

## 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 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

## Technical specifications

<b>Mode of Operation</b>	Ultrasonic level, volume, pump, and open channel flow	<b>Design</b>	
Measuring range	0.3 ... 60 m (1 ... 196 ft), transducer dependent	Weight	
<b>Input</b>		• 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)
<b>Output</b>		Material (enclosure)	Polycarbonate
Transducer frequency	10 ... 52 kHz	Degree of protection	
Ultrasonic transducer	Compatible transducers: All EchoMax and ST-H series transducers	• Enclosure with display or blank lid:	IP65/Type 4X/NEMA 4X
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>	• 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	<b>Cable</b>	
• Resolution	0.1 % of range	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>
<b>Accuracy</b>		Max. separation between transducer and transceiver	365 m (1 200 ft)
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>	<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
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>	Programming	
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>	• Primary	4 Local push buttons
<b>Rated operating conditions</b>		• Secondary	<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>
Installation conditions		Memory	<ul style="list-style-type: none"> <li>• 512 kB flash EPROM</li> <li>• 1.5 MByte flash for data logging</li> </ul>
• Location	Indoor/outdoor	<b>Power supply</b>	
• 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		<b>Certificates and approvals</b>	
• Ambient temperature (enclosure)	-20 ... +50 °C (-4 ... +122 °F)	General	CSA <sub>US/CA</sub> , CE, FM, UL listed, RCM, 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
		<b>Communication</b>	HART 7.0, USB

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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		✓	✓	

Selection and Ordering data	Article No.	Selection and Ordering data	Article No.
<b>SITRANS LUT420 and LUT430</b> 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. ↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	<b>7ML5050-</b> 	<b>Communications Manual</b> English French Spanish German Italian Note: The communications manual should be ordered as a separate line item on the order.	<b>A5E33701270</b> <b>7ML1998-5NE11</b> <b>7ML1998-5NE21</b> <b>7ML1998-5NE31</b> <b>7ML1998-5NE51</b>
<b>Model</b> SITRANS LUT420 - Level controller SITRANS LUT430 - Level, Pump & Flow controller	<b>A</b> <b>B</b>	<b>Accessories</b> 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 4/189 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 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	<b>7ML1930-1AC</b> <b>7ML1813-...</b> <b>7ML1930-1GF</b> <b>7ML1930-1GB</b> <b>7ML1930-1GD</b> <b>7MF4997-1DB</b> <b>7ML1930-1GE</b> <b>7ML5741-...</b> <b>7ML5740-...</b> <b>7ML5744-...</b> <b>7ML5750-...</b>
<b>Enclosure display options</b> 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	<b>A</b> <b>B</b> <b>C</b>	<b>Spare parts</b> 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) Battery BR2032 Panel mount gasket and fastener kit DIN-rail clip	<b>7ML1830-1PA</b> <b>7ML1830-1PB</b> <b>7ML1830-1PC</b> <b>7ML1830-1PD</b> <b>7ML1830-1PE</b> <b>7ML1830-1PF</b> <b>7ML1830-1PG</b> <b>7ML1830-1PH</b> <b>7ML1830-1PJ</b> <b>7ML1830-1PK</b> <b>7ML1830-1PL</b>
<b>Input voltage</b> 100 ... 230 V AC ± 15 % 10 ... 32 V DC	<b>1</b> <b>2</b>	We can offer shorter delivery times for configurations designated with the Quick Ship Symbol . For details see page 9/5 in the appendix.	
<b>Cable inlet</b> 3 cable inlets, cable glands not supplied 3 cable inlets, 3 M20 plastic cable glands supplied	<b>1</b> <b>2</b>		
<b>Number of measurement points</b> Single point system (includes one transducer input, one mA output, and one external temperature sensor input)	<b>1</b>		
<b>Communications and I/O</b> HART, 2 discrete inputs, 3 relays	<b>D</b>		
<b>Approvals</b> General purpose CE, FM, CSA <sub>US/C</sub> , UL, RCM Hazardous locations CSA Class I, II, III, Div. 2 (Groups A, B, C, D, F, G)	<b>A</b> <b>C</b>		
<b>Selection and Ordering data</b>	<b>Order code</b>		
<b>Further designs</b> Please add <b>"-Z"</b> 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	<b>C11</b> <b>Y15</b> <b>N07</b>		
<b>Operating Instructions</b>	<b>Article No.</b>		
English French Spanish German Italian Multi-language compact operating instructions Note: The operating instructions should be ordered as a separate line item on the order.	<b>A5E33329501</b> <b>7ML1998-5MV11</b> <b>7ML1998-5MV21</b> <b>A5E35690863</b> <b>7ML1998-5MV51</b> <b>7ML1998-5XU81</b>		

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<b>SITRANS LUT440</b> 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.	<b>7ML5050-</b> 
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
<b>Model</b> SITRANS LUT440 - High accuracy Open Channel Monitor <sup>1)</sup>	<b>C</b>
<b>Enclosure display options</b> 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	<b>A</b> <b>B</b> <b>C</b>
<b>Input voltage</b> 100 ... 230 V AC ± 15 % 10 ... 32 V DC	<b>1</b> <b>2</b>
<b>Cable inlet</b> 3 cable inlets, cable glands not supplied 3 cable inlets, 3 M20 plastic cable glands supplied	<b>1</b> <b>2</b>
<b>Number of measurement points</b> Single point system (includes one transducer input, one mA output, and one external temperature sensor input)	<b>1</b>
<b>Communications and I/O</b> HART, 2 discrete inputs, 3 relays	<b>D</b>
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<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).

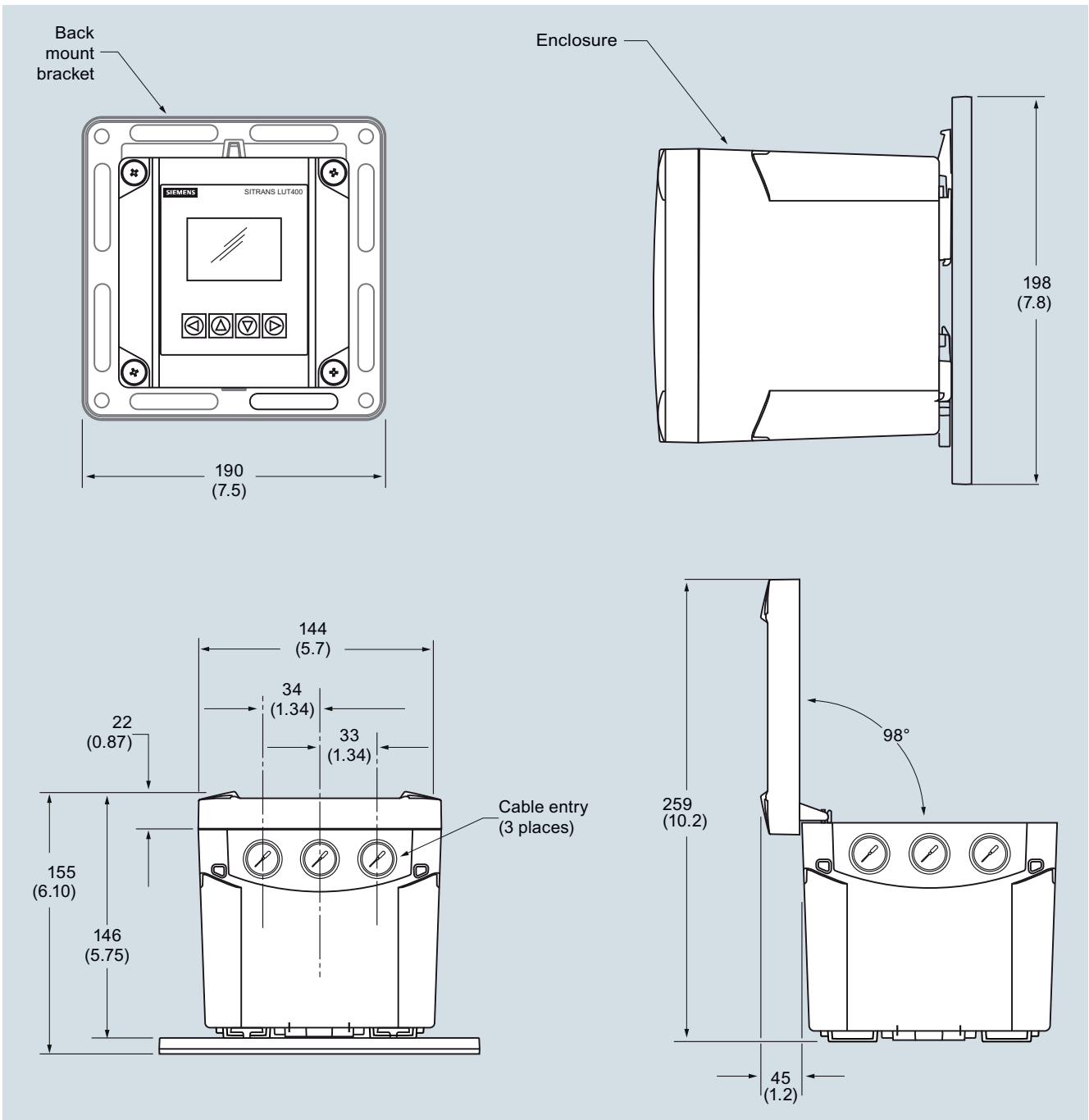
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<b>Further designs</b> Please add " <b>-Z</b> " to Article No. and specify Order code(s).	
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Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	<b>Y15</b>
Namur NE43 failsafe setting - device preset to failsafe < 3.6 mA	<b>N07</b>
<b>Operating Instructions</b>	Article No.
English	<b>A5E33329501</b>
French	<b>7ML1998-5MV11</b>
Spanish	<b>7ML1998-5MV21</b>
German	<b>A5E35690863</b>
Italian	<b>7ML1998-5MV51</b>
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**Dimensional drawings**

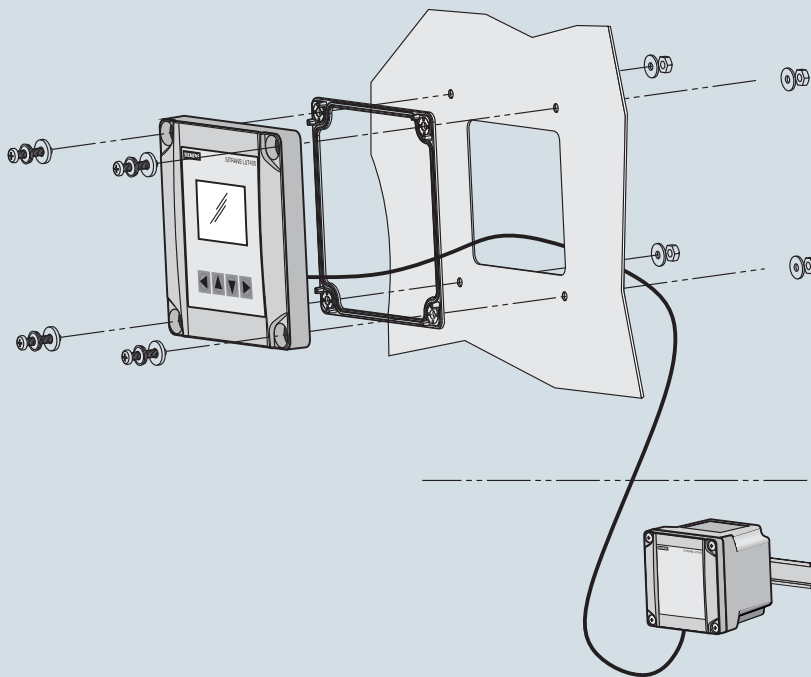
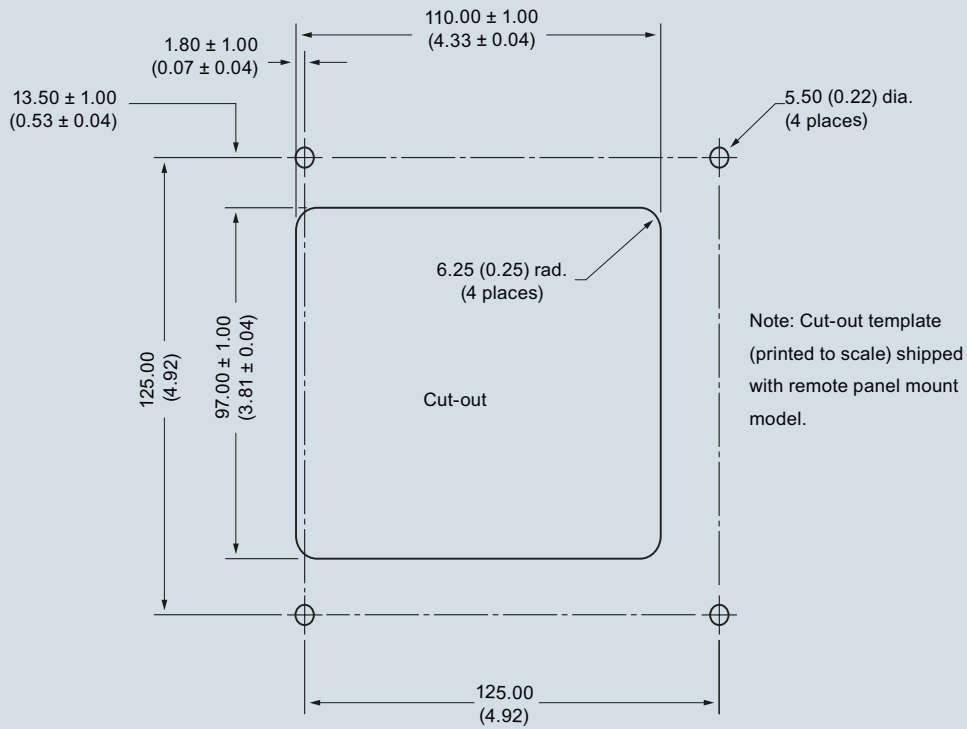


SITRANS LUT400, dimensions in mm (inch)

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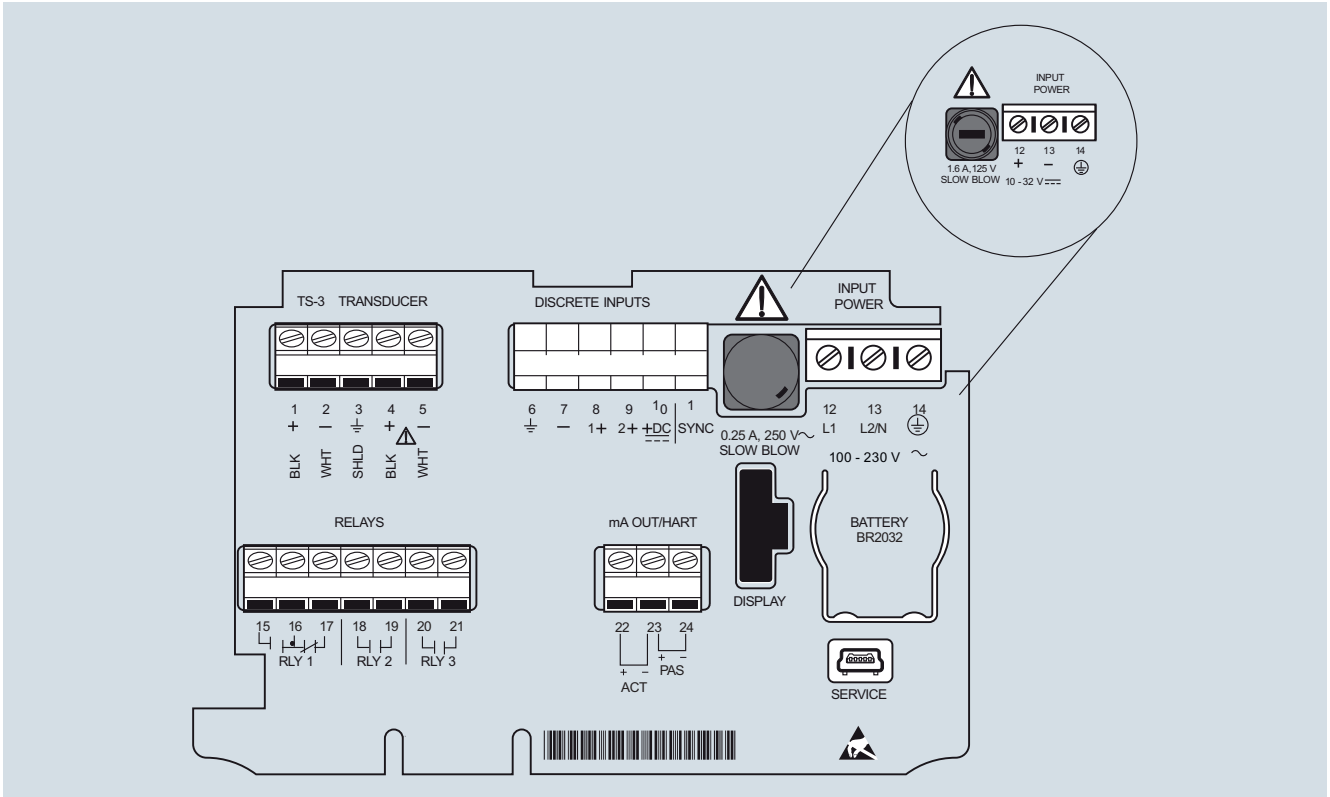
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**Schematics**



SITRANS LUT400 connections