

Level Measurement

Continuous level measurement – Ultrasonic controllers

SITRANS LUT400 series

Overview



The Siemens SITRANS LUT400 series controllers are compact, single point, long-range ultrasonic controllers for continuous level or volume measurement of liquids, slurries, and 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 LUI display with local four-button programming, menu-driven parameters, and Wizard support for key applications
- 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

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, Volume, 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

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Technical specifications

Mode of Operation	Ultrasonic level, volume, pump, and open channel flow
Measuring range	0.3 ... 60 m (1 ... 196 ft), transducer dependent
Input	
Discrete	0 ... 50 V DC switching level Logical 0 = < 10 V DC Logical 1 = 10 ... 50 V DC Max. 3 mA
Output	
Transducer frequency	10 ... 52 kHz
Ultrasonic transducer	Compatible transducers: All EchoMax and ST-H series transducers
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
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
Accuracy	
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
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
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
Rated operating conditions	
Installation conditions	
• Location	Indoor/outdoor
• Installation category	II
• Pollution degree	4
Ambient conditions	
• Ambient temperature (enclosure)	-20 ... +50 °C (-4 ... +122 °F)
Design	
Weight	
• Enclosure with display lid:	1.3 kg (2.87 lbs)
• Enclosure with blank lid:	1.2 kg (2.65 lbs)
Material (enclosure)	Polycarbonate
Degree of protection	
• Enclosure with display or blank lid:	IP65/Type 4X/NEMA 4X
• Enclosure with blank lid and knock-out removed:	IP20
• Remote display lid:	IP65/Type 3/NEMA 3

Cable	
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
Max. separation between transducer and transceiver	365 m (1 200 ft)
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	
Programming	
• Primary	4 Local push buttons
• 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)
Memory	<ul style="list-style-type: none"> • 512 kB flash EPROM • 1.5 MB flash for data logging
Power supply	
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
Certificates and approvals	
General	CSA _{US/C} , CE, FM, UL listed, C-TICK
Hazardous	
• Non-incendive (Canada)	CSA Class I, Div. 2, Groups A, B, C, D; Class II, Div. 2, Groups F, G; Class III
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			✓
	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		✓	✓
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		✓	✓	

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Selection and Ordering data

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.

Model

SITRANS LUT420 - Level controller
SITRANS LUT430 - Level, Pump & Flow controller

Enclosure display options

With display
With remote panel mount display
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, C-TICK
Hazardous locations CSA Class I, II, III, Div. 2
(Groups A,B,C,D,F,G)

Order No.

Order No.	Options
7ML5050-	C)
0	0
A	A
B	B
A	A
B	B
C	C
1	1
2	2
1	1
2	2
1	1
D	D
A	A
C	C

Selection and Ordering data

Further designs

Please add "-Z" to Order 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 fail-safe < 3.6 mA

Operating Instructions

English

French

Spanish

German

Italian

Note: The operating instructions should be ordered as a separate line item on the order.

Communications Manual

English

French

Spanish

German

Italian

Note: The communications manual should be ordered as a separate line item on the order.

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 in catalog

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/RS-232 (for use with a PC and SIMATIC PDM)

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

Sunshield

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)

Lid (with Display)

Lid (Blank)

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

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

Battery BR2032

Panel mount gasket and fastener kit

DIN-rail clip

Order No.

C11
Y15
N07
7ML1998-5MV01
7ML1998-5MV11
7ML1998-5MV21
7ML1998-5MV31
7ML1998-5MV51
7ML1998-5NE01
7ML1998-5NE11
7ML1998-5NE21
7ML1998-5NE31
7ML1998-5NE51
7ML1930-1AC
7ML1813
7ML1930-1GF
7ML1930-1GB
7ML1930-1GD
7MF4997-1DA
7MF4997-1DB
7ML1930-1GE
7ML1830-1PA
7ML1830-1PB
7ML1830-1PC
7ML1830-1PD
7ML1830-1PE
7ML1830-1PF
7ML1830-1PG
7ML1830-1PH
7ML1830-1PJ
7ML1830-1PK
7ML1830-1PL

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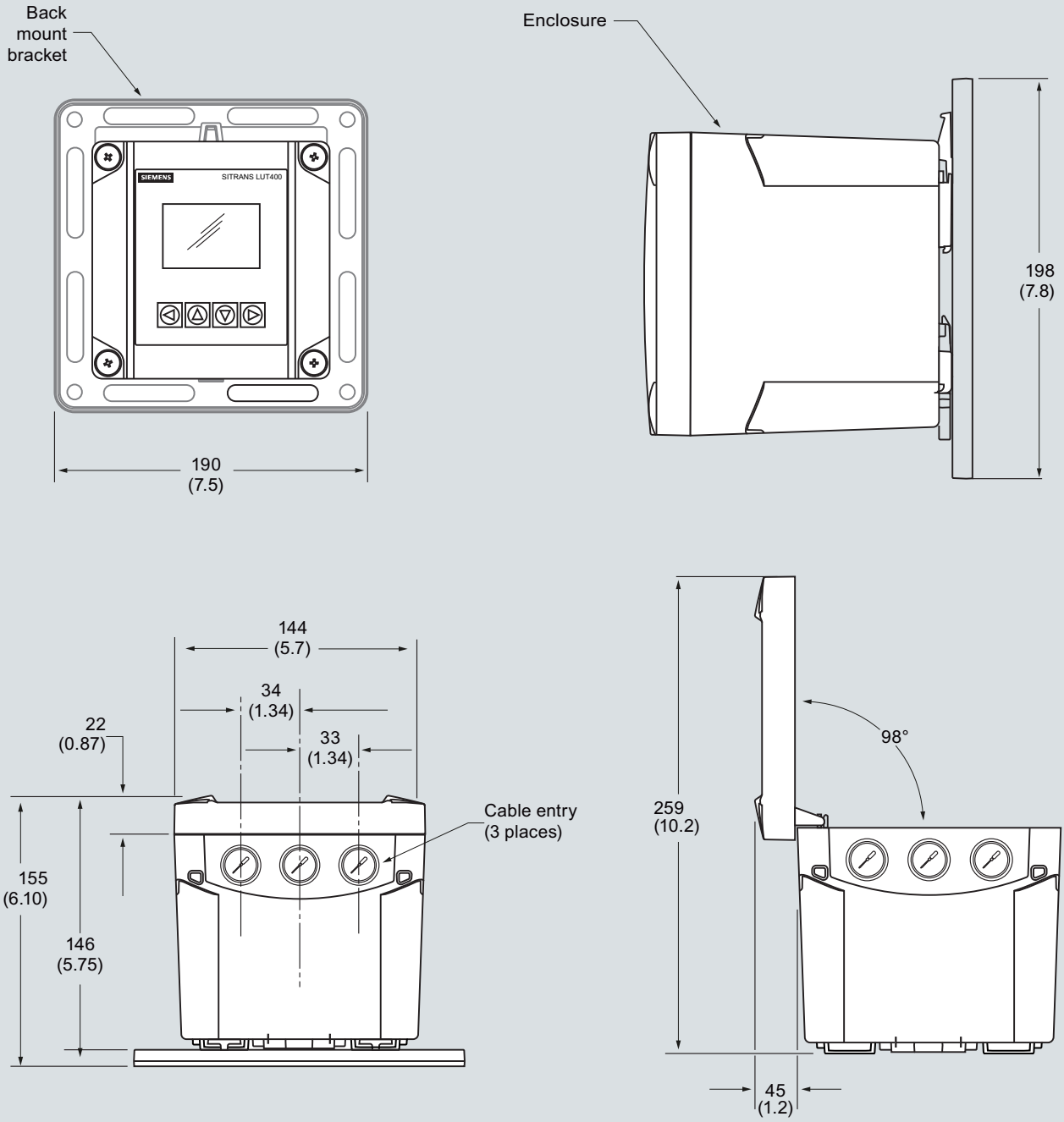
Selection and Ordering data	Order No.	Selection and Ordering data	Order No.
SITRANS LUT440 The SITRANS LUT440 is the most accurate and featured model in the LUT400 series. It includes high accuracy open channel monitoring, relay functions for external samplers, totalizers, alarms, and enhanced data logging, as well as all pump and control functions available with other models in the LUT400 series.	C) 7ML5050- 0 ■■■■ - ■■■■ 0	Further designs Please add "-Z" to Order 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 fail-safe < 3.6 mA	C11 Y15 N07
Model SITRANS LUT440 - High accuracy Open Channel Monitor ¹	C	Operating Instructions English French Spanish German Italian Note: The operating instructions should be ordered as a separate line item on the order.	7ML1998-5MV01 7ML1998-5MV11 7ML1998-5MV21 7ML1998-5MV31 7ML1998-5MV51
Enclosure display options With display With remote panel mount display 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	A B C	Communications Manual English French Spanish German Italian Note: The communications manual should be ordered as a separate line item on the order.	7ML1998-5NE01 7ML1998-5NE11 7ML1998-5NE21 7ML1998-5NE31 7ML1998-5NE51
Input voltage 100 ... 230 V AC ± 15 % 10 ... 32 V DC	1 2	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 in catalog 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/RS-232 (for use with a PC and SIMATIC PDM) HART modem/USB (for use with PC and SIMATIC PDM) Sunshield	7ML1930-1AC 7ML1813 7ML1930-1GF 7ML1930-1GB 7ML1930-1GD 7MF4997-1DA 7MF4997-1DB 7ML1930-1GE
Cable inlet 3 cable inlets, cable glands not supplied 3 cable inlets, 3 M20 plastic cable glands supplied	1 2	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) Lid (with Display) Lid (Blank) Fuse - AC (0.25 A, 250 V, Slow Blow) Fuse - DC (1.6 A, 125 V, Slow Blow) Battery BR2032 Panel mount gasket and fastener kit DIN-rail clip	7ML1830-1PA 7ML1830-1PB 7ML1830-1PC 7ML1830-1PD 7ML1830-1PE 7ML1830-1PF 7ML1830-1PG 7ML1830-1PH 7ML1830-1PJ 7ML1830-1PK 7ML1830-1PL
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, C-TICK 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).	A C		

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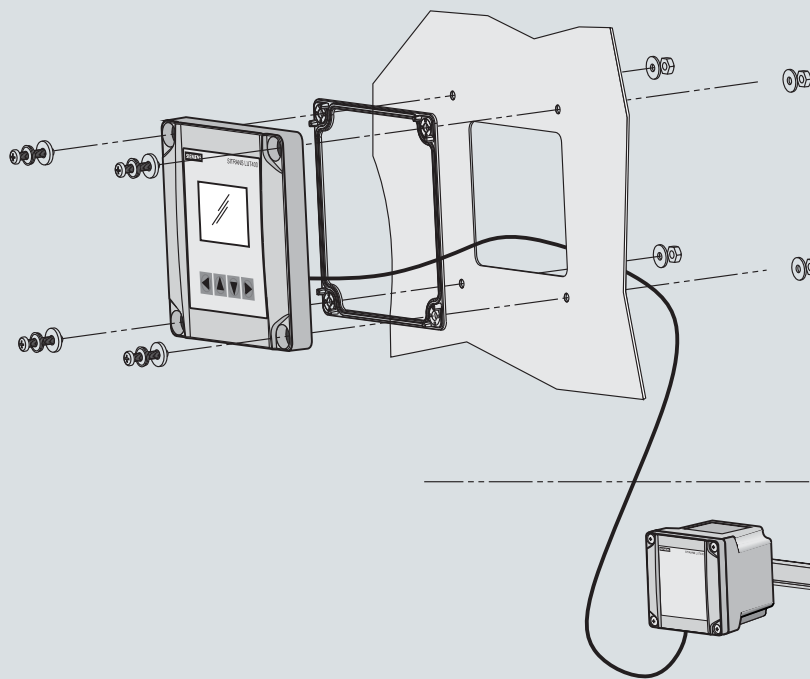
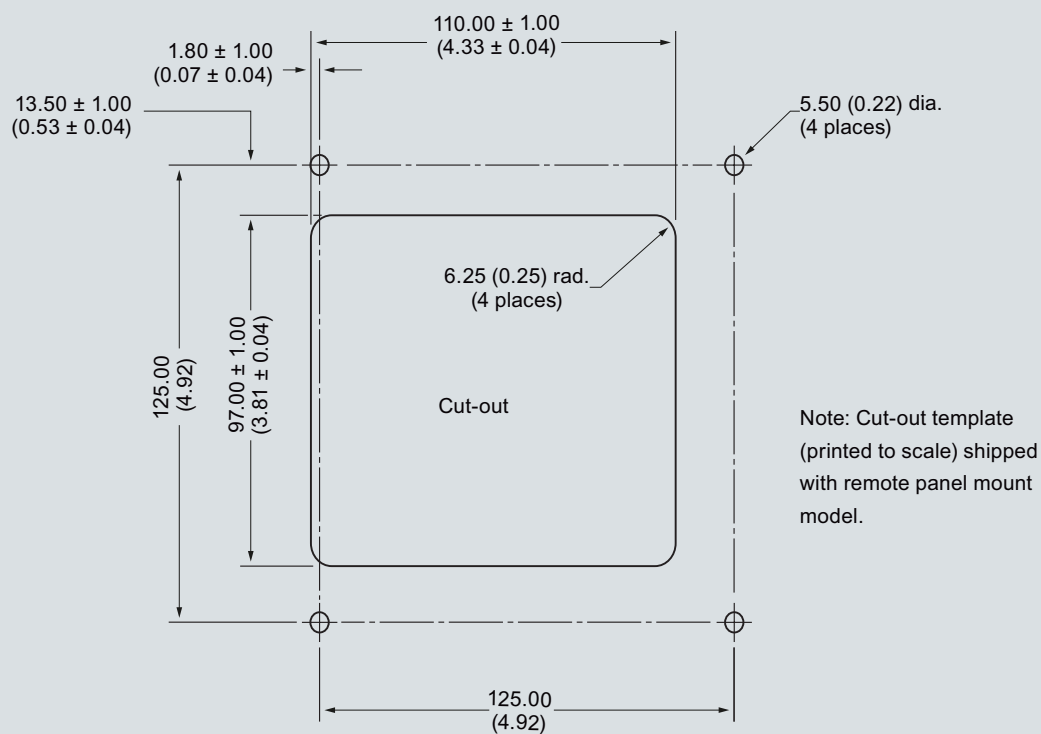
Dimensional drawings



SITRANS LUT400, dimensions in mm (inch)

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Dimensional drawings



SITRANS LUT400, dimensions in mm (inch)

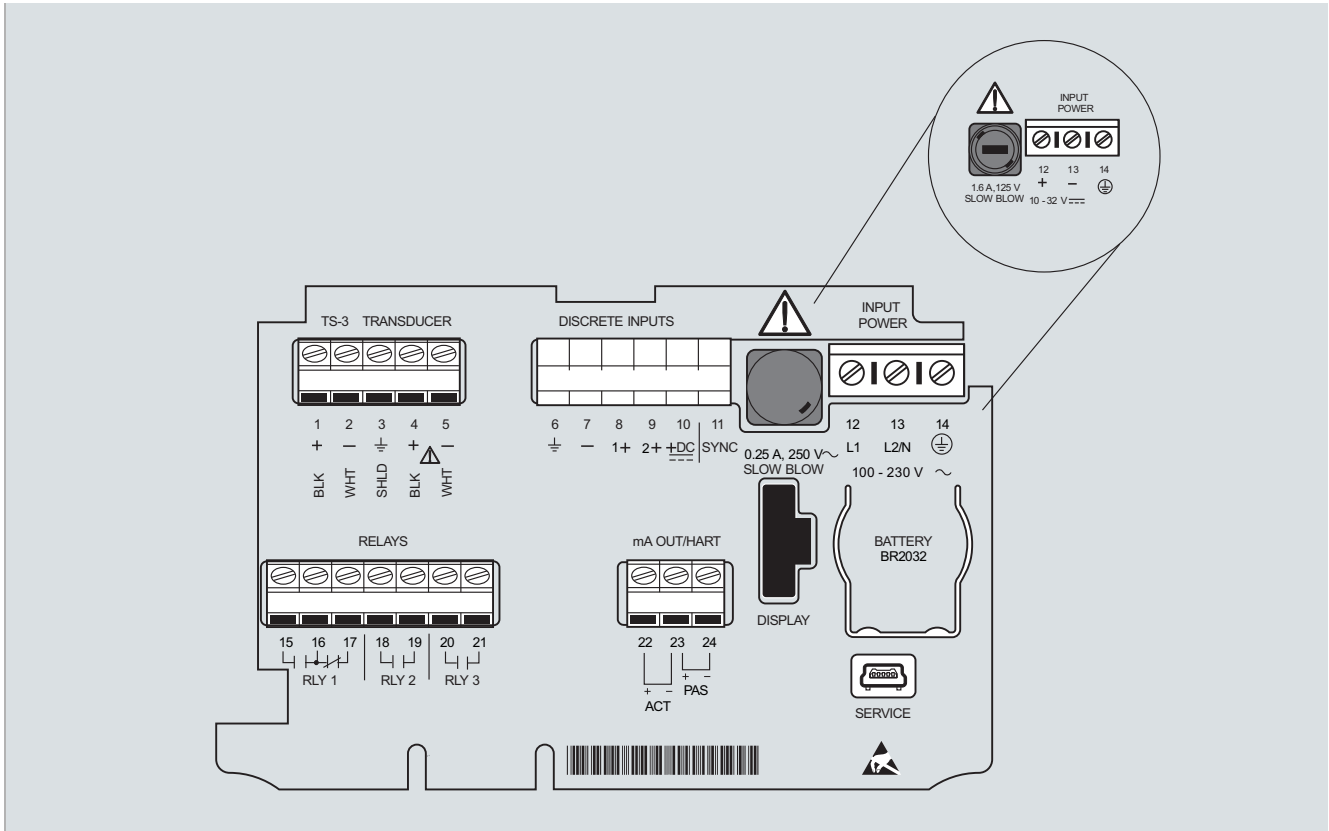
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Schematics

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SITRANS LUT400, connections