

## 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 Echo-Max 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/C</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 Level Controller	SITRANS LUT430 Level, pump and flow controller	SITRANS LUT440 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		✓	✓	