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HTN HYDRAULIC TENSIONER NUT OPERATING INSTRUCTIONS.

INTRODUCTION

The Hi-Force HTN series tensioner nuts are designed for quick and accurate tensioning of pipe flanges etc. where frequent opening of the joint for inspection or maintenance is required. The tensioner is designed to remain permanently fitted to the stud and takes the place of a conventional nut.

It is recommended that these instructions are read in conjunction with the pump instructions. Hi-Force recommends the use of an AHP275BTU pump unit for tensioning duties.

The use of Hi-Force Boltright software is a simple way to determine the pressures required for correct joint tightening.

SAFETY NOTES.

WARNING!

All equipment used must be rated for the same operating pressure i.e. 1500 bar (21,750 psi). DO NOT MIX high and low pressure components. If in doubt, contact your local Hi-Force Distributor.

Never attempt to use this High Pressure equipment if you are in any doubt regarding the correct assembly and operation.

Always wear eye protection and gloves.

Do not exceed the maximum working pressure
As stated on the tensioner nut

Never exceed maximum piston stroke. When the red or yellow indicator band on the piston becomes visible, stop the pump.

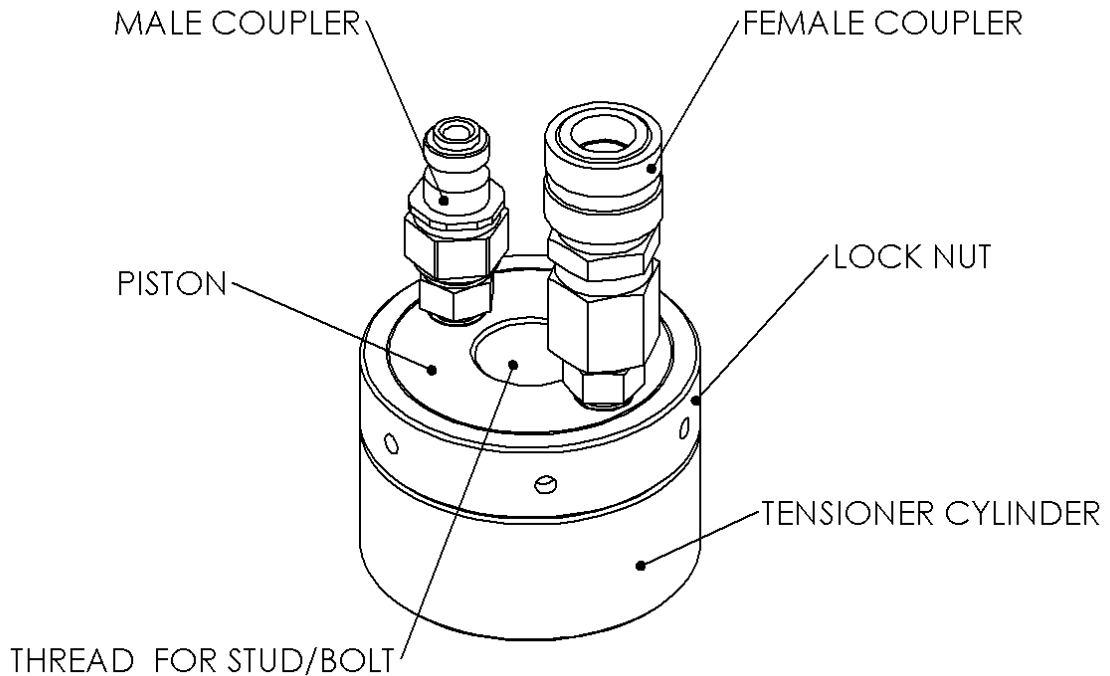
Never pressurise an un-coupled male coupling connector.

Only approach pressurised Bolt Tensioners
When you are certain pressure is holding.

Never attempt to solve leaks in the system
While the system is pressurised.

Ensure there is sufficient thread protruding above the joint face to allow full engagement of the tensioner nut.

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IDENTIFICATION OF COMPONENTS

HTN TENSIONER COMPONENTS

Hi-Force HTN tensioners in common with most other similar equipment have no physical built in device to prevent the piston being pumped right out of the cylinder. This allows the tool to be kept compact for use in confined spaces. Hi-Force HTN tensioners have a maximum stroke indicator in the form of a red band on the piston. When this band becomes visible the piston is at maximum stroke and the pump should be stopped immediately.

In the event of over stroking the tensioner is designed so that escaping oil will be directed inwards to the centre of the tool rather than towards the operator. Seal damage is very likely if pistons are over stroked in this manner.

All HTN tensioners are marked with the model number, capacity and thread size on the side of the tensioner cylinder. Please refer to table one below to determine the correct size for the studs in use. Attempting to fit the incorrect size of tensioner to a stud can result in damage to the stud or the tensioner and may result in personal injury.

HTN tensioners are designed for use with mineral oil as the working fluid. Do not use with any other fluid without consulting Hi-Force.

CAPACITY DATA

MODEL	STUD BOLT SIZE	CAPACITY		EFF AREA	STROKE	DIAMETER	HEIGHT
		(kN)	(tonne)	cm ²	mm	mm	mm
HTN1-100	1" - 8 UN	198.27	20.21	13.22	5	72	55
HTN2-112	1 1/8" -8UN	216.30	22.05	14.42	5	75	55
HTN3-125	1 1/4" -8UN	252.94	25.78	16.86	5	82	57
HTN4-137	1 3/8" - 8UN	305.83	31.18	20.39	5	88	57
HTN5-150	1 1/2" - 8 UN	344.12	35.08	22.94	6	93	58
HTN6-162	1 5/8" - 8 UN	397.61	40.53	26.51	6	100	62
HTN7-175	1 3/4" - 8 UN	475.01	48.42	31.67	6	106	64
HTN8-187	1 7/8" - 8 UN	501.40	51.11	33.43	6	110	64
HTN9-200	2" - 8UN	563.72	57.46	37.58	6	117	67
HTN10-225	2 1/4" - 8UN	746.44	76.09	49.76	8	128	74
HTN11-250	2 1/2" - 8 UN	905.13	92.27	60.34	8	141	77
HTN12-275	2 3/4" - 8 UN	999.85	101.92	66.66	8	150	78
HTN13-300	3" - 8 UN	1203.43	122.67	80.23	8	162	81
HTN14-325	3 1/4" - 8 UN	1413.72	144.11	94.25	10	174	87
HTN15-350	3 1/2" - 8 UN	1605.04	163.61	107.00	10	187	95
HTN16-375	3 3/4" - 8 UN	1704.59	173.76	113.64	10	194	102
HTN17-400	4" - 8 UN	1911.46	194.85	127.43	10	205	110
HTN1-M24	M24 x 2	198.27	20.21	13.22	5	72	55
HTN2-M27	M27 x 3	216.30	22.05	14.42	5	75	55
HTN3-M30	M30 x 3.5	252.94	25.78	16.86	5	82	57
HTN3-M33	M33 x 3.5	252.94	25.78	16.86	5	82	57
HTN4-M36	M36 x 4	305.83	31.18	20.39	5	88	57
HTN5-M39	M39 x 4	344.12	35.08	22.94	6	93	58
HTN6-M42	M42 x 4.5	397.61	40.53	26.51	6	100	62
HTN7-M45	M45 x 4.5	475.01	48.42	31.67	6	106	64
HTN8-M48	M48 x 5	501.40	51.11	33.43	6	110	64
HTN9-M52	M52 x 5	563.72	57.46	37.58	6	117	67
HTN10-M56	M56 x 5.5	746.44	76.09	49.76	8	128	74
HTN11-M60	M60 x 5.5	905.13	92.27	60.34	8	141	77
HTN11-M64	M64 x 6	905.13	92.27	60.34	8	141	77
HTN12-M68	M68 x 6	999.85	101.92	66.66	8	150	78
HTN13-M72	M72 x 6	1203.43	122.67	80.23	8	162	81
HTN13-M76	M76 x 6	1203.43	122.67	80.23	8	162	81
HTN14-M80	M80 x 6	1413.72	144.11	94.25	10	174	87
HTN14-M85	M85 x 6	1413.72	144.11	94.25	10	174	87
HTN15-M90	M90 x 6	1605.04	163.61	107.00	10	187	95
HTN16-M95	M95 x 6	1704.59	173.76	113.64	10	194	102
HTN17-M100	M100 x 6	1911.46	194.85	127.43	10	205	110

PRERARATION

Ensure studs are clean and have sufficient protrusion to fully engage with the tension nut. Note: on some smaller models the stud must not be allowed to

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protrude more than 2-3 threads beyond the top face of the nut as it will interfere with the couplers on the top face of the tensioner.

Ensure that the joint face where the tensioner makes contact is smooth, flat free from rust and other debris.

Screw the tensioner down the stud by hand until the base of the tensioner makes contact with the joint face. **IMPORTANT:** Do not use a bar inserted between the couplers to increase leverage as this may damage the couplers.

Once all the tensioners are in place the hydraulic connections can be made.

HYDRAULIC CONNECTION.

Always use Hi-Force XHC hoses to make the connections.

The connection to the hydraulic pump must always be made to the male coupler on the tensioner.

In most cases there will be more than one tensioner on a joint. In order that all bolts are tensioned equally, all the tensioners can be joined together with link hoses. Connect the female coupler on one tensioner to the male coupler on the next, until all tensioners are connected. This will leave a female coupler un-connected at the end of the chain. This is normal and safe practice. There must never be a male coupler left unconnected anywhere in the circuit.

SETTING OF PUMP PRESSURE

It is strongly recommended that a Hi-Force AHP275BTU pump unit is used to pressurise the HTN tensioners. Refer to the pump literature for detailed instructions. However in general terms, the pump must be pre-set to the calculated tensioning pressure for the flange/bolt combination in question. To do this proceed as follows.

1. Ensure that no hose is connected to the pump.
2. Open the hydraulic release valve fully.
3. Turn the air pressure regulator knob fully anticlockwise to reduce air pressure to zero.
4. Connect pump to the air supply.
5. Open the air shut off valve adjacent to the regulator. The pump should not operate.
6. Increase the air pressure by slowly turning the pressure regulator knob clockwise until the pump starts operating.
7. Close the hydraulic release valve without using undue force.
8. Monitor the oil pressure gauge and increase the air pressure until the pump stalls at the desired oil pressure
9. Slowly open the hydraulic release valve to release pressure, and then close again to check the pressure setting. Adjust if required.
10. Close the air shut off valve and open the hydraulic release valve.

Even though the pump has been set to stall at the desired pressure, it is good practice to monitor the oil pressure during the tensioning procedure.

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OPERATION: TO TENSION A JOINT

Connect the pump to the free end of the tensioner hose to the pump. Turn on the air supply to the pump and the pump should start to operate. Close the hydraulic release valve on the pump and monitor the pressure gauge. Keep a close watch on all of the tensioners to ensure that they do not over stroke.

When the required pressure is reached the pump will stall. Check that pressure is holding in the system by monitoring the pressure gauge. Note that in a system with only a few small tensioners, even the smallest leak will cause the pressure to drop. The pump will stroke occasionally to maintain the pressure.

Tighten the locknuts on all tensioners until they come into contact with the tensioner cylinder. Use a tommy bar in the holes of the locknut for this. The tommy bar can be tapped with a hammer to ensure firm contact.

Release hydraulic pressure and remove all hoses.

If required the couplers may be removed and replaced with ¼" BSP blanking plugs.

OPERATION: TO DE-TENSION A JOINT

Connect all hydraulic hoses as described in HYDRAULIC CONNECTION above.

Operate the pump while checking the locknuts with a tommy bar. As soon as the locknuts come loose, stop the pump.

Unscrew the locknuts by 3-4 turns and release the hydraulic pressure slowly to de-tension the joint.

The hydraulic nuts can then be removed from the studs. If any are still locked in place and the locknuts are tight then it is likely that the locknuts were not unscrewed far enough. Reapply pressure until the locknuts are free and unscrew them another couple of turns. Release the pressure, and remove the remaining tensioners from the studs.

If the tensioners cannot be removed from the stud, ensure the threads above the tensioner are thoroughly clean.