Instruction Manual · August 2005


million
in one

# sitrans
## CU 02

SIEMENS

**Safety Guidelines:** Warning notices must be observed to ensure personal safety as well as that of others, and to protect the product and the connected equipment. These warning notices are accompanied by a clarification of the level of caution to be observed.

**Qualified Personnel:** This device/system may only be set up and operated in conjunction with this manual. Qualified personnel are only authorized to install and operate this equipment in accordance with established safety practices and standards.

**Unit Repair and Excluded Liability:**

- The user is responsible for all changes and repairs made to the device by the user or the user's agent.
- All new components are to be provided by Siemens Milltronics Process Instruments Inc.
- Restrict repair to faulty components only.
- Do not reuse faulty components.

**Warning:** This product can only function properly and safely if it is correctly transported, stored, installed, set up, operated, and maintained.

**Note:** Always use product in accordance with specifications.



**Contact SMPI Technical Publications at the following address:**


Technical Publications
Siemens Milltronics Process Instruments Inc.
1954 Technology Drive, P.O. Box 4225
Peterborough, Ontario, Canada, K9J 7B1
Email: **techpubs.smpi@siemens.com**


- For a selection of Siemens Milltronics level measurement manuals, go to: **www. siemens.com/processautomation**. Under Process Instrumentation, select *Level Measurement* and then go to the manual archive listed under the product family.
- For a selection of Siemens Milltronics weighing manuals, go to: **www. siemens.com/processautomation**. Under Weighing Technology, select *Continuous Weighing Systems* and then go to the manual archive listed under the product family.

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# About the SITRANS CU 02

**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

## 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:

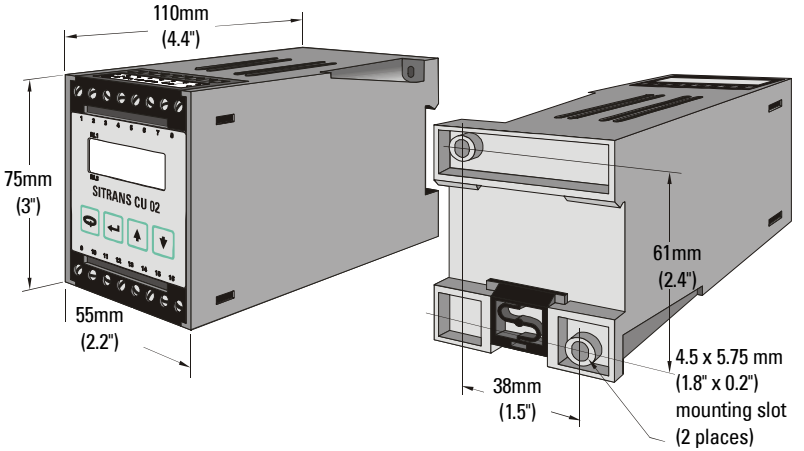
- 550 g (18 oz)

# Installation

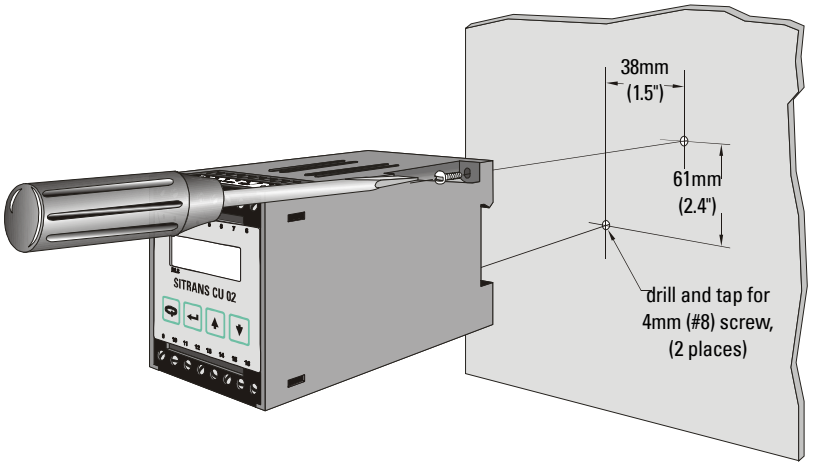
**Notes:**
Installation shall only be performed by qualified personnel and in accordance with local governing regulations.
This product is susceptible to electrostatic shock. Follow proper grounding procedures.

## Mounting

### Dimensions

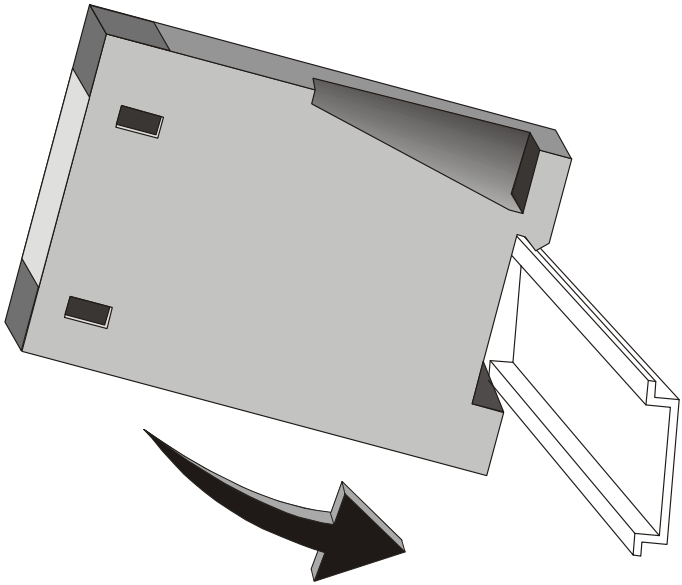



### Wall / Panel Mounting

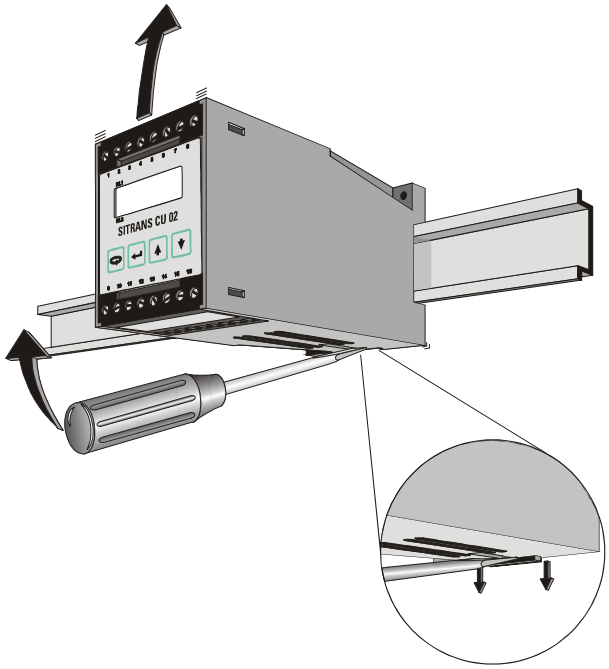


# Rail Mounting

## Mounting

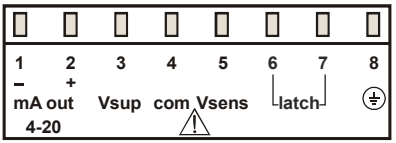


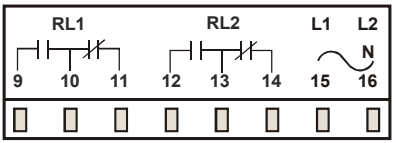
## Removal



# Interconnection

## Connection Layout



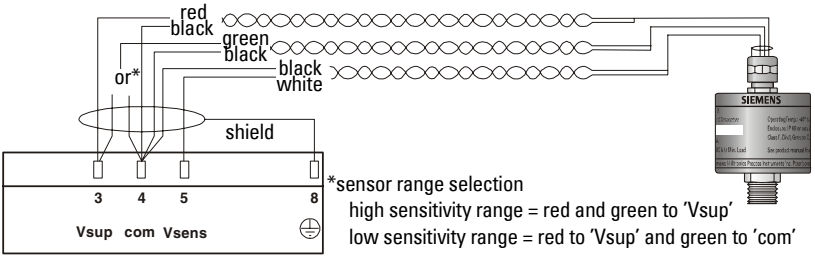




**WARNING:**

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

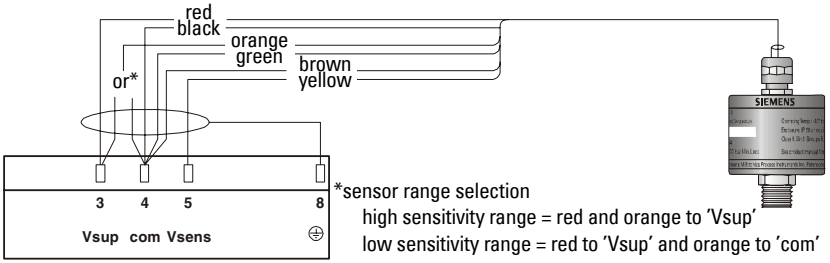
# SITRANS AS 100 Sensor Connection

## Standard Temperature Version




*sensor range selection
high sensitivity range = red and green to 'Vsup'
low sensitivity range = red to 'Vsup' and green to 'com'

## Extended Temperature Version

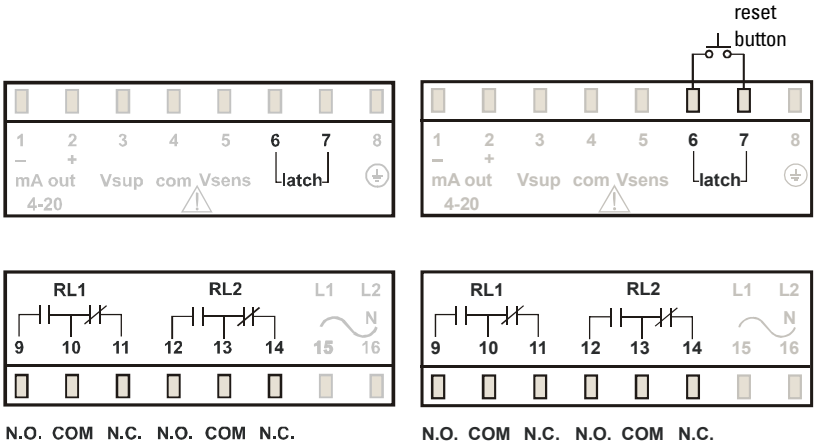



*sensor range selection
high sensitivity range = red and orange to 'Vsup'
low sensitivity range = red to 'Vsup' and orange to 'com'

# Relay Output Connection*

**Auto Reset**
*(P14 / 24 = 0)*

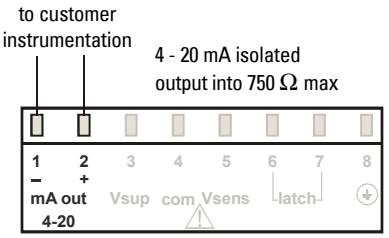
**Manual Reset**
*(P14 / 24 = 1)*



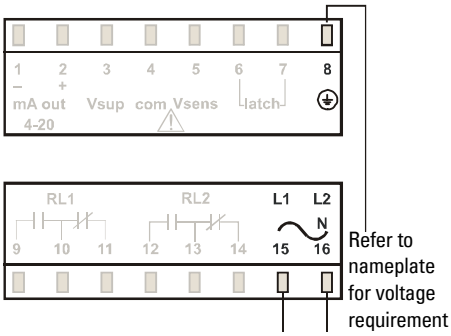

All relays are certified for use in equipment where the short circuit capacity of the circuits in which they are connected is limited by fuses having ratings not exceeding the rating of the relays.

*refer to Operation \ Alarm

**Analog Output Connection**




**Power Connection**



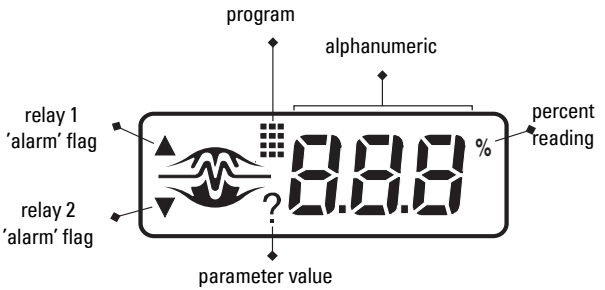

The equipment must be protected by a 15 A fuse or circuit breaker in the building installation.

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.

## 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).

## Display




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

Press: ▲ for percent

Press: ▼ 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.

## 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 |  e.g. alarm above 80% |
| low alarm: | alarm condition occurs when the sensor signal level (%) is of a lesser value than the low% setpoint |  e.g. alarm below 20% |
| 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 |  e.g. alarm beyond 20% and 80% |
| in bound: | alarm condition occurs when the sensor signal level (%) is of a value gbetween the low% and high% alarm setpoints |  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

# 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 (Vsens) from the SITRANS sensor. In the case where Vsens 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.

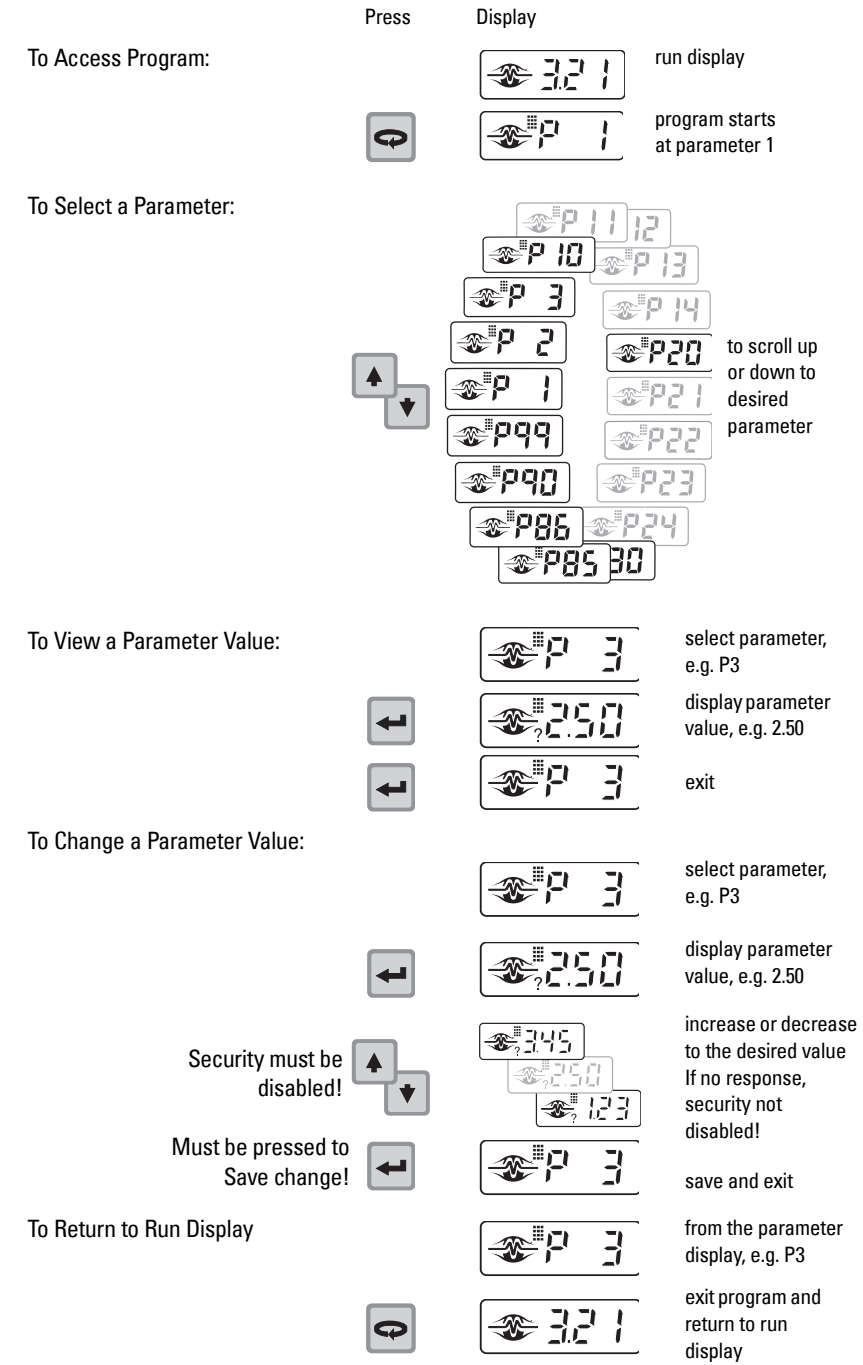
## Security

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


Press
Display
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
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

# 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.

**Note:**
Security must be disabled to set programming functions.

## 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.

## 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

# Ancillary Functions

## Damping

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

# 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 (Vsens = 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

| | Press | Display | |
|---|---|---|---|
| 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 value |
| |  |  | disable code |
| |  |  | **security disabled,** programming access granted |

# Maintenance

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

# Notes

# Notes

**www.siemens.com/processautomation**

Siemens Milltronics Process Instruments Inc.
1954 Technology Drive, P.O. Box 4225
Peterborough, ON, Canada K9J 7B1
Tel: (705) 745-2431 Fax: (705) 741-0466
Email: techpubs.smpi@siemens.com



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