- Land and offshore production sensors
- Drilling & subsea sensors
- Portable field process calibrators
- Laboratory and workshop calibrators
- High accuracy and stability
- Standard and customised designs
Contents

1 A World Leader

2,3 Measuring up to Pressure

4,5 Offshore Production Sensors

6,7 Drilling & Subsea Sensors

8,9 Land Based Production Sensors

10,11 Portable Field Process Calibrators

12,13 Laboratory and Workshop Calibration Standards

Back cover Some Druck Users
Established in 1972, Druck is a world leading manufacturer of high performance pressure sensors, calibrators and controllers based upon its own proven micromachined silicon strain gauge technology.

Pursuing a dynamic policy of continual product development whilst focused upon individual customer needs, Druck offers an extensive product range designed to meet the varied and demanding requirements of the oil and gas industry.

By continually improving the performance of the silicon sensor, Druck have developed highly accurate and reliable pressure transducers and transmitters for many critical oil and gas production and exploration applications including offshore drilling and subsea systems, land-based extraction and distribution.

A wide range of pressure, temperature and electrical calibrators are also available for use in the laboratory and workshop, or on-site for calibration, troubleshooting and commissioning. This comprehensive range of precision instruments includes portable calibrators, automated pressure controllers and primary standard deadweight testers.

From offshore platform emergency shutdown systems and subsea wellheads to drilling rigs and land based storage tanks, Druck can supply the precise sensors and calibration equipment required. Supported by a global network of subsidiaries and agents, Druck has the capability to support the oil and gas market worldwide.
**Druck in Oil & Gas**

Measuring up to Pressure

---

**High performance...**

**Zero maintenance**

Druck silicon transducer technology provides high accuracy and reliable pressure measurement proven by over 20 years experience within the oil & gas industry.

The piezo-resistive silicon assembly is mounted within a glass-to-metal seal and completed with a compliant metallic isolation diaphragm to provide a high integrity pressure module. This module is fitted with appropriate conditioning electronics and built into a rugged and hermetically sealed mechanical package.

To ensure high reliability throughout their operating life, all sensors manufactured by Druck are subjected to an Acceptance Test Procedure (ATP) and, where required, Environmental Stress Screening (ESS) prior to delivery.

Completed pressure transducers and transmitters will withstand the severe environmental conditions experienced both onshore and offshore. They are supported by NACE certification, Hazardous area Certification and in some applications Lloyd’s Type approval.

- Gauge, absolute or differential pressure ranges
- Millivolt, voltage, frequency, current and digital outputs
- Accuracies to 0.05% with long term stability less than ±0.1% per annum
- Compact and rugged with flexible packaging design
- CENELEC, FM, UL, CSA and Lloyds approved

---

**Silicon Assembly**

Pressure sensitive, micromachined silicon diaphragm.

**Pressure Module**

High integrity hermetic construction offering full media compatibility.

**Conditioning Electronics**

Sensor reliability and small packaging is enhanced by the use of surface mount electronics.

---

All welded and encapsulated packaging can be customised for a fully compliant form and fit.

Electrical interface can be selected from a range of weatherproof cable and connector options.

Pressure connection formats range from simple threads to bulkhead forms for specific applications.
Your requirements...
Our commitment

Druck is totally committed to exceeding customer expectations not only in product design and performance, but also with product support and customer service.

Continuous investment in resources and facilities enables Druck to provide expertise from concept discussions, through Initial and Final Design Reviews, computerised manufacturing and testing to dedicated program management.

Druck applies a wide range of engineering design tools to produce 3D models with traceability of product controlled by a detailed design package. Program management uses the latest Windows based software for task identification and management, risk analysis and completion of Contract Data Requirements List (CDRL) milestones.

Druck’s commitment extends from the development program through to worldwide application and service support.

- Multi-disciplined engineering groups with over 20 years of oil and gas industry experience
- Totally integrated manufacturing from silicon fabrication to advanced test systems
- Computer based program management systems
- ISO 9001 quality approved with UKAS accredited calibration laboratories
- Global support from industry specialist application and product engineers

Computer assisted 3D design models reduce product development cycle

Fully automated Acceptance Test Procedures (ATP) and Environmental Stress Screening (ESS)

Specialist application and service support provided worldwide

Some company and product approvals
Offshore production systems typically incorporate a wide range of pressure measurement applications, many of which are unique to this specific sector of the industry.

Druck have developed a series of high performance products to meet this demand, including fast response, high integrity sensors for use in emergency shutdown systems and other safety critical applications.

Druck sensing technology is ideally suited to meet the special requirements of this demanding environment, whilst a flexible design approach enables both standard and custom designed sensors to be supplied.

Druck technology provides cost effective solutions ranging from high pressure, high temperature wellhead applications to the very low range measurements associated with heating, ventilation and air conditioning.

A selection of products specifically suitable for offshore platforms are shown. Detailed product datasheets are available on request.

- **Wellhead**
  - NACE compatible materials for high pressure oil, gas or condensate.

- **Flow**
  - High static low differential transmitter
  - High accuracy and NACE compatible

- **General Process**
  - Rangeable and SmartHART® devices with NACE compatible wetted materials
  - Intrinsically Safe and Flameproof versions available.
Emergency Shutdown
High precision, fast response. Excellent stability and reliability.

Trip Level
Used for replacing pressure switches with increased reliability and integrity.

Liquid Level
Tank and ballast level measurement. Suitable for corrosive mixtures such as crude oil and seawater.

Heating, Ventilation and Air Conditioning
Very low pressure ranges in gauge, absolute and differential formats.

Druck In Oil & Gas - 04/00
One of the most demanding pressure measurement applications in the oil and gas drilling operation is addressed by the mud pressure transmitter. Drilling Mud performs a number of critical functions including cooling and lubrication of the drilling tools, removing debris and it is also the communication medium for downhole measurements whilst drilling.

The measurement of both high static and dynamic “pulse” pressures are critical to the drilling function. Transmitters used for this application must therefore provide high accuracy, fast response and also withstand the extreme shock and vibration levels encountered.

A representative selection of Druck sensors tailored for oil and gas drilling applications are shown below. Detailed product datasheets are available on request.

- Rugged, robust design
- Replaceable sensor element
- NACE compatible materials
- Cenelec, FM, CSA approvals

**Mud Pressure Measurement**
Stand-pipe mounted transmitter with Hammer Union process connection.

**Mud Static/Dynamic Pressures**
Dual output for simultaneous static and dynamic pressure measurement.

**Hydraulic Pressure Monitoring**
Detachable junction box for ease of maintenance with conduit systems.
Subsea applications often require sensors which are specifically designed to withstand high external pressure whilst exposed to seawater for prolonged periods of time. Long term reliability is therefore of prime importance, due to the high cost of retrieving installed units for repair or replacement.

Druck has developed a range of subsea pressure sensors which are used and proven for both control systems and for direct mounting onto wellheads. For Remotely Operated Vehicle (ROV) applications where pressure sensors are not permanently immersed underwater, a range of standard devices are used for hydraulic systems monitoring and depth measurements.

A selection of Druck subsea sensors is shown below. Detailed product datasheets are available on request.

- High integrity packaging
- Millivolt, voltage, current or digital outputs
- Excellent accuracy and stability
- All welded construction with high secondary containment

Subsea sensors

Subsea Wellhead Sensors
High pressure API flange mounted. Third party approved, temperature and pressure versions available.

Remote Operated Vehicles
Fully submersible for hydraulic control and depth measurement applications.

Wellhead Control System
Hydraulic control valve mounted transmitters with high external pressure containment.

Druck In Oil & Gas - 04/00
although the land based oil and gas sector is more mature than the offshore industry it is still developing new methods of extraction to improve efficiency and reduce production costs.

The infrastructure supporting the industry, involving the distribution of products extracted from offshore locations, is usually landbased. For example, this may include intercontinental pipelines and associated compressor stations.

Druck has developed an extensive range of high performance pressure transmitters for use in the many aspects of land based production and distribution operations.

To withstand the harsh oil & gas production environment, whilst providing cost effective pressure measurements, a wide choice of performance levels and packaging is available including high grade wetted materials.

Druck pressure sensors provide exceptional accuracy and reliability and offer probably the lowest cost of ownership throughout the industry.

Some Druck sensors used for land based production purposes are shown. Detailed product datasheets are available on request.
Custom packages designs
Gauge, absolute and differential pressure ranges
Proven reliability in hostile environments
Low power versions available for remote site installations
Cenelec, FM, CSA approvals

Pipeline Compressor Station
Maintaining flow and pressure levels along gas pipes.

Pipeline Hydrostatic Testing
Pressure testing of pipelines to verify both physical and mechanical integrity.

Gas Flow Computers
Pressure sensors for monitoring and measuring the mass flow of gas.

Storage Tank Monitoring
Oil and gas storage pressures at low recovery wells in remote locations.
Druck test and calibration tools have evolved over the past 20 years to provide the most comprehensive cover of pressure, temperature and electrical parameters throughout the high technology world of oil and gas production. Durability, reliability and ease of operation have become Druck trademarks in remote and hostile environments worldwide.

Druck portable calibrators are available with ISO9000 systems compatibility. This enables test procedures to be generated and results to be documented, eliminating errors due to manual operation. PC based calibration management software packages are also available which allow the planning of resources and scheduling of preventative maintenance.

Calibrating and adjusting Smart transmitters is also simplified using a product which incorporates built-in HART® communication facilities. Druck can also supply maintenance test tools for simple everyday uses such as stroking valves and loop checking.

A selection of Druck Portable Calibrators is shown. Detailed product datasheets are available on request.

**Precision Pressure Calibrators**

The documenting DPI 605 series offers transfer standard accuracy, programmable safety limits, integral handpump and fine adjustment.

**Pressure Calibrators**

A simple task menu and built-in pressure generation makes the documenting DPI610/615 series easy to use.

**Dryblock Temperature Calibrators**

Two models cover temperatures from 45°C below ambient to 650°C, available as a stable source or as a complete calibration system.

**Handheld Pressure Indicators**

Pressure/leak indicators with gauge, absolute or differential ranges and internal or remote sensors.
Druck In Oil & Gas - 04/00

**Handheld Loop Tester**
A smart loop tester which simplifies everyday maintenance tasks. Easy-to-use menu operation selects linear, flow or valve stroke options.

**Portable Primary Pressure Standard**
The Pressurements model T9000 is used for accurate on-site calibration of low pressure and differential pressure transmitters.

**Multifunction Calibrators**
The MCX II and TRX II Series combine temperature, electrical, frequency and optionally pressure capability in a single, fully documenting calibrator with PCMCIA interface.

**Calibration Software**
A choice of calibration management software is available, compatible with Druck and other types of calibrators.

**4 In 1 Handpump**
The PV411 covers vacuum, low pressure control, HP gas and hydraulic pressures in a convenient hand-held package.

- Pressure, temperature, electrical and frequency calibrators
- Multifunction, Smart/HART® and documenting versions
- Compact, rugged and self-contained
- Intrinsically safe versions for use in hazardous area zones 0, 1 and 2
- Calibration management software
Druck in Oil & Gas

Laboratory and Workshop Calibration Standards

Druck, together with group subsidiary companies Ruska and Pressurements, sets the standard for pressure calibration in the oil and gas industry.

The widest range of primary and secondary standards is available for applications ranging from the calibration of downhole pressure sensors to the validation of differential pressure transmitters used, for example, in custody transfer/fiscal metering applications.

These instruments are used in calibration laboratories, workshops, ATE systems and on-site for pressures from 5Pa to 500MPa gauge, differential or absolute and are compatible with a variety of pressure media including gas, oil and water.

To meet the productivity demands of the oil and gas industry, instruments can also be used remotely under PC control, enabling continuous and unattended 24 hour daily operation.

A representative selection of calibration standards is shown. Detailed product datasheets are available on request.

Fluid Technology (PVT)

Ruska offers a full range of laboratory equipment for phase behaviour studies of reservoir fluids, from lean gas condensates to black oils. This includes:

- Mercury free PVT systems
- Positive displacement pumps
- Button hole samplers
- Sample transport and storage bottles
- Analytical software

Automated Test and Calibration

For high speed and automated pressure calibration, the Druck DPI515 combines high performance with the latest patented self-characterising control technology.

Automated High Pressure Controller

The Ruska model 7610 is a high precision automated hydraulic transfer standard with dual sensor and triple ranging options for optimum performance.

Bench Calibration System

The DPI 530 pressure controller combined with the rack mounting DPI 605R indicator produces an ideal bench calibration system.
Complete range of laboratory test and calibration equipment

- Ranges from 5Pa to 500MPa
- Automated and manual Primary Standard deadweight testers
- Wide range of pressure controllers for bench and ATE systems
- Multifunction pressure indicators

**Multifunction Pressure Indicator**

The transfer standard DPI 145 can display a wide range of measured and processed variables in user selectable formats.

**Precision Deadweight Testers**

The Pressurements range of deadweight testers offer a wide variety of options to fulfill numerous calibration requirements.

**Differential Deadweight Testers**

The Pressurements model 4000DA is used for the accurate calibration of differential pressure transmitters at high line pressures.

**Fully Automated Deadweight Tester**

Continuous unattended operation 24 hours a day, 7 days a week. Used extensively for the calibration of downhole pressure sensors.
### Some Druck Users

<table>
<thead>
<tr>
<th>Company</th>
<th>Company</th>
<th>Company</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABB Offshore Systems</td>
<td>Brown &amp; Root</td>
<td>Saga Petroleum</td>
</tr>
<tr>
<td>AGIP</td>
<td>Burlington Resources</td>
<td>Saudi Ramco</td>
</tr>
<tr>
<td>Aker Marine</td>
<td>CAC</td>
<td>Schlumberger</td>
</tr>
<tr>
<td>Alstom Gas Turbines</td>
<td>Conoco</td>
<td>Sedco Forex</td>
</tr>
<tr>
<td>Altura</td>
<td>Copper Energy</td>
<td>Shaffer</td>
</tr>
<tr>
<td>AMEC</td>
<td>Chevron</td>
<td>Shell</td>
</tr>
<tr>
<td>Amclyde</td>
<td>Daniels</td>
<td>Sinopec</td>
</tr>
<tr>
<td>Amerada Hess</td>
<td>Danish Gas</td>
<td>Sperry-Sun</td>
</tr>
<tr>
<td>Applied Automation</td>
<td>Diamond Offshore</td>
<td>Statoil</td>
</tr>
<tr>
<td>ARCO</td>
<td>Duke Energy</td>
<td>Subsea Offshore</td>
</tr>
<tr>
<td>Airon Gas</td>
<td>Dubai Natural Gas</td>
<td>Texaco</td>
</tr>
<tr>
<td>Baker Hughes Inteq</td>
<td>Elf</td>
<td>Thai Petroleum Industries</td>
</tr>
<tr>
<td>BHP Petroleum</td>
<td>Elf Enterprise - Caledonia</td>
<td>Total</td>
</tr>
<tr>
<td>Bord Gais Eireann</td>
<td>El Paso Natural Gas</td>
<td>Trans Canadian Pipeline</td>
</tr>
<tr>
<td>BP/Amoco</td>
<td>Esso</td>
<td>Western Atlas</td>
</tr>
<tr>
<td>Brisco</td>
<td>Fina</td>
<td>Wood Group</td>
</tr>
<tr>
<td>British Gas</td>
<td>Flow Automation</td>
<td>Wormald Lintott</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Druck Limited**

Fir Tree Lane, Groby
Leicester LE6 0FH

Tel: +44 (0) 116 231 7100
Fax: +44(0) 116 231 7103
E-mail: sales@druck.com
Internet: www.druck.com