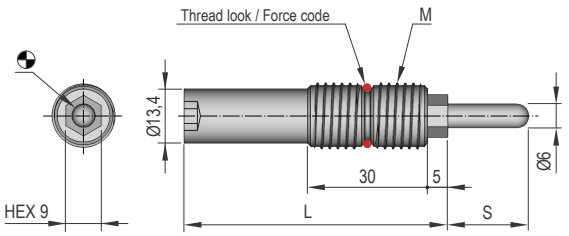

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SP1L

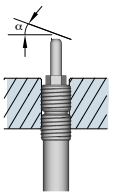
Standard spring load (Red)

Code	S mm	M	L mm	Preloading approx. (N)	Compressed approx. (N)
SP1L x 10	10	M16 x 1,5	60	4	13
SP1L x 15	15		60	10	40
SP1L x 20	20		80	7	34
SP1L x 30	30		80	7	45
SP1L x 30/1	30		120	18	40
SP1L x 40	40		150	13	37
SP1L x 50	50		150	13	43
SP1L x 60	60		150	13	49
SP1L x 70	70		200	10	40
SP1L x 80	80		200	10	45

SP1F

Heavy spring load (Yellow)

Code	S mm	M	L mm	Preloading approx. (N)	Compressed approx. (N)
SP1F x 10	10	M16 x 1,5	60	13	45
SP1F x 15	15		60	15	56
SP1F x 20	20		80	15	75
SP1F x 20/1	20		80	34	172
SP1F x 30	30		120	20	80
SP1F x 30/1	30		150	56	132
SP1F x 40	40		150	56	158
SP1F x 50	50		200	19	100
SP1F x 60	60		200	19	116
SP1F x 70	70		200	19	132
SP1F x 80	80		200	25	100

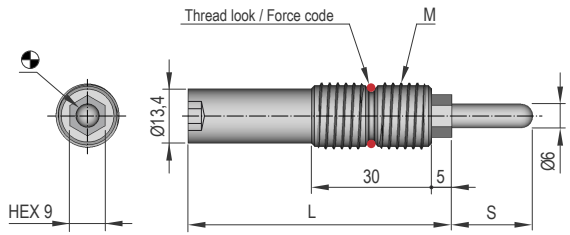


Stroke (s)	Max α°
10 to 20	20°
30 to 50	15°
60 to 80	10°

Max. stem speed	1,6 m/s
Maximum rate	60 - 120spm
Operating temperature	-10ºC - +80ºC
Operating average life	300.000cycles
Body: free cutting black oxide steel	
Bolt: free cutting steel, case-hardened	

SP-KEY





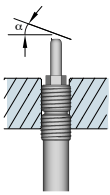


SP2L Standard spring load (Red)

Code	S mm	M	L mm	Preloading approx. (N)	Compressed approx. (N)
SP2L x 10	10	M16 x 2	60	4	13
SP2L x 15	15		60	10	40
SP2L x 20	20		80	7	34
SP2L x 30	30		80	7	45
SP2L x 30/1	30		120	18	40
SP2L x 40	40		150	13	37
SP2L x 50	50		150	13	43
SP2L x 60	60		150	13	49
SP2L x 70	70		200	10	40
SP2L x 80	80		200	10	45

SP2F Heavy spring load (Yellow)

Code	S mm	M	L mm	Preloading approx. (N)	Compressed approx. (N)
SP2F x 10	10	M16 x 2	60	13	45
SP2F x 15	15		60	15	56
SP2F x 20	20		80	15	75
SP2F x 20/1	20		80	34	172
SP2F x 30	30		120	20	80
SP2F x 30/1	30		150	56	132
SP2F x 40	40		150	56	158
SP2F x 50	50		200	19	100
SP2F x 60	60		200	19	116
SP2F x 70	70		200	19	132
SP2F x 80	80		200	25	100

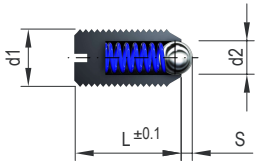


Stroke (s)	Max α°
10 to 20	20°
30 to 50	15°
60 to 80	10°

Max. stem speed	1,6 m/s
Maximum rate	60 - 120spm
Operating temperature	-10ºC - +80ºC
Operating average life	300.000cycles
Body: free cutting black oxide steel	
Bolt: free cutting steel, case-hardened	

SP-KEY







Material
Body: free cutting black oxide steel
Ball:stainless steel, hardened to 62Hrc

ER-20L

Standard spring load

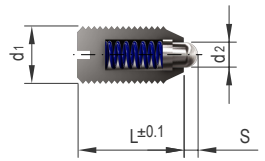
d1	d2 mm	L mm	S mm
M4	2,5	9	0,8
M5	3	12	0,9
M6	3,5	14	1
M8	4,5	16	1,5
M10	6	19	2
M12	8	22	2,5
M16	10	24	3,5
M20	12	30	4,5
M24	15	34	5,5

Code	Spring force	
	Initial (N)	Final (N)
ER-20L-M4	6	12
ER-20L-M5	7	13
ER-20L-M6	9	15
ER-20L-M8	20	35
ER-20L-M10	25	45
ER-20L-M12	35	60
ER-20L-M16	65	110
ER-20L-M20	80	120
ER-20L-M24	100	150

ER-20F

Heavy spring load

Code	Spring force	
	Initial (N)	Final (N)
-	-	-
ER-20F-M5	13	30
ER-20F-M6	40	40
ER-20F-M8	40	60
ER-20F-M10	60	90
ER-20F-M12	75	115
ER-20F-M16	115	190
ER-20F-M20	115	210
ER-20F-M24	125	240





Material
Body: free cutting black oxide steel
Bolt: free cutting hardened, black oxide steel

ER-21L

Standard spring load

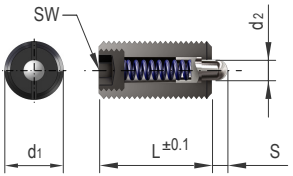
d1	d2 mm	L mm	S mm
M4	1,8	9	1,5
M5	2,4	12	2
M6	2,7	14	2
M8	4	16	2
M10	4,5	19	2,5
M12	6	22	3,5
M16	8,5	24	4,5
M20	10	30	6,5
M24	13	34	8

Code	Spring force	
	Initial (N)	Final (N)
ER-21L-M4	6	16
ER-21L-M5	6	17
ER-21L-M6	7	18
ER-21L-M8	20	35
ER-21L-M10	20	45
ER-21L-M12	25	60
ER-21L-M16	50	95
ER-21L-M20	80	140
ER-21L-M24	80	160

ER-21F

Heavy spring load

Code	Spring force	
	Initial (N)	Final (N)
-	-	-
-	-	-
ER-21F-M6	13	40
ER-21F-M8	40	70
ER-21F-M10	40	80
ER-21F-M12	60	115
ER-21F-M16	60	150
ER-21F-M20	100	200
ER-21F-M24	110	230





Material
Body: free cutting black oxide steel
Bolt: free cutting, hardened, black oxide steel

ER-40L

Standard spring load

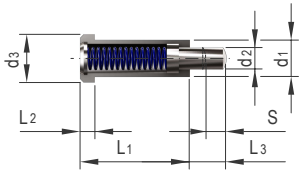
d1	d2 mm	L mm	S mm	SW mm
M4	1,5	15	1,5	1,3
M5	2,4	18	2,3	1,5
M6	2,7	20	2,5	2
M8	3,5	22	3	2,5
M10	4	22	3	3
M12	6	28	4	4
M16	7,5	32	5	5
M20	10	40	7	6

Code	Spring force	
	Initial (N)	Final (N)
ER-40L-M4	5	15
ER-40L-M5	7	20
ER-40L-M6	7	20
ER-40L-M8	9	35
ER-40L-M10	9	35
ER-40L-M12	15	55
ER-40L-M16	45	100
ER-40L-M20	70	140

ER-40F

Heavy spring load

Code	Spring force	
	Initial (N)	Final (N)
-	-	-
ER-40F-M5	13	45
ER-40F-M6	18	50
ER-40F-M8	25	70
ER-40F-M10	25	70
ER-40F-M12	45	110
ER-40F-M16	60	160
ER-40F-M20	90	200

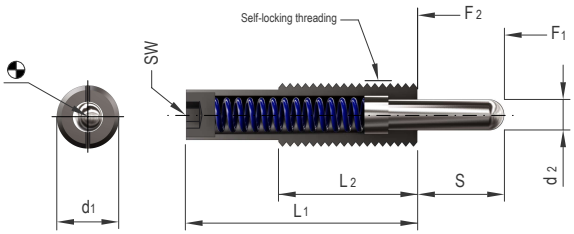




Material
Body: free cutting black oxide steel
Ball:stainless steel, hardened to 62Hrc

ER-60

Code	d_1 mm	d_2 mm	d_3 mm	L_1 mm	L_2 mm	L3 mm	S mm	Spring force Initial (N)	Spring force Final (N)
ER-60-06	6	2,6	8	20	3,2	6	3,5	10	22
ER-60-08	8	3,8	10	24	3,2	8	4,5	30	90
ER-60-10	10	5,9	13	30	4	10	5,5	42	110
ER-60-12	12	7,8	16	36	5	12	6,5	50	130





Material
Body: free cutting black oxide steel
Bolt: free cutting steel, case-hardened

ER-L Standard spring load

Code	d_1	S mm	d_2 mm	L_1 mm	L_2 mm	SW mm	Spring force F_1 Initial (N)	Spring force F_2 Final (N)
ER 12-10L	M12 x 1,75	10	5,5	43	35	4	4	20
ER 16-10LS	M16 x 2	10	8	50	35	5	10	50
ER 16-10L	M16 x 2	10	8	60	35	5	13	40
ER 16-15L	M16 x 2	15	8	60	35	5	10	40
ER 16-20L	M16 x 2	20	8	60	35	5	13	40
ER 16-30L	M16 x 2	30	8	125	35	5	18	40
ER 16-40L	M16 x 2	40	8	125	35	5	18	40
ER 16-50L	M16 x 2	50	8	155	35	5	20	50
ER 16-60L	M16 x 2	60	8	159	35	5	18	40
ER 16-70L	M16 x 2	70	8	185	35	5	20	50
ER 16-80L	M16 x 2	80	8	185	35	5	20	50
ER 24-15L	M24 x 3	15	10	60	45	8	20	100
ER 30-20L	M30 x 3,5	20	15	70	45	12	30	150

ER-H Heavy spring load

Code	d_1	S mm	d_2 mm	L_1 mm	L_2 mm	SW mm	Spring force F_1 Initial (N)	Spring force F_2 Final (N)
ER 12-10H	M12 x 1,75	10	5,5	43	35	4	7	40
ER 16-10HS	M16 x 2	10	8	50	35	5	20	100
ER 16-10H	M16 x 2	10	8	60	35	5	27	80
ER 16-15H	M16 x 2	15	8	60	35	5	15	80
ER 16-20H	M16 x 2	20	8	85	35	5	17	80
ER 16-30H	M16 x 2	30	8	125	35	5	20	80
ER 16-40H	M16 x 2	40	8	125	35	5	20	80
ER 16-50H	M16 x 2	50	8	155	35	5	30	100
ER 16-60H	M16 x 2	60	8	159	35	5	20	80
ER 16-70H	M16 x 2	70	8	185	35	5	30	150
ER 16-80H	M16 x 2	80	8	185	35	5	30	150
ER 24-15H	M24 x 3	15	10	60	45	8	40	200
ER 30-20H	M30 x 3,5	20	15	70	45	12	50	300