**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 DTMf 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
## Technical specifications

### 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**
  - Max. load:
    - 4 ... 20 mA, isolated
    - 600 Ω max. in ACTIVE mode, 750 Ω max. in PASSIVE mode
  - Max. 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)

## 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
- **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

## 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 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 ... 30 V DC, 10 W
  - Fuse: 5 x 20 mm, Slow Blow, 1.6 A, 125 V

## Certificates and approvals
- **General**
  - CSA C22.2, CE, FM, UL listed, C-TICK, 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
- **Communication**
  - HART 7.0, USB
## Level Measurement

**Continuous level measurement — Ultrasonic controllers**

### SITRANS LUT400 series

<table>
<thead>
<tr>
<th>Category</th>
<th>Feature</th>
<th>SITRANS LUT420 Level Controller</th>
<th>SITRANS LUT430 Level, pump and flow controller</th>
<th>SITRANS LUT440 High accuracy OCM controller</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operations</td>
<td>Level, space, and distance measurement</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>Open channel flow measurement</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td></td>
<td>Volume conversion</td>
<td>✓</td>
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</tr>
<tr>
<td>Specifications</td>
<td>Compatible with EchoMax and ST-H transducers</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>Standard accuracy: ± 1 mm +0.17 % of measured distance</td>
<td>✓</td>
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<tr>
<td></td>
<td>High accuracy: ± 1 mm within 3 meters</td>
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<td></td>
<td>Mounting options: wall or panel, pipe, DIN-rail</td>
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<tr>
<td>Data logging and</td>
<td>HART communications</td>
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<tr>
<td>communications</td>
<td>4 ... 20 mA output (active and passive)</td>
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<td></td>
<td>Integrated datalogger for measurement value and alarms</td>
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<td>Integrated datalogger for fixed rate flow logging</td>
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<td>Integrated datalogger for variable rate flow logging triggered by changes in flow condition</td>
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<td></td>
<td>Daily data logging for maximum, minimum and average flow, daily totalized volume, and minimum and maximum temperature</td>
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<tr>
<td>Flow monitoring</td>
<td>High accuracy open channel flow measurement</td>
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<td></td>
<td>9 digit daily and running flow totalizers</td>
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<td>High and low flowrate alarms</td>
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<td>External totalizer and sampler control</td>
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<td>MCERTS Class 1 Certification</td>
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<td>MCERTS Class 2 Certification</td>
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<tr>
<td>Pump control</td>
<td>Energy saving algorithms for pump control</td>
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<td></td>
<td>Wall cling reduction</td>
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<td>Pump run-on functionality</td>
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<td>Pump start and power resumption delays</td>
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<td>Alternate duty pump routines</td>
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<td>Fixed duty and service ratio pump routines</td>
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<td></td>
<td>Pumped volume totalizer</td>
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<td></td>
<td>Submergence detection</td>
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<td></td>
<td>Discrete input pump interlocks</td>
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<tr>
<td></td>
<td>Time to spill calculation</td>
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</tr>
</tbody>
</table>
## Level Measurement
### Continuous level measurement — Ultrasonic controllers

#### SITRANS LUT400 series

## Selection and Ordering data

<table>
<thead>
<tr>
<th>Article No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>7ML5050-0000</td>
<td>SITRANS LUT420 and LUT430&lt;br&gt;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.</td>
</tr>
</tbody>
</table>

### 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.

### Input voltage

- 100 ... 230 V AC ± 15 %
- 10 ... 32 V DC

### Cable inlet

- 3 cable inlets, cable glands not supplied
- 3 cable inlets, 3 M20 plastic cable glands supplied

### Number of measurement points

- Single point system (includes one transducer input, one mA output, and one external temperature sensor input)

### Communications and I/O

- HART, 2 discrete inputs, 3 relays

### Approvals

- General purpose CE, FM, CSA, UL, C-TICK
- Hazardous locations CSA Class I, II, III, Div. 2 (Groups A, B, C, D, F, G)

We can offer shorter delivery times for configurations designated with the Quick Ship Symbol. For details see page 9/5 in the appendix.

## Selection and Ordering data

<table>
<thead>
<tr>
<th>Article No.</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>7ML5050-0000</td>
<td>Further designs&lt;br&gt;Please add &quot;-Z&quot; to Article No. and specify Order code(s).&lt;br&gt;Manufacturer’s test certificate M to DIN 53530, Part 18 and to ISO 9000&lt;br&gt;Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]; Measuring-point number/identification (max. 27 characters) specify in plain text&lt;br&gt;Namur NE43 failsafe setting - device preset to failsafe &lt; 3.6 mA</td>
</tr>
</tbody>
</table>

### Operating instructions

- English<br>- French<br>- Spanish<br>- German<br>- Italian

Note: The operating instructions should be ordered as a separate line item on the order.

### Communications Manual

- English<br>- French<br>- Spanish<br>- German<br>- Italian

Note: The communications manual should be ordered as a separate line item on the order.

### Accessories

- Tag, stainless steel, 12 x 45 mm (0.47 x 1.77 inch), one text line, suitable for enclosure<br>- TS-3 Temperature Sensor - see TS-3 in catalog<br>- Panel mount cable extension, 2.5 m (8.2 ft)<br>- Qty 3 cable glands and retaining nuts<br>- USB cable, 2 m (6.56 ft) - Standard USB-A to USB-mini B<br>- HART modem/RS-232 (for use with a PC and SIMATIC PDM)<br>- HART modem/USB (for use with a PC and SIMATIC PDM)<br>- Sunshield, 304 stainless steel<br>- SITRANS RD100 Remote display - see Chapter 7<br>- SITRANS RD200 Remote display - see Chapter 7<br>- SITRANS RD500 web, datalogging, alarming, ethernet, and modem support for instrumentation - see Chapter 7

### Spare parts

- Panel mount retrofit kit (convert standard unit with display to panel mount version)<br>- Terminal block replacement kit (5 piece kit with one of each removable terminal)<br>- Wall/Pipe mount plate<br>- Enclosure (include blank label)<br>- SITRANS LUT400 Lid (with Display)<br>- SITRANS LUT400 Lid (blank)<br>- Fuse - AC (0.25 A, 250 V, Slow Blow)<br>- Fuse - DC (1.6 A, 125 V, Slow Blow)<br>- Battery BR2032<br>- Panel mount gasket and fastener kit<br>- DIN-rail clip

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Level Measurement

Continuous level measurement — Ultrasonic controllers

SITRANS LUT400 series

Selection and Ordering data

<table>
<thead>
<tr>
<th>Article No.</th>
<th>Model</th>
<th>Enclosure display options</th>
<th>Communication and I/O</th>
<th>Approvals</th>
</tr>
</thead>
<tbody>
<tr>
<td>SITRANS LUT440</td>
<td>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.</td>
<td>With display</td>
<td>HART, 2 discrete inputs, 3 relays</td>
<td>General purpose CE, FM, CSAUSC, UL, C-TICK Hazardous locations CSA Class I, II, III, Div. 2, (Groups A, B, C, D, F, G)</td>
</tr>
<tr>
<td>7ML5050-0xxx</td>
<td>SITRANS LUT440 - High accuracy Open Channel Monitor</td>
<td>With remote panel mount display (includes panel mount cable extension, 2.5 m (8.2 ft))</td>
<td>No display (blank lid provided)</td>
<td>-</td>
</tr>
<tr>
<td>7ML5050-0xxx</td>
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</tr>
</tbody>
</table>

Further designs

Please add ")Z" 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

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 x 45 mm (0.47 x 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) Qty 3 cable glands and retaining nuts 7ML1930-1GD
- USB cable 2 m (6.56 ft) - Standard USB-A to USB-mini B 7ML1930-1AC
- HART modem/RS-323 (for use with a PC and SIMATIC PDM) 7MF4997-1DA
- HART modem/USB (for use with PC and SIMATIC PDM) 7MF4997-1DB
- Sunshield, 304 stainless steel 7ML1930-1GE
- SITRANS RD100 Remote display - see Chapter 7 7ML7500-1AA00-0
- SITRANS RD200 Remote display - see Chapter 7 7ML7500-1AA00-0
- SITRANS RD500 web, datalogging, alarming, ethernet, and modem support for instrumentation - see Chapter 7 7ML7500-1AA00-0

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) 7ML1830-1PA
- Wall/Pipe mount plate 7ML1830-1PC
- Enclosure (include blank label) 7ML1830-1PC
- SITRANS LUT400 Lid (with Display) 7ML1830-1PE
- SITRANS LUT400 Lid (blank) 7ML1830-1PE
- Fuse - AC (0.25 A, 250 V, Slow Blow) 7ML1830-1PF
- Fuse - DC (1.6 A, 125 V, Slow Blow) 7ML1830-1PH
- Battery BR2032 7ML1830-1JP
- Panel mount gasket and fastener kit 7ML1830-1PK
- DIN-rail clip 7ML1830-1PL

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).

- We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ◆. For details see page 9/5 in the appendix.
Dimensional drawings

SITRANS LUT400, dimensions in mm (inch)
SITRANS LUT400, dimensions in mm (inch)
Continuous level measurement — Ultrasonic controllers

SITRANS LUT400 series

Schematics

SITRANS LUT400 connections