FLUKE®

721Ex
Pressure Calibrator

Users Manual

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Introduction

The 721Ex Pressure Calibrator (the Product) is a simple to use and versatile pressure calibrator. The two internal pressure sensors are configured with different pressure measurement ranges. One range for lower pressure (P1) and one range for higher pressure (P2). The Product features inputs for mA, switch contacts, and an RTD probe.

Safety Information

A **Warning** identifies conditions and procedures that are dangerous to the user. A **Caution** identifies conditions and procedures that can cause damage to the Product or the equipment under test.

⚠⚠ Warning

To prevent possible electrical shock, fire, or personal injury:

- **Only assemble and operate high-pressure systems if you know the correct safety procedures. High-pressure liquids and gases are hazardous and the energy from them can be released without warning.**
- **Read all safety information before you use the Product.**
- **Carefully read all instructions.**
- **Only operate the Product in non-hazardous areas or classified areas where this device is certified to operate.**
- **Use the correct terminals, function, and range for measurements.**
- **Do not apply more than the rated voltage, between the terminals or between each terminal and earth ground.**
- **Do not touch voltages > 30 V ac rms, 42 V ac peak, or 60 V dc.**
- **Remove all probes, test leads, and accessories before the battery door is opened.**
- **Do not exceed the Measurement Category (CAT) rating of the lowest rated individual component of a Product, probe, or accessory.**
- **Do not use and disable the Product if it is damaged.**
- **Remove the input signals before you clean the Product.**
- **Use only specified replacement parts.**
- **Have an approved technician repair the Product.**
- **Use the Product only as specified, or the protection supplied by the Product can be compromised.**
- **Only change batteries in an area known to be non-hazardous.**

- **The battery door must be closed and locked before you operate the Product.**
- **Do not improperly apply pressure. Vacuum should not be applied to any gauge pressure sensor. The Product display shows "OL" when an inappropriate pressure is applied. If "OL" is shown on any pressure display, the pressure should be reduced or vented immediately to prevent Product damage or possible personnel injury. "OL" is shown when the pressure exceeds 110 % of the nominal range of the sensor or when a vacuum in excess of 2 PSI is applied on gauge range sensors.**
- **Push the ZERO button to zero the pressure sensor when vented to atmospheric pressure.**
- **Check entity parameters before making any connections to this Product.**
- **Remove the batteries if the Product is not used for an extended period of time, or if stored in temperatures that exceed the battery manufacturer's specifications. If the batteries are not removed, battery leakage can damage the Product.**
- **Replace the batteries when the low battery indicator shows to prevent incorrect measurements.**
- **Be sure that the battery polarity is correct to prevent battery leakage.**
- **Repair the Product before use if the battery leaks.**
- **Use only specified replacement parts.**

Ex-Hazardous Areas

An Ex-hazardous area as used in this manual refers to an area made hazardous by the potential presence of flammable or explosive vapors. These areas are also referred to as hazardous locations.

The Product has been designed for use in Ex-Hazardous Areas. These are areas where potentially flammable or explosive vapors may occur. These areas are referred to as hazardous (classified) locations in the United States, as Hazardous Locations in Canada, as Potentially Explosive Atmospheres in Europe and as Explosive Gas Atmospheres by most of the rest of the world. The Product is designed as intrinsically safe. This means that connecting the Product to equipment that is used within intrinsically-safe circuits will not cause an ignition-capable arc as long as the entity parameters are suitably matched.

⚠⚠ Warning

To prevent possible personal injury, check entity parameters before making any connections to this device.

Measuring Pressure

⚠ Warning

For safe operation and maintenance of the Product, Refer to the table of ranges and resolutions at the back of the manual for information about overpressure and burst pressure ratings. Pressure sensors can be damaged and personnel injury can occur due to improper application of pressure. Vacuum should not be applied to any gauge pressure sensor. The Product display shows “OL” when an inappropriate pressure is applied. If “OL” is seen on any pressure display, reduce or vent pressure immediately to prevent equipment damage or possible personnel injury. “OL” is shown when pressure >120 % of the nominal range of the sensor or when a vacuum >2 PSI is applied on gauge range sensors.

Symbols

Symbols used on the Product or in this manual are shown in Table 1.

Table 1. Symbols

Symbol	Description	Symbol	Description
	Risk of Danger. Important information. See Manual.		Conforms to relevant Australian EMC standards.
	Hazardous voltage. Risk of electric shock.		Battery
	Conforms to European Union directives.		Conforms to relevant South Korean EMC Standards.
	Conforms to ATEX requirements		This product complies with the WEEE Directive (2002/96/EC) marking requirements. The affixed label indicates that you must not discard this electrical/electronic product in domestic household waste. Product Category: With reference to the equipment types in the WEEE Directive Annex I, this product is classed as category 9 "Monitoring and Control Instrumentation" product. Do not dispose of this product as unsorted municipal waste. Go to Fluke's website for recycling information.

Standard Equipment

Make sure that the Product shipment is complete. It must include:

- The Product
- Product Manuals CD
- Getting Started Manual
- Quick Reference Guide
- Test leads
- Carry case
- Calibration certificate

Product Features

Figure 1 and Table 2 shows the location of the buttons, pressure controls, connection ports, and electrical inputs.

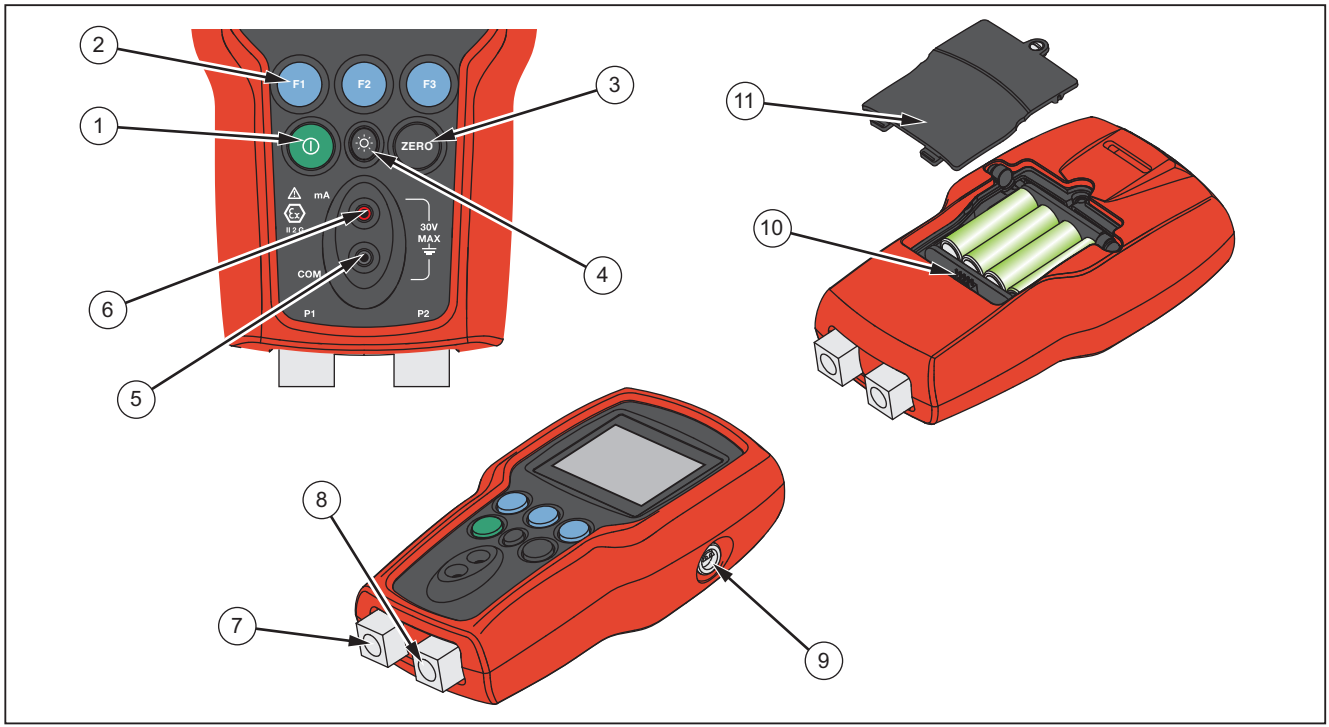

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Figure 1. Product Interface

Table 2. Product Features

Item	Description
①	Power button. Turns on and off the Product
②	Function buttons. Used to configure the Product. These keys correspond to messages on the display.
③	Zero button. Zeros pressure measurements.
④	Backlight button. Push to turn the backlight on or off.
⑤	COMMON input
⑥	Input terminals to measure current and a contact closer for switch test.
⑦	Low pressure port [P1]
⑧	High pressure port [P2]
⑨	RTD probe connector
⑩	Firmware programming connector (for factory use only)
⑪	Battery door

Notes

When ⏻ is pushed to turn on the Product, a short startup self-check routine is run. During that routine, the display shows the current firmware revision level, auto-shutdown status, and the range of the internal pressure sensors.

A maximum of 5 minutes warm-up is necessary for the product to reach rated accuracy. A longer warm-up period can be necessary for large changes in ambient temperature. See the "Zero Function Use" section for more about zeroing the pressure sensor displays. It is recommended that pressure ranges be zeroed each time the Product is started.

Display

The display has two main regions:

- The menu bar (located at the bottom of the screen) is used with the function buttons to access the Product menu.
- The main display has a maximum of three process measurement sub-regions.

These sub-regions will be referred to as the UPPER, MIDDLE and LOWER displays. Figure 2 shows the location of the different display fields. Table 3 describes them.

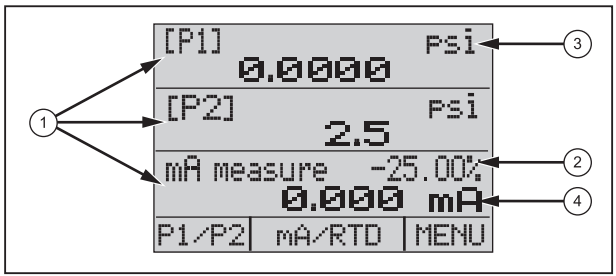

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Figure 2. Display

Table 3. Display Functions

Item Number	Name	Description
①	Primary Parameters	Shows what is being measured.
②	Span Indicator	Shows the percent of the 4 mA to 20 mA span. (For mA functions only.)
③	Pressure Units	Shows one of 17 pressure units available for display.
④	Units	Shows the unit of measure for the display.

Language Selection

The user interface is available in three languages:

- English
- Norwegian
- German

To select a language:

1. Turn the Product off.
2. Hold down F1, ☼, and ⏻ simultaneously.
3. As the Product powers up, the display shows the language in the top left corner of the display. Repeat the procedure to show each subsequent language. Once the necessary language is shown, the Product user interface stays in that language until another language is chosen.

Home Menu Functionality

There are three options for the Home Menu:

- P1/P2
- mA/RTD
- MENU

These options are shown across the bottom of the display.

From anywhere within the menu structure, push F3 to get back to the Home Menu.

Backlight Use

Push ☼ to toggle on and off the backlight.

Zero Function

In pressure mode and when the pressure is within the zero limit, The Product zeros pressure on any port that is currently shown on the display. The zero limits are within 10 % of the full-scale range of the selected sensor. If the display shows “OL,” the zero function will not operate.

Menus

There are 11 sub menus that can be accessed from F3 (Main Menu). Push F2 to go to the next menu selection. For the last menu, push F3 (DONE) to return to the Main Menu.

The 11 sub-main menus are:

- SWITCHTEST
- %ERROR
- MINMAX
- SET UNITS
- CONTRAST
- LOCK CFG
- AUTO OFF
- RESOLUTION
- HART
- PROBE TYPE
- DAMP

Push F1, F2, or F3, depending on the menu, to toggle through each parameter of an active menu. The individual menus are explained in the subsequent sections.

SWITCHTEST

To access the SWITCHTEST menu, push F3. **SWITCHTEST** is shown on the menu bar.

Connect a pressure switch to the Product as shown in Figure 3.

For all connections in this manual:

⚠⚠ Warning

To prevent possible electrical shock, fire, or personal injury, check entity parameters before making any connections to this Product.

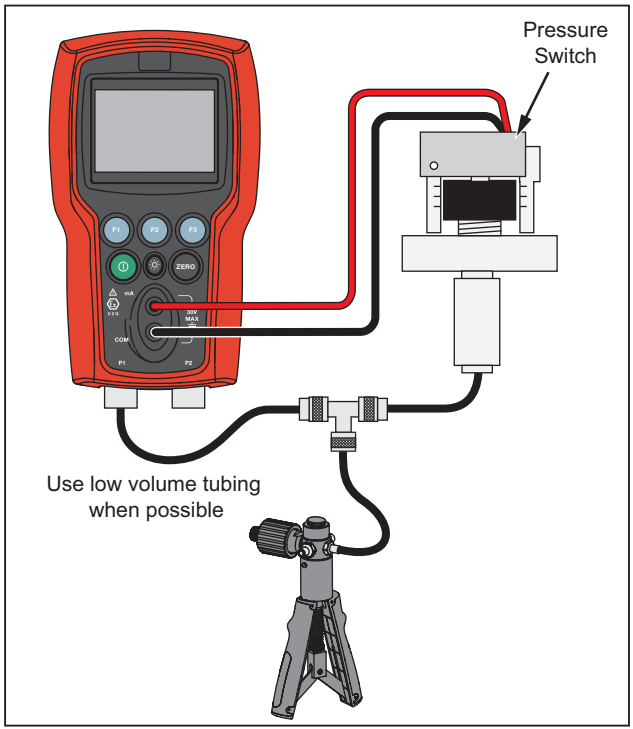


Figure 3. Pressure Switch Connection

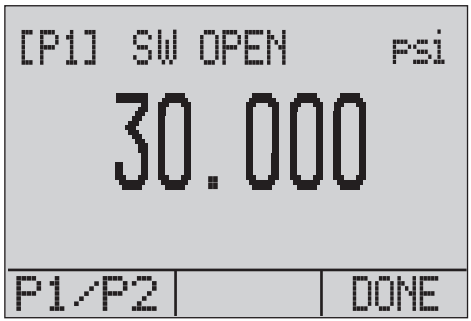
To do a switch test:

1. Use the P1 or P2 pressure input connections to connect the Product to the input of the switch. Connect the contact output of the switch to the COM and mA terminals of the Product. The polarity of the terminals does not matter.
2. Connect the pump to the Product and the pressure switch.
3. Make sure the vent on the pump is open.
4. Push F1 to select P1 or P2 depending on how the Product is connected.
5. Zero the Product if necessary.
6. Close the vent after the Product is zeroed.
7. If connected to a normally closed switch, the top of the display will read “CLOSE”.
8. Slowly apply pressure with the pump until the switch opens.

Note

In the SWITCHTEST mode the display update rate is increased to help capture changing pressure inputs. Even with this enhanced sample rate pressurizing, the test should be done slowly to ensure accurate readings.

9. Once the switch is open, “OPEN” will be shown. Bleed the pump slowly until the pressure switch closes.



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At the top of the display it will now read, “SW OPENED AT” and show the pressure at which the switch opened.

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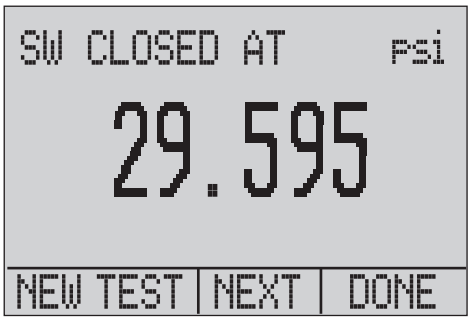
10. Push the “NEXT” option to view when the switch closed, and the dead band.



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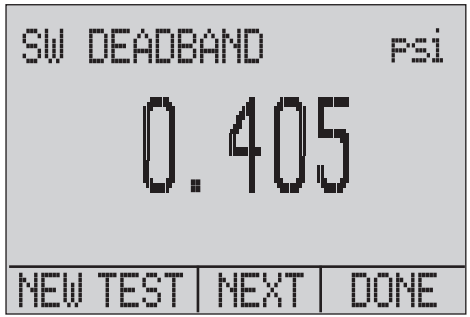

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11. Push the “NEW TEST” option to clear the data and do another test.
12. Push F3 to end the test and return to the main menu.

%ERROR

The Product features a unique function which can calculate pressure vs. milliamp error as a percentage of the 4 mA - 20 mA loop span. The %ERROR mode uses all three screens and has a unique menu structure. It simultaneously shows pressure, mA, and percent error. See Figure 4.

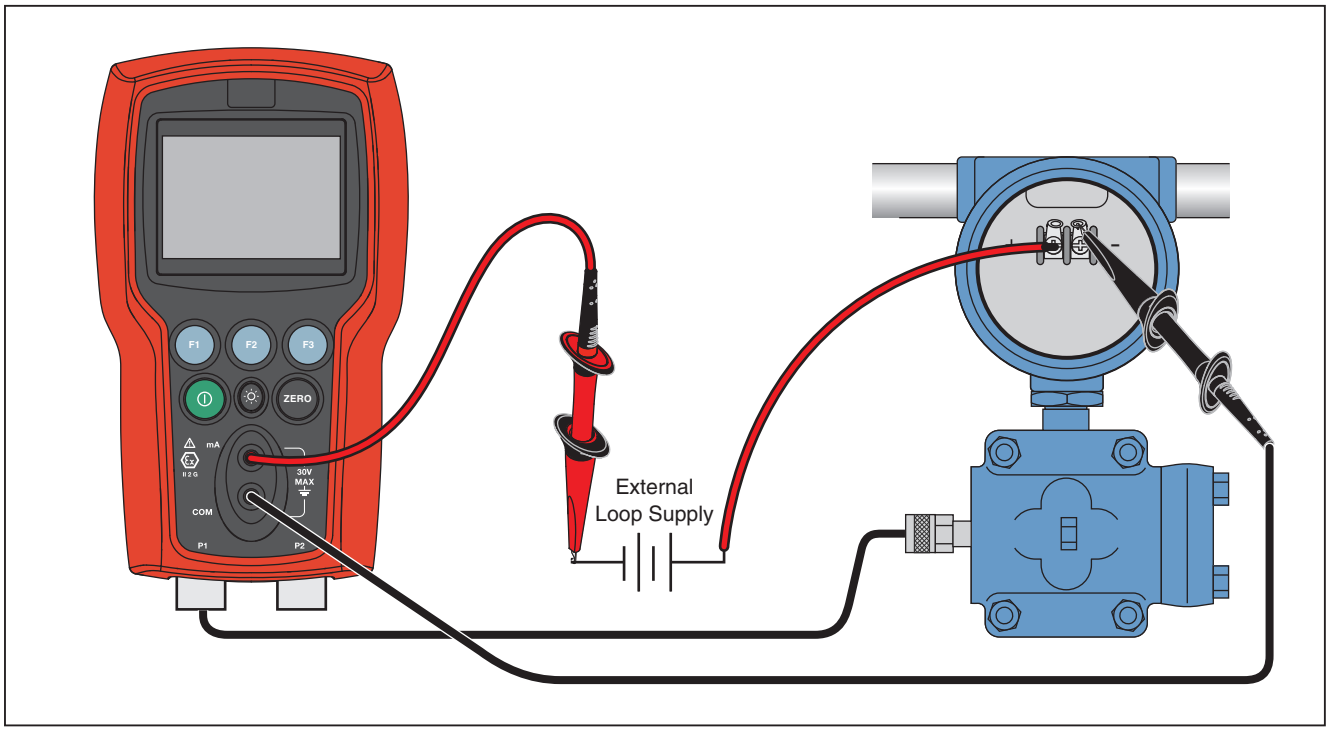

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Figure 4. Percent Error Function Connection

Example:

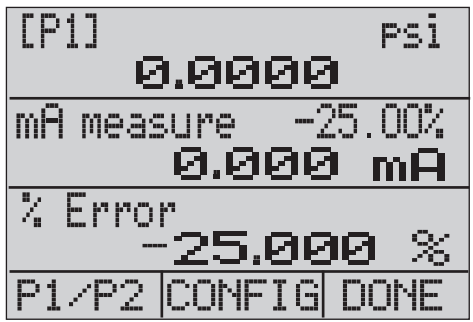
A pressure transmitter under test is 30 psi (2 Bar) Full-Scale and outputs a corresponding 4 mA to 20 mA signal. Program a 0 psi to 30 psi pressure span into the Product and the Product calculates and shows the deviation or %Error from the expected 4 mA to 20 mA output. This eliminates the need for manual calculations and helps when it is difficult to set an exact pressure.

To use the %ERROR function:

1. Push F3 to access the menus.
2. Push F2 to step through the menu until **%ERROR** is shown on the menu bar.
3. Push F1 to open the %ERROR screen.
4. Push F1 to scroll through the port choices (P1 or P2).
5. Push F2 to configure the pressure range settings.
6. Use the arrow keys to set the 100 % point of the desired pressure range, select DONE SET when finished.
7. Use the arrow keys to set 0 % point and select DONE SET. The % ERROR mode is now ready to use.

Note

The 0 % and 100 % point will be saved in non-volatile memory until they are changed again by the user.



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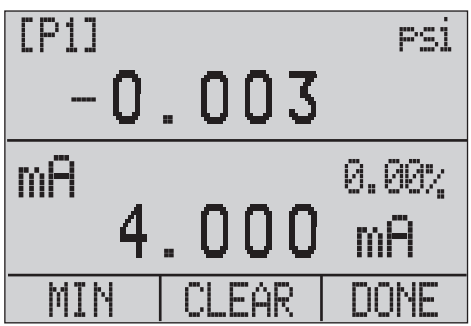
MINMAX

The Product has a min/max feature to capture the minimum and maximum values of any displayed parameter. To use the MINMAX menu:

1. Push F3 to access the menus.
2. Push F2 to step through the menu until **MINMAX** is shown on the menu bar.
3. Push F1 to toggle the display through the min and max values that are stored in the min/max registers. These readings are live so that the new min/max values will be recorded while in this mode.



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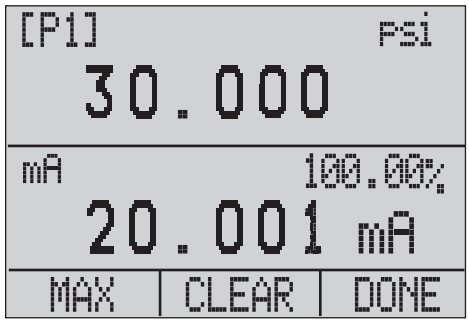

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To reset the min/max registers, push F2 for “CLEAR”. These registers are also cleared at power-up or when the configuration is changed. Push F3 to exit MIN MAX and see live measurements.

SET UNITS

Use the **SET UNITS** menu to select the measurement units for each port. To use this menu:

1. Push F3 to access the menus.
2. Push F2 to step through the menu until **SET UNITS** is shown on the menu bar.
3. Push F1 to select the necessary unit. The choices are:

- inHg 0 °C
- mmHg 0 °C
- kg/cm^2
- mmH_2O 4 °C
- mmH_2O 20 °C
- ftH_2O 60 °F
- psi
- inH_2O 4 °C
- inH_2O 20 °C
- inH_2O 60 °F
- cmH_2O 4 °C
- cmH_2O 20 °C
- bar
- mbar
- MPa
- kPa

4. Push F2 to move through each function (P1, P2, or RTD) and change to the desired units.
5. Push F3 when finished with units selection.

CONTRAST

Use the Contrast menu to adjust the display contrast.

1. Push F3 to access the menus.
2. Push F2 to step through the menu until **CONTRAST** is shown on the menu bar.
3. Push F1 to access the Contrast menu.

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4. Push F2 and F3 repeatedly to adjust the display contrast to the necessary level. Push F1 to finish the adjustment and go home as shown below.

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Lock and Unlock Configurations (CFG)

Use the **LOCK CFG** or **UNLOCK CFG** options of the Configuration Lock Menu (CONFIG), shown below, to lock or unlock the display configuration.

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When the LOCK CFG option is pushed, the menu display goes home and the menu configuration option on the Main Menu is locked. All menus are locked with the exception of:

- MINMAX
- CONTRAST
- CONFIG

You will also notice that some menu choices disappear when the LOCK CFG is used.

When the UNLOCK CFG option is selected, the configuration is unlocked and the menu display goes to the subsequent menu.

AUTO OFF

The Product can be set to automatically power off after a chosen number of minutes. This function can also be disabled. To set the auto off parameters:

1. Push F3 to access the menus.
2. Push F2 to step through the menu until **AUTO OFF** is shown on the menu bar.
3. Push F1 on the Auto Off Main Menu shown below.

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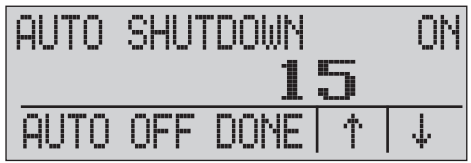
4. Push F2 or F3 to select the number of minutes before the Product turns off or scroll down to 0 to disable Auto Off as shown below.



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5. Push F1 to set the parameters and go to the main menu. The auto off time is reset when a key is pushed.

RESOLUTION

To choose between a low or high resolution display:

1. Push F3 to access the menus.
2. Push F2 to step through the menu until **RESOLUTION** is shown on the menu bar.
3. Push F1 to select the Resolution menu.
4. Push F1 or F2 to turn low resolution on or off.
5. Push F3 when finished.

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PROBE TYPE

To select an external RTD probe for use with the Product:

1. Push F3 to access the menus.
2. Push F2 to step through the menu until **PROBE** is shown on the menu bar.

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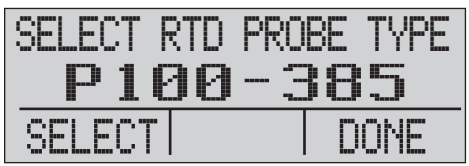
3. Push F1 on to select the Probe type. The probe choices are:
   - P100-385
   - P100-392
   - P100-JIS

4. Push F1 to select the necessary probe type (see the figure below). Push F3 to store the change and go to the Main Menu.

Note

The default probe type is PT100-385.



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5. Connect the RTD Probe.

The standard probe has a 10-inch insertion depth with a ¼-inch diameter stainless steel sheath. See Figure 5.

Note

The factory default type is PT100-385 so if the Product is used with the Fluke 720 RTD Probe (pn 4366669), it is not necessary to set the probe type. Connect the probe to the Product and configure the display to read temperature.

The display shows "OL" when the measured temperature is outside the nominal measurement range of the RTD function (below -40 °C or above 150 °C).

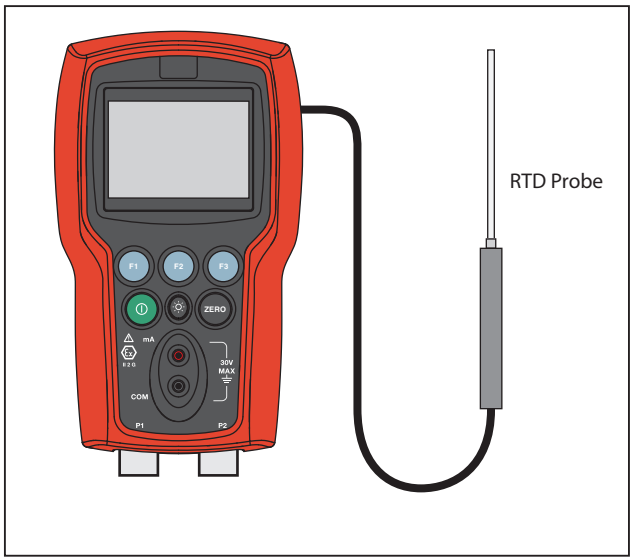

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Figure 5. Temperature Measurement with RTD Probe

DAMP

Turn on or off Damping with the **DAMP** menu selection. When damping is on, the Product shows a running average from ten measurements. The Product makes approximately three indications per second.

To use the Damping function:

1. Push F3 to access the menus.
2. Push F2 to step through the menu until **DAMP** is shown on the menu bar.
3. Push F1 to select the **DAMP** menu.
4. Push F1 or F2 to turn on or off the **DAMP** function.
5. Push F3 when finished.

hmq064.eps

Measure Pressure

To measure pressure, connect the Product with the correct fitting and select a pressure port. The Product has two internal sensors. Make sure to choose the sensor based on working pressures and accuracy.

⚠Warning

To prevent personal injury:

- **Pressure sensors can be damaged and/or personnel injury can occur due to improper application of pressure. Refer to Table 4 for information on overpressure and burst pressure ratings. Vacuum should not be applied to any gauge pressure sensor. The Product display shows "OL" when an inappropriate pressure is applied. If "OL" is shown on any pressure display, the pressure should be reduced or vented immediately to prevent Product damage or possible personnel injury. "OL" is shown when the pressure exceeds 110 % of the nominal range of the sensor or when a vacuum in excess of 2 PSI is applied on gauge range sensors.**
- **Push ZERO to zero the pressure sensor when vented to atmospheric pressure.**

Note

To ensure accuracy of the Product, the Product must be zeroed before a device is calibrated. See the "Zero Function Use" section.

Media Compatibility

The Product has a media-isolated sensor to prevent sensor contamination. Whenever possible, clean dry air is the media of choice. If this is not possible, make sure the media is compatible with the sensor. For the 16 PSIG and 36 PSIG range, use media compatible with Silicon, Pyrex, RTV, Gold, Ceramic, Nickel, and Aluminum. For all other ranges, use media compatible with 316 Stainless Steel.

Measurements

Use the input terminals on the front of the Product to measure current. Current is measured in mA and percentage of range. The range on the Product is set at 0 % at 4 mA and 100 % at 20 mA.

Use the RTD connector and an RTD probe to measure temperature.

From the main menu, push F2 to select mA or RTD. This function will only work on the LOWER screen.

Note

The display shows "OL" when the measured current is more than the nominal range of current measurement (24 mA).

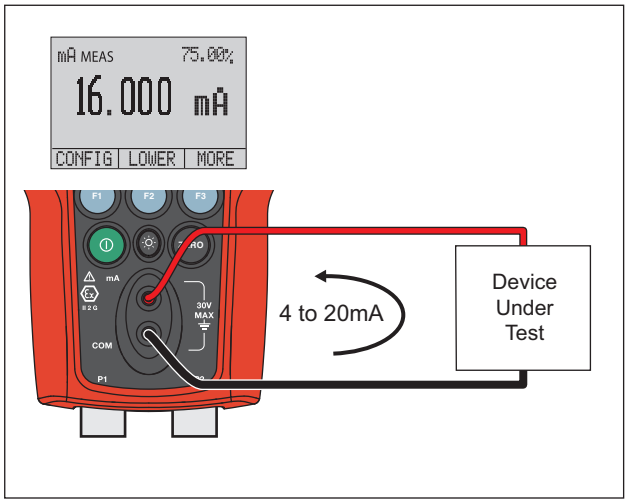

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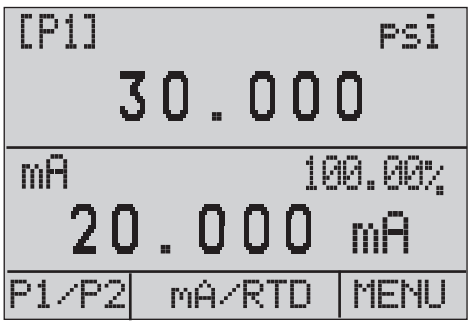
Figure 6. Measure Current

Transmitter Calibration

mA Input Function

The mA input function reads back the 4 mA to 20 mA output from the device being calibrated. This can be done passively. The device under test directly generates 4 mA to 20 mA and can be read by the Product.



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Pressure-to-Current Transmitter Calibration

To calibrate a pressure-to-current transmitter (P/I):

1. Connect the Product and the pump to the transmitter. See Figure 7.
2. Apply pressure with the pump.
3. Measure the current output of the transmitter.
4. Ensure the reading is correct. If not, adjust the transmitter as necessary.

Note

Use low-volume tubing when possible.

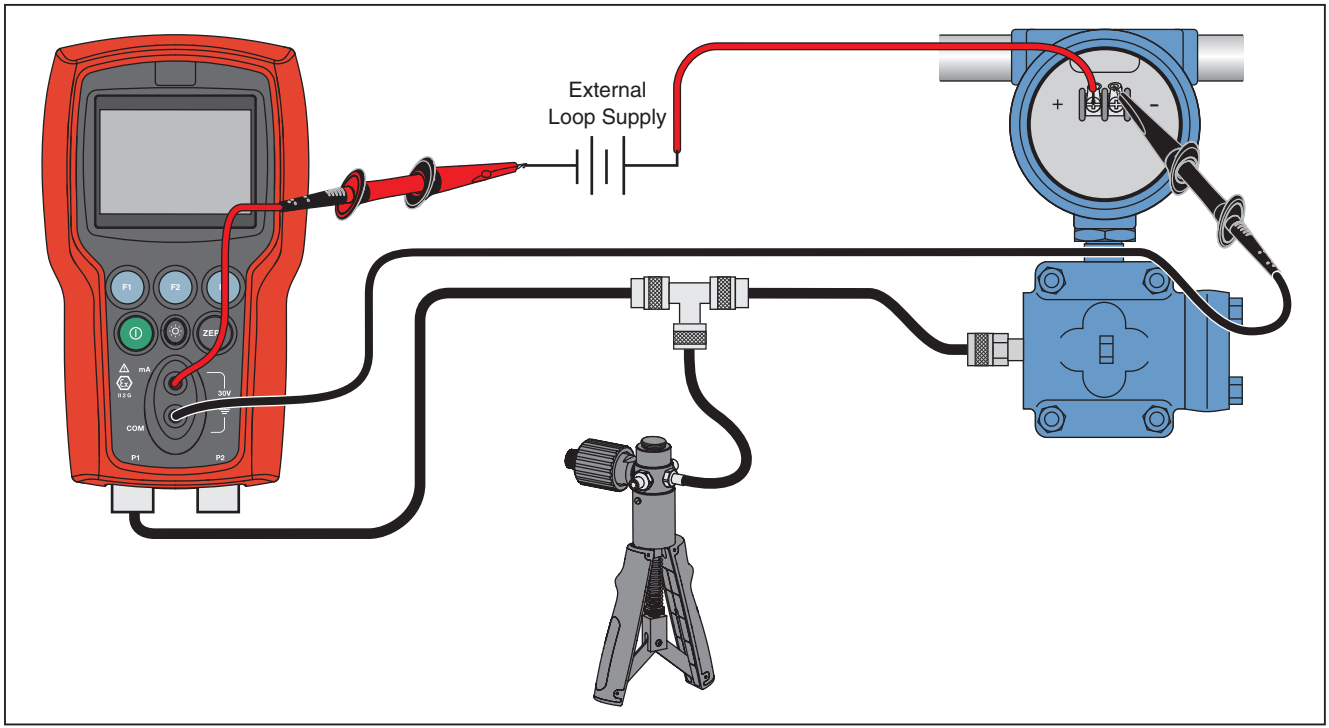

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Figure 7. Pressure-to-Current Transmitter Connections

Ranges and Resolution

Ranges and resolutions for the Product are shown in Table 4.

Table 4. Ranges and Resolutions

Range (PSI)		16	36	100	300	500	1000	1500	3000	5000
Burst Pressure		60	120	400	1200	2000	4000	6000	9000	10000
Proof Pressure (PSI)		35	70	200	600	1000	2000	3000	6000	7000
Engineering Unit	Factor									
psi	1	16	36	100	300	500	1000	1500	3000	5000
bar	0.06894757	1.1032	2.4821	6.8947	20.684	34.474	68.947	103.42	206.84	344.74
mbar	68.94757	1103.2	2482.1	6894.8	20684	34474	68948	N/A	N/A	N/A
kPa	6.894757	110.32	248.21	689.48	2068.4	3447.4	6894.8	10342	20684	34474
MPa	0.00689476	0.1103	0.2482	0.6894	2.0684	3.4474	6.8948	10.342	20.684	34.474
kg/cm2	0.07030697	1.1249	2.5311	7.0307	21.092	35.153	70.307	105.46	210.92	351.53
cmH20 @ 4 °C	70.3089	1124.9	2531.1	7030.9	21093	35154	70309	N/A	N/A	N/A
cmH20 @ 20 °C	70.4336	1126.9	2535.6	7043.4	21130	35217	70434	N/A	N/A	N/A
mmH20 @ 4 °C	703.089	11249	25311	70309	N/A	N/A	N/A	N/A	N/A	N/A
mmH20 @ 20 °C	704.336	11269	25356	70434	N/A	N/A	N/A	N/A	N/A	N/A
inH20 @ 4 °C	27.68067	442.89	996.50	2768.1	8304.2	13840	27681	41521	83042	N/A
inH20 @ 20 °C	27.72977	443.68	998.27	2773.0	8318.9	13865	27730	41595	83189	N/A
inH20 @ 60 °F	27.70759	443.32	997.47	2770.8	8312.3	13854	27708	41561	83123	N/A
mmHg @ 0 °C	51.71508	827.44	1861.7	5171.5	15515	25858	51715	77573	N/A	N/A
inHg @ 0 °C	2.03602	32.576	73.297	203.60	610.81	1018.0	2036.0	3054.0	6108.1	10180

- Proof pressure - maximum allowable pressure without a shift in calibration.
- Burst pressure - sensor damaged or destroyed; some risk of personnel injury.

Maintenance

Replace the Batteries

If the batteries discharge too far, the Product automatically shuts down to prevent battery leakage.

⚠⚠ Warning

To prevent possible electrical shock, fire, or personal injury:

- **Remove the batteries if the Product is not used for an extended period of time, or if stored in temperatures above 50 °C. If the batteries are not removed, battery leakage can damage the Product.**
- **Replace the batteries when the low battery indicator shows to prevent incorrect measurements.**
- **Be sure that the battery polarity is correct to prevent battery leakage.**
- **Repair the Product before use if the battery leaks.**
- **The battery door must be closed and locked before you operate the Product.**
- **Only change batteries in an area known to be non-hazardous.**

To change the batteries, see Figure 8:

1. Turn off the Product.
2. Turn the Product so that the display is down.
3. With a flat-head screwdriver, remove the battery door screw.
4. Replace the four AA batteries with new batteries. Make sure that the polarity on the batteries is correct. See Table 5 for a list of approved batteries.
5. Replace the battery door.
6. Tighten the battery door screw.

Table 5. Approved Batteries

Battery Manufacturer (All Batteries Alkaline 1.5 V)	Type
Duracell	MN1500
Rayovac	Max Plus 815
Eveready (Energizer)	E91
Panasonic	LR6XWA

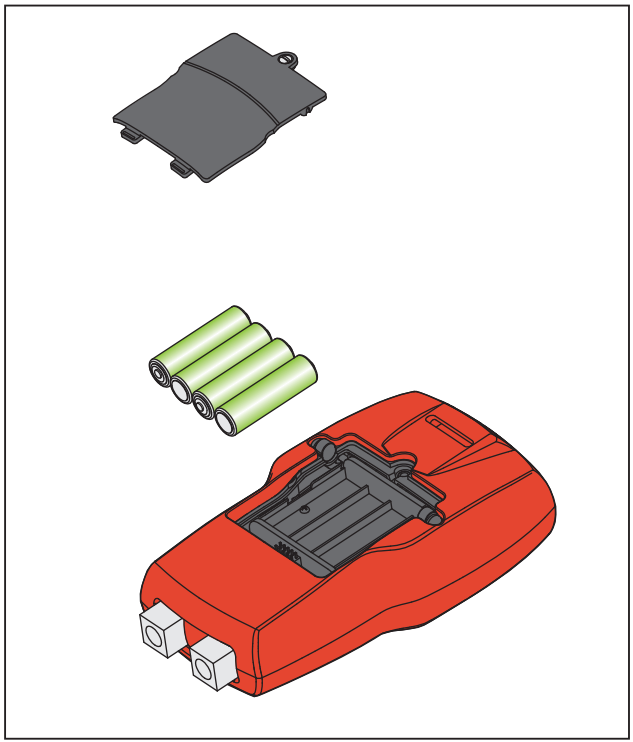
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Figure 8. Battery Replacement

Clean the Product

⚠Caution

To avoid damaged to the Product:

- **Do not use solvents or abrasive cleansers.**
- **Do not allow water into the case.**

Clean the Product with a soft cloth dampened with water or water and mild soap.

User-Replaceable Parts and Accessories

⚠⚠ Warning

To prevent possible electrical shock, fire, or personal injury, use only specified replacement parts.

User-replaceable parts are listed in Table 6 and shown in Figure 9 . For more information about these items, contact a Fluke representative. See the “Contact Fluke” section of this manual.

Table 6. User-Replaceable Parts and Accessories

Item	Description	Part Number
①	Red Holster	4497306
②	TL7X Probe Cap, Red	3986579
③	TL7X Probe Cap, Black	3986568
④	TPAK80-4-2002, Magnet Strap	669952
④	TPAK80-4-8001, Strap 9 inches	669960
⑤	AA Alkaline Batteries	376756
⑥	Safety Sheet	4561164
⑦	Quick Reference Guide	4561158
⑧	Users Manual CD	4561173
Not Shown	Rubber Feet	4364579
Not Shown	Fluke-720RTD Probe for 721 and 719Pro	4366669
Not Shown	Test Lead Set	Variable[1]
Not Shown	Alligator Clip, Red	Variable[1]
Not Shown	Alligator Clip, Black	Variable[1]

[1] See www.fluke.com for more information about the test leads and alligator clips available for your region.

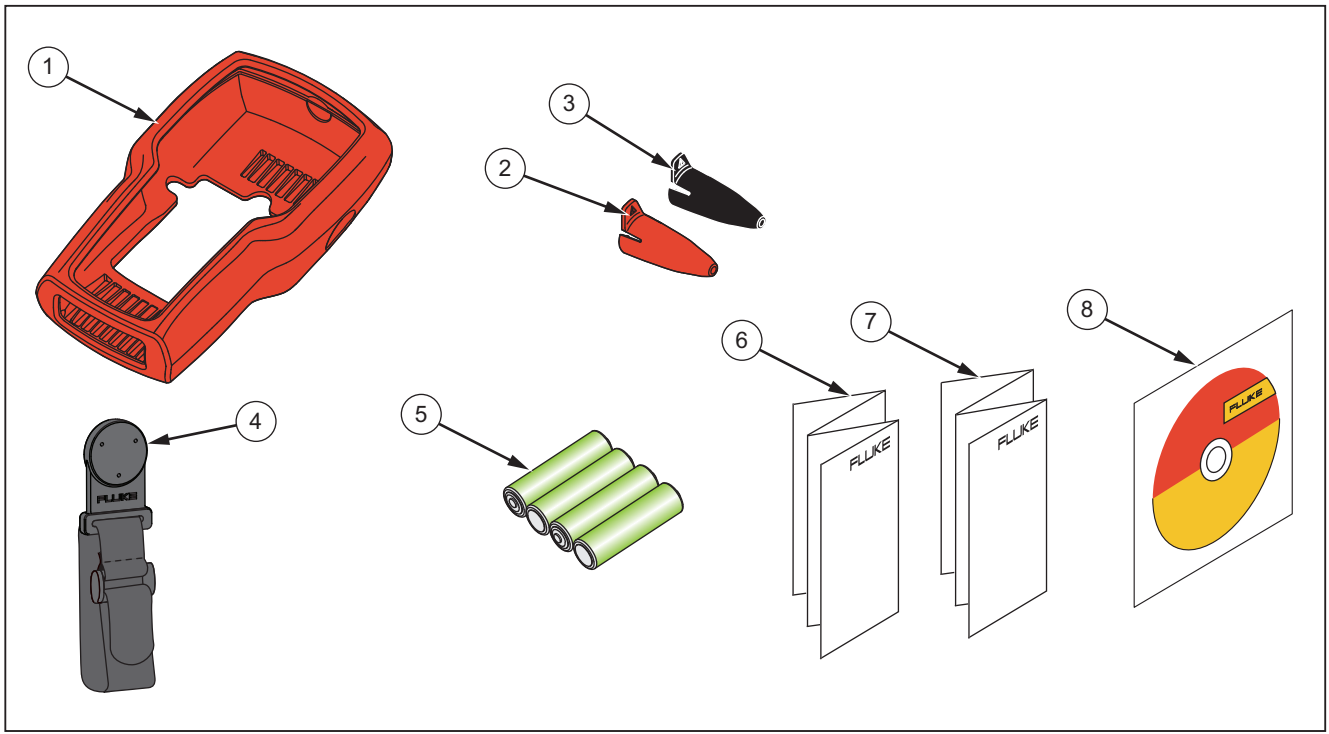

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Figure 9. User-Replaceable Parts and Accessories

Specifications

(15 °C to 35 °C unless otherwise noted)

Environmental

Operating Temperature ..... -10 °C to +45 °C (14 °F to +113 °F)

Storage

With Batteries..... Per battery manufacturer's specification, not to exceed storage specification without batteries.

Without Batteries..... -20 °C to +60 °C (-4 °F to +140 °F)

Altitude..... 2000 m

Power Requirements ..... 6 V dc

Batteries..... 4 AA batteries (alkaline)

Battery Life..... >35 hours, typical usage

Electrical and Temperature Measurement (1 year)

Function	Range	Resolution	Accuracy
mA Measure	0 to 24 mA	0.001 mA	±0.015 % of rdg ±0.002 mA
*Temperature measure (RTD/Ohms)	-40 °C to 150 °C (-40 °F to 302 °F)	0.01 °C, 0.01 °F	±0.015 % of rdg ±0.02 Ω; ±0.1 °C (±0.2 °F) ±0.25 °C (± 0.45 °F) combined uncertainty when using 720 RTD probe accessory
*Temperature measurement requires optional 720RTD Pt-100 RTD probe available as an accessory.			

Physical

Dimensions (with holster) .....(H x W x D) (20 x 11 x 5.8) cm, (7.9 x 4.3 x 2.3) in

Weight (with holster) .....0.539 kg (1 lb 3 oz)

Ingress Protection .....IEC 60529 - IP40

Connectors/Ports

Pressure.....Two, 1/8 in NPT

RTD.....RTD probe

Temperature Effect (all functions).....No effect on accuracy on all functions from 15 °C to 35 °C

Add ±0.002 % Full Scale/°C for temps outside of 15 °C to 35 °C

1-year Specifications		Low Pressure Sensor			High Pressure Sensor		
Model	**Calibrator Description**	**Range Sensor 1**	**Resolution Sensor 1**	**Accuracy Sensor 1**	**Range Sensor 2**	**Resolution Sensor 2**	**Accuracy Sensor 2**
721Ex-1601	16 PSIG, 100 PSIG	-14 psi + 16 psi -0.97 bar to 1.1 bar	0.001 psi, 0.0001 bar	0.025 % of full scale	-12 psi to +100 psi -0.83 bar to 6.9 bar	0.01 psi 0.0001 bar	0.025 % of full scale
721Ex-1603	16 PSIG, 300 PSIG				-12 psi to +300 psi -0.83 bar to 20 bar	0.01 psi 0.001 bar	
721Ex-1605	16 PSIG, 500 PSIG				-12 psi to +500 psi -0.83 bar to 34.5 bar	0.01 psi 0.001 bar	
721Ex-1610	16 PSIG, 1000 PSIG				0 psi to +1000 psi 0.00 bar to 69 bar	0.1 psi 0.001 bar	
721Ex-1615	16 PSIG, 1500 PSIG				0 psi to +1500 psi 0.00 bar to 103.4 bar	0.1 psi 0.001 bar	
721Ex-1630	16 PSIG, 3000 PSIG				0 psi to +3000 psi 0.00 bar to 200 bar	0.1 psi 0.01 bar	
721Ex-1650	16 PSIG, 5000 PSIG				0 psi to +5000 psi 0.00 bar to 345 bar	0.1 psi 0.01 bar	0.035 % of full scale

1-year Specifications		Low Pressure Sensor			High Pressure Sensor		
Model	**Calibrator Description**	**Range Sensor 1**	**Resolution Sensor 1**	**Accuracy Sensor 1**	**Range Sensor 2**	**Resolution Sensor 2**	**Accuracy Sensor 2**
721Ex-3601	36 PSIG, 100 PSIG	-14 psi + 36 psi -0.97 bar to 2.48 bar	0.001 psi, 0.0001 bar	0.025 % of full scale	-12 psi to +100 psi -0.83 bar to 6.9 bar	0.01 psi 0.0001 bar	0.025 % of full scale
721Ex-3603	36 PSIG, 300 PSIG				-12 psi to +300 psi -0.83 bar to 20 bar	0.01 psi 0.001 bar	
721Ex-3605	36 PSIG, 500 PSIG				-12 psi to +500 psi -0.83 bar to 34.5 bar	0.01 psi 0.001 bar	
721Ex-3610	36 PSIG, 1000 PSIG				0 psi to +1000 psi 0.00 bar to 69 bar	0.1 psi 0.001 bar	
721Ex-3615	36 PSIG, 1500 PSIG				0 psi to +1500 psi 0.00 bar to 103.4 bar	0.1 psi 0.01 bar	
721Ex-3630	36 PSIG, 3000 PSIG				0 psi to +3000 psi 0.00 bar to 200 bar	0.1 psi 0.01 bar	
721Ex-3650	36 PSIG, 5000 PSIG				0 psi to +5000 psi 0.00 bar to 345 bar	0.1 psi 0.01 bar	0.035 % of full scale

Electromagnetic Compatibility (EMC)	IEC 61326-1 (Portable); IEC 61326-2-2, CISPR 11, Group 1, Class A
	Group 1 equipment: group 1 has intentionally generated and/or use conductively coupled radio-frequency energy which is necessary for the internal functioning of the equipment itself.
	Class A equipment is equipment suitable for use in all establishments other than domestic and those directly connected to a low voltage power supply network which supplies buildings used for domestic purposes. Caution - There may be potential difficulties in ensuring electromagnetic compatibility in other environments, due to conducted and radiated disturbances.
	USA (FCC) – 47 CFR 15 subpart B, this product is considered an exempt device per clause 15.103
	Applies to use in Korea only. Class A Equipment (Industrial Broadcasting & Communication Equipment) [1]
	[1] This product meets requirements for industrial (Class A) electromagnetic wave equipment and the seller or user should take notice of it. This equipment is intended for use in business environments and is not to be used in homes.
Ex-Hazardous Area Markings	⟨εx⟩ Ex ia IIB T3 Gb (Ta= -10… +45 °C) CE
	KEMA 10 ATEX 0168X
	Ex ia IIB T3 Gb (Ta= -10…+45 °C)
	II 2 G IECEX CSA 10.0013X
	Manufactured by Martel Electronics, Inc.,
	3 Corporate Park Dr.
	Derry, NH, USA
Entity Parameters	MEASUREMENT JACKS:
	Ui = 30 V; Li = 80 mA; Pi = 750 mW; Ci = 0 μF; Li = 0 mH
	Uo = 7, 14 V; Io = 1,12 mA; Po = 2 mW: Co = 240 μF; Lo = 1 H
	Circular Connector: FOR USE WITH LTP100A RTD PROBE ONLY