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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
- 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

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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	• 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	• 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	• 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	• -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 lb)
• Enclosure with blank lid:	1.2 kg (2.65 lb)
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	• 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) removeable LCD, 240 x 160 pixels resolution, operational up to 5 m from enclosure base
Programming	
• Primary	4 Local push buttons
• Secondary	• 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	• 512 kB flash EPROM • 1.5 MByte 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, 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

4

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SITRANS LUT400 series

Category	Feature	SITRANS LUT420 Level Controller	SITRANS LUT430 Level, pump and flow controller	SITRANS LUT440 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		✓	✓

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Selection and Ordering data		Article No.
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.		**7ML5050-** 0 ■■■ - ■■■ 0
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, C-TICK	⬟	A
Hazardous locations CSA Class I, II, III, Div. 2 (Groups A, B, C, D, F, G)		C

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

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		**7ML1998-5MV01**
French		**7ML1998-5MV11**
Spanish		**7ML1998-5MV21**
German		**7ML1998-5MV31**
Italian		**7ML1998-5MV51**
Multi-language compact operating instructions Note: The operating instructions should be ordered as a separate line item on the order.		**7ML1998-5XU81**
Communications Manual		
English		**7ML1998-5NE01**
French		**7ML1998-5NE11**
Spanish		**7ML1998-5NE21**
German		**7ML1998-5NE31**
Italian Note: The communications manual should be ordered as a separate line item on the order.		**7ML1998-5NE51**
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 in catalog		**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/RS-232 (for use with a PC and SIMATIC PDM)		**7MF4997-1DA**
Hart modem/USB (for use with a PC and SIMATIC PDM)		**7MF4997-1DB**
Sunshield, 304 stainless steel		**7ML1930-1GE**
SITRANS RD100 Remote display - see Chapter 7		
SITRANS RD200 Remote display - see Chapter 7		
SITRANS RD500 web, datalogging, alarming, ethernet, and modem support for instrumentation - see Chapter 7		**7ML5750-1AA00-0**
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**
Battery BR2032		**7ML1830-1PJ**
Panel mount gasket and fastener kit		**7ML1830-1PK**
DIN-rail clip		**7ML1830-1PL**

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SITRANS LUT400 series

Selection and Ordering data	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.	**7ML5050-** 0 ■■■ - ■■■ 0
Model	
SITRANS LUT440 - High accuracy Open Channel Monitor [1]	C
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, C-TICK	A
Hazardous locations CSA Class I, II, III, Div. 2, (Groups A, B, C, D, F, G)	C

[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).

We can offer shorter delivery times for configurations designated with the Quick Ship Symbol. For details see page 9/5 in the appendix.

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	**7ML1998-5MV01**
French	**7ML1998-5MV11**
Spanish	**7ML1998-5MV21**
German	**7ML1998-5MV31**
Italian	**7ML1998-5MV51**
Note: The operating instructions should be ordered as a separate line item on the order.	
Communications Manual	
English	**7ML1998-5NE01**
French	**7ML1998-5NE11**
Spanish	**7ML1998-5NE21**
German	**7ML1998-5NE31**
Italian	**7ML1998-5NE51**
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	**7ML1930-1AC**
TS-3 Temperature Sensor - see TS-3 in catalog	**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/RS-232 (for use with a PC and SIMATIC PDM)	**7MF4997-1DA**
HART modem/USB (for use with PC and SIMATIC PDM)	**7MF4997-1DB**
Sunshield, 304 stainless steel	**7ML1930-1GE**
SITRANS RD100 Remote display - see Chapter 7	
SITRANS RD200 Remote display - see Chapter 7	
SITRANS RD500 web, datalogging, alarming, ethernet, and modem support for instrumentation - see Chapter 7	**7ML5750-1AA00-0**
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**
Battery BR2032	**7ML1830-1PJ**
Panel mount gasket and fastener kit	**7ML1830-1PK**
DIN-rail clip	**7ML1830-1PL**

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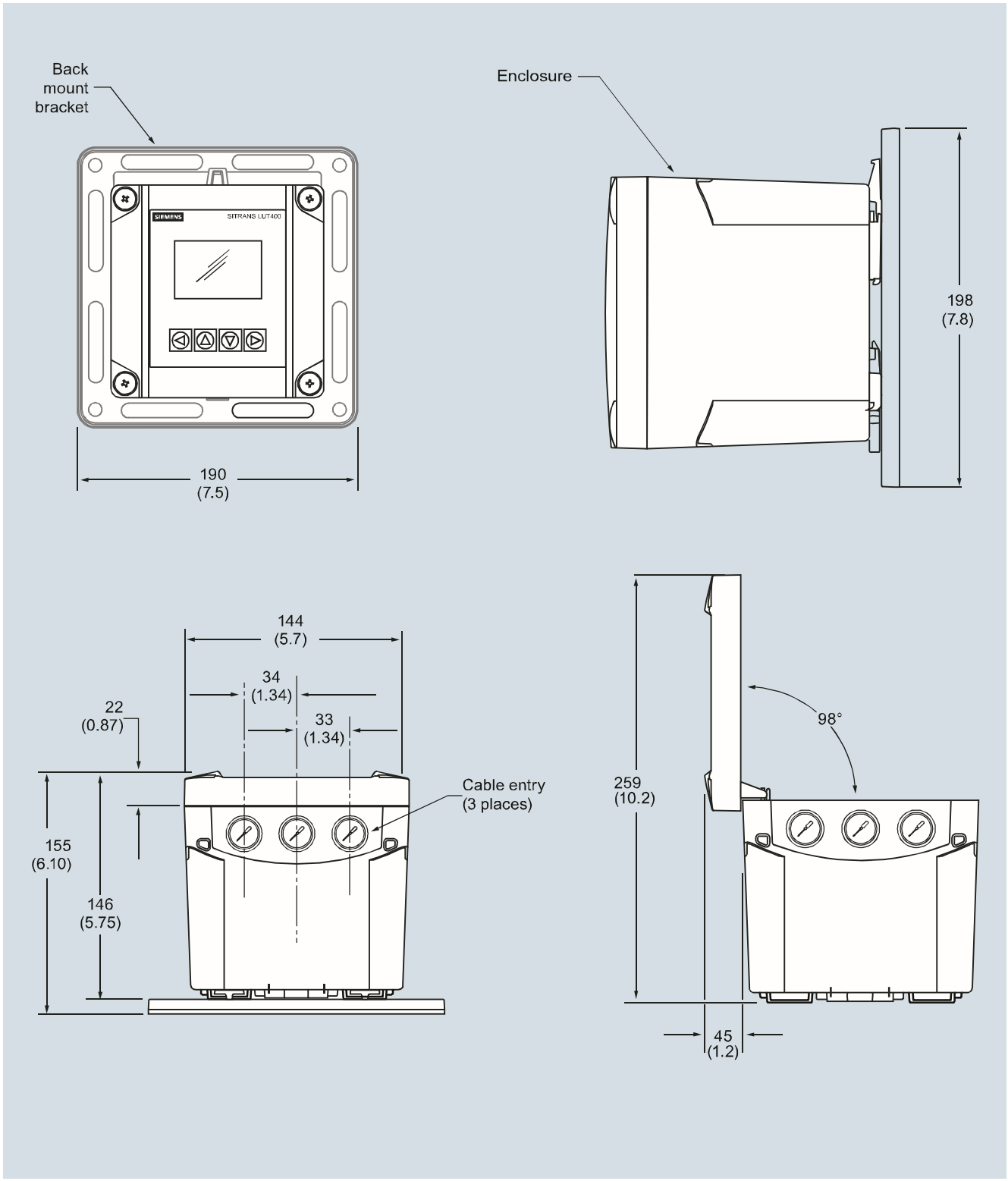
Dimensional drawings



SITRANS LUT400, dimensions in mm (inch)

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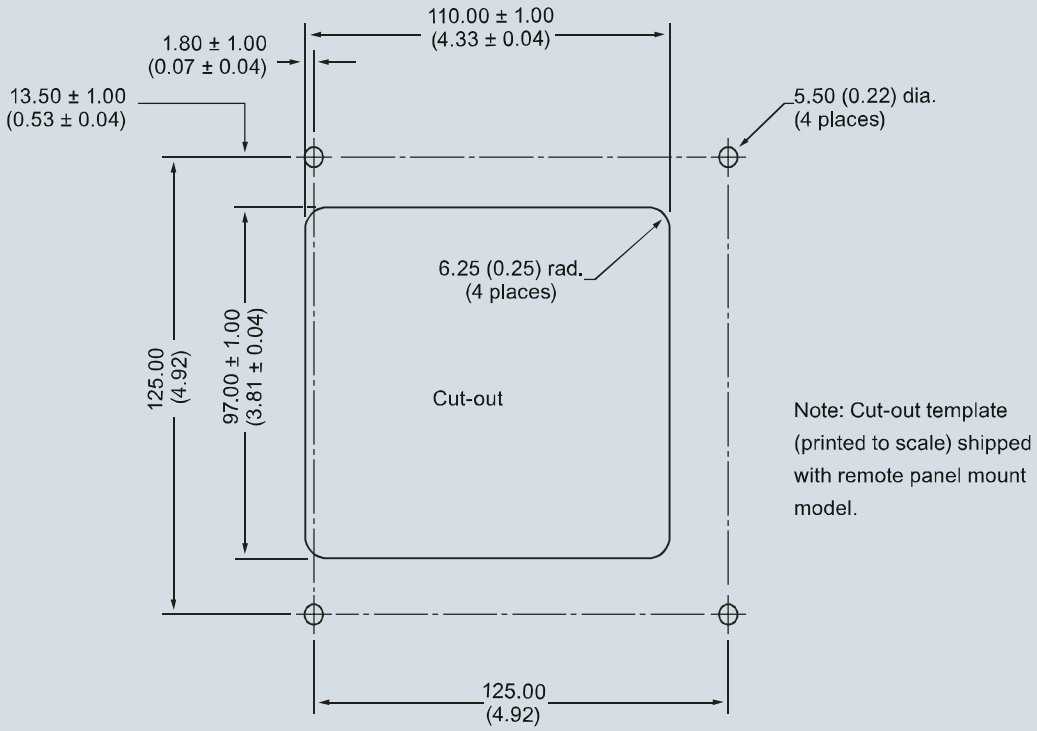

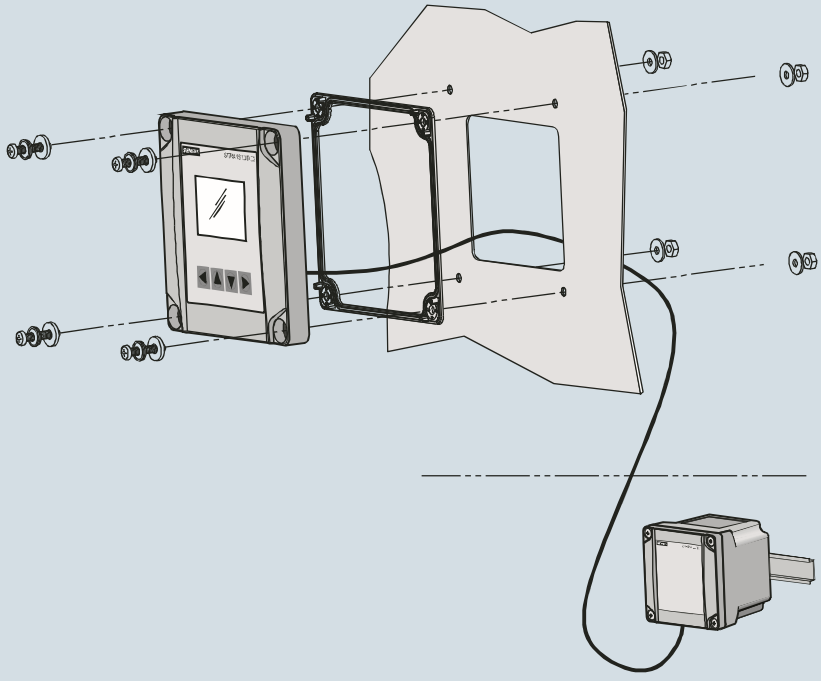

SITRANS LUT400, dimensions in mm (inch)

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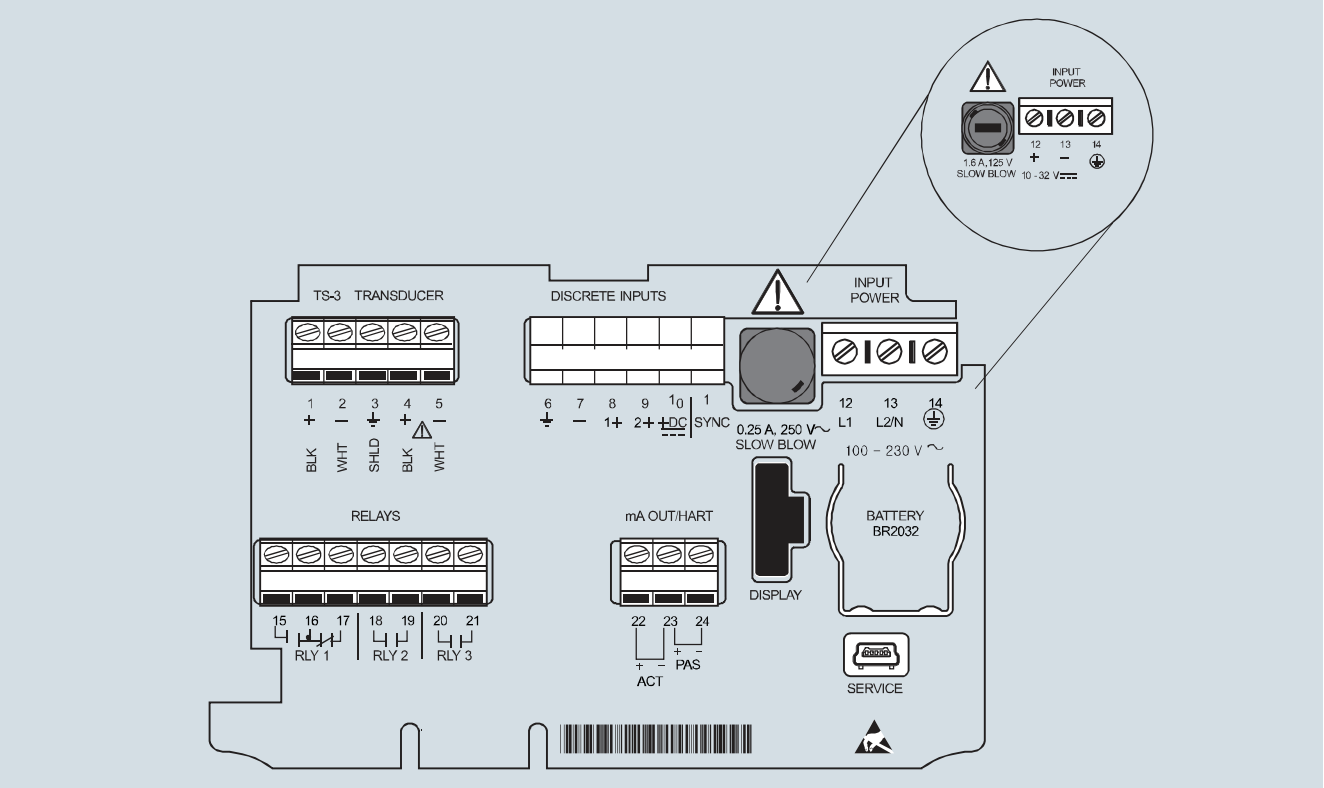
Schematics



SITRANS LUT400 connections