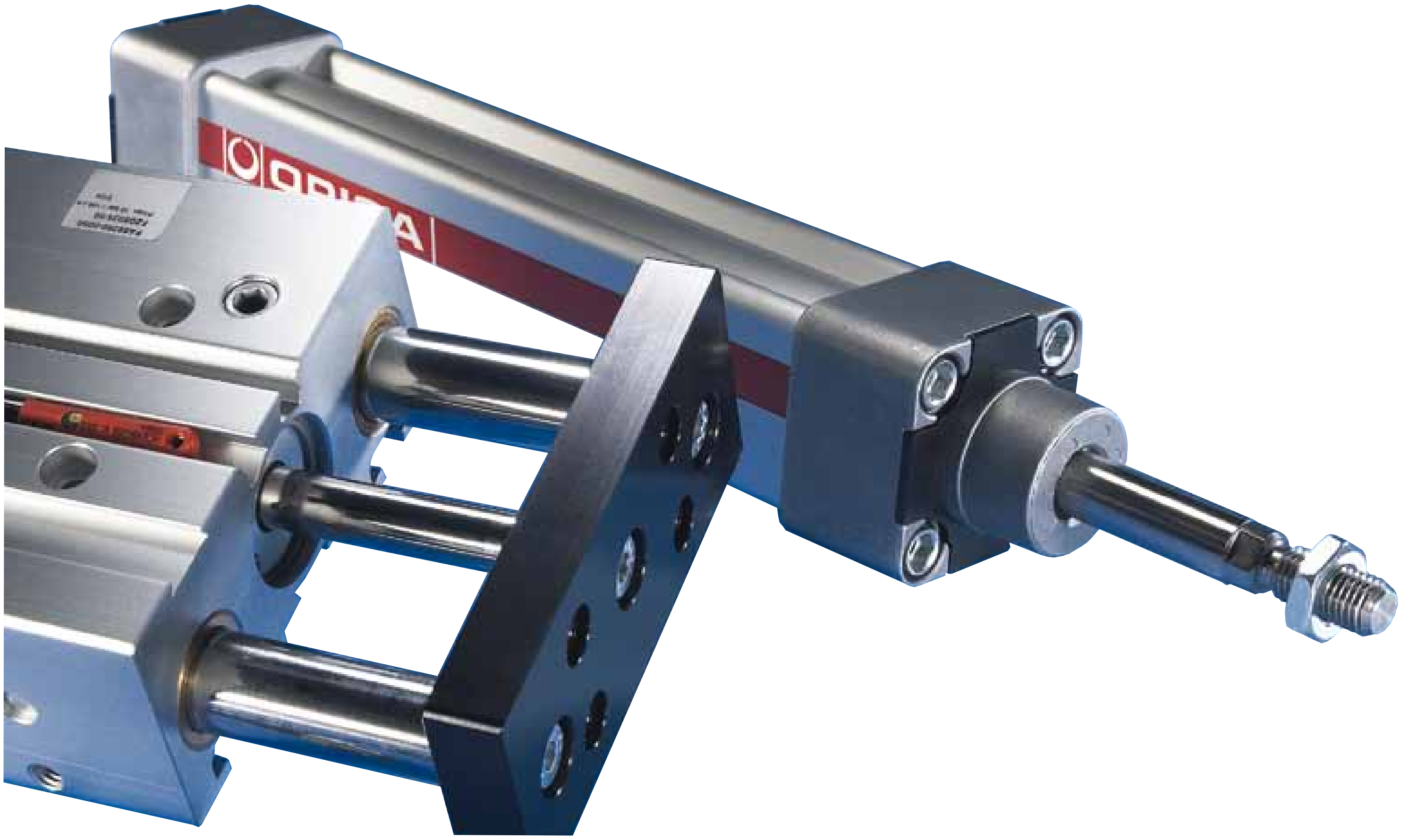

Piston Rod Cylinders
Bellows Cylinders

Special strengths for specific request

aerospace
climate control
electromechanical
filtration
fluid & gas handling
hydraulics
pneumatics
process control
sealing & shielding

ENGINEERING YOUR SUCCESS.

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All the products listed in this catalog are designed for typical pneumatic applications which e.g. are installed in higher-level machines. The recognized technical rules for safe and expert work are to be observed for the use and installation of pneumatic products. The precondition for the use of the products is, unless stated otherwise, correctly prepared compressed air free from aggressive media. Furthermore, the respective regulations of the legislator, the TÜV (Technical Inspection Association), the respective professional associations or the VDE (Association of Electrical, Electronic and Information Technologies) provisions also apply.

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Importance of EU Directives

Various Directives have been issued by the EU Commission in the course of the unification of the single European market; the following Directives are in part of significance for ORIGA products:

- Simple pressure vessels (87/404/EWG, amended by 90/488/EWG and 93/68/EWG)
- Low-voltage electrical equipment (73/23/EWG, amended by 93/68/EWG)
- Machinery Directive (89/392/EWG, amended by 91/368/EWG, 93/44/EWG and 98/37/EG)
- Pressure Equipment Directive (97/23/EWG)
- Equipment and protective systems intended for use in potentially explosive atmospheres (ATEX Directive, 94/9/EG)
- Electromagnetic Compatibility Directive (EMV Directive, 89/336/EWG, amended by 92/31/EWG)

If a product comes within the scope of application of one of these Guidelines, then an EU Declaration of Conformity with CE mark (CE for Communauté Européenne) is required. This CE marking does not represent a quality feature but verifies that the conformity assessment procedure specified has been concluded successfully and the protective requirements of the relevant EU Directives have been observed.

Products which do not come under any of the above mentioned Directives may not bear the CE mark nor may any manufacturer's declaration according to the EU Machinery Directive or Declaration of Conformity be issued for these products.

If a product may not be CE marked according to the Machinery Directive, it must however be marked if it comes within the scope of application of any other Directive.
The following harmonized standards are applied in the design of ORIGA components and systems:

- DIN EN ISO 12100 Safety of machinery
- DIN EN 60204.1 Electrical equipment of machines
- DIN EN 983 Safety requirements for fluid power systems and their components.
-

The following Directives are of particular significance to Parker Origa:

ORIGA products in potentially explosive atmospheres, to which the above mentioned ATEX Directive applies, are treated according to the Directive and CE and EX marked.

- According to the Machinery Directive, ORIGA products are mainly components for installation in machines and therefore do not require an EU Declaration of Conformity with CE mark.
- Parker Origa issues a manufacturer's declaration according to the Machinery Directive for these components.
- This declaration corresponds to a great extent to the Declaration of Conformity with the comment that commissioning is only permitted if the machine or system conforms to the Directives.
- This manufacturer's declaration impacts neither our product liability based on the product liability law nor warranty assurances according to our General Terms of Sale and Delivery.
- Neither does the manufacturer's declaration affect our quality assurance measures according to our Quality Management Manual nor our quality certification according to ISO 9001.
- According to the Pressure Equipment Directive, ORIGA products are components of low hazard potential, thus most of the products do not come under this Directive. The exceptions to this are maintenance equipment from a certain pressure/volume level onwards. These components are treated according to the Directive if required and bear the CE mark.

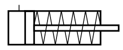
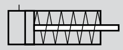
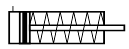
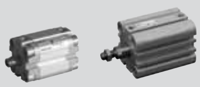
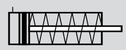
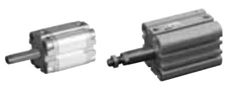
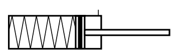
ORIGA products are excluded from the following EU Guidelines:

- End-of-life vehicles (2000/53/EG).
- Waste Electronic and Electrical equipment (WEEE, 2002/96/EG) and Restriction on Hazardous Substances (RoHS, 2002/95/EG).
- Pressure Equipment Directive (97/23/EWG) with the above mentioned exceptions.
-

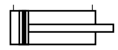
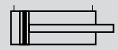
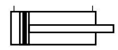
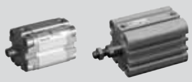
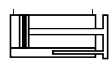
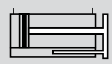
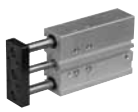
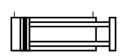
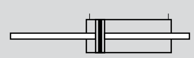
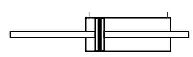
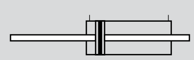
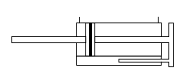
Table of Contents

*** The cylinders are according to the ATEX Certification 94/9/EG (ATEX 95).**
You will find further information on the ATEX directives in our brochure A5P060E

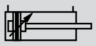
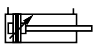
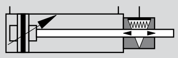
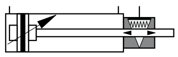
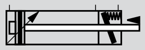
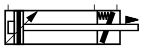
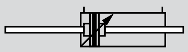
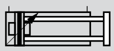
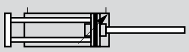
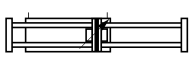
Cylinder single acting - standard version

System	Fig.	Standard	Symbol	Series	Piston-Ø mm	Page
Single acting without cushioning		ISO6432		R3...	10-25	15-21
		–		SZK3...	32-63	77-84
Single acting without cushioning For contactless position sensing		–		SZ7...	12-100	77-83
		ISO21287		NZ7... NZ7...	12-25 32-100	23-28 34-42
		ISO21287		NZ8... NZ8...	12-25 32-100	23-28 34-42

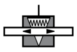
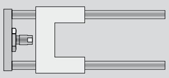
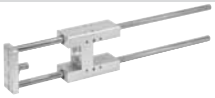
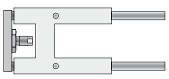
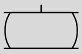
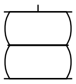
Cylinder double acting without cushioning - standard version, Guided Cylinders

System	Fig.	Standard	Symbol	Series	Piston-Ø mm	Page
Double acting without cushioning For contactless position sensing		–		SZ6...	12-100	77-84
		ISO6432		R6...	10-25	15-21
		–		R6... RK6...	32-63 32-63	69-76
		ISO21287		NZ6... NZ6...	12-25 32-100	23-28 34-42
		–		SZV6...	20-100	77-84
		–		NZV6... NZV6...	12-25 32-100	23-28 34-42
Guided Cylinders Double acting without cushioning For contactless position sensing		–		FZG6... FZK6...	20-50 20-50	86-99
Double acting without cushioning With through piston road For contactless position sensing		ISO6432 –		RDU6... RDU6...	12-25 32-63	15-21 69-76
		–		SZD6...	12-100	77-84
		–		NZD6... NZD6...	12-25 32-100	23-28 34-42
Twin rod cylinder Double acting without cushioning With through piston road For contactless position sensing				NZVD6...	32-100	34-42

Cylinder double acting with cushioning - standard version

System	Fig.	Standard	Symbol	Series	Piston-Ø mm	Page
Double acting with cushioning		ISO15552		DZ1...	125-320	60-67
Double acting with cushioning For contactless position sensing		ISO6432		R5...	20-25	15-21
		–		R5...	32-63	69-76
		ISO15552		AZ5...	32-100	46-59
		ISO15552		DZ5...	125-320	60-67
Cylinder with Locking unit Double acting with cushioning For contactless position sensing		–		AZF5...	32-100	46-59
		–		DZ5.../...-FSE	125	62-63
Double acting with cushioning For contactless position sensing		–		DZB5...	32-125	118-125
For contactless position sensing Blocking on forward and reverse stroke		–		DZBA5...	32-125	118-125
Double acting with cushioning With through piston road For contactless position sensing		ISO15552		AZD5...	32-100	46-59
Multi-position cylinder Double acting with cushioning For contactless position sensing		–		AZZ5.../.../...	32-100	46-59
Twin rod cylinder Double acting with cushioning For contactless position sensing		–		RDV5...	25	15-21
		–		AZV5...	32-100	46-59
		–		AZ35...	32-100	46-59
		–		AZ45...	32-100	46-59

Cylinders with Locking Unit, Linear Guides, Bellows Cylinders

System	Fig.	Standard	Symbol	Series	Piston-Ø mm	Page
Locking Unit		–		FSE...	32-125	114-117
Linear Guide, U-form for cylinders		–		FEU..-.....	8-100	100-106
Linear Guide, H-form for cylinders		–		FEH..-.....	8-100	107-112
Bellows Cylinder - single convolution type		–		SP-1B..		127-132
Bellows Cylinder - double convolution type		–		SP-2B..		127-128 133-136

Pneumatic cylinders

for EX-Areas
ATEX versions

EC Declaration of Conformity

Technical Data

Characteristics	Symbol	Unit	Description
General			
Type			Piston rod cylinders
Series			AZ, DZ, NZ, R, SZ
Ambient temperature range	T_{min} T_{max}	°C °C	-10 +60 Note: For use below freezing point (0 °C), please consult us
Max. switching frequency		Hz	1
Max. operating pressure	p_{max}	bar	8
Maximum Speed		m/sec.	0.5
Medium		 µm µm	Compressed air unlubricated and free of water and dirt to ISO 8573-1 Solids: Class 6, particle size ≤ 5 for dust Class 7, particle size ≤ 40 for gas Water content class 4, pressure dew point +3°C, but min. 5°C below min. operating temperature
Noise		dB(A)	70

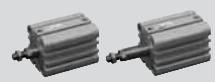
For further technical data, see the Characteristics Table for the individual cylinder series

Cylinder series in ATEX versions

Parker-Origa-Products for Ex-Atmospheres

Equipment Group II Category 2GD

Piston Rod Cylinders: Ex II 2GD c T4 T135°C

Series	Size	Stroke Range	Accessories	Illustration
AZ Series 5000	Ø 32-100	1-2000mm	Mountings programme, FEUG/FEHG,FEHK	
DZ Series 5000	Ø 125-250	10-2000mm	Mountings programme	
NZ Series 6000	Ø 32-100	1-500mm	Mountings programme, FEUG/FEHG,FEHK	
NZ Series 7000 Series 8000	Ø 32-100	1-25mm	Mountings programme, FEUG/FEHG,FEHK	
R6 Series 6000	Ø 10-25	1-500mm	Mountings programme, FEUG	
R5 Series 5000	Ø 20-25	1-500mm	Mountings programme, FEUG	
SZ Series 6000	Ø 12-100	1-80mm	Mountings programme	
SZ Series 7000	Ø 32-100	1-25mm	Mountings programme	

Sensors: Magnetic Switches

ES-K-ATEX 5m Cable lenght	Ex II 2GD EEx ib IIC T5 T100°C
ES-K-ATEX 10m Cable lenght	Ex II 2GD EEx ib IIC T5 T100°C
RS-K ATEX 5m Cable lenght	Ex II 3GD EEx nC IIC T3 146°C
RS-K ATEX 10m Cable lenght	Ex II 3GD EEx nC IIC T3 146°C

Note on ordering:
When ordering the ATEX version of a cylinder, please add „ATEX“ to the type designation and order no.
Example:
DZ 5125-0100 ATEX
PA 53540-0100 ATEX

Recommended Standard Stroke Ranges*

for Cylinder

Note

For cylinders with position sensing a minimum stroke length must be observed!
(i.e. length required for fitting of magnetic sensors.)
The stroke lengths shown above do not take the load into account!
(i.e. observe maximum permissible lateral force, if there is no external guidance, and maximum permissible bending force)

*For other stroke lengths please contact our Customer Service.

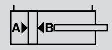
Series	Piston diameter														
	10	12	16	20	25	32	40	50	63	80	100	125	160	200	250	320
NZ/NZD	–	–	–	–	–	1-300	1-300	1-400	1-400	1-500	1-500	–	–	–	–	–
NZV/NZVD	–	–	–	–	–	5-300	5-300	5-400	5-400	1-500	1-500	–	–	–	–	–
AZ/AZV/AZD5000 + Viton	–	–	–	–	–	1-2000	1-2000	1-2000	1-2000	1-2000	1-2000	–	–	–	–	–
AZZ Tie rod	–	–	–	–	–	1-2000	1-2000	1-2000	1-2000	1-2000	1-2000	–	–	–	–	–
AZZ Multiposition	–	–	–	–	–							–	–	–	–	–
DZ	–	–	–	–	–	–	–	–	–	–	–	10-2000	10-2000	10-2000	10-2000	10-2000
DZB, DZBA5000	–	–	–	–	–	1-1000	1-1000	1-1000	1-1000	1-1000	1-1000	1-1000				
NZ 2000, 6000 + Viton	–	1-200	1-200	1-200	1-200	1-320	1-320	1-400	1-400	1-500	1-500	–	–	–	–	–
NZ 2000, 7000 , 8000 + Viton	–	1-10	1-25	1-25	1-25	1-25	1-25	1-25	1-25	1-25	1-25	–	–	–	–	–
NZD/NZV	–	1-50	1-50	1-50	1-50	1-100	1-100	1-100	1-100	1-100	1-100	–	–	–	–	–
SZ6000	–	1-50	1-50	1-50	1-50	1-80	1-80	1-80	1-80	1-80	1-80	–	–	–	–	–
SZ7000	–	1-10	1-25	1-25	1-25	1-25	1-25	1-25	1-25	1-25	1-25	–	–	–	–	–
SZV6000	–	1-50	1-50	1-80	1-80	1-80	1-80	–	–	–	–	–	–	–	–	–
SZD6000	–	1-10	1-25	1-50	1-50	1-80	1-80	1-80	1-80	1-80	1-80	–	–	–	–	–
SZK3000	–	–	–	–	–	1-10	–	1-10	1-10	–	–	–	–	–	–	–
R/RK3000	1-25	1-50	1-50	1-50	1-50	–	–	–	–	–	–	–	–	–	–	–
R/RK5000, 6000	1-100	1-200	1-200	1-320	1-500	1-500	1-500	1-500	1-500	–	–	–	–	–	–	–
RDU6000	1-100	1-200	1-320	1-500	1-500	–	–	–	–	–	–	–	–	–	–	–
FUEG	1-100	1-200	1-200	1-250	1-250	10-500	10-500	10-500	10-500	10-500	10-500	–	–	–	–	–
FEHG/FEHK	–	–	–	–	–	10-500	10-500	10-500	10-500	10-500	10-500	–	–	–	–	–

Formula	$F = p \cdot A \cdot R$
Symbol	Description
A p R	Piston area Pressure in bar Friction ca. 10%

1) Air consumption when charging in dm3/100 mm stroke. The tube volume must also be taken into consideration.
The given figures relate to piston area A.

The figures for piston area B change proportionally with the piston areas A to B.

A = Piston area - piston side
B = Piston area - piston rod side



Piston Force and Air Consumption

for Standard Cylinders

		Piston diameter (mm)																
		8	10	12	16	20	25	32	40	50	63	80	100	125	160	200	250	320
Piston area * (cm^2)	A	0.5	0.8	1.1	2.0	3.1	4.9	8.0	12.6	19.6	31.2	50.0	78.0	122.7	201.0	314.1	490.8	804
	B	0.38	0.65	0.85	1.7	2.6	4.1	6.9	10.6	16.5	28.0	45.4	73.6	114.7	188.5	301.5	471.2	773
Approx. piston force (kN) at ... bar	1	0.0045	0.007	0.010	0.018	0.028	0.044	0.072	0.113	0.176	0.281	0.452	0.706	1.104	1.809	2.827	4.417	7.236
	2	0.0090	0.014	0.020	0.036	0.056	0.088	0.144	0.226	0.353	0.561	0.905	1.413	2.209	3.619	5.654	8.835	14.476
	3	0.0135	0.021	0.030	0.054	0.084	0.132	0.217	0.339	0.530	0.842	1.357	2.120	3.313	5.428	8.482	13.253	21.715
	4	0.0180	0.028	0.040	0.072	0.113	0.176	0.289	0.452	0.707	1.122	1.809	2.827	4.417	7.238	11.309	17.671	28.953
	5	0.0225	0.035	0.050	0.090	0.141	0.220	0.362	0.565	0.884	1.402	2.262	3.534	5.522	9.407	14.137	22.089	36.191
	6	**0.0270**	**0.042**	**0.060**	**0.108**	**0.169**	**0.265**	**0.434**	**0.678**	**1.060**	**1.683**	**2.714**	**4.241**	**6.626**	**10.857**	**16.964**	**26.507**	**43.429**
	7	0.0315	0.049	0.070	0.126	0.197	0.309	0.506	0.792	1.237	1.963	3.167	4.948	7.731	12.666	19.792	30.952	50.652
	8	0.0360	0.056	0.080	0.144	0.226	0.353	0.579	0.905	1.414	2.244	3.619	5.654	8.835	14.476	22.619	35.342	57.788
	9	0.0405	0.063	0.090	0.162	0.254	0.397	0.651	1.018	1.590	2.524	4.071	6.361	9.940	16.286	25.447	39.760	65.124
	10	0.0450	0.070	0.100	0.180	0.282	0.441	0.723	1.131	1.767	2.805	4.523	7.068	11.044	18.095	28.274	44.178	72.360
Approx. air consumption (dm3/100 mm stroke at ... bar1) Figures are valid for piston area A (see symbol)	1	0.010	0.016	0.02	0.04	0.06	0.09	0.18	0.30	0.46	0.71	1.20	1.90	2.65	4.60	6.90	10.80	16.50
	2	0.015	0.024	0.03	0.06	0.09	0.14	0.27	0.43	0.69	1.00	1.85	2.85	4.10	6.90	10.40	16.30	24.50
	3	0.020	0.032	0.04	0.08	0.12	0.19	0.36	0.58	0.92	1.40	2.45	3.80	5.50	9.20	13.90	21.80	32.50
	4	0.025	0.040	0.05	0.10	0.15	0.24	0.45	0.72	1.15	1.75	3.00	4.75	6.95	11.50	17.40	27.20	40.50
	5	0.030	0.048	0.06	0.12	0.18	0.29	0.55	0.86	1.40	2.10	3.65	5.70	8.40	13.80	20.90	32.70	48.00
	6	**0.035**	**0.056**	**0.07**	**0.14**	**0.21**	**0.34**	**0.65**	**1.00**	**1.60**	**2.50**	**4.25**	**6.60**	**9.70**	**16.00**	**24.40**	**38.20**	**56.50**
	7	0.040	0.064	0.08	0.16	0.25	0.39	0.73	1.15	1.80	2.85	4.85	7.60	11.15	18.30	27.90	43.70	64.50
	8	0.045	0.072	0.09	0.18	0.28	0.41	0.82	1.30	2.00	3.20	5.45	8.50	12.55	20.60	31.50	49.20	72.50
	9	0.050	0.080	0.10	0.20	0.31	0.49	0.90	1.45	2.30	3.55	6.10	9.50	14.00	22.90	35.00	54.60	80.50
	10	0.055	0.088	0.11	0.22	0.34	0.53	1.00	1.60	2.50	3.90	6.40	10.40	15.40	25.20	38.50	60.10	89.00

For piston rod load diagram see pages 10-13

Piston Rod Load Diagram

– for standard cylinder types
– for twin rod cylinders

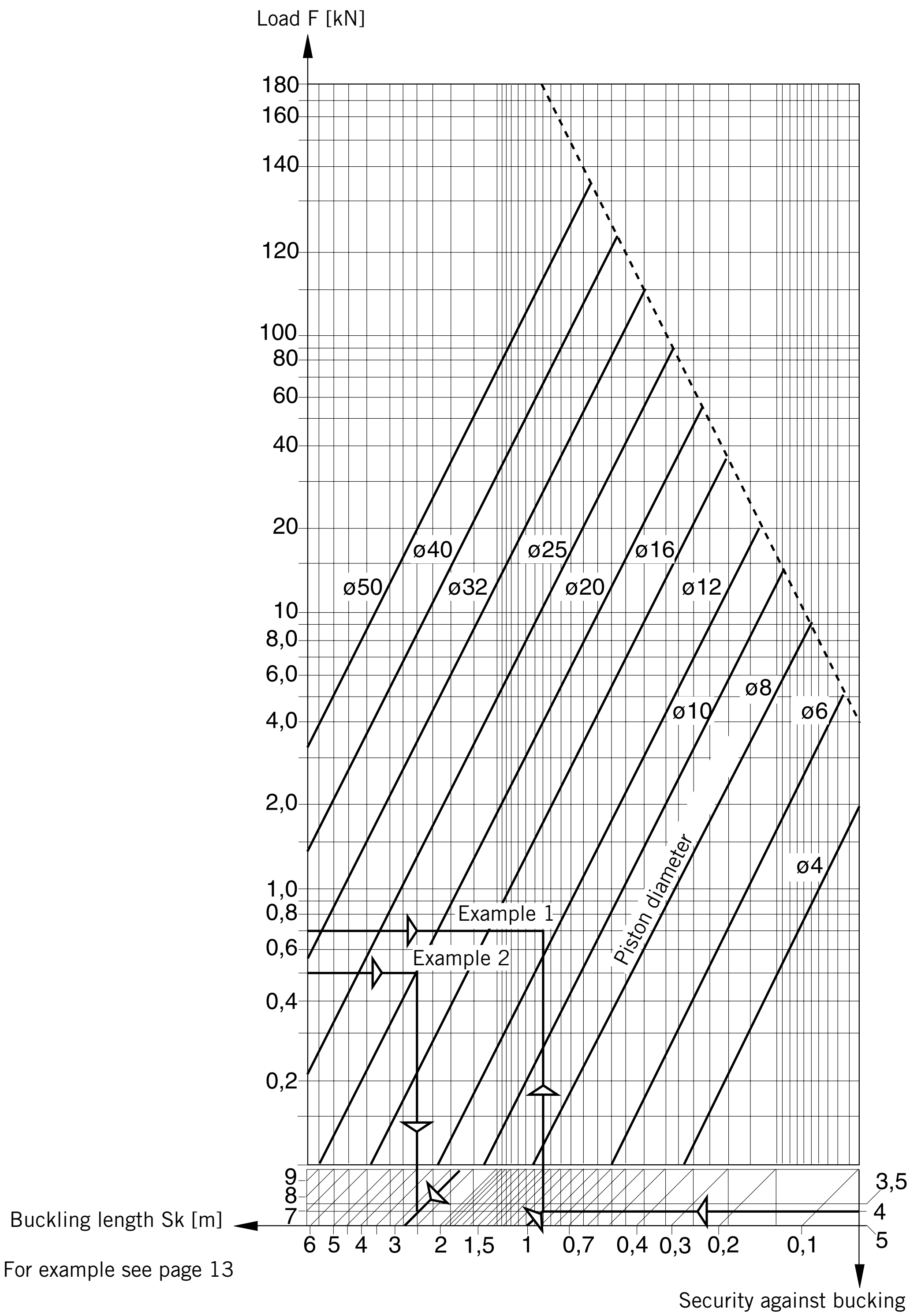
By means of this diagram the necessary piston rod diameter has to be determined to prevent the rod from buckling.

Always take the maximum piston thrust attainable at the specified operating pressure with the cylinder in question (see page 9).

Loads resulting from longer strokes (as indicated in the diagram) on request.

In cases of special mounting conditions and transverse forces please consult us.

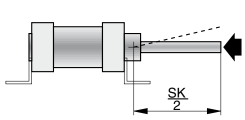
Recommended security against buckling: 3.5 to 5.



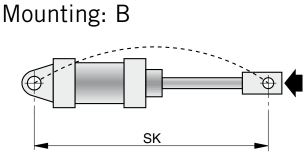
For example see page 13

Buckling Possibilities of Piston Rods

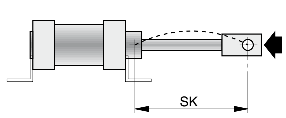
Mounting: A, C, D



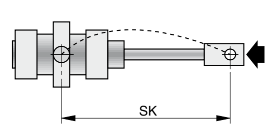
Mounting: B



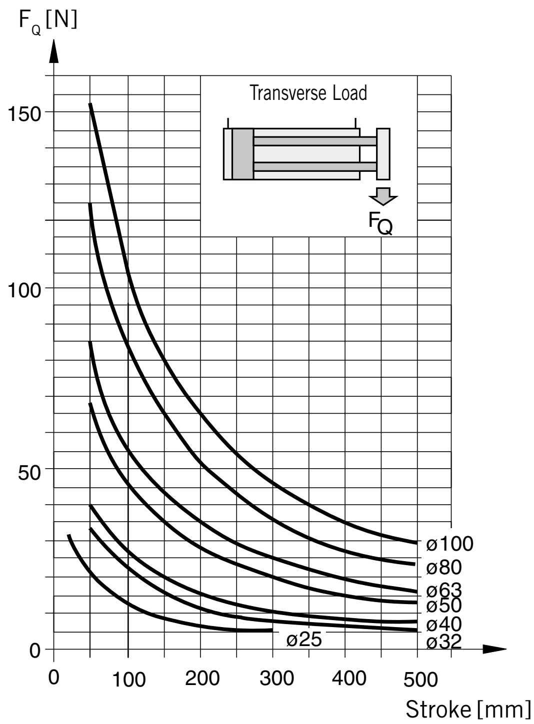
Mounting: A, C, D



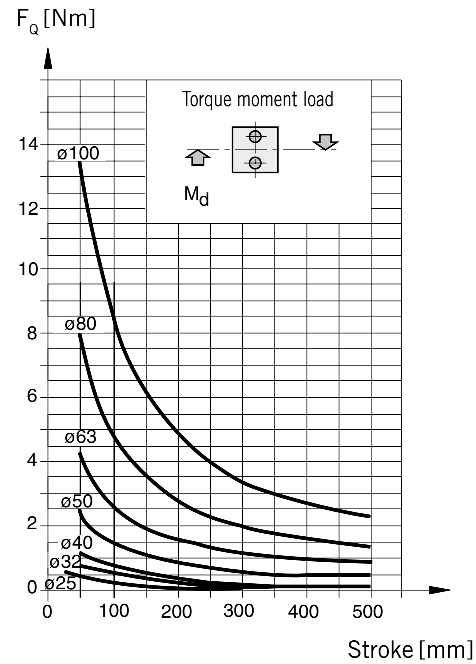
Mounting: E



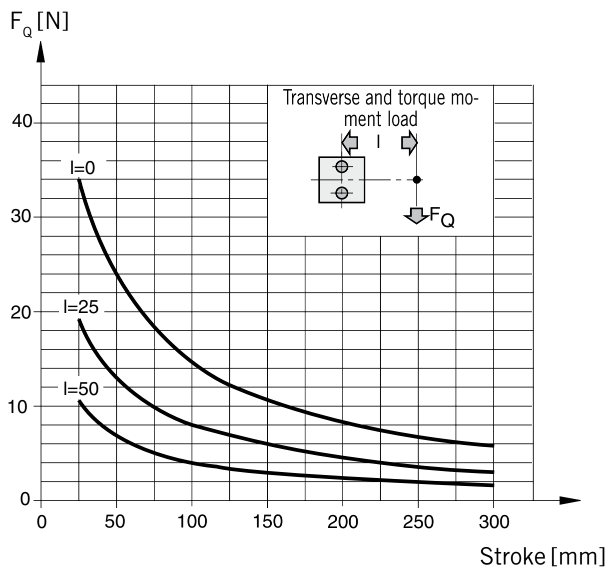
Twin Rod Cylinder [1)]
Transverse Load - Ø 25 - 100 mm



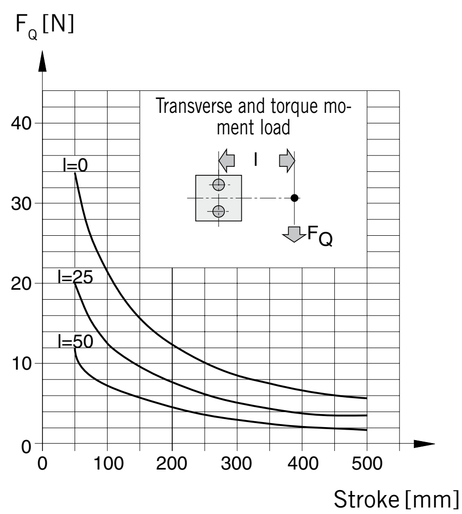
Twin Rod Cylinder [1)]
Torgue moment load - Ø 25 - 100 mm



Twin Rod Cylinder [1)]
Transverse and Torque Moment Load - Ø 25 mm

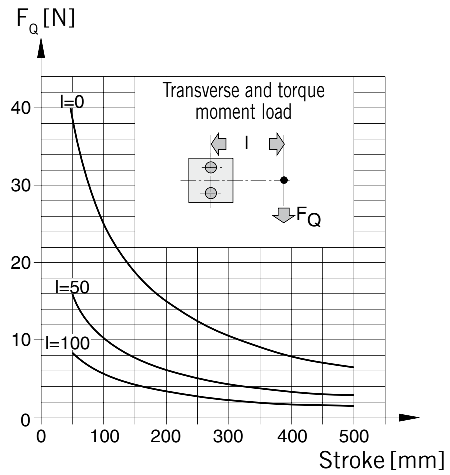


Twin Rod Cylinder [1)]
Transverse and Torque Moment Load - Ø 32 mm

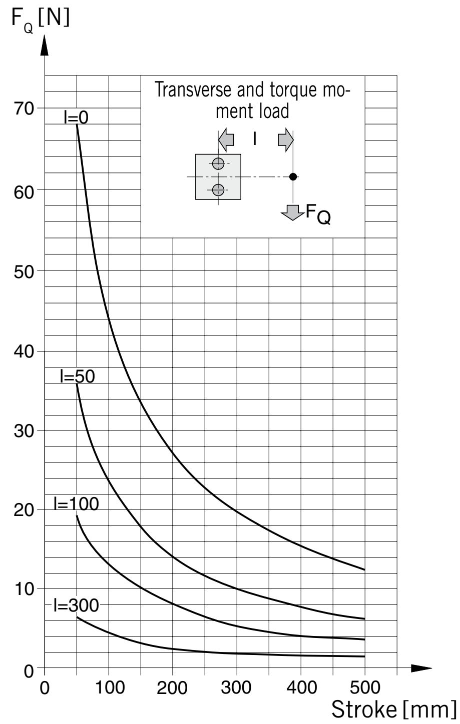


[1)] for installation instructions see page 13

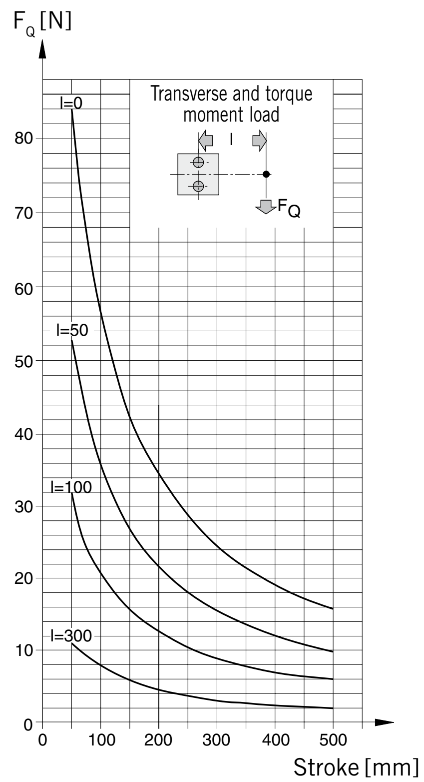
Twin Rod Cylinder [1)]
Transverse and Torque Moment Load - Ø 40 mm



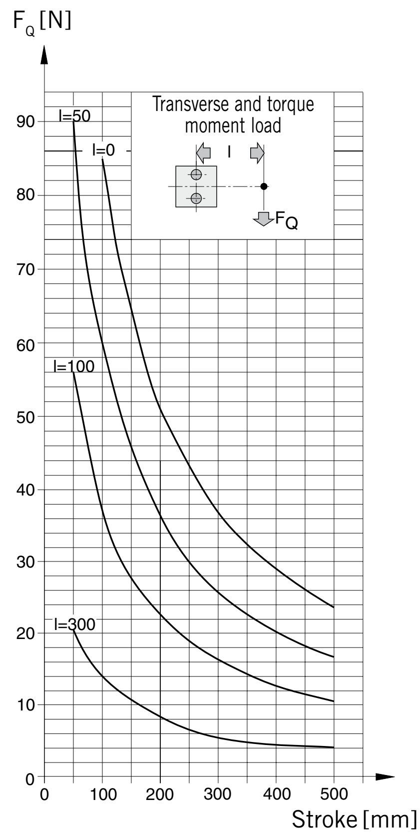
Twin Rod Cylinder [1)]
Transverse and Torque Moment Load - Ø 50 mm



Twin Rod Cylinder [1)]
Transverse and Torque Moment Load - Ø 63 mm

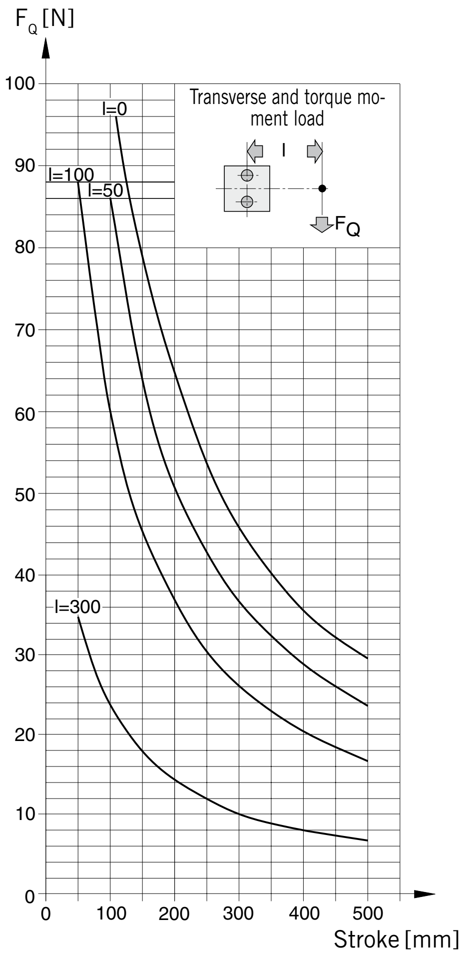


Twin Rod Cylinder [1)]
Transverse and Torque Moment Load - Ø 80 mm



[1)] for installation instructions see page 13

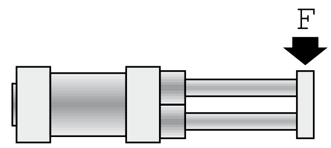
Twin Rod Cylinder [1]
Transverse and Torque Moment Load - Ø 100 mm



[1]) see installation instructions

Installation Instructions for Twin Rod Cylinders

For maximum reliability and service life, transverse loads should be applied as shown.



Examples

Example 1:	Given	Piston thrust: 0.7 kN Stroke length: 1000 mm Operating pressure: approx. 6 bar Mounting type C
	Wanted	Piston rod diameter with 4-fold security against buckling; Check the piston thrust of the cylinder diameter resulting from the piston rod diameter.
	Solution	see example 1 in piston rod load diagram. The piston rod diameter lies between 12 and 16 mm - a cylinder with a piston rod of 16 mm diameter therefore has to be chosen. According to the diagram referring to piston force and air consumption a cylinder 05 40 mm diameter is required.
Example 2:	Given	Cylinder: Ø 50 mm Piston rod: Ø 20 mm Mounting type: B Stroke length: 1000 mm Piston thrust: 0.5 kN at 6 bar
	Wanted	max. stroke with 4-fold security against buckling
	Solution	see example 2 in piston rod load diagram. Sk = 2900 mm max. stroke = 1450 mm

Piston force and air consumption see page 9

Standard Cylinders

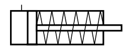
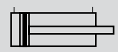
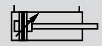
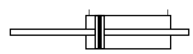
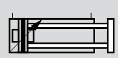
Basic cylinder to ISO 6432 CETOP RP 52P

Series R.... Series RDU.... Ø 10-25 mm

Basic cylinder non-rotating

Series RDV.... Ø 25 mm

Overview

System	Fig.	Symbol	Series	Page
Single acting without cushioning			R3...	16-19 21
Double acting without cushioning For contactless position sensing			R6...	16-19 21
Double acting with cushioning			R1...	16-19 21
Double acting with cushioning For contactless position sensing			R5...	16-19 21
With through piston rods Double acting without cushioning For contactless position sensing			RDU6...	16-19 21
Non-rotating Double acting with cushioning For contactless position sensing			RDV5...	16, 17 20, 21

Round cylinder Ø 10-25 mm

to ISO 6432
CETOP RP 52P

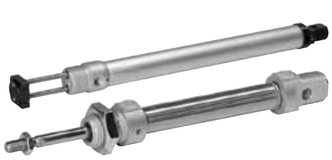
Series R....

System:
- **single acting**
- **double acting without cushioning**
- **double acting with cushioning**
- **for contactless position sensing**
- **ATEX-Version** Ex
- **with through piston rod**
- **non-rotating**

Universal cylinder mountable to the front
and rear cylinder end caps by means of a thread.
Pivot mounted on the rear cylinder covers.

The delivery includes:
1 Cylinder
1 Hexagon nut for piston rod thread and cylinder mounting

Versions without contactless position sensing on request



Characteristics

Characteristics	Symbol	Unit	Description					
General Features								
Type			Basic cylinder					
Series			R.... , RDU...., RDV....					
System								
R3....			Single acting without cushioning					
R6....			Double acting without cushioning					
R1...., R5....			Double acting with cushioning					
RDU6...			With through piston rod Double acting without cushioning					
RDV5...			Non-rotating Double acting with cushioning					
Ambient temperature range	T_{min} T_{max}	°C °C	-10 +70	Note: When using below freezing point (°C), please contact us for advice				
Medium temperature range	T_{max}	°C	+70					
Weight (mass)		kg	See table					
Medium			Filtered and lubricated or filtered unlubricated compressed air					
Lubrication			Oil mist lubrication compatible with Buna N					
Material								
Cylinder barrel			Steel, high-alloy					
Front/rear end caps			Aluminium					
Piston rod			Steel, high-alloy					
Pneumatic Characteristics								
Nominal pressure	p_n	bar	6					
Series			R...., RDU					RDV
Piston diameter		mm	10	12	16	20	25	25
Operating pressure range	p_{min} p_{max}	bar bar	1,5 10	1 10				1 10
Port size			M5	M5	M5	G1/8	G1/8	G1/8
Piston rod diameter		mm	4	6	6	8	10	6
Stroke length		mm	For standard stroke lengths see order instructions, max. 50 (R 3...), max. 500 (R 5..., R 6...) longer strokes on request					
Cushioned stroke		mm	–	–	–	17	17	17
Piston force and air			see page 9					
Compression force at 6 bar		N						265
Tensile force at 6 bar		N						235

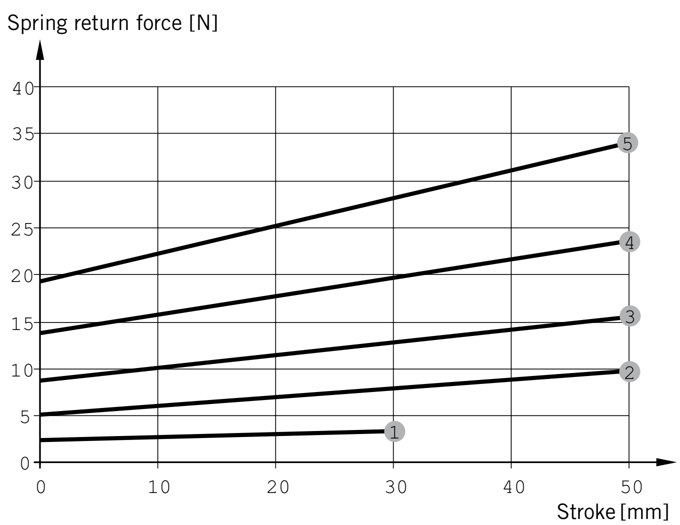
Weight (mass) kg

Mounting	Cylinder diameter									
	Ø10		Ø12		Ø16		Ø20		Ø25	
	1*	2*	1*	2*	1*	2*	1*	2*	1*	2*
Basic cylinder Type R....	0.065	0.025	0.120	0.040	0.135	0.050	0.260	0.070	0.350	0.080
With through piston rod Type RDU....	0.100	0.045	0.155	0.060	0.170	0.070	0.330	0.110	0.460	0.170
Non-rotating Type RDV....	–	–	–	–	–	–	–	–	0.460	0.110

Mounting	Cylinder diameter				
	Ø10	Ø12	Ø16	Ø20	Ø25
RA (1 bracket)	0.022	0.043	0.043	0.100	0.100
RC	0.013	0.028	0.028	0.050	0.050
RB	0.023	0.036	0.036	0.080	0.080

* 1 = Weight for cylinder with 100 mm stroke
2 = Weight for every additional 100 mm stroke length

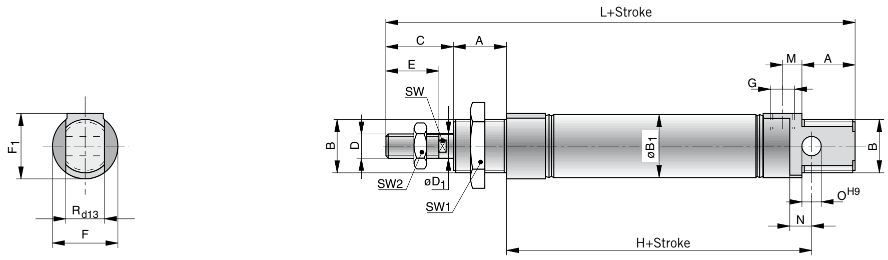
Theoretical Spring Return Forces in relation to Stroke Length
Series R3..., R5..., R6...



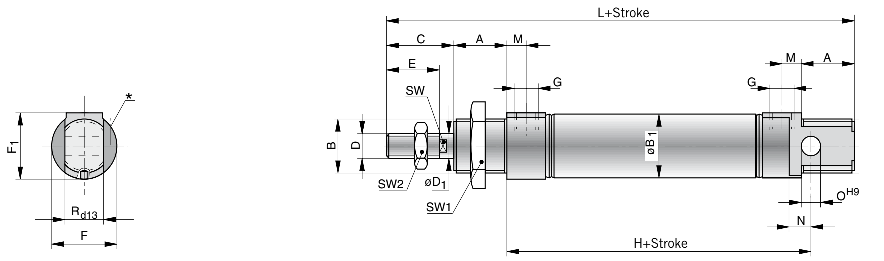
1 = Cylinder Ø10
2 = Cylinder Ø12
3 = Cylinder Ø16
4 = Cylinder Ø20
5 = Cylinder Ø25

Piston force and air consumption see page 9, dimensions see page 18-20, order instructions see page 21

Dimensions – Basic Cylinder, Single Acting, Ø 10 – 25 mm
Series R3...

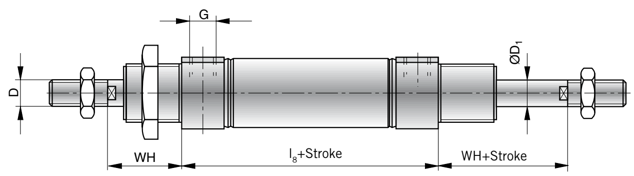


Dimensions – Basic Cylinder, Double Acting, Ø 10 – 25 mm
Series R5..., R6..., R1...



*From the connection side: adjustable end cushioning only for types R 5016, R 5020, R 5025

Dimensions – Basic Cylinder, Double Acting with through piston rod
Series RDU6...



for further dimensions see Series R5....

Dimension Table (mm) for Basic Cylinder, Series R...., RDU....

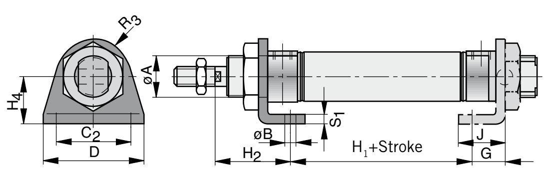
Cyl.Ø	A	B	ØB_1	C	D	ØD_1	E	F	F_1	G	H + Stroke	l_8 +Stroke
10	12	M12x1.25	11.3	16	M4	4	12	15	15	M5	48	44.5
12	17	M16x1.5	13.3	21	M6	6	16	20	20	M5	53	46
16	17	M16x1.5	17.3	21	M6	6	16	20 *	20*	M5	60	56
20	20	M22x1.5	21.3	24	M8	8	20	27	27	G1/8	71	66
25	22	M22x1.5	26.5	28	M10x1.25	10	22	27	27	G1/8	76	69

* for Type R5016: F = 22 , F_1 = 21

Cyl.Ø	L+ Stroke	M	N	ØO^{H9}	R_{d13}	SW	SW_1	SW_2	WH	WH +Stroke
10	84	5	6	4	8	–	19	7	16	16
12	101	5	9	6	12	5	24	10	22	22
16	111	5	9	6	12	5	24	10	22	22
20	130	8	12	8	16	7	32	13	24	24
25	141	8	12	8	16	9	32	17	28	28

Mountings – Series R...., RDU...., Ø 10 – 25 mm

Dimensions Mounting RA

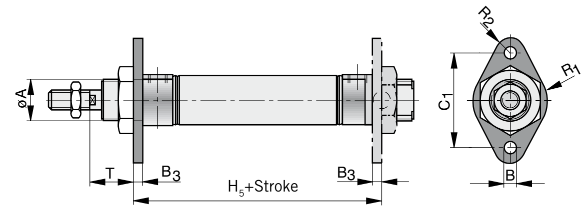


Material: steel, passivated

Dimension Table (mm) for Mounting RA

Cyl.-Ø	ØA	ØB	C_2	D	G	H_1+ Stroke	H_2	H_4	J	R_3	S_1
10	12	4.5	25	35	11	30	24	16	16	10	3
12	16	5.5	32	42	14	29	32	20	20	13.5	4
16	16	5.5	32	42	14	36	32	20	20	13.5	4
20	22	6.6	40	54	17	44	36	25	25	18	5
25	22	6.6	40	54	17	45	40	25	25	18	5

Dimensions Mounting RC

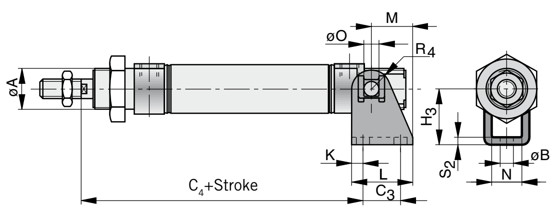


Material: steel, passivated

Dimension Table (mm) for Mounting RC

Cyl.-Ø	ØA	ØB	B_3	C_1	H_5+ Stroke	R_1	R_2	T
10	12	4.5	3	30	52	12.5	5	13
12	16	5.5	4	40	58	15	6	18
16	16	5.5	4	40	64	15	6	18
20	22	6.6	5	50	78	20	8	19
25	22	6.6	5	50	79	20	8	23

Rear Trunnion Mounting RB



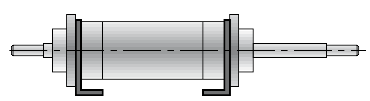
Material: steel, passivated

Dimension Table (mm) – for Mounting RB

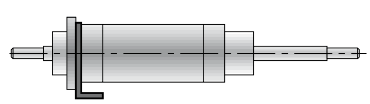
Cyl. Ø	ØB	C_3	C_4+ Stroke	H_3	K	L	M	N	ØO	R_4	S_2
10	4.5	12.5	65	24	6.5	23	18	8.1	4	5	2.5
12	5.5	15	73	27	5	25	18	12.1	6	7	3
16	5.5	15	80	27	5	25	18	12.1	6	7	3
20	6.6	20	91	30	6	32	22	16.1	8	10	4
25	6.6	20	100	30	6	32	22	16.1	8	10	4

Mountings – Series RDU....

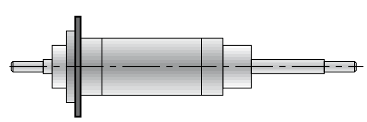
Mounting RA2-.. (2 brackets)



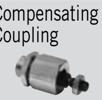
Mounting RA1.. (1 bracket)



Mounting RC-..(1 flange)

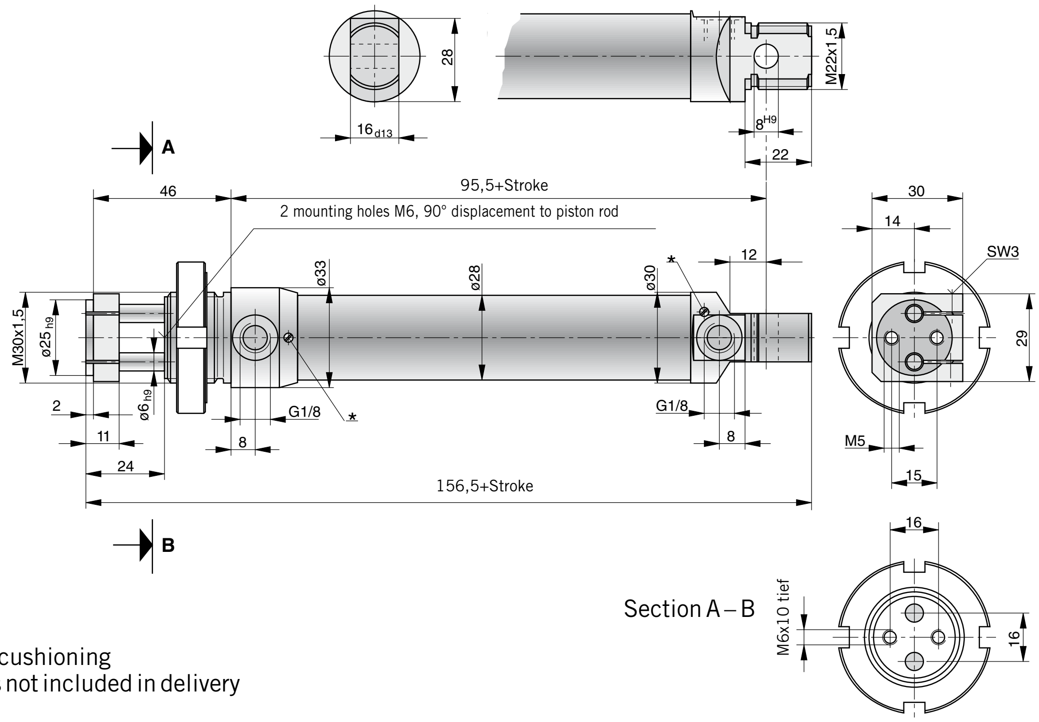


Mountings - Accessories

Piston Rod Eye	Piston Rod Clevis	Compensating Coupling	Magnetic Switch	Magnetic Switch				
								
Page 138	Page 139	Page 140	Page 152	Page 149				

Piston force and air consumption see page 9, dimensions see page 18-20, order instructions see page 21

Dimensions – Double acting, non-rotating, Ø 25 mm
Series RDV5...

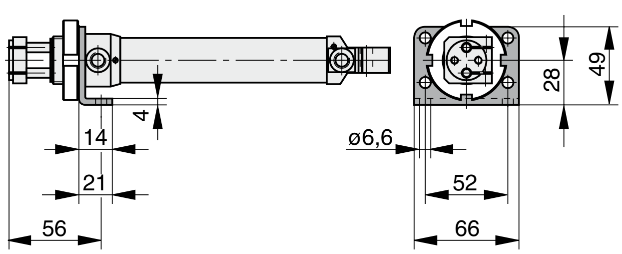


* adjustable end cushioning
Mounting nut is not included in delivery

Mounting instruction:
When mounting the front plate onto the piston rods tighten the screws with a torque $M_a = 4$ N.

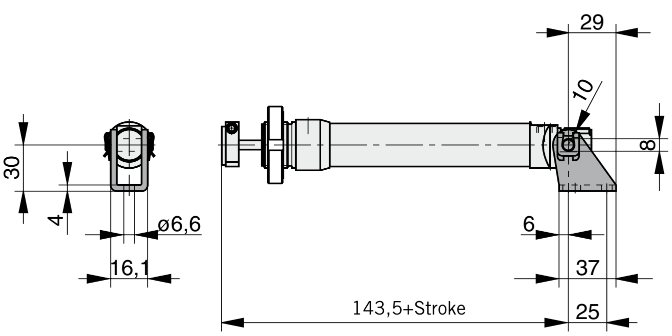
Mountings – Series RDV...., Ø 25 mm

Dimensions (mm) – Mounting RA



Material: steel, passivated

Dimensions (mm) – Mounting RB (counter bearing)



Material: steel, passivated

Mountings - Accessories

Magnetic Switch

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Magnetic Switch

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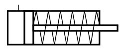
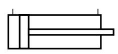
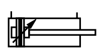
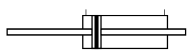
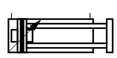
Piston force and air consumption see page 9, order instructions see page 21

Order Instructions – Basic Cylinder, Series R...., RDU...., RDV....

System	Symbol	Piston-Ø	Stroke Length	Order Instructions Type	Order-No.
Single acting without cushioning		10	max. 25[1)]	R3010/..	PA67410-....
		12	max. 50[2)]	R3012/..	PA67430-....
		16	max. 50[2)]	R3016/..	PA67450-....
		20	max. 50[2)]	R3020/..	PA67470-....
		25	max. 50[2)]	R3025/..	PA67500-....
Double acting without cushioning For contactless position sensing		10	max. 100[3)]	R6010/..	PA67420-....
		12	max. 200[3)]	R6012/..	PA67440-....
		16	max. 200[3)]	R6016/..	PA67460-....
		20	max. 320[3)]	R6020/..	PA67490-....
		25	max. 500[3)]	R6025/..	PA67520-....
Double acting with cushioning		16	max. 200[3)]	R1016/..	PA68400-....
		20	max. 320[3)]	R1020/..	PA67570-....
		25	max. 500[3)]	R1025/..	PA67590-....
Double acting with cushioning For contactless position sensing		16	max. 200[3)]	R5016/..	PA68410-....
		20	max. 320[3)]	R5020/..	PA67480-....
		25	max. 500[3)]	R5025/..	PA67510-....
With through rod piston Double acting without cushioning For contactless position sensing		10	max. 100[3)]	RDU6010/...	PA68420-....
		12	max. 200[3)]	RDU6012/...	PA67690-....
		16	max. 320[3)]	RDU6016/...	PA67700-....
		20	max. 500[3)]	RDU6020/...	PA67710-....
		25	max. 500[3)]	RDU6025/...	PA67720-....
Non-rotating Double acting with cushioning For contactless position sensing		25	max. 500[3)]	RDV5025/...	PA50470-....

Complete type designation and order no. with stroke length (in mm) (4-digit)
Standard stroke length:
1) 0010, 0025
2) 0010, 0025, 0050
3) 0025, 0050, 0080, 0100, 0125, 0160, 0200, 0250, 0320

Mountings – Cylinder mounting parts and Accessories

Description	Order-No. Type	Ø10	Ø12	Ø16	Ø20	Ø25
Foot mounting (1 mounting bracket)	RA 1-..	KX 9271	KK 26302	KK 26302	KK 28302	KK 28302
Foot mounting (standard version)	RA 2-..*	PD 31522	PD 25771	PD 25771	PD 25772	PD 25772
Flange mounting (1 flange)	RC- ..	KX 9272	KK 26305	KK 26305	KK 28305	KK 28305
Rear trunnion mounting	RB- ..**	KZ 1412	KZ 1419	KZ 1419	KZ 1420	KZ 1420
Foot mounting (1 mounting bracket) for series RDV5...	RA 1-32					KK29.302
Groove nut for series RDV5...						ZP2125

Complete type designation with piston-Ø

Example: RA 1-25 KK 28302

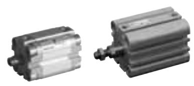
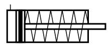
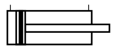
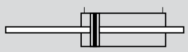
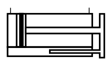
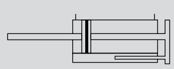
* consisting of 2 mounting brackets and 1 hexagonal nut
** consisting of 1 pivot with bolt and circlip

Standard Cylinders

Compact Cylinder to ISO 21287

Series NZ....
Series NZD....
Series NZV....
Series NZVD....
Ø 12-100 mm

Overview

System	Fig.	Symbol	Series	Piston-Ø mm	Page
Single acting For contactless position sensing			NZ7...	12-25 32-100	24-29 31 34-39 42
Single acting With through piston rod For contactless position sensing			NZ8...	12-25 32-100	24-29 31 34-39 42
Double acting without cushioning For contactless position sensing			NZ6...	12-25 32-100	24-29 31 34-39 42
With through piston rod Double acting without cushioning For contactless position sensing			NZD6...	12-25 32-100	24-29 31 34-39 42
Non-rotating Double acting without cushioning For contactless position sensing			NZV6...	12-25 32-100	24, 25 30, 33 34, 35 40-42
Non-rotating With through piston rod Double acting without cushioning For contactless position sensing			NZVD6...	32-100	34, 35 40-42

Compact Cylinder Ø 12-25 mm

to ISO 21287

Series NZ....
Series NZD....
Series NZV....

Versions:
- **single acting**
- **double acting without cushioning**
- **for contactless position sensing**
- **with through piston rod**
- **non-rotating**
- **option of internal or external mounting on piston rod**

Special version:
- high temperature version (150°C)

The cylinder profile has grooves in which, depending on stroke length, one or more magnetic switches can be mounted for sensing the end positions or intermediate positions of the magnetic piston.

The delivery includes:
1 Cylinder

Magnetic switches are not included - please order these separately.

Versions without contactless position sensing on request.

Characteristics

Characteristics	Symbol	Unit	Description			
General Features						
Type			Piston rod cylinder			
Series			NZ7, NZ8, NZ6			
Series			Piston rod cylinder			
NZ7..., NZ8...			Double acting without cushioning			
NZ6...			Double acting without cushioning			
NZD6...			With through piston rod Double acting without cushioning			
NZV6...			Non-rotating Double acting without cushioning			
Mountig			See drawing			
Tube connection			Thread			
Ambient temperature range	T_{min} T_{max}	°C °C	-20 +80	Note: When using below freezing point (°C) it is necessary to consult us		
Medium temperature range	T_{max}	°C	+80			
Weight (mass)		kg	See table			
Installation			In any position			
Medium			Filtered and lubricated or filtered and unlubricated compressed air			
Lubrication			Oil mist lubrication compatible with polyurethane			
Material						
Cylinder tube			Aluminium, anodised			
Front/rear end caps			Aluminium, laquered			
Piston rod			Steel, high-alloy			
Pneumatic Characteristics						
Nominal pressure	p_n	bar	6			
Operating pressure	p_{min} p_{max}	bar bar	1,0 (1,5 Single acting version) 10			
Piston diameter		mm	12	16	20	25
Port size			M5	M5	M5	M5
Piston rod diameter		mm	6	8	10	10
Piston rod thread						
Internal			M3	M4	M6	M6
External			M5	M6	M8x1.25	M8x1.25
Stroke length		mm	Standard stroke lengths see order instrutions, max. 200			
Piston force and air consumption			See page 9			
Cushioning		mm	Elastomer cushioning at both ends			
Spring return force max.		N	See diagram			

Weight (mass) kg

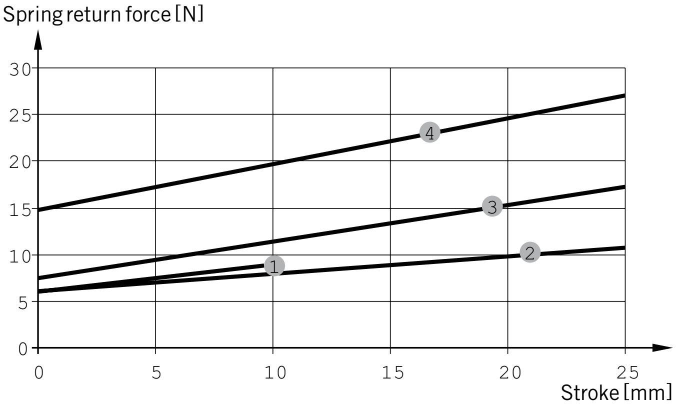
Cylinder version	Cylinder diameter							
	Ø12		Ø16		Ø20		Ø25	
	1*	2*	1*	2*	1*	2*	1*	2*
Standard Type NZ	0.095	0.015	0.105	0.019	0.162	0.024	0.199	0.027
With through piston rod Type NZD	0.103	0.016	0.115	0.020	0.177	0.026	0.215	0.028
Non-rotating Type NZV	0.112	0.018	0.122	0.022	0.188	0.028	0.233	0.031

* 1 = Cylinder weight (10 mm stroke)
2 = Weight per further 10 mm stroke length

Mounting	Cylinder diameter			
	Ø12	Ø16	Ø20	Ø25
A	0.047	0.047	0.086	0.100
BA	0.021	0.021	0.038	0.042
C	0.110	0.110	0.180	0.220
D	0.110	0.110	0.180	0.220

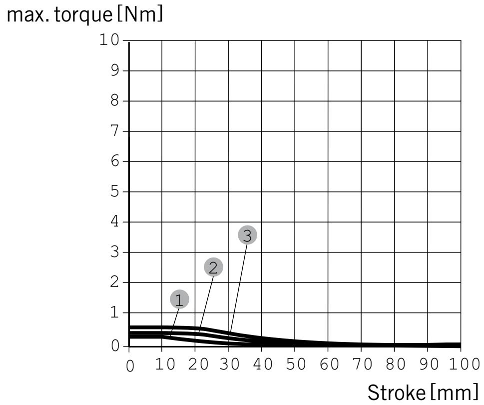
Theoretical Spring Return Forces in relation to Stroke Length Series NZ7000, NZ8000

1 = Cyl. Ø12
2 = Cyl. Ø16
3 = Cyl. Ø20
4 = Cyl. Ø25



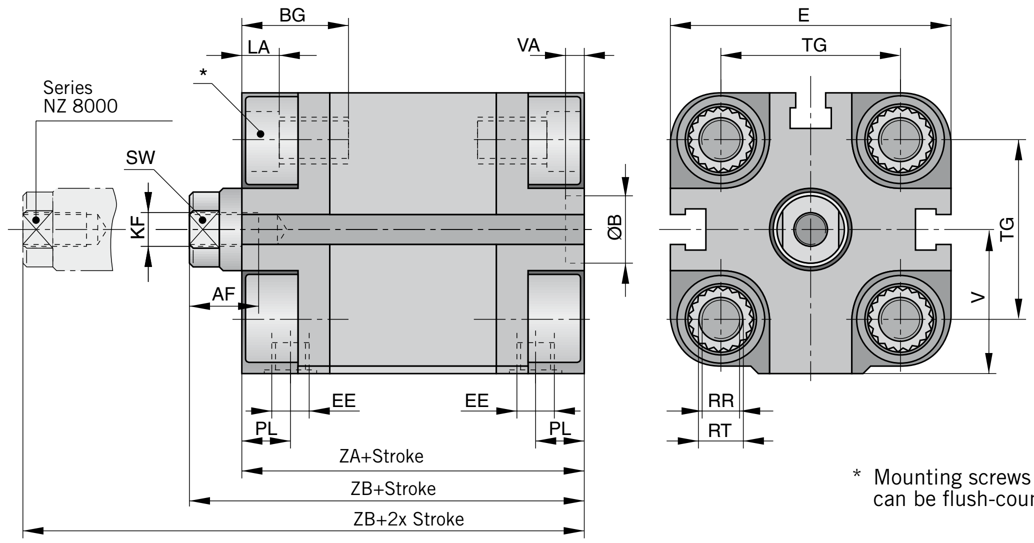
Torque (Nm) in relation to Stroke Length Series NZV

1 = Cyl. Ø12, 16
2 = Cyl. Ø20
3 = Cyl. Ø25



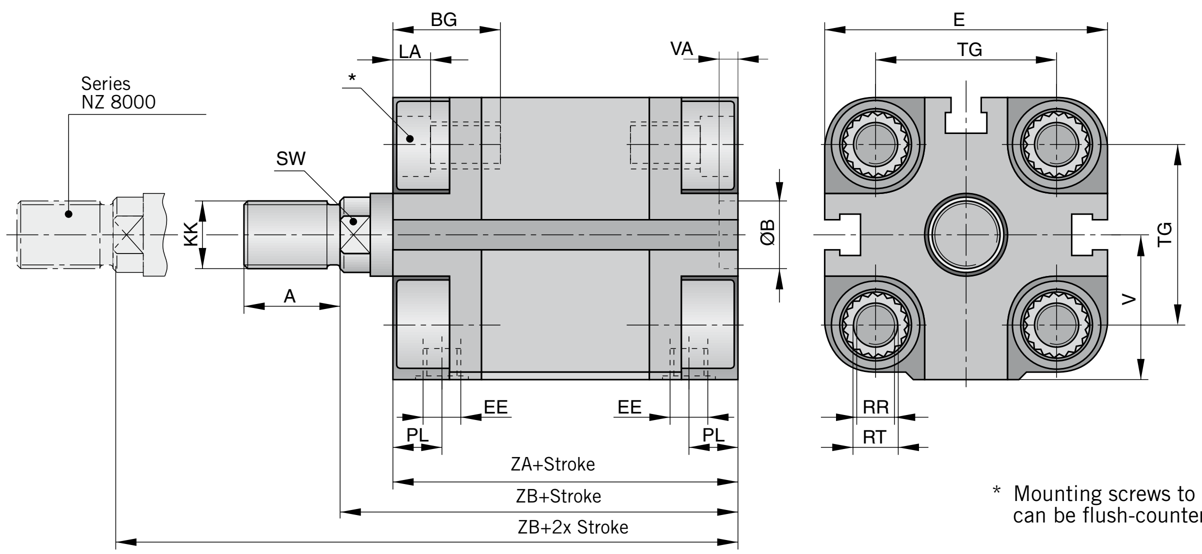
Piston force and air consumption see page 9, dimensions see page 26-27, order instructions see page 31, 32

Dimensions – Basic Cylinder, Ø 12 – 25 mm
Version: Piston Rod with Internal Thread (Series NZ..../...)



* Mounting screws to DIN 912 can be flush-countersunk

Dimensions – Basic Cylinder, Ø 12 – 25 mm
Version: Piston Rod with External Thread (Series NZ..../...-AG)

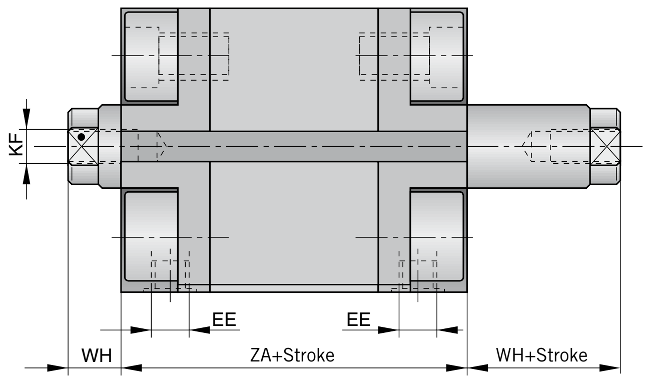


* Mounting screws to DIN 912 can be flush-countersunk

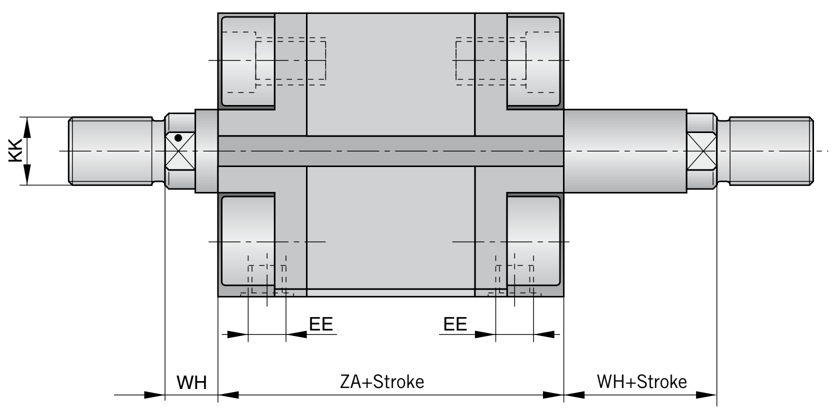
Dimension table (mm) – Basic Cylinder

Cyl. Ø	A	B	E	V	AF	BG	EE	KF	KK	LA	PL	RR	RT	TG	VA	ZA +Stroke	ZB +Stroke	ZB +2x Stroke	SW	WH	WH +Stroke
12	12	6	29	15,5	8	8	M5	M3	M5	5	5	3,2	M4	18	4	37	42,5	42,5	5	5,5	5,5
16	16	6	29	15,5	10	10	M5	M4	M6	5	5	3,2	M4	18	4	37	42,5	42,5	7	5,5	5,5
20	16	6	36	19,5	10	15	M5	M6	M8x1,25	5	5	4,1	M5	22	4	37	43	43	8	6	6
25	16	6	40	21,5	10	15	M5	M6	M8x1,25	5	5	4,1	M5	26	4	39	45	45	8	6	6

Dimensions – Basic Cylinder with through piston rod, Ø 12 – 25 mm
Version: Piston Rod with Internal Thread (Series NZD..../...)



Dimensions – Basic Cylinder with through piston rod, Ø 12 – 25 mm
Version: Piston Rod with External Thread (Series NZD..../...-AG)



Accessories

Piston Rod Eye

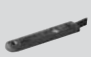
Page 138

Piston Rod Clevis

Page 151

Compensating Coupling

Page 140

Magnetic Switch

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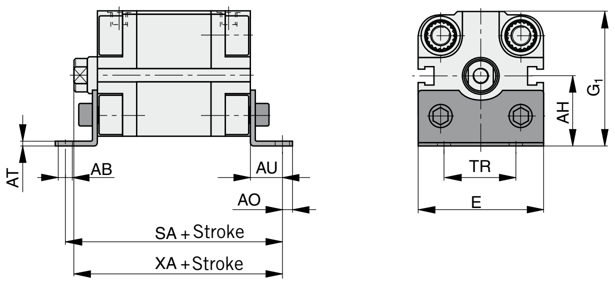
Piston force and air consumption see page 9, order instructions see page 31, 32

Mountings – Series NZ.... , Ø 12 –25 mm

Dimensions for Mounting A



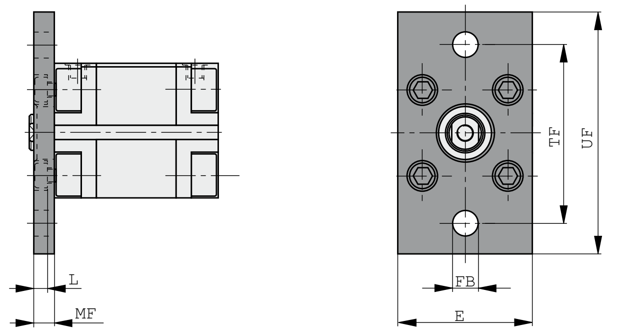
Material: steel, passivated

Dimension Table (mm) – Mounting A

Cyl. Ø	ØAB	AH	AO	AT	AU	E	G_1	TR	SA +Stroke	XA +Stroke
12	5.8	22	4.5	3	13	28	36.5	18	63	55.5
16	5.8	22	4.5	3	13	28	36.5	18	63	55.5
20	7	27	7	4	16	36	46	22	69	59
25	7	29	7	4	16	40	49.5	26	71	61

Included in delivery: 2 foot brackets, 4 screws

Dimensions for Mounting C



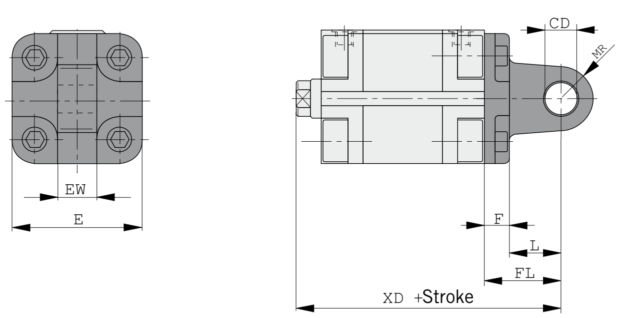
Material: steel, zinc-plated

Dimension Table (mm) – Mounting C

Cyl. Ø	ØFB	E	L	MF	TF	UF
12	5.5	29	5	8	43	55
16	5.5	29	5	8	43	55
20	6.6	36	5	8	55	70
25	6.6	40	5	8	60	76

Included in delivery: 1 flange, 4 screws

Dimensions for Mounting BA



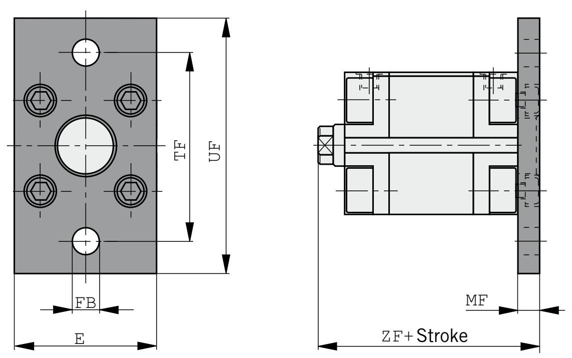
Material: cast aluminium

Dimension Table (mm) – Mounting BA

Cyl. Ø	ØCD H9	E	EW	F	FL	L	MR	XD+Stroke
12	6	27	12	6	16	10	6	58.5
16	6	27	12	6	16	10	6	58.5
20	8	34	16	6	20	14	8	63
25	8	38	16	6	20	14	8	65

Included in delivery: 1 mounting eyelets, 4 screws

Dimensions for Mounting D



Material: steel, zinc-plated

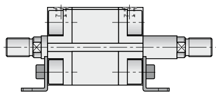
Dimension Table (mm) – Mounting D

Cyl. Ø	ØFB	E	MF	TF	UF	ZF+Stroke
12	5.5	29	8	43	55	50.5
16	5.5	29	8	43	55	50.5
20	6.6	36	8	55	70	51
25	6.6	40	8	60	76	53

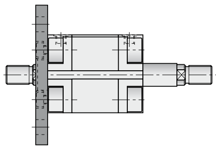
Included in delivery: 1 flange, 4 screws

Mountings – Series NZD...., Ø 12 –25 mm

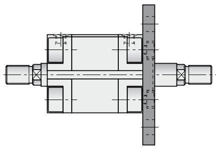
Mounting A-.. (Foot mounting)



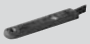
Mounting C-.. (Front flange mounting)



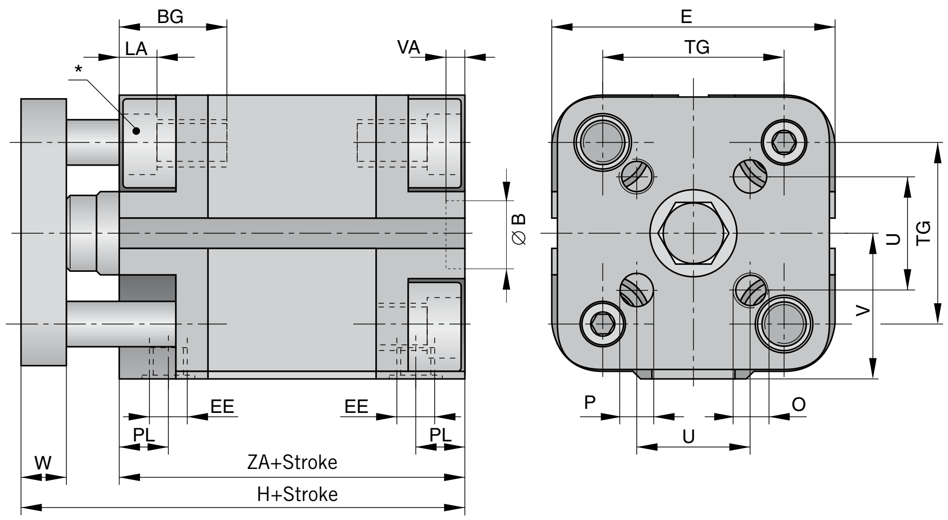
Mounting D-..(Rear flange mounting)



Accessories

Piston Rod Eye	Piston Rod Clevis	Compensating Coupling	Magnetic Switch					
								
Page 138	Page 139	Page 140	Page 152					

Dimensions – Basic Cylinder, non-rotating, Ø 12 – 25 mm
Series NZV....

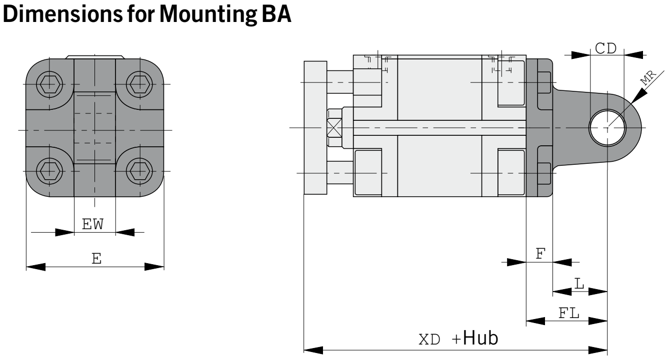


* Mounting screws to DIN 912 can be flush-countersunk

Dimensions Table (mm) – Basic Cylinder, Series NZV

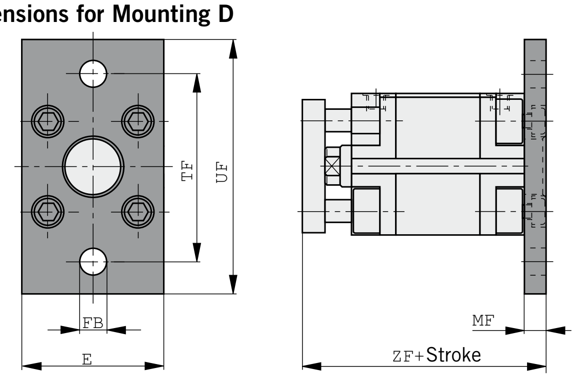
Cyl. Ø	ØB	BG	E	EE	H	LA	O	P	PL	U	TG	V	VA	W	ZA +Stroke
12	6	8	29	M5	48.5	5	M3	3	5	9.9	18	15.5	4	6	37
16	6	10	29	M5	48.5	5	M3	3	5	9.9	18	15.5	4	6	37
20	6	15	38	M5	51	5	M4	4	5	12	22	19.5	4	8	37
25	6	15	41	M5	53	5	M5	5	5	15.6	26	21.5	4	8	39

Dimensions for Mounting BA



Material: cast aluminium

Dimensions for Mounting D



Material: steel, zinc-plated

Dimensions Table (mm) – Mounting BA

Cyl. Ø	ØCD	E	EW	F	FL	L	MR	XD +Stroke
12	6	27	12	6	16	10	6	64.5
16	6	27	12	6	16	10	6	64.5
20	8	34	16	6	20	14	8	71
25	8	38	16	6	20	14	8	73

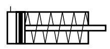
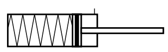
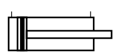
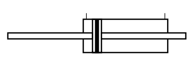
Included in delivery: 1 mounting eyelets, 4 screws

Dimensions Table (mm) – Mounting D

Cyl. Ø	ØFB	E	MF	TF	UF	ZF +Stroke
12	5.5	29	8	43	55	56.5
16	5.5	29	8	43	55	56.5
20	6.6	36	8	55	70	59
25	6.6	40	8	60	76	61

Included in delivery: 1 flange, 4 screws

Order Instructions for Basic Cylinder, Series NZ...., NZD...., Ø 12 – 25 mm

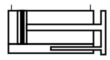
System	Symbol	Piston-Ø	Order instructions Type	Order-No.
Single acting without cushioning For contactless position sensing		12	NZ 7012/..	PA 67960-....
		12	NZ 7012/..-AG	PA 68320-....
		16	NZ 7016/..	PA 67970-....
		16	NZ 7016/..-AG	PA 68330-....
		20	NZ 7020/..	PA 67980-....
		20	NZ 7020/..-AG	PA 68340-....
		25	NZ 7025/..	PA 67990-....
		25	NZ 7025/..-AG	PA 68350-....
Single acting without cushioning For contactless position sensing		12	NZ 8012/..	PA 68000-....
		12	NZ 8012/..-AG	PA 68360-....
		16	NZ 8016/..	PA 68010-....
		16	NZ 8016/..-AG	PA 68370-....
		20	NZ 8020/..	PA 68020-....
		20	NZ 8020/..-AG	PA 68380-....
		25	NZ 8025/..	PA 68030-....
		25	NZ 8025/..-AG	PA 68390-....
Double acting without cushioning For contactless position sensing		12	NZ6012/..	PA67920-....
		12	NZ6012/..-AG	PA68280-....
		16	NZ6016/..	PA67930-....
		16	NZ6016/..-AG	PA68290-....
		20	NZ6020/..	PA67940-....
		20	NZ6020/..-AG	PA68300-....
		25	NZ6025/..	PA67950-....
		25	NZ6025/..-AG	PA68310-....
With through piston rod Double acting without cushioning For contactless position sensing		12	NZD6012/..	PA68200-....
		12	NZD6012/..-AG	on request
		16	NZD6016/..	PA68210-....
		16	NZD6016/..-AG	on request
		20	NZD6020/..	PA68220-....
		20	NZD6020/..-AG	on request
		25	NZD6025/..	PA68230-....
		25	NZ6025/..-AG	on request

Complete type designation and order no. with stroke length in mm (4-digits)

Standard stroke length
– Single acting version: 0005, 0010, 0015, 0020, 0025 (Ø12: 0005, 0010)
– Double acting version: 0005, 0010, 0015, 0020, 0025, 0030, 0040, 0050 delivered preferably

Magnetic switches are not included - please order these separately.

Order Instructions for Basic Cylinder, Series NZV...., Ø 12 – 25 mm

System	Symbol	Piston-Ø	Order instructions Type	Order-No.
Non-rotating Double acting without cushioning For contactless position sensing		12	NZV6012/..	PA68160-....
		16	NZV6016/..	PA68170-....
		20	NZV6020/..	PA68180-....
		25	NZV6025/..	PA68190-....

Complete type designation and order no. with stroke length in mm (4-digits)

Standard stroke length
– Double acting version: 0005, 0010, 0015, 0020, 0025, 0030, 0040, 0050 delivered preferably

Order Instructions for Cylinder Mountings

Description	Order-No. Ø12	Ø16	Ø20	Ø25
Foot mounting A-..	KL5510	KL5510	KL5511	KL5512
Rear trunnion mounting BA-..	KL5513	KL5513	KL5514	KL5515
Front flange mounting C-..	KL5516	KL5516	KL5517	KL5518
Rear flange mounting D-..	KL5516	KL5516	KL5517	KL5518

Characteristics

Characteristics	Symbol	Unit	Description					
General Features								
Type			Compact cylinder					
Series			NZ7, NZ8, NZ6					
Series			Piston rod cylinder					
NZ7..., NZ8...			Single acting without cushioning					
NZ6...			Double acting without cushioning					
NZD6...			With through piston rod Double acting without cushioning					
NZV6...			Non-rotating Double acting without cushioning					
NZVD6...			Non-rotating, double acting without cushio-ning and with through piston rod					
Mounting			See drawing					
Tube connection			Thread					
Ambient temperature range	T_{min} T_{max}	°C °C	-20 +80	Note: When using below freezing point (°C) it is necessary to consult us				
Medium temperature range	T_{max}	°C	+80					
Weight (mass)		kg	See table					
Installation			In any position					
Medium			Filtered and lubricated or filtered and unlubricated compressed air					
Lubrication			Oil mist lubrication compatible with polyurethane					
Material								
Cylinder tube			Aluminium, anodised					
Front/Rear end caps			Aluminium					
Piston rod			Steel, high-alloy					
Pneumatic Characteristics								
Nominal pressure	p_n	bar	6					
Operating pressure	p_{min} p_{max}	bar bar	0,5 (1,0 Single acting version) 10					
Piston diameter		mm	32	40	50	63	80	100
Port size			G1/8	G1/8	G1/8	G1/8	G1/8	G1/8
Piston rod diameter		mm	12	16	20	20	25	25
Piston rod thread								
Internal			M8	M8	M10	M10	M12	M12
External			M10 x1.25	M10 x1.25	M12 x1.25	M12 x1.25	M16 x1.5	M16 x1.5
Stroke length		mm	Standard stroke length see order instructions					
Piston force and air consumption			See page 9					
Cushioning		mm	Elastomer cushioning at both ends					
Spring return force max.		N	See diagram					

Compact Cylinder Ø 32-100 mm

Compact cylinder to ISO 21287

Series NZ....
Series NZD....
Series NZV....
Series NZVD....

Versions:
- **single acting**
- **double acting without cushioning**
- **for contactless position sensing**
- **with through piston rod**
- **non-rotating**
- **option of internal or external mounting on piston rod**
- **ATEX-Version** Ⓔx

Special versions:
- Viton version for high temperature range (+150°)
- various piston rod extensions
- various piston rod materials
- with adaptor plate for valve mounting

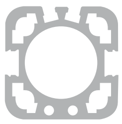
The cylinder profile has grooves in which, depending on stroke length, one or more magnetic swtiches can be mounted for sensing the end positions or intermediate po-sitions of the magnetic piston.

The delivery includes:
1 Cylinder
1 Hexagon nut for piston rod thread

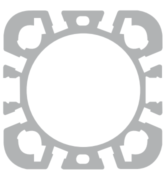
Magnetic switches are not included - please order these separately

Profile for Basic Cylinder NZ

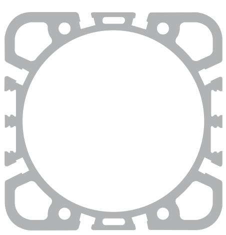
Ø32 mm, Ø40 mm



Ø50 mm, Ø63 mm



Ø80 mm, Ø100 mm



Weight (mass) kg

Cylinder version	Cylinder diameter											
	Ø32		Ø40		Ø50		Ø63		Ø80		Ø100	
	1*	2*	1*	2*	1*	2*	1*	2*	1*	2*	1*	2*
Standard Type NZ	0.293	0.036	0.417	0.051	0.573	0.071	0.826	0.081	1.272	0.104	2,209	0,128
With through rod piston Type NZD	0.313	0.045	0.453	0.066	0.635	0.095	0.872	0.105	1.371	0.142	2,337	0,161
Non-rotating Type NZV	0.395	0.044	0.543	0.059	0.778	0.083	1.093	0.093	1.738	0.122	2,843	0,148
Non-rotating, with through rod piston Type NZVD	0.517	0.061	0.705	0.082	1.046	0.120	1.404	0.130	2.303	0.178	3,605	0,198

* 1 = Cylinder weight (10 mm stroke)
2 = Weight per further 10 mm stroke length

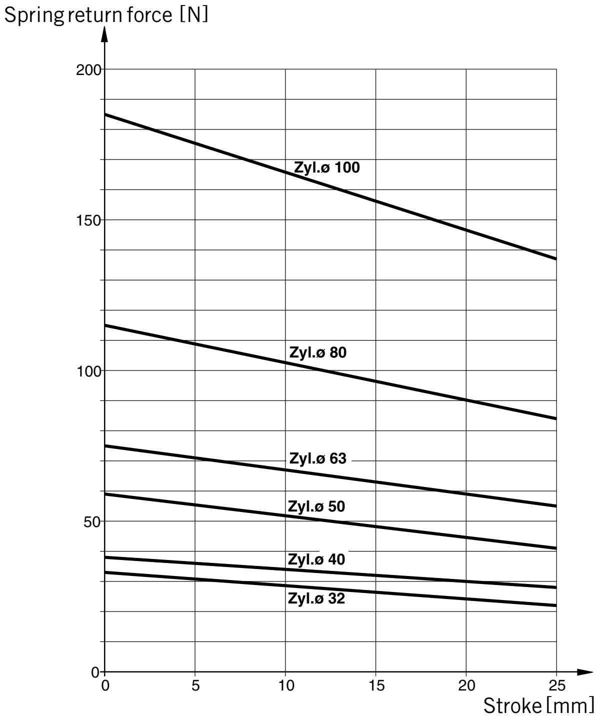
Mounting	Cylinder diameter					
	Ø32	Ø40	Ø50	Ø63	Ø80	Ø100
A	0.146	0.186	0.335	0.390	0.789	1.003
B	0.072	0.093	0.166	0.221	0.487	0.741
BA	0.100	0.128	0.205	0.303	0.568	0.905
BAS	0.106	0.146	0.216	0.322	0.561	0.864
C	0.095	0.115	0.229	0.277	0.623	0.780
D	0.095	0.115	0.229	0.277	0.623	0.780
Security bolt for mounting B,BA,BAS	0.034	0.055	0.062	0.127	0.160	0.315

Dimensions (mm) for Special Piston Rod Threads and Thread length

Piston Rod with External Thread (mm)			
Cylinder-Ø	Special Thread KK	Standard Thread KK	SW
32	M10	M10x1.25	10
40	M10	M10x1.25	13
50	M12	M12x1.25	17
63	M12	M12x1.25	17
80	M16	M16x1.5	19
100	M16	M16x1.5	22
External Thread Length of the Piston Rod (mm)			
Cylinder-Ø	$A_{min.}$	$A_{Standard}$	$A_{max.}$
32	13	19	99
40	13	19	99
50	13	22	99
63	13	22	99
80	13	28	99
100	13	28	99

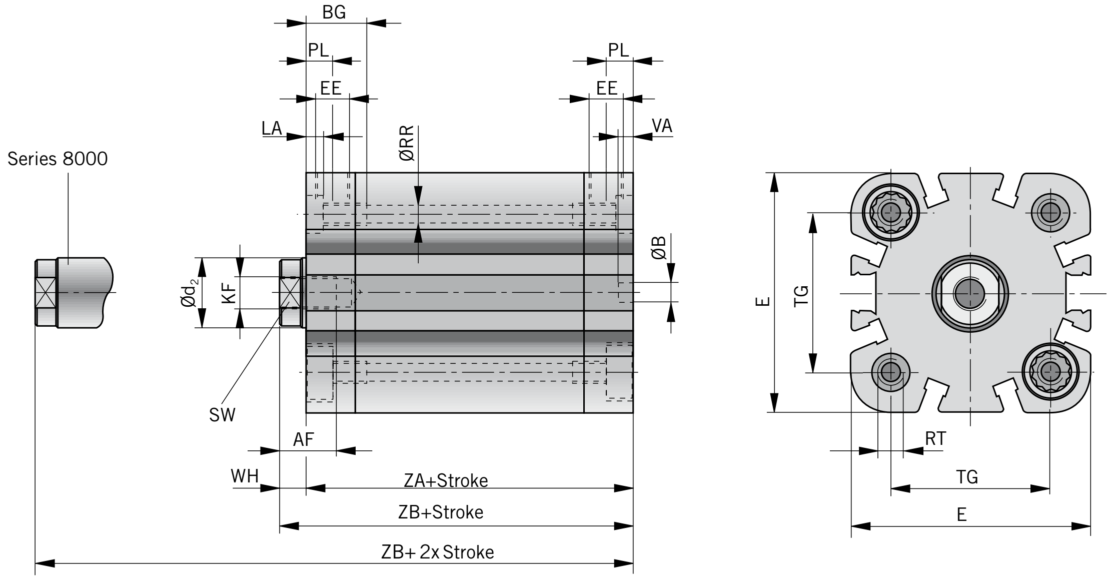
Note:
In the configuration of a cylinder with through piston rod, Series NZD, the assumption is that both piston rods are identical. Only one is configured and this applies to both piston rods. If two different piston rods are required, a special cylinder must be ordered. Special cylinders are not configurable.

Theoretical Spring Return Forces in relation to Stroke Length
Series NZ7000, NZ8000

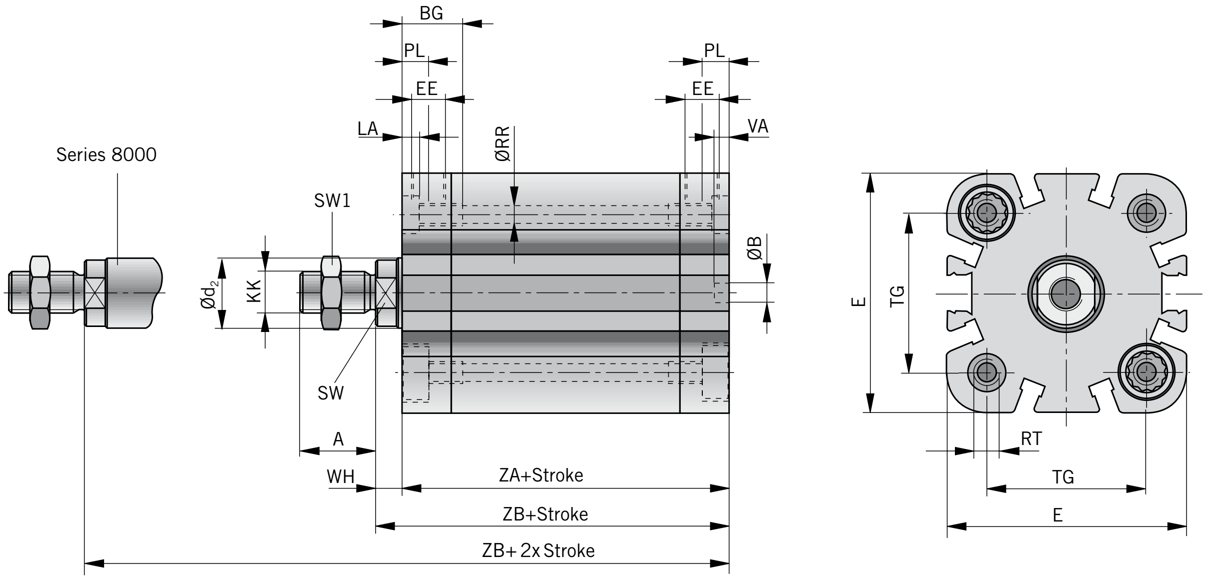


Piston force and air consumption see page 9, dimensions see page 36-41, order instructions see page 42, 43

Dimensions – Basic Cylinder, Ø 32 – 100 mm
Version: Piston rod with Internal Thread (Series NZ..../...)



Dimensions – Basic Cylinder, Ø 32 – 100 mm
Version: Piston rod with External Thread (Series NZ..../...-AG)

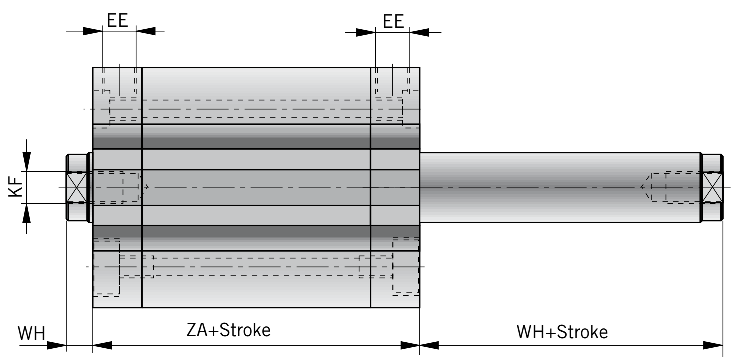


Dimension Table (mm) – Series NZ...., NZD...

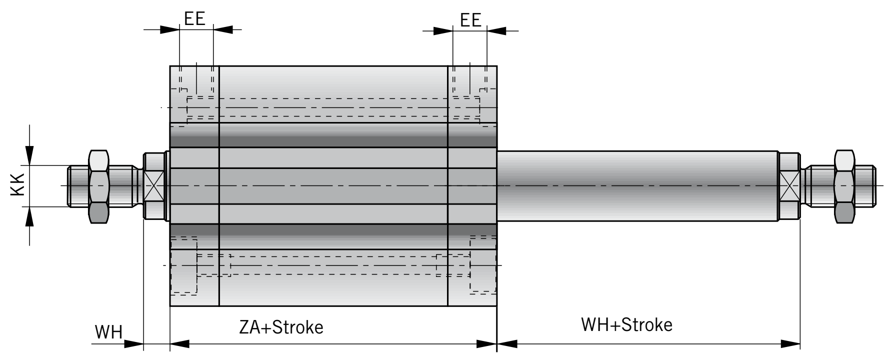
Cyl. Ø	A	ØB^H9	Ød2_h9	E	AF	BG	EE	KF	KK
32	19	6	12	50	13	14.5	G1/8	M8	M10x1.25
40	19	6	16	58	13	14.5	G1/8	M8	M10x1.25
50	22	6	20	70	16	14	G1/8	M10	M12x1.25
63	22	8	20	80	16	14.5	G1/8	M10	M12x1.25
80	28	8	25	96	20	15.5	G1/8	M12	M16x1.5
100	28	8	25	116	20	20	G1/8	M12	M16x1.5

Piston force and air consumption see page 9, order instructions see page 42, 43

Dimensions – Basic Cylinder with Through Piston Rod, Ø 32 – 100 mm
Version: Piston rod with Internal Thread (Series NZ..../...)



Dimensions – Basic Cylinder with Through Piston Rod, Ø 32 – 100 mm
Version: Piston rod with External Thread (Series NZ..../...-AG)

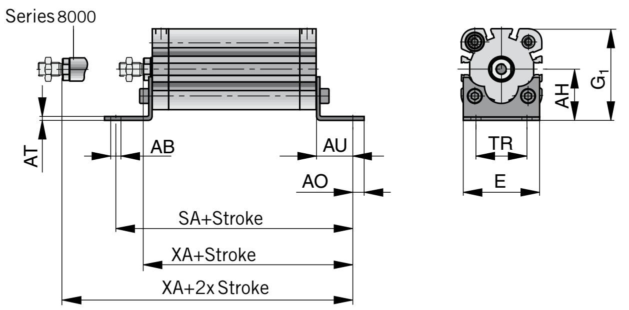


Cyl. Ø	LA	PL	TG	ØRR	RT	SW	SW1	VA	WH	WH+Stroke	ZA+Stroke	ZB+Stroke (*
32	5	7.5	32.5	8.5	M6	10	17	4	7	7	44	51
40	5	7.5	38	8.5	M6	13	17	4	7	7	45	52
50	6	7.5	46.5	10.5	M8	17	19	4	8	8	45	53
63	6	7.5	56.5	10.5	M8	17	19	4	8	8	49	57
80	2	7.5	72	13.8	M10	19	24	4	10	10	54	64
100	2	10	89	13.8	M10	22	24	4	10	10	67	77

(* for Series NZ8000: ZB+2xStroke

Mountings – Series NZ...., Ø 32 – 100 mm

Dimensions for Mounting A



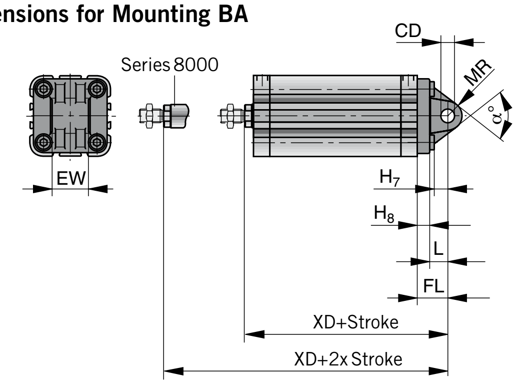
Material: steel, passivated

Dimension Table (mm) – Mounting A

Cyl. Ø	E	G_1	ØAB	AH	AO	AT	AU	SA +Stroke	TR	XA +Stroke (*
32	47	57	7	32	8	4	24	92	32	75
40	53	65	10	36	10	4	28	101	36	80
50	65	80	10	45	10	5	32	109	45	85
63	75	90	10	50	10	5	32	113	50	89
80	95	111	12	63	14	6	41	136	63	105
100	115	129	14.5	71	15	6	41	149	75	118

Included in delivery: 2 foot brackets, 4 screws
(* Series NZ8000: XA + 2x Stroke

Dimensions for Mounting BA



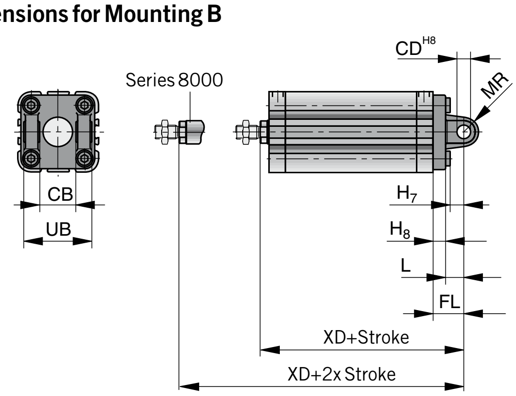
Material: cast aluminium

Dimension Table (mm) – Mounting BA

	H_7	H_8	L	ØCD^{H8}	EW	FL	MR	XD + Stroke (*	α°
32	10	10	12	10	26	22	10.5	73	60
40	13	10	15	12	28	25	13	77	60
50	12	11	16	12	32	27	13	80	70
63	17	11	21	16	40	32	17	89	60
80	16	15	21	16	50	36	17	100	70
100	20.5	16	25	20	60	41	21	118	70

Included in delivery: 1 rear trunnion mounting, 4 screws
(* Series NZ8000: XD + 2x Stroke

Dimensions for Mounting B



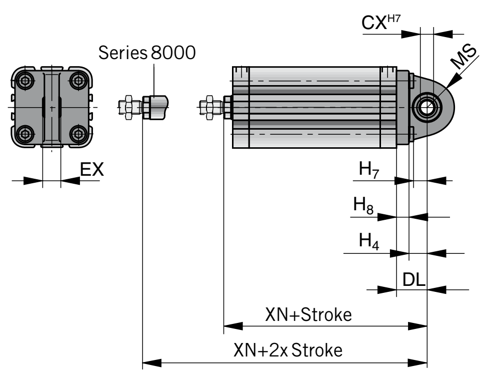
Material: cast aluminium

Dimension Table (mm) – Mounting B

Cyl. Ø	H_7	H_8	L	CB	ØCD^{H8}	FL	MR	UB	XD+Hub (*
32	10	10	12	26	10	22	9	45	73
40	13	10	15	28	12	25	11	52	77
50	12	11	16	32	12	27	12	60	80
63	17	11	21	40	16	32	15	70	89
80	16	15	21	50	16	36	16	90	100
100	20.5	16	25	60	20	41	20	110	118

Included in delivery: 1 rear trunnion mounting, 4 screws
(* Series NZ8000: XD + 2x Stroke

Dimensions for Mounting BAS
(Rear trunnion mounting with spherical bearing)



Material: cast aluminium

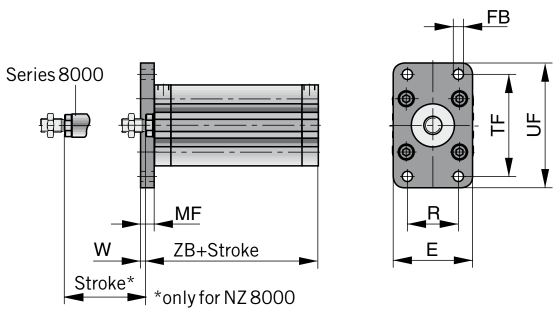
Dimension Table (mm) – Mounting BAS

Cyl. Ø	H_4	H_7	H_8	ØCX^{H7}	DL	MR	EX	XN+Hub (*
32	12	10	10	10	22	18	14	73
40	15	13	10	12	25	21	16	77
50	16	12	11	12	27	23	16	80
63	21	17	11	16	32	27	21	89
80	21	16	15	16	36	29	21	100
100	25	20.5	16	20	41	34	25	118

Included in delivery: 1 rear trunnion mounting with spherical bearing, 4 screws (* Series NZ8000: XN + 2x Stroke

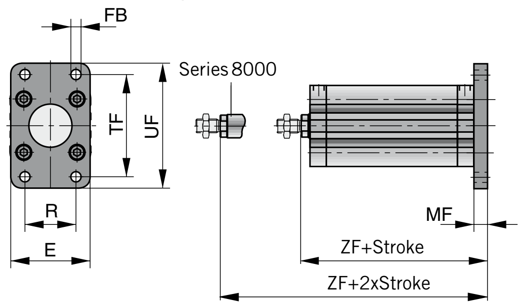
Mountings – Series NZ...., Ø 32 – 100 mm

Dimensions for Mounting C



Material: cast aluminium

Dimensions for Mounting D



Material: cast aluminium

Dimension Table (mm) – for Mounting C

Cyl. Ø	ØFB	E	MF	R	TF	UF	W	ZB+Stroke
32	7	50	10	32	64	79	3	51
40	9	56	10	36	72	90	3	52
50	9	70	12	45	90	110	4	53
63	9	80	12	50	100	120	4	57
80	12	100	16	63	126	153	6	64
100	14	120	16	75	150	178	6	77

Included in delivery: 1 flange, 4 screws

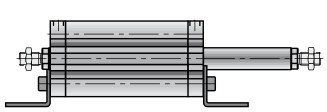
Dimension Table (mm) – for Mounting D

Cyl. Ø	ØFB	E	MF	R	TF	UF	ZF+Stroke (*
32	7	50	10	32	64	79	61
40	9	56	10	36	72	90	62
50	9	70	12	45	90	110	65
63	9	80	12	50	100	120	69
80	12	100	16	63	126	153	80
100	14	120	16	75	150	178	93

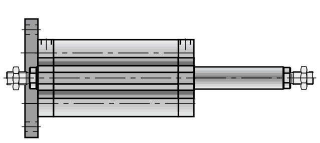
Included in delivery: 1 flange, 4 screws
(*for Series NZ8000 : ZF+2 x Stroke

Mountings – Series NZD...., Ø 32 – 100 mm

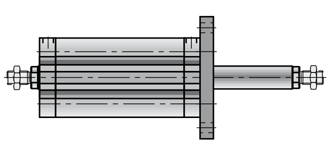
Mounting A-..
(Foot mounting)



Mounting C-..
(Front flange mounting)



Mounting D-..
(Rear flange mounting)



Accessories

Piston Rod Eye

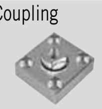
Page 138

Piston Rod Clevis

Page 139

Compensating Coupling

Page 140

Coupling

Page 141

Magnetic Switch

Page 152

Adapter plate for Mounting

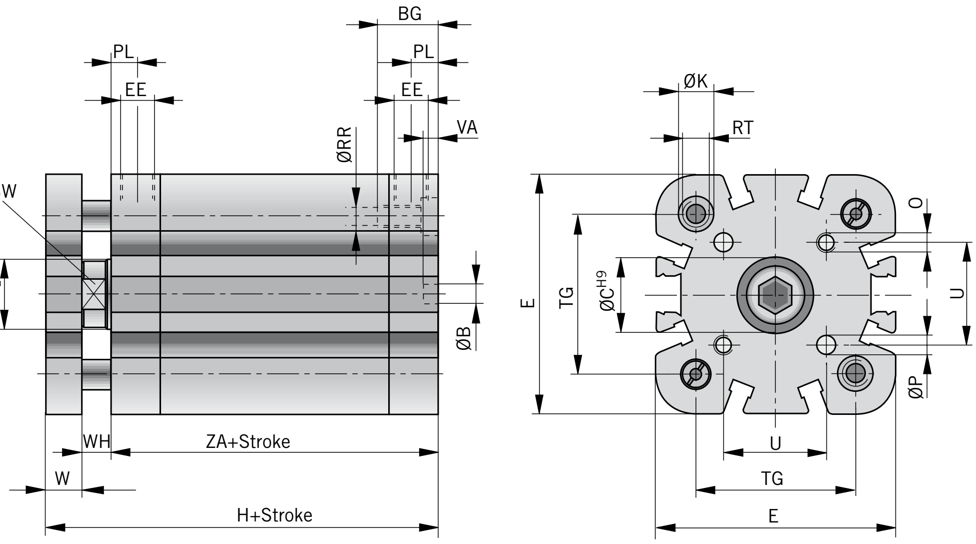
Page 145

Pivot for Mounting B

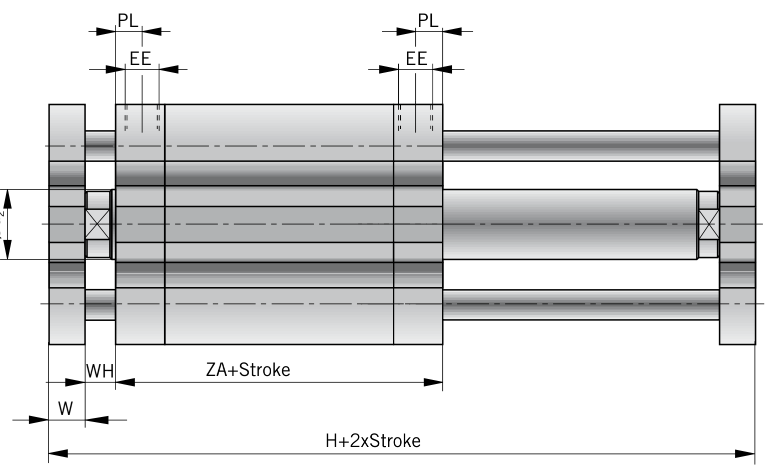
Page 142

Piston force and air consumption see page 9, order instructions see page 42, 43

Dimensions – Basic Cylinder, non-rotating, Ø 32 – 100 mm
Series NZV....



Dimensions – Basic Cylinder, non-rotating, with through piston rod, Ø 32 – 100 mm
Series NZVD....



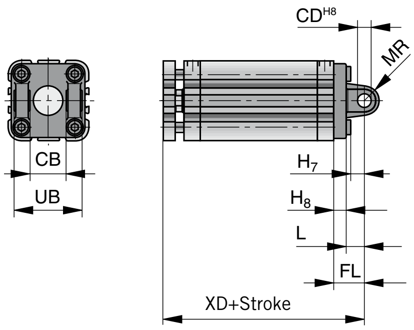
Dimension Table (mm) – Series NZV...., NZVD....

Cyl. Ø	ØB	ØC^{H9}	Ø$d2_{h9}$	E	H +Stroke	H +2x Stroke	ØK	O	ØP^{H8}	U	W	BG	EE	PL	TG	ØRR	RT	SW	VA	WH	ZA + Stroke
32	6	17	12	50	61	78	9	M5	5	19.8	10	14.5	G1/8	7.5	32.5	8.5	M6	10	4	7	44
40	6	17	16	58	62	79	9	M5	5	23.3	10	14.5	G1/8	7.5	38	8.5	M6	13	4	7	45
50	6	22	20	70	65	85	9	M6	6	29.7	12	14	G1/8	7.5	46.5	10.5	M8	17	4	8	45
63	8	22	20	80	69	89	9	M6	6	35.4	12	14.5	G1/8	7.5	56.5	10.5	M8	17	4	8	49
80	8	28	25	96	78	102	12	M8	8	46	14	15.5	G1/8	7.5	72	13.8	M10	19	4	10	54
100	8	30	25	116	91	115	12	M10	10	56.6	14	20	G1/8	10	89	13.8	M10	22	4	10	67

Piston force and air consumption see page 9, order instructions see page 42, 43

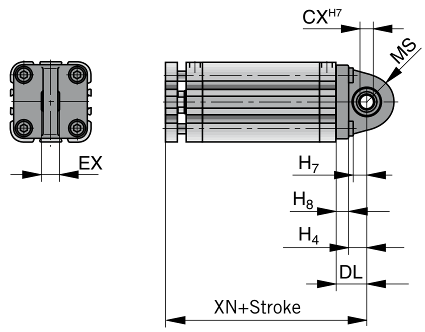
Mountings – Series NZV...., Ø 32 – 100 mm

Dimensions for Mounting B



Material: cast aluminium

Dimensions for Mounting BAS
(Rear trunnion mounting with spherical bearing)



Material: cast aluminium

Dimension Table (mm) – for Mounting BA

Cyl. Ø	H_7	H_8	L	CB	ØCD^{H8}	FL	MR	UB	XD +Stroke
32	10	10	12	26	10	22	9	45	83
40	13	10	15	28	12	25	11	52	87
50	12	11	16	32	12	27	12	60	92
63	17	11	21	40	16	32	15	70	101
80	16	15	21	50	16	36	16	90	114
100	20.5	16	25	60	20	41	20	110	132

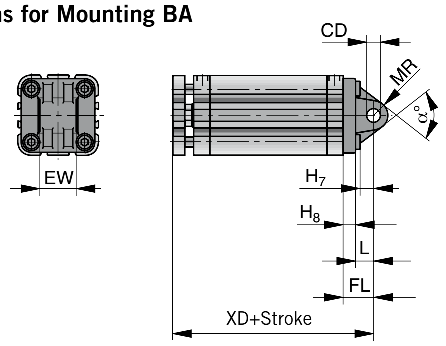
Included in delivery: 1 rear trunnion mounting, 4 screws

Dimension Table (mm) – for Mounting BAS

Cyl. Ø	H_4	H_7	H_8	ØCX^{H7}	DL	MS	EX	XN +Stroke
32	12	10	10	10	22	18	14	83
40	15	13	10	12	25	21	16	87
50	16	12	11	12	27	23	16	92
63	21	17	11	16	32	27	21	101
80	21	16	15	16	36	29	21	114
100	25	20.5	16	20	41	34	25	132

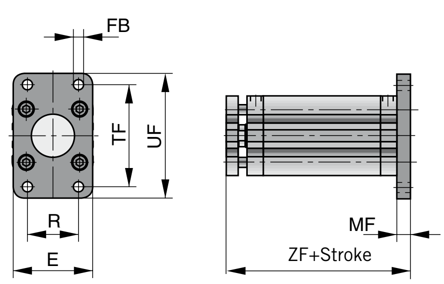
Included in delivery: 1 rear trunnion mounting with spherical bearing, 4 screws

Dimensions for Mounting BA



Material: cast aluminium

Dimensions for Mounting D



Material: cast aluminium

Dimension Table (mm) – for Mounting BA

Zyl. Ø	H_7	H_8	L	øCD^{H8}	EW	FL	MR	XD + Stroke	α°
32	11	10	12	10	26	22	10,5	83	60
40	14	10	15	12	28	25	13	87	60
50	15	11	16	12	32	27	13	92	70
63	20	11	21	16	40	32	17	101	60
80	20	15	21	16	50	36	17	114	70
100	24	16	25	20	60	41	21	132	70

Included in delivery: 1 rear trunnion mounting, 4 screws

Dimension Table (mm) – for Mounting D

Zyl. Ø	E	R	ØFB	MF	TF	UF	ZF +Stroke
32	50	32	7	10	64	79	71
40	56	36	9	10	72	90	72
50	70	45	9	12	90	110	77
63	80	50	9	12	100	120	81
80	100	63	12	16	126	153	94
100	120	75	14	16	150	178	107

Included in delivery: 1 flange, 4 screws

* Note for piston rod version:
In the configuration of a cylinder with through piston rod, Series NZD, the assumption is that both piston rods are identical. Only one is configured and this applies to both piston rods. If two different piston rods are required, a special cylinder must be ordered. Special cylinders are not configurable.

Order Instructions for Basic Cylinder Series NZ

Order-No.	NZ	6	050	-	1000	/	000	-	0	0	0	0	0	X	-13

Series	
NZ	Standard
NZD	with through piston rod*
NZV	with non-rotating piston rod
NZVD	with non-rotating through piston rod

System	
6	Double acting without cushioning, for contactless position sensing
7	Single acting without cushioning, spring at front end, for contactless position sensing
8	Single acting without cushioning, spring at rear end, for contactless position sensing

Cylinder Diameter	
032	32 mm
040	40 mm
050	50 mm
063	63 mm
080	80 mm
100	100 mm

Stroke Length
Length (4-digit) in mm

Piston Rod Extension*
Length (3-digit) in mm

Air connection	
0	Standard
1**	at one end in rear end cap
2**	at one end in front end cap

** On request

Seals / Wiper	
0	Standard (NBR)
1	Viton (+150°C)

Lubrication	
0	Grease (Standard)

Piston Rod Material*	
0	Steel, high-alloy (Standard)
1	Steel, high-alloy (V2A)
3	Steel, unalloyed, hard-chrome plated (CK45)

Piston Rod Thread*	
0	External Thread
1	Special External Thread Details see page 34
2	Internal Thread (Standard)

Pneumatic cylinders for the Ex-Atmospheres (ATEX)	
X	See ATEX Certification 94/9/EG (ATEX 95)
0	Standard without Ex-Protection

External Thread Length of the Piston Rod (optional) *	
Length (2-digit) in mm Details see page 34	
-13	for example 13 mm

Standard stroke length

Single acting version:	0005, 0010, 0015, 0020, 0025
Double acting version:	0005, 0010, 0025, 0050, 0080, 0100, 0125, 0160, 0200, 0250, 0320, 0400, 0500 delivered preferably

Order Instructions for Cylinder Mountings

Description	Order-No.					
	Ø32	Ø40	Ø50	Ø63	Ø80	Ø100
Foot mounting A-..	PD 27917	PD 27918	PD 28072	PD 28073	PD 28074	PD 28075
Rear trunnion mounting B-..	PD 22704	PD 22705	PD 22706	PD 22707	PD 22708	PD 22709
Rear trunnion mounting BA-..	PD 23412	PD 23413	PD 23414	PD 23415	PD 23416	PD 23417
Rear trunnion mounting BAS-..	PD 23843	PD 23844	PD 23845	PD 23846	PD 23847	PD 23848
Front flange mounting C-..	PD 23403	PD 23404	PD 23405	PD 23406	PD 23407	PD 23408
Rear flange mounting D-..	PD 23403	PD 23404	PD 23405	PD 23406	PD 23407	PD 23408
Security bolt for mountings B, BA, BAS	KY 6153	KY 6154	KY 6157	KY 6156	KY 6158	KY 6159

Order Instructions:

For standard versions of basic cylinder, Series NZ, see price list (e.g. NZ6050-0080)

Ordering example for a configurable basic cylinder:
- Cylinder with through piston rod
- Double acting without cushioning
- For contactless position sensing
- Diameter 50 mm
- Stroke 80 mm
- Piston rod extension 15 mm (at both ends)
- Air connection at one end in rear end cap
- Viton seals (up to +150 °C)
- Standard lubrication
- Piston rod material, high alloy steel 1.4305
- Piston rod with external thread
- Without EX-protection
- External thread length of pistonrod 13 mm (at both ends)

Type designation per order code

NZ6050-0080/015-110100-13

Accessories

Piston Rod Eye

Page 138

Piston Rod Clevis

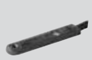
Page 139

Compensating Coupling

Page 140

Coupling

Page 141

Magnetic Switch

Page 152

Adapter plate for Mounting

Page 145

Pivot for Mounting B

Page 142

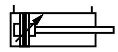
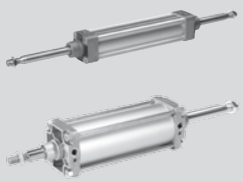
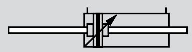
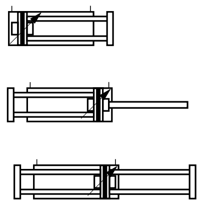
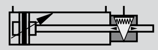
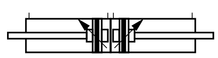
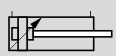
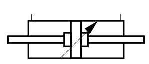
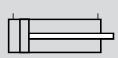
Standard Cylinders

to ISO 15552

Series AZ....
Ø 32-100 mm

Series DZ....
Ø 125-320 mm

Overview

System	Fig.	Symbol	Series	Page
Double acting with cushioning For contactless position sensing			AZ5... AZZ5... DZ5...	46-49 52, 53, 58 60, 61 64-67
With through piston rod Double acting with cushioning For contactless position sensing			AZD5... DZD5...	46-49 52, 53, 58 60, 61 64-67
Non-rotating Double acting with cushioning For contactless position sensing			AZV5... AZ35... AZ45...	46,47 54-58
With locking unit Double acting with cushioning For contactless position sensing			AZF5... DZF5...	46, 47 50-53 58 60-63
Multiple Position Cylinder Double acting with cushioning For contactless position sensing			AZZ5.../..../....	46-49 52, 53 58
Double acting with cushioning			DZ1...	60, 61 64-67
With through piston rod Double acting with cushioning			DZD1... on request	60, 61 64-67
Double acting without cushioning			DZ2... on request	60, 61 64-67
Double acting without cushioning For contactless position sensing			DZ6... on request	60, 61 64-67

Standard Cylinder Ø 32-100mm

to ISO 15552 (ISO 6431) VDMA 24562 and CETOP RP43P

Series AZ....

Versions:
- **double acting with cushioning**
- **for contactless position sensing**
- **ATEX-Version**

Special Versions:
- Viton version for high temperature range (+150°)
- With through piston rod
- With additional piston rod
- With locking unit
- Version H for hydraulic operation (p_{max} = 10 bar)
- Tie rod version
- With metal wiper
- Various piston rod extensions
- Various piston rod materials
- With adaptor plate for valve mounting

The delivery includes:
1 Cylinder
1 Hexagon nut for piston rod thread

Magnetic switches are not included - please order these separately.

Characteristics

Characteristics	Symbol	Unit	Description					
General Features								
Type			Cylinder					
Series			AZ					
System			Piston rod cylinder					
AZ5..., AZZ5... AZZ5.../..../....			Double acting with cushioning Multi position cylinder					
AZD5...			With through piston rod Double acting with cushioning					
AZV5...			Non-rotating Double acting with cushioning					
AZ35...			Non-rotating, with through piston rod, double acting with cushioning					
AZ45...			Non-rotating, with through piston rod, double acting with cushioning					
Mounting			See drawing					
Tube connection			Thread					
Ambient temperature range	T_{min} T_{max}	°C °C	-20 +80	Note: When using below freezing point (°C) it is necessary to consult us				
Medium temperature range	T_{max}	°C	+80					
Weight (mass)		kg	See table					
Installation			In any position					
Medium			Filtered and lubricated or filtered and unlubricated compressed air					
Lubrication			Oil mist lubrication compatible with Buna N					
Material								
Cylinder tube			Aluminium, anodized					
Front/Rear end caps			Cast Aluminium					
Piston rod			Steel, high-alloy – Series AZ Steel, hard-chrome plated – Series AZV					
Pneumatic Characteristics								
Nominal pressure	p_n	bar	6					
Operating pressure range	p_{min} p_{max}	bar bar	0,5 10					
Piston diameter		mm	32	40	50	63	80	100
Port size			G1/8	G1/4	G1/4	G3/8	G3/8	G1/2
Piston rod diameter Series AZ Series AZV		 mm mm	 12 8	 16 10	 20 12	 20 16	 25 20	 25 20
Piston rod thread			M10 x1.25	M12 x1.25	M16 x1.5	M16 x1.5	M20 x1.5	M20 x1.5
Stroke length		mm	For standard stroke lengths see order instructions max. 2000mm, longer strokes on request					
Piston force and air consumption			See page 9					
Compression force AZV* AZ3* AZ4*		N N N	430 374 380	680 570 590	1060 890 940	1680 1510 1466	2714 2464 2375	4240 4002 3900
Tensile force AZV* AZ3* AZ4*		N N N	380 380 380	590 590 590	940 940 940	1466 1466 1466	2375 2375 2375	3900 3900 3900
Cushioning		mm	At both ends, infinitely variable					
Cushioned stroke Series AZ		mm	23	23	23	23	37	37
Cushioned stroke Series AZV		mm	20	25	25	25	28	30

* 6 bar

Weight (mass) kg

Cylinder version	Cylinder diameter											
	Ø32		Ø40		Ø50		Ø63		Ø80		Ø100	
	1*	2*	1*	2*	1*	2*	1*	2*	1*	2*	1*	2*
Standard Type AZ	0.770	0.220	1.200	0.340	1.740	0.480	2.500	0.610	3.680	0.880	5.200	1.130
with through piston rod Type AZD	0.960	0.250	1.520	0.490	2.260	0.720	3.060	0.850	4.540	1.260	6.190	1.500
non-rotating Type AZV	0.800	0.250	1.000	0.350	1.700	0.500	2.600	0.600	4.200	0.900	6.200	1.000
non-rotating with through piston rod Type AZ3	0.800	0.250	1.000	0.350	1.700	0.500	2.600	0.600	4.200	0.900	6.200	1.000
non-rotating with through piston rods Type AZ4	1.000	0.300	1.400	0.400	2.300	0.600	3.200	0.900	5.600	1.400	7.400	1.500
multiple pos. cyl. Typ AZZ	0.950	0.250	1.300	0.550	2.200	0.650	2.800	0.750	4.600	1.150	6.700	1.400

* 1 = Cylinder weight (100 mm stroke)
2 = Weight per further 100 mm stroke length

Mounting	Cylinder diameter					
	Ø32	Ø40	Ø50	Ø63	Ø80	Ø100
A	0.150	0.190	0.340	0.390	0.790	1.000
B	0.070	0.090	0.170	0.220	0.490	0.740
BA	0.100	0.130	0.210	0.300	0.570	0.910
BAS	0.100	0.150	0.220	0.320	0.560	0.860
C	0.100	0.120	0.230	0.280	0.620	0.780
D	0.100	0.120	0.230	0.280	0.620	0.780
EN	0.110	0.180	0.230	0.390	0.530	0.720
EN for series AZZ	0.110	0.290	0.330	0.650	0.830	1.560

Dimensions (mm) for Special Piston Rod Threads and Thread Length

Piston Rod with External Thread (mm)			
Cylinder-Ø	Special thread KK	Standard thread KK	SW
32	M10x1.5	M10x1.25	10
40	M12x1.75	M12x1.25	13
50	M16x2	M16x1.5	17
63	M16x2	M16x1.5	17
80	M20x2.5	M20x1.5	22
100	M20x2.5	M20x1.5	22
External Thread Length of the Piston Rod (mm)			
Cylinder-Ø	$AM_{min.}$	$AM_{Standard}$	$AM_{max.}$
32	12	22	99
40	16	24	99
50	20	32	99
63	20	32	99
80	25	40	99
100	25	40	99
Internal Thread Length of the Piston Rod (mm)			
Cylinder-Ø	Internal thread KK	Thread depth $AF_{min.}$	Core hole depth
32	M6x1	13	18
40	M8x1,25	16	23
50	M10x1,5	20	28
63	M10x1,5	20	28
80	M12x1,75	24	32
100	M12x1,75	24	32

Note:
In the configuration of a cylinder with through piston rod, Series AZD, the assumption is that both piston rods are identical. Only one is configured and this applies to both piston rods. If two different piston rods are required, a special cylinder must be ordered. Special cylinders are not configurable.

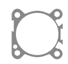
The new cylinder profile makes position sensing possible with magnetic switches in either dovetail slot version (Type RS, ES) or T-slot version (Type RST, EST).

One or more magnetic proximity sensors (depending on stroke length) can be mounted in the grooves in the cylinder profile, for sensing the end positions or intermediate positions of the piston.

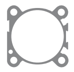
Profile AZ Basic Cylinder

Ø 32

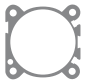
Ø 40



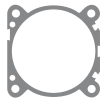
Ø 50



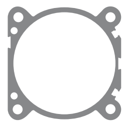
Ø63



Ø80

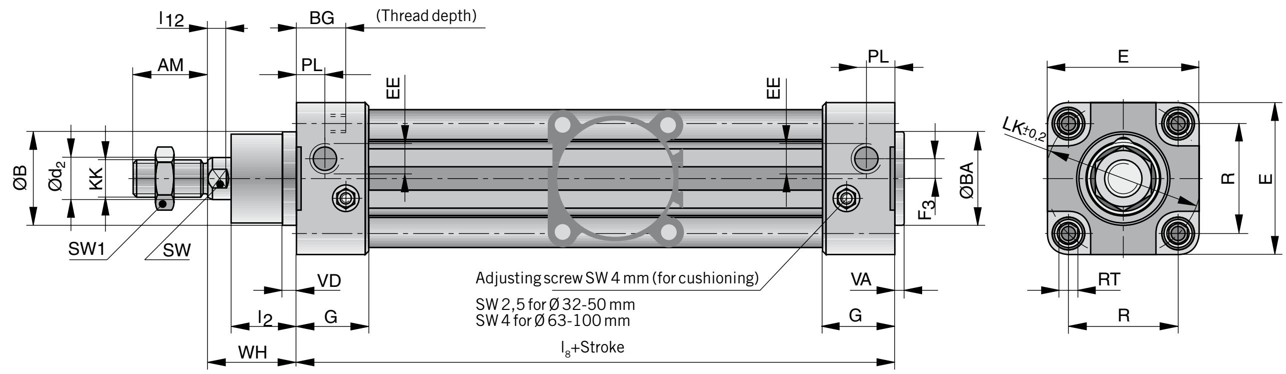


Ø100

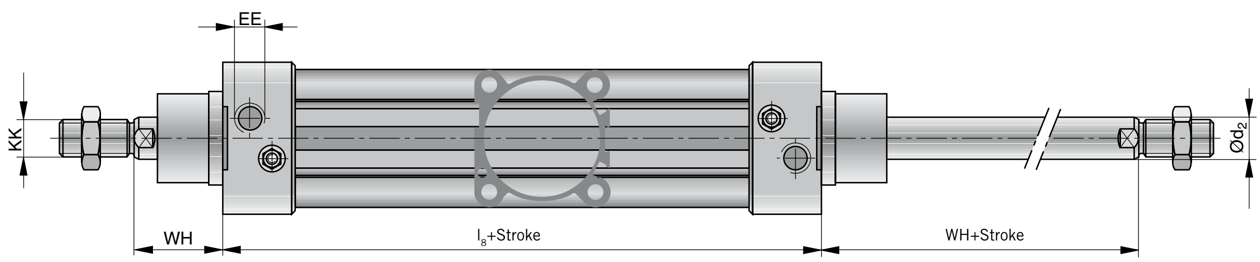


Piston force and air consumption see page 9, dimensions see page 48-57, order instructions see page 58, 59

Dimensions for Basic Cylinder, Series AZ...., Ø 32 – 100 mm



Dimensions – Basic Cylinder with Through Piston Rod, Series AZD...., Ø 32 – 100 mm



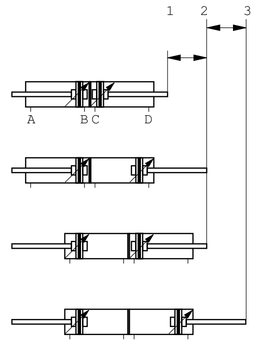
Dimension Table (mm) – Series AZ...., AZD...., AZZ....

Cyl. Ø	ØB_{d11}	Ød_2	E	F_3	G	l_2	l_8 +Stroke	l_{12}	R	AM	ØBA_{d11}	BG
32	30	12	47	4.5	30.5	20	94	6	32.5	22	30	16
40	35	16	55	5.3	34	20.5	105	6.5	38	24	35	16
50	40	20	65	8.5	31	28	106	8	46.5	32	40	16
63	45	20	78	8	33	26	121	8	56.5	32	45	16
80	45	25	95	9	35.5	32.5	128	10	72	40	45	17
100	55	25	115	13	37	37.5	138	10	89	40	55	17

Multiple Position Cylinder

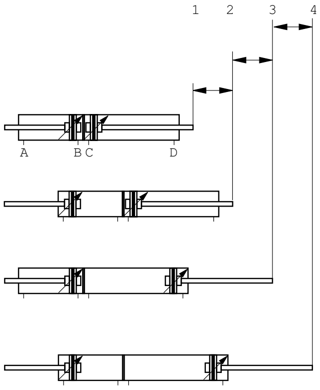
A three- or four-position cylinder consists of two separate cylinders whose piston rods extend in opposite directions. Depending on the control system and the division of the stroke length, this type of cylinder can provide up to four positions, with each position defined exactly by a stop. Note that when a piston rod end is fixed, the cylinder tube itself carries out the movement and therefore requires flexible air connections.

Arrangement for 3 positions



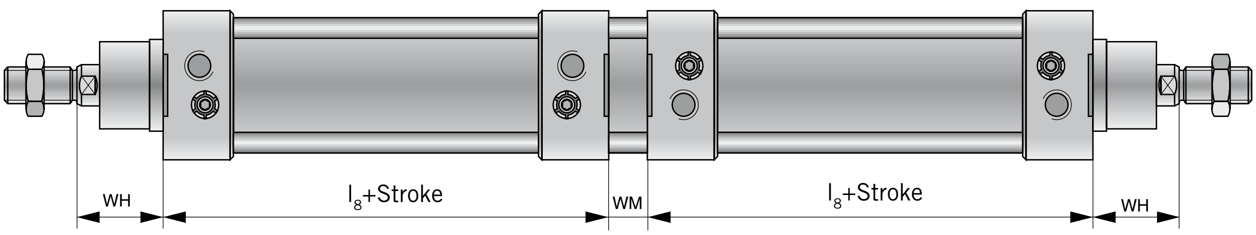
Two cylinders series AZ of the same stroke length are connected together.

Arrangement for 4 positions



Two cylinders series AZ of different stroke lengths are connected together.

Dimensions – Multiple Position Cylinder, Series AZZ...., Ø 32 – 100 mm



Cyl. Ø	EE	ØLK	KK	PL	RT	SW	SW_1	VA	VD	WH	WM
32	G1/8	46	M10x1.25	20	M6	10	17	4	5	26	12
40	G1/4	54	M12x1.25	14.5	M6	13	19	4	4.5	30	12
50	G1/4	66	M16x1.5	16	M8	17	24	4	6	37	15
63	G3/8	80	M16x1.5	16	M8	17	24	4	6	37	14
80	G3/8	102	M20x1.5	20.5	M10	22	30	4	6	46	18
100	G1/2	126	M20x1.5	19	M10	22	30	4	6	51	18

Accessories

Piston Rod Eye

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Piston Rod Clevis

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Compensating Coupling

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Coupling

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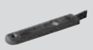
Magnetic Switch

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Adapter plate for Mounting

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Pivot for Mounting B

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Pivot for Mounting E

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Piston force and air consumption see page 9, mountings see page 52, 53, order instructions see page 58, 59

Standard Cylinder Ø 32-100 mm

Series AZF

Version:
- **with locking unit – locks if pressure drops**
- **double acting with cushioning**
- **for contactless position sensing**

For further technical informations and examples see page 114, 115

****) Note:**

The holding force quoted relates to a static load. If this load is exceeded, slippage can occur. Any dynamic forces occurring in operation must not exceed the static holding force.
In clamped operating mode, if the load is fluctuatung, the clamping unit is not free from play. The cylinder is not suitable for positioning tasks.

Actuation:
The clamping unit must only be released when both cylinder chambers are pressurised, otherwise there is danger of an accident from the jerky movement of the piston rod. Shutting off the compressed air supply at both ends with a 5/3 way valve provides adequate safety only for a short time.

Characteristics

Characteristics	Symbol	Unit	Description					
General								
Description			Cylinder with locking unit					
Type			Piston rod cylinder					
Series			AZF					
Locking unit			Locks if pressure drops					
Materials – Locking unit								
Cartridge			Aluminium, anodised					
Housing			Aluminium, anodised					
Clamping jaw			Ms					
Cylinder piston rod			Steel, high-alloy					
FSE unlocking pressure		bar	≥ 4 to 10					
Cylinder diameter		mm	32	40	50	63	80	100
Cylinder operating pressure			M5	M5	G1/8	G1/8	G1/8	G1/8
Locking force, static **)		N	600	1000	1500	2200	3000	5000

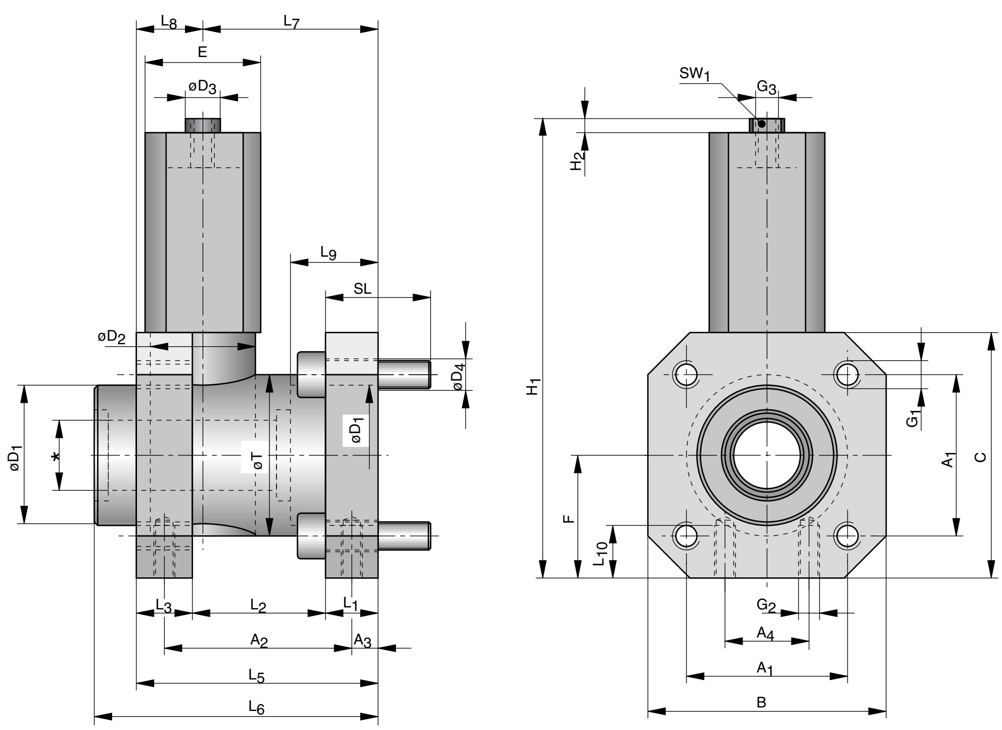
For all other dimensions for cylinders and cylinder mountings see page 46, 47

Weight (mass) kg

Description	Cylinder diameter (mm)					
	32	40	50	63	80	100
Locking unit	0.60	0.80	1.00	1.20	1.40	1.60
Basic cylinder *)	0.82	1.26	1.82	2.40	4.30	5.80

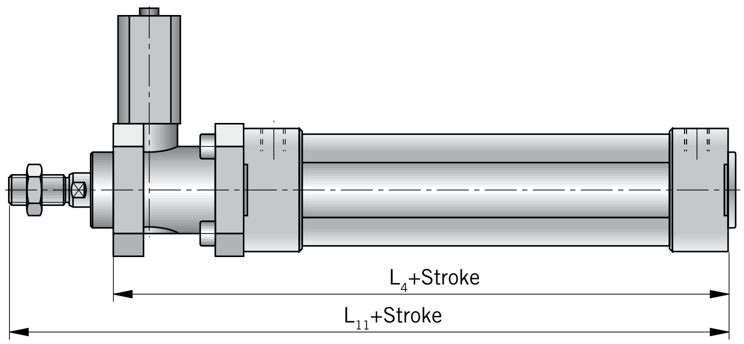
*) with 100 mm stroke and longer piston rod

Dimensions – Locking unit FSE...



* Piston rod diameter

Dimensions of Cylinder with Locking Unit FSE..., Ø 32 – 100 mm



For all other dimensions for cylinders and cylinder mountings see page 48, 49, 52, 53

Dimension Table (mm) – for Locking Unit FSE... and Dimensions including Cylinder

Cyl. Ø	A_1	A_2	A_3	A_4	B	C	ØD_1	ØD_2	ØD_3	ØD_4	E	F	G_1	G_2	G_3
32	32.5	40	4.2	16	48	50	30	20	10	6.6	22.5	25	M6	M5	M5
40	38	46	4.5	21	56	58	35	24	10	6.6	27.5	29	M6	M5	G1/8
50	46.5	54	11.5	24	68	70	40	30	15	8.5	32.5	35	M8	M6	G1/8
63	56.5	55	7.5	32	82	85	45	38	15	8.5	41	42.5	M8	M8	G1/8
80	72	70	10	44	100	105	45	40	19	11	49	52.5	M10	M8	G1/8
100	89	70	10	60	120	130	55	48	19	11	53	65	M10	M8	G1/8

Cyl. Ø	H_1	H_2	L_1	L_2	L_3	L_4 +Stroke	L_5	L_6	L_7	L_8	L_9	L_{10}	L_{11} +Stroke	SL	SW1	ØT
32	94	4	8	28	12	142	48	58	32	16	20.5	8	183	20	8	34
40	102.5	4	10	33	12	160	55	65	35.5	19.5	22.5	10	205	25	8	42
50	119.5	4	15	39	16	176	70	82	49	21	29.5	12	231	30	13	50
63	138	4	15	40	15	203	70	82	49	21	29.5	12	246	30	13	50
80	152	4	16	58	16	218	90	110	62	28	35.5	16	292	30	17	60
100	193.5	4	16	58	18	230	92	115	65	27	38.5	16	307	30	17	60

Accessories

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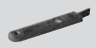
Magnetic Switch



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Pivot for Mounting B

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Pivot for Mounting E

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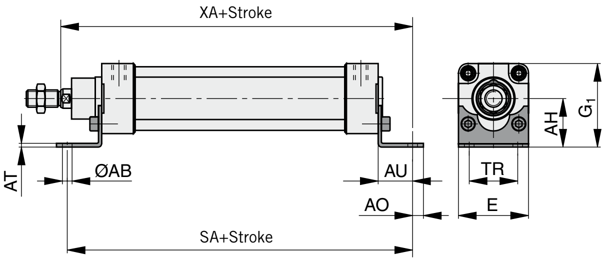
Piston force and air consumption see page 9, mountings see page 52, 53, order instructions see page 58, 59

Mountings – Basic Cylinder, Series AZ...., AZD....., AZZ...., Ø 32 – 100 mm

Dimensions for Mounting A



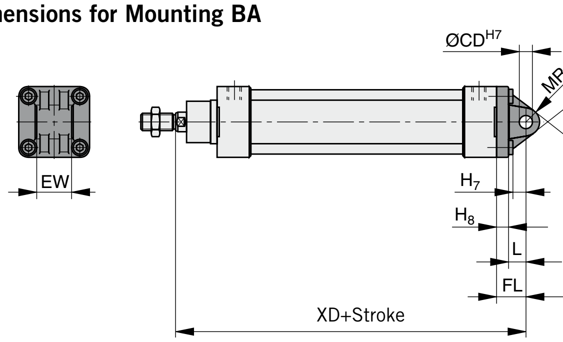
Material: steel passivated

Dimension Table (mm) – for Mounting A

Cyl. Ø	E	G_1	ØAB	AH	AO	AT	AU	SA + Stroke	TR	XA +Stroke
32	47	55.5	7	32	8	4	24	142	32	144
40	53	62.5	9	36	10	4	28	161	36	163
50	65	77.5	9	45	10	5	32	170	45	175
63	75	87.5	9	50	10	5	32	185	50	190
80	95	110.5	12	63	14	6	41	210	63	215
100	115	128.5	14	71	15	6	41	220	75	230

Included in delivery: 2 foot brackets, 4 screws

Dimensions for Mounting BA



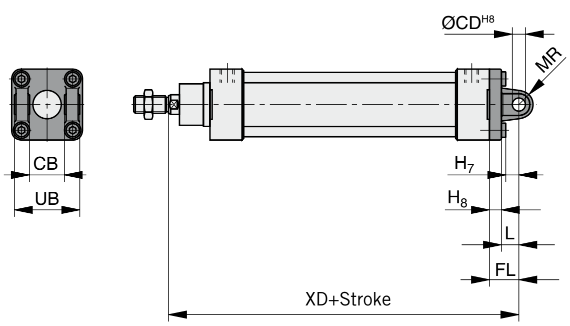
Material: cast aluminium

Dimension Table (mm) – for Mounting BA

Cyl. Ø	H_7	H_8	L	ØCD^{H7}	EW	FL	MR	XD +Stroke	α°
32	10	10	12	10	26	22	10.5	142	60
40	13	10	15	12	28	25	13	160	60
50	12	11	16	12	32	27	13	170	70
63	17	11	21	16	40	32	17	190	60
80	16	15	21	16	50	36	17	210	70
100	20.5	16	25	20	60	41	21	230	70

Included in delivery: 1 rear trunnion mounting, 4 screws

Dimensions for Mounting B



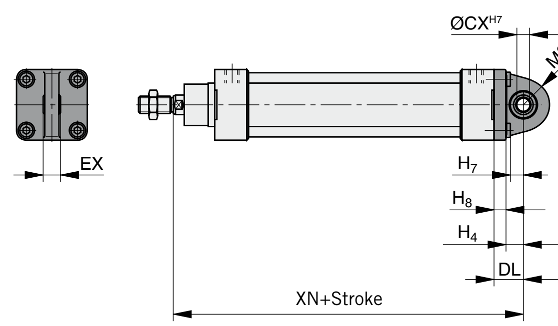
Material: cast aluminium

Dimension Table (mm) – for Mounting B

Cyl. Ø	H_7	H_8	L	ØCD^{H8}	CB	FL	MR	UB	XD + Stroke
32	10	10	12	10	26	22	9	45	142
40	13	10	15	12	28	25	11	52	160
50	12	11	16	12	32	27	12	60	170
63	17	11	21	16	40	32	15	70	190
80	16	15	22	16	50	36	16	90	210
100	20.5	16	25	20	60	41	20	110	230

Included in delivery: 1 rear trunnion mounting, 4 screws

Dimensions for Mounting BAS
(rear trunnion mounting with spherical bearing)



Material: cast aluminium

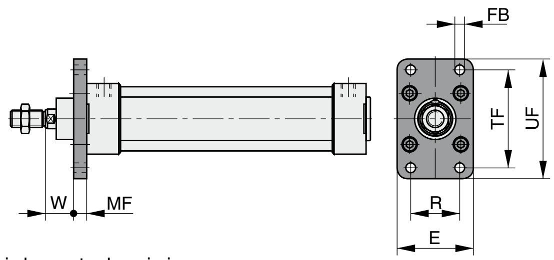
Dimension Table (mm) – for Mounting BAS

Cyl. Ø	H_4	H_6	H_7	ØCX^{H7}	DL	EX	MS	XN +Stroke
32	12	22	10	10	22	14	18	142
40	15	25	13	12	25	16	21	160
50	16	27	12	12	27	16	23	170
63	21	32	17	16	32	21	27	190
80	21	36	16	26	36	21	29	210
100	25	41	20.5	20	41	25	34	230

Included in delivery: 1 rear trunnion mounting with spherical bearing, 4 screws

Mounting – Basic Cylinder, Series AZ…., AZD….., AZZ…., Ø 32 – 100 mm

Dimensions for Mounting C



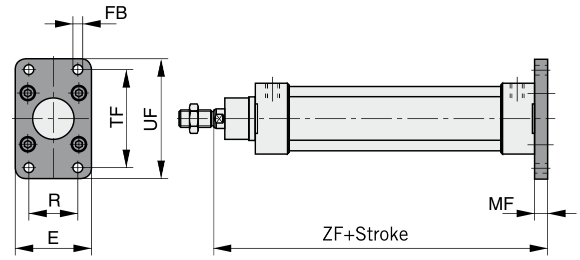
Material: cast aluminium

Dimension Table (mm) – for Mounting C

Cyl. Ø	E	R	ØFB	MF	TF	UF	W
32	50	32	7	10	64	79	16
40	56	36	9	10	72	90	20
50	70	45	9	12	90	110	25
63	77	50	9	12	100	120	25
80	100	63	12	16	126	153	30
100	120	75	14	16	150	178	35

Included in delivery: 1 flange, 4 screws

Dimensions for Mounting D



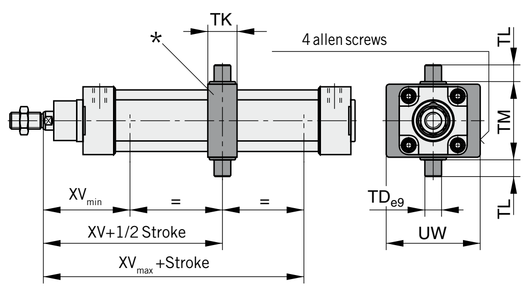
Material: cast aluminium

Dimension Table (mm) – for Mounting D

Cyl. Ø	E	R	ØFB	MF	TF	UF	ZF +Stroke
32	50	32	7	10	64	79	130
40	56	36	9	10	72	90	145
50	70	45	9	12	90	110	155
63	77	50	9	12	100	120	170
80	100	63	12	16	126	153	190
100	120	75	14	16	150	178	205

Included in delivery: 1 flange, 4 screws

Dimensions for Mounting EN
for series AZ (profile cylinder barrel version)



Material: cast aluminium

* Position centre trunnion mounting
Standard position: Type EN1 – The taps of the EN attachment are horizontally aligned to the air supply
Option: Type EN2 – The taps of the EN attachment are vertically aligned to the air supply

Dimension Table (mm) – for Mounting EN

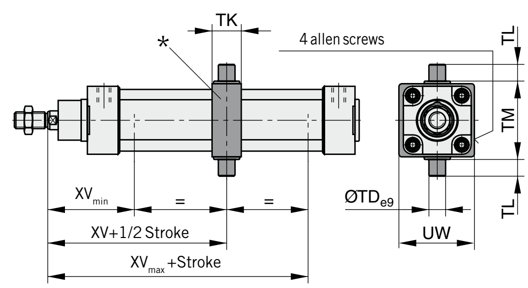
Cyl. Ø	$ØTD_{e9}$	TK	TL	TM	UW	XV_{min}	XV+ 1/2 Stroke	XV_{max} +Stroke
32	12	25	12	50	65	69	73	77
40	16	28	16	63	75	78	83	87
50	16	28	16	75	85	82	90	98
63	20	36	20	90	100	88	98	107
80	20	36	20	110	120	100	110	120
100	25	48	25	132	135	112	120	128

The trunnion mounting can be moved to any position between XV_{min} and XV_{max} after loosening the clamping screws.

Included in delivery: 1 rear trunnion mounting

As standard, the position of the T-slots and dovetail slots is on the same side as the air connections. Exception: Ø 32 has only T-slots on the same side as the air connections, with a dovetail slot on the underside.

Dimensions for Mounting EN
for series AZZ (tie rod version)



Material: SG cast iron, chromated

* Position centre trunnion mounting
Standard position: Type EN1 – The taps of the EN attachment are horizontally aligned to the air supply
Option: Type EN2 – The taps of the EN attachment are vertically aligned to the air supply

Dimension Table (mm) – for Mounting EN

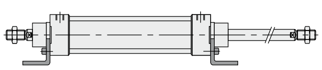
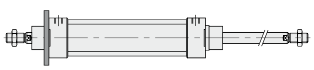
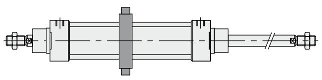
Cyl. Ø	$ØTD_{e9}$	TK	TL	TM	UW	XV_{min}	XV+ 1/2 Stroke	XV_{max} + Stroke
32	12	15	12	50	46	64	73	82
40	16	20	16	63	59	74	83	91
50	16	20	16	75	69	78	90	102
63	20	25	20	90	84	83	97,5	112
80	20	30	20	110	102	97	110	123
100	25	32	25	132	125	104	120	136

The trunnion mounting can be moved to any position between XV_{min} and XV_{max} after loosening the clamping screws.

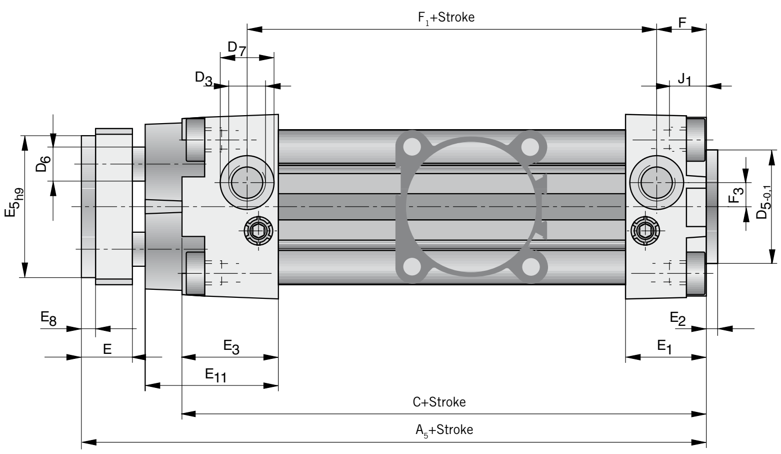
Note on EN mounting: To avoid faulty switching, the magnetic switches should be fitted at least 10 to 20 mm away from the EN mounting, depending on cylinder diameter.

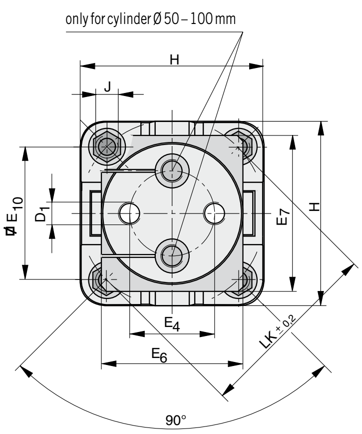
Included in delivery: 1 rear trunnion mounting

Mountings – Basic Cylinder with Through Piston Rod, Series AZD.... , Ø 32 – 100 mm

Foot mounting A	Front flange mounting C	Centre trunnion mounting EN
		

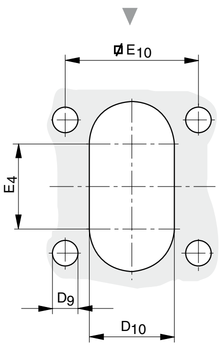
Dimensions – Basic Cylinder, non-rotating, Series AZV...., Ø 32 – 100 mm





Hole configuration for flush mounting

Load direction

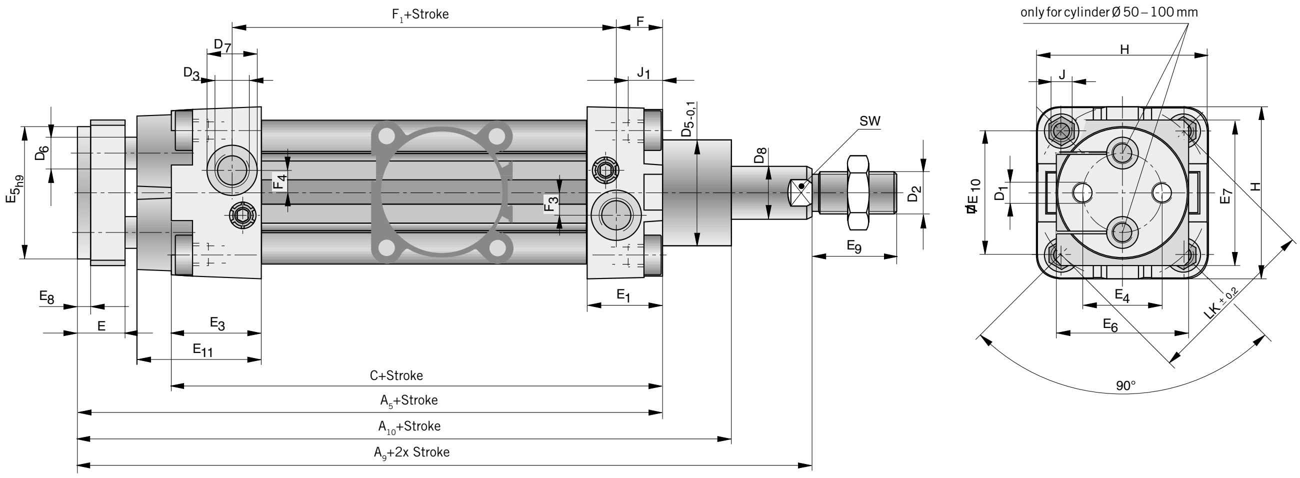


Dimension Table (mm) – Basic Cylinder AZV...., AZ3...., AZ4....

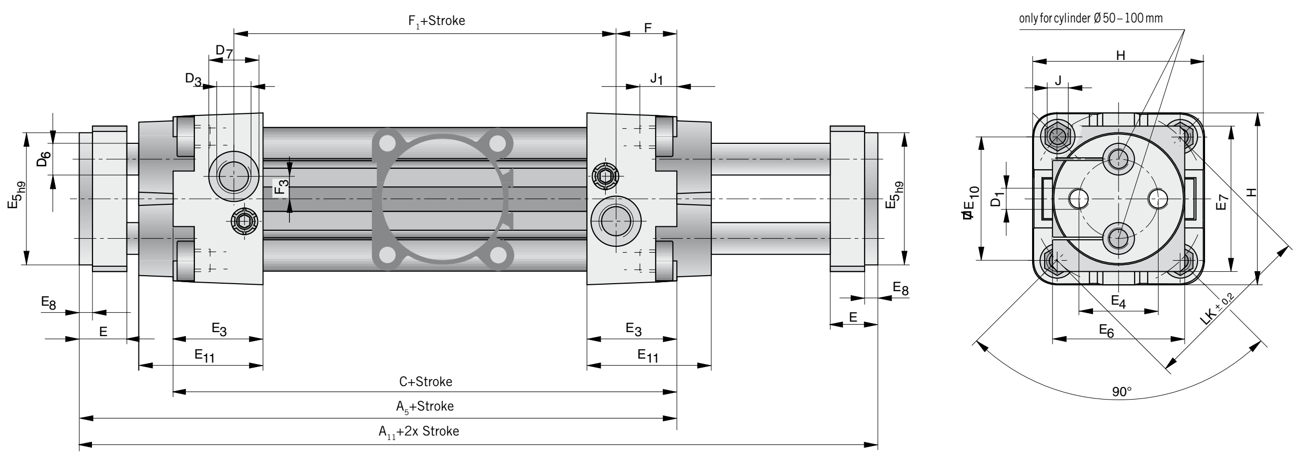
Cyl. Ø	A_5 + Stroke	A_9 + 2x Stroke	A_{10} + Stroke	A_{11} + 2x Stroke	C + Stroke	D_1	D2	D_3	ØD_5	ØD_6	ØD_7	ØD_8	ØD_9	D_{10}	E	E_1	E_2	E_3
32	128	154	146	154	102	M 6	M10x1.25	G 1/8	30	8	15	12	7	23	15	29	4	26
40	142	172	163	172	112	M 8	M12x1.25	G 1/4	35	10	19	16	7	25	15	27	4	30
50	151	188	177	185	117	M 8	M16x1.5	G 1/4	40	12	19	20	9	30	18	29	4	34
63	161	198	187	197	125	M 10	M16x1.5	G 3/8	45	16	23	20	9	34	22	30	4	34
80	174	220	206	212	136	M 12	M20x1.5	G 3/8	45	20	23	25	10	38	22	34	4	39
100	181	232	218	219	143	M 12	M20x1.5	G 1/2	55	20	28	25	10	38	22	35	4	40

Piston force and air consumption see page 9, mountings see page 56, 57, order instructions see page 58, 59

Diumensions – Basic Cylinder, non-rotating, with through piston rod, series AZ3…., Ø 32 – 100 mm



Dimensions – Basic Cylinder, non-rotating, with through piston rods, series AZ4…., Ø 32 – 100 mm



Cyl. Ø	ØE_4	$E_{5\,h9}$	E_6	E_7	E_8	E_9	E_{10}	E_{11}	F AZV, AZ3	F AZ4	F_1+Stroke AZV, AZ3	F_1+Stroke AZ4	F_3 AZV, AZ4	F_3 AZ3	F_4	J	J_{1max}	H	ØLK	SW
32	19	32	32	40	4	20	32.5	34	14.5	17.5	74	75	6	6	6	M 6	16	47	46	10
40	22.5	40	40	45	4	24	38	42	16	19	77.5	75	7	7	7	M 6	16	53	54	14
50	30	50	50	55	5	32	46.5	47	17.5	23	77	72	9.5	9.5	9.5	M 8	16	65	66	17
63	38	63	63	70	5	32	56.5	45	17.5	21.5	87	83	10	10	10	M 8	16	75	80	17
80	50	80	80	95	5	40	72	52	20.5	26	90	85	9	9	9	M 10	16	95	102	22
100	70	100	100	115	5	40	89	53	19	24.5	100	95	13	13	13	M 10	16	115	126	22

Accessories

Piston Rod Eye

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Piston Rod Clevis

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Adapter plate for Mounting

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Pivot for Mounting B

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Pivot for Mounting B

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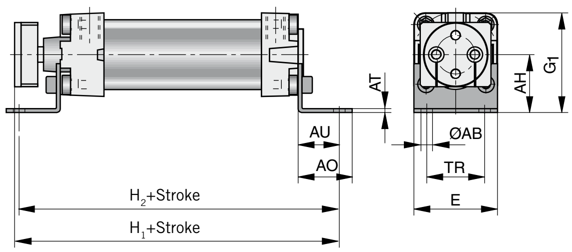
Mountings – Series AZV...., AZ3...., AZ4...., Ø 32 – 100 mm

Dimensions for Mounting A



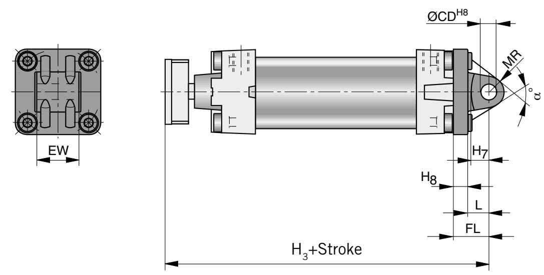
Material: steel, passivated

Dimension Table (mm) – for Mounting A

Cyl. Ø	E	G_1	H_1 + Stroke	H_2 + Stroke	AH	ØAB	AO	AT	AU	TR
32	47	55.5	152	150	32	7	32	4	24	32
40	53	62.5	170	168	36	9	38	4	28	36
50	65	77.5	183	181	45	9	42	5	32	45
63	75	87.5	193	189	50	9	42	5	32	50
80	95	110.5	215	218	63	12	55	6	41	63
100	115	128.5	222	225	71	14	56	6	41	75

Included in delivery: 2 foot brackets, 4 screws

Dimensions for Mounting BA



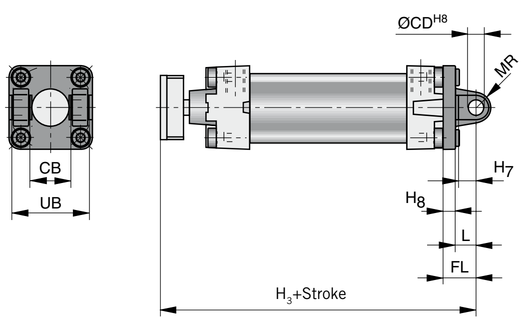
Material: cast aluminium

Dimension Table (mm) – for Mounting BA

Cyl. Ø	H_3 + Stroke	H_7	H_8	L	$ØCD^{H8}$	FL	MR	EW	α°
32	150	10	10	12	10	22	10.5	26	60
40	167	13	10	15	12	25	13	28	60
50	178	12	11	16	12	27	13	32	70
63	193	17	11	21	16	32	17	40	60
80	210	16	15	21	16	36	17	50	70
100	222	20.5	16	25	20	41	21	60	70

Included in delivery: 1 rear trunnion mounting, 4 screws

Dimensions for Mounting B



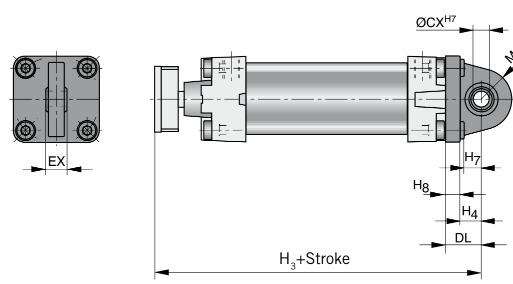
Material: cast aluminium

Dimension Table (mm) – for Mounting B

Cyl. Ø	H_3 + Stroke	H_7	H_8	L	CB	$ØCD^{H8}$	FL	MR	UB
32	150	10	10	12	26	10	22	9	45
40	167	13	10	15	28	12	25	11	52
50	178	12	11	16	32	12	27	12	60
63	193	17	11	21	40	16	32	15	70
80	210	16	15	22	50	16	36	16	90
100	222	20.5	16	25	60	20	41	20	110

Included in delivery: 1 rear trunnion mounting, 4 screws

Dimensions for Mounting BAS
(Rear trunnion mounting with spherical bearing)



Material: cast aluminium

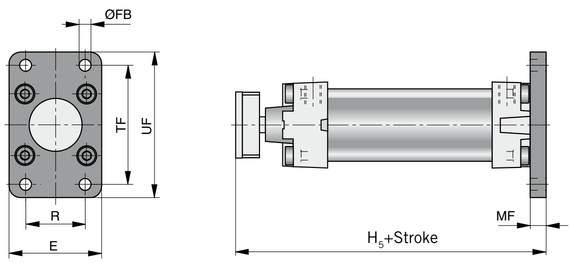
Dimension Table (mm) – for Mounting BAS

Cyl. Ø	H_3 + Stroke	H_4	H_7	H_8	$ØCX^{H7}$	DL	EX	MS
32	150	12	10	10	10	22	14	18
40	167	15	13	10	12	25	16	21
50	178	16	12	11	12	27	16	23
63	193	21	17	11	16	32	21	27
80	210	21	16	15	16	36	21	29
100	222	25	20.5	16	20	41	25	34

Included in delivery: 1 rear trunnion mounting with spherical bearing, 4 screws

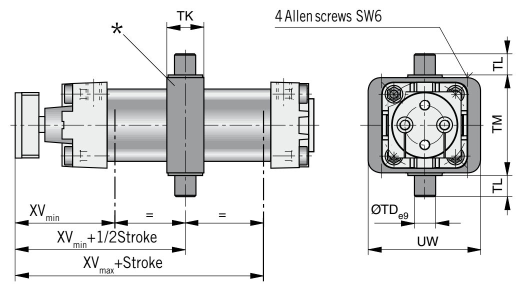
Mountings – Series AZV ...., AZ3...., AZ4...., Ø 32 – 100 mm

Dimensions for Mounting D



Material: cast aluminium

Dimensions for Mounting EN
for series AZ (profile cylinder barrel version)



Material: cast aluminium

* Position centre trunnion mounting
Standard position: Type EN1 – The taps of the EN attachment are horizontally aligned to the air supply
Option: Type EN2 – The taps of the EN attachment are vertically aligned to the air supply

Dimension Table (mm) – for Mounting D

Cyl. Ø	E	H_5 + Stroke	R	ØFB	MF	TF	UF
32	50	138	32	7	10	64	79
40	56	152	36	9	10	72	90
50	70	163	45	9	12	90	110
63	77	173	50	9	12	100	120
80	100	190	63	12	16	126	153
100	120	197	75	14	16	150	178

Included in delivery: 1 flange, 4 screws

Dimension Table (mm) – for Mounting EN

Cyl. Ø	$ØTD_{e9}$	TK	TL	TM	UW	XV_{min}	XV+ 1/ Stroke	XV_{max} + Stroke
32	12	25	12	50	65	64	76	87
40	16	28	16	63	75	75	87	99
50	16	28	16	75	85	84	95	106
63	20	36	20	90	100	89	101	112
80	20	36	20	110	120	96	109	121
100	25	48	25	132	135	99	112	125

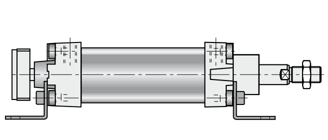
Included in delivery: 1 rear trunnion mounting

After loosening the locking screws, the trunnion mounting is infinitely variable between XV_{min} and XV_{max}.

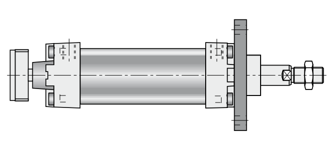
As standard, the position of the T-slots and dovetail slots is on the same side as the air connections. Exception: Ø 32 has only T-slots on the same side as the air connections, with a dovetail slot on the underside.

Diumensions – Basic Cylinder, with through piston rod, series AZ3...., Ø 32 – 100 mm

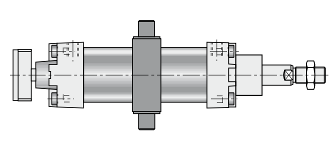
Foot mounting A



Rear flange mounting D

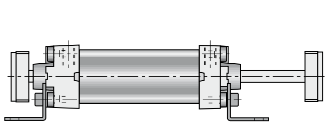


Centre trunnion mounting EN

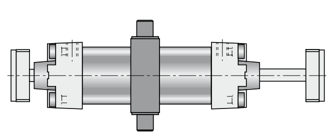


Diumensions – Basic Cylinder, with through piston rods, series AZ4...., Ø 32 – 100 mm

Foot mounting A



Centre trunnion mounting EN

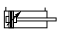
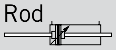
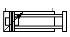
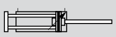
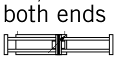


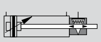
Piston force and air consumption see page 9, order instructions see page 58, 59

Order Instructions for Basic Cylinder Series AZ...., Ø 32 – 100 mm

AZ			5	032	-	1000	/	000	-	0	0	0	0	0	X	-12

Series	
AZ	Standard (profile cylinder barrel version)
AZZ	Tie rod version

Type of piston rod	
	Standard (with profile tube) 
D	With Through Piston Rod 
V	With non-rotating Piston Rod 
3	With through piston rod, non-rotating at one end 
4	With through piston rod, non-rotating at both ends 

Locking Unit	
	without (Standard)
F	with Locking Unit 

System	
5	Double acting with adjustable end cushioning, for contactless position sensing

Cylinder Diameter	
032	32 mm
040	40 mm
050	50 mm
063	63 mm
080	80 mm
100	100 mm

Stroke Length
Length in mm (4-digit)

Piston Rod Extension *
Length in mm (3-digit)

Air connection	
0	Standard
1	at one end in rear end cap, Ø 40 – 100 mm
2	at one end in front end cap, Ø 40 – 100 mm
3	Cylinder tube – 90° rotated
4	Cylinder tube – 180° rotated
5	Cylinder tube – 270° rotated

Seal / Wiper	
0	Standard (NBR)
1	Viton (+150°C)
2	NBR with metal wiper
3	Hydraulic (10 bar) with metal wiper

Lubrication	
0	Grease (Standard)

Piston Rod Material *	
0	Steel, high-alloy (Standard)
1	Steel, high-alloy (V2A)
3	Steel, unalloyed, hard-chrome plated (CK45)

Piston Rod Thread *	
0	External Thread (Standard)
1	Special – External Thread Details see page 47
2	Internal Thread

Pneumatic cylinders for the Ex-Atmospheres (ATEX)	
X	See ATEX Certification 94/9/EG (ATEX 95)
0	Standard without Ex-Protection

External Thread Length of the Piston Rod (optional) *	
Length (2-digit) in mm Details see page 47	
-12	for example 12 mm

*** Note for piston rod version:**
In the configuration of a cylinder with through piston rod, Series AZD, the assumption is that both piston rods are identical. Only one is configured and this applies to both piston rods. If two different piston rods are required, a special cylinder must be ordered. Special cylinders are not configurable.

Standard Stroke Length

0025, 0050, 0080, 0100, 0125, 0160, 0200, 0250, 0320, 0400, 0500 delivered preferably

Order Instructions – Multiple Position Cylinder Series AZZ...., Ø 32 – 100 mm

Order Instructions	AZZ5	PD..../..../....

Series	
AZZ5	with tie rod

Piston Diameter (mm)	Order-No.
032	PD40351
040	PD40354
050	PD40249
063	PD40357
080	PD40216
100	PD40360

2
1

Stroke Length Cylinder 1 and 2
Length in mm
Standard Stroke Length 0025, 0050, 0080, 0100, 0125, 0160, 0200, 0250, 0320, 0400, 0500 delivered preferably

Order Instructions:

For standard versions of basic cylinder, Series AZ, see price list (e.g. AZ5032-0125)

Ordering example for a configurable basic cylinder:
- Cylinder with through piston rod
- Double acting with cushioning
- for contactless position sensing
- Diameter 32 mm
- Stroke 125 mm
- Piston rod extension 15 mm (at both ends)
- Air connection at one end in rear end cap
- Viton seals (up to +150 °C)
- Standard lubrication
- Piston rod material, high alloy steel 1.4305
- Piston rod with external thread
- Without EX protection
- External thread length of piston rod 25 mm (at both ends)

Type designation per order code

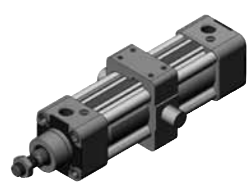
AZ5032-0125/015-110100-25

Ordering example for a cylinder for use in potentially explosive atmospheres:

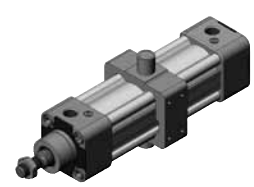
Standard Basic Cylinder , Ø 32 mm, ATEX, Series AZ:
AZ5032-0500/000-00000X

* **Order information for cylinders with EN-mountings**
When ordering, please indicate the position of the centre trunnion mounting

Standard position: Type EN1
The taps of the EN attachment are horizontally aligned to the air supply



Option: Type EN2
The taps of the EN attachment are vertically aligned to the air supply



Order Instructions for Cylinder Mountings and Accessories

Description	Order-No. Ø32	Ø40	Ø50	Ø63	Ø80	Ø100
Foot mounting A-..	PD 27917	PD 27918	PD 28072	PD 28073	PD 28074	PD 28075
Rear trunnion mounting B-..	PD 22704	PD 22705	PD 22706	PD 22707	PD 22708	PD 22709
Rear trunnion mounting BA-..	PD 23412	PD 23413	PD 23414	PD 23415	PD 23416	PD 23417
Rear trunnion mounting BAS-..	PD 23843	PD 23844	PD 23845	PD 23846	PD 23847	PD 23848
Front flange mounting C-..	PD 23403	PD 23404	PD 23405	PD 23406	PD 23407	PD 23408
Rear flange mounting D-..	PD 23403	PD 23404	PD 23405	PD 23406	PD 23407	PD 23408
Centre trunnion mounting EN-..* (for the tie rod version AZZ)	KL9234	KL9235	KL9236	KL9237	KL9238	KL9239
Centre trunnion mounting EN-..* (for profile cylinder barrel version AZ)	PD 39195	PD 39196	PD 39197	PD 39198	PD 39199	PD 39200
Security bolt for mountings B, BA, BAS	KY 6153	KY 6154	KY 6157	KY 6156	KY 6158	KY 6159

Standard Cylinder Ø125-320mm

to ISO 15552
(ISO 6431)
CETOP RP53P

Series DZ....

Versions:
double acting with cushioning

for contactless position sensing

ATEX-Version ⟨Ex⟩
(Series DZ5...)

Special Versions:
- to CETOP RP53P (piston rod thread M24x2)
- with through piston rod
- longer cushion strokes - on request
- without adjustable end cushioning - on request
- versions for application at approx. +80° to 150°C - on request

Delivery includes:
1 Cylinder
1 Hexagon nut for piston rod thread

Magnetic switches are not included - please order these separately.

Characteristics

Characteristics	Symbol	Unit	Description				
Type			Cylinder				
Series			DZ1, DZ5				
System			Piston rod cylinder Double acting with cushioning				
Mounting			See drawing				
Tube connection			Thread				
Ambient temperatur range	T_{min}	°C	-20	Note: When using below freezing point (°C) it is necessary to consult us			
	T_{max}	°C	+80				
Medium temperatur range	T_{max}	°C	+80				
Weight (mass)		kg	See table				
Installation			In any position				
Medium			Filtered and lubricated or filtered and unlubricated compressed air				
Lubrication			Oil mist lubrication compatible with Buna N				
Material							
Cylinder tube			Aluminium, anodized				
Front/Rear end caps			Aluminium, anodized				
Piston rod			Steel, high alloy				
Pneumatic Characteristics							
Nominal pressure	p_n	bar	6				
Operating pressure range	p_{min}	bar	1				
	p_{max}	bar	10				
Piston diameter		mm	125	160	200	250	320
Port size			G 1/2	G 3/4	G 3/4	G 1	G1
Piston rod diameter		mm	32	40	40	50	63
Piston rod thread			M27x2**	M36x2	M36x2	M42x2	M48x2
Stroke length		mm	For standard stroke lengths see order instructions max. 2000mm, longer strokes on request				
Piston force and air consumption			See page 9				
Cushioning			At both ends, infinitely variable				
Cushioning stroke		Cyl. Ø	125	160	200	250	320
		mm	42	52	52	52	50

** Standard piston rod thread M27x2
– on request M24x2 to CETOP RP53P can also be delivered.

Piston force and air consumption see page 9, dimensions see page 61-65, order instructions see page 66, 67

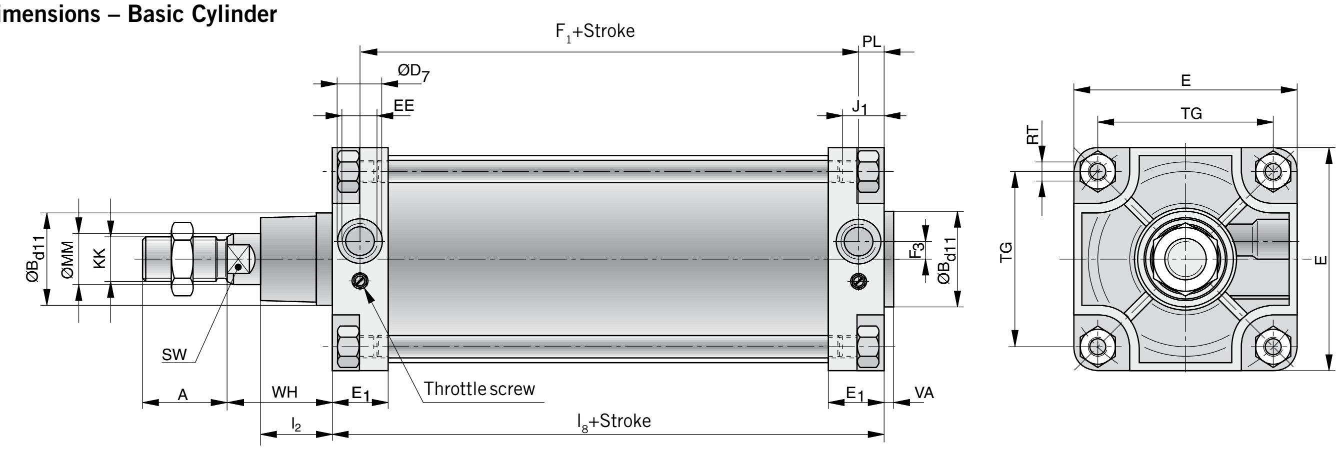
Weight (mass) kg

Cylinder version	Cylinder diameter									
	Ø125		Ø160		Ø200		Ø250		Ø320	
	1*	2*	1*	2*	1*	2*	1*	2*	1*	2*
Standard Type DZ	7.200	1.300	12.500	2.050	20.000	2.200	35.000	4.000	66.000	6.000

* 1 = Weight for cylinder with 100 mm stroke
2 = Weight for further 100 mm stroke length

Mounting	Cylinder diameter				
	Ø125	Ø160	Ø200	Ø250	Ø320
A	2.100	3.800	5.000	9.700	17.000
B	1.400	2.600	4.100	7.100	31.000
BA	1.600	2.700	4.200	15.700	33.000
BAS	1.600	2.600	11.300	19.000	30.000
C	1.400	7.200	12.200	19.200	38.000
D	1.400	7.200	12.200	19.200	38.000
EN	3.300	6.100	8.100	14.800	16.000

Dimensions – Basic Cylinder



Dimension Table (mm) – for Basic Cylinder

Cyl. Ø	A	$ØB_{d11}$	$ØD_7$	E	E_1	F_1 + Stroke	F_3	$J_{1\,max.}$	l_2	l_8 + Stroke	EE	KK	ØMM	PL	RT	SW	TG	VA	WH
125	54	60	28	140	35	122	11	18	45	160	G1/2	M27x2*	32	19	M12	27	110	6	65
160	72	65	33	180	45	130	11	23	50	180	G3/4	M36x2	40	25	M16	36	140	6	80
200	72	75	33	220	45	130	15	23	60	180	G3/4	M36x2	40	25	M16	36	175	6	95
250	84	90	40	280	64	136	21	27	70	200	G 1	M42x2	50	32	M20	46	220	10	105
320	96	110	44	340	55	158	–	28	89,5	220	G1	M48x2	63	31	M24	55	270	9,5	120

* Standard piston rod thread M27x2 - on request M24x2 to CETOP RP53P can also be deliverd

Accessories

Piston Rod Eye

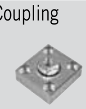
Page 138

Piston Rod Clevis

Page 139

Compensating Coupling

Page 140

Coupling

Page 141

Magnetic Switch

Page 152

Pivot for Mounting B

Page 155

Pivot for Mounting E

Seite 144

Standard Cylinder Ø 125 mm

Series DZ5.../....FSE

Version:
with locking unit – locks if pressure drops

double acting with cushioning

for contactless position sensing

For further technical informations and examples see page 114, 115

**) Note:

The holding force quoted relates to a static load. If this load is exceeded, slippage can occur. Any dynamic forces occurring in operation must not exceed the static holding force.
In clamped operating mode, if the load is fluctuatung, the clamping unit is not free from play. The cylinder is not suitable for positioning tasks.

Actuation:
The clamping unit must only be released when both cylinder chambers are pressurised, otherwise there is danger of an accident from the jerky movement of the piston rod. Shutting off the compressed air supply at both ends with a 5/3 way valve provides adequate safety only for a short time.

Characteristics

Characteristics	Symbol	Unit	Description
General			
Benennung			Cylinder with locking unit
Type			Piston rod cylinder
Series			DZ5125/....-FSE
Locking unit			FSE- locks if pressure drops
Material FSE			
Cartridge			Aluminium, anodised
Housing			Aluminium, anodised
Clamping jaw			Ms
Cylinder piston rod			Steel, high-alloy
FSE unlocking pressure		bar	≥ 4 to 10
Cylinder diameter		mm	125
Pilot air connection			G1/8
Locking force, static **)		N	7000

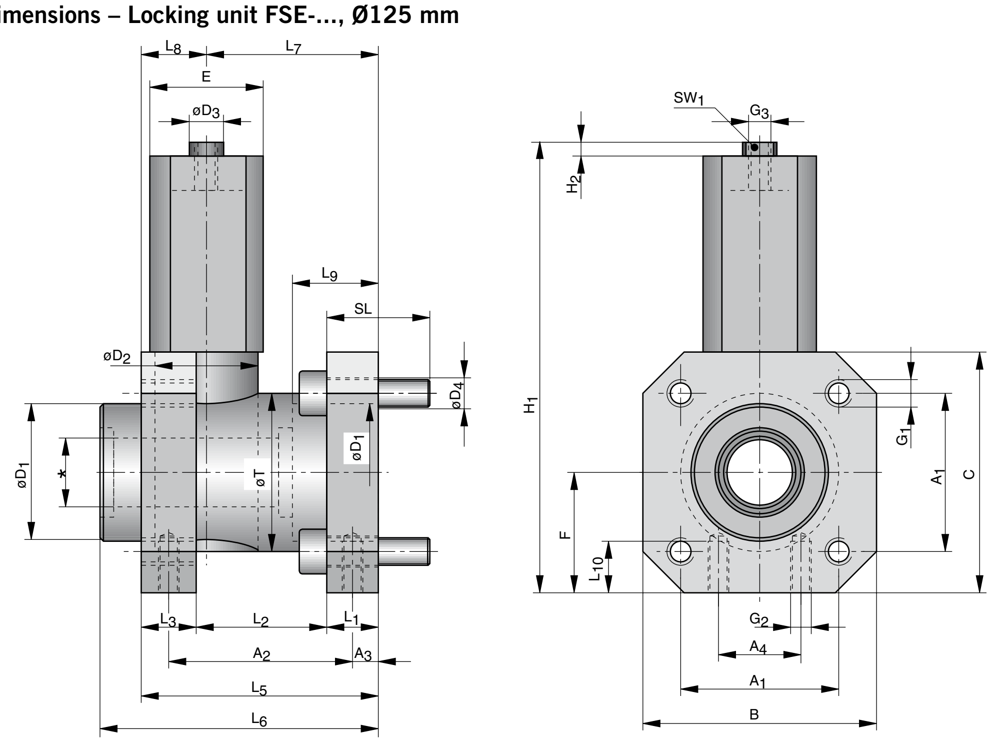
For all other dimensions for cylinders and cylinder mountings see page 60, 61

Weight (mass) kg

Description	Cylinder diameter (mm)
	125
Locking unit	1.80
Basic cylinder *)	7.87

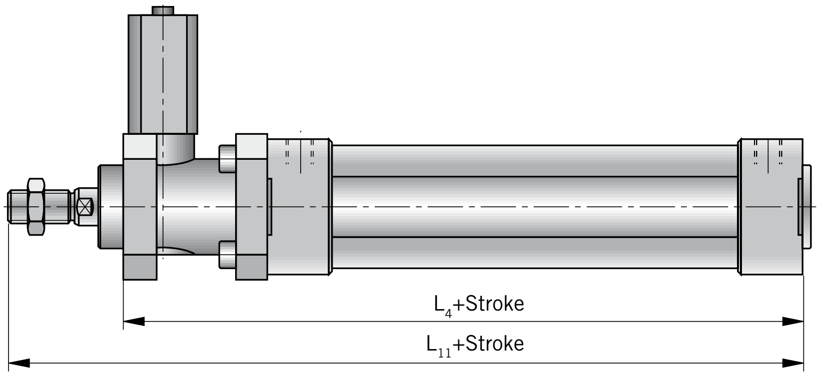
*) with 100 mm stroke and longer piston rod

Dimensions – Locking unit FSE-..., Ø125 mm



* Piston rod diameter

Dimensions of Cylinder with Locking Unit FSE-..., Ø125 mm



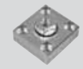
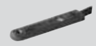
For all other dimensions for cylinders and cylinder mountings see page 61, 64-65

Dimensions Table (mm) – for Locking Unit FSE-... and Dimensions including Cylinder

Cyl. Ø	A_1	A_2	A_3	A_4	B	C	ØD_1	ØD_2	ØD_3	ØD_4	E	F	G_1	G_2	G_3
125	110	95	11	75	140	150	60	65	19	13	65	75	M12	M10	G1/8

Cyl. Ø	H_1	H_2	L_1	L_2	L_3	L_4 +Stroke	L_5	L_6	L_7	L_8	L_9	L_{10}	L_{11} +Stroke	SL	SW1	ØT
125	223.5	4	25	70	27	282	122	154	85	37	45.5	20	388	45	17	80

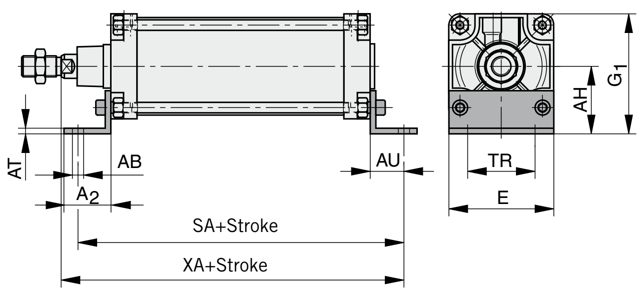
Accessories

Piston Rod Eye	Piston Rod Clevis	Compensating Coupling	Coupling	Magnetic Switch	Pivot for Mounting B	Pivot for Mounting E		
								
Page 138	Page 139	Page 140	Page 141	Page 152	Page 142	Seite 144		

Piston force and air consumption see page 9, mountings see page 64,65, order instructions see page 66,67

Mountings – Series DZ...., Ø 125 – 320 mm

Dimensions for Mounting A

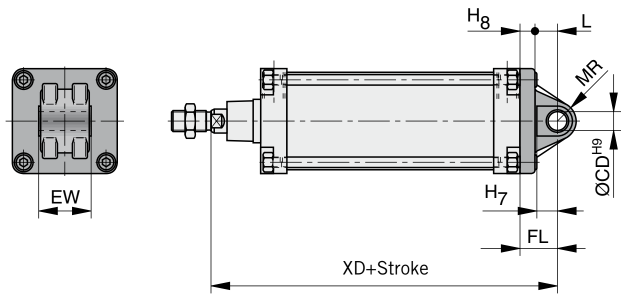


Material: steel, passivated

Dimensions Table (mm) – for Mounting A

Cyl. Ø	A_2	E	G_1	ØAB	AH	AT	AU	SA +Stroke	TR	XA +Stroke
125	60	140	160	16	90	8	45	250	90	270
160	80	180	205	18	115	8	60	300	115	320
200	100	220	245	22	135	9	70	320	135	345
250	110	280	305	26	165	10	75	350	165	380
320	130	353	370	35	200	23	85	390	200	425

Dimensions for Mounting BA

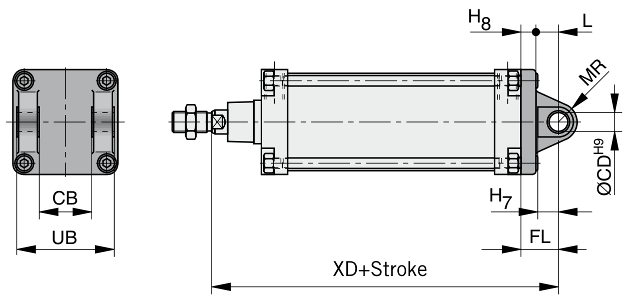


Material: cast aluminium

Dimensions Table (mm) – for Mounting BA

Cyl. Ø	H_7	H_8	L	$ØCD^{H9}$	EW	FL	MR	XD +Stroke
125	27.5	20	30	25	70	50	25	275
160	28.5	20	35	30	90	55	30	315
200	28.5	25	35	30	90	60	31	335
250	39	25	45	40	110	70	41	375
320	26	30	50	45	120	80	46	420

Dimensions for Mounting B

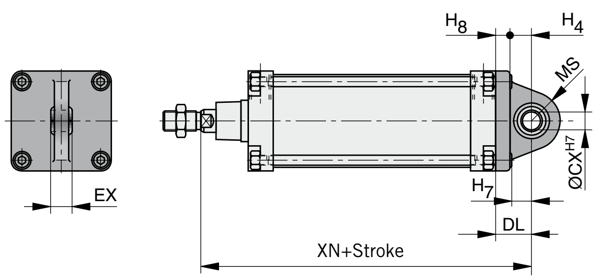


Material: cast aluminium

Dimensions Table (mm) – for Mounting B

Cyl. Ø	H_7	H_8	L	$ØCD^{H9}$	CB	FL	MR	UB	XD +Stroke
125	27,5	20	30	25	70	50	25	130	275
160	28,5	20	35	30	90	55	30	170	315
200	28,5	25	35	30	90	60	31	170	335
250	25	25	45	40	110	70	41	200	375
320	26	30	50	45	120	80	46	220	420

Dimensions for Mounting BAS



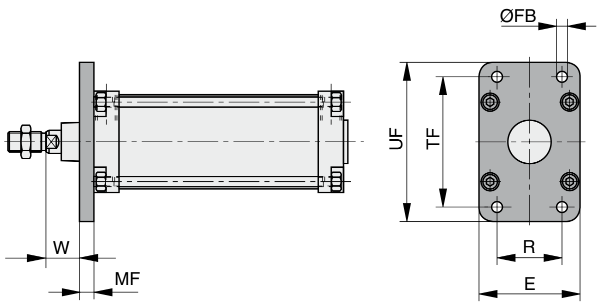
Material: cast aluminium

Dimensions Table (mm) – for Mounting BAS

Cyl. Ø	H_4	H_7	H_8	$ØCX^{H7}$	DL	EX	MS	XN +Stroke
125	30	27,5	20	25	50	31	40	275
160	35	28,5	20	30	55	37	48	315
200	36	33	24	35	60	43	47	335
250	42	39	28	40	70	49	53	375
320	50	26	30	50	80	60	63	420

Mountings – Series DZ...., Ø 125 – 320 mm

Dimensions for Mounting C

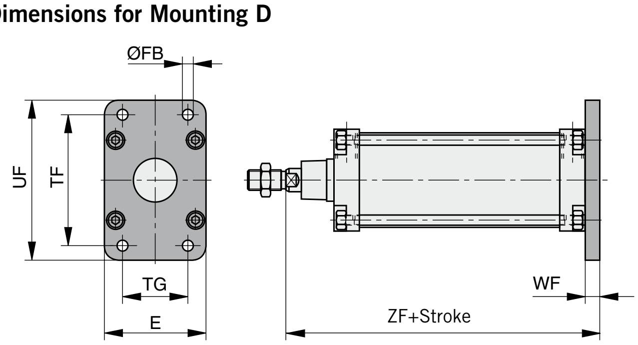


Material: Ø125 cast aluminium
Ø160 - Ø320 steel, passivated

Dimension Table (mm) – for Mounting C

Cyl. Ø	E	R	W	ØFB	MF	TF	UF
125	145	90	45	16	20	180	220
160	180	115	60	18	20	230	275
200	220	135	70	22	25	270	315
250	280	165	80	26	25	330	380
320	353	200	90	33	30	400	475

Dimensions for Mounting D

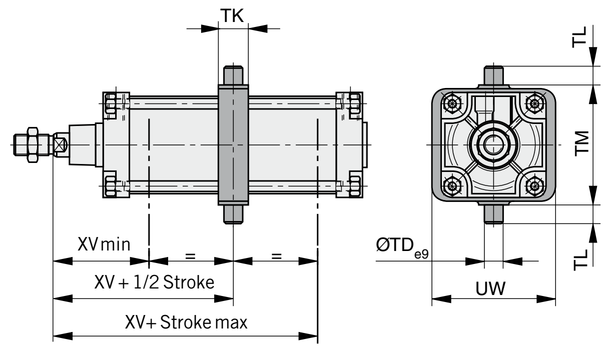


Material: Ø125 cast aluminium
Ø160 - Ø320 steel, passivated

Dimension Table (mm) – for Mounting D

Cyl. Ø	E	ØFB	TF	TG	UF	WF	ZF +Stroke
125	145	16	180	90	220	20	245
160	180	18	230	115	275	20	280
200	220	22	270	135	315	25	300
250	280	26	330	165	380	25	330
320	353	33	400	200	475	30	370

Dimensions for Mounting EN



Material: nodular graphite cast iron, passivated

* Position centre trunnion mounting

Standard position: Type EN1 – The taps of the EN attachment are horizontally aligned to the air supply
Option: Type EN2 – The taps of the EN attachment are vertically aligned to the air supply

Dimension Table (mm) – for Mounting EN

Cyl. Ø	$ØTD_{e9}$	TK	TL	TM	UW	XV_{min}	XV +1/2 Stroke	XV_{max} + Stroke
125	25	32	25	160	155	116	145	174
160	32	40	32	200	190	145	170	195
200	32	40	32	250	240	160	185	210
250	40	50	40	320	296	194	205	216
320	50	70	50	400	400	210	230	250

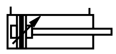
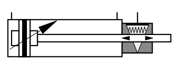
Note:

When ordering please give exact dimension XV+ 1/2 Hub. Mounting is assembled when delivered.

Instructions for mounting EN:

In order to avoid faulty operation of the magnetic switches, a min. distance of 10 to 20 mm has to be kept between switch and EN-mounting when fastening them to the cylinder.

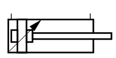
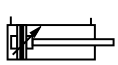
Order Instructions – Basic Cylinder, Series DZ...., Ø 125 – 320 mm

System	Symbol	Standard	Piston-Ø	Order instructions Type	Order-No.
Double acting with adjustable end cushioning		ISO	125	DZ1125/....	PA53530-....
		CETOP	125	DZ1125/....	PA53500-....
		ISO	160	DZ1160/....	PA54000-....
		ISO	200	DZ1200/....	PA54500-....
		ISO	250	DZ1250/....	PA55000-....
		ISO	320	DZ1320/....	PA55500-....
Double acting with adjustable end cushioning, for contactless position sensing		ISO	125	DZ5125/....	PA53540-....
		CETOP	125	DZ5125/....	PA53510-....
		ISO	160	DZ5160/....	PA54010-....
		ISO	200	DZ5200/....	PA54510-....
		ISO	250	DZ5250/....	PA55010-....
		ISO	320	DZ5320/....	PA55520-....
With locking unit Double acting with adjustable end cushioning, for contactless position sensing		ISO	125	DZ5125/....-FSE	PA64027-....
		CETOP	125	DZ5125/....-FSE	PA64017-....

Complete type designation and order no. with stroke length in mm (4-digit)

Standard stroke length 0025, 0050, 0080, 0100, 0125, 0160, 0200, 0250, 0320, 0400, 0500 delivered preferably

Order Instructions – Cylinder with Mounting EN, Series DZ...., Ø 125 – 320 mm

System	Symbol	Standard	Piston-Ø	Order instructions Type	Order-No.
Double acting with adjustable end cushioning		ISO	125	DZ1125EN/.../....	PA53536-....
		CETOP	125	DZ1125EN/.../....	PA53506-....
		ISO	160	DZ1160EN/.../...	PA54006-.../...
		ISO	200	DZ1200EN/.../...	PA54506-.../...
		ISO	250	DZ1250EN/.../...	PA55006-.../...
Double acting with adjustable end cushioning, for contactless position sensing		ISO	125	DZ5125EN/.../...	PA53546-.../...
		CETOP	125	DZ5125EN/.../...	PA53516-.../...
		ISO	160	DZ5160EN/.../...	PA54016-.../...
		ISO	200	DZ5200EN/.../...	PA54516-.../...
		ISO	250	DZ5250EN/.../...	PA55016-.../...

Complete type designation and order no. with stroke length in mm (3-digits)

Give dimension XV+1/2Stroke with type designation and order no.

Cylinder-Ø 320 mm on request

Ordering Example:

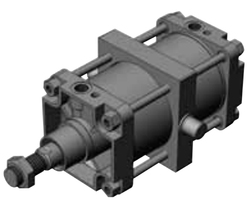
Basic Cylinder: DZ5125/0500 PA 53510-0500

Order Instructions – Cylinder Mountings

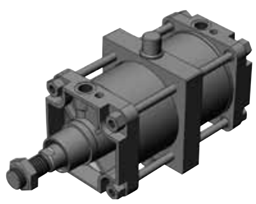
Description	Order-No. Ø125	Ø160	Ø200	Ø250	Ø320
Foot mounting A-...	PD 22026	PD 22027	PD 24792	PD 25758	KL9139
Rear trunnion mounting B-...	PD 22034	PD 22035	PD 24990	PD 25710	KL9137
Rear trunnion mounting BA-...	PD 23418	PD 22628	PD 24999	PD 25759	KL9135
Rear trunnion mounting BAS-...	PD 23849	PD 23850	PD 25766	PD 25760	KL9136
Front flange mounting C-...	PD 23409	PD 23410	PD 24924	PD 25761	KL9140
Rear flange mounting D-...	PD 23409	PD 23410	PD 24924	PD 25761	KL9140
Centre trunnion mounting EN-...*	KL9240	KL9241	KL9242	KL9243	KL9138
Security bolt for mountings B, BA, BAS	PD 22598	PD 22599	PD 22599	KY 8658	KL9141

*** Order information for cylinders with EN-mountings**
When ordering, please indicate the position of the centre trunnion mounting

Standard position: Type EN1
The taps of the EN attachment are horizontally aligned to the air supply



Option: Type EN2
The taps of the EN attachment are vertically aligned to the air supply



Accessories

Piston Rod Eye

Page 138

Piston Rod Clevis

Page 139

Compensating Coupling

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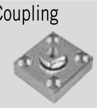
Coupling

Page 141

Magnetic Switch

Page 152

Pivot for Mounting B

Page 142

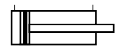
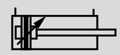
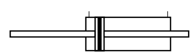
Pivot for Mounting E

Seite 144

Piston Rod Cylinders

Round Cylinder
Series R...., RK....
Ø 32-63 mm

Overview

System	Fig.	Symbol	Series	Page
Double acting without cushioning For contactless position sensing			R6... RK6...	70-76
Double acting with cushioning For contactless position sensing			R5...	70-76
With through piston rod Double acting without cushioning For contactless position sensing			RDU6...	70-76

Round Cylinder Ø 32-63 mm

Series R...., RK....
Series RDU....

Versions:
- **double acting without cushioning**
- **double acting with adjustable cushioning**
- **for contactless position sensing**

Universal cylinder for mounting by a thread on the cylinder covers.
Pivot mounted on the front and rear cylinder covers.

The delivery includes:
1 Cylinder
1 Hexagon nut for piston rod thread and for cylinder mountings

Versions without contactless position sensing on request.

Characteristics

Characteristics	Symbol	Unit	Description			
General Features						
Type			Round cylinder			
Series			R.... , RK....			
System			Piston rod cylinder			
R6..., RK6....			Double acting without cushioning			
R5....			Double acting with cushioning			
RDU6...			With through piston rod Double acting without cushioning			
Ambient temperature range	T_{min} T_{max}	°C °C	-10 +70	Note: When using below freezing point (°C) please contact as for advice		
Medium temperature range	T_{max}	°C	+70			
Weight (mass)		kg	See table			
Medium			Filtered and lubricated or filtered and unlubricated compressed air			
Lubrication			Oil mist lubrication compatible with NBR and PU			
Material						
Cylinder barrel			Aluminium, anodised			
Front/rear end caps			Aluminium			
Piston rod			Steel, high-alloy			
Pneumatic Characteristics						
Nominal pressure	p_n	bar	6			
Piston diameter		mm	32	40	50	63
Operating pressure range	p_{min} p_{max}	bar bar	1 10			
Port size			G1/8	G1/4	G1/4	G3/8
Piston rod diameter		mm	12	16	20	20
Stroke length		mm	For standard stroke lengths see order instructions, max. 500, longer strokes on request			
Cushioned stroke			At both ends progressively adjustable			
Cushioned stroke		mm	22	27	28	28
Piston force and air			See page 9			

Weight (mass) kg

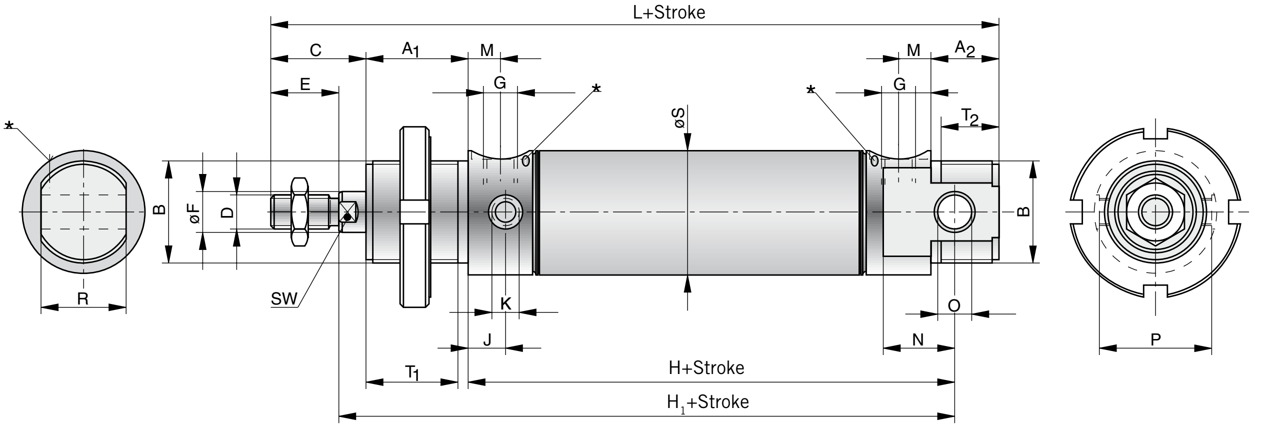
Cylinder version	Cylinder diameter							
	Ø32		Ø40		Ø50		63	
	1*	2*	1*	2*	1*	2*	1*	2*
Basic cylinder Typ R....	0.550	0.150	0.940	0.250	1.400	0.300	1.900	0.400
With through piston rod Typ RDU....	1.100	0.340	1.480	0.560	2.560	0.850	3.260	0.950

* 1 = Weight for cylinder with 100 mm stroke
2 = Weight for every additional 100 mm stroke length

Mounting	Cylinder diameter			
	Ø32	Ø40	Ø50	63
RA (1 bracket)	0.100	0.190	0.290	0.360
RC	0.100	0.190	0.290	0.360
RB	0.170	0.290	0.480	0.700
RE	0.150	0.260	0.380	0.590

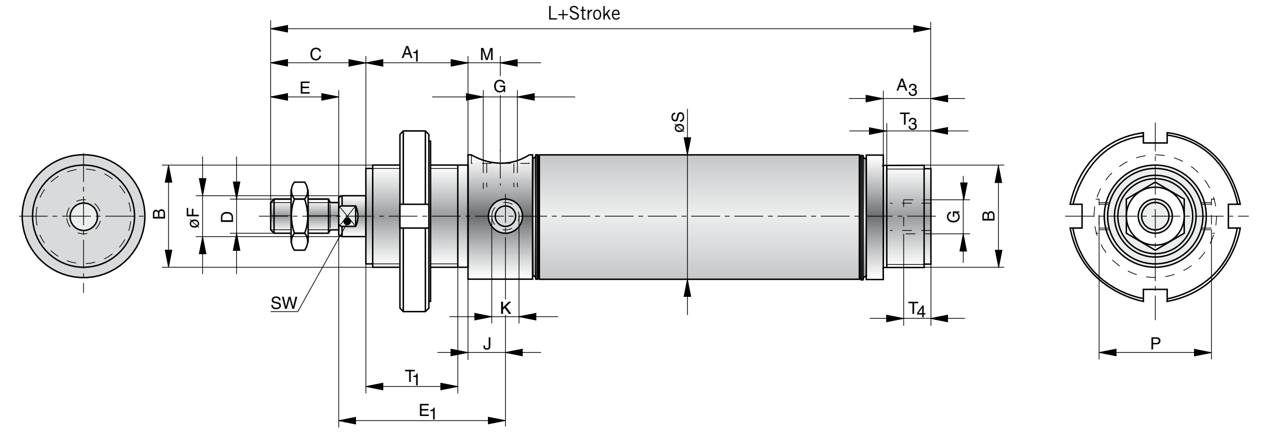
Piston force and air consumption see page 9, dimensions see page 72- 75, order instructions see page 76

Dimensions – Basic Cylinder, Series R…., Ø 32 – 63 mm



* adjustable end cushioning only for series R 5000

Dimensions – Basic Cylinder, Series RK…., Ø 32 – 63 mm

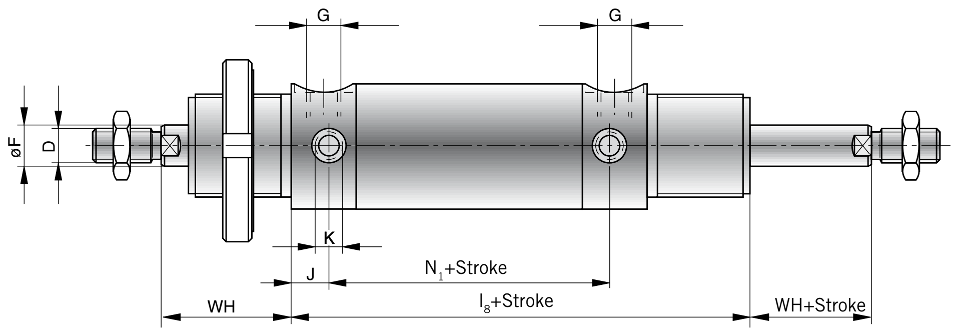


Dimension Table (mm) – Basic Cylinder, Series R…., RK…., RDU….

Cyl. Ø	A_1	A_2	A_3	B	C	D	E	E_1	ØF	G	H	H_1 +Stroke	J	K	I_8 +Stroke
32	30	19.5	14	M30x1.5	28	M10	20	49	12	G1/8	90.5	128.5	11	M8x1	83.5
40	35	21.5	16	M38x1.5	34	M12	24	57	16	G1/4	99.5	144.5	12	M10x1	89
50	38	25	18	M45x1.5	44	M16	32	63	20	G1/4	109.5	159.5	13	M12x1.5	93.5
63	38	24.5	18	M45x1.5	45	M16	32	64.5	20	G3/8	116.5	167.5	13.5	M14x1.5	101

Piston force and air consumption see page 9, mountings see page 74, 75, order instructions see page 76

Dimensions – Basic Cylinder with Through Piston Rod, Series RDU...., Ø 32 – 63 mm



Cyl. Ø	L + Stroke R....	L + Stroke RK....	M	N	N_1 +Stroke	O	P	R_{h12}	ØS	T_1	T_2	T_3	T_4	SW	WH	WH + Stroke
32	160.5	138.5	9.5	21	61.5	10	33	25	35	27	16.5	12	8	10	38	38
40	181.5	156.5	11	24	65	12	42	30	43	32	17.5	14	12	14	45	45
50	205.5	179.5	11	27	67.5	14	52	35	54	35	21	16	12	17	50	50
63	215.5	186.5	12.5	28	74	16	62	35	67	35	20.5	16	12	17	51	51

Accessories

Piston Rod Eye

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Piston Rod Clevis

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Compensating Coupling

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Magnetic Switch

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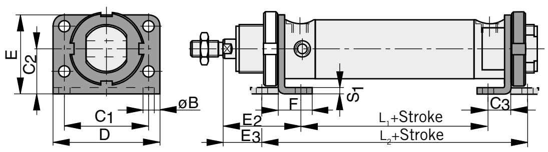
Mountings – Series R…., RK…., Ø 32 – 63 mm

Foot Mounting Type RA2-..



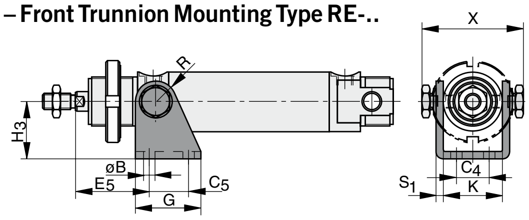
Material: steel, passivated

Dimension Table (mm) – Foot Mounting Type RA2

Cyl. Ø	ØB	C_1	C_2	C_3	D	E	E_2	E_3	F	L_1 +Stroke	L_2 +Stroke	S_1
32	6.6	52	28	14	66	49	48	24	21	63 46.5*	111 94.5*	4
40	9	60	33	20	80	58	60	25	30	61 41.5*	131 111.5*	5
50	9	70	40	20	90	70	64	30	30	70.5 51.5*	138.5 119.5*	6
63	9	76	45	20	96	80	65	31	30	80 57.5*	148 125.5*	6

* Dimensions in the grey fields are valid for series RK….

Pivot – Front Trunnion Mounting Type RE-..

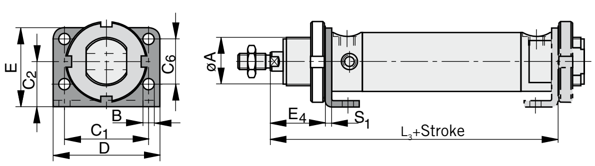


Material: steel, passivated

Dimension Table (mm) – Pivot – Front Trunnion Mounting Type RE

Cyl. Ø	ØB	C_4	C_5	E_5	G	H_3	K	R	S_1	X
32	6.6	20	24	45	40	35	36.1	12	4	60
40	9	28	30	54	50	40	45.1	13	5	75
50	9	36	34	59	54	45	55.1	14	6	89
63	9	42	35	63.5	65	50	70.1	16	6	109

Foot Mounting Type RA1-..
Flange Mounting Type RC-..



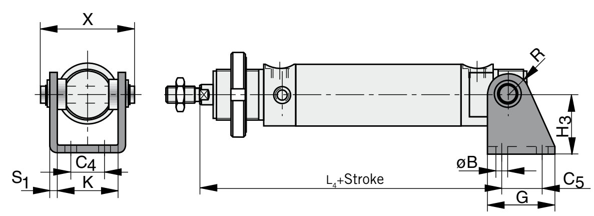
Material: steel, passivated

Dimension Table (mm) – Mounting RA1, RC

Cyl. Ø	ØA	B	C_1	C_2	C_6	D	E	E_4	L_3 +Stroke	S_1
32	30.1	6.6	52	28	28	66	49	34	125 108.5*	4
40	38.1	9	60	33	30	80	58	40	141 121.5*	5
50	45.1	9	70	40	40	90	70	44	154.5 135.5*	6
63	45.1	9	76	45	50	96	80	45	165 142.5*	6

* Dimensions are valid for series RK….

Pivot – Rear Trunnion Mounting Type RB-..

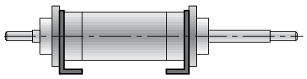
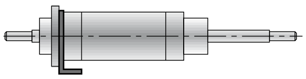
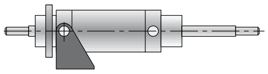


Material: steel, passivated

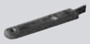
Dimension Table (mm) – Pivot Rear Trunnion Mounting Type RB

Cyl. Ø	ØB	C_4	C_5	G	H_3	H	K	L_4 +Stroke	R	S_1	X
32	6.6	20	24	40	35	8	36.1	124.5	12	4	58
40	9	28	30	50	40	10	45.1	141.5	13	5	70
50	9	36	34	54	45	10	55.1	155.5	14	6	86
63	9	42	35	65	50	15	70.1	166.5	16	6	100

Mountings – Series RDU… (with through piston rod), Ø 32 – 63 mm

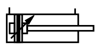
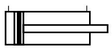
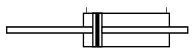
Foot mounting (2 mounting brackets)	Foot mounting (Flange mounting)	Pivot – Front Trunnion Mounting
		
Material: steel, passivated	steel, passivated	steel, passivated

Accessories

Piston Rod Eye	Piston Rod Clevis	Compensating Coupling	Magnetic Switch					
								
Page 138	Page 139	Page 140	Page 152					

Piston force and air consumption see page 9, dimensions see page 72-74, order instructions see page 76

Order Instructions – Basic Cylinder *

Series	Symbol	Piston-Ø	Order Instructions Type	Order-No.
Double acting with adjustable end cushioning For contactless position sensing		32	R 5032/....*	PD46443-...
		40	R 5040/....	PD46445-....
		50	R 5050/....	PD46447-....
		63	R 5063/....	PD46449-....
Double acting without adjustable end cushioning For contactless position sensing		32	R 6032/....	PD46444-....
			RK 6032/....	PA58220-....
		40	R 6040/....	PD46446-....
			RK 6040/....	PA59140-....
		50	R 6050/....	PD46448-....
			RK 6050/....	PA60210-....
		63	R 6063/....	PD46450-....
			RK 6063/....	PA61150-....
With through piston rod Double acting without adjustable end cushioning For contactless position sensing		32	RDU 6032/....*	PD58270-...
		40	RDU 6040/....	PD59200-....
		50	RDU 6050/....	PD60270-....
		63	RDU 6063/....	PD61200-....

Complete type designation and order no. with stroke length (in mm) (4-digit)

Standard stroke lengths: 0025, 0050, 0080, 0100, 0125, 0160, 0200, 0250, 0320, 0400, 0500 delivered preferably

* Magnetic switch mounting by band

Order Instructions – Mountings - Accessories

Description	Type	Order-No. Ø32	Ø40	Ø50	Ø63
Foot mounting (1 mounting bracket)	RA 1-..	KK 29.302	KK 30.302	KK 31.302	KK 32.302
Foot mounting (standard version)	RA 2-..*	PD 25712	PD 25713	PD 25714	PD 25715
Flange mounting (1 mounting bracket)	RC- ..	KK 29.302	KK 30.302	KK 31.302	KK 32.302
Rear trunnion mounting	RB- ..	PD 40390	PD 40391	PD 40392	PD 40393
Front trunnion mounting	RE-..	PD 40394	PD 40395	PD 40396	PD 40397

Complete type designation with piston-Ø

Ordering example: RA-32 KK 29.302

* consists of 2 mounting brackets and 1 groove nut

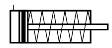
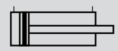
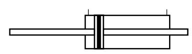
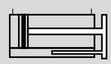
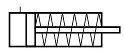
Piston Rod Cylinders

Compact Cylinder

Series SZ....
Ø 12-100 mm

Series SZK....
Ø 32-63 mm

Overview

System	Fig.	Symbol	Series	Page
Single acting without cushioning For contactless position sensing			SZ7...	78-81 83, 84
Double acting without cushioning For contactless position sensing			SZ6...	78-81 83, 84
With through piston rod Double acting without cushioning For contactless position sensing			SZD6...	78-81 84
Non-rotating Double acting without cushioning For contactless position sensing			SZV6...	78-81 84
Single acting without cushioning			SZK3...	78, 79 82, 84

Compact Cylinder Ø 12-100 mm

Series SZ....
Series SZD....
Series SZV....

Versions:
- **single acting without cushioning**
- **double acting without cushioning**
- **for contacless position sensing**
- **with through piston rod**
- **non-rotating**
- **ATEX-Version**

Special versions:
- with non-standard stroke lengths
- non-rotating with through piston rod

Compact cylinders are especially suitable for short stroke clamping tasks.
- minimum space requirements
- high clamping forces
- fast response times

Characteristics

Characteristics	Symbol	Unit	Description				
General Features							
Type			Compact cylinder				
Series			SZ.... , SZD...., SZV....				
System			Piston rod cylinder				
SZ6....			Double acting without cushioning For contactless position sensing				
SZ7....			Single acting without cushioning For contactless position sensing				
SZK3....			Single acting without cushioning				
SZD6...			With through piston rod Double acting without cushioning For contactless position sensing				
SZV6...			Non-rotating Double acting without cushioning For contactless position sensing				
Mounting							
Series SZ..., SZD.. . SZV... SZK....			4 screws 2 screws Ø 32 mm: 2 screws Ø 50 - 63 mm: 4 screws See drawing for size dimensions				
Ambient temperature range	T_{min} T_{max}	°C °C	-10 +70	Note: When using below freezing point (°C) please contact us for advice			
Medium temperature range	T_{max}	°C	+70				
Weight (mass)		kg	See table for details				
Medium			Filtered and lubricated or filtered and unlubricated compressed air				
Lubrication			Oil mist lubrication compatible with Buna N				
Material							
Housing			Aluminium profile, anodised				
End cap, top SZK3... SZ7..., SZ6..., SZV6....			Aluminium, brass Ø12-40: brass, Ø50-100: Al				
End cap, bottom			Aluminium				
Piston rod			Steel, high-alloy				
Seal			Oil resistant rubber				
Pneumatic Characteristics – Series SZ 6..., SZ7...., SZD6..., SZK3...							
Nominal pressure	p_n	bar	6				
Piston diameter		mm	12	16	20	25	32
Operating pressure range SZK3... SZ7..., SZ6..., SZV6... SZD6...	 p_{max} $p_{min/max}$ $p_{min/max}$ $p_{min/max}$	 bar bar bar bar	 – 1-10 – 2.5-10	 – 1-10 – 2-10	 – 1-10 1-10 2-10	 – 1-10 1-10 1.5-10	 10 1-10 1-10 1.5-10
Piston diameter		mm	40	50	63	80	100
Operating pressure range SZK3... SZ7..., SZ6..., SZV6... SZD6...	 p_{max} $p_{min/max}$ $p_{min/max}$ $p_{min/max}$	 bar bar bar bar	 – 1-10 1-10 2.5-10	 10 1-10 1-10 2-10	 10 1-10 1-10 2-10	 – 1-10 – 1.5-10	 – 1-10 – 1.5-10

Piston force and air consumption see page 9, dimensions see page 80,82,
order instructions see page 83, 84

Characteristics – Continuation						
Piston diameter	mm	12	16	20	25	32
Port size						
SZK3...		–	–	–	–	G1/8
SZ7..., SZ6...,		M5	M5	M5	G1/8	G1/8
SZV6...		–	–	M5	G1/8	G1/8
SZD6...		M5	M5	M5	G1/8	G1/8
Piston diameter	mm	40	50	63	80	100
Port size						
SZK3...		–	G1/8	G1/8	–	–
SZ7..., SZ6...,		G1/8	G1/8	G1/8	G1/4	G1/4
SZV6...		G1/8	G1/8	G1/8	–	–
SZD6...		G1/8	G1/8	G1/8	G1/4	G1/4
Piston diameter	mm	12	16	20	25	32
Piston rod diameter						
SZK3...		–	–	–	–	12
SZ7..., SZ6...,		6	8	10	12	12
SZV6...		–	–	10	12	12
SZD6...		6	8	10	12	12
Piston diameter	mm	40	50	63	80	100
Piston rod diameter						
SZK3...		–	16	16	–	–
SZ7..., SZ6...,		16	20	20	25	32
SZV6...		16	20	20	–	–
SZD6...		16	20	20	25	32
Stroke length						
SZK3...	mm	Ø32: 5, 10, Ø50-63: 10				
SZ7...	mm	max. 25, standard stroke lengths see order instructions				
SZ6..., SZD6..., SZV6...	mm	max. 80, standard stroke lengths see order instructions				
		Further stroke lengths on request				
Piston force and air consumption		See page 9				

Spring Return Force in N*

Series	Stroke length (mm)	F_{min} (N) Ø12	Ø16	Ø20	Ø25	Ø32	Ø40	Ø50	Ø63	Ø80	Ø100
SZK3...	[1])	–	–	–	–	53	–	173	254	–	–
SZ7...	5	8	15	23	26	38	48	–	–	–	–
SZ7...	10	6	12	19	21	28	38	70	90	114	138
SZ7...	25	–	11	19	20	28	38	48	67	90	120

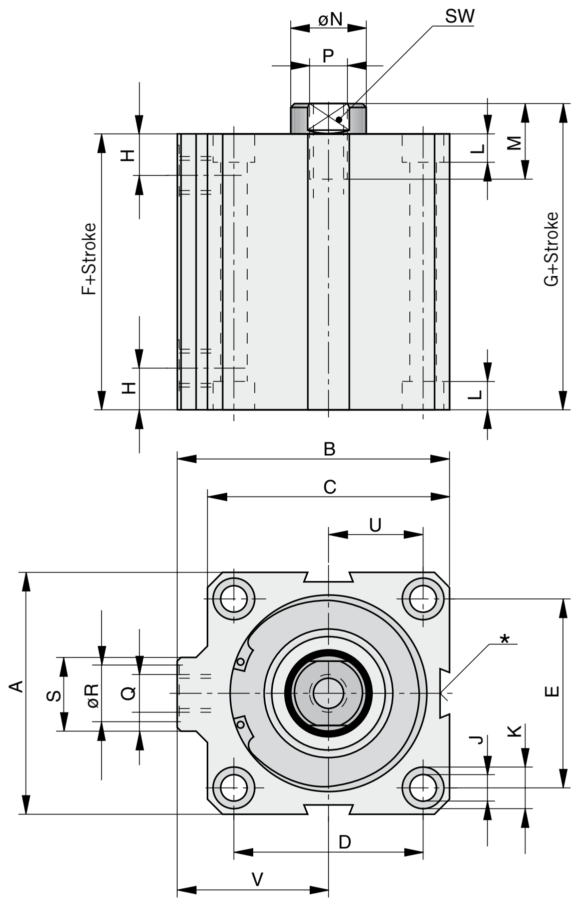
* theoretical value
[1]) stroke lengths for series SZK3...: Ø32: 5 mm, 10 mm, Ø50-63: 10 mm

Weight (mass) kg

Series	Cylinder diameter Ø12		Ø16		Ø20		Ø25		Ø32		Ø40		Ø50		Ø63		Ø80		Ø100	
	1*	2*	1*	2*	1*	2*	1*	2*	1*	2*	1*	2*	1*	2*	1*	2*	1*	2*	1*	2*
SZK3...	–	–	–	–	–	–	–	–	0.170 for stroke 5 mm		0.200 for stroke 10 mm		0.450 for stroke 10 mm		0.800 for stroke 10 mm		–	–	–	–
SZ7...	0.050	0.013	0.080	0.018	0.110	0.022	0.160	0.033	0.230	0.042	0.350	0.059	0.500	0.080	0.900	0.108	1.300	0.138	2.100	0.213
SZ6...	0.050	0.013	0.080	0.018	0.110	0.022	0.160	0.033	0.230	0.042	0.350	0.059	0.500	0.080	0.900	0.108	1.300	0.138	2.100	0.213
SZD6...	0.060	0.015	0.100	0.022	0.140	0.028	0.200	0.042	0.280	0.051	0.430	0.075	0.640	0.104	1.060	0.133	1.560	0.176	2.540	0.276
SZV6...	–	–	–	–	0.220	0.024	0.280	0.036	0.350	0.046	0.480	0.065	0.650	0.090	1.200	0.115	–	–	–	–

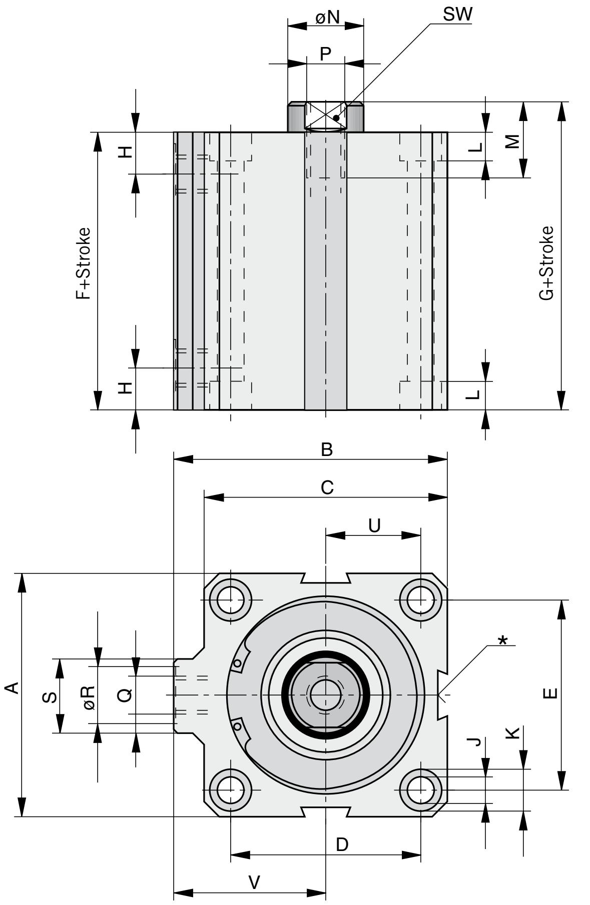
* 1 = Weight for cylinder with 10 mm stroke
2 = Weight per additonal 10 mm stroke length
for series SZK3... stroke see table

Dimensions – Cylinder, Series SZ7…., Ø 12 – 100 mm



* are omitted for cyl. Ø12 to 20 mm

Dimensions – Cylinder, Series SZ6…., Ø 12 – 100 mm



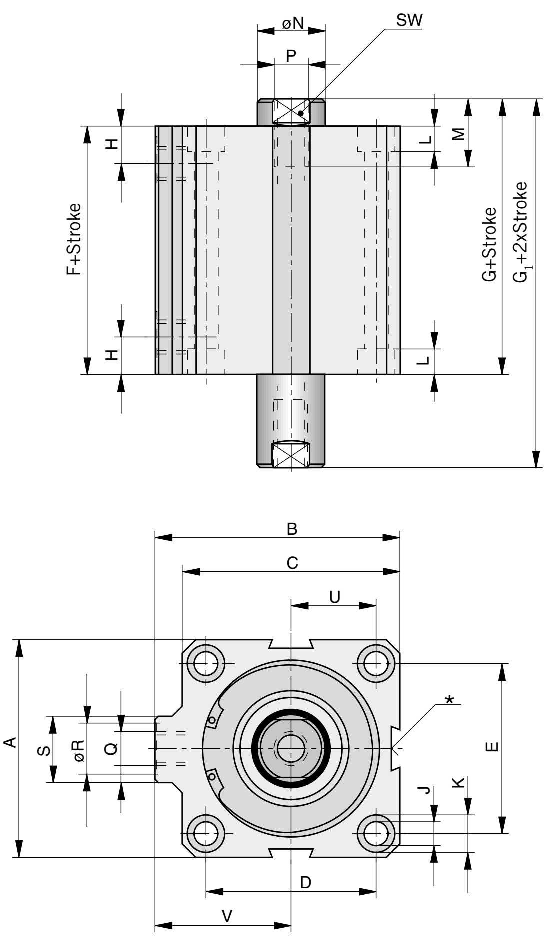
* are omitted for cyl. Ø12 to 20 mm

Dimension Table (mm), dimensions depending on stroke – Series SZ7…, SZ6…, SZD6…, SZV…,

Cyl. Ø	Standard stroke lenghts (mm) SZ7…	Standard stroke lenghts (mm) SZ6…	F+stroke SZ7…	G+stroke SZ7…	F+stroke SZ6… SZV6…**	G+stroke SZ6… SZV6…**	F+Hub SZD6…	G+stroke SZD6…	G_1+2xstroke SZD6…
12	5/10	5/10	34	38.5	34	38.5	34	38.5	43
16	5/10	5/10/15/25	34.5	40	34.5	40	34.5	40	45.5
16	15/25	–	44.5	50	–	–	–	–	–
20	5/10	5/10/15/25/50	36	42	36	42	36	42	48
20	15/25	–	46	52	–	–	–	–	–
25	5/10	5/10/15/25/50	38.5	45	38.5	45	38.5	45	51.5
25	15/25	–	48.5	55	–	–	–	–	–
32	5/10/15/25	5/10/15/25/50/80	39	45.5	39	45.5	39	45.5	52.5
40	5/10/15/25	5/10/15/25/50/80	41.5	48.5	41.5	48.5	41.5	48.5	55.5
50	10/15/25	10/15/25/50/80	45	53.5	45	53.5	45	53.5	61.5
63	10/15/25	10/15/25/50/80	52.5	60.5	52.5	60.5	52.5	60.5	69.5
80	10/15/25	10/15/25/50/80	57	66.5	57	66.5	57	66.5	76
100	10/15/25	10/15/25/50/80	58.5	69.5	58.5	69.5	58.5	69.5	80.5

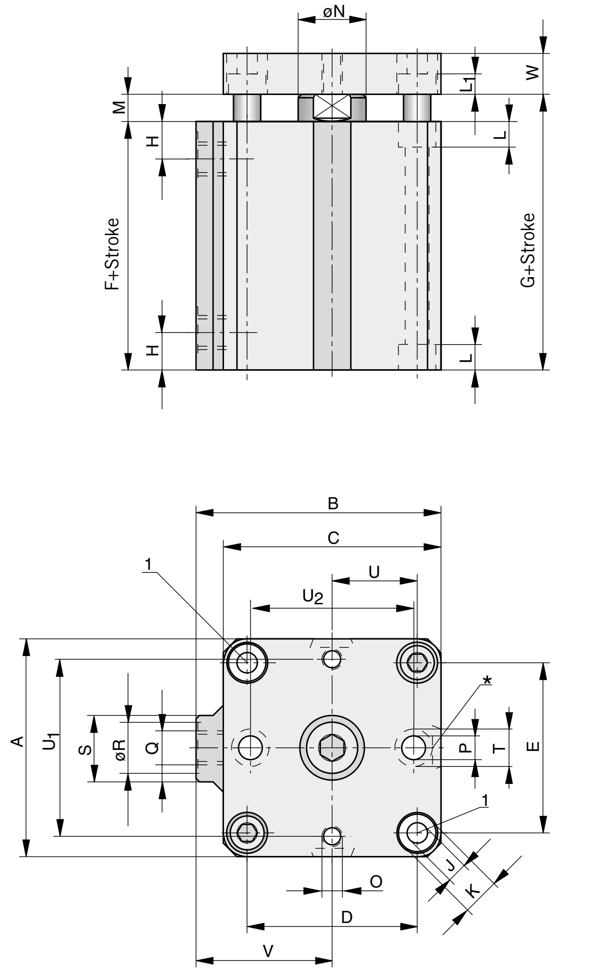
** only Ø20 – 63 mm

Dimensions – Cylinder, Series SZD6...., Ø 12 – 100 mm



* are omitted for cyl. Ø12 to 20 mm

Dimensions – Cylinder, Series SZV6...., Ø 20 – 63 mm

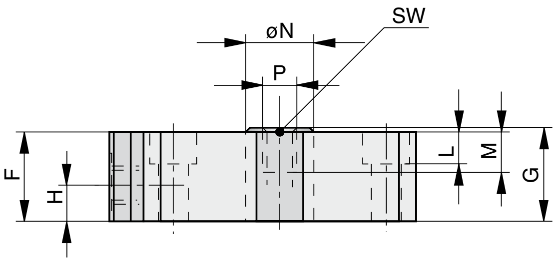


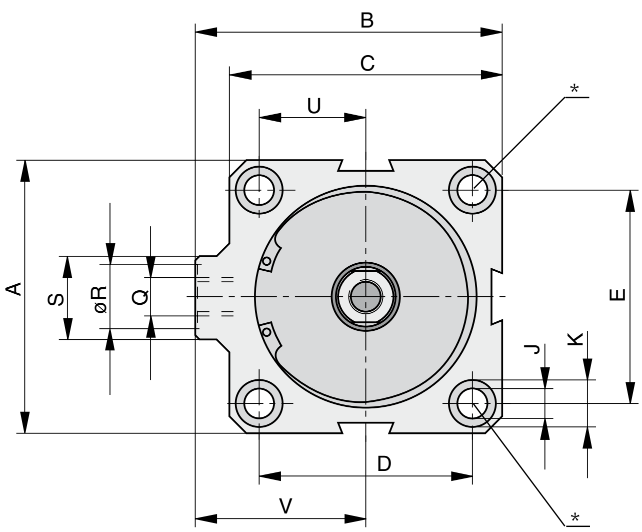
* is omitted for cyl. Ø 20 mm
[1)] Mounting holes for cylinder

Dimension Table (mm), general dimensions – Series SZ7..., SZ6..., SZD6..., SZV...,

Cyl. Ø	A	B	C	D	E	H	ØJ	ØK	L	L_1	M	ØN	P	Q	ØR	S	U	V	W	SW
12	23	27	25	17.4	13	10	4.0	6	3.5	–	6	6	M3	M5	8	11	8.6	14.5	–	5
16	28	30	28	20	20	10.5	4.0	6	3.5	–	8	8	M4	M5	8	11	10	16	–	6
20	32	34	32	22	22	11	4.5	7.5	4.8	5	8	10	M5	M5	8	11	11	18	8	8
25	37	44	39	28	26	11.5	4.5	7.5	4.8	5	12	12	M6	G1/8	15	19	14	24.5	8	10
32	45	52	48	36	32	11.5	5.5	10	5.8	6	12	12	M8	G1/8	15	19	18	28	10	10
40	55	59	55	41	41	12.5	6.7	11	6.8	6	12	16	M8	G1/8	15	19	20.5	31.5	10	13
50	64	72	64	50	50	13.5	6.7	11	6.8	7	17.5	20	M10	G1/8	15	19	25	40	12	17
63	80	88	80	62	62	15.5	8.5	14	8.3	9	17.5	20	M12	G1/8	15	23	31	48	12	17
80	94	104	94	73	73	16	8.5	14	8.3	–	25	25	M16	G1/4	19	23	36.5	57	–	22
100	117	125.5	117	90.5	90.5	16	10.5	18	11	–	28	32	M20	G1/4	19	23	45.25	67	–	27

Dimensions – Cylinder, Series SZK3…, Ø 32, 50, 63 mm





* is omitted for cyl. Ø32 mm

Series	A	B	C	D	E	F	G	H	J	K	L	M	ØN	Q	P	ØR	S	U	V	SW
SZK3032/5	45	52	48	–	32	27	28	8.5	5.5	10	5.7	12	12	G1/8	M6	15	19	18	28	10
SZK3032/10	45	52	48	–	32	32	33	8.5	5.5	10	5.7	12	12	G1/8	M6	15	19	18	28	10
SZK3050/10	64	72	64	50	50	30	31	8.5	6.7	11	6.8	12	16	G1/8	M8	15	19	25	40	13
SZK3063/10	80	88	80	62	62	35	36	8.5	8.5	14	8.3	12	16	G1/8	M8	15	23	31	48	13

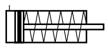
Accessories

Magnetic Switch

Page 149

Piston force and air consumption see page 9, order instructions see page 83, 84

Order Instructions – Cylinder, Series SZ7...., Ø 12 – 100 mm

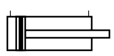
System	Symbol	Piston-Ø	Order Instructions	
			Type	Order-No.
Single acting without cushioning For contactless position sensing		12	SZ7012/..	PA67330-....
		16	SZ7016/..	PA67340-....
		20	SZ7020/..	PA67350-....
		25	SZ7025/..	PA67360-....
		32	SZ7032/..	PA58160-....
		40	SZ7040/..	PA59070-....
		50	SZ7050/..	PA60140-....
		63	SZ7063/..	PA61090-....
		80	SZ7080/..	PA62100-....
		100	SZ7100/..	PA63010-....

Complete Stroke Length (mm) (4-digit)

Standard Stroke Lengths

Cyl. Ø	Stroke Lengths (mm)
12	5, 10
16, 20, 25, 32, 40	5, 10, 15, 25
50, 63, 80, 100	10, 15, 25

Order Instructions – Cylinder, Series SZ6...., Ø 12 – 100 mm

System	Symbol	Piston-Ø	Order Instructions	
			Type	Order-No.
Double acting without cushioning For contactless position sensing		12	SZ6012/..	PA67290-....
		16	SZ6016/..	PA67300-....
		20	SZ6020/..	PA67310-....
		25	SZ6025/..	PA67320-....
		32	SZ6032/..	PA58150-....
		40	SZ6040/..	PA59060-....
		50	SZ6050/..	PA60150-....
		63	SZ6063/..	PA61100-....
		80	SZ6080/..	PA62090-....
		100	SZ6100/..	PA63000-....

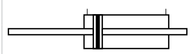
Complete Stroke Length (mm) (4-digit)

Standard Stroke Lengths

Cyl. Ø	Stroke Lengths (mm)
12	5, 10
16	5, 10,15, 25
20, 25	5, 10, 15, 25, 50
32, 40	5, 10, 15, 25, 50, 80
50, 63, 80, 100	10, 15, 25, 50, 80

Further stroke lengths available on request.

Order Instructions – Cylinder, Series SZD6...., Ø 12 – 100 mm

System	Symbol	Piston-Ø	Order Instructions	
			Type	Order-No.
With through piston rod Double acting without cushioning For contactless position sensing		12	SZD6012/..	PA67610-....
		16	SZD6016/..	PA67620-....
		20	SZD6020/..	PA67630-....
		25	SZD6025/..	PA67640-....
		32	SZD6032/..	PA58230-....
		40	SZD6040/..	PA59150-....
		50	SZD6050/..	PA60220-....
		63	SZD6063/..	PA61160-....
		80	SZD6080/..	PA62120-....
		100	SZD6100/..	PA63030-....

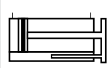
Complete Stroke Length (mm) (4-digit)

Standard Stroke Lengths

Cyl. Ø	Stroke Lengths (mm)
12	5, 10
16	5, 10, 15, 25
20, 25	5, 10, 15, 25, 50
32, 40	5, 10, 15, 25, 50, 80
50, 63, 80, 100	10, 15, 25, 50, 80

Further stroke lengths available on request.

Order Instructions – Cylinder, Series SZV6...., Ø 20 – 63 mm

System	Symbol	Piston-Ø	Order Instructions	
			Type	Order-No.
Non-rotating Double acting without cushioning For contactless position sensing		20	SZV6020/..	PA67370-....
		25	SZV6025/..	PA67380-....
		32	SZV6032/..	PA58190-....
		40	SZV6040/..	PA59100-....
		50	SZV6050/..	PA60130-....
		63	SZV6063/..	PA61080-....

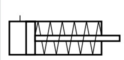
Complete Stroke Length (mm) (4-digit)

Standard Stroke Lengths

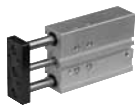
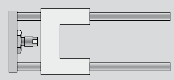
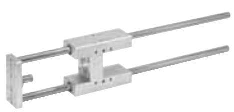
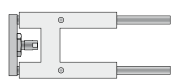
Cyl.Ø	Stroke Lengths (mm)
20, 25	5, 10, 15, 25, 50
32, 40	5, 10, 15, 25, 50, 80
50, 63, 80, 100	10, 15, 25, 50, 80

Further stroke lengths available on request.

Order Instructions – Cylinder, Series SZK3...., Ø 32, 50, 63 mm

System	Symbol	Piston-Ø	Order Instructions	
			Type	Order-No.
Single acting		32	SZK3032/5	PD35344-0005
		32	SZK3032/10	PD35344-0010
		50	SZK3050/10	PD35331-0010
		63	SZK3063/10	PD35346-0010

Overview

System	Fig.	Symbol	Series	Page
Non-rotating Double acting without cushioning For contactless position sensing			FZG6... FZK6...	86-99
Linear guide, U-Form for cylinders to ISO15552, ISO6432 Ø 8-100 mm			FEUG..	100-106
Linear guide, H-Form for cylinders to ISO15552 Ø 32-100 mm			FEHG... FEHK...	107-112

Guided Cylinders

Series
*FZG6... **
*FZK6...***
Ø 20-50 mm

* Guided Cylinders with Sliding Guidance
** Guided Cylinders with Recirculating Ball Bearing Guidance

Linear Guides

Series
*FEUG...**
*FEHG...**
*FEHK...***
Ø 8 – 100 mm

* Linear Guide – with plain bearings
** Linear Guide – with ball bearings

Guided Cylinder

Series
*FZG6...**
*FZK6...***
Ø 20-50 mm

* Guided Cylinders with Sliding Guidance
** Guided Cylinders with Recirculating Ball Bearing Guidance

Depending on stroke length, one or more magnetic switches can be mounted in the slots in the cylinder profile for contactless position sensing of the end and intermediate piston positions.
Especially recommended are RST or EST magnetic switches which can be directly fitted in the T-slots in the cylinder.

Included in delivery:
1 guided cylinder
4 centring bushes (see table)
2 screw plugs, replaceable, preassembled

Cylinder switches are not included - please order separately.

Characteristics

Characteristics	Symbol	Unit	Description				
General							
Type			Guided cylinder				
Series			FZG/FZK				
System FZG6..., FZK6...			Double-acting without end FZG6..., FZK6... cushioning for contactless position sensing				
Connection			See dimensional drawings				
Connection			Thread				
Ambient temperature range	$T_{min/max}$ $T_{min/max}$	°C °C	FZG: -20 to +80 FZK: -5 to +60		Note: When using below freezing point (°C) it is necessary to consult us		
Medium temperature range	T_{max}	°C	+80				
Weight (Mass)			See Table				
Installation			In any position				
Medium			Filtered and lubricated or filtered, unlubricated compressed air				
Lubrication			Initial lubrication with grease during assembly				
Materials							
Housing			Aluminium, anodized				
Front/rear end cap			Aluminium, anodized				
Piston rod			Steel, high-alloy				
Carrier plate			Aluminium, high-strength, anodized				
Guide rod			FZG: steel, high-alloy FZK: steel, brushed				
Pneumatic Characteristics							
Nominal pressure	p_n	bar	6				
Operating pressure range							
Ø 20	$p_{min/max}$	bar	2 – 10				
Ø 25-40			1,5 – 10				
Ø 50			1 – 10				
Piston diameter		mm	20	25	32	40	50
Port size			M5	G1/8	G1/8	G1/8	G1/4
Piston rod diameter		mm	10	12	12	16	20
Guide rod diameter FZG		mm	14	16	20	20	25
Guide rod diameter FZK		mm	12	14	16	16	20
Stroke lengths		mm	See table order instructions page 99				
Net force and air consumption			See page 9				
Cushioning			Elastomer cushioning at both ends				
Lateral force Torque	max.	N Nm	See diagrams				

Number of Centring Bushes FZG / FZK

Type	FZ-020	FZ-025	FZ-032	FZ-040	FZ-050
AH-7	2	2	-	-	-
AH-9	2	2	2	2	-
AH-12	-	-	2	2	4

Weight and Moving Mass

Guided Cylinders with Sliding Guidance - Series FZG

Weight (Mass) [kg]

Stroke [mm]	Size [mm]				
	Ø 20	Ø 25	Ø 32	Ø 40	Ø 50
10	–	–	–	–	–
20	0.594	0.950	1.375	–	–
25	0.632	1.030	1.425	1.690	2.668
30	0.672	1.047	1.515	–	–
40	0.853	1.185	1.666	–	–
50	0.945	1.295	1.815	2.110	3.320
80	1.192	1.620	2.324	2.718	4.266
100	1.354	1.830	2.612	3.057	4.762
125	–	–	3.066	3.575	5.562
160	–	–	3.628	4.182	6.478
200	–	–	4.225	4.897	7.527

Moving Mass [kg]

Stroke [mm]	Size [mm]				
	Ø 20	Ø 25	Ø 32	Ø 40	Ø 50
10	–	–	–	–	–
20	0.303	0.453	0.735	–	–
25	0.317	0.471	0.763	0.860	1.474
30	0.332	0.489	0.791	–	–
40	0.421	0.556	0.847	–	–
50	0.451	0.592	0.903	1.017	1.719
80	0.538	0.701	1.156	1.291	2.169
100	0.597	0.774	1.268	1.416	2.365
125	–	–	1.502	1.668	2.758
160	–	–	1.698	1.888	3.102
200	–	–	1.922	2.139	3.495

Guided Cylinders with Recirculating Ball Bearing Guidance - Series FZK

Weight (Mass) [kg]

Stroke [mm]	Size [mm]				
	Ø 20	Ø 25	Ø 32	Ø 40	Ø 50
10	–	–	–	–	–
20	0.544	0.848	1.192	–	–
25	0.583	0.887	1.241	1.494	2.380
30	0.622	0.940	1.305	–	–
40	0.766	1.062	1.440	–	–
50	0.845	1.163	1.573	1.877	2.935
80	1.078	1.464	2.019	2.404	3.766
100	1.225	1.660	2.274	2.698	4.207
125	–	–	2.656	3.150	4.880
160	–	–	3.120	4.201	5.701
200	–	–	3.650	4.315	6.632

Moving Mass [kg]

Stroke [mm]	Size [mm]				
	Ø 20	Ø 25	Ø 32	Ø 40	Ø 50
10	–	–	–	–	–
20	0.257	0.387	0.564	–	–
25	0.268	0.402	0.584	0.680	1.161
30	0.280	0.417	0.603	–	–
40	0.347	0.469	0.642	–	–
50	0.370	0.498	0.681	0.795	1.340
80	0.440	0.586	0.852	0.987	1.655
100	0.486	0.644	0.931	1.079	1.798
125	–	–	1.088	1.254	2.072
160	–	–	1.225	1.415	2.323
200	–	–	1.381	1.598	2.610

Speeds

Piston diameter [mm]	Ø 20	Ø 25	Ø 32	Ø 40	Ø 50
Stroke [mm]	100	100	200	200	200
Extension speed max. (v_{maxA}) [m/s]	0.8	0.8	0.8	0.8	0.6
Retraction speed max. (v_{maxL}) [m/s]	0.8	0.8	0.8	0.8	0.6

End Cushioning

Drives with end cushioning designation „2000/6000“ are fitted with an elastomer end cushioning system. The permissible impact and residual forces shown below must not be exceeded; they are valid for specific mass/speed combinations (for calculation principles, see below).

Shock-Absorbing Capability of the Elastomer End Cushioning

The permissible kinetic impact or residual energy at the end stop must not be exceeded, otherwise mechanical failure of the cylinder can occur (deformation, breakage, change in running characteristics). The permissible kinetic impact energy is calculated with the following formula:

$$E_{per} = \frac{1}{2}(m_{own} + m_{load}) \times v^2$$

E_{per} = permissible kinetic impact energy [Nm]

m_{own} = moving own mass [kg]

m_{load} = moving load mass [kg]

v = impact speed [m/s]

From this value the permissible operating conditions can be calculated with the following forms of the equation:

Permissible impact speed:

$$v_{per} = \frac{2 \times E_{per}}{m_{own} + m_{load}}$$

Maximum permissible mass:

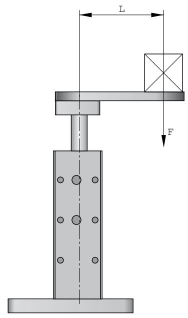
$$m_{load} = \frac{2 \times E_{per}}{v^2} - m_{own}$$

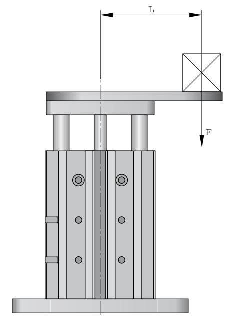
Piston diameter (mm)	Ø 20	Ø 25	Ø 32	Ø 40	Ø 50
E_{per}(Nm)	0.14	0.35	0.40	0.52	0.64

Permissible Lateral Load for Series FZG (Guided Cylinder with Sliding Guidance)

Permissible Loading in dependence on Lever Arm/Net Load

Application Example: Lifting Cylinder

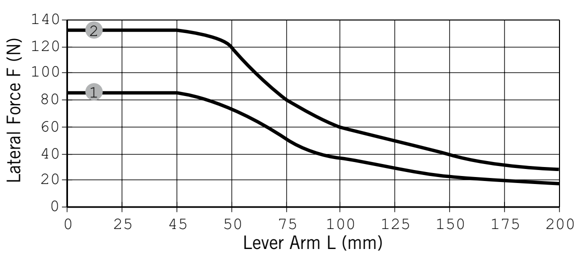




F = lateral force (N)
L = lever arm (mm)

Series FZG6020 / 6025 (Stroke 30 mm)

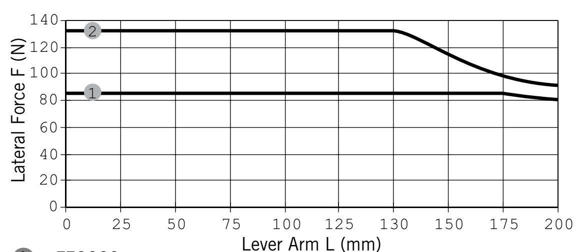
Series	Lever Arm L (mm)									
	0	25	45	50	75	100	125	150	175	200
	Lateral Force F (N)									
1 FZG6020	85	85	85	70	49	37	30	23	20	18
2 FZG6025	132	132	132	120	80	60	49	40	33	30



1 = FZG020
2 = FZG025

Series FZG6020 / 6025 (Stroke 40 - 100 mm)

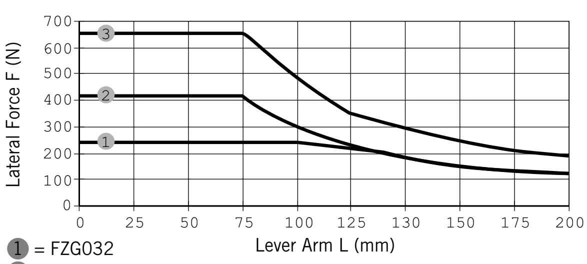
Series	Lever Arm L (mm)									
	0	25	50	75	100	125	130	150	175	200
	Lateral Force F (N)									
1 FZG6020	85	85	85	85	85	85	85	85	85	79
2 FZG6025	132	132	132	132	132	132	132	112	98	88



1 = FZG020
2 = FZG025

Series FZG6032, 6040, 6050 (Stroke 50 mm)

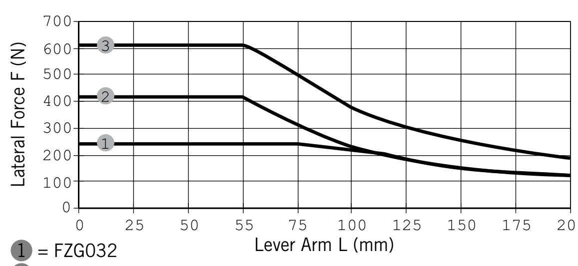
Series	Lever Arm L (mm)									
	0	25	50	55	75	100	125	150	175	200
	Lateral Force F (N)									
1 FZG6032	240	240	240	240	240	220	180	150	130	120
2 FZG6040	410	410	410	410	300	220	180	150	130	120
3 FZG6050	650	650	650	650	500	350	300	250	210	190



1 = FZG032
2 = FZG040
3 = FZG050

Series FZG6032, 6040, 6050 (Stroke 80 - 100 mm)

Series	Lever Arm L (mm)									
	0	25	50	55	75	100	125	150	175	200
	Lateral Force F (N)									
1 FZG6032	240	240	240	240	240	220	180	150	130	120
2 FZG6040	410	410	410	410	300	220	180	150	130	120
3 FZG6050	610	610	610	610	500	370	300	250	210	190

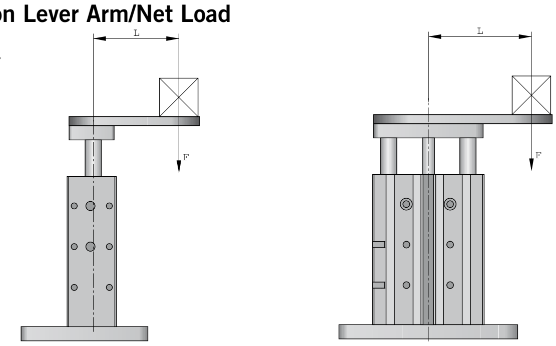


1 = FZG032
2 = FZG040
3 = FZG050

Permissible Lateral Load for Series FZK (Guided Cylinder with Recirculating Ball Bearing Guidance)

Permissible Loading in dependence on Lever Arm/Net Load

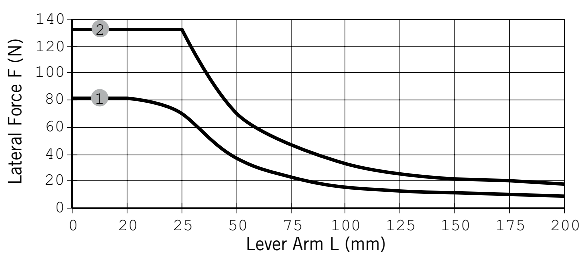
Application Example: Lifting Cylinder



F = lateral force (N)
L = lever arm (mm)

Series FZK6020 / 6025 (Stroke 30 mm)

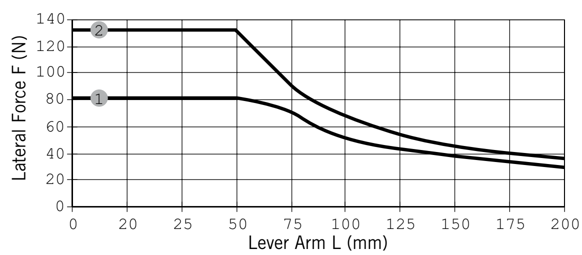
Series		Lever Arm L (mm)									
		0	20	25	50	75	100	125	150	175	200
		Lateral Force F (N)									
1	FZK6020	82	82	70	37	23	18	13	11	10	9
2	FZK6025	132	132	132	70	47	33	28	22	20	18



1 = FZK020
2 = FZK025

Series FZK6020 / 6025 (Stroke 40 - 100 mm)

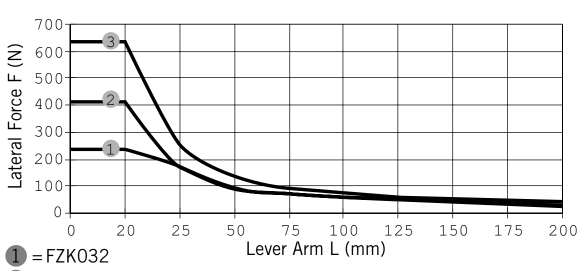
Series		Lever Arm L (mm)									
		0	20	25	50	75	100	125	150	175	200
		Lateral Force F (N)									
1	FZK6020	82	82	82	82	70	50	40	37	30	27
2	FZK6025	132	132	132	132	90	66	52	45	38	35



1 = FZK020
2 = FZK025

Series FZK6032, 6040, 6050 (Stroke 50 mm)

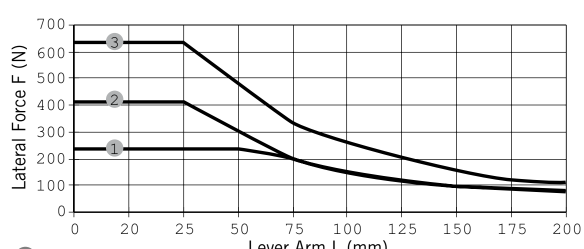
Series		Lever Arm L (mm)									
		0	20	25	50	75	100	125	150	175	200
		Lateral Force F (N)									
1	FZK6032	240	240	175	85	75	65	50	48	40	25
2	FZK6040	420	420	160	85	75	65	50	48	40	25
3	FZK6050	650	650	250	125	90	80	60	52	50	48



1 = FZK032
2 = FZK040
3 = FZK050

Series FZK6032, 6040, 6050 (Stroke 80 - 100 mm)

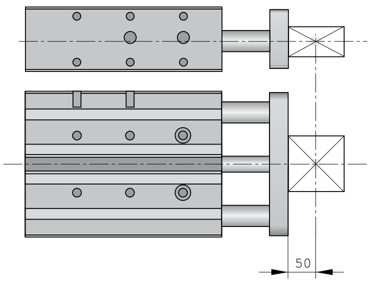
Series		Lever Arm L (mm)									
		0	20	25	50	75	100	125	150	175	200
		Lateral Force F (N)									
1	FZK6032	240	240	240	240	200	150	120	100	85	80
2	FZK6040	420	420	420	310	200	150	120	100	85	80
3	FZK6050	650	650	650	500	340	265	205	160	130	125



1 = FZK032
2 = FZK040
3 = FZK050

Maximum Net Load / permissible Torque – Series FZK and FZG

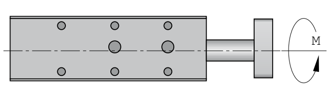
Maximum Net Load F [N] for Sliding and Recirculating Ball Bearing Guidance



Net load centre of gravity

Series	Piston-Ø	Maximum Net Load F (N) per stroke (mm)										
		10	20	25	30	40	50	80	100	125	160	200
FZG6020	20	–	67	64	61	110	103	86	77	–	–	–
FZK6020	20	–	45	39	35	91	88	80	75	–	–	–
FZG6025	25	–	121	116	112	123	115	96	86	–	–	–
FZK6025	25	–	88	86	84	100	97	89	85	–	–	–
FZG6032	32	–	188	180	173	161	150	166	150	168	146	127
FZK6032	32	–	120	118	116	112	109	134	128	144	135	126
FZG6040	40	–	–	180	–	–	150	166	150	168	146	127
FZK6040	40	–	–	118	–	–	109	134	128	144	135	126
FZG6050	50	–	–	257	–	–	216	234	212	229	200	174
FZK6050	50	–	–	182	–	–	168	201	193	211	199	188

Maximum Torsion Load M [Nm] for Sliding and Recirculating Ball Bearing Guidance



Torsion

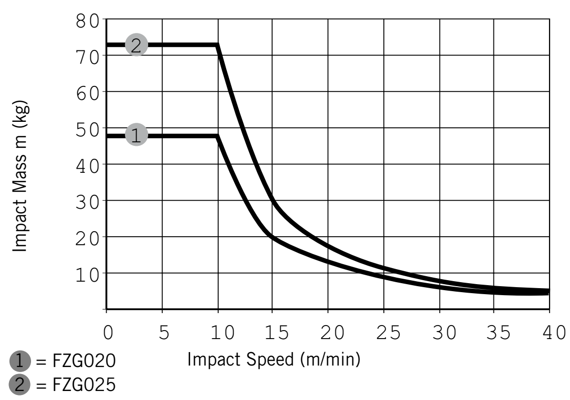
Series	Piston-Ø	Maximum Torsion Load M (Nm) per stroke (mm)										
		10	20	25	30	40	50	80	100	125	160	200
FZG6020	20	–	1.85	1.75	1.70	3.00	2.80	2.35	2.10	–	–	–
FZK6020	20	–	1.30	1.13	1.01	2.64	2.56	2.34	2.23	–	–	–
FZG6025	25	–	4.15	3.95	3.80	4.20	3.90	3.25	2.90	–	–	–
FZK6025	25	–	3.00	2.92	2.85	3.40	3.30	3.02	2.89	–	–	–
FZG6032	32	–	7.30	7.00	6.70	6.20	5.80	6.40	5.80	6.50	5.70	5.00
FZK6032	32	–	4.70	4.60	4.55	4.40	4.25	5.25	5.00	5.60	5.25	4.90
FZG6040	40	–	–	7.90	–	–	6.55	7.25	6.55	7.35	6.40	5.55
FZK6040	40	–	–	5.20	–	–	4.80	5.90	5.65	6.35	5.95	5.55
FZG6050	50	–	–	14.15	–	–	11.85	12.85	11.65	12.55	11.00	9.60
FZK6050	50	–	–	10.00	–	–	9.30	11.00	10.60	11.60	11.00	10.30

Permissible Impact Energy – Series FZG (Guided Cylinder with Sliding Guidance)

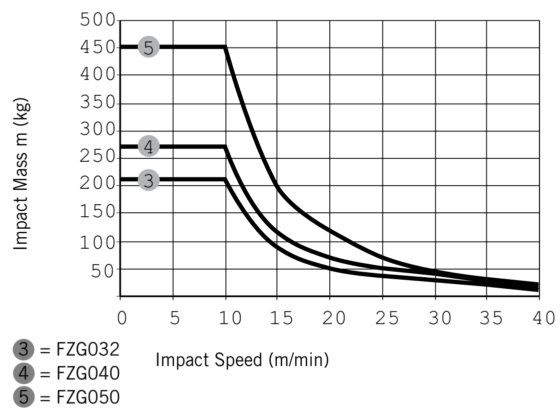
Application as Stop Cylinder / Only Sliding Guidance

Series	Impact Speed v [m/min]								
	0	5	10	15	20	25	30	35	40
	Impact Mass m [kg]								
1 FZG020	47	47	47	21	12	8	5	4	3
2 FZG025	75	75	75	31	18	12	8	6	4
3 FZG032	210	210	210	90	50	40	30	20	10
4 FZG040	270	270	270	110	70	50	40	25	15
5 FZG050	450	450	450	200	120	70	50	30	20

Permissible Impact Energy – Series FZG6020, FZG6025

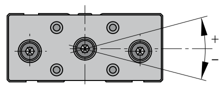


Permissible Impact Energy – Series FZG6032, FZG6040, FZG6050



Torsion Play of Recirculating Ball Bearing Guidance and Sliding Guidance (retracted mode, unloaded)

Series	Torsion Play [°]				
	Ø 20	Ø 25	Ø 32	Ø 40	Ø 50
FZG6000	0.09	0.09	0.07	0.06	0.05
FZK6000	0.08	0.08	0.07	0.05	0.05

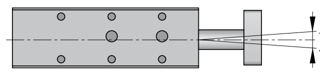


Torsion / Play for Series FZK and FZG

For accuracy of guidance, apart from torsion play, the torsion of the rod itself must be taken into account.

Deflection of Piston Rod with Sliding Guidance FZG and Recirculating Ball Bearing Guidance FZK (bearing play)

Series	Stroke [mm]	Deflection of Piston Rod				
		Ø 20	Ø 25	Ø 32	Ø 40	Ø 50
FZG6000	50	0.11	0.10	0.13	0.13	0.12
FZK6000	50	0.08	0.08	0.08	0.08	0.08



Deflection of Piston Rod through Bearing Play + Lateral Force General formula for the deflection of the piston rod under load is:

$$f = \frac{F_{load} \times L^3_{rod}}{6 \times E_{rod} \times I_{rod}}$$

F_{load} = lateral force applied

L_{rod} = free bending length of rod

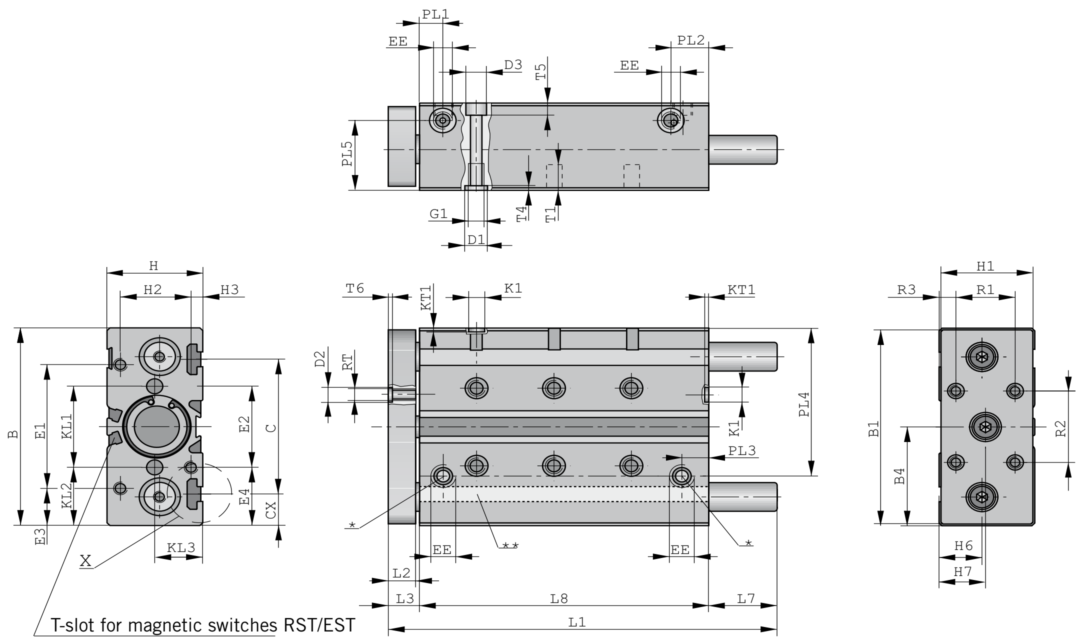
E_{rod} = modulus of elasticity of piston rod material

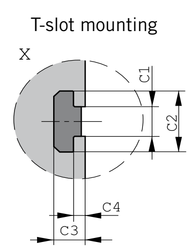
I_{rod} = surface torque of piston rod

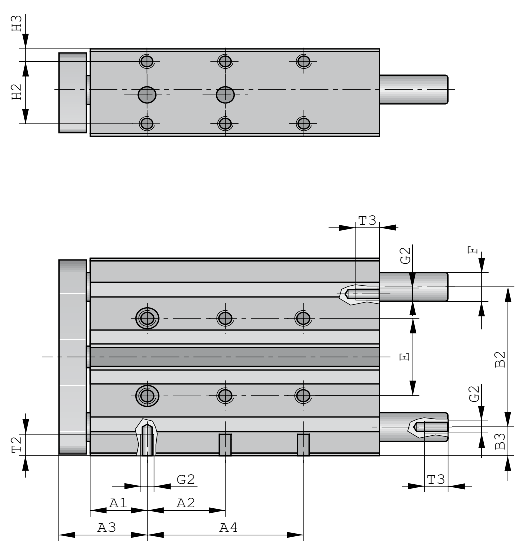
The total deflection of the piston rod is made up of the sum of:

– the deflection caused by bearing play and
– the deflection caused by rod distortion under load.

Dimensions - Series FZG6020 to 6032 and Series FZK6020 to 6032







* Screw plugs
** On Ø 20, dovetail slot on this side

Dimensions Table (mm) – Series FZK(G) 6020 to 6032

Stroke	External Dimensions																							
	L1			L2			L3			L7			L8			B			B1			B2		
	Ø20	Ø25	Ø32	Ø20	Ø25	Ø32	Ø20	Ø25	Ø32	Ø20	Ø25	Ø32	Ø20	Ø25	Ø32	Ø20	Ø25	Ø32	Ø20	Ø25	Ø32	Ø20	Ø25	Ø32
20	75	93	101	12	12	14	14	14	16	–	13.4	17	61	65.6	68	83	95	110	81	93	108	58	66	78
25	80	98	106							–	13.4	17	66	70.6	73									
30	85	103	111							–	13.4	17	71	75.6	78									
40	121	123	121							26	–	17	81	85.6	88									
50	131	133	131							26	–	17	91	95.6	98									
80	161	163	179							26	–	35	121	125.6	128									
100	181	183	199							26	–	35	141	145.6	148									
125	–	–	244							–	–	55	–	–	173									
160	–	–	279							–	–	55	–	–	208									
200	–	–	319							–	–	55	–	–	248									

Stroke	External Dimensions																							
	B3			B4			H			H1			H6			H7			F_{h6} (FZK)			F_{h8} (FZG)		
	Ø20	Ø25	Ø32	Ø20	Ø25	Ø32	Ø20	Ø25	Ø32	Ø20	Ø25	Ø32	Ø20	Ø25	Ø32	Ø20	Ø25	Ø32	Ø20	Ø25	Ø32	Ø20	Ø25	Ø32
20 to 200	12.5	13.5	16	41.5	47.5	55	36	44	49	34	42	47	17	20	22	18.5	24	23.5	12	14	16	14	16	20

Stro-ke	Mounting Dimensions																							
	E ±0.1			E1 ±0.1			E2 ±0.1			E3			E4			A1 ±0.1			A2 ±0.1			A3		
	Ø20	Ø25	Ø32	Ø20	Ø25	Ø32	Ø20	Ø25	Ø32	Ø20	Ø25	Ø32	Ø20	Ø25	Ø32	Ø20	Ø25	Ø32	Ø20	Ø25	Ø32	Ø20	Ø25	Ø32
20	30	35	43	–	64	70	74	35	45	–	15.5	20	4.5	30	32.5	26	26	29	–	–	–	40	40	45
25																			20	20	20			
30																			20	20	20			
40																			20	20	20			
50																			40	40	40			
80																			40	40	40			
100																			40	40	40			
125																					40			
160																					40			
200																					40			

Stro-ke	Mounting Dimensions																							
	A4 ±0.1			H2 ±0.1			H3			R1 ±0.1			R2 ±0.1			R3			RT			G1		
	Ø20	Ø25	Ø32	Ø20	Ø25	Ø32	Ø20	Ø25	Ø32	Ø20	Ø25	Ø32	Ø20	Ø25	Ø32	Ø20	Ø25	Ø32	Ø20	Ø25	Ø32	Ø20	Ø25	Ø32
20	–	–	–	–	31	37	4.5	6.5	6	20	20	30	30	40	40	7	12	8.5	M5	M6	M6	M6	M6	M8
25	–	–	–																					
30	30	–	–																					
40	–	–	–																					
50	–	–	–																					
80	–	–	–																					
100	80	80	80																					
125	–	–	80																					
160	–	–	120																					
200	–	–	160																					

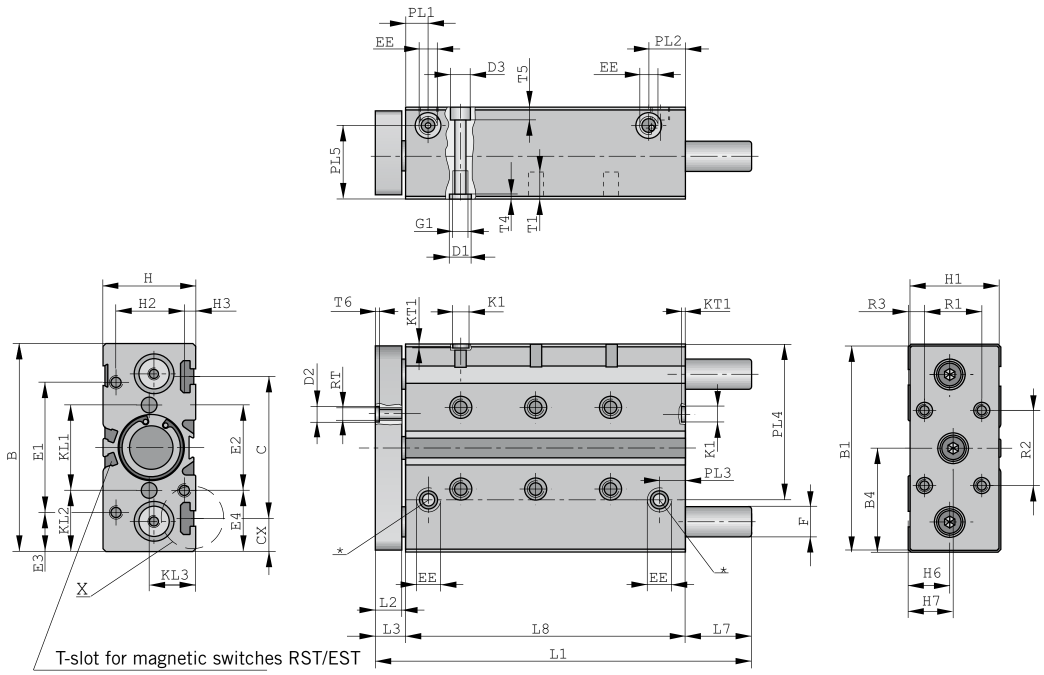
Stroke	Mounting Dimensions																	
	G2			T1			T2			T3			T5			ØD3		
	Ø20	Ø25	Ø32	Ø20	Ø25	Ø32	Ø20	Ø25	Ø32	Ø20	Ø25	Ø32	Ø20	Ø25	Ø32	Ø20	Ø25	Ø32
20 to 200	M5	M6	M6	12	14	15	10	12	10	10	12	12	5.7	5.7	6.8	9	9	11

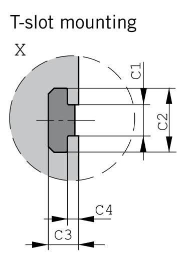
Stroke	Air Connection																	
	EE			PL1			PL2			PL3			PL4			PL5		
	Ø20	Ø25	Ø32	Ø20	Ø25	Ø32	Ø20	Ø25	Ø32	Ø20	Ø25	Ø32	Ø20	Ø25	Ø32	Ø20	Ø25	Ø32
20 to 200	M5	G1/8	G1/8	15.3	13.5	12.2	12	17	19.5	12	13	13.5	55	70	81	29	35	39

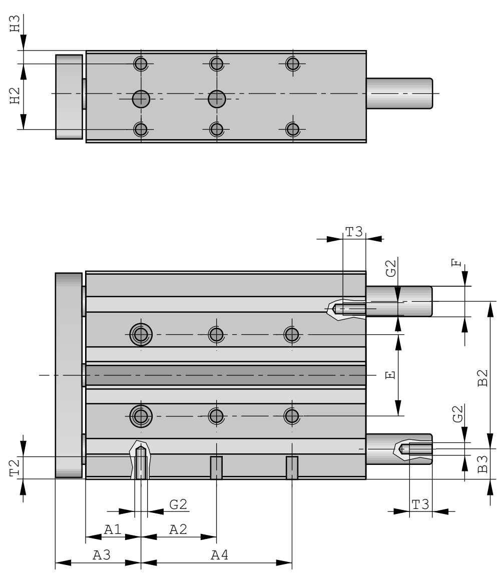
Stroke	T-Slot Mounting																	
	C			C1			C2			C3			C4			CX		
	Ø20	Ø25	Ø32	Ø20	Ø25	Ø32	Ø20	Ø25	Ø32	Ø20	Ø25	Ø32	Ø20	Ø25	Ø32	Ø20	Ø25	Ø32
20 to 200	55	66	75	6.15	8.2	8.2	12	16.7	16.7	5.5	8	8	1,2	3	3	17.5	14.5	17.5

Stroke	Centring Bush Holes																									
	$ØD1^{H7}$			$ØD2^{H7}$			$ØK1^{H7}$			KL1			KL2			KL3			KT1			T4			T6		
	Ø20	Ø25	Ø32	Ø20	Ø25	Ø32	Ø20	Ø25	Ø32	Ø20	Ø25	Ø32	Ø20	Ø25	Ø32	Ø20	Ø25	Ø32	Ø20	Ø25	Ø32	Ø20	Ø25	Ø32	Ø20	Ø25	Ø32
20 to 200	9	9	12	9	9	9	7	7	9	31	37	45	26	29	32.5	18	22	24.5	1.6	1.6	2.1	2.1	2.1	2.6	2.1	2.1	2.1

Dimensions – Series FZG6040 / 6050 and Series FZK6040 / 6050







* Screw plugs

Dimensions Table (mm) – Series FZK(K) 6040 and 6050

Stroke	External Dimensions															
	L1		L2		L3		L7		L8		B		B1		B2	
	Ø40	Ø50	Ø40	Ø50	Ø40	Ø50	Ø40	Ø50	Ø40	Ø50	Ø40	Ø50	Ø40	Ø50	Ø40	Ø50
25	106	118	14	16	16	18	14	23	76	77	120	148	118	146	88	110
50	131	143					14	23	101	102						
80	179	194					32	44	131	132						
100	199	214					32	44	151	152						
125	244	259					52	64	176	177						
160	279	294					52	64	211	212						
200	319	334					52	64	251	252						

Stroke	External Dimensions															
	B3		B4		H		H1		H6		H7		F_{h6} (FZK)		F_{h8} (FZG)	
	Ø40	Ø50	Ø40	Ø50	Ø40	Ø50	Ø40	Ø50	Ø40	Ø50	Ø40	Ø50	Ø40	Ø50	Ø40	Ø50
25 to 200	16	19	60	74	54	64	52	62	24	29.5	26	29.7	16	20	20	25

Stroke	Mounting Dimensions															
	E ±0.1		E1 ±0.1		E2 ±0.1		E3		E4		A1 ±0.1		A2 ±0.1		A3	
	Ø40	Ø50	Ø40	Ø50	Ø40	Ø50	Ø40	Ø50	Ø40	Ø50	Ø40	Ø50	Ø40	Ø50	Ø40	Ø50
25	51	64	48	110	48	130	36	19	32.5	9	29	32	20	20	45	50
50													40	40		
80													40	40		
100													40	40		
125													40	40		
160													40	40		
200													40	40		

Stroke	Mounting Dimensions															
	A4 ±0.1		H2 ±0.1		H3		R1 ±0.1		R2 ±0.1		R3		RT		G1	
	Ø40	Ø50	Ø40	Ø50	Ø40	Ø50	Ø40	Ø50	Ø40	Ø50	Ø40	Ø50	Ø40	Ø50	Ø40	Ø50
25	–	–	42	50	6	7	30	40	50	60	16	12	M6	M8	M8	M8
50	–	–														
80	–	–														
100	80	80														
125	80	80														
160	120	120														
200	160	160														

Stroke	Mounting Dimensions											
	G2		T1		T2		T3		T5		ØD3	
	Ø40	Ø50	Ø40	Ø50	Ø40	Ø50	Ø40	Ø50	Ø40	Ø50	Ø40	Ø50
25 to 200	M8	M8	15	15	14	16	14	16	6.8	6.8	11	11

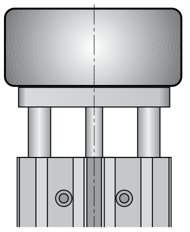
Stroke	Air Connection											
	EE		PL1		PL2		PL3		PL4		PL5	
	Ø40	Ø50	Ø40	Ø50	Ø40	Ø50	Ø40	Ø50	Ø40	Ø50	Ø40	Ø50
25 to 200	G1/8	G1/4	15.3	14	19.5	18.9	18.7	15	96	116.5	42	50.5

Stroke	T-Slot Mounting											
	C		C1		C2		C3		C4		CX	
	Ø40	Ø50	Ø40	Ø50	Ø40	Ø50	Ø40	Ø50	Ø40	Ø50	Ø40	Ø50
25 to 200	82	97	8.2	8.2	16.7	16.7	8	8	3	3	19	25.5

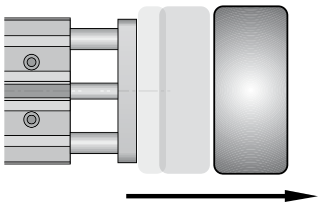
Stroke	Centring Bush Holes																	
	$ØD1^{H7}$		$ØD2^{H7}$		$ØK1^{H7}$		KL1		KL2		KL3		KT1		T4		T6	
	Ø40	Ø50	Ø40	Ø50	Ø40	Ø50	Ø40	Ø50	Ø40	Ø50	Ø40	Ø50	Ø40	Ø50	Ø40	Ø50	Ø40	Ø50
25 to 200	12	12	9	12	9	12	55	68	32.5	40	27	32	2.1	2.6	2.6	2.6	2.1	2.6

Applications

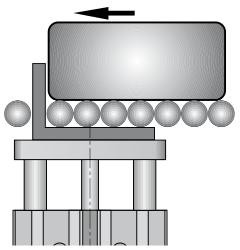
Lifting



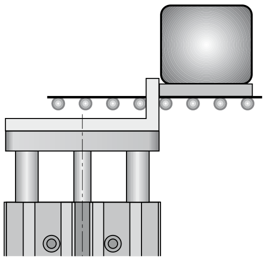
Pushing



Stopping

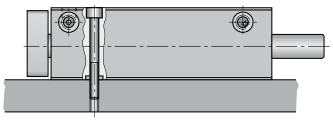


Stopping with Stop Bracket

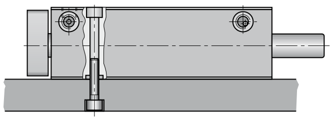


Mounting Possibilities

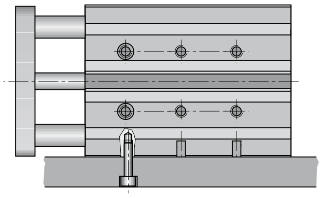
Flat mounting from above



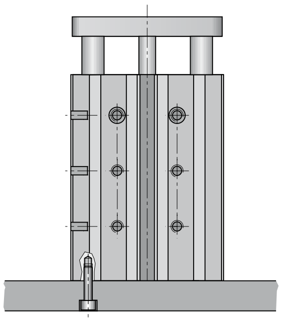
Flat mounting from below



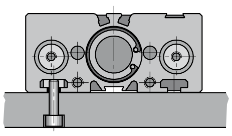
Side mounting



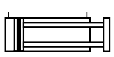
End face mounting



T-slot mounting



Order Instructions – Guided Cylinder FZK / FZG, Ø 20 – 50 mm

Cyl. Ø (mm)	Symbol	Stroke* (mm)	Order Instructions			
			with Sliding Guidance		with Ball Bearing Guidance	
			Type	Order-No.	Type	Order-No.
20		20	FZG6020/20	PA68240-0020	FZK6020/20	PA68250-0020
		25	FZG6020/25	PA68240-0025	FZK6020/25	PA68250-0025
		30	FZG6020/30	PA68240-0030	FZK6020/30	PA68250-0030
		40	FZG6020/40	PA68240-0040	FZK6020/40	PA68250-0040
		50	FZG6020/50	PA68240-0050	FZK6020/50	PA68250-0050
		80	FZG6020/80	PA68240-0080	FZK6020/80	PA68250-0080
		100	FZG6020/100	PA68240-0100	FZK6020/100	PA68250-0100
25		20	FZG6025/20	PA68260-0020	FZK6025/20	PA68270-0020
		25	FZG6025/25	PA68260-0025	FZK6025/25	PA68270-0025
		30	FZG6025/30	PA68260-0030	FZK6025/30	PA68270-0030
		40	FZG6025/40	PA68260-0040	FZK6025/40	PA68270-0040
		50	FZG6025/50	PA68260-0050	FZK6025/50	PA68270-0050
		80	FZG6025/80	PA68260-0080	FZK6025/80	PA68270-0080
		100	FZG6025/100	PA68260-0100	FZK6025/100	PA68270-0100
32		20	FZG6032/20	PA58640-0020	FZK6032/20	PA58650-0020
		25	FZG6032/25	PA58640-0025	FZK6032/25	PA58650-0025
		30	FZG6032/30	PA58640-0030	FZK6032/30	PA58650-0030
		40	FZG6032/40	PA58640-0040	FZK6032/40	PA58650-0040
		50	FZG6032/50	PA58640-0050	FZK6032/50	PA58650-0050
		80	FZG6032/80	PA58640-0080	FZK6032/80	PA58650-0080
		100	FZG6032/100	PA58640-0100	FZK6032/100	PA58650-0100
		125	FZG6032/125	PA58640-0125	FZK6032/125	PA58650-0125
		160	FZG6032/160	PA58640-0160	FZK6032/160	PA58650-0160
		200	FZG6032/200	PA58640-0200	FZK6032/200	PA58650-0200
40		25	FZG6040/25	PA59570-0025	FZK6040/25	PA59580-0025
		50	FZG6040/50	PA59570-0050	FZK6040/50	PA59580-0050
		80	FZG6040/80	PA59570-0080	FZK6040/80	PA59580-0080
		100	FZG6040/100	PA59570-0100	FZK6040/100	PA59580-0100
		125	FZG6040/125	PA59570-0125	FZK6040/125	PA59580-0125
		160	FZG6040/160	PA59570-0160	FZK6040/160	PA59580-0160
		200	FZG6040/200	PA59570-0200	FZK6040/200	PA59580-0200
50		25	FZG6050/25	PA60650-0025	FZK6050/25	PA60660-0025
		50	FZG6050/50	PA60650-0050	FZK6050/50	PA60660-0050
		80	FZG6050/80	PA60650-0080	FZK6050/80	PA60660-0080
		100	FZG6050/100	PA60650-0100	FZK6050/100	PA60660-0100
		125	FZG6050/125	PA60650-0125	FZK6050/125	PA60660-0125
		160	FZG6050/160	PA60650-0160	FZK6050/160	PA60660-0160
		200	FZG6050/200	PA60650-0200	FZK6050/200	PA60660-0200

*other strokes on request

Linear Guide, U-Form Ø 8-100 mm

for cylinders to ISO 15552 (ISO 6431), ISO6432

Series FEUG…

Version:
– with plain bearings

Supplied as follows:
Ø8 - 25mm:
for cylinders to ISO 6432

1 guide
1 mounting nut

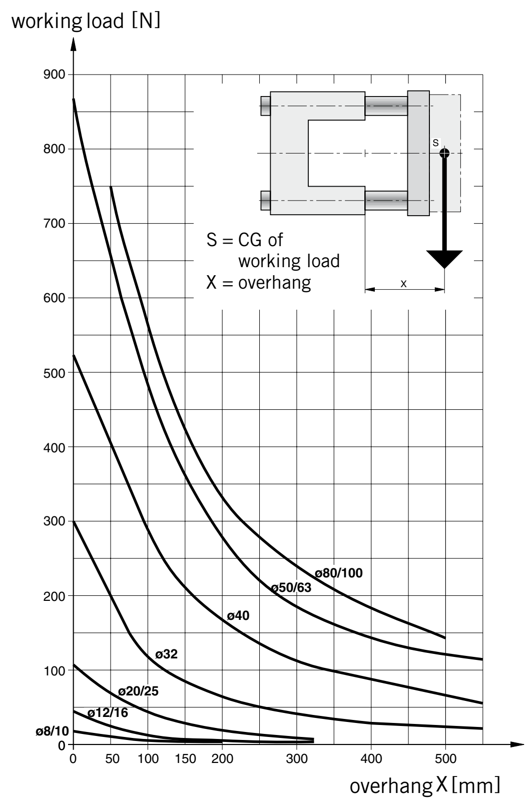
Ø32 bis 100mm:
for cylinders to ISO 15552 (ISO 6431)

1 guide
4 mounting nuts

Characteristics

Characteristics	Symbol	Unit	Description					
General Features								
Installation			In any position					
Temperature range	T_{min} T_{max}	°C °C	-20 +80					
Material								
Guide body			Aluminium, anodized					
Guide rods			Steel, corrosion-resistant					
Guide bushes			Sintered bronze					
Mounting plate			Aluminium, anodized					
Piston rod mounting			Steel, corrosion-resistant					
Weight (mass)		for cyl.	Ø8/10		Ø12/16		Ø20/25	
With 100mm stroke		kg	0.20		0.38		0.68	
Per further 100mm stroke		kg	0.05		0.08		0.13	
Weight (mass)		for cyl.	Ø32	Ø40	Ø50	Ø63	Ø80	Ø100
With 100mm stroke		kg	1.32	1.98	3.35	4.60	8.30	10.85
Per further 100mm stroke		kg	0.18	0.32	0.50	0.50	0.77	0.77

Maximum working load in relation to overhang - FEUG version with plain bearings



Deflection - FEUG version with plain bearings

Diagram 1 - Deflection with a working load of 10 N

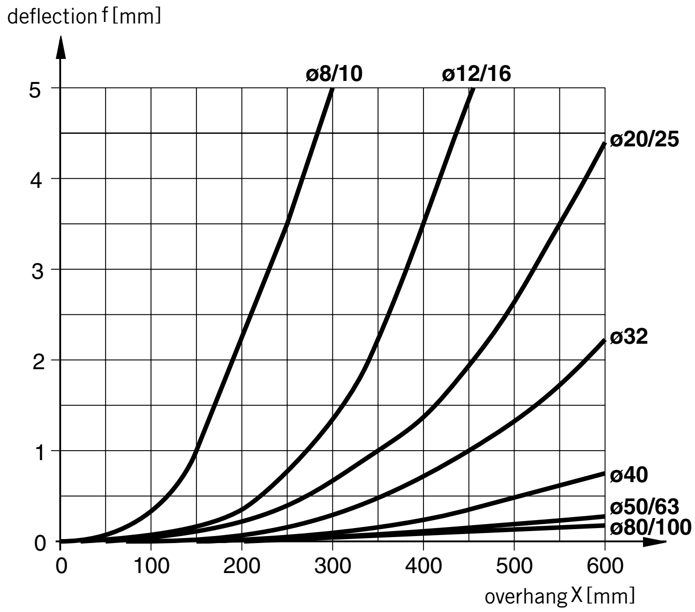
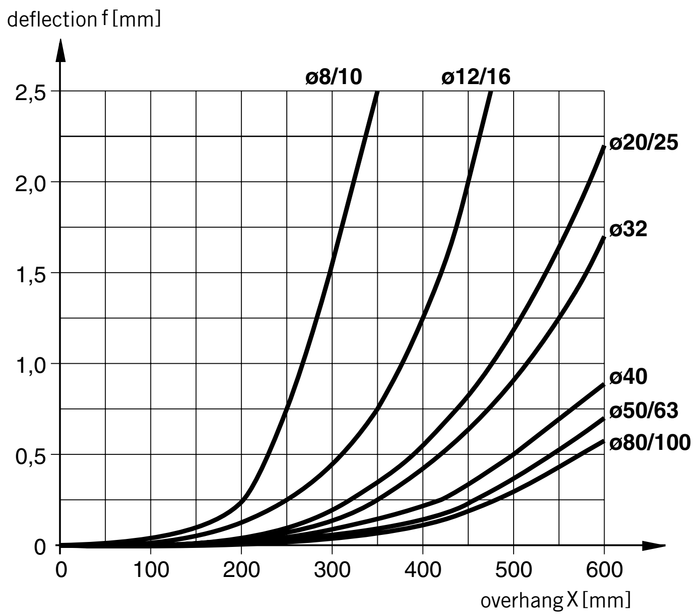
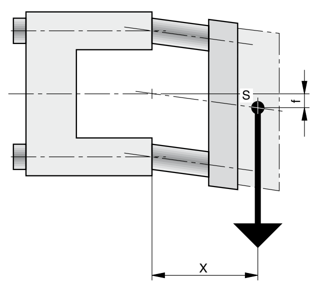


Diagram 2 - Deflection under own weight



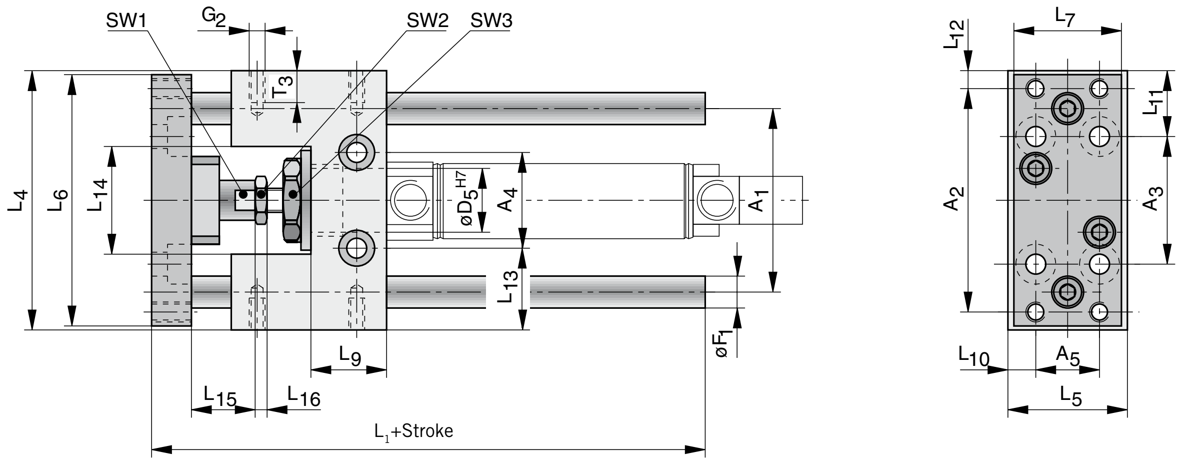


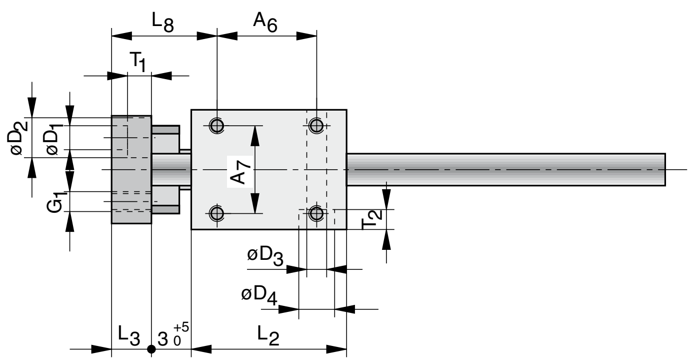
S = CG of working load
X = overhang
f = deflection

Deflection

The total deflection is the sum of the deflection under own weight (Diagram 2) and the deflection under load (Diagram 1).
The deflection for every 10 N load is shown in Diagram 1.

Dimensions of linear guides - for round cylinders ø 8 to 25 mm



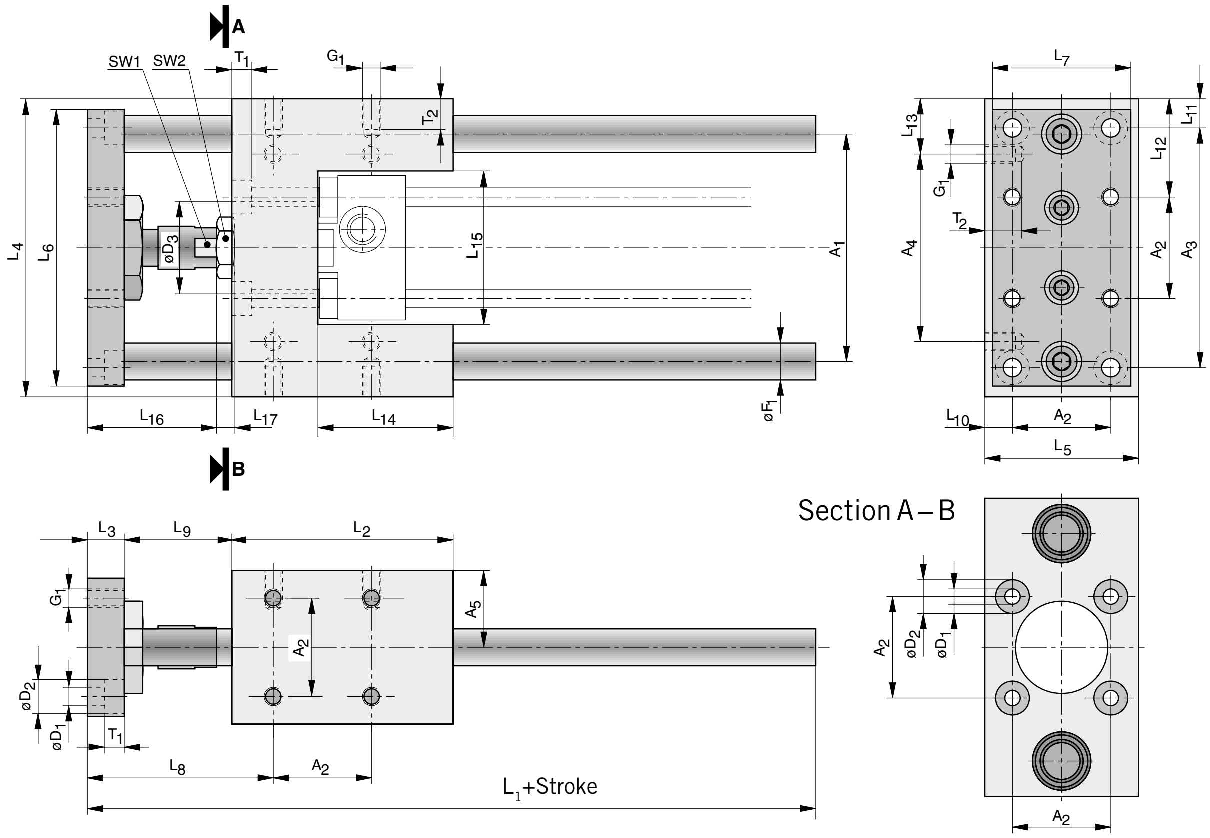


Dimensions table (mm) for linear guides - for round cylinders ø 8 - 25 mm

Type	Cylinder diameter					
	8	10	12	16	20	25
A_1	40	40	46	46	58	58
A_2	44	44	54	54	68	68
A_3	25	25	32	32	40	40
A_4	24	24	24	24	38	38
A_5	16	16	16	16	20	20
A_6	19	19	25	25	32.5	32.5
A_7	19	19	22	22	23	23
$ØD_1$	4.5	4.5	4.5	4.5	5.5	5.5
$ØD_2$	7.5	7.5	8	8	10	10
$ØD_3$	4.5	4.5	5.5	5.5	6.6	6.6
$ØD_4$	–	–	–	–	11	11
$ØD_5^{H7}$	12	12	16	16	22	22
$ØF_1$	6	6	8	8	10	10
G_1	M4	M4	M4	M4	M5	M5
G_2	M4	M4	M4	M4	M6	M6
L_1+stroke	60	60	69	69	85	85
L_2	35	35	39	39	55	55
L_3	10	10	10	10	12	12
L_4	56	56	65	65	79	79
L_5	26	26	30	30	34	34
L_6	54	54	63	63	76	76
L_7	25	25	27	27	32	32
L_8	21^{+5}_{0}	21^{+5}_{0}	19.5^{+5}_{0}	19.5^{+5}_{0}	24^{+5}_{0}	24
L_9	17	17	19	19	25	25
L_{10}	5.5	5.5	7.5	7.5	7	7
L_{11}	16	16	16.5	16.5	19.5	19.5
L_{12}	6	6	5.5	5.5	5.5	5.5
L_{13}	16	16	20.5	20.5	20.5	20.5
L_{14}	24	24	27	27	37	37
L_{15}	19	19	16	16	29	23
L_{16}	2.2	2.2	3.2	3.2	4	6
SW1	9	9	9	9	13	13
SW2	–	7*	10*	11*	13*	17*
SW3	15	15	19	19	27	27
T_1	4.6	4.6	4.6	4.6	5.7	5.7
T_2	–	–	–	–	7	7
T_3	8	8	8	8	14	14

* Nut sizes correspond to the sizes of the counternuts on the piston rods

Dimensions of linear guides - for standard cylinders ø 32 - 100 mm



Dimensions table (mm) for linear guides - for standard cylinders ø 32 - 100 mm

Type	Cylinder diameter					
	32	40	50	63	80	100
A_1	74	87	104	119	148	172
A_2	32.5	38	46.5	56.5	72	89
A_3	78	84	100	105	130	150
A_4	61	69	85	100	130	150
A_5	25	29	35	42.5	52.5	65
$ØD_1$	6.6	6.6	9	9	11	11
$ØD_2$	11	11	15	15	18	18
$ØD_3$	30	35	40	45	45	55
$ØF_1$	12	16	20	20	25	25
G_1	M6	M6	M8	M8	M10	M10
L_1+stroke	133	149	175	190	238	249
L_2	72	84	100	115	162	167
L_3	12	12	15	15	20	20
L_4	97	115	137	152	189	213
L_5	50	58	70	85	105	130
L_6	90	110	130	145	180	200
L_7	45	54	63	80	100	120
L_8	60.5^{+5}_{0}	63.5^{+5}_{0}	76^{+5}_{0}	76^{+5}_{0}	93^{+6}_{0}	95.5^{+6}_{0}
L_9	35^{+5}_{0}	41^{+5}_{0}	48^{+5}_{0}	48^{+5}_{0}	56^{+6}_{0}	56^{+6}_{0}
L_{10}	8.75	10.0	11.75	14.25	16.5	20.5
L_{11}	9.5	15.5	18.5	23.5	29.5	31.5
L_{12}	32.25	38.5	45.25	47.75	58.5	62
L_{13}	18	23	26	26	29.5	31.5
L_{14}	44	51	60	75	112	112
L_{15}	50.2	58.2	70.2	85.2	105.4	130.4
L_{16}	30	36	42	42	49	49
L_{17}	6	7	8	8	10	10
SW1	13	15	22	22	27	27
SW2	17	19	24	24	30	30
T_1	6.5	6.5	9	9	11	11
T_2	10	10	13	13	16	16

Order Instructions – Linear Guide FEUG.., Ø 8 – 40 mm

for Cyl. Ø (mm)	Stroke (mm)	Order Instructions	
		Typ	Bestell-Nr.
8, 10	25	FEUG8-10/25	PD38013-0025
	50	FEUG8-10/50	PD38013-0050
	100	FEUG8-10/100	PD38013-0100
12, 16	50	FEUG12-16/50	PD38014-0050
	100	FEUG12-16/100	PD38014-0100
	200	FEUG12-16/200	PD38014-0200
20	50	FEUG20/50	PD38015-0050
	100	FEUG20/100	PD38015-0100
	160	FEUG20/160	PD38015-0160
	200	FEUG20/200	PD38015-0200
	250	FEUG20/250	PD38015-0250
	400	FEUG20/400	PD38015-0400
25	50	FEUG25/50	PD38016-0050
	100	FEUG25/100	PD38016-0100
	160	FEUG25/160	PD38016-0160
	200	FEUG25/200	PD38016-0200
	250	FEUG25/250	PD38016-0250
	400	FEUG25/400	PD38016-0400
32	50	FEUG32/50	PD38017-0050
	100	FEUG32/100	PD38017-0100
	160	FEUG32/160	PD38017-0160
	200	FEUG32/200	PD38017-0200
	250	FEUG32/250	PD38017-0250
	320	FEUG32/320	PD38017-0320
40	50	FEUG40/50	PD38018-0050
	100	FEUG40/100	PD38018-0100
	160	FEUG40/160	PD38018-0160
	200	FEUG40/200	PD38018-0200
	250	FEUG40/250	PD38018-0250
	320	FEUG40/320	PD38018-0320

Order Instructions – Linear Guide FEUG.., Ø 50 – 100 mm

for Cyl. Ø (mm)	Stroke (mm)	Order Instructions	
		Typ	Bestell-Nr.
50	50	FEUG50/50	PD38019-0050
	100	FEUG50/100	PD38019-0100
	160	FEUG50/160	PD38019-0160
	200	FEUG50/200	PD38019-0200
	250	FEUG50/250	PD38019-0250
	320	FEUG50/320	PD38019-0320
63	50	FEUG63/50	PD38020-0050
	100	FEUG63/100	PD38020-0100
	160	FEUG63/160	PD38020-0160
	200	FEUG63/200	PD38020-0200
	250	FEUG63/250	PD38020-0250
	320	FEUG63/320	PD38020-0320
80	50	FEUG80/50	PD38021-0050
	100	FEUG80/100	PD38021-0100
	160	FEUG80/160	PD38021-0160
	200	FEUG80/200	PD38021-0200
	250	FEUG80/250	PD38021-0250
	320	FEUG80/320	PD38021-0320
100	50	FEUG100/50	PD38022-0050
	100	FEUG100/100	PD38022-0100
	160	FEUG100/160	PD38022-0160
	200	FEUG100/200	PD38022-0200
	250	FEUG100/250	PD38022-0250
	320	FEUG100/320	PD38022-0320

Characteristics

Characteristics	Symbol	Unit	Description					
General Features								
Installation			In any position					
Temperature range	T_{min} T_{max}	°C °C	-20 +80					
Material								
Guide body			Aluminium, anodized					
Guide rods			Steel, corrosion-resistant for FEHG version Steel, hardened for FEHK version					
Guide bushes			Sintered bronze for FEHG version Linear ball bearings for FEHK version					
Mounting plate			Aluminium, anodized					
Piston rod mounting			Steel, corrosion-resistant					
Weight (mass)		for Cyl.	Ø32	Ø40	Ø50	Ø63	Ø80	Ø100
With 100 mm stroke		kg	1.42	2.25	3.80	5.05	9.18	11.80
Per further 100 mm stroke		kg	0.18	0.28	0.55	0.55	0.77	0.77

Linear Guide, H-Form Ø 32-100 mm

for cylinders to ISO 15552 (ISO6431) 32-100 mm

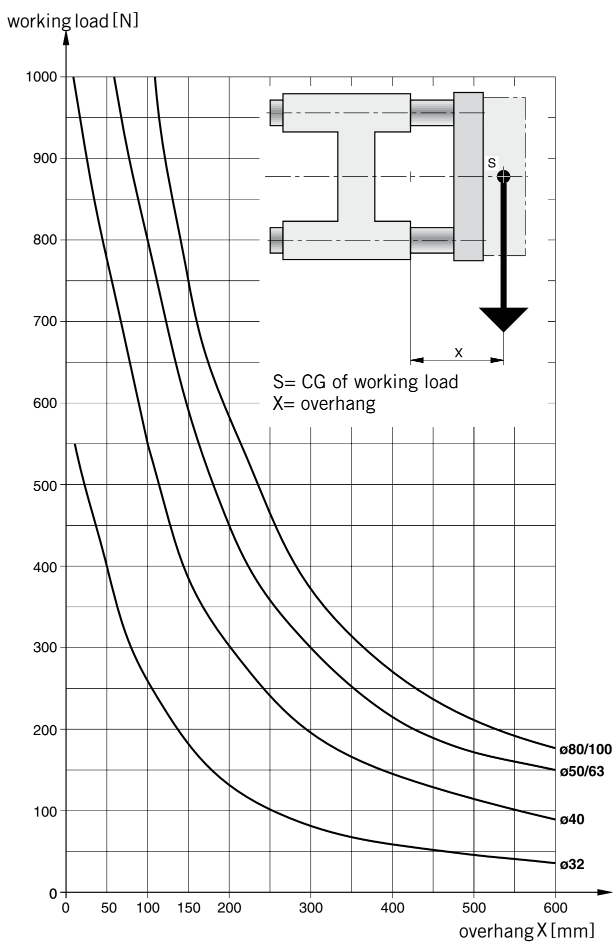
Series FEH...

Version:
- **with plain bearings FEHG...**
- **with ball bearings FEHK...**

Supplied as follows:
Ø32 to 100mm:
für Zylinder nach ISO 15552 (ISO 6431)

1 guide
4 mounting nuts

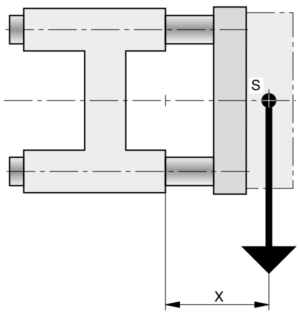
Maximum working load in relation to overhang - FEHG version with plain bearings



For short strokes, the working load figures obtained from the diagrams must be multiplied by a correction factor (k) (see Diagram). In the working load curves for overhangs up to 60 mm these short stroke corrections are already included. In the case of impact loads, the maximum permissible working load must be halved..

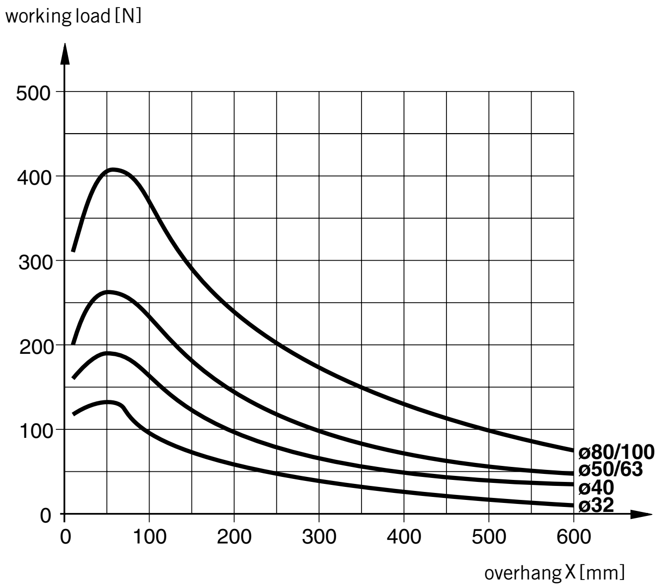
Factor 1
for normal applications

Factor 2
for impact loads

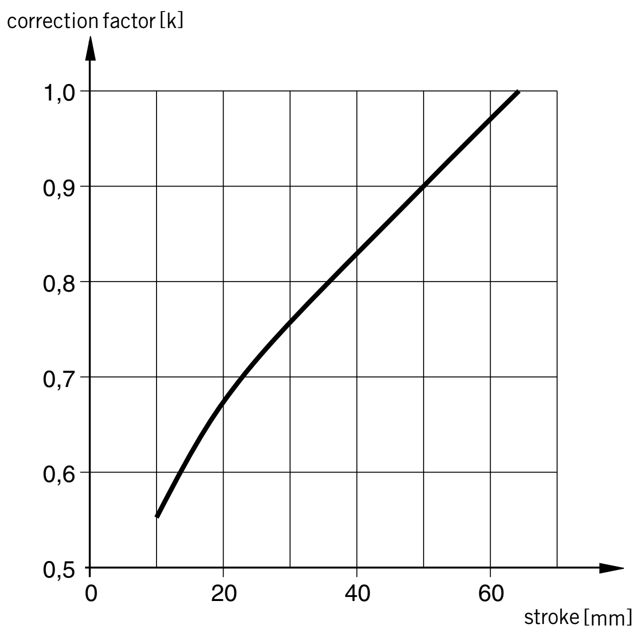


S= CG of working load
X= overhang

Maximum working load in relation to overhang - FEHK version with ball bearings



Reduction of working load with short strokes - FEHK version with ball bearings



Deflection - FEHG version with plain bearings and FEHK version with ball bearings

Diagram 1 - Deflection with a working load of 10N

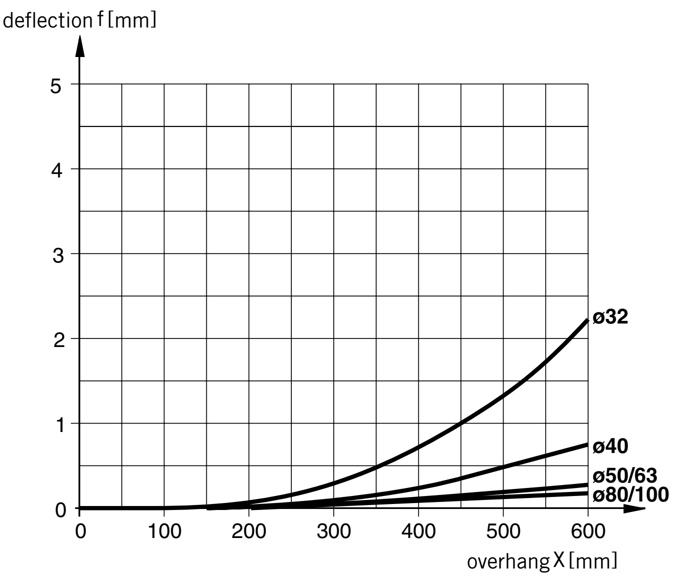
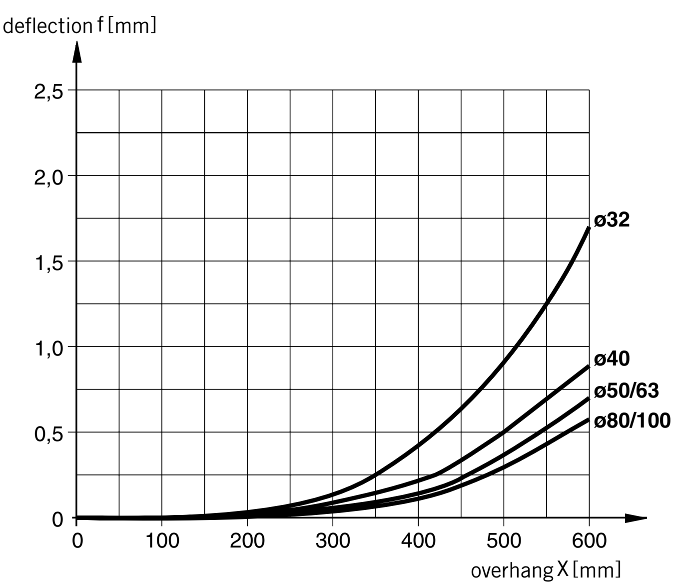
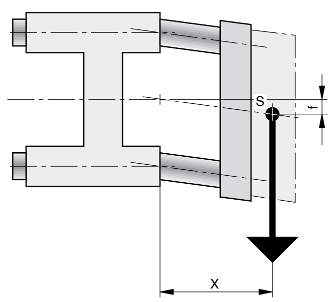


Diagram 2 - Deflection under own weight



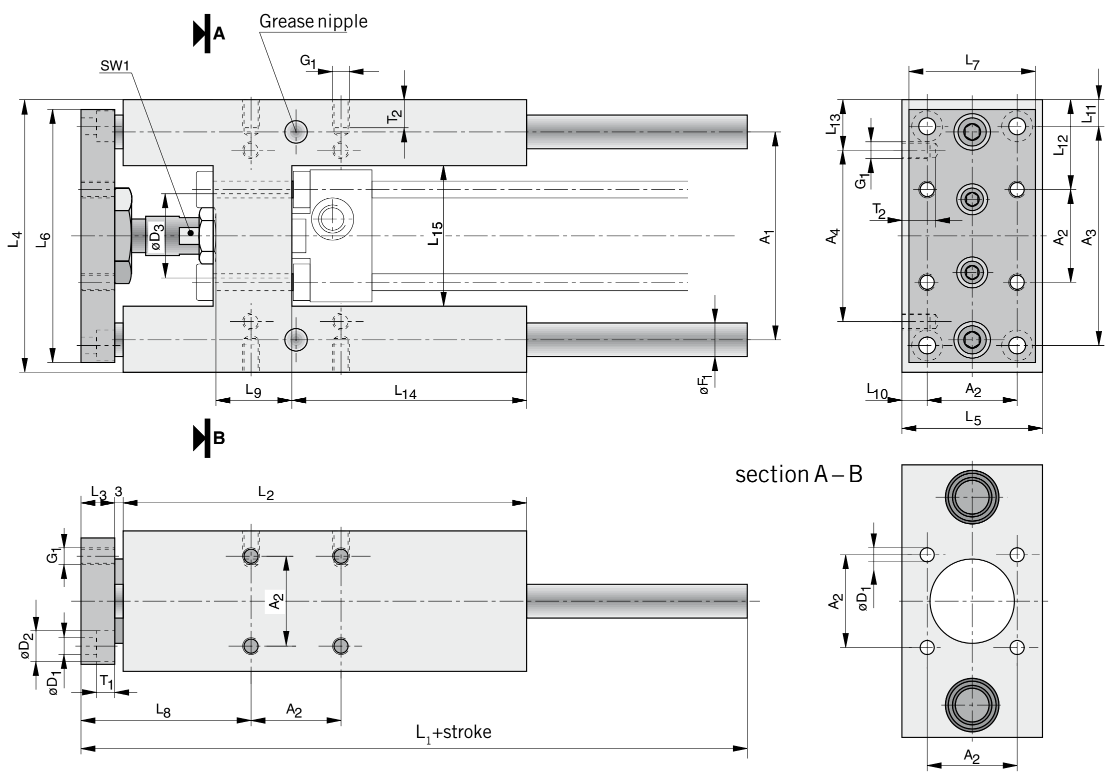


S = CG of working load
X = overhang
f = deflection

Deflection

The total deflection is the sum of the deflection under own weight (Diagram 2) and the deflection under load (Diagram 1).
The deflection for every 10 N load is shown in Diagram 1.

Dimensions – Linear Guide Type FEHG .., FEHK.., Ø 32 – 100 mm



Dimension Table (mm) – Linear Guide Type FEHG.. , FEHK.., Ø 32 – 100 mm

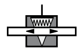
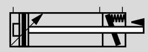
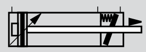
Type	Cylinder diameter					
	32	40	50	63	80	100
A_1	74	87	104	119	148	172
A_2	32.5	38	46.5	56.5	72	89
A_3	78	84	100	105	130	150
A_4	61	69	85	100	130	150
$ØD_1$	6.6	6.6	9	9	11	11
$ØD_2$	11	11	15	15	18	18
$ØD_3$	30	35	40	45	45	55
$ØF_1$	14 (12*)	18 (16*)	22 (20*)	22 (20*)	25	25
G_1	M6	M6	M8	M8	M10	M10
L_1+Hub	177	192	237	237	280	280
L_2	125	140	150	182	215	220
L_3	12	12	15	15	20	20
L_4	97	115	137	152	189	213
L_5	50	58	70	85	105	130
L_6	90	110	130	145	180	200
L_7	45	54	63	80	100	120
L_8	59.70^{+5}_{0}	63^{+5}_{0}	70.2^{+10}_{0}	73.5^{+10}_{0}	89^{+10}_{0}	90.5^{+10}_{0}
L_9	28	33	40	40	50	50
L_{10}	8.75	10.0	11.75	14.25	16.5	20.5
L_{11}	9.5	15.5	18.5	23.5	29.5	31.5
L_{12}	32.25	38.5	45.25	47.75	58.5	62
L_{13}	18	23	26	26	29.5	31.5
L_{14}	65	69	65	97	112	112
L_{15}	50.5	58.5	70.5	85.5	105.4	130.4
SW1	13	15	22	22	27	27
SW2	–	–	–	–	30	30
T_1	6.5	6.5	9	9	11	11
T_2	10	10	13	13	16	16

* (FEHK version with ball bearings)

Order Instructions – Linear Guide Type FEHG, FEHK

for Cyl.Ø (mm)	Stroke (mm)	Order Instructions for plain bearing version		Order Instructions for ball bearing version	
		Type	Order-No.	Type	Order-No.
32	50	FEHG32/50	PD38001-0050	FEHK32/50	PD38007-0050
	100	FEHG32/100	PD38001-0100	FEHK32/100	PD38007-0100
	160	FEHG32/160	PD38001-0160	FEHK32/160	PD38007-0160
	200	FEHG32/200	PD38001-0200	FEHK32/200	PD38007-0200
	250	FEHG32/250	PD38001-0250	FEHK32/250	PD38007-0250
	320	FEHG32/320	PD38001-0320	FEHK32/320	PD38007-0320
40	50	FEHG40/50	PD38002-0050	FEHK40/50	PD38008-0050
	100	FEHG40/100	PD38002-0100	FEHK40/100	PD38008-0100
	160	FEHG40/160	PD38002-0160	FEHK40/160	PD38008-0160
	200	FEHG40/200	PD38002-0200	FEHK40/200	PD38008-0200
	250	FEHG40/250	PD38002-0250	FEHK40/250	PD38008-0250
	320	FEHG40/320	PD38002-0320	FEHK40/320	PD38008-0320
50	50	FEHG50/50	PD38003-0050	FEHK50/50	PD38009-0050
	100	FEHG50/100	PD38003-0100	FEHK50/100	PD38009-0100
	160	FEHG50/160	PD38003-0160	FEHK50/160	PD38009-0160
	200	FEHG50/200	PD38003-0200	FEHK50/200	PD38009-0200
	250	FEHG50/250	PD38003-0250	FEHK50/250	PD38009-0250
	320	FEHG50/320	PD38003-0320	FEHK50/320	PD38009-0320
63	50	FEHG63/50	PD38004-0050	FEHK63/50	PD38010-0050
	100	FEHG63/100	PD38004-0100	FEHK63/100	PD38010-0100
	160	FEHG63/160	PD38004-0160	FEHK63/160	PD38010-0160
	200	FEHG63/200	PD38004-0200	FEHK63/200	PD38010-0200
	250	FEHG63/250	PD38004-0250	FEHK63/250	PD38010-0250
	320	FEHG63/320	PD38004-0320	FEHK63/320	PD38010-0320
80	50	FEHG80/50	PD38005-0050	FEHK80/50	PD38011-0050
	100	FEHG80/100	PD38005-0100	FEHK80/100	PD38011-0100
	160	FEHG80/160	PD38005-0160	FEHK80/160	PD38011-0160
	200	FEHG80/200	PD38005-0200	FEHK80/200	PD38011-0200
	250	FEHG80/250	PD38005-0250	FEHK80/250	PD38011-0250
	320	FEHG80/320	PD38005-0320	FEHK80/320	PD38011-0320
100	50	FEHG100/50	PD38006-0050	FEHK100/50	PD38012-0050
	100	FEHG100/100	PD38006-0100	FEHK100/100	PD38012-0100
	160	FEHG100/160	PD38006-0160	FEHK100/160	PD38012-0160
	200	FEHG100/200	PD38006-0200	FEHK100/200	PD38012-0200
	250	FEHG100/250	PD38006-0250	FEHK100/250	PD38012-0250
	320	FEHG100/320	PD38006-0320	FEHK100/320	PD38012-0320

Overview

System	Fig.	Symbol	Series	Page
Locking units for cylinder Ø 32- 125 mm			FSE..	114-117
Cylinder with locking unit Double acting with cushioning For contactless position sensing		 	DZB.... DZBA....	118-125

Locking Units

to ISO 15552

for series AZ....
Ø 32-100 mm

for series DZ....
Ø 125 mm

Cylinders with Locking Unit

Series DZB....
Ø 32-125 mm
Blocking reverse stroke

Series DZBA....
Ø 32-125 mm

Mountings
to ISO 15552

Locking Unit for Cylinders Ø 32-125 mm

Series FSE..

Version:
with locking unit – locks if pressure drops

Cylinders see page 46, 47 and 60.

**) Note:

The holding force quoted relates to a static load. If this load is exceeded, slippage can occur. Any dynamic forces occurring in operation must not exceed the static holding force.
In clamped operating mode, if the load is fluctuatung, the clamping unit is not free from play. The cylinder is not suitable for positioning tasks.

Actuation:

The clamping unit must only be released when both cylinder chambers are pressurised, otherwise there is danger of an accident from the jerky movement of the piston rod. Shutting off the compressed air supply at both ends with a 5/3 way valve provides adequate safety only for a short time.

Characteristics

Characteristics	Symbol	Unit	Description						
General									
Description			Piston rod cylinder with locking unit						
Series			AZF						
Locking unit			locks if pressure drops						
Material – Locking unit									
Cartridge			Aluminium, anodised						
Housing			Aluminium, anodised						
Clamping Jaw			Ms						
Cyl. piston rod			Steel, high-alloy						
FSE unlocking pressure		bar	≥ 4 bis 10						
Cylinder diameter		mm	32	40	50	63	80	100	125
Pilot air connection			M5	M5	G1/8	G1/8	G1/8	G1/8	G1/8
Locking force, static **)		N	600	1000	1500	2200	3000	5000	7000

for further information see standard cylinder on pages 46, 47, 60

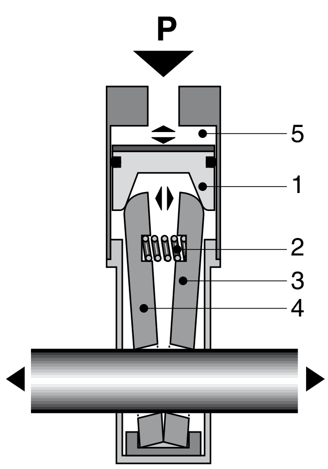
Weight (mass) kg

Description	Cylinder diameter						
	32	40	50	63	80	100	125
Locking unit	0.60	0.80	1.00	1.20	1.40	1.60	1.80
Basic cylinder *)	0.70	1.20	1.75	2.32	3.75	4.90	7.87

*) with 100 mm stroke and longer piston rod

Function

If the pressure drops the piston rod is locked by two tilting plates.
When the piston (1) is put under pressure it is pushed downwards, pressing the two tilting plates (3) and (4) together. The piston rod is then free to move.
If the pressure drops in piston chamber (5), a spring pushes the two plates (3) and (4) apart, so that the wedge effect pushes the piston (1) upwards and the tilting plates lock the piston rod.



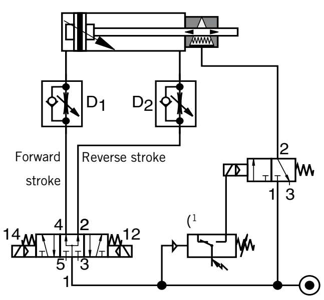
Important

– The locking unit can only be mounted on the cylinder if it is held in its unlocked position either by air pressure or by a suitable screw.

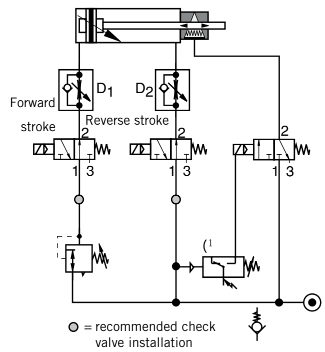
– When the cylinder piston rod is locked it must not be rotated or subjected to external force.

Circuit Diagrams – Cylinder with the Locking Unit FSE-...

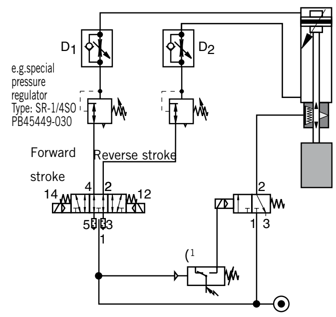
Example 1:
Horizontal Application with 5/3 Way Valve - RFB



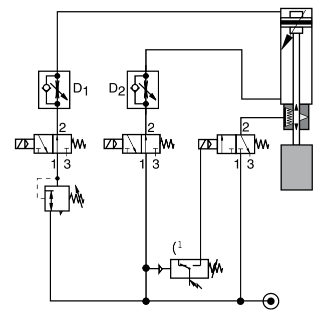
Example 2:
Horizontal Application with Two 3/2 Way Valves - RFE



Example 3:
Vertical Application with 5/3 Way Valve - RFE



Example 4:
Vertical Application with Two 3/2 Way Valves



Example 1

When operating pressure is applied the P/E converter is closed and the 3/2 way valve is on through-flow, i.e. the locking unit is unlocked (working position).
The locking unit is actuated with a 3/2 way solenoid valve via a pressure switch, whereby if the pressure drops, the pressure switch reacts and the locking unit exhausts via the 3/2 way valve so that the piston rod is locked.
The use of the 5/3 way valve ensures that both sides of the cylinder piston are under pressure, so that the piston rod remains wherever it stops. This „standstill“ however is only enough for the function of the FSE locking unit: without the FSE, the piston rod would continue its forward stroke because of the different piston areas.
After the pressure is equalized on both sides of the cylinder piston the locking unit can be actuated and the piston rod locked. The sequence of operations must therefore be correct: the two throttle/check valves D1 and D2 only control piston speed and have no influence on the actuation of the locking unit.
The fitting of a check valve increases safety because it prevents any movement of the piston before the FSE locks.

Example 2

In contrast to example1, here the 5/3 way valve is replaced by two 3/2 way valves.
The choice will depend on the customer.

Example 3

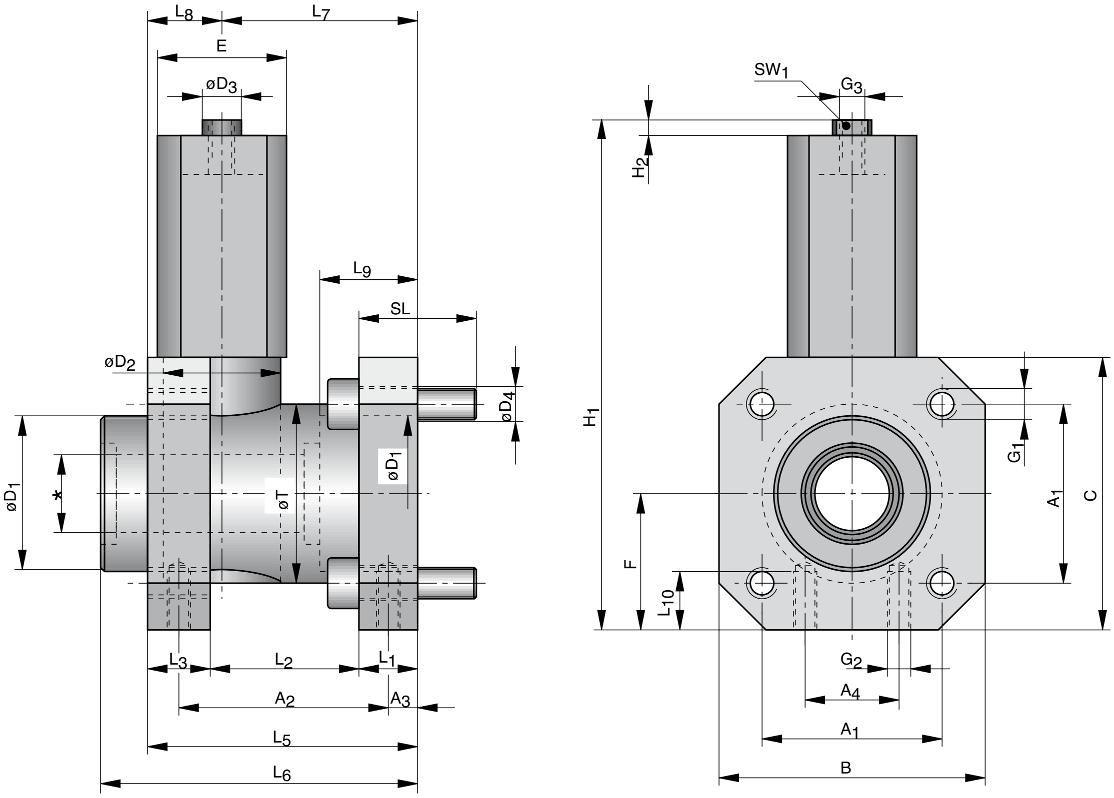
Example 3 is designed for a load acting downwards. The installation of the special pressure regulators between valve and cylinder makes regulation of the stroke direction possible.
Venting is carried out via the main valve of the pressure regulator, so that there is no limitation of the stroke times.

Example 4

This example is basically similar to example 2 but it is designed for a load acting downwards. A regulator on port 5 of the 5/3 way valve or on port 1
of the 3/2 way valve connected to the top end of the cylinder equalizes the forces resulting from the difference in piston areas and the load acting downwards.

(1 **Note:**
without P/E converter: only if the pressure drops
with P/E converter: if the pressure drops or the power fails.

Dimensions – Locking Unit FSE-..., Ø 32 – 125 mm



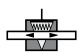
* Piston rod diameter
for installation dimensions for cylinder with locking unit FSE-... see page 51, 63

Dimensions Table (mm) – for Locking Unit FSE-...

Cyl. Ø	A_1	A_2	A_3	A_4	B	C	$ØD_1$	$ØD_2$	$ØD_3$	$ØD_4$	E	F	G_1	G_2
32	32.5	40	4.2	16	48	50	30	20	10	6.6	22.5	25	M6	M5
40	38	46	4.5	21	56	58	35	24	10	6.6	27.5	29	M6	M5
50	46.5	54	11.5	24	68	70	40	30	15	8.5	32.5	35	M8	M6
63	56.5	55	7.5	32	82	85	45	38	15	8.5	41	42.5	M8	M8
80	72	70	10	44	100	105	45	40	19	11	49	52.5	M10	M8
100	89	70	10	60	120	130	55	48	19	11	53	65	M10	M8
125	110	95	11	75	140	150	60	65	19	13	65	75	M12	M10

Cyl. Ø	G_3	H_1	H_2	L_1	L_2	L_3	L_5	L_6	L_7	L_8	L_9	L_{10}	SL	SW1	ØT
32	M5	94	4	8	28	12	48	58	32	16	20.5	8	20	8	34
40	G1/8	102.5	4	10	33	12	55	65	35.5	19.5	22.5	10	25	8	42
50	G1/8	119.5	4	15	39	16	70	82	49	21	29.5	12	30	13	50
63	G1/8	138	4	15	40	15	70	82	49	21	29.5	12	30	13	50
80	G1/8	152	4	16	58	16	90	110	62	28	35.5	16	30	17	60
100	G1/8	193.5	4	16	58	18	92	115	65	27	38.5	16	30	17	60
125	G1/8	223.5	4	25	70	27	122	154	85	37	45.5	20	45	17	80

Order Instructions – Locking unit (without cylinder), Series FSE-..., Ø 32 – 125 mm

Description	Symbol	for Cyl. Ø	Order Instructions	
			Type	Order-No.
Locking unit locks if pressure drops		32	FSE 032	KC 8227
		40	FSE 040	KC 8228
		50	FSE 050	KC 8229
		63	FSE 063	KC 8230
		80	FSE 080	KC 8231
		100	FSE 100	KC 8232
		125	FSE 125	KC 8233

Cylinder Ø32-125 mm

with blocking device

Series DZB.... Blocking reverse stroke

Series DZBA.... Blocking forward stroke

Mountings to ISO 15552 (ISO 6431)

Special versions:

- according to CETOP RP 53 P (Piston rod thread M24x2)
- versions for special applications on request

Delivery includes:

1 Cylinder
1 Hexagon nut for piston rod thread

Characteristics

Characteristics	Symbol	Unit	Description						
General Features									
Type			Piston rod cylinder with blocking device						
Series			DZB - reverse stroke blocked DZBA - forward stroke blocked						
System			Double acting with cushioning at one end						
Mounting			See drawing						
Tube connection			Thread						
Ambient temperature range	T_{min} T_{max}	°C °C	-20 +80	Note: When using below freezing point (°C) it is necessary to consult us					
Medium temperature range	T_{max}	°C	+80						
Weight (mass)		kg	See table						
Installation			In any position						
Medium			Filtered and lubricated or filtered and unlubricated air						
Lubrication			Oil mist lubrication compatible with Buna						
Material									
Cylinder tube			Aluminium, anodised						
Front/Rear end caps			Aluminium, anodised						
Piston rod			Inductively hardened steel hard-chrome plated						
Pneumatic Characteristics									
Nominal pressure	p_n	bar	6						
Operating pressure range	p_{min} p_{max}	bar bar	2 8						
Releasing pressure		bar	≥ 4						
Piston diameter		mm	32	40	50	63	80	100	125
Port size			G1/8	G1/4	G1/4	G3/8	G3/8	G1/2	G1/2
Port size control signal			M5	G1/8	G1/8	G1/4	G1/4	G1/4	G1/4
Piston rod diameter		mm	12	16	20	20	25	25	32
Piston rod thread		mm	M10 x1.25	M12 x1.25	M16 x1.5	M16 x1.5	M20 x1.5	M20 x1.5	M27 x2*)
Stroke length		mm	For standard stroke lengths see order instructions max. 1000mm, longer strokes on request						
Piston force and			See page 9						
Static holding force **)			Corresponds to the respective cylinder force - see page 9						
Cushioning			Adjustable at one end						
Cushioned stroke length		Ø	32	40	50	63	80	100	125
		mm	20	25	25	25	28	30	42

*) Standard piston rod thread M 27x2 - on request also piston rod thread M24x2 to CETOP RP 53 P can be delivered.

**) see page 119

) **Note – Static holding force:

The holding force quoted relates to a static load. If this load is exceeded, slippage can occur. Any dynamic forces occurring in operation must not exceed the static holding force.
In clamped operating mode, if the load is fluctuatung, the clamping unit is not free from play. The cylinder is not suitable for positioning tasks.

Actuation:
The clamping unit must only be released when both cylinder chambers are pressurised, otherwise there is danger of an accident from the jerky movement of the piston rod.

Shutting off the compressed air supply at both ends with a 5/3 way valve provides adequate safety only for a short time.

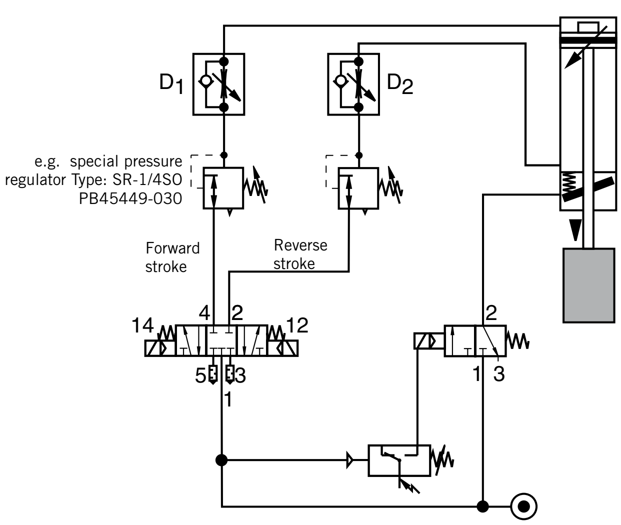
Weight (mass) kg

Cylinder version	Cylinder diameter													
	Ø32		Ø40		Ø50		Ø63		Ø80		Ø100		Ø125	
	*1	*2	1	2	1	2	1	2	1	2	1	2	1	2
Basic Cylinder	1.06	0.26	1.45	0.56	2.45	0.67	3.70	0.75	6.00	1.15	9.50	1.40	11.90	1.30

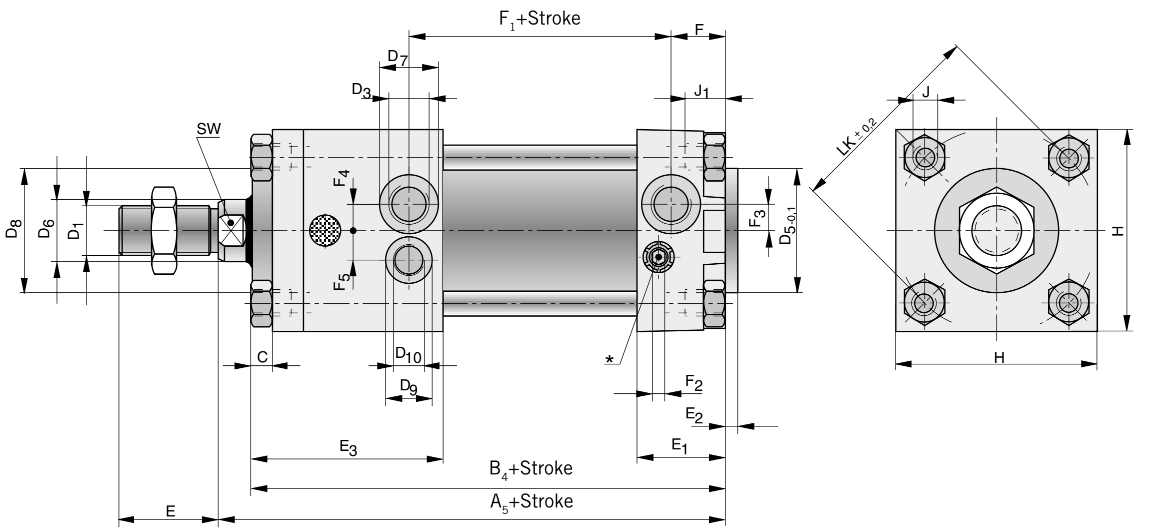
Mounting	Cylinder diameter						
	Ø32	Ø40	Ø50	Ø63	Ø80	Ø100	Ø125
B	0.070	0.090	0.170	0.220	0.490	0.790	1.400
BA	0.100	0.130	0.210	0.300	0.570	0.910	1.600
BAS	0.100	0.150	0.220	0.320	0.560	0.860	1.600
D	0.100	0.120	0.230	0.280	0.620	0.780	1.400
EN	0.110	0.180	0.230	0.390	0.530	0.720	3.300

* 1 = Weight for cylinder with 100 mm stroke
2 = Weight for every additional 100 mm stroke length

Control Example for Blocking Cylinder



Dimensions – Basic Cylinder, Series DZB5...., Ø 32 – 125 mm



* throttle screw (for cushioning)

Dimensions Table (mm) – for Basic Cylinder, Series DZB5...

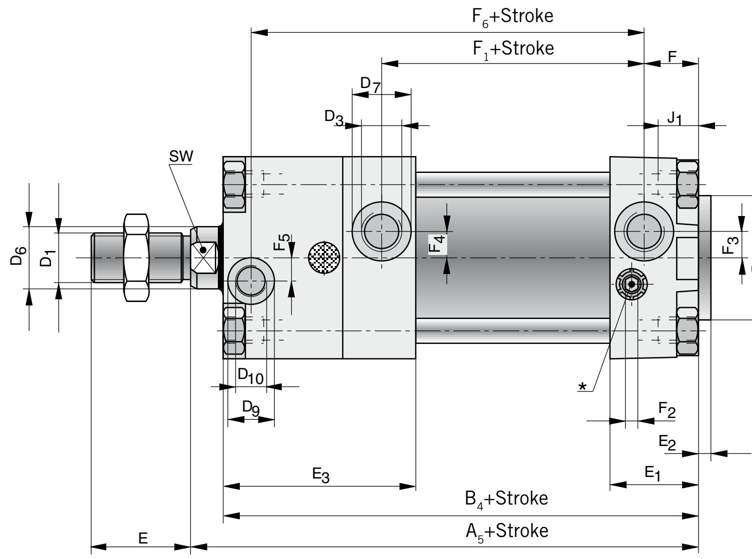
Cylinder-Ø	Norm	A_5+Stroke	B_4+Stroke	C	D_1	D_3	Ø D_5	Ø D_6	Ø D_7	Ø D_8	Ø D_9	D_{10}	E
32	ISO	120	112	5	M10x1.25	G1/8	30	12	15	30	8	M 5	20
40	ISO	135	126	6	M12x1.25	G1/4	35	16	19	35	15	G1/8	24
50	ISO	143	132	6.5	M16x1.5	G1/4	40	20	19	40	15	G1/8	32
63	*)	170	159	6.5	M16x1.5	G3/8	45	20	23	57	19	G1/4	32
80	*)	188	174	8.5	M20x1.5	G3/8	45	25	23	78	19	G1/4	40
100	*)	203	189	8.5	M20x1.5	G1/2	55	25	28	100	19	G1/4	40
125	ISO	225	209	15	M27x2	G1/2	60	32	28	121	19	G1/4	54
125	CETOP	225	209	15	M24x2	G1/2	60	32	28	121	19	G1/4	54

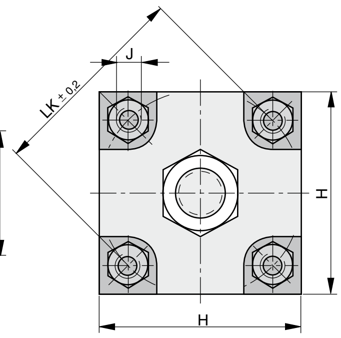
*) Dimensions not to ISO norm.

Cylinder-Ø	Norm	E_1	E_2	E_3	F	F_1+Stroke	F_2	F_3	F_4	F_5	J	$J_{1\ max}$	H	LK Ø	SW
32	ISO	29	4	46	14	60	SW4	5.5	6	7	M6	16	47	46	10
40	ISO	27	4	56.5	16	63.5	SW4	7	8	9.5	M6	16	53	54	14
50	ISO	29	4	61	17.5	64.5	SW4	8.5	8	9.5	M8	16	65	66	17
63	*)	30	4	81	17	73	SW4	8	12	11	M8	16	75	80	17
80	*)	34	4	84	20.5	82.5	SW4	9	12.5	15	M10	16	95	102	22
100	*)	35	4	92.5	19	93	SW4	13	15	15	M10	16	115	126	22
125	ISO	40	4	104	19	100	-	11	15	15	M12	18	140	156	27
125	CETOP	40	4	104	19	100	-	11	15	15	M12	18	140	156	27

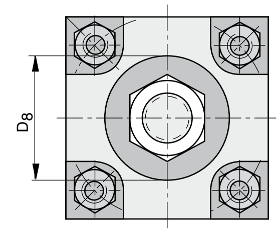
*) Dimensions not to ISO norm.

Dimensions – Basic Cylinder, Series DZBA5…., Ø 32 – 125 mm





* throttle screw (for cushioning)



view by cylinder Ø 125 mm

Dimension Table (mm) – for Basic Cylinder, Series DZBA5...

Cylinder-Ø	Norm	A_5+Stroke	B_4+Stroke	D_1	D_3	Ø D_5	Ø D_6	Ø D_7	Ø D_8	Ø D_9	D_{10}	E	E_1	E_2
32	ISO	120	112	M10x1.25	G1/8	30	12	15	–	8	M 5	20	29	5
40	ISO	135	126	M12x1.25	G1/4	35	16	19	–	15	G1/8	24	27	5
50	ISO	143	132	M16x1.5	G1/4	40	20	19	–	15	G1/8	32	29	6.5
63	*)	170	159	M16x1.5	G3/8	45	20	23	–	19	G1/4	32	30	6
80	*)	188	174	M20x1.5	G3/8	45	25	23	–	19	G1/4	40	34	8
100	*)	203	189	M20x1.5	G1/2	55	25	28	–	19	G1/4	40	35	8
125	ISO	225	209	M27x2	G1/2	60	32	28	100	19	G1/4	54	40	10
125	CETOP	225	209	M24x2	G1/2	60	32	28	100	19	G1/4	54	40	10

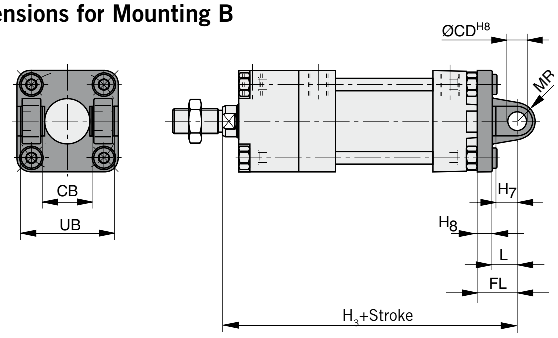
*) Dimensions not to ISO norm.

Cylinder-Ø	Norm	E_3	F	F_1+Stroke	F_2	F_3	F_4	F_5	F_6+Stroke	J	$J_{1\,max}$	H	LK Ø	SW
32	ISO	46	14	60	SW4	5.5	6	7	94	M6	11	47	46	10
40	ISO	56,5	16	63.5	SW4	7	8	7.5	103.5	M6	11	53	54	14
50	ISO	61	17.5	64.5	SW4	8.5	8	7.5	107	M8	12	65	66	17
63	*)	81	17	73	SW4	8	12	8.5	118	M8	12	75	80	17
80	*)	84	20.5	82.5	SW4	9	12.5	9	129.5	M10	16	95	102	22
100	ISO	92,5	19	93	SW4	13	15	16.5	145.5	M10	16	115	126	22
125	ISO	104	19	100	-	11	15	28	179	M12	18	140	156	27
125	CETOP	104	19	100	-	11	15	28	179	M12	18	140	156	27

*) Dimensions not to ISO norm.

Mountings – Series DZB...., DZBA...., Ø 32 – 125 mm

Dimensions for Mounting B



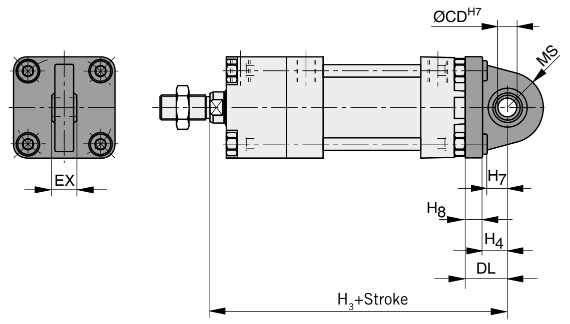
Material: cast aluminium

Dimension Table (mm) – for Mounting B

Cyl. Ø	H_3+Stroke	H_7	H_8	FL	L	CB	ØCD^{H8}	MR	UB
32	142	10	10	22	12	26	10	9	45
40	160	13	10	25	15	28	12	11	52
50	170	12	11	27	16	32	12	12	60
63	202	17	11	32	21	40	16	15	70
80	224	16	15	36	22	50	16	16	90
100	244	20.5	16	41	25	60	20	20	110
125	275	27.5	20	50	30	70	25^{H9}	25	130

Included in delivery: 1 rear trunnion mounting, 4 screws

Dimensions for Mounting BAS



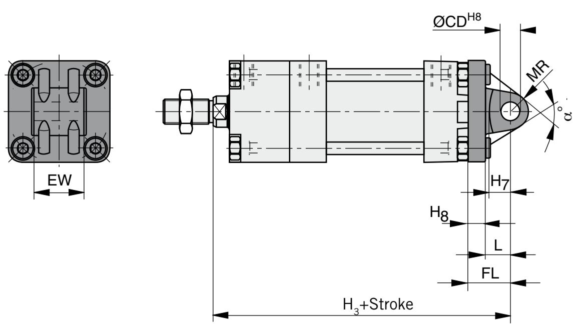
Material: cast aluminium

Dimension Table (mm) – for Mounting BAS

Cyl. Ø	H_3+Stroke	H_4	H_7	H_8	ØCX^{H7}	DL	MS	EX
32	142	12	10	10	10^{H8}	22	18	14
40	160	15	13	10	12^{H8}	25	21	16
50	170	16	12	11	12^{H8}	27	23	16
63	202	21	17	11	16	32	27	21
80	224	21	16	15	16	36	29	21
100	244	25	20.5	16	20	41	34	25
125	275	30	27.5	20	25	50	40	31

Included in delivery: 1 rear trunnion mounting with spherical bearing, 4 screws

Dimensions for Mounting BA



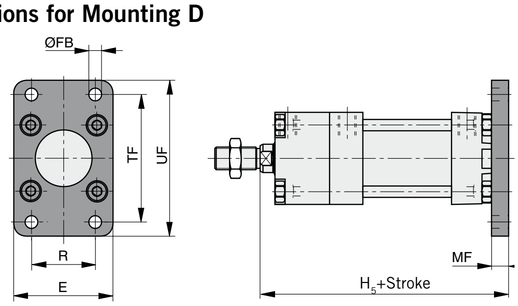
Material: cast aluminium

Dimension Table (mm) – for Mounting BA

Cyl. Ø	H_3+Stroke	H_7	H_8	L	ØCD^{H8}	FL	MR	EW	α°
32	142	10	10	12	10	22	10.5	26	60
40	160	13	10	15	12	25	13	28	60
50	170	12	11	16	12	27	13	32	70
63	202	17	11	21	16	32	17	40	60
80	224	16	15	21	16	36	17	50	70
100	244	20.5	16	25	20	41	21	50	70
125	275	27.5	20	30	25^{H9}	50	25	70	60

Included in delivery: 1 rear trunnion mounting, 4 screws

Dimensions for Mounting D



Material: cast aluminium

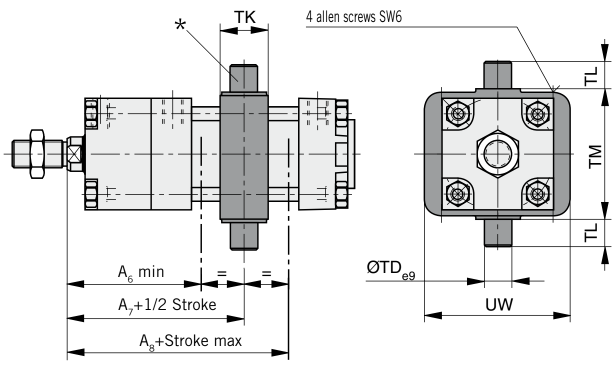
Dimension Table (mm) – for Mounting D

Cyl. Ø	E	H_5 +Stroke	R	ØFB	MF	TF	UF
32	50	130	32	7	10	64	79
40	56	145	36	9	10	72	90
50	70	155	45	9	12	90	110
63	77	182	50	9	12	100	120
80	100	204	63	12	16	126	153
100	120	219	75	14	16	150	178
125	145	245	90	16	20	180	220

Included in delivery: 1 flange, 4 screws

Dimensions – Series DZB...., DZBA...., Ø 32 – 125 mm

Dimensions for Mounting EN



Material: nodular graphite cast iron, passivated

* Position centre trunnion mounting
Standard position: Type EN1 – The taps of the EN attachment are horizontally aligned to the air supply
Option: Type EN2 – The taps of the EN attachment are vertically aligned to the air supply

Dimension Table (mm) – for Mounting EN

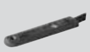
Cyl. Ø	$A_{6\ min}$	A_7 +1/Stroke	$A_{8\ max}$ +Stroke	$ØTD_{e9}$	TK	TL	TM	UW
32	61.5	72.5	83.5	12	15	12	50	40
40	75.5	86.8	98	16	20	16	63	59
50	82	93	104	16	20	16	75	69
63	104.5	116	127.5	20	25	20	90	84
80	113	126	139	20	30	20	110	102
100	122.5	137.3	152	25	32	25	132	125
125	140	182.5	165	25	32	25	160	155

Included in delivery: 1 rear trunnion mounting

Cyl.-Ø 32-100 mm:
The trunnion mounting can be moved to any position between A_6 and A_8 after loosening the clamping screws.

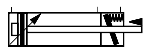
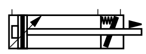
Cyl.-Ø 125 mm:
When ordering please give exact dimension A_7.
Mounting is assembled when delivered.

Accessories

Piston Rod Eye	Piston Rod Clevis	Compensating Coupling	Coupling	Magnetic Switch	Adapter plate for Mounting	Pivot for Mounting B	Pivot for Mounting EN
							
Page 138	Page 139	Page 140	Page 141	Page 152	Page 145	Page142, 143	Page 144

Piston force and air consumption see page 9, order instructions see page 136, 137

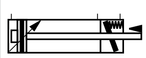
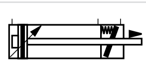
Order Instructions – Basic Cylinder, Series DZB…., DZBA…., Ø 32 – 125 mm

System	Symbol	Piston-Ø	Order Instructions Type	Order-No.
For contactless position sensing Double acting with adjustable end cushio-ning in one direction Reverse stroke blocked		32	DZB5032/....	PD29546-....
		40	DZB5040/....	PD29547-....
		50	DZB5050/....	PD29548-....
		63	DZB5063/....	PD27063-....
		80	DZB5080/....	PD27064-....
		100	DZB5100/....	PD22605-....
		125*	DZB5125/....	PD26273-....
		125**	DZB5125/....	PD27066-....
For contactless position sensing Double acting with adjustable end cushio-ning in one direction Forward stroke blocked		32	DZBA5032/....	PD29549-....
		40	DZBA5040/....	PD29550-....
		50	DZBA5050/....	PD29551-....
		63	DZBA5063/....	PD27059-....
		80	DZBA5080/....	PD27060-....
		100	DZBA5100/....	PD27061-....
		125*	DZBA5125/....	PD26243-....
		125**	DZBA5125/....	PD26209-....

Complete type designation and order no. with stroke length (in mm) (4-digit)

Standard stroke lengths
0025, 0050, 0080, 0100, 0125, 0160, 0200, 0320, 0400, 0500 delivered preferably

Order Instructions – Cylinder with Mounting EN, Ø 125 mm

System	Symbol	Piston-Ø	Order Instructions Type	Order-No.
Double acting with ad-justable end cushioning in one direction Reverse stroke blocked		125*	DZB5125EN-..../...	PD29578-..../...
		125**	DZB5125EN-..../...	PD29579-..../...
Double acting with ad-justable end cushioning in one direction Forward stroke blocked		125*	DZBA5125EN-..../...	PD29580-..../...
		125**	DZBA5125EN-..../...	PD29581-..../...

Complete type designation and order no. with stroke length (in mm) (4-digit)

Add exact A_7 dimension in mm (3 digits)

* Piston rod thread = M27x2 = ISO
** Piston rod thread = M24x2 = CETOP

Order Instructions – Cylinder Mountings Series DZB...., DZBA...., Ø 32 – 125 mm

Description	Order-No.						
	Ø32	Ø40	Ø50	Ø63	Ø80	Ø100	Ø125
Swivel mounting B-	PD 22704	PD 22705	PD 22706	PD 22707	PD 22708	PD 22709	PD 22034
Rear trunnion mounting BA-..	PD 23412	PD 23413	PD 23414	PD 23415	PD 23416	PD 23417	PD 23418
Rear trunnion mounting BAS-..	PD 23843	PD 23844	PD 23845	PD 23846	PD 23847	PD 23848	PD 23849
Rear flange mounting D-..	PD 23403	PD 23404	PD 23405	PD 23406	PD 23407	PD 23408	PD 23409
Centre trunnion mounting EN-..*	KL9234	KL9235	KL9236	KL9237	KL9238	KL9239	KL9240

* Position centre trunnion mounting
Standard position: Type EN1 – The taps of the EN attachment are horizontally aligned to the air supply
Option: Type EN2 – The taps of the EN attachment are vertically aligned to the air supply

Ordering Example:

Basic Cylinder: DZB5063-0500 PD27063-0500
Mounting: BAS-63 PD23846

Accessories

Piston Rod Eye

Page 138

Piston Rod Clevis

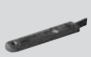
Page 139

Compensating Coupling

Page 140

Coupling

Page 141

Magnetic Switch

Page 152

Adapter plate for Mounting

Page 145

Pivot for Mounting B

Page 142, 143

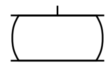
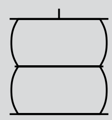
Pivot for Mounting EN

Page 144

Bellows Cylinders

Series SP....
Single convolution
Double convolution

Overview

System	Fig.	Symbol	Series	Page
Bellows Cylinder single convolution type			SP-1B..	128-132
Bellows Cylinder double convolution type			SP-2B..	128 133-136

Bellows cylinders are single acting. They are made of neoprene rubber reinforced by 2 layers of nylon cord.
The external diameter of the bellows is largest when the cylinder is compressed. When air is introduced, they cylinder extends and the bellows diameter decreases. The longer the stroke, the more the force decreases.

There are two basic types:

Single and double convolution.

Single convolution: maximum stroke length 110 mm.
Double convolution: maximum stroke length 240 mm.
Standard delivery includes fitted end plates for the particular type.

Technical Notes

Force
The force available depends on the stroke length: see the force diagrams in the data sheets.

Maximum permissible length
Depends on the operating pressure and is shown in the force diagrams: it must not be exceeded, to avoid damage to the cylinder. The stroke must therefore be limited by an external stop.

Minimum permissible length
Is shown in the dimension tables and must be observed: be sure to provide an external limit stop.

Medium
Air, Water (with glycol additives) and brake fluid. (No hydraulic fluids)

Oil resistance
The amount of oil necessary for lubricating pneumatic systems and moderate external oil contamination are harmless.

Operating pressure range
Is 2-8 bar for the standard 2 ply cylinder.

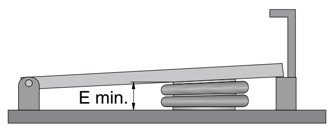
Temperature range
-40 to +70°C

Special versions
Are available on request, e.g. larger diameters, higher temperature ranges, open ended with mounting rings, etc..

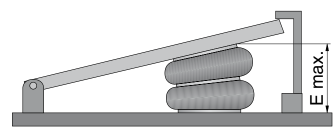
Maximum permissible pitch

The pitch of the end plates must not exceed 30°.
Minimum permissible length (E_{min}) and maximum permissible length (E_{max}), must be observed.

Position at minimum permissible length



Position at maximum permissible length



Installation Size

Series	Port size	Type	Force
	G1/4	SP-1B04	See force diagrams
	G1/4	SP-1B05	
	G1/4	SP-1B07	
	G3/4	SP-1B12	
	G3/4	SP-1B22	
	G3/4	SP-1B34	
	G1/4	SP-2B04	
	G1/4	SP-2B05	
	G1/4	SP-2B05A	
	G1/4	SP-2B07	
	G3/4	SP-2B12	
	G3/4	SP-2B22	
	G3/4	SP-2B34	

Bellows Cylinder

Series SP-1B..
Single convolution

Characteristics

Characteristics	Symbol	Unit	Description
System			Single acting
Mounting			See drawing
Tube connection			Thread
Ambient temperature range	T_{min} T_{max}	°C °C	- 40 higher temperature ranges on request +70
Installation			Max. pitch of end plates 30°, max. deviation of axes to one another must be less than 10 mm. Both limits of stroke have to be limited by external stops. Return has to be effected by external force.
Medium			Filtered and unlubricated compressed air
Material			End plates of steel, galvanized and chromium anodized; Mounting rings of aluminium. Bellows-neoprene with nylon cord lining.
Operating pressure range	p_{max}	bar	8 (for cushioning duty = 7 bar)

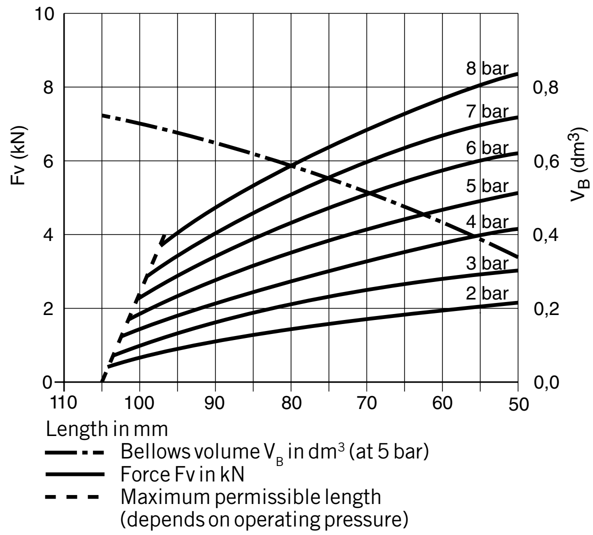
Stroke, Weight, Frequency

Type	Stroke max. (mm)	Weight (mass) (kg)	Frequency[1] (Hz)
SP-1B04	55	0.85	3 (when E = 80)
SP-1B05	45	1.0	4 (when E = 75)
SP-1B07	90	2.1	2.8 (when E = 90)
SP-1B12	100	2.7	2.4 (when E = 100)
SP-1B22	110	4.5	2.1 (when E = 120)
SP-1B34	110	5.5	2.1 (when E = 120)

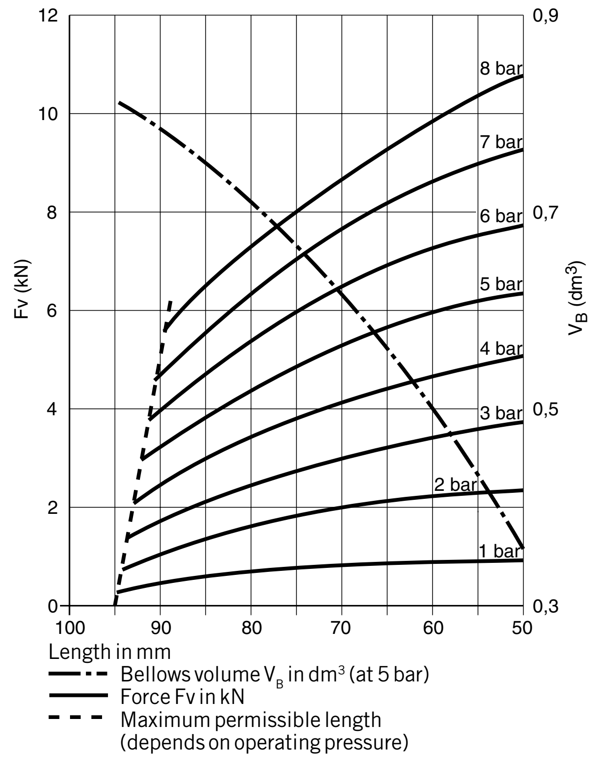
[1] Nominal values at p_{max}

Force Diagrams – Series SP-1B..

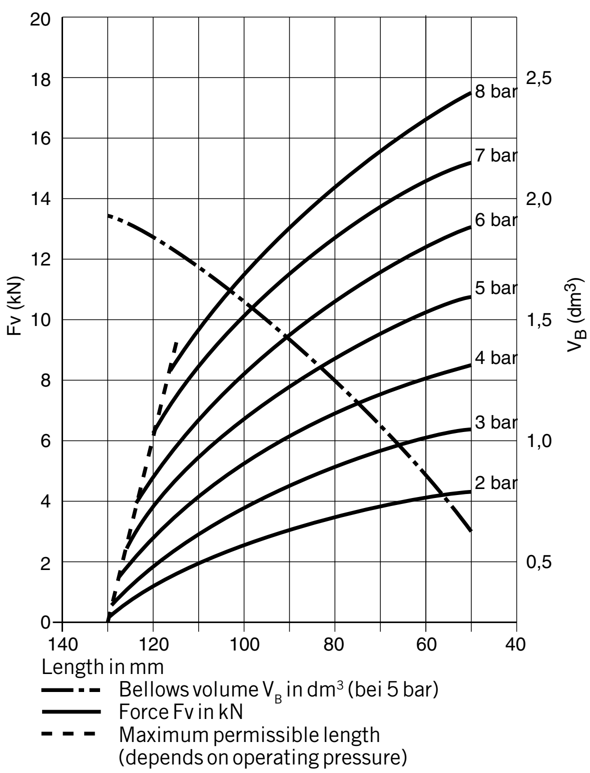
Type: SP-1B04, Stroke: max. 55 mm



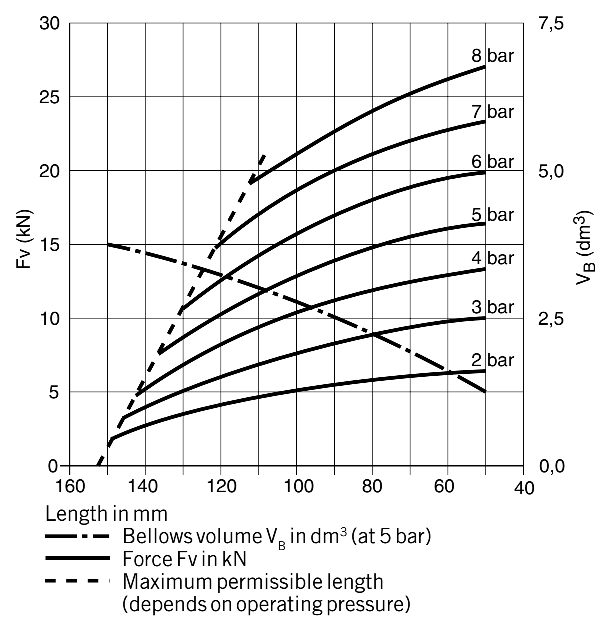
Type: SP-1B05, Stroke: max. 45 mm



Type: SP-1B07, Stroke: max. 90 mm

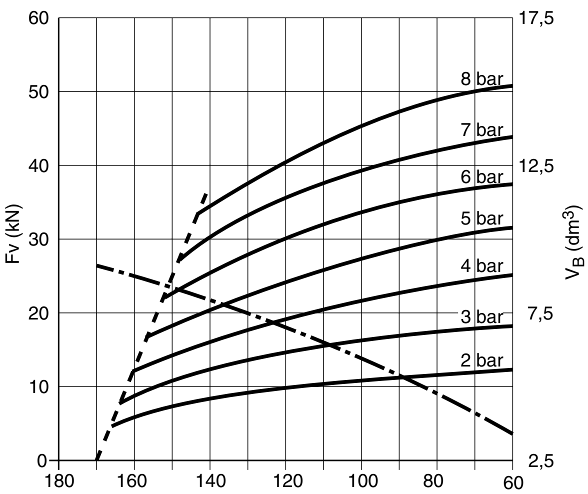


Type: SP-1B12, Stroke: max. 100 mm



Force Diagrams – Series SP-1B..

Type: SP-1B22, Stroke: max. 110 mm



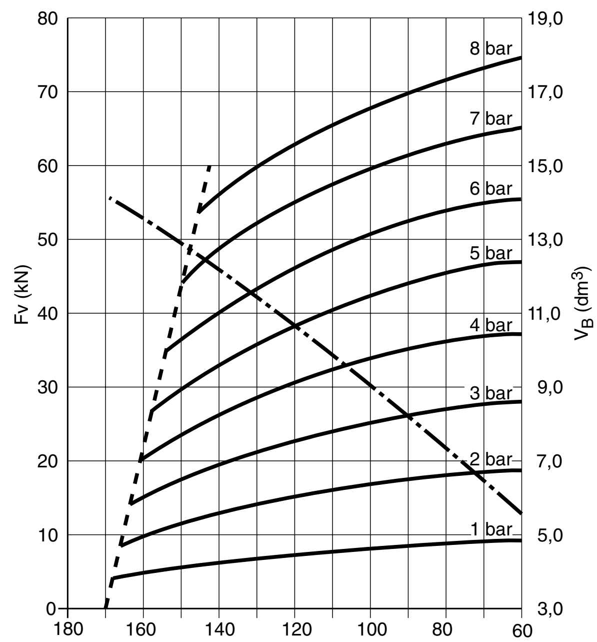
Length in mm

Bellows Volume V_B in dm³ (at 5 bar)

Force Fv in kN

Maximum permissible length (depends on operating pressure)

Type: SP-1B34, Stroke: max. 110 mm



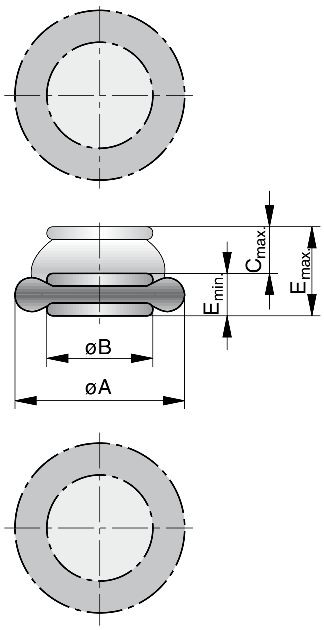
Length in mm

Bellows Volume V_B in dm³ (at 5 bar)

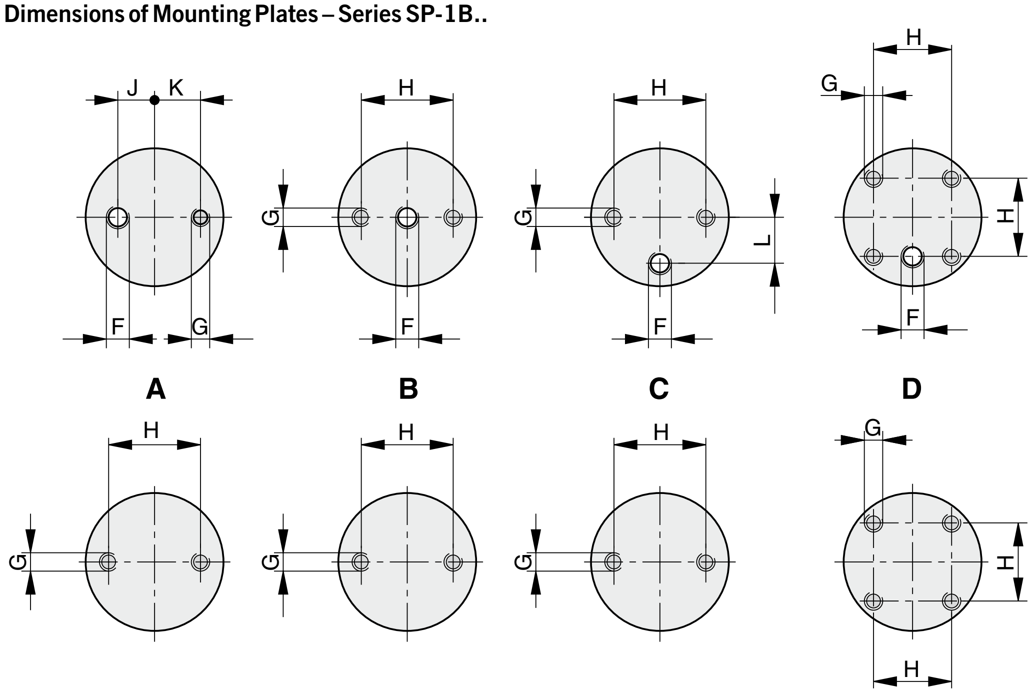
Force Fv in kN

Maximum permissible length (depends on operating pressure)

Dimensions
Series SP-1B..



Dimensions of Mounting Plates – Series SP-1B..



Dimension Table (mm) and Order Instructions

Type	Order-No.	Mounting plate	ØA at 8 bar	ØB	C_{max} **	E_{max} **	E_{min}	F	G*	H	J	K	L
SP-1B04	KY 9500	A	150	88	55	105	50	G1/4	M8	22	9	11	–
SP-1B05	KY 8401	B	165	110	45	95	50	G1/4	M8	44.5	–	–	–
SP-1B07	KY 9501	C	205	135	80	130	50	G1/4	M8	54	–	–	27
SP-1B12	KY 9502	C	250	160	100	150	50	G3/4	M8	89	–	–	38
SP-1B22	KY 9590	C	350	229	110	170	60	G3/4	M12	157.5	–	–	73
SP-1B34	KY 8010	D	420	288	110	170	60	G3/4	M8	158.8	–	–	–

* 15 deep
**These dimensions depend on the operating pressure: see force diagrams

Bellows Cylinder

Series SP-2B..
Double convolution

Characteristics

Characteristics	Symbol	Unit	Description
System			Single acting
Mounting			See drawing
Tube connection			Thread
Ambient temperature range	T_{min} T_{max}	°C °C	- 40 higher temperature ranges on request +70
Installation			Max. pitch of end plates 30°, max. deviation of axes to one another must be less than 10 mm. Both limits of stroke have to be limited by external stops. Return has to be effected by external force.
Medium			Filtered and unlubricated compressed air
Material			End plates of steel, galvanized and chromium anodized; Mounting rings of aluminium. Bellows - neoprene with nylon cord lining
Operating pressure range	p_{max}	bar	8 (for cushioning duty = 7 bar)

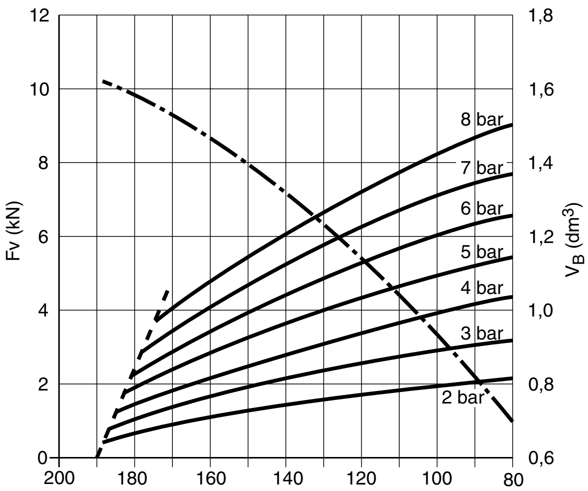
Stroke, Weight, Frequency

Type	Stroke max. (mm)	Weight (mass) (kg)	Frequency [1] (Hz)
SP-2B04	110	1.1	2.3 (when E = 80)
SP-2B05	80	1.2	2.5 (when E = 120
SP-2B05A	105	1.25	2.3 (when E = 140)
SP-2B07	125	2.6	1.9 (when E = 160)
SP-2B12	150	3.5	1.8 (when E = 180)
SP-2B22	170	4.9	1.7 (when E = 190)
SP-2B34	170	6.8	1.7 (when E = 190)

[1] Nominal values at p_{max}

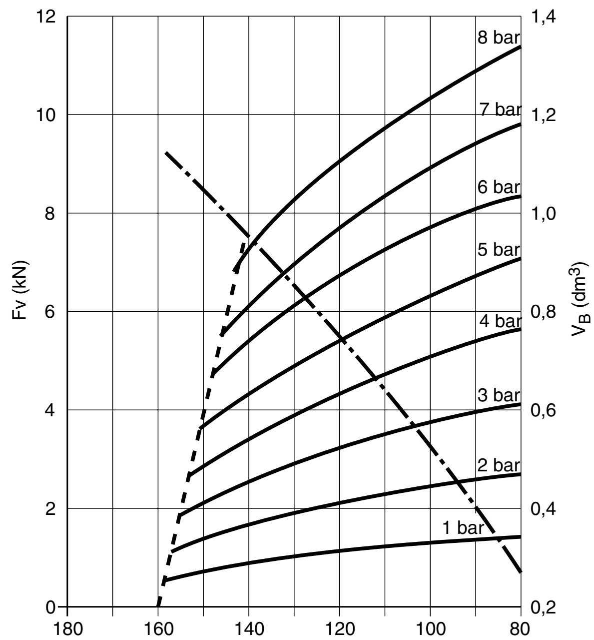
Force Diagrams – Series SP-2B..

Type: SP-2B04, Stroke: max. 110 mm



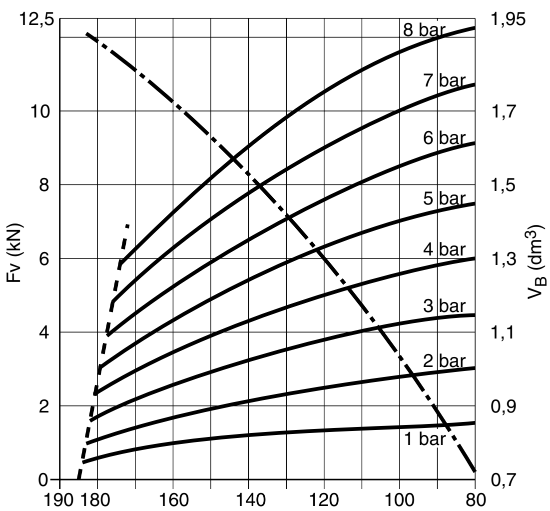
Length in mm
Bellows volume V_B in dm³ (at 5 bar)
Force Fv in kN
Maximum permissible length (depends on operating pressure)

Type: SP-2B05, Stroke: max. 80 mm



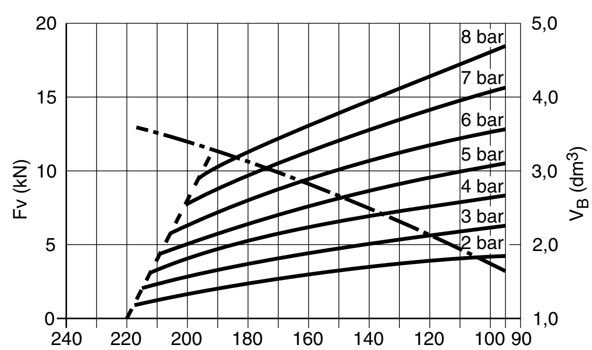
Length in mm
Bellows volume V_B in dm³ (at 5 bar)
Force Fv in kN
Maximum permissible length (depends on operating pressure)

Type: SP-2B05A, Stroke: max. 105 mm



Length in mm
Bellows volume V_B in dm³ (at 5 bar)
Force Fv in kN
Maximum permissible length (depends on operating pressure)

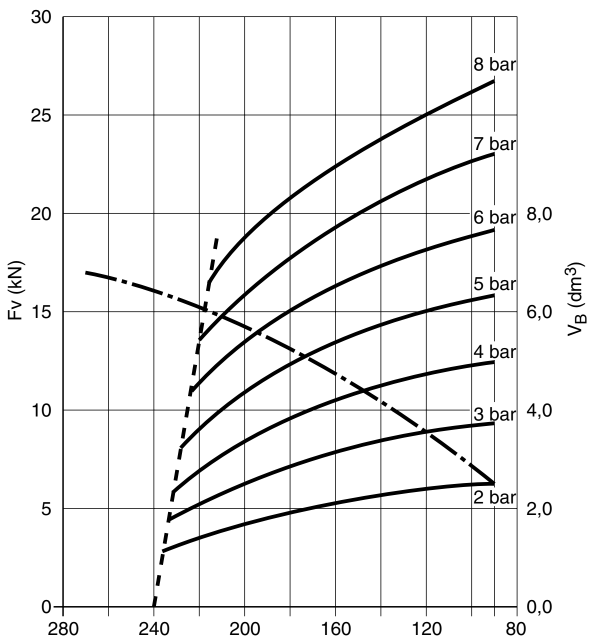
Type: SP-2B07, Stroke: max. 125 mm



Length in mm
Bellows Volume V_B in dm³ (bei 5 bar)
Force Fv in kN
Maximum permissible length (depends on operating pressure)

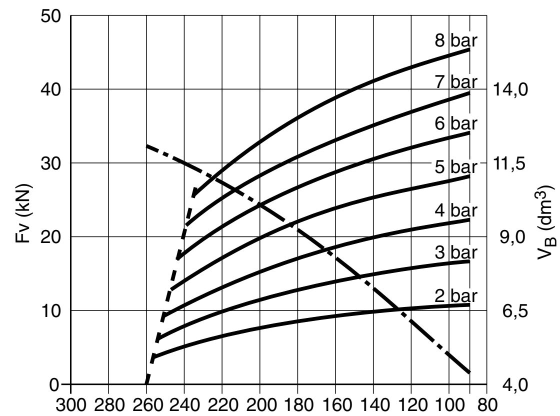
Force Diagrams – Series SP-2B..

Type: SP-2B12, Stroke: max. 150 mm



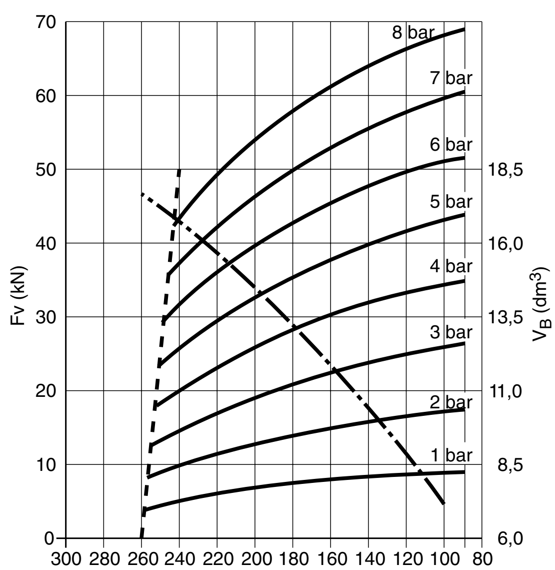
Length in mm
Bellows volume V_B in dm³ (at 5 bar)
Force Fv in kN
Maximum permissible length
(depends on operating pressure)

Type: SP-2B22, Stroke: max. 170 mm



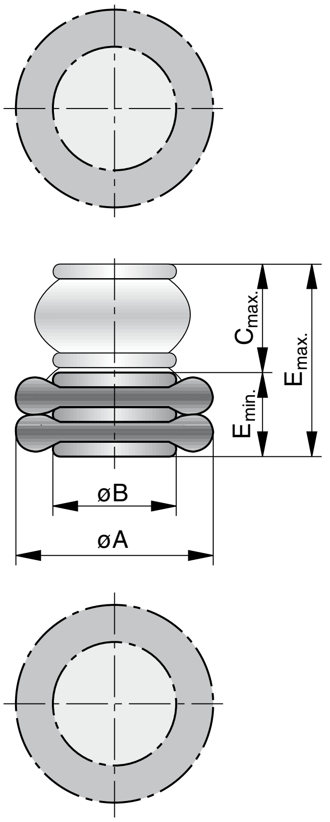
Length in mm
Bellows volume V_B in dm³ (at 5 bar)
Force Fv in kN
Maximum permissible length
(depends on operating pressure)

Type: SP-2B34, Stroke: max. 170 mm

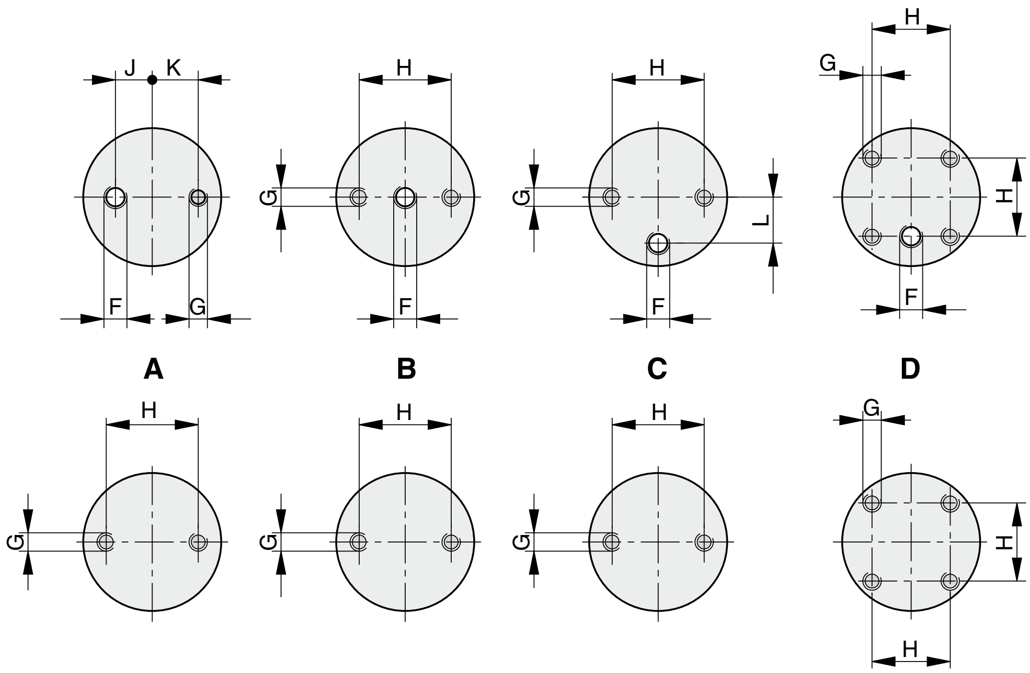


Length in mm
Bellows volume V_B in dm³ (at 5 bar)
Force Fv in kN
Maximum permissible length
(depends on operating pressure)

Dimensions Series SP-2B..



Dimensions of Mounting Plates – Series SP-2B..



Dimension Table (mm) and Order Instructions

Type	Order-No.	Mounting	ØA at 8 bar	ØB	C_{max} **	E_{max} **	E_{min}	F	G*	H	J	K	L
SP-2B04	KY 9612	A	165	82	110	190	80	G1/4	M8	22	9	11	-
SP-2B05	KY 8011	B	165	110	80	160	80	G1/4	M8	44.5	-	-	-
SP-2B05A	KY 8012	B	170	110	105	185	80	G1/4	M8	44.5	-	-	-
SP-2B07	KY 9589	C	215	135	125	220	95	G1/4	M8	54	-	-	27
SP-2B12	KY 9611	C	250	160	150	240	90	G3/4	M8	89	-	-	38
SP-2B22	KY 9591	C	320	229	170	260	90	G3/4	M12	157.5	-	-	73
SP-2B34	KY 8007	D	390	288	170	260	90	G3/4	M8	158.8	-	-	-

*15 deep
**These dimensions depend on the operating pressure: see force diagrams

Cylinder Accessories

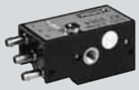
for piston rods
– Piston rod eyes
– Piston rod clevis
– Compensating Coupling
– Coupling

Pivot
– for mounting B
– for mounting EN

Adapter plate for mounting of S9-valves

Magnetic switch

Overview

System	Fig.	Norm	Series	Page
Piston rod eye		ISO8139 CETOP RP103P	GA-.....	138
Piston rod clevis		ISO8140 CETOP RP102P	GK-.....	139
Compensating coupling			AK-.....	140
Coupling			KS-...	141
Pivot for mounting B		VDMA24562	GLN-...	142 143
Pivot for mounting EN			EL-...	144
Adapter plate for mounting S9-valve G1/8 and G1/4			PD40372	145
Magnetic switch electronic also in ATEX-Version			RS... ES..	149, 156
Magnetic switch electronic			RST... EST...	152
Magnetic switch pneumatic			DZVP	147

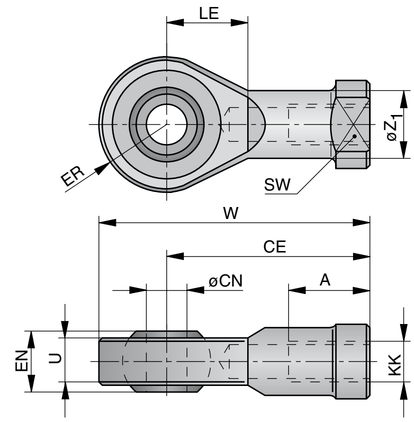
Piston rod eyes

for Cylinder
Ø 10 to 320 mm

– to ISO 8139
– to CETOP RP103P

Series GA-...

Dimensions



Material: galvanized steel

Assembly instructions:
When mounting the load avoid lateral forces on the piston rod.

Delivery includes:
1 spherical clevis

Dimension Table (mm)

Type	ØCN^{H7}	LE	U	EN	ER	W	A	CE	KK	ØZ$_1$	SW
GA-M4	5	9	6	8	9	35	12	27	M4	9	8
GA-M6	6	11	6.75	9	10	40	12	30	M6	10	11
GA-M8	8	13	9	12	12	48	16	36	M8	12.5	14
GA-M10	10	15	10.5	14	14	57	20	43	M10	15	17
GA-M10x1.25	10	15	10.5	14	14	57	20	43	M10x1.25	15	17
GA-M12	12	17	12	16	16	66	22	50	M12	17.5	19
GA-M12x1.25	12	17	12	16	16	66	22	50	M12x1.25	17.5	19
GA-M16	16	22	15	21	21	85	28	64	M16	22	22
GA-M16x1.5	16	22	15	21	21	85	28	64	M16x1.5	22	22
GA-M20x1.5	20	26	18	25	25	102	33	77	M20x1.5	27.5	32
GAN-M24x2	25	31	22	31	$30_{max.}$	$124_{max.}$	42_{min}	94	M24x2	33.5	36
GAN-M27x2	30	36	25	37	$35_{max.}$	$145_{max.}$	$51_{min.}$	110	M27x2	40	41
GAN-M36x2	35	41	28	43	$40_{max.}$	$165_{max.}$	$56_{min.}$	125	M36x2	46	50
GAN-M42x2	40	46	33	49	$45_{max.}$	$187_{max.}$	$60_{min.}$	142	M42x2	53	55
GAN-M48x2	50	59	45	60	$58_{max.}$	$218_{max.}$	$65_{min.}$	160	M48x2	65	65

Order Instructions and Weight

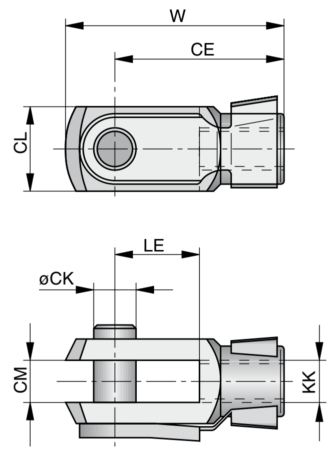
Order Instructions		Weight (mass) (kg)
Type	Order-No.	
GA-M4	KX 6023	0.021
GA-M6	KY 6144	0.025
GA-M8	KY 6145	0.043
GA-M10	KY 6146	0.072
GA-M10x1,25	KY 6147	0.072
GA-M12	KY 6185	0.107
GA-M12x1,25	KY 6148	0.107
GA-M16	KY 6149	0.21
GA-M16x1,5	KY 6150	0.21
GA-M20x1,5	KY 6151	0.38
GAN-M24x2	KY 6152	0.65
GAN-M27x2	KY 6862	1.0
GAN-M36x2	KY 6863	1.6
GAN-M42x2	KY 6864	3.5
GAN-M48x2	KL 9132	5.2

Piston rod clevis

for Cylinder
Ø 10 to 320 mm
– to ISO 8140
– to CETOP RP102P

Series GK-...

Dimensions



Material: galvanized steel

Dimension Table (mm)

Type	ØCK	LE	CM	CL	W	CE	KK
GK-M4	4	8	4	8	22	16	M4
GK-M6	6	12	6	12	31	24	M6
GK-M8	8	16	8	16	42	32	M8
GK-M10	10	20	10	20	52	40	M10
GK-M10x1.25	10	20	10	20	52	40	M10x1.25
GK-M12	12	24	12	24	62	48	M12
GK-M12x1.25	12	24	12	24	62	48	M12x1.25
GK-M16	16	32	16	32	83	64	M16
GK-M16x1.5	16	32	16	32	83	64	M16x1.5
GK-M20x1.5	20	40	20	40	105	80	M20x1.5
GKN-M24x2	25	50	25	50	132 max.	100	M24x2
GKN-M27x2	30	54	30	55	148 max.	112	M27x2
GKN-M36x2	35	72	36	70	188 max.	144	M36x2
GKN-M42x2	40	84	40	85	245 max.	168	M42x2
GKN-M48x2	50	96	50	96	277 max.	192	M48x2

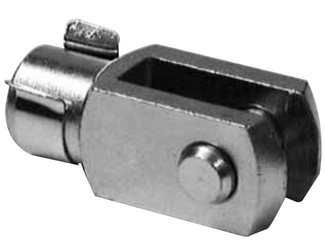
Assembly instructions:
On the load side with pin and circlip (supplied).
When mounting the load avoid lateral forces on the piston rod.

Delivery includes:
1 spherical clevis

From Ø 125 upward, the safety clamp and the pin held with two circlips are omitted.

Order Instructions and Weight

Order Instructions		Weight (mass) (kg)
Type	Order-No.	
GK-M4	KZ 1413	0.008
GK-M6	KY 6132	0.016
GK-M8	KY 6133	0.038
GK-M10	KY 6134	0.08
GK-M10x1.25	KY 6135	0.08
GK-M12	KY 6138	0.125
GK-M12x1.25	KY 6136	0.125
GK-M16	KY 6140	0.3
GK-M16x1.5	KY 6139	0.3
GK-M20x1.5	KY 6141	0.52
GKN-M24x2	KY 6142	1.08
GKN-M27x2	KY 6866	1.5
GKN-M36x2	KY 6867	2.9
GKN-M42x2	KY 6868	6
GKN-M48x2	KL9131	7.9



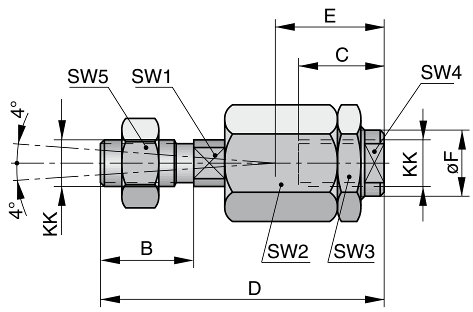
Compensating Coupling

for Piston Rods
Ø 10 to 320 mm
– to ISO 8139
– to CETOP RP103P

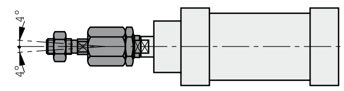
Series AK-...

The compensating coupling is used to connect the piston rod end of all types of cylinders to the machine parts which are to be moved.
It compensates for radial and angular misalignments.

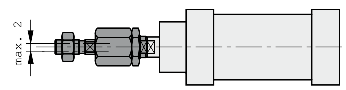
Dimensions



Angular compensation



Radial compensation of the centre axis



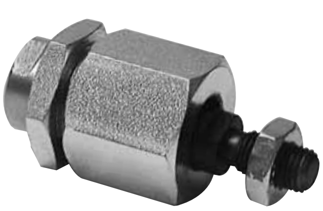
Material: Steel
Tensile strength: 500-600 N/mm²

Dimension Table (mm)

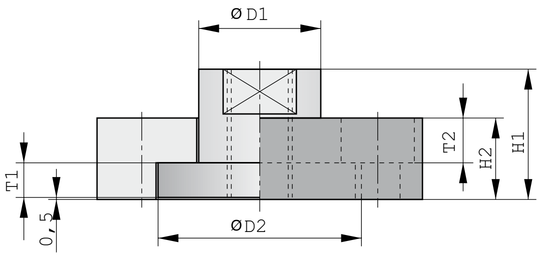
Type	KK	B	C	D	E	ØF	SW1	SW2	SW3	SW4	SW5
AK-M4	M4	8	14	33	20	SW12	3.2	12	12	12	7
AK-M6	M6	12	11	39	14	8.5	5	13	13	7	10
AK-M8	M8	16	14	55	20	12.4	7	17	17	10	13
AK-M10	M10	20	23	70	31	21	12	30	30	19	17
AK-M10x1.25	M10x1.25	20	23	73	31	21	12	30	30	19	17
AK-M12	M12	24	23	68	31	21	12	30	30	19	19
AK-M12x1.25	M12x1.25	24	23	77	31	21	12	30	30	19	19
AK-M16	M16	40	32	113	45	33.5	19	41	41	30	24
AK-16x1.5	M16x1.5	32	32	108	45	33.5	19	41	41	30	24
AK-M20x1.5	M20x1.5	40	42	122	56	33.5	19	41	41	30	30
AK-M24x2	M24x2	44	48	147	51	–	22	55	55	32	36
AK-M27x2	M27x2	54	48	147	51	39	24	55	55	32	41
AK-M36x2	M36x2	72	50	241	110	56	36	75	75	50	55
AK-M42x2	M42x2	82	88	271	120	–	36	80	80	60	65
AK-M48x2	M48x2	82	88	271	120	–	42	80	80	60	75

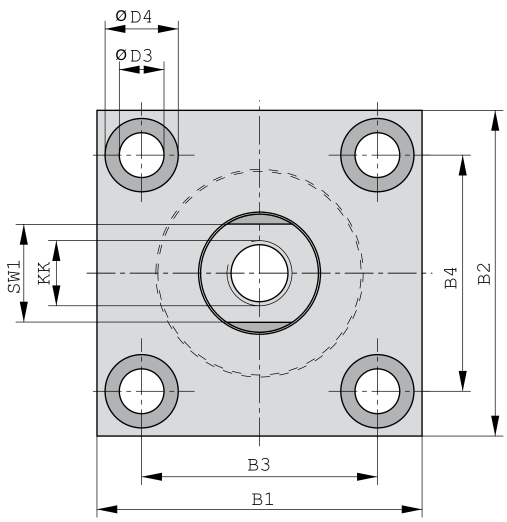
Order Instructions and Weight

Order Instructions		Weight (mass) (kg)
Type	Order-No.	
AK-M4	KY1152	0.020
AK-M6	KY1126	0.020
AK-M8	KY1127	0.060
AK-M10	KY1128	0.230
AK-M10x1.25	KY1129	0.230
AK-M12	KY1130	0.230
AK-M12x1.25	KY1131	0.230
AK-M16	KY1132	0.650
AK-M16x1.5	KY1133	0.650
AK-M20x1.5	KY1134	0.710
AK-M24x2	KC5035	1.600
AK-M27x2	KC5036	1.600
AK-M36x2	KY1139	5.100
AK-M42x2	KY1140	7.900
AK-M48x2	KL9133	7.900



Dimensions





Material: steel, zinc-plated

Coupling

for Cylinder
Ø 32– 100 mm

Series KS-....

- angular compensation 0.4 to 0.8 mm
- radial compensation 2 mm

Included in delivery:
1 flange
1 threaded part

Dimension Table (mm)

Type	B_1	B_2	B_3	B_4	$ØD_1^{H11}$	$ØD_2$	$ØD_3^{H13}$	$ØD_4^{H13}$	H_1	H_2	T_1	T_2	KK	SW1
KS-M10x1.25	60	37	36	23	20	30	6.6	11	24	15	7	7	M10x1.25	17
KS-M12x1.25	60	56	42	38	25	40	9	15	30	20	8	9	M12x1.25	19
KS-M16x1.5	80	80	58	58	30	50	11	18	32	20	9	11	M16x1.5	24
KS-M16x1.5	80	80	58	58	30	50	11	18	32	20	9	11	M16x1.5	24
KS-M20x1.5	90	90	65	65	40	60	14	20	35	20	10	13	M20x1.5	36
KS-M20x1.5	90	90	65	65	40	60	14	20	35	20	10	13	M20x1.5	36

Order Instructions and Weight

Order Instructions		Weight (kg)
Type	Order-No.	
KS-M10x1.25	KC 5224	0.300
KS-M12x1.25	KC 5225	0.400
KS-M16x1.5	KC 5226	0.900
KS-M20x1.5	KC 5227	1.100

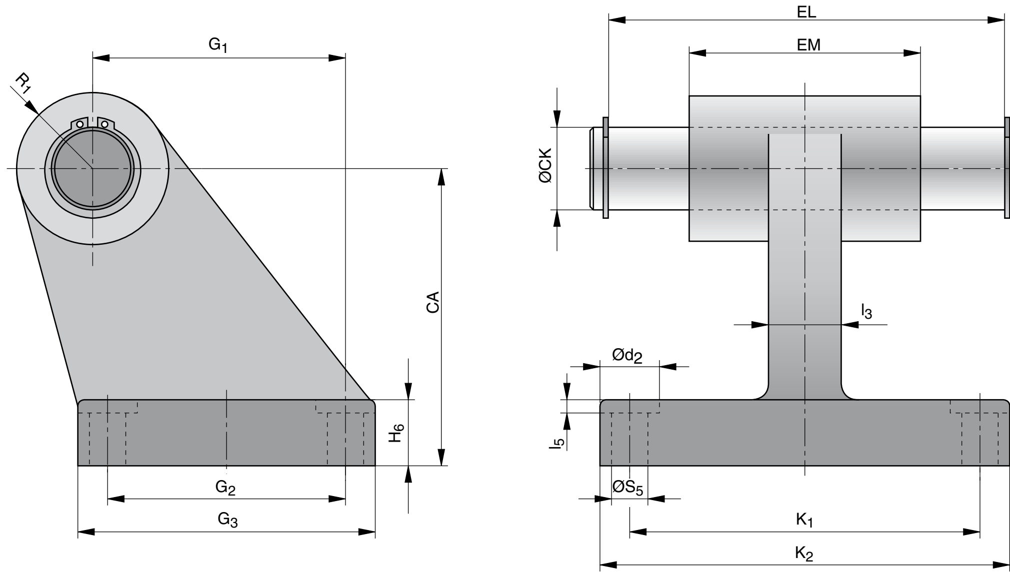
Pivot for mounting B

for Cylinder
Ø 32 to 100 mm
– to ISO 15552
– to VDMA 24562
– to CETOP RP43P

Series GLN-...

for 90° rotation

Dimensions – Pivot for mounting B Ø 32-320 mm
for 90° rotation



Included in delivery:

for Ø 32-100 mm:
1 Bracket
1 Pin with collar
1 Circlip

for Ø 125-320 mm:
1 Bracket
1 Pin
2 Circlips DIN 471

Material:
Ø 32-200: cast aluminium
Ø 250-320: cast steel

Dimension Table (mm)

Cyl. Ø	Ød_2	l_3	l_5	G_1	G_2	G_3	EL	H_6	K_1	K_2	R_1	ØS_5	CA	ØCK^{H9}	EM
32	11	10	1.6	21	18	31	46	8	38	51	10	6.6	32	10	26
40	11	15	1.6	24	22	35	53	10	41	54	11	6.6	36	12	28
50	15*	16	1.6	33	30	45	61	12	50	65	13	9.0	45	12	32
63	15	16	1.6	37	35	50	71	14*	52	67	15	9.0	50	16	40
80	18	20	2.5	47	40	60	91	14	66	86	15	11.0	63	16	50
100	18	20	2.5	55	50	70	111	17*	76	96	19	11.0	71	20	60
125	20	30	3.2	70	60	90	132	20	94	124	22.5	14.0	90	25	70
160	20	36	4.0	97	88	126	172	25	118	156	31.5	14.0	115	30	90
200	26	40	4.0	105	90	130	172	30	122	162	31.5	18.0	135	30	90
250	33	45	4.5	128	110	160	202	35	150	200	40	22.0	165	40	110
320	40	55	4.5	150	122	186	222	40	170	234	45	26.0	200	45	120

* strengthened, non-standard dimensions

Order Instructions and Weight

for Cylinder Ø	Weight (kg)	Order Instructions	
		Type	Order-No.
32*	0.092	GLN-032	PD 40844
40*	0.131	GLN-040	PD 40845
50*	0.193	GLN-050	PD 40846
63*	0.305	GLN-063	PD 40847
80*	0.460	GLN-080	PD 40848
100*	0.840	GLN-100	PD 40849
125**	3.0	GLN-125	PD 24027
160**	6.5	GLN-160	PD 24028
200**	8.0	GLN-200	PD 39193
250**	13.5	GLN-250	PD 39194
320**	21.90	GLN-320	KL9129

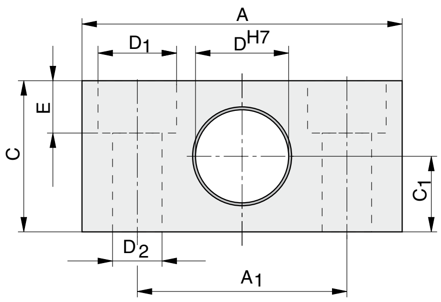
* version with circlip
** version with 2 security bolts according to DIN 471

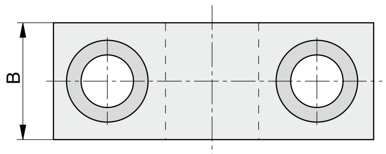
Pivot for mounting EN

for Cylinder
Ø 32 to 320 mm

Series EL-...

Dimensions





Material:
Ø32-125 mm – cast aluminium
Ø160-250 mm – Al, anodized
Ø 320 mm – steel

Dimension Table (mm)

for Cyl. Ø	A	A_1	B	C	C_1	$ØD^{H7}$	$ØD_1$	$ØD_2$	E
32	55	36	20	26	13	12	13.5	8.4	9
40, 50	55	36	20	26	13	16	13.5	8.4	9
63, 80	65	42	25	30	15	20	16.5	10.5	11
100, 125	75	50	28	40	20	25	19	13	13
160, 200	92	60	35	60	30	32	26	18	17
250	140	90	40	70	35	40	33	22	21.5
320	150	100	60	80	40	50	40	26	25.5

Order Instructions and Weight

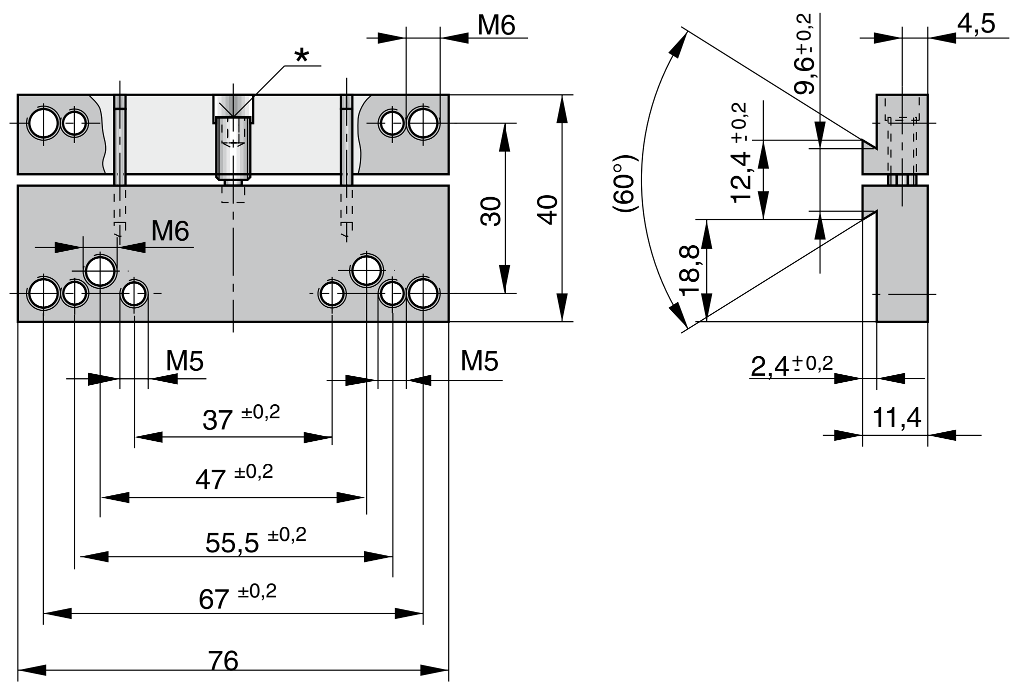
Order Instructions		for Cylinder-Ø	Weight (mass) (kg)
Type	Order-No.		
EL-032	PD 23381	32	0.06
EL-040/050	PD 23382	40, 50	0.06
EL-063/080	PD 23383	63, 80	0.10
EL-100/125	PD 23384	100, 125	0.175
EL-160/200	PD 24425	160, 200	0.35
EL-250	PD 25763	250	0.50
EL-320	KL 9130	320	6,70

Adapter plate

for mounting of
S9 valves
G1/8, G1/4

for cylinder series
Ø 32 – 100 mm
– NZ...., NZD....,
NZV...
– AZ...., AZD....,
AZ3...., AZ4....

Dimensions (mm)



Material: Al, anodized

Order Instruction: PD40372

Magnetic Switches pneumatic

with output indicator

Series DZPV

Characteristics

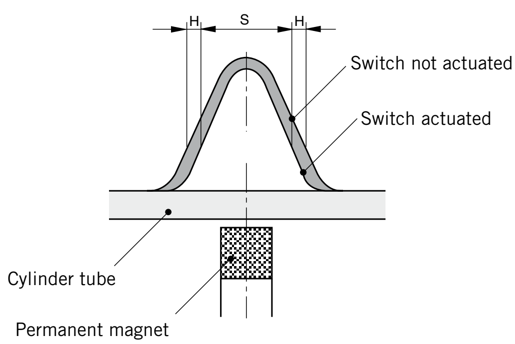
Characteristics	Symbol	Unit	Description
Installation			In any position
Material			Housing: Macrolon
Ambient temperature range *)	T_{min} T_{max}	°C °C	-10 +60
Service life			10 x 10^6 switching cycles
Switching point accuracy		mm	± 0,2
Max. impulse acceleration		m/s^2	50 g
Nominal diameter		mm	2
Medium			Filtered compressed air
Filter fineness	max.	µm	40
Lubrication			None required
Nominal pressure		bar	6
Operating pressure range	p_{min} p_{max}	bar bar	2 6
Nominal flow		l/min	40
Switching frequency		Hz	40 (without switching volume)
Connection			Push-on nipples for NW3 tubing
Weight (mass)		kg	0.014 Magnet switch 0.020 Magnet switch with mounting

*) For the temperature range of the magnetic switches, the surface temperature and own heat generation of the cylinder must be taken into account.

The magnetic switches are mounted on the cylinder tube profile.
One or more switches can be fitted, depending on the stroke length.
For cylinders for contactless position sensing see Series AZ, AZV.

Switching Characteristics

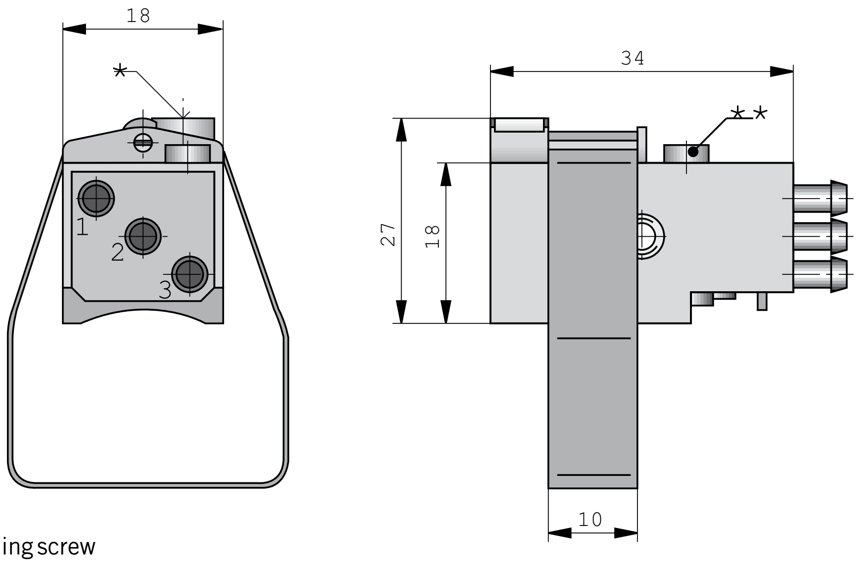
H = Hysteresis
S = Response range



Response Range, Overrun Speed

Cylinder Ø (mm)	Response range s	Overrun speed $V_{max.}$
32	12	$V_{max.} = \frac{s}{ta}$ ta = response time of following device
40	12	
50	12	
63	13	
80	13	
100	13	

Dimensions (mm) – for Tube Connection NW3



* Tightening screw
** Indicator

Assembly Instructions

– The mounting is designed only for AZ cylinders. The switch must be mounted on a radiused side of the cylinder barrel (not on a side with a dovetail groove).

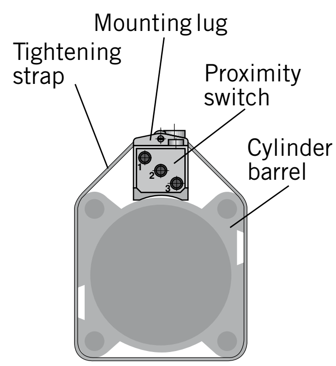
– When fitting the DZPV, ensure that the tightening screw between strap and switch is tightened with a torque not exceeding 1.5 Nm.

– To avoid interference from other magnetic fields, pneu matic cylinders installed close together should be at least 20 mm apart.

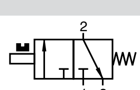
– To avoid interference from other ferromagnetic components with the function of the DZPV, a minimum spacing of 15 mm should be maintained.

– When fitting the DZPV, ensure that port 3 (exhaust) is never closed.

The DZPV pneumatic proximity switch requires the following operating conditions:
– filtered and moderately lubricated compressed air
– compressed air without aggressive constituents
– operating pressure from 2 to 8 bar



Order Instructions

Version	Symbol	for Cylinder Ø	Order Instructions	
			Type	Order-No.
Switch			DZPV	KZ 2364
Mounting element		32-100	KLAZ 32	KC 8255

Characteristics

Characteristics	Symbol	Unit	Description	
Electrical Characteristics			Type RS	Type ES
Switching output			Reed	PNP/NPN
Operating voltage	U_B	V	(5 DC) 10-240 AC/DC (NO) (5 DC) 10-150 AC/DC (NC) (5 DC) 10-70 AC/DC plug	10-30 DC
Voltage drop		V	≤ 3	≤ 2
Connection technology			2-wire	3-wire
Switching function			Normally open/closed	Normally open
Permanent current	I_{Dmax}	mA	< 200	
Breaking capacity		W	< 100	
Power consumption		mA	–	< 20
Function indicator			LED, yellow	
Response time		ms	< 2	< 2 (on)
Sensitivity		mT	2...4	2...4
Switch-off delay		ms	None	25
Short circuit proof			No	Yes
Pole reversal proof			No	Yes
Switchable capacity		µF	0.1 at 100 Ω, 24 VDC	
Switching point accuracy		mm	± 0.2 *	
Hysteresis		mm	1.5 for series OSP < 8 *)	≤ 3 *)
EMC		EN	to 60947	
Service life			≥ 10 x 10^8 switching cycles	Theoretically unlimited
Mechanical Characteristics				
Housing			Macrolon, smoke colour	
Cable diameter		mm^2	2 x 0.14	3 x 0.14
Cable type			PVC highly flexible/PUR highly flexible	
Cable length			2.5 at 5.0 m, connector on 10 cm cable	
Bending radius		mm	Fixed ≥ 20, moving ≥ 70	
Weight		g	45 (RS-K, cable 2.5m) 80 (RS-K, cable 5.0m) 15 (RS-S)	
Degree of protection		IP	67 to EN 60529	
Ambient temperature range **)		°C	-25 to +80	
Shock resistance		G	< 50 at 50 Hz and 1mm stroke	

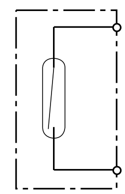
*) These values depend on the type and diameter of cylinder used – please consult us,

**) For the temperature range of the magnetic switches, the surface temperature and own heat generation of the cylinder must be taken into account.

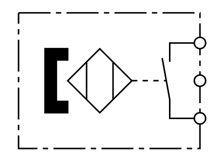
Magnetic Switches electronic

CE

Series RS



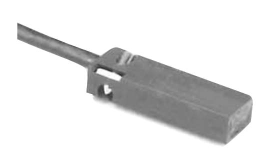
Series ES



Magnetic switches are used for electrical sensing of the position of the piston, e.g. at its end positions. They can also be used for sensing of intermediate positions.

Sensing is contactless, based on magnets which are built-in as standard. A yellow LED indicates operating status.

The magnetic switches are fitted in the dovetail slot in the profiles of AZ-, SZ-, NZ- and NZK-cylinders or with a strap mounting on R-type cylinders.



Magnetic Switches RS and ES

Electrical Service Life Protective Measures

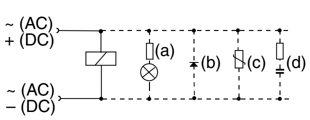
Magnetic switches are sensitive to excessive currents and inductions. With high switching frequencies and inductive loads such as relays, solenoid valves or lifting magnets, service life will be greatly reduced.

With resistive and capacitative loads with high switch-on current, such as light bulbs, a protective resistor should be fitted. This also applies to long cable lengths and voltages over 100 V.

In the switching of inductive loads such as relays, solenoid valves and lifting magnets, voltage peaks (transients) are generated which must be suppressed by protective diodes, RC loops or varistors.

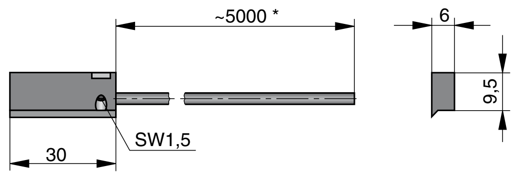
Connection Examples:

Load with protective circuits
(a) Protective resistor for light bulb
(b) Freewheel diode on inductivity
(c) Varistor on inductivity
(d) RC element on inductivity



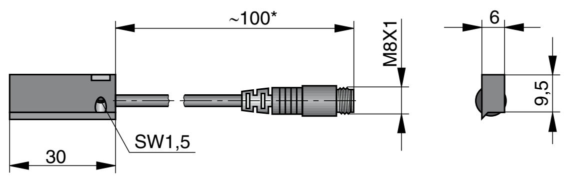
For the type ES, external protective circuits are not normally needed.

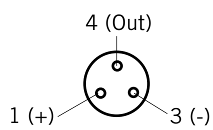
Dimensions (mm) – Type RS-K



* Length with possible minus tolerance, see chart below

Dimensions (mm) – Type ES-S / RS-S**





PIN assignment (view of pins) according to DIN EN 50044

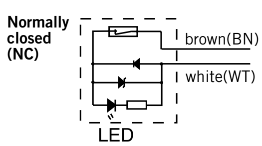
* Length with possible minus tolerance, see chart below
** Operating voltage max. 70 V

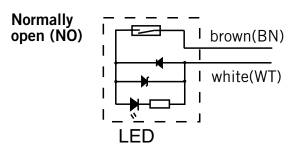
Length of connection cable with length tolerance

Sensor Order-No.	Nominal cable length	Length tolerance
KL3043, KL3055, KL3059	2500 mm	– 50 mm
KL3045, KL3048, KL3056	5000 mm	– 50 mm
KL3054	100 mm	– 20 mm
KL3060	145 mm	± 5 mm

Type RS
In the type RS contact is made by a mechanical reed switch encapsulated in glass.

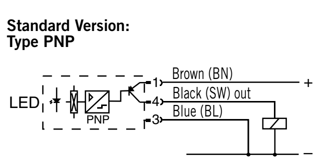
Electrical Connection, Type RS

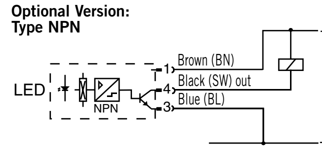




Type ES
In the type ES contact is made by an electronic switch – without bounce or wear and protected from pole reversal. The output is short circuit proof and insensitive to shocks and vibrations.

Electrical Connection, Type ES

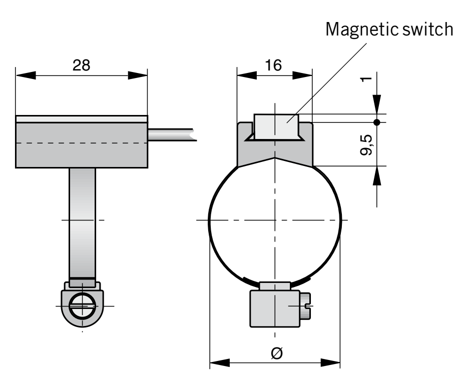




Order Instructions

Version	Imprint	Order Instructions	
		Type	Order-No.
Magnetic switch, reed contact, normally open, screw connector M8, Pin 3 neutral (ES-S compatible connector; preferred type)	1+ 4 max. 70 V/0,2 A	RS-S	KL3047
Magnetic switch, reed contact, normally closed, screw connector M8, Pin 3 neutral	1+ 4 max. 70 V/0,2 A	RS-S	KL3087
Magnetic switch, reed contact, normally closed with 5.0 m cable	bn+ max. 150 V/0,2 A	RS-K	KL3048
Magnetic switch, reed contact, normally open with 2.5 m cable	bn+ max. 240 V/0,2 A	RS-K	KL3043
Magnetic switch, reed contact, normally open with 5.0 m cable	bn+ max. 240 V/0,2 A	RS-K	KL3045
Magnetic switch, electronic, PNP-Switching with screw connector M8	PNP	ES-S	KL3054
Magnetic switch, electronic, NPN-Switching with screw connector M8	NPN	ES-S	KL3060
Magnetic switch, electronic, PNP-Switching with 2.5 m cable	PNP	ES-K	KL3055
Magnetic switch, electronic, NPN-Switching with 2.5 m cable	NPN	ES-K	KL3059
Magnetic switch, electronic, PNP-Switching with 5.0 m cable	PNP	ES-K	KL3056
Cable set 2.5 m and connector M8 with union nut		KSG25	KC3102
Cable set 5.0 m and connector M8 with union nut		KSG50	KC3104
Connector M8 without cable for custom made cables		STG8	KC3152

Strap mounting for Magnetic Switch for Series R, Ø10-63mm



Dimension Table and Order Instructions – Mounting

Cyl. Ø	Order Instructions	
	Type	Order-No.
10,12,16	HMSR 010, 012, 016	KL9196
20, 25	HMSR 020, 025	KL9197
32	HMSR 032	KL9198
40	HMSR 040	KL9199
50	HMSR 050	KL9284
63	HMSR 063	KL9285

Magnetic Switches electronic

CE

Series RST
Series EST

Magnetic switches are used for electrical sensing of the position of the piston, e.g. at its end positions. They can also be used for sensing of intermediate positions.

Sensing is contactless, based on magnets which are built-in as standard. A yellow LED indicates operating status.

The magnetic switches are mounted directly in the T-slot of NZ, AZ and FZ cylinders or, with the adapter, in the dovetail slot in the profiles of SZ- and NZK cylinders. For R-type cylinders a special strap mounting is used.

1) For the temperature range of the magnetic switches, the surface temperature and own heat generation of the cylinder must be taken into account.

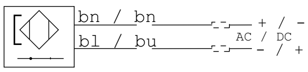
Characteristics

Characteristics	Symbol	Unit	Description	
Electrical Characteristics			Type RST	Type EST
Switching output			Reed	PNP
Operating voltage	U_B	V	10-30 AC/DC	10-30 DC
Ripple	U_b		–	≤ 10%
Voltage drop		V	≤ 3	≤ 2
Electrical configuration			2-wire	3-wire
Output function			Normally open/closed	Normally open
Permanent current	I_{Dmax}	mA	≤ 100	≤ 100
Breaking capacity		W	≤ 6 peak	–
Power consumption, at U_B=24V, switched on, without load		mA	–	≤ 10
Function indicator			LED, yellow (not for normally closed)	
Response time		ms	≤ 2	≤ 0,5
Sensitivity		mT	2 – 4	2 – 4
Time delay before availability		ms	–	≤ 2
Reverse polarity protection			yes	yes
Short-circuit protection			no	yes (pulsed)
Switchable capacity load		µF	0.1 at 100 Ω, 24 VDC	
Switching frequency		Hz	≤ 400	≤ 5 k
Repeatability		mm	≤ 0.2*)	≤ 0.2 *)
Hysteresis		mm	≤ 1.5 *)	≤ 1.5 *)
EMC		EN	60947-5-2	
Lifetime			≥ 35 Mio. cycles with PLC load	unlimited
Power-up pulse suppression			–	yes
Protection for inductive load			–	yes
Mechanical Characteristics				
Housing			Plastic / PA66 + PA6I red	
Cable cross section		mm^2	2 x 0.14	3 x 0.14
Cable type			PUR, black	PUR, black
Bending radius		mm	≥ 36	≥ 30
Weight		kg	ca. 0.030 RST-K ca. 0.010 RST-S	ca. 0.030 EST-K ca. 0.010 EST-S
Degree of protection		IP	67 to EN 60529	
Ambient temperature range 1)		°C	-25 to +80	-25 to +75 at U_B=10-30 V -25 to +80 at U_B=10-28 V
– with adapter		°C	-25 to +60	
Adapter tightening torque		Nm	0.15 (tightening torque for screwing adapter onto magnetic switch)	
Shock resistance				
Vibration to EN 60068-2-6		G	15, 11ms, 10 to 55 Hz, 1 mm	
Shock to EN 60068-2-27		G	50, 11 ms	
Bump to EN 60068-2-29		G	30, 11 ms, 1000 bumps each axis	

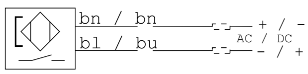
*) These values depend on the type and diameter of cylinder used – please consult us.

Electrical Connection
Type RST-K

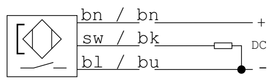
Normally closed



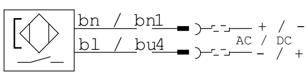
Normally open



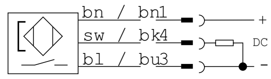
Electrical Connection
Type EST-K



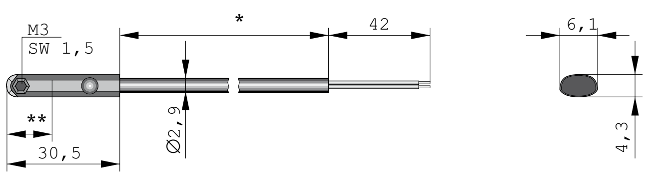
Electrical Connection
Type RST-S



Electrical Connection
Type EST-S



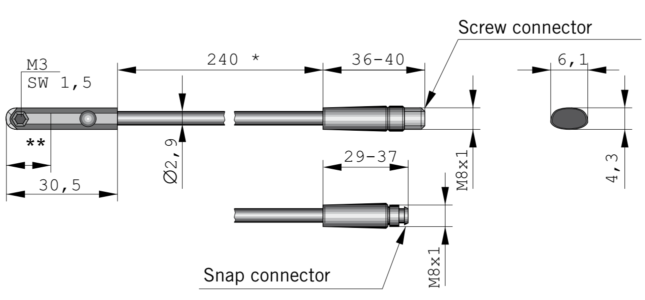
Dimensions (mm) – Type RST-K, EST-K



* Cable lengths available: 5000 mm ± 75 mm
2000 mm ± 40 mm

** Switching point: Type RST-K Normally closed 14 mm
Type RST-K Normally open 12.3 mm
Type EST-K Normally open 8.1 mm

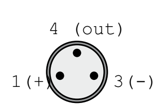
Dimensions (mm) – Type RST-S, EST-S



* ± 6 mm
** Switching point: Type RST-K Normally closed 14 mm
Type RST-K Normally open 12.3 mm
Type EST-K Normally open 8.1 mm

Type RST
In the type RST contact is made by a mechanical reed switch encapsulated in glass.

Type EST
In the type EST contact is made by an electronic switch – without bounce or wear and protected from pole reversal. The output is short circuit proof and insensitive to shocks and vibrations. Connection is by 3-pole connector for easy disconnection.Fitted with connection cable 100 mm long with connector.
A 5 m cable with connector and open end can be ordered separately, or use the Order No. for the complete Type ES with 5 m cable.



PIN assignment
(view of pins) to DIN EN 50044

Electrical Service Life Protective Measures

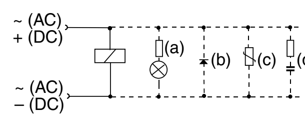
Magnetic switches are sensitive to excessive currents and inductions. With high switching frequencies and inductive loads such as relays, solenoid valves or lifting magnets, service life will be greatly reduced.

With resistive and capacitative loads with high switch-on current, such as light bulbs, a protective resistor should be fitted. This also applies to long cable lengths.

In the switching of inductive loads such as relays, solenoid valves and lifting magnets, voltage peaks (transients) are generated which must be suppressed by protective diodes, RC loops or varistors.

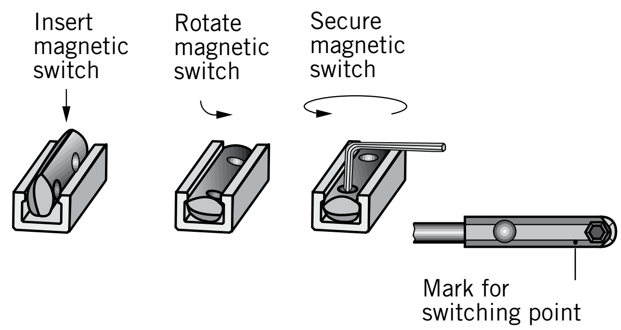
Connection Examples:

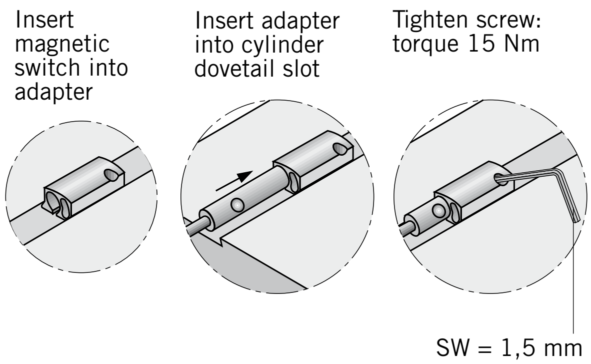
Load with protective circuits
(a) Protective resistor for light bulb
(b) Freewheel diode on inductivity
(c) Varistor on inductivity
(d) RC element on inductivity



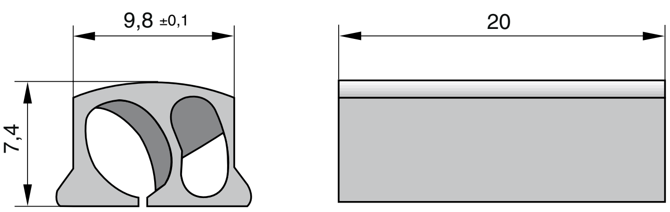
For the type EST, external protective circuits are not normally needed.

Installation

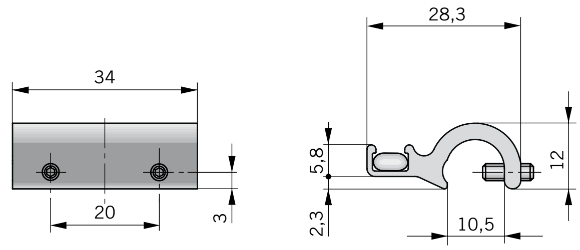




Dimensions of Adapter for Magnetic Switch

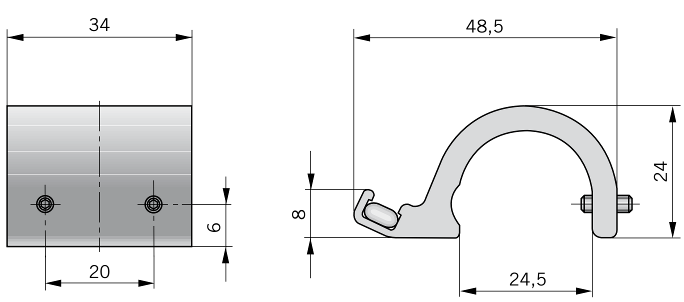


Mounting for T-slot switch for Cylinder Series AZZ Ø32–100 mm



Order-No. PD48955

Mounting for T-slot switch for Cylinder Series DZ Ø125–320 mm

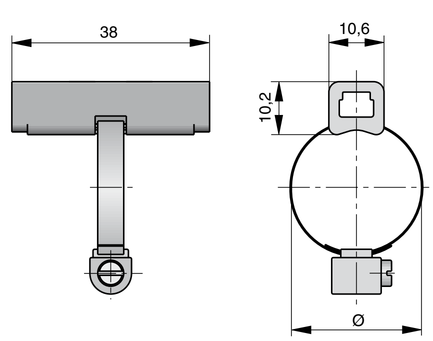


Order-No. PD48956

Order Instructions – Mounting for T-slot switch

Cylinder Series	for Cyl. Ø	Order Instructions	
		Type	Order-No.
R.... Ø10-63mm	10/12/16	HMTR 010/012/016	KL9190
	20/25	HMTR 020/025	KL9191
	32	HMTR 032	KL9192
	40	HMTR 040	KL9193
	50	HMTR 050	KL9194
	63	HMTR 063	KL9195

Mounting for T-slot switch for Cylinder Series R Ø10–63 mm



Order Instructions – Magnetic Switches

Version	Voltage	Order Instructions	
		Type	Order-No.
Magnetic switch, reed contact, normally open, LED indicator, cable 2 m	10-30 V AC / DC	RST-K	KL 3301
Magnetic switch, reed contact, normally open, LED indicator, cable 5 m	10-30 V AC / DC	RST-K	KL 3300
Magnetic switch, reed contact, normally open, snap connector M8, LED indicator cable 0.24 m	10-30 V AC / DC	RST-S	KL 3302
Magnetic switch, reed contact, normally open, screw connector M8, LED indicator, cable 0.24 m	10-30 V AC / DC	RST-S	KL 3303
Magnetic switch, reed contact, normally closed, cable 5 m	10-30 V AC / DC	RST-K	KL 3305
Magnetic switch, electronic, PNP, LED indicator, cable 2 m	10-30 V DC	EST-K	KL 3308
Magnetic switch, electronic, PNP, LED indicator, cable 5 m	10-30 V DC	EST-K	KL 3309
Magnetic switch, electronic, PNP snap connector M8, LED indicator	10-30 V DC	EST-S	KL 3312
Magnetic switch, electronic, PNP screw connector M8, LED indicator	10-30 V DC	EST-S	KL 3306

Included in delivery: 1 magnetic switch
1 adapter for dovetail slot mounting

Order Instructions – Accessories

Description	Order Instructions	
	Type	Order-No.
Cable M8; 2.5 m – without lock nut	KS 25	KY 3240
Cable M8; 5.0 m – without lock nut	KS 50	KY 3241
Cable M8; 10.0 m – without lock nut	KS 100	KC 3140
Cable M8; 2.5 m – with lock nut	KSG 25	KC 3102
Cable M8; 5.0 m – with lock nut	KSG 50	KC 3104
Adapter for dovetail slot (pack of 10)		KL 3333
Mounting for T-slot switch – for Cylinder Series AZZ Ø 32-100 mm		PD48955
Mounting for T-slot switch – for Cylinder Series DZ Ø 125-320 mm		PD48956
Mounting for T-slot switch – for Cylinder Series R Ø 10-63 mm	HMTR ...	see page 154

Components for EX-Areas

Magnetic Switches electronic

CE

Series RS-K..ATEX
Series ES-K..ATEX

For electrical sensing of the carrier position, e.g. at the end positions, magnetic switches may be fitted. They can also be used for sensing of intermediate positions.

Position sensing is contactless and is based on magnets fitted as standard to the carrier. A yellow LED indicates operating status.

The magnetic switches are fitted directly with an adapter in the dovetail slot of the cylinder.

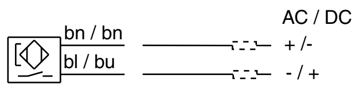
Characteristics

Characteristics	Symbol	Unit	Description	
Electrical Characteristics			Type RS-K ATEX	Type ES-K ATEX
ATEX Certification			yes	yes
Category Type: RS-K			Ex II 3GD EEX nC IIC T3 146°C	
Category Type: ES-K			Ex II 2GD EEX ib IIC T5 100°C	
Switching output			Reed	Namur
Operating voltage	U_B	V	10-240 AC/DC	7-9 DC
Voltage drop		V	≤ 3	–
Electrical configuration			Two wire	Two wire
Output function			Normally open	Normally open
Permanent current	I_{Dmax}	mA	≤ 200	≤ 3
Power consumption		W/VA	≤ 10/10 Spitze	
Peak current		mA	≤ 500	–
Power consumption, without load		mA	–	≤ 1
Function indicator			LED, yellow	
Response time On/Out		ms	≤ 2	≤ 0.5
Sensitivity		mT	2 – 4	2 – 4
Reverse polarity prot			yes	yes
Short-circuit protection			no	yes
Repeatability		mm	≤ 0.2 *)	≤ 0.2 *)
Hysteresis		mm	≤ 1.5 *)	≤ 1.5 *)
EMC		EN	60947-5-2	
Lifetime			≥ 10 Mio. Cycles with PLC load	
Mechanical Characteristics				
Housing			Makrolon, smoke color	
Cable cross section		mm^2	2 x 0.14	2 x 0.14
Cable type			PVC, blue	PVC, blue
Weight		kg	ca. 0.075	
Degree of protection		IP	67 nach EN 60529	
Ambient temperature range **)		°C °C	-25 +80	-20 +75
Surface temperature		°C	The maximum surface temperature T=146 °C is referred to the max. ambiente temperature of 80 °C	–
Shock resistance				
Vibration and Shock			50G at 50Hz and 1mm	

*) These values depend on the type and diameter of cylinder used – please consult us.
**) For the temperature range of the magnetic switches, the surface temperature and own heat generation of the cylinder must be taken into account.

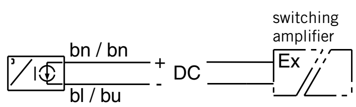
Electrical Connection – Type RS-K ATEX

Make contact (Reed)

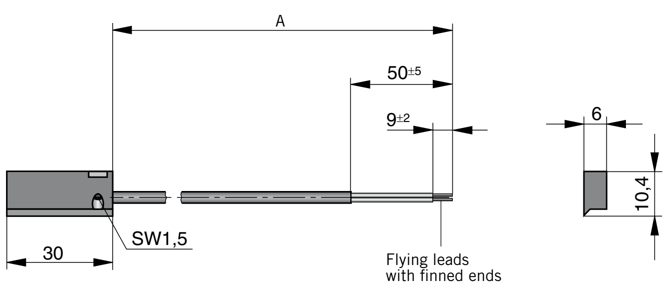


Electrical Connection – Type ES-K ATEX

Make contact (Namur)



Dimensions (mm)



Dimension Table (mm)

Magnetic switch Order-No.	Nominal cable length A	Lenghts tolerance
KL3240	5000	- 50
KL3241	10000	- 50
KL3250	5000	- 50
KL3251	10000	- 50

Magnetic Switches
Type RS-K
ATEX-Version

In the type RS contact is made by a mechanical reed switch encapsulated in glass.

ATEX-Version Type: RS-K
Ⓔx II 3GD EEX nC IIC T3 146°C

Magnetic Switches
Type ES-K
ATEX-Version

In the type ES contact is made by an electronic switch – without bounce or wear and protected from pole reversal. The output is short circuit proof and insensitive to shocks and vibrations.

ATEX-Version Type: ES-K Ⓔx II 2GD EEX ib IIC T5 100°C

Caution!

The connection of the magnetic switch Type ES-K ATEX must be realised my means of an EEX i switching amplifier (see Accessories).

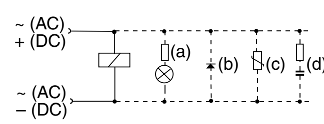
Electrical Service Life Protective Measures

Magnetic switches are sensitive to excessive currents and inductions. With high switching frequencies and inductive loads such as relays, solenoid valves or lifting magnets, service life will be greatly reduced.

With resistive and capacitative loads with high switch-on current, such as light bulbs, a protective resistor should be fitted. This also applies to long cable lengths.

In the switching of inductive loads such as relays, solenoid valves and lifting magnets, voltage peaks (transients) are generated which must be suppressed by protective diodes, RC loops or varistors.

Connection Examples:
Load with protective circuits
(a) Protective resistor for light bulb
(b) Freewheel diode on inductivity
(c) Varistor on inductivity
(d) RC element on inductivity



Order Instructions – Magnetic switches

Version	Voltage	Order Instructions	
		Type	Order-No.
Magnetic switch, reed contact, normally open LED indicator, cable 5 m	10-240 V AC/DC	RS-K ATEX	KL3240
Magnetic switch, reed contact, normally open, LED indicator, cable 10 m	10-240 V AC/DC	RS-K ATEX	KL3241
Magnetic switch, electronic, NAMUR, normally open, LED indicator, cable 5 m	7-9 V DC	ES-K ATEX	KL3250
Magnetic switch, electronic, NAMUR, normally open, LED indicator, cable 10 m	7-9 V DC	ES-K ATEX	KL3251

Order Instructions – Accessories

Description	for magnetic switch	Order-No.
2 channel switching amplifier 24 V DC	ES-K ATEX	2876
2 channel switching amplifier 220 V AC	ES-K ATEX	1546

Note: 2 magnetic switches can be connected to each switching amplifier.

Notes

Notes

Parker Worldwide

AE – UAE, Dubai
Tel: +971 4 8127100
parker.me@parker.com

AR – Argentina, Buenos Aires
Tel: +54 3327 44 4129

AT – Austria, Wiener Neustadt
Tel: +43 (0)2622 23501-0
parker.austria@parker.com

AT – Eastern Europe,
Wiener Neustadt
Tel: +43 (0)2622 23501 900
parker.easteurope@parker.com

AU – Australia, Castle Hill
Tel: +61 (0)2-9634 7777

AZ – Azerbaijan, Baku
Tel: +994 50 2233 458
parker.azerbaijan@parker.com

BE/LU – Belgium, Nivelles
Tel: +32 (0)67 280 900
parker.belgium@parker.com

BR – Brazil, Cachoeirinha RS
Tel: +55 51 3470 9144

BY – Belarus, Minsk
Tel: +375 17 209 9399
parker.belarus@parker.com

CA – Canada, Milton, Ontario
Tel: +1 905 693 3000

CH – Switzerland, Etoy
Tel: +41 (0) 21 821 02 30
parker.switzerland@parker.com

CL – Chile, Santiago
Tel: +56 2 623 1216

CN – China, Shanghai
Tel: +86 21 5031 2525

CZ – Czech Republic, Klecany
Tel: +420 284 083 111
parker.czechrepublic@parker.com

DE – Germany, Kaarst
Tel: +49 (0)2131 4016 0
parker.germany@parker.com

DK – Denmark, Ballerup
Tel: +45 43 56 04 00
parker.denmark@parker.com

ES – Spain, Madrid
Tel: +34 902 33 00 01
parker.spain@parker.com

FI – Finland, Vantaa
Tel: +358 (0)20 753 2500
parker.finland@parker.com

FR – France, Contamine s/Arve
Tel: +33 (0)4 50 25 80 25
parker.france@parker.com

GR – Greece, Athens
Tel: +30 210 933 6450
parker.greece@parker.com

HK – Hong Kong
Tel: +852 2428 8008

HU – Hungary, Budapest
Tel: +36 1 220 4155
parker.hungary@parker.com

IE – Ireland, Dublin
Tel: +353 (0)1 466 6370
parker.ireland@parker.com

IN – India, Mumbai
Tel: +91 22 6513 7081-85

IT – Italy, Corsico (MI)
Tel: +39 02 45 19 21
parker.italy@parker.com

JP – Japan, Tokyo
Tel: +(81) 3 6408 3901

KR – South Korea, Seoul
Tel: +82 2 559 0400

KZ – Kazakhstan, Almaty
Tel: +7 7272 505 800
parker.easteurope@parker.com

LV – Latvia, Riga
Tel: +371 6 745 2601
parker.latvia@parker.com

MX – Mexico, Apodaca
Tel: +52 81 8156 6000

MY – Malaysia, Shah Alam
Tel: +60 3 7849 0800

NL – The Netherlands,
Oldenzaal
Tel: +31 (0)541 585 000
parker.nl@parker.com

NO – Norway, Ski
Tel: +47 64 91 10 00
parker.norway@parker.com

NZ – New Zealand, Mt Wellington
Tel: +64 9 574 1744

PL – Poland, Warsaw
Tel: +48 (0)22 573 24 00
parker.poland@parker.com

PT – Portugal, Leca da Palmeira
Tel: +351 22 999 7360
parker.portugal@parker.com

RO – Romania, Bucharest
Tel: +40 21 252 1382
parker.romania@parker.com

RU – Russia, Moscow
Tel: +7 495 645-2156
parker.russia@parker.com

SE – Sweden, Spånga
Tel: +46 (0)8 59 79 50 00
parker.sweden@parker.com

SG – Singapore
Tel: +65 6887 6300

SK – Slovakia, Banská Bystrica
Tel: +421 484 162 252
parker.slovakia@parker.com

SL – Slovenia, Novo Mesto
Tel: +386 7 337 6650
parker.slovenia@parker.com

TH – Thailand, Bangkok
Tel: +662 717 8140

TR – Turkey, Istanbul
Tel: +90 216 4997081
parker.turkey@parker.com

TW – Taiwan, Taipei
Tel: +886 2 2298 8987

UA – Ukraine, Kiev
Tel +380 44 494 2731
parker.ukraine@parker.com

UK – United Kingdom,
Warwick
Tel: +44 (0)1926 317 878
parker.uk@parker.com

US – USA, Cleveland
Tel: +1 216 896 3000

VE – Venezuela, Caracas
Tel: +58 212 238 5422

ZA – South Africa,
Kempton Park
Tel: +27 (0)11 961 0700
parker.southafrica@parker.com

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Parker-Origa GmbH
Industriestr. 8
70794 Filderstadt, Germany
Tel. +49 (0)7158 17030
Fax +49 (0)7158 64870
Email: info-origa-de@parker.com
www.parker-origa.com