MAC / MAD series

SHOCK ABSORBERS

Mindman

Miniature MAC series
-M8, M10, M12

Our miniature shock absorbers MAC Series- M8, M10, M12 provide great effect for shock impact and come to stop smoothly and are Ideal for light loads.

MAC series - Porous type
M14, M20, M25, M36

MAC series is self-compensating, and ideal for energy absorption in high speed, medium speed and low speed impact. MAC series can stop moving objects smoothly and quietly.

Long stroke in 50 mm-
Porous fixed type

Model MAC 2050 and M 20 are applicable for high impact and high effectiveness.

MAD series
-Adjustable

MAD-l410 is designed in single orifice. MAD-2016, MAD-2525, MAD-2540 and MAD-3650 are designed in porosity. MAD Series of shock absorbs is self-contained, fully adjustable and suitable for wide range of applications.

MAD series
-Porous adjustable type M42

Stroke in 25, 50, 75mm, adjustable, this series is ideal for heavy duty applications.

MACD-2030
Double cushion

MACD-2030 are porosity fixed and double cushioning shock absorbers, and can be used alternatively against impact from directions of upper and lower sides, or right

Order example:

MAC – 0806 – 1 – □

- **MAD**: Adjustable
  MAC: Non-Adjustable
  MACD: Double Cushion
- Tube O.D.
- STROKE
- Select Damping Constant from Graph:
  1: Hight Impact Speed
  2: Medium Impact Speed
  3: Low Impact Speed
- Blank: with cap
  N: without Cap

OTHER

MAC Self conpensation

SHOCK ABSORBERS

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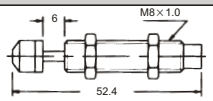
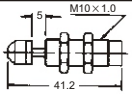
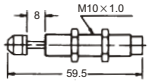
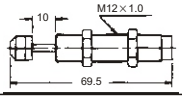
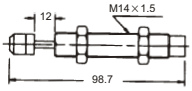
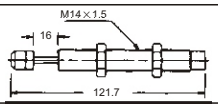
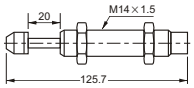
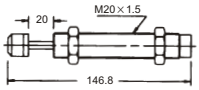
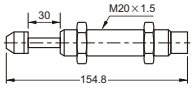
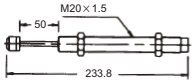
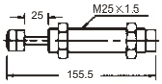
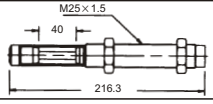
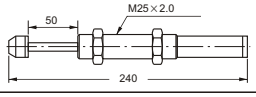
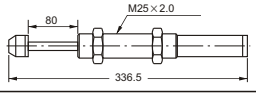
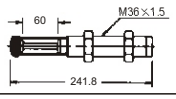
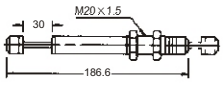
MAC series - Self conpensation

Model	Dimensions	Max. effective mass (kg)	Max. energy absorbed per cycle (nm)	Max. impact speed (m/s)	Without cap	With cap	Flange	Stop collar
MAC-0806		0.5~6	2	0.5~2.0	○	○	–	○
MAC-1005		1~7	3	0.8~3.5	○	○	–	○
MAC-1008		2~9	4	0.8~3.0	○	○	–	○
MAC-1210		5~30	5	0.8~3.0	○	○	–	○
MAC-1412		8~100	15	0.8~3.0	○	○	–	○
MAC-1416		10~150	20	0.8~3.0	○	○	–	○
MAC-1420		12~160	25	0.8~3.0	○	○	–	○
MAC-2020		30~700	40	1.0~3.5	○	○	–	○
MAC-2030		30~700	50	1.0~3.5	○	○	–	○
MAC-2050		600~1200	60	1.0~3.5	–	○	–	○
MAC-2525		200~1500	80	1.0~4.0	–	○	–	○
MAC-2540		300~2000	120	1.0~4.0	–	○	–	○
MAC-2550		15~160	98	1.0~4.0	○	○	–	○
MAC-2580		20~200	150	1.0~4.0	○	○	–	○
MAC-3660		400~2400	250	1.0~4.0	–	○	○	○
MACD-2030		40~900	45	1.0~3.5	–	○	–	○

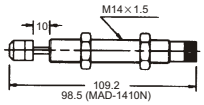
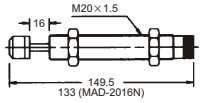
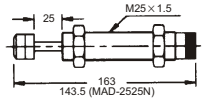
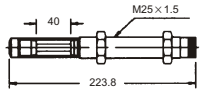
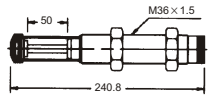
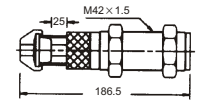
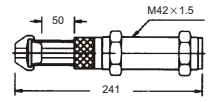
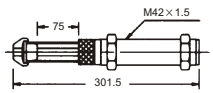
Specification

Order no.	Stroke (mm)	Max. Nm per cycle (Et)	Max. Nm per hour (Etc)	Max. effective mass (ml) kg	Max. impact speed (v) m/s	Operating temperature (℃)	Weight (g)
MAC-0806-1	6	2	8800	0.5	2.0	-10~80	11
MAC-0806-2	6	2	8800	2.0	1.0	-10~80	11
MAC-0806-3	6	2	8800	6.0	0.5	-10~80	11
MAC-1005-1	5	3	10800	1	3.0	-10~80	14
MAC-1005-2	5	3	10800	3	1.5	-10~80	14
MAC-1005-3	5	3	10800	7	0.8	-10~80	14
MAC-1008-1	8	4	15200	2	3.0	-10~80	20
MAC-1008-2	8	4	15200	4	1.5	-10~80	20
MAC-1008-3	8	4	15200	9	0.8	-10~80	20
MAC-1210-1	10	5	17640	5	3.0	-10~80	31.5
MAC-1210-2	10	5	17640	10	1.5	-10~80	31.5
MAC-1210-3	10	5	17640	30	0.8	-10~80	31.5
MAC-1412-1	12	15	30000	8	3.0	-10~80	80
MAC-1412-2	12	15	30000	50	1.5	-10~80	80
MAC-1412-3	12	15	30000	100	0.8	-10~80	80
MAC-1416-1	16	20	35000	10	3.0	-10~80	90
MAC-1416-2	16	20	35000	70	1.5	-10~80	90
MAC-1416-3	16	20	35000	150	0.8	-10~80	90
MAC-1420-1	20	25	40000	12	3.0	-10~80	95
MAC-1420-2	20	25	40000	80	1.5	-10~80	95
MAC-1420-3	20	25	40000	160	0.8	-10~80	95
MAC-2020-1	20	40	40000	30	3.5	-10~80	215
MAC-2020-2	20	40	40000	200	2.0	-10~80	215
MAC-2020-3	20	40	40000	700	1.0	-10~80	215
MAC-2030-1	30	50	48000	30	3.5	-10~80	220
MAC-2030-2	30	50	48000	200	2.0	-10~80	220
MAC-2030-3	30	50	48000	700	1.0	-10~80	220
MAC-2050-1	50	60	60000	60	3.5	-10~80	300
MAC-2050-2	50	60	60000	400	2.0	-10~80	300
MAC-2050-3	50	60	60000	1200	1.0	-10~80	300
MAC-2525-1	25	80	70000	200	4.0	-10~80	330
MAC-2525-2	25	80	70000	800	2.5	-10~80	330
MAC-2525-3	25	80	70000	1500	1.0	-10~80	330
MAC-2540-1	40	120	75000	300	4.0	-10~80	430
MAC-2540-2	40	120	75000	1200	2.5	-10~80	430
MAC-2540-3	40	120	75000	2000	1.0	-10~80	430
MAC-2550-1	50	98	90000	15	4.0	-10~80	435
MAC-2550-2	50	98	90000	40	2.5	-10~80	435
MAC-2550-3	50	98	90000	160	1.0	-10~80	435
MAC-2580-1	80	150	120000	20	4.0	-10~80	535
MAC-2580-2	80	150	120000	50	2.5	-10~80	535
MAC-2580-3	80	150	120000	200	1.0	-10~80	535
MAC-3660-1	60	250	120000	400	4.0	-10~80	1030
MAC-3660-2	60	250	120000	1500	2.5	-10~80	1030
MAC-3660-3	60	250	120000	2400	1.0	-10~80	1030
MACD-2030-1	30	45	55000	40	3.5	-10~80	220
MACD-2030-2	30	45	55000	300	2.0	-10~80	220
MACD-2030-3	30	45	55000	900	1.0	-10~80	220

MAD Adjustable
SHOCK ABSORBERS

Mindman

MAD series - Adjustable

Model	Dimensions	Max. effective mass (kg)	Max. energy absorbed per cycle (Nm)	Max. impact speed (m/s)	Without cap	With cap	Flange	Stop collar
MAD-1410		80	20	3.0	○	○	–	○
MAD-2016		200	25	3.5	○	○	–	○
MAD-2525		400	85	3.5	–	○	–	○
MAD-2540		700	100	3.5	–	○	–	○
MAD-3650		1400	300	3	–	○	○	○
MAD-4225		3000	260	3.5	–	○	○	–
MAD-4250		4000	500	4.5	–	○	○	–
MAD-4275		6000	750	4.5	–	○	○	–

Specification

Order no.	Stroke (mm)	Max. Nm per cycle (Et)	Max. Nm per hour (Etc)	Max. effective mass (ml) kg	Max. impact speed (v) m/s	Operating temperature (℃)	Weight (g)
MAD-1410N	10	20	25000	80	3.0	-10~80	84
MAD-1410	10	20	25000	80	3.0	-10~80	90
MAD-2016N	16	25	30000	200	3.5	-10~80	222
MAD-2016	16	25	30000	200	3.5	-10~80	230
MAD-2525	25	85	54000	400	3.5	-10~80	335
MAD-2525N	25	85	70000	400	3.5	-10~80	350
MAD-2540	40	100	80000	700	3.5	-10~80	455
MAD-3650	50	300	100000	1400	3	-10~80	1100
MAD-4225	25	260	125000	3000	3.5	-10~80	1280
MAD-4250	50	500	150000	4000	4.5	-10~80	1490
MAD-4275	75	750	180000	6000	4.5	-10~80	1710

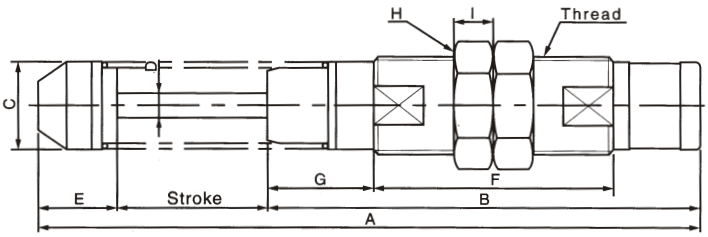
MAC series Non adjustable hydraulic series

SHOCK ABSORBERS

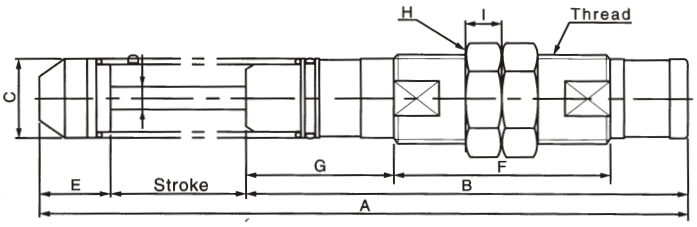
Specification

Order No.	Stroke (mm)	**Max. Nm per cycle** (Et)	**Max. Nm per hour** (Etc)	**Max. effective mass** (ml) Kg	**Max. impact speed** (v) M/s	**Operating temperature** (℃)	**Weight** (g)
MAC-1415-7K	15	9.8	35,280	15	1.5	-10~80	80
MAC-1415-8K	15	9.8	35,280	7	2	-10~80	80
MAC-1415-9K	15	9.8	35,280	3	3	-10~80	80
MAC-2030-4K	30	44	26,460	120	0.9	-10~80	185
MAC-2030-5K	30	44	26,460	60	1.2	-10~80	185
MAC-2030-6K	30	44	26,460	30	1.7	-10~80	185
MAC-2030-7K	30	44	26,460	15	2.4	-10~80	185
MAC-2030-8K	30	44	26,460	8	3.3	-10~80	185
MAC-2030-16K	30	44	26,460	5	4.2	-10~80	205
MAC-2030-18K	30	44	26,460	3	6.0	-10~80	205
MAC-2050-10K	50	59	35,280	60	1.4	-10~80	250
MAC-2050-11K	50	59	35,280	30	2	-10~80	250
MAC-2050-12K	50	59	35,280	15	2.8	-10~80	250
MAC-2050-13K	50	59	35,280	8	3.8	-10~80	250
MAC-2050-16K	50	59	35,280	5	5.0	-10~80	235
MAC-2050-17K	50	59	35,280	3	6.8	-10~80	245

MAC-2030-4K
MAC-2030-5K
MAC-2030-6K
MAC-2030-7K
MAC-2030-8K



MAC-2030-16K
MAC-2030-18K



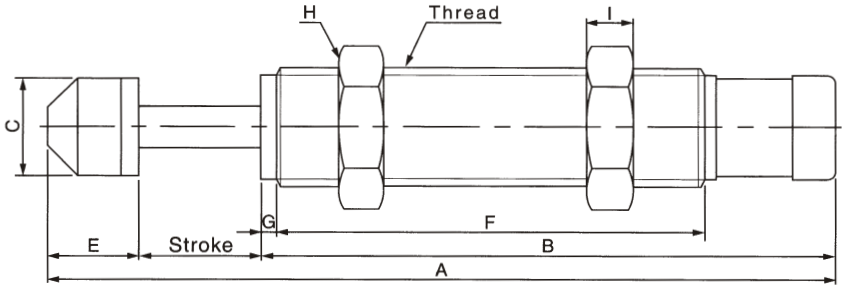
MAC series Non adjustable hydraulic series

SHOCK ABSORBERS

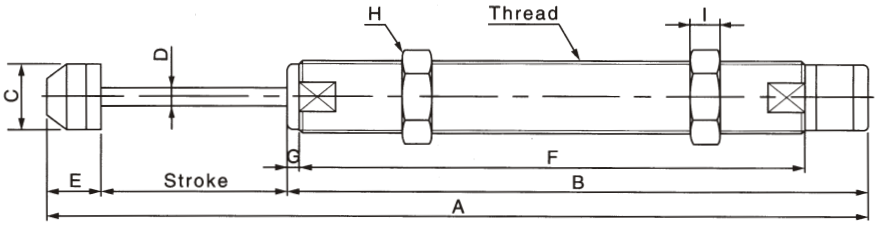
Specification

Order no.	Thread	Stroke (mm)	A	B	C	D	E	F	G	H	I
MAC-1415-7K	M 14×1.5	15	95.2	69.5	12	3.5	10.7	53	2	19	6
MAC-1415-8K	M 14×1.5	15	95.2	69.5	12	3.5	10.7	53	2	19	6
MAC-1415-9K	M 14×1.5	15	95.2	69.5	12	3.5	10.7	53	2	19	6
MAC-2030-4K	M 20×1.5	30	132.5	86	18	5	16.5	48	21	26	8
MAC-2030-5K	M 20×1.5	30	132.5	86	18	5	16.5	48	21	26	8
MAC-2030-6K	M 20×1.5	30	132.5	86	18	5	16.5	48	21	26	8
MAC-2030-7K	M 20×1.5	30	132.5	86	18	5	16.5	48	21	26	8
MAC-2030-8K	M 20×1.5	30	132.5	86	18	5	16.5	48	21	26	8
MAC-2030-16K	M 20×1.5	30	144.2	86	18	5	16.5	48	32.7	26	8
MAC-2030-18K	M 20×1.5	30	144.2	86	18	5	16.5	48	32.7	26	8
MAC-2050-10K	M 20×1.5	50	220.5	156	17	5	14.5	136	3	26	8
MAC-2050-11K	M 20×1.5	50	220.5	156	17	5	14.5	136	3	26	8
MAC-2050-12K	M 20×1.5	50	220.5	156	17	5	14.5	136	3	26	8
MAC-2050-13K	M 20×1.5	50	220.5	156	17	5	14.5	136	3	26	8
MAC-2050-16K	M 20×1.5	50	220.5	156	18	5	14.5	136	3	26	8
MAC-2050-17K	M 20×1.5	50	220.5	156	18	5	14.5	57	3	26	8

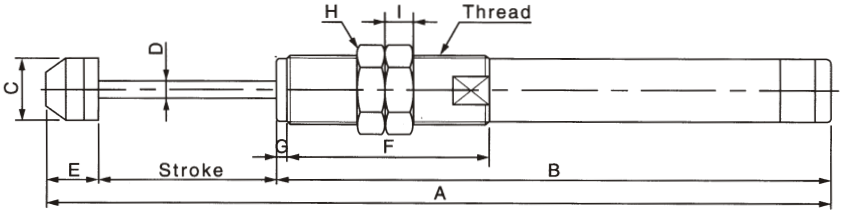
MAC-1415-7K
MAC-1415-8K
MAC-1415-9K



MAC-2050-10K
MAC-2050-11K
MAC-2050-12K
MAC-2050-13K
MAC-2050-16K

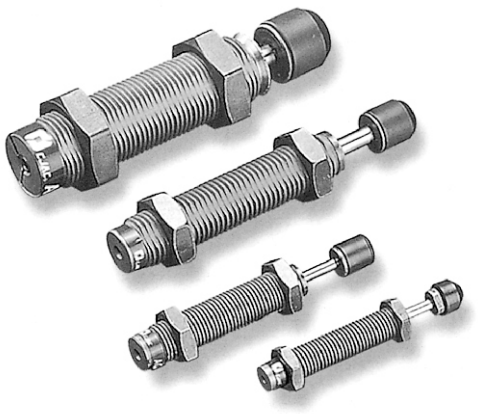


MAC-2050-17K



MAC series Non adjustable hydraulic series

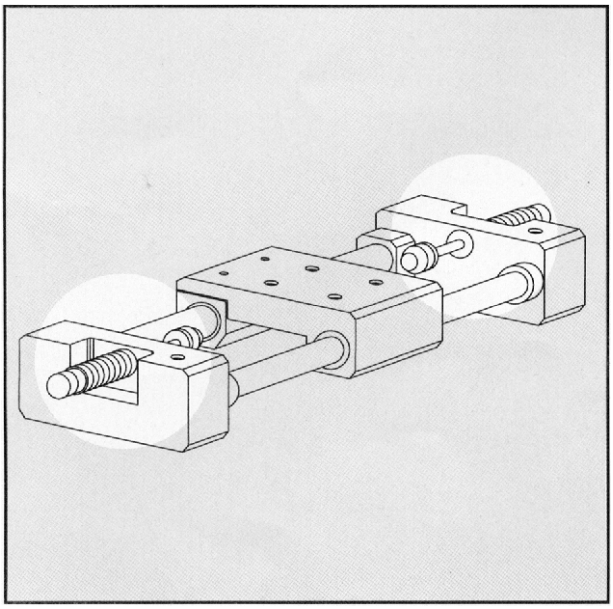
SHOCK ABSORBERS



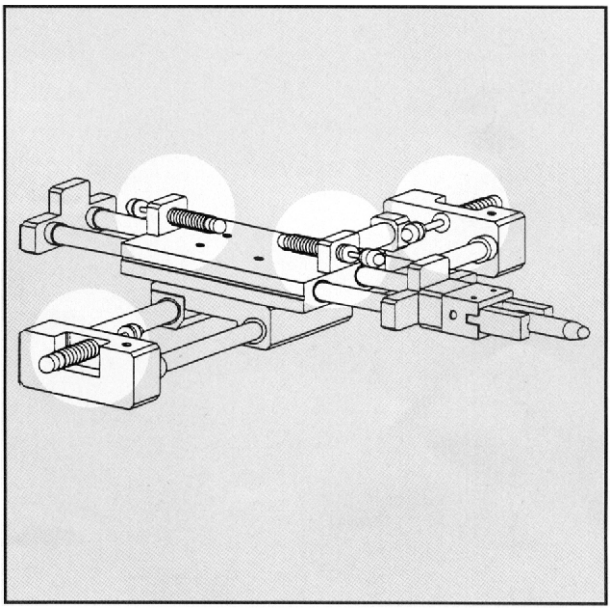
Specification

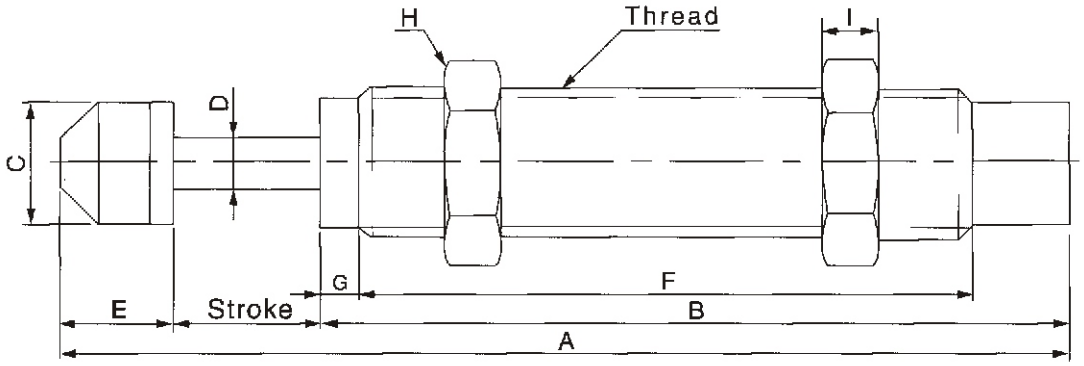
Order no.	Stroke (mm)	**Max. Nm per cycle** (Et)	**Max. Nm per hour** (Etc)	**Max. effective mass** (ml) kg	**Max. impact speed** (v) m/s	**Operating temperature** (℃)	**Weight** (g)
MAC-0806-SN	6	3	7,000	6	0.3-2.5	-10~80	15
MAC-0806-S	6	3	7,000	6	0.3-2.5	-10~80	17
MAC-1007-SN	7	6	12,400	12	0.3-3.5	-10~80	25
MAC-1007-S	7	6	12,400	12	0.3-3.5	-10~80	28
MAC-1210-SN	10	12	22,500	22	0.3-4.0	-10~80	29
MAC-1210-S	10	12	22,500	22	0.3-4.0	-10~80	32
MAC-1412-SN	12	20	33,000	40	0.3-5.0	-10~80	65
MAC-1412-S	12	20	33,000	40	0.3-5.0	-10~80	70
MAC-2015-SN	15	59	38,000	120	0.3-5.0	-10~80	150
MAC-2015-S	15	59	38,000	120	0.3-5.0	-10~80	160
MAC-2525-SN	25	80	60,000	180	0.3-5.0	-10~80	295
MAC-2525-S	25	80	60,000	180	0.3-5.0	-10~80	280
MAC-2725-SN	25	147	72,000	270	0.3-5.0	-10~80	360
MAC-2725-S	25	147	72,000	270	0.3-5.0	-10~80	375

Application example: Slide unit cylinder



Application example: Slide unit

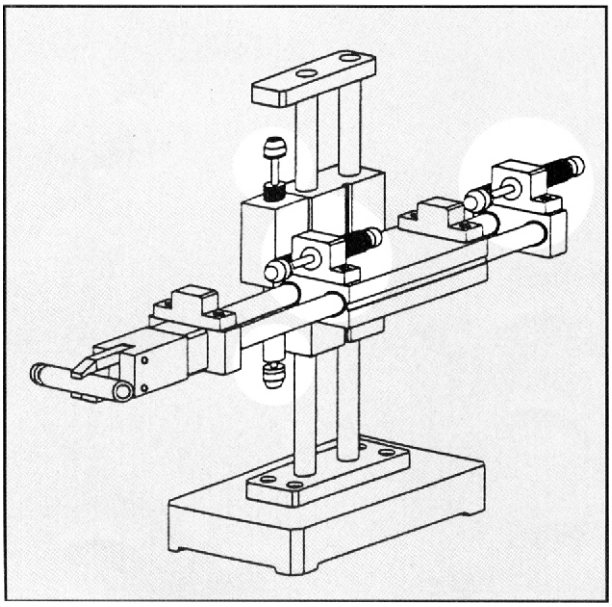




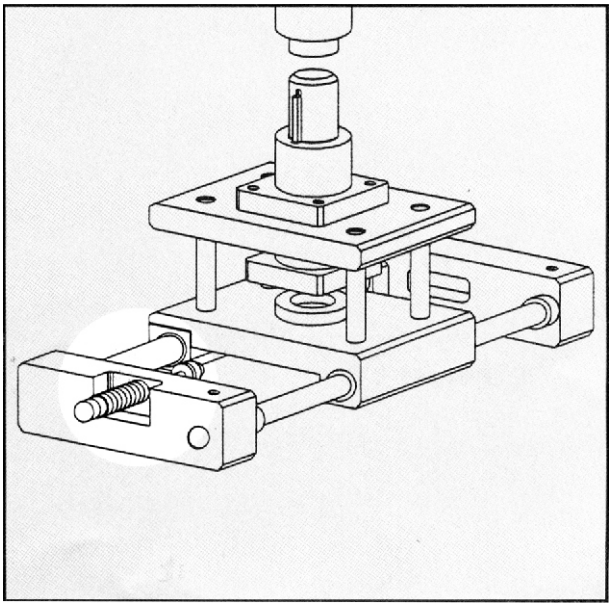
Specification

Order no.	Thread	Stroke (mm)	A	B	C	D	E	F	G	H	I
MAC-0806-SN	M 8×1.0	6	--	40.6	--	2.8	--	33.6	2	11	3
MAC-0806-S	M 8×1.0	6	55.2	40.6	6.6	2.8	8.6	33.6	2	11	3
MAC-1007-SN	M 10×1.0	7	--	47	--	3	--	39	3	12.7	3
MAC-1007-S	M 10×1.0	7	62.6	47	8.6	3	8.6	39	3	12.7	3
MAC-1210-SN	M 12×1.0	10	--	50	--	3	--	45.5	--	14	4
MAC-1210-S	M 12×1.0	10	67	50	10.3	3	7	45.5	--	14	4
MAC-1412-SN	M 14×1.5	12	--	67	--	4	--	58	4	19	6
MAC-1412-S	M 14×1.5	12	90	67	12	4	11	58	4	19	6
MAC-2015-SN	M 20×1.5	15	--	73	--	6	--	62	4	26	8
MAC-2015-S	M 20×1.5	15	103	73	18	6	15	62	4	26	8
MAC-2525-SN	M 25×1.5	25	--	92	--	8	--	82	--	32	10
MAC-2525-S	M 25×1.5	25	130	92	22.8	8	13	82	--	32	10
MAC-2725-SN	M 27×1.5	25	--	111	--	8	--	96	5	36	6
MAC-2725-S	M 27×1.5	25	154.8	111	22	8	18.8	96	5	36	6

Application example: Pick and place robot



Application example: Press feed



Four parameters are required to precisely determine the dimension of shock absorbers:

- Mass to be decelerated m (kg)
- Impact velocity v (m/s)
- Propelling or driving force F (N)
- Number of impact cycles per hour C (/hr)

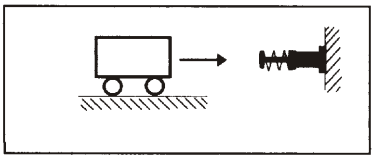
Some useful calculation formulas:

- Kinetic energy: $E_K = mv^2/2$
- Drive energy: $E_D = F \cdot S$
- Free fall velocity: $v = \sqrt{2g \cdot h}$
- Pneumatic or hydraulic cylinder driving forces: $F = 0.00785\ Pd^2$
- Maximum shock force (approximate): $Fm = 1.2\ E_T/S$
- Propelling force generated by electric motors: $F = 3000\ kW/v$
- Total energy absorbed per hour: $E_{TC} = E_T \cdot C$

Symbols	Unit	Description
μ		Coefficient of friction
α	(rad)	Angle of incline
θ	(rad)	Side load angle
ω	(rad/s)	Angular velocity
A	(m)	Width
B	(m)	Thickness
C	(/hr)	Impact cycles per hour
d	(mm)	Cylinder bore diameter
E_D	(Nm)	Drive energy per cycle
E_K	(Nm)	Kinetic energy per cycle
E_T	(Nm)	Total energy per cycle
E_{TC}	(Nm)	Total energy per hour
F	(N)	Propelling force
F_m	(N)	Maximum shock force
g	(m/s^2)	Acceleration due to gravity (9.81 m/s)
h	(m)	Height
HM		Arresting torque factor for motors (normally 2.5)
kW	(kW)	Electric motor power
m	(kg)	Mass to be decelerated
M_m	(kg)	Effective mass
P	(bar)	Operation pressure
R_s	(m)	Radius
R	(m)	Shock absorber mounting distance from rotation center
S	(m)	Stroke
T	(Nm)	Driving torque
t	(s)	Deceleration time
v	(m/s)	Velocity of impact mass
v_s	(m/s)	Impact velocity at shock absorber

Example 1: Horizontal impact

Application data:
m = 300kg
v = 1.0m/s
S = 0.04m
C = 300/hr



Formulas and calculation:

$E_K = \frac{mv^2}{2} = \frac{300 \cdot 1.0^2}{2} = 150Nm$

$E_T = E_K = 150Nm$

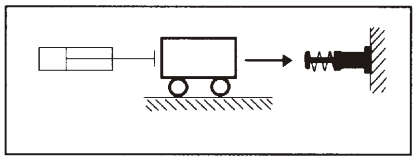
$E_{TC} = E_T \cdot C = 150 \cdot 300 = 45000Nm/hr$

$M_e = \frac{2E_T}{V^2} = \frac{2 \cdot 1.50}{1.0^2} = 300kg$

Choose from sizing diagram: MAD3650 is adequate

Example 2: Horizontal impact with propelling force

Application data:
m = 300kg
v = 1.2m/s
S = 0.05m
P = 40N/cm^2
d = 100mm
C = 300/hr



Formulas and calculation:

$E_K = \frac{mv^2}{2} = \frac{300 \cdot 1.0^2}{2} = 216Nm$

$E_D = F \cdot S = 0.00785Pd^2 \cdot S$

$= 0.00785 \cdot 40 \cdot 100^2 \cdot 0.05 = 157Nm$

$E_T = E_K + E_D = 216 + 157 = 373Nm$

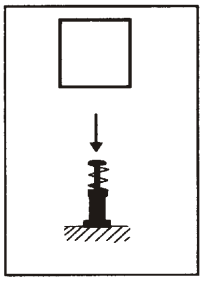
$E_{TC} = E_T \cdot C = 373 \cdot 300 = 111900Nm/hr$

$M_e = \frac{2E_T}{V^2} = \frac{2 \cdot 3.73}{1.2^2} = 518kg$

Choose from sizing diagram: MAD4250 is adequate

Example 3: Free fall impact

Application data:
m = 40kg
h = 0.4m
S = 0.06m
C = 200/hr



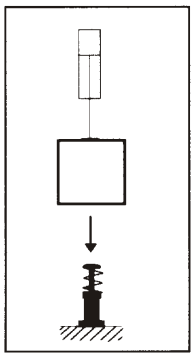
Formulas and calculation:

v	$= \sqrt{2g \cdot h}$	$= \sqrt{2 \cdot 9.81 \cdot 0.4}$	$=2.8m/sec$
E_K	$= \frac{mv^2}{2}$	$= \frac{40 \cdot 2.8^2}{2}$	$=157Nm$
E_D	$= F \cdot S$	$= mg \cdot h$	$=40 \cdot 9.81 \cdot 0.06 \quad =23.5Nm$
E_T	$= E_K+E_D$	$= 157+23.5$	$=180.5Nm/hr$
E_{TC}	$= E_T \cdot C$	$= 180.5 \cdot 200$	$=36100Nm/hr$
M_e	$= \frac{2E_T}{V^2}$	$= \frac{2 \cdot 180.5}{2.8^2}$	$=46kg$

Choose from sizing diagram: MAC3660-1 is adequate

Example 4: Free fall impact with propelling

Application data:
m = 40kg
h = 0.3m
S = 0.025m
P = 5bar
d = 50mm
C = 200/hr
v = 1.0m/sec



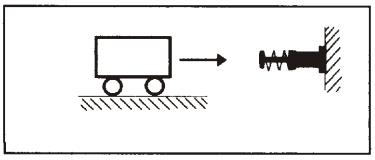
Formulas and calculation:

E_K	$= \frac{mv^2}{2}$	$= \frac{40 \cdot 1.0^2}{2}$	$=20Nm$
E_D	$= F \cdot S$	$=(mg+0.0785Pd^2) \cdot S$	
	$=(40 \cdot 9.81+0.0785 \cdot 5 \cdot 50^2) \cdot 0.025$		$=33.5Nm$
E_T	$= E_K+E_D$	$= 20+33.5$	$=55.5Nm$
E_{TC}	$= E_T \cdot C$	$= 55.5 \cdot 200$	$=11100Nm/hr$
M_e	$= \frac{2E_T}{V^2}$	$= \frac{2 \cdot 55.5}{1.0^2}$	$=111kg$

Choose from sizing diagram: MAD2525 is adequate

Example 5: Horizontal impact with motor driving

Application data:
m = 400kg
v = 1.0m/s
kW = 1.5kW
HM = 2.5
S = 0.075m
C = 60/hr



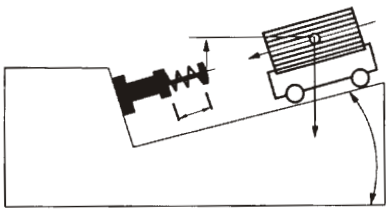
Formulas and calculation:

E_K	$= \frac{mv^2}{2}$	$= \frac{400 \cdot 1.0^2}{2}$	$=200Nm$
E_D	$= F. S = \frac{kW \cdot HM}{v} \cdot S = \frac{1500 \cdot 2.5}{1.0} \cdot 0.075$		$=281Nm$
E_T	$= E_K+E_D$	$= 200+281$	$=481Nm$
E_{TC}	$= E_T \cdot C$	$= 481 \cdot 60$	$=25860Nm/hr$
M_e	$= \frac{2E_T}{V^2}$	$= \frac{2 \cdot 481}{1.0^2}$	$=962kg$

Choose from sizing diagram: MAD4275 is adequate

Example 6: Inclined impact

Application data:
m = 150kg
h = 0.3m
S = 0.075m
α = 30°
C = 200/hr



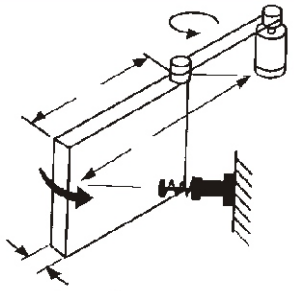
Formulas and calculation:

v	$= \sqrt{2g \cdot h}$	$= \sqrt{2 \cdot 9.81 \cdot 0.3}$	$=2.43m/sec$
E_K	$= \frac{mv^2}{2}$	$= \frac{150 \cdot 2.43^2}{2}$	$=443Nm$
E_D	$= F \cdot S$	$= m \cdot g \cdot S \cdot \sin\alpha$	
	$= 150 \cdot 9.81 \cdot 0.075 \cdot \sin30°$		$=55.2Nm$
E_T	$= E_K+E_D$	$= 433+55.2$	$=498.2Nm/hr$
E_{TC}	$= E_T \cdot C$	$= 498.2 \cdot 200$	$=99640Nm/hr$
M_e	$= \frac{2E_T}{V^2}$	$= \frac{2 \cdot 498.2}{2.43^2}$	$=168.7kg$

Choose from sizing diagram: MAD4275 is adequate

Example 7: Horizontal rotating door

Application data:
m = 20kg
ω = 2.0rad/s
T = 20Nm
R_S = 0.8m
A = 1.0m
B = 0.05m
S = 0.016m
C = 100/hr

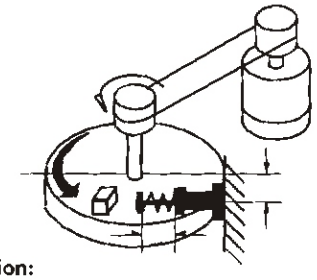


I	=	$\frac{m(4A^2+B^2)}{12}$	= $\frac{20(4 \cdot 1.0^2+0.05^2)}{12}$	=6.67kg · m^2
E_K	=	$\frac{I\omega^2}{2}$	= $\frac{6.67 \cdot 2.0^2}{2}$	=13.34Nm
θ	=	$\frac{s}{R_S}$	= $\frac{0.04}{0.8}$	=0.05rad
E_D	=	T · θ	= 20 · 0.05	=1.0Nm
E_T	=	E_K+E_D	= 13.34+1.0	=1434Nm
E_{TC}	=	E_T · C	= 14.34 · 100	=1434Nm/hr
v	=	ω · R_S	= 2.0 · 0.8	=1.6m/s
M_e	=	$\frac{2E_T}{V^2}$	= $\frac{2 \cdot 14.34}{1.6^2}$	=11.20kg

Choose from sizing diagram: MAD2016 is adequate

Example 8: Rotary index table with propelling force

Application data:
m = 200kg
ω = 1.0rad/s
T = 100Nm
R = 0.5m
R_S = 0.4m
S = 0.04m
C = 100/hr



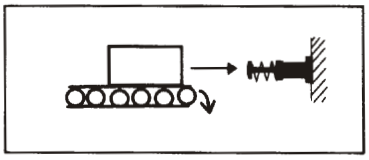
Formulas and calculation:

I	=	$\frac{mR^2}{2}$	= $\frac{200 \cdot 0.5^2}{2}$	=25kg · m^2
E_K	=	$\frac{I\omega^2}{2}$	= $\frac{25 \cdot 1.0^2}{2}$	=12.5Nm
θ	=	$\frac{s}{R_S}$	= $\frac{0.04}{0.4}$	=0.1rad
E_D	=	T · θ	= 100 · 0.1	=10Nm
E_T	=	E_K+E_D	= 12.5+10	=22.5Nm
E_{TC}	=	E_T · C	= 22.5 · 50	=1125Nm/hr
v	=	ω · R_S	= 1.0 · 0.4	=0.4m/s
M_e	=	$\frac{2E_T}{V^2}$	= $\frac{2 \cdot 22.5}{0.4^2}$	=281kg

Choose from sizing diagram: MAD2540 is adequate

Example 9: Horizontal mass on driven rollers

Application data:
m = 150kg
v = 0.5m/s
μ = 0.25
S = 0.02m
C = 120/hr



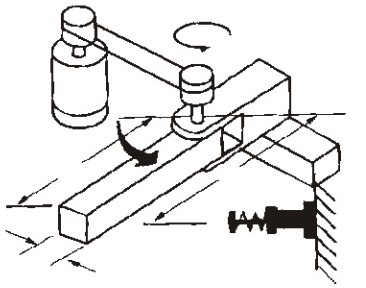
Formulas and calculation:

E_K	=	$\frac{mv^2}{2}$	= $\frac{150 \cdot 0.5^2}{2}$	=18.75Nm
E_D	= F · S	=mg μ · S	=150 · 9.81 · 0.25 · 0.02	=7.35Nm
E_T	=	E_K+E_D	= 18.73+7.35	=26.1Nm
E_{TC}	=	E_T · C	= 26.1 · 120	=3132Nm/hr
M_e	=	$\frac{2E_T}{V^2}$	= $\frac{2 \cdot 26.1}{0.5^2}$	=208.8kg

Choose from sizing diagram: MAC2020-3 is adequate

Example 10: Rotating beam with driving force

Application data:
m = 40kg
A = 0.5m
B = 0.05m
ω = 2.0rad/s
T = 10Nm
R_S = 0.4m
S = 0.05m
C = 50/hr



I	=	$\frac{m(4A^2+B^2)}{12}$	= $\frac{40(4 \cdot 0.5^2+0.05^2)}{12}$	=3.36kg · m^2
E_K	=	$\frac{I\omega^2}{2}$	= $\frac{3.36 \cdot 2.0^2}{2}$	=6.8Nm
θ	=	$\frac{s}{R_S}$	= $\frac{0.05}{0.4}$	=0.125rad
E_D	=	T · θ	= 10 · 0.125	=1.25Nm
E_T	=	E_K+E_D	= 6.8+1.25	=8.05Nm
E_{TC}	=	E_T · C	= 8.05 · 50	=402.5Nm/hr
v	=	ω · R_S	= 2.0 · 0.4	=0.8m/s
M_e	=	$\frac{2E_T}{V^2}$	= $\frac{2 \cdot 8.05}{0.8^2}$	=25.15kg

Choose from sizing diagram: MAD1416-2 is adequate