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119475-P1
Rev B, 12/00

MKS Baratron®
Type 722A
Absolute Pressure Transducer

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Safety Procedures and Precautions

The following general safety precautions must be observed during all phases of operation of this instrument. Failure to comply with these precautions or with specific warnings elsewhere in this manual violates safety standards of intended use of the instrument and may impair the protection provided by the equipment. MKS Instruments, Inc. assumes no liability for the customer's failure to comply with these requirements.

DO NOT SUBSTITUTE PARTS OR MODIFY INSTRUMENT

Do not install substitute parts or perform any unauthorized modification to the instrument. Return the instrument to a MKS Calibration and Service Center for service and repair to ensure that all safety features are maintained.

SERVICE BY QUALIFIED PERSONNEL ONLY

Operating personnel must not remove instrument covers. Component replacement and internal adjustments must be made by qualified service personnel only.

USE CAUTION WHEN OPERATING WITH HAZARDOUS MATERIALS

If hazardous materials are used, users must take responsibility to observe the proper safety precautions, completely purge the instrument when necessary, and ensure that the material used is compatible with sealing materials.

PURGE THE INSTRUMENT

After installing the unit, or before its removal from a system, be sure to purge the unit completely with a clean dry gas to eliminate all traces of the previously used flow material.

USE PROPER PROCEDURES WHEN PURGING

This instrument must be purged under a ventilation hood, and gloves must be worn to protect personnel.

DO NOT OPERATE IN EXPLOSIVE ATMOSPHERES

To avoid explosion, do not operate this product in an explosive atmosphere unless it has been specifically certified for such operation.

USE PROPER FITTINGS AND TIGHTENING PROCEDURES

All instrument fittings must be consistent with instrument specifications, and compatible with the intended use of the instrument. Assemble and tighten fittings according to manufacturer's directions.

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CHECK FOR LEAK-TIGHT FITTINGS

Before proceeding to instrument setup, carefully check all plumbing connections to the instrument to ensure leak-tight installation.

OPERATE AT SAFE INLET PRESSURES

This unit should never be operated at pressures higher than the rated maximum pressure (refer to the product specifications for the maximum allowable pressure).

INSTALL A SUITABLE BURST DISC

When operating from a pressurized gas source, a suitable burst disc should be installed in the vacuum system to prevent system explosion should the system pressure rise.

KEEP THE UNIT FREE OF CONTAMINANTS

Do not allow contaminants of any kind to enter the unit before or during use. Contamination such as dust, dirt, lint, glass chips, and metal chips may permanently damage the unit.

Definitions of WARNING, CAUTION, and NOTE messages used throughout the manual.

Warning

The WARNING sign denotes a hazard. It calls attention to a procedure, practice, condition, or the like, which, if not correctly performed or adhered to, could result in injury to personnel.

Caution

The CAUTION sign denotes a hazard. It calls attention to an operating procedure, practice, or the like, which, if not correctly performed or adhered to, could result in damage to or destruction of all or part of the product.

Note

The NOTE sign denotes important information. It calls attention to a procedure, practice, condition, or the like, which is essential to highlight.

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Chapter One: General Information

Introduction

The Baratron® Type 722A Absolute Pressure Transducer offers the proven technology of the Baratron transducer in a smaller package. The unit provides an accuracy of 0.5% of Reading and carries a CE Mark to indicate full compliance with the EMC Directive 89/336/EEC.

The 722 transducer is available with a selection of options.

- *Range:* 1 Torr through 25,000 Torr (0.2 psia through 500 psia)
- *Fittings:* ½ " tube, 4-VCR® , 8-VCR®, 8-VCO®, Mini-CF, and NW-16-KF
- *Connectors:* 5-pin terminal block, 9-pin Type "D", and 15-pin Type "D" on a six inch length of cable

Refer to *Appendix A: Product Specifications,* page 27, for a complete list of product specifications. The model code of your transducer specifies the options chosen. Refer to *Appendix B: Model Code Explanation,* page 29, for more information on the model code.

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How This Manual is Organized

This manual is designed to provide instructions on how to set up, install, and operate a Type 722 unit.

Before installing your Type 722 unit in a system and/or operating it, carefully read and familiarize yourself with all precautionary notes in the *Safety Messages and Procedures* section at the front of this manual. In addition, observe and obey all WARNING and CAUTION notes provided throughout the manual.

Chapter One: General Information, (this chapter) introduces the product and describes the organization of the manual.

Chapter Two: Installation, explains the environmental requirements and describes how to mount the instrument in your system.

Chapter Three: Overview, gives a brief description of the instrument and its functionality.

Chapter Four: Operation, describes how to use the instrument and explains all the functions and features.

Chapter Five: Maintenance and Troubleshooting, lists a few general practices to follow to ensure that the unit will perform optimally. It also includes a table of hints for reference in the event the unit malfunctions.

Appendix A: Product Specifications, lists the specifications of the instrument.

Appendix B: Model Code Explanation, describes the model code.

Customer Support

Standard maintenance and repair services are available at all of our regional MKS Calibration and Service Centers listed on the back cover. In addition, MKS accepts the instruments of other manufacturers for recalibration using the Primary and Transfer Standard calibration equipment located at all of our regional service centers. Should any difficulties arise in the use of your Type 722 instrument, or to obtain information about companion products MKS offers, contact any authorized MKS Calibration and Service Center. If it is necessary to return the instrument to MKS, please obtain an ERA Number (Equipment Return Authorization Number) from the MKS Calibration and Service Center before shipping. The ERA Number expedites handling and ensures proper servicing of your instrument.

Please refer to the inside of the back cover of this manual for a list of MKS Calibration and Service Centers.

Warning	**All returns to MKS Instruments must be free of harmful, corrosive, radioactive, or toxic materials.**

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Chapter Two: Installation

How To Unpack the Type 722 Unit

MKS has carefully packed the Type 722 unit so that it will reach you in perfect operating order. Upon receiving the unit, however, you should check for defects, cracks, broken connectors, etc., to be certain that damage has not occurred during shipment.

Note Do *not* discard any packing materials until you have completed your inspection and are sure the unit arrived safely.

If you find any damage, notify your carrier and MKS immediately. If it is necessary to return the unit to MKS, obtain an ERA Number (Equipment Return Authorization Number) from the MKS Service Center before shipping. Please refer to the inside of the back cover of this manual for a list of MKS Calibration and Service Centers.

Caution **Only qualified individuals should perform the installation and any user adjustments. They must comply with all the necessary ESD and handling precautions while installing and adjusting the instrument. Proper handling is essential when working with all highly sensitive precision electronic instruments.**

Unpacking Checklist

Standard Equipment:

- Type 722 Unit
- Type 722 Instruction Manual (this book)

Optional Equipment:

- Electrical Connector Accessories Kit - 722A-K1 (includes a mating connector for the electrical connector)
- Most pressure, flow, flow ratio, and throttling valve controllers
- MKS Type 146, Type 660, Type PDR-C-1C, or Type PDR-C-2C power supply/readout unit
- Cables to connect the 722 transducer to the above equipment

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Product Location and Requirements

Operating Environmental Requirements

- Ambient Operating Temperature: 0° C to 50° C (32° F to 122° F)
- Ventilation requirements include sufficient air circulation

Dimensions

Note All dimensions are listed in inches with millimeters referenced in parentheses.

The dimensions of the 722 transducer vary depending upon the full scale range:

Full scale ranges up to and including 1000 Torr: are referred to as "low pressure" transducers

Full scale ranges above 1000 Torr: are referred to as "high pressure" transducers

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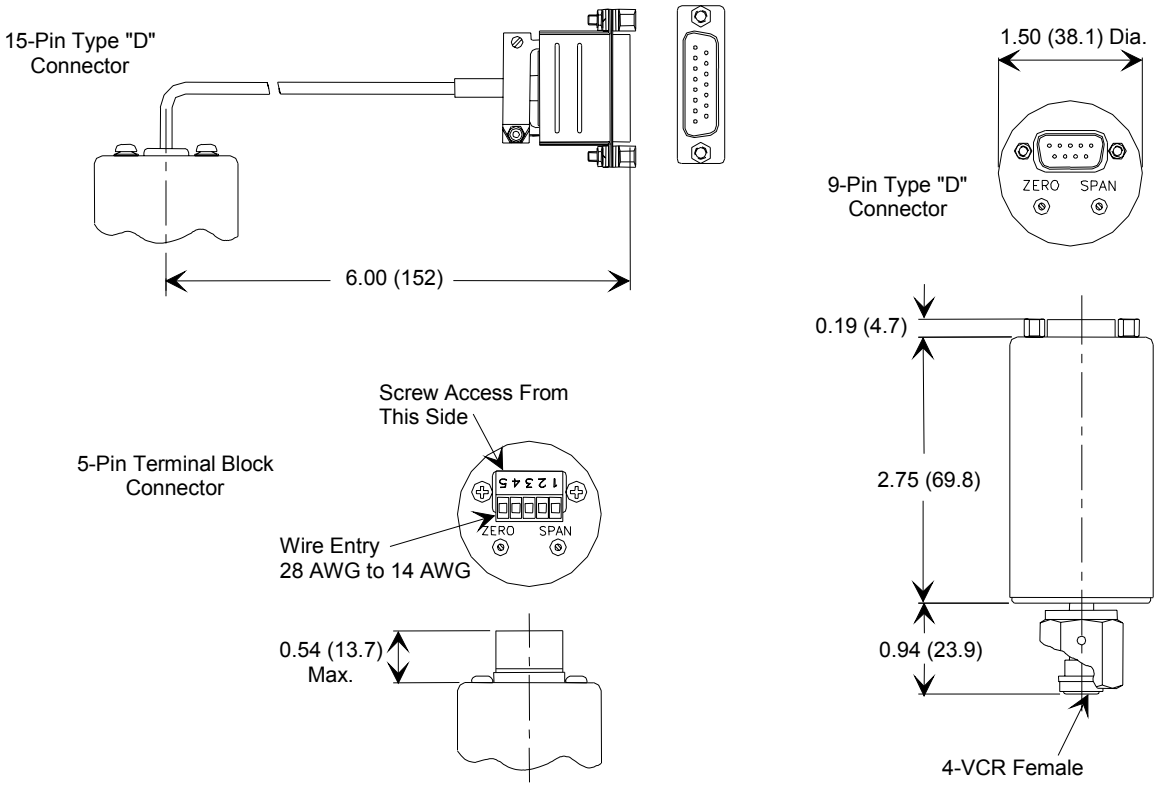


Figure 1: Dimensions of the Low Pressure (up to 1000 Torr) Type 722 Transducer

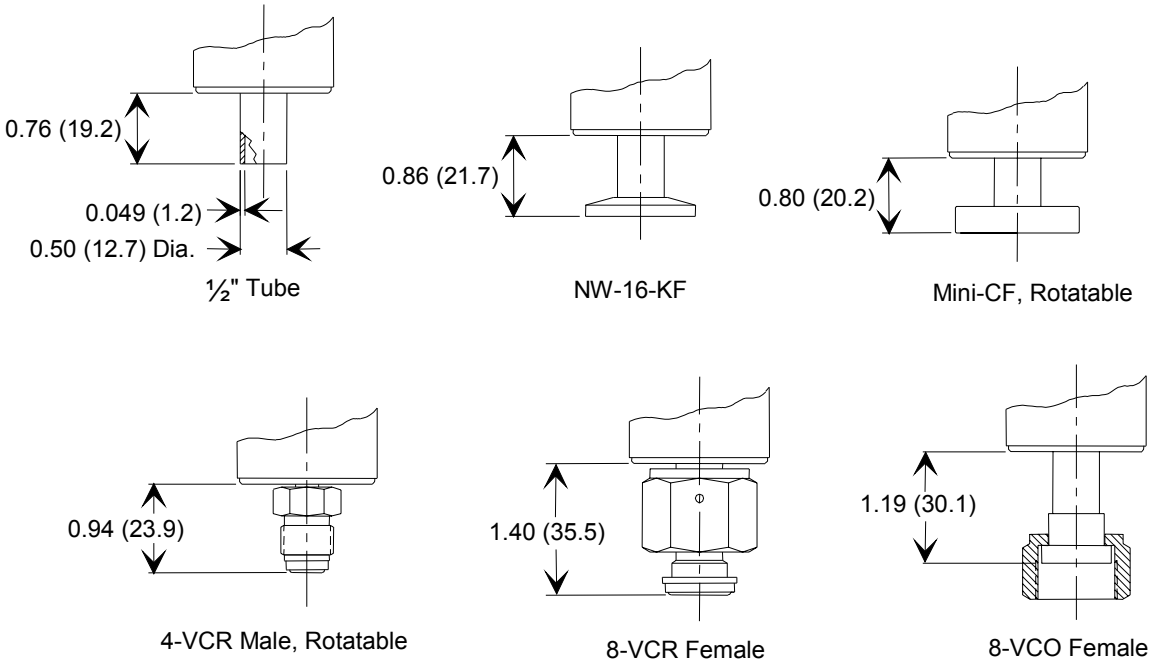


Figure 2: Fitting Dimensions for the Low Pressure Type 722 Transducer

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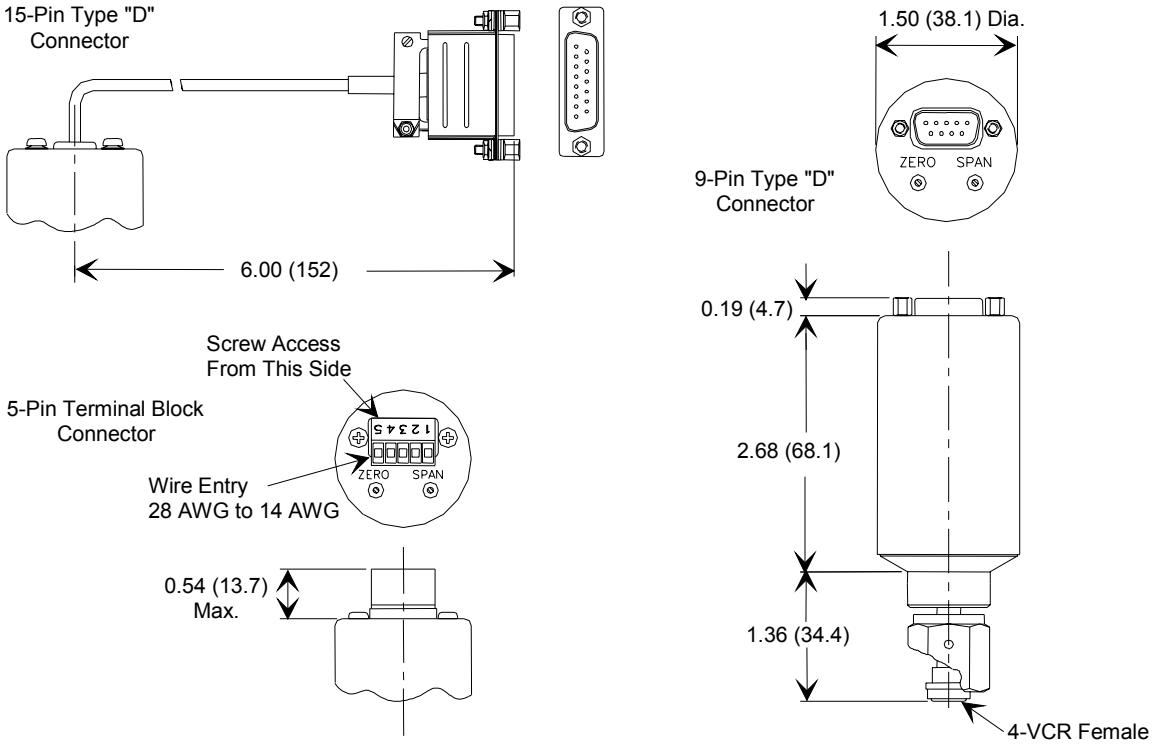


Figure 3: Dimensions of the High Pressure (>1000 to 25,000 Torr) Type 722 Transducer

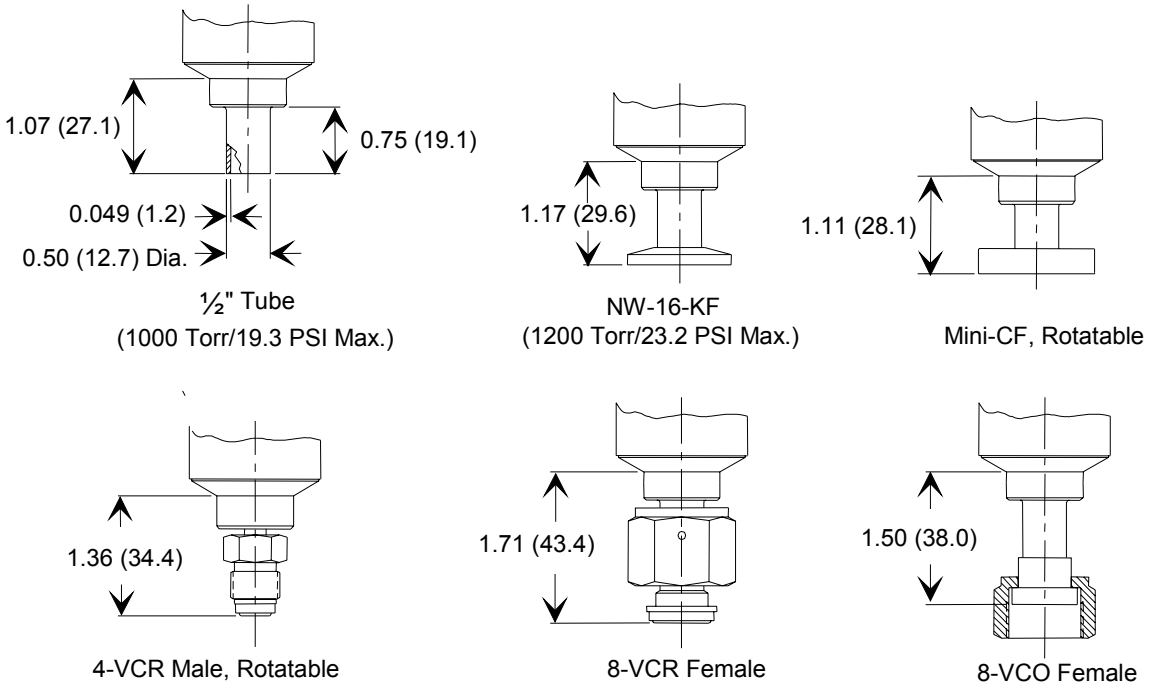


Figure 4: Fitting Dimensions of the High Pressure Type 722 Transducer

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Setup

Mounting

The 722 transducer can be mounted with the cylindrical end in either a vertical (upright) or horizontal position. The mounting requirements allow any foreign matter entering the pressure port to fall *away from* the sensing diaphragm.

Mounting the Unit in a Vertical Position

If the unit is mounted in a vertical position, the cylindrical end of the unit must point upwards, as shown in Figure 5. Do not install the unit with the cylindrical end of the unit pointing downward because particulate impurities may accumulate on the sensing diaphragm and alter the pressure reading.

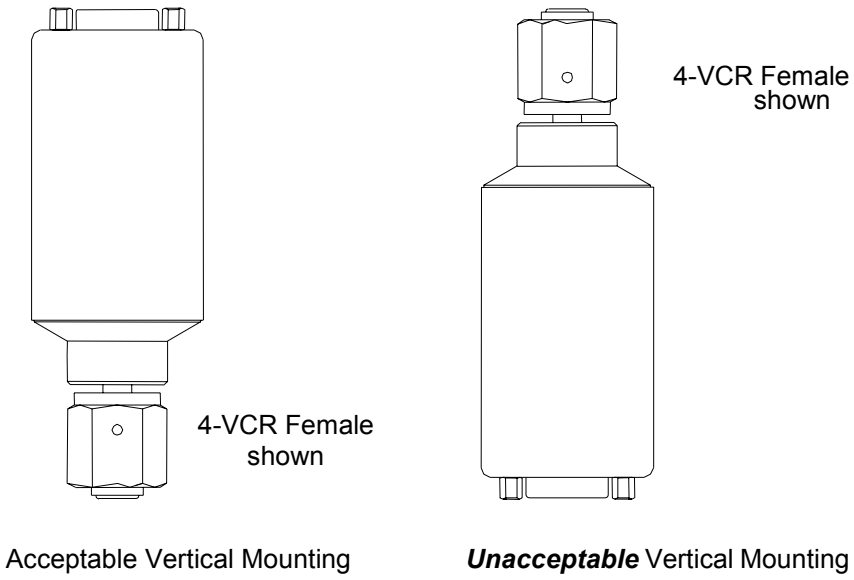


Figure 5: Vertical Mounting Positions

Mounting the Unit in a Horizontal Position

In a horizontal position, the cylindrical end of the unit can point in any direction.

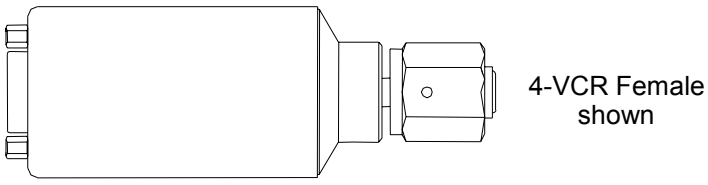


Figure 6: Acceptable Horizontal Mounting Position

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Fittings

The 722 transducer is available with a variety of different fittings, listed below:

- ½" Tube
- 4-VCR® type Female
- 8-VCR® type Female
- 8-VCO® type Female
- NW-16-KF
- Mini-CF

Caution

1. **MKS *does not warranty* the 722 transducer when single or double metal ferrule compression-type vacuum fittings are used because damage will occur to the transducer when improper tightening procedures are followed.**
2. **Before proceeding to *Setup*, page 9, carefully check all plumbing connections to the instrument to ensure a leak-tight installation.**

Making Mechanical Connections

To make mechanical connections in line to a system, use the recommended installation practices, as specified by the fitting manufacturer or by an appropriate standard.

Warning

Improper installation can cause personal injury or damage equipment. Follow proper installation procedures at all times.

How To Tighten Fitting Attachments

For VCR Fittings: Tighten 1/8 turn past the finger tight position for 316 SS or nickel gaskets (¼ turn for copper or aluminum).

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Connectors

The 722 transducer is available with a 9-pin Type “D”, a 5-pin terminal block connector, or a 15-pin Type “D” on a 6 inch cable

Note

A “No Connection” pin assignment means that the pin has no internal connection.

Pinout of the 9-Pin Type “D” Connector	
Pin	**Assignment**
1	Pressure Output
2	No Connection
3	No Connection
4	+ Power Input
5	No Connection
6	No Connection
7	No Connection
8	Pressure Return
9	Power Return

Table 1: Pinout of the 9-Pin Type “D” Connector

Pinout of the 5-Pin Terminal Block Connector	
Pin	**Assignment**
1	Power Return
2	Pressure Return
3	Pressure Output
4	No Connection
5	+ Power Input

Table 2: Pinout of the 5-Pin Terminal Block Connector

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Pinout of the 15-Pin Type "D" Connector	
Pin	**Assignment**
1	No Connection
2	Pressure Output
3	No Connection
4	No Connection
5	Power Return
6	No Connection
7	+ Power Input
8	No Connection
9	No Connection
10	No Connection
11	No Connection
12	Pressure Return
13	No Connection
14	No Connection
15	Chassis

Table 3: Pinout of the 15-Pin Type "D" Connector

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How to Wire a PDR Series Readout to a Type 722 Transducer with a 9-pin Type "D" Connector.

Caution

DO NOT use the -15 VDC output of the PDR readout to power the 722 transducer. When the -15 VDC signal of the PDR is connected to the power return of the transducer, a short between the -15 VDC of the transducer and the A GND of the PDR occurs. The PDR readout will blank out. Either unit may be damaged.

The correct cable to use to connect the 9 pin Type "D" connector to the PDR readout is a CB700-2 cable. This cable has the mating Type "D" connector on the transducer end and flying leads on the PDR end. Table 4 lists the pin assignments for the various colored wires on the flying leads end of the cable.

Connections Between a Transducer with a Type "D" Connector and a PDR Readout			
Pin Number	**Transducer Signal**	**Flying Lead Color Code**	**PDR Signal**
1	Pressure Output	Red	Pressure Input
4	+ Power Input	Green	+ 15 VDC
8	Pressure Return	Black	Signal Ground (A GND)
9	Power Return	White	Power Ground (D GND)

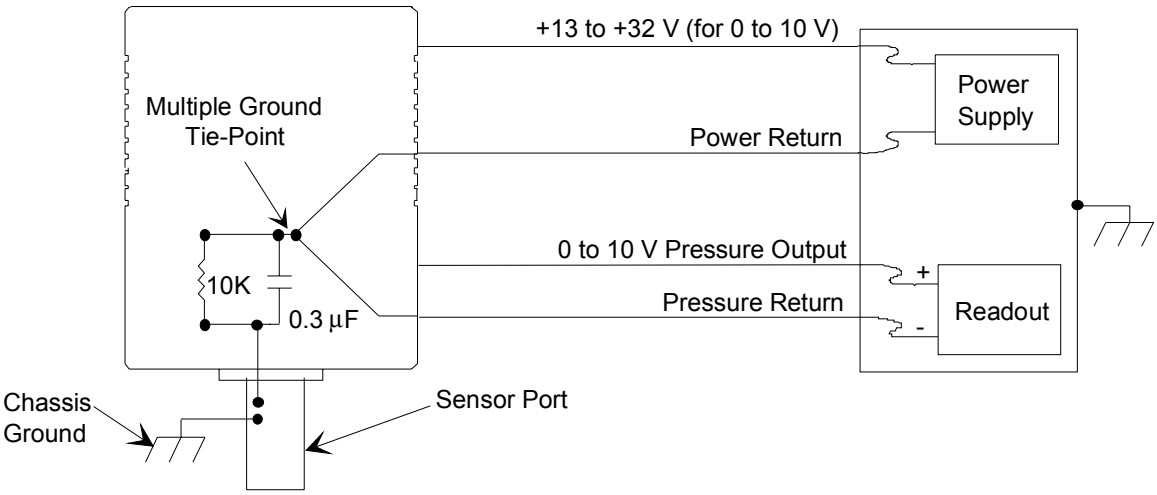
Table 4: Connections Between a Transducer with a Type "D" Connector and a PDR Readout

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Electrical Information

The 722 transducer requires an external power source capable of supplying the voltages listed in *Appendix A: Product Specifications,* page 27. Noise and ripple should be less than 2 mV (peak-to-peak) over a 10 kHz bandwidth. You may use any readout device capable of reading from -0.6 V to 11 V. Refer to Figure 7 for the power, signal and chassis grounding scheme for a voltage unit.

Note The ground of any external power supply and readout should be the same as the transducer ground (chassis ground) to minimize any possible ground loops and power supply noise which can affect the performance and stability of the system.



Note 1: For best results, use a readout with fully differential inputs.

Note 2: The absolute value of the potential difference between the chassis ground and signal common/power ground should not exceed 14 Volts.

Figure 7: Electrical Scheme for a Voltage Unit

NW-16-KF Fitting Information

The NW-16-KF fittings are only available for units with full scale pressure of a maximum of 5000 Torr (100 psia).

Warning **Units with NW-16-KF fittings and a full scale range greater than 1200 Torr (23 psi) require an HPS overpressure ring. Operating the unit without a protective overpressure ring may result in injury.**

The HPS part number for the overpressure ring is HPS 10031.

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Interface Cables

Interface cables to all MKS companion products can be purchased from MKS. Refer to Table 5 for a listing of the cable numbers.

As of January 1, 1996, all products shipped to the European Community must comply with the EMC Directive 89/336/EEC, which covers radio frequency emissions and immunity tests. MKS products that meet these requirements are identified by application of the CE Mark.

Note

1. Metal braided, shielded cables are required to meet CE Mark specifications.
2. To order braided shielded cables, add an "S" after the cable type designation. For example, to order a standard connection cable to connect the 722 transducer to a Type PDR-C-1 readout, use part number CB700-2-X, where X designates the cable length; for a braided, shielded cable use part number CB700S-2-X.

Interface Cables			
Transducer Connector	**MKS Power Supply/Readout**	**Cable Description**	**Cable Number**
9-pin Type "D"	Type 146, 660	9-pin Type "D" to 15-pin Type "D"	CB700-1-X
	PDR-C-1, PDR-C-2	9-pin Type "D" to flying leads	CB700-2-X
where X indicates the length of the cable, in feet			

Table 5: Interface Cables

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Generic Shielded Cable Description

MKS offers a full line of cables for all MKS equipment. Should you choose to manufacture your own cables, follow the guidelines listed below:

1. The cable must have a *braided* shield, covering all wires. Neither aluminum foil nor spiral shielding will be as effective; using either may nullify regulatory compliance.
2. The connectors must have a metal case, which has direct contact to the cable's shield on the whole circumference of the cable. The inductance of a flying lead or wire from the shield to the connector will seriously degrade the shield's effectiveness. The shield should be grounded to the connector before its internal wires exit.
3. With very few exceptions, the connector(s) must make good contact to the device's case (ground). "Good contact" is about 0.01 ohms; and the ground should surround all wires. Contact to ground at just one point may not suffice.
4. For shielded cables with flying leads at one or both ends; it is important at each such end, to ground the shield *before* the wires exit. Make this ground with absolute minimum length. Refer to Figures 8 and 9, page 17. (A ¼ inch piece of #22 wire may be undesirably long since it has approximately 5 nH of inductance, equivalent to 31 ohms at 1000 MHz). After picking up the braid's ground, keep wires and braid flat against the case. With very few exceptions, grounded metal covers are not required over terminal strips. If one is required, it will be stated in the Declaration of Conformity or in the instruction manual.
5. In selecting the appropriate type and wire size for cables, consider:
   A. The voltage ratings;
   B. The cumulative I^2R heating of all the conductors (keep them safely cool);
   C. The IR drop of the conductors, so that adequate power or signal voltage gets to the device;
   D. The capacitance and inductance of cables which are handling fast signals, (such as data lines or stepper motor drive cables); and
   E. That some cables may need internal shielding from specific wires to others; please see the instruction manual for details regarding this matter.

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Attaching the Terminal Block Connector Cable

The cable to the terminal block connector must be firmly attached to the top of the transducer, in order to comply with CE Mark requirements. Figure 8 shows the preferred method to connect the cable; using a metal cable clamp to affix the cable to the transducer. Figure 9 shows an alternate method; wrapping the braided shield under the screw. Both examples show the cable securely clamped to the transducer.

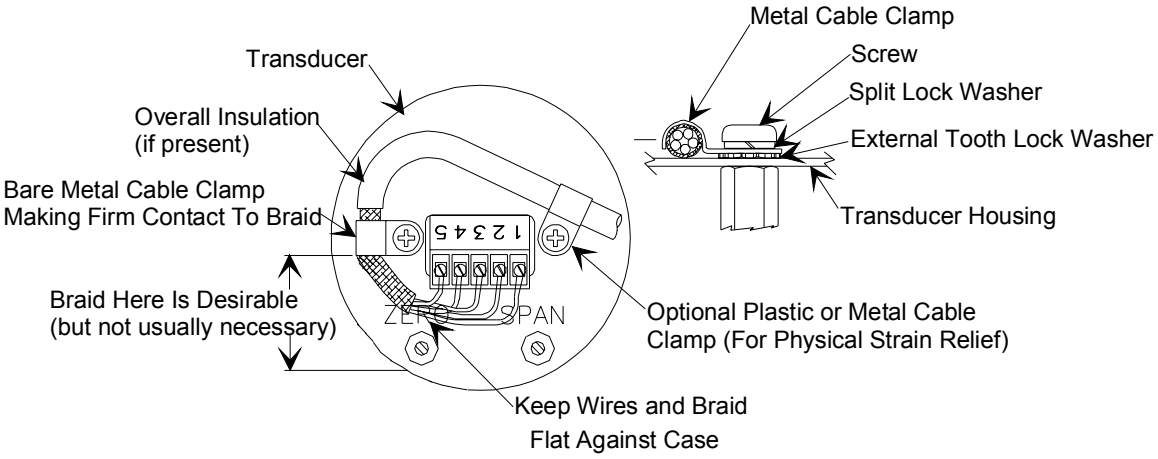


Figure 8: How To Connect the Cable to a Terminal Block (Example 1)

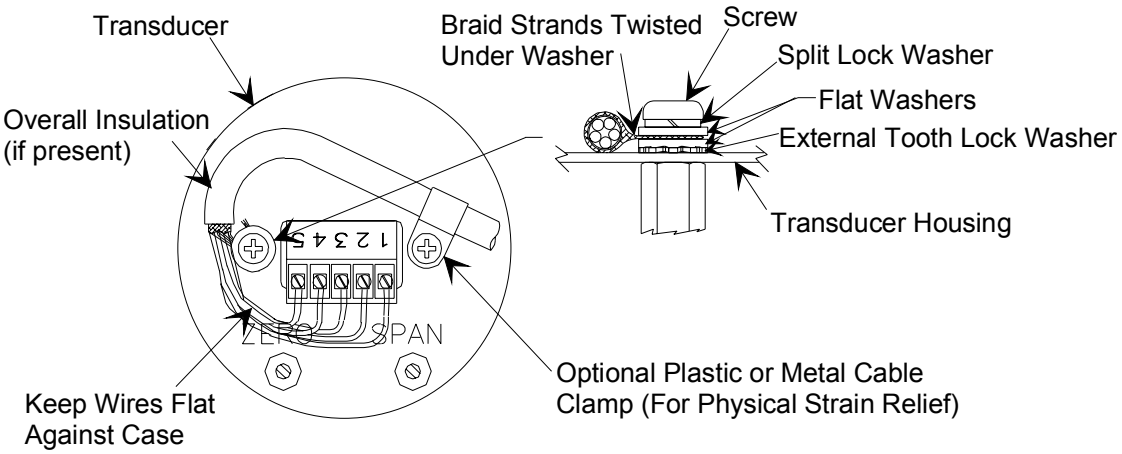


Figure 9: How To Connect the Cable to a Terminal Block (Example 2)

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How To Check the Transducer Zero

Check the transducer zero prior to the initial operation and then periodically as required. The zero can be set (or reset) by adjusting the zero potentiometer located on the top cover of the transducer or, on the front panel of an MKS Power Supply/Readout, if you are using one. Refer to Figure 1, page 7, for the location of the zero potentiometer on a low pressure 722 transducer; Figure 3, page 8, for a high pressure 722 transducer.

How To Zero the 722 Transducer

To zero the 722 transducer, you must pump the unit, with the power on, down to a pressure less than the transducer's resolution (0.01% of Full Scale).

Note

The zero adjustment ***must*** be made at a pressure less than the transducer's resolution (0.01% of F.S.).

In addition, you should position the transducer in the *same orientation* as it will be positioned when installed in your system.

Zeroing a transducer at a pressure above its stated minimum resolution creates a *zero offset* relative to true absolute pressure. All subsequent readings are then linear and accurate *relative to the offset value*.

Note

If your system cannot achieve a sufficiently low pressure to set the transducer zero, you may use a vacuum leak detector with sufficient vacuum pumping (to achieve proper zeroing pressures). In this case, mount the transducer on the leak detector *in the same plane of orientation as it will be during actual use*.

To properly zero an absolute transducer, follow this procedure:

1. Install the transducer in a system and connect a power supply/readout.
2. Pump the system down to a pressure below the resolution of the transducer.

   Refer to Table 6, page 19, for recommended pressure levels.
3. Using a small screwdriver, adjust the ZERO pot until the readout displays zero (0000).

   Refer to the figure listed below for the location of the ZERO pot.

   Low Pressure 722 Transducer: Figure 1, page 7,

   High Pressure 722 Transducer: Figure 3, page 8.

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Highest Pressure for Proper Zero Adjustment	
Full Scale Range	**Pressure**
1 Torr	$<5 \times 10^{-5}$ Torr
10 Torr	$< 5 \times 10^{-4}$ Torr
100 Torr	$< 5 \times 10^{-3}$ Torr
500 Torr	$< 5 \times 10^{-3}$ Torr
1000 Torr	$< 5 \times 10^{-2}$ Torr
30 psia	$< 1 \times 10^{-3}$ psia
100 psia	$< 5 \times 10^{-3}$ psia
500 psia	$< 2 \times 10^{-2}$ psia

Table 6: Highest Pressure for Proper Zero Adjustment

Span Adjustment

The span setting may require adjustment periodically. Only adjust the SPAN pot in conjunction with a calibration transfer standard. ***Do not*** adjust the span setting if a calibration transfer standard is not available. Instead, send the unit back to an MKS Service Center for calibration.

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Chapter Three: Overview

General Information

A complete pressure transducer system requires three components to convert pressure to a linear DC voltage output: a sensor, signal conditioner, and power supply. An analog or digital meter is required to display the DC output in pressure units.

The 722 transducer contains two of the above components: the sensor and signal conditioner. An MKS or MKS-compatible power supply is required to complete the pressure to DC voltage output conversion, and an MKS or MKS-compatible display unit is required for direct pressure readout. The display unit could be a personal computer, an MKS pressure controller, or an MKS PDR Series power supply/readout unit.

Sensor

The variable capacitance sensor consists of a pressure inlet tube (port) connected to a small chamber in the transducer body. One wall of this chamber is a metal diaphragm. The front side of the diaphragm is exposed to the gas whose pressure is to be measured. The back, or *reference* side of the diaphragm faces a rigidly mounted ceramic disc containing two electrodes. The diaphragm is positioned opposite the inlet port.

The reference side is permanently evacuated below the resolution of the instrument and its vacuum is maintained with a chemical getter system.

The diaphragm deflects with changing pressure (force per unit area) independently of the gas type or composition of the measured gas. This deflection causes an imbalance of the sensor electrode capacitances since the distance to the diaphragm is now different for each electrode. Using a precision constant frequency oscillator for excitation, the imbalance of capacitances is converted to a DC voltage. The resultant signal is then linearized, zeroed, and amplified via the signal conditioner electronics, to produce a precise output signal scaled to the range of the transducer.

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Signal Conditioning Electronics

The signal conditioner contains state-of-the-art balanced bridge circuitry, self-compensated for thermal stability with ambient temperature changes. The circuit board construction uses surface mount technology. The output is either a DC voltage or mA current, which is linear with pressure. The transducer is then calibrated against a transfer standard to provide the selected output over the range of the transducer.

Label

The 722 transducer has one product identification label, shown in Figure 10.



Figure 10: Product Label

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Chapter Four: Operation

General

After installation and during periodic maintenance, check the transducer zero to verify proper output. If the output is incorrect, set the output by adjusting the zero potentiometer. Refer to *How To Check the Transducer Zero,* page 18, for zeroing instructions.

Lowest Suggested Pressure Available for Reading

The pressures listed in the middle column of Table 7 reflect reliable and practical pressures for different range transducers. Lower readings may be obtained in environments, which have stable temperature and air flow.

Lowest Suggested Pressure to Use for Control

The pressures listed in the last column of Table 7 are for reference, and represent the pressure reading of the transducer at 50 mV signal output. A DC signal of at least 50 mV is the recommended minimum signal level to use when integrating any transducer into complex processing systems.

Suggested Pressures for Reading and Control		
Full Scale Range	**Lowest Suggested Pressure for Reading**	**Lowest Suggested Pressure for Control**
1 Torr	5×10^{-4}	5×10^{-3}
10 Torr	5×10^{-3} Torr	5×10^{-2} Torr
100 Torr	5×10^{-2} Torr	5×10^{-1} Torr
500 Torr	5×10^{-2} Torr	5×10^{-1} Torr
1000 Torr	0.5 Torr	5 Torr
30 psia	3×10^{-2} psia	3×10^{-1} psia
100 psia	0.1 psia	1 psia
500 psia	0.5 psia	5 psia

Table 7: Suggested Pressures for Reading and Control

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Chapter Five: Maintenance and Troubleshooting

General

In general, no maintenance is required other than proper installation and operation, and an occasional zero adjustment. If a transducer fails to operate properly upon receipt, check for shipping damage, and check the power/signal cable for correct continuity. Any damage should be reported to the carrier and MKS Instruments immediately. If there is no obvious damage and the continuity is correct, obtain an ERA Number (Equipment Return Authorization Number) before returning the unit to MKS Instruments for service.

Caution **Only qualified individuals should perform the installation and any user adjustments. They must comply with all the necessary ESD and handling precautions while installing and adjusting the instrument. Proper handling is essential when working with all highly sensitive precision electronic instruments.**

In production operations, verify the transducer zero (and adjust if necessary) each time the equipment is shut down for routine maintenance.

Periodically check for wear on the cables and inspect the enclosure for visible signs of damage.

Note The zero adjustment is the ***only*** adjustment that should usually be made in the field. Only adjust the span setting if you have access to proper calibration standards. Return the transducer to MKS Instruments for other adjustments, calibration, or servicing.

Zero Adjustment

All pressure transducers require initial and periodic zero adjustments. Make these adjustments at a pressure *lower than* the transducer's minimum resolution to achieve the full dynamic range specified for the transducer. Refer to *How To Zero the 722 Transducer,* page 18, for instructions on adjusting the zero setting.

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Troubleshooting

Troubleshooting Chart		
Symptom	**Possible Cause**	**Solution**
Overrange positive or negative signal	A shorted transducer or a damaged interconnect cable (transducer to electronics module).	Measure supply voltages at the connector. Inspect cable and transducer. Replace if necessary.
Measurement slowly goes positive over time	Overpressure and/or a build-up of contamination in the P_x cavity.	Return to MKS for servicing or transducer replacement.
Unstable zero output	The ambient temperature may be too high. *or* The ambient temperature is varying over a wide range.	Refer to *Operating Environmental Requirements,* page 6, and be sure the ambient temperature is within product requirements.

Table 8: Troubleshooting Chart

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Appendix A: Product Specifications

Performance Specifications

Accuracy	0.5% of Reading
CE Mark Compliance[1]	EMC Directive 89/336/EEC
Temperature Coefficients	
Zero	0.008% of F.S./ °C 10 Torr through 25,000 Torr
	0.020% of F.S./ °C 1 Torr
Span	0.04% of Rdg./ °C

Physical Specifications

Ambient Operating Temperature Range	0° to 50° C (32° to 122° F)
Burst Pressure	10 times full scale or 100 psi, whichever is greater
Fittings	½ inch Tube; 4-VCR female, 8-VCR female, 8-VCO female, NW-16-KF, Mini-CF.
Full Scale Pressure Ranges	1 Torr through 25,000 Torr (0.02 psia through 500 psia)
Material Exposed to Gas	Inconel®/SST with VCR female fitting Inconel with ½ inch diameter tubulation
Overpressure Limit	45 psia or 2 times full scale, whichever is greater
Weight	< 10 oz. (< 283 g)

NW-16-KF Fitting Information

The NW-16-KF fittings are only available for units with full scale pressure of a maximum of 5000 Torr (100 psia).

[1] Requires a metal, braided, shielded cable properly grounded at both ends.

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Warning **Units with NW-16-KF fittings and a full scale range greater than 1200 Torr (23 psi) require an HPS overpressure ring. Operating the unit without a protective overpressure ring may result in injury.**

The HPS part number for the overpressure ring is HPS 10031.

Electrical Specifications

Input Required	
0 to 5 Volt output	10.8 VDC to +32 VDC (regulated if below 13 VDC) @ 10 mA max.
0 to 10 Volt output	+13 VDC to +32 VDC @ 10 mA max.
Output	
0 to 5 VDC	into >10 K ohm load
0 to 10 VDC	into >10 K ohm load

Due to continuing research and development activities, these product specifications are subject to change without notice.

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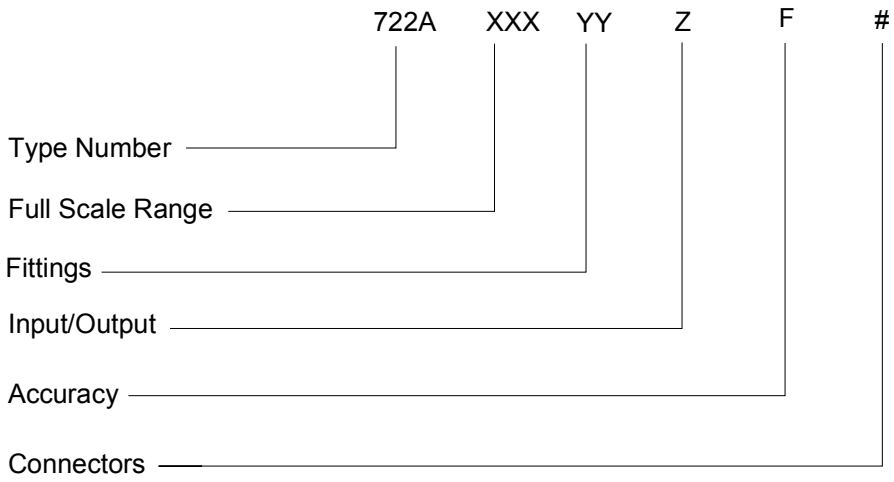
Appendix B: Model Code Explanation

Model Code

The options of your transducer are identified in the model code when you order the unit. The model code is identified as follows:

722AXXXYYZF#

where:



Type Number (722A)

This designates the model number of the instrument.

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Full Scale Range (XXX)

The full scale range is indicated by a two digit / one letter code.

Full Scale Range	Ordering Code
1	01T
10	11T
20	21T
100	12T
500	52T
1,000*	13T
5,000*	53T
10,000*	14T
25,000*	RCT

*must include a fitting.

Fittings (YY)

Six types of fittings are available, designated by a two letter code.

	Ordering Code
4-VCR Type Female	CD
½″ tube weld stub	BA
8-VCR Type Female	CE
8-VCO Type Female	DA
Mini-CF, rotatable	HA
NW-16-KF	GA

Power (Z)

The input/output power is designated by a single number code.

	Ordering Code
+13 to +32 VDC/0 to 10 VDC	2
+10.8 to 32 VDC/0 to 5 VDC	3

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NW-16-KF Fitting Information

The NW-16-KF fittings are only available for units with full scale pressure of a maximum of 5000 Torr (100 psia).

Warning **Units with NW-16-KF fittings and a full scale range greater than 1200 Torr (23 psi) require an HPS overpressure ring. Operating the unit without a protective overpressure ring may result in injury.**

The HPS part number for the overpressure ring is HPS 10031.

Accuracy (F)

The accuracy (0.5% of Reading) is specified by a letter F in this field.

Connector (#)

Three types of connectors are available, indicated by a single code.

	Ordering Code
9-pin Type "D"	A
15-pin Type "D" with a 6 inch cable	K
5-pin terminal strip	J

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