement. If there is any clogging of the port with any debris, remove it gently with a tweezer. Do not use any sharp tool that can damage the diaphragm. Non-corrosive solvents can be used for cleaning the pressure port such as iso-propyl alcohol.

TECHNICAL SPECIFICATIONS

PNEUMATIC

Sensor type	Ceramic. Generally compatible with all aggressive fluids except hydrofluoric acid
Service	Liquid, Gas, Vapour
Range - mbar	0 to 150, 400
Range - bar	0 to 1, 2, 5, 10, 20, 50, 100, 200, 400
Turn down ratio	2:1
Maximum pressure	Non-deteriorating – 1.5 X Burst pressure – 2 X
Process connection	
Standard	1/4" NPT(M)
Flush mount Screwed	1" NPTM (Optional)
Flush mount Flanged	1 1/2" 150RF (Optional)
Wetted parts	316 Stainless Steel

ELECTRICAL

Output	4-20 mA
Power Supply	9 to 32 VDC
Accuracy (inclusive of repeatability and hysteresis)	± 0.5% for 1 to 400 bar of FS ± 1.0% for 150 & 400 mbar of FS
Zero temp co-eff.	± 0.03%/°C of full scale @ 25 °C
Span temp co-eff.	± 0.03%/°C of full scale @ 25 °C
Load capability	750Ω @ 24VDC nominal
Output current limit	32mA max., 0.2mA min.
Electrical connection	3 pole Plug and Socket with solder type terminals
Response Time	< 100 mSecs

MECHANICAL

Enclosure	Style GC – Stainless steel Weatherproof to IP:65
Mounting	Direct on line
Overall dimensions	36mm dia x 120mm ht
Approx. weight	250 gm

OPERATION & AMBIENT CONDITIONS

Process temp. limits	
for 1 to 400 bar	(-)20°C to (+)125°C
for 150 & 400 mbar	0°C to (+)70°C
Ambient temp. limits	0°C to 70°C
Humidity limits	0 to 95%RH

COMPLIANCE

EMI/EMC Interference	Compliant to Interference emission and immunity to EN:50081-2 & EN:50082-2
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