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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

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Selection and ordering data

SITRANS LUT400 Series Ultrasonic level controller Continuous, non-contact, 60 m (197 ft) range. Monitors level, volume, and volume flow in liquids, slurries, and solids. With high accuracy volume flow and built in data logging.	Article No. 7ML5050-	0	●	●	●	●	-	●	●	●	0
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.											
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											
Ordinary Locations/General Purpose (Non-Ex), CE, UKCA, FM, $_{C}$CSA$_{US}$, UL, RCM, EAC, KC										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).	
Declaration of compliance 2.1 (EN 10204) - delivery meets order requirements	**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**

Spare parts and accessories	Article No.
Operating Instructions	
All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	
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	**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 with USB interface	**7MF4997-1DB**
Sunshield, 304 stainless steel	**7ML1930-1GE**
SITRANS RD100, loop powered display - see Chapter 7	**7ML5741-...**
SITRANS RD150, remote digital display for 4 ... 20 mA and HART devices - see Chapter 7	**7ML5742-.....-....**
SITRANS RD200, universal input display with Modbus conversion - see Chapter 7	**7ML5740-...**

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Selection and ordering data (continued)

Spare parts and accessories	Article No.
SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7	7ML5744-...
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

SITRANS LUT400 Series Ultrasonic level controller Continuous, non-contact, 60 m (197 ft) range. Monitors level, volume, and volume flow in liquids, slurries, and solids. With high accuracy volume flow and built in data logging.	Article No. 7ML5050-	0	●	●	●	●	-	●	●	●	0
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.											
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											
Ordinary Locations/General Purpose (Non-Ex), CE, UKCA, FM, CCSAUS, UL, RCM, EAC, KC										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).

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Selection and ordering data (continued)

Selection and Ordering data	Order code
Further designs	
Please add "**-Z**" to Article No. and specify Order code(s).	
Declaration of compliance 2.1 (EN 10204) - delivery meets order requirements	**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**

Spare parts and accessories	Article No.
Operating Instructions	
All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	
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	**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 with USB interface	**7MF4997-1DB**
Sunshield, 304 stainless steel	**7ML1930-1GE**
SITRANS RD100, loop powered display - see Chapter 7	**7ML5741-...**
SITRANS RD150, remote digital display for 4 ... 20 mA and HART devices - see Chapter 7	**7ML5742-.....-....**
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-...**
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**
LUT440, assembly, DC, board stack with cradle, general purpose	**A5E42847453**
LUT440, assembly, AC, board stack with cradle, general purpose	**A5E42847455**
LUT440, assembly, DC, board stack with cradle, hazardous	**A5E42847454**
LUT440, assembly, AC, board stack with cradle, hazardous	**A5E42847456**

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Technical specifications

SITRANS LUT400 series	
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)
• Storage temperature	-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) removable LCD, 240 x 160 pixels resolution, operational up to 5 m from enclosure base

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Technical specifications (continued)

SITRANS LUT400 series	
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 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	$_{C}$CSA$_{US}$,CE, UKCA, FM, UL Listed, RCM, EAC, KC, MCERTS
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

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		✓	✓

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Technical specifications (continued)

Category	Feature	SITRANS LUT420 Level Controller	SITRANS LUT430 Level, pump and flow controller	SITRANS LUT440 High accuracy OCM controller
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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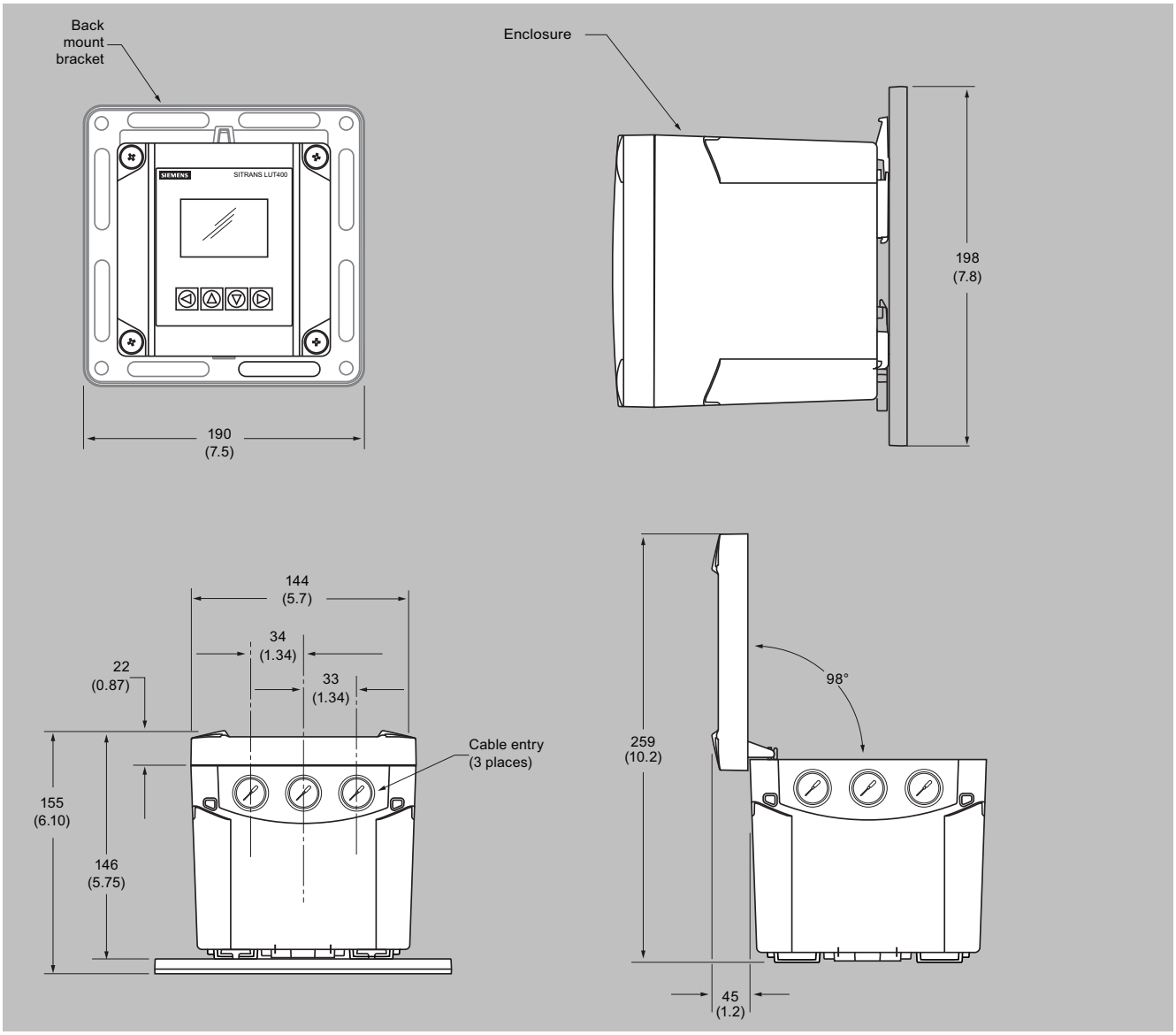
Dimensional drawings



SITRANS LUT400, dimensions in mm (inch)

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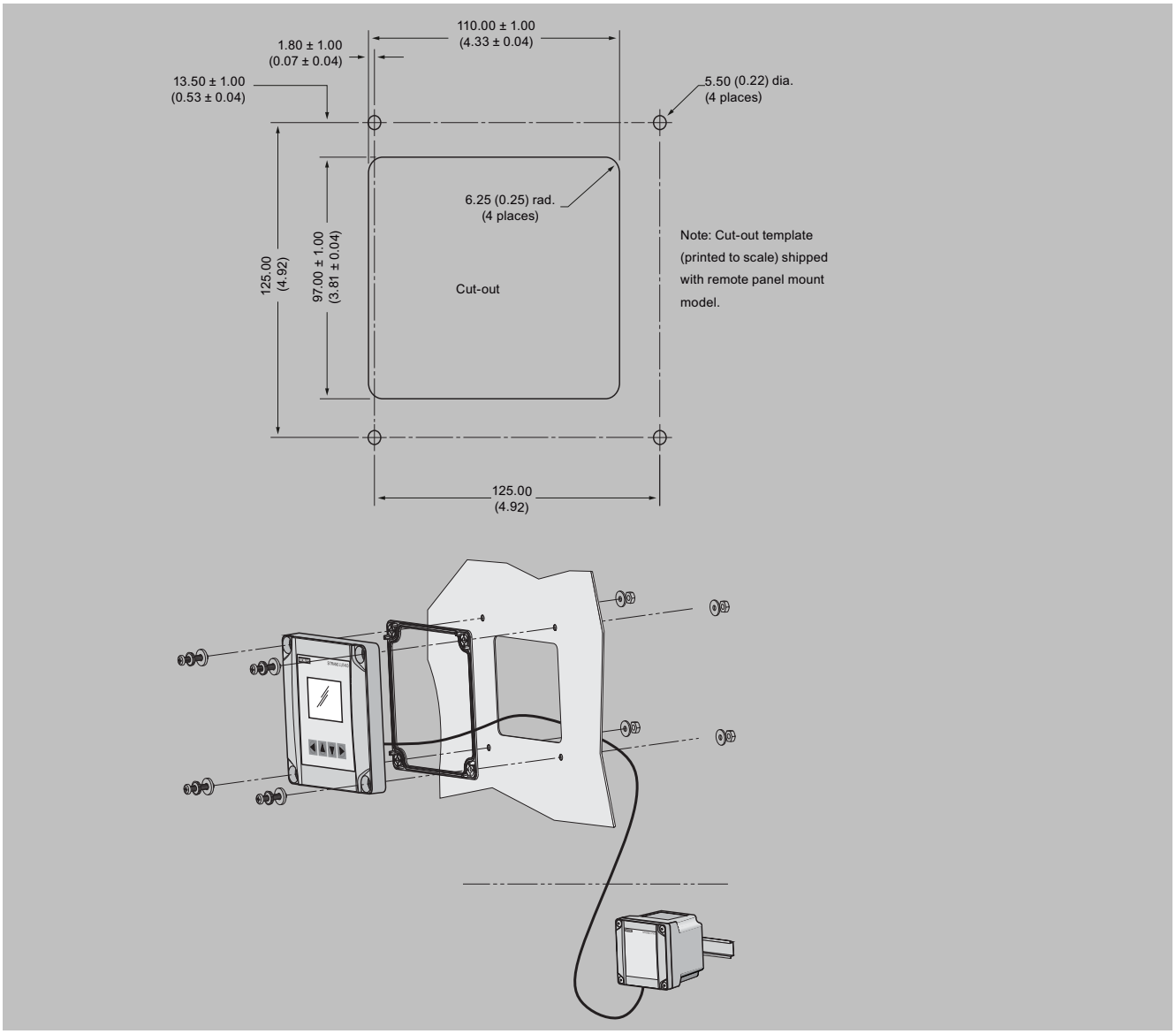
Dimensional drawings (continued)



SITRANS LUT400, dimensions in mm (inch)

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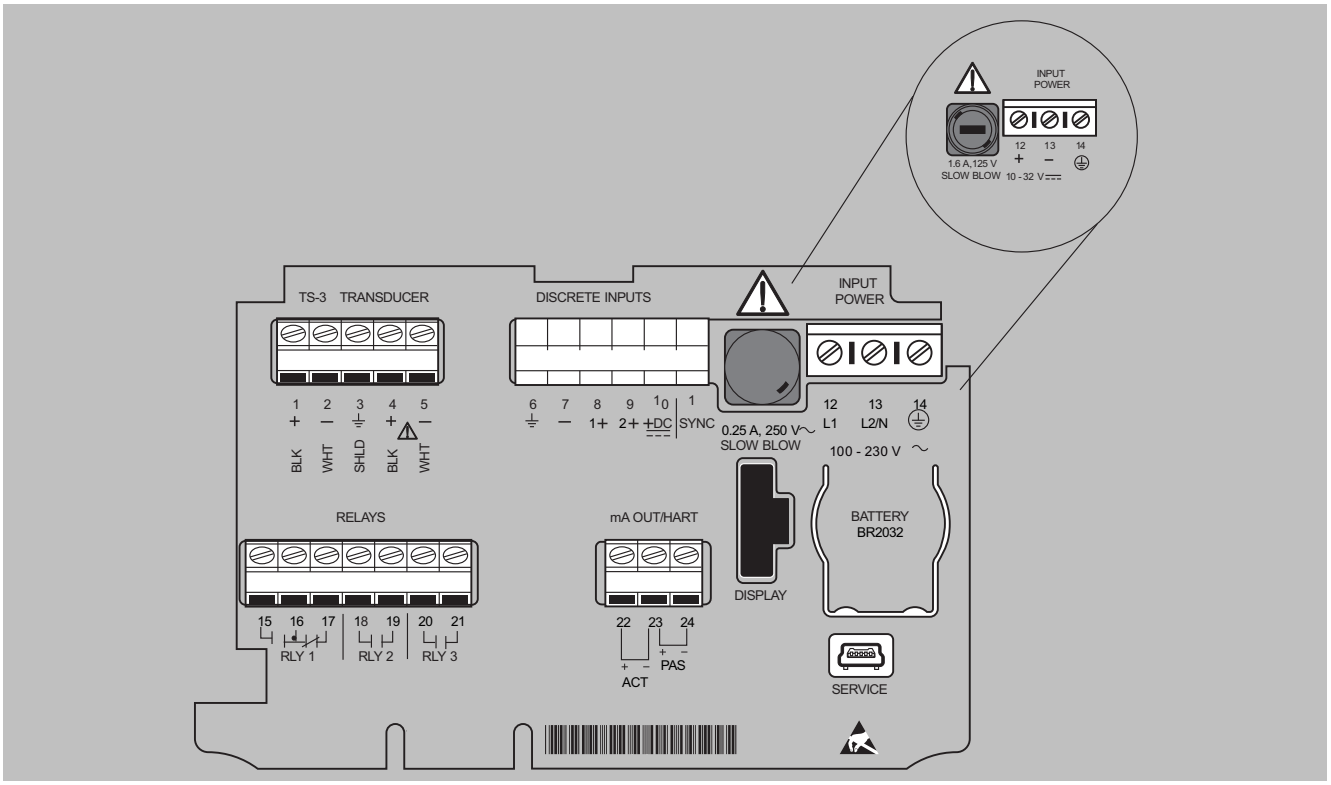
Circuit diagrams



SITRANS LUT400 connections