

smartTensioner®
Hamburg · Germany

BoltTensioner & CompactFlangeBoltTensioner



Tools for highly loaded bolted connections

HP
Hydraulic Pump

STD
Subsea Tensioning Devices

IBT
Integrated Bolt Tensioner

BT
Bolt Tensioner

HMTU
Hydraulic Mechanical Tensioning Unit

HTU
Hydraulic Tensioning Unit

BT

BoltTensioner



The smartTensioner BoltTensioner (BT) is used to tension bolts hydraulically and to lock the tension with conventional hexagon nuts.

Two series of BoltTensioner

Sometimes high forces are needed, sometimes small and lightweight devices are necessary. We have developed two different kinds of BoltTensioners:

The HF series allows very high forces (max. bolt stresses at approx. 850 MPa) with still relatively small diameters and low weight.

The SL series only stresses the bolts up to 350 MPa but is much lighter and smaller in diameter.

The BT is a tool that is used for tensioning and detensioning and does not remain on the bolt. The BT offers the advantages of purely hydraulic bolt tensioning in environments where the original nut must be used, e.g. due to license reasons. However, BTs are heavier than HTU or HMTU systems and more demanding to employ.

All BTs can be used as a standalone solution or as a tensioning ring (MultiStudTensioning MST). While the maximum force is comparable to HMTU tensioners, the setting losses using the conventional nut to lock the bolt force are somewhat higher.

smartTensioner BT can be used on bolts as small as thread size M8 (1/4") all the way up to M150 (6").

For the smaller diameters, several BTs are combined on one base plate, which is individually customized for the current flange, and are connected to one smartTensioner HydraulicPump HP.

MultiBoltTensioning MBT

For thread sizes M8 (1/4") up to M56 (2 1/4"), several BTs are combined on one base plate and operated by one pump (MBT). The base plate follows the flange geometry. Operation and handling are easier and faster than using each BT individually.

The operator only needs to put two or more MBTs on the flange and either turns the puller on the bolts or – the faster method - uses the Quick Coupling Device to easily connect the bolts with the puller. Then only the power cord needs to be connected – that's all!

Wide range of sizes: From M8 (1/4") up to M150 (6")

Specifications

BoltTensioner / SL - Series								
Type	Part.-No.	Bolt load [kN]	Height H [mm]	Diameter D [mm]	Thread		Stroke [mm]	Weight [kg]
SLBT12	1031-012	40.00	99.00	43.00	M12	1/2-UNC	10	0.69
SLBT14	1031-014	54.00	97.32	46.38	M14		11	0.51
SLBT16	1031-016	70.00	97.37	49.60	M16	5/8-UNC	12	0.45
SLBT20	1031-020	110.00	101.74	55.73	M20	3/4-UNC	13	0.63
SLBT22	1031-022	133.00	105.61	58.69	M22	7/8-UNC	14	0.84
SLBT24	1031-024	158.00	110.33	61.62	M24	1-UNC	15	1.12
SLBT27	1031-027	200.00	118.60	66.00	M27		16	1.64
SLBT30	1031-030	247.00	127.79	70.44	M30	1 1/8-8UN	17	2.24
SLBT33	1031-033	299.00	137.40	75.00	M33	1 1/4-8UN	18	2.90
SLBT36	1031-036	356.00	146.98	79.73	M36	1 3/8-8UN	19	3.59
SLBT39	1031-039	418.00	156.18	84.67	M39	1 1/2-8UN	20	4.30
SLBT42	1031-042	485.00	164.68	89.84	M42	1 5/8-8UN	21	4.99
SLBT45	1031-045	557.00	172.26	95.27	M45	1 3/4-8UN	22	5.67
SLBT48	1031-048	633.00	178.75	100.96	M48	1 7/8-8UN	23	6.32
SLBT52	1031-052	743.00	185.56	108.93	M52	2-8UN	24	7.13
SLBT56	1031-056	862.00	190.25	117.31	M56	2 1/8-8UN	25	7.89
SLBT60	1031-060	990.00	193.00	126.00	M60	2 3/8-8UN	26	8.61
SLBT64	1031-064	1.126.00	194.21	134.90	M64	2 1/2-8UN	27	9.33
SLBT68	1031-068	1.271.00	194.50	143.84	M68		28	10.09
SLBT72	1031-072	1.425.00	194.71	152.64	M72	2 3/4-8UN	29	10.94
SLBT76	1031-076	1.588.00	195.89	161.07	M76	3-8UN	30	11.96
SLBT80	1031-080	1.759.00	199.30	168.88	M80	3 1/8-8UN	31	13.24
SLBT85	1031-085	1.986.00	209.01	177.28	M85	3 3/8-8UN	32	15.36
SLBT90	1031-090	2.227.00	227.93	183.57	M90	3 1/2-8UN	33	18.26
SLBT95	1031-095	2.481.00	260.00	187.00	M95	3 3/4-8UN	34	22.21
SLBT100	1031-100	2.749.00	309.63	186.72	M100	4-8UN	35	27.50

BoltTensioner / HF - Series								
Type	Part.-No.	Bolt load [kN]	Height H [mm]	Diameter D [mm]	Thread		Stroke [mm]	Weight [kg]
HFBT12	1032-012	93.61	91.00	38.00	M12	1/2-UNC	10	0.72
HFBT14	1032-014	131.68	95.00	44.00	M14		11	0.93
HFBT16	1032-016	164.85	99.00	49.00	M16	5/8-UNC	12	1.20
HFBT20	1032-020	248.19	109.00	58.00	M20	3/4-UNC	13	1.85
HFBT22	1032-022	297.26	113.00	62.50	M22	7/8-UNC	14	2.21
HFBT24	1032-024	350.75	118.00	67.00	M24	1-UNC	15	2.67
HFBT27	1032-027	408.65	126.00	72.50	M27		16	3.33
HFBT30	1032-030	506.25	134.00	79.00	M30	1 1/8-8UN	17	4.23
HFBT33	1032-033	638.02	142.00	86.50	M33	1 1/4-8UN	18	5.08
HFBT36	1032-036	715.29	150.00	91.00	M36	1 3/8-8UN	19	6.43
HFBT39	1032-039	871.39	158.00	99.00	M39	1 1/2-8UN	20	7.47
HFBT42	1032-042	992.28	166.00	105.00	M42	1 5/8-8UN	21	8.61
HFBT45	1032-045	1.215.45	174.00	114.00	M45	1 3/4-8UN	22	9.86
HFBT48	1032-048	1.357.54	182.00	120.00	M48	1 7/8-8UN	23	11.22
HFBT52	1032-052	1.500.11	193.00	126.50	M52	2-8UN	24	13.21
HFBT56	1032-056	1.747.10	202.00	135.00	M56	2 1/8-8UN	25	15.41
HFBT60	1032-060	2.110.67	211.00	146.00	M60	2 3/8-8UN	26	17.85
HFBT64	1032-064	2.449.95	219.00	156.00	M64	2 1/2-8UN	27	20.50
HFBT68	1032-068	2.814.34	226.00	166.00	M68		28	23.40
HFBT72	1032-072	3.115.67	232.00	174.00	M72	2 3/4-8UN	29	26.55
HFBT76	1032-076	3.209.87	237.00	182.00	M76	3-8UN	30	29.96
HFBT80	1032-080	3.625.92	240.00	192.00	M80	3 1/8-8UN	31	33.63
HFBT85	1032-085	4.194.45	241.00	205.00	M85	3 3/8-8UN	32	38.62
HFBT90	1032-090	4.885.25	240.00	219.00	M90	3 1/2-8UN	33	44.05
HFBT95	1032-095	5.195.72	236.00	226.00	M95	3 3/4-8UN	34	49.95
HFBT100	1032-100	6.238.59	228.00	245.00	M100	4-8UN	35	56.34

BT are available for other threads on request.

Advantages of BT

High bolt forces with low contact area

The smartTensioner BoltTensioner operates with high hydraulic pressure. That allows smaller diameters and lower weights of the BT in combination with higher bolting forces.

NutTurningDrive NTD

Optionally, an automated nut turning feature can be integrated. It turns the hexagon nut of the bolt in the tensioning and detensioning process using a small motor integrated in the BT. The level of torque applied can be defined by the operator. An integrated ElectricNutDrive is available.

HydraulicPistonReturn HPR

After using the BT, the piston is often not in its initial position. Especially with larger BTs, pushing the piston back is difficult and cumbersome. With our HPR, turning the knob on the HP is all that is required to start the hydraulic piston return process.

ElectronicStrokeLimitation PSL

A small sensor detects if the piston should be moved beyond its stroke limits. Since the pump is directly connected to the BT, it will stop automatically and prevent failures.

Simple nut turning

All BTs use a small gear box to turn the hexagon nut using an adapter that is simply placed on the nut. The operator is able to turn the nut with a hexagon. Alternatively, an electric screwdriver or a torque wrench can be used. This allows the application of torque in the tensioning process to be controlled.

Quick bolt coupling

Instead of turning the puller on the bolt, a quick coupling device is available. More information is available on request.



CFBT

CompactFlangeBoltTensioner



Specifications

BoltTensioner / CompactFlange - Series								
Type	Part.-No.	Bolt load [kN]	Height H [mm]	Diameter D [mm]	Thread		Stroke [mm]	Weight [kg]
CFBT12	1033-012	57.88	106.00	25.70	M12	1/2-UNC	10	0.72
CFBT16	1033-016	106.00	116.00	34.60	M16	5/8-UNC	11	0.72
CFBT20	1033-020	134.46	125.00	39.70	M20	3/4-UNC	12	0.72
CFBT22	1033-022	186.67	130.00	45.00	M22	7/8-UNC	13	0.72
CFBT24	1033-024	244.83	134.00	49.50	M24	1-UNC	14	0.72
CFBT30	1033-030	322.54	147.00	56.10	M30	1 1/8-8UNC	15	0.93
CFBT33	1033-033	442.54	154.00	66.00	M33	1 1/4-8UNC	16	1.20
CFBT36	1033-036	535.47	160.00	71.00	M36	1 3/8-8UNC	17	1.31
CFBT39	1033-039	624.59	166.00	76.70	M39	1 1/2-8UNC	18	2.46
CFBT42	1033-042	754.17	172.00	83.00	M42	1 5/8-8UNC	19	3.71
CFBT45	1033-045	754.17	178.00	83.00	M45	1 3/4-8UNC	20	5.08
CFBT48	1033-048	1.021.33	183.00	94.50	M48	1 7/8-8UNC	21	6.55
CFBT52	1033-052	1.177.66	191.00	102.00	M52	2-8UNC	22	8.67
CFBT60	1033-060	1.548.22	204.00	114.00	M60	2 3/8-8UNC	23	13.95
CFBT64	1033-064	1.932.08	211.00	126.00	M64	2 1/2-8UNC	24	16.71
CFBT68	1033-068	1.853.97	217.00	135.00	M68		25	19.66
CFBT72	1033-072	2.110.08	223.00	136.00	M72	2 3/4-8UNC	26	22.81
CFBT76	1033-076	2.569.65	228.00	148.00	M76	3-8UNC	27	26.16
CFBT85	1033-085	3.015.97	240.00	159.00	M85	3 3/8-8UNC	28	34.41
CFBT90	1033-090	3.358.03	246.00	170.00	M90	3 1/2-8UNC	29	39.41
CFBT95	1033-095	1.853.97	251.00	180.00	M95	3 3/4-8UNC	30	44.73
CFBT100	1033-100	4.691.95	256.00	196.00	M100	4-8UNC	31	50.35

CFBT are available for other threads on request.



Advantages of CFBT:

Adapted to compact flange geometry

smartTensioner CFBT follows the individual geometry of modern compact flanges. It is optimized to use all available space on the flanges to ensure high bolting forces.

Meets specifications

For many compact flanges, bolting forces are defined in the CF specification. Our CFBT meets all requirements concerning bolt forces and contact area.

Lightweight and easy to handle

The CFBT is significantly smaller and lighter than comparable solutions on the market.

The CompactFlangeBoltTensioner CFBT is technically comparable to the BT but has been designed to tension compact flanges.

On many compact flanges, the bolts are turned very tightly and the prescribed tension force is high. The CFBT meets exactly these requirements. With our CFBT, it is possible to tension all kinds and sizes of compact flanges, even with bolts as small as M8 - from one side!

Our CFBT meets or exceeds the requirements of these standards:

- VECTOR SPO
- VECTOR SPO Subsea
- NORSOK Compact Flanges L-005
- UHV-CD / UHV-CDg

Additional features

As with our BT, the CFBT features a HydraulicPistonReturn HPR, PistonStrokeLimitation PSL and NutTurningDrive NTD. Automated nut driving is also available as Quick Coupling solutions.



No hoses!

No external pumps!

No clumsy high-pressure connectors!

These features make our BT system unique:

- **HydraulicPistonReturn HPR**

Each BT cylinder is equipped on the top side with a smaller hydraulic cylinder and annular piston that is unpressurized in regular operation. To return the main piston to its initial position after use, the HPR is pressurized and moves the main piston back to the cylinder ground. HPR uses a closed hydraulic system. As it is premounted, no changes have to be made to the BT for operation. the HPR uses a special version of our HydraulicPump that includes a valve that is connected to the main cylinder as well as to the HPR. To activate the HPR, just turn the knob - that's all!

- **PistonStrokeLimitation PSL**

On the top of each BT, a sensor determines whether the main piston should be moved beyond its admissible stroke. If so, leakages and process delays might occur. To prevent this, our PSL is connected to the HydraulicPump, which will stop further operation. The operator is informed on the pump's display.

- **NutTurningDrive NTD**

The hexagon nut that remains on the flange is covered by the BT and is difficult to access and to turn manually. Therefore, the BT features an NTD that allows the nut to be turned either with standard wrenches, torque wrenches or cordless screwdrivers. It allows sufficient torque to be applied to turn sluggish nuts.

