

## DPI 260 SERIES: Digital Pressure Indicators

### INTRODUCTION

The DPI 260, 261 and 262 range of digital pressure instruments measure and indicate pressure in any specified scale units and provide accuracies of  $\pm 0.1\%$  F.S. or  $\pm 0.04\%$  F.S. The DPI 265/266 and 267 digital pressure monitors provide additional features of alarm trips, peak hold etc.

The instruments utilize the proven Druck range of pressure transducers for the DPI 260 and 261 and the pressure transmitters for the DPI 262. The Druck sensors feature excellent linearity and hysteresis and good long term stability. The transducers can be installed either internally or externally. Transmitters are remotely mounted and can often be situated at the pressure source.

The pressure range covered by the instrument extends from 1 psi to 10000 psi gauge, differential or absolute. These accurate instruments provide competitive alternatives to conventional analog dial gauges and manometers and offer the advantage of clear, unambiguous digital readout. BCD and analog outputs are also available.

The digital readout and electronics are purpose-designed for interfacing with the transducers or the transmitters. This is a  $4\frac{1}{2}$  digit, LED display is capable of providing  $\pm 19999$  for the full-scale pressure readout giving a resolution of 0.005%. Transducers and transmitters can be matched to the instrument to provide a required pressure readout by adjusting zero/span pots and internal switches.

The DPI 260 series electronics contain an extremely stable polarizing supply, signal conditioning and amplifier system which does not degrade the transducer specification.

The DPI 261 can be specified with a  $\pm 0.04\%$  F.S. linearity, hysteresis and repeatability tolerance. This is achieved by employing electronic linearization enhancement techniques to further improve the excellent characteristics of the transducer. In addition the temperature compensation is improved providing a figure, for sensitivity, of better than  $\pm 0.0025\%$  of reading/ $^{\circ}\text{F}$ .

The DPI 262 digital pressure indicator is specially configured for use with 4-20mA transmitter outputs. Any of the Druck series of PTX pressure transmitters can be used with the DPI 262, with the exception of the PTX 200 which is a 3 terminal device. The transmitters are always mounted remote to the indicator and connected via a cable.

The user can confidently use the high level analog output, BCD outputs or RS232 available for accurate recordings on other data collection equipment, knowing that the fundamental pressure data is to an extremely high order of accuracy.

The instrument case is a compact, rugged, purpose molded ABS shell designed to fit a standard DIN panel cut-out (3.6 x 1.8 ins). The panel instruments are suitable for easy mounting and are secured by case side fixings from the front panel.

The DPI 265, 266 and 267 have the same standard specifications as the DPI 260, 261 and 262, but with additional facilities that include alarm levels, peak reading and RS232 output. The case

### BASIC INSTRUMENT

This self-contained, strain gauge indicator can be used in conjunction with other sensors for the display of parameters such as force, displacement, load, liquid levels and strain. The user can interface this instrument to his own sensor and calibrate as required.



# DPI 260 SERIES: Specification

## DPI 260 INDICATOR

The DPI 260 is a general purpose  $4\frac{1}{2}$  digit LED strain gauge bridge indicator, capable of indicating 19999 maximum full scale for a wide range of input millivolts. A second order linearization control is included to improve transducer performance (DPI 261/266).

For applications requiring full-scale engineering units less than 19999, the overload indication (flashing zeros) can be made to occur at any pre-set value. The zero reading can be suppressed or elevated up to  $\pm 19999$ . The coarse gain, zero and decimal point selection are all achievable by internal switches making the instrument easy to re-program in the field.

The standard transducer excitation supply can be selected to either 5 or 10 volts by means of links and will supply 350 ohm bridges.

A wide variety of options area available such as external d.c. power supplied, BCD output, analog output (volts or mA adjustable gain and offset).

## Standard Specification

### Readout

$\pm 19999$ .

### Display

0.3 inch seven segment LED.

### Display Overload

Settable anywhere between 1999 and 19999 to provide flashing 0000.

### Resolution

0.005% F.S. maximum.

### Response

333 msec to full-scale on digital display and BCD output.

### Zero and Sensitivity Control

Front panel trim adjustments.

## Temperature Performance

Over the range  $50^{\circ}$  to  $85^{\circ}\text{F}$  ( $10^{\circ}$  to  $30^{\circ}\text{C}$ )

Sensitivity Temperature Coefficient  
 $<0.0025\%$  of reading/ $^{\circ}\text{F}$

Zero Offset Temperature Coefficient  
 $<0.0015\%$  F.S./ $^{\circ}\text{F}$   
(ref. to 50mV input - 5V common mode)  
Zero suppression temperature coefficient  
 $<0.0025\%$  of reading/ $^{\circ}\text{F}$

## Long Term Stability

Zero offset  $<0.02\%$  F.S. per year  
Sensitivity  $<0.02\%$  F.S. per year

## Position Effect

Negligible.

## Electrical Specification

### Excitation Voltages

5 or 10 Volts into 350 ohm bridge minimum (DPI 260/265, 261/266). 17.5 to 30 volts (not selectable) at 20mA for transmitter (DPI 262/267).

### Loop Voltage Drop

2V at 20mA (100 Ohm) - DPI 262/267

### Input Signal Range

10 to 200mV nominal for 19999 maximum display (DPI 260/265, 261/266). 16mA nominal for 19999 maximum display (DPI 262/267).

### Zero Suppression/Elevation

Capable of  $\pm 19999$  by internal switch setting.

### Linearization

Square law  $\pm 1\%$  maximum at 100mV input (DPI 261/266).

### Power Supplies

110V or 240V, 50-400Hz at 3VA max.  
Link selectable.

See options for alternative supplies.

### Output Options

A range of both digital and analogue outputs are available.

Please refer to the Options section.

## Analog Output Options

This multi-function board is configured by a link and resistor choice to give either a buffered 0 to 10 V (max) output or 4-20mA output; with zero suppression/elevation also being available. This 4-20mA can be configured either as passive sink or to power the loop with 20 volts ( $\pm 0.5\text{V}$ ). Under any configuration the following applies;

Zero rationalization  $<\pm 0.3\%$  F.S.

\* Gain rationalization  $<0.1\%$  F.S.

Bandwidth 2KHz

In-band noise  $<0.02\%$  F.S. pk-pk.

Zero offset temperature coefficient

$<0.002\%$  of reading/ $^{\circ}\text{F}$

\* Gain temperature coefficient

$<0.0025\%$  of reading/ $^{\circ}\text{F}$

Zero suppression temperature coefficient

$<0.0025\%$  of reading/ $^{\circ}\text{F}$

\* Gain errors do not apply to 0 to 2V output which is a unity gain buffer.

## Environmental Specification

### Temperature

Operating  $32^{\circ}$  to  $122^{\circ}\text{F}$  ( $0^{\circ}$  to  $50^{\circ}\text{C}$ )

Calibrated  $50^{\circ}$  to  $86^{\circ}\text{F}$  ( $10^{\circ}$  to  $30^{\circ}\text{C}$ )

Storage  $-5^{\circ}$  to  $+158^{\circ}\text{F}$  ( $-20^{\circ}$  to  $+70^{\circ}\text{C}$ )

## Physical Specification

### Weight

1.1 lbs (DPI 260 series).

1.7 lbs (DPI 265 series).

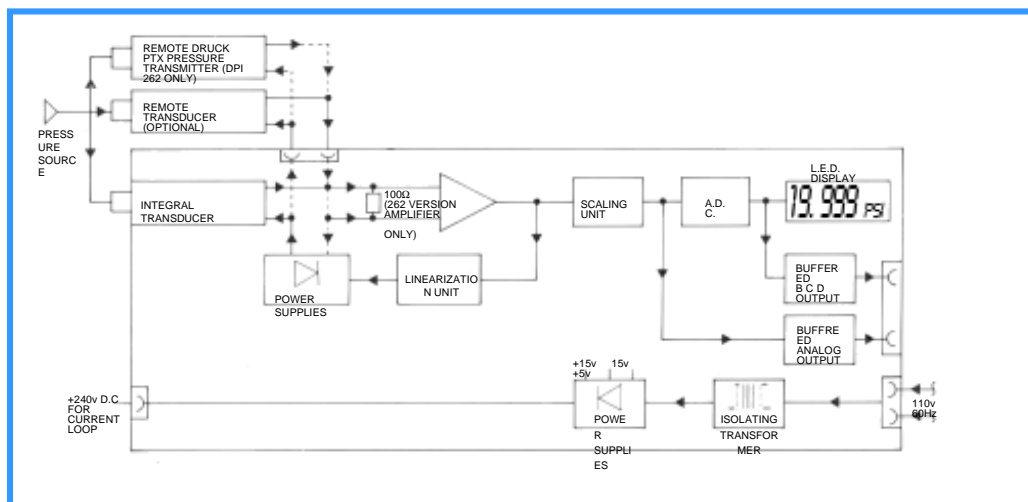
### Dimensions

3.78 ins. (wide) x 1.89 ins. (high) x 6.89 ins. (deep) - DPI 260/261/262

3.78 ins. (wide) x 3.78 ins. (high) x 6.89 ins. (deep) - DPI 265/266/267

### Remote Connections

Transducer or transmitter electrical connections available via connector on rear panel.



# DPI 260: Specification

## DPI 260

### Integral Transducer Specification

#### Operating Pressure Ranges

Any full-scale range can be specified between the ranges listed below:-

0-1 psi to 0-900 psi gauge

0-1 psi to 0-500 psi differential

(Maximum line pressure 30 psi.)

*For higher line pressure, vacuum and compound ranges, refer to manufacturer.*

0-5 psi to 0-900 psi absolute

Barometric range version:-

11.5 psi to 17 psi absolute.

*Other pressure units can be specified, e.g. ins. Hg, ins. H<sub>2</sub>O, Kpa, mbar, etc.*

#### Overpressure

The rated pressure can be exceeded by the following multiples causing negligible calibration changes:-

10 x for 1 psi to 2.5 psi ranges

6 x for 2.5 psi to 5 psi ranges

4 x 5 psi to 900 psi ranges

900 psi and above refer to manufacturer.

#### Positive Pressure Media

Compatible with most common fluids.

#### Reference Pressure Media

Dry, non-corrosive, non-conducting gases.

For liquid pressure media on reference, refer to remote transducer selection.

#### Pressure Connections (integral)

1/8" NPT male

*Others available on request (via adapter).*

### Remote Transducer Specification

#### Operating Pressure Ranges

Any full-scale range can be specified between the ranges listed below:-

0-1 psi to 0-900 psi gauge

0-1 psi to 0-500 psi wet/dry differential

0-2.5 psi to 0-500 psi bar wet/wet differential

(Maximum line pressure 500 psi)

*1000 psi line pressure available on request.*

0-5 psi to 0-10000 psi sealed gauge or

absolute

*Other pressure units can be specified, e.g.*

*inH<sub>2</sub>O, inHg, Kpa, mbar, etc.*

#### Transducer Selection

Please note the following:-

Gauge – PDCR 800/900 series

Absolute – PDCR 900/series

Wet/dry differential – PDCR 920

Wet/wet differential – PDCR 2100 series

Depth measurement – PDCR 830/930

*Please refer to the relevant transducer data sheets for other types and specification details.*

#### Overpressure

Please refer to the relevant transducer data sheet.

#### Pressure Media

Compatible with most common fluids.

#### Electrical Connections

Connector supplied with remote transducer and 6 ft. of cable.

Pin 1 Supply positive

Pin 2 Output positive

Pin 3 Output negative

Pin 4 Supply negative

Pin 5 Screen

Pin 6 Sense

*Longer lengths available on request.*

### Pressure Measurement Specification

#### Accuracy

Integral/external transducers.

Combined non-linearity, hysteresis and repeatability.

± 0.08% F.S. for 1 psi to 500 psi

± 0.1% F.S. for 501 psi to 900 psi

± 0.15% F.S. for 901 psi to 10000 psi

(with external transducer)

± 0.6% F.S. available for ranges to 300 psi on request. *Please refer to manufacturer.*

*Instruments are calibrated in the positive direction only, unless otherwise specified.*

*For bi-directional calibration, quoted accuracies are in one direction only.*

#### Temperature Effects

Integral transducers

± 0.5% total error band 32° to 122°F.

*For remote transducers operating over wider temperature ranges refer to the relevant transducer data sheet for temperature effects.*

## DPI 261

Specification identical to DPI 260 except:-

#### Accuracy

± 0.04% F.S. for 1 psi to 500 psi

± 0.06% F.S. for 501 psi to 900 psi

± 0.1% F.S. for 901 to 10000 psi

(with external transducer)

*Better accuracies are available on request.*

*Instruments are calibrated in the positive direction only unless specified otherwise.*

#### Calibrated Temperature Range

50° to 86°F

#### Thermal Sensitivity Effects

<0.0025% of reading /°F to 900 psi

<0.01% of reading /°F above 900 psi

The temperature coefficient also applies to remote transducers.

## DPI 262

### Remote Transmitter Specification

See the relevant data sheet for specification details.

*This instrument is suitable for use with all*

*Druck pressure transmitters with the*

*exception of the PTX 200.*

*Other 4-20mA two wire transmitters can also be interfaced.*

#### Operating Pressure Ranges

Any full-scale range can be specified between the ranges listed below:-

0-1 psi to 0-880 psi gauge

0-5 psi to 0-10000 psi sealed gauge or

absolute

0-2.5 psi to 0-500 psi wet/wet differential

(Maximum line pressure 500 psi)

*1000 psi line pressure available on request.*

*Sealed gauge not available below 500 psi.*

*Other pressure units can be specified, e.g. inHg, inH<sub>2</sub>O, KPa, mbar, etc.*

#### Transmitter Selection

Please note the following:-

Gauge, sealed gauge or absolute

- PTX 500/600 series

Wet/wet differential

- PTX 120/WL

Depth measurement

- PTX 161/D

PTX 164/165

*Please refer to the relevant transmitter data sheets for other types and specification details.*

#### Overpressure

Please refer to the relevant transmitter data sheet.

#### Pressure Media

Compatible with most common fluids.

#### Electrical Connection

Connector supplied with remote transmitter and 6 ft. of cable.

Pin 1 Supply positive

Pin 2 Supply negative

Pin 6 Screen

*Longer lengths available on request.*

### Pressure Measurement Specification

#### Accuracy

Combined non-linearity, hysteresis and repeatability.

± 0.1% F.S. for 1 psi to 10000 psi ranges.

± 0.3% F.S. for 1 psi to 10000 psi ranges. (PTX 500 only).

± 0.06% F.S. available for ranges to 300 psi on request. *Please refer to manufacturer.*

*Instruments are calibrated in the positive direction only.*

#### Temperature Effects

Refer to the relevant transmitter data sheet for temperature effects.

## DPI 265/266/267

The description of the DPI 260, 261 and 262 instruments is applicable to the enhanced options instruments the 265/266 and 267. For example, if the characteristics of the DPI 260 are required but the added facilities of alarm levels, peak hold or RS232 are also needed then the unit to specify will be the DPI 265.

For further details of the special features of the DPI 265 series, e.g. RS232, peak hold, alarms etc, see following page.

## DPI 265 SERIES: Specification

### DPI 265/266/267

The DPI 265/266 and 267 provide the additional enhanced features of alarm levels, peak reading and RS 232 output. This range of instruments is housed in a larger 3.78 x 3.78 inches enclosure and the various settings and command instructions are via the panel membrane keyboard. All the specification details describing the DPI 260, 261 and 262 still apply since the instruments are effectively incorporated into the DPI 265, 266 and 267 respectively.

These additional features allow extra applications to be addressed such as safety monitoring, tank filling, maximum failure pressure recording and central reporting to computer systems.

#### Features

Instruments are supplied with all the following features:-

#### Alarm/Trip Levels

Two independent trip levels are available. Each trip level can be set anywhere over the 0-100% F.S. value. Each trip level has in turn

its own adjustable re-set or hysteresis value settable anywhere over the 0-100% F.S. providing, if required, a latched output. All the settings are carried out from the front panel membrane key-pad. Relay contacts are provided with 5A/220V capability.

#### Peak Reading

As an alternative to displaying the current pressure value, the maximum and minimum pressure excursions experienced over a period of time can be displayed. A press key is provided which on the first press displays the highest pressure value experienced. Re-pressing this key changes the display to the lowest pressure value experienced. To cancel either the maximum or minimum current value, press the  $\blacktriangle$  key. Pressing the set-up key returns the display to current value monitoring. The peak value is that sampled over the digital update period of 333mS.

#### Hold Facility

To freeze the display, press the HOLD key. The displayed value will then remain unchanged by further updates. Re-pressing

this key will cancel the HOLD function and normal updates will resume.

#### Print Key

With an RS232 compatible printer connected to the interface, depressing this key outputs a single displayed value reading. Using of this key, in conjunction with this 'set-up' facility, enables the Baud rate to be selected and, if required, carriage return/line feed/function.

#### RS232 Interface

In addition to providing a valuable pressure value transmission interface to a remote computer system, it is also possible to utilize this interface to remotely program the instrument. The RS232 interface can then be used to remotely set and read trip levels, read peak values and re-set trip levels, interrupts, lock-out or enable the keyboard, read key-press actions and provide usual device clear commands. Several instruments can be operated on the same interface connected in a 'Daisy Chain' or network fashion, each being independently addressable.

DPI 260 with remote transducer



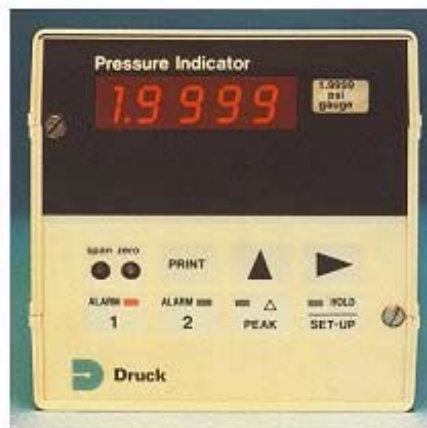
DPI 261 with integral transducer



DPI 262 with remote transducer



DPI 265/266/267 monitor





# DPI 260 SERIES: Digital Pressure Indicator

## OPTIONS

### (A) Buffered BCD Parallel Output.

Full parallel, buffered, TTL compatible output with data valid signal, 10 msec data invalid period during update (DV=0). Display or output hold available.

### (B) Buffered BCD Multiplexed Output

Four wire multiplexed data bus with TTL level and tri-state control, four bits parallel to indicate value and sequential digit transmission, with the digit address provided by a further 4 bits. Synchronised to data clock or can be continuously decoded. Display hold also available.

### (C) Buffered Analog Output – 2V related to 19999.

0 to ± 2V relating to 0 to ± 19999 display, set to ± 0.3% F.S. zero rationalization with 2mA drive capability.

### (D) Buffered Analog Output – scaled above 2.5 psi

0 to ± 10V relative to any scale value set to ± 0.3% F.S. zero rationalization and ± 0.1% gain rationalization with 2mA drive capability.

### (E) Current Output – passive sink.

4-20mA representing 0-100% F.S. positive pressure read-out when powered by externally energized supply (this option allows the instrument to emulate a pressure transmitter).

### (F) Current Output with Loop Power.

4-20mA representing 0-100% F.S. positive pressure readout and providing energizing loop voltage of 20 volts nominal. (Loop voltage + 15V with option (H)).

### (G) 12V d.c. Operation

External 12V d.c. operation at 300mA max. If requesting the 12V d.c. option the instrument will not operate directly from a 110V or 240V power supply.

### (H) 28V d.c. Operation

External 28V d.c. operation at 300mA max. If requesting the 28V d.c. option, the instrument will not operate directly from a 110V or 240V power supply.

## ACCESSORIES

Power cord, options connector, five point calibration certificate and instruction manual supplied with instrument.

## ORDERING INFORMATION

If required, the basic instrument can be ordered without transducer or calibration. Please refer to price list.

Please state the following:-

- (1) Type number.
- (2) Pressure range and scaling factor.
- (3) Gauge, differential or absolute.  
*N.B. Line pressure for differential range.*
- (4) Integral or remote transducer.  
*For remote transducer see relevant transducer data sheet for ordering information.*
- (5) Temperature range for remote transducer.
- (6) Pressure connection.
- (7) Pressure media.
- (8) Power supplies.
- (9) Options.

*For non-standard requirements please specify in detail.*

*Continuing development sometimes necessitates specification changes without notice.*

## DIGITAL INSTRUMENTS

Druck manufactures 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 Inc. are calibrated against precision pressure calibration equipment which is traceable to the National Institute of Standards and Technology (NIST).

## INSTALLATION DRAWINGS Dimensions: inches

