Published on *Fluke Calibration: Europe* (https://eu.flukecal.com)

PPCH Automated Pressure Controller / Calibrator

Highlights

Hydraulic pressure controller to 200 MPa (30,000 psi)

- Hydraulic pressure controller to 200 MPa (30,000 psi)
- High precision control
- AutoRange feature
- For liquid pressures up to 30,000 psi (200 MPa)
- One or two Q-RPTs in each controller
- Supports external reference pressure transducers
- FLASH memory for simple and free embedded software upgrades via Fluke Calibration web-site

PPCH™, is a pressure generator/controller/calibrator for liquid pressure operation from 1 to 200 MPa (150 to 30 000 psi). As with the rest of Fluke Calibration's, PPC family of pressure controllers, the emphasis is on high end performance, minimizing measurement uncertainty and maintaining precise control over a very wide pressure range… in a compact and rugged instrument.

New, individually characterized, quartz reference pressure transducer (Q-RPT) modules increase precision and reduce measurement uncertainty. The AutoRange™ feature supports infinite ranging, automatically optimizing all aspects of operation for the exact range of the DUT being calibrated and taking pressure controller rangeability to a new level.

A unique pressure generation and control system provides unlimited, on-demand pressure, very high control resolution and 10:1 pressure control turndown. Four different control modes are included for maximum versatility.

Open architecture allows reference pressure measurement to be internal to, or remote from, the controller. If desired, the reference can be located at the test measurement point and independently removed for recalibration. With all of this, PPCH opens new doors in automated high pressure

hydraulic calibration and test applications.

Description

Quartz reference pressure transducer (Q-RPT) modules

PPCH'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 automated 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.

PPCH can be delivered with a low cost utility sensor for applications in which the high precision and stability of a Q-RPT are not required.

Q-RPTs available for PPCH

Q-RPT Designation	SI Version Maximum Range Absolute Gauge (MPa)	US Version Maximum Range AbsoluteGauge (psi)
A200M[1]	200	30 000
A140M[1]	140	20 000
A100M[1]	100	15 000

A70M	70	10 000
A40M	40	6 000
A20M	20	3 000

[1.] Hi Q-RPT only, not available in Lo Q-RPT position.

Infinite Ranging™ and autoRange™

There is a lot more to covering a wide range of test devices with a single pressure controller than "% of reading" measurement uncertainty.

In addition to the necessary measurement uncertainty, PPCH offers the full pressure control and feature adaptability that are needed for true rangeability in test and calibration applications. Infinite ranging gives PPCH unprecedented versatility in adapting to a wide variety of devices to be tested. With the easy to use AutoRange function, a few simple key strokes or a single remote command string at the start of a test adapts every feature of the controller to optimize it for a specific range.

Open architecture

A PPCH controller can be configured with up to four Q-RPT modules. These can be internal or external to the PPCH controller. External Q-RPTs are in RPM4™ Reference Pressure Monitors. The RPM4's Q-RPTs then become part of the PPCH system and are managed by PPCH. External Q-RPTs must be disconnected or protected by valves when PPCH is used at pressure greater than the external Q-RPT range. Examples of possible PPCH system configurations include:

- A PPCH with one or two built-in Q-RPTs to act as a stand alone, "one box" controller/calibrator package.
- A PPCH with no internal Q-RPTs and an external Q-RPT to configure a system whose reference pressure measurement is remote from the controller. This configuration is ideal when it is advantageous for the reference to be removed from the system (e.g. for recalibration) while leaving the controller installed or to locate the reference measurement in closer proximity to the device or system under test.
- A PPCH with no built-in Q-RPTs to act as a low cost automated pressure setting and controlling device (for example to automate pressure control in a PG7000™ piston gauge system).

Features, features, features

PPCH includes all the features you expect in today's state-of-the-art instruments and much more:

- Pressure "ready/not ready" indicator with user adjustable criteria
- Intelligent AutoZero™ function
- 16 SI and US pressure units
- Automatic fluid pressure head correction
- On-board, programmable calibration sequences with DUT tolerance testing
- Remote [ENTER] footswitch for hands free test execution
- Valve drivers option for system design
- Automated leak testing routines
- RS-232 and IEEE- 488 communications
- FLASH memory for simple and free embedded software upgrades

Specifications

PPCH General Specifications

Power Requirements	85 to 264 VAC, 50/60 Hz, 75 W max
Normal Operating Temperature Range	15 to 35 °C
Vibration	Meets MIL-T-28800D
Weight (Typical)	50 kg approx (110 lb)
Dimensions	30 cm H x 52 cm W x 50 cm D (12 in. x 20.5 in. x 20 in.) with enclosure 6U H rack mount version
Communications Ports	RS232 (COM1, COM2), IEEE-488.2
Operating Modes	Gauge, absolute
Pressure Ranges	Atmosphere to 200 MPa (30,000 psi)
Operating Media	Sebacate oil standard. Others optional (consult Fluke Calibration)
Internal Reservoir Volume	250 cc (external unlimited)

Drive Air Supply	70M - 500 kPa (75 psi), 300 l/m (10cfm) 140M - 500 kPa (75 psi), 450 l/m (15cfm) 100M - 700 kPa (100 psi), 300 l/m (10cfm) 200M - 700 kPa (100 psi), 450 l/m (15cfm)
Pressure Connections	DRIVE AIR SUPPLY 1/8 in. NPT F TEST DH500 (equivalent to AE F250C, HIP HF4)
Utility Sensor	Precision/Resolution ± 0.10 % span / 0.001 % span
Drivers	(8) 12V, 1 A max total output
CE Conformance	Available, must be specified

Pressure control

Control Modes	**Dynamic:** Sets target pressure within hold limit and continuously adjusts pressure to remain at target value. **Static:** Sets target pressure within hold limit and shuts off control, allowing pressure to stabilize naturally. **Monotonic:** Sets pressure to target, then maintains very slow ramp in same direction as pressure increment. **Ramp:** Sets and maintains user specified rate of change of pressure. **Piston Gauge:** Control PPCH is controlled by PG7302™ to automate piston gauge pressure control.
Control Precision	To ± 0.003 % of Q-RPT span
Control Volume	0 to 100 cc, 50 cc optimum (operates in larger volumes but pressure stabilizing time increases)
Control Speed	180 seconds into a 50 cc volume and 20 % FS excursions with default hold limits.
Lowest Controllable Pressure	1 MPa (150 psi)(lower in optimum conditions and with PG7302)

Measured and delivered pressure (Q-RPT)

Warm Up Time	30 minute temperature stabilization recommended from cold power up	
Resolution	To 1 ppm, user adjustable	
Calibration	A2LA accredited calibration report included	
Q-RPTs	**Less than A200M**	**A200M**
Precision[1]	± 0.012 % of reading[5]	±0.015 % of reading[5]
Predicted One Year Stability[2]	± 0.005 % of reading	± 0.005 % of reading
Measurement Uncertainty Delivered	± 0.013 % of reading[5]	± 0.018 % of reading[5]
Pressure Uncertainty (Dynamic Control Mode)[4]	± 0.016 % of reading[5]	± 0.020 % of reading[5]

1. Combined linearity, hysteresis and repeatability.
2. Predicted one year stability limit (k=2) assuming regular use of AutoZero function. AutoZero occurs automatically when vented in gauge mode, by comparison with a barometric reference in absolute mode. Absolute mode predicted one year stability without use of AutoZ is ± (0.005 % Q-RPT span + 0.005 % of reading).
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. Maximum deviation of the PPCH controlled pressure from the true value including measurement uncertainty and dynamic control hold limt.
5. % of reading applies to 30 to 100 % of Q-RPT span. Under 30 % of Q-RPT span, uncertainty is a constant value obtained by multiplying the % of reading value by 30 % of Q-RPT span.

Models and Accessories

Model Name	Description

Model Name	Description

PPCH-nnnM	PPCH Automated Pressure Controller/Calibrator for Hydraulic Pressure with no internal Q-RPT (utility sensor only)
	
	To configure:
	
	• Determine maximum controlled pressure required. Select:
	  ◦ PPCH-200M for 200 MPa (30 000 psi)
	  ◦ PPCH-140M for 140 MPa (20 000 psi)
	  ◦ PPCH-100M for 100 MPa (15 000 psi)
	  ◦ PPCH-70M for 70 MPa (10 000 psi)
	• Configure an appropriate RPM4. Note that the maximum pressure of the PPCH defines the maximum pressure of the PPCH system.

PPCH-nnnM AnnnMc1/AnnnMC2	PPCH Automated Pressure Controller/Calibrator for Hydraulic Pressure with one or two internal Q-RPTs
	
	To configure:
	
	• Determine maximum controlled pressure required. Select:
	  ◦ PPCH-200M for 200 MPa (30 000 psi)
	  ◦ PPCH-140M for 140 MPa (20 000 psi)
	  ◦ PPCH-100M for 100 MPa (15 000 psi)
	  ◦ PPCH-70M for 70 MPa (10 000 psi)
	• Select one or two Q-RPTs. Lo Q-RPT must be A70M or lower.

Accessories common to all models:

Accessory	Description
A100M	PPCH Quartz Reference Pressure Transducer (Q-RPT)
A140M	PPCH Quartz Reference Pressure Transducer (Q-RPT)

Accessory	Description
A200M	PPCH Quartz Reference Pressure Transducer (Q-RPT)
A40M	PPCH Quartz Reference Pressure Transducer (Q-RPT)
A70M	PPCH Quartz Reference Pressure Transducer (Q-RPT)
Footswitch	Remote [ENTER] footswitch
RS232 Cable	9-pin, 2 m for PPC3 COM1 or PPC3-to-RPM4 connections
Reservoir	External fluid reservoir
RPM4	Reference pressure monitor for external Q-RPTs
PPCH 08-SP	Special fluid
PPC4 07	Special calibration
PPCH 06-01	Enclosure (for bench applications)
PPCH 05-01	CE mark

Accessory	Description
PPCH 04-02	SI units version
Priority Gold Instrument CarePlan	Fluke Calibration Priority Gold Instrument CarePlans are available for most calibration products. Please contact your local Fluke Calibration sales representative for details or to request a quote. You may also call the Customer Care Center at 877-355-3225 or send email to careplans@flukecal.com.
Silver CarePlan	Fluke Calibration Silver CarePlans are available for most calibration products. Please contact your local Fluke Calibration sales representative for details or to request a quote. You may also call the Customer Care Center at 877-355-3225 or send email to careplans@flukecal.com.

Knowledge_and_information

Product Manuals
External Reservoir for PPCH™ 4 liter capacity Instruction Sheet (1.38 MB)
High Pressure Filter Kit Instruction Sheet (654.23 KB)
PPC Test Port Connections Kitf Installation Instructions (210.35 KB)
PPCH™ Operation and Maintenance Manual (18.49 MB)
PPCH™ Operation and Maintenance Manual Supplement (49.25 KB)
PPCH™ Operation and Maintenance Manual (rus) (4.17 MB)
PPCH™ Pump Supply Filter Kit Instruction Sheet (795.68 KB)
Q-RPT Replacement Kit Instruction Sheet (787.41 KB)

Application Notes

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

PPCH Hydraulic Pressure Controller/Calibrator Technical Data (2.43 MB)

Software

COMPASS for Pressure Calibration Software Download/Upgrade

Firmware

PPCH 1.01n Embedded Software

Instruction Sheets

PPC Rack Mount Kit Installation Instructions (107.72 KB)

Replacing PPCH and PPCH-G Valve Driver Board Instruction Sheet (182.26 KB)

LabView Drivers

LabVIEW Drivers, Pressure and Flow Calibration Products

Free Utilities

CalTool for RPTs Free Utility

Product Images

Source URL: https://eu.flukecal.com/products/pressure-calibration/automated-pressure-controller-calibrators/ppch-automated-pressure-cont

Links:
[1] https://eu.flukecal.com/lightboxform/webform_client_form_98799?product=PPCH%20Automated%20Pressure%20Controller%20%2F%20Calibrator&family=08a0ec52-599c-e611-80c4-00155dfe6b1a
[2] https://eu.flukecal.com/print/products/pressure-calibration/automated-pressure-controller-calibrators/ppch-automated-pressure-cont?quicktabs_product_details=4#quicktabs-product_details