Plug Valve

Operation & Maintenance Manual

Plug Valve | Operation & Maintenance Manual

High-Pressure Flow Control | Reliable Sealing | Quick Maintenance

Document No.	Version	Language
SM-SJ-MAN-002	2026 Edition	English / EN

Applicable standards: API Spec 6A / API Spec 16C / NACE MR0175

Jiangsu Shimai Machinery Co., Ltd. | Jiangsu, China

WARNING: Before use, verify that the product model, pressure rating, connection type and field service conditions match the operating requirements.

CAUTION: Do not exceed rated pressure, disassemble under pressure, strike damaged connection components, or mix components with different pressure ratings.

CAUTION: Stop operation and isolate the product immediately if cracks, deformation, thread damage, seal failure, abnormal raceway wear, or unclear markings are found.

1. Application and Scope

Plug valves are used for opening, closing, and flow isolation in high-pressure flowline and manifold systems. They are widely used in cementing, fracturing, acidizing, pressure testing, oilfield high-pressure manifolds, and temporary flowlines. Products may be configured with hammer union ends, threaded ends, flanged ends, or skid/base structures, and may be supplied with manual, pneumatic, hydraulic, or gear-operated actuators.

When selecting the product, confirm the bore size, pressure rating, connection type, actuator, medium, temperature, and service condition. For H_2S service, use NACE-compliant products. For low-temperature service, confirm the applicable materials, seals, and grease for the specified temperature range.

2. Construction and Working Principle

Plug valves typically consist of a valve body, plug, seal segments, side segments, O-rings, support rings, cover, locking parts, grease fittings, and an actuator. The plug rotates inside the body; opening and closing are achieved by aligning or offsetting the plug bore with the flowline bore.

• The valve body is the main pressure-containing part and shall match the pressure rating and connection type.

• The plug and seal segments form the main sealing pair. Sealing face cleanliness and lubrication directly affect operating torque and sealing performance.

• Grease fittings are used to inject specified grease for lubrication, auxiliary sealing, and corrosion protection.

• The actuator may be manual, pneumatic, hydraulic, or gear-operated and is selected based on the field control mode and torque requirements.

3. Model, Pressure Rating and Connection Type

Model designation is recommended as: size + Fig rating or thread type + pressure rating + connection type + actuator + service condition. Example: 3" × 3" Fig 1502, 105 MPa, F × M, Gear-Operated. Add Low-Temperature or NACE where applicable.

Item	Description
Fig 602 / 1002 / 1502 / 2002 / 2202	**Indicates the hammer union connection rating; it shall match the flowline pressure rating.**
F × M	**Indicates the hammer union end connection type for quick connection of high-pressure flowlines.**
LP / TBG Thread	**Indicates the threaded connection type; thread size, direction and sealing requirements shall be confirmed.**

Manual / Pneumatic / Hydraulic / Gear-Operated	**Indicates manual, pneumatic, hydraulic, or gear-operated actuator.**
NACE / Low-Temperature	**Indicates sour or low-temperature service; materials, seals, and grease shall be confirmed.**

4. Main Technical Parameters

The following values are typical supply ranges. Final dimensions, weight, materials, seals, actuator, and inspection requirements shall be governed by the purchase order, approved drawings, and valid product documents.

Item	Common Range
Size	**1" × 2", 2" × 2", 2" × 3", 3" × 3", etc.**
Working Pressure	**42 MPa, 70 MPa, 105 MPa, 140 MPa, etc.**
Connection Type	**Fig 602, Fig 1002, Fig 1502, Fig 2002, Fig 2202 hammer union connections; LP / TBG threaded connections; flanged connections, etc.**
Actuator	**Manual, pneumatic, hydraulic, and gear-operated.**
Service Condition	**Standard service, NACE sour service and low-temperature service.**
Maintenance Parts	**O-rings, support rings, seal segments, side segments, grease fittings, plug, etc.**
Applicable and Reference Standards	**SY/T 5211-2016; API Spec 6A; NACE MR0175**

Representative Model Examples:

Representative Model	Size	Pressure	Connection Type	Actuator	Service Condition
2" × 2" Fig 602, 42 MPa, F × M, Manual	**2"**	**42 MPa**	**Fig 602 (F×M)**	**Manual**	**Standard**
2" × 2" Fig 1502, 105 MPa, F × M, Hydraulic	**2"**	**105 MPa**	**Fig 1502 (F×M)**	**Hydraulic**	**Standard**
3" × 3" Fig 1502, 105 MPa, F × M, Gear-Operated	**3"**	**105 MPa**	**Fig 1502 (F×M)**	**Gear-Operated**	**Standard**
3" × 3" Fig 1502, 70 MPa, F × M, Manual, NACE	**3"**	**70 MPa**	**Fig 1502 (F×M)**	**Manual**	**NACE**

2" × 2" Fig 1502, 70 MPa, F × M, Manual, Low-Temperature	**2"**	**70 MPa**	**Fig 1502 (F×M)**	**Manual**	**Low-Temperature**

5. Pre-Installation Inspection

• Verify valve model, size, pressure rating, connection type, actuator and service condition.

• Confirm smooth valve operation, clear open/close position indication and correct actuator direction.

• Check valve body, connection ends, threads, union sealing faces, flange sealing faces and exposed fasteners. They shall be free from cracks, deformation, severe corrosion or damage.

• Check grease fittings, O-rings, seal segments and plug sealing faces. Relubricate and check seals after long-term storage.

• Confirm that the flowline interior is clean and free from sand, iron chips, welding slag, cement lumps, acid residue or other foreign matter that may damage sealing faces.

6. Installation and Operation Requirements

• Confirm complete system depressurization before installation, removal, grease maintenance or parts replacement.

• Do not mix valves and flowlines of different pressure ratings, Fig ratings or incompatible connection types.

• Do not operate the valve beyond rated working pressure, temperature or applicable medium range.

• Operate the valve smoothly. Do not use extension bars or impact methods beyond design requirements.

• Pneumatic, hydraulic and gear-operated actuators shall be connected according to control system requirements. Test operation shall confirm full-open and full-close positions.

• If leakage, abnormal sticking, actuator failure or body damage is found, stop use immediately, depressurize and inspect.

7. Maintenance

• After each operation, flush the valve cavity with clean water or specified cleaning medium to remove mud, cement, acid, fracturing fluid, and sand-laden residue.

• Select specified grease according to service condition and temperature. Inject grease through grease fittings and operate the valve in open/close positions to distribute grease evenly.

• After pumping acid, cement slurry or sand-laden medium, clean promptly and replenish grease.

• Apply rust preventive oil to exposed threads, sealing faces and connection ends. Fit protective

caps during transportation and storage.

• Periodically disassemble and inspect the valve, remove old grease, and check plug, seal segments, O-rings, support rings and grease fittings. Replace worn or aged parts promptly.

8. Common Faults and Corrective Actions

Fault	Possible Cause	Corrective Action
Leakage at Valve Cover or End Cover	**Damaged O-ring, abnormal seal segment position, or foreign matter / scratches on cover sealing face.**	**Depressurize, disassemble and inspect; replace O-ring, clean and check sealing faces, reassemble and inject grease.**
Leakage Between Seal Segment and Valve Body	**Foreign matter trapped, seal segment wear, valve body bore corrosion or scratches.**	**Disassemble, inspect and clean. Check seal segments and body sealing faces; replace repair kit or related parts if necessary.**
Leakage at Plug	**Plug O-ring, support ring or sealing face wear; insufficient lubrication.**	**Replace seals, inspect plug surface and inject grease as specified.**
Sticking or Excessive Operating Torque	**Old grease hardening, foreign matter, seal deformation or plug or segment wear.**	**Depressurize, clean, disassemble and inspect; remove old grease and foreign matter, replace worn parts and inject new grease.**
Leakage at Grease Fitting	**Damaged grease fitting, check structure failure, thread damage or contaminated grease.**	**Replace grease fitting, check threads and inject grease through the new fitting.**

9. Ordering and Technical Confirmation

When ordering plug valves, provide the following information to confirm model, material, seals, actuator, inspection and delivery requirements:

• Size, working pressure, connection type and end orientation.

• Actuator type: manual, pneumatic, hydraulic, or gear-operated.

• Service condition: standard, NACE sour service, low-temperature service, or other special media.

• Whether repair kits, wear parts, manuals, tool kits, or matching manifolds are required.

• Certificate requirements, pressure test requirements, NDT, third-party inspection, packaging, and transportation requirements.

• For replacement parts, provide original product model, connection dimensions, field photos or drawings.

This manual is a general operation and maintenance document for plug valves. Field operation shall also comply with owner safety rules, equipment nameplates, product drawings, project technical agreements and applicable standards.

Customer Feedback / After-Sales Service Information

Customer Feedback Form

Product Name		**Model / Specification**	
Product No.		**Date of Manufacture**	
User / Customer		**Contact Person**	
Telephone		**Email**	
Service Condition		**Date of Use**	
Issue Type	□ Operation □ Maintenance □ Quality □ Transportation □ Other	**Urgency**	□ General □ Important □ Urgent
Issue Description			
Field Description			
Suggestions			
Signature		**Date**	

Manufacturer and Technical Support

Jiangsu Shimai Machinery Co., Ltd.

Address: No. 96 Xingye Road, Jingjiang City, Jiangsu Province, China

Postal Code:214500Website: www.jqlk.com

Email: drillingtool@163.com Technical Support

Scan to view product details