## **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 webbased 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

Technical specifications			
Mode of Operation	Ultrasonic level, volume, pump,	Design	
	and open channel flow	Weight	
Measuring principle		Enclosure with display lid	1.3 kg (2.87 lb)
Measuring range	0.3 60 m (1 196 ft), transducer dependent	Enclosure with blank lid     Material (analysture)	1.2 kg (2.65 lb)
lamut	transducer dependent	Material (enclosure)	Polycarbonate
<b>Input</b> Discrete	0 50 V DC switching level Logical 0 ≤ 10 V DC Logical 1 = 10 50 V DC	Degree of protection  Enclosure with display or blank lid  Enclosure with blank lid and knock-out removed	IP65/Type 4X/NEMA 4X IP20
	Max. 3 mA	Remote display lid	IP65/Type 3/NEMA 3
Output		Cable	
Transducer frequency	10 52 kHz	Transducer and mA output signal	Transducer, mA output:
Ultrasonic transducer Relays	Compatible transducers: All EchoMax and ST-H series transducers  • 1 SPDT Form C, NO or NC relay,		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
	rated 1A at 250 V AC, non- inductive and 3A at 30 V DC • 2 SPST Form A, NO relays, rated		requirements to meet 250 V 5 A contact rating
	5A at 250 V AC, non-inductive and 3 A at 30 V DC	Max. separation between transducer and transceiver	365 m (1 200 ft)
mA output	4 20 mA, isolated	Displays and controls	60 x 40 mm (2.36 x 1.57 inch) removeable
Max. load	600 $\Omega$ max. in ACTIVE mode, 750 $\Omega$ max. in PASSIVE mode		LCD, 240 x 160 pixels resolution,
Resolution	0.1 % of range		operational up to 5 m from enclosure base
Accuracy		Programming	5.151554.5 2455
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	Primary     Secondary	<ul> <li>4 Local push buttons</li> <li>PC running SIMATIC PDM</li> <li>PC running Emerson AMS Device Manager</li> <li>PC running a web browser</li> </ul>
Resolution	<ul> <li>Standard operation: 0.1 % of range or 2 mm (0.08 inch), whichever is greater</li> <li>High accuracy OCM: 0.6 mm</li> </ul>		<ul> <li>PC running a Field Device Tool (FDT)</li> <li>Field Communicator 375/475 (FC375/FC475)</li> </ul>
	(0.02 inch), within 3 m (9.84 ft) range	Memory	<ul><li>512 kB flash EPROM</li><li>1.5 MByte flash for data logging</li></ul>
Temperature compensation	• -40 +150 °C (-40 +300 °F) • Integral temperature sensor in	Power supply	
	transducer  External TS-3 temperature sensor (optional)  Programmable fixed temper-	AC version	100 230 V AC ± 15 %, 50/60 Hz, 36 VA Fuse: 5 x 20 mm, Slow Blow, 0.25 A, 250 V
Dated an author 199	ature values	DC version	10 32 V DC, 10 W Fuse: 5 x 20 mm, Slow Blow,
Rated operating conditions			1.6 A, 125 V
Installation conditions  • Location	Indoor/outdoor	Certificates and approvals	
<ul><li>Installation category</li><li>Pollution degree</li></ul>	II 4	General	CSA <sub>US/C</sub> , CE, FM, UL listed, C-TICK
Ambient conditions • Ambient temperature (enclosure)	-20 +50 °C (-4 +122 °F)	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

		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	✓	<b>✓</b>	✓
	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>✓</b>	✓
Data logging and commu- nications	HART communications	✓	<b>✓</b>	✓
	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		<b>✓</b>	<b>✓</b>
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			✓

Selection and Ordering data	Order 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
Model SITRANS LUT420 - Level controller SITRANS LUT430 - Level, Pump & Flow controller	A B
Enclosure display options 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	A B C
Input voltage 100 230 V AC ± 15 % 10 32 V DC	1 2
Cable inlet 3 cable inlets, cable glands not supplied 3 cable inlets, 3 M20 plastic cable glands supplied	1 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 <sub>US/C</sub> , UL, C-TICK  Hazardous locations CSA Class I, II, III, Div. 2  (Groups A,B,C,D,F,G)	A C

Selection and Ordering data	Order No.
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	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 fail- safe < 3.6 mA	N07
Operating Instructions	
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, $12 \times 45$ mm (0.47 $\times$ 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
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
Lid (with Display)	7ML1830-1PE
No display (blank lid provided)	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

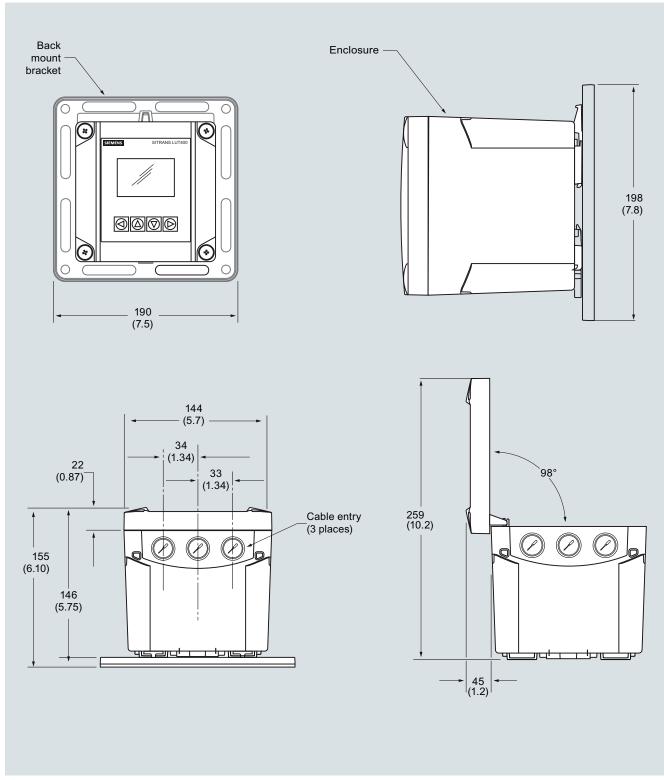
Selection and Ordering data	Order No.
SITRANS LUT440 The SITRANS LUT440 is the most accurate and featured model in the LUT400 series. It includes high accuracy open channel monitoring, relay functions for external samplers, totalizers, alarms, and enhanced data logging, as well as all pump and control functions available with other models in the LUT400 series.	7ML5050- 0 <b>1 1 1 - 1 1 1</b> 0
Model SITRANS LUT440 - High accuracy Open Channel Monitor 1)	С
Enclosure display options 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	A B C
Input voltage 100 230 V AC ± 15 % 10 32 V DC	1 2
Cable inlet 3 cable inlets, cable glands not supplied 3 cable inlets, 3 M20 plastic cable glands supplied	1 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 <sub>US/C</sub> , UL, C-TICK  Hazardous locations CSA Class I, II, III, Div. 2,  (Groups A,B,C,D,F,G)	A C
1) Compatible with all EchoMax Transducers, High accur	racy OCM perfor-

<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).

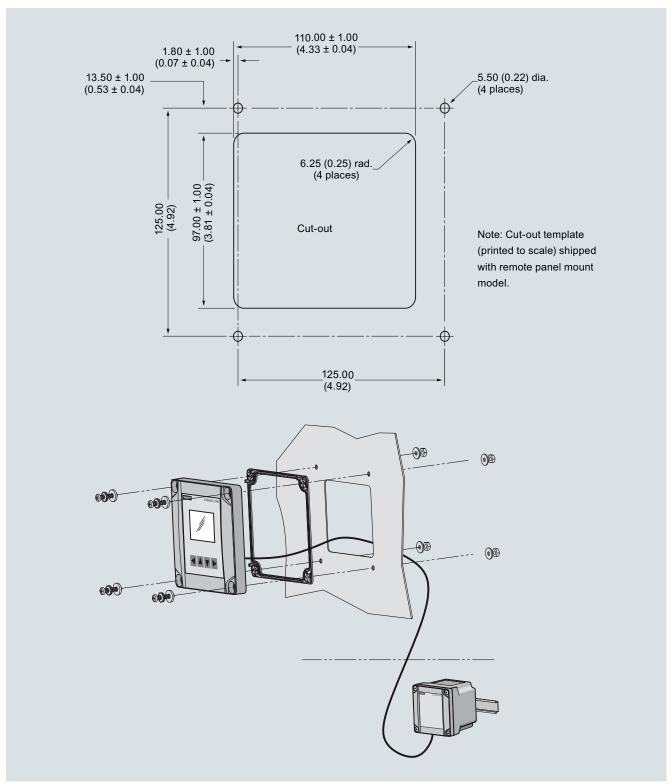
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Qty 3 cable glands and retaining nuts	7ML1930-1GB
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HART modem/USB (for use with PC and SIMATIC PDM)	7MF4997-1DB
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Spare parts	
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Terminal 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
Lid (with Display)	7ML1830-1PE
No display (blank lid provided)	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

## SITRANS LUT400 series

## Dimensional drawings



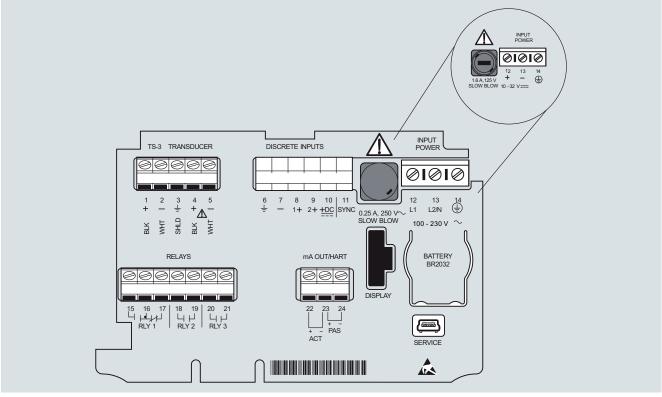
SITRANS LUT400, dimensions in mm (inch)



SITRANS LUT400, dimensions in mm (inch)

### **SITRANS LUT400 series**

## Schematics



SITRANS LUT400 connections