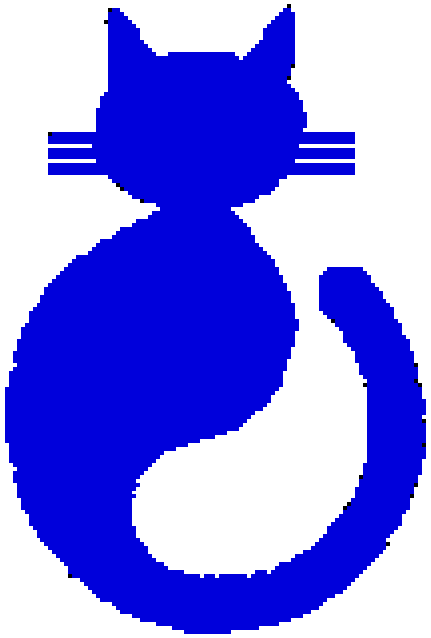


Gascat – Indústria e Comércio Ltda

JR Series - Pressure Regulating Valve

Installation, Maintenance and Operation Manual

CONTENTS

1 – INSTRUCTIONS PRIOR TO COMMISSIONING

It should be clearly understood that the information given under the Commissioning Instructions below do not intend to revoke or substitute instructions laid out by any relevant entity, and reference should be made to the relevant Standards and/or existent recommendations on the subject.

It is implied that before Commissioning, the performance of the appropriate "Cleaning and Purification Procedures" shall be observed and all the instructions contained in "Pressurization" and "Labor Safety and Health Standards" shall be strictly followed.

The recommendations of valves' suppliers, as for instance, "open slowly" or "open very slowly" should be strictly observed.

2 – HEALTH AND SAFETY

Regulators, valves, and other pressurized components that contain toxic or flammable gases, or other hazardous products, are potentially dangerous if not correctly operated and maintained. It is mandatory that all users of these equipments are properly instructed and warned on their potential danger, and certify yourself that the personnel responsible for installation, testing, commissioning, operation, and maintenance of the plant are properly skilled to perform their duties. Instruction manuals are provided for orientation of the operators, but it is supposed that they have a basic knowledge level. If any doubts or ambiguities remain that could affect the proper procedures ask ***Gascat*** Indústria e Comércio Ltda., which will be pleased to instruct, or to provide the suitable service or instruction. **NOT TO TAKE ANY RISK**. Our telephone, fax numbers, and e-mail are the following:

Gascat Indústria e Comércio Ltda.
Rodovia SP 73, 1141 – Indaiatuba / São Paulo.
CEP 13347-990
Brazil
Phone: 55 19 3875-7511
Fax: 55 19 3894-5674
Email: vendas@gascat.com.br

The comments below, while not completely inclusive, provide guidance on possible sources of risk to safety and health.

2.1 – NOISE

Regulators, valves, and other pressure reducers can produce high noise levels, which can be harmful to persons exposed to them for long time periods. Users should assure themselves that appropriate provisions will be taken, in order to foresee health safety of employees and/or third parties, according to standards and recommendations in force.

2.2 – INSTALLATION

All equipment, piping, and vessels are designed to support mechanical efforts, as, for instance, torque and bending momentum, in addition to internal pressure. However, careful shall be exercised during installation not to develop excessive efforts, which can cause cracks that may result in serious breakage when the regulator is put into operation. Excessive tensions can also be caused if the equipment is overburden by piping, which should be otherwise appropriately supported.

All regulators, shutoff valves, relief valves, etc., shall be installed taking into account the correct flow sense.

Impulse lines are important components of any control system and it is essential for them to be correctly installed according to instructions.

Impulse lines should be appropriately supported to reduce excessive vibration, which can provoke fatigue breakdown. They should also be positioned so that they cannot serve as support to feet or hands. Impulse lines should have a slight slope so that liquids and condensates drain towards the main piping.

Auxiliary systems should not be changed, or modified, without knowledge of the operation conditions and permission of the responsible in charge.

2.3 – OPERATION

Depending on the regulator type, its valve can be positioned fully open. Consequently, when a regulator is put into operation, the shutoff valves should be opened slowly so that the regulator valve can assume its regulating position. If the valves are quickly opened, the upstream pressure can pass downstream through the regulator and over-pressurize downstream the main line.

All regulators, etc., should operate with the regulating spring specified by the manufacturer. This provision is particularly important when operating relief or shutoff valves, since incorrect springs can hinder a relief valve to open and a shutoff valve to close.

Provisions should be taken to avoid water input through breathing and ventilation openings.

2.4 – MAINTENANCE

Regulators and valves contain gases under pressure that sometimes are higher than the atmospheric pressure. Before trying to investigate any problem or to perform service maintenance of the equipment, they should be safely de-pressurized. Furthermore, as most gases can be flammable, poisonous, corrosive, or somehow, dangerous, it may be necessary to purge the installation with an inert gas, as nitrogen. Special precautions are necessary for operation with oxygen or hydrochloric gas and the user should be reassured that appropriate procedures are implemented.

Eventually, it is not enough to isolate the high-pressure device, since high pressures can be retained downstream of isolation valves. Do not try to remove covers, plugs, etc., before these parts are properly freed-up. Even so, it is advisable to consider if high-pressure gas can be present at the time of removal of covers and plugs.

Most regulators use spiral springs as the loading device. It is important to reduce the load of these springs relieving their loaders as much as possible. In some cases, some residual load may last, even though the spring is relaxed to the limits of its housing.

3 – INTRODUCTION

The Series JR regulators are single stage, self-operated regulators for heavy duty work under high, medium, and low pressure applications, for all types of non-corrosive gases and for corrosive gases, when built in special versions.

These regulators were developed with the purpose of facilitating their maintenance, or parts substitution, as much as possible. Therefore, because of their top entry characteristic, there is no need to remove them from the line for maintenance or cleaning. The JR Series regulators are also known for their small weight, constructive simplicity and soundness.

For valves intended for use with oxygen, all necessary precautions shall be taken for operation with this gas, avoiding oil or grease presence in tools, and use of lubricants that are not compatible with oxygen. Always use building materials for the valve that are compatible with the type of used gas.

4 – OPERATING PRINCIPLE

Pressure regulators of the JR Series operate by direct spring action on the output pressure sensor element (diaphragm) that, with consumption variation and consequent pressure change on the sensor element, will re-position the shutter stem increasing or reducing the valve aperture, in order to keep the adjusted output pressure constant.

A variation of this system uses external piloting for JR Regulators. Operation is by action of this pilot pressure directly on the sensor element of the output pressure (diaphragm) that, with consumption variation and consequent pressure change on the sensor element, in the same way as for regulators operated by direct spring action, will re-position the shutter shaft increasing or reducing valve aperture, in order to keep constant the adjusted output pressure.

5 – CHARACTERISTICS

- ✓ FITTINGS: ½" thread (with reduction adapter), ¾", ¾" x 1", 1" NPT (according to ANSI B1.20.1) or BSP (according to BS 21 – DIN 2999); with ½", ¾" 150# flange, and with 1" 150/300# flange (pursuant ANSI B16.5).
- ✓ Self-operated regulator by direct spring action.
- ✓ Open or closed fail-safe condition (the closed condition implies the regulating spring with no pressure at all).
- ✓ Topy Entry

6 – INSTALLATION

6.1 – Filter

We recommended the installation of a basket type or "Y" filter of 150 mesh (minimum), as close as possible to the regulator inlet. A careful filter installation is essential to the perfect operation of the equipment, because eventual particles existing in the piping can lodge themselves between the seat and the shutter, damaging them and provoking direct flow passage.

6.2 – Cleaning

Check pipeline cleaning before the regulator installation. We recommended a complete purge of the line with nitrogen or compressed air.

6.3 – Flow Direction

Check the flow direction engraved in the valve body before installation. Junior Series regulators can be installed in any position.

6.4 – Line Ø

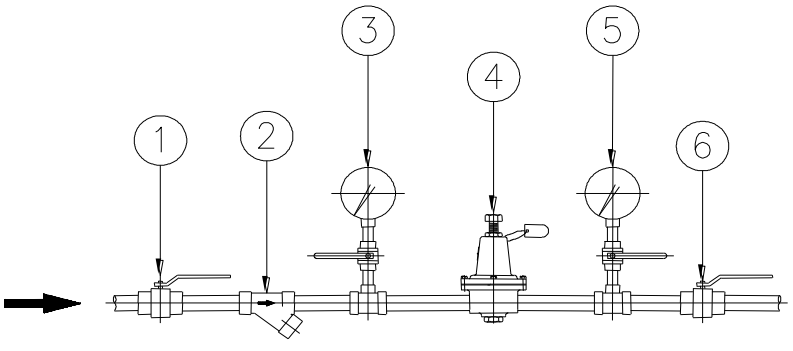
Piping diameter downstream of the regulator should, preferably, be larger than ¾".

6.5 – Other important devices for a safe installation

A safe installation shall contain, at least (see outline drawing proposed below):

1. Manual blocking valve (ball type, or similar).
2. Filter.
3. Pressure gauge for input pressure reading.
4. Pressure regulator.
5. Pressure gauge for output pressure reading.
6. Manual blocking valve (ball type, or similar).

INSTALLATION OUTLINE



7 – OPERATION (START-UP)

- ✓ Slowly open the gas inlet valve.
- ✓ Check if there are no leaks in connections connecting to the regulator.
- ✓ Adjust the outlet pressure (set-point) turning the regulating screw in the clockwise sense to increase pressure, or in the counterclockwise sense to reduce it. Perform this operation with a small gas flow.
- ✓ When the wanted outlet pressure (set-point) is reached, lock the regulating screw with the lock nut.
- ✓ Check tightness of the shutter/seat assembly. Without gas consumption the output pressure gauge shall present a quick increase in pressure at closing that shall stabilizes after some seconds.

8 – MAINTENANCE

Defect	Probable Cause	Solution
Outlet pressure decrease/insufficient flow	Dirt in filter	Check the filter and to proceed its cleaning. For regulators with external pilot check piloting pressure.
Outlet pressure increasing/direct passage	Presence of particles between shutter/seat or worn out shutter packing.	Remove the shutter by removing the lower plug or, for JR II regulator, by removing the spring cover and the seat. Check if the same is not damaged or dirty, proceeding its cleaning or replacement as needed. Check the condition of the sealing border of the seat, proceeding its replacement if necessary.
Gas passage through the spring cap vent	Diaphragm rupture.	To loosen the cover of the spring and to replace the diaphragm.
Vibration.	Worn out shutter and seat shaft.	Replace the shutter and seat shaft assembly.

9 – STORAGE

The regulators should not suffer mechanical shock, not to risk internal components' damages.

The regulators should be stored at a clean and dry place, protected from bad weather.

10 – GENERAL RECOMMENDATIONS

- ✓ We test our regulators and valves at the requested operation conditions.
- ✓ Criteria and maintenance steps are contained in manuals, however, for any doubt on the use, operation, or maintenance, contact Gascat's technical department that will provide you proper guidance.
- ✓ Gascat supplies, on request, a complete replacement kit.

11 – WARRANTY

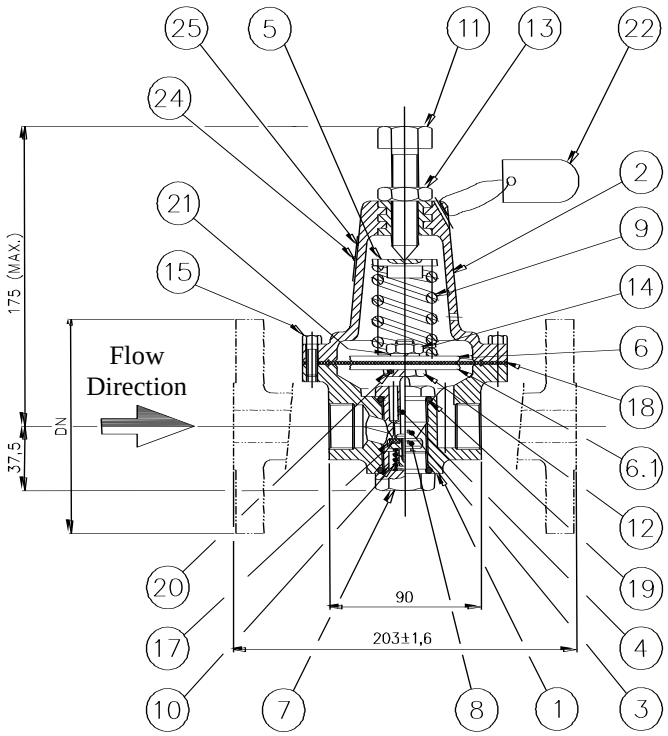
We warrant our products, for a 12 months period from the date of invoicing, if the products are in operation, extending the warrant up to 18 months, in case they are in stock. Such warranty only covers those cases for which the occurrence of production defects are evidenced, which remained unnoticed at the time the product delivery.

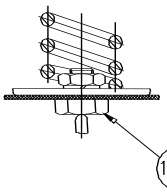
To present warranty is not valid if it is found that the defect or mishap was caused by accident, normal wear, inadequate installation, improper maneuvering or use, inadequate storage, assembly disregarding technical standards or if the buyer undertook repairs or changes in equipment by himself, without the manufacturer's previous authorization.

The information contained in this manual contains Gascat's supply conditions, independently of the verified performance.

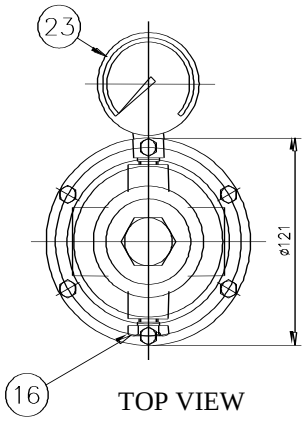
The information herein contained shall not be interpreted or suggest performance warranty in relation to the final products, or the system usage purpose, nor should they serve as usage recommendation for any product or process mentioned in the specifications. This system should only be operated by qualified technician trained for this purpose; and no changes that may affects the system safety can be executed without our previous authorization.

Gascat Ind. and Com. Ltda. withholds the right to make changes without notice, introducing improvements in the described products drawings or specifications.





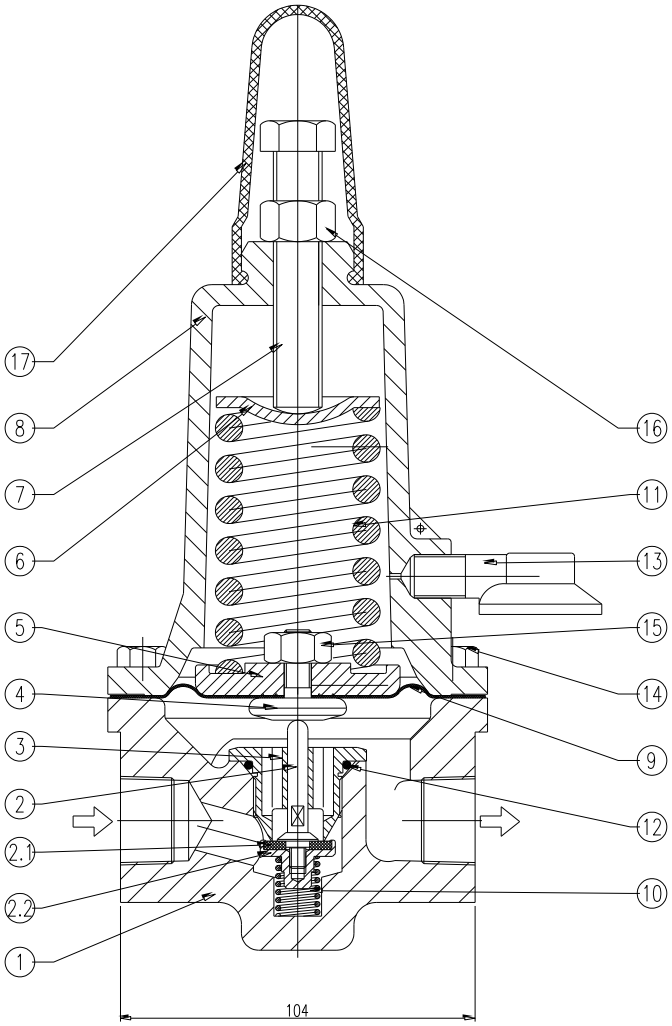
Building detail for
Regulating Valve Junior B

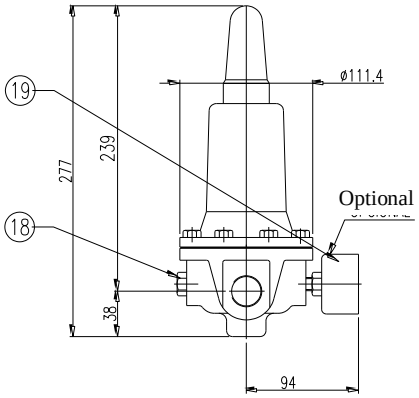


TOP VIEW

	Item	Qty.	DESCRIPTION	Drawing Nº	Material	Remarks
	1	01	BODY	See Table 1		
	2	01	TOP COVER	21.005.3	SAE 323	
•	3	01	SEAT	21.007.4		
•	4	01	STEM	21.012.4		
	5	01	SPRING FOLLOWER	21.010.4	SAE 1020	Yellow Dichromate
	6	01	DIAPHRAGM PLATE (For JR A, B & HP)	21.009.4	BRASS	
	6.1	01	DIAPHRAGM PLATE (For JR A & HP)	21.009.4	BRASS	
	7	01	PLUG	21.011.4		
•	8	01	SHUTTER	21.008.4		
	9	01	REGULATING SPRING		SAE 1070	Painted
	10	01	SHUTTER SPRING	01.038.4	AISI 302	
	11	01	REGULATING SCREW	21.014.4	SAE 1020	Yellow Dichromate
•	12	01	DIAPHRAGM SCREW (For JR A & HP)	21.015.4		
•	12.1	01	DIAPHRAGM SCREW (For JR B)	05.001.4		
	13	01	NUT 5/8" W.		EB-283	Yellow Dichromate
	14	01	NUT 1/2" W.		EB-283	Yellow Dichromate
	15	06	HEX. HEAD SCREW ¼" W x ¾"		EB-168	Yellow Dichromate
	16	01	PLUG			
•	17	01	SHUTTER GASKET	04.004.4		
•	18	01	DIAPHRAGM	04.001.4		
•	19	02	O'RING			
•	20	01	O'RING for JUNIOR A & HP			
	21	01	SPRING WASHER		SAE 1070	Yellow Dichromate
	22	01	TAG NAMEPLATE		SS	If requested
	23	01	PRESSURE GAUGE WITH EXTENSION			
	24	02	RIVET		SAE 1020	
	25	01	NAMEPLATE		ALUMINUM	

NOTE: (•) Denotes items of the spare parts kit

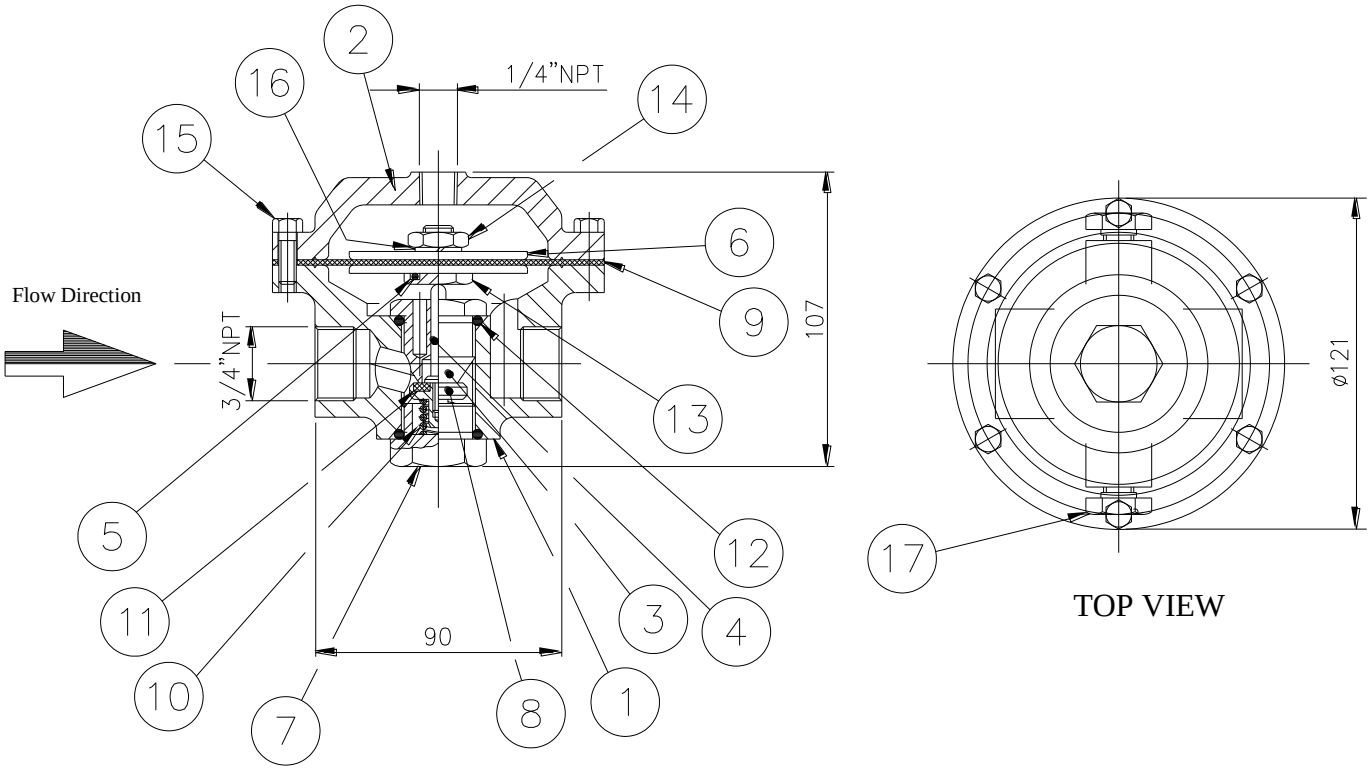




	Item	Qty.	DESCRIPTION	MaterialL	Drawing Nº	Remarks
	1	01	BODY	FORGED BRASS	21.012.2	SEE NOTE 1.
•	2	01	SHUTTER STEM	AISI 410	21.012.4	
•	2.1	01	SHUTTER GASKET	VITON	04.004.04	
	2.2	01	SHUTTER BODY	BRASS	21.008.4	
•	3	01	SIX (6) HOLES SEAT	TM-360	21.024.4	
	4	01	DIAPHRAGM SCREW	SAE 1020	21.026.4	
	5	01	TOP PLATE	SAE 1020	21.027.4	
	6	01	SPRING FOLLOWER	SAE 1020	21.029.4	
	7	01	REGULATING SCREW	SAE 1020	21.028.4	
	8	01	COVER	SAE 323	21.013.3	
•	9	01	DIAPHRAGM	BUNA N	04.036.4	
	10	01	SHUTTER SPRING	AISI 302	01.038.4	
	11	01	REGULATING SPRING	SAE 1070	SEE TABLE	
•	12	01	O-RING	BUNA N	06.49.18	
	13	01	¼" NPT VENT	BUNA N	03.49.10	
	14	08	HEX. HEAD SCREW 5/16" NC x 18 FPP x 11/16"	CLASS 8.8	05.50.66	
	15	01	HEX. NUT 1/16" NC	CLASS 8.8	05.50.67	
	16	01	LOWER NUT 9/16" NC	CLASS 8.8	05.50.68	
	17	01	HOOD	ABS	28.01.54	
	18	01	HEX PLUG 1/8" NPT	BRASS	03.49.01	
	19	01	PRESSURE GAUGE			

NOTE: (•) Denotes items of the spare parts kit

PILOT DRIVEN JR REGULATOR



	Item	Qty.	DESCRIPTION	Drawing Nº	Material	Remarks
	1	01	BODY	21.00.01	NODULAR	
	2	01	TOP COVER	21.00.25	BRONZE	
•	3	01	SEAT	21.01.01	BRASS	
•	4	01	SHUTTER STEM	21.01.54	AISI 410	
•	5	01	O-RING	06.49.45	BUNA-N	
	6	01	DIAPHRAGM PLATE	21.01.27	BRASS	
	7	01	PLUG	21.01.05	SAE 1020	
•	8	01	SHUTTER BODY	21.01.02	BRASS	
•	9	01	DIAPHRAGM	04.49.36	BUNA-N	
	10	01	SHUTTER SPRING	01.49.40	AISI 302	
•	11	01	SHUTTER GASKET	04.49.47	VITON	
•	12	02	O-RING	06.49.18	BUNA-N	
•	13	01	DIAPHRAGM SCREW	21.01.26	BRASS	
	14	01	NUT ½" W	05.49.41	EB-283	Yellow Dichromate
	15	06	HEX HEAD SCREW ¼" w x ¾"	05.49.55	EB-168	Yellow Dichromate
	16	01	SPRING WASHER	05.49.73	SAE 1070	Yellow Dichromate
	17	01	PLUG	03.49.01	BRASS	

NOTE: (•) Denotes items of the spare parts kit