



Calibration

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RPM4 Reference Pressure Monitor

Highlights

Premium performance in a compact and rugged reference pressure monitor

- Independent quartz reference pressure transducer modules (Q-RPTs) with individual self-defense systems (SDS™) (See Q-RPT module advantages under "Features.")
- Infinite Ranging and AutoRange™
- Differential measurement mode (channel 1- channel 2)
- 15 kPa (2.2 psi) compound gauge Q-RPT with turndown to < 3 kPa (0.4 psi)
- Integrates with PPC4 as external reference measurement device
- Battery/charger pack available
- RPM4 carries on the tradition of the RPM line of pressure monitors: combining very high end performance with ruggedness and reliability
- Stability based Ready/Not Ready indication
- Built-in fluid head corrections
- User defined pressure units
- Intelligent AutoZero™ function
- Remote [ENTER] switch
- Large character, easy to read display

- 12 V dc power and battery pack option
- External valve drivers
- RS232 and IEEE-488 communications
- PC based recalibration utility software included
- Flash memory for simple and free embedded

Description

RPM4 Reference Pressure Monitor is different from traditional pressure monitors. State-of-the-art performance from very low pressure to 280 MPa (40,000 psi)... advanced on-board features... compact and rugged... full local and remote communications... RPM4 is the perfect solution in a wide variety of high end pressure calibration, testing and measurement applications.

Infinite Ranging™ and AutoRange™

Infinite Ranging gives RPM4 Reference Pressure Monitor unprecedented versatility in adapting to the specific range of operation. With the easy-to-use AutoRange function, a few simple key strokes or a single remote command string at the start of a test adapt every feature of the pressure monitor to optimize it for the range to be covered. Just enter the maximum pressure and the measurement mode. AutoRange then:

- Selects and activates the most appropriate Q-RPT to cover the specified range and measurement mode.
- Sets the pressure unit of measure. • Activates absolute, gauge or compound gauge measurement.
- Adjusts display resolution to the appropriate level for the range.
- Adjusts overpressure alarms to the actual range of operation.
- Reduces measurement uncertainty proportionally to the selected range (premium class Q-RPTs only).

Note: The use of RPM4's Infinite Ranging and AutoRange feature is recommended to optimize operation for a specific range but is not required to obtain “% of reading measurement specifications.

SDS™ Q-RPT self defense system

All Q-RPT modules up to 7 MPa (1 000 psi) include the unique Self Defense System™ (SDS). SDS valves automatically isolate and vent the module's Q-RPT when it is not in use or an overpressure is about to occur. With SDS, any Q-RPT module can be left connected to pressure up to 10 MPa (1 500 psi) without needing to isolate or disconnect it.

Advanced on-board functions

RPM4 pressure monitors provides a variety of advanced on-board pressure data functions including:

- Special data such as pressure average over time, rate of change, hi/lo, freeze, deviation from set point.
- Differential mode directly measures the difference between two Q-RPTs including taring at the line pressure.
- Parallel measurement uses two Q-RPTs redundantly as one.
- Leak check measures average pressure rate of change over a user set time period.
- AutoTest automates calibration routines with tolerance testing and data logging.

Quartz reference pressure transducer (Q-RPT) modules

RPM4's outstanding pressure measurement specifications are made possible by Fluke Calibration's exclusive quartz reference pressure transducer (Q-RPT) modules.

Q-RPTs measure pressure by measuring the change in the natural oscillating frequency of a quartz crystal with pressure induced stress. To be qualified for use in a Q-RPT module, each transducer is individually evaluated and characterized using primary pressure standards. Only transducers exhibiting required levels of linearity, repeatability and stability are selected. A proprietary compensation model, derived from more than 15 years experience with thousands of quartz pressure transducers, is applied to optimize the metrological characteristics needed in a transfer standard. Standard and premium class Q-RPT modules are available to best fit your performance and budgetary requirements.

A unique dynamic compensation for atmospheric pressure system uses an independent on-board barometer to provide seamless switching between absolute, gauge and compound gauge modes at any time. The barometer is used only to measure the small variations in atmospheric pressure that occur during gauge mode operation so its absolute error and drift over time do not contribute to measurement uncertainty. Q-RPT modules offer the advantages of:

- % of reading measurement uncertainty with AutoRange span turndown available
- Negligible warm up time

- No gas species dependence
- Quartz element isolated from test medium
- Low sensitivity to orientation

Q-PRTs and ranges

Q-RPT Designation	SI Version		US Version		Measurement MODE(s) Supported	Operating Media	SDS™ Self Defense System
	Maximum Range [kPa]	Maximum Range [kPa]	Maximum Range [psi]	Maximum Range [psi]			
	Absolute	Gauge	Absolute	Gauge			
A280M-L	280 000	280 000	40 000	40 000	Absolute, Gauge and Compound Gauge	Gas Stdard Oil available	Not available
A200M-L	200 000	200 000	30 000	30 000			
A140M-L	140 000	140 000	20 000	20 000			
A100M-L	100 000	100 000	15 000	15 000			
A70M	70 000	70 000	10 000	10 000		Gas Standard Oil available Gas only	Included
A40M	40 000	40 000	6 000	6 000			
A20M	20 000	20 000	3 000	3 000			
A14M	14 000	14 000	2 000	2 000			
A10M	10 000	10 000	1 500	1 500			
A7M	7 000	7 000	1 000	1 000			
A3.5M	3 500	3 500	500	500			
A2M	2 000	2 000	300	300			
A1.4M	1 400	1 400	200	200			
A700K	700	700	100	100			

A350K	350	250	50	35			
A200K	200	100	30	15			
A160K	160	60	23	8			
A100K	110	10	16	1.5			
BA100K¹	110	---	16	---			
G200K	---	200	---	30	Gauge only		
G100K	---	100	---	15			
BG15K²	---	15	---	2.2			
G15K	---	15	---	2.2			

1 BA100K is a barometer with a low point of 70 kPa (10 psia).

2 BG15K is bidirectional gauge from - 15 to + 15 kPa (- 2.2 to + 2.2 psi).

Compatible with PPC4 Automated Pressure Controller

RPM4 can be used as an external reference pressure measurement device for a Fluke Calibration PPC4, fully automated, pressure controller/calibrator. One RPM4 can be connected to PPC4 by 9-pin RS232 cable. The RPM4's Q-RPT(s) become part of the PPC4 system and are managed by the PPC4 transparently to the user. There is only one test connection for the PPC4 system's full range of operation.

Specifications

General

Power Requirements	85 to 264 VAC, 50/60 Hz, 25 VA max and 12 VDC @ 9 Ahr
Battery/Charger:	100 to 240 VAC, 50/60 Hz
Normal Operating Temperature Range	15 to 35 °C
Vibration	Meets MIL-T-28800D
Weight (Typical)	5 kg (11 lb)
Dimensions	10 cm H x 22.7 cm W x 24 cm D (3.9 in. x 8.9 in. x 9.5 in.)
Battery/Charger:	8 cm H x 22.5 cm W x 20 cm D (3.1 in. x 8.9 in. x 7.9 in.)
Communications Ports	RS232 (COM1, COM2), IEEE-488.2
Operating Modes	Absolute, gauge, compound gauge, differential
Pressure Ranges	Vacuum to 280 MPa (40,000 psi)
Operating Media	Q-RPTs lower than A7M Gas only All others Either gas or oil
Calibration	NVLAP accredited
Pressure Connections	Up to A70M: 1/8 in. NPT F Above A70M: DH500 (equivalent to AE250C)
CE Mark	Available, must be specified

Measured pressure (Q-RPT)

Warm Up Time	30 minute temperature stabilization recommended from cold power up
Resolution	To 1 ppm, user adjustable
Predicted One Year Stability¹	± 0.005 % of reading all ranges and classes
Precision²	Q-RPTs up to A14M (2,000 psi)
Standard Class:	± 0.008 % of reading, or 0.0024% of Q-RPT span, whichever is greater ⁴
Premium Class:	± 0.005 % of reading, 0.0015% of AutoRanged span or 0.0005% of Q-RPT span, whichever is greater ⁵
Measurement Uncertainty³	Q-RPTs up to A12M (2,000 psi)
Standard Class:	± 0.010 % of reading or 0.0030% of Q-RPT span, whichever is greater ⁴
Premium Class:	± 0.008 % of reading, 0.0024% of AutoRanged span, or 0.0007% of Q-RPT span, whichever is greater ⁵
Precision²	Q-RPTs A20M TO A140M (3,000 to 20,000 psi) ± 0.012 % of reading or 0.0036% of Q-RPT span, whichever is greater ⁴
Measurement Uncertainty³	Q-RPTs A20M TO A140M (3,000 to 20,000 psi) ± 0.013 % of reading or 0.0039% of Q-RPT span, whichever is greater ⁴
Precision²	QRPT's A200M to A280M (30,000 to 40,000 psi) ± 0.015 % of reading or 0.0045% of Q-RPT span, whichever is greater ⁴
Measurement Uncertainty³	QRPT's A200M to A280M (30,000 to 40,000 psi) ± 0.018 % of reading or 0.0054% of Q-RPT span, whichever is greater ⁴

1. Predicted one year stability limit ($k=2$) assuming regular use of AutoZero function. Absolute mode predicted one year stability without use of AutoZ is $\pm (0.005$ % Q-RPT span + 0.005 % of reading). QRPT's A200MN to A280M (30,000 to 40,000 psi).
2. Combined linearity, hysteresis and repeatability. Add ± 1 Pa (0.00015 psi) in gauge mode with an Axxx Q-RPT for the resolution and short term stability of the on-board barometer.

3. Maximum deviation of the Q-RPT indication from the true value of applied pressure including precision, predicted one year stability, temperature effect and calibration uncertainty, combined and expanded ($k=2$) following the ISO “Guide to the Expression of Uncertainty in Measurement.
4. % of reading value times measured pressure from 100 to 30 % of Q-RPT span. Under 30 % of Q-RPT span, % of reading value times 30 % of Q-RPT span. For example, if the QRPT is a Standard A160K, the Measurement Uncertainty in pressure is 0.010% times the measured pressure to 48 kPa (160 kPa span x 30%) and 0.0048 kPa (160 kPa span x 30% x 0.01%) under 48 kPa.
5. % of reading value times measured pressure from 100 to 30 % of AutoRanged span. Under 30% of AutoRanged span, % of reading value times 30% of AutoRanged span. If AutoRanged span is less then 30% of maximum Q-RPT span, % of reading values times measured pressure, or % of reading times 9% of Q-RPT span, whichever is greater. For example, if the Q-RPT is a Premium A160K and AutoRanged span is 160 kPa, the Measurement Uncertainty in pressure is measured pressure x 0.008% to 48 kPa (160 kPa AutoRanged span x 30%) and 0.0038 kPa (160 kPa span x 30% x 0.008%) under 48 kPa. If the AutoRanged span is 100 kPa (greater than 30% of 160 kPa maximum Q-RPT span), the Measurement Uncertainty in pressure is measured pressure x 0.008% to 30 kPa (100 kPa AutoRanged span x 30%) and 0.0025 kPa (100 kPa span x 30% x 0.008%) under 30 kPa. If the AutoRanged span is 30 kPa (less than 30% of the 160 kPa maximum Q-RPT span), the Measurement Uncertainty in pressure is measured pressure x 0.008% to 14.4 kPa (160 kPa maximum Q-RPT span x 9%) and 0.0012 kPa (160 kPa maximum Q-RPT span x 9% x 0.008%) under 14.4 kPa. For GXXX ranges, the total uncertainty is expanded to 0.015% reading or 0.0045% of Q-RPT span, whichever is greater when used outside of the altitude range of -90 to Ordering information 900 meters (-300 to 3000 feet).
6. Premium class not available on G100K and G200K ranges.

Models and Accessories

Model Name	Description
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Model Name	Description
RPM4 mhhhac/mlllac	Reference Pressure Monitor Where: mhhhac indicates the Hi Q-RPT designation. c indicates Q-RT class (s for Standard, p for Premium) mlllac indicates the Lo Q-RPT designation and class. Leave blank if there is no Lo Q-RPT. See Q-RPT and ranges table under Features for available Q-RPTs.
RPM4 04	-1 US units version, -2 SI units version
RPM4 05	CE mark
RPM4 06	Special calibration
RPM4 07	Special test fluid, Hi Q-RPT (specify fluid)
RPM4 08	Special test fluid, Lo Q-RPT (specify fluid)
RPM4 09	-1 Special configuration, air data (A160K/A160K, A350K/A160K only)

Model Name	Description
RPM4-LP	Low Pressure Monitor, -15 to 15 kPa (-60 to 60 inH ₂ O)

Accessories common to all models:

Accessory	Description
Battery Pack/Charger	12 V dc battery with charger
Rack Mount Kit	Rack mount kit for standard 19 in. rack
Foot Switch	Remote [ENTER] foot switch (part #3070940)
3990-803	Manually operated gas pressure controller, pressure range vacuum to 20 MPa (3,000 psi)
MPC1-1000	Manually operated gas pressure controller, pressure range vacuum to 7 MPa (1,000 psi)
GPC1-16000 / GPC1-10000	Gas pressure controllers
MPG1-200M 402122	Manual hydraulic pressure generator/controller, 200 MPa (30,000 psi)

Accessory	Description
MPG2-H	Manual hydraulic pressure generator/controller, 200 MPa (30,000 psi)
OPG1-30000	Hydraulic pressure generator - Includes: 1 qt. Di-2 Ethyl Hexyl Sebacate (synthetic oil), External tubing/adaptors for connection to a PG7302 or RPM4, and Operation and maintenance manual.
PK-7000-PPC/MPC	Interconnections Kit - connect PG7102 to PPC or MPC pressure controller, and device under test.

Knowledge_and_information

Product Manuals

 [Interconnection Kit For MPG2-H with RPM4 or PG7302 Instruction Sheet \(479.98 KB\)](#)

 [Q-RPT Replacement Kit Instruction Sheet \(787.41 KB\)](#)

 [RPM4 Operation and Maintenance \(4.54 MB\)](#)

 [RPM4 Operation and Maintenance \(rus\) \(3.66 MB\)](#)

 [RPM4 Operation and Maintenance Supplement \(79.83 KB\)](#)

 [RPM4™ Rack Mount Kit Installation Instructions \(252.67 KB\)](#)

Application Notes

 [Guide to Determining Pressure Measurement Uncertainty for Q-RPT Based Products \(1.35 MB\)](#)

 [How to calibrate reference pressure transducers with COMPASS® for Pressure Software \(4.31 MB\)](#)

Data Sheets

 [RPM4 BA100K Reference Pressure Barometer Data Sheet \(3.15 MB\)](#)

 [RPM4 Reference Pressure Monitor Data Sheet \(1.85 MB\)](#)

 [RPM4-LP Low Pressure Monitor Data Sheet \(1.76 MB\)](#)

Software

[COMPASS for Pressure Calibration Software Download/Upgrade](#)

Firmware

[RPM4 v1.01I Embedded Software](#)

[RPM4-AF v1.00b Embedded Software](#)

Instruction Sheets

 [Interconnection Kit For MPG1 with RPM4 or PG7302 Instruction Sheet \(94.59 KB\)](#)

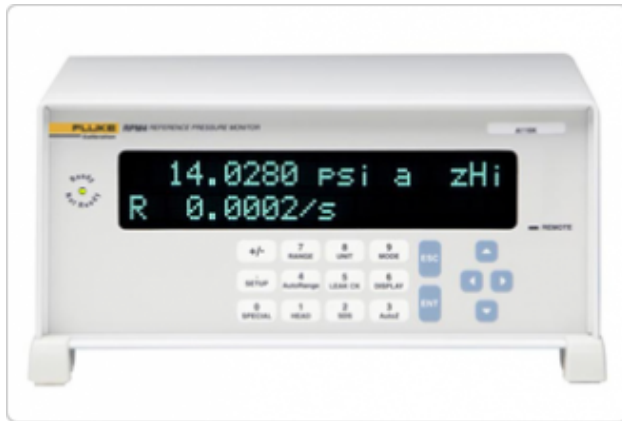
LabView Drivers

[LabVIEW Drivers, Pressure and Flow Calibration Products](#)

Free Utilities

[CalTool for RPTs Free Utility](#)

Product Images



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