Load Cell Input Digital Process Indicator IDU-240

ID DIGITAL PROCESS INDICATOR RANGE

Function: The IDU-240 is a panel mounting digital process indicator designed specifically for use with load cell transducers and for weighing applications. The IDU-240 has a bright 5 digit red LED display. The display can be factory set, or adjusted by the user, to display in tonnes, litres, grams or any other engineering units. The indicators come as standard with a 10 Volt DC transducer excitation supply; two logic inputs; an analogue re-transmitting output; an RS422/485 communications interface and a universal mains power input. The software comes with many features including tare, offset zeroing, "in-flight" compensation, "peak-picking" and extensive alarm functions. Options include: two alarm relay outputs, or, four TTL logic outputs; low voltage DC/AC power supply input; and green LED display.

Features on the IDU-240 are as follows:

Sensor Connections

The IDU-240 uses a 6 wire ratiometric method of measurement. Up to four 350 ohm load cells can be connected in parallel. More can be used if the resistance is higher (e.g. 8 x 700 ohm load cells) and the total current does not exceed 120mA at 10 Volt DC. An external 10 Volt DC supply can be used, if required, still retaining the ratiometric measurement capability.

Display Configuration

The IDU-240 can be configured by the user for the required engineering units and display resolution. In addition the least significant digit can be set to a 0 or 5 only, or to a fixed 0 if a steady reading is difficult to achieve. For noisy signals an independent display filter is provided. The user can also select the display update rate to be 2, 4 or 10 per second.

Calibration and Scaling

Calibrating the IDU-240 to load cells can be achieved in one of two ways. Values from the strain gauge can be entered manually or the IDU-240 can read the actual output from the transducer at two points in the range, normally at zero and another point near the maximum load to be measured. These measured values are stored with their associated display values as the calibration parameters. For more demanding applications, up to 24 points can be independently calibrated to compensate for any non-linearity in the load cell.

Serial Communications

The IDU-240 comes equipped with an isolated RS422/485 serial communications interface to allow connection to computers or PLCs. Three protocols are provided as standard to allow easy integration with most SCADA packages.

Digital Status (Logic) Inputs / Front Panel Function Keys

The IDU-240 has two logic inputs and five front panel pushbuttons provided as standard. The pushbuttons allow the user to set up the indicator via a simple password protected menu. In addition two of the pushbuttons can be individually programmed by the user to give operator level access to some of the functions listed below. The two logic inputs allow remote control of these indicator functions via external devices such as switches or PLCs. The inputs may be activated by volt free contacts or open collector TTL outputs, and can be individually programmed by the user to perform one or more of the following functions: Tare; Auto Zero; Part Count; Display Hold; Display Maximum (Peak); Display Minimum (Valley); Display Average; Display Reset (Peak Picking Mode); Measure Once (Single Shot Measurement); Display Test (Lights all display segments); Keyboard Lock; Alarm (Latch) Reset; Alarm Disable; Analogue Output Hold; Reset Max, Min and Average; Start Fill.

Analogue Re-transmitting Output

The user programmable analogue output allows the IDU-240 to transmit the measured value, the maximum, minimum, average, net or gross value, or a value sent via the serial interface. The analogue output can be scaled for any portion of the display range and is configurable for 4 to 20mA, 0 to 20mA and 0 to 10 Volt signals. Electrical isolation ensures that problems with earth loops are avoided.

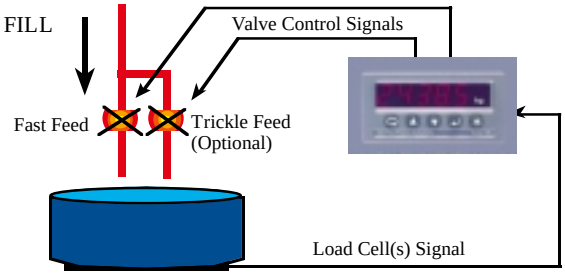
Alarm Menu

The IDU-240 can indicate alarms on the display along with the measured value. The user can individually configure the following parameters for each of four alarms: High, Low or Deviation Alarm Action; High and Low Band Limits (Deviation Action only); On and Off Delay Timers; On and Off Hysteresis; Latching or Non-Latching; Normal or Pulsed Output Modes; Set-point Adjustment (during normal running and only via password protected menus). Optional extras include 2 x changeover relay contact outputs or 4 x TTL open collector outputs. When filling modes are selected, Digital (TTL/Relay) outputs 1 and 2 are automatically assigned.

Applications for the IDU-240

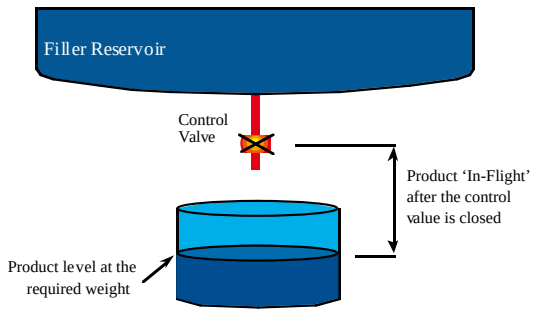
Fill and (Optional) Trickle Feeder Control

The IDU-240s relay or TTL outputs can be used to control filling of a container which is placed on a single load cell or on multiple load cells wired in parallel. The container weight can be compensated for by using the "Tare" or "Zero" function. The IDU-240 controls the (high speed) feed device and, at a user definable point during the filling, switches off the high speed fill and switches on an optional Trickle (low speed) feed to achieve an accurate total fill weight. (See also "in-flight" compensation below)



Automatic "In-Filght" Compensation

"In-Flight" compensation allows the filling system to switch off the filler valve before the correct weight has been reached. This may be required if some of the product could be delivered a time after the filler control valve has been switched off. The In-Flight compensation can be applied to both the main and trickle feed controls outputs.

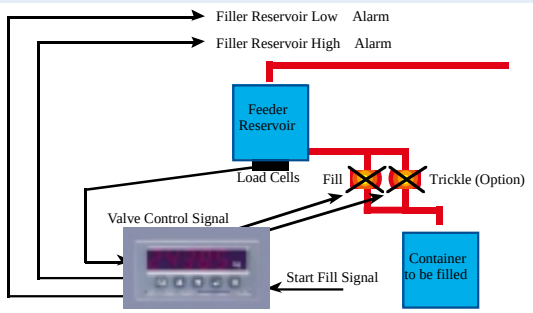


Learn Function

A learning function allows the IDU-240 to automatically correct the "In-Flight" compensation, so increasing the accuracy of the delivered weight. This compensation is particularly useful when the product's flow rate characteristics change, perhaps due to variations in moisture or temperature. The "Learn" system constantly adjusts the switching point to optimise for changing product conditions.

Loss of Weight / Discharge Control

This feature calculates the loss of weight of the feeder reservoir, rather than measuring the weight of the vessel that is being filled. Again both a "fast" feeder and an optional "trickle" feeder system may be used. The IDU-240 will measure and control, by use of a logic or relay output, the loss of a preset weight of product to the container to be filled. Alarm outputs can also be used to indicate if the reservoir tank is too low or full. The fill command can be entered externally via a logic input, or by pressing a front panel function button.

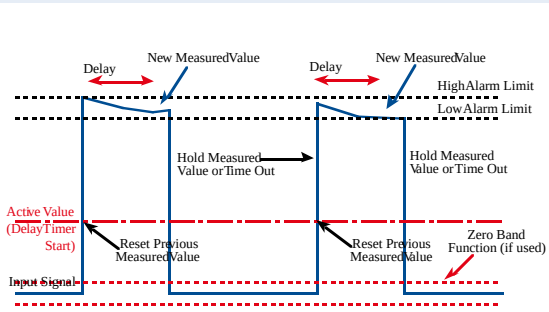


Peak Picking

This useful features allows filled containers to be checked for weight, an alarm being activated if the weight falls outside preset limits. To eliminate false peak values being displayed due to the load being "dropped" on to the load cells, a delay can be set before the measurement is displayed and the alarms become operational after crossing a defined threshold level. This delay is programmable between zero (off) and 10 seconds to 0.1 second resolution. The measured value is displayed until the next load is weighed. Alarms are only active while a load is being weighed and after the delay period.

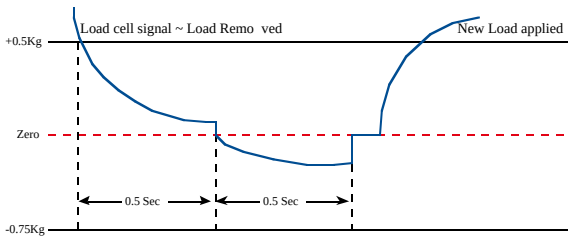
Auto Set Point Adjustment

For the Peak Picking application described above, there may be a slight change in the overall weight of the product over time. This may be due to slight differences in the container weight, for example. If a slight error from the set point value is seen, the set point can be automatically adjusted in a similar way as described in the In-Flight "Learn" feature described earlier. If an alarm is activated (due to the weight being out of limits) the set point correction is ignored for that measurement cycle. Limits can be set to inhibit the maximum amount of set point correction that can occur.



Automatic Zeroing Band Function

Due to the hysteresis of some load cells, the measured value may not return to exactly zero when a load is removed. This function allows the user to set an error band around zero where the IDU-240 will automatically initiate a zeroing of the measured value, if the reading is within the preset band. The error band can be set to any displayable value, and high and low limits can be individually entered. The automatic zeroing band function is repeated every 0.5 seconds as long as the measured value is within the preset band. This removes the need to manually "zero" the instrument before the next load is measured.



Part Count Function

A "Part Count" function can be enabled by using a status (logic) input or a front panel function button. The IDU-240 is used to weigh a single part or known number of parts and then this measured value is used to calculate the total number of parts in the batch.

LEE-DICKENS LTD
Desborough, Kettering, Northants NN14 2QW U.K.
Tel: (01536) 760156 Fax (01536) 762552

SPECIFICATIONS

INPUTS:

ADC Type
Sigma Delta

Resolution
18 Bit (1 part in 262,144)

Measurement Mode
Ratiometric

Range
0.5 to 20mV per Volt

Connection
6 wire - 2 x excitation,
2 x sense, 2 x signal

Input Impedance
100M ohms or greater

Measurement Rate
20 per second

DISPLAYS:

Display
5 digit Red LEDs
Option: Green LEDs

Digit Size
14.2mm

Full Scale Range
-19999 to 99999

Decimal Point
Programmable to any location

Display Update
Selectable: 2,4 or 10 updates per second

OUTPUTS:

ISOLATED ANALOGUE RE-TRANSMITTING OUTPUT

Output Type:
User selectable 0 to 10 Volt dc, 0 to 20mA or 4 to 20mA

Maximum Voltage output:
11 Volts dc @ 22mA

Maximum Current output:
22mA @ 18 Volt dc
Load: 900 ohm maximum
Isolation: 500V dc / Peak ac

Temperature drift:
< 100ppm per ºC

Accuracy: better than 0.2% of input span

Resolution: 0.05% (5mV or 0.01mA)

Speed of response:
63% within 32mS
99% within 100mS

This feature includes a programmable output damping filter and user scaling to any displayable value.

OPTIONAL DIGITAL OUTPUTS

Relay Alarms
2 x Single Pole Changeover contacts rated at
1 Amp at 250 Volt AC
5 Amps at 30 Volt DC

TTL Outputs
4 x TTL Open Collector

Outputs can be energised or de-energised in the alarm condition or configured to give a pulse output

SUPPLY:

Power Supply Voltage
Universal mains power:
90 to 265 Volt AC 50/60 Hz
Option: 24 Volt dc / ac

Power Required
20VA nominal

Transducer Supply
Regulated 10 Volt dc at 120mA max (for instance, to power up to 4 x 350 ohm load cells wired in parallel)

A 20 Volt dc output can be supplied for use with I.S. barriers - please ask sales for further information

COMMUNICATIONS:

Serial Communications
Type: RS422 / 485
2 or 4 wire multidrop
Isolation: 500V dc / Peak ac
Speed: 1200, 2400, 4800 or 9600 baud
Parity: Odd, Even or None
Stop Bits: 1 or 2
Protocols: MODBUS™, RTU (J-BUS), MODBUS™ ASCII, and, DTPI

GENERAL:

Accuracy
Better than 0.02% of reading

Common/Series Mode Rejection
>150dB / >70dB at 50/60 Hz

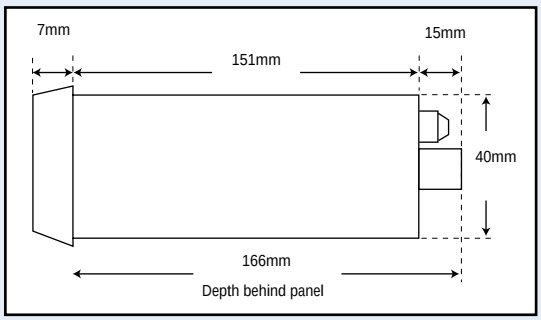
Operating/Storage Temperature/RH
+10 to +50ºC /
-10 to +70ºC
10 to 95% RH non-condensing

Safety
EN61010

Protection Level
Fascia panel to IP65

Weight
Mains or Low Voltage powered
0.4 Kg (max) net
0.55 Kg including handbook, labels and packaging

MECHANICAL DETAILS



Dimensions (mm):
48(H) x 96(W) x 173(D)

Panel Cut-out (mm):
44(H) x 92(W)

Depth Behind Panel (mm):
166mm including terminals

ORDERING DETAILS

(a) Give identification code, i.e. IDU-240
(b) Give details of power supply, i.e. 90 to 265 Volt AC
(c) Give details of calibration, i.e. 0 to 20,000 tonnes
(d) Specify if Green LED display required
(e) Specify if alarms required and if so which type, i.e. 2 alarm relays

LEE-DICKENS LTD
Desborough, Kettering, Northants NN14 2QW U.K.
Tel: (01536) 760156 Fax (01536) 762552