

# Taper Lock® Metric Bushes

## METRIC BORES AND KEYWAYS

Bore Dia.	Keyway		Keyway Depth	Product Code								
	Width	Depth		Shallow								
				1008	1108	1210	1610	1615	2012	2517	3020	3030
9	3	1,4	–	029A0009	029B0009							
10	3	1,4	–	010	010							
11	4	1,8	–	011	011	029C0011						
12	4	1,8	–	012	012	012						
14	5	2,3	–	014	014	014	029G0014	029H0014	029K0014			
15	5	2,3	–	015	015	015	015	015	015			
16	5	2,3	–	016	016	016	016	016	016	029M0016		
18	6	2,8	–	018	018	018	018	018	018	018		
19	6	2,8	–	019	019	019	019	019	019	019		
20	6	2,8	–	020	020	020	020	020	020	020		
22	6	2,8	–	022	022	022	022	022	022	022		
24	8	3,3	1,3	024*	024	024	024	024	024	024		
25	8	3,3	1,3	025*	025	025	025	025	025	025	029P0025	
28	8	3,3	1,3		<b>028*</b>	028	028	028	028	028	028	
30	8	3,3	–			030	030	030	030	030	030	
32	10	3,3	--			032	032	032	032	032	032	
35	10	3,3	–				035	035	035	035	035	029Q0035
38	10	3,3	–				038	038	038	038	038	038
40	12	3,3	–				040	040	040	040	040	040
42	12	3,3	2,2				<b>042*</b>	<b>042*</b>	042	042	042	042
45	14	3,8	–						045	045	045	045
48	14	3,8	–						048	048	048	048
50	14	3,8	–						050	050	050	050
55	16	4,3	–							055	055	055
60	18	4,4	–							060	060	060
65	18	4,4	–								065	065
70	20	4,9	–								070	070
75	20	4,9	–								075	075

## METRIC BORES AND KEYWAYS

Bore Dia.	Keyway		Shallow Keyway Depth	Product Code								
	Width	Depth		3525	3535	4030	4040	4535	4545	5040	5050	
35	10	3,3	–	029J0035	029R0035							
38	10	3,3	–	038	038							
40	12	3,3	–	040	040	029X0040	029S0040					
42	12	3,3	–	042	042	042	042					
45	14	3,8	–	045	045	045	045					
48	14	3,8	–	048	048	048	048					
50	14	3,8	–	050	050	050	050					
55	16	4,3	–	055	055	055	055	029Y0055	029T0055			
60	18	4,4	–	060	060	060	060	060	060			
65	18	4,4	–	065	065	065	065	065	065			
70	20	4,9	–	070	070	070	070	070	070	029Z0070	029U0070	
75	20	4,9	–	075	075	075	075	075	075	075	075	075
80	22	5,4	–	080	080	080	080	080	080	080	080	080
85	22	5,4	–	085	085	085	085	085	085	085	085	085
90	25	5,4	–	090	090	090	090	090	090	090	090	090
95	25	5,4	–	<b>095</b>		095	095	095	095	095	095	095
100	28	6,4	4,4	<b>100*</b>		100	100	100	100	100	100	100
105	28	6,4	–			<b>105</b>		105	105	105	105	105
110	28	6,4	–			<b>110</b>		110	110	110	110	110
115	32	7,4	5,4			<b>115*</b>		<b>115</b>		115	115	115
120	32	7,4	–					<b>120</b>		120	120	120
125	32	7,4	–					<b>125</b>		125	125	125

Dimensions in millimetres.

Keyways are British Standard Metric BS 4235: Part 1: 1972 DIN 6885 and conform to ISO recommendations with the exception of those marked\* which are shallower. Where a key is to be used it should be parallel and side fitting with top clearance. Depth of keyway is measured at CENTRE.

Bold italic type indicates bushes made of ductile material.

## INCH BORES AND KEYWAYS

Bore Dia.	Keyway		Shallow Keyway Depth	Product Code								
	Width	Depth		1008	1108	1210	1610	1615	2012	2517	3020	3030
<b>0,375</b>	0,125	0,06	–	019A0006	019B0006							
<b>0,500</b>	0,125	0,06	–	008	008		019G0008	019H0008				
<b>0,625</b>	0,187	0,09	–	010	010	019C0010	010	010				
<b>0,750</b>	0,187	0,09	–	012	012	012	012	012	019K0012	019M0012		
<b>0,875</b>	0,250	0,12	–	014	014	014	014	014	014	014		
<b>1,000</b>	0,250	0,12	0,052	100*	100	100	100	100	100	100		
<b>1,125</b>	0,312	0,11	0,064		<b>102*</b>	102	102	102	102	102		
<b>1,250</b>	0,312	0,11	–			104	104	104	104	104	019P0104	019Q0104
<b>1,375</b>	0,375	0,11	–				106	106	106	106	106	106
<b>1,500</b>	0,375	0,11	–				108	108	108	108	108	108
<b>1,625</b>	0,437	0,13	0,103				110	110*	110	110	110	110
<b>1,750</b>	0,437	0,13	–						112	112	112	112
<b>1,875</b>	0,500	0,13	–						114	114	114	114
<b>2,000</b>	0,500	0,13	–						200	200	200	200
<b>2,125</b>	0,625	0,18	–							202	202	202
<b>2,250</b>	0,625	0,18	–							204	204	204
<b>2,375</b>	0,625	0,18	–							206	206	206
<b>2,500</b>	0,625	0,18	–							208	208	208
<b>2,625</b>	0,750	0,21	–								210	210
<b>2,750</b>	0,750	0,21	–								212	212
<b>2,875</b>	0,750	0,21	–								214	214
<b>3,000</b>	0,750	0,21	–								300	300

## INCH BORES AND KEYWAYS

Bore Dia.	Keyway		Shallow Keyway Depth	Product Code								
	Width	Depth		3525	3535	4030	4040	4535	4545	5040	5050	
<b>1,500</b>	0,375	0,11	–	019J0108	019R0108							
<b>1,625</b>	0,437	0,13	–	110	110							
<b>1,750</b>	0,437	0,13	–	112	112	019X0112	19S0112					
<b>1,875</b>	0,500	0,13	–	114	114	114	114					
<b>2,000</b>	0,500	0,13	–	200	200	200	200					
<b>2,125</b>	0,625	0,18	–	202	202	202	202					
<b>2,250</b>	0,625	0,18	–	204	204	204	204	019Y0204	019T0204			
<b>2,375</b>	0,625	0,18	–	206	206	206	206	206	206			
<b>2,500</b>	0,625	0,18	–	208	208	208	208	208	208			
<b>2,625</b>	0,750	0,21	–	210	210	210	210	210	210			
<b>2,750</b>	0,750	0,21	–	212	212	212	212	212	212	019Z0212	019U0212	
<b>2,875</b>	0,750	0,21	–	214	214	214	214	214	214	214	214	214
<b>3,000</b>	0,750	0,21	–	300	300	300	300	300	300	300	300	300
<b>3,125</b>	0,875	0,26	–	302	302	302	302	302	302	302	302	302
<b>3,250</b>	0,875	0,26	–	304	304	304	304	304	304	304	304	304
<b>3,375</b>	0,875	0,26	–	306	306	306	306	306	306	306	306	306
<b>3,500</b>	0,875	0,26	–	308	308	308	308	308	308	308	308	308
<b>3,750</b>	1,000	0,32	0,245	<b>312*</b>		312	312	312	312	312	312	312
<b>4,000</b>	1,000	0,32	0,155	<b>400*</b>		400	400	400	400	400	400	400
<b>4,250</b>	1,250	0,37	–			<b>404</b>		404	404	404	404	404
<b>4,500</b>	1,250	0,37	0,255			<b>408*</b>		408	408	408	408	408
<b>4,750</b>	1,250	0,37	–					<b>412</b>		412	412	412
<b>5,000</b>	1,250	0,37	0,258					<b>500*</b>		500	500	500

Dimensions in inches.

All Keyways are parallel and to British Standard 46: Part 1: 1958, with the exception of those marked\* which are shallower.

Where a key is to be used it should be side fitting with top clearance. Depth of keyway is measured at CENTRE.

Bold italic type indicates bushes made of ductile material.

## Minimum Diameters of Taper Bored Hubs

The following table shows the recommended minimum diameter in mm for bespoke component hubs that are to be drilled, tapped and taper bored for use with Taper Lock bushes. The table differentiates between grey iron and ductile materials of various minimum tensile strength grades (in N/mm<sup>2</sup> or MN/m<sup>2</sup> units, which are numerically equal).

All standard Fenner Taper Lock products are tested to ensure that they are capable of safely containing the radial and circumferential hub stresses generated by the wedging mechanism which makes Taper Lock the equivalent of a shrink-on fit. For Taper Lock hub machining details, consult FPT.

Taper Lock® Bush	Minimum Hub Diameters (mm) for Various Materials			
	Tensile Strength N/mm <sup>2</sup>			
	Cast Iron 180	Cast Iron 250	Steel 420	Steel 600
1008	62	54	51	47
1108	64	57	54	50
1210	104	86	78	69
1610	109	92	85	78
1615	90	81	77	73
2012	121	106	99	92
2517	130	119	113	108
3020	160	146	140	132
3030	144	136	132	127
3525	211	191	178	167
3535	191	176	168	160
4030	224	207	197	186
4040	209	195	188	180
4535	223	212	205	198
4545	215	205	200	194
5040	240	229	223	216
5050	233	223	219	213

## Average Slip Torques for Taper Lock Fixing (Without key)

The following table shows empirically derived average slip torque values in Nm for each basic Taper Lock bush size with a variety of common metric bore diameters. The values assume that the assembly uses a Fenner Taper Lock bush fitted, in accordance with the instructions supplied with every bush, to a hub prepared to the Fenner specification. Slip will tend to occur at the bush/shaft interface, at the prescribed torque, unless a key is fitted. With a key, the slip tendency transfers to the bush/hub interface at a greater torque value related to the ratio of bush outer dia. to bore dia.. Consult FPT for specific values.

Formula to calculate the slip torque if a key is used:  $\frac{\text{Large OD of Bush}}{\text{Shaft Size}} \times \text{average slip torque value.}$

Bush	Bore (mm)	Average Slip Torque (Nm)	Bush	Bore (mm)	Average Slip Torque (Nm)
1008	12	29	3020 3030	38	520
	19	51		48	730
	24	66		55	890
1108	12	28	3525* 3535	60	970
	19	49		75	1300
	24	64		42	1000
	28	79		60	1580
1210	16	82	4030* 4040	75	2150
	19	105		90	2600
	24	142		100*	3075
	32	210		48	1700
1610 1615	19	98	4535* 4545	60	2300
	24	135		75	3150
	38	240		100	4400
	42	265		115*	5150
2012	24	165	5040 5050	55	2500
	38	320		75	3900
	42	340		100	5500
	48	400		110	6300
	50	420		125*	6625
2517	24	220		75	3950
	38	380		100	5650
	42	430		125	7370
	48	510			
	55	600			
	60	670			

Large bores marked\* are only available in bush sizes marked\*

# Taper Lock® Installation Instructions

## TO INSTALL

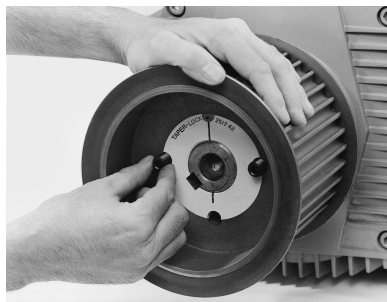
1. After ensuring that the mating tapered surfaces, bore and shaft are completely clean and free from oil or dirt, insert bush in hub so that holes line up.
2. Sparingly oil thread and point of grub screws, or thread and under head of cap screws. Place screws loosely in holes threaded in hub, shown thus ⊙ in diagram.
3. If a key is to be fitted place it in the shaft keyway before fitting the bush. It is essential that it is a parallel key and side fitting only and has TOP CLEARANCE.
4. Clean shaft and fit hub to shaft as one unit and locate in position desired, remembering that bush will nip the shaft first and then hub will be slightly drawn on to the brush.
5. Using a hexagon wrench tighten screws gradually and alternately to torque shown in table below.
6. Hammer against large-end of bush, using a block or sleeve to prevent damage. (This will ensure that the bush is seated squarely in the bore.) Screws will now turn a little more. Repeat this alternate hammering and screw tightening once or twice to achieve maximum grip on the shaft.
7. After drive has been running under load for a short time stop and check tightness of screws.
8. Fill empty holes with grease to exclude dirt.



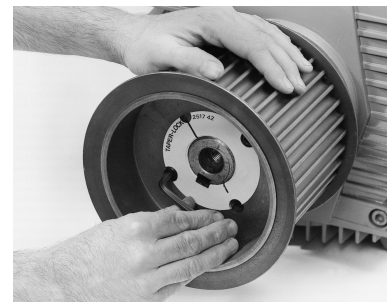
**INSERT BUSH**



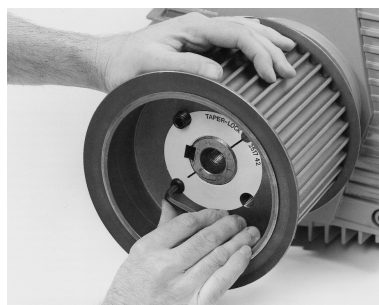
**INSERT SCREWS and LOCATE ON SHAFT**



**TIGHTEN SCREWS FINGER TIGHT**



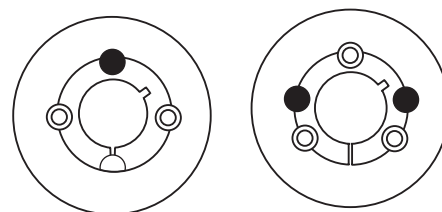
**TIGHTEN SCREWS ALTERNATELY**



**REMOVING A TAPER LOCK BUSH**

## TO REMOVE

1. Slacken all screws by several turns, remove one or two according to number of removal holes shown thus ● in diagram. Insert screws into removal holes after oiling thread and under head of cap screws.
2. Tighten screws alternately until bush is loosened in hub and assembly is free on the shaft.
3. Remove assembly from shaft.



**REMOVAL HOLES ●**

Bush size	1008	1108	1210	1610	1615	2012	2517	3020	3030	3525	3535	4030	4040	4535	4545	5040	5050	
Screw tightening torque (Nm)	5,6	5,6	20	20	20	30	50	90	90	115	115	170	170	190	190	270	270	
qty	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	
Screw details	size (BSW)	1/4"	1/4"	3/8"	3/8"	3/8"	7/16"	1/2"	5/8"	5/8"	1/2"	1/2"	5/8"	5/8"	3/4"	3/4"	7/8"	7/8"
	Hex, socket size (mm)	3	3	5	5	5	6	6	8	8	10	10	12	12	14	14	14	14
Large end dia. (mm)	35,0	38,0	47,5	57,0	57,0	70,0	85,5	108	108	127	127	146	146	162	162	178	178	
Bush length (mm)	22,3	22,3	25,4	25,4	38,1	31,8	44,5	50,8	76,2	63,5	89,0	76,2	102	89,0	114	102	127	
Approx mass (kg)	0,1	0,1	0,2	0,3	0,5	0,7	1,5	2,7	3,6	3,8	5,0	5,6	7,7	7,5	10,0	11,1	14,0	

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