Approved Service Agents
For the list of service centres visit our web site:
www.gesensing.com

Symbols

This equipment meets the requirements of all relevant European safety directives. The equipment carries the CE mark.

This symbol, on the instrument, indicates that the user should refer to the user manual.

Do not dispose of this product as household waste. Use an approved organisation that collects and/or recycles waste electrical and electronic equipment. For more information:

Contact us at www.gesensing.com
The IECEx certificate for this equipment can be reviewed at the following web site:

www.iecex.com
A full copy of the ATEX certificate for this equipment can be supplied, contact us at the following web site:

www.gesensing.com
### Certificate Number

Certificate Number: K0341 Issue No. 2

### Schedule

<table>
<thead>
<tr>
<th>Certificate Number</th>
<th>Issue No. 2</th>
</tr>
</thead>
</table>

#### 11 Description of Equipment

The equipment described is designed to measure the capacitance of a variable in its circuit in a balanced or unbalanced way (e.g., for a cable loop circuit, other types of circuits, or anything in between). The equipment is a portable unit that can be used in various environments, including indoor and outdoor locations, and it is equipped with a digital display for easy reading. The equipment is compact and lightweight, making it easy to carry and operate.

The unit can be connected to a computer for data analysis and storage. The equipment's accuracy is guaranteed through calibration and testing at regular intervals. The equipment's main features include a high-resolution display, a user-friendly interface, and a robust design that ensures long-term reliability.

#### 12 Report Number

Report Number: 20070001

#### 13 Special Conditions for Safe Use

1. When using the unit, ensure that the power supply is properly connected to the equipment.
2. Ensure that the equipment is used in a well-ventilated area to prevent overheating.
3. Do not use the equipment near flammable materials or in hazardous environments.

#### 14 Electrical and Mechanical Requirements

<table>
<thead>
<tr>
<th>Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>X-1-0201</td>
<td>1-5</td>
</tr>
<tr>
<td>X-1-0202</td>
<td>1-5</td>
</tr>
<tr>
<td>X-1-0203</td>
<td>1-5</td>
</tr>
<tr>
<td>X-1-0204</td>
<td>1-5</td>
</tr>
<tr>
<td>X-1-0205</td>
<td>1-5</td>
</tr>
<tr>
<td>X-1-0206</td>
<td>1-5</td>
</tr>
</tbody>
</table>

#### 15 Essential Health and Safety Requirements

All relevant Essential Health and Safety Requirements are covered by the standards listed above.
Introduction
The Druck UPS-III Intrinsically Safe Loop Calibrator can supply power (source mode) and produce readings (measure mode) to perform field calibrations on 2-wire devices. The set-up menu enables the user to “source” or “measure” in either voltage or current and to perform continuity tests. These instructions detail the requirements and operation of the UPS III Intrinsically Safe Loop Calibrator in a hazardous area. Read the whole publication before starting.

Installation Requirements in Hazardous Areas
Marking details
Serial number/year of manufacture

[CE] [Ex]

1180
Baseefa06ATEX0224X
IECEx BAS 06.0053X
Ex ib IIC T4 (-10°C < Ta < +40°C)
Druck, LE6 0FH, UK (manufacturer)

Requirements and Conditions
Refer to the supply and input/output parameter table.

Batteries
WARNING: Only replace batteries in a safe area
Only use the battery type listed below.

Requirements
Installing should be carried out by qualified plant installation technicians in compliance with the latest issue of EN 60079-14.

Special Conditions for Use
This loop calibrator may be used in zones 1 and 2 for industries with any gas group.
• Maximum component temperature class T4 (135°C).
• Only use 4 x LR6 (size AA), Duracell PROCELL, Duracell PLUS, ENERGIZER ULTIMATE or GP SUPERALKALINE LR6.

Loop Calibrator Casing
• Avoid impact sparking when installing in a hazardous area.
• Provide additional protection for calibrators that may be damaged in service.
Declaration Requirements

The Intrinsically Safe UPS-III is designed and manufactured to meet the essential health and safety requirements not covered by EC Type Examination Certificate Baseefa06ATEX0224 when installed as detailed above.

This intrinsically safe loop calibrator is designed and manufactured to protect against other hazards as defined in paragraph 1.2.7 of Annex II of the ATEX Directive 94/9/EC.

Specifications

Accuracies
1 year for 17°C to 27°C outside these limits

<table>
<thead>
<tr>
<th>Mode</th>
<th>Range</th>
<th>Resolution</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Source 2 wire†</td>
<td>0 to 24 mA</td>
<td>0.001</td>
<td>0.015% rdg + 2 lsd</td>
</tr>
<tr>
<td>Source mA</td>
<td>0 to 24 mA*</td>
<td>0.001</td>
<td>0.015% rdg + 2 lsd</td>
</tr>
<tr>
<td>Measure mA</td>
<td>0 to 24 mA</td>
<td>0.001</td>
<td>0.015% rdg + 2 lsd</td>
</tr>
<tr>
<td>Measure V</td>
<td>0 to 50V**</td>
<td>0.01</td>
<td>0.015% rdg + 4 lsd</td>
</tr>
<tr>
<td>Continuity</td>
<td>100Ω***</td>
<td>-</td>
<td>0.5 mA</td>
</tr>
</tbody>
</table>

* R max 65Ω at 20 mA lsd least significant digits
** R-measure >1MΩ rdg reading
*** Audio + visual
† maximum 24V, typically 21V
Hart® communications... menu selectable 220Ω loop resistor
Operating Temperature........ -10°C to 40°C (14°F to 104°F)
Storage Temperature........ -20°C to 70°C (-4°F to 158°F)

This loop calibrator meets the essential protection requirements of the relevant EEC directives.

Electrical Power Supply

Only use 4 x LR6 (size AA), Duracell PROCELL, Duracell PLUS, ENERGIZER ULTIMATE or GP SUPRALKALINE LR6.

Physical

Dimensions.................... 90 x 140 x 42 mm (3.5" x 5.5" x 1.7")
Weight (nominal)................. 460 grams (16.2 oz.)
Terminals......................... 4 mm sockets
Case .................................. High impact ABS
Environmental........................ IP40
Relative Humidity.................. 0 to 90%

K0341 Issue No. 2
Table 1
Guide to supply and input/output

<table>
<thead>
<tr>
<th>No.</th>
<th>Parameter and conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 &amp; 2</td>
<td>Current measurement between mA and COM with external 24V. This mode of operation inserts the apparatus in the current loop by breaking into the circuit and connecting mA (positive) and COM (negative) into the circuit.</td>
</tr>
<tr>
<td>3</td>
<td>Current measurement between mA (24V) and mA with internal 24V. Terminal mA(24V) provides the source of power to supply remote sensor. Special condition for safe use - remote sensor MUST be isolated from all other sources of power.</td>
</tr>
<tr>
<td>4</td>
<td>Voltage measurement between V and COM</td>
</tr>
<tr>
<td>5</td>
<td>Continuity measurement between V and COM Special condition for safe use - remote sensor MUST be isolated from all other sources of power.</td>
</tr>
<tr>
<td>6</td>
<td>Current generation between mA and COM with external 24V. This mode of operation inserts the apparatus in the current loop by breaking into the circuit and connecting mA (positive) and COM (negative) into the circuit.</td>
</tr>
<tr>
<td>7</td>
<td>Current generation between mA (24V) and mA with internal 24V. Terminal mA (24V) provides the source of power to supply the remote sensor Special condition for safe use - remote sensor MUST be isolated from all other sources of power.</td>
</tr>
</tbody>
</table>
### Table 2

Supply and input/output parameter

<table>
<thead>
<tr>
<th>Param.</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>$U_i$</td>
<td>30V</td>
<td>0*</td>
<td>30V</td>
<td>0*</td>
<td>30V</td>
<td>0*</td>
<td>30V</td>
</tr>
<tr>
<td>$I_i$</td>
<td>100mA</td>
<td>0*</td>
<td>100mA</td>
<td>0*</td>
<td>100mA</td>
<td>0*</td>
<td>100mA</td>
</tr>
<tr>
<td>$P_i$</td>
<td>1W</td>
<td>0*</td>
<td>1W</td>
<td>0*</td>
<td>1W</td>
<td>0*</td>
<td>1W</td>
</tr>
<tr>
<td>$U_0$</td>
<td>6.51V</td>
<td>25.2V</td>
<td>6.51V</td>
<td>6.51V</td>
<td>6.51V</td>
<td>25.2V</td>
<td>6.51V</td>
</tr>
<tr>
<td>$I_0$</td>
<td>14mA</td>
<td>15mA</td>
<td>12mA</td>
<td>8mA</td>
<td>14mA</td>
<td>15mA</td>
<td>12mA</td>
</tr>
<tr>
<td>$P_0$</td>
<td>22mW</td>
<td>0.995W</td>
<td>20mW</td>
<td>20mW</td>
<td>22mW</td>
<td>0.995W</td>
<td>20mW</td>
</tr>
<tr>
<td>$C_i$</td>
<td>220pF#</td>
<td>220pF#</td>
<td>110pF</td>
<td>110pF</td>
<td>220pF#</td>
<td>220pF#</td>
<td>220pF#</td>
</tr>
<tr>
<td>$L_i$</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>$C_0$</td>
<td>13nF</td>
<td>53nF</td>
<td>10nF</td>
<td>11µF</td>
<td>13nF</td>
<td>53nF</td>
<td>10nF</td>
</tr>
<tr>
<td>$L_0$</td>
<td>1.5mH</td>
<td>500µH</td>
<td>1.5mH</td>
<td>1.5mH</td>
<td>1.5mH</td>
<td>500µH</td>
<td>1.5mH</td>
</tr>
</tbody>
</table>

* Special condition for safe use

#220pF consists of 110pF @ 6.51 V max and 110pF @ 1.6V max.
OPERATION

Keys
The key switches the loop calibrator on and off. Press and hold for 2 seconds.

The key changes the measure or source operating mode. Pressing the keys makes menu selections, sets numerical values and controls step and ramp functions (up/down).

The select advanced functions shown on the bottom of the display. When no key is pressed for 10 minutes, the loop calibrator times out and switches off. To disable this automatic time out, select autpower down in the set-up menu.
Operating Modes

Pressing \( \text{F1} \) switches the instrument on and the display shows the start-up sequence. Pressing \( \text{F2} \), at this time, the display shows the information screen:

Pressing \( \text{F3} \), at this time, the display shows the set-up screen:

The calibrator can be used in two modes: **measure** or **source**.

**Measure mode**

The display shows the measured value, depending on the settings made in set-up and advanced settings:

- When measuring current pressing \( \text{F4} \) enables linear or flow, pressing \( \text{F5} \) enables mA or % (value of 4 to 20 mA or 0 to 20 mA).
- When measuring voltage pressing \( \text{F6} \) changes the resolution between 0.00V and 0.000V.

To measure continuity the displays shows an open or closed switch symbol with an audible signal on switch closure.
Connect the calibrator to the device to be tested:

1. **Measure mA**
   - Press the **mode** key and select [Measure mA]. An external power supply supplies a maximum of 30 V for the loop. The calibrator measures the current of the loop.

2. **Closed loop current measurement from transmitter test terminal**

3. **Measure mA with 24 V**
   - Press **mode** key and select [Measure mA and 24V]. The calibrator supplies 24 V (maximum) for the loop, maximum 24 mA.
   - *Special condition for safe use, see page 3.

4. **Measure Volts**
   - Press **mode** key and select [Measure Volts], measure range 50 V, maximum impedance 1 Mohm.
**Continuity Test**
Press mode key and select (Continuity Test). Pressing (2) switches the audible signal on/off.

**Source Mode**
The display shows the source value in mA or % value of 4 to 20 mA or 0 to 20 mA, linear or flow depending on the settings made in set-up and advanced settings.
*Special condition for safe use, see page 3.

**Source mA**
Press mode key and select (Source mA).

**Source mA with 24V**
Press mode key and select (Source mA and 24V). The calibrator supplies loop power of: 24 V (maximum), (typically 21 V) and 24 mA.
*Special condition for safe use, see page 3.
Advanced Options in a Source mode

Press the key and select mA Source or mA Source & 24V.
Use and (Enter) to select the function.
Press the key (Advanced) and the display shows:
Linear simulates linear transmitters.
Flow simulates flow transmitters.
Valve simulates valve control signals.
Use  and (Enter) to select the Advanced option:

Advanced

Step 25% steps for linear and flow - fixed values for valve.
Auto-step The same as step with a timed step interval.
Span Check Step between 4 (or 0) mA and 20 mA.
Ramp Automatic ramp between 4 (or 0) mA and 20 mA.

Note: Ramp function not available for valve selection.
Use (Esc) to quit. The display returns to the selected source mode with the advanced setting available.

MODE
mA source mA source & 24V

Lin
Flow
Valve
F1 Advanced
Step
Auto-step
Time (M:S)
Span Check
Ramp
Time (M:S)

Adjust +1/-1 second
Adjust +1/-1 second
Adjust +1/-1 second
Operation of Advanced Options
Press the key to switch the advanced setting on and off:
e.g. on or off
Press or to:
- step the output up or down.
- step the span check maximum or minimum
- start the "ramp".

Press then to start:
- continuous auto-step.
- or
- continuous ramp cycle.

Hart® Application
This application allows mA measure and source modes to be used through the Hart® communicator.
Maintenance
• Return the loop calibrator to an authorised ATEX repair centre for any repairs, it cannot be repaired on-site.
• To keep the loop calibrator accurate a calibration check should be carried out once per year.

Cleaning
• Clean the loop calibrator leather case with a moist, lint-free cloth and weak detergent.
Battery Replacement

WARNING: ONLY REPLACE BATTERIES IN A SAFE AREA

Only use the battery type listed on page two.

Unscrew and remove the securing screw from the battery panel.

Replace the batteries, check the polarity of the batteries. Refit and secure the battery panel.
Calibration Instructions

**WARNING:**
CALIBRATE UPS-III-IS LOOP CALIBRATORS IN A SAFE AREA.

**General**

The instrument is supplied by the manufacturer, complete with calibration certificate(s). A calibration period of 12 months is recommended. The actual calibration interval depends on instrument usage and the total measurement uncertainty acceptable for the specified application.

The UPS-III-IS is a very precise measuring instrument and the test equipment and conditions of test must be suitable for the type of work. The calibration check and calibration adjustment should be carried out in a controlled environment by a calibration technician*.

The manufacturer offers a comprehensive and, if required, UKAS accredited calibration service.

* A calibration technician must have the necessary technical knowledge, documentation, special test equipment and tools to carry out the calibration work on this equipment.

**Calibration Equipment**

The following tables give the accuracy requirements for the calibration equipment and the UPS-III-IS.

Calibration requires a stable temperature of 21°C ±1°C (70°F ±2°F).

**UPS-III-IS measure mode**

<table>
<thead>
<tr>
<th>Applied mA</th>
<th>Permitted UPS-III-IS error (mA)</th>
<th>Calibrator error (mA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0.002</td>
<td>0</td>
</tr>
<tr>
<td>4</td>
<td>0.002</td>
<td>0.00014</td>
</tr>
<tr>
<td>12</td>
<td>0.002</td>
<td>0.00030</td>
</tr>
<tr>
<td>20</td>
<td>0.002</td>
<td>0.00046</td>
</tr>
</tbody>
</table>

**Table 3**

mA measure
### Calibration Check

1. Connect the UPS-III-IS to the electrical calibrator. Switch on the electrical calibrator and allow it to thermally stabilise.
2. Switch on the UPS-III-IS and allow the instrument to thermally stabilise.
3. Set the UPS-III-IS to mA measure, adjust the electrical calibrator to apply the first value in the table 3. Record the reading of the UPS-III-IS.
4. Repeat step 3 for all the values in the table 3.
5. Compare the recorded values and the applied values if the difference is greater than the permitted error, the instrument requires a calibration adjustment.
6. Repeat this procedure for V measure (table 4) and mA source (table 5).

### Calibration Adjustment

1. Connect the UPS-III-IS to the electrical calibrator. Switch on the electrical calibrator and allow it to thermally stabilise.

---

### Table 4

<table>
<thead>
<tr>
<th>Applied V</th>
<th>Permitted UPS-III-IS error (mV)</th>
<th>Calibrator error (mV)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0.004</td>
<td>0.00040</td>
</tr>
<tr>
<td>20</td>
<td>0.004</td>
<td>0.00014</td>
</tr>
<tr>
<td>40</td>
<td>0.005</td>
<td>0.00064</td>
</tr>
<tr>
<td>50</td>
<td>0.005</td>
<td>0.00070</td>
</tr>
</tbody>
</table>

### Table 5

<table>
<thead>
<tr>
<th>Applied mA</th>
<th>Permitted UPS-III-IS error (mA)</th>
<th>Calibrator error (mA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0.002</td>
<td>0</td>
</tr>
<tr>
<td>4</td>
<td>0.002</td>
<td>0.00012</td>
</tr>
<tr>
<td>12</td>
<td>0.002</td>
<td>0.00011</td>
</tr>
<tr>
<td>20</td>
<td>0.002</td>
<td>0.00015</td>
</tr>
</tbody>
</table>
2. Switch on the UPS-III-IS and press \( F_2 \) within two seconds to select Calibration. Enter the access code \([9410 \text{ factory setting}]\) and allow the instrument to thermally stabilise.

3. Select the parameter required for calibration. Use the display menu to select the calibration values. After a successful calibration enter the new calibration date.

The instrument performs a two-point calibration for V and mA.

2 seconds → \( F_2 \) → Setup → Calibration → Enter

Access Code → \( F_2 \) → Calibration menu