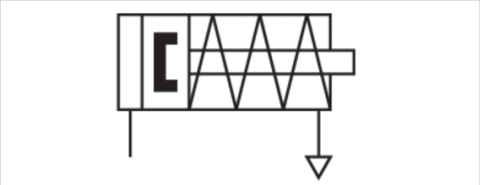
ISO 15524, series SSI

AVENTICS™ ISO 15524, series SSI

EMERSON.

Short-stroke cylinder, Series SSI

- Ø 12-63 mm
- Ports M5 G 1/8 G 1/4
- Single-acting, retracted without pressure
- with magnetic piston
- Cushioning elastic
- Piston rod Internal thread



Standards	ISO 15524
Compressed air connection	Internal thread
Ambient temperature min./max.	-20 ... 80 °C
Medium temperature min./max.	-20 ... 80 °C
Medium	Compressed air
Max. particle size	50 µm
Oil content of compressed air	0 ... 5 mg/m³
Pressure for determining piston forces	6.3 bar

Technical data

Piston Ø Piston rod thread Ports Piston rod Ø	12 mm M3 M5 6 mm	16 mm M4 M5 8 mm	20 mm M5 M5 10 mm	25 mm M6 M5 12 mm	32 mm M8 G 1/8 16 mm	40 mm M8 G 1/8 16 mm
Stroke 5	R480637920	R480637922	R480637924	R480637927	R480637930	R480637933
10	R480637921	R480637923	R480637925	R480637928	R480637931	R480637934
25	-	-	R480637926	R480637929	R480637932	R480637935

Piston Ø Piston rod thread Ports Piston rod Ø	50 mm M10 G 1/4 20 mm	63 mm M10 G 1/4 20 mm
Stroke 5	-	-
10	R480637936	R480637938
25	R480637937	R480637939

Technical data

Piston Ø	12 mm	16 mm
Extracting piston force	71 N	127 N
Impact energy	0.02 J	0.03 J
Weight 0 mm stroke	0.039 kg	0.061 kg
Weight +10 mm stroke	0.012 kg	0.017 kg
Working pressure min./max.	1.7 ... 10 bar	1.5 ... 10 bar
Material, front cover	Brass	Aluminum
Sealing material	Nitrile butadiene rubber	Nitrile butadiene rubber
Stroke max.	10 mm	10 mm

Piston Ø	20 mm	25 mm
Extracting piston force	198 N	309 N
Impact energy	0.04 J	0.05 J
Weight 0 mm stroke	0.077 kg	0.098 kg
Weight +10 mm stroke	0.02 kg	0.027 kg
Working pressure min./max.	1.5 ... 10 bar	1.5 ... 10 bar
Material, front cover	Aluminum	Aluminum
Sealing material	Nitrile butadiene rubber	Nitrile butadiene rubber
Stroke max.	25 mm	25 mm

Piston Ø	32 mm	40 mm	50 mm	63 mm
Extracting piston force	507 N	792 N	1237 N	1964 N
Impact energy	0.16 J	0.24 J	0.32 J	0.38 J
Weight 0 mm stroke	0.171 kg	0.236 kg	0.385 kg	0.606 kg
Weight +10 mm stroke	0.038 kg	0.044 kg	0.067 kg	0.079 kg
Working pressure min./max.	1.3 ... 10 bar	1.3 ... 10 bar	1 ... 10 bar	1 ... 10 bar
Material, front cover	Aluminum	Aluminum	Aluminum	Aluminum
Sealing material	Polyurethane	Polyurethane	Polyurethane	Polyurethane
Stroke max.	25 mm	25 mm	25 mm	25 mm

Retracting piston force see diagram

Technical information

The pressure dew point must be at least 15 °C under ambient and medium temperature and may not exceed 3 °C .
The oil content of compressed air must remain constant during the life cycle.
Use only the approved oils from AVENTICS. Further information can be found in the “Technical information” document (available in the MediaCentre).

Please note that this variant does not use a scraper.

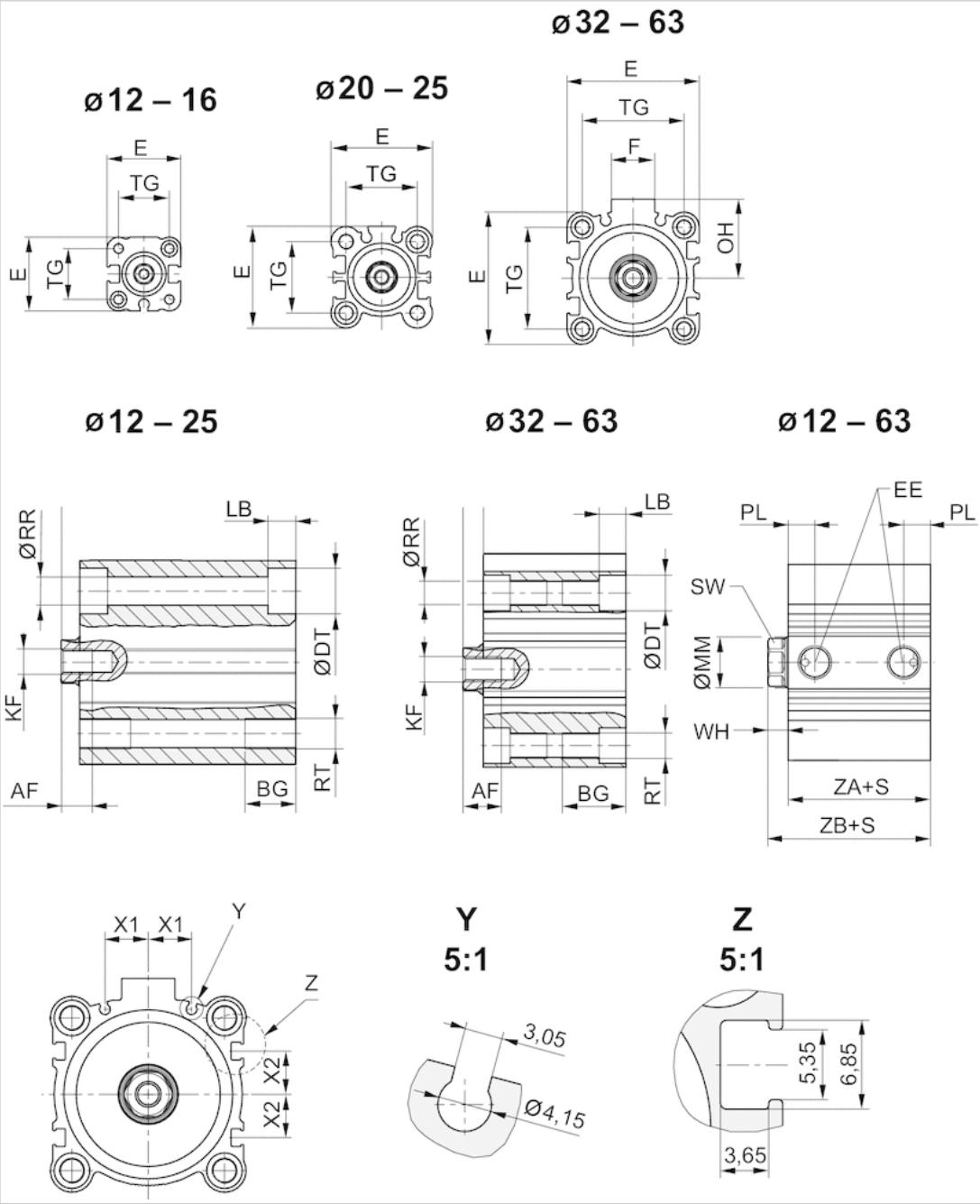
Technical information

Material	
Cylinder tube	Aluminum, anodized
Piston rod	Stainless steel
Front cover	Brass Aluminum

Material	
End cover	Aluminum
Seal	Nitrile butadiene rubber Polyurethane
	See table for additional data on materials.

Dimensions

Dimensions



S = stroke

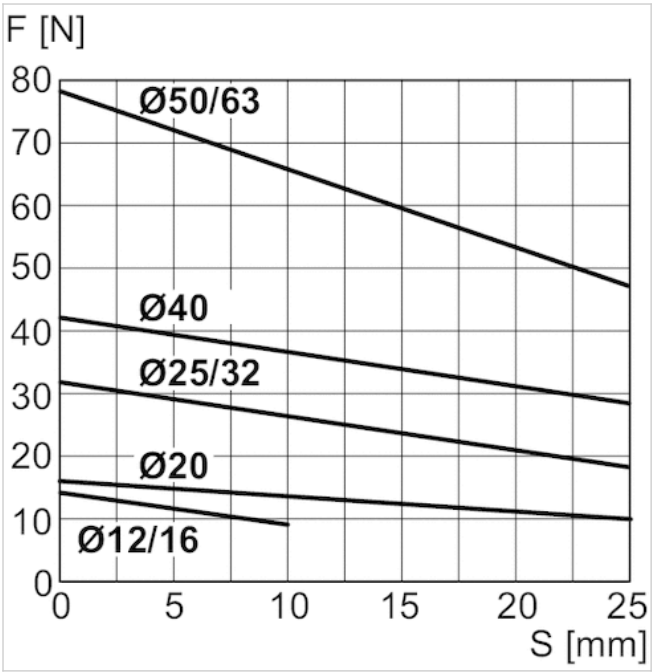
Dimensions

Piston Ø	AF	BG	ØDT	E	EE	F	KF	LB max.	ØMM f8	OH	PL	ØRR	RT	SW	TG
12 mm	6	7	6.5	25	M5	-	M3	3.5	6	-	5.5	3.7	M4	5	15,5 ±0,3
16 mm	8	7	6.5	29	M5	-	M4	3.5	8	-	5.5	3.7	M4	7	20 ±0,3
20 mm	7	10	9	36	M5	-	M5	5.5	10	-	5.5	5.55	M6	8	25,5 ±0,3
25 mm	12	10	9	40	M5	-	M6	5.5	12	-	5.5	5.55	M6	10	28 ±0,3
32 mm	13	16	9	45	G 1/8	17	M8	5.5	16	27	7.5	5.55	M6	13	34 ±0,3
40 mm	13	16	9	52	G 1/8	17	M8	5.5	16	31	7.5	5.55	M6	13	40 ±0,3
50 mm	15	20	11	64	G 1/4	21	M10	8	20	39	10.5	7.4	M8	17	50 ±0,5
63 mm	15	25	14	77	G 1/4	21	M10	10.5	20	45.5	10.5	9.3	M10	17	60 ±0,5

Piston Ø	WH	X1	X2	ZA±0,2	ZB±2
12 mm	3,5 ±1,5	0	0	28	31.5
16 mm	3,5 ±1,5	0	0	30.5	34
20 mm	4,5 ±1,5	5.7	4.3	31,5	für Hub 11-25 mm + 6,5 mm
25 mm	5 ±1,5	6	5	32,5	für Hub 11-25 mm + 6,5 mm
32 mm	7 ±2	8.5	7.5	33	40
40 mm	7 ±2	10.8	11	39.5	46.5
50 mm	8 ±2	14	13	40.5	48.5
63 mm	8 ±2	17	17	46	54

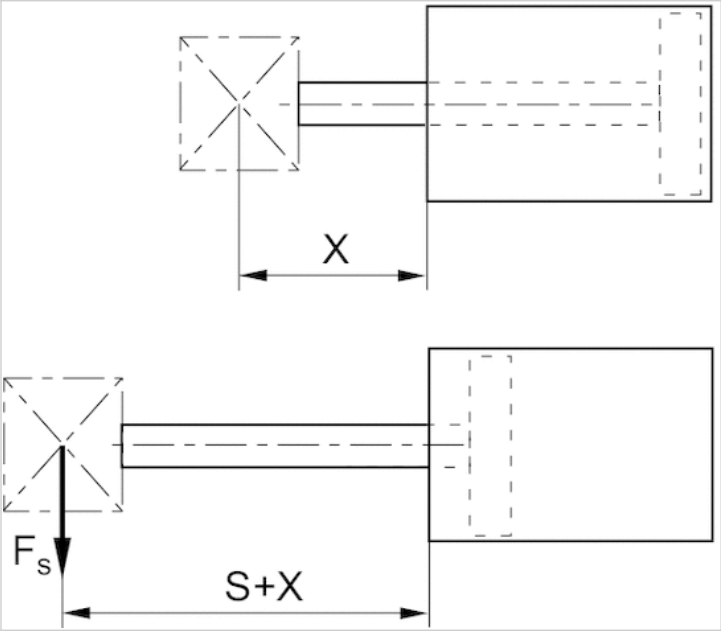
Diagrams

Retracting piston force



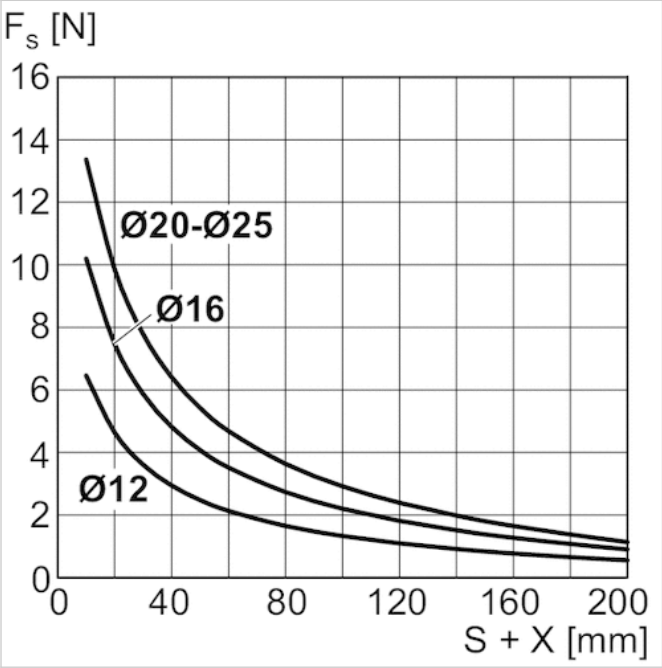
F = spring return force, s = return stroke

Maximum admissible lateral force, Ø 12 ... 25 mm



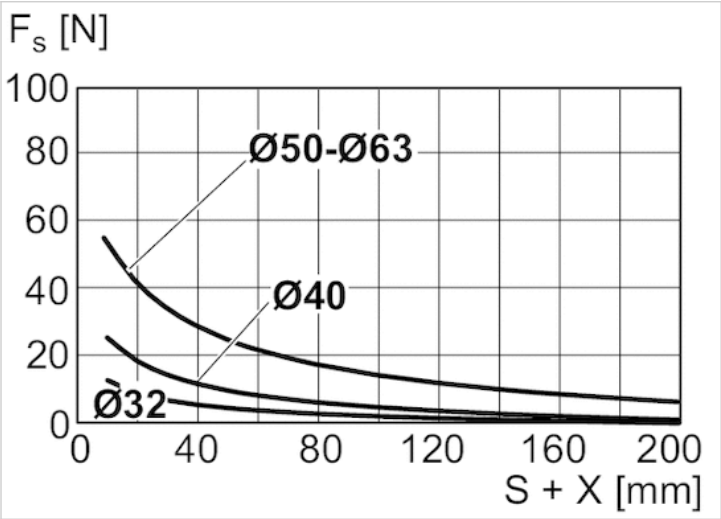
X = distance between force application point and cylinder cover
FS = lateral force
S = stroke

Maximum admissible lateral force, Ø 12 ... 25 mm



X = distance between force application point and cylinder cover
FS = lateral force
S = stroke

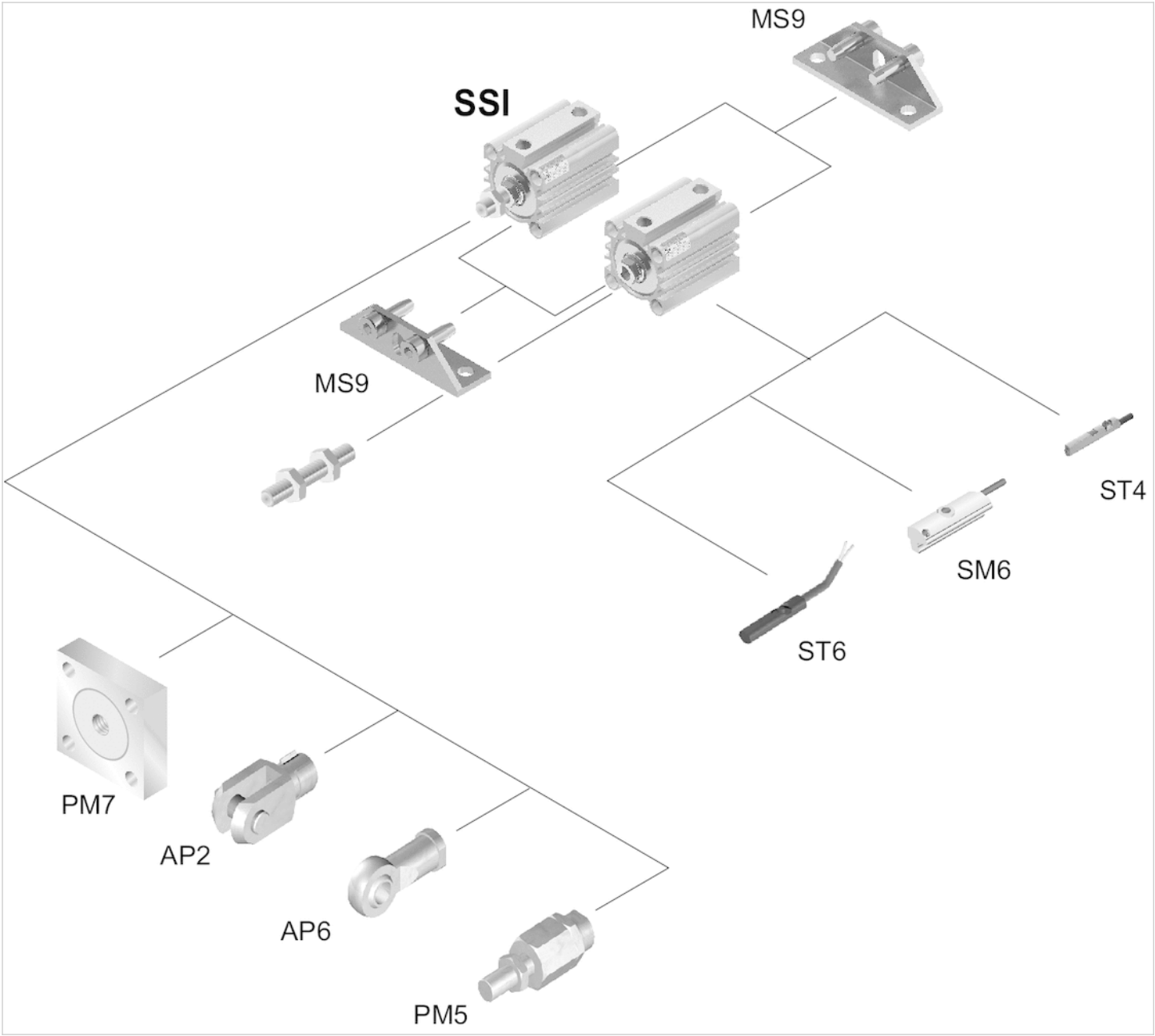
Maximum admissible lateral force, Ø 32 mm ... 63 mm



X = distance between force application point and cylinder cover
FS = lateral force
S = stroke

Accessories overview

Overview drawing

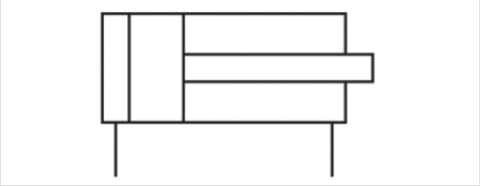


Use our Internet configurator to order variants with an external thread.

NOTE:
This overview drawing is only for orientation to indicate where the various accessory parts can be fastened to the cylinder. The illustration has been simplified for this purpose. It is thus not possible to derive the dimensions from this overview.

Short-stroke cylinder, Series SSI

- Ø 12-100 mm
- Ports M5 G 1/8 G 1/4 G 3/8
- double-acting
- Cushioning elastic
- Piston rod Internal thread



Standards	ISO 15524
Compressed air connection	Internal thread
Ambient temperature min./max.	-20 ... 80 °C
Medium temperature min./max.	-20 ... 80 °C
Medium	Compressed air
Max. particle size	50 µm
Oil content of compressed air	0 ... 5 mg/m³
Pressure for determining piston forces	6.3 bar

Technical data

Piston Ø Piston rod thread Ports Piston rod Ø	12 mm M3 M5 6 mm	16 mm M4 M5 8 mm	20 mm M5 M5 10 mm	25 mm M6 M5 12 mm	32 mm M8 G 1/8 16 mm	40 mm M8 G 1/8 16 mm
Stroke 5	R480637830	R480637835	R480637841	R480637849	R480637857	R480637865
10	R480637831	R480637836	R480637842	R480637850	R480637858	R480637866
15	R480637832	R480637837	R480637843	R480637851	R480637859	R480637867
20	R480637833	R480637838	R480637844	R480637852	R480637860	R480637868
25	R480637834	R480637839	R480637845	R480637853	R480637861	R480637869
30	-	R480637840	R480637846	R480637854	R480637862	R480637870
40	-	-	R480637847	R480637855	R480637863	R480637871
50	-	-	R480637848	R480637856	R480637864	R480637872
80	-	-	-	-	R480644580	R480641942
100	-	-	-	-	R480644582	R480644583

Piston Ø Piston rod thread Ports Piston rod Ø	50 mm M10 G 1/4 20 mm	63 mm M10 G 1/4 20 mm	80 mm M16 G 3/8 25 mm	100 mm M20 G 3/8 32 mm
Stroke 5	R480637873	R480637883	R480637893	R480637903
10	R480637874	R480637884	R480637894	R480637904

Piston Ø Piston rod thread Ports Piston rod Ø	50 mm M10 G 1/4 20 mm	63 mm M10 G 1/4 20 mm	80 mm M16 G 3/8 25 mm	100 mm M20 G 3/8 32 mm
15	R480637875	R480637885	R480637895	R480637905
20	R480637876	R480637886	R480637896	R480637906
25	R480637877	R480637887	R480637897	R480637907
30	R480637878	R480637888	R480637898	R480637908
40	R480637879	R480637889	R480637899	R480637909
50	R480637880	R480637890	R480637900	R480637910
80	R480637881	R480637891	R480637901	R480637911
100	R480637882	R480637892	R480637902	R480637912

Technical data

Piston Ø	12 mm	16 mm
Retracting piston force	53 N	95 N
Extracting piston force	71 N	127 N
Impact energy	0.03 J	0.06 J
Weight 0 mm stroke	0.023 kg	0.039 kg
Weight +10 mm stroke	0.012 kg	0.017 kg
Working pressure min./max.	1 ... 10 bar	1 ... 10 bar
Material, front cover	Brass	Brass
Scraper material	Nitrile butadiene rubber	Nitrile butadiene rubber
Stroke max.	75 mm	100 mm

Piston Ø	20 mm	25 mm
Retracting piston force	148 N	238 N
Extracting piston force	198 N	309 N
Impact energy	0.08 J	0.1 J
Weight 0 mm stroke	0.052 kg	0.071 kg
Weight +10 mm stroke	0.02 kg	0.027 kg
Working pressure min./max.	1 ... 10 bar	1 ... 10 bar
Material, front cover	Brass	Aluminum
Scraper material	Nitrile butadiene rubber	Nitrile butadiene rubber
Stroke max.	150 mm	150 mm

Piston Ø	32 mm	40 mm
Retracting piston force	380 N	665 N
Extracting piston force	507 N	792 N
Impact energy	0.16 J	0.24 J
Weight 0 mm stroke	0.11 kg	0.193 kg
Weight +10 mm stroke	0.038 kg	0.044 kg
Working pressure min./max.	0.6 ... 10 bar	0.6 ... 10 bar
Material, front cover	Aluminum	Aluminum
Scraper material	Nitrile butadiene rubber	Nitrile butadiene rubber
Stroke max.	150 mm	150 mm

Piston Ø	50 mm	63 mm	80 mm	100 mm
Retracting piston force	1039 N	1766 N	2857 N	4441 N
Extracting piston force	1237 N	1964 N	3167 N	4948 N
Impact energy	0.32 J	0.38 J	0.43 J	0.5 J
Weight 0 mm stroke	0.312 kg	0.523 kg	0.97 kg	1.83 kg
Weight +10 mm stroke	0.067 kg	0.079 kg	0.122 kg	0.168 kg
Working pressure min./max.	0.6 ... 10 bar	0.6 ... 10 bar	0.6 ... 10 bar	0.6 ... 10 bar
Material, front cover	Aluminum	Aluminum	Aluminum	Aluminum
Scraper material	Polyurethane	Polyurethane	Polyurethane	Polyurethane
Stroke max.	150 mm	150 mm	150 mm	150 mm

Technical information

The pressure dew point must be at least 15 °C under ambient and medium temperature and may not exceed 3 °C .
The oil content of compressed air must remain constant during the life cycle.
Use only the approved oils from AVENTICS. Further information can be found in the “Technical information” document (available in the MediaCentre).

Note the selection of fittings for strokes 10 mm .

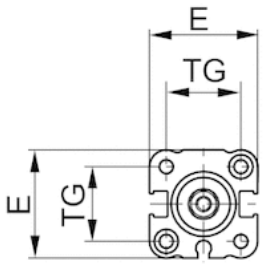
Technical information

Material	
Cylinder tube	Aluminum, anodized
Piston rod	Stainless steel
Front cover	Brass Aluminum
End cover	Aluminum
Seal	Nitrile butadiene rubber
Scraper	Nitrile butadiene rubber Polyurethane
	See table for additional data on materials.

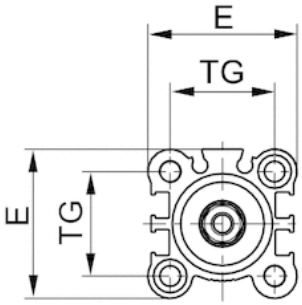
Dimensions

Dimensions

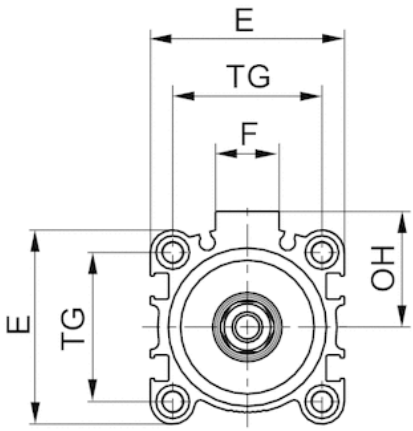
ø12 – 16



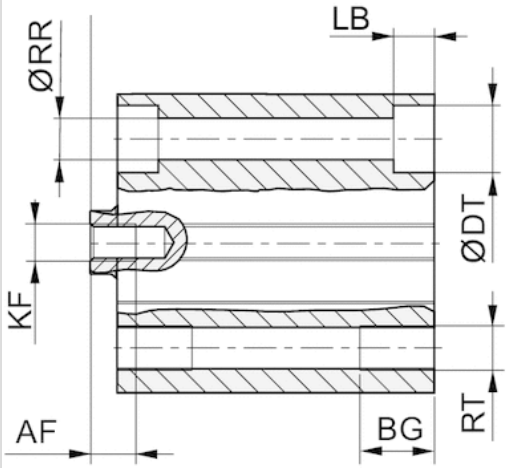
ø20 – 25



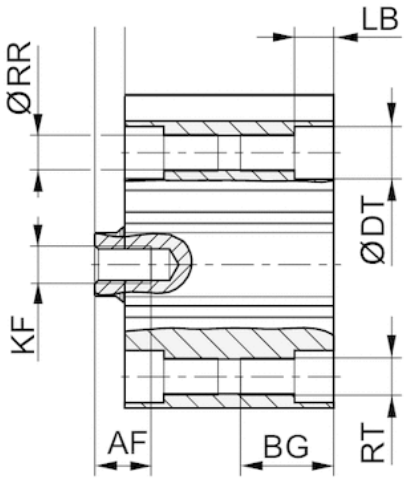
ø32 – 100



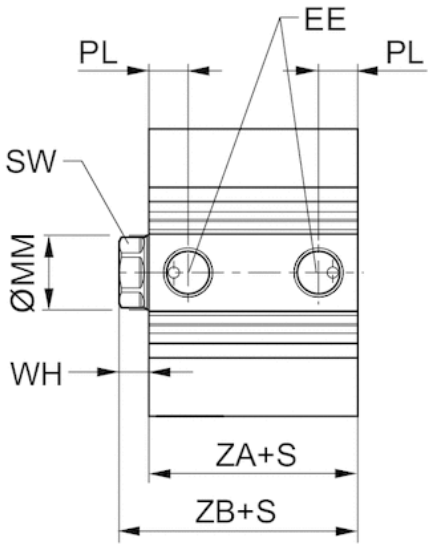
ø12 – 25



ø32 – 100



ø12 – 100



S = stroke

Dimensions

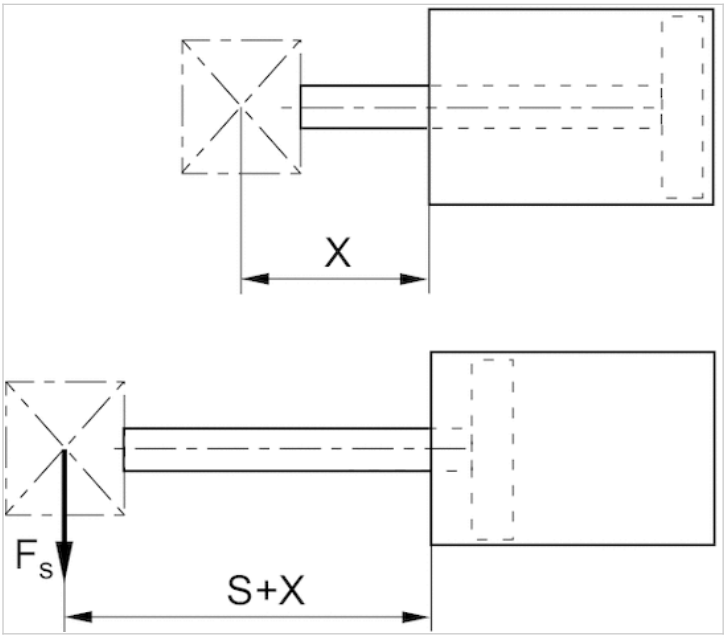
Piston Ø	AF	BG	ØDT	E	EE	F	KF	LB max.	ØMM f8	OH	ØRR	RT	SW	TG
12 mm	6	7	6.5	25	M5	-	M3	3.5	6	-	3.7	M4	5	15,5 ±0,3
16 mm	8	7	6.5	29	M5	-	M4	3.5	8	-	3.7	M4	7	20 ±0,3
20 mm	7	10	9	36	M5	-	M5	5.5	10	-	5.55	M6	8	25,5 ±0,3
25 mm	12	10	9	40	M5	-	M6	5.5	12	-	5.55	M6	10	28 ±0,3
32 mm	13	16	9	45	G 1/8	17	M8	5.5	16	27	5.55	M6	13	34 ±0,3
40 mm	13	16	9	52	G 1/8	17	M8	5.5	16	31	5.55	M6	13	40 ±0,3
50 mm	15	20	11	64	G 1/4	21	M10	8	20	39	7.4	M8	17	50 ±0,5
63 mm	15	25	14	77	G 1/4	21	M10	10.5	20	45.5	9.3	M10	17	60 ±0,5

Piston Ø	AF	BG	ØDT	E	EE	F	KF	LB max.	ØMM f8	OH	ØRR	RT	SW	TG
80 mm	21	30	17.5	98	G 3/8	26	M16	13.5	25	59	11.2	M12	22	77 ±0,5
100 mm	27	30	17.5	117	G 3/8	26	M20	13.5	32	65	11.2	M12	27	94 ±0,5

Piston Ø	WH	S	PL	ZA±0,2	ZB±2
12 mm	3,5 ±1,5	2-4 ≥5	4,5 5,5	17	20.5
16 mm	3,5 ±1,5	≥2	5.5	18.5	22
20 mm	4,5 ±1,5	≥2	5.5	19.5	24
25 mm	5 ±1,5	≥2	5.5	22.5	27
32 mm	7 ±2	2-4 ≥5	6,3 7,5	23	30
40 mm	7 ±2	≥2	7.5	29.5	36.5
50 mm	8 ±2	2-8 ≥9	8,2 10,5	30.5	38.5
63 mm	8 ±2	≥2	10.5	36	44
80 mm	10 ±2	≥2	12.5	43.5	53.5
100 mm	12 ±2,5	≥2	14	53	65

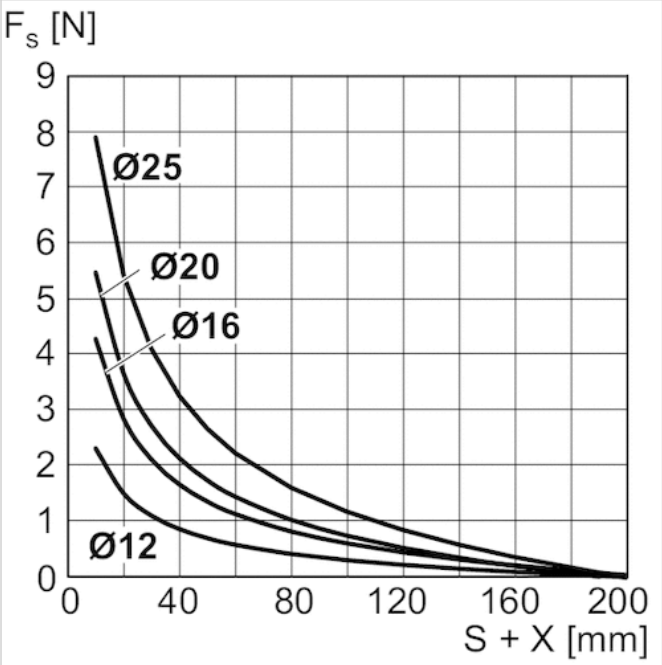
Diagrams

Maximum admissible lateral force, Ø 12 ... 25 mm



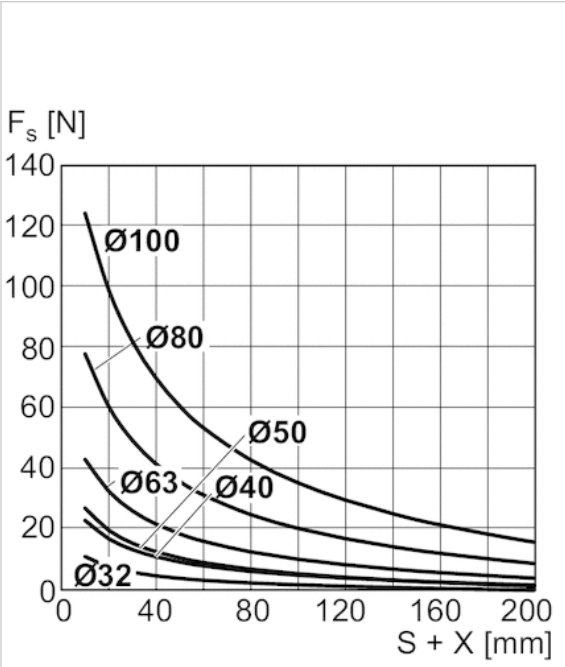
X = distance between force application point and cylinder cover
FS = lateral force
S = stroke

Maximum admissible lateral force, Ø 12 ... 25 mm



X = distance between force application point and cylinder cover
FS = lateral force
S = stroke

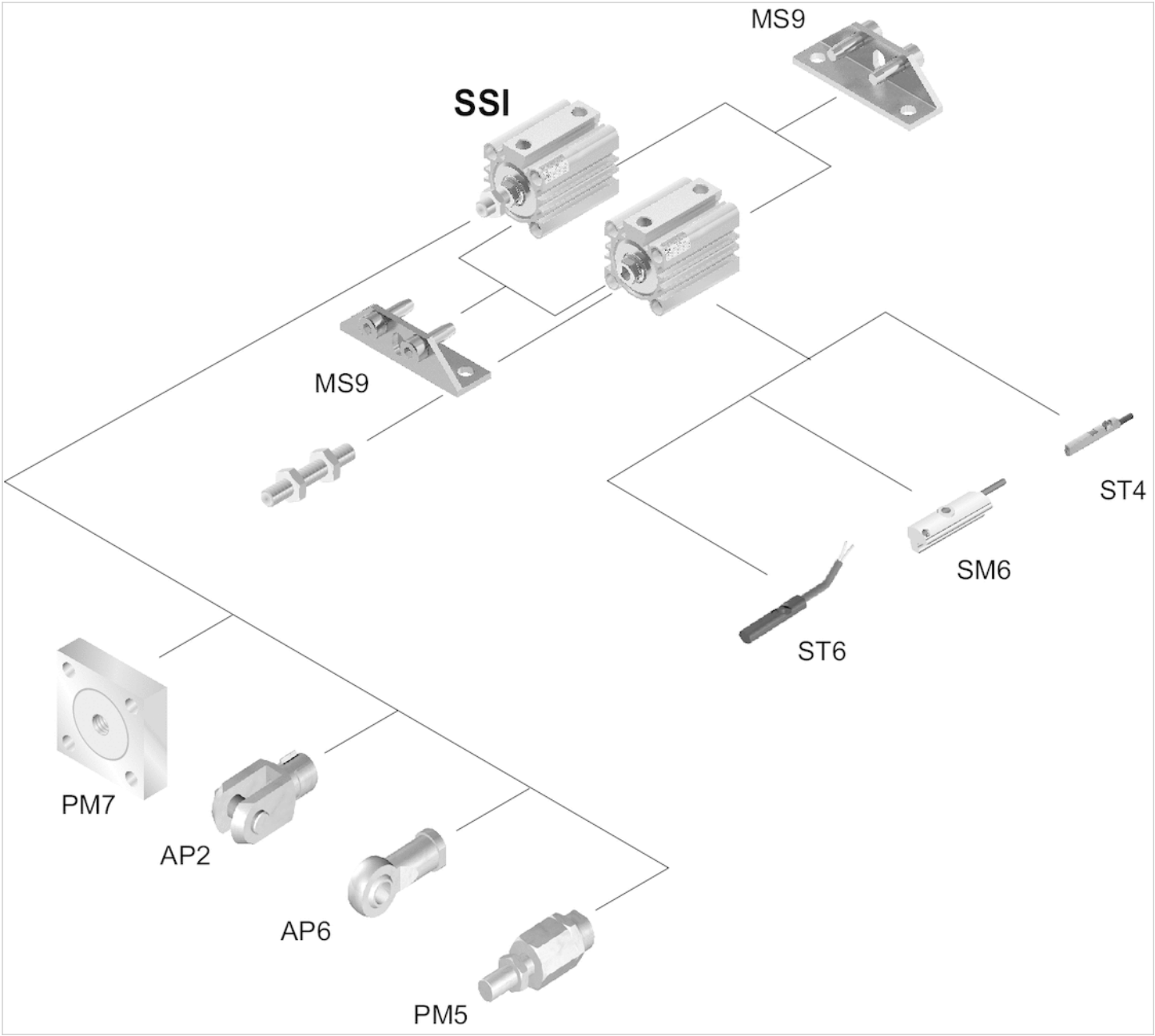
Maximum admissible lateral force, Ø 32 ... 100 mm



X = distance between force application point and cylinder cover
FS = lateral force
S = stroke

Accessories overview

Overview drawing



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Short-stroke cylinder, Series SSI

- Ø 12-100 mm
- Ports M5 G 1/8 G 1/4 G 3/8
- double-acting
- with magnetic piston
- Cushioning elastic
- Piston rod Internal thread

Standards	ISO 15524
Compressed air connection	Internal thread
Ambient temperature min./max.	-20 ... 80 °C
Medium temperature min./max.	-20 ... 80 °C
Medium	Compressed air
Max. particle size	50 µm
Oil content of compressed air	0 ... 5 mg/m³
Pressure for determining piston forces	6.3 bar

Technical data

Piston Ø Piston rod thread Ports Piston rod Ø	12 mm M3 M5 6 mm	16 mm M4 M5 8 mm	20 mm M5 M5 10 mm	25 mm M6 M5 12 mm	32 mm M8 G 1/8 16 mm	40 mm M8 G 1/8 16 mm
Stroke 5	R412019800	R412019808	R412019816	R412019824	R412019832	R412019842
10	R412019801	R412019809	R412019817	R412019825	R412019833	R412019843
15	R412019802	R412019810	R412019818	R412019826	R412019834	R412019844
20	R412019803	R412019811	R412019819	R412019827	R412019835	R412019845
25	R412019804	R412019812	R412019820	R412019828	R412019836	R412019846
30	R412019805	R412019813	R412019821	R412019829	R412019837	R412019847
40	R412019806	R412019814	R412019822	R412019830	R412019838	R412019848
50	R412019807	R412019815	R412019823	R412019831	R412019839	R412019849
80	-	-	-	-	R412019840	R412019850
100	-	-	-	-	R412019841	R412019851

Piston Ø Piston rod thread Ports Piston rod Ø	50 mm M10 G 1/4 20 mm	63 mm M10 G 1/4 20 mm	80 mm M16 G 3/8 25 mm	100 mm M20 G 3/8 32 mm
Stroke 5	R412019852	R412019862	R412019872	R412019882

Piston Ø Piston rod thread Ports Piston rod Ø	50 mm M10 G 1/4 20 mm	63 mm M10 G 1/4 20 mm	80 mm M16 G 3/8 25 mm	100 mm M20 G 3/8 32 mm
10	R412019853	R412019863	R412019873	R412019883
15	R412019854	R412019864	R412019874	R412019884
20	R412019855	R412019865	R412019875	R412019885
25	R412019856	R412019866	R412019876	R412019886
30	R412019857	R412019867	R412019877	R412019887
40	R412019858	R412019868	R412019878	R412019888
50	R412019859	R412019869	R412019879	R412019889
80	R412019860	R412019870	R412019880	R412019890
100	R412019861	R412019871	R412019881	R412019891

Technical data

Piston Ø	12 mm	16 mm
Retracting piston force	53 N	95 N
Extracting piston force	71 N	127 N
Impact energy	0.03 J	0.06 J
Weight 0 mm stroke	0.04 kg	0.064 kg
Weight +10 mm stroke	0.012 kg	0.017 kg
Working pressure min./max.	1 ... 10 bar	1 ... 10 bar
Material, front cover	Brass	Brass
Scraper material	Nitrile butadiene rubber	Nitrile butadiene rubber
Sealing material	Nitrile butadiene rubber	Nitrile butadiene rubber
Stroke max.	75 mm	100 mm

Piston Ø	20 mm	25 mm
Retracting piston force	148 N	238 N
Extracting piston force	198 N	309 N
Impact energy	0.08 J	0.1 J
Weight 0 mm stroke	0.083 kg	0.099 kg
Weight +10 mm stroke	0.021 kg	0.027 kg
Working pressure min./max.	1 ... 10 bar	1 ... 10 bar
Material, front cover	Brass	Aluminum
Scraper material	Nitrile butadiene rubber	Nitrile butadiene rubber
Sealing material	Nitrile butadiene rubber	Nitrile butadiene rubber
Stroke max.	150 mm	150 mm

Piston Ø	32 mm	40 mm	50 mm	63 mm
Retracting piston force	380 N	665 N	1039 N	1766 N
Extracting piston force	507 N	792 N	1237 N	1964 N
Impact energy	0.16 J	0.24 J	0.32 J	0.38 J
Weight 0 mm stroke	0.148 kg	0.245 kg	0.38 kg	0.598 kg
Weight +10 mm stroke	0.038 kg	0.044 kg	0.067 kg	0.079 kg
Working pressure min./max.	0.6 ... 10 bar	0.6 ... 10 bar	0.6 ... 10 bar	0.6 ... 10 bar
Material, front cover	Aluminum	Aluminum	Aluminum	Aluminum
Scraper material	Polyurethane	Polyurethane	Polyurethane	Polyurethane

Piston Ø	32 mm	40 mm	50 mm	63 mm
Sealing material	Polyurethane	Polyurethane	Polyurethane	Polyurethane
Stroke max.	150 mm	150 mm	150 mm	150 mm

Piston Ø	80 mm	100 mm
Retracting piston force	2857 N	4441 N
Extracting piston force	3167 N	4948 N
Impact energy	0.43 J	0.5 J
Weight 0 mm stroke	1.09 kg	1.89 kg
Weight +10 mm stroke	0.122 kg	0.168 kg
Working pressure min./max.	0.6 ... 10 bar	0.6 ... 10 bar
Material, front cover	Aluminum	Aluminum
Scraper material	Polyurethane	Polyurethane
Sealing material	Polyurethane	Polyurethane
Stroke max.	150 mm	150 mm

Technical information

The pressure dew point must be at least 15 °C under ambient and medium temperature and may not exceed 3 °C .
The oil content of compressed air must remain constant during the life cycle.
Use only the approved oils from AVENTICS. Further information can be found in the “Technical information” document (available in the MediaCentre).

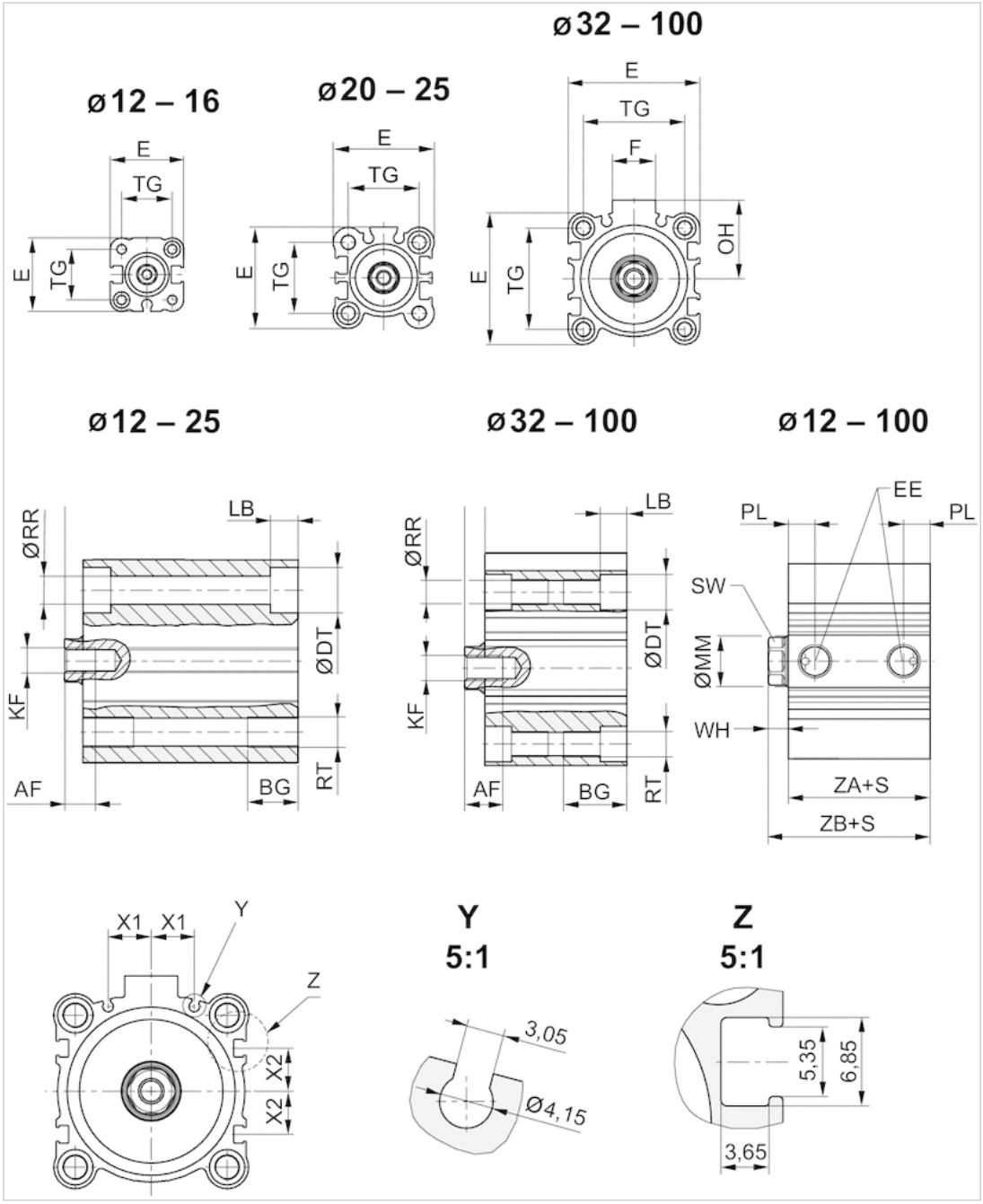
Use our Internet configurator to order variants with an external thread.

Technical information

Material	
Cylinder tube	Aluminum, anodized
Piston rod	Stainless steel
Front cover	Brass Aluminum
End cover	Aluminum
Seal	Nitrile butadiene rubber Polyurethane
Scraper	Nitrile butadiene rubber Polyurethane
	See table for additional data on materials.

Dimensions

Dimensions



S = stroke

Dimensions

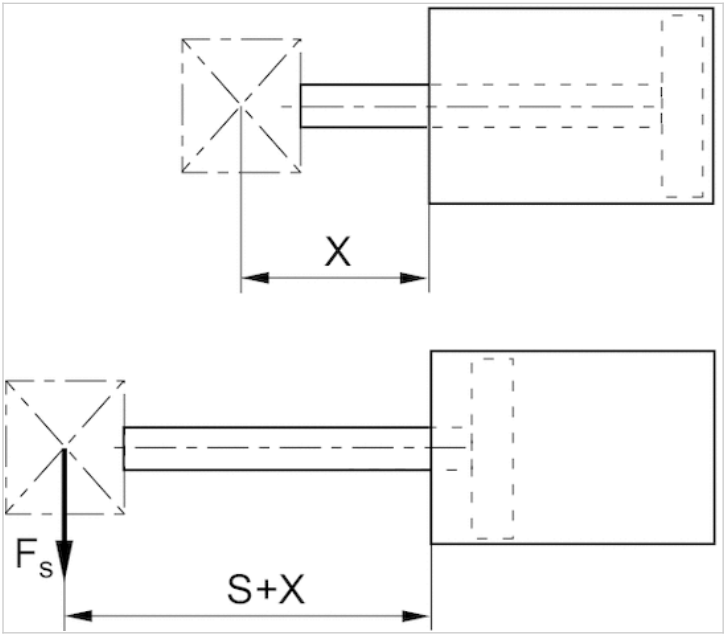
Piston Ø	AF	BG	ØDT	E	EE	F	KF	LB max.	ØMM f8	OH	PL	ØRR	RT	SW	TG
12 mm	6	7	6.5	25	M5	-	M3	3.5	6	-	5.5	3.7	M4	5	15,5 ±0,3
16 mm	8	7	6.5	29	M5	-	M4	3.5	8	-	5.5	3.7	M4	7	20 ±0,3
20 mm	7	10	9	36	M5	-	M5	5.5	10	-	5.5	5.55	M6	8	25,5 ±0,3
25 mm	12	10	9	40	M5	-	M6	5.5	12	-	5.5	5.55	M6	10	28 ±0,3
32 mm	13	16	9	45	G 1/8	17	M8	5.5	16	27	7.5	5.55	M6	13	34 ±0,3
40 mm	13	16	9	52	G 1/8	17	M8	5.5	16	31	7.5	5.55	M6	13	40 ±0,3

Piston Ø	AF	BG	ØDT	E	EE	F	KF	LB max.	ØMM f8	OH	PL	ØRR	RT	SW	TG
50 mm	15	20	11	64	G 1/4	21	M10	8	20	39	10.5	7.4	M8	17	50 ±0,5
63 mm	15	25	14	77	G 1/4	21	M10	10.5	20	45.5	10.5	9.3	M10	17	60 ±0,5
80 mm	21	30	17.5	98	G 3/8	26	M16	13.5	25	59	12.5	11.2	M12	22	77 ±0,5
100 mm	27	30	17.5	117	G 3/8	26	M20	13.5	32	65	14	11.2	M12	27	94 ±0,5

Piston Ø	WH	X1	X2	ZA±0,2	ZB±2
12 mm	3,5 ±1,5	0	0	28	31.5
16 mm	3,5 ±1,5	0	0	30.5	34
20 mm	4,5 ±1,5	5.7	4.3	31.5	36
25 mm	5 ±1,5	6	5	32.5	37.5
32 mm	7 ±2	8.5	7.5	33	40
40 mm	7 ±2	10.8	11	39.5	46.5
50 mm	8 ±2	14	13	40.5	48.5
63 mm	8 ±2	17	17	46	54
80 mm	10 ±2	23.5	21	53.5	63.5
100 mm	12 ±2,5	31	28	63	75

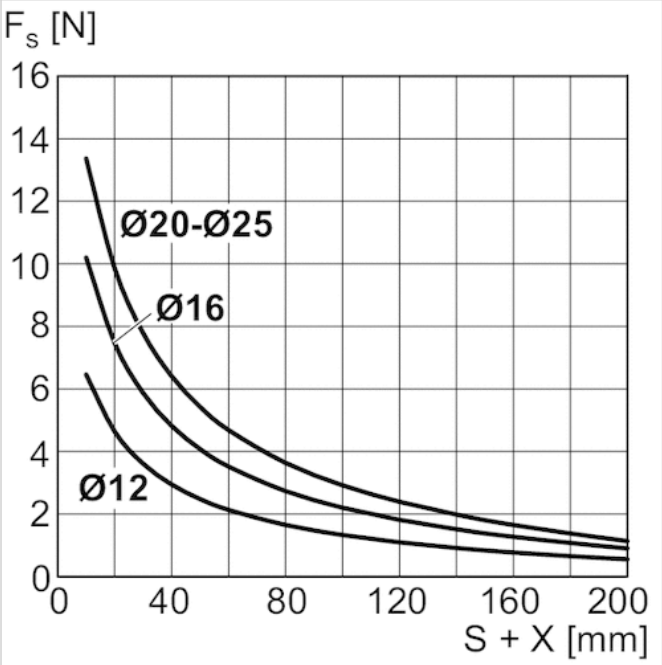
Diagrams

Maximum admissible lateral force, Ø 12 ... 25 mm



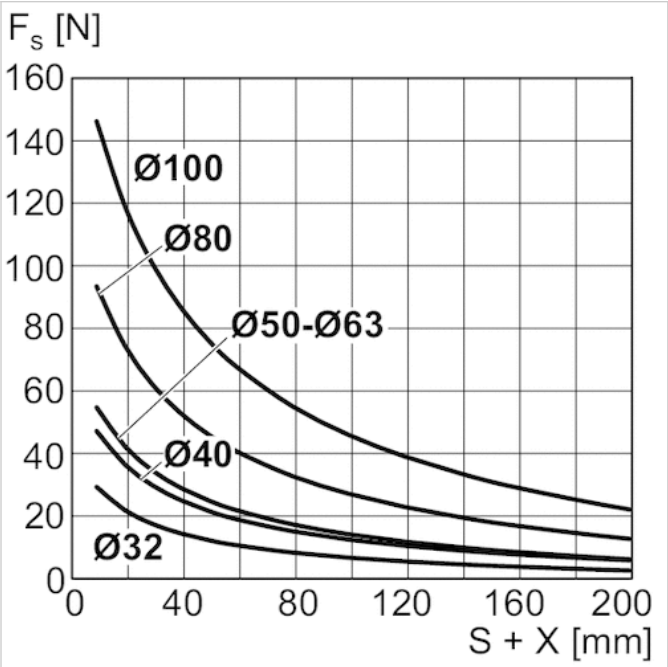
X = distance between force application point and cylinder cover
FS = lateral force
S = stroke

Maximum admissible lateral force, Ø 12 ... 25 mm



X = distance between force application point and cylinder cover
FS = lateral force
S = stroke

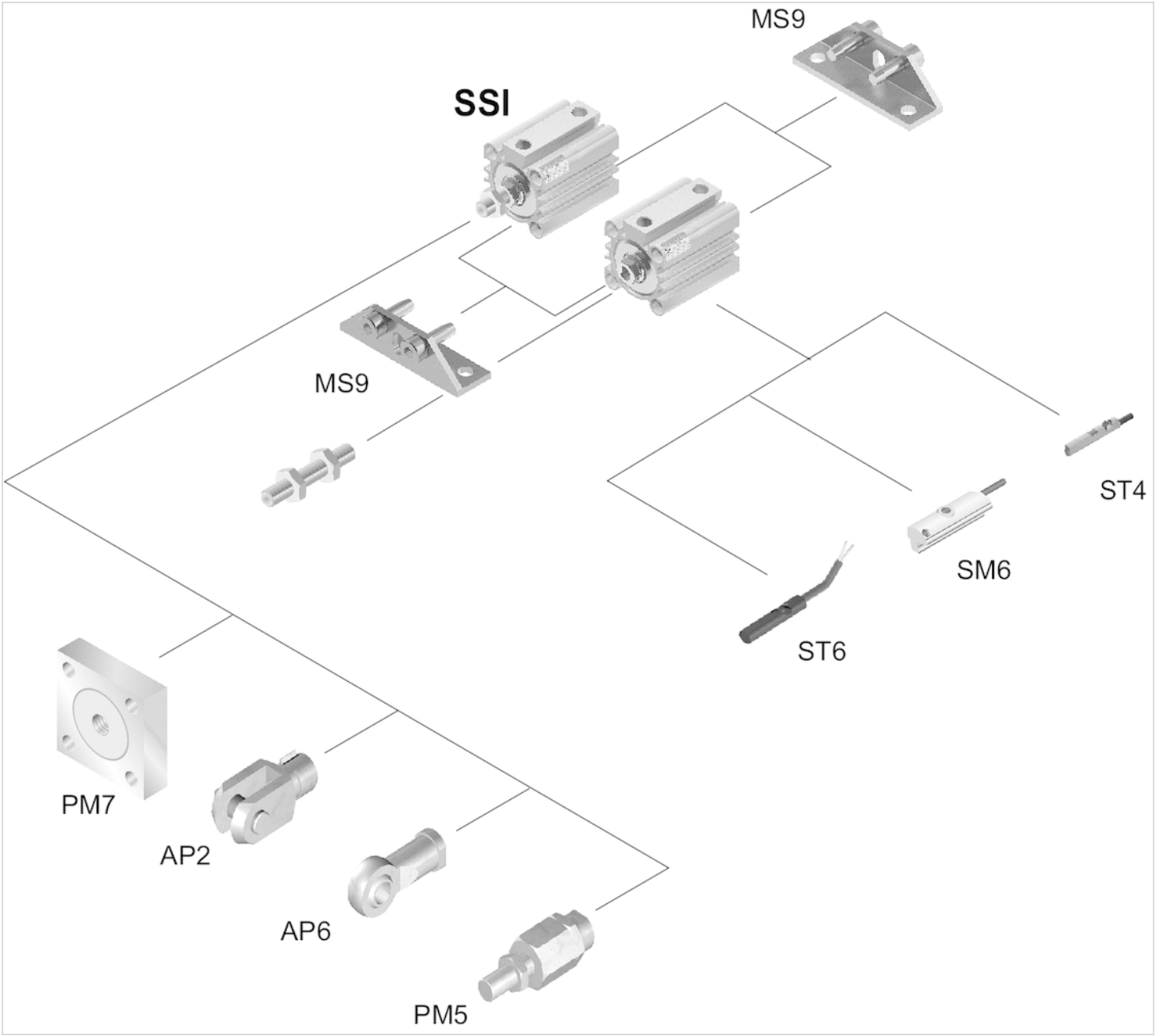
Maximum admissible lateral force, Ø 32 ... 100 mm



X = distance between force application point and cylinder cover
FS = lateral force
S = stroke

Accessories overview

Overview drawing

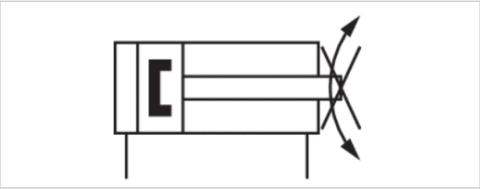


Use our Internet configurator to order variants with an external thread.

NOTE:
This overview drawing is only for orientation to indicate where the various accessory parts can be fastened to the cylinder. The illustration has been simplified for this purpose. It is thus not possible to derive the dimensions from this overview.

Short-stroke cylinder, Series SSI

- Ø 20-63 mm
- Ports M5 G 1/8 G 1/4
- double-acting
- with magnetic piston
- Cushioning elastic
- Piston rod non-rotating, with front plate



Standards	ISO 15524
Compressed air connection	Internal thread
Ambient temperature min./max.	-20 ... 80 °C
Medium temperature min./max.	-20 ... 80 °C
Medium	Compressed air
Max. particle size	50 µm
Oil content of compressed air	0 ... 5 mg/m³
Pressure for determining piston forces	6.3 bar

Technical data

Piston Ø Ports Piston rod Ø	20 mm M5 10 mm	25 mm M5 12 mm	32 mm G 1/8 16 mm	40 mm G 1/8 16 mm	50 mm G 1/4 20 mm	63 mm G 1/4 20 mm
Stroke 5	R480637940	R480637948	R480637956	R480637964	R480637972	R480637982
10	R480637941	R480637949	R480637957	R480637965	R480637973	R480637983
15	R480637942	R480637950	R480637958	R480637966	R480637974	R480637984
20	R480637943	R480637951	R480637959	R480637967	R480637975	R480637985
25	R480637944	R480637952	R480637960	R480637968	R480637976	R480637986
30	R480637945	R480637953	R480637961	R480637969	R480637977	R480637987
40	R480637946	R480637954	R480637962	R480637970	R480637978	R480637988
50	R480637947	R480637955	R480637963	R480637971	R480637979	R480637989
80	-	-	R480644584	R480644585	R480637980	R480637990
100	-	-	R480641813	R480644586	R480637981	R480637991

Technical data

Piston Ø	20 mm	25 mm
Retracting piston force	148 N	238 N
Extracting piston force	198 N	309 N
Impact energy	0.08 J	0.1 J
Weight 0 mm stroke	0.101 kg	0.14 kg
Weight +10 mm stroke	0.021 kg	0.028 kg
Working pressure min./max.	1 ... 10 bar	1 ... 10 bar
Material, front cover	Brass	Aluminum
Scraper material	Nitrile butadiene rubber	Nitrile butadiene rubber
Sealing material	Nitrile butadiene rubber	Nitrile butadiene rubber
Stroke max.	150 mm	150 mm

Piston Ø	32 mm	40 mm	50 mm	63 mm
Retracting piston force	380 N	665 N	1039 N	1766 N
Extracting piston force	507 N	792 N	1237 N	1964 N
Impact energy	0.16 J	0.24 J	0.32 J	0.38 J
Weight 0 mm stroke	0.216 kg	0.334 kg	0.547 kg	0.842 kg
Weight +10 mm stroke	0.039 kg	0.045 kg	0.07 kg	0.083 kg
Working pressure min./max.	0.6 ... 10 bar	0.6 ... 10 bar	0.6 ... 10 bar	0.6 ... 10 bar
Material, front cover	Aluminum	Aluminum	Aluminum	Aluminum
Scraper material	Polyurethane	Polyurethane	Polyurethane	Polyurethane
Sealing material	Polyurethane	Polyurethane	Polyurethane	Polyurethane
Stroke max.	150 mm	150 mm	150 mm	150 mm

Technical information

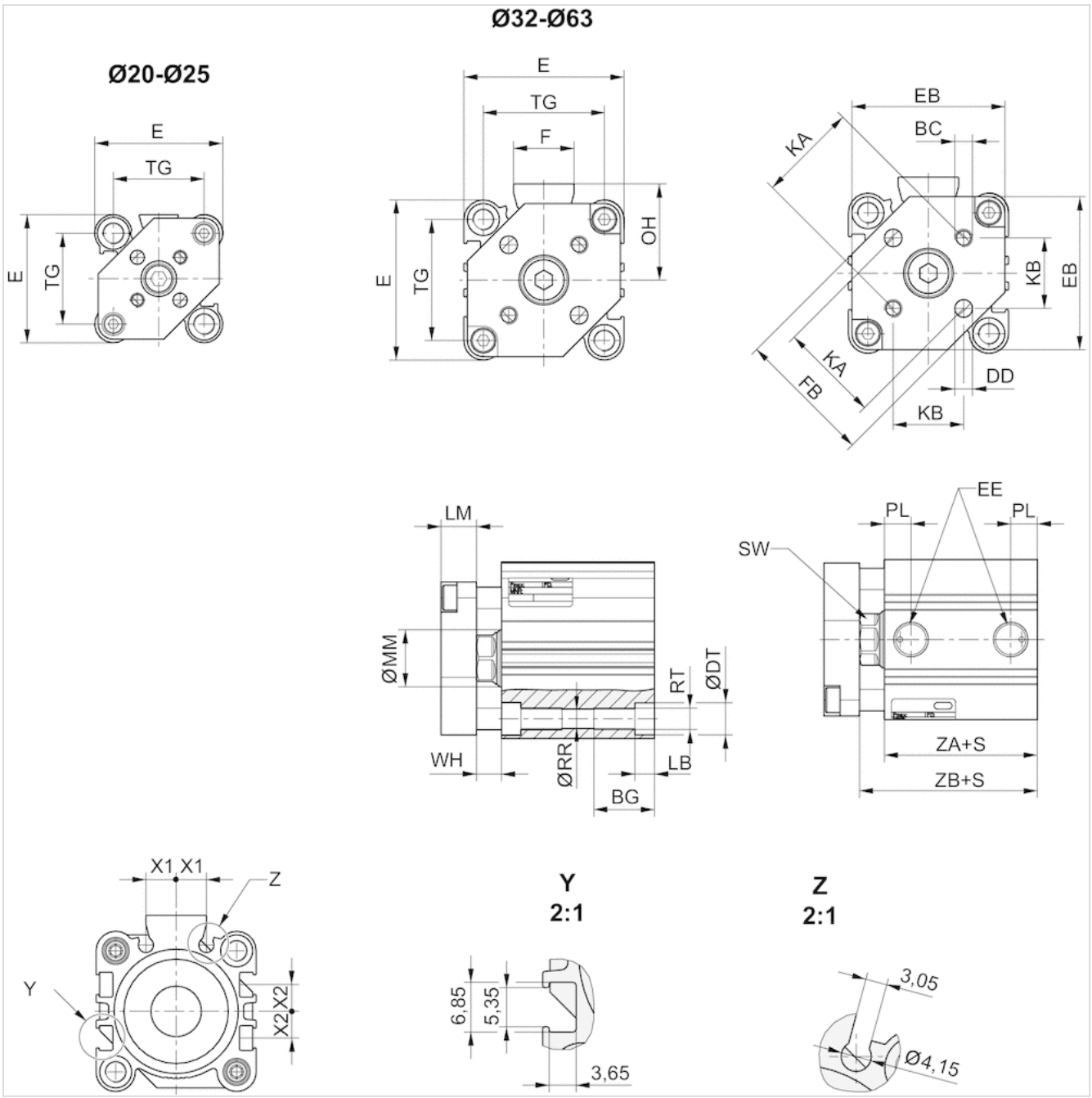
The pressure dew point must be at least 15 °C under ambient and medium temperature and may not exceed 3 °C .
The oil content of compressed air must remain constant during the life cycle.
Use only the approved oils from AVENTICS. Further information can be found in the “Technical information” document (available in the MediaCentre).

Technical information

Material	
Cylinder tube	Aluminum, anodized
Piston rod	Stainless steel
Front cover	Brass Aluminum
End cover	Aluminum
Seal	Nitrile butadiene rubber Polyurethane
Front plate	Aluminum
Guide rod	Stainless steel
Scraper	Nitrile butadiene rubber Polyurethane
	See table for additional data on materials.

Dimensions

Dimensions



S = stroke

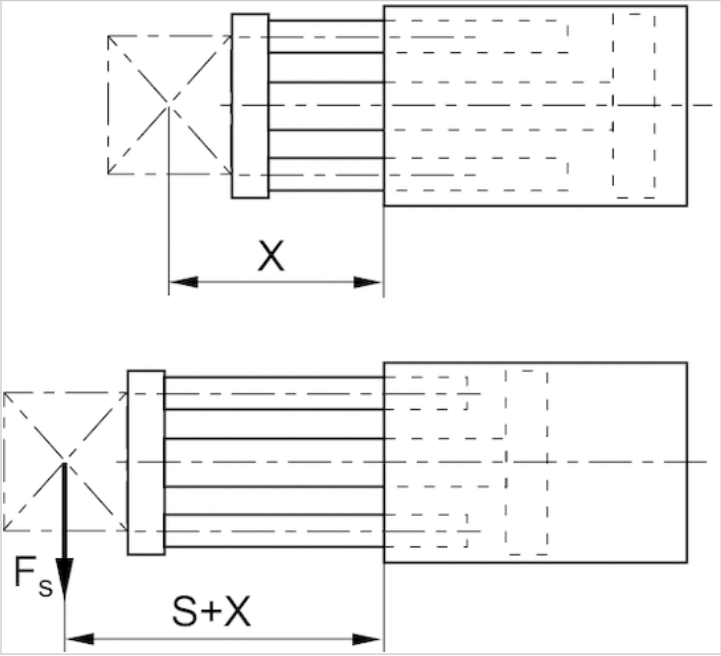
Dimensions

Piston Ø	BC	BG	ØDD H13	ØDT	E	EB	EE	F	FB	KA	KB	LB max.	LM	ØMM f8
20 mm	M4	16	4	9	36	34	M5	-	26	17 ±0,1	12 ±0,1	5.5	8	10
25 mm	M5	16	5	9	40	38	M5	-	30	22 ±0,1	15,6 ±0,1	5.5	8	12
32 mm	M5	16	5	9	45	43	G 1/8	17	38	28 ±0,2	19,8 ±0,2	5.5	10	16
40 mm	M5	16	5	9	52	50	G 1/8	17	46	33 ±0,2	23,3 ±0,2	5.5	10	16
50 mm	M6	20	6	11	64	62	G 1/4	21	58	42 ±0,2	29,7 ±0,2	8	12	20
63 mm	M6	25	6	14	77	74	G 1/4	21	69	50 ±0,2	35,4 ±0,2	10.5	12	20

Piston Ø	OH	PL	ØRR	RT	SW	TG	WH	X1	X2	ZA±0,2	ZB±2
20 mm	-	5.5	5.55	M6	8	25,5 ±0,3	4,5 ±1,5	5.7	4.3	29.5	34
25 mm	-	5.5	5.55	M6	10	28 ±0,3	5 ±1,5	6	5	32.5	37.5
32 mm	27	7.5	5.55	M6	13	34 ±0,3	7 ±2	8.5	7.5	33	40
40 mm	31	7.5	5.55	M6	13	40 ±0,3	7 ±2	10.8	11	39.5	46.5
50 mm	39	10.5	7.4	M8	17	50 ±0,5	8 ±2	14	13	40.5	48.5
63 mm	45.5	10.5	9.3	M10	17	60 ±0,5	8 ±2	17	17	46	54

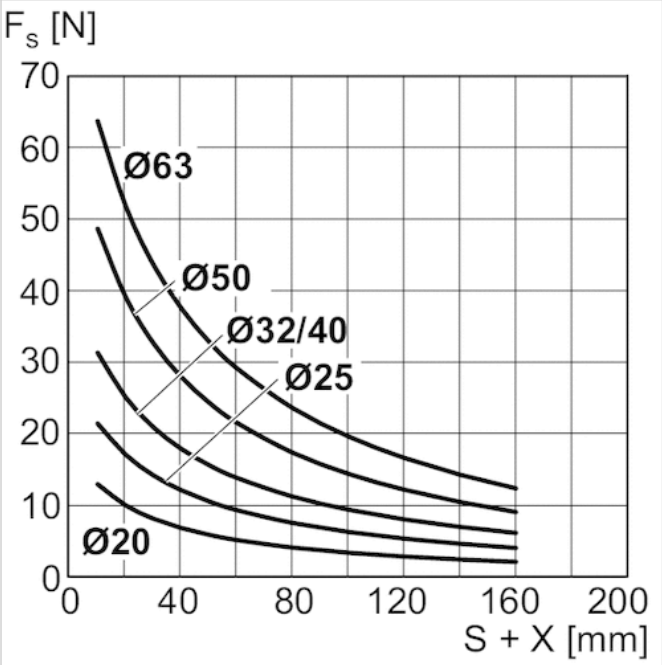
Diagrams

Maximum admissible lateral force, dynamic



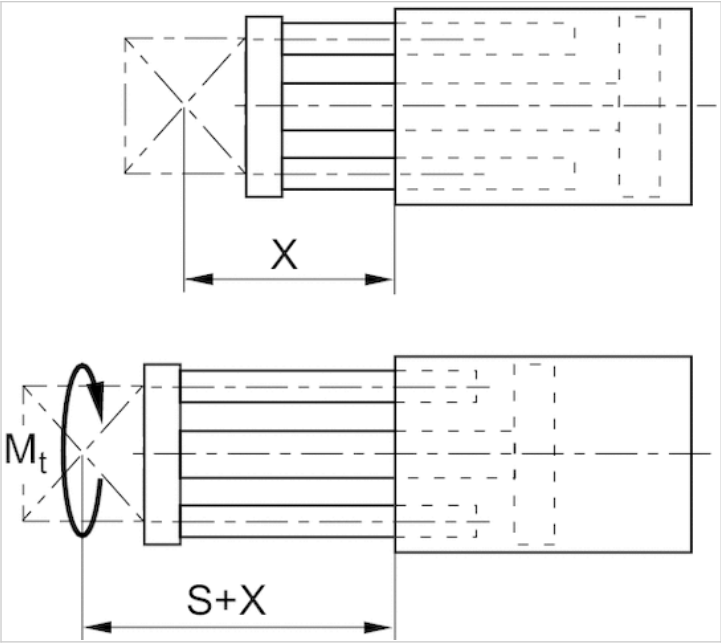
X = distance between force application point and cylinder cover
FS = lateral force
S = stroke

Maximum admissible lateral force, dynamic



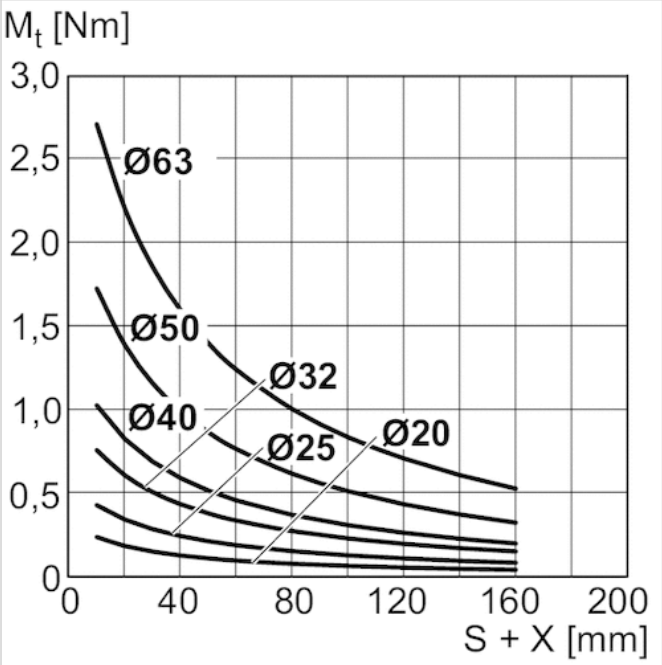
X = distance between force application point and cylinder cover
FS = lateral force
S = stroke

Max. permissible torque, Dynamic



X = distance between force application point and cylinder cover
M = max. permissible torque
S = stroke

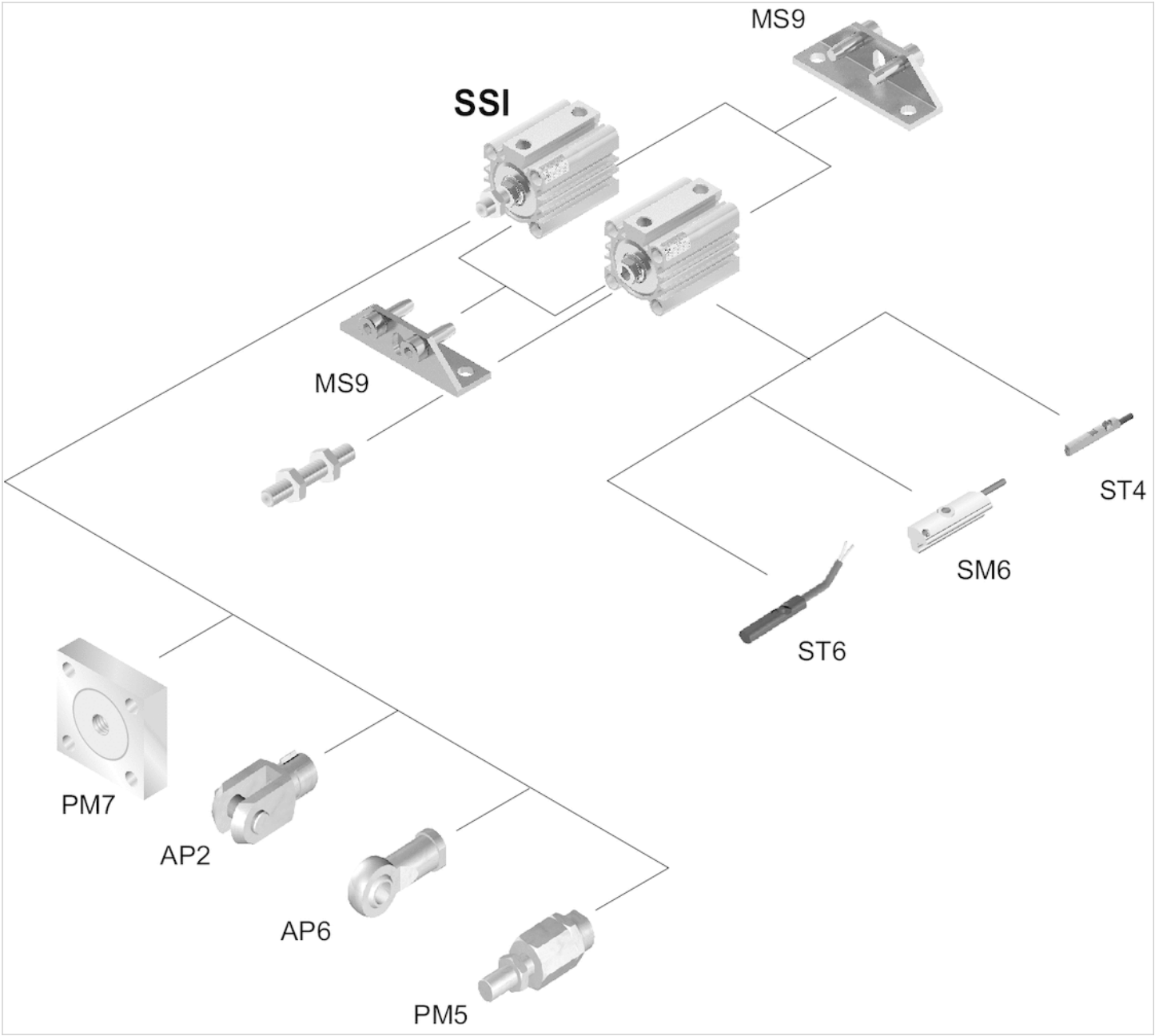
Max. permissible torque, Dynamic



X = distance between force application point and cylinder cover
M = max. permissible torque
S = stroke

Accessories overview

Overview drawing



Use our Internet configurator to order variants with an external thread.

NOTE:
This overview drawing is only for orientation to indicate where the various accessory parts can be fastened to the cylinder. The illustration has been simplified for this purpose. It is thus not possible to derive the dimensions from this overview.

Short-stroke cylinder, Series SSI

- Cushioning elastic
- Piston rod External thread

Standards

ISO 15524

For additional technical data please see the relevant data sheets for the standard version.

Technical information

The pressure dew point must be at least 15 °C under ambient and medium temperature and may not exceed 3 °C .
The oil content of compressed air must remain constant during the life cycle.
Use only the approved oils from AVENTICS. Further information can be found in the “Technical information” document (available in the MediaCentre).

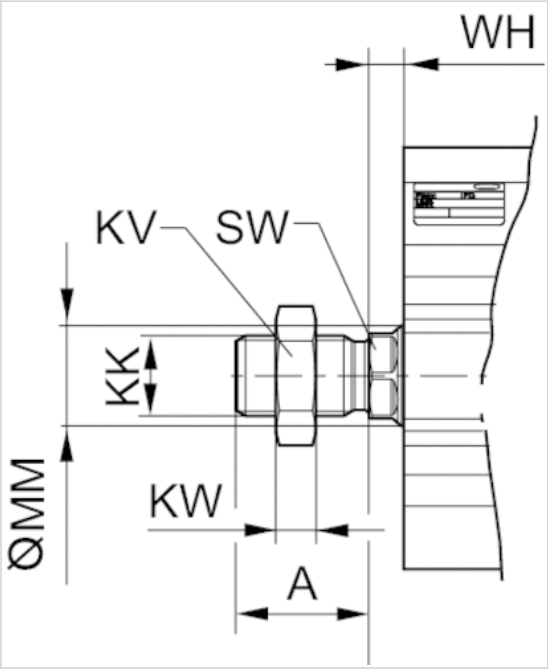
For this variant with external thread, two different external threads with the dimensions indicated below can be selected in the configurator .

Technical information

Material	
Piston rod	Stainless steel
Nut for piston rod	Steel, galvanized

Dimensions

Dimensions



Compatible with piston rod accessories

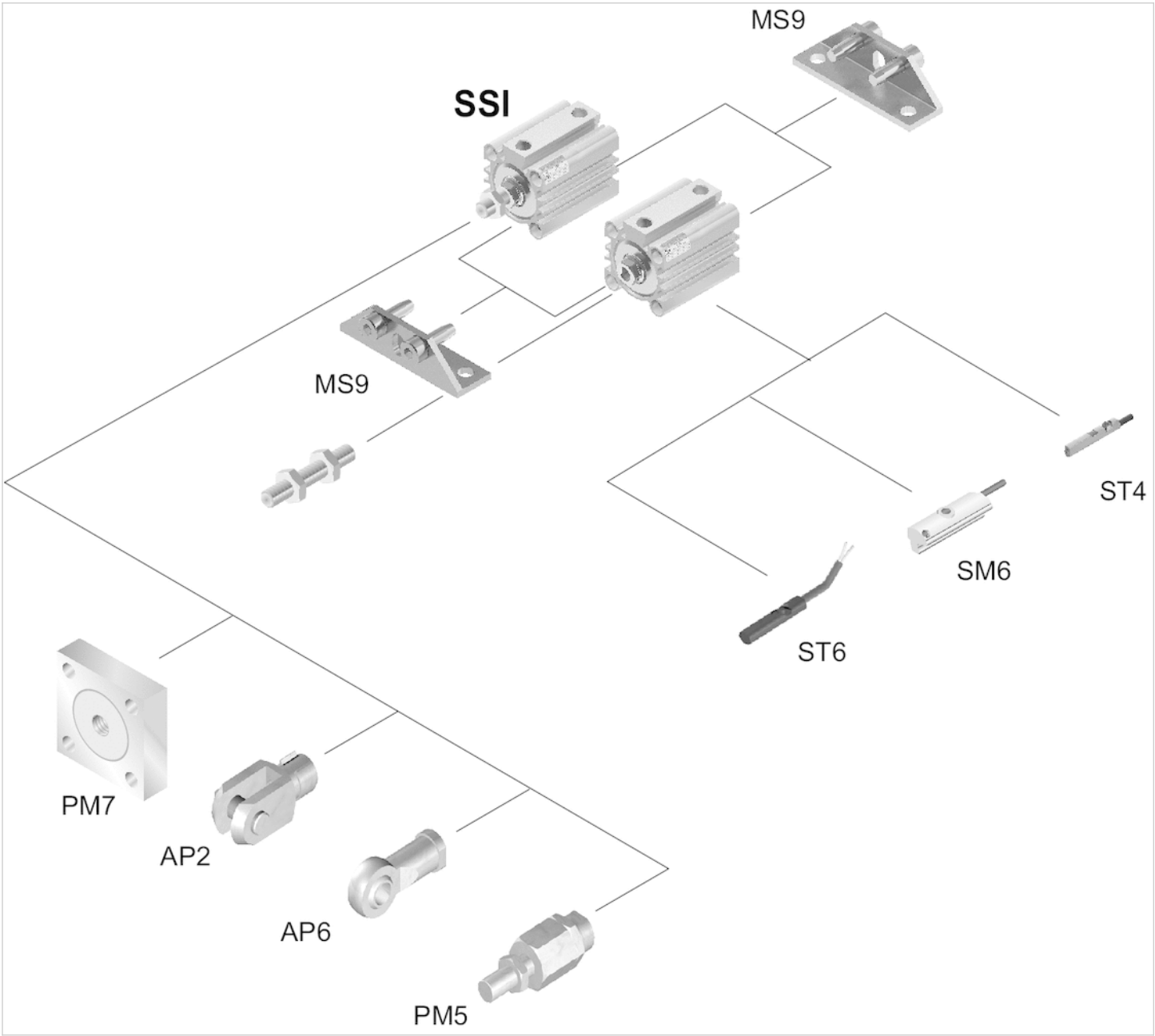
Ø	A ±0,3	KK	KV	KW	ØMM f8	SW	WH
12	10.5	M4	7	2.2	6	5	3,5 ±1,5
16	12	M6	10	3.2	8	7	3,5 ±1,5
20	14	M8	13	4	10	8	4,5 ±1,5
25	17.5	M10x1,25	17	6	12	10	5 ±1,5
32	21.5	M12x1,25	18	6	16	13	7 ±2
40	21.5	M12x1,25	18	6	16	13	7 ±2
50	26.5	M16x1,5	24	8	20	17	7 ±2
63	26.5	M16x1,5	24	8	20	17	7 ±2
80	34	M20x1,5	30	10	25	22	9,5 ±2
100	33	M20x1,5	30	10	32	27	10,5 ±2,5

Compatible with third-party products

Ø	A ±0,3	KK	KV	KW	ØMM f8	SW	WH
12	10.5	M5	8	2.7	6	5	3,5 ±1,5
16	12	M6	10	3.2	8	7	3,5 ±1,5
20	14	M8	13	4	10	8	4,5 ±1,5
25	17.5	M10x1,25	17	6	12	10	5 ±1,5
32	21.5	M14x1,5	22	8	16	13	7 ±2
40	21.5	M14x1,5	22	8	16	13	7 ±2
50	26.5	M18x1,5	27	9	20	17	7 ±2
63	26.5	M18x1,5	27	9	20	17	7 ±2
80	34	M22x1,5	32	10	25	22	9,5 ±2
100	33	M26x1,5	41	13.5	32	27	10,5 ±2,5

Accessories overview

Overview drawing



Use our Internet configurator to order variants with an external thread.

NOTE:
This overview drawing is only for orientation to indicate where the various accessory parts can be fastened to the cylinder. The illustration has been simplified for this purpose. It is thus not possible to derive the dimensions from this overview.

Foot mounting, Series MS9

- Suitable piston Ø 12 16 20 25 32 40 50 63 80 100 mm
- Cylinder mounting for cylinder in accordance with ISO 15524

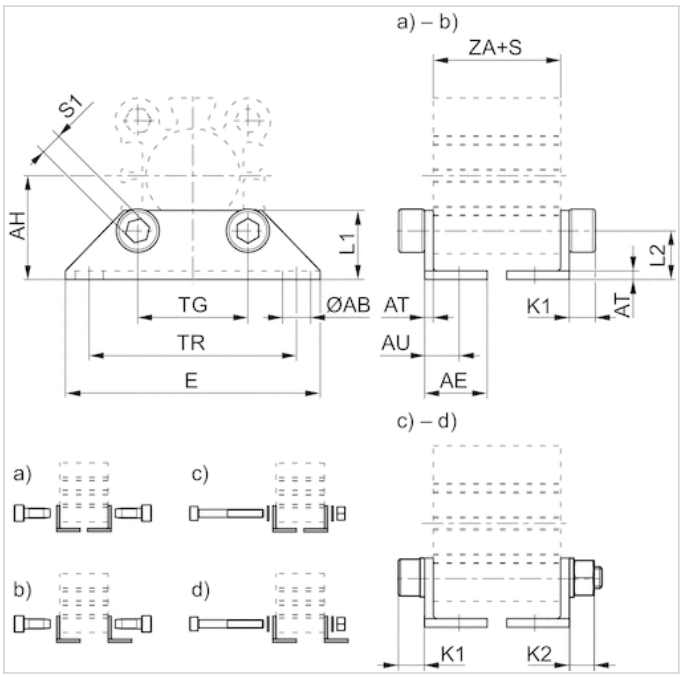
Technical data

Part No.	Piston Ø	Housing material	Surface
R402006266	12 mm	Stainless steel	-
R402006267	16 mm	Stainless steel	-
R402006268	20 mm	Stainless steel	-
R402006269	25 mm	Stainless steel	-
R402006270	32 mm	Stainless steel	-
R402006271	40 mm	Stainless steel	-
R402006272	50 mm	Stainless steel	-
R402006273	63 mm	Stainless steel	-
R402006274	80 mm	Steel	galvanized
R402006275	100 mm	Steel	galvanized

Technical information

Material	
Material	Stainless steel Steel
	galvanized

Dimensions



S = stroke

Dimensions and cylinder-dependent installation options

Part No.	Piston Ø	Installation options	ZA+S, min.	Min. stroke (with magnetic piston)
R402006266	12 mm	b) a) b)	21 22 mm	2 2 mm
R402006267	16 mm	b) a) b)	21 22 mm	2 2 mm
R402006268	20 mm	d) c) d) a) b)	23.5 26.5 29.5 mm	2 2 2 mm
R402006269	25 mm	d) a) b)	26.5 29.5 mm	2 2 mm
R402006270	32 mm	d) c) d) a) b)	27 29 35 mm	2 2 2 mm
R402006271	40 mm	c) d) a) b)	33.5 35.5 mm	2 2 mm
R402006272	50 mm	d) c) d) a) b)	34.5 39.5 45.5 mm	2 2 5 mm
R402006273	63 mm	d) c) d) a) b)	40 43 53 mm	2 3 7 mm
R402006274	80 mm	d) c) d) a) b)	47.5 51.5 61.5 mm	2 2 8 mm
R402006275	100 mm	d) c) d) a) b)	57 58 61 mm	2 2 2 mm

Min. stroke (without magnetic piston)	Length of through mounting screw	K1
4 5 mm	-	4 4
4 4 mm	-	4 4
4 7 10 mm	45 mm 45 mm	6 6 6
4 7 mm	45 mm	6 6
4 6 12 mm	50 mm 50 mm	6 6 6

Min. stroke (without magnetic piston)	Length of through mounting screw	K1
4 6 mm	50 mm	6 6
4 9 15 mm	60 mm 60 mm	7,6 7,6 8
4 7 17 mm	80 mm 80 mm	9,6 9,6 10
4 8 18 mm	90 mm 90 mm	12 12 12
4 5 8 mm	90 mm 90 mm	12 12 12

K2	S1	Ø AB	AE	AH	AT	AU	E	L1	L2	TG	TR
- 	3 3	4.5	12.5	17	2	8	44	13	9.3	15.5	34
- 	3 3	4.5	12.5	19	2	8	47	13	9	20	38
5,7 5,7 -	4 4 5	6.5	14.5	24	2	8	59	16	11.3	25.5	48
5,7 -	4 5	6.5	16	26	2	9.5	63	17	12	28	52
5,7 5,7 -	4 4 5	6.5	16.8	30	3	11	69	18.5	13	34	57
5,7 -	4 5	6.5	17	33	3	11	75	20	13	40	64
6,8 6,8 -	5 5 6	9	22	39	3	14.5	93.5	25	14	50	79
8,4 8,4 -	6 6 8	11	25	46	4	17	113	25	16	60	95
10,4 10,4 -	8 8 10	13	30	59	5	20	138	35	20.5	77	118
10,4 10,4 -	8 8 10	13	33.5	71	5	22	159	40	24	94	137

Scope of delivery: 2 foot mountings incl. mounting screws

ZA + S = cylinder length incl. stroke

S = stroke

Mounting kit

Weight 0.02 kg

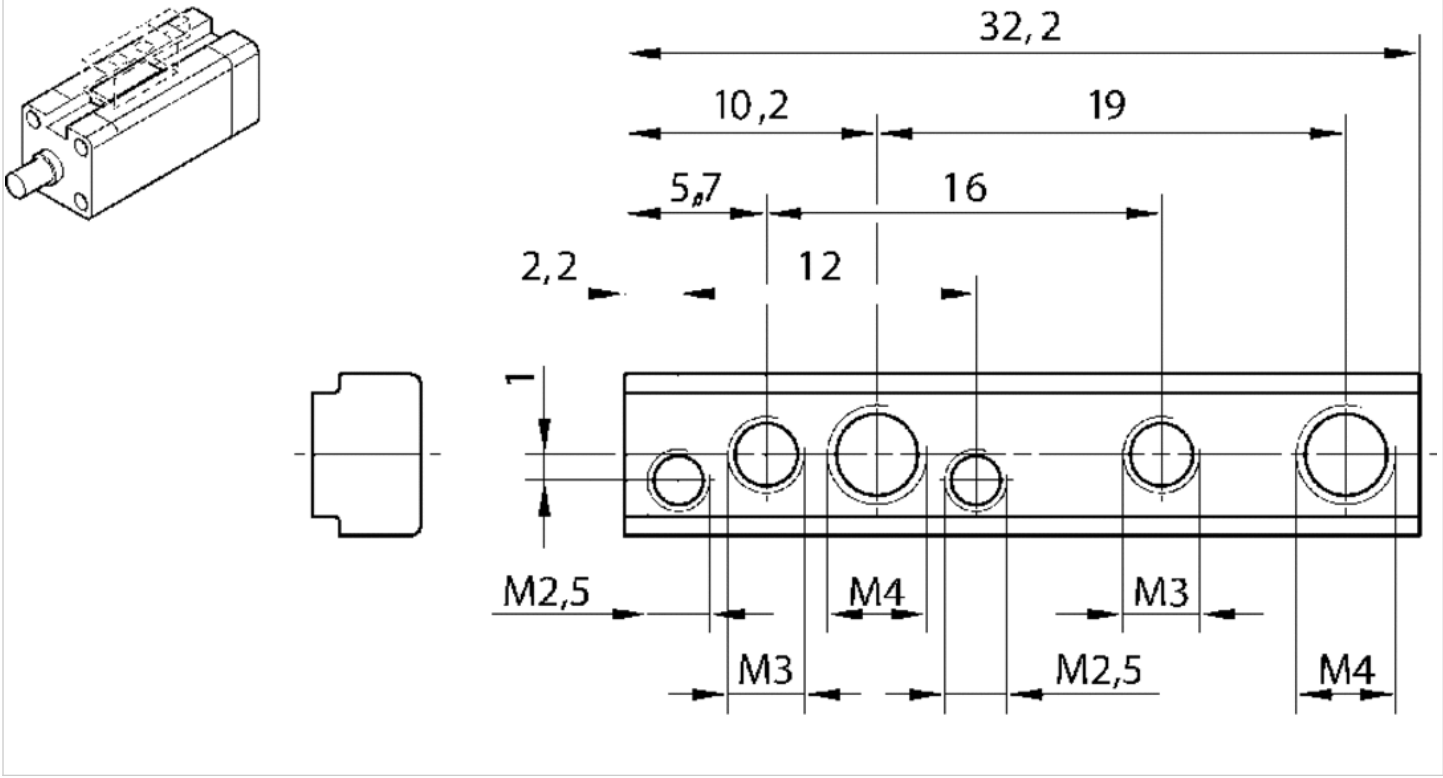
Technical data

Part No.
1827020275

Technical information

Material	
Housing	Brass

Dimensions



Dimensions

Part No.	Ø mm	Material Screws	Surface Screws
1827020275	16–100	Steel	galvanized

Rod clevis AP2, Series CM2

- with circlip, to mount on cylinder CCL-IS/IC, CCI, SSI, CSL-RD, ICM, ICS-D2, 167

Weight See table below

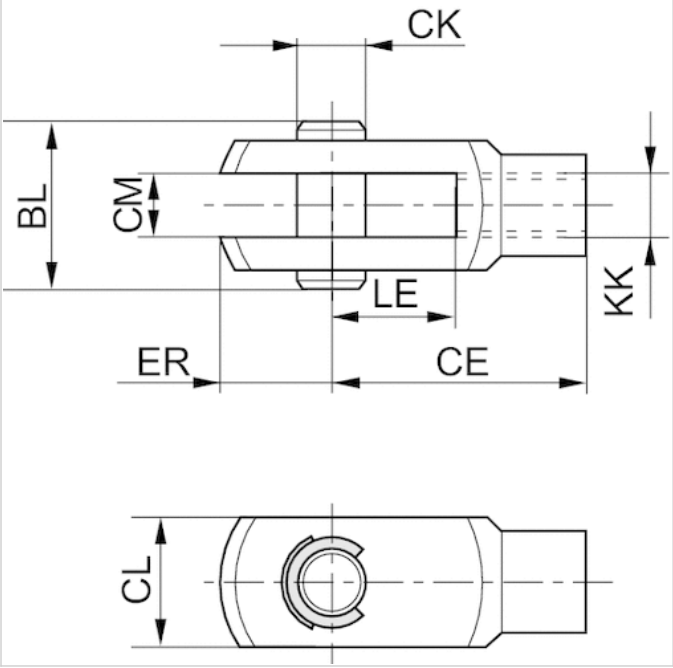
Technical data

Part No.	Suitable piston rod thread	for	Weight
3330510000	M4	SSI ICM	0.01 kg
3330516000	M6	CSL-RD SSI ICM	0.02 kg
3590502000	M10x1,25	CCL-IS CCL-IC CCI CSL-RD SSI ICM ICS-D2 167	0.1 kg
3590504000	M12x1,25	CCL-IS CCL-IC CCI SSI 167 ICS-D2	0.16 kg
3590505000	M16x1,5	CCL-IS ICS-D2 167	0.4 kg

Technical information

Material	
	Stainless steel

Dimensions



Dimensions

Part No.	KK	CE	CK e8	CL	CM B12	ER	BL	LE
3330510000	M4	16	4	10	5	6	15	8
3330516000	M6	24	6	12	6	7	17	12
3590502000	M10x1,25	40	10	20	10	12	26	20
3590504000	M12x1,25	48	12	24	12	14	31	24
3590505000	M16x1,5	64	16	32	16	19	39	32

Rod clevis AP2, Series CM2

- with split pin, to mount on cylinder SSI, ICS-D2

Weight See table below

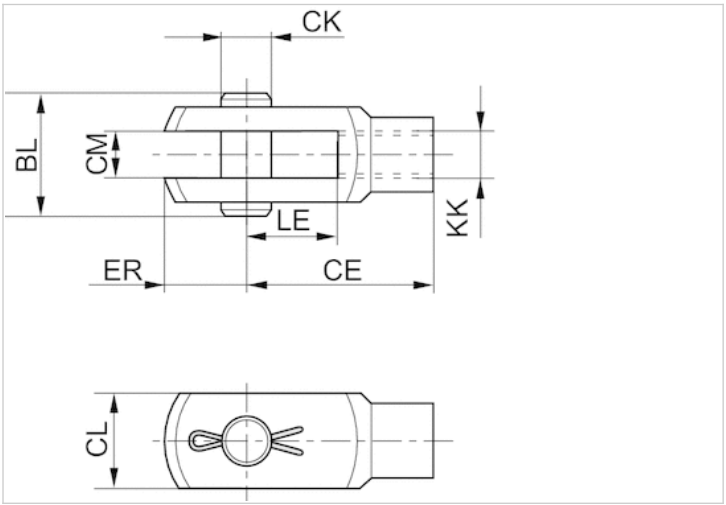
Technical data

Part No.	Suitable piston rod thread	for	Weight
2990600503	M10x1,25	SSI ICS-D2	0.11 kg
2990600505	M16x1,5	SSI ICS-D2	0.41 kg
2990600508	M20x1,5	SSI ICS-D2	1.16 kg

Technical information

Material	
	Stainless steel, acid-proof

Dimensions



Dimensions

Part No.	KK	CE	CK e8	CL	CM B12	ER	BL	LE
2990600503	M10x1,25	40	10	20	10	12	26	20
2990600505	M16x1,5	64	16	32	16	19	39	32
2990600508	M20x1,5	80	20	40	20	20	49	40

Rod clevis PM6, Series CM2

- for ball eye rod end AP6

Technical data

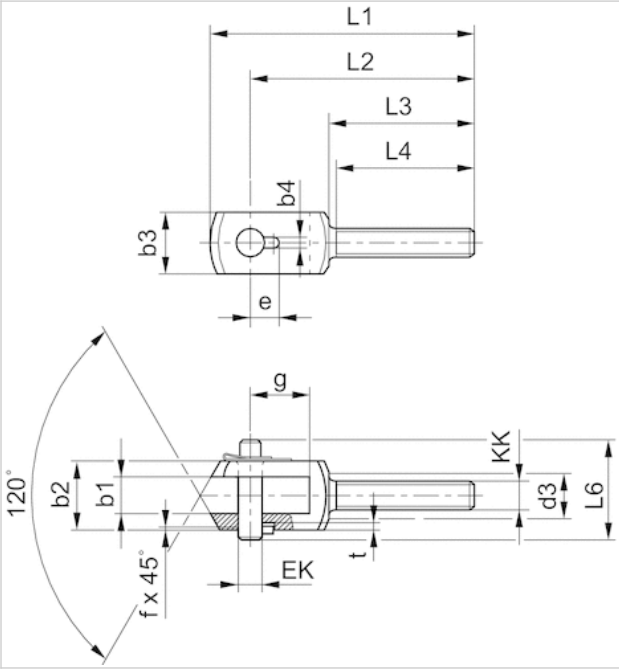
Part No.	for	Swivel bearing Ø
1822122032	AP6	14 mm
1822122033	AP6	16 mm
1822122034	AP6	21 mm
1822122035	AP6	25 mm

Scope of delivery incl. bolt

Technical information

Material	
	Steel
	galvanized

Dimensions



Dimensions

Part No.	b1 B12	b2 d12	b3	b4 +0,2	d3	e +0,3	EK	f	g	L1	L2	L3	L4 +1	L6	t +0,2
1822122032	14	28	20	3.3	17	11.5	10	0.7	20	90	78	53	50	35	3
1822122033	16	30	25	4.3	19	12	12	1	26	108	92	58	55	39	3
1822122034	21	40	35	4.3	24	14	16	1	31	129	108	65	62	50	3
1822122035	25	50	40	4.3	30	16	20	1	43	156	131	73	69	60	3

Ball eye rod end AP6, series CM2

- with flange, to mount on cylinder PRA, TRB, CCI, SSI, MNI, RPC, KPZ, 167, CVI, RDC, 102, ITS

Weight See table below

Technical data

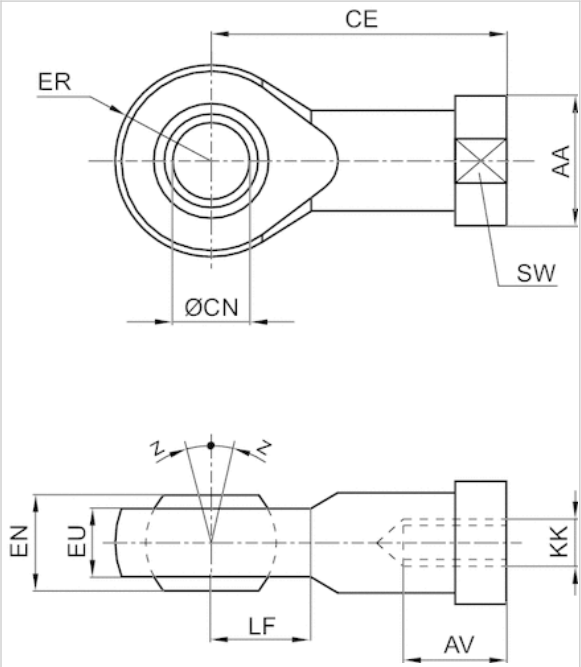
Part No.	Suitable piston rod thread	for	Swivel bearing Ø
1822124000	M4	MNI SSI	5 mm
1822124001	M6	MNI CCI SSI	152.4 mm
1822124002	M8	MNI CCI SSI KPZ	203.2 mm
1822124003	M10x1,25	PRA TRB MNI CCI SSI RPC KPZ 167 CVI RDC	254 mm
1822124004	M12x1,25	PRA TRB CCI SSI RPC KPZ 167 CVI 102	304.8 mm
1822124005	M16x1,5	PRA TRB CCI SSI RPC KPZ 167 CVI RDC 102	406.4 mm

Part No.	Weight
1822124000	0.02 kg
1822124001	0.03 kg
1822124002	0.05 kg
1822124003	0.07 kg
1822124004	0.12 kg
1822124005	0.21 kg

Technical information

Material	
	Steel
	galvanized

Dimensions



Dimensions

Part No.	KK	AA	AV min.	CE	Ø CN H7	EN –0,1	ER	EU max.	LF	SW	Z [°] max.
1822124000	M4	12	8	27	5	8	9	7.5	9	9	4
1822124001	M6	13	9	30	6	9	10	7.5	10	11	4
1822124002	M8	16	12	36	8	12	12	9.5	12	14	4
1822124003	M10x1,25	19	15	43	10	14	14	11.5	14	17	4
1822124004	M12x1,25	22	18	50	12	16	16	12.5	16	19	4
1822124005	M16x1,5	27	24	64	16	21	21	15.5	21	22	4

Ball eye rod end AP6, series CM2

- with flange, to mount on cylinder CCL-IS/IC, SSI, CSL-RD, ICM, ICS-D2

Weight See table below

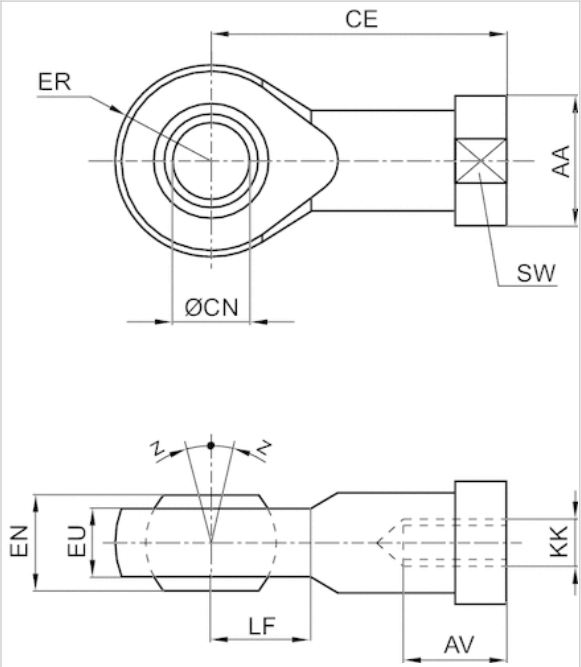
Technical data

Part No.	Suitable piston rod thread	for	Swivel bearing Ø	Weight
8958209032	M10x1,25	CCL-IS CCL-IC SSI CSL-RD ICM ICS-D2	254 mm	0.09 kg
8958209042	M12x1,25	CCL-IS CCL-IC SSI ICS-D2	304.8 mm	0.12 kg
8958209052	M16x1,5	CCL-IS CCL-IC SSI ICS-D2	406.4 mm	0.23 kg
8958209062	M20x1,5	CCL-IS SSI ICS-D2	508 mm	0.41 kg

Technical information

Material	
	Stainless steel

Dimensions



Dimensions

Part No.	KK	AA	AV min.	CE	Ø CN H7	EN –0,1	ER	EU max.	LF	SW	Z [°] max.
8958209032	M10x1,25	19	15	43	10	14	14	10.5	14	17	6,5
8958209042	M12x1,25	22	18	50	12	16	16	12	16	19	6,5
8958209052	M16x1,5	27	24	64	16	21	21	15	21	22	7,5
8958209062	M20x1,5	34	30	77	20	25	25	18	25	30	7,5

Compensating coupling PM5, series CM2

- to mount on cylinder PRA, TRB, CCL-IS/-IC, CCI, SSI, MNI, KPZ, KHZ, 167, CVI, RPC, RDC, ITS, spherical

Weight See table below

Technical data

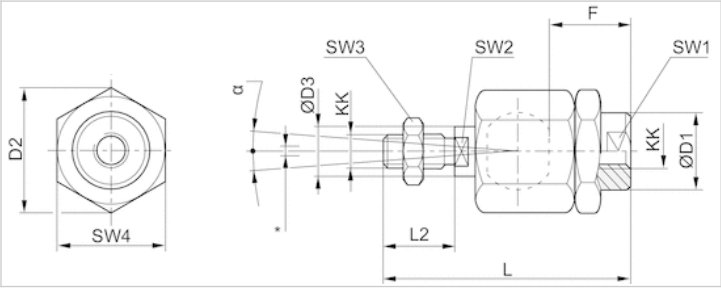
Part No.	Suitable piston rod thread	for
1826409008	M4	MNI
R412026140	M6x1	CCL-IC CCI MNI
R412026141	M8x1,25	CCL-IC CCI MNI
R412026142	M10x1,25	PRA TRB CCL-IS CCL-IC CCI SSI KPZ 167 CVI RPC
R412026143	M12x1,25	PRA TRB CCI CCL-IS CCL-IC SSI KPZ 167 CVI RPC
R412026145	M20x1,5	PRA TRB CCL-IS SSI KPZ 167 CVI

Part No.	Weight
1826409008	0.02 kg
R412026140	0.02 kg
R412026141	0.05 kg
R412026142	0.21 kg
R412026143	0.21 kg
R412026145	0.68 kg

Technical information

Material	
	Steel
	galvanized

Dimensions



* Radial joint

Dimensions

Part No.	KK	Ø D1	D2	Ø D3	F	L ±2	L2	SW1	SW2	SW3	SW4	α [°]	1)	2)
1826409008	M4	12	13.5	4	13	33	8	12	3.2	7	12	8	0.05-0.2	0-0,5
R412026140	M6x1	8.5	14.5	6	11	36.5	11	7	5	10	13	6	0.05-0.5	0-1,5
R412026141	M8x1,25	12.5	19	8	21	58	21	11	7	13	17	8	0.05-0.5	0-1,5
R412026142	M10x1,25	22	32	14	23	74.5	23	19	12	17	30	8	0.05-0.5	0-2
R412026143	M12x1,25	22	32	14	24	75	24	19	12	19	30	7	0.05-0.5	0-2
R412026145	M20x1,5	32	45	22	40	119	40	30	20	30	41	6	0.05-0.5	0-2

1) Axial play

2) Radial play

Compensating coupling PM7, series CM2

- to mount on cylinder PRA, TRB, CCL-IS/-IC, CCI, SSI, KPZ, 167, CVI, RPC, ITS, with plate

Weight See table below

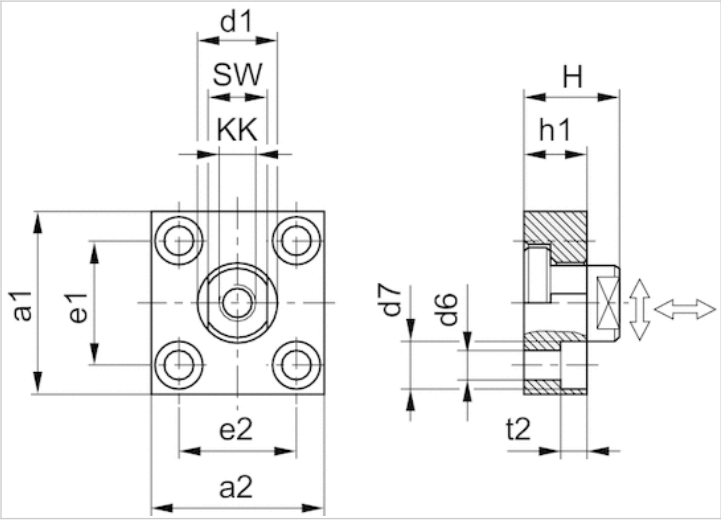
Technical data

Part No.	Suitable piston rod thread	for	Weight
1827001629	M10x1,25	PRA TRB CCL-IS CCL-IC CCI SSI KPZ RPC 167	0.3 kg
1827001630	M12x1,25	PRA TRB CCL-IS CCL-IC CCI SSI KPZ RPC 167	0.4 kg
1827001631	M16x1,5	PRA TRB CCL-IS CCL-IC CCI SSI KPZ RPC 167	0.9 kg
1827001632	M20x1,5	PRA TRB CCL-IS SSI KPZ CVI 167	1.15 kg

Technical information

Material	
	Steel
	galvanized

Dimensions



Dimensions

Part No.	a1	a2	d1 h11	d6 H13	d7 H13	e1 H13	e2	h1	t2	H	SW
1827001629	60	37	20	6.6	11	36 ±0,15	23 ±0,15	15	7	24	17
1827001630	60	56	25	9	15	42 ±0,2	38 ±0,2	20	9	30	19
1827001631	80	80	30	11	18	58 ±0,2	58 ±0,2	20	11	32	24
1827001632	90	90	40	14	20	65 ±0,3	65 ±0,3	20	13	35	36

Tightening torque for the coupling pin Ma ± 5%	Axial play min./max.	Radial play min./max.
17 Nm	0.4 0.8 mm	1.9 2.3 mm
29 Nm	0.4 0.8 mm	1.9 2.3 mm
71 Nm	0.4 0.8 mm	1.9 2.3 mm
138 Nm	0.4 0.8 mm	1.9 2.3 mm

Piston rod extension, series CM2

Weight See table below

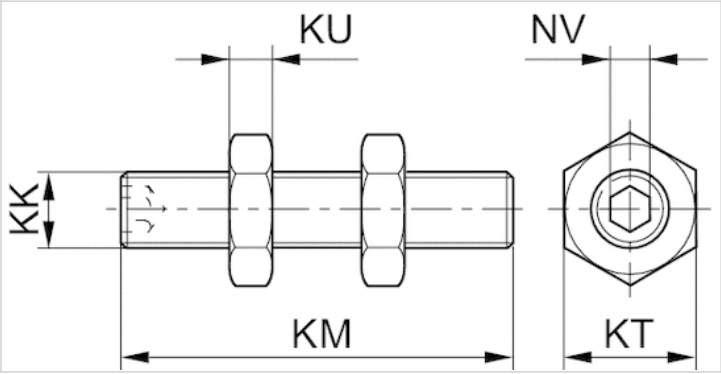
Technical data

Part No.	Suitable piston rod thread	Weight
2701412000	M3	0.01 kg
2701420000	M5	0.015 kg
2701432000	M6	0.02 kg
2701450000	M8	0.03 kg
2701463000	M10	0.05 kg

Technical information

Material	
	Stainless steel

Dimensions



Dimensions

Part No.	KK	KM	KT	KU	NV
2701412000	M3	20	5.5	1.8	1.5
2701420000	M5	25	8	2.7	2.5
2701432000	M6	30	10	3.2	3
2701450000	M8	35	13	4	4
2701463000	M10	40	16	5	5

Sensor, Series ST4

- 4 mm T-slot
- with cable
- Plug, M8, 3-pin, with knurled screw
- UL certification
- Reed electronic PNP
- Direct mounting for series PRA, SSI, GSU, RTC, CKP, GPC, MSC, MSN, RCM, CVI
- Indirect mounting for series MNI, CSL-RD, ICM

Certificates	UL (Underwriters Laboratories) cULus RoHS
Ambient temperature min./max.	-30 ... 80 °C
Protection class	IP65, IP67
Switching point precision	±0,1 mT
Min./max. DC operating voltage	See table below
Switching logic	NO (make contact)
Display	LED
LED status display	Yellow
Vibration resistance	10 - 55 Hz, 1 mm
Shock resistance	30 g / 11 ms
Cable length L	0.3 0.5 m
Mounting screw	Combination: slotted and hexagon socket

Technical data

Part No.		for
R412019490		PRA, SSI, GSU, RTC, CKP, GPC, MSC, MSN, RCM, CVI
R412019686		PRA, SSI, GSU, RTC, CKP, GPC, MSC, MSN, RCM, CVI
R412019493		PRA, SSI, GSU, RTC, CKP, GPC, MSC, MSN, RCM, CVI
R412019687		PRA, SSI, GSU, RTC, CKP, GPC, MSC, MSN, RCM, CVI

Part No.	Type of contact	Cable length L	Min./max. DC operating voltage
R412019490	Reed	0.3 m	5 ... 30 V DC
R412019686	Reed	0.5 m	5 ... 30 V DC
R412019493	electronic PNP	0.3 m	10 ... 30 V DC
R412019687	electronic PNP	0.5 m	10 ... 30 V DC

Part No.	Voltage drop U at Imax	DC switching current, max.
R412019490	≤ 0,5 V	0.13 A
R412019686	≤ 0,5 V	0.13 A
R412019493	≤ 2,5 V	0.1 A
R412019687	≤ 2,5 V	0.1 A

Part No.	AC switching current, max.	Switching capacity
R412019490	0.13 A	3 W / 3 VA

Part No.	AC switching current, max.	Switching capacity
R412019686	0.13 A	3 W / 3 VA
R412019493	-	-
R412019687	-	-

Part No.	Version
R412019490	Protected against polarity reversal
R412019686	Protected against polarity reversal
R412019493	short circuit resistant Protected against polarity reversal
R412019687	short circuit resistant Protected against polarity reversal

Technical information

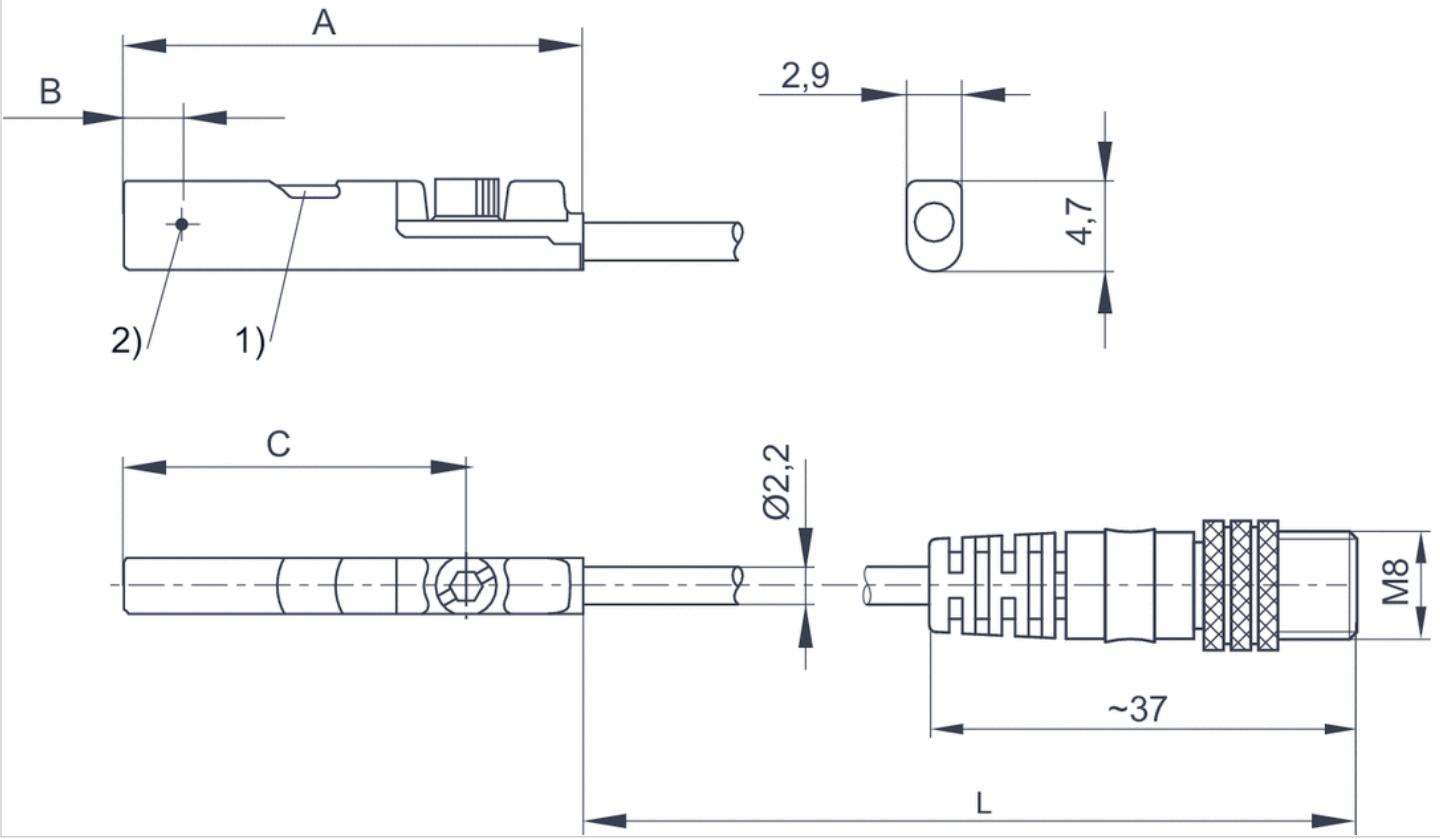
The max. switching capacity must not be exceeded.

Technical information

Material	
Housing	Polyamide fiber-glass reinforced
Cable sheath	Polyurethane

Dimensions

Dimensions



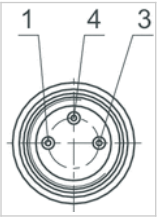
1) LED 2) Switching point
L = cable length

Dimensions

Part No.	A	B	C
R412019490	26.3	6.3	20.3
R412019686	26.3	6.3	20.3
R412019493	23.7	2.8	17.7
R412019687	23.7	2.8	17.7

Pin assignments

Pin assignments



Pin	1	3	4
Allocation	(+)	(-)	(OUT)

Sensor, Series ST4

- 4 mm T-slot
- with cable
- Plug, M8, 3-pin
- UL certification
- Reed electronic PNP electronic NPN
- Direct mounting for series PRA, SSI, GSU, RTC, CKP, GSP, MSC, MSN, RCM, CVI
- Indirect mounting for series MNI, CSL-RD, ICM

Certificates	UL (Underwriters Laboratories) cULus RoHS
Ambient temperature min./max.	-30 ... 80 °C
Protection class	IP65, IP67
Switching point precision	±0,1 mT
Min./max. DC operating voltage	See table below
Switching logic	NO (make contact)
Display	LED
LED status display	Yellow
Vibration resistance	10 - 55 Hz, 1 mm
Shock resistance	30 g / 11 ms
Cable length L	0.3 m
Mounting screw	Combination: slotted and hexagon socket

Technical data

Part No.		for
R412019682		PRA, SSI, GSU, RTC, CKP, GSP, MSC, MSN, RCM, CVI
R412019683		PRA, SSI, GSU, RTC, CKP, GSP, MSC, MSN, RCM, CVI
R412019694		PRA, SSI, GSU, RTC, CKP, GSP, MSC, MSN, RCM, CVI

Part No.	Type of contact	Cable length L	Min./max. DC operating voltage
R412019682	Reed	0.3 m	5 ... 30 V DC
R412019683	electronic PNP	0.3 m	10 ... 30 V DC
R412019694	electronic NPN	0.3 m	10 ... 30 V DC

Part No.	Voltage drop U at Imax	DC switching current, max.
R412019682	≤ 0,5 V	0.13 A
R412019683	≤ 2,5 V	0.1 A
R412019694	≤ 2,5 V	0.1 A

Part No.	AC switching current, max.	Switching capacity
R412019682	0.13 A	3 W / 3 VA
R412019683	-	-
R412019694	-	-

Part No.	Version
R412019682	Protected against polarity reversal
R412019683	short circuit resistant Protected against polarity reversal
R412019694	short circuit resistant Protected against polarity reversal

Technical information

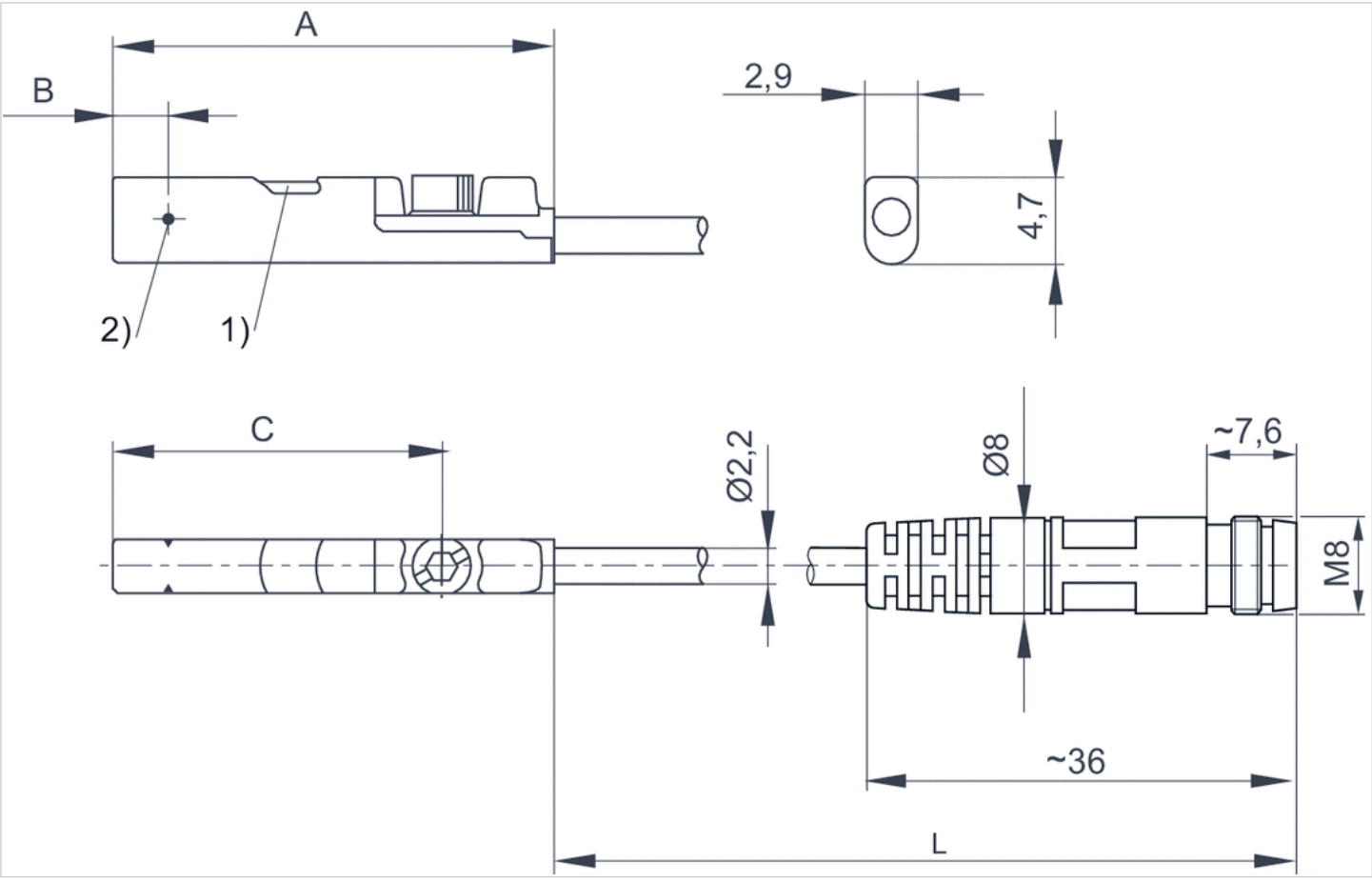
The max. switching capacity must not be exceeded.

Technical information

Material	
Housing	Polyamide fiber-glass reinforced
Cable sheath	Polyurethane

Dimensions

Dimensions



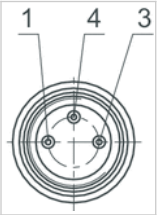
1) LED 2) Switching point
L = cable length

Dimensions

Part No.	A	B	C
R412019682	26.3	6.3	20.3
R412019683	23.7	2.8	17.7
R412019694	23.7	2.8	17.7

Pin assignments

Pin assignments



Pin	1	3	4
Allocation	(+)	(-)	(OUT)

Sensor, Series ST4

- 4 mm T-slot
- with cable
- open cable ends, 3-pin
- UL certification
- Reed electronic PNP electronic NPN
- Direct mounting for series PRA, SSI, GSU, RTC, CKP, GPC, MSC, MSN, RCM, CVI
- Indirect mounting for series MNI, CSL-RD, ICM

Certificates	UL (Underwriters Laboratories) cULus RoHS
Ambient temperature min./max.	-30 ... 80 °C
Protection class	IP65, IP67
Switching point precision	±0,1 mT
Min./max. DC operating voltage	See table below
Switching logic	NO (make contact)
Display	LED
LED status display	Yellow
Vibration resistance	10 - 55 Hz, 1 mm
Shock resistance	30 g / 11 ms
Cable length L	3 5 m
Mounting screw	Combination: slotted and hexagon socket

Technical data

Part No.		for
R412019488		PRA, SSI, GSU, RTC, CKP, GPC, MSC, MSN, RCM, CVI
R412019489		PRA, SSI, GSU, RTC, CKP, GPC, MSC, MSN, RCM, CVI
R412019680		PRA, SSI, GSU, RTC, CKP, GPC, MSC, MSN, RCM, CVI
R412019681		PRA, SSI, GSU, RTC, CKP, GPC, MSC, MSN, RCM, CVI
R412019684		PRA, SSI, GSU, RTC, CKP, GPC, MSC, MSN, RCM, CVI
R412019685		PRA, SSI, GSU, RTC, CKP, GPC, MSC, MSN, RCM, CVI

Part No.	Type of contact	Cable length L	Min./max. DC operating voltage
R412019488	Reed	3 m	5 ... 30 V DC
R412019489	Reed	5 m	5 ... 30 V DC
R412019680	electronic PNP	3 m	10 ... 30 V DC
R412019681	electronic PNP	5 m	10 ... 30 V DC
R412019684	electronic NPN	3 m	10 ... 30 V DC
R412019685	electronic NPN	5 m	10 ... 30 V DC

Part No.	Voltage drop U at Imax	DC switching current, max.
R412019488	≤ 0,5 V	0.13 A
R412019489	≤ 0,5 V	0.13 A
R412019680	≤ 2,5 V	0.1 A
R412019681	≤ 2,5 V	0.1 A

Part No.	Voltage drop U at Imax	DC switching current, max.
R412019684	≤ 2,5 V	0.1 A
R412019685	≤ 2,5 V	0.1 A

Part No.	AC switching current, max.	Switching capacity
R412019488	0.13 A	3 W / 3 VA
R412019489	0.13 A	3 W / 3 VA
R412019680	-	-
R412019681	-	-
R412019684	-	-
R412019685	-	-

Part No.	Version
R412019488	Protected against polarity reversal
R412019489	Protected against polarity reversal
R412019680	short circuit resistant Protected against polarity reversal
R412019681	short circuit resistant Protected against polarity reversal
R412019684	short circuit resistant Protected against polarity reversal
R412019685	short circuit resistant Protected against polarity reversal

Technical information

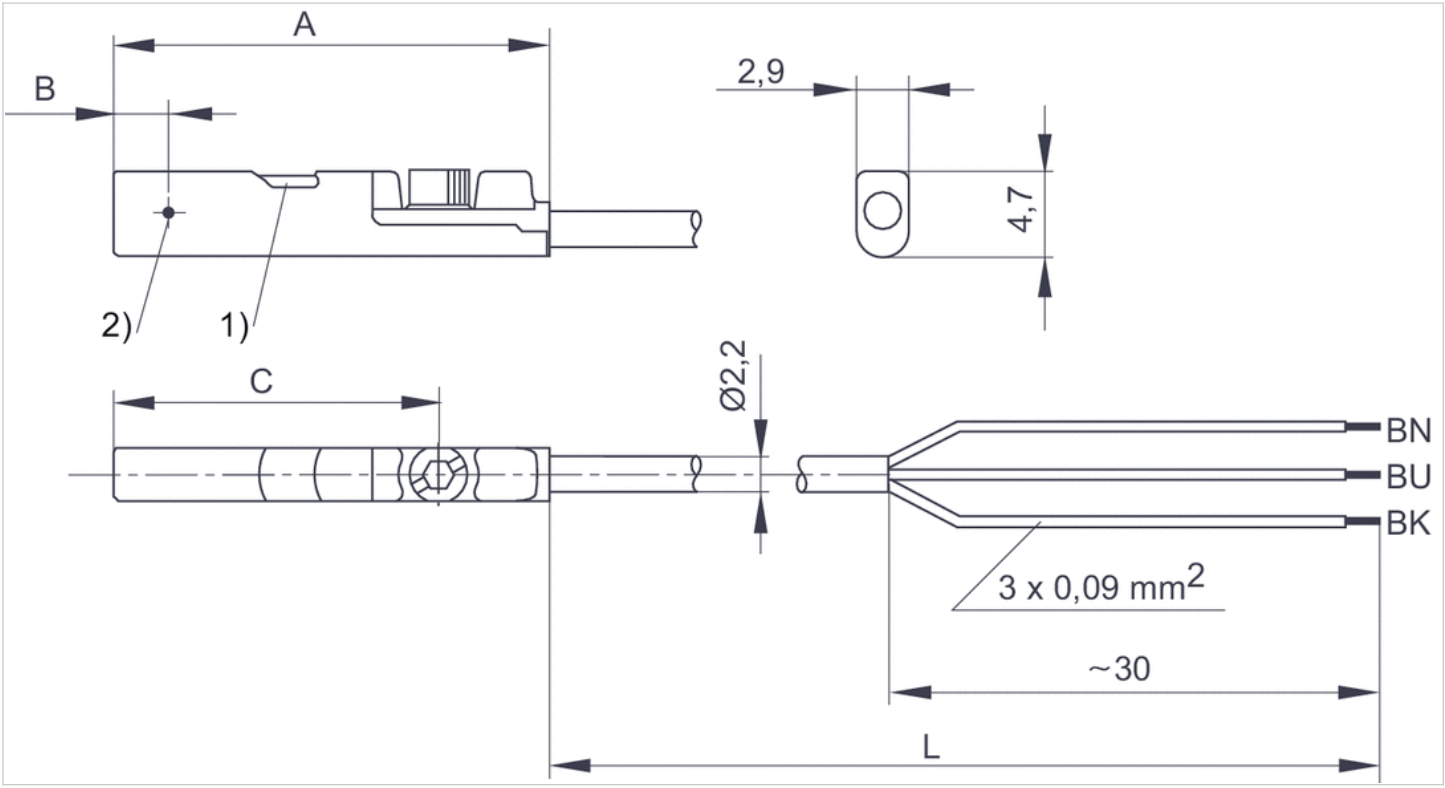
The max. switching capacity must not be exceeded.

Technical information

Material	
Housing	Polyamide fiber-glass reinforced
Cable sheath	Polyurethane

Dimensions

Dimensions



1) LED 2) Switching point
L = cable length
BN = brown, BK = black, BU = blue

Dimensions

Part No.	A	B	C
R412019488	26.3	6.3	20.3
R412019489	26.3	6.3	20.3
R412019680	23.7	2.8	17.7
R412019681	23.7	2.8	17.7
R412019684	23.7	2.8	17.7
R412019685	23.7	2.8	17.7

Sensor, Series ST4

- 4 mm T-slot
- with cable
- Plug, M12, 3-pin, with knurled screw
- UL certification
- Reed electronic PNP
- Direct mounting for series PRA, SSI, GSU, RTC, CKP, GPC, MSC, MSN, RCM, CVI
- Indirect mounting for series MNI, CSL-RD, ICM

Certificates	UL (Underwriters Laboratories) cULus RoHS
Ambient temperature min./max.	-30 ... 80 °C
Protection class	IP65, IP67
Switching point precision	±0,1 mT
Min./max. DC operating voltage	See table below
Switching logic	NO (make contact)
Display	LED
LED status display	Yellow
Vibration resistance	10 - 55 Hz, 1 mm
Shock resistance	30 g / 11 ms
Cable length L	0.3 m
Mounting screw	Combination: slotted and hexagon socket

Technical data

Part No.		for
R412019688		PRA, SSI, GSU, RTC, CKP, GPC, MSC, MSN, RCM, CVI
R412019689		PRA, SSI, GSU, RTC, CKP, GPC, MSC, MSN, RCM, CVI

Part No.	Type of contact	Cable length L	Min./max. DC operating voltage
R412019688	Reed	0.3 m	5 ... 30 V DC
R412019689	electronic PNP	0.3 m	10 ... 30 V DC

Part No.	Voltage drop U at Imax	DC switching current, max.
R412019688	≤ 0,5 V	0.13 A
R412019689	≤ 2,5 V	0.1 A

Part No.	AC switching current, max.	Switching capacity
R412019688	0.13 A	3 W / 3 VA
R412019689	-	-

Part No.	Version
R412019688	Protected against polarity reversal

Part No.	Version
R412019689	short circuit resistant Protected against polarity reversal

Technical information

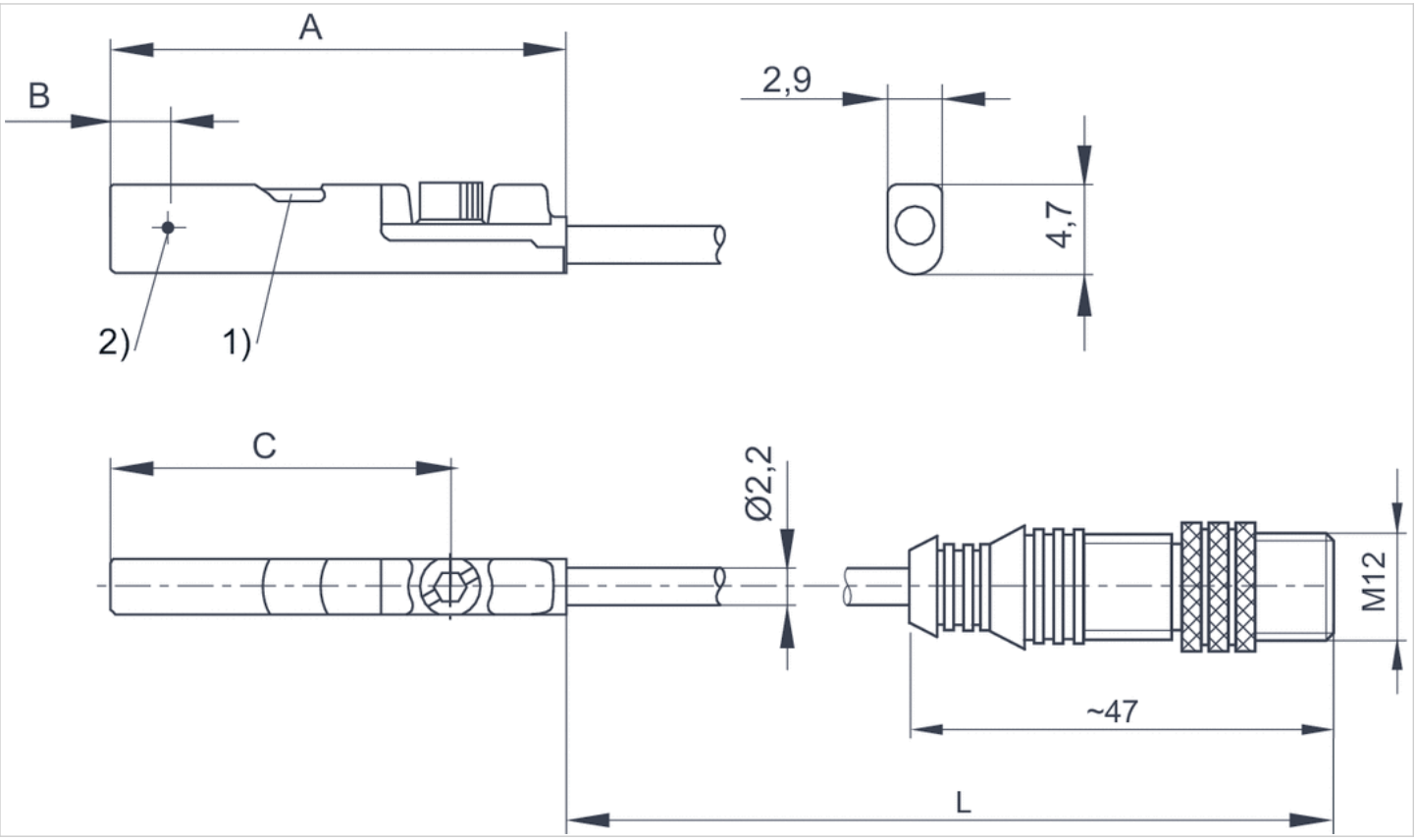
The max. switching capacity must not be exceeded.

Technical information

Material	
Housing	Polyamide fiber-glass reinforced
Cable sheath	Polyurethane

Dimensions

Dimensions

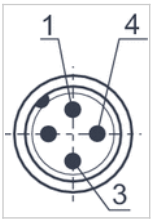


1) LED 2) Switching point
L = cable length

Dimensions

Part No.	A	B	C
R412019688	26.3	6.3	20.3
R412019689	23.7	2.8	17.7

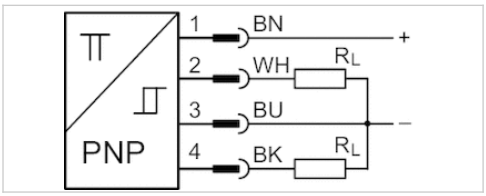
Pin assignments



Pin	1	3	4
Allocation	(+)	(-)	(OUT)

Sensors, Series ST4-2P

- 4 mm T-slot
- number of switching points 2
- with cable
- without wire end ferrule, tin-plated, 4-pin
- electronic PNP
- 2 switching points
- electronic PNP
- Direct mounting for series PRA, SSI, RTC, GPC, MSC, MSN, RCM, CVI
- Indirect mounting for series MNI, CSL-RD, ICM



Certificates	RoHS
Ambient temperature min./max.	-20 ... 75 °C
Protection class	IP65, IP67
number of switching points	2
Power consumption	15 mA
Min./max. DC operating voltage	12 ... 30 V DC
Repetitive precision max. measuring range	0,1 mT
Hysteresis	1 mT
Switching logic	NO (make contact)
Display	LED
LED status display	Yellow
Display	2 LED
Vibration resistance	10 - 55 Hz, 1 mm
Shock resistance	30 g / 11 ms
Cable length L	2 m
Mounting screw	with hexagon socket

Technical data

Part No.	for	Type of contact	Cable length L
R412010139	PRA, SSI, RTC, GPC, MSC, MSN, RCM, CVI	electronic PNP	2 m

Part No.	Detection range max.	Voltage drop U at Imax	DC switching current, max.
R412010139	50 mm	≤ 2,2 V	0.15 A

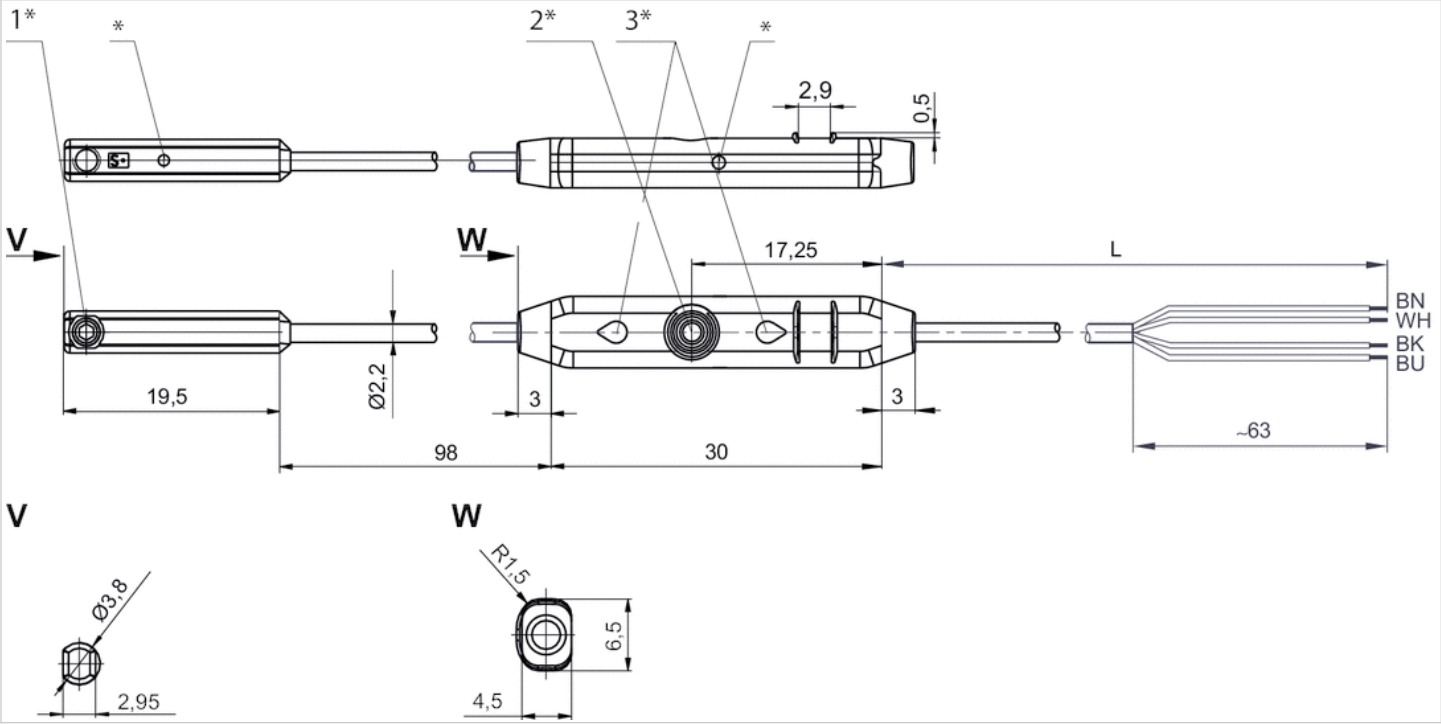
Part No.	Function	Version
R412010139	electronic PNP	short circuit resistant Protected against polarity reversal

Technical information

Material	
Housing	Polyamide
Cable sheath	Polyurethane

Dimensions

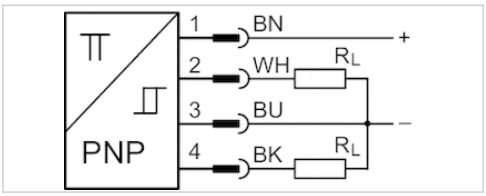
Dimensions



1* = mounting screw 2* = teach button 3* = LED
L = cable length
(1) BN=brown
(2) WH=white
(3) BU=blue
(4) BK=black
* Switching point

Sensors, Series ST4-2P

- 4 mm T-slot
- number of switching points 2
- with cable
- Plug, M8x1, 4-pin, with knurled screw
- electronic PNP
- 2 switching points
- electronic PNP
- Direct mounting for series PRA, SSI, RTC, GPC, MSC, MSN, RCM, CVI
- Indirect mounting for series MNI, CSL-RD, ICM



Certificates	RoHS
Ambient temperature min./max.	-20 ... 75 °C
Protection class	IP65, IP67
number of switching points	2
Power consumption	15 mA
Min./max. DC operating voltage	12 ... 30 V DC
Repetitive precision max. measuring range	0,1 mT
Hysteresis	1 mT
Switching logic	NO (make contact)
Display	LED
LED status display	Yellow
Display	2 LED
Vibration resistance	10 - 55 Hz, 1 mm
Shock resistance	30 g / 11 ms
Cable length L	0.3 m
Mounting screw	with hexagon socket

Technical data

Part No.	for	Type of contact	Cable length L
R412010140	PRA, SSI, RTC, GPC, MSC, MSN, RCM, CVI	electronic PNP	0.3 m

Part No.	Detection range max.	Voltage drop U at Imax	Function
R412010140	50 mm	≤ 2,2 V	electronic PNP

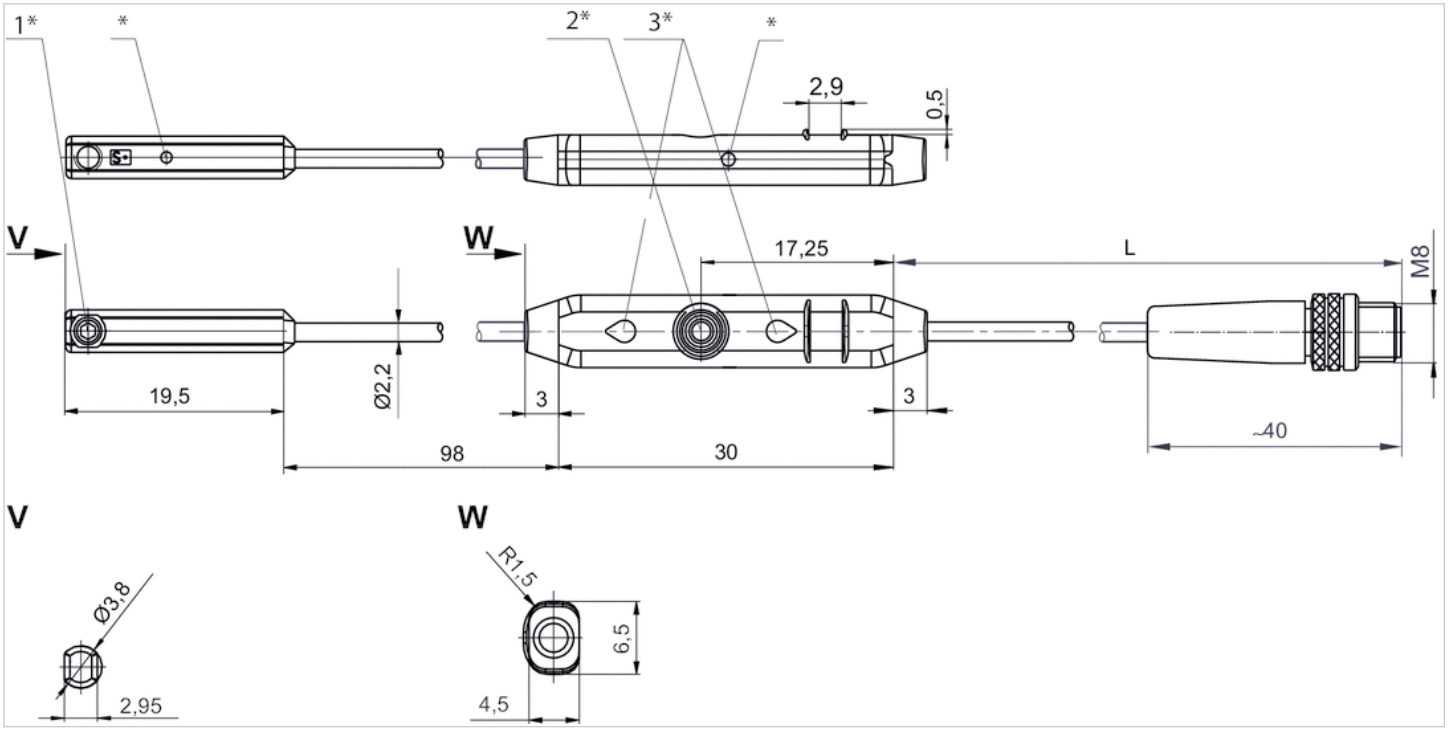
Part No.	Version
R412010140	short circuit resistant Protected against polarity reversal

Technical information

Material	
Housing	Polyamide
Cable sheath	Polyurethane

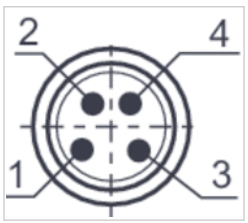
Dimensions

Dimensions



1* = mounting screw 2* = teach button 3* = LED
L = cable length
* Switching point

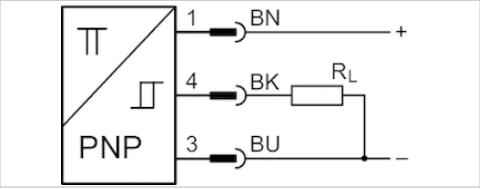
Pin assignments



Pin	1	2	3	4
Allocation	(+)	(OUT)	(-)	(OUT)

Sensor, Series ST6

- 6 mm T-slot
- with cable
- open cable ends, 3-pin
- ATEX
- UL certification, ATEX
- electronic PNP
- Direct mounting for series PRA, PRE, CCI, KPZ, SSI, GPC, CVI
- Indirect mounting for series TRB, ITS, CCL-IS, MNI, CSL-RD, RPC, ICS-D2, ICM, KHZ, TRR



Certificates	ATEX CE declaration of conformity cULus RoHS
ATEX class G	II 3G Ex nA IIC T4 Gc X
ATEX class D	II 3D Ex tc IIIC T135°C Dc X
Ambient temperature min./max.	-20 ... 50 °C
Protection class	IP67
Switching point precision	±0,1 mT
Quiescent current (without load)	10 mA
Min./max. DC operating voltage	10 ... 30 V DC
Switching logic	NO (make contact)
LED status display	Yellow
Vibration resistance	10 - 55 Hz, 1 mm
Shock resistance	30 g / 11 ms
Cable length L	3 5 m

Technical data

Part No.	for	Type of contact	Cable length L
R412022854	PRA, PRE, CCI, KPZ, SSI, GPC, CVI	electronic PNP	3 m
R412022856	PRA, PRE, CCI, KPZ, SSI, GPC, CVI	electronic PNP	5 m

Part No.	Voltage drop U at Imax	DC switching current, max.
R412022854	≤ 2,5 V	0.1 A
R412022856	≤ 2,5 V	0.1 A

Part No.	Max. switching frequency
R412022854	1000 Hz
R412022856	1000 Hz

Part No.	Version
R412022854	short circuit resistant Protected against polarity reversal

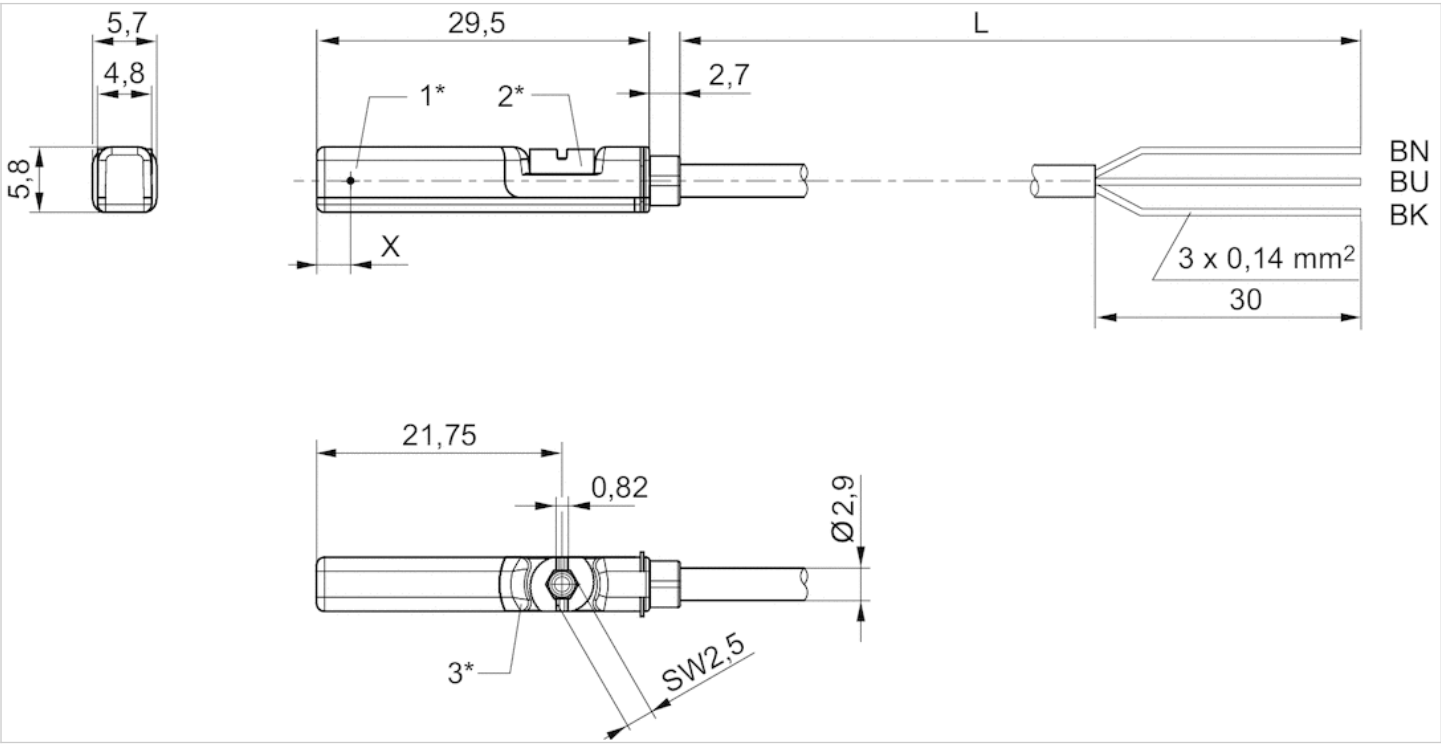
Part No.	Version
R412022856	short circuit resistant Protected against polarity reversal

Technical information

Material	
Housing	Polyamide
Cable sheath	Polyurethane
Locking screw	Stainless steel

Dimensions

Fig. 2



1* = switching point 2* = locking screw 3* = LED window, transparent
L = cable length
BN = brown, BK = black, BU = blue
X = electronic: 11.6 mm

Sensor, Series ST6

- 6 mm T-slot
- with cable
- open cable ends, 2-pin open cable ends, 3-pin
- UL certification
- Reed electronic PNP electronic NPN
- Direct mounting for series PRA, PRE, CCI, KPZ, SSI, GPC, CVI
- Indirect mounting for series TRB, ITS, CCL-IS, MNI, CSL-RD, RPC, ICS-D2, ICM, KHZ, TRR

Ambient temperature min./max.	-30 ... 80 °C
Protection class	IP65, IP67, IP69K
Switching point precision	±0,1 mT
Nominal current, actuated state	30 mA
Quiescent current (without load)	8 mA
Min./max. DC operating voltage	See table below
Min./max. AC operating voltage	See table below
Hysteresis	≥ 0,2 mT
Switching logic	NO (make contact)
LED status display	Yellow
Vibration resistance	10 - 55 Hz, 1 mm
Shock resistance	30 g / 11 ms
Cable length L	3 5 10 m

Technical data

Part No.		for	Type of contact
R412022866		PRA, PRE, CCI, KPZ, SSI, GPC, CVI	Reed
R412027170		PRA, PRE, CCI, KPZ, SSI, GPC, CVI	Reed
R412022869		PRA, PRE, CCI, KPZ, SSI, GPC, CVI	Reed
R412022870		PRA, PRE, CCI, KPZ, SSI, GPC, CVI	Reed
R412022871		PRA, PRE, CCI, KPZ, SSI, GPC, CVI	Reed
R412022853		PRA, PRE, CCI, KPZ, SSI, GPC, CVI	electronic PNP
R412022855		PRA, PRE, CCI, KPZ, SSI, GPC, CVI	electronic PNP
R412022857		PRA, PRE, CCI, KPZ, SSI, GPC, CVI	electronic PNP
R412022849		PRA, PRE, CCI, KPZ, SSI, GPC, CVI	electronic NPN
R412022850		PRA, PRE, CCI, KPZ, SSI, GPC, CVI	electronic NPN

Part No.	Cable length L	Min./max. DC operating voltage	Min./max. AC operating voltage
R412022866	3 m	10 ... 230 V DC	10 ... 230 V AC
R412027170	5 m	10 ... 230 V DC	10 ... 230 V AC
R412022869	3 m	10 ... 30 V DC	10 ... 30 V AC
R412022870	5 m	10 ... 30 V DC	10 ... 30 V AC
R412022871	10 m	10 ... 30 V DC	10 ... 30 V AC
R412022853	3 m	10 ... 30 V DC	-
R412022855	5 m	10 ... 30 V DC	-
R412022857	10 m	10 ... 30 V DC	-
R412022849	3 m	10 ... 30 V DC	-
R412022850	5 m	10 ... 30 V DC	-

Part No.	Voltage drop U at Imax	DC switching current, max.
R412022866	≤ 3,5 V	0.13 A
R412027170	≤ 3,5 V	0.13 A
R412022869	I*Rs	0.3 A
R412022870	≤ 0,1 V	0.3 A
R412022871	I*Rs	0.3 A
R412022853	≤ 2,5 V	0.13 A
R412022855	≤ 2,5 V	0.13 A
R412022857	≤ 2,5 V	0.13 A
R412022849	≤ 2,5 V	0.13 A
R412022850	≤ 2,5 V	0.13 A

Part No.	AC switching current, max.	Switching capacity
R412022866	0.13 A	Reed, 2-pin: max. 10 W
R412027170	0.13 A	Reed, 2-pin: max. 10 W
R412022869	0.5 A	Reed, 3-pin: max. 6 W
R412022870	0.5 A	Reed, 3-pin: max. 6 W
R412022871	0.5 A	Reed, 3-pin: max. 6 W

Part No.	AC switching current, max.	Switching capacity
R412022853	-	-
R412022855	-	-
R412022857	-	-
R412022849	-	-
R412022850	-	-

Part No.	Max. switching frequency	Operating current, not switched
R412022866	400 Hz	-
R412027170	400 Hz	-
R412022869	400 Hz	-
R412022870	400 Hz	-
R412022871	400 Hz	-
R412022853	1000 Hz	8 mA
R412022855	1000 Hz	8 mA
R412022857	1000 Hz	8 mA
R412022849	1000 Hz	8 mA
R412022850	1000 Hz	8 mA

Part No.	Operating current, switched
R412022866	-
R412027170	-
R412022869	-
R412022870	-
R412022871	-
R412022853	30 mA
R412022855	30 mA
R412022857	30 mA
R412022849	30 mA
R412022850	30 mA

Part No.	Version	Fig.	
R412022866	Protected against polarity reversal	Fig. 1	1)
R412027170	Protected against polarity reversal	Fig. 1	1)
R412022869	Protected against polarity reversal	Fig. 2	2)
R412022870	Protected against polarity reversal	Fig. 2	2)
R412022871	Protected against polarity reversal	Fig. 2	2)
R412022853	short circuit resistant Protected against polarity reversal	Fig. 2	3)
R412022855	short circuit resistant Protected against polarity reversal	Fig. 2	3)
R412022857	short circuit resistant Protected against polarity reversal	Fig. 2	3)
R412022849	short circuit resistant Protected against polarity reversal	Fig. 2	3)
R412022850	short circuit resistant Protected against polarity reversal	Fig. 2	3)

1) open cable ends, 2-pin, The product of operating voltage and continuous current must not exceed the maximum switching capacity.

2) open cable ends, 3-pin, The product of operating voltage and continuous current must not exceed the maximum switching capacity.

3) open cable ends, 3-pin

Technical information

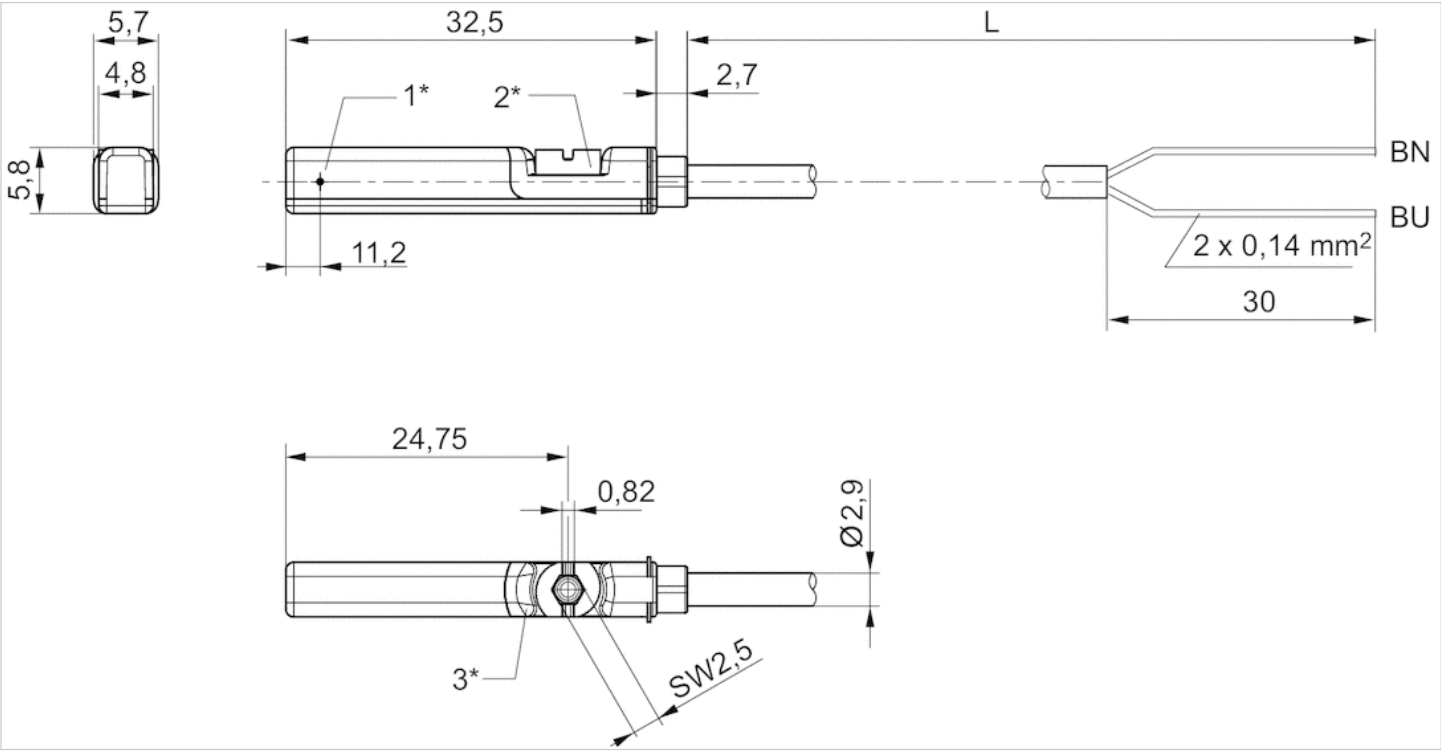
No cULus certification for 230 V variant.

Technical information

Material	
Housing	Polyamide
Cable sheath	Polyurethane
Locking screw	Stainless steel

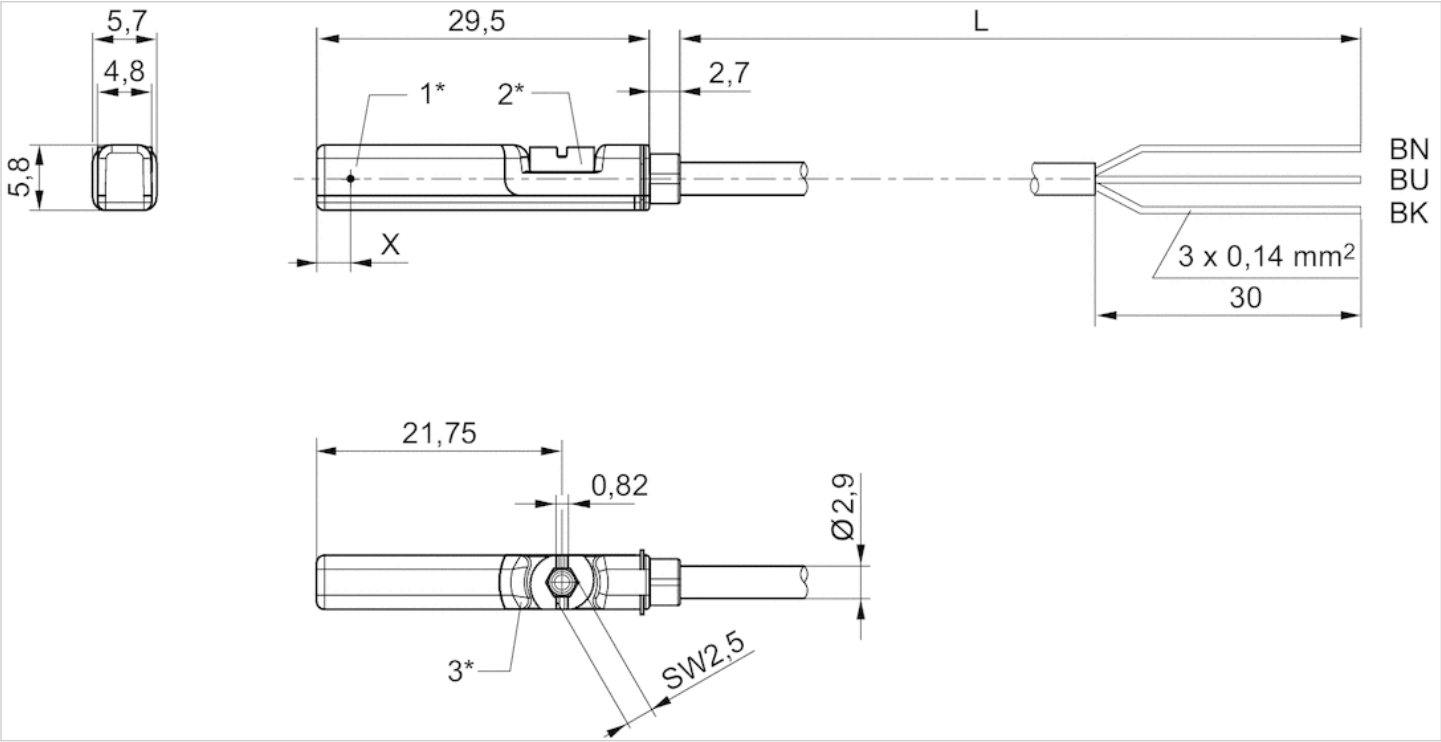
Dimensions

Fig. 1



1* = switching point 2* = locking screw 3* = LED window, transparent
L = cable length
BN=brown, BU=blue

Fig. 2



1* = switching point 2* = locking screw 3* = LED window, transparent
L = cable length
BN = brown, BK = black, BU = blue
X = electronic: 11.6 mm

Sensor, Series ST6

- 6 mm T-slot
- with cable
- Plug, M8, 3-pin Plug, M8, 2-pin
- UL certification
- Reed electronic PNP electronic NPN
- Direct mounting for series PRA, PRE, CCI, KPZ, SSI, GPC, CVI
- Indirect mounting for series TRB, ITS, CCL-IS, MNI, CSL-RD, RPC, ICS-D2, ICM, KHZ, TRR

Certificates	CE declaration of conformity cULus RoHS
Ambient temperature min./max.	-30 ... 80 °C
Protection class	IP65, IP67
Switching point precision	±0,1 mT
Nominal current, actuated state	30 mA
Quiescent current (without load)	8 mA
Min./max. DC operating voltage	10 ... 30 V DC
Min./max. AC operating voltage	See table below
Hysteresis	≥ 0,2 mT
Switching logic	NO (make contact)
LED status display	Yellow
Vibration resistance	10 - 55 Hz, 1 mm
Shock resistance	30 g / 11 ms
Cable length L	0.3 m

Technical data

Part No.		for	Type of contact
R412022868		PRA, PRE, CCI, KPZ, SSI, GPC, CVI	Reed
R412027172		PRA, PRE, CCI, KPZ, SSI, GPC, CVI	Reed
R412022872		PRA, PRE, CCI, KPZ, SSI, GPC, CVI	Reed
R412022858		PRA, PRE, CCI, KPZ, SSI, GPC, CVI	electronic PNP
R412022851		PRA, PRE, CCI, KPZ, SSI, GPC, CVI	electronic NPN

Part No.	Cable length L	Min./max. AC operating voltage	Voltage drop U at Imax
R412022868	0.3 m	10 ... 30 V AC	≤ 3,5 V
R412027172	0.3 m	10 ... 30 V AC	≤ 3,5 V
R412022872	0.3 m	10 ... 30 V AC	≤ 0,1 V
R412022858	0.3 m	-	≤ 2,5 V
R412022851	0.3 m	-	≤ 2,5 V

Part No.	DC switching current, max.	AC switching current, max.
R412022868	0.13 A	0.13 A
R412027172	0.13 A	0.13 A
R412022872	0.3 A	0.5 A
R412022858	0.13 A	-

Part No.	DC switching current, max.	AC switching current, max.
R412022851	0.13 A	-

Part No.	Switching capacity	Max. switching frequency
R412022868	Reed, 2-pin: max. 10 W	400 Hz
R412027172	Reed, 2-pin: max. 10 W	400 Hz
R412022872	Reed, 3-pin: max. 6 W	400 Hz
R412022858	-	1000 Hz
R412022851	-	1000 Hz

Part No.	Operating current, not switched	Operating current, switched
R412022868	-	-
R412027172	-	-
R412022872	-	-
R412022858	8 mA	30 mA
R412022851	8 mA	30 mA

Part No.	Version	
R412022868	Protected against polarity reversal	1)
R412027172	Protected against polarity reversal	1)
R412022872	Protected against polarity reversal	1)
R412022858	short circuit resistant Protected against polarity reversal	-
R412022851	short circuit resistant Protected against polarity reversal	-

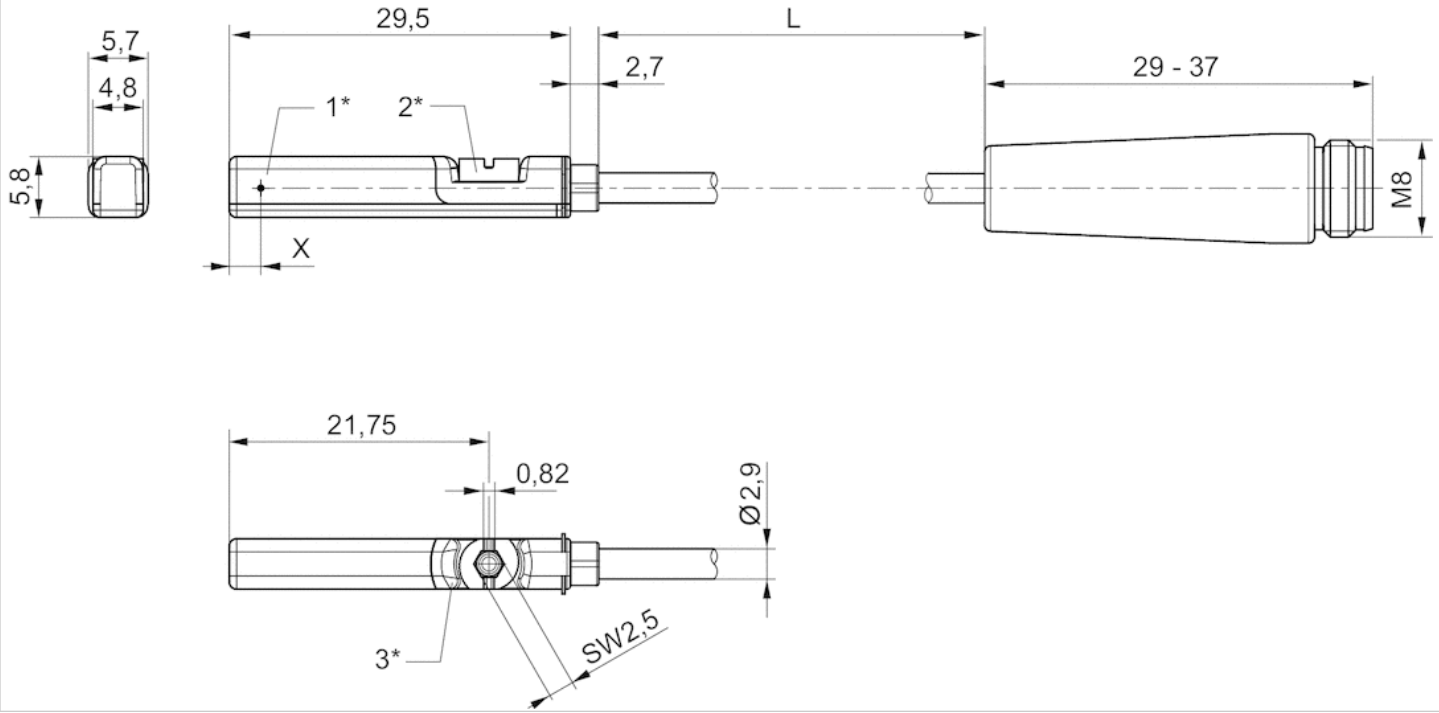
1) The product of operating voltage and continuous current must not exceed the maximum switching capacity.

Technical information

Material	
Housing	Polyamide
Cable sheath	Polyurethane
Locking screw	Stainless steel

Dimensions

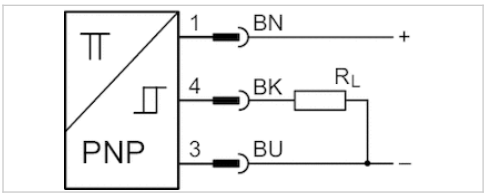
Dimensions



1* = switching point 2* = locking screw 3* = LED window, transparent
L = cable length
X = electronic: 11,6 mm, Reed: 8,3 mm

Sensor, Series ST6

- 6 mm T-slot
- with cable
- Plug, M12, 3-pin, with knurled screw
- ATEX
- UL certification, ATEX
- electronic PNP
- Direct mounting for series PRA, PRE, CCI, KPZ, SSI, GPC, CVI
- Indirect mounting for series TRB, ITS, CCL-IS, MNI, CSL-RD, RPC, ICS-D2, ICM, KHZ, TRR



Certificates	ATEX CE declaration of conformity cULus RoHS
ATEX class G	II 3G Ex nA IIC T4 Gc X
ATEX class D	II 3D Ex tc IIIC T135°C Dc X
Ambient temperature min./max.	-20 ... 50 °C
Protection class	IP67
Switching point precision	±0,1 mT
Quiescent current (without load)	10 mA
Min./max. DC operating voltage	10 ... 30 V DC
Switching logic	NO (make contact)
LED status display	Yellow Yellow
Vibration resistance	10 - 55 Hz, 1 mm
Shock resistance	30 g / 11 ms
Cable length L	0.3 m

Technical data

Part No.	for	Type of contact	Cable length L
R412022864	PRA, PRE, CCI, KPZ, SSI, GPC, CVI	electronic PNP	0.3 m

Part No.	Voltage drop U at Imax	DC switching current, max.
R412022864	≤ 2,5 V	0.1 A

Part No.	Max. switching frequency
R412022864	1000 Hz

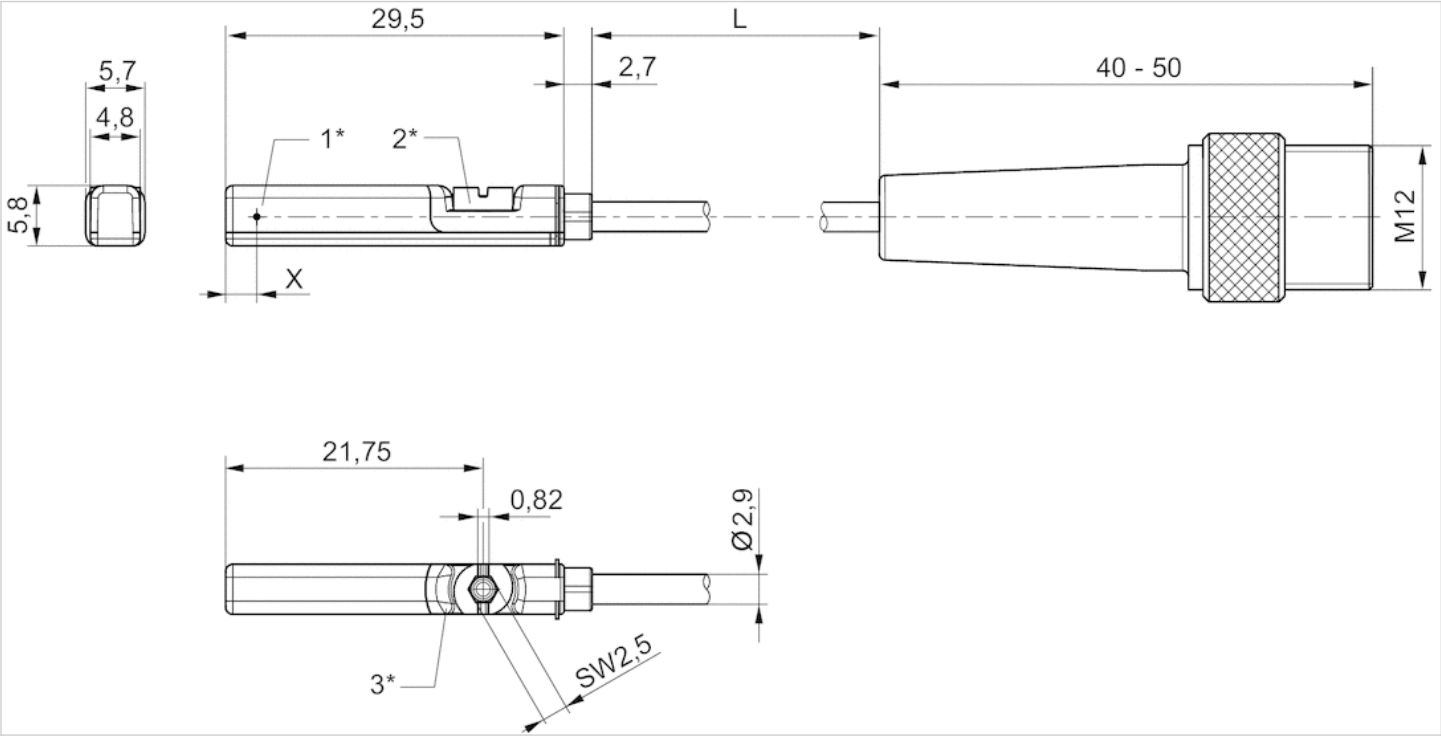
Part No.	Version
R412022864	short circuit resistant Protected against polarity reversal

Technical information

Material	
Housing	Polyamide
Cable sheath	Polyurethane
Locking screw	Stainless steel

Dimensions

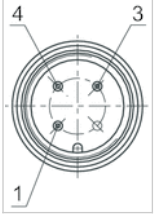
Dimensions



1* = switching point 2* = locking screw 3* = LED window, transparent
L = cable length
X = PNP: 11,6 mm, reed: 8,3 mm

Pin assignments

Pin assignments



Pin	1	3	4
Allocation	(+)	(-)	(OUT)

Sensor, Series ST6

- 6 mm T-slot
- with cable
- Plug, M12, 2-pin, with knurled screw Plug, M12, 4-pin, with knurled screw
- UL certification
- Reed electronic PNP
- Direct mounting for series PRA, PRE, CCI, KPZ, SSI, GPC, CVI
- Indirect mounting for series TRB, ITS, CCL-IS, MNI, CSL-RD, RPC, ICS-D2, ICM, KHZ, TRR

Certificates	CE declaration of conformity cULus RoHS
Ambient temperature min./max.	-30 ... 80 °C
Protection class	See table below
Switching point precision	±0,1 mT
Nominal current, actuated state	30 mA
Quiescent current (without load)	8 mA
Min./max. DC operating voltage	10 ... 30 V DC
Min./max. AC operating voltage	See table below
Hysteresis	≥ 0,2 mT
Switching logic	NO (make contact)
LED status display	Yellow
Vibration resistance	10 - 55 Hz, 1 mm
Shock resistance	30 g / 11 ms
Cable length L	0.3 0.1 3 5 m

Technical data

Part No.		for	Type of contact
R412027171		PRA, PRE, CCI, KPZ, SSI, GPC, CVI	Reed
R412022876		PRA, PRE, CCI, KPZ, SSI, GPC, CVI	Reed
R412022879		PRA, PRE, CCI, KPZ, SSI, GPC, CVI	electronic PNP
R412022863		PRA, PRE, CCI, KPZ, SSI, GPC, CVI	electronic PNP
R412022877		PRA, PRE, CCI, KPZ, SSI, GPC, CVI	electronic PNP
R412022878		PRA, PRE, CCI, KPZ, SSI, GPC, CVI	electronic PNP

Part No.	Cable length L	Min./max. AC operating voltage	Voltage drop U at Imax
R412027171	0.3 m	10 ... 30 V AC	≤ 3,5 V
R412022876	0.3 m	10 ... 30 V AC	≤ 0,1 V
R412022879	0.1 m	-	≤ 2,5 V
R412022863	0.3 m	-	≤ 2,5 V
R412022877	3 m	-	≤ 2,5 V
R412022878	5 m	-	≤ 2,5 V

Part No.	DC switching current, max.	AC switching current, max.
R412027171	0.13 A	0.13 A
R412022876	0.3 A	0.5 A

Part No.	DC switching current, max.	AC switching current, max.
R412022879	0.13 A	-
R412022863	0.13 A	-
R412022877	0.13 A	-
R412022878	0.13 A	-

Part No.	Switching capacity	Max. switching frequency
R412027171	Reed, 2-pin: max. 10 W	400 Hz
R412022876	Reed, 3-pin: max. 6 W	400 Hz
R412022879	-	1000 Hz
R412022863	-	1000 Hz
R412022877	-	1000 Hz
R412022878	-	1000 Hz

Part No.	Operating current, not switched	Operating current, switched	Protection class
R412027171	-	-	IP65, IP67
R412022876	-	-	IP65, IP67
R412022879	8 mA	30 mA	IP65, IP67
R412022863	8 mA	30 mA	IP65, IP67, IP69K
R412022877	8 mA	30 mA	IP65, IP67
R412022878	8 mA	30 mA	IP65, IP67

Part No.	Version	
R412027171	Protected against polarity reversal	1)
R412022876	Protected against polarity reversal	1)
R412022879	short circuit resistant Protected against polarity reversal	-
R412022863	short circuit resistant Protected against polarity reversal	-
R412022877	short circuit resistant Protected against polarity reversal	-
R412022878	short circuit resistant Protected against polarity reversal	-

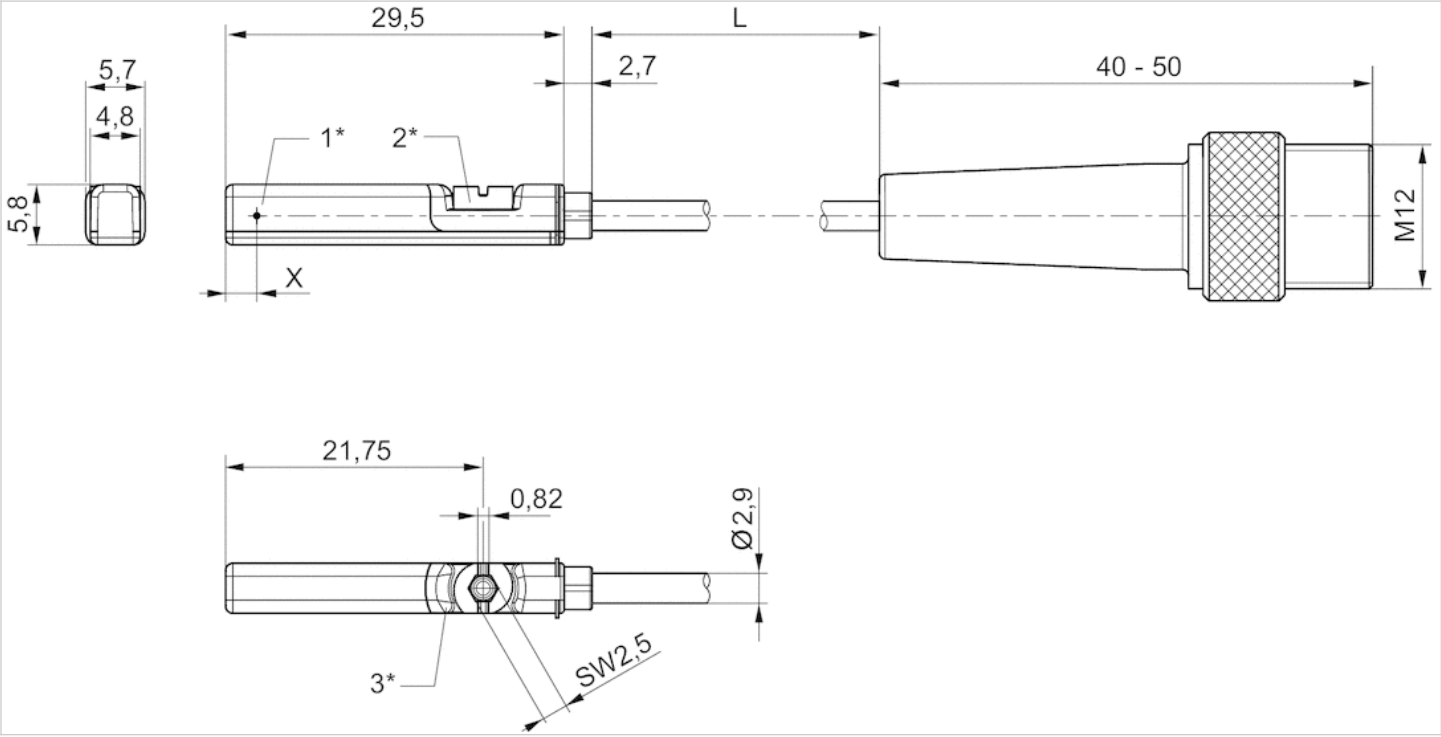
1) The product of operating voltage and continuous current must not exceed the maximum switching capacity.

Technical information

Material	
Housing	Polyamide
Cable sheath	Polyurethane
Locking screw	Stainless steel

Dimensions

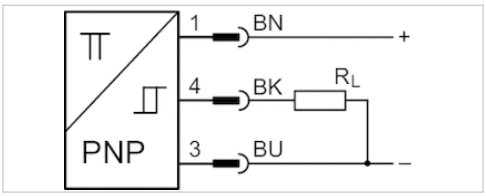
Dimensions



1* = switching point 2* = locking screw 3* = LED window, transparent
L = cable length
X = PNP: 11,6 mm, reed: 8,3 mm

Sensor, Series ST6

- 6 mm T-slot
- with cable
- Plug, M8, 3-pin, with knurled screw
- ATEX
- UL certification, ATEX
- electronic PNP
- Direct mounting for series PRA, PRE, CCI, KPZ, SSI, GPC, CVI
- Indirect mounting for series TRB, ITS, CCL-IS, MNI, CSL-RD, RPC, ICS-D2, ICM, KHZ, TRR



Certificates	ATEX CE declaration of conformity cULus RoHS
ATEX class G	II 3G Ex nA IIC T4 Gc X
ATEX class D	II 3D Ex tc IIIC T135°C Dc X
Ambient temperature min./max.	-20 ... 50 °C
Protection class	IP65, IP67
Switching point precision	±0,1 mT
Quiescent current (without load)	10 mA
Min./max. DC operating voltage	10 ... 30 V DC
Switching logic	NO (make contact)
LED status display	Yellow Yellow
Vibration resistance	10 - 55 Hz, 1 mm
Shock resistance	30 g / 11 ms
Cable length L	0.3 m

Technical data

Part No.	for	Type of contact	Cable length L
R412022860	PRA, PRE, CCI, KPZ, SSI, GPC, CVI	electronic PNP	0.3 m

Part No.	Voltage drop U at Imax	DC switching current, max.
R412022860	≤ 2,5 V	0.1 A

Part No.	Max. switching frequency
R412022860	1000 Hz

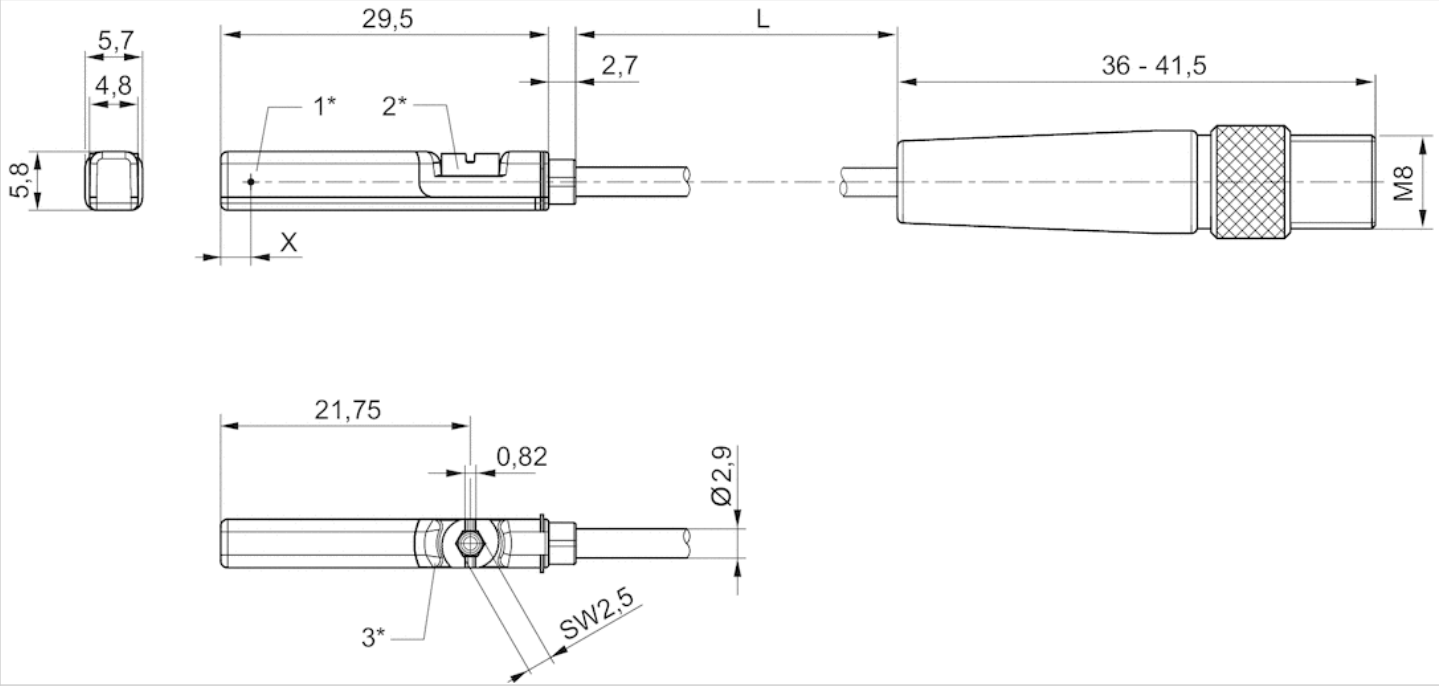
Part No.	Version
R412022860	short circuit resistant Protected against polarity reversal

Technical information

Material	
Housing	Polyamide
Cable sheath	Polyurethane
Locking screw	Stainless steel

Dimensions

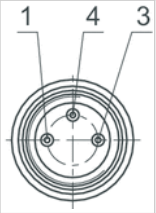
Dimensions



1* = switching point 2* = locking screw 3* = LED window, transparent
L = cable length
X = electronic: 11,6 mm, Reed: 8,3 mm

Pin assignments

Pin assignments



Pin	1	3	4
Allocation	(+)	(-)	(OUT)

Sensor, Series ST6

- 6 mm T-slot
- with cable
- Plug, M8, 3-pin, with knurled screw
- UL certification
- Reed electronic PNP electronic NPN
- Direct mounting for series PRA, PRE, CCI, KPZ, SSI, GPC, CVI
- Indirect mounting for series TRB, ITS, CCL-IS, MNI, CSL-RD, RPC, ICS-D2, ICM, KHZ, TRR

Certificates	CE declaration of conformity cULus RoHS
Ambient temperature min./max.	-30 ... 80 °C
Protection class	IP65, IP67
Switching point precision	±0,1 mT
Nominal current, actuated state	30 mA
Quiescent current (without load)	8 mA
Min./max. DC operating voltage	10 ... 30 V DC
Min./max. AC operating voltage	See table below
Hysteresis	≥ 0,2 mT
Switching logic	NO (make contact)
Switching capacity	Reed, 3-pin: max. 6 W
LED status display	Yellow
Vibration resistance	10 - 55 Hz, 1 mm
Shock resistance	30 g / 11 ms
Cable length L	0.3 0.5 m

Technical data

Part No.		for	Type of contact
R412022873		PRA, PRE, CCI, KPZ, SSI, GPC, CVI	Reed
R412022875		PRA, PRE, CCI, KPZ, SSI, GPC, CVI	Reed
R412022874		PRA, PRE, CCI, KPZ, SSI, GPC, CVI	Reed
R412022859		PRA, PRE, CCI, KPZ, SSI, GPC, CVI	electronic PNP
R412022862		PRA, PRE, CCI, KPZ, SSI, GPC, CVI	electronic PNP
R412022861		PRA, PRE, CCI, KPZ, SSI, GPC, CVI	electronic PNP
R412022852		PRA, PRE, CCI, KPZ, SSI, GPC, CVI	electronic NPN

Part No.	Cable sheath	Cable length L	Min./max. AC operating voltage
R412022873	Polyurethane	0.3 m	10 ... 30 V AC
R412022875	Polyvinyl chloride	0.3 m	10 ... 30 V AC
R412022874	Polyurethane	0.5 m	10 ... 30 V AC
R412022859	Polyurethane	0.3 m	-
R412022862	Polyvinyl chloride	0.3 m	-
R412022861	Polyurethane	0.5 m	-
R412022852	Polyurethane	0.3 m	-

Part No.	Voltage drop U at Imax	DC switching current, max.
R412022873	I*Rs	0.3 A
R412022875	I*Rs	0.3 A
R412022874	I*Rs	0.3 A
R412022859	≤ 2,5 V	0.13 A
R412022862	≤ 2,5 V	0.13 A
R412022861	≤ 2,5 V	0.13 A
R412022852	≤ 2,5 V	0.13 A

Part No.	AC switching current, max.	Max. switching frequency
R412022873	0.5 A	400 Hz
R412022875	0.5 A	400 Hz
R412022874	0.5 A	400 Hz
R412022859	-	1000 Hz
R412022862	-	1000 Hz
R412022861	-	1000 Hz
R412022852	-	1000 Hz

Part No.	Operating current, not switched	Operating current, switched
R412022873	-	-
R412022875	-	-
R412022874	-	-
R412022859	8 mA	30 mA
R412022862	8 mA	30 mA
R412022861	8 mA	30 mA
R412022852	8 mA	30 mA

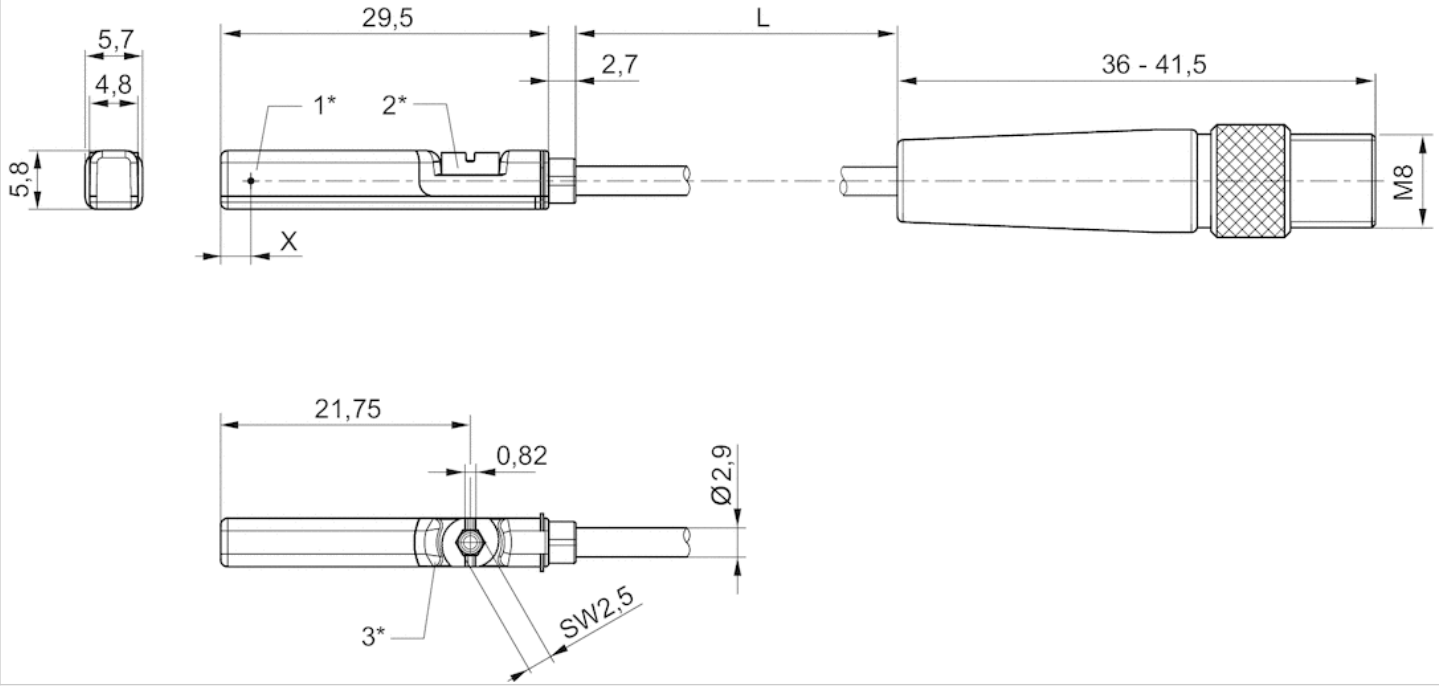
Part No.	Version
R412022873	Protected against polarity reversal
R412022875	Protected against polarity reversal
R412022874	Protected against polarity reversal
R412022859	short circuit resistant Protected against polarity reversal
R412022862	short circuit resistant Protected against polarity reversal
R412022861	short circuit resistant Protected against polarity reversal
R412022852	short circuit resistant Protected against polarity reversal

Technical information

Material	
Housing	Polyamide
Cable sheath	Polyurethane Polyvinyl chloride
Locking screw	Stainless steel

Dimensions

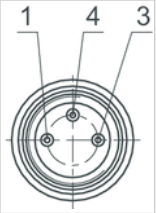
Dimensions



1* = switching point 2* = locking screw 3* = LED window, transparent
L = cable length
X = electronic: 11,6 mm, Reed: 8,3 mm

Pin assignments

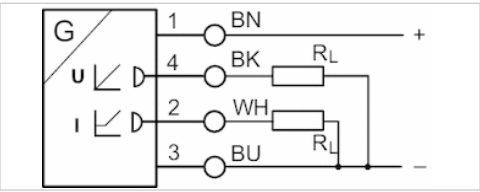
Pin assignments



Pin	1	3	4
Allocation	(+)	(-)	(OUT)

Sensors, Series SM6

- 6 mm groove
- with cable
- without wire end ferrule, tin-plated, 4-pin
- with distance measuring sensor, measurement range 32 ... 256 mm
- Analog
- Direct mounting for series PRA, PRE, CCI, KPZ, SSI, GPC, CVI
- Indirect mounting for series TRB, ITS, 167, MNI, ICM, TRR



Certificates	cULus
Ambient temperature min./max.	-20 ... 70 °C
Protection class	IP67
Output signal	0 - 10 V DC, 4 - 20 mA
Quiescent current (without load)	25 mA
Maximum load (analog current output)	500 Ω
Residual ripple	≤ 10 %
sampling interval	1 ms
Resolution max. measuring range	0,05 mm
Repetitive precision max. measuring range	0.1 mm
Linearity deviation	0,3 mm
Sampling speed	3 m/s
Display	LED
LED status display	Yellow
Vibration resistance	10 - 55 Hz, 1 mm
Shock resistance	30 g / 11 ms
Cable length L	2 m

Technical data

Part No.	for	Type of contact	Cable length L
R412010141	PRA, PRE, CCI, KPZ, SSI, GPC, CVI	Analog	2 m
R412010143	PRA, PRE, CCI, KPZ, SSI, GPC, CVI	Analog	2 m
R412010262	PRA, PRE, CCI, KPZ, SSI, GPC, CVI	Analog	2 m
R412010264	PRA, PRE, CCI, KPZ, SSI, GPC, CVI	Analog	2 m

Part No.	max. measuring range	Overall length Sensor A
R412010141	32 mm	45 mm
R412010143	64 mm	77 mm
R412010262	96 mm	109 mm
R412010264	128 mm	141 mm

Part No.	Version
R412010141	short circuit resistant Protected against polarity reversal Overload protection
R412010143	short circuit resistant Protected against polarity reversal Overload protection
R412010262	short circuit resistant Protected against polarity reversal Overload protection

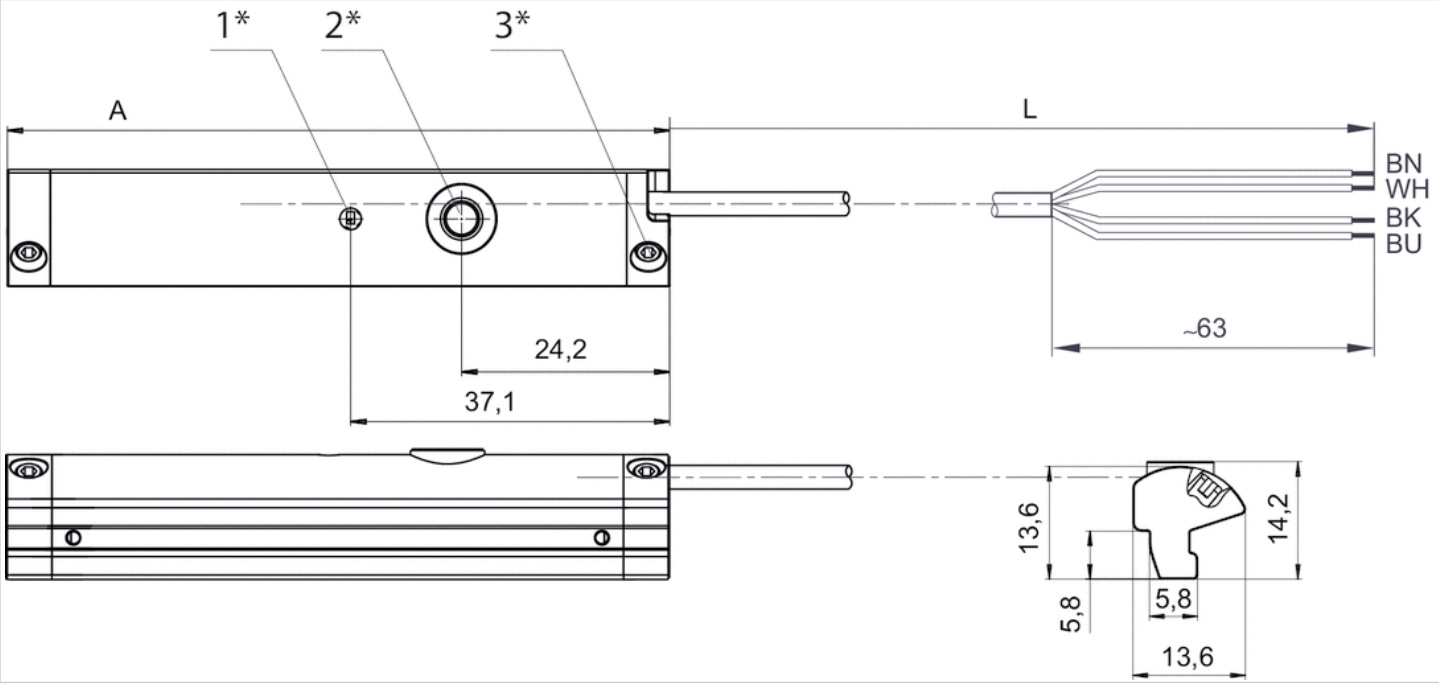
Part No.	Version
R412010264	short circuit resistant Protected against polarity reversal Overload protection

Technical information

Material	
Housing	Polyamide fiber-glass reinforced
Cable sheath	Polyurethane

Dimensions

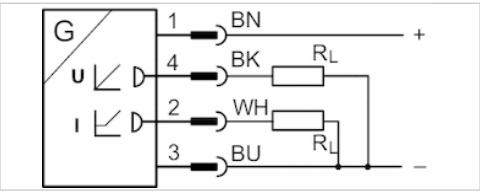
Dimensions



1* = LED 2* = teach button 3* = threaded pin M3x11
L = cable length
(1) BN=brown
(2) WH=white
(3) BU=blue
(4) BK=black
A = sensor length

Sensors, Series SM6

- 6 mm groove
- with cable
- Plug, M8x1, 4-pin, with knurled screw
- with distance measuring sensor, measurement range 32 ... 256 mm
- Analog
- Direct mounting for series PRA, PRE, CCI, KPZ, SSI, GPC, CVI
- Indirect mounting for series TRB, ITS, 167, MNI, ICM, TRR



Certificates	cULus
Ambient temperature min./max.	-20 ... 70 °C
Protection class	IP67
Output signal	0 - 10 V DC, 4 - 20 mA
Quiescent current (without load)	25 mA
Min./max. DC operating voltage	15 ... 30 V DC
sampling interval	1 ms
Resolution max. measuring range	0,05 mm
Repetitive precision max. measuring range	0.1 mm
Linearity deviation	0,3 mm
Sampling speed	3 m/s
Display	LED
LED status display	Yellow
Vibration resistance	10 - 55 Hz, 1 mm
Shock resistance	30 g / 11 ms
Cable length L	0.3 m

Technical data

Part No.	for	Type of contact	Cable length L
R412010142	PRA, PRE, CCI, KPZ, SSI, GPC, CVI	Analog	0.3 m
R412010144	PRA, PRE, CCI, KPZ, SSI, GPC, CVI	Analog	0.3 m
R412010263	PRA, PRE, CCI, KPZ, SSI, GPC, CVI	Analog	0.3 m
R412010265	PRA, PRE, CCI, KPZ, SSI, GPC, CVI	Analog	0.3 m

Part No.	max. measuring range	Overall length Sensor A
R412010142	32 mm	45 mm
R412010144	64 mm	77 mm
R412010263	96 mm	109 mm
R412010265	128 mm	141 mm

Part No.	Version
R412010142	short circuit resistant Protected against polarity reversal Overload protection
R412010144	short circuit resistant Protected against polarity reversal Overload protection
R412010263	short circuit resistant Protected against polarity reversal Overload protection

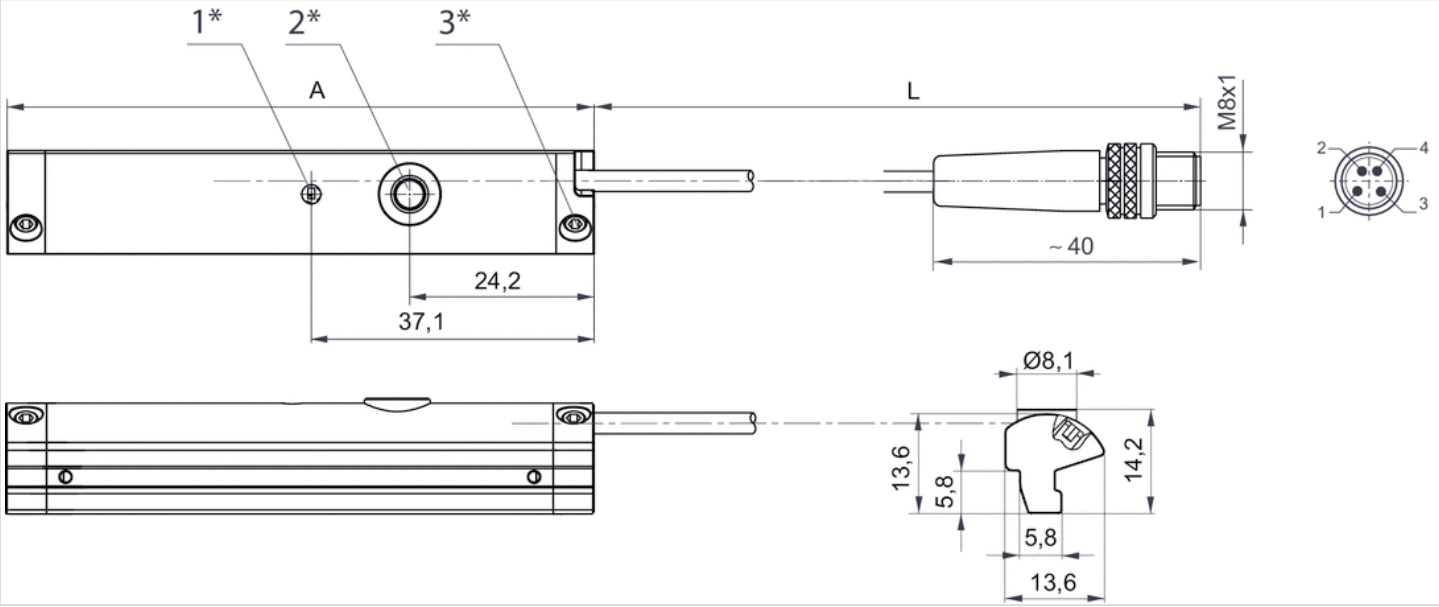
Part No.	Version
R412010265	short circuit resistant Protected against polarity reversal Overload protection

Technical information

Material	
Housing	Polyamide fiber-glass reinforced
Cable sheath	Polyurethane

Dimensions

Dimensions

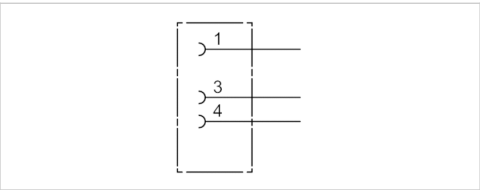


1* = LED 2* = teach button 3* = threaded pin M3x11
L = cable length
Pin assignment: 1 = (+), 2 = (OUT 1) 3 = (GND), 4 = (OUT 2), EN 60947-5-7
A = sensor length

Round plug connector, Series CON-RD

- Socket, M8x1, 3-pin, A-coded, straight, 180°
- UL (Underwriters Laboratories)
- unshielded

Connection type	Soldering
Ambient temperature min./max.	-25 ... 80 °C
Operational voltage	48 V AC/DC
Protection class	IP67
Weight	0.009 kg



Technical data

Part No.	Max. current	suitable cable-Ø min./max
1834484173	4 A	3.5 / 5 mm

Technical information

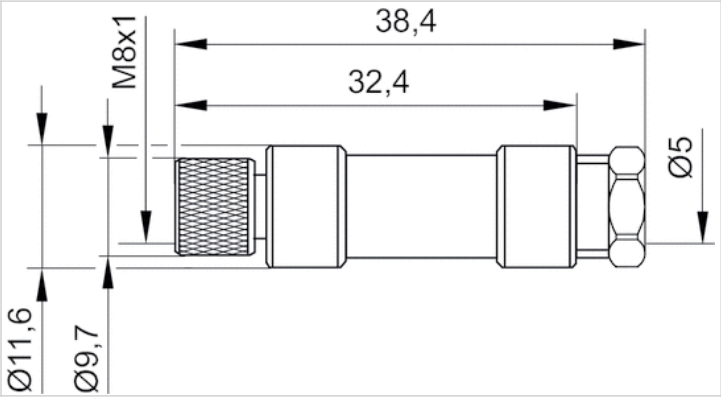
The specified protection class is only valid in assembled and tested state.

Technical information

Material	
Housing	Polyamide

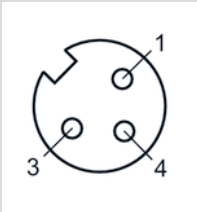
Dimensions

Dimensions



Pin assignments

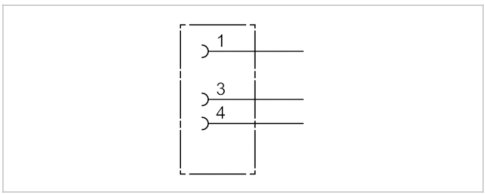
Pin assignment, socket



Round plug connector, Series CON-RD

- Socket, M8x1, 3-pin, A-coded, angled, 90°
- UL (Underwriters Laboratories)
- unshielded

Connection type	Soldering
Ambient temperature min./max.	-40 ... 85 °C
Operational voltage	48 V AC/DC
Protection class	IP67
Weight	0.01 kg



Technical data

Part No.	Max. current	Contact assignment	suitable cable-Ø min./max
1834484174	4 A	3	3.5 / 5 mm

Technical information

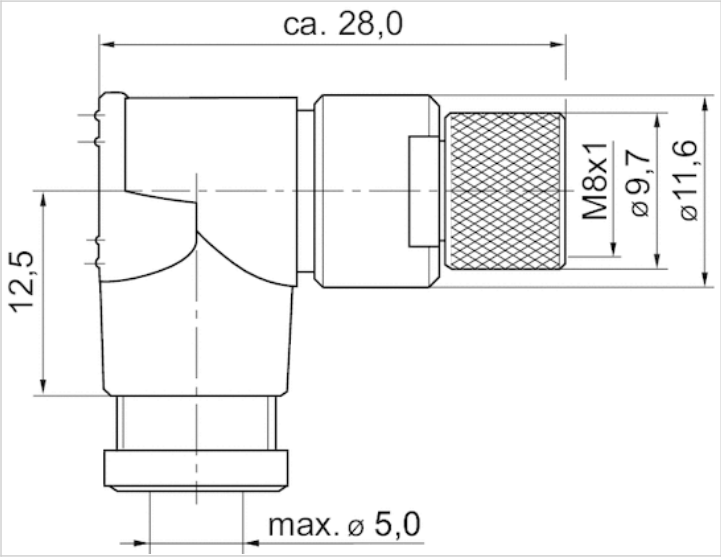
The specified protection class is only valid in assembled and tested state.

Technical information

Material	
Housing	Polyamide

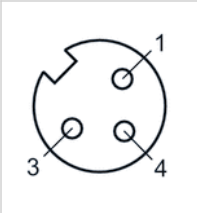
Dimensions

Dimensions



Pin assignments

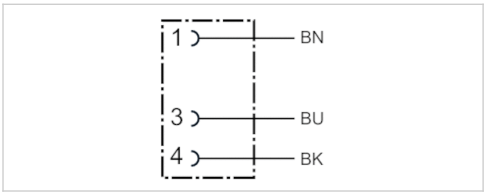
Pin assignment, socket



Round plug connector, Series CON-RD

- Socket M8x1 3-pin A-coded straight 180°
- open cable ends
- with cable
- UL (Underwriters Laboratories)
- unshielded

Ambient temperature min./max.	-25 ... 85 °C
Operational voltage	48 V AC/DC
Protection class	IP67
Wire cross-section	0.24 mm²
Weight	See table below



Technical data

Part No.	Max. current	Number of wires	Cable-Ø	Cable length	Certification	Weight
1834484166	4 A	3	4.5 mm	3 m	UL (Underwriters Laboratories)	0.087 kg
1834484168	4 A	3	4.5 mm	5 m	UL (Underwriters Laboratories)	0.141 kg
1834484247	4 A	3	4.5 mm	10 m	UL (Underwriters Laboratories)	0.277 kg

Technical information

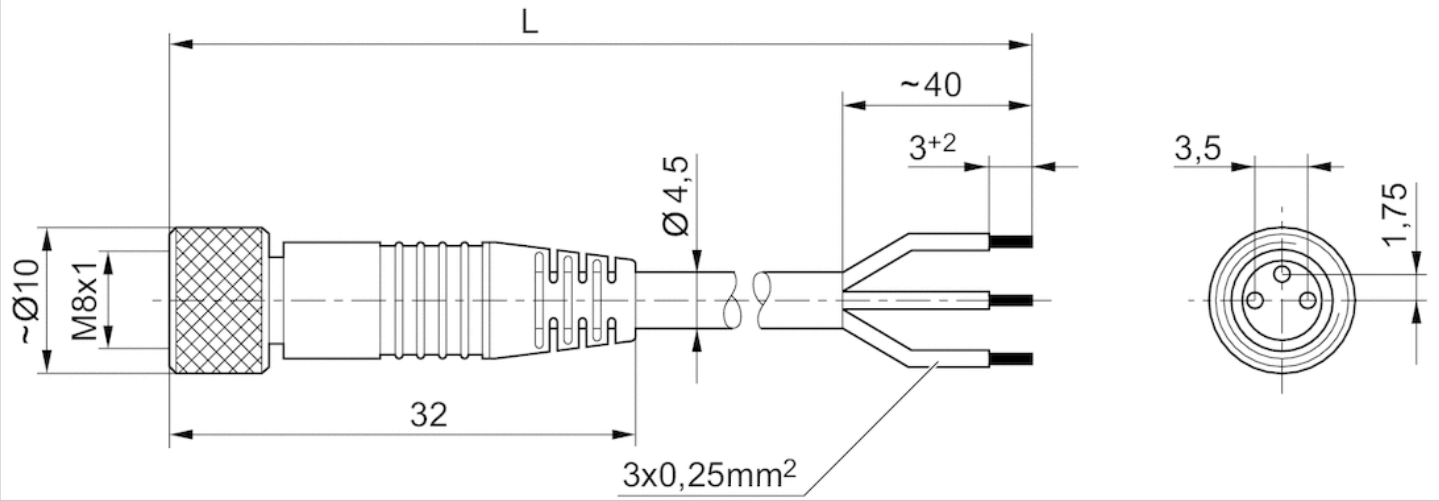
The specified protection class is only valid in assembled and tested state.

Technical information

Material	
Housing	Polyurethane
Cable sheath	Polyurethane

Dimensions

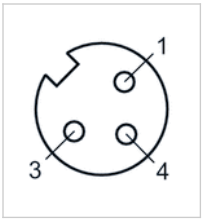
Dimensions



L = length

Pin assignments

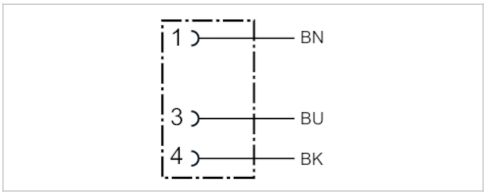
Pin assignment, socket



(1) BN=brown
(3) BU=blue
(4) BK=black

Round plug connector, Series CON-RD

- Socket M8x1 3-pin A-coded angled 90°
- open cable ends
- with cable
- unshielded



Ambient temperature min./max.	-40 ... 85 °C
Operational voltage	48 V AC/DC
Protection class	IP67
Wire cross-section	0.24 mm²
Weight	See table below

Technical data

Part No.	Max. current	Number of wires	Cable-Ø	Cable length	Weight
1834484167	4 A	3	4.5 mm	3 m	0.087 kg
1834484169	4 A	3	4.5 mm	5 m	0.139 kg
1834484248	4 A	3	4.5 mm	10 m	0.279 kg

Technical information

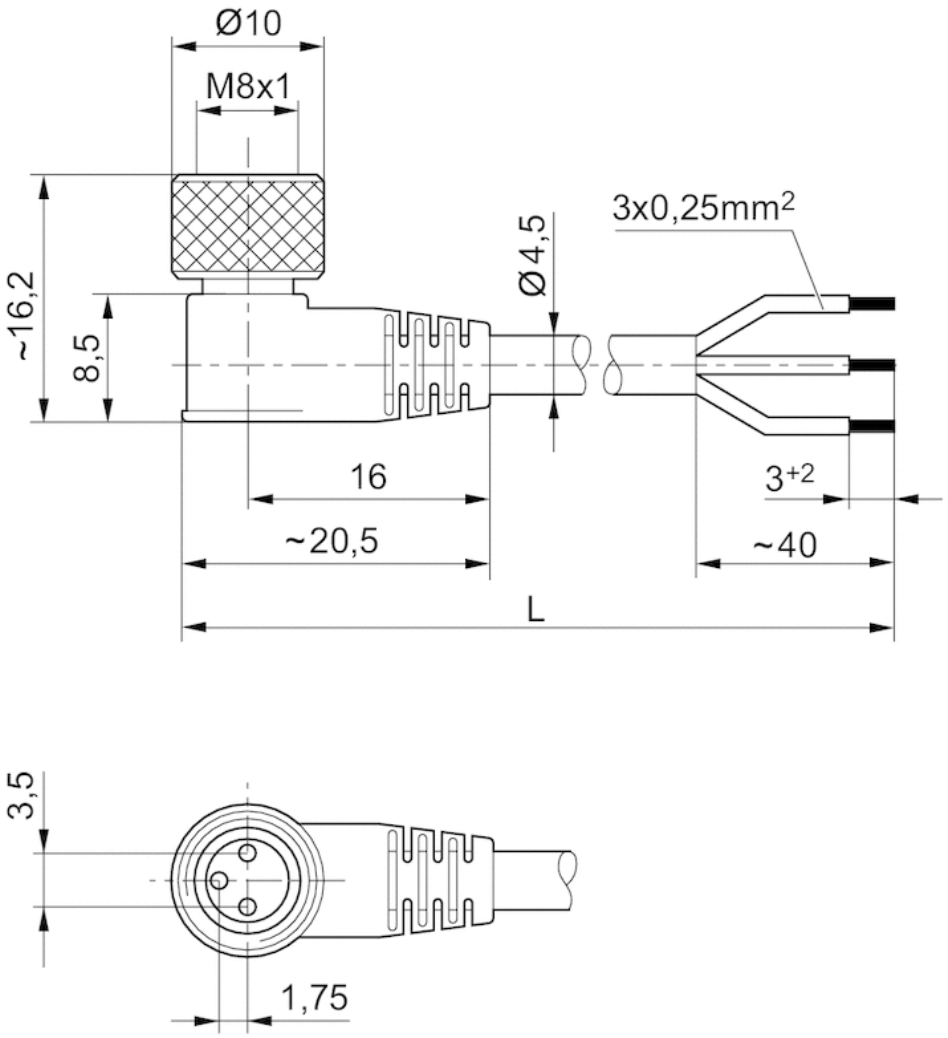
The specified protection class is only valid in assembled and tested state.

Technical information

Material	
Housing	Polyurethane
Cable sheath	Polyurethane

Dimensions

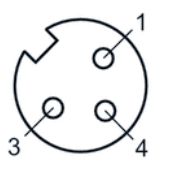
Dimensions



L = length

Pin assignments

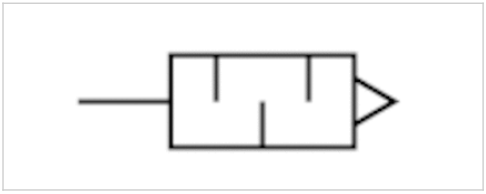
Pin assignment, socket



(1) BN=brown
(3) BU=blue
(4) BK=black

Silencers, series SI1

- M5
- Sintered bronze



Working pressure min./max.	0 ... 10 bar
Ambient temperature min./max.	-25 ... 80 °C
Medium	Compressed air
Sound pressure level	72 dB
Weight	0.004 kg
Comment	Flow characteristic curves can be found under “Diagrams”.

Technical data

Part No.	Compressed air connection	Flow	Delivery unit
		Qn	
1827000006	M5	398 l/min	10 piece

Weight per piece

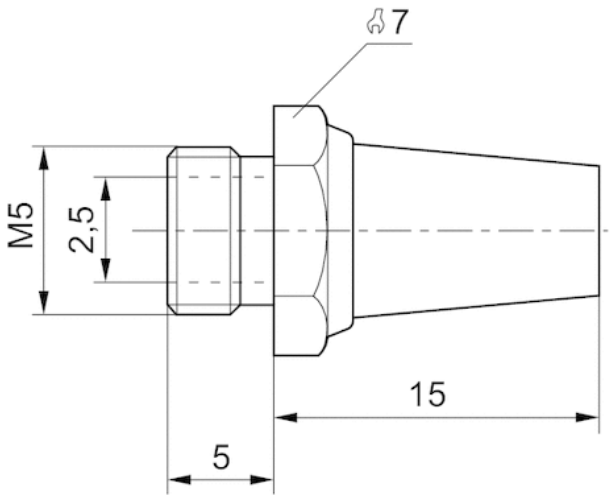
Nominal flow Qn at p1 = 6 bar (absolute) freely discharged. Sound pressure level measured at 6 bar against atmosphere at 1 m distance.

Technical information

Material	
Silencer	Sintered bronze
Thread	Brass

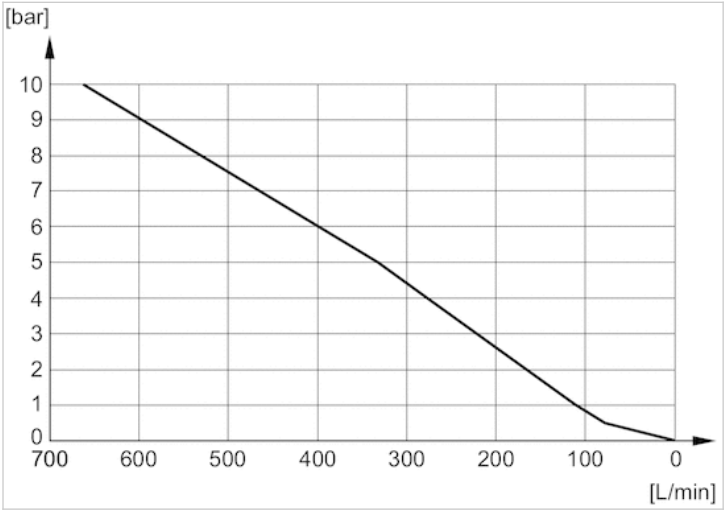
Dimensions

Dimensions in mm



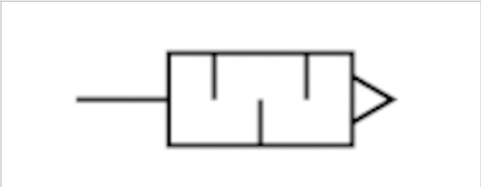
Diagrams

Flow diagram, 1827000006



Silencers, series SI1

- G 1/8
- Sintered bronze



Working pressure min./max.	0 ... 10 bar
Ambient temperature min./max.	-25 ... 80 °C
Medium	Compressed air
Sound pressure level	75 dB
Weight	0.01 kg
Comment	Flow characteristic curves can be found under “Diagrams”.

Technical data

Part No.	Compressed air connection	Flow	Delivery unit
		Qn	
1827000000	G 1/8	1623 l/min	10 piece

Weight per piece

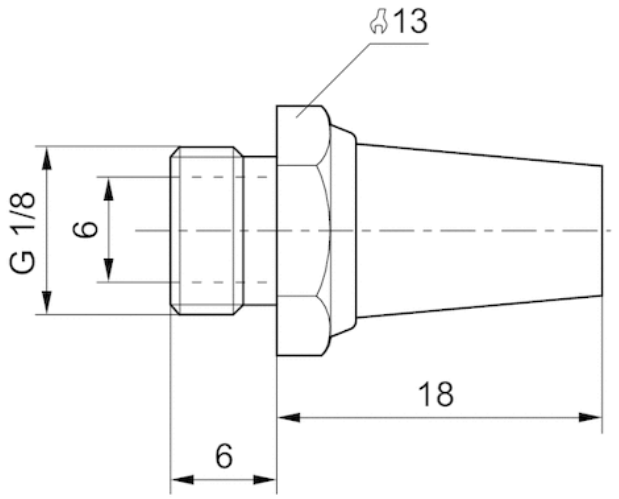
Nominal flow Qn at p1 = 6 bar (absolute) freely discharged. Sound pressure level measured at 6 bar against atmosphere at 1 m distance.

Technical information

Material	
Silencer	Sintered bronze
Thread	Brass

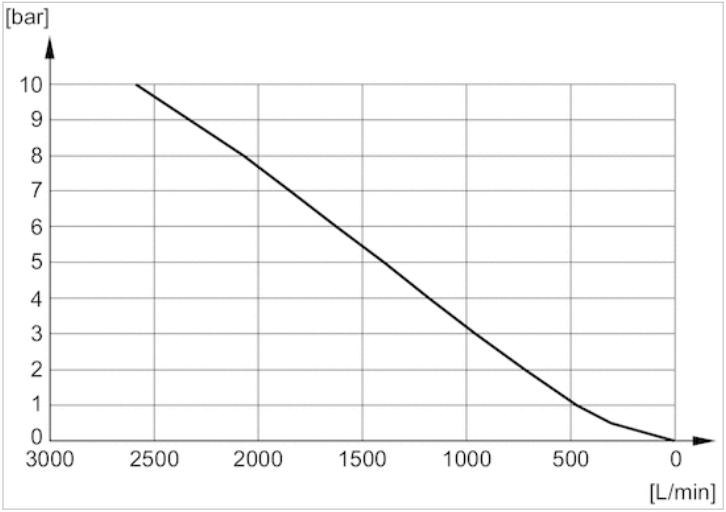
Dimensions

Dimensions in mm



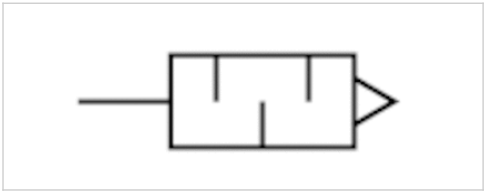
Diagrams

Flow diagram, 1827000000



Silencers, series SI1

- G 1/4
- Sintered bronze



Working pressure min./max.	0 ... 10 bar
Ambient temperature min./max.	-25 ... 80 °C
Medium	Compressed air
Sound pressure level	79 dB
Weight	0.02 kg
Comment	Flow characteristic curves can be found under “Diagrams”.

Technical data

Part No.	Compressed air connection	Flow	Delivery unit
		Qn	
1827000001	G 1/4	3390 l/min	10 piece

Weight per piece

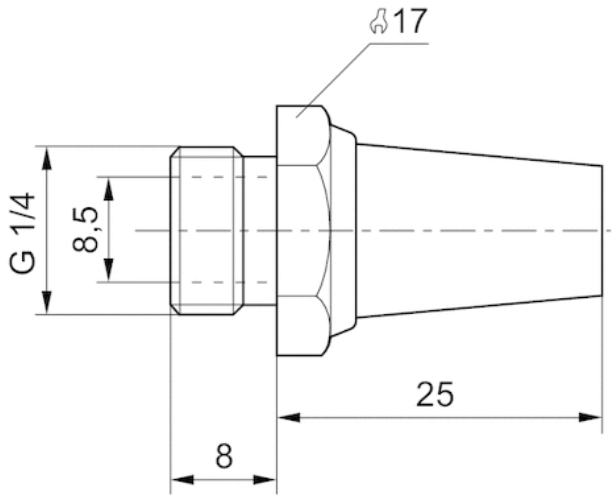
Nominal flow Qn at p1 = 6 bar (absolute) freely discharged. Sound pressure level measured at 6 bar against atmosphere at 1 m distance.

Technical information

Material	
Silencer	Sintered bronze
Thread	Brass

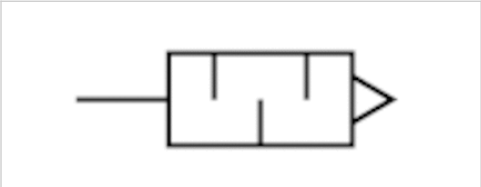
Dimensions

Dimensions in mm



Silencers, series SI1

- G 3/8
- Sintered bronze



Working pressure min./max.	0 ... 10 bar
Ambient temperature min./max.	-25 ... 80 °C
Medium	Compressed air
Sound pressure level	84 dB
Weight	0.05 kg
Comment	Flow characteristic curves can be found under “Diagrams”.

Technical data

Part No.	Compressed air connection	Flow	Delivery unit
		Qn	
1827000002	G 3/8	6554 l/min	5 piece

Weight per piece

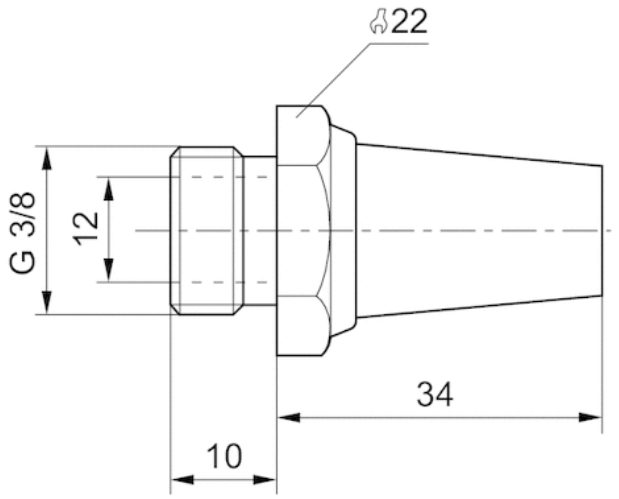
Nominal flow Qn at p1 = 6 bar (absolute) freely discharged. Sound pressure level measured at 6 bar against atmosphere at 1 m distance.

Technical information

Material	
Silencer	Sintered bronze
Thread	Brass

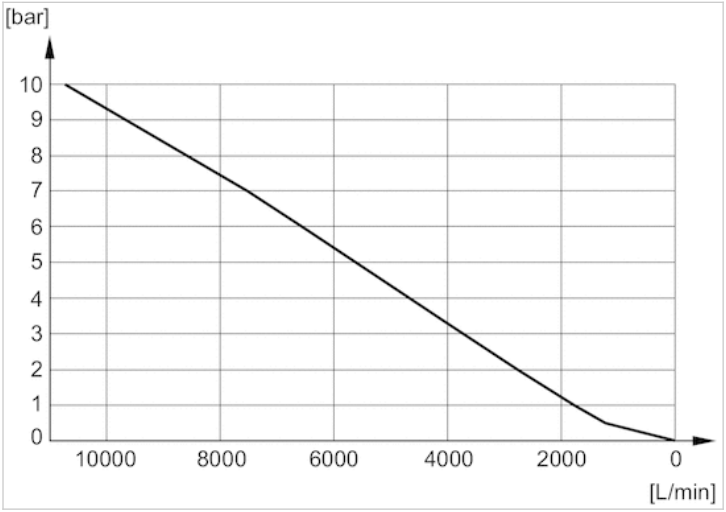
Dimensions

Dimensions in mm



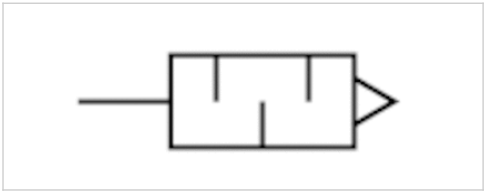
Diagrams

Flow diagram, 1827000002



Silencers, series SI1

- M5 G 1/8 G 1/4 G 3/8
- Sintered bronze



Working pressure min./max.	0 ... 10 bar
Ambient temperature min./max.	-25 ... 80 °C
Medium	Compressed air
Sound pressure level	See table below
Weight	See table below
Comment	Flow characteristic curves can be found under “Diagrams”.

Technical data

Part No.	Compressed air connection	Sound pressure level	Flow	Delivery unit	Weight
			Qn		
1827000032	M5	79 dB	252 l/min	10 piece	0.005 kg
1827000031	G 1/8	85 dB	700 l/min	10 piece	0.001 kg
1827000033	G 1/4	88 dB	1116 l/min	10 piece	0.01 kg
1827000034	G 3/8	90 dB	1706 l/min	5 piece	0.016 kg

Weight per piece

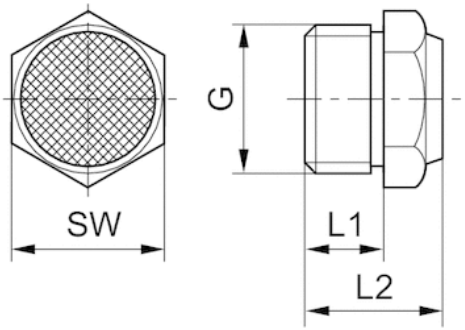
Nominal flow Qn at p1 = 6 bar (absolute) freely discharged. Sound pressure level measured at 6 bar against atmosphere at 1 m distance.

Technical information

Material	
Silencer	Sintered bronze
Thread	Brass

Dimensions

Dimensions



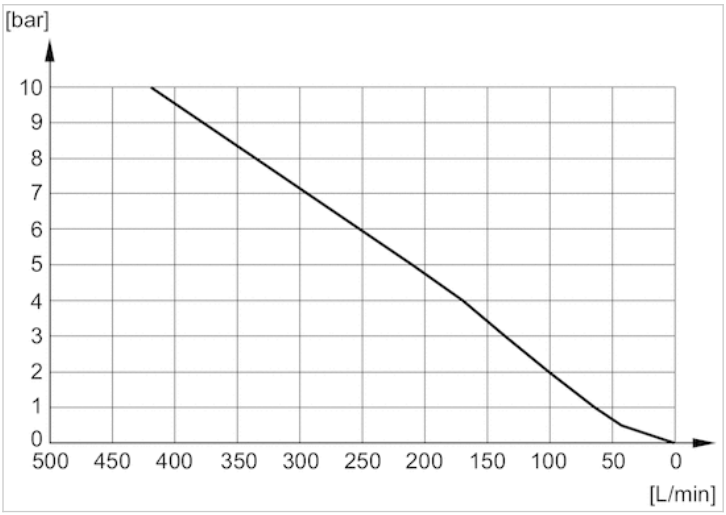
Dimensions

Part No.	Port G	L1	L2	SW
1827000032	M5	5	10.3	7
1827000031	G 1/8	6	11.5	13
1827000033	G 1/4	8	13.5	17
1827000034	G 3/8	10	17.5	22

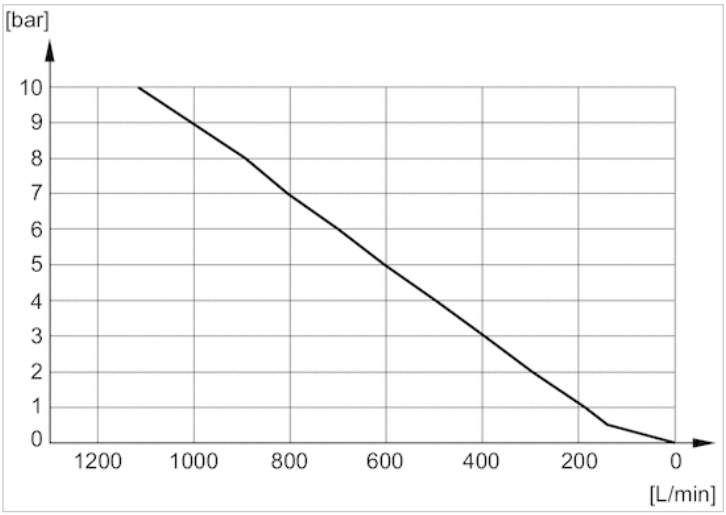
Sound pressure level measured at 6 bar at 1 m distance

Diagrams

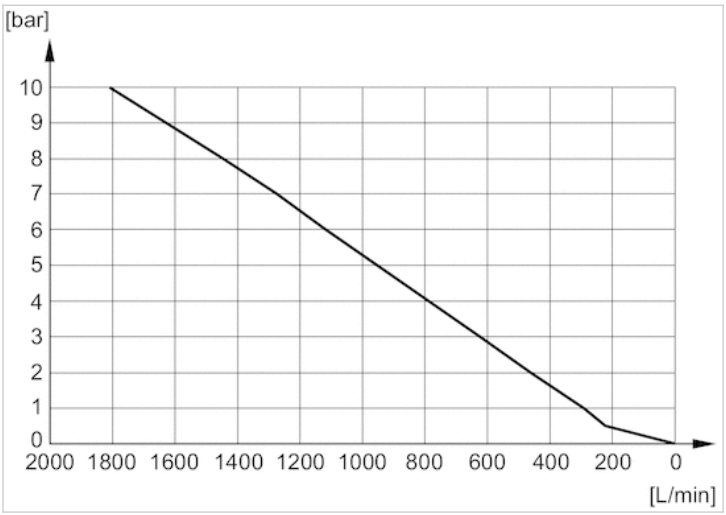
Flow diagram, 1827000032



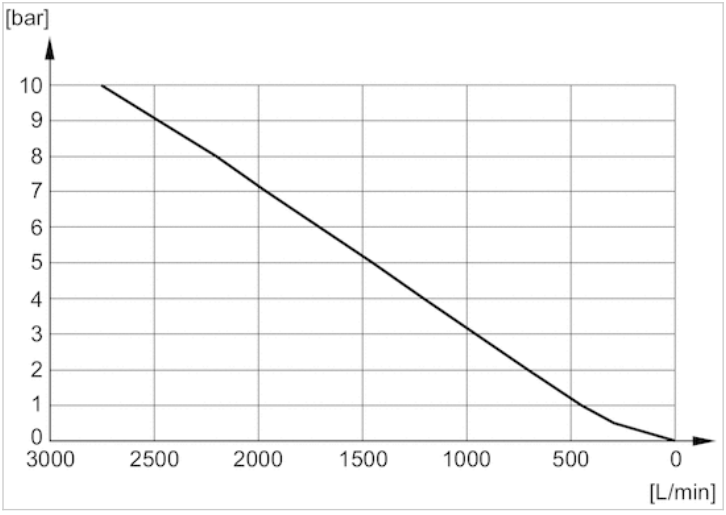
Flow diagram, 1827000031



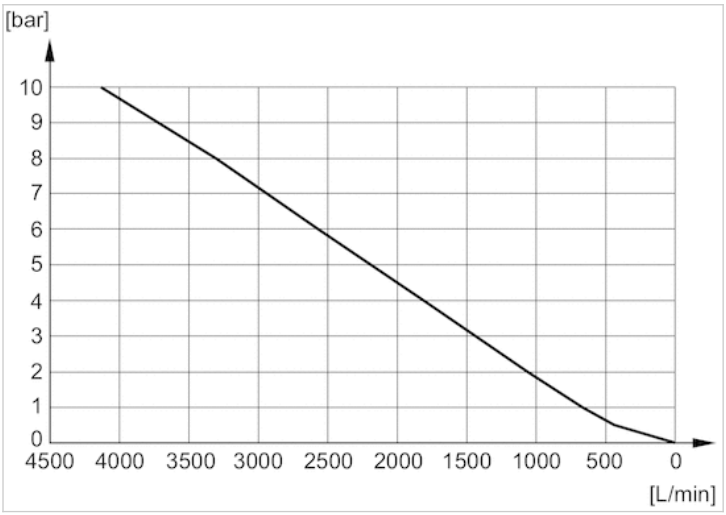
Flow diagram, 1827000033



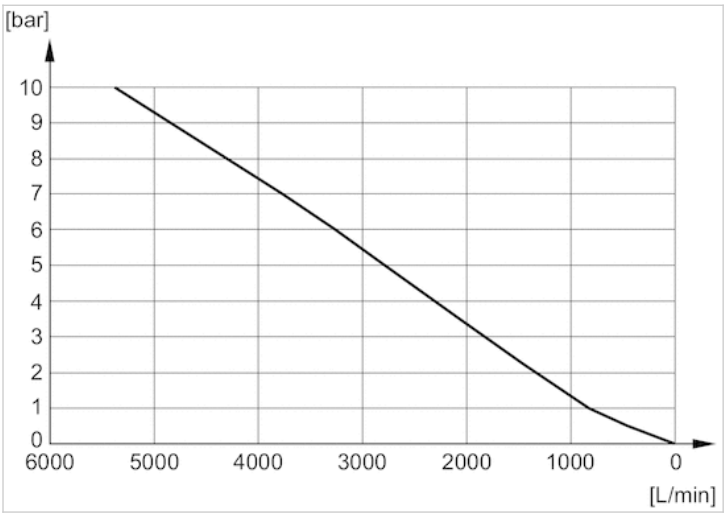
Flow diagram, 1827000034



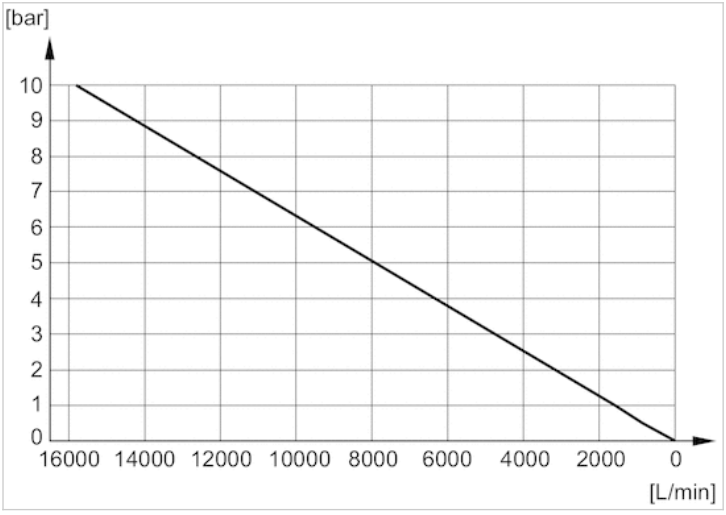
Flow diagram, 1827000035



Flow diagram, 8145003400



Flow diagram, 8145001000



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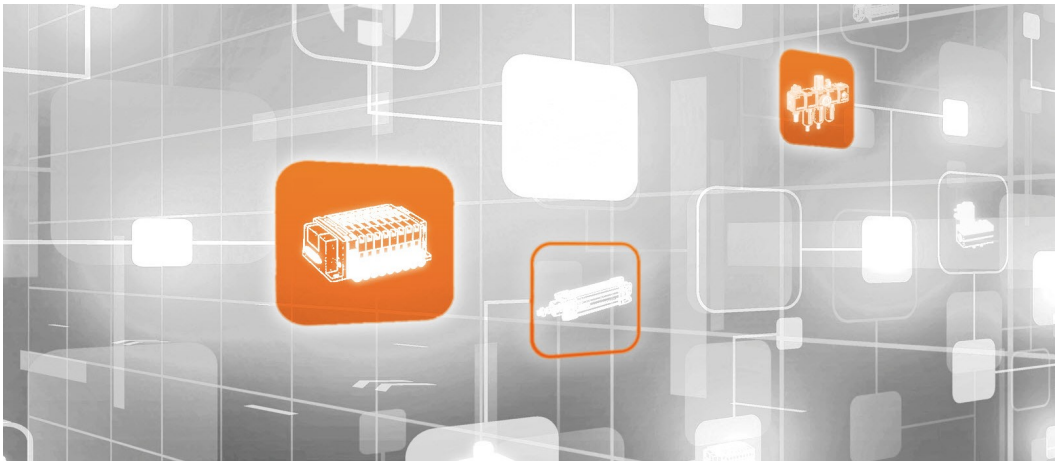

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