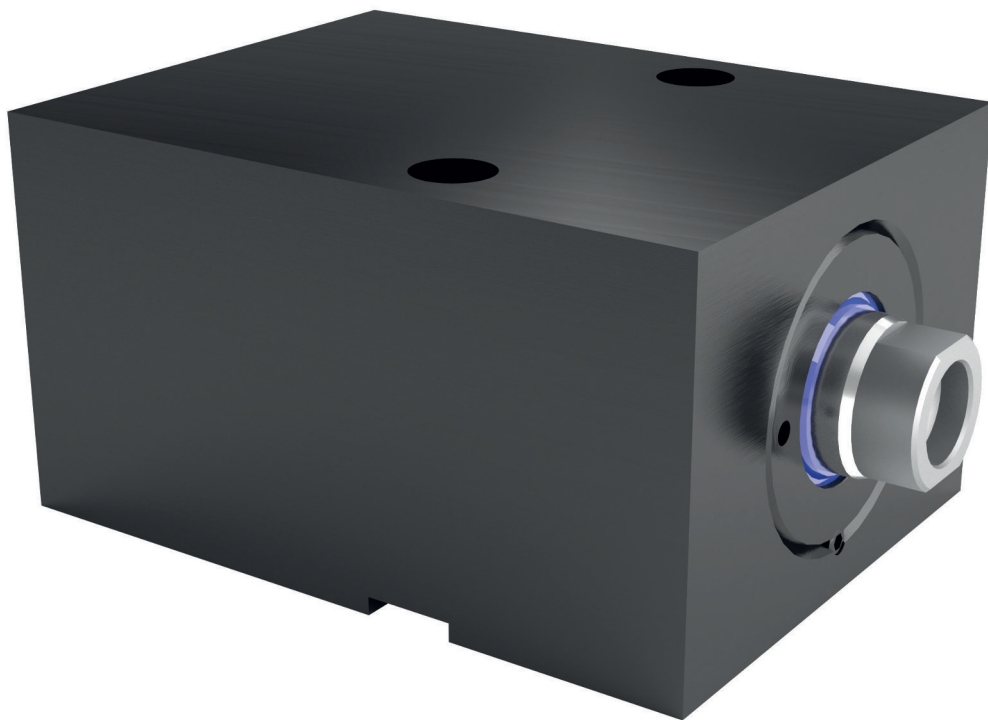




CYLINDER TECHNOLOGY

BLOCK CYLINDER

SINGLE-ACTING WITH STEEL HOUSING

- M501** – Transverse bores
– Pipe thread connection
– With spring return

- M502** – Transverse bores
– Pipe thread connection
– Without spring return

- M503** – Longitudinal bores
– Pipe thread connection
– With spring return

- M504** – Longitudinal bores
– Pipe thread connection
– Without spring return

DOUBLE-ACTING WITH STEEL HOUSING

- M505** – Transverse bores
– Pipe thread connection

- M506** – Longitudinal bores
– Pipe thread connection

- M507** – Longitudinal bores
– O-ring connection, side

- M508** – Transverse bores
– O-ring connection, rod side

- M509** – Transverse bores
– O-ring connection, rod side

- M520** – Through piston rod for position monitor

DOUBLE-ACTING WITH ALUMINUM HOUSING

- M521** – Longitudinal and transverse bores
– Pipe thread connection

- M522** – Transverse bores
– O-ring connection, side

- M523** – Longitudinal bores
– O-ring connection, rod side

- M524** – Longitudinal bores
– O-ring connection, base side

ROUND CYLINDER

HOLLOW PISTON CYLINDER

SINGLE-ACTING

- M710** – Male threads
– With spring return

- M711** – Without male threads
– With spring return

DOUBLE-ACTING

- M712** – Male threads

- M713** – Without male threads

CLAMPING CYLINDER

- M720B** – With spherical piston

- M720G** – With female threads on piston

SCREW-IN CYLINDER

DOUBLE-ACTING

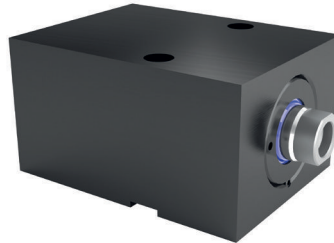
- M730B** – With spherical piston
M730G – With female threads on piston

- M731** – With head flange
– Female threads on piston

GENERAL DESCRIPTION

Block cylinders can present the ideal solution due to their large range of force with compact design dimensions and thanks to short and precise cycle times for many manufacturing tasks. With functions such as

- positioning
- clamp
- embossing
- stamping
- riveting
- clamping
- closing
- opening
- bending
- drawing



they have also been proven in automobile, machine and mold construction, as well as in the field of injection molding.

DESIGN

Housing:	Material C45k bronzed, piston bore rolled or honed
Pistons:	Material case hardened steel, one piece, piston rod seal in tandem design
Dimensional tolerances:	As long as not otherwise indicated, according to DIN 7168-m

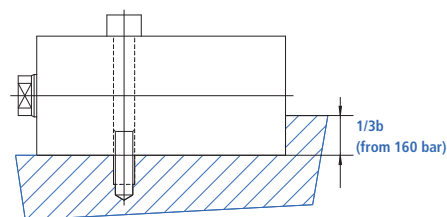
GENERAL INFORMATION

Force range:	Up to above 1000 kN
Standard strokes:	Of 8–200 mm
Installation position:	As required
Piston speed:	Vmax 0.5 m/s
Max. operating pressure:	500 bar
Operating temperature:	Standard –10 to +60°C, Viton: on request
Piston transverse force:	Should be avoided, in no case > 5 % of the cylinder force
Medium:	Mineral oil according to DIN 51524

TECHNICAL INFORMATION

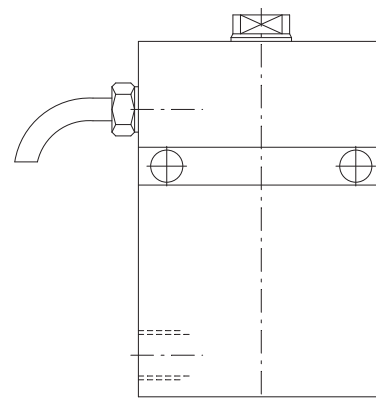
FASTENING

With fastening using transverse bores above an operating pressure of 160 bar the cylinder must be supported on the back or by slot nuts.



VENTILATION OF THE SPRING CHAMBER WITH SINGLE-ACTING DESIGN

If aggressive cutting and cooling liquids should get into the spring chamber through the sinter metal filter, a ventilation hose must be connected and laid in a protected location.



TECHNICAL DATA

Pistons Ø D	mm	16	20	25	32	40	50	63	80	100	125	160	200
Rods Ø D	mm	10	14	16	20	25	32	40	50	63	80	100	125
Effective piston area, pressing	cm ²	2	3.1	4.9	8	12.5	19.6	31.1	50.3	78.4	122.7	201	314.1
Effective piston area, pulling	cm ²	1.2	1.6	2.9	4.9	7.7	11.6	18.6	30.6	47.4	72.4	122.5	191.4
Compression force (100 bar)	kN	2	3.1	4.9	8	12.5	19.6	31.1	50.3	78.4	122.7	201	314.1
Tensile force (100 bar)	kN	1.2	1.6	2.9	4.9	7.7	11.6	18.6	30.6	47.4	72.4	122.5	191.4

CUSTOM DESIGN

High temperature design with Viton: For temperatures above 100°C.

Order example: M501-2-020-V

Stroke shortening during extension: By using a spacing disk the stroke is shortened

Order example: M501-2-020-30

Male threads on the piston rod: Desired threads are made on the piston rod ends

Order example: M501-2-020-M8 x 15 (Total length = L + 15 mm)

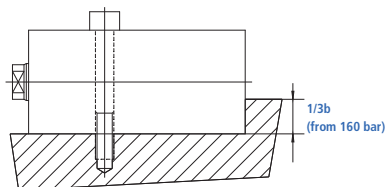
Inductive proximity switch: Placing inductive proximity switch on the stroke start and stroke end

Order example: M505-2-20-N

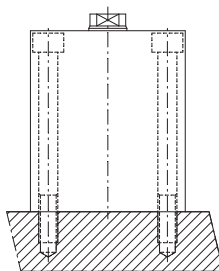
Punching cylinder: Placing guide elements on pistons and screwed connection

Order example: M505-2-20-ST

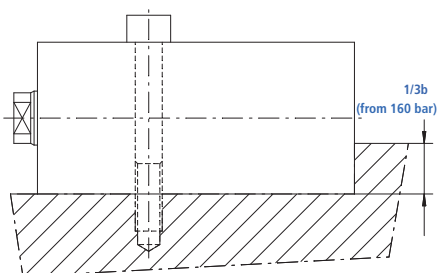
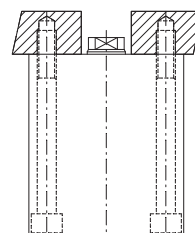
FASTENING / CONNECTION TYPES



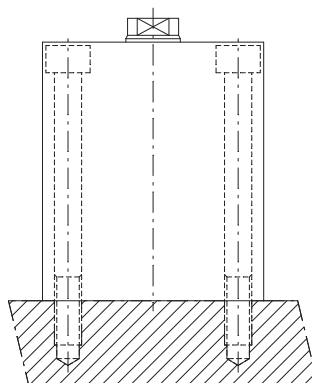
M501 · M502



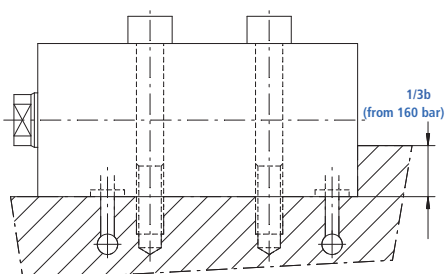
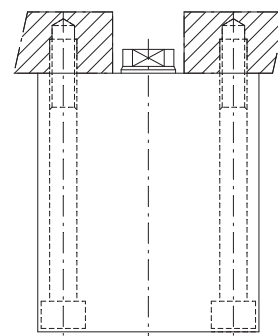
M503 · M504



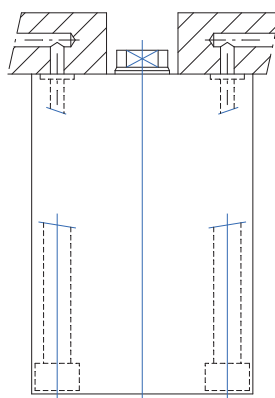
M505



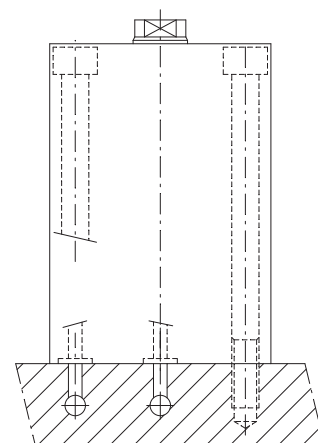
M506



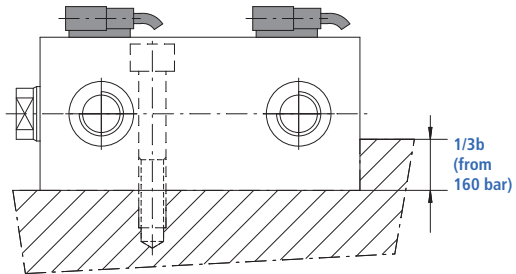
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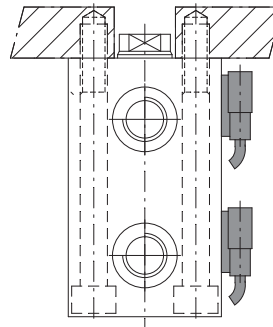
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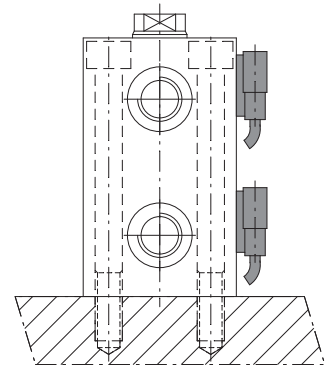
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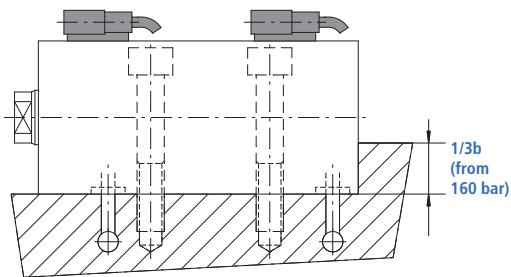
M521



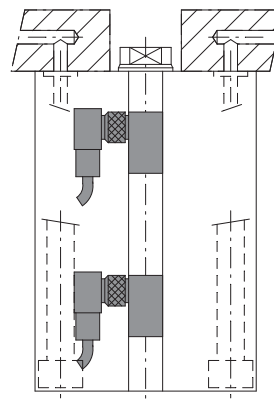
M521



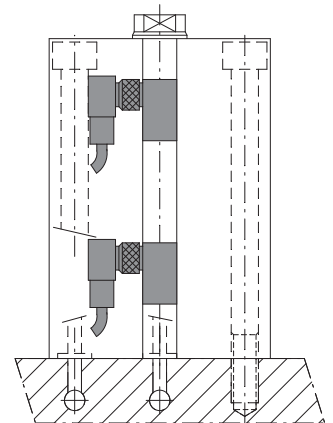
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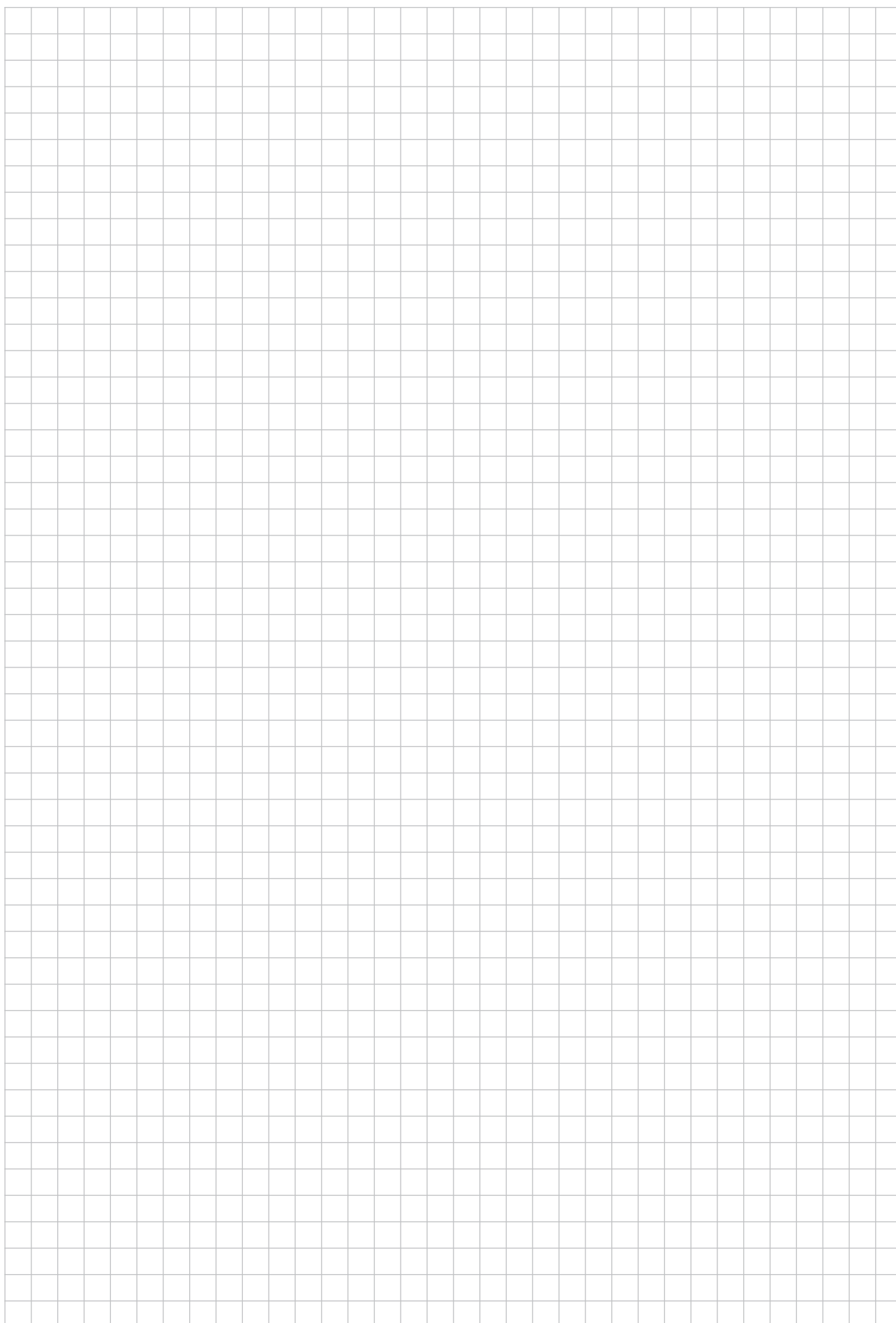
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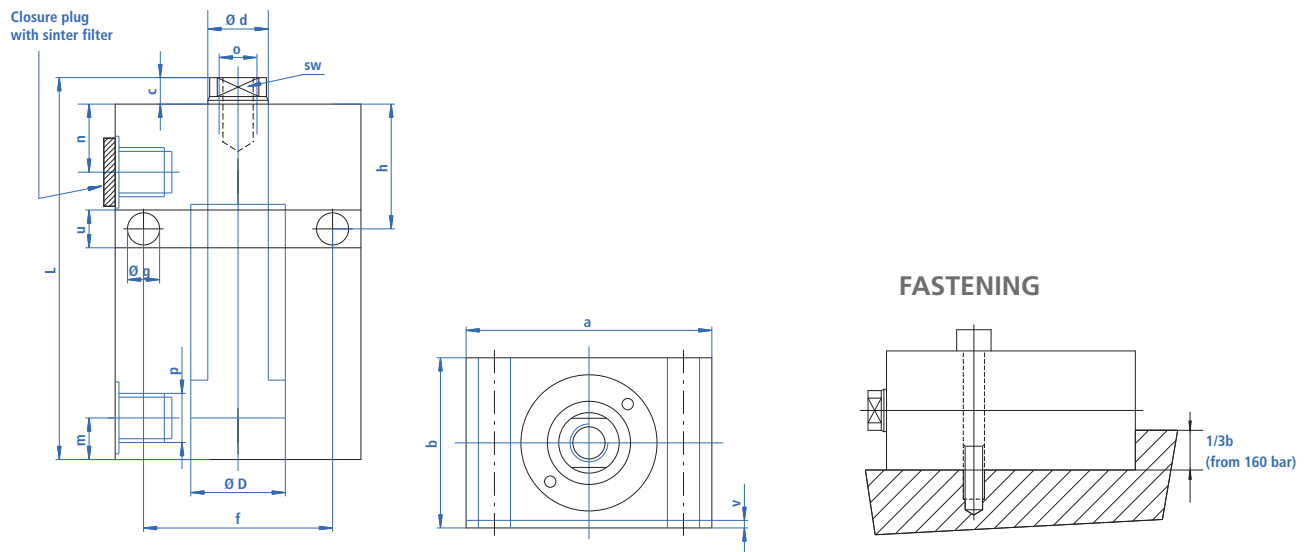


M523



M524





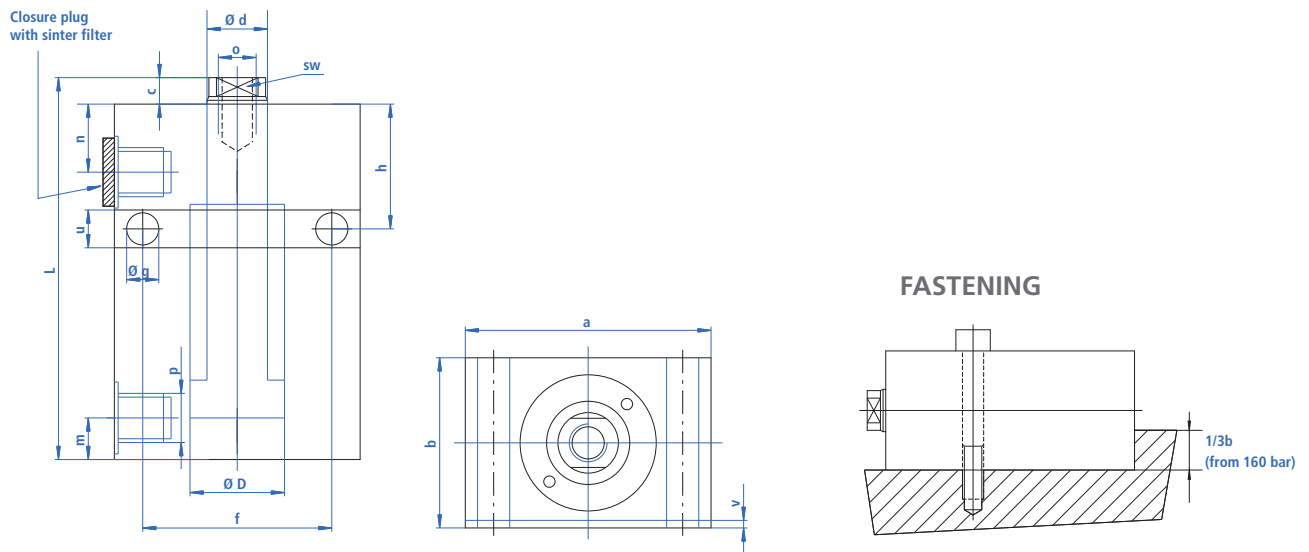
TECHNICAL DATA M501

Pistons Ø D	mm	16	20	25	32	40	50	63	80	100
Rods Ø D	mm	10	14	16	20	25	32	40	50	63
a	mm	60	60	65	75	85	100	125	160	200
b	mm	35	35	45	55	63	75	95	120	150
c	mm	6	7	7	10	10	10	14	14	15
f	mm	30	40	50	55	63	76	95	120	158
g Ø	mm	6.5	6.5	8.5	10.5	10.5	13	17	21	25
h	mm	30	30	33	38	40	44	50	60	64
m	mm	11	11	11	11	11	13	17	21	25
n	mm	16.5	17	18	22	24	27	26	34	35
o x thread depth		M6 x 12	M8 x 15	M10 x 15	M12 x 15	M16 X 25	M20 X 30	M27 X 40	M30 X 40	M42 x 60
p	mm	G 1/4	G 1/4	G 1/4	G 1/4	G 1/4	G 1/4	G 1/2	G 1/2	G 1/2
u	mm	8	8	10	12	12	16	20	24	28
v	mm	2	2	2	3	3	5	5	7	7
sw	mm	8	10	13	17	22	27	36	46	55

ORDER NUMBER OVERVIEW

Pistons Ø D	Compression force at 100 bar	Spring return force at 100 bar	Stroke ±1		Total length L	
mm	kN	kN	mm		mm	
016	2	50	8	20	62	97
020	3.1	100	8	20	68	102
025	4.9	140	8	20	71	101
032	8	190	10	20	85	110
040	12.5	250	10	20	89	114
050	19.6	400	12	20	100	125
063	31.1	400	12	25	116	149
080	50.3	720	12	32	131	179
100	78.4	1100	12	32	145	205
			1	2	1	2

ORDER NUMBER: M501 - Y - XXX



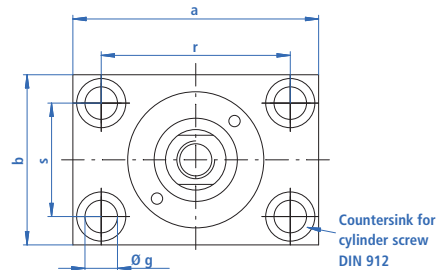
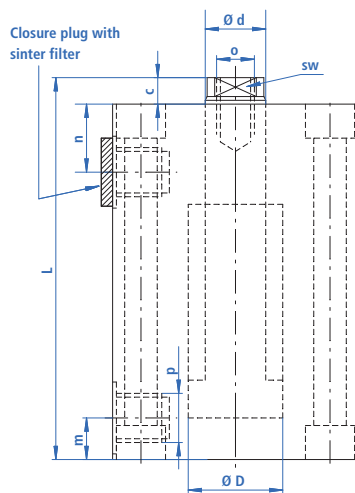
TECHNICAL DATA M502

Pistons Ø D	mm	16	20	25	32	40	50	63	80	100
Rods Ø D	mm	10	14	16	20	25	32	40	50	63
a	mm	60	60	65	75	85	100	125	160	200
b	mm	35	35	45	55	63	75	95	120	150
c	mm	6	7	7	10	10	10	14	14	15
f	mm	30	40	50	55	63	76	95	120	158
g Ø	mm	6.5	6.5	8.5	10.5	10.5	13	17	21	25
h	mm	30	30	33	38	40	44	50	60	64
m	mm	11	11	11	11	11	13	17	21	25
n	mm	16.5	17	18	22	24	27	26	34	35
o x thread depth		M6 x 12	M8 x 15	M10 x 15	M12 x 15	M16 X 25	M20 X 30	M27 X 40	M30 X 40	M42 x 60
p	mm	G 1/4	G 1/4	G 1/4	G 1/4	G 1/4	G 1/4	G 1/2	G 1/2	G 1/2
u	mm	8	8	10	12	12	16	20	24	28
v	mm	2	2	2	3	3	5	5	7	7
sw	mm	8	10	13	17	22	27	36	46	55

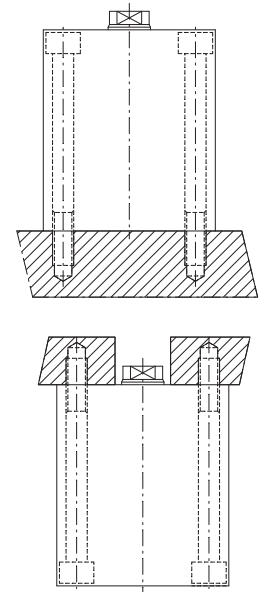
ORDER NUMBER OVERVIEW

Pistons Ø D	Compression force at 100 bar	Stroke ±1		Total length L	
mm	kN	mm		mm	
016	2	16	50	62	97
020	3.1	16	50	68	102
025	4.9	20	50	71	101
032	8	25	50	85	110
040	12.5	25	50	89	114
050	19.6	25	50	100	125
063	31.1	30	63	116	149
080	50.3	32	80	131	179
100	78.4	40	100	145	205
		1	2	1	2

ORDER NUMBER: M502 - Y - XXX



FASTENING



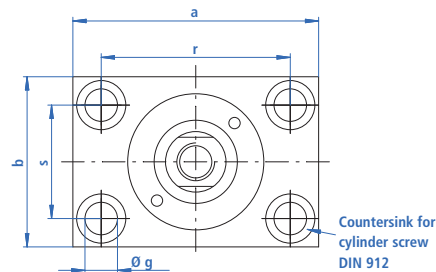
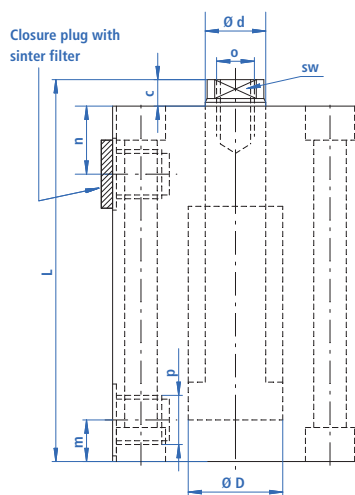
TECHNICAL DATA M503

Pistons Ø D	mm	16	20	25	32	40	50	63	80	100
Rods Ø D	mm	10	14	16	20	25	32	40	50	63
a	mm	60	60	65	75	85	100	125	160	200
b	mm	35	35	45	55	63	75	95	120	150
c	mm	6	7	7	10	10	10	14	14	15
g Ø	mm	6.5	6.5	8.5	10.5	10.5	13	17	21	25
m	mm	11	11	11	11	11	13	17	21	25
n	mm	16.5	17	18	22	24	27	26	34	35
o x thread depth		M6 x 12	M8 x 15	M10 x 15	M12 x 15	M16 X 25	M20 X 30	M27 X 40	M30 X 40	M42 x 60
p		G 1/4	G 1/4	G 1/4	G 1/4	G 1/4	G 1/4	G 1/2	G 1/2	G 1/2
r	mm	40	40	50	55	63	76	95	120	158
s	mm	22	22	30	35	40	45	65	80	108
sw	mm	8	10	13	17	22	27	36	46	55

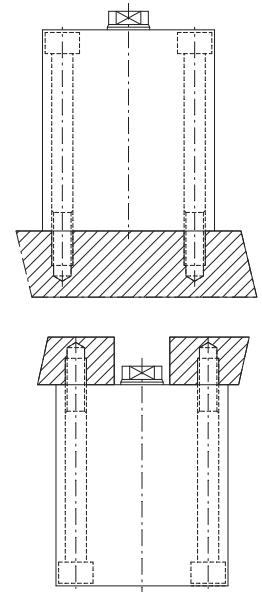
ORDER NUMBER OVERVIEW

Pistons Ø D	Compression force at 100 bar	Spring return force	Stroke ±1		Total length L	
mm	kN	kN	mm		mm	
016	2	50	8	20	62	97
020	3.1	100	8	20	68	102
025	4.9	140	8	20	71	101
032	8	190	10	20	85	110
040	12.5	250	10	20	89	114
050	19.6	400	12	20	100	125
063	31.1	400	12	25	116	149
080	50.3	720	12	32	131	179
100	78.4	1100	12	32	145	205
			1	2	1	2

ORDER NUMBER: M503 - Y - XXX



FASTENING



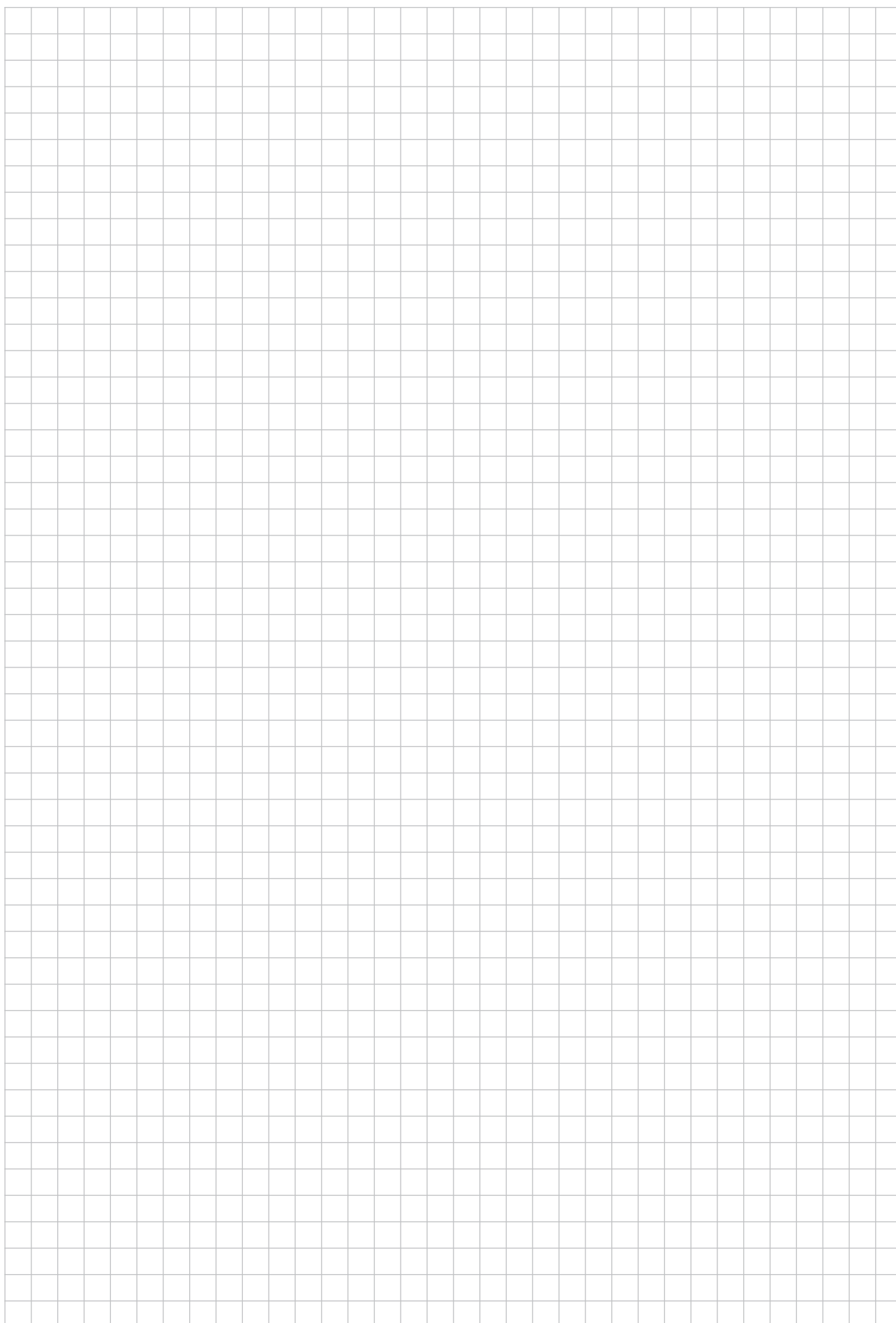
TECHNICAL DATA M504

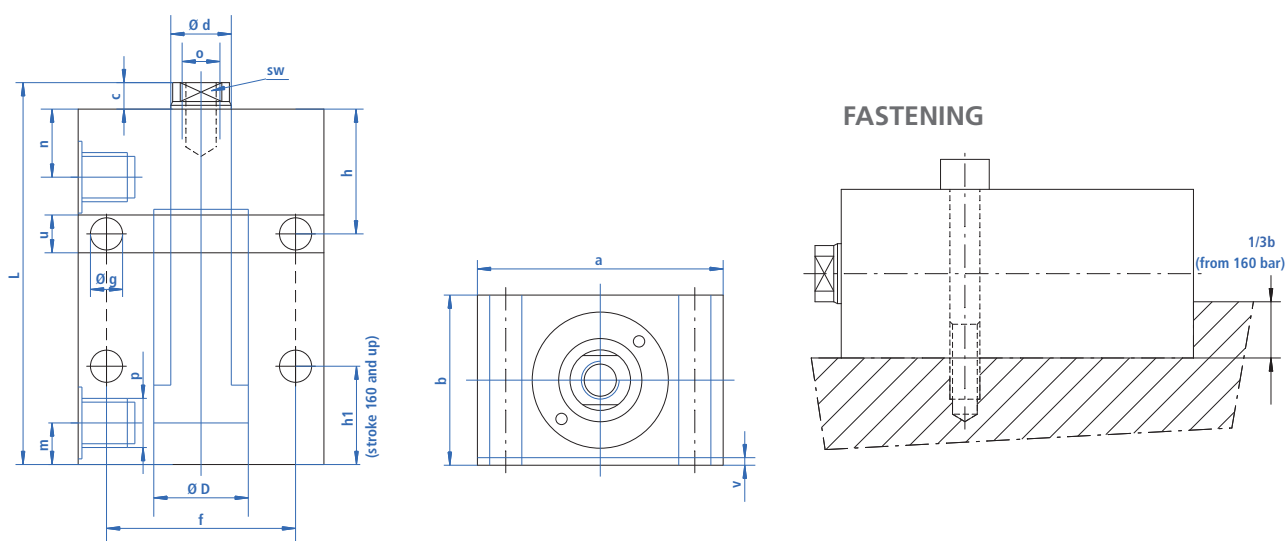
Pistons Ø D	mm	16	20	25	32	40	50	63	80	100
Rods Ø D	mm	10	14	16	20	25	32	40	50	63
a	mm	60	60	65	75	85	100	125	160	200
b	mm	35	35	45	55	63	75	95	120	150
c	mm	6	7	7	10	10	10	14	14	15
g Ø	mm	6.5	6.5	8.5	10.5	10.5	13	17	21	25
m	mm	11	11	11	11	11	13	17	21	25
n	mm	16.5	17	18	22	24	27	26	34	35
o x thread depth		M6 x 12	M8 x 15	M10 x 15	M12 x 15	M16 X 25	M20 X 30	M27 X 40	M30 X 40	M42 x 60
p		G 1/4	G 1/4	G 1/4	G 1/4	G 1/4	G 1/4	G 1/2	G 1/2	G 1/2
r	mm	40	40	50	55	63	76	95	120	158
s	mm	22	22	30	35	40	45	65	80	108
sw	mm	8	10	13	17	22	27	36	46	55

ORDER NUMBER OVERVIEW

Pistons Ø D	Compression force at 100 bar	Stroke ±1		Total length L	
mm	kN	mm		mm	
016	2	16	50	62	97
020	3.1	16	50	68	102
025	4.9	20	50	71	101
032	8	25	50	85	110
040	12.5	25	50	89	114
050	19.6	25	50	100	125
063	31.1	30	63	116	149
080	50.3	32	80	131	179
100	78.4	40	100	145	205
		1	2	1	2

ORDER NUMBER: M504 - Y - XXX





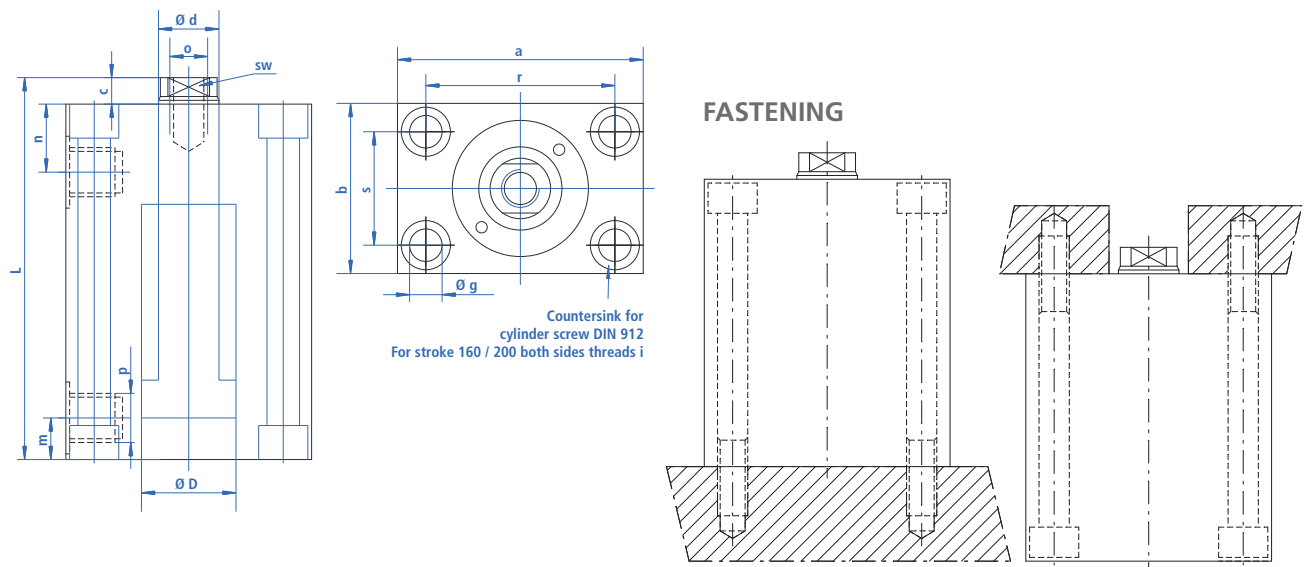
TECHNICAL DATA M505

Pistons Ø D	mm	16	20	25	32	40	50	63	80	100	125	160
Rods Ø D	mm	10	14	16	20	25	32	40	50	63	80	100
a	mm	60	60	65	75	85	100	125	160	200	230	300
b	mm	35	35	45	55	63	75	95	120	150	180	230
c	mm	6	7	7	10	10	10	14	14	15	16	22
f	mm	30	40	50	55	63	76	95	120	158	180	230
g Ø	mm	6.5	6.5	8.5	10.5	10.5	13	17	21	25	32	39
h	mm	30	30	33	38	40	44	50	60	64	82	92
h1 (stroke 160 and up)	mm	—	—	26	27	27	30	41	47	54	66	77
m	mm	11	11	11	11	11	13	17	21	25	31	39
n	mm	16.5	17	18	22	24	27	26	34	35	47	55
o x thread depth		M6 x 12	M8 x 15	M10 x 15	M12 x 15	M16 x 25	M20 x 30	M27 x 40	M30 x 40	M42 x 60	M48 x 70	M56 x 80
p	mm	G 1/4	G 1/4	G 1/4	G 1/4	G 1/4	G 1/4	G 1/2	G 1/2	G 1/2	G 1/2	G 1/2
u	mm	8	8	10	12	12	16	20	24	28	35	42
v	mm	2	2	2	3	3	5	5	7	7	7	7
sw	mm	8	10	13	17	22	27	36	46	55	70	90

ORDER NUMBER OVERVIEW

Pistons Ø D	Comp. force at 100 bar	Tensile force at 100 bar	Stroke ±1					Total length L				
mm	kN	kN	mm					mm				
016	2	1.2	16	50	100					150	97	62
020	3.1	1.6	16	50	100					155	102	68
025	4.9	2.9	20	50	100	160			214	151	101	71
032	8	4.9	25	50	100	160	200	263	223	160	110	85
040	12.5	7.7	25	50	100	160	200	267	227	164	114	89
050	19.6	11.6	25	50	100	160	200	278	238	175	125	100
063	31.1	18.6	30	63	100	160	200	290	250	186	149	116
080	50.3	30.6	32	80	100	160	200	303	263	199	179	131
100	78.4	47.4	40	100		160	200	309	269		205	145
125	122.7	72.4	40	100		160	200	330	290		226	166
160	201	122.5	40	100		160	200	354	314		250	190
			1	2	3	4	5	5	4	3	2	1

ORDER NUMBER: M505 - **Y** - **XXX**



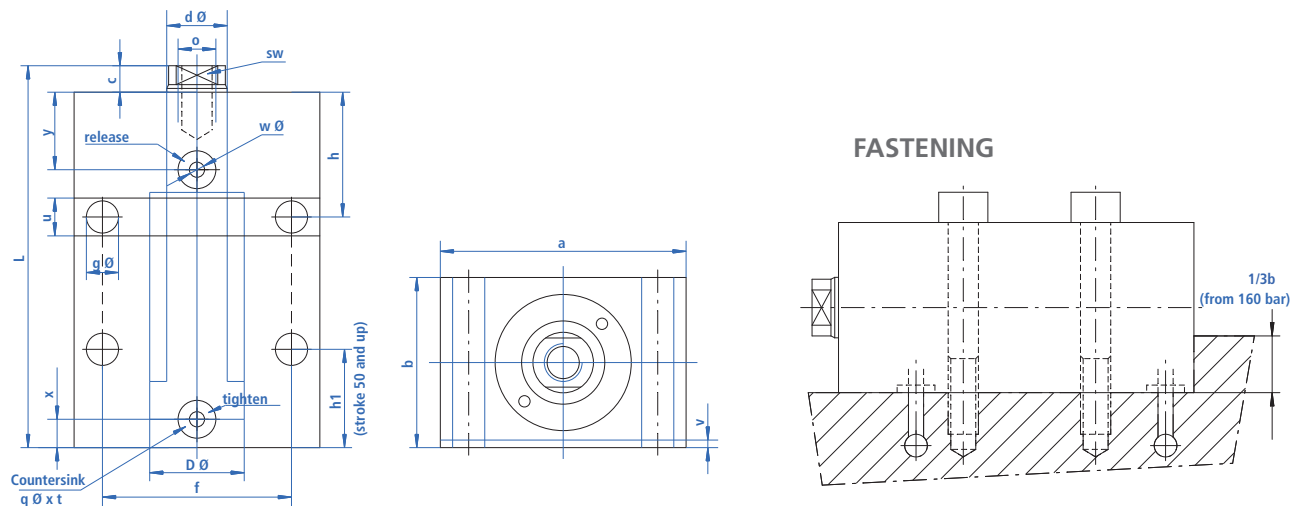
TECHNICAL DATA M506

Pistons Ø D	mm	16	20	25	32	40	50	63	80	100	125	160
Rods Ø D	mm	10	14	16	20	25	32	40	50	63	80	100
a	mm	60	60	65	75	85	100	125	160	200	230	300
b	mm	35	35	45	55	63	75	95	120	150	180	230
c	mm	6	7	7	10	10	10	14	14	15	16	22
g Ø	mm	6.5	6.5	8.5	10.5	10.5	13	17	21	25	32	39
m	mm	11	11	11	11	11	13	17	21	25	31	39
n	mm	16.5	17	18	22	24	27	26	34	35	47	55
o x thread depth		M6 x 12	M8 x 15	M10 x 15	M12 x 15	M16 X 25	M20 X 30	M27 X 40	M30 X 40	M42 X 60	M48 X 70	M56 x 80
p		G 1/4	G 1/4	G 1/4	G 1/4	G 1/4	G 1/4	G 1/2	G 1/2	G 1/2	G 1/2	G 1/2
r	mm	40	40	50	55	63	76	95	120	158	180	230
s	mm	22	22	30	35	40	45	65	80	108	130	160
sw	mm	8	10	13	17	22	27	36	46	55	70	90

ORDER NUMBER OVERVIEW

Pistons Ø D	Comp. force at 100 bar	Tensile force at 100 bar	Stroke ±1					Total length L				
mm	kN	kN	mm					mm				
016	2	1.2	16	50	100					150	97	62
020	3.1	1.6	16	50	100					155	102	68
025	4.9	2.9	20	50	100	160			214	151	101	71
032	8	4.9	25	50	100	160	200	263	223	160	110	85
040	12.5	7.7	25	50	100	160	200	267	227	164	114	89
050	19.6	11.6	25	50	100	160	200	278	238	175	125	100
063	31.1	18.6	30	63	100	160	200	290	250	186	149	116
080	50.3	30.6	32	80	100	160	200	303	263	199	179	131
100	78.4	47.4	40	100		160	200	309	269		205	145
125	122.7	72.4	40	100		160	200	330	290		226	166
160	201	122.5	40	100		160	200	354	314		250	190
			1	2	3	4	5	5	4	3	2	1

ORDER NUMBER: M506 - **Y** - **XXX**



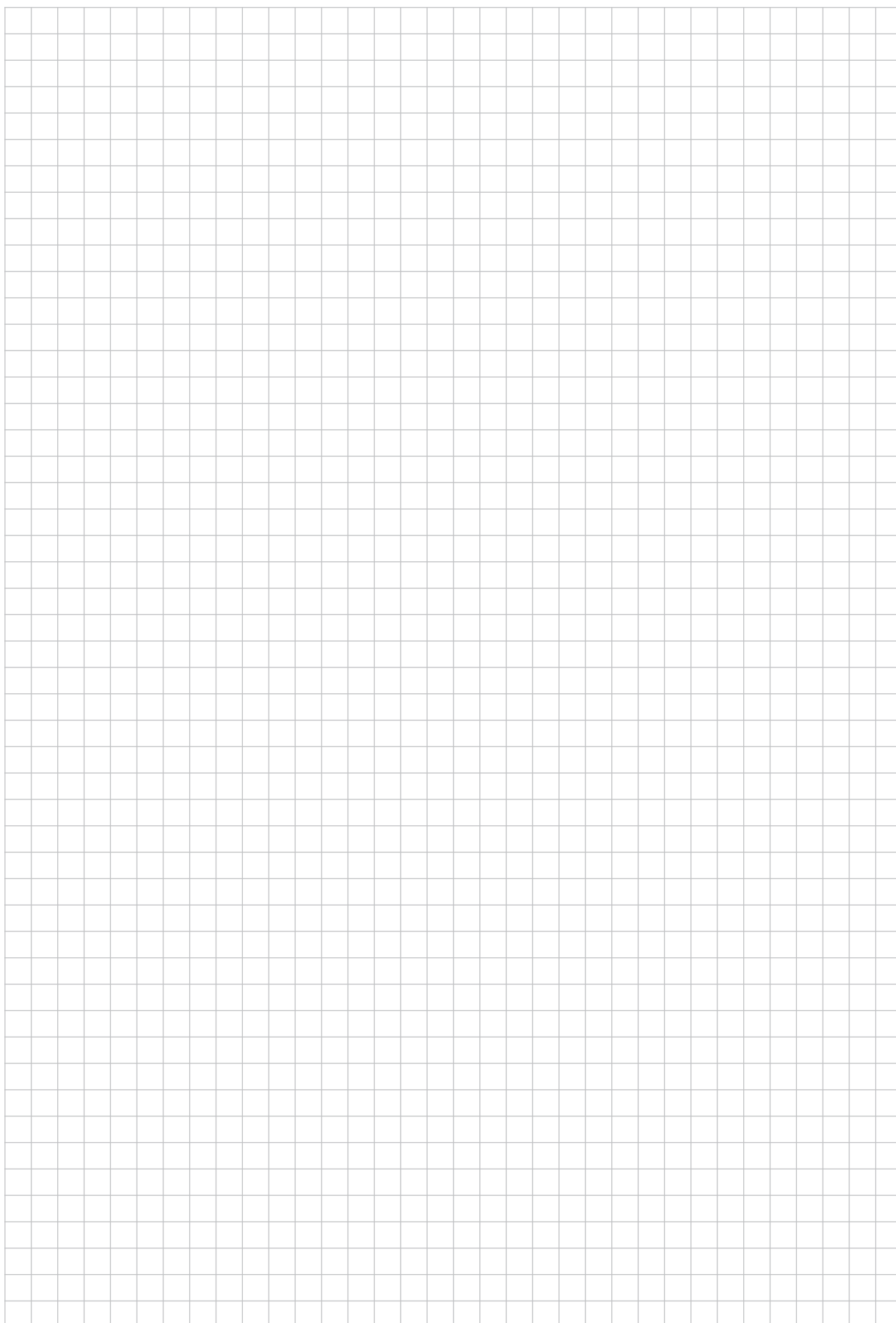
TECHNICAL DATA M507

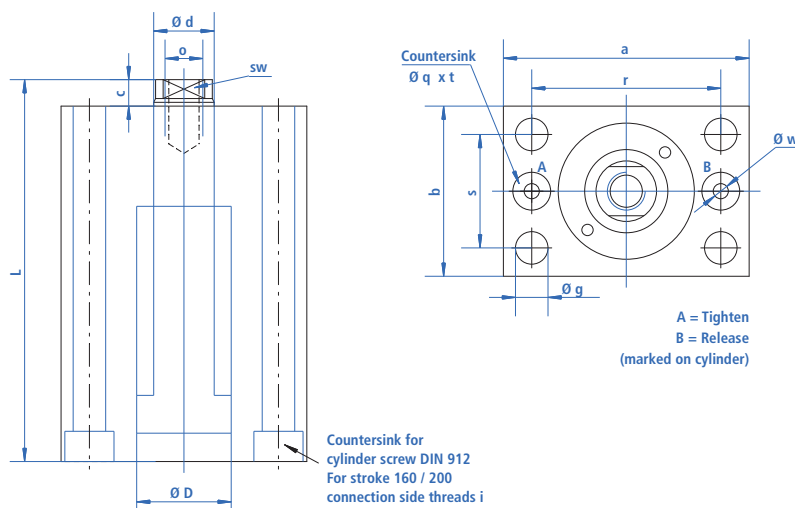
Pistons Ø D	mm	16	20	25	32	40	50	63	80	100	125
Rods Ø D	mm	10	14	16	20	25	32	40	50	63	80
a	mm	60	60	65	75	85	100	125	160	200	230
b	mm	35	35	45	55	63	75	95	120	150	180
c	mm	6	7	7	10	10	10	14	14	15	16
f	mm	30	40	50	55	63	76	95	120	158	180
g Ø	mm	6.5	6.5	8.5	10.5	10.5	13	17	21	25	32
h	mm	30	30	33	38	40	44	50	60	64	82
h1 (stroke 50 mm and up)	mm	24.5	26	26	27	27	30	41	47	54	66
o x thread depth		M6 x 12	M8 x 15	M10 x 15	M12 x 15	M16 x 25	M20 x 30	M27 x 40	M30 x 40	M42 x 60	M48 x 70
qØ x t	mm	9.8x1.1	9.8x1.1	9.8x1.1	9.8x1.1	9.8x1.1	10.8x1.1	13.8x1.5	13.8x1.5	13.8x1.5	13.8x1.5
u	mm	8	8	10	12	12	16	20	24	28	35
v	mm	2	2	2	3	3	5	5	7	7	7
w Ø	mm	3.5	3.5	4	5	6	6	8	8	8	8
x	mm	7	7.5	7.5	10	10	13	16	21	25	31
y	mm	20.5	20.5	21	25	27	29.5	32	39	40	47
O-ring	mm	7x1.5	7x1.5	7x1.5	7x1.5	7x1.5	8x1.5	10x2	10x2	10x2	10x2
sw	mm	8	10	13	17	22	27	36	46	55	70

ORDER NUMBER OVERVIEW

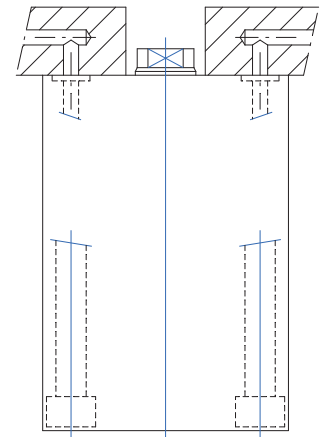
Pistons Ø D	Comp. force at 100 bar	Tensile force at 100 bar	Stroke ±1					Total length L				
mm	kN	kN	mm					mm				
016	2	1.2	16	50	100					150	97	62
020	3.1	1.6	16	50	100					155	102	68
025	4.9	2.9	20	50	100	160			214	151	101	71
032	8	4.9	25	50	100	160	200	263	223	160	110	85
040	12.5	7.7	25	50	100	160	200	267	227	164	114	89
050	19.6	11.6	25	50	100	160	200	278	238	175	125	100
063	31.1	18.6	30	63	100	160	200	290	250	186	149	116
080	50.3	30.6	32	80	100	160	200	303	263	199	179	131
100	78.4	47.4	40	100		160	200	309	269		205	145
125	122.7	72.4	40	100		160	200	330	290		226	166
			1	2	3	4	5	5	4	3	2	1

ORDER NUMBER: M507 - Y - XXX





FASTENING



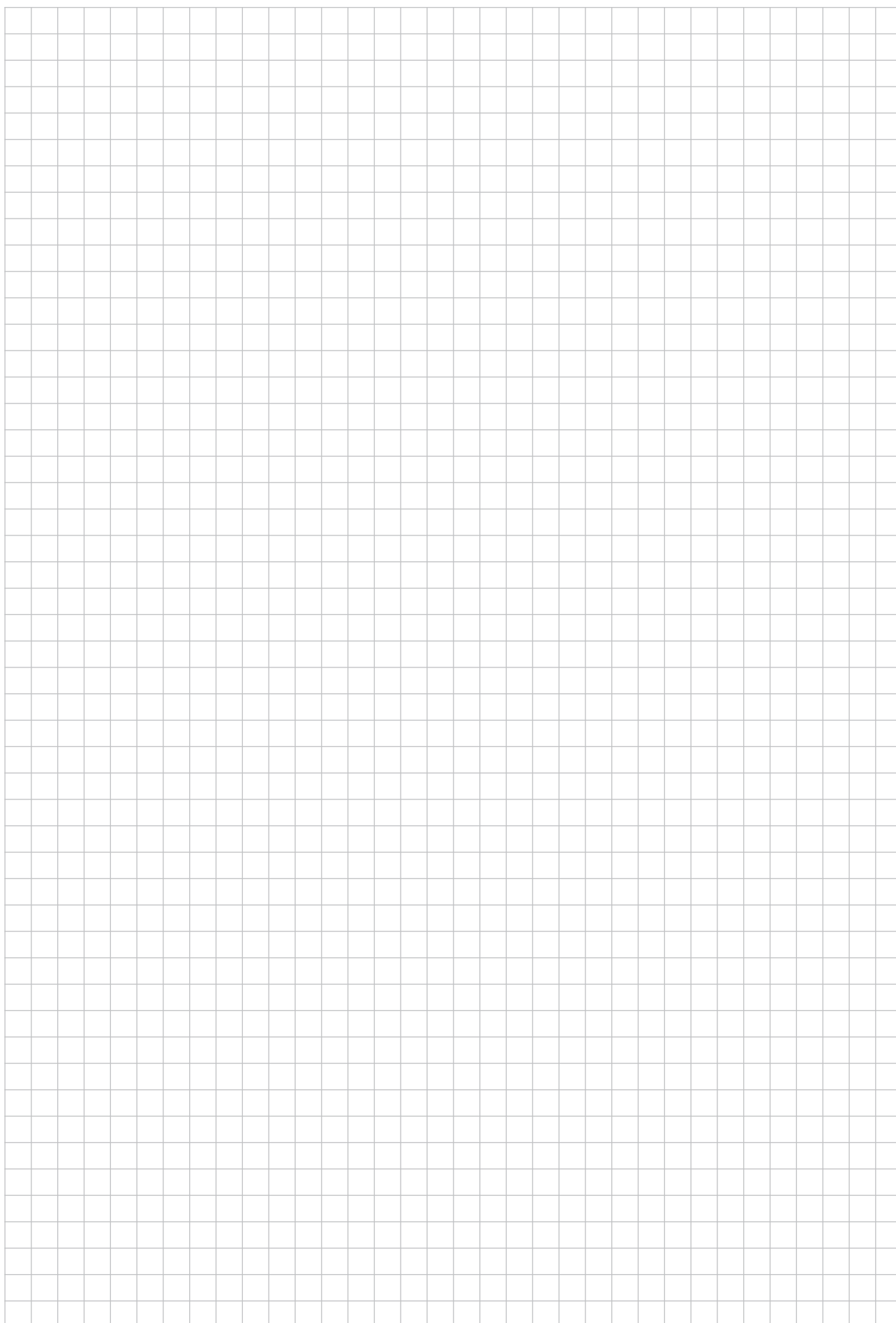
TECHNICAL DATA M508

Pistons Ø D	mm	16	20	25	32	40	50	63	80	100	125
Rods Ø D	mm	10	14	16	20	25	32	40	50	63	80
a	mm	60	60	65	75	85	100	125	160	200	230
b	mm	35	35	45	55	63	75	95	120	150	180
c	mm	6	7	7	10	10	10	14	14	15	16
g Ø	mm	6.5	6.5	8.5	10.5	10.5	13	17	21	25	32
i (only stroke 160/200)		-	-	M8 x 12	M10 x 15	M10x15	M12 x 18	M16 x 24	M20 x 30	M24 x 36	M30 x 45
o x thread depth		M6 x 12	M8 x 15	M10 x 15	M12 x 15	M16 x 25	M20 x 30	M27 x 40	M30 x 40	M42 x 60	M48 x 70
qØ x t	mm	9.8x1.1	9.8x1.1	9.8x1.1	9.8x1.1	9.8x1.1	10.8x1.1	13.8x1.5	13.8x1.5	13.8x1.5	13.8x1.5
r	mm	40	40	50	55	63	76	95	120	158	180
s	mm	22	22	30	35	40	45	65	80	108	130
w Ø	mm	3.5	3.5	4	5	6	6	8	8	8	8
O-ring	mm	7x1.5	7x1.5	7x1.5	7x1.5	7x1.5	8x1.5	10x2	10x2	10x2	10x2
sw	mm	8	10	13	17	22	27	36	46	55	70

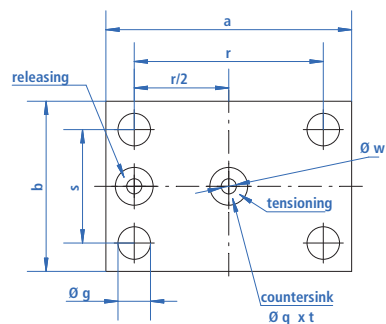
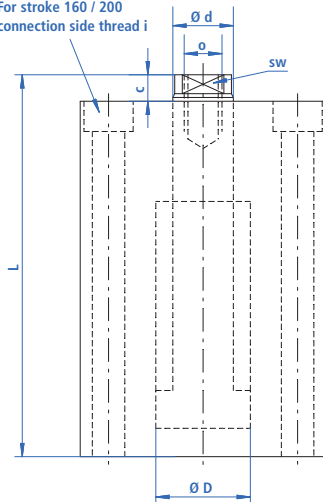
ORDER NUMBER OVERVIEW

Pistons Ø D	Compr. force at 100 bar	Tensile force at 100 bar	Stroke ±1					Total length L				
mm	kN	kN	mm					mm				
016	2	1.2	16	50	100					150	97	62
020	3.1	1.6	16	50	100					155	102	68
025	4.9	2.9	20	50	100	160			214	151	101	71
032	8	4.9	25	50	100	160	200	263	223	160	110	85
040	12.5	7.7	25	50	100	160	200	267	227	164	114	89
050	19.6	11.6	25	50	100	160	200	278	238	175	125	100
063	31.1	18.6	30	63	100	160	200	290	250	186	149	116
080	50.3	30.6	32	80	100	160	200	303	263	199	179	131
100	78.4	47.4	40	100		160	200	309	269		205	145
125	122.7	72.4	40	100		160	200	330	290		226	166
			1	2	3	4	5	5	4	3	2	1

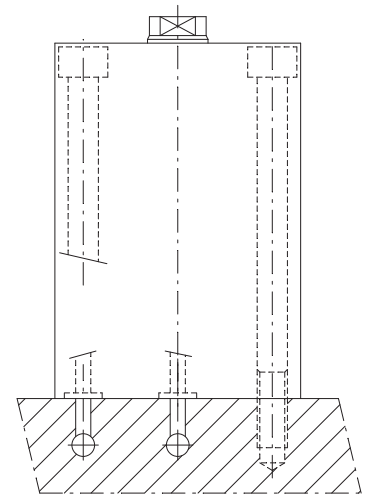
ORDER NUMBER: M508 - Y - XXX



Countersink for
cylinder screw DIN 912
For stroke 160 / 200
connection side thread i



FASTENING



TECHNICAL DATA M509

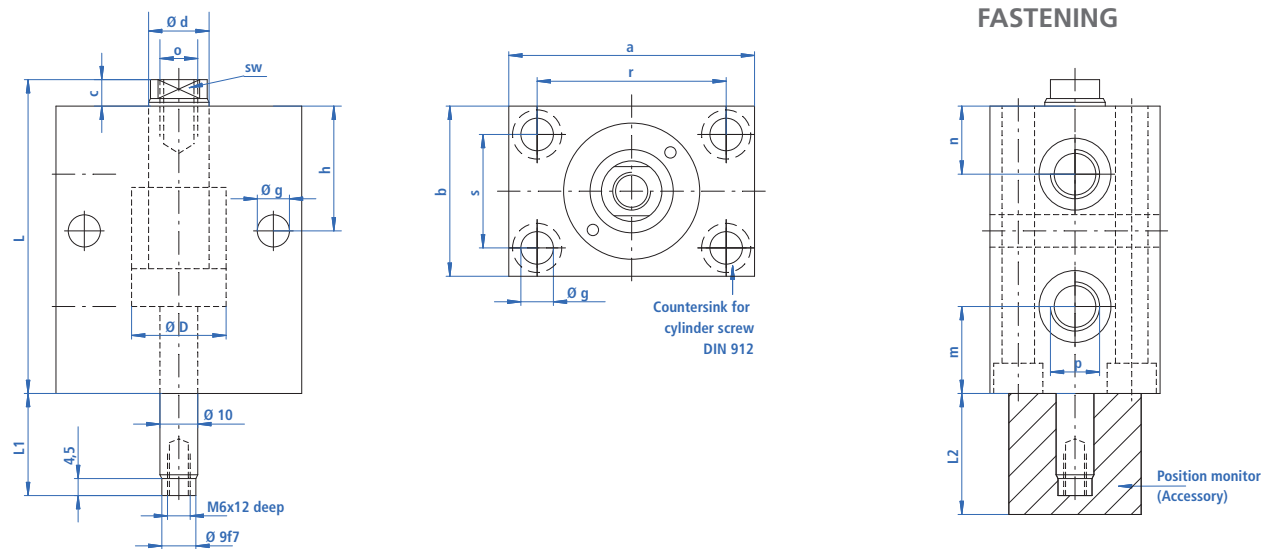
Pistons Ø D	mm	16	20	25	32	40	50	63	80	100	125
Rods Ø D	mm	10	14	16	20	25	32	40	50	63	80
a	mm	60	60	65	75	85	100	125	160	200	230
b	mm	35	35	45	55	63	75	95	120	150	180
c	mm	6	7	7	10	10	10	14	14	15	16
g Ø	mm	6.5	6.5	8.5	10.5	10.5	13	17	21	25	32
i (only stroke 160/200)		-	-	M8 x 12	M10 x 15	M10 x 15	M12 x 18	M16 x 24	M20 x 30	M24 x 36	M30 x 45
o x thread depth		M6 x 12	M8 x 15	M10 x 15	M12 x 15	M16 x 25	M20 x 30	M27 x 40	M30 x 40	M42 x 60	M48 x 70
q Ø x t	mm	9.8 x 1.1	9.8 x 1.1	9.8 x 1.1	9.8 x 1.1	9.8 x 1.1	10.8 x 1.1	13.8 x 1.5	13.8 x 1.5	13.8 x 1.5	13.8 x 1.5
r	mm	40	40	50	55	63	76	95	120	158	180
s	mm	22	22	30	35	40	45	65	80	108	130
w Ø	mm	3.5	3.5	4	5	6	6	8	8	8	8
O-ring	mm	7 x 1.5	7 x 1.5	7 x 1.5	7 x 1.5	7 x 1.5	8 x 1.5	10 x 2	10 x 2	10 x 2	10 x 2
sw	mm	8	10	13	17	22	27	36	46	55	70

ORDER NUMBER OVERVIEW

Pistons Ø D	Comp. force at 100 bar	Tensile force at 100 bar	Stroke ±1					Total length L				
mm	kN	kN	mm					mm				
016	2	1.2	16	50	100					150	97	62
020	3.1	1.6	16	50	100					155	102	68
025	4.9	2.9	20	50	100	160			214	151	101	71
032	8	4.9	25	50	100	160	200	263	223	160	110	85
040	12.5	7.7	25	50	100	160	200	267	227	164	114	89
050	19.6	11.6	25	50	100	160	200	278	238	175	125	100
063	31.1	18.6	30	63	100	160	200	290	250	186	149	116
080	50.3	30.6	32	80	100	160	200	303	263	199	179	131
100	78.4	47.4	40	100		160	200	309	269		205	145
125	122.7	72.4	40	100		160	200	330	290		226	166
			1	2	3	4	5	5	4	3	2	1

ORDER NUMBER: M509 - Y - XXX





TECHNICAL DATA M520

Pistons Ø D	mm	16	20	25	32	40	50	63	80	100	125
Rods Ø D	mm	10	14	16	20	25	32	40	50	63	80
a	mm	60	60	65	75	85	100	125	160	200	230
b	mm	35	35	45	55	63	75	95	120	150	180
c	mm	6	7	7	10	10	10	14	14	15	16
g Ø	mm	6.5	6.5	8.5	10.5	10.5	13	17	21	25	32
i (only stroke 160/200)		-	-	M8 x 12	M10 x 15	M10x15	M12 x 18	M16 x 24	M20 x 30	M24 x 36	M30 x 45
o x thread depth		M6 x 12	M8 x 15	M10 x 15	M12 x 15	M16 x 25	M20 x 30	M27 x 40	M30 x 40	M42 x 60	M48 x 70
qØ x t	mm	9.8x1.1	9.8x1.1	9.8x1.1	9.8x1.1	9.8x1.1	10.8x1.1	13.8x1.5	13.8x1.5	13.8x1.5	13.8x1.5
r	mm	40	40	50	55	63	76	95	120	158	180
s	mm	22	22	30	35	40	45	65	80	108	130
w Ø	mm	3.5	3.5	4	5	6	6	8	8	8	8
O-ring	mm	7x1.5	7x1.5	7x1.5	7x1.5	7x1.5	8x1.5	10x2	10x2	10x2	10x2
sw	mm	8	10	13	17	22	27	36	46	55	70

ORDER NUMBER OVERVIEW

Pistons Ø D	Compression force at 100 bar	Tensile force at 100 bar	Stroke ±1	Total length L (without position monitor accessory)
mm	kN	kN	mm	mm
025	4.9	2.9	20	110
032	8	4.9	25	128
040	12.5	7.7	25	132
050	19.6	11.6	25	142
063	31.1	18.6	30	161
080	50.3	30.6	32	181
100	78.4	47.4	40	192
125	122.7	72.4	40	213
			1	1

ORDER NUMBER: M509 - Y - XXX

GENERAL DESCRIPTION

Block cylinders can present the ideal solution due to their large range of force with compact design dimensions and thanks to short and precise cycle times for many manufacturing tasks.

With functions such as

- positioning
- clamp
- embossing
- stamping
- riveting
- clamping
- closing
- opening
- bending
- drawing



they have also been proven in automobile, machine and mold construction, as well as in the field of injection molding.

With aluminum block cylinders the query of the position of the cylinder piston is possible via electronic magnet sensors.

The switches can be freely adjusted by moving along the grooves.

Aluminum block cylinders with position monitor are used with time- or cycle-bound clamping and releasing cycles and in automated systems.

DESIGN

Housing:	Material AlZnMgCu1.5 Piston bore rolled or honed
Pistons:	Material case hardened steel, one piece, piston rod seal in tandem design
Dimensional tolerances:	As long as not otherwise indicated, according to DIN 7168-m

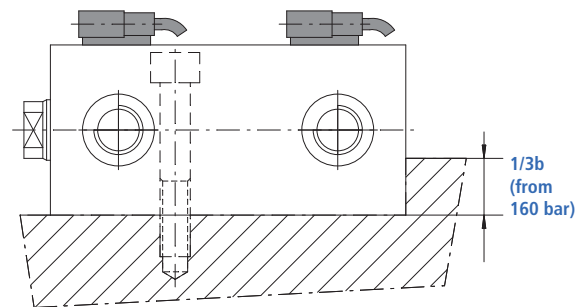
GENERAL INFORMATION

Force range:	Up to above 1000 kN
Standard strokes:	Of 20–100 mm
Installation position:	As required
Piston speed:	V _{max} 0.5 m/s
Max. operating pressure:	350 bar
Operating temperature:	Standard –10 to +60°C, Viton: on request
Piston transverse force:	Should be avoided, in no case > 5% of the cylinder force
Medium:	Mineral oil according to DIN 51524

TECHNICAL INFORMATION

FASTENING

With fastening using transverse bores above an operating pressure of 160 bar the cylinder must be supported on the back or by slot nuts.



TECHNICAL DATA

Pistons Ø D	mm	25	32	40	50	63
Rods Ø D	mm	16	20	25	32	40
Effective piston area, pressing	cm ²	4.9	8	12.5	19.6	31.1
Effective piston area, pulling	cm ²	2.9	4.9	7.7	11.6	18.6
Compression force (100 bar)	kN	4.9	8	12.5	19.6	31.1
Tensile force (100 bar)	kN	2.9	4.9	7.7	11.6	18.6

CUSTOM DESIGN

High temperature design with Viton: For temperatures above 100°C.

Order example: M521-2-020-V

Stroke shortening during extension: By using a spacing disk the stroke is shortened

Order example: M521-2-020-30

Male threads on the piston rod: Desired threads are made on the piston rod ends

Order example: M521-2-020-M8 x 15 (Total length = L + 15 mm)

Inductive proximity switch: Placing inductive proximity switch on the stroke start and stroke end

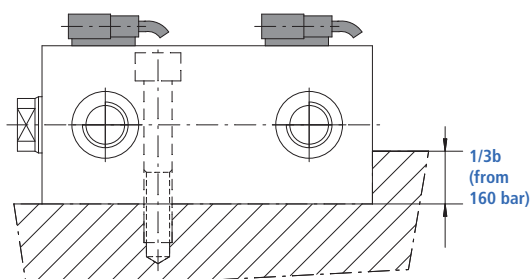
Order example: M521-2-20-N

Punching cylinder: Placing guide elements on pistons and screwed connection

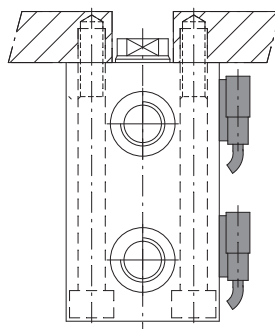
Order example: M521-2-20-S

FASTENING / CONNECTION TYPES

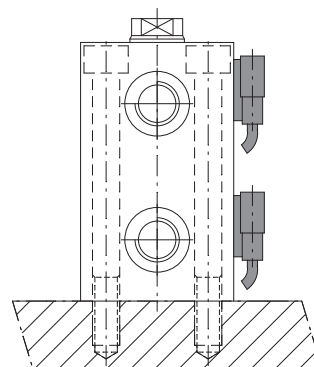
PIPE THREADS



M521

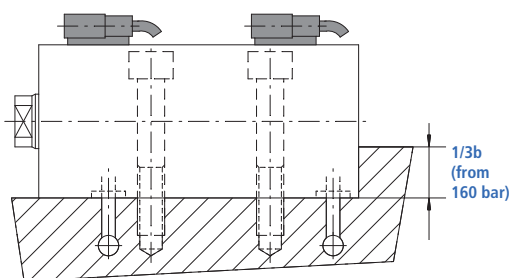


M521

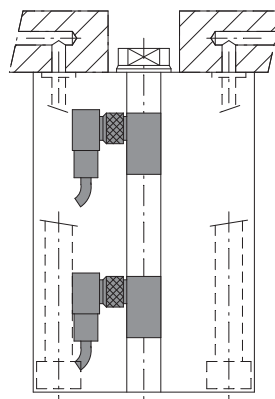


M521

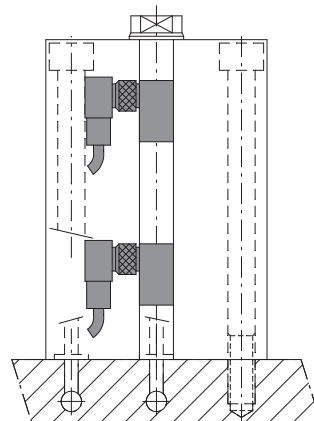
O RING CONNECTION



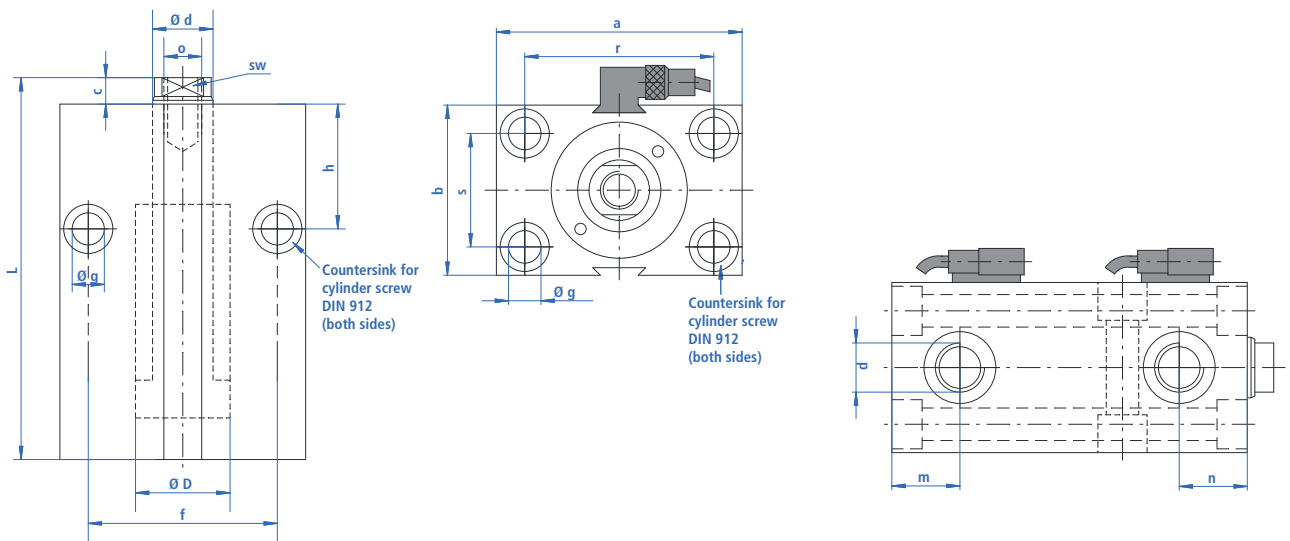
M522



M523



M524



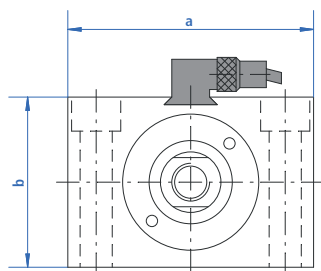
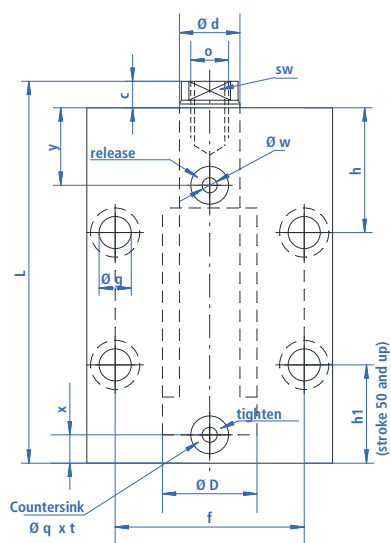
TECHNICAL DATA M521

Pistons Ø D	mm	25	32	40	50	63
Rods Ø D	mm	16	20	25	32	40
a	mm	65	75	85	100	125
b	mm	45	55	63	75	95
c	mm	7	10	10	10	14
f	mm	50	55	63	76	95
g Ø	mm	8.5	10.5	10.5	13	17
h	mm	33	38	40	44	50
m	mm	18	20	21	21	26
n	mm	18	22	24	27	26
o x thread depth		M10 x 15	M12 x 15	M16 x 25	M20 x 30	M27 x 40
p	mm	G 1/4	G 1/4	G 1/4	G 1/4	G 1/2
r	mm	50	55	63	76	95
s	mm	30	35	40	45	65
sw	mm	13	17	22	27	36

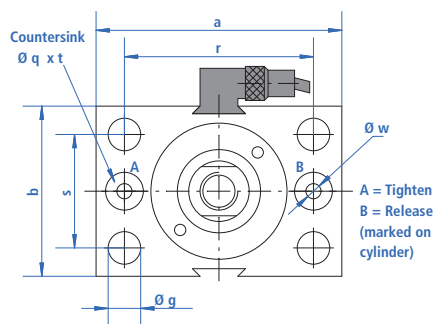
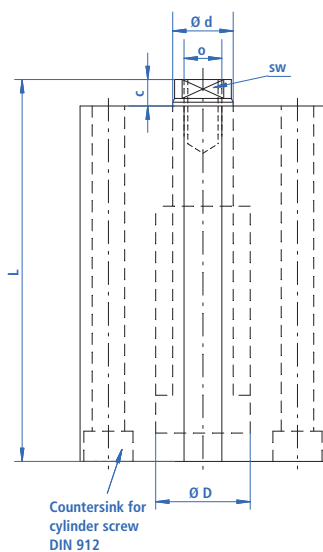
ORDER NUMBER OVERVIEW

Pistons Ø D	Comp. force at 100 bar	Tensile force at 100 bar	Stroke ±1			Total length L		
mm	kN	kN	mm			mm		
025	4.9	2.9	20	50	100	85	115	165
032	8	4.9	25	50	100	100	125	175
040	12.5	7.7	25	50	100	106	131	181
050	19.6	11.6	25	50	100	117	142	192
063	31.1	18.6	30	63	100	135	168	205
			1	2	3	1	2	3

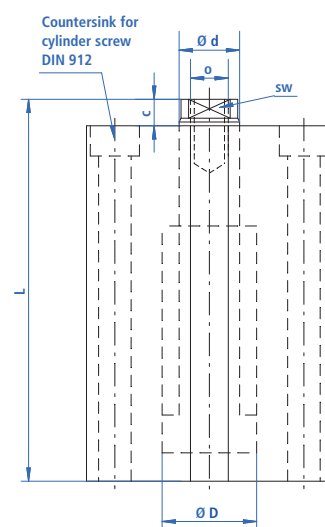
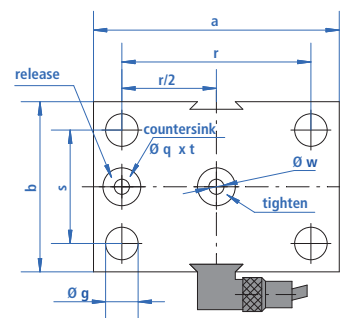
ORDER NUMBER: M521 - Y - XXX



M522



M523



M524

TECHNICAL DATA M522 | M523 | M524

Pistons Ø D	mm	25	32	40	50	63
Rods Ø D	mm	16	20	25	32	40
a	mm	65	75	85	100	125
b	mm	45	55	63	75	95
c	mm	7	10	10	10	14
f	mm	50	55	63	76	95
g Ø	mm	8.5	10.5	10.5	13	17
h	mm	33	38	40	44	50
h1 (stroke 50 and up)	mm	40	42	44	47	60
x	mm	21.5	25	27	30	35
y	mm	21	25	27	29.5	32
o x thread depth		M10 x 15	M12 x 15	M16 x 25	M20 x 30	M27 x 40
q Ø x t	mm	9.8 x 1.1	10.8 x 1.1	10.8 x 1.1	10.8 x 1.1	15.8 x 1.3
r	mm	50	55	63	76	95
s	mm	30	35	40	45	65
w Ø	mm	4	5	6	6	8
O-ring	mm	7 x 1.5	8 x 1.5	8 x 1.5	8 x 1.5	12.42 x 1.78
sw	mm	13	17	22	27	36

ORDER NUMBER OVERVIEW M522

Pistons Ø D	Comp. force at 100 bar	Tensile force at 100 bar	Stroke ±1			Total length L		
mm	kN	kN	mm			mm		
025	4.9	2.9	20	50	100	85	115	165
032	8	4.9	25	50	100	100	125	175
040	12.5	7.7	25	50	100	106	131	181
050	19.6	11.6	25	50	100	117	142	192
063	31.1	18.6	30	63	100	135	168	205
			1	2	3	1	2	3

ORDER NUMBER: M522 - Y - XXX

ORDER NUMBER OVERVIEW M523

Pistons Ø D	Comp. force at 100 bar	Tensile force at 100 bar	Stroke ±1			Total length L		
mm	kN	kN	mm			mm		
025	4.9	2.9	20	50	100	85	115	165
032	8	4.9	25	50	100	100	125	175
040	12.5	7.7	25	50	100	106	131	181
050	19.6	11.6	25	50	100	117	142	192
063	31.1	18.6	30	63	100	135	168	205
			1	2	3	1	2	3

ORDER NUMBER: M523 - Y - XXX

ORDER NUMBER OVERVIEW M524

Pistons Ø D	Comp. force at 100 bar	Tensile force at 100 bar	Stroke ±1			Total length L		
mm	kN	kN	mm			mm		
025	4.9	2.9	20	50	100	85	115	165
032	8	4.9	25	50	100	100	125	175
040	12.5	7.7	25	50	100	106	131	181
050	19.6	11.6	25	50	100	117	142	192
063	31.1	18.6	30	63	100	135	168	205
			1	2	3	1	2	3

ORDER NUMBER: M523 - Y - XXX

GENERAL DESCRIPTION

Round cylinders can be arranged close to each other due to their space-saving exterior shape and present the ideal solution for numerous manufacturing tasks. Frequent use in multiple clamping equipment in the automotive branch and in machine construction and mold making.

Typical tasks of the elements for this are positioning, clamping, embossing, stamping, riveting, closing, opening, bending or drawing of components.



DESIGN

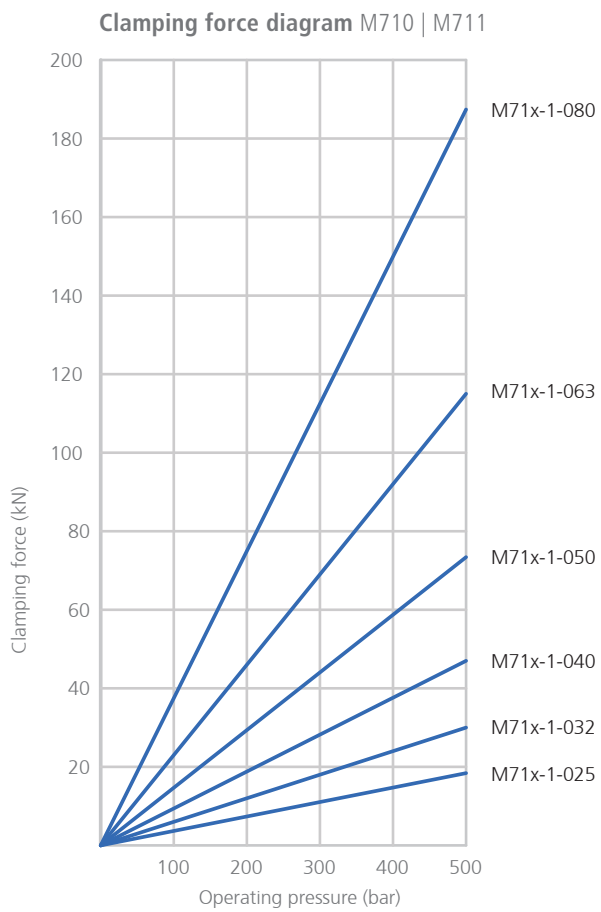
Housing:	Automotive steel bronzed, piston bore rolled or honed
Pistons:	Material case hardened steel, one piece, piston rod seal in tandem design
Dimensional tolerances:	As long as not otherwise indicated, according to DIN 7168-m

HOLLOW PISTON CYLINDER

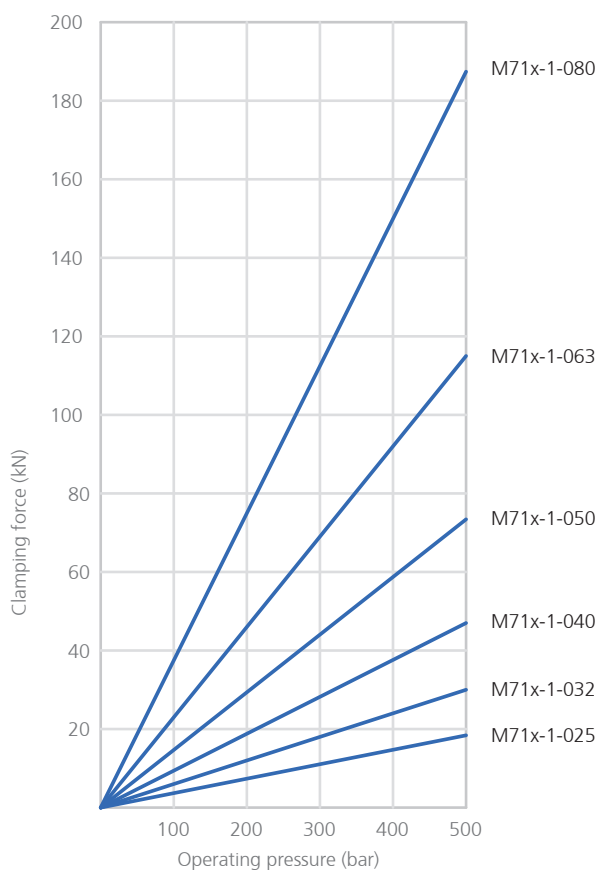
Hollow piston cylinders are often used in connection with mechanical clamping elements as tension and compression cylinders. Hollow piston cylinders have a spring return setting and the piston rods a HC thread for heli-coil use.

GENERAL INFORMATION

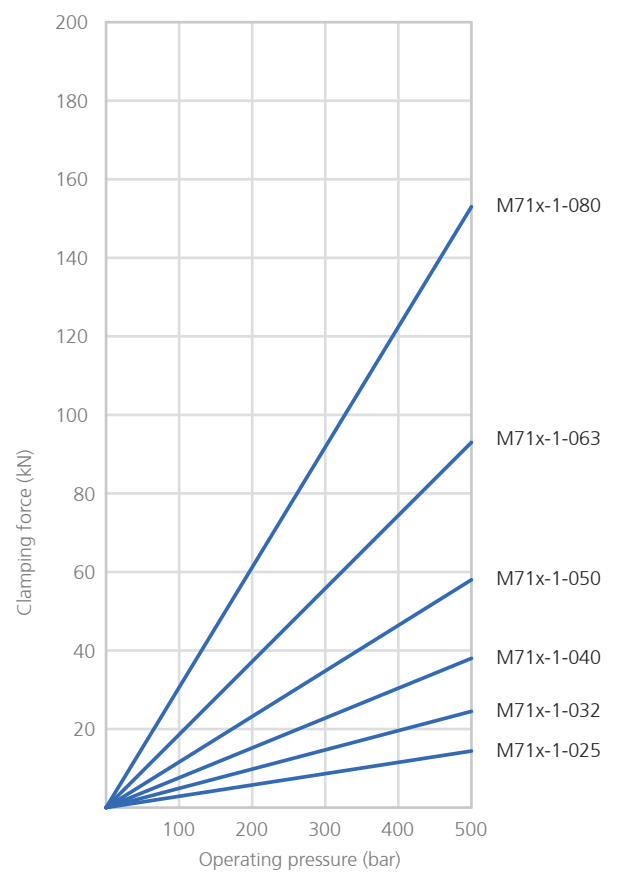
Force range:	Clamping force up to 200 kN
Standard strokes:	Of 10–25 mm
Installation position:	Fastening through flanging or sticking on the pulling rod.
Piston speed:	V _{max} 0.5 m/s
Max. operating pressure:	500 bar
Operating temperature:	Standard: –10 to +60°C Viton: on request
Piston transverse force:	Should be avoided, in no case > 5 % of the cylinder force
Medium:	Mineral oil according to DIN 51524
Models:	24 models with/without male threads
Connections:	Pipe thread connection



Forward stroke clamping force diagram M712 | M713



Return stroke clamping force diagram M712 | M713



CLAMPING AND SCREW-IN CYLINDERS

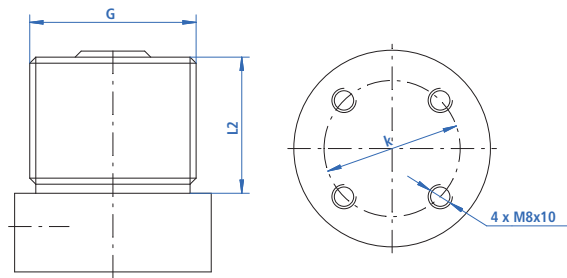
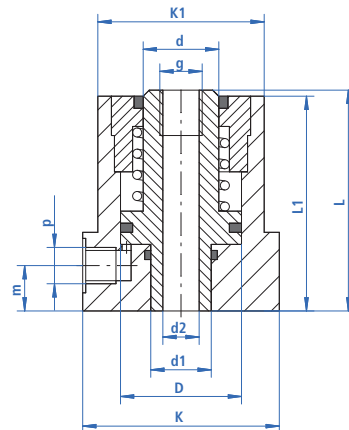
Clamping and screw-in cylinders are mainly used in multiple clamping devices and allow there a close arrangement of the individual elements, which double-acting design enables precise cycle times.

GENERAL INFORMATION CLAMPING CYLINDER

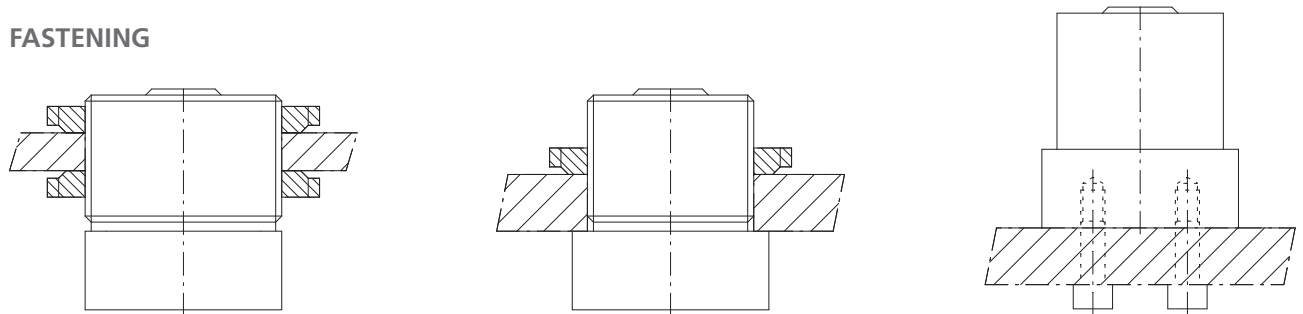
Force range:	Clamping force up to 160 kN
Standard strokes:	Of 20–50 mm
Installation position:	Fastening by flanging
Max. operating pressure:	500 bar
Operating temperature:	Standard: –10 to +60°C Viton: on request
Piston transverse force:	Should be avoided, in no case > 5% of the cylinder force
Medium:	Mineral oil according to DIN 51524
Models:	12 models with male threads
Connections:	Pipe thread connection
Designs:	Piston rod ends with female threads or spherical

GENERAL INFORMATION SCREW-IN CYLINDER

Force range:	Clamping force up to 160 kN
Standard strokes:	Of 15–50 mm
Installation position:	Fastening by screwing in (cylindrical housing in cartridge design)
Max. operating pressure:	500 bar
Operating temperature:	Standard: –10 to +60°C Viton: on request
Piston transverse force:	Should be avoided, in no case > 5% of the cylinder force
Medium:	Mineral oil according to DIN 51524
Models:	20 models
Connections:	Oil supply via oil channels
Designs:	Piston rod ends with female threads or spherical

M710

M711

Hollow piston
cylinder single-acting

FASTENING

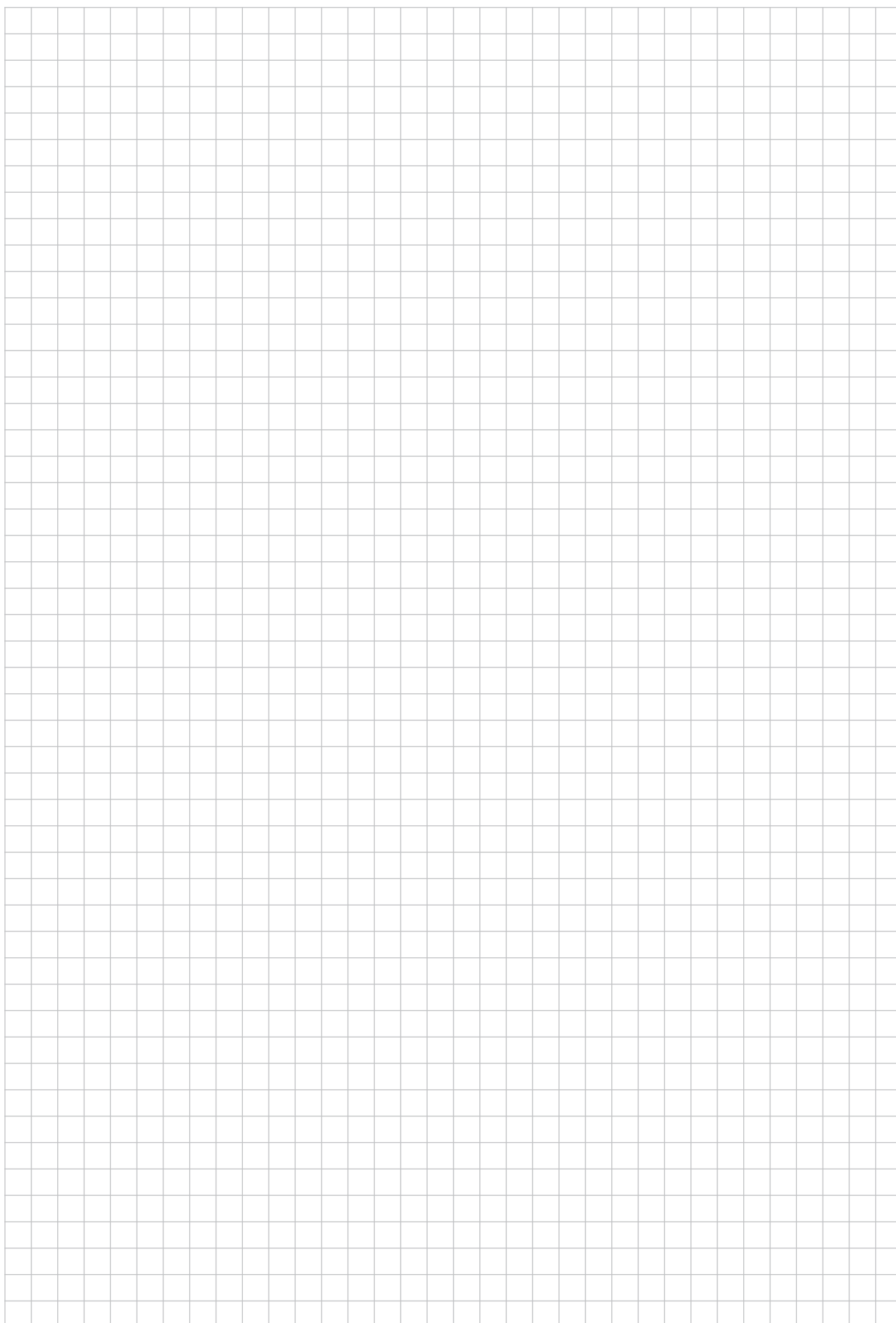


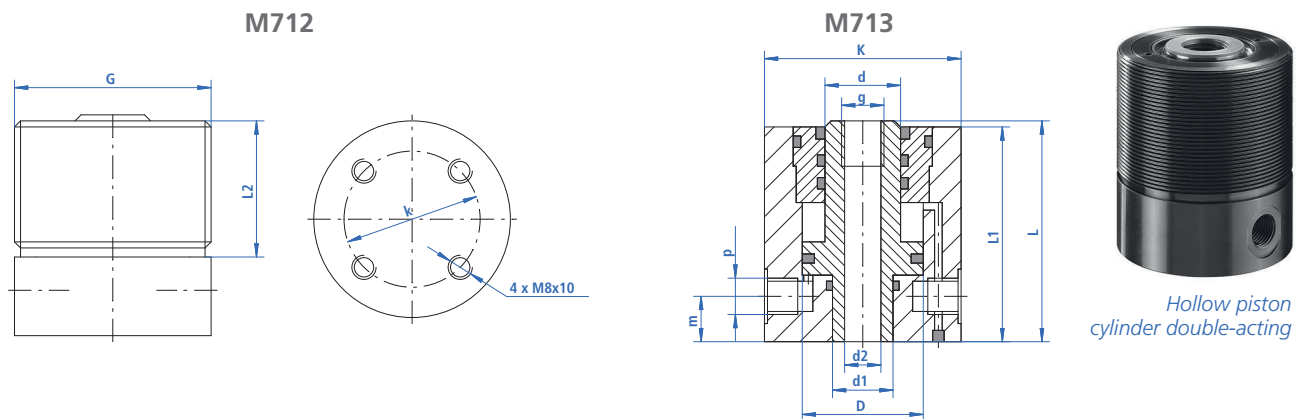
TECHNICAL DATA M710 | M711

Pistons Ø D	mm	25	32	40	50	63	80
Rods Ø D	mm	16	20	25	32	40	50
Lift	mm	10	10	12	12	16	16
Effective piston area	cm²	3.77	6.03	9.42	14.72	23.12	37.68
Clamping force	100 bar	kN	3.7	6	9.4	14.7	23
	500 bar	kN	18.5	30	47	73.5	115
d1	mm	12	16	20	25	32	40
d2	mm	8.2	10.2	12.2	16.2	20.2	27.2
G		M40 x 1.5	M45 x 1.5	M55 x 1.5	M65 x 1.5	M80 x 2	M100 x 2
g		HC M8	HC M10	HC M12	HC M16	HC M20	HC M27
K	mm	50	55	65	70	80	100
K1	mm	40	45	55	65	80	100
k	mm	35	40	45	50	60	75
L	mm	60	65	72	78	96	110
L1	mm	59	64	71	77	95	109
L2	mm	36	41	45	50	60	65
m	mm	12	12	15	15	21	23
p		G 1/4	G 1/4	G 1/4	G 1/4	G 1/4	G 1/4

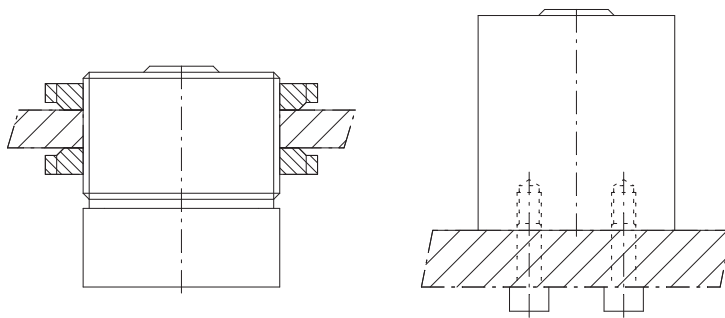
ORDER NUMBER OVERVIEW

Housing with male threads	M710-1-025	M710-1-032	M710-1-040	M710-1-050	M710-1-063	M710-1-080
Housing without male threads	M711-1-025	M711-1-032	M711-1-040	M711-1-050	M711-1-063	M711-1-080





FASTENING

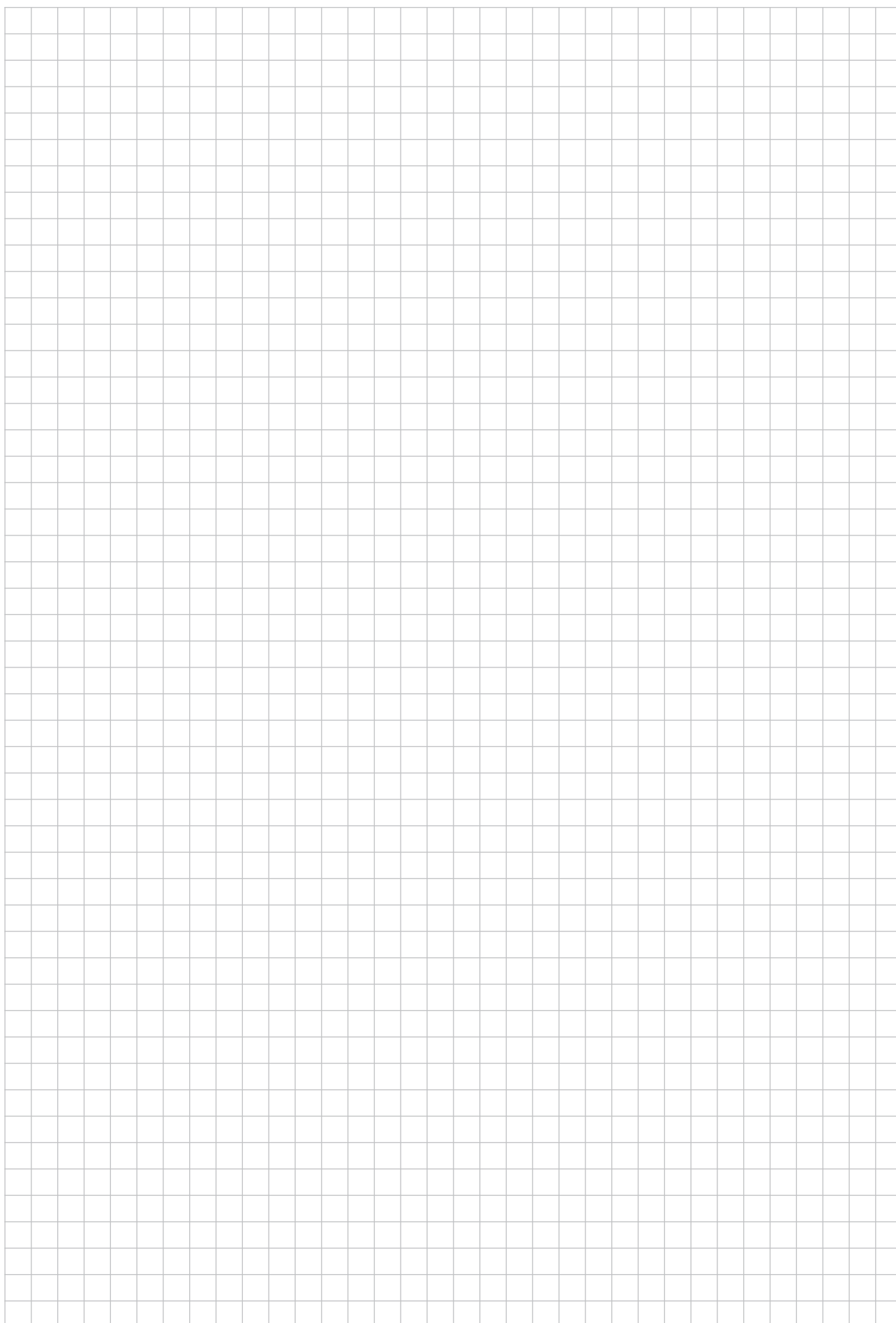


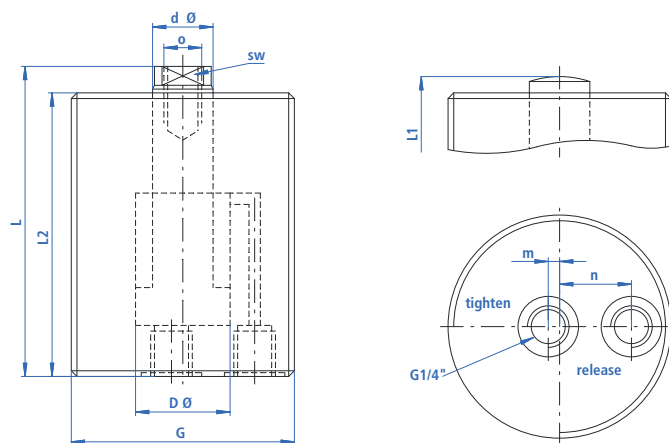
TECHNICAL DATA M712 | M713

Pistons Ø D	mm	25	32	40	50	63	80
Rods Ø D	mm	16	20	25	32	40	50
Lift	mm	10	10	16	16	20	25
Effective piston area	Forward stroke	cm ²	3.77	6.03	9.42	14.72	23.12
	Return stroke	cm ²	2.89	4.9	7.65	11.59	18.6
Clamping force 100 bar	Forward stroke		3.77	6.03	9.42	14.72	23.12
	Return stroke		2.89	4.9	7.65	11.59	18.6
Clamping force 500 bar	Forward stroke	kN	18.85	30.15	47.1	73.6	115.6
	Return stroke	kN	14.45	24.5	38.25	57.95	93
d1	mm	12	16	20	25	32	40
d2	mm	8.2	10.2	12.2	16.2	20.2	27.2
G		M50 x 1.5	M55 x 1.5	M65 x 1.5	M70 x 1.5	M80 x 2	M100 x 2
g		HC M8	HC M10	HC M12	HC M16	HC M20	HC M27
K	mm	50	55	65	70	80	100
k	mm	35	40	45	50	60	75
L	mm	60	65	73	79	96	110
L1	mm	59	64	72	78	95	109
L2	mm	36	41	45	50	60	65
m	mm	11	12	14	14	18	22
p		G 1/4	G 1/4	G 1/4	G 1/4	G 1/4	G 1/4

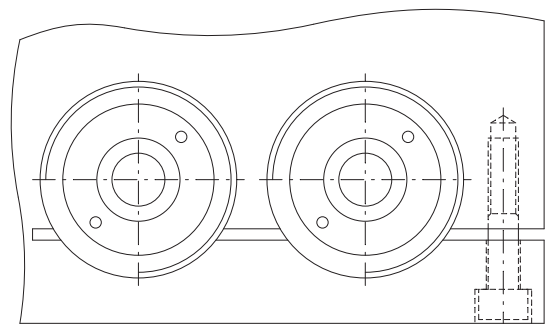
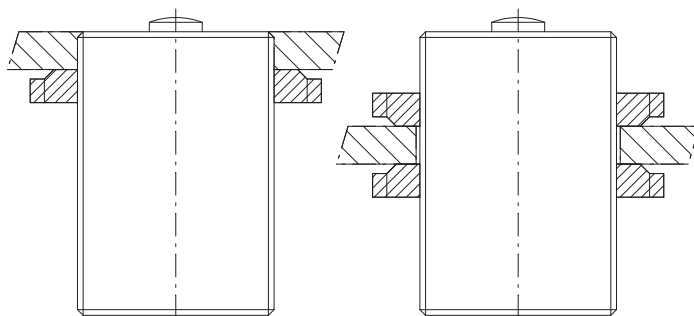
ORDER NUMBER OVERVIEW

Housing with male threads	M712-1-025	M712-1-032	M712-1-040	M712-1-050	M712-1-063	M712-1-080
Housing without male threads	M713-1-025	M713-1-032	M713-1-040	M713-1-050	M713-1-063	M713-1-080



Clamping cylinder
M720Clamping cylinder
M720, spherical

FASTENING

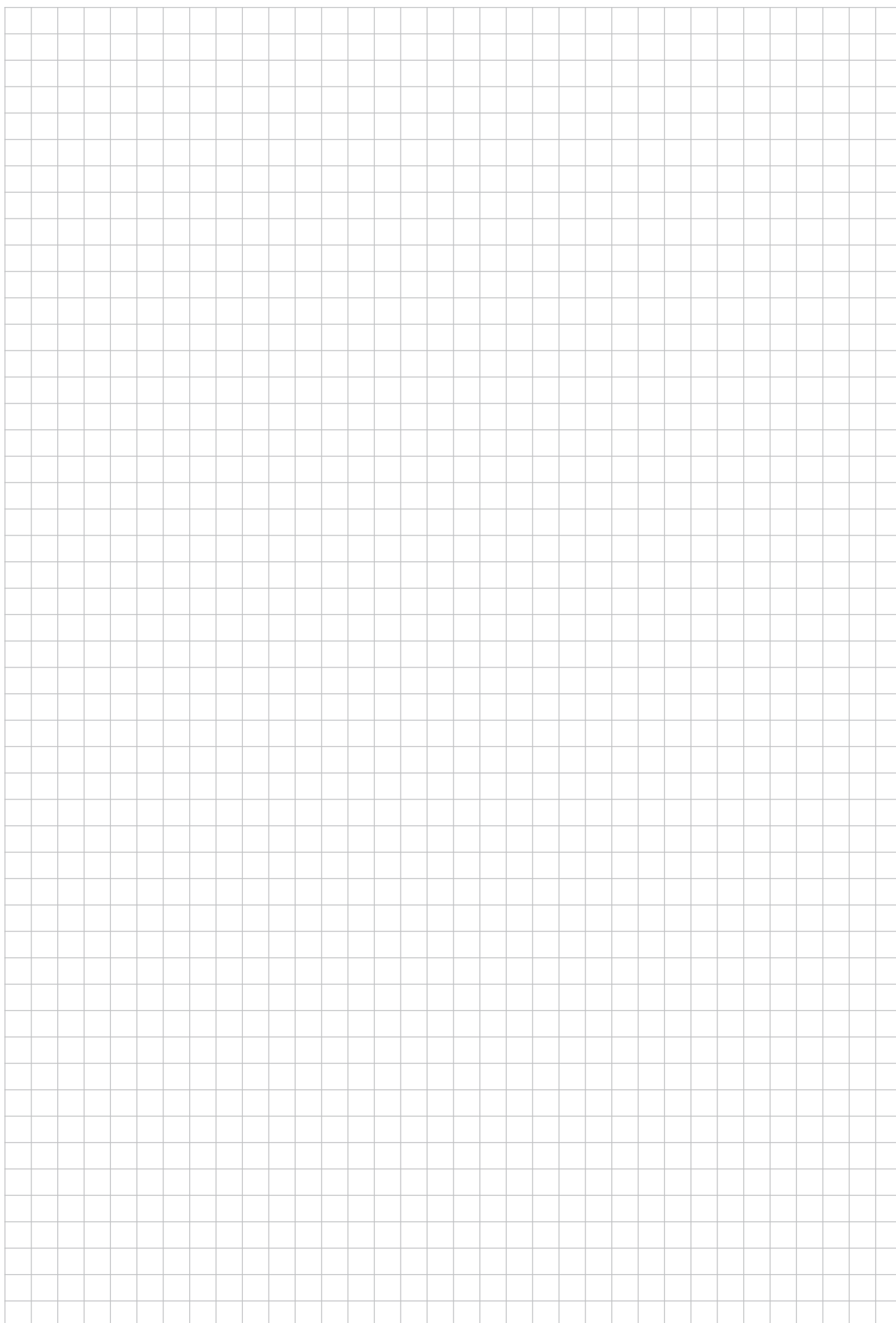


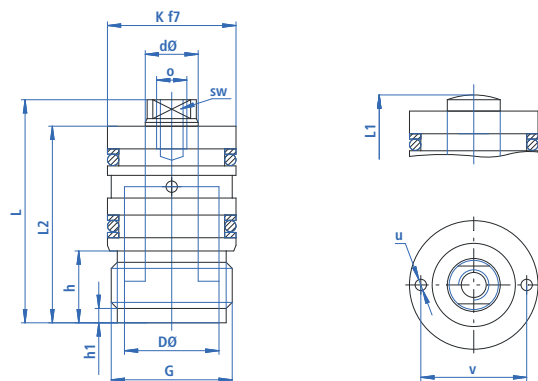
TECHNICAL DATA M720

Pistons Ø D	mm	20	25	32	40	50	63
Rods Ø D	mm	10	14	16	20	25	32
Lift	mm	20	25	25	40	40	50
Effective piston area	cm ²	3.14	4.9	8.0	12.56	19.62	31.15
Clamping force (100 bar)	Compression	kN	3.14	4.9	8.0	12.56	31.15
	Tension	kN	2.3	3.4	6.2	9.6	23.8
Clamping force (100 bar)	Compression	kN	16	25	40	64	100
	Tension	kN	11.5	17	31	48	75.5
G		M45 x 1.5	M52 x 1.5	M60 x 1.5	M70 x 1.5	M85 x 2	M105 x 2
L	mm	74.5	81.5	87.5	108	113.5	129.5
L1	mm	71.5	78.5	84.5	105	110.5	125.5
L2	mm	68	75	80	100	103	117
m	mm	9	6	3	0	0	0
n	mm	13	16	20	25.5	23.5	41
o	mm	M6 x 12	M8 x 12	M10 x 15	M12 x 20	M16 x 22	M20 x 30
sw	mm	8	11	13	17	19	24

ORDER NUMBER OVERVIEW

Piston, female threads	M720-G-020	M720-G-025	M720-G-032	M720-G-040	M720-G-050	M720-G-063
Piston, spherical	M720-B-020	M720-B-025	M720-B-032	M720-B-040	M720-B-050	M720-B-063



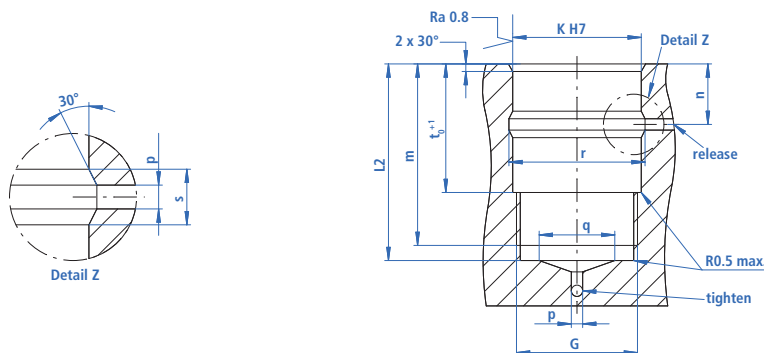


Screw-in cylinder
M730 with
female threads



Screw-in cylinder
M730, spherical

INSTALLATION SPACE



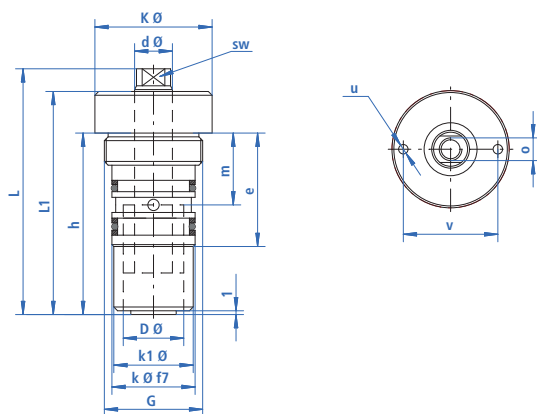
TECHNICAL DATA M730

Pistons Ø D	mm	10	16	20	25	32	40	50	63
Rods Ø D	mm	5	8	10	14	16	20	25	32
Lift	mm	15	15	20	25	25	40	40	50
Effective piston area	cm²	0.78	2.0	3.14	4.9	8.0	12.56	19.62	31.15
Comp. force (100 bar)	kN	0.78	2.0	3.14	4.9	8.0	12.56	19.62	31.15
Tensile force (100 bar)	kN	0.6	1.5	2.3	3.4	6.2	9.6	15.1	23.8
Comp. force (500 bar)	kN	4	10	16	25	40	64	100	156
Tensile force (500 bar)	kN	3	7.5	11.5	17	31	48	75.5	119
G		M15 x 1.5	M22 x 1.5	M26 x 1.5	M32 x 1.5	M40 x 1.5	M50 x 1.5	M62 x 1.5	M78 x 1.5
h	mm	14	15	17	19	22	30	33	40
h1	mm	3	3	3	4	4	5	6	6
K	mm	16	24	28	34	42	52	64	80
L	mm	38	47	51	59	64	85	88	103
L1	mm	35	44	48	56	61	82	85	99
L2	mm	33	41	44	52	56	76.5	77	90
m	mm	30	38	41	48	52	71.5	71	84
n	mm	11	16.5	14	16	19	21.5	22	25
o	mm	M3 x 6	M5 x 10	M6 x 12	M8 x 12	M10 x 15	M12 x 20	M16 x 22	M20 x 30
p	mm	2	3	3	3	4	6	6	6
q	mm	5	11	15	20	27	35	45	58
r / s	mm	17 / 4	25 / 5	29 / 5	35 / 5	43.6 / 7	54 / 10	66 / 10	82 / 10
t	mm	20	27	28	34	35	47	45	51
u / v	mm	2 / 12.5	3 / 18	4 / 22	4 / 28	5 / 32	6 / 40	8 / 48	10 / 62
sw	mm	-	-	8	11	13	17	19	24

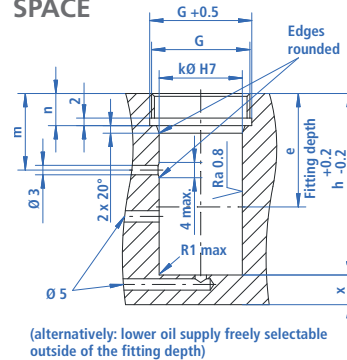
ORDER NUMBER OVERVIEW

Piston, female threads	M730 - G - 010	M730 - G - 016	M730 - G - 020	M730 - G - 025	M730 - G - 032	M730 - G - 040	M730 - G - 050	M730 - G - 063
Piston, spherical	M730 - B - 010	M730 - B - 016	M730 - B - 020	M730 - B - 025	M730 - B - 032	M730 - B - 040	M730 - B - 050	M730 - B - 063

2D and 3D data is found at: <https://micromat.partcommunity.com>



INSTALLATION SPACE



Screw-in cylinder
M731

PLEASE OBSERVE

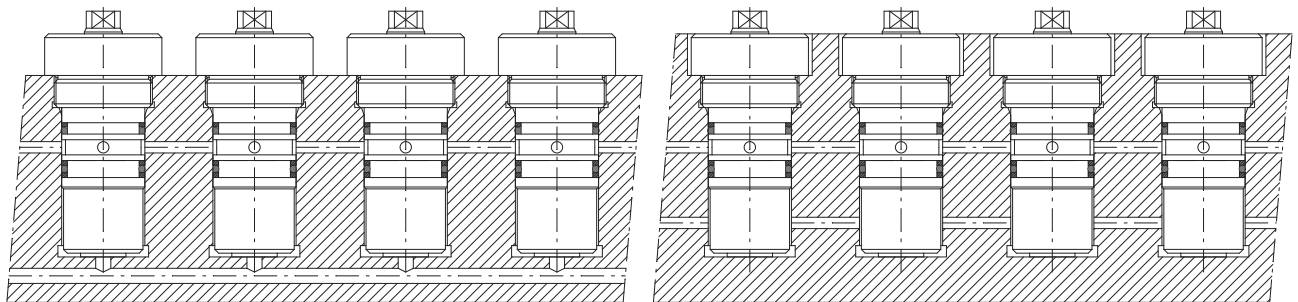
The location of the lower oil feed can be located anywhere in the area outside of the fitting depth.

The insertion chamfer and the bore of the upper oil infeed must be carefully rounded in order to prevent damage to the seals during assembly.

The base of the fixture hole serves as a stop during return of the piston, therefore the dimension h must absolutely be maintained.

Dimension r applies for an operation pressure of 500 bar and a breaking strength of the material used of 500 N/mm².

INSTALLATION EXAMPLE



TECHNICAL DATA M731

Pistons Ø D	mm	16	20	25	32
Rods Ø D	mm	10	12	16	20
Lift	mm	16	20	25	32
Comp. force (100 bar)	kN	2.0	3.1	4.9	8.0
Tensile force (100 bar)	kN	1.2	2.0	2.9	4.9
Comp. force (500 bar)	kN	10	15.7	24.5	40.2
Tensile force (500 bar)	kN	6.1	10.0	14.5	24.5
e	mm	30	31.0	39	44
G	mm	M26 x 1.5	M32 x 1.5	M40 x 1.5	M50 x 1.5
h	mm	48	53	65	72
k	mm	22	28	35	44
k1	mm	21	26	33	42
K	mm	31	37	44	54
L	mm	65	67	82	94
L1	mm	59	60	75	84
m	mm	19	20	25	28
n	mm	8.5	10.5	13.5	15.5
o	mm	M6 x 12	M8 x 12	M10 x 15	M12 x 15
r min.	mm	8	10	11	13
u / v	mm	2.5 / 25	4 / 30	5 / 35	5 / 45
sw	mm	8	10	13	17
Tightening torque	Nm	50	100	200	400

2D and 3D data is found at: <https://micromat.partcommunity.com>

ORDER NUMBER OVERVIEW

	M731-1-016	M731-1-020	M731-1-025	M731-1-032
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