



**Hydraulic wrench for plate heat exchangers
(Used for hydraulic tightening and tensioning)**

**User manual
Model: LT series**

Product Series List

Item model			
Motive Form	Electric-driven	Electric-driven	Manual Operation
Power			
Single Cylinder Rated Tonnage			
Effective Stroke			
Number of Cylinders (units)			
Operating Mode	Independent/Linked/Bi-Directional	Independent/Linked/Uni-Directional	Linked
Dead Weight (Kg)			
Carrying Type	Wheeled	Wheeled	Portable
Features & Applications	Hydraulic cylinder has an electric reset feature, eliminating the need for manual intervention. It represents the forefront of plate exchange hydraulic wrench technology.	Its parameters offer extensive options, catering to various plate exchanger manufacturers and bulk users, specifically designed for large-sized, expansive, and high-force heat exchangers.	This model is designed as a portable solution, particularly suited for on-site maintenance by plate exchanger technicians and small-scale users.

Purposes and Features:

This product is designed and manufactured for the installation and disassembly of plate heat exchangers, aiming to address the challenges posed by the high tightening torque of the rod nut and the significant travel distance, which lead to intense physical labor. By using this device, not only can the labor intensity of workers be greatly reduced, but also labor productivity can be significantly improved. It transforms the previously multi-person heavy physical labor into a task that can be easily accomplished by a single person, with a cycle time reduced by at least 80%. Simultaneously, utilizing this device for the installation and disassembly of plate heat exchangers can prevent injuries caused by the rod and nuts being squeezed, and it can achieve synchronized compression of the movable pressing plate. This is highly beneficial for enhancing the assembly quality of the product. Therefore, this hydraulic wrench serves as an excellent substitute for conventional manual wrenches and is particularly suitable for use by manufacturers of plate heat exchanger hosts and bulk users.

For the LT series hydraulic wrench is specially designed and manufactured for plate heat exchangers, its design principles are rational, making it more compact and safer to use. This significantly reduces the failure rate.

Structural Principles:

The LT series hydraulic wrench for plate heat exchangers (electric) is mainly composed of an electric motor, hydraulic pump, hydraulic valve, hydraulic cylinder, electrical components, oil tank, trolley, and hydraulic hoses, as shown in Figure 1.

The dynamic force for the wrench is sourced from an electric motor and a hydraulic pump. Within the LT series, the hydraulic pump utilized is purposefully engineered as a radial displacement quantitative piston pump, meticulously tailored to the technical prerequisites of dedicated wrench applications. This pump adeptly satisfies the requirement for unwavering and synchronized advancement during plate heat exchanger tightening, thereby ensuring an unwavering assembly standard. Notably, this pump boasts an unembellished configuration, ensuring minimal occurrence of malfunctions and exhibiting marginal vulnerability to oil contamination.

The hydraulic control valve follows a cohesive assembly concept, amalgamating relief valves, unloading valves, one-way valves, and four-way stop valves into a singular valve body composition. When the system's pressure surpasses the designated threshold, the relief valve autonomously opens, providing a protective shield for the entire system. Meanwhile, the unloading valve and four-way stop valve grant the ability to designate the operational status of any hydraulic cylinder, as shown in Figure 2.

Paramount as the operative component, the hydraulic cylinder orchestrates the functionality of the hydraulic wrench. With the infusion of hydraulic oil into the hydraulic cylinder, the plunger propels, thereby inducing a relative motion between

the rod and the hydraulic cylinder. This sequential motion impels the mobile pressing plate to progressively advance from the lower support foot of the cylinder, effectively attaining the objective of compression.

Figure 1: hydraulic principle diagram

Figure 2: Front View Schematic of Movable Pressing Plate

Usage Instructions: (Please refer to the respective model's user manual)

1. As per the assembly requirements of the plate heat exchanger, assemble all components into their designated positions. Hand-tighten the rod nuts and adjust them to achieve a generally uniform compression size across all points.
2. Place the hydraulic cylinders onto the 2nd, 4th, 7th, and 9th rods (refer to Figure 3; if the user's heat exchanger differs from the illustration, select four or two symmetrically positioned rods). Position each valve as indicated in Figure 5. Using the control knob, initiate the hydraulic return operation to move the piston of the cylinder to the bottom position.
3. Lift the main valve and position the valves as shown in Figure 4. After ensuring that each hydraulic cylinder is fully supported on the movable pressing plate, press the start (ON) button. The hydraulic cylinders will begin their movement, continuing until the piston inside the cylinder approaches its limit position. (Refer to the color pages in the manual for further guidance.)

Figure 4-5: Front View Schematic of LT-I Valve Assembly Panel

4. Hand-tighten all remaining rod nuts.
5. Place the unloading valve on the oil tank in the open position as shown in Figure 5. Press the button again to move the piston back to the bottom, then close the unloading valve as shown in figure 4.
6. Repeat the process from steps 3 to 5, and measure the compression size until the intended design size is achieved.
7. The loosening process of the heat exchanger is carried out in the reverse sequence.
8. For specific cylinder operation or a set of cylinders (not applicable for LT-IV model), you can deactivate the cylinders not in use (position the corresponding valve lever upright).
9. When the compression size is significantly different from the design size, it is unnecessary to adjust uneven point sizes. As the compression size approaches the design size, automatic adjustment will align them uniformly.

10. For the manual LT-IV model, only an unloading valve is present. Tightening the valve handwheel clockwise will apply pressure, and counterclockwise loosening will release pressure. Other operational procedures are identical to the electric model. LT-IV is recommended exclusively for BR06 and lower model products. When space or other conditions require its use for larger models, two LT-IV units can be used in tandem.

Safety Precautions:

1. The power plug for the electric motor must be a four-pin plug, and ensure proper grounding protection before usage.
2. Do not start the motor when all valves are in the closed position.
3. During tightening, all personnel must operate from the side of the heat exchanger and avoid aligning the rod directly towards anyone.
4. Avoid performing screwing or related operations while the hydraulic cylinder is in operation to prevent getting caught or injured.
5. Throughout the tightening process, ensure all rod nuts are properly positioned and tightened promptly, not solely focusing on rods with hydraulic cylinders.
6. During tightening, verify that the positions of all rods are correct, and that the hydraulic cylinder supports rest entirely on the movable pressing plate without any gaps.
7. Do not conduct pressure tests while the hydraulic wrench is pressurized. Do not disassemble after pressurizing without releasing pressure.
8. Never pressurize the hydraulic cylinder without a load applied.

Maintenance and Care:

1. Do not bend the hydraulic hoses tightly, especially during operation.
2. Handle the hydraulic cylinder with care and avoid tossing it randomly to prevent loosening of the support legs or damaging the cylinder barrel.
3. Prevent dust, iron particles, and other foreign objects from entering the cylinder and causing damage.
4. While pressurizing, move the hydraulic wrench away to prevent water from entering the electrical components or causing cylinder wall rust.

5. Regularly check the oil level inside the tank. It is advisable to maintain the oil level in the tank at half capacity after filling the cylinder.
6. When not in use, safeguard the hydraulic cylinder against damage and the entry of foreign objects.

Operating Instructions for LT-1 Electric Four-Cylinder Bidirectional Hydraulic Wrench
(Plate Heat Exchanger Dedicated)

1. Connect the wrench to the plate heat exchanger, as shown in the diagram below.
2. Set the valve rods as shown in the diagram above.
3. Lift the main valve (the first valve rod).
4. Press the button to initiate hydraulic cylinder compression.
5. Stop compressing when the cylinder core extends approximately 60mm.
6. Hand-tighten the remaining rod nuts. If the compression size is not yet achieved, proceed to the next round of operation from step 2.
7. If only cylinder 1 and 3 are used, or if cylinder 1 and 3 are not in place, lift the corresponding valve rods for other cylinders, as shown above.