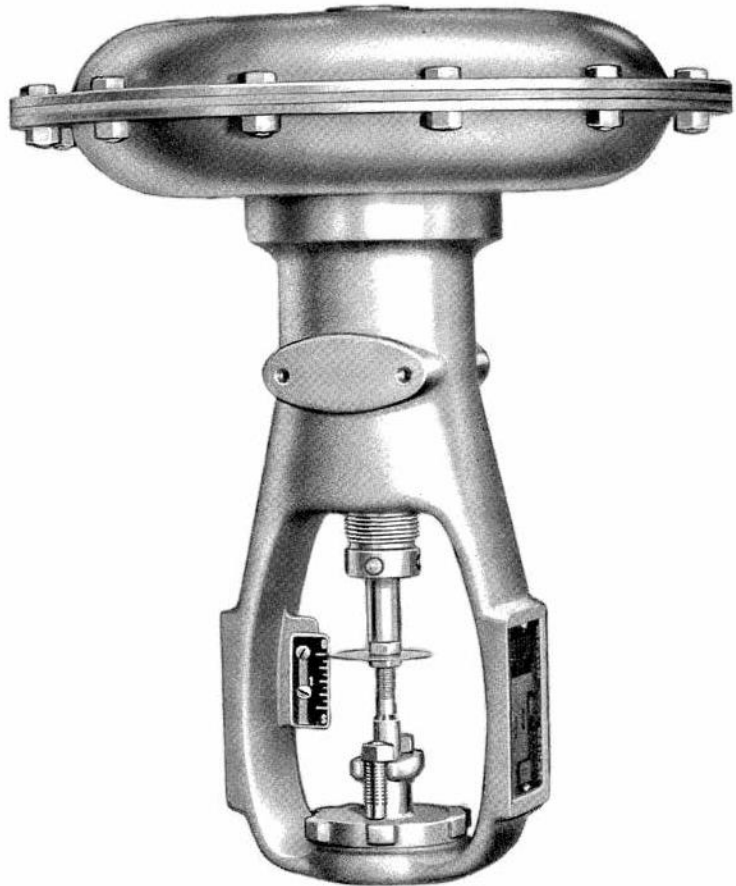


# Model 37/38

## Spring-Diaphragm Actuators

Instruction Manual (Rev.D)



**THESE INSTRUCTIONS PROVIDE THE CUSTOMER/OPERATOR WITH IMPORTANT PROJECT-SPECIFIC REFERENCE INFORMATION IN ADDITION TO THE CUSTOMER/OPERATOR'S NORMAL OPERATION AND MAINTENANCE PROCEDURES. SINCE OPERATION AND MAINTENANCE PHILOSOPHIES VARY, BAKER HUGHES COMPANY (AND ITS SUBSIDIARIES AND AFFILIATES) DOES NOT ATTEMPT TO DICTATE SPECIFIC PROCEDURES, BUT TO PROVIDE BASIC LIMITATIONS AND REQUIREMENTS CREATED BY THE TYPE OF EQUIPMENT PROVIDED.**

**THESE INSTRUCTIONS ASSUME THAT OPERATORS ALREADY HAVE A GENERAL UNDERSTANDING OF THE REQUIREMENTS FOR SAFE OPERATION OF MECHANICAL AND ELECTRICAL EQUIPMENT IN POTENTIALLY HAZARDOUS ENVIRONMENTS. THEREFORE, THESE INSTRUCTIONS SHOULD BE INTERPRETED AND APPLIED IN CONJUNCTION WITH THE SAFETY RULES AND REGULATIONS APPLICABLE AT THE SITE AND THE PARTICULAR REQUIREMENTS FOR OPERATION OF OTHER EQUIPMENT AT THE SITE.**

**THESE INSTRUCTIONS DO NOT PURPORT TO COVER ALL DETAILS OR VARIATIONS IN EQUIPMENT NOR TO PROVIDE FOR EVERY POSSIBLE CONTINGENCY TO BE MET IN CONNECTION WITH INSTALLATION, OPERATION OR MAINTENANCE. SHOULD FURTHER INFORMATION BE DESIRED OR SHOULD PARTICULAR PROBLEMS ARISE WHICH ARE NOT COVERED SUFFICIENTLY FOR THE CUSTOMER/OPERATOR'S PURPOSES THE MATTER SHOULD BE REFERRED TO BAKER HUGHES.**

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## Safety Information

### Important –

#### Please read before installation

These instructions contain **DANGER**, **WARNING**, and **CAUTION** labels, where necessary, to alert you to safety related or other important information. Read the instructions carefully **before** installing and maintaining your control valve. **DANGER** and **WARNING** hazards are related to personal injury. **CAUTION** hazards involve equipment or property damage. Operation of damaged **equipment can, under certain operational conditions, result in degraded process system performance that can lead to injury or death. Total compliance with all DANGER, WARNING, and CAUTION notices is required for safe operation.**



This is the safety alert symbol. It alerts you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.



Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.



Indicates a potentially hazardous situation which, if not avoided, could result in serious injury.



Indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury.



When used without the safety alert symbol, indicates a potentially hazardous situation which, if not avoided, could result in property damage.

**Note: Indicates important facts and conditions.**

## About this Manual

- The information in this manual is subject to change without prior notice.
- The information contained in this manual, in whole or part, shall not be transcribed or copied without Baker Hughes's written permission.
- Please report any errors or questions about the information in this manual to your local supplier.
- These instructions are written specifically for the 37/38 spring diaphragm actuator and do not apply for other equipment outside of this product line.

## Useful Life

The current estimated useful life period for the 37/38 actuator is 25+ years. To maximize the useful life of the product, it is essential to conduct annual inspections, routine maintenance and ensure proper installation to avoid any unintended stresses on the product. The specific operating conditions will also impact the useful life of the product. Consult the factory for guidance on specific applications if required prior to installation.

## Warranty

Items sold by Baker Hughes are warranted to be free from defects in materials and workmanship for a period of one year from the date of shipment provided said items are used according to Baker Hughes recommended usages. Baker Hughes reserves the right to discontinue manufacture of any product or change product materials, design or specifications without notice.

### **Note: Prior to installation**

***The equipment must be installed, put into service and maintained by qualified and competent professionals who have undergone suitable training.***

***All surrounding pipelines must be thoroughly flushed to ensure all entrained debris has been removed from the system.***

***Under certain operating conditions, the use of damaged equipment could cause a degradation of the performance of the system which may lead to personal injury or death.***

***Changes to specifications, structure, and components used may not lead to the revision of this manual unless such changes affect the function and performance of the product.***

## Description

The **Masoneilan™ 37/38** spring-diaphragm actuator is a simple, powerful, mechanical device. There are two general types: *Air-to-Extend Stem* and *Air-to-Retract Stem*. Actuators are designated by case size: Nos. 9, 11, 13, 15, 18 and 18L.

The nominal range of a spring-diaphragm actuator is the air pressure range in pounds per square inch (psi) for rated stroke under no load. Common ranges are 3–15 psi and 6–30 psi. The spring range and maximum allowable supply pressure are marked on the serial plate. For a 3–15 psi nominal range, the stem will start to stroke when the air pressure reaches 3 psi, and will complete the stroke when the pressure reaches 15 psi (plus or minus 5%).

In the air-to-extend actuator, conformation of the molded diaphragm to the diaphragm plate serves as a flexible upper guide for the actuator stem (26). The lower guide is an oil-impregnated bronze bushing (37) located in the spring adjustor (36). The air-to-retract actuator differs from the air-to-extend unit in that the spring (22), spring barrel (71) and spring adjustor (36) are located *above* the diaphragm plate (40) and diaphragm (39) which are inverted. A gasket (19) at the joint of the diaphragm case and yoke and a packing box around the actuator stem prevents air leakage. The diaphragm acts as a flexible upper guide and the packing box assembly as the lower guide for the actuator stem.

Air connections are 1/4" NPT. Connections are located in the upper diaphragm case (air-to-extend actuators) or yoke (air-to-retract actuators).

Standard Actuator Size	Effective Diaphragm Area (sq. in.)	Maximum Stroke (in.)
9	45	3/4
11	71	1
13	105	1 1/2
15	145	2
18	200	2 1/2
18L	200	4

## Maintenance

### Air-to-Extend Actuators (Type 37)

#### Diaphragm Replacement

Before disassembling the actuator, all spring compression should be relieved by turning the spring adjustor (36), to prevent the upper case popping up when the cap screws (45) are removed. This is especially important on actuators with a high initial spring setting. Remove cap screws (45), nuts (46) and upper diaphragm case (43). Remove nut (30) and washer (41) to release the diaphragm (39). If possible, the replacement diaphragm should be of the molded type supplied by Baker Hughes Masoneilan, but in an emergency a diaphragm may be cut from flat sheet stock for up to and including No. 15 actuators. To allow sufficient stroke without restriction due to flatness of the diaphragm, the diaphragm bolt circle should be about 10% greater than that of the diaphragm case.

Replace washer (41), nut (30) and upper diaphragm case.

#### Spring Adjustment

An air supply, with a gauge and regulator, should be piped to the upper diaphragm case for this adjustment. Adjust spring compression so that the actuator stem (26) just begins to move when air pressure reaches minimum pressure of the range stamped on the serial plate. This movement is most easily detected by feeling the stem as air pressure is applied.

**Note: Adjust spring compression only when there is no air pressure on diaphragm.**

## **Air-to-Retract Actuators (Type 38)**

### **Diaphragm Replacement**

The procedure is the same as for air-to-extend actuators except that the entire upper case assembly (including spring barrel (71), spring (22), spring seats (33 and 34), nut (30) and diaphragm plate (40) must be removed to release the diaphragm. Install a new diaphragm and reassembly the above parts.

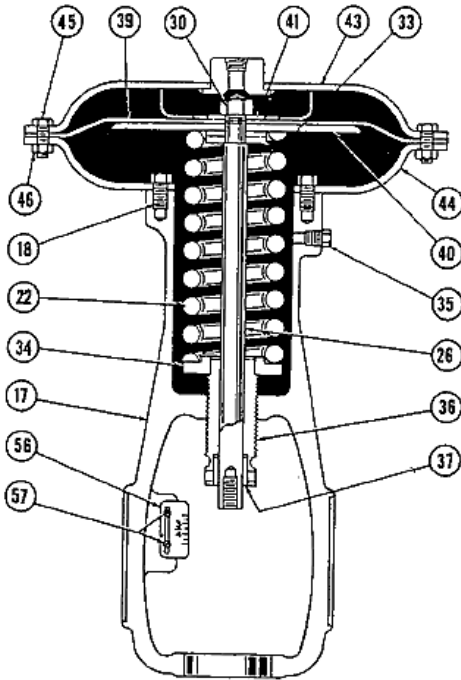
### **Spring Adjustment**

The procedure is identical with that for air-to-extend actuators except that supply air is piped to the 1/4" port in the yoke.

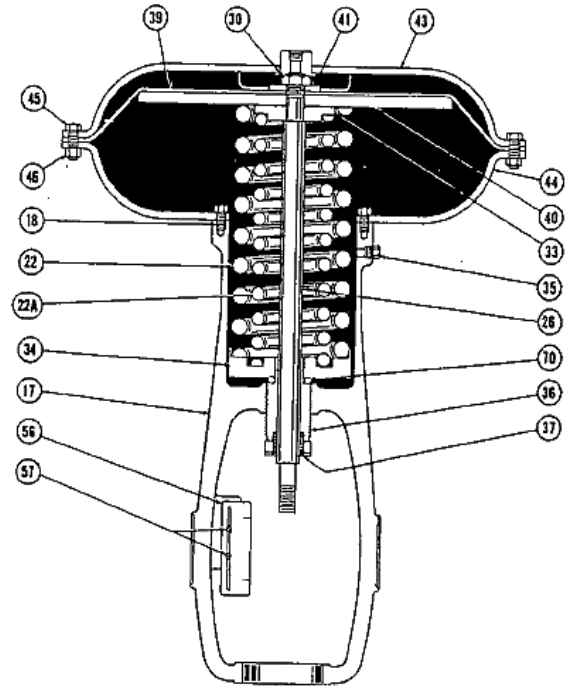
### **Packing Box**

The packing box is subject to low air pressure only and requires minimum maintenance. The packing rings have a square section and are made of carbon core with braided PTFE jacket. The packing may be added to or completely replaced without disassembling either the actuator or the mechanism (or valve) to which it is attached. Be sure to tighten packing nut (20) lightly. Over-tightening will cause excessive friction, resulting in sluggish performance.

### Air-to-Extend Actuators (Type 37)

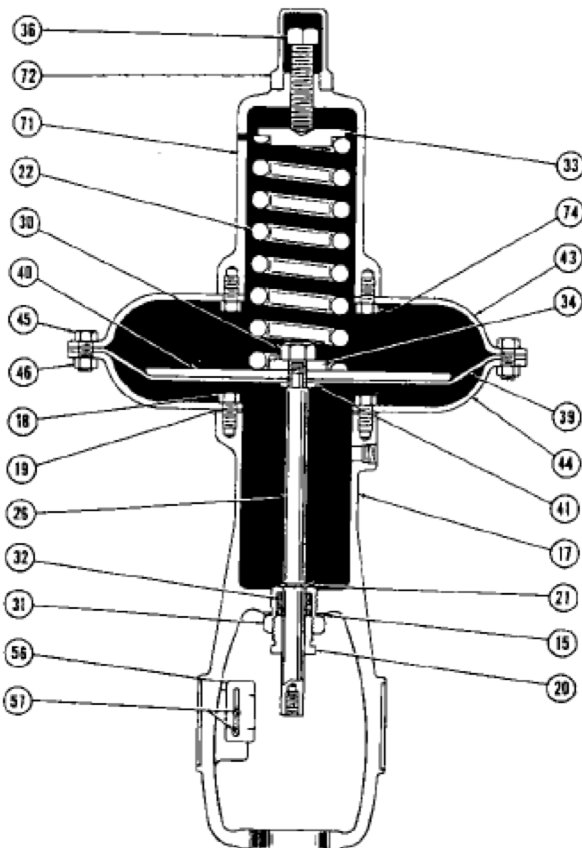


Case Nos. 9, 11 & 13

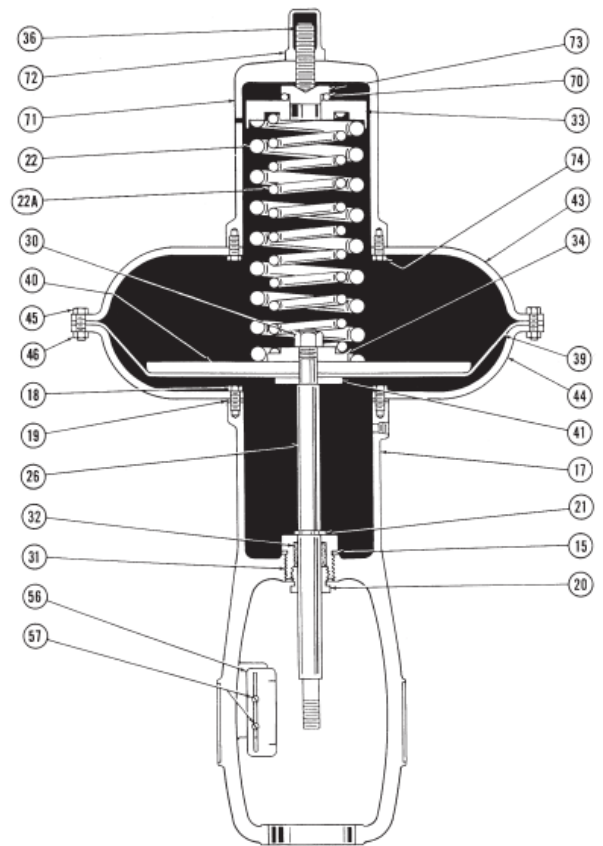


Case Nos. 15, 18 & 18L

### Air-to-Retract Actuators (Type 38)



Case Nos. 9, 11 & 13



Case Nos. 15, 18 & 18L

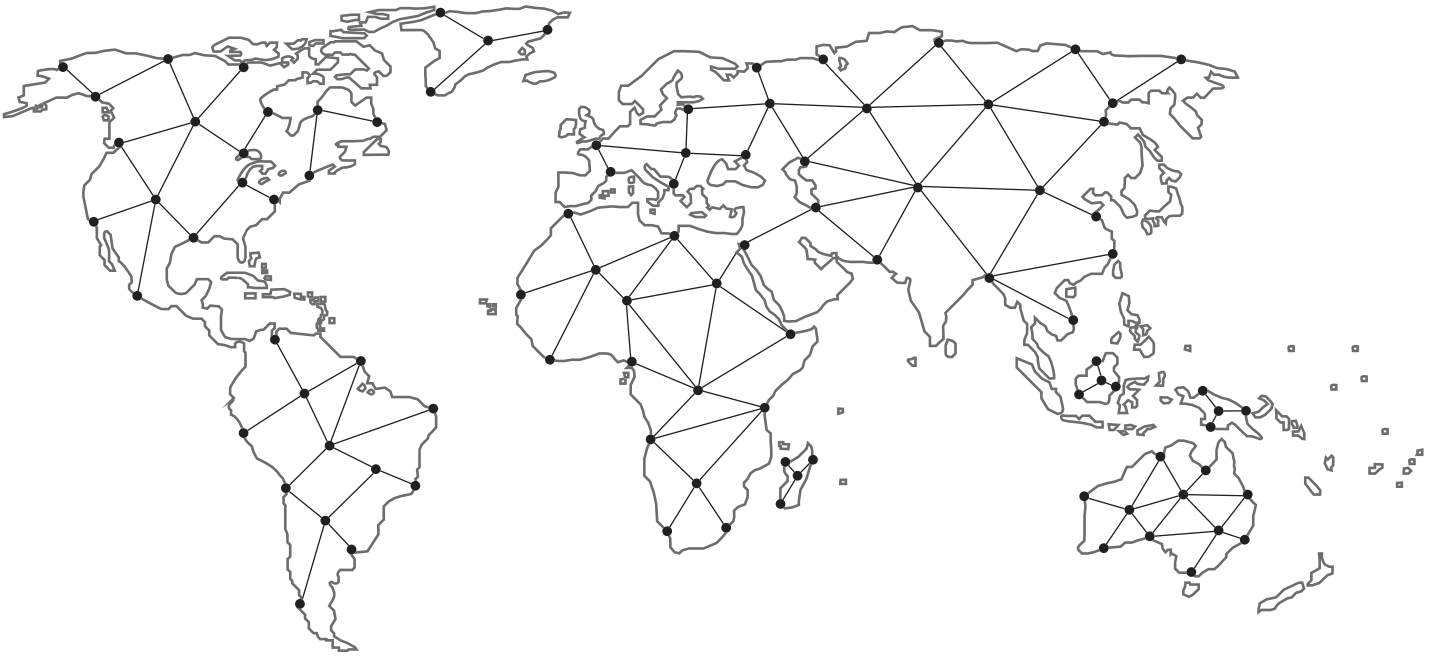
## Parts Reference

Ref. No.	Part Name	Computer Abbrev.	Ref. No.	Part Name	Computer Abbrev.
• 15	Gasket (packing box)	GASKET	37	Bushing (spring adjuster)	BUSHING
17	Yoke	YOKE	• 39	Diaphragm	DIAPHRM
18	Cap Screw (L case to yoke)	CAP SCR	40	Diaphragm Plate	DPH PLT
• 19	Gasket (L case to yoke)	GASKET	41	Diaphragm Washer	DPH WSH
20	Packing Nut	PKG NUT	43	Upper Diaphragm Case	U D CSE
21	Snap Ring Actuator	SNP RNG	44	Lower Diaphragm Case	L D CSE
22	Spring Actuator	ACT SPR	45	Cap Screw (diaph. case)	CAP
22A	Spring Actuator	ACT SPR	46	Nut (diaph. case)	NUT
26	Stem	STM	56	Travel Indicator Scale	T I SCL
30	Nut (actuator stem)	NUT	57	Machine Screw Ball	MCN SCR BALL
31	Packing Box	PKG BOX	70	and Retainer Spring	& RTN SPR
• 32	Packing	PACKING	71	Barrel Spring Barrel	BRL SBL
33	Spring Seat (upper)	USPR ST	72	Cap Ball Bearing	CAP BBG
34	Spring Seat (lower)	LSPR ST	73	Race	RCE
35	Pipe Plug	PIP PLG	74	Cap Screw (SBL to U D CSE)	CAP SCR
36	Spring Adjustor	SPR ADJ			

- Recommended spare parts.

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