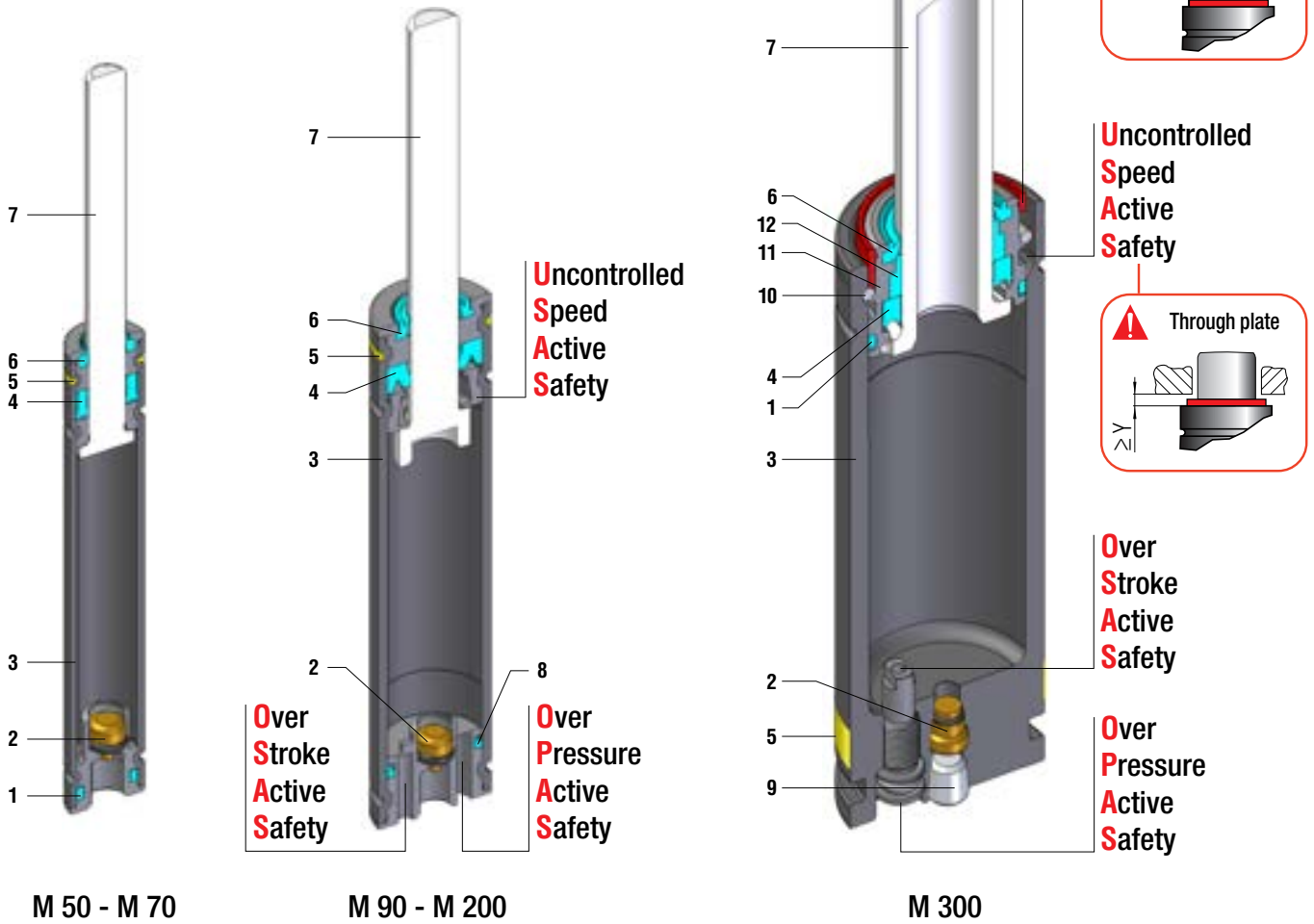


VDI	BMW	FCA
Ford	MB	Nissan
PSA	VW	



Mini cilindri - Mini cylinders - Mini Gasdruckfedern
 Mini-ressorts - Mini cilindros - Mini-cilindros

SEALING	ROD SEAL	
DESIGN	RETAINING GROOVE DESIGN	BUSH-BODY DESIGN (M 300 only)

1	Dual ring seal	5	Force color code	9	Stopper
2	Valve	6	Rod wiper	10	Retaining ring
3	Body	7	Rod (Nitrited Superfinished)	11	Bush
4	Rod seal	8	O-ring	12	Guide ring

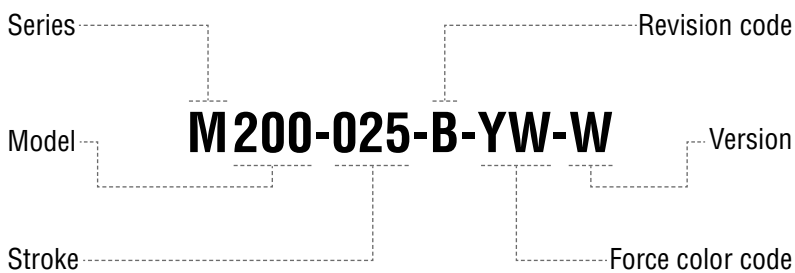
RANGE CHART

Model	Body Ø		Stroke Cu		Initial force F0						
	mm	inch	mm	inch	daN	lb	OSAS	USAS	OPAS	SKUDO	SW
M 50	12	0.47	7 - 125	0.28 - 4.92	6 - 50	13 - 112	-	-	-	-	✓
M 50 TBI	5/8" 11 UNC		7 - 125	0.28 - 4.92	6 - 50	13 - 112	-	-	-	-	-
M 50 TBM1	M 16 X 1,5		7 - 125	0.28 - 4.92	6 - 50	13 - 112	-	-	-	-	-
M 50 TBM2	M 16 X 2		7 - 125	0.28 - 4.92	6 - 50	13 - 112	-	-	-	-	-
M 50 TEM	M 16 X 2		7 - 125	0.28 - 4.92	6 - 50	13 - 112	-	-	-	-	-
M 70	15	0.59	7 - 125	0.28 - 4.92	8 - 70	18 - 157	-	-	-	-	✓
M 90	19	0.75	7 - 125	0.28 - 4.92	5 - 90	11 - 202	✓	✓	✓	-	✓
M 90 TBM	M 24 X 1,5		7 - 125	0.28 - 4.92	5 - 90	11 - 202	✓	✓	✓	-	-
M 90 TEM	M 24 X 1,5		7 - 125	0.28 - 4.92	5 - 90	11 - 202	✓	✓	✓	-	-
M 90 TBI	1" 8 UNC		7 - 125	0.28 - 4.92	5 - 90	11 - 202	✓	✓	✓	-	-
M 200	25	0.98	7 - 200	0.28 - 7.87	17 - 200	38 - 450	✓	✓	✓	-	✓
M 300	32	1.26	7 - 125	0.28 - 4.92	80 - 320	180 - 719	✓	✓	✓	-	✓

✓ Built-in as standard

✓ Optional upon request

HOW TO ORDER



Available versions



M 200-025-B-YW
Standard code



Self contained



M 200-025-B-YW-W
Add "-W" to standard code



Self contained

+
Secondary wiper





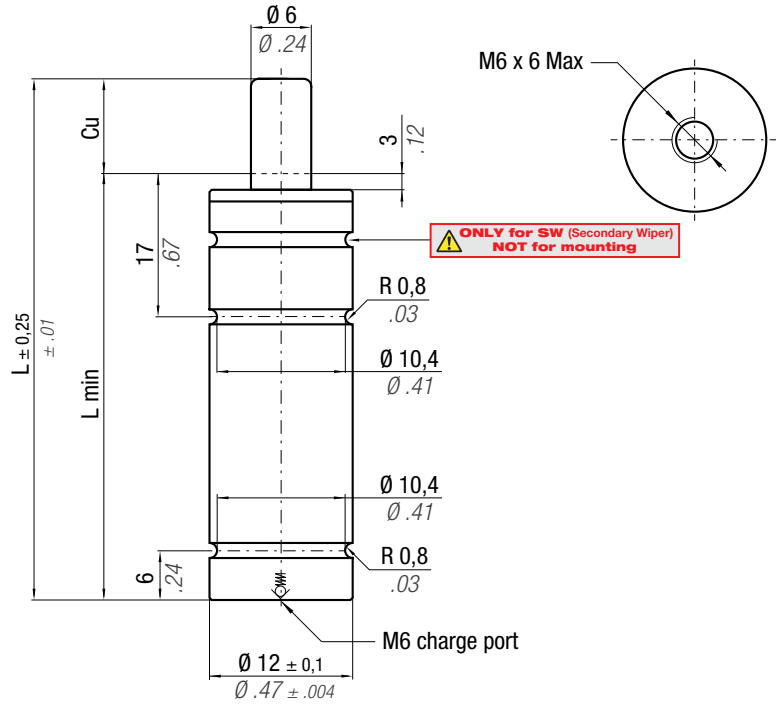
ACTIVE SAFETY

* $F_{1i} =$ Isothermal end force at 100% Cu p. 16 ** $F_{1p} =$ Polytrophic end force at 100% Cu

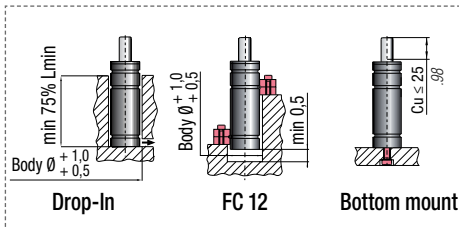


Micro 32°

Force color code	P		Fo Initial force $\pm 5\%$ at $+20^\circ\text{C} + 68^\circ\text{F}$	
	bar	psi	daN	lb
GR	45	653	13	29
BU	90	1305	25	56
RD	135	1958	38	85
YW	180	2610	50	112
BK	20-180	290-2610	6-50	13-112



CODE	Cu	L	L min	F _{1i} * End force	F _{1p} ** End force	Vo	Temperature		ΔP	P max 180 bar 2610 psi	P min 20 bar 290 psi	S 0,28 cm ² 0,043 in ²	SPM ~ 100 - 150 (at 20°C)	Max Speed 1,8 m/s 70.8 in/s	Maintenance kit Disposable
							0 - 80 °C 32 - 176 °F	± 0,33 %/°C							
M50 - 007 - A - ...	7	56	49	1,24 x F0	1,41 x F0	1,2									
M50 - 010 - A - ...	10	62	52	1,30 x F0	1,50 x F0	1,4									
M50 - 013 - A - ...	12,7	67,4	54,7	1,35 x F0	1,57 x F0	1,6									
M50 - 015 - A - ...	15	72	57	1,38 x F0	1,62 x F0	1,8									
M50 - 019 - A - ...	19	80	61	1,42 x F0	1,69 x F0	2,1									
M50 - 025 - A - ...	25	92	67	1,47 x F0	1,77 x F0	2,5									
M50 - 038 - A - ...	38	118	80	1,53 x F0	1,88 x F0	3,5									
M50 - 050 - A - ...	50	142	92	1,57 x F0	1,95 x F0	4,4									
M50 - 063 - A - ...	63,5	172	108,5	1,57 x F0	1,93 x F0	5,6									
M50 - 075 - A - ...	75	195	120	1,59 x F0	1,97 x F0	6,5									
M50 - 080 - A - ...	80	205	125	1,59 x F0	1,98 x F0	6,9									
M50 - 100 - A - ...	100	245	145	1,62 x F0	2,02 x F0	8,4									
M50 - 125 - A - ...	125	295	170	1,64 x F0	2,06 x F0	10,2									

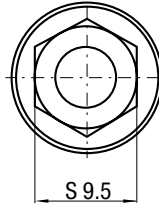
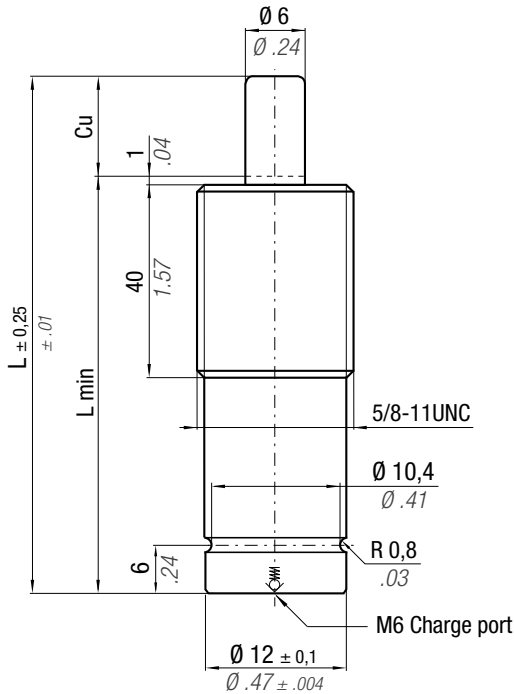


HOW TO ORDER

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INSTALLATION GUIDELINE

p. 205



* F_{1i} =

Isothermal
end force
at 100% Cu



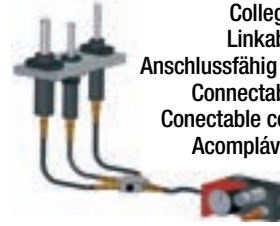
p. 16

** F_{1p} =

Polytropic
end force
at 100% Cu



**ACTIVE
SAFETY**



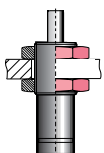
Collegabile con tubi
Linkable with hoses
Anschlussfähig mit Leitungen
Connectable avec tubes
Conectable con mangueras
Acompláveis com tubos

Micro 32°

Force color code	P		Fo	
	bar	psi	Initial force ± 5% at +20°C +68°F	
			daN	lb
GR	45	653	13	29
BU	90	1305	25	56
RD	135	1958	38	85
YW	180	2610	50	112
BK	20-180	290-2610	6-50	13-112

	0 - 80 °C 32 - 176 °F	ΔP ± 0,33 %/°C	P max 180 bar 2610 psi	P min 20 bar 290 psi	S 0,28 cm ² 0.043 in ²	SPM ~ 100 - 150 (at 20°C)	Max Speed 1,8 m/s 70.8 in/s	Maintenance kit Disposable
--	--------------------------	---------------------------	------------------------------	----------------------------	--	---------------------------------	-----------------------------------	-------------------------------

CODE	Cu		L		L min		F _{1i} *		F _{1p} **		V ₀		~Kg	~lb	PED 2014/68/EU
	mm	inch	mm	inch	mm	inch	daN	lb	daN	lb	cm ³	in ³			
M50-007-A-...-TBI	7	0.28	56	2.20	49	1.93	1,24 x F ₀		1,41 x F ₀		1,2	0.07	0,03	0.07	✓
M50-010-A-...-TBI	10	0.39	62	2.441	52	2.05	1,30 x F ₀		1,50 x F ₀		1,4	0.09	0,03	0.07	✓
M50-013-A-...-TBI	12,7	0.50	67,4	2.65	54,7	2.15	1,35 x F ₀		1,57 x F ₀		1,6	0.10	0,03	0.07	✓
M50-015-A-...-TBI	15	0.59	72	2.83	57	2.24	1,38 x F ₀		1,62 x F ₀		1,8	0.11	0,03	0.07	✓
M50-019-A-...-TBI	19	0.75	80	3.15	61	2.40	1,42 x F ₀		1,69 x F ₀		2,1	0.13	0,03	0.07	✓
M50-025-A-...-TBI	25	0.98	92	3.62	67	2.64	1,47 x F ₀		1,77 x F ₀		2,5	0.15	0,03	0.07	✓
M50-038-A-...-TBI	38	1.50	118	4.65	80	3.15	1,53 x F ₀		1,88 x F ₀		3,5	0.21	0,04	0.09	✓
M50-050-A-...-TBI	50	1.97	142	5.59	92	3.62	1,57 x F ₀		1,95 x F ₀		4,4	0.27	0,05	0.11	✓
M50-063-A-...-TBI	63,5	2.50	172	6.77	108,5	4.27	1,57 x F ₀		1,93 x F ₀		5,6	0.34	0,06	0.13	✓
M50-075-A-...-TBI	75	2.95	195	7.68	120	4.72	1,59 x F ₀		1,97 x F ₀		6,5	0.40	0,06	0.13	✓
M50-080-A-...-TBI	80	3.15	205	8.07	125	4.92	1,59 x F ₀		1,98 x F ₀		6,9	0.42	0,07	0.15	✓
M50-100-A-...-TBI	100	3.94	245	9.65	145	5.71	1,62 x F ₀		2,02 x F ₀		8,4	0.51	0,08	0.18	✓
M50-125-A-...-TBI	125	4.92	295	11.61	170	6.69	1,64 x F ₀		2,06 x F ₀		10,2	0.62	0,09	0.20	✓



39DI5/8-11A

HOW TO ORDER

p. 39

INSTALLATION GUIDELINE

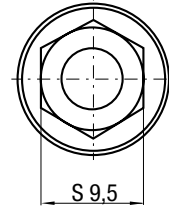
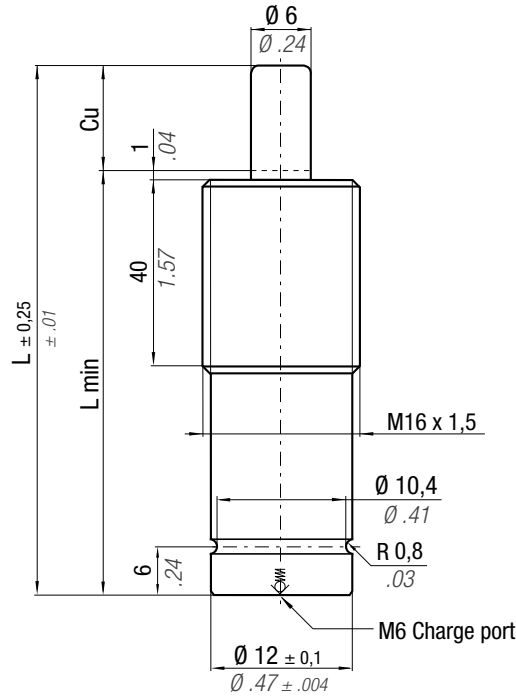
p. 205

ACTIVE SAFETY

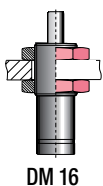
* F_{1i} = Isothermal end force at 100% Cu p. 16 ** F_{1p} = Polytropic end force at 100% Cu



Force color code	P		Fo Initial force $\pm 5\%$ at $+20^\circ\text{C} + 68^\circ\text{F}$	
	bar	psi	daN	lb
GR	45	653	13	29
BU	90	1305	25	56
RD	135	1958	38	85
YW	180	2610	50	112
BK	20-180	290-2610	6-50	13-112



CODE		0 - 80 °C 32 - 176 °F	ΔP $\pm 0,33\% / ^\circ\text{C}$	P max 180 bar 2610 psi	P min 20 bar 290 psi	S 0,28 cm ² 0,043 in ²	SPM ~ 100 - 150 (at 20°C)	Max Speed 1,8 m/s 70.8 in/s	Maintenance kit					
									Disposable					
CODE		Cu		L		L min		F_{1i} * End force *		F_{1p} ** End force **		Vo		
		mm	inch	mm	inch	mm	inch	daN	lb	daN	lb	cm ³	in ³	
M50 - 007 - A - ... - TBM1		7	0.28	56	2.20	49	1.93	1,24 x FO	1,41 x FO	1,2	0.07	0,03	0.07	✓
M50 - 010 - A - ... - TBM1		10	0.39	62	2.44	52	2.05	1,30 x FO	1,50 x FO	1,4	0.09	0,03	0.07	✓
M50 - 013 - A - ... - TBM1		12,7	0.50	67,4	2.65	54,7	2.15	1,35 x FO	1,57 x FO	1,6	0.10	0,03	0.07	✓
M50 - 015 - A - ... - TBM1		15	0.59	72	2.83	57	2.24	1,38 x FO	1,62 x FO	1,8	0.11	0,03	0.07	✓
M50 - 019 - A - ... - TBM1		19	0.75	80	3.15	61	2.40	1,42 x FO	1,69 x FO	2,1	0.13	0,03	0.07	✓
M50 - 025 - A - ... - TBM1		25	0.98	92	3.62	67	2.64	1,47 x FO	1,77 x FO	2,5	0.15	0,03	0.07	✓
M50 - 038 - A - ... - TBM1		38	1.50	118	4.65	80	3.15	1,53 x FO	1,88 x FO	3,5	0.21	0,04	0.09	✓
M50 - 050 - A - ... - TBM1		50	1.97	142	5.59	92	3.62	1,57 x FO	1,95 x FO	4,4	0.27	0,05	0.11	✓
M50 - 063 - A - ... - TBM1		63,5	2.50	172	6.77	108,5	4.27	1,57 x FO	1,93 x FO	5,6	0.34	0,06	0.13	✓
M50 - 075 - A - ... - TBM1		75	2.95	195	7.68	120	4.72	1,59 x FO	1,97 x FO	6,5	0.40	0,06	0.13	✓
M50 - 080 - A - ... - TBM1		80	3.15	205	8.07	125	4.92	1,59 x FO	1,98 x FO	6,9	0.42	0,07	0.15	✓
M50 - 100 - A - ... - TBM1		100	3.94	245	9.65	145	5.71	1,62 x FO	2,02 x FO	8,4	0.51	0,08	0.18	✓
M50 - 125 - A - ... - TBM1		125	4.92	295	11.61	170	6.69	1,64 x FO	2,06 x FO	10,2	0.62	0,09	0.20	✓

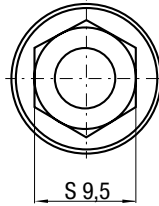
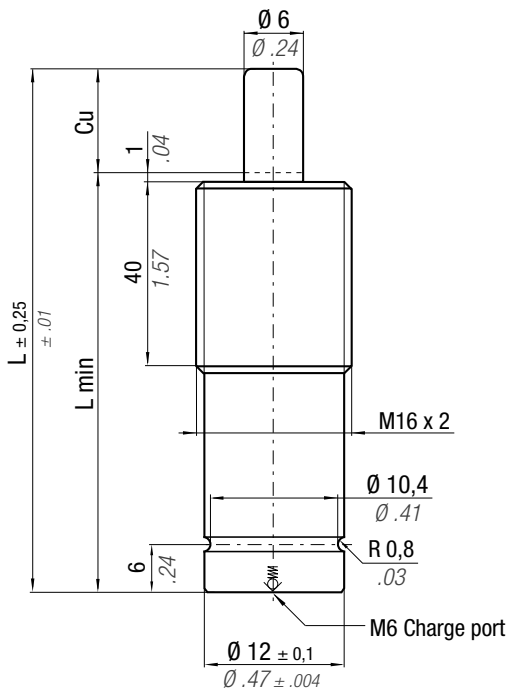


HOW TO ORDER

p. 39

INSTALLATION GUIDELINE

p. 205



* F_{1i} =

Isothermal
end force
at 100% Cu

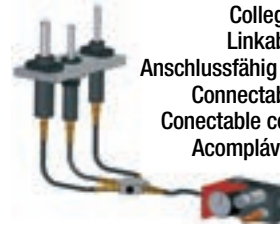


p. 16



** F_{1p} =

Polytropic
end force
at 100% Cu



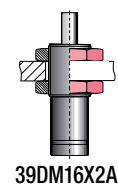
Collegabile con tubi
Linkable with hoses
Anschlussfähig mit Leitungen
Connectable avec tubes
Conectable con mangueras
Acompláveis com tubos

Micro 32°

**ACTIVE
SAFETY**

Force color code	P		F ₀ Initial force ± 5% at +20°C +68°F	
	bar	psi	daN	lb
GR	45	653	13	29
BU	90	1305	25	56
RD	135	1958	38	85
YW	180	2610	50	112
BK	20-180	290-2610	6-50	13-112

CODE	Cu	L	L min	F _{1i} *		F _{1p} **		V ₀		Maintenance kit	
				daN	lb	daN	lb	cm ³	in ³	~Kg	~lb
M50 - 007 - A - ... - TBM2	7	56	49	1,24 x F ₀	1,41 x F ₀	1,2	0,07	0,03	0,07	✓	
M50 - 010 - A - ... - TBM2	10	62	52	1,30 x F ₀	1,50 x F ₀	1,4	0,09	0,03	0,07	✓	
M50 - 013 - A - ... - TBM2	12,7	67,4	54,7	1,35 x F ₀	1,57 x F ₀	1,6	0,10	0,03	0,07	✓	
M50 - 015 - A - ... - TBM2	15	72	57	1,38 x F ₀	1,62 x F ₀	1,8	0,11	0,03	0,07	✓	
M50 - 019 - A - ... - TBM2	19	80	61	1,42 x F ₀	1,69 x F ₀	2,1	0,13	0,03	0,07	✓	
M50 - 025 - A - ... - TBM2	25	92	67	1,47 x F ₀	1,77 x F ₀	2,5	0,15	0,03	0,07	✓	
M50 - 038 - A - ... - TBM2	38	118	80	1,53 x F ₀	1,88 x F ₀	3,5	0,21	0,04	0,09	✓	
M50 - 050 - A - ... - TBM2	50	142	92	1,57 x F ₀	1,95 x F ₀	4,4	0,27	0,05	0,11	✓	
M50 - 063 - A - ... - TBM2	63,5	172	108,5	1,57 x F ₀	1,93 x F ₀	5,6	0,34	0,06	0,13	✓	
M50 - 075 - A - ... - TBM2	75	195	120	1,59 x F ₀	1,97 x F ₀	6,5	0,40	0,06	0,13	✓	
M50 - 080 - A - ... - TBM2	80	205	125	1,59 x F ₀	1,98 x F ₀	6,9	0,42	0,07	0,15	✓	
M50 - 100 - A - ... - TBM2	100	245	145	1,62 x F ₀	2,02 x F ₀	8,4	0,51	0,08	0,18	✓	
M50 - 125 - A - ... - TBM2	125	295	170	1,64 x F ₀	2,06 x F ₀	10,2	0,62	0,09	0,20	✓	



39DM16X2A

HOW TO ORDER



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INSTALLATION GUIDELINE



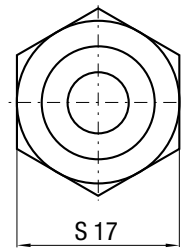
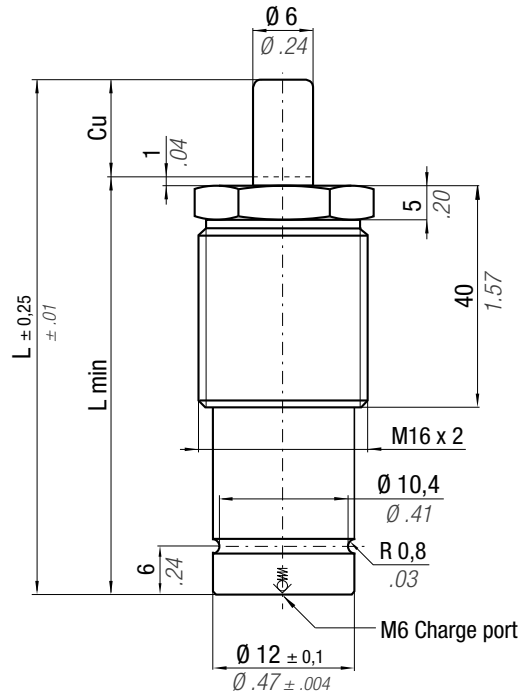
p. 205

ACTIVE SAFETY

* F_{1i} = Isothermal end force at 100% Cu p. 16 ** F_{1p} = Polytrophic end force at 100% Cu



Force color code	P		Fo Initial force $\pm 5\%$ at +20°C / +68°F	
	bar	psi	daN	lb
GR	45	653	13	29
BU	90	1305	25	56
RD	135	1958	38	85
YW	180	2610	50	112
BK	20-180	290-2610	6-50	13-112



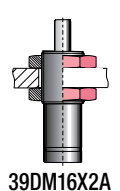
CODE		0 - 80 °C 32 - 176 °F	ΔP $\pm 0,33 \% / ^\circ C$	P max 180 bar 2610 psi	P min 20 bar 290 psi	S 0,28 cm ² 0,043 in ²	SPM ~ 100 - 150 (at 20°C)	Max Speed 1,8 m/s 70.8 in/s	Maintenance kit					
									Disposable					
M50 - 007 - A - ... - TEM		7	0.28	56	2.20	49	1.93	1,24 x F0	1,41 x F0	1,2	0,07	0,03	0,07	✓
M50 - 010 - A - ... - TEM		10	0.39	62	2.441	52	2.05	1,30 x F0	1,50 x F0	1,4	0,09	0,03	0,07	✓
M50 - 013 - A - ... - TEM		12,7	0.50	67,4	2.65	54,7	2.15	1,35 x F0	1,57 x F0	1,6	0,10	0,03	0,07	✓
M50 - 015 - A - ... - TEM		15	0.59	72	2.83	57	2.24	1,38 x F0	1,62 x F0	1,8	0,11	0,03	0,07	✓
M50 - 019 - A - ... - TEM		19	0.75	80	3.15	61	2.40	1,42 x F0	1,69 x F0	2,1	0,13	0,03	0,07	✓
M50 - 025 - A - ... - TEM		25	0.98	92	3.62	67	2.64	1,47 x F0	1,77 x F0	2,5	0,15	0,03	0,07	✓
M50 - 038 - A - ... - TEM		38	1.50	118	4.65	80	3.15	1,53 x F0	1,88 x F0	3,5	0,21	0,04	0,09	✓
M50 - 050 - A - ... - TEM		50	1.97	142	5.59	92	3.62	1,57 x F0	1,95 x F0	4,4	0,27	0,05	0,11	✓
M50 - 063 - A - ... - TEM		63,5	2.50	172	6.77	108,5	4.27	1,57 x F0	1,93 x F0	5,6	0,34	0,06	0,13	✓
M50 - 075 - A - ... - TEM		75	2.95	195	7.68	120	4.72	1,59 x F0	1,97 x F0	6,5	0,40	0,06	0,13	✓
M50 - 080 - A - ... - TEM		80	3.15	205	8.07	125	4.92	1,59 x F0	1,98 x F0	6,9	0,42	0,07	0,15	✓
M50 - 100 - A - ... - TEM		100	3.94	245	9.65	145	5.71	1,62 x F0	2,02 x F0	8,4	0,51	0,08	0,18	✓
M50 - 125 - A - ... - TEM		125	4.92	295	11.61	170	6.69	1,64 x F0	2,06 x F0	10,2	0,62	0,09	0,20	✓

HOW TO ORDER

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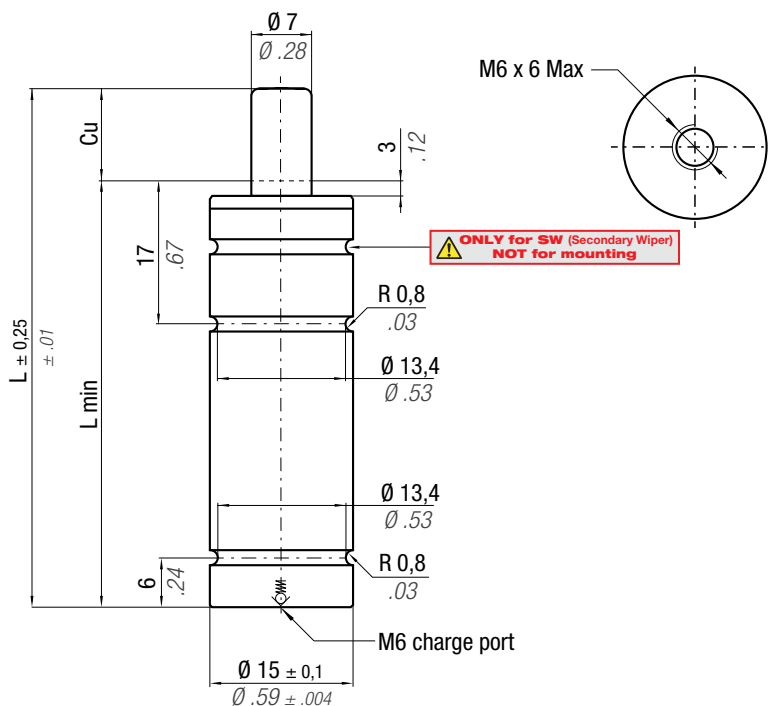
INSTALLATION GUIDELINE

p. 205





ACTIVE SAFETY



* $F_{1i} =$

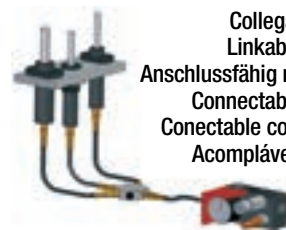
Isothermal end force at 100% Cu



p. 16

** $F_{1p} =$

Polytropic end force at 100% Cu



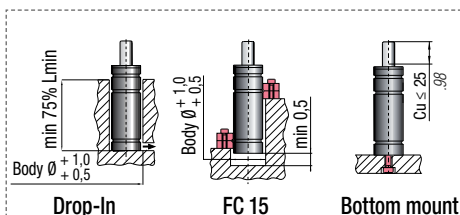
Collegabile con tubi
Linkable with hoses
Anschlussfähig mit Leitungen
Connectable avec tubes
Conectable con mangueras
Acompláveis com tubos

Micro 32°

Force color code	P		Fo	
	bar	psi	Initial force ± 5% at +20°C +68°F	
			daN	lb
GR	45	653	18	40
BU	90	1305	35	79
RD	135	1958	50	112
YW	180	2610	70	157
BK	20-180	290-2610	8-70	18-157

	0 - 80 °C 32 - 176 °F	ΔP ± 0,33 %/°C	P max 180 bar 2610 psi	P min 20 bar 290 psi	S 0,38 cm ² 0.059 in ²	SPM ~ 100 - 150 (at 20°C)	Max Speed 1,8 m/s 70.8 in/s	Maintenance kit Disposable
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CODE		Cu		L		L min		F_{1i} *		F_{1p} **		Vo				
		mm	inch	mm	inch	mm	inch	daN	lb	daN	lb	cm ³	in ³			~Kg
M70 - 007 - A - ...		7	0.28	56	2.20	49	1.93	1,19 x F0		1,33 x F0		1,9	0.12	0,04	0.09	✓
M70 - 010 - A - ...		10	0.39	62	2.44	52	2.05	1,24 x F0		1,41 x F0		2,2	0.13	0,05	0.11	✓
M70 - 013 - A - ...		12,7	0.50	67,4	2.65	54,7	2.15	1,27 x F0		1,46 x F0		2,6	0.16	0,05	0.11	✓
M70 - 015 - A - ...		15	0.59	72	2.83	57	2.24	1,30 x F0		1,51 x F0		2,8	0.17	0,05	0.11	✓
M70 - 019 - A - ...		19	0.75	80	3.15	61	2.40	1,34 x F0		1,57 x F0		3,2	0.20	0,05	0.11	✓
M70 - 025 - A - ...		25	0.98	92	3.62	67	2.64	1,38 x F0		1,64 x F0		3,9	0.24	0,06	0.13	✓
M70 - 038 - A - ...		38	1.50	118	4.65	80	3.15	1,44 x F0		1,73 x F0		5,3	0.32	0,07	0.15	✓
M70 - 050 - A - ...		50	1.97	142	5.59	92	3.62	1,48 x F0		1,79 x F0		6,6	0.40	0,08	0.18	✓
M70 - 063 - A - ...		63,5	2.50	172	6.77	108,5	4.27	1,47 x F0		1,79 x F0		8,5	0.52	0,09	0.20	✓
M70 - 075 - A - ...		75	2.95	195	7.68	120	4.72	1,49 x F0		1,82 x F0		9,7	0.59	0,10	0.22	✓
M70 - 080 - A - ...		80	3.15	205	8.071	125	4.92	1,50 x F0		1,83 x F0		10,3	0.63	0,10	0.22	✓
M70 - 100 - A - ...		100	3.94	245	9.65	145	5.71	1,52 x F0		1,87 x F0		12,5	0.76	0,12	0.26	✓
M70 - 125 - A - ...		125	4.92	295	11.61	170	6.69	1,54 x F0		1,90 x F0		15,2	0.93	0,14	0.31	✓



HOW TO ORDER

p. 39

INSTALLATION GUIDELINE

p. 205



ACTIVE SAFETY

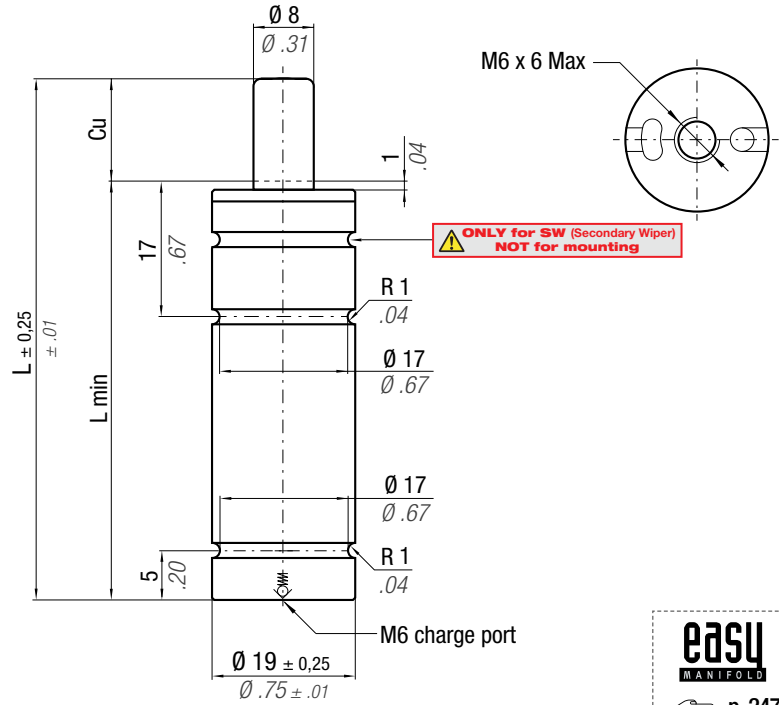


Il nuovo codice sarà fornito solo ad esaurimento del vecchio - The new code will be supplied only when the old will be out of stock - Der neue Kode wird nur angegeben, wenn der alte nicht mehr lieferbar ist - Le nouveau code sera fourni uniquement lorsque le vieux stock sera écoulé - El nuevo código será suministrado sólo cuando se agoten las existencias del antiguo - O novo código irá ser fornecido apenas quando o antigo esgotar stock

* F_{1i} = Isothermal end force at 100% Cu p. 16
** F_{1p} = Polytrophic end force at 100% Cu

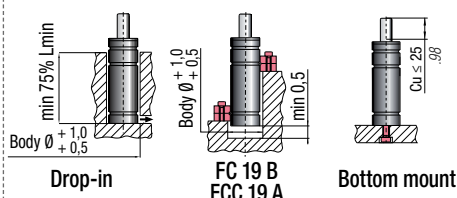
Collegabile con tubi - Linkable with hoses
Anschlussfähig mit Leitungen
Connectable avec tubes - Conectable con mangueras
Acompláveis com tubos
Micro 32°

Force color code	P		F0 Initial force ± 5% at +20°C +68°F	
	bar	psi	daN	lb
OR	10	145	5	11
PR	20	290	10	22
GR	60	870	30	67
BU	100	1450	50	112
RD	140	2030	70	157
YW	180	2610	90	202
BK	10-180	145-2610	5-90	11-202



N ₂	0 - 80 °C 32 - 176 °F	ΔP ± 0,33 %/°C	P max 180 bar 2610 psi	P min 10 bar 145 psi	S 0,50 cm ² 0,078 in ²	SPM ~ 100 - 150 (at 20°C)	Max Speed 1,8 m/s 70,8 in/s	Maintenance kit Disposable
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CODE PHASING OUT from 05/2019	NEW	Cu		L		L min		F _{1i} * End force *		F _{1p} ** End force **		Vo		PED 2014/68/EU
		mm	inch	mm	inch	mm	inch	daN	lb	daN	lb	cm ³	in ³	
M90 - 007 - A - ...	M90 - 007 - B - ...	7	0.28	56	2.20	49	1.93	1,21 x F0	1,39 x F0	2,3	0.14	0,07	0.15	✓
M90 - 010 - A - ...	M90 - 010 - B - ...	10	0.39	62	2.44	52	2.05	1,25 x F0	1,44 x F0	2,9	0.18	0,07	0.15	✓
M90 - 013 - A - ...	M90 - 013 - B - ...	12,7	0.50	67,4	2.65	54,7	2.15	1,27 x F0	1,48 x F0	3,4	0.21	0,08	0.18	✓
M90 - 015 - A - ...	M90 - 015 - B - ...	15	0.59	72	2.83	57	2.24	1,28 x F0	1,50 x F0	3,9	0.24	0,08	0.18	✓
M90 - 025 - A - ...	M90 - 025 - B - ...	25	0.98	92	3.62	67	2.64	1,32 x F0	1,57 x F0	5,8	0.35	0,09	0.20	✓
M90 - 038 - A - ...	M90 - 038 - B - ...	38,1	1.50	118,2	4.65	80,1	3.15	1,35 x F0	1,60 x F0	8,4	0.51	0,11	0.24	✓
M90 - 050 - A - ...	M90 - 050 - B - ...	50	1.97	142	5.59	92	3.62	1,36 x F0	1,62 x F0	10,8	0.66	0,12	0.26	✓
M90 - 063 - A - ...	M90 - 063 - B - ...	63,5	2.50	172	6.77	108,5	4.27	1,36 x F0	1,62 x F0	13,7	0.84	0,14	0.31	✓
M90 - 080 - A - ...	M90 - 080 - B - ...	80	3.15	205	8.07	125	4.92	1,37 x F0	1,64 x F0	17	1.04	0,15	0.33	✓
M90 - 100 - A - ...	M90 - 100 - B - ...	100	3.94	245	9.65	145	5.71	1,37 x F0	1,65 x F0	20,9	1.28	0,17	0.37	✓
M90 - 125 - A - ...	M90 - 125 - B - ...	125	4.92	295	11.61	170	6.69	1,38 x F0	1,66 x F0	25,8	1.57	0,20	0.44	✓

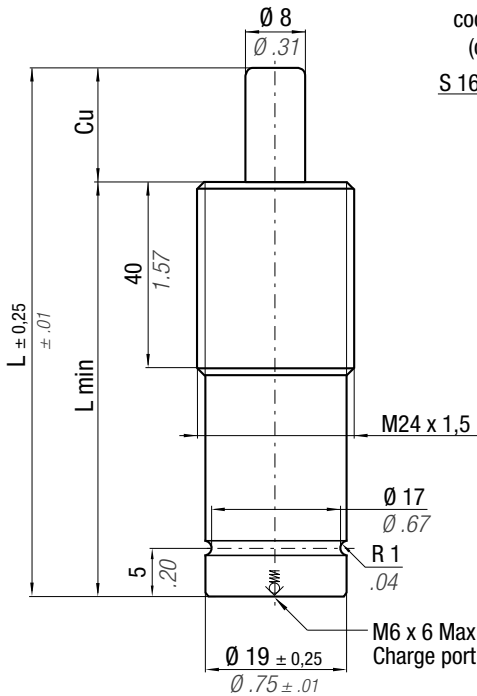


HOW TO ORDER

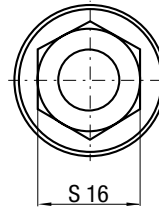
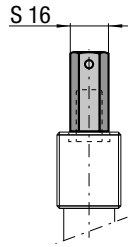
p. 39

INSTALLATION GUIDELINE

p. 205



cod. 39 TBT
(optional)



!
Senza riserva corsa
Without reserve of stroke
Ohne Hubreserve
Sans course de réserve
Sin margen de Carrera
Sem reserva de curso

!
NON superare 90% Cu
DO NOT exceed 90% Cu
NICHT überschreiten die 90% Cu
NE PAS dépasser 90% Cu
NO superar el 90% Cu
NÃO se excedam os 90% Cu

Il nuovo codice sarà fornito solo ad esaurimento del vecchio - The new code will be supplied only when the old will be out of stock - Der neue Kode wird nur angegeben, wenn der alte nicht mehr lieferbar ist - Le nouveau code sera fourni uniquement lorsque le vieux stock sera écoulé - El nuevo código será suministrado sólo cuando se agoten las existencias del antiguo - O novo código irá ser fornecido apenas quando o antigo esgotar stock

* $F_{1i} =$

Isothermal end force at 100% Cu



p. 16

** $F_{1p} =$

Polytrophic end force at 100% Cu



Collegabile con tubi - Linkable with hoses
Anschlussfähig mit Leitungen
Connectable avec tubes - Connectable con mangueras
Acompláveis com tubos

Micro 32°

Force color code	P		F ₀	
	bar	psi	Initial force ± 5% at +20°C +68°F	
			daN	lb
OR	10	145	5	11
PR	20	290	10	22
GR	60	870	30	67
BU	100	1450	50	112
RD	140	2030	70	157
YW	180	2610	90	202
BK	10-180	145-2610	5-90	11-202

ACTIVE SAFETY



OSAS



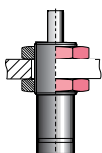
USAS



OPAS

	0 - 80 °C 32 - 176 °F	ΔP ± 0,33 %/°C	P max 180 bar 2610 psi	P min 10 bar 145 psi	S 0,50 cm ² 0.078 in ²	SPM ~ 100 - 150 (at 20°C)	Max Speed 1,8 m/s 70.8 in/s	Maintenance kit Disposable
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CODE PHASING OUT from 05/2019	NEW	Cu		L		L min		F _{1i} *		F _{1p} **		V ₀		PED		
		mm	inch	mm	inch	mm	inch	daN	lb	daN	lb	cm ³	in ³	~Kg	~lb	2014/68/EU
M90-007-A-...-TBM	M90-007-B-...-TBM	7	0.28	56	2.20	49	1.93	1,21 x F ₀		1,39 x F ₀		2,3	0.14	0,07	0.15	✓
M90-010-A-...-TBM	M90-010-B-...-TBM	10	0.39	62	2.44	52	2.05	1,25 x F ₀		1,44 x F ₀		2,9	0.18	0,07	0.15	✓
M90-013-A-...-TBM	M90-013-B-...-TBM	12,7	0.50	67,4	2.65	54,7	2.15	1,27 x F ₀		1,48 x F ₀		3,4	0.21	0,08	0.18	✓
M90-015-A-...-TBM	M90-015-B-...-TBM	15	0.59	72	2.83	57	2.24	1,28 x F ₀		1,50 x F ₀		3,9	0.24	0,08	0.18	✓
M90-025-A-...-TBM	M90-025-B-...-TBM	25	0.98	92	3.62	67	2.64	1,32 x F ₀		1,57 x F ₀		5,8	0.35	0,09	0.20	✓
M90-038-A-...-TBM	M90-038-B-...-TBM	38,1	1.50	118,2	4.65	80,1	3.15	1,35 x F ₀		1,60 x F ₀		8,4	0.51	0,11	0.24	✓
M90-050-A-...-TBM	M90-050-B-...-TBM	50	1.97	142	5.59	92	3.62	1,36 x F ₀		1,62 x F ₀		10,8	0.66	0,12	0.26	✓
M90-063-A-...-TBM	M90-063-B-...-TBM	63,5	2.50	172	6.77	108,5	4.27	1,36 x F ₀		1,62 x F ₀		13,7	0.84	0,14	0.31	✓
M90-080-A-...-TBM	M90-080-B-...-TBM	80	3.15	205	8.07	125	4.92	1,37 x F ₀		1,64 x F ₀		17	1.04	0,15	0.33	✓
M90-100-A-...-TBM	M90-100-B-...-TBM	100	3.94	245	9.65	145	5.71	1,37 x F ₀		1,65 x F ₀		20,9	1.28	0,17	0.37	✓
M90-125-A-...-TBM	M90-125-B-...-TBM	125	4.92	295	11.61	170	6.69	1,38 x F ₀		1,66 x F ₀		25,8	1.57	0,20	0.44	✓



DM 24

HOW TO ORDER

p. 39

INSTALLATION GUIDELINE

p. 205

Il nuovo codice sarà fornito solo ad esaurimento del vecchio - The new code will be supplied only when the old will be out of stock - Der neue Kode wird nur angegeben, wenn der alte nicht mehr lieferbar ist - Le nouveau code sera fourni uniquement lorsque le vieux stock sera écolulé - El nuevo código será suministrado sólo cuando se agoten las existencias del antiguo - O novo código irá ser fornecido apenas quando o antigo esgotar stock

ACTIVE SAFETY



OSAS



USAS



OPAS

* $F_{1i} =$

Isothermal end force at 100% Cu



p. 16

** $F_{1p} =$

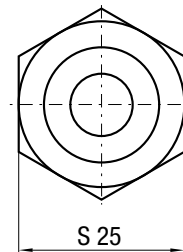
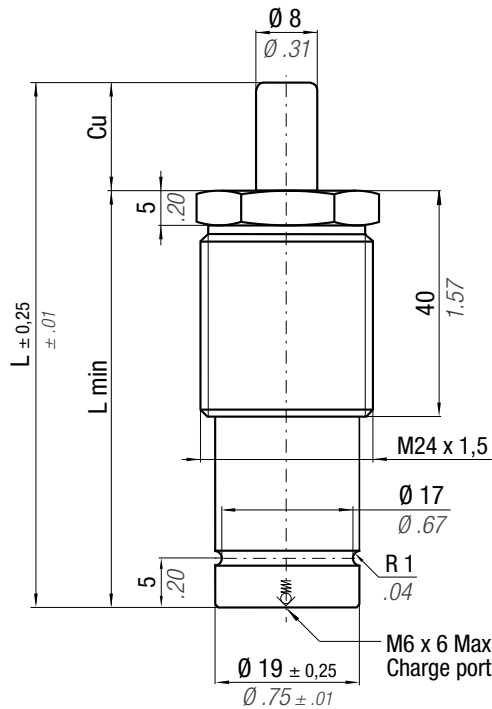
Polytropic end force at 100% Cu



Collegabile con tubi - Linkable with hoses
Anschlussfähig mit Leitungen
Connectable with tubes - Connectable with mangueras
Acompláveis com tubos

Micro 32°

Force color code	P		F ₀	
	bar	psi	Initial force ± 5% at +20°C	+68°F
			daN	lb
OR	10	145	5	11
PR	20	290	10	22
GR	60	870	30	67
BU	100	1450	50	112
RD	140	2030	70	157
YW	180	2610	90	202
BK	10-180	145-2610	5-90	11-202

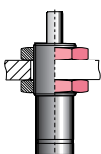


Senza riserva corsa
Without reserve of stroke
Ohne Hubreserve
Sans course de réserve
Sin margen de Carrera
Sem reserva de curso



NON superare 90% Cu
DO NOT exceed 90% Cu
NICHT überschreiten die 90% Cu
NE PAS dépasser 90% Cu
NO superar el 90% Cu
NÃO se excedam os 90% Cu

N ₂		0 - 80 °C 32 - 176 °F	ΔP ± 0,33 %/°C	P max 180 bar 2610 psi	P min 10 bar 145 psi	S 0,50 cm ² 0,078 in ²	SPM ~ 100 - 150 (at 20°C)	Max Speed 1,8 m/s 70,8 in/s	Maintenance kit Disposable
CODE PHASING OUT from 05/2019	NEW	Cu	L	L min	F _{1i} *	F _{1p} **	V ₀	PED 2014/68/EU	
M90-007-A-...-TEM	M90-007-B-...-TEM	7 0.28	56 2.20	49 1.93	1,21 x F ₀	1,39 x F ₀	2,3 0.14	0,07 0.15	✓
M90-010-A-...-TEM	M90-010-B-...-TEM	10 0.39	62 2.44	52 2.05	1,25 x F ₀	1,44 x F ₀	2,9 0.18	0,07 0.15	✓
M90-013-A-...-TEM	M90-013-B-...-TEM	12,7 0.50	67,4 2.65	54,7 2.15	1,27 x F ₀	1,48 x F ₀	3,4 0.21	0,08 0.18	✓
M90-015-A-...-TEM	M90-015-B-...-TEM	15 0.59	72 2.83	57 2.24	1,28 x F ₀	1,50 x F ₀	3,9 0.24	0,08 0.18	✓
M90-025-A-...-TEM	M90-025-B-...-TEM	25 0.98	92 3.62	67 2.64	1,32 x F ₀	1,57 x F ₀	5,8 0.35	0,09 0.20	✓
M90-038-A-...-TEM	M90-038-B-...-TEM	38,1 1.50	118,2 4.65	80,1 3.15	1,35 x F ₀	1,60 x F ₀	8,4 0.51	0,11 0.24	✓
M90-050-A-...-TEM	M90-050-B-...-TEM	50 1.97	142 5.59	92 3.62	1,36 x F ₀	1,62 x F ₀	10,8 0.66	0,12 0.26	✓
M90-063-A-...-TEM	M90-063-B-...-TEM	63,5 2.50	172 6.77	108,5 4.27	1,36 x F ₀	1,62 x F ₀	13,7 0.84	0,14 0.31	✓
M90-080-A-...-TEM	M90-080-B-...-TEM	80 3.15	205 8.07	125 4.92	1,37 x F ₀	1,64 x F ₀	17 1.04	0,15 0.33	✓
M90-100-A-...-TEM	M90-100-B-...-TEM	100 3.94	245 9.65	145 5.71	1,37 x F ₀	1,65 x F ₀	20,9 1.28	0,17 0.37	✓
M90-125-A-...-TEM	M90-125-B-...-TEM	125 4.92	295 11.61	170 6.69	1,38 x F ₀	1,66 x F ₀	25,8 1.57	0,20 0.44	✓



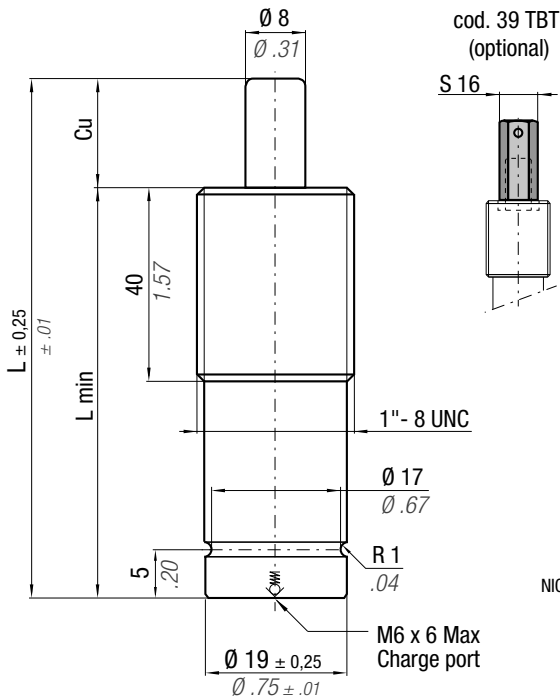
DM 24

HOW TO ORDER

p. 39

INSTALLATION GUIDELINE

p. 205



cod. 39 TBT (optional)

S 16

S 16

Senza riserva corsa
Without reserve of stroke
Ohne Hubreserve
Sans course de réserve
Sin margen de Carrera
Sem reserva de curso

NON superare 90% Cu
DO NOT exceed 90% Cu
NICHT überschreiten die 90% Cu
NE PAS dépasser 90% Cu
NO superar el 90% Cu
NÃO se excedam os 90% Cu

Il nuovo codice sarà fornito solo ad esaurimento del vecchio - The new code will be supplied only when the old will be out of stock - Der neue Kode wird nur angegeben, wenn der alte nicht mehr lieferbar ist - Le nouveau code sera fourni uniquement lorsque le vieux stock sera écoulé - El nuevo código será suministrado sólo cuando se agoten las existencias del antiguo - O novo código irá ser fornecido apenas quando o antigo esgotar stock

* $F_{1i} =$ Isothermal end force at 100% Cu p. 16 ** $F_{1p} =$ Polyphasic end force at 100% Cu

Collegabile con tubi - Linkable with hoses
Anschlussfähig mit Leitungen
Connectable avec tubes - Connectable con mangueras
Acompláveis com tubos

Micro 32°

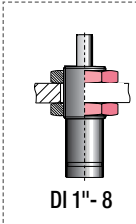
Force color code	P		F ₀ Initial force ± 5% at +20°C +68°F	
	bar	psi	daN	lb
OR	10	145	5	11
PR	20	290	10	22
GR	60	870	30	67
BU	100	1450	50	112
RD	140	2030	70	157
YW	180	2610	90	202
BK	10-180	145-2610	5-90	11-202

ACTIVE SAFETY



N ₂	0 - 80 °C 32 - 176 °F	ΔP ± 0,33 %/°C	P max 180 bar 2610 psi	P min 10 bar 145 psi	S 0,50 cm ² 0.078 in ²	SPM ~ 100 - 150 (at 20°C)	Max Speed 1,8 m/s 70.8 in/s	Maintenance kit Disposable
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CODE PHASING OUT from 05/2019	NEW	Cu		L		L min		F _{1i} * End force *		F _{1p} ** End force **		V ₀		PED 2014/68/EU		
		mm	inch	mm	inch	mm	inch	daN	lb	daN	lb	cm ³	in ³	~Kg	~lb	
M90-007-A-...-TBI	M90-007-B-...-TBI	7	0.28	56	2.20	49	1.93	1,21 x F ₀		1,39 x F ₀		2,3	0.14	0,07	0.15	✓
M90-010-A-...-TBI	M90-010-B-...-TBI	10	0.39	62	2.44	52	2.05	1,25 x F ₀		1,44 x F ₀		2,9	0.18	0,07	0.15	✓
M90-013-A-...-TBI	M90-013-B-...-TBI	12,7	0.50	67,4	2.65	54,7	2.15	1,27 x F ₀		1,48 x F ₀		3,4	0.21	0,08	0.18	✓
M90-015-A-...-TBI	M90-015-B-...-TBI	15	0.59	72	2.83	57	2.24	1,28 x F ₀		1,50 x F ₀		3,9	0.24	0,08	0.18	✓
M90-025-A-...-TBI	M90-025-B-...-TBI	25	0.98	92	3.62	67	2.64	1,32 x F ₀		1,57 x F ₀		5,8	0.35	0,09	0.20	✓
M90-038-A-...-TBI	M90-038-B-...-TBI	38,1	1.50	118,2	4.65	80,1	3.15	1,35 x F ₀		1,60 x F ₀		8,4	0.51	0,11	0.24	✓
M90-050-A-...-TBI	M90-050-B-...-TBI	50	1.97	142	5.59	92	3.62	1,36 x F ₀		1,62 x F ₀		10,8	0.66	0,12	0.26	✓
M90-063-A-...-TBI	M90-063-B-...-TBI	63,5	2.50	172	6.77	108,5	4.27	1,36 x F ₀		1,62 x F ₀		13,7	0.84	0,14	0.31	✓
M90-080-A-...-TBI	M90-080-B-...-TBI	80	3.15	205	8.07	125	4.92	1,37 x F ₀		1,64 x F ₀		17	1.04	0,15	0.33	✓
M90-100-A-...-TBI	M90-100-B-...-TBI	100	3.94	245	9.65	145	5.71	1,37 x F ₀		1,65 x F ₀		20,9	1.28	0,17	0.37	✓
M90-125-A-...-TBI	M90-125-B-...-TBI	125	4.92	295	11.61	170	6.69	1,38 x F ₀		1,66 x F ₀		25,8	1.57	0,20	0.44	✓



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ISO 11901 - 1 B8 3180 220 000 002(MB)	VDI 3003 - Blatt 2 K32D2-2400-50 (Nissan)	B2 4007 (BMW) E24.54.815.G (PSA)	075.90.50 (FCA) 39D 878 (VW)
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ACTIVE SAFETY

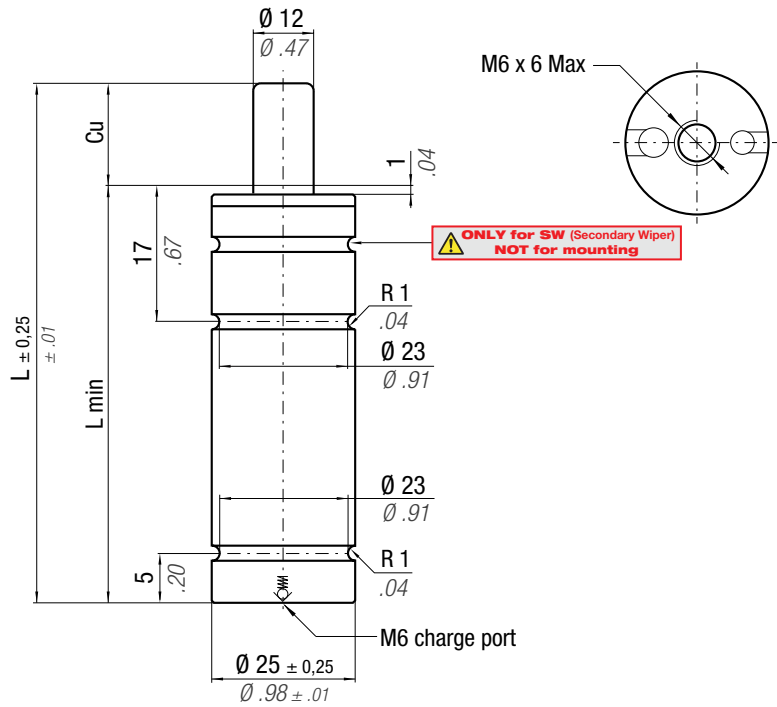


Il nuovo codice sarà fornito solo ad esaurimento del vecchio - The new code will be supplied only when the old will be out of stock - Der neue Kode wird nur angegeben, wenn der alte nicht mehr lieferbar ist - Le nouveau code sera fourni uniquement lorsque le vieux stock sera écoulé - El nuevo código será suministrado sólo cuando se agoten las existencias del antiguo - O novo código irá ser fornecido apenas quando o antigo esgotar stock

* F_{1i} = Isothermal end force at 100% Cu
 ** F_{1p} = Polytrophic end force at 100% Cu

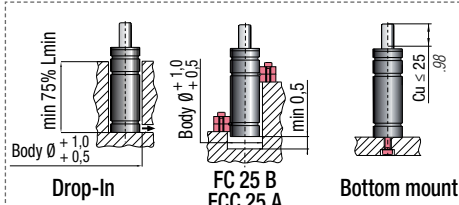
Collegabile con tubi - Linkable with hoses
 Anschlussfähig mit Leitungen
 Connectable avec tubes - Connectable con mangueras
 Acompláveis com tubos
 Micro 32°

Force color code	P		F0 Initial force ± 5% at +20°C +68°F	
	bar	psi	daN	lb
OR	15	218	17	38
PR	25	363	28	63
GR	45	653	50	112
BU	90	1305	100	225
RD	135	1958	150	337
YW	180	2610	200	450
BK	10-180	145-2610	11-200	25-450



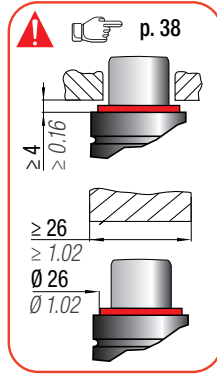
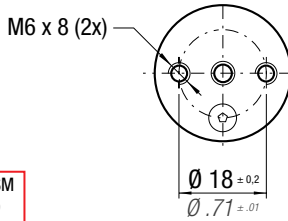
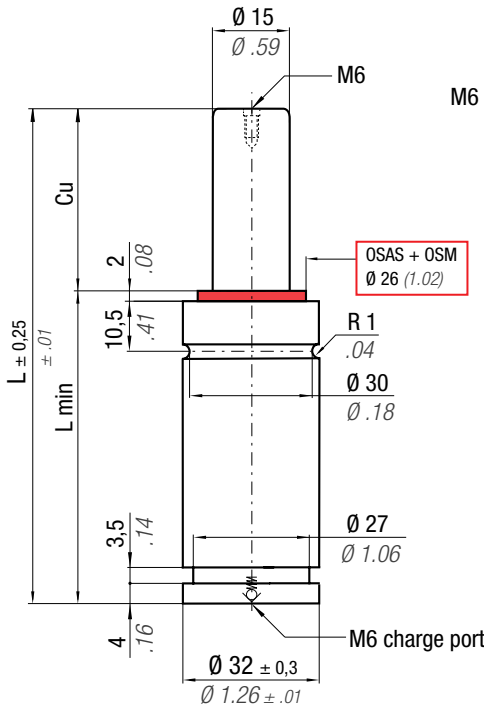
N ₂	0 - 80 °C 32 - 176 °F	ΔP ± 0,33 %/°C	P max 180 bar 2610 psi	P min 10 bar 145 psi	S 1,13 cm ² 0.175 in ²	SPM ~ 50 - 80 (at 20°C)	Max Speed 1,8 m/s 70.8 in/s	Maintenance kit Disposable
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CODE PHASING OUT from 05/2019	NEW	Cu		L		L min		F _{1i} * End force *		F _{1p} ** End force **		Vo		PED 2014/68/EU
		mm	inch	mm	inch	mm	inch	daN	lb	daN	lb	cm ³	in ³	
M200 - 007 - A - ...	M200 - 007 - B - ...	7	0.28	56	2.20	49	1.93	1,30 x F0	1,50 x F0	4	0.24	0,12	0.26	✓
M200 - 010 - A - ...	M200 - 010 - B - ...	10	0.39	62	2.44	52	2.05	1,34 x F0	1,57 x F0	5,2	0.32	0,13	0.29	✓
M200 - 013 - A - ...	M200 - 013 - B - ...	12,7	0.50	67,4	2.65	54,7	2.15	1,37 x F0	1,62 x F0	6,2	0.38	0,13	0.29	✓
M200 - 015 - A - ...	M200 - 015 - B - ...	15	0.59	72	2.83	57	2.24	1,38 x F0	1,64 x F0	7	0.43	0,14	0.31	✓
M200 - 016 - A - ...	M200 - 016 - B - ...	16	0.63	74	2.91	58	2.28	1,39 x F0	1,65 x F0	7,4	0.45	0,14	0.31	✓
M200 - 025 - A - ...	M200 - 025 - B - ...	25	0.98	92	3.62	67	2.64	1,43 x F0	1,72 x F0	10,8	0.66	0,16	0.35	✓
M200 - 038 - A - ...	M200 - 038 - B - ...	38,1	1.50	118,2	4.65	80,1	3.15	1,46 x F0	1,77 x F0	15,7	0.96	0,19	0.42	✓
M200 - 050 - A - ...	M200 - 050 - B - ...	50	1.97	142	5.59	92	3.62	1,47 x F0	1,79 x F0	20,2	1.23	0,20	0.44	✓
M200 - 063 - A - ...	M200 - 063 - B - ...	63,5	2.50	172	6.77	108,5	4.27	1,48 x F0	1,81 x F0	25,2	1.54	0,23	0.51	✓
M200 - 080 - A - ...	M200 - 080 - B - ...	80	3.15	205	8.07	125	4.92	1,49 x F0	1,83 x F0	31,2	1.90	0,26	0.57	✓
M200 - 100 - A - ...	M200 - 100 - B - ...	100	3.94	245	9.65	145	5.71	1,50 x F0	1,83 x F0	38,7	2.36	0,30	0.66	✓
M200 - 125 - A - ...	M200 - 125 - B - ...	125	4.92	295	11.61	170	6.69	1,50 x F0	1,84 x F0	48,1	2.94	0,34	0.75	✓
-	M200 - 150 - B - ...	150	5.91	353	13.90	203	7.99	1,57 x F0	1,81 x F0	59	2.32	0,42	0.93	✓
-	M200 - 160 - B - ...	160	6.30	373	14.69	213	8.39	1,57 x F0	1,81 x F0	62,8	2.47	0,45	0.99	✓
-	M200 - 175 - B - ...	175	6.89	403	15.87	228	8.98	1,57 x F0	1,82 x F0	68,4	2.69	0,47	1.04	✓
-	M200 - 200 - B - ...	200	7.87	453	17.83	253	9.96	1,58 x F0	1,83 x F0	77,8	3.06	0,52	1.15	✓



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OSAS + OSM = OVER STROKE ACTIVE SAFETY + OVER STROKE MARKER

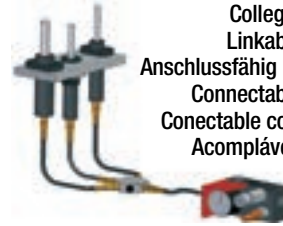
* $F_{1i} =$

Isothermal end force at 100% Cu

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** $F_{1p} =$

Polytropic end force at 100% Cu



Collegabile con tubi
Linkable with hoses
Anschlussfähig mit Leitungen
Connectable avec tubes
Conectable con mangueras
Acompláveis com tubos

Micro 32°

Force color code	P		Fo	
	bar	psi	Initial force ± 5% at +20°C +68°F	
			daN	lb
GR	45	653	80	180
BU	90	1305	160	360
RD	135	1958	240	540
YW	180	2610	320	719
BK	10-180	145-2610	18-320	40-719

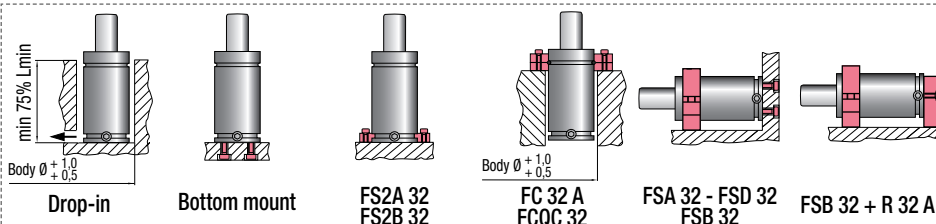


ACTIVE SAFETY



CODE PHASING OUT from 04/2021	NEW	ΔP		P_{max}	P_{min}	S	SPM	$Max\ Speed$	$Maintenance\ kit$					
		bar	psi	180 bar 2610 psi	10 bar 145 psi	1,77 cm ² 0.274 in ²	~ 50 - 80 (at 20°C)	1,8 m/s 70.8 in/s	39BMMCI32A					
Cu	L	L min	$F_{1i} *$		$F_{1p} **$		V_0		PED					
			mm	inch	mm	inch	mm	inch	daN	lb	daN	lb	cm ³	in ³
M300-007-A-...	♦M300-007-B-...	7	0.28	56	2.20	49	1.93	1,20 x F0	1,35 x F0	8,3	0.51	0,21	0.01	✓
M300-010-A-...	♦M300-010-B-...	10	0.39	62	2.44	52	2.05	1,24 x F0	1,41 x F0	10,1	0.62	0,22	0.01	✓
M300-013-A-...	M300-013-B-...	12,7	0.50	67,4	2.65	54,7	2.15	1,27 x F0	1,46 x F0	11,7	0.71	0,23	0.01	✓
M300-015-A-...	M300-015-B-...	15	0.59	72	2.83	57	2.24	1,29 x F0	1,49 x F0	13,1	0.80	0,24	0.01	✓
M300-025-A-...	M300-025-B-...	25	0.98	92	3.62	67	2.64	1,35 x F0	1,58 x F0	19,1	1.17	0,26	0.01	✓
M300-038-A-...	M300-038-B-...	38	1.50	118	4.65	80	3.15	1,38 x F0	1,64 x F0	26,9	1.64	0,30	0.01	✓
M300-050-A-...	M300-050-B-...	50	1.97	142	5.59	92	3.62	1,40 x F0	1,67 x F0	34,1	2.08	0,34	0.01	✓
M300-063-A-...	M300-063-B-...	63,5	2.50	172	6.77	108,5	4.27	1,40 x F0	1,66 x F0	43,8	2.67	0,39	0.02	✓
M300-080-A-...	M300-080-B-...	80	3.15	205	8.07	125	4.92	1,41 x F0	1,69 x F0	53,7	3.28	0,44	0.02	✓
M300-100-A-...	M300-100-B-...	100	3.94	245	9.65	145	5.71	1,43 x F0	1,71 x F0	65,8	4.02	0,50	0.02	✓
M300-125-A-...	M300-125-B-...	125	4.92	295	11.61	170	6.69	1,44 x F0	1,73 x F0	80,8	4.93	0,57	0.02	✓

♦ Disposable



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