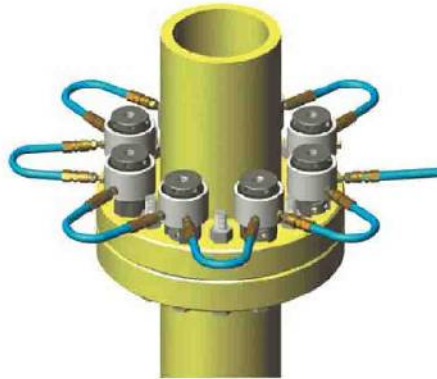


MASKO TECH ENGINEERS

MTS SERIES



Bolt tensioning is now the preferred method of tightening bolts and studs on all critical applications. Bolt tensioners are designed for operation in a wide variety of applications including pipeline flanges, heat exchangers, pressure vessels, compressor covers, boiler feed pumps, windmills and many others. We provide a comprehensive range of bolt tensioners for optimum solutions to bolt tensioning requirements. Our Bolt tensioners and accessories are CE marked in accordance with Pressure Equipment and Machinery Directives, as applicable. In comparison to traditional tightening methods, tightening with bolt tensioners offers significant advantages:

- No torsional loading of fasteners.
- Direct loading - no damage to assembly.
- Easy and fast operation.
- Very high accuracy and repeatability.
- Automation feasible and can be used for critical applications.



MTS Series Bolt Tensioners are designed for operation in a wide variety of applications including pipeline flanges, heat exchangers, pressure vessels, compressor covers, boilers feed pumps, anchors bolts and many others.

The **MTS Bolt Tensioner** is very simple to use and consists of four parts - Threaded Puller, Load Cell, Bridge and Nut Driver (Nut Rotating Socket).



THREADED PULLER



LOAD CELL



BRIDGE



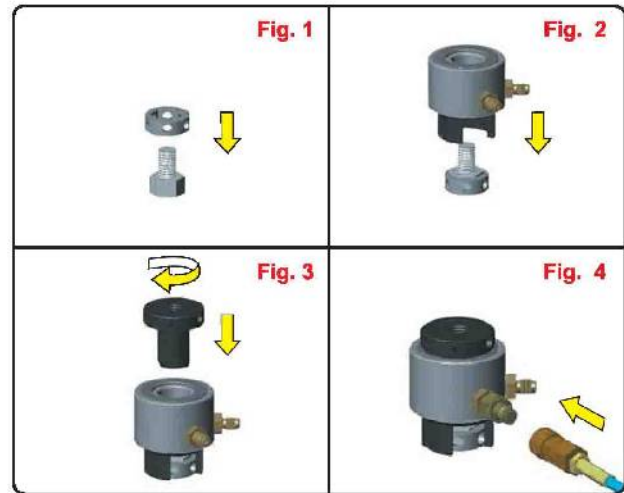
NUT DRIVER /
NUT ROTATING SOCKET

MTS SERIES - TOPSIDE BOLT TENSIONERS

Brief Operational Sequence

The nut-driver is placed over the nut (fig.1). The bridge and load cell is then placed over the bolt (fig.2). The Puller is then screwed over the stud protruding above the nut face (fig.3) making sure that at least 1 x diameter of bolt is engaged with the Threaded Puller.

Desired hydraulic pressure is now applied to load cell, which stretches the bolt (fig.4). The nut is turned down using the nut-driver and tommy bar. The Pressure is then released leaving the stud loaded to the desired value.



THE MTS SERIES TOPSIDE BOLT TENSIONERS IS ONE OF THE MOST LIGHT, COMPACT AND VERSATILE LINE OF TENSIONERS AVAILABLE:

Features

- **Versatile Design:** The MTS Series standard variable tensioners are designed to provide a wide range of flexibility, covering stud sizes from 3/4" to 5.3/4" (M-16 to M-150). Different stud sizes are accommodated by the same load cell by simply changing the adaptor kit consisting of Threaded Puller, Bridge and Nut Driver.

- **High Strength Aircraft Quality Alloy Steel:** The MTS Series tensioners operate at a maximum pressure of 1500 Bar and are manufactured from high strength AISI 4340 alloy steel parts for long lasting trouble free performance.

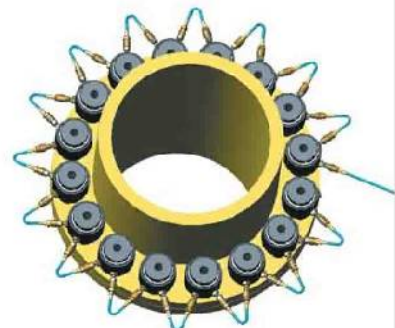
- **Stroke Indicator:** The MTS Series tensioners have and an exceptional stroke of 15 mm. The Integral Stroke Indicator allows the piston stroke to be viewed while tensioning is in progress. A Red line on piston indicates an over stroke ensuring safe operation.

- **Safe Design in event of Piston 'Over Stroke':** The MTS series tensioners are designed so that in event of over-stroke the high pressure fluid will be released from the inner side of the load cell, thus saving the operator from any potential exposure.

- **Multi Tensioning:** The MTS Series load cell is provisioned with two connections and this acts as a manifold for multi tensioning applications. By using high pressure link hoses, any number of bolt tensioners can be connected and used simultaneously. This ensures equal tightening of all bolts on the flange and reduces work time.

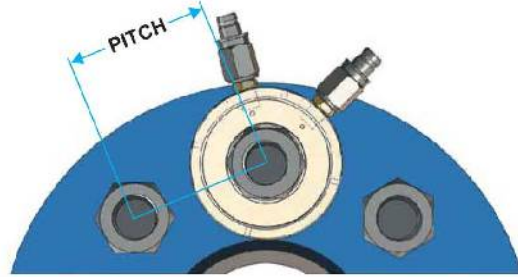
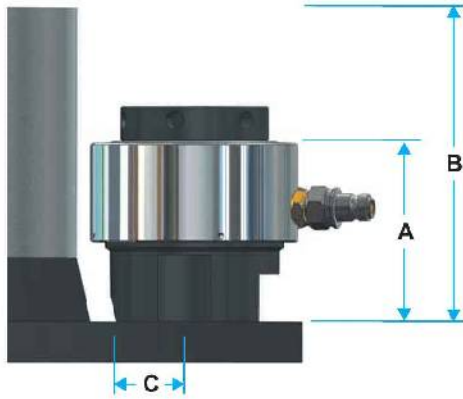
- **Anti Roll, Composite Material Seals:** All MTS Tensioners are fitted with Anti Roll, Composite Material seals for longer life and high reliability. The seals used have a low coefficient of friction so that the piston can be returned to a closed position with minimal effort. PST Series tensioners can be provided with machined PU (poly urethane) seals if requested by the customer.

- **Floating Piston:** The unique piston design allows 2° tilt without any loss of load, preventing piston seizure or damage to piston bore.



MASKO TECH ENGINEERS

TOPSIDE BOLT TENSIONERS



Technical Specifications

Model No.		Bolt Size		Max Load		Hyd Area		O.D.	Min Pitch	Relief C	Height A	Clearance B	Weight
Load Cell	Adaptor Kit	inch	mm	M Ton	kN	in ²	mm ²	mm	mm	mm	mm	mm	kg.
MTS - 01	A1-0.12	3/4		34.5	339	3.50	2257	84	46	26	86	160	3.5*
	A1-M20		20						47	26	86	160	1.3
	A1-0.14	7/8							53	30	94	168	1.4
	A1-M24		24						54	30	94	168	1.4
	A1-1.00	1							55	30	94	168	1.4
MTS - 02	A2-M27		27	40.6	397	4.11	2649	98	56	29	96	170	4.5*
	A2-1.02	1.1/8							59	32	97	171	1.8
	A2-M30		30						62	32	97	171	1.9
	A2-1.04	1.1/4							67	35	99	177	2.0
	A2-M33		33						68	35	99	180	2.1
	A2-1.06	1.3/8							72	38	101	183	2.3
	A2-M36		36						73	38	101	186	2.3
MTS - 03	A3-1.04	1.1/4		65.2	639	6.60	4259	115	69	37	99	185	5.9*
	A3-M33		33						70	37	99	174	2.4
	A3-1.06	1.3/8							74	40	101	176	2.9
	A3-M36		36						75	40	101	176	2.9
	A3-1.08	1.1/2							80	43	105	182	3.0
	A3-M39		39						80	43	105	183	3.0
MTS - 04	A4-1.06	1.3/8		73.6	721	7.45	4808	128	75	41	101	183	7.7*
	A4-M36		36						76	41	101	183	3.4
	A4-1.08	1.1/2							81	43	105	183	3.6
	A4-M39		39						81	43	105	183	3.6
	A4-1.10	1.5/8							86	46	107	186	3.9
	A4-M42		42						86	46	107	186	3.9
	A4-1.12	1.3/4							91	49	108	189	4.0
MTS - 05	A5-1.10	1.5/8		96.1	942	9.73	6280	145	87	47	132	197	11.4*
	A5-M42		42						87	47	134	199	5.2
	A5-1.12	1.3/4							92	50	139	204	5.4
	A5-M45		45						93	50	140	205	5.4
	A5-1.14	1.7/8							98	53	146	211	5.6
	A5-M48		48						98	53	146	211	5.6
	A5-2.00	2							104	56	151	216	6.3
	A5-M52		52						105	56	151	216	5.9
MTS - 06	A6-1.14	1.7/8		138.2	1354	13.99	9028	165	99	54	109	209	14.8*
	A6-M48		48						99	54	109	209	7.1
	A6-2.00	2							105	57	112	214	7.6
	A6-M52		52						106	57	112	214	7.6
	A6-M56		56						113	61	116	223	7.8
	A6-2.04	2.1/4							114	61	116	244	7.8

* Indicates weight of Load Cell +Adaptor Kit of particular size.

MASKO TECH ENGINEERS

TOPSIDE BOLT TENSIONERS



MTS - SERIES



Model No.		Bolt Size		Max Load		Hyd Area		O.D.	Min Pitch	Relief C	Height A	Clearance B	Weight
Load Cell	Adaptor Kit	inch	mm	M Ton	kN	in ²	mm ²	mm	mm	mm	mm	mm	kg.
MTS - 07	A7-M56		56	168.5	1651	17.06	11006	180	112	59	154	219	18.1*
	A7-2.04	2.1/4							112	59	156	221	9.3
	A7-M60		60						117	61	163	228	9.4
	A7-2.08	2.1/2							125	66	169	231	9.7
	A7-M64		64						125	66	169	231	9.7
	A7-M68		68						129	66	177	238	10.0
MTS - 08	A8-2.08	2.1/2		201.8	1978	20.44	13188	198	129	70	137	242	23.4*
	A8-M64		64						129	70	137	242	12.1
	A8-M68		68						132	69	142	246	12.3
	A8-2.12	2.3/4							139	75	142	246	12.5
	A8-M72		72						141	75	145	251	12.5
MTS - 09	A9-2.12	2.3/4		230.3	2257	23.30	15045	215	139	75	145	261	29.3*
	A9-M72		72						141	75	145	261	15.6
	A9-M76		76						150	80	145	254	17.2
	A9-3.00	3							150	80	145	254	17.2
MTS - 10	A10-M80		80	310.9	3047	31.48	20312	244	160	87	156	275	40.3*
	A10-3.04	3.1/4							162	87	156	278	24.0
	A10-M85		85						164	87	158	269	24.5
	A10-3.08	3.1/2							174	93	162	276	22.6
	A10-M90		90						175	93	154	269	22.6
	A10-M95		95						179	93	160	275	22.8
	A10-3.12	3.3/4							191	105	160	276	22.9
	A10-M100		100						195	105	167	288	22.1
A10-4.00	4		197	105	167	288	22.1						
MTS - 11	A11-3.12	3.3/4		384.5	3768	38.94	25120	280	192	106	172	299	52.7*
	A11-M100		100						196	106	179	306	31.4
	A11-4.00	4							198	106	179	299	31.4
	A11-4.04	4.1/4							209	111	186	306	36.4
	A11-M110		110						210	111	186	308	36.4
	A11-4.08	4.1/2							222	118	191	319	39.7
	A11-M120		120						226	118	198	327	41.4
	A11-4.12	4.3/4							229	121	202	337	42.3
A11-M125		125	233	121	202	212	43.3						
MTS - 12	A12-M125		125	485.1	4754	49.13	31694	325	236	124	204	346	89.6*
	A12-5.00	5							243	129	204	350	60.3
	A12-M130		130						243	126	207	359	63.1
	A12-5.04	5.1/4							254	135	210	367	63.1
	A12-5.08	5.1/2							266	141	217	374	70.4
	A12-M140		140						260	135	217	374	70.6
	A12-5.3/4	5.3/4							276	145	218	383	70.8
	A12-M150		150						275	141	221	386	73.3

* Weight of Load Cell + Adaptor Kit of particular size.

Please refer to catalog sheet - 'Basics of Tensioning' for Bolt Tensioners application and tool pressure calculation.

MSS SERIES - SUB SEA BOLT TENSIONERS

MSS Series Bolt Tensioners are specially designed for sub sea applications. These Tensioners are suitable for higher pressure rating flanges also. It's ergonomic design makes it very easy to handle and use by divers under the harsh sea conditions. These tensioners are designed to provide a wide range of flexibility, covering stud sizes 3/4" to 3.1/2" (M-18 to M-85).

The tool consists of two basic parts - Tensioning Unit and Puller Nut as shown below:



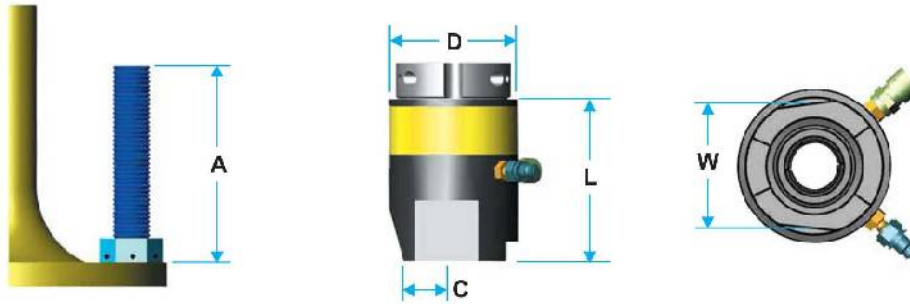
Features

- **High Strength Stainless Steel Construction:** The Complete tool is made from high strength stainless steel for use in corrosive sea environment and to minimize maintenance. Optional alloy still construction also available.
- **Versatile Design:** Designed to provide a wide range of flexibility, covering stud sizes 3/4" to 3.1/2" (M-18 to M-85) using just 8 load cells.
- **Higher Load generation:** Generates higher load making it suitable for higher pressure rating flanges (API 170 - 10K).
- **Long Stroke And Stroke Indication:** All tensioners have a 25mm long stroke with piston marked with fluorescent rings for indication of stroke and over stroke limit.
- **Safe Design In event of Piston 'Over Stroke':** Designed to release high pressure hydraulic oil inwards in the event of over-stroke, thus saving the operator from any potential exposure.
- **Multi Tensioning:** The tensioning unit cell is provisioned with two connections that act as a manifold for multi tensioning applications.
- **Anti Roll, Composite Material Seals:** Fitted with Anti Roll, Composite Material seals for longer life and high reliability. The seals used have a low coefficient of friction so that the piston can be returned to a closed position with minimal effort. Sub Sea tensioners can be provided with machined PU (poly urethane) seals if requested by the customer.
- **Split Nut:** Optional Split Nut available for fast and easy fitment which ensures most efficient use of expensive diver time.
- **Safe Handling:** Provisioned with detachable hooks and strap for easy handling under water.
- **Non Slip Tool Surface:** Knurled and formed surface allows easy handling.
- **Fluorescent band:** Fluorescent band provided on load cell body for easy tool identification in poor visibility conditions.

MASKO TECH ENGINEERS

SUB SEA BOLT TENSIONERS

MSS - SERIES



Specifications

Model No.		Bolt Size		Max Load		Hyd Area		D	C	W	L	A	Weight
Load Cell	Puller Nut.	inch	mm	Ton	kN	in ²	mm ²	mm	mm	mm	mm	mm	Kg.
MSS - 03	PT03-0.12	3/4"		21.2	188	1.95	1256	65	30	46	100	122	2.0*
	PT03-M20		M20										0.3
	PT03-0.14	7/8"											0.3
MSS - 04	PT04-M24			34.7	309	3.19	2061	86	30	64	123	153	4.0*
	PT04-1.00	1											0.7
	PT04-M27		M27										0.7
	PT04-1.02	1.1/8"											0.7
MSS - 05	PT04-M30		M30										0.7
	PT05-1.04	1.1/4"		54.2	482	4.98	3215	98	30	78	138	171	5.5*
	PT05-M33		M33										0.7
	PT05-1.06	1.3/8"											0.7
PT05-M36		M36	0.7										
MSS - 07	PT07-1.08	1.1/2"		79.4	706	7.30	4710	117	30	93	147	186	7.4*
	PT07-M39		M39										0.8
	PT07-1.10	1.5/8"											0.8
	PT07-M42		M42										0.8
MSS - 11	PT11-1.12	1.3/4"		119.1	1060	10.95	7065	138	60	113	152	197	13.5*
	PT11-M45		M45										3.5
	PT11-1.14	1.7/8"											3.5
	PT11-M48		M48										3.5
	PT11-2.00	2"											3.8
MSS - 15	PT11-M52		M52										3.8
	PT15-M56		M56	174.7	1554	16.06	10362	164	60	141	171	229	20.7*
	PT15-2.04	2.1/4"											5.0
	PT15-M60		M60										5.0
	PT15-2.08	2.1/2"											5.2
PT15-M64		M64	5.2										
MSS - 20	PT20-2.12	2.3/4"		219.4	1952	20.17	13011	190	60	166	194	266	23.5*
	PT20-M72		M72										5.2
	PT20-M76		M76										5.2
	PT20-3.00	3"											5.2
MSS - 27	PT27-M80		M80	268.7	2390	24.70	15935	214	60	191	208	288	31.5*
	PT27-3.04	3.1/4"											6.5
	PT27-M85		M85										6.5
	PT27-3.08	3.1/2"											6.5

* Weight of Load Cell + Puller Nut.

MASKO TECH ENGINEERS

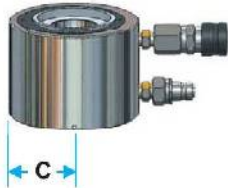
WIND MILL BOLT TENSIONERS SERIES

The wind mill bolting applications has its own restrictions for use of tools due poor open working environment and restricted space for application. Towers are high and pneumatic supply is normally not practical for tools. Tools required must be light in weight compact in size and must use energy source readily available at site.

We have two types of tensioners for WIND MILL Applications i.e. **CA Series** and **CAT Series**. The 700 bar **CA Series** are specially designed for Base Bolt applications, while the **CAT Series**, 1500 bar tensioners are for versatile applications from Tower Base to Turbine Blades.

CA SERIES BASE BOLT TENSIONERS

These tensioners are specially designed for Base Bolt applications of Wind Mill Towers. Tensioning is carried out using standard Hydraulic Torque Wrench Powerpack. Though most applications are covered by our two models as referred below, customised sizes are available against requirement.



Specifications

Model No.	Bolt Size	Max Load	Max Dia	Stroke	Dim. C	OAL	Weight
		kN	mm	mm	mm	mm	Kg.
CA - 3639	M33 - M36	385	116	25	54	138	4.3
CA - 3642	M36 - M42	412	125	25	58	138	5.5

MAIN FEATURES OF CA SERIES

- **Double Acting Design:** The double acting action of load cell helps in fast and automatic return of the piston thus making the operation very safe, easy and fast.
- **700 Bar Working Pressure:** The 700 bar working pressure to facilitate the operation using standard Electrical Power-pack, used for hydraulic torque wrenches thus reducing inventory.
- **Versatile Sizes:** Can be used for Metric, Imperial and William Threads by changing to required puller.
- **Hard Chrome Plating:** The cylinder of CA Series tensioner is hard chrome plated for better corrosion resistance and long working life at rough working environment of wind farms.
- **Alloy Steel Construction:** All parts are made from High Strength Alloy Steel for better safety factor and compact design.
- **Long Stroke:** CA series tensioners are provisioned with 25mm long stroke for completion of bolt elongation in single pull.

NOTE : Customised design with different load capacity available to specific requirement.

MASKO TECH ENGINEERS

WIND BOLT TENSIONERS SERIES

CAT SERIES BOLT TENSIONERS

These 1500 bar working pressure tensioners are specially developed from our Compact series to meet auto retract and ease of operation requirement of wind mill application.



With Auto Retraction



Without Auto Retraction

Specifications

Model No.	Bolt Size		Max Load kN	Max Dia mm	Stroke (mm)	
	Metric	Imperial			Standard	Long
CAT - 27	M24 - M27	7/8 - 1	271	74	15	25
CAT - 33	M30 - M33	1.1/8 - 1.1/4	369	86	15	25
CAT - 36	M33 - M36	1.1/8 - 1.1/2	767	118	15	25
CAT - 42	M39 - M42	1.1/8 - 1.1/2	820	123	15	25

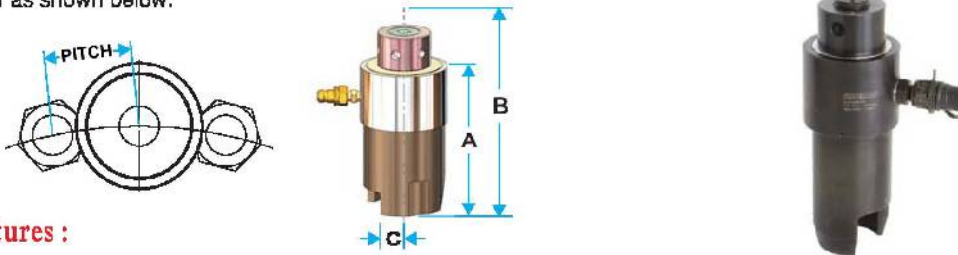
MAIN FEATURES OF CAT SERIES

- **Compact Design:** The tensioners are designed with smaller dia for ease of tool fitment.
- **Higher Working Pressure:** 1500 bar working pressure to generate higher load with smaller hydraulic area of tensioner.
- **Geared Nut Drive:** Geared Nut Driver to move the nut faster and with ease using standard 1/2" Square Drive Wrench.
- **Longer Stroke:** Tool is available with standard and long stroke as per application.
- **Alloy Steel Construction :** All parts are made from High Strength Alloy Steel better strength and compact design.
- **Customised Adaptor Kits :** CAT series tensioners are available with both standard and customised adaptor kit.
- **Optional Auto Spring Return:** Standard tensioners are available with optional auto spring retraction for fast and easy retraction of piston.

MASKO TECH ENGINEERS

COMPACT SLIMLINE BOLT TENSIONERS

CST Series are slimmer, variable type Bolt Tensioners consisting of five parts - Puller, Puller Nut, Load Cell, Bridge and Nut Driver as shown below:



Features :

- **Versatile Design:** Designed to provide a wide range of flexibility, covering stud sizes 3/4" to 2.1/2" (M-20 to M-64).
- **High Strength Alloy Steel Construction :** All Parts are made from high strength Aircraft Quality alloy steel for long lasting performance and better safety factor.
- **Stroke Indication:** Marked Piston indicates stroke and provides an over stroke indication.
- **Safe Design:** Designed to release high pressure hydraulic oil inwards in event of over-stroke, thus saving the operator from exposure.
- **Anti Roll, Composite Material Seals :** Fitted with Anti Roll, Composite Material seals for longer life and high reliability. The seals used have a low coefficient of friction so that the piston can be returned to a closed position with minimal effort. Sub Sea tensioners can be provided with machined PU (poly urethane) seals if requested by the customer.
- **Floating Piston:** The unique piston design allows 2° tilt without any loss of load and prevents piston seizure or damage of piston bore.

Specifications

Model No.		Bolt Size		Max Load		Hyd Area		O.D.	Min Pitch	Relief C	Height A	Clearance B
Load Cell	Adaptor Kit	inch	mm	Ton	kN	in ²	mm ²	mm	mm	mm	mm	mm
CST-24	A24-0.12	3/4		26.4	235.1	2.43	1568	68	42	37	173	192
	A24-M20		M20						43	38	173	193
	A24-0.14	7/8							44	41	175	197
	A24-M24		M24						46	44	177	201
	A24-1.00	1							47	46	178	203
	A24-M27		M27						49	50	180	207
CST-36	A36-1.02	1.1/8		47.6	423.2	4.37	2822	88	53	53	240	269
	A36-M30		M30						55	55	241	271
	A36-1.04	1.1/4							56	58	243	274
	A36-M33		M33						57	60	244	277
	A36-1.06	1.3/8							59	63	246	281
	A36-M36		M36						61	65	247	283
CST-41	A41-M3		M36	59.8	531.6	5.49	3545	103	76	65	267	303
	A41-1.08	1.1/2							78	69	269	307
	A41-M39		M39						79	70	270	309
	A41-1.10	1.5/8							81	74	272	314
	A41-M42		M42						82	75	273	315
CST-48	A48-M42		M42	84.6	752.7	7.78	5019	118	92	75	296	338
	A48-1.12	1.3/4							93	80	298	343
	A48-M45		M45						94	81	299	344
	A48-1.14	1.7/8							96	85	302	349
	A48-M48		M48						97	86	302	350
CST-55	A55-M48		M48	104.1	926.2	9.57	6176	130	104	86	327	375
	A55-2.00	2							106	91	330	381
	A55-M52		M52						107	93	331	383
	A55-M56		M56						109	100	335	391
	A55-2.04	2.1/4							109	102	336	393
CST-60	A60-2.04	2.1/4		191.8	1261.6	13.04	8413	148	117	102	367	424
	A60-M60		M60						120	107	370	430
	A60-2.08	2.1/2							121	113	374	437
	A60-M64		M64						124	113	374	438

MASKO TECH ENGINEERS

SPECIAL APPLICATION BOLT TENSIONERS

Dedicated Tensioner :

Dedicated Tensioners are used for Specific Thread Size Application. In these tensioners the threaded piston acts as a puller too. These tensioners are specially designed for applications having space restrictions, both around and above the stud bolt.



These tensioners are designed and supplied to specific application requirement and have the below specific features:

- **Compact Design:** The dedicated tensioner has a very compact dia for required load and size with nominal requirement of operational height.
- **Customised Stroke:** Tool is available with standard 15mm and customised stroke as per application.
- **Alloy Steel Construction:** All parts are made from High Strength Alloy Steel for better strength and compact design.
- **Delivery:** In-house design and production facilities ensure faster customization and delivery.

Multistage Tensioner :

These tensioners are slimmer diameter tools generating high application load. Its unique design combines the load generated by two load cells, stacked together.

These tensioners are used for low clearance high load applications on application like Gearboxes, Gas-Turbines and Windmill applications etc.

These tensioners too have 1500 bar max operating pressure. These are available for sizes from 1" to 3" (24mm to 72mm for metric sizes) for different thread configurations. Optional Auto Spring Return Feature makes the operation very fast and easy.

Standard tools have geared Nut Driver to move the nut faster and with ease using standard 1/2" Square Drive Wrench. If required tool is supplied with standard nut driver.

All parts of these tensioners are made of Special High Strength Alloy Steel for better design and safety requirement.

These tools too are mostly made to customised requirement for specific application.



MASKO TECH ENGINEERS

AIR OPERATED TENSIONER HYDRAULIC PUMP



MT - AH - 1500 SERIES

Pump		
Pressure Ratio		1:350
Displacement Volume	Cm3	1.3
Operating Pressure, Max. (at 5.1 bar Pre Limited (PL) Air Pressure)	bar	1,800
Compressed air supply (air drive)		
System Operating Air Pressure, Max.	bar	5.1
Safety Valve Set Pressure	bar	5.5
Stainless Steel Tank Capacity		
Oil Tank capacity	litre	5

Other Models with higher maximum operating pressures, digital pressure gauges and larger hydraulic reservoir capacities are available as per customer requirements.

Technical Features :

- **Stainless Steel Frame:** The hydraulic unit is installed in a weather proof stainless steel protection frame.
- **Logical Control Panel:** Logical layout design engraved for easy operation.
- **Calibrated Pressure Gauge:** Calibrated 150mm (6"), liquid filled, SS Frame, 2500 bar rating pressure gauge with dual reading of bar & psi.
- **Complete Air System:** System includes FRL Unit, air pressure gauge and control knob for safe air control and supply.
- **Higher Operating Pressure:** Pump has max working pressure of 1500 bar to cover all bolt tensioning applications.
- **Light Weight:** Unit weighs only 18 Kg and measures 450mm x 340mm x 480mm.
- **Lower Input air Pressure:** Higher pressure ratio of 1 : 350 ensures less input air pressure for operation.
- **Quick Connect Outlet:** Pump comes fitted with quick connect outlet for easy connection of hydraulic hose.

HAND PUMP MT - HP - 1500 SERIES

Hand Pump

This hand pump is specially designed for bolt tensioner applications. The pump is compact and light in weight with longer handle needing very little effort to generate max working load. All pumps are supplied with suitable fittings and stainless steel 4" dia pressure gauge.



Model No.	Description	Usable Oil Capacity (Liters)	Outlet Coupler	Dimensions			Net Weight Kg.
				Length mm	Width mm	Height mm	
MT - HP - 1500	1500 bar Hand Pump c/w 200 bar gauge	2.0	HCS-150-F	750	120	200	11.0