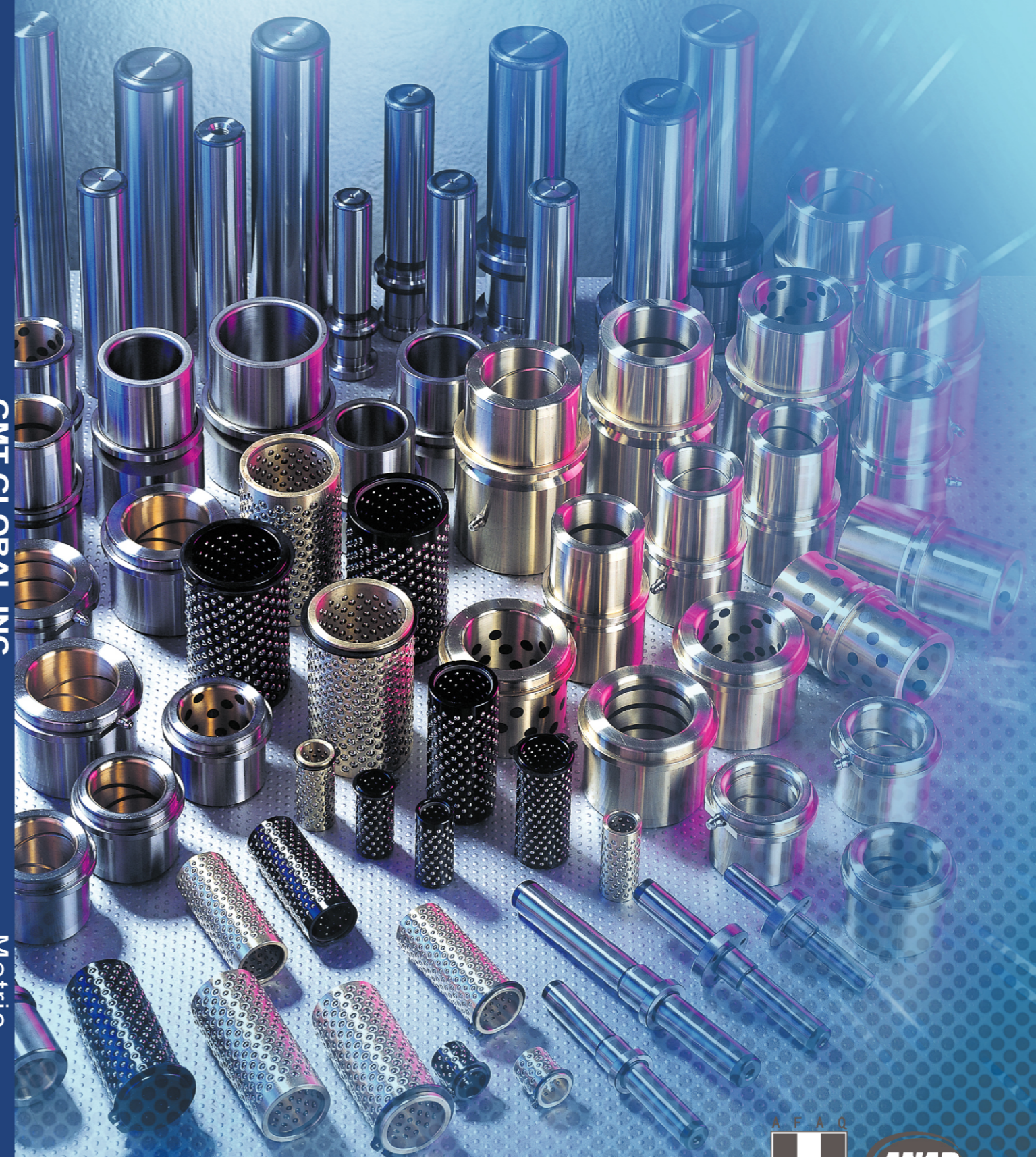


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ISO 9001:2000





Guide Post series.....	P.2 – P.26
Guide Bushing series .....	P.27 – P.40
Guide Ball Cage series .....	P.41 – P.51
Post,Bushing and Ball Cage selection data .....	P.52 – P.56
(For PAM-GS/BS type,PBM-GS/BS type, BAM,BQM,BBM,CEM,CFM assembly reference only.)	
Assembly Details .....	P.57 – P.79
Technical Information.....	P.80 – P.84



<b>Material:</b>	Steel DIN 1.2067/1.3505 ISO B1/100Cr6 AISI/SAE 52100 JIS SUJ 2
<b>Hardness:</b>	60-64 HRC
<b>Finish:</b>	Precision ground
<b>Assembly:</b>	Hole bore ISO N5
<b>Cylindrical Tolerance</b>	Ø3 – Ø10: 0.001



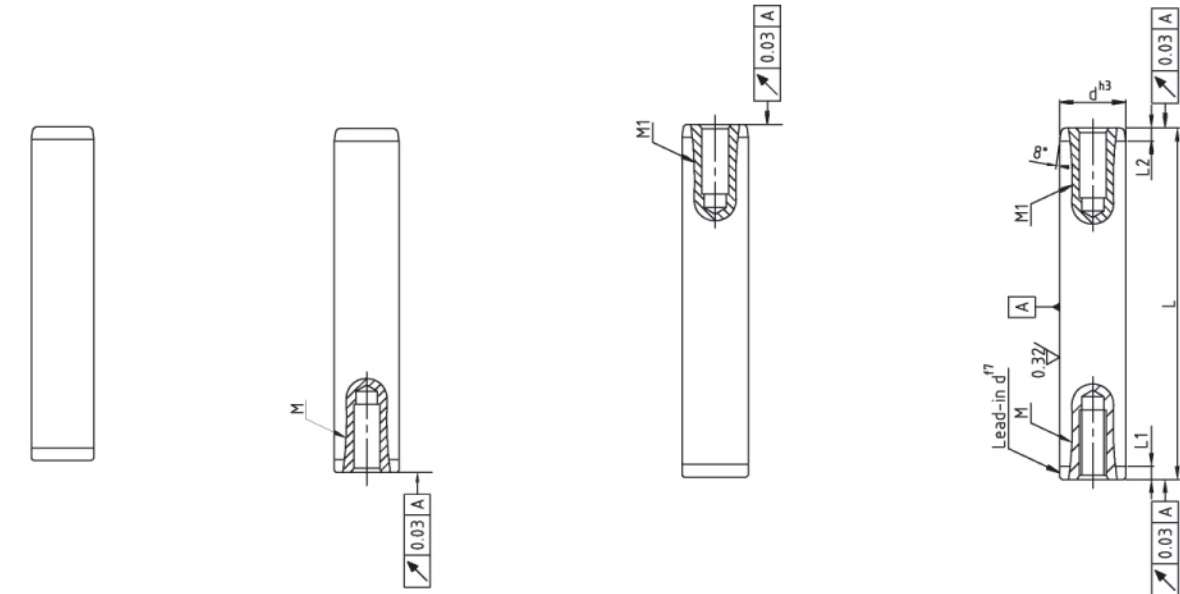
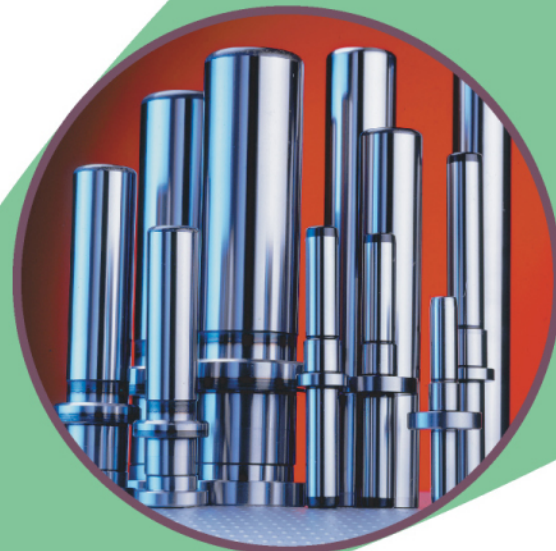
Thread data		
d	M	M1
3	-	-
4	-	-
5	M3	M3
6	M3	M3
8	M4	M4
10	M5	M5

NT: No Thread

PI: Press-in Side

GS: Guide Side

BS: Both Sides



## Guide Post Series

Sizes													
Diameter		Length			Part Number		Diameter		Length			Part Number	
d		L1	L2	L			d		L1	L2	L		
3		2	2	40	PAM-03-040xx		6 / 8	2	2	80	PAM-06-080xx	PAM-08-080xx	
				50	PAM-03-050xx						100	PAM-06-100xx	PAM-08-100xx
				60	PAM-03-060xx						120	PAM-06-120xx	PAM-08-120xx
				80	PAM-03-080xx						140	PAM-06-140xx	PAM-08-140xx
4 / 5		2	2	40	PAM-04-040xx	PAM-05-040xx	10	3	3	50	PAM-06-160xx	PAM-08-160xx	
				50	PAM-04-050xx	PAM-05-050xx					60	PAM-10-050xx	
				60	PAM-04-060xx	PAM-05-060xx					60	PAM-10-060xx	
				80	PAM-04-080xx	PAM-05-080xx					80	PAM-10-080xx	
6 / 8		2	2	40	PAM-04-100xx	PAM-05-100xx	100			100	PAM-10-100xx		
				50	PAM-06-040xx	PAM-08-040xx					120	PAM-10-120xx	
				50	PAM-06-050xx	PAM-08-050xx					140	PAM-10-140xx	
				60	PAM-06-060xx	PAM-08-060xx					160	PAM-10-160xx	

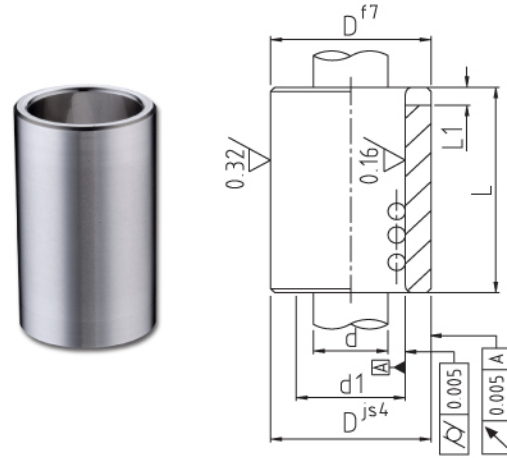
Order note: Please add the appropriate suffix to designate desired thread type.

NT = No thread  
PI = Press-in side  
GS = Guide side  
BS = Both sides

Example: PAM-06-100PI = Diameter 06, Length 100, Press-in side threads



<b>Material:</b>	Steel DIN 1.2067/1.3505 ISO B1/100Cr6 AISI/SAE 52100 JIS SUJ2
<b>Hardness:</b>	60-64 HRC
<b>Finish:</b>	Precision ground
<b>Assembly:</b>	Hole bore ISO H5

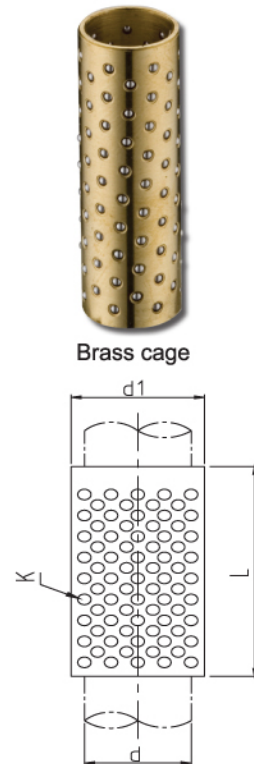


Sizes											
Diameter			Length		Part Number	Diameter			Length		Part Number
d	d1	D	L1	L		d	d1	D	L1	L	
3	5	8	2	10	BAM-03-010	6	8	10	2	20	BAM-06-020
				15					25	BAM-06-025	
				20					30	BAM-06-030	
4	6	8	2	15	BAM-04-015	8	10	18	2	20	BAM-08-020
				20					25	BAM-08-025	
				25					30	BAM-08-030	
				30					40	BAM-08-040	
5	7	10	2	15	BAM-05-015	10	14	22	3	20	BAM-10-020
				20					25	BAM-10-025	
				25					30	BAM-10-030	
6	8	10	2	15	BAM-06-015				40	BAM-10-040	

Example: BAM-06-020=Diameter 06, Length 20

Sizes											
Diameter			Length		Part Number	Diameter			Length		Part Number
d	d1	K	L	d		d1	K	L			
3	5	1	10		CAM-03-010BR	6	8	1	20		CAM-06-020BR
			15		CAM-03-015BR				25		CAM-06-025BR
			20		CAM-03-020BR				30		CAM-06-030BR
4	6	1	10		CAM-04-010BR	8	10	1	15		CAM-08-015BR
			15		CAM-04-015BR				20		CAM-08-020BR
			20		CAM-04-020BR				25		CAM-08-025BR
			25		CAM-04-025BR				30		CAM-08-030BR
5	7	1	10		CAM-05-010BR	10	14	2	20		CAM-10-020BR
			15		CAM-05-015BR				25		CAM-10-025BR
			20		CAM-05-020BR				30		CAM-10-030BR
			25		CAM-05-025BR				40		CAM-10-040BR
			30		CAM-05-030BR				50		CAM-10-050BR
6	8	1	10		CAM-06-010BR						
			15		CAM-06-015BR						

Example: CAM-06-020BR=Diameter 06, Length 20, Brass cage



<b>Material:</b>	Steel DIN 1.2067/1.3505 ISO B1/100Cr6 AISI/SAE 52100 JIS SUJ 2
<b>Hardness:</b>	60-64 HRC
<b>Finish:</b>	Precision ground
<b>Assembly:</b>	Hole bore ISO N5
<b>Cylindrical Tolerance:</b>	Ø11 - 16: 0.001 Ø19 - 25: 0.002 Ø30 - 80: 0.003



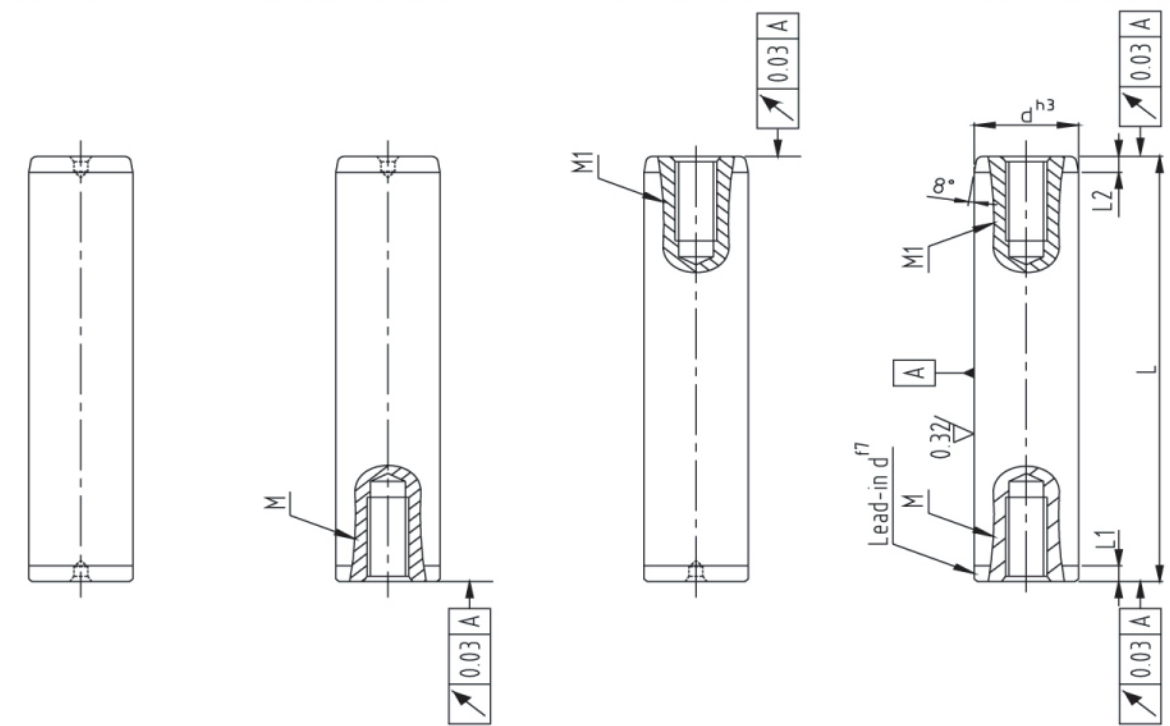
Thread data		
d	M	M1
11 - 16	M6	M6
19 - 25	M8	M8
30 - 50	M10	M10
60 - 63	M12	M12
80	M12	M12

NT: No Thread

PI: Press-in Side

GS: Guide Side

BS: Both Sides



Sizes												
Diameter		Length			Part Number		Diameter		Length		Part Number	
d	L1	L2	L			d	L1	L2	L			
11 / 12	3	3	60	PAM-11-060xx	PAM-12-060xx	15 / 16	4	4	112	PAM-15-112xx	PAM-16-112xx	
				PAM-11-080xx	PAM-12-080xx					PAM-15-125xx	PAM-16-125xx	
				PAM-11-100xx	PAM-12-100xx					PAM-15-140xx	PAM-16-140xx	
				PAM-11-112xx	PAM-12-112xx					PAM-15-160xx	PAM-16-160xx	
				PAM-11-125xx	PAM-12-125xx					PAM-15-180xx	PAM-16-180xx	
15 / 16	4	4	90	PAM-11-140xx	PAM-12-140xx	19 / 20	4	4	100	PAM-15-200xx	PAM-16-200xx	
				PAM-11-160xx	PAM-12-160xx					PAM-15-090xx	PAM-16-090xx	
				PAM-11-100xx	PAM-12-100xx					PAM-15-100xx	PAM-16-100xx	



Sizes															
Diameter			Length			Part Number		Diameter			Length			Part Number	
d	L1	L2	L			d	L1	L2	L						
19 / 20	4	4	140	PAM-19-140xx	PAM-20-140xx	38 / 40	6	6	280	PAM-38-280xx	PAM-40-280xx				
			160	PAM-19-160xx	PAM-20-160xx				315	PAM-38-315xx	PAM-40-315xx				
			180	PAM-19-180xx	PAM-20-180xx				355	PAM-38-355xx	PAM-40-355xx				
			200	PAM-19-200xx	PAM-20-200xx				400	PAM-38-400xx	PAM-40-400xx				
			224	PAM-19-224xx	PAM-20-224xx				450	PAM-38-450xx	PAM-40-450xx				
			250	PAM-19-250xx	PAM-20-250xx				500	PAM-38-500xx	PAM-40-500xx				
			280	PAM-19-280xx	PAM-20-280xx				48 / 50	6	8	180	PAM-48-180xx	PAM-50-180xx	
24 / 25	5	5	100	PAM-24-100xx	PAM-25-100xx	60 / 63	8	8	200	PAM-48-200xx	PAM-50-200xx				
			112	PAM-24-112xx	PAM-25-112xx				224	PAM-48-224xx	PAM-50-224xx				
			125	PAM-24-125xx	PAM-25-125xx				250	PAM-48-250xx	PAM-50-250xx				
			140	PAM-24-140xx	PAM-25-140xx				280	PAM-48-280xx	PAM-50-280xx				
			160	PAM-24-160xx	PAM-25-160xx				315	PAM-48-315xx	PAM-50-315xx				
			180	PAM-24-180xx	PAM-25-180xx				355	PAM-48-355xx	PAM-50-355xx				
			200	PAM-24-200xx	PAM-25-200xx				400	PAM-48-400xx	PAM-50-400xx				
			224	PAM-24-224xx	PAM-25-224xx				450	PAM-48-450xx	PAM-50-450xx				
			250	PAM-24-250xx	PAM-25-250xx				500	PAM-48-500xx	PAM-50-500xx				
			280	PAM-24-280xx	PAM-25-280xx				550	PAM-48-550xx	PAM-50-550xx				
			315	PAM-24-315xx	PAM-25-315xx				600	PAM-48-600xx	PAM-50-600xx				
30 / 32	6	6	125	PAM-30-125xx	PAM-32-125xx	80	8	8	250	PAM-60-250xx	PAM-63-250xx				
			140	PAM-30-140xx	PAM-32-140xx				280	PAM-60-280xx	PAM-63-280xx				
			160	PAM-30-160xx	PAM-32-160xx				315	PAM-60-315xx	PAM-63-315xx				
			180	PAM-30-180xx	PAM-32-180xx				355	PAM-60-355xx	PAM-63-355xx				
			200	PAM-30-200xx	PAM-32-200xx				400	PAM-60-400xx	PAM-63-400xx				
			224	PAM-30-224xx	PAM-32-224xx				450	PAM-60-450xx	PAM-63-450xx				
			250	PAM-30-250xx	PAM-32-250xx				500	PAM-60-500xx	PAM-63-500xx				
			280	PAM-30-280xx	PAM-32-280xx				550	PAM-60-550xx	PAM-63-550xx				
			315	PAM-30-315xx	PAM-32-315xx				600	PAM-60-600xx	PAM-63-600xx				
			355	PAM-30-355xx	PAM-32-355xx				280	PAM-80-280xx					
			400	PAM-30-400xx	PAM-32-400xx				315	PAM-80-315xx					
38 / 40	6	6	160	PAM-38-160xx	PAM-40-160xx				450	PAM-80-450xx					
			180	PAM-38-180xx	PAM-40-180xx				500	PAM-80-500xx					
			200	PAM-38-200xx	PAM-40-200xx				550	PAM-80-550xx					
			224	PAM-38-224xx	PAM-40-224xx				600	PAM-80-600xx					
			250	PAM-38-250xx	PAM-40-250xx										

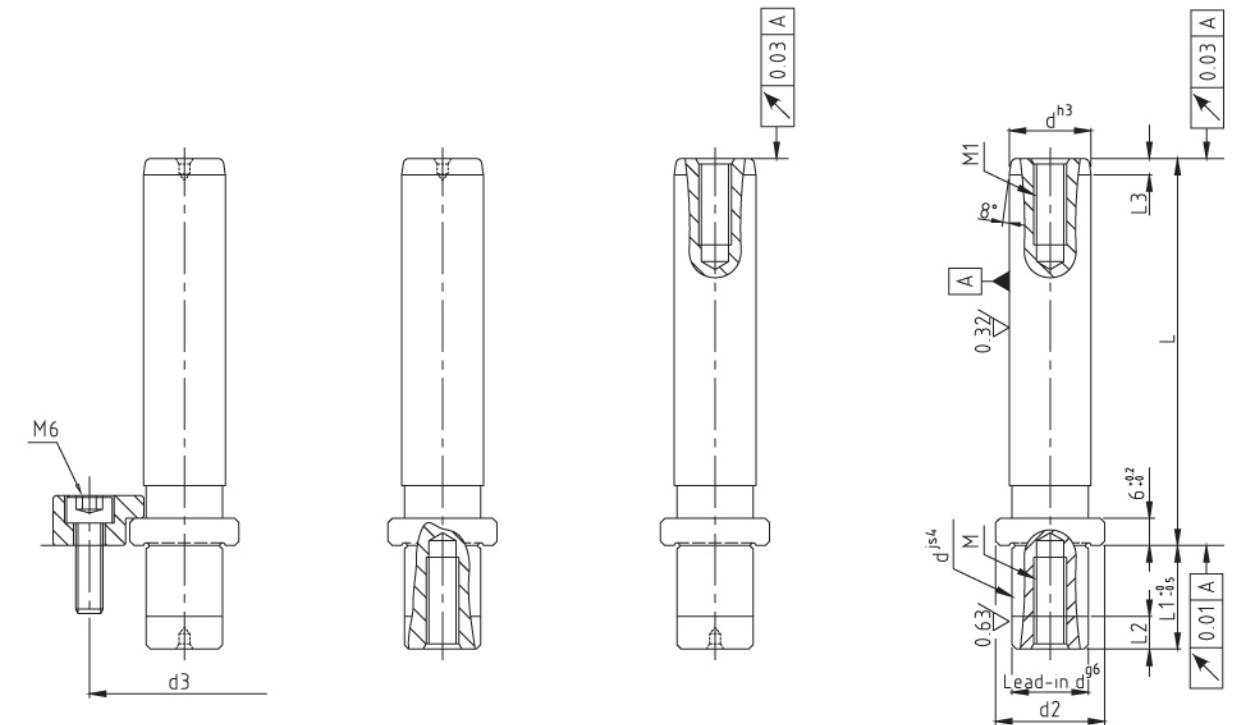
Order note: Please add the appropriate suffix to designate desired thread type.  
 NT = No thread (For assembly details, please refer to page 58, 59, 66)  
 PI = Press-in side (For assembly details, please refer to page 61, 62)  
 GS = Guide side (For assembly details, please refer to page 73, 74)  
 BS = Both sides (For assembly details, please refer to page 76)

Example: PAM-40-200NT = Diameter 40, Length 200, None thread

<b>Material:</b>	Steel DIN 1.2067/1.3505 ISO B1/100Cr6 AISI/SAE 52100 JIS SUJ 2
<b>Hardness:</b>	60-64 HRC
<b>Finish:</b>	Precision ground
<b>Assembly:</b>	Hole bore ISO K5
<b>Cylindrical Tolerance:</b>	Ø11 - 16: 0.001 Ø19 - 25: 0.002 Ø30 - 80: 0.003



NT: No Thread    PI: Press-in Side    GS: Guide Side    BS: Both Sides



Sizes									
Diameter		Thread		Length				Part Number	
d	d2	d3	M	M1	L1	L2	L3	L	
11 / 12	17	33	M6	M6	12	3	3	70	PBM-11-070xx
								80	PBM-11-080xx
								90	PBM-11-090xx
								100	PBM-11-100xx
								112	PBM-11-112xx



Sizes										
Diameter			Thread		Length				Part Number	
d	d2	d3	M	M1	L1	L2	L3	L		
11 / 12	17	33	M6	M6	12	3	3	125	PBM-11-125xx	PBM-12-125xx
15 / 16	22	38	M6	M6	16	3	4	80	PBM-15-080xx	PBM-16-080xx
								90	PBM-15-090xx	PBM-16-090xx
								100	PBM-15-100xx	PBM-16-100xx
								112	PBM-15-112xx	PBM-16-112xx
								125	PBM-15-125xx	PBM-16-125xx
								140	PBM-15-140xx	PBM-16-140xx
								160	PBM-15-160xx	PBM-16-160xx
								180	PBM-15-180xx	PBM-16-180xx
19 / 20	25	42	M8	M8	23	4	4	100	PBM-19-100xx	PBM-20-100xx
								112	PBM-19-112xx	PBM-20-112xx
								125	PBM-19-125xx	PBM-20-125xx
								140	PBM-19-140xx	PBM-20-140xx
								160	PBM-19-160xx	PBM-20-160xx
								180	PBM-19-180xx	PBM-20-180xx
								200	PBM-19-200xx	PBM-20-200xx
24 / 25	32	49	M8	M8	27	5	5	100	PBM-24-100xx	PBM-25-100xx
								112	PBM-24-112xx	PBM-25-112xx
								125	PBM-24-125xx	PBM-25-125xx
								140	PBM-24-140xx	PBM-25-140xx
								160	PBM-24-160xx	PBM-25-160xx
								180	PBM-24-180xx	PBM-25-180xx
								200	PBM-24-200xx	PBM-25-200xx
								224	PBM-24-224xx	PBM-25-224xx
								250	PBM-24-250xx	PBM-25-250xx
30 / 32	40	57	M10	M10	37	6	6	112	PBM-30-112xx	PBM-32-112xx
								125	PBM-30-125xx	PBM-32-125xx
								140	PBM-30-140xx	PBM-32-140xx
								160	PBM-30-160xx	PBM-32-160xx
								180	PBM-30-180xx	PBM-32-180xx
								200	PBM-30-200xx	PBM-32-200xx
								224	PBM-30-224xx	PBM-32-224xx
								250	PBM-30-250xx	PBM-32-250xx
								280	PBM-30-280xx	PBM-32-280xx
38 / 40	50	67	M10	M10	37	6	6	125	PBM-38-125xx	PBM-40-125xx
								140	PBM-38-140xx	PBM-40-140xx
								160	PBM-38-160xx	PBM-40-160xx
								180	PBM-38-180xx	PBM-40-180xx
								200	PBM-38-200xx	PBM-40-200xx
								224	PBM-38-224xx	PBM-40-224xx
								250	PBM-38-250xx	PBM-40-250xx
								280	PBM-38-280xx	PBM-40-280xx

Sizes										
Diameter			Thread		Length				Part Number	
d	d2	d3	M	M1	L1	L2	L3	L		
38 / 40	50	67	M10	M10	37	6	6	315	PBM-38-315xx	PBM-40-315xx
48 / 50	63	80	M10	M10	47	8	8	140	PBM-48-140xx	PBM-50-140xx
								160	PBM-48-160xx	PBM-50-160xx
								180	PBM-48-180xx	PBM-50-180xx
								200	PBM-48-200xx	PBM-50-200xx
								224	PBM-48-224xx	PBM-50-224xx
								250	PBM-48-250xx	PBM-50-250xx
								280	PBM-48-280xx	PBM-50-280xx
								315	PBM-48-315xx	PBM-50-315xx
								355	PBM-48-355xx	PBM-50-355xx
60 / 63	80	97	M12	M12	47	8	8	160	PBM-60-160xx	PBM-63-160xx
								180	PBM-60-180xx	PBM-63-180xx
								200	PBM-60-200xx	PBM-63-200xx
								224	PBM-60-224xx	PBM-63-224xx
								250	PBM-60-250xx	PBM-63-250xx
								280	PBM-60-280xx	PBM-63-280xx
								315	PBM-60-315xx	PBM-63-315xx
								355	PBM-60-355xx	PBM-63-355xx
80	100	117	M12	M12	60	8	8	250	PBM-80-250xx	
								280	PBM-80-280xx	
								315	PBM-80-315xx	
								355	PBM-80-355xx	
								400	PBM-80-400xx	

Order note: Please add the appropriate suffix to designate desired thread type.

NT: No thread (For assembly details, please refer to page 59, 60, 66)

PI = Press-in side (For assembly details, please refer to page 62, 63)

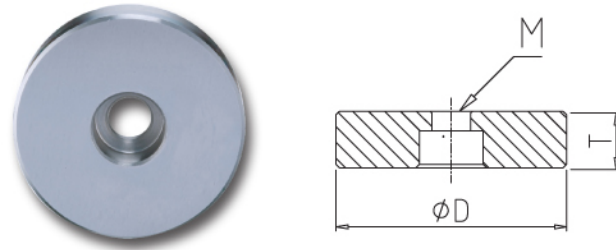
GS = Guide side (For assembly details, please refer to page 74, 75)

BS = Both sides (For assembly details, please refer to page 77)

Example: PBM-60-200GS = Diameter 60, Length 200, Guide side threads



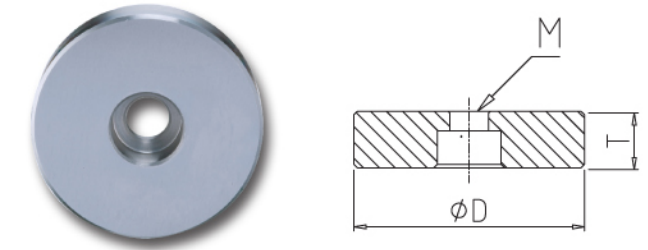
<b>Material:</b>	Steel DIN/EN C50 ISO C50 AISI/SAE 1049 JIS S50C
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Spacer for Guide Post with Shoulder							
Post	D	D1	T	H	M	Part Number	
11 / 12	17	19	10	11	M6	AAM-11	AAM-12
15 / 16	22	24	10	11	M6	AAM-15	AAM-16
19 / 20	25	27	13	14	M8	AAM-19	AAM-20
24 / 25	32	34	13	14	M8	AAM-24	AAM-25
30 / 32	40	42	16	17	M10	AAM-30	AAM-32
38 / 40	50	52	16	17	M10	AAM-38	AAM-40
48 / 50	63	65	16	17	M10	AAM-48	AAM-50
60 / 63	77	79	18	19	M12	AAM-60	AAM-63
80	94	96	18	19	M12	AAM-80	

Example: AAM-50=Use for guide post diameter 50.

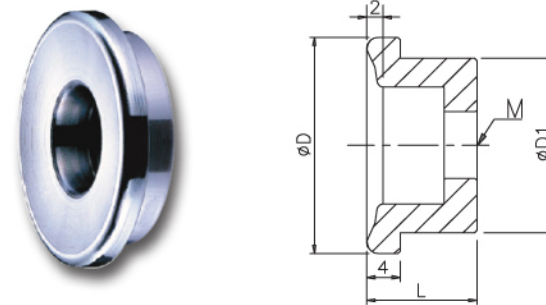
<b>Material:</b>	Steel DIN/EN C50 ISO C50 AISI/SAE 1049 JIS S50C
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Spacer for Guide Post with Shoulder							
Post	D	D1	T	H	M	Part Number	
11 / 12	17	19	10	11	M6	AAM-11	AAM-12
15 / 16	22	24	10	11	M6	AAM-15	AAM-16
19 / 20	25	27	13	14	M8	AAM-19	AAM-20
24 / 25	32	34	13	14	M8	AAM-24	AAM-25
30 / 32	40	42	16	17	M10	AAM-30	AAM-32
38 / 40	50	52	16	17	M10	AAM-38	AAM-40
48 / 50	63	65	16	17	M10	AAM-48	AAM-50
60 / 63	77	79	18	19	M12	AAM-60	AAM-63
80	94	96	18	19	M12	AAM-80	

Example: AAM-50=Use for guide post diameter 50.

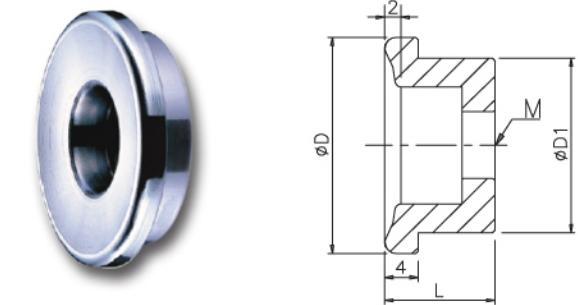
<b>Material:</b>	Steel DIN EN10084/10083 ISO C50 AISI/SAE 1049 JIS S50C
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Washer for Guide Post						
Post	D	D1	L	M	Part Number	
11 / 12	14 / 15	10 / 11	10	M6	AGM-11	AGM-12
15 / 16	19 / 20	14 / 15	10	M6	AGM-15	AGM-16
19 / 20	23 / 24	18 / 19	10	M8	AGM-19	AGM-20
24 / 25	28 / 29	23 / 24	10	M8	AGM-24	AGM-25
30 / 32	36 / 38	29 / 31	20	M10	AGM-30	AGM-32
38 / 40	44 / 48	37 / 39	20	M10	AGM-38	AGM-40
48 / 50	54 / 56	47 / 49	20	M10	AGM-48	AGM-50
60 / 63	67 / 70	59 / 62	20	M12	AGM-60	AGM-63
80	89	79	20	M12	AGM-80	

Example: AGM-50= Use for guide post diameter 50.

<b>Material:</b>	Steel DIN EN10084/10083 ISO C50 AISI/SAE 1049 JIS S50C
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Washer for Guide Post						
Post	D	D1	L	M	Part Number	
11 / 12	14 / 15	10 / 11	10	M6	AGM-11	AGM-12
15 / 16	19 / 20	14 / 15	10	M6	AGM-15	AGM-16
19 / 20	23 / 24	18 / 19	10	M8	AGM-19	AGM-20
24 / 25	28 / 29	23 / 24	10	M8	AGM-24	AGM-25
30 / 32	36 / 38	29 / 31	20	M10	AGM-30	AGM-32
38 / 40	44 / 48	37 / 39	20	M10	AGM-38	AGM-40
48 / 50	54 / 56	47 / 49	20	M10	AGM-48	AGM-50
60 / 63	67 / 70	59 / 62	20	M12	AGM-60	AGM-63
80	89	79	20	M12	AGM-80	

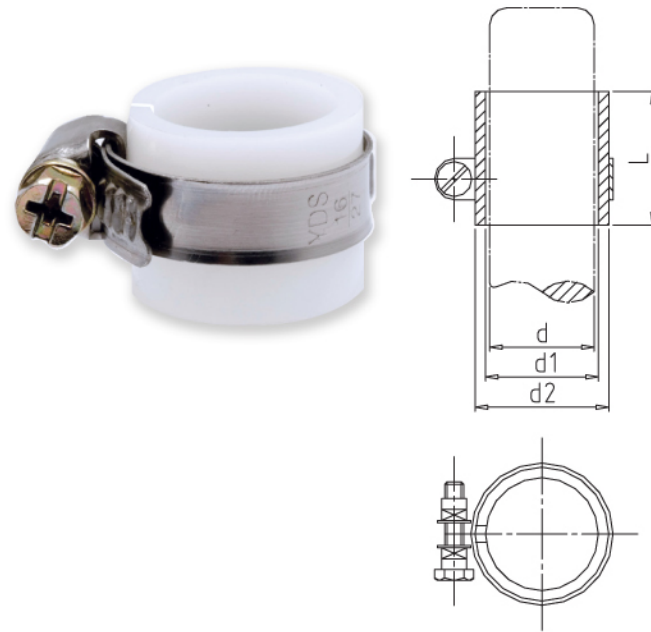
Example: AGM-50= Use for guide post diameter 50.



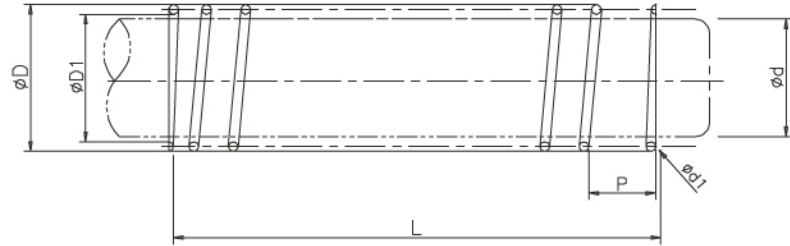
<b>Material:</b>	DIN/EN Durethan ISO POM
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Part Number: AKM

Diameter			Length	Part Number	
d	d1	d2	L		
11 / 12	11.3/12.3	16	20	AKM-11	AKM-12
15 / 16	15.3/16.3	20	20	AKM-15	AKM-16
19 / 20	19.3/20.3	25	20	AKM-19	AKM-20
24 / 25	24.5/25.5	30	30	AKM-24	AKM-25
30 / 32	30.5/32.5	40	30	AKM-30	AKM-32
38 / 40	38.5/40.5	50	40	AKM-38	AKM-40
48 / 50	48.5/50.5	60	40	AKM-48	AKM-50
60 / 63	60.5/63.5	70	40	AKM-60	AKM-63
80	80.5	90	45	AKM-80	



<b>Material:</b>	DIN 2076 ASTM A228 JIS G3522
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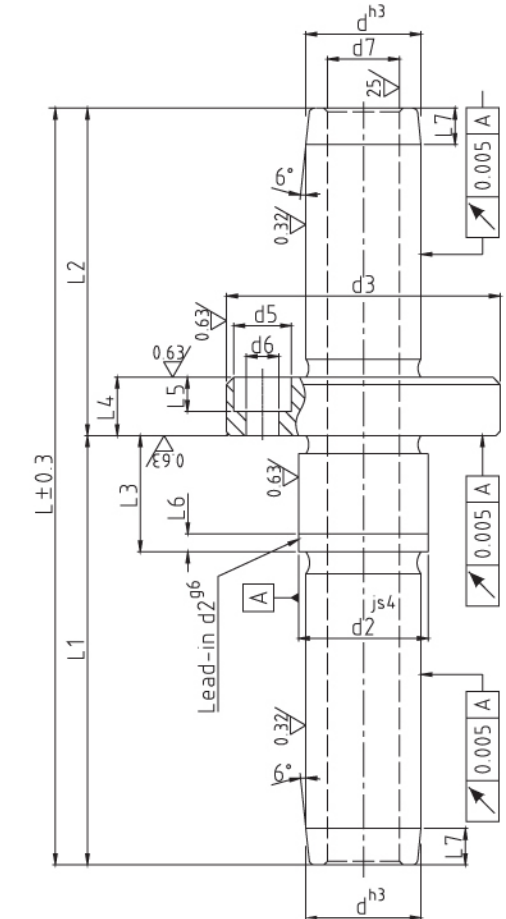
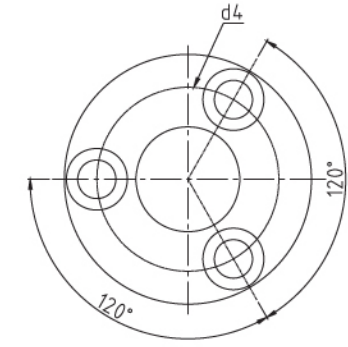
Part Number: SWP

Spring for Guide Post

Post (d)	d1	D1	D	P	L
11	0.6	11.5	12.7	10	25,30,35,40,45,50,55,60
12	0.6	12.5	13.7	10	25,30,35,40,45,50,55,60
15	0.8	15.5	17.1	12	30,35,40,45,50,55,60,65,70,75,80,85,90
16	0.8	16.5	18.1	12	30,35,40,45,50,55,60,65,70,75,80,85,90
19	0.8	19.5	21.1	14	40,45,50,55,60,65,70,75,80,85,90,95,100
20	0.9	20.5	22.3	14	40,45,50,55,60,65,70,75,80,85,90,95,100
24	1.2	24.5	26.9	14	55,65,75,85,95,105,115,125,135,145,150,200
25	1.2	25.5	27.9	14	55,65,75,85,95,105,115,125,135,145,150,200
30	1.6	30.5	33.7	16	55,65,75,85,95,105,115,125,135,145,150,200
32	1.6	32.5	35.7	16	55,65,75,85,95,105,115,125,135,145,150,200
38	1.8	38.5	42.1	18	65,75,85,95,105,115,125,135,145,150,200,250
40	2.0	40.5	44.5	20	65,75,85,95,105,115,125,135,145,150,200,250
48	2.3	48.5	53.1	23	65,75,85,95,105,115,125,135,145,150,200,250,300
50	2.3	50.5	55.1	23	65,75,85,95,105,115,125,135,145,150,200,250,300
60	2.5	60.5	65.5	25	85,95,105,115,125,135,145,150,200,250,300
63	2.5	63.5	68.5	25	85,95,105,115,125,135,145,150,200,250,300,350
80	2.5	80.5	85.5	28	105,115,125,135,145,150,200,250,300,350,400

Example: SWP-50-200=Diameter 50, Length 200.

<b>Material:</b>	Steel DIN 1.2067/1.3505 ISO B1/100Cr6 AISI/SAE 52100 JIS SUJ 2
<b>Hardness:</b>	60-64 HRC
<b>Finish:</b>	Precision ground
<b>Assembly:</b>	Hole bore ISO K5
<b>Cylindrical Tolerance:</b>	Ø11 – Ø16: 0.001 Ø19 – Ø25: 0.002 Ø30 – Ø50: 0.003



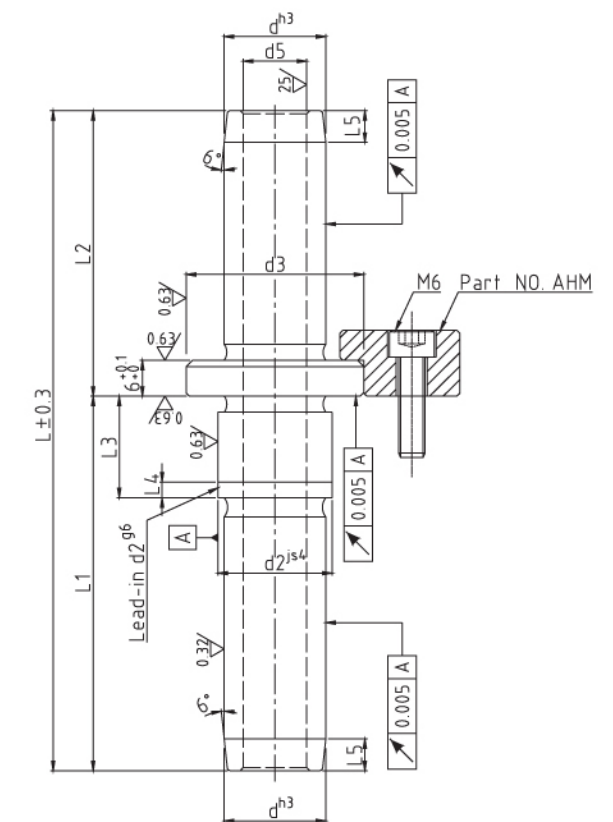
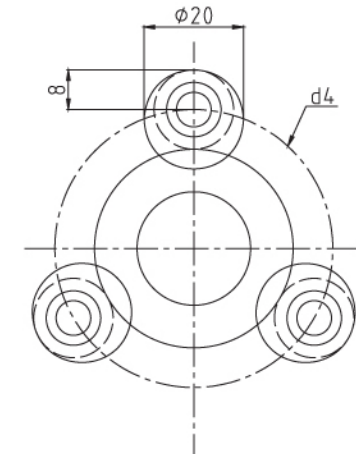
		Sizes															
		Diameter						Length						Part Number			
d	d2	d3	d4	d5	d6	d7*	L1	L2	L3	L4	L5	L6	L7	L			
11 / 12	13	28	20	6	3.4	-	50	40	12	6	3.4	3	3	90	PCM-11-090	PCM-12-090	
							60	40						100	PCM-11-100	PCM-12-100	
							60	50						110	PCM-11-110	PCM-12-110	
							60	60						120	PCM-11-120	PCM-12-120	
							70	60						130	PCM-11-130	PCM-12-130	
							70	70						140	PCM-11-140	PCM-12-140	
15 / 16	18	38	28	8	4.5	-	70	62	16	8	4.6	4	5	132	PCM-15-132	PCM-16-132	
							80	62						142	PCM-15-142	PCM-16-142	
							90	62						152	PCM-15-152	PCM-16-152	



Sizes																
Diameter							Length								Part Number	
d	d2	d3	d4	d5	d6	d7*	L1	L2	L3	L4	L5	L6	L7	L		
15 / 16	18	38	28	8	4.5	-	90	70	16	8	4.6	4	5	160	PCM-15-160	PCM-16-160
							100	70						170	PCM-15-170	PCM-16-170
							100	80						180	PCM-15-180	PCM-16-180
19 / 20	22	42	32	8	4.5	-	90	70	20	8	4.6	4	5	160	PCM-19-160	PCM-20-160
							100	70						170	PCM-19-170	PCM-20-170
							100	80						180	PCM-19-180	PCM-20-180
							110	80						190	PCM-19-190	PCM-20-190
							110	90						200	PCM-19-200	PCM-20-200
							110	100						210	PCM-19-210	PCM-20-210
24 / 25	26	48	38	8	4.5	-	100	80	22	8	4.6	5	5	180	PCM-24-180	PCM-25-180
							110	80						190	PCM-24-190	PCM-25-190
							110	90						200	PCM-24-200	PCM-25-200
							120	90						210	PCM-24-210	PCM-25-210
							120	100						220	PCM-24-220	PCM-25-220
							120	110						230	PCM-24-230	PCM-25-230
30 / 32	34	60	48	10	5.5	20	100	80	25	10	5.7	5	6	180	PCM-30-180	PCM-32-180
							110	80						190	PCM-30-190	PCM-32-190
							110	90						200	PCM-30-200	PCM-32-200
							120	90						210	PCM-30-210	PCM-32-210
							120	100						220	PCM-30-220	PCM-32-220
							130	100						230	PCM-30-230	PCM-32-230
							130	110						240	PCM-30-240	PCM-32-240
							140	110						250	PCM-30-250	PCM-32-250
							110	90	27	12	6.8	6	6	200	PCM-38-200	PCM-40-200
							120	90						210	PCM-38-210	PCM-40-210
120	100						220	PCM-38-220	PCM-40-220							
130	100						230	PCM-38-230	PCM-40-230							
130	110						240	PCM-38-240	PCM-40-240							
140	110						250	PCM-38-250	PCM-40-250							
140	120						260	PCM-38-260	PCM-40-260							
48 / 50	52	80	66	11	6.6	20	150	110	37	15	6.8	6	8	260	PCM-48-260	PCM-50-260
							160	120						280	PCM-48-280	PCM-50-280
							170	130						300	PCM-48-300	PCM-50-300
							180	140						320	PCM-48-320	PCM-50-320
							200	160						360	PCM-48-360	PCM-50-360
220	180						400	PCM-48-400	PCM-50-400							

\* d7 contains standard inner diameter of 20mm for d=Ø30 thru d= Ø50  
 \* Clamp arrangement data, please see page 10.  
 \* For assembly details, please refer to page 67.  
 \* Example:PCM-50-260=Diameter 50,Length 260

<b>Material:</b>	Steel DIN 1.2067/1.3505, ISO B1/100Cr6 AISI/SAE 52100 JIS SUJ 2
<b>Hardness:</b>	60-64 HRC
<b>Finish:</b>	Precision ground
<b>Assembly:</b>	Hole bore ISO K5
<b>Cylindrical Tolerance:</b>	Ø11 – Ø16: 0.001 Ø19 – Ø25: 0.002 Ø30 – Ø50: 0.003



Sizes												
Diameter					Length						Part Number	
d	d2	d3	d4	d5	L1	L2	L3	L4	L5	L		
11 / 12	13	18	36	-	50	40	12	3	3	90	PDM-11-090	PDM-12-090
					60	40				100	PDM-11-100	PDM-12-100
					60	50				110	PDM-11-110	PDM-12-110
					60	60				120	PDM-11-120	PDM-12-120
					70	60				130	PDM-11-130	PDM-12-130
70	70				140	PDM-11-140	PDM-12-140					
15 / 16	18	24	40	-	70	62	16	4	5	132	PDM-15-132	PDM-16-132
					80	62				142	PDM-15-142	PDM-16-142



Sizes												
Diameter					Length						Part Number	
d	d2	d3	d4	d5	L1	L2	L3	L4	L5	L		
15 / 16	18	24	40	-	90	62	16	4	5	152	PDM-15-152	PDM-16-152
					90	70				160	PDM-15-160	PDM-16-160
					100	70				170	PDM-15-170	PDM-16-170
					100	80				180	PDM-15-180	PDM-16-180
19 / 20	22	28	44	-	90	70	20	4	5	160	PDM-19-160	PDM-20-160
					100	70				170	PDM-19-170	PDM-20-170
					100	80				180	PDM-19-180	PDM-20-180
					110	80				190	PDM-19-190	PDM-20-190
					110	90				200	PDM-19-200	PDM-20-200
					110	100				210	PDM-19-210	PDM-20-210
24 / 25	26	32	49	-	100	80	22	5	5	180	PDM-24-180	PDM-25-180
					110	80				190	PDM-24-190	PDM-25-190
					110	90				200	PDM-24-200	PDM-25-200
					120	90				210	PDM-24-210	PDM-25-210
					120	100				220	PDM-24-220	PDM-25-220
					120	110				230	PDM-24-230	PDM-25-230
					130	100				230	PDM-30-230	PDM-32-230
					130	110				240	PDM-30-240	PDM-32-240
30 / 32	34	40	57	20	100	80	25	5	6	180	PDM-30-180	PDM-32-180
					110	80				190	PDM-30-190	PDM-32-190
					110	90				200	PDM-30-200	PDM-32-200
					120	90				210	PDM-30-210	PDM-32-210
					120	100				220	PDM-30-220	PDM-32-220
					130	100				230	PDM-30-230	PDM-32-230
					130	110				240	PDM-30-240	PDM-32-240
					140	110				250	PDM-30-250	PDM-32-250
38 / 40	42	50	67	20	110	90	27	6	6	200	PDM-38-200	PDM-40-200
					120	90				210	PDM-38-210	PDM-40-210
					120	100				220	PDM-38-220	PDM-40-220
					130	100				230	PDM-38-230	PDM-40-230
					130	110				240	PDM-38-240	PDM-40-240
					140	110				250	PDM-38-250	PDM-40-250
48 / 50	52	63	80	20	150	110	37	6	8	260	PDM-48-260	PDM-50-260
					160	120				280	PDM-48-280	PDM-50-280
					170	130				300	PDM-48-300	PDM-50-300
					180	140				320	PDM-48-320	PDM-50-320
					200	160				360	PDM-48-360	PDM-50-360
					220	180				400	PDM-48-400	PDM-50-400

\* d7 contains standard inner diameter of 20mm for d=Ø30 thru d= Ø50

\* Clamp arrangement data, please see page 10

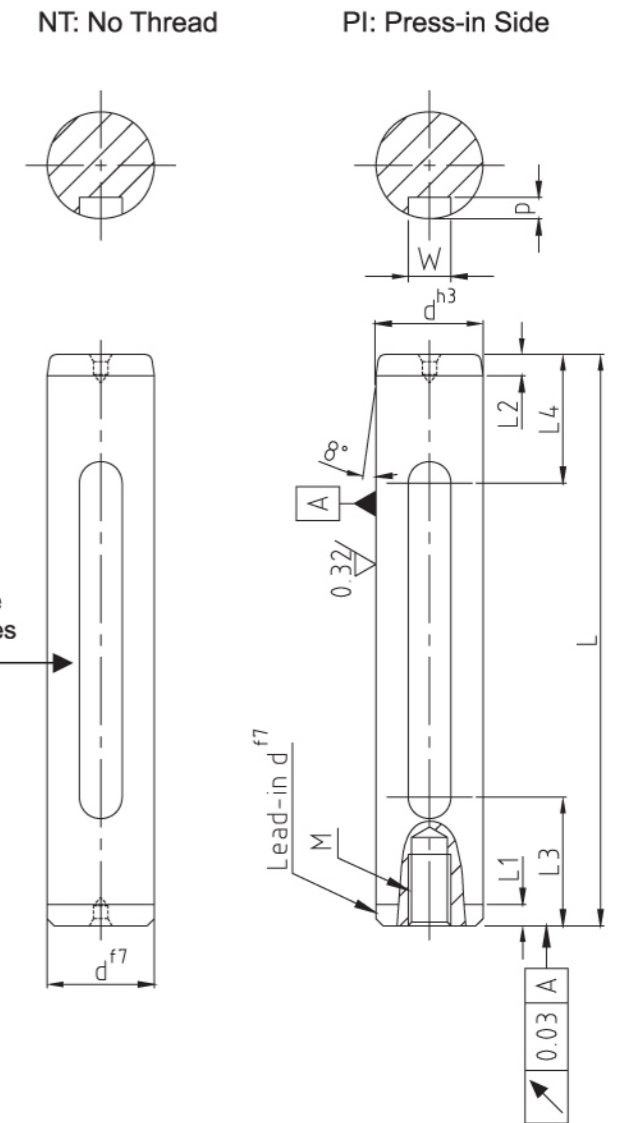
\* For assembly details, please refer to page 67.

\* Example PDM-50-400=Diameter 50,Length 400

<b>Material:</b>	Steel DIN 1.2067/1.3505 ISO B1/100Cr6 AISI/SAE 52100 JIS SUJ 2
<b>Hardness:</b>	60-64 HRC
<b>Finish:</b>	Precision ground
<b>Assembly:</b>	Hole bore ISO N5
<b>Cylindrical Tolerance:</b>	Ø11 – Ø16: 0.001 Ø19 – Ø25: 0.002 Ø30 – Ø80: 0.003



Ø11-40: 1 groove  
Ø48-80: 2 grooves



Sizes											
Diameter	Length				Thread	Length				Part Number	
	L1	L2	L3	L4		M	W	P	L		
11 / 12	3	3	20	20	M6	4	2.8	60	PEM-11-060xx	PEM-12-060xx	
									80	PEM-11-080xx	PEM-12-080xx
									100	PEM-11-100xx	PEM-12-100xx
									112	PEM-11-112xx	PEM-12-112xx
									125	PEM-11-125xx	PEM-12-125xx
									140	PEM-11-140xx	PEM-12-140xx
15 / 16	4	4	25	25	M6	4	2.8	90	PEM-15-090xx	PEM-16-090xx	
								100	PEM-15-100xx	PEM-16-100xx	
								112	PEM-15-112xx	PEM-16-112xx	
								125	PEM-15-125xx	PEM-16-125xx	
								140	PEM-15-140xx	PEM-16-140xx	
								160	PEM-15-160xx	PEM-16-160xx	
				180	PEM-15-180xx	PEM-16-180xx					
				200	PEM-15-200xx	PEM-16-200xx					



Diameter	Length				Thread	Length				Part Number	
	L1	L2	L3	L4		M	W	P	L		
19 / 20	4	4	30	30	M8	6	3.5	100	PEM-19-100xx	PEM-20-100xx	
									112	PEM-19-112xx	PEM-20-112xx
									125	PEM-19-125xx	PEM-20-125xx
									140	PEM-19-140xx	PEM-20-140xx
									160	PEM-19-160xx	PEM-20-160xx
									180	PEM-19-180xx	PEM-20-180xx
									200	PEM-19-200xx	PEM-20-200xx
									224	PEM-19-224xx	PEM-20-224xx
									250	PEM-19-250xx	PEM-20-250xx
									280	PEM-19-280xx	PEM-20-280xx
24 / 25	5	5	35	35	M8	6	3.5	100	PEM-24-100xx	PEM-25-100xx	
								112	PEM-24-112xx	PEM-25-112xx	
								125	PEM-24-125xx	PEM-25-125xx	
								140	PEM-24-140xx	PEM-25-140xx	
								160	PEM-24-160xx	PEM-25-160xx	
								180	PEM-24-180xx	PEM-25-180xx	
								200	PEM-24-200xx	PEM-25-200xx	
								224	PEM-24-224xx	PEM-25-224xx	
								250	PEM-24-250xx	PEM-25-250xx	
								280	PEM-24-280xx	PEM-25-280xx	
30 / 32	6	6	40	40	M10	6	3.5	125	PEM-30-125xx	PEM-32-125xx	
								140	PEM-30-140xx	PEM-32-140xx	
								160	PEM-30-160xx	PEM-32-160xx	
								180	PEM-30-180xx	PEM-32-180xx	
								200	PEM-30-200xx	PEM-32-200xx	
								224	PEM-30-224xx	PEM-32-224xx	
								250	PEM-30-250xx	PEM-32-250xx	
								280	PEM-30-280xx	PEM-32-280xx	
								315	PEM-30-315xx	PEM-32-315xx	
								355	PEM-30-355xx	PEM-32-355xx	
38 / 40	6	6	50	50	M10	6	3.5	160	PEM-38-160xx	PEM-40-160xx	
								180	PEM-38-180xx	PEM-40-180xx	
								200	PEM-38-200xx	PEM-40-200xx	
								224	PEM-38-224xx	PEM-40-224xx	
								250	PEM-38-250xx	PEM-40-250xx	
								280	PEM-38-280xx	PEM-40-280xx	
								315	PEM-38-315xx	PEM-40-315xx	
								355	PEM-38-355xx	PEM-40-355xx	
								400	PEM-38-400xx	PEM-40-400xx	
								450	PEM-38-450xx	PEM-40-450xx	
48 / 50	6	8	60	60	M10	6	3.5	180	PEM-48-180xx	PEM-50-180xx	
								200	PEM-48-200xx	PEM-50-200xx	
								224	PEM-48-224xx	PEM-50-224xx	
								250	PEM-48-250xx	PEM-50-250xx	
								280	PEM-48-280xx	PEM-50-280xx	
315	PEM-48-315xx	PEM-50-315xx									

Diameter	Length				Thread	Length				Part Number	
	L1	L2	L3	L4		M	W	P	L		
48/50	6	8	60	60	M10	6	3.5	355	PEM-48-355xx	PEM-50-355xx	
								400	PEM-48-400xx	PEM-50-400xx	
								450	PEM-48-450xx	PEM-50-450xx	
								500	PEM-48-500xx	PEM-50-500xx	
								550	PEM-48-550xx	PEM-50-550xx	
								600	PEM-48-600xx	PEM-50-600xx	
60 / 63	8	8	70	70	M12	6	3.5	250	PEM-60-250xx	PEM-63-250xx	
								280	PEM-60-280xx	PEM-63-280xx	
								315	PEM-60-315xx	PEM-63-315xx	
								355	PEM-60-355xx	PEM-63-355xx	
								400	PEM-60-400xx	PEM-63-400xx	
								450	PEM-60-450xx	PEM-63-450xx	
80	8	8	80	80	M12	6	3.5	280	PEM-80-280xx		
								315	PEM-80-315xx		
								355	PEM-80-355xx		
								400	PEM-80-400xx		
								450	PEM-80-450xx		
								500	PEM-80-500xx		
								550	PEM-80-550xx		
								600	PEM-80-600xx		

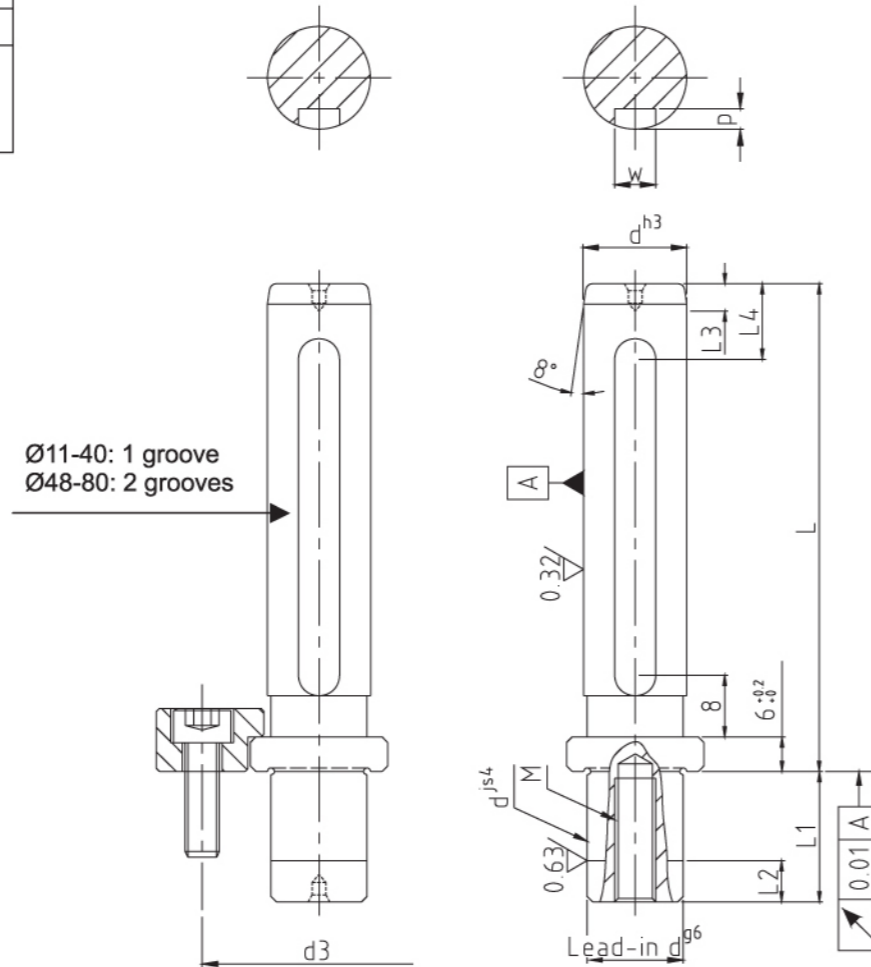
Order note: Please add the appropriate suffix to designated desired thread type.  
 NT = No thread (For assembly details, please refer to page 68)  
 PI = Press-in Side (For assembly details, please refer to page 70)  
 Example: PEM-63-400PI = Diameter 63, Length 400, Press-in side thread



<b>Material:</b>	Steel DIN 1.2067/1.3505 ISO B1/100Cr6 AISI/SAE 52100 JIS SUJ 2
<b>Hardness:</b>	60-64 HRC
<b>Finish:</b>	Precision ground
<b>Assembly:</b>	Hole bore ISO K5
<b>Cylindrical Tolerance:</b>	Ø11 – Ø16: 0.001 Ø19 – Ø25: 0.002 Ø30 – Ø80: 0.003

NT: No Thread

PI: Press-in Side



Sizes												Part Number	
Diameter			Length										
d	d2	d3	L1	L2	L3	L4	W	P	M	L			
11 / 12	17	33	12	3	3	20	4	2.8	M6	70	PFM-11-070xx	PFM-12-070xx	
										80	PFM-11-080xx	PFM-12-080xx	
										90	PFM-11-090xx	PFM-12-090xx	
										100	PFM-11-100xx	PFM-12-100xx	
										112	PFM-11-112xx	PFM-12-112xx	
										125	PFM-11-125xx	PFM-12-125xx	
15 / 16	22	38	16	3	4	25	4	2.8	M6	80	PFM-15-080xx	PFM-16-080xx	
										90	PFM-15-090xx	PFM-16-090xx	
										100	PFM-15-100xx	PFM-16-100xx	

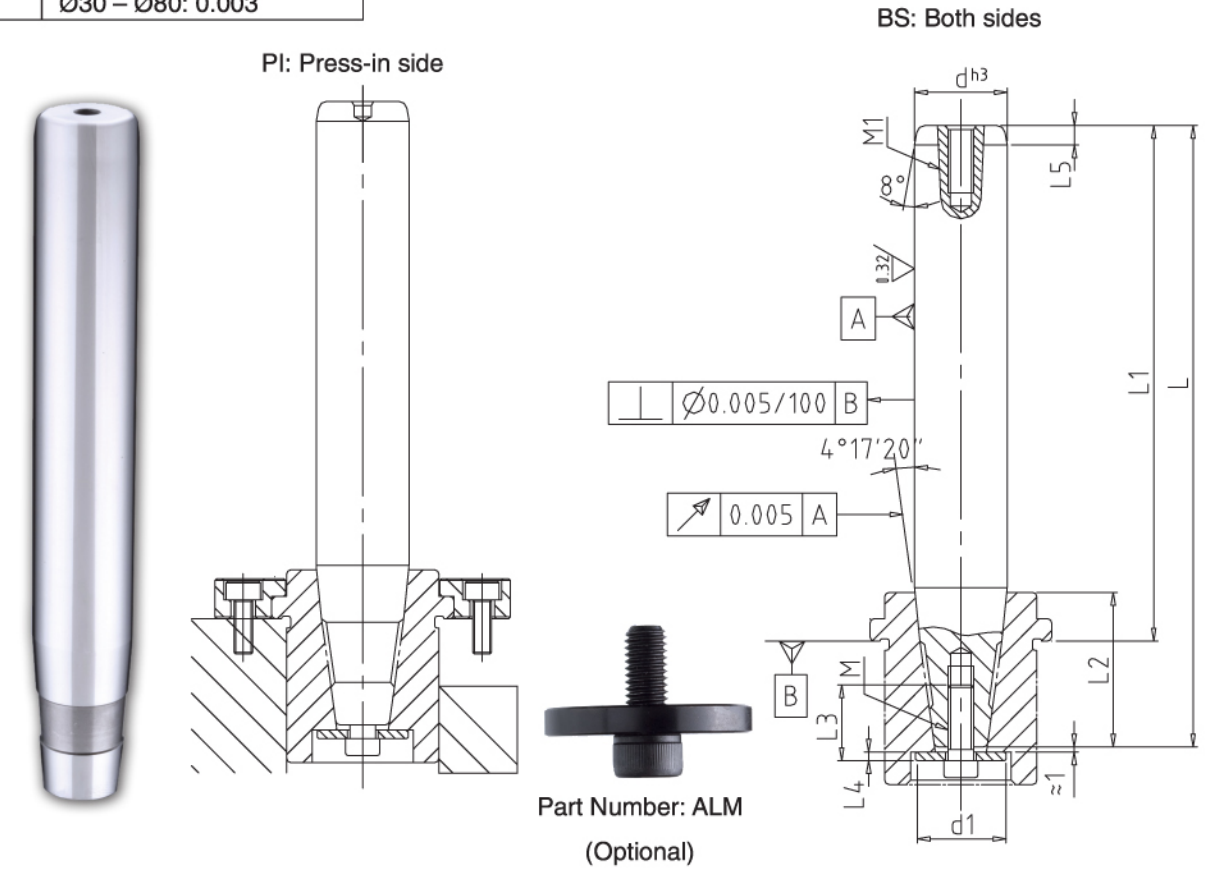
Sizes												Part Number	
Diameter			Length										
d	d2	d3	L1	L2	L3	L4	W	P	M	L			
15 / 16	22	38	16	3	4	25	4	2.8	M6	112	PFM-15-112xx	PFM-16-112xx	
										125	PFM-15-125xx	PFM-16-125xx	
										140	PFM-15-140xx	PFM-16-140xx	
										160	PFM-15-160xx	PFM-16-160xx	
										180	PFM-15-180xx	PFM-16-180xx	
19 / 20	25	42	23	3	4	30	6	3.5	M8	100	PFM-19-100xx	PFM-20-100xx	
										112	PFM-19-112xx	PFM-20-112xx	
										125	PFM-19-125xx	PFM-20-125xx	
										140	PFM-19-140xx	PFM-20-140xx	
										160	PFM-19-160xx	PFM-20-160xx	
										180	PFM-19-180xx	PFM-20-180xx	
										200	PFM-19-200xx	PFM-20-200xx	
24 / 25	32	49	27	5	5	35	6	3.5	M8	100	PFM-24-100xx	PFM-25-100xx	
										112	PFM-24-112xx	PFM-25-112xx	
										125	PFM-24-125xx	PFM-25-125xx	
										140	PFM-24-140xx	PFM-25-140xx	
										160	PFM-24-160xx	PFM-25-160xx	
										180	PFM-24-180xx	PFM-25-180xx	
										200	PFM-24-200xx	PFM-25-200xx	
										224	PFM-24-224xx	PFM-25-224xx	
										250	PFM-24-250xx	PFM-25-250xx	
30 / 32	40	57	37	6	6	40	6	3.5	M10	112	PFM-30-112xx	PFM-32-112xx	
										125	PFM-30-125xx	PFM-32-125xx	
										140	PFM-30-140xx	PFM-32-140xx	
										160	PFM-30-160xx	PFM-32-160xx	
										180	PFM-30-180xx	PFM-32-180xx	
										200	PFM-30-200xx	PFM-32-200xx	
										224	PFM-30-224xx	PFM-32-224xx	
										250	PFM-30-250xx	PFM-32-250xx	
										280	PFM-30-280xx	PFM-32-280xx	
38 / 40	50	67	37	6	6	50	6	3.5	M10	125	PFM-38-125xx	PFM-40-125xx	
										140	PFM-38-140xx	PFM-40-140xx	
										160	PFM-38-160xx	PFM-40-160xx	
										180	PFM-38-180xx	PFM-40-180xx	
										200	PFM-38-200xx	PFM-40-200xx	
										224	PFM-38-224xx	PFM-40-224xx	
										250	PFM-38-250xx	PFM-40-250xx	
										280	PFM-38-280xx	PFM-40-280xx	
										315	PFM-38-315xx	PFM-40-315xx	
48 / 50	63	80	47	8	8	60	6	3.5	M10	140	PFM-48-140xx	PFM-50-140xx	
										160	PFM-48-160xx	PFM-50-160xx	
										180	PFM-48-180xx	PFM-50-180xx	
										200	PFM-48-200xx	PFM-50-200xx	



Sizes												Part Number								
Diameter			Length																	
d	d2	d3	L1	L2	L3	L4	W	P	M	L										
48 / 50	63	80	47	8	8	60	6	3.5	M10	224	PFM-48-224xx	PFM-50-224xx								
										250	PFM-48-250xx	PFM-50-250xx								
										280	PFM-48-280xx	PFM-50-280xx								
										315	PFM-48-315xx	PFM-50-315xx								
										355	PFM-48-355xx	PFM-50-355xx								
60 / 63	80	97	47	8	70	6	3.5	M12	160	PFM-60-160xx	PFM-63-160xx									
									180	PFM-60-180xx	PFM-63-180xx									
									200	PFM-60-200xx	PFM-63-200xx									
									224	PFM-60-224xx	PFM-63-224xx									
									250	PFM-60-250xx	PFM-63-250xx									
									280	PFM-60-280xx	PFM-63-280xx									
									315	PFM-60-315xx	PFM-63-315xx									
									355	PFM-60-355xx	PFM-63-355xx									
									80	100	117	60	8	80	6	3.5	M12	250	PFM-80-250xx	
																		280	PFM-80-280xx	
									315	PFM-80-315xx										
									355	PFM-80-355xx										
									400	PFM-80-400xx										

Order note: Please add the appropriate suffix to designated desired thread type.  
 NT = No thread (For assembly details, please refer to page 69)  
 PI = Press-in Side (For assembly details, please refer to page 71)  
 Example: PFM-16-140PI = Diameter 16, Length 140, Press-in side threads

<b>Material:</b>	Steel DIN 1.2067/1.3505 ISO B1/100Cr6 AISI/SAE 52100 JIS SUJ 2
<b>Hardness:</b>	60-64 HRC
<b>Finish:</b>	Precision ground
<b>Assembly:</b>	Hole bore ISO H5
<b>Cylindrical Tolerance:</b>	Ø11 – Ø16: 0.001 Ø19 – Ø25: 0.002 Ø30 – Ø80: 0.003



Sizes												Part Number	
Diameter		Thread		Length									
d	d1	M	M1	L	L1	L2	L3	L4	L5				
15 / 16	15	M5	M6	87	80	19	16	4	4	PGM-15-080xx	PGM-16-080xx		
				97	90					PGM-15-090xx	PGM-16-090xx		
				107	100					PGM-15-100xx	PGM-16-100xx		
				119	112					PGM-15-112xx	PGM-16-112xx		
				130	123					PGM-15-123xx	PGM-16-123xx		
				147	140					PGM-15-140xx	PGM-16-140xx		
19/20	19	M6	M8	167	160					PGM-15-160xx	PGM-16-160xx		
				115	100	27	20	4	4	PGM-19-100xx	PGM-20-100xx		
				127	112					PGM-19-112xx	PGM-20-112xx		
				140	125					PGM-19-125xx	PGM-20-125xx		
				155	140					PGM-19-140xx	PGM-20-140xx		

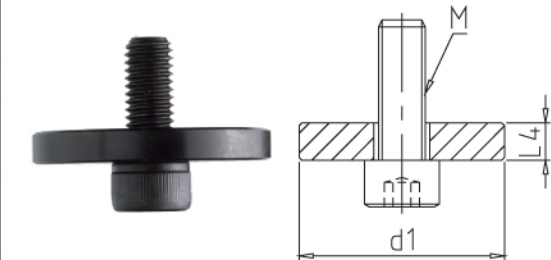


Sizes															
Diameter		Thread		Length						Part Number					
d	d1	M	M1	L	L1	L2	L3	L4	L5						
19/20	19	M6	M8	175	160	27	20	4	4	PGM-19-160xx	PGM-20-160xx				
				195	180					PGM-19-180xx	PGM-20-180xx				
24/25	24	M8	M8	122	100	34	25	5	5	PGM-24-100xx	PGM-25-100xx				
				134	112					PGM-24-112xx	PGM-25-112xx				
				147	125					PGM-24-125xx	PGM-25-125xx				
				162	140					PGM-24-140xx	PGM-25-140xx				
				182	160					PGM-24-160xx	PGM-25-160xx				
				206	180					PGM-24-180xx	PGM-25-180xx				
				222	200					PGM-24-200xx	PGM-25-200xx				
				246	224					PGM-24-224xx	PGM-25-224xx				
				272	250					PGM-24-250xx	PGM-25-250xx				
30/32	30	M8	M10	134	112	37	25	5	6	PGM-30-112xx	PGM-32-112xx				
				147	125					PGM-30-125xx	PGM-32-125xx				
				162	140					PGM-30-140xx	PGM-32-140xx				
				182	160					PGM-30-160xx	PGM-32-160xx				
				202	180					PGM-30-180xx	PGM-32-180xx				
				222	200					PGM-30-200xx	PGM-32-200xx				
				246	224					PGM-30-224xx	PGM-32-224xx				
				272	250					PGM-30-250xx	PGM-32-250xx				
								302	280					PGM-30-280xx	PGM-32-280xx
								157	125	47	25	6	6	PGM-38-125xx	PGM-40-125xx
				172	140					PGM-38-140xx	PGM-40-140xx				
				192	160					PGM-38-160xx	PGM-40-160xx				
				212	180					PGM-38-180xx	PGM-40-180xx				
				232	200					PGM-38-200xx	PGM-40-200xx				
				256	224					PGM-38-224xx	PGM-40-224xx				
				282	250					PGM-38-250xx	PGM-40-250xx				
				312	280					PGM-38-280xx	PGM-40-280xx				
				347	315					PGM-38-315xx	PGM-40-315xx				
48/50	50	M10	M10	176	140	54	30	6	8	PGM-48-140xx	PGM-50-140xx				
				196	160					PGM-48-160xx	PGM-50-160xx				
				216	180					PGM-48-180xx	PGM-50-180xx				
				236	200					PGM-48-200xx	PGM-50-200xx				
				260	224					PGM-48-224xx	PGM-50-224xx				
				286	250					PGM-48-250xx	PGM-50-250xx				
				316	280					PGM-48-280xx	PGM-50-280xx				
				351	315					PGM-48-315xx	PGM-50-315xx				
60/63	62	M12	M12	207	160	65	30	6	8	PGM-60-160xx	PGM-63-160xx				
				227	180					PGM-60-180xx	PGM-63-180xx				
				247	200					PGM-60-200xx	PGM-63-200xx				
				271	224					PGM-60-224xx	PGM-63-224xx				
				297	250					PGM-60-250xx	PGM-63-250xx				
				327	280					PGM-60-280xx	PGM-63-280xx				
				362	315					PGM-60-315xx	PGM-63-315xx				
				402	355					PGM-60-355xx	PGM-63-355xx				

Sizes											
Diameter		Thread		Length						Part Number	
d	d1	M	M1	L	L1	L2	L3	L4	L5		
80	80	M12	M12	319	250	87	30	6	8	PGM-80-250xx	
				349	280					PGM-80-280xx	
				384	315					PGM-80-315xx	
				424	355					PGM-80-355xx	
				469	400					PGM-80-400xx	

Part Number: ALM

Diameter	Length	Thread	Part Number
d1	L4	M	
15	4	M5	ALM-15
19	4	M6	ALM-19
24	5	M8	ALM-24
30	5	M8	ALM-30
38	6	M8	ALM-38
50	6	M10	ALM-50
62	6	M12	ALM-62
80	6	M12	ALM-80



Order note: Please add the appropriate suffix to designated desired thread type.

The guide post is workable only with BSM bushing, please refer to P. 26.

PI = Press-in side (For assembly details, please refer to page 64, 65, 72 )

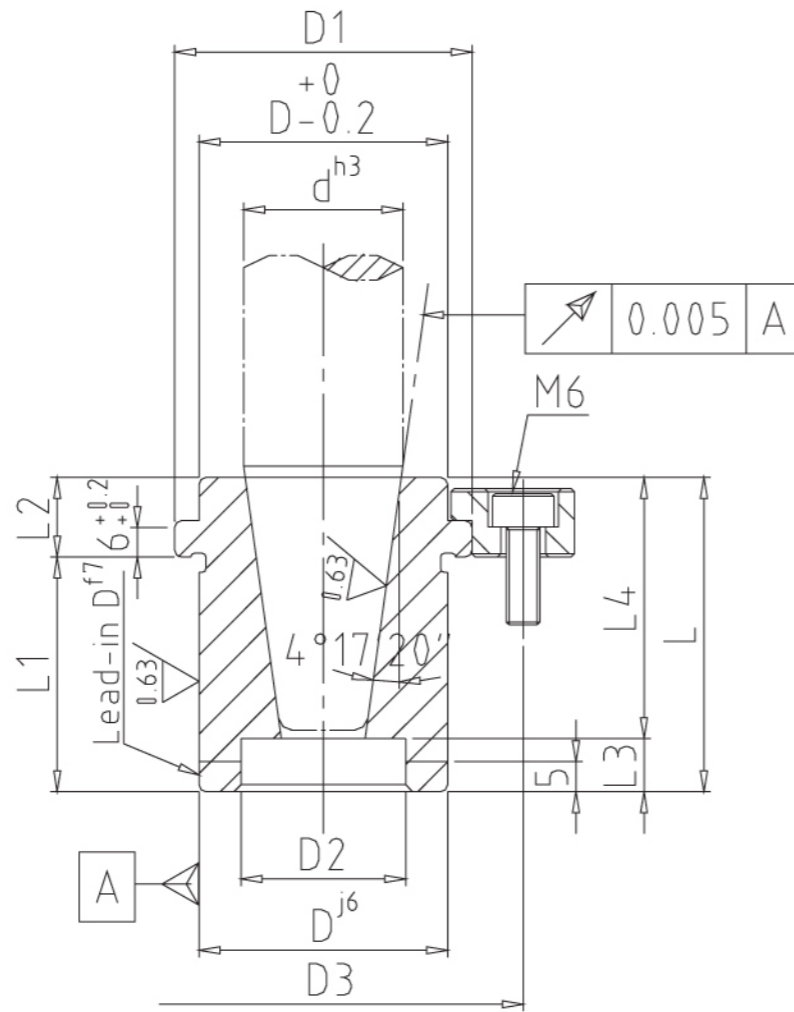
BS = Both sides (For assembly details, please refer to page 78, 79 )

Example: PGM-20-125PI = Diameter 20, Length 125, Press-in side

ALM-19 = Use for guide post diameter 19.



<b>Material:</b>	Steel DIN 1.2067/1.3505 ISO B1/100Cr6 AISI/SAE 52100 JIS SUJ 2
<b>Hardness:</b>	60-64 HRC
<b>Finish:</b>	Precision ground
<b>Assembly:</b>	Hole bore ISO H5
<b>Cylindrical Tolerance:</b>	Ø11 – Ø16: 0.001 Ø19 – Ø25: 0.002 Ø30 – Ø80: 0.003



Sizes											
Diameter					Length					Part Number	
d	Dj6	D1	D2	D3	L	L1	L2	L3	L4		
15 / 16	26	34	17	51	29	17	12	9	20	<b>BSM-15-029-17</b>	<b>BSM-16-029-17</b>
					39	27	12	19	20	<b>BSM-15-039-27</b>	<b>BSM-16-039-27</b>
19 / 20	32	40	21	57	39	27	12	11	28	<b>BSM-19-039-27</b>	<b>BSM-20-039-27</b>
					49	37	12	21	28	<b>BSM-19-049-37</b>	<b>BSM-20-049-37</b>
24 / 25	40	48	26	65	49	37	12	14	35	<b>BSM-24-049-37</b>	<b>BSM-25-049-37</b>
					59	47	12	24	35	<b>BSM-24-059-47</b>	<b>BSM-25-059-47</b>
30 / 32	48	56	32	73	52	37	15	14	38	<b>BSM-30-052-37</b>	<b>BSM-32-052-37</b>
					62	47	15	24	38	<b>BSM-30-062-47</b>	<b>BSM-32-062-47</b>
38 / 40	58	66	42	83	62	47	15	14	48	<b>BSM-38-062-47</b>	<b>BSM-40-062-47</b>
					72	57	15	24	48	<b>BSM-38-072-57</b>	<b>BSM-40-072-57</b>
48 / 50	70	80	52	97	72	54	18	17	55	<b>BSM-48-072-54</b>	<b>BSM-50-072-54</b>
					82	64	18	27	55	<b>BSM-48-048-64</b>	<b>BSM-50-082-64</b>
60 / 63	85	95	64	112	85	67	18	19	66	<b>BSM-60-085-67</b>	<b>BSM-63-085-67</b>
					95	77	18	29	66	<b>BSM-60-095-77</b>	<b>BSM-63-095-77</b>
80	105	116	82	133	107	89	18	19	88	<b>BSM-80-107-89</b>	
					117	99	18	29	88	<b>BSM-80-117-99</b>	

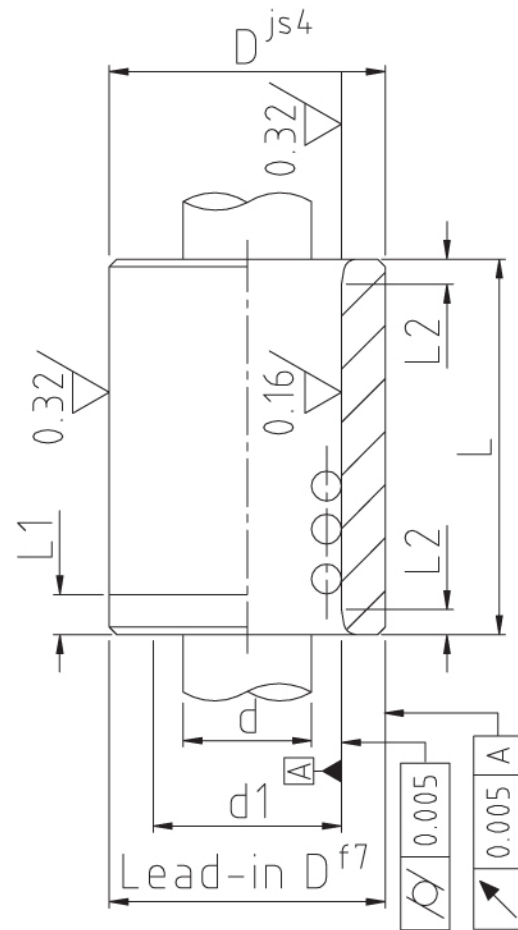
The bushing is workable with the guide post PGM only, please refer to P.23



## Guide Bushing Series



<b>Material:</b>	Steel DIN 1.2067/1.3505 ISO B1/100Cr6 AISI/SAE 52100 JIS SUJ 2
<b>Hardness:</b>	60-64 HRC
<b>Finish:</b>	Precision ground
<b>Assembly:</b>	Hole bore ISO H5



Sizes															
Diameter			Length			Part Number		Diameter			Length			Part Number	
d	d1	D	L1	L2	L			d	d1	D	L1	L2	L		
11 / 12	15 / 16	22	3	2	23	BAM-11-023	BAM-12-023	19 / 20	25 / 26	32	4	2	37	BAM-19-037	BAM-20-037
					30	BAM-11-030	BAM-12-030						47	BAM-19-047	BAM-20-047
					37	BAM-11-037	BAM-12-037						60	BAM-19-060	BAM-20-060
15 / 16	21 / 22	28	4	2	23	BAM-15-023	BAM-16-023						77	BAM-19-077	BAM-20-077
					30	BAM-15-030	BAM-16-030	24 / 25	30 / 31	40	5	2.5	23	BAM-24-023	BAM-25-023
					37	BAM-15-037	BAM-16-037						30	BAM-24-030	BAM-25-030
					47	BAM-15-047	BAM-16-047						37	BAM-24-037	BAM-25-037
					60	BAM-15-060	BAM-16-060						47	BAM-24-047	BAM-25-047
19 / 20	25 / 26	32	4	2	23	BAM-19-023	BAM-20-023						60	BAM-24-060	BAM-25-060
					30	BAM-19-030	BAM-20-030						77	BAM-24-077	BAM-25-077

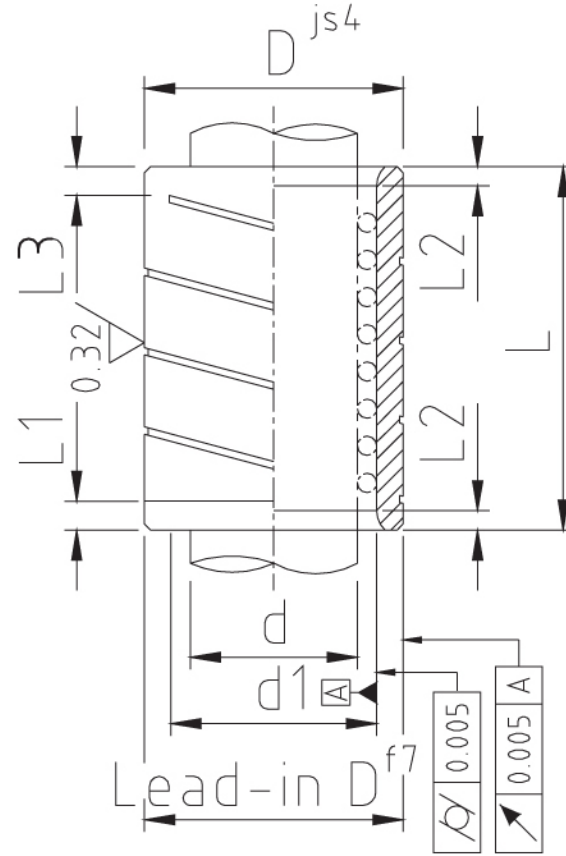
Sizes															
Diameter			Length			Part Number		Diameter			Length			Part Number	
d	d1	D	L1	L2	L			d	d1	D	L1	L2	L		
24 / 25	30 / 31	40	5	2.5	95	BAM-24-095	BAM-25-095	48 / 50	56 / 58	70	6	3	77	BAM-48-077	BAM-50-077
					110	BAM-24-110	BAM-25-110						95	BAM-48-095	BAM-50-095
					130	BAM-24-130	BAM-25-130						110	BAM-48-110	BAM-50-110
30 / 32	38 / 40	48	6	2.5	30	BAM-30-030	BAM-32-030						120	BAM-48-120	BAM-50-120
					37	BAM-30-037	BAM-32-037						130	BAM-48-130	BAM-50-130
					47	BAM-30-047	BAM-32-047						150	BAM-48-150	BAM-50-150
					60	BAM-30-060	BAM-32-060						170	BAM-48-170	BAM-50-170
					77	BAM-30-077	BAM-32-077						190	BAM-48-190	BAM-50-190
					95	BAM-30-095	BAM-32-095						215	BAM-48-215	BAM-50-215
					110	BAM-30-110	BAM-32-110						240	BAM-48-240	BAM-50-240
					130	BAM-30-130	BAM-32-130						265	BAM-48-265	BAM-50-265
					150	BAM-30-150	BAM-32-150	60 / 63	70 / 73	85	8	3.5	60	BAM-60-060	BAM-63-060
					170	BAM-30-170	BAM-32-170						77	BAM-60-077	BAM-63-077
38 / 40	46 / 48	58	6	3	30	BAM-38-030	BAM-40-030						95	BAM-60-095	BAM-63-095
					37	BAM-38-037	BAM-40-037						120	BAM-60-120	BAM-63-120
					47	BAM-38-047	BAM-40-047						150	BAM-60-150	BAM-63-150
					60	BAM-38-060	BAM-40-060						170	BAM-60-170	BAM-63-170
					77	BAM-38-077	BAM-40-077						190	BAM-60-190	BAM-63-190
					95	BAM-38-095	BAM-40-095						215	BAM-60-215	BAM-63-215
					110	BAM-38-110	BAM-40-110						240	BAM-60-240	BAM-63-240
					120	BAM-38-120	BAM-40-120						265	BAM-60-265	BAM-63-265
					130	BAM-38-130	BAM-40-130	80	92	105	8	3.5	120	BAM-80-120	
					150	BAM-38-150	BAM-40-150						135	BAM-80-135	
					170	BAM-38-170	BAM-40-170						150	BAM-80-150	
					190	BAM-38-190	BAM-40-190						170	BAM-80-170	
					215	BAM-38-215	BAM-40-215						190	BAM-80-190	
48 / 50	56 / 58	70	6	3	37	BAM-48-037	BAM-50-037						215	BAM-80-215	
					47	BAM-48-047	BAM-50-047						240	BAM-80-240	
					60	BAM-48-060	BAM-50-060						265	BAM-80-265	

\* For assembly details, please refer to page 66-78

\* Example: BAM-60-60 = Diameter 60, Length 60



<b>Material:</b>	Steel DIN 1.2067/1.3505, ISO B1/100Cr6 AISI/SAE 52100 JIS SUJ 2
<b>Hardness:</b>	60-64 HRC
<b>Finish:</b>	Precision ground
<b>Assembly:</b>	Hole bore ISO H5



Sizes								
Diameter			Length				Part Number	
d	d1	D	L1	L2	L3	L		
11 / 12	15 / 16	22	3	2	4	23	BQM-11-023	BQM-12-023
					4	30	BQM-11-030	BQM-12-030
					5	37	BQM-11-037	BQM-12-037
					4	23	BQM-15-023	BQM-16-023
15 / 16	21 / 22	28	4	2	4	30	BQM-15-030	BQM-16-030
					5	37	BQM-15-037	BQM-16-037
					7	47	BQM-15-047	BQM-16-047
					7	60	BQM-15-060	BQM-16-060
19 / 20	25 / 26	32	4	2	4	23	BQM-19-023	BQM-20-023
					4	30	BQM-19-030	BQM-20-030
					5	37	BQM-19-037	BQM-20-037
					7	47	BQM-19-047	BQM-20-047
					7	60	BQM-19-060	BQM-20-060
					7	77	BQM-19-077	BQM-20-077

Sizes								
Diameter			Length				Part Number	
d	d1	D	L1	L2	L3	L		
24 / 25	30 / 31	40	5	2.5	4	23	BQM-24-023	BQM-25-023
					4	30	BQM-24-030	BQM-25-030
					5	37	BQM-24-037	BQM-25-037
					7	47	BQM-24-047	BQM-25-047
					7	60	BQM-24-060	BQM-25-060
					7	77	BQM-24-077	BQM-25-077
					7	95	BQM-24-095	BQM-25-095
					7	110	BQM-24-110	BQM-25-110
					7	130	BQM-24-130	BQM-25-130
					30 / 32	38 / 40	48	6
5	37	BQM-30-037	BQM-32-037					
7	47	BQM-30-047	BQM-32-047					
7	60	BQM-30-060	BQM-32-060					
7	77	BQM-30-077	BQM-32-077					
7	95	BQM-30-095	BQM-32-095					
7	110	BQM-30-110	BQM-32-110					
7	130	BQM-30-130	BQM-32-130					
7	150	BQM-30-150	BQM-32-150					
7	170	BQM-30-170	BQM-32-170					
38 / 40	46 / 48	58	6	3	4	30	BQM-38-030	BQM-40-030
					5	37	BQM-38-037	BQM-40-037
					7	47	BQM-38-047	BQM-40-047
					7	60	BQM-38-060	BQM-40-060
					7	77	BQM-38-077	BQM-40-077
					7	95	BQM-38-095	BQM-40-095
					7	110	BQM-38-110	BQM-40-110
					7	120	BQM-38-120	BQM-40-120
					7	130	BQM-38-130	BQM-40-130
					7	150	BQM-38-150	BQM-40-150
48 / 50	56 / 58	70	6	3	5	37	BQM-48-037	BQM-50-037
					7	47	BQM-48-047	BQM-50-047
					7	60	BQM-48-060	BQM-50-060
					7	77	BQM-48-077	BQM-50-077
					7	95	BQM-48-095	BQM-50-095
					7	110	BQM-48-110	BQM-50-110
					7	120	BQM-48-120	BQM-50-120
					7	130	BQM-48-130	BQM-50-130
					7	150	BQM-48-150	BQM-50-150

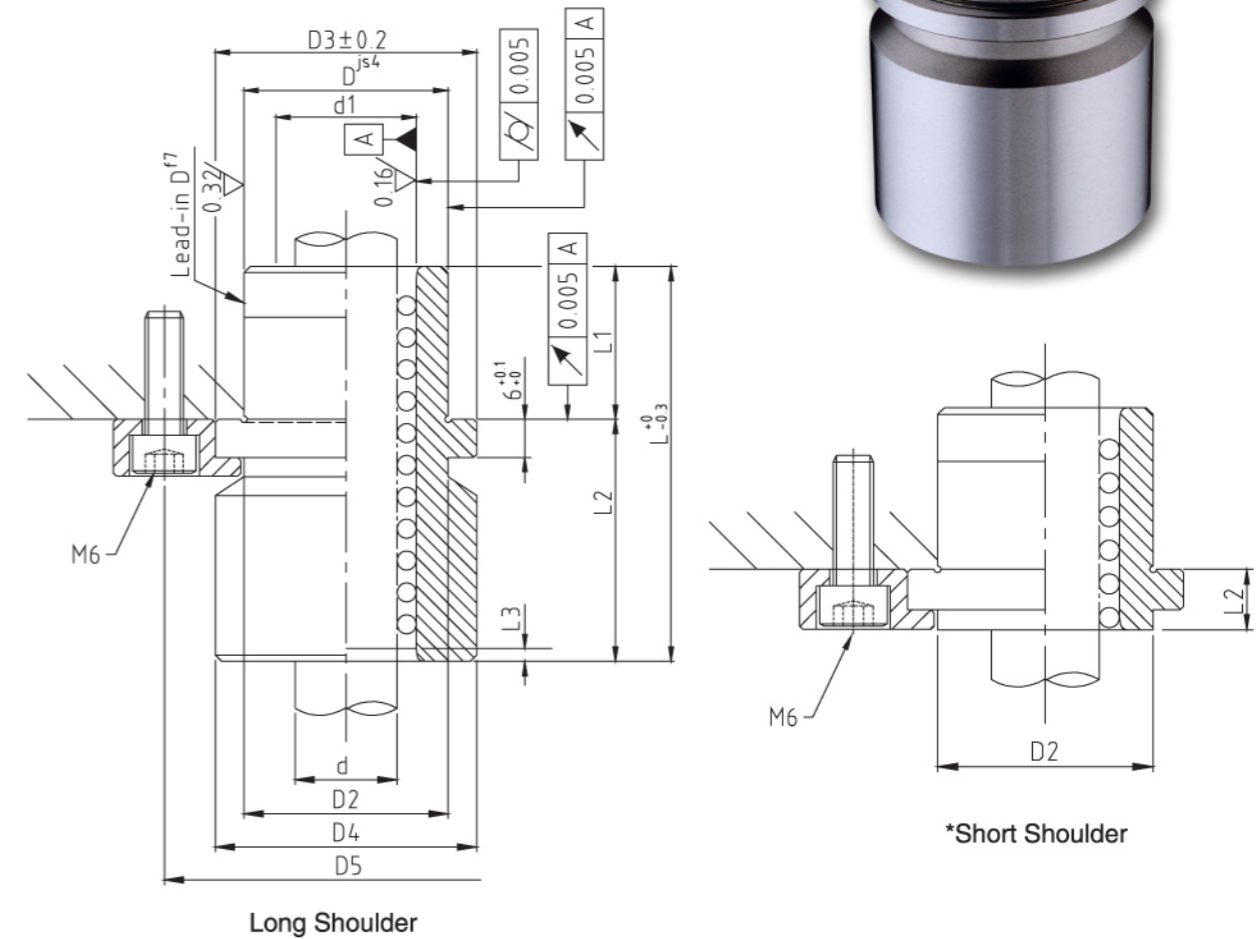


Sizes							Part Number	
Diameter			Length					
d	d1	D	L1	L2	L3	L		
48 / 50	56 / 58	70	6	3	7	170	<b>BQM-48-170</b>	<b>BQM-50-170</b>
					7	190	<b>BQM-48-190</b>	<b>BQM-50-190</b>
					7	215	<b>BQM-48-215</b>	<b>BQM-50-215</b>
					7	240	<b>BQM-48-240</b>	<b>BQM-50-240</b>
					7	265	<b>BQM-48-265</b>	<b>BQM-50-265</b>
60 / 63	70 / 73	85	8	3.5	7	60	<b>BQM-60-060</b>	<b>BQM-63-060</b>
					7	77	<b>BQM-60-077</b>	<b>BQM-63-077</b>
					7	95	<b>BQM-60-095</b>	<b>BQM-63-095</b>
					7	120	<b>BQM-60-120</b>	<b>BQM-63-120</b>
					7	150	<b>BQM-60-150</b>	<b>BQM-63-150</b>
					7	170	<b>BQM-60-170</b>	<b>BQM-63-170</b>
					7	190	<b>BQM-60-190</b>	<b>BQM-63-190</b>
					7	215	<b>BQM-60-215</b>	<b>BQM-63-215</b>
					7	240	<b>BQM-60-240</b>	<b>BQM-63-240</b>
					7	265	<b>BQM-60-265</b>	<b>BQM-63-265</b>
80	92	105	8	3.5	7	120	<b>BQM-80-120</b>	
					7	135	<b>BQM-80-135</b>	
					7	150	<b>BQM-80-150</b>	
					7	170	<b>BQM-80-170</b>	
					7	190	<b>BQM-80-190</b>	
					7	215	<b>BQM-80-215</b>	
					7	240	<b>BQM-80-240</b>	
					7	265	<b>BQM-80-265</b>	

\* For assembly details, please refer to page 66~78

\* Example: BQM-60-60 = Diameter 60, Length 60

<b>Material:</b>	Steel DIN 1.2067/1.3505, ISO B1/100Cr6 AISI/SAE 52100 JIS SUJ 2
<b>Hardness:</b>	60-64 HRC
<b>Finish:</b>	Precision ground
<b>Assembly:</b>	Hole bore ISO H5



Sizes												
Diameter							Length				Part Number	
d	d1	D	D2	D3	D4	D5	L	L1	L2	L3		
11 / 12	15 / 16	22	22	30	-	47	28	18	10*	2	BBM-11-028-18	BBM-12-028-18
							33	23	10*		BBM-11-033-23	BBM-12-033-23
15 / 16	22 / 23	28	28	36	36	53	33	23	10*	2	BBM-15-033-23	BBM-16-033-23
							40	30	10*		BBM-15-040-30	BBM-16-040-30
							55	23	32		BBM-15-055-23	BBM-16-055-23
							70	38	32		BBM-15-070-38	BBM-16-070-38
19 / 20	25 / 26	32	32	39	39	56	35	23	12*	2	BBM-19-035-23	BBM-20-035-23
							43	23	20		BBM-19-043-23	BBM-20-043-23
							49	37	12*	2	BBM-19-049-37	BBM-20-049-37



Sizes												Part Number	
Diameter						Length							
d	d1	D	D2	D3	D4	D5	L	L1	L2	L3			
19 / 20	25 / 26	32	32	39	39	56	59	23	36	2		BBM-19-059-23	BBM-20-059-23
							69	37	32			BBM-19-069-37	BBM-20-069-37
							75	30	45			BBM-19-075-30	BBM-20-075-30
24 / 25	30 / 31	40	40	48	46	65	35	23	12*	2.5		BBM-24-035-23	BBM-25-035-23
							49	37	12*			BBM-24-049-37	BBM-25-049-37
							55	30	25			BBM-24-055-30	BBM-25-055-30
							59	23	36			BBM-24-059-23	BBM-25-059-23
							69	37	32			BBM-24-069-37	BBM-25-069-37
							80	30	50			BBM-24-080-30	BBM-25-080-30
							97	47	50			BBM-24-097-47	BBM-25-097-47
30 / 32	38 / 40	48	48	56	53	73	42	30	12*	2.5		BBM-30-042-30	BBM-32-042-30
							59	47	12*			BBM-30-059-47	BBM-32-059-47
							75	30	45			BBM-30-075-30	BBM-32-075-30
							80	60	20			BBM-30-080-60	BBM-32-080-60
							93	30	63			BBM-30-093-30	BBM-32-093-30
							97	47	50			BBM-30-097-47	BBM-32-097-47
							116	60	56			BBM-30-116-60	BBM-32-116-60
38 / 40	46 / 48	58	58	66	63	83	52	37	15*	3		BBM-38-052-37	BBM-40-052-37
							75	60	15*			BBM-38-075-60	BBM-40-075-60
							79	47	32			BBM-38-079-47	BBM-40-079-47
							97	47	50			BBM-38-097-47	BBM-40-097-47
							108	37	71			BBM-38-108-37	BBM-40-108-37
							116	60	56			BBM-38-116-60	BBM-40-116-60
							129	75	54			BBM-38-129-75	BBM-40-129-75
48 / 50	56 / 58	70	70	79	77	96	65	47	18*	3		BBM-48-065-47	BBM-50-065-47
							78	60	18*			BBM-48-078-60	BBM-50-078-60
							97	47	50			BBM-48-097-47	BBM-50-097-47
							108	37	71			BBM-48-108-37	BBM-50-108-37
							127	47	80			BBM-48-127-47	BBM-50-127-47
							131	60	71			BBM-48-131-60	BBM-50-131-60
							142	75	67			BBM-48-142-75	BBM-50-142-75
60 / 63	70 / 73	85	85	95	92	111	80	60	20*	3.5		BBM-60-080-60	BBM-63-080-60
							115	60	55			BBM-60-115-60	BBM-63-115-60
							150	60	90			BBM-60-150-60	BBM-63-150-60
							162	98	64			BBM-60-162-98	BBM-63-162-98
80	92	105	105	118	114	135	80	60	20*	3.5		BBM-80-080-60	BBM-80-080-60
							120	60	60			BBM-80-120-60	BBM-80-120-60
							150	60	90			BBM-80-150-60	BBM-80-150-60

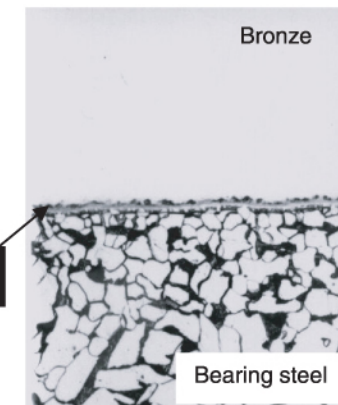
\* - Short Shoulder

\* For assembly details, please refer to page 66 ~ 79

\* Example:BBM-60-080 = Diameter 60, overall length 80,L1 60

### Bronzed Plated Bushings

Steel Bronze plated bushings are characterized by their high load capacity and resistance to wear. In addition, they have very good heat dissipation characteristics that ensure the rapid disbursement of excessive frictional heat. The internal lubrication system must be supplied with high quality oil or grease several times a day, depending on sliding speed. The recommended sliding speed is 15-30 meters per minute.



Due to the fact that solid lubricant is being distributed on the bushing, these particular bushings have the distinction of self-lubrication and do not undergo any deformation, even after continuous, long-term use.

Maintenance free guide bushings can be used without lubrication, but performance will be further enhanced with initial break-in grease or lubrication.

Item No. BCM, BDM, BEM, BFM, BGM

Material: Steel DIN 1.2067/1.3505, ISO B1/100Cr6, AISI/SAE 52100 JIS SUJ2 (58-63 HRC), Bronze  
 Assembly: Hole bore ISO H5

### Solid Bronze Bushings

The alloy bushings series are made of high strength tension brass alloy and an application of Molybdenum Disulphide (MoS<sub>2</sub>). The MoS<sub>2</sub> provides a self-lubricating solution: improving the extreme pressure load carrying capacity and by helping to reduce both the operating temperature as well as component wear rates up to 30 meters per minute.

Item No. BJM, BHM, BNM, BLM, BKM

Material: Bronze  
 Assembly: Hole bore ISO H5

### Internal Graphite Bushings

These self-lubricating bushings contain Molybdenum Disulphide (MoS<sub>2</sub>) lubricant which is suitable in environments where standard lubrication is impractical. The lubricant is designed to integrate to the bearings, thus requiring no grease or oil, permitting continuous operation and eliminating downtime.

In addition, they are tolerant to a wide range of temperature environments, have good anti-corrosion and chemical resistance properties, and able to maintain their accuracy and prevent any variation of their physical properties during use.

They provide an effective solution or reducing the friction and increase the speed of production line.

Minimum diameter available: ø38mm

Item No. BGM, BMM

Material: Steel DIN 1.2067/1.3505, ISO B1/100Cr6, AISI/SAE 52100 JIS SUJ 2 (58-63 HRC), Bronze  
 Assembly: Hole bore ISO H5



**With MoS<sub>2</sub> filled spiral groove**

Steel w/ Bronze plating and MoS<sub>2</sub>  
Item No. BCM

Solid Bronze w/ MoS<sub>2</sub>  
Item No. BHM

Long shoulder

Short shoulder

**With MoS<sub>2</sub> filled groove**

Steel w/ Bronze plating and MoS<sub>2</sub>  
Item No. BEM

Solid Bronze w/MoS<sub>2</sub>  
Item No. BKM

Long shoulder

Short shoulder

Sizes see page 39-40

**With spiral oil groove & lubrication fitting**

Steel w/ Bronze plating  
Item No. BDM

Solid Bronze  
Item No. BJM

Long shoulder

Short shoulder

Lubrication Fitting (M)

**With MoS<sub>2</sub> plug inserts**

Solid Bronze  
Item No. BNM


Long shoulder

Short shoulder

Sizes see page 39-40

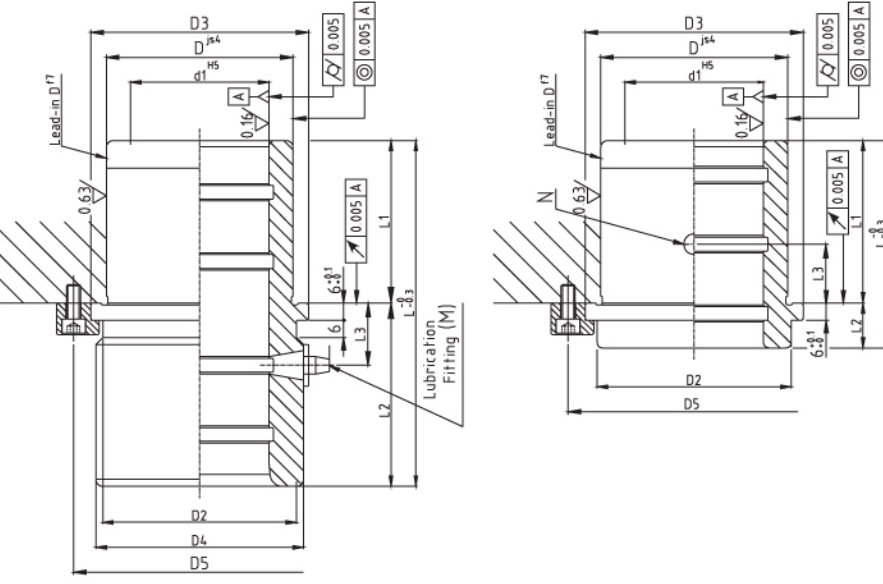


**With round oil groove & lubrication fitting**



Steel w/ Bronze plating  
Item No. BFM


Solid Bronze  
Item No. BLM



Long shoulder

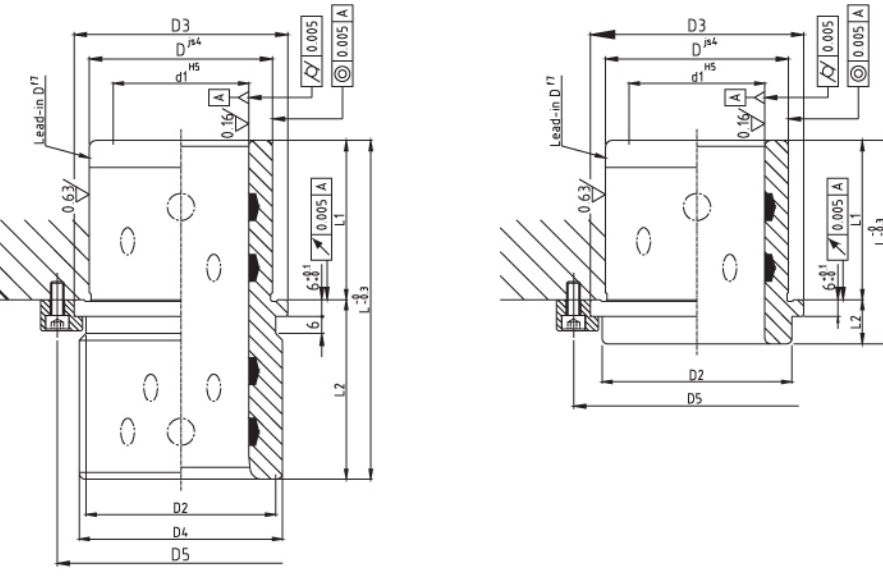
Short shoulder

**With MoS<sub>2</sub> inserts**



Steel w/ Bronze plating  
Item No. BGM

Solid Bronze  
Item No. BMM



Long shoulder

Short shoulder

Sizes see page 39-40

Sizes													Part Number					
Diameter					Length				Thread									
d1	D	D2	D3	D4	D5	L	L1	L2	L3	M	N							
11 / 12	22	22	30	-	47	28	18	10*	4	-	4	XXX-11-028-18	XXX-12-028-18					
						33	23	10*	6.5	-	4	XXX-11-033-23	XXX-12-033-23					
15 / 16	28	28	36	36	53	33	23	10*	6.5	-	4	XXX-15-033-23	XXX-16-033-23					
						40	30	10*	10	-	4	XXX-15-040-30	XXX-16-040-30					
						55	23	32	16	M6*1	-	XXX-15-055-23	XXX-16-055-23					
						70	38	32	16	M6*1	-	XXX-15-070-38	XXX-16-070-38					
19 / 20	32	32	39	39	56	35	23	12*	5.5	-	5	XXX-19-035-23	XXX-20-035-23					
						43	23	20	13	M6*1	-	XXX-19-043-23	XXX-20-043-23					
						49	37	12*	12.5	-	5	XXX-19-049-37	XXX-20-049-37					
						59	23	36	16	M6*1	-	XXX-19-059-23	XXX-20-059-23					
						69	37	32	16	M6*1	-	XXX-19-069-37	XXX-20-069-37					
						75	30	45	20	M6*1	-	XXX-19-075-30	XXX-20-075-30					
24 / 25	40	40	48	46	65	35	23	12*	5.5	-	5	XXX-24-035-23	XXX-25-035-23					
						49	37	12*	12.5	-	5	XXX-24-049-37	XXX-25-049-37					
						55	30	25	13	M6*1	-	XXX-24-055-30	XXX-25-055-30					
						59	23	36	16	M6*1	-	XXX-24-059-23	XXX-25-059-23					
						69	37	32	16	M6*1	-	XXX-24-069-37	XXX-25-069-37					
						80	30	50	20	M6*1	-	XXX-24-080-30	XXX-25-080-30					
						97	47	50	20	M6*1	-	XXX-24-097-47	XXX-25-097-47					
						30 / 32	48	48	56	53	73	42	30	12*	9	-	5	XXX-30-042-30
59	47	12*	17.5	-	5	XXX-30-059-47						XXX-32-059-47						
75	60	15*	22.5	-	5	XXX-30-075-60						XXX-32-075-60						
80	30	50	20	M10*1	-	XXX-30-080-30						XXX-32-080-30						
93	30	63	20	M10*1	-	XXX-30-093-30						XXX-32-093-30						
97	47	50	20	M10*1	-	XXX-30-097-47						XXX-32-097-47						
116	60	56	20	M10*1	-	XXX-30-116-60						XXX-32-116-60						
38 / 40	58	58	66	63	83	52						37	15*	11	-	6	XXX-38-052-37	XXX-40-052-37
75						60	15*	22.5	-	6	XXX-38-075-60	XXX-40-075-60						
79						47	32	16	M10*1	-	XXX-38-079-47	XXX-40-079-47						
108						37	71	20	M10*1	-	XXX-38-108-37	XXX-40-108-37						
116						60	56	20	M10*1	-	XXX-38-116-60	XXX-40-116-60						
129						75	54	20	M10*1	-	XXX-38-129-75	XXX-40-129-75						
48 / 50						70	70	79	77	96	65	47	18*	21	-	6	XXX-48-065-47	XXX-50-065-47
78											60	18*	21	-	6	XXX-48-078-60	XXX-50-078-60	
97	47	50	20	M10*1	-						XXX-48-097-47	XXX-50-097-47						
127	47	80	20	M10*1	-						XXX-48-127-47	XXX-50-127-47						
131	60	71	20	M10*1	-						XXX-48-131-60	XXX-50-131-60						
142	75	67	20	M10*1	-						XXX-48-142-75	XXX-50-142-75						
60 / 63	85	85	95	92	111	80	60	20*	20	-	6	XXX-60-080-60	XXX-63-080-60					
115						60	55	20	M10*1	-	XXX-60-115-60	XXX-63-115-60						
150						60	90	20	M10*1	-	XXX-60-150-60	XXX-63-150-60						

Sizes													Part Number	
Diameter					Length				Thread					
d1	D	D2	D3	D4	D5	L	L1	L2	L3	M	N			
80	105	105	118	114	135	80	60	20*	20	M10*1	—	XXX-80-080-60	XXX-80-080-60	
						120	60	60	20	M10*1		XXX-80-120-60	XXX-80-120-60	
						150	60	90	20	M10*1		XXX-80-150-60	XXX-80-150-60	

Order Note: Please add the appropriate prefix to designate desired type.

BCM: Steel w/ Bronze plating with MoS2 filled spiral groove

(For assembly details, please refer to page 58, 59, 61, 62, 64)

BDM: Steel w/ Bronze plating with spiral oil groove and lubrication fitting

(For assembly details, please refer to page 58, 59, 61, 62, 64)

BEM: Steel w/ Bronze plating with MoS2 filled oil groove

(For assembly details, please refer to page 58, 59, 61, 62, 64)

BFM: Steel w/ Bronze plating with oil groove and lubrication fitting

(For assembly details, please refer to page 58, 59, 61, 62, 64)

BGM: Steel w/ Bronze plating with MoS2 inserts - [Minimum diameter available: Dia.40mm]

(For assembly details, please refer to page 58, 60, 61, 63, 64)

BHM: Solid Bronze with MoS2 filled spiral groove

(For assembly details, please refer to page 58, 60, 61, 63, 64)

BJM: Solid Bronze with spiral oil groove and lubrication fitting

(For assembly details, please refer to page 58, 60, 61, 63, 64)

BKM: Solid Bronze with MoS2 filled groove

(For assembly details, please refer to page 58, 60, 61, 63, 64)

BLM: Solid Bronze with oil groove and lubrication fitting

(For assembly details, please refer to page 59, 60, 62, 63, 65)

BMM: Solid Bronze with MoS2 inserts - [Minimum diameter available: Dia.40mm]

(For assembly details, please refer to page 59, 60, 62, 63, 65)

BNM: Solid Bronze with MoS2 inserts

(For assembly details, please refer to page 59, 60, 62, 63, 65)

BPM: Solid steel with spiral oil groove and lubrication fitting

(For assembly details, please refer to page 59, 60, 62, 63, 65)

Example: BNM-60-115-60L = Inside diameter 60mm, Overall length 115mm,  
L1=60mm Solid Bronze with graphite plugged

\* - Short Shoulder



## Ball Cage Series





Aluminum cage with black anodized finish



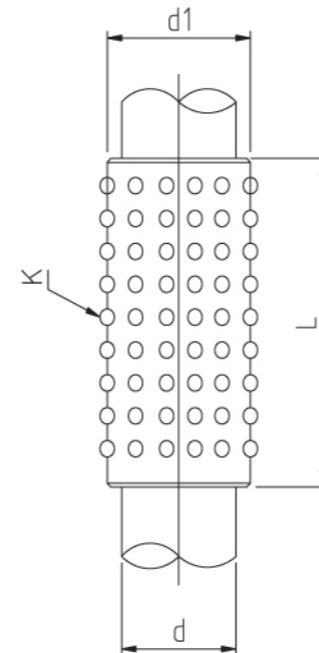
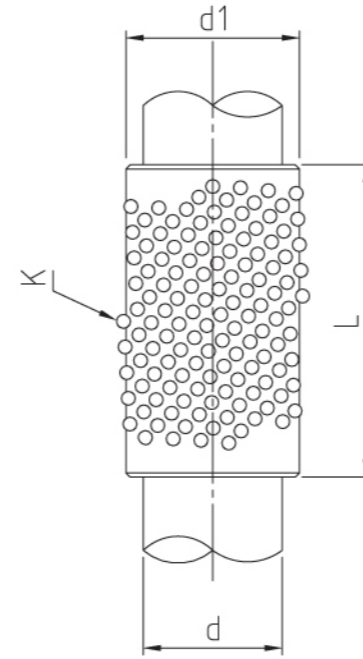
Brass cage



Aluminum cage with black anodized finish



POM cage



Sizes																	
Diameter				Length		Part Number		Diameter				Length		Part Number			
d	d1	K	L	Part Number		d	d1	K	L	Part Number		d	d1	K	L	Part Number	
11 / 12	15 / 16	2	20	CAM-11-020xx	CAM-12-020xx	15 / 16	21 / 22	3	25	CAM-15-025xx	CAM-16-025xx						
			30	CAM-11-030xx	CAM-12-030xx				30	CAM-15-030xx	CAM-16-030xx						
			35	CAM-11-035xx	CAM-12-035xx				35	CAM-15-035xx	CAM-16-035xx						
			40	CAM-11-040xx	CAM-12-040xx				40	CAM-15-040xx	CAM-16-040xx						
			50	CAM-11-050xx	CAM-12-050xx				50	CAM-15-050xx	CAM-16-050xx						

Sizes																	
Diameter				Length		Part Number		Diameter				Length		Part Number			
d	d1	K	L	Part Number		d	d1	K	L	Part Number		d	d1	K	L	Part Number	
15 / 16	21 / 22	3	60	CAM-15-060xx	CAM-16-060xx	38 / 40	46 / 48	4	100	CAM-38-100xx	CAM-40-100xx						
19 / 20	25 / 26	3	30	CAM-19-030xx	CAM-20-030xx				110	CAM-38-110xx	CAM-40-110xx						
			35	CAM-19-035xx	CAM-20-035xx				130	CAM-38-130xx	CAM-40-130xx						
			40	CAM-19-040xx	CAM-20-040xx				150	CAM-38-150xx	CAM-40-150xx						
			50	CAM-19-050xx	CAM-20-050xx				170	CAM-38-170xx	CAM-40-170xx						
			60	CAM-19-060xx	CAM-20-060xx	48 / 50	56 / 58	4	50	CAM-48-050xx	CAM-50-050xx						
			70	CAM-19-070xx	CAM-20-070xx				60	CAM-48-060xx	CAM-50-060xx						
			80	CAM-19-080xx	CAM-20-080xx				70	CAM-48-070xx	CAM-50-070xx						
24 / 25	30 / 31	3	30	CAM-24-030xx	CAM-25-030xx				80	CAM-48-080xx	CAM-50-080xx						
			40	CAM-24-040xx	CAM-25-040xx				90	CAM-48-090xx	CAM-50-090xx						
			50	CAM-24-050xx	CAM-25-050xx				100	CAM-48-100xx	CAM-50-100xx						
			60	CAM-24-060xx	CAM-25-060xx				110	CAM-48-110xx	CAM-50-110xx						
			70	CAM-24-070xx	CAM-25-070xx				130	CAM-48-130xx	CAM-50-130xx						
			80	CAM-24-080xx	CAM-25-080xx				150	CAM-48-150xx	CAM-50-150xx						
			90	CAM-24-090xx	CAM-25-090xx				170	CAM-48-170xx	CAM-50-170xx						
			100	CAM-24-100xx	CAM-25-100xx	60 / 63	70 / 73	5	70	CAM-60-070xx	CAM-63-070xx						
30 / 32	38 / 40	4	40	CAM-30-040xx	CAM-32-040xx				80	CAM-60-080xx	CAM-63-080xx						
			50	CAM-30-050xx	CAM-32-050xx				90	CAM-60-090xx	CAM-63-090xx						
			60	CAM-30-060xx	CAM-32-060xx				110	CAM-60-110xx	CAM-63-110xx						
			70	CAM-30-070xx	CAM-32-070xx				130	CAM-60-130xx	CAM-63-130xx						
			80	CAM-30-080xx	CAM-32-080xx				150	CAM-60-150xx	CAM-63-150xx						
			90	CAM-30-090xx	CAM-32-090xx				170	CAM-60-170xx	CAM-63-170xx						
			100	CAM-30-100xx	CAM-32-100xx	80	92	6	100	CAM-80-100xx							
			110	CAM-30-110xx	CAM-32-110xx				110	CAM-80-110xx							
38 / 40	46 / 48	4	50	CAM-38-050xx	CAM-40-050xx				130	CAM-80-130xx							
			60	CAM-38-060xx	CAM-40-060xx				150	CAM-80-150xx							
			70	CAM-38-070xx	CAM-40-070xx				170	CAM-80-170xx							
			80	CAM-38-080xx	CAM-40-080xx				200	CAM-80-200xx							
			90	CAM-38-090xx	CAM-40-090xx												

Order note: Please add the appropriate suffix to designate desired material type.

AL: Aluminum cage with black anodized finish

BR: Brass cage

PM: POM cage

RL: Regular alignment of steel balls (only for Aluminum and POM cages, suffix followed after material code.)

Example: CAM-040-040AL = Rigid alignment, diameter 40mm, Length 40mm, aluminum cage.

CAM-050-060AL-RL=Regular alignment, diameter 50mm, Length 60, aluminum cage.

For assembly details, please refer to page 73, 74, 75





Aluminum cage with black anodized finish



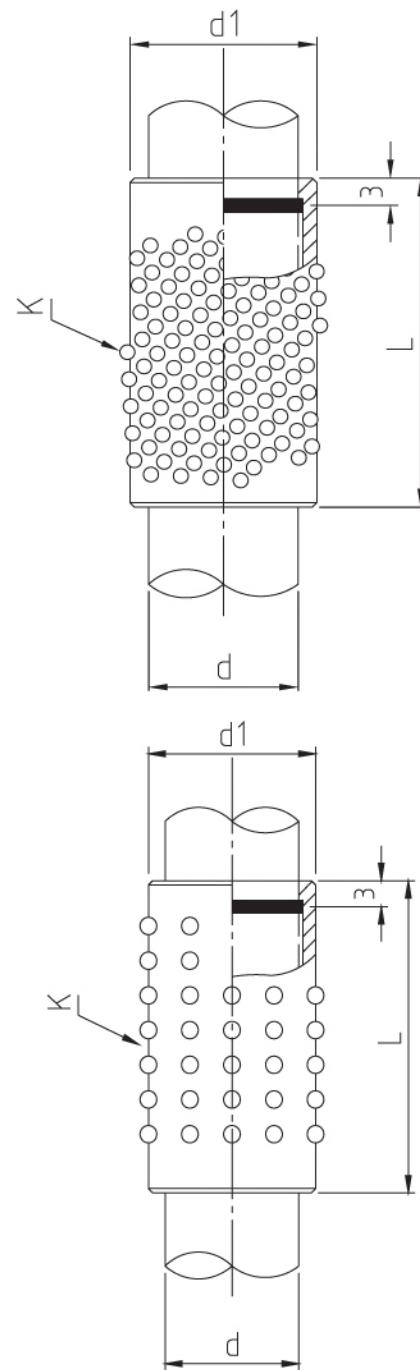
Brass cage



Aluminum cage with black anodized finish



POM cage



Sizes												
Diameter		Length		Part Number		Diameter			Length		Part Number	
d	d1	K	L			d	d1	K	L			
11 / 12	15 / 16	2	20	CBM-11-020xx	CBM-12-020xx	15 / 16	21 / 22	3	35	CBM-15-035xx	CBM-16-035xx	
			30	CBM-11-030xx	CBM-12-030xx				40	CBM-15-040xx	CBM-16-040xx	
			35	CBM-11-035xx	CBM-12-035xx				50	CBM-15-050xx	CBM-16-050xx	
			40	CBM-11-040xx	CBM-12-040xx				60	CBM-15-060xx	CBM-16-060xx	
			50	CBM-11-050xx	CBM-12-050xx	19 / 20	25 / 26	3	30	CBM-19-030xx	CBM-20-030xx	
15 / 16	21 / 22	3	25	CBM-15-025xx	CBM-16-025xx				35	CBM-19-035xx	CBM-20-035xx	
			30	CBM-15-030xx	CBM-16-030xx				40	CBM-19-040xx	CBM-20-040xx	

Sizes												
Diameter		Length		Part Number		Diameter			Length		Part Number	
d	d1	K	L			d	d1	K	L			
19 / 20	25 / 26	3	50	CBM-19-050xx	CBM-20-050xx	38 / 40	46 / 48	4	130	CBM-38-130xx	CBM-40-130xx	
			60	CBM-19-060xx	CBM-20-060xx				150	CBM-38-150xx	CBM-40-150xx	
			70	CBM-19-070xx	CBM-20-070xx				170	CBM-38-170xx	CBM-40-170xx	
			80	CBM-19-080xx	CBM-20-080xx	48 / 50	56 / 58	4	50	CBM-48-050xx	CBM-50-050xx	
24 / 25	30 / 31	3	30	CBM-24-030xx	CBM-25-030xx				60	CBM-48-060xx	CBM-50-060xx	
			40	CBM-24-040xx	CBM-25-040xx				70	CBM-48-070xx	CBM-50-070xx	
			50	CBM-24-050xx	CBM-25-050xx				80	CBM-48-080xx	CBM-50-080xx	
			60	CBM-24-060xx	CBM-25-060xx				90	CBM-48-090xx	CBM-50-090xx	
			70	CBM-24-070xx	CBM-25-070xx				100	CBM-48-100xx	CBM-50-100xx	
			80	CBM-24-080xx	CBM-25-080xx				110	CBM-48-110xx	CBM-50-110xx	
			90	CBM-24-090xx	CBM-25-090xx				130	CBM-48-130xx	CBM-50-130xx	
			100	CBM-24-100xx	CBM-25-100xx				150	CBM-48-150xx	CBM-50-150xx	
30 / 32	38 / 40	4	40	CBM-30-040xx	CBM-32-040xx				170	CBM-48-170xx	CBM-50-170xx	
			50	CBM-30-050xx	CBM-32-050xx	60 / 63	70 / 73	5	70	CBM-60-070xx	CBM-63-070xx	
			60	CBM-30-060xx	CBM-32-060xx				80	CBM-60-080xx	CBM-63-080xx	
			70	CBM-30-070xx	CBM-32-070xx				90	CBM-60-090xx	CBM-63-090xx	
			80	CBM-30-080xx	CBM-32-080xx				110	CBM-60-110xx	CBM-63-110xx	
			90	CBM-30-090xx	CBM-32-090xx				130	CBM-60-130xx	CBM-63-130xx	
			100	CBM-30-100xx	CBM-32-100xx				150	CBM-60-150xx	CBM-63-150xx	
			110	CBM-30-110xx	CBM-32-110xx				170	CBM-60-170xx	CBM-63-170xx	
38 / 40	46 / 48	4	50	CBM-38-050xx	CBM-40-050xx	80	92	6	100	CBM-80-100xx		
			60	CBM-38-060xx	CBM-40-060xx				110	CBM-80-110xx		
			70	CBM-38-070xx	CBM-40-070xx				130	CBM-80-130xx		
			80	CBM-38-080xx	CBM-40-080xx				150	CBM-80-150xx		
			90	CBM-38-090xx	CBM-40-090xx				170	CBM-80-170xx		
			100	CBM-38-100xx	CBM-40-100xx				200	CBM-80-200xx		
			110	CBM-38-110xx	CBM-40-110xx							

Order note: Please add the appropriate suffix to designate desired material type.

AL: Aluminum cage with black anodized finish

BR: Brass cage

PM: POM cage

RL: Regular alignment of steel balls (only for Aluminum and POM cages, suffix followed after material code.)

Example: CBM-040-040AL = Rigid alignment, diameter 40mm, Length 40mm, aluminum cage.

CBM-050-060AL-RL=Regular alignment, diameter 50mm, Length 60, aluminum cage.

For assembly details, please refer to page 66, 67.





Aluminum cage with black anodized finish



Brass cage

Regular alignment of steel balls

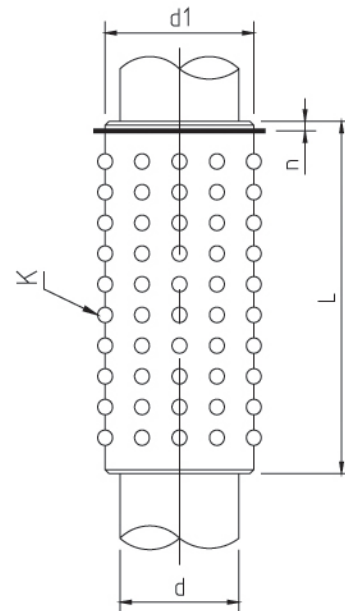
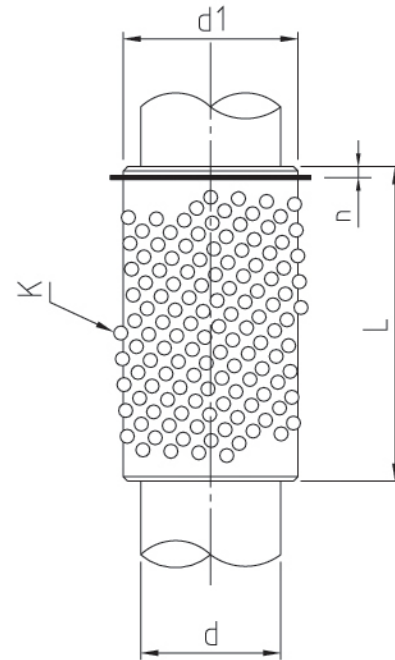


Aluminum cage with black anodized finish



POM cage

d	n
11 – 25	3
30 – 50	4
60 – 63	5
80	6



Sizes													
Diameter				Length	Part Number		Diameter				Length	Part Number	
d	d1	K	L		d	d1	K	L	d	d1		K	L
11 / 12	15 / 16	2	20	CCM-11-020xx	CCM-12-020xx	15 / 16	21 / 22	3	25	CCM-15-025xx	CCM-16-025xx		
			30	CCM-11-030xx	CCM-12-030xx				30	CCM-15-030xx	CCM-16-030xx		
			35	CCM-11-035xx	CCM-12-035xx				35	CCM-15-035xx	CCM-16-035xx		
			40	CCM-11-040xx	CCM-12-040xx				40	CCM-15-040xx	CCM-16-040xx		
			50	CCM-11-050xx	CCM-12-050xx				50	CCM-15-050xx	CCM-16-050xx		

Sizes													
Diameter				Length	Part Number		Diameter				Length	Part Number	
d	d1	K	L		d	d1	K	L	d	d1		K	L
15 / 16	21 / 22	3	60	CCM-15-060xx	CCM-16-060xx	38 / 40	46 / 48	4	100	CCM-38-100xx	CCM-40-100xx		
19 / 20	25 / 26	3	30	CCM-19-030xx	CCM-20-030xx				110	CCM-38-110xx	CCM-40-110xx		
			35	CCM-19-035xx	CCM-20-035xx				130	CCM-38-130xx	CCM-40-130xx		
			40	CCM-19-040xx	CCM-20-040xx				150	CCM-38-150xx	CCM-40-150xx		
			50	CCM-19-050xx	CCM-20-050xx				170	CCM-38-170xx	CCM-40-170xx		
			60	CCM-19-060xx	CCM-20-060xx	48 / 50	56 / 58	4	50	CCM-48-050xx	CCM-50-050xx		
			70	CCM-19-070xx	CCM-20-070xx				60	CCM-48-060xx	CCM-50-060xx		
			80	CCM-19-080xx	CCM-20-080xx				70	CCM-48-070xx	CCM-50-070xx		
24 / 25	30 / 31	3	30	CCM-24-030xx	CCM-25-030xx				80	CCM-48-080xx	CCM-50-080xx		
			40	CCM-24-040xx	CCM-25-040xx				90	CCM-48-090xx	CCM-50-090xx		
			50	CCM-24-050xx	CCM-25-050xx				100	CCM-48-100xx	CCM-50-100xx		
			60	CCM-24-060xx	CCM-25-060xx				110	CCM-48-110xx	CCM-50-110xx		
			70	CCM-24-070xx	CCM-25-070xx				130	CCM-48-130xx	CCM-50-130xx		
			80	CCM-24-080xx	CCM-25-080xx				150	CCM-48-150xx	CCM-50-150xx		
			90	CCM-24-090xx	CCM-25-090xx				170	CCM-48-170xx	CCM-50-170xx		
			100	CCM-24-100xx	CCM-25-100xx	60 / 63	70 / 73	5	70	CCM-60-070xx	CCM-63-070xx		
30 / 32	38 / 40	4	40	CCM-30-040xx	CCM-32-040xx				80	CCM-60-080xx	CCM-63-080xx		
			50	CCM-30-050xx	CCM-32-050xx				90	CCM-60-090xx	CCM-63-090xx		
			60	CCM-30-060xx	CCM-32-060xx				110	CCM-60-110xx	CCM-63-110xx		
			70	CCM-30-070xx	CCM-32-070xx				130	CCM-60-130xx	CCM-63-130xx		
			80	CCM-30-080xx	CCM-32-080xx				150	CCM-60-150xx	CCM-63-150xx		
			90	CCM-30-090xx	CCM-32-090xx				170	CCM-60-170xx	CCM-63-170xx		
			100	CCM-30-100xx	CCM-32-100xx	80	92	6	100	CCM-80-100xx			
			110	CCM-30-110xx	CCM-32-110xx				110	CCM-80-110xx			
38 / 40	46 / 48	4	50	CCM-38-050xx	CCM-40-050xx				130	CCM-80-130xx			
			60	CCM-38-060xx	CCM-40-060xx				150	CCM-80-150xx			
			70	CCM-38-070xx	CCM-40-070xx				170	CCM-80-170xx			
			80	CCM-38-080xx	CCM-40-080xx				200	CCM-80-200xx			
			90	CCM-38-090xx	CCM-40-090xx								

Order note: Please add the appropriate suffix to designate desired material type.

AL: Aluminum cage with black anodized finish

BR: Brass cage

PM: POM cage

RL: Regular alignment of steel balls (only for Aluminum and POM cages, suffix followed after material code.)

Example: CCM-040-040AL = Rigid alignment, diameter 40mm, Length 40mm, aluminum cage.

CCM-050-060AL-RL=Regular alignment, diameter 50mm, Length 60, aluminum cage.

For assembly details, please refer to page 67,73~79.

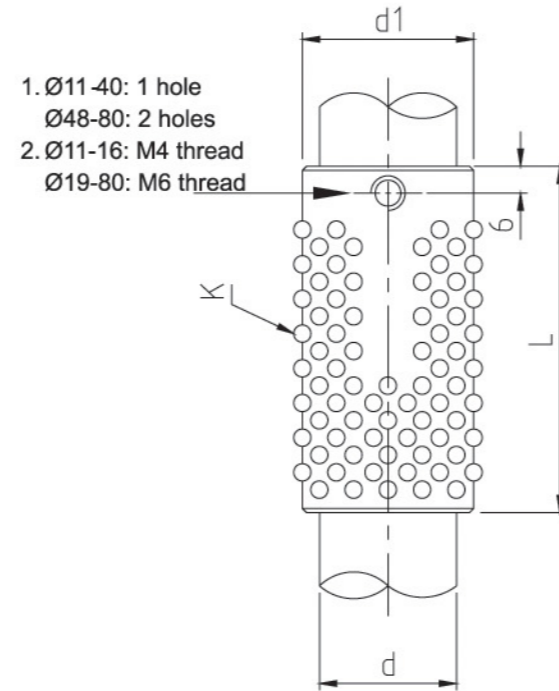




Aluminum cage with black anodized finish



Brass cage



Sizes											
Diameter		Length		Part Number		Diameter		Length		Part Number	
d	d1	K	L			d	d1	K	L		
11 / 12	15 / 16	2	20	CDM-11-020xx	CDM-12-020xx	24 / 25	30 / 31	3	70	CDM-24-070xx	CDM-25-070xx
			30	CDM-11-030xx	CDM-12-030xx				80	CDM-24-080xx	CDM-25-080xx
			35	CDM-11-035xx	CDM-12-035xx				90	CDM-24-090xx	CDM-25-090xx
			40	CDM-11-040xx	CDM-12-040xx				100	CDM-24-100xx	CDM-25-100xx
			50	CDM-11-050xx	CDM-12-050xx	30 / 32	38 / 40	4	40	CDM-30-040xx	CDM-32-040xx
15 / 16	21 / 22	3	25	CDM-15-025xx	CDM-16-025xx				50	CDM-30-050xx	CDM-32-050xx
			30	CDM-15-030xx	CDM-16-030xx				60	CDM-30-060xx	CDM-32-060xx
			35	CDM-15-035xx	CDM-16-035xx				70	CDM-30-070xx	CDM-32-070xx
			40	CDM-15-040xx	CDM-16-040xx				80	CDM-30-080xx	CDM-32-080xx
			50	CDM-15-050xx	CDM-16-050xx				90	CDM-30-090xx	CDM-32-090xx
			60	CDM-15-060xx	CDM-16-060xx				100	CDM-30-100xx	CDM-32-100xx
19 / 20	25 / 26	3	30	CDM-19-030xx	CDM-20-030xx				110	CDM-30-110xx	CDM-32-110xx
			35	CDM-19-035xx	CDM-20-035xx	38 / 40	46 / 48	4	50	CDM-38-050xx	CDM-40-050xx
			40	CDM-19-040xx	CDM-20-040xx				60	CDM-38-060xx	CDM-40-060xx
			50	CDM-19-050xx	CDM-20-050xx				70	CDM-38-070xx	CDM-40-070xx
			60	CDM-19-060xx	CDM-20-060xx				80	CDM-38-080xx	CDM-40-080xx
			70	CDM-19-070xx	CDM-20-070xx				90	CDM-38-090xx	CDM-40-090xx
			80	CDM-19-080xx	CDM-20-080xx				100	CDM-38-100xx	CDM-40-100xx
24 / 25	30 / 31	3	30	CDM-24-030xx	CDM-25-030xx				110	CDM-38-110xx	CDM-40-110xx
			40	CDM-24-040xx	CDM-25-040xx				130	CDM-38-130xx	CDM-40-130xx
			50	CDM-24-050xx	CDM-25-050xx				150	CDM-38-150xx	CDM-40-150xx
			60	CDM-24-060xx	CDM-25-060xx				170	CDM-38-170xx	CDM-40-170xx

Sizes											
Diameter		Length		Part Number		Diameter		Length		Part Number	
d	d1	K	L			d	d1	K	L		
48 / 50	56 / 58	4	50	CDM-48-050xx	CDM-50-050xx	60 / 63	70 / 73	5	90	CDM-60-090xx	CDM-63-090xx
			60	CDM-48-060xx	CDM-50-060xx				110	CDM-60-110xx	CDM-63-110xx
			70	CDM-48-070xx	CDM-50-070xx				130	CDM-60-130xx	CDM-63-130xx
			80	CDM-48-080xx	CDM-50-080xx				150	CDM-60-150xx	CDM-63-150xx
			90	CDM-48-090xx	CDM-50-090xx				170	CDM-60-170xx	CDM-63-170xx
			100	CDM-48-100xx	CDM-50-100xx	80	92	6	100	CDM-80-100xx	
			110	CDM-48-110xx	CDM-50-110xx				110	CDM-80-110xx	
			130	CDM-48-130xx	CDM-50-130xx				130	CDM-80-130xx	
			150	CDM-48-150xx	CDM-50-150xx				150	CDM-80-150xx	
			170	CDM-48-170xx	CDM-50-170xx				170	CDM-80-170xx	
60 / 63	70 / 73	5	70	CDM-60-070xx	CDM-63-070xx				200	CDM-80-200xx	
			80	CDM-60-080xx	CDM-63-080xx						

Order note: Please add the appropriate suffix to designate desired material type.

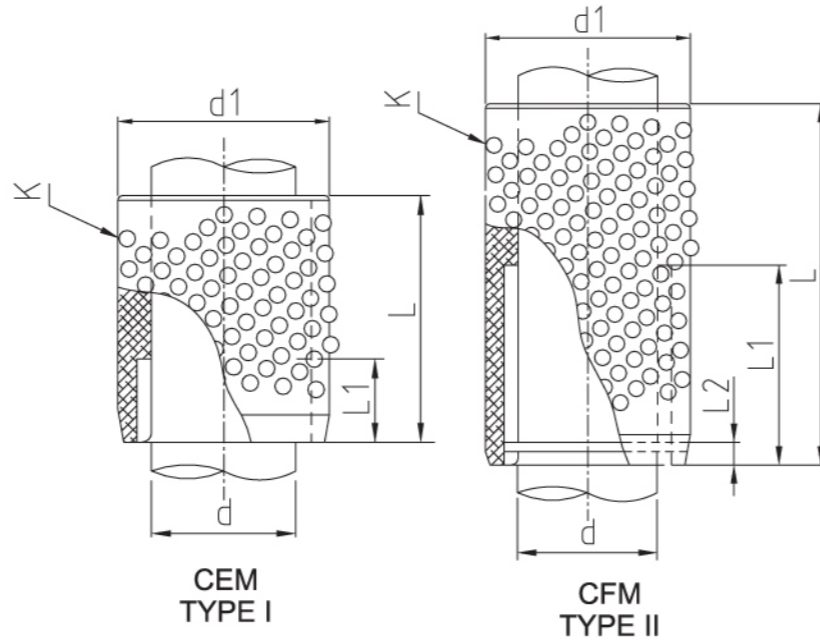
AL: Aluminum cage with black anodized finish

BR: Brass cage

Example: CFM-40-080AL = diameter 40mm, Length 80mm, aluminum cage

\* - To be used with post PEM & PFM (page 68~71)





Aluminum cage with black anodized finish

Brass cage

Diameter		K	Length			Part Number			
d	d1		L	L1	L2	TYPE I		TYPE II	
24 / 25	30 / 31	3	36	11.5	4.2	CEM-24-036xx	CEM-25-036xx		
			48	17.5		CEM-24-048xx	CEM-25-048xx		
			55	31				CFM-24-055xx	CFM-25-055xx
			70	40				CFM-24-070xx	CFM-25-070xx
			90	47				CFM-24-090xx	CFM-25-090xx
			100	55				CFM-24-100xx	CFM-25-100xx
30 / 32	38 / 40	4	36	11.5	4.2	CEM-30-036xx	CEM-32-036xx		
			48	17.5		CEM-30-048xx	CEM-32-048xx		
			70	40				CFM-30-070xx	CFM-32-070xx
			90	47				CFM-30-090xx	CFM-32-090xx
			105	55				CFM-30-105xx	CFM-32-105xx
			115	65				CFM-30-115xx	CFM-32-115xx
38 / 40	46 / 48	4	48	17.5	5.8	CEM-38-048xx	CEM-40-048xx		
			60	23.5		CEM-38-060xx	CEM-40-060xx		
			70	40				CFM-38-070xx	CFM-40-070xx
			85	48				CFM-38-085xx	CFM-40-085xx
			105	56				CFM-38-105xx	CFM-40-105xx
			115	66				CFM-38-115xx	CFM-40-115xx
48 / 50	56 / 58	4	70	28.5	7.0	CEM-48-070xx	CEM-50-070xx		
			80	35.5		CEM-48-080xx	CEM-50-080xx		
			105	56				CFM-48-105xx	CFM-50-105xx
			120	65				CFM-48-120xx	CFM-50-120xx

Diameter		K	Length			Part Number			
d	d1		L	L1	L2	TYPE I		TYPE II	
48 / 50	56 / 58	4	140	76	7.0			CFM-48-140xx	CFM-50-140xx
			150	86				CFM-48-150xx	CFM-50-150xx
			160	96				CFM-48-160xx	CFM-50-160xx
			170	108				CFM-48-170xx	CFM-50-170xx
			185	121				CFM-48-185xx	CFM-50-185xx
			195	133				CFM-48-195xx	CFM-50-195xx
60 / 63	70 / 73	5	98	42.5	7.0	CEM-60-098xx	CEM-63-098xx		
			145	76				CFM-60-145xx	CFM-63-145xx
			165	86				CFM-60-165xx	CFM-63-165xx
			180	96				CFM-60-180xx	CFM-63-180xx
			190	107				CFM-60-190xx	CFM-63-190xx
			205	121				CFM-60-205xx	CFM-63-205xx
80	92	6	98	42.5	8.5	CEM-80-098xx			
			145	76				CFM-80-145xx	CFM-80-145xx
			165	86				CFM-80-165xx	CFM-80-165xx
			180	96				CFM-80-180xx	CFM-80-180xx
			190	107				CFM-80-190xx	CFM-80-190xx
			205	121				CFM-80-205xx	CFM-80-205xx
			215	132			CFM-80-215xx	CFM-80-215xx	

Order note: Please add the appropriate suffix to designate desired material type.

AL: Aluminum cage with black anodized finish

BR: Brass cage

Example: CFM-40-080AL = diameter 40mm, Length 80mm, aluminum cage

For assembly details, please refer to page 73 ~ 79.

Post	Ball Cage Accessories Data											
	Stop Washer Retainer		Bushing Top Washer	Hex Head Screw	Snap Ring Ball bearing cage	SET: ABM*1 AJM*1		SET: ACM*1 ADM*1 AJM*1 AEM*1				
	I	II	II	I & II	II	I	II	I	II	I	II	
24 / 25	ABM-24	ABM-25	ACM-24	ACM-25	ADM-24	AJM-0620	AEM-24	AEM-25	AFM-24	AFM-25	AGM-24	AGM-25
30 / 32	ABM-30	ABM-32	ACM-30	ACM-32	ADM-24	M6*20L	AEM-30	AEM-32	AFM-30	AFM-32	AGM-30	AGM-32
38 / 40	ABM-38	ABM-40	ACM-38	ACM-40	ADM-38	AJM-1025	AEM-38	AEM-40	AFM-38	AFM-40	AGM-38	AGM-40
48 / 50	ABM-48	ABM-48	ACM-48	ACM-50	ADM-38	M10*25L	AEM-48	AEM-50	AFM-48	AFM-50	AGM-48	AGM-50
60 / 63	ABM-60	ABM-60	ACM-60	ACM-63	ADM-60	AJM-1230	AEM-60	AEM-63	AFM-60	AFM-63	AGM-60	AGM-63
80	ABM-80		ACM-80		ADM-60	M12*30L	AEM-80		AFM-80		AGM-80	



The selection of the proper bushing assembly is based on the guide post diameter and required stroke distance. Using the selection chart on page 53 :

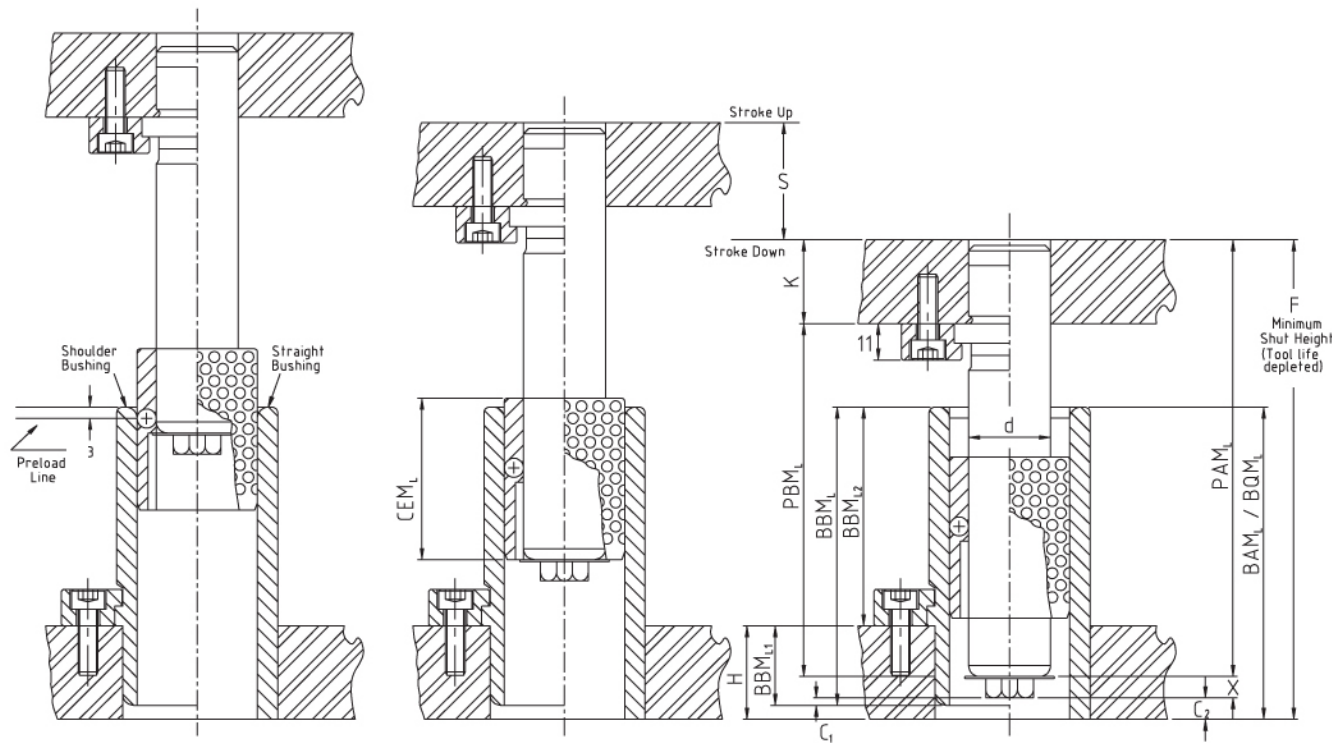
1. Locate the column for required stroke distance "S". (note: add any necessary grinding allowance when determining stroke length).
2. Locate the row for the required guide post diameter "d".

**Ball Cage selection:**

3. Move down the appropriate stroke column until reaching the colored square which corresponds to the proper guide post diameter.
4. Select the ball cage length that best matches your requirement. (note: longer ball cages provide increased life).

**Ball Bushing selection:**

5. Move down the appropriate stroke column until reaching the colored square which corresponds to the proper guide post diameter.
6. Select the required bushing length from the Bushing Length column.



- Based on Shoulder Bushing  
 $PAM_L / PBM_L = F - C_1 - X - H + BBM_{L1}$
- Based on Straight Bushing  
 $PAM_L / PBM_L = F - C_2 - X$

d	X	C <sub>1</sub> / C <sub>2</sub>
24 / 25	7	3
30 / 32	7	3
38 / 40	9.5	3
48 / 50	9.5	3
60 / 63	9.5	3
80	9.5	3

Post	Ball-bearing Bushing			Ball Cage	Stroke "S" Including any necessary grinding allowance											Y
	Shoulder		Straight		CEM <sub>L</sub>	20	40	60	80	100	120	140	160			
d	BBM <sub>L1</sub>	BBM <sub>L2</sub>	BAM <sub>L</sub> BQM <sub>L</sub>													
24/25	36	59	60	36												
	50	80	77													
	50	97	95													
			110													
30/32	45	75	77	36												
	50	97	95													
	60	116	110													
			130													
			150													
			170													
38/40	32	79	77	48												
	50	97	95													
	56	116	110													
	54	129	130													
			150													
			170													
48/50	37	108	110	70												
	80	127	130													
	67	142	150													
			170													
			190													
			215													
			240													
			265													
				84												
60/63	90	150	150													
	64	150	170													
			190													
			215													
			240													
80	90	150	150													
			170													
			190													
			215													
			240													
		265														
			98													

Y: If die grinding is not required, stroke may be increased by the amount of die grind allowance shown in "Y" column. If die grind is greater than the amount shown, stroke will shorten by the additional amount added.



The selection of the proper bushing assembly is based on the operating conditions, guide post diameter and required stroke distance. Using the selection chart on page 55 :

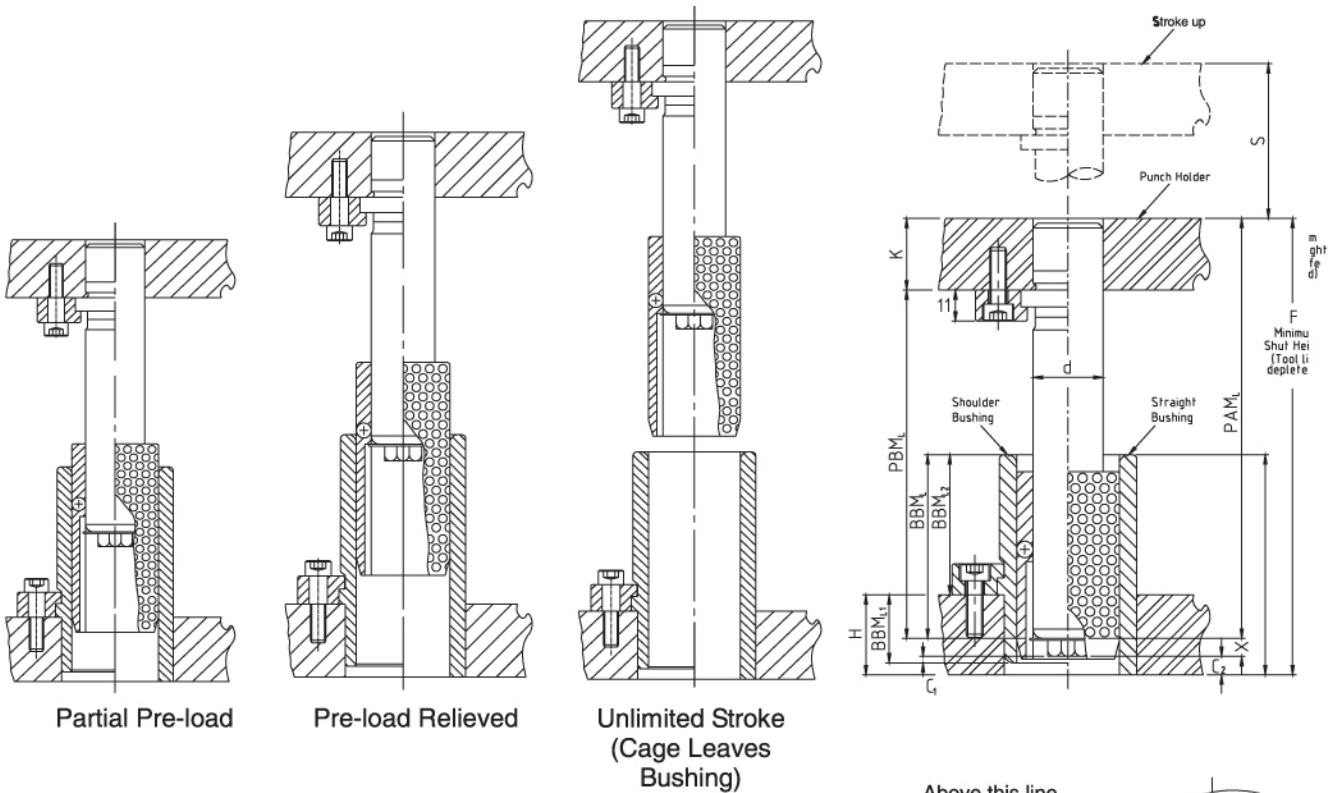
1. Determine the required operating conditions.
2. Locate the column for required stroke distance "S". (note: add any necessary grinding allowance when determining stroke length).
3. Locate the row for the required guide post diameter "d".

**Ball Cage selection:**

4. Move down the appropriate stroke column until reaching the colored square which corresponds to the proper guide post diameter.
5. Select the ball cage length that best matches your requirement. (note: longer ball cages provide increased life).

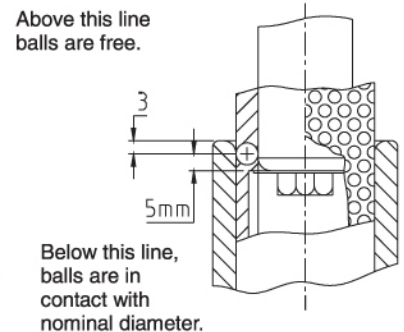
**Ball Bushing selection:**

6. Move down the appropriate stroke column until reaching the colored square which corresponds to the proper guide post diameter.
7. Select the required bushing length from the Bushing Length column.



- Based on Shoulder Bushing:  
Guide Post  $PAM_L / PBM_L = F - C_1 - X - H + BBM_{L1}$
- Based on Straight Bushing:  
Guide Post  $PAM_L / PBM_L = F - C_2 - X$
- Straight Bushing:  
 $BAM_L / BQM_L + K$  must be smaller than F  
Maximum  $BAM_L / BQM_L = F - K$
- Shoulder Bushing:  
 $BBM_{L2} + H + K$  must be smaller than F  
Maximum  $BBM_{L2} = F - H - K$

d	X	C <sub>1</sub> / C <sub>2</sub>
24 / 25	10.5	3.5
30 / 32	10.5	3.5
38 / 40	13	4
48 / 50	13	4
60 / 63	13	4
80	13	4





Post	Ball-bearing Bushing			Ball Cage	Stroke "S" Including any necessary grinding allowance																															
	Shoulder		Straight		CFM <sub>L</sub>																															
d	BBM <sub>L2</sub>	BBM <sub>L</sub>	BAM <sub>L</sub> BQM <sub>L</sub>	CFM <sub>L</sub>																																
24 / 25	25	55	60	55																																
	32	69	77	70																																
	50	97	95	90																																
			110	100																																
			130	110																																
30 / 32	45	75	77	70																																
	50	97	95	90																																
	56	116	110	105																																
			130	115																																
			150	125																																
38 / 40	32	79	77	70																																
	50	97	95	85																																
	71	108	110	105																																
	54	129	130	115																																
			150	125																																
48 / 50	71	108	110	105																																
	80	127	130	120																																
	67	142	150	140																																
			170	150																																
			190	160																																
60 / 63	90	150	150	145																																
	64	162	170	165																																
			190	180																																
			215	190																																
			240	205																																
80	90	150	150	145																																
	60	120	170	165																																
			190	180																																
			215	190																																
			240	205																																
		265	215																																	

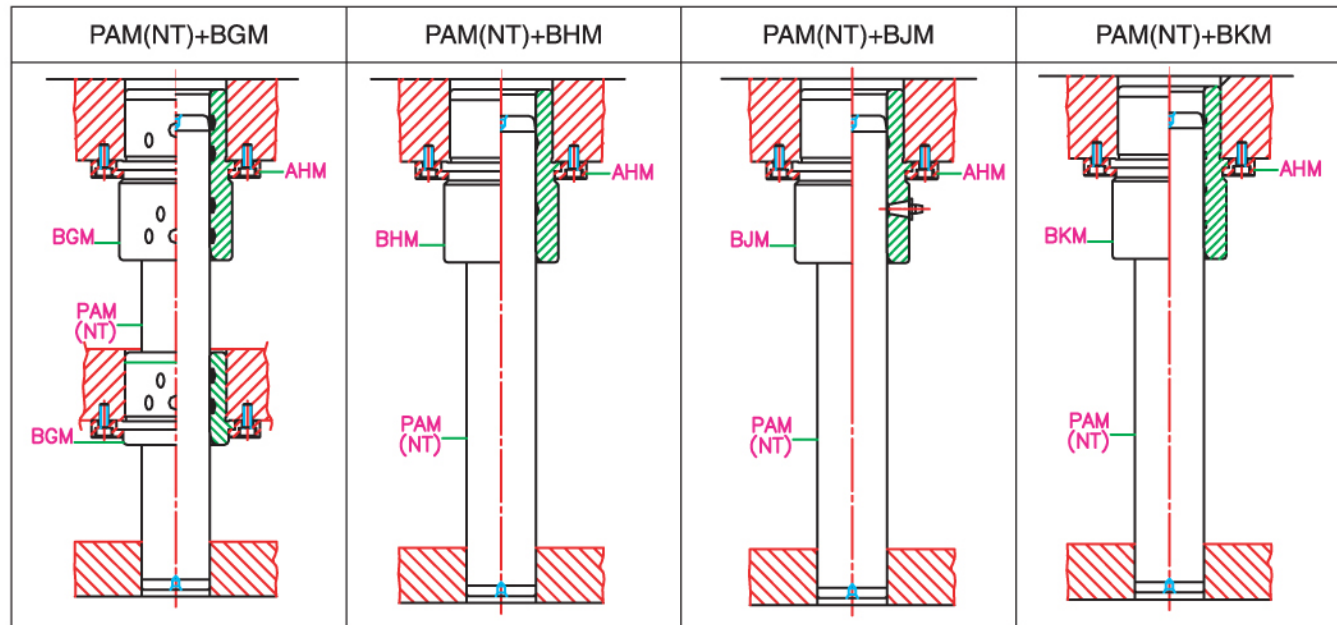
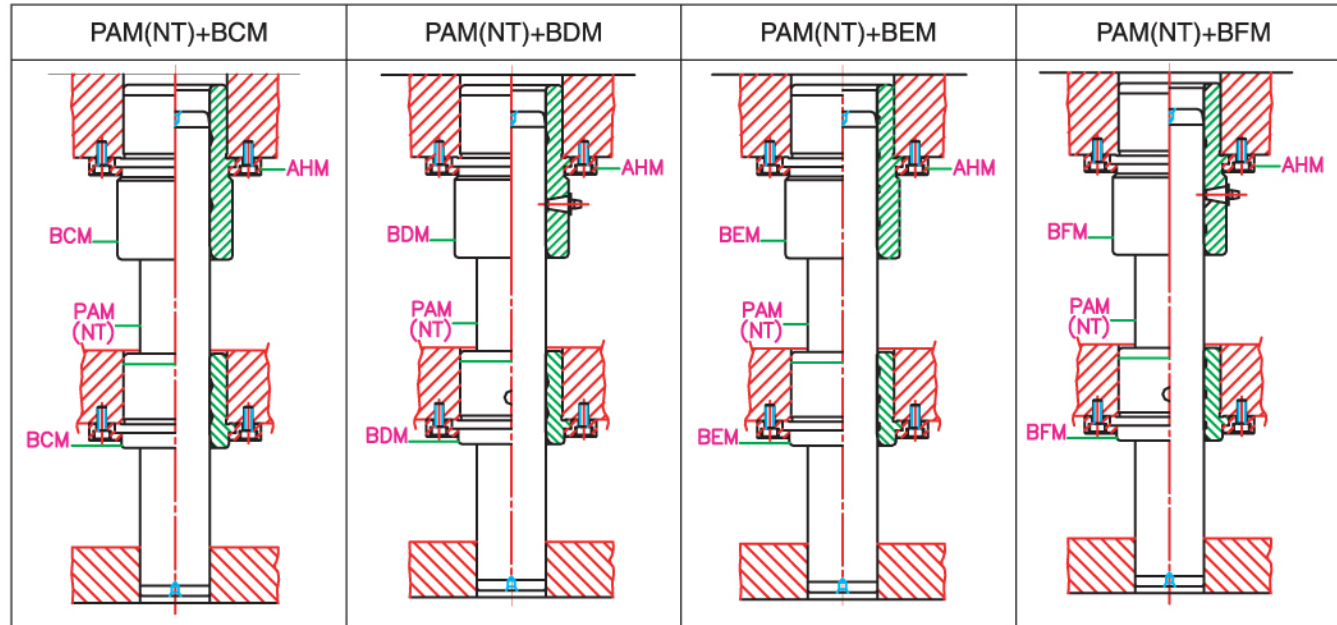
■ Type II components provide Type I operating condition.
 ■ Partial pre-load
 ■ Pre-load Relieved
 ■ Unlimited Stroke (Cage Leaves Bushing)



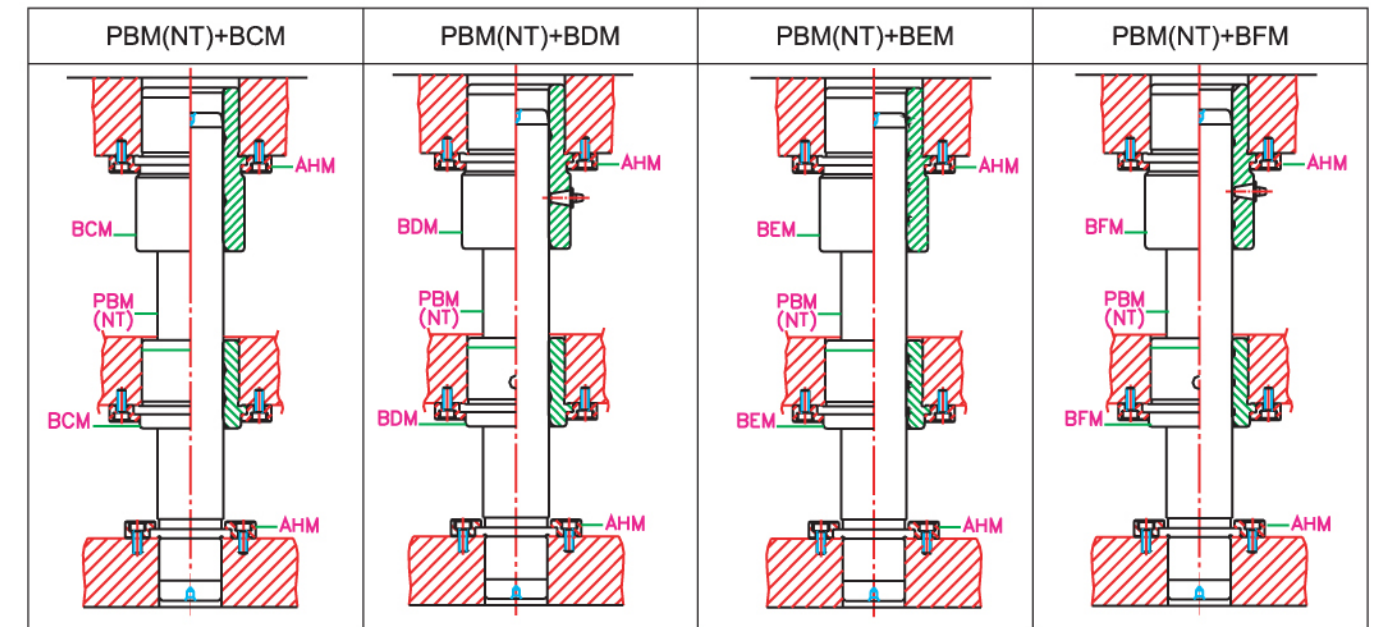
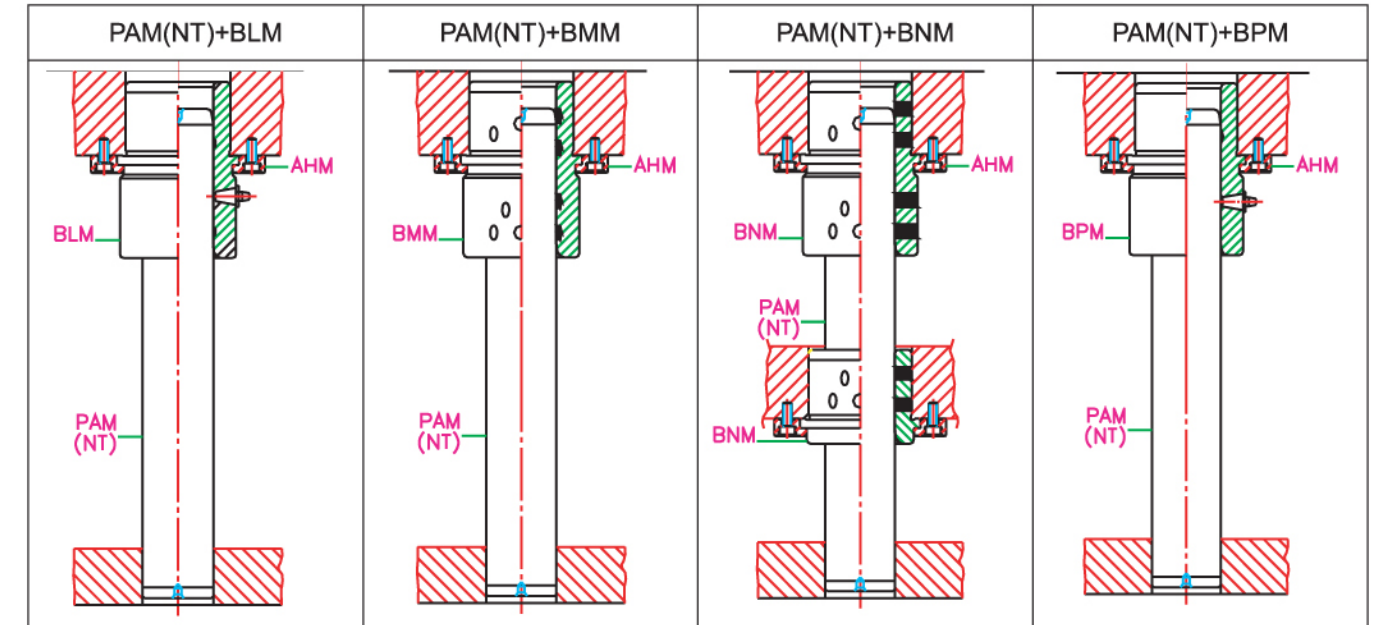
## *Assembly details*



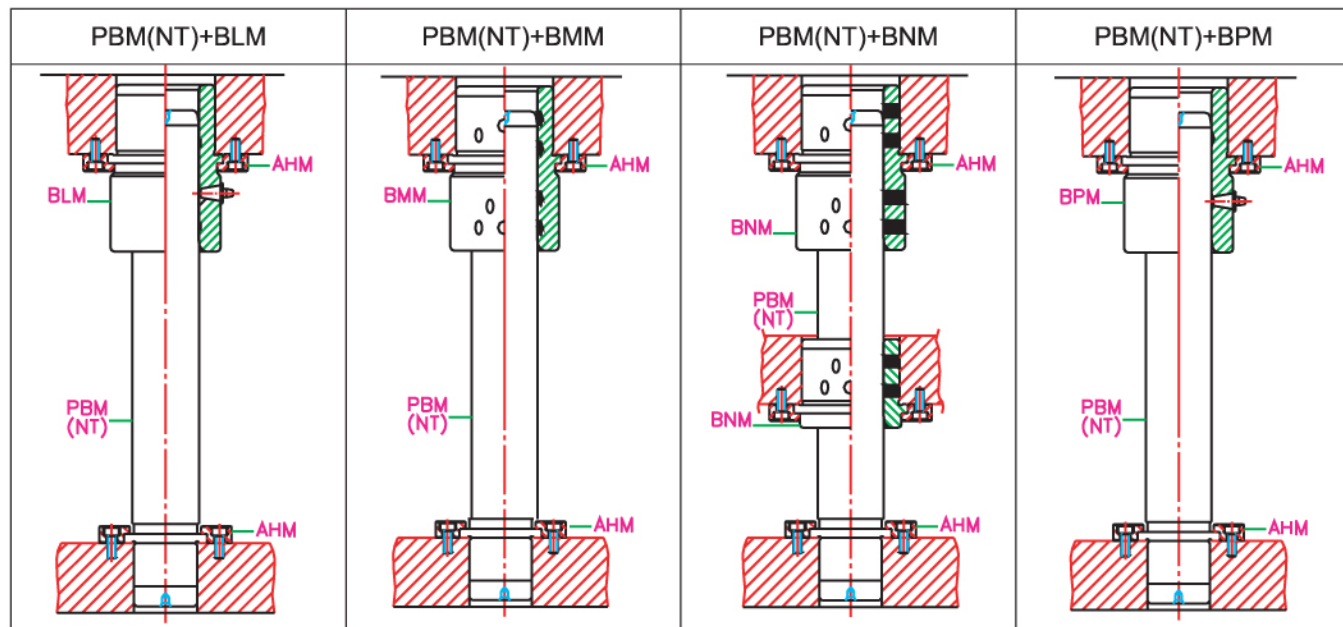
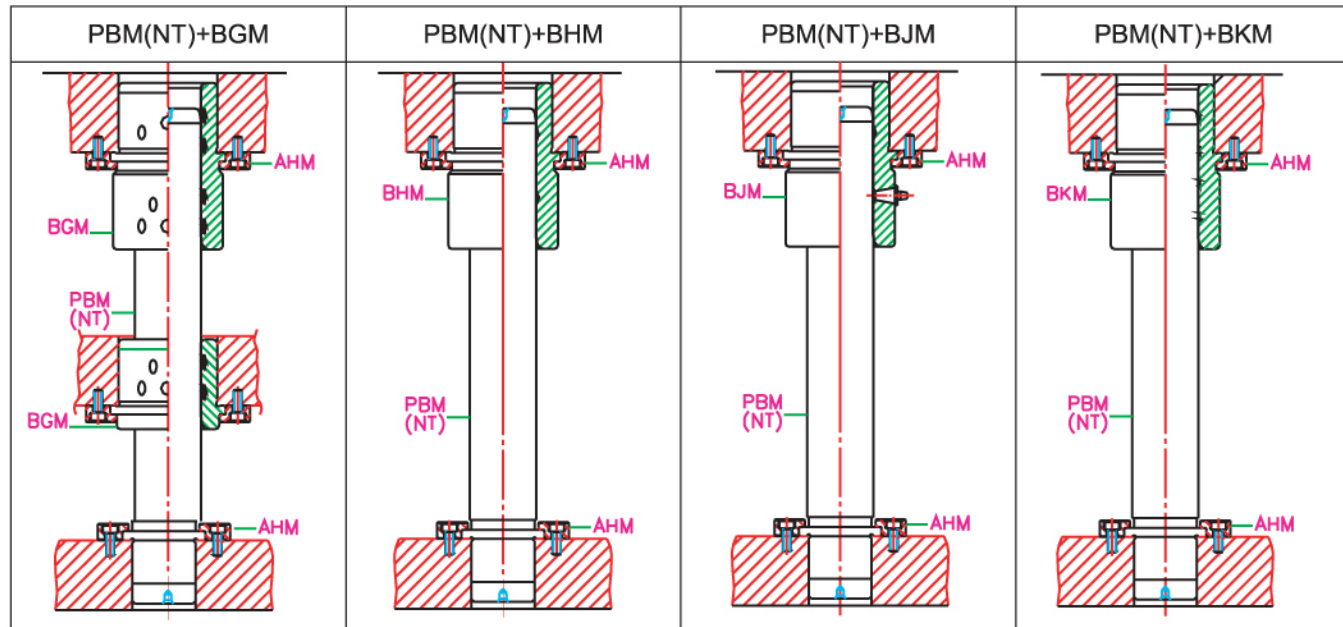
Guide Post (NT) with Bushings



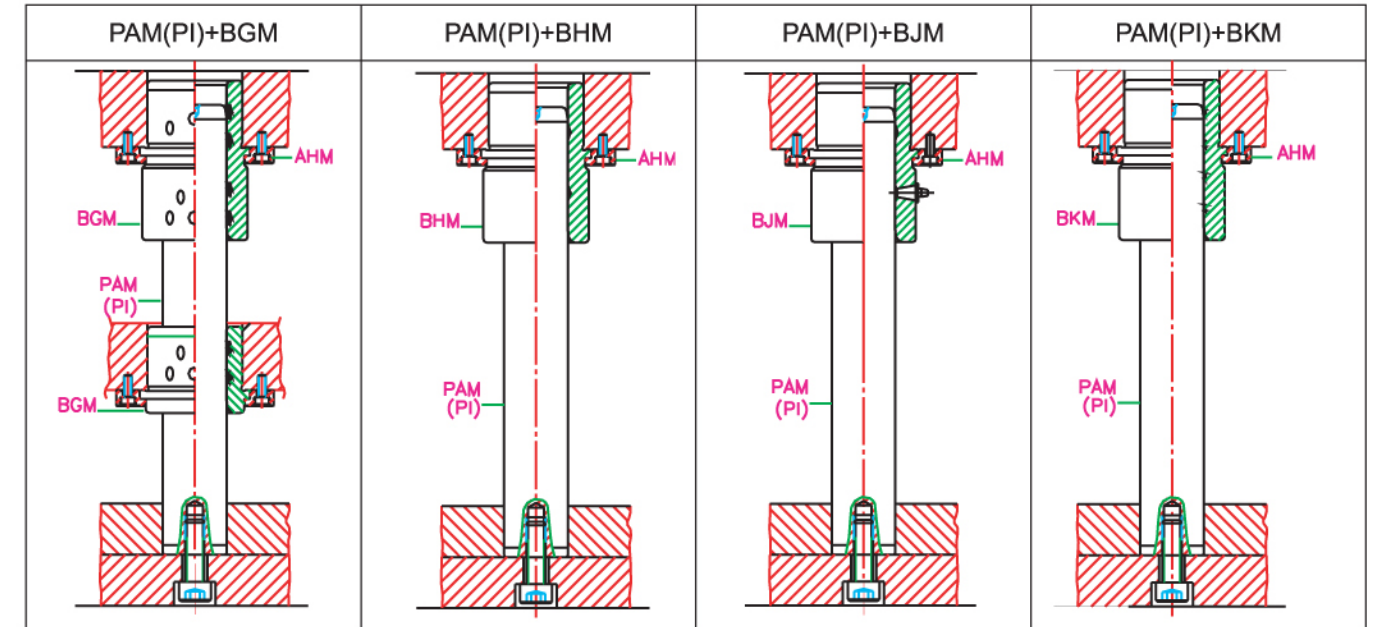
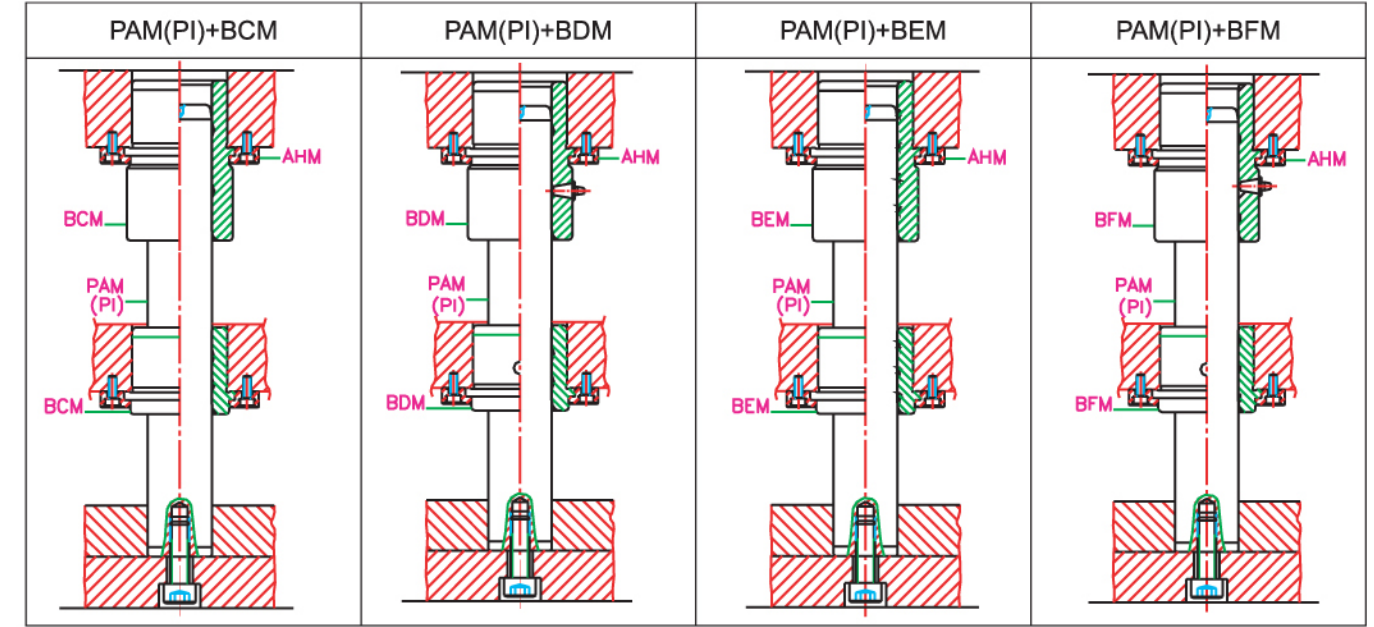
Guide Post (NT) with Bushings



Guide Post (NT) with Bushings

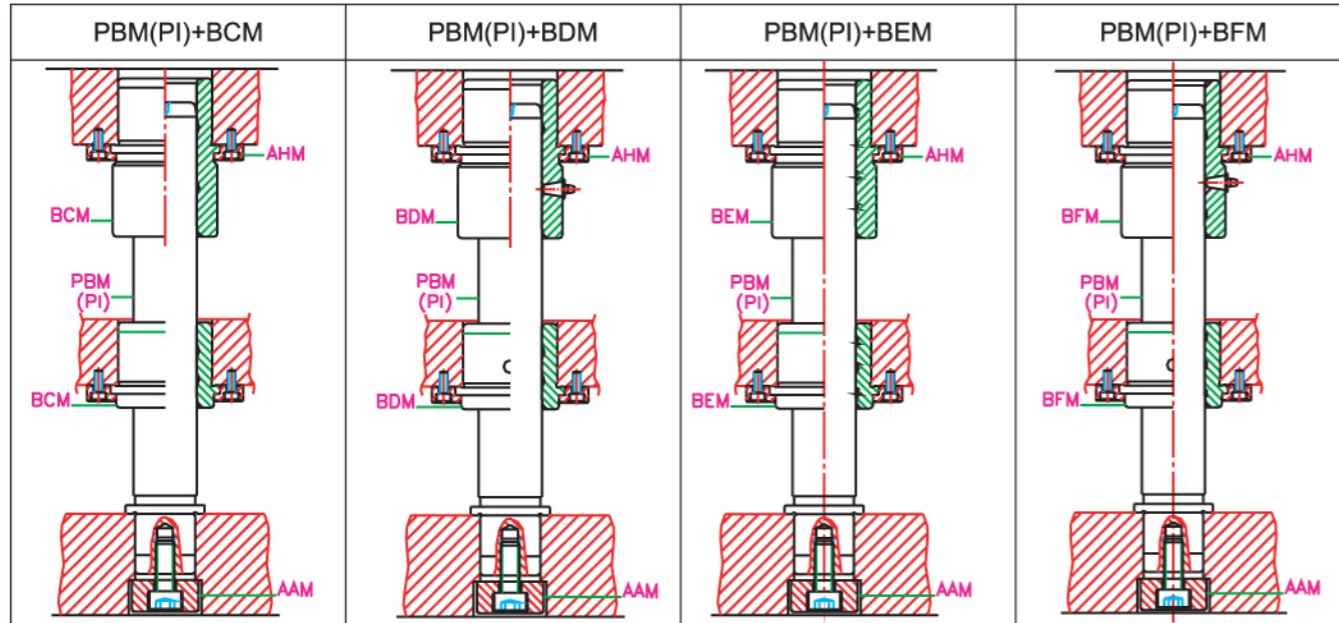
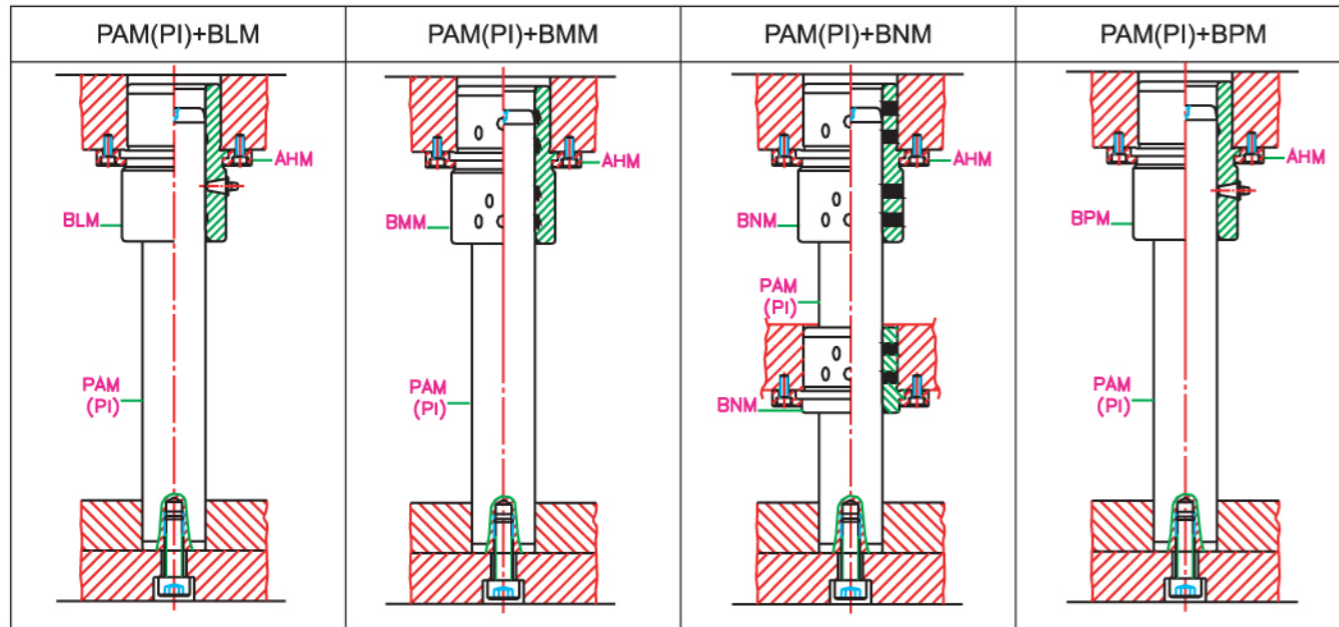


Guide Post (PI) with Bushings

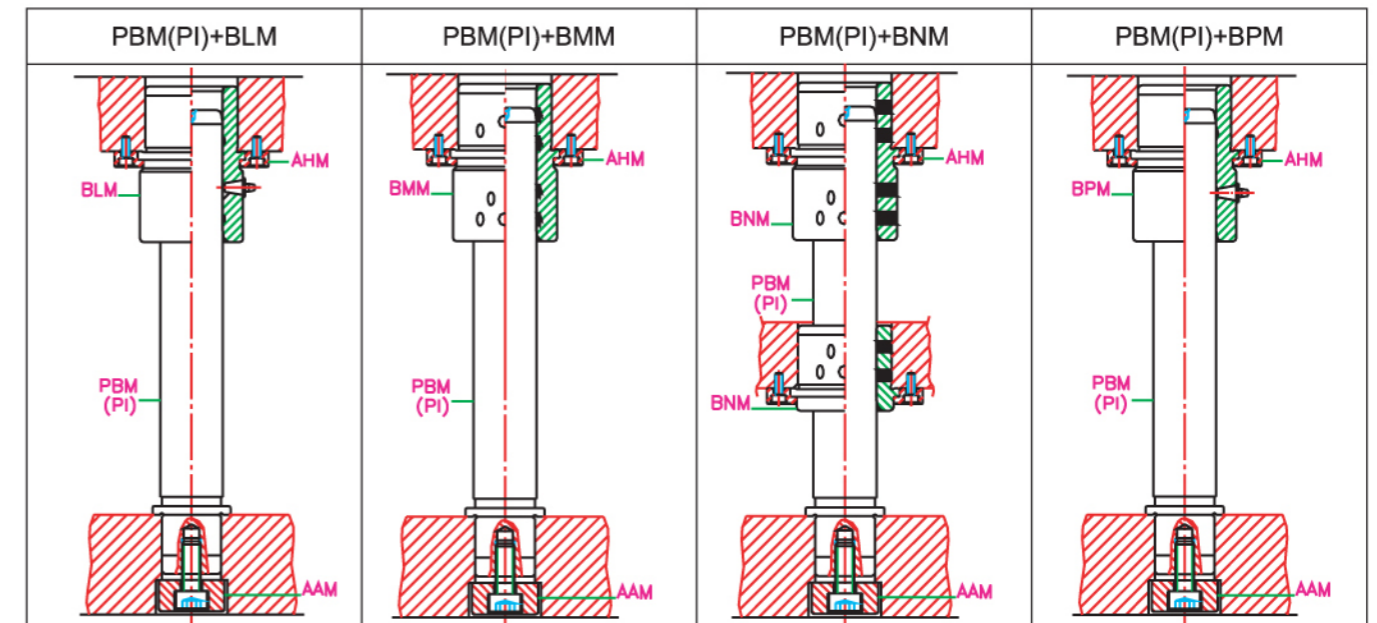
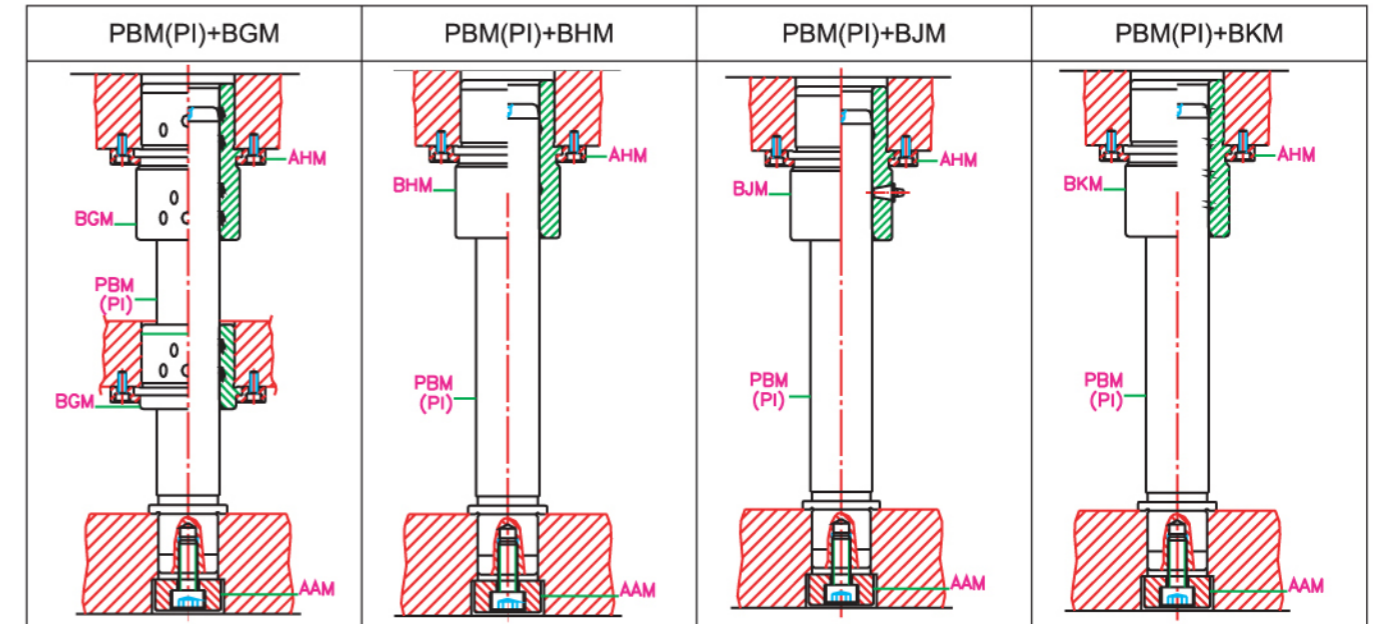




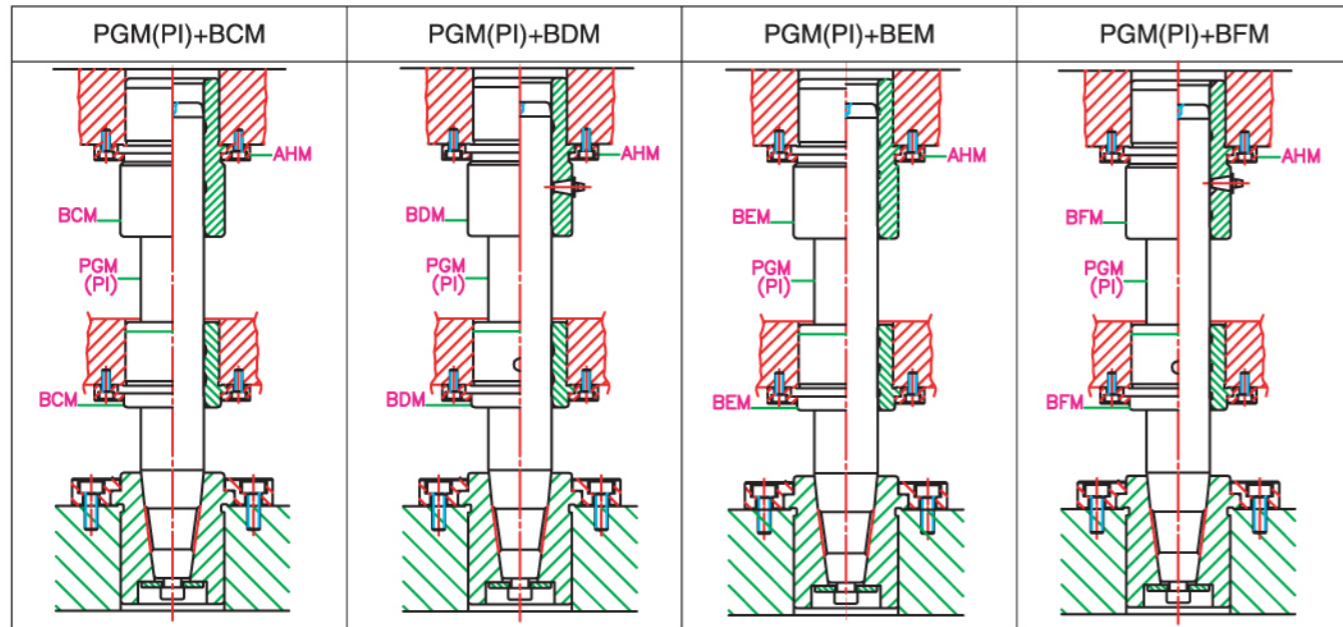
Guide Post (PI) with Bushings



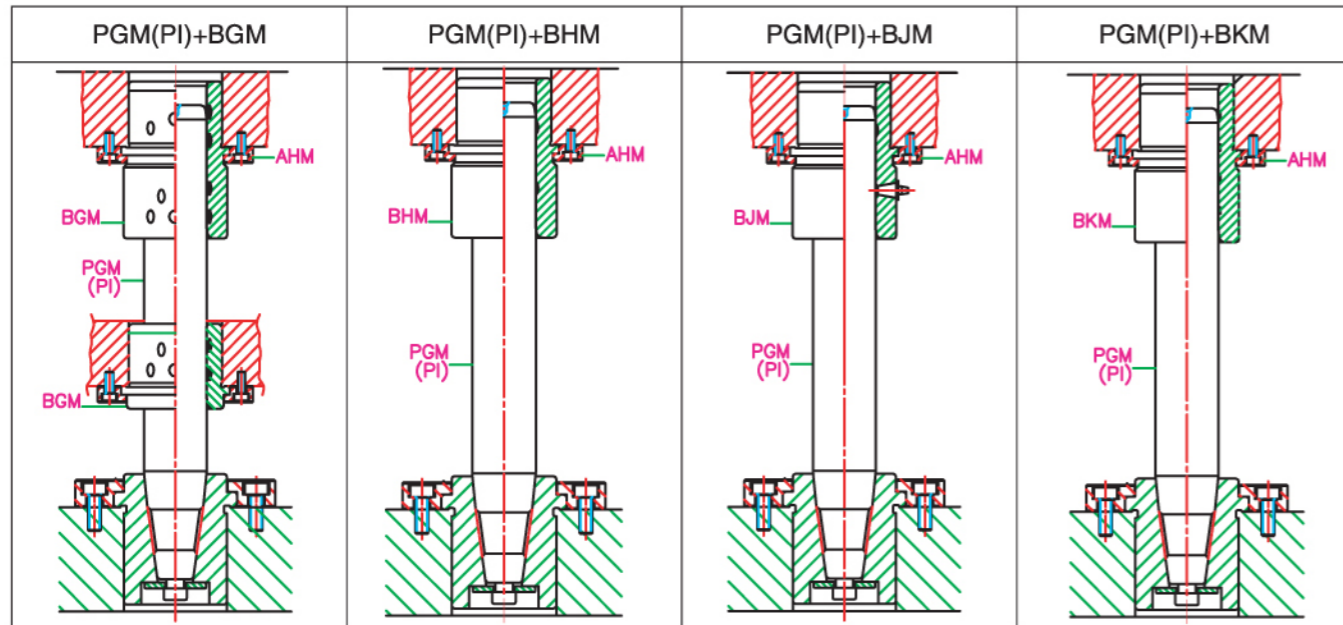
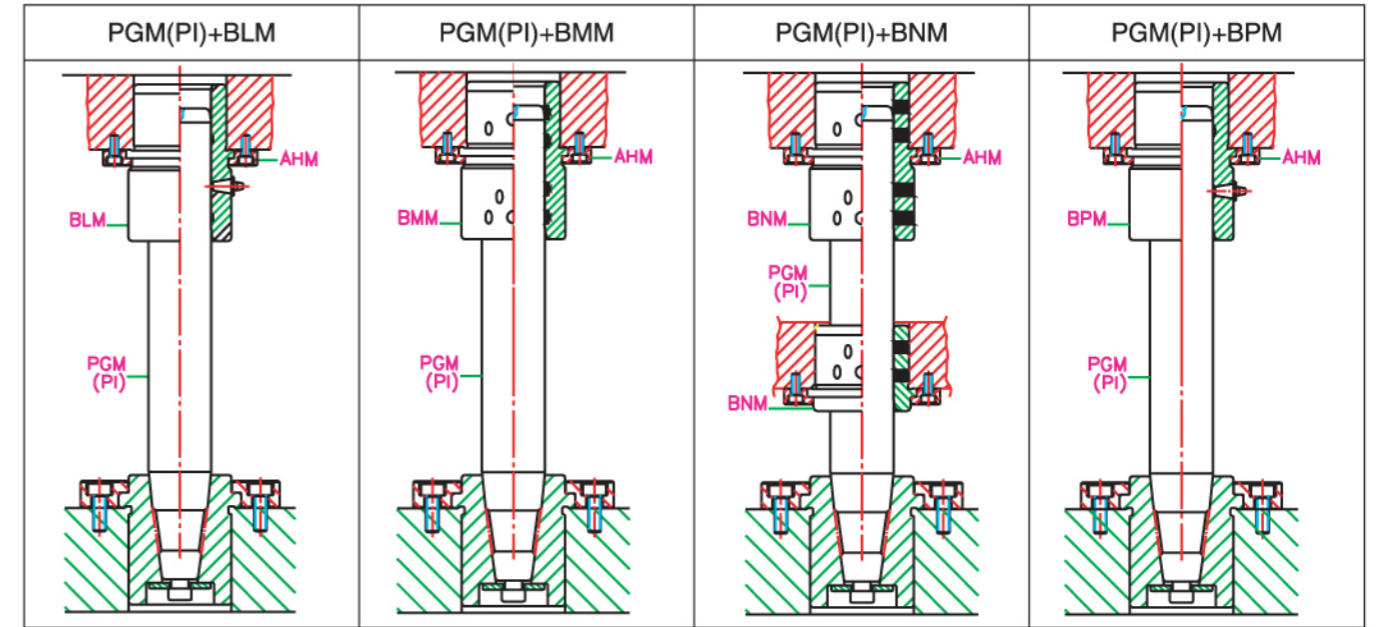
Guide Post (PI) with Bushings



Guide Post (PI) with Bushings

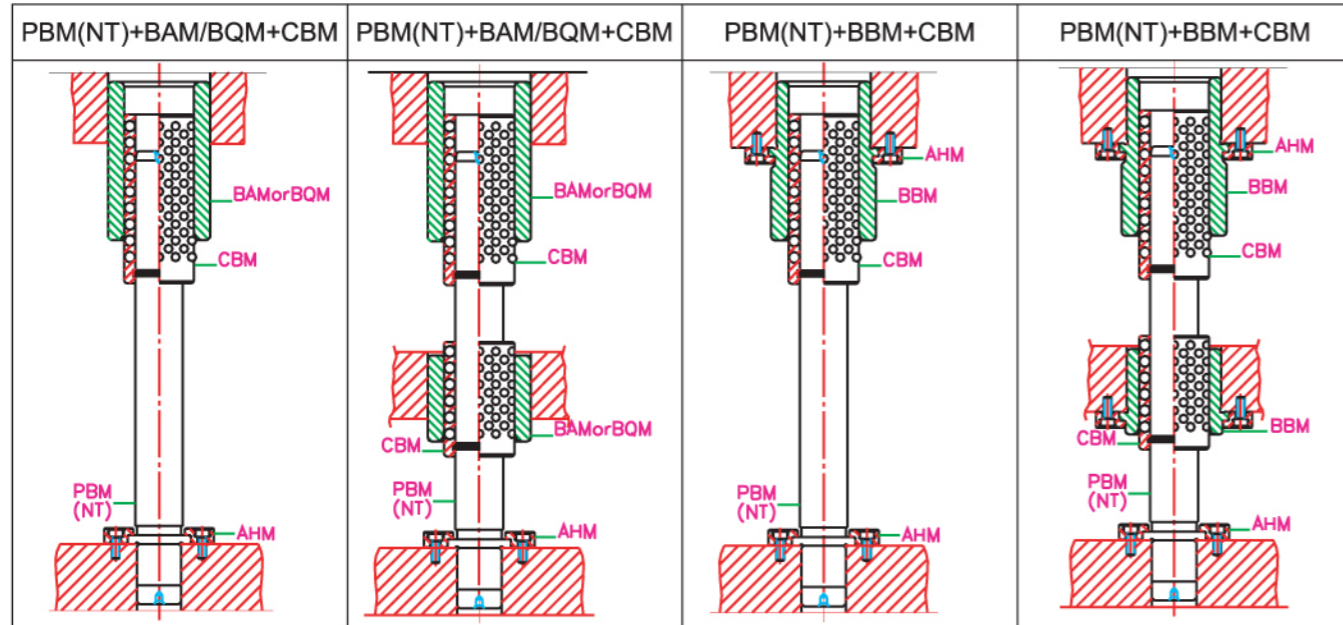
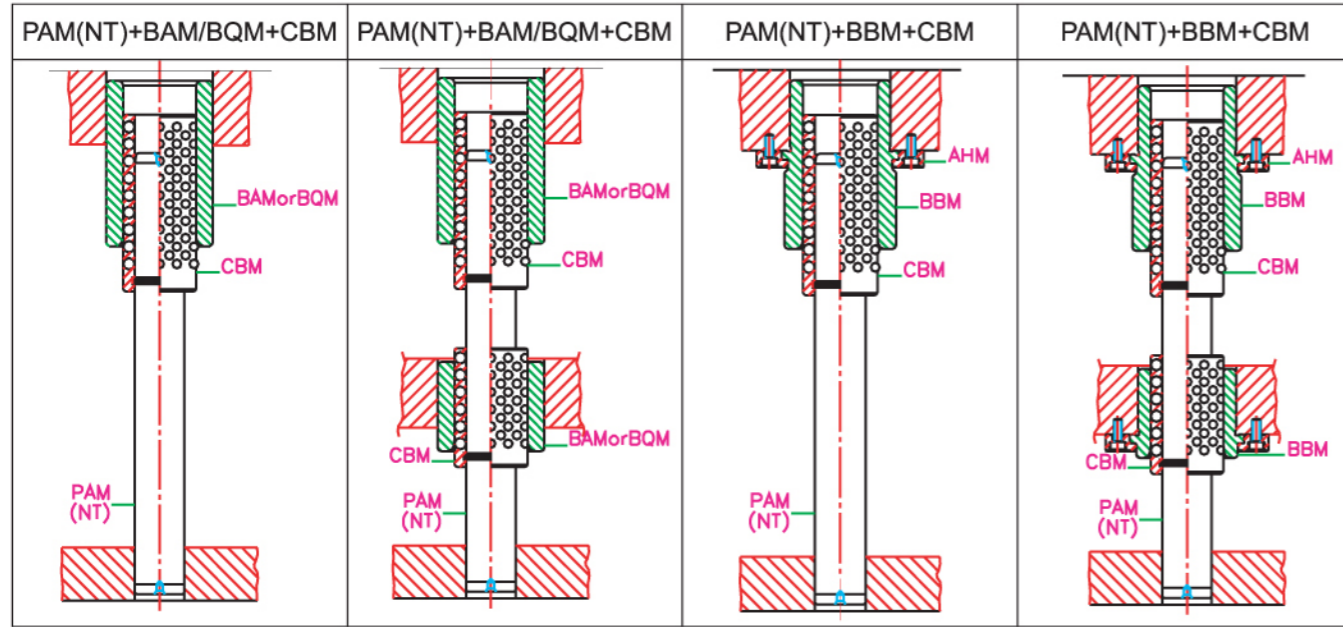


Guide Post (PI) with Bushings

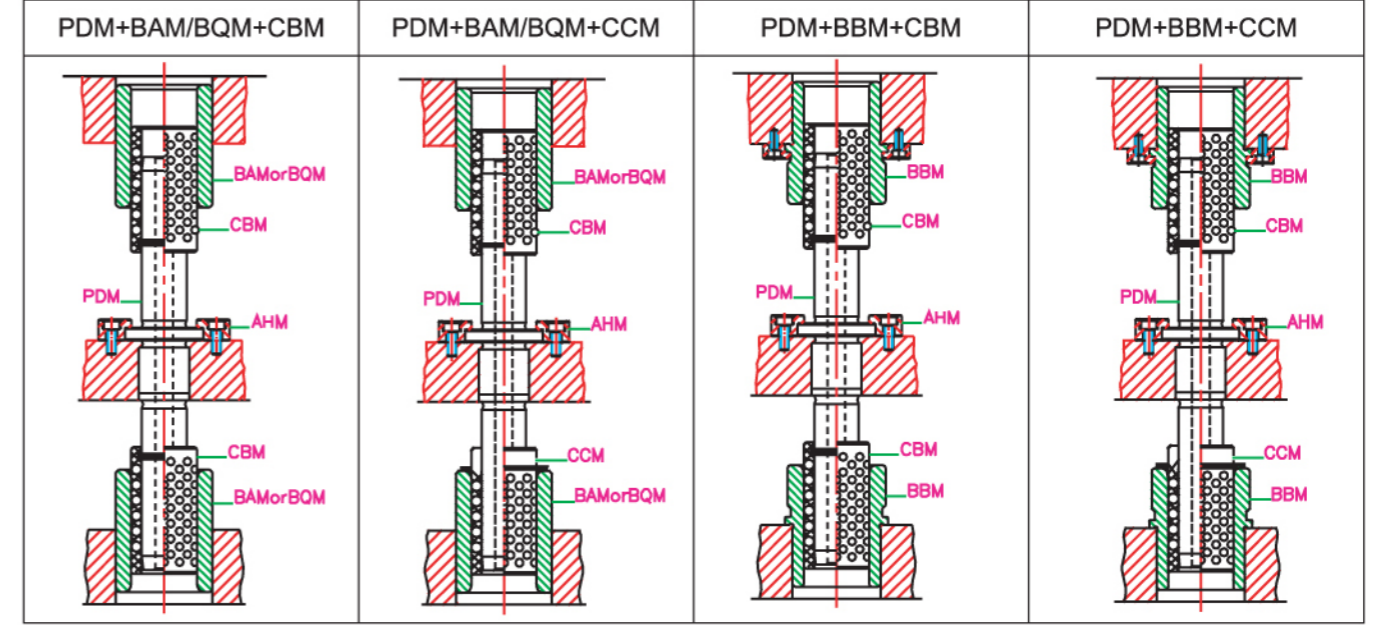
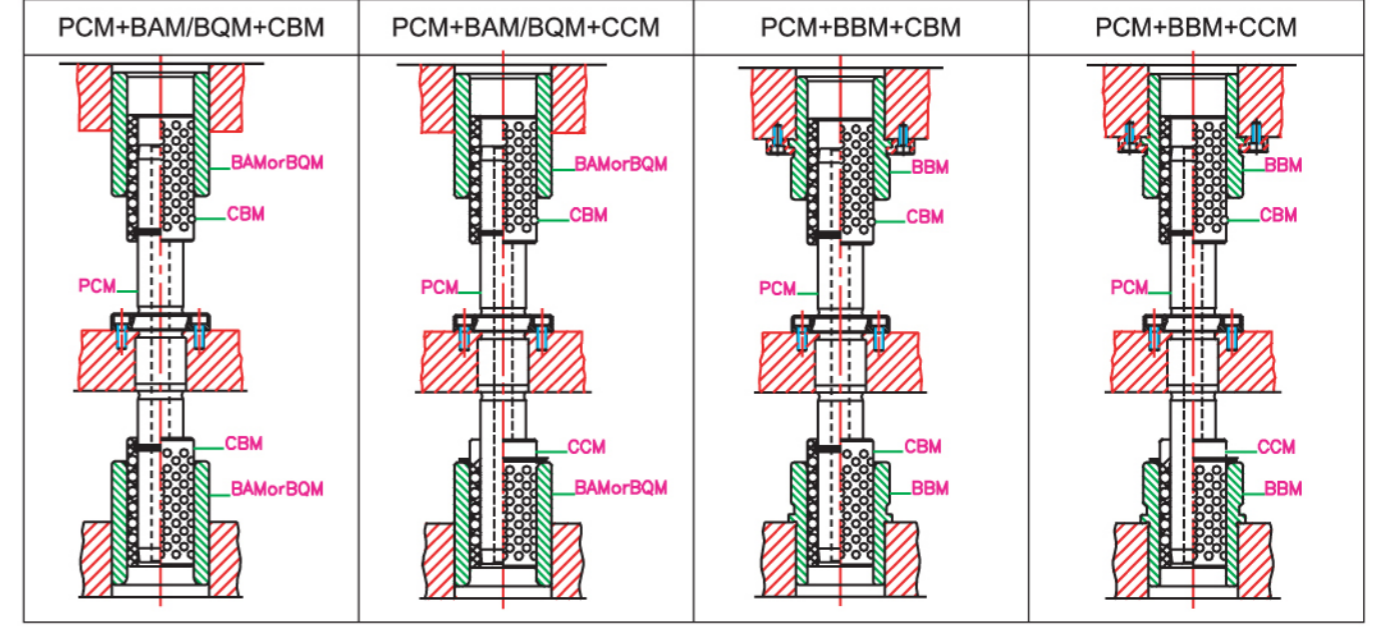




Guide Post (NT) with Bushings & Ball cages

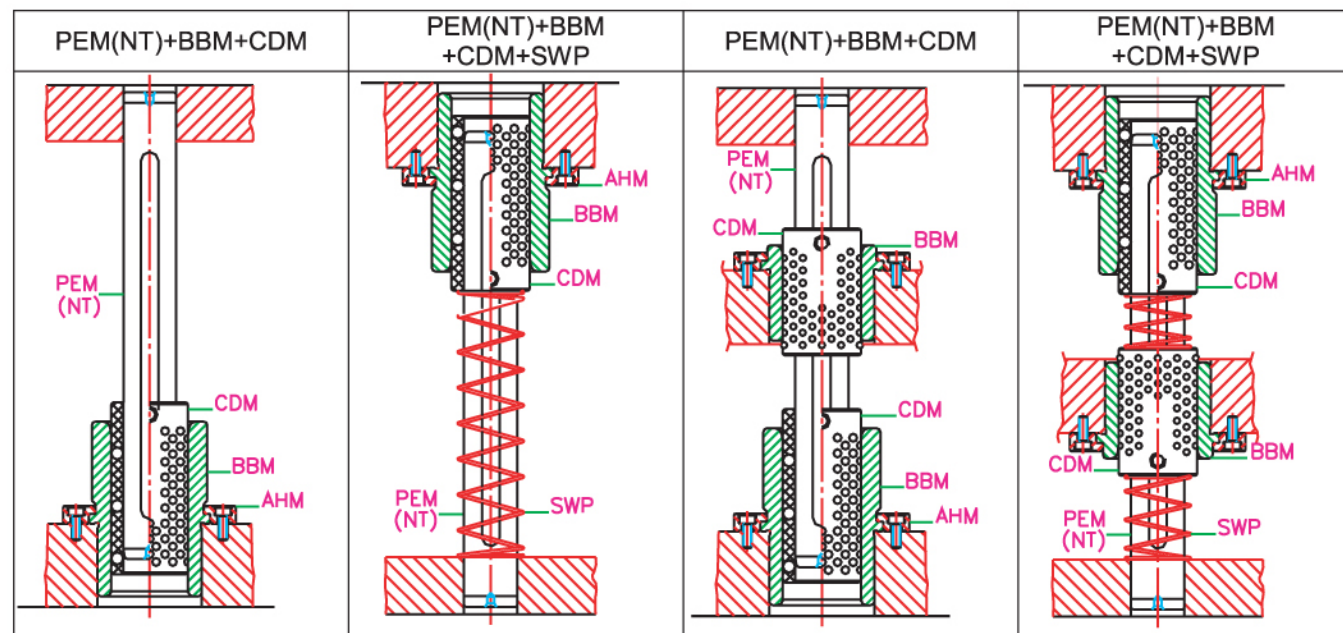
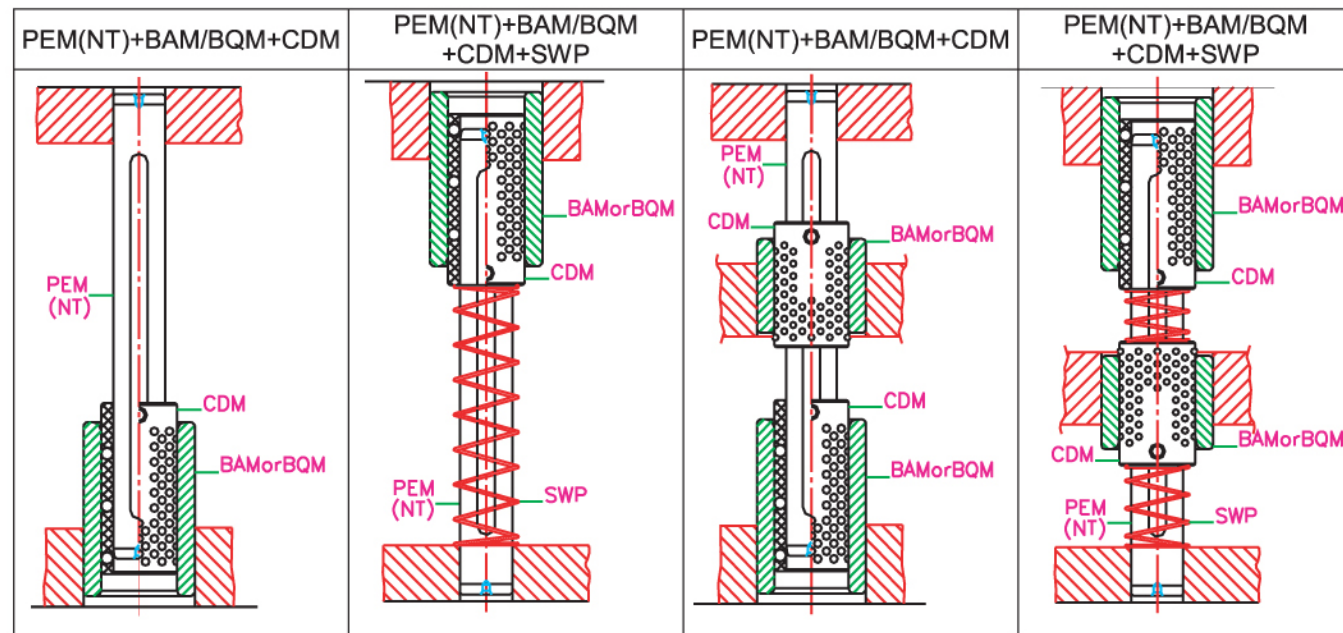


Guide Post with Bushings & Ball cages

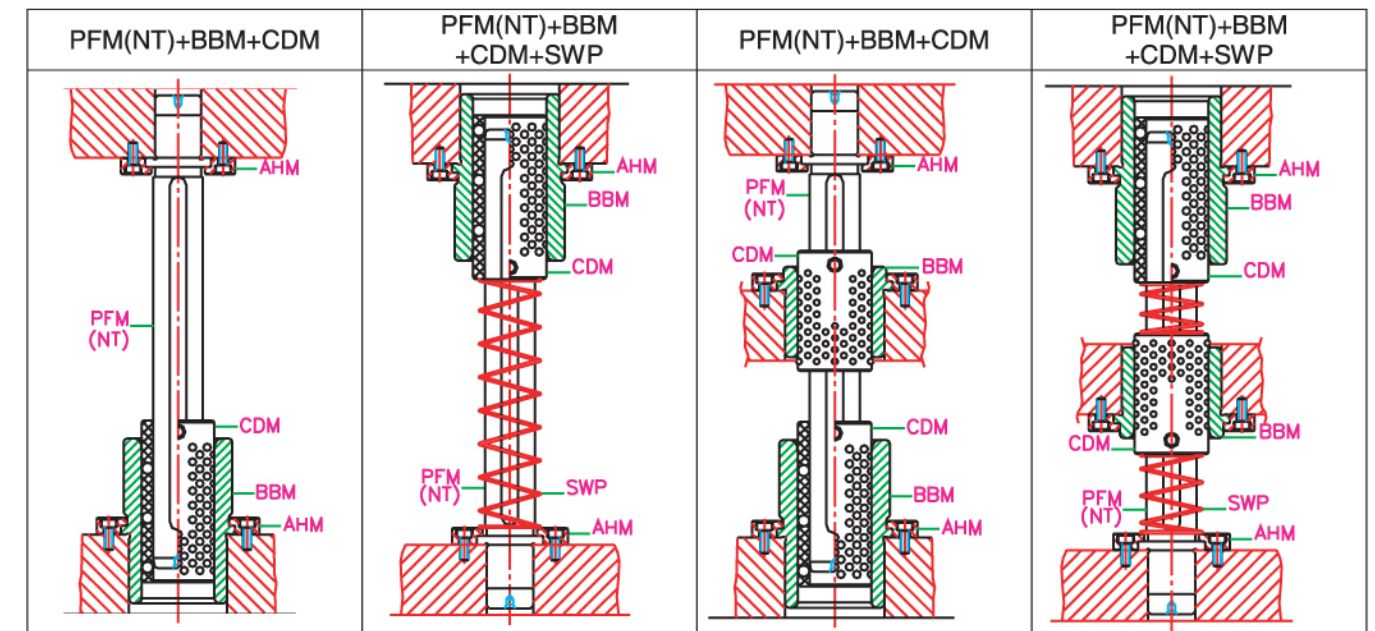
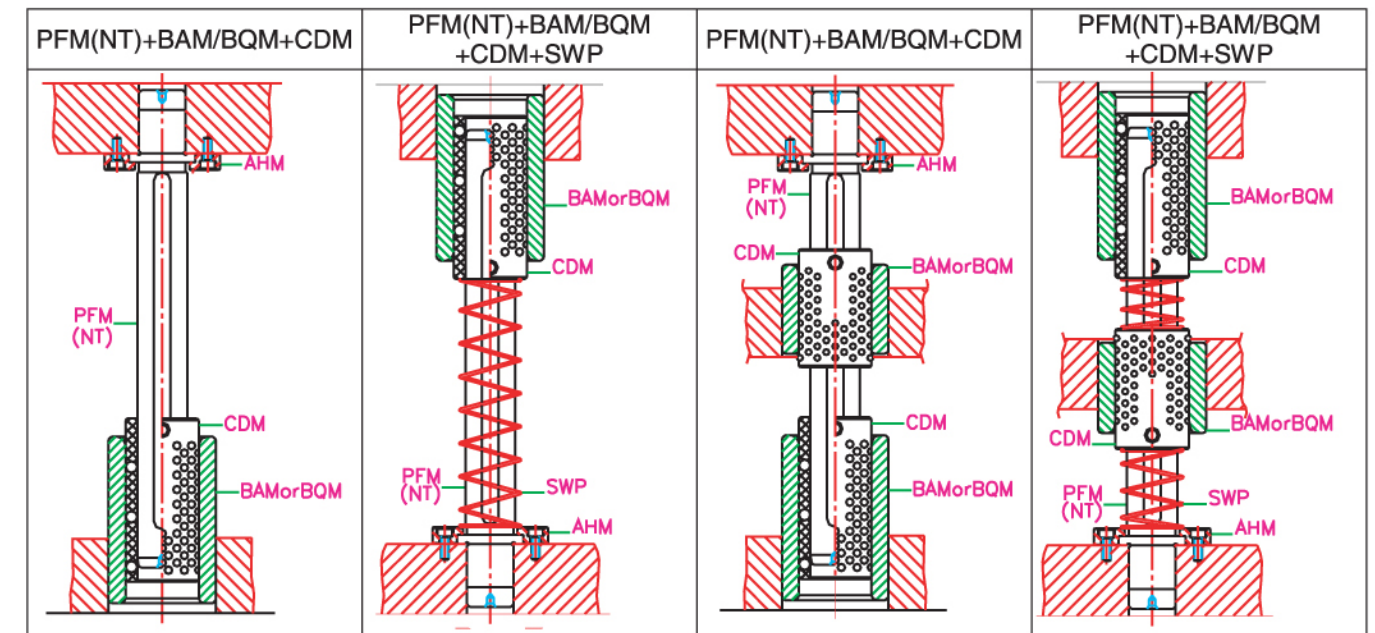




Guide Post (NT) with Bushings & Ball cages

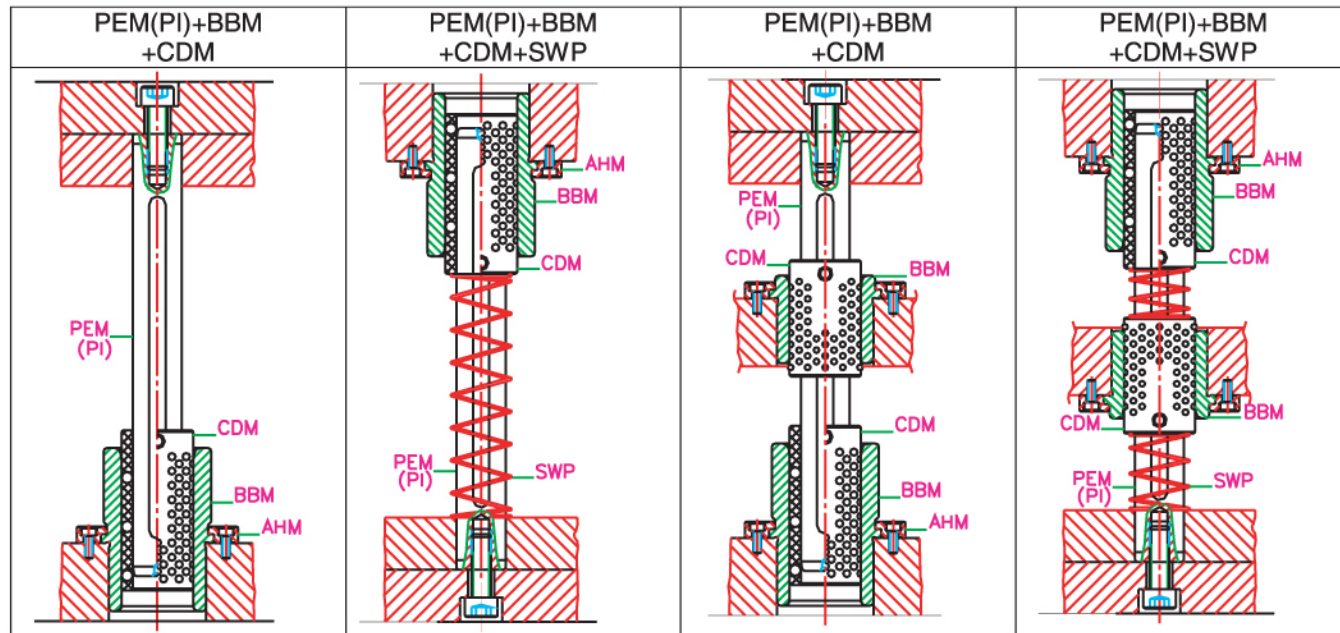
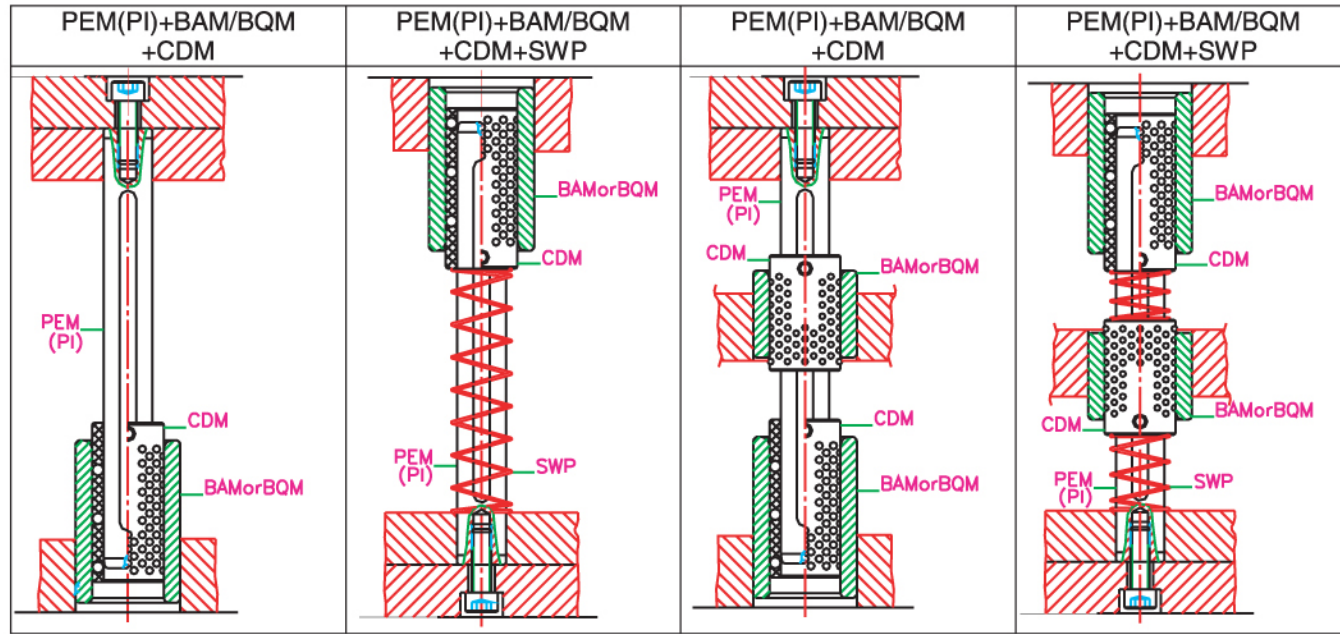


Guide Post (NT) with Bushings & Ball cages

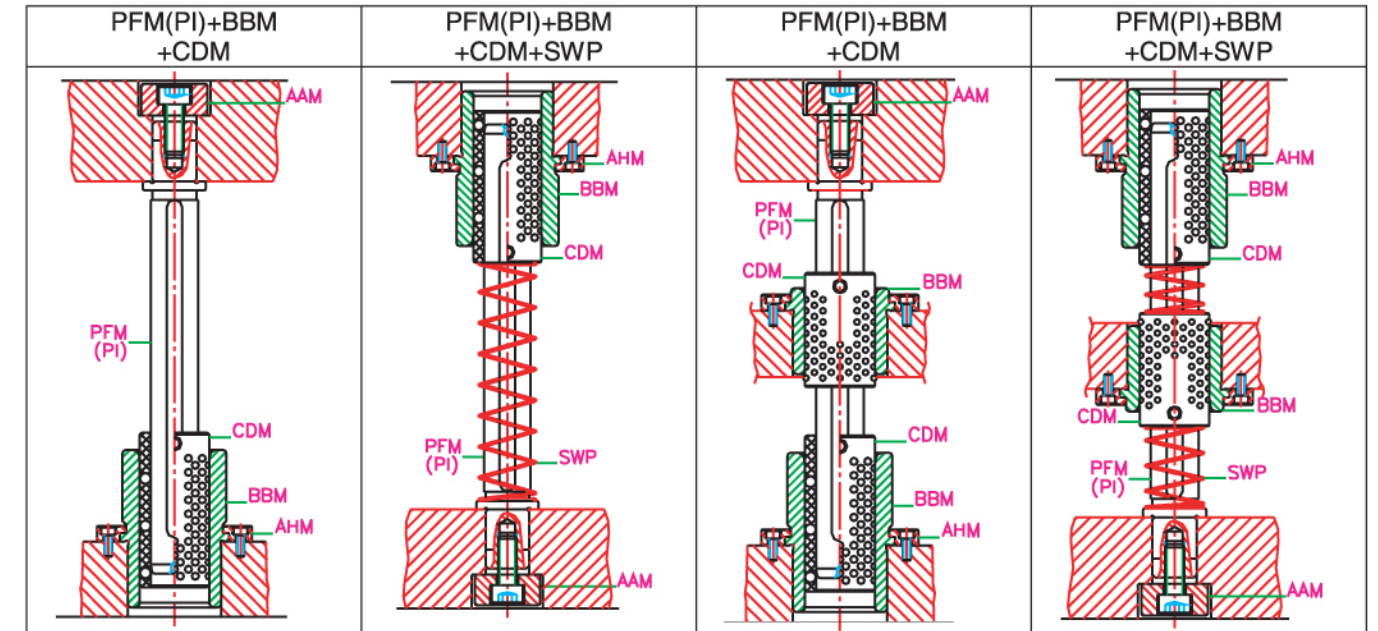
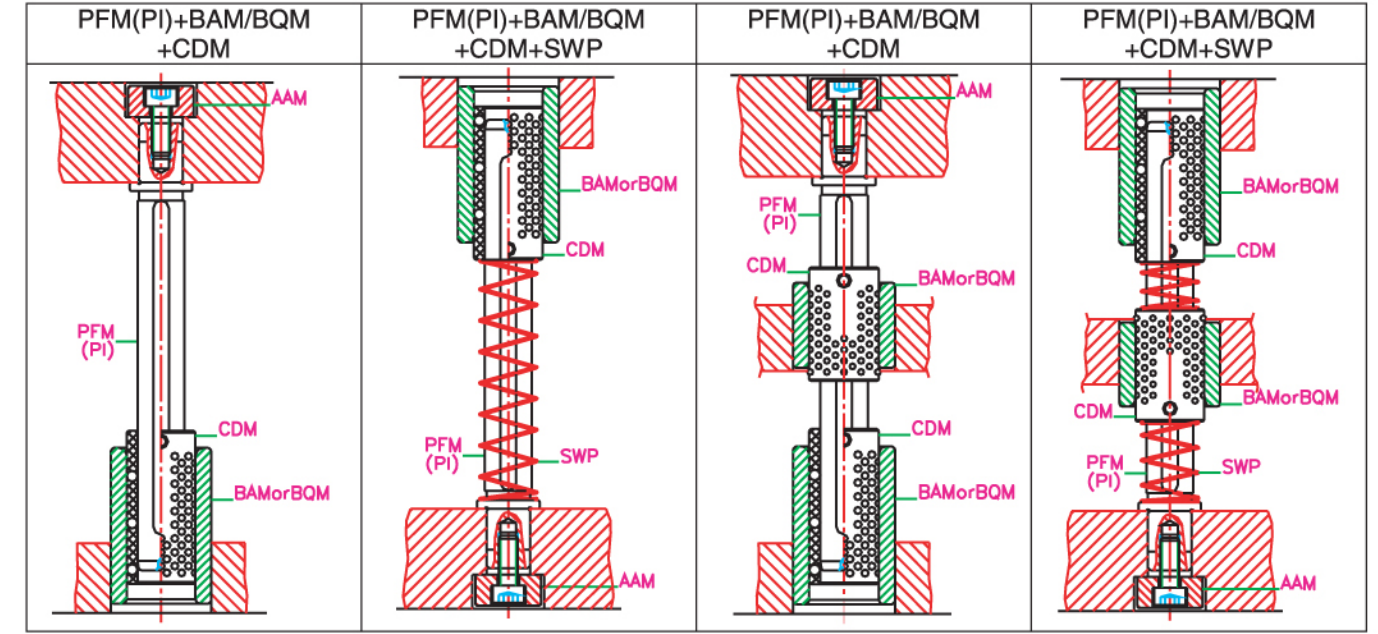




Guide Post (PI) with Bushings & Ball cages

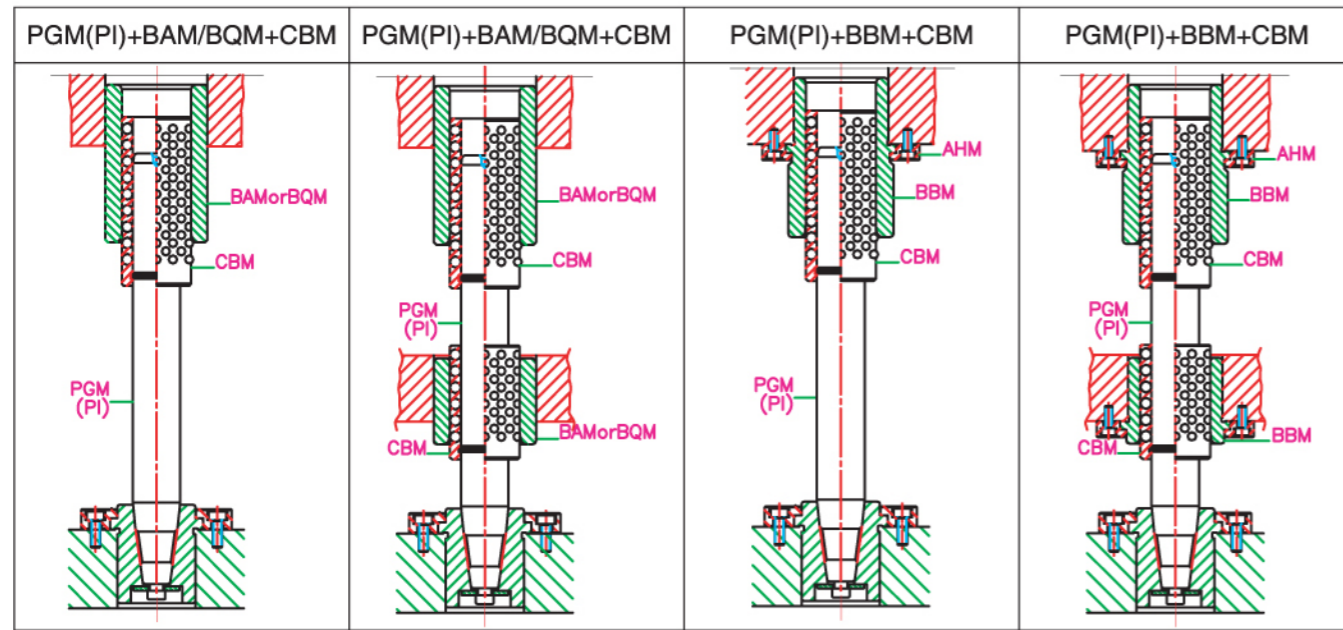


Guide Post (PI) with Bushings & Ball cages

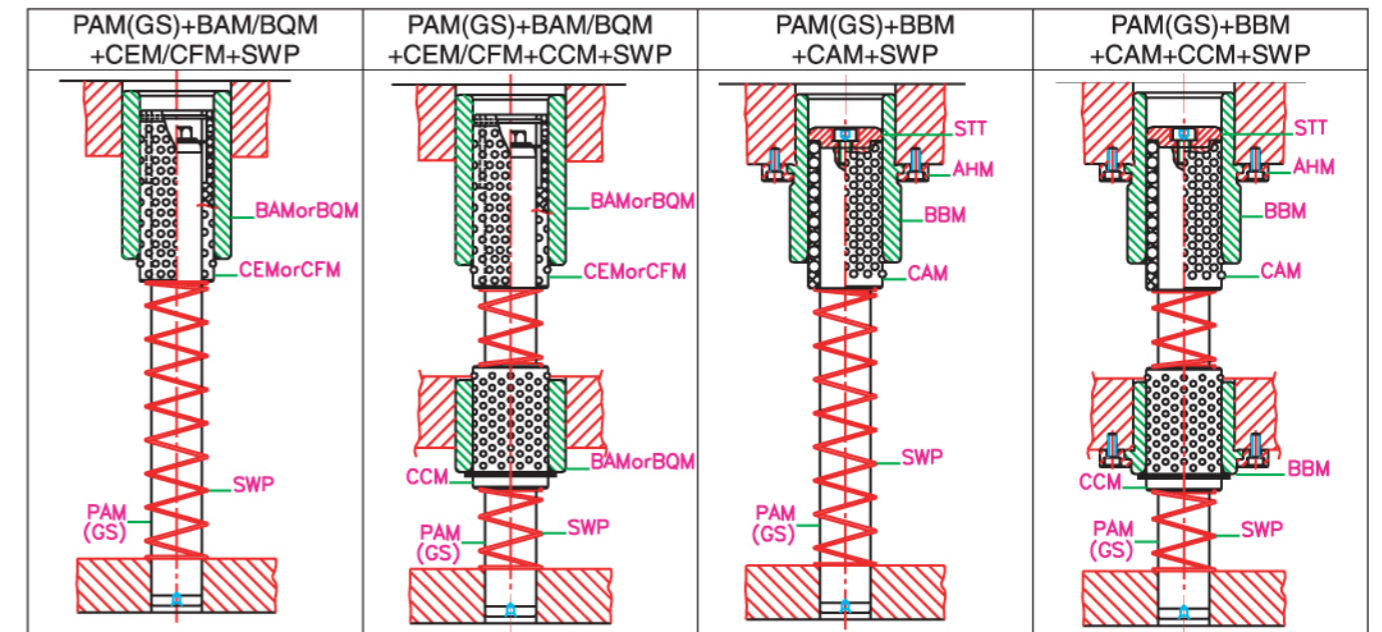
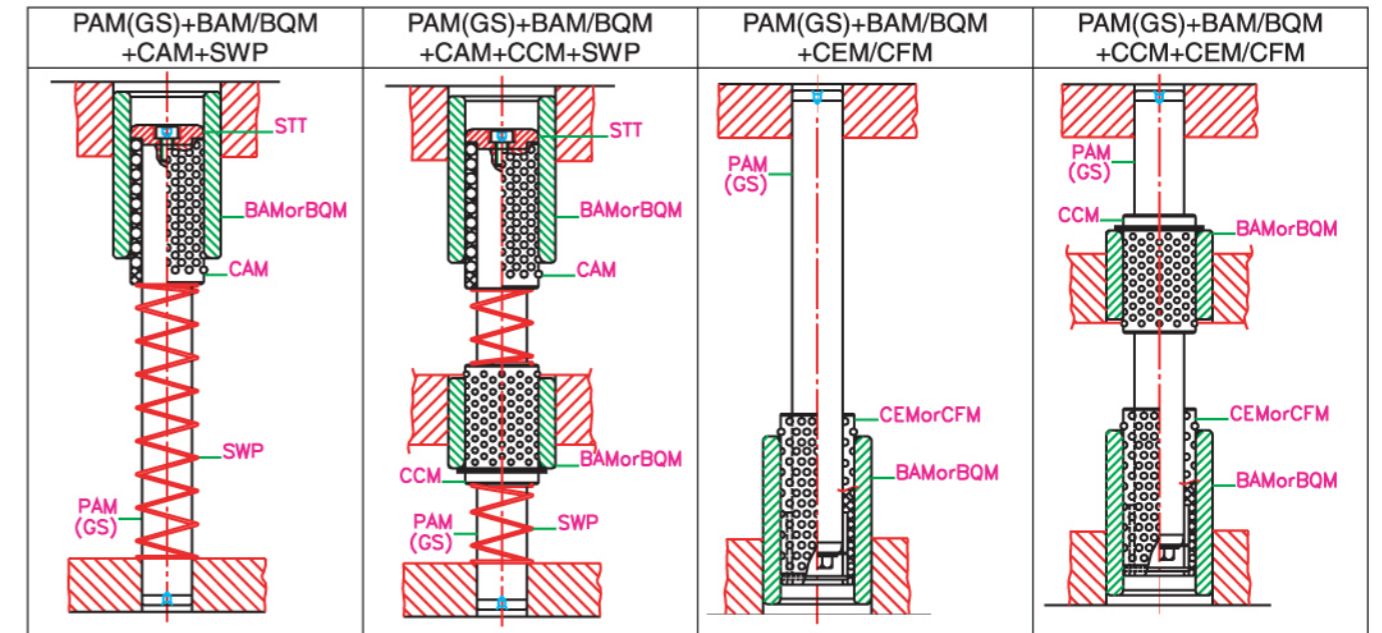




Guide Post (PI) with Bushings & Ball cages

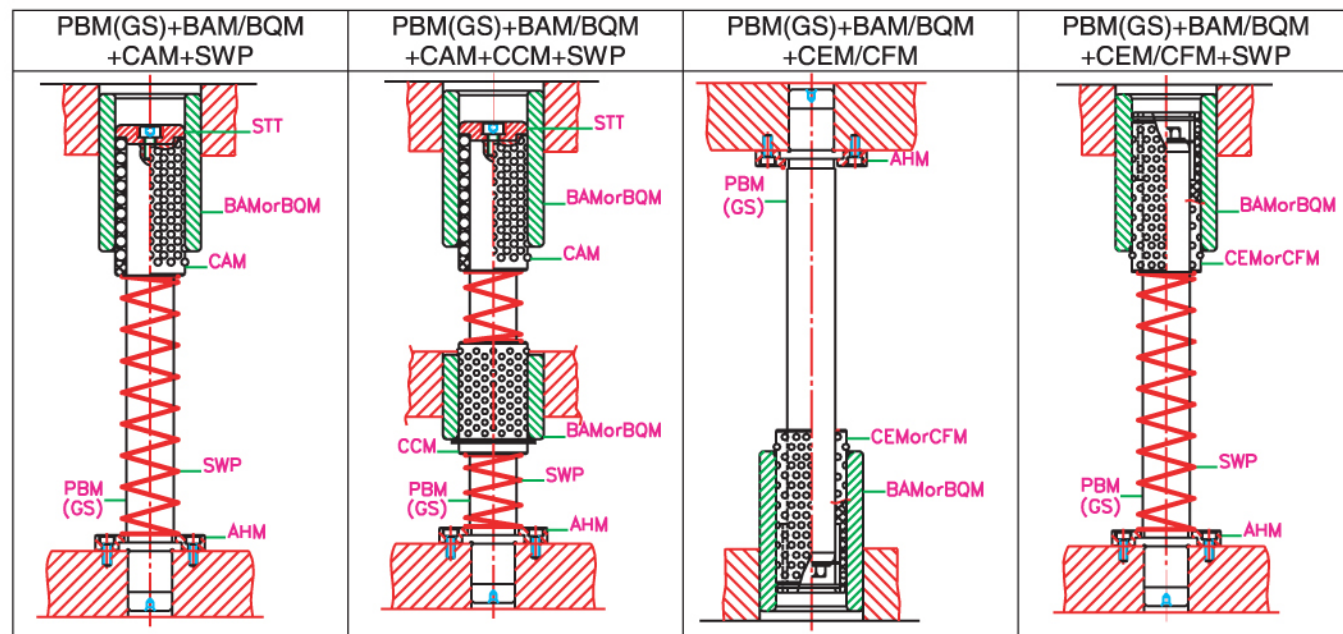
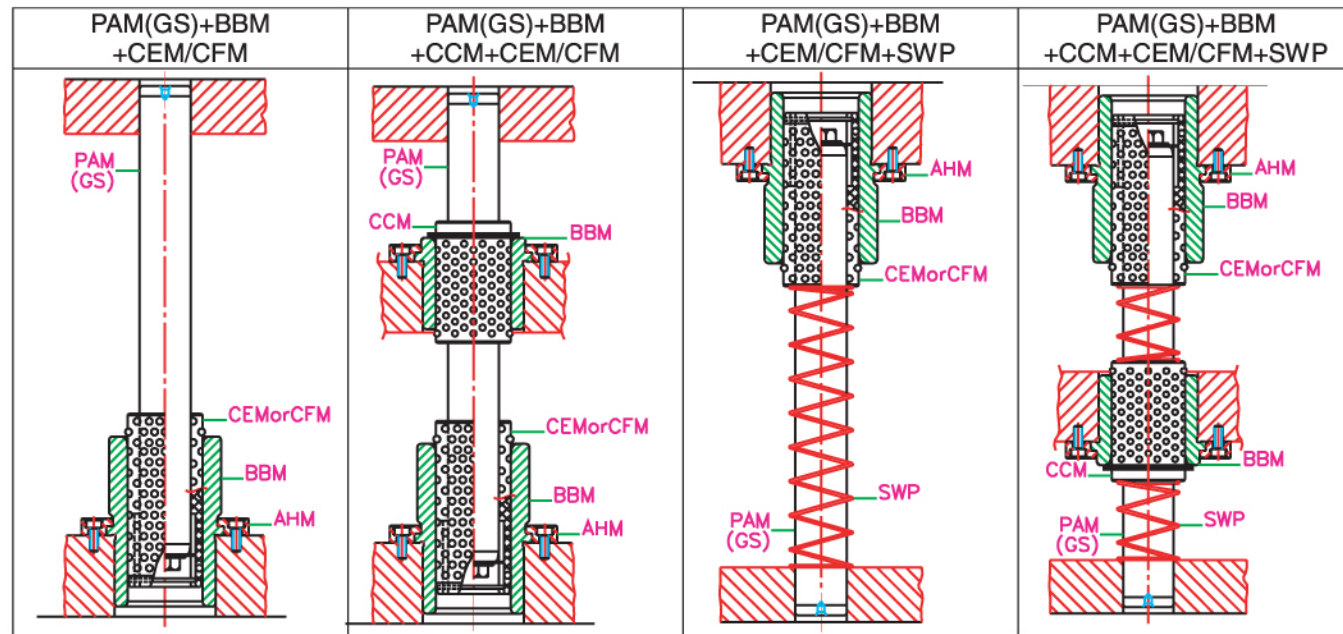


Guide Post (GS) with Bushings & Ball cages

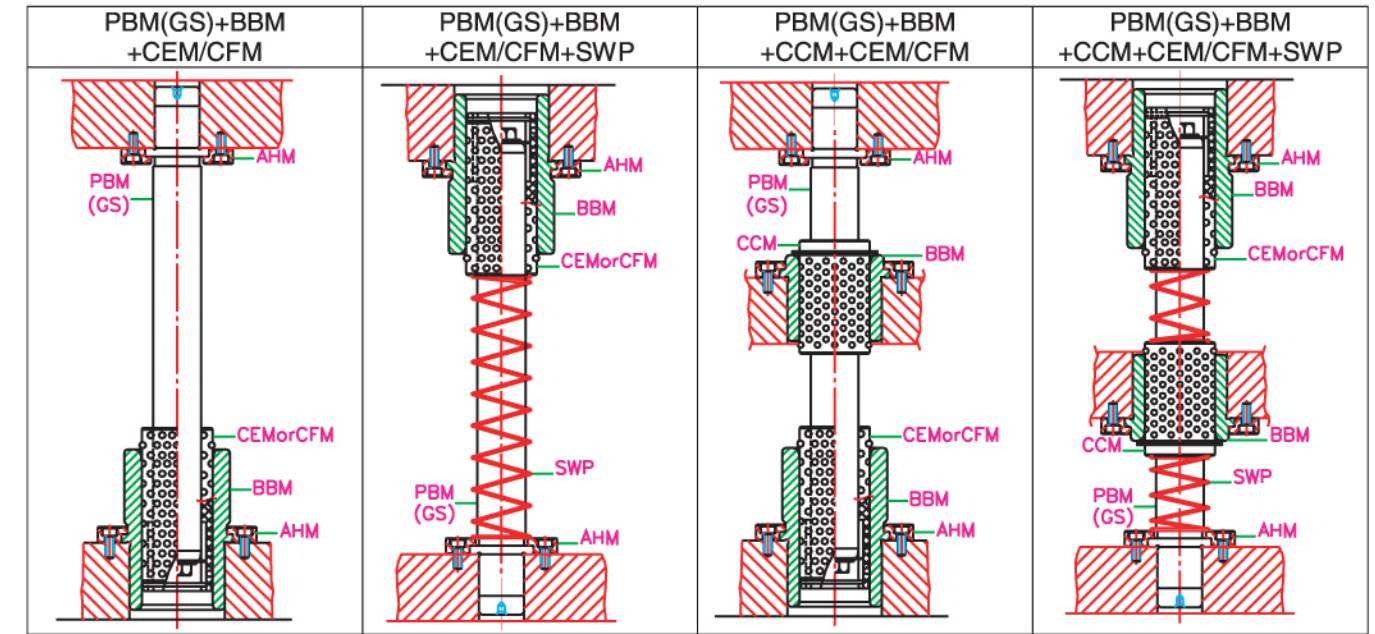
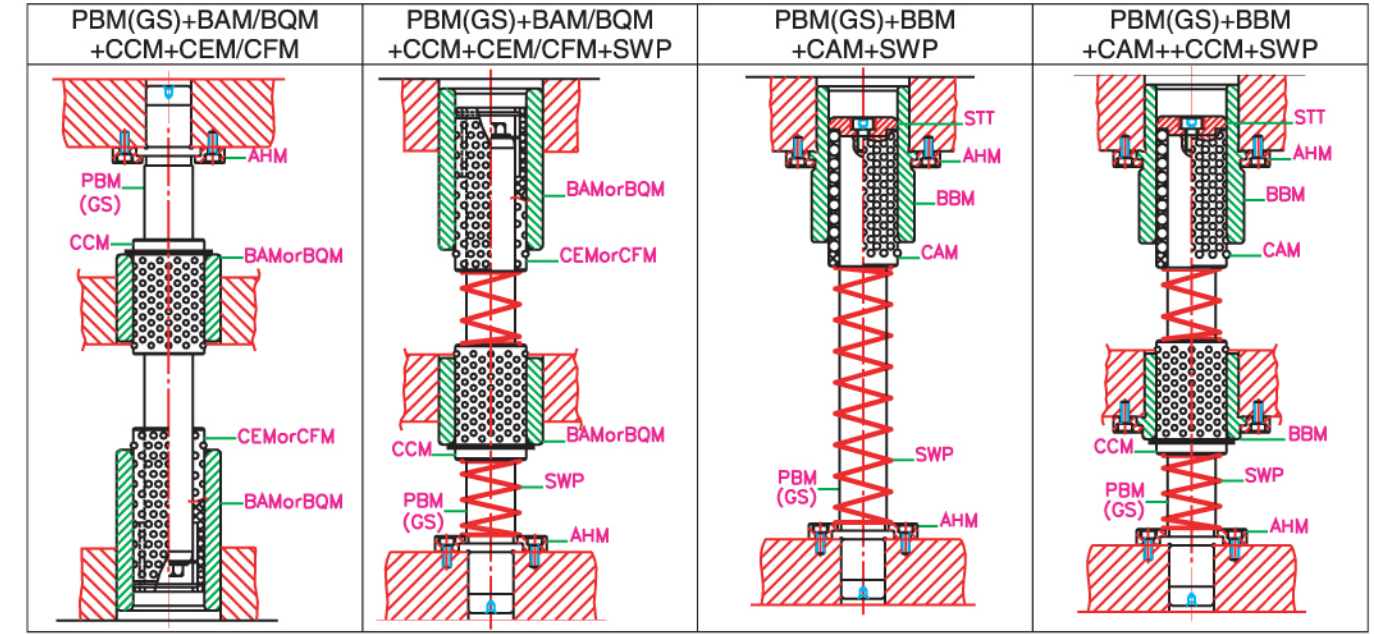




Guide Post (GS) with Bushings & Ball cages

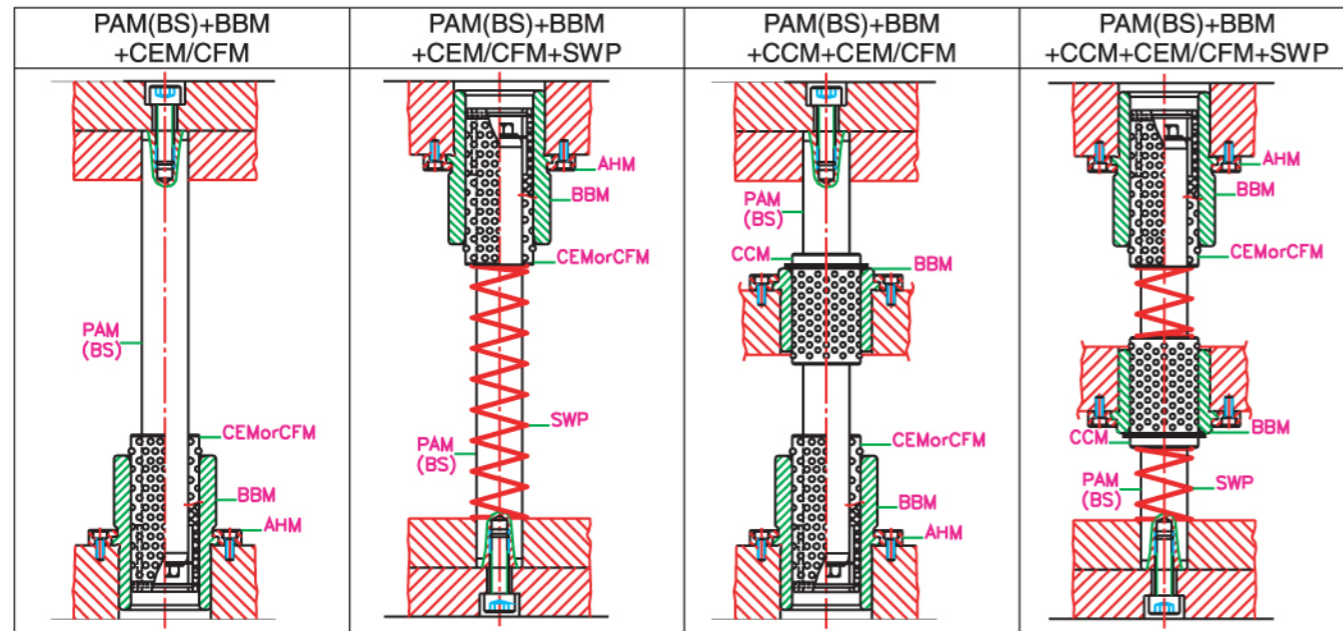
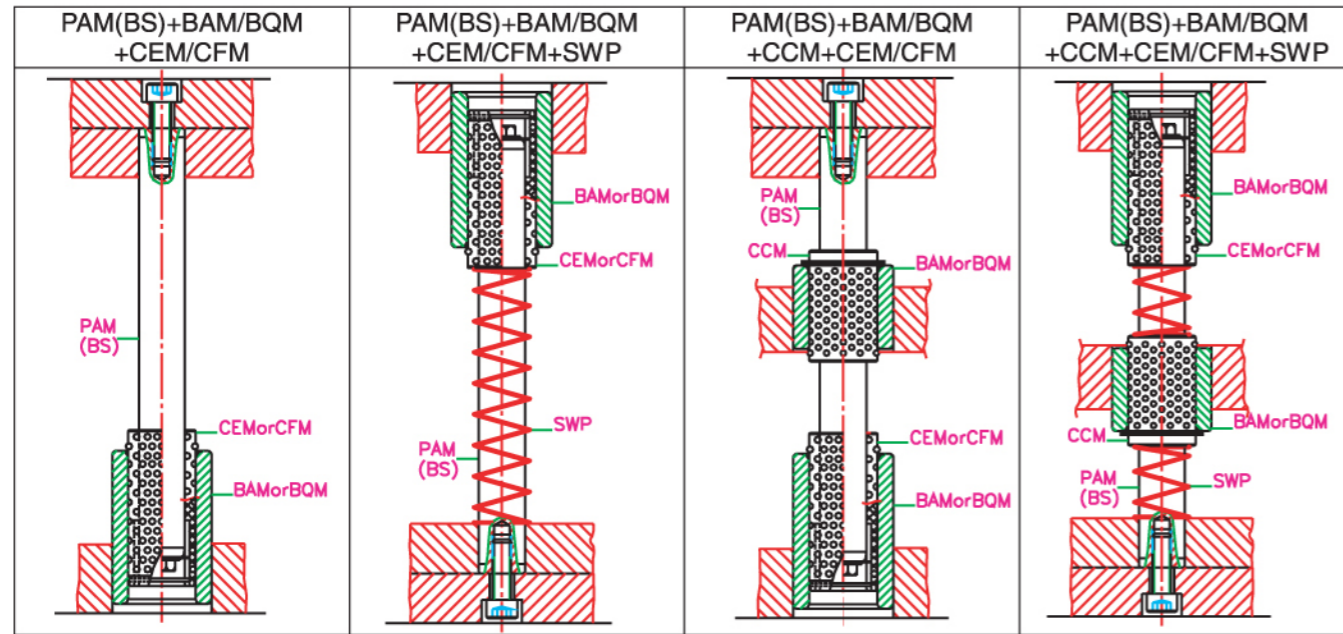


Guide Post (GS) with Bushings & Ball cages

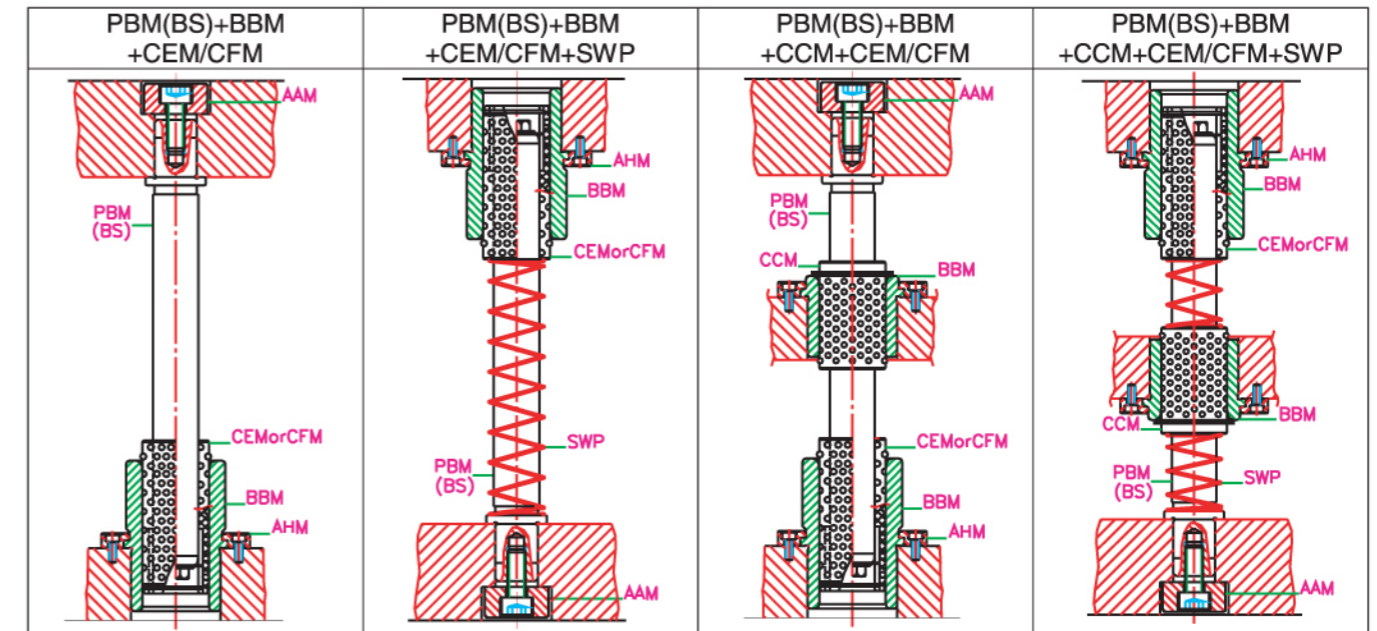
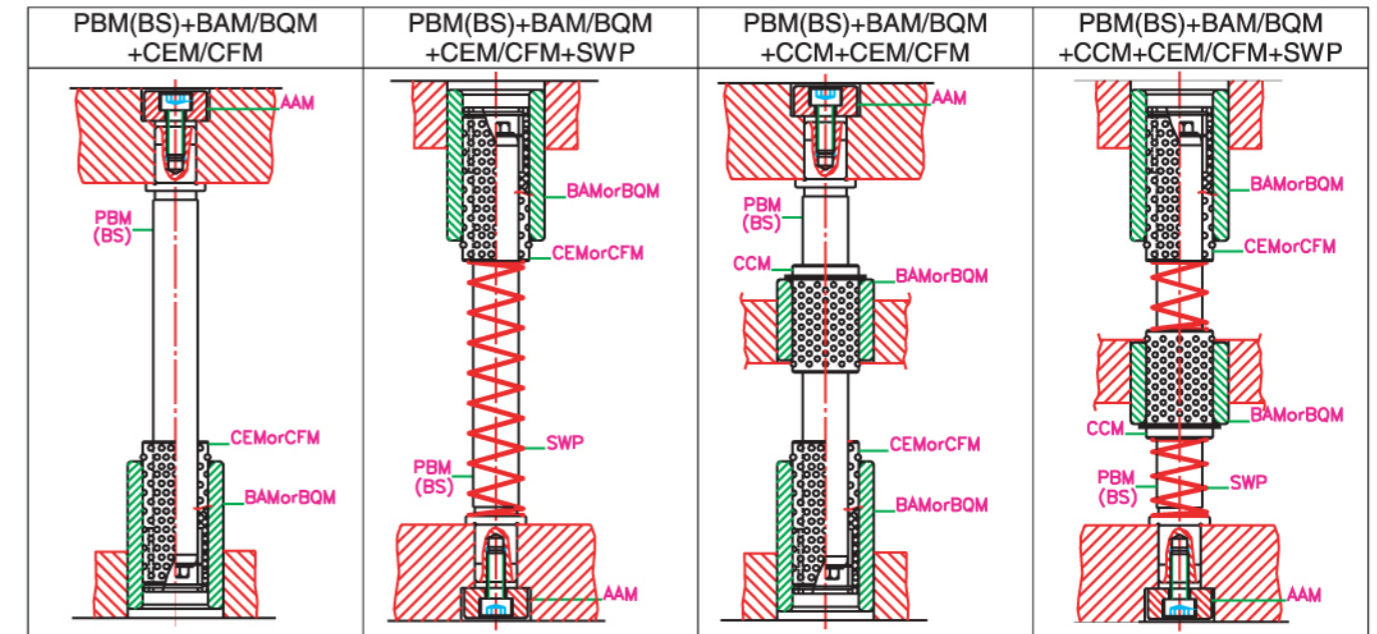




Guide Post (BS) with Bushings & Ball cages

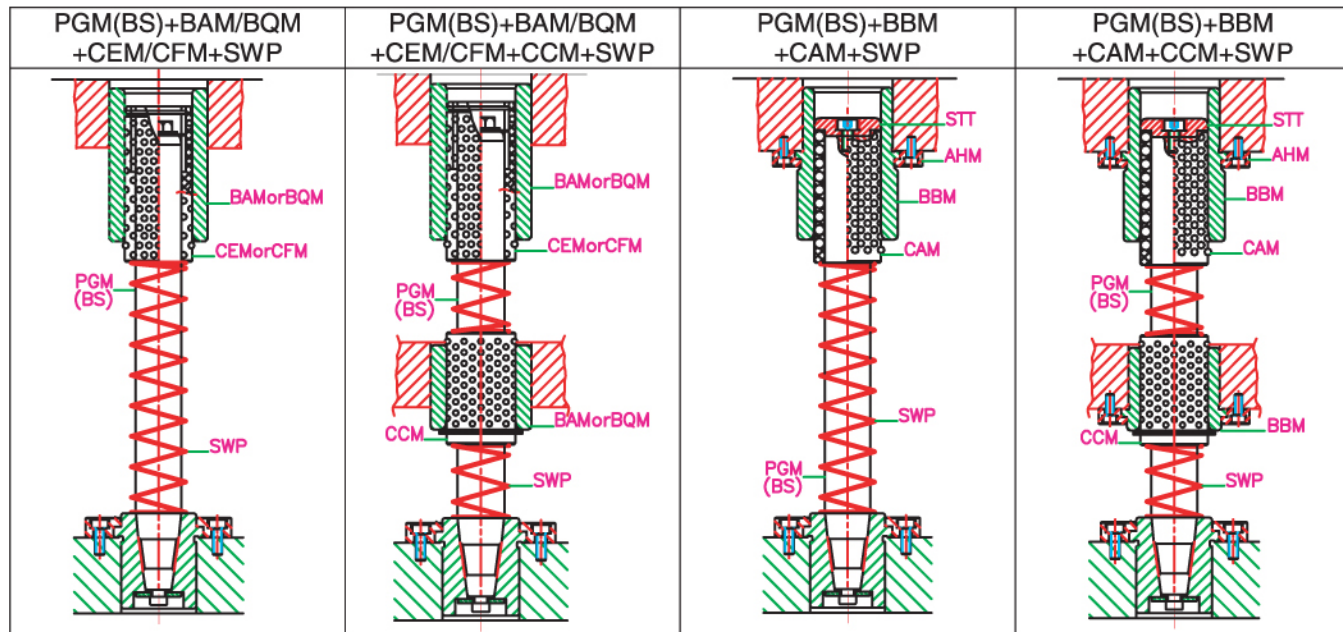
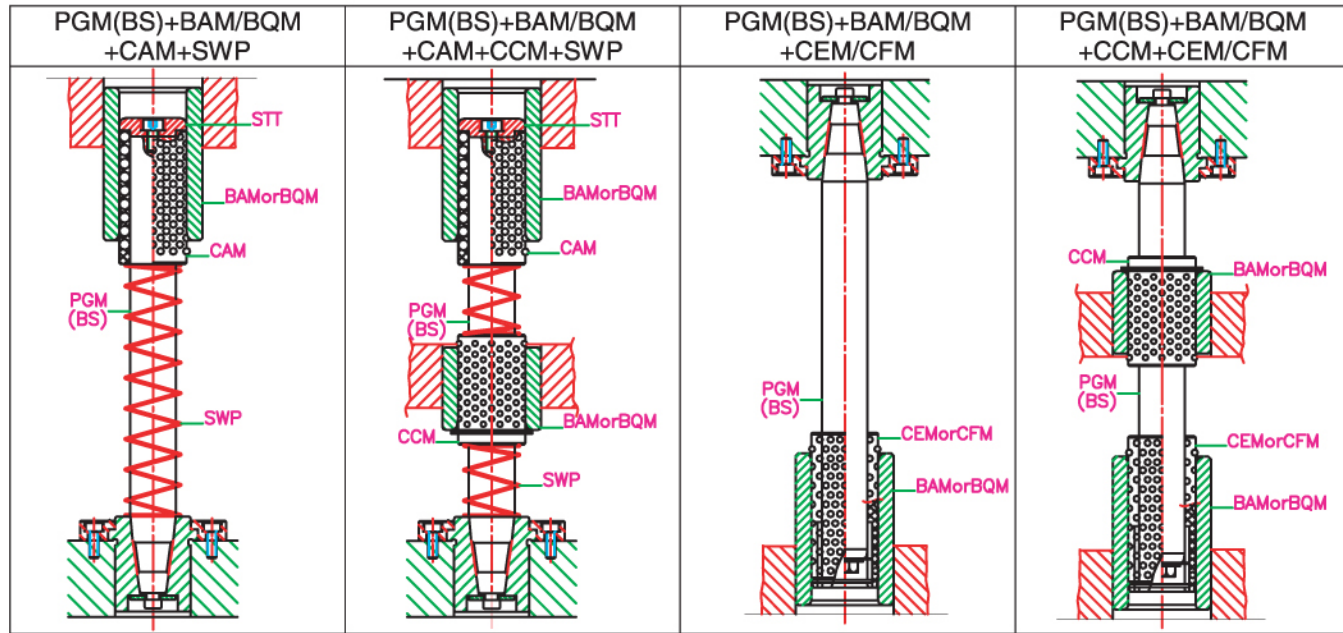


Guide Post (BS) with Bushings & Ball cages

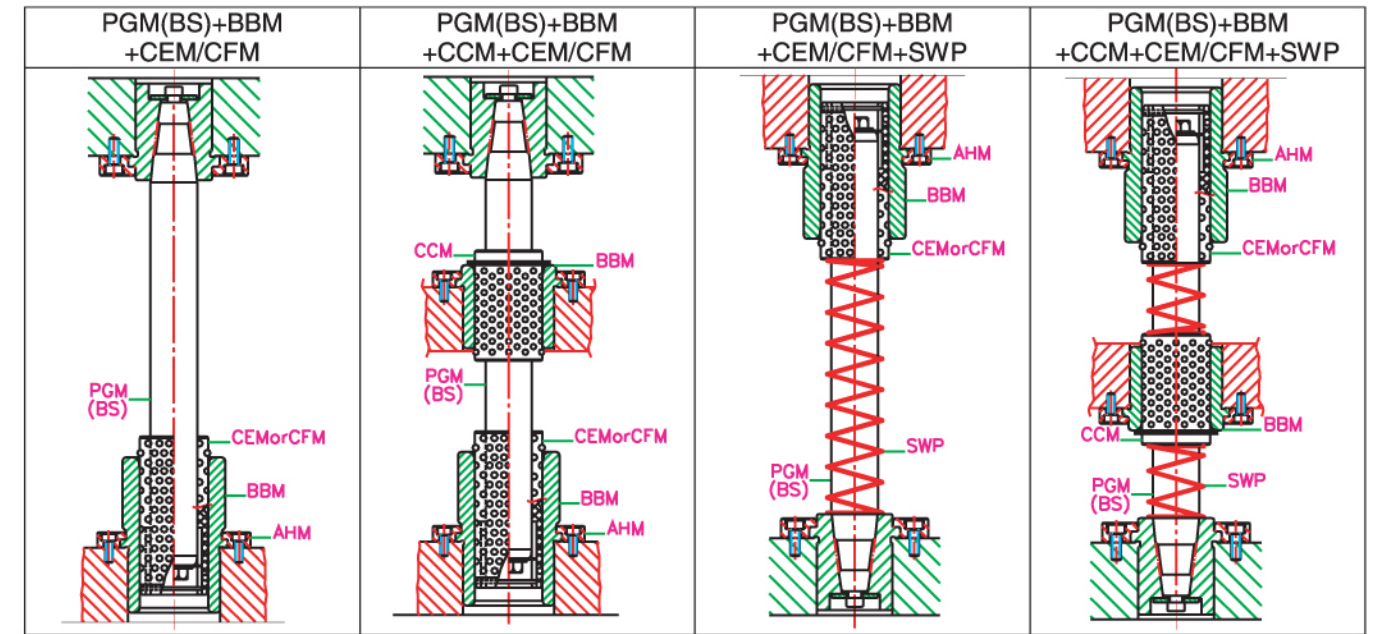




Guide Post (BS) with Bushings & Ball cages



Guide Post (BS) with Bushings & Ball cages



- © ISO Tolerances
- © Hardness Conversion Table
- © Material Conversion Table
- © Metric & Inch Dimension Conversion Table

Shaft diameters Dimensions in  $\mu\text{m}$  (1  $\mu\text{m}$  = 0.001mm)

mm		e7	f6	f7	f8	g5	g6	h3	h4	h5	h6	h7	h8	h9	j6	js4	js5	js6	k5	k6	m5	m6	n5	n6	
Over	To																								
0	3	-14 -24	-6 -12	-6 -16	-6 -20	-2 -6	-2 -8	0 -2	0 -3	0 -4	0 -6	0 -10	0 -14	0 -25	+4 -2	$\pm 1.5$	$\pm 2$	$\pm 3$	+4 0	+6 0	+6 +2	+8 +2	+8 +4	+10 +4	
3	6	-20 -32	-10 -18	-10 -22	-10 -28	-4 -9	-4 -12	0 -2.5	0 -4	0 -5	0 -8	0 -12	0 -18	0 -30	+6 -2	$\pm 2$	$\pm 2.5$	$\pm 4$	+6 +1	+9 +1	+9 +4	+12 +4	+13 +8	+16 +8	
6	10	-25 -40	-13 -22	-13 -28	-13 -35	-5 -11	-5 -14	0 -2.5	0 -4	0 -6	0 -9	0 -15	0 -22	0 -36	+7 -2	$\pm 2$	$\pm 3$	$\pm 4.5$	+7 +1	+10 +1	+12 +6	+15 +6	+16 +10	+19 +10	
10	18	-32 -50	-16 -27	-16 -34	-16 -43	-6 -14	-6 -17	0 -3	0 -5	0 -8	0 -11	0 -18	0 -27	0 -43	+8 -3	$\pm 2.5$	$\pm 4$	$\pm 5.5$	+9 +1	+12 +1	+15 +7	+18 +7	+20 +12	+23 +12	
18	30	-40 -61	-20 -33	-20 -41	-20 -53	-7 -16	-7 -20	0 -4	0 -6	0 -9	0 -13	0 -21	0 -33	0 -52	+9 -4	$\pm 3$	$\pm 4.5$	$\pm 6.5$	+11 +2	+15 +1	+17 +8	+21 +8	+24 +15	+28 +15	
30	50	-50 -75	-25 -41	-25 -50	-25 -64	-9 -20	-9 -25	0 -4	0 -7	0 -11	0 -16	0 -25	0 -39	0 -62	+11 -8	$\pm 3.5$	$\pm 5.5$	$\pm 8$	+13 +2	+18 +2	+20 +9	+25 +9	+28 +17	+33 +17	
50	80	-60 -90	-30 -49	-30 -60	-30 -76	-10 -23	-10 -29	0 -5	0 -8	0 -13	0 -19	0 -30	0 -46	0 -74	+12 -7	$\pm 4$	$\pm 6.5$	$\pm 9.5$	+15 +2	+21 +2	+24 +11	+30 +11	+33 +20	+39 +20	
80	120	-72 -107	-36 -58	-36 -71	-36 -90	-12 -27	-12 -34	0 -6	0 -10	0 -15	0 -22	0 -35	0 -54	0 -87	+13 -9	$\pm 5$	$\pm 7.5$	$\pm 11$	+18 +3	+25 +3	+28 +13	+35 +13	+38 +23	+45 +23	

Bore diameters Dimensions in  $\mu\text{m}$  (1  $\mu\text{m}$  = 0.001mm)

Mm		E8	F7	F8	G7	H5	H6	H7	H8	H9	H10	J7	JS4	JS5	K5	K6	K7	M5	M6	M7	N5	P6	P7	R6	
Over	To																								
0	3	+28 +14	+16 +5	+20 +6	+12 +2	+4 0	+6 0	+10 0	+14 0	+25 0	+40 0	+4 -5	$\pm 1.5$	+2 -2	0 -4	0 -6	0 -10	-2 -6	-2 -8	-2 -12	-4 -8	-6 -12	-6 -16	-10 -16	
3	6	+38 +20	+22 +10	+28 +10	+16 +4	+5 0	+8 0	+12 0	+18 0	+30 0	+48 0	+6 -6	$\pm 2$	+2.5 -2.5	0 -5	+2 -6	+3 -9	-3 -8	-1 -9	0 -12	-7 -12	-9 -17	-8 -20	-12 -20	
6	10	+47 +25	+28 +13	+35 +13	+20 +5	+6 0	+9 0	+15 0	+22 0	+36 0	+58 0	+8 -7	$\pm 2.5$	+3 -3	+1 -5	+2 -7	+5 -10	-4 -10	-3 -12	0 -15	-8 -14	-12 -21	-9 -24	-16 -25	
10	18	+59 +32	+34 +16	+43 +16	+24 +6	+8 0	+11 0	+18 0	+27 0	+43 0	+70 0	+10 -8	$\pm 3$	+4 -4	+2 -6	+2 -9	+6 -12	-4 -12	-4 -15	0 -18	-9 -17	-15 -26	-11 -29	-20 -31	
18	30	+73 +40	+41 +20	+53 +20	+28 +7	+9 0	+13 0	+21 0	+33 0	+52 0	+84 0	+12 -9	$\pm 3.5$	+4.5 -4.5	+1 -8	+2 -11	+6 -15	-5 -14	-4 -17	0 -21	-12 -21	-18 -31	-14 -35	-24 -37	
30	50	+89 +50	+50 +25	+64 +25	+34 +9	+11 0	+16 0	+25 0	+39 0	+62 0	+100 0	+14 -11	$\pm 4$	+5.5 -5.5	+2 -9	+3 -13	+7 -18	-5 -16	-4 -20	0 -25	-13 -24	-21 -37	-17 -42	-29 -45	
50	80	+106 +60	+60 +30	+76 +30	+40 +10	+13 0	+19 0	+30 0	+46 0	+74 0	+120 0	+18 -12	$\pm 5$	+6.5 -6.5	+3 -10	+4 -15	+9 -21	-6 -19	-5 -24	0 -30	-15 -28	-26 -45	-21 -51	-35 -56	
80	120	+126 +72	+71 +36	+90 +36	+47 +12	+15 0	+22 0	+35 0	+54 0	+87 0	+140 0	+22 -13		+7.5 -7.5	+2 -13	+4 -18	+10 -25	-8 -23	-6 -28	0 -35	-18 -33	-30 -52	-24 -59	-44 -66	



Rockwell Hardness			Vickers Hardness (HV)	Brinell Hardness (HB)		Shore Hardness (HS)
A Scale Load: 588.4N (HRA)	B Scale Load: 980.7N (HRB)	C Scale Load: 1471N (HRC)		Standard Ball	Tungsten Carbide Ball	
85.6	-	68	940	-	-	97
85.0	-	67	900	-	-	95
84.5	-	66	865	-	-	92
83.9	-	65	832	-	739	91
83.4	-	64	800	-	722	88
82.8	-	63	772	-	705	87
82.3	-	62	746	-	688	85
81.8	-	61	720	-	670	83
81.2	-	60	697	-	654	81
80.7	-	59	674	-	634	80
80.1	-	58	653	-	615	78
79.6	-	57	633	-	595	76
79.0	-	56	613	-	577	75
78.5	-	55	595	-	560	74
78.0	-	54	577	-	543	72
77.4	-	53	560	-	525	71
76.8	-	52	544	500	512	69
76.3	-	51	528	487	496	68
75.9	-	50	513	475	481	67
75.2	-	49	498	464	469	66
74.7	-	48	484	451	455	64
74.1	-	47	471	442	443	63
73.6	-	46	458	432	432	62
73.1	-	45	446	421	421	60
72.5	-	44	434	409	409	58
72.0	-	43	423	400	400	57
71.5	-	42	412	390	390	56
70.9	-	41	402	381	381	55
70.4	-	40	392	371	371	54
69.9	-	39	382	362	362	52
69.4	-	38	372	353	353	51
68.9	-	37	363	344	344	50
68.4	(109.0)	36	354	336	336	49
67.9	(108.5)	35	345	327	327	48
67.4	(108.0)	34	336	319	319	47
66.8	(107.5)	33	327	311	311	46
66.3	(107.0)	32	318	301	301	44
65.8	(106.0)	31	310	294	294	43
65.3	(105.5)	30	302	286	286	42
64.7	(104.5)	29	294	279	279	41
64.3	(104.0)	28	286	271	271	41
63.8	(103.0)	27	279	264	264	40
63.3	(102.5)	26	272	258	258	38
62.8	(101.5)	25	266	253	253	38
62.4	(101.0)	24	260	247	247	37
62.0	100.0	23	254	243	243	36
61.5	99.0	22	248	237	237	35
61.0	98.5	21	243	231	231	35
60.5	97.8	20	238	226	226	34
-	96.7	(18)	230	219	219	33
-	95.5	(16)	222	212	212	32
-	93.9	(14)	213	203	203	31
-	92.3	(12)	204	194	194	29
-	90.7	(10)	196	187	187	28
-	89.5	(8)	188	179	179	27
-	87.1	(6)	180	171	171	26
-	85.5	(4)	173	165	165	25
-	83.5	(2)	166	158	158	24
-	81.7	(0)	160	152	152	24

■ Material speed tool steel & Alloy tool steel

JIS	ISO	AISI ASTM	BS	DIN VDEh	
SKH51	HS 6-5-2	M2	BM 2	S 6-5-2	1.3343
SKH55	HS 6-5-2-5	—	BM35	S 6-5-2-5	1.3243
SKS 3	—	—	—	—	1.2419
SKD11	—	D2	BD2	—	1.2379
SKD61	40CrMoV5	H13	BH13	X40CrMoV51	1.2344

■ High-carbon chrome bearing steel

JIS	ISO	AISI SAE	BS	DIN	
SUJ 2	B1or 100Cr6	52100	—	100Cr6	1.2067/1.3505

■ Carbon steel for machine structural use & Chrome molybdenum steel

JIS	ISO 683/1,10,11 <sup>5)</sup>	AISI SAE	BS 970 Part1,3 BS EN 10083-1,2	DIN		
S45C	C45	1045 1046	C45	C45	1.0503	
	C45E4		C45E	C45E	1.1191	
	C45M2		C45R	C45R	1.1193	
S50C	C50	1049	080M50	C50	1.1213	
	C50E4		C50	C50E		
	C50M2		C50R	C50R		
S55C	C55	1055	070M55	C55	1.0535/1.1203	
	C55E4		C55	C55E		
	C55M2		C55R	C55R		
	—		—	—		
SCM430	—	4131	—	—	1.7218	
SCM435	34CrMo4	4137	34CrMo4	34CrMo4	1.7220	
	34CrMoS4		34CrMoS4	34CrMoS4		
SCM440	42CrMo4	4140 4142	708M40	42CrMo4	1.7225	
	42CrMoS4		709M40			42CrMoS4
	—		42CrMo4			—
	—		42CrMoS4			—

■ Stainless Steel

JIS	ISO TR 15510 L No.	AISI	BS	DIN	
SUS 303	13	303	303S21	X10CrNiS18 9	1.4305
SUS 304	6	304	304S31	X5CrNi18 10	1.4301
SUS 430	41	430	430S17	X6Cr17	1.4016

■ Aluminum and aluminum alloy extender

JIS H4000:88	ISO 6361:90 ISO 209:89	ASTM B209M:95	BS EN485-2:95 BS EN573-3:95	DIN EN485-2:95 DIN EN573-3:94
A5052P	AlMg2.5	5052	EN AW-5052	EN AW-5052
A6061P	—	6061	EN AW-6061	EN AW-6061
A7075P	AlZn5.5MgCu	7075	EN AW-7075	EN AW-7075

Remarks: AISI (USA), ASTM (USA), BS (UK), DIN (Germany), ISO (International Standard), JIS (Japan)

mm	Inch	
	(Fraction)	(Decimal)
0	0	0.000
3.175	1/8	0.125
6.350	1/4	0.250
9.525	3/8	0.375
12.700	1/2	0.500
15.875	5/8	0.625
19.050	3/4	0.750
22.225	7/8	0.875
25.400	1	1.000
28.575	1-1/8	1.125
31.750	1-1/4	1.250
34.925	1-3/8	1.375
38.100	1-1/2	1.500
41.275	1-5/8	1.625
44.450	1-3/4	1.750
47.625	1-7/8	1.875
50.800	2	2.000
53.975	2-1/8	2.125
57.150	2-1/4	2.250
60.325	2-3/8	2.375
63.500	2-1/2	2.500
66.675	2-5/8	2.625
69.850	2-3/4	2.750
73.025	2-7/8	2.875
76.200	3	3.000
79.375	3-1/8	3.125
82.550	3-1/4	3.250
85.725	3-3/8	3.375
88.900	3-1/2	3.500
92.075	3-5/8	3.625
95.250	3-3/4	3.750
98.425	3-7/8	3.875
101.600	4	4.000
104.775	4-1/8	4.125
107.950	4-1/4	4.250
111.125	4-3/8	4.375
114.300	4-1/2	4.500
117.475	4-5/8	4.625
120.650	4-3/4	4.750
123.825	4-7/8	4.875

mm	Inch	
	(Fraction)	(Decimal)
127.000	5	5.000
130.175	5-1/8	5.125
133.350	5-1/4	5.250
136.525	5-3/8	5.375
139.700	5-1/2	5.500
142.875	5-5/8	5.625
146.050	5-3/4	5.750
149.225	5-7/8	5.875
152.400	6	6.000
155.575	6-1/8	6.125
158.750	6-1/4	6.250
161.925	6-3/8	6.375
165.100	6-1/2	6.500
168.275	6-5/8	6.625
171.450	6-3/4	6.750
174.625	6-7/8	6.875
177.800	7	7.000
180.975	7-1/8	7.125
184.150	7-1/4	7.250
187.325	7-3/8	7.375
190.500	7-1/2	7.500
193.675	7-5/8	7.625
196.850	7-3/4	7.750
200.025	7-7/8	7.875
203.200	8	8.000
206.375	8-1/8	8.125
209.550	8-1/4	8.250
212.725	8-3/8	8.375
215.900	8-1/2	8.500
219.075	8-5/8	8.625
222.250	8-3/4	8.750
225.425	8-7/8	8.875
228.600	9	9.000
231.775	9-1/8	9.125
234.950	9-1/4	9.250
238.125	9-3/8	9.375
241.300	9-1/2	9.500
244.475	9-5/8	9.625
247.650	9-3/4	9.750
250.825	9-7/8	9.875

mm	Inch	
	(Fraction)	(Decimal)
254.000	10	10.000
257.175	10-1/8	10.125
260.350	10-1/4	10.250
263.525	10-3/8	10.375
266.700	10-1/2	10.500
269.875	10-5/8	10.625
273.050	10-3/4	10.750
276.225	10-7/8	10.875
279.400	11	11.000
282.575	11-1/8	11.125
285.750	11-1/4	11.250
288.925	11-3/8	11.375
292.100	11-1/2	11.500
295.275	11-5/8	11.625
298.450	11-3/4	11.750
301.625	11-7/8	11.875
304.800	12	12.000
307.975	12-1/8	12.125
311.150	12-1/4	12.250
314.325	12-3/8	12.375
317.500	12-1/2	12.500
320.675	12-5/8	12.625
323.850	12-3/4	12.750
327.025	12-7/8	12.875
330.200	13	13.000
333.375	13-1/8	13.125
336.550	13-1/4	13.250
339.725	13-3/8	13.375
342.900	13-1/2	13.500
346.075	13-5/8	13.625
349.250	13-3/4	13.750
352.425	13-7/8	13.875
355.600	14	14.000
381.000	15	15.000
406.400	16	16.000
431.800	17	17.000
457.200	18	18.000
482.600	19	19.000
508.000	20	20.000
533.400	21	21.000