SIEMENS

SITRANS

Acoustic Sensors SITRANS CU02

Operating Instructions

03/2017

A5E40873245_AA

Legal information

Warning notice system

This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent damage to property. The notices referring to your personal safety are highlighted in the manual by a safety alert symbol, notices referring only to property damage have no safety alert symbol. These notices shown below are graded according to the degree of danger.

⚠ DANGER

indicates that death or severe personal injury **will** result if proper precautions are not taken.

⚠ WARNING

indicates that death or severe personal injury **may** result if proper precautions are not taken.

⚠ CAUTION

indicates that minor personal injury can result if proper precautions are not taken.

NOTICE

indicates that property damage can result if proper precautions are not taken.

If more than one degree of danger is present, the warning notice representing the highest degree of danger will be used. A notice warning of injury to persons with a safety alert symbol may also include a warning relating to property damage.

Qualified Personnel

The product/system described in this documentation may be operated only by **personnel qualified** for the specific task in accordance with the relevant documentation, in particular its warning notices and safety instructions. Qualified personnel are those who, based on their training and experience, are capable of identifying risks and avoiding potential hazards when working with these products/systems.

Proper use of Siemens products

Note the following:

⚠ WARNING

Siemens products may only be used for the applications described in the catalog and in the relevant technical documentation. If products and components from other manufacturers are used, these must be recommended or approved by Siemens. Proper transport, storage, installation, assembly, commissioning, operation and maintenance are required to ensure that the products operate safely and without any problems. The permissible ambient conditions must be complied with. The information in the relevant documentation must be observed.

Trademarks

All names identified by ® are registered trademarks of Siemens AG. The remaining trademarks in this publication may be trademarks whose use by third parties for their own purposes could violate the rights of the owner.

Disclaimer of Liability

We have reviewed the contents of this publication to ensure consistency with the hardware and software described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

Siemens AG
Division Process Industries and Drives
Postfach 48 48
90026 NÜRNBERG
GERMANY

Document order number: A5E40873245
℗ 10/2018 Subject to change

Table of contents

About the SITRANS CU 02

1

1.1 Overview

Note

SITRANS CU 02 is to be used only in the manner outlined in this instruction manual.

The SITRANS CU 02 is an alarm control unit for use with SITRANS AS 100 acoustic sensor.

Features

- LCD display
- 2 SPDT (form C) relays
- 4 - 20 mA output, isolated
- programmable start up delay
- programmable alarm delay

Specifications

2

Power :	
• see nameplate for voltage configuration (100/115/200/230 V ac ±15%, 50/60 Hz, 10 VA)	
Environmental :	
• location:	indoor
• altitude:	2000 m max
• ambient temperature:	-20 to 50 °C (-4 to 122 °F)
• relative humidity:	80% for temperatures up to 50 °C
• installation category:	II
• pollution degree:	2
Sensor Excitation :	
• 26 Vdc nominal, 70 mA max	
Input :	
• SITRANS Sensor 0 – 10 Vdc	
Display :	
• liquid crystal	three 9 mm (0.35") digits multisegment graphic for operation status
Relay :	
• 2 alarm/control relays • 1 form 'C' SPDT contact per relay, rated 5 A at 250 V ac non inductive	
Analog Output :	
• isolated 4 - 20 mA • 750 Ω load max	
Cable :	
• analog output	Belden 8760 18AWG shielded twisted pair or equivalent
• latch contact input:	Belden 8760 18AWG shielded twisted pair or equivalent
Accuracy :	
• ±0.02V (display) or ±40µA (mA output)	
Enclosure :	
• 55 mm W x 75 mm H x 110 mm D (2.2" W x 3" H x 4.4" D)	
• polycarbonate	
• mounting:	• DIN rail (DIN 46277 or DIN EN50022) • wall / panel mount

Ingress Protection :
• IP 20
Approval :
• CSA general purpose
Weight :
• 550 g (18 oz)

Installation

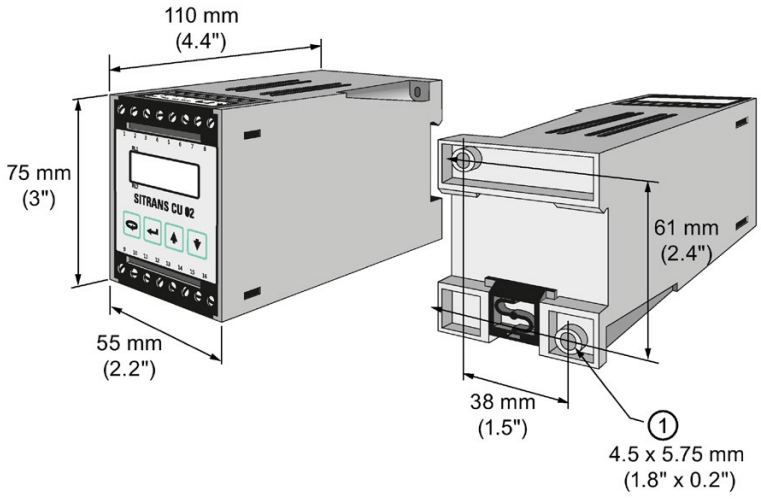
3

Note

Installation shall only be performed by qualified personnel and in accordance with local governing regulations. This product is susceptible to electrostatic shock. Follow proper grounding procedures.

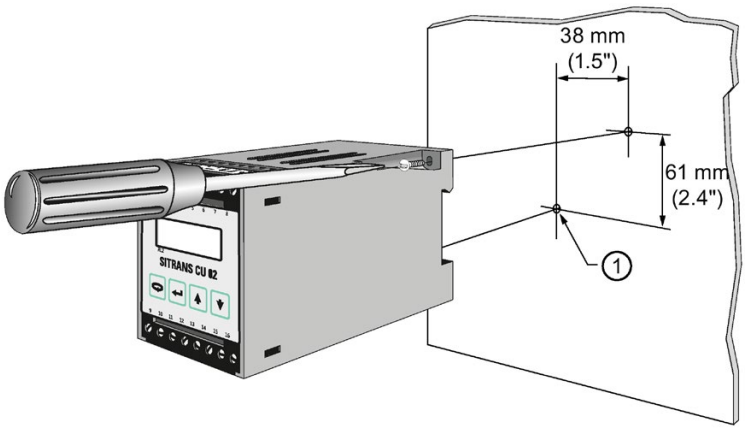
3.1 Mounting

Dimensions



① Mounting slot (2 places).

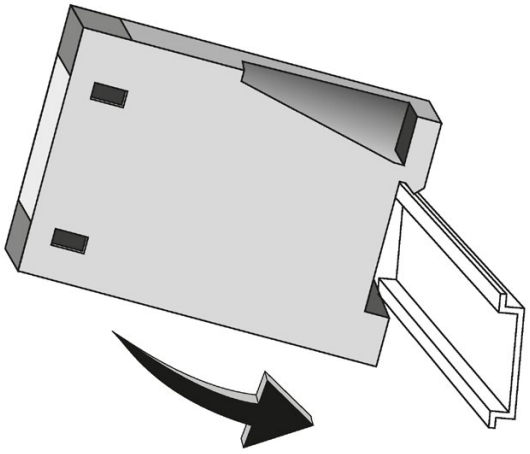
Wall / Panel Mounting



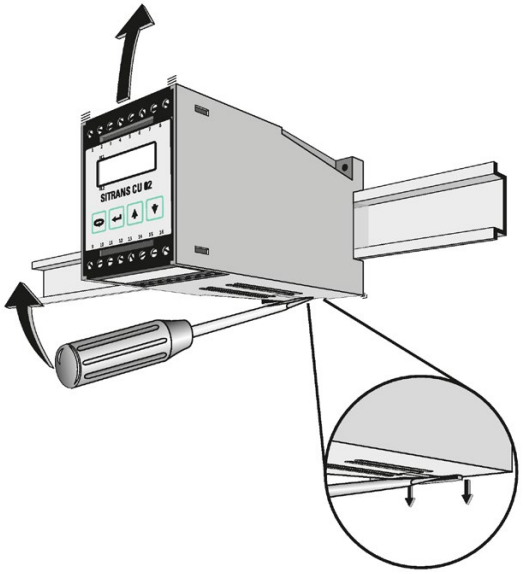
① Drill and tap for 4 mm (#8) screw (2 places).

3.2 Rail mounting

Mounting



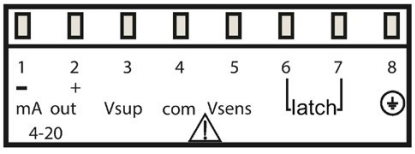
Removal

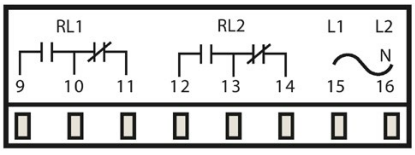


Interconnection

4

4.1 Connection Layout





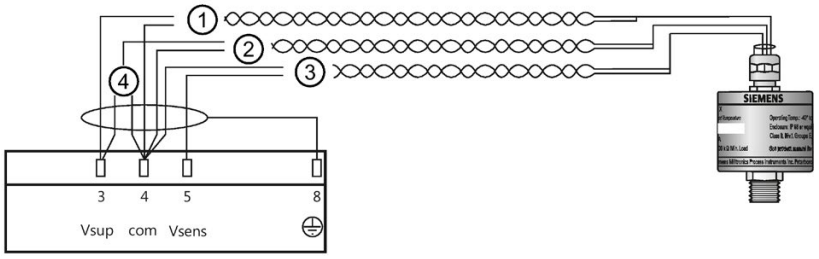
WARNING

WARNING:

- All field wiring must have insulation suitable for at least 250 V.
- Relay contact terminals are for use with equipment having no accessible live parts and wiring having insulation suitable for at least 250 V.
- The maximum allowable working voltage between adjacent relay contacts shall be 250 V.

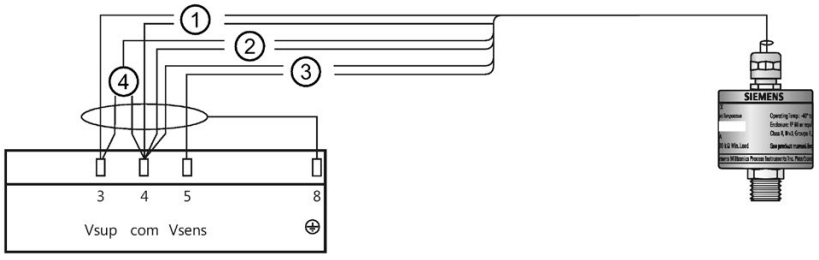
4.2 SITRANS AS 100 Sensor Connection

Standard Temperature Version



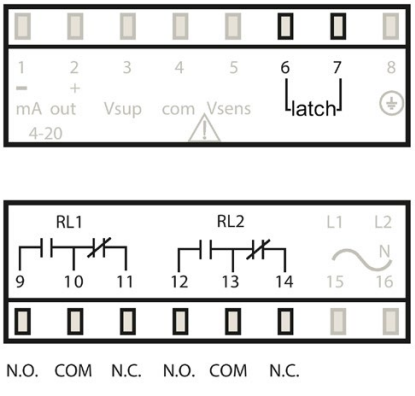
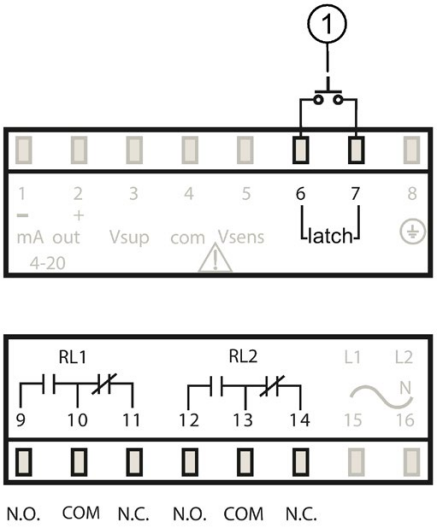
① Red/black
② Green/black
③ Black/white
④ Sensor range selection
- high sensitivity range = red and green to 'V_{sup}'.
- low sensitivity range = red to 'V_{sup}' and green to 'com'.

Extended Temperature Version

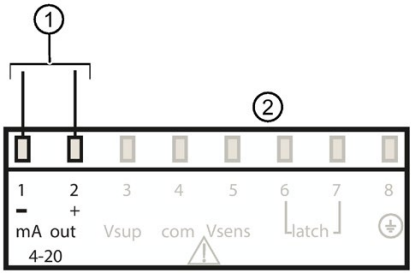
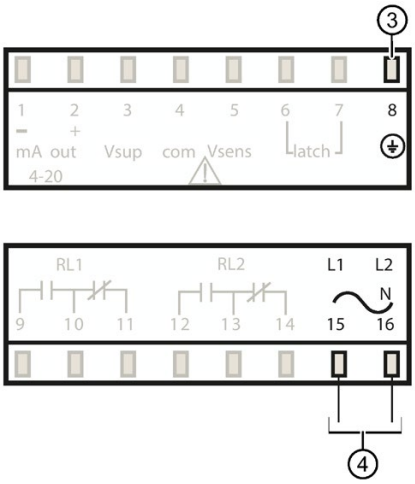


① Red/black
② Orange/green
③ Brown/yellow
④ Sensor range selection
- high sensitivity range = red and orange to 'V_{sup}'.
- low sensitivity range = red to 'V_{sup}' and orange to 'com'.

Relay Output Connection*

Auto Reset (*P14 / 24 = 0*)	**Manual Reset** (*P14 / 24 = 1*)
	
① Reset button. All relays are certified for use in equipment where the short circuit capacity of the circuits in which they are connected is limited by fuses having ratings not exceeding the rating of the relays.	

*refer to Operation \ Alarm

Analog Output Connection	Power Connection
	

① To customer instrumentation.

② 4 - 20 mA isolated output into 750 Ω max.

③ Refer to nameplate for voltage requirement.

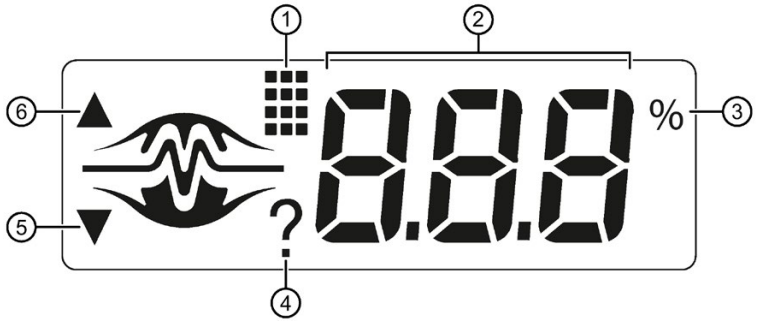
④ The equipment must be protected by a 15 A fuse or circuit breaker in the building installation. A circuit breaker or switch in the building marked as the disconnect switch shall be in close proximity to the equipment and within easy reach of the operator.

Operation 5

5.1 Start Delay

On initial powering of the SITRANS CU 02, the start delay circuit prevents the relays from going into alarm for the period of time programmed (parameter P80).

5.2 Display



① Program
② Alphanumeric
③ Percent reading
④ Parameter value
⑤ Relay 2 'alarm' flag
⑥ Relay 1 'alarm' flag

The SITRANS CU 02 normally displays the input signal level (V_{sens}) from the SITRANS sensor in volts, or in percentage of the programmed span (P3 – P2). The selection is made while viewing V_{sens}.

Action :

Press arrow up (▲) for percent.

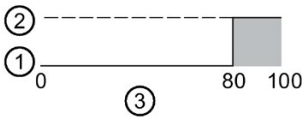
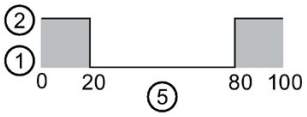
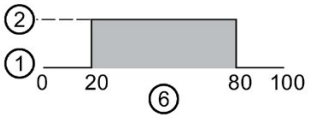
Press arrow down (▼) for volts.

Damping is provided to slow the response of the display when rapid or minor fluctuations in the process or machinery operation are encountered. The greater the damping value (P86), the slower the response.

5.3 Relay

The SITRANS CU 02 has two onboard programmable relays (P10/20). Under normal operation, the relays are energized (normally open contact closed). Under alarm condition, the `alarm' flag starts flashing immediately, indicating that the relay delay (P13/ 23) has started counting. If the alarm condition ceases before the relay delay expires, the flashing `alarm' flag is aborted. If the relay delay expires, the relay de-energizes and the contacts change state. The `alarm' flag ceases flashing and remains on. Upon resumption of normal operating condition, the `alarm' flag disappears. The relay and relay delay reset manually or automatically depending on the mode selected (P14/24). If automatic, the reset is immediate. If manual, the reset occurs upon actuation of the reset button (latch).

Each relay is programmable for either:

high alarm:	alarm condition occurs when the sensor signal level (%) is of a greater value than the high% setpoint.	
low alarm:	alarm condition occurs when the sensor signal level (%) is of a lesser value than the low% setpoint.	
out of bound:	alarm condition occurs when the sensor signal level (%) is of a greater value than the high % alarm setpoint or of a lesser value than the low% alarm setpoint.	
in bound:	alarm condition occurs when the sensor signal level (%) is of a value between the low% and high% alarm setpoints	
① Off ② On ③ e.g. alarm above 80% ④ e.g. alarm below 20% ⑤ e.g. alarm beyond 20% and 80% ⑥ e.g. alarm between 20% and 80%		

The individual relay functions in combination provide:

- high% and high-high% alarm
- high% and low% alarm
- high% and bound alarm
- low% and low-low% alarm
- low% and bound alarm
- bound 1 and bound 2 alarm

Note

If the SITRANS AS 100 sensor is located in areas with high RF noise, then the alarm setpoints should be set to 0.50 V above or below the fault/no fault conditions.

5.4 Analog Output

The SITRANS CU 02 provides an isolated analog 4 - 20 mA output by calibration of the 4 and 20 mA levels to the operating span of the input signal (V_{sens}) from the SITRANS sensor. In the case where V_{sens} passes the lower and upper limits of the span, low and high mA limits are factory set to nominal values of 2 and 22 mA respectively, providing indication of overrange activity.

Damping is provided to slow the response of the analog output when rapid or minor fluctuations in the process or machinery operation are encountered. The greater the damping value (P85), the slower the response.

Security

The SITRANS CU 02 is factory shipped with security (P 1) disabled, allowing program access. If it is desired to deny programming access (viewing access is not restricted), security can be enabled by entering the enable code. If it is desired to regain programming access, the disable code must be entered. Refer to Security Alteration.

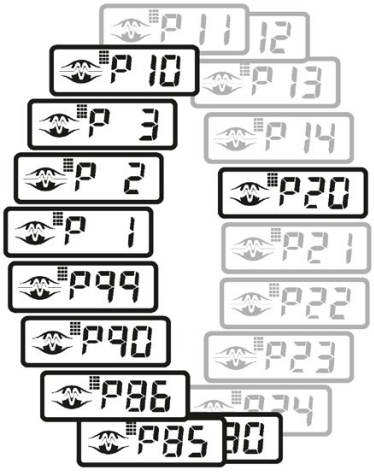
Parameter Reset

A master reset (P99) is provided to automatically reset all programming parameters to their factory values. However, if it is desired to reset an individual parameter, this can be done by entering its factory value, as given in Parameter List.

Setting Up

6

6.1 Setting Up

Action description	Press	Display	Display Description
To Access Program:			run display
			program starts at parameter 1
To Select a Parameter:	 		to scroll up or down to desired parameter
To View a Parameter Value:			select parameter, e.g. P3
			display parameter value, e.g. 2.50
			exit
To Change a Parameter Value:			select parameter, e.g. P3
			display parameter value, e.g. 2.50

Action description	Press	Display	Display Description
	Security must be disabled!  		increase or decrease to the desired value. If no response, security not disabled!
	Must be pressed to Save change! 		save and exit
To Return to Run Display			from the parameter display, e.g. P3
			exit program and return to run display

6.2 Operating values

With the SITRANS Sensor and Control Unit properly mounted, connected and powered. Run the material or machinery through its range of operation.

Note the following values where applicable:

• normal operating level	V_{norm} = _____-
• abnormal operating level	V_{abn} = _____-

Where applicable values are unobtainable, they can be estimated and entered while programming.

Programming

7

Note

Security must be disabled to set programming functions.

7.1 Calibration: 0 - 100% / 4 - 20 mA

- calibrate the 0% / 4 or 20 mA level by entering the value of V_{norm} into P 2
- calibrate the 100% / 20 or 4 mA level by entering the value of V_{abn} into P 3. The difference between P 2 and P 3 must be at least 0.2 V for full 4 - 20 mA span.

7.2 Relays

For precise determination of alarm setpoints, view the run display in percent and run the material or machinery through its range of operation. Note the % values corresponding to the alarm points.

Note

The setpoints should be 0.50 V above or below the fault/no fault condition if the sensor is installed in high RF noise locations.

Relay 1

- enable, P10 = 1
- setpoint:
  - for high% alarm:

    P11 = enter setpoint value in %

    P12 = 0

    for low% alarm:

    P11 = 0

    P12 = enter setpoint value in %

    for out of bound alarm:

    P11 = enter high% setpoint value in %

    P12 = enter low% setpoint value in %

    for in bound alarm:

    P11 = enter low% setpoint value in %

    P12 = enter high% setpoint value in %
- relay delay set (1 - 999 s), P13
- reset select, P14
  - auto = 0
  - manual = 1

Relay 2

- enable, P20 = 1
- setpoint:
  - for high% alarm:

    P21 = enter setpoint value in %

    P22 = 0

    for low% alarm:

    P21 = 0

    P22 = enter setpoint value in %

    for out of bound alarm:

    P21 = enter high% setpoint value in %

    P22 = enter low% setpoint value in %

    for in bound alarm:

    P21 = enter low% setpoint value in %

    P22 = enter high% setpoint value in %

- relay delay set (1 - 999 s), P23
- reset select, P24
  - auto = 0
  - manual = 1

7.3 Ancillary Functions

Damping

- mA output damping adjust (typical value, 1 - 50), P85
- display damping adjust (typical value, 1 - 50), P86

7.4 Parameter List

P- 1	security, reference = 500 [f]
P- 2	0% calibration / 4 mA (V_{sens} = 0 - 7.3 V) [f=0.50]
P- 3	100% calibration / 20 mA (V_{sens} = 0.2 - 7.5 V) [f=2.50]
P-10	relay 1, operation: • 0 = disabled[f] • 1 = enabled
P-11•	relay 1, high alarm setpoint (0 = disabled,1 to 100%)[f = 80]
P-12•	relay 1, low alarm setpoint (0 = disabled,1 to 100%)[f= 20]
P-13•	relay 1, delay (1[f] to 999 s)
P-14•	relay 1, latch: • 0 = auto reset[f] • 1 = manual reset
P-20	relay 2, operation: • 0 = disabled[f] • 1 = enabled
P-21•	relay 2, high alarm setpoint (0 = disabled, 1 to 100%)[f= 70]
P-22•	relay 2, low alarm setpoint (0 = disabled, 1 to 100%)[f = 30]
P-23•	relay 2, delay (1[f] to 999 s)
P-24•	relay 2, latch: • 0 = auto reset[f] • 1 = manual reset
P-80	start delay (1 to 999 s) [f=10]
P-85	damping, mA out (1[f] to 999)
P-86	damping, display (1[f] to 999)
P-90	software revision number
P-99	reset: 0 = normal[f] 9 = reset

[f] factory setting

• accessible only if relay operation function is enabled

Security Alteration

Action Description	Press	Display	Dosplay Description
To Enable Security			security disabled, programming access granted
			reference value
			enable code
			**security enabled**, programming access denied
To Disable Security			**security enabled**, programming access denied
			reference valuereference value
			disable code
			**security disabled**, programming access granted

Maintenance

9

SITRANS CU 02 requires no maintenance, however a program of periodic checks is recommended.