Druck

DPI 280 SERIES

Digital Pressure and Process Indicators

- **Wide range of process measurements:**
  Pressure, load, strain, voltage, current, temperature

- **Available interfaced and calibrated with pressure sensor internal or external:**
  70 mbar to 700 bar gauge
  350 mbar to 700 bar absolute
  70 mbar to 60 bar differential

- **Extensive range of programmable features**

- **Built-in sensor energisation**

- **RS 232/485 and analogue output options**

DPI 280

DPI 280 SERIES: Digital Pressure and Process Indicators

INTRODUCTION

The DPI 280 series of digital process indicators provide, via microprocessor based circuitry, 'smart' instruments for use with a wide variety of sensors and signal inputs.

When used with the Druck range of silicon technology pressure transducers or transmitters, a direct reading in pressure is provided. Units can be supplied with an internal or external sensor.

Alternatively instruments are available for direct input of a wide range of thermocouple types and PT 100 resistance thermometers for temperature monitoring.

Process features available include alarm levels, peak reading, signal averaging, dual scales, tare zero suppression and many other useful alternative displays and operating modes. Powerful application orientated software features make the DPI 280 ideal for a wide range of signal readout and enable a single instrument design to be utilised for all measurement parameters.

Models are able to handle most process applications.

DPI 280/281 INDICATOR

To measure: Pressure, load and general strain gauge applications. Includes built-in transducer excitation (10 V). Voltage: 0 to ±20 mV up to 0 to 2 V F.S.

DPI 282/283 INDICATOR

To measure: Temperature: J, K, T, N, R, S thermocouples
RTD PT 100.
Voltage: 0 to ±20 mV up to 0 to ±20 V F.S.
Current: 0 to ±1 mA up to 0 to ±20 mA.
e.g. for process transmitters
(includes loop excitation - 24 V).

DPI 284/285 PRESSURE INDICATOR

To measure: Pressure via internal sensor over the range 0 to 60 bar gauge or absolute.

KEY FEATURES

Easy to use and program
User configured display formats.
Password protected configuration.
User configured operated functions.
Guided transducer calibration routines.
Push button zero and span trimming.
User configured linearisation table.

High performance
18 bit conversion.
0.02% F.S. basic accuracy.

Easy to install
Universal 110/220 V a.c. and isolated 10 to 40 V d.c. power supply.
Removable rear screw connector.
IP 65 front panel protection (optional).
Compact $^1/_8$ DIN 48 mm x 96 mm enclosure.

Powerful, application oriented software features.
Dual scaling with front panel switching.
Push button tare and zero.
Up to 4 flexible alarms (open collector output).
Peak.valley detection.
Measurement averaging.

Interfaced pressure transducer/transmitter
0 to 70 mbar up to 0 to 700 bar gauge.
0 to 350 mbar up to 0 to 700 bar absolute.
0 to 70 mbar up to 0 to 60 bar differential.
0.1% F.S. total accuracy.
Calibrated with indicator.

Range of options
0 to 20 mA, 4 to 20 mA or 0 to 2 V d.c.
Front panel to IP65.

PROCESS FUNCTIONS

Alarms
Up to 4 alarms are available as standard.
The alarm types are: High or low, low with disable during start-up, on/off controller with direct or reverse action, high or low deviation.
Alarm Features: Adjustable on/off delay (0 to 100 seconds), adjustable hysteresis, latching: non/manual reset/fail-safe.
Operator set-point adjustment (which can be disabled as part of the configuration).

Peak/valley detection
Two configurable functions to allow detection of peak, valley or peak and valley.
Configurable operator access to view and reset.
Adjustable capture delay (0 to 100 seconds).

Dual scaling
A function to allow the measurement to be displayed in either of two scales (e.g. bar and psi).
Second scale is assigned limits corresponding to the main scale limits.
Each scale can have different formats and resolution.
Toggle between the two scales by assigning an operator function key.

Tare and gross/nett functions
Tare off the current displayed reading by assigning an operator function key.
Toggle between the gross and nett measurement values by assigning a second operator function key.

Analogue output
Easy to install, optional, isolated analogue output.
Map any part of the reading scale to an output adjustable from 0 to 20 mA to 0 to 2V.
Up to 10V output by adding load resistor to 0 to 20mA option.
Any output of reading, nett, peak/valley or unlinearised input can be given.

Serial communications
Optional, isolated, serial communications interface for full access to all instrument function and features.
Dual port RS 232 (for multi-drop connection) or twisted pair RS 485 for distributed multi-drop operation.

Password protection and calibration locking
Instrument configuration can be protected by a 4 digit password.
Calibration data can be locked and changes identified to guarantee calibration certificates.

User configurable linearisation
A powerful non-linear scaling facility for sensor linearity improvement, square, square root and logarithmic scaling for applications such as flow and tank volume measurement.

DPI 280 SERIES: Specification

GENERAL SPECIFICATION

Display
5 digit high visibility LED 15 mm high.
Readings from -19999 to +20999.
Selectable decimal point position.

Display Overload
Pre-set under over range limits.
Display flashes at limit values.

Resolution
Utilises 18 bit A/D converter (1 part in 200,000).

Response
Preset time 0.1 to 20 seconds.
Walking window average of up to 25 settings.

Temperature Performance

Zero
1 æV/°C +0.001% of F.S./°C.
(DPI 280 & DPI 282 thermocouples).
±0.001% of F.S./°C (DPI 282 voltage).
±0.004% of F.S./°C (DPI 282 current).

Span
±0.003% of reading/°C.
(all models voltage and temperature).
±0.005% of reading/°C (DPI 282/283 current).

Zero & Span Controls
Set via press key commands.

Positive Effect
Negligible.

Alarm Output (DPI 280, 282, 284)
Four independent alarms, each having an open collector switch capability.
External source voltage: 48 V max.
Current: 0.5 A max.

Alarm Output (DPI 281, 283, 285)
Two independent alarms, each having a single pole relay capable of switching.
240 Va.c. at 3 A, 24 V d.c. at 1A.

Accuracy
±0.02% F.S. for voltage and current.

Linearisation
User defined 16 segment (17 value) piecewise curve fit.

Power Supplies
V a.c.: 90 - 132/200 - 264 V, 47 - 70 Hz,
4 VA, Isolation *>2500 Vrms.
V d.c.: 10 - 40 V, 300 mA @ 10 V,
Isolation *>500 Vrms.
* with respect to I/O terminals.

Environmental Specification

Temperature
Operating: -10° to 60°C
Storage: -40° to 85°C.

Humidity
0 to 90% RH non condensing.

Sealing
Front panel to IP 65 (with Option E).

Safety
Electrical & Mechanical Safety: EN61010
EMC Emissions: EN50081-1
EMC Immunity: EN50082-1
Certification: CE Marked.

Physical Specification

Weight
500 gms.

Dimensions
$1/_8$ DIN case 40 mm x 96 mm x 125 mm deep.
Polycarbonate UL94V.2
Cut out for panel mounting 92.2 x 44.2 mm.

Electrical Connections
Screw terminals on rear.

PRESSURE INDICATOR

DPI 280/281/282/283 for remote sensors

Pre-calibrated Pressure Indicator
Instruments can be supplied interfaced to a Druck transducer or transmitter (DPI 280/281 or DPI 282/283) and calibrated as a matched pair.

Operating Pressure Ranges
Any full scale range can be specified between the ranges listed below:-
0 to 70 mbar up to 700 bar gauge.
0 to 350 mbar up to 0 to 700 bar absolute.
0 to 70 mbar up to 0 to 35 bar wet/dry differential.
0 to 175 mbar up to 0 to 60 bar wet/wet differential
Maximum line pressure 35 bar.
75 bar line pressure available upon request.
Other pressure units can be specified, e.g. psi, mH$_2$O etc.

Pressure Scale Units
Typical units available:-
Pa, hPa, kPa, MPa, mbar, bar, kg/cm^2, kg/m^2, mmHg, cmHg, mHg, mmH$_2$O, cmH$_2$O, mH$_2$O, torr, atm, psi, lb/ft^2, inHg, inH$_2$O and ftH$_2$O.

Sensor Selection
Please note the following:-
Gauge: PDCR 800/900
PTX 500/600
Absolute: PDCR 900
PTX 500/600
Wet/dry differential: PDCR 10/L
Wet/wet differential: PDCR 2100
PTX 2100
Depth measurement: PDCR 830/930
PTX 161/164
Please refer to the relevant sensor data sheets for other types and specification details.

Pressure Measurement Accuracy

Combined Non-linearity, Hysteresis and Repeatability
±0.1% F.S. for 70 mbar to 60 bar
±0.15% F.S. for 61 bar to 700 bar
±0.3% F.S. for 70 mbar to 700 bar ranges (PTX 500 Series and PTX 1400).
Instruments are calibrated in the positive direction only unless otherwise specified. For bi-directional calibration quoted accuracies are in one direction only.
For the above accuracy, Druck carry out a complete end-to-end traceable calibration. For lower cost solutions, the user can self calibrate using electrical signal input.

Temperature Effects
Refer to the relevant sensor data sheet for temperature effects.

Overpressure
Please refer to the relevant sensor data sheet.

Pressure Media
Please refer to the relevant sensor data sheet.

DPI 284, 285 with integral sensor

As an alternative to remote sensors, the instrument can be supplied with an integral pressure transducer.

Pressure Scale Units
As stated for the remote transducers.

Pressure Measurement Accuracy

Combined Non-linearity, Hysteresis and Repeatability
±0.1% F.S. for 350 mbar to 60 bar.

PRESSURE INDICATOR

Operating Pressure Range
Any full scale range can be specified between the ranges listed below:-
0 to 350mbar to 0 to 60 bar gauge or absolute.

Temperature Effects
±0.5% Total Error band 0° to 50°C.

Overpressure
The rated pressure can be exceeded by the following multiple, causing negligible calibration change:-
4 x for 350mbar to 60 bar ranges.

Media
Fluids compatible with stainless steel 316L and Hastelloy.

Pressure Connection
G $1/_8$B or $1/_8$NPT.

PROCESS INDICATOR

DPI 280 Series

The DPI 280/281 is configured for strain gauge sensors, such as pressure transducers and load cells. The DPI 282/283 is configured for voltage, current and temperature inputs.

Electrical Specification

Sensor Excitation
10 V ±0.1% @ 120 mA max. (DPI 280/281)
24 V ±5% @ 35 mA max. (DPI 282/283).

Input Signal Range
0 to ±20 mV up to 0 to ±2 V F.S.
(all models)
0 to ±2 V up to 0 to ±20 V F.S.
(DPI 282/283)
0 to ±1 mA up to 0 to ±20 mA F.S.
(DPI 282/283).

Input Impedance
>1000 Mê (all models)
(20 mV to 2 V range)
>25 k ê (DPI 282/283, 20 V range)
100 ê input resistance (DPI 282/283 mA range).

Input Signal Noise Rejection
CMRR >120dB
NMRR >60 dB @ 50/60 Hz.

TEMPERATURE INDICATOR

DPI 282/283

The DPI 282 and 283 are precalibrated for the following types of thermocouples (ANSI) and RTD's (DIN 43761):-

TC/RTD	Range	Res'n	Acc
J	-200° to 750°C	0.1°C	±0.5°C
K	-200° to 1300°C	0.1°C	±0.6°C
T	-200° to 400°C	0.1°C	±0.3°C
N	-200° to 1300°C	0.5°C	±1.0°C
R	-50° to 1650°C	0.5°C	±1.0°C
S	-50° to 1750°C	0.5°C	±1.0°C
PT 100	-200° to 850°C	0.1°C	±0.5°C
PT 100	-60° to 130°C	0.02°C	±0.5°C

The accuracy figures includes 90 day stability.

Automatic or manual input cold junction compensation.

Thermocouples burn out detection.

DPI 280 SERIES: Digital Process Indicators

Instrument Type Number	Input Parameters										Output Parameters		
	Voltage/Current				Temperature		Pressure				Sensor Excitation		Alarms
					T/C	RTD	External			Internal			
	0 to 2 V d.c.	0 to 20 V d.c.	0 to 20mA d.c.	J, K, T, N, R, S ③	PT 100 ③			350 mbar to 700 bar abs.	70 mbar to 700 barg	70 mbar to 60 bar diff.	350mbar to 60 bar (l abs.)	10 V 120mA max.	24 V 35mA max.	4 x open collector	2 x relay single pole
280	✓				✓①	✓①	✓①			✓①			✓	
281	✓				✓①	✓①	✓①				✓			✓
282	✓	✓	✓	✓	✓②	✓②	✓②			✓②	✓	✓		
283	✓	✓	✓	✓	✓②	✓②	✓②				✓		✓	
284											✓		✓	
285											✓			✓

Notes:
Each instrument type configurable for a single input parameter only:
① External pressure transducer with mV output signal.
② External pressure transmitter with mA output signal.
   ① and ② pressure sensors required.

③ Thermocouples and RTD's not supplied.

OPTIONS

Only one option from A, B, C or D can be fitted:-

(A) Analogue Output - Current

A current output proportional to the displayed value of 0 to 20 mA or 4 to 20 mA is provided with the ability to drive into a load resistance of 550ê maximum with an accuracy of ±0.05% F.S. The bandwidth is limited by the display update rate. For voltage output a load resistor can be added, e.g. 10 V F.S. = 500ê.
   (A1)   DPI 280/1/2/3
   (A2)   DPI 284/5

(B) RS 232 Interface

A serial communication interface is provided with multi-drop capability via a dual port. Up to 99 units are addressable with a point to point maximum distance of 20 metres. V24 voltage levels are used and the data rate is settable between 300 and 9600 baud. Isolation is 200 Vrms between RS 232 lines and power 0 V. A lead of 1m length and a mating connector are provided.
   (B1)   DPI 280/1/2/3
   (B2)   DPI 284/5

(C) RS 485 Interface

The RS 485 interface provides a 2 wire bus with 120ê termination and RS 485 voltage compatible levels. Up to 31 addressable units can be included with a maximum cable length of 1200 metres. Data rates settable between 300 and 9600 baud. Isolation is 200Vrms between RS 485 lines and power 0V.
   (C1)   DPI 280/1/2/3
   (C2)   DPI 284/5

(D) Analogue Output - Voltage

A voltage output proportional to the displayed value of 0-2Vd.c. is produces with an output impedance of <1ê and an accuracy of ±0.05% F.S. Bandwidth is limited by the display update rate.
   (D1)   DPI 280/1/2/3
   (D2)   DPI 284/5

(E) IP 65 Front Panel Cover

A transparent hinged cover with sealing ring is provided to give protection of the instrument front panel to IP 65.
(56 x 110 x 30 mm)

ACCESSORIES

(1) Operating handbook supplied.
(2) When ordering with matching transducer or transmitters, a calibration certificate.
(3) For Option B mating connector with 300 mm lead.

ORDERING INFORMATION

The unit can be ordered with or without sensor and calibration.

For all indicators, please state the following:
(1) Type number.
(2) Options.

When interfaced with remote sensors (DPI 280/281 or DPI 282/283):-
(3) Pressure range and scaling
(4) Gauge, differential or absolute.
   (N.B. line pressure for differential).
(5) Transducer or transmitter specification/type - *see relevant sensor data sheet for ordering.*

When interfaced to internal sensor (DPI 284/285):-
(3) Pressure range and scaling
(4) Gauge or absolute
(5) Pressure connection.

RELATED PRODUCTS

Druck manufacture a comprehensive range of pressure indicators, controllers and calibrators. Please refer to manufacturer for further information and data sheets.
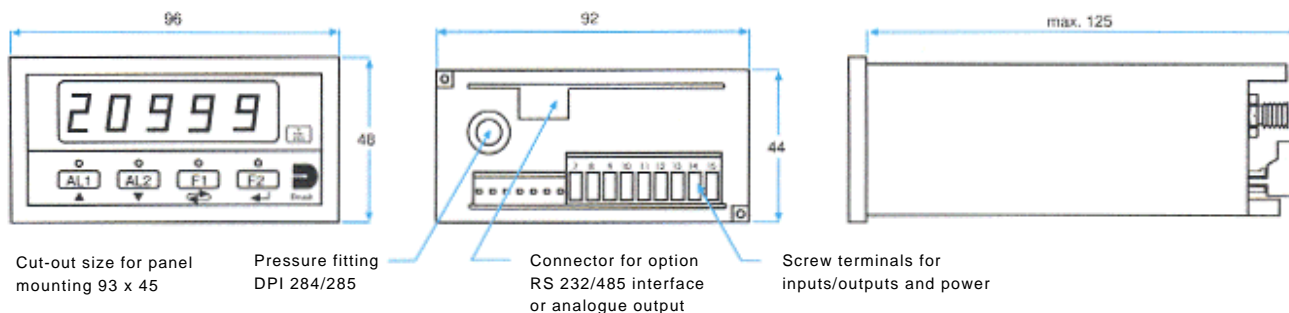
CALIBRATION STANDARDS

Instruments manufactured by Druck Limited are calibrated against precision pressure calibration equipment which is traceable to International Standards.

For non-standard requirements please specify in details.

Continuing development sometimes necessitates specification changes without notice.

INSTALLATION DRAWINGS   Dimensions: mm

Cut-out size for panel mounting 93 x 45

Pressure fitting DPI 284/285

Connector for option RS 232/485 interface or analogue output

Screw terminals for inputs/outputs and power

Agent: