

Level instruments

Continuous level measurement - Ultrasonic controllers

SITRANS LU01 and LU02

Overview



The SITRANS LU01 is an ultrasonic long-range level controller for liquids and solids in a single vessel up to 60 m (200 ft).

Handheld programmer shown is an accessory and must be ordered separately.

Benefits

- Single point, long-range level monitoring
- Easy to install; easy to program using removable infrared keypad (optional)
- Compatible with all Echomax® transducers
- Backlit LCD display with reading in standard engineering units
- Automatic level-to-volume conversion for standard or custom tank shapes
- Dolphin Plus and SmartLink compatible
- High/low alarms

Application

The system consists of a SITRANS LU01 monitor linked to a non-contacting ultrasonic transducer that can be mounted up to 365 m (1200 ft) away. The SITRANS LU01 will measure distance, level or volume, and it features patented Sonic Intelligence® echo processing software for superior reliability.

Readings are displayed in user-selectable linear engineering units on the backlit LCD.

An on-board communications port automatically configures for RS-232, RS-485 or bi-polar current loop. The SITRANS LU01 will connect to a DCS or PLC using Siemens SmartLink® interface modules, giving you remote 2-way communication and full parameter access. Modules for popular industrial buses can be factory installed or added later to meet changing needs. No external gateway is required, reducing hardware and cabling costs.

- Key Applications: chemical storage, liquid storage, bulk solids storage (gravel, flour bins, grains, cereals), plastic pellets

Overview



The SITRANS LU02 is a dual point ultrasonic long-range level controller for liquids and solids in one or two vessels up to 60 m (200 ft).

Handheld programmer shown is an accessory and must be ordered separately.

Benefits

- Dual point, long-range level monitoring
- Easy to install; easy to program using removable infrared keypad (optional)
- Compatible with all Echomax® transducers
- Backlit LCD display with reading in standard engineering units
- Automatic level-to-volume conversion for standard or custom tank shapes
- Dolphin Plus and SmartLink compatible
- High/low alarms

Application

SITRANS LU02 will measure liquids, solids or a combination of both in one or two vessels of different sizes, shapes and configurations up to 60 m (200 ft).

The system uses ultrasonic technology to measure level, space, distance, volume or average/differential. It features patented Sonic Intelligence® echo processing software for superior reliability. Transducers can be mounted up to 365 m (1200 ft) from the monitor.

Readings are displayed in user-selectable linear engineering units on the backlit LCD.

It features an onboard communications port that automatically configures for RS-232, RS-485 or bi-polar current loop. It will connect to a DCS or PLC using Siemens SmartLink® interface modules, giving you remote 2-way communication and full parameter access. Modules for popular industrial buses can be factory installed or added later to meet changing needs. No external gateway is required, reducing hardware and cabling costs.

- Key Applications: chemical storage, liquid storage, bulk solids storage (gravel, flour bins, grains, cereals), plastic pellets, tripper car

Technical specifications

Mode of operation		Power supply	
• Measuring principle	Ultrasonic level measurement	AC model	100/115/200/230 V AC $\pm 15\%$, 50/60 Hz, 31 VA
• Measuring range	0.3 to 60 m (1 to 200 ft)	DC model	18 to 30 V DC, 25 W
• Measuring points	SITRANS LU01: Max. one point; SITRANS LU02: Max. two points	Displays and controls	51 x 127 mm (2 x 5") graphics LCD with backlighting
Output signal		• Memory	EEPROM (non-volatile), no backup battery required
• Ultrasonic transducer	Echomax series, ST-H transducers	• Programming	Using removable programmer (ordered separately) or Dolphin Plus (option)
• Relays	4 SPDT Form C relays, rated at 5 A at 250 V AC, resistive load	Certificates and approvals	CE, CSA _{US/IC} , FM, ATEX II 3D Lloyd's register of Shipping (Categories ENV1, ENV2, ENV3 and ENV5)
• mA output	0/4 to 20 mA, optically isolated	Options	
- Max. load	750 Ω , isolated, 30 V	• External temperature sensor	TS-3
- Resolution	0.1 % of range	• Communications	• SmartLinX: protocol-specific modules as interface for popular industrial fieldbus systems • Dolphin Plus: Siemens Windows [®] -compatible interface and ComVerter link (infrared)
- Outputs	SITRANS LU01: Max. one mA output SITRANS LU02: Max. two mA outputs		
Accuracy			
• Error in measurement	0.25% of range or 6 mm (0.24"), whichever is greater		
• Resolution	0.1% of measuring range or 2 mm (0.08"), whichever is greater		
• Temperature compensation	-50 to +150 °C (-58 to +302 °F) • Integral temperature sensor • External TS-3 temperature sensor (optional) • Programmable fixed temperature		
Rated operating conditions			
<u>Ambient conditions</u>			
Ambient temperature for enclosure	-20 to +50 °C (-4 to +122 °F)		
Design			
Weight	2.7 kg (6 lbs)		
Material (enclosure)	Polycarbonate		
Degree of protection (wall mount)	IP65		
Electrical connection			
• Ultrasonic transducer cable extension	RG62-A/U coaxial cable with low capacitance		
• mA output signal	2-core copper conductor, twisted, shielded, 0.5 to 0.75 mm ² (22 to 18 AWG), Belden [®] 8760 or equivalent is acceptable		
• Electrical connection and relay connection	Copper conductor according to local requirements, rated 250 V 5 A		
• Synchronization	Up to 16 LU01/LU02 units can be synchronized together		

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SITRANS LU01 and LU02

Selection and Ordering data	Order No.
SITRANS LU01/LU02	C) 7ML5004-
Single or dual point ultrasonic long-range level monitoring system for liquids and solids, and ranges up to 60 m (200 ft).	
Number of measuring points	
LU01 version, 1 point	1
LU02 version, 2 points	2
Input voltage	
100/115/200/230 V AC, voltage selector switch	A
18 to 30 V DC	B
Feature software	
Standard	A
Application software	
Standard	1
Data communications	
No module (SmartLinx ready)	0
SmartLinx Allen-Bradley® Remote I/O module	1
SmartLinx PROFIBUS DP module	2
SmartLinx Modbus® RTU module	3
Enclosure	
Wall mount	1
Wall mount, drilled, 6 x M20x1.5	3
Approvals	
CE, CSA _{USC} , FM ¹⁾	A
CE ²⁾	B
ATEX II 3D ¹⁾	C
Further designs	Order code
Please add " -Z " to Order No. and specify Order code(s).	
Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters) specify in plain text	Y15

Selection and Ordering data	Order No.
SITRANS LU01/LU02	C) 7ML5004-
Single or dual point ultrasonic long-range level monitoring system for liquids and solids, and ranges up to 60 m (200 ft).	
Instruction manual	
SITRANS LU01, English	C) 7ML1998-5BE02
SITRANS LU01, French	C) 7ML1998-5BE12
SITRANS LU01, German	C) 7ML1998-5BE32
SITRANS LU02, English	C) 7ML1998-5BD02
SITRANS LU02, French	C) 7ML1998-5BD12
SITRANS LU02, German	C) 7ML1998-5BD32
Note: The instruction manual should be ordered as a separate line item.	
This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and instruction manual library.	
Other instruction manuals	
SmartLinx Allen-Bradley Remote I/O, English	C) 7ML1998-1AP03
SmartLinx PROFIBUS DP, English	C) 7ML1998-1AQ03
SmartLinx PROFIBUS DP, German	C) 7ML1998-1AQ33
SmartLinx PROFIBUS DP, French	C) 7ML1998-1AQ12
SmartLinx Modbus, English	C) 7ML1998-1BF01
SmartLinx Modbus, German	C) 7ML1998-1BF31
Note: The appropriate SmartLinx instruction manual should be ordered as a separate line on the order.	
Accessories	
Handheld programmer	7ML1830-2AN
Tag, stainless steel, 12 x 45 mm (0.47 x 1.77"), one text line, suitable for enclosures	7ML1930-1AC
M20 cable gland kit (6 M20 cable glands, 6 M20 nuts, 3 stop plugs)	7ML1830-1GM
TS-3 Temperature Sensor - see TS-3 on page 5/186	
Spare parts	
Card, LU01 mother main, comm ready	C) 7ML1830-1KX
Card, LU02 mother main, comm ready	C) 7ML1830-1MA
Card, LU02 daughter, comm ready	C) 7ML1830-1LP
Card, LU01 daughter, comm ready	C) 7ML1830-1LN
Card, display	7ML1830-1LQ
See SmartLinx product page 5/301 for more information.	

¹⁾ Available with enclosure option 1 only

²⁾ Available with enclosure option 3 only

C) Subject to export regulations AL: N, ECCN: EAR99

®Modbus is a registered trademark of Schneider Electric.

®Allen-Bradley is a registered trademark of Rockwell Automation.

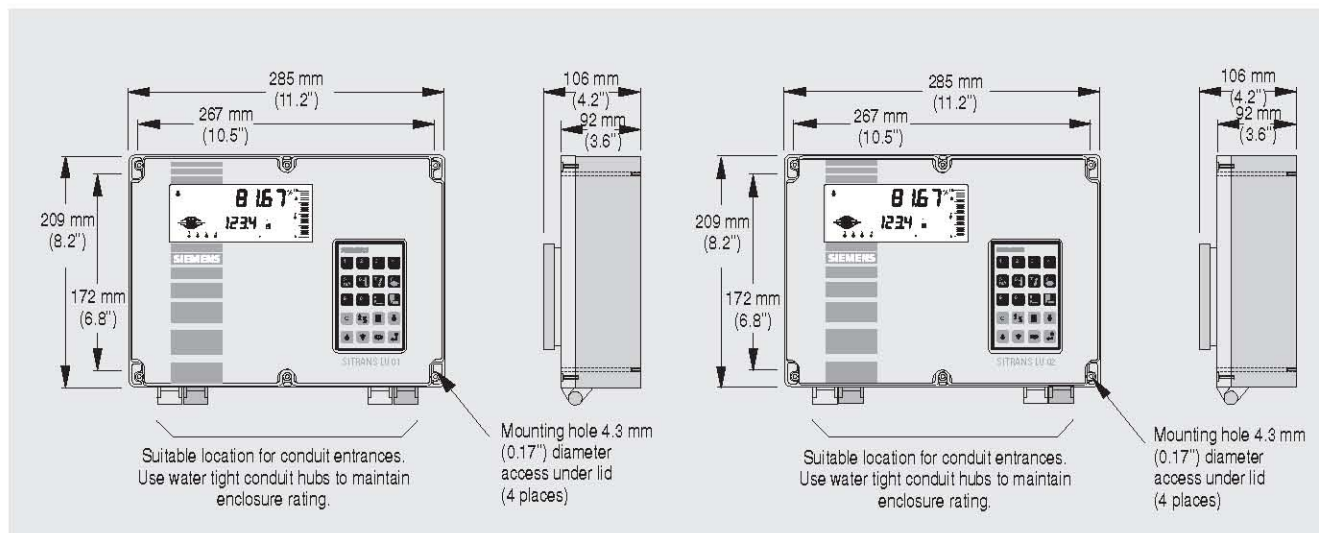
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Continuous level measurement - Ultrasonic controllers

SITRANS LU01 and LU02

Dimensional drawings



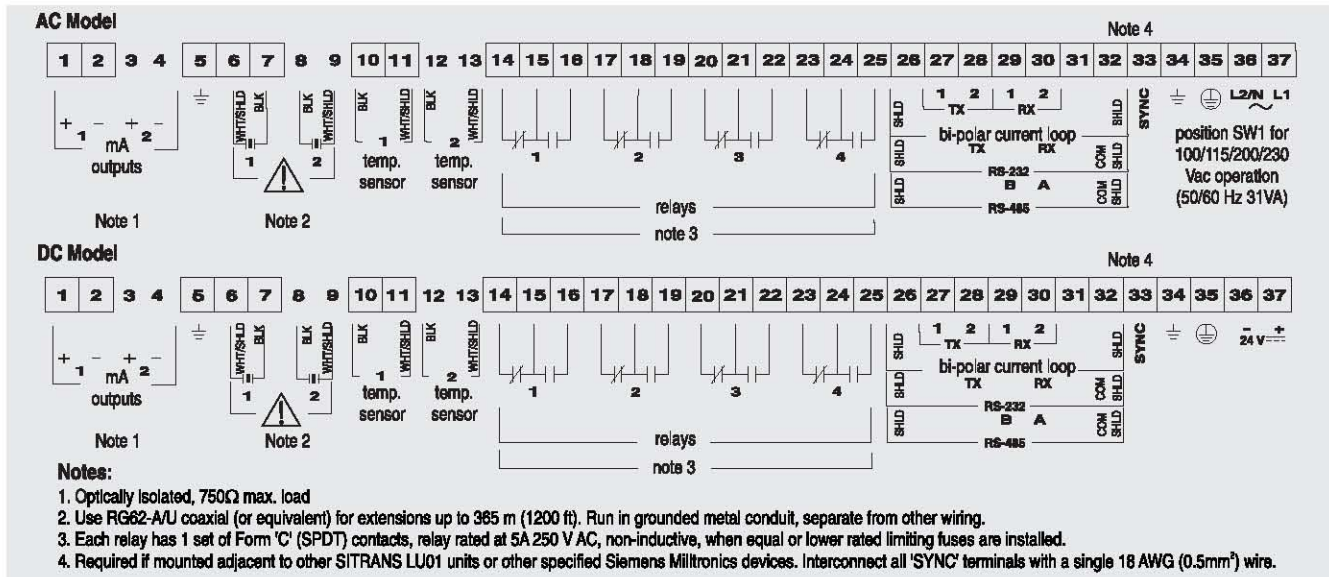
Dimensional drawings for SITRANS LU01 (left) and SITRANS LU02 (right)

Level instruments

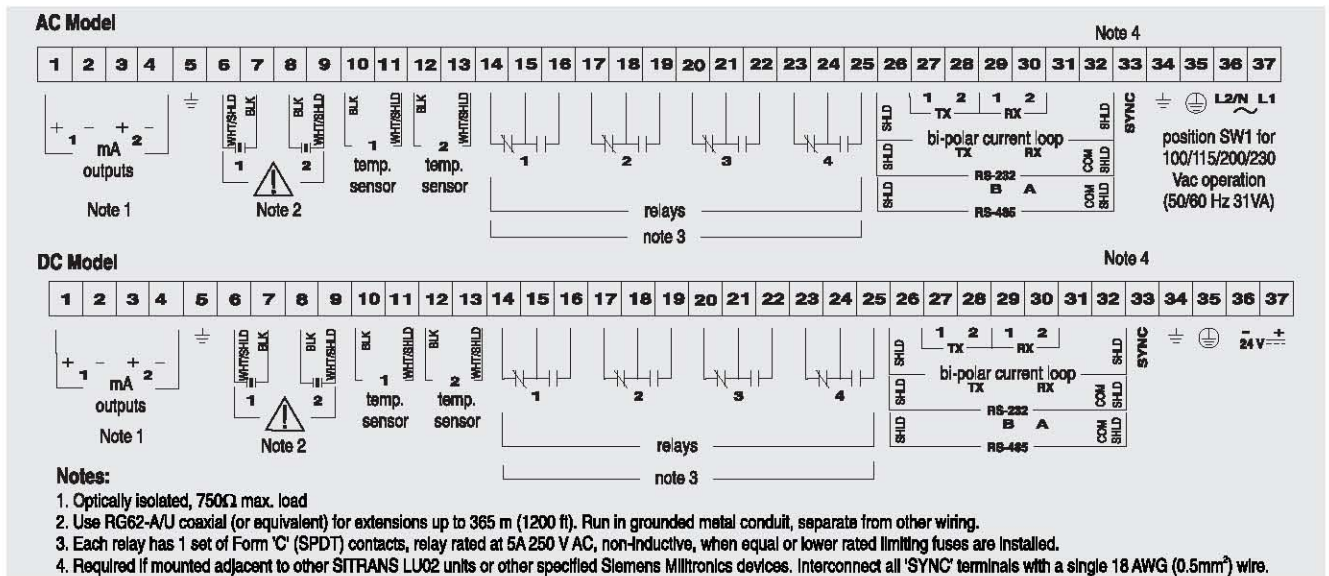
Continuous level measurement - Ultrasonic controllers

SITRANS LU01 and LU02

Schematics



SITRANS LU01 connections



SITRANS LU02 connections

Level instruments

Continuous level measurement - Ultrasonic controllers

SITRANS LU10

Overview



SITRANS LU10 is an ultrasonic long-range level monitor for liquids and solids, offering 10-point monitoring in a single unit.

Handheld programmer shown is an accessory and must be ordered separately.

Benefits

- Ten point, long-range level monitoring
- Automatic level-to-volume conversion for standard or custom tank shapes
- Dolphin Plus and SmartLinx® compatible
- Backlit LCD display with reading in standard engineering units
- Easy to install, easy to program using removable infrared key-pad (optional)

Application

It can be used in a wide range of applications to scan liquids, solids or a combination of both contained in vessels of differing size, shape and configuration up to 60 m (200 ft).

SITRANS LU10 uses ultrasonic technology to measure level, space, distance, volume or average/differential. Transducers can be mounted up to 365 m (1200 ft) from the monitor. The SITRANS LU10 features patented Sonic Intelligence® echo processing software for superior reliability. Readings are displayed in user-selectable linear engineering units on the LCD.

SITRANS LU10 will connect to a DCS or PLC using Siemens SmartLinx® interface modules, giving you remote 2-way communication and full parameter access. Modules for popular industrial buses can be factory installed or added later to meet changing needs. No external gateway is required, reducing hardware and cabling costs.

- Key Applications: chemical storage, liquid storage, bulk solids storage (sugar, flour bins, grains, cereals), plastic pellets, tank farms

Technical specifications

Mode of operation	
Measuring principle	Ultrasonic level measurement
Measuring range	Max. 0.3 to 60 m (1 to 200 ft)
Measuring points	Max. 10
Output	
• Ultrasonic transducer	Echomax® series, ST-H transducers
• Relays	• SITRANS LU SAM module (option): 20 alarm/control relays • SPDT Form C relays, rated 5 A at 250 V AC, resistive load
• mA output	SITRANS LU A0 module (option): 0/4 to 20 mA, optically isolated
- Max. load	750 Ω, isolated
- Resolution	0.1 % of range
Accuracy	
• Error in measurement	0.25 % of range or 6 mm (0.24"), whichever is greater
• Resolution	0.1% of measuring range or 2 mm (0.08"), whichever is greater
• Temperature compensation	-50 to +150 °C (-58 to +302 °F) • Integral temperature sensor • External TS-3 temperature sensor (expandable to 10 inputs with optional TIB-9 card) • Programmable fixed temperature
Rated operating conditions	
<u>Ambient conditions</u>	
• Ambient temperature for enclosure	-20 to +50 °C (-4 to +122 °F)
Design	
• Weight	2.7 kg (6 lbs)
• Material (enclosure)	Polycarbonate
• Degree of protection (wall mount)	IP65/Type 4X/NEMA 4X
Electrical connection	
• Ultrasonic transducer	RG62-A/U coaxial cable with low capacitance
• Signal transmission	2-core copper conductor, twisted, shielded, 0.5 to 0.75 mm ² (22 to 18 AWG), Belden® 8760 or equivalent is acceptable
• Electrical connection and relay connection	Copper conductor according to local requirements, rated 250 V 5 A
• Synchronization	Up to 16 LU10 units can be synchronized together
Power supply	100/115/200/230 V AC ± 15%, 50/60 Hz, 15 VA
Displays and controls	
• Memory	51 x 127 mm (2 x 5") graphics LCD with backlighting
• Programming	EEPROM (non-volatile), no backup battery required
	Using removable programmer (ordered separately) or Dolphin Plus (option)
Certificates and approvals	• CE, FM, CSA/USC, ATEX II 3D

Continuous level measurement - Ultrasonic controllers

SITRANS LU10

Options

- Expansion card
TIB-9, increases the number of TS-3 inputs from 1 to 10
- External temperature sensor
TS-3
- Communications
 - SmartLinx: protocol-specific modules as interface for popular industrial fieldbus systems
 - Dolphin Plus: Siemens Windows[®]-compatible interface and ComVerter link (infrared)
- I/O devices
 - Max. 3 I/O devices per
 - SITRANS LU10
 - SITRANS LU AO analog output module (max. 1)
 - SITRANS LU SAM, satellite alarm module (max. 2)

[®]Windows is a registered trademark of Microsoft Corporation.

Selection and Ordering data

Order No.

SITRANS LU10

C) **7ML 5 007 -**

Ten point ultrasonic long-range level monitoring system for liquids and solids applications, and ranges up to 60 m (200 ft).

Input voltage

100/115, 200/230 V AC, selectable

Feature software

Standard

Application software

Standard

Data communications

No module (SmartLinx ready)
SmartLinx Allen-Bradley[®] Remote I/O module
SmartLinx PROFIBUS DP module
SmartLinx Modbus[®] RTU module

TIB-9 temperature card

None

With TIB-9 card

Enclosure

Wall mount

Wall mount, drilled, 12 x M20 x 1.5

Approvals

CE, CSA_{USC}, FM¹⁾ATEX II 3D¹⁾CE²⁾

Further designs

Order code

Please add "**-Z**" to Order No. and specify Order code(s).

Stainless steel tag [69 x 50 mm (2.71 x 1.97")]:
Measuring-point number/identification (max. 16 characters) specify in plain text

Instruction manual

Order No.

English

C) **7ML1998-5AN02**

French

C) **7ML1998-5AN12**

German

C) **7ML1998-5AN32**

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

This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and instruction manual library.

Other instruction manuals

SmartLinx Allen-Bradley Remote I/O, English

C) **7ML1998-1AP03**

SmartLinx PROFIBUS DP, English

C) **7ML1998-1AQ03**

SmartLinx PROFIBUS DP, German

C) **7ML1998-1AQ33**

SmartLinx PROFIBUS DP, French

C) **7ML1998-1AQ12**

SmartLinx Modbus, English

C) **7ML1998-1BF01**

SmartLinx Modbus, German

C) **7ML1998-1BF31**

Note: The appropriate SmartLinx instruction manual should be ordered as a separate line on the order.

Accessories

Handheld programmer

7ML1830-2AN

Tag, stainless steel, 12 x 45 mm (0.47 x 1.77"),

7ML1930-1AC

one text line, suitable for enclosures

Temperature Card (TIB-9)

C) **7ML1830-1CN**

M20 cable gland kit (6 M20 cable glands,

7ML1830-1GM

6 M20 nuts, 3 stop plugs)

TS-3 Temperature Sensor - see TS-3 on page 5/186

Spare parts

Card, mother main, comm ready

C) **7ML1830-1ML**

Card, daughter, comm ready

C) **7ML1830-1LY**

Card, display

7ML1830-1LQ

See SmartLinx product page 5/301 for more information.

¹⁾ Available with Enclosure option 1 only

²⁾ Available with Enclosure option 2 only

C) Subject to export regulations AL: N, ECCN: EAR99

[®]Modbus is a registered trademark of Schneider Electric.

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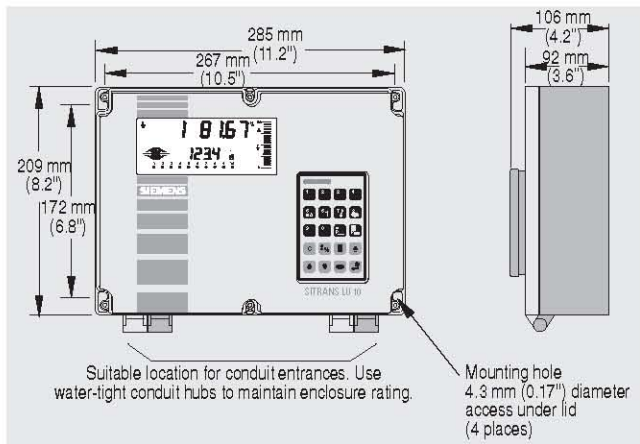
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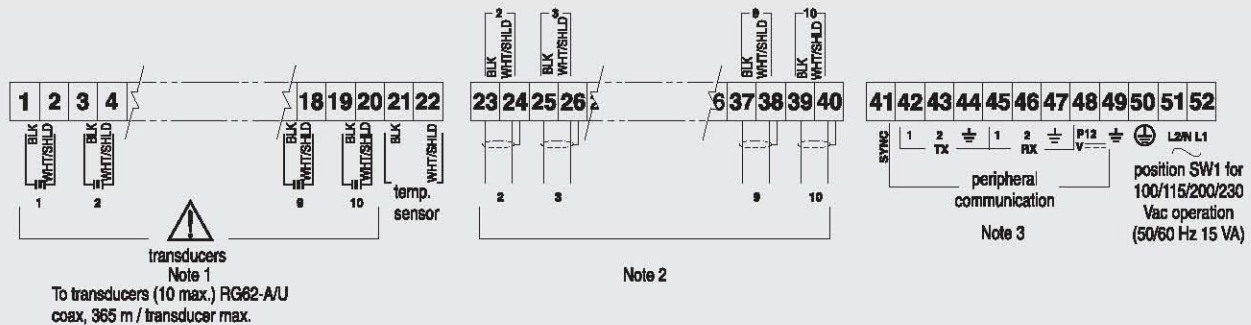
SITRANS LU10

Dimensional drawings



SITRANS LU10 dimensions

Schematics



Notes:

1. Transducer cables must be run in a grounded metal conduit separate from other wiring (except TS-3 temperature sensor wiring, if applicable).
2. Optional TIB-8 card for multiple temperature sensors. Do not jump the terminals if TS-3s are not used.
3. The SITRANS LU10 is compatible with the following Siemens Milltronics peripherals:
 - SITRANS LU SAM - relay satellite alarm module
 - SITRANS LU AO - analog output module

SITRANS LU10 connections

Level instruments

Continuous level measurement - Ultrasonic controllers

SITRANS LU SAM

Overview



SITRANS LU SAM Satellite Alarm Module provides up to 20 relay outputs for the measurement points of the SITRANS LU10 level monitor.

Benefits

- The SITRANS LU SAM can be located up to 1500 m (5000 ft) from the SITRANS LU10
- Relay outputs can be assigned to any point on the SITRANS LU10

Application

The operation of the SITRANS LU SAM is programmed via the SITRANS LU10. The only on-board settings are for bank selection and output testing.

Using a SITRANS LU SAM, you can have two relay outputs for all ten measurement points, all 20 for a single measurement point or any combination between the two.

All relays are Form C to allow NO or NC wiring.

Technical specifications

Mode of operation	Satellite alarm module
Input	
Communications	Data from SITRANS LU10
• Transmission rate	4800 bits/s
• Voltage	± 20 mA bipolar current loop
Output	
• Relays	20 multi-purpose relays, programmable from SITRANS LU10 SPDT Form C relays, rated 5 A at 250 V AC, resistive load
• ± 20 mA bipolar current loop - Max. load	Input and transmission 1 receiving unit
Rated operation conditions	
<u>Ambient conditions</u>	
• Ambient temperature	-20 to +50 °C (-5 to +122 °F)
• Location	Indoor/outdoor
• Installation category	II
• Pollution degree	4
Design	
• Weight	3 kg (6.6 lbs)
• Material (enclosure)	Polycarbonate
• Degree of protection	Type 4X/NEMA 4X/IP65
• Cable connection	2 copper conductors, twisted, with foil shield/drain wire, 300 V 0.5 to 0.75 mm ² (22 to 18 AWG)
• Electrical connection and relay connection	Copper conductor according to local requirements, rated 250 V 5 A
Power supply	100/115/200/230 V AC ± 15%, 50/60 Hz, 20 VA
Displays and controls	1 LED for display of voltage/communications state, 20 LEDs for display of relay states
Certificates and approvals	CE, FM, CSA _{USC} , C-TICK

Selection and Ordering data

Order No.

SITRANS LU SAM

C) **7ML5811-1A**

Satellite alarm module provides up to 20 relay outputs for the measurement points of the SITRANS LU10 level monitor.

Approvals: CSA_{USC}, FM, CE, C-TICK

Instruction manual

English

C) **7ML1998-5CF02**

German

C) **7ML1998-5CF32**

Note: Instruction manuals should be ordered as a separate line item on the order.

This device is shipped with the Siemens Milltronics manual CD containing the complete Quick Start and instruction manual library.

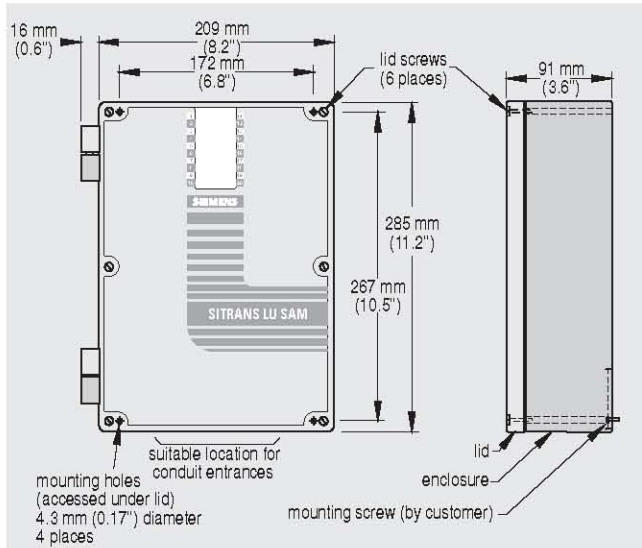
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Level instruments

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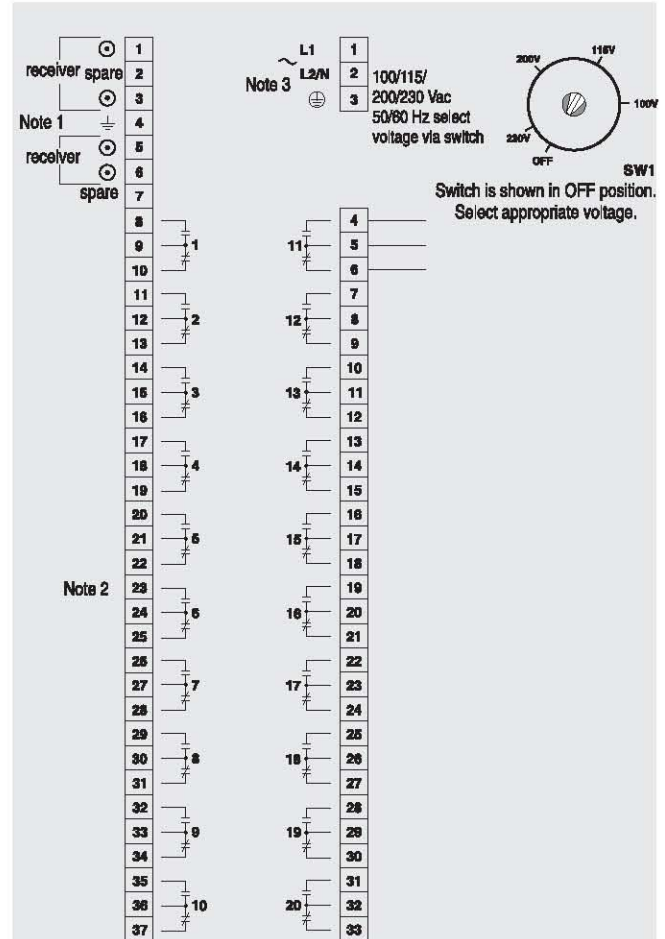
SITRANS LU SAM

Dimensional drawings



SITRANS LU SAM dimensions

Schematics



Notes:

1. SITRANS LU SAM receiver is polarized.
2. Refer to associated application device instruction manual for wiring detail. Check that the communication parameter P740 (SITRANS LU10) is 'ON'.
3. If SITRANS LU SAM is unpowered, transmitter ceases communication to all downstream peripherals.
4. Relay contact Form 'C' SPDT, 5A at 250 V AC non-inductive (typical) of up to 20 per SITRANS LU SAM).

SITRANS LU SAM connections

Level instruments

Continuous level measurement - Ultrasonic controllers

SITRANS LU AO

Overview



The SITRANS LU AO Analog Output Module provides remote analog output for the measurement points of the SITRANS LU10 level monitor.

Benefits

- Analog outputs can be up to 1500 m (5000 ft) from the SITRANS LU10
- Analog outputs can be per transducer and/or average of 2 or more

Application

The operation of the SITRANS LU AO is programmed via the SITRANS LU10. The only on-board settings are for bank selection and output testing.

The SITRANS LU AO can provide up to 10 analog outputs (each sharing a common negative bus which is electrically isolated from ground).

Technical specifications

Mode of operation	Output module
Input	
Communications	Data from SITRANS LU10
• Transmission rate	4800 bits/s
• Voltage	± 20 mA bipolar current loop
• Polarization	Non-polarized
• Max. load	1 receiving unit
Output	
• Analog outputs	10 analog outputs, programmable from SITRANS LU10 0 or 4 to 20 mA, isolated
• ± 20 mA bipolar current loop	Input and transmission
- Max. load	750 Ω
- Resolution	0.1%
Rated operating conditions	
<u>Ambient conditions</u>	
• Ambient temperature for enclosure	-20 to +50 °C (-5 to +122 °F)
• Location	Indoor/outdoor
• Installation category	II
• Pollution degree	4
Design	
Weight	2 kg (4.4 lbs)
Material (enclosure)	Polycarbonate
Degree of protection	Type 4X/NEMA 4X/IP65
• Cable connection	2 copper conductors, twisted, with foil shield/drain wire, 300 V 0.5 to 0.75 mm ² (22 to 18 AWG)
• Electrical connection and relay connection	Copper conductor according to local requirements, rated 250 V 5 A
Power supply	100/115/200/230 V AC ± 15%, 50/60 Hz, 15 VA
Displays and controls	1 LED for display of voltage/communications state
Certificates and approvals	CE, FM, CSA _{US/C} , C-TICK

Selection and Ordering data

Selection and Ordering data	Order No.
SITRANS LU AO	C) 7ML5810-1A
Provides remote analog output for the measurement points of the SITRANS LU10 level monitor.	
Approvals: CSA _{US/C} , FM, CE, C-TICK	
Instruction manual	
English	C) 7ML1998-5CE01
German	C) 7ML1998-5CE31
Note: Instruction manuals should be ordered as a separate line item on the order.	
This device is shipped with the Siemens Milltronics manual CD containing the complete Quick Start and instruction manual library.	

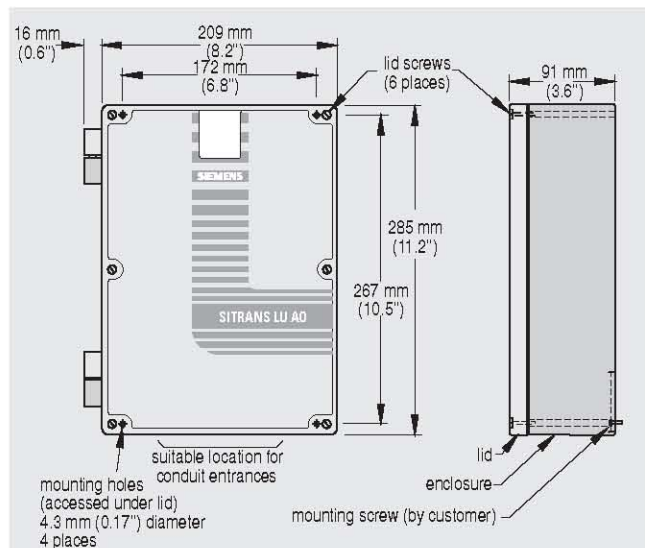
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Level instruments

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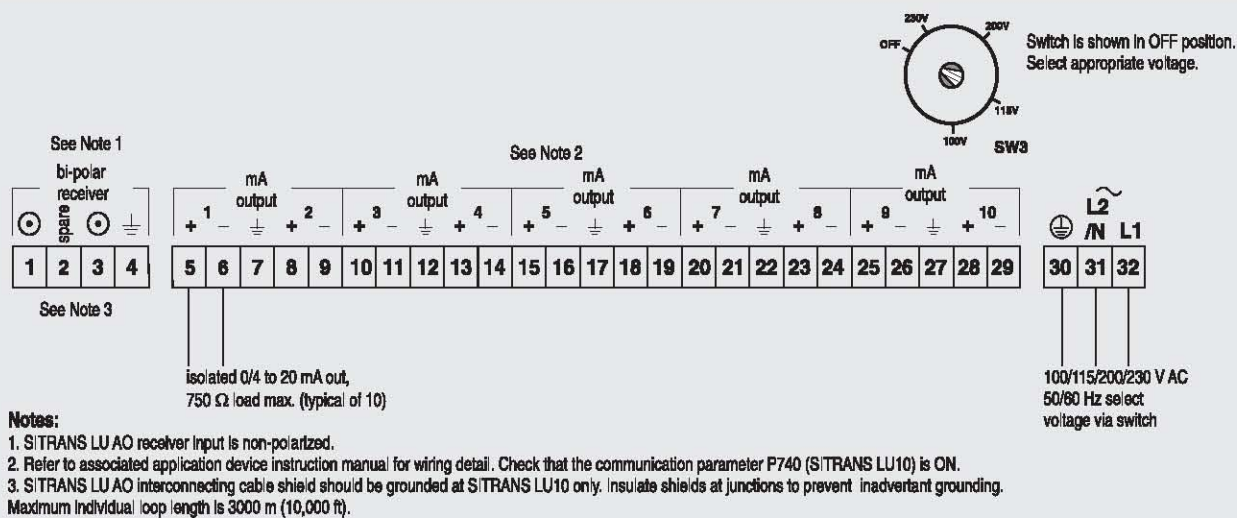
SITRANS LU AO

Dimensional drawings



SITRANS LU AO dimensions

Schematics



SITRANS LU AO connections