



Hydraulic Roll Changing Trolley

Operation and Maintenance Manual

1. Equipment Overview

Equipment Name: Hydraulic Roll Changing Trolley

Applicable Industry: Metallurgical industry – wire rod mills and bar rolling mills

Application: Installation and removal of roll rings during roll changing operations

The hydraulic roll changing trolley is designed to assist in the safe and efficient installation (mounting) and removal (dismounting) of roll rings on rolling mill rolls.

It significantly reduces labor intensity, improves operational safety, and ensures accurate roll ring positioning during roll changing procedures.

2. Working Principle

The roll changing trolley operates through a hydraulic system capable of generating **two-stage pressure levels** to drive the roll changing tools:

- **Low pressure stage**
Used for roll ring positioning and pre-tightening
- **High pressure stage**
Used for tightening the taper sleeve during installation or releasing the taper sleeve during removal

The complete system consists of the following four main components:

1. Electric hydraulic pump station (power source)
2. Hydraulic valve group (controls pressure levels and action sequence)
3. Mobile roll changing trolley (execution unit)
4. Electrical control system (push buttons, PLC, pressure switches)

3. Main Technical Specifications

- High-pressure rating: **700 bar** (normal operating pressure: **630 bar**)
- High-pressure flow rate: **0.4 L/min**
- Low-pressure rating: **80 bar** (installation low pressure approx. **160 bar**)
- Low-pressure flow rate: **2.6 L/min**
- Motor power: **1.1 kW**
- Motor speed: **1500 r/min**
- Hydraulic oil tank capacity: **10 L**
- Overall dimensions: **1100 × 620 × 880 mm**

4. Pre-Start Inspection (Very Important)

Before starting the equipment, the following checks must be completed:

1. Connect the **380V power supply** and confirm correct phase sequence
2. Open the electrical control cabinet and verify that the leakage protection switch input voltage is **220V**
3. Check the following items:
 - Hydraulic oil level in the tank
 - Hydraulic hoses and fittings for leakage
 - Installation or removal tools are correctly mounted

After confirming all items are normal, turn the **main power switch** on the control panel to the “ON” position.

5. Roll Ring Installation Procedure

5.1 Preparation

- Ensure the installation tool is fully screwed onto the roll shaft thread
- The tool end face must be in full contact with the roll ring end face, with no gap
- Connect the hydraulic hose using the quick coupling, ensuring it is fully tightened and properly seated

Failure to ensure correct tool installation before pressurization may cause uneven load on the taper sleeve and potential damage.

5.2 Installation Steps

1. Set the selector switch to the “**Installation**” position
2. Press and hold the installation button:
 - The low-pressure piston operates first
 - Pressure rises to approximately **160 bar**, positioning the roll ring
 - The high-pressure piston then operates
 - Pressure rises to approximately **550 bar** (or process-specified value), tightening the taper sleeve
3. When both low and high pressures reach their set values, keep the button pressed for several seconds as required by the process
4. Release the installation button:
 - High pressure is released immediately
 - Low pressure is released after a delay of approximately **5 seconds**
 - The high-pressure piston retracts and the motor stops
5. It is recommended to repeat the installation operation once to ensure reliability
6. After the pump stops:
 - Disconnect the quick coupling
 - Remove the tools and hydraulic hose

6. Roll Ring Removal Procedure

6.1 Preparation

- Ensure the removal tool is fully engaged with the taper sleeve
- The taper sleeve lugs must be in firm contact with the positioning nut of the removal tool
- The quick coupling must be fully tightened and sealed

Improper engagement may result in ineffective pressurization or tool damage.

6.2 Removal Steps

1. Set the selector switch to the **“Removal”** position
2. Press and hold the removal button:
 - The system begins pressurization
 - Maximum removal pressure reaches approximately **620 bar**
3. Observe the pressure gauge carefully:
 - When the taper sleeve separates from the roll shaft, the pressure will drop suddenly
4. Release the button immediately when the pressure drop is observed:
 - The taper sleeve has been released
5. After releasing the button:
 - The working head retracts automatically by spring force
 - The system stops automatically (PLC protection enabled)

6. Disconnect the hydraulic hose and remove the tool to complete the removal operation

7. Pressure Setting Instructions

(Adjustment by non-professionals is strictly prohibited)

7.1 Basic Principles

- The high-pressure setting must always be higher than the low-pressure setting
- Incorrect pressure settings will cause failure of low-to-high pressure switching

7.2 Factory and Common Settings

- Low-pressure relief valve: **160 bar**
- Pressure switching setting: **60–80 bar**
- Installation high pressure: **400 bar** (adjustable according to process)
- Normal system operating pressure: **630 bar**

7.3 Removal Protection

- Pressure switch DG33: factory set at **200 bar**
- Normally does not require adjustment
- Prevents damage caused by continued pressurization after taper sleeve release

8. Operating Precautions (Must Be Observed)

1. Never press any button before confirming correct tool installation
2. Continuously monitor pressure gauge changes during operation
3. During installation:
 - Both low and high pressures must reach set values
 - Maintain pressure for several seconds before releasing the button
4. If low pressure continues to rise beyond the set value:
 - Release the button immediately and restart the operation
5. During removal:
 - Release the button immediately when pressure drops suddenly
 - The system is equipped with automatic shutdown protection

9. Maintenance and Service

(Directly affects equipment service life)

9.1 Hydraulic System Maintenance

- Keep the hydraulic system clean at all times
- Approximately **80% of hydraulic failures are caused by contaminated oil**
- Hydraulic system maintenance must be carried out by qualified personnel only

9.2 Daily Inspection

- Check hydraulic pipelines and valve groups for leakage
- Check oil tank level
- Check motor and pump for abnormal noise or vibration

9.3 Electrical Safety

- Test leakage protection switch **once per month**
- Press test button under power:
 - Tripping occurs → normal
 - No tripping → replacement required

9.4 Hydraulic Oil

- Check oil quality once per year
- Replace oil immediately if deterioration is detected
- Recommended oil grades:
 - Mobil Anti-Wear Hydraulic Oil **ISO VG 32 or 46**

9.5 Alarm Indication

- Red indicator: Power supply
- Green indicator: System running
- Yellow indicator: Low oil level / oil refill required
- When an alarm occurs, the system performs an automatic emergency stop

10. Common Faults and Troubleshooting

Fault	Possible Cause	Solution
Pump does not run	PLC, contactor, or thermal protection fault	Check electrical system
Relief valve ineffective	Valve damage or blockage	Repair or replace valve
No pressure at high or low stage	Internal leakage in valve group	Inspect and reconnect
Solenoid valve leakage	Solenoid valve failure	Replace solenoid valve
Hydraulic oil leakage	Loose fittings	Retighten fittings
Incorrect pressure reading	Pressure gauge failure	Replace pressure gauge



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