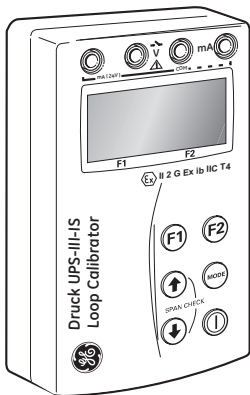


GE
Sensing

Druck UPS-III-IS

Intrinsically Safe Loop Calibrator

User manual - K0341



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:



EC Declaration of Conformity

Product: UPS-III-IS
Loop Calibrator

The above product(s) meets the protection requirements of the relevant EC Directives.

Supplier: Druck Limited, Fir Tree Lane Groby Leicester LE6 0FH
Tel: +44 (0) 116 231 7100 Fax: +44 (0) 116 231 7101

Signed: *H.S. Mankia* **Date:** 15th September 2006
For and on behalf of Druck Limited

Name: H. S. Mankia **Position:** Technical Director (Instruments)

Relevant European Directives	
Directive Name	Directives
Low Voltage Directive	73/23/EEC as amended by 93/68/EEC
Electromagnetic Compatibility	89/336/EEC as amended by 92/31/EEC and 93/68/EEC
Potentially Explosive Atmospheres	94/9/EC

Standards	
Standard Name	Standard
Safety requirements for electrical equipment for measurement, control and laboratory use	EN61010-1:2001
Electrical equipment for measurement, control and laboratory use – EMC requirements	EN61326:1997 + A1:1998 + A2:2001 + A3:2003
Electrical apparatus for explosive atmospheres - General Requirements	EN60079-0:2004
Electrical apparatus for potentially explosive atmospheres intrinsic safety "I"	EN50020:2002

The IECEx certificate for this equipment can be reviewed at the following web site:

www.iecex.com



1 **EC - TYPE EXAMINATION CERTIFICATE**

2 **Equipment or Protective System Intended for use in Potentially Explosive Atmospheres**
Directive 94/9/EC

3 **EC - Type Examination Certificate Number:** Baseefa06ATEX0224X

4 **Equipment or Protective System:** UPS-III-IS

5 **Manufacturer:** Druck Limited

6 **Address:** Groby, Leicester, LE6 0FH, UK

7 This equipment or protective system and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.

8 Baseefa (2001) Ltd., Notified Body number 1180, in accordance with Article 9 of the Council Directive 94/9/EC of 23 March 1994, certifies that this equipment or protective system has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres given in Annex II to the Directive.

The examination and test results are recorded in confidential Report No. 06(C)0004

9 Compliance with the Essential Health and Safety Requirements has been assured by compliance with:

EN 60079-0: 2004 EN 50020: 2002

except in respect of those requirements listed at item 18 of the Schedule.

10 If the sign "X" is placed after the certificate number, it indicates that the equipment or protective system is subject to special conditions for safe use specified in the schedule to this certificate.

11 This EC - TYPE EXAMINATION CERTIFICATE relates only to the design and construction of the specified equipment or protective system. Further requirements of the Directive apply to the manufacturing process and supply of this equipment or protective system. These are not covered by this certificate.

12 The marking of the equipment or protective system shall include the following :

Ⓔ II 2G Ex ib IIC T4 (-10°C ≤ Ta ≤ +40°C)

This certificate may only be reproduced in its entirety, without any change, schedule included.

Baseefa Customer Reference No. 0312

Project File No. 06/0004

This certificate is granted subject to the general terms and conditions of Baseefa (2001) Ltd. It does not necessarily indicate that the equipment may be used in particular industries or circumstances.

Baseefa

Rockhead Business Park, Staden Lane,
Buxton, Derbyshire SK17 9RZ

Telephone +44 (0) 1298 766600 Fax +44 (0) 1298 766601
e-mail info@baseefa.com web site www.baseefa.com

Baseefa is a trading name of Baseefa (2001) Ltd
Registered in England No. 4305578 at the above address

K S SINCLAIR
DIRECTOR
On behalf of
Baseefa (2001) Ltd.

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

www.gesensing.com



Schedule

13

14

Certificate Number Baseefa06ATEX0224X

15 Description of Equipment or Protective System

The UPS-III-IS is designed to measure voltage, continuity or current (in a current loop circuit, either passive or active) of intrinsically safe circuits or generate a current (for a current loop circuit, either passive or active) for intrinsically safe circuits.

The equipment comprises four PCB's; an encapsulated power supply PCB, an analogue processing PCB, a digital processing PCB and a keyboard and display PCB. Connections between the boards are made by PCB mounted inter-board connectors. The apparatus is powered by four AA Alkaline primary batteries and is enclosed in a moulded plastic housing containing a display window and six push button switches. The plastic housing is further protected by a leather case which must always be fitted when the instrument is used.

The user connections are made to the apparatus by means of four 4mm sockets situated above the display window for connection of user test leads.

16 Report Number

06(C)0006

17 Special Conditions for Safe Use

1. When user terminal SK7 is used (the 24V output), the external, circuit under test, must be completely isolated from any other sources of power.
2. The remote sensor MUST be isolated from all other sources of power when used in the following operating modes.
 - V w.r.t. COM : Continuity measurement.
 - mA(24V) w.r.t. mA : Powered current loop, current measurement.
 - mA(24V) w.r.t. mA : Powered current loop, current generation

18 Essential Health and Safety Requirements

All relevant Essential Health and Safety Requirements are covered by the standards listed at item 9.

19 Drawings and Documents

Number	Sheet	Issue	Date	Description
X-A3-0241	1 of 1	1	11 Aug 06	UPS-III-IS PSU Board Circuit Diagram for Baseefa
X-A3-0241	1 to 2	1	-	Bill of Materials for X-A3-0241
X-A3-0242	1 to 2	1	11 Aug 06	UPS-III-IS Digital Board Circuit Diagram for Baseefa
X-A3-0242	1 to 2	1	-	Bill of Materials for X-A3-0242
X-A3-0243	1 to 2	1	11 Aug 06	UPS-III-IS Analogue PCB Circuit Diagram for Baseefa
X-A3-0243	1 to 2	1	-	Bill of Materials for X-A3-0243
X-A3-0244	1 of 1	1	08 Jun 06	UPS-III-IS Keyboard/Display PCA Circuit Diagram for Baseefa
X-A3-0244	1 of 1	1	-	Bill of Materials for X-A3-0244
X-A3-0248	1 of 1	1	11 Aug 06	UPS-III-IS Carry Case

Certificate Number
Baseefa06ATEX0224X



Issued 19 September 2006
Page 3 of 3

Number	Sheet	Issue	Date	Description
X-A2-0250	1 of 1	1	11.8.06	UPS-III-IS Power Supply Board Tracking Layers
X-A2-0251	1 of 1	1	11.8.06	UPS-III-IS Power Supply Board Assembly Drawing
X-A2-0252	1 of 2	1	11.8.06	UPS-III-IS Analogue Board Tracking Layers
X-A2-0252	2 of 2	1	11.8.06	UPS-III-IS Analogue Board Inner Layers
X-A2-0253	1 of 1	1	11.8.06	UPS-III-IS Analogue Board Assembly Drawing
X-A2-0254	1 of 2	2	6.9.06	UPS-III-IS Digital Board Tracking Layers
X-A2-0254	2 of 2	2	6.9.06	UPS-III-IS Digital Board Inner Layers
X-A2-0255	1 of 1	2	6.9.06	UPS-III-IS Digital Board Assembly Drawing
X-A2-0256	1 of 2	1	11.8.06	UPS-III-IS Keypad Display Board Tracking Layers
X-A2-0256	2 of 2	1	11.8.06	UPS-III-IS Keypad Display Board Inner Layers
X-A2-0257	1 of 1	1	11.8.06	UPS-III-IS Keypad Display Board Assembly Drawing
X-A2-0260	1 of 1	2	04 Sep 06	UPS-III-IS Base molding
X-A4-0262	1 of 1	1	11.08.06	UPS-III-IS Certification Label
X-A3-0263	1 of 1	2	04 Sep 06	UPS-III-IS General Assembly
X-A3-0264	1 of 1	2	04 Sep 06	UPS-III-IS Front Housing Assembly
X-A3-0265	1 of 1	2	04 Sep 06	UPS-III-IS Potted Rear Housing Assembly

UPS-III Intrinsically Safe Loop Calibrator

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



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

..... 0.003%/°C(0.0015%/F°)

Reference..... 22°C ±5°C/RH45%±15%

Mode	Range	Resolution	Accuracy
Source 2 wire†	0 to 24 mA	0.001	0.015% rdg + 2 lsd
Source mA	0 to 24 mA*	0.001	0.015% rdg + 2 lsd
Measure mA	0 to 24 mA	0.001	0.015% rdg + 2 lsd
Measure V	0 to 50V**	0.01	0.015% rdg + 4 lsd
Continuity	<100Ω***	-	0.5 mA

* R max 650Ω 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 SUPERALKALINE 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%

Table 1**Guide to supply and input/output**

No.	Parameter and conditions
1 & 2	Current measurement between mA and COM with external 24V. <i>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.</i>
3	Current measurement between mA (24V) and mA with internal 24V. <i>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.</i>
4	Voltage measurement between V and COM
5	Continuity measurement between V and COM <i>Special condition for safe use - remote sensor MUST be isolated from all other sources of power.</i>
6	Current generation between mA and COM with external 24V. <i>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.</i>
7	Current generation between mA (24V) and mA with internal 24V. <i>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.</i>

Table 2
Supply and input/output parameter


Param.	1&2	3	4	5	6	7
U_i	30V	0*	50V	0*	30V	0*
I_i	100mA	0*	100mA	0*	100mA	0*
P_i	1W	0*	1W	0*	1W	0*
U_0	6.51V	25.2V	6.51V	6.51V	6.51V	25.2V
I_0	14mA	158mA	12mA	8mA	14mA	158mA
P_0	22mW	0.995W	20mW	20mW	22mW	0.995W
C_i	220pF#	220pF#	110pF	110pF	220pF#	220pF#
L_i	0	0	0	0	0	0
C_0	33nF	53nF	10nF	11 μ F	33nF	53nF
L_0	1.5mH	500 μ H	1.5mH	100mH	1.5mH	500 μ H


* 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 **outpower down** in the set-up menu.

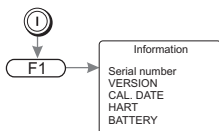


SPAN CHECK

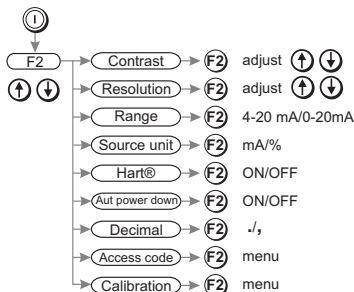


Operating Modes

Pressing **(I)** switches the instrument on and the display shows the start-up sequence. Pressing **(F1)**, at this time, the display shows the information screen:



Pressing **(F2)**, 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 **(F1)** enables linear or flow, pressing **(F2)** enables mA or % (value of 4 to 20 mA or 0 to 20 mA).

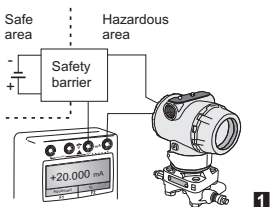
When measuring voltage pressing **(F2)** changes the resolution between 0.00V and 0.000V.

To measure continuity the displays shows an open or closed switch symbol with an audible signal on switch closure.

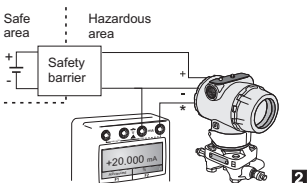
Connect the calibrator to the device to be tested:

1 and 2 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.



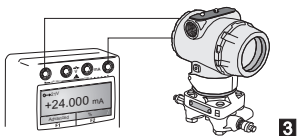
Closed loop current measurement from transmitter test terminal



3 Measure mA with 24 V*

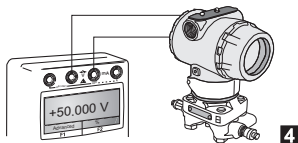
Press **mode** key and select [Measure mA and 24V]. The calibrator supplies 24 V (maximum) for the loop, maximum 24 mA.

*Special condition for safe use, see page 3.



4 Measure Volts

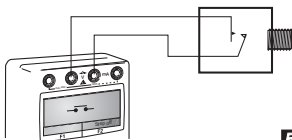
Press **mode** key and select [Measure Volts], measure range 50 V, maximum impedance 1 Mohm.



5 Continuity Test*

Press **mode** key and select [Continuity Test].

Pressing **(F2)** switches the audible signal on/off.



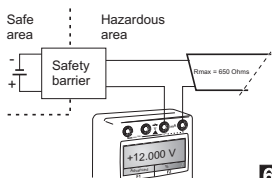
Source Mode

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.*

6 Source mA

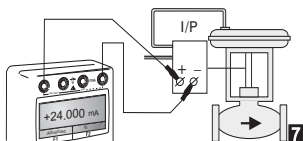
Press **mode** key and select [Source mA].



7 Source mA with 24V*

Press **mode** key and select [Source mA and 24V]. The calibrator supplies loop power of: 24 V [maximum], (typically 21V) and 24 mA.

**Special condition for safe use, see page 3.*



Advanced Options in a Source mode

Press the **MODE** key and select mA Source or mA Source & 24V.

Use **↑** **↓** and **F2** (Enter) to select the function.

Press the **F1** key (Advanced) and the display shows:

Linear simulates linear transmitters.

Flow simulates flow transmitters.

Valve simulates valve control signals.

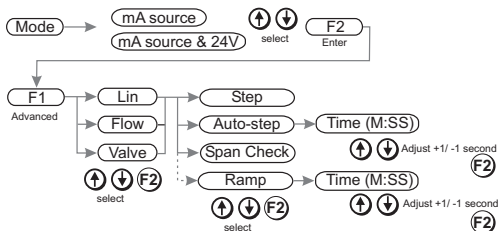
Use **↑** **↓** and **F2** (Enter) to select the Advanced option:

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 **F1** to quit. The display returns to the selected source mode with the advanced setting available.



Operation of Advanced Options

Press the **(F2)** 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".

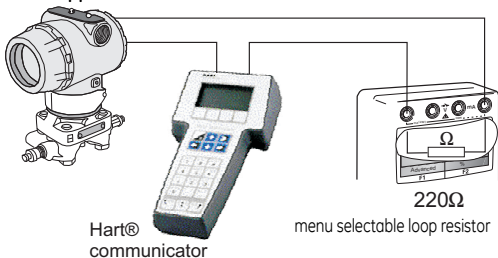
Press  then  to start:

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.

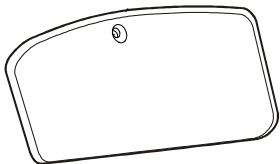
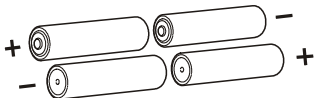
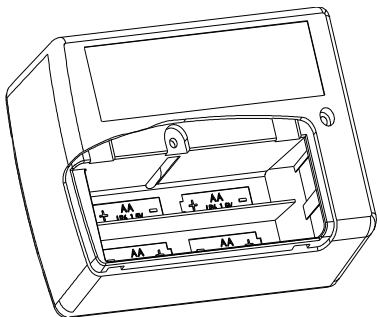
Battery Replacement

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 $21^{\circ} \pm 1^{\circ}\text{C}$ ($70^{\circ} \pm 2^{\circ}\text{F}$).

UPS-III-IS measure mode

Table 3
mA measure

Applied mA	Permitted UPS-III-IS error (mA)	Calibrator error (mA)
0	0.002	0
4	0.002	0.00014
12	0.002	0.00030
20	0.002	0.00046

Table 4
V measure

Applied V	Permitted UPS-III-IS error (mV)	Calibrator error (mV)
0	0.004	0.00040
20	0.004	0.00014
40	0.005	0.00064
50	0.005	0.00070

UPS-III-IS source mode

Table 5
mA source

Applied mA	Permitted UPS-III-IS error (mA)	Calibrator error (mA)
0	0.002	0
4	0.002	0.00012
12	0.002	0.00011
20	0.002	0.00015

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.

2. Switch on the UPS-III-IS and press **F2**, within two seconds to select Calibration. Enter the access code [9410 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.

