



HTE Series

Multi-Stage Tensioner

Operation Manual

1. Specifications

HTE Regular Models:

Model	MAX Pressure	MAX Load	Stroke	Effective Area	Outside Diameter	Bolt Size	Nut Size
	bar	KN	mm	mm ²	mm		mm
HTE24	1350	307	7	2274	59	M24	36
HTE30	1350	461	7	3417	72	M30	46
HTE33	1350	595	7	4407	79	M33	50
HTE36	1350	680	10	5037	84.5	M36	55
HTE39	1350	800	10	5926	91.5	M39	60
HTE42	1350	922	10	6830	98.5	M42	65
HTE45	1350	4086	10	8047	107	M45	70
HTE48	1350	1296	10	9604	116	M48	75
HTE52	1350	1535	10	11370	126.8	M52	80
HTE56	1350	1660	10	12296	131	M56	85
HTE64	1250	2350	10	18800	147.8	M64	95
HTE72	1150	2598	12	22593	156	M72	105
HTE80	1200	3615	10	30133	183	M80	115

Features:

- Disc Spring Return
- Over Stroke Warning Signs
- Mechanical Torque Wrench Operation Device
- Explosion Protection Design
- Counter Device
- Quick Replaceable Puller and Bridge Design



Tips:

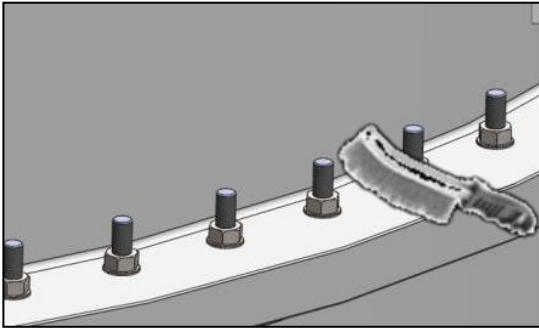
- ✧ The bridge and puller could be different due to different working situations.
- ✧ WREN accept customized designs according to customers working situations.
- ✧ WREN will assist customer to make customized designs.

2. Safety Precautions

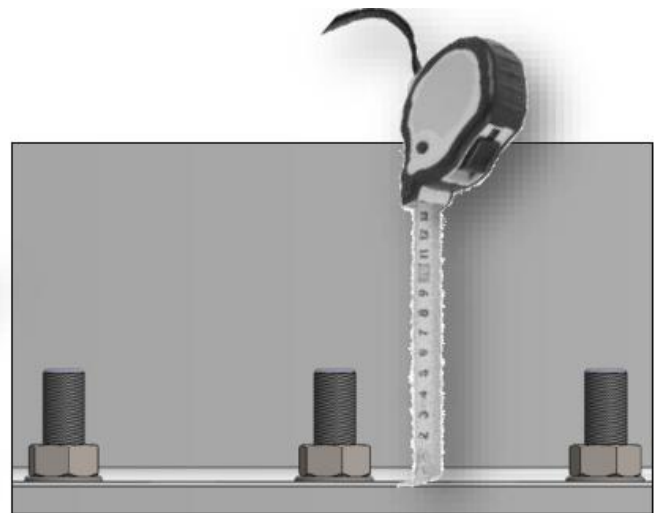
It is dangerous to use high pressure tools, in order to avoid hurting people and damaging tools, please follow the following basic safety recommendations.

1. Before using the hydraulic tensioner, carefully check whether the Tensioner pump, hose, and bolt tensioner are damaged due to improper transportation or storage. If damaged, please dispose it before using.
2. Check the operating data (pre-tightening force, operating pressure) of the bolt tensioner and the bolt (grade, thread length on the nut). The user is responsible for confirming the characteristics, pre-tightening force and connection method of the used bolts.
3. The inner and outer surfaces of the bolt tensioner and the tensioner pump, especially the exposed connection surface of the joint, must be kept clean. They must be cleaned with a special abluent, and then wiped with a clean towel.
4. Inspect whether the oil grade (32 # or 46# anti-wear hydraulic oil) is correct and sufficient. After using, when the oil is insufficient, please fill enough and the correct hydraulic oil.
5. After the work is completed, the pump pressure needs to be reduced to zero.
6. Do not use damaged or unqualified high pressure hose. Do not use kinked hose. The bending radius of the high pressure hose should be $\geq 200\text{mm}$.
7. Check the hydraulic circuit before increasing the pressure. Verify that all circuit components are properly connected and check their status. If any problem components are detected, they must be replaced with new components with the same characteristics.
8. During the tightening process, keep away from pressure releasing point. Avoid getting hurt.
9. During the process of pressure increasing, keep a distance of 3-5 meters from the bolt tensioner. Never stand directly in front of the pre-tightening force. The pressure increasing must be carefully monitored by the operator (observed by the pressure gauge).
10. The stroke of the bolt tensioner cannot exceed its maximum value. When the maximum stroke is reached, the mark can be seen on the piston. If the stroke exceeds its maximum value, the bolt tensioner will lose its tension function.

3. CAUTIONS

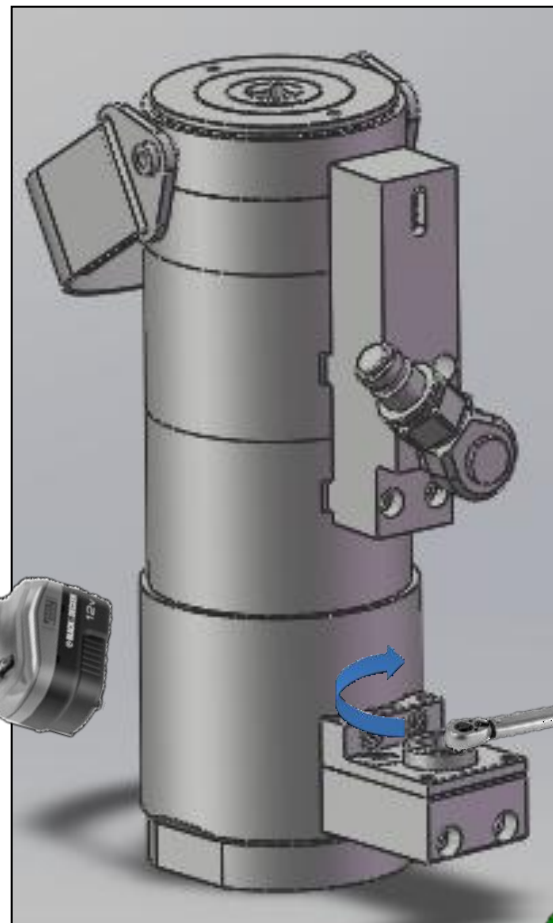
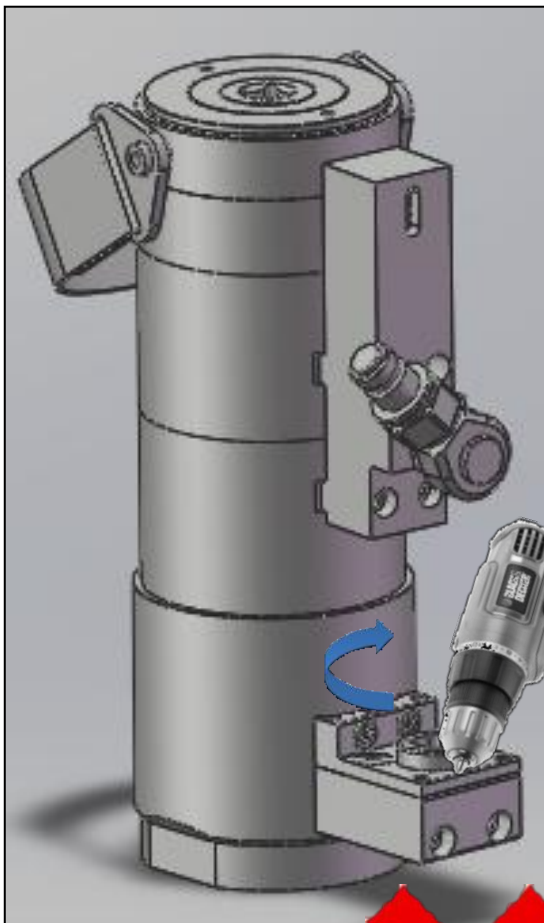


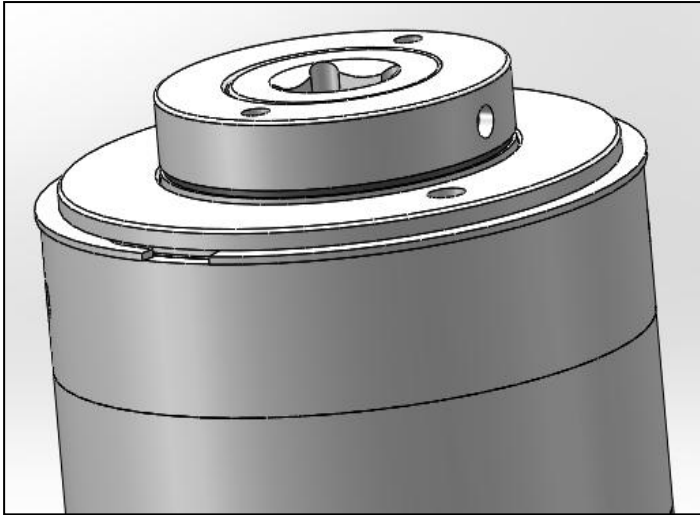
Before operating the tensioner, please clean the surface and thread of the bolt



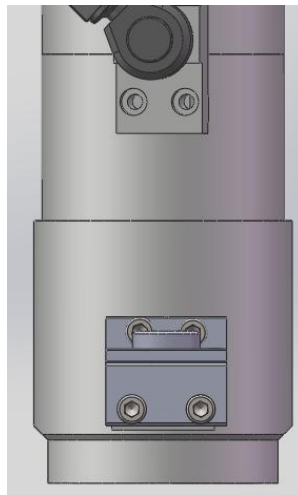
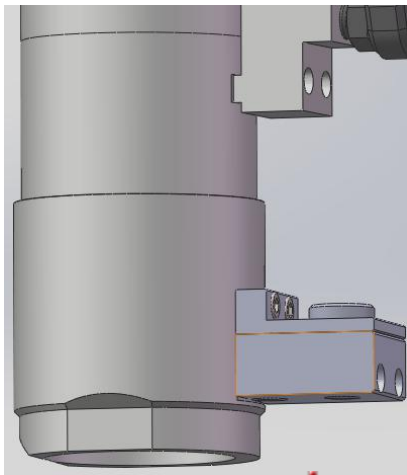
Ensure that there is enough engagement length between the bolt and the tensioner, but it must be less than the maximum allowed by the tensioner.

Do not use a battery-driven wrench to turn the gearbox

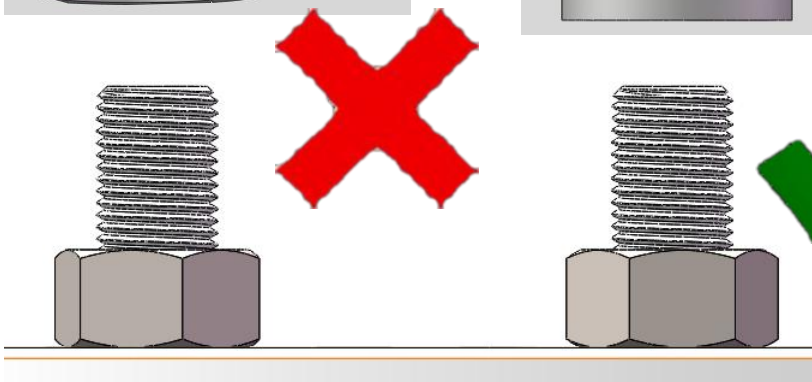




The tensioner stroke cannot exceed its maximum value. Check the common specification table of HTE tensioner for stroke parameters. When the maximum stroke is reached, the warning line can also be seen on the piston. If the maximum pressure is reached on this line, abandon the tension cycle. Tighten the nut, release the pressure, and pressurize again.

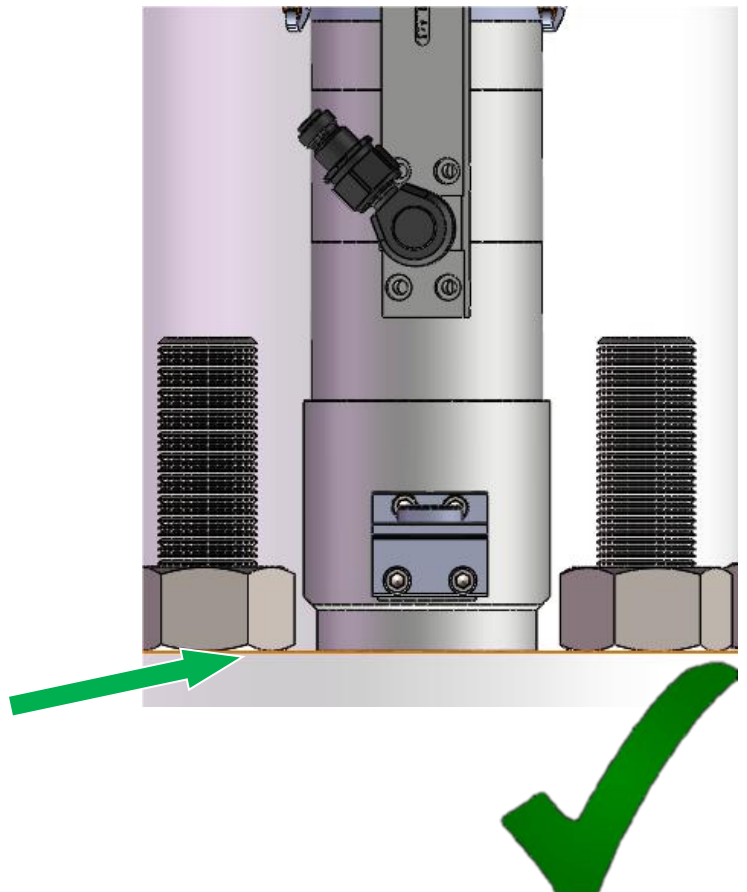
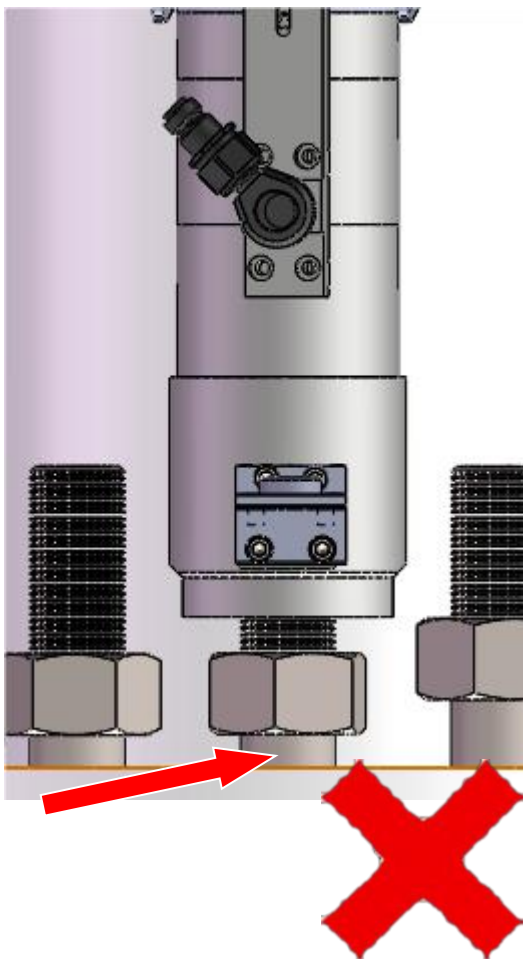


Place the tensioner correctly. Generally, place the rotation device on the front.

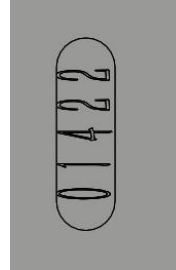
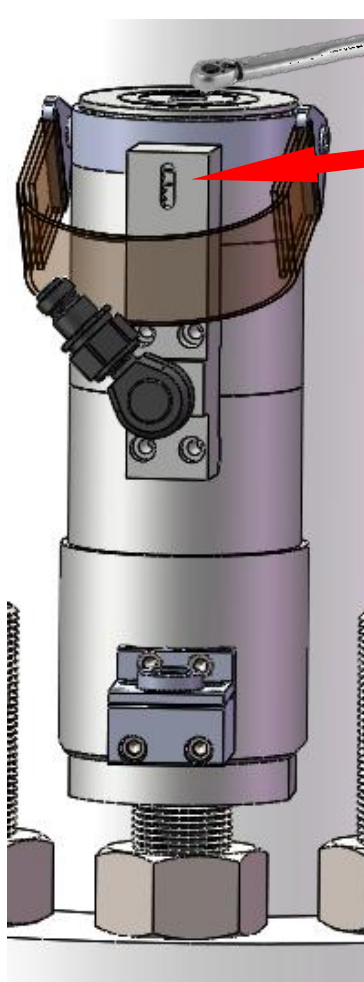


4. Operating Procedure

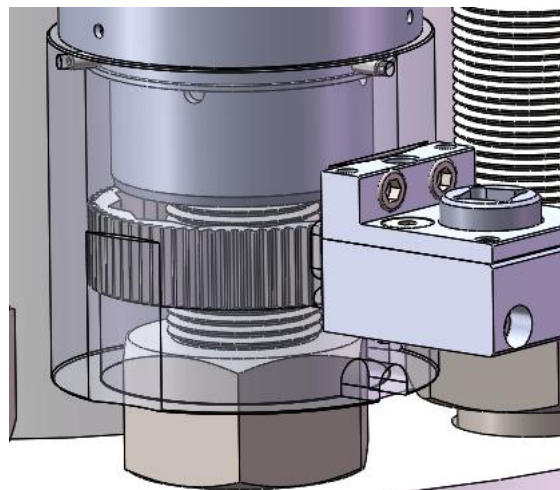
1. Check the load to be applied to the bolt.
2. According to the pressure-load table, find out the pressure required for the corresponding load.
3. Check the effective thread length of the bolt exposed nut to ensure that the height of the bolt is lower than the maximum height allowed by the tensioner under the condition of ensuring the engagement.
4. Tighten the nut onto the flange surface before tension.



5. Screw the tensioner into the bolt with a manual torque wrench. Make sure that the gear sleeve and the nut are properly engaged.

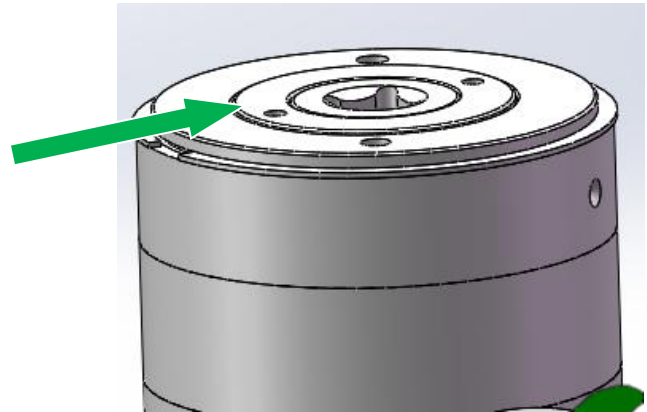
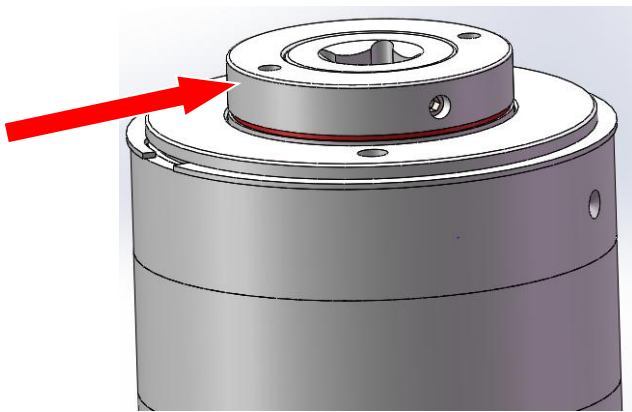


The unique counting design can accurately grasp the tension times of the Bolt Tensioner.



Connect the tensioner pump and the high pressure hose and start operation.

7. Release the pressure of the oil pump after tightening or loosening the nut, the tensioner will return to position automatically, and the hydraulic oil flows back to the oil pump storage tank. When the piston returns to the initial position (that is, the piston is flush with the cylinder), it is ready to work for next stroke.



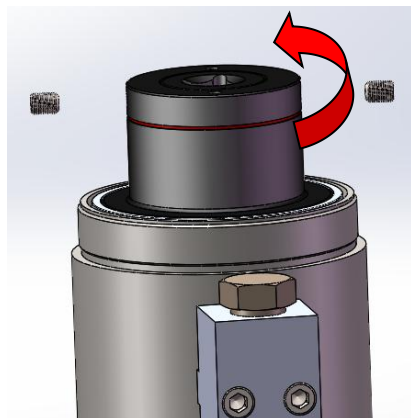
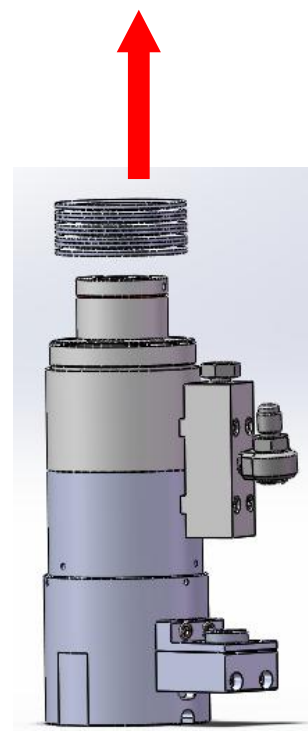
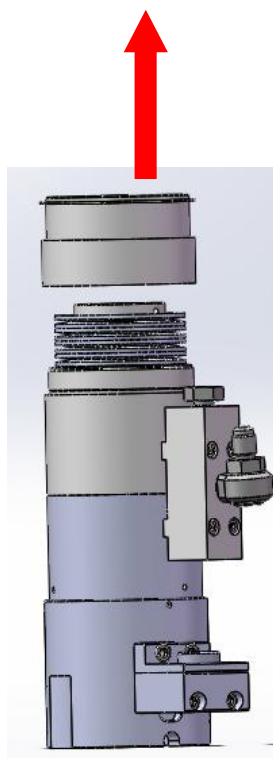
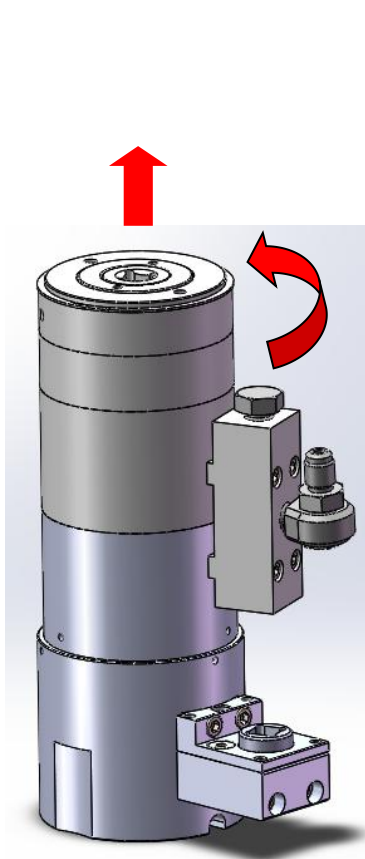
▲ **Warning:** Before removing the tensioner, make the stroke of the tensioner zero for next time to use.

▲ **Note:** Please clear the tensioner after using, ensure the tensioner will not get rusted.

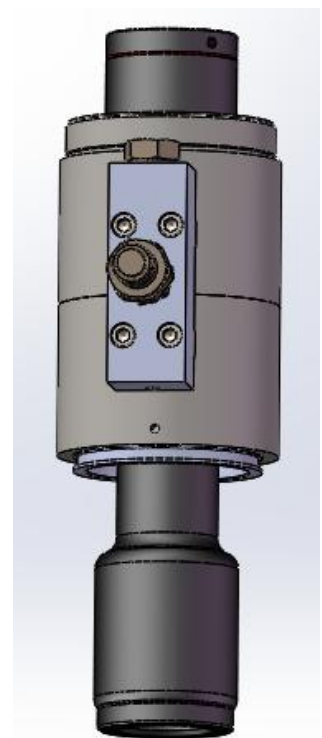
Notice: 1. Please do not disassemble the tensioner without proposal.
2. Do not over-stroked the tensioner.

5. Replace Puller

Remove the topside cap, then remove the disc springs.



Remove the set screw,
then loosen the lock nut.

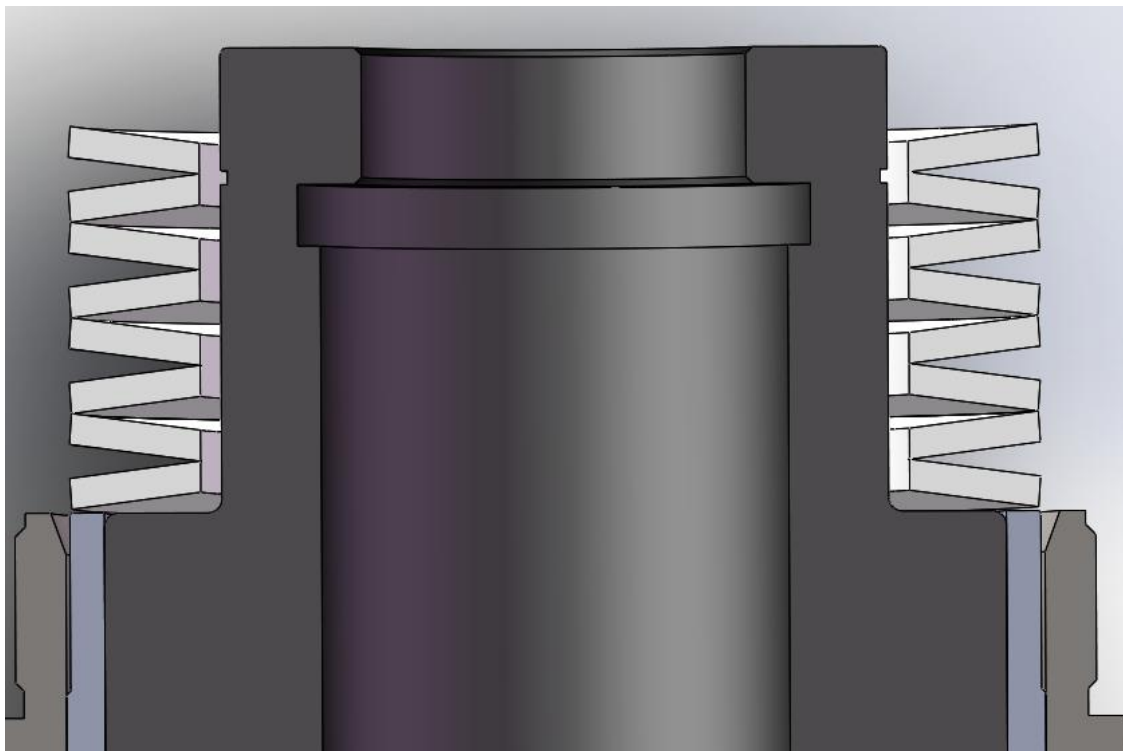
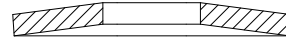


After removing the bridge
and protective sleeve, the
puller can be replaced as
needed.



Pay attention to the direction when assembling the disc spring, as shown in the figure below:

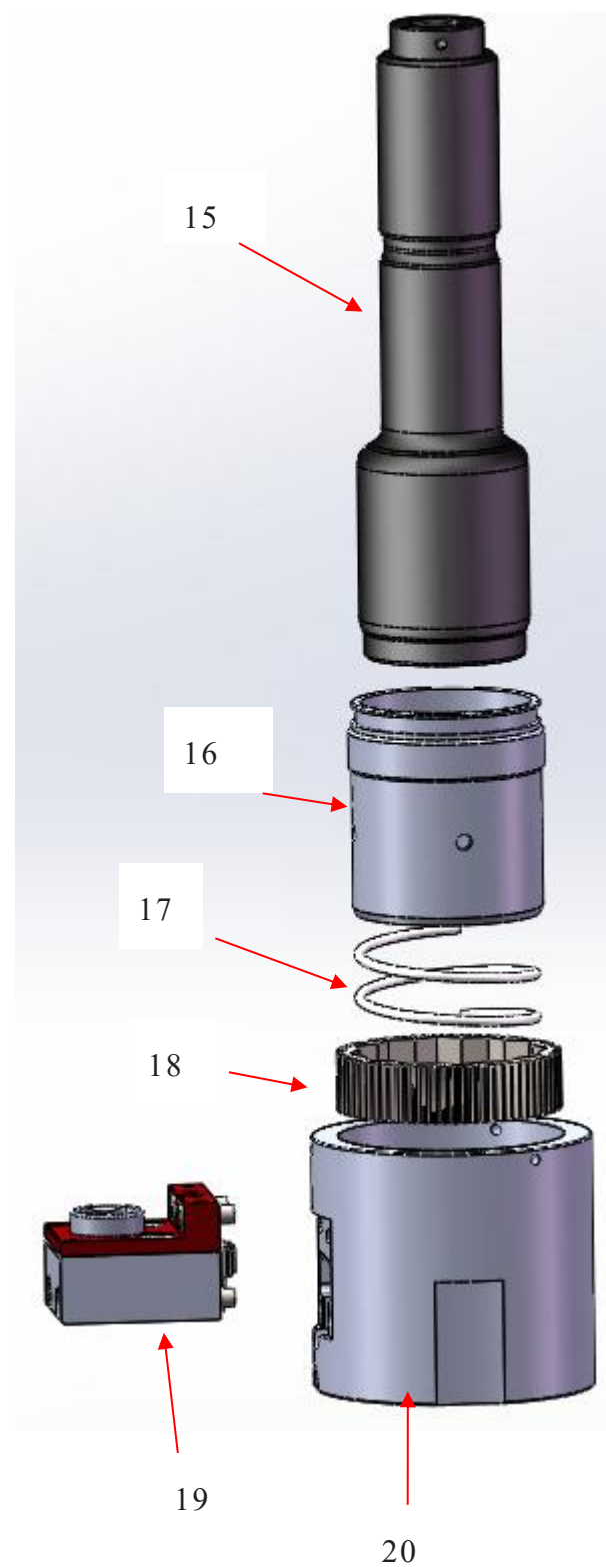
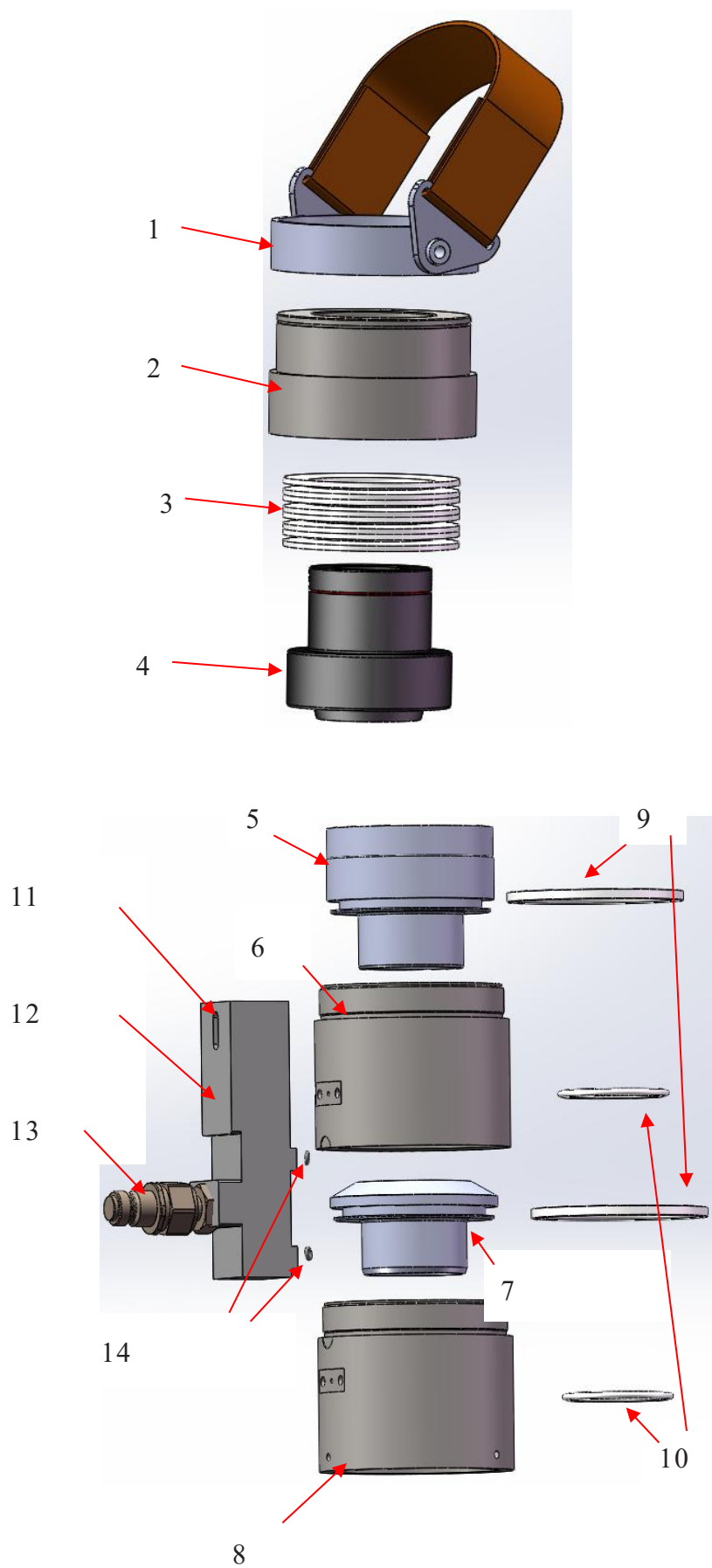
The disc springs need to be placed in opposite directions alternately; please note that the opening of the bottom disc spring faces downwards →



6. Troubleshooting Guide

Trouble	Reason	Solution
Leakage at connecting block and joint	The connection block is damaged or the joint connection is loosen	Re-tighten the connection block correctly, if the leakage continues, replace with a new connection block
Leakage at the connection between the connecting block and the cylinder	The seal is broken or the screw is loosen	Tighten the connecting screws, if the leakage continues, replace the seals
Leakage at the piston	The seals is broken or the mechanical part is damaged	Stop using the tensioner, contact supplier for repair
The piston can not recover	There is pressure inside the cylinder	Reconnect the coupler, release the inner pressure
The puller is not compatible with the bolt	The puller is damaged or does not match the bolt specification	Change the puller
The tensioner can not work	Continue to pressurize after the puller reaches the maximum stroke	Lock the puller through the gear box first, then reset the correct working pressure
	The tensioner reaches the maximum load	Make sure the load is enough for the application, if not, change for the suitable tensioner

7. THE EXPLOSIVE DRAWING



H T E Spare Parts List

[illegible]

8. Pressure-Load Chart

HTE24 Pressure-Load Chart														
Pressure		Load	Pressure		Load	Pressure		Load	Pressure		Load	Pressure		Load
(MPa)	(Bar)	(KN)	(MPa)	(Bar)	(KN)	(MPa)	(Bar)	(KN)	(MPa)	(Bar)	(KN)	(MPa)	(Bar)	(KN)
1	10	2.3	28	280	63.7	55	550	125.1	82	820	186.5	109	1090	247.9
2	20	4.5	29	290	65.9	56	560	127.3	83	830	188.7	110	1100	250.1
3	30	6.8	30	300	68.2	57	570	129.6	84	840	191.0	111	1110	252.4
4	40	9.1	31	310	70.5	58	580	131.9	85	850	193.3	112	1120	254.7
5	50	11.4	32	320	72.8	59	590	134.2	86	860	195.6	113	1130	257.0
6	60	13.6	33	330	75.0	60	600	136.4	87	870	197.8	114	1140	259.2
7	70	15.9	34	340	77.3	61	610	138.7	88	880	200.1	115	1150	261.5
8	80	18.2	35	350	79.6	62	620	141.0	89	890	202.4	116	1160	263.8
9	90	20.5	36	360	81.9	63	630	143.3	90	900	204.7	117	1170	266.1
10	100	22.7	37	370	84.1	64	640	145.5	91	910	206.9	118	1180	268.3
11	110	25.0	38	380	86.4	65	650	147.8	92	920	209.2	119	1190	270.6
12	120	27.3	39	390	88.7	66	660	150.1	93	930	211.5	120	1200	272.9
13	130	29.6	40	400	91.0	67	670	152.4	94	940	213.8	121	1210	275.2
14	140	31.8	41	410	93.2	68	680	154.6	95	950	216.0	122	1220	277.4
15	150	34.1	42	420	95.5	69	690	156.9	96	960	218.3	123	1230	279.7
16	160	36.4	43	430	97.8	70	700	159.2	97	970	220.6	124	1240	282.0
17	170	38.7	44	440	100.1	71	710	161.5	98	980	222.9	125	1250	284.3
18	180	40.9	45	450	102.3	72	720	163.7	99	990	225.1	126	1260	286.5
19	190	43.2	46	460	104.6	73	730	166.0	100	1000	227.4	127	1270	288.8
20	200	45.5	47	470	106.9	74	740	168.3	101	1010	229.7	128	1280	291.1
21	210	47.8	48	480	109.2	75	750	170.6	102	1020	232.0	129	1290	293.4
22	220	50.0	49	490	111.4	76	760	172.8	103	1030	234.2	130	1300	295.6
23	230	52.3	50	500	113.7	77	770	175.1	104	1040	236.5	131	1310	297.9
24	240	54.6	51	510	116.0	78	780	177.4	105	1050	238.8	132	1320	300.2
25	250	56.9	52	520	118.3	79	790	179.7	106	1060	241.1	133	1330	302.5
26	260	59.1	53	530	120.5	80	800	181.9	107	1070	243.3	134	1340	304.7
27	270	61.4	54	540	122.8	81	810	184.2	108	1080	245.6	135	1350	307.0
Calculation formula:		Load (KN) = Working Pressure (Bar)/1350x307 or Load (KN) = Working Pressure (MPa)/135x307												

HTE30D Pressure-Load Chart

Pressure			Load	Pressure			Load	Pressure			Load	Pressure			Load	Pressure			Load	Pressure			Load
(MPa)	(Bar)	(KN)		(MPa)	(Bar)	(KN)		(MPa)	(Bar)	(KN)		(MPa)	(Bar)	(KN)		(MPa)	(Bar)	(KN)		(MPa)	(Bar)	(KN)	
1	10	3.4		28	280	95.6		55	550	187.8		82	820	280.0		109	1090	372.2					
2	20	6.8		29	290	99.0		56	560	191.2		83	830	283.4		110	1100	375.6					
3	30	10.2		30	300	102.4		57	570	194.6		84	840	286.8		111	1110	379.0					
4	40	13.7		31	310	105.9		58	580	198.1		85	850	290.3		112	1120	382.5					
5	50	17.1		32	320	109.3		59	590	201.5		86	860	293.7		113	1130	385.9					
6	60	20.5		33	330	112.7		60	600	204.9		87	870	297.1		114	1140	389.3					
7	70	23.9		34	340	116.1		61	610	208.3		88	880	300.5		115	1150	392.7					
8	80	27.3		35	350	119.5		62	620	211.7		89	890	303.9		116	1160	396.1					
9	90	30.7		36	360	122.9		63	630	215.1		90	900	307.3		117	1170	399.5					
10	100	34.1		37	370	126.3		64	640	218.5		91	910	310.7		118	1180	402.9					
11	110	37.6		38	380	129.8		65	650	222.0		92	920	314.2		119	1190	406.4					
12	120	41.0		39	390	133.2		66	660	225.4		93	930	317.6		120	1200	409.8					
13	130	44.4		40	400	136.6		67	670	228.8		94	940	321.0		121	1210	413.2					
14	140	47.8		41	410	140.0		68	680	232.2		95	950	324.4		122	1220	416.6					
15	150	51.2		42	420	143.4		69	690	235.6		96	960	327.8		123	1230	420.0					
16	160	54.6		43	430	146.8		70	700	239.0		97	970	331.2		124	1240	423.4					
17	170	58.1		44	440	150.3		71	710	242.5		98	980	334.7		125	1250	426.9					
18	180	61.5		45	450	153.7		72	720	245.9		99	990	338.1		126	1260	430.3					
19	190	64.9		46	460	157.1		73	730	249.3		100	1000	341.5		127	1270	433.7					
20	200	68.3		47	470	160.5		74	740	252.7		101	1010	344.9		128	1280	437.1					
21	210	71.7		48	480	163.9		75	750	256.1		102	1020	348.3		129	1290	440.5					
22	220	75.1		49	490	167.3		76	760	259.5		103	1030	351.7		130	1300	443.9					
23	230	78.5		50	500	170.7		77	770	262.9		104	1040	355.1		131	1310	447.3					
24	240	82.0		51	510	174.2		78	780	266.4		105	1050	358.6		132	1320	450.8					
25	250	85.4		52	520	177.6		79	790	269.8		106	1060	362.0		133	1330	454.2					
26	260	88.8		53	530	181.0		80	800	273.2		107	1070	365.4		134	1340	457.6					
27	270	92.2		54	540	184.4		81	810	276.6		108	1080	368.8		135	1350	461.0					

Calculation formula: Load (KN) = Working Pressure (Bar)/1350x461 or Load (KN) = Working Pressure (MPa)/135x461

HTE33C Pressure-Load Chart

Pressure			Load	Pressure			Load	Pressure			Load	Pressure			Load	Pressure			Load
(MPa)	(Bar)	(KN)		(MPa)	(Bar)	(KN)		(MPa)	(Bar)	(KN)		(MPa)	(Bar)	(KN)		(MPa)	(Bar)	(KN)	
1	10	4.4		28	280	123.4		55	550	242.4		82	820	361.4		109	1090	480.4	
2	20	8.8		29	290	127.8		56	560	246.8		83	830	365.8		110	1100	484.8	
3	30	13.2		30	300	132.2		57	570	251.2		84	840	370.2		111	1110	489.2	
4	40	17.6		31	310	136.6		58	580	255.6		85	850	374.6		112	1120	493.6	
5	50	22.0		32	320	141.0		59	590	260.0		86	860	379.0		113	1130	498.0	
6	60	26.4		33	330	145.4		60	600	264.4		87	870	383.4		114	1140	502.4	
7	70	30.9		34	340	149.9		61	610	268.9		88	880	387.9		115	1150	506.9	
8	80	35.3		35	350	154.3		62	620	273.3		89	890	392.3		116	1160	511.3	
9	90	39.7		36	360	158.7		63	630	277.7		90	900	396.7		117	1170	515.7	
10	100	44.1		37	370	163.1		64	640	282.1		91	910	401.1		118	1180	520.1	
11	110	48.5		38	380	167.5		65	650	286.5		92	920	405.5		119	1190	524.5	
12	120	52.9		39	390	171.9		66	660	290.9		93	930	409.9		120	1200	528.9	
13	130	57.3		40	400	176.3		67	670	295.3		94	940	414.3		121	1210	533.3	
14	140	61.7		41	410	180.7		68	680	299.7		95	950	418.7		122	1220	537.7	
15	150	66.1		42	420	185.1		69	690	304.1		96	960	423.1		123	1230	542.1	
16	160	70.5		43	430	189.5		70	700	308.5		97	970	427.5		124	1240	546.5	
17	170	74.9		44	440	193.9		71	710	312.9		98	980	431.9		125	1250	550.9	
18	180	79.3		45	450	198.3		72	720	317.3		99	990	436.3		126	1260	555.3	
19	190	83.7		46	460	202.7		73	730	321.7		100	1000	440.7		127	1270	559.7	
20	200	88.1		47	470	207.1		74	740	326.1		101	1010	445.1		128	1280	564.1	
21	210	92.6		48	480	211.6		75	750	330.6		102	1020	449.6		129	1290	568.6	
22	220	97.0		49	490	216.0		76	760	335.0		103	1030	454.0		130	1300	573.0	
23	230	101.4		50	500	220.4		77	770	339.4		104	1040	458.4		131	1310	577.4	
24	240	105.8		51	510	224.8		78	780	343.8		105	1050	462.8		132	1320	581.8	
25	250	110.2		52	520	229.2		79	790	348.2		106	1060	467.2		133	1330	586.2	
26	260	114.6		53	530	233.6		80	800	352.6		107	1070	471.6		134	1340	590.6	
27	270	119.0		54	540	238.0		81	810	357.0		108	1080	476.0		135	1350	595.0	

Calculation formula: Load (KN) = Working Pressure (Bar)/1350x595 or Load (KN) = Working Pressure (MPa)/135x595

HTE36E Pressure-Load Chart

Pressure			Load	Pressure			Load	Pressure			Load	Pressure			Load	Pressure			Load
(MPa)	(Bar)	(KN)		(MPa)	(Bar)	(KN)		(MPa)	(Bar)	(KN)		(MPa)	(Bar)	(KN)		(MPa)	(Bar)	(KN)	
1	10	5.0		28	280	142.9		55	550	277.0		82	820	413.0		109	1090	549.0	
2	20	10.1		29	290	148.0		56	560	282.1		83	830	418.1		110	1100	554.1	
3	30	15.1		30	300	153.1		57	570	287.1		84	840	423.1		111	1110	559.1	
4	40	20.1		31	310	158.2		58	580	292.1		85	850	428.1		112	1120	564.1	
5	50	25.2		32	320	163.3		59	590	297.2		86	860	433.2		113	1130	569.2	
6	60	30.2		33	330	168.4		60	600	302.2		87	870	438.2		114	1140	574.2	
7	70	35.3		34	340	173.5		61	610	307.3		88	880	443.3		115	1150	579.3	
8	80	40.3		35	350	178.6		62	620	312.3		89	890	448.3		116	1160	584.3	
9	90	45.3		36	360	183.7		63	630	317.3		90	900	453.3		117	1170	589.3	
10	100	50.4		37	370	188.8		64	640	322.4		91	910	458.4		118	1180	594.4	
11	110	55.4		38	380	193.9		65	650	327.4		92	920	463.4		119	1190	599.4	
12	120	60.4		39	390	199.0		66	660	332.4		93	930	468.4		120	1200	604.4	
13	130	65.5		40	400	204.1		67	670	337.5		94	940	473.5		121	1210	609.5	
14	140	70.5		41	410	209.3		68	680	342.5		95	950	478.5		122	1220	614.5	
15	150	75.6		42	420	214.4		69	690	347.6		96	960	483.6		123	1230	619.6	
16	160	80.6		43	430	219.5		70	700	352.6		97	970	488.6		124	1240	624.6	
17	170	85.6		44	440	224.6		71	710	357.6		98	980	493.6		125	1250	629.6	
18	180	90.7		45	450	229.7		72	720	362.7		99	990	498.7		126	1260	634.7	
19	190	95.7		46	460	234.8		73	730	367.7		100	1000	503.7		127	1270	639.7	
20	200	100.7		47	470	239.9		74	740	372.7		101	1010	508.7		128	1280	644.7	
21	210	105.8		48	480	245.0		75	750	377.8		102	1020	513.8		129	1290	649.8	
22	220	110.8		49	490	250.1		76	760	382.8		103	1030	518.8		130	1300	654.8	
23	230	115.9		50	500	255.2		77	770	387.9		104	1040	523.9		131	1310	659.9	
24	240	120.9		51	510	260.3		78	780	392.9		105	1050	528.9		132	1320	664.9	
25	250	125.9		52	520	265.4		79	790	397.9		106	1060	533.9		133	1330	669.9	
26	260	131.0		53	530	270.5		80	800	403.0		107	1070	539.0		134	1340	675.0	
27	270	136.0		54	540	275.6		81	810	408.0		108	1080	544.0		135	1350	680.0	

Calculation formula: Load (KN) = Working Pressure (Bar)/1350x680 or Load (KN) = Working Pressure (MPa)/135x680

HTE39A Pressure-Load Chart

Pressure			Load	Pressure			Load	Pressure			Load	Pressure			Load	Pressure			Load	Pressure			Load
(MPa)	(Bar)	(KN)		(MPa)	(Bar)	(KN)		(MPa)	(Bar)	(KN)		(MPa)	(Bar)	(KN)		(MPa)	(Bar)	(KN)		(MPa)	(Bar)	(KN)	
1	10	5.9		28	280	165.9		55	550	325.9		82	820	485.9		109	1090	645.9					
2	20	11.9		29	290	171.9		56	560	331.9		83	830	491.9		110	1100	651.9					
3	30	17.8		30	300	177.8		57	570	337.8		84	840	497.8		111	1110	657.8					
4	40	23.7		31	310	183.7		58	580	343.7		85	850	503.7		112	1120	663.7					
5	50	29.6		32	320	189.6		59	590	349.6		86	860	509.6		113	1130	669.6					
6	60	35.6		33	330	195.6		60	600	355.6		87	870	515.6		114	1140	675.6					
7	70	41.5		34	340	201.5		61	610	361.5		88	880	521.5		115	1150	681.5					
8	80	47.4		35	350	207.4		62	620	367.4		89	890	527.4		116	1160	687.4					
9	90	53.3		36	360	213.3		63	630	373.3		90	900	533.3		117	1170	693.3					
10	100	59.3		37	370	219.3		64	640	379.3		91	910	539.3		118	1180	699.3					
11	110	65.2		38	380	225.2		65	650	385.2		92	920	545.2		119	1190	705.2					
12	120	71.1		39	390	231.1		66	660	391.1		93	930	551.1		120	1200	711.1					
13	130	77.0		40	400	237.0		67	670	397.0		94	940	557.0		121	1210	717.0					
14	140	83.0		41	410	243.0		68	680	403.0		95	950	563.0		122	1220	723.0					
15	150	88.9		42	420	248.9		69	690	408.9		96	960	568.9		123	1230	728.9					
16	160	94.8		43	430	254.8		70	700	414.8		97	970	574.8		124	1240	734.8					
17	170	100.7		44	440	260.7		71	710	420.7		98	980	580.7		125	1250	740.7					
18	180	106.7		45	450	266.7		72	720	426.7		99	990	586.7		126	1260	746.7					
19	190	112.6		46	460	272.6		73	730	432.6		100	1000	592.6		127	1270	752.6					
20	200	118.5		47	470	278.5		74	740	438.5		101	1010	598.5		128	1280	758.5					
21	210	124.4		48	480	284.4		75	750	444.4		102	1020	604.4		129	1290	764.4					
22	220	130.4		49	490	290.4		76	760	450.4		103	1030	610.4		130	1300	770.4					
23	230	136.3		50	500	296.3		77	770	456.3		104	1040	616.3		131	1310	776.3					
24	240	142.2		51	510	302.2		78	780	462.2		105	1050	622.2		132	1320	782.2					
25	250	148.1		52	520	308.1		79	790	468.1		106	1060	628.1		133	1330	788.1					
26	260	154.1		53	530	314.1		80	800	474.1		107	1070	634.1		134	1340	794.1					
27	270	160.0		54	540	320.0		81	810	480.0		108	1080	640.0		135	1350	800.0					

Calculation formula: Load (KN) = Working Pressure (Bar)/1350x800 or Load (KN) = Working Pressure (MPa)/135x800

HTE42D Pressure-Load Chart

Pressure			Load	Pressure			Load	Pressure			Load	Pressure			Load	Pressure			Load
(MPa)	(Bar)	(KN)		(MPa)	(Bar)	(KN)		(MPa)	(Bar)	(KN)		(MPa)	(Bar)	(KN)		(MPa)	(Bar)	(KN)	
1	10	6.8		28	280	191.2		55	550	375.6		82	820	560.0		109	1090	744.4	
2	20	13.7		29	290	198.1		56	560	382.5		83	830	566.9		110	1100	751.3	
3	30	20.5		30	300	204.9		57	570	389.3		84	840	573.7		111	1110	758.1	
4	40	27.3		31	310	211.7		58	580	396.1		85	850	580.5		112	1120	764.9	
5	50	34.1		32	320	218.5		59	590	402.9		86	860	587.3		113	1130	771.7	
6	60	41.0		33	330	225.4		60	600	409.8		87	870	594.2		114	1140	778.6	
7	70	47.8		34	340	232.2		61	610	416.6		88	880	601.0		115	1150	785.4	
8	80	54.6		35	350	239.0		62	620	423.4		89	890	607.8		116	1160	792.2	
9	90	61.5		36	360	245.9		63	630	430.3		90	900	614.7		117	1170	799.1	
10	100	68.3		37	370	252.7		64	640	437.1		91	910	621.5		118	1180	805.9	
11	110	75.1		38	380	259.5		65	650	443.9		92	920	628.3		119	1190	812.7	
12	120	82.0		39	390	266.4		66	660	450.8		93	930	635.2		120	1200	819.6	
13	130	88.8		40	400	273.2		67	670	457.6		94	940	642.0		121	1210	826.4	
14	140	95.6		41	410	280.0		68	680	464.4		95	950	648.8		122	1220	833.2	
15	150	102.4		42	420	286.8		69	690	471.2		96	960	655.6		123	1230	840.0	
16	160	109.3		43	430	293.7		70	700	478.1		97	970	662.5		124	1240	846.9	
17	170	116.1		44	440	300.5		71	710	484.9		98	980	669.3		125	1250	853.7	
18	180	122.9		45	450	307.3		72	720	491.7		99	990	676.1		126	1260	860.5	
19	190	129.8		46	460	314.2		73	730	498.6		100	1000	683.0		127	1270	867.4	
20	200	136.6		47	470	321.0		74	740	505.4		101	1010	689.8		128	1280	874.2	
21	210	143.4		48	480	327.8		75	750	512.2		102	1020	696.6		129	1290	881.0	
22	220	150.3		49	490	334.7		76	760	519.1		103	1030	703.5		130	1300	887.9	
23	230	157.1		50	500	341.5		77	770	525.9		104	1040	710.3		131	1310	894.7	
24	240	163.9		51	510	348.3		78	780	532.7		105	1050	717.1		132	1320	901.5	
25	250	170.7		52	520	355.1		79	790	539.5		106	1060	723.9		133	1330	908.3	
26	260	177.6		53	530	362.0		80	800	546.4		107	1070	730.8		134	1340	915.2	
27	270	184.4		54	540	368.8		81	810	553.2		108	1080	737.6		135	1350	922.0	

Calculation formula: Load (KN) = Working Pressure (Bar)/1350x922 or Load (KN) = Working Pressure (MPa)/135x922

HTE45 Pressure-Load Chart

Pressure			Load	Pressure			Load	Pressure			Load	Pressure			Load	Pressure			Load
(MPa)	(Bar)	(KN)		(MPa)	(Bar)	(KN)		(MPa)	(Bar)	(KN)		(MPa)	(Bar)	(KN)		(MPa)	(Bar)	(KN)	
1	10	8.0		28	280	225.2		55	550	442.4		82	820	659.6		109	1090	876.8	
2	20	16.1		29	290	233.3		56	560	450.5		83	830	667.7		110	1100	884.9	
3	30	24.1		30	300	241.3		57	570	458.5		84	840	675.7		111	1110	892.9	
4	40	32.2		31	310	249.4		58	580	466.6		85	850	683.8		112	1120	901.0	
5	50	40.2		32	320	257.4		59	590	474.6		86	860	691.8		113	1130	909.0	
6	60	48.3		33	330	265.5		60	600	482.7		87	870	699.9		114	1140	917.1	
7	70	56.3		34	340	273.5		61	610	490.7		88	880	707.9		115	1150	925.1	
8	80	64.4		35	350	281.6		62	620	498.8		89	890	716.0		116	1160	933.2	
9	90	72.4		36	360	289.6		63	630	506.8		90	900	724.0		117	1170	941.2	
10	100	80.4		37	370	297.6		64	640	514.8		91	910	732.0		118	1180	949.2	
11	110	88.5		38	380	305.7		65	650	522.9		92	920	740.1		119	1190	957.3	
12	120	96.5		39	390	313.7		66	660	530.9		93	930	748.1		120	1200	965.3	
13	130	104.6		40	400	321.8		67	670	539.0		94	940	756.2		121	1210	973.4	
14	140	112.6		41	410	329.8		68	680	547.0		95	950	764.2		122	1220	981.4	
15	150	120.7		42	420	337.9		69	690	555.1		96	960	772.3		123	1230	989.5	
16	160	128.7		43	430	345.9		70	700	563.1		97	970	780.3		124	1240	997.5	
17	170	136.8		44	440	354.0		71	710	571.2		98	980	788.4		125	1250	1005.6	
18	180	144.8		45	450	362.0		72	720	579.2		99	990	796.4		126	1260	1013.6	
19	190	152.8		46	460	370.0		73	730	587.2		100	1000	804.4		127	1270	1021.6	
20	200	160.9		47	470	378.1		74	740	595.3		101	1010	812.5		128	1280	1029.7	
21	210	168.9		48	480	386.1		75	750	603.3		102	1020	820.5		129	1290	1037.7	
22	220	177.0		49	490	394.2		76	760	611.4		103	1030	828.6		130	1300	1045.8	
23	230	185.0		50	500	402.2		77	770	619.4		104	1040	836.6		131	1310	1053.8	
24	240	193.1		51	510	410.3		78	780	627.5		105	1050	844.7		132	1320	1061.9	
25	250	201.1		52	520	418.3		79	790	635.5		106	1060	852.7		133	1330	1069.9	
26	260	209.2		53	530	426.4		80	800	643.6		107	1070	860.8		134	1340	1078.0	
27	270	217.2		54	540	434.4		81	810	651.6		108	1080	868.8		135	1350	1086.0	

Calculation formula: Load (KN) = Working Pressure (Bar)/1350x1086 or Load (KN) = Working Pressure (MPa)/135x1086

HTE48B Pressure-Load Chart

Pressure			Load	Pressure			Load	Pressure			Load	Pressure			Load
(MPa)	(Bar)	(KN)		(MPa)	(Bar)	(KN)		(MPa)	(Bar)	(KN)		(MPa)	(Bar)	(KN)	
1	10	9.6		28	280	268.8		55	550	528.0		82	820	787.2	
2	20	19.2		29	290	278.4		56	560	537.6		83	830	796.8	
3	30	28.8		30	300	288.0		57	570	547.2		84	840	806.4	
4	40	38.4		31	310	297.6		58	580	556.8		85	850	816.0	
5	50	48.0		32	320	307.2		59	590	566.4		86	860	825.6	
6	60	57.6		33	330	316.8		60	600	576.0		87	870	835.2	
7	70	67.2		34	340	326.4		61	610	585.6		88	880	844.8	
8	80	76.8		35	350	336.0		62	620	595.2		89	890	854.4	
9	90	86.4		36	360	345.6		63	630	604.8		90	900	864.0	
10	100	96.0		37	370	355.2		64	640	614.4		91	910	873.6	
11	110	105.6		38	380	364.8		65	650	624.0		92	920	883.2	
12	120	115.2		39	390	374.4		66	660	633.6		93	930	892.8	
13	130	124.8		40	400	384.0		67	670	643.2		94	940	902.4	
14	140	134.4		41	410	393.6		68	680	652.8		95	950	912.0	
15	150	144.0		42	420	403.2		69	690	662.4		96	960	921.6	
16	160	153.6		43	430	412.8		70	700	672.0		97	970	931.2	
17	170	163.2		44	440	422.4		71	710	681.6		98	980	940.8	
18	180	172.8		45	450	432.0		72	720	691.2		99	990	950.4	
19	190	182.4		46	460	441.6		73	730	700.8		100	1000	960.0	
20	200	192.0		47	470	451.2		74	740	710.4		101	1010	969.6	
21	210	201.6		48	480	460.8		75	750	720.0		102	1020	979.2	
22	220	211.2		49	490	470.4		76	760	729.6		103	1030	988.8	
23	230	220.8		50	500	480.0		77	770	739.2		104	1040	998.4	
24	240	230.4		51	510	489.6		78	780	748.8		105	1050	1008.0	
25	250	240.0		52	520	499.2		79	790	758.4		106	1060	1017.6	
26	260	249.6		53	530	508.8		80	800	768.0		107	1070	1027.2	
27	270	259.2		54	540	518.4		81	810	777.6		108	1080	1036.8	

Calculation formula: Load (KN) = Working Pressure (Bar)/1350x1296 or Load (KN) = Working Pressure (MPa)/135x1296

HTE56 Pressure-Load Chart

Pressure		Load	Pressure		Load	Pressure		Load	Pressure		Load	Pressure		Load
(MPa)	(Bar)	(KN)	(MPa)	(Bar)	(KN)	(MPa)	(Bar)	(KN)	(MPa)	(Bar)	(KN)	(MPa)	(Bar)	(KN)
1	10	12.3	28	280	344.3	55	550	676.3	82	820	787.2	109	1090	1340.3
2	20	24.6	29	290	356.6	56	560	688.6	83	830	796.8	110	1100	1352.6
3	30	36.9	30	300	368.9	57	570	700.9	84	840	806.4	111	1110	1364.9
4	40	49.2	31	310	381.2	58	580	713.2	85	850	816.0	112	1120	1377.2
5	50	61.5	32	320	393.5	59	590	725.5	86	860	825.6	113	1130	1389.5
6	60	73.8	33	330	405.8	60	600	737.8	87	870	835.2	114	1140	1401.8
7	70	86.1	34	340	418.1	61	610	750.1	88	880	844.8	115	1150	1414.1
8	80	98.4	35	350	430.4	62	620	762.4	89	890	854.4	116	1160	1426.4
9	90	110.7	36	360	442.7	63	630	774.7	90	900	864.0	117	1170	1438.7
10	100	123.0	37	370	455.0	64	640	787.0	91	910	873.6	118	1180	1451.0
11	110	135.3	38	380	467.3	65	650	799.3	92	920	883.2	119	1190	1463.3
12	120	147.6	39	390	479.6	66	660	811.6	93	930	892.8	120	1200	1475.6
13	130	159.9	40	400	491.9	67	670	823.9	94	940	902.4	121	1210	1487.9
14	140	172.1	41	410	504.1	68	680	836.1	95	950	912.0	122	1220	1500.1
15	150	184.4	42	420	516.4	69	690	848.4	96	960	921.6	123	1230	1512.4
16	160	196.7	43	430	528.7	70	700	860.7	97	970	931.2	124	1240	1524.7
17	170	209.0	44	440	541.0	71	710	873.0	98	980	940.8	125	1250	1537.0
18	180	221.3	45	450	553.3	72	720	885.3	99	990	950.4	126	1260	1549.3
19	190	233.6	46	460	565.6	73	730	897.6	100	1000	960.0	127	1270	1561.6
20	200	245.9	47	470	577.9	74	740	909.9	101	1010	969.6	128	1280	1573.9
21	210	258.2	48	480	590.2	75	750	922.2	102	1020	979.2	129	1290	1586.2
22	220	270.5	49	490	602.5	76	760	934.5	103	1030	988.8	130	1300	1598.5
23	230	282.8	50	500	614.8	77	770	946.8	104	1040	998.4	131	1310	1610.8
24	240	295.1	51	510	627.1	78	780	959.1	105	1050	1008.0	132	1320	1623.1
25	250	307.4	52	520	639.4	79	790	971.4	106	1060	1017.6	133	1330	1635.4
26	260	319.7	53	530	651.7	80	800	983.7	107	1070	1027.2	134	1340	1647.7
27	270	332.0	54	540	664.0	81	810	996.0	108	1080	1036.8	135	1350	1660.0

Calculation formula: Load (KN) = Working Pressure (Bar)/1350x1660 or Load (KN) = Working Pressure (MPa)/135x1660

HTE64C Pressure-Load Chart

Pressure			Load	Pressure			Load	Pressure			Load	Pressure			Load
(MPa)	(Bar)	(KN)		(MPa)	(Bar)	(KN)		(MPa)	(Bar)	(KN)		(MPa)	(Bar)	(KN)	
1	10	18.8		26	260	488.8		51	510	958.8		76	760	1428.8	1898.8
2	20	37.6		27	270	507.6		52	520	977.6		77	770	1447.6	1917.6
3	30	56.4		28	280	526.4		53	530	996.4		78	780	1466.4	1936.4
4	40	75.2		29	290	545.2		54	540	1015.2		79	790	1485.2	1955.2
5	50	94.0		30	300	564.0		55	550	1034.0		80	800	1504.0	1974.0
6	60	112.8		31	310	582.8		56	560	1052.8		81	810	1522.8	1992.8
7	70	131.6		32	320	601.6		57	570	1071.6		82	820	1541.6	2011.6
8	80	150.4		33	330	620.4		58	580	1090.4		83	830	1560.4	2030.4
9	90	169.2		34	340	639.2		59	590	1109.2		84	840	1579.2	2049.2
10	100	188.0		35	350	658.0		60	600	1128.0		85	850	1598.0	2068.0
11	110	206.8		36	360	676.8		61	610	1146.8		86	860	1616.8	2086.8
12	120	225.6		37	370	695.6		62	620	1165.6		87	870	1635.6	2105.6
13	130	244.4		38	380	714.4		63	630	1184.4		88	880	1654.4	2124.4
14	140	263.2		39	390	733.2		64	640	1203.2		89	890	1673.2	2143.2
15	150	282.0		40	400	752.0		65	650	1222.0		90	900	1692.0	2162.0
16	160	300.8		41	410	770.8		66	660	1240.8		91	910	1710.8	2180.8
17	170	319.6		42	420	789.6		67	670	1259.6		92	920	1729.6	2199.6
18	180	338.4		43	430	808.4		68	680	1278.4		93	930	1748.4	2218.4
19	190	357.2		44	440	827.2		69	690	1297.2		94	940	1767.2	2237.2
20	200	376.0		45	450	846.0		70	700	1316.0		95	950	1786.0	2256.0
21	210	394.8		46	460	864.8		71	710	1334.8		96	960	1804.8	2274.8
22	220	413.6		47	470	883.6		72	720	1353.6		97	970	1823.6	2293.6
23	230	432.4		48	480	902.4		73	730	1372.4		98	980	1842.4	2312.4
24	240	451.2		49	490	921.2		74	740	1391.2		99	990	1861.2	2331.2
25	250	470.0		50	500	940.0		75	750	1410.0		100	1000	1880.0	2350.0

Calculation formula: Load (KN) = Working Pressure (Bar)/1350x2350 or Load (KN) = Working Pressure (MPa)/135x2350