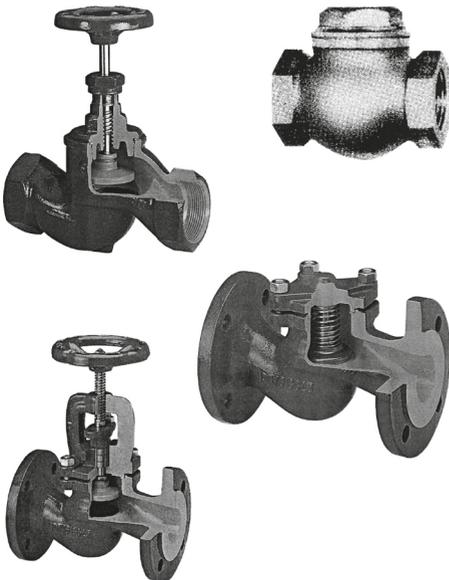


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## **GXM Stop valves and RJ Check valves**

### Installation and Maintenance Instructions

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1. General safety information
2. General product information
3. Quality control and storage
4. Installation
5. Commissioning
6. Maintenance
7. Spare parts

# 1. General safety information

A products' safe operation is assured when they are properly installed, commissioned, used and maintained by qualified personnel (see section 11 of the present instruction paper) according to the operation instructions.

Compliance with installation and safety general instructions must also be observed during piping and plant assembly together with an appropriate use of safety equipment and facilities.

## 1.1 Intended use

Referring to Installation and Maintenance Instructions, Name Plate and Technical Information Sheet, check that the product is suitable for the intended use/application. The products listed below comply with the requirements of the European Pressure Equipment Directive 2014/68/UE and carry the CE mark, when so required. The products fall within the following Pressure Equipment Directive categories:

### GXMZ - GXM16Z - GXM40Z - RJ216Z - RJ205N - RJ205Z Valves

Valve type	PN	DN	Gas Group 1	Gas Group 2	Liquid Group 1	Liquid Group 2
GXMZ	16	1/2"÷1"	SEP	SEP	SEP	SEP
		1 1/4"÷2"	1	1	1	1
		15÷25	SEP	SEP	SEP	SEP
GXM16Z	16	32÷50	1	SEP	SEP	SEP
		65÷125	2	1	SEP	SEP
		150÷200	2	1	2	SEP
		250÷300	3	2	2	SEP
		15÷25	2	SEP	SEP	SEP
GXM40Z	40	32	2	SEP	SEP	SEP
		40÷50	2	1	SEP	SEP
		65÷80	2	1	2	SEP
		100÷125	3	2	2	SEP
		150÷200	3	3	2	SEP
RJ216Z	16	25	SEP	SEP	SEP	SEP
		32÷50	1	SEP	SEP	SEP
		65÷125	2	1	SEP	SEP
		150÷200	2	1	2	SEP
		250÷300	3	2	2	SEP
RJ205Z	16	1/2"÷1"	SEP	SEP	SEP	SEP
		1 1/4"÷2"	1	1	1	1
RJ205N	16	1/2"÷ 2"	-	SEP	-	SEP

**SEP = not subjected to CE marking as per Para 3.3 of Directive 2014/68/UE.**

- I) The products have been specifically designed for use on steam, compressed air, water / condensate, dyatermic oil or other fluids that are in Group 2 of the above mentioned Pressure Equipment Directive. The products' use on other fluids within Group 2 may be possible but, if this is contemplated, Spirax Sarco should be contacted to confirm the suitability of the product for the application being considered.
- II) Check material suitability, pressure and temperature and their maximum and minimum values. If the maximum operating limits of the product are lower than those of the system in which it is being fitted, or if malfunction of the product could result in a dangerous overpressure or overtemperature occurrence, ensure a safety device is included in the system to prevent such over-limit situations.
- III) Determine the correct installation situation and direction of fluid flow.
- IV) Spirax Sarco products are not intended to withstand external stresses that may be induced by any system to which they are fitted. It is the responsibility of the installer to consider these stresses and take adequate precautions to minimise them.
- V) Remove protection covers from all connections and protective film from all name-plates, where appropriate, before installation on steam or other high temperature applications.

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## 1.2 Access

Ensure safe access and if necessary a safe working platform (suitably guarded) before attempting to work on the product. Arrange suitable lifting gear if required.

## 1.3 Lighting

Ensure adequate lighting, particularly where detailed or intricate work is required.

## 1.4 Hazardous liquids or gases in the pipeline

Consider what is in the pipeline or what may have been in the pipeline at some previous time. Consider: flammable materials, substances hazardous to health, extremes of temperature.

## 1.5 Hazardous environment around the product

Consider: explosion risk areas, lack of oxygen (e.g. tanks, pits), dangerous gases, extremes of temperature, hot surfaces, fire hazard (e.g. during welding), excessive noise, moving machinery.

## 1.6 The system

Consider the effect on the complete system of the work proposed. Will any proposed action (e.g. closing isolation valves, electrical isolation) put any other part of the system or any personnel at risk? Dangers might include isolation of vents or protective devices or the rendering ineffective of controls or alarms. Ensure isolation valves are turned on and off in a gradual way to avoid system shocks.

## 1.7 Pressure systems

Ensure that any pressure is isolated and safely vented to atmospheric pressure. Consider double isolation (double block and bleed) and the locking or labelling of closed valves. Do not assume that the system has depressurised even when the pressure gauge indicates zero.

## 1.8 Temperature

Allow time for temperature to normalise after isolation to avoid danger of burns.

## 1.9 Tools and consumables

Before starting work ensure that you have suitable tools and/or consumables available. Use only genuine Spirax Sarco replacement parts.

## 1.10 Protective clothing

Consider whether you and/or others in the vicinity require any protective clothing to protect against the hazards of, for example, chemicals, high/low temperature, radiation, noise, falling objects and dangers to eyes and face.

## 1.11 Permits to work

All work must be carried out or be supervised by a suitably competent person.

Installation and operating personnel should be trained in the correct use of the product according to the Installation and Maintenance Instructions. Where a formal 'permit to work' system is in force it must be complied with.

Where there is no such system, it is recommended that a responsible person should know what work is going on and, where necessary, arrange to have an assistant whose primary responsibility is safety. Post 'warning notices' if necessary.

## 1.12 Handling

Manual handling of large and/or heavy products may present a risk of injury. Lifting, pushing, pulling, carrying or supporting a load by bodily force can cause injury particularly to the back. You are advised to assess the risks taking into account the task, the individual, the load and the working environment and use the appropriate handling method depending on the circumstances of the work being done.

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### 1.13 Residual hazards

During ordinary use, the external surface of the product may be extremely hot. If any product is employed at limit working conditions, their surface layer warmth may reach the temperature of 200°C. Many products are not self-draining: consider it when disassembling or removing the product from the plant (refer to "Maintenance" paragraph).

### 1.14 Freezing

Provision must be made to protect products which are not self-draining against frost damage in environments where they may be exposed to temperatures below freezing point.

### 1.15 Disposal

Unless otherwise stated in the Installation and Maintenance Instructions, this product is recyclable and no ecological hazard is anticipated with its disposal providing due care is taken.

### 1.16 Returning products

Customers and stockists are reminded that under EC Health, Safety and Environment Law, when returning products to Spirax Sarco they must provide information on any hazards and the precautions to be taken due to contamination residues or mechanical damage which may present a health, safety or environmental risk.

This information must be provided in writing including Health and Safety data sheets relating to any substances identified as hazardous or potentially hazardous.

### 1.17 Working safely with cast iron products on steam

Cast iron products are commonly found on steam and condensate systems. If installed correctly using good steam engineering practices, it is perfectly safe.

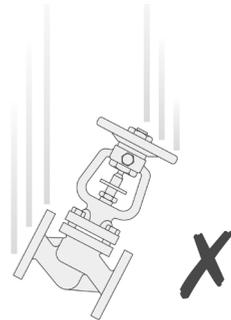
However, because of its mechanical properties, it is less forgiving compared to other materials such as SG iron or carbon steel.

The following are the good engineering practices required to prevent waterhammer and ensure safe working conditions on a steam system.

### Safe Handling

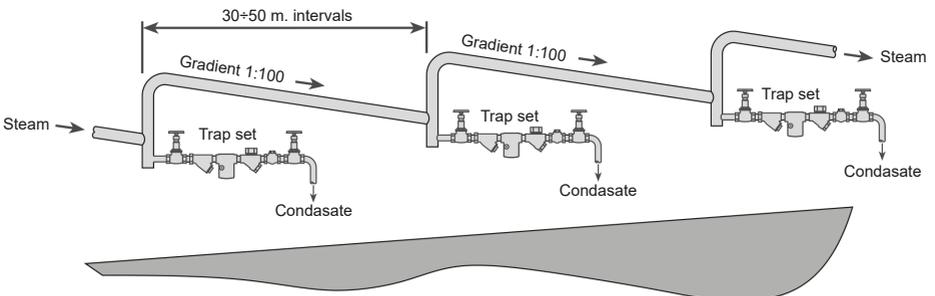
Cast Iron is a brittle material. If the product is dropped during installation and there is any risk of damage the product should not be used unless it is fully inspected and pressure tested by the manufacturer.

Please remove label before commissioning.

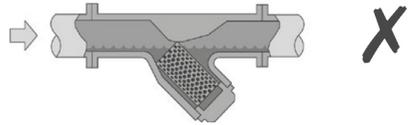
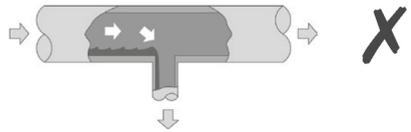
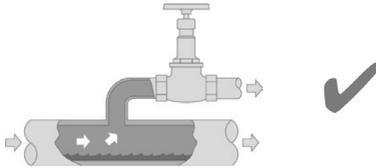
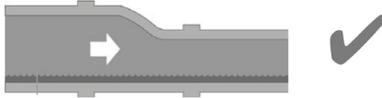
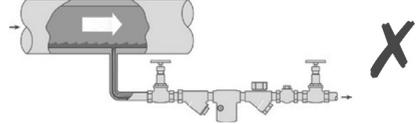
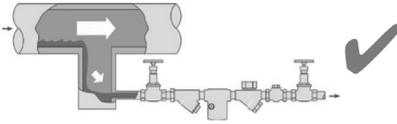


### Prevention of water hammer

Steam trapping on steam mains:



## Steam Mains - Do's and Dont's:



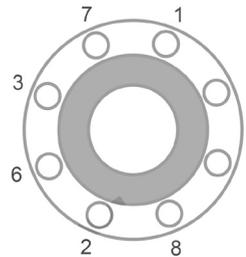
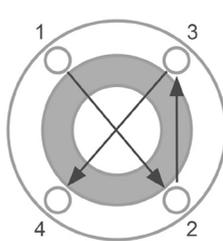
## Prevention of tensile stressing

Pipe misalignment:

Installing products or re-assembling after maintenance:



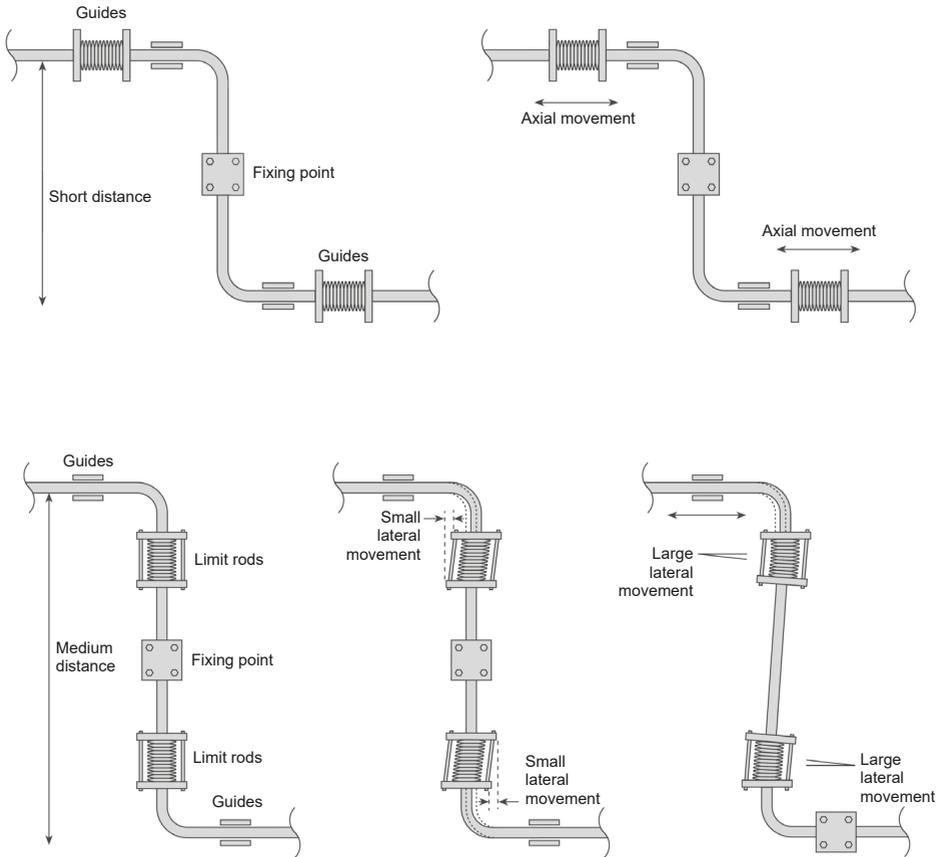
Do not over tighten.  
Use correct torque figures.



Flange bolts should be gradually tightened across diameters to ensure even load and alignment.

## Thermal expansion:

Examples showing the use of expansion bellows. It is highly recommended that expert advice is sought from the bellows manufacturer.



## 2. General product information

### 2.1 Utilization

Stop valves GXM series are designed to interrupt the passage of fluids in the plant. They are manually controlled by the provided handwheel that can be opened by rotating the handwheel counterclockwise and closed by rotating the handwheel in clockwise direction. These valves aren't provided and can't be used for flow control purpose.

Check valves RJ216Z series are designed to open when subjected to a differential pressure enough to exceed the strength exercised from the weight of the valve spring loaded plug (0,1 bar).

Check valves RJ205Z and RJ205N are designed to open when subjected to a differential pressure enough to exceed the strength exercised from the weight of the valve plug.

### 2.2 General description

Stop valves GXM series are provided both with threaded or with flanged connection. The bonnet is enbloc type for threaded valves and bridge type for flanged connections. The spindle seal is graphite ring type.

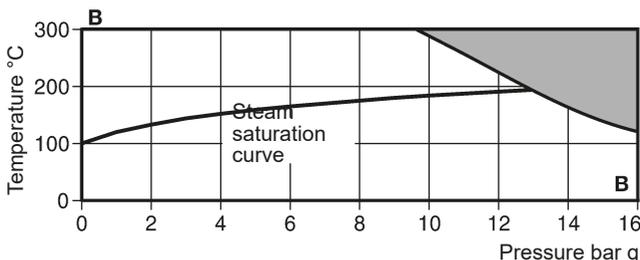
Valves RJ216Z are lift check valves with in line connections. The construction is with flanged connections.

Valves RJ205Z and RJ205N are lift check valves with in line connections. The construction is with threaded gas female connections.

Type	Material	Size	Connections	PN
GXMZ	DIN GG25	½" ÷ 2"	UNI-ISO 7/1 gas	16
GXM16Z	DIN GG26	15 ÷ 100	UNI 2237 - 2229	16
GXM40Z	GP 240 GH	15 ÷ 200	EN1092-1	40
RJ216Z	DIN GG27	15 ÷ 100	UNI 2237 - 2229	16
RJ205Z	DIN GG28	½" ÷ 2"	UNI-ISO 7/1 gas	16
RJ205N	RG5 7 OT58	½" ÷ 2"	UNI-ISO 7/1 gas	16

### 2.3 Limiting conditions

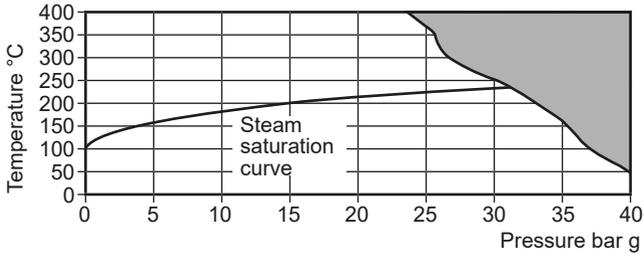
GXMZ  
GXM16Z  
RJ205N  
RJ205Z  
RJ216Z



 The product **must not be** used in this region

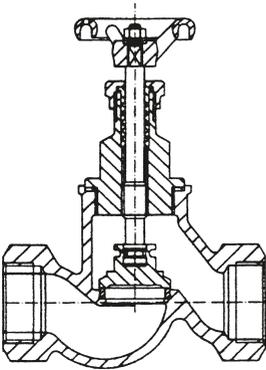
Body design conditions		PN 16
PMA - Maximum allowable pressure		16 bar g @ 120°C
TMA - Maximum allowable temperature	RJ205N	180°C
	RJ205Z, RJ216Z	200°C
PMO - Maximum operating pressure	GXMZ, GXM16Z	300°C @ 9,6 bar g
		12,8 bar g
TMO - Maximum operating temperature	RJ205N	180°C
	GXMZ, GXM16Z, RJ205Z e RJ216Z	200°C
Designed for a maximum cold hydraulic test pressure of		24 bar g

**GXM40Z**

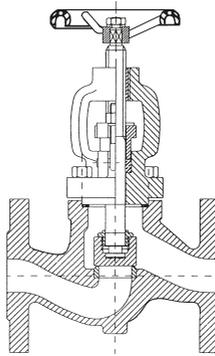


 The product **must not be** used in this region

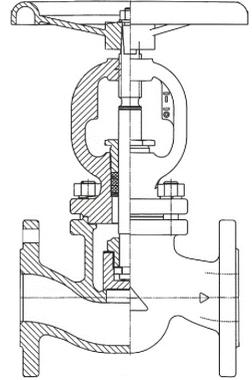
Body design conditions	PN 40
PMA - Maximum allowable pressure	40 bar g @ 50°C
TMA - Maximum allowable temperature	400°C @ 23,8 bar g
PMO - Maximum operating pressure	30,4 bar g
TMO - Maximum operating temperature	250°C
Designed for a maximum cold hydraulic test pressure of	60 bar g



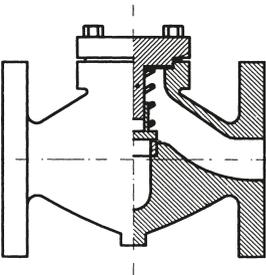
**Fig. 1**  
GXMZ Stop valve



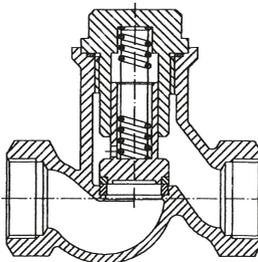
**Fig. 2**  
GXM16Z Stop valve



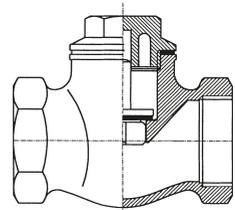
**Fig. 3**  
GXM40Z Stop valve



**Fig. 3**  
RJ216Z Check valve



**Fig. 4**  
RJ205Z Check valve



**Fig. 5**  
RJ205N Check valve

## 3. Quality control and storage

### 3.1 Control upon receipt

All the valves upon receipt must be examined to check they have not suffered injuries during the transport. Detection of possible problems must be promptly communicated to Spirax Sarco. Likewise it is necessary to verify the compatibility between the plant features in which will be installed the valves and the specifications of the supplied product. Check the correctness of maximum temperature, pressure and fluid limits (see the valve label and refer to this handbook). In case of doubt, contact Spirax Sarco.

### 3.2 Storage

All the valves must be stored in dry and covered place, properly protected from both atmospheric agents, dirt and any other foreign body that may result harmful. Valves must be protected until installed on the plant. Protective covers for connections and flanges must not be removed until the installation of the valves on the plant.

## 4. Installation

**Note: before actioning any installing operation observe the 'General safety information' in Section 1.**

### 4.1 General rules

Unpack the valve and remove protective covers from the joints, taking care that any dust or dirt can not enter into the valve. Subsequently, visually verify that the appliance is intact and haven't suffered damages due to transport and storage; otherwise do not proceed to installation.

Check again that the label's data are compatible with plant's requirements.

Check that no pressure exists in the plant and that the piping is clean, carefully blown and free from foreign bodies that may cause irreversible damages to the seal between seat and plug. Damages caused by particles of dust or dirt are not under warranty.

### 4.2 Installation

Valves may be installed on the piping in any position, in any case preferential arrangement may be with handwheel or cap upwards; check valves should be installed in horizontal pipelines cover up. It is always necessary to respect the flow direction, indicated by the arrow marked on the body of the valve. Inlet and outlet piping must be appropriately supported and aligned, and pipe expansions must not generate stress to the valves as they are not designed to withstand it. While positioning and welding the piping, valve must be properly fixed and supported. Threaded valve clamping must not involve further stresses to the equipment and the material employed for joints must be appropriate and compatible with plant requirements and specifications.

Flanged connections must be accurately cleaned to assure perfect positioning and tightness of the gasket. Gasket must be perfectly centred to avoid obstruction inside the passages. Allow a safe access and free space all around the handwheel to carry out work. Flange bolts must be tightened following crossed sequence, adequate to obtain co planarity and uniform clamping.

Do not proceed to tighten the bolts in lack of co planarity or when flanges are excessively spaced.

During painting works, protect the valve stem. Before commissioning the plant and in any case after maintenance works, piping must be accurately washed and blown, keeping the valve completely opened to remove every possible foreign body.

### 4.3 Hydraulic test

When an hydraulic test of the plant is required, the declared test pressure must never been exceeded.

## 5. Commissioning

After installation or any maintenance work, check the whole operativeness of the system and test all the alarms and protection devices.

To commission the plant, slowly increase the pressure, avoiding sudden pressure and temperature variations; simultaneously check presence of leakages at piping connections and on the body of the valve, till achievement of working full pressure. This process is hazardous, and must be worked out with the utmost care.

In leakage case, immediately relieve the pressure proceed with appropriate action to restore the tightness.

Sizes of handwheels are proportioned to the driving force required for the operation of the valve. For no reason supplementary levers should be employed. to operate the valve.

Regular operativeness has to be controlled carrying out some opening and closing cycles.

For GXM threaded valves, in case of leakage of shaft seal, the graphite packing rings must be compressed by tightening the provided threaded nut of the stuffing box, while with flanged valves the compression must be done by clamping the two stuffing box nuts.

## 6. Maintenance

**Note: Before actioning any maintenance operation observe the ‘General safety information’ in Section 1.**

Maintenance operations must be carried out by qualified staff, properly equipped and provided with original spare parts.

Before disassembling the valve from the plant, disconnect and adequately support the concerned pipe parts.

### 6.1 When carry out maintenance

It is advisable to check the valve after some time, to solve simple problems that may become dangerous in the future. Such period of time depends on features and effective use of the plant (type of fluid, temperature, pressure, etc.) and must be fixed from the person in charge of plant maintenance.

### 6.2 Basic controls

To guarantee safe and enduring use of the fitted valves, the following inspections should be performed:

- **Visual inspection of the body:** visually check searching for appeared roughness, possible aroused damages, corrosion or erosion.
- **Lubrication of the stem:** it is recommended to apply to the stem thread a small quantity of graphite-based or copper-based grease to avoid irregular friction or jamming.
- **Checking of the body-cover and of flange-bolts clamping:** after the use of the valve in a continuous cycle of the plant, it is recommended to verify the tightening of components.

### 6.3 Operation for leakages

- **Leakage of connections:** it is necessary to depressurize the system and replace the gaskets, referring to section 4, "Installation".
- **Leakage between valve seat and plug:** this fault is generally caused by foreign bodies entrapped between the inner valve surfaces; the use of the valve in such a situation over an extended period of time could cause irreparable damages. The prompt intervention, grinding the seat and plug can restore the functionality.
- **Stem packing leakage:** this is the most frequently worn out point of the valve; it is therefore required to carry out periodic compression of graphite rings referring to work conditions.
- **Procedure for compression of stem packing ring:** depressurize the system.

For threaded valves GXMZ series, tighten the compression nut of the rings; for valves GXM16Z and GXM40Z series tighten alternatively the flange compression nuts, paying attention to maintain it perpendicular to the stem axis. It should be noted that the compression of the gasket rings increases the operating torque of the valve. Should this operation fail to restore tightness, it is required to replace the rings.

- **Leak between body and cap:** depressurize the system.
  - **For GXM valves** always operate with open plug; unscrew the threaded cap or loosen the screws which fix the cap to the valve body, acting alternatively and with crossing procedure. Verify integrity and good conditions inside the valve body. Remove the old body gasket and accurately clean the contact surfaces. Using a new gasket, refit the parts and, in case of bridge cap, tighten the bolts alternatively and with a crossing procedure.
  - **For RJ216Z check valves,** loosen the fixing screws between body and cap alternatively and with a crossing procedure. Pay attention to the thrust of the plug internal spring. Verify integrity and good conditions of the inside valve body. Remove the old body gasket and accurately clean the contact surfaces. Using a new gasket, refit the parts and tighten the bolts alternatively and with a crossing procedure.
  - **For RJ205Z and RJ205N check valves,** unscrew the cap and verify clearness and good conditions inside the valve body. Remove the old gasket and accurately clean the contact surfaces. Using a new gasket, carry out the assemblage and clamp the cap.

## 7. Spare parts

Place orders for spare parts always indicating the spare designation and valve model and diameter.

Valve type	Spare designation	
<b>GXMZ</b>	Stem seal	(n° 10 rings)
	Body seal	(n° 5 off)
<b>GXM16Z</b>	Stem seal	(n° 10 rings)
	Body seal	(n° 5 off)
<b>GXM40Z</b>	Stem seal	(n° 10 rings)
	Body seal	(n° 5 off)
<b>RJ216Z</b>	Body seal	(n° 5 off)

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## **SERVICE**

For technical support, please contact our local Sales Engineer or our Head Office directly:

**Spirax Sarco S.r.l.** - Technical Assistance

Via per Cinisello, 18 - 20834 Nova Milanese (MB) - Italy

Tel.: (+39) 0362 4917 257 - (+39) 0362 4917 211 - Fax: (+39) 0362 4917 315

E-mail: [support@it.spiraxsarco.com](mailto:support@it.spiraxsarco.com)

## **LOSS OF GUARANTEE**

**Total or partial disregard of above instructions involves loss of any rights to guarantee.**

**Spirax-Sarco S.r.l.** - Via per Cinisello, 18 - 20834 Nova Milanese (MB) - Tel.: 0362 49 17.1 - Fax: 0362 49 17 307