

TR HANK® SELF CLINCH FASTENERS

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Edition 12

TR Self-Clinch Fasteners



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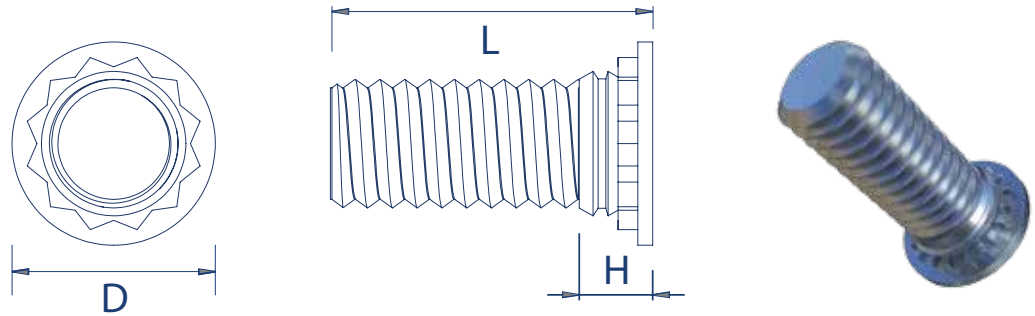
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Flush Head Studs

TR-FH/TR-FHS/TR-FH4/TR-FHA



Zinc Plated Steel: TR-FH | Stainless Steel: TR-FHS | 400 Series Stainless Steel: TR-FH4 | Aluminium: TR-FHA



Metric Dimensions

Thread	M2	M2.5	M3	M3.5	M4	M5	M6	M8
D ±0.4	3.5	4.1	4.6	5.3	5.9	6.5	8.2	9.6
H maximum	1.95	1.95	2.1	2.2	2.4	2.7	3.0	3.7
Minimum sheet thickness	1.0	1.0	1.0	1.0	1.0	1.0	1.6	2.4
Recommended hole size +0.08	2.0	2.5	3.0	3.5	4.0	5.0	6.0	8.0
Minimum distance to edge of sheet	5.2	5.4	5.6	6.4	7.2	7.2	7.9	9.6

Preferred Range

Thread	M2	M2.5	M3	M3.5	M4	M5	M6	M8
(L) Length ±0.4	5			•		•		
	6	•	•	•		•	•	
	8	•	•	•	•	•	•	•
	10	•	•	•	•	•	•	•
	12	•	•	•	•	•	•	•
	15	•	•	•	•	•	•	•
	16	•		•	•	•	•	•
	18	•	•	•		•	•	•
	20	•	•	•	•	•	•	•
	22			•		•	•	•
	25			•	•	•	•	•
	28					•	•	•
	30			•		•	•	•
	35			•		•	•	•
	38					•	•	•
	40					•	•	•
	45					•	•	•
	50					•	•	•



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Flush Head Studs

TR-FH/TR-FHS/TR-FH4/TR-FHA



Metric Performance Data: TR-FH4

Thread	M2.5	M3	M4	M5	M6	M8
Test sheet material	Stainless Steel					
Sheet thickness	1.4	1.5	1.5	1.5	1.5	2.5
Installation (kN)	40.0	41.0	51.0	54.0	71.0	73.5
Pushout (N)	2000	2230	3300	3600	4210	5500
Torque-out (Nm)	14	1.8	6.6	10.8	15.9	30.0
Pull through (N)	-	3300	8010	10020	14950	-

Metric Performance Data: TR-FHS

Thread	M2	M2.5	M3	M4	M5	M6	M8
Test sheet material	Steel						
Sheet thickness	1.5	1.5	1.5	1.5	1.5	2.5	2.5
Installation (kN)	13.5	13.5	14.7	26.0	32.0	44.0	49.9
Torsional resistance (Nm)	0.45	0.8	1.4	2.9	6.4	10.0	17.0
Pushout (N)	740	740	820	1790	2000	2500	2800
Pull through (N)	-	1800	2450	4800	6000	10600	13600

Metric Performance Data: TR-FH

Thread	M2	M2.5	M3	M3.5	M4	M5	M6	M8
Test sheet material	Steel							
Sheet thickness	1.5	1.5	1.5	1.5	1.5	1.5	2.5	2.5
Installation (kN)	9.0	11.0	14.7	22.3	28.0	33.5	45.0	45.0
Torsional resistance (Nm)	0.45	1.0	1.7	2.8	4.3	6.8	12.0	19.5
Pushout (N)	700	740	820	1335	1800	2100	2600	2900
Pull through (N)	1700	2800	3900	3780	5700	6300	11400	15500

TR-FH - Recommended for use in sheet hardness: HRB 80 or less

TR-FHS - Recommended for use in sheet hardness: HRB 70 or less

TR-FH4 - Recommended for use in sheet hardness: HRB 92 or less

TR-FHA - Recommended for use in sheet hardness: HRB 50 or less

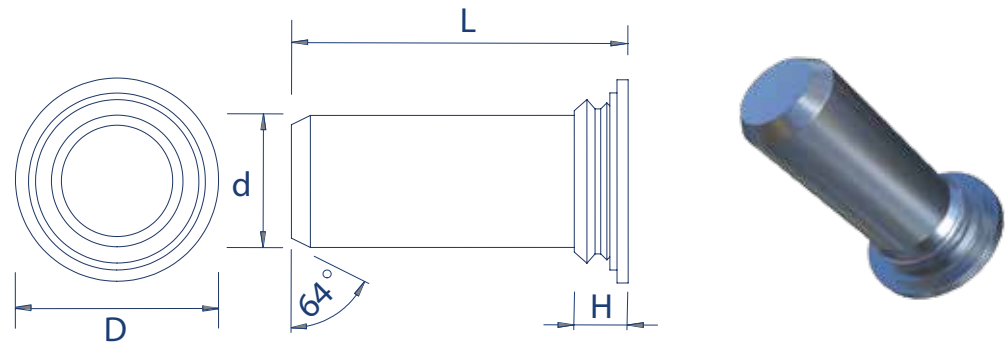


Flush Head Pins

TR-TP/TR-TPS/TR-TP4



Zinc Plated Steel: TR-TP | Stainless Steel: TR-TPS | 400 Series Stainless Steel: TR-TP4



Metric Dimensions

(d) Pin diameter ± 0.05	3	4	5	6
Minimum sheet thickness	1.0			
Recommended hole size	3.5	4.5	5.5	6.5
D ± 0.4	5.20	6.12	7.19	8.13
H maximum	2.29	2.29	2.29	2.29
Minimum distance to edge of sheet	6.4	7.1	7.61	7.9

Preferred Range

Pin diameter ± 0.05	3	4	5	6	
(L) Length ± 0.4	3	•			
	4	•			
	6	•	•		
	8	•	•	•	
	10	•	•	•	•
	12	•	•	•	•
	16	•	•	•	•
	20		•	•	•

Metric Performance Data: TR-TP

Pin diameter	3	4	5	6
Test sheet material	Steel			
Installation (kN)	23	27	35	40
Pushout (kN)	1	1.6	1.8	2.2

TR-TP - Recommended for use in sheet hardness: HRB 80 or less
 TR-TPS - Recommended for use in sheet hardness: HRB 70 or less
 TR-TP4 - Recommended for use in sheet hardness: HRB 92 or less



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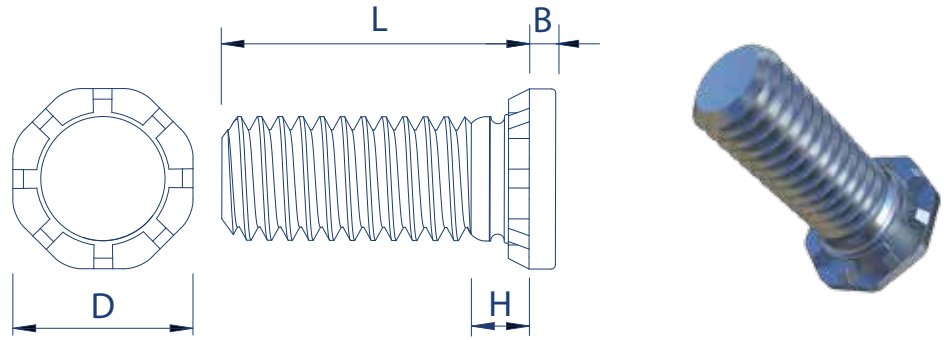
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High Strength Studs

TR-HFH/TR-HFHS



Zinc Plated Steel: TR-HFH | Stainless Steel: TR-HFHS



Metric Dimensions

Thread	M5	M6	M8	M10
D ± 0.25	7.8	9.4	12.5	15.7
H maximum	2.7	2.8	3.5	4.1
B maximum	1.14	1.27	1.78	2.29
Minimum sheet thickness	1.3	1.5	2.0	2.3
Recommended hole size +0.13	5.0	6.0	8.0	10.0
Minimum distance to edge of sheet	10.7	11.5	12.7	13.7

Preferred Range

Thread	M5	M6	M8	M10	
(L) Length ± 0.4	10	•			
	12	•	•		
	15	•	•	•	
	16			•	
	18			•	
	20	•	•	•	•
	25		•	•	•
	30	•	•	•	•
	35		•	•	•
	40		•	•	•
	45				
	50			•	•



High Strength Studs

TR-HFH/TR-HFHS



Metric Performance Data: TR-HFH

Thread		M5	M6	M8	M10
Test sheet thickness	Aluminium	1.5	1.5	2.3	2.4
	Steel				
Test sheet hardness (HRB)	Aluminium	15	43	39	39
	Steel	65	59	58	58
Installation (kN)	Aluminium	14	30	36	41
	Steel	27	34	45	55
Pushout (N)	Aluminium	805	1280	1750	2450
	Steel	1550	1780	2210	3475
Torque-out (Nm)	Aluminium	5.4	14.5	30.1	36
	Steel	7.7	14.5	30.1	49.5

Metric Performance Data: TR-HFHS

Thread		M5	M6	M8	M10
Test sheet thickness	Aluminium	1.62	1.62	2.23	2.3
	Steel	1.5	1.6	2.48	2.3
Test sheet hardness (HRB)	Aluminium	35	35	44	44
	Steel	54	45	43	44
Installation (kN)	Aluminium	13	15.5	24.5	34
	Steel	22.5	25	38	47
Pushout (N)	Aluminium	805	1280	1700	2450
	Steel	1505	1780	2200	3500
Torque-out (Nm)	Aluminium	5.4	11.5	21	36.5
	Steel	6.5	11.5	21	36.5

TR-HFH - Recommended for use in sheet hardness: HRB 85 or less

TR-HFHS - Recommended for use in sheet hardness: HRB 70 or less



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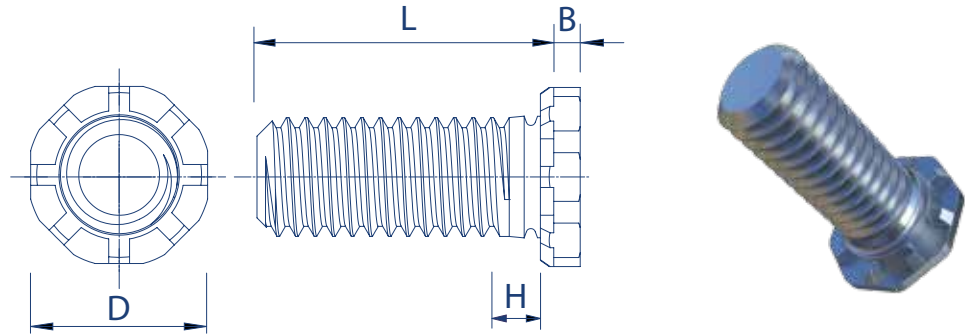
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High Strength Studs for Thin Sheets

TR-HFE



Zinc Plated Steel: TR-HFE



Metric Dimensions

Thread	M5	M6	M8
D ± 0.25	9.60	11.35	15.30
H maximum	2.60	2.80	3.30
B maximum	1.35	1.52	2.13
Minimum sheet thickness	1.0	1.0	1.5
Recommended Hole Size $+0.13$	5.0	6.0	8.0
Minimum distance to edge of sheet	10.00	11.50	14.50

Preferred Range

Thread	M5	M6	M8	
(L) Length ± 0.4	8	•		
	15	•	•	
	18		•	
	20	•	•	•
	25		•	•
	30		•	•
	35			•
	40			•
	50			•



High Strength Studs for Thin Sheets

TR-HFE



Metric Performance Data: TR-HFE

Thread	M5	M6	M8
Test sheet material	Steel		
Test sheet thickness	1.00	1.00	1.50
Maximum nut tightening torque (Nm)	4.40	10.00	21.70
Installation (kN)	51.10	60.00	71.10
Pushout (N)	1350	1400	2400
Torque-out (Nm)	8.10	14.40	33.90
Tensile strength (kN)	12.80	18.10	32.90
Pull through (kN)	10.60	15.50	27.50
Bushing hole size for pull through (mm)	7.40	8.20	10.30

TR-HFE - Recommended for use in sheet hardness: HRB 85 or less



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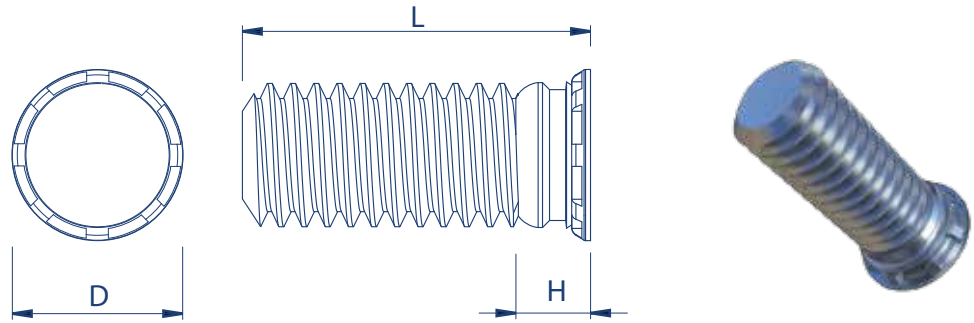
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Low Displacement Flush Head Studs

TR-FHL/TR-FHLS



Zinc Plated Steel: TR-FHL | Stainless Steel: TR-FHLS



Metric Dimensions

Thread	M2.5	M3	M4	M5
D ± 0.4	3.15	3.65	4.65	5.9
H maximum	2.1	2.1	2.4	2.7
Minimum sheet thickness	1.0			
Recommended hole size +0.08	2.5	3.0	4.0	5.0
Minimum distance to edge of sheet	2.8	3.3	4.3	5.6

Preferred Range

Thread	M2.5	M3	M4	M5
(L) Length ± 0.4	6	•	•	•
	8	•	•	•
	10	•	•	•
	12	•	•	•
	15	•	•	•
	18	•	•	•
	20		•	•
	25		•	•
	30			•



Low Displacement Flush Head Studs

TR-FHL/TR-FHLS



Metric Performance Data: TR-FHL/TR-FHLS

Thread		M2.5	M3	M4	M5
Test material sheet thickness	Aluminium	1.2	1.2	1.2	1.2
	Steel	1.1	1.1	1.1	1.1
Installation (kN)	Aluminium	3.2	4.5	5.4	11.1
	Steel	5.4	5.4	6.7	20.1
Pushout (N)	Aluminium	286	286	370	535
	Steel	451	476	555	1010
Torque-out (Nm)	Aluminium	0.56	0.66	1.2	2.2
	Steel	1.2	1.3	2.2	4.5
Pull through (N)	Aluminium	1250	1300	1560	1900
	Steel	2290	2550	3350	3760

TR-FHL - Recommended for use in sheet hardness: HRB 80 or less

TR-FHLS - Recommended for use in sheet hardness: HRB 70 or less



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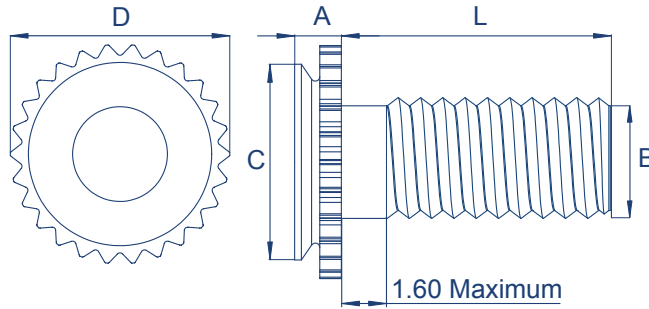
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Concealed Head Studs

TR-CHC/TR-CFHC/TR-CHA/TR-CFHA



Stainless Steel: TR-CHC/TR-CFHC | Aluminium: TR-CHA/TR-CFHA



Metric Dimensions

Thread	M3	M4	M5
D ±0.4	5.21	8.33	8.89
C maximum	4.35	7.35	7.9
Blind mounting hole ±0.08	4.37	7.37	7.93
Minimum distance to edge of sheet	4.0	5.6	6.4
Hole in mating part +0.08	3.6	4.6	5.6
Hole depth	TR-CHC / TR-CHA	1.10	
	TR-CFHC / TR-CFHA	1.91	
A maximum	TR-CHC / TR-CHA	1.04	
	TR-CFHC / TR-CFHA	1.80	
Minimum sheet thickness	TR-CHC / TR-CHA	1.60	
	TR-CFHC / TR-CFHA	2.40	

Preferred Range

Thread	M3	M4	M5
(L) Length ±0.4	6	•	
	8	•	
	10	•	
	12	•	•
	16	•	•
	20	•	•
	25	•	

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Concealed Head Studs

TR-CHC/TR-CFHC/TR-CHA/TR-CFHA



Metric Performance Data: TR-CHC/TR-CFHC/TR-CHA/TR-CFHA

Thread		M3	M4	M5
Installation (kN)	Stainless steel: TR-CHC	8.0	17.8	22.2
	Stainless steel: TR-CFHC	8.9	14.7	17.8
	Aluminium: TR-CHA	6.2	12.5	17.8
	Aluminium: TR-CFHA	6.7	13.3	15.6
Pushout (N)	Stainless steel: TR-CHC	1065	1200	1290
	Stainless steel: TR-CFHC	1065	1955	3020
	Aluminium: TR-CHA	555	645	755
	Aluminium: TR-CFHA	845	1065	1330
Maximum tightening torque	Stainless steel: TR-CHC	0.5	2.0	3.6
	Stainless steel: TR-CFHC	0.5	2.0	3.6
	Aluminium: TR-CHA	0.3	1.2	2.16
	Aluminium: TR-CFHA	0.3	1.2	2.16

TR-CHC/CFHC - Recommended for use in sheet hardness: HRB 70 or less

TR-CHA/CFHA - Recommended for use in sheet hardness: HRB 50 or less



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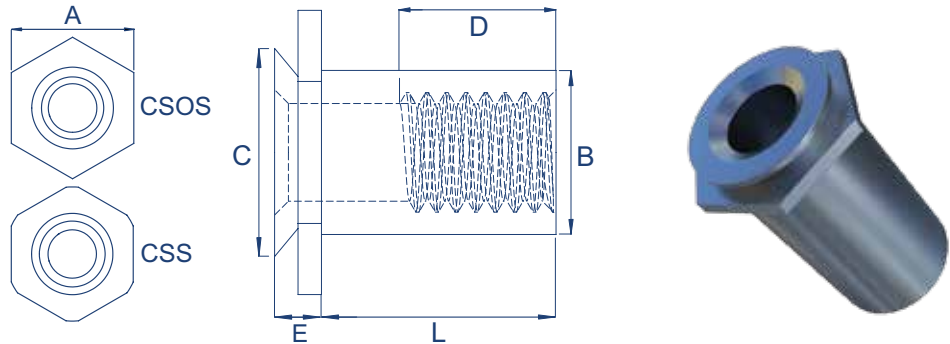
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Concealed Head Standoffs

TR-CSOS/TR-CSS



Stainless Steel: TR-CSOS/TR-CSS



Metric Dimensions

Thread		M3	M4	M5	M6
A		6.35	8.73	9.53	11.11
D		5.0	6.5	9.6	9.6
B		4.2	6.23	7.37	9.0
C		5.39	7.9	8.72	9.89
Blind mounting hole ± 0.8		5.41	7.92	8.74	9.9
Minimum distance to edge of sheet		4.8	6.4	7.2	9.5
Hole in mating part $+0.08$		5.41	7.92	8.73	9.9
Hole depth	TR-CSOS	1.91	1.91	1.91	1.91
	TR-CSS	1.09	1.09	1.09	-
E Minimum depth of blind hole	TR-CSOS	1.83	1.83	1.83	1.83
	TR-CSS	1.04	1.04	1.04	-
Minimum sheet thickness	TR-CSOS	2.4	2.4	2.4	2.4
	TR-CSS	1.6	1.6	1.6	-

Preferred Range

Thread		M3	M4	M5	M6
(L) Length ± 0.4	4	•			
	6	•	•		
	8	•	•		
	10	•			
	12	•			
	16	•			
	20	•			

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Concealed Head Standoffs

TR-CSOS/TR-CSS



Metric Performance Data: TR-CSOS/TR-CSS

Thread		M3	M4	M5	M6
Installation (kN)	Stainless steel: TR-CSS	17.8	21.3	24.5	-
	Stainless steel: TR-CSOS	19.2	23.6	26.7	28.9
Pushout (N)	Stainless steel: TR-CSS	1330	1775	2000	-
	Stainless steel: TR-CSOS	1465	1955	2665	2860
Maximum tightening torque	Stainless steel: TR-CSS	0.55	2.0	3.6	-
	Stainless steel: TR-CSOS	0.44	1.6	2.9	7.2

TR-CSOS/CSS - Recommended for use in sheet hardness: HRB 70 or less



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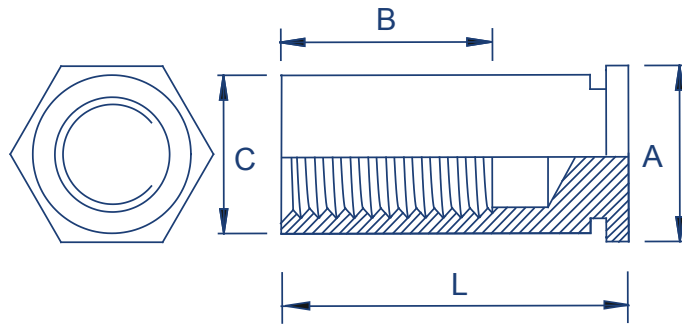
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Blind Standoffs

TR-BSO/TR-BSOS/TR-BSO4/TR-BSOA



Zinc Plated Steel: TR-BSO | Stainless Steel: TR-BSOS | 400 Series Stainless Steel: TR-BSO4 | Aluminium: TR-BSOA



Metric Dimensions

Thread	M2, M2.5, M3	M3alt	M4	M5
C -0.13	4.2	5.39	7.12	7.12
A Nom.	4.8	6.4	7.9	7.9
Minimum sheet thickness	1.0	1.0	1.27	1.27
Recommended hole size +0.08	4.22	5.41	7.14	7.14
Minimum distance to edge of sheet	6.0	6.8	8.0	8.0

(L) Length +0.05/-0.13	5	6	7	8	10	12	14	15	16	18	20	22	25
(B) Thread depth - Minimum	2.8	3.2	3.6	4.0	5.0	6.5			9.5				

Metric Performance Data: TR-BSO/TR-BSOS

Thread		M2, M2.5, M3	M3alt	M3.5, M4	M5
Test sheet material		Steel			
Test sheet thickness		1.5			
Installation	(kN) Steel + Stainless	9.9	14.8	17.9	17.9
Torsional resistance	(Nm) Steel + Stainless	2.16	3.95	8.5	8.5
Pushout	(N) Steel + Stainless	1050	1870	2500	2500
Pull-through	(N) Steel	1470	1470	3180	3180
	(N) Stainless	1180	1180	2490	2490
Maximum torque for mating screw	(Nm) Steel	0.56	0.56	2.1	3.7
	(Nm) Stainless	0.45	0.45	1.7	2.9

TR-BSO - Recommended for use in sheet hardness: HRB 80 or less
 TR-BSOS - Recommended for use in sheet hardness: HRB 70 or less
 TR-BSO4 - Recommended for use in sheet hardness: HRB 88 or less
 TR-BSOA - Recommended for use in sheet hardness: HRB 50 or less

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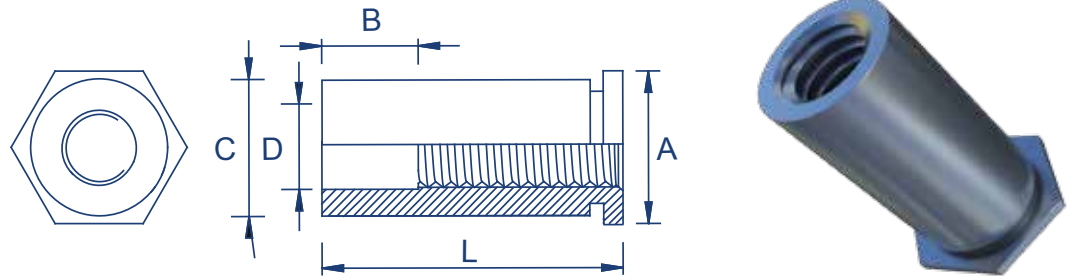


Through Standoffs

TR-SO/TR-SOS/TR-SO4/TR-SOA



Zinc Plated Steel: TR-SO | Stainless Steel: TR-SOS | 400 Series Stainless Steel: TR-SO4 | Aluminium: TR-SOA



Metric Dimensions

Thread	M2, M2.5, M3	M3alt	M4	M5
C ± 0.13	4.2	5.39	7.12	7.12
D counterbore diameter ± 0.13	3.2	3.2	4.8	5.35
A Nom.	4.8	6.4	7.9	7.9
Minimum sheet thickness	1.0	1.0	1.27	1.27
Recommended hole size +0.08	4.22	5.41	7.14	7.14
Minimum distance to edge of sheet	6.0	6.8	8.0	8.0

(L) Length +0.05/-0.13	3	4	5	6	7	8	10	12	14	15	16	18	20	22	25
(B) Thread depth - Minimum	N/A					4			8			11			

Metric Performance Data: TR-SO/TR-SOS

Thread	M2, M2.5, M3	M3alt	M3.5, M4	M5	
Test sheet material	Steel				
Test sheet thickness	1.5				
Installation	Metric (kN)	9.9	14.8	17.9	17.9
Torsional resistance	Metric (Nm)	2.16	3.95	8.5	8.5
Pushout	Metric (N)	1050	1870	2500	2500
Pull-through	Metric (N) (Steel)	1470	1470	3180	3180
	(N) (st/st)	1180	1180	2490	2490

TR-SO - Recommended for use in sheet hardness: HRB 80 or less

TR-SOS - Recommended for use in sheet hardness: HRB 70 or less

TR-SO4 - Recommended for use in sheet hardness: HRB 88 or less

TR-SOA - Recommended for use in sheet hardness: HRB 50 or less



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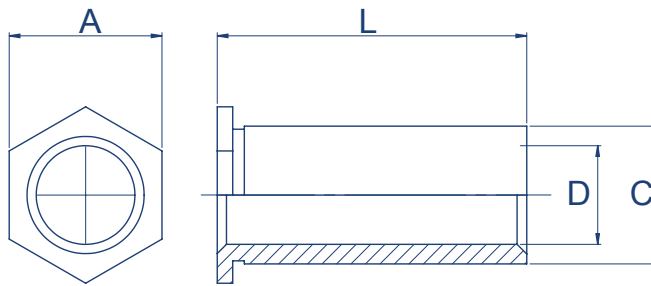
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Clear Hole Standoffs

TR-SO



Zinc Plated Steel: TR-SO



Metric Dimensions

Diameter code	43.1	63.1	63.6	83.6	84.1	85.1
D counterbore diameter ± 0.13	3.1	3.1	3.6	3.6	4.1	5.1
C ± 0.13	4.2	5.39	5.39	7.12	7.12	7.12
A Nom.	4.8	6.4	6.4	7.9	7.9	7.9
Minimum sheet thickness	1.0	1.0	1.0	1.27	1.27	1.27
Recommended hole size $+0.08$	4.22	5.41	5.41	7.14	7.14	7.14
Minimum distance to edge of sheet	6.0	6.8	6.8	8.0	8.0	8.0

(L) Length $+0.05/-0.13$	3	4	5	6	8	10	12	14	16	18	20
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TR-SO - Recommended for use in sheet hardness: HRB 80 or less

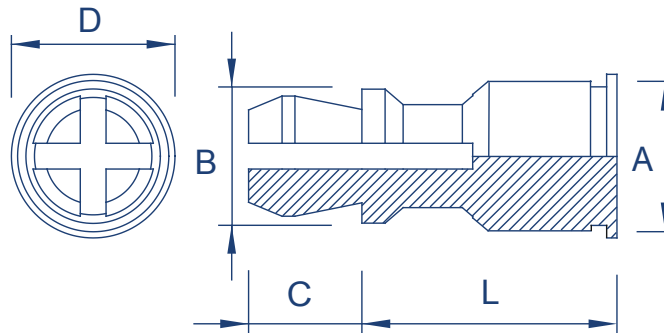


Clip-on Standoffs

TR-SSS/TR-SSC/TR-SSA



Zinc Plated Steel: TR-SSS | Stainless Steel: TR-SSC | Aluminium: TR-SSA



Metric Dimensions

Top panel mounting hole diameter	(L) Length code ± 0.13									A maximum	B ± 0.13	C ± 0.13	D ± 0.13	Hole size $+0.08$
Metric 4mm	8	10	12	14	16	18	20	22	25	5.39	4.78	3.58	6.35	5.4

Metric Performance Data: TR-SSS/TR-SSC/TR-SSA

Type	Steel Zinc	Stainless Steel	Aluminium
Installation (kN)	15.6	16.5	6.7
Pushout (kN)	1785	1785	881
Test sheet material	Steel	Steel	Aluminium
Test sheet thickness	1.5	1.5	1.0

Part number	Panel 1 - Metal HRB50					Panel 2 - PC board or metal			
	Bottom mounting hole $+0.08$	Maximum hardness	Minimum thickness	Minimum distance to edge of sheet	Maximum location tolerance	Top mounting hole $+0.08$	Maximum hardness	Thickness range	Minimum distance to edge of sheet
TR-SSS	5.41	HRB 60	1.0	6.6	± 0.13	4.0	No limit	1-1.8	2.54
TR-SSC		HRB 70							
TR-SSA		HRB 50							

TR-SSS - Recommended for use in sheet hardness: HRB 60 or less

TR-SSC - Recommended for use in sheet hardness: HRB 70 or less

TR-SSA - Recommended for use in sheet hardness: HRB 50 or less



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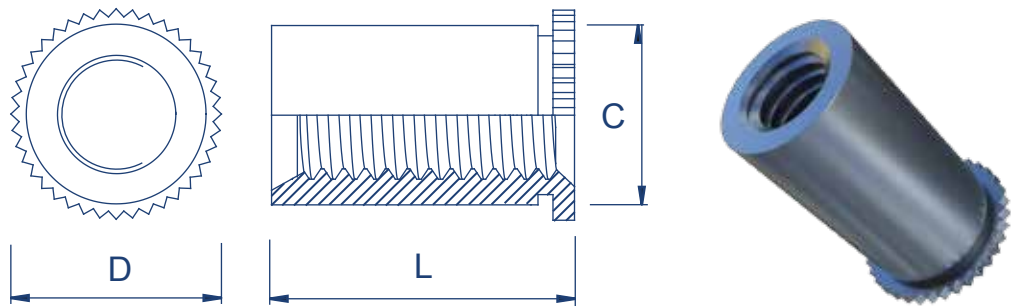
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Screw Lock Threaded Standoffs

TR-DSO/TR-DSOS



Zinc Plated Steel: TR-DSO | Stainless Steel: TR-DSOS



Metric Dimensions

Thread	M3	
(L) Length +0.05 -0.13	6.35	7.0
C maximum	4.2	
D Nom.	4.92	
Sheet thickness	0.94 - 6.35	
Recommended hole size +0.08	4.2	
Minimum distance to edge of sheet	3.2	

Metric Performance Data: TR-DSO/TR-DSOS

Thread	M3	
Sheet thickness	Steel	1.0
	Aluminium	1.0
Installation (kN)	Steel	5.85
	Aluminium	4.5
Pushout (N)	Steel	334
	Aluminium	225
Torsional resistance (Nm)	Steel	1.2
	Aluminium	1.1

TR-DSO - Recommended for use in sheet hardness: HRB 80 or less

TR-DSOS - Recommended for use in sheet hardness: HRB 70 or less

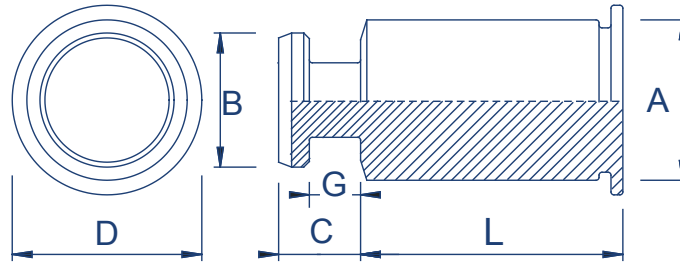


Hole Slide Lock Standoffs

TR-SKC



Stainless Steel: TR-SKC



Metric Dimensions

Body size - Sheet code	61.5	D Nom.	6.35
A maximum	5.39	G ± 0.08	1.73
B ±0.08	4.5	Recommended hole size + 0.08	5.5
C maximum	2.75		

Length code 'L' mm ±0.13

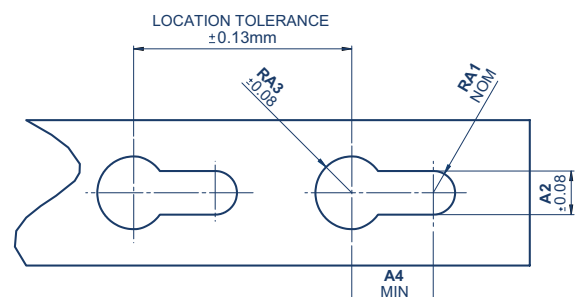
2	4	6	8	10	12	14	16	18	20	22	25
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Metric Performance Data: TR-SKC

Test sheet material	Steel		5052-H34 Aluminium	
Test sheet thickness	1.52			
Body sheet code	Installation (kN)	Pushout (N)	Installation (kN)	Pushout (N)
61.5	14.3	2650	7.0	1100

Part number	Panel 1 - Metal HRB50					Panel 2 - PC board or metal					
	Bottom mounting hole +0.08	Maximum hardness	Minimum thickness	Minimum distance to edge of sheet	Maximum location tolerance	Top mounting hole +0.08				Thickness range	Minimum distance to edge of sheet
						A1 Nom.	A2 ±0.08	A3 ±0.08	A4 Minimum.		
TR-SKC	5.4	HRB 70	1.0	6.6	±0.13	1.5	3.0	5.0	3.75	1.45-1.62	4.1

TR-SKC - Recommended for use in sheet hardness: HRB 70 or less



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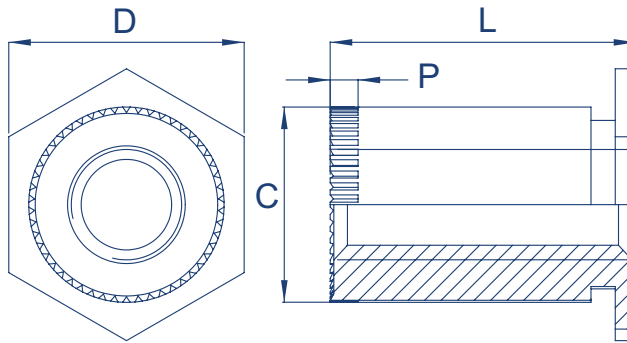
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Grounding Standoffs

TR-SOSG



Stainless Steel: TR-SOSG



Metric Dimensions

Thread	M3
C ± 0.13	5.39
D Nom.	6.4
Minimum sheet thickness	1.0
Knurling	0.76
Recommended hole size +0.08	5.4
Minimum distance to edge of sheet	6.8

Metric Performance Data: TR-SOSG

Thread	Type	Length code 'L' mm ±0.13					
		3	4	6	8	10	12
M3	TR-SOSG						

TR-SOSG - Recommended for use in sheet hardness: HRB 70 or less

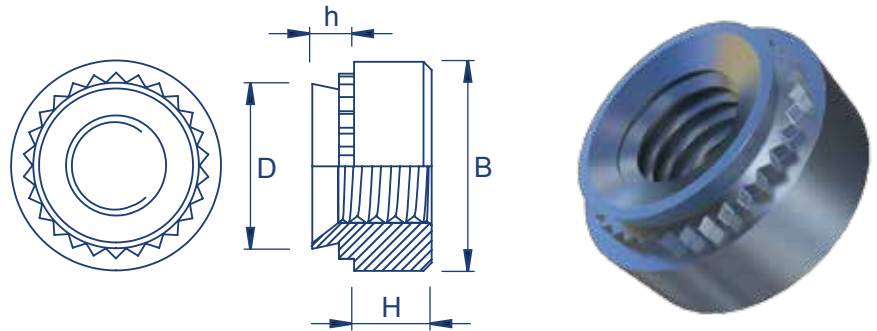


Nuts

TR-S/TR-CLS/TR-SP4/TR-SP2/TR-CLA/TR-H



Zinc Plated Steel: TR-S | Stainless Steel: TR-CLS | 400 Series Stainless Steel: TR-SP4 | A286 Stainless Steel: TR-SP2 | Aluminium: TR-CLA



Metric Dimensions: TR-S/TR-CLS/TR-SP4/TR-SP2

Thread	M2, M2.5, M3			M3alt			M3.5			M4			
	0	1	2	0	1	2	0	1	2	0	1	2	3
D maximum	4.20			4.73			4.73			5.38			
B ±0.2	6.35			7.1			7.1			7.95			
H ±0.25	1.5			1.5			1.5			2.0			
h maximum	0.77	0.97	1.38	0.77	0.97	1.38	0.77	0.97	1.38	0.77	0.97	1.38	2.21
Minimum sheet thickness	0.8	1.0	1.4	0.8	1.0	1.4	0.8	1.0	1.4	0.8	1.0	1.4	2.3
Recommended hole size +0.08	4.22			4.75			4.75			5.41			
Minimum distance to edge of sheet	4.8			5.6			5.6			6.9			

Thread	M5				M6					M8			M10		M12
	0	1	2	3	00	0	1	2	3	1	2	3	1	2	1
D maximum	6.33				8.73					10.47			13.97		16.95
B ±0.2	8.75				11.10					12.65			17.35		20.55
H ±0.25	2.0				4.08					5.47			7.48		8.5
h maximum	0.77	0.97	1.38	2.21	0.89	1.15	1.38	2.21	3.05	1.38	2.21	3.05	2.21	3.05	3.05
Minimum sheet thickness	0.8	1.0	1.4	2.3	0.92	1.2	1.4	2.3	3.2	1.4	2.3	3.2	2.31	3.18	3.18
Recommended hole size +0.08	6.35				8.75					10.5			14.0		17.0
Minimum distance to edge of sheet	7.1				8.6					9.7			13.5		16.0

Metric Dimensions: TR-H Non Locking Nuts - Zinc Plated Steel

Thread	Type	h maximum	Minimum sheet thickness	Rec hole size +0.13	D maximum	B ±0.25	H ±0.13	Minimum distance to edge of sheet
	Non locking							
M10	H	1.48	1.48	12.7	12.67	16.5	7.9	12



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Metric Dimensions: TR-CLA

Thread	M2		M3		M3.5		M4		M5		M6	
Shank code	1	2	1	2	1	2	1	2	1	2	1	2
D maximum	4.22		4.73		5.38		5.97		7.47		8.72	
B ±0.2	6.3		6.3		7.1		7.9		9.5		11.05	
H ±0.25	1.5		2.0		2.0		3.0		3.8		4.08	
h maximum	0.98	1.38	0.98	1.38	0.98	1.38	0.98	1.38	0.98	1.38	1.38	2.21
Minimum sheet thickness	1.0	1.4	1.0	1.4	1.0	1.4	1.0	1.4	1.0	1.4	1.4	2.3
Recommended hole size +0.08	4.25		4.75		5.4		6.0		7.5		8.75	
Minimum distance to edge of sheet	4.8		5.6		6.9		7.1		7.9		8.6	

Metric Performance Data: TR-S/TR-CLS

Thread	M2, M2.5			M3				M3alt			M3.5			M4			
Test material	Steel																
Shank code	0	1	2	0	1	2	3	0	1	2	0	1	2	0	1	2	3
Installation (kN)	11.2 - 15.6			11.2 - 15.6				13.4 - 26.7			13.4 - 26.7			18 - 27			
Torsional resistance (Nm)	1.5	1.75	2.0	1.5	1.75	2.0	2.1	1.8	2.4	2.4	1.8	2.4	2.4	3.0	4.0	5.0	4.2
Pushout (N)	480	560	1020	480	560	1020	1110	485	575	1200	485	575	1200	495	650	1255	1300

Thread	M5				M6			M8			M10		M12
Test material	Steel												
Shank code	0	1	2	3	1	2	3	1	2	3	1	2	1
Installation (kN)	18 - 38				27 - 36			27 - 36			32 - 50		33-49
Torsional resistance (Nm)	3.7	4.5	6.9	6.0	17.1	17.1	16.4	18.8	20.4	18.1	36.1	36.1	73.9
Pushout (N)	535	801	1115	1500	1765	1765	1755	1870	1870	1860	2021	2021	3065

Metric Performance Data: TR-SP4/SP2

Thread	M2, M2.5			M3			M4			M5			M6		M8	
Test material	Stainless Steel															
Shank code	0	1	2	0	1	2	0	1	2	0	1	2	1	2	1	2
Installation (kN)	35	40	45	35	40	45	40	44	46	42	46	51	60	66	66	72
Torsional resistance (Nm)	-	-	-	1.6	2.0	2.3	3.4	4.2	5.1	4.0	5.1	6.7	17.0	19.0	19.0	21.8
Pushout (N)	580	720	1290	580	720	1290	650	800	1590	805	1030	1780	2005	2300	2100	2415

- TR-S - Recommended for use in sheet hardness: HRB 80 or less
- TR-CLS - Recommended for use in sheet hardness: HRB 70 or less
- TR-SP4/SP2 - Recommended for use in sheet hardness: HRB 90 or less
- TR-CLA - Recommended for use in sheet hardness: HRB 50 or less
- TR-H - Recommended for use in sheet hardness: HRB 80 or less

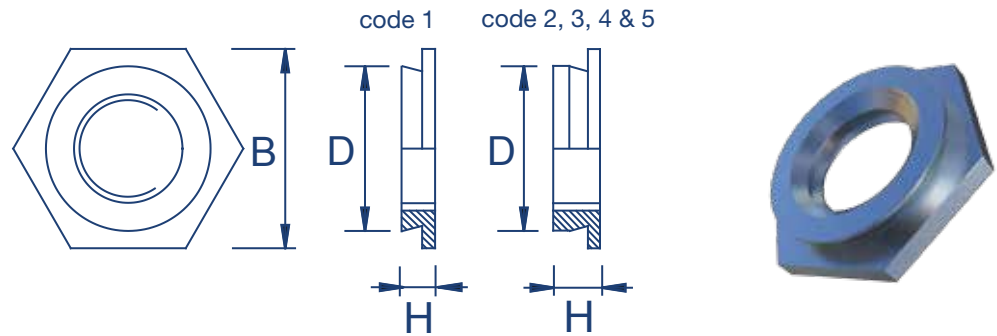


Flush Nuts

TR-F



Stainless Steel: TR-F



Metric Dimensions

Thread	M2, M2.5		M3		M3alt		M3.5		M4		M5		M6		
	1	2	1	2	1	2	1	2	1	2	1	2	3	4	5
Shank code	1	2	1	2	1	2	1	2	1	2	1	2	3	4	5
D maximum	4.35		4.35		5.35		5.35		7.35		7.90		8.72		
B Nom.	4.8		4.8		6.4		6.4		7.9		8.7		9.5		
H maximum	1.53	2.3	1.53	2.3	1.53	2.3	1.53	2.3	1.53	2.3	1.53	2.3	3.05	3.84	4.63
Sheet thickness	1.53 - 2.3	2.32 min.	1.53 - 2.3	2.32 min.	1.53 - 2.3	2.32 min.	1.53 - 2.3	2.32 min.	1.53 - 2.3	2.32 min.	1.53 - 2.3	2.32 min.	3.18 - 3.94	3.96 - 4.72	4.75 min.
Recommended Hole size +0.08	4.37		4.37		5.4		5.4		7.37		7.92		8.74		
Minimum distance to edge of sheet	6.0		6.0		6.5		6.5		7.2		8.8		8.8		

Metric Performance Data: TR-F

Thread	M2, M2.5		M3		M3alt		M3.5		M4		M5		M6		
	1	2	1	2	1	2	1	2	1	2	1	2	3	4	5
Test sheet material	Steel														
Test sheet thickness	1.5	2.3	1.5	2.3	1.5	2.3	1.5	2.3	1.5	2.3	1.5	2.3	3.1	3.9	4.75
Installation (kN)	13.5		13.5		13.5		13.5		18.0		18.0		20.0		
Pushout (kN)	0.9		0.9		1.1		1.1		1.2		1.2		3.7		

TR-F - Recommended for use in sheet hardness: HRB 70 or less



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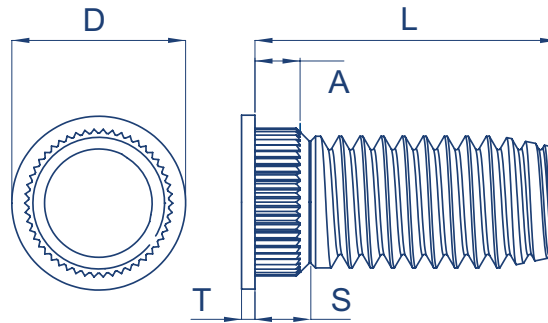
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Broaching Studs

TR-KFH



Electro-Tin Plated Phosphor Bronze: TR-KFH



Metric Dimensions

Thread	M2.5	M3	M4	M5
D ± 0.25	4.10	4.58	5.74	6.6
S maximum	2.30	2.3	2.3	2.3
A maximum	1.65	1.65	1.65	1.65
T ± 0.13	0.51	0.51	0.51	0.51
Minimum sheet thickness	1.53	1.53	1.53	1.53
Recommended hole size $+0.08$	2.60	3.0	4.2	5.0
Minimum distance to edge of sheet	3.30	3.8	5.1	5.3

Preferred Range

Thread	M2.5	M3	M4	M5
(L) Length ± 0.25	6	•		
	8	•	•	
	10		•	•
	12		•	•
	15	•	•	•
	18		•	•
	25		•	

TR-KFH - Recommended for use in sheet hardness: HRB 55 or less

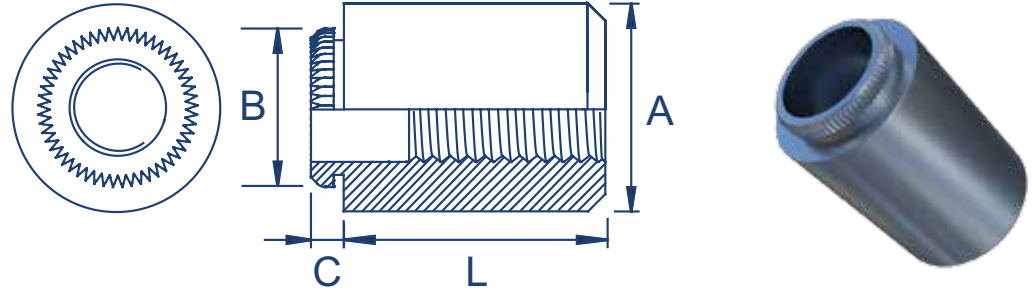


Broaching Standoffs

TR-KFE/TR-KFSE



Electro Tin Plated Steel: TR-KFE | Stainless Steel: TR-KFSE



Metric Dimensions - Length to suit customer requirements

Thread or through hole size	M2	M2.5	M3	3.6	M4	4.2
C maximum	1.53	1.53	1.53	1.53	1.53	1.53
B	4.68	4.68	4.68	5.87	6.75	6.86
A	5.56	5.56	5.56	7.14	8.74	8.74
Minimum sheet thickness	1.53	1.53	1.53	1.53	1.53	1.53
Recommended hole size +0.08	4.22	4.22	4.22	5.41	6.4	6.4
Minimum distance to edge of sheet	4.4	4.4	4.4	5.5	6.4	7.1

Preferred Range

Thread	(L) Length ± 0.13								
	3	4	5	6	8	10	12	14	16
M2		•							
M2.5				•					•
M3	•	•	•	•	•	•	•	•	
3.6	•								
M4		•				•			
4.2									

Metric Performance Data: TR-KFE/TR-KFSE

Thread	M2	M2.5	M3 & 3.6	M4 & 4.2
Test sheet material	FR4 fiberglass			
Test sheet thickness	1.5			
Installation (kN)	2.2	2.2	2.2	2.2
Torsional resistance (Nm)	1.36	1.36	1.36	3.0
Pushout (N)	290	290	290	400



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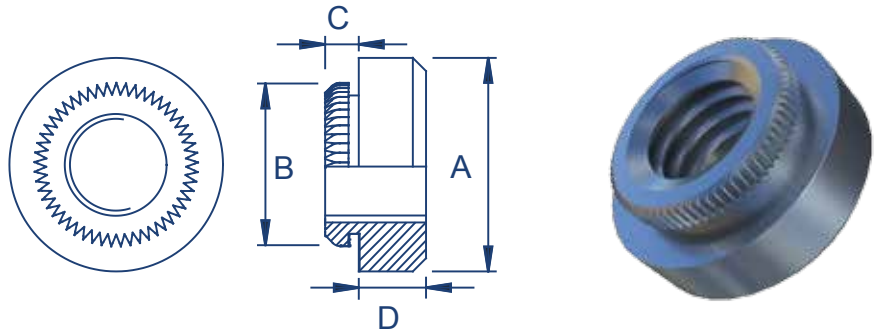
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Broaching Nuts

TR-KF2/TR-KFS2



Electro Tin Plated Steel: TR-KF2 | Stainless Steel: TR-KFS2



Metric Dimensions

Thread	M2	M2.5	M3	M3.5	M4	M5
C maximum	1.53	1.53	1.53	1.53	1.53	1.53
B ±0.08	4.19	4.68	4.68	5.88	6.86	7.37
A ±0.13	5.56	5.56	5.56	7.0	8.74	9.53
D ±0.13	1.5	1.5	1.5	1.6	2.0	3.0
Minimum sheet thickness	1.53	1.53	1.53	1.53	1.53	1.53
Recommended Hole size +0.08	3.73	4.22	4.22	5.5	6.40	6.90
Minimum distance to edge of sheet	4.2	4.4	4.4	5.5	6.4	7.1

Metric Performance Data: TR-KF2/TR-KFS2

Thread	M2	M2.5	M3	M3.5	M4	M5
Test sheet material	FR4 fiberglass					
Test sheet thickness	1.5					
Installation (kN)	2.2	2.2	2.2	2.2	2.2	2.2
Torsional resistance (Nm)	1.36	1.36	2.06	3.75	4.55	
Pushout (N)	200	200	210	335	355	

TR-KF2 - Recommended for use in sheet hardness: HRB 60 or less

TR-KFS2 - Recommended for use in sheet hardness: HRB 70 or less

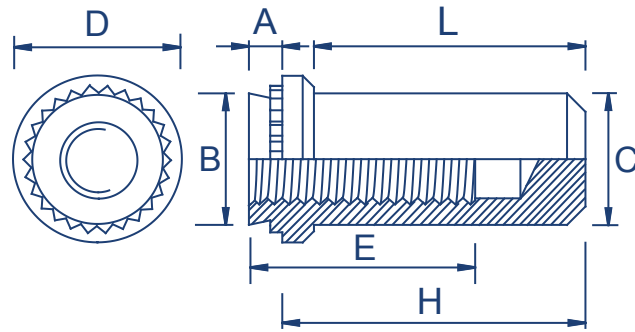


Blind Nuts

TR-B/TR-BS



Zinc Plated Steel: TR-B | Stainless Steel: TR-BS



Metric Dimensions

Thread	M3		M4		M5		M6	
	1	2	1	2	1	2	1	2
Shank code	1	2	1	2	1	2	1	2
A maximum	0.97	1.38	0.97	1.38	0.97	1.38	1.38	2.21
Minimum sheet thickness	1.0	1.4	1.0	1.4	1.0	1.4	1.4	2.29
Recommended hole size +0.08	4.22		5.41		6.35		8.75	
B maximum	4.20		5.38		6.33		8.73	
C maximum	3.84		5.2		6.02		7.8	
D ±0.25	6.35		7.95		8.75		11.1	
E minimum	5.3		7.1		7.1		7.8	
H ±0.25	9.6		11.2		11.2		14.3	
L maximum	8.5		9.8		9.8		12.7	
Minimum distance to edge of sheet	4.8		6.9		7.1		8.6	

Metric Performance Data: TR-B/TR-BS

Thread	M3		M4		M5		M6	
	1	2	1	2	1	2	1	2
Shank code	1	2	1	2	1	2	1	2
Test sheet material	Steel							
Sheet thickness	1.0	1.4	1.0	1.4	1.0	1.4	1.4	2.3
Installation (kN)	11.5	14.0	16.0	21.0	18.0	25.0	26.0	26.0
Pushout (N)	572	1021	604	1256	631	1419	1782	1782
Torque-out (Nm)	1.7	2.15	3.5	5.1	4.1	6.9	11.9	12.0

TR-B - Recommended for use in sheet hardness: HRB 80 or less
 TR-BS - Recommended for use in sheet hardness: HRB 70 or less



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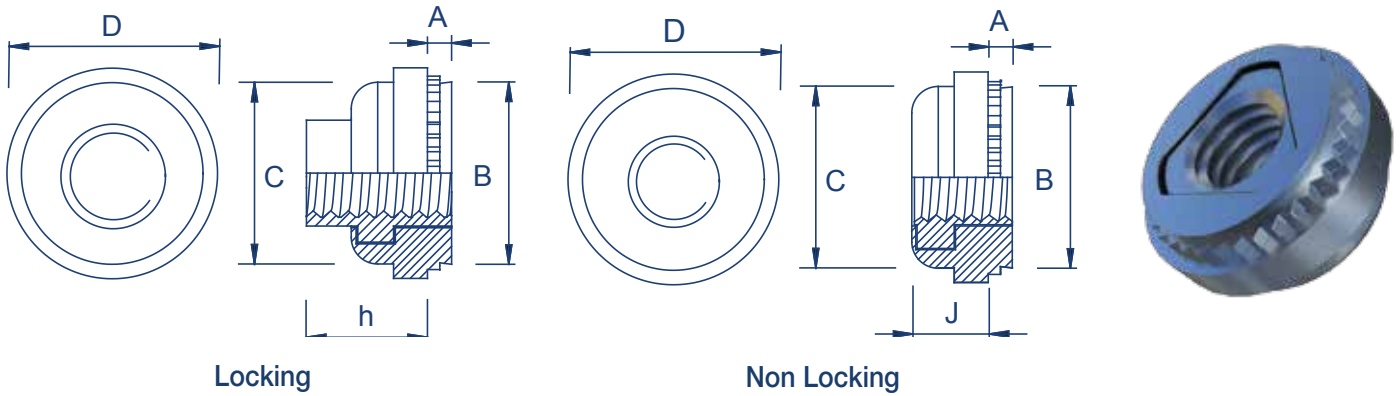
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Floating Fasteners (Locking & Non-Locking)

TR-LAS/TR-AS/TR-LAC/TR-AC



Zinc Plated Steel: TR-LAS/TR-AS | Stainless Steel: TR-LAC/TR-AC



Metric Dimensions

Thread	M3		M4		M5		M6
Shank code	1	2	1	2	1	2	2
A maximum	0.97	1.38	0.97	1.38	0.97	1.38	1.38
Minimum sheet thickness	0.97	1.38	0.97	1.38	0.97	1.38	1.38
Recommended hole size +0.08	7.37		9.35		10.31		13.08
B maximum	7.35		9.33		10.29		13.06
C maximum	7.37		9.28		10.29		12.96
D ±0.4	9.14		11.18		11.94		15.24
h maximum	4.83		5.34		6.86		7.88
J maximum	3.31		3.31		4.32		5.34
Minimum distance to edge of sheet	7.62		8.64		9.14		10.67

Metric Performance Data: TR-LAS/TR-LAC

Thread	M3		M4		M5		M6		
Shank code	1	2	1	2	1	2	2		
Test sheet material	Steel								
Sheet thickness	1.0	1.6	1.0	1.6	1.0	1.6	1.6		
Installation (kN)	TR-LAS & TR-LAC		13.3	13.3	13.3	13.3	15.6	15.6	22.2
Pushout (N)	TR-LAS & TR-LAC		1341	1340	1338	1784	1789	2009	2226
Torque-out (Nm)	TR-LAS & TR-LAC		9.7	17.0	17.1	22.8	16.9	22.9	36.9

TR-LAS/AS - Recommended for use in sheet hardness: HRB 70 or less
 TR-LAC/AC - Recommended for use in sheet hardness: HRB 70 or less

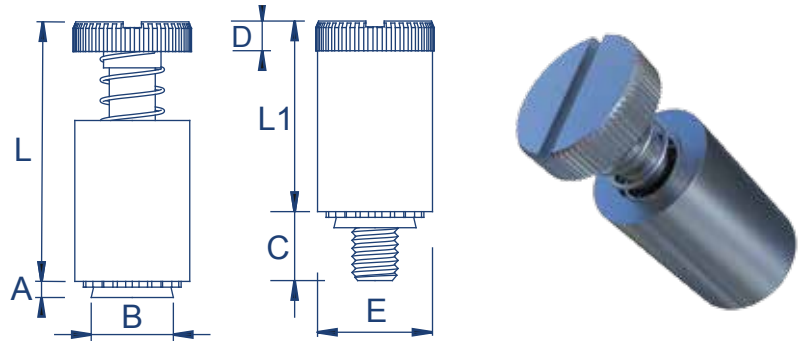


Panel Fasteners

TR-PFS2/TR-PFC2



Zinc Plated Steel: TR-PFS2 | Stainless Steel: TR-PFC2



Metric Dimensions

Thread	M3		M4			M5			M6		
Screw length code	40	62	50	72	94	50	72	94	60	82	04
A maximum	1.53		1.53			1.53			1.53		
B maximum	6.71		7.9			8.72			10.47		
C ±0.4	6.4	9.5	7.9	11.1	14.3	7.9	11.1	14.3	9.5	12.7	15.9
D ±0.13	1.83		2.08			2.08			2.46		
E ±0.25	7.92		9.53			10.31			11.89		
L Nom.	13.72		17.53			17.53			22.35		
L1 maximum	9.14		11.43			11.47			14.73		
Minimum sheet thickness	1.53		1.53			1.53			1.53		
Recommended hole size +0.08	6.73		7.90			8.74			10.49		
Screw protrusion before installation ±0.64	0	3.2	0	3.2	6.4	0	3.2	6.4	0	3.2	6.4
Minimum distance to edge of sheet	6.35		7.87			8.63			9.65		

Metric Performance Data: TR-PFS2/TR-PFC2

Thread		M3	M4	M5	M6
Installation (kN)	Aluminium	10.8	13.0	13.4	15.6
	Steel	13.4	17.0	17.9	22.3
Pushout (N)	Aluminium	1070	1335	1780	1780
	Steel	1335	1780	2230	2670

TR-PFS2 - Recommended for use in sheet hardness: HRB 80 or less
 TR-PFC2 - Recommended for use in sheet hardness: HRB 70 or less



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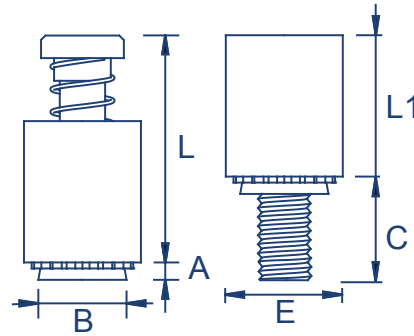
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Recess Panel Fasteners

TR-PFC2P



Stainless Steel: TR-PFC2P



Metric Dimensions

Thread	M3		M4			M5			M6		
Screw length code	40	60	50	72	94	50	72	94	62	82	04
A maximum	1.53		1.53			1.53			1.53		
B maximum	6.71		7.9			8.72			10.47		
C ±0.4	6.4	9.5	7.9	11.1	14.3	7.9	11.1	14.3	9.5	12.7	15.9
Driver size	No. 1		No.2			No.2			No.3		
E ±0.25	7.92		9.53			10.31			11.89		
L Nom.	13.72		17.91			17.91			22.99		
L1 maximum	9.4		12.19			12.45			15.75		
Minimum sheet thickness	1.53		1.53			1.53			1.53		
Recommended hole size +0.08	6.73		7.92			8.74			10.49		
Screw protrusion before installation ±0.64	0	3.2	0	3.2	6.4	0	3.2	6.4	0	3.2	6.4
Minimum distance to edge of sheet	6.35		7.87			8.63			9.65		

Metric Performance Data: TR-PFC2P

Thread		M3	M4	M5	M6
Installation (kN)	Aluminium	10.8	13.0	13.4	15.6
	Steel	13.4	17.0	17.9	22.3
Pushout (N)	Aluminium	1070	1335	1780	1780
	Steel	1335	1780	2230	2670

TR-PFC2P - Recommended for use in sheet hardness: HRB 70 or less

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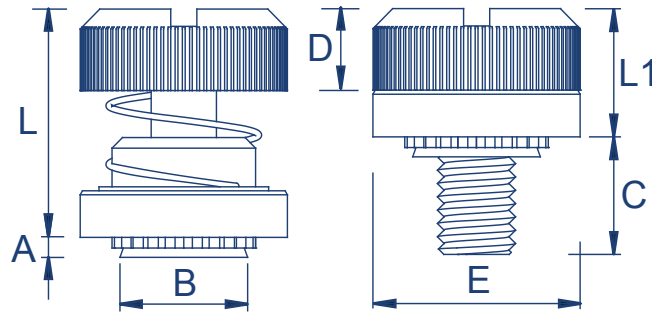


Low Profile Panel Fasteners

TR-PF31/TR-PF32



Nickel Plated Steel: TR-PF31 | Nickel Plated Steel: TR-PF32



Metric Dimensions

Thread	M3		M4		M5		M6
Type	TR-PF31	TR-PF32	TR-PF31	TR-PF32	TR-PF31	TR-PF32	TR-PF32
Screw length code	30		30		30		35
A maximum	0.97	1.48	0.97	1.48	0.97	1.48	1.48
Minimum sheet thickness	1.0	1.5	1.0	1.5	1.0	1.5	1.5
Recommended hole size +0.08	5.5		6.4		8.0		9.5
B maximum	5.48		6.38		7.98		9.48
L Nom.	15.11		15.24		15.37		17.15
D ±0.13	5.13		5.26		5.59		6.12
E ±0.25	10.31		11.89		13.46		15.88
C ±0.4	7.62		7.62		7.62		8.89
L1 maximum	8.26		8.38		8.51		9.78
Minimum distance to edge of sheet	6.6		7.37		8.38		9.65

Metric Performance Data: TR-PF31/TR-PF32

Thread	M3	M4	M5	M6	
Test sheet material	Aluminium				
Installation (kN)	TR-PF31	9.9	12.6	15.6	19.2
	TR-PF32				

*Can be used in cold rolled provided hardness does not exceed rockwell B30

TR-PF31 - Recommended for use in sheet hardness: HRB 60 or less

TR-PF32 - Recommended for use in sheet hardness: HRB 60 or less



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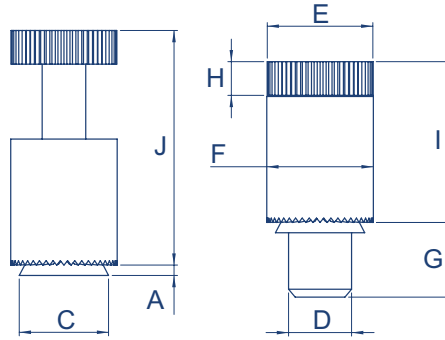
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Locating Pin Panel Fasteners

TR-PTL2/TR-PSL2



Zinc Plated Steel: TR-PTL2 | TR-PSL2



Metric Dimensions

Type	TR-PTL2	TR-PSL2
Plunger diameter code	04	04
Plunger length code	4.0	4.0
A maximum	1.47	1.47
Minimum sheet thickness	1.53	1.53
Recommended hole size+0.08	8.33	8.33
C maximum	8.31	8.31
D -0.13	6.35	6.35
E ±0.25	12.7	12.7
F ±0.25	10.3	10.3
G ±0.25	7.87	7.87
H ±0.25	4.32	4.32
I ±0.25	15.11	12.95
J Nom.	22.73	19.81
Minimum distance to edge of sheet	8.64	8.64

Metric Performance Data

Aluminium		Steel	
Installation (Kn)	Pushout (N)	Installation (Kn)	Pushout (N)
13.3	1779	17.8	2224

TR-PTL2 - Recommended for use in sheet hardness: HRB 80 or less

TR-PSL2 - Recommended for use in sheet hardness: HRB 80 or less

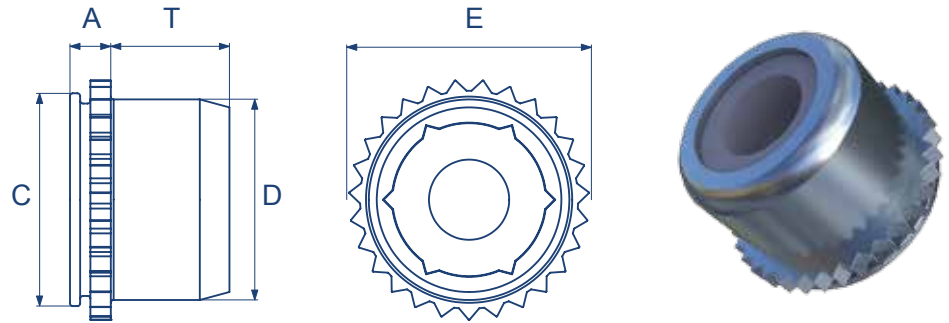


Nylon Lock Nuts

TR-PL/TR-PLC



Zinc Plated Steel: TR-PL | Stainless Steel: TR-PLC



Metric Dimensions

Thread	M3	M4	M5
A maximum	1.53	1.53	1.53
Sheet thickness	1.0 - 1.78	1.0 - 1.78	1.0 - 1.78
Recommended hole size +0.08	6.0	7.5	8.0
C maximum	5.98	7.48	7.98
D maximum	5.52	7.01	7.52
E maximum	7.01	8.54	9.0
T maximum	3.56	4.2	4.45
Minimum distance to edge of sheet	4.32	5.59	6.35
Maximum hole in attached parts	3.5	4.5	5.5

TR-PL - Recommended for use in sheet hardness: HRB 70 or less

TR-PLC - Recommended for use in sheet hardness: HRB 70 or less



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Nylon Lock Nuts

TR-PL/TR-PLC



Metric Performance Data: TR-PL/TR-PLC

Thread		M3	M4	M5
Maximum tightening torque (Nm)		1.13	2.30	3.12
1.5mm 5052-H34 aluminium	Installation (kN)	8.90	8.90	8.90
	Push out (N)	1000	1290	1330
	Torque out (Nm)	2.25	6.77	7.90
1mm 5052-H34 aluminium	Installation (kN)	6.67	6.67	6.67
	Push out (N)	710	800	800
	Torque out (Nm)	2.25	3.16	4.51
1.5mm steel	Installation (kN)	13.34	13.34	13.34
	Push out (N)	1156	1290	1557
	Torque out (Nm)	2.25	6.77	7.90
1.2mm steel	Installation (kN)	13.34	13.34	13.34
	Push out (N)	1000	1200	1380
	Torque out (Nm)	2.25	6.77	7.90

TR-PL - Recommended for use in sheet hardness: HRB 70 or less

TR-PLC - Recommended for use in sheet hardness: HRB 70 or less

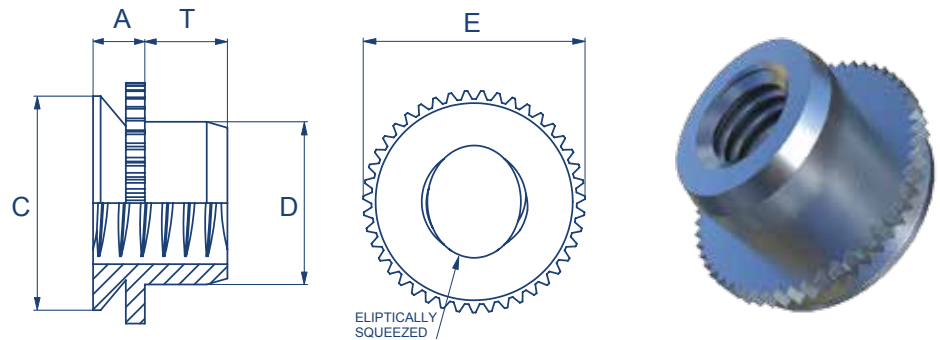


Self-Locking Mini Squeezed Nuts

TR-UL/TR-FE/TR-FEO



Stainless Steel: TR-UL/TR-FE/TR-FEO



Metric Dimensions: TR-UL

Thread	M2
E	4.07
A	0.79
C	3.60
D	2.50
T	1.65
Sheet thickness	0.76 - 0.91
Recommended hole size +0.08	3.61
Minimum distance to edge of sheet	2.80

Metric Dimensions: TR-FE/TR-FEO

Thread		M3	M4	M5	M6
E		4.88	8.17	8.17	9.74
A	FE	1.53	1.52	1.53	1.53
	FEO	1.02	1.02	1.02	
C		4.37	7.37	7.37	8.72
D		3.96	5.23	6.48	7.72
T		1.9	2.55	3.05	3.3
Sheet thickness	FE	1.5 - 1.78	1.5 - 1.78	1.5 - 1.78	1.5 - 1.78
	FEO	0.99 - 1.14	0.99 - 1.14	0.99 - 1.14	
Hole size in sheet +0.08		4.39	7.39	7.39	8.74
Minimum distance to edge of sheet		3.6	5.2	5.2	7.1

TR-UL/FE/FEO - Recommended for use in sheet hardness: HRB 70 or less



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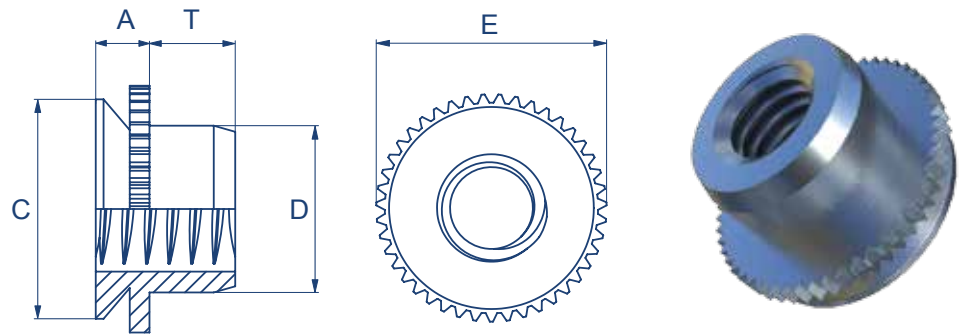
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Non-Locking Mini Squeezed Nuts

TR-U/TR-FEX/TR-FEOX



Stainless Steel: TR-U/TR-FEX/TR-FEOX



Metric Dimensions: TR-U

Thread	M2
E	4.07
A	0.79
C	3.60
D	2.50
T	1.65
Sheet thickness	0.76 - 0.91
Recommended hole size +0.08	3.61
Minimum distance to edge of sheet	2.80

Metric Dimensions: TR-FEX/TR-FEOX

Thread		M3	M4	M5	M6
E		4.88	8.17	8.17	9.74
A	FEX	1.53	1.53	1.53	1.53
	FEOX	1.02	1.02	1.02	
C		4.37	7.37	7.37	8.72
D		3.96	5.23	6.48	7.72
T		1.9	2.55	3.05	3.3
Sheet thickness	FEX	1.5 - 1.78	1.5 - 1.78	1.5 - 1.78	1.5 - 1.78
	FEOX	0.99 - 1.14	0.99 - 1.14	0.99 - 1.14	
Hole size in sheet +0.08		4.39	7.39	7.39	8.74
Minimum distance to edge of sheet		3.6	5.2	5.2	7.1

TR-U/FEX/FEOX - Recommended for use in sheet hardness: HRB 70 or less

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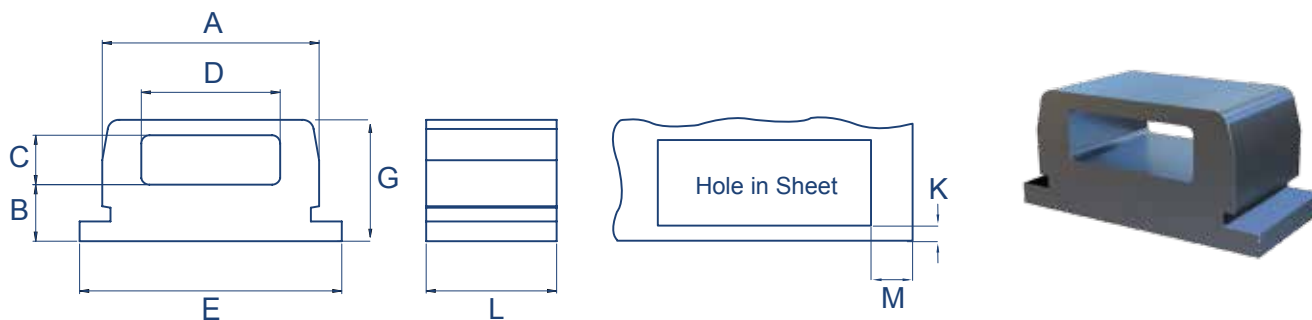


Cable Tie-Mounts

TR-TD



Zinc Plated Steel: TR-TD



Metric Dimensions

Type	TD - 40	TD - 60	TD - 175
Length code	4	6	12
L ± 0.08	3.07	4.67	9.42
Sheet thickness	1.02 - 1.27	1.02 - 1.78	1.02 - 3.18
Hole size in sheet $+0.05 -0.03$	6.35 x 3.18	7.93 x 4.75	12.70 x 9.53
A ± 0.08	6.25	7.82	12.60
B ± 0.15	1.40	1.91	3.30
C ± 0.15	1.65	1.65	2.40
D ± 0.15	4.06	5.21	9.14
E ± 0.15	7.82	9.40	14.28
Height G ± 0.15	3.81	4.57	7.24
Minimum hole edge to sheet edge (M)	1.02		
Minimum hole edge to sheet edge (K)	3.73	4.98	6.65

Metric Performance Data: TR-TD

Part number	Test sheet material							
	Steel				5052-H34 Aluminium			
	Installation (kN)	Pushout (N)	Pull through (N)	Side load (N)	Installation (kN)	Pushout (N)	Pull through (N)	Side load (N)
TR-TD-40-4	8	780	445	400	4.5	400	445	400
TR-TD-60-6	11	1160	712	445	6.7	620	712	445
TR-TD-175-12	17.7	1560	780	620	13.3	1040	780	620

TR-TD - Recommended for use in sheet hardness: HRB 60 or less



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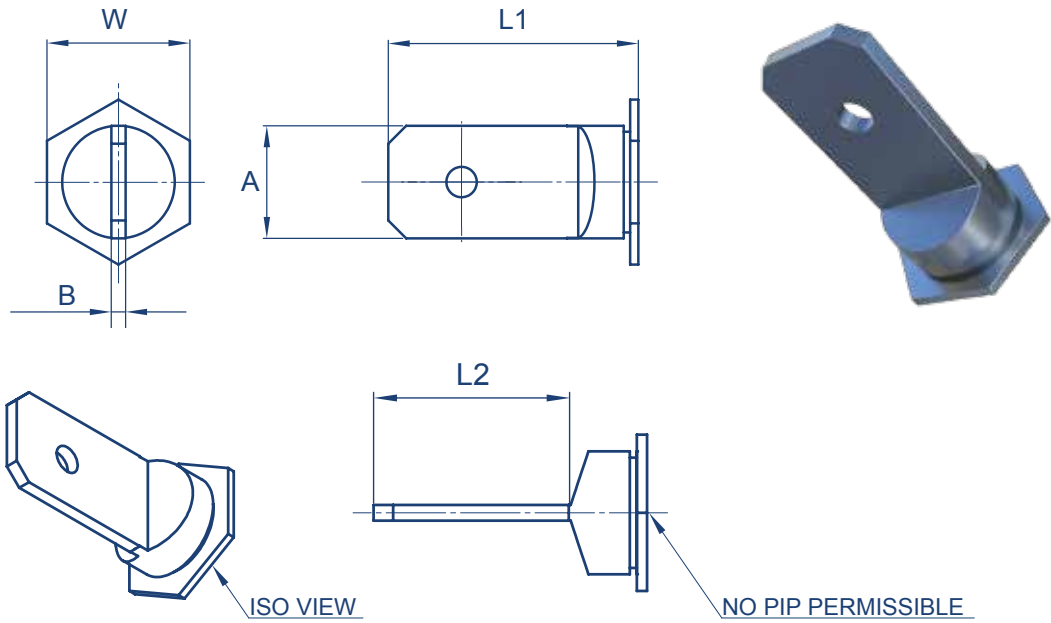
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Self Clinch Terminal Pins

TR-TER



Electro Tin Plated Steel: TR-TER



Metric Dimensions

Part number	TR-TER
Plate A x B	6.3 x 0.8
Recommended hole size ± 0.08	6.4
L1	14.0
L2 ± 0.5	9.0
W	8.0
Minimum distance to edge of sheet	7.2
Minimum sheet thickness	0.8

TR-TER - Recommended for use in sheet hardness: HRB 80 or less

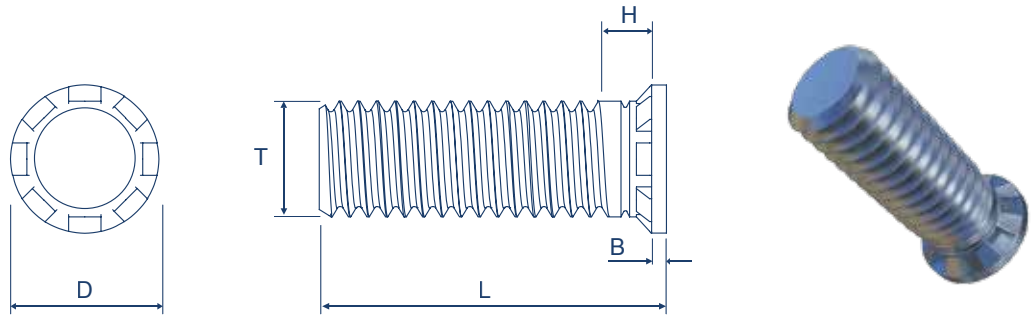


Thin Sheet Studs

TR-TFH/TR-TFHS



Zinc Plated Steel: TR-TFH | Stainless Steel: TR-TFHS



Metric Dimensions

Thread	M3	M4	M5
D ± 0.25	4.5	5.8	6.4
H maximum	1.8	1.8	2.3
B maximum	0.64	0.64	0.64
Minimum sheet thickness	0.51	0.51	0.51
Recommended Hole Size +0.08	3.0	4.0	5.0

Preferred Range

Thread	M3	M4	M5
(L) Length ± 0.4	6	•	
	8	•	•
	10	•	•
	12	•	•
	15	•	•
	18		
	20		•

TR-TFH - Recommended for use in sheet hardness: HRB 80 or less
 TR-TFHS - Recommended for use in sheet hardness: HRB 70 or less



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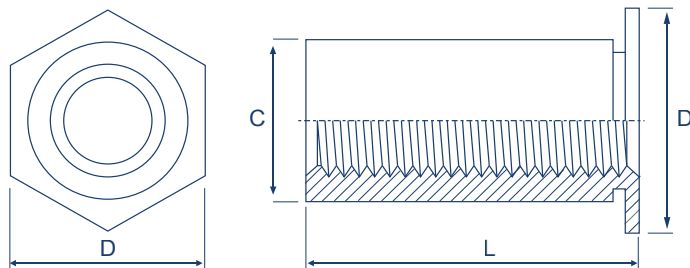
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Thin Sheet Standoffs

TR-TSO/TR-TSOS



Zinc Plated Steel: TR-TSO | Stainless Steel: TR-TSOS



Metric Dimensions

Thread	M2.5	M2.5 Alt	M3	M3 Alt	M3.5
C -0.13	4.2	5.39	4.2	5.39	5.39
D ±0.25	4.8	6.4	4.8	6.4	6.4
Minimum sheet thickness	0.63				
Recommended hole size +0.08	4.22 - 4.30	5.41 - 5.49	4.22 - 4.30	5.41 - 5.49	5.41 - 5.49
Minimum distance to edge of sheet	5.8	7.1	5.8	7.1	7.1

Preferred Range

Thread	M2.5	M2.5 Alt	M3	M3 Alt	M3.5
(L) Length	2mm		•		
	3mm	•		•	
	4mm	•		•	
	6mm	•	•	•	
	8mm	•	•	•	
	10mm	Blind	•	•	
	12mm			Blind	
	14mm	Blind		Blind	
	16mm				
	18mm				
19mm					

TR-TSO - Recommended for use in sheet hardness: HRB 60 or less
 TR-TSOS - Recommended for use in sheet hardness: HRB 70 or less

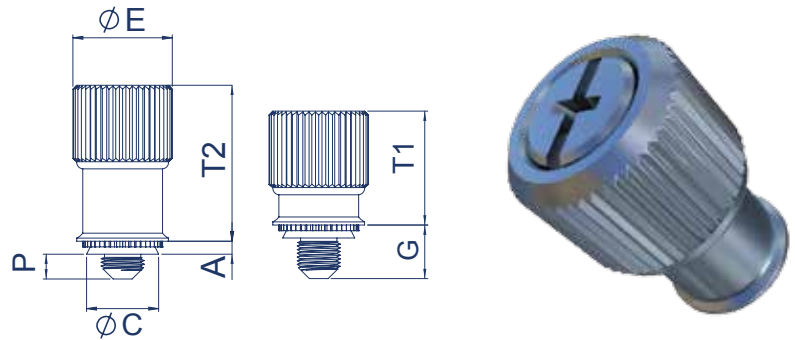


Captive Panel Screws

TR-PF11



Nickel Plated Heat Treated Steel (Retainer), Aluminium (Knob), Stainless Steel (Screw & Spring): TR-PF11



Metric Dimensions

Thread	M3		M4			M5			M6
	0	1	0	1	2	0	1	2	2
Screw length code									
A maximum	0.92		0.92			0.92			0.92
Minimum sheet thickness	0.92		0.92			0.92			0.92
Recommended hole size +0.08	5.56		7.92			7.92			9.53
C maximum	5.54		7.90			7.90			9.50
E ±0.25	10.59		13.06			13.06			14.61
G ±0.64	4.32	5.84	5.84	7.37	8.89	5.84	7.37	8.89	10.41
P ±0.64	0	1.52	0	1.52	3.05	0	1.52	3.05	3.05
T1 Nom.	7.87		11.43			11.43			13.46
T2 Nom.	11.43		16.26			16.26			20.07
Driver size	#1		#2			#2			#3
Minimum distance to edge of sheet	7.11		8.38			8.38			11.68

Metric Performance Data: TR-PF11

Thread		M3	M4	M5	M6
Installation (kN)	Aluminium	6.7	13.3	13.3	15.6
	Steel	11.1	20.0	20.0	22.2
Pushout (N)	Aluminium	355	445	445	465
	Steel	645	710	710	865

TR-PF11 - Recommended for use in sheet hardness: HRB 80 or less.



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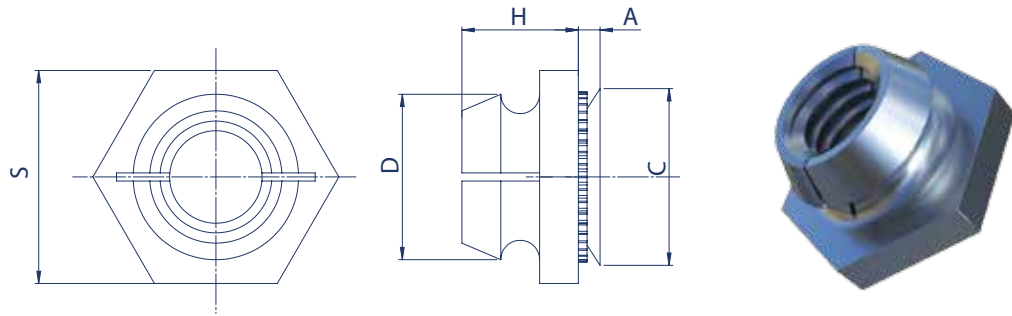
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Self Clinch Locking Nuts

TR-LK/TR-LKS



Zinc Plated Steel: TR-LK | Stainless Steel: TR-LKS



Metric Dimensions

Thread	M2.5		M3		M4		M5	
Shank code	1	2	1	2	1	2	1	2
A shank maximum	0.97	1.38	0.97	1.38	0.97	1.38	0.97	1.38
Minimum sheet thickness	1.0	1.4	1.0	1.4	1.0	1.4	1.0	1.4
Recommended hole size +0.08	4.37		4.75		6.76		7.92	
C maximum	4.35		4.73		6.73		7.90	
D maximum	4.45		4.85		6.20		7.40	
S Nom.	6.35		6.35		8.73		9.53	
H ±0.25	3.43		3.43		4.45		5.21	
Minimum distance to edge of sheet	3.90		4.00		5.20		5.60	

Preferred Range

Shank Code	Thread			
	M2.5	M3	M4	M5
1	•	•	•	•
2	•	•	•	•

Metric Performance Data: TR-LK/TR-LKS

Thread		M2.5		M3		M4		M5	
		1	2	1	2	1	2	1	2
Installation (kN)	Aluminium	7.1	8.9	7.1	8.9	12.0	13.3	14.2	14.2
	Steel	13.3	13.3	13.3	13.3	17.8	19.1	17.8	19.1
Pushout (N)	Aluminium	578	667	578	890	667	1112	667	1112
	Steel	667	711	667	1112	845	1334	1112	1334

TR-LK/LKS - Recommended for use in sheet hardness: HRB 70 or less

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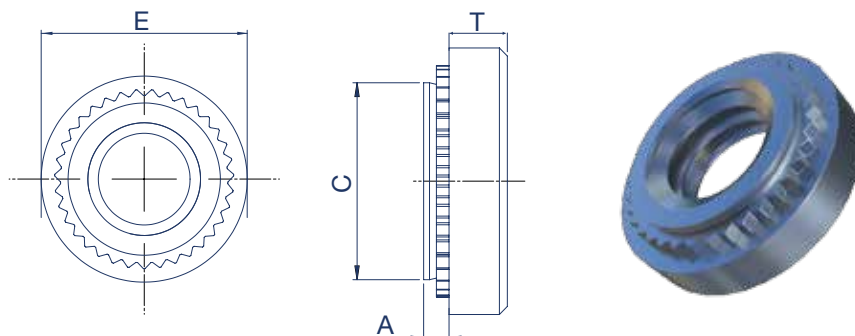


Thin Sheet Nuts

TR-SMPS



Zinc Plated Steel: TR-SMPS



Metric Dimensions

Thread	M2.5	M3	M3.5
A shank maximum		0.61	
Minimum sheet thickness		0.64	
Recommended hole size +0.08	3.8	4.24	4.75
C maximum	3.79	4.22	4.73
E ±0.25	5.6	5.6	6.4
T ±0.25		1.4	
Minimum distance to edge of sheet	3.7	4.3	5.1

Preferred Range

Thread	M2.5	M3	M3.5
	•	•	

Metric Performance Data: TR-SMPS

Thread	M2.5	M3	M3.5
Test sheet material		Steel	
Installation (kN)	6.7	8.0	8.8
Pushout (N)	156	267	289
Torque-Out (Nm)	1.13	1.35	1.58

TR-SMPS - Recommended for use in sheet hardness: HRB 70 or less



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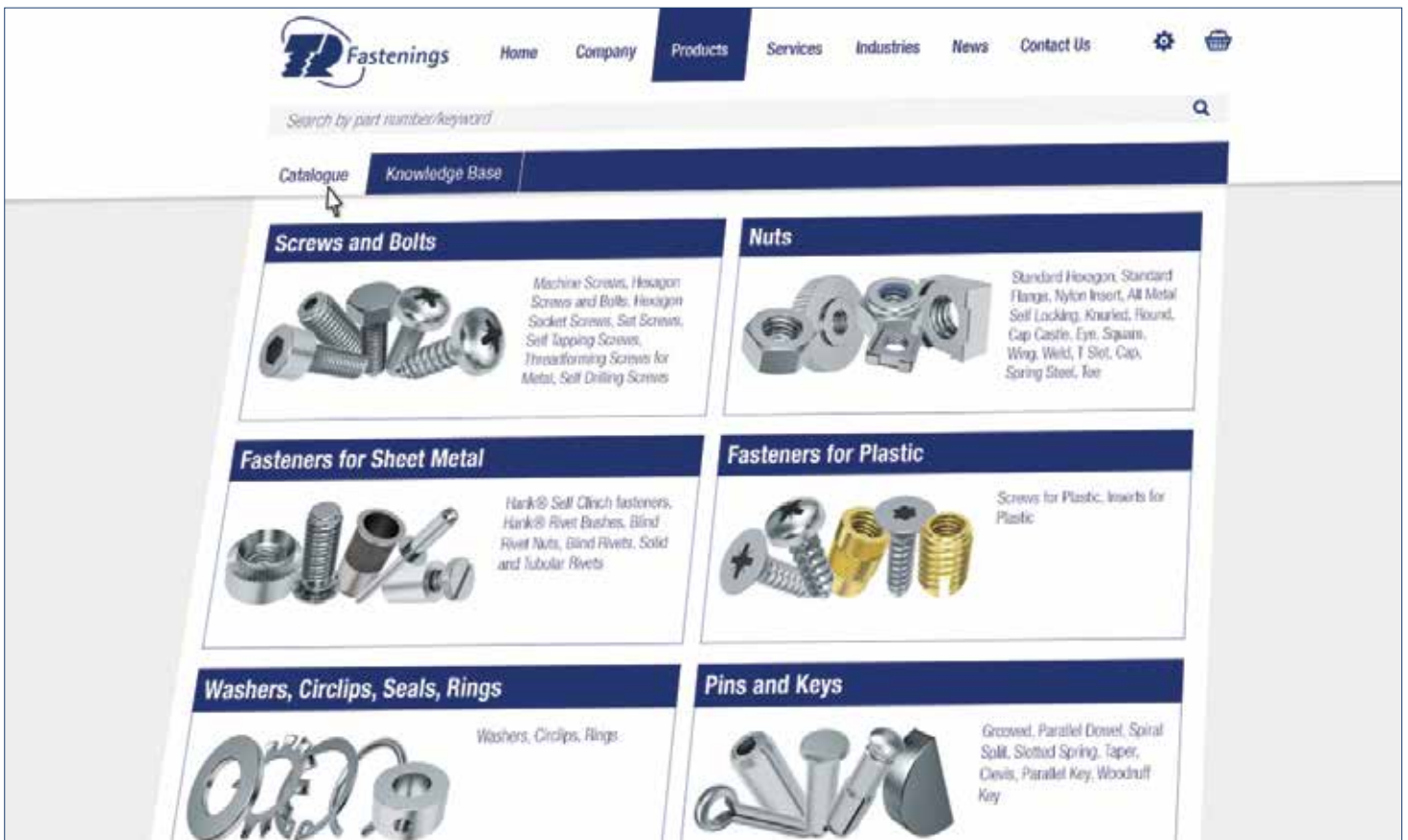


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The TR website features an online catalogue of over 50,000 products for use in all sectors, from TR's own branded range of fasteners including Hank® self-clinch fasteners and rivet bushes, self-locking nuts, inserts and screws for plastic, blind rivets and rivet nuts, plastic fasteners and cable management products to screws, nuts, washers and specially manufactured parts.

Combining a modern design with a powerful search tool it has never been easier to find the product required. Users can simply search for the product or product range required using any number of search terms and choose from a range of items available and related technical

information. Once the product and size needed has been selected, users can view, send or download a dynamically generated 2D drawing for the part that includes all related dimensional data, download the related 3D model in a number of formats and save the part to the enquiry basket.

In addition, the website carries an extensive Engineering Knowledge Base, which includes:

- A comprehensive range of 2D/3D fastener models available to download
- Step-by-step animated installation guides
- Tooling requirements and related technical information
- Detailed performance data
- Material and finish specifications
- Fastener standards and comparison tables
- Key industries and the services we supply

TR Fastenings is a full service provider and the TR website also features sections on the key industries it supplies and the services and technical support available to its customers, from engineering and design through to specification, manufacturing, quality and logistics.

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