

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, 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 principle	
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 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	<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) removeable 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 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
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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Category	Feature	SITRANS LUT420	SITRANS LUT430	SITRANS LUT440
		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: $\pm 1 \text{ mm} + 0.17 \%$ of measured distance	✓	✓	✓
	High accuracy: $\pm 1 \text{ mm}$ 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 conditions			✓
	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			✓	

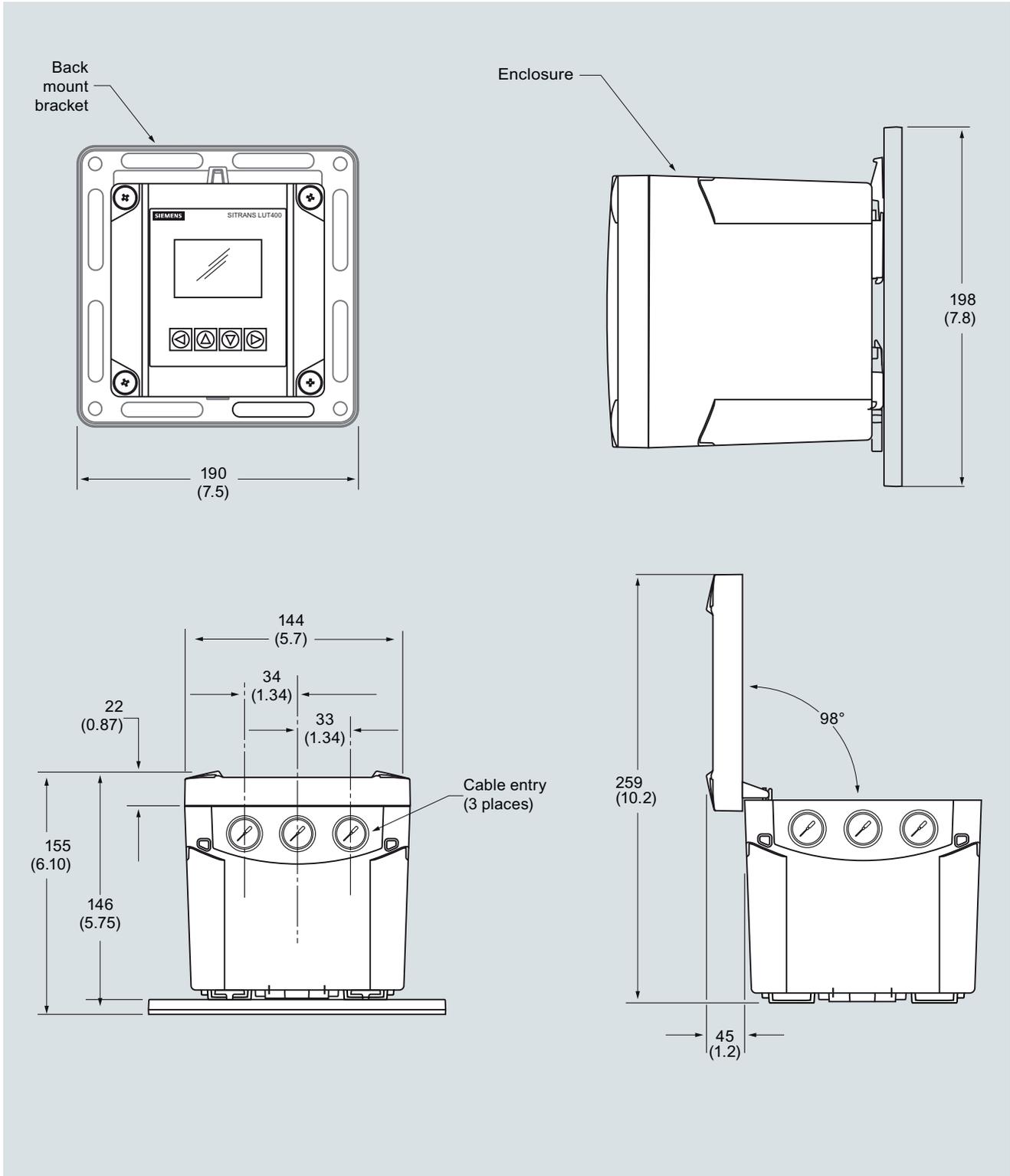
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Dimensional drawings

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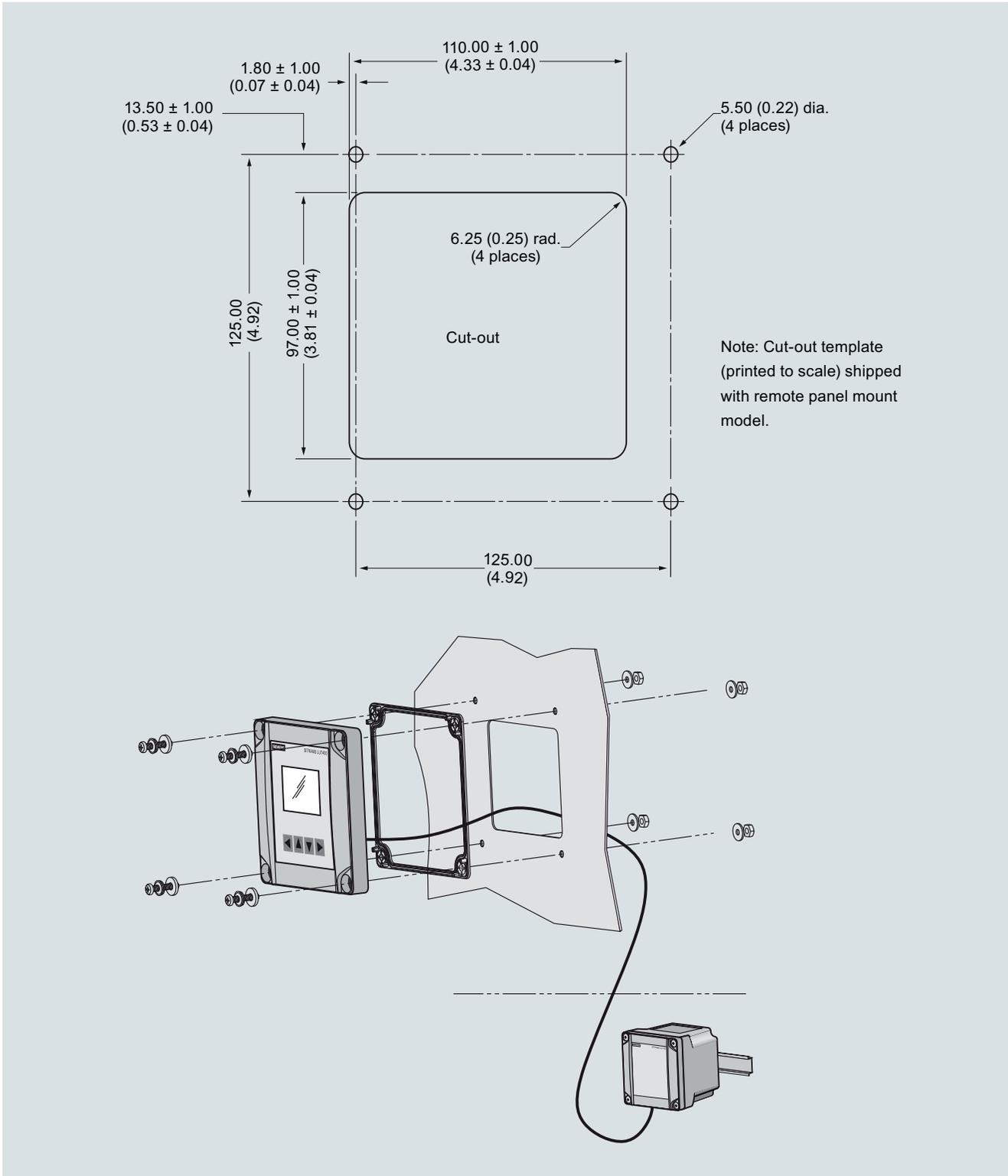


SITRANS LUT400, dimensions in mm (inch)

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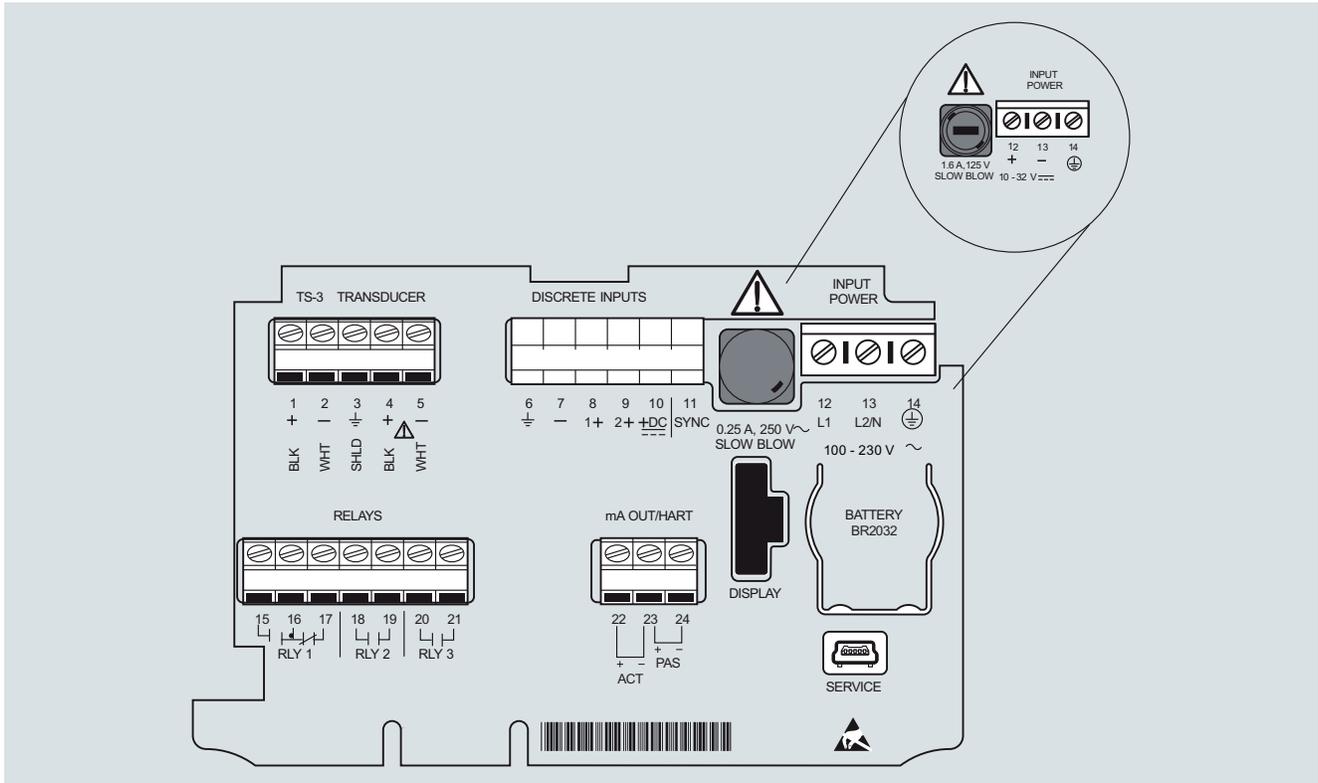
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Schematics

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SITRANS LUT400 connections