**FIELD DEVICES – ***POSITIONERS***

**Product Specifications**

**SRD960 Universal Positioner**
**SRD960-T Position Transmitter**

For Ex d / Explosion Proof applications

The Universal Positioner SRD960 is designed to operate pneumatic valve actuators and is available in the version Ex d / explosionproof (flameproof) or Ex ia / intrinsic safety. It can be operated from control systems (e.g. the Foxboro I/A Series System), controllers, or PC-based configuration- and operation tools such FDT/DTM. The positioner is available with different communication protocols. This includes versions with analog setpoint (4 to 20 mA) without communication or with superimposed HART signal; or fieldbus communication according to PROFIBUS-PA and FOUNDATION Fieldbus H1 based on IEC 1158-2 MBP acc. to FISCO. The multi-lingual full text graphic LCD in connection with the external 4 push buttons allows a comfortable and easy local configuration and operation as well as the display of valve specific data, and status- and diagnostic messages.

**DEVICE FEATURES**

**Intelligent**
- Auto-start with self-calibration
- Self diagnostics, status- and diagnostic messages
- Easy operation with four keys
- Multi-Lingual full text graphical LCD

**With communication**
- HART, FOUNDATION Fieldbus H1, PROFIBUS-PA
- Configuration by means of local keys, hand held terminal (HART), PC with FDT-DTM or I/A Series system
- Advanced Diagnostic / Premium Diagnostic: FDT based Software for valve diagnostics and predictive mainenance

**COMMON FEATURES**

- Stroke 8 to 120 mm / 260 mm (0.3 to 14.7 in / 10.2 in)
- Angle range up to 95°
- Supply air pressure up to 6 bar (90 psig), with spool valve up to 7 bar (105 psig)
- Single or double-acting
- Mounting on linear actuators according to NAMUR – IEC 50534-6-1 – VDI/VDE 3847
- Mounting on rotary actuators acc. to VDI/VDE 3845
- Protection class IP 66, NEMA 4X
- Approved for SIL applications
- Explosion protection: Flameproof according to ATEX - Ex d; Explosion proof according to FM

Equipment should be installed, operated, serviced, and maintained only by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising from the use of this material.
OVERVIEW of SRD960 Positioner

**Electronics Version:** (see P.4, 8)
- "H" HART (4-20 mA)  P.8
- "P" PROFIBUS PA  P.8
- "Q" FOUNDATION Fieldbus H1  P.8

**Additional i/o:** P.11
- Binary inputs
- Binary outputs
- Position feedback
- Limit switches

**Mounting Adapters** P.15
- 1/4-18NPT or G1/4

**Cable Glands** P.19
- 1/2-14NPT or M20x1.5

**Display Covers:** P.14
- LCD or Closed

**Built-in Gauges** P.17

**Boosters** P.18

**Combinations**

<table>
<thead>
<tr>
<th>Device version</th>
<th>Controller</th>
<th>Display</th>
<th>local configuration</th>
<th>remote configuration</th>
</tr>
</thead>
<tbody>
<tr>
<td>“H” HART (4-20 mA)</td>
<td>Digital</td>
<td>LCD</td>
<td>push buttons</td>
<td>via communication</td>
</tr>
<tr>
<td>“P” Profibus</td>
<td>Digital</td>
<td>LCD</td>
<td>push buttons</td>
<td>via communication</td>
</tr>
<tr>
<td>“Q” F.Fieldbus</td>
<td>Digital</td>
<td>LCD</td>
<td>push buttons</td>
<td>via communication</td>
</tr>
</tbody>
</table>
**FUNCTIONAL SPECIFICATIONS (common data for SRD960 -B or C)**

### Travel range
- Stroke range: 8 to 260 mm (0.3 to 10.2 in) with standard feedback levers; special levers on request
- Rotation angle range: up to 95° (without mechanical stop)

### Supply
- Supply air pressure:
  - Single acting: 1.4 to 6 bar (20 to 90 psig)
  - Double acting: 1.4 to 7 bar (20 to 105 psig)
- Output to actuator: 0 to ~100 % of supply air pressure (up to 5.5 bar at 6 bar supply air pressure)
- Air supply: according to ISO 8573-1
  - Solid particle size and density class 2
  - Oil rate: class 3
  - Pressure dew point: 10 K under ambient temperature

### Air consumption (steady state) ln/h (scfh)

<table>
<thead>
<tr>
<th>Supply air pressure bar (psig)</th>
<th>1.4 (20)</th>
<th>3 (45)</th>
<th>6 (90)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single acting</td>
<td>80 (2.8)</td>
<td>130 (4.6)</td>
<td>220 (7.8)</td>
</tr>
<tr>
<td>Double acting</td>
<td>130 (4.6)</td>
<td>230 (8.1)</td>
<td>430 (15.2)</td>
</tr>
<tr>
<td>Spool Valve</td>
<td>100 (3.5)</td>
<td>240 (8.5)</td>
<td>500 (17.7)</td>
</tr>
</tbody>
</table>

### Air output ln/h (scfh)
At max. deviation, single and double acting:

<table>
<thead>
<tr>
<th>Supply air pressure bar (psig)</th>
<th>1.4 (20)</th>
<th>3 (45)</th>
<th>6 (90)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Without booster</td>
<td>2 700 (95)</td>
<td>5 000 (177)</td>
<td>7 500 (265)</td>
</tr>
<tr>
<td>With Spool Valve 4)</td>
<td>6 000 (211)</td>
<td>12 000 (423)</td>
<td>18 000 (636)</td>
</tr>
<tr>
<td>With booster code F, G</td>
<td>21 000 (742)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>With booster code H</td>
<td>42 000 (1 484)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: The use of boosters in connection with Spool valve is not recommended.

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2) Data measured according to VDI/VDE 2177
3) With stroke 30 mm and lever length 90 mm
4) Spool valve is the type of amplifier used in device SRD960-C
5) Standard diaphragm amplifier

Devices SRD960-B and SRD960-Cxxxxxxx-M are using "standard" diaphragm amplifier
**FUNCTIONAL SPECIFICATIONS** (common data for SRD960-B or C)

**Features**

- Automatic start-up ............ Autostart functionality
- Automatic detection of mechanical stops, control parameters and of direction of spring force. A dynamic optimization is included in this procedure. This procedure allows a full adaptation on optimization of the positioner to the actuator without any manual adjustments!

**Options**

- Built-in independent inductive limit switches
- Pressure Sensors for supply air pressure and output pressure I (y1) and II (y2)
- Additional Inputs / outputs:
  - 2 binary outputs (position alarms)
  - Position feedback 4-20 mA + binary alarm output
  - 2 binary inputs

**Operation and configuration**

- Local ......................... with four keys
- Display ......................... Multi-Lingual Graphic LCD

The positioner with LCD is available with three different menu languages:

- Two menu languages are standard:
  - English
  - German

- Freely definable third language (additional languages on request):
  - French
  - Portuguese
  - Spanish
  - Italian
  - Swedish
  - etc.

The third menu language has to be selected and specified with order.

All additional Menu languages can be downloaded into the positioner by means of the operation- and configuration software VALcare™. Language downloads are available on our homepage.

**Position feedback and alarms**

- Position feedback / valve position ...... via communication
  - Optional 1) ................. 4-20 mA position feedback

- Alarms ......................... via communication
  - Optional 1) .................. 1 alarm output
  - Position alarms ................. via communication
    - Hi and Lo alarm
    - Hi/Hi and Lo/Lo alarm

- Optional 1) ........................ 2 binary outputs
  - Hi and Lo alarm
  - Hi/Hi and Lo/Lo alarm

**Diagnosis**

- **local**
  - Self diagnostics
  - Status- and diagnostic messages

- **via VALcare™ Valve Diagnostic Software:**
  - Service Management for planning and scheduling of service intervals
  - Histograms for displaying the position- and response history over time
  - Partial Stroke Test for the functional inspection of safety related actuators
  - Hours in operation, cycle counter and travel sum of the actuator are determined
  - Surveillance of loop current
  - Shows condition of device:
    - Potentiometer
    - IP Motor
    - Exceeding range of actuator (possible indication for wear of plug or seat)
    - Remaining control deviation (possible indication for jammed actuator, blocked valve stem or plug, not sufficient air capacity / supply air pressure / positioning pressure)

- if equipped with pressure sensors (optional):
  - Monitoring of the stem friction
  - Histograms for displaying the friction-history over time
  - surveillance of air supply and output pressure, each with display of physical value

- Additional diagnosical possibilities in control operation by means of external sensors (optional). See also the VALcare Documentation.

**Service plug**

All basic devices are equipped with a service plug A at the front side. There via RS232 interface a PC with VALcare (DTM) can be connected via modem EDC82 (galv. separated, not Ex).

Information about EDC82 modem see TI EVE0102 Y.

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1) By means of additional inputs/outputs (Option Board)
Manual settings:

Actuator mode .................. linear or rotary actuator
Linear valve .................... left or right mounted
Rotary actuator ................ opening clockwise or counter-clockwise
Characteristic of setpoint ...... linear, equal percentage, invers- equal percentage or custom (22 points)
Valve function ................... opens or closes with increasing setpoint
Split range ...................... free upper and lower values
Travel limits .................... free upper and lower values
Cutoffs.......................... free upper and lower values
Stroke range .................... configurable
Temperature unit ............... configurable (°C or °F)
Autostart........................
  - Endpoints
  - Standard Autostart
  - Enhanced Autostart 1)
  - Smooth response 1)
  - Fast response 1)
Control parameters .......... Determined during Autostart.
Working range .................. freely adjustable (for indication on LCD)
Manual adjustment of .......... P-gain, I-time, T63-time and dead band
Manual operation ............... Manual input of setpoint to drive the valve in steps with 12.5 % or 1 % 1)
Pneumatic test.................... Function to test the pneumatic output
Workshop......................... input and angle calibration
LCD language .................... dependent on version
LCD orientation............... dependent on version
PROFIBUS-PA ................... Bus address
FOUNDATION Fieldbus ........ Simulation
  Switch from Link Master to Basic Field Device

Software supported configurations:

- By means of Hand Held Terminal (HART)
- PC by means of VALcare Software
- I/A Series System, Foxboro Evo and other DCSs

Failure handling
Safety position at
- Air supply failure .......... pressure y1 = zero
- Electric power failure .......... pressure y1 = zero
- Failure of electronics .......... pressure y1 = zero
- Failure of communication is recognized by configurable watch dog with response delay of 0.1 s to 24 h
Behavior ....................... configurable as pressure y1 = zero or stop at last value or a configured value
Diagnostic report ............... via communication and local LCD
Historical status ............... is set if alarm was activated at any time (also just short alarms)
Reset ............................. by acknowledging

1) from HW-Rev. 3.4 / Firmware Rev. 16
PHYSICAL SPECIFICATIONS (common data for SRD960 -B or C or T)

Mounting (see page 17 for details)
Attachment preparation by means of mounting adapter

**Option N** for
- NAMUR according to IEC 534, Part 6
- Direct to IFC-/Flowserve actuators such as FoxPak and FoxTop
- Rotary actuators according to VDI/VDE 3845

**Option R** for
- Rotary actuators according to VDI/VDE 3845

**Option T** for
- Integrated mounting with air connection on back
  - for details refer to page 21, Attachment prep.
  
**Option D** for
- NAMUR according to VDI/VDE 3847
- Rotary actuators according to VDI/VDE 3845

**Option F** for
- NAMUR according to IEC 534, Part 6
- Rotary actuators according to VDI/VDE 3845

Attachment to stroke actuators
- direct to FlowPak / FlowTop with attachment kit EBZG -E1
- for casting yoke acc. to IEC 534-6 (NAMUR) . . . . . . with attachment kit EBZG -H

Stroke range with feedback lever:
- standard (EBZG-A) 8 to 70 mm / 0.31 to 2.76 in
- extended (EBZG-B) 60 to 120 mm / 2.36 to 4.72 in
- extended (EBZG-A1) 110 to 260 mm / 4.33 to 10.24 in

Larger stroke ranges can be realized with special levers.

- for pillar yoke acc. to IEC 534-6 (NAMUR) . . . . . . with attachment kit EBZG -K

Stroke range with feedback lever:
- standard ..................... 8 to 70 mm / 0.31 to 2.76 in
- extended ..................... 60 to 120 mm / 2.36 to 4.72 in

Attachment to rotary actuators
acc. to VDI/VDE 3845 .... with attachment kit EBZG -R

- Further attachment kits see ModelCodes page19 -

Materials
Housing and covers.......... Aluminum (Alloy No. 230) finished with 2 component DD varnish

All moving parts of feedback system (V4A) .... 1.4306 / 1.4571 / 1.4104
Mounting bracket................. SS or Aluminum (Alloy No. 230)
Pneumatic diaphragm .......... Silicone (suitable for use in lacquer industry according to Lab-Test)

Weight
Single acting .................... approx. 2.7 kg (5.9 lbs)
Double acting ..................... approx. 3 kg (6.6 lbs)

Pneumatic connection
NAMUR mounting ............ 3 x female threads 1/4-18 NPT or G1/4 for pipe diameter 6 to 12 mm (0.24 to 0.47 in) for air supply and outputs y1, y2 to the actuator
Direct mounting ............... Instead of the output y1 an air connection on the backside with O-ring will be used (closed at NAMUR mounting).

Electrical connection
Line entry ...................... 1 or 2 cable glands 1/2-14 NPT or M 20 x1.5 (others with Adapter AD-...)
Cable diameter .................. 6 to 12 mm (0.24 to 0.47 in)
Screw terminals ................. 2 terminals for input, 4 terminals for additional inputs / outputs
Tightening torque ............. min. 0.5 Nm, max. 0.6 Nm
Wire cross section ............ solid wire 0.5 to 6 mm² stranded wire 0.5 to 4 mm² cramped wire 0.5 to 2.5 mm² (AWG 21-14)
Test sockets .................. integrated in terminals, for options and communicator connection
PHYSICAL SPECIFICATIONS (common data for SRD960 -B or C or T)

Ambient conditions
Operating conditions acc. to IEC 654-1
The device can be operated at a class Dx location
Ambient temperature for
  Operation .......................... –40 to 80 °C (–40 to 176 °F)
  Transport and storage .............. –40 to 80 °C (–40 to 176 °F)
Storge conditions acc.
  to IEC 60721-3-1 ........... 1K5; 1B1; 1C2; 1S3; 1M2
Display
  LCD (visible) .................. –25 to 80 °C (–13 to 176 °F)
  acc. to IEC 529 .............. IP 66
  acc. to NEMA .......... Type 4X

Electromagnetic compatibility EMC
Operating conditions industrial environment
Immunity according to
  - EN 61 326-1 ................. fulfilled
Emission according to
  - EN 55 011,
  Group 1, Class B ............... fulfilled
NAMUR
  recommendation NE21 .... fulfilled

SAFETY REQUIREMENTS CE label
Electromagnetic Compatibility 4) ........... 2004/108/EG
Low-voltage regulation .......... not applicable

Safety
According to EN 61010-1
(or IEC 1010-1) ............... safety class III
  Overvoltage Category I
Internal fuses ................ only with PROFIBUS or
  FOUNDATION Fieldbus,
but not replaceable
External fuses .................. limitation of power supplies
  for fire protection must be observed acc. to
  EN 61010-1, appendix F (or IEC 1010-1).
Compliance with the essential health and safety
requirements has been assured by compliance with

Electrical Classification 5) 6)
See certificate of conformity EX EVE0109 A (de)(en)

Type of protection ATEX “Ex d – Flameproof”
II 2 G Ex d IIC Temperature class T4...T6
  (Design AD 639)
EC-Type-Examination Certificate PTB 02 ATEX 1084 X
Permissible ambient temperature range:
  Temperature class T4 ............ –30 °C to 80 °C
  (–22 °F to 176 °F)
  Temperature class T4 .......(on request)
  –40 °C to 80 °C
  (–40 °F to 176 °F)
  Temperature class T6 ............ –30 °C to 75 °C
  (–22 °F to 167 °F)
  Temperature class T6 .......(on request)
  –40 °C to 75 °C
  (–40 °F to 167 °F)
For connections in explosion protected hazardous
areas according to directive 94/9/EG appendix II, with
the following maximum values:
  Input circuit:
    Maximum electrical power ............... P max = 2.5 W
    Electrical connections .............. U max = up to 60 V
  Self-heating of device surface ...... 1.3 K/W

Type of protection FM “explosion proof”
Class I, Division 1, Groups B, C, D
hazardous locations, indoor and outdoor, NEMA 4X

Type of protection CSA “explosion proof”
Ex d II (H2) T4/T6 Gb
Class I, Division 1, Groups B, C and D
Class II, Division 1, Groups E, F and G
hazardous locations, indoor and outdoor, NEMA 4X

1) Details see Certificates of Conformity. With built-in “Inductive
   Limit Switch” Code T only –20 °C
2) Below –20 °C reaction time for value changes is reduced
3) Under service as directed
4) With PROFBUS or FOUNDATION Fieldbus only, if shield of wiring
   is grounded on both ends
5) With appropriate order only
6) National requirements must be observed
SRD960 with HART communication
SRD960-xHxxxx

Signal Input
Two wire system
Reverse polarity protection .standard feature
Signal range ............... 4-20 mA
Operating range ........... 3.6 to 21.5 mA
Voltage range of unloaded
input signal ............... DC 12 to 36 V
Load ................................ 420 Ohms, 8.4 V at 20 mA
Communication signal ...... HART, 1200 Baud, FSK
(Frequency Shift Key)
modulated on 4-20 mA
0.5 Vpp at 1kOhm load
Input impedance Zi ........... Z = 320 Ohms
for ac voltage 0.5 to 10 kHz with < 3 dB non-linearity
Cable capacity and inductance see HART standard
specifications (e.g. C < 100 nF).
Impedance of other devices at the input (parallel or serial)
must be within HART spec.
Applications without communication require not to exceed
input capacitance parallel to the input not higher than 100 µF.

Start-up time (init phase) .... approx. 2 s
 Interruption time without power down:
- with LCD ....................... 85 ms ¹)

Configuration
Local / Display .............. see page 4
Software......................... VALcare™ (FDT-Software)
Hardware ....................... MOD991 for PC, IBM compatible
Hand Terminal ............... HART Hand held terminal
I/A Series System .......... on request
Other control systems ....... AMS, Siemens SIMATIC PDM
(ProcessDeviceManager)

SRD960 with communication
PROFIBUS-PA ........ SRD960-xPxxxx

Data transfer .................. acc. to PROFIBUS- PA profile
class B based on EN 50170 and DIN 19245 part 4
GSD file ..................... the actual file can be down-
loaded from our homepage

Configuration
Local / Display .............. see page 4
Software......................... VALcare™ (FDT-Software)
Hardware ....................... PC- or PCMCIA-interfaces
from Softing
I/A Series System .......... with FBM223
Other control systems ....... All Profibus-PA- compatible,
e.g. Siemens SIMATIC PDM
(ProcessDeviceManager)

SRD960 with communication
FOUNDATION Fieldbus H1
SRD960-xQxxxx

Data transfer ............... FF Specification Rev. 1.4,
Link-Master (LAS)
Two revisions of Firmware can be selected for the
FOUNDATION Fieldbus devices in the model code of
the positioner. The selection of the Firmware revision
is depending of the DCS compatibility, the DD Files
already installed in the DCS and the installed base on
your site.
Double check interoperability of following
characteristics with your DCS before ordering!

When selected Firmware FF16 in the model code :
Certified according to .... ITK 4.6
Function Blocks.............. PID, AO, 2xDI, 1xDO
Transducer, Resource
When selected Firmware FF18 in the model code :
Certified according to .... ITK 6.0.1
Function Blocks.............. PID, AO, 4xDI, 1xDO, IS, OS,
AI, MAI, Transducer, Resource

Additional functionality Flat Addressing
DD files ..................... the actual file can be down-
loaded from our homepage

Configuration
Local / Display .............. see page 4
Software ..................... VALcare™ (FDT-Software)
or National Instruments NI-FBUS configurator
Hardware ..................... FBUS-interfaces (AT-FBUS
and PCMCIA- FBUS)
I/A Series System .......... with FBM220 / 221
Other control systems ....... All FOUNDATION Fieldbus
H1 compatible. Fisher Rosemount Delta-V, Honeywell,
Yokogawa, ABB

For both fieldbus versions
Input signal .................. digital
Supply voltage .............. DC 9 to 32 V ²)
max. Supply voltage .... DC 36 V
Operating current ........... 10.5 mA ± 0.5 (base current)
Current amplitude ............ ± 8 mA
Fault current ............... base current + 0 mA
(base current + 4 mA by means of independent
FDE-safety circuit) according to IEC 1158-2
Start-up time (init phase) approx. 2 s

Operating values
Bus connection ............. Fieldbus interface based
on IEC 1158-2 according to FISCO-Model
(see Electrical certifications)
Power supply ............... Power supply is achieved
dependant on the application by means of fieldbus
power supply units or segment coupler

¹) Worst case conditions 4-20 mA, with position feedback option, i/p-output
with max. current
²) Data of “Intrinsically Safe” version
Special SRD960 versions for particular use

These devices contain only the functions described below and are constructed without controller and without pneumatic parts in a shortened housing.

**SRD960 -TXQ:**
Stand alone Position Transmitter unit

The actual value of the actuator is converted to a 4-20 mA signal.

**Input**
Stroke / Rotary angle by means of conductive plastic precision potentiometer

**Output**
Two wire system

**Signal range**
4 to 20 mA / 20 to 4 mA or free configuration

**Permitted load**
\[ R_{\text{max}} = \frac{(U_s-12 \text{ V})}{0.02 \text{ A}} \] (\( U_s = \text{supply voltage in V} \))

**Power supply**
Reverse polarity protection . standard feature

**Supply voltage**
\( U_s = \text{DC 12 to 36 V} \)

**Permitted ripple**
< 10 % p.p.

**Supply voltage dependency**
negligible

**Response characteristic**
Non-linearity (terminal based adjustment).............< 1% F.S.
Hysteresis.....................< 0.5% F.S.
Load dependency....................negligible
Temperature effect...............< 0.1% / 10 K

**Weight**
approx. 2.3 kg

**Configuration and status**
Local configuration ..............2 push buttons and 2 LEDs

**SRD960 -TXNSSX -H:**
Potentiometer unit for remote mounting application

Contains a potentiometer, which is the value of the actuator, forwarded the value on to the actual positioner mounted in a protected place.

Can be used for applications where vibrations or extreme temperatures may disturb or damage the positioner.

**Travel Range**
Stroke range ......................8 to 260 mm (0.3 to 10.2 in)
Rotation angle range .............up to 95 ° (without mechanical stop)

**Response Characteristic**
Please refer to the technical data of the positioner SRD960 with which is mounted together.

**Weight**
approx. 2.3 kg

**Ambient conditions**
Ambient temperature..............–40 to 100 °C (~40 to 212 °F)

IP66

For more information about remote mounting please consult TI EVE0105 R.
OPTION for all SRD960 -B or -C

Pressure sensors [item 3]
Three built-in pressure sensors, Code "Option –B", for supply air, output y1 and y2 to actuator, necessary for Premium Diagnostic

Measuring range .................. 0 to 8 bar (0 to 120 psig)
Accuracy ......................... 0.5 %
Temperature influence ....... 0.5 % / 10 K (–40 to 80 °C)

Parts set for subsequent mounting:
Option B (3x pressure sensors).......EW 426 247 311
Two binary outputs (limit signals) [item 1]
Stroke / angle derived from positioner feedback, configurable
galvanically separated 2 limit signals, two-wire system, according to DIN 19234, for external supply
supply voltage....................... DC 8 to 48 V
Logic:
  limit value not exceeded ...... < 1 mA
  limit value exceeded......... > 2.2 mA (typ. 6 mA)
  device fault ....................... < 50 µA
configurable as switch output:
  limit value not exceeded ...... < 50 µA
  limit value exceeded......... > 20 mA / 20 V
  > 40 mA / 10 V (power derated)
Reference: AB1 for upper, AB2 for lower limit
Terminals for AB1 ................. 81+, 82–
  AB2 ................. 83+, 84–
Explosion protection thereto see page 7.

Parts set for subsequent mounting:
Code P.................................... EW 426 346 021

Position feedback 4-20 mA [item 1]
Stroke / angle derived from positioner feedback,
1 output analog, galvanically separated, two-wire system
according to DIN 19234, for external supply
supply voltage ...................... DC 8 to 48 V
signal range ....................... 3.8 to 21.5 mA
0 % and 100 % configurable
device fault ....................... < 1 mA
Terminals for AI1 .................. 31+, 32–

1 Binary output alarm, galvanically separated, two-wire system, according to DIN 19234, for external supply
supply voltage ...................... DC 8 to 48 V
Logic ....................................
  no alarm < 1 mA
  alarm > 2.2 mA
  device fault < 50 µA
Terminals for AB1 ................. 81+, 82–
The binary output for Alarm will be activated in the following cases:
  - Remaining control deviation
  - Circuit to I/P module is disturbed
  - Circuit to potentiometer is disturbed
  - Calibration error:
    - no angle calibration
    - no current calibration
  - Autostart failed
    (Pre-settings can be configured via communication)
Explosion protection thereto see page 7.

Parts set for subsequent mounting:
Code Q.................................... EW 426 346 039
ADDITIONAL EQUIPMENT (continued)

Additional Inputs / Outputs, built into any SRD960 -B or -C

Order in Model Code: SRD960– □□ B

Two Binary Contact Inputs [item 1]

Two independent binary inputs, supplied by the basic device, for connection of sensors. A connected switch is loaded with 3 V, 150 μA. Both binary inputs can be used for diagnostics or also configurable for the control functions.

<table>
<thead>
<tr>
<th>Switch 1</th>
<th>Switch 2</th>
<th>Actuator control function</th>
</tr>
</thead>
<tbody>
<tr>
<td>close</td>
<td>close</td>
<td>normal operation</td>
</tr>
<tr>
<td>open</td>
<td>close</td>
<td>go to stop at 0 %</td>
</tr>
<tr>
<td>close</td>
<td>open</td>
<td>go to stop at 100 %</td>
</tr>
<tr>
<td>open</td>
<td>open</td>
<td>hold last position</td>
</tr>
</tbody>
</table>

Terminals for EB1 .......... 13+, 14–
EB2 .......... 15+, 16–

Requirements for connected switches:
- Capacitance in parallel ......< 100 nF
- Resistance for ON ..........< 2 kOhms
- for OFF ..................> 10 kOhms
- Hysteresis ................... 2 to 5 kOhms
- For application with ......... - mechanical switches
  - opto couper outputs
  - open collector / drain
  - outputs of transistor
  - circuits

For further informationen about the contact inputs please consult TI EVE0105 B.

Explosion protection thereto see page 7.

Parts set for subsequent mounting:
Code B  ......................... EW 426 346 012

Order in Model Code: SRD960– □□ E

Two Binary Signal Inputs/Outputs [item 1]

Two Binary Inputs/Outputs are configured by the device as Input or as output, as well as the kind of Signals as on/off or as to NAMUR signal in accordance (DIN 19234).

Configured as NAMUR:

Input/Output
- Logic 0 ...................... > 0.35 mA, < 1 mA
- Logic 1 ...................... > 2.2 mA < 6 mA

Input current Limited to ........ < 6 mA

On/Off Signal

Output:
- Logic 0 ...................... < 50 μA
- Logic 1 ...................... > 40 mA / 10 V

Input:
- Logic 0 ...................... < 4 mA
- Logic 1 ...................... > 6 mA

Signal Voltage Range .......... 6 to 36 V

Terminals for Ch1 .......... 81+, 82–
Ch2 .......... 83+, 84–

Part set for subsequent mounting:
Code E  ......................... EW 426 247 417
ADDITIONAL EQUIPMENT (continued)
Additional Inputs/Outputs built into any SRD960 -B or -C

Order in Model Code: SRD960-□□□□ T, U, R, V

**Built-in Limit Switch:**

- Standard version (SJ2-N) . . . . Code T
- Security version (SJ2-SN) . . . . Code U
- In three wire technology (SI 2-K08-AP7) . . . . Code R

Stoke / angle derived from positioner feedback, two-wire system
Output ............................... 2 inductive proximity sensors acc. to DIN 19 234 or NAMUR for connection to switching amplifier with intrinsically safe control circuit 1)

Current consumption
-vane clear ........................ > 2.2 mA
-vane interposed ................... < 1 mA

for control circuit with the following electrical values
-supply voltage .................. DC 8 V, R<sub>i</sub> approx. 1 kOhm
-supply voltage range ........ DC 5 to 25 V (only with ZZZ)
-permissible line resistance ......... < 100 Ohms

Response characteristic
-switching differential ............. < 1 %
-switching point repeatability ... < 0.2 %

Terminals for Code T ............ GW1 . 41+, 42–
GW2 . 53+, 54–

Terminals for Code ............. GW1 . 42
GW2 . 52
Supply 41+, 43–

Explosion protection thereto see page 7.

Part sets for subsequent mounting:
Code T ............................ EW 426 346 057
Code U ............................ EW 426 346 066
Code R ............................ EW 426 346 075

**Built-in Limit Switch:**

- Mechanical switches

Micro Switches .................. Code V

Stroke / angle derived from positioner feedback lever
Output ............................... 2 mechanical switches (Micro switches) 2) 3)

Manufacturer ..................... Saia-Burgess
Type ............................... V4NS-C4-AC1-UL
UL- and CSA-approved

Absolute limit values AC
of mechanical switches built into positioner:
U<sub>max</sub> ............................... 42 V AC 5)
I<sub>max</sub> ................................ 0.5 A (resistive load) 5)
I<sub>max</sub> ................................ 0.03 A (inductive load) 6)

Absolute limit values DC
of mechanical switches built into positioner:
U<sub>max</sub> ............................... 30 V DC
I<sub>max</sub> ................................ 1 A

Switching Differential: ......... < 2.5 %
Terminals for SW1 ............. 41, 42
SW2 ............... 51, 52

The circuit of the mechanical switches has to be protected by a suitable fuse. The diameter of the protective conductor needs to be at least 1.5 mm<sup>2</sup> / AWG 16.

Parts set for subsequent mounting
Code V ............................ EW 426 346 084

---

1) Operating mode min. (= Low) / max. (= high)
selectable by adjustment of switch vanes
2) Data measured according to VDI/VDE 2177
3) With stroke 30 mm and lever length 90 mm
4) Operating mode normally open / normally closed selectable by vane adjustment
5) Approval according to UL (UL 1054) and CSA (CSA 22.2 No. 55) at 6,000 operations and T = 65 °C / 149 °F
6) Based on EN 61058-1, at 10,000 operations and T = 85 °C
7) General rating at 50,000 operations and T = 85 °C / 185 °F
LOCAL DISPLAY

Order in Model Code: SRD960–□□□□□□□□□□□□□□□

• Cover with LCD and 4 external push buttons

The positioner in version with LCD is available with three different menu languages:
Standard menu languages:
- English - German

Freely definable third language (additional languages on request):
- French - Portuguese - Spanish
- Italian - Swedish, ... - see Model Code

The third menu language has to be selected and specified with order.

The pre-set menu language is English. This menu language can easily be set to another pre-configured menu language by means of the local push buttons.

All “freely definable” third Menu languages can be downloaded into the positioner by means of the operation- and configuration software VALcare™. This way also the pre-configured third language can be modified. The additional language downloads are available on our homepage.

Despite some special functions all configurable parameters are accessible by means of the local push buttons.

Displayed data in operation:
• valve position
• stem position
• input current
• setpoint digital
• setpoint stem
• supply pressure
• output pressure 1
• output pressure 2
• temperature
• valve cycles
• travel sum
• Hours of operation
• Tag number
• Tag name
• Firmware version

For configuration details see Master Instructions (MI) or Quick Guide (QG).

Configuration Menus

LCD Cover

Local Push buttons

Value
What is displayed
Status and diagnostic message

For configuration details see Master Instructions (MI) or Quick Guide (QG).
ATTACHMENT PREPARATION

Order in Model Code: SRD960-□□□□□□□□□□

The Universal Positioner needs a linking piece for attachment to the different brands of actuators.

The standard Mounting Adapter is marked with Option N.

**Mounting Adapter**

Preparation for attachment to:
- NAMUR, according to IEC 534-6
- Direct mounting to FoxPak and FoxTop actuators, with y1-d air supply (no external tubing for y)
- Rotary actuators acc. to VDI/VDE 3845

**Order Option N.**

Preparation for attachment to:
- Rotary actuators acc. to VDI/VDE 3845

**Order Option R.**

Preparation for attachment to:
- Integrated mounting with air connections on rear
- Rotary actuators acc. to VDI/VDE 3845

**Order Option T.**

Preparation for attachment to:
- NAMUR, according to VDI/VDE 3847
- Rotary actuators acc. to VDI/VDE 3845

**Order Option D.**

As Option N, but no y1-d air supply (with external tubing for y)

**Order Option F.**
1  Cable gland ¹)
2  Plug, interchangeable with Pos. 1 ¹)
3  Connection ²) (11 +/12 –) for input (w) or terminals (11 / 12) for bus connection IEC 1158-2
3a  Connection ²) for additional inputs / outputs
4  Ground connection
5  Female thread G 1/4 or 1/4-18 NPT ³) for output I (y1)
6  Female thread G 1/4 or 1/4-18 NPT ³) for air supply (s)
7  Female thread G 1/4 or 1/4-18 NPT ³) for output II (y2)
8  Direct attachment hole for output I (y1)
9  Feedback shaft
10  Connection manifold for attachment to stroke actuators (see page 17 for details)
11  Connection base for attachment to rotary actuators
12  Cover with window and push buttons
12a  Push button protection cover (option -X)
13a  Key  MENU
13b  Key  DOWN
13c  Key  UP
13d  Key  ENTER / STORE
13e  Key  CHECK
15  Pneumatic unit with amplifier and connection
16  4 screws for connection of pneumatic unit
18  Built-in pressure gauges for air-supply, output Y1 and output Y2
19  Cover for electronic connection compartment
20  Protection screw for electronic connection-and electronic compartment
21  Air vent, dust and water protected (IP65 and NEMA 4X)
22  Data label
25  Tip jacks, 2 mm dia.
26  Arrow is perpendicular to shaft 9 at angle 0 degree

¹) See cable glands BUSG on page 19
The device is supplied with dust protection covers
²) Screw terminals or WAGO Cage clamps
³) Type of thread marked on housing
## Model Codes SRD960

### Universal Positioner SRD960

**Version**
- Single Acting
- Double Acting
- Position Transmitter
- Local Control Panel (LCP960) for PST Monitoring

**Input/Communication**
- HART (4 - 20 mA)
- Profibus PA based on IEC 1158-2 (MBP)
- FOUNDATION Fieldbus H1 based on IEC 1158-2 (MBP)
- not applicable

**Electrical Certification / Explosion protection**
- Explosion-proof according to FM (w/o cable glands or plugs)
- Flameproof II 2 G EEx d IIB/IIC T4/T5/T6 according to ATEX (w/o cable glands or plugs)
- Without Ex (with cable glands and plugs)

**Additional Inputs/Outputs**
- Without Additional Inputs / Outputs
- Binary Input - integrated
- Binary Output - integrated
- Binary Inputs/Outputs (mandatory for ESD application)
- Analog Position Feedback (4-20 mA)
- Potentiometer Input (for Remote Mounting - main unit)
- Limit Switches (standard version SJ2-N)
- Limit Switches (security version SJ2-SN)
- Mechanical Switches (Micro Switches)
- LEDS (cover without window and without external pushbuttons)
- Grafical LCD (cover with window and with external pushbuttons)

**Gauges**
- Without Gauges
- Built-In Gauges with scale in bar/psi
- Built-In Stainless Steel Gauges with scale in bar/psi

**Pneumatical Connection**
- 1/4 - 18 NPT
- G 1/4

**Electrical Connection**
- 1/2 - 14 NPT (w/o cable glands or plugs for certified SRD960)
- M20 x 1.5 (w/o cable glands or plugs for certified SRD960)

**Electrical Certification / Explosion protection**
- Flameproof II 2 G EEx d IIB/IIC T4/T5/T6 according to ATEX (w/o cable glands or plugs)
- Explosion-proof according to FM (w/o cable glands or plugs)
- Explosion-proof according to CSA (w/o cable glands or plugs)
- GOST Approved for Explosion-proof
- Without Ex (with cable glands and plugs)

**Mounting Preparation on Positioner**
- NAMUR acc. to IEC 534-6 / Direct Mounting to Flowserve actuators FlowPak and FlowTop
- Rotary Actuators according to VDI/VDE 3845
- Integrated attachment with air channels on back/Rotary Actuators according to VDI/VDE 3845
- Direct mounting acc. to NAMUR VDI/VDE 3847/Rotary Actuators according to VDI/VDE 3845
- NAMUR acc. to IEC 534-6 / Rotary Actuators according to VDI/VDE 3845

**Language**
- LCD Language in English / German / Spanish
- LCD Language in English / German / Portuguese
- LCD Language in English / German / Polish
- LCD Language in English / German / Czech
- LCD Language in English / German / Turkish
- LCD Language in English / German / Swedish
- LCD Language in English / German / Hungarian
- LCD Language in English / German / Serbian

---

<table>
<thead>
<tr>
<th>Feature</th>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single Acting</td>
<td></td>
<td>-B</td>
</tr>
<tr>
<td>Double Acting</td>
<td></td>
<td>-C</td>
</tr>
<tr>
<td>Position Transmitter</td>
<td></td>
<td>-T</td>
</tr>
<tr>
<td>Local Control Panel (LCP960) for PST Monitoring</td>
<td></td>
<td>-L</td>
</tr>
<tr>
<td>HART (4 - 20 mA)</td>
<td>(g)</td>
<td>H</td>
</tr>
<tr>
<td>Profibus PA based on IEC 1158-2 (MBP)</td>
<td>(g)</td>
<td>P</td>
</tr>
<tr>
<td>FOUNDATION Fieldbus H1 based on IEC 1158-2 (MBP)</td>
<td>(g)</td>
<td>Q</td>
</tr>
<tr>
<td>not applicable</td>
<td>(f)</td>
<td>X</td>
</tr>
<tr>
<td>LCD Language in English / German / Spanish</td>
<td>(e)</td>
<td>A</td>
</tr>
<tr>
<td>LCD Language in English / German / Portuguese</td>
<td>(e)</td>
<td>C</td>
</tr>
<tr>
<td>LCD Language in English / German / Polish</td>
<td>(e)</td>
<td>D</td>
</tr>
<tr>
<td>LCD Language in English / German / Czech</td>
<td>(e)</td>
<td>E</td>
</tr>
<tr>
<td>LCD Language in English / German / Turkish</td>
<td>(e)</td>
<td>G</td>
</tr>
<tr>
<td>LCD Language in English / German / Swedish</td>
<td>(e)</td>
<td>H</td>
</tr>
<tr>
<td>LCD Language in English / German / Hungarian</td>
<td>(e)</td>
<td>M</td>
</tr>
<tr>
<td>LCD Language in English / German / Serbian</td>
<td>(e)</td>
<td>N</td>
</tr>
</tbody>
</table>
Model Codes SRD960 (continued)

<table>
<thead>
<tr>
<th>Options</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>LCD Language in English / German / Dutch</td>
<td>(e)(g)(p) O</td>
</tr>
<tr>
<td>LCD Language in English / German / Romanian</td>
<td>(e)(g)(p) P</td>
</tr>
<tr>
<td>LCD Language in English / German / Lithuanian</td>
<td>(e)(g)(p) Q</td>
</tr>
<tr>
<td>Without</td>
<td>(h)(p) S</td>
</tr>
<tr>
<td>Booster relays, Code LEXG -F, -G, -H</td>
<td></td>
</tr>
<tr>
<td>Connection manifold, LEXG -K, -L, -D, -D1</td>
<td></td>
</tr>
<tr>
<td>ACCESSORIES, FOR ALL DEVICES</td>
<td></td>
</tr>
<tr>
<td>Lateral attachment to positioner</td>
<td></td>
</tr>
<tr>
<td>Air output</td>
<td></td>
</tr>
<tr>
<td>See table on page 3</td>
<td></td>
</tr>
<tr>
<td>The use of boosters together with a spool valve amplifier is not</td>
<td></td>
</tr>
<tr>
<td>recommended.</td>
<td></td>
</tr>
<tr>
<td>So avoid to select LEXG-G with SRD960-C. In case of need select LEXG-G</td>
<td></td>
</tr>
<tr>
<td>with SRD960-Cxxxxxxxxxxxxx-M</td>
<td></td>
</tr>
</tbody>
</table>
## Model Codes Accessories

### Parts for Intelligent Positioner

<table>
<thead>
<tr>
<th>Attachment kit</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>EBZG</td>
<td></td>
</tr>
<tr>
<td>for diaphragm actuators with casting yoke acc. NAMUR (incl. standard couple lever)</td>
<td>H</td>
</tr>
<tr>
<td>for diaphragm actuators with pillar yoke acc. NAMUR (incl. standard couple lever)</td>
<td>K</td>
</tr>
<tr>
<td>for directly mounting (incl. standard couple lever)</td>
<td>D</td>
</tr>
<tr>
<td>for mounting to rotary actuators acc. VDI/VDE 3845 (without bracket)</td>
<td>R</td>
</tr>
<tr>
<td>for FlowTop / FlowPak</td>
<td>E1</td>
</tr>
<tr>
<td>Further Attachment kits on request. See also our Internet site.</td>
<td></td>
</tr>
</tbody>
</table>

### Cable Gland

<table>
<thead>
<tr>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>BUSG</td>
</tr>
<tr>
<td>M20 x 1.5 stainless steel</td>
</tr>
<tr>
<td>M20 x 1.5 plastics, color gray</td>
</tr>
<tr>
<td>M20 x 1.5 plastics, color blue</td>
</tr>
<tr>
<td>M20 x 1.5 plastics, color white</td>
</tr>
<tr>
<td>M20 x 1.5 HF-cable gland for Fieldbus</td>
</tr>
<tr>
<td>M20 x 1.5 Plug-connector for Fieldbus (ss / threaded connection 7/8 - UN)</td>
</tr>
<tr>
<td>M20 x 1.5 Plug-connector for Profitux PA (ss / threaded connection M12)</td>
</tr>
<tr>
<td>M20 x 1.5 stainless steel, Ex d</td>
</tr>
<tr>
<td>M20 x 1.5 Brass Zink plated, Ex d</td>
</tr>
<tr>
<td>1/2-14 NPT cable gland 6 to 12 mm, Stainless steel, Ex d</td>
</tr>
<tr>
<td>1/2-14 NPT cable gland 6 to 12 mm, Steel Zink plated, Ex d</td>
</tr>
<tr>
<td>1/2-14 NPT, Brass Zink plated, Ex d</td>
</tr>
<tr>
<td>M20 x 1.5 Plug, plastic</td>
</tr>
<tr>
<td>M20 x 1.5 Plug, Ex d / explosionproof certified, stainless steel</td>
</tr>
<tr>
<td>1/2-14 NPT Plug, Ex d / explosionproof certified, stainless steel</td>
</tr>
<tr>
<td>M20 x 1.5 Plug, Brass Zink plated, Ex d</td>
</tr>
<tr>
<td>1/2-14 NPT Plug, Brass Zink plated, Ex d</td>
</tr>
</tbody>
</table>

### Adapter

<table>
<thead>
<tr>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>AD</td>
</tr>
<tr>
<td>Adapter 1/2&quot; NPT to 3/4&quot; NPT (stainless steel)</td>
</tr>
<tr>
<td>Adapter M20 x 1.5 to 1/2&quot; - 14 NPT (internal thread) (Brass Nickel plated)</td>
</tr>
<tr>
<td>Adapter M20 x 1.5 to 1/2&quot; - 14 NPT (internal thread) (stainless steel)</td>
</tr>
<tr>
<td>Adapter M20 x 1.5 to PG13.5 (internal thread) (stainless steel)</td>
</tr>
<tr>
<td>Adapter M20 x 1.5 to G1/2&quot; (internal thread) (stainless steel)</td>
</tr>
<tr>
<td>Adapter (plastic) M20 x 1.5 to PG13.5 (internal thread)</td>
</tr>
</tbody>
</table>

### Manifold (for SRD960, SRD991 and SRI990)

<table>
<thead>
<tr>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>LEXG</td>
</tr>
<tr>
<td>With Connection G 1/4</td>
</tr>
</tbody>
</table>

### Booster Relay (for SRD960, SRD991 and SRI990, with connection 1/4 - 18 NPT)

<table>
<thead>
<tr>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>F</td>
</tr>
<tr>
<td>for Version single acting</td>
</tr>
<tr>
<td>for Version double acting</td>
</tr>
<tr>
<td>H</td>
</tr>
<tr>
<td>for Version single acting with doubled output capacity</td>
</tr>
</tbody>
</table>

### Booster Relay (mounted independent from positioner, for SRD960, SRD991 and SRI990, with connection G1/4)

<table>
<thead>
<tr>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>X1</td>
</tr>
<tr>
<td>for Version single acting</td>
</tr>
<tr>
<td>for Version double acting</td>
</tr>
<tr>
<td>Z1</td>
</tr>
<tr>
<td>for Version single acting with doubled output capacity</td>
</tr>
</tbody>
</table>
DIMENSIONS – Direct attachment to stroke actuators

**Feedback lever**  
Code EBZG-A for 8..70 mm travel

**Feedback lever**  
FoxPak/FoxTop in Code EBZG-E

**Carrier bolt**  
for connection to valve stem

**Detail:** shaft stub 9 is perpendicular to the arrow 26 on the housing
LCD orientation can be changed by means of local push buttons under Menu 3.9.2 to ‘flipped’, to ensure a correct orientation of the display.

Attachment to casting yoke  
(with attachment kit Code EBZG -H)  

Attachment to pillar yoke  
(with attachment kit Code EBZG -K)  

Mounting bracket

Feedback lever  
Code EBZG-A for 8..70 mm travel  

Feedback lever  
Code EBZG-B for 60..120 mm travel  

Carrier bolt  
for connection to valve stem
DIMENSIONS – Attachment to rotary actuators acc. to VDI/VDE 3845

Attachment diagram of bracket

Delivery of bracket by manufacturer of actuator
or see EBZG -C1, -C2 or -C3
SRD960 DIMENSIONS

DIMENSIONS

mm
in