



Function: The IDU-220 series of universal input indicators comprises a range of four models which can be used for simple measurement only applications, or in more demanding situations requiring digital communications, alarms, maths functions and complex signal conditioning. The powerful menu-driven software enables fast flexible set-up from the front panel or by use of a PC compatible configuration programme. No adjustments of internal potentiometers, internal links or plug-in cards are necessary.

- IDU-221 4 digit, isolated 24 volt dc transmitter supply, isolated 10 volt dc regulated transducer supply
- IDU-222 4 digit, isolated 24 volt dc transmitter supply, isolated 10 volt dc regulated transducer supply and dual level trip amplifier/alarms
- IDU-223 5 digit, isolated 24 volt dc transmitter supply, programmable isolated 1-12 volt dc transducer supply, status input, isolated analogue output, and isolated RS422/485 serial communications
- IDU-224 5 digit, isolated 24 volt dc transmitter supply, programmable isolated 1-12 volt dc transducer supply, status input, isolated analogue output, isolated RS422/485 serial communications and dual level trip amplifier/alarms

All four models in the range have the following common features:

- * Universal input for Thermocouples, RTDs, mV, Volts and mA signals;
- * Universal mains supply (90 – 265 Volt AC 50/60Hz) (option 10-32 Volts ac or dc supply);
- * Maximum, Minimum and Averaging memories;
- * 24 point user linearisation (i.e. for tank content linearisation);
- * 24 Volt dc (nominal) two wire transmitter power supply;
- * 10 Volt dc regulated supply to power strain gauge type sensors

The IDU-220 series indicators also have 2 front panel buttons which are user definable to perform special functions such as Auto-Zero, Tare, etc. On the IDU-223/224 models there are also two digital inputs which can be user configured to perform similar functions such as Auto-Zero and Display Hold.

Applications – Temperature

The IDU-220 series can be used in a wide variety of temperature measurement applications with results displayed in °C, °F, or °Kelvin (Absolute). In applications where non-linearising temperature transmitters are used the IDU-220 series can linearise the 4 to 20mA signal received to the thermocouple curve. Where accuracy is vital to the application, a IDU-220 series indicator can be calibration matched to the output of the actual sensor to be used, thus removing most system measurement errors.

Applications – Pressure and Weighing

A variety of pressure transducers, pressure transmitters or strain gauge bridges can be connected to the IDU-220 series. The indicator and sensor can be matched using the user calibration feature, greatly reducing errors due to sensor output and excitation voltage variations. A front panel button or status input can be configured to provide an auto zero feature allowing zero offset errors to be eliminated. For weighing applications, a tare function can be similarly configured.

Applications – Process Inputs

The IDU-220 series indicators have a number of features that make them particularly suitable for the measurement of process signals. Maths functions allow calculations for orifice plates, "V" notch weir flow and rectangular (Cippaletti) weir flow. A filter is available for noisy or fast moving signals. A 24 point user linearisation facility is provided for applications such as tank contents measurement. All of the IDU-220 input types can be scaled to any engineering units within the display range or, if necessary, mapped to one of the thermosensor or user linearisation curves.

Applications – Signal Retransmission

The user programmable isolated analogue output allows the IDU-220 series to be used in applications where a local display as well as data logging/recording/telemetry is required. This output can be configured to transmit the measured, averaged, maximum or minimum value and has its own damping filter for noisy or fast moving signals. The input can be locally conditioned and retransmitted over a relatively long distance. Being electrically isolated, problems associated with earth loops, which are often encountered in measuring systems, are eliminated.

Applications – Communications

The IDU-220 series serial protocol is compatible with most SCADA software packages. Up to thirty two IDU-220 indicators can be connected to a single master device in a multi-drop 2 or 4 wire configuration. A PC based software package can be supplied which enables multiple configurations to be modified and stored. The display and analogue output can be controlled via the serial interface, allowing an indicator to be used as a remote display or control device.

Applications – Alarm and Control

The comprehensive alarm functions built into the IDU-220 series makes them particularly suitable for monitoring, switching and control applications. The hysteresis facility stops noisy signals triggering repeated alarms. High and low deviation allows control around a setpoint. On and off delay times can be set, with individual alarms configured as latching or non-latching. Alarms can be displayed and acknowledged on the IDU-220 front panel.

Features – Universal Input

All of the IDU-220 series can be directly connected to most process sensors including thermocouples, RTDs, mA loops, transmitter outputs, and other dc signals. All thermosensor ranges have built-in linearisation curves and internal or external CJC is available. The decimal point position can either be user-programmed to give the required display resolution or set to auto-ranging mode. The sensor open circuit detection can be selected to produce upscale or downscale readings. Process inputs can be scaled to any engineering units and any input can be mapped to one of the thermosensor linearisation curves.

Features – Sensor Excitation

All IDU-220 series indicators are fitted with a fixed 24 Volt dc output which is electrically isolated. This can be used to power a single loop powered transmitter. In addition the IDU-221 and the IDU-222 have a 10 Volt dc regulated supply whilst the IDU-223 and the IDU-224 have a programmable 0 to 12 Volt dc regulated output. In all four instruments the output is electrically isolated to 500 Volts. The programmable supply is configured via the internal software and is primarily designed to power strain gauge type sensors including load cells.

Features – User Linearisation

Some applications require a special linearisation curve to be defined by the user. A typical example is tank contents measurement where the pressure of a liquid can be measured but this does not have a linear relationship to the actual volume. The user linearisation function on the IDU-220 series indicators allows up to 24 calibration points to be defined. Each point can be entered manually or, for greater accuracy, directly from the sensor output, thus removing most system measurement errors. The 24 points can be entered in any order.

Features – Analogue Output

The IDU-223 and IDU-224 are fitted with an electrically isolated analogue output which has 0.05% resolution. The output can be configured by the user as a 0 to 20mA, 4 to 20mA or 0 to 10 Volt dc signal and can be scaled over any of the display range. For example, a type K thermocouple input can be retransmitted as a linear 4 to 20mA signal equivalent to 0 to 1000°C to another device such as a chart recorder or a data logger. The analogue output can be set to transmit the measured, the maximum, the minimum or the averaged value and has its own damping filter for noisy or fast moving signals.

Features – Serial Communications

The IDU-223 and the IDU-224 are fitted with an electrically isolated RS422/485 serial interface. All measured values and set-up parameters are accessible, however, the instruments can be set to be read only, thus protecting their configuration. Two protocols are available, namely, MODBUS and a proprietary manufacturers protocol, which has been designed to be easier to implement. The display, analogue output and transducer supply can all be configured via the serial interface.

Features – Alarms

Each of the IDU-220 series indicators has four software configurable alarm settings. These can be configured by the user for alarm type, setpoint, on/off delay and on/off hysteresis value. Alarms can be individually set to be latching or non-latching and to flash a message on the front panel display when active. The IDU-222 and IDU-224 models are fitted with 2 relays which can be operated by any of the four alarm setpoints. In addition a special AND function allows the relays to switch only if two or more of the alarm conditions are active. Relays can be configured to be energised or de-energised in the alarm condition.

Features – Password Protection

The IDU-220 instrument's configuration can be protected by the use of a user-defineable password. In addition, editing of the alarm set-points, alarm acknowledging and the resetting of the maximum, minimum or average value memory can be individually protected from an operator.

Features – Function Buttons

The two buttons marked (@ and *) on the front panel of all models can be user-programmed to give operator level access to one or more of the following functions: Tare; Auto-Zero; Display Hold; Display Maximum; Display Minimum; Display Average; Reset Maximum, Minimum and Average; Display Test.

Features – Software

All configuration parameters can be password protected and are preserved in the event of a power failure. The following software functions are available to the user:

Input Type	Maths Functions	<u>Models IDU-223 and 224 only</u>
Linearisation Type	Alarm Set-up x 4	Status Input Set-up x 2
Internal or External CJC	Averaging Time Period	Transducer Supply Set-up
Sensor Break Detection	User Linearisation	Analogue Output Set-up
Display Resolution	Password Set-up	Analogue Output Scaling
Display Filter Time Constant	Function Button Set-up x 2	Analogue Output Damping
Scaling and Calibration	Relay Set-up (222/224 only)	Serial Communications Set-up



SPECIFICATIONS

INPUTS:

DC Current

Between -20 and +20mA
into 5 ohms typically
Accuracy: $\pm 0.02\%$ typically
 $\pm 0.05\%$ of reading $\pm 4\mu\text{A}$ worst case
Resolution: 2.0 μA
Burden: 100mV maximum

DC Voltage

Between -10 and +10 Volts,
into > 1M ohm
or
between -100 and +100mVolts
into > 100M ohms
Accuracy: $\pm 0.02\%$ typically
 $\pm 0.05\%$ of reading $\pm 20\mu\text{V}$ worst case
Resolution 1 μV (100mV range)
100 μV (10V range)

Resistance Thermometers (RTDs, PT100s)

2, 3 or 4 wire
Excitation current: 0.25mA typical
Range: 0 to 400 ohms
PT100(alpha=385) -200 to +850°C
PT100(alpha=392) -100 to +457°C
PT130 -200 to +500°C
NI100 -60 to +250°C
Accuracy:
0.2 ohms/ $\pm 0.2^\circ\text{C}$ typical
0.4 ohms/ $\pm 0.5^\circ\text{C}$ worst case
Resolution: 0.01 ohms

Resistance (2 wire)

Potentiometers (3 wire)
Range: 0 to 400 ohms
Accuracy: ± 0.2 ohms typically
 ± 0.4 ohms worst case
Range: 0 to 4000 ohms using
10 Volt input
Accuracy: $\pm 0.3\%$ typically
 $\pm 0.5\%$ worst case

Thermocouples

Type B, C, D, E, G, J, K, L, N, R, S, T,
U, Ni/Ni, Platinel II, Palaplat

Type	Range Covered
J Fe/NiCu	-210 to 1200°C
K NiCh/NiAl	-270 to 1372°C
T Cu/CuNi	-270 to 400°C
Accuracy including linearisation: $\pm 0.2^\circ\text{C}$ typically @ 25°C $\pm 0.5^\circ\text{C}$ worst case	
E NiCh/CuNi	-270 to 1000°C
N Nicrosil/Nisil	-200 to 1300°C
Accuracy including linearisation $\pm 0.3^\circ\text{C}$ typically @ 25°C $\pm 0.5^\circ\text{C}$ worst case	
L Fe/Con	-200 to 900°C
U Cu/CuNi	-200 to 400°C
Accuracy including linearisation: $\pm 0.4^\circ\text{C}$ typically @ 25°C $\pm 0.7^\circ\text{C}$ worst case	
C W5%/26%Rh	0 to 2320°C
D W3%/26%Rh	0 to 2320°C
G W/W26%Rh	0 to 2320°C
Ni/Ni 18% Moly	0 to 1370°C
Platinel II	0 to 1370°C
Palaplat	0 to 240°C
Accuracy including linearisation: $\pm 0.4^\circ\text{C}$ typically @ 25°C $\pm 1.0^\circ\text{C}$ worst case	
R Pt13%RhPt	-50 to 1767°C
S Pt10%RhPt	-50 to 1767°C
Accuracy including linearisation: $\pm 0.6^\circ\text{C}$ typically @ 25°C $\pm 1.0^\circ\text{C}$ worst case	
B Pt30%/6%Rh	0 to 1820°C
Accuracy including linearisation: $\pm 0.8^\circ\text{C}$ typically @ 25°C $\pm 1.5^\circ\text{C}$ worst case	

Reference Junction Compensation (CJC)

Accuracy: better than $\pm 0.5^\circ\text{C}$
after 30 minutes

Thermosensor Break Detection

Programmable Up or Down Scale

OUTPUTS:

Analogue Output IDU-223 and IDU-224

Range: User selectable
0 to 20mA into 10 to 900 ohms
4 to 20mA into 10 to 900 ohms
0 to 10 Volt into 500 ohms min
Maximum Output:
Current: 22mA @ 18 Volts
Voltage: 11 Volts @ 22mA
Isolation: 500 Volts dc/peak AC
Accuracy: 0.1% typically
0.2% of span worst case
Resolution: 0.05% of span
(5mV or 0.01mA)
Programmable damping filter
Output Ripple: < 10mV
Temperature Drift: < 100ppm/°C
Response Time: 63% within 32mS,
99% within 100mS

Alarm Relay Outputs IDU-222 and IDU-224

Relays: 2 x SPCO contacts
Rated: 1 Amp @ 250 Volt AC
5 Amp @ 30 Volt DC

Serial Communications

IDU-223 and IDU-224
Type: RS422/RS485 2 or 4 wire
multidrop
Communications Rate:
1200, 2400, 4800 or 9600 baud
Parity: Odd, Even or None
Stop Bits: 1 or 2
Protocol: MODBUS and Proprietary
Isolation: 500 Volt dc/peak AC

Transmitter/Transducer Supplies

Isolation: 500 Volt DC/Peak AC
24 Volt transmitter supply:
Nominal 24 Volts @ 32mA max
IDU-221 and IDU-222
10 Volt DC transducer supply
Regulated 10V $\pm 0.1\text{V}$ @ 30mA max
IDU-223 and IDU-224
0 to 12V DC regulated transducer
supply
Resolution: 0.01 Volt
Accuracy: $\pm 0.05\text{V}$ (typically 0.02V)
Temperature Drift: < 100 ppm/°C
Output Ripple: < 5mV
Output Current: 35mA maximum

DISPLAY:

Number of Digits

IDU-221 and IDU-222
4 digits
IDU-223 and IDU-224
5 digits

Digit Type

14.2mm high brightness
Red of Green LEDs

Display Range

IDU-221 and IDU-222
-1999 to 9999
IDU-223 and IDU-224
-19999 to 99999

Update Rate

2 per second

GENERAL:

A/D Converter

Dual slope integrating with
auto-zero
Conversion Rate: 10 per second
Resolution: 16 bit + sign (1 μV)
Common Mode Rejection: > 150dB
Series Mode Rejection: > 70dB
(50 or 60Hz)

Operating Temperature Range

10 to +50°C

Storage Temperature Range

-10 to +70°C

Operating/Storage Humidity Range

0 to 95% RH non-condensing

Mounting

Panel mounting

Panel Cut-out

92mm(W) x 44mm(H)

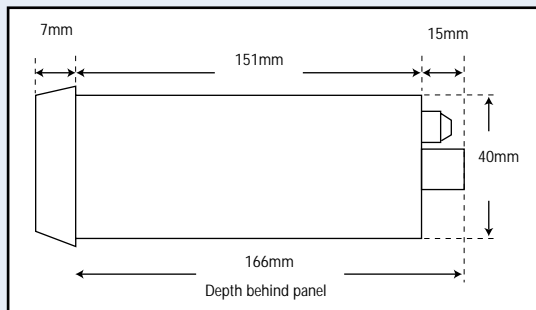
Protection Level

Front Panel to IP65 (NEMA4)

Weight

400 gms

MECHANICAL DETAILS



ORDERING DETAILS

- Give identification code, i.e. IDU-223
- Give details of power supply, i.e. 240 Volt AC
- Specify LED colour required, i.e. Red

If you require Lee-Dickens to programme the indicator prior to delivery,
please also provide the following information:

- Specify input type and range, i.e. 4 to 20mA
- Specify display range, i.e. 0 to 1000.0°C
- Specify all other options required, i.e. Relay settings, etc.