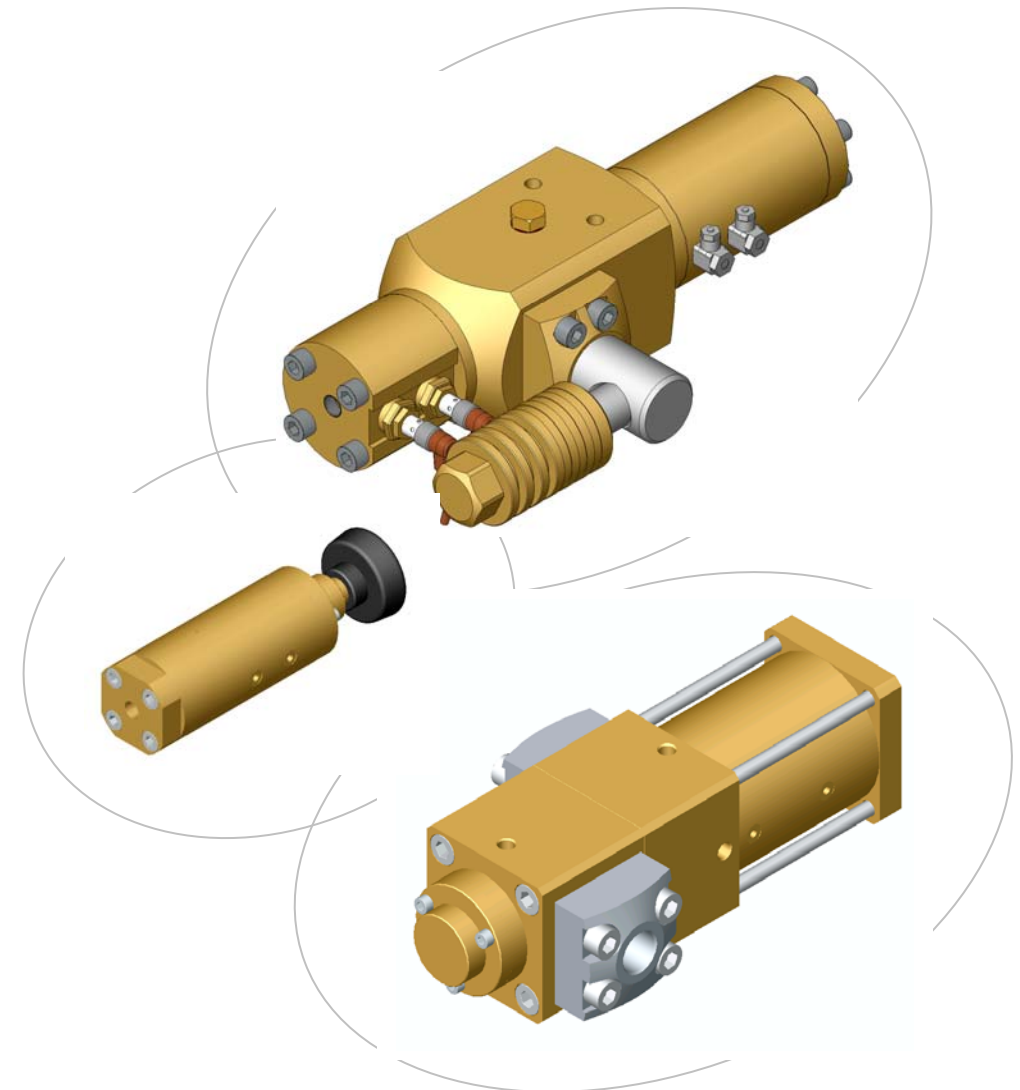


For questions with regards to the m-tech valves, please specify the following:

- serial number
- valve type
- valve function (e.g. gas inlet, venting or shut-off valve)
- filling centre in which the valve is used



 m-tech gmbh ist zertifiziert nach
DIN EN ISO 9001:2000

Die m-tech gmbh ist
ein Unternehmen der
müller co-ax gruppe.



Table of contents

1.0	General indications
1.1	Target group
1.2	Personnel qualification
1.3	Safekeeping
2.0	Product description
2.1	Important information concerning the valve
2.1.1	Purpose of application
2.1.2	Precautionary measure
2.1.3	Conformity
2.1.4	Valve label
2.1.5	Technical data
3.0	Safety instructions
3.1	Product safety
3.2	Selection of personnel and its qualification; fundamental obligations
3.2.1	General
3.2.2	Transport / Mounting / Putting in service / Maintenance / Repair
3.2.3	Electrical installation
4.0	Installation / Putting in service
4.1	Measures and considerations prior to installation
4.2	Installation
4.2.1	Valve installation with welded connection
4.2.2	Valve installation with threaded connection
4.2.3	Electrical connection
4.2.4	Pneumatic connection
4.3	Putting in service
5.0	Valve application in explosive areas
5.1	Lubricants
5.2	Sealings / o-rings
5.3	Installation
5.4	Installation / Outside application
6.0	Maintenance
6.1	High pressure valves
6.1.1	First complete maintenance
6.1.2	Following complete maintenance
6.2	High pressure valves replacement instructions
6.2.1	High pressure valves type PCG-H replacement / dismantling
6.2.2	High pressure valves type PCG-H replacement / mounting
6.2.3	High pressure valves type MPG 12 replacement / dismantling
6.2.4	High pressure valves type MPG 12 replacement / mounting
6.2.5	High pressure valves type MPG 03 replacement / fixing with double nipple 1/4" / dismantling
6.2.6	High pressure valves type MPG 03 replacement / fixing with double nipple 1/4" / mounting
6.2.7	High pressure valves type MPG 03 replacement / fixing with screwings and pipe clips / dismantling
6.2.8	High pressure valves type MPG 03 replacement / fixing with screwings and pipe clips / mounting
6.3	Filter
6.3.1	Filter replacement
6.3.2	Filter inspection
6.4	Check valve replacement
6.5	Relief valves MPG 12 RV
7.0	Spare parts
8.0	Repair
9.0	Storage
10.0	Packaging
11.0	Transport
12.0	Disposal

1.0 General indications

The entire Operating Manual must have been read through and understood.

Should difficulties or questions arise that cannot be solved with the help of the Operating Manual, please contact the supplier / manufacturer.

This Operating Manual covers the areas of installation/commissioning, maintenance, repair, storage, packaging, transport and disposal. The Operating Manual was compiled in accordance with the regulations of guideline 97/23/EC concerning pressure devices.

The operator is responsible for adhering to local safety regulations also with regard of the assembly personnel employed. When using the valve outside the Federal Republic of Germany, the operator or those responsible for the design of the plant must ensure that valid national regulations are adhered to.

The manufacturer reserves all rights of technical changes and improvements at any time.

1.1 Target group

This Operating Manual is directed at persons who are entrusted with the installation planning, installation, commissioning or maintenance/repair. These persons must have qualifications in accordance with their activities and functions. This also includes the knowledge of applicable accident prevention regulations, generally recognized safety regulations, EC guidelines and country-specific standards and regulations.

1.2 Personnel qualification

Transport, installation, commissioning, maintenance or repair must only be performed by trained or instructed personnel.

Work on electrical equipment of the device must only be performed by a qualified electrician or instructed persons under the guidance and supervision of a qualified electrician according to the rules of engineering.

1.3 Safekeeping

Access to the entire Operating Manual must be guaranteed at all times at the place of operation of the valve.

2.0 Product description

2.1 Important information concerning the valve

2.1.1 Purpose of application

The valves are intended for installation in gas tubes.

The type of medium/gas and the limit values of medium pressure and temperature according to the data sheet must be adhered to. Any other or additional use must be accorded with the supplier / manufacturer.

2.1.2 Precautionary measures

When using the valves, observe the currently applicable laws (e.g. EC guideline and national regulations) and the recognized rules of engineering. The general equipment and safety regulations for pipeline and plant construction and the local safety and accident prevention regulations apply in addition. It is indispensable to observe the Operating Manual with regard to all work on the valve and whenever handling the valve.

2.1.3 Conformity

The valves and the accessories have been built according to the state of the art and in accordance with the guideline 97/23/EG concerning pressure devices.

2.1.4 Valve label

The valves are provided with a label containing the necessary information according to the pressure device guideline 97/23/EG.

2.1.5 Technical Data

The technical data and the essential permissible limit values are included in the corresponding data sheet.

3.0 Safety instructions

3.1 Product safety

Install and operate the valves as well as the accessories only in perfect condition taking into account the entire Operating Manual.

Use of material-incompatible media, exceeding the limit values of medium pressure and temperature and mechanical additional loads can result in failure of the valve material and bursting of the valve.

3.2 Selection of personnel and its qualification; fundamental obligations

3.2.1 General

The persons entrusted with the installation planning, installation, commissioning, maintenance or repair must be qualified in accordance with their activities and functions.

Based on their technical training, their knowledge and experience and their knowledge of the applicable standards, the personnel must be able to evaluate the work entrusted to them, understand the interactions between valve and system and recognize possible dangers.

They must also have knowledge of applicable accident prevention regulations, generally recognized safety regulations, EC guidelines and country-specific standards and regulations and all application-based regional and company-internal regulations and requirements.

Personnel that have to be trained or instructed or apprentices are only allowed to work at the system under the constant supervision of an experienced person. The legal minimum age for the persons working with the system has to be observed.

3.2.2 Transport / Mounting / Putting in service / Maintenance / Repair

Only by trained or instructed personnel. For safety reasons, recheck whether all necessary measures for the protection of persons have been taken before commencing the work.

3.2.3 Electrical installation

Work on electrical equipment of the device must only be performed by an electrician or persons under the guidance and supervision of an electrician in accordance with the rules of engineering.

4.0 Installation / putting in service

4.1 Measures and considerations prior to installation

Compare material, pressure and temperature details of the valves with the operating conditions of the pipeline system to verify material resistance and load capacity.

Install the valve so that it is well accessible in future for connections works, maintenances and repairs. Otherwise the installation position can be any.

Install a suitable dirt trap in front of the valve in order to ensure trouble-free valve operation.

4.2 Installation

Before installing the valve, inspect for possible transport damage.

Before installing the valve, check the pipe system for absolute cleanliness in order to prevent that traces from the pipe installation or other foreign bodies are flushed into the valve during installation.

Valves and pipelines operated at high (> 50°C) or low temperatures (< 0°C) must be protected against touching through insulation or the danger of possible contact must be pointed out through appropriate warning signs.

Devices of purging, depressurisation and venting have to be protected against the incoming of foreign elements.

4.2.1 Installation with welded connection

Welding works are only permitted to be executed by qualified welders, according to the respective requirements of the country. It is only permitted to weld tubes that are identical to the valve connection adapter concerning material and connection diameter.

When connecting the tubes to the valve, it has to be observed that the connection is executed free of mechanical tension and without deaxation. The welded tube must not force the valve or its connection flanges.

To tighten the connection flange at the valve it is only permitted to use the o-ring supplied by m-tech.

Carry out leak and operating tests.

4.2.2 Valve installation with threaded connection

The tube thread has to be suitable for the connection thread of the valve.

Use suitable sealing stuff (e.g. seal tape suitable for oxygen).

When connecting the tubes to the valve, it has to be observed that the connection is executed free of mechanical tension and without deaxation.

Carry out a tightness test after mounting the connection pieces.

4.2.3 Electrical connection

Work on electrical equipment of the valve must only be performed by a qualified electrician or by instructed persons under the guidance and supervision of a qualified electrician according to the rules of engineering taking into account DIN EN 60204-1 (electrical equipment of machines).

Prior to any electrical work on the valve, de-energize all poles and secure appropriately.

Always ensure that the supplied tension corresponds to the service tension of the pilot valve.

Only the specified voltage in the correct polarity is connected in order to avoid damage or hazards.

If the valve is equipped with additional equipment such as limit switches, always observe the technical data and electrical connection values at the appropriate data sheets.

4.2.4 Pneumatic connection

Use filtered, dry and oil-free air for pneumatically activated valves.

The actuating air pressure has to correspond to the value indicated at the data sheet (if necessary, adjust the actuating air pressure with a corresponding pressure reducer). Please find attached the corresponding data sheet.

4.3 Putting in service

Prior to putting in service, read and observe the safety instructions.

Prior to every putting in service of a new system or re-putting in service of a system after maintenances or repairs ensure the following:

- all installation and assembly work has been properly completed
- putting in service is only executed by qualified personnel according to chapter 3.2.1
- the pipe system has been thoroughly flushed to remove contamination

Protection devices and guards removed before work execution must be reinstalled afterwards.

5.0 Valve application in explosive areas

To eliminate dangers of an ignition source applying the armature in explosive areas, the following details have to be observed:



Only valves are allowed to be applied which are consistent with the **directive 94/9/EG** and which are tagged with the following label:



5.1 Lubricant

Only utilise lubricant grease pastes that are permitted for oxygen boards. The company m-tech prescribes for your products the following lubricant:

gleitmo 599 high intensity lubricant for oxygen boards

Producer :
Fuchs Lubritech GmbH
Hans-Reiner-Straße 7-13
D-67685 Weilerbach
Tel +49 (0) 6374 / 924-800

5.2 Sealings / o-rings

The permanent application temperature of the sealing materials has to be 20K higher than the max. surface temperature of the armature.

The used sealing materials have to be permanently resistant against the applied media.

It is highly recommended to only use original spare parts of the producer.

5.3 Installation

To avoid residual currents through the armature, all conductive parts of the armature have to be linked into the total potential compensation of the system.

5.4 Installation / Outdoor application

To protect the armature against eventual ignition sources caused by lightning strokes, it has to be integrated into the local lightning protection installation when applied outdoor.

6.0 Maintenance

Prior to any work on the valve, read and observe the safety instructions.

Ensure prior to work that the pipeline is completely free of pressure.

Working on valves under pressure can be fatal !

The valve and connected pipelines can be very cold or very hot due to the temperature of the medium.

The magnet of the pilot valve can also have high temperatures due to the electrical dissipation of the drive.

- The high-pressure valves are mounted as modular or cartridge valves. This enables an easy dismounting of the valves.
- It is recommended to provision spare valves to avoid a production loss in case of a defective valve.
- Only the exchange of the valve is permitted to be executed independently.
- Without the prior permission of m-tech, no dismounting of the valves / modules mounted at the system is allowed to be executed independently.
- For safety reasons, only qualified and especially by m-tech trained personnel are allowed to maintain or repair the valves / modules.
- In case of defect, return the valve to m-tech for repair and use a spare valve or cartridge in the meantime.

All components brought into contact with gases have to be kept free of oil and grease.

6.1 High pressure valves

MAINTENANCE WORK	ACTIVITY	INTERVAL
first complete maintenance	see point 6.1.1	after 5 years or 50000 switching cycles*
following complete maintenances	see point 6.1.2	at the latest after further 5 years / 50000 switching cycles* or earlier, if recommended by m-tech

* 1 switching cycle corresponds to one opening and one closure of the valve

6.1.1 First complete maintenance

All maintenances are executed by m-tech in our company or directly on site.

A complete maintenance includes the following actions

- Valve examination.
- Complete disassembly and maintenance of the valve (exchange of all seals).
- Cleaning for oxygen service of all valve components.
- Valve condition assessment by m-tech.
- Determination of the period for further maintenances.
- Detailed registration of the relevant data in a separate "Maintenance-Inspection-Sheet" containing all further recommendations to be followed (with a copy for the customer).

6.1.2 Following complete maintenance

On occasion of the first maintenance after 5 years or 50000 switching cycles, the next maintenance date will be determined by m-tech.

It is highly recommended that the customer observes the given maintenance dates.

6.2 High pressure valves replacement instructions

➤ Preparation

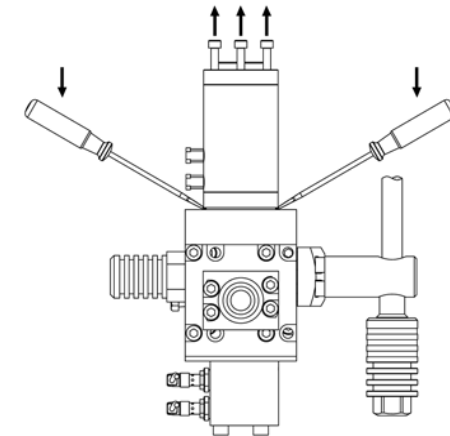
- Close the bottle faucets on each ramp.
- Close all shut-off valves on the gas inlet line(s).
- The gas supply is now interrupted.

➤ Venting

- Vent the system internally.
- Vent additionally operating manually the pilot valves / the positioner.
 - Open the venting valve and leave it open.
 - Open the ramp valves and leave them open.
 - Re-close all valves in reversed order.
- The internal system pressure should now be at 0 bar, all manometers have to indicate 0 bar.

6.2.1 High pressure valves type PCG-H replacement / dismounting

- Close the shut off faucet supplying actuating air.
- Remove the pneumatic tubes at the valve cylinder on ports 2 and 4.
- Screw out the 6 cylinder screws (M8 mm) by means of a hexagon socket screw key size 6 mm in a uniform way and in a diagonal sequence.
- Proceed carefully and take care of any pressure that may still be inside the system.
- Simultaneously lever the cartridge to be replaced from two sides by means of two screwdrivers and pull it out slowly.
- Control the inner cleanness of the block visually and purge it with an adequate medium.

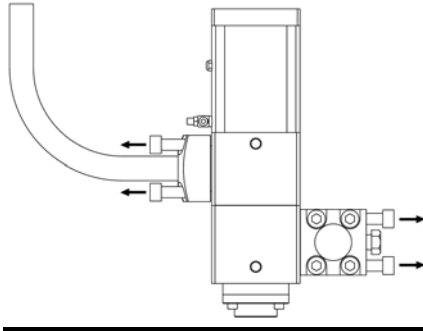


6.2.2 High pressure valves type PCG-H replacement / mounting

- Mount the cartridge into the body.
- Screw in the 6 cylinder screws (M8) in a uniform way and in a diagonal sequence by means of a hexagon socket screw key size 6 mm with a **torque of 16 Nm**.
- Reconnect the pneumatic tubes to the valve cylinder at ports 2 and 4.
- Open the shut off faucet supplying the actuating air.
- Control the actuating pressure.
- The actuating pressure has to be exactly at **7,0 bar**.
- Open the shut off valves on the gas inlet line(s) slowly and carefully.
- Effect several filling procedures on a trial basis.
- Examine the tightness and the function.

6.2.3 High pressure valves type MPG 12 replacement / dismounting

- Close the stopcock for the actuating air.
- Remove the pneumatic tube.
- Screw out the 4 cylinder screws (M10) of the connection adapter.
- Screw out the 4 fastening screws (M10) of the valve.

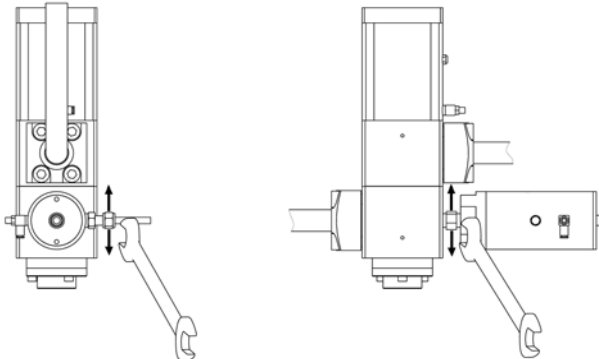


6.2.4 High pressure valves type MPG 12 replacement / mounting

- Mount the new valve.
- Screw in the 4 cylinder screws (M10) of the connection adapter (torque 40 Nm).
- Screw in the 4 fastening screws (M10) of the valve (torque 40 Nm).
- Connect the pneumatic tube.
- Open the stopcock for the actuating air.
- Check the actuating air pressure.
- The actuating air pressure has to be exactly of **7,0 bar**.
- Open the gas inlet shut-off valves slowly and cautiously.
- Execute a test filling.
- Carry out a leak test.

6.2.5 High pressure valves type MPG 03 replacement / fixing with double nipple 1/4" / dismounting

- Close the stopcock for the actuating air.
- Remove the pneumatic tube.
- Loosen the nuts.
- Remove the valve.

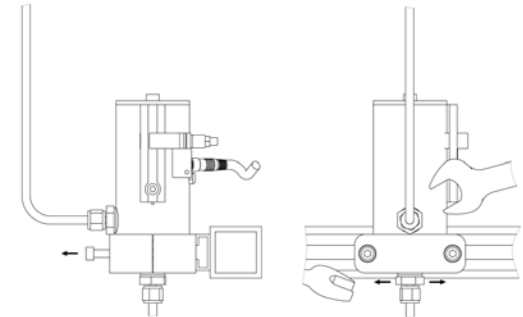


6.2.6 High pressure valves type MPG 03 replacement / fixing with double nipple 1/4" / mounting

- Mount the new valve.
- Push the piping with the mounted clamp rings into the double nipple.
- Screw tight the nuts.
- Connect the high pressure piping.
- Screw tight the high pressure piping with a fork wrench.
- Open the stopcock for the actuating air.
- Check the actuating air pressure.
- The actuating air pressure has to be exactly of **7,0 bar**.
- Open the gas inlet shut-off valves slowly and cautiously.
- Execute a test filling.
- Carry out a leak test.

6.2.7 High pressure valves type MPG 03 replacement / fixing with screwings and pipe clips / dismounting

- Close the stopcock for the actuating air.
- Remove the pneumatic tube.
- Remove the high pressure tube piping.
- Loosen the M6 x 65 screws.
- Remove the valve.



6.2.8 High pressure valves type MPG 03 replacement / fixing with screwings and pipe clips / mounting

- Mount the new valve.
- Tighten the screwed coupling and the pipe fitting.
- Put the valve into the pipe clip.
- Tighten hand-screwed both M6 x 65 screws.
- Connect the high pressure piping.
- Tighten the high pressure piping with a fork wrench.
- Open the stopcock for the actuating air.
- Check the actuating air pressure.
- The actuating air pressure has to be exactly of **7,0 bar**.
- Open the gas inlet shut-off valves slowly and cautiously.
- Execute a test filling.
- Carry out a leak test.

6.3 Filter

- Filters that may be installed are to be handled with care.
- Their purpose is to act against particles and shall consequently minimize possible damages on valves or other components of the gas filling system.
- Precondition for the highest possible operational security and efficiency of the filters is the costumers' careful cleaning and purging of the tube system before initial service in order to prevent penetration of any foreign substance (particles, metallic slivers, welding beads etc.).
- Normally, the filters do not require a special maintenance. However, they should be inspected within certain intervals concerning possible pollution.

It is recommended to examine the filters within the following time intervals :

MAINTENANCE WORKS	ACTIVITY	INTERVAL
1. examination	see point 6.3.1	8 days after initial putting in service
2. examination	see point 6.3.1	3 months after initial putting in service
3. examination	see point 6.3.1	6 months after initial putting in service
Further examinations	see point 6.3.1	every 6 months

6.3.1 Filter replacement

➤ Dismounting

- Dismount the filter body from the tubing unscrewing the union nut with a fork wrench jaw size 60 mm and 52 mm.
- Pull out the filter cartridge and empty it over a white sheet by patting it slightly and carefully.

➤ Particles

- Keep found particles for later examination.

➤ Cleaning

- Purge the filter cartridge with oil-free air.

➤ Mounting

- Inspect the o-rings concerning wear and tear and replace them if necessary.
- Afterwards, remount the o-rings carefully and integrate the filter body into the pipe system.
- In any case, pay attention to the correct flow direction (arrow printed on the valve body) !
- Remount the union nut and tighten it hand-screwed with a fork wrench jaw size 60 mm and 52 mm.

6.3.2 Inspection of the filters

Examination of found particles regarding :

- quantity
- material
- origin

Preventive measures :

Taking the results of the examination of foreign elements as a basis, suitable preventive measures should be introduced, in order to avoid the origination respectively penetration of particles into the system and to minimize their appearance as well as possible in future.

6.4 Check valve replacement

➤ Dismounting

- Dismount the filter body from the tubing unscrewing the union nut with a fork wrench jaw size 60 mm and 52 mm.
- Dismount the check valve body.

➤ Mounting

- Mount the check valve body.
- Remount the union nut and tighten it hand-screwed with a fork wrench jaw size 60 mm and 52 mm

6.5 Relief valves MPG 12 RV

- Safety valves serve as a system protection against exceeding the maximum service pressure. Therefore, they have to be treated and installed very carefully.
- The cross-section of the outlet tube should be chosen as large as possible, however at least 14 mm.
- Ideally, the outlet tube should be descending. Condensation that may arise has to be drained off without danger.
- The inlet tube has to be kept as short as possible and has to correspond at least to the nominal diameter of the valve.
- The system service pressure should be at least 10 % less than the cracking pressure of the valve to grant a faultless closing of the valve after the venting.
- For being sure of choosing the correct technical configuration of the safety valve the data sheet has to be applied at all costs.

7.0 Spare parts

- In order to prevent any production loss arising from a necessary repair of a valve, we recommend the provisioning of corresponding MPG spare valves.
- The advantage of spare valves provisioning is the fast and easy way to replace a valve so that a continuous production is assured.
- For security reasons, the removal and mounting of valves has to be effected in strict accordance with our corresponding Replacement Instructions.
- Upon request, we are prepared to submit to the customer a detailed recommendation regarding type and quantity of spare valves as well as other spare parts.

8.0 Repair

All components as well as the accessories of the valve construction series MPG 03 and MPG 12 have to be repaired by the manufacturer m-tech or specially trained personnel.

Prior to re-commissioning, the system is subject to a leak test according to DIN 3230.

9.0 Storage

During storage, protect the valves from external effects and dirt. Protect the connection openings to prevent entry of dirt.

The storage room should be dry and dust-free. Storage temperature must be frost-free up to +25°C. Store spare parts so that joints are not exposed to sunlight or UV light from other sources.

10.0 Packaging

Pack the valves so that any accessories such as limit switches or way measuring sensors cannot be damaged through subsequent transport. Protect connection opening to prevent the entry of dirt.

11.0 Transport

Protect the valves against external force such as shock, impact, vibration etc. during transport. Protect existing sealing surfaces on the connections from damage.

12.0 Disposal

Observe the valid legal regulations for appropriate disposal protecting the environment.