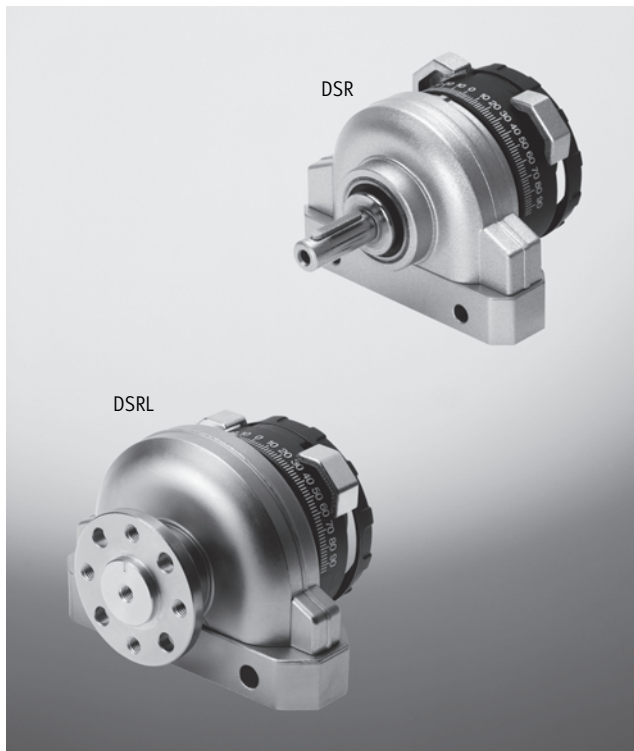


## Semi-rotary actuators DSR/DSRL - Inch Series



- Wide variety of mounting options
- Infinitely adjustable rotation angle
- Comprehensive range of accessories

Product range overview						
Function	Version	Piston Ø [in]	Rotation angle [°]	Torque [ft-lbf]	Variants	
					P	FW
Double-acting	Semi-rotary actuator with keyed drive shaft	3/8, 1/2	0 ... 181	0.6 ... 1.1	■	■
		5/8, 1, 1-1/4, 1-5/8	0 ... 184	2.2 ... 22.1	■	■

### Variants

P Flexible cushioning pads on each side      FW With hollow flanged shaft

# Semi-rotary actuators DSR/DSRL - Inch Series

## Features

### Description

In these semi-rotary actuators, the force is directly transmitted to the drive shaft via a rotary vane. The rotation angle is infinitely adjustable.

The adjustable stop system is separate from the rotary vane so that any forces which occur are absorbed by the stop blocks. The impacts are cushioned at the end positions by built-in flexible pads.

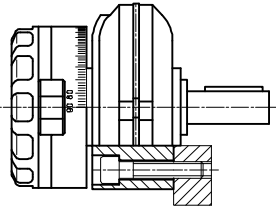
**DSRL-...-FW**  
This design with hollow flanged shaft permits the passage of liquid or

gaseous media, or even tubing or wiring. The force is transmitted directly and backlash-free via a splined shaft.

### Mounting options

Without mounting attachments

Direct mounting



With mounting attachments

For DSR

Foot mounting HSR-...-FW



Flange mounting FSR



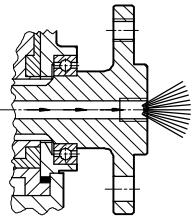
For DSRL

Foot mounting HSR-...-FW

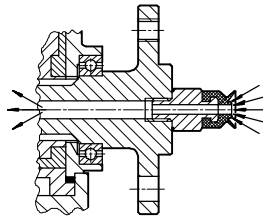


### Sample applications with hollow flanged shaft in DSRL

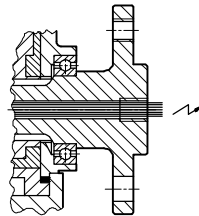
Air blast



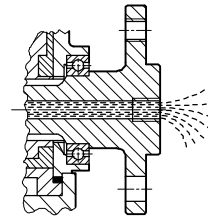
Vacuum



Electrical lines



Water, coolant, oil, glue, etc.

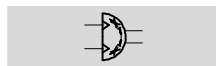


# Semi-rotary actuators DSR/DSRL - Inch Series

FESTO

Technical data

Function



Variants

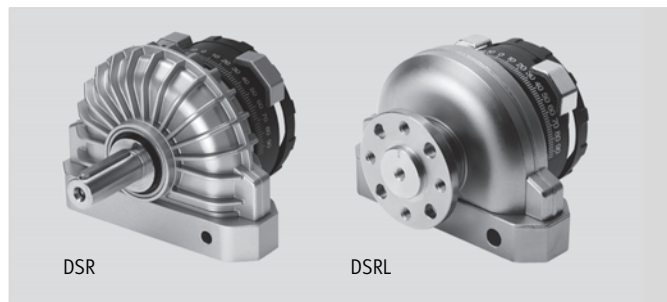
- With keyed shaft
- With hollow flanged shaft

Diameter

3/8 ... 1-5/8 inch

Force

0.6 ... 22.1 ft-lbf



DSR

DSRL

General technical data						
Piston Ø	3/8	1/2	5/8	1	1-1/4	1-5/8
Pneumatic connection	M3	10-32 UNF	10-32 UNF	10-32 UNF	1/8" NPT	1/4" NPT
Design	Semi-rotary actuator with vane drive					
Cushioning	Non-adjustable at both ends					
Magnet for position sensing	Via electrical, pneumatic, or inductive switches (ordered separately, see accessories)					
Rotation angle	0 ... 181°		0 ... 184°			

Operating conditions						
Piston Ø	3/8	1/2	5/8	1	1-1/4	1-5/8
Operating medium	Filtered compressed air, lubricated or unlubricated					
Operating pressure [psi]	36.8 ... 117.6	29.4 ... 117.6	22.1 ... 117.6			
Temperature range <sup>1)</sup> [°F]	+14 ... +140					

1) Note operating range of proximity sensors

Forces and torques						
Piston Ø	3/8	1/2	5/8	1	1-1/4	1-5/8
Torque at 90 psi [ft-lbf]	0.6	1.1	2.2	5.5	11.1	22.1
Max. rotating frequency <sup>2)</sup> [Hz]	3					
Max. perm. radial load <sup>3)</sup> [lbf]	6.7	10.1	16.9	27.0	45.0	78.7
Max. perm. axial load <sup>3)</sup> [lbf]	2.2	4.0	6.7	11.2	16.9	27.0
Max. perm. mass moment of inertia <sup>3)</sup>	Diagrams					

2) Please observe the max. permissible mass moments of inertia

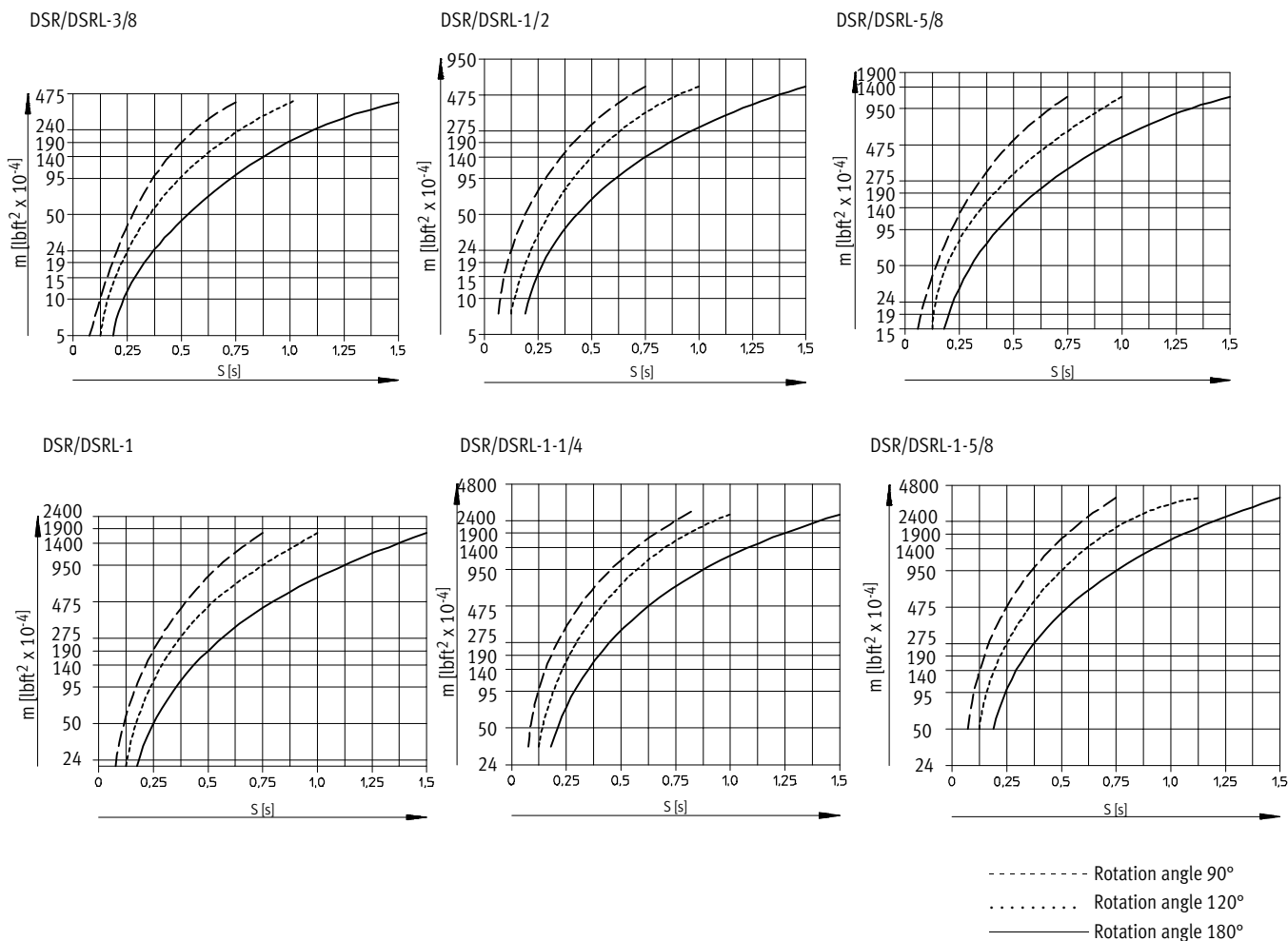
3) On the drive shaft at maximum frequency

# Semi-rotary actuators DSR/DSRL - Inch Series

Technical data

## Max. permissible mass moment of inertia

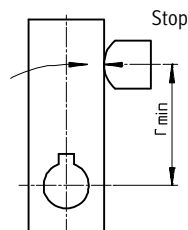
Mass moment of inertia  $m$  as a function of rotation time  $S$  and rotation angle



### Assembly instructions:

If the listed maximum permissible mass moment of inertia is exceeded, external stops must be attached. Please note: the stop must not be less than the minimum radius to the drive shaft ( $r_{min}$ ). The stop force must not exceed the maximum force.

Due to the flexibility of the internal stops, a precise end position can only be achieved using external stops.



∅ [in]	Stop radius $r_{min}$ [in]	Maximum force [lbf]
3/8	0.5	13.5
1/2	0.6	20.2
5/8	0.7	36.0
1	0.8	71.9
1-1/4	1.1	107.9
1-5/8	1.6	146.1

### Note

When throttling the semi-rotary drives to rotating speeds under 180°/s, the drives must be operated at a pressure

of at least 90 psi. A constant speed fluctuation of  $\pm 30\%$  is to be expected. The flutters and the

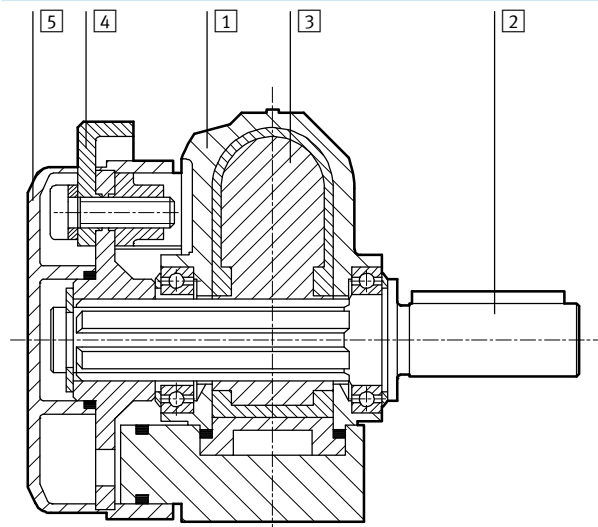
rotating times shown in the diagrams can only be improved by using flow control valves.

# Semi-rotary actuators DSR/DSRL - Inch Series

Technical data

## Materials

Sectional view



### Rotary actuator

1	Housing	Die-cast zinc
2	Drive shaft	Nickel plated steel
3	Rotary vane	Plastic
4	Trip cam	Sintered steel, nickel plated
5	Cover cap	Plastic
-	Seals	Nitrile rubber

### Weights [oz]

Piston Ø	3/8	1/2	5/8	1	1-1/4	1-5/8
DSR-...	3.5	7.1	10.9	19.1	45.3	84.7
DSRL-...-FW	4.9	8.5	12.4	21.5	49.0	95.2

# Semi-rotary actuators DSR/DSRL - Inch Series

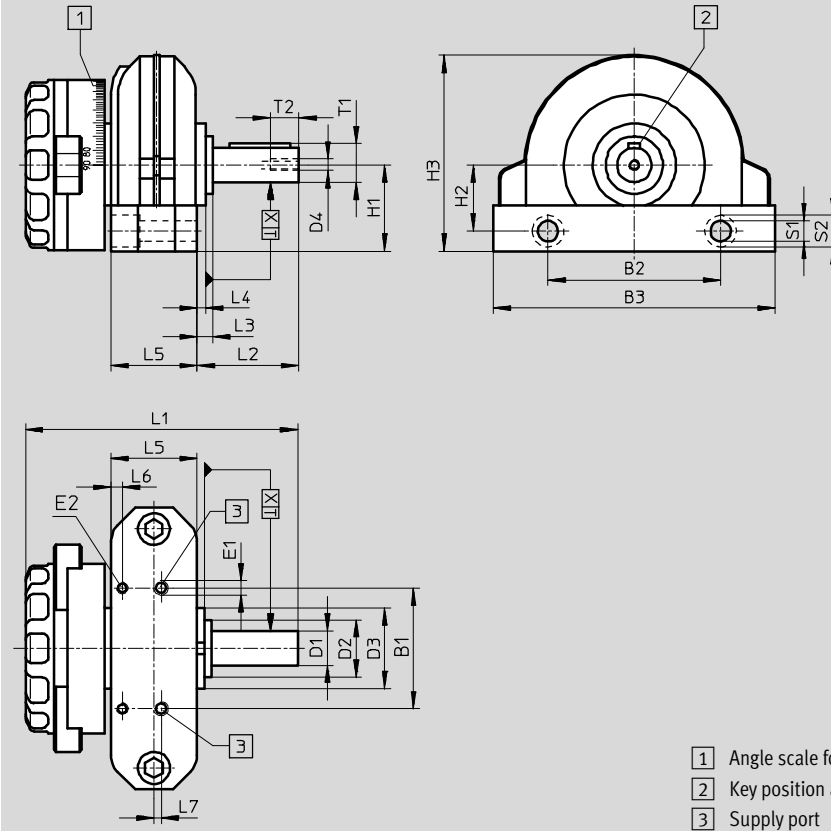
Technical data

**FESTO**

## Dimensions

Download CAD Data → [www.festo.com/us/cad](http://www.festo.com/us/cad)

DSR



### Note

The rotation angle in both directions is 90°, and it is pressure-dependent. The cushioning angle on each side is approx. 1.6° maximum, at 117.6 psi.

After the rotation process, the kinetic energy is converted by cushioning, the drive shaft rotates back by a corresponding angle.

The stops must not be removed as the rotary vane is not suitable for end-position limiting. The cover cap is equipped with an angle scale for adjusting.

When attaching additional components to the drive shaft, the maximum permissible tightening torque of the bolt at D4 must not be exceeded.

- 1 Angle scale for rotation angle reading
- 2 Key position at 0°
- 3 Supply port

∅ [in]	B1	B2	B3	D1 ∅	D2 ∅	D3 ∅	D4	E1	E2	H1	H2	H3	L1	L2
3/8	0.9	1.3	2.1	15/64	0.5	25/32	1-72 UNF	M3	4-48 UNF	0.8	0.6	1.5	2.2	0.9
1/2	1.0	1.6	2.6	5/16	0.6	7/8	4-48 UNF	10-32 UNF	4-48 UNF	0.9	0.7	1.9	2.6	1.0
5/8	1.2	1.8	3.1	3/8	0.7	61/64	4-48 UNF	10-32 UNF	4-48 UNF	1.1	0.8	2.2	3.0	1.1
1	1.7	2.4	3.9	7/16	0.7	1-7/64	8-32 UNC	10-32 UNF	8-32 UNC	1.2	0.9	2.7	3.7	1.4
1-1/4	2.1	3.1	5.1	5/8	1.1	1-21/32	10-32 UNF	1/8" NPT	8-32 UNC	1.7	1.3	3.6	4.9	2.0
1-5/8	2.8	3.9	6.3	3/4	1.4	2-3/64	1/4-28 UNF	1/4" NPT	8-32 UNC	2.1	1.6	4.8	6.4	2.4

∅ [in]	L3	L4	L5	L6	L7	S1	S2	T1	T2	X	Key <sup>1)</sup> [mm]	Tightening torque at D4 [ft-lbf]
3/8	0.3	0.2	0.6	0.1	0.1	0.1	0.2	0.3	0.3	0.01	A2 x 2 x 12	0.5
1/2	0.2	0.1	0.7	0.1	0.1	0.2	0.3	0.3	0.4	0.01	A2 x 2 x 16	0.9
5/8	0.2	0.1	0.9	0.1	-	0.2	0.4	0.4	0.4	0.01	A3 x 3 x 18	0.9
1	0.2	0.1	1.2	0.2	-	0.3	0.4	0.5	0.4	0.02	A4 x 4 x 25	4.1
1-1/4	0.4	0.3	1.4	0.2	-	0.3	0.6	0.7	0.5	0.02	A5 x 5 x 36	4.1
1-5/8	0.4	0.2	2.0	0.2	-	0.3	0.6	0.9	0.6	0.02	A6 x 6 x 45	4.1

1) included in scope of delivery

Dimensions are in inches, unless otherwise noted.

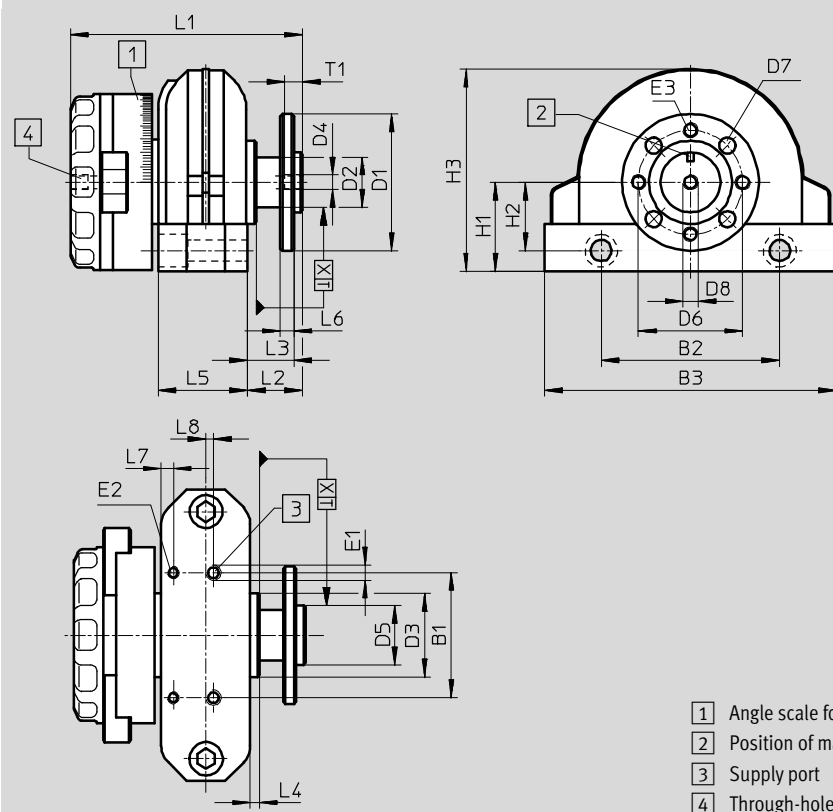
# Semi-rotary actuators DSR/DSRL - Inch Series



Technical data

## Dimensions

DSRL



### Note

The rotation angle in both directions is 90°, and it is pressure-dependent. The cushioning angle on each side is approx. 1.6° maximum, at 117.6 psi.

After the rotation process, the kinetic energy is converted by cushioning, the drive shaft rotates back by a corresponding angle.

The stops must not be removed as the rotary vane is not suitable for end-position limiting. The cover cap is equipped with an angle scale for adjusting.

When attaching additional components to the drive flange, the maximum permissible tightening torque of the bolt at D4 must not be exceeded.

- 1 Angle scale for rotation angle reading
- 2 Position of marking at angle scale 0°
- 3 Supply port
- 4 Through-hole

∅	B1	B2	B3	D1	D2	D3	D4	D5	D6	D7	D8	E1	E2	E3	H1
[in]				∅	∅	∅		∅	∅	∅	∅ min.				
3/8	0.9	1.3	2.1	1-3/16	3/8	25/32	1-7/2 UNF	7/16	13/16	0.13	0.06	M3	4-48 UNF	4-48 UNF	0.8
1/2	1.0	1.6	2.6	1-5/16	1/2	7/8	4-48 UNF	35/64	1	0.13	0.06	10-32 UNF	4-48 UNF	4-48 UNF	0.9
5/8	1.2	1.8	3.1	1-1/2	35/64	61/64	10-32 UNF	5/8	1-7/64	0.20	0.14	10-32 UNF	4-48 UNF	10-32 UNF	1.1
1	1.7	2.4	3.9	1-3/4	43/64	1-7/64	8-32 UNC	3/4	1-3/8	0.20	0.14	10-32 UNF	8-32 UNC	10-32 UNF	1.2
1-1/4	2.1	3.2	5.1	2-3/8	15/16	1-21/32	10-32 UNF	1-3/32	1-3/4	0.27	0.28	1/8" NPT	8-32 UNC	1/4-28 UNF	1.7
1-5/8	2.7	3.9	6.3	2-3/4	1-11/64	2-3/64	1/4-28 UNF	1-13/32	2-1/8	0.33	0.28	1/4" NPT	8-32 UNC	5/16-24 UNF	2.1

∅	H2	H3	L1	L2	L3	L4	L5	L6	L7	L8	S1	S2	T1	X	Tightening torque at D4 [ft-lbf]
[in]															
3/8	0.6	1.5	1.9	0.6	0.5	0.2	0.6	1/8	0.1	0.1	0.1	0.2	0.2	0.01	0.7
1/2	0.7	1.9	2.1	0.5	0.5	0.1	0.7	1/8	0.1	0.1	0.2	0.3	0.2	0.01	1.2
5/8	0.8	2.2	2.6	0.6	0.6	0.1	0.9	5/32	0.1	-	0.2	0.4	0.2	0.01	1.2
1	0.9	2.7	3.1	0.7	0.6	0.1	1.2	11/64	0.2	-	0.3	0.4	0.2	0.02	5.5
1-1/4	1.3	3.6	4.1	1.0	0.9	0.3	1.4	15/64	0.2	-	0.3	0.6	0.3	0.02	5.5
1-5/8	1.6	4.8	5.3	1.2	1.0	0.2	2.0	19/64	0.2	-	0.3	0.6	0.3	0.02	5.5

Dimensions are in inches, unless otherwise noted.

# Semi-rotary actuators DSR/DSRL - Inch Series

Ordering Data

**M** Mandatory data

Function	Piston Ø	Rotation angle °	Cushioning	Magnet for position sensing	Shaft type
DSR DSRL	3/8 1/2 5/8 1 1 1/4 1 5/8	0 ... 184	P	A	FW
<b>DSR</b>	<b>1</b>	<b>180</b>	<b>P</b>	<b>A</b>	

**Ordering table**

Size	3/8	1/2	5/8	1	1 1/4	1 5/8	Code	Enter code
<b>M</b> Function	Semi-rotary actuator with keyed shaft						<b>DSR</b>	
	Semi-rotary actuator, with flanged, hollow drive shaft <sup>1)</sup>						<b>DSRL</b>	
Piston Ø [in]	1/2	5/8	3/4	1	1 1/4	1 5/8	-...	
Rotation angle [°]	0 ... 181		0 ... 184				-...	
Cushioning	Non-adjustable at both ends						<b>-P</b>	-P
Magnet for position sensing	For use with magnetic proximity sensor						<b>-A</b>	-A
Shaft type	Keyed shaft (standard - no product code necessary)							
	Hollow flanged shaft						<b>-FW</b>	

1) Shaft type -FW must be specified with DSRL.

Transfer order code

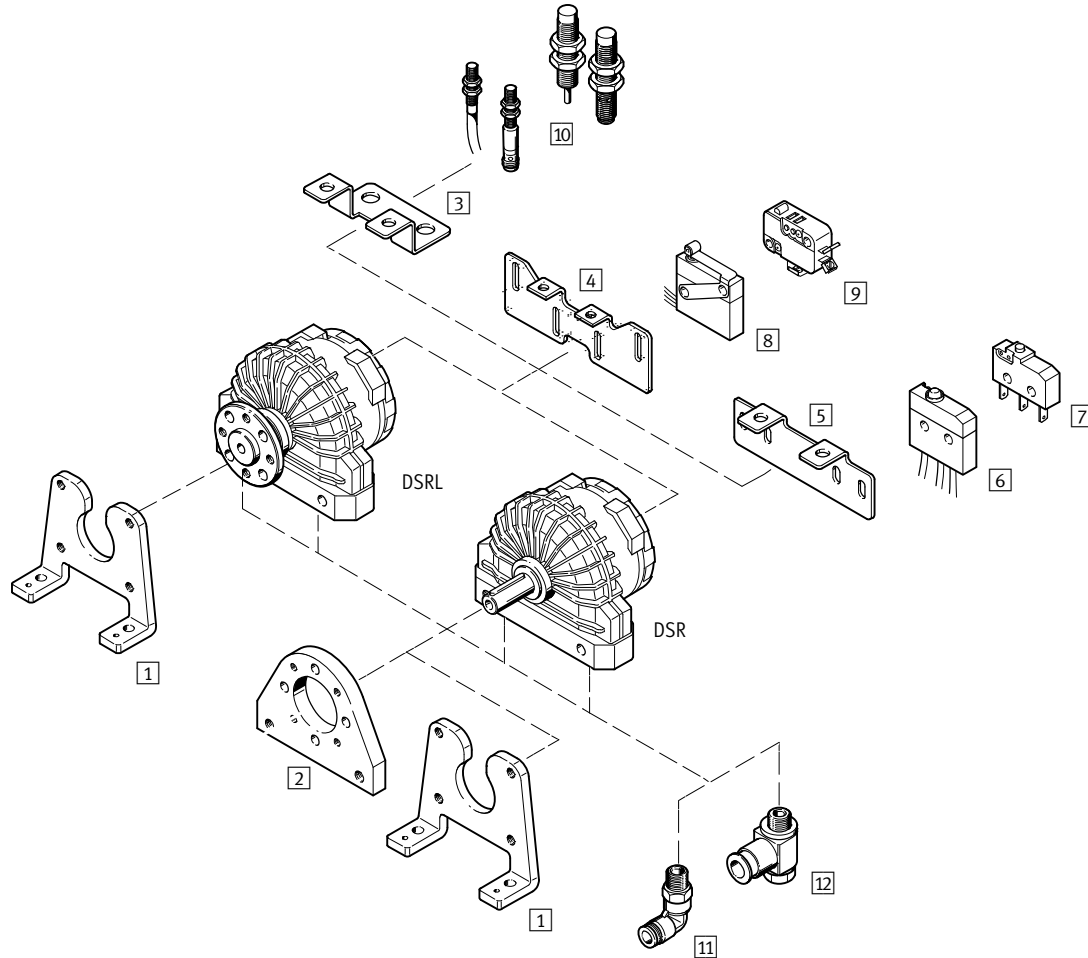
-  -  - **P**  - **A**  -



# Semi-rotary actuators DSR/DSRL - Inch Series

Accessories overview

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Mounting attachments and accessories			
	Description	DSR	DSRL
1	Foot mounting HSR-...-FW	■	■
2	Flange mounting FSR	■	-
3	Mounting kit WSR-...	■	■
4	Mounting kit WSR-12 ... 40	■	■
5	Mounting kit WSR-10/12-K	■	■
6	Micro switch S-3-BE-SW	■	■
7	Micro switch S-3-BE	■	■
8	Micro switch SR-3-E-SW	■	■
9	Micro switch S-3-E	■	■
10	Proximity sensors SIEN	■	■
11	Push-in elbow fitting QSL	■	■
12	One-way flow control valve GRLA	■	■

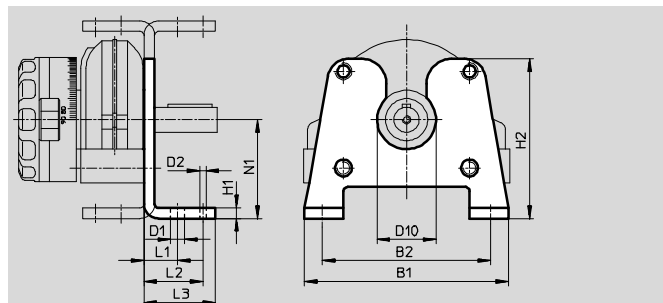
# Semi-rotary actuators DSR/DSRL - Inch Series

Accessories



## Foot mounting HSR-...-FW

Material:  
Steel



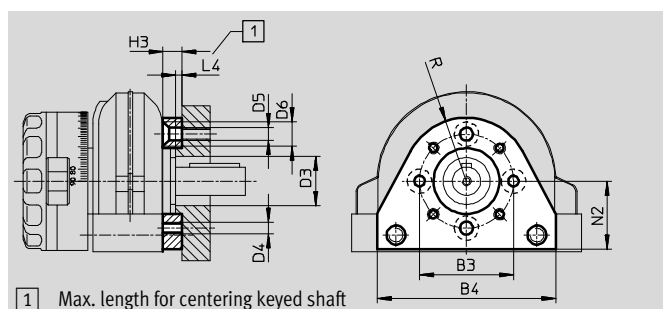
### Dimensions and ordering data

For $\varnothing$ [in]	B1	B2	D1 $\varnothing$	D2	D10	H1	H2	L1	L2	L3	N1	CRC <sup>1)</sup>	Weight [oz]	Part No.	Type
3/8	2.1	1.7	0.1	0.1	0.8	0.2	2.1	0.4	0.7	0.8	1.3	2	2.2	33317	HSR-10-FW
1/2	2.5	2.0	0.1	0.1	0.9	0.2	2.5	0.4	0.7	0.8	1.6	2	3.1	30923	HSR-12-FW
5/8	3.0	2.5	0.2	0.1	0.9	0.2	2.8	0.6	0.9	1.0	1.7	2	6.0	30924	HSR-16-FW
1	3.8	3.1	0.3	0.1	1.1	0.2	3.0	0.6	1.1	1.3	1.9	2	8.3	30925	HSR-25-FW
1-1/4	5.1	4.1	0.3	0.2	1.7	0.3	4.3	0.8	1.3	1.7	2.6	2	23.3	30926	HSR-32-FW
1-5/8	6.3	5.1	0.3	0.2	2.0	0.3	5.3	1.0	1.7	2.0	3.2	2	36.7	30927	HSR-40-FW

1) Corrosion resistance class 2 according to Festo standard 940 070  
Components with moderate corrosion resistance for use in normal industrial environments subjected to contact with coolants or lubricating agents.

## Flange mounting FSR

Material:  
Die-cast Aluminum



### Dimensions and ordering data

For $\varnothing$ [in]	B3	B4	D3 $\varnothing$ min.	D4	D5 $\varnothing$	D6 $\varnothing$	H3	L4 max.	N2	R	CRC <sup>1)</sup>	Weight [oz]	Part No.	Type
3/8	1.1	1.8	0.5	M3	0.1	0.3	0.3	0.1	0.8	0.7	2	0.8	34480	FSR-10
1/2	1.2	2.1	0.7	M3	0.1	0.3	0.3	0.1	0.9	0.8	2	1.1	14658	FSR-12
5/8	1.4	2.4	0.7	M4	0.2	0.3	0.3	0.1	1.0	0.9	2	1.8	13236	FSR-16
1	1.6	3.0	0.8	M5	0.2	0.4	0.3	0.1	1.1	1.1	2	2.5	13237	FSR-25
1-1/4	2.2	3.9	1.3	M6	0.3	0.5	0.5	0.1	1.7	1.4	2	6.3	13238	FSR-32
1-5/8	2.8	4.7	1.5	M8	0.4	0.6	0.6	0.2	2.0	1.8	2	10.6	14655	FSR-40

1) Corrosion resistance class 2 according to Festo standard 940 070  
Components with moderate corrosion resistance for use in normal industrial environments subjected to contact with coolants or lubricating agents.

Dimensions are in inches, unless otherwise noted.

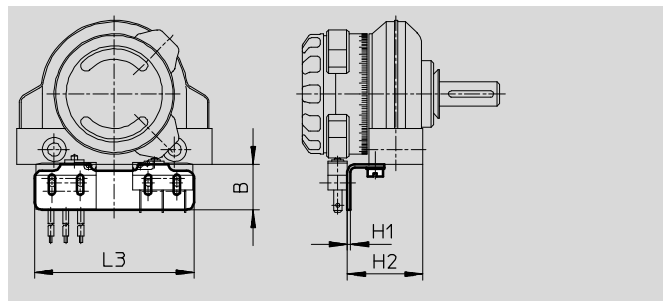
# Semi-rotary actuators DSR/DSRL - Inch Series

Accessories

## Mounting kit WSR-10/12-K

For micro switch S-3-BE, S-3-BE-SW

Material:  
Steel



### Dimensions and ordering data

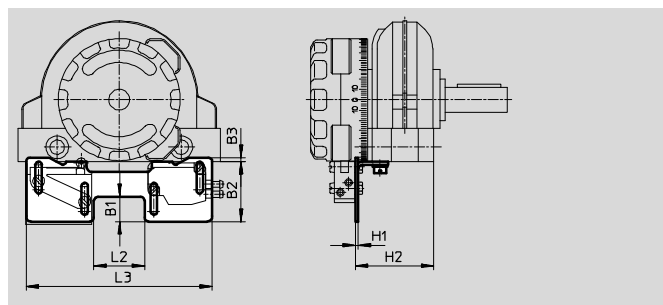
For Ø [in]	B	H1	H2	L3	CRC <sup>1)</sup>	Weight [oz]	Part No.	Type
3/8	0.6	0.04	0.9	1.9	2	0.4	33414	WSR-10-K
1/2	0.6	0.04	1.0	2.1	2	0.5	15686	WSR-12-K

1) Corrosion resistance class 2 according to Festo standard 940 070  
Components with moderate corrosion resistance for use in normal industrial environments subjected to contact with coolants or lubricating agents.

## Mounting kit WSR-1/2 ... 1-5/8

For micro switch S-3-E, SR-3-E-SW

Material:  
Steel



### Dimensions and ordering data

For Ø [in]	B1	B2	B3	H1	H2	L2	L3	CRC <sup>1)</sup>	Weight [oz]	Part No.	Type
1/2	0.2	0.9	0.2	0.1	0.9	0.6	3.1	2	0.4	15684	WSR-12
5/8	0.4	1.0	0.2	0.1	1.2	0.7	3.3	2	0.8	14874	WSR-16
1	0.5	1.1	0.1	0.1	1.5	1.0	3.5	2	0.9	14796	WSR-25
1-1/4	0.5	1.1	0.1	0.1	1.9	1.6	4.2	2	1.0	14960	WSR-32
1-5/8	0.5	1.1	0.1	0.1	2.7	2.0	4.7	2	1.1	14961	WSR-40

1) Corrosion resistance class 2 according to Festo standard 940 070  
Components with moderate corrosion resistance for use in normal industrial environments subjected to contact with coolants or lubricating agents.

Dimensions are in inches, unless otherwise noted.

# Semi-rotary actuators DSR/DSRL - Inch Series



Accessories

## Mounting kits WSR

### WSR-...-J

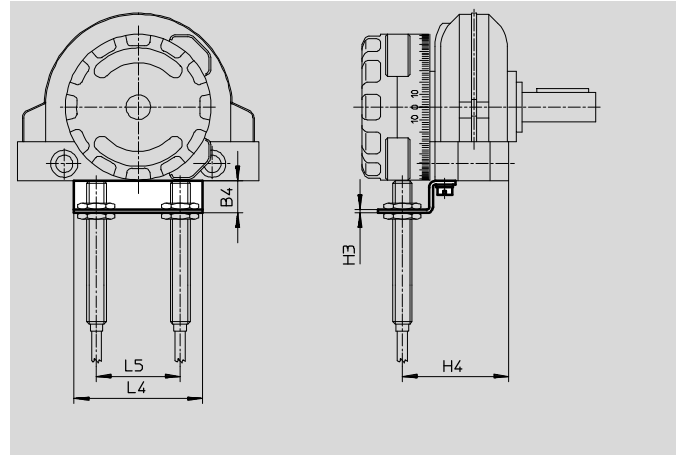
For proximity sensors SIEN-M8

### WSR-...-J-M5

For proximity sensors SIEN-M5

Material:

Steel



## Dimensions and ordering data

WSR-...-J

For Ø [in]	B4	H3	H4	L4	L5	CRC <sup>1)</sup>	Weight [oz]	Part No.	Type
3/8	0.5	0.1	1.4	2.0	1.1	2	0.4	14873	WSR-16-J
1/2	0.5	0.1	1.7	2.0	1.3	2	0.6	14799	WSR-25-J
5/8	0.5	0.1	2.1	2.5	1.9	2	0.6	14962	WSR-32-J
1	0.5	0.1	3.0	3.1	2.4	2	0.8	14963	WSR-40-J

## Dimensions and ordering data

WSR-...-J-M5

For Ø [in]	B4	H3	H4	L4	L5	CRC <sup>1)</sup>	Weight [oz]	Part No.	Type
3/8	0.3	0.04	1.0	1.2	0.8	2	0.2	33413	WSR-10-J-M5
1/2	0.3	0.04	1.1	1.3	1.0	2	0.4	15685	WSR-12-J-M5
5/8	0.3	0.04	1.4	1.5	1.1	2	2.8	15931	WSR-16-J-M5
1	0.5	0.06	1.7	2.0	1.3	2	0.6	15932	WSR-25-J-M5
1-1/4	0.5	0.06	2.1	2.5	1.9	2	0.9	15933	WSR-32-J-M5
1-5/8	0.5	0.06	3.0	3.1	2.4	2	1.1	15934	WSR-40-J-M5

1) Corrosion resistance class 2 according to Festo standard 940 070

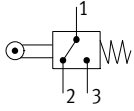
Components with moderate corrosion resistance for use in normal industrial environments subjected to contact with coolants or lubricating agents.

Dimensions are in inches, unless otherwise noted.

# Semi-rotary actuators DSR/DSRL - Inch Series

Accessories

## Electrical limit switch for end-position sensing

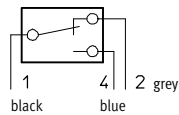


The switching point may only be exceeded by 0.02 inch in these electrical limit switches. Actuation only vertical to stem axis.

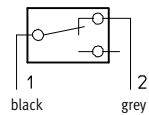
	S-3-BE	S-3-BE-SW	S-3-E	SR-3-E-SW
Connection	3 push-in connectors (0.11x0.02 inch)	3 wires (0.0012 in <sup>2</sup> )	Screw connector	3 wires 3.3 ft long
Contact rating	See table below			
Operating voltage	250 V AC/250 V DC			
Line current ohmic load	–	–	6 A/250 V AC 0.25 A/250 V DC	5 A/250 V AC 0.25 A/250 V DC
Line current inductive load	–	–	2 A/250 V AC 0.1 A/250 V DC	2 A/250 V AC 0.03 A/250 V DC
Utilization category	AC 12/DC 12 (ohmic load) AC 14/DC 13 (inductive load)			
CE symbol	Yes, as per EU Directive 73/23/EEC			
Protection class to EN 60529	IP40	IP67	IP00	IP65
Temperature range	–4 ... +185 °F		–4 ... +176 °F	
Material	Housing, cover: black plastic			
Weight	0.07 oz	0.56 oz	0.25 oz	0.35 oz

### Contact configuration:

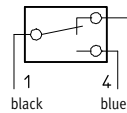
#### Changeover switch



#### NC contact



#### NO contact



Contact rating				
S-3-BE, S-3-BE-SW				
AC voltage				
Voltage [V] ~	Resistance load [A]	Inductive load [A]		
12	6	6		
24	3	2		
60	1	0.5		
110	0.5	0.2		
220	0.25	0.1		
S-3-E	DC	AC	DC	AC
12	6	–	6	–
24	6	–	6	–
60	1	–	0.5	–
110	0.5	–	0.2	–
220	0.25	–	0.1	–
250	–	6	–	2
SR-3-E-SW	DC	AC	DC	AC
15	3	–	5	–
30	3	–	5	–
50	1	–	1	–
75	0.25	–	0.75	–
125	0.03	5	0.5	5
250	0.03	5	0.25	5

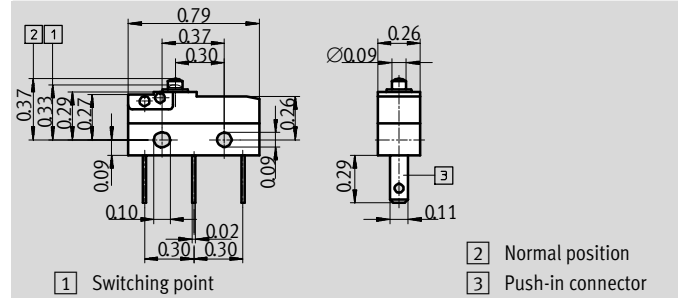
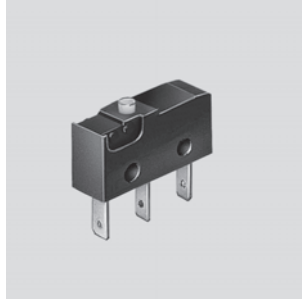
# Semi-rotary actuators DSR/DSRL - Inch Series

Accessories

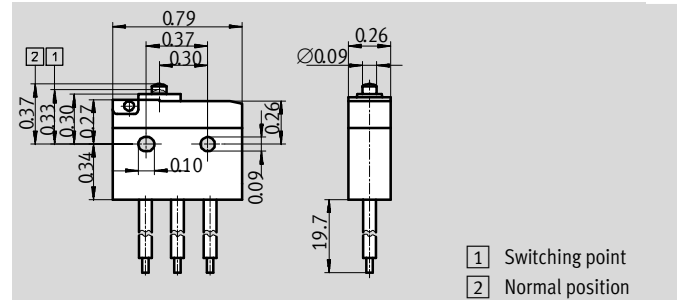
FESTO

## Electrical limit switches for end-position sensing

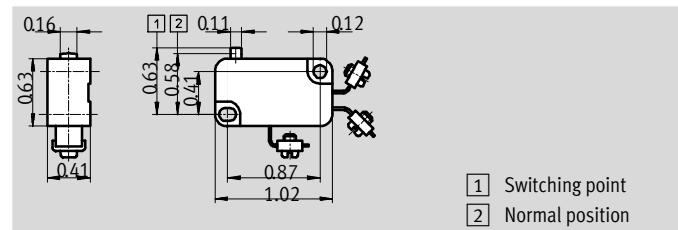
Micro switch  
S-3-BE



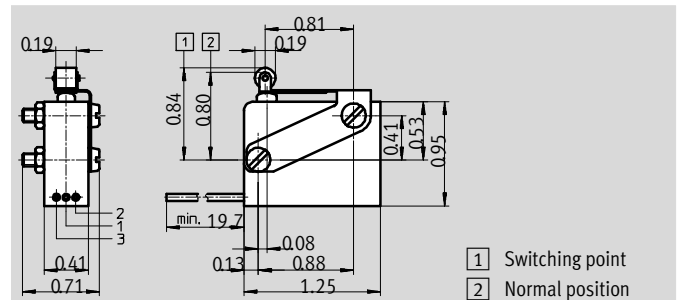
Micro switch with cable (splash-proof)  
S-3-BE-SW



Micro switch  
S-3-E



Micro switch with roller lever (splash-proof)  
SR-3-E-SW



### Ordering data


For Ø [in]	Description	Design	Part No.	Type
3/8 ... 1/2	Micro switch	Spade connectors	30648	S-3-BE
	Micro switch, splash-proof	With cable	30649	S-3-BE-SW
5/8 ... 1-5/8	Micro switch	Screw connectors	7347	S-3-E
	Micro switch, splash-proof	With roller lever	14797	SR-3-E-SW



Dimensions are in inches, unless otherwise noted.


## Semi-rotary actuators DSR/DSRL - Inch Series

FESTO

Accessories

Ordering data – Sensors					
	For Ø [in]	Remarks	Connection	Part No.	Type
	3/8 ... 1-5/8	For mounting kit WSR-...-J-M5	Cable	150370	SIEN-M5B-PS-K-L
			Plug	150371	SIEN-M5B-PS-S-L
	5/8 ... 1-5/8	For mounting kit WRM-...-J	Cable	150386	SIEN-M8B-PS-K-L
			Plug	150387	SIEN-M8B-PS-S-L

Ordering data – Plug sockets							
	Mounting	Switch output		Connection	Cable length [ft]	Part No.	Type
		PNP	NPN				
Straight socket							
	M8 union nut	■	■	3-pin	8.2	159420	SIM-M8-3GD-2.5-PU
					16.4	159421	SIM-M8-3GD-5-PU
Angled socket							
	M8 union nut	■	■	3-pin	8.2	159422	SIM-M8-3WD-2.5-PU
					16.4	159423	SIM-M8-3WD-5-PU

Ordering data – One-way flow control valves				
	Connection		Part No.	Type
	Thread	For tubing OD		
	10-32 UNF	5/32"	165008	GRLA-10-32-UNF-QS-5/32-U
		1/4"	192753	GRLA-10-32-UNF-QS-1/4-U
	1/8" NPT	5/32"	165009	GRLA-1/8-NPT-QS-5/32-U
		3/16"	190941	GRLA-1/8-NPT-QS-3/16-U
		1/4"	165010	GRLA-1/8-NPT-QS-1/4-U
		5/16"	165013	GRLA-1/8-NPT-QS-5/16-U
	1/4" NPT	3/16"	190944	GRLA-1/4-NPT-QS-3/16-U
		1/4"	165011	GRLA-1/4-NPT-QS-1/4-U
		5/16"	165014	GRLA-1/4-NPT-QS-5/16-U
		3/8"	190947	GRLA-1/4-NPT-QS-3/8-U

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