

## Overview



The SITRANS LUT400 series controllers are compact, single point, long-range ultrasonic controllers for continuous level or volume measurement of liquids, slurries, solids, and high accuracy monitoring of open channel flow.

## Benefits

- Small 1/2 DIN enclosure [144 h x 144 d x 146 w mm (5.7 x 5.7 x 5.75 inch)] with standard universal mounting bracket for wall, pipe, and DIN rail, plus an optional panel mount
- Easy to use HMI display with local four-button programming, menu-driven parameters, and Wizard support for key applications
- English, German, French, Spanish, Chinese, Italian, Portuguese, and Russian texts on the HMI.
- Level, Volume, OCM Flow monitoring
- Three relays combined with a suite of pump, alarm, and relay control features
- HART Communications
- EDDs for SIMATIC PDM, AMS Device Manager, and Field Communicator 375/475, plus DTMs for FDTs (Field Device Tools)
- Web browser for local programming from an intuitive web-based interface
- Two discrete inputs for backup level override and pump interlock functions
- Echo profile and trend views from the local display
- Patented digital receiver for improved performance in electrically noisy applications (close proximity to VSDs)
- Real time clock with daylight savings time, supporting an integrated datalogger and energy saving algorithms for minimizing pump operation during high cost energy periods
- Removable terminal blocks for ease of wiring
- MCERTS Certified for Open Channel Flow

## Application

The SITRANS LUT400 comes in three different models, depending on the application, level of performance and functionality required:

- SITRANS LUT420 Level Controller: Level or volume measurement of liquids, slurries, and solids, as well as basic pump control functions, and basic data logging capability
- SITRANS LUT430 Level, Pump and Flow Controller: Includes all features of the LUT420 plus a full suite of advanced pump control and alarm functionality, open channel flow monitoring, and basic flow data logging capability
- SITRANS LUT440 High Accuracy OCM: Our most featured, highest accuracy model. Includes all features of the LUT430, plus the industry's best accuracy ( $\pm 1$  mm within 3 m), full suite of advanced control functionality, and enhanced flow logging capability
- Key Applications: wet wells, reservoirs, flumes/weirs, chemical storage, liquid storage, hoppers, crusher bins, dry solids storage

## Level measurement

Continuous level measurement  
Controllers

### SITRANS LUT400 series

#### Technical specifications

<b>Mode of Operation</b>	Ultrasonic level, volume, pump, and open channel flow
Measuring range	0.3 ... 60 m (1 ... 196 ft), transducer dependent
<b>Input</b>	
Discrete	0 ... 50 V DC switching level Logical 0 ≤ 10 V DC Logical 1 = 10 ... 50 V DC Max. 3 mA
<b>Output</b>	
Transducer frequency	10 ... 52 kHz
Ultrasonic transducer	Compatible transducers: All Echo-Max and ST-H series transducers
Relays	<ul style="list-style-type: none"> <li>• 1 SPDT Form C, NO or NC relay, rated 1A at 250 V AC, non-inductive and 3A at 30 V DC</li> <li>• 2 SPST Form A, NO relays, rated 5A at 250 V AC, non-inductive and 3 A at 30 V DC</li> </ul>
mA output	4 ... 20 mA, isolated
Max. load	600 Ω max. in ACTIVE mode, 750 Ω max. in PASSIVE mode
Resolution	0.1 % of range
<b>Accuracy</b>	
Error in measurement	<ul style="list-style-type: none"> <li>• Standard operation: ± 1 mm (0.04 inch) plus 0.17 % of measured distance</li> <li>• High accuracy OCM: ± 1 mm (0.04 inch), within 3 m (9.84 ft) range</li> </ul>
Resolution	<ul style="list-style-type: none"> <li>• Standard operation: 0.1 % of range or 2 mm (0.08 inch), whichever is greater</li> <li>• High accuracy OCM: 0.6 mm (0.02 inch), within 3 m (9.84 ft) range</li> </ul>
Temperature compensation	<ul style="list-style-type: none"> <li>• -40 ... +150 °C (-40 ... +300 °F)</li> <li>• Integral temperature sensor in transducer</li> <li>• External TS-3 temperature sensor (optional)</li> <li>• Programmable fixed temperature values</li> </ul>
<b>Rated operating conditions</b>	
Installation conditions	
<ul style="list-style-type: none"> <li>• Location</li> <li>• Installation category</li> <li>• Pollution degree</li> </ul>	Indoor/outdoor II 4
Ambient conditions	
<ul style="list-style-type: none"> <li>• Ambient temperature (enclosure)</li> <li>• Storage temperature</li> </ul>	-20 ... +50 °C (-4 ... +122 °F) -20 ... +50 °C (-4 ... +122 °F)

<b>Design</b>	
Weight	
<ul style="list-style-type: none"> <li>• Enclosure with display lid</li> <li>• Enclosure with blank lid</li> </ul>	1.3 kg (2.87 lb) 1.2 kg (2.65 lb)
Material (enclosure)	Polycarbonate
Degree of protection	
<ul style="list-style-type: none"> <li>• Enclosure with display or blank lid</li> <li>• Enclosure with blank lid and knock-out removed</li> </ul>	IP65/Type 4X/NEMA 4X IP20
Remote display lid	IP65/Type 3/NEMA 3
<b>Cable</b>	
Transducer and mA output signal	<ul style="list-style-type: none"> <li>• Transducer, mA output: 2 copper conductors, twisted, with foil shield/drain wire, 300 V 0.5 ... 0.75 mm<sup>2</sup> (22 ... 18 AWG)</li> <li>• Relay/power to be copper conductors per local requirements to meet 250 V 5 A contact rating</li> </ul>
Max. separation between transducer and transceiver	365 m (1 200 ft)
<b>Displays and controls</b>	60 x 40 mm (2.36 x 1.57 inch) removable LCD, 240 x 160 pixels resolution, operational up to 5 m from enclosure base
Programming	
<ul style="list-style-type: none"> <li>• Primary</li> <li>• Secondary</li> </ul>	4 Local push buttons <ul style="list-style-type: none"> <li>• PC running SIMATIC PDM</li> <li>• PC running Emerson AMS Device Manager</li> <li>• PC running a web browser</li> <li>• PC running a Field Device Tool (FDT)</li> <li>• Field Communicator 375/475 (FC375/FC475)</li> </ul>
Memory	<ul style="list-style-type: none"> <li>• 512 kB flash EPROM</li> <li>• 1.5 MB flash for data logging</li> </ul>
<b>Power supply</b>	
AC version	100 ... 230 V AC ± 15 %, 50/60 Hz, 36 VA Fuse: 5 x 20 mm, Slow Blow, 0.25 A, 250 V
DC version	10 ... 32 V DC, 10 W Fuse: 5 x 20 mm, Slow Blow, 1.6 A, 125 V
<b>Certificates and approvals</b>	
General	CSA <sub>US/C</sub> , CE, FM, UL listed, RCM, EAC, KCC, MCERTS certified for Open Channel Flow
Hazardous	
<ul style="list-style-type: none"> <li>• Non-incendive (Canada)</li> </ul>	CSA Class I, Div. 2, Groups A, B, C, D; Class II, Div. 2, Groups F, G; Class III
<ul style="list-style-type: none"> <li>• Shipping</li> </ul>	Lloyd's Register, ABS
<b>Communication</b>	HART 7.0, USB

#### Technical specifications (continued)

Category	Feature	SITRANS LUT420	SITRANS LUT430	SITRANS LUT440
		Level Controller	Level, pump and flow controller	High accuracy OCM controller
<b>Operations</b>	Level, space, and distance measurement	✓	✓	✓
	Open channel flow measurement		✓	✓
	Volume conversion	✓	✓	✓
<b>Specifications</b>	Compatible with EchoMax and ST-H transducers	✓	✓	✓
	Standard accuracy: ± 1 mm + 0.17 % of measured distance	✓	✓	✓
	High accuracy: ± 1 mm within 3 meters			✓
	Mounting options: wall or panel, pipe, DIN-rail	✓	✓	✓
<b>Data logging and communications</b>	HART communications	✓	✓	✓
	4 ... 20 mA output (active and passive)	✓	✓	✓
	Integrated datalogger for measurement value and alarms	✓	✓	✓
	Integrated datalogger for fixed rate flow logging		✓	✓
	Integrated datalogger for variable rate flow logging triggered by changes in flow condition			✓
	Daily data logging for maximum, minimum and average flow, daily totalized volume, and minimum and maximum temperature		✓	✓
<b>Flow monitoring</b>	High accuracy open channel flow measurement			✓
	9 digit daily and running flow totalizers		✓	✓
	High and low flowrate alarms		✓	✓
	External totalizer and sampler control		✓	✓
	MCERTS Class 1 Certification			✓
	MCERTS Class 2 Certification		✓	
<b>Pump control</b>	Energy saving algorithms for pump control		✓	✓
	Wall cling reduction	✓	✓	✓
	Pump run-on functionality		✓	✓
	Pump start and power resumption delays		✓	✓
	Alternate duty pump routines	✓	✓	✓
	Fixed duty and service ratio pump routines		✓	✓
	Pumped volume totalizer		✓	✓
	Submergence detection	✓	✓	✓
	Discrete input pump interlocks		✓	✓
	Time to spill calculation		✓	✓

## Level measurement

### Continuous level measurement Controllers

#### SITRANS LUT400 series

#### Selection and ordering data

##### SITRANS LUT420 and LUT430

Continuous, non-contact, 60 m (197 ft) range. Monitors level, volume, and volume flow in liquids, slurries, and solids. With high accuracy volume flow and built in data logging.

Click on the Article No. for the online configuration in the PIA Life Cycle Portal.

##### Model

SITRANS LUT420 - Level controller

SITRANS LUT430 - Level, Pump & Flow controller

##### Enclosure display options

With display

With remote panel mount display  
[Includes panel mount cable extension, 2.5 m (8.2 ft)]

No display (blank lid provided)

Note: Enclosure includes back-plate for wall and pipe mounting, and an integrated clip for DIN-rail mounting. DIN-rail mounting for standard TS35 x 7.5 and TS35 x 15 mm DIN-rail to IEC 60715, EN 60715

##### Input voltage

100 ... 230 V AC ± 15 %

10 ... 32 V DC

##### Cable inlet

3 cable inlets, cable glands not supplied

3 cable inlets, 3 M20 plastic cable glands supplied

##### Number of measurement points

Single point system (includes one transducer input, one mA output, and one external temperature sensor input)

##### Communications and I/O

HART, 2 discrete inputs, 3 relays

##### Approvals

General purpose CE, FM, CSA<sub>US/C</sub>, UL, RCM, EAC, KCC

Hazardous locations CSA Class I, II, III, Div. 2, Groups A, B, C, D, F, G

##### Further designs

Please add **"-Z"** to Article No. and specify Order code(s).

Manufacturer's test certificate M to DIN 55350, Part 18 and to ISO 9000

Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text

Namur NE43 failsafe setting - device preset to failsafe < 3.6 mA

##### Operating Instructions

All literature is available to download for free, in a range of languages, at

<http://www.siemens.com/processinstrumentation/documentation>

#### Article No.

7ML5050-

0 0 0 0 - 0 0

A

B

A

B

C

1

2

1

2

1

D

A

C

Order code

C11

Y15

N07

#### Article No.

##### Accessories

Tag, stainless steel, 12 x 45 mm (0.47 x 1.77 inch), one text line, suitable for enclosure

TS-3 Temperature Sensor - see TS-3 on page 4/226

Panel mount cable extension, 2.5 m (8.2 ft)

Qty 3 cable glands and retaining nuts

USB cable, 2 m (6.56 ft) - Standard USB-A to USB-mini B

Hart modem/USB  
(for use with a PC and SIMATIC PDM)

Sunshield, 304 stainless steel

SITRANS RD100, loop powered display - see Chapter 7

SITRANS RD150, remote digital display for 4 ... 20 mA and HART devices - see Chapter 7

SITRANS RD200, universal input display with Modbus conversion - see Chapter 7

SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7

SITRANS RD500 web, universal remote monitoring solution for instrumentation - see Chapter 7

##### Spare parts

Panel mount retrofit kit (convert standard unit with display to panel mount version)

Terminal block replacement kit  
(5 piece kit with one of each removable terminal)

Wall/Pipe mount plate

Enclosure (include blank label)

SITRANS LUT400 Lid (with Display)

SITRANS LUT400 Lid (blank)

Fuse - AC (0.25 A, 250 V, Slow Blow)

Fuse - DC (1.6 A, 125 V, Slow Blow)

Panel mount gasket and fastener kit

DIN-rail clip

LUT420, assembly, DC, board stack with cradle, general purpose

LUT420, assembly, AC, board stack with cradle, general purpose

LUT430, assembly, DC, board stack with cradle, general purpose

LUT430, assembly, AC, board stack with cradle, general purpose

LUT420, assembly, DC, board stack with cradle, hazardous

LUT420, assembly, AC, board stack with cradle, hazardous

LUT430, assembly, DC, board stack with cradle, hazardous

LUT430, assembly, AC, board stack with cradle, hazardous

7ML1930-1AC

7ML1813-...

7ML1930-1GF

7ML1930-1GB

7ML1930-1GD

7MF4997-1DB

7ML1930-1GE

7ML5741-...

7ML5742-.....-....

7ML5740-...

7ML5744-...

7ML5750-...

7ML1830-1PA

7ML1830-1PB

7ML1830-1PC

7ML1830-1PD

7ML1830-1PE

7ML1830-1PF

7ML1830-1PG

7ML1830-1PH

7ML1830-1PK

7ML1830-1PL

A5E42824483

A5E42824562

A5E42824564

A5E42824568

A5E42824561

A5E42824563

A5E42824565

A5E42824570

## Selection and ordering data

## Article No.

## Article No.

**SITRANS LUT440**

Continuous, non-contact, 60 m (197 ft) range. Monitors level, volume, and volume flow in liquids, slurries, and solids. With high accuracy volume flow and built in data logging.

Click on the Article No. for the online configuration in the PIA Life Cycle Portal.

**Model**

SITRANS LUT440 - High accuracy Open Channel Monitor<sup>1)</sup>

**Enclosure display options**

With display

With remote panel mount display [includes panel mount cable extension, 2.5 m (8.2 ft)]

No display (blank lid provided)

Note: Enclosure includes back-plate for wall and pipe mounting, and an integrated clip for DIN-rail mounting. DIN-rail mounting for standard TS35 x 7.5 and TS35 x 15 mm DIN-rail to IEC 60715, EN 60715

**Input voltage**

100 ... 230 V AC ± 15 %

10 ... 32 V DC

**Cable inlet**

3 cable inlets, cable glands not supplied

3 cable inlets, 3 M20 plastic cable glands supplied

**Number of measurement points**

Single point system (includes one transducer input, one mA output, and one external temperature sensor input)

**Communications and I/O**

HART, 2 discrete inputs, 3 relays

**Approvals**

General purpose CE, FM, CSA<sub>US/C</sub>, UL, RCM, EAC, KCC

Hazardous locations CSA Class I, II, III, Div. 2, Groups A, B, C, D, F, G

<sup>1)</sup> Compatible with all EchoMax Transducers. High accuracy OCM performance with the use of an XRS-5 transducer and TS-3 temperature sensor (each sold separately).

**Further designs**

Please add **"-Z"** to Article No. and specify Order code(s).

Manufacturer's test certificate M to DIN 55350, Part 18 and to ISO 9000

Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text

Namur NE43 failsafe setting - device preset to failsafe < 3.6 mA

**Operating Instructions**

All literature is available to download for free, in a range of languages, at

<http://www.siemens.com/processinstrumentation/documentation>

Article No.
7ML5050-
0 0 0 0 - 0 0
C
A
B
C
1
2
1
2
1
D
A
C

**Accessories**

Tag, stainless steel, 12 x 45 mm (0.47 x 1.77 inch), one text line, suitable for enclosure

TS-3 Temperature Sensor - see TS-3 on page 4/226

Panel mount cable extension 2.5 m (8.2 ft)

Qty 3 cable glands and retaining nuts

USB cable 2 m (6.56 ft) - Standard USB-A to USB-mini B

HART modem/USB (for use with PC and SIMATIC PDM)

Sunshield, 304 stainless steel

SITRANS RD100, loop powered display - see Chapter 7

SITRANS RD150, remote digital display for 4 ... 20 mA and HART devices - see Chapter 7

SITRANS RD200, universal input display with Modbus conversion - see Chapter 7

SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7

SITRANS RD500 web, universal remote monitoring solution for instrumentation - see Chapter 7

**Spare parts**

Panel mount retrofit kit (convert standard unit with display to panel mount version)

Terminal block replacement kit (5 piece kit with one of each removable terminal)

Wall/Pipe mount plate

Enclosure (include blank label)

SITRANS LUT400 Lid (with Display)

SITRANS LUT400 Lid (blank)

Fuse - AC (0.25 A, 250 V, Slow Blow)

Fuse - DC (1.6 A, 125 V, Slow Blow)

Panel mount gasket and fastener kit

DIN-rail clip

LUT440, assembly, DC, board stack with cradle, general purpose

LUT440, assembly, AC, board stack with cradle, general purpose

LUT440, assembly, DC, board stack with cradle, hazardous

LUT440, assembly, AC, board stack with cradle, hazardous

7ML1930-1AC

7ML1813-...

7ML1930-1GF

7ML1930-1GB

7ML1930-1GD

7MF4997-1DB

7ML1930-1GE

7ML5741-...

7ML5742-.....-....

7ML5740-...

7ML5744-...

7ML5750-...

7ML1830-1PA

7ML1830-1PB

7ML1830-1PC

7ML1830-1PD

7ML1830-1PE

7ML1830-1PF

7ML1830-1PG

7ML1830-1PH

7ML1830-1PK

7ML1830-1PL

A5E42847453

A5E42847455

A5E42847454

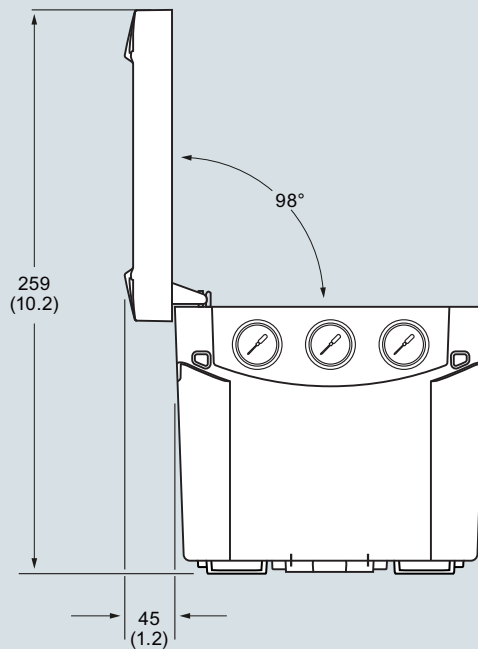
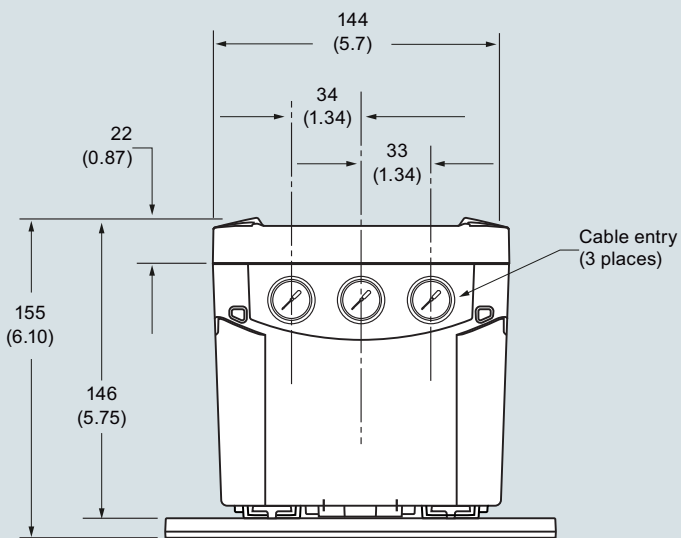
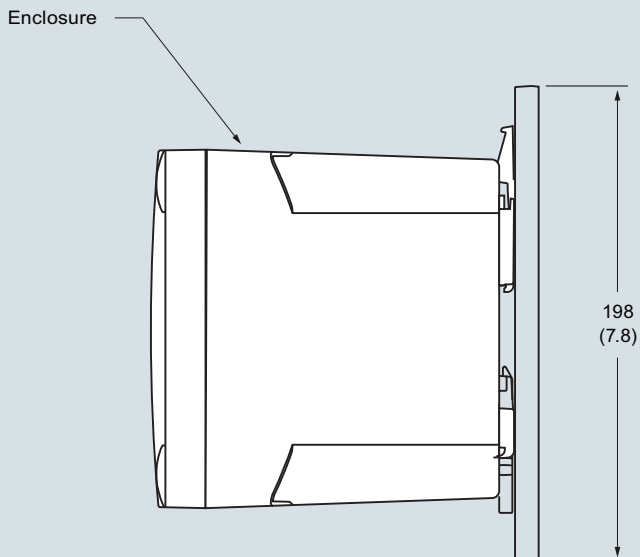
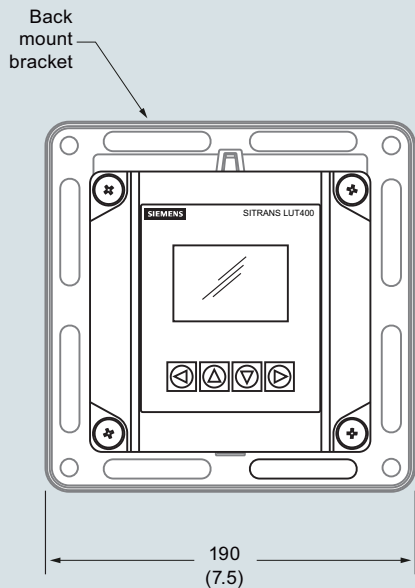
A5E42847456

## Level measurement

Continuous level measurement  
Controllers

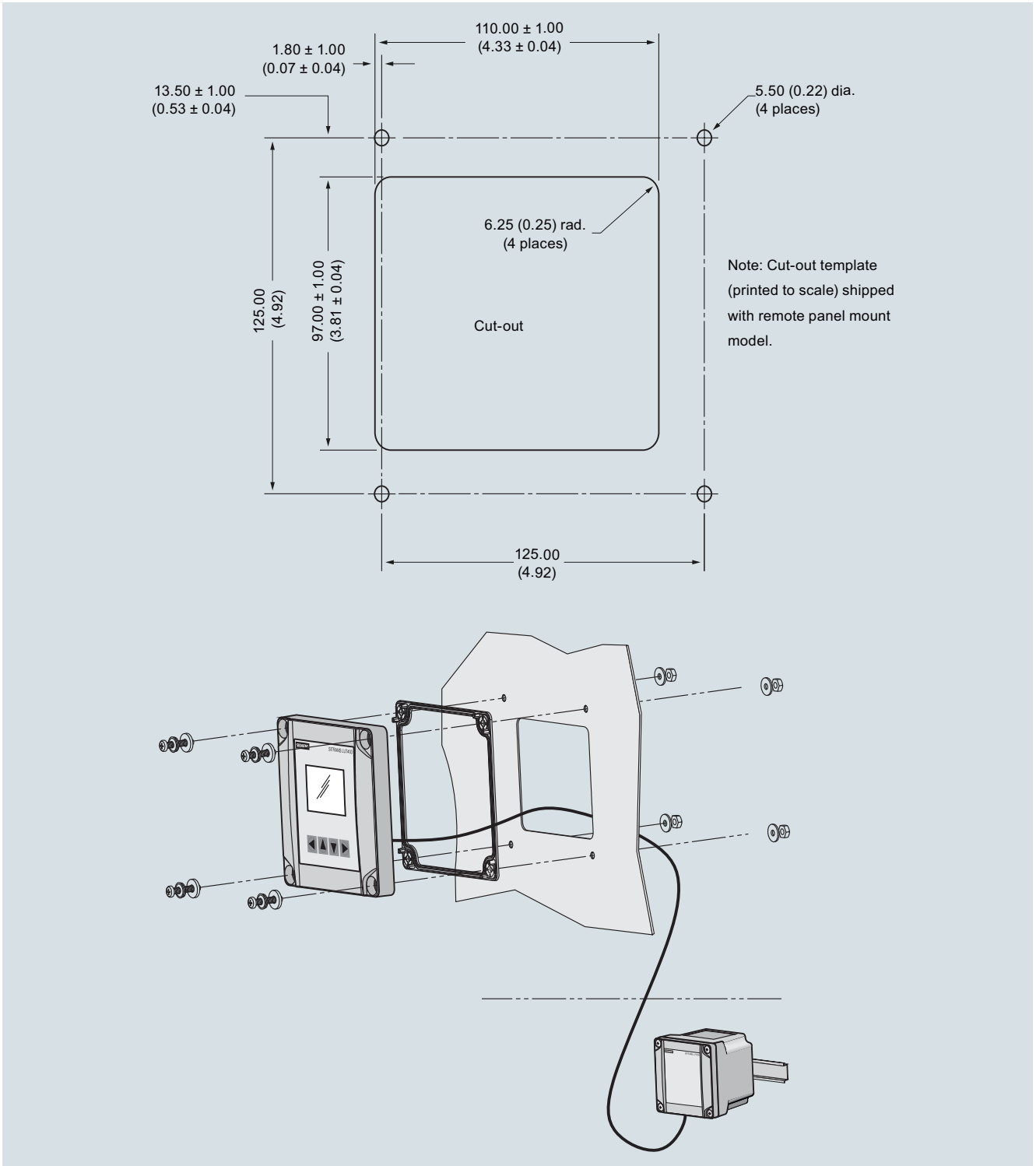
### SITRANS LUT400 series

#### Dimensional drawings



SITRANS LUT400, dimensions in mm (inch)

**Dimensional drawings** (continued)



SITRANS LUT400, dimensions in mm (inch)

## Level measurement

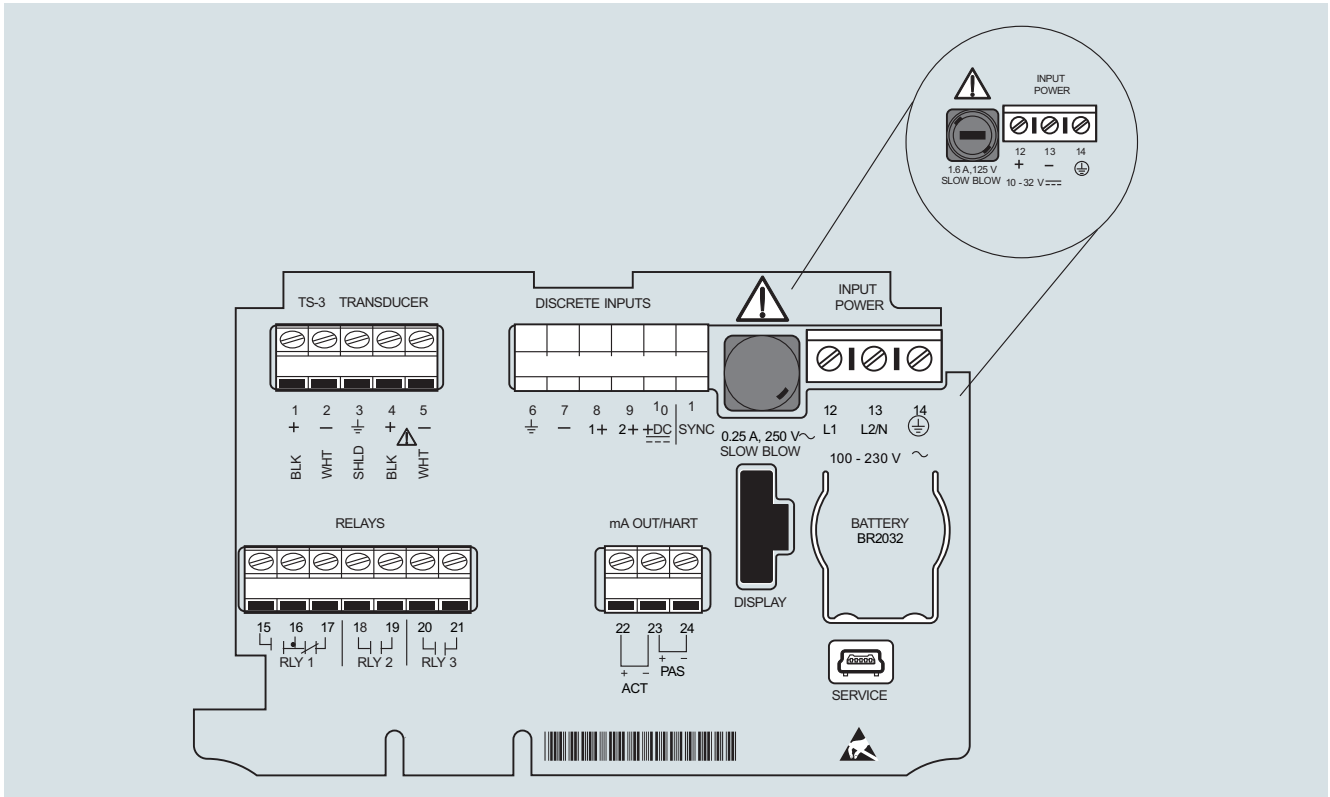
Continuous level measurement

Controllers

### SITRANS LUT400 series

#### Circuit diagrams

4



SITRANS LUT400 connections