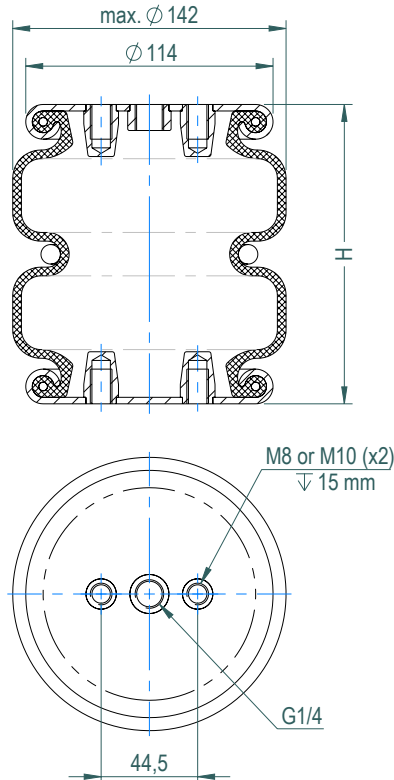


F SERIES
Crimped Design

M-12

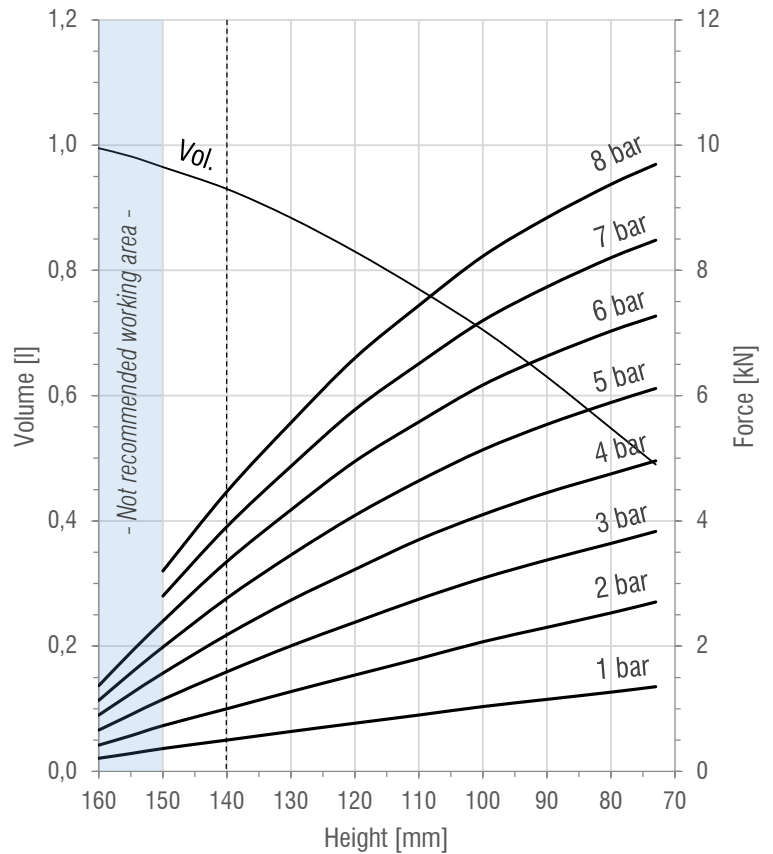
DOUBLE
CONVOLUTION

DRAWING



M8&M10=25 Nm G1/4=25 Nm

FORCE-HEIGHT CHART



TECHNICAL DATA

PRODUCT CHARACTERISTICS

Static diameter [mm]	126
Max. diameter [mm]	142
Required space diameter [mm]	160
Min. height [mm]	73
Static height [mm]	130
Design height [mm]	140
Max. usable height [mm]	150
Max. stroke [mm]	77
Force to compress to H_{min} at 0 bar [N]	260
Weight [kg]	1,48

REFERENCES

M-12_B	Rubber bellow only
M-12_C_G1/4	With crimped plates & G1/4 air inlet
M-12_R_SH	With socket head bead rings
M-12_R_TR	With threaded bead rings

Designs available with stainless steel and high temperature rubber compounds. Additional designs on request.

DYNAMIC CHARACTERISTICS FOR USE AS ISOLATOR

Pressure [bar]	3	4	5	6	7	Vol. [l]
Load [kN]	1,6	2,2	2,8	3,4	3,9	0,9
Spring rate [N/mm]	56	76	95	113	132	
Natural frequency [Hz]	2,97	2,94	2,92	2,91	2,90	
Isolation rate at 10 Hz	90,3%	90,5%	90,7%	90,8%	90,8%	

Values at recommended design height H: 140 mm - - - - -

STATIC CHARACTERISTICS FOR USE AS ACTUATOR

Pressure [bar]		3	4	5	6	7	Vol. [l]
Height H [mm]	80	3,6	4,8	5,9	7,0	8,2	0,5
	90	3,4	4,5	5,5	6,6	7,7	0,6
	100	3,1	4,1	5,1	6,2	7,2	0,7
	110	2,8	3,7	4,6	5,6	6,5	0,8
	120	2,4	3,2	4,1	5,0	5,8	0,8
	130	2,0	2,7	3,5	4,2	4,9	0,9
	140	1,6	2,2	2,8	3,4	3,9	0,9
	150	1,1	1,6	2,0	2,4	2,8	1,0

Force values [kN]

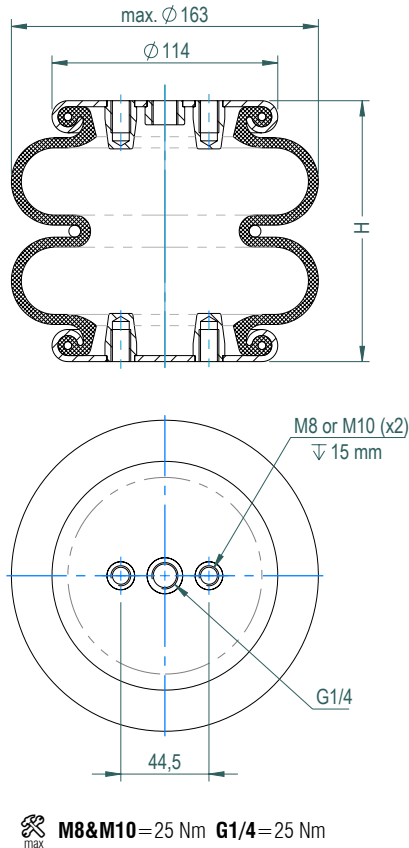
All Volume [l] values at 7 bar

F SERIES
Crimped Design

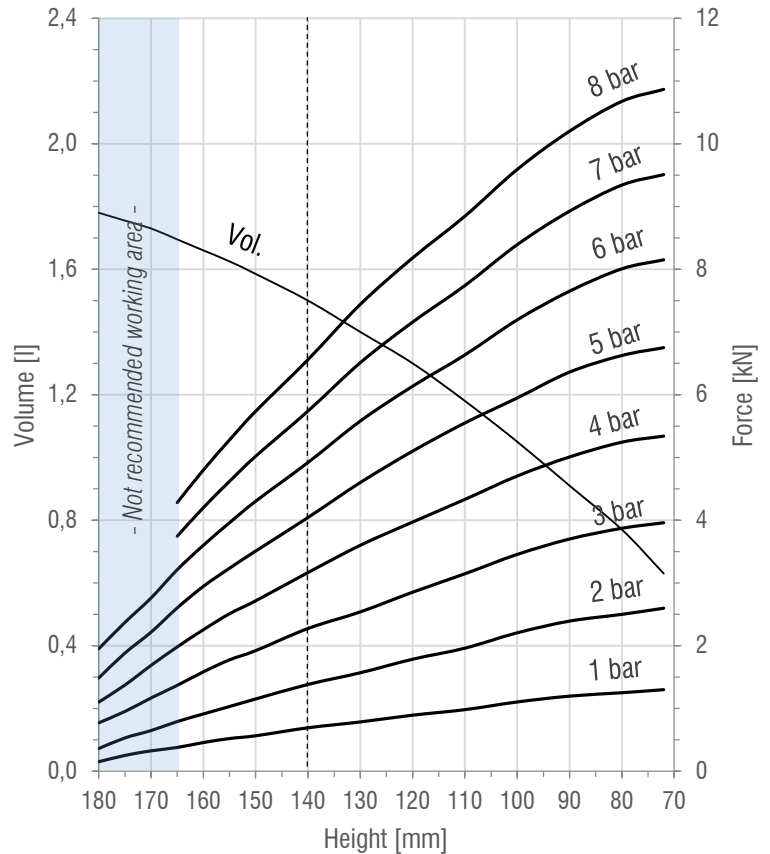
M-70

DOUBLE
CONVOLUTION

DRAWING



FORCE-HEIGHT CHART



TECHNICAL DATA

PRODUCT CHARACTERISTICS

Static diameter [mm]	155
Max. diameter [mm]	163
Required space diameter [mm]	180
Min. height [mm]	72
Static height [mm]	130
Design height [mm]	140
Max. usable height [mm]	165
Max. stroke [mm]	93
Force to compress to H_{min} at 0 bar [N]	150
Weight [kg]	1,57

REFERENCES

M-70_B	Rubber bellow only
M-70_C_G1/4	With crimped plates & G1/4 air inlet
M-70_R_SH	With socket head bead rings
M-70_R_TR	With threaded bead rings

Designs available with stainless steel and high temperature rubber compounds. Additional designs on request.

DYNAMIC CHARACTERISTICS FOR USE AS ISOLATOR

Pressure [bar]	3	4	5	6	7	Vol. [l]
Load [kN]	2,3	3,2	4,0	4,9	5,7	1,5
Spring rate [N/mm]	57	79	98	115	133	
Natural frequency [Hz]	2,51	2,50	2,46	2,42	2,40	
Isolation rate at 10 Hz	93,3%	93,3%	93,6%	93,8%	93,9%	

Values at recommended design height H: 140 mm -----

STATIC CHARACTERISTICS FOR USE AS ACTUATOR

Height H [mm]	Pressure [bar]						Vol. [l]
	3	4	5	6	7		
80	3,9	5,2	6,6	8,0	9,3	0,8	
90	3,7	5,0	6,4	7,7	8,9	0,9	
100	3,5	4,7	5,9	7,2	8,4	1,1	
110	3,1	4,3	5,6	6,6	7,7	1,2	
120	2,9	4,0	5,1	6,1	7,2	1,3	
130	2,5	3,6	4,6	5,6	6,5	1,4	
140	2,3	3,2	4,0	4,9	5,7	1,5	
150	1,9	2,7	3,5	4,3	5,0	1,6	
160	1,6	2,3	2,9	3,6	4,2	1,7	

Force values [kN]

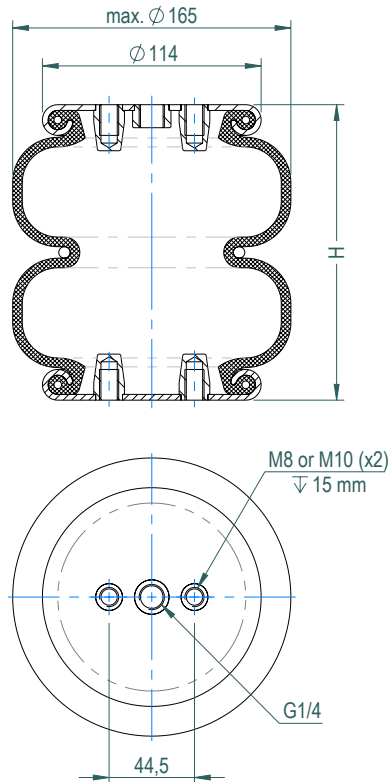
All Volume [l] values at 7 bar

F SERIES
Crimped Design

M-70-E

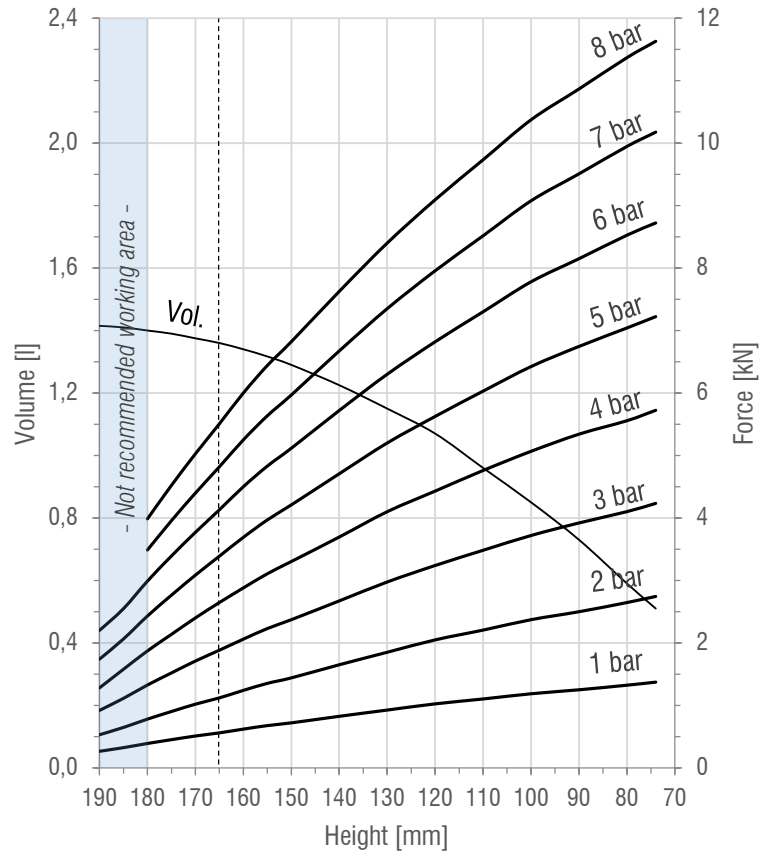
DOUBLE
CONVOLUTION

DRAWING



M8&M10=25 Nm G1/4=25 Nm

FORCE-HEIGHT CHART



TECHNICAL DATA

PRODUCT CHARACTERISTICS

Static diameter [mm]	146
Max. diameter [mm]	165
Required space diameter [mm]	180
Min. height [mm]	74
Static height [mm]	150
Design height [mm]	165
Max. usable height [mm]	180
Max. stroke [mm]	106
Force to compress to H_{min} at 0 bar [N]	170
Weight [kg]	1,61

REFERENCES

M-70-E_B	Rubber bellow only
M-70-E_C_G1/4	With crimped plates & G1/4 air inlet
M-70-E_R_SH	With socket head bead rings
M-70-E_R_TR	With threaded bead rings

Designs available with stainless steel and high temperature rubber compounds. Additional designs on request.

DYNAMIC CHARACTERISTICS FOR USE AS ISOLATOR

Pressure [bar]	3	4	5	6	7	Vol. [l]
Load [kN]	1,9	2,6	3,4	4,1	4,8	1,4
Spring rate [N/mm]	45	61	76	91	105	
Natural frequency [Hz]	2,45	2,41	2,37	2,34	2,34	
Isolation rate at 10 Hz	93,6%	93,9%	94,1%	94,2%	94,2%	

Values at recommended design height H: 165 mm -----

STATIC CHARACTERISTICS FOR USE AS ACTUATOR

Pressure [bar]		3	4	5	6	7	Vol. [l]
Height H [mm]	80	4,1	5,6	7,0	8,5	9,9	0,6
	100	3,7	5,1	6,4	7,8	9,1	0,9
	120	3,2	4,4	5,6	6,8	8,0	1,1
	140	2,7	3,7	4,7	5,7	6,7	1,2
	160	2,1	2,9	3,7	4,5	5,3	1,3
	175	1,5	2,1	2,8	3,4	4,0	1,4
180	1,3	1,9	2,4	3,0	3,5	1,4	

Force values [kN]

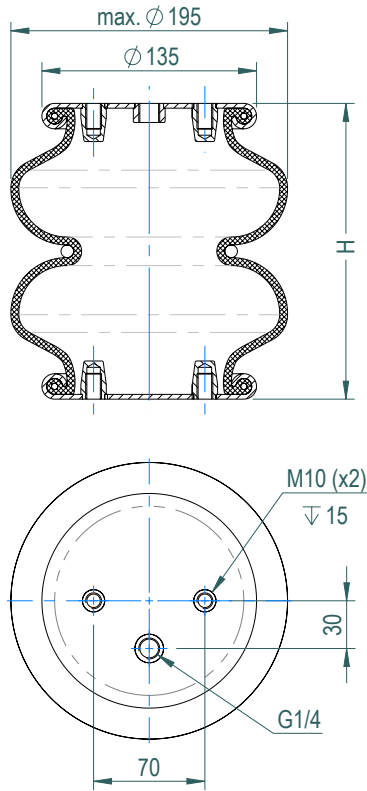
All Volume [l] values at 7 bar

F SERIES
Crimped Design

M-2600

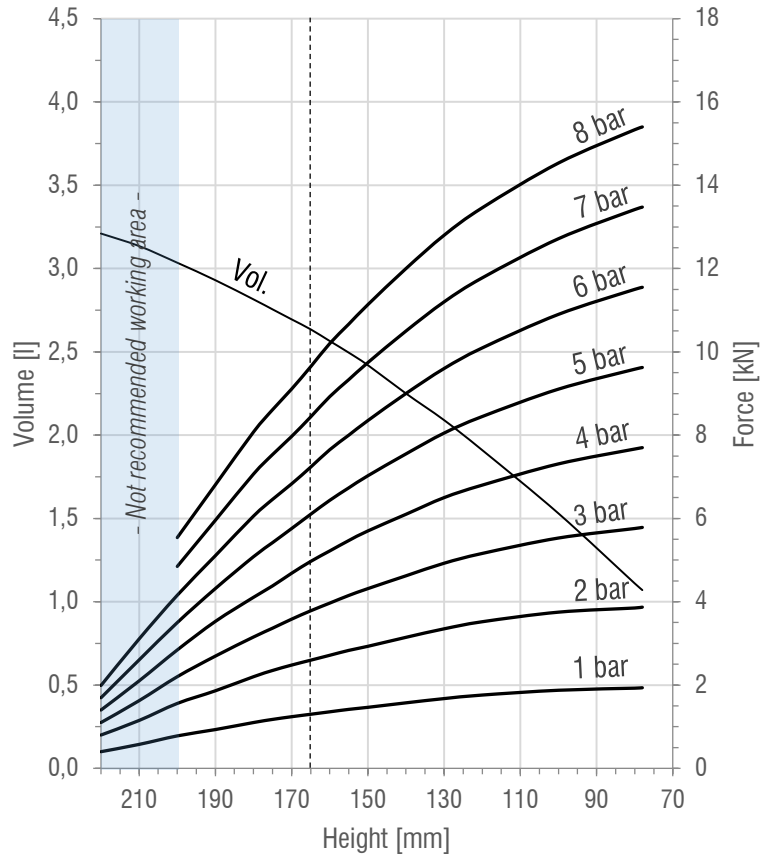
DOUBLE
CONVOLUTION

DRAWING



M8&M10=25 Nm G1/4=25 Nm

FORCE-HEIGHT CHART



TECHNICAL DATA

PRODUCT CHARACTERISTICS

Static diameter [mm]	171
Max. diameter [mm]	195
Required space diameter [mm]	210
Min. height [mm]	78
Static height [mm]	180
Design height [mm]	165
Max. usable height [mm]	200
Max. stroke [mm]	122
Force to compress to H_{min} at 0 bar [N]	80
Weight [kg]	2,2

REFERENCES

M-2600_B	Rubber bellow only
M-2600_C_G1/4	With crimped plates & G1/4 air inlet

Designs available with stainless steel and high temperature rubber compounds. Additional designs on request.

DYNAMIC CHARACTERISTICS FOR USE AS ISOLATOR

Pressure [bar]	3	4	5	6	7	Vol. [l]
Load [kN]	3,8	5,0	6,1	7,2	8,4	2,6
Spring rate [N/mm]	74	98	117	136	157	
Natural frequency [Hz]	2,22	2,22	2,19	2,17	2,16	
Isolation rate at 10 Hz	94,8%	94,8%	95,0%	95,1%	95,1%	

Values at recommended design height H: 165 mm -----

STATIC CHARACTERISTICS FOR USE AS ACTUATOR

Pressure [bar]		3	4	5	6	7	Vol. [l]
Height H [mm]	80	5,8	7,7	9,6	11,5	13,4	1,1
	100	5,5	7,3	9,1	10,9	12,7	1,5
	120	5,2	6,8	8,4	10,1	11,8	1,9
	140	4,6	6,1	7,6	9,0	10,5	2,3
	160	4,0	5,2	6,4	7,7	8,9	2,6
	180	3,2	4,1	5,1	6,1	7,1	2,8
	200	2,2	2,8	3,5	4,2	4,8	3,0

Force values [kN]

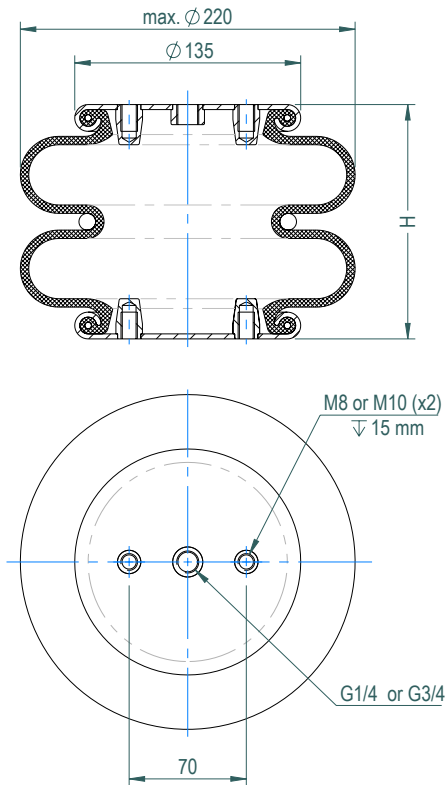
All Volume [l] values at 7 bar

F SERIES
Crimped Design

M-80

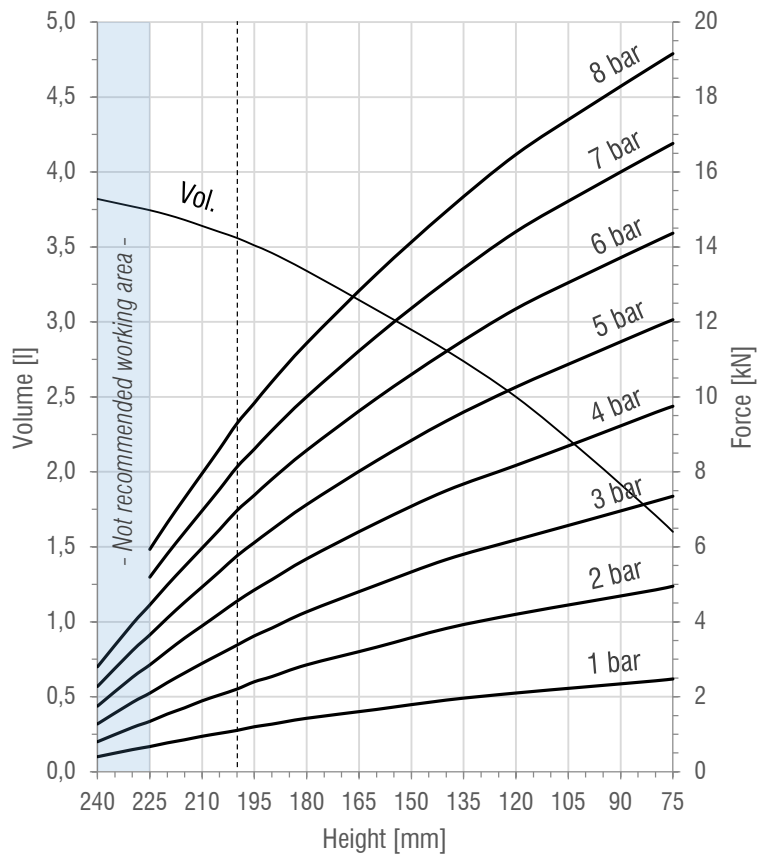
DOUBLE
CONVOLUTION

DRAWING



M8&M10=25 Nm G1/4=25 Nm G3/4=50 Nm

FORCE-HEIGHT CHART



TECHNICAL DATA

PRODUCT CHARACTERISTICS

Static diameter [mm]	203
Max. diameter [mm]	215
Required space diameter [mm]	230
Min. height [mm]	75
Static height [mm]	150
Design height [mm]	200
Max. usable height [mm]	225
Max. stroke [mm]	150
Force to compress to H_{min} at 0 bar [N]	90
Weight [kg]	2,32

REFERENCES

M-80_B	Rubber bellow only
M-80_C_G1/4	With crimped plates & G1/4 air inlet
M-80_C_G3/4	With crimped plates & G3/4 air inlet
M-80_R_SH	With socket head bead rings
M-80_R_TR	With threaded bead rings
M-80_R_CS	With countersunk bead rings

Designs available with stainless steel and high temperature rubber compounds. Additional designs on request.

DYNAMIC CHARACTERISTICS FOR USE AS ISOLATOR

Pressure [bar]	3	4	5	6	7	Vol. [l]
Load [kN]	3,4	4,6	5,8	7,0	8,1	3,6
Spring rate [N/mm]	63	82	101	120	140	
Natural frequency [Hz]	2,16	2,12	2,10	2,08	2,07	
Isolation rate at 10 Hz	95,1%	95,3%	95,4%	95,5%	95,5%	

Values at recommended design height H : 200 mm -----

STATIC CHARACTERISTICS FOR USE AS ACTUATOR

Pressure [bar]	3	4	5	6	7	Vol. [l]	
Height H [mm]	80	7,2	9,6	11,9	14,2	16,5	1,7
	100	6,7	8,9	11,1	13,3	15,5	2,1
	120	6,2	8,2	10,3	12,4	14,4	2,5
	140	5,7	7,5	9,4	11,2	13,1	2,8
	160	5,0	6,6	8,3	10,0	11,6	3,1
	180	4,3	5,7	7,1	8,6	10,0	3,3
	200	3,4	4,6	5,8	7,0	8,1	3,6
220	2,4	3,2	4,1	5,0	5,8	3,7	

Force values [kN]

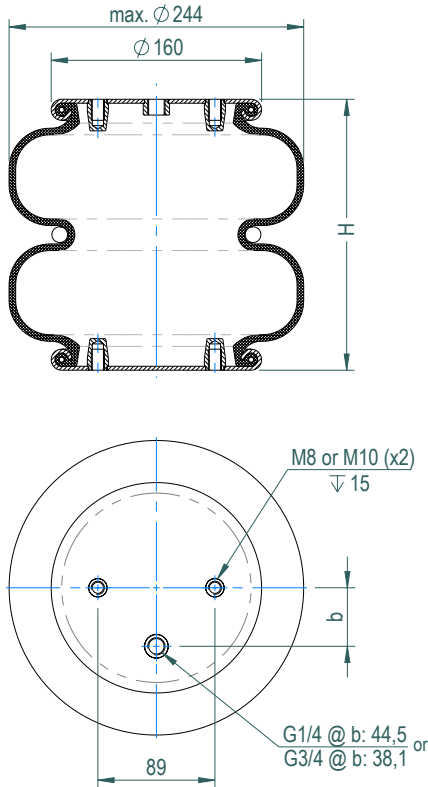
All Volume [l] values at 7 bar

F SERIES
Crimped Design

M-85-E

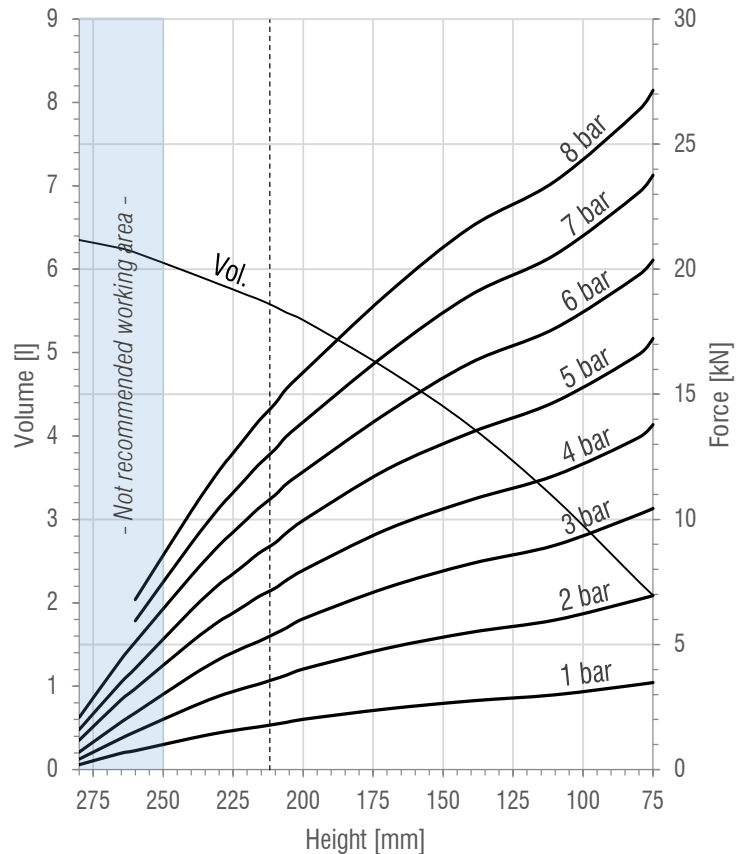
DOUBLE
CONVOLUTION

DRAWING



M8&M10=25 Nm **G1/4**=25 Nm **G3/4**=50 Nm

FORCE-HEIGHT CHART



TECHNICAL DATA

PRODUCT CHARACTERISTICS

Static diameter [mm]	222
Max. diameter [mm]	244
Required space diameter [mm]	260
Min. height [mm]	75
Static height [mm]	203
Design height [mm]	216
Max. usable height [mm]	250
Max. stroke [mm]	175
Force to compress to H_{min} at 0 bar [N]	69
Weight [kg]	3,1

REFERENCES

M-85-E_B	Rubber bellow only
M-85-E_C_G1/4	With crimped plates & G1/4 air inlet
M-85-E_C_G3/4	With crimped plates & G3/4 air inlet
M-85-E_R_SH	With socket head bead rings
M-85-E_R_TR	With threaded bead rings
M-85-E_R_CS	With countersunk bead rings

Designs available with stainless steel and high temperature rubber compounds. Additional designs on request.

DYNAMIC CHARACTERISTICS FOR USE AS ISOLATOR

Pressure [bar]	3	4	5	6	7	Vol. [l]
Load [kN]	5,1	6,9	8,6	10,4	12,2	5,6
Spring rate [N/mm]	76	100	123	145	169	
Natural frequency [Hz]	1,93	1,90	1,89	1,87	1,86	
Isolation rate at 10 Hz	96,1%	96,3%	96,3%	96,4%	96,4%	

Values at recommended design height H: 216 mm -----

STATIC CHARACTERISTICS FOR USE AS ACTUATOR

Pressure [bar]	3	4	5	6	7	Vol. [l]	
Height H [mm]	80	10,2	13,3	16,6	19,8	23,1	2,3
	110	9,0	11,8	14,7	17,6	20,6	3,3
	140	8,2	10,8	13,5	16,3	19,0	4,1
	170	7,3	9,6	12,0	14,3	16,6	4,8
	200	6,0	8,0	10,0	11,9	13,9	5,4
	210	5,4	7,3	9,1	11,0	12,8	5,6
	220	4,9	6,6	8,3	10,0	11,7	5,7
	240	3,7	5,1	6,4	7,7	9,0	6,0

Force values [kN]

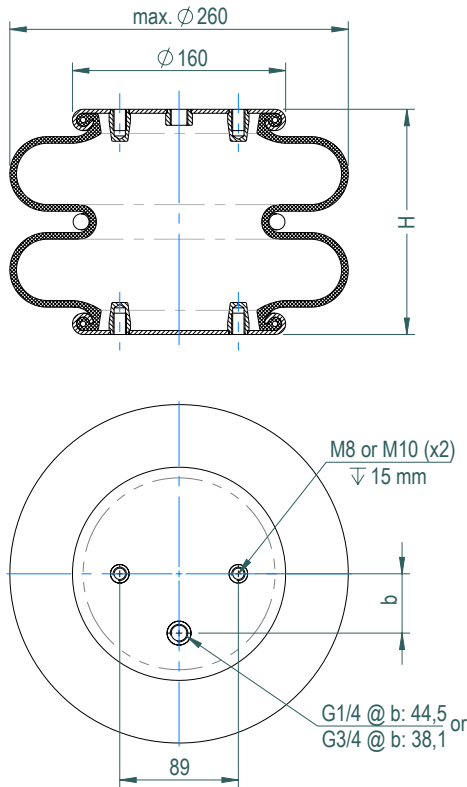
All Volume [l] values at 7 bar

F SERIES
Crimped Design

M-85

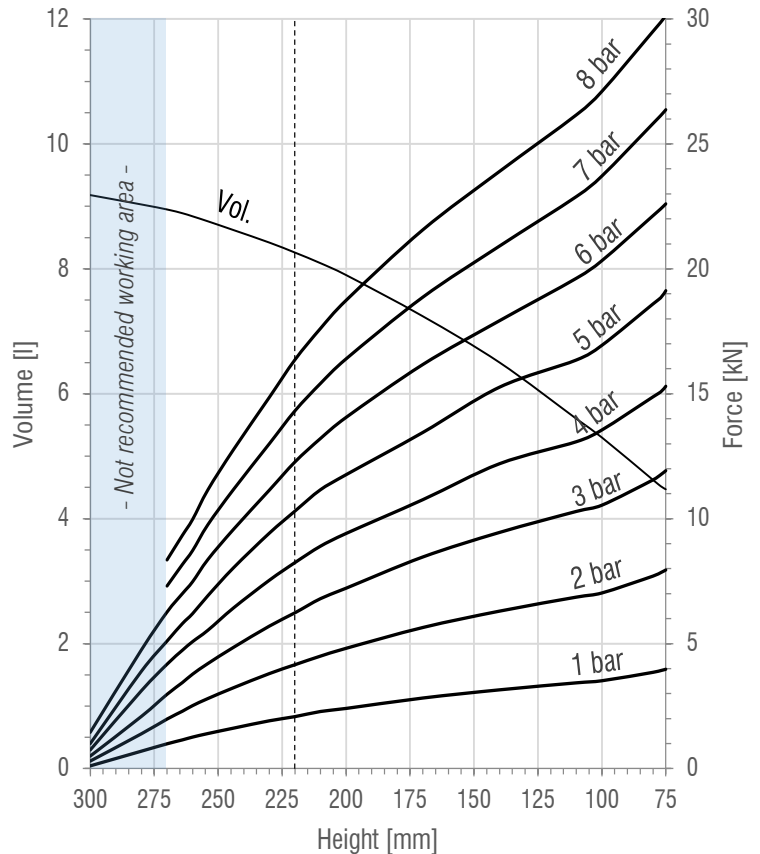
DOUBLE
CONVOLUTION

DRAWING



M8&M10=25 Nm G1/4=25 Nm G3/4=50 Nm

FORCE-HEIGHT CHART



TECHNICAL DATA

PRODUCT CHARACTERISTICS

Static diameter [mm]	252
Max. diameter [mm]	260
Required space diameter [mm]	275
Min. height [mm]	75
Static height [mm]	150
Design height [mm]	220
Max. usable height [mm]	270
Max. stroke [mm]	195
Force to compress to H_{min} at 0 bar [N]	40
Weight [kg]	3,3

REFERENCES

M-85_B	Rubber bellow only
M-85_C_G1/4	With crimped plates & G1/4 air inlet
M-85_C_G3/4	With crimped plates & G3/4 air inlet
M-85_R_SH	With socket head bead rings
M-85_R_TR	With threaded bead rings
M-85_R_CS	With countersunk bead rings

Designs available with stainless steel and high temperature rubber compounds. Additional designs on request.

DYNAMIC CHARACTERISTICS FOR USE AS ISOLATOR

Pressure [bar]	3	4	5	6	7	Vol. [l]
Load [kN]	6,2	8,2	10,3	12,3	14,3	8,3
Spring rate [N/mm]	79	98	121	143	166	
Natural frequency [Hz]	1,78	1,73	1,72	1,71	1,70	
Isolation rate at 10 Hz	96,7%	96,9%	97,0%	97,0%	97,0%	

Values at recommended design height H: 220 mm -----

STATIC CHARACTERISTICS FOR USE AS ACTUATOR

Pressure [bar]	3	4	5	6	7	Vol. [l]	
Height H [mm]	80	11,6	14,9	18,6	22,1	25,8	4,6
	110	10,3	13,1	16,4	19,6	22,9	5,6
	140	9,5	12,2	15,3	17,9	20,9	6,5
	170	8,5	10,8	13,5	16,2	18,9	7,2
	200	7,2	9,4	11,8	14,1	16,4	7,9
	210	6,9	8,9	11,2	13,2	15,4	8,1
	230	5,7	7,5	9,4	11,1	13,0	8,4
	254	4,2	5,5	6,9	8,4	9,8	8,8
	260	3,8	5,1	6,4	7,5	8,7	8,9

Force values [kN]

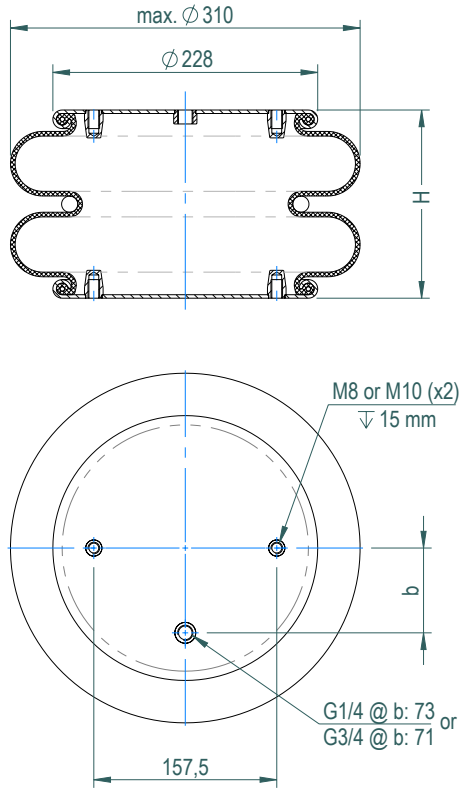
All Volume [l] values at 7 bar

F SERIES
Crimped Design

M-90

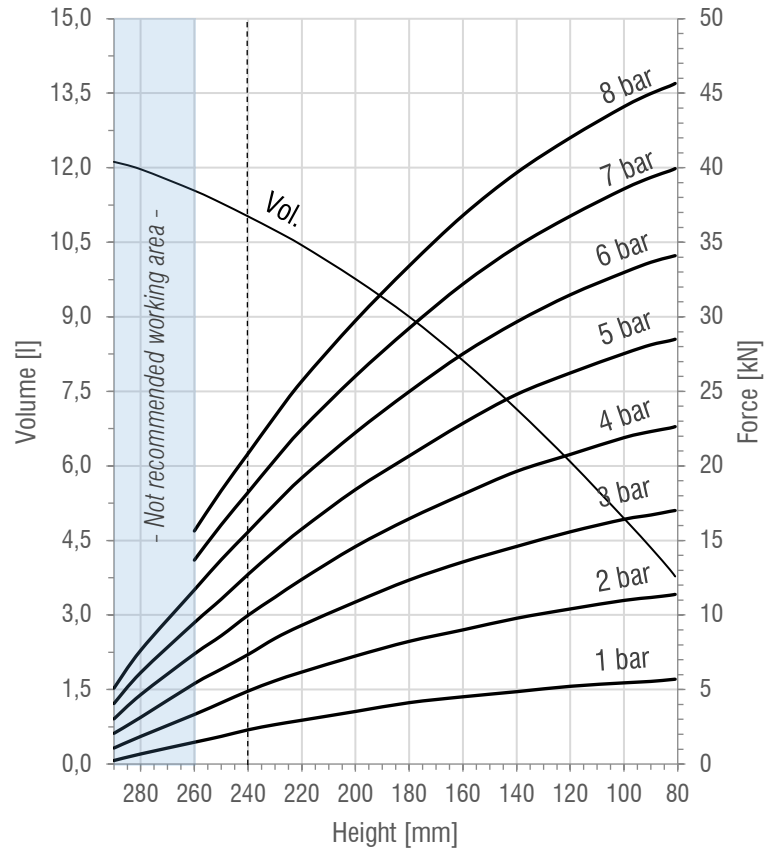
DOUBLE
CONVOLUTION

DRAWING



M8&M10=25 Nm G1/4=25 Nm G3/4=50 Nm

FORCE-HEIGHT CHART



TECHNICAL DATA

PRODUCT CHARACTERISTICS

Static diameter [mm]	300
Max. diameter [mm]	310
Required space diameter [mm]	325
Min. height [mm]	81
Static height [mm]	162
Design height [mm]	240
Max. usable height [mm]	260
Max. stroke [mm]	179
Force to compress to H_{min} at 0 bar [N]	65
Weight [kg]	5,5

REFERENCES

M-90_B	Rubber bellow only
M-90_C_G1/4	With crimped plates & G1/4 air inlet
M-90_C_G3/4	With crimped plates & G3/4 air inlet
M-90_R_SH	With socket head bead rings
M-90_R_TR	With threaded bead rings
M-90_R_CS	With countersunk bead rings

Designs available with stainless steel and high temperature rubber compounds. Additional designs on request.

DYNAMIC CHARACTERISTICS FOR USE AS ISOLATOR

Pressure [bar]	3	4	5	6	7	Vol. [l]
Load [kN]	7,4	10,0	12,7	15,6	18,2	11,0
Spring rate [N/mm]	137	171	214	249	289	
Natural frequency [Hz]	2,16	2,07	2,05	2,00	1,99	
Isolation rate at 10 Hz	95,1%	95,5%	95,6%	95,8%	95,9%	

Values at recommended design height H: 240 mm -----

STATIC CHARACTERISTICS FOR USE AS ACTUATOR

Pressure [bar]	3	4	5	6	7	Vol. [l]	
Height H [mm]	100	16,5	21,9	27,5	33,0	38,6	4,9
	120	15,6	20,8	26,2	31,5	36,8	6,1
	140	14,6	19,6	24,8	29,7	34,7	7,1
	160	13,6	18,1	22,9	27,5	32,2	8,1
	180	12,3	16,5	20,7	25,0	29,2	9,0
	200	10,9	14,6	18,4	22,2	26,0	9,8
	220	9,3	12,4	15,8	19,2	22,5	10,4
	240	7,4	10,0	12,7	15,6	18,2	11,0
	260	5,3	7,3	9,4	11,5	13,5	11,6

Force values [kN]

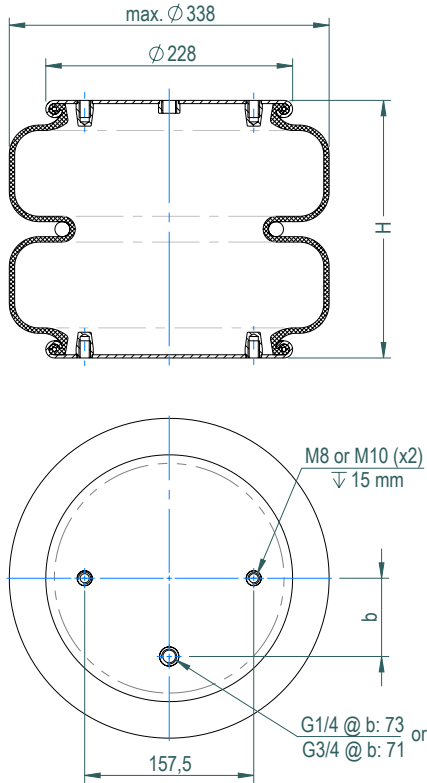
All Volume [l] values at 7 bar

F SERIES
Crimped Design

M-90-E

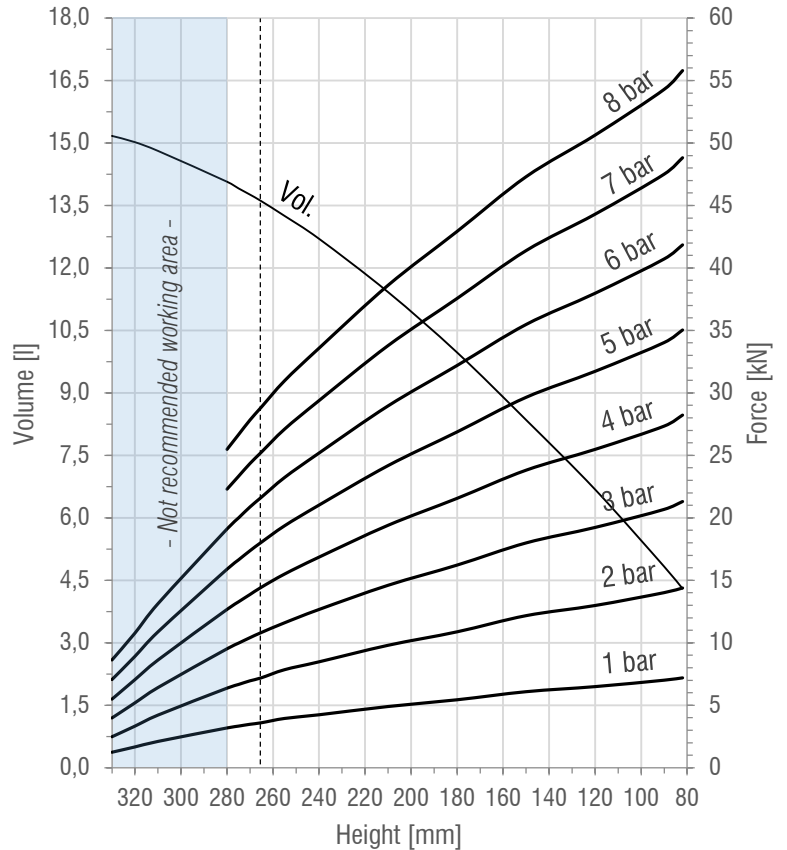
DOUBLE
CONVOLUTION

DRAWING



M8&M10=25 Nm G1/4=25 Nm G3/4=50 Nm

FORCE-HEIGHT CHART



TECHNICAL DATA

PRODUCT CHARACTERISTICS

Static diameter [mm]	302
Max. diameter [mm]	338
Required space diameter [mm]	355
Min. height [mm]	82
Static height [mm]	210
Design height [mm]	265
Max. usable height [mm]	280
Max. stroke [mm]	198
Force to compress to H_{min} at 0 bar [N]	190
Weight [kg]	5,8

REFERENCES

M-90-E_B	Rubber bellow only
M-90-E_C_G1/4	With crimped plates & G1/4 air inlet
M-90-E_C_G3/4	With crimped plates & G3/4 air inlet
M-90-E_R_SH	With socket head bead rings
M-90-E_R_TR	With threaded bead rings
M-90-E_R_CS	With countersunk bead rings

Designs available with stainless steel and high temperature rubber compounds. Additional designs on request.

DYNAMIC CHARACTERISTICS FOR USE AS ISOLATOR

Pressure [bar]	3	4	5	6	7	Vol. [l]
Load [kN]	10,8	14,5	18,1	21,7	25,3	13,6
Spring rate [N/mm]	130	172	210	247	286	
Natural frequency [Hz]	1,73	1,73	1,70	1,69	1,68	
Isolation rate at 10 Hz	96,9%	96,9%	97,0%	97,1%	97,1%	

Values at recommended design height H: 265 mm -----

STATIC CHARACTERISTICS FOR USE AS ACTUATOR

Pressure [bar]		3	4	5	6	7	Vol. [l]
Height H [mm]	90	20,7	27,3	34,0	40,7	47,5	4,8
	120	19,2	25,5	31,7	38,0	44,3	6,7
	150	18,0	23,8	29,6	35,5	41,4	8,4
	180	16,2	21,6	26,9	32,2	37,6	10,0
	210	14,6	19,4	24,2	29,0	33,8	11,4
	240	12,7	16,9	21,0	25,2	29,4	12,7
270	10,4	13,9	17,4	20,9	24,4	13,8	

Force values [kN]

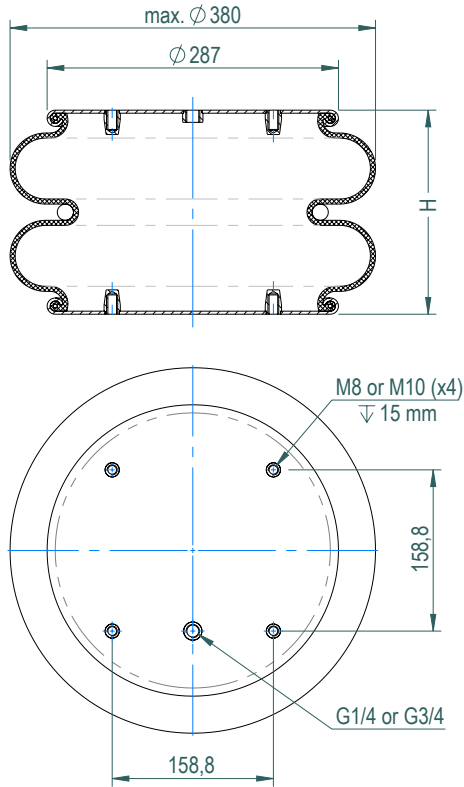
All Volume [l] values at 7 bar

F SERIES
Crimped Design

M-100

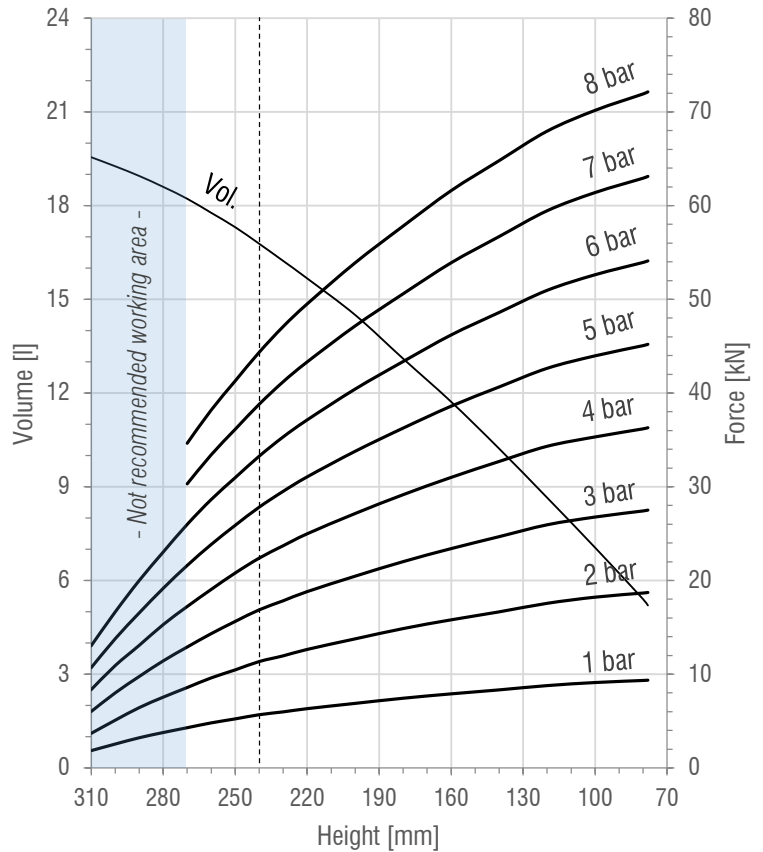
DOUBLE
CONVOLUTION

DRAWING



M8&M10=25 Nm G1/4=25 Nm G3/4=50 Nm

FORCE-HEIGHT CHART



TECHNICAL DATA

PRODUCT CHARACTERISTICS

Static diameter [mm]	368
Max. diameter [mm]	380
Required space diameter [mm]	395
Min. height [mm]	78
Static height [mm]	180
Design height [mm]	240
Max. usable height [mm]	270
Max. stroke [mm]	192
Force to compress to H_{min} at 0 bar [N]	200
Weight [kg]	8,1

REFERENCES

M-100_B	Rubber bellow only
M-100_C_G1/4	With crimped plates & G1/4 air inlet
M-100_C_G3/4	With crimped plates & G3/4 air inlet
M-100_R_SH	With socket head bead rings
M-100_R_TR	With threaded bead rings
M-100_R_CS	With countersunk bead rings

Designs available with stainless steel and high temperature rubber compounds. Additional designs on request.

DYNAMIC CHARACTERISTICS FOR USE AS ISOLATOR

Pressure [bar]	3	4	5	6	7	Vol. [l]
Load [kN]	16,9	22,4	27,8	33,3	38,8	16,8
Spring rate [N/mm]	159	200	241	282	325	
Natural frequency [Hz]	1,53	1,49	1,47	1,46	1,45	
Isolation rate at 10 Hz	97,6%	97,7%	97,8%	97,8%	97,9%	

Values at recommended design height H: 240 mm -----

STATIC CHARACTERISTICS FOR USE AS ACTUATOR

Pressure [bar]	3	4	5	6	7	Vol. [l]	
Height H [mm]	80	27,4	36,2	45,1	53,9	62,9	5,4
	100	26,8	35,3	44,0	52,6	61,4	7,1
	120	25,9	34,3	42,6	51,0	59,5	8,7
	140	24,7	32,7	40,7	48,6	56,7	10,2
	160	23,4	31,0	38,6	46,2	53,9	11,7
	180	22,0	29,2	36,3	43,4	50,6	13,1
	200	20,5	27,1	33,8	40,4	47,2	14,5
	220	18,8	25,0	31,1	37,1	43,3	15,7
260	14,3	19,0	23,8	28,6	33,4	17,8	

Force values [kN]

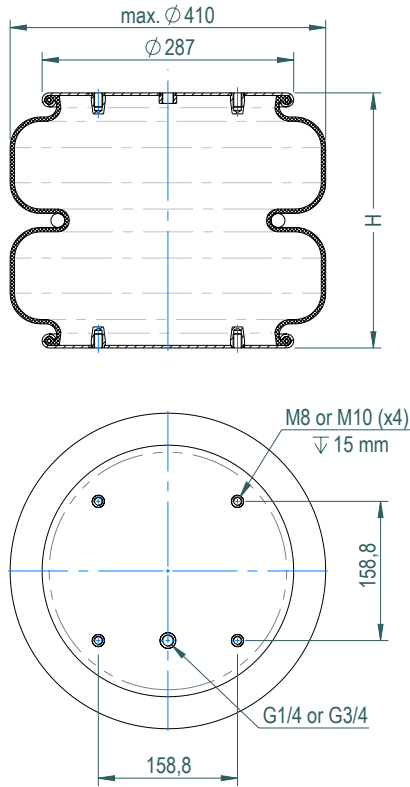
All Volume [l] values at 7 bar

F SERIES
Crimped Design

M-100-E

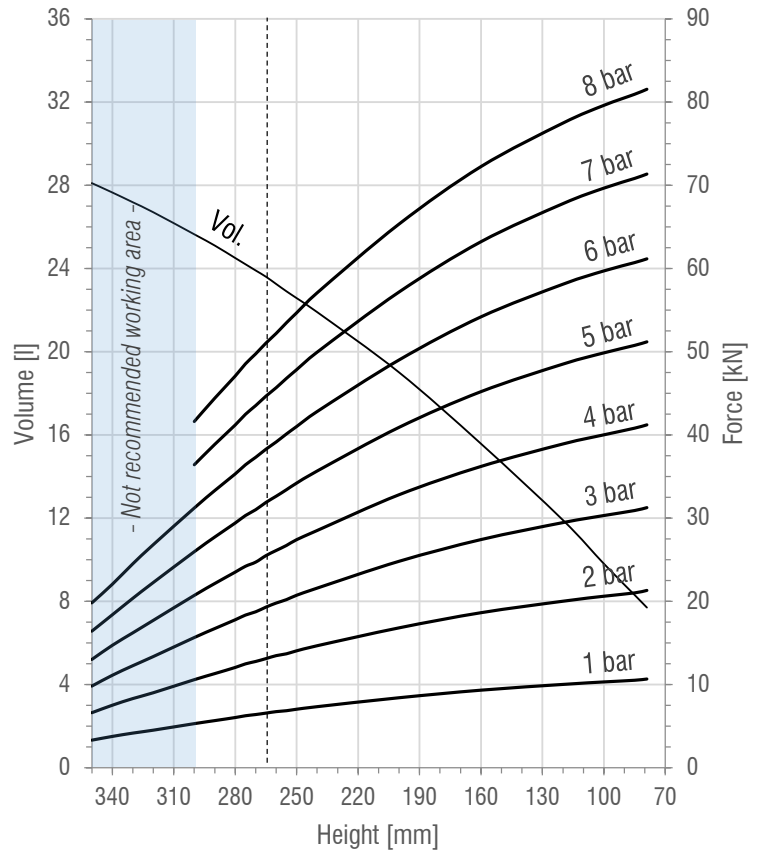
DOUBLE
CONVOLUTION

DRAWING



M8&M10=25 Nm G1/4=25 Nm G3/4=50 Nm

FORCE-HEIGHT CHART



TECHNICAL DATA

PRODUCT CHARACTERISTICS

Static diameter [mm]	368
Max. diameter [mm]	410
Required space diameter [mm]	425
Min. height [mm]	79
Static height [mm]	260
Design height [mm]	265
Max. usable height [mm]	300
Max. stroke [mm]	221
Force to compress to H_{min} at 0 bar [N]	230
Weight [kg]	8,4

REFERENCES

M-100-E_B	Rubber bellow only
M-100-E_C_G1/4	With crimped plates & G1/4 air inlet
M-100-E_C_G3/4	With crimped plates & G3/4 air inlet
M-100-E_R_SH	With socket head bead rings
M-100-E_R_TR	With threaded bead rings
M-100-E_R_CS	With countersunk bead rings

Designs available with stainless steel and high temperature rubber compounds. Additional designs on request.

DYNAMIC CHARACTERISTICS FOR USE AS ISOLATOR

Pressure [bar]	3	4	5	6	7	Vol. [l]
Load [kN]	19,3	25,5	31,9	38,3	44,6	23,6
Spring rate [N/mm]	192	248	302	357	412	
Natural frequency [Hz]	1,58	1,56	1,54	1,53	1,52	
Isolation rate at 10 Hz	97,5%	97,5%	97,6%	97,6%	97,6%	

Values at recommended design height H: 265 mm -----

STATIC CHARACTERISTICS FOR USE AS ACTUATOR

Pressure [bar]		3	4	5	6	7	Vol. [l]
Height H [mm]	80	31,3	41,2	51,2	61,2	71,3	7,7
	120	29,5	38,9	48,5	58,1	67,8	11,9
	160	27,4	36,2	45,2	54,2	63,2	15,6
	200	24,8	32,8	40,9	49,0	57,2	19,0
	240	21,6	28,5	35,7	42,8	49,9	21,9
	280	17,8	23,5	29,4	35,3	41,2	24,5
300	15,6	20,7	26,0	31,2	36,4	25,6	

Force values [kN]

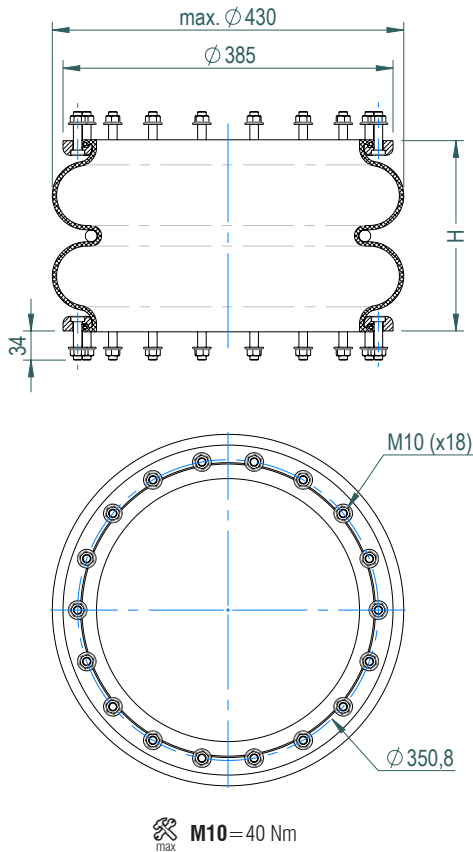
All Volume [l] values at 7 bar

F SERIES
Socket Head Bead Ring Design

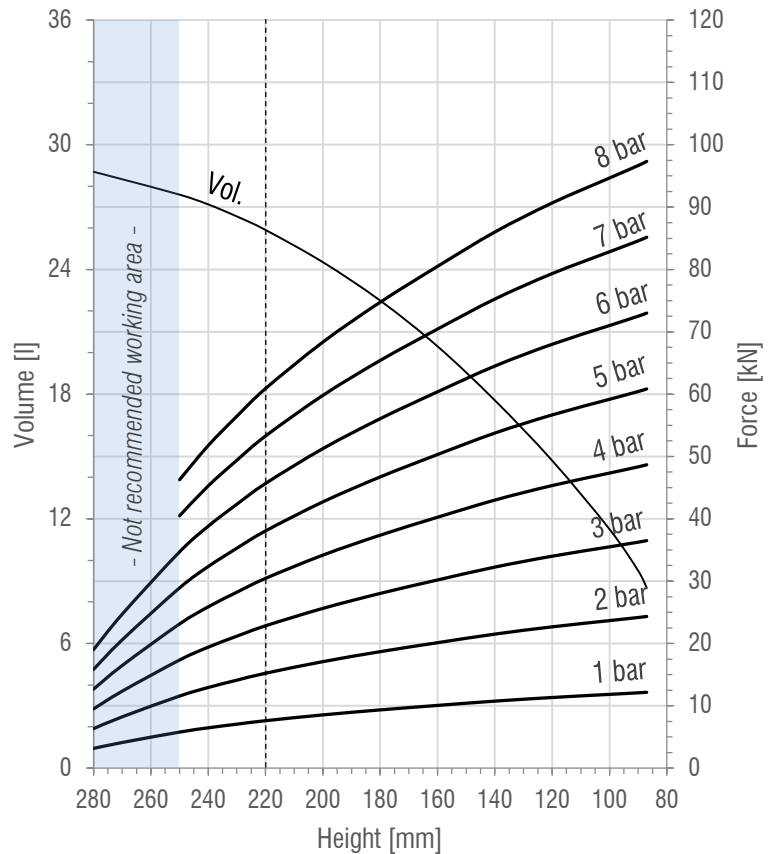
M-110

DOUBLE
CONVOLUTION

DRAWING



FORCE-HEIGHT CHART



TECHNICAL DATA

PRODUCT CHARACTERISTICS

Static diameter [mm]	385
Max. diameter [mm]	430
Required space diameter [mm]	470
Min. height [mm]	87
Static height [mm]	215
Design height [mm]	220
Max. usable height [mm]	250
Max. stroke [mm]	163
Force to compress to H_{min} at 0 bar [N]	320
Weight [kg]	13,0

REFERENCES

M-110_B	Rubber bellow only
M-110_R_SH	With socket head bead rings
M-110_R_TR	With threaded bead rings
M-110_R_CS	With countersunk bead rings

Designs available with stainless steel and high temperature rubber compounds. Additional designs on request.

DYNAMIC CHARACTERISTICS FOR USE AS ISOLATOR

Pressure [bar]	3	4	5	6	7	Vol. [l]
Load [kN]	22,8	30,4	38,1	45,7	53,3	25,9
Spring rate [N/mm]	261	340	419	497	576	
Natural frequency [Hz]	1,69	1,67	1,66	1,65	1,64	
Isolation rate at 10 Hz	97,1%	97,1%	97,2%	97,2%	97,2%	

Values at recommended design height H : 220 mm -----

STATIC CHARACTERISTICS FOR USE AS ACTUATOR

Pressure [bar]	3	4	5	6	7	Vol. [l]	
Height H [mm]	100	35,5	47,3	59,2	71,0	82,8	11,5
	120	34,0	45,3	56,7	68,0	79,3	14,8
	140	32,3	43,0	53,8	64,5	75,3	17,7
	160	30,2	40,2	50,3	60,4	70,4	20,3
	180	28,0	37,4	46,7	56,1	65,4	22,5
	200	25,6	34,2	42,7	51,3	59,8	24,4
	220	22,8	30,4	38,1	45,7	53,3	25,9
240	19,4	25,9	32,3	38,8	45,3	27,1	

Force values [kN]

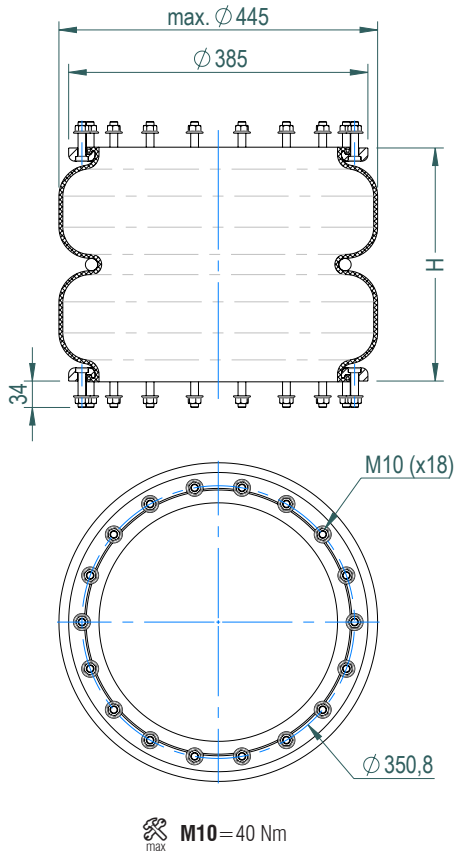
All Volume [l] values at 7 bar

F SERIES
Socket Head Bead Ring Design

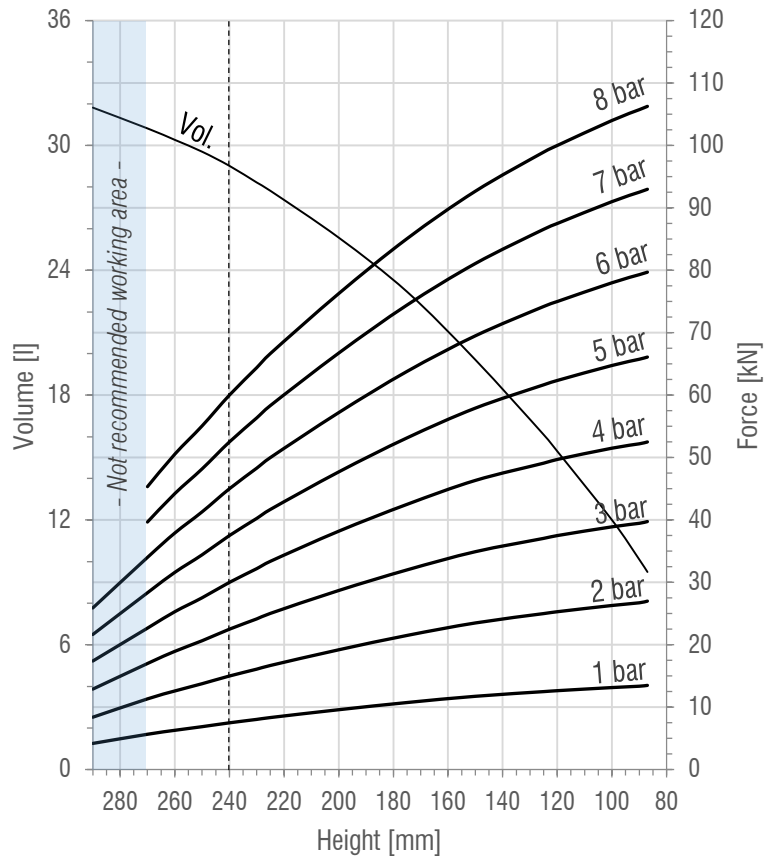
M-110-E/4

DOUBLE
CONVOLUTION

DRAWING



FORCE-HEIGHT CHART



TECHNICAL DATA

PRODUCT CHARACTERISTICS

Static diameter [mm]	385
Max. diameter [mm]	445
Required space diameter [mm]	485
Min. height [mm]	87
Static height [mm]	270
Design height [mm]	240
Max. usable height [mm]	270
Max. stroke [mm]	183
Force to compress to H_{min} at 0 bar [N]	330
Weight [kg]	13,3

REFERENCES

M-110-E/4_B	Rubber bellow only
M-110-E/4_R_SH	With socket head bead rings
M-110-E/4_R_TR	With threaded bead rings
M-110-E/4_R_CS	With countersunk bead rings

Designs available with stainless steel and high temperature rubber compounds. Additional designs on request.

DYNAMIC CHARACTERISTICS FOR USE AS ISOLATOR

Pressure [bar]	3	4	5	6	7	Vol. [l]
Load [kN]	22,5	30,0	37,5	45,0	52,5	29,0
Spring rate [N/mm]	282	367	452	537	622	
Natural frequency [Hz]	1,77	1,75	1,74	1,73	1,72	
Isolation rate at 10 Hz	96,8%	96,8%	96,9%	96,9%	96,9%	

Values at recommended design height H: 240 mm -----

STATIC CHARACTERISTICS FOR USE AS ACTUATOR

Pressure [bar]		3	4	5	6	7	Vol. [l]
Height H [mm]	100	38,9	51,5	64,8	78,0	91,0	12,0
	125	37,1	49,1	61,7	74,2	86,6	16,1
	150	34,9	46,3	57,9	69,5	81,1	19,7
	175	32,0	42,5	53,2	63,8	74,4	23,0
	200	28,7	38,2	47,7	57,2	66,7	25,6
	225	25,0	33,4	41,7	50,0	58,3	27,8
250	20,7	27,5	34,4	41,3	48,2	29,7	

Force values [kN]

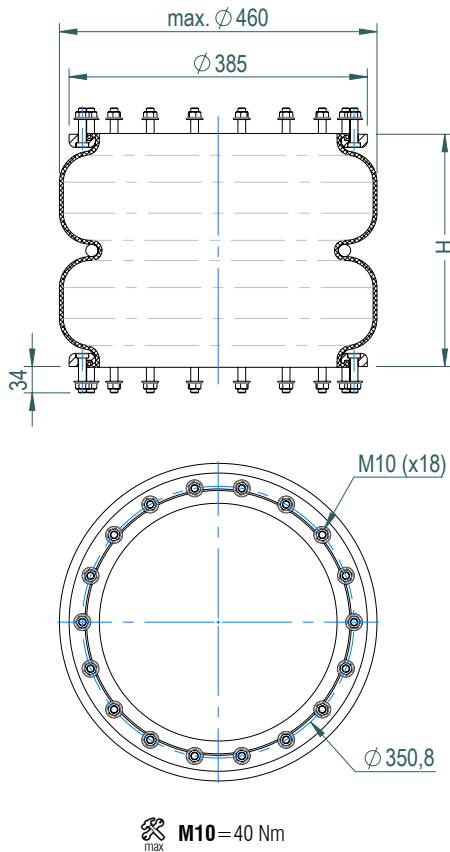
All Volume [l] values at 7 bar

F SERIES
Socket Head Bead Ring Design

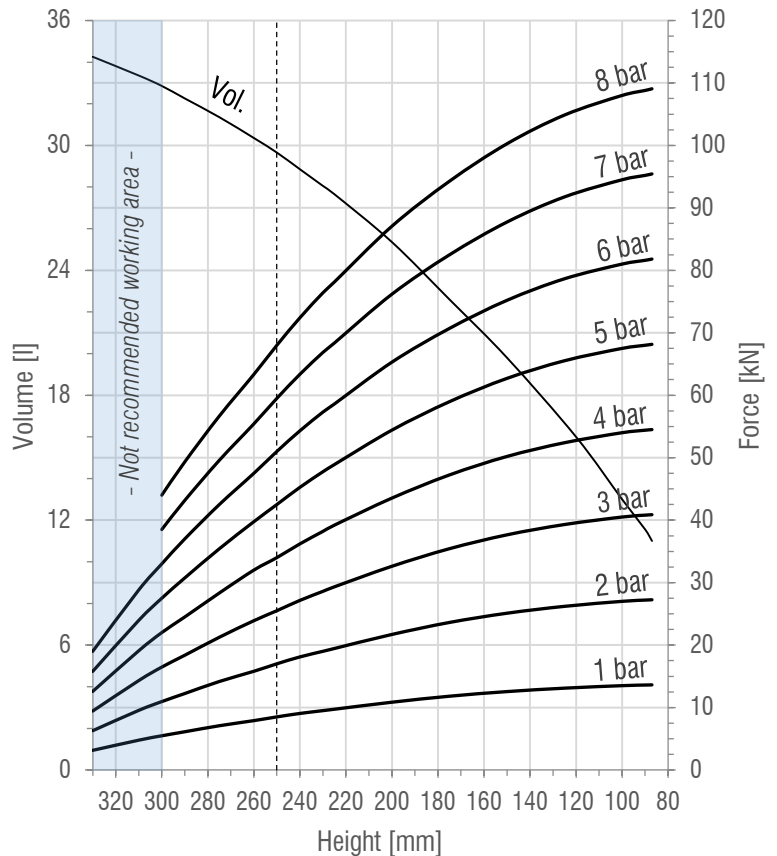
M-110-E/2

DOUBLE
CONVOLUTION

DRAWING



FORCE-HEIGHT CHART



TECHNICAL DATA

PRODUCT CHARACTERISTICS

Static diameter [mm]	385
Max. diameter [mm]	460
Required space diameter [mm]	500
Min. height [mm]	87
Static height [mm]	300
Design height [mm]	250
Max. usable height [mm]	300
Max. stroke [mm]	213
Force to compress to H_{min} at 0 bar [N]	380
Weight [kg]	13,6

REFERENCES

M-110-E/2_B	Rubber bellow only
M-110-E/2_R_SH	With socket head bead rings
M-110-E/2_R_TR	With threaded bead rings
M-110-E/2_R_CS	With countersunk bead rings

Designs available with stainless steel and high temperature rubber compounds. Additional designs on request.

DYNAMIC CHARACTERISTICS FOR USE AS ISOLATOR

Pressure [bar]	3	4	5	6	7	Vol. [l]
Load [kN]	25,5	34,0	42,5	51,0	59,5	29,7
Spring rate [N/mm]	283	361	455	550	637	
Natural frequency [Hz]	1,67	1,63	1,64	1,64	1,64	
Isolation rate at 10 Hz	97,1%	97,3%	97,2%	97,2%	97,3%	

Values at recommended design height H: 250 mm -----

STATIC CHARACTERISTICS FOR USE AS ACTUATOR

Pressure [bar]		3	4	5	6	7	Vol. [l]
Height H [mm]	100	40,5	54,0	67,5	81,0	94,5	13,0
	125	39,3	52,4	65,5	78,7	91,8	16,0
	175	35,4	47,2	59,0	70,7	82,5	22,6
	200	32,6	43,5	54,4	65,3	76,2	25,4
	225	29,3	39,2	48,9	58,6	68,4	27,7
	250	25,5	34,0	42,5	51,0	59,5	29,7
275	21,3	28,3	35,4	42,5	49,6	31,4	

Force values [kN]

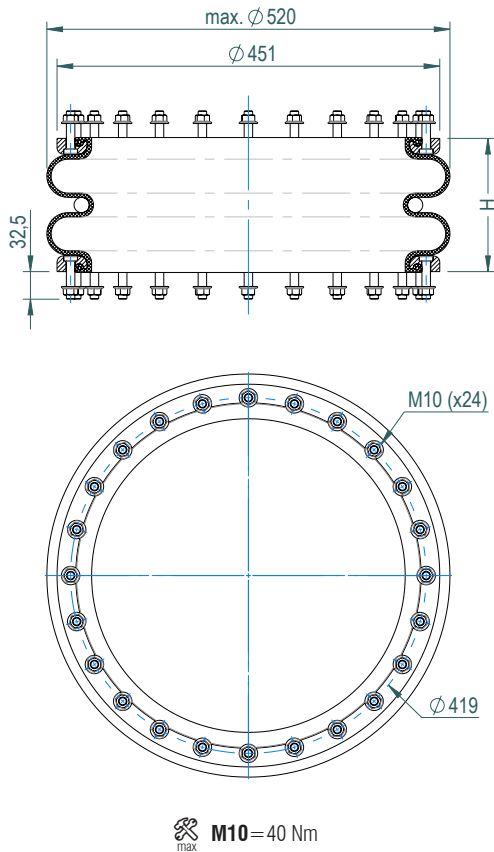
All Volume [l] values at 7 bar

F SERIES
Socket Head Bead Ring Design

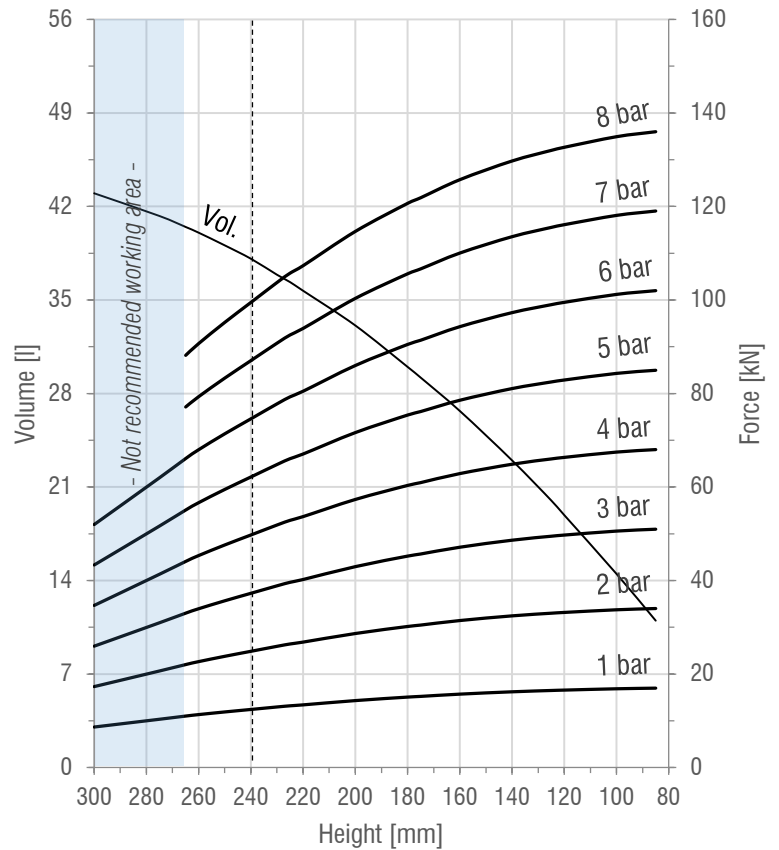
M-60-2

DOUBLE
CONVOLUTION

DRAWING



FORCE-HEIGHT CHART



TECHNICAL DATA

PRODUCT CHARACTERISTICS

Static diameter [mm]	507
Max. diameter [mm]	520
Required space diameter [mm]	570
Min. height [mm]	85
Static height [mm]	205
Design height [mm]	240
Max. usable height [mm]	265
Max. stroke [mm]	180
Force to compress to H_{min} at 0 bar [N]	180
Weight [kg]	18,2

REFERENCES

M-60-2_B	Rubber bellow only
M-60-2_R_SH	With socket head bead rings
M-60-2_R_TR	With threaded bead rings

Designs available with stainless steel and high temperature rubber compounds. Additional designs on request.

DYNAMIC CHARACTERISTICS FOR USE AS ISOLATOR

Pressure [bar]	3	4	5	6	7	Vol. [l]
Load [kN]	37,3	49,7	62,2	74,6	87,0	38,1
Spring rate [N/mm]	361	465	568	672	775	
Natural frequency [Hz]	1,56	1,53	1,51	1,50	1,49	
Isolation rate at 10 Hz	97,5%	97,6%	97,7%	97,7%	97,7%	

Values at recommended design height H: 240 mm -----

STATIC CHARACTERISTICS FOR USE AS ACTUATOR

Pressure [bar]	3	4	5	6	7	Vol. [l]	
Height H [mm]	120	49,8	66,3	82,9	99,5	116,1	18,9
	140	48,7	64,9	81,1	97,3	113,5	23,0
	160	47,2	62,9	78,6	94,3	110,0	26,7
	180	45,3	60,3	75,4	90,5	105,6	30,0
	200	43,0	57,3	71,7	86,0	100,3	33,1
	220	40,3	53,7	67,1	80,5	93,9	35,7
	240	37,3	49,7	62,2	74,6	87,0	38,1
	260	34,0	45,3	56,7	68,0	79,3	40,1

Force values [kN]

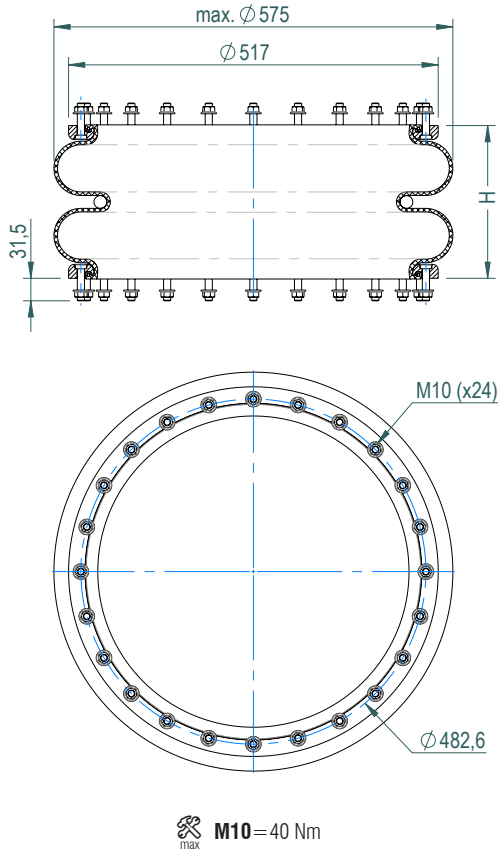
All Volume [l] values at 7 bar

F SERIES
Socket Head Bead Ring Design

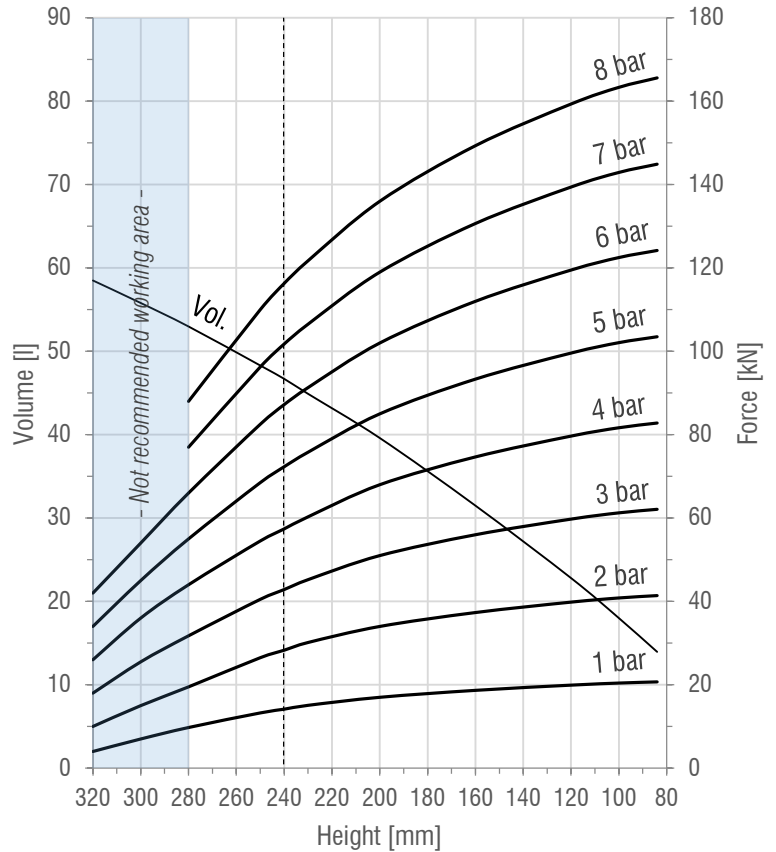
M-118-2

DOUBLE
CONVOLUTION

DRAWING



FORCE-HEIGHT CHART



TECHNICAL DATA

PRODUCT CHARACTERISTICS

Static diameter [mm]	558
Max. diameter [mm]	575
Required space diameter [mm]	615
Min. height [mm]	84
Static height [mm]	210
Design height [mm]	240
Max. usable height [mm]	280
Max. stroke [mm]	196
Force to compress to H_{min} at 0 bar [N]	250
Weight [kg]	21,5

REFERENCES

M-118-2_B	Rubber bellow only
M-118-2_R_SH	With socket head bead rings
M-118-2_R_TR	With threaded bead rings
M-118-2_R_CS	With countersunk bead rings

Designs available with stainless steel and high temperature rubber compounds. Additional designs on request.

DYNAMIC CHARACTERISTICS FOR USE AS ISOLATOR

Pressure [bar]	3	4	5	6	7	Vol. [l]
Load [kN]	42,9	57,4	72,3	87,2	101,8	46,7
Spring rate [N/mm]	528	656	806	956	1103	
Natural frequency [Hz]	1,75	1,69	1,67	1,66	1,65	
Isolation rate at 10 Hz	96,8%	97,1%	97,1%	97,2%	97,2%	

Values at recommended design height H: 240 mm -----

STATIC CHARACTERISTICS FOR USE AS ACTUATOR

Pressure [bar]		3	4	5	6	7	Vol. [l]
Height H [mm]	100	61,3	81,7	102,1	122,5	142,9	18,0
	120	59,8	79,7	99,6	119,5	139,4	22,8
	160	56,0	74,7	93,3	112,0	130,7	31,5
	200	51,0	68,0	85,0	102,0	119,0	39,6
	240	42,9	57,4	72,3	87,2	101,8	46,7
280	31,8	44,0	55,0	66,0	77,0	53,0	

Force values [kN]

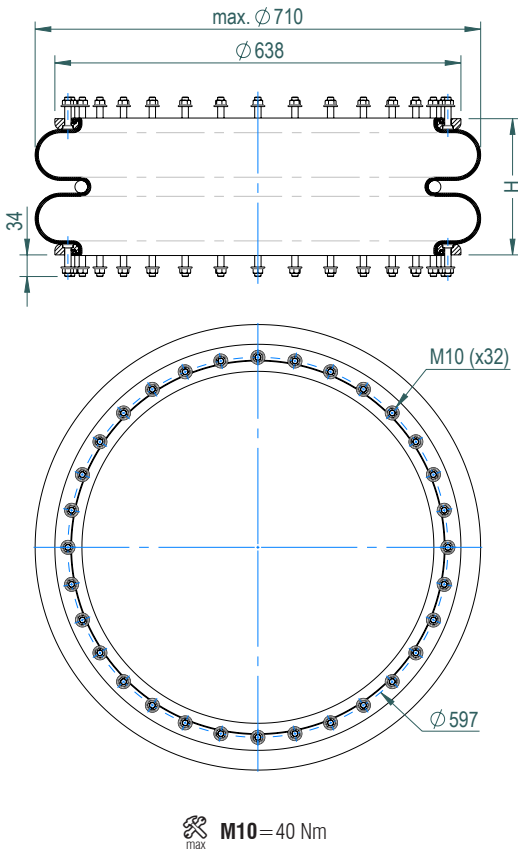
All Volume [l] values at 7 bar

F SERIES
Socket Head Bead Ring Design

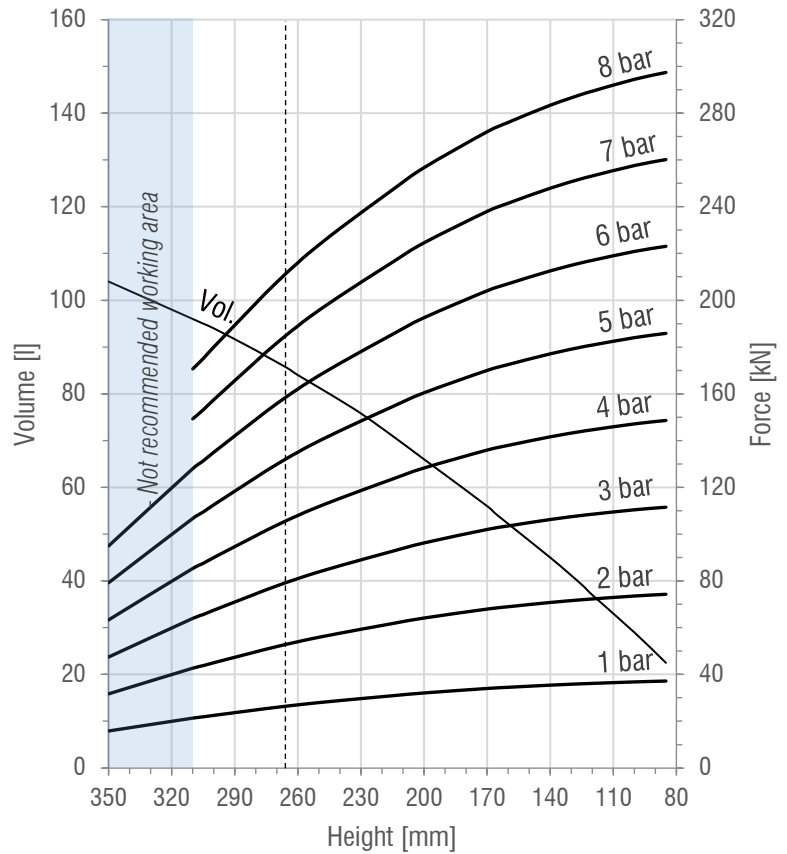
M-130-2

DOUBLE
CONVOLUTION

DRAWING



FORCE-HEIGHT CHART



TECHNICAL DATA

PRODUCT CHARACTERISTICS

Static diameter [mm]	700
Max. diameter [mm]	710
Required space diameter [mm]	760
Min. height [mm]	85
Static height [mm]	210
Design height [mm]	265
Max. usable height [mm]	305
Max. stroke [mm]	220
Force to compress to H_{min} at 0 bar [N]	700
Weight [kg]	28

REFERENCES

M-130-2_B	Rubber bellow only
M-130-2_R_SH	With socket head bead rings
M-130-2_R_TR	With threaded bead rings

Designs available with stainless steel and high temperature rubber compounds. Additional designs on request.

DYNAMIC CHARACTERISTICS FOR USE AS ISOLATOR

Pressure [bar]	3	4	5	6	7	Vol. [l]
Load [kN]	79,5	106,0	132,5	159,0	185,5	85,5
Spring rate [N/mm]	1.041	1.327	1.613	1.899	2.184	
Natural frequency [Hz]	1,81	1,77	1,74	1,73	1,72	
Isolation rate at 10 Hz	96,6%	96,8%	96,9%	96,9%	97,0%	

Values at recommended design height H: 265 mm -----

STATIC CHARACTERISTICS FOR USE AS ACTUATOR

Pressure [bar]	3	4	5	6	7	Vol. [l]	
Height H [mm]	120	108,5	144,7	180,8	217,0	253,2	37,0
	160	103,5	138,0	172,5	207,0	241,5	54,0
	200	96,3	128,3	160,4	192,5	224,6	66,0
	240	86,5	115,3	144,2	173,0	201,8	75,8
	280	74,5	99,3	124,2	149,0	173,8	89,3

Force values [kN]

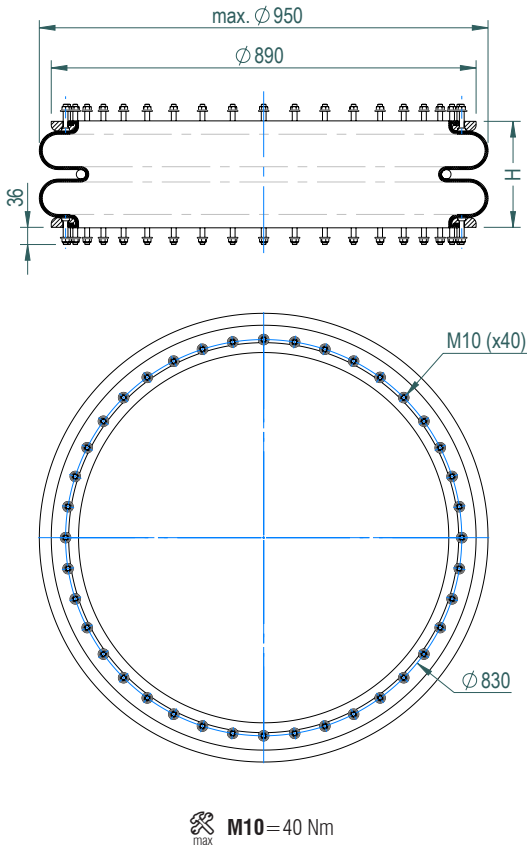
All Volume [l] values at 7 bar

F SERIES
Socket Head Bead Ring Design

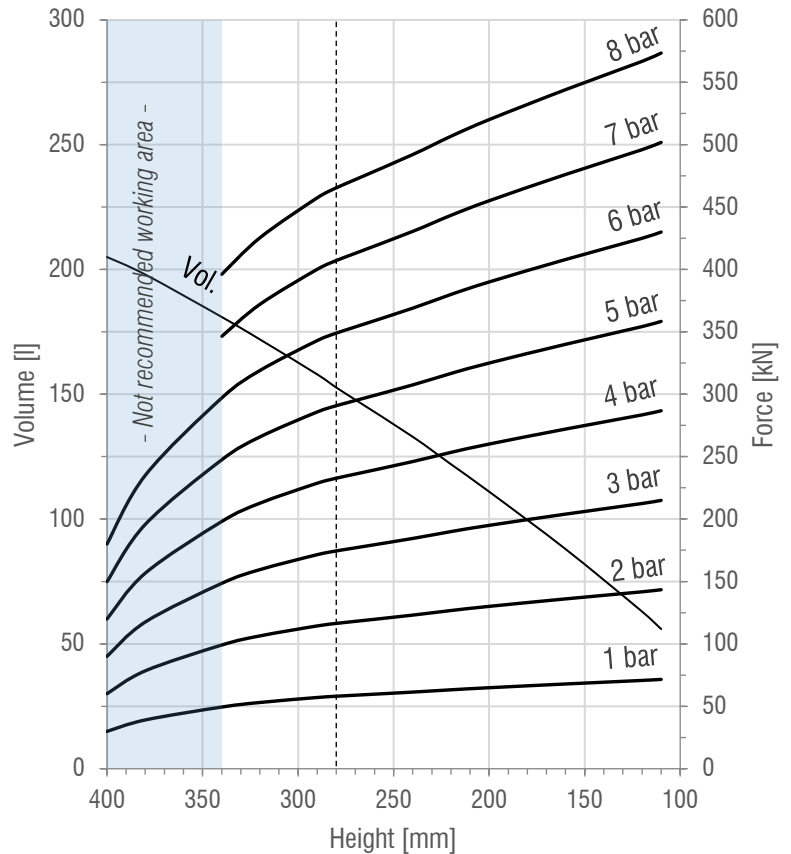
M-140-2

DOUBLE
CONVOLUTION

DRAWING



FORCE-HEIGHT CHART



TECHNICAL DATA

PRODUCT CHARACTERISTICS

Static diameter [mm]	940
Max. diameter [mm]	950
Required space diameter [mm]	1.000
Min. height [mm]	110
Static height [mm]	225
Design height [mm]	280
Max. usable height [mm]	340
Max. stroke [mm]	230
Force to compress to H_{min} at 0 bar [N]	1.600
Weight [kg]	54,2

REFERENCES

M-140-2_B	Rubber bellow only
M-140-2_R_SH	With socket head bead rings
M-140-2_R_TR	With threaded bead rings

Designs available with stainless steel and high temperature rubber compounds. Additional designs on request.

DYNAMIC CHARACTERISTICS FOR USE AS ISOLATOR

Pressure [bar]	3	4	5	6	7	Vol. [l]
Load [kN]	174,5	232,7	290,8	349,0	407,2	152,7
Spring rate [N/mm]	1.347	1.706	2.065	2.424	2.783	
Natural frequency [Hz]	1,39	1,35	1,33	1,32	1,31	
Isolation rate at 10 Hz	98,0%	98,1%	98,2%	98,2%	98,3%	

Values at recommended design height H: 280 mm -----

STATIC CHARACTERISTICS FOR USE AS ACTUATOR

Pressure [bar]		3	4	5	6	7	Vol. [l]
Height H [mm]	120	212,5	283,3	354,2	425,0	495,8	63,0
	160	204,0	272,0	340,0	408,0	476,0	88,0
	200	195,0	260,0	325,0	390,0	455,0	111,0
	240	184,5	246,0	307,5	369,0	430,5	133,0
	280	174,5	232,7	290,8	349,0	407,2	152,7
320	159,5	212,7	265,8	319,0	372,2	172,0	

Force values [kN]

All Volume [l] values at 7 bar