

**VALVOLE MANUALI A SFERA TIPO VS2200 – PED 2014/68/UE**  
**BALL MANUAL VALVES TYPE VS2200 - PED 2014/68/UE****MANUALE DI INSTALLAZIONE E MANUTENZIONE**  
**INSTALLATION AND MAINTENANCE MANUAL****1 – INFORMAZIONI GENERALI**

A) Prima di installare l'apparecchio rimuovere le protezioni di plastica poste a copertura delle flange o degli attacchi di connessione.

B) Prima di installare l'apparecchio assicurarsi che il fluido sia compatibile con i dati di targa e specifica tecnica.

C) **Attenzione!** Durante la messa in funzione o l'esercizio non toccare l'apparecchio che potrebbe condurre calore se il fluido impiegato è ad alta temperatura.

D) Le valvole sono realizzate per impieghi su fluidi puliti (senza contenuto di parti solide) o blandamente abrasivi.

**Attenzione!** L'utilizzo con fluidi abrasivi può determinare il rapido decadimento delle caratteristiche di tenuta della valvola in esercizio; la presenza di solidi o l'utilizzo con fluidi incrostanti o con depositi indurenti possono determinare il rapido decadimento delle caratteristiche di tenuta e manovrabilità.

E) L'utilizzatore deve prevedere metodi adeguati alla eliminazione dei rischi derivanti dalla temperatura superficiale dei corpi valvola in esercizio. L'identificazione della temperatura superficiale dei corpi in accordo alla Direttiva 2014/34/UE ATEX non è possibile, risultando funzione della temperatura del fluido intercettato. Nei servizi con fluidi a temperatura ambiente le valvole non superano i 60°C (classe di temperatura T6 in accordo EN13463-1) in presenza di manovre ripetute con cadenza non superiore a 1 operazione ogni 3 secondi. Diversamente, la temperatura superficiale del corpo raggiunge la temperatura del fluido veicolato.

**Attenzione!** L'utilizzatore deve valutare la temperatura superficiale dei corpi qualora l'ambiente circostante possa presentare atmosfera potenzialmente esplosiva.

**Attenzione!** Non superare cadenze di manovra oltre 1 operazione ogni 3 secondi.

F) Le valvole devono essere utilizzate all'interno dei valori massimi e minimi di temperatura e pressione indicati sul prospetto tecnico. Per ulteriori informazioni circa le massime combinazioni pressione/temperatura ammissibili contattare il nostro Ufficio Tecnico.

**Attenzione!** L'utilizzatore deve prevedere mezzi idonei contro il superamento dei limiti di impiego.

G) **Attenzione!** Prima di iniziare eventuali operazioni di manutenzione assicurarsi che l'apparecchio non sia in pressione e/o caldo.

H) La chiusura rapida della valvola in condizioni di flusso ad alta velocità può determinare una sovrassollecitazione delle sedi di tenuta per "colpo di ariete", tali da determinare il decadimento delle caratteristiche di tenuta.

**Attenzione!** L'utilizzatore deve prevedere mezzi idonei contro gli effetti da "colpo di ariete"

**1 – GENERAL INFORMATION**

A) Before installing equipment, remove plastic covers placed on flanges or connection ends.

B) Before installing equipment, be sure the fluid is compatible with the plate data and the technical leaflet.

C) **Warning!** Do not touch the equipment during start-up or during working operation because it may conduct heat if the used fluid is at high temperature..

D) The valves are built for clean fluids (without solid part inside) or little abrasive.

**Warning!** Using abrasive fluids may cause a fast decay of the tightness characteristics. Using scaled fluids, fluids with deposit or with solid parts may cause a fast decay of the tightness and handling characteristics.

E) Users must have suitable methods to avoid hazards due to surface body temperature in working conditions. It's not possible to define the surface temperature according to Directive 2014/34/UE ATEX, because it is the temperature of the intercepted fluid. In the plants with ambient temperature the valves don't overtake 60°C (T6 class temperature according to EN13463-1) handling up to 1 operation every 3 seconds. On the other hand, the body surface temperature hits the one of the carried fluid.

**Warning!** The user must know the surface temperature of the body valves, if the valve is operating in a potential explosive atmosphere .

**Warning!** Don't handle the valve more than 1 time every 3 seconds.

F) Valves must be used according to the minimum and maximum values indicated on the technical leaflet. For further information about the maximum pressure/temperature combination, please contact our Technical Department.

**Warning!** The user must use suitable methods against working limits overtaking.

G) **Warning!** Before starting maintenance be sure that the equipment is not pressurized or hot.

H) A fast closure of the valve with high speed fluid condition may cause an overstress on the tightness seats due to "water hammer"

**Warning!** The user must use suitable methods against "water hammer" effects

I) Il numero massimo di ore di esercizio previste può essere influenzato dalle condizioni reali di esercizio.

**Attenzione!** L'utilizzatore determini l'intervallo minimo per l'ispezione periodica sulla base delle reali condizioni di esercizio, in particolare in funzione del grado di corrosione/anno previsti in sede di progettazione della linea in relazione al sovra spessore di corrosione disponibile. Si raccomanda che la periodicità del controllo non superi comunque i due anni o le 5000 manovre.

L) **Attenzione!** Non è garantito il funzionamento delle valvole corredate con attuatore di manovra in caso di terremoto.

M) **Attenzione!** Non è consentito il montaggio di attuatori diversi da quelli forniti senza preventiva approvazione dal costruttore.

N) **Attenzione!** L'utilizzatore deve provvedere alla pulizia periodica delle zone soggette all'accumulo di polveri al fine di evitare depositi superiori a 5 mm.

O) Non rimuovere la targhetta descrittiva poiché riporta importanti dati tecnici e marcature. La manomissione di tale targhetta comporta la decadenza della conformità PED 97/23/CE e della conformità alla specifica tecnica.

I) The max. number of working time (hours) depends on the real working conditions.

**Warning!** The user must determinate the minimum time for the periodical check-up, according to the real working conditions. Pay attention to the corrosion/year degree, set in the plant project, according to the extra thickness of corrosion. It's recommended to check-up the valve not later than two years or up to 5000 handlings.

G) **Warning!** in case of earthquake, the proper working of valves with pneumatic or electric actuators is not

M) **Warning!** It's not allowed to mount other type of actuators, different from the standard, without Constructor approval.

N) **Warning!** The user must clean periodically the valve from the dust, to avoid the deposit over 5 mm.

O) Do not remove description plate because important technical data are stamped on it. Removing the description plate the PED 97/23/CE conformity and the conformity to the technical leaflet will expire.

INSTALLAZIONE	INSTALLATION
<p>La valvola è bidirezionale perciò può essere montata in entrambi i sensi.</p> <p>Compatibilmente con il diametro della valvola viene comunque raccomandato il montaggio di un filtro a "Y" tipo "FY300 - FY600 - FY600K" a monte dello stesso.</p>	<p>The valve can be installed in both directions.</p> <p>An "FY300 - FY600 - FY600K" "Y" strainer is recommended before the valve.</p>
MANUTENZIONE	MAINTENANCE
2	

<ol style="list-style-type: none"> <li>1. <i>Disinstallare la valvola dall'impianto.</i></li> <li>2. <i>Pulire la valvola dai residui del prodotto dell'impianto, specie se tossico o comunque nocivo.</i></li> <li>3. <i>Bloccare la valvola in morsa.</i></li> <li>4. <i>Ruotare la sfera in posizione di "valvola chiusa" mediante la leva (rif.15).</i></li> <li>5. <i>Contrassegnare la posizione Corpo-Chiusura tracciando una linea di fede a mezzo della punta da segno.</i></li> <li>6. <i>Svitare e togliere i terminali (rif.20) dal corpo svitando i dadi (rif.18)</i></li> <li>7. <i>Sollevare e togliere le guarnizioni corpo di tenuta (rif.5).</i></li> <li>8. <i>Estrarre la sfera (rif.2), esaminare la superficie della calotta sferica e nel caso si superficie rigata o danneggiata procedere alla sostituzione della sfera.</i></li> <li>9. <i>Sollevarre ed estrarre le due sedi di tenuta (rif.3). Pulire accuratamente le sedi e nel caso di superfici rigate o danneggiate procedere alla sostituzione delle sedi.</i></li> <li>10. <i>Svitare e togliere il dado di fissaggio (rif.13) dallo stelo. Togliere in sequenza : il disco di bloccaggio (rif.10) la rondella a dentatura esterna (rif.9) la boccola (rif.8) il pacchetto premistoppa (rif.7) lo stelo (rif.12) procedere alla sostituzione del pacchetto premistoppa (rif.7)</i></li> <li>11. <i>Rimontare dall'interno lo stelo e le altre parti, procedendo nell'ordine inverso da quello dello smontaggio.</i></li> <li>12. <i>Posizionare le sedi di tenuta nei relativi alloggiamenti.</i></li> <li>13. <i>inserire la sfera nel corpo valvola ed eseguire con cautela alcune manovre per accertare e garantire la rotazione in posizione della sfera.</i></li> <li>14. <i>Posizionare nell'alloggiamento la guarnizione corpo di tenuta tra corpo e terminali.</i></li> <li>15. <i>Avvitare i dadi (rif.18).</i></li> <li>16. <i>Accertarsi che la rotazione della sfera, apertura e chiusura della valvola, presenti una resistenza di manovra omogenea.</i></li> </ol>	<ol style="list-style-type: none"> <li>1. <i>Disconnect the valve from the plant.</i></li> <li>2. <i>Clean the valve from the rest of the plant product, especially if toxic and dangerous.</i></li> <li>3. <i>Lock the valve into a vice.</i></li> <li>4. <i>Rotate the ball into "closed valve" position by the lever (ref.15).</i></li> <li>5. <i>Mark the "closed body" position with a line, using a centre punch.</i></li> <li>6. <i>Unscrew and remove the terminals body (ref.20) from the body unscrew the nuts (ref18).</i></li> <li>7. <i>Lift and remove the body gaskets (ref.5) with suitable tools.</i></li> <li>8. <i>Remove the ball (ref.2), inspect the surface and replace it if damaged or scratched.</i></li> <li>9. <i>Lift and remove the two seats (ref.3) with suitable tools. Clean the seats and replace it if damaged or scratched.</i></li> <li>10. <i>Unscrew and remove the locking nuts (ref.13) from the stem. Remove step by step: The stopper (ref.10) The tab washer (ref.9) The gland (ref.8) The stem packing (ref.7) The stem (ref.12) Replace the stem packing (ref.7)</i></li> <li>11. <i>Remount the stem and the other components from the inside, in the reverse order.</i></li> <li>12. <i>Insert the seats into their own housing.</i></li> <li>13. <i>Insert the ball into the valve body. Handling carefully a few times to be sure about the correct ball position.</i></li> <li>14. <i>Insert the ball gasket into the housing between body and terminals body.</i></li> <li>15. <i>Screw the nuts (ref.18).</i></li> <li>16. <i>Check that the ball rotation has an homogeneous strength, between open and closed position.</i></li> </ol>
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**MANUALI DI RIFERIMENTO per TIPO VS2200 DE / VS2200 SE**

Pistoni: n° M/PISTONI/I  
 Posizionatori analogici: n° M/PPR/EPR/I/E  
 Posizionatori SMART n° M/SS2L/SS2R/E

**REFERENCE MANUALS for TYPE VS2200 DE / VS2200 SE**

Pistons: n° M/PISTONI/E  
 Analogue positioners: n° M/PPR/EPR/I/E  
 SMART positioners n° M/SS2L/SS2R/E

**DICHIARAZIONE DI CONFORMITA'**  
**AI SENSI DELL'ALLEGATO IV DIRETTIVA EUROPEA "PED" N° 2014/68/UE**  
Declaration of conformity according to PED DIRECTIVE N° 2014/68/UE annex IV

- A. **Descrizione Tipo / Description Type : VS2200 – VS2200 DE – VS2200 SE**  
**Valvole a sfera / Ball Valves**
- Numero/i di matricola / Serial number/s : Vari / various**
- DN - Ø 1/2" – 1" Massima pressione ammissibile / Max allowable pressure PS 71 bar**
- Tabella 7 – Tubazioni di cui all'articolo 4, paragrafo 1, lettera c), punto i) secondo trattino**  
Table 7 – Piping referred to in Article 4(1)(c)(i), second indent
- B. **Procedure di valutazione di conformità utilizzata :**  
Conformity Assessment procedures followed :
- Art.4 Par.3 ( Fabbricati second una corretta prassi costruttiva )**  
**Article 4, paragraph 3 – SEP ( Sound Engineering Practice )**

- A. **Descrizione Tipo / Description Type : VS2200 – VS2200 DE – VS2200 SE**  
**Valvole a sfera / Ball Valves**
- Numero/i di matricola / Serial number/s : Vari / various**
- DN - Ø 1.1/4" – 4" Massima pressione ammissibile / Max allowable pressure PS 71 bar**
- B. **Fluido Gruppo 2                      Articolo 3,                      punto 1.3 lettera b),                      secondo trattino**  
Group of fluid                      2                      Article 3,                      Section 1.3                      (b),                      second indent
- C. **Procedure di valutazione di conformità utilizzata : Modulo A – cat. I**  
Conformity Assessment procedures followed : **Module A – cat. I**



**Per quanto esposto si dichiara che gli apparecchi descritti ai punti A e B verificati in accordo al punto C, soddisfano i requisiti essenziali di sicurezza previsti nell'allegato I della Direttiva 97/23/CE e ad essa applicabili.**  
We declare that the equipments mentioned on above point A and B, verified according to point C, are conformed to the most essential safety requirements as required by Directive 97/23/CE annex I.

La scrivente CONFLOW SpA dichiara origine e nome del costruttore. CONFLOW SpA declares origin and manufacturer name:  
AYVAZ Ataturk Sanayi Bolgesi Hadimkoy Mahallesi Mustafa Inan Caddesi No:44 Amavutkoy – Istanbul - Turkey

**Gli eventuali accessori e/o varianti di attuatore sono conformi alle seguenti Direttive:**  
Eventually accessories and actuator variations are conformed to following Directive:

Posizionatore elettropneumatico **Tipo EPR –SS2R** 2014/30/UE  
Electropneumatic Pilot Positioner Type EPR – SS2R

Posizionatore elettropneumatico **Tipo EPR-EXATEX – SS2R-EXATEX** Ex II 2G Ex ia IIC T5 (ATEX-IECEX)  
Electropneumatic Pilot Positioner Type EPR-EXATEX – SS2R-EXATEX

Posizionatore Elettropneumatico **Tipo EPR-EXD** Ex md IIB T6 (ATEX-IECEX)  
Electropneumatic Pilot Positioner Type EPR-EXD

Box Fine corsa **Tipo LSB1000** Rotary 2014/30/UE – 2014/35/UE **Tipo LSB3000** Rotary 2014/30/UE  
Position Monitoring Rotary Switches Type LSB1000 Rotary Tipo LSB3000 Rotary 2014/30/UE

Elettrovalvole **Tipo EV3 – EV5 24V CC - 24V – 110V – 220V 50/60 Hz** 2014/30/UE  
Solenoid valves Type EV3 – EV5 24V CC – 24V – 110V – 220V 50/60 Hz

**CERTIFICATO DI CONFORMITA'**. I prodotti sono stati verificati e ispezionati rispetto al nostro Sistema Controllo Qualita' UNI EN ISO 9001. Noi certifichiamo che questo prodotto corrisponde alla Vostra richiesta e che le sue caratteristiche sono in conformita' con le nostre specifiche tecniche.

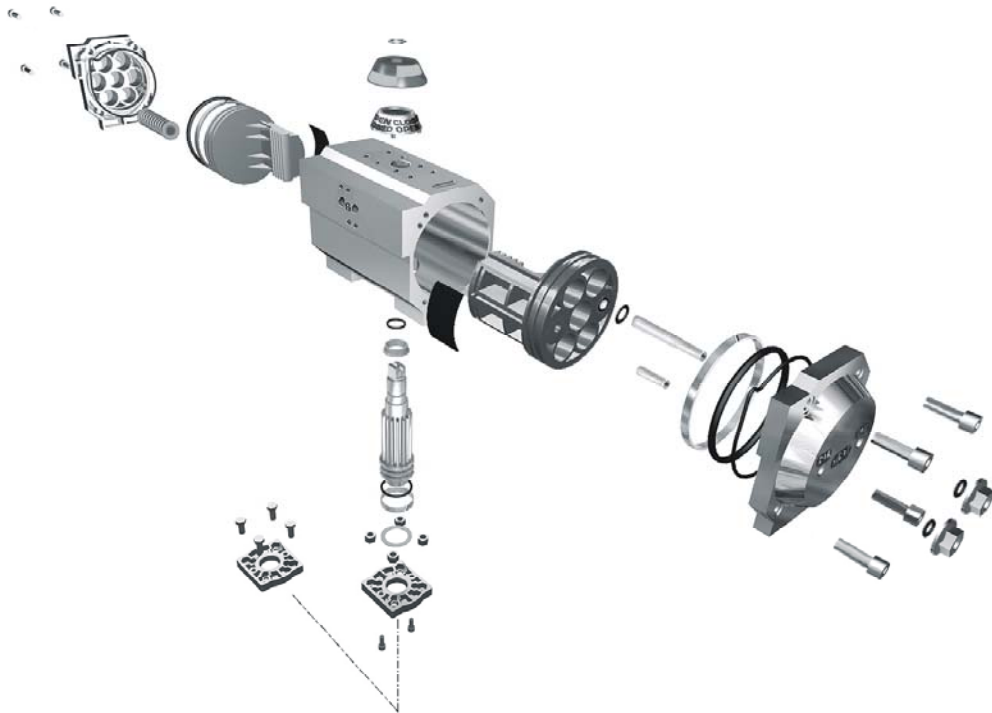
**CERTIFICATE OF CONFORMITY** This product has been manufactured, tested and inspected in accordance with our Quality Assurance System UNI EN ISO 9001. We certify that it contents correspond to the order placed and its performance is in conformance with our technical specifications.

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# **Max-Air** TECHNOLOGY

## **Rack & Pinion Pneumatic Actuators**

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# **INSTALLATION, OPERATION & MAINTENANCE MANUAL**

**CONFLOW** s.p.a.

COMPANY  
WITH QUALITY SYSTEM  
CERTIFIED BY DNV  
== ISO 9001 ==

Via Lecco 69/71  
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## CHAPTER 1: PRODUCT DESCRIPTION

**Emme Technology** offers a broad range of pneumatic rack & pinion actuators. **Emme Technology** actuators are designed to operate with dry or lubricated air media, but will function equally well with non-corrosive and inert gas or light hydraulic oil. The actuators are offered in two different configurations: double acting and spring return. Each actuator can be easily converted from double acting to spring return (or vice versa) by insertion (or removal) of spring cartridges.

**Emme Technology** actuators are equipped in the standard configurations with the following unique features:

- Double travel stops
- External open/closed indication
- Pre – loader springs of non – metallic material
- Stainless steel pinion up to UT20, carbon steel electroless nickel coated for larger sizes.
- Shaft bearings isolate the pinion gear from the housing and support the shaft for high cycle application.
- All bodies are internally lapped.
- All internal and external surfaces are anodized for corrosion resistance.
- End caps and pistons are epoxy powder coated for corrosion resistance.
- Angle of rotation: 90° - 120° - 135° - 150° - 180° (240° on request).
- All air line connections are ¼” GAS (or ¼” NPT).
- “NAMUR” VDI/VDE 3845 and ISO 5211 dimensions on all sizes.

## CHAPTER 2: TECHNICAL FEATURES & DATA

### 2 - 1 METHOD OF OPERATION

#### AIR TO CLOSE CLOCKWISE ROTATION

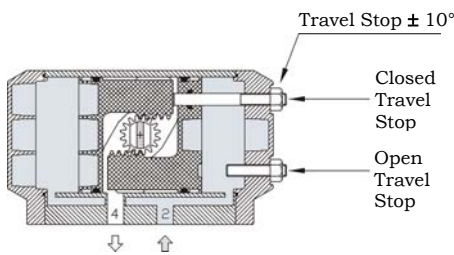


Figure 2.a

#### AIR TO OPEN COUNTER CLOCKWISE ROTATION

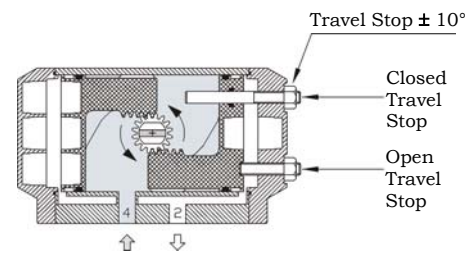


Figure 2.b

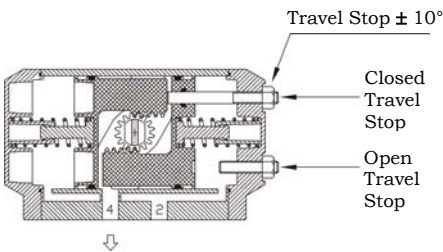


Figure 2.c

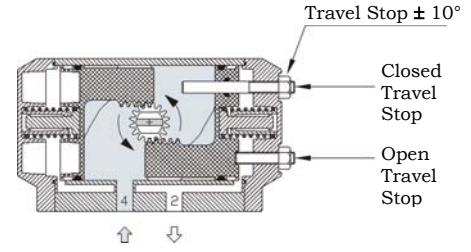


Figure 2.d

#### DOUBLE ACTING

**Note:** The bracketed numbers refer to the actuator exploded view – page 8.

Rotation occurs when compressed air is supplied to the actuator through Port 4, connected to the interior cavity between the pistons (ref. 7 & 12), or through Port 2, connected to the end cap area (ref. 2 & 16).

- As shown in **Figure 2.a**, pressure to Port 2 fills the outboard cavities pushing both pistons (ref. 7 & 12) inward and exhausting air through Port 4. As the pistons retract they rotate the pinion (ref. 22) clockwise (when viewed from the top of the actuator).

- Pressure to Port 4, as shown in **Figure 2.b**, fills the inboard cavity pushing both pistons (ref. 7 & 12) outward and exhausting air through Port 2. As the pistons extend they rotate the pinion (ref. 22) counter clockwise (when viewed from the top of the actuator)

### **SPRING RETURN**

**Note:** The bracketed numbers refer to the actuator exploded view – page 8.

In this configuration the closed position occurs with spring cartridges (ref. 4), which are located between the pistons and end caps.

- Relieving pressure from the inboard cavity through Port 4, as shown in **Figure 2.c**, allows the spring cartridges (ref. 4) to push both pistons (ref. 7 & 12) inward. As the pistons retract they rotate the pinion (ref. 22) clockwise (when viewed from the top of the actuator).
- Pressure to Port 4, see **Figure 2.d**, fills the inboard cavity pushing both pistons outward and exhausting air through Port 2. As the pistons (ref. 7 & 12) extend they rotate the pinion (ref. 22) counter clockwise (when viewed from the top of the actuator) and compress all the spring cartridges (ref. 4).

Although **Max-Air** actuator typically operates counter clockwise to open and clockwise to close, it is possible to change this style of operation. **Figure 2.e** and **2.f** show the same double acting actuator with the piston orientation changed to convert the actuator from a fail clockwise actuator to a fail counter clockwise unit (as described in Chapter 4 – 5).



## 2 – 2 TECHNICAL DATA & WORKING CONDITIONS

- Operating Media – Dry or lubricated air, non-corrosive and inert gas or light hydraulic oil.
- Air supply: 2 Bar (30 PSIG) to 10 Bar (150 PSIG) maximum. *A safety valve is normally recommended.*
- Temperature: Standard from –20°C a +100°C (–10°F to +176°F) and –50°C +150°C available on request.
- Lubrication: Factory lubricated for life under normal working conditions with **Exxon CAZAR K2** or equivalent
- Application: Suitable for both indoor and/or outdoor applications.

## 2 – 3 SPECIAL CONDITIONS

- When the actuator is to be operated with oxygen, the actuator must be perfectly clean and specially lubricated.
- Operating the actuator beyond its designed temperature limitations may damage internal and external components and, therefore, could prove potentially dangerous for operating and maintenance personnel.
- Operating the actuator beyond its designated pressure limitations may result in either an actuator malfunction or an actuator explosion and, therefore, could prove potentially dangerous for operating and maintenance personnel.
- **Note:** Do not disassemble the actuator end caps when air pressure is applied to the actuator.

## CHAPTER 3: INSTALLATION

**Emme Technology** actuators can be fitted on many styles of quarter-turn valves, including ball, butterfly and plug and dampers in accordance with the instructions contained in this chapter.

**Emme Technology** actuators are designed to be easy to install, for this reason a mounting flange (ref. 27 of the actuator exploded view page 8 and **Figure 3.a** and **3.b**) has been designed. The flange is an integral part of the body and is equipped with ISO 5211 drilling (**table a**) in order to allow a male/female or female/male coupling with the valve.




**Figure 3.a**

Bottom view of **Emme Technology** actuator

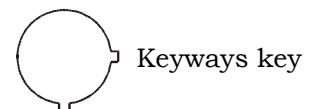
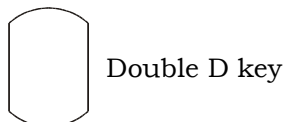
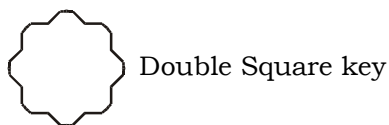
TYPE	DRILLING FLANGE			
	F03 (Ø36)	F04 (Ø42)		
UT05	F03 (Ø36)	F04 (Ø42)		
UT10	F03 (Ø36)	F04 (Ø42)		
UT13	F04 (Ø42)	F05 (Ø50)	F07 (Ø70)	Ø3.250"
UT15	F04 (Ø42)	F05 (Ø50)	F07 (Ø70)	Ø3.250"
UT17	F04 (Ø42)	F05 (Ø50)	F07 (Ø70)	Ø3.250"
UT18	F04 (Ø42)	F05 (Ø50)	F07 (Ø70)	Ø3.250"
UT20	F04 (Ø42)	F05 (Ø50)	F07 (Ø70)	Ø3.250"
UT25	F04 (Ø42)	F05 (Ø50)	F07 (Ø70)	Ø3.250"
UT30	F04 (Ø42)	F05 (Ø50)	F07 (Ø70)	Ø3.250"
UT35	F07(Ø70) + F10 (Ø102)	Ø3.250" + F12 (Ø125)	Ø3.250" + Ø5"	
UT40	F07(Ø70) + F10 (Ø102)	Ø3.250" + F12 (Ø125)	Ø3.250" + Ø5"	
UT45	F07(Ø70) + F10 (Ø102)	Ø3.250" + F12 (Ø125)	Ø3.250" + Ø5"	
UT50	F10 (Ø102)	F12 (Ø125)		
UT55	F10 (Ø102)	F12 (Ø125)		
UT60	F10 (Ø102)	F12 (Ø125)	F14 (Ø140)	
UT65	F10 (Ø102)	F12 (Ø125)	F14 (Ø140)	

**Table a**

 = Standard

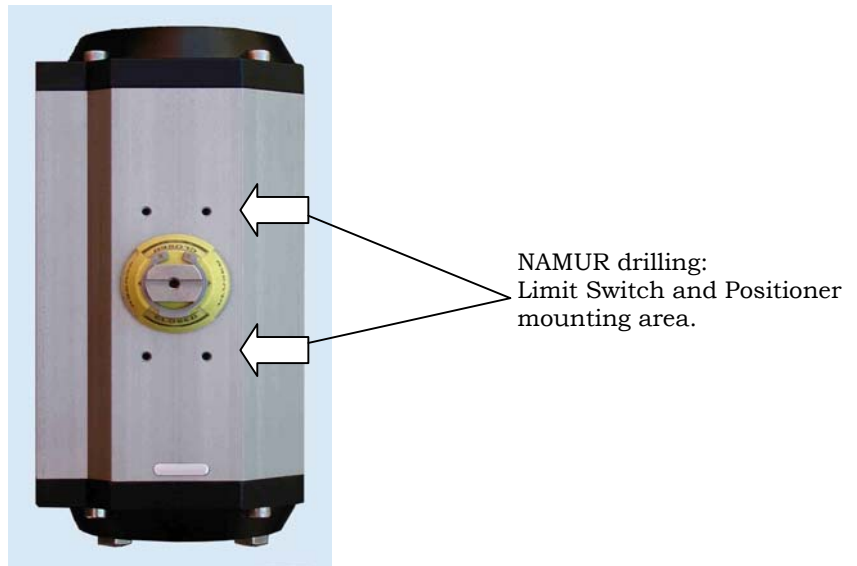
**Note: The bracketed numbers indicate the diameter between the holes.**

The pinion presents a double – square female drive to allow a large flexibility in mounting; it allows the assembling on valves stem, or coupling, with square key at 45° or at 90° indifferently. On request, bottom pinion female key may be done as double D or cylindrical with one or two keyways.



On the top face of **Emme Technology** actuators there is a NAMUR standard mounting pattern for easy installation of accessories for position survey and/or control devices (Micro Switch Boxes, Positioners, ecc)

**Figure 3.b** shows an actuator in the normal position (closed) with the pinion flats and the indicator – drive milling perpendicular to the body



**Figure 3.b**  
Top view of **Emme Technology** actuator

The Ports are NAMUR standard for easy solenoid valve connection

#### **Installation procedure.**

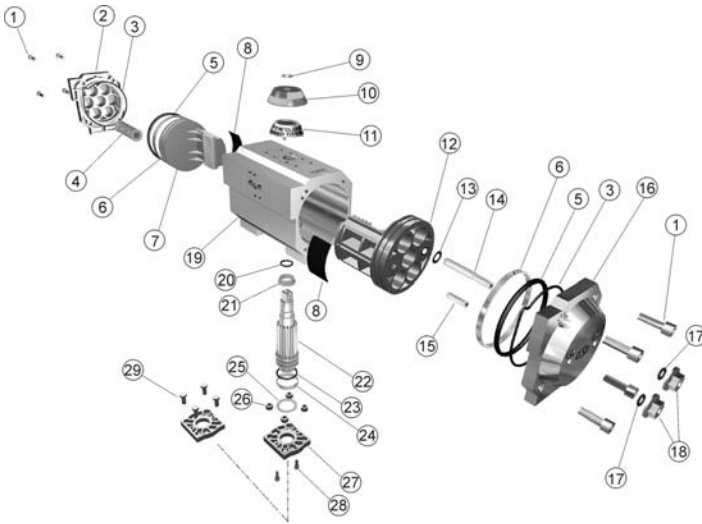
1. Check the coupling female pinion drive – valve stem.
2. Make sure that the valve and the actuator are both in the **closed** position before proceeding (see **Figure 3.b**).
3. Install mounting bracket on the valve and hand tighten all fasteners; be sure not to fully torque bolts until entire assembly is correctly aligned and installed.
4. a) **Mounting with brackets:** Place coupling on valve stem and the actuator on mounting bracket. Align valve and actuator in order to eliminate forces on the system; tighten all the assembly fasteners.  
b) **Direct mounting:** Position the actuator on valve; use caution while inserting the valve stem into the double square female pinion drive. Insert the screws from the bottom side of flange and manually tighten them and align the assembly in order to eliminate the forces on the system; tighten all assembly fasteners.

5. Actuate the unit several times to ensure that it works properly. If the unit does not work properly, disassemble the unit and repeat steps 1 – 4. If the problem persists, contact your local **Emme Technology** representative.
6. After the completion of the mounting operations, it is necessary to set the actuator stroke through the travel stops to ensure that the valve works properly. **Emme Technology** actuators have a regulation range from  $-10^{\circ}$  to  $+10^{\circ}$  and from  $80^{\circ}$  to  $100^{\circ}$  ( $\pm 10^{\circ}$  in both open and close directions). (See Chapter 4 – 3 for information on actuator positioning phase).
7. Rotate actuator and valve assembly to desired degree.

## CHAPTER 4: MAINTENANCE

Maintenance instructions provide the end user with necessary information for standard examination of O-rings and soft parts for wear. Repair kits consisting of all soft parts are readily available.

### EXPLODED VIEW



### PARTS LIST

ITEM	DESCRIPTION	MATERIALS
1	END CAP SCREW	AISI 304 STEEL
2	LEFT END CAP	*
3	END CAP O-RING (x)	BUNA-N
4	SPRING CARTRIDGE	SPRING STEEL EPOXY COATED
5	PISTON O-RING (x)	BUNA-N
6	GUIDE RING (x)	TECHNO-POLYMER
7	LEFT PISTON	*
8	PISTON THRUST BLOCK (x)	TECHNO-POLYMER
9	INDICATOR SNAP RING	AISI 304 STEEL
10	INDICATOR (ROTATING PART)	TECHNO-POLYMER
11	INDICATOR (FIX PART)	TECHNO-POLYMER
12	RIGHT PISTON	*
13	REGULATION O-RING (x)	BUNA-N
14	INTERNAL REGULATION SCREW	AISI 304 STAINLESS STEEL
15	STOP BOLT	AISI 304 STAINLESS STEEL
16	RIGHT END CAP	DIE CAST ALUMINUM
17	WASHER	AISI 304 STAINLESS STEEL
18	STOP BOLT NUT	AISI 304 STAINLESS STEEL
19	ACTUATOR BODY	EXTRUDED ALUMINUM ASTM B210 (6063)
20	UPPER PINION O-RING (x)	BUNA-N
21	UPPER PINION BEARING (x)	TECHNO-POLYMER ASTM A314 (303)
22	PINION	STAINLESS STEEL or SAE 11L14 NICKEL PLATED acc. ASTM B733
23	LOWER PINION O-RING (x)	BUNA-N
24	LOWER PINION BEARING (x)	TECHNO-POLYMER
25	WASHER	QUENCHED and TEMPERED STEEL
26	NUTS	AISI 304 STAINLESS STEEL
27	FLANGE	**
28	FLANGE SCREWS	AISI 304 STAINLESS STEEL
29	BOLTS (optionals)	AISI 304 STAINLESS STEEL

#### LEGEND:

\* = Techno-polymer thru UT15, die cast aluminium for larger sizes

\*\* = Techno-polymer thru UT30, die cast aluminium for larger sizes

(x) wear parts



#### 4 - 1 DISASSEMBLING PROCEDURE FOR THE SUBSTITUTION OF O-RINGS, BEARINGS, GUIDE RING AND THRUST BLOCK

**CAUTION – PLEASE READ CAREFULLY:**

- **BEFORE CARRYING OUT ANY MAINTENANCE ON EMME TECHNOLOGY ACTUATORS, IT IS ESSENTIAL THAT THE ACTUATOR IS NOT UNDER PRESSURE AND IS FREE OF ANY ACCESSORIES.**
- **FOR YOUR SAFETY, IT IS ABSOLUTELY NECESSARY, BEFORE DISASSEMBLING A SPRING RETURN ACTUATOR, THAT THE UNIT IS IN THE FAILSAFE POSITION (SPRINGS EXTENDED AND NOT COMPRESSED).**

1. Disconnect all electrical and air supplies from the actuator.
2. Remove the actuator from the mounting bracket and place in a clean environment.
3. After removing the end cap screws (ref. 1), remove the end caps (ref. 2 and 16).
4. Remove O-Rings (ref. 3) from the end caps and inspect their wear and lubrication.
5. Remove the internal regulation screw (ref. 14) and the stop bolt (ref. 15), located in the right end cap.
6. Using a wrench on the appropriate mill on the upper part of pinion (ref. 22), turn the pinion counter-clockwise until the pistons (ref. 7 & 12) protrude further out from the cylinder to be removed.
7. Remove the pistons by hand or with pliers, taking the pistons from the spring grooves and using caution not to damage the pistons' surfaces. **Note:** If actuator is fail counter-clockwise (**mounting B**), pinion must be rotated in the opposite direction.
8. Remove O-Rings (ref. 5), guide ring (ref. 6) and thrust block (ref. 8) from the left and right pistons.
9. Remove the screws (ref. 28) from the bottom side of the flange (ref. 27) and turn over the actuator. Firmly tap the upper part of the pinion on a wood surface, to prevent damage of the pinion. Remove the unit flange – pinion through the bottom of the body (ref. 19).
10. Remove the pinion from the flange.
11. Remove the washer (ref. 25).
12. Remove the O-Rings and the bearings (ref. 20, 21, 23 and 24) from the pinion.
13. Inspect and replace the following wearing parts as necessary:

<i>General</i>	<i>Reference</i>	<i>Detail</i>	<i>Qty.</i>
End cap (ref. 2 & 16)	3	End cap O-Rings	2
Piston (ref. 7 & 12)	5	Piston O-Ring	1
	6	Piston guide ring	2
	8	Piston thrust block	1
Travel stop (ref. 14 & 15)	13	Stop bolt O-Ring	1
	17		
Pinion (ref. 22)	20	Pinion O-Ring (upper)	1
	21	Pinion bearing (upper)	1
	23	Pinion O-Ring (lower)	1
	24	Pinion bearing (lower)	1

All these soft parts are included in **Emme Technology** repair kits.

## 4 – 2 LOW/ HIGH TEMPERATURE O-RINGS INSTALLATION

1. Disassemble the actuator as described in chapter 4 – 1.
2. Using a screw driver, remove the following O-Rings from the actuator:
  - a. Pistons (ref. 5).
  - b. End caps (ref. 3).
  - c. Upper pinion (ref. 20).
  - d. Lower pinion (ref. 23).
3. Using alcohol, or another mild solvents, remove the lubrication from each actuator parts and carefully clean all the surfaces before inserting a new set of O-Rings.
4. Divide the O-Rings and indicate their position of installation:
  - a. Piston O-Rings: they are the thickest O-Rings (ref. 5)
  - b. End cap O-Rings: they have the biggest diameter (ref. 3)
  - c. Pinion O-Rings: of the remaining O-Rings, the large diameter O-Rings goes on the Lower O-Ring groove (ref. 23) and the smaller diameter on the Upper O-Ring groove (ref. 20)
  - d. Stop bolt O-Ring (ref. 13)
5. Install the low/high temperature O-Ring set. If this operation is too difficult, the O-Rings can be slightly stretched and greased to ease installation. When installing the end cap O-Ring be sure to seat them properly, otherwise they might be pinched during the end cap installation (ref. 1 & 16).
6. Apply grease to the following internal part of actuator:
  - a. Inner bore of actuator
  - b. Piston wear surfaces (O-Ring, guide ring and thrust block)
  - c. Piston rack
  - d. Pinion gear teeth
  - e. Pinion wear surfaces and O-Rings

7. Assemble the actuator as described in chapter 4 – 3.

### 4 – 3 ASSEMBLY PROCEDURE

1. Insert O-Rings (ref. 20 & 23) and bearings (ref. 21 & 24) on pinion (ref. 22).
2. Insert nuts (ref. 26) and the washer (ref. 25) in the appropriate grooves of the flange (ref. 27): this operation reduces friction and wear.
3. Insert the pinion in the flange.
4. Insert the unit pinion–flange into the actuator body (ref. 19) pushing until the flange is completely inserted into the body.
5. Tighten the flange screws (ref. 28).
6. **Intermediate test:** using a wrench and acting on the appropriate mill on the upper part of the pinion. Manually rotate the pinion to make sure it freely rotates.
7. Insert the O-Rings (ref. 5), the guide ring (ref. 6) and the thrust block (ref. 8) on the left and right pistons (ref. 7 & 12).
8. **Piston insertion:** This operation can be performed in two different ways in order to obtain either a fail clockwise actuator (**mounting A - FCW**) or a fail counter clockwise actuator (**mounting B - FCCW**). “Right piston” is the piston which contains a hole, as opposed to the “left piston” which does not contain a hole. While facing the supply holes of the actuator body, insert the left piston on the left end of body and right piston on the right end.

#### 8a. Mounting A:

##### Left piston insertion.

- Place the actuator in a stand up position on its right side with the flange facing you and the supply holes on your right.
- To obtain the counter clockwise rotation (mounting A) it is necessary to insert the rack of the piston to the left of the pinion.
- Insert the left piston applying pressure with hands until the piston is completely in the body.

##### Right piston insertion.

- Place the actuator in a stand up position on its left side with the flange facing you.
- Insert the rack of the piston to the left of the pinion.
- Insert the right piston applying pressure with hands until the piston is completely in the body.

- 8b. **Mounting B:** follow the same steps as above, but inserting the rack of both pistons on the right of the pinion.

**9. Actuator positioning phase:**

- 9a.** Place the actuator in a stand up position on a flat surface with the upper part of the pinion on the right side.
- 9b.** Manually apply pressure to the piston, as this will assist to compress the opposite piston.
- 9c.** While continuing to apply pressure, use a wrench on the appropriate mill of the upper portion of the pinion and rotate the pinion counter clockwise. At this point there must be clicking sound due to the interlocking between the piston rack and the pinion tooth. Make sure to create an individual sound per tooth.
- 9d.** After each individual sound, rotate the pinion clockwise; verify that the pinion Namur mill is about 10° beyond the perpendicular to the body axis. If problematic, repeat step 9c.
- 9e.** Double check the correct assembly of the actuator, confirming that the open position pistons are of equal distance from the cylinder border.

**10. End cap mounting:**

- 10a.** Insert the end cap O-Rings (ref. 3) into their grooves by following the shape of the grooves with a finger to ensure that the O-Rings are properly seated.
- 10b.** Insert the stop bolt (ref. 15) and the internal regulation screw (ref.14) into the right end cap (ref. 16) from the external side of the end cap. Screw clockwise until they appear inside the end cap.
- 10c.** Insert the O-Rings (ref. 13), the washer (ref. 17) and the nuts (ref. 18).
- 10d.** Insert the end cap screws (ref. 1) and tighten them in an alternating order to the factory torque standard (see Table b).

<b>ACTUATOR TYPE</b>	<b>TORQUE Nm (In.Lbs)</b>
<b>UT15</b>	<b>8 (70)</b>
<b>UT20 - UT25</b>	<b>12 (106)</b>
<b>UT30 - UT35 UT40 - UT45</b>	<b>15 (133)</b>
<b>UT50 - UT55 UT60 - UT65</b>	<b>22 (193)</b>

**Table b****11. Adjustment:**

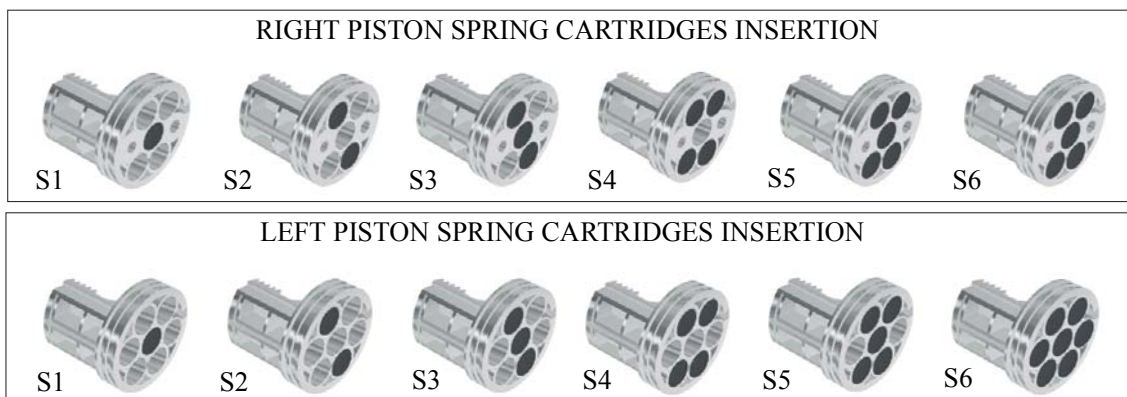
- Supply low pressure compressed air to Port 2 (see drawings Chapter 2 – 1). Using a hex key wrench, turn the internal regulation screw until the pinion shaft is perpendicular to the actuator axis (0° position); tighten the nut to the respective standard of the torque listed in **Table b**.
- Next, supply low pressure compressed air to Port 4 to open the actuator. The pinion shaft must be at a 90° position (with respect to the 0° position), aligned with the actuator axis. If it is not aligned, act on the stop bolt and tighten the nut to the respective standard of the torque listed in table b.

#### 4 - 4 SPRING CARTRIDGE INSERTION

**Emme Technology** actuators can be easily converted from Double Acting to Spring Return by changing the spring number and configuration inside the end cap. **Emme Technology** actuators can accept up to **5 springs in the right end cap** and **7 in the left end cap**. We advise the insertion of at least two spring cartridges in each end cap in order to have a uniform distribution of forces on the pistons. The number of the springs loaded affects the torque value the actuator will be able to generate during its working cycle. See Chapter 5 and the **Emme Technology** data sheet to properly size a spring return actuator.

##### Springs Installation Procedure:

1. Remove the four end cap screws (ref. 1) from the right and left end caps;
2. Remove the end caps;
3. Insert the correct number of spring cartridges into **each** end cap (i.e. UT15-S4 = 4 + 4 springs) referring to **Table c**. It is strongly advised to insert the plastic part of the cartridge containing the deep hole into the appropriate end cap seat.



**Table c**

## WARRANTY

Emme Technology provides the following warranty regarding products manufactured by it. Emme Technology warrants its products to be free from defects in materials and workmanship when these products are used for the purposes for which they were designed and manufactured. Emme Technology does not warrant its products against chemical or stress corrosion or against any other failure other than from defects in material or workmanship.

The warranty period is 12 (twelve) months from shipment date.

Any claim regarding this warranty must be in writing and received by Emme Technology before the last effective date of the warranty period. Upon Emme Technology's receipt of a warranty claim, Emme Technology reserves the right to inspect the product(s) in question either at the filed location or at Emme Technology manufacturing plant. If, after inspection of such product(s), Emme Technology determines that the purchaser's claim is covered by this warranty, Emme Technology's sole liability and the purchaser's sole remedy under this warranty is limited to the refunding of the purchase price or repair or replacement thereof a Emme Technology's option. Emme Technology will not be liable for any repairs, labor, material or other expenses that are not specifically authorized in writing by Emme Technology, and in no event shall Emme Technology be liable for any direct or consequential damages arising out of any defect from any cause whatsoever.

This warranty is null and void in the following cases:

- any Emme Technology product is disassembled, modified or altered at any location other than Emme Technology, Sesto San Giovanni (Milan) Italy
- improper installation
- if products are used for purposes for which they were not designed and manufactured.

Any product sold by Emme Technology but manufactured by companies other than Emme Technology, is not covered by this warranty. The warranty for such products shall be subject only to the warranty relief, if any, provided by the suppliers and/or manufactures of such products.

**NOTE:** in continuing research to improve and expand the range of its product, Emme Technology reserves the right to change or modify product design or construction without prior notice and without incurring in any obbligation to make such changes or modifications on products previously or subsequently sold.



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