

# Manual



P-1500 P-1520

P-1700 P-1720

P-1710 P-1730



P-1700



P-1500

GB

**Manufacturers declaration**

in compliance with EC directive 89/392/EEC.

We hereby confirm that the appliances described in this sheet has been manufactured in compliance with the applicable standards and is intended for installation in a machine/application, and that commissioning is strictly prohibited until evidence has been provided that the machine/application in question is also in compliance with

EC directive 89/392/EEC.

This manufacturers declaration is applicable to the following PMV series:

P-1500, P-1520, P-1700, P-1710, P-1720, P-1730.

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**Hersteller-Erklärung**

im Sinne der EG-Richtlinie 89/392/EWG.

Hiermit erklären wir, daß die in diesem Blatt beschriebenen Geräte entsprechend den gültigen Normen gebaut und zum Einbau in eine Maschine oder Applikation bestimmt sind, sowie daß deren Inbetriebnahme so lange untersagt ist, bis festgestellt wurde, daß diese

Maschine/Applikation ebenfalls der EG-Richtlinie

89/392/EWG.

Diese Herstellererklärung hat für folgende PMV-Serien Gültigkeit:

P-1500, P-1520, P-1700, P-1710, P-1720, P-1730.

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**Déclaration de fabricant**

au sens de la directive de la 89/392/CEE.

Nous déclarons par la présente que les appareils décrits sur cette page sont construits en conformité avec les normes en vigueur et qu'ils sont destinés à être montés dans une machine ou une application, nous déclarons également que leur mise en service est interdite tant qu'il n'a pas été constaté que cette

machine/application satisfait

également à la directive 89/392/CEE.

Cette déclaration de fournisseur est valable pour les types d'appareils PMV suivants:

P-1500, P-1520, P-1700, P-1710, P-1720, P-1730.



*Mr. Jan-Eric Andersson  
President, Palmstiernas Instrument AB*



## PMV Positioner storage and handling procedures

PMV Positioners are precision instruments which should be stored and handled accordingly to avoid problems or damage.

Appropriate precautions should be taken to protect units while in storage.

### Warehouse storage

Stored in original PMV shipping containers, units should be stored in an environmentally controlled area, i.e. clean, cool (15-26°C, 6~80°F) and dry, out of direct sunlight or weather exposure.

### Field storage

Note: Once air supply to the positioner is connected and turned on, internal air bleed will prevent the ingress of moisture and protect the unit from corrosion. It is recommended that the air supply be left on at all times.

- If units are installed immediately, turn, and leave on, the air supply.
- If positioner must be stored outdoors, tighten all covers which may loosened in shipment, make sure all open enclosure entry points are sealed.

Positioners should be wrapped and sealed air and watertight with desiccant inside the plastic, units should be securely covered with an opaque cover and not exposed to direct sunlight, rain or snow.

### Potential damage mechanism

When units are stored in hot, humid climates, the daily heating/cooling cycle will cause air to expand/ contract and be drawn in and out of the positioner housing.

Dependent on the local temperature variations, humidity, dew points and the time in storage condensation could occur and accumulate inside causing erratic operation or failure due to water or corrosion. The potential for condensation damage is especially high in southern climates and aggravated if units are exposed to direct sunlight.

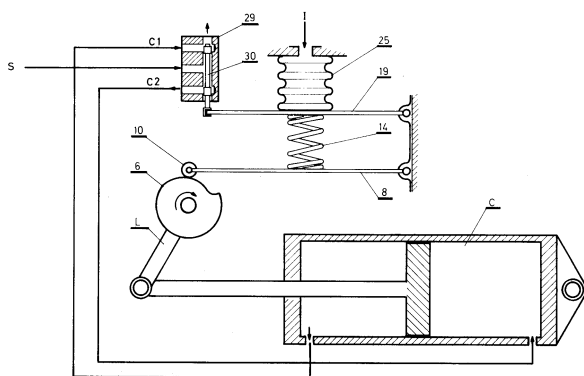
For further assistance, please contact your nearest PMV office.



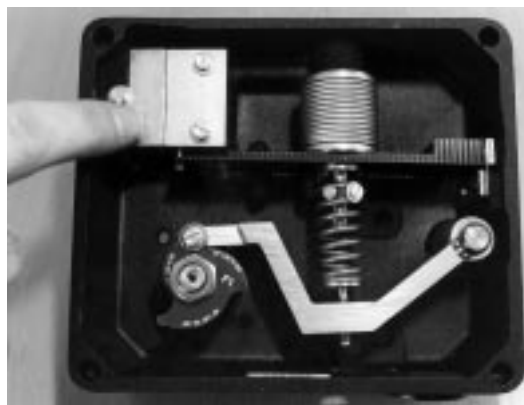
# Function

The positioning is based on the principle of balanced forces. One force is originated by the signal pressure transmitted through bellows (25) on balance arm (19). The other force is from the feed back spring (14) and is proportional to the level of the lower arm (8).

The lower arm (8) level is determined by the position of the cam (6) which is secured to the spindle (2). The spindle (2) is activated by the cylinder rod. When these two forces are equal, the balance arm (19) is in a central neutral position, as is the spool (30). There is a slight leakage of air past the close tolerances between the pilot valve parts (29 and 30). A small flow runs from supply S past the pilot valve ports into the cylinder through connections C1 and C2. Another small flow leaks out into the positioner housing.



For figures of components see EXPLODED DRAWING on page?)



The PMV Positioner without cover.

## Assume an equilibrium position

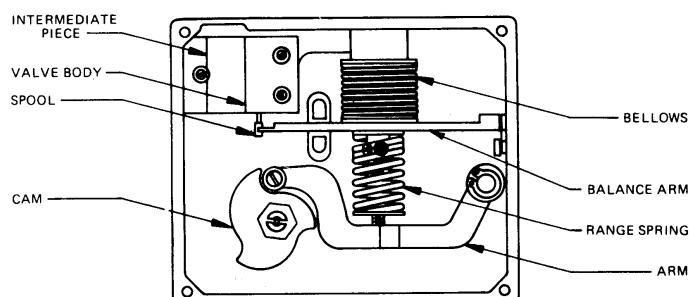
If the control pressure is increased the bellows (25) will be deflected downwards, compressing the spring (14). The end of the balance arm (19) moves the spool (30) in the bore of the valve body (29) guiding the supply air to the right side of the piston and, at the same time, exhausts air from the left side of the piston through connection C1 into the positioner housing.

The cylinder piston moves to the left "rotating the spindle (2) with the cam (6) clockwise" forcing the lower arm (8) upward compressing the feed-back spring (14). These motions will continue until the additional force from spring (14) on the balance arm (19) overcomes the additional force from the bellows (25). The balance arm (19) will then return to its neutral, centre position, as will the spool (30). There will be no further motion. Cylinder position is stable at this new position.

There is only one cylinder position for each signal pressure value. If an external force acts upon the cylinder piston rod, it will move momentarily in the direction of the force. The cam (6), lower arm (8), spring (14), balance arm (19) and spool (30) will move so that the pressure difference created in the cylinder will counter-balance the external force.



# The PMV Rotary Positioner



## Air preparation

The PMV Rotary Positioner can work with supply pressure up to 10 bar (150 psi). In order to obtain satisfactory operation and high reliability, the positioner should be fed with dry, clean oil free air.

By connecting the air supply to the positioner via a filter 25 microns which is placed as close to the positioner as possible, the required air quality is received.

For large pressure variations of the supply air, a pressure regulator should be mounted between filter and positioner in order to eliminate the fluctuations.

## Installation

The supply air shall be connected to the port S. The control pressure shall be connected to port I while ports C1 and C2 are connected to the connections of the cylinder.

### 1. To zero the positioner

The zeroing screw is accessible from the outside. Back off the screw and move the cover to one side. Fig 1



Figure 1

Adjust by means of a screwdriver. The adjusting screw is provided with a friction brake and need not therefore be locked after adjustment. Fig 2



Figure 2

### 2. To adjust the Control Pressure Range

#### 2.1 General

The top end of the spring is provided with an adjusting nut. The effective length of the spring can be varied by turning the spring relative to the nut. For any fixed control range the actuator will move more if the effective length of the spring is increased. Fig 3

A. Long travel

B. Short travel

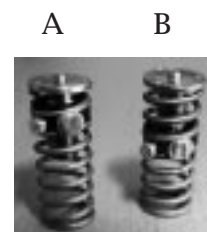


Figure 3

After the spring length has been adjusted, the spring guide must be turned in relation to the nut so that its underside is not in contact with the end of the spring. Fig 4

A. Incorrect

B. Correct

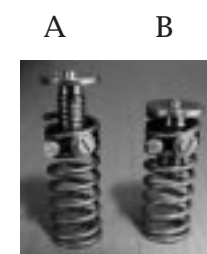


Figure 4



## 2.2 To increase the actuator travel

**IMPORTANT:** Always start from zero! Make zero adjustment (see 1). Adjust slowly the control pressure to the top value and check the movement of the actuator. Should you need more travel: Back off the locking screw which locks the spring to the adjusting nut. Fig 5

Turn the spring clockwise to increase the effective length of the spring. Tighten the screw. Fig 6

After making an adjustment of the effective spring length you must again start by making zero adjustments. Should large adjustments be necessary you must rearrange the position of nut relative to the spring guide in order to be able to make zero adjustments Fig 7

Back off the locking screw which locks the adjusting nut to the spring guide.

Turn the spring and the spring guide anticlock-wise until the end of spring is almost in contact with the flat of the top spring guide. Fig 8



Figure 5



Figure 6



Figure 7



Figure 8

Tighten screw (16).

Be sure the control pressure is adjusted to minimum value. When the zero is correctly adjusted turn once more the control pressure slowly to top value and check the movement of the actuator. Make further adjustments if necessary – N.B. always go back and start from the zero position. Fig 9



Figure 9

## 2.3 To reduce the actuator travel

**IMPORTANT:** Always start from zero! Make zero adjustment (see I. above). Adjust the control pressure signal to the top value slowly and check the movement of the actuator. Should you need less travel:

Please notice: Should large adjustments be required you must rearrange the position of the nut relative to the top spring guide in order to be able to reduce the effective length of the spring

Back off the locking screw. Fig 10



Figure 10

Turn the spring and the top spring guide clockwise to allow space for the free end of the spring when reducing the amount of effective spring length. Fig 11



Figure 11



Tighten the screw and back off screw.  
Fig 12

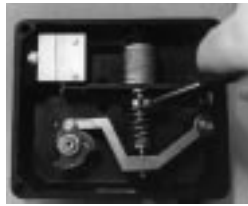


Figure 12

Turn the spring relative to the nut for less effective spring.  
Fig 13



Figure 13

Tighten the screw and make zero adjustment (make sure the control pressure signal is at zero level). Adjust once more the control pressure signal to top level and check the movement of the actuator. Make further adjustments if necessary.  
Fig 14



Figure 14

N.B. After adjustments are completed please make sure that screws are securely fastened. If these screws are not accessible, see Section 2.4 below.

#### 2.4 To turn the top spring guide (18) through 120 degrees

The spring guide can be fitted in three positions in relation to the balance arm. By compressing the spring, the spring guide will be released from the balance arm, and the spring and spring guide can be turned through 120 degrees in either direction. The spring guide, nut and spring can thus always be fitted so that the locking screws and will be accessible.

### 3. To change the action

*3.1 To change from valve opening on increasing signal to valve closing on increasing signal, or vice-versa, proceed as follows:*

Shut off supply and instrumental air.

As standard, the positioner is fitted with an intermediate piece.  
Fig 15



Figure 15

Reverse the flexible tubing between the positioner ports C1 and C2.

Remove the positioner cover. The screws can be left partially threaded into the cover. Remove the nut that fastens the cam to the spindle.  
Fig 16



Figure 16

Invert the cam, position it to the desired signal range, (stamped on the cam lobes), and install the nut but do not tighten the nut yet.  
Fig 17



Figure 17

Turn on the supply and instrumental air.

Make sure the actuator is in the position corresponding to the minimum signal (fully open for units piped to close on increasing signal or fully closed on units piped to open on increasing signal).





Position the cam as shown. The ballbearing should not ride up on the inactive portion of the cam.  
Fig 18

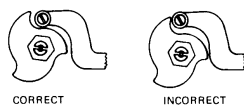


Figure 18

NOTE: The cam will turn slightly with the nut as it is tightened. Be sure to allow for that slight clock-wise rotation.



Figure 19

Remove the screw retaining the intermediate piece. Wash the components and blow them clean and dry with compressed air. Check that ports C1 and C2 are clean. Certain adapters incorporate filters which cannot be removed. Such adapters should be replaced, if necessary. Check that the O-rings are in good condition.  
Fig 22



Figure 22

#### 4. To clean the valve body

Remove the four screws and remove the cover. Remove the screws.  
Fig 21



Figure 20

Carefully remove the valve body. Fit so that the spool slides easily and does not bind against the balance arm.  
Fig 22



Figure 21





Fit the intermediate piece and tighten the screw lightly.  
Fig 23



Figure 23

Check that the bottom edge of the intermediate piece is slightly (0.5-1 mm) outside the face in the casing.  
Fig 24



Figure 24

Fit the valve body with spool. Take care not to damage the groove in the spool for the balance arm.

Fit the screws with the washers. Press the valve body against the inter-mediate piece. Back off the screw. Press hard and tighten the screws. Tighten the screw.  
Fig 25



Figure 25

Adjust the starting point by means of the screw.  
Fig 26



Figure 26

## 5. To replace the bellows

Remove the cover. Remove the spring with its adjusting nut and spring guide by compressing the spring. Remove the screws and remove the balance arm. Turn the bellows back and forth while with-drawing it out of its mounting.

Before fitting, the length of the bellows must be measured. The length should be 35mm and should be adjusted if necessary by stretching or compressing the bellows.

Check that the O-ring is in good condition and take care when compressing the bellows while fitting it into place.  
Fig 27



Figure 27

N.B. Hold the part of the bellows to which the O-ring is fitted when pressing in the bellows, since the dimension 35 mm may otherwise alter.

Refit the balance arm and the spring.

## 6. To zero the indicator

Remove the four screws and remove the cover.

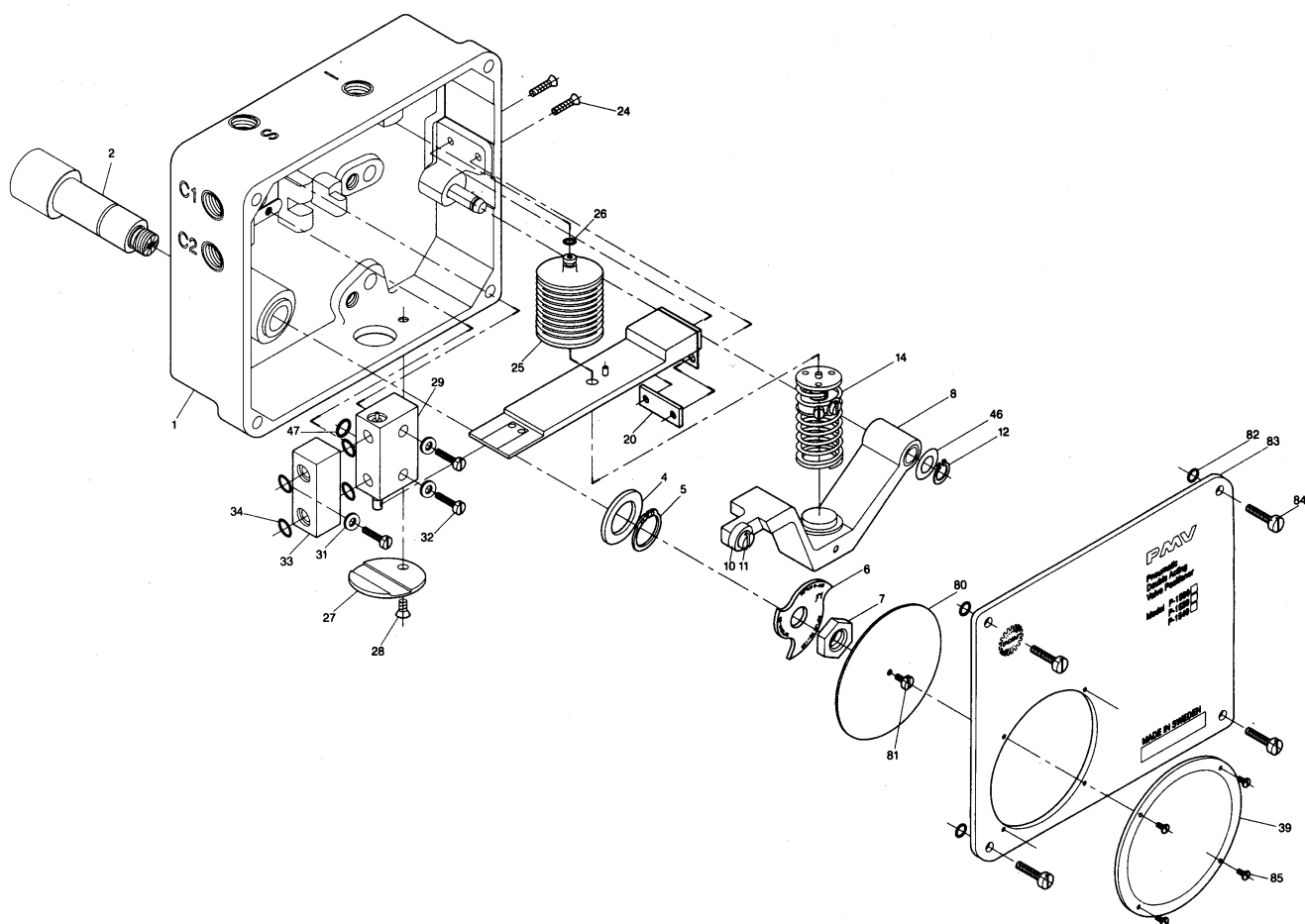
Back off the locking screw and zero the indicator. Replace the cover to check the setting of the indicator. Make fine adjustments if necessary.

Tighten the locking screw. Do not tighten screw too hard, otherwise the indicator will crack.

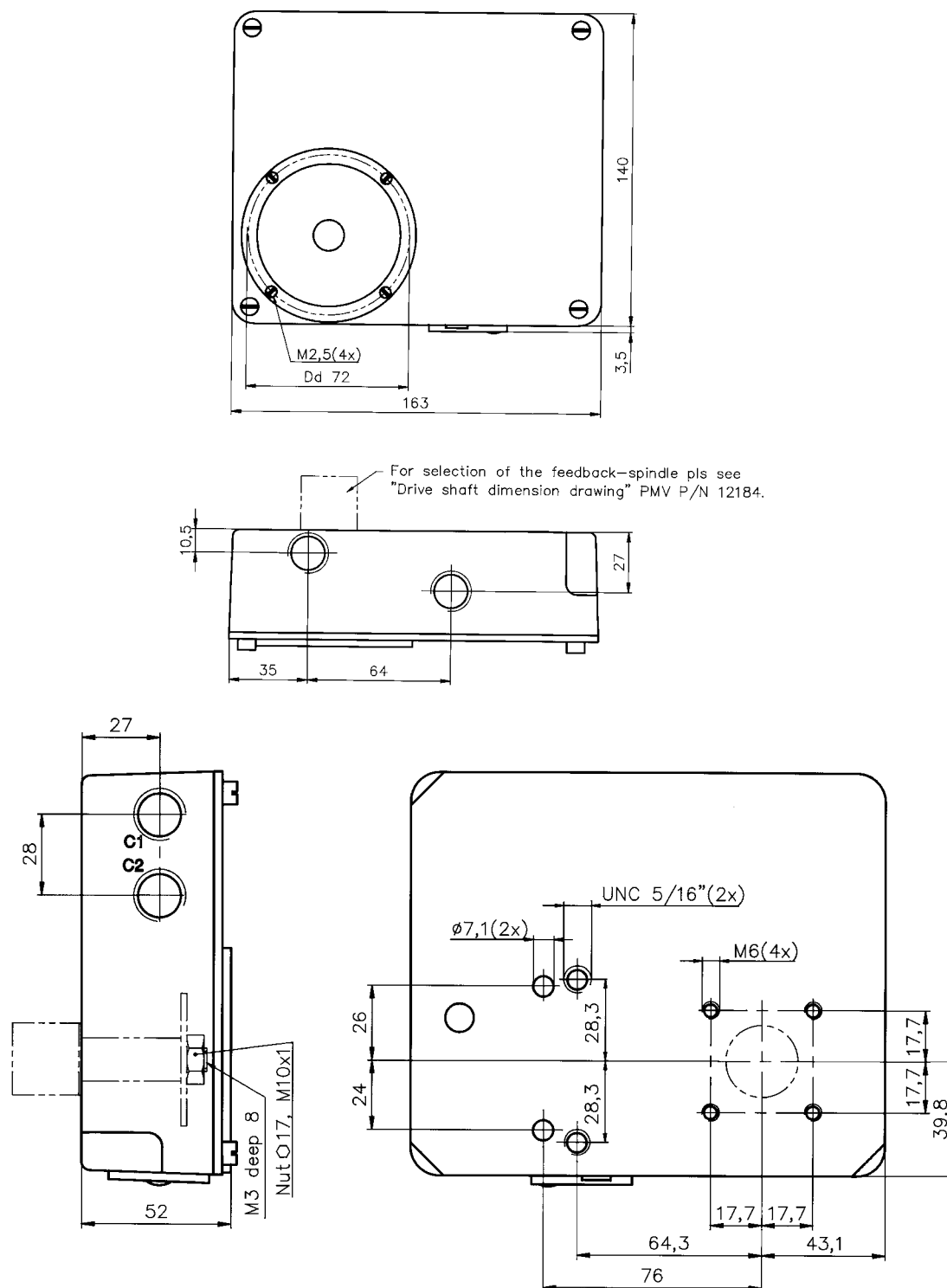
Mount the cover and tighten the four screws.



# Exploded drawing



# Dimension drawing P1500/P-1700



Order information:  
A2 for 1/8"-27 NPT male connectors.





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