



PACE5000E & PACE6000E

Modular Pressure Controllers

Speed and Accuracy. No Compromises

Applications and Industries

Laboratory, manufacturing, R&D and Calibration applications in:

- Aerospace, Defence and Space
- Energy
- · Healthcare and Pharmaceutical
- · Electronic and Semi-con
- Transport
- · Metrology and Calibration
- Environmental
- Industrial

Highlights

- Industry leading controller performance (speed, accuracy and stability)into large or small volumes
- Highest accuracy/lowest uncertainty sensor measurement (12-month specification)
- Fully redesigned user interface and larger display area
- Simple and intuitive menu structures with context sensitive help
- Testbench interfacing with HDMI monitor output, mouse keyboard
- 'Drop in' replacement for PACE5000 and PACE6000 with Control Module backwards compatibility
- · Improved diagnostic capability,
- · Windows USB auto-install driver,
- Standards compliant communication, GPIB IEEE-488, RS232, SCPI-99, USBTMC, LXI 1.6 standard (VXI-11 &HiSLIP), NI IVI-C and LabVIEW certified instrument drivers



PACE5000E chassis

- · Single channel pressure controller chassis
- Can be used with any interchangeable PACE CM control module as a bench top or rack mounted pressure controller
- The ideal option for end of line testing and production as well as wider industrial applications due it's speed and control stability but equally suited to a laboratory and workshop environment.

PACE6000 E chassis

- · Dual channel pressure controller chassis
- With two PACE CM control modules fitted the PACE6000E can be used in single, auto-ranging or simultaneous dual pressure control mode*
- · No module pressure range ratio limit
- Increased flexibility due to its multi-channel capability and often chosen for calibration and lab-based work due to the stability and accuracy of the measurement but equally capable in an industrial environment due to its speed and large display.

PACE Control Modules

PACE utilises Interchangeable control modules (CM) that are easily installed and uninstalled into a PACE chassis.

The CM contains all the valves, manifolds and sensors for the unit along with the calibration data.

This unique approach, provides the following benefits when compared to other approaches available in the market.

- Valves and manifolds can be tuned for specific pressure ranges, resulting in market leading speed, stability and volume control.
- Chassis can remain compact. PACE5000E is 2U high and PACE6000E is 3U high. Both units are only 330 mm deep allowing space in behind for connections and accessories if units are rack mounted
- Only the Control Module needs to be recalibrated or maintained so the chassis can remain in place and can continue to be utilised.
- One chassis covers all pressure ranges, there is no need to have a different chassis for low or higher pressure ranges etc.
- Reduced opportunity for leaks as sensors are mounted directly into the manifold and valve assembly.



* for auto-ranging, both control modules have to be a range below 70 bar/1000 psi or both control modules have to be a range above 70 bar/1000 psi

Speed and control stability

Indicative performance:

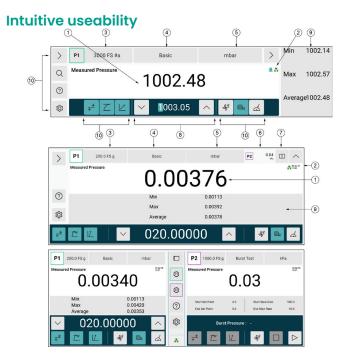
- Control speed / response time (high speed):
 1.5 seconds *
- Control speed / response time (high accuracy):
 <= 3 seconds **
- * Optimized performance into an external load of <=100ml, 20-50%FS step, 0.025%FS stability.
- ** External load of <=100ml, 20-50%FS step, 0.005%FS stability, add 2 seconds for 0.001%FS stability

All performance figures include a 1 second stabilisation time.

 Druck's PACE pressure controllers in conjunction with the Control Modules use an advanced pressure control algorithm. The result is that PACE can stabilise quicker than any other controller on the market up to and including 0.001%FS stability, for large or small volumes.

Long-term measurement stability

As a high accuracy pressure sensor manufacture, Druck Ltd is in control of the whole development and manufacture of the sensors we build into our units which means we can control the specification and adherence to that spec. This ensures the customer can trust the performance of our sensor measurement through out the whole calibration period without need to complete time-consuming check calibrations or adjustments.



- Pressure measurement of selected sensor in selected pressure measurement units
- 2. Enabled Function symbols
- 3. Measurement Range button
- 4. Task button
- Measurement Units button
- P2 (Pneumatic Contol Module 2) Pressure measurement (PACE6000 E only)
- 7. One and two channel screen select
- 8. Setpoint area
- 9. Status area
- 10. Icons

LXI[™]-LAN eXtensions for Instruments

The PACE5000E and PACE6000E instruments include LXI standard communications through the ethernet connection and a local network.

This functionality enables quick and seamless integration into new or existing systems along with improved debugging, troubleshooting and remote software update capabilities.

4Sight2 - A complete calibration system

Druck 4Sight2 is the next generation calibration and asset management software that provides full visibility of all your assets, reference standards and resources on your plant.

Fully integrated with PACE series controllers, 4Sight2 can be used to perform fully automated full loop calibration or test runs which can immensely improve your process.

4Sight2's uniquely designed real time calibration features interrogates PACE to achieve calibration set points as defined in the calibration procedure and intelligently collects readings avoiding any kind of manual intervention. This can be used for number of use cases;

- Calibration of pressure instrumentation such as transmitters, transducers, switches etc
- Highest accuracy calibration of Druck instruments (automated), sensors as well as third party calibration equipment.
- · End of line testing of pressure gauges.
- Leak test of pressure instruments.
- Accredited quality calibration using some of Druck's finest, best in class technology products such as CM3 and PACE Tallis.

Some of the other benefits of 4sight2 include:

- Standardisation of calibration process amongst multiple users, departments, and sites.
- · Full visibility of all your assets and test equipment.
- Integration with Druck portable calibrator range for in field calibrations.



- Fully automated measurement uncertainty calculation for accredited calibration services.
- One click calibration certificate generation in a customisable format.
- · Paperless calibration process.
- · Audit ready at all times.
- Capture of full calibration history with trending feature to analyse drift patterns

4Sight2 Packages compatible with PACE Controller Series

Package	Description
4SIGHT2-STD	Standard license included up to 2000 tags, 5 user licenses, integration with portable calibrators, integration with PACE or Temperature calibrators, and most features as defined in the 4Sight2 datasheet.
4SIGHT2-ADV	Advanced license includes up to 5000 tags, 10 user licenses, integration with portable calibrators, PACE and Temperature calibrators and all features as defined in the 4Sight2 datasheet.

For more information refer to 4Sight2 webpage found here.

PACE5000 E/6000 E Options

Leak test

Leak test applies a test pressure(s) to an external system connected to the instrument to determine the magnitude of pressure variations due to leaks. This application sets the test pressure and a dwell time to eliminate potential adiabatic effects at the test pressure and the leak test time period. On completion, the display shows the start pressure, end pressure, pressure change and leak rate.

Burst test

Burst test is an application for the PACE series designed primarily for the testing of pressure rupture discs. The burst test option applies a controlled increase of pressure and accurately measures the exact point at which the device rupture or burst occurs.

Specifications

Pressure measurement	
CM0/CM1/CM2 Pressure ranges:	25, 70, 200, 350 and 700 mbar gauge, 1, 2, 3.5, 7, 10, 20, 35, 70, 100, 135, 172, 210 bar gauge 0.35, 1, 3, 5, 10, 15, 30, 50, 100, 150, 300, 500, 1000, 1500, 2000, 2500, 3000 psi gauge 2.5, 7, 20, 35, 70, 100, 200, 350, 700 kPa gauge 1, 2, 3.5, 7, 10, 13.5, 17.2, 21 MPa gauge All gauge versions available with negative calibration as standard. For absolute pressure ranges select any range of 1 bar and above and add barometric option
CM3 pressure ranges:	1,2.5,7,10,20,35 and 70, 100, 135, 172, 210 bar pseudo gauge 2,3.5,8,11,21,36,71,101, 136, 173 and 211 Bar absolute 15, 36, 101, 145, 290, 507, 1015, 1450, 1958, 2494, 3046 Psi pseudo gauge 29, 44, 73, 116, 160, 305, 522, 1030, 1465, 1973, 2509, 3060 psi absolute 0.1, 0.25, 0.7, 1.2, 3.5, 7, 10, 13.5, 17.2 21 MPa pseudo gauge 0.2, 0.3, 0.5, 0.8, 1.1, 2.1, 3.6, 7.1, 10.1, 13.6, 17.3, 21.1 MPa absolute (other ranges available, please consult factory)
Over range indication:	10% above mbar/bar full scale pressure range
Pressure Media:	Dry, oil free, and non-combustible gas maintained at a value of 10% above the maximum required outlet pressure, dry air or nitrogen recommended.
Display	
PACE5000E	LCD: Color display with touchscreen. 216 mm x 54 mm (8.5" x 2.1")
PACE6000E	LCD: Color display with touchscreen. 243 mm x 91 mm (9.6" x 3.6")
Comms update rate	20 times per second
Display update rate	2 times per second
Readout	±99999999
Pressure units	mbar, bar, Pa(N/m2), hPa, kPa, MPa, mmHg @ 0°C, cmHg @ 0°C, mHg @ 0°C, inHg @ 0°C, mmH22O @ 4°C, cmH, torr, atm, psi, lb/ft2O @ 4°C, mH2, inH2O @ 4°C, inH2O @ 4°C, mmH2O @ 20°C, inH2O @ 20°C, cmH2O @ 60°F, ftH2O @20°C, mH2O @ 4°C, ftH2O @ 20°C, kg/m2O @ 20°C, 2, kg/cm ftH2O @ 60°F, user defined 1, user defined 2, user defined 3, user defined 4
Performance	
PACE CM0 standard precision	0.02% Rdg + 0.02% FS (25 mbar: 0.20% rdg + 0.20% FS, 70 mbar: 0.10% rdg + 0.10% FS, 200 mbar: 0.04% rdg + 0.04% FS) includes linearity, hysteresis, repeatability and temperature effects over calibrated temperature range, for gauge pressures and assumes steady state temperature and regular zeroing.
PACE CM0 controller stability	0.005% FS
PACE CMI high precision	0.01% Rdg + 0.01% FS (25 mbar: 0.10% rdg + 0.10% FS, 70 mbar: 0.05% rdg + 0.05% FS, 200 mbar: 0.02% rdg + 0.02% FS) includes linearity, hysteresis, repeatability and temperature effects over calibrated temperature range, for gauge pressures and assumes steady state temperature and regular zeroing.
PACE CM1 controller stability	0.003% FS (25mbar range = 0.005% FS)
PACE CM2 premium precision	0.005% Rdg + 0.005% FS (25 mbar: 0.05% rdg + 0.05% FS, 70 mbar: 0.025% rdg + 0.025% FS, 200 mbar: 0.01% rdg + 0.01% FS) includes linearity, hysteresis, repeatability and temperature effects over calibrated temperature range, for gauge pressures and assumes steady state temperature and regular zeroing.
PACE CM2 – controller stability	0.001% FS (25mbar = 0.004% FS. 70 mbar = 0.003% FS)
PACE CM3 reference precision	0.001% FS for 2, 3.5 bar a includes non-linearity, hysteresis, repeatabilty and temperature effects over calibrated temperature range. 0.0015% FS for 8-211 bar a includes non-linearity, hysteresis, repeatabilty and temperature effects over calibrated temperature range.
PACE CM3 controller stability	0.001% of absolute range FS
PACE CM3 accuracy	Absolute ranges 2, 3.5 bar accuracy (2 Sigma) over calibrated temperature range 0.0004%Rdg + 0.0027% FS. 8-101 bar 0.0021% RDG + 0.0026 % FS* 136 Bar 0.0025% RDG + 0.0023 % FS* 173 Bar 0.0026% RDG + 0.0022 % FS* 211 Bar 0.0027% RDG + 0.0022 % FS* Includes measurement precision, measurement long-term stability (see below) and calibration equipment expanded uncertainty. Pseudo gauge range accuracy (3.5bara and below) will need to include the barometer uncertainty using the RSS
*T	(root sum of squares) method.

^{*}To meet annual CM3 accuracy specification, zeroing against a barometric reference is recommended every 28 days. The long-term stability spec will be subject to the specification of the barometric reference used, quoted figures are for CM3-B.

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PACE CM – weight 5 kg or 11 lbs PACE CM – pressure connection 6 1/8 Female (1/8 NPT Female by adaptor for North America)	Physical	
PACE CM – pressure connection G 1/8 Female (1/8 NPT Female by adaptor for North America)	PACE chassis – weight	PACE5000 E 5.6 kg or 12.3 lbs, PACE6000 E 7.2 kg or 15.9 lbs
	PACE CM – weight	5 kg or 11 lbs
PACE 5000F - dimensions (WxHxD) 440 mm x 88 mm (21) x 320 mm (17.3" x 3.47" x 12.6")	PACE CM - pressure connection	G 1/8 Female (1/8 NPT Female by adaptor for North America)
THE HITTH CONTINUE (NO. AUT. ALEO)	PACE 5000E - dimensions (WxHxD)	440 mm x 88 mm (2U) x 320 mm (17.3" x 3.47" x 12.6")
PACE 6000E – dimensions (WxHxD) 440 mm X 132 mm (3U) X 320 mm (17.3" x 5.2" x 12.6")	PACE 6000E - dimensions (WxHxD)	440 mm X 132 mm (3U) X 320 mm (17.3" x 5.2" x 12.6")

Ordering information

Please state the following (where applicable)

1. PACE chassis

PACE5000E Single Pressure Controller Chassis
 PACE6000E Dual Pressure Controller Chassis

2. PACE chassis – options

The range of optional features includes:

• Leak test Automatically measures leak rates in the desired units/minute or units/second

• Burst test For testing the pressure rupture point

• GPIB option Expansion card to enable GPIB communication

3. PACE chassis - mains lead

Choose one from this list:

- · Mains lead IEC-UK plug
- · Mains lead IEC-Japan plug
- · Mains lead IEC-EU plug
- · Mains lead IEC-USA plug
- · Mains lead IEC-South Africa/India plug
- · Mains lead IEC-China plug
- · Mains lead IEC-Australia/New Zealand plug

4. Instrument Set Up

Please state area of use for instrument set up:

- Europe
- · North America
- Japan
- Asia
- · Rest of world
- · Malaysia

5.Country of Use

Please state country of use

6.Country Marking

Supports specific product compliance labelling:

- · Standard Compliance Marking
- · South Korea

6. PACE control module - pressure range

bar	psi	Ра
CM2,CM1,CM0		
25 mbar g	0.35 psi g	2.5 kPa g
70 mbar g	1 psi g	7.0 kPa g
200 mbar g	3 psi g	20.0 kPa g
350 mbar g	5 psi g	35.0 kPa g
700 mbar g	10 psi g	70.0 kPa g
1 bar g	15 psi g	100.0 kPa g
2 bar g	30 psi g	200.0 kPa g
3.5 bar g	50 psi g	350.0 kPa g
7 bar g	100 psi g	700.0 kPa g
10 bar g	150 psi g	1.0 MPa g
20 bar g	300 psi g	2.0 MPa g
35 bar g	500 psi g	3.5 MPa g
70 bar g	1,000 psi g	7.0 MPa g
100 bar g	1,500 psi g	10.0 MPa g
135 bar g	2,000 psi g	13.5 MPa g
172 bar g	2,500 psi g	17.2 MPa g
210 bar g	3,000 psi g	21.0 MPa g

СМЗ		
2 bar a	30 psi a	200.0 kPa a
3.5 bar a	50 psi a	350.0 kPa a
8 bar a	116 psi a	0.8 MPa a
11 bar a	160 psi a	1.1 MPa a
21 bar a	304 psi a	2.1 MPa a
36 bar a	522 psi a	3.6 MPa a
71 bar a	1,029 psi a	7.1 MPa a
101 bar a	1,465 psi a	10.1 MPa a
136 bar a	1,973 psi a	13.6 MPa a
173 bar a	2,509 psi a	17.3 MPa a
211 bar a	3,060 psi a	21.1 MPa a
1 bar pg	15 psi pg	100.0 kPa pg
2.5 bar pg	36 psi pg	250.0 kPa pg
7 bar pg	100 psi pg	700.0 kPa pg
10 bar pg	150 psi pg	1.0 мРа рд
20 bar pg	300 psi pg	2.0 MPa pg
35 bar pg	500 psi pg	3.5 MPa pg
70 bar pg	1,000 psi pg	7.0 MPa pg
100 bar pg	1,500 psi pg	10.0 MPa pg
135 bar pg	2,000 psi pg	13.5 MPa pg
172 bar pg	2,500 psi pg	17.2 MPa pg
210 bar pg	3,000 psi pg	21.0 MPa pg

7. PACE control module - precision

- PACE CM0 = standard
- PACE CM1 = high
- PACE CM2 = premium
- PACE CM3 = reference

8. PACE control module - barometric option

Provides absolute pressure option in addition to gauge pressure. In absolute mode adds barometric pressure to gauge pressure range. Pressure control in absolute range is not available for any CM0-B/CM1-B/CM2-B with a gauge range of 700 mbar (10 psi, 70 kPa) or below.

Provides gauge pressure option in addition to absolute pressure. In gauge mode, subtracts barametric pressure from absolute pressure range. Not available for pressure ranges less than 2 bar (30 psi, 200 kPa) absolute

9. Physical accessories and related items

Part number	Description
IO-ADAPT-G1/4	Adaptor G 1/8 male to G 1/4 female
IO-ADAPT-1/8NPT	Adaptor G 1/8 male to 1/8 NPT female
IO-ADAPT-1/4NPT	Adaptor G 1/8 male to 1/4 NPT female
IO-ADAPT-7/16UNF	Adaptor G 1/8 male to 7/16 – 20 UNF female
IO-ADAPT-AN4	Adaptor G 1/8 male to AN4 37 deg male
IO-ADAPT-AN6	Adaptor G 1/8 male to AN6 37 deg male
IO-ADAPT-BARB	Adaptor G 1/8 male to 1/4 I.D. pipe
IO-ADAPTOR-KIT	Contains one of each of the above adaptors.
IO-DIFF-KIT-LP	Differential connection kit low pressure Helps reduce the impact of thermal and/or pressure changes in ambient conditions occurring during the measurement cycle.
IO-NEG-G-GEN-1	Negative gauge pressure generator Used to generate small – ve gauge pressure (Venturi effect) to enable control at zero gauge without the need for a vacuum pump.
IO-VAC-SYS	Vacuum system check valve kit Allows exhaust pressure to bypass vacuum pump to atmosphere, which improves control performance from any positive pressure downwards.
IO-SNUBBER-1	Snubber reference port Provides a pneumatic time constant to the sensor –ve port, thus attenuating the effect of ambient draughts.
IO-DIFFUSER-1	Diffuser gas exhaust Screws into vent or – ve supply port to diffuse exhaust gas.
IO-RMK-P6000	Rack mount kit PACE6000 19" rack mount kit
IO-RMK-P5000	Rack mount kit PACE5000 19" rack mount kit
IO-FILTER-KIT	Filter kit control manifold Contains 5 filters for control module pressure ports.
IO-IML-1	Mains lead - UK Plug
IO-IML-2	Mains lead-Japan plug
IO-IML-3	Mains lead-EU plug
IO-IML-4	Mains lead-USA plug
IO-IML-5	Mains lead-South Africa/India plug
IO-IML-6	Mains lead-China plug
IO-IML-7	Mains lead-AUS/NZ plug
Related Items	
IOPACE-REG-1	Regulator set at 0.0275bar, 248bar MWP
IOPACE-REG-2	Regulator set at 0.077bar, 248bar MWP
IOPACE-REG-3	Regulator set at 0.22bar, 248bar MWP
IOPACE-REG-4	Regulator set at 0.385bar, 248bar MWP
IOPACE-REG-5	Regulator set at 0.77bar, 248bar MWP
IOPACE-REG-6	Regulator set at 1.1bar, 248bar MWP
IOPACE-REG-7	Regulator set at 2.2bar, 248bar MWP
IOPACE-REG-8	Regulator set at 3.85bar, 248bar MWP
IOPACE-REG-9	Regulator set at 7.7bar, 248bar MWP
IOPACE-REG-10	Regulator set at 11bar, 248bar MWP
IOPACE-REG-11	Regulator set at 22bar, 248bar MWP
IOPACE-REG-12	Regulator set at 38.5bar, 689bar MWP
IOPACE-REG-13	Regulator set at 77bar, 689bar MWP
IOPACE-REG-14	Regulator set at 110bar, 689bar MWP

Part number	Description
IOPACE-REG-15	Regulator set at 148.5bar, 689bar MWP
IOPACE-REG-16	Regulator set at 192.5bar, 689bar MWP
IOPACE-REG-17	Regulator set at 231bar, 689bar MWP
IOPACE-PSRV-1	Pressure RV set at 1.2bar, ¼"OD
IOPACE-PSRV-2	Pressure RV set at 1.5bar, %"OD
IOPACE-PSRV-3	Pressure RV set at 3bar, ¼" OD
IOPACE-PSRV-4	Pressure RV set at 5.2bar, ¼" OD
IOPACE-PSRV-5	Pressure RV set at 12bar, ¼" OD
IOPACE-PSRV-6	Proportional Safety RV set at 15bar
IOPACE-PSRV-7	Proportional Safety RV set at 30bar
IOPACE-PSRV-8	Proportional Safety RV set at 50bar
IOPACE-PSRV-9	Proportional Safety RV set at 94bar
IOPACE-PSRV-10	Proportional Safety RV set at 140bar
IOPACE-PSRV-11	Proportional Safety RV set at 170bar
IOPACE-PSRV-12	Proportional Safety RV set at 225bar
IOPACE-PSRV-13	Proportional Safety RV set at 240bar
IOPACE-VENT-VALVE	Manual Vent Valve ¼" Tube Fitting
IOPACE-O-M-TRAP	Oil & Mist Trap for Vacuum Pump
IOPACE-F-L-TRAP	Foreline Trap for Vacuum Pump
IOPACE-FILTER	Air Filter Tee Type ¼" Tube Fitting
IO-FILTER-KIT	Filter Kit Control Manifold
IOPACE-VAC-PUMP-1	Oil Sealed Rotary Vane Vacuum Pump
IOPACE-RESERVOIR-1	Pressure Reservoir 300cc, 124 bar MWP
IOPACE-RESERVOIR-2	Pressure Reservoir 500cc, 124 bar MWP
IOPACE-RESERVOIR-3	Pressure Reservoir 1000cc, 124 bar MWP
IOPACE-BLANKPLUG-1	Blanking Plug ¼"MNPT
IOPACE-BLANKPLUG-2	Blanking Plug G1/8
IOPACE-FITTING-1	G¼ VCO Bulkhead
IOPACE-FITTING-2	Swagelok G1/8 to G½ VCO
IOPACE-FITTING-3	VCO ¼ Tee T-connection for Reservoir
IOPACE-FITTING-4	VCO ¼ Union Female
IOPACE-FITTING-5	VCO ¼ Cap
IOPACE-FITTING-6	SS Male Connector ¼" VCO x ¼" MNPT
IOPACE-FITTING-7	SS Male Tube Adapter ¼" OD x ¼" MNPT
IOPACE-HOSE-1	VCO ¼ Hose - 1m
IOPACE-HOSE-2	VCO ¼ Hose - 0.5m
IOPACE-TROLLEY-24U	19" Trolley 24U (WxHxD) 600mm x 1200mm x 600mm
IOPACE-GPIB-CARD	GPIB Expansion Card
IO620-USB-RS232	Dongle USB A to DB9-RS232

