Overview

Sonar Proximity Switches
Accessories

SONPROG interface device

The programmed values are saved in the Sonar proximity switch and are retained even without interface or after the supply voltage has been disconnected.

The programmed values can be printed out and recorded. They will then be immediately available, for example for series applications or for replacement of the Sonar proximity switch.

Parameters
Operating range

The commands "Lower limit of operating range" and "Upper limit of operating range" are used to define a window within the sensing range of the Sonar proximity switch.

If an object enters the operating range, the switching output is active (with NO contact). If an object is outside the operating range, the switching output is not active.

In the case of Sonar proximity switch of compact range M30 K2 with two switching outputs, the second switching output is active when an object is located between the blind zone and the operating range.

Sound cone

Differential travel

The differential travel can be adjusted to move the switch-on point and the switch-off point at the limits of the operating range away from each other. This prevents output flutter and level control tasks can be solved elegantly.

Example: Fill level monitoring with adjustable differential travel

Switching element function

The function of the switching output that was set at the factory can be changed, e.g. from NO to NC.

The assignment of the connections does not change as a result. This means that when a device with NO function is changed to NC, the switching output remains assigned to pin 4.

Parameters
Operating range

The commands "Lower limit of operating range" and "Upper limit of operating range" are used to define a window within the sensing range of the Sonar proximity switch.

If an object enters the operating range, the switching output is active (with NO contact). If an object is outside the operating range, the switching output is not active.

In the case of Sonar proximity switch of compact range M30 K2 with two switching outputs, the second switching output is active when an object is located between the blind zone and the operating range.

Sound cone

Differential travel

The differential travel can be adjusted to move the switch-on point and the switch-off point at the limits of the operating range away from each other. This prevents output flutter and level control tasks can be solved elegantly.

Example: Fill level monitoring with adjustable differential travel

Switching element function

The function of the switching output that was set at the factory can be changed, e.g. from NO to NC.

The assignment of the connections does not change as a result. This means that when a device with NO function is changed to NC, the switching output remains assigned to pin 4.
Sonar Proximity Switches

Accessories

SONPROG interface device

Switching rate

The Sonar proximity switch can be switched over from standard switching frequency (in accordance with the technical specifica-
tions) and rapid switching frequency (3 times the standard
value).

Note:
A Sonar proximity switch with a rapid switching
frequency is more sensitive to disturbance.

Analog distance measurement

Proximity switches with an analog output can detect the distance
to an object. This distance is converted into a proportional
analog output signal (0 to 10 V, 0 to 20 mA or 4 to 20 mA). The
resolution of the analog output is at least 1 mm within the preset
limits.

Example

Blind zone

A value must not be set for the blind zone that is less than the
minimum value. This is the time that the Sonar proximity switch
requires to switch over from send to receive mode.

The blind zone can be moved away from the Sonar proximity
switch (i.e. increased) to permit interfering objects in the fore-
ground to be ignored. The interfering echo resulting from such
an object is suppressed by extending the blind zone, and detec-
tion of the desired object is possible again. The range of the
Sonar proximity switch can be reduced in this case because
part of the echo from the object to be detected is suppressed.
However, objects are still not permitted within the original blind
zone.

It is important to ensure with this setting the object does not
reflect ultrasound so well that double or triple echoes arise that
give the impression of a more distant object. (a fault of this kind
cannot occur during normal operation because only the first
echo is accepted as valid).

Sensing range

Reducing the sensing range can enhance the resolution of the
Sonar proximity switch. With large sensing ranges, it is not
possible to adjust some values in steps of one millimeter. The
minimum resolution of a Sonar proximity switch is 1 mm.

Mean value generation

Unfortunate reflective conditions or moving surfaces (e.g. in the
case of moving liquids and bulk material on conveyors) can
cause the measured values to change continuously, which re-
sults in constant switching. The Sonar proximity switch allows a
mean value to be generated from up to 255 measurements.

Failed signals (when no object is in the sensing range) are
ignored on mean-value generation. After each measurement,
a mean value is generated immediately from the new measured
value and the stored number of old values. The response time of
the Sonar proximity switch is, therefore, not extended. A delay
only occurs at the end of a measurement if the object is removed
from the sensing range. This delay corresponds to the measure-
ment cycle time multiplied by the saved number of mean values.

Attenuation (see sound cones)

The susceptibility of the receive amplifier is reduced here.
Weakly reflecting objects at the edge of the sound cone are sup-
pressed. It is also possible to reduce the size of the sound cone
here electronically. The permitted values are 0 (maximum sensi-
tivity) to 7 (minimum sensitivity).

Technical specifications

<table>
<thead>
<tr>
<th>Type</th>
<th>3RX4 000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Required hardware</td>
<td>PC with VGA graphics card, serial interface COM1 or COM2</td>
</tr>
<tr>
<td>Required software</td>
<td>MS-DOS Version 3.1 and higher, Windows 3.X, Windows 95, 98, Windows NT</td>
</tr>
<tr>
<td>Operational voltage</td>
<td>100 V to 240 V AC, 24 V DC</td>
</tr>
</tbody>
</table>

Software-Update via Internet:
www.siemens.de/simatic-sensors/px

Selection and Ordering data

<table>
<thead>
<tr>
<th>Designation</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>SONPROG interface unit</td>
<td>3RX4 000</td>
</tr>
</tbody>
</table>
## Selection and Ordering data

<table>
<thead>
<tr>
<th>Designation</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Aligning unit with mounting bracket</strong>&lt;br&gt;for Sonar proximity switch M30&lt;br&gt;Swivel range approx. 20° around longitudinal axis of proximity switch. Following assignment, the proximity switch is screwed tight in the selected position.</td>
<td>3RX1 301</td>
</tr>
<tr>
<td><strong>Aligning unit with mounting flange</strong>&lt;br&gt;for Sonar proximity switch M30&lt;br&gt;Swivel range approx. 20° around longitudinal axis of proximity switch. Following assignment, the proximity switch is screwed tight in the selected position.</td>
<td>3RX1 302</td>
</tr>
<tr>
<td><strong>Passive reflector</strong>&lt;br&gt;for Sonar proximity switch M30</td>
<td>3RX1 910</td>
</tr>
<tr>
<td><strong>Mounting clamp</strong> (molded plastic)&lt;br&gt;- for Sonar proximity switch, M18 form&lt;br&gt;- for Sonar proximity switch, M30 form</td>
<td>3SX6 283&lt;br&gt;3SX6 284</td>
</tr>
<tr>
<td><strong>Aligning unit</strong>&lt;br&gt;for 3SG16 67 Sonar proximity switch</td>
<td>3SX6 287</td>
</tr>
</tbody>
</table>

For plug-in connectors and extension cables see from page 2/248.

---

### Aligning unit with mounting bracket

- **Designation**: 3RX1 301
- **Description**: Aligning unit with mounting bracket for Sonar proximity switch M30. Swivel range approx. 20° around longitudinal axis of proximity switch. Following assignment, the proximity switch is screwed tight in the selected position.

### Mounting clamp (molded plastic)

- **Designations**: 3SX6 283, 3SX6 284
- **Description**: Mounting clamp for Sonar proximity switch, M18 form and M30 form.
- **Dimensions**:
  - a: 45<br>  - b: 30<br>  - c: 26<br>  - d: Ø 4,5<br>  - e: 32<br>  - f: 19,6<br>  - g: 19,0 (for M18) and 29,8 (for M30)