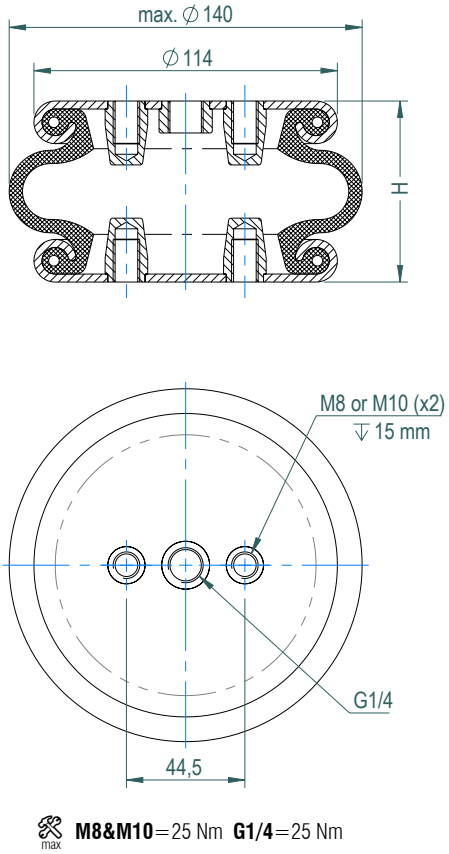
F SERIES
Crimped Design

M-10

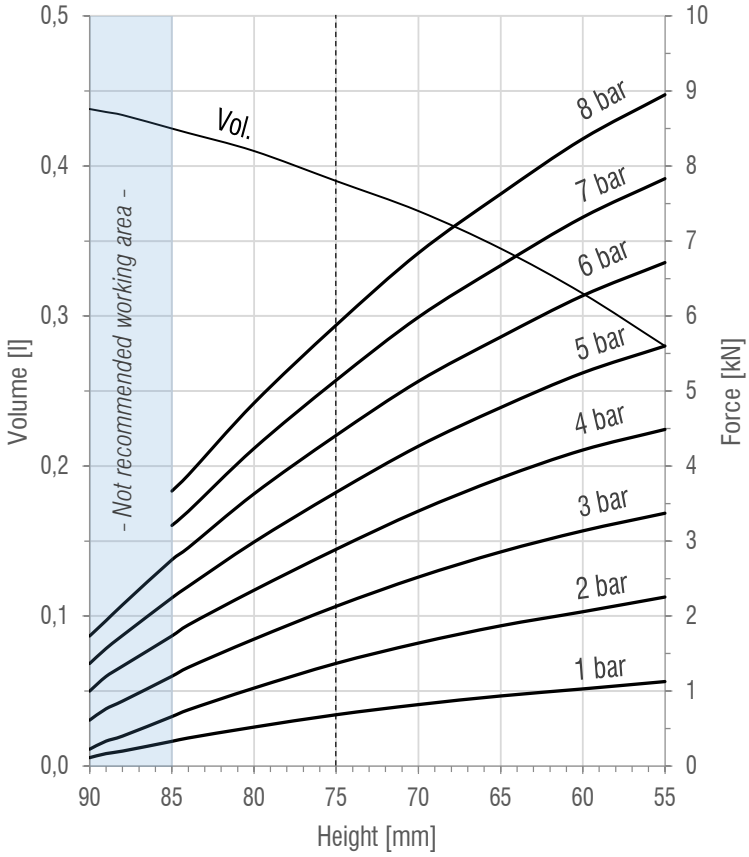
SINGLE
CONVOLUTION

DRAWING



max. **M8&M10**=25 Nm **G1/4**=25 Nm

FORCE-HEIGHT CHART



TECHNICAL DATA

PRODUCT CHARACTERISTICS

Static diameter [mm]	133
Max. diameter [mm]	140
Required space diameter [mm]	155
Min. height [mm]	55
Static height [mm]	71
Design height [mm]	75
Max. usable height [mm]	85
Max. stroke [mm]	30
Force to compress to H_{min} at 0 bar [N]	245
Weight [kg]	1,3

REFERENCES

M-10_B	Rubber bellow only
M-10_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]	2,1	2,9	3,7	4,4	5,1	0,4
Spring rate [N/mm]	127	162	195	228	264	
Natural frequency [Hz]	3,86	3,74	3,65	3,60	3,58	
Isolation rate at 10 Hz	82,5%	83,7%	84,6%	85,2%	85,3%	

Values at recommended design height H: 75 mm - - - - -

STATIC CHARACTERISTICS FOR USE AS ACTUATOR

Pressure [bar]		**3**	**4**	**5**	**6**	**7**	**Vol. [l]**
Height H [mm]	**55**	3,4	4,5	5,6	6,7	7,8	0,3
	60	3,1	4,2	5,2	6,3	7,3	0,3
	65	2,9	3,8	4,8	5,7	6,7	0,3
	70	2,5	3,4	4,3	5,1	6,0	0,4
	75	2,1	2,9	3,7	4,4	5,1	0,4
	80	1,7	2,3	3,0	3,6	4,2	0,4
	85	1,2	1,7	2,2	2,8	3,2	0,4

Force values [kN] *All Volume [l] values at 7 bar*

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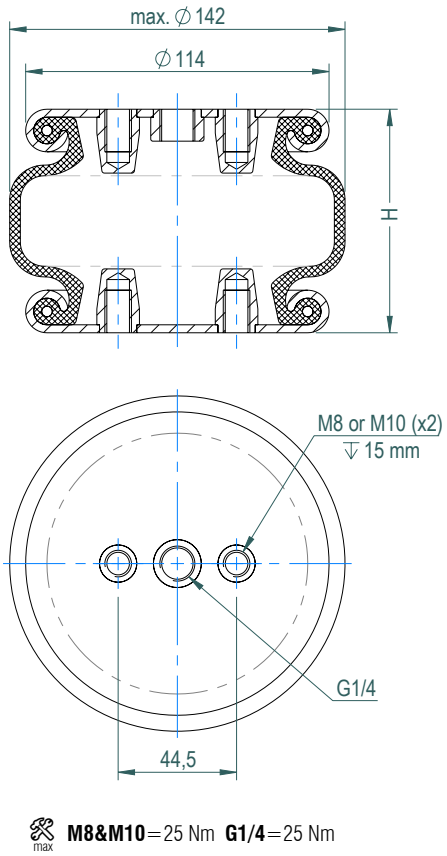
F SERIES
Crimped Design

M-11

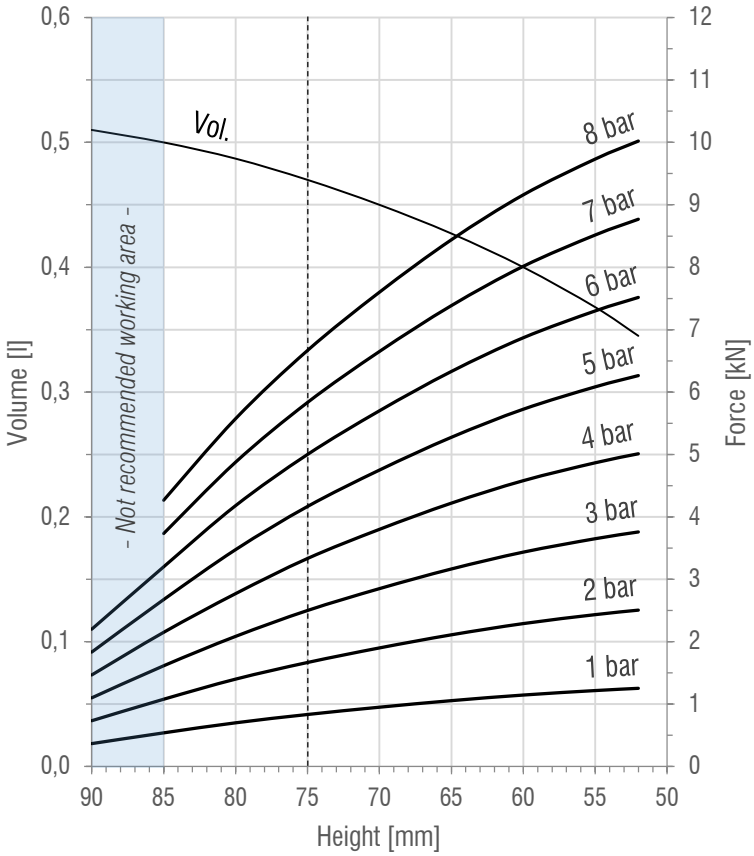
SINGLE
CONVOLUTION

DRAWING



max. **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]	155
Min. height [mm]	52
Static height [mm]	85
Design height [mm]	75
Max. usable height [mm]	85
Max. stroke [mm]	33
Force to compress to H_{min} at 0 bar [N]	200
Weight [kg]	1,26

REFERENCES

M-11_B	Rubber bellow only
M-11_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]	2,5	3,3	4,2	5,0	5,8	0,5
Spring rate [N/mm]	116	152	188	224	260	
Natural frequency [Hz]	3,41	3,38	3,36	3,35	3,34	
Isolation rate at 10 Hz	86,8%	87,1%	87,3%	87,4%	87,5%	

Values at recommended design height H: 75 mm - - - - -

STATIC CHARACTERISTICS FOR USE AS ACTUATOR

Pressure [bar]		**3**	**4**	**5**	**6**	**7**	**Vol. [l]**
Height H [mm]	**55**	3,7	4,9	6,1	7,3	8,5	0,4
	60	3,4	4,6	5,7	6,9	8,0	0,4
	65	3,2	4,2	5,3	6,3	7,4	0,4
	70	2,9	3,8	4,8	5,7	6,7	0,5
	75	2,5	3,3	4,2	5,0	5,8	0,5
	80	2,1	2,8	3,5	4,2	4,9	0,5
	85	1,6	2,2	2,7	3,2	3,7	0,5

Force values [kN] *All Volume [l] values at 7 bar*

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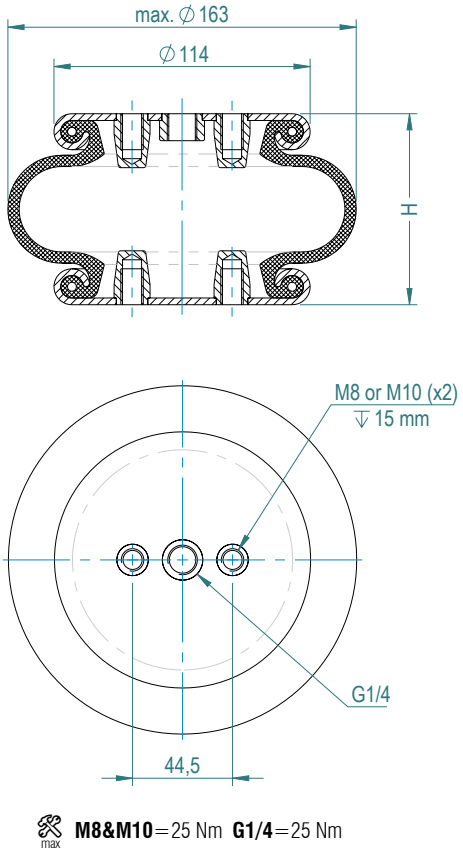
F SERIES
Crimped Design

M-20

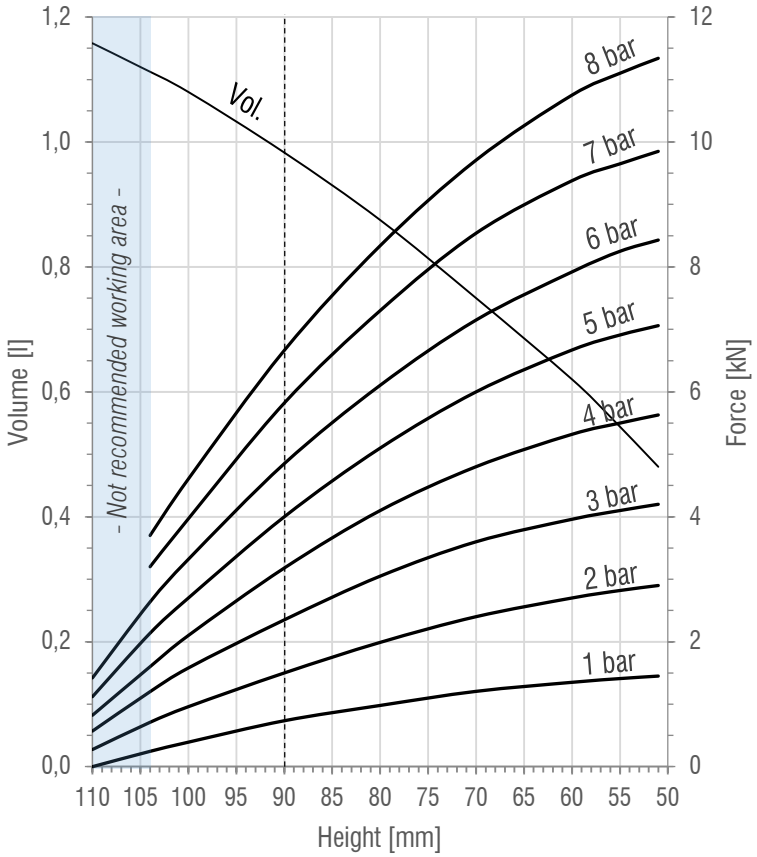
SINGLE
CONVOLUTION

DRAWING



max. **M8&M10**=25 Nm **G1/4**=25 Nm

FORCE-HEIGHT CHART



TECHNICAL DATA

PRODUCT CHARACTERISTICS

Static diameter [mm]	155
Max. diameter [mm]	163
Required space diameter [mm]	180
Min. height [mm]	51
Static height [mm]	85
Design height [mm]	90
Max. usable height [mm]	104
Max. stroke [mm]	53
Force to compress to H_{min} at 0 bar [N]	147
Weight [kg]	1,37

REFERENCES

M-20_B	Rubber bellow only
M-20_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]	2,3	3,2	4,0	4,9	5,8	1,0
Spring rate [N/mm]	121	156	192	223	261	
Natural frequency [Hz]	3,61	3,50	3,46	3,39	3,35	
Isolation rate at 10 Hz	85,0%	86,0%	86,4%	87,0%	87,4%	

Values at recommended design height H: 90 mm - - - - -

STATIC CHARACTERISTICS FOR USE AS ACTUATOR

Pressure [bar]		**3**	**4**	**5**	**6**	**7**	**Vol. [l]**
Height H [mm]	**60**	4,0	5,3	6,7	7,9	9,4	0,6
	70	3,6	4,8	6,0	7,2	8,5	0,8
	80	3,1	4,1	5,1	6,1	7,3	0,9
	90	2,4	3,2	4,0	4,9	5,8	1,0
	100	1,6	2,1	2,7	3,3	4,0	1,1

Force values [kN] *All Volume [l] values at 7 bar*

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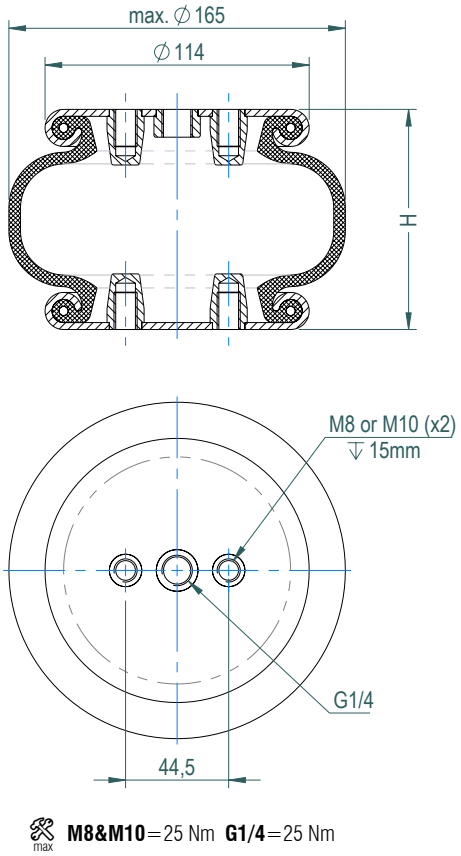
F SERIES
Crimped Design

M-20-E

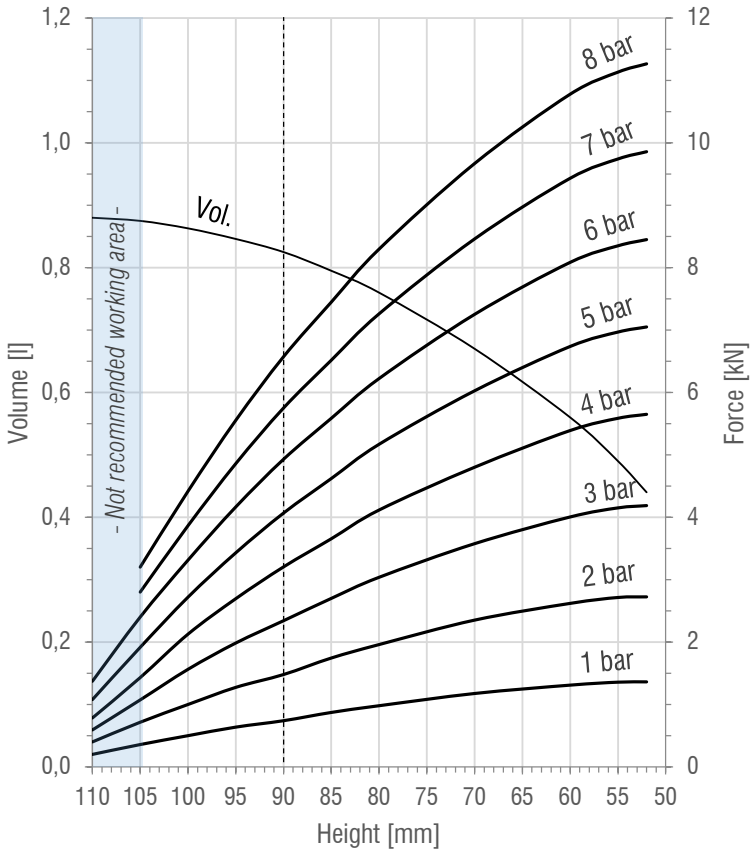
SINGLE
CONVOLUTION

DRAWING



max **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]	52
Static height [mm]	89
Design height [mm]	90
Max. usable height [mm]	105
Max. stroke [mm]	53
Force to compress to H_{min} at 0 bar [N]	186
Weight [kg]	1,33

REFERENCES

M-20-E_B	Rubber bellow only
M-20-E_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]	2,3	3,2	4,1	4,9	5,8	0,83
Spring rate [N/mm]	104	138	170	201	233	
Natural frequency [Hz]	3,34	3,29	3,23	3,19	3,18	
Isolation rate at 10 Hz	87,5%	87,9%	88,4%	88,7%	88,7%	

Values at recommended design height H: 90 mm - - - - -

STATIC CHARACTERISTICS FOR USE AS ACTUATOR

Pressure [bar]		**3**	**4**	**5**	**6**	**7**	**Vol. [l]**
Height H [mm]	**60**	4,0	5,4	6,7	8,1	9,4	0,6
	70	3,6	4,8	6,0	7,3	8,5	0,7
	80	3,0	4,1	5,2	6,2	7,3	0,8
	90	2,3	3,2	4,1	4,9	5,8	0,8
	100	1,6	2,1	2,7	3,3	3,9	0,9

Force values [kN] *All Volume [l] values at 7 bar*

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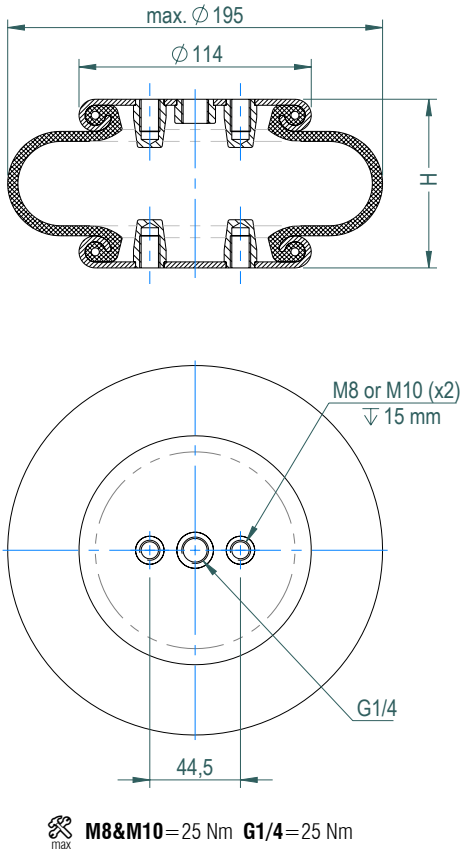
F SERIES
Crimped Design

M-25

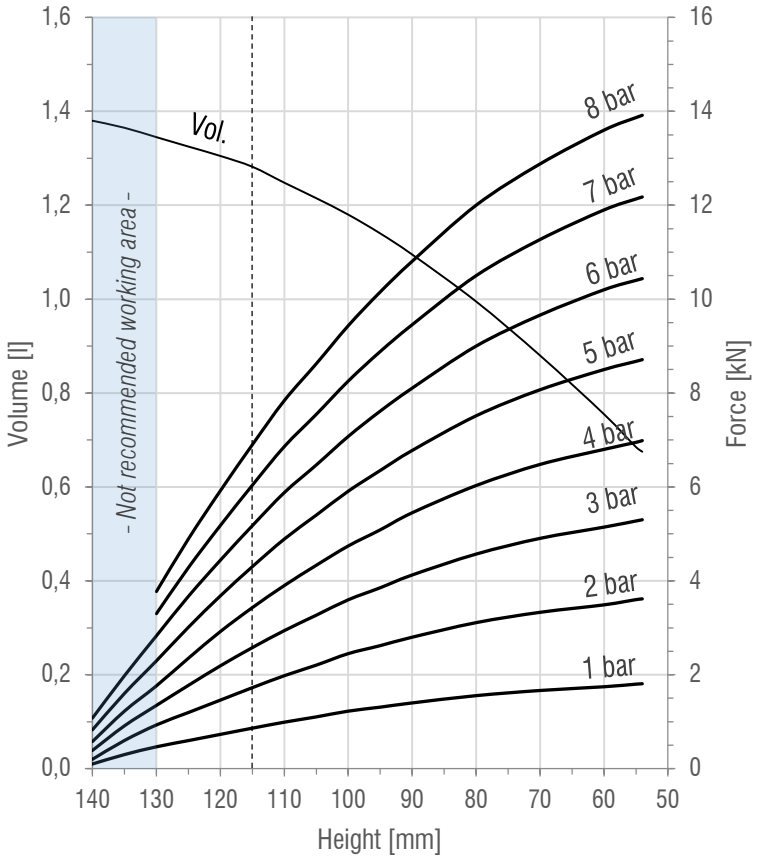
SINGLE
CONVOLUTION

DRAWING



max. **M8&M10**=25 Nm **G1/4**=25 Nm

FORCE-HEIGHT CHART



TECHNICAL DATA

PRODUCT CHARACTERISTICS

Static diameter [mm]	184
Max. diameter [mm]	195
Required space diameter [mm]	210
Min. height [mm]	54
Static height [mm]	95
Design height [mm]	115
Max. usable height [mm]	130
Max. stroke [mm]	76
Force to compress to H_{min} at 0 bar [N]	50
Weight [kg]	1,4

REFERENCES

M-25_B	Rubber bellow only
M-25_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]	2,6	3,4	4,3	5,2	6,0	1,3
Spring rate [N/mm]	97	126	152	178	207	
Natural frequency [Hz]	3,06	3,04	2,98	2,94	2,93	
Isolation rate at 10 Hz	89,6%	89,9%	90,3%	90,6%	90,6%	

Values at recommended design height H: 115 mm - - - - -

STATIC CHARACTERISTICS FOR USE AS ACTUATOR

Pressure [bar]		**3**	**4**	**5**	**6**	**7**	**Vol. [l]**
Height H [mm]	**60**	5,1	6,8	8,5	10,2	11,9	0,8
	70	4,9	6,5	8,1	9,7	11,3	0,9
	80	4,6	6,0	7,5	9,0	10,5	1,0
	90	4,1	5,5	6,8	8,1	9,5	1,1
	100	3,6	4,7	5,9	7,1	8,3	1,2
	110	2,9	3,9	4,9	5,9	6,9	1,2
	120	2,2	2,9	3,7	4,4	5,2	1,3
	130	1,3	1,8	2,3	2,8	3,3	1,3

Force values [kN] *All Volume [l] values at 7 bar*

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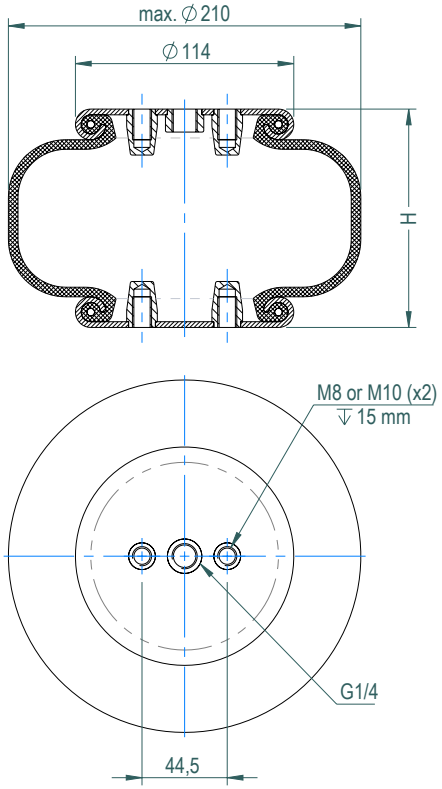
F SERIES
Crimped Design

M-25-E

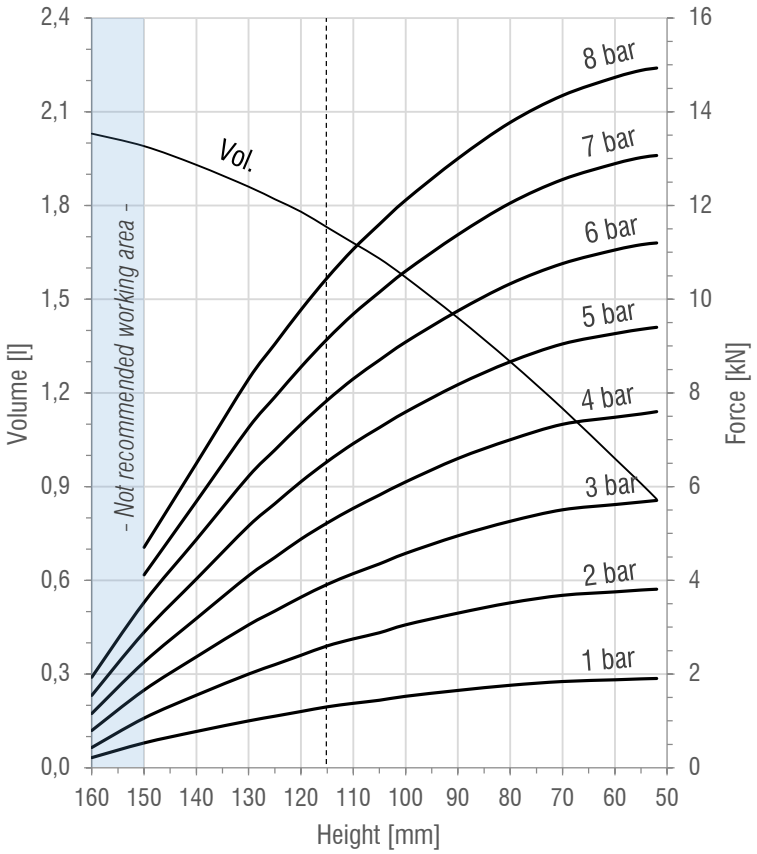
SINGLE
CONVOLUTION

DRAWING



max. **M8&M10**=25 Nm **G1/4**=25 Nm

FORCE-HEIGHT CHART



TECHNICAL DATA

PRODUCT CHARACTERISTICS

Static diameter [mm]	183
Max. diameter [mm]	210
Required space diameter [mm]	225
Min. height [mm]	52
Static height [mm]	115
Design height [mm]	115
Max. usable height [mm]	150
Max. stroke [mm]	98
Force to compress to H_{min} at 0 bar [N]	90
Weight [kg]	1,47

REFERENCES

M-25-E_B	Rubber bellow only
M-25-E_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]	3,9	5,2	6,5	7,8	9,1	1,7
Spring rate [N/mm]	90	117	142	166	192	
Natural frequency [Hz]	2,40	2,36	2,33	2,30	2,29	
Isolation rate at 10 Hz	93,9%	94,1%	94,3%	94,4%	94,5%	

Values at recommended design height H: 115 mm - - - - -

STATIC CHARACTERISTICS FOR USE AS ACTUATOR

Pressure [bar]		**3**	**4**	**5**	**6**	**7**	**Vol. [l]**
Height H [mm]	**60**	5,6	7,5	9,3	11,1	12,9	1,0
	70	5,5	7,3	9,0	10,8	12,6	1,2
	80	5,3	7,0	8,7	10,3	12,1	1,3
	90	5,0	6,6	8,2	9,8	11,4	1,4
	100	4,6	6,1	7,6	9,1	10,6	1,6
	110	4,1	5,5	6,9	8,3	9,7	1,7
	120	3,6	4,9	6,1	7,3	8,6	1,8
	130	3,1	4,1	5,2	6,2	7,3	1,9
	140	2,4	3,2	4,0	4,9	5,7	1,9
	150	1,7	2,3	2,9	3,5	4,1	2,0

Force values [kN] *All Volume [l] values at 7 bar*

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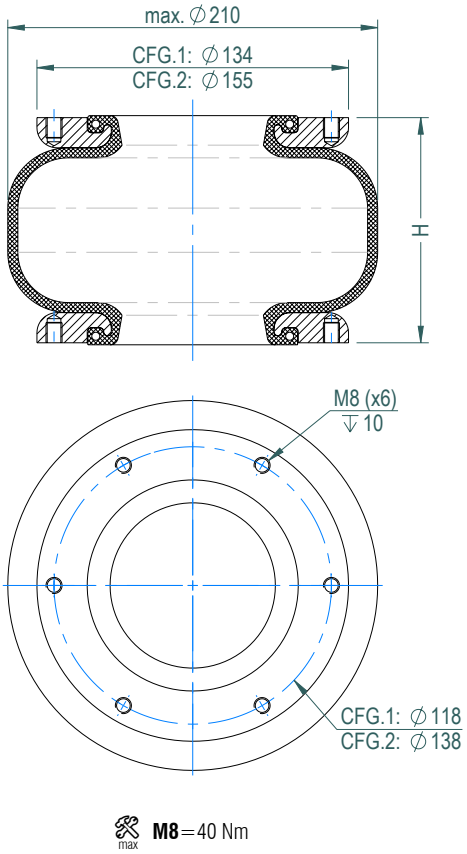
F SERIES
Threaded Bead Ring Design

MT-110

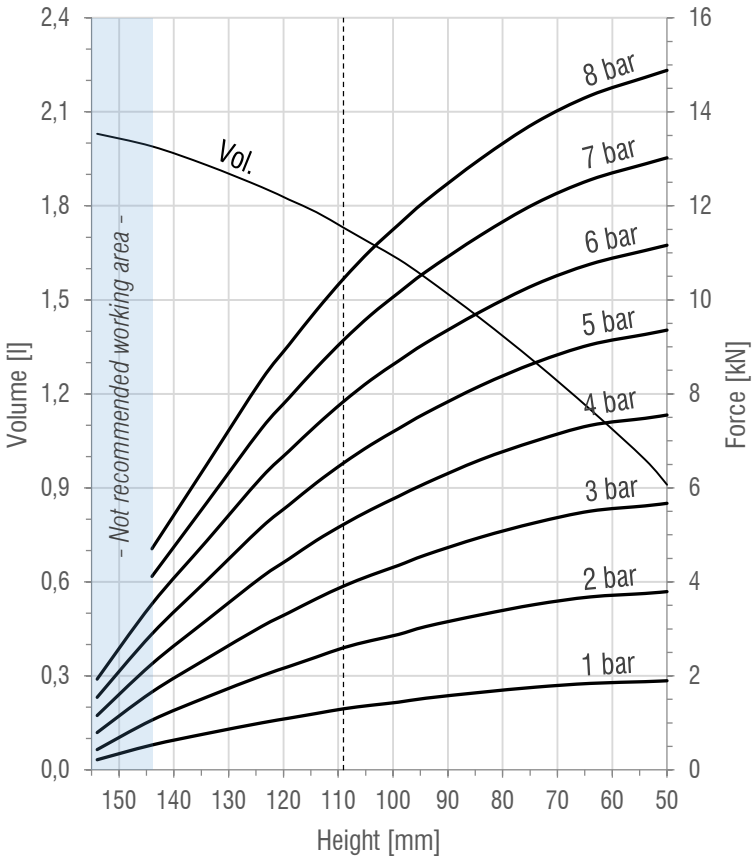
SINGLE
CONVOLUTION

DRAWING



max **M8**=40 Nm

FORCE-HEIGHT CHART



TECHNICAL DATA

PRODUCT CHARACTERISTICS

Static diameter [mm]	183
Max. diameter [mm]	210
Required space diameter [mm]	225
Min. height [mm]	50
Static height [mm]	109
Design height [mm]	109
Max. usable height [mm]	144
Max. stroke [mm]	94
Force to compress to H_{min} at 0 bar [N]	90
Weight [kg]	(1)1,0 / (2)1,4

REFERENCES

MT-110_B	Rubber bellow only
MT-110_R_TR_D134	With alum. threaded bead rings
MT-110_R_TR_D155	With alum. 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]	3,9	5,2	6,5	7,8	9,1	1,7
Spring rate [N/mm]	90	117	142	166	192	
Natural frequency [Hz]	2,40	2,36	2,33	2,30	2,29	
Isolation rate at 10 Hz	93,9%	94,1%	94,3%	94,4%	94,5%	

Values at recommended design height H: 109 mm - - - - -

STATIC CHARACTERISTICS FOR USE AS ACTUATOR

Pressure [bar]		**3**	**4**	**5**	**6**	**7**	**Vol. [l]**
Height H [mm]	**54**	5,6	7,5	9,3	11,1	12,9	1,0
	64	5,5	7,3	9,0	10,8	12,6	1,2
	74	5,3	7,0	8,7	10,3	12,1	1,3
	84	5,0	6,6	8,2	9,8	11,4	1,4
	94	4,6	6,1	7,6	9,1	10,6	1,6
	104	4,1	5,5	6,9	8,3	9,7	1,7
	114	3,6	4,9	6,1	7,3	8,6	1,8
	124	3,1	4,1	5,2	6,2	7,3	1,9
	134	2,4	3,2	4,0	4,9	5,7	1,9
	144	1,7	2,3	2,9	3,5	4,1	2,0

Force values [kN] *All Volume [l] values at 7 bar*

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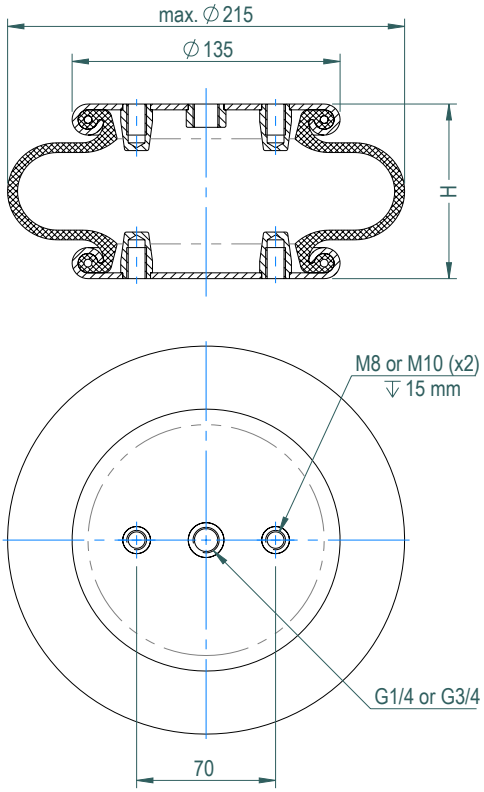
F SERIES
Crimped Design

M-30

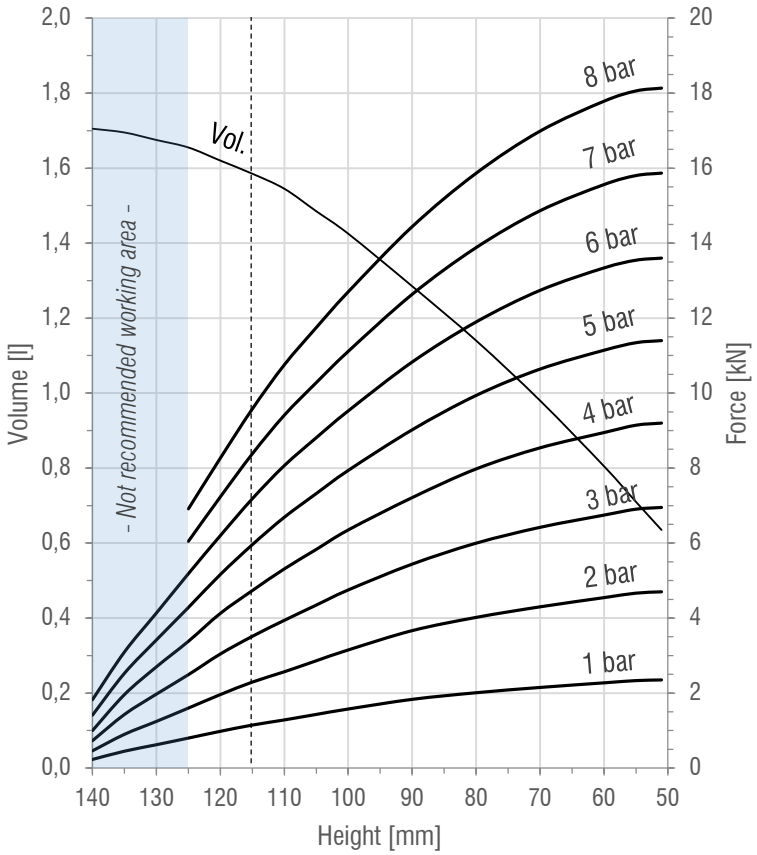
SINGLE
CONVOLUTION

DRAWING



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

FORCE-HEIGHT CHART



TECHNICAL DATA

PRODUCT CHARACTERISTICS

Static diameter [mm]	202
Max. diameter [mm]	215
Required space diameter [mm]	230
Min. height [mm]	51
Static height [mm]	85
Design height [mm]	115
Max. usable height [mm]	125
Max. stroke [mm]	74
Force to compress to H_{min} at 0 bar [N]	60
Weight [kg]	1,8

REFERENCES

M-30_B	Rubber bellow only
M-30_C_G1/4	With crimped plates & G1/4 air inlet
M-30_C_G3/4	With crimped plates & G3/4 air inlet
M-30_R_SH	With socket head bead rings
M-30_R_TR	With threaded bead rings
M-30_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]	3,5	4,7	6,0	7,2	8,4	1,6
Spring rate [N/mm]	130	169	208	247	287	
Natural frequency [Hz]	3,04	2,99	2,96	2,93	2,93	
Isolation rate at 10 Hz	89,8%	90,2%	90,4%	90,6%	90,6%	

Values at recommended design height H: 115 mm - - - - -

STATIC CHARACTERISTICS FOR USE AS ACTUATOR

Pressure [bar]		**3**	**4**	**5**	**6**	**7**	**Vol. [l]**
Height H [mm]	**60**	6,7	8,9	11,1	13,3	15,6	0,8
	70	6,4	8,5	10,6	12,7	14,9	1,0
	80	6,0	8,0	9,9	11,9	13,9	1,1
	90	5,4	7,2	9,0	10,8	12,6	1,3
	100	4,8	6,4	7,9	9,5	11,1	1,4
	110	3,9	5,3	6,7	8,1	9,4	1,5
	120	3,0	4,1	5,2	6,2	7,2	1,6

Force values [kN] *All Volume [l] values at 7 bar*

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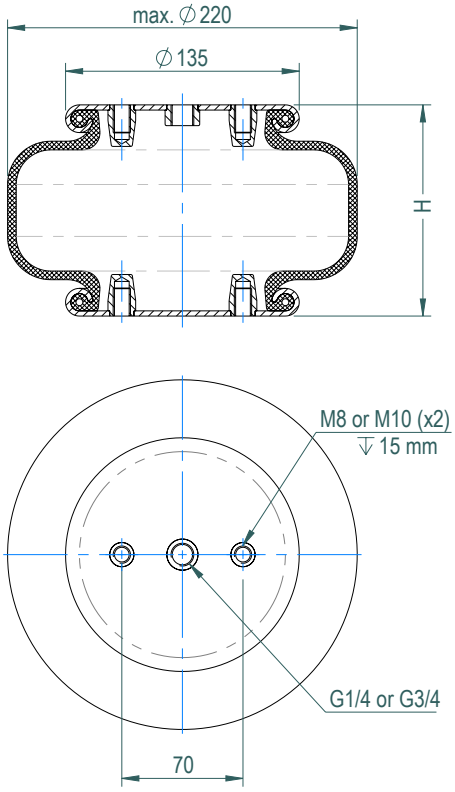
F SERIES
Crimped Design

M-30-E

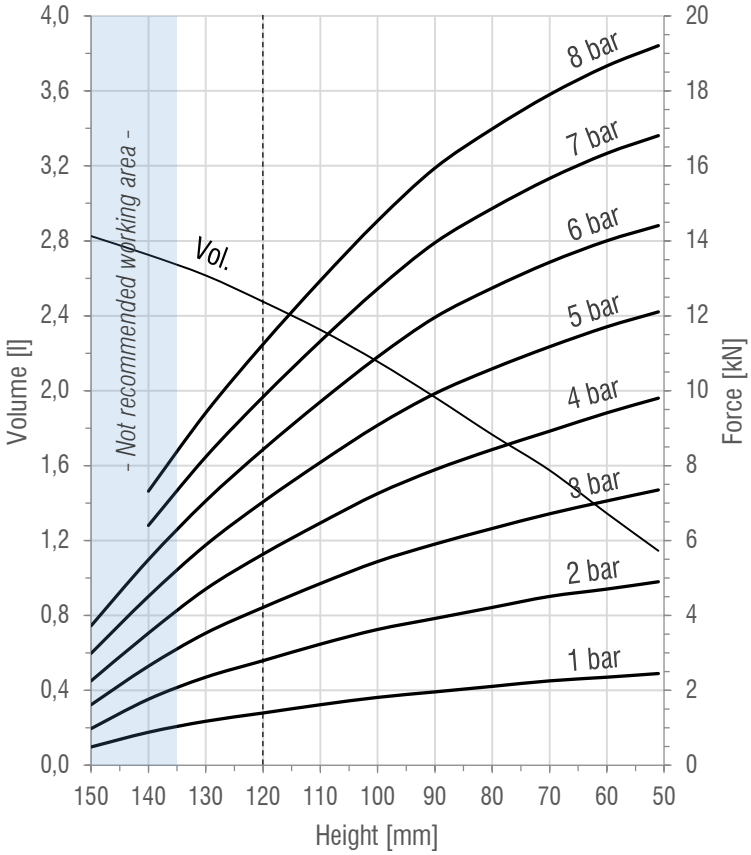
SINGLE
CONVOLUTION

DRAWING



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

FORCE-HEIGHT CHART



TECHNICAL DATA

PRODUCT CHARACTERISTICS

Static diameter [mm]	202
Max. diameter [mm]	220
Required space diameter [mm]	235
Min. height [mm]	51
Static height [mm]	115
Design height [mm]	120
Max. usable height [mm]	135
Max. stroke [mm]	84
Force to compress to H_{min} at 0 bar [N]	120
Weight [kg]	1,8

REFERENCES

M-30-E_B	Rubber bellow only
M-30-E_C_G1/4	With crimped plates & G1/4 air inlet
M-30-E_C_G3/4	With crimped plates & G3/4 air inlet
M-30-E_R_SH	With socket head bead rings
M-30-E_R_TR	With threaded bead rings
M-30-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]	4,2	5,6	7,0	8,4	9,8	2,5
Spring rate [N/mm]	152	200	242	285	331	
Natural frequency [Hz]	3,01	2,98	2,94	2,91	2,90	
Isolation rate at 10 Hz	90,1%	90,3%	90,6%	90,8%	90,8%	

Values at recommended design height H: 120 mm - - - - -

STATIC CHARACTERISTICS FOR USE AS ACTUATOR

Pressure [bar]		**3**	**4**	**5**	**6**	**7**	**Vol. [l]**
Height H [mm]	**60**	7,1	9,4	11,7	14,0	16,3	1,3
	70	6,7	8,9	11,2	13,4	15,7	1,6
	80	6,3	8,4	10,6	12,7	14,9	1,8
	90	5,9	7,9	9,9	12,0	13,9	2,0
	100	5,4	7,3	9,1	10,9	12,7	2,2
	110	4,9	6,5	8,1	9,7	11,3	2,3
	120	4,2	5,6	7,0	8,4	9,8	2,5
	130	3,5	4,7	5,9	7,1	8,2	2,6
	140	2,6	3,5	4,5	5,5	6,4	2,7

Force values [kN] *All Volume [l] values at 7 bar*

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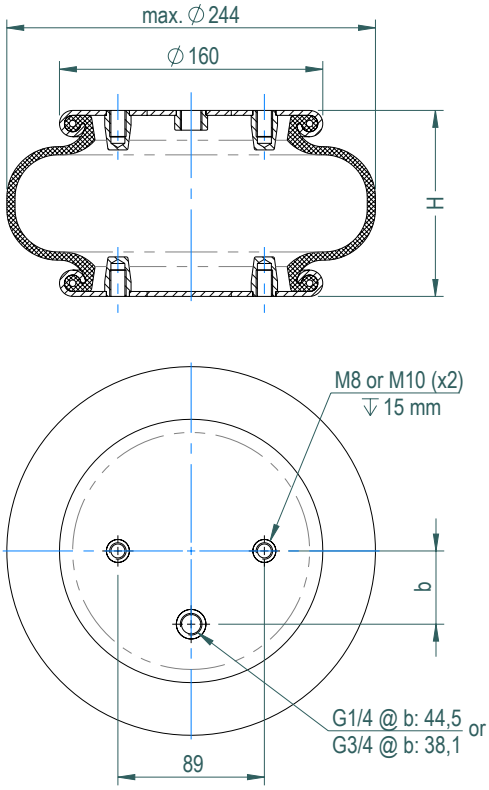
F SERIES
Crimped Design

M-35-E

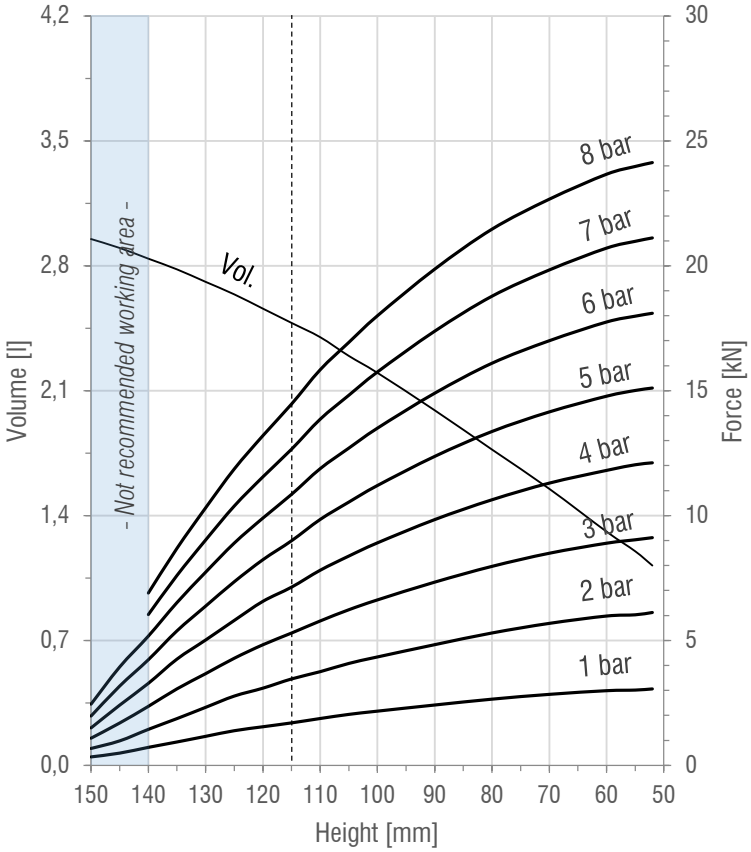
SINGLE
CONVOLUTION

DRAWING



max **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]	52
Static height [mm]	110
Design height [mm]	115
Max. usable height [mm]	140
Max. stroke [mm]	88
Force to compress to H_{min} at 0 bar [N]	80
Weight [kg]	2,3

REFERENCES

M-35-E_B	Rubber bellow only
M-35-E_C_G1/4	With crimped plates & G1/4 air inlet
M-35-E_C_G3/4	With crimped plates & G3/4 air inlet
M-35-E_R_SH	With socket head bead rings
M-35-E_R_TR	With threaded bead rings
M-35-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]	5,3	7,1	9,0	10,8	12,7	2,5
Spring rate [N/mm]	168	218	268	317	367	
Natural frequency [Hz]	2,81	2,76	2,73	2,70	2,69	
Isolation rate at 10 Hz	91,4%	91,7%	92,0%	92,1%	92,2%	

Values at recommended design height H: 115 mm - - - - -

STATIC CHARACTERISTICS FOR USE AS ACTUATOR

Pressure [bar]		**3**	**4**	**5**	**6**	**7**	**Vol. [l]**
Height H [mm]	**60**	8,9	11,8	14,8	17,8	20,7	1,3
	70	8,5	11,3	14,1	17,0	19,8	1,6
	80	8,0	10,6	13,4	16,1	18,8	1,8
	90	7,3	9,8	12,4	14,9	17,4	2,0
	100	6,6	8,9	11,2	13,5	15,8	2,2
	110	5,8	7,8	9,8	11,9	13,9	2,4
	120	4,8	6,6	8,2	9,9	11,6	2,6
	130	3,7	5,0	6,4	7,7	9,0	2,7
	140	2,4	3,3	4,2	5,2	6,0	2,8

Force values [kN] *All Volume [l] values at 7 bar*

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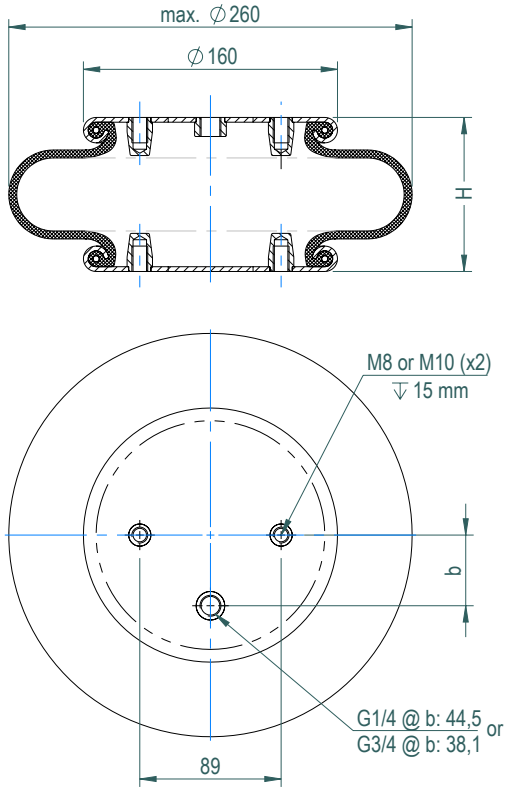
F SERIES
Crimped Design

M-35

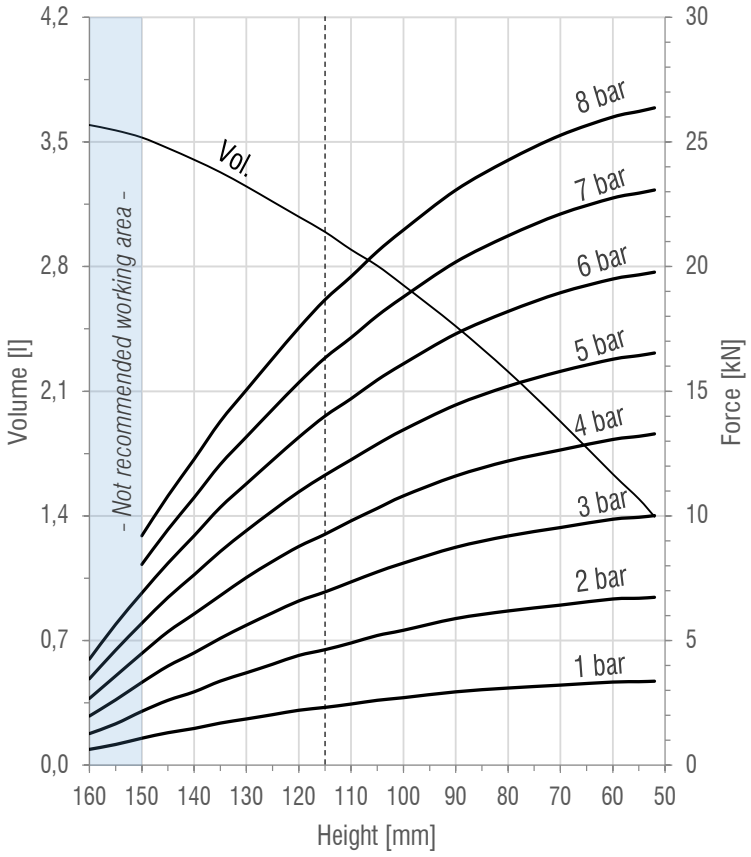
SINGLE
CONVOLUTION

DRAWING



max. **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]	52
Static height [mm]	90
Design height [mm]	115
Max. usable height [mm]	150
Max. stroke [mm]	98
Force to compress to H_{min} at 0 bar [N]	40
Weight [kg]	2,43

REFERENCES

M-35_B	Rubber bellow only
M-35_C_G1/4	With crimped plates & G1/4 air inlet
M-35_C_G3/4	With crimped plates & G3/4 air inlet
M-35_R_SH	With socket head bead rings
M-35_R_TR	With threaded bead rings
M-35_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]	6,9	9,3	11,6	14,0	16,3	3,0
Spring rate [N/mm]	161	205	252	299	345	
Natural frequency [Hz]	2,41	2,35	2,33	2,31	2,30	
Isolation rate at 10 Hz	93,8%	94,1%	94,3%	94,4%	94,4%	

Values at recommended design height H: 115 mm - - - - -

STATIC CHARACTERISTICS FOR USE AS ACTUATOR

Pressure [bar]		**3**	**4**	**5**	**6**	**7**	**Vol. [l]**
Height H [mm]	**60**	9,9	13,1	16,3	19,5	22,8	1,6
	70	9,5	12,6	15,8	19,0	22,1	1,9
	80	9,2	12,2	15,2	18,2	21,2	2,2
	90	8,7	11,6	14,5	17,3	20,2	2,5
	100	8,1	10,8	13,5	16,1	18,8	2,7
	110	7,4	9,8	12,3	14,7	17,2	2,9
	120	6,6	8,8	11,0	13,2	15,3	3,1
	130	5,6	7,5	9,4	11,3	13,2	3,3
	140	4,5	6,1	7,6	9,2	10,7	3,4
	150	3,3	4,5	5,7	6,9	8,1	3,5

Force values [kN] *All Volume [l] values at 7 bar*

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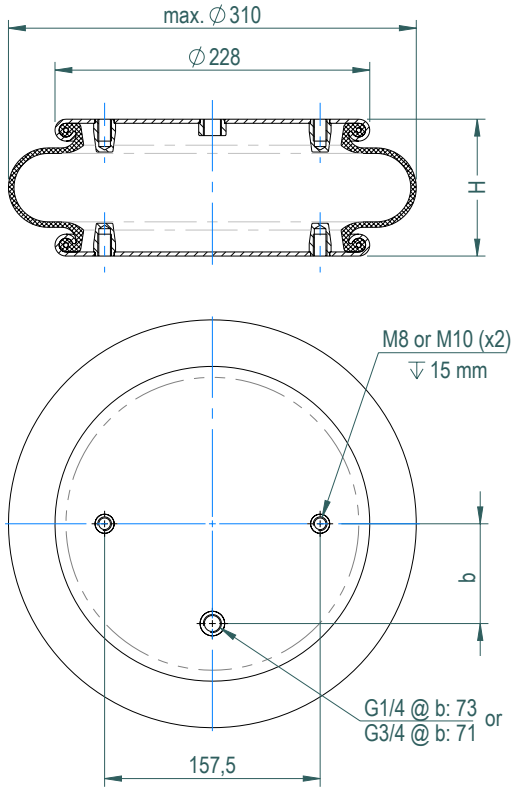
F SERIES
Crimped Design

M-40

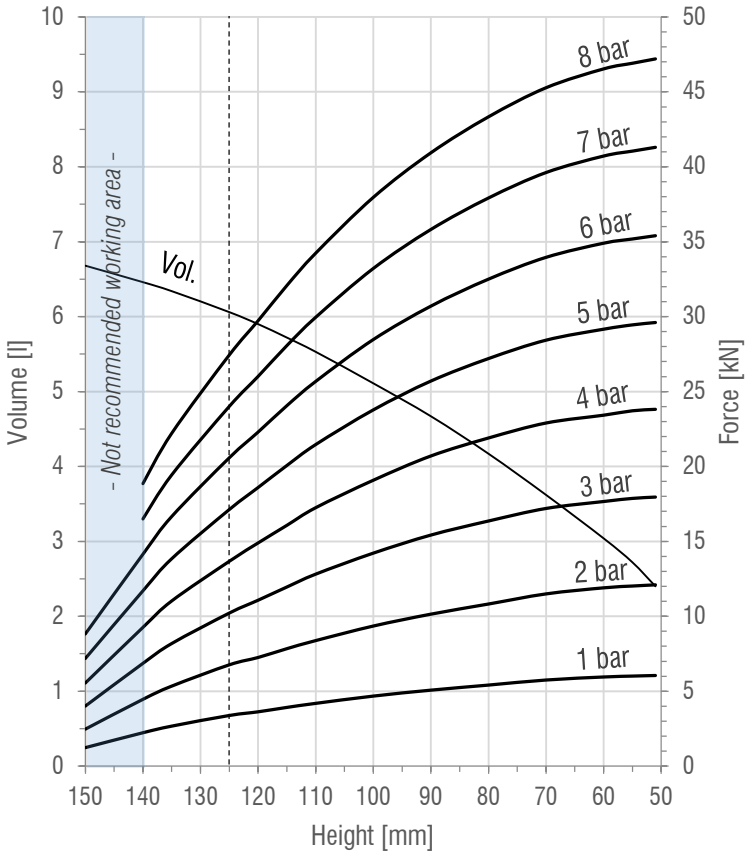
SINGLE
CONVOLUTION

DRAWING



max. **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]	51
Static height [mm]	100
Design height [mm]	125
Max. usable height [mm]	140
Max. stroke [mm]	89
Force to compress to H_{min} at 0 bar [N]	50
Weight [kg]	4,0

REFERENCES

M-40_B	Rubber bellow only
M-40_C_G1/4	With crimped plates & G1/4 air inlet
M-40_C_G3/4	With crimped plates & G3/4 air inlet
M-40_R_SH	With socket head bead rings
M-40_R_TR	With threaded bead rings
M-40_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]	10,2	13,7	17,1	20,6	24,0	6,1
Spring rate [N/mm]	288	378	461	545	632	
Natural frequency [Hz]	2,65	2,63	2,60	2,57	2,57	
Isolation rate at 10 Hz	92,4%	92,6%	92,8%	92,9%	93,0%	

Values at recommended design height H: 125 mm - - - - -

STATIC CHARACTERISTICS FOR USE AS ACTUATOR

Pressure [bar]		**3**	**4**	**5**	**6**	**7**	**Vol. [l]**
Height H [mm]	**60**	17,7	23,4	29,2	34,9	40,7	3,0
	70	17,2	22,9	28,4	34,0	39,6	3,6
	80	16,4	21,9	27,2	32,5	37,9	4,2
	90	15,4	20,7	25,7	30,7	35,8	4,7
	100	14,2	19,1	23,8	28,5	33,2	5,1
	110	12,8	17,2	21,5	25,7	30,0	5,5
	120	11,1	14,9	18,6	22,3	26,0	5,9
	130	9,4	12,5	15,6	18,8	22,1	6,2
	140	6,9	9,3	11,7	14,1	16,5	6,5

Force values [kN] *All Volume [l] values at 7 bar*

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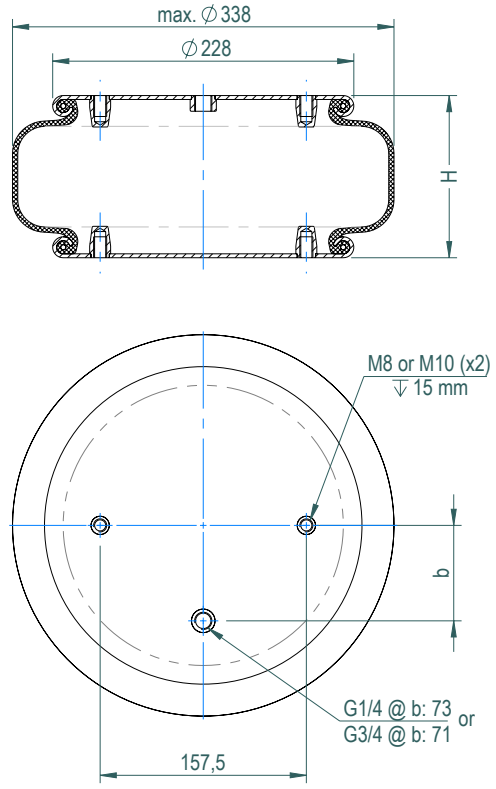
F SERIES
Crimped Design

M-40-E

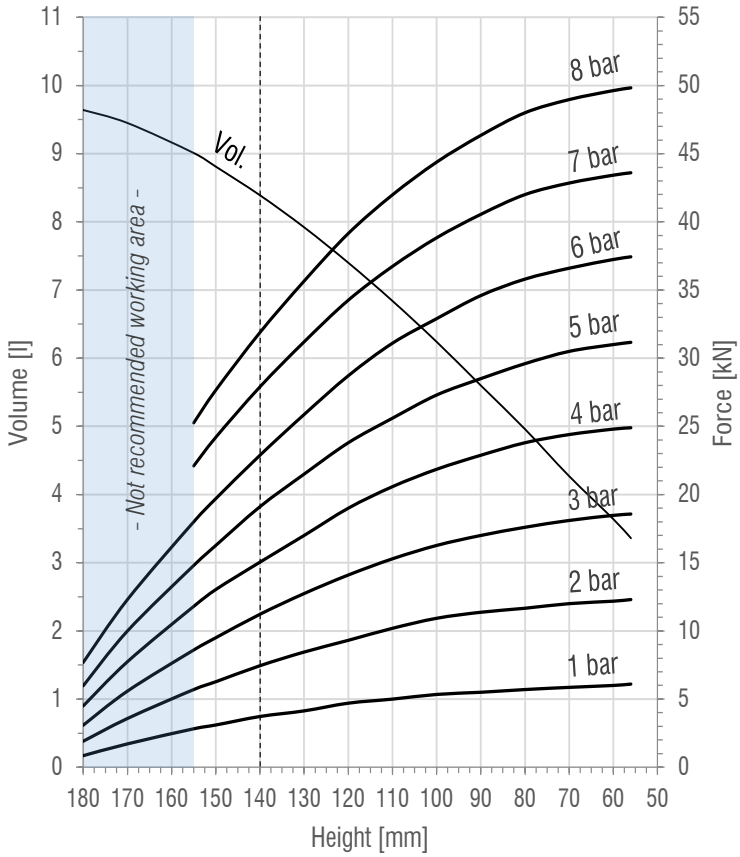
SINGLE
CONVOLUTION

DRAWING



max. **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]	338
Required space diameter [mm]	355
Min. height [mm]	56
Static height [mm]	135
Design height [mm]	140
Max. usable height [mm]	155
Max. stroke [mm]	99
Force to compress to H_{min} at 0 bar [N]	75
Weight [kg]	4,2

REFERENCES

M-40-E_B	Rubber bellow only
M-40-E_C_G1/4	With crimped plates & G1/4 air inlet
M-40-E_C_G3/4	With crimped plates & G3/4 air inlet
M-40-E_R_SH	With socket head bead rings
M-40-E_R_TR	With threaded bead rings
M-40-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]	11,2	15,1	19,1	22,9	27,9	8,4
Spring rate [N/mm]	277	345	435	515	594	
Natural frequency [Hz]	2,48	2,39	2,39	2,37	2,31	
Isolation rate at 10 Hz	93,4%	93,9%	94,0%	94,0%	94,4%	

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]	**70**	18,1	24,4	30,5	36,6	42,8	4,3
	80	17,6	23,8	29,6	35,8	42,0	5,0
	90	17,0	22,9	28,5	34,6	40,5	5,6
	100	16,3	21,9	27,3	32,9	38,8	6,2
	110	15,3	20,6	25,6	31,1	36,7	6,8
	120	14,1	19,0	23,8	28,7	34,3	7,4
	130	12,7	17,0	21,5	25,9	31,2	7,9
	140	11,2	15,0	19,1	22,9	27,9	8,4

Force values [kN] *All Volume [l] values at 7 bar*

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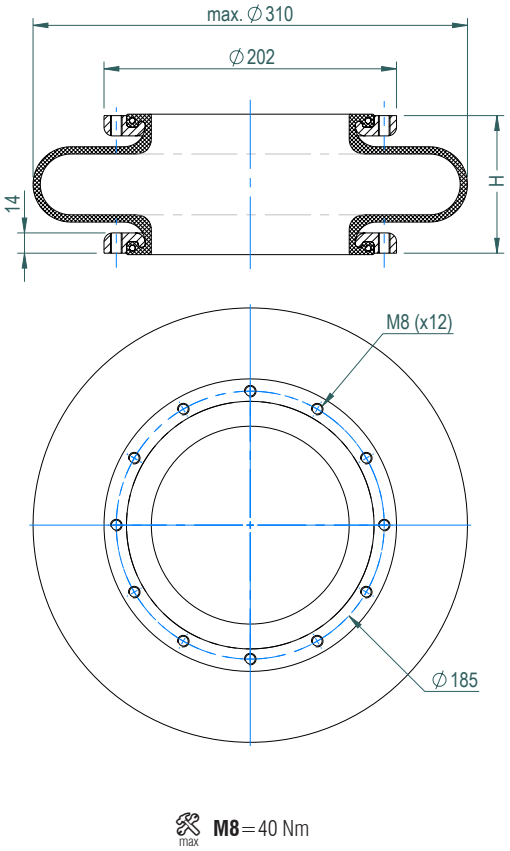
F SERIES
Threaded Bead Ring Design

M-40-EE

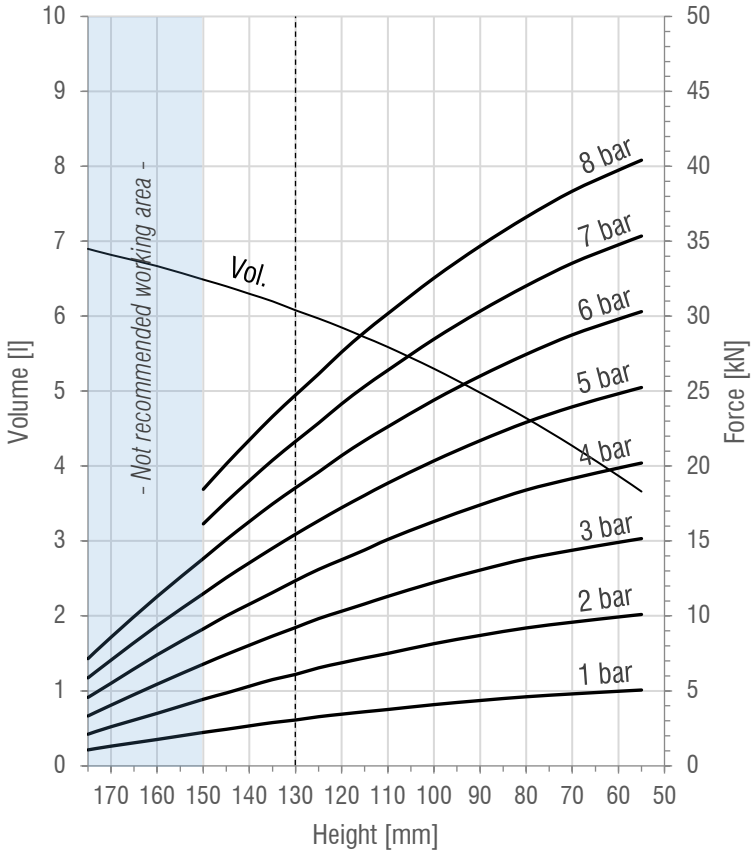
SINGLE
CONVOLUTION

DRAWING



max. **M8** = 40 Nm

FORCE-HEIGHT CHART



TECHNICAL DATA

PRODUCT CHARACTERISTICS

Static diameter [mm]	300
Max. diameter [mm]	310
Required space diameter [mm]	325
Min. height [mm]	55
Static height [mm]	90
Design height [mm]	130
Max. usable height [mm]	150
Max. stroke [mm]	95
Force to compress to H_{min} at 0 bar [N]	15
Weight [kg]	3,6

REFERENCES

M-40-EE_B	Rubber bellow only
M-40-EE_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]	9,2	12,4	15,5	18,6	21,6	6,1
Spring rate [N/mm]	177	228	280	332	384	
Natural frequency [Hz]	2,19	2,15	2,13	2,11	2,11	
Isolation rate at 10 Hz	95,0%	95,2%	95,3%	95,3%	95,4%	

Values at recommended design height H: 130 mm - - - - -

STATIC CHARACTERISTICS FOR USE AS ACTUATOR

Pressure [bar]		**3**	**4**	**5**	**6**	**7**	**Vol. [l]**
Height H [mm]	**60**	14,9	19,9	24,8	29,8	34,8	3,9
	70	14,4	19,2	24,0	28,8	33,5	4,3
	80	13,8	18,4	22,9	27,5	32,0	4,6
	90	13,1	17,4	21,7	26,0	30,3	5,0
	100	12,2	16,3	20,4	24,4	28,5	5,3
	110	11,3	15,1	18,9	22,6	26,4	5,6
	120	10,3	13,8	17,2	20,7	24,2	5,9
	130	9,2	12,4	15,5	18,6	21,6	6,1
	140	8,0	10,8	13,5	16,3	19,0	6,3
	150	6,8	9,1	11,5	13,8	16,1	6,5

Force values [kN] *All Volume [l] values at 7 bar*

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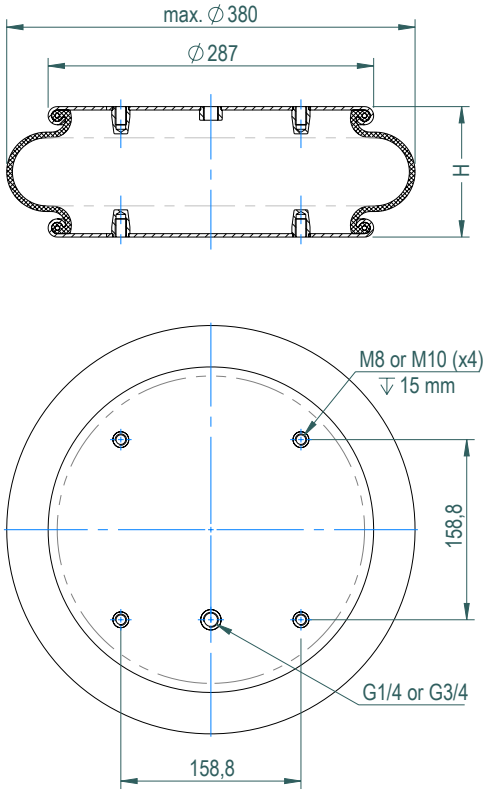
F SERIES
Crimped Design

M-45

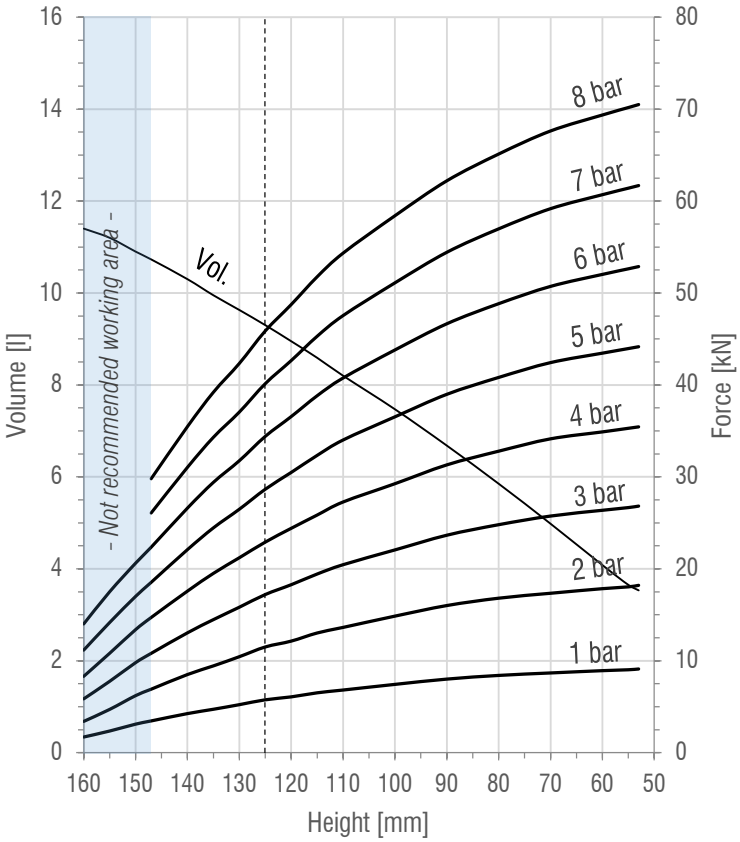
SINGLE
CONVOLUTION

DRAWING



max. **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]	53
Static height [mm]	112
Design height [mm]	125
Max. usable height [mm]	147
Max. stroke [mm]	94
Force to compress to H_{min} at 0 bar [N]	210
Weight [kg]	5,75

REFERENCES

M-45_B	Rubber bellow only
M-45_C_G1/4	With crimped plates & G1/4 air inlet
M-45_C_G3/4	With crimped plates & G3/4 air inlet
M-45_R_SH	With socket head bead rings
M-45_R_TR	With threaded bead rings
M-45_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]	17,2	22,9	28,7	34,4	40,1	9,3
Spring rate [N/mm]	484	613	750	886	1024	
Natural frequency [Hz]	2,65	2,59	2,56	2,54	2,53	
Isolation rate at 10 Hz	92,4%	92,8%	93,0%	93,1%	93,2%	

Values at recommended design height H: 125 mm - - - - -

STATIC CHARACTERISTICS FOR USE AS ACTUATOR

Pressure [bar]		**3**	**4**	**5**	**6**	**7**	**Vol. [l]**
Height H [mm]	**60**	26,4	34,9	43,5	52,0	60,7	4,1
	70	25,7	34,1	42,4	50,7	59,2	5,0
	80	24,8	32,8	40,8	48,8	57,0	5,9
	90	23,7	31,3	39,0	46,6	54,4	6,7
	100	22,1	29,3	36,5	43,8	51,1	7,5
	110	20,4	27,3	34,0	40,7	47,5	8,2
	120	18,3	24,4	30,5	36,6	42,6	9,0
	130	15,8	21,2	26,5	31,8	37,0	9,6
	140	13,0	17,6	22,1	26,6	31,0	10,3

Force values [kN] *All Volume [l] values at 7 bar*

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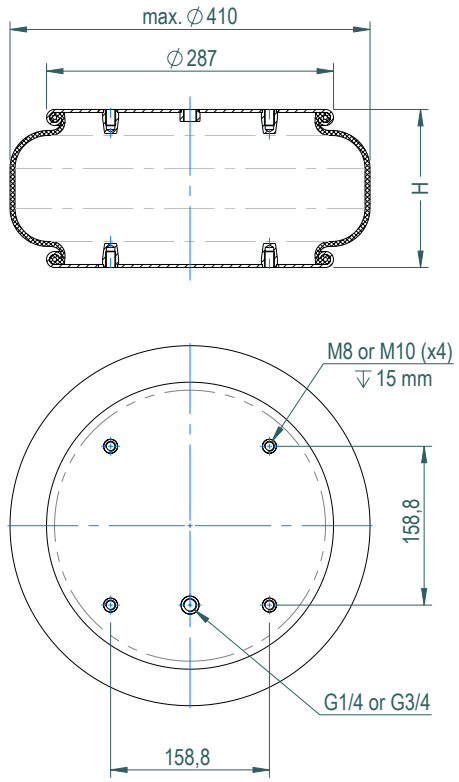
F SERIES
Crimped Design

M-45-E

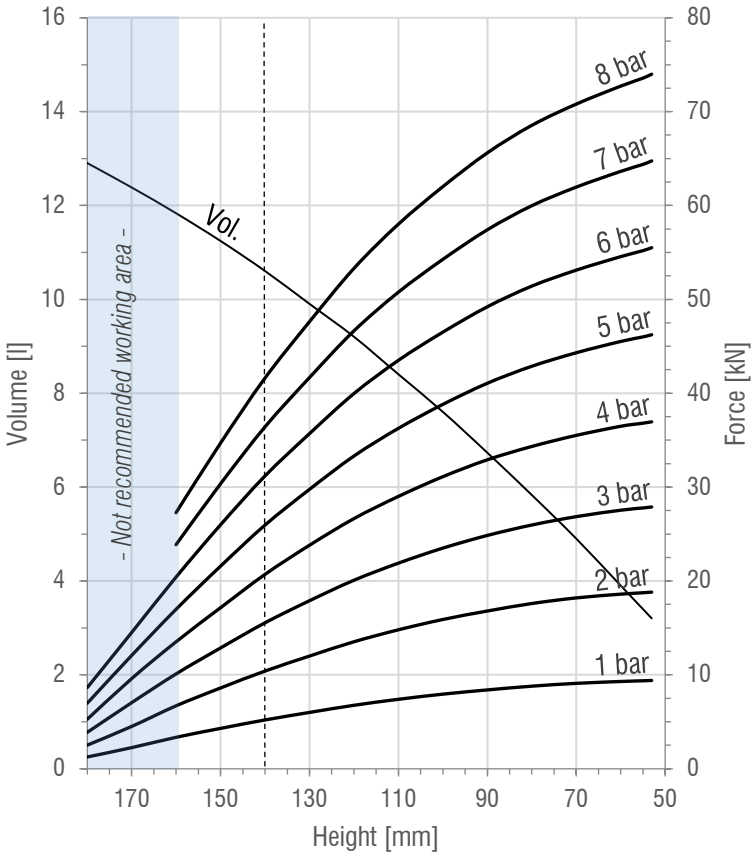
SINGLE
CONVOLUTION

DRAWING



max **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]	53
Static height [mm]	150
Design height [mm]	140
Max. usable height [mm]	160
Max. stroke [mm]	107
Force to compress to H_{min} at 0 bar [N]	170
Weight [kg]	5,85

REFERENCES

M-45-E_B	Rubber bellow only
M-45-E_C_G1/4	With crimped plates & G1/4 air inlet
M-45-E_C_G3/4	With crimped plates & G3/4 air inlet
M-45-E_R_SH	With socket head bead rings
M-45-E_R_TR	With threaded bead rings
M-45-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]	15,6	20,7	26,0	31,2	36,4	10,6
Spring rate [N/mm]	436	563	686	809	936	
Natural frequency [Hz]	2,65	2,61	2,57	2,55	2,54	
Isolation rate at 10 Hz	92,5%	92,7%	92,9%	93,1%	93,1%	

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]	**60**	27,5	36,5	45,5	54,5	63,6	3,9
	80	26,0	34,3	42,9	51,4	60,0	5,8
	100	23,5	31,1	38,8	46,5	54,3	7,6
	120	20,1	26,6	33,3	40,0	46,6	9,2
	140	15,6	20,7	26,0	31,2	36,4	10,6
	160	10,1	13,5	17,0	20,4	23,8	11,8

Force values [kN] *All Volume [l] values at 7 bar*

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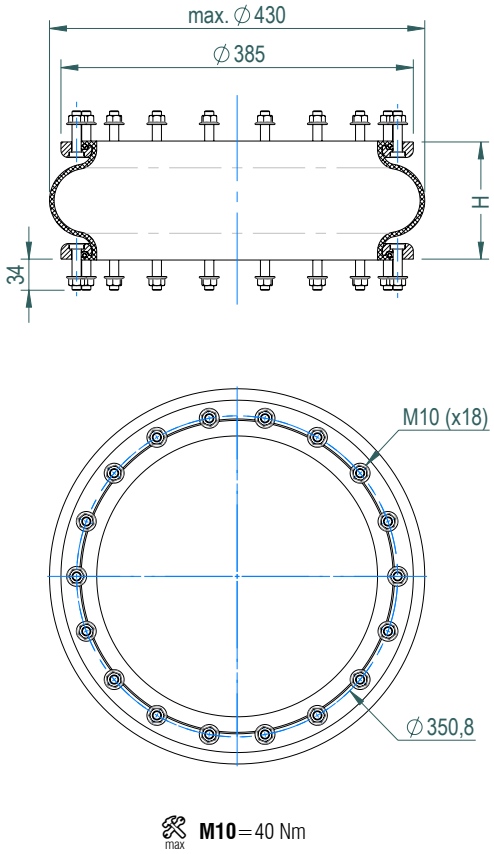
F SERIES
Socked Head Bead Ring Design

M-48

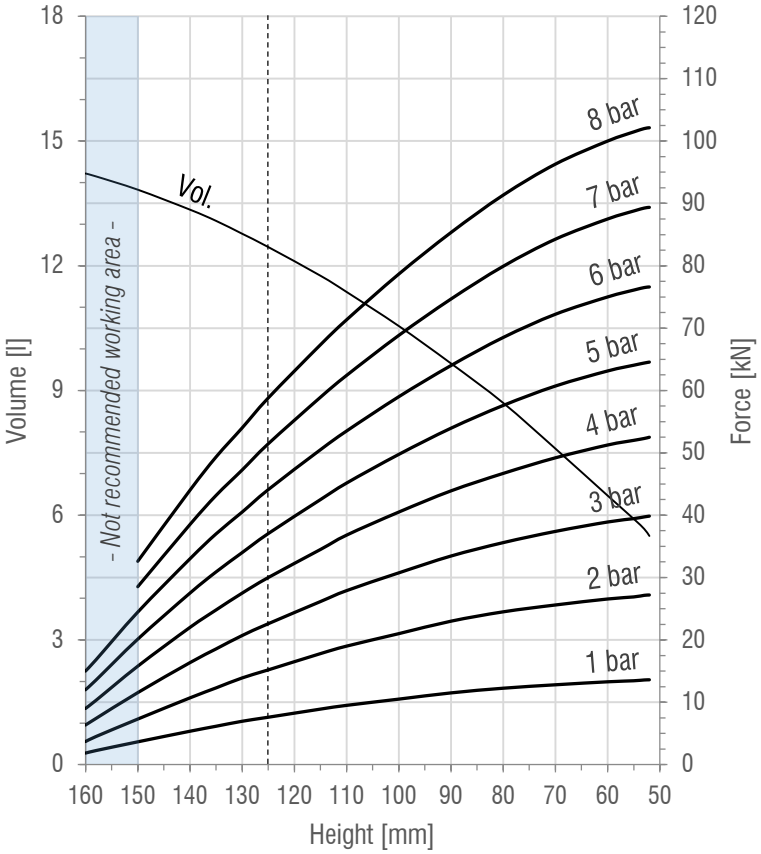
SINGLE
CONVOLUTION

DRAWING



max **M10** = 40 Nm

FORCE-HEIGHT CHART



TECHNICAL DATA

PRODUCT CHARACTERISTICS

Static diameter [mm]	385
Max. diameter [mm]	430
Required space diameter [mm]	470
Min. height [mm]	52
Static height [mm]	125
Design height [mm]	125
Max. usable height [mm]	150
Max. stroke [mm]	98
Force to compress to H_{min} at 0 bar [N]	220
Weight [kg]	10,6

REFERENCES

M-48_B	Rubber bellow only
M-48_R_SH	With socket head bead rings
M-48_R_TR	With threaded bead rings
M-48_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]	22,6	30,0	37,1	44,1	51,5	12,5
Spring rate [N/mm]	605	764	911	1059	1226	
Natural frequency [Hz]	2,59	2,52	2,48	2,45	2,44	
Isolation rate at 10 Hz	92,8%	93,2%	93,4%	93,6%	93,7%	

Values at recommended design height H: 125 mm - - - - -

STATIC CHARACTERISTICS FOR USE AS ACTUATOR

Pressure [bar]		**3**	**4**	**5**	**6**	**7**	**Vol. [l]**
Height H [mm]	**60**	38,9	51,3	63,1	75,0	87,5	6,5
	70	37,4	49,2	60,7	72,2	84,3	7,6
	80	35,6	46,7	57,6	68,5	79,9	8,7
	90	33,5	43,9	54,0	64,0	74,7	9,7
	100	30,8	40,5	49,8	59,0	68,8	10,6
	110	27,9	36,8	45,2	53,5	62,4	11,4
	120	24,4	32,4	40,0	47,6	55,6	12,1
	130	20,7	27,5	34,0	40,5	47,3	12,8
	140	16,4	22,0	27,5	33,0	38,5	13,4
	150	11,5	15,8	20,1	24,5	28,5	13,8

Force values [kN] *All Volume [l] values at 7 bar*

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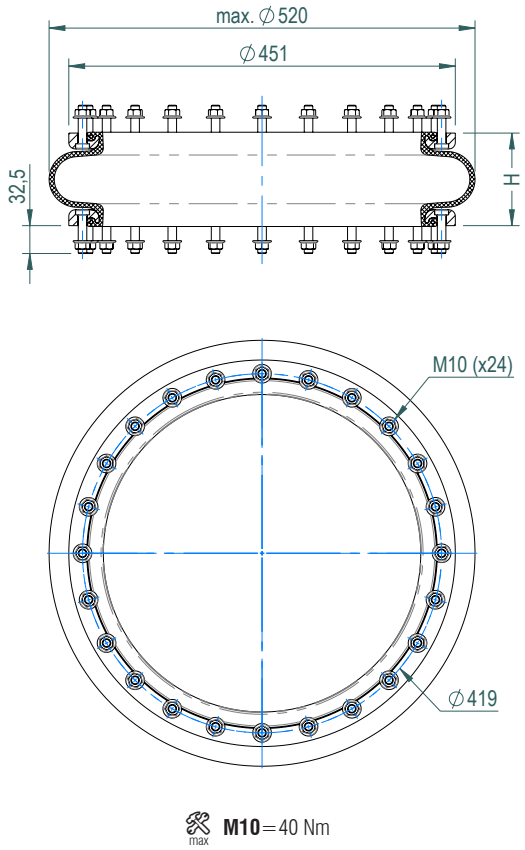
F SERIES
Socket Head Bead Ring Design

M-60-1

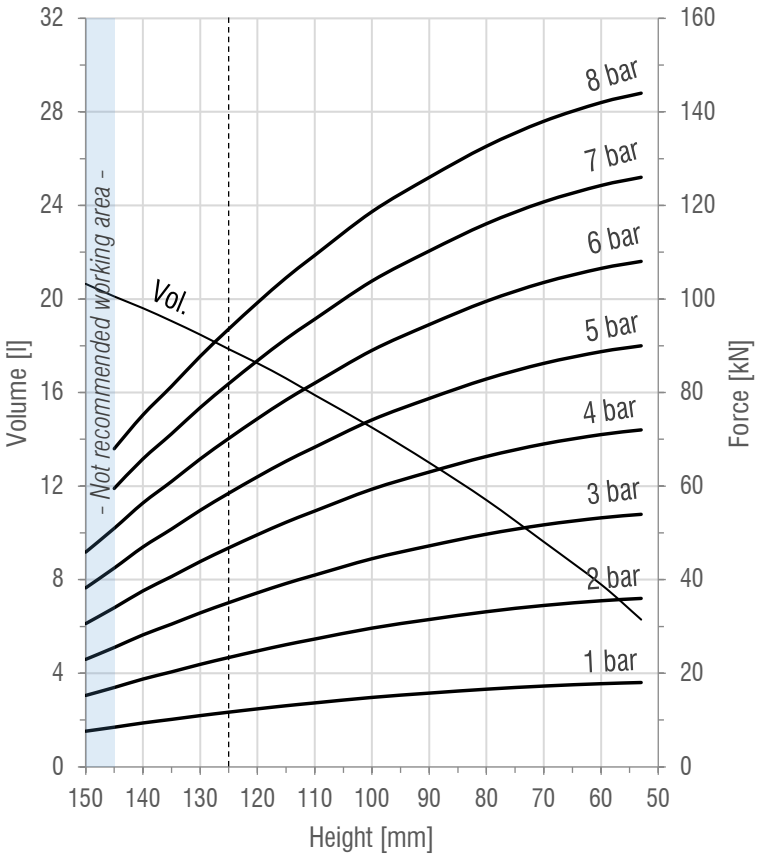
SINGLE
CONVOLUTION

DRAWING



M10 = 40 Nm

FORCE-HEIGHT CHART



TECHNICAL DATA

PRODUCT CHARACTERISTICS

Static diameter [mm]	507
Max. diameter [mm]	520
Required space diameter [mm]	570
Min. height [mm]	53
Static height [mm]	125
Design height [mm]	125
Max. usable height [mm]	145
Max. stroke [mm]	92
Force to compress to H_{min} at 0 bar [N]	90
Weight [kg]	14,3

REFERENCES

M-60-1_B	Rubber bellow only
M-60-1_R_SH	With socket head bead rings
M-60-1_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]	35,1	46,8	58,5	70,2	81,9	17,9
Spring rate [N/mm]	886	1144	1401	1659	1916	
Natural frequency [Hz]	2,51	2,47	2,45	2,43	2,42	
Isolation rate at 10 Hz	93,3%	93,5%	93,6%	93,7%	93,8%	

Values at recommended design height H: 125 mm - - - - -

STATIC CHARACTERISTICS FOR USE AS ACTUATOR

Pressure [bar]		**3**	**4**	**5**	**6**	**7**	**Vol. [l]**
Height H [mm]	**60**	53,3	71,0	88,8	106,5	124,3	7,8
	80	49,8	66,3	82,9	99,5	116,1	11,4
	100	44,5	59,3	74,2	89,0	103,8	14,5
	120	37,2	49,6	62,0	74,4	86,8	17,3
	140	28,2	37,6	47,0	56,4	65,8	19,6

Force values [kN] *All Volume [l] values at 7 bar*

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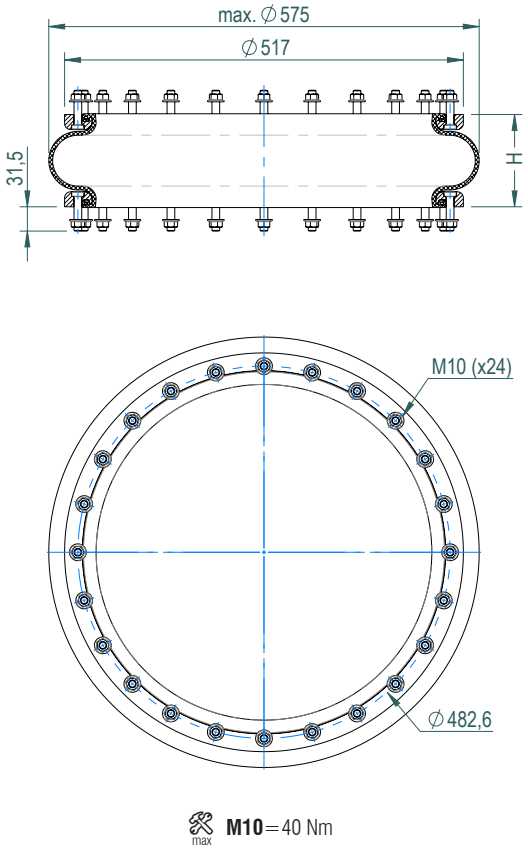
F SERIES
Socket Head Bead Ring Design

M-118-1

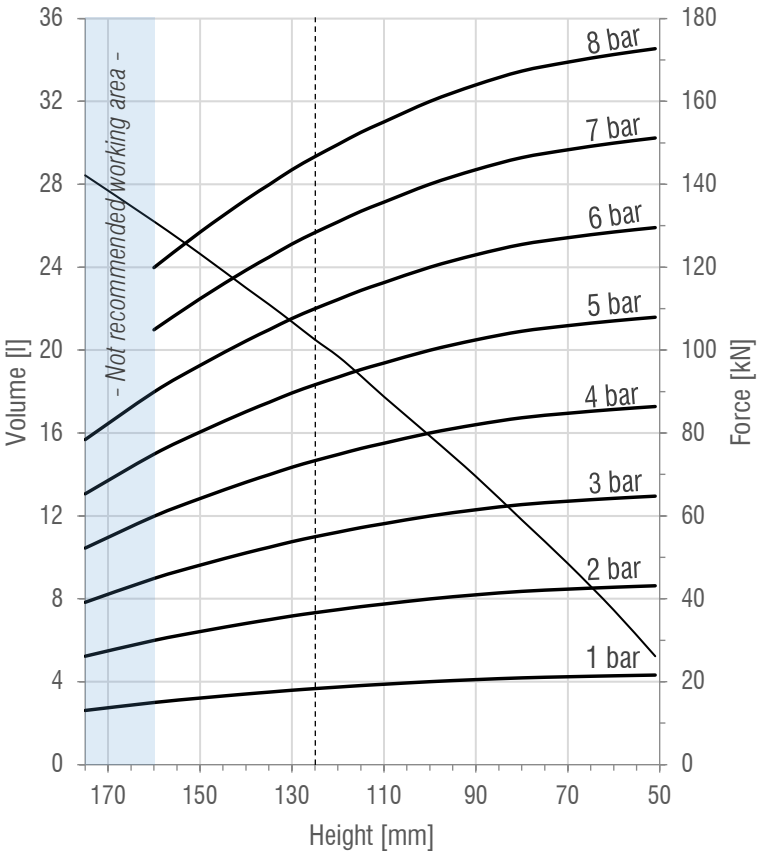
SINGLE
CONVOLUTION

DRAWING



max **M10**=40 Nm

FORCE-HEIGHT CHART



TECHNICAL DATA

PRODUCT CHARACTERISTICS

Static diameter [mm]	558
Max. diameter [mm]	575
Required space diameter [mm]	615
Min. height [mm]	51
Static height [mm]	125
Design height [mm]	125
Max. usable height [mm]	160
Max. stroke [mm]	109
Force to compress to H_{min} at 0 bar [N]	120
Weight [kg]	17,3

REFERENCES

M-118-1_B	Rubber bellow only
M-118-1_R_SH	With socket head bead rings
M-118-1_R_TR	With threaded bead rings
M-118-1_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]	55,0	73,3	91,7	110,0	128,3	20,5
Spring rate [N/mm]	1103	1399	1694	1989	2284	
Natural frequency [Hz]	2,24	2,18	2,15	2,13	2,11	
Isolation rate at 10 Hz	94,7%	95,0%	95,2%	95,3%	95,3%	

Values at recommended design height H: 125 mm - - - - -

STATIC CHARACTERISTICS FOR USE AS ACTUATOR

Pressure [bar]		**3**	**4**	**5**	**6**	**7**	**Vol. [l]**
Height H [mm]	**60**	64,3	85,7	107,1	128,5	149,9	7,5
	80	62,8	83,7	104,6	125,5	146,4	11,8
	100	60,0	80,0	100,0	120,0	140,0	15,9
	120	56,1	74,8	93,5	112,2	130,9	19,7
	140	51,1	68,1	85,2	102,2	119,2	23,0
	160	45,0	59,9	74,9	89,9	104,9	26,2

Force values [kN] *All Volume [l] values at 7 bar*

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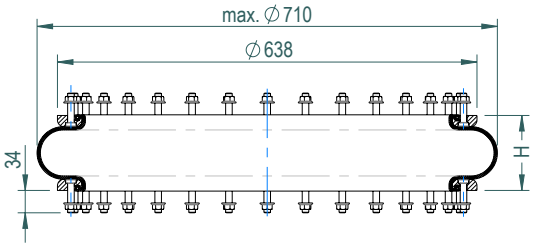
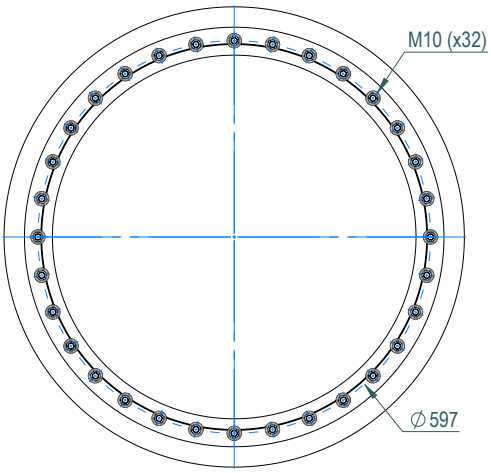
F SERIES
Socket Head Bead Ring Design

M-130-1

SINGLE
CONVOLUTION

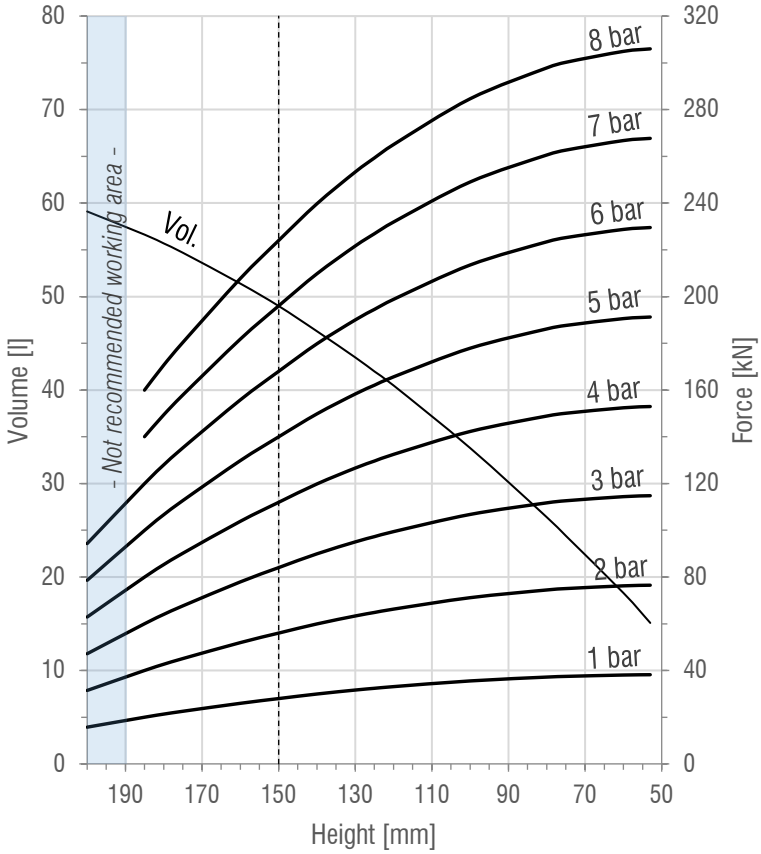
DRAWING





max **M10**=40 Nm

FORCE-HEIGHT CHART



TECHNICAL DATA

PRODUCT CHARACTERISTICS

Static diameter [mm]	700
Max. diameter [mm]	710
Required space diameter [mm]	760
Min. height [mm]	53
Static height [mm]	120
Design height [mm]	150
Max. usable height [mm]	185
Max. stroke [mm]	132
Force to compress to H_{min} at 0 bar [N]	700
Weight [kg]	21,3

REFERENCES

M-130-1_B	Rubber bellow only
M-130-1_R_SH	With socket head bead rings
M-130-1_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]	84,0	112,0	140,0	168,0	196,0	49,0
Spring rate [N/mm]	1421	1826	2231	2636	3041	
Natural frequency [Hz]	2,06	2,02	2,00	1,98	1,97	
Isolation rate at 10 Hz	95,6%	95,8%	95,9%	95,9%	96,0%	

Values at recommended design height H: 150 mm - - - - -

STATIC CHARACTERISTICS FOR USE AS ACTUATOR

Pressure [bar]		**3**	**4**	**5**	**6**	**7**	**Vol. [l]**
Height H [mm]	**60**	114,4	152,5	190,6	228,7	266,8	18,3
	80	111,7	148,9	186,2	223,4	260,6	26,4
	100	106,8	142,3	177,9	213,5	249,1	33,8
	120	99,4	132,5	165,7	198,8	231,9	40,5
	140	89,9	119,9	149,8	179,8	209,8	46,3
	160	77,9	103,9	129,8	155,8	181,8	51,4
	180	64,0	85,3	106,7	128,0	149,3	55,7

Force values [kN] *All Volume [l] values at 7 bar*

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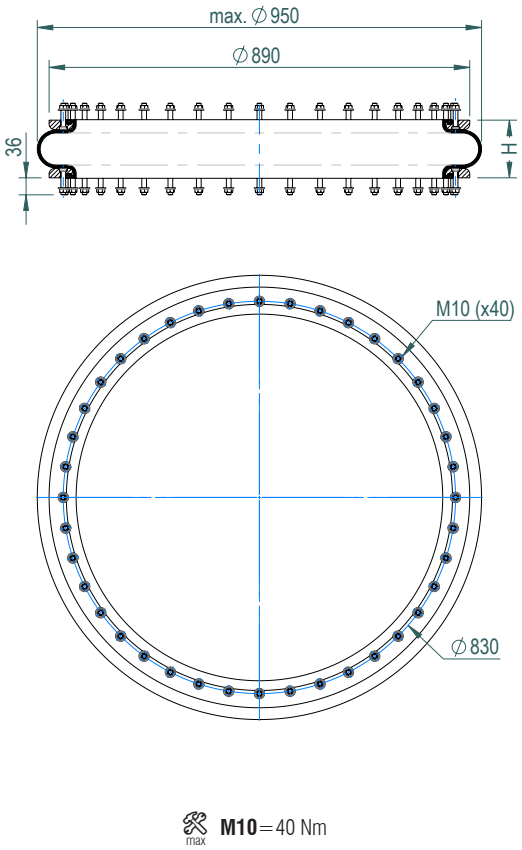
F SERIES
Socket Head Bead Ring Design

M-140-1

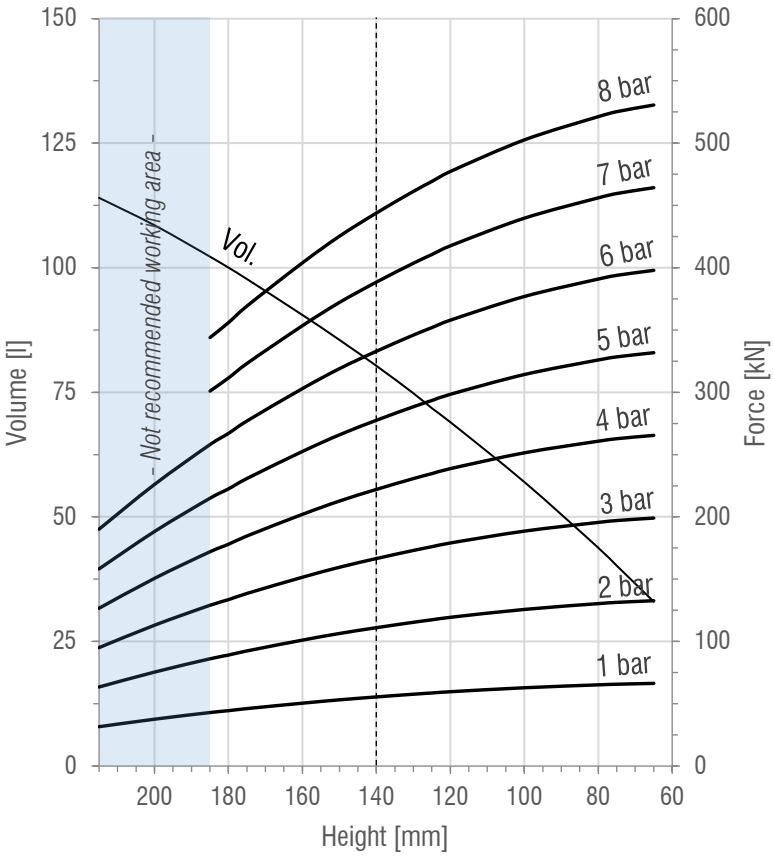
SINGLE
CONVOLUTION

DRAWING



M10 = 40 Nm

FORCE-HEIGHT CHART



TECHNICAL DATA

PRODUCT CHARACTERISTICS

Static diameter [mm]	940
Max. diameter [mm]	950
Required space diameter [mm]	1.000
Min. height [mm]	65
Static height [mm]	130
Design height [mm]	140
Max. usable height [mm]	185
Max. stroke [mm]	120
Force to compress to H_{min} at 0 bar [N]	1.400
Weight [kg]	44,8

REFERENCES

M-140-1_B	Rubber bellow only
M-140-1_R_SH	With socket head bead rings
M-140-1_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]	166,5	222,0	277,5	333,0	388,5	80,3
Spring rate [N/mm]	2.749	3.491	4.233	4.975	5.717	
Natural frequency [Hz]	2,03	1,98	1,95	1,93	1,92	
Isolation rate at 10 Hz	95,7%	95,9%	96,0%	96,1%	96,2%	

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**	195,5	260,7	325,8	391,0	456,2	43,8
	100	188,5	251,3	314,2	377,0	439,8	57,0
	120	179,0	238,7	298,3	358,0	417,7	69,0
	140	166,5	222,0	277,5	333,0	388,5	80,3
	160	151,5	202,0	252,5	303,0	353,5	90,5
	180	133,5	178,0	222,5	267,0	311,5	100,0

Force values [kN] *All Volume [l] values at 7 bar*

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