FB 998

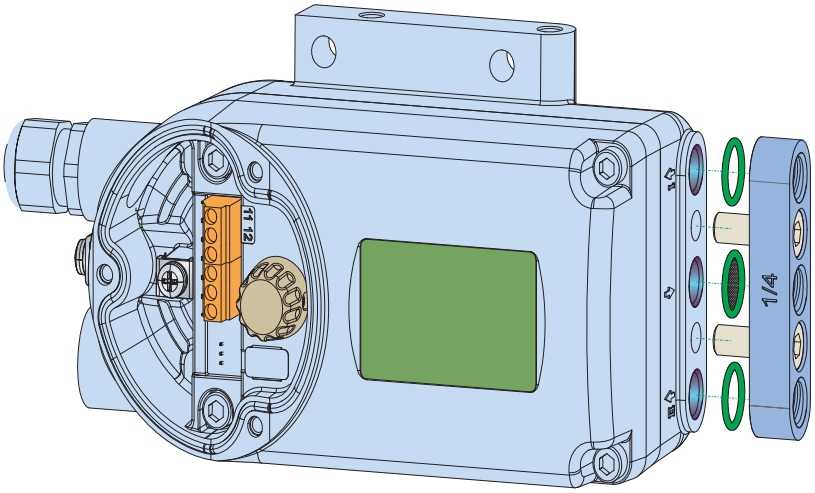
Linear & Rotary Intelligent Positioner with HART Communication

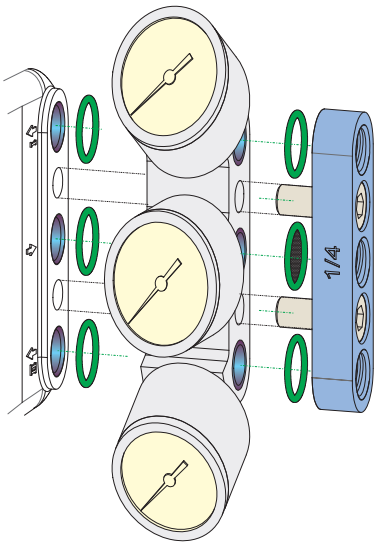
The intelligent positioner SRD998 is designed to operate pneumatic valve actuators and can be operated from control systems (e.g. the Foxboro I/A Series System and Foxboro Evo™), controllers or PC-based configuration and operation tools such as the FDT/ DTMs VALcare™. The positioner is available with HART 7 communication protocol. The extra large multi-lingual full text graphical-LCD, in conjunction with the rotary selector, allows a comfortable and easy local configuration and operation. For installations in contact with explosive atmospheres certificates are available.

MAIN FEATURE

Intelligent

- Auto-start with self-calibration
- Self diagnostics, status- and diagnostic messages
- DTM for valve diagnostics and predictive maintenance
- Easy local operation with the rotary selector
- Extra large multi-lingual full text graphical LCD
- With HART 7 communication
- Stroke 8 to 260 mm (0.3 to 10.2 in) with standard lever; larger stroke with special lever
- Angle range up to 95 ° (up to 120 ° on request)
- Mounting onto any linear or rotary actuator
- Supply air pressure up to 10 bar (145 psig)
- Single or double acting
- Protection class IP 66
- Explosion protection: Intrinsic Safety according to ATEX / IECEx, INMETRO, NEPSI, PESO, CNS, EAC





TECHNICAL DATA

Supply

Supply air pressure

B0S, C0S ..... 1.4 to 6 bar (20 to 87 psig)

B1S, B2S .....1.4 to 10 bar (20 to 145 psig)

C2S, C3S .....1.4 to 10 bar (20 to 145 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

The use of a **filter regulator** for the air supply of positioner is strongly recommended. It reduces the air pressure to the actuator's maximum pressure, keeps it constant, and filters the air.

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.....without mechanical stop up to 95 ° angle (up to 120° on request)

Response characteristic 1) 2)

Sensitivity..... < 0.1 % of travel span

Non-linearity (terminal based adjustment) < 0.6 % of travel span

Hysteresis ..... < 0.3 % of travel span

Supply air dependence ..... < 0.1 % / 1 bar (15 psi) Temperature effect < 0.3 % / 10 K ▪▪▪

… TECHNICAL DATA

Mechanical vibration effect acc. IEC 60068-2-6 (2007) for 10 to 500 Hz up to 2 g

- For Pneumatics B0S, ... < ±0.25% up to 80 Hz and 1 g
  < ±0.25% up to 70 Hz and 2 g
- For Pneumatics B1S, B2S..... < ±0.25% up to 70 Hz and 1 g
  < ±0.25% up to 50 Hz and 2 g
- For Pneumatics C0S ..... < ±0.25 % up to 400 Hz and 1 g
  < ±0.25 % up to 70 Hz and 2 g
- For Pneumatics C2S, C3S < ±0.25 % up to 55 Hz and 2 g

In case of high vibrations, we recommend using remote mounting solution.

Note for single / double acting operation

For optimal control performance, the use of *double* acting positioners onto *single* acting actuators is not recommended.

Pneumatic Performance - Air flow

Air flow at Air Input / output:	1.4 bar	3 bar	6 bar		
Pneumatic **Code B0S** (single acting - Standard Flow)					
to pressurize actuator	4000	7000	14000		Nl/h
to vent actuator	2700	5000	10000		Nl/h
Pneumatic **Code C0S** (double acting - Standard Flow)					
to pressurize actuator	3500	5000	10000		Nl/h
to vent actuator	2500	3750	7500		Nl/h

Pneumatic Performance - Air consumption [3] [Nl/h]

Air consumption at steady state:		1,4 Bar	3 bar	6 bar		
Pneumatic **Code**:	Input signal					
B0S (single acting - Standard Flow)	0 %	<100	<100	<100		Nl/h
B0S (single acting - Standard Flow)	100 %	175	250	400		
C0S (double acting - Standard Flow)	0 %	175	250	400		Nl/h
C0S (double acting - Standard Flow)	50 %	215	335	570		Nl/h
C0S (double acting - Standard Flow)	100 %	175	250	400		Nl/h

1) Data measured according to VDI/VDE 2177 and IEC 61514-2
2) With 90 °angle, rotary actuator
3) Measured according ANSI / ISA-75.13.01-2013

FUNCTIONAL SPECIFICATIONS

Features

Automatic start-up .....(Autostart functionality)

Automatic determination of the mechanical end positions of the valve (initial value and final value), IP motor parameters, direction of action of the spring, and control parameters. The control parameters are optimized dynamically during this routine.

This procedure makes a perfect adjustment and opti- mization to the actuator possible without additional manual settings! Several Auto-start modes are available (details see on next pages).

Operation and Configuration

The local LCD enables a fast and easy configuration as well as clear diagnostic messages.

Local..... with local rotary selector

Display ..... multi lingual graphic LCD

The positioner contains the following menu languages:

• English • German • French • Chinese • Portuguese

SETTING

Manual, local and remote settings:

Actuator mode ..... linear or rotary actuator

- Linear valve ..... left or right mounted

- Rotary actuator.....opening clockwise or counter-clockwise

Valve characteristic..... linear, equal percentage, inverse-equal percentage or custom (22 points)

Valve action .....opens or closes with increasing set point

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
- Smooth response
- Fast response

Control parameters..... Determined during Autostart.

Working range ..... freely adjustable (for indication on LCD)

Manual adjustment of .....P-gain, I-time, D-time, T63-time, and dead band

Manual operation.....Manual input of set point to drive the valve in steps of 12.5 % or 1 %

Pneumatic test.....Function to test the pneumatic output

LCD orientation ..... Standard, and upside down ▪▪▪

... SETTING

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Software supported configurations:

- By means of Hand Held Terminal (HART)

- PC by means of VALcare DTM Software

- I/A Series System, Foxboro Evo and other DCSs

Failure handling

In case of Single Acting, Safety position at

- Air supply failure.....pressure y1 = zero

- Electric power failure..... pressure y1 = zero

- Failure of electronics ..... pressure y1 = zero

In case of Double Acting or spool valve amplifier, safety position at

- Air supply failure ..... pressure y1 = zero; y2 =zero

- Electric power failure..... pressure y1 = zero; y2 = full air supply pressure

- Failure of electronics ..... pressure y1 = zero; y2 = full air supply pressure

DIAGNOSTIC

To monitor the high performance of the positioner, we offer several diagnostic utilities:

Surveillance/Function	**Basis**	**Advanced**
Configuration data	YES	YES
Imput current adjustment	YES	YES
A/D convertere	YES	YES
Position valve	YES	YES
Connection to I/P converter	YES	YES
Potentiometer	YES	YES
Angle adjustment	YES	YES
Reaching of the set pointin a specific time	YES	YES
Temperature limit min or max	YES	YES
Autostart	YES	YES
Custom characterization		YES
Auto diagnostic		YES
Alarm management		YES
Alarm output for switching (with option board)		YES
Status List acc. To NE 107		YES
Position hystory		YES
Response History		YES
Step response analyze		YES

PHYSICAL SPECIFICATIONS (common data for all versions)

Mounting

Attachment to stroke actuators

- for casting yoke acc. to IEC 534-6 (NAMUR)with attachment kit EBZG –H or –H1

- for pillar yoke acc. to IEC 534-6 (NAMUR)with attachment kit EBZG –K or –K1

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.

Attachment to rotary actuators acc. to VDI/VDE 3845

with attachment kit ..... EBZG -R

- Further attachment kits see ModelCodes page 15/16

- Mounting orientation see attachment dimensions starting from page 17

Materials

Housing and covers ....Aluminum Alloy No. 230(GD-AlSi12) Polyester Powder coated

Sealings between covers .....Silicone elastomer and silicone core with Ag/Cu particles

LCD Window ....Polycarbonate, U.V. stabilized

External Screws .....Stainless Steel V2A 1.4301

otherboard ....Coated with protective resin

All moving parts of feedback ystem (e.g. shaft) ..... 1.4306 / 1.4571 / 1.4104

Attachment kits .. V4A 1.4401 or depending upon version) . Aluminum Alloy No. 230 (GD-AlSi12) finished with DD varnish

Mounting bracket ..... Aluminum Alloy No. 230 (GD-AlSi12)

Pneumatic diaphragms .... VMQ, PVMQ (Silicone elastomer, suitable for use in the paint industry) (depending upon version)

Weight

With pneumatic B0S..... approx. 2.1 kg (4.7 lbs) C0S ..... approx. 2.3 kg (5.1 lbs)

With pneumatic B2S..... approx. 2.2 kg (4.9 lbs) C3S ..... approx. 2.2 kg (4.9 lbs)

Pneumatic connection

NAMUR mounting..... G 1/4 or 1/4-18 NPT via manifold ▪▪▪

… PHYSICAL SPECIFICATIONS (common data for all versions) Mounting

Electrical Connection

Line entry ……..1 cable gland M20 x1.5, 1/2-14 NPT with Adapter AD-)

Cable diameter ..... …..6 to 12 mm (0.24 to 0.47 in)

Screw terminals .....2 terminals for input

Wire cross section .....0.3 to 2.5 mm2 (AWG 22-14) max torque 0,6 Nm

Ambient conditions:

Operating conditions - acc. to IEC 654-1

The device can be operated at a class Dx location.

Ambient temperature

Operation 1) ..... –40 to 80 °C (–40 to 176 °F)

Transport and storage.....–40 to 80 °C (–40 to 176 °F)

If the device is exposed to sunlight and the temperature may rise above 80 °C / 176 °F, we recommend a sun shade.

Storage conditions acc. to IEC 60721-3-1..... 1K5; 1B1; 1C2; 1S3; 1M2 i

Indicators

LCD (visible) 2) ..... –25 to 70 °C (–13 to 158 °F

Relative humidity .....up to 100 %

Protection class acc. to IEC 60529 . . . . . IP 66; acc. to NEMA ..... Type 4X

Electromagnetic compatibility EMC

Operating conditions - industrial environment

Immunity according to:

- EN 61326 .....fulfilled

- IEC 61326 ..... .fulfilled

- EN 61000-6-2 .....fulfilled

Emission according to EN 61326

- Class A and Class B ….fulfilled

- EN 61000-6-4 .....fulfilled

- EN 55011 Group 1,

- Class A and Class B ....fulfilled

- NAMUR recommendation

- EMV NE21 .....fulfilled …

… PHYSICAL SPECIFICATIONS (common data for all versions) Mounting

SAFETY REQUIREMENTS

CE label

Electromagnetic

Compatibility…… 2014 / 30 / EC

Low-voltage regulation ……not applicable

See also Declaration of Conformity.

Safety

According to EN 61010-1 (or IEC 1010-1) … Safety class III Overvoltage Category I

External fuses… Limitation of power supplies for fire protection must be observed acc. to EN 61010-1, app. F, or IEC 1010-1.

ELECTRICAL CLASSIFICATION 1) 2)

See Certificates of Conformity EX EVE0108 A

Intrinsically Safe according to ATEX / IEC Ex

Code A1, A2, or A3

A1 = II 2 G Ex ia IIC T4/T6 Gb / II 1 D Ex ia IIIC T100 °C Da or A2 = II 2 G Ex ib IIC T4/T6 Gb / II 2 D Ex ib IIIC T100 °C Db

or A3 = II 3 G Ex ic IIC T4/T6 Gc / II 3 D Ex ic IIIC T100 °C Dc

For use in hazardous areas in certified safe circuits with the following maximum values:

Pi	Ui	Ii	T4	T6
900 mW	30 V	130 mA	–40°C to 80°C	
660 mW	28.1 V	130 mA	–40°C to 80°C	–40°C to 44°C
630 mW	25.7 V	130 mA	–40°C to 80°C	–40°C to 46°C
590 mW	25.3 V	130 mA	–40°C to 80°C	–40°C to 48°C
510 mW	26 V	130 mA	–40°C to 80°C	–40°C to 52°C

Li = < 10 µH

Ci = < 2.5 nF

IP degree acc. to IEC 60529 ……IP 66

Other electrical certifications in progress

1) With appropriate order only

2) National requirements must be observed

HART COMMUNICATION

SRD998 with HART communication SRD998-Hxxxx

Signal Input ..... two wire system

Reverse polarity protection... standard feature

Signal range ..... 4 to 20 mA

Operating range..... 3.6 to 21.5 mA

Input voltage ..... DC 12 to 36 V[1)] (unloaded)

Load ..... 420 Ohms, 8.4 V at 20 mA

Communication signal ..... HART 7, 1200 Baud, FSK (Frequency Shift Key) modulated on 4 to 20 mA, 0.5 Vpp at 1 kOhm load

Input impedance Zi ..... Z = 320 Ohms for ac voltage 0.5 to 10 kHz with < 3 dB non-linearity

Cable capacity and inducance 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 exceeding input capacitance parallel to the input not higher than 5 µF.

Start-up time ..... approx. 3 sec

Interruption time without power down . . . typ. 8 ms [2)]

1) On request we can specify higher voltage limits

2) Worst case conditions 4-20 mA, I/p-output with max. current

Configuration

The SRD998 can be configured via HART by any host system whatever is a PC with a HART Modem, Hand Held Terminal or a DCS.

LOCAL (by means of rotary selector and LCD display) See page 6

DTM (Device Type Manager)

We are a leading company in term of FDT-DTM technology

https://www.schneider-electric.com/en/download/range/63514-Valve%20Positioners/?docType=4889330-DTM+files

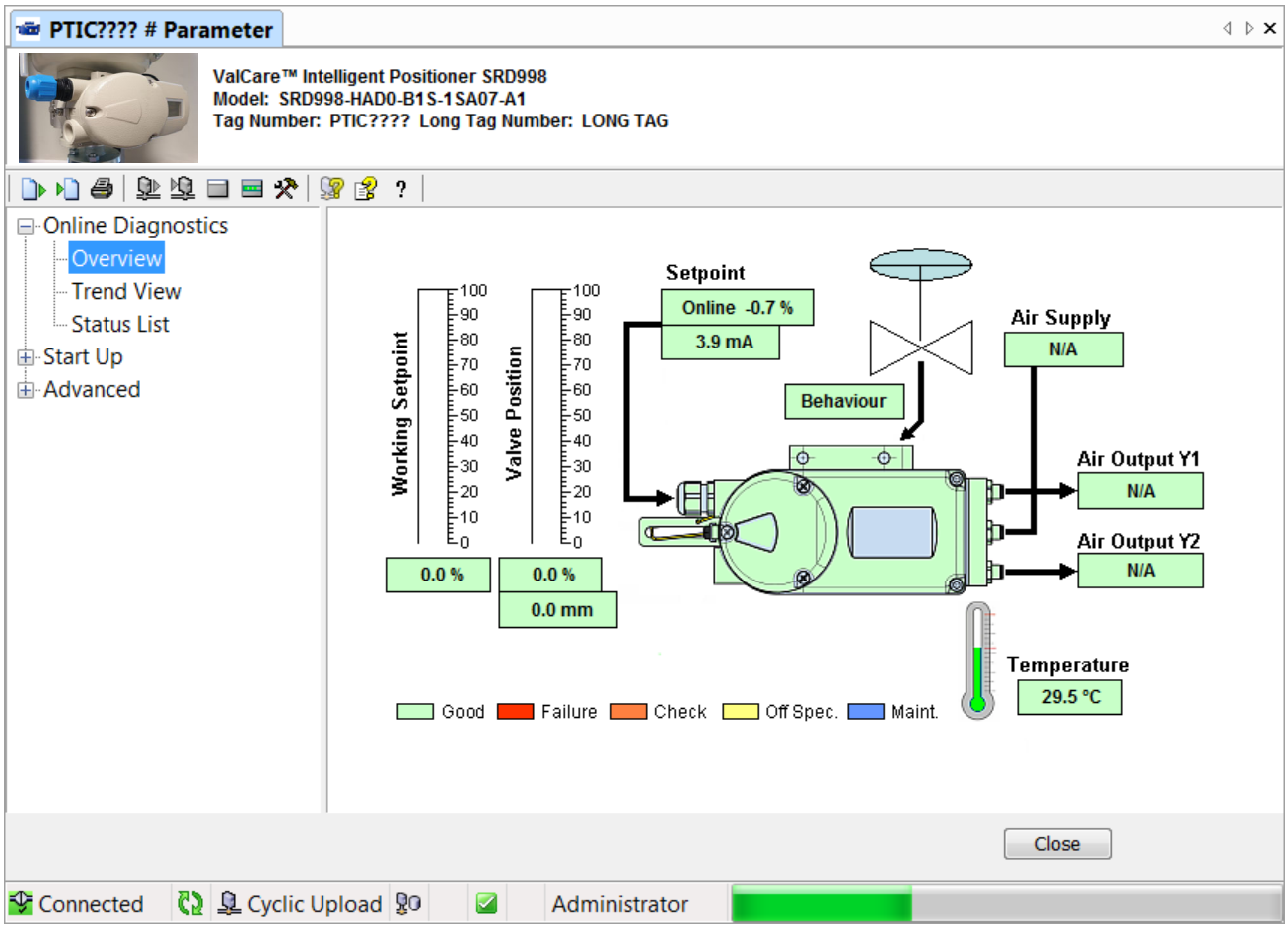
Therefore we provide a DTM fully certified for its inter- operability and with the state-of-the-art presentation and diagnostics features.

The DTM can be downloaded from our homepage.

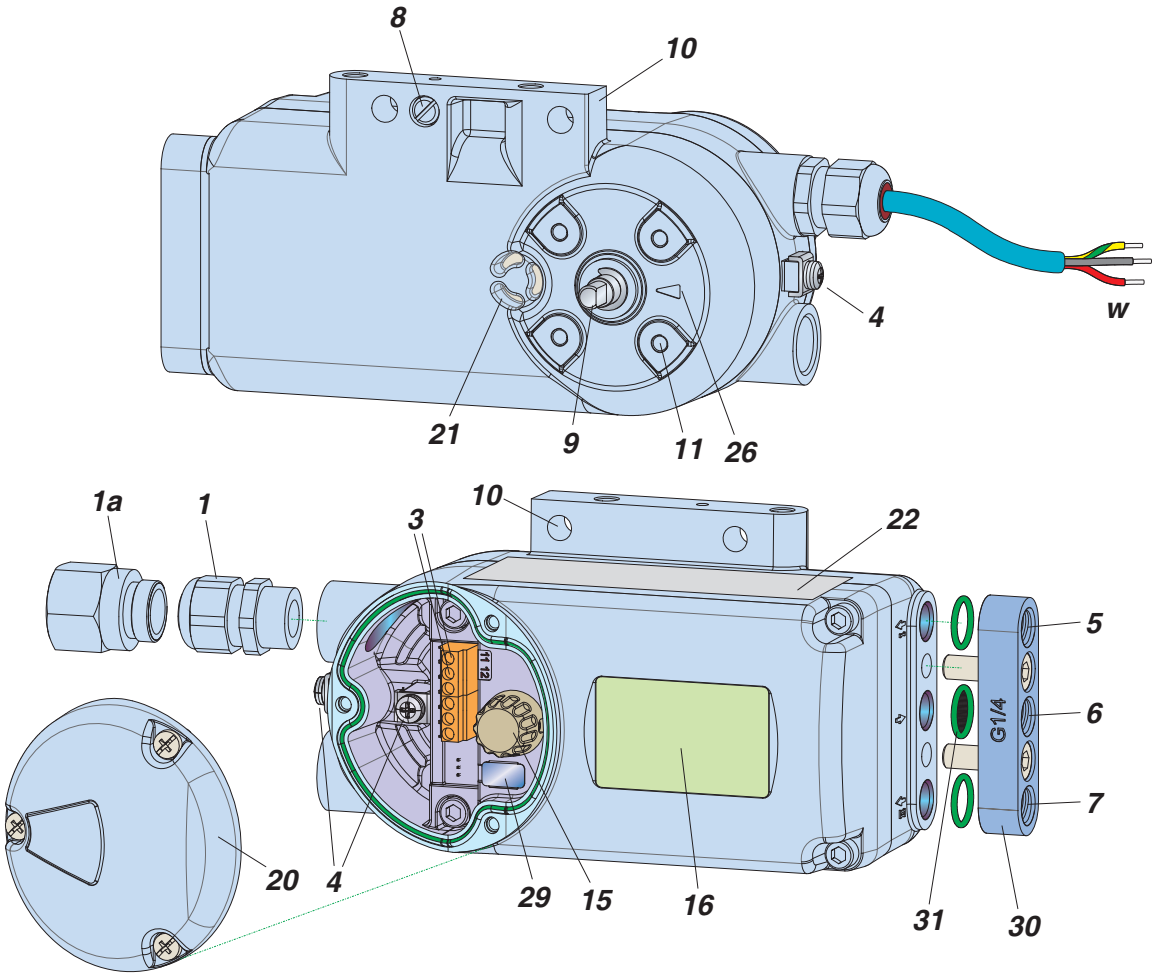
DD (Device Description) and EDD (Enhanced Device Description)

In case the host system is not supporting the FDT-DTM technology, you can download the DD and/or EDD from our homepage.

… HART COMMUNICATION



FUNCTIONAL DESIGNATION



1 Cable gland

1a Adapter, e.g. 1/2”-14 NPT

3 Screw terminals (11 / 12) for input (w)

4 Ground connection (inner and outer)

5 Output I (y1)

6 Air supply (s)

7 Output II (y2)

8 Direct attachment hole for output I (y1)

9 Feedback shaft

10 Connection manifold for attachment to stroke actuators

11 Connection base for attachment to rotary actuators

15 Rotary selector for select Menu, and press to confirm

16 LCD with true text in many languages

20 Cover for electrical connection compartment

21 Air vent, dust and water protected

22 Data label

26 Arrow is perpendicular to shaft ***9*** at angle 0 degree

29 Service only

30 Connecting manifold, G 1/4 or 1/4 NPT

31 Component O-ring with filter, for air supply

MODEL CODES

Intelligent Positioner SRD998

Communication

HART ..... H

Profibus PA ..... (a) P

FOUNDATION Fieldbus H1 ..... (a) Q

Diagnostics Performance

Basic Diagnostics .....BD

Advanced Diagnostics ..... AD

Premium Diagnostics ....(a).....PD

Partial Stroke Testing & Shutdown.... .....(a).....SA

Partial Stroke Testing & SOV Monitoring (a) .....SB

Electrical In-Out Option

No In-Out Option 0

Universal In-Out Option .....(a).....1

Version –

Single acting .....B

Double acting C

Pneumatic Performance

Standard Pneumatic (max 6 bar air supply) 0

Standard Flow - - High Performance Pneumatic (10 bar max air supply) 1

High Flow - - - - - High Performance Pneumatic (10 bar max air supply) 2

Very High Flow - High Performance Pneumatic (CV 1 – 10 bar max air supply) 3

Fail in case of lost of power

Fail safe ....S

Fail freeze .....(a).....F

Housing –

Aluminum.....1

SST (316)..... (a) 2

Aluminum Ex d ..... (a) 3

SST (316) Ex d ..... (a) 4

Mounting

Standard .....S

For direct mounting .....T

For VDI/VDE 3847 .....(a)..... ..... U

For remote mounting of positioner with side mounting potentiometer unit V

For remote mounting of positioner with top mounting potentiometer unit .....W

For remote mounting of positioner w/o potentiometer unit (order pot. separately) ....Y

Pneumatic Connection

1/4 NPT.....A

1/4 G ..... B

1/4 NPT with tapped exhaust(a).....C

1/4 G with tapped exhaust(a).....D

… MODEL CODES

Gauges

Without gauge 0

With 2 standard gauges for single acting ..... (b) 1

With 2 Nickel plated gauges connection for single acting ..... (b) 2

With 3 standard gauges for double acting ..... (c) 3

With 3 Nickel plated gauges connection for double acting ..... (c) 4

Electrical Connection

M20x1.5 7

1/2 NPT (made with an adaptor) 8

Electrical Certification

without certification ..... ZZ

ATEX / IEC Ex: II 2G Ex ia IIC T4/T6 Gb, II 1D Ex ia IIIC T100 °C Da A1

ATEX / IEC Ex: II 2G Ex ib IIC T4/T6 Gb, II 2D Ex ib IIIC T100 °C Db A2

ATEX / IEC Ex: II 3G Ex ic IIC T4/T6 Gc, II 3D Ex ic IIIC T100 °C Dc A3

INMETRO: Ex ia IIC T4/T6 Gb, Ex ia IIIC T100 °C Da, IP66 ..... B1

INMETRO: Ex ib IIC T4/T6 Gb, Ex ib IIIC T100 °C Db, IP66 ..... B2

INMETRO: Ex ic IIC T4/T6 Gc, Ex ic IIIC T100 °C Dc, IP66 ..... B3

NEPSI: Ex ia IIC T4/T6 Ga, Ex ia D20 T100 Da, IP66 ..... N1

NEPSI: Ex ib IIC T4/T6 Gb, Ex ib D21 T100 Db, IP66 ..... N2

NEPSI: Ex ic IIC T4/T6 Gc, Ex ic D22 T100 Dc, IP66 ..... N3

FM certification IS ..... (a) F1

FM certification IS ..... (a) F2

FM certification IS ..... (a) F3

CSA certification IS ..... (a) C1

CSA certification IS ..... (a) C2

CSA certification IS ..... (a) C3

EAC: 1 Ex ia IIC T4/T6 Gb X, Ex ia IIIC T100°C Da G1

EAC: 1 Ex ib IIC T4/T6 Gb X, Ex ib IIIC T100°C Db ..G2

EAC: 2 Ex ic IIC T4/T6 Gc X, Ex ic IIIC T100°C Dc G3

KOSHA certification IS ..... (a) K1

KOSHA certification IS ..... (a) K2

KOSHA certification IS ..... (a) K3

TIIS certification IS ..... (a) J1

TIIS certification IS ..... (a) J2

TIIS certification IS ..... (a) J3

CNS certification IS [1)]

PESO certification IS [2)]

Options –

Positioner suitable for use of natural gas instead of air supply ..... (a) ..... -S

Positioner free of copper and its alloys ..... (a) ..... -C

Approved for SIL2 / SIL3 application ..... (a) ..... -Q …

... MODEL CODES

... Options

Stainless Steel Label, fixed with wire.....-L

Positioner with ECEP .....(a).....-X

(a) Not released
(b) Only to be ordered with single acting model code Version B
(c) Only to be ordered with double acting model code Version C
1) The SRD998 has the CNS certificate for usage in Taiwan

MODEL CODES ACCESSORIES

Communication / Modem / DTM

HART USB Modem (made by Ifak) with ATEX IS Certification MOD900

DTM for SRD Series for HART / FF / Profibus . . . . . VALCARE

Service Modem EDC90

Cable Gland

Cable Gland, M20x1.5 Plastics, Color Gray/Black BUSG-K6

Cable Gland, M20x1.5 Plastics, Color Blue BUSG-K7

Cable Gland, M20x1.5 Plastics, Color White. BUSG-K9

Cable Gland, M20x1.5 Stainless Steel. BUSG-S6

Adapter

Adapter (Brass With Nickel Coating) M20 x 1.5 To 1/2 - 14 NPT (Internal Thread) AD-A5

Adapter (ss) M20x1.5 to 1/2-14 NPT (Internal Thread) AD-A6

Attachment Kits **EBZG**

For diaphragm actuators with casting yoke acc. NAMUR (incl. standard Couple lever) . . . . . -H

For diaphragm actuators with pillar yoke acc. NAMUR (incl. standard Couple lever). . . . . -K

For FoxTop / FoxPak . . . . . (g) . . . . . -E1

For mounting to rotary actuators acc. VDI/VDE 3845 (without bracket) . . . . . -R

Brackets VDI/VDE 3845 (A = 80 mm / 3.15 in; B = 20 mm / 0.79 in) . . . . . -C1

Brackets VDI/VDE 3845 (A = 80 mm / 3.15 in; B = 30 mm / 1.18 in) . . . . . -C2

Brackets VDI/VDE 3845 (A = 130 mm / 5.12 in; B = 50 mm / 1.97 in). . . . . -C3

Brackets VDI/VDE 3845 (A = 130 mm / 5.12 in; B = 30 mm / 1.18 in). . . . . -C4

Universal Brackets VDI/VDE 3845 (A = 80 or 130 mm; B=20 or 30 or 50 mm) . . . . . -C5

Couple Lever **EBZG**

Standard (stroke max. 80 mm) . . . . . A

Extended (stroke max. 260 mm) . . . . . -A1

Reduced (stroke < 8 mm) . . . . . -A2

Fold feedback lever (stroke 8 to 70 mm) . . . . . -A3

Short stroke (stroke 8 to 35 mm) . . . . . -A4

MODEL CODES ACCESSORIES

Carrier bolt	**SRXG**
Carrier bolt extra short 23 mm	A
Adjustable carrier bolt 20 to 37 mm	-B
Carrier bolt 38 mm	-C
Carrier bolt 47 mm	-D
Carrier bolt 57 mm	-E
Carrier bolt 65 mm	-F
Adjustable carrier bolt with fixing system for stem diameter up to 21 mm	.G
Adjustable carrier bolt with fixing system for stem diameter up to 34 mm	H
Carrier Bolt 80 mm	-I
Adjustable carrier bolt for thread 3/8"	-J
Adjustable carrier bolt for thread 5/16"	-K
Extension for carrier bolt	-L
Adjustable carrier bolt with fixing system centered for stem diameter up to 64 mm	-M
Adjustable carrier bolt with fixing system centered for stem diameter up to 21 mm	-G1
Adjustable carrier bolt with fixing system centered with extension up to 80 mm for stem diameter up to 21 mm	-G2

Questo documento ha solo valenza informativa. OMC S.p.A. si riserva di modificarne il contenuto senza alcun preavviso.

OMC S.p.A.

Via Galileo Galilei, 18 -20060 - Cassina de Pecchi (MI) - ITALY

Tel.: (+39) 02.95.28.468

Fax: (+39) 02.95.21.495

info@omcsrl.com

www.omcvalves.com