



Rotary Actuators

Series VRS / VRA

Sizes 32, 40, 50, 63, 80, 100 & 125 mm

Rotation 96°, 186° and 366°

PDE2655TCUK



ENGINEERING YOUR SUCCESS.

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VRS / VRA Rotary Actuators (Ø32 to Ø125mm) Change title line

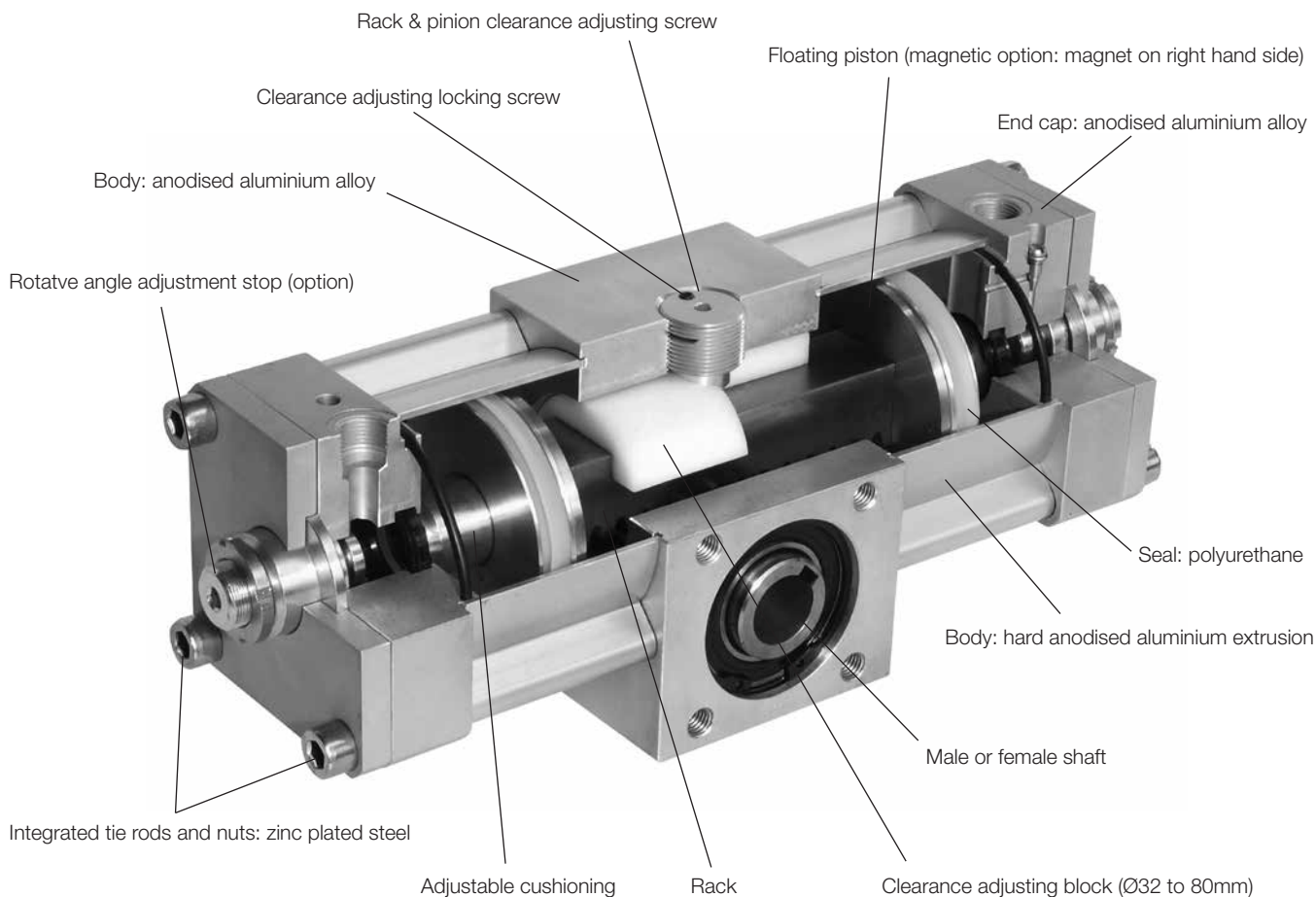
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- Transforms the rectilinear motion of 2 single acting opposite cylinders into rotary motion via a rack and pinion drive contained within the cylinder body.
- Various tasks can be handled by use of a torque cylinder, including gate opening and closing, clamping and agitation of fluids and raw materials.
- Key points of the VRS / VRA cylinder design
 - lightweight materials (aluminium alloy)
 - accuracy in motion (cushioning, clearance compensation - bores up to 80mm)
 - long life (floating piston, nitrile seals, adjustable cushions)
 - good resistance to corrosion
 - easy cleaning (extruded body)
- Operates with dry, lubricated or non lubricated air
- The range includes bores from Ø32 to 125mm with rotative angles of 96°, 186° and 366°
- Magnetic piston versions can be fitted with P8S sensors and brackets
- Several options are available; rotative angle adjustable stop, male shaft or female shaft (through)

VRS standard version (Ø32 to 125mm)**VRA version (Ø32 to 80mm) for corrosive environment**

- Aluminium blanking plate for the clearance adjustment screw
- Rack and pinion gear contained in waterproof enclosure (silicone seal)
- Stainless steel waterproof ball bearings
- Stainless steel pinion
- Stainless steel circlips, internal tie rods and screws
- Optional Magnetic version



Material specification

	VRS	VRA
Rack	XC40 steel	XC40 steel
Floating piston	Aluminium	Aluminium
Magnet (**M version)	Magnetic elastomer	Magnetic elastomer
Piston seals	Polyurethane	Polyurethane
Rack and pinion gear seals		Silicone
Body	Anodised aluminium	Anodised aluminium
Integrated tie rods, nuts, circlips, screws	Zinc plated steel	303 stainless steel
Body	Hard anodised aluminium extrusion	Hard anodised aluminium extrusion
End caps	Anodised aluminium	Anodised aluminium
Male or female transmission shaft	XC40 steel	304 stainless steel (female)
Cushion sleeve	Brass	Brass
Clearance adjusting block (Ø 32 to 80mm)	Acetal	Acetal
Adjusting screw blanking plate		Aluminium + silicone seal

Condition of use

	Ø 32 to 80mm	Ø 100 and 125mm
Temperature range	-10°C to +60°C (14°F to 140°F)	
Pressure range (bar)	0.5 to 10 7 to 145 psi)	0.3 to 10 (4 to 145 psi)
Air condition	Filtered air 40µ, lubricated or non lubricated, dry or non dry	

Theoretical torque

Ø Bore mm	Pinion Module	ØPm	Torque (N.m)				
			2 bar	4 bar	6 bar	8 bar	10 bar
32	1.5	20	2.4	4.8	7.2	9.6	12
40	2	40	5.0	10.0	15.0	20.0	25
50	2	40	8.0	16.0	24.0	32.0	40
63	3	54	17.0	34.0	51.0	68.0	85
80	3	54	27.0	54.0	81.0	108.0	135
100	5	75	58.0	116.0	174.0	232.0	290
125	5	75	92.0	184.0	276.0	368.0	460

The table above shows the theoretical torque at different pressures. A maximum efficiency of 80% should be assured due to functional losses.

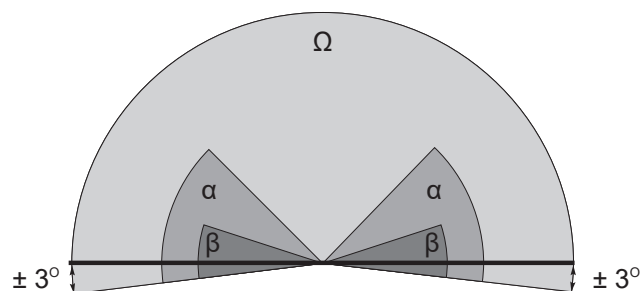
Technical data

Bore (mm)		32	40	50	63	80	100	125
Maximum load (N)	Axial	110	350	350	1050	1050	2500	2500
	Radial	35	220	220	900	900	2000	2000
Cushion angle (°)		50	45	45	32	32	30	30
Nominal moment of inertia (kg.m ³)		0.003	0.01	0.02	0.1	0.2	0.3	0.4
Rotative angle (-1°)		96°, 186°, 366°						
Angular tolerance		0°10'	0°10'	0°10'	0°10'	0°10'	1°	1°

Technical data

Rotative angle adjustable stop and cushion angle

Ø Cylinder bore (mm)	32	40	50	63	80	100	125
	96°	96°	96°	96°	96°	96°	96°
Rotative angle	Ω 186°	186°	186°	186°	186°	186°	186°
	366°	366°	366°	366°	366°	366°	366°
Cushion angle	α 50°	45°	45°	32°	32°	30°	30°
Adjustable angle	β 15°	15°	15°	15°	15°	15°	15°
(R option: Adjustable stop)							



Maintenance

After 2 million cycles in nominal moment of inertia conditions, the cylinder should be dismantled and seals replaced. When assembling, grease gear and rack with ESSO GP GREASE or equivalent. Adjust clearance of gear and rack (Ø 32 to 80 cylinder bore) with the screw (1) in order to obtain the following minimum operating pressures (unloaded cylinder), then secure the adjustment with the screw (2).

Backlash adjustment

Ø Bore (mm)	Minimum operating pressure
Ø 32 and 40	0.5 bar (7 psi)
Ø 50 and 63	0.4 bar (6 psi)
Ø 80	0.3 bar (4 psi)



Weight - kg (lbs)

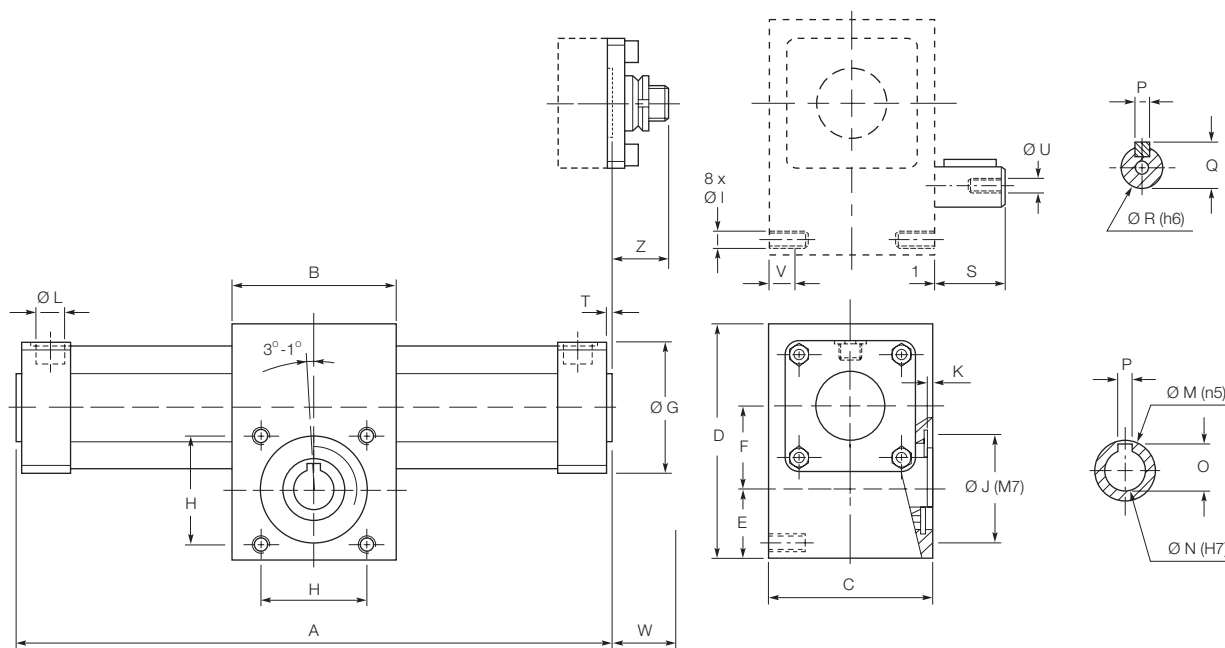
Standard cylinder : Female shaft, 0° rotation, magnetic or non magnetic

Bore (mm)	32	40	50	63	80	100	125
Standard cylinder	1.30 (2.9)	2.20 (4.8)	2.50 (5.5)	5.30 (11.7)	6.20 (13.7)	15.70 (34.6)	17.80 (39.2)
For male shaft	0.10 (0.2)	0.20 (0.4)	0.20 (0.4)	0.45 (1.0)	0.45 (1.0)	1.50 (3.3)	1.50 (3.3)
For one adjustable stop	0.15 (0.3)	0.25 (0.5)	0.35 (0.8)	0.35 (0.8)	0.40 (0.9)	1.00 (2.2)	1.00 (2.2)
Per 90° of rotation	0.10 (0.2)	0.30 (0.7)	0.40 (0.9)	0.70 (1.5)	0.80 (1.8)	2.00 (4.4)	2.30 (5.0)

Example : VRM050-186FRN Weight = $2.5 + 0.35 \times 1 + 0.40 \times 2 = 3.65 \text{ kg}$
 $(5.5 + 0.77 \times 1 + 0.88 \times 2 = 8.04 \text{ lbs})$

Dimensions (mm)

Cylinder bores Ø 32 to 80mm



The location of the shaft key is indicated when the pistons are on the left.
First rotation as indicated (clockwise).

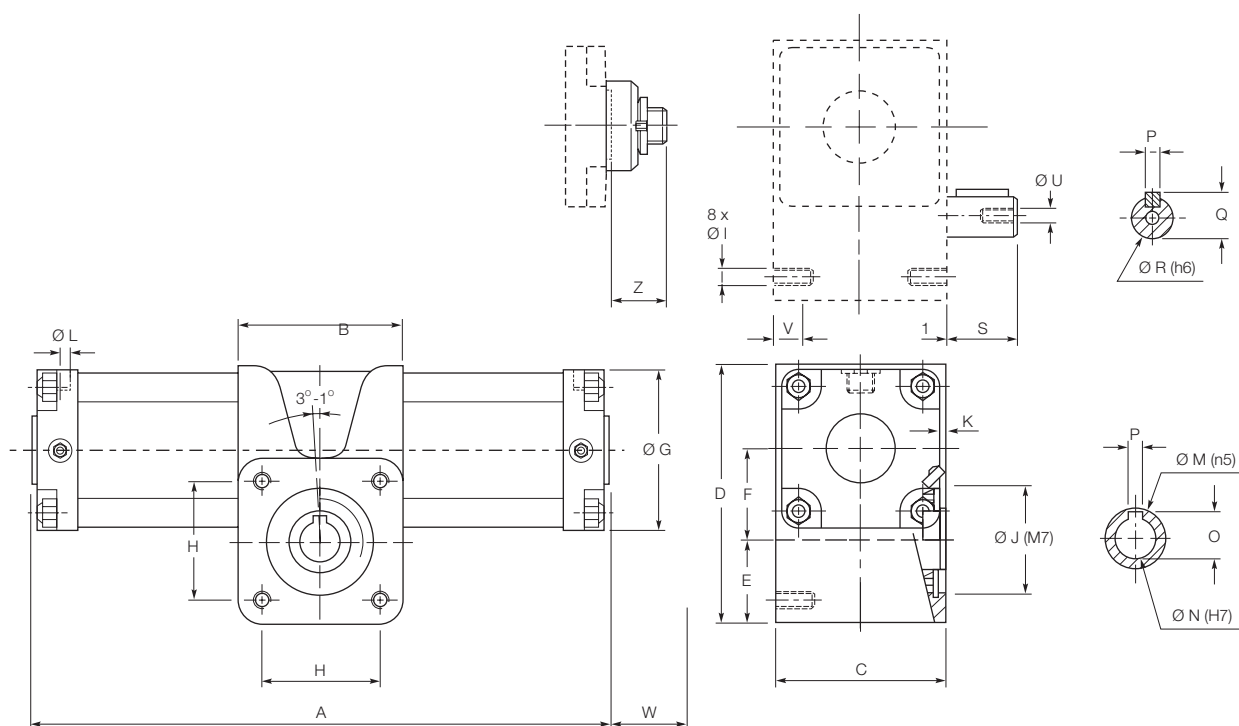
Ω : Rotative angle 96°, 186° or 366°

Ø	A*	B	C	D	E	F	G	H	I	J	K	L
32	128 + 0.523 Ω	50	50	72	25.0	24.0	45	35	M6	35	2.0	G1/8"
40	163 + 0.6981 Ω	65	65	95	32.5	29.5	52	47	M8	47	3.0	G1/4"
50	163 + 0.6981 Ω	65	65	95	32.5	29.5	65	47	M8	47	3.0	G1/4"
63	209 + 0.9424 Ω	95	95	126	40.0	38.0	75	62	M10	62	3.5	G3/8"
80	209 + 0.9424 Ω	95	95	126	40.0	38.0	95	62	M10	62	3.5	G3/8"
Ø	M	N	O	P	Q	R	S	T	U	V	W*	Z
32	17	10	11.7	4	13.5	12	20	2	M4 x 10	10	22	31
40	25	15	17.2	5	18.0	16	30	3	M5 x 15	12	24	35
50	25	15	17.2	5	18.0	16	30	3	M5 x 15	12	29	35
63	35	24	27.2	8	27.0	24	40	3	M8 x 20	15	32	32
80	35	24	27.2	8	27.0	24	40	3	M8 x 20	15	32	32

* Add W to A for the magnetic version (magnet on right hand side as standard).

Dimensions (mm)

Cylinder bores Ø 100 to 125mm



The location of the shaft key is indicated when the pistons are on the left.
First rotation as indicated (clockwise).

Ω : Rotative angle 96°, 186° or 366°

Ø	A*	B	C	D	E	F	G	H	I	J	K	L
100	304 + 1.309 Ω	130	142	188	64.0	53.5	115	90	M14	90	4.5	G1/2"
125	304 + 1.309 Ω	130	142	188	64.0	53.5	140	90	M14	90	4.5	G1/2"
Ø	M	N	O	P	Q	R	S	U	V	W*	Z	
100	55	35	38.7	10	38.5	35	50	M12 x 20	24	4	38	
125	55	35	38.7	10	38.5	35	50	M12 x 20	24	4	38	

* Add W to A for the magnetic version (magnet on right hand side as standard).

Ordering references

V

R

S

M

0

5

0

-

1

8

6

F

R

N

1

3

Series

M

Magnetic

Ø mm

32

40

50

63

80

100

125

Rotation Angle

096 = 96°

186 = 186°

366 = 366°

Version

S

Standard

Bores 32 - 125 mm

A

Corrosive Environment

Bores 32 - 100 mm

Shaft

F

Female

M

Male

Left Endplate

N

Without angle adjustment

R

With angle adjustment

Right Endplate

N

Without angle adjustment

R

With angle adjustment

Left Endplate

1

Standard position of port

2, 3, 4

Other positions

Right Endplate

1

Standard position of port

2, 3, 4

Other positions

1

2

3

4

Position of port to diagram above.
(Position 1 as standard if not specified)

Maintenance - Seal kit

Bore (mm)	32	40	50	63	80	100	125
Actuators VRS/ VRSM	JJVRA032	JJVRA040	JJVRA050	JJVRA063	JJVRA080	JJVR100	JJVR125
Actuators VRA / VRAM							

Sensors

VRSM and VRAM cylinders can be fitted with sensors. These sensors use the following mounting bracket.

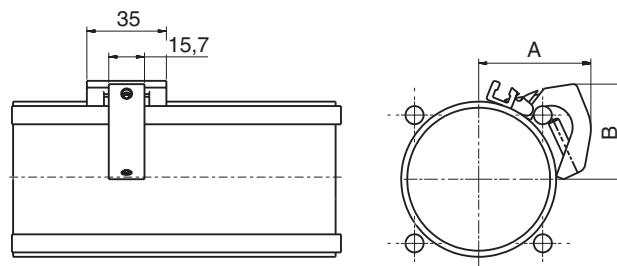
Ø Bore (mm)	32	40	50	63	80	100	125
Mounting bracket	P8S-TMA0X*						
A	35	39	48	50	58	70	
B	30	35	42	48	56	65	

Note: Mounting brackets and sensors must be ordered separately

* Please consult Technical Department for 125 mm bore.

Adapter for tie-rod design

Description	Weight [kg]	Order code
Double jointed adapter for bore Ø 32 to 125 mm	0.07	P8S-TMA0X



Reed sensors

The sensors are based on proven reed switches, which offer reliable function in many applications. Simple installation, a protected position on the cylinder and clear LED indication.

Electronic sensors

The electronic sensors are "Solid State", i.e. they have no moving parts at all. They are provided with short-circuit protection and transient protection as standard. The built-in electronics make the sensors suitable for applications with high on and off switching frequency, and where very long service life is required.

	Electronic	Reed
Cylinder type:	Profile with T-slot	
Cylinder type with adaptor:	Profile with S-slot (dovetail) Tie rods Round cylinders	
Installation:	Drop-in. Fixed by 1.5 mm stainless steel allen key or flathead screwdriver.	
Housing length:	34.7 mm 31.5 mm (ATEX)	
Output Type / Function:	PNP, Normally Open (NO) NPN, Normally Closed (NC)	Normally Open (NO) Normally Closed (NC)
Switching (on/off) switching frequency:	≤ 1000 Hz	± 400 Hz
Degree of Protection (IP):	IP67	
Power consumption:	≤ 10 mA	-
Input Supply Voltage Range:	10 to 30 V DC 18 to 30 V DC (ATEX)	10 to 30 10 to 120 10 to 230 V AC/DC (2-wire) 10 to 30 V AC/DC (3-wire)
Voltage Drop:	≤ 2,2 V	≤ 3,5 V (2-wire NO) ≤ 0,1 V (3-wire) ≤ 0,1 V (2-wire NC)
Continuous output current:	≤ 100 mA ≤ 70 mA (ATEX)	≤ 100 mA (2-wire NO) ≤ 500 mA (3-wire) ≤ 500 mA (2-wire NC)
Switching capacity:	-	≤ 10 W
Hazardous area category:	3G / 3D (ATEX)	-
Protection Class:	III	II (2-wire) III (3-wire)
Response Sensitivity:	2.65.. 2.95 mT	2.1.. 3.4 mT
Overrun Distance:	3 mm	9 mm
Hysteresis:	≤ 0.5 mT	≤ 0.2 mT
Repeatability:	≤ 0.1 mT	
Reverse Polarity Protection:	Yes	
Short-circuit Protection:	Yes	-
Power-up Pulse Protection:	Yes	-
Ambiant Operating Temperature Range:	-25 to +75 °C (PUR cable) -20 to +70°C (PVC cable) -20 to +45°C (ATEX)	
Shock and Vibration resistance:	30 g 11 ms / 10 ... 55 Hz, 1 mm	
EMC:	According to EN 60947-5-2	
Industry Standard:	CE C UL US RoHs Ex	CE C UL US RoHs
UL Certification:	On request	
Housing Material:	Plastic polyamid PA12 (ATEX) PA66	Plastic polyamid PA12 (2-wire 240V) PA66
Cable Specification:	PUR (Polyurethane) PVC (Polyvinyl Chloride)	
Conductor Cross-Section:	0.14 mm² (3 wire)	0.14 mm² (3-wire) 0.12 mm² (2-wire)
Colour of LED:	Yellow	
Connection Style:	M8 snap-in M8R (knurled nuts) M12 (knurled nuts) None (Flying lead)	

Sensors

Output/function	Cable/connector	Weight [kg]	Order code
Electronic sensors, 10-30 V DC			
PNP type, normally open	0.27 m PUR cable and 8 mm snap-in male connector	0.007	P8S-GPSHX
PNP type, normally open	0.27 m PUR cable and M12 screw male connector	0.015	P8S-GPMHX
PNP type, normally open	3 m PVC cable without connector	0.030	P8S-GPFLX
PNP type, normally open	10 m PVC cable without connector	0.110	P8S-GPFTX
Reed sensors, 10-30 V AC/DC			
Normally open	0.27 m PUR cable and 8 mm snap-in male connector	0.007	P8S-GSSHX
Normally open	0.27 m PUR cable and M12 screw male connector	0.015	P8S-GSMHX
Normally open	3 m PVC cable without connector	0.030	P8S-GSFLX
Normally open	10 m PVC cable without connector	0.110	P8S-GSFTX
Normally closed	5 m PVC cable without connector without LED	0.050	P8S-GCFPX
Reed sensors, 10-120 V AC/DC			
Normally open	3 m PVC cable without connector	0.030	P8S-GRFLX
Reed sensors, 24-230 V AC/DC			
Normally open	3 m PVC cable without connector	0.030	P8S-GRFLX2

Male connectors for connecting cables

Cable connectors for producing your own connecting cables.
The connectors can be quickly attached to the cable without special tools. Only the outer sheath of the cable is removed.
The connectors are available for M8 screw connectors and meet protection class IP 65.



Technical data

Operating voltage:	max. 32V AC/DC
Operating current per contact:	max. 4 A
Connection cross section:	0.25.... 0.5 mm ² (conductor diameter min 0.1)
Protection class:	IP65 And IP 67 when plugged and screwed down (EN 60529)
Temperature range:	- 25... +85°C

Connector	Weight [kg]	Order Code
M8 screw connector	0.018	P8CS0803J
M12 screw connector	0.022	P8CS1204J

Connecting cables

Description	Weight [g]	For Product Series	Order Code
Cable flex PVC 3 meter with 8mm snap-in connector / flying leads	70	P8S Sensors with M8	9126344341
Cable flex PVC 10 meter with 8mm snap-in connector / flying leads	210	P8S Sensors with M8	9126344342
Cable PUR 3 meter with 8mm snap-in female connector / flying leads	70	P8S Sensors with M8	9126344345
Cable flex PUR 10 meter with 8mm snap-in connector / flying leads	210	P8S Sensors with M8	9126344346
Cable PVC 2.5 meter with M8 screw connector / flying leads	60	P8S Sensors with knurled M8	KC3102
Cable PVC 5 meter with M8 screw female connector / flying leads	120	P8S Sensors with knurled M8	KC3104