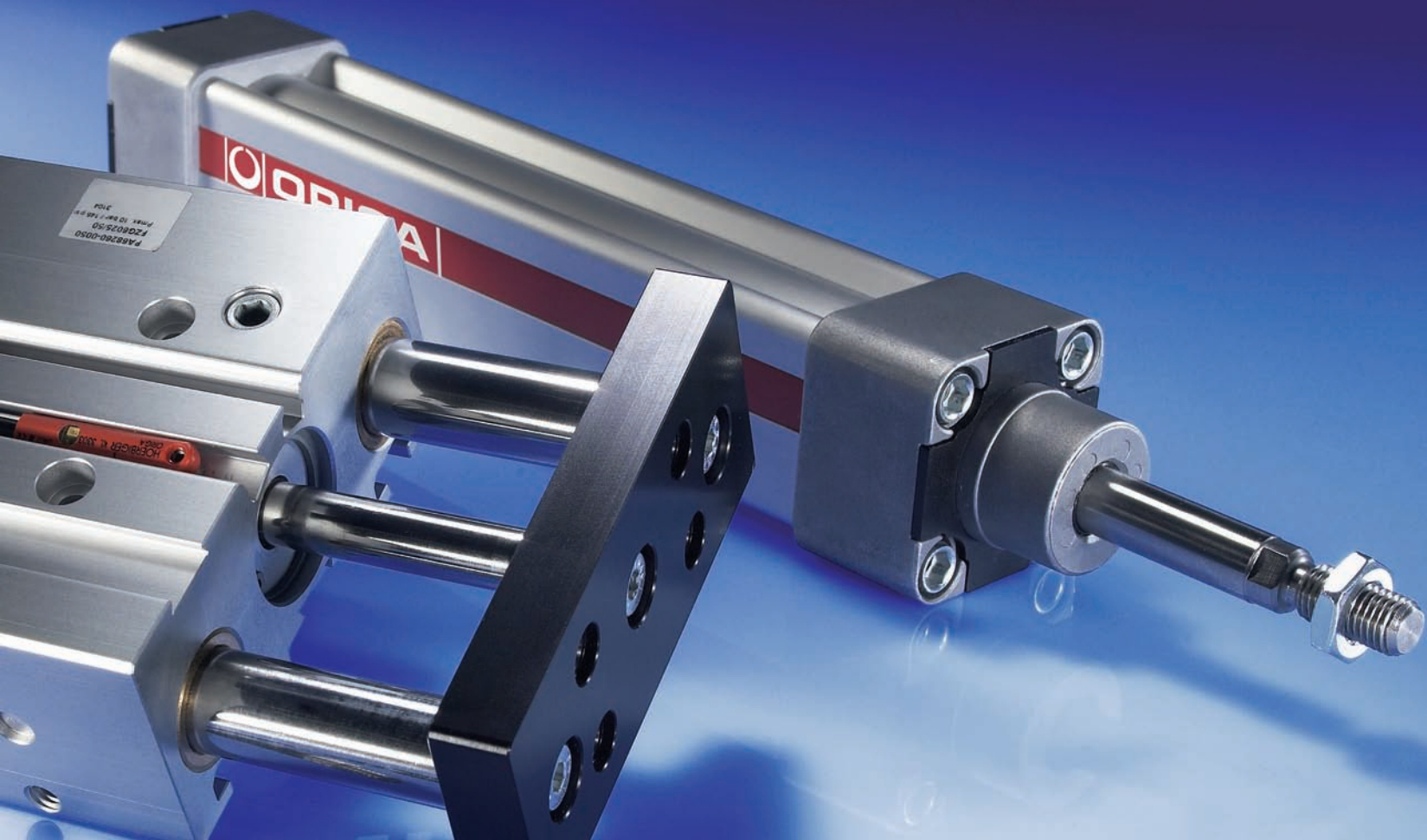


Piston Rod Cylinders Bellows Cylinders

ORIGA – simply the first


HOERBIGER
because performance counts



Information on application

The contents of this catalog are not binding and are only intended for informational purposes and are not to be considered as offer with legal effect. A written confirmation of order from HOERBIGER is authoritative for the conclusion of a contract; this confirmation is given solely under the respective currently applicable HOERBIGER General Terms of Sale and Delivery. These are included in our price list and in the Internet at www.hoerbiger.com.

All the products presented in this catalog are purely for commercial use. None of the information or contents is appropriate for private consumers. Private consumers cannot place orders based on the information in the catalog. Please contact HOERBIGER for further information.

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.

The technical data stated in this catalog is to be observed by the user. The data stated may not be exceeded nor fallen short of. If such data is not stated then it may be assumed that there are no such upper or lower limits or restrictions for particular applications. In the case of unusual physical or chemical applications, consultation and clearances are to be obtained from HOERBIGER.

Unless otherwise agreed in individual cases, the customer or end consumer is responsible for the disposal of the ORIGA products. Disposal by HOERBIGER is not included in the price and this would have to be taken into account in the event of any applicable return to and disposal by HOERBIGER.

Technical data and representations

The technical data and illustrations have been compiled with great care and to the best of our knowledge. We cannot assume any guarantee for the up-to-dateness, correctness and completeness of the information.

The data and information such as illustrations, drawings, descriptions, dimensions, weights, materials, technical and other performances as well as the products and services described in general product descriptions, HOERBIGER catalogs, brochures and price lists of any type are subject to change and may be modified or updated at any time without prior announcement by HOERBIGER. They are only binding in so far as the contract or confirmation of order expressly refers to them. Slight deviations from such product descriptions are deemed as approved and do not affect the fulfillment of contracts in so far as these are considered acceptable to customers.

This catalog does not contain any guarantees, assured characteristics or agreements on condition by HOERBIGER for the products represented, neither expressly nor implicitly, nor with regard to the availability of the products. Advertising statements regarding quality characteristics, properties or applications of ORIGA products are without legal obligation.

As far as legally permissible, any liability is excluded on the part of HOERBIGER for direct or indirect damage, consequential damage, claims of any type and on any legal basis arising from the use of the information contained in this catalog.

Trademarks, copyright and reproduction

The representation of industrial rights such as brands, logos, registered trademarks or patents in this catalog does not include the granting of licenses or rights of use. The use of these is not permitted without the express consent of HOERBIGER. The entire contents of this catalog are the intellectual property of HOERBIGER. Within the meaning of copyright, any unlawful use of intellectual property, even extracts, is prohibited. Reprinting, reproduction and translation (even extracts) are only permitted with the prior written consent of HOERBIGER.

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 HOERBIGER:

- 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. HOERBIGER-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:

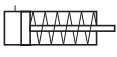
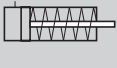
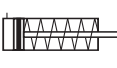
- End-of-life vehicles (2000/53/EG).
- Waste Electronic and Electrical equipment (WEEE, 2002/96/EG) and Restriction on Hazardous Substances (RoHS, 2002/95/EG).
- Pressure Equipment Directive (97/23/EWG) with the above mentioned exceptions.

Table of Contents

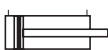
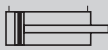
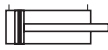
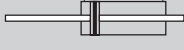
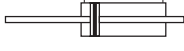
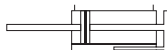
Title	Page	Title	Page
Survey – Series and Versions	2-5	Locking Units, Blocking Cylinders	
Survey – Products for the EX-Areas *	6-7	Overview	113
Recommended standard stroke ranges	8	– Cylinders with Locking Units, Ø32-125mm	
Piston force and air consumption	9	Series FSE	114-117
Piston rod load diagram	10-13	– Blocking Cylinders, Ø32-125mm	
Standard Cylinders		Mountings to ISO15552	
Overview Round Cylinders	15	Series DZB, DZBA	118-125
– Cylinders to ISO6432, Ø10-25mm,		Bellows Cylinders	
Series R, RDU, RDV	16-21	Overview	127
Overview Compact Cylinder	23	General Informations	128
– Cylinders to ISO21287, Ø12-25mm		– Bellows Cylinder, Single convolution type,	
Series NZ, NZD, NZV	24-32	Series SP-1B	129-132
– Cylinders to ISO21287, Ø32-100mm		– Bellows Cylinder, Double convolution type,	
Series NZ, NZD, NZV, NZVD	33-44	Series SP-2B	133-136
Overview Standard Cylinders	45	Cylinder Accessories	
– Cylinders to ISO15552, Ø32-100mm,		Overview	137
Series AZ, AZZ, AZD, AZF, AZV, AZ3, AZ4	46-59	Piston Rods	
– Cylinders to ISO15552, Ø125-320mm,		– Piston Rod Eyes to ISO8139, Series GA	138
Series DZ, DZF	60-67	– Piston Rod Clevis to ISO8140, Series GK	139
Piston Rod Cylinders		– Compensating Coupling, Series AK	140
Overview Round Cylinders	69	– Coupling, Series KS	141
– Cylinders, Ø32-63mm,		Pivots for Mountings	
Series R, RK, RDU	70-76	– for Mounting B, Series GLN	142-143
Overview Compact Cylinders	77	– for Mounting EN, Series EL	144
– Cylinders, Ø12-100mm		Adapter plate for Mounting of S9-valves	145
Series SZ, SZD, SZV	78-84	Magnetic Switch	
Guided Cylinders, Linear Guides		– pneumatic, Series DZVP	147-148
Overview	85	– electric, dovetail slot switch	
– Guided Cylinders, Ø20-50mm		Series RS, ES	149-151
Series FZG, FZK	86-99	– electric, T-slot switch	
– Linear Guide, U-form, Ø8-100mm		Series RST, EST	152-155
for Cylinders to ISO15552, ISO6432		– electric, dovetail slot switch	
Series FEUG	100-106	Series RS-ATEX, ES-ATEX	156-158
– Linear Guide, H-form, Ø8-100mm			
for Cylinders to ISO15552, ISO6432			
Series FEHG, FEHK	107-112		

*** 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

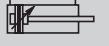
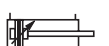
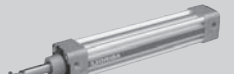
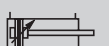
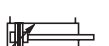
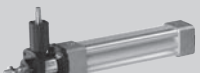
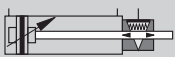
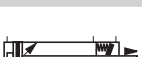
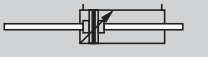
Cylinder single acting - standard version

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...	12-25	23-28
				NZ7...	32-100	34-42
		ISO21287		NZ8...	12-25	23-28
				NZ8...	32-100	34-42

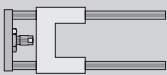
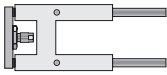
Cylinder double acting without cushioning - standard version, Guided Cylinders

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...	32-63	69-76
		ISO21287		RK6...	32-63	
				NZ6...	12-25	23-28
				NZ6...	32-100	34-42
Guided Cylinders		—		SZV6...	20-100	77-84
		—		NZV6...	12-25	23-28
				NZV6...	32-100	34-42
Double acting without cushioning For contactless position sensing		—		FZG6...	20-50	86-99
				FZK6...	20-50	
Double acting without cushioning With through piston rod For contactless position sensing		ISO6432		RDU6...	12-25	15-21
		—		RDU6...	32-63	69-76
		—		SZD6...	12-100	77-84
		—		NZD6...	12-25	23-28
				NZD6...	32-100	34-42
Twin rod cylinder Double acting without cushioning With through piston rod 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		—		AZF5...	32-100	46-59
Double acting with cushioning For contactless position sensing		—		DZ5.../...-FSE	125	62-63
Double acting with cushioning For contactless position sensing		—		DZB5...	32-125	118-125
Double acting with cushioning For contactless position sensing Blocking on forward and reverse stroke		—		DZBA5...	32-125	118-125
Double acting with cushioning With through piston rod 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



HOERBIGER-ORIGA GmbH
Industriestraße 8
D-70794 Filderstadt
Tel. +49 - 7156 1703-0 Fax 64870
E-mail dmarket@hoerbiger-origa.com
Internet: www.hoerbiger-origa.com

Filderstadt, im Juli 2003

Konformitätserklärung
im Sinne der EG-Richtlinie 94/9/EG (ATEX)

Hiermit erklären wir, dass die
Geräte: Kolbenstangenzyylinder
Baureihen: AZ, DZ, NZ, R, SZ
den Bestimmungen der Richtlinie 94/9/EG (ATEX) für Geräte und Schutzsysteme zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen entsprechen.
Gerätegruppe, Kategorie, Zonen:
II 2GD c T4 T135°C -16°CStA5+69°C für Zone 1, 2, 21, 22 (Gas- und Staub-Atmosphäre)

Das Konformitätsbewertungsverfahren wurde in Anlehnung an die Richtlinie 94/9/EG (ATEX) durchgeführt. Die entsprechenden Unterlagen sind bei folgender benannten Stelle 0123 hinterlegt:
TUV Product Service GmbH
Gottlieb-Daimler-Str. 7
D-70794 Filderstadt

Folgende harmonisierten Normen sind angewandt:

EN 983	Sicherheit von Maschinen, Anforderungen an fluidtechnische Anlagen	Dt. 1996
EN 1127-1	Explosionsschutz, Teil 1: Grundlagen und Methodik	Dt. 1997
EN 13463-1	Nichtelektrische Geräte für den Einsatz in explosionsgefährdeten Bereichen, Teil 1: Grundlagen und Anforderungen	Dt. 2001
prEN 13463-5	Teil 5: Schutz durch sichere Bauweise	Dt. 2000
ISO 8573-1	Druckluft-Reinheitsklassen	Gb. 2001

Weitere einschlägige Bestimmungen: EG-Maschinenrichtlinie (89/392/EWG)
Die zugehörige Betriebsanleitung enthält wichtige sicherheitstechnische Hinweise und Vorschriften für die Inbetriebnahme der genannten mechanischen Geräte gemäß Richtlinie 94/9/EG (ATEX).
Änderungen an den genannten Geräten sind nicht zulässig, außer mit ausdrücklicher schriftlicher Zustimmung des Herstellers.
Werden die genannten Geräte in eine übergeordnete Maschine eingebaut, so müssen die durch den Einbau entstehenden neuen Risiken durch den Hersteller der neuen Maschine beurteilt werden.
HOERBIGER-ORIGA GmbH, im Juli 2003


 Dr.-Ing. Erhard Fritz
Geschäftsführer


 Johann Asperger
Geschäftsführer



KonformitätserklärungATEXKolbenstangenzyylinder.de Seite 1 von 1

Cylinder series in ATEX versions



HOERBIGER-ORIGA-Products for -Atmospheres

Equipment Group II Category 2GD

Piston Rod Cylinders: 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	 II 2GD EEx ib IIC T5 T100°C
ES-K-ATEX 10m Cable lenght	 II 2GD EEx ib IIC T5 T100°C
RS-K ATEX 5m Cable lenght	 II 3GD EEx nC IIC T3 146°C
RS-K ATEX 10m Cable lenght	 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 Tierod	-	-	-	-	-	1-2000	1-2000	1-2000	1-2000	1-2000	1-2000	-	-	-	-	-
AZZ Multiposition	-	-	-	-	-	1-500/500	1-500/500	1-500/500	1-500/500	1-500/500	1-500/500	-	-	-	-	-
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	$F = p \cdot A-R$
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 (dm ³ /100 mm stroke at ... bar ¹⁾ 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

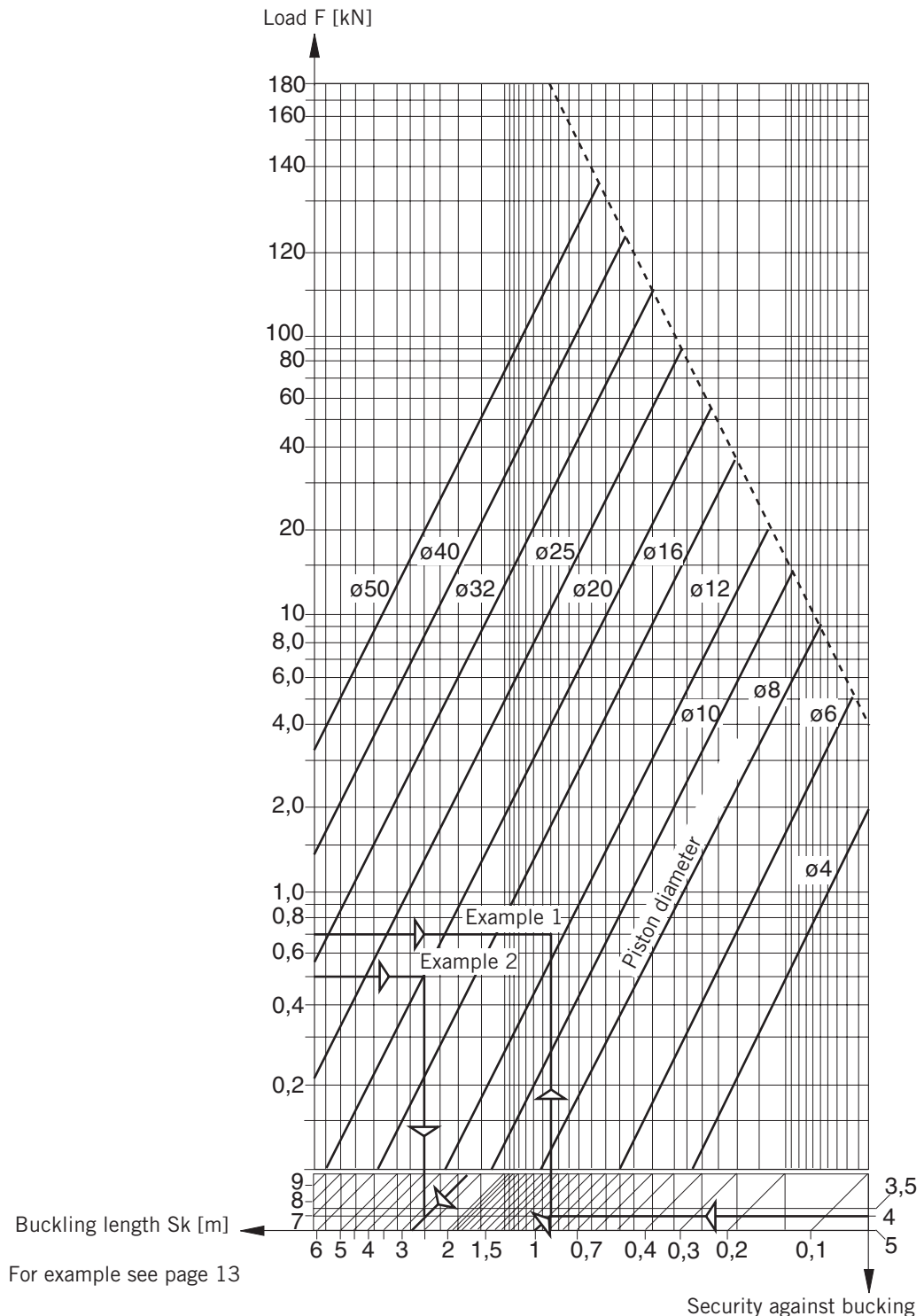
By means of this diagram the necessary piston rod diameter has to be determined to prevent the rod from buckling.

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.

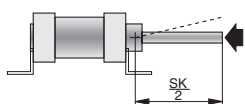
In cases of special mounting conditions and transverse forces please consult us.

Recommended security against buckling: 3.5 to 5.

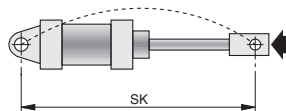


Buckling Possibilities of Piston Rods

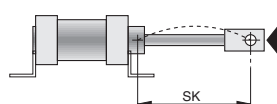
Mounting: A, C, D



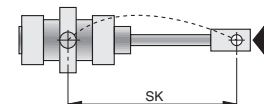
Mounting: B



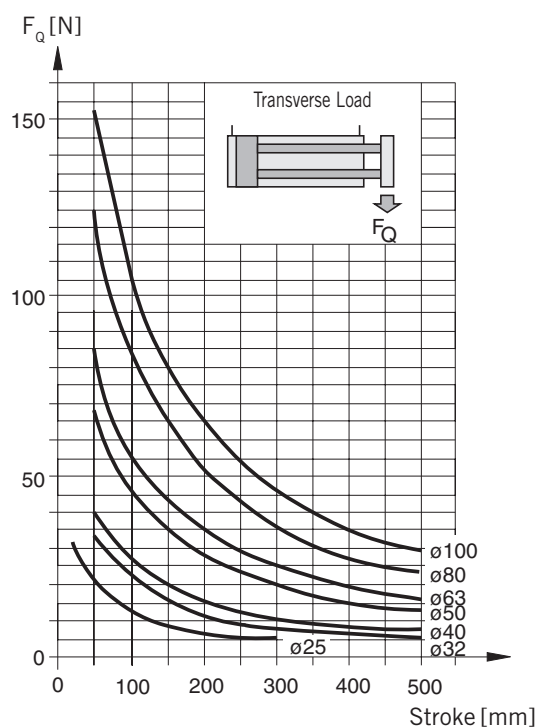
Mounting: A, C, D



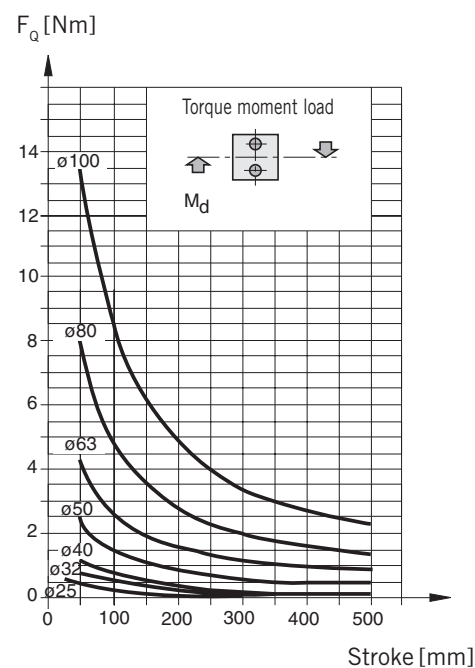
Mounting: E



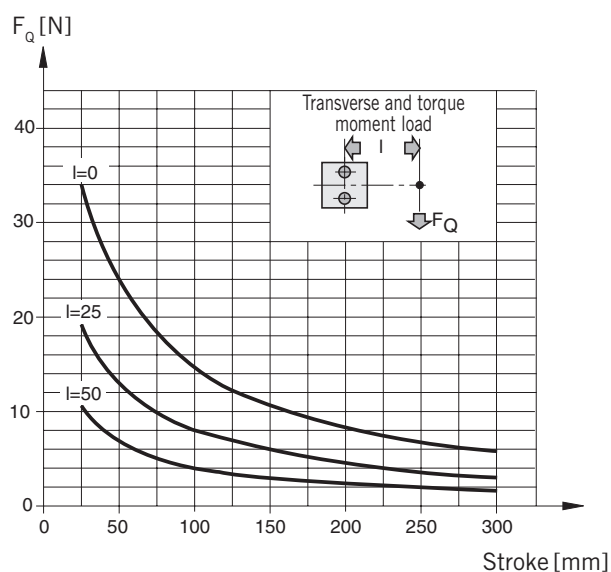
Twin Rod Cylinder ¹⁾
Transverse Load - Ø 25 - 100 mm



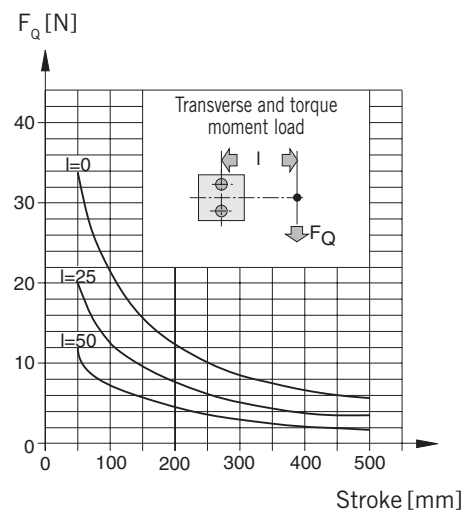
Twin Rod Cylinder ¹⁾
Torque moment load - Ø 25 - 100 mm



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

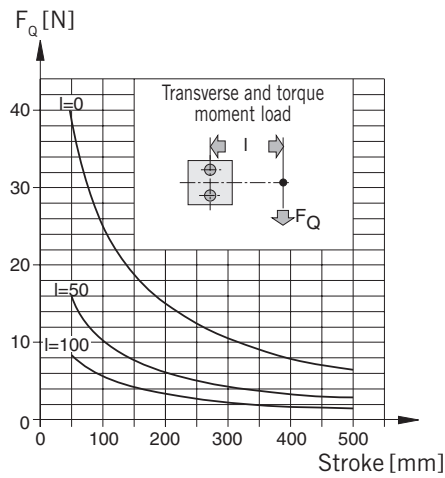


Twin Rod Cylinder ¹⁾
Transverse and Torque Moment Load - Ø 32 mm

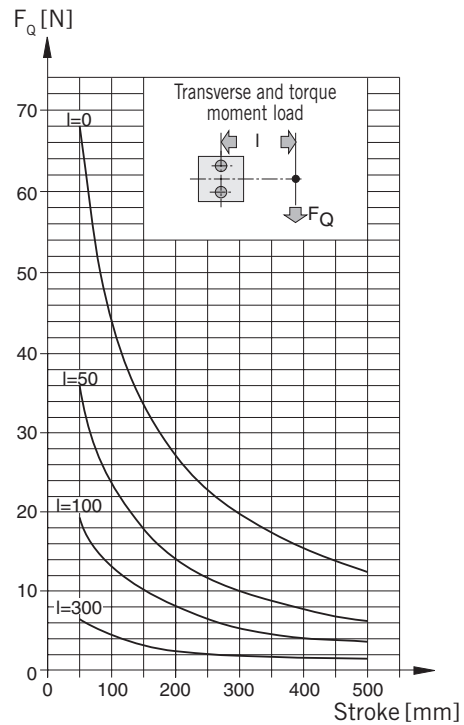


¹⁾ for installation instructions see page 13

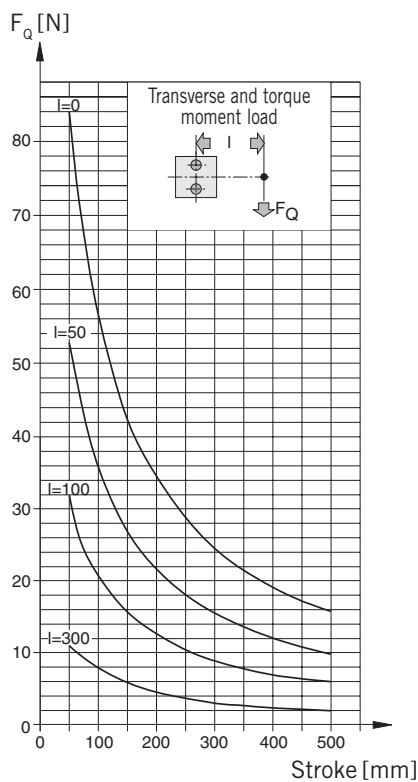
Twin Rod Cylinder¹⁾
Transverse and Torque Moment Load - Ø 40 mm



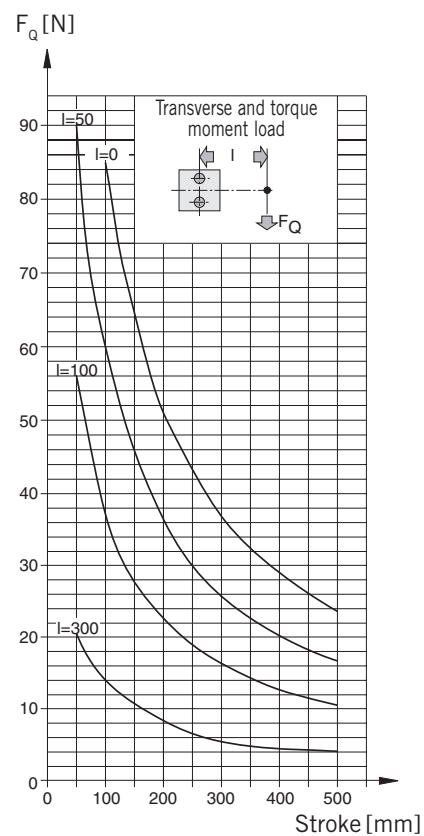
Twin Rod Cylinder¹⁾
Transverse and Torque Moment Load - Ø 50 mm



Twin Rod Cylinder¹⁾
Transverse and Torque Moment Load - Ø 63 mm

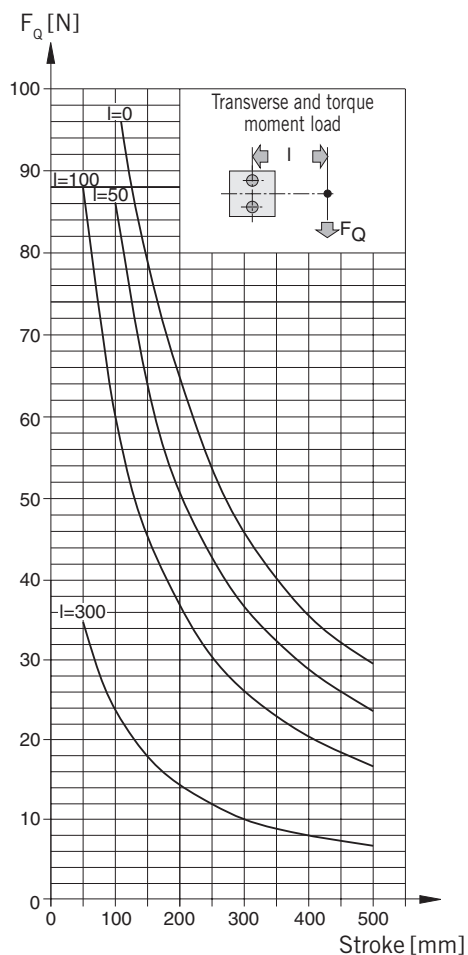


Twin Rod Cylinder¹⁾
Transverse and Torque Moment Load - Ø 80 mm



¹⁾ for installation instructions see page 13

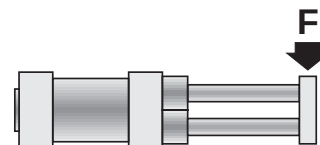
Twin Rod Cylinder ¹⁾ Transverse and Torque Moment Load - Ø 100 mm



¹⁾ see installation instructions

Installation Instructions for Twin Rod Cylinders

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

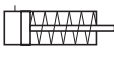
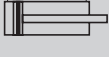
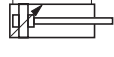
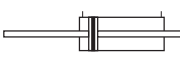


Examples

- 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

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

**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*

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 
- 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
Medium temperature range	T_{max}	°C	+70
Note: When using below freezing point (°C), please contact us for advice			
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
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 consumption			see page 9
Compression force at 6 bar		N	265
Tensile force at 6 bar		N	235

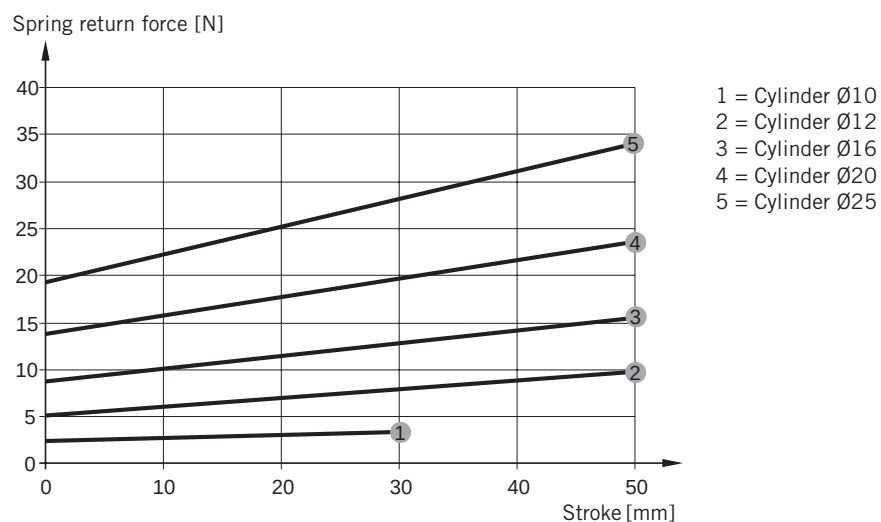


Weight (mass) kg

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

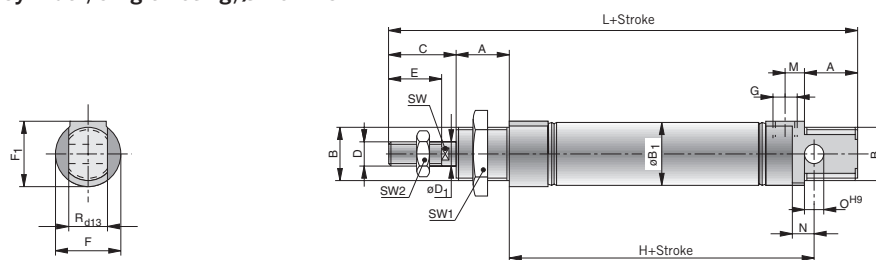
Mounting	Cylinder diameter				
	Ø10	Ø12	Ø16	Ø20	Ø25
RA (1 bracket)	0.022	0.043	0.043	0.100	0.100
RC	0.013	0.028	0.028	0.050	0.050
RB	0.023	0.036	0.036	0.080	0.080
* 1 = Weight for cylinder with 100 mm stroke 2 = Weight for every additional 100 mm stroke length					

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

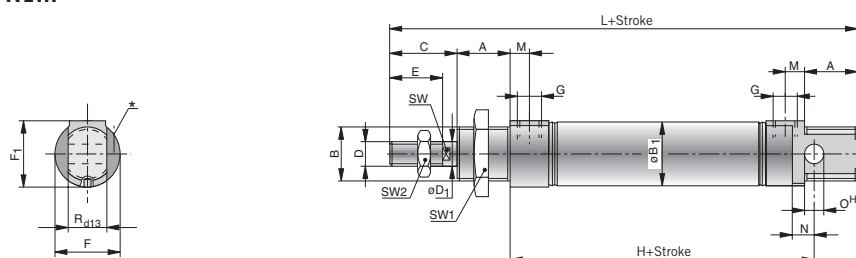


Piston force and air consumption see page 9, dimensions see page 18-20, order instructions see page 21

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

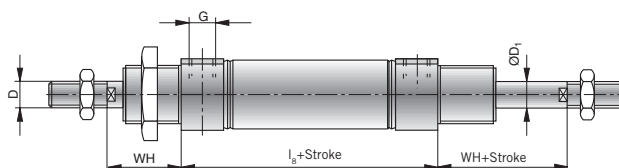


Dimensions – Basic Cylinder, Double Acting, Ø 10 – 25 mm Series R5..., R6..., R1...



*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....

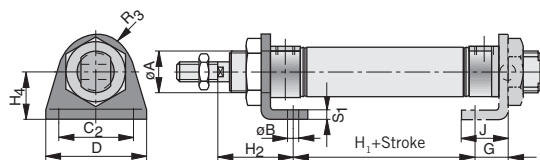
Cyl.Ø	A	B	ØB ₁	C	D	ØD ₁	E	F	F ₁	G	H + Stroke	I _s +Stroke
10	12	M12x1.25	11.3	16	M4	4	12	15	15	M5	48	44.5
12	17	M16x1.5	13.3	21	M6	6	16	20	20	M5	53	46
16	17	M16x1.5	17.3	21	M6	6	16	20 *	20*	M5	60	56
20	20	M22x1.5	21.3	24	M8	8	20	27	27	G1/8	71	66
25	22	M22x1.5	26.5	28	M10x1.25	10	22	27	27	G1/8	76	69

* for Type R5016: F = 22, F₁ = 21

Cyl.Ø	L+ Stroke	M	N	ØØ ^{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

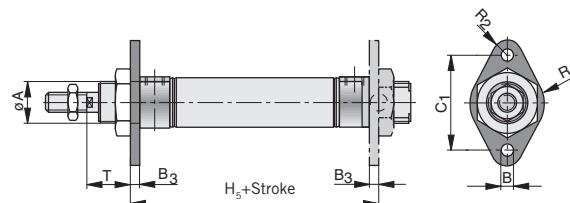


Material: steel, passivated

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

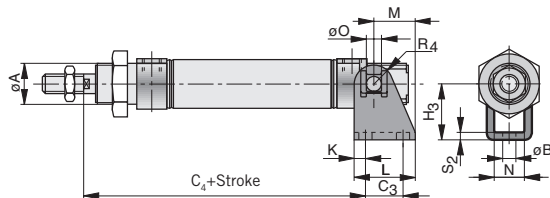


Material: steel, passivated

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

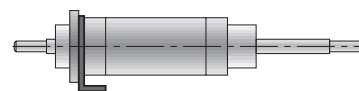
Cyl. Ø	ØB	C ₃	C ₄ + Stroke	H ₃	K	L	M	N	ØO	R ₄	S ₂
10	4.5	12.5	65	24	6.5	23	18	8.1	4	5	2.5
12	5.5	15	73	27	5	25	18	12.1	6	7	3
16	5.5	15	80	27	5	25	18	12.1	6	7	3
20	6.6	20	91	30	6	32	22	16.1	8	10	4
25	6.6	20	100	30	6	32	22	16.1	8	10	4

Mountings – Series RDU....

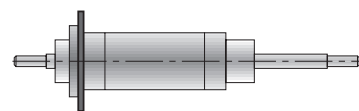
Mounting RA2... (2 brackets)



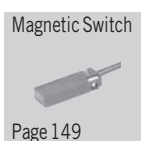
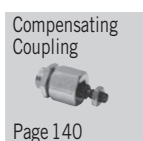
Mounting RA1.. (1 bracket)



Mounting RC... (1 flange)

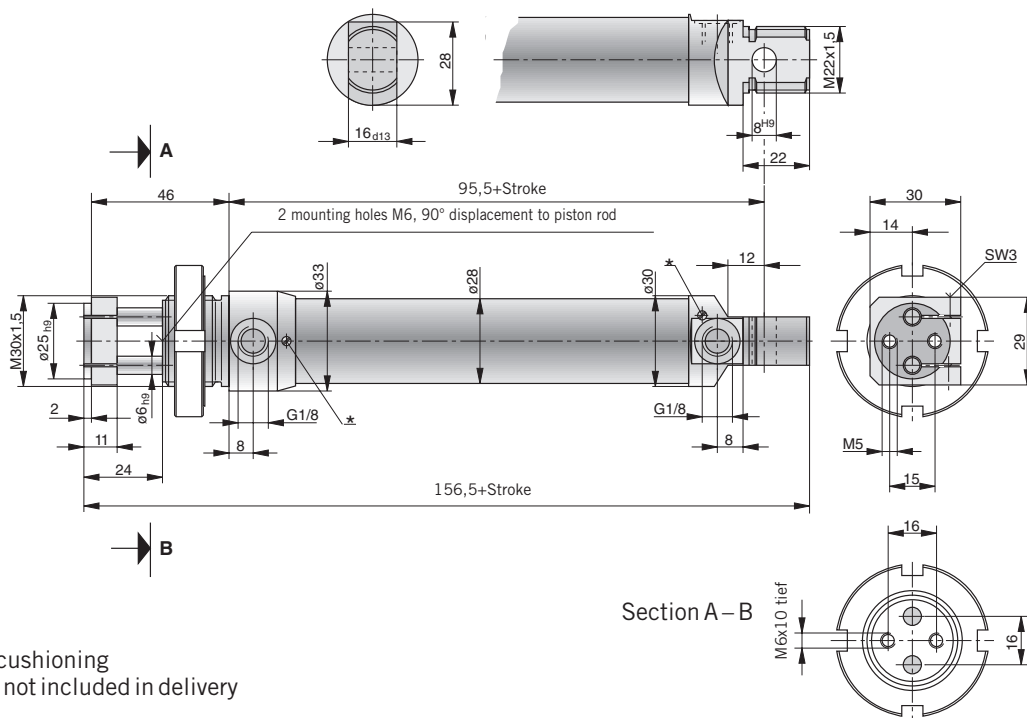


Mountings - Accessories



Piston 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...**



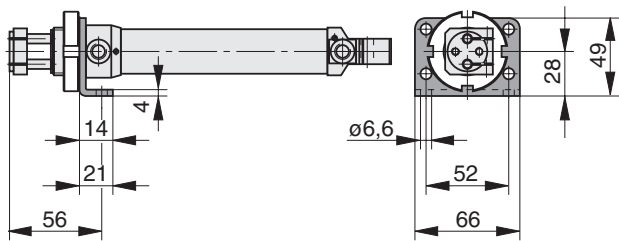
* adjustable end cushioning
Mounting nut is not included in delivery

Mounting instruction:

When mounting the front plate onto the piston rods tighten the screws with a torque $M_a = 4 \text{ N}$.

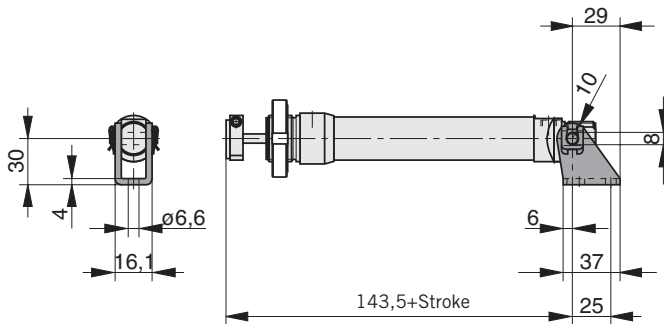
Mountings – Series RDV..., Ø 25 mm

Dimensions (mm) – Mounting RA



Material: steel, passivated

Dimensions (mm) – Mounting RB (counter bearing)



Material: steel, passivated

Mountings - Accessories



Page 152

Page 149

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

**HOERBIGER****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)

Standard stroke length:

¹⁾ 0010, 0025²⁾ 0010, 0025, 0050³⁾ 0025, 0050, 0080, 0100, 0125, 0160, 0200, 0250, 0320

(4-digit)

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					KK 29.302
Groove nut for series RDV5...						ZP2125

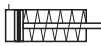
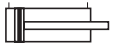
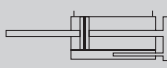
Complete type designation with piston-Ø

Example: RA 1-25 KK 28302

* consisting of 2 mounting brackets and 1 hexagonal nut

** consisting of 1 pivot with bolt and circlip

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

Standard Cylinders

*Compact Cylinder
to ISO 21287*

Series NZ....

Series NZD....

Series NZV....

Series NZVD....

Ø 12-100 mm

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
Mounting			See drawing
Tube connection			Thread
Ambient temperature range	T_{min} T_{max}	°C °C	-20 +80
Medium temperature range	T_{max}	°C	+80
Note: When using below freezing point (°C) it is necessary to consult us			
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 instructions, 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

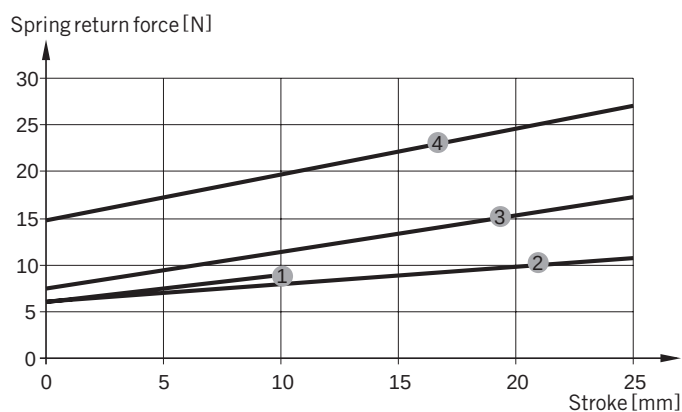
Theoretical Spring Return Forces in relation to Stroke Length Series NZ7000, NZ8000

1 = Cyl. Ø12

2 = Cyl. Ø16

3 = Cyl. Ø20

4 = Cyl. Ø25

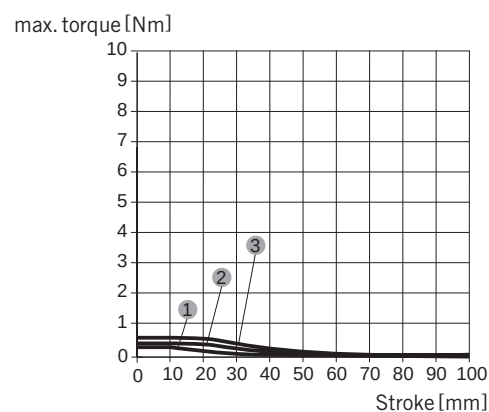


Torque (Nm) in relation to Stroke Length Series NZV

1 = Cyl. Ø12, 16

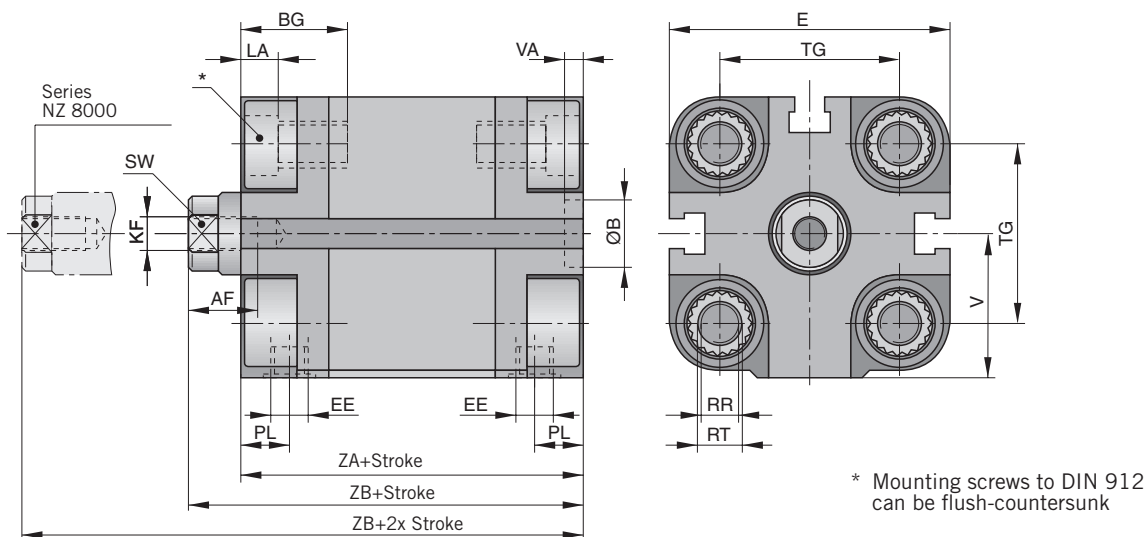
2 = Cyl. Ø20

3 = Cyl. Ø25

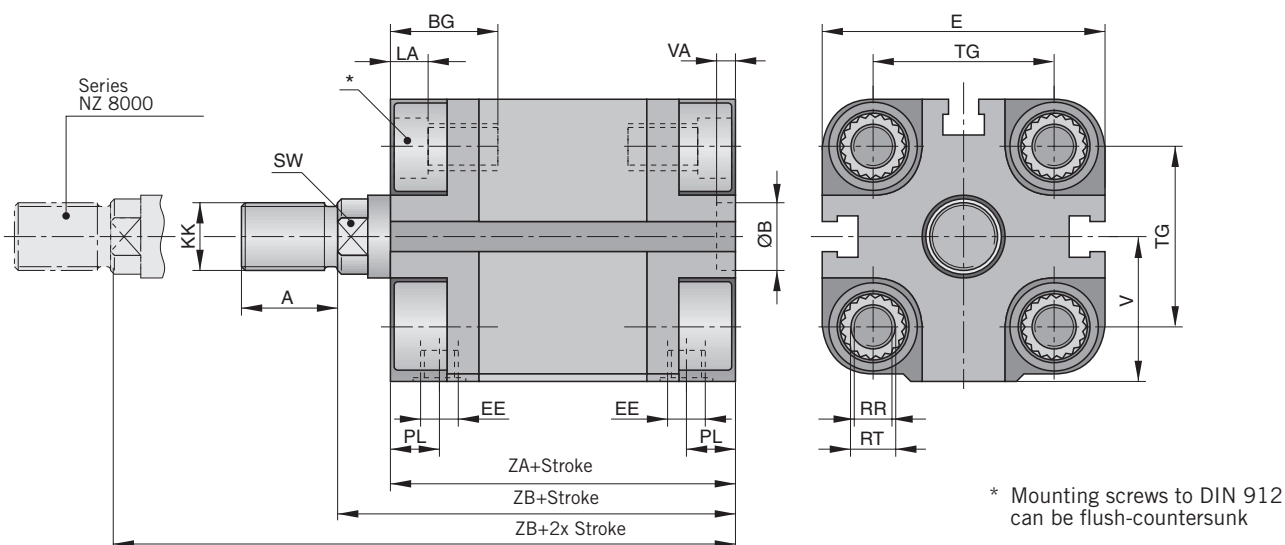


Piston force and air consumption see page 9, dimensions see page 26-27, order instructions see page 31, 32

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



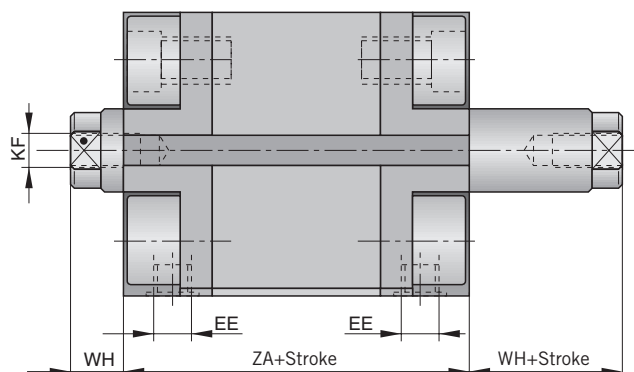
Dimensions – Basic Cylinder, Ø 12 – 25 mm
Version: Piston Rod with External Thread (Series NZ..../...-AG)



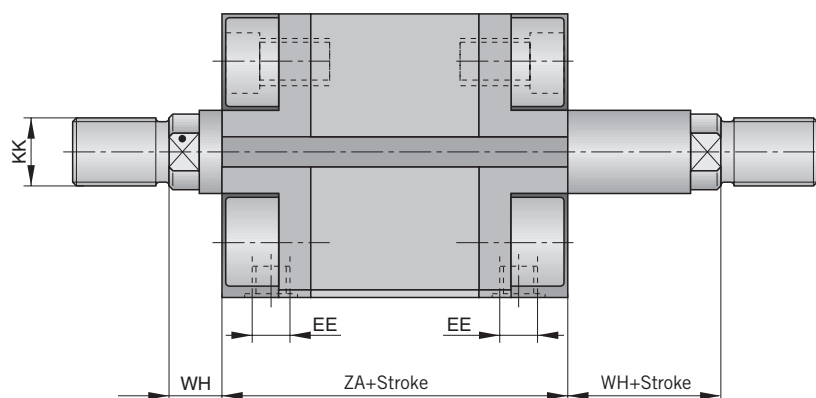
Dimension table (mm) – Basic Cylinder

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

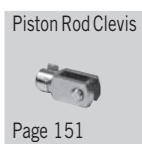
Dimensions – Basic Cylinder with through piston rod, $\varnothing$ 12 – 25 mm
Version: Piston Rod with Internal Thread (Series NZD..../...)



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



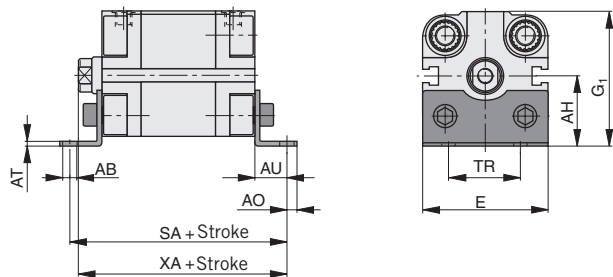
Accessories



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



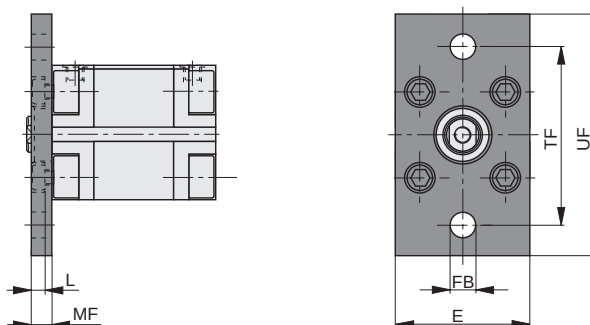
Material: steel, passivated

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



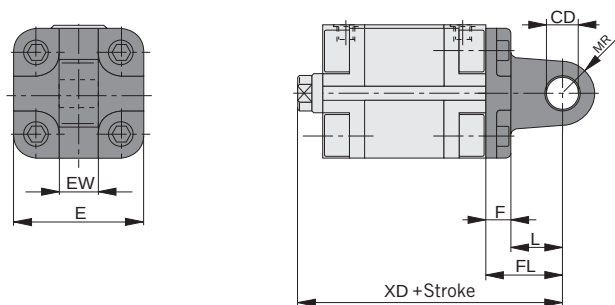
Material: steel, zinc-plated

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



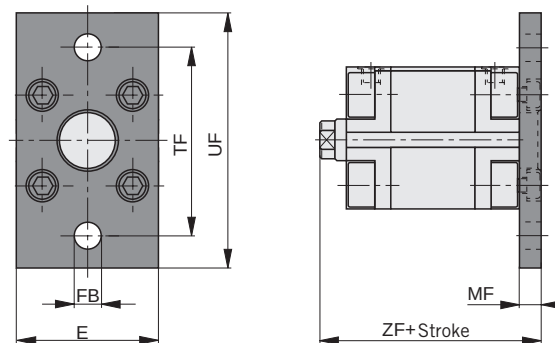
Material: cast aluminium

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

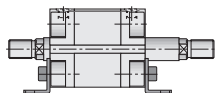
Dimension Table (mm) – Mounting D

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

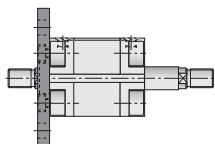
Included in delivery: 1 flange, 4 screws

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

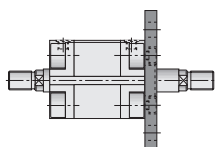
Mounting A-.. (Foot mounting)



Mounting C-.. (Front flange mounting)



Mounting D-.. (Rear flange mounting)



Accessories

Piston Rod Eye



Page 138

Piston Rod Clevis



Page 139

Compensating
Coupling



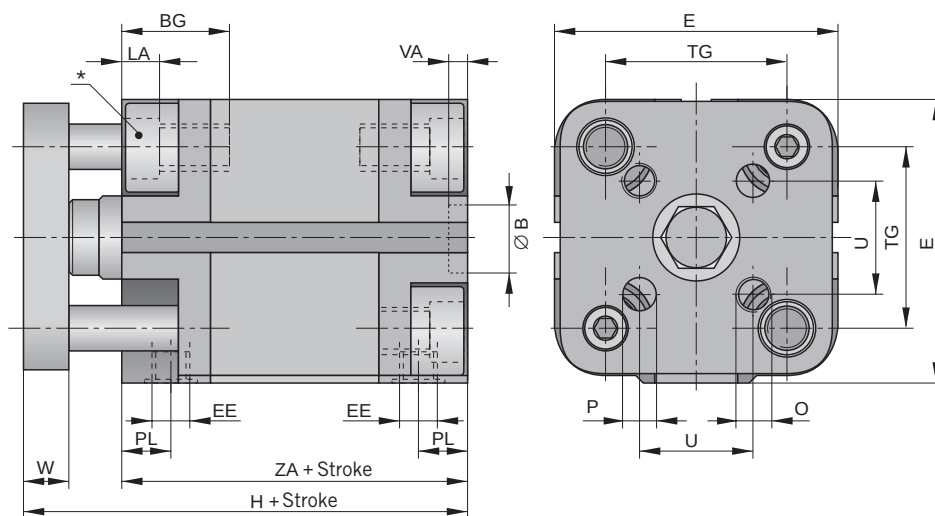
Page 140

Magnetic Switch



Page 152

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

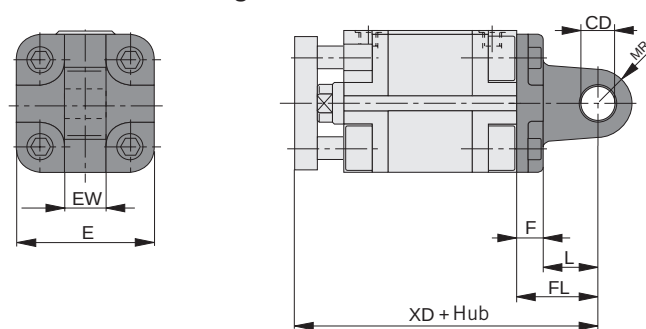


* Mounting screws to DIN 912 can be flush-countersunk

Dimensions Table (mm) – Basic Cylinder, Series NZV

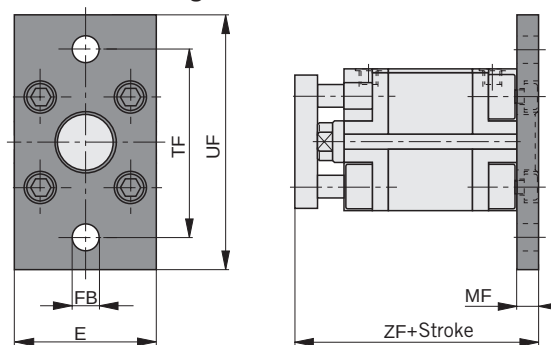
Cyl. Ø	ØB	BG	E	EE	H	LA	O	P	PL	U	TG	VA	W	ZA +Stroke
12	6	8	29	M5	48.5	5	M3	3	5	9.9	18	4	6	37
16	6	10	29	M5	48.5	5	M3	3	5	9.9	18	4	6	37
20	6	15	38	M5	51	5	M4	4	5	12	22	4	8	37
25	6	15	41	M5	53	5	M5	5	5	15.6	26	4	8	39

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

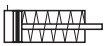
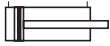
Included in delivery: 1 mounting eyelets, 4 screws

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	NZD6025/..-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		12	NZV6012/..	PA68160-....
Double acting without cushioning		16	NZV6016/..	PA68170-....
For contactless position sensing		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 cushioning and with through piston rod
Mounting			See drawing
Tube connection			Thread
Ambient temperature range	T_{min} T_{max}	°C °C	-20 +80
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 M10 M12 M12 M16 M16 x1.25 x1.25 x1.25 x1.25 x1.5 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 

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 switches can be mounted for sensing the end positions or intermediate positions 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

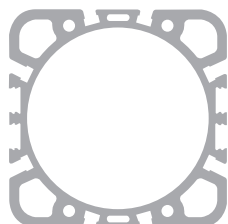
Ø32 mm, Ø40 mm



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

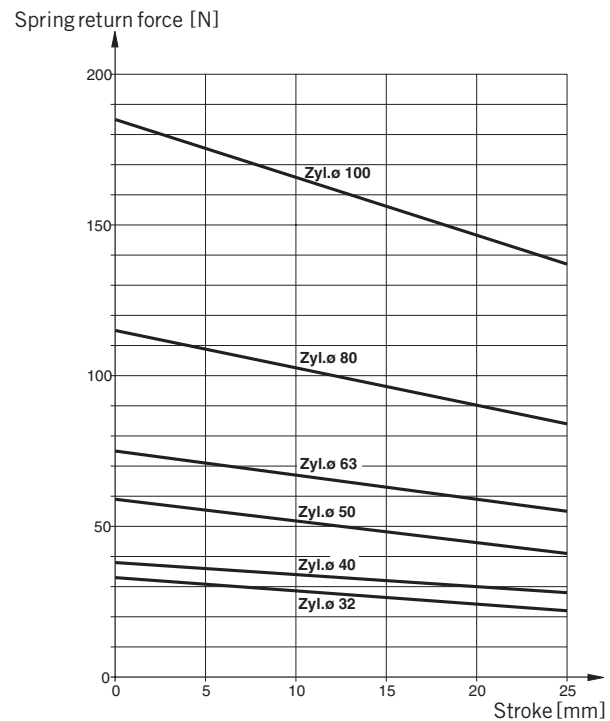
Dimensions (mm) for Special Piston Rod Threads and Thread length

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:

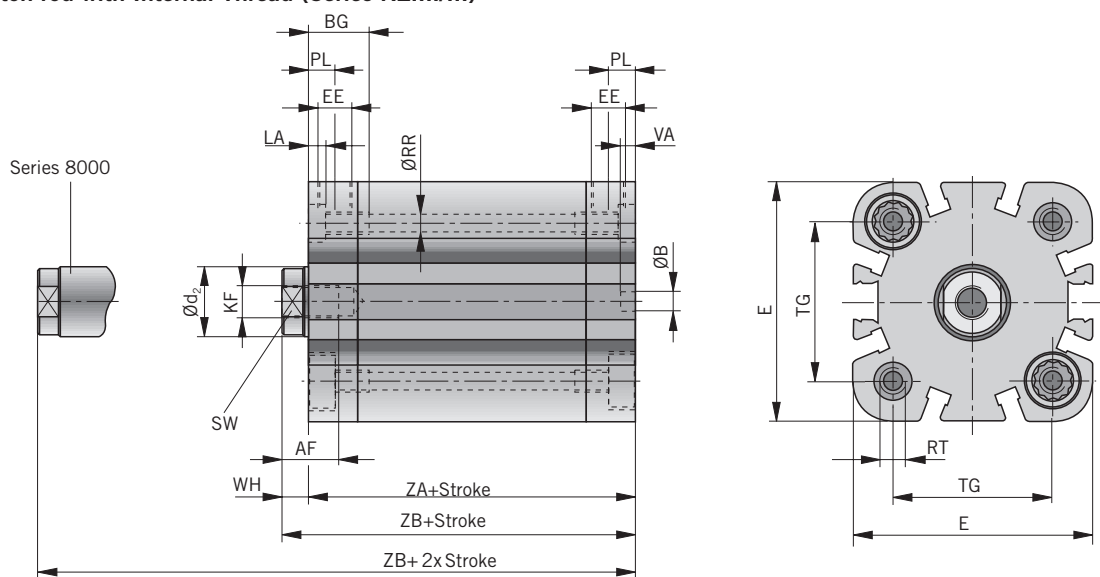
In the configuration of a cylinder with through piston rod, Series NZD, the assumption is that both piston rods are identical. Only one is configured and this applies to both piston rods. If two different piston rods are required, a special cylinder must be ordered. Special cylinders are not configurable.

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

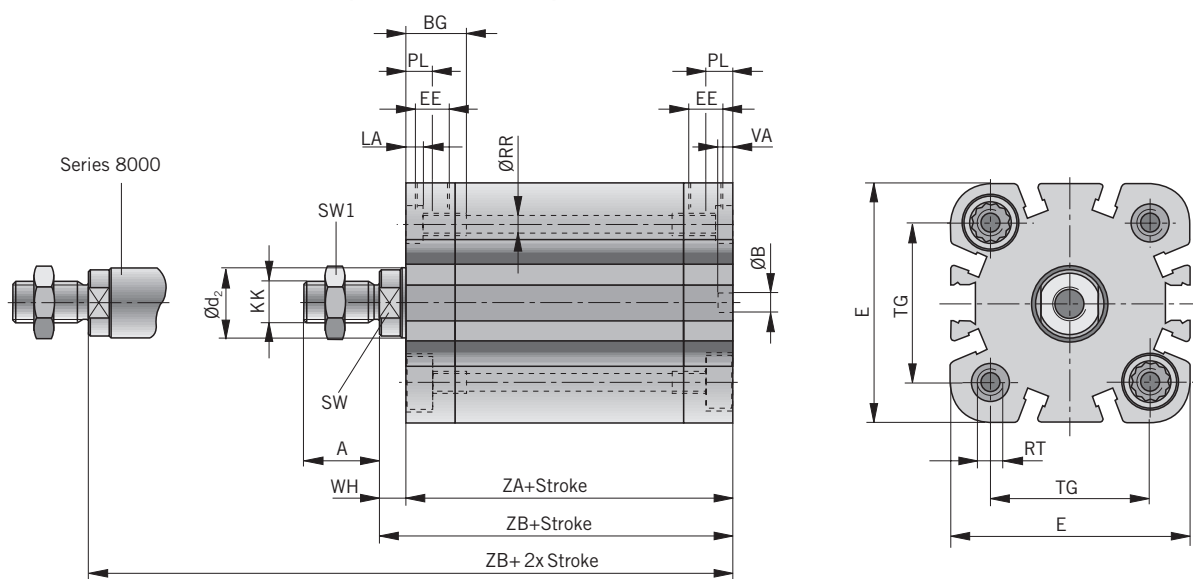


Piston force and air consumption see page 9, dimensions see page 36-41, order instructions see page 42, 43

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)

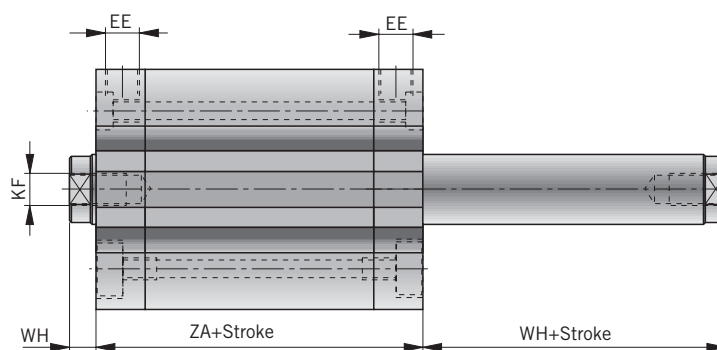


Dimension Table (mm) – Series NZ...., NZD...

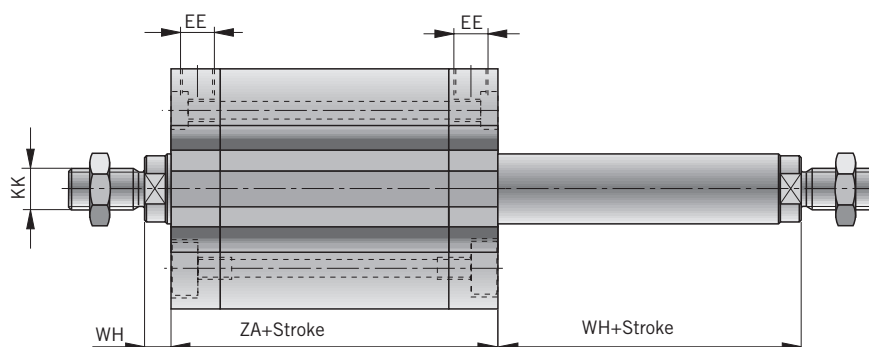
Cyl. Ø	A	ØB ^{H9}	Ød2 _{H9}	E	AF	BG	EE	KF	KK
32	19	6	12	50	13	14.5	G1/8	M8	M10x1.25
40	19	6	16	58	13	14.5	G1/8	M8	M10x1.25
50	22	6	20	70	16	14	G1/8	M10	M12x1.25
63	22	8	20	80	16	14.5	G1/8	M10	M12x1.25
80	28	8	25	96	20	15.5	G1/8	M12	M16x1.5
100	28	8	25	116	20	20	G1/8	M12	M16x1.5

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)

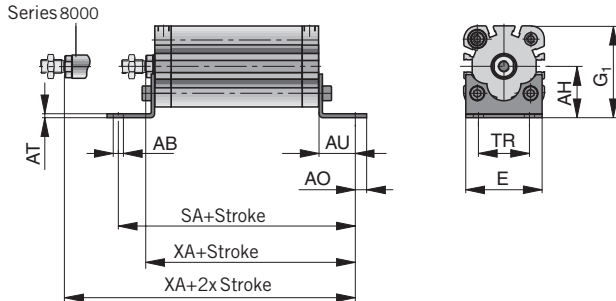


Cyl. Ø	LA	PL	TG	ØRR	RT	SW	SW1	VA	WH	WH+Stroke	ZA+Stroke	ZB+Stroke (*)
32	5	7.5	32.5	8.5	M6	10	17	4	7	7	44	51
40	5	7.5	38	8.5	M6	13	17	4	7	7	45	52
50	6	7.5	46.5	10.5	M8	17	19	4	8	8	45	53
63	6	7.5	56.5	10.5	M8	17	19	4	8	8	49	57
80	2	7.5	72	13.8	M10	19	24	4	10	10	54	64
100	2	10	89	13.8	M10	22	24	4	10	10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

(* for Series NZ8000: ZB+2xStroke

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

Dimensions for Mounting A



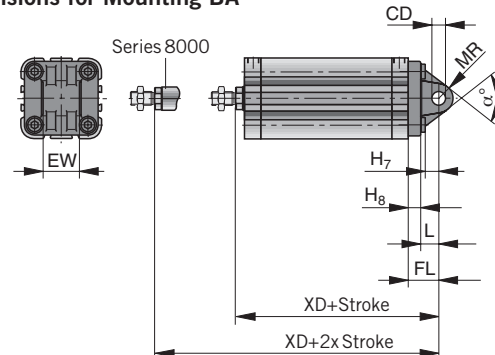
Material: steel, passivated

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



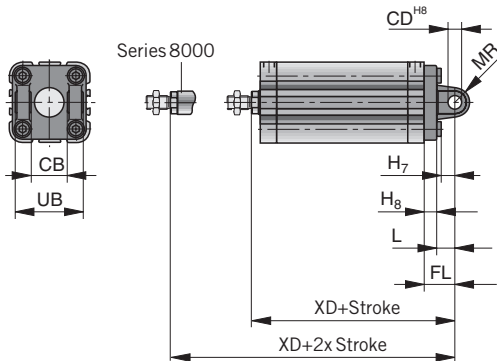
Material: cast aluminium

Dimension Table (mm) – Mounting BA

Cyl. Ø	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

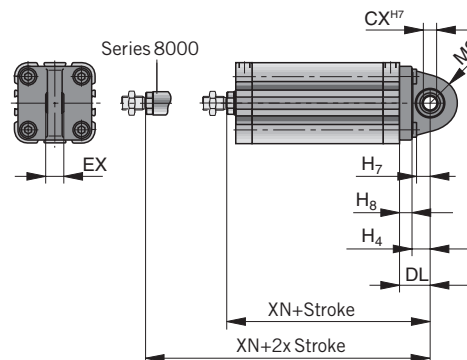
Dimension Table (mm) – Mounting B

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

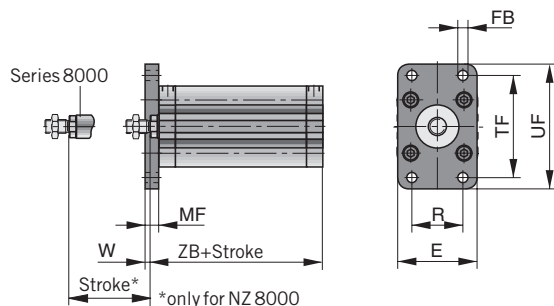
Dimension Table (mm) – Mounting BAS

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



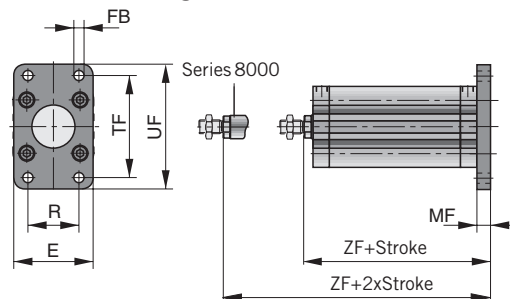
Material: cast aluminium

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

Dimensions for Mounting D



Material: cast aluminium

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

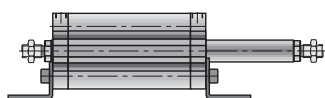
Included in delivery: 1 flange, 4 screws

(*for Series NZ8000 : ZF+2 x Stroke)

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

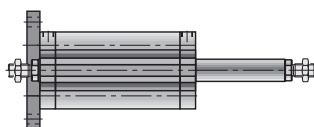
Mounting A-..

(Foot mounting)



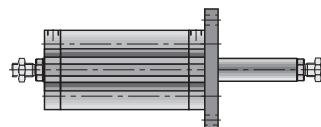
Mounting C-..

(Front flange mounting)



Mounting D-..

(Rear flange mounting)

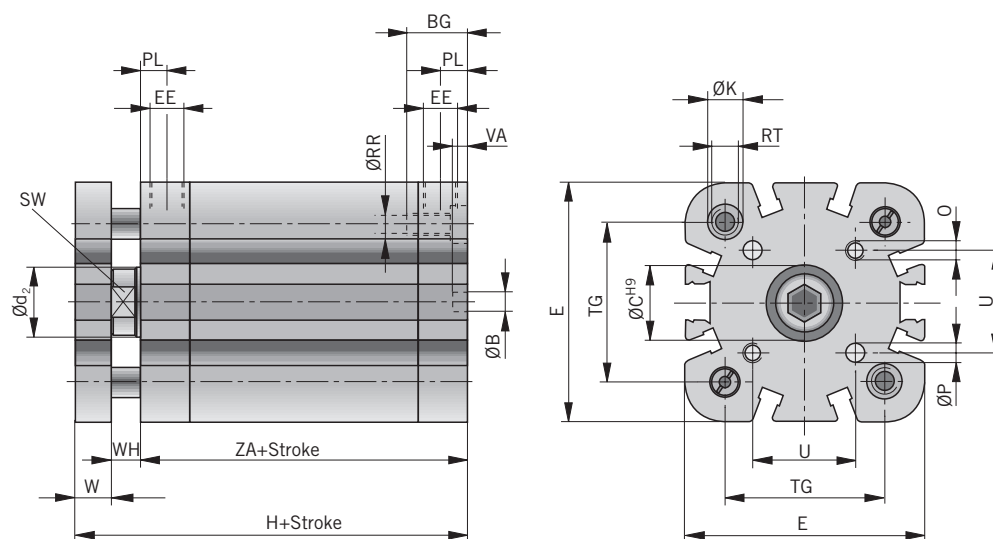


Accessories

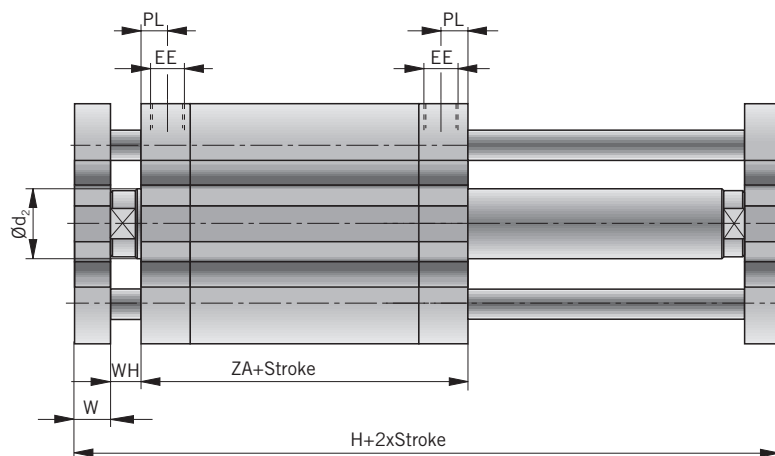
 Page 138	 Page 139	 Page 140	 Page 141	 Page 152	 Page 145	 Page 142		
---	---	---	---	---	---	---	--	--

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....



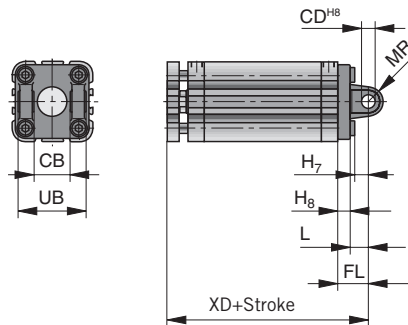
Dimension Table (mm) – Series NZV...., NZVD....

Cyl. Ø	ØB	ØC ^{H9}	Ød _{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

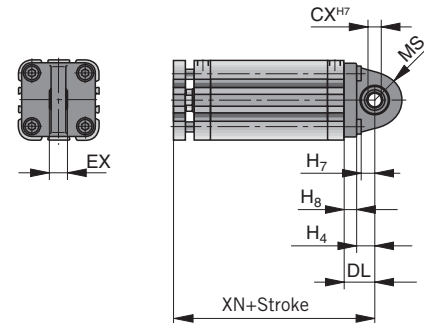
Dimensions for Mounting B



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

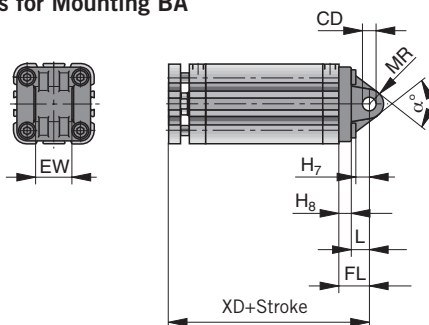
Included in delivery: 1 rear trunnion mounting, 4 screws

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

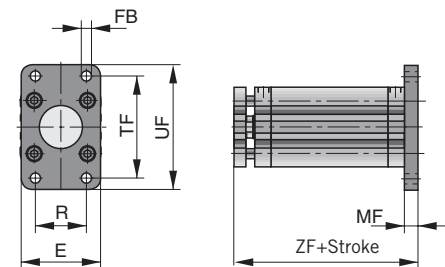
Included in delivery: 1 rear trunnion mounting with spherical bearing, 4 screws

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	0	X	-13
Series	NZ	6	050	-	1000	/	000	-	0	0	0	0	0	0	X	-13
NZ	Standard															
NZD	with through piston rod*															
NZV	with non-rotating piston rod															
NZVD	with non-rotating through piston rod															
System	6	7	8													
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	040	050	063	080	100										
32 mm	40 mm	50 mm	63 mm	80 mm	100 mm											
Stroke Length																
Length (4-digit) in mm																
Piston Rod Extension*																
Length (3-digit) in mm																
Air connection	0	1**	2**													
Standard	at one end in rear end cap	at one end in front end cap														
External Thread Length of the Piston Rod (optional) *																
Length (2-digit) in mm																
Details see page 34																
-13	for example 13 mm															
Pneumatic cylinders for the Ex-Atmospheres (ATEX)																
X	See ATEX Certification 94/9/EG (ATEX 95)															
0	Standard without Ex-Protection															
Piston Rod Thread*																
0	External Thread															
1	Special External Thread Details see page 34															
2	Internal Thread (Standard)															
Piston Rod Material*																
0	Steel, high-alloy (Standard)															
1	Steel, high-alloy (V2A)															
3	Steel, unalloyed, hard-chrome plated (CK45)															
Lubrication																
0	Grease (Standard)															
Seals / Wiper																
0	Standard (NBR)															
1	Viton (+150°C)															

Standard stroke length

Single acting version:

Double acting version:

0005, 0010, 0015, 0020, 0025

0005, 0010, 0025, 0050, 0080, 0100, 0125, 0160, 0200, 0250, 0320, 0400, 0500 delivered preferably

** On request

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)

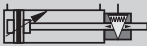
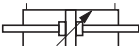
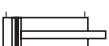
Type designation per order code

NZ6050-0080/015-110100-13

Accessories

 Page 138	 Page 139	 Page 140	 Page 141	 Page 152	 Page 145	 Page 142		
---	---	---	---	---	---	---	--	--

Overview

System	Fig.	Symbol	Series	Page
doppeltwirkend mit Dämpfung für berührungslose Positionserfassung			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
Cylinders**
to ISO 15552
Series AZ....
Ø 32-100 mm
Series DZ....
Ø 125-320 mm

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...			Double acting with cushioning
AZZ5.../.../...			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	-20 +80
Medium temperature range	T_{max}	°C	+80
			Note: When using below freezing point (°C) it is necessary to consult us
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		mm	12 16 20 20 25 25
Series AZV		mm	8 10 12 16 20 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*	N		430 680 1060 1680 2714 4240
AZ3*	N		374 570 890 1510 2464 4002
AZ4*	N		380 590 940 1466 2375 3900
Tensile force AZV*	N		380 590 940 1466 2375 3900
AZ3*	N		380 590 940 1466 2375 3900
AZ4*	N		380 590 940 1466 2375 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

**HOERBIGER****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



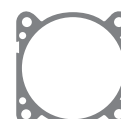
Ø 63



Ø 80

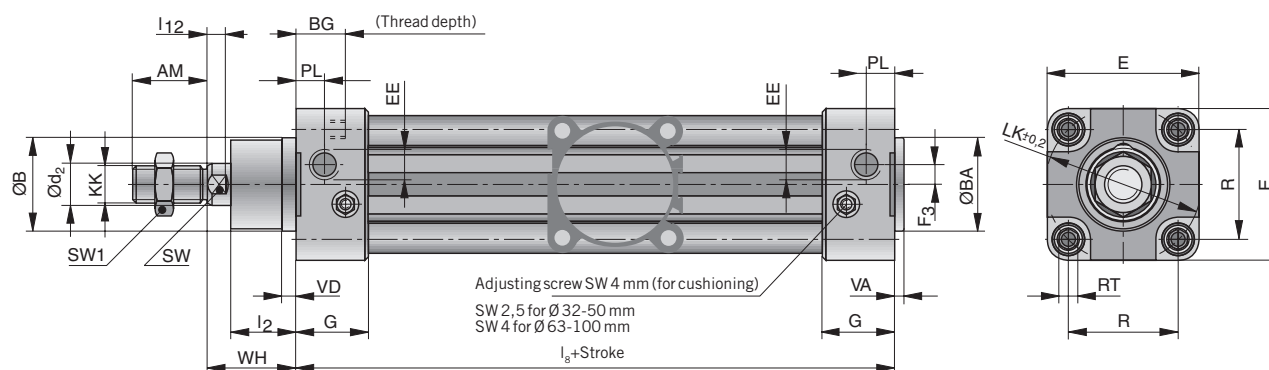


Ø 100

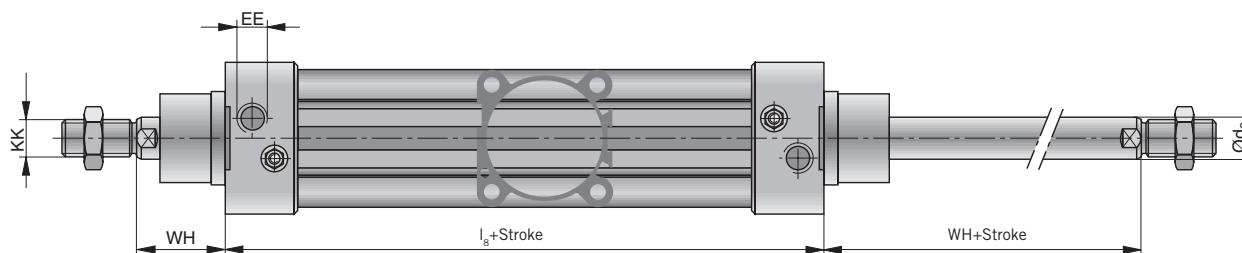


Piston force and air consumption see page 9, dimensions see page 48-57, order instructions see page 58, 59

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



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



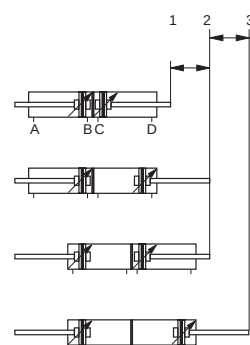
Dimension Table (mm) – Series AZ..., AZD..., AZZ...

Cyl. Ø	ØB _{d11}	Ød ₂	E	F ₃	G	I ₂	I ₈ + Stroke	I 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

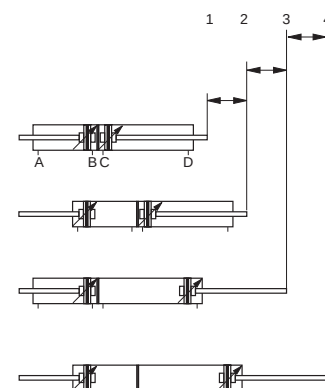
A three- or four-position cylinder consists of two separate cylinders whose piston rods extend in opposite directions. Depending on the control system and the division of the stroke length, this type of cylinder can provide up to four positions, with each position defined exactly by a stop. Note that 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



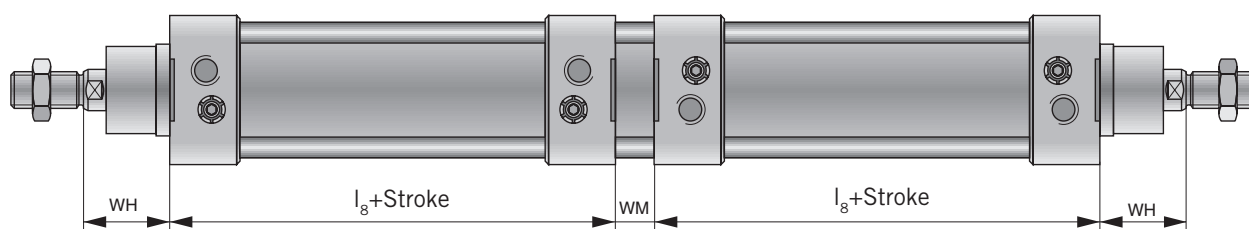
Two cylinders series AZ of the same stroke length are connected together.

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

 Page 138	 Page 139	 Page 140	 Page 141	 Page 152	 Page 145	 Page 142	 Seite 144	
---	---	---	---	---	---	---	--	--

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 information 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 fluctuating, 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

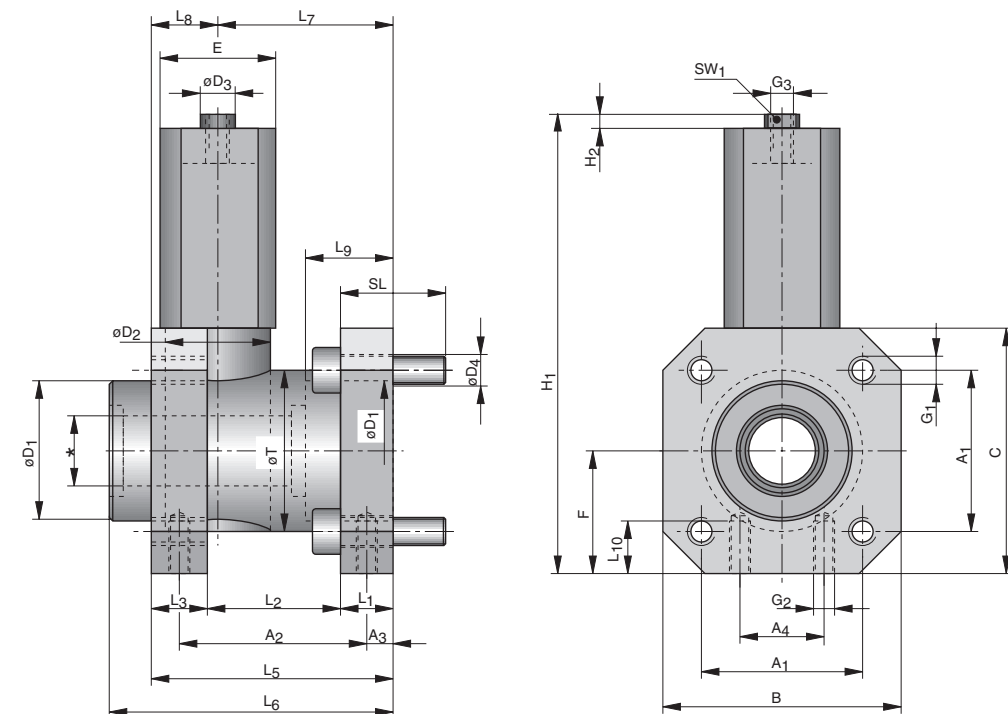
For all other dimensions for cylinders and cylinder mountings see page 46, 47

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

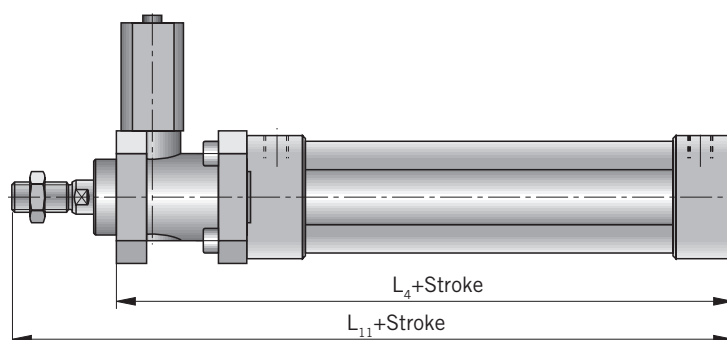
*) with 100 mm stroke and longer piston rod

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

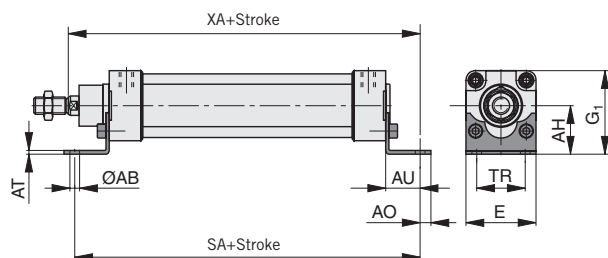
Accessories

 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 Seite 142	 Pivot for Mounting E Seite 144	
---	--	--	---	--	---	--	--	--

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



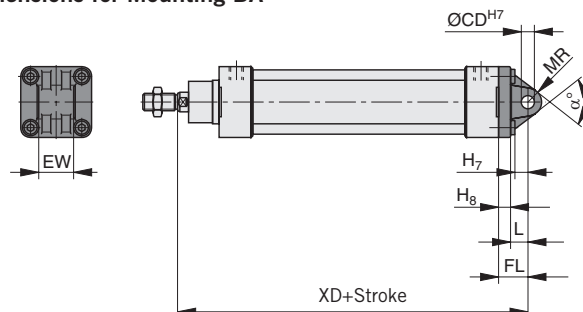
Material: steel passivated

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



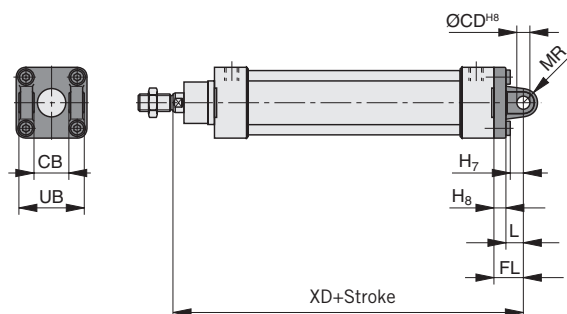
Material: cast aluminium

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

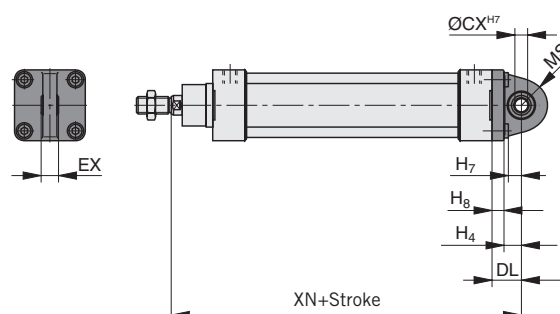
Dimension Table (mm) – for Mounting B

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

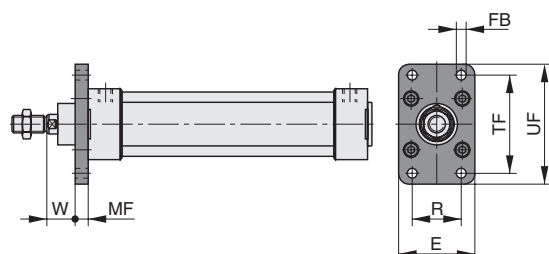
Dimension Table (mm) – for Mounting BAS

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



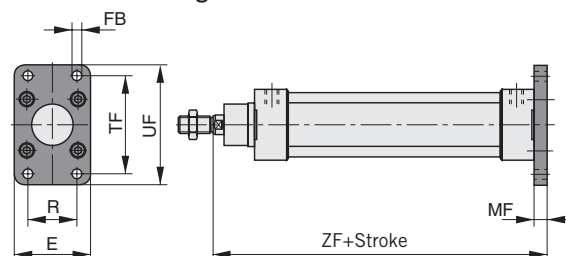
Material: cast aluminium

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



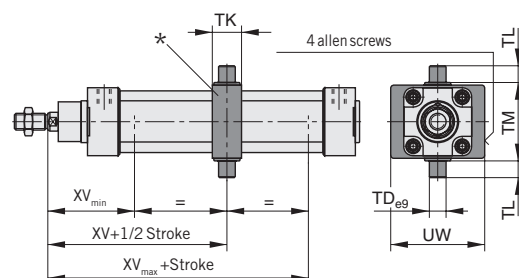
Material: cast aluminium

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

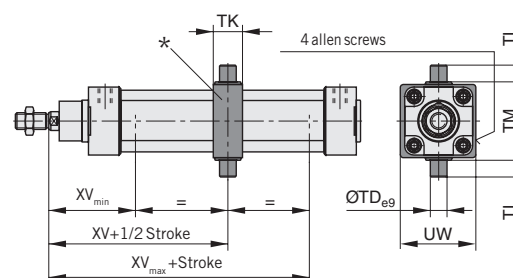
Cyl. Ø	ØTD _{e9}	TK	TL	TM	UW	XV _{min}	XV+ 1/2 Stroke	XV _{max} + Stroke
32	12	25	12	50	65	69	73	77
40	16	28	16	63	75	78	83	87
50	16	28	16	75	85	82	90	98
63	20	36	20	90	100	88	98	107
80	20	36	20	110	120	100	110	120
100	25	48	25	132	135	112	120	128

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.

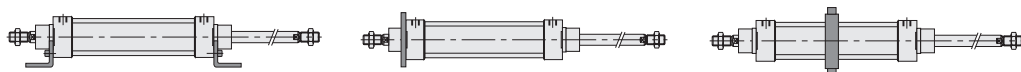
Included in delivery: 1 rear trunnion mounting

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

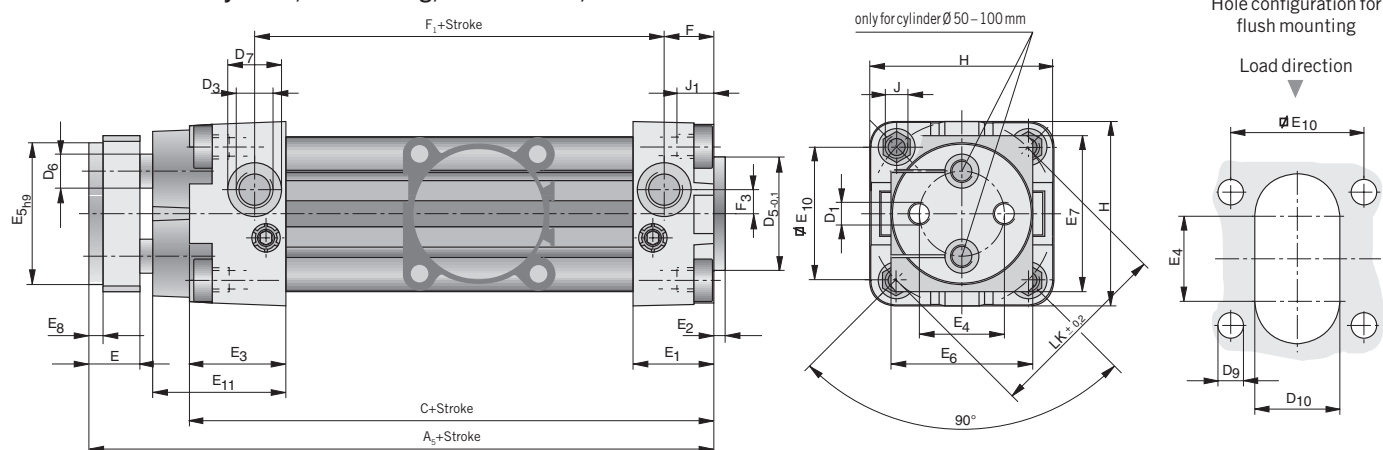
Foot mounting A

Front flange mounting C

Centre trunnion mounting EN



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

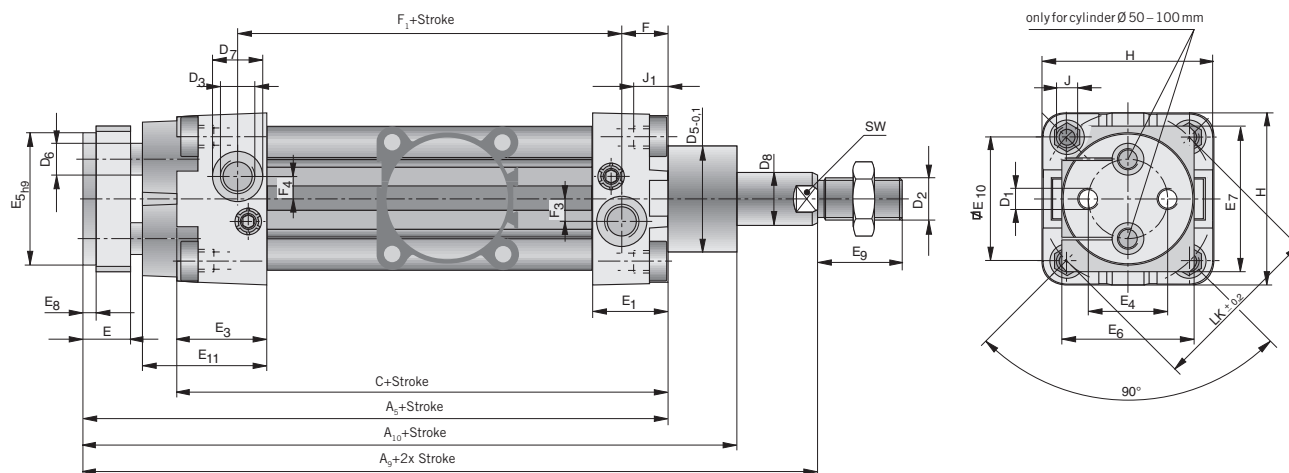


Dimension Table (mm) – Basic Cylinder AZV...., AZ3...., AZ4....

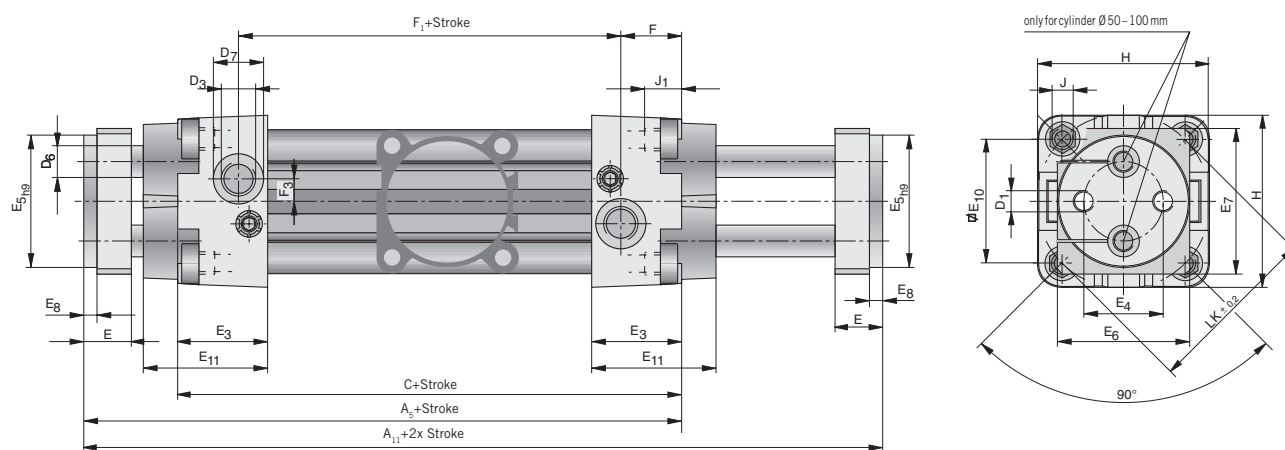
Cyl. Ø	A ₅ + Stroke	A ₉ + 2X Stroke	A ₁₀ + Stroke	A ₁₁ + 2X Stroke	C + Stroke	D ₁	D ₂	D ₃	ØD ₅	ØD ₆	ØD ₇	ØD ₈	ØD ₉	D ₁₀	E	E ₁	E ₂	E ₃
32	128	154	146	154	102	M 6	M10x1.25	G 1/8	30	8	15	12	7	23	15	29	4	26
40	142	172	163	172	112	M 8	M12x1.25	G 1/4	35	10	19	16	7	25	15	27	4	30
50	151	188	177	185	117	M 8	M16x1.5	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

Dimensions – 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



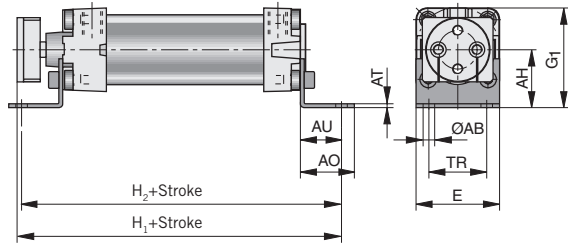
Cyl. Ø	$\varnothing E_4$	E_{5h9}	E_6	E_7	E_8	E_9	E_{10}	E_{11}	F AZV, AZ3	F AZ4	$F_1 + \text{Stroke}$ AZV, AZ3	$F_1 + \text{Stroke}$ AZ4	F_3 AZV, AZ4	F_3 AZ3	F_4	J	$J_{1\max}$	H	ØLK	SW
32	19	32	32	40	4	20	32.5	34	14.5	17.5	74	75	6	6	6	M 6	16	47	46	10
40	22.5	40	40	45	4	24	38	42	16	19	77.5	75	7	7	7	M 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

 Page 138	 Page 139	 Page 140	 Page 141	 Page 152	 Page 145	 Seite 142	 Seite 144	
---	---	---	---	---	--	--	--	--

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

Dimensions for Mounting A



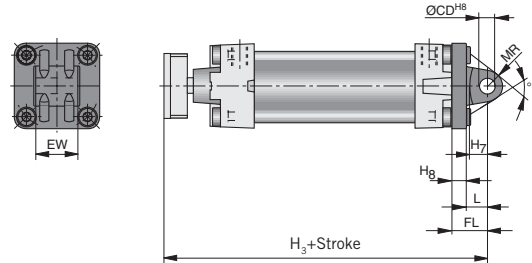
Material: steel, passivated

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



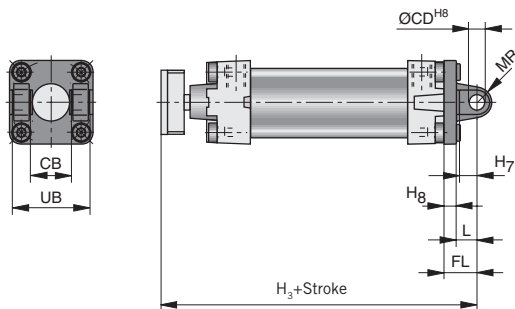
Material: cast aluminium

Dimension Table (mm) – for Mounting BA

Cyl. Ø	H ₃ + Stroke	H ₇	H ₈	L	ØCDH ₈	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

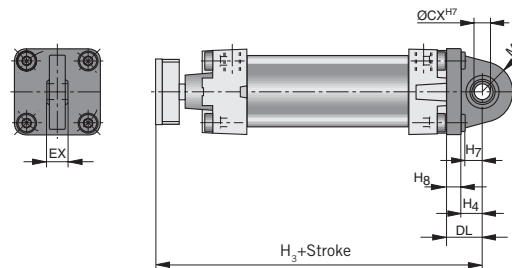
Dimension Table (mm) – for Mounting B

Cyl. Ø	H ₃ + Stroke	H ₇	H ₈	L	CB	ØCDH ₈	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

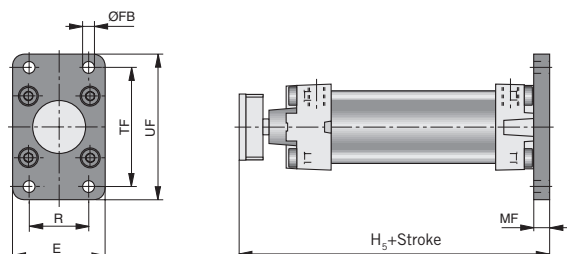
Dimension Table (mm) – for Mounting BAS

Cyl. Ø	H ₃ + Stroke	H ₄	H ₇	H ₈	ØCXH ₇	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



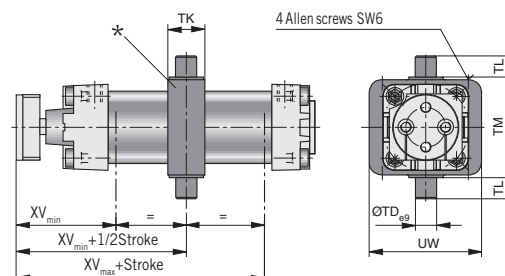
Material: cast aluminium

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

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 _{min} + 1/2 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

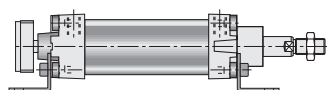
Included in delivery: 1 rear trunnion mounting

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

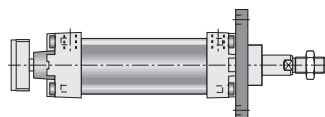
As standard, the position of the T-slots and dovetail slots is on the same side as the air connections. Exception: Ø 32 has only T-slots on the same side as the air connections, with a dovetail slot on the underside.

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

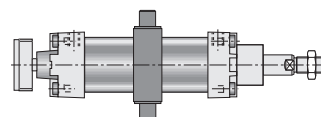
Foot mounting A



Rear flange mounting D

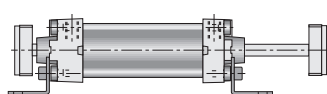


Centre trunnion mounting EN

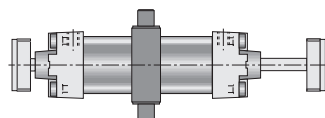


Dimensions – Basic Cylinder, with through piston rods, series AZ4....., Ø 32 – 100 mm

Foot mounting A



Centre trunnion mounting EN

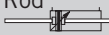
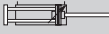


Piston force and air consumption see page 9, order instructions see page 58, 59

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

*** 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.

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)	

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

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

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

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

Lubrication	
0	Grease (Standard)

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

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

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

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:

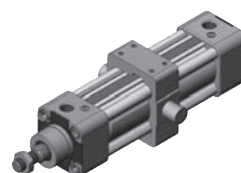
Standard Basic Cylinder, Ø 32 mm, ATEX, Series AZ:
AZ5032-0500/000-00000X

* Order information for cylinders with EN-mountings

When ordering, please indicate the position of the centre trunnion mounting

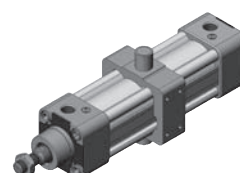
Standard position: Type EN1

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 
(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
	T_{max}	°C	+80
Medium temperatur range	T_{max}	°C	+80
			Note: When using below freezing point (°C) it is necessary to consult us
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, hard-chrome plated
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 instruc- tions max. 2000mm, longer strokes on request
Piston force and air consumption			See page 9
Cushioning			At both ends, infinitely variable
Cushioning stroke		Cyl. Ø mm	125 160 200 250 320 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

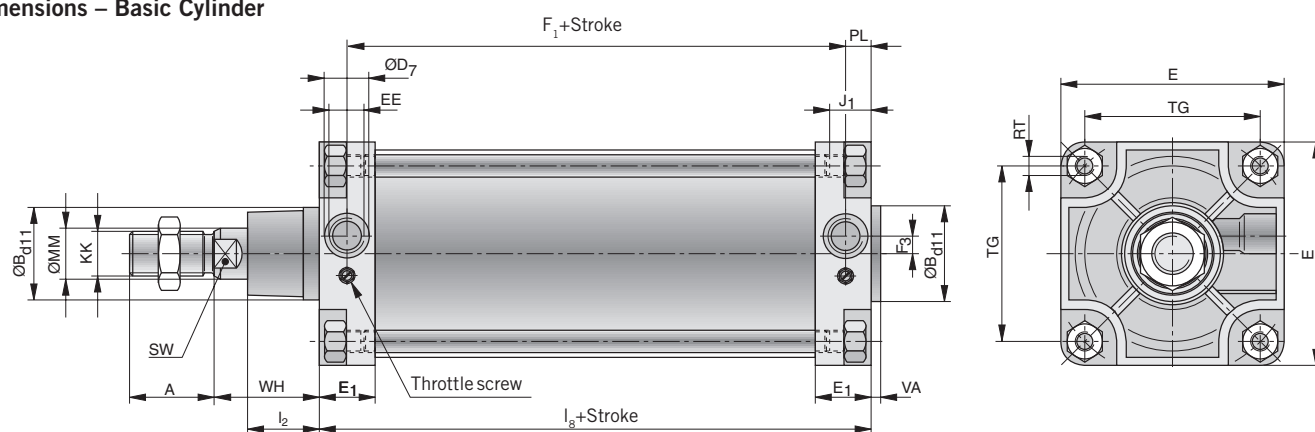
Cylinder version	Cylinder diameter									
	Ø125		Ø160		Ø200		Ø250		Ø320	
	1*	2*	1*	2*	1*	2*	1*	2*	1*	2*
Standard Type DZ	7.200	1.300	12.500	2.050	20.000	2.200	35.000	4.000	66.000	6.000

* 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.	I ₂	I 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 delivered

Accessories

 Page 138	 Page 139	 Page 140	 Page 141	 Page 152	 Page 155	 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 informa-
tions and examples see page
114, 115

****)) Note:**
The holding force quoted
relates to a static load. If
this load is exceeded, slippa-
ge can occur. Any dynamic
forces occurring in operation
must not exceed the static
holding force.
In clamped operating mode,
if the load is fluctuating, 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 cylin-
der 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 ade-
quate 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

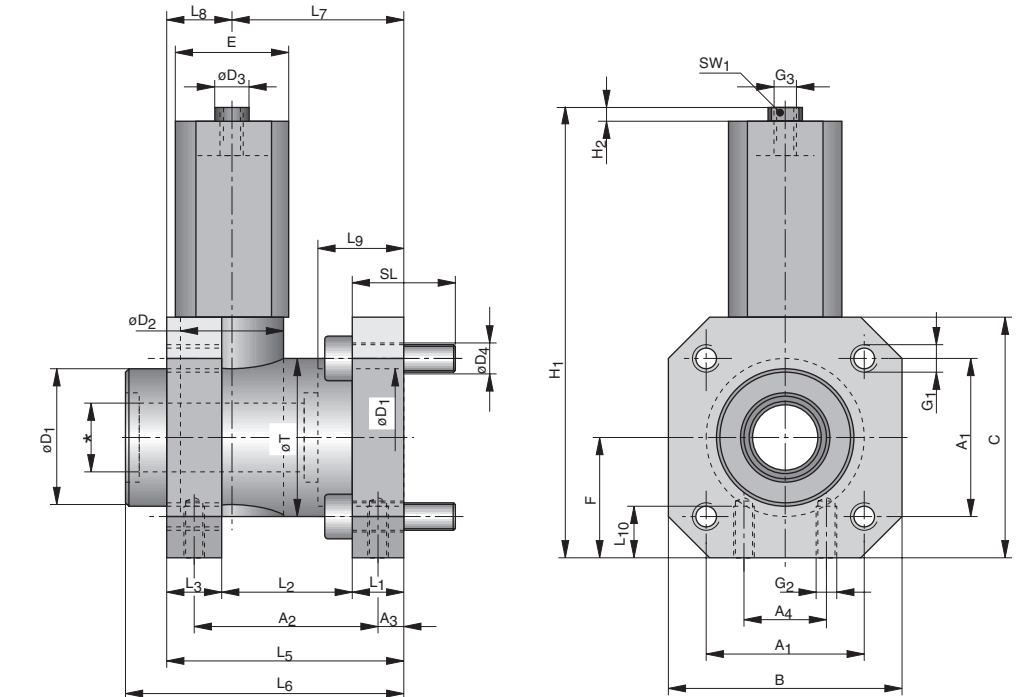
For all other dimensions for cylinders and cylinder mountings see page 60, 61

Weight (mass) kg

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

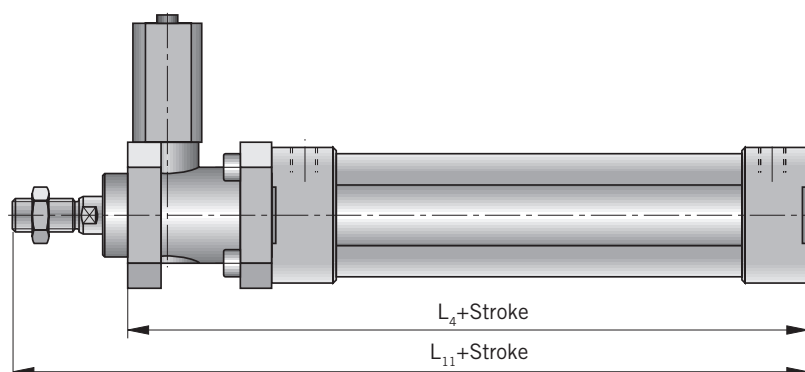
*) with 100 mm stroke and longer piston rod

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	314	122	154	85	37	45.5	20	384	45	17	80

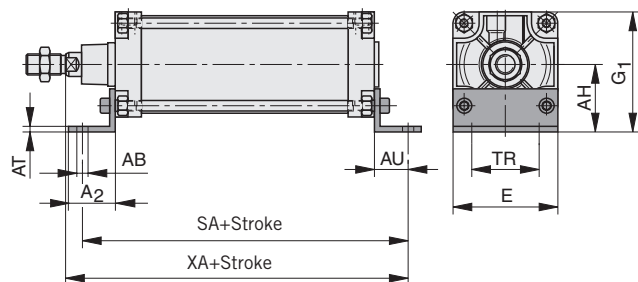
Accessories

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 142	Pivot for Mounting E  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

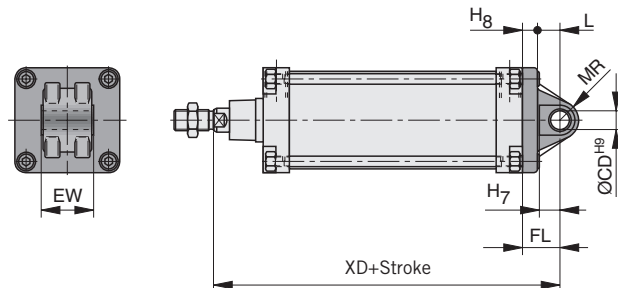


Material: steel, passivated

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

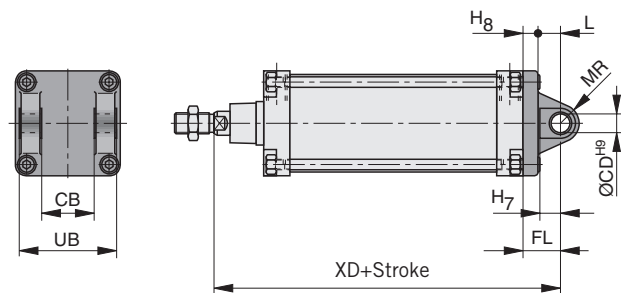


Material: cast aluminium

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

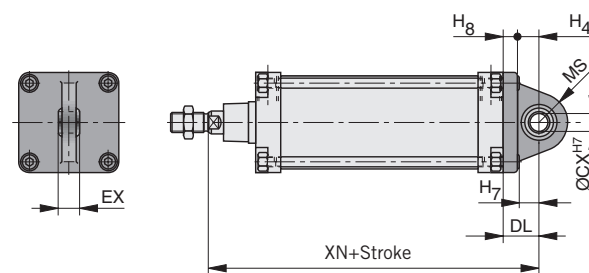


Material: cast aluminium

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



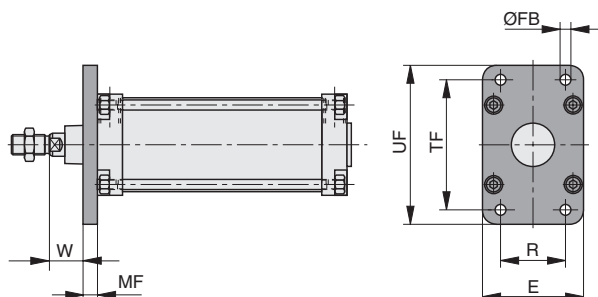
Material: cast aluminium

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

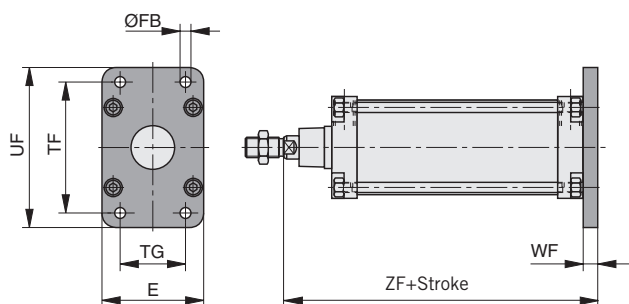


Material: Ø125 cast aluminium
Ø160 - Ø320 steel, passivated

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

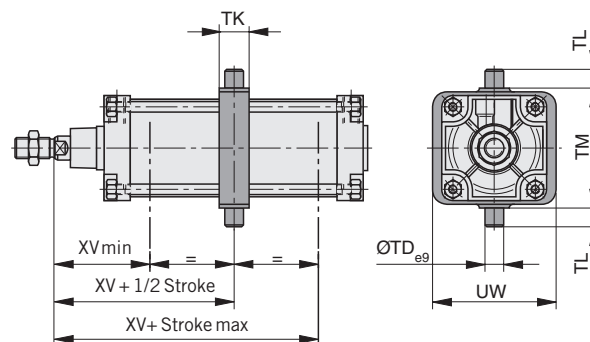


Material: Ø125 cast aluminium
Ø160 - Ø320 steel, passivated

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		ISO	125	DZ5125/....-FSE	PA64027-....
Double acting with adjustable end cushioning, for contactless position sensing		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

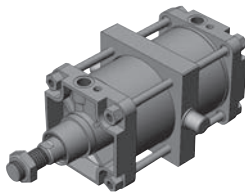
Description	Order-No.				
	Ø125	Ø160	Ø200	Ø250	Ø320
Foot mounting A-...	PD 22026	PD 22027	PD 24792	PD 25758	KL9139
Rear trunnion mounting B-...	PD 22034	PD 22035	PD 24990	PD 25710	KL9137
Rear trunnion mounting BA-...	PD 23418	PD 22628	PD 24999	PD 25759	KL9135
Rear trunnion mounting BAS-...	PD 23849	PD 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	KY8658	KL9141

* Order information for cylinders with EN-mountings

When ordering, please indicate the position of the centre trunnion mounting

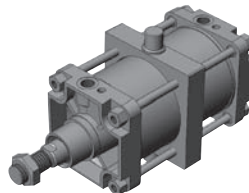
Standard position: Type EN1

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



Page 140

Coupling



Page 141

Magnetic Switch



Page 152

Pivot for Mounting B



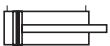
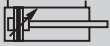
Page 142

Pivot for Mounting E



Seite 144

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

Piston Rod Cylinders

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

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
Medium temperature range	T_{max}	°C	+70
Note: When using below freezing point (°C) please contact as for advice			
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 consumption			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

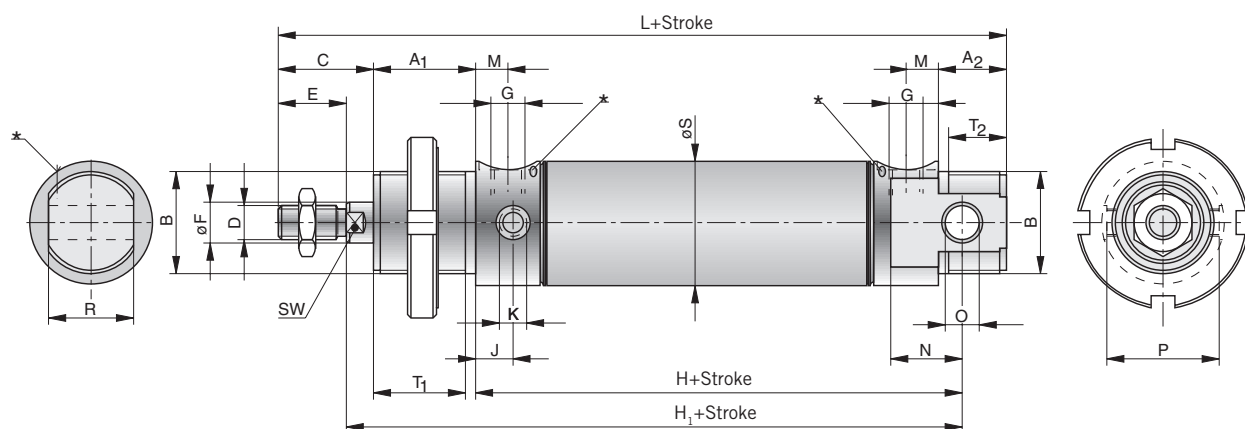
* 1 = Weight for cylinder with 100 mm stroke

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

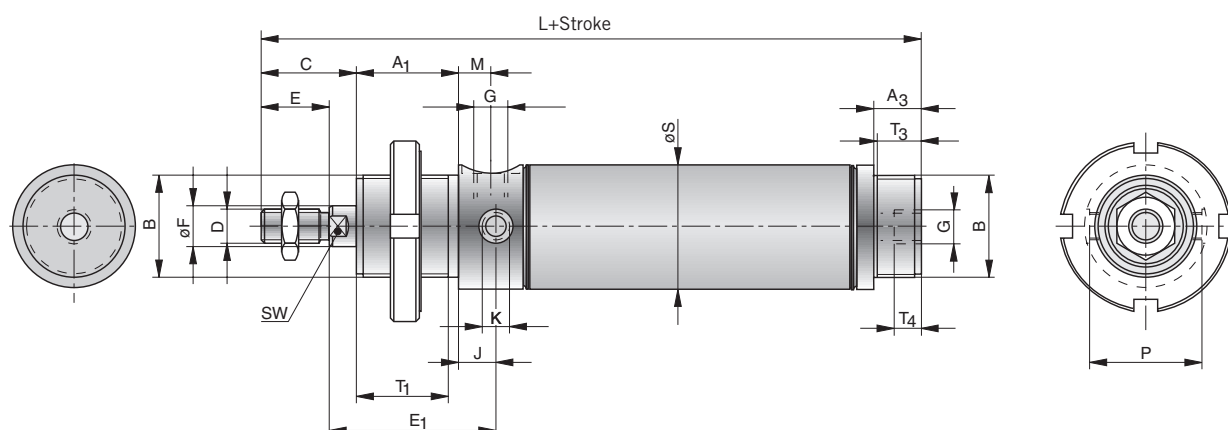
Piston force and air consumption see page 9, dimensions see page 72- 75, order instructions see page 76

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

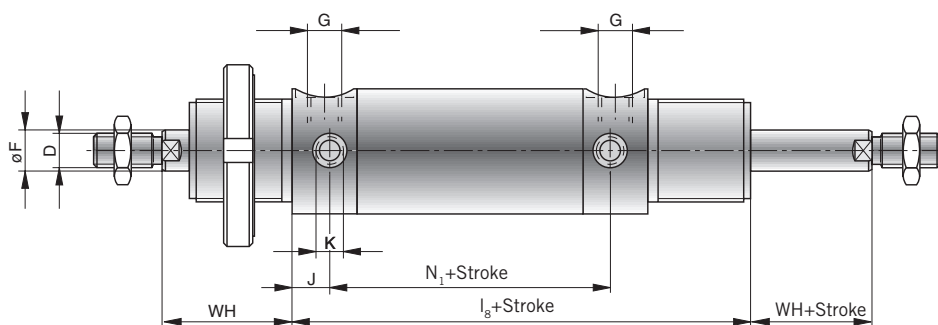


Dimension Table (mm) – Basic Cylinder, Series R..., RK..., RDU....

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



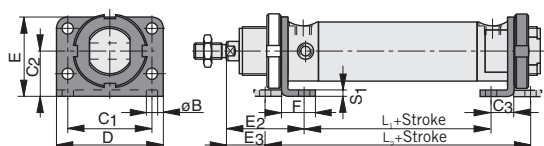
Cyl. Ø	L + Stroke R....	L + Stroke RK....	M	N	N ₁ + Stroke	O	P	R _{h12}	ØS	T ₁	T ₂	T ₃	T ₄	SW	WH	WH + Stroke
32	160.5	138.5	9.5	21	61.5	10	33	25	35	27	16.5	12	8	10	38	38
40	181.5	156.5	11	24	65	12	42	30	43	32	17.5	14	12	14	45	45
50	205.5	179.5	11	27	67.5	14	52	35	54	35	21	16	12	17	50	50
63	215.5	186.5	12.5	28	74	16	62	35	67	35	20.5	16	12	17	51	51

Accessories

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

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

Foot Mounting Type RA2-..



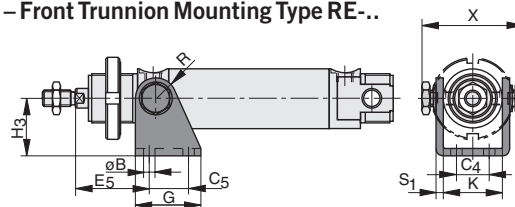
Material: steel, passivated

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	111	4
										46.5*	94.5*	
40	9	60	33	20	80	58	60	25	30	61	131	5
										41.5*	111.5*	
50	9	70	40	20	90	70	64	30	30	70.5	138.5	6
										51.5*	119.5*	
63	9	76	45	20	96	80	65	31	30	80	148	6
										57.5*	125.5*	

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

Pivot – Front Trunnion Mounting Type RE-..

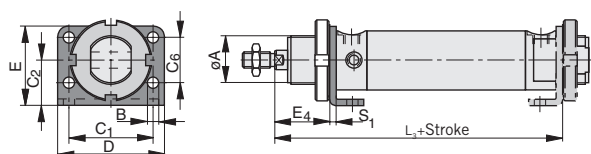


Material: steel, passivated

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-..



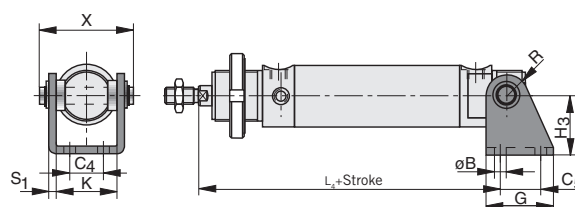
Material: steel, passivated

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	4
									108.5*	
40	38.1	9	60	33	30	80	58	40	141	5
									121.5*	
50	45.1	9	70	40	40	90	70	44	154.5	6
									135.5*	
63	45.1	9	76	45	50	96	80	45	165	6
									142.5*	

* Dimensions are valid for series RK....

Pivot – Rear Trunnion Mounting Type RB-..



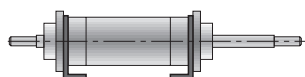
Material: steel, passivated

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

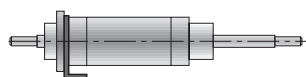
Mountings – Series RDU... (with through piston rod), Ø 32 – 63 mm

Foot mounting
(2 mounting brackets)



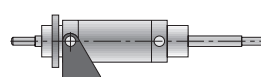
Material: steel, passivated

Foot mounting
(Flange mounting)



steel, passivated

Pivot – Front Trunnion Mounting



steel, passivated

Accessories

Piston Rod Eye



Page 138

Piston Rod Clevis



Page 139

Compensating
Coupling



Page 140

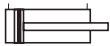
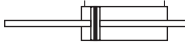
Magnetic Switch



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-....
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

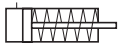
Description	Type	Order-No.			
		Ø32	Ø40	Ø50	Ø63
Foot mounting (1 mounting bracket)	RA 1-..	KK 29.302	KK 30.302	KK 31.302	KK 32.302
Foot mounting (standard version)	RA 2-..*	PD 25712	PD 25713	PD 25714	PD 25715
Flange mounting (1 mounting bracket)	RC- ..	KK 29.302	KK 30.302	KK 31.302	KK 32.302
Rear trunnion 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

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

Piston Rod Cylinders

Compact Cylinder

*Series SZ....
Ø 12-100 mm*

*Series SZK....
Ø 32-63 mm*

Compact Cylinder Ø 12-100 mm

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

Versions:

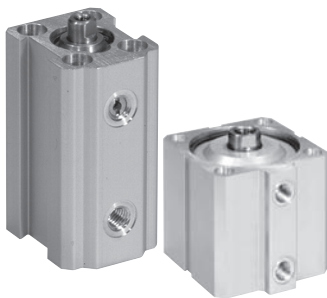
- single acting without cushioning
- double acting without cushioning
- for contactless position sensing
- with through piston rod
- non-rotating
- ATEX-Version 

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
Medium temperature range	T_{max}	°C	+70
Note: When using below freezing point (°C) please contact us for advice			
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....	p_{max}	bar	– – – – 10
SZ7...., SZ6...., SZV6....	$p_{min/max}$	bar	1-10 1-10 1-10 1-10 1-10
SZD6....	$p_{min/max}$	bar	– – 1-10 1-10 1-10
	$p_{min/max}$	bar	2.5-10 2-10 2-10 1.5-10 1.5-10
Piston diameter		mm	40 50 63 80 100
Operating pressure range			
SZK3....	p_{max}	bar	– 10 10 – –
SZ7...., SZ6...., SZV6....	$p_{min/max}$	bar	1-10 1-10 1-10 1-10 1-10
SZD6....	$p_{min/max}$	bar	1-10 1-10 1-10 – –
	$p_{min/max}$	bar	2.5-10 2-10 2-10 1.5-10 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..., SZV6...		M5	M5	M5	G1/8	G1/8
SZD6...		–	–	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..., SZV6...		G1/8	G1/8	G1/8	G1/4	G1/4
SZD6...		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..., SZV6...		6	8	10	12	12
SZD6...		–	–	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..., SZV6...		16	20	20	25	32
SZD6...		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 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

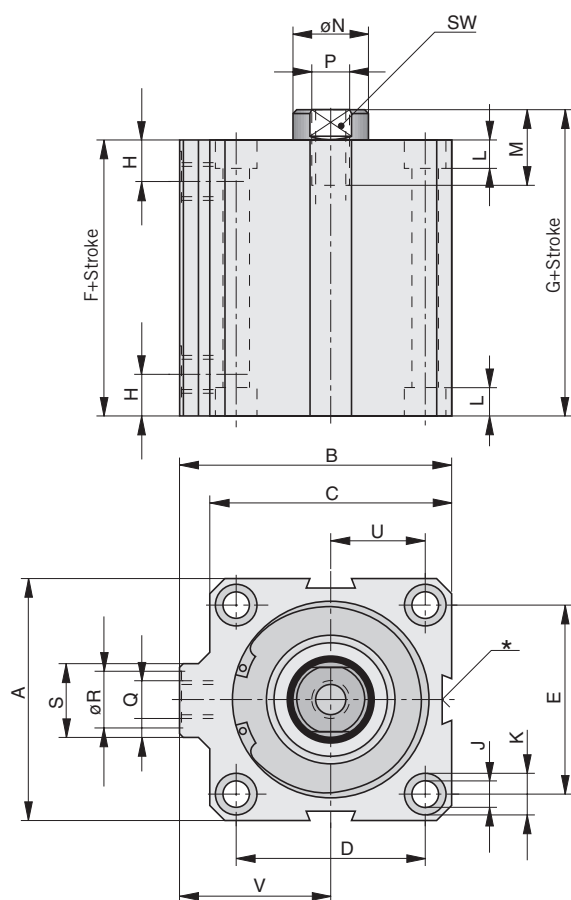
Weight (mass) kg

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

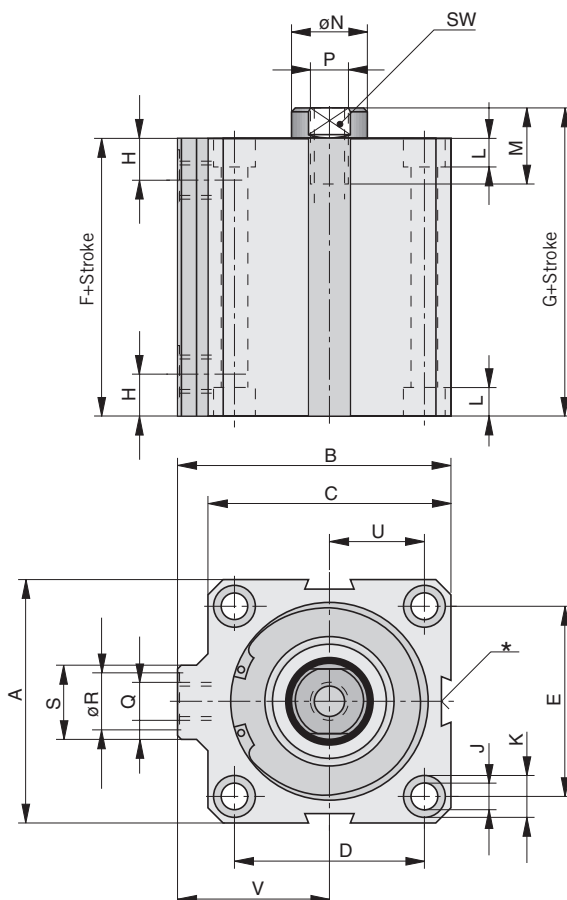
2 = Weight per additional 10 mm stroke length for series SZK3... stroke see table

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



* are omitted for cyl. Ø12 to 20 mm

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



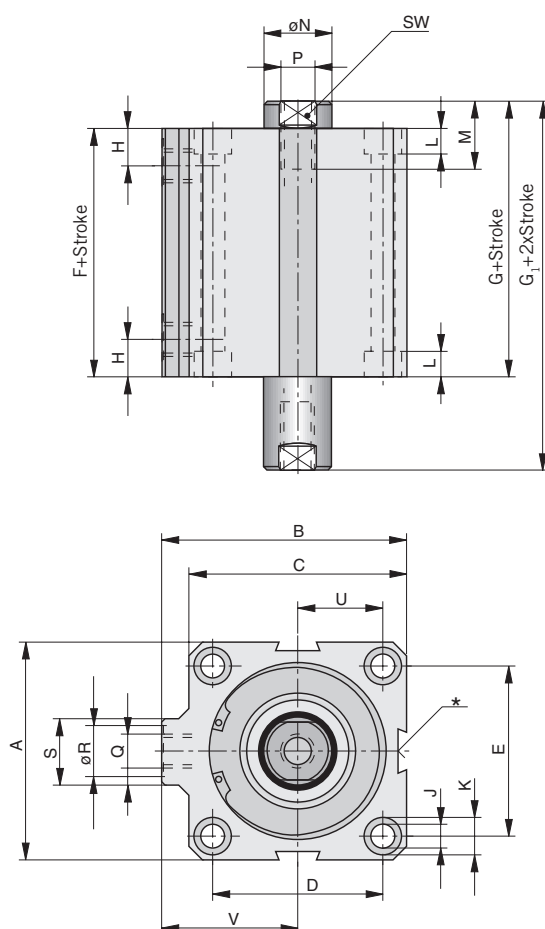
* are omitted for cyl. Ø12 to 20 mm

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

Cyl. Ø	Standard stroke lengths (mm) SZ7...	Standard stroke lengths (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

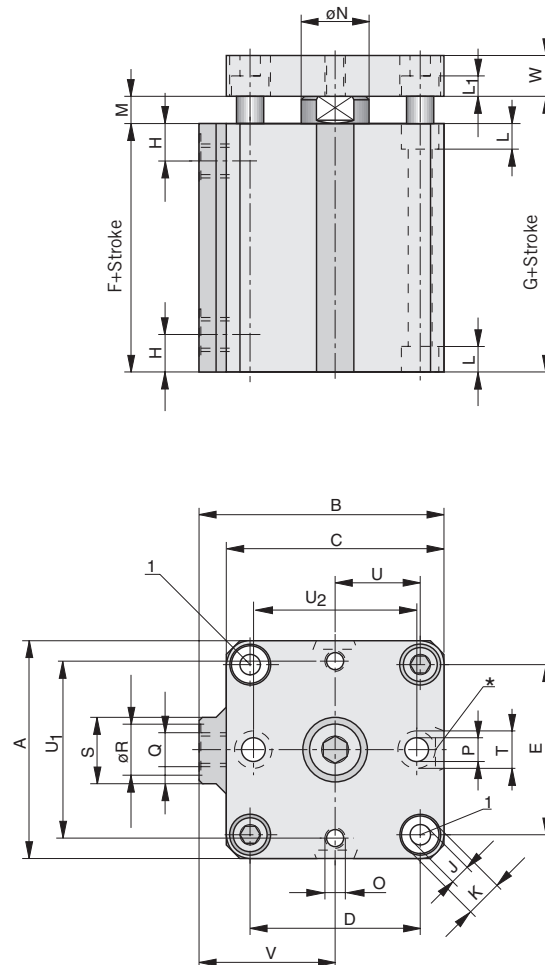
** only Ø20 – 63 mm

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



* are omitted for cyl. Ø12 to 20 mm

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

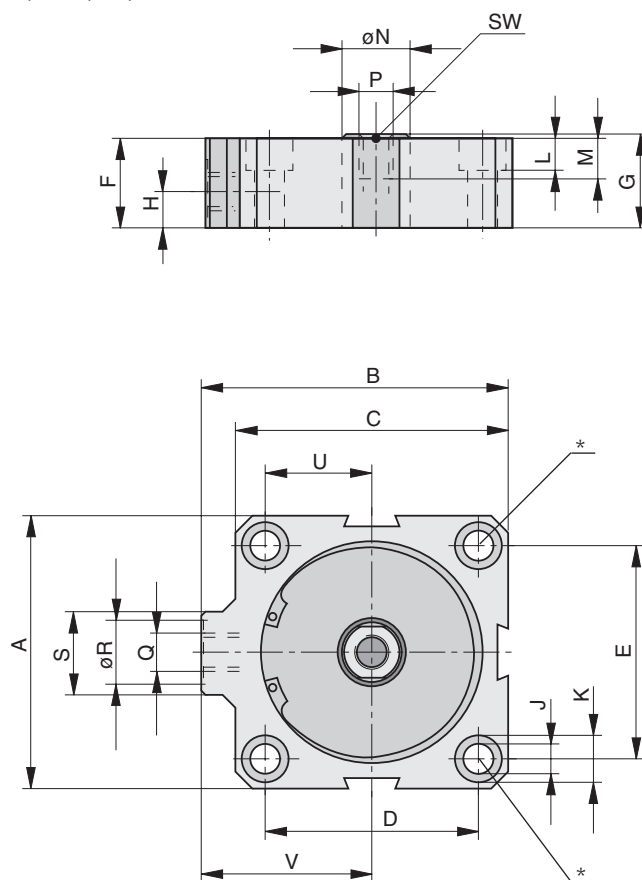


* is omitted for cyl. Ø 20 mm
1) Mounting holes for cylinder

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	ϕN	Q	P	ϕR	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-....

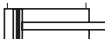
Complete Stroke Length (mm)

(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)

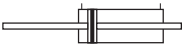
(4-digit)

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)

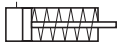
(4-digit)

Standard Stroke Lengths

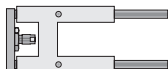
Cyl. Ø	Stroke Lengths (mm)
20, 25	5, 10, 15, 25, 50
32, 40	5, 10, 15, 25, 50, 80
50, 63, 80, 100	10, 15, 25, 50, 80

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

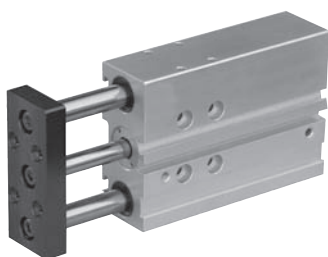
** Guided Cylinders with Recirculating Ball Bearing Guidance

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 cushioning for contactless position sensing
Connection			See dimensional drawings
Connection			Thread
Ambient temperature range	$T_{min/max}$	°C	FZG: -20 to +80
	$T_{min/max}$	°C	FZK: -5 to +60
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:

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

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:

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

Maximum permissible mass:

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

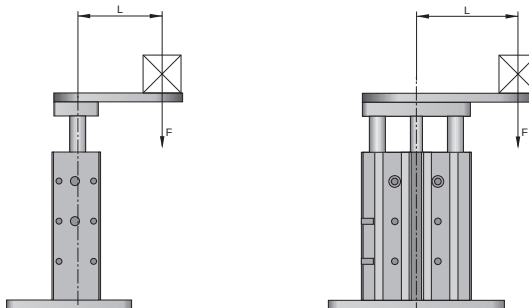
Piston diameter (mm)	Ø 20	Ø 25	Ø 32	Ø 40	Ø 50
E_{per} (Nm)	0.14	0.35	0.40	0.52	0.64

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

Permissible Loading in dependence on Lever Arm/Net Load

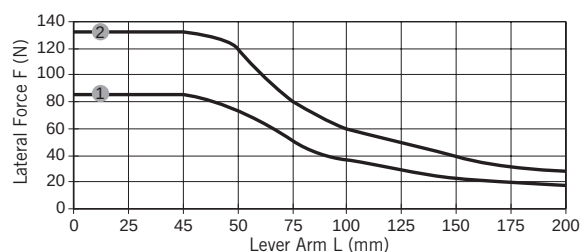
Application Example: Lifting Cylinder

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



Series FZG6020 / 6025 (Stroke 30 mm)

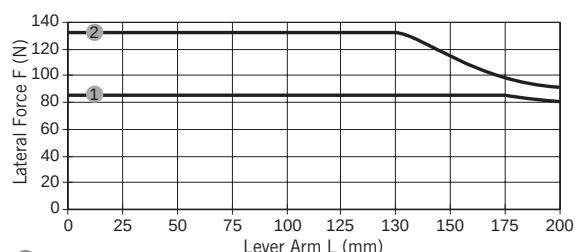
Series	Lever Arm L (mm)										
	0	25	45	50	75	100	125	150	175	200	
	Lateral Force F (N)										
① FZG6020	85	85	85	70	49	37	30	23	20	18	
② FZG6025	132	132	132	120	80	60	49	40	33	30	



① = FZG020
② = FZG025

Series FZG6020 / 6025 (Stroke 40 - 100 mm)

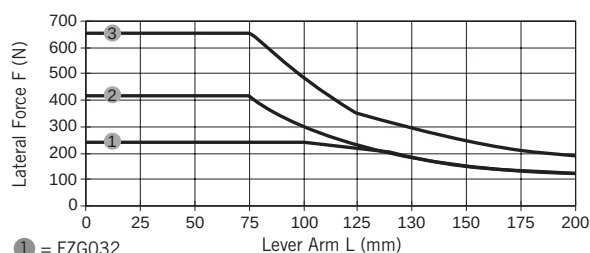
Series	Lever Arm L (mm)										
	0	25	50	75	100	125	130	150	175	200	
	Lateral Force F (N)										
① FZG6020	85	85	85	85	85	85	85	85	85	79	
② FZG6025	132	132	132	132	132	132	132	132	112	98	



① = FZG020
② = FZG025

Series FZG6032, 6040, 6050 (Stroke 50 mm)

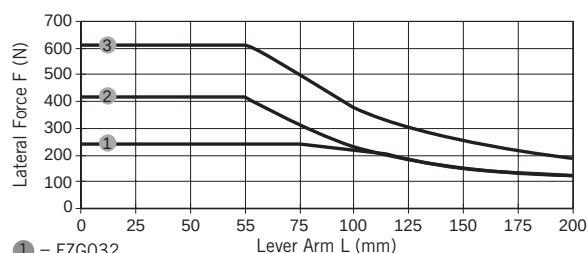
Series	Lever Arm L (mm)										
	0	25	50	55	75	100	125	150	175	200	
	Lateral Force F (N)										
① FZG6032	240	240	240	240	240	220	180	150	130	120	
② FZG6040	410	410	410	410	300	220	180	150	130	120	
③ FZG6050	650	650	650	650	500	350	300	250	210	190	



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	

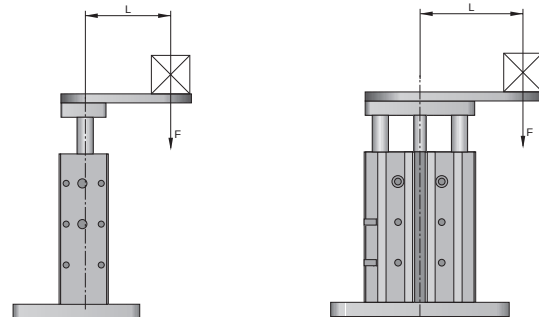


① = FZG032
② = FZG040
③ = FZG050

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

Permissible Loading in dependence on Lever Arm/Net Load

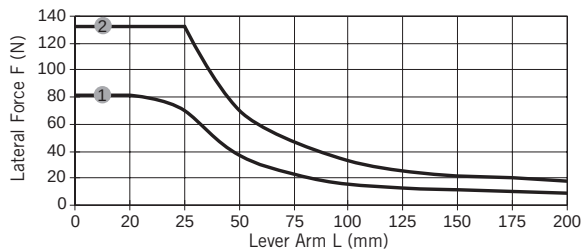
Application Example: Lifting Cylinder



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

Series FZK6020 / 6025 (Stroke 30 mm)

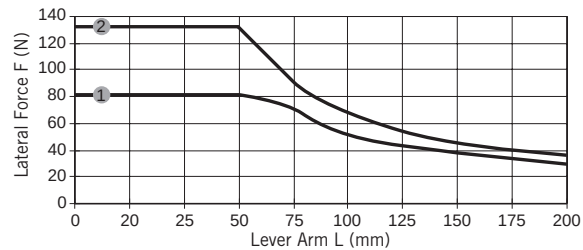
Series	Lever Arm L (mm)									
	0	20	25	50	75	100	125	150	175	200
Lateral Force F (N)										
① FZK6020	82	82	70	37	23	18	13	11	10	9
② FZK6025	132	132	132	70	47	33	28	22	20	18



① = FZK6020
② = FZK6025

Series FZK6020 / 6025 (Stroke 40 - 100 mm)

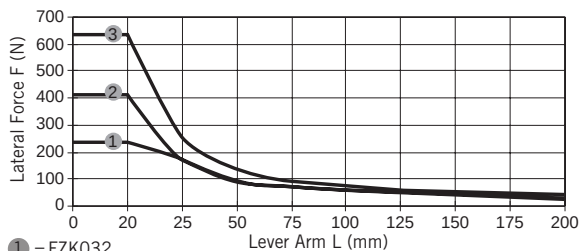
Series	Lever Arm L (mm)									
	0	20	25	50	75	100	125	150	175	200
Lateral Force F (N)										
① FZK6020	82	82	82	82	70	50	40	37	30	27
② FZK6025	132	132	132	132	90	66	52	45	38	35



① = FZK6020
② = FZK6025

Series FZK6032, 6040, 6050 (Stroke 50 mm)

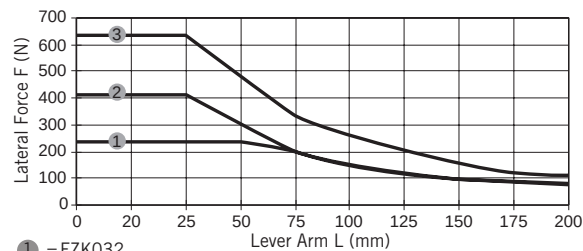
Series	Lever Arm L (mm)									
	0	20	25	50	75	100	125	150	175	200
Lateral Force F (N)										
① FZK6032	240	240	175	85	75	65	50	48	40	25
② FZK6040	420	420	160	85	75	65	50	48	40	25
③ FZK6050	650	650	250	125	90	80	60	52	50	48



① = FZK6032
② = FZK6040
③ = FZK6050

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

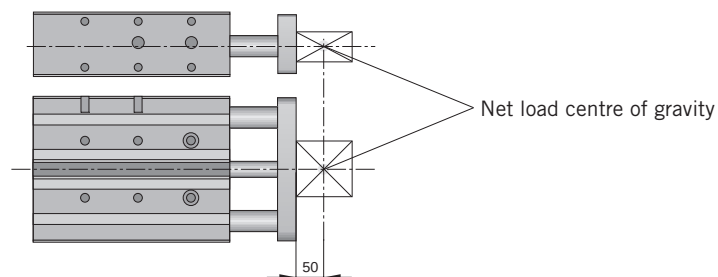
Series	Lever Arm L (mm)									
	0	20	25	50	75	100	125	150	175	200
Lateral Force F (N)										
① FZK6032	240	240	240	240	200	150	120	100	85	80
② FZK6040	420	420	420	310	200	150	120	100	85	80
③ FZK6050	650	650	650	500	340	265	205	160	130	125



① = FZK6032
② = FZK6040
③ = FZK6050

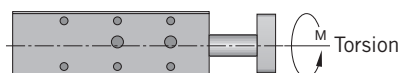
Maximum Net Load / permissible Torque – Series FZK and FZG

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



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



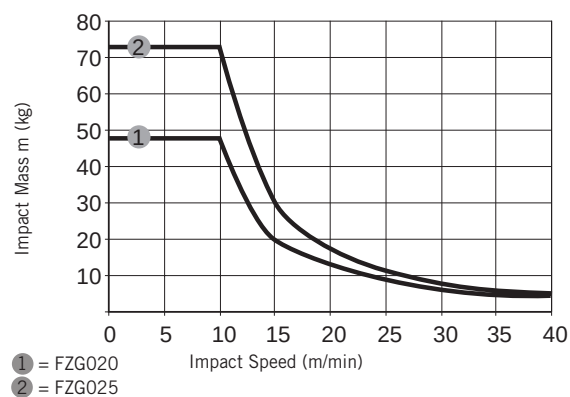
Series	Piston- Ø	Maximum Torsion Load M (Nm) per stroke (mm)											
		10	20	25	30	40	50	80	100	125	160	200	
FZG6020	20	–	1.85	1.75	1.70	3.00	2.80	2.35	2.10	–	–	–	
FZK6020	20	–	1.30	1.13	1.01	2.64	2.56	2.34	2.23	–	–	–	
FZG6025	25	–	4.15	3.95	3.80	4.20	3.90	3.25	2.90	–	–	–	
FZK6025	25	–	3.00	2.92	2.85	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)

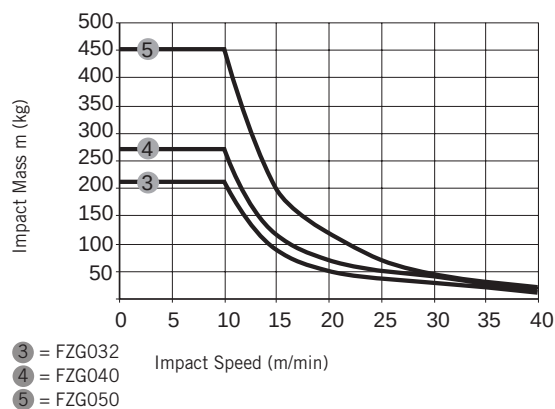
Application as Stop Cylinder / Only Sliding Guidance

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

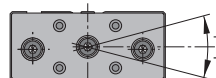


Permissible Impact Energy – Series FZG6032, FZG6040, FZG6050



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

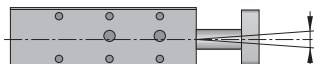


Torsion / Play for Series FZK and FZG

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:

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

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.

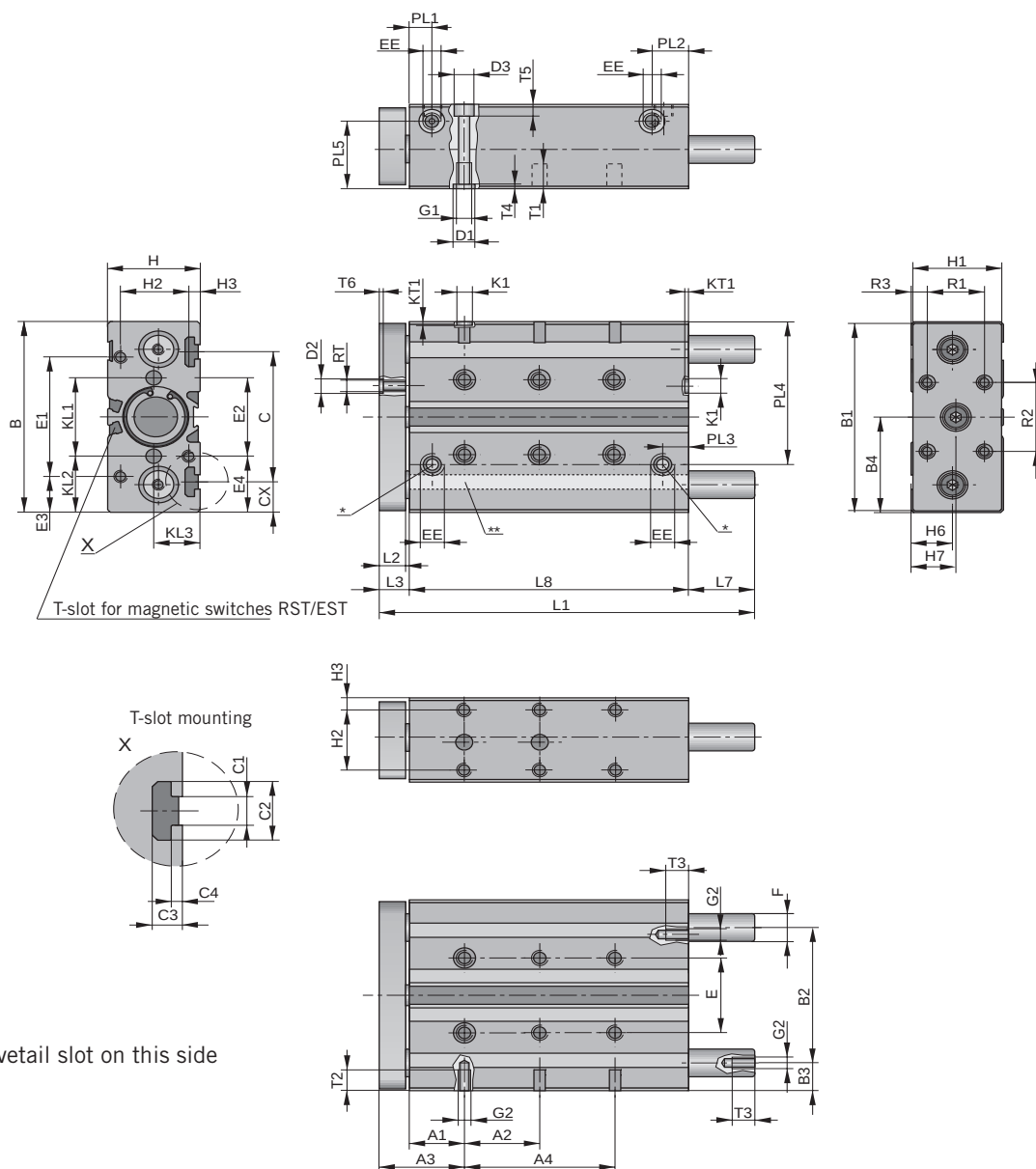
F_{load} = lateral force applied

L_{rod} = free bending length of rod

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

I_{rod} = surface torque of piston rod

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			
	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	68	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

Stroke	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	

Stroke	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	—	—	—	—	33.5	37	4.5	4.5	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																					

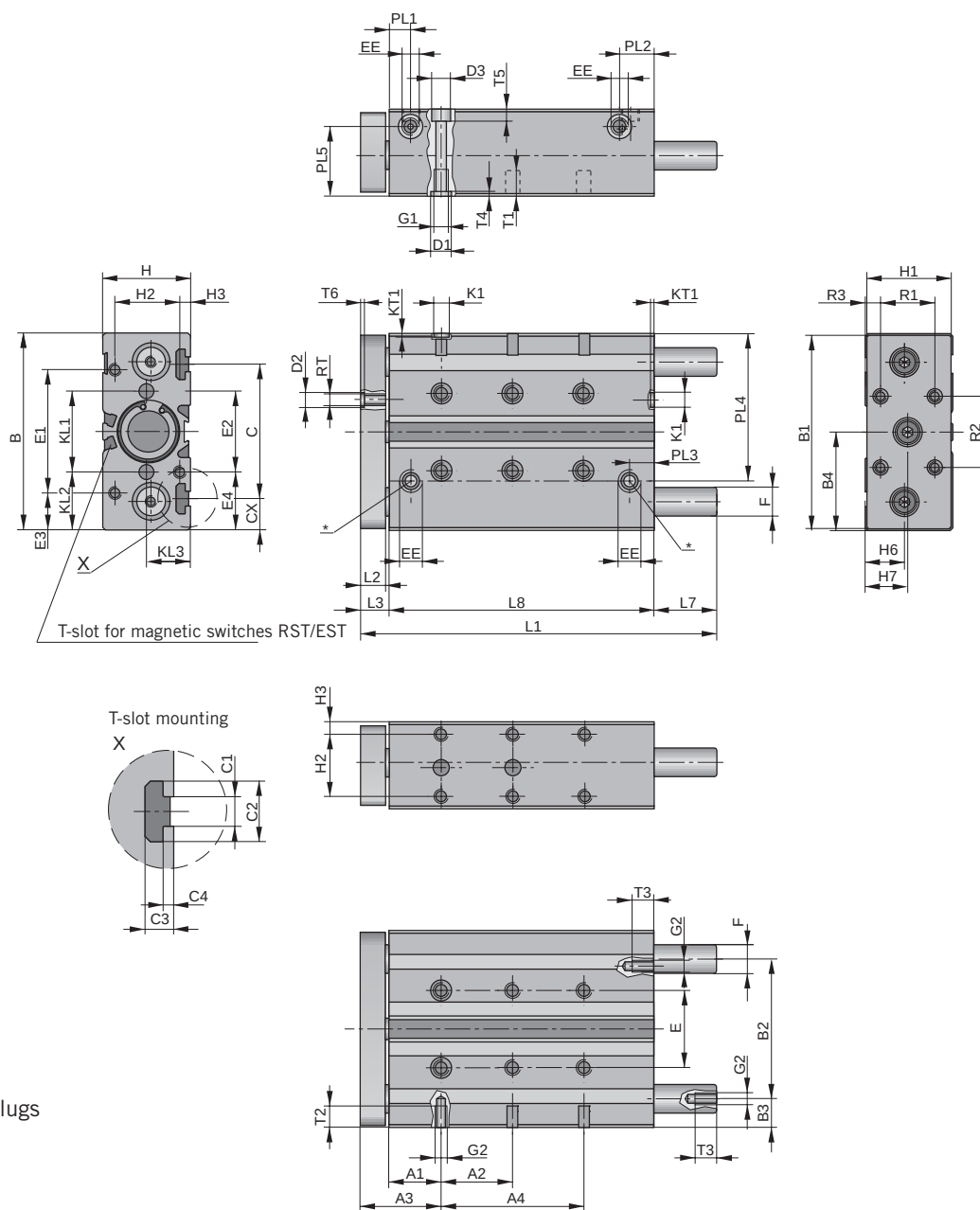
Stroke	Mounting Dimensions																	
	G2			T1			T2			T3			T5			ØD3		
	Ø20	Ø25	Ø32	Ø20	Ø25	Ø32	Ø20	Ø25	Ø32	Ø20	Ø25	Ø32	Ø20	Ø25	Ø32	Ø20	Ø25	Ø32
20 to 200	M5	M6	M6	12	14	15	10	12	10	10	12	12	5.7	5.7	6.8	9	9	11

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

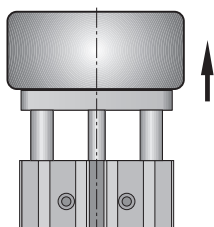
Stroke	Air Connection											
	EE		PL1		PL2		PL3		PL4		PL5	
	Ø40	Ø50	Ø40	Ø50	Ø40	Ø50	Ø40	Ø50	Ø40	Ø50	Ø40	Ø50
25 to 200	G1/8	G1/4	15.3	14	19.5	18.9	18.7	15	96	116.5	42	50.5

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

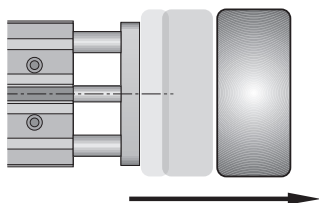
Stroke	Centring Bush Holes																	
	ØD1 ^{H7}		ØD2 ^{H7}		ØK1 ^{H7}		KL1		KL2		KL3		KT1		T4		T6	
	Ø40	Ø50	Ø40	Ø50	Ø40	Ø50	Ø40	Ø50	Ø40	Ø50	Ø40	Ø50	Ø40	Ø50	Ø40	Ø50	Ø40	Ø50
25 to 200	12	12	9	12	9	12	55	68	32.5	40	27	32	2.1	2.6	2.6	2.6	2.1	2.6

Applications

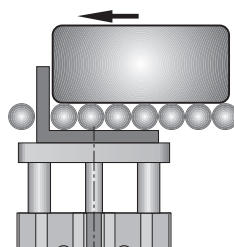
Lifting



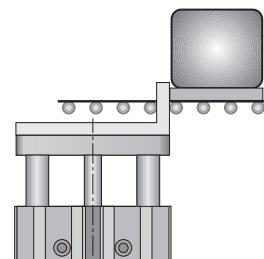
Pushing



Stopping

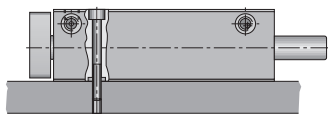


Stopping with Stop Bracket

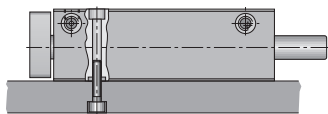


Mounting Possibilities

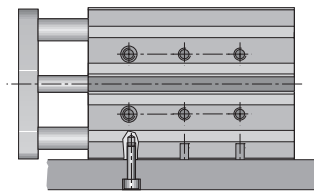
Flat mounting from above



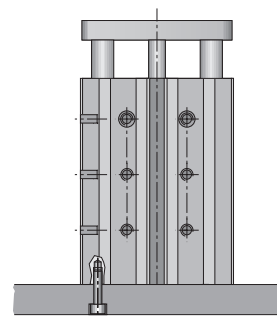
Flat mounting from below



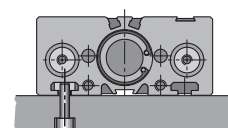
Side mounting



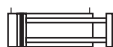
End face mounting



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),
ISO 6432

Series FEUG...

Version:
– with plain bearings

Supplied as follows:
Ø8 - 25mm:
for cylinders to ISO 6432
1 guide
1 mounting nut

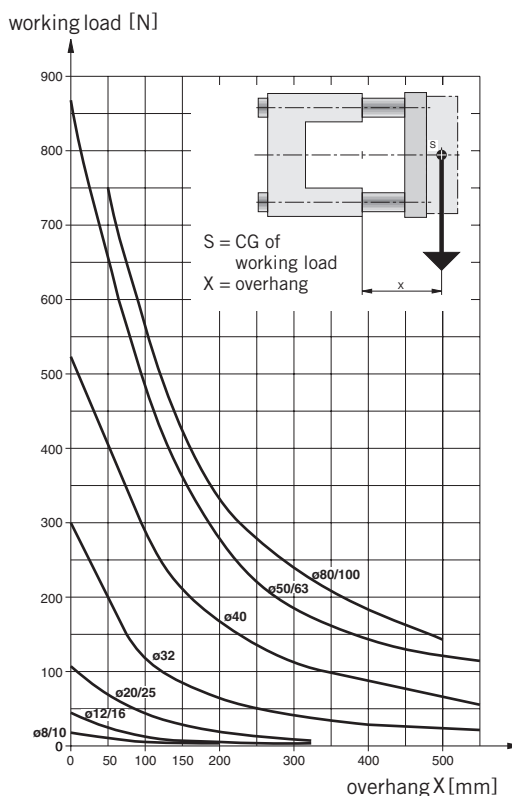
Ø32 bis 100mm:
for cylinders to ISO 15552
(ISO 6431)

1 guide
4 mounting nuts

Characteristics

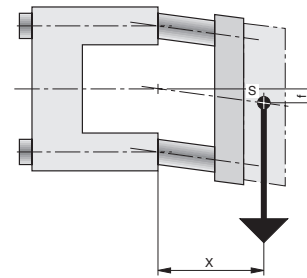
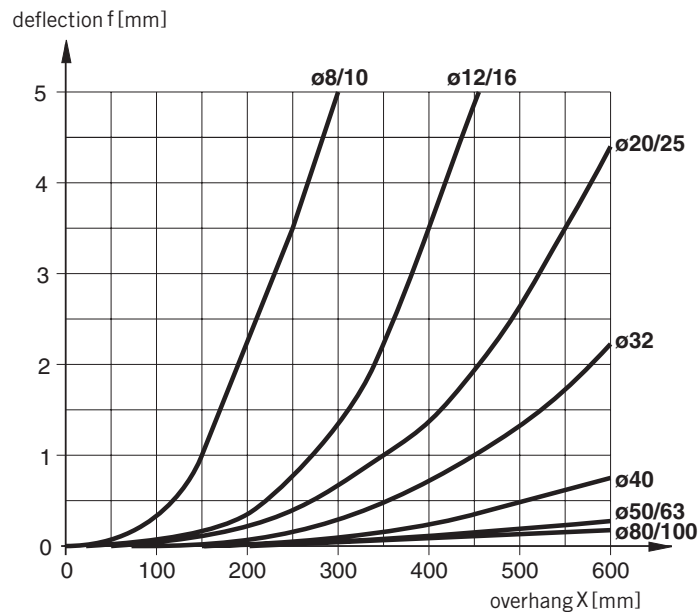
Characteristics	Symbol	Unit	Description					
General Features								
Installation		In any position						
Temperature range	T _{min}	°C	-20					
	T _{max}	°C	+80					
Material								
Guide body		Aluminium, anodized						
Guide rods		Steel, corrosion-resistant						
Guide bushes		Sintered bronze						
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

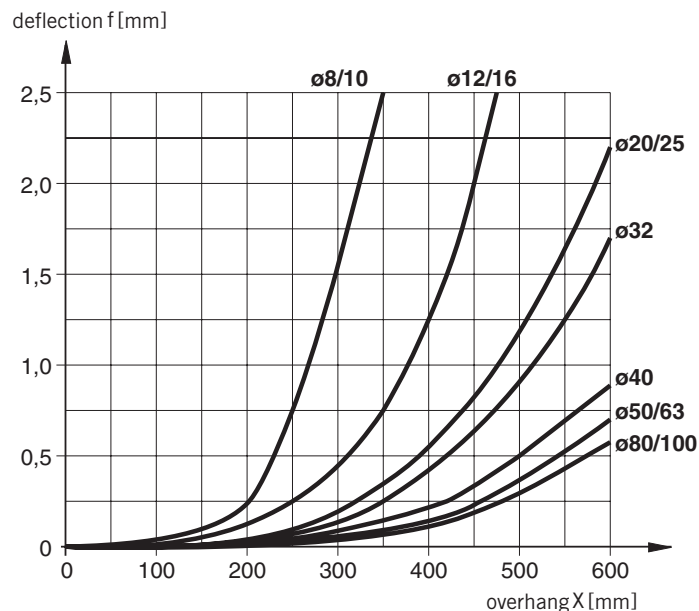


S = CG of working load
 X = overhang
 f = deflection

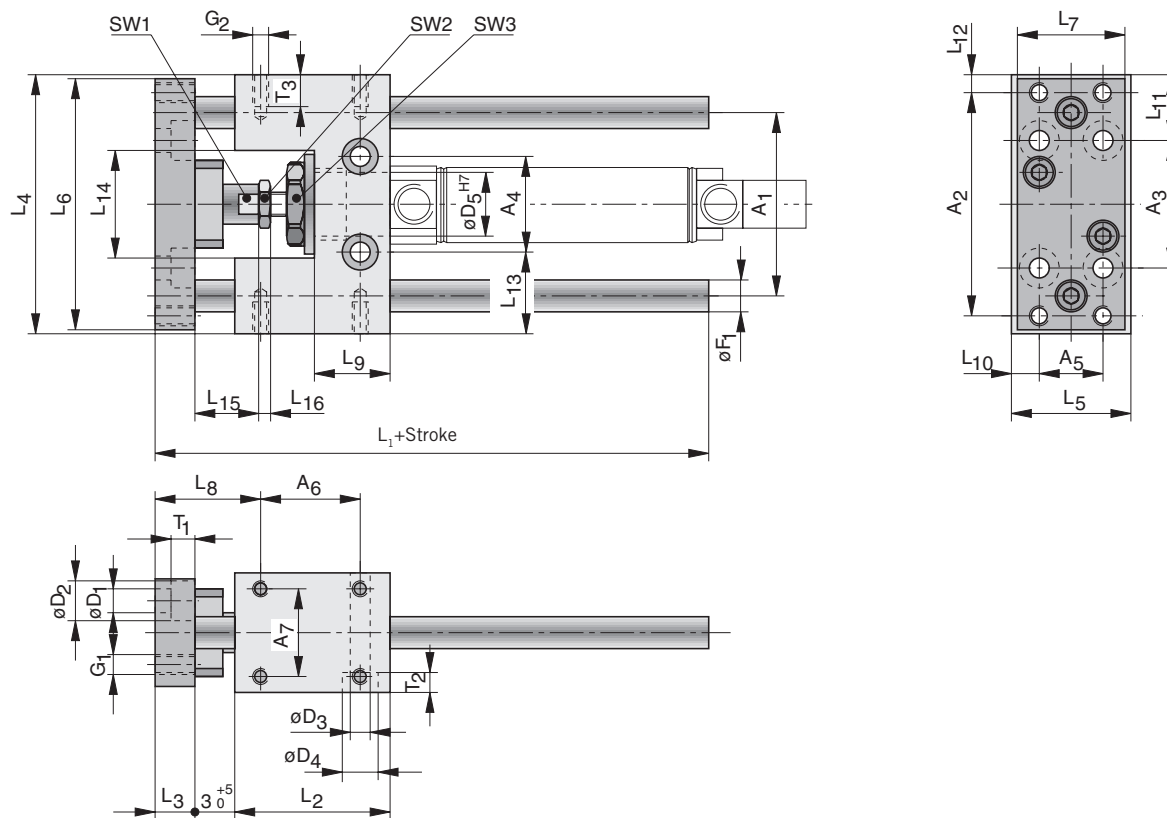
Deflection

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.

Diagram 2 - Deflection under own weight



Dimensions of linear guides - for round cylinders $\varnothing 8$ to 25 mm

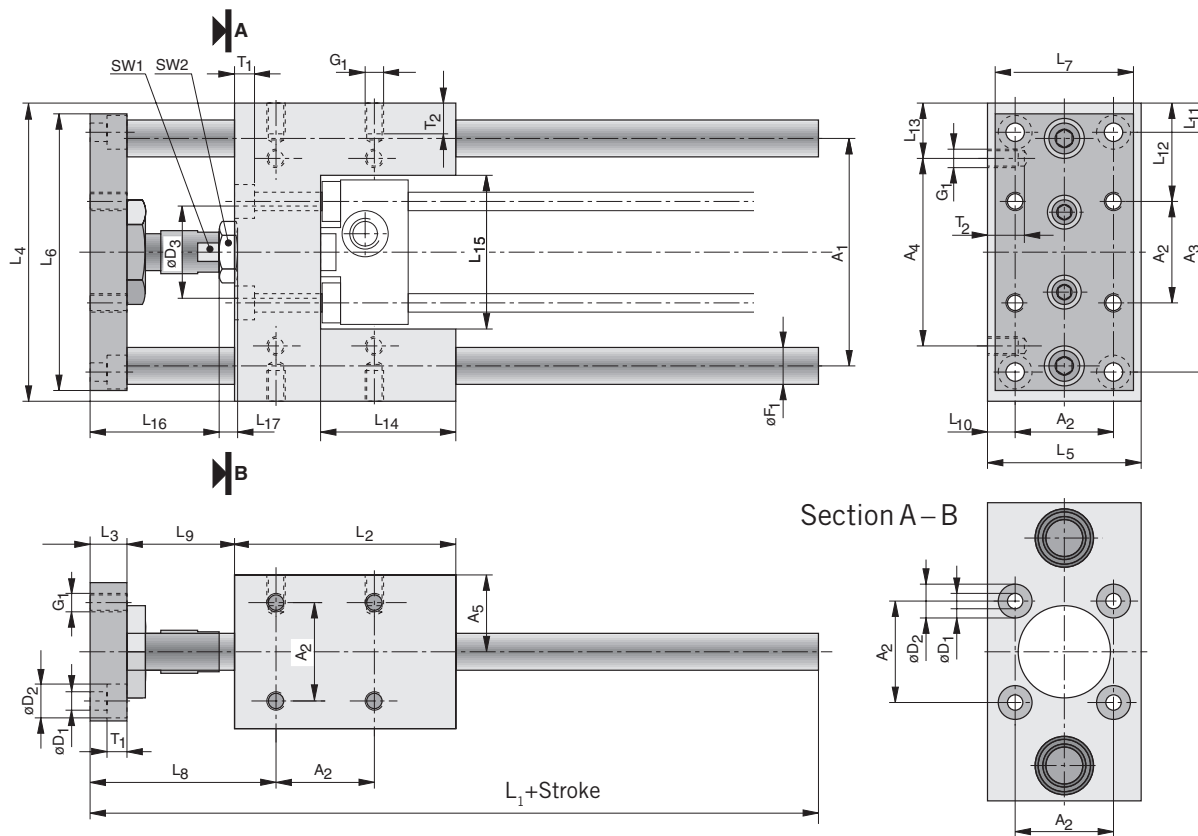


Dimensions table (mm) for linear guides - for round cylinders ø 8 - 25 mm

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 counter nuts on the piston rods

Dimensions of linear guides - for standard cylinders $\varnothing 32 - 100$ 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
25	400	FEUG20/400	PD38015-0400
	50	FEUG25/50	PD38016-0050
	100	FEUG25/100	PD38016-0100
	160	FEUG25/160	PD38016-0160
	200	FEUG25/200	PD38016-0200
32	250	FEUG25/250	PD38016-0250
	400	FEUG25/400	PD38016-0400
	50	FEUG32/50	PD38017-0050
	100	FEUG32/100	PD38017-0100
	160	FEUG32/160	PD38017-0160
40	200	FEUG32/200	PD38017-0200
	250	FEUG32/250	PD38017-0250
	320	FEUG32/320	PD38017-0320
	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}	°C	-20					
	T _{max}	°C	+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
(ISO 6431)
32-100 mm

Series FEH...

Version:

– with plain bearings

FEHG...

– with ball bearings

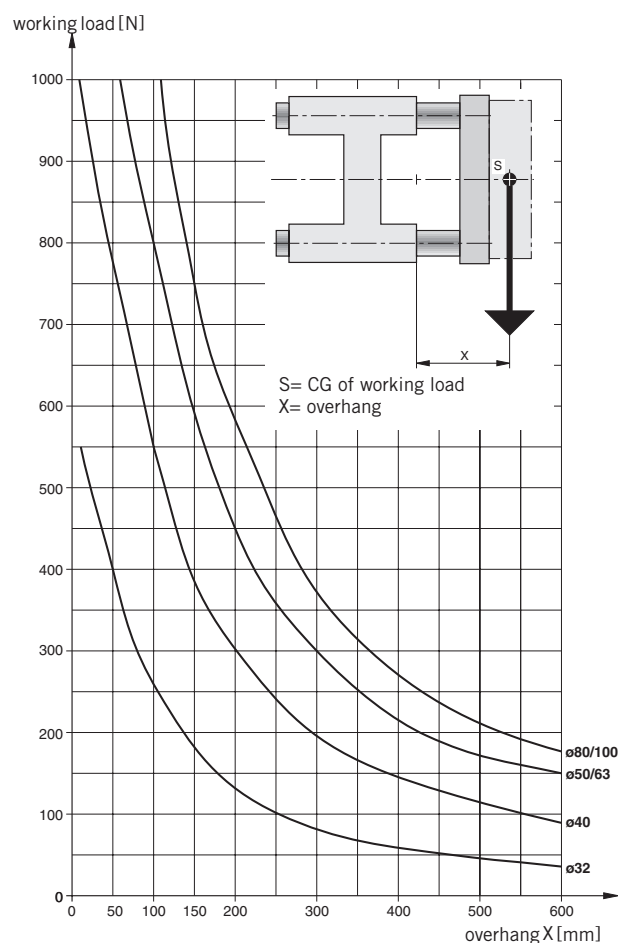
FEHK...

Supplied as follows:

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

1 guide
4 mounting nuts

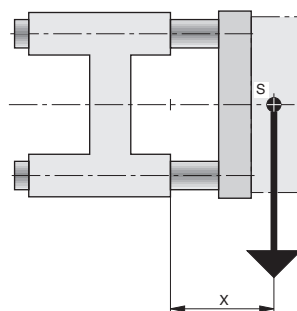
Maximum working load in relation to overhang - FEHG version with plain bearings



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..

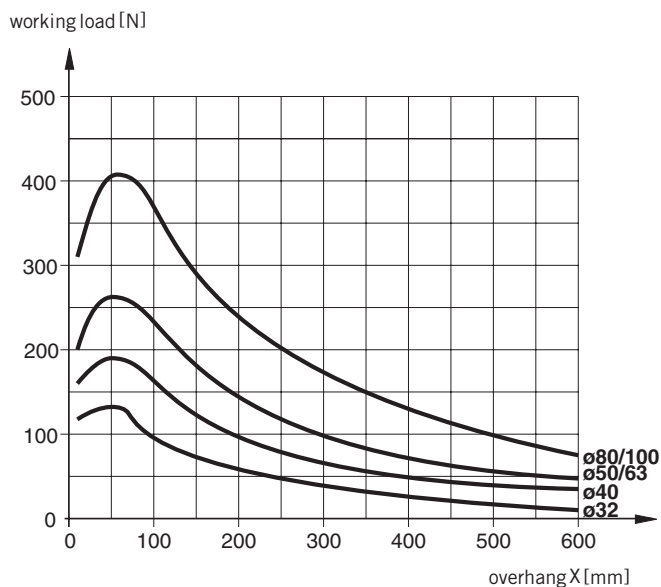
Factor 1
for normal applications

Factor 2
for impact loads

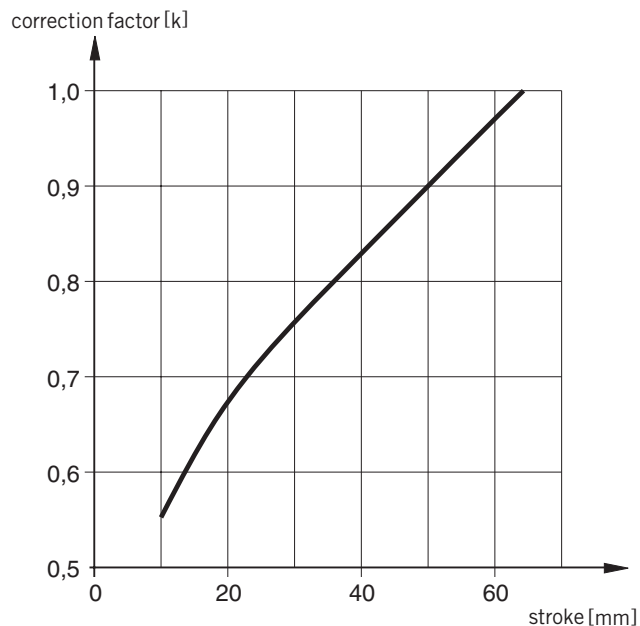


S= CG of working load
X= overhang

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

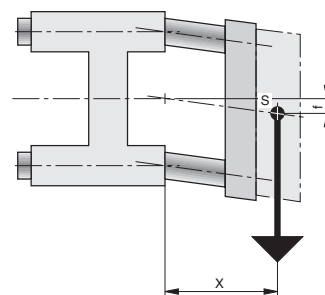
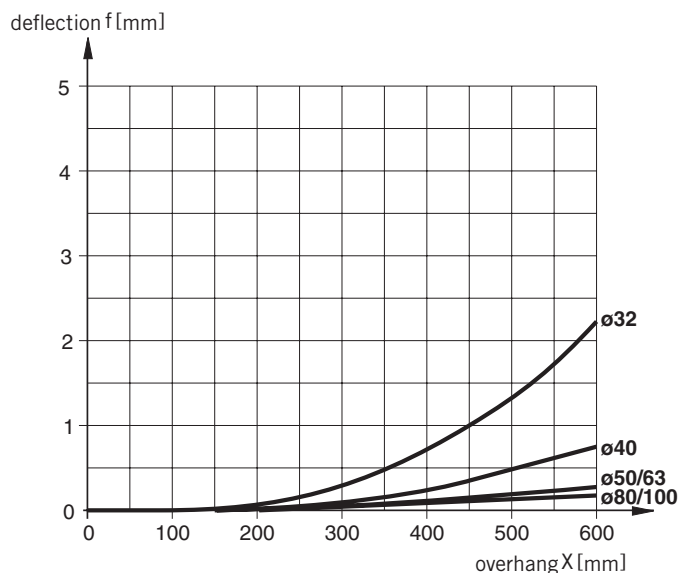


Reduction of working load with short strokes - FEHK version with ball bearings



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

Diagram 1 - Deflection with a working load of 10N

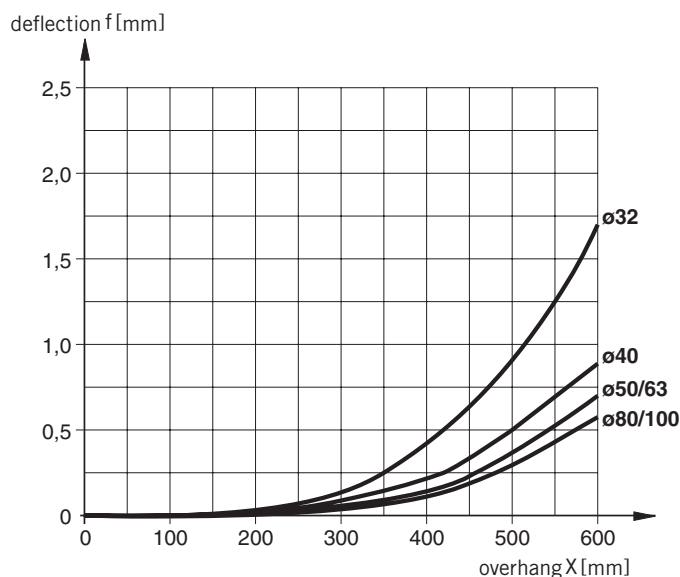


S = CG of working load
X = overhang
f = deflection

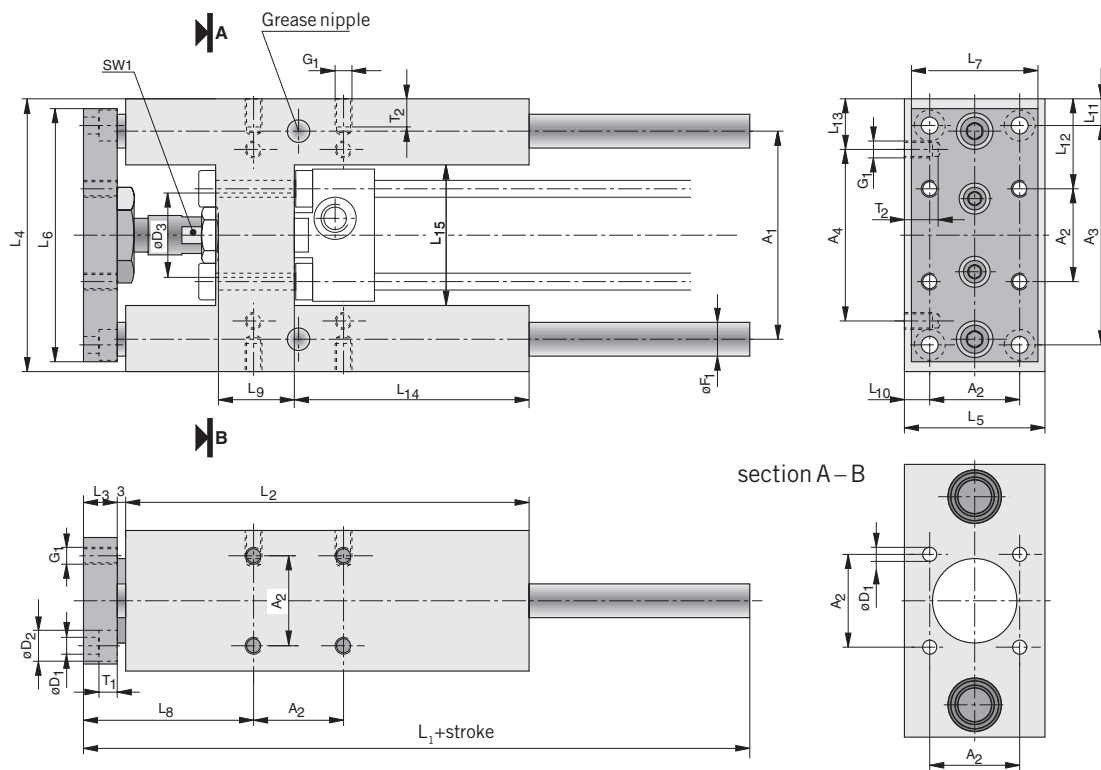
Deflection

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.

Diagram 2 - Deflection under own weight



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



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

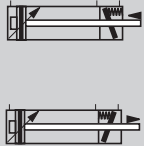
Type	Cylinder diameter					
	32	40	50	63	80	100
A ₁	74	87	104	119	148	172
A ₂	32.5	38	46.5	56.5	72	89
A ₃	78	84	100	105	130	150
A ₄	61	69	85	100	130	150
ØD ₁	6.6	6.6	9	9	11	11
ØD ₂	11	11	15	15	18	18
ØD ₃	30	35	40	45	45	55
ØF ₁	14 (12*)	18 (16*)	22 (20*)	22 (20*)	25	25
G ₁	M6	M6	M8	M8	M10	M10
L ₁ +Hub	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.**

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

**) 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 fluctuating, the clamping unit is not free from play. The cylinder is not suitable for positioning tasks.

Actuation:

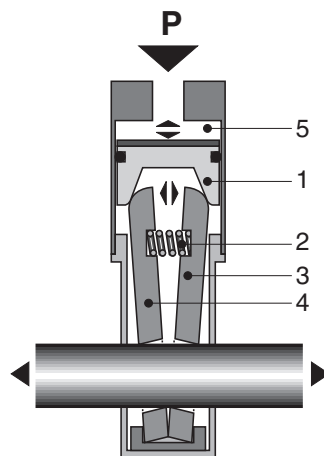
The clamping unit must only be released when both cylinder chambers are pressurised, otherwise there is danger of an accident from the jerky movement of the piston rod. Shutting off the compressed air supply at both ends with a 5/3 way valve provides adequate safety only for a short time.

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.

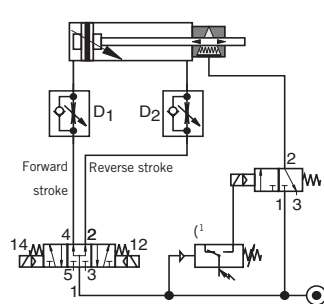


Important

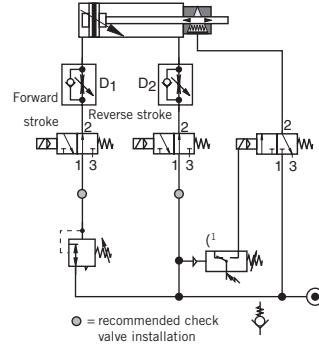
- The locking unit can only be mounted on the cylinder if it is held in its unlocked position either by air pressure or by a suitable screw.
- When the cylinder piston rod is locked it must not be rotated or subjected to external force.

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

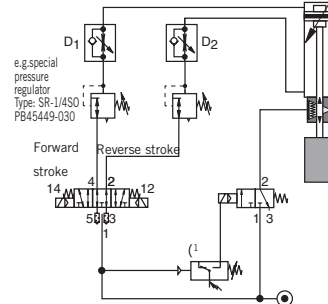
Example 1:
Horizontal Application with
5/3 Way Valve - RFB



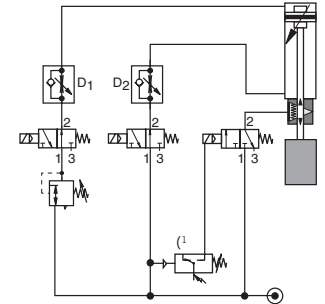
Example 2:
Horizontal Application with
Two 3/2 Way Valves - RFE



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 „stand-still“ 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 example 1, here the 5/3 way valve is replaced by two 3/2 way valves. The choice will depend on the customer.

Example 3

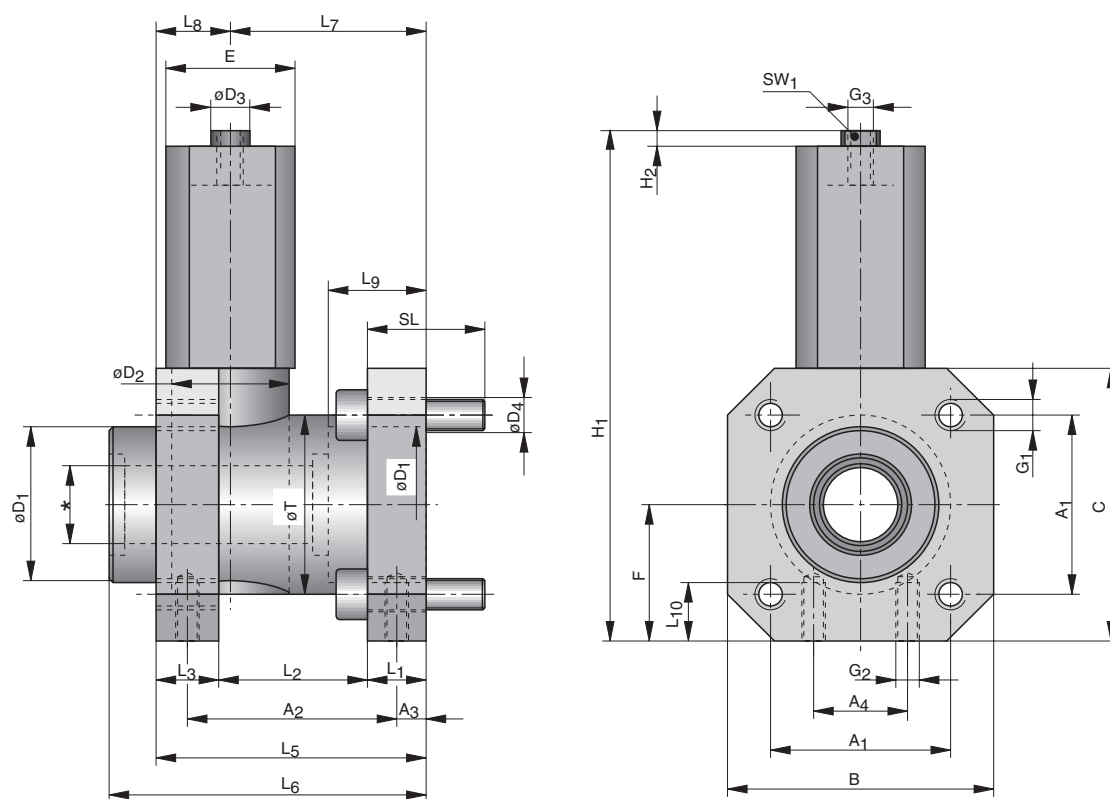
Example 3 is designed for a load acting downwards. The installation of the special pressure regulators between valve and cylinder makes regulation of the stroke direction possible. Venting is carried out via the main valve of the pressure regulator, so that there is no limitation of the stroke times.

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	-20 +80
Medium temperature range	T_{max}	°C	+80
Note: When using below freezing point (°C) it is necessary to consult us			
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 N
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 air consumption			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 fluctuating, 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

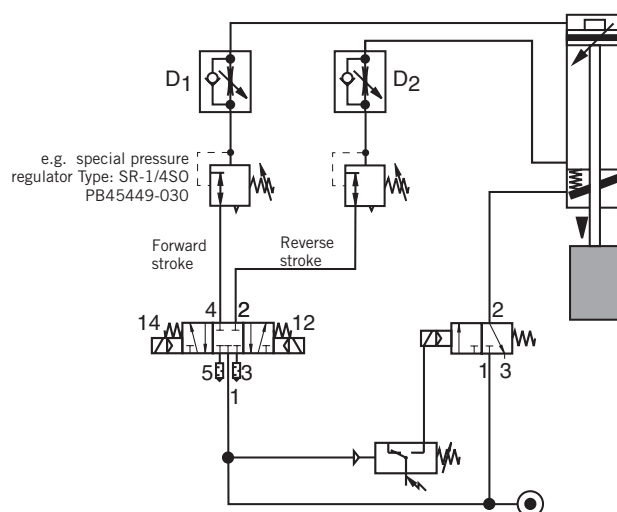
Cylinder version	Cylinder diameter													
	Ø32		Ø40		Ø50		Ø63		Ø80		Ø100		Ø125	
	*1	*2	1	2	1	2	1	2	1	2	1	2	1	2
Basic Cylinder	1.06	0.26	1.45	0.56	2.45	0.67	3.70	0.75	6.00	1.15	9.50	1.40	11.90	1.30

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

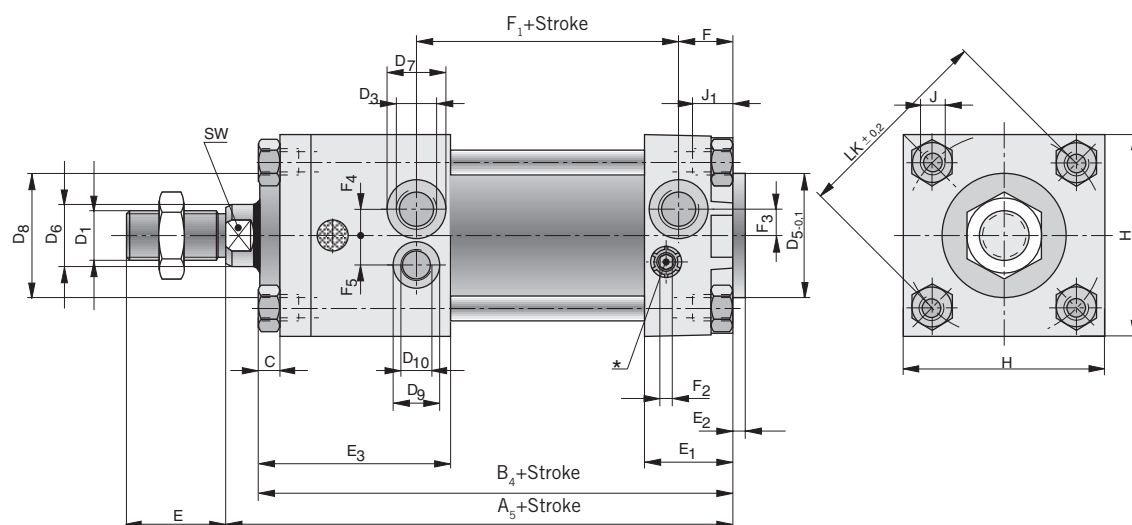
* 1 = Weight for cylinder with 100 mm stroke

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...

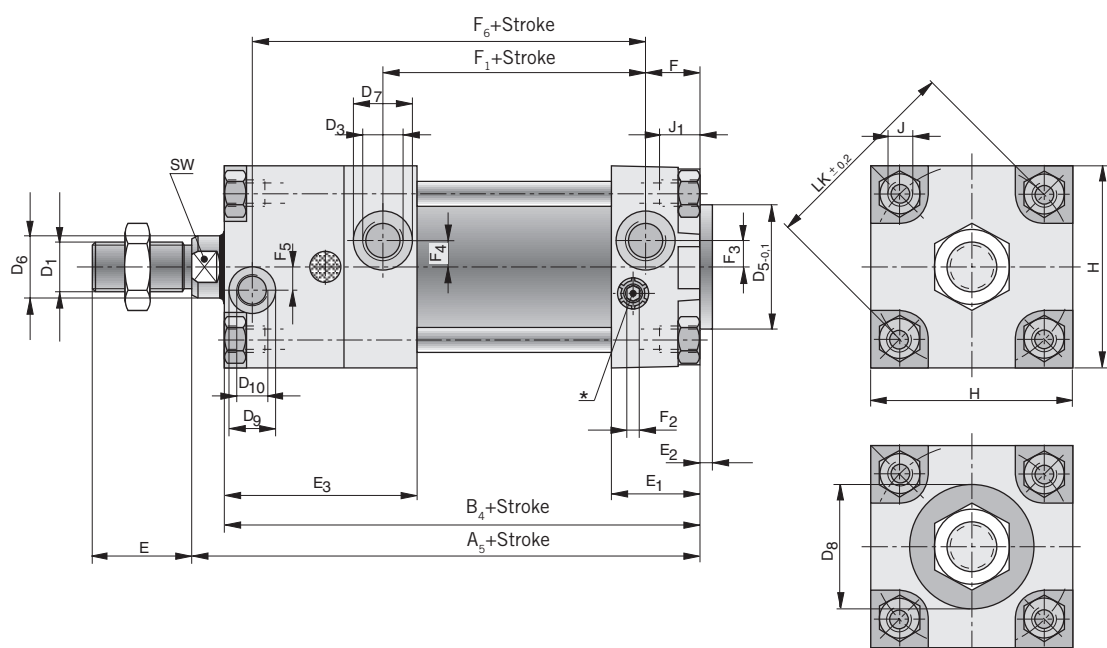
Cylinder-Ø	Norm	A ₅ +Stroke	B ₄ +Stroke	C	D ₁	D ₃	Ø D ₅	Ø D ₆	Ø D ₇	Ø D ₈	Ø D ₉	D ₁₀	E
32	ISO	120	112	5	M10x1.25	G1/8	30	12	15	30	8	M 5	20
40	ISO	135	126	6	M12x1.25	G1/4	35	16	19	35	15	G1/8	24
50	ISO	143	132	6.5	M16x1.5	G1/4	40	20	19	40	15	G1/8	32
63	*)	170	159	6.5	M16x1.5	G3/8	45	20	23	57	19	G1/4	32
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

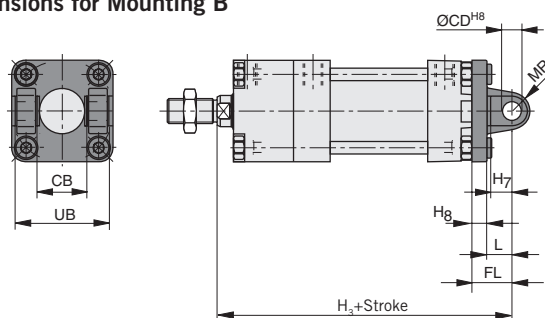
*) Dimensions not to ISO norm.

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



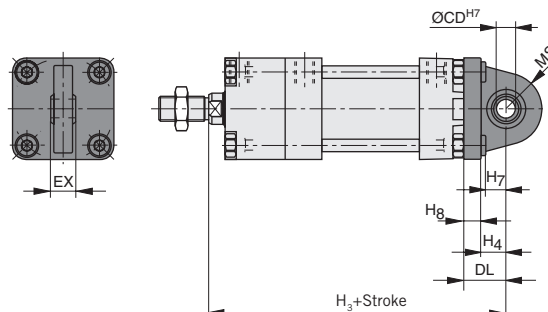
Material: cast aluminium

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



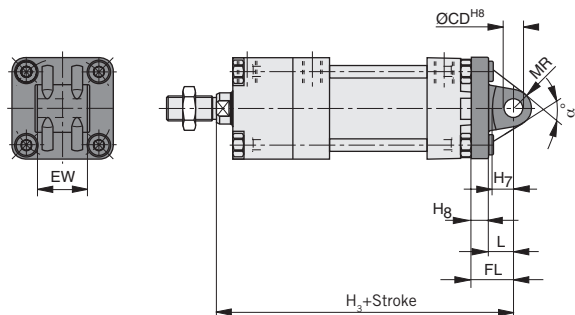
Material: cast aluminium

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



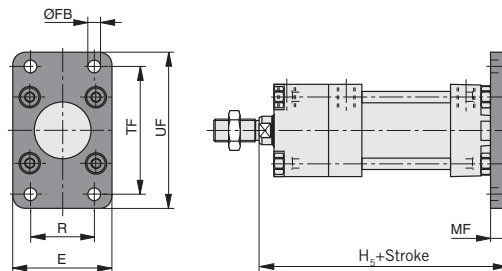
Material: cast aluminium

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

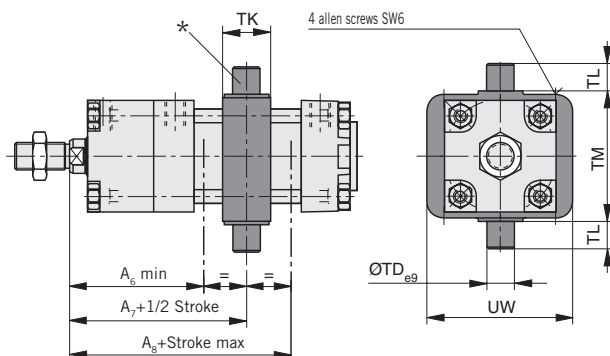
Dimension Table (mm) – for Mounting D

Cyl. Ø	E	H ₃ +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	$A_6 \text{ min}$	$A_7 + 1/2 \text{ Stroke}$	$A_8 \text{ max} + \text{Stroke}$	$\varnothing TD_{e9}$	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:

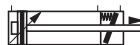
When ordering please give exact dimension A_7 .
Mounting is assembled when delivered.

Accessories

 Page 138	 Page 139	 Page 140	 Page 141	 Page 152	 Page 145	 Page 142, 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 cushioning 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 cushioning 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-....

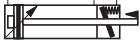
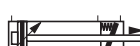
Complete type designation and order no. with stroke length (in mm)

(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 adjustable end cushioning in one direction Reverse stroke blocked		125*	DZB5125EN-..../...	PD29578-..../...
		125**	DZB5125EN-..../...	PD29579-..../...
Double acting with adjustable 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 A₇ 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:

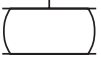
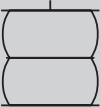
Basic Cylinder: DZB5063-0500 PD27063-0500

Mounting: BAS-63 PD23846

Accessories

 Page 138	 Page 139	 Page 140	 Page 141	 Page 152	 Page 145	 Page 142, 143	 Page 144	
---	---	---	---	---	--	--	---	--

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

Series SP....

Single convolution

Double convolution

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.

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.

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.

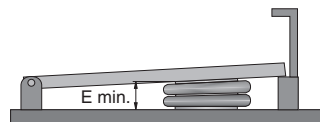
Temperature range

-40 to +70°C

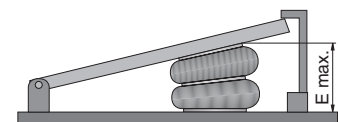
Special versions

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

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

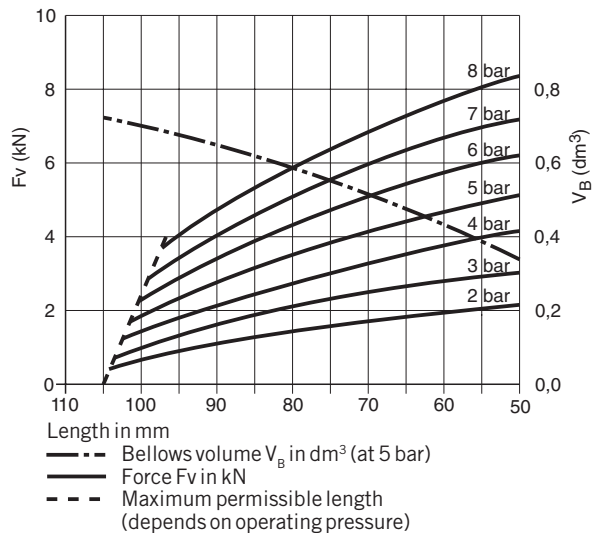
Type	Stroke max. (mm)	Weight (mass) (kg)	Frequency ¹⁾ (Hz)
SP-1B04	55	0.85	3 (when E = 80)
SP-1B05	45	1.0	4 (when E = 75)
SP-1B07	90	2.1	2.8 (when E = 90)
SP-1B12	100	2.7	2.4 (when E = 100)
SP-1B22	110	4.5	2.1 (when E = 120)
SP-1B34	110	5.5	2.1 (when E = 120)

¹⁾ Nominal values at p_{max}

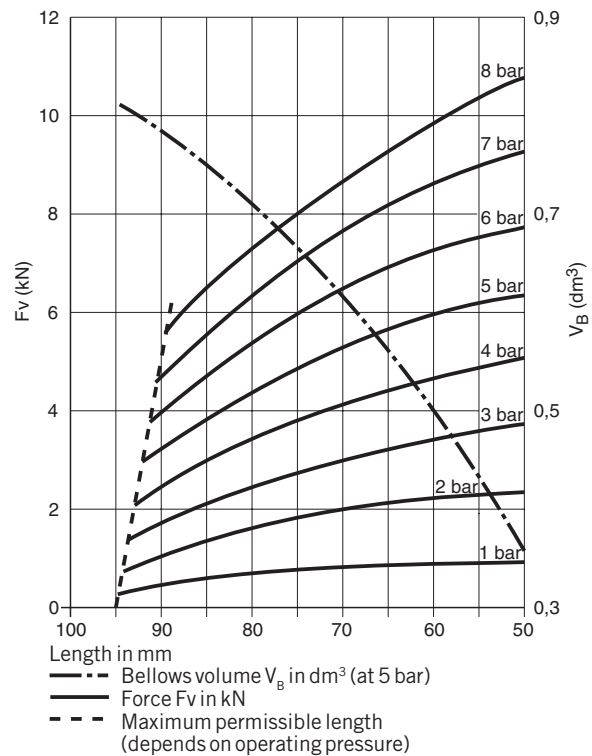


Force Diagrams – Series SP-1B..

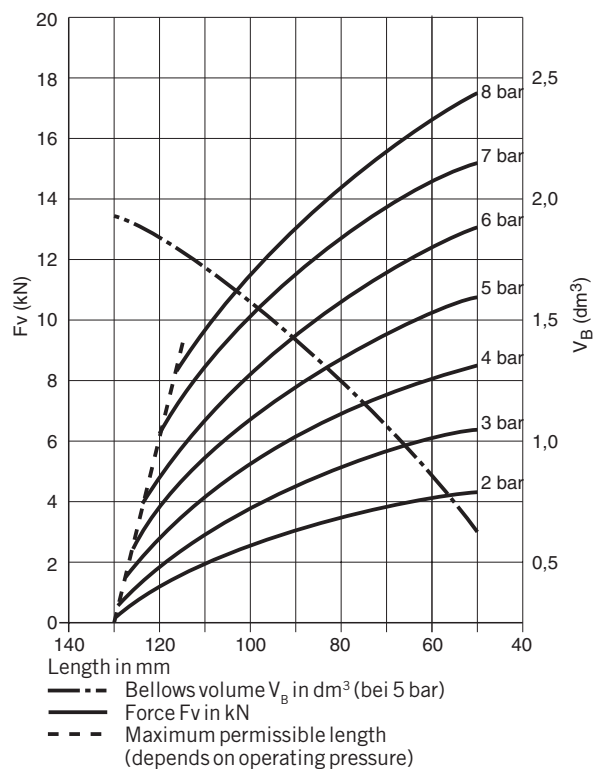
Type: SP-1B04, Stroke: max. 55 mm



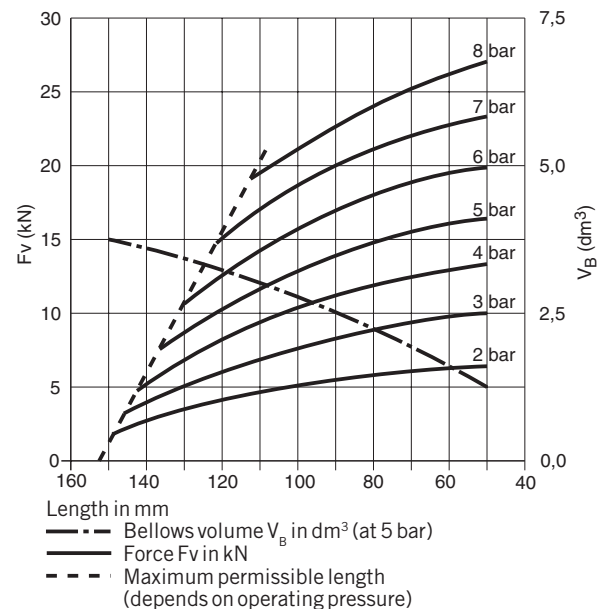
Type: SP-1B05, Stroke: max. 45 mm



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

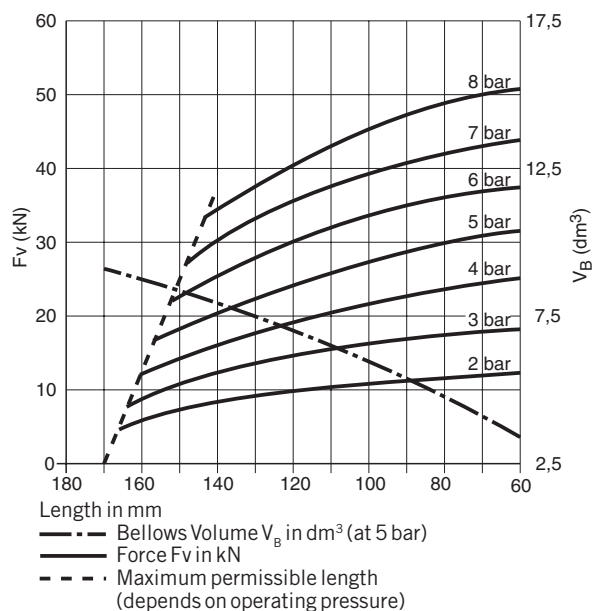


Type: SP-1B12, Stroke: max. 100 mm

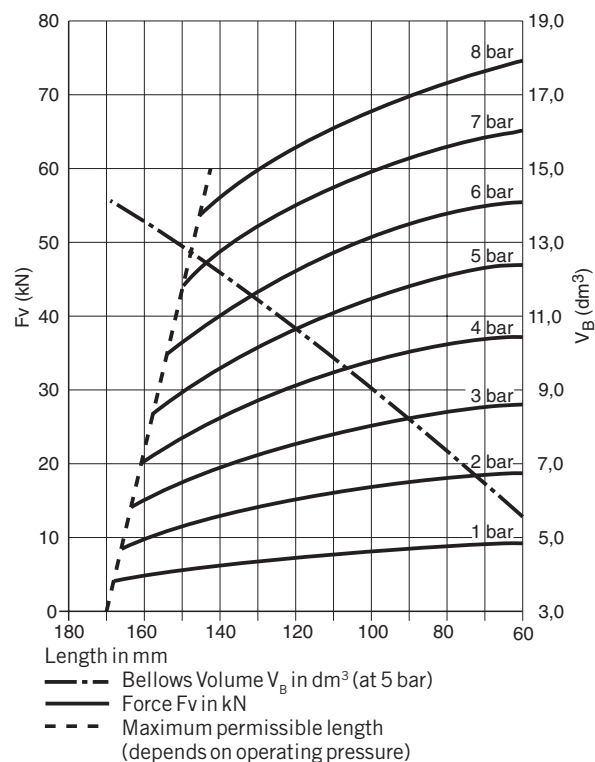


Force Diagrams – Series SP-1B..

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

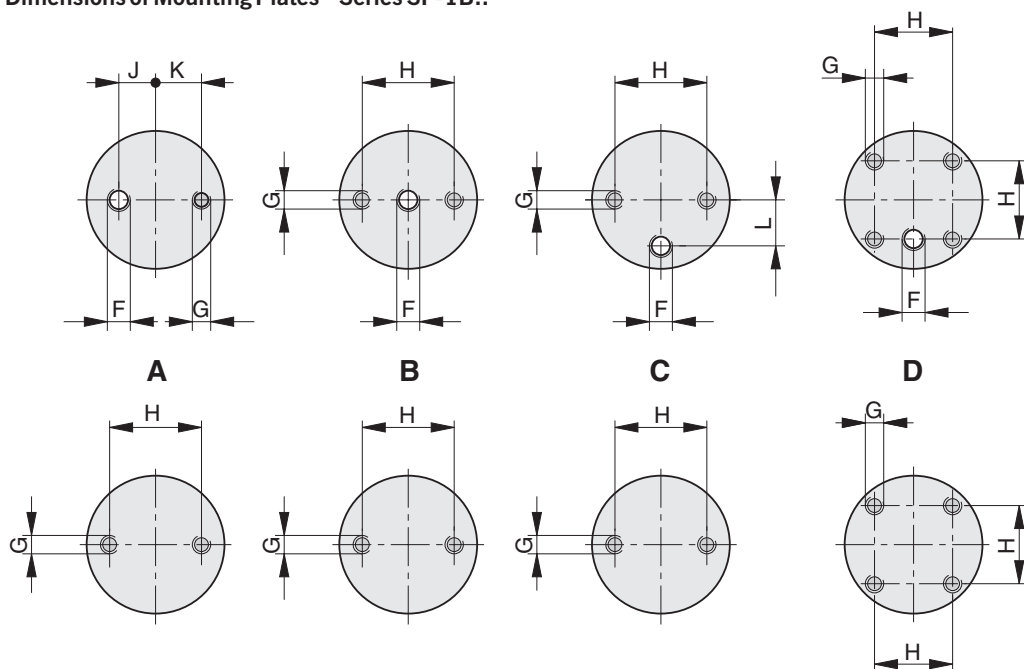
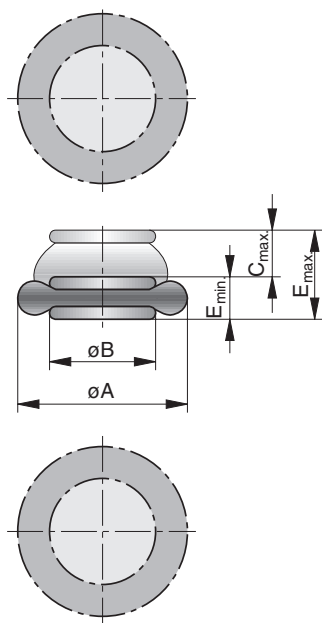


Type: SP-1B34, Stroke: max. 110 mm



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	KY9500	A	150	88	55	105	50	G1/4	M8	22	9	11	–
SP-1B05	KY8401	B	165	110	45	95	50	G1/4	M8	44.5	–	–	–
SP-1B07	KY9501	C	205	135	80	130	50	G1/4	M8	54	–	–	27
SP-1B12	KY9502	C	250	160	100	150	50	G3/4	M8	89	–	–	38
SP-1B22	KY9590	C	350	229	110	170	60	G3/4	M12	157.5	–	–	73
SP-1B34	KY8010	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

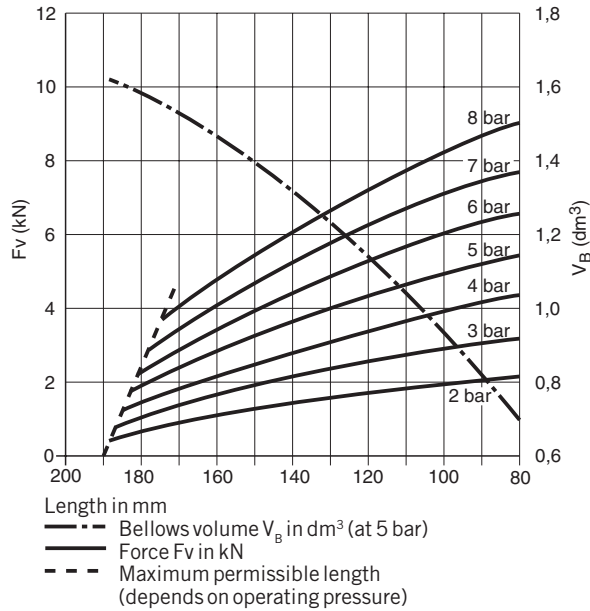
Type	Stroke max. (mm)	Weight (mass) (kg)	Frequency ¹⁾ (Hz)
SP-2B04	110	1.1	2.3 (when E = 80)
SP-2B05	80	1.2	2.5 (when E = 120)
SP-2B05A	105	1.25	2.3 (when E = 140)
SP-2B07	125	2.6	1.9 (when E = 160)
SP-2B12	150	3.5	1.8 (when E = 180)
SP-2B22	170	4.9	1.7 (when E = 190)
SP-2B34	170	6.8	1.7 (when E = 190)

¹⁾ Nominal values at p_{max}

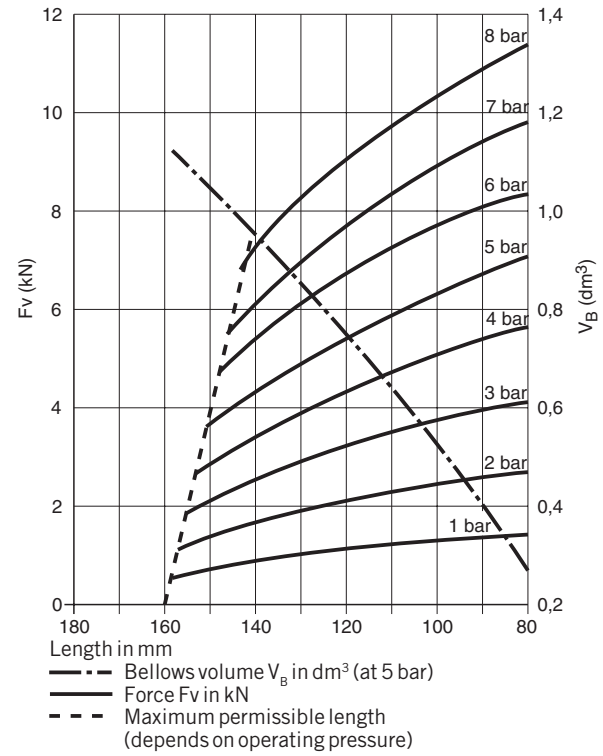


Force Diagrams – Series SP-2B..

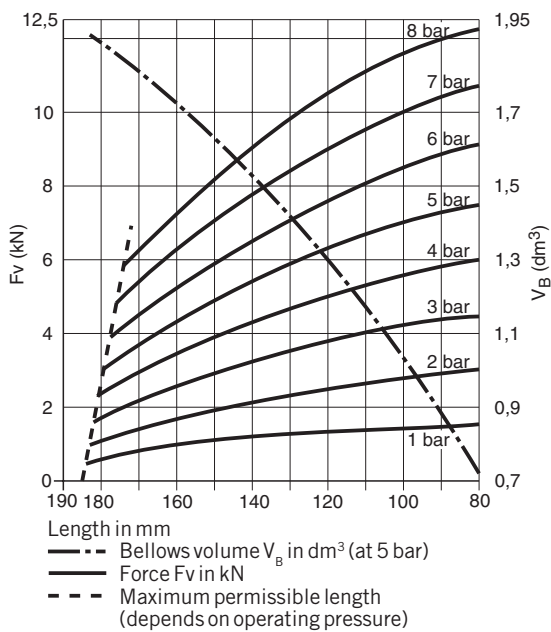
Type: SP-2B04, Stroke: max. 110 mm



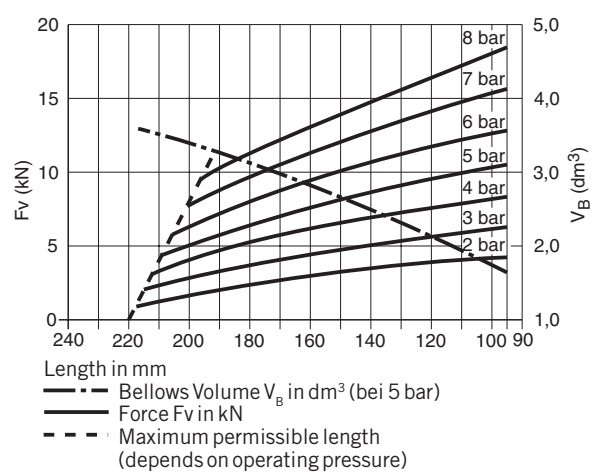
Type: SP-2B05, Stroke: max. 80 mm



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

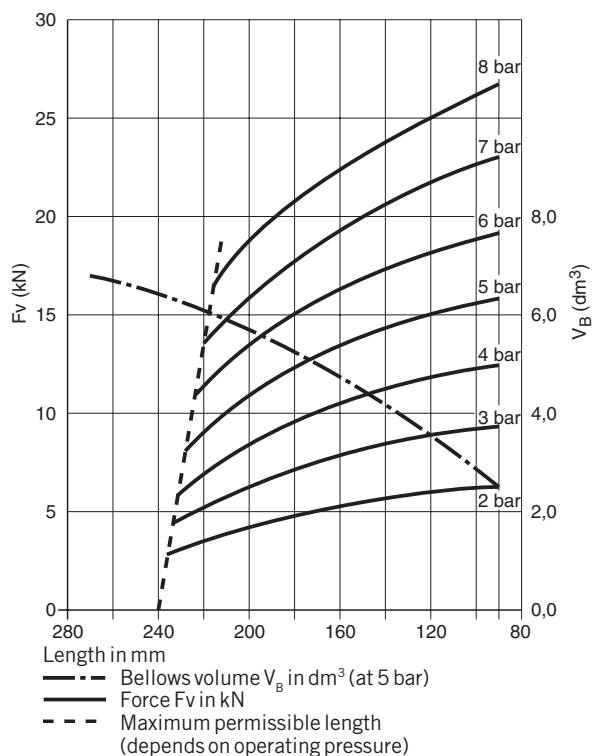


Type: SP-2B07, Stroke: max. 125 mm

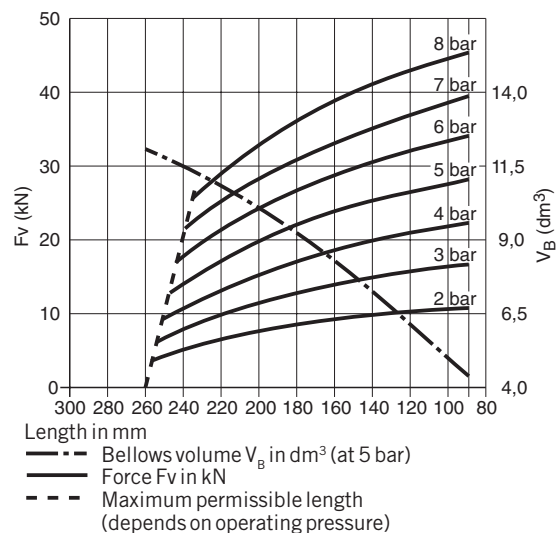


Force Diagrams – Series SP-2B..

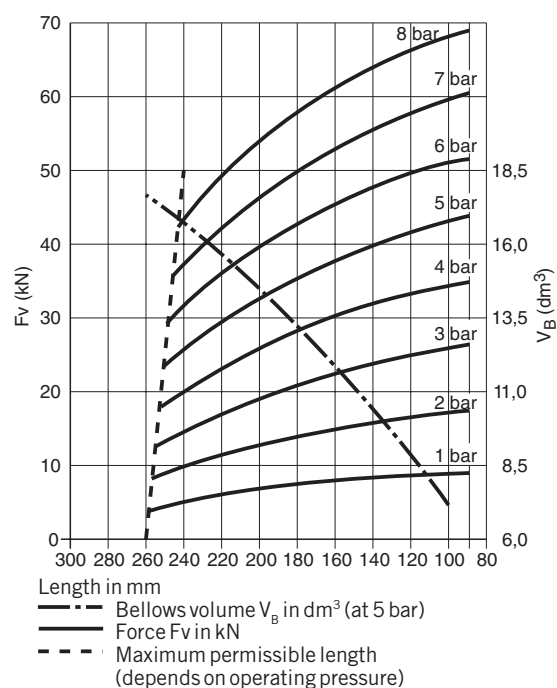
Type: SP-2B12, Stroke: max. 150 mm



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

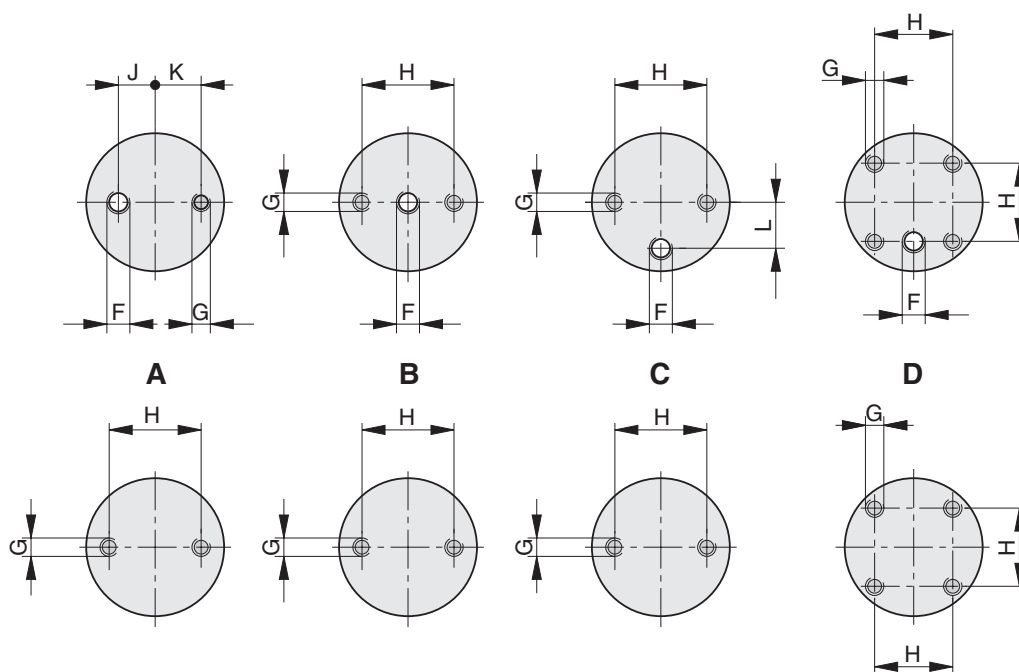
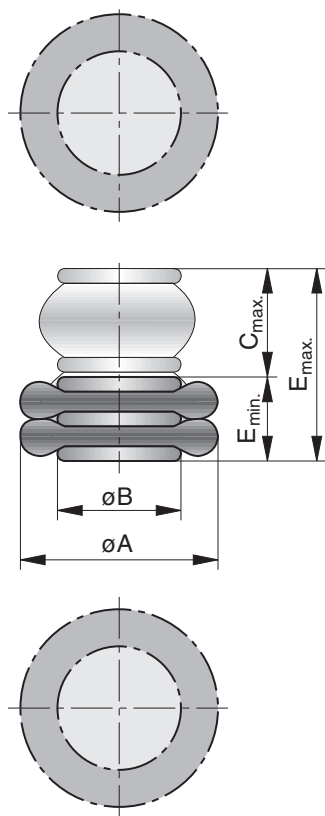


Type: SP-2B34, Stroke: max. 170 mm



Dimensions Series SP-2B..

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



Dimension Table (mm) and Order Instructions

Type	Order-No.	Mounting	$\varnothing A$ at 8 bar	$\varnothing B$	C_{max}^{**}	E_{max}^{**}	E_{min}	F	G^*	H	J	K	L
SP-2B04	KY9612	A	165	82	110	190	80	G1/4	M8	22	9	11	-
SP-2B05	KY8011	B	165	110	80	160	80	G1/4	M8	44.5	-	-	-
SP-2B05A	KY8012	B	170	110	105	185	80	G1/4	M8	44.5	-	-	-
SP-2B07	KY9589	C	215	135	125	220	95	G1/4	M8	54	-	-	27
SP-2B12	KY9611	C	250	160	150	240	90	G3/4	M8	89	-	-	38
SP-2B22	KY9591	C	320	229	170	260	90	G3/4	M12	157.5	-	-	73
SP-2B34	KY8007	D	390	288	170	260	90	G3/4	M8	158.8	-	-	-

* 15 deep

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

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

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

Piston rod eyes

for Cylinder

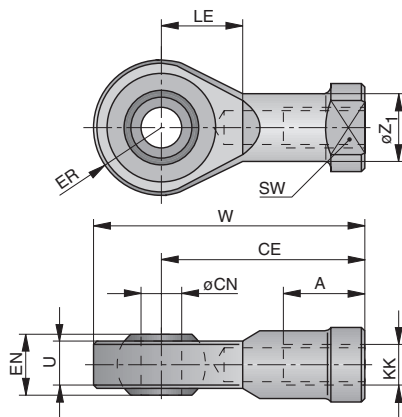
$\varnothing 10$ to 320 mm

– 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)

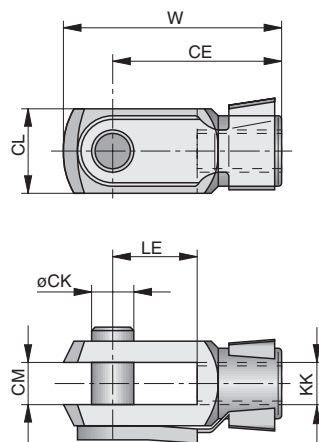
Type	ØCN ^{H7}	LE	U	EN	ER	W	A	CE	KK	ØZ ₁	SW
GA-M4	5	9	6	8	9	35	12	27	M4	9	8
GA-M6	6	11	6.75	9	10	40	12	30	M6	10	11
GA-M8	8	13	9	12	12	48	16	36	M8	12.5	14
GA-M10	10	15	10.5	14	14	57	20	43	M10	15	17
GA-M10x1.25	10	15	10.5	14	14	57	20	43	M10x1.25	15	17
GA-M12	12	17	12	16	16	66	22	50	M12	17.5	19
GA-M12x1.25	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



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

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	KL 9131	7.9

Piston rod clevis

for Cylinder

Ø 10 to 320 mm

– to ISO 8140

– to CETOP RP102P

Series GK-...

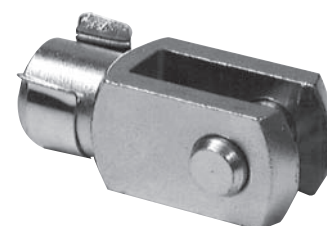
Assembly instructions:

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

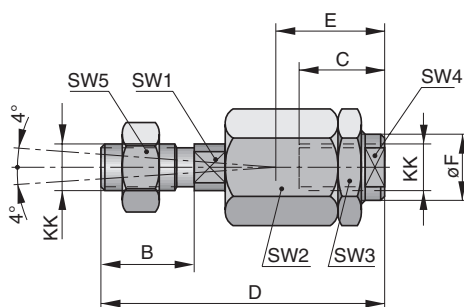
From Ø 125 upward, the safety clamp and the pin held with two circlips are omitted.



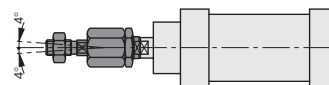
Compensating Coupling

for Piston Rods
 $\varnothing$ 10 to 320 mm
 – to ISO 8139
 – to CETOP RP103P
 Series AK-...

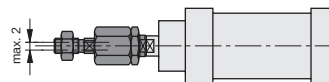
Dimensions



Angular compensation



Radial compensation of the centre axis



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

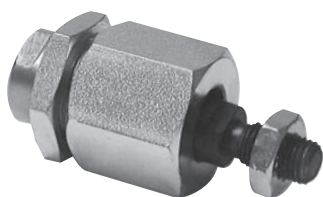
The compensating coupling is used to connect the piston rod end of all types of cylinders to the machine parts which are to be moved.
 It compensates for radial and angular misalignments.

Dimension Table (mm)

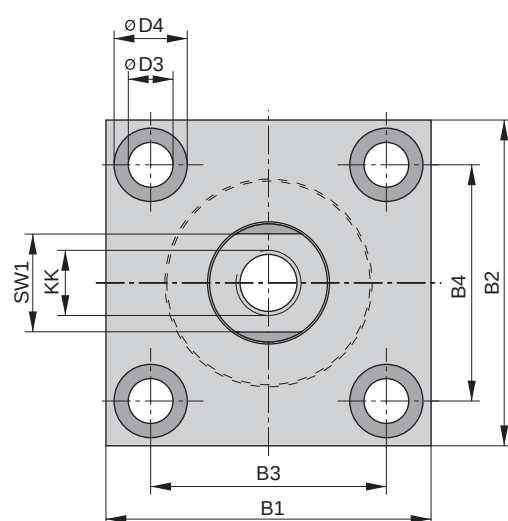
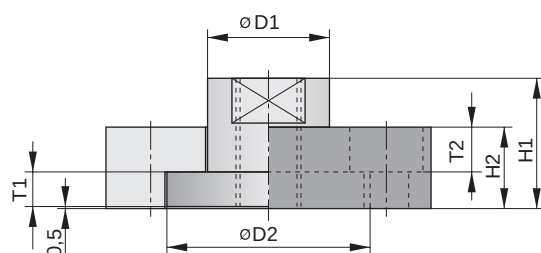
Type	KK	B	C	D	E	$\varnothing F$	SW1	SW2	SW3	SW4	SW5
AK-M4	M4	8	14	33	20	SW12	3.2	12	12	12	7
AK-M6	M6	12	11	39	14	8.5	5	13	13	7	10
AK-M8	M8	16	14	55	20	12.4	7	17	17	10	13
AK-M10	M10	20	23	70	31	21	12	30	30	19	17
AK-M10x1.25	M10x1.25	20	23	73	31	21	12	30	30	19	17
AK-M12	M12	24	23	68	31	21	12	30	30	19	19
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-M16x1.5	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:

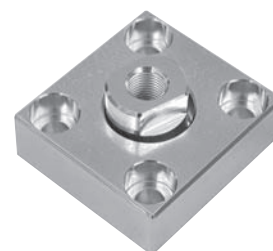
- 1 flange
- 1 threaded part

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
 $\varnothing$ 32 to 100 mm
 – to ISO 15552
 – to VDMA 24562
 – to CETOP RP43P
 Series GLN-...

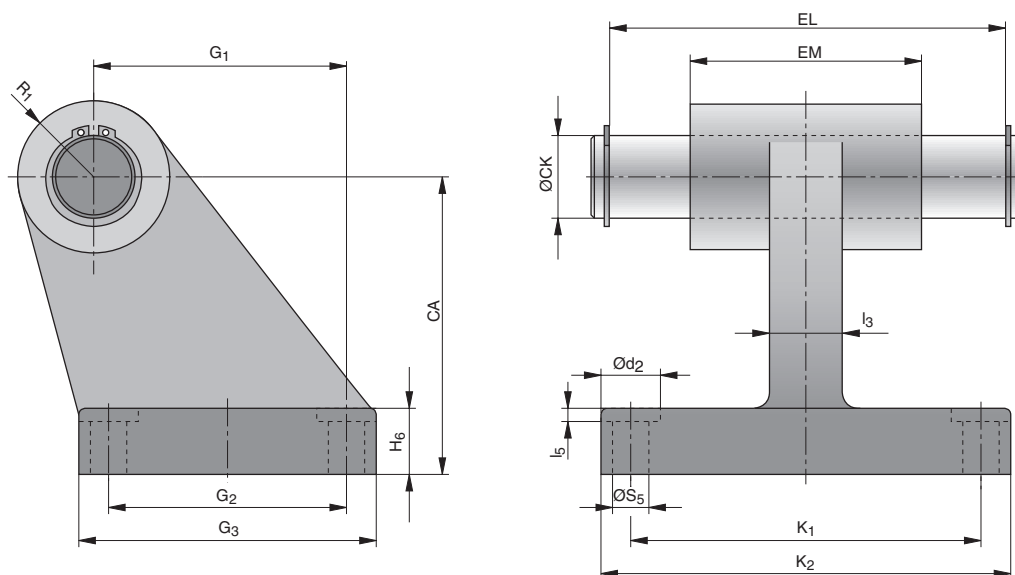
for 90° rotation

Included in delivery:

for $\varnothing$ 32-100 mm:
 1 Bracket
 1 Pin with collar
 1 Circlip

for $\varnothing$ 125-320 mm:
 1 Bracket
 1 Pin
 2 Circlips DIN 471

Dimensions – Pivot for mounting B $\varnothing$ 32-320 mm
 for 90° rotation

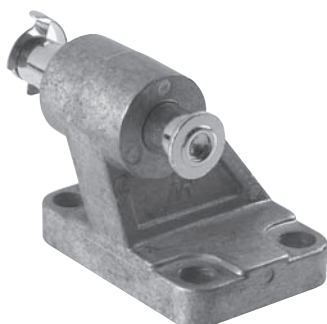


Material:
 $\varnothing$ 32-200: cast aluminium
 $\varnothing$ 250-320: cast steel

Dimension Table (mm)

Cyl. $\varnothing$	$\varnothing d_2$	l_3	l_5	G_1	G_2	G_3	EL	H_6	K_1	K_2	R_1	$\varnothing S_5$	CA	$\varnothing CK^{H9}$	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

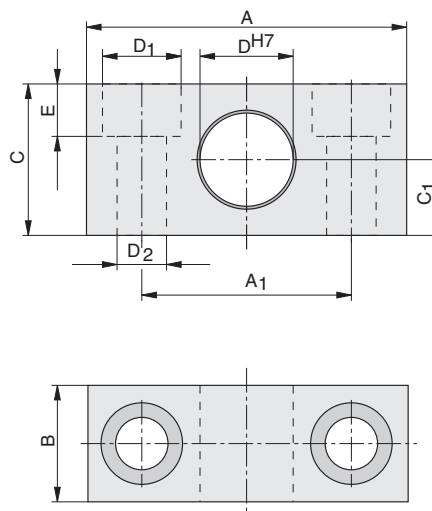
** version with 2 security bolts according to DIN 471

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)

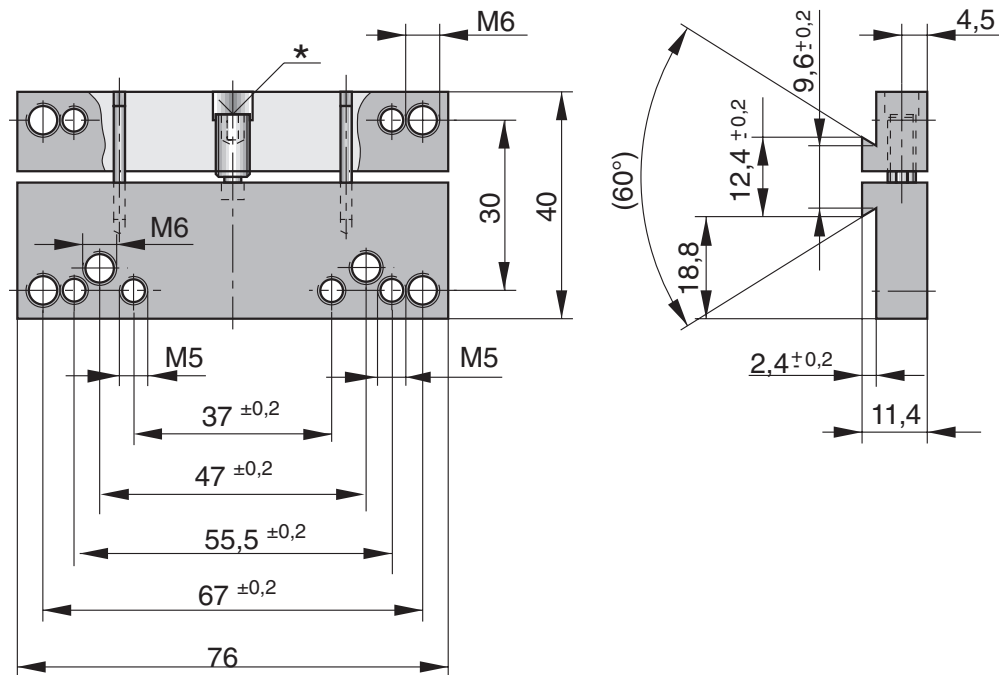
for Cyl. Ø	A	A ₁	B	C	C ₁	ØD ^{H7}	ØD ₁	ØD ₂	E
32	55	36	20	26	13	12	13.5	8.4	9
40, 50	55	36	20	26	13	16	13.5	8.4	9
63, 80	65	42	25	30	15	20	16.5	10.5	11
100, 125	75	50	28	40	20	25	19	13	13
160, 200	92	60	35	60	30	32	26	18	17
250	140	90	40	70	35	40	33	22	21.5
320	150	100	60	80	40	50	40	26	25.5

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



Dimensions (mm)



Material: Al, anodized

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....

Order Instruction: PD40372



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.

Magnetic Switches pneumatic

with output indicator

Series DZPV

The magnetic switches are mounted on the cylinder tube profile.

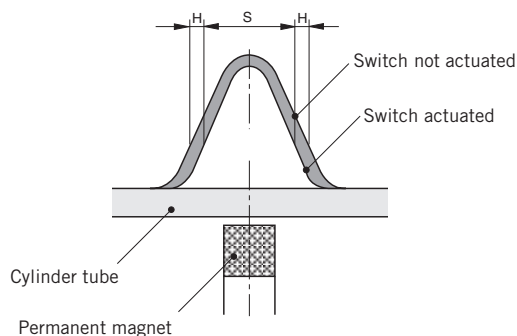
One or more switches can be fitted, depending on the stroke length.

For cylinders for contactless position sensing see Series AZ, AZV.

Switching Characteristics

H = Hysteresis

S = Response range

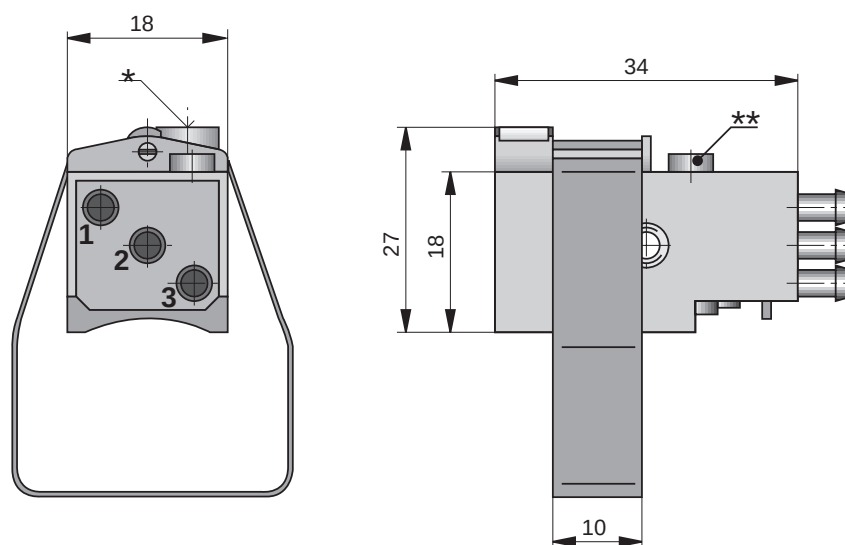


Response Range, Overrun Speed

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



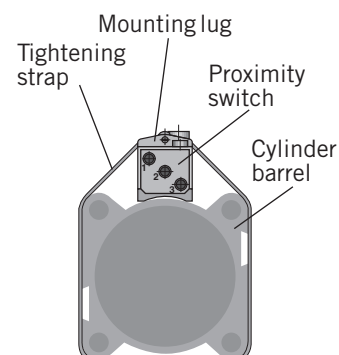
Dimensions (mm) – for Tube Connection NW3



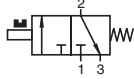
* Tightening screw
** Indicator

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, pneumatic 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

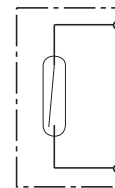
Characteristics	Symbol	Unit	Description
Electrical Characteristics		Type RS	Type ES
Switching output			Reed
Operating voltage	U_B	V	(5 DC) 10-240 AC/DC (NO) (5 DC) 10-150 AC/DC (NC) (5 DC) 10-70 AC/DC plug
Voltage drop		V	≤ 3
Connection technology			2-wire
Switching function			Normally open/closed
Permanent current	I_{Dmax}	mA	< 200
Breaking capacity		W	< 100
Power consumption		mA	–
Function indicator			LED, yellow
Response time		ms	< 2
Sensitivity		mT	2...4
Switch-off delay		ms	None
Short circuit proof			No
Pole reversal proof			No
Switchable capacity		μF	0,1 at 100 Ω , 24 VDC
Switching point accuracy		mm	$\pm 0,2^*$
Hysteresis		mm	1,5 for series OSP < 8 *)
EMC		EN	to 60947
Service life			$\geq 10 \times 10^8$ switching cycles
Mechanical Characteristics			
Housing			Macrolon, smoke colour
Cable diameter		mm ²	2 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,

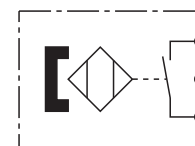
**) For the temperature range of the magnetic switches, the surface temperature and own heat generation of the cylinder must be taken into account.

Magnetic Switches electronic

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

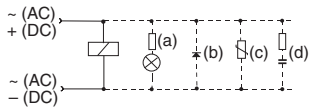
Magnetic switches are sensitive to excessive currents and inductions. With high switching frequencies and inductive loads such as relays, solenoid valves or lifting magnets, service life will be greatly reduced.

With resistive and capacitive 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.

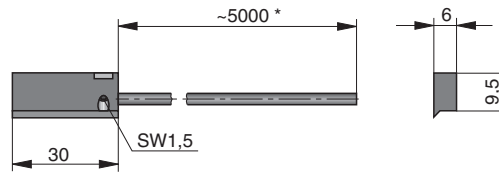
Connection Examples:

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



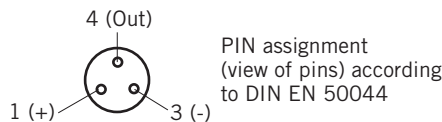
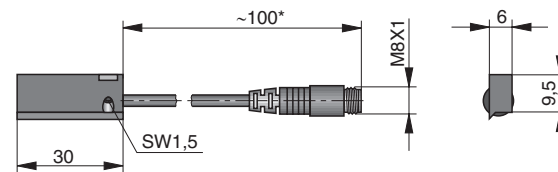
For the type ES, external protective circuits are not normally needed.

Dimensions (mm) – Type RS-K



* Length with possible minus tolerance, see chart below

Dimensions (mm) – Type ES-S/RS-S**



* Length with possible minus tolerance, see chart below

** Operating voltage max. 70 V

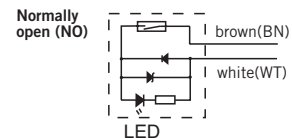
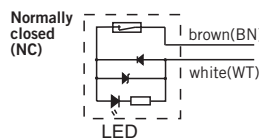
Length of connection cable with length tolerance

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.

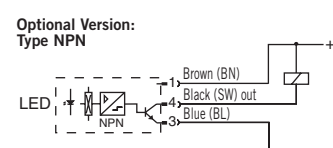
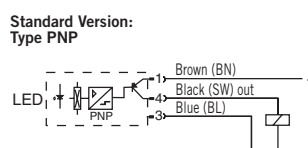
Electrical Connection, Type RS



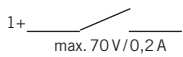
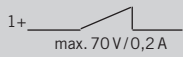
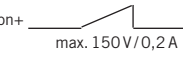
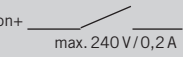
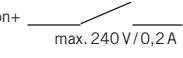
Type ES

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.

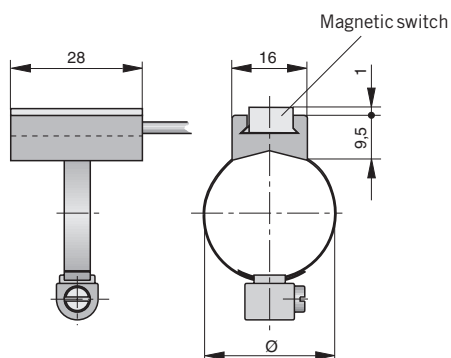
Electrical Connection, Type ES



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.



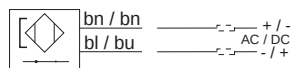
Characteristics

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 bei 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	

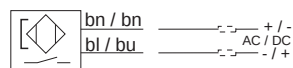
*) These values depend on the type and diameter of cylinder used – please consult us.

Electrical Connection Type RST-K

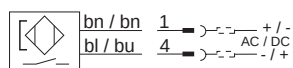
Normally closed



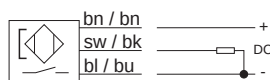
Normally open



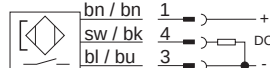
Electrical Connection Type RST-S



Electrical Connection Type EST-K



Electrical Connection Type EST-S



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.

Magnetic Switches Series RST, EST

Electrical Service Life Protective Measures

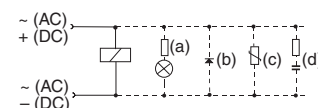
Magnetic switches are sensitive to excessive currents and inductions. With high switching frequencies and inductive loads such as relays, solenoid valves or lifting magnets, service life will be greatly reduced.

With resistive and capacitive 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.

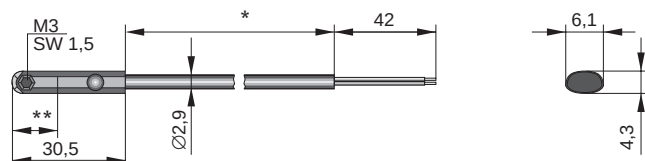
Connection Examples:

- 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.

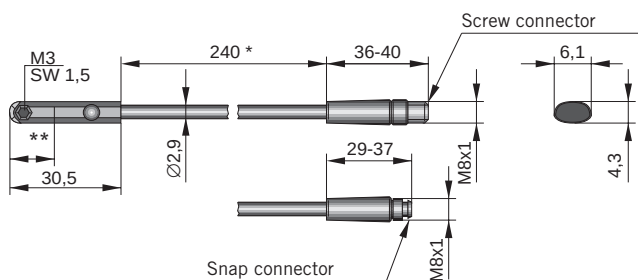
Dimensions (mm) – Type RST-K, EST-K



* Cable lengths available: 5000 mm $\pm$ 75 mm
2000 mm $\pm$ 40 mm

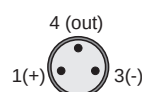
** Switching point: Type RST-K Normally closed 14 mm
Type RST-K Normally open 12,3 mm
Type EST-K Normally open 8,1 mm

Dimensions (mm) – Type RST-S, EST-S



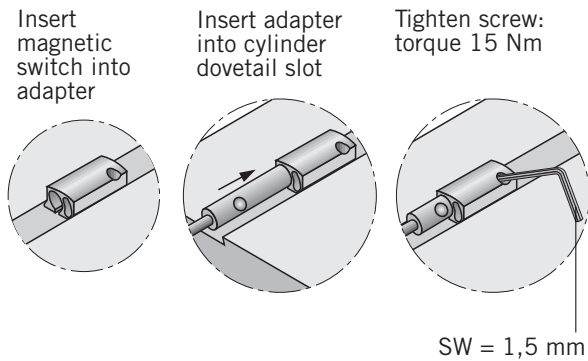
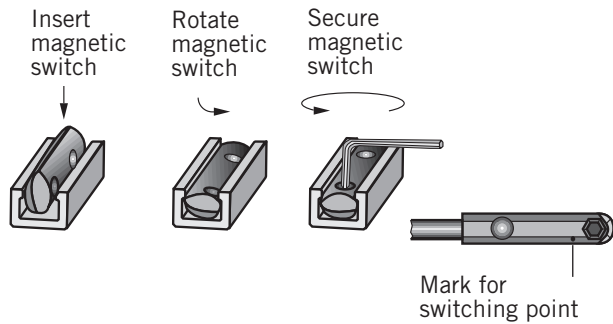
* $\pm$ 6 mm

** 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

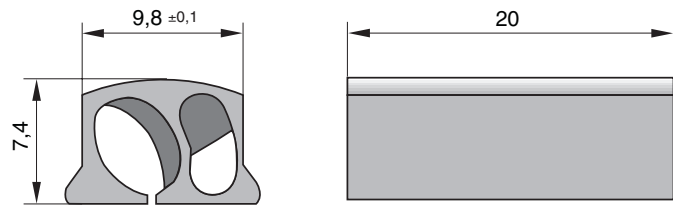


PIN assignment
(view of pins) to DIN EN 50044

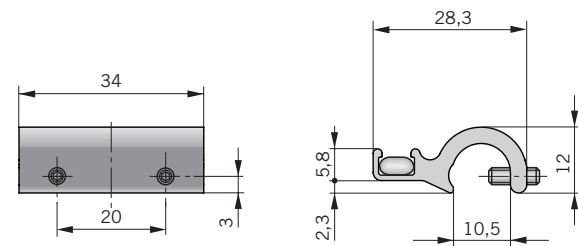
Installation



Dimensions of Adapter for Magnetic Switch

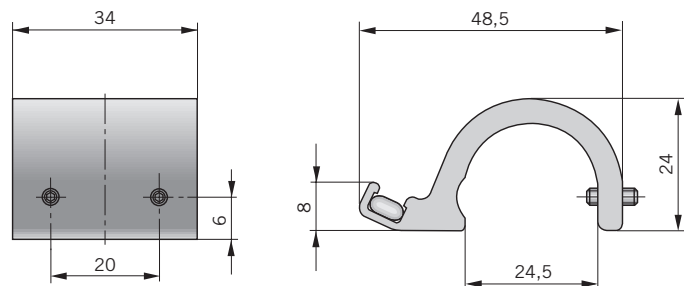


Mounting for T-slot switch for Cylinder Series AZZ Ø32–100 mm



Order-No. PD48955

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

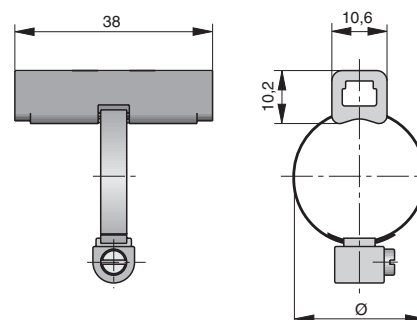


Order-No. PD48956

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

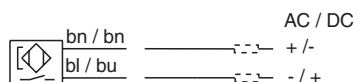
Characteristics	Symbol	Unit	Description	
Electrical Characteristics			Type RS-K ATEX	Type ES-K ATEX
ATEX Certification			yes	yes
Category Type: RS-K			⊕ II 3GD EEX nC IIC T3 146°C	
Category Type: ES-K			⊕ II 2GD EEX ib IIC T5 100°C	
Switching output			Reed	Namur
Operating voltage	U _B	V	10-240 AC/DC	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	-25	-20
		°C	+80	+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.

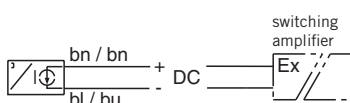
Electrical Connection – Type RS-K ATEX

Make contact (Reed)

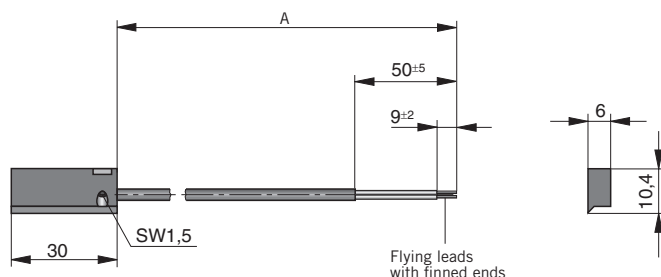


Electrical Connection – Type ES-K ATEX

Make contact (Namur)



Dimensions (mm)



Dimension Table (mm)

Magnetic switch Order-No.	Nominal cable length A	Lengths 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
 Ex 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 Ex II
 2GD EEX ib IIC T5 100°C

Caution!

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

Magnetic Switches Series RST, EST

Electrical Service Life Protective Measures

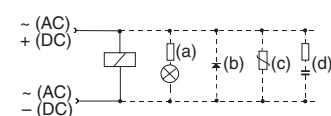
Magnetic switches are sensitive to excessive currents and inductions. With high switching frequencies and inductive loads such as relays, solenoid valves or lifting magnets, service life will be greatly reduced.

With resistive and capacitive 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

Your competent partner with a worldwide service and sales network.



AT	HOERBIGER-Origa Pneumatik GmbH • Dr. Alexander-Schärf-Straße 12 • AT-2700 Wiener Neustadt Tel +43 2622 26071-269 • Fax +43 2622 26071-266 • info-hoat-sales.pn@hoerbiger.com
AU	HOERBIGER Australia Pty. Ltd. • 17-19 David Street • AU-3175 Dandenong, Victoria Tel +61 3 9793 9488 • Fax +61 3 9706 8152 • info-hoau-sales@hoerbiger.com
CH	HOERBIGER-Origa AG • Industriestr. 30 • CH-8112 Otelfingen (Zürich) Tel +41 44 846 6860 • Fax +41 44 846 6870 • info-hoch-sales@hoerbiger.com
CN	HOERBIGER (Wuxi) Automation Technology CO., Ltd • Science & Technology Business Incubator, Anzhen Xidong Park, Xishan EDZ • Wuxi 214105, P.R.China Tel +86 510 8520 3468 • Fax +86 510 8520 3498 • info-wuxi@hoerbiger.com
FR	HOERBIGER Origas SAS • 9 Avenue du Québec • FR-91978 Courtaboeuf Cedex Tel +33 1 69 29 22 00 • Fax +33 1 69 29 22 10 • info-hofr-sales@hoerbiger.com
GB	HOERBIGER-Origas Ltd. • Unit 12 Brunel Court • Waterwells Business Park • Gloucester GL2 2AL, UK Tel +44 8700 600655 • Fax +44 8700 600656 • info-hogb-sales@hoerbiger.com
IT	HOERBIGER Origas SRL • S.P. 14 Rivoltana, 35 int. 4 • IT-20096 Pioltello Mi Tel +39 02 92 16 65 53 • Fax +39 02 92 16 67 77 • info-hoit-sales@hoerbiger.com
NL	HOERBIGER-Origas B.V. • Plaza 11C • NL-4782 SL Moerdijk Tel +31 168 356 600 • Fax +31 168 356 601 • info-honl-sales@hoerbiger.com
NO	HOERBIGER Origas AS • Postboks 2173 Strømsø • NO-3003 Drammen Tel +47 3 288 08 40 • Fax +47 3 282 83 20 • info-hose-sales@hoerbiger.com
MY	HOERBIGER-Origas Sdn Bhd • No. 10 & 12 Lorong IKS Juru 3 • MY-14100 Juru, Simpang Ampat, Penang Tel +60 4 508 10 11 • Fax +60 4 508 21 22 • info-hosg-sales@hoerbiger.com
SE	HOERBIGER-Origas AB • Kungsgatan 14, Box 67 • SE-73622 Kungsör Tel +46 227 411 00 • Fax +46 227 411 29 • info-hose-sales@hoerbiger.com
US	HOERBIGER-Origas Corporation • 100 West Lake Drive • IL-60139 Glendale Heights, Illinois, USA Tel +1 630 871 830-0 • Fax +1 630 871 1515 • info-hous-sales@hoerbiger.com

HOERBIGER-ORIGA GmbH
Industriestr. 8
70794 Filderstadt, Deutschland
Tel. +49 (0)7158 1703 0
Fax +49 (0)7158 64870
info-hode-sales@hoerbiger.com

Hotline – DE:
01805 432 666

www.hoerbiger.com