



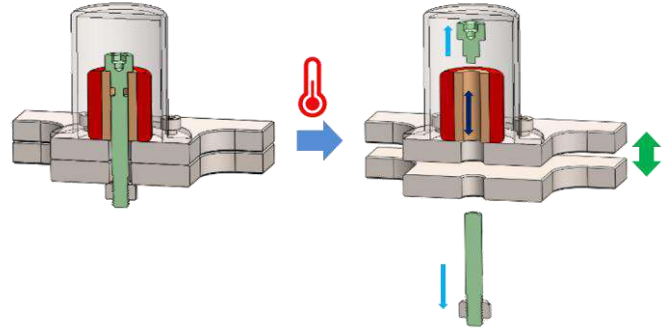
HIGH-PERFORMANCE SMART ACTUATOR FOR SPACE APPLICATIONS

Adapted to satellites from 1U to large ones

From M2 (1,2kN) to M12 (60kN)

OVERVIEW

- ▶ Compatible with HDRM (Hold Down Release Mechanisms)
- ▶ Triggering time: 30 to 300 sec
- ▶ Triggering temperature up to 230°C
- ▶ In Orbit operational temperature range: from -120°C to +120°C
- ▶ Preload up to 60 kN



HIGH TEMPERATURE

LIGHT

ROBUST

ITAR FREE

COMPACT

MINIATURIZATION

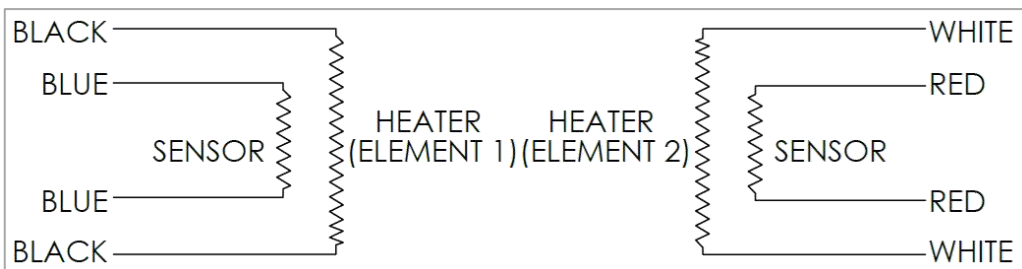
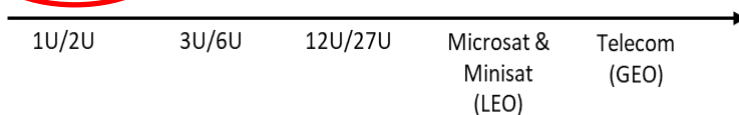
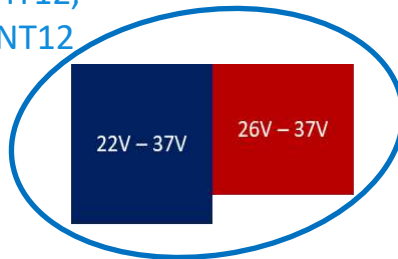
RELIABLE

ELECTRICAL

HT05, HT06, HT08, HT10, HT12, NT05, NT06, NT08, NT10, NT12

HT03, NT03
HT04, NT04

HT02, NT02



FEATURES

SMA component ◀
(Shape Memory Alloy)

Redundant heater ◀

2 temperature sensors ◀
(COTS or ESCC)

Customizable fastener ◀





TECHNICAL DATA

TRIGGY® "HT"	TRHT02	TRHT03 - 8V	TRHT03 - 16V	TRHT04 - 8V	TRHT04 - 16V	TRHT05	TRHT06	TRHT08	TRHT10	TRHT12
Screw diameter (mm)	M2	M3	M3	M4	M4	M5	M6	M8	M10	M12
Inner diameter (mm)	2,30	2,80	2,80	3,30	3,30	4,40	5,40	6,50	8,50	10,80
Outer diameter (mm)	10,00	12,80	12,80	15,30	15,30	18,10	20,60	26,00	31,50	37,00
Armed length (mm)	9,20	8,66	8,66	10,15	10,15	12,68	15,70	18,24	23,88	29,42
Elongation (mm)	0,60	0,74	0,74	0,65	0,65	0,82	1,00	1,16	1,52	1,88
Nominal power (W)	6,7	11,6	11,6	20,8	20,8	34,4	50	86	142,2	201,6
Voltage range (V)	3,5 - 4,2	7 - 8,4	14 - 16,8	7 - 8,4	14 - 16,8	22 - 37	22 - 37	22 - 37	22 - 37	22 - 37
Current range (A)	1,47 - 1,76	1,27 - 1,53	0,64 - 0,77	2,28 - 2,73	1,14 - 1,37	0,97 - 1,63	1,41 - 2,36	2,42 - 4,06	4 - 6,72	5,66 - 9,52
Fracture load (N)	1900	4800	4800	8200	8200	13400	18900	34600	55100	80300
Maximum axial preload (N)*	1400	3500	3500	6100	6100	10000	14100	25900	41200	60100
Mass (g)	3	6	6	11	11	21	33	75	149	259

- ▶ Material: CN-250X (CTE: 17)
- ▶ In orbit temperature range: -120 to +120°C
- ▶ Length smaller than Triggys® NT
- ▶ Triggering temperature: 150°C

TRIGGY® "NT"	TRNT02	TRNT03 - 8V	TRNT03 - 16V	TRNT04 - 8V	TRNT04 - 16V	TRNT05	TRNT06	TRNT08	TRNT10	TRNT12
Screw diameter (mm)	M2	M3	M3	M4	M4	M5	M6	M8	M10	M12
Inner diameter (mm)	2,30	2,80	2,80	3,30	3,3	4,40	5,40	6,50	8,50	10,80
Outer diameter (mm)	9,50	12,00	12,00	14,20	14,20	16,60	18,90	23,60	28,50	33,50
Armed length (mm)	4,95	6,37	6,37	7,89	7,89	10,31	12,94	15,47	20,63	26,19
Elongation (mm)	0,27	0,32	0,32	0,39	0,39	0,49	0,61	0,72	0,95	1,18
Nominal power (W)	7,8	20,2	20,2	36,5	36,5	57,2	85,8	150,4	236,8	335,7
Voltage range (V)	3,5 - 4,2	7 - 8,4	14 - 16,8	7 - 8,4	14 - 16,8	22 - 37	22 - 37	22 - 37	22 - 37	22 - 37
Current range (A)	1,71 - 2,05	2,21 - 2,66	1,11 - 1,33	4 - 4,8	2 - 2,4	1,61 - 2,7	2,41 - 4,05	4,23 - 7,1	6,65 - 11,18	9,43 - 15,85
Fracture load (N)	1900	4800	4800	8200	8200	13400	18900	34600	55100	80300
Maximum axial preload (N)*	1400	3500	3500	6100	6100	10000	14100	25900	41200	60100
Mass (g)	3	8	8	15	15	27	43	95	183	317

- ▶ Material: NiTi (CTE: 11)
- ▶ In orbit temperature range: -120 to +80°C
- ▶ Suitable for thermal insulation with low creep
- ▶ Triggering temperature: 120°C

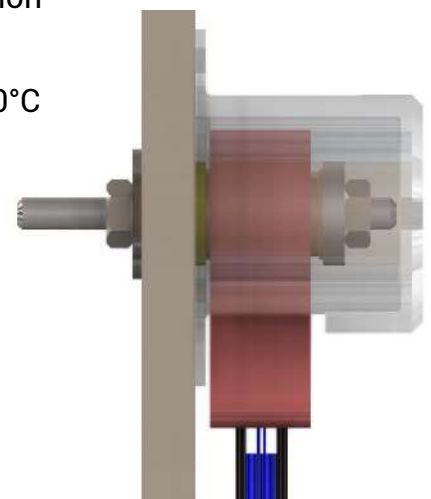
* Maximum axial preload can only be obtained with tensioner tool

TRIGGY® "HT"

- ✚ Dimensions
- ✚ Environment temperature range
- ✚ Thermal and mechanical margin

TRIGGY® "NT"

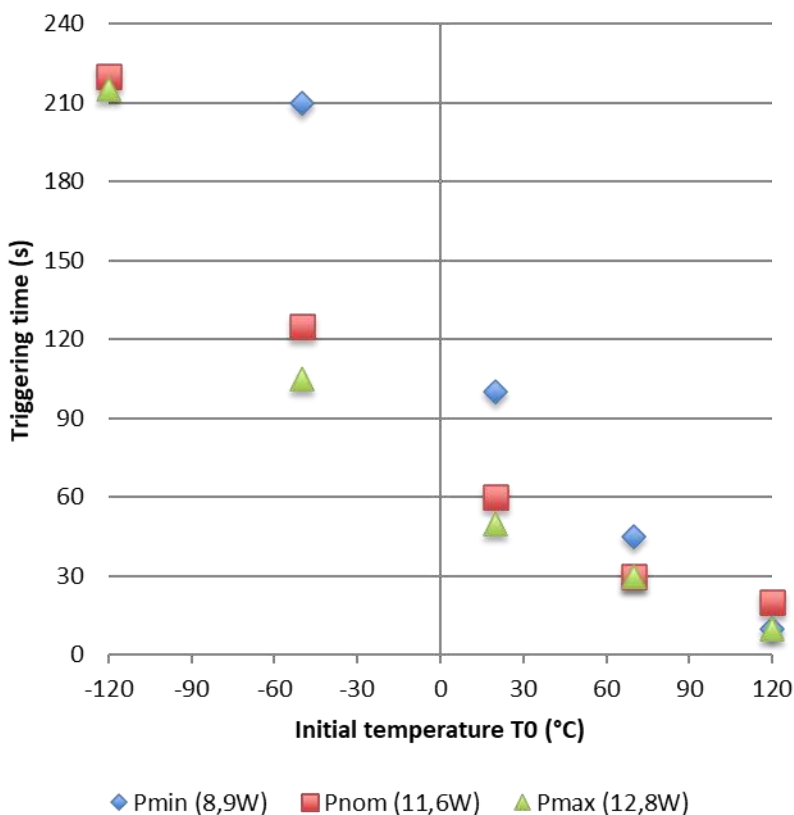
- ✚ Triggering time
- ✚ Stiffness
- ✚ Suitable for thermal insulation with low creep



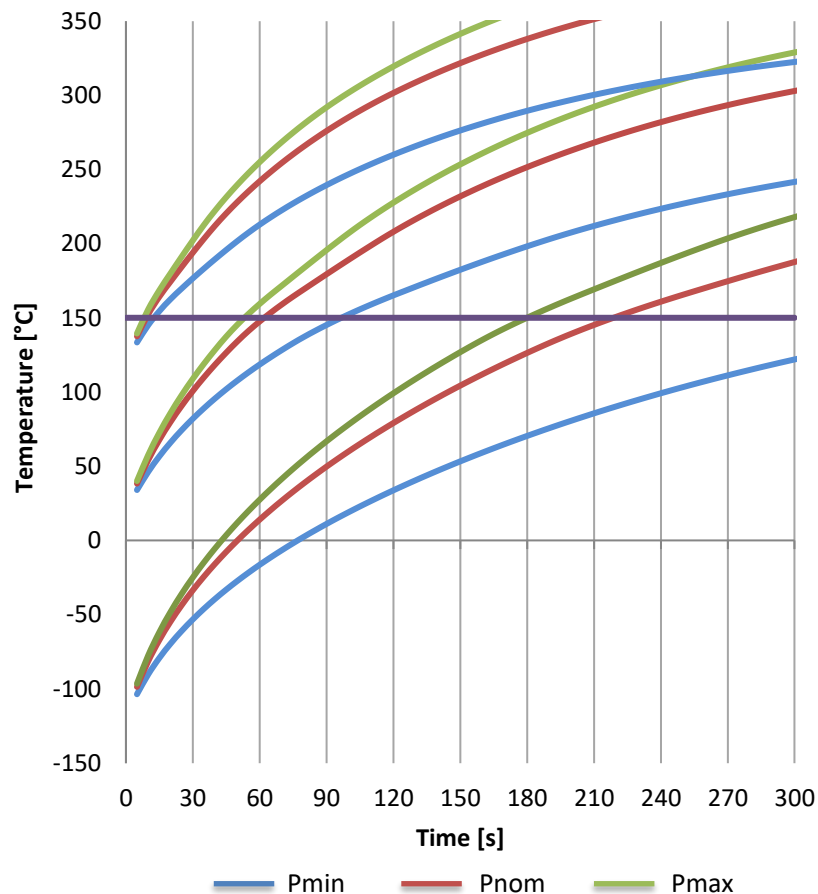


TRIGGERING

Triggering time (example for Triggy TRHT03)



Temperature during triggering (example for Triggy TRHT03)

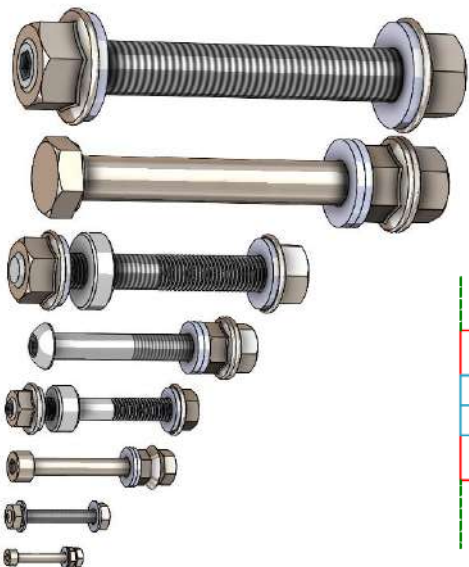


Data estimated from finite element analysis with redundant heater

FASTENER / TIE ROD

► Configure your own fastener/tie rod

► 2 materials available:

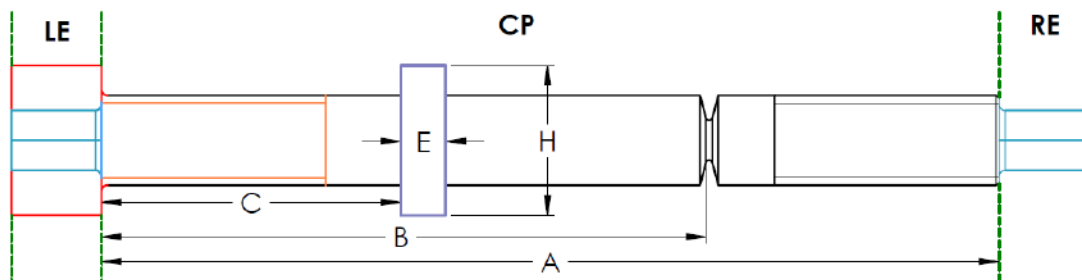


**Stainless Steel
15-5 PH**

- High preload
- Re: 1300 Mpa
- E: 196 GPa
- CTE: 11

**Titanium according to
AMS4965**

- Thermal insulation
- Lighter
- Re: 1100 Mpa
- E: 110 GPa
- CTE: 9

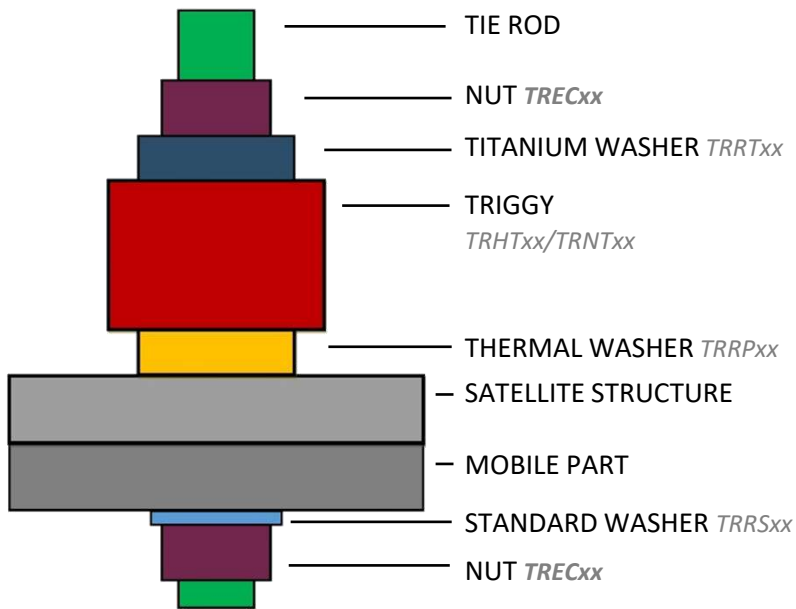




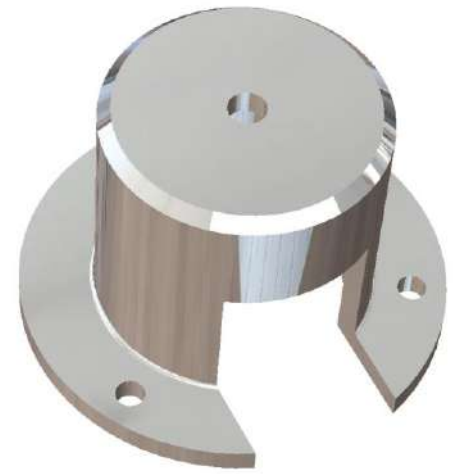
TRIGGY® ACCESSORIES



TYPICAL INTEGRATION



CASING



Casing example

THERMAL WASHER

Ref	Material	Thickness (mm)	OD (mm)	ID (mm)	Mass (g)	Compatible with
TRRP02	Duratron® CU60 PBI	1	6,4	2,2	0,04	HT02/NT02
TRRP03	Duratron® CU60 PBI	1	9,7	3,2	0,09	HT03/NT03
TRRP04	Duratron® CU60 PBI	1	12,8	4,3	0,15	HT04/NT04
TRRP05	Duratron® CU60 PBI	1	16,3	5,3	0,24	HT05/NT05
TRRP06	Duratron® CU60 PBI	1	19,1	6,4	0,33	HT06/NT06
TRRP08	Duratron® CU60 PBI	1	25,5	8,4	0,59	HT08/NT08
TRRP10	Duratron® CU60 PBI	1	32,8	10,5	0,99	HT10/NT10
TRRP12	Duratron® CU60 PBI	1	39,8	13	1,44	HT12/NT12

Tolerances : -0 / +0,1 mm

TITANIUM WASHER

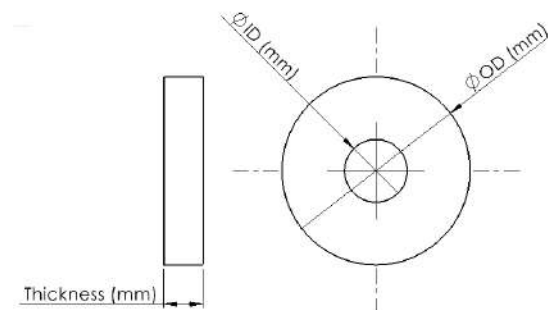
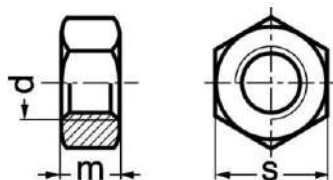
Ref	Material	Thickness (mm)	OD (mm)	ID (mm)	Mass (g)	Compatible with
TRRT02	Ta6V Grade 5	2	6,3	2,2	0,24	HT02/NT02
TRRT03	Ta6V Grade 5	2	9,6	3,2	0,57	HT03/NT03
TRRT04	Ta6V Grade 5	3	12,7	4,3	1,49	HT04/NT04
TRRT05	Ta6V Grade 5	4	16,3	5,3	3,30	HT05/NT05
TRRT06	Ta6V Grade 5	4	19,0	6,4	4,44	HT06/NT06
TRRT08	Ta6V Grade 5	4	22,0	8,4	5,74	HT08/NT08
TRRT10	Ta6V Grade 5	5	32,7	10,5	16,65	HT10/NT10
TRRT12	Ta6V Grade 5	5	39,7	13	24,42	HT12/NT12

Tolerances : -0 / +0,1 mm

STANDARD WASHER

Ref	Material	Thickness (mm)	OD (mm)	ID (mm)	Mass (g)	Compatible with
TRRS02	SS 15-5PH	0,5	7	2,2	0,08	HT02/NT02
TRRS03	SS 15-5PH	0,8	12	3,2	0,37	HT03/NT03
TRRS04	SS 15-5PH	0,8	14	4,3	0,49	HT04/NT04
TRRS05	SS 15-5PH	1	16	5,3	0,79	HT05/NT05
TRRS06	SS 15-5PH	1,2	18	6,4	1,18	HT06/NT06
TRRS08	SS 15-5PH	1,5	22	8,4	2,15	HT08/NT08
TRRS10	SS 15-5PH	2	27	10,5	4,30	HT10/NT10
TRRS12	SS 15-5PH	2,5	31,75	13	7,28	HT12/NT12

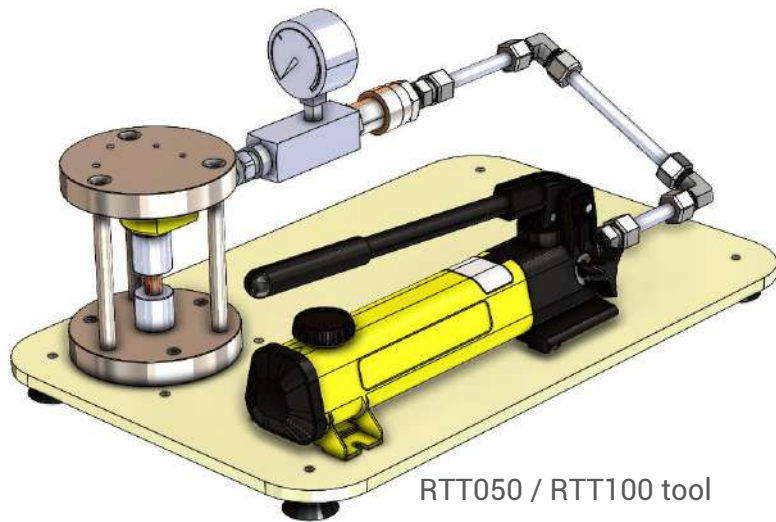
Tolerances : -0 / +0,1 mm



NUT

Ref	Material	d	m (mm)	s (mm)	Mass (g)	Compatible with
TREC02	SS 15-5PH	M2	1,6	4	0,15	HT02/NT02
TREC03	SS 15-5PH	M3	2,4	5,5	0,40	HT03/NT03
TREC04	SS 15-5PH	M4	3,2	7	0,85	HT04/NT04
TREC05	SS 15-5PH	M5	4,7	8	1,39	HT05/NT05
TREC06	SS 15-5PH	M6	5,2	10	2,63	HT06/NT06
TREC08	SS 15-5PH	M8	6,8	13	5,80	HT08/NT08
TREC10	SS 15-5PH	M10	8,4	16	10,83	HT10/NT10
TREC12	SS 15-5PH	M12	10,8	18	15,82	HT12/NT12

Tolerances : -0 / +0,1 mm

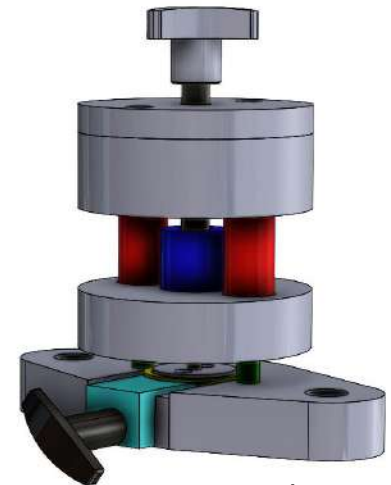


RTT050 / RTT100 tool

RESET TOOL

- ▶ Provide load to compress and arm Triggy® products
- ▶ Transportable
- ▶ No electrical power
- ▶ 3 sizes for Triggy® family

Ref	Maximum load (kN)	Length (m)	Width (m)	Height (m)	Mass (kg)	Compatible with
RTT005	5	0,18	0,12	0,18	3	HT02/HT03/HT04/NT02/NT03/NT04
RTT050	25	0,55	0,35	0,25	10	HT02/HT03/HT04/HT05/HT06/NT02/NT03/NT04/NT05/NT06
RTT100	50	0,55	0,35	0,25	15	HT08/HT10/HT12/NT08/NT10/NT12

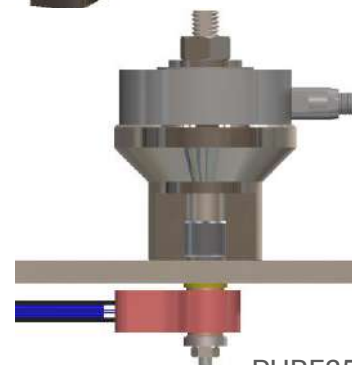
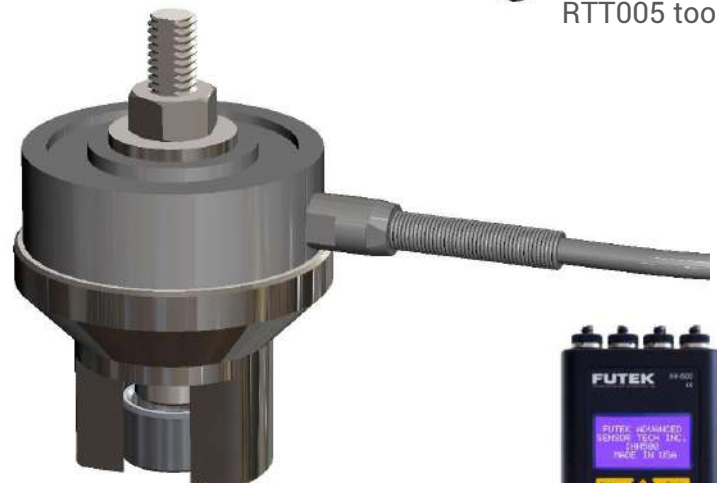


RTT005 tool

TENSIONER TOOL

- ▶ Provide strength to preload fastener and Triggy®
- ▶ Transportable
- ▶ Usable with battery or cable
- ▶ 4 sizes for Triggy® family:

Ref	Maximum load (kN)	Diameter (mm)	Height (m)	Mass (kg)	Compatible with
PURE30	4,5	28	45	0,2	M2 to M3
PURE35	22,6	40	55	0,25	M4 to M6
PURE40	45,3	54	70	0,7	M8
PURE50	90,7	80	90	1,5	M10 to M12



PURE35 with Triggy® TRHT03

