

Level Measurement

Continuous level measurement
Ultrasonic controllers

SITRANS LUT400 series

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 (± 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

Technical specifications

Mode of Operation	Ultrasonic level, volume, pump, and open channel flow	Design	
Measuring range	0.3 ... 60 m (1 ... 196 ft), transducer dependent	Weight	
Input		• Enclosure with display lid	1.3 kg (2.87 lb)
Discrete	0 ... 50 V DC switching level Logical 0 ≤ 10 V DC Logical 1 = 10 ... 50 V DC Max. 3 mA	• Enclosure with blank lid	1.2 kg (2.65 lb)
Output		Material (enclosure)	Polycarbonate
Transducer frequency	10 ... 52 kHz	Degree of protection	
Ultrasonic transducer	Compatible transducers: All Echo-Max and ST-H series transducers	• Enclosure with display or blank lid	IP65/Type 4X/NEMA 4X
Relays	<ul style="list-style-type: none"> • 1 SPDT Form C, NO or NC relay, rated 1A at 250 V AC, non-inductive and 3A at 30 V DC • 2 SPST Form A, NO relays, rated 5A at 250 V AC, non-inductive and 3 A at 30 V DC 	• Enclosure with blank lid and knock-out removed	IP20
mA output	4 ... 20 mA, isolated	Remote display lid	IP65/Type 3/NEMA 3
Max. load	600 Ω max. in ACTIVE mode, 750 Ω max. in PASSIVE mode	Cable	
Resolution	0.1 % of range	Transducer and mA output signal	<ul style="list-style-type: none"> • Transducer, mA output: 2 copper conductors, twisted, with foil shield/drain wire, 300 V 0.5 ... 0.75 mm² (22 ... 18 AWG) • Relay/power to be copper conductors per local requirements to meet 250 V 5 A contact rating
Accuracy		Max. separation between transducer and transceiver	365 m (1 200 ft)
Error in measurement	<ul style="list-style-type: none"> • Standard operation: ± 1 mm (0.04 inch) plus 0.17 % of measured distance • High accuracy OCM: ± 1 mm (0.04 inch), within 3 m (9.84 ft) range 	Displays and controls	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
Resolution	<ul style="list-style-type: none"> • Standard operation: 0.1 % of range or 2 mm (0.08 inch), whichever is greater • High accuracy OCM: 0.6 mm (0.02 inch), within 3 m (9.84 ft) range 	Programming	
Temperature compensation	<ul style="list-style-type: none"> • -40 ... +150 °C (-40 ... +300 °F) • Integral temperature sensor in transducer • External TS-3 temperature sensor (optional) • Programmable fixed temperature values 	• Primary	4 Local push buttons
Rated operating conditions		• Secondary	<ul style="list-style-type: none"> • PC running SIMATIC PDM • PC running Emerson AMS Device Manager • PC running a web browser • PC running a Field Device Tool (FDT) • Field Communicator 375/475 (FC375/FC475)
Installation conditions		Memory	<ul style="list-style-type: none"> • 512 kB flash EPROM • 1.5 MB flash for data logging
• Location	Indoor/outdoor	Power supply	
• Installation category	II	AC version	100 ... 230 V AC ± 15 %, 50/60 Hz, 36 VA Fuse: 5 x 20 mm, Slow Blow, 0.25 A, 250 V
• Pollution degree	4	DC version	10 ... 32 V DC, 10 W Fuse: 5 x 20 mm, Slow Blow, 1.6 A, 125 V
Ambient conditions		Certificates and approvals	
• Ambient temperature (enclosure)	-20 ... +50 °C (-4 ... +122 °F)	General	CSA _{US/C} , CE, FM, UL listed, RCM, EAC, KCC, MCERTS certified for Open Channel Flow
		Hazardous	
		• Non-incendive (Canada)	CSA Class I, Div. 2, Groups A, B, C, D; Class II, Div. 2, Groups F, G; Class III
		• Shipping	Lloyd's Register, ABS
		Communication	HART 7.0, USB

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		SITRANS LUT420	SITRANS LUT430	SITRANS LUT440
Category	Feature	Level Controller	Level, pump and flow controller	High accuracy OCM controller
Operations	Level, space, and distance measurement	✓	✓	✓
	Open channel flow measurement		✓	✓
	Volume conversion	✓	✓	✓
Specifications	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	✓	✓	✓
Data logging and communications	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		✓	✓
Flow monitoring	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		✓	
Pump control	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		✓	✓

Selection and Ordering data	Article No.
<p>SITRANS LUT420 and LUT430 Compact ultrasonic level controllers for continuous short to long-range level or volume measurement of liquids, slurries, and solids. Both units include basic relay functions for pumps, alarms, and other controls, plus onboard data logging. LUT430 offers additional advanced pump control and alarm functionality, open channel flow monitoring, and basic flow data logging capability. Functionality varies by model.</p> <p>➤ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.</p>	7ML5050-
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Model	
SITRANS LUT420 - Level controller	A
SITRANS LUT430 - Level, Pump & Flow controller	B
Enclosure display options	
With display	A
With remote panel mount display [Includes panel mount cable extension, 2.5 m (8.2 ft)]	B
No display (blank lid provided)	C
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 %	1
10 ... 32 V DC	2
Cable inlet	
3 cable inlets, cable glands not supplied	1
3 cable inlets, 3 M20 plastic cable glands supplied	2
Number of measurement points	
Single point system (includes one transducer input, one mA output, and one external temperature sensor input)	1
Communications and I/O	
HART, 2 discrete inputs, 3 relays	D
Approvals	
General purpose CE, FM, CSA _{US/C} , UL, RCM, EAC, KCC	A
Hazardous locations CSA Class I, II, III, Div. 2, Groups A, B, C, D, F, G	C

Selection and Ordering data	Order code
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	C11
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	Y15
Namur NE43 failsafe setting - device preset to failsafe < 3.6 mA	N07
Operating Instructions	Article No.
English	A5E33329501
German	A5E35690863
Note: The Operating Instructions should be ordered as a separate line item on the order.	
All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	

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Accessories	
Tag, stainless steel, 12 x 45 mm (0.47 x 1.77 inch), one text line, suitable for enclosure	7ML1930-1AC
TS-3 Temperature Sensor - see TS-3 on page 4/188	7ML1813-...
Panel mount cable extension, 2.5 m (8.2 ft)	7ML1930-1GF
Qty 3 cable glands and retaining nuts	7ML1930-1GB
USB cable, 2 m (6.56 ft) - Standard USB-A to USB-mini B	7ML1930-1GD
Hart modem/USB (for use with a PC and SIMATIC PDM)	7MF4997-1DB
Sunshield, 304 stainless steel	7ML1930-1GE
SITRANS RD100, loop powered display - see Chapter 7	7ML5741-...
SITRANS RD200, universal input display with Modbus conversion - see Chapter 7	7ML5740-...
SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7	7ML5744-...
SITRANS RD500 web, universal remote monitoring solution for instrumentation - see Chapter 7	7ML5750-...
Spare parts	
Panel mount retrofit kit (convert standard unit with display to panel mount version)	7ML1830-1PA
Terminal block replacement kit (5 piece kit with one of each removable terminal)	7ML1830-1PB
Wall/Pipe mount plate	7ML1830-1PC
Enclosure (include blank label)	7ML1830-1PD
SITRANS LUT400 Lid (with Display)	7ML1830-1PE
SITRANS LUT400 Lid (blank)	7ML1830-1PF
Fuse - AC (0.25 A, 250 V, Slow Blow)	7ML1830-1PG
Fuse - DC (1.6 A, 125 V, Slow Blow)	7ML1830-1PH
Panel mount gasket and fastener kit	7ML1830-1PK
DIN-rail clip	7ML1830-1PL
LUT420, assembly, DC, board stack with cradle, general purpose	A5E42824483
LUT420, assembly, AC, board stack with cradle, general purpose	A5E42824562
LUT430, assembly, DC, board stack with cradle, general purpose	A5E42824564
LUT430, assembly, AC, board stack with cradle, general purpose	A5E42824568
LUT420, assembly, DC, board stack with cradle, hazardous	A5E42824561
LUT420, assembly, AC, board stack with cradle, hazardous	A5E42824563
LUT430, assembly, DC, board stack with cradle, hazardous	A5E42824565
LUT430, assembly, AC, board stack with cradle, hazardous	A5E42824570

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Article No.

SITRANS LUT440

The SITRANS LUT440 is the most accurate and featured model in the LUT400 series. It includes high accuracy open channel monitoring, relay functions for external samplers, totalizers, alarms, and enhanced data logging, as well as all pump and control functions available with other models in the LUT400 series.

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

Model

SITRANS LUT440 - High accuracy Open Channel Monitor¹⁾

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_{US/C}, UL, RCM, EAC, KCC

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

¹⁾ 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).

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Selection and Ordering data

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 4/188

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 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-...

7ML5740-...

7ML5744-...

7ML5750-...

7ML1830-1PA

7ML1830-1PB

7ML1830-1PC

7ML1830-1PD

7ML1830-1PE

7ML1830-1PF

7ML1830-1PG

7ML1830-1PH

7ML1830-1PK

7ML1830-1PL

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Selection and Ordering data

Order code

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

English

German

Note: The Operating Instructions should be ordered as a separate line item on the order.

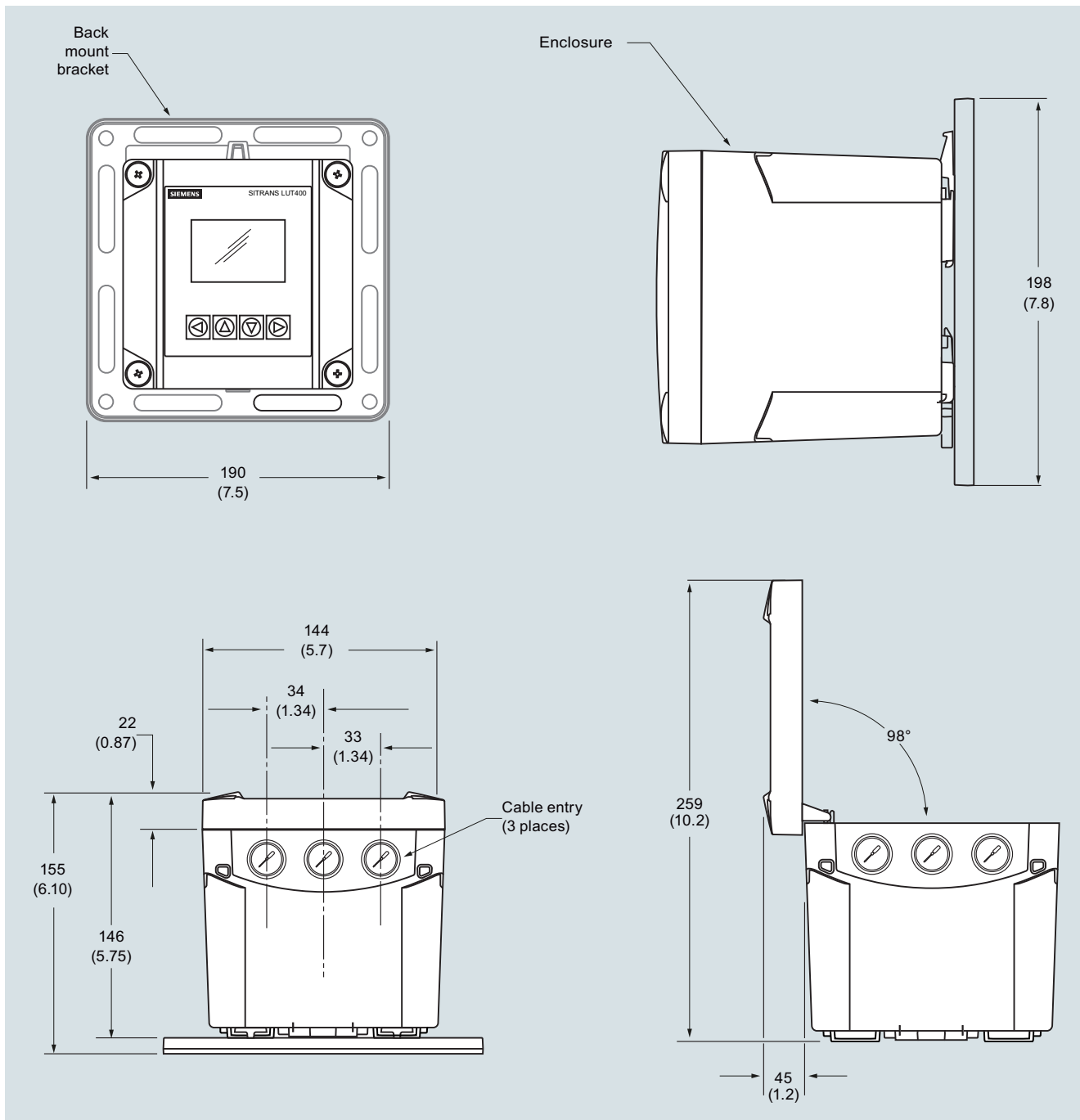
All literature is available to download for free, in a range of languages, at <http://www.siemens.com/processinstrumentation/documentation>

Article No.

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Dimensional drawings



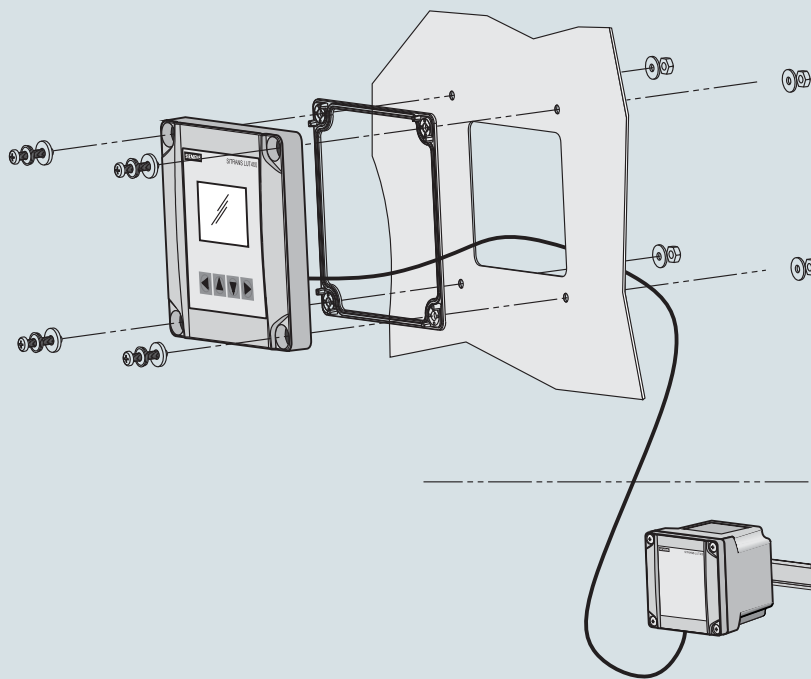
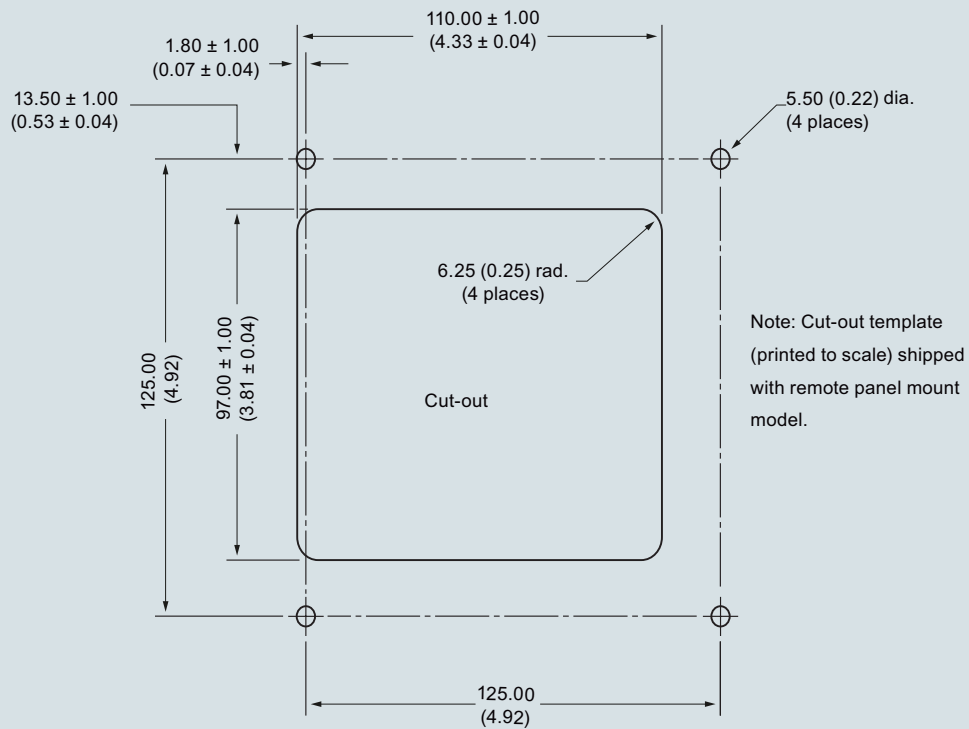
SITRANS LUT400, dimensions in mm (inch)

Level Measurement

Continuous level measurement

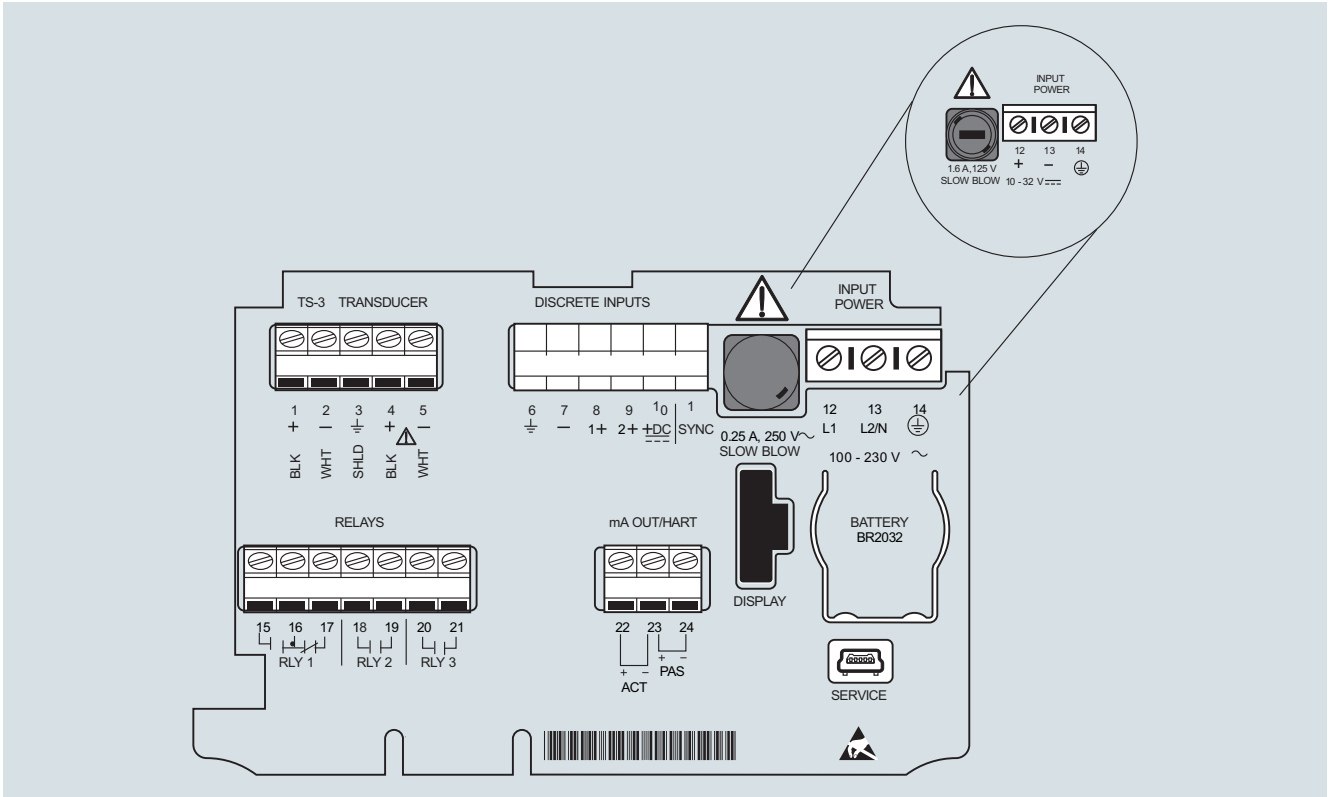
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SITRANS LUT400, dimensions in mm (inch)

Circuit diagrams



SITRANS LUT400 connections