FLUKE®
Calibration

Series 7615
Ruska Hydraulic Pressure Controllers

Technical Data



Features

- Precision to 0.01%
- Pressure ranges up to 40 000 psi (275 MPa)
- Six pressure ranges available in one instrument
- Automatic cyclic and fatigue testing with high speed control
- Automate high pressure test and calibration

The Series 7615 hydraulic pressure controller introduces a new approach to automatic testing of high pressure transducers, sensors and instruments. The Series 7615 is the result of combined technologies developed over the last 10 years. Using the pulse-width modulated valves (the same used in the Series 7250), a unique pneumatic to hydraulic intensifier has been developed that allows simple, automated high pressure control of pressures up to 40,000 psi (275 MPa).

The Series 7615 provides fast, accurate pressure control where the pressure setpoint is achieved quickly, even when controlling into a 50 cc load volume. This combination of speed, pressure range and compatibility with virtually any liquid medium, is unique to the Series 7615.

The Series 7615 is an excellent choice for automating pressure calibrations that were previously performed manually wtih hand pumps/deadweight testers in applications such as:

- High volume transducer manufacturing such as diesel fuel rail sensors and transducers.
- High pressure automotive transducers such as those used in braking systems.
- Pressure sensors used in downhole tools for oil and gas applications
- Throttle body pressure sensors.
- Any application that involves high pressure test or calibration using a liquid medium for safety, compatibility or other concerns.

The Series 7615 increases throughput and reduces cost through speed and automation without sacrificing performance.

The Series 7615 offers a variety of pressure ranges to 40 000 psi (275 MPa), with IEEE 488 and RS-232 digital interfaces for a complete automated solution. The remote communication syntax uses the SCPI format and is compatible with the Series 7000 pressure indicators and controllers.

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Pressure control

The control parameters in the Model 7615 are optimized to provide the fastest rate of pressure change with minimal overshoot. At the end of the test, the pressure can be vented to the reservoir for rapid depressurization or reduced under control. If the piston reaches the end of travel before the minimum setpoint pressure is achieved, then there will be an automatic recharge cycle. Actual times will depend on medium selection, system volume, geometry and device under test. Typical control time into a 50 cubic centimeters volume and 10% steps within the control stability specification would be 90 seconds.

Automating high pressure test and calibration

The Model 7615 features an easy-to-use, menu-driven user interface for straightforward, simple operation.

Step up/down: For calibrations where the increments are fixed intervals, enter a user-defined step value. The controller increases or decreases the pressure by the step amount with a single keystroke. No more lengthy keystroke sequences to program.

Sweep test: For simple exercising routines, as with dial gauges, enter a start value, a stop value and number of times to repeat the cycle. The controller automatically exercises the device under test prior to the calibration run.

Onboard programs: For frequently used or lengthy calibrations, the controller can store up to 20 user-defined programs/profiles with up to a total of 1000 steps in internal memory.

Computer interface: Every controller is provided with both an RS-232 and IEEE-488 interface, and the controller syntax follows SCPI protocol for easy programming. A LabVIEW® driver is also available.

COMPASS® for Pressure Software: Provides complete automation of pressure calibrations. A ready-to-use software package that interfaces with all Fluke Calibration pressure controllers, along with other devices to provide closed loop calibrations. Compass also provides calibration management solutions by providing a printout of calibration results and performance analysis, and stores historical data.

Pressure units/scales: Features two user-defined, programmable units of measure, and twelve standard units: inHg at 0 °C, inHg at 60 °C, kPa, bar, psi, inH_2O at 4 °C, inH_2O at 20 °C, inH_2O at 60°F, kg/c^2, mmHg at 0 °C or cmH_2O at 4 °C

Head pressure: Automatic correction for given head pressure differences

Protection of the device under test: Set upper and lower pressure limits to ensure protection of the device under test.

The Series 7615 also offers the following additional modes of operation:

Cyclic mode

Ideal for fatigue testing or extended proof pressure cycling. First, the user sets the desired maximum pressure value for the cycle. The Series 7615 controls the maximum pressure and once achieved, it moves the pump to the home or starting position to establish the minimum pressure value for the cycle. The minimum value obtainable is dependent on the device under test volume and medium. Therefore it cannot be defined by the operator in this mode, (If the lower pressure value must be defined, please see sweep operation). The pressure is then cycled between the maximum and minimum pressure values. The Series 7615 will cycle between the maximum and minimum pressure until the preset number of cycles defined by the operator have been achieved. The profile of the cycle (rate of pressure change and dwell time at maximum and minimum pressure values) can also be defined.

Sweep mode

This is similar to cyclic mode except that in sweep mode the lower pressure point is also controlled.

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Calibration

Specifications

General	
Electrical	110/220 V ac, 50/60 Hz
Temperature	Operating: –18 °C to 50 °C (0 °F to 122 °F) Storage: –20 °C to 50 °C (–4 °F to 122 °F)
Humidity	5 % to 95% RH, non-condensing
Dimensions (H x W x D)	35.5 cm x 43 cm x 66 cm (14 in x 17 in x 26 in)
Weight	68 kg (150 lb)
Pressure supply	100 psig to 110 psig (6.9 bar to 7.5 bar) dry air @ 5 SCFM peak (150 SCLM)
Test port connection	Autoclave F250C
Supply pressure connection	1/4 in NPTF
Display	Vacuum fluorescent, graphical
Tare mode	Tare mode included for gauge calibrations
Calibration	
A NVLAP accredited (ISO 17025) calibration report is provided with each instrument.	

The Series 7615 hydraulic pressure controller features a compatibility with a variety of media. Almost any liquid can be used as the pressure medium. Some of the fluids that can be used in the Series 7615 include: Dioctyl sebacate (DOS) oil, monoplex DOS oil, silicon oil DOW 210H high temperature, hydraulic fluid oil MIL-H-5606 or MIL-H-83282C, SKYDROL 500B-4-1, automobile transmission fluid, fluorinert FC-77 or FC-70, other media available_consult factory about your application.



The Series 7615 is compact and can be placed on a benchtop or rackmounted in a 19 in (483 mm) EIA instrument rack. The Series 7615 is ideal for various applications including: automotive (fuel rail sensors, braking systems, throttle body sensor testing), aerospace (braking systems, surface control systems, rocket motor sensors), industrial (transducer/transmitter testing, automated test equipment, pressure/temperature sensor characterization) and many others.

Performance				
Measure		**Precision***	**Stability**	**Total uncertainty****
	Ranges to 20 000 psia (140 MPa)	0.01 % of range	0.01 % of range per year	0.015 % of range per year
	Ranges above 20 000 psia (140 MPa)	0.02 % of range	0.02 % of range per year	0.028 % of range per year
Control	Ranges to 20 000 psia (140 MPa); 0.01 % maximum full scale (FS) Ranges above 20 000 psia (140 MPa); 0.02 % maximum FS			
Low control point	When controlling from a higher pressure to a lower pressure, low control point is 400 psig (2.7 MPa). Unit can be vented to 0 psig (0 MPa).			

* Precision is defined as the combined effects olinearity, repeatability, hysteresis and temperature effects over the entire operating temperature range 0 °F to 122 °F (–18 °C to 50 °C).
** Expression of accuracy (uncertainty) conforms with the recommendations of the ISO guide to the expression of uncertainty in measurement and includes RSS of precision, stability, temperature effects, and the calibration standard to 2 sigma (95 %).

Pressure range	
The following ranges are available for the Series 7615	6 000 psia (40 MPa) 10 000 psia (70 MPa) 15 000 psia (100 MPa) 20 000 psia (140 MPa) 30 000 psia (200 MPa) 40 000 psia (275 MPa)
	Tare mode allows operation in gauge mode. All above ranges can be provided with the triple scale option (see table below).

Options	
Dual sensor option	The Series 7615 can be supplied in a dual sensor configuration. Select any range above for the high sensor. For the low sensor, select any range above except 30 000 psia (200 MPa) or 40 000 psia (275 MPa).
Triple range option	All above ranges can be supplied with the triple scale option to provide three ranges with a single sensor configuration and six ranges with the dual sensor configuration. For each selected sensor, the performance will be 0.01 % of each range up to 20 000 psig (1 400 bar) and 0.02 % for 30 000 psig (2 070 bar) and 40 000 psig (2 750 bar).

Triple scale ranges			
Full scale	**Low**	**Mid**	**High**
6 000 (40 MPa)	2 000 (14 MPa)	4 000 (28 MPa)	6 000 (40 MPa)
10 000 (70 MPa)	3 000 (20 MPa)	6 000 (40 MPa)	10 000 (70 MPa)
15 000 (100 MPa)	5 000 (30 MPa)	10 000 (60 MPa)	15 000 (100 MPa)
20 000 (140 MPa)	6 000 (40 MPa)	12 000 (80 MPa)	20 000 (140 MPa)
30 000 (200 MPa)	10 000 (70 MPa)	20 000 (140 MPa)	30 000 (200 MPa)
40 000 (275 MPa)	12 000 (80 MPa)	25 000 (180 MPa)	40 000 (275 MPa)

Accessories

7615-EXV	3882774	External Priming Vent Valve
7615-106	3882366	Rack Mount Kit
7615-900	3882756	Lines and Fittings Kit
7000-METDRV	3891089	MET/CAL Procedures

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Printed in U.S.A. 4/2011 3833845B D-EN-N
Pub_ID: 11733-eng

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