ZEAL INDIA

TOOLS & EQUIPMENTS

CONTROLLED BOLTING TOOLS

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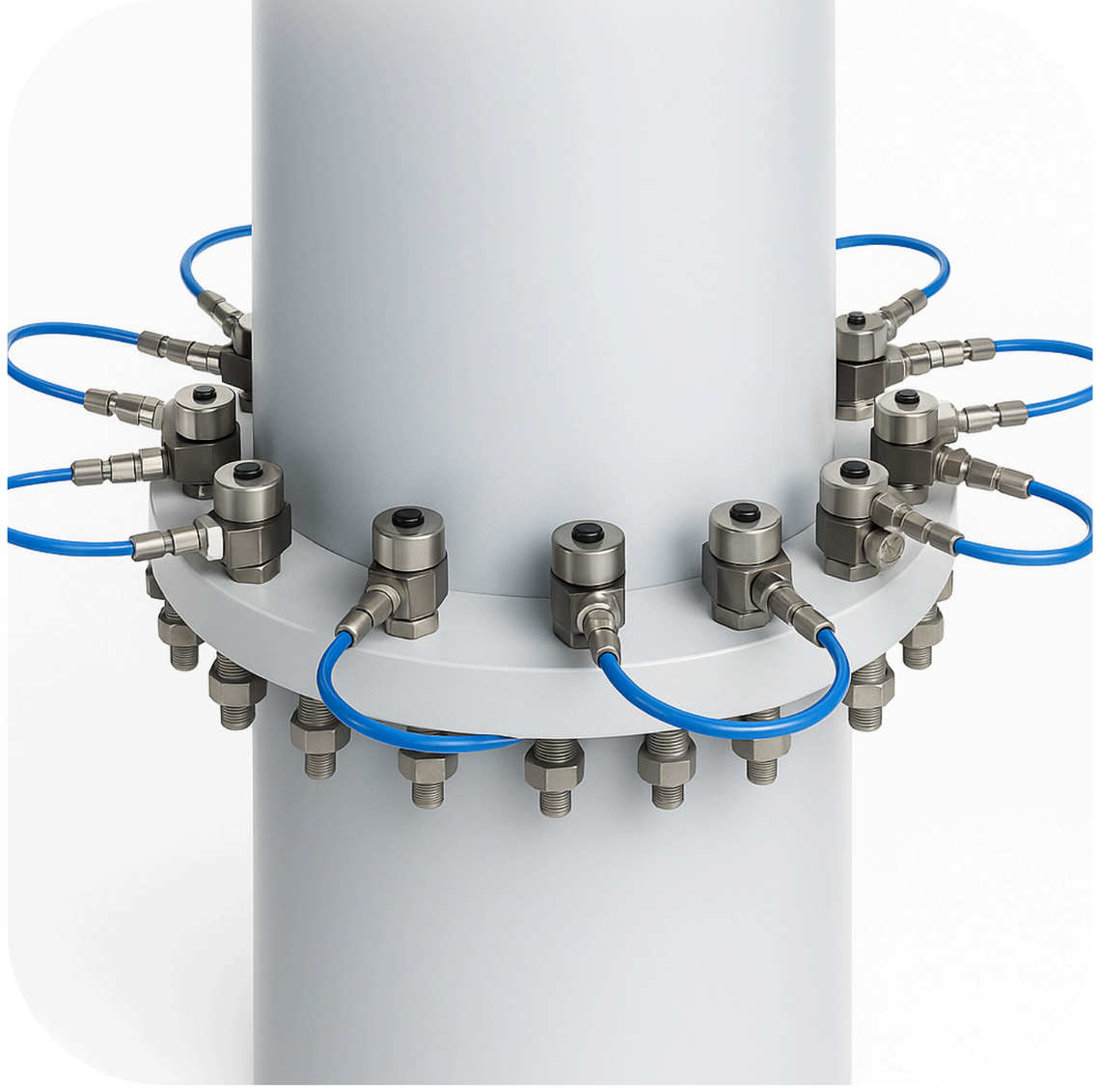


Bolt tensioning is now the preferred method of tightening bolts and studs on all critical applications. Bolt tensioners are designed for operation in a wide variety of applications including pipeline flanges, heat exchangers, pressure vessels, compressor covers, boiler feed pumps, windmills and many 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.

ZST Series

TOP SIDE BOLT TENSIONERS

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

Thread Puller

Load Cell

Bridge

Nut Driver / Nut Rotating Socket

Brief Operational Sequence

ZST Series

TOP SIDE BOLT TENSIONERS

The nut-driver is placed over the nut (fig.1).
The bridgeand 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 loadcell, which stretches the bolt. (fig.4).
The nut is turned down using the nut-driver andtommy bar.
The Pressure in then released leaving thestud loaded to the desired value.

Fig. 1

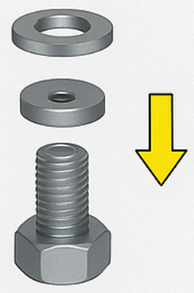


Fig. 2

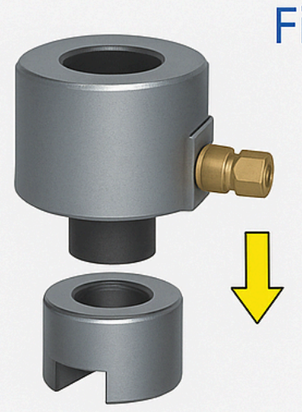


Fig. 3

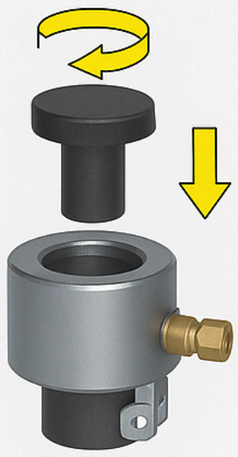
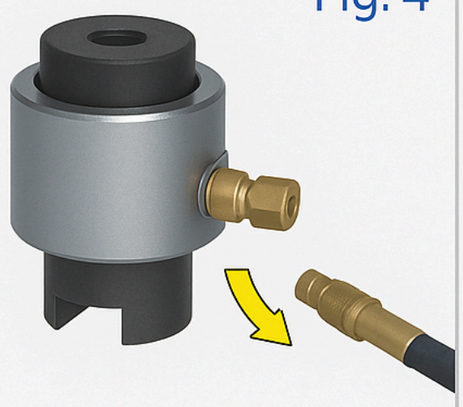


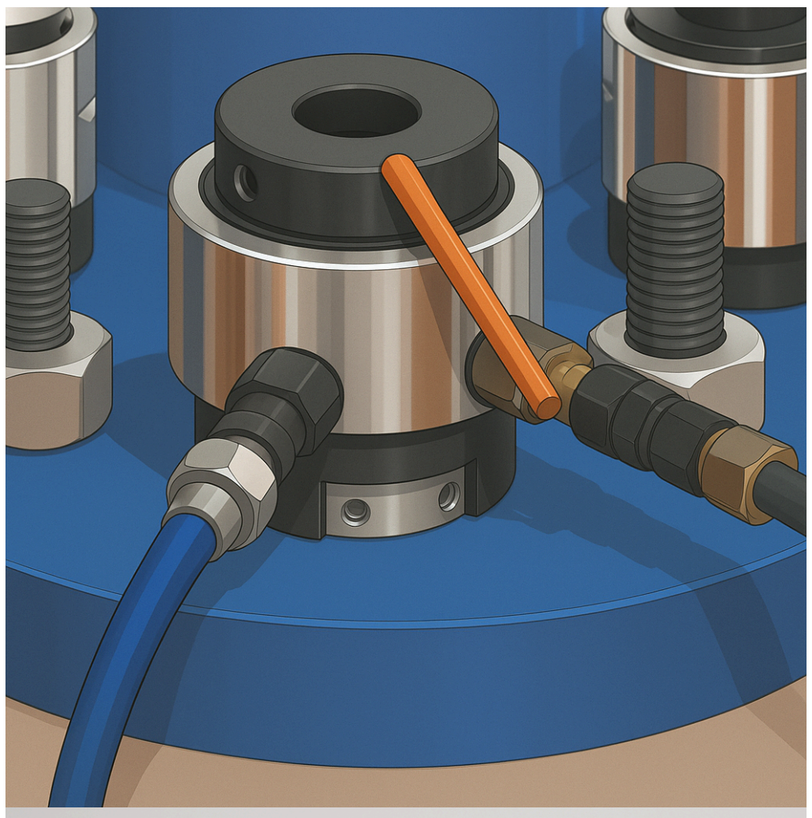
Fig. 4



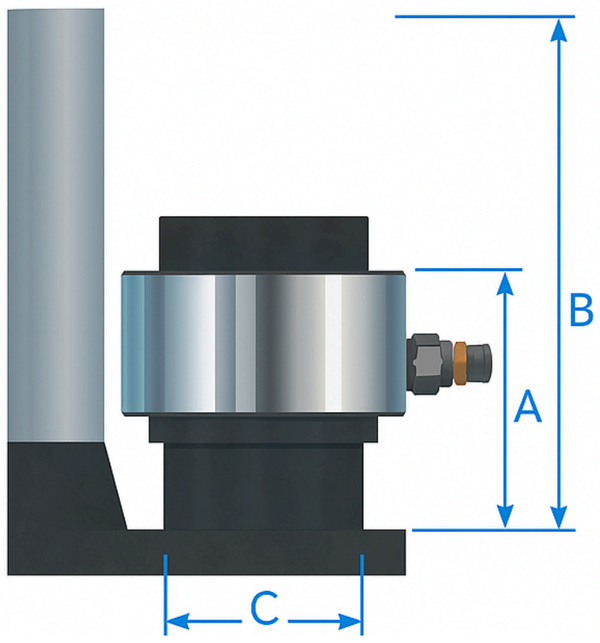
THE ZST SERIES TOPSIDE BOLT TENSIONERS IS ONE OF THE MOST LIGHT, COMPACT AND VERSATILE LINE OF TENSIONERS AVAILABLE:

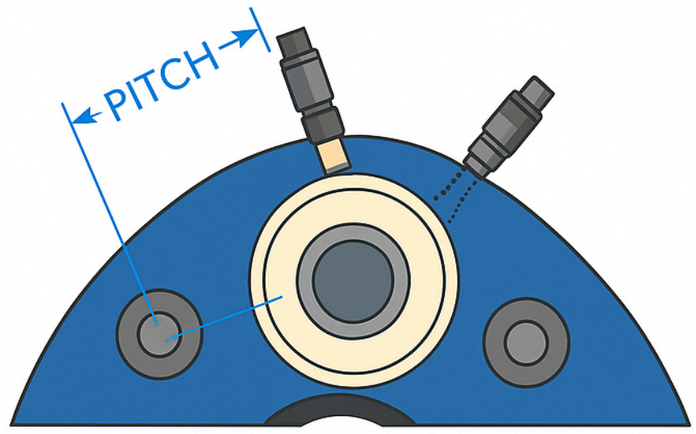
Features :

- **Versatile Design**: The ZST 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 ZST 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 ZST 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 stoke ensuring safe operation.
- **Safe Design in event of Piston ‘Over Stroke’:** The ZST 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 ZST 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 ZST 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. ZST 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.



ZST Series TOP SIDE BOLT TENSIONING





Model No.		Bolt Size		Max Load		Hyd Area		O.D.	Min Pitch	Relief C	Height A	Cle ance B	Weight
Load Cell	Adaptor Kit	inch	mm	M Ton	k N	in2	mm2	mm	mm	mm	mm	mm	kg.
ZST-01	A1-0.12	3/4		34.5	339	3.50	2257	84	46	30	86	160	3.5*
	A1-M20		20						47	30	86	160	1.3
	A1-0.14	7/8							53	32	94	168	1.4
	A1-M24		24						54	32	94	168	1.4
	A1-1.00	1							55	32	94	168	1.4
ZST-02	A2-M27		27	40.6	397	4.11	2649	98	56	34	96	170	4.5*
	A2-1.02	1.1/8							59	37	98	172	1.8
	A2-M30		30						62	37	97	173	1.9
	A2-1.04	1.1/4							67	40	99	180	2.0
	A2-M33		33						68	40	99	181	2.1
	A2-1.06	1.3/8							72	43	101	186	2.3
	A2-M36		36						73	43	101	187	2.3
ZST-03	A3-1.04	1.1/4		65.2	639	6.60	4259	115	69	40	99	185	5.9*
	A3-M33		33						70	40	99	174	2.4
	A3-1.06	1.3/8							74	43	101	177	2.9
	A3-M36		36						75	43	101	178	2.9
	A3-1.08	1.1/2							80	45	105	187	3.0
	A3-M39		39						80	43	105	186	3.0
ZST-04	A4-1.06	1.3/8		73.6	721	7.45	4808	128	75	43	101	183	7.7*
	A4-M36		36						76	43	101	183	3.4
	A4-1.08	1.1/2							81	45	105	183	3.6
	A4-M39		39						81	45	105	183	3.6
	A4-1.10	1.5/8							86	48	107	187	3.9
	A4-M42		42						86	48	107	188	3.9
	A4-1.12	1.3/4							91	51	108	192	4.0
ZST-05	A5-1.10	1.5/8		96.1	942	9.73	6280	145	87	48	113	198	11.4*
	A5-M42		42						87	48	113	200	5.2
	A5-1.12	1.3/4							92	51	117	205	5.4
	A5-M45		45						93	51	117	206	5.4
	A5-1.14	1.7/8							98	54	120	212	5.6
	A5-M48		48						98	54	120	212	5.6
	A5-2.00	2							104	57	120	217	6.3
	A5-M52		52						105	57	120	217	5.9
ZST-06	A6-1.14	1.7/8		138.2	1354	13.99	9028	165	99	54	120	209	14.8*
	A6-M48		48						99	54	120	210	7.1
	A6-2.00	2							105	57	123	215	7.6
	A6-M52		52						106	57	123	215	7.6
	A6-M56		56						113	62	126	223	7.8
	A6-2.04	2.1/4							114	62	126	224	7.8

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

ZST Series

TOP SIDE BOLT TENSIONING

Model No.		Bolt Size		Max Load		Hyd Area		O.D.	Min Pitch	Relief C		Clearance B	Weight
Load Cell	Adaptor Kit	inch	mm	M Ton	k N	in2	mm2	mm	mm	mm		mm	kg.
ZST-07	A7-M56		56	168.5	1651	17.06	11006	180	112	62		222	18.1*
	A7-2.04	2.1/4							112	62		224	9.3
	A7-M60		60						117	62		229	9.4
	A7-2.08	2.1/2							125	68		236	9.7
	A7-M64		64						125	68		236	9.7
	A7-M68		68						129	68		238	10.0
ZST-08	A8-2.08	2.1/2		201.8	1978	20.44	13188	198	129	70		242	23.4*
	A8-M64		64						129	70		242	12.1
	A8-M68		68						132	69		249	12.3
	A8-2.12	2.3/4							139	75		254	12.5
	A8-M72		72						141	75		256	12.5
ZST-09	A9-2.12	2.3/4		230.3	2257	23.30	15045	215	139	75		261	29.3*
	A9-M72		72						141	75		261	15.6
	A9-M76		76						150	80		263	17.2
	A9-3.00	3							150	80		264	17.2
ZST-10	A10-M80		80	310.9	3047	31.48	20312	244	160	87		275	40.3*
	A10-3.04	3.1/4							162	87		278	24.0
	A10-M85		85						164	87		275	24.5
	A10-3.08	3.1/2							174	93		280	22.6
	A10-M90		90						175	93		279	22.6
	A10-M95		95						179	93		281	22.8
	A10-3.12	3.3/4							191	105		281	22.9
	A10-M100		100						195	105		304	22.1
	A10-4.00	4							197	105		304	22.1
ZST-11	A11-3.12	3.3/4		384.5	3768	38.94	25120	280	192	106		299	52.7*
	A11-M100		100						196	106		306	31.4
	A11-4.00	4							198	106		299	31.4
	A11-4.04	4.1/4							209	111		312	36.4
	A11-M110		110						210	111		313	36.4
	A11-4.08	4.1/2							222	118		324	39.7
	A11-M120		120						226	118		330	41.4
	A11-4.12	4.3/4							229	121		342	42.3
	A11-M125		125						233	121		348	43.3
ZST-12	A12-M125		125	485.1	4754	49.13	31694	325	236	124		354	89.6*
	A12-5.00	5							243	129		359	60.3
	A12-M130		130						243	126		361	63.1
	A12-5.04	5.1/4							254	135		367	63.1
	A12-5.08	5.1/2							266	141		380	70.4
	A12-M140		140						260	135		380	70.6
	A12-5.3/4	5.3/4							276	145		389	70.8
	A12-M150		150						275	141		396	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.

Electric Bolt Tensioner Pump

MODEL

ZM–EH–1500

The ZM-EH-1500 Electric motor with gear pump are designed to provide optimal service with bolt tensioner or hydraulictools single-acting. Equipped with remote control with 5 m. cable for an easy use, 5 Ltr. tank, electromagnetic level andprotective framework it is the ideal tool under all job conditions.

Model		ZM-EH-1500
Maximum pressure 1st stage	bar	150
	psi	2,145
Maximum pressure 2nd stage	bar	1,500
	psi	21,450
Hydraulic flow 1st stage	Lt./min	3
Hydraulic flow 2nd stage	Lt./min	0.7
Power rating and Voltage	kW / V	0.7 / 230 V - 50Hz / single-phase
Speed	rpm	1400
Sound level	dB(A)	80
Intensification factor		13 : 1
Electric pump weight	Kg.	42 (with 5 Lt. Reservoir, frame and remote control)

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

Technical Features:

- **Heavy Duty Steel Frame:** Unit is enclosed in heavy duty frame for protection during handling usage and transportation.
- **Calibrated Pressure Gauge:** Calibrated 100mm (4”), liquid filled, 2000 bar rating pressure gauge with dual reading of bar and psi.
- **Ergonomical layout:** Logical layout of equipments and controls ensure easy operation and maintenance.
- **Remote Control:** Hand haled remote control for easy and safe operation

Air Operated Hydraulic Bolt Tensioner Pump

MODEL

ZU-AH-1500

The ZU-AH-1500 air operated pumps are designed and manufactured to meet the highest technical and safety requirements of high pressure equipment.

Model		ZU-AH-1500
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.
Safety Valve Set Pressure	bar	1
Stainless Steel Tank Capacity		5.
Oil Tank capacity	litre	55

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

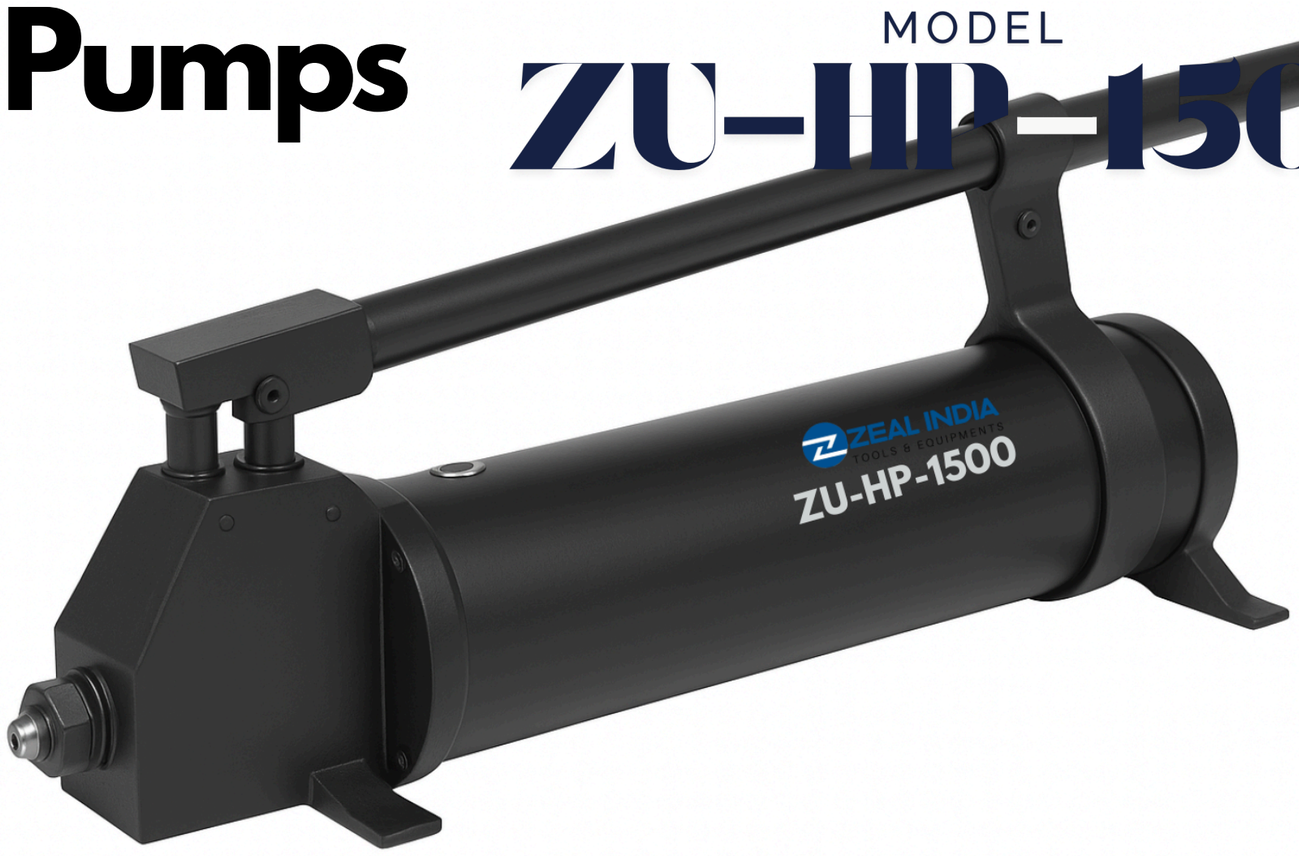
Technical Features:

- **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 22 Kg and measures 390mm x 390mm x 410mm.
- **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 Pumps

MODEL

ZU-HP-1500



This hand pump is specialy designed for bolt tensioner applications. The pumpis compact and light in weight with longer handle needingvery little effort to generate max working load. All pumps are suppliedwith 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	
ZU-HP-1500	1500 bar Hand Pump c/w 200 bar gauge	2.0	HCS-150-F	750	120	200	11.0

High Pressure Accessories

High Pressure Tensioner Hoses

Lead Hose

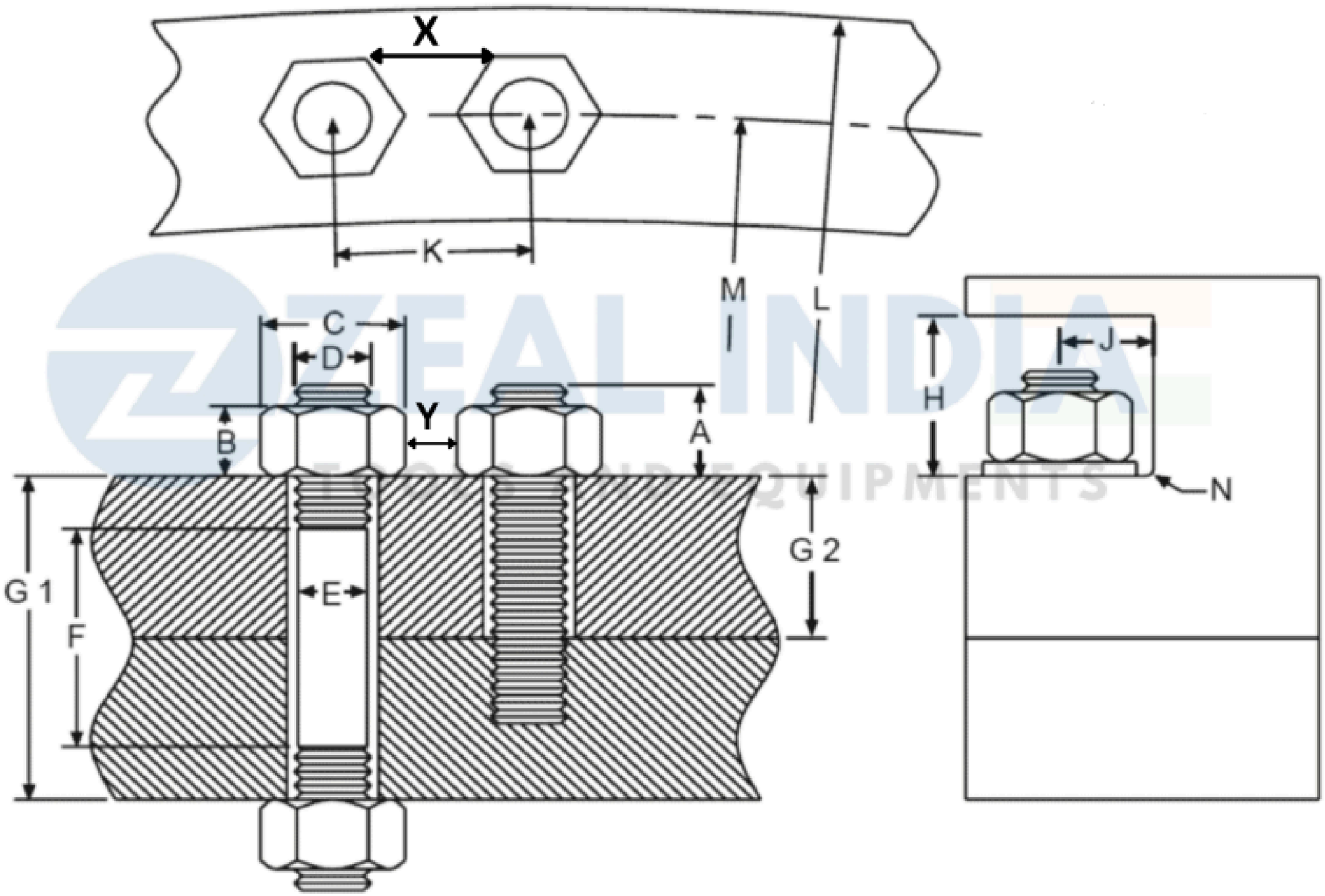
Connecting Hose

Part No.	OAL Mtr.	QRC
ZU-HG-0150	1.5	F X F
ZU-HG-0300	3.0	F x F
ZU-HG-0300-L	3.0	F x M
ZU-HG-0500	5.0	F x F
ZU-HG-0500-L	5.0	F x M

Features:

- 4- Ply construction.
- Available in 1.5m, 3m and 5m standard lengths. Other custom built lengths also available.
- Max. Working Pressure : 1800 Bar.
- Burst Pressure : 4500 Bar.
- Min. Bend Radius : 150mm
- All hoses fitted with quick connect Couplings at both ends.
- Working Temperature Range: -30 to 80 Deg C.
- Tensioner Hose Reel of upto 500m single hose for sub sea applications available with required end fittings.

Application Checklist



Thread Pitch / TPI. _____ Stud material. _____

Stud strength. _____ Desired retained stress in stud. _____

Depth if nut fits in a counterbore (or spot face depth).

_____

Service temperature. _____ Desired stroke or amount of flange compression. _____

Will studs be loaded individually or several at a time? _____

1.	A	
2.	B	
3.	C	
4.	D	
5.	E	
6.	F	
7.	G_1	
8.	G_2	

9.	H	
10.	J	
11.	K	
12.	L	
13.	M	
14.	N	
15.	Y	