HLD3

Hydraulic Bolt Tensioner

User Manual

Pingyuan Jingke Hydraulic Co., Ltd.

Catalogue

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I. Introduction

HLD3 single-stage hydraulic bolt tensioner is an ultra-high pressure pre-tightening tool designed and produced by our company. It can precisely control the pre-tightening force of bolt connections. It is an ideal tool to improve bolt connection quality and labor efficiency. This series of bolt tensioners have an over-stroke protection function to avoid seal damage and ensure the safety of the operator. The tool improves work efficiency, reduces labor intensity. It has high working pressure, and under the same stretching force, the tool is small in size and light in weight. It is widely used in metallurgy, machinery, chemical industry, power stations, shipbuilding, cement, coal, pressure vessels and other machinery and equipment. Assembly, installation and maintenance.

The maximum working pressure of HLD3 series single-stage bolt tensioner is 150MPa. The pre-tightening force is displayed by the pressure gauge of the hydraulic pump station, and the nut can be pre-tightened or removed. The tensioner and the hydraulic pump station are connected by high-pressure hoses and quick connectors, which are easy to operate and use. The same hydraulic tensioner can be equipped with tie rods of different specifications to apply different specifications of bolts, so as to reduce the number of tensioners as much as possible, thereby reducing costs.

II. Technical Parameters（Table 1）

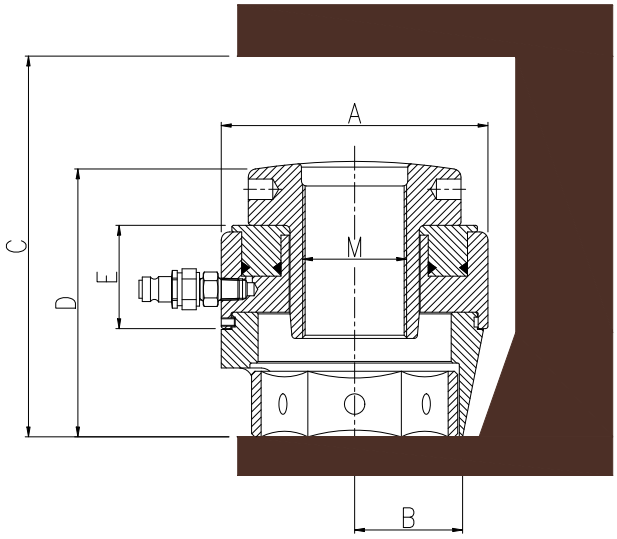
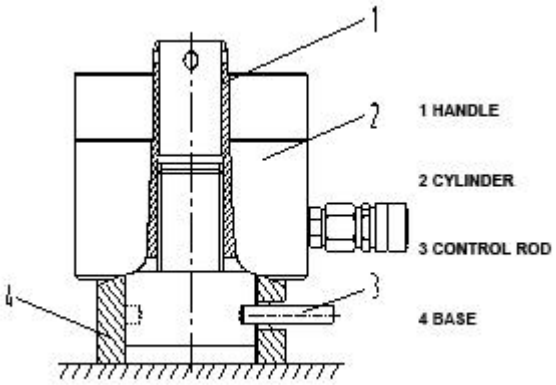


Table 1

Parameters / Model	Thread specification	A	B	C	D	E	Piston area (mm^2)	Stroke (mm)	Cylinder pressure (MPa)	Stretching force (KN)
HLD3	M48	133	48	205	146	58	5357	10	150	803

III. Operation method and steps

1、Place



(1) As shown in the figure on the right, put the base on the nut, check whether the base is placed upright and stable, the supporting surface must be perpendicular to the bolt axis, and the base axis should be coaxial with the bolt axis;

(2) Place the oil cylinder on the base and place it stably;

(3) Screw the tie rod on the thread of the protruding bolt, screw it down as far as possible, and fit the piston.

2. Connection and pre-tightening force setting

(1) Pre-tightening force setting

According to the design requirements, before connecting the hydraulic bolt tensioner, calculate the pressure required by the hydraulic pump station. The calculation of the pressure value is:

$$P = (10 \times F)/S \quad MPa$$

P--set pressure of hydraulic pump station MPa

F— required pre-tightening force KN

S--The piston area of the bolt tensioner (see Table 1) cm^2

When the high pressure hose is not connected, adjust the handle of the high pressure relief valve of the hydraulic pump station, and set the pressure of the hydraulic pump station according to the calculated value.

The setting steps are as follows:

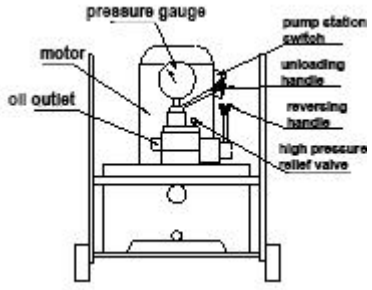


Figure 1

(1) As shown in Figure 1, first put the reversing handle at the O position, and then turn the unloading handle to the unloading position (counterclockwise).

(2) Turn on the pump station switch to start the hydraulic pump station.

(3) First lock the handle of the unloading valve (clockwise), and then turn the handle of the reversing valve to the upper pressure position (position A), and observe the pointer of the pressure gauge at the same time. When the pointer points to the required pressure, immediately pot the reversing handle in the O position (i.e. hold pressure).

(4) After setting the pressure, turn the unloading handle to the unloading position (counterclockwise), and place the reversing handle at the O position.

(2) Connection

As shown in Figure 2, after setting the pressure of the hydraulic pump station, connect the hydraulic

bolt tensioner. The bolt tensioner and the hydraulic pump station are connected by a high-pressure hose, and one hydraulic pump station can drive multiple bolt tensioners.

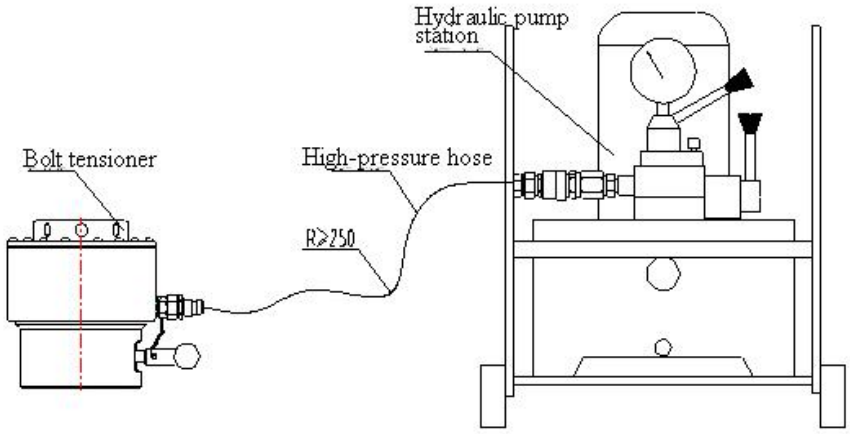


Figure 2

3、Stretch

(1) Start the pump station, lock the unloading handle (clockwise), and turn the reversing handle to position A, then the pump station starts to press up, and each hydraulic bolt tensioner stretches the screw with the same tension (At the beginning, the tighter screw may not move). Observe the lift of the stretcher. As long as there is a stretcher stroke in place, the pressure can be maintained. (Please refer to the corresponding pump station manual for detailed operation steps)

(2) Tighten the nut. As the bolts are stretched by stretching, a gap is created between the nuts that are jointed before stretching. Use the control rod to rotate the nuts so that each nut that is stretched at the same time is jointed with the supporting surface again.

(3) To relieve the pressure, turn the unloading handle to the unloading position (counterclockwise), and the piston is reset by the disc spring.

(4) If you need to stretch the same bolt multiple times, you can repeat steps (1), (2), (3) until the pre-tightening is completed.

Warning: It is strictly forbidden to work over pressure and over stroke (H≤10mm). The screw length of the tie rod and the bolt must be greater than 70% of the bolt diameter.

4、Remove the bolt tensioner

When the pressure is released, the bolt tensioner can be removed.

IV、 Precautions

1. When stretching, the lift of the stretcher must be less than the stroke of the stretcher, otherwise it will affect the use of the stretcher, get a false stretch force value, or even damage the stretcher.

2. The screwing length of the thread is required to be greater than the bolt diameter.

3. When pre-tightening and disassembling nuts, the working pressure of the system must not exceed 150MPa.

4. The high-pressure hose should be in a free state and must not be bent into a circle with a diameter less than 500mm.

5. Before the oil cylinder is connected (under load), that is, when it is sealed by the quick connector (pressure is generated), the oil pump cannot be pressurized, otherwise the valve core of the quick connector will be damaged or even people get injured.

V、 Maintenance

1. All parts of the tensioner should always be kept clean, and there should be no dust and dirt around the oil pump, oil cylinder, and hose.

2. The working fluid is L-HM32 or L-HM46 hydraulic oil. It is strictly prohibited to use alcohol, water, glycerin, brake fluid, ordinary engine oil, etc. as working fluid.

3. The working fluid should be replaced once a year, and it must be filtered and cleaned with a 120-200 mesh filter.

4. When not in use, it should be stored in a dry and suitable temperature room.

5. The high-pressure hoses should be properly kept and not corroded by corrosive gases and liquids. The hose is prone to ageing due to long-term use and storage, so it should be checked and replaced regularly. The hose shall be subjected to a pressure test once a year.

6. When replacing the cylinder seal, the seal must be put into the seal groove, otherwise the pressure cannot be built up.

VI、Bolt pre-tightening force (for reference)

1. Table 2 does not apply to fine pitch bolts;

2. The conditions for using Table 2 are:

   1) The thread complies with GB/T196-1981;

   2) When pre-tightening, lubricate the bearing surface of the thread, bolt head and nut.

3. For fasteners with soft material, in order to avoid excessive loss of pre-tightening force, special washers for high-strength bolts should be installed under the bolt heads or nuts.

Table 2:

Strength level		4.8	6.8	8.8	10.9	12.9
Min. breaking strength		400 MPa	600 MPa	800 MPa	1000 MPa	1200 MPa
Material		General structural steel	Steel for mechanical structure	Chrome Molybdenum Alloy Steel	Nickel-chromium-molybdenum alloy steel	Nickel-chromium-molybdenum alloy steel
Bolt	Opposite side	KN	KN	KN	KN	KN
M27	41	88	132	176	248	298
M30	46	108	161	215	303	363
M33	50	133	200	266	375	449
M36	55	157	235	314	441	529
M39	60	187	281	375	527	632
M42	65	215	323	430	605	726
M45	70	251	376	502	705	846
M48	75	283	424	566	796	955
M52	80	338	506	675	949	1139
M56	85	390	585	780	1096	1315
M60	90	454	680	907	1275	1531
M64	95	514	771	1028	1445	1734
M68	100	587	880	1173	1650	1980
M72	105	664	996	1329	1868	2242
M76	110	747	1120	1494	2100	2520
M80	115	834	1251	1668	2346	2815
M85	120	950	1425	1900	2672	3206
M90	130	1073	1610	2147	3019	3623
M100	145	1343	2014	2686	3777	4533
M110	155	1643	2464	3285	4620	5544
M120	175	1973	2959	3945	5548	6657
M125	180	2149	3223	4298	6043	7252

Note: The value in the table is measured when the bolt reaches 60% of the yield limit. The recommended bolt pre-tightening force is: the data in the table×(70～80)%.

For example: M48, 8.8 grade bolt, the bolt pre-tightening force is:

566×(70～80)% = 396～453 KN.

VII、Comparison table of Pressure and stretching force

Pressure (MPa)	Stretching Force (KN)	Pressure (MPa)	Stretching Force (KN)
20	107.2	86	460.8
22	117.9	88	471.5
24	128.6	90	482.2
26	139.3	92	492.9
28	150.0	94	503.6
30	160.7	96	514.3
32	171.4	98	525.0
34	182.2	100	535.8
36	192.9	102	546.5
38	203.6	104	557.2
40	214.3	106	567.9
42	225.0	108	578.6
44	235.7	110	589.3
46	246.5	112	600.1
48	257.2	114	610.8
50	267.9	116	621.5
52	278.6	118	632.2
54	289.3	120	642.9
56	300.0	122	653.6
58	310.7	124	664.3
60	321.5	126	675.1
62	332.2	128	685.8
64	342.9	130	696.5
66	353.6	132	707.2
68	364.3	134	717.9
70	375.0	136	728.6
72	385.7	138	739.4
74	396.5	140	750.1
76	407.2	142	760.8
78	417.9	144	771.5
80	428.6	146	782.2
82	439.3	148	792.9
84	450.0	150	803.6