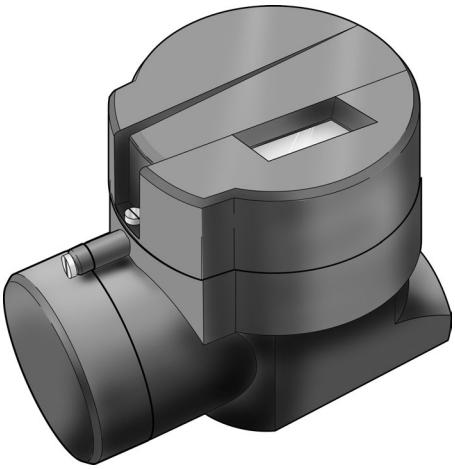
D3
Digital Positioner



IOM

PMV

Contents

1. Introduction

The PMV D3 is a digital positioner designed primarily for controlling adjustable valves.

The positioner can be used with single or double action actuators with either rotary or linear movement.

The PMV D3 can be equipped with modules for feedback, limit switches and a pressure gauge block. Pressure sensors can be installed in the pneumatic block to offer advanced diagnostics

The modules can be factory assembled before delivery or fitted later.

The modules for feedback and limit switches can contain the following:

Feedback 4-20 mA and one of the following functions:

- Two mechanical contacts
- Two reed switches
- Two inductive sensors, DIN 19234

Safety instruction

Read the safety instructions in this manual carefully before using the product. The installation, operation, and maintenance of the product must be done by staff with the necessary training and experience. If any questions arise during installation, contact the supplier/sales office before continuing work.

Warning

- The valve package moves when in operation and can cause personal injury or damage if handled incorrectly.
- If the input signal fails or is switched off, the valve moves quickly to its end position.
- If the compressed air supply fails or is turned off, fast movements can occur.
- The valve is not controlled by the input signals when in the Out of service mode. It will open/close in the event of a leak.
- If a high value is set for Cut off, fast movements can occur.
- When the valve is controlled in the Manual mode, the valve can move quickly.
- Incorrect settings can cause self-oscillation, which can lead to damage.

Important

- Always turn off the compressed air supply before removing or disconnecting the air supply connection or the integral filter. Remove or disconnect with care because C- is still under pressure even after the air supply is turned off.
- Always work in an ESD protected area when servicing the PCB´s. Make sure the input signal is switched off.
- The air supply must be free from moisture, water, oil and particles.

Special Conditions for Safe Use

The enclosure of PMV D3I (Intrinsically safe) is made of aluminium and any impact or friction caused by external objects shall be avoided in the application.

2. Storage

General

The PMV D3 positioner is a precision instrument. Therefore it is essential that it is handled and stored in the right way. Always follow the instructions below!

N.B. As soon as the positioner is connected and started, internal air leakage will provide protection against corrosion and prevent the ingress of moisture. For this reason, the air supply pressure should always be kept on.

Storage indoors

Store the positioner in its original packaging. The storage environment must be clean, dry, and cool (15 to 26°C, 59 to 79°F.

Storage outdoors or for a longer period

If the positioner must be stored outdoors, it is important that all the cover screws are tightened and that all connections are properly sealed. The unit should be packed with a desiccant (silica gel) in a plastic bag or similar, covered with plastic, and not exposed to sunlight, rain, or snow.

This is also applicable for long-term storage (more than 1 month) and for long transport by sea.

Storage in a warm place

When the positioner is stored in a warm place with a high relative humidity and is subjected to daily temperature variations, the air inside the unit will expand and contract.

This means that air from outside the unit may be drawn into the positioner. Depending on the temperature variations, relative humidity, and other factors, condensation and corrosion can occur inside the unit, which in turn can give rise to functional disorders or a failure.

3. Design

The PMV D3 positioner contains:

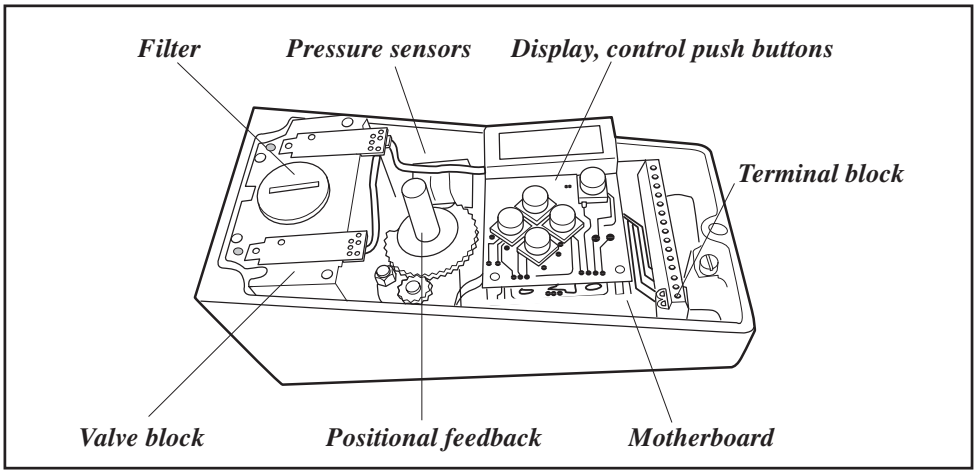
- Electronic board with microprocessor, HART modem, Profibus, Foundation Fieldbus, display, etc.
- Valve block
- Positional feedback with potentiometer
- Sealed compartment for electrical connections.

The push buttons and display are accessible underneath the aluminium cover, which is sealed with an O-ring.

A PC configurator is available free of charge on our webpage www.pmv.nu

The only requirements are: D3 positioner must have HART communication and a HART modem for connection between PC and positioner.

With the configurator, settings can be done and saved in the PC, then downloaded to the positioner.



The figure shows the PMV D3 with the cover removed.

4. Variants

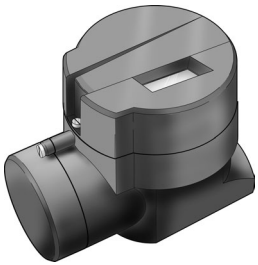
PMV D3 General purpose

The PMV D3 digital positioner has an easy to use user interface with 5 pushbuttons and local graphic LCD display. Communication options include 4-20mA HART, Foundation Fieldbus and Profibus PA. All PMV D3 positioners are available with Feedback, Fail Freeze (Fail in last position and hold when power is lost), 270-degree rotation (for extended travel) and Gauge block.

PMV D3 Explosion proof

The PMV D3 digital positioner is available in explosion proof enclosure. The explosion proof PMV D3 features the same easy to use interface for local configuration as the **general purpose** version does. Communication with Hart, Foundation Fieldbus and Profibus is possible.

Further features are gauge ports and local graphic LCD display.
ATEX: EEx d IIB + H_2 T6 (Ta +65°C), T5 (Ta +80°C) ⟨Ex⟩ II 2GD



PMV D3 Intrinsically safe

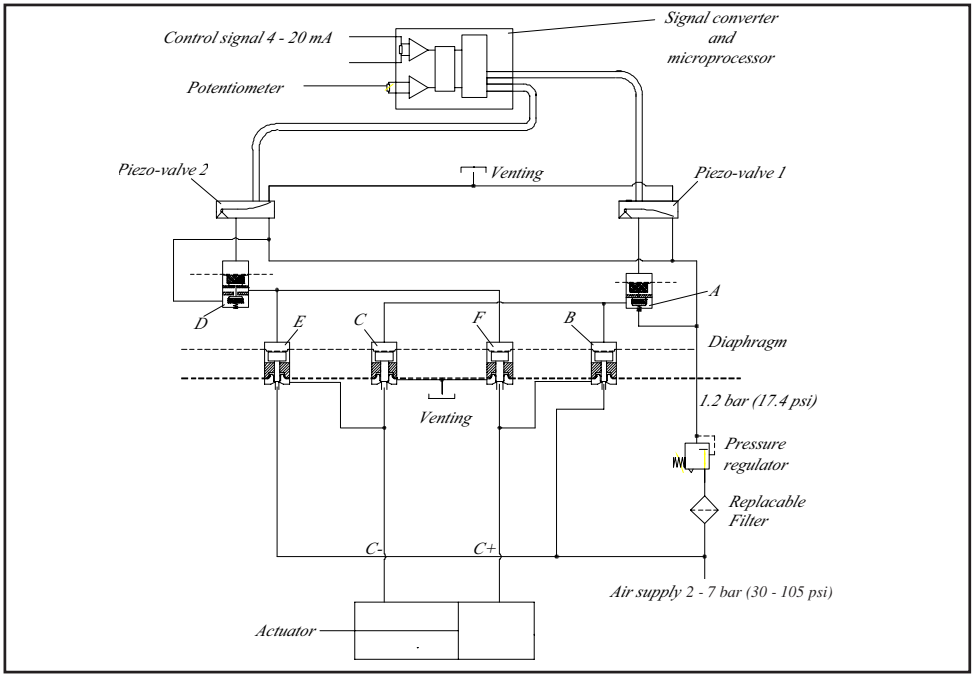
The PMV D3 digital positioner is available in intrinsically safe version for installation in hazardous areas. The intrinsically safe PMV D3 has all the same features and options as the general purpose version, gauge block, local graphic LCD display and feedback option etc. Communication with Hart and Profibus is possible.

ATEX: EEx ia IIC T4 Ta=-30...80°C ⟨Ex⟩ II 1 GD
CSA, FM Class I Div.1 Grps B, C, D, Class II Div.1 Grps E, F, G, T6, T5.

Pressure sensors

Pressure sensors can be installed in the pneumatic block in order to provide advanced diagnostics in combination with ValveSight software.

5. Function



The control signal function and the feedback from the potentiometer position are converted to digital signals that are processed with a PID algorithm in the microprocessor. This provides control signals to the two piezo-valves.

Valves B and E deliver air to the actuator while valves C and F exhaust air from the actuator to atmosphere. Valves B and C are controlled by Piezo-valve 1 and valve A. Valves E and F are controlled by Piezo-Valve 2 and valve D.

Full supply pressure is directed to valves B and E. Air with filtered and reduced pressure is supplied to valves A, C, D and F.

For double acting actuators, connect C+ and C- to the actuator.

For single acting (spring return) actuators connect C+ to the actuator and plug port C-.

Assume equilibrium

Increasing input signal changes position in piezo-valve 1, causing valve A to close.

Supply pressure is then allowed to open valve B and flow to the actuator via the C+ port. When the actuator reaches its new steady state position piezo-valve 1 closes which causes valves B and C to close shutting off supply air to the actuator.

A decreasing input signal functions in the same manner, except uses piezo-valve 2 and valves D, E and F.

6. Installation

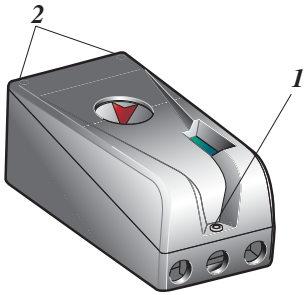
Removal of cover

General purpose / Intrinsically safe

Remove cover by first loosening the screw **1** and then the two screws **2**.

To install cover, first tighten the screw **1**, then the two screws **2**.

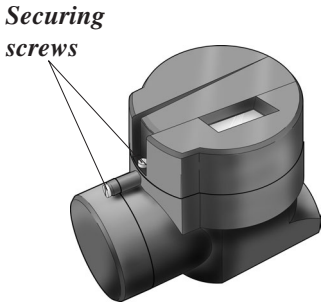
Tighten to 1,5 — 2 Nm.



Explosion proof

To remove covers, first unscrew securing screws, then unscrew covers.

To install, screw covers on as far as possible. Mount the securing screws. Back off slightly on the large cover to be able to screw down the securing screw completely.



Tubing

Use tubes with a minimum inner diameter 6 mm (1/4”).

Air supply requirements

Max. air supply pressure, see the section Technical Data, Section 10.

The air supply must be free from moisture, water, oil, and particles.

Standard: DIN/ISO 8573-1

The air must come from a refrigeration dried supply or be treated in such a way that its dew point is at least 10°C (18°F) below the lowest expected ambient temperature.

To ensure a stable and problem-free air supply, we recommend the installation of a filter/pressure regulator <40µ as close to the positioner as possible.

Before the air supply is connected to the positioner, we recommend the hose is opened freely for 2 to 3 minutes to allow any contamination to be blown out. Direct the air jet into a large paper bag to trap any water, oil, or other foreign materials. If this indicates that the air system is contaminated, it should be properly cleaned.

WARNING! Do not direct the open air jet towards people or objects because it may cause personal injury or damage.

Poor quality air supplies are the main source of problems in pneumatic systems.

Mounting

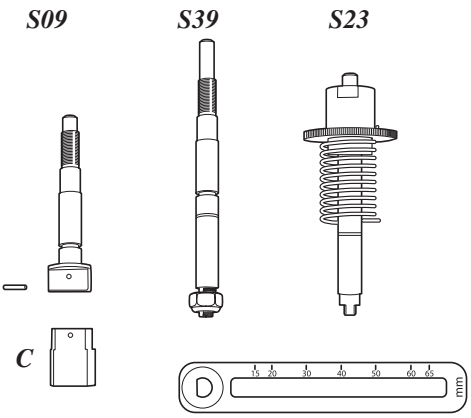
N.B. If the positioner is installed in a hazardous environment, it must be of a type approved for this purpose.

The PMV D3 positioner, all versions, has an ISO F05 footprint, A. The holes are used to attach the PMV D3 to the mounting bracket B. Please contact PMV or your local distributor representative with actuator specifics for the proper mounting bracket and hardware.

The spindle adapter C can be changed to suit the actuator in question.

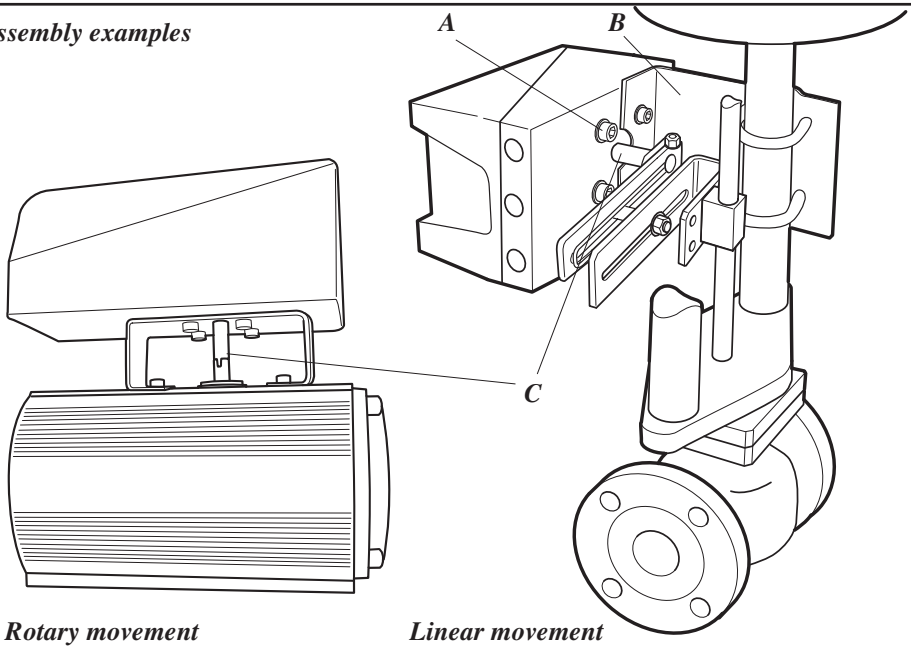
Remove the existing adapter using two screwdrivers. Check that the spring ring on the positioner spindle is undamaged and fit the new adapter. Alternative, press out pin and remove adapter.

Spindles

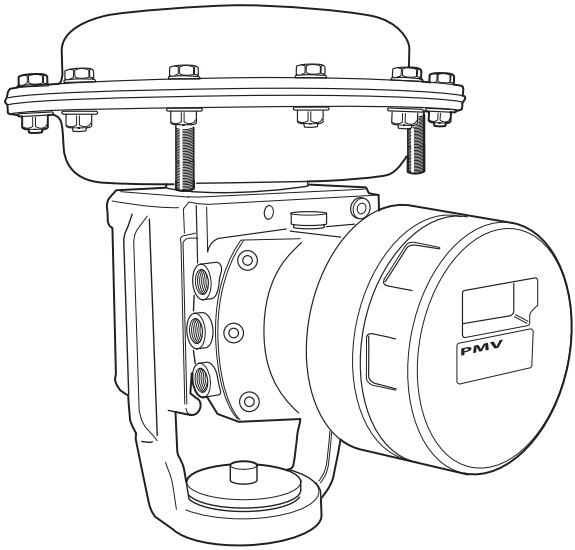


It is important that the positioner's spindle and the arms, that transfer the actuator movements, are correctly mounted. Any tension between these parts can cause incorrect operation and abnormal wear.

Assembly examples



Direct mounting to actuator

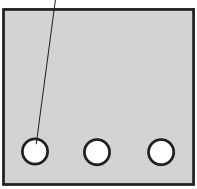


Connections

Air:

Port S	Supply air, 2-7 bar (30–105 psi)
Port C+	Connection to actuator, opening
Port C-	Connection to actuator, closing (only for double action) Plug for single action.

Must be plugged when converting to single action function.



C– ***S*** ***C+***

Electrical connection

See page 12, 13.

Dimensions

Air connections:
1/4" NPT alt. G 1/4"
Electrical connection:
M20 x 1.5 alt. NPT 1/2"

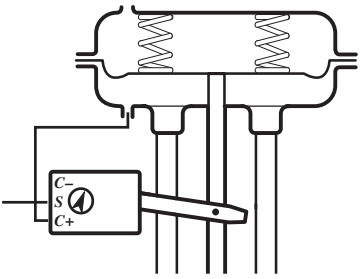
Loctite 577 or equivalent is recommended as a sealant.

For data for air and electrical connections, see section Technical Data on page 50.

Single action positioner, Direct function

Actuator with closing spring

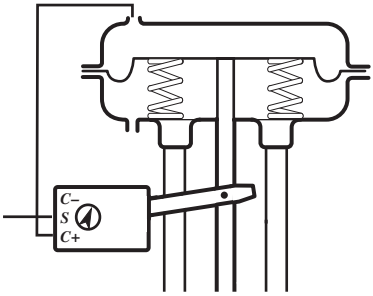
When the control signal increases, the pressure C+ to the actuator is **increased**. The valve stem moves upward and rotates the positioner spindle **counter-clockwise**. When the control signal drops to zero, C+ is vented and the valve closes.



Reverse function

Actuator with opening spring

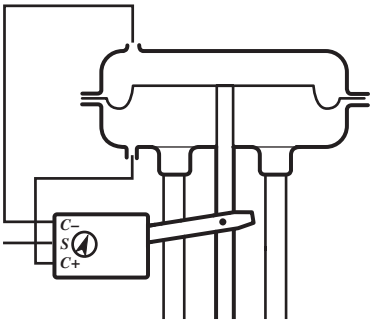
When the control signal increases the pressure C+ to the actuator is **increased**. The valve stem moves downward and the positioner spindle rotates **clockwise.** When the control signal drops to zero, C+ is vented and the valve opens.



Double action positioner, Direct function

Double action actuator

When the control signal increases, the pressure C+ to the actuator is increased. The valve stem is pressed upward and rotates the positioner spindle counter-clockwise. When the control signal is reduced, the pressure C- to the actuator increases and the valve spindle is pressed downward. If the control signal disappears, the pressure goes to C-, C+ vents, and the valve closes.



Fail in place (Fail Freeze)

Signal hold at previous position when input signal drops below 3,75 mA.

Drift rate in midrange <0,1% after 30 s and < 2% after 30 min.

Electrical connections

Terminal block diagram for the PMV D3 and PMV D3 Ex.

See cdwg 3-86

Warning! In a hazardous environment where there is a risk of explosion, electrical connections must comply with the relevant regulations.

PMV D3

The terminal block (below) for the positioner is accessible when the aluminium cover and inner cover are removed, see Section 8.

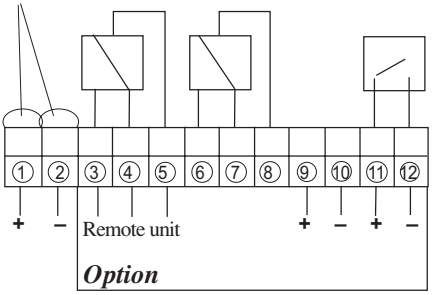
Remote unit

The remote unit shall be connected between terminals 3, 4 and 5 in the PMV D3 and 3, 4 and 5 in the remote unit. Use a shielded cable and ground it in the PMV D3 only. Max recommended distance between PMV D3 and remote unit: 5 m (16,4 ft).

Note! When converting the PMV D3 or PMV D3 Ex to a remote unit, modifications have to be done internally with a cable.

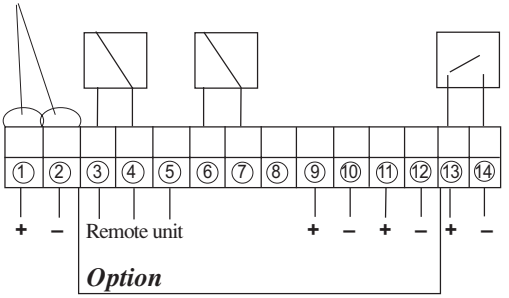
When installing PMV D3 Intrinsically safe unit, always consider cdwg 3-86.

PMV D3, 12 terminals



1 Input signal + 4-20 mA , Hart, Profibus, Foundation Fieldbus
2 Input signal – 4-20 mA , Hart, Profibus, Foundation Fieldbus
3 Switch 1 NO/Remote
4 Switch 1 NC/Remote
5 Switch 1 COM/Remote
Optional
6 Switch 2 NO
7 Switch 2 NC
8 Switch 2 COM
9 4-20 mA + Feedback, 13-28 V DC
10 4-20 mA – Feedback, 13-28 V DC
11 Alarm output +, 8-28 V DC
12 Alarm output –, 8-28 V DC

PMV D3, 14 terminals



1 Input signal + 4-20 mA , Hart, Profibus, Foundation Fieldbus
2 Input signal – 4-20 mA , Hart, Profibus, Foundation Fieldbus
3 Remote Unit
4 Remote Unit
5 Remote Unit
Optional
6 Switch 2 NO
7 Switch 2 NC
8 Switch 2 COM
9 AUX input 4-20 mA +
10 AUX input 4-20 mA –
11 4-20 mA + Feedback, 13-28 V DC
12 4-20 mA – Feedback, 13-28 V DC
13 Alarm output +, 8-28 V DC
14 Alarm output –, 8-28 V DC

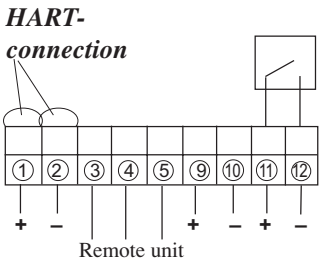
PMV D3 Ex

The terminal (below) for the positioner is accessible when the terminal cover is removed, see Section 8.

See cdwg 3-86

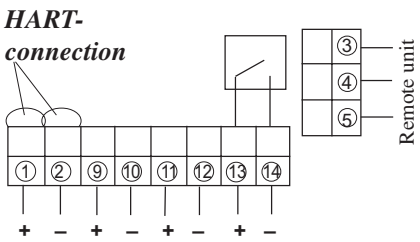
Warning! In a hazardous environment where there is a risk of explosion, electrical connections must comply with the relevant regulations.

PMV D3 Ex, 12 terminals



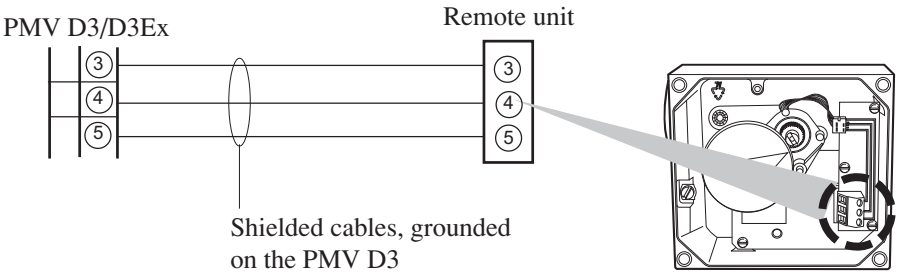
1 Input signal + 4-20 mA , Hart, Profibus, Foundation Fieldbus
2 Input signal – 4-20 mA , Hart, Profibus, Foundation Fieldbus
3 Remote unit
4 Remote unit
5 Remote unit
Optional
9 4-20 mA + Feedback, 13-28 V DC
10 4-20 mA – Feedback, 13-28 V DC
11 Alarm output +, 8-28 V DC
12 Alarm output –, 8-28 V DC

PMV D3 Ex, 14 terminals

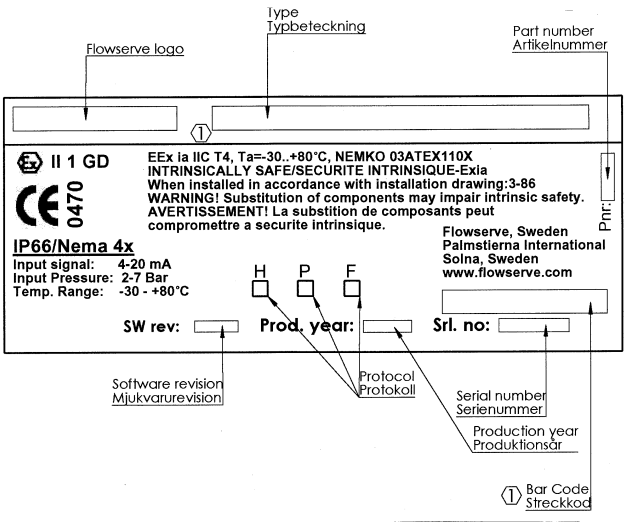


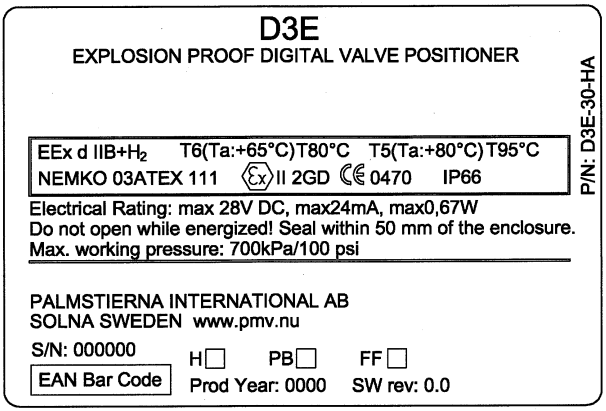
1 Input signal + 4-20 mA , Hart, Profibus, Foundation Fieldbus
2 Input signal – 4-20 mA , Hart, Profibus, Foundation Fieldbus
3 Remote unit
4 Remote unit
5 Remote unit
Optional
9 AUX input 4-20 mA +
10 AUX input 4-20 mA –
11 4-20 mA + Feedback, 13-28 V DC
12 4-20 mA – Feedback, 13-28 V DC
13 Alarm output +, 8-28 V DC
14 Alarm output –, 8-28 V DC

Connecting a remote unit



Signs


Type
Typbeteckning
Flowserve logo
Part number
Artikelnummer
II 1 GD
CE 0470
EEx ia IIC T4, Ta=-30..+80°C, NEMKO 03ATEX110X
INTRINSICALLY SAFE/SECURITE INTRINSIQUE-Exia
When installed in accordance with installation drawing:3-86
WARNING! Substitution of components may impair intrinsic safety.
AVERTISSEMENT! La substition de composants peut
compromettre a securite intrinsique.
Pnr:
IP66/Nema 4x
Input signal: 4-20 mA
Input Pressure: 2-7 Bar
Temp. Range: -30 - +80°C
Flowserve, Sweden
Palmstierna International
Solna, Sweden
www.flowserve.com
H P F
SW rev:
Prod. year:
Srl. no:
Software revision
Mjukvarurevision
Protocol
Protokoll
Serial number
Serienummer
Production year
Produktionsår
Bar Code
Streckkod


D3E
EXPLOSION PROOF DIGITAL VALVE POSITIONER
P/N: D3E-30-HA
EEx d IIB+H2 T6(Ta:+65°C)T80°C T5(Ta:+80°C)T95°C
NEMKO 03ATEX 111 II 2GD CE 0470 IP66
Electrical Rating: max 28V DC, max24mA, max0,67W
Do not open while energized! Seal within 50 mm of the enclosure.
Max. working pressure: 700kPa/100 psi
PALMSTIERNA INTERNATIONAL AB
SOLNA SWEDEN www.pmv.nu
S/N: 000000
H PB FF
EAN Bar Code
Prod Year: 0000 SW rev: 0.0

D3 Digital Positioner model code

A= **Model no**

D	3	X	Digital positioner with display and indicator, General purpose
D	3	I	Digital positioner with display and indicator, Intrinsically safe ATEX
D	3	E	Digital positioner with display, no indicator, Explosion proof ATEX, CSA/FM

B= **Connections**

G	1/4" G air, M20 x 1,5 ectrical
N	1/4" NPT air, 1/2" NPT electrical
M	1/4" NPT air, M20 x 1,5 electrical

C= **Surface treatment**

U	Powder epoxy

D= **Function**

S	Single acting
L	Single acting, Fail Freeze
P	Single acting, Fail freeze remote mounted
M	Single acting, remote mounted
D	Double acting acting
K	Double acting Fail Freeze function
Q	Double acting Fail freeze remote mounted
R	Double acting Remote mounted

E= **Spindle**

2	3	Rotary VDI/VDE 3845
3	9	D type with thread/nut for Linear actuators
0	9	Double D type & adator spindle

F= **Cover and Indicator (No indicator on D3E, D3F)**

P	V	A	Black PMV, 90 deg, Arrow indicator
P	V	B	Black, Extended travel, 270 deg Arrow indicator
W	C	A	Worcester Controls, Arrow indicator

G= **Sensors/Temperature/seals**

Z	No pressure sensors, NBR -30 to 80 deg C
Y	On Board pressure sensors, NBR -30 to 80 deg C

H= **Input signal/Protocoll**

4	4-20 mA
5	HART, 4-20 mA
P	Profibus PA
F	Foundation Fieldbus (Not for D3I)

I= **Feedback option (Limitations for D3E)**

X	No feedback option
T*	Plug in 4-20 mA transmitter only + Alarm module
S*	Limit switches MEC + 4-20 mA + Alarm
N*	Limit sensors NAM + 4-20 mA + Alarm
P*	Limit switches PXY + 4-20 mA + Alarm
4*	Slot type Namur sensor, P+F SJ2 S1N + Alarm
5*	Slot type Namur sensor, P+F SJ2 SN + Alarm
6*	Slot type Namur sensor, P+F SJ2N + Alarm

J= **Acessories**

X	No acessories
M	Gauge block For D3X, D3I only, For D3E (default) Gauge ports D3E, D3F (default)

A	A	A	B	C	-	D	E	E	F	F	F	-	G	H	I	J

*Not for D3E, D3F

FLOWSERVE

Flow Control Division
PMV, Palmstierna International AB

The Atex Directive 94/9/EC

THE DECLARATION OF CONFORMITY

Name & Address of MANUFACTURER Within the European Community:	*PMV Palmstierna International AB* *Korta Gatan 9* *S-171 54 Solna*
Description of Equipment:	*D3E/Logix 800-15*
Name & Address of the Notified Body which holds a copy of Technical file:	NEMKO AS P.O.BOX 73 Blindern NO-0314 Oslo
Equipment Marking:	EEx d IIB + H_2 T5/T6 Ex II 2 G
Reference of the: EC Type Examination Certificate EC Design Examination Certificate EC Certificate of Conformity	NEMKO 03ATEX111
*Name & Address of the Notified Body monitoring the Manufacturer's Quality Assurance System: **	NEMKO AS P.O.BOX 73 Blindern NO-0314 Oslo
References of Harmonized Standards used:	EN 50014 EN 50018 EN ISO 9001:2000 EN 10204 EN 1127-1 EN 50081-1, EN 55011 Class B EN 50082-2 EN 61000-4-2,-3,-4,-5,-6 Lvl 3
References of European Standards and Directives used:	Pressure Equipment Directive 97/23/EC Machinery 98/37/EC *CE Marking 93/68/EEC* *Electromagnetic Compatibility 89/336/EEC* *Low Voltage 72./23/EEC*
Authorized Person for the **MANUFACTURER** *Within the European Community:*	Name: Roland Wedebrand Signature: Title: Director Operations Date: 2005-10-27

PMV Palmstierna International AB
VAT Reg.No. SE556112603701

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S-171 54 Solna
Sweden

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Facsimile +46 (0) 8 555 106 01
www.pmv.nu

FLOWSERVE

Flow Control Divisio
PMV, Palmstierna International AB

The Atex Directive 94/9/EC

THE DECLARATION OF CONFORMITY

Name & Address of MANUFACTURER Within the European Community:	*PMV Palmstierna International AB* *Korta Gatan 9* *S-171 54 Solna*
Description of Pressure Equipment:	*D3I/Logix 800-02*
Name & Address of the Notified Body which holds a copy of Technical file:	NEMKO AS P.O.BOX 73 Blindern NO-0314 Oslo
Equipment Marking:	EEx ia IIC T4  II 1 GD
Reference of the: EC Type Examination Certificate EC Design Examination Certificate EC Certificate of Conformity	NEMKO 03ATEX110
*Name & Address of the Notified Body monitoring the Manufacturer's Quality Assurance System: **	NEMKO AS P.O.BOX 73 Blindern NO-0314 Oslo
References of Harmonised Standards used:	EN 50014 EN 50020 EN 9001 EN 13463-1 EN 13463-5 EN 1127-1 EN 50081-1, EN55011 Class B EN 50082-2 EN61000-4-2,-3,-4,-5,-6 Lvl 3
References of European Standards and Directives used:	Pressure Equipment Directive 97/23/EC Machinery 98/37/EC *CE Marking 93/68/EEC* *Electromagnetic Compatibility 89/336/EEC* *Low Voltage 72./23/EEC*
Authorized Person for the **MANUFACTURER** *Within the European Community:*	Name: Erik Mokvist Signature:  Title: ATEX Authorized Person Date: 2004-06-17

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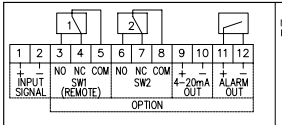
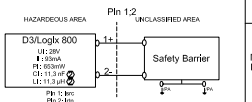


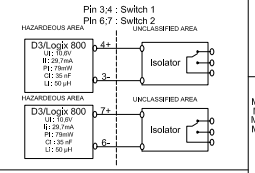
4–20mA input signal

Model no: D3lxx-xxxxxx-x4xx/Logix 810-02-xxxxxx-xxx-xxx
D3lxx-xxxxxx-x5xx/Logix 820-02-xxxxxx-xxx-xxx



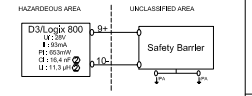
NAMUR switches

Model no: D3lxx-xxxxxx-xxNx/Logix 8x0-02-xxxxxx-xxx-xx3
D3lxx-xxxxxx-xx4x/Logix 8x0-02-xxxxxx-xxx-xx4
D3lxx-xxxxxx-xx5x/Logix 8x0-02-xxxxxx-xxx-xx5
D3lxx-xxxxxx-xx6x/Logix 8x0-02-xxxxxx-xxx-xx6



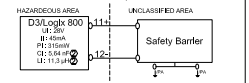
4–20 mA Output

Model no: D3lxx-xxxxxx-xxTx/Logix 8x0-02-xxxxxx-xxx-xxT



Alarm

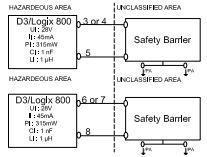
Model no: D3lxx-xxxxxx-xxTx/Logix 8x0-02-xxxxxx-xxx-xxT



Mechanical or Proximity switches

Model no: D3lxx-xxxxxx-xxSx/Logix 8x0-02-xxxxxx-xxx-xx1
Model no: D3lxx-xxxxxx-xxPx/Logix 8x0-02-xxxxxx-xxx-xx2

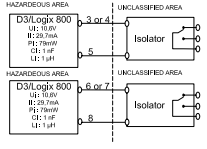
Normally Open	Normally Closed
Pin 3;5 : Switch 1	Pin 4;5 : Switch 1
Pin 6;8 : Switch 2	Pin 7;8 : Switch 2



Mechanical or Proximity switches

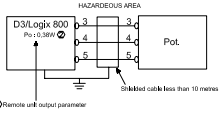
Model no: D3lxx-xxxxxx-xxSx/Logix 8x0-02-xxxxxx-xxx-xx1
Model no: D3lxx-xxxxxx-xxPx/Logix 8x0-02-xxxxxx-xxx-xx2

Normally Open	Normally Closed
Pin 3;5 : Switch 1	Pin 4;5 : Switch 1
Pin 6;8 : Switch 2	Pin 7;8 : Switch 2



Remote unit

Model no: D3lxx-Mxxxxx-xxxx/Logix 8x0-02-xxxxxx-xMx-xxx
Model no: D3lxx-Pxxxxx-xxxx/Logix 8x0-02-xxxxxx-xPx-xxx
Model no: D3lxx-Qxxxxx-xxxx/Logix 8x0-02-xxxxxx-xQx-xxx
Model no: D3lxx-Rxxxxx-xxxx/Logix 8x0-02-xxxxxx-xRx-xxx ①

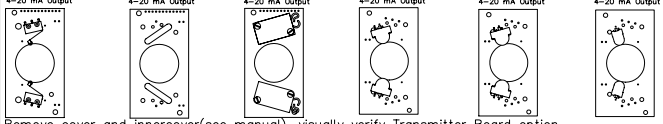


② Remote unit output parameter

It is only allowed to connect the Pot. unit to the ①D3/Logix 8x0 connectors 3, 4 and 5. The connection requires a shielded cable less than 10 metres or less than 30 feet.

Transmitter Board Options

Model no: Logix 8x0-02-xxxxxx-xx1-xxx D3lxx-xxxxxx-xxSx	Model no: Logix 8x0-02-xxxxxx-xx2-xxx D3lxx-xxxxxx-xxPx	Model no: Logix 8x0-02-xxxxxx-xx3-xxx D3lxx-xxxxxx-xxNx	Model no: Logix 8x0-02-xxxxxx-xx4-xxx D3lxx-xxxxxx-xx4x	Model no: Logix 8x0-02-xxxxxx-xx5-xxx D3lxx-xxxxxx-xx5x	Model no: Logix 8x0-02-xxxxxx-xx6-xxx D3lxx-xxxxxx-xx6x
3– As81M ①	3– As81P ①	3– As81N ①	3– As81D4 ①	3– As81D5 ①	3– As81D6 ①
Mechanical Sw.+ 4–20 mA Output	Proximity Sw.+ 4–20 mA Output	Namur Sw.+ 4–20 mA Output	Slotted Namur Sw.+ 4–20 mA Output	Slotted Namur Sw.+ 4–20 mA Output	Slotted Namur Sw.+ 4–20 mA Output



Remove cover and innercover(see manual), visually verify Transmitter Board option.

Warnings:

Substitution of components may impair Intrinsic Safety.
To prevent Ignition of flammable or combustible atmospheres, disconnect power before servicing,
or; read, understand and adhere to the manufacturer's live maintenance procedures.

Non-Incendive:
Substitution of the following components may impair suitability for Division 2 :
All components need Saftey Barriers * except the Switches on transmitter board 3-As81N, 3-As81D4,
3-As81D5, 3-As81D6, 3-As81P, D3-As38E N, D3-As38E D4, D3-As38E D5, D3-As38E D6 and D3-As38E P.
Explosion Hazard - Do not disconnect equipment unless area is known to be non-hazardous.

*Only CSA and FM

Further requirements for FM:
- Associated apparatus manufacturer's installation drawing must be followed when installing this equipment.
- The Entity Concept allows interconnections of intrinsically safe apparatus with associated apparatus when the following is true:
  Vmax or Ui larger than Voc, Vt or Uo;
  Imax or II larger than Isc, It or Io
  Pmax or PI larger than Po
  Ca larger than Ci + Ccable
  La larger than Li + Lcable
- Dust-Tight conduit seal must be when installed in Class II and Class III environments.
- Control equipment connected to Associated Apparatus must not use or generate more than 250 Vrms or Vdc.
- Resistance between Intrinsically Safe Ground must be less than 1,0 Ohm.
- Installation should be in accordance with ANSI/ISA-RP12.06.01 "Installation of Intrinsically Safe Systems for Hazardous (Classified) Locations" and the National Electric Code (ANSI/NFPA 70).
- The associated apparatus must be FM approved.
- The associated apparatus must be a resistively limited by a single or multiple channel FM Approved Associated apparatus having parameters less than those quoted, and for which the output and the combinations of output is non-ignition capable for the Class, Division and Group of use.

REV.	MODIFICATION	DATE	MOD.BY
1	"Old" Transmitter board assemblys (03–4538 E) omitted. Single acting remote, added.	061114	KBM
2	11.3 was 5 (Ui), 11.3 was 4, 16.4 was 4, 11.3 was 5, 5.64 was 5,7 Remote output parameter added.	070112	KBM

For units with 14 terminals see www.pmv.nu

Schedule drawing

Control Drawing

PART NO.	PCS	DESCRIPTION	MATERIAL	DIMENSION	ANNOTATION
MALE TOL.		UNSPECIFIED TOLERANCES ACCORDING TO	SURFACE	PROJECTION EUROPE	

FLOWSERVE	PMV Positioner D3/Logix 800	DRW BY KBM	APPR. BY	SCALE
		DRAWING NO. 3–86		DATE 051208

PALMSTIERNA INTERNATIONAL AB
KORTA GATAN 9 SE–171 54 SOLNA SWEDEN – Tel: +46(0)8 555 106 00–Fax: +46(0)8 555 106 01 – www.pmv.nu

7. Control

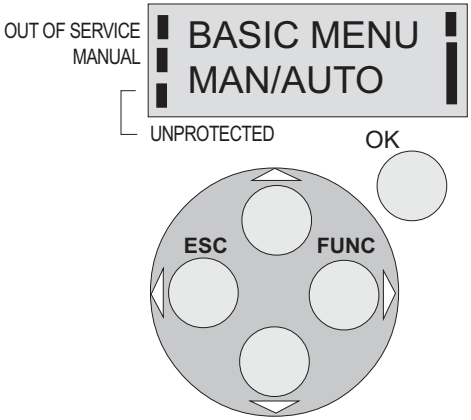
Menus and pushbuttons

The positioner is controlled using the five pushbuttons and the display, which are accessible when the aluminium cover is removed.

For normal functioning, the display shows the current value. Press the ESC button for two seconds to display the main menu.

Use the  pushbuttons to browse through the main menu and the sub-menus.

The main menu is divided up into a basic menu and a full menu, see page 21.



Other functions

ESC
Exit the menu without making any changes (as long as any changes have not been confirmed with OK).

FUNC
To select function and change parameters.

OK
To confirm selection or change of parameters.

MENU INDICATOR
Displays the position of the current menu row in the menu.

IN SERVICE
The positioner is following the input signal. This is the normal status when the positioner is working.

OUT OF SERVICE
The positioner is not following the input signal. Critical parameters can be changed.

MANUAL
The positioner can be adjusted manually using the pushbuttons. See section ”Man/Auto”, page 29”.

UNPROTECTED
Most of the parameters can be changed when the positioner is in the ”Unprotected” position. However, critical parameters are locked when the positioner is in the ”In service” position.

Menu indicator

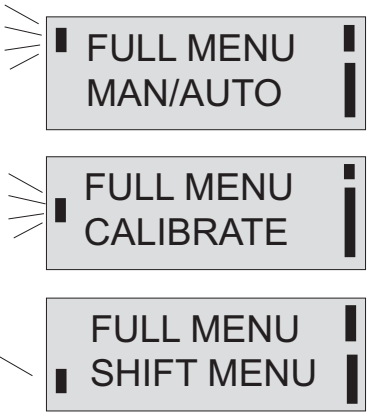
There are indicators at both sides of the display window and they indicate as follows:

Flashing in position **Out of service**

Flashing in position **Manual**

Displayed in position **Unprotected**

The indicators on the right-hand side show the position in the current menu.



Menus

To display the menus you can select:

- **Basic menu**, which means you can browse through four different steps

- **Full menu**, which comprises ten steps. Use the Shift Menu to browse through the steps

Full Menu can be locked out using a passcode.

The main menus are shown on the next page and the sub-menus on the subsequent pages.

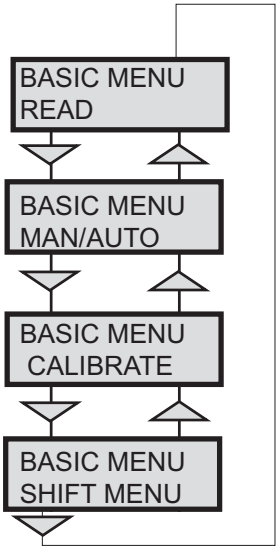
Changing parameter values

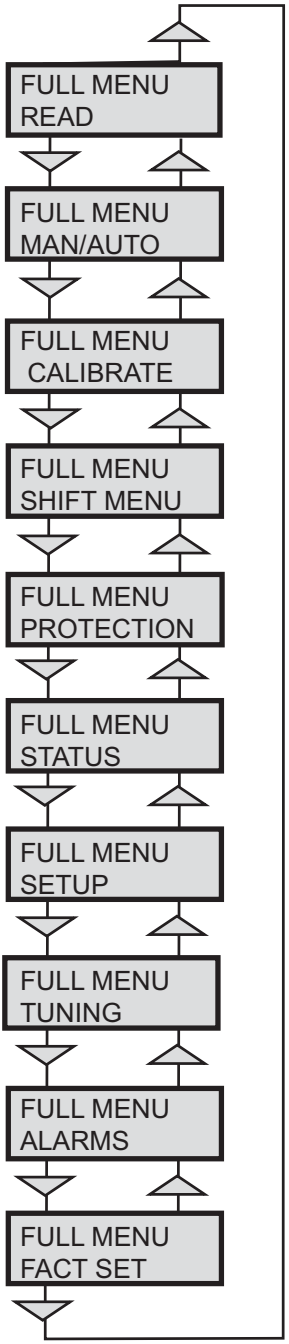
Change by pressing  until the desired figure is flashing.

Press  to step to the desired figure. Confirm by pressing OK.

A change can be undone by pressing the **ESC** button, which returns you to the previous menu.

Menu system





The menus are described on the following pages.

First start

Calibrate in the basic menu is displayed automatically the first time the power is applied, and can be selected from the basic/ main menu at any later time.

A complete auto-calibration takes about 3 minutes and includes end limit calibration, auto-tuning, leak test, and a check on the speed of movement. Start the automatic calibration by selecting **Auto-Cal** and then answer the questions on the display by pressing **OK** or the respective arrow. The menu is described on the next page.

Calibration error messages

If a fault occurs during calibration, one of the following error messages can be displayed:

No movement/press ESC to abort

Typically the result of an air delivery issue to the actuator, or incorrect mounting and/or linkage arrangement. Check for proper supply air to the positioner, pinched tubing, proper actuator sizing, proper linkage and mounting arrangement.

Pot uncalibrated/press ESC to abort

The potentiometer has been set to an illegal value. The potentiomenter is aligned using the Calibrate - Expert cal - pot Menu. The calibration sequence must be restarted after the fault is corrected.

Air leak detected/ESC = abort
OK = go on

An air leak has been detected. The calibration sequence should be restarted after the fault is corrected.

First start, Profibus

Connect the input signal at pos 1 and 2 on the terminal block. See Electrical connections in the manual.

In the SETUP/Devicedata/Profibus: change the address from 126 to any number between 1-125.

Never use the same number with more than one unit. Install values in failsafe mode, for communication when loss of signal.

Calibrate the unit.

GSD files are available at our web-page www.pmv.nu

To install the D3_PROFIBUS.DDL file to Siemens SIMATIC PDM.

1. Move the files to The directory with the DeviceInstall.exe. There should be one existing from Siemens that is included in PDM
2. Run the Program DeviceInstall.exe

Parameter	Description	BYTE	
SP	Setpoint	The SP has 5 bytes, 4 bytes for the float value and one status byte that has to be 128 or over (80 in hex) for the D3 to accept it. Use 128 means GOOD and everything should work fine.	4+1=5
READBACK	Position	The READBACK has 5 bytes, 4 bytes for the float value and one status byte.	4+1=5
POS_D	Digital position	Gets a position in digital form 0 = Not initialized 1 = Opened 2 = Closed 3 = Intermediate	2
CHECKBACK		Detailed information of the device, bit wise coded, more than one massage possible at ones.	3
RCAS_IN	Remote Cascade	The RCAS_IN has 5 bytes, 4 bytes for the float value and one status byte.	4+1=5
RCAS_OUT	Remote Cascade	The RCAS_OUT has 5 bytes, 4 bytes for the float value and one status byte.	4+1=5

Status Byte

MSB								LSB meaning	D3 use
0	0	0	0	1	0	x	x	not connected	
0	0	0	0	1	1	x	x	device failure	PROFIbus PA module failure
0	0	0	1	0	0	x	x	sensor failure	No sensor value
0	0	0	1	1	1	x	x	out of service	AI Function Block in O/S mode
1	0	0	0	0	0	x	x	Good -	Non cascade measured value OK All Alarm values used
1	0	0	0	0	0	0	0	ok	
1	0	0	0	1	0	0	1	below low limit Lo	Advisory alarm
1	0	0	0	1	0	1	1	Above high limit Hi	Advisory alarm
1	0	0	0	1	1	0	1	Lo-Lo	Critical alarm
1	0	0	0	1	1	1	1	Hi-Hi	Critical alarm

Example SP = 43.7% and 50%

Float	Hex	Status
43.7	42 2E CC CD	80
50.0	42 48 00 00	80

(FF) Fieldbus Foundation function blocks

Function blocks are sets of data sorted by function and use. They can be connected to each other to solve a control process, or to a controlling DCS. To get a good introduction and understanding of FF look at www.fieldbus.org and download the "Technical Overview" from the About FF pages.

(TB) Transducer Block

The TB contains unit specific data. Most of the parameters are the same as parameters found on the display. The data and the order of data varies between different products.

The AO-block setpoint (SP) and process value (PV) parameters are transceived to the TB through a channel.

The TB has to be in AUTO for the AO-block to be in AUTO.

The positioner has to be in menu-auto mode and in service to be controlled from the fieldbus.

If the positioner is placed in menu-manual mode then the transducer block will be forced to (LO) local override. In this way a person in the field will be able to control the positioner from the keypad, without collision with a control loop.

(RB) Resource Block

The RB is a set of parameters that looks the same for all units and products. The values of the RB define unit information that concerns the Fieldbus Protocol such as

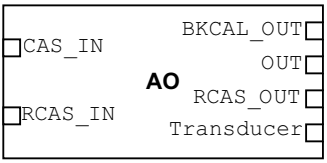
MANUFAC_ID which informs the unique manufacturer id. For Flowserve it is 0x464C53.

The RB has to be in AUTO for the AO-block to be in AUTO.

(AO) Analogue Output Block

The AO follows Fieldbus Foundation's standard on content and action. It is used for transferring (SP) setpoints from the bus to the positioner.

AO-block overview



CAS_IN (cascade input) and RCAS_IN (remote cascade input) are selected as inputs to the AO block depending on the MODE_BLK parameter. The selected input will be relayed to the SP parameter of the AO block. BKCAL_OUT (back calculated output) is a calculated output that can be sent back to a controlling object so that control bumps can be avoided. Usually the BKCAL_OUT is set to be the (PV) process value of the AO-block, i.e. the actual measured position of the valve.

OUT is the primary calculated output of the AO block. During a limited action (ramping) of the AO block the RCAS_OUT parameter will supply the final setpoint and the OUT parameter will be the limited output.

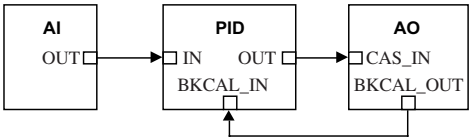
The transducer block is connected through a channel to the AO block. Through this channel the OUT value and SP are transceived.

In order to set the AO block to AUTO, the TB and the RB have to be in AUTO. Further the AO block has to be scheduled. Using National Instruments Configurator; scheduling can be done by adding the unit to a project and then click on the "upload to device"-icon.

To write a setpoint value by hand, add Man to MODE->Permitted parameter, and then choose MODE->Target to Man. Make sure that the unit is scheduled.

Example

A typical FF block loop control might look like the following:



Where the positioner is represented by the AO-block.

The contents of the menu are shown on the next page. The various menu texts are described below.

Auto-Cal	Auto-tuning and calibration of end positions
Start tune	Starts the tuning. Questions/commands are displayed during calibration. Select the type of movement, function, etc. with ▽ and confirm with **OK** as shown in the chart on the next page.
Lose prev value? OK?	A warning that the value set previously will be lost (not during the first auto-tuning).
Actuator? rotating	Select for rotating actuator.
Actuator? linear	Select for linear actuator.
Actuator single act	Select for single act.
Actuator double act	Select for double act.
Direction? direct	Select for direct function.
Direction? reverse	Select for reverse function.
In service? Press OK	Calibration finished. Press OK to start positioner functioning. (If ESC is pressed, the positioner assumes the ”Out of service” position but the calibration is retained).
TravelCal	Calibration of end positions
Start cal	Start end position calibration.
Lose prev value? OK?	A warning that the previously set value will be lost. Confirm with OK. The calibration sequence starts.
In service? Press OK	Calibration finished. Press OK to start positioner functioning. (If ESC is pressed, the positioner assumes the ”Out of service” position but the calibration is retained).
Perform	Setting gain
Normal	100% gain
Perform 50%, 25%, 12%, L, M, S	Possibility to select a lower gain in steps.
L, M, S	Preset values for L, M, S actuators
Factory set	Resets all set values and enters Factory Mode. **Should only be used by authorized staff.**

Note. Original P. I. D. will always be shown in display

ExpertCal

Set point LO: Use the calibrator set to 4 mA (or set another value on the display). Press OK.

Set point HI: Use a calibrator of 20 mA (or set another value on the display). Press OK.

Transmitter: Connect 10 - 28VDC. Connect an external mA meter to the loop. Read low value on mA meter and adjust with up/down key. Press OK to set low value. Repeat procedure to set High value. Also see video on www.pmv.nu

Pot: Potentiometer setting, see section 8. Also see video on www.pmv.nu

Full reset: Resets all set values.

Pressure LO: Use a supply of 2 bar (30 psi) (or set another value on the display). Press OK. Pressure read out only possible on PMV D3 with built in pressure sensor.

Pressure HI: Use a supply of 7 bar (105 psi) (or set another value on the display). Press OK. Pressure read out only possible on PMV D3 with built in pressure sensor.

Temp: Calibrate using a known temperature.

14 terminals

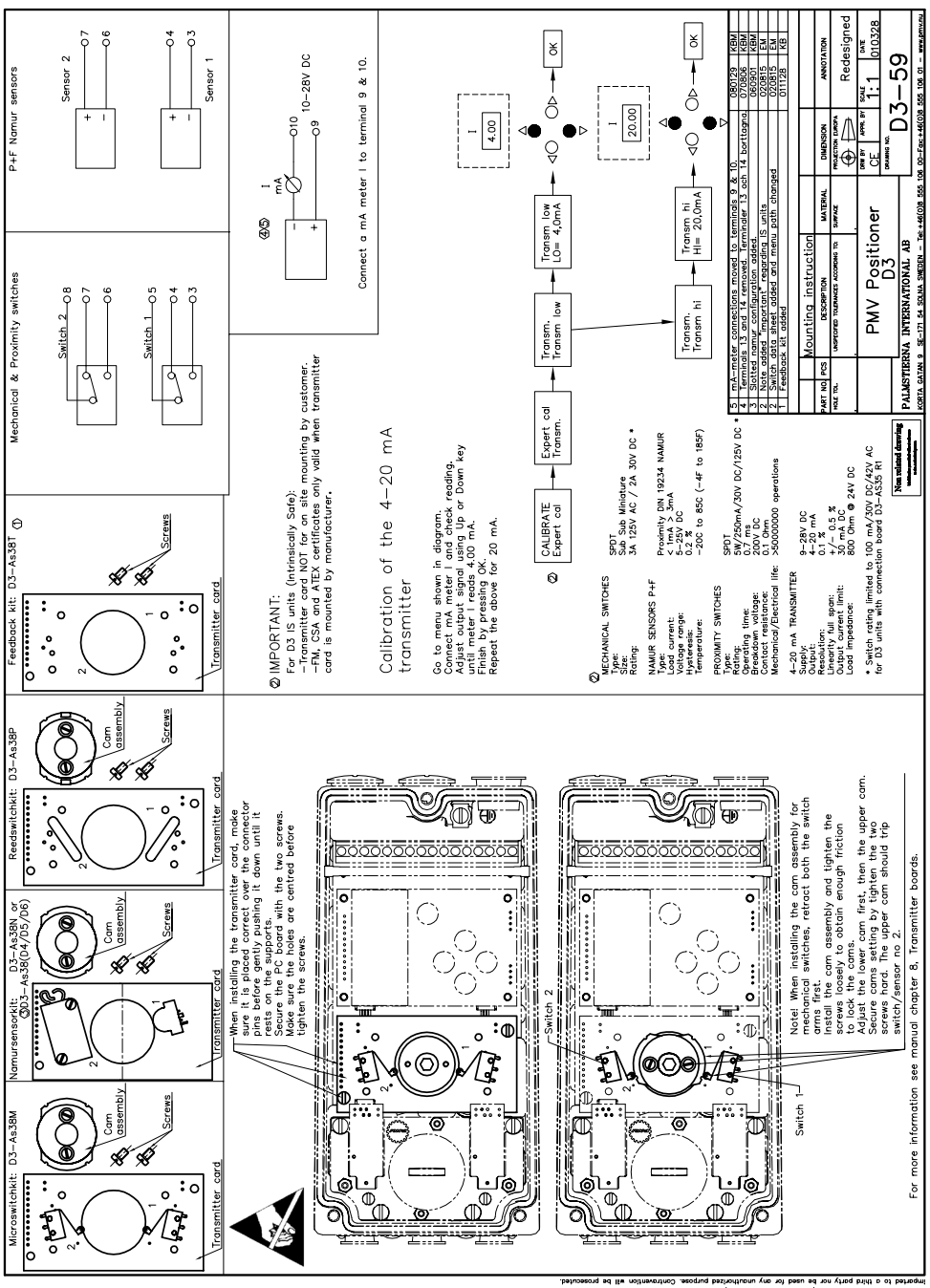
Aux input LO: Use the calibrator and a power supply of 4 mA (or set another value on the display). Press OK.

Aux input HI: Use a supply of 20 mA (or set another value on the display). Press OK.

Pot: Potentiometer setting, if its position relative to the gear segment has been changed. See Section 8.

Full reset: Resets all the set values.

Feedback option



The menu contents are shown in the figures on the right and the texts are described below:

Current values can be read using the Read Menu and some values can be reset.

Pos Shows current position

Set&pos Set point and position

Set&dev Set point and deviation

Temp Shows current temperature

Aux Shows auxinput signal valve. External pot or similar (Only Double board)

Statistics

n cycles Shows number of movements (turns)

Acc travel Shows accumulated movement

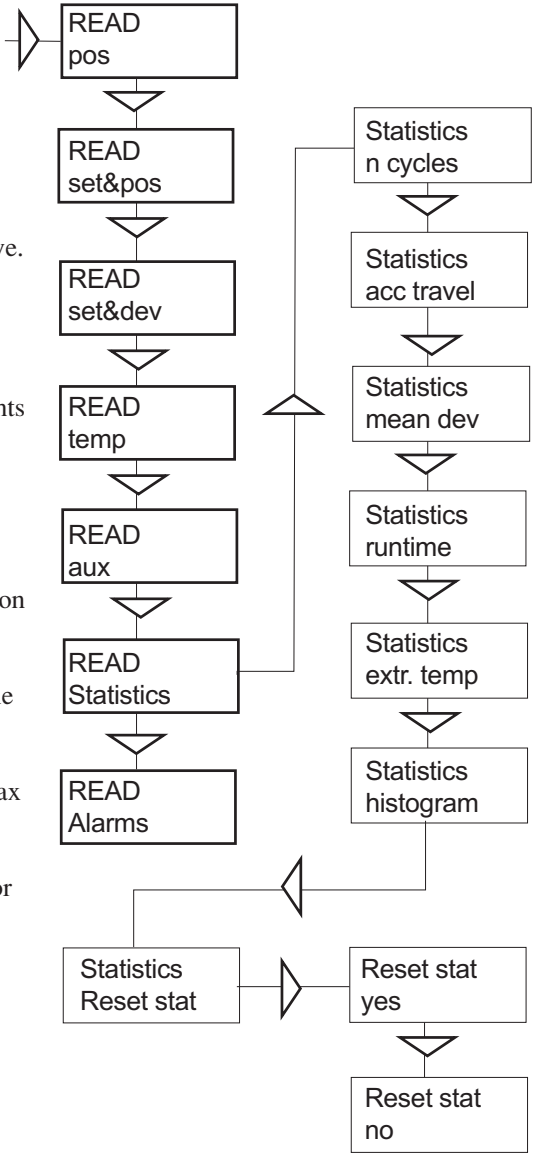
mean dev Shows accumulated deviation in %

runtime Shows accumulated runtime since last reset

Extr temp Shows extreme min and max temperature

Histogram Shows position and time for PV

Alarms Displays tripped alarms



The Man/Auto menu is used to change between manual and automatic modes.

The menu contents are shown in the figures on the right and the various texts are described below:

AUT, OK = MAN
Positioner in automatic mode

MAN, OK = AUT
Positioner in manual mode

In the **MAN** mode, the value of POS can be changed using ▲▼. The push-buttons increase/decrease the value in steps. The value can also be changed in the same way as for the other parameter values, as described on page 20.

When changing between **MAN** and **AUT** mode, the **OK** button must be pressed for 3 seconds.

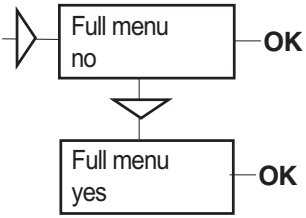
Other functions
C+ can be fully opened by pressing ▲ and then immediately OK simultaneously.

C- can be fully opened by pressing ▼ and OK simultaneously.

C+ and C- can be fully opened for blowing clean by pressing ▲▼ and OK simultaneously.

The Shift Menu is used to choose between the basic menu and the full menu.

The menu contents are shown in the figures on the right and the various texts are described below:



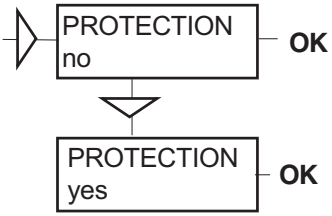
No Full menu selected.

Yes Basic menu selected.

Full Menu can be locked with a passcode, see Setup menu.

The Write Protect menu is used to protect all essential settings.

The menu contents are shown in the figures on the right and the various texts are described below:



No Entered values are not write protected. ”Unprotected” is displayed in the lower left-hand corner.

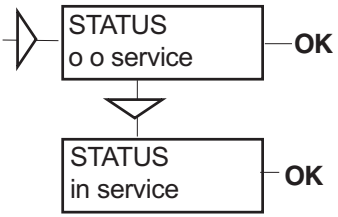
Yes Entered values are write protected. Passcod needed for change to **No** (Applicable when a passcode has been set up in SETUP menu).

.

When changing between Yes and No mode, the OK button must be pressed for 3 seconds.

The Status Menu is used to select whether or not the positioner is in service.

The menu contents are shown in the figures on the right and the various texts are described below:



o o service Not in service. Flashing indicator in upper left-hand corner of display.

in service Positioner in service. Critical parameters cannot be changed.

When changing between **In service** and **Out of service**, the **OK** button must be pressed for 3 seconds.

FULL MENU
SETUP

The Setup Menu is used for various settings.

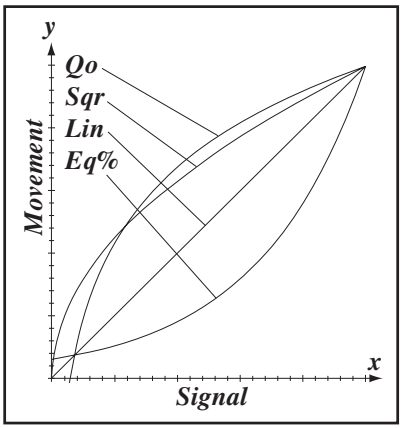
The menu contents are shown in the chart on the next page and the various texts are described below:

Actuator	Type of actuator	Size of actuator	Time out
Rotating	Rotating actuator.	Small	10 s
Linear	Linear actuator.	Medium	25 s
		Large	60 s
		Texas	180 s

Lever Only for linear actuator.
Lever stroke Stroke length to achieve correct display.
Level cal Calibration of positions to achieve correct display.

Direction
Direct Direct function (signal increase opens). Indicator/spindle rotates counter-clockwise.
Reverse Reverse function.

Character Curves that show position as a function of input signal.
Linear
Equal % — See diagram.
Quick open
Sqr root
Custom Create own curve.



Cust chr
# of point Specify number of points (3, 5, 9, 17, or 33)
Cust curve Enter values on X and Y axes.

Curr range
0%=4.0 mA
100%=20.0 mA Possibility of selecting which input signal values will correspond to 0% and 100% movement respectively. Examples of settings: 4 mA = 0%, 12 mA = 100%, 12 mA = 0%, 20 mA = 100%.

TRVL range	Setting end positions
0%=0.0%	Select Out of Service. Set percentage value for desired end position (e.g. 3%).
Set 0%	Select In Service. Connect calibrator. Move forward to desired end position (0%) and press OK.
100%=100.0%	Select Out of Service. Set percentage value for desired end position (e.g. 97%).
Set 100%	Select In Service. Connect calibrator. Move forward to desired end position (100%) and press OK.
Trvl ctrl	Behaviour at set end position
Set low	Choose between Free (go to mechanical stop), Limit (stop at set end position), and Cut off (go directly to mechanical stop at set end position).
Set high	Similar to Set low.
Values	Select position for Cut off and Limit at the respective end positions.
Passcodes	Setting passcodes for various functions
Full menu	Passcode for access to full menu.
Write prot	Passcode for removing write protect.
Expert	Passcode for access to Expert menu (TUNING).
Fact set	Passcode to return to default values applicable when positioner was delivered.

Numbers between 0000 and 9999 can be used as passcodes. 0 = no passcode required.

Appearance	On display
Language	Select menu language.
Units	Select units.
Def. Display	Select value(s) to be displayed during service.
	The display reverts to this value 10 minutes after any change is made.
Start menu	Start in Basic menu or Full menu.
Contrast	Adjust display contrast (Only Double board).
Orient	Orientation of text on display.
Par mode	Display of control para meters such as P, I, D or K, Ti, Td.
Devicedata	
HW rew	General parameters.
SW rew	
Capability	
HART	Menu with HART parameters. Only amendable with HART communicator. It is possible to read from display.
Profibus	
Status	Indicates present status
Device ID	Serial number
Address	1-126
Tag	Allotted ID
Descriptor	ID description
Date	N/A
Failsafe	Value = preset pos Time = Set time +10sec= time before movement Valve act = failsafe (preset pos) or lastvalue (present pos) Alarm out= On/Off
Foundation Fieldbus	
Device ID	Serial number
Nod address	Address on the bus provided by the DCS system
TAG–PD_TAG	Name provided by the DCS system
Descriptor	PMV D3 positioner
Date	N/A (not applicable)
Sim jumper	Simulate jumper, FF simulation functionality activated = ON

The menu contents are shown in the chart on the next page and the various texts are described below:

Close time	Minimum time (Min 0.005) from fully open to closed.
Open time	Minimum time (Min 0.05) from closed to fully open.
Deadband	Setting deadband. Min. 0.2%.
Expert	Advanced settings.
Control	See explanations below.
Togglestep	Test tool for checking functions. Overlays a square wave on the set value.
Self test	Internal test of processor, potentiometer, etc.
Leakage	Air leakage in actuator/tubing can be compensated by settings.
Undo	You can read last 20 changes.

P,I,D and K,Ti,Td parameters

If one of the gains is changed, the corresponding value in the other gain set is changed accordingly.

Min Pulse

The minimum pulse lengths (the "minpulses") are displayed in the menu, and can be changed.

Normal values are:

DN1, DN2: 2750 to 4300

UP1, UP2: 3750 to 5220

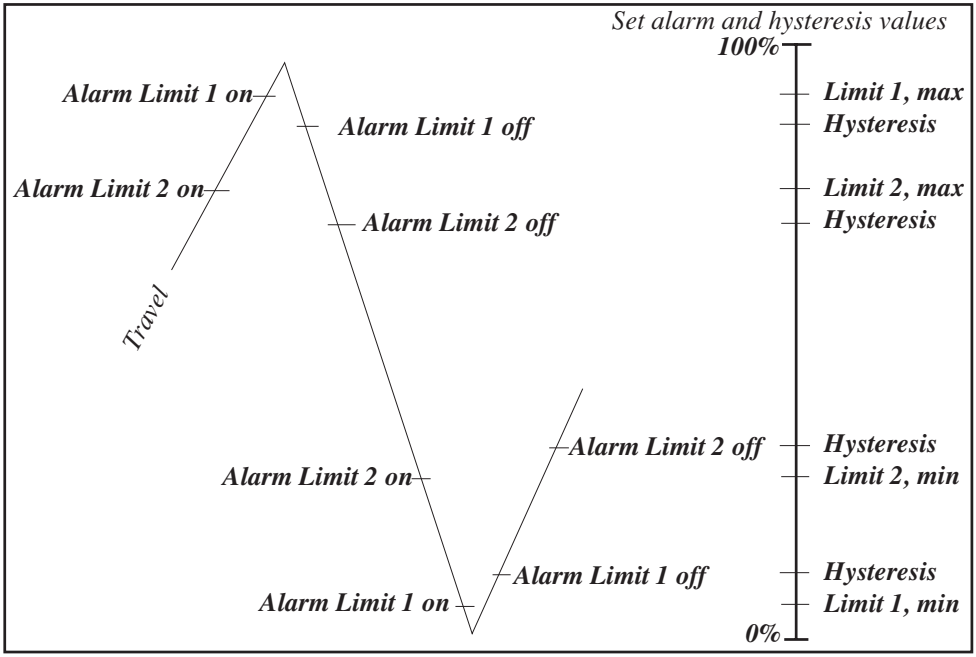
Spring adjust

The spring adjust function compensates the airflow linearly with the actuator C+ chamber volume (for a constant position error), so that low volumes get less flow. This is needed for linear single-acting actuators, where a low C+ volume means that the actuator spring is extended, its force is reduced, and less flow is needed for stable position changes.

FULL MENU
ALARMS

The menu contents are shown in the chart on the next page and the various texts are described below:

Deviation	Alarm generated when deviation occurs
On/Off	Alarm on/off.
Distance	Allowed distance before alarm is generated.
Time	Total deviation time before alarm is generated.
Alarm out	Select ON/OFF offers output on terminals.
Valve act	Behaviour of valve when alarm is generated.
Limit 1	Alarm above/below a certain level.
On/Off	Alarm on/off.
Minipos	Setting of desired min. position.
Maxpos	Setting of desired max. position. — See diagram below!
Hysteresis	Desired hysteresis.
Alarm on	Select ON/OFF offers output on terminals.
Valve act	Behaviour of valve when alarm is generated.
Limit 2	See Limit 1.



14 terminal version

Pos=aux	External potentiometer
On/Off	Function on/off.
Max diff	Max. allowed deviation between internal and external potentiometer.
Alarm out	Select ON/OFF offers output on terminals 13 and 14.
Valve act	Behaviour of valve when alarm is generated.
Aux input	External input signal 4-20 mA.
On/Off	Alarm on/off.
Minipos	Setting of desired min. position.
Maxpos	Setting of desired max. position.
Hysteresis	Desired hysteresis.
Valve act	Behaviour of valve when alarm is generated.

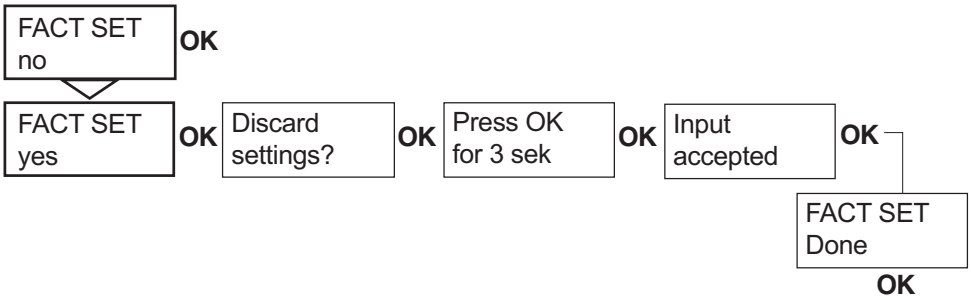
Function similar to Limit 1 and 2. See chart on previous page.

Temp	**Alarm based on temperature**
On/Off	Temperature alarm on/off.
Low temp	Temperature setting.
High temp	Temperature setting.
Hysteresis	Allowed hysteresis.
Alarm out	Select ON/OFF offers output on terminals.
Valve act	Behaviour of valve when alarm is generated.

Valve act	
No action	Alarm generated only. Operations not affected.
Goto open	C+ gives full pressure and valve moves to fully open position. Positioner changes to position Manual.
Goto close	C- gives full pressure and valve moves to fully closed position. Positioner changes to position Manual.
Manual	Valve stays in unchanged position. Positioner moves to position Manual.

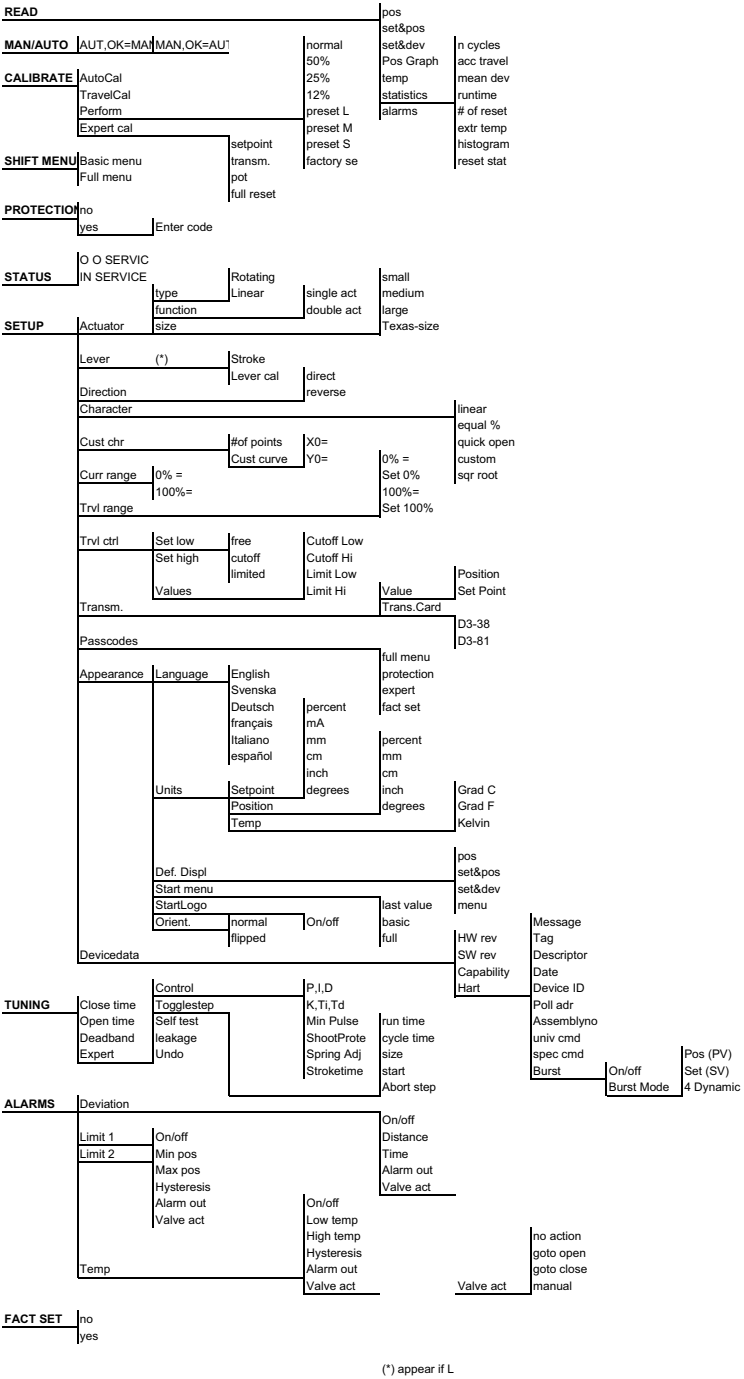
The menu contents are shown in the chart below.

The default values that were set on delivery can be reset using the Fact Set menu. Values from calibration and from other settings will then be lost.



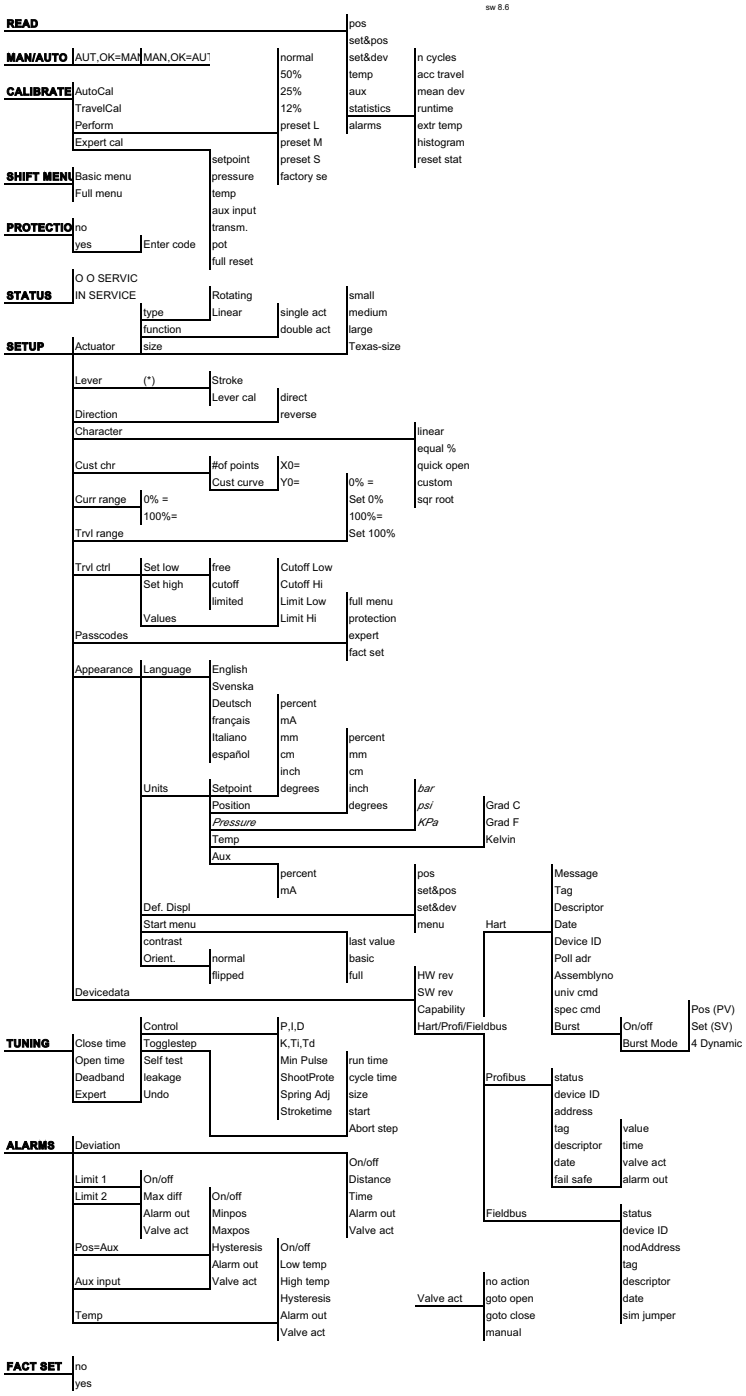
Single Board 12 terminals

sw 9.0



(*) appear if L

Double Board 14 terminals



(*) appear if L

8. Maintenance/service

When carrying out service, replacing a circuit board, etc., it may be necessary to remove and refit various parts of the positioner. This is described on the following pages.

Read the Safety Instructions on page 3 before starting work on the positioner.

Cleanliness is essential when working with the positioner. Contamination in the air ducts will infallible lead to operational disturbances. Do not disassemble the unit more than that described here.

Do not take the valve block apart because its function will be impaired.

When working with the PMV D3 positioner, the work place must be equipped with ESD protection before the work is started.

Always turn off the air and electrical supplies before starting any work.

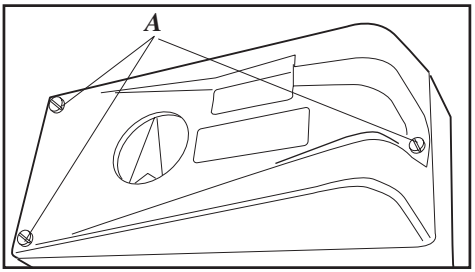
When upgrading electronically parts inside a PMV positioner approved for installation in Hazardous locations special procedures apply, permission from PMV/Flowserve is required prior to the start of work.

Please contact a Flowserve office for information regarding proper procedures.
www.pmv.nu or infopmv@flowserve.com

Disassembling PMV D3

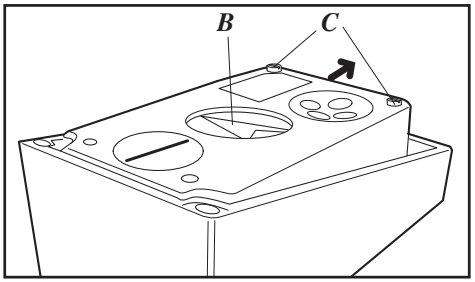
Removing cover and inner cover

• Unscrew the screws A and remove the cover. When mounting cover – see page 8.



• Pull off the arrow pointer, B, using a small screw driver.

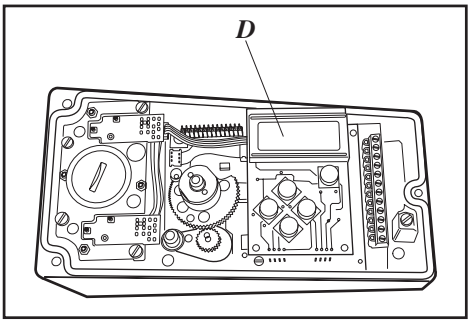
• Unscrew the screws C, pull the inner cover slightly in the direction of the arrow, and remove the cover. Do not remove the filter plug.



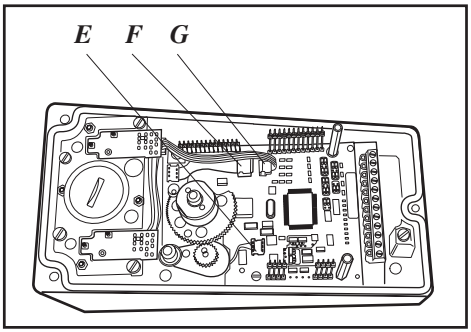
Circuit boards (pcb)

Disconnect or switch off the electric power supply before starting any work.

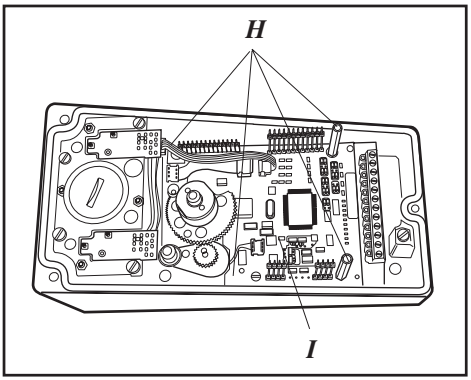
• Lift off the display pcb.



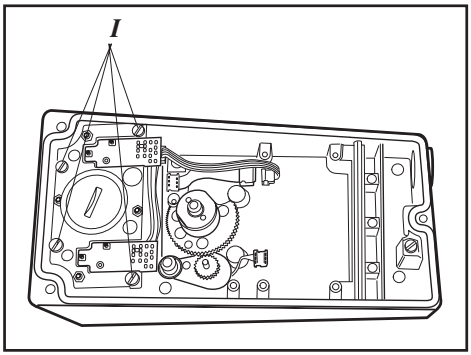
• Release the cable connections E, F and G,



• Unscrew the spacers H and lift up the terminal board I



Valve block



Turn off the air and electric power supply before starting any work.

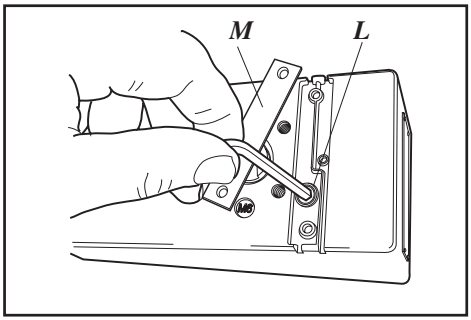
• Remove the four screws I and lift out the valve block

N.B. Do not disassemble the valve block

• When installing the valve block — torque the four screws to 1,4 Nm and seal with Locktite 222.

Silencer

A silencer, L (option) can be mounted under the plate M on the PMV D3. Contact PMV.



Spindle adapter

The spindle adapter can be changed to suit the actuator in question, see page 9 or video at www.pmv.nu

Potentiometer

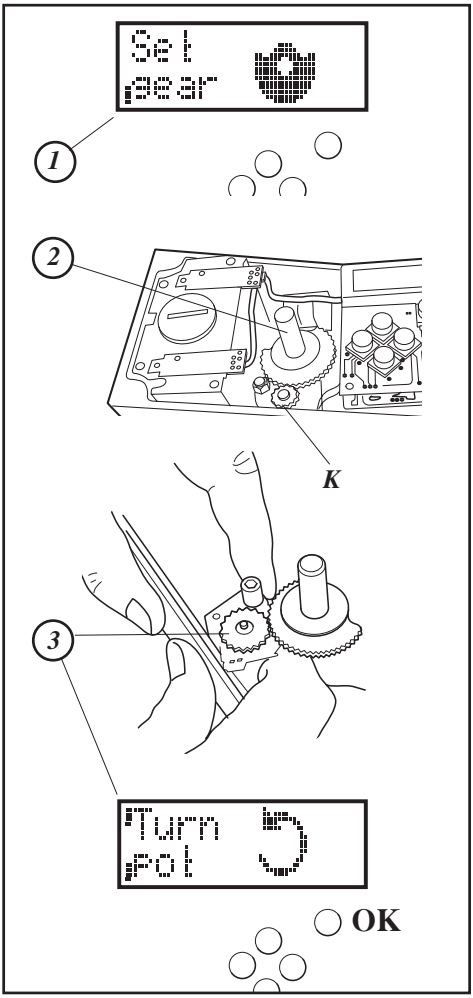
90° and 270° spring loaded potentiometer
The spring-loaded potentiometer **K** can be removed from the gearwheel for calibration or replacement.

If the potentiometer is replaced or the setting is changed, it must be calibrated.

• Select the menu Calibrate - Expert - Cal pot. The display shows Set gear (1).

• Turn the spindle shaft (2) cw to end position and press OK. Turn ccw to the end and press OK.

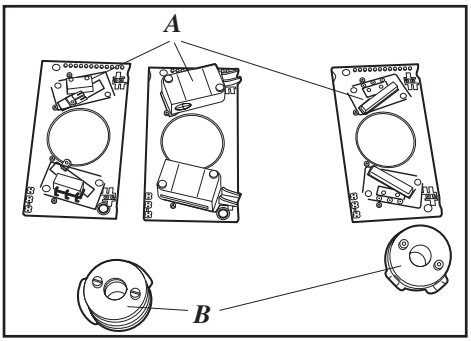
• Unmesh the potentiometer (3) and turn it according to display until OK is shown. Press OK.



Transmitter boards

The equipment for transmitter feedback consists of a circuit board A, cam assembly B and screws.

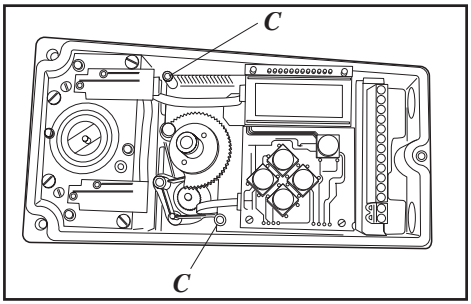
The circuit board exists in four:
- with mecanical switches, SPDT
- with namur sensors, DIN 19234
- with proximity switches
- with feedback transmitter only



Transmitter board installation

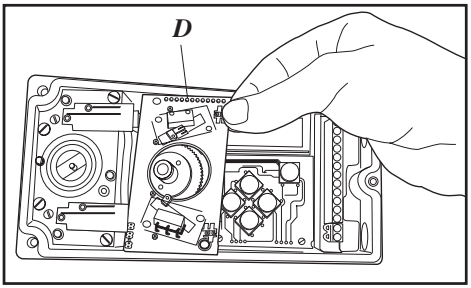
Caution! Turn off the power and air supply before starting the installation.

Important for PMV D3 units with hazardous approvals:
Maintenance and repairs only to be made by authorized staff.

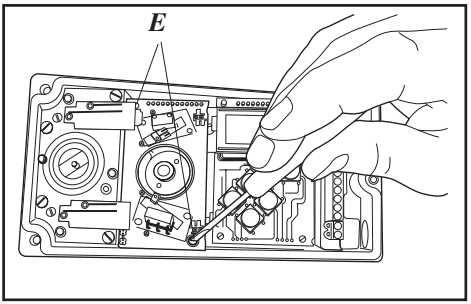


• Remove the cover, indicator and inner cover according to the description on page 40.

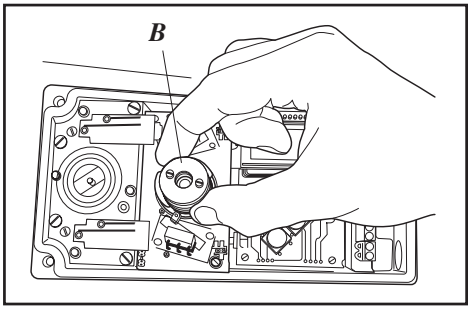
• Check that both spacers **C** are installed.



• Carefully mount the circuit board in its position. The pins **D** should fit in the connector and the positioners motherboard. Make sure that the feed back PC board is properly connected.

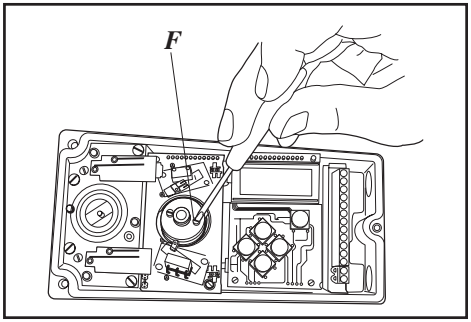


• Secure the circuit board with the enclosed screws **E**.

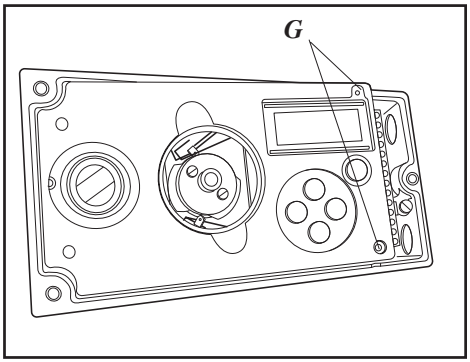


• Install the cam asssembly **B** on the shaft and push it down to its position. If the board has microswitches, be careful not to damage the levers.

• Tighten the screws **F**, on the cam assembly. Do not tighten the screws to hard. The cams should be able to move in relation to each other.

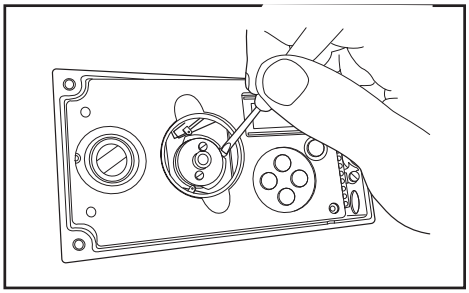


• Install the inner cover with the two screws, **G**.



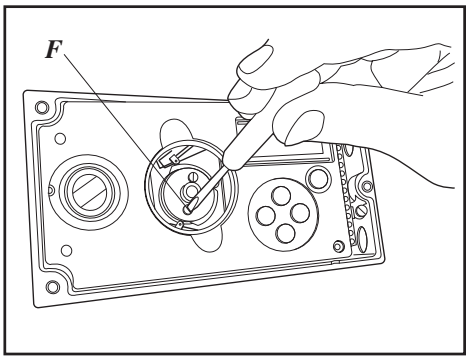
• Connect the wiring for the transmitter feedback on the terminal block, according to the drawing on next page.

• Adjust the position where the switches/ sensors should be affected, by turning the cams with a screwdriver.



• Tighten the cam assembly screws **F** when the cams are correctly adjusted.

• Install the indicator and cover.
To calibrate the feedback transmitter, see drawing on next page.



Disassembling PMV D3 Ex

• Loosen the screws **A** and **B** and remove the caps **C** och **D**.

• Remove the inner display cover **E** by loosening the four screws **F**.

• Carefully remove the display board and loosen the connection **H** and **I**.

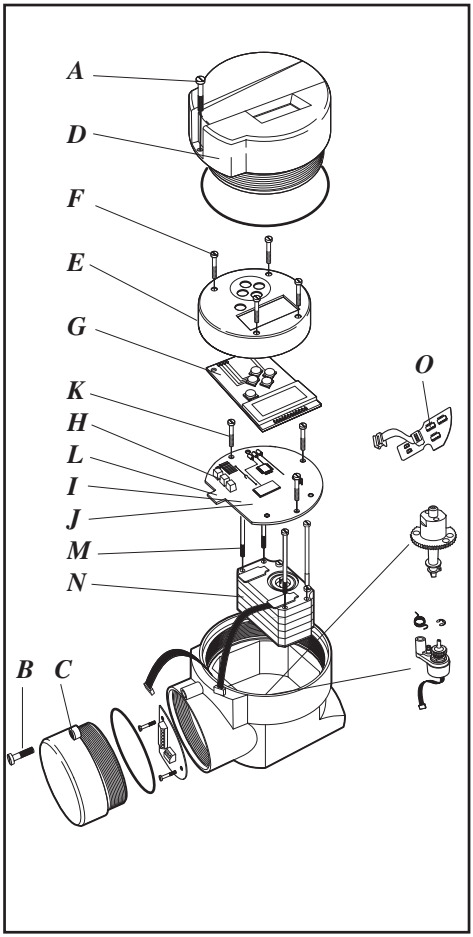
• Release the wide cable from the connector **J** on the terminal board.

• Loosen the three screws **K**.

• Remove the circuit board package **L**, consisting of terminal and processor board.

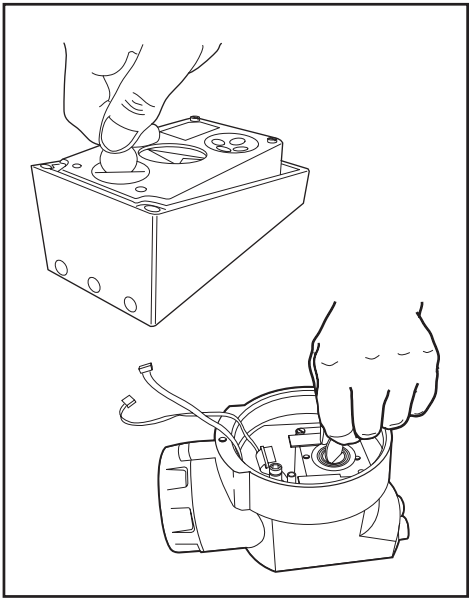
• Remove he four screws **M** and lift the block **N**.

• Pressure sensor board **O**, (option) can only be moved after the block **N** is removed.



Filter change, PMV D3 and PMV D3 Ex

Turn off the compressed air supply before starting any work. Otherwise the filter can be uncontrollably blown out of the positioner by the air pressure, which can be dangerous.



• Remove the filter cap using a coin of suitable size.

Note! Do not use a screwdriver. The filter cap might crack and cause air leakage.

• When installing the filter/filter plug, start by installing the O-ring in the bottom of the cavity in the pneumatic block. Do *not* try to install it on the threaded filter plug.

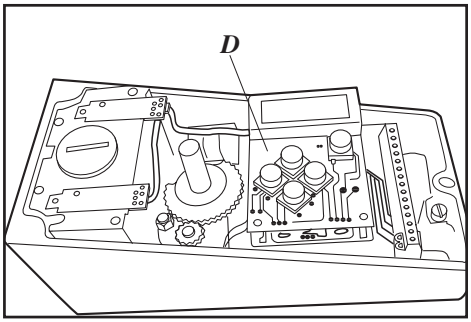
Insert filter in the filter plug, then thread the filter plug into pneumatic block.

Converting for remote control

Disconnect or switch off the electric power supply before starting any work.

• Remove cover and inner cover, see page 40.

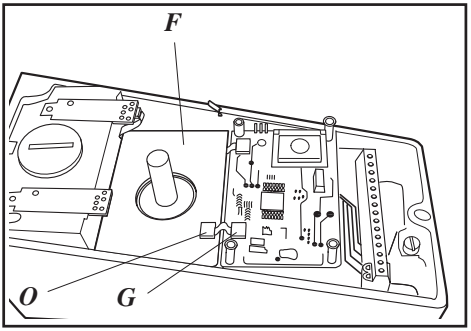
• Lift off the display pcb, **D**.



• Disconnect and secure the pot cable.

• Install transmitter board D3-AS38T , **F**.

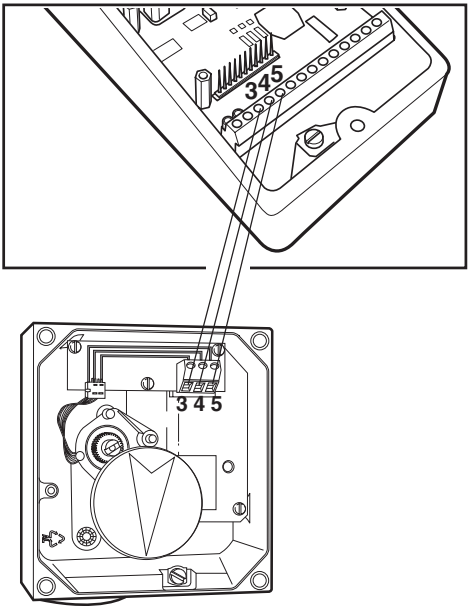
• Install the enclosured wire between **G** and **O** on the transmiter board.



• Connect the wiring between terminals 3, 4, 5 in the PMV D3 unit and 3, 4, 5 in the remote unit.

Use a shielded wire and ground it in the PMV D3 unit only.

Avoid longer distance than 5 m between PMV D3 unit and remote unit.



9. Trouble shooting

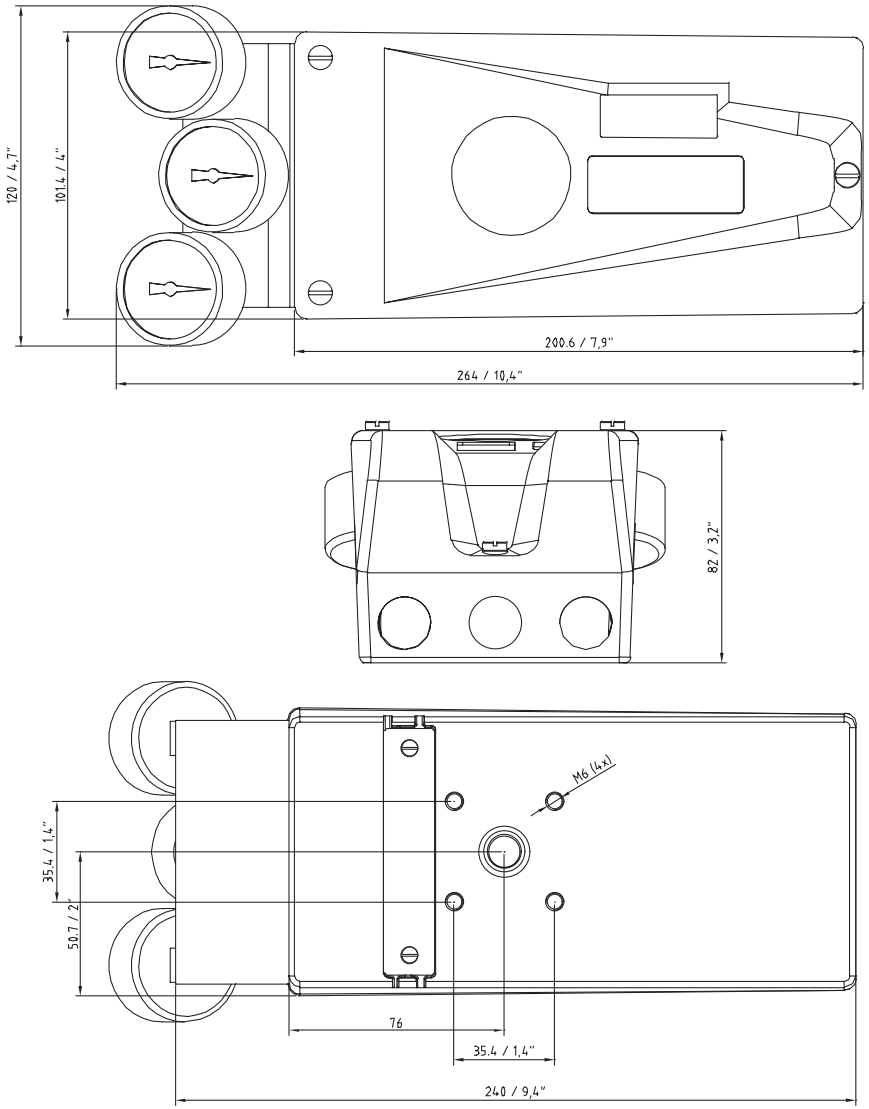
Fault symptom	Action
Change in input signal to positioner does not affect actuator position.	• Check air supply pressure, air cleanliness, and connection between positioner and actuator. • Out of service, in manual mode. • Check input signal to positioner. • Check mounting and connections of positioner and actuator.
Change in input signal to positioner makes actuator move to its end position.	• Check input signal. • Check mounting and connections of positioner and actuator.
Inaccurate regulation.	• Implement auto-tuning. Check for any leaks. • Uneven air supply pressure. • Uneven input signal. • Wrong size of actuator being used. • High friction in actuator/valve package. • Excess play in actuator/valve package. • Excess play in mounting of positioner on actuator. • Dirty/humid supply air.
Slow movements, unstable regulation.	• Implement auto-tuning. • Increase the deadband (Tuning menu). • Adjust Performance (Calibrate menu).

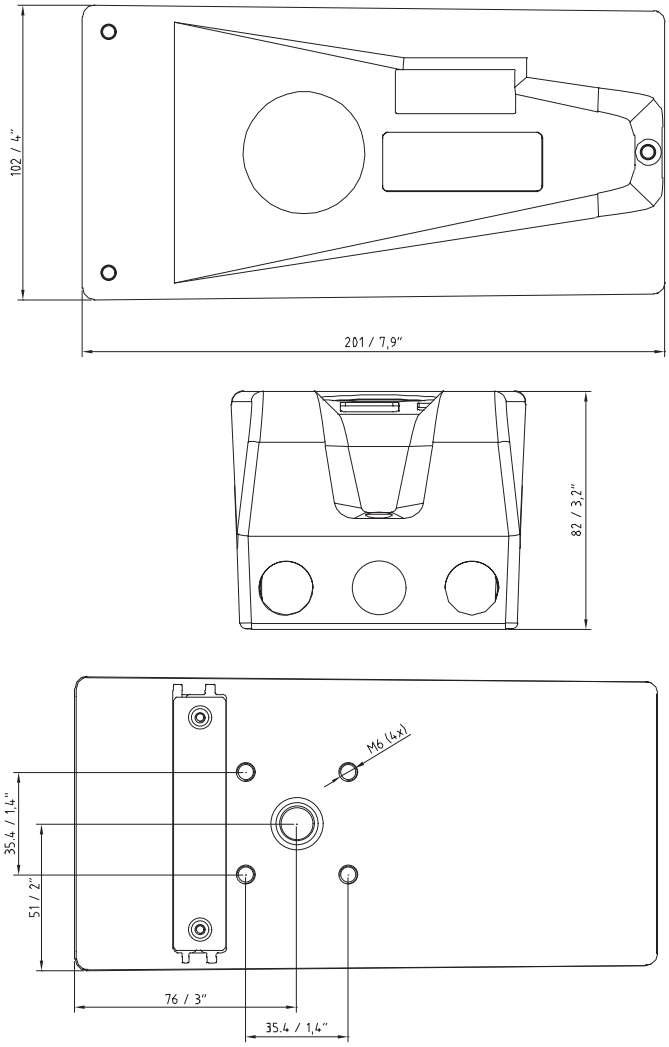
10. Technical data

Rotation angle	min. 30° max 100°, option 270°
Stroke	5—130 mm (0.2” to 5.1”)
Input signal	4—20 mA
Air supply	2—7 bar (30—105 psi) DIN/ISO 8573-1 Free from oil, water and moisture. Filtered to min. 40 micron
Air delivery	350 nl/min (13.8 scfm)
Air consumption	<0.3 nl/min (0.01 scfm)
Air connections	1/4” G or NPT
Cable entry	3 x M20 or 1/ 2” NPT
Electrical connections	Screw terminals 2.5 mm^2 /AWG14
Linearity	<1%
Repeatability	<0.5%
Hysteresis	<0.4%
Dead band	0.2—10% adjustable
Display	Graphic, view area 15 x 41mm (0.6 x 1.6”)
UI	5 push buttons
Processor	16 bit, M 16C
CE directives	93/68EEC, 89/336/EEC, 92 /31/EEC
EMC	EN 50 081-2, EN 50 082-2
Voltage drop, Double board	<10.1 V => resistance 505 Ω
Voltage drop, Single board without HART	< 8.0 V => resistance 400 Ω
Voltage drop, Single board with HART	< 9.4 V => resistance 470 Ω
Vibrations	<1% up to 10 g at frequency 10 — 500 Hz
Enclosure	IP66/NEMA 4X
Material	Die-cast aluminium, A2/A4 fasteners
Surface treatment	Powder epoxy
Temperatur range	–30 to +80°C (–22 to 176° F)
Weight	PMV D3X, 1.4 kg (3 lbs). PMV D3E, 3 kg (6.6 lbs)
Alarm output	Transistor Ri 1 KΩ
Alarm Supply Voltage	8—28 V DC
Mounting position	Any

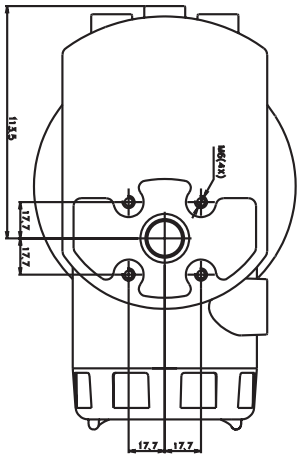
Mechanical switches	
Type	SPDT
Size	Sub Sub miniature
Rating	3 A/125 V AC 2 A/30 V DC
Namur sensors (N32-V3-N)	
Type	Proximity DIN 19234 NAMUR
Load current	1 mA ≤ I ≤ 3 mA
Voltage range	5 - 25 V DC
Hysteresis	0.2 %
Temp	–20°C to 85°C (–4°F to 185°F)
Proximity switches	
Type	SPDT
Rating	5 W/250 mA/30 V DC/125 V AC
Operating time	0.7 ms
Breakdown voltage	200 V DC
Contact resistance	0.1 Ω
Mechanical/electrical life	>50 x 10^6 operations
Slot Namur switches (S32-S1N, S32-SN, S32-N)	
Type	Proximity DIN EN 60947-5-6
Load current	1 mA ≤ I ≤ 3 mA
Voltage	8 V DC
Hysteresis	0.2 %
Temp	–25°C to 85°C (–13°F to 185°F)
4 - 20 mA transmitter	
Supply	9 - 28 V DC
Output	4 - 20 mA
Resolution	0.1 %
Linearity full span	+/–0.5 %
Output current limit	30 mA DC
Load impedance	800 Ω @ 24 V DC

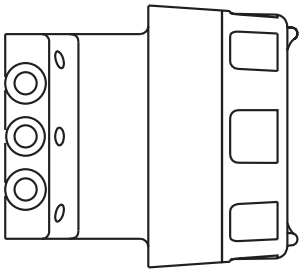
With optional gauge block installed

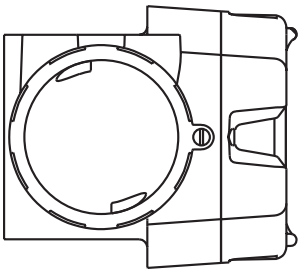


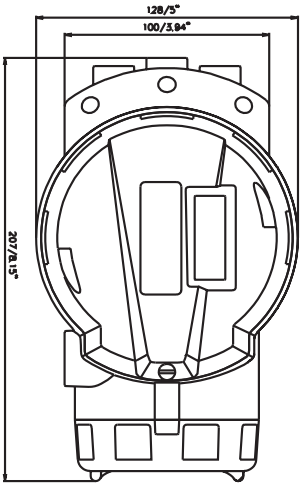

102 / 4"
201 / 7,9"
82 / 3,2"
M6 (4x)
35.4 / 1,4"
51 / 2"
76 / 3"
35.4 / 1,4"

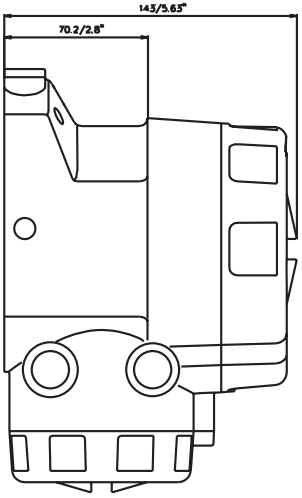
Explosion proof version



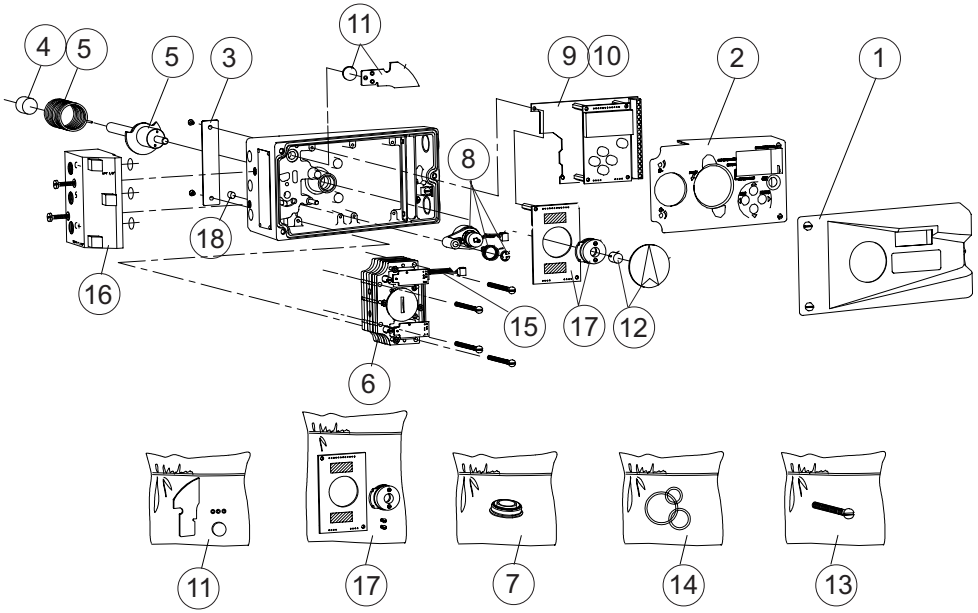




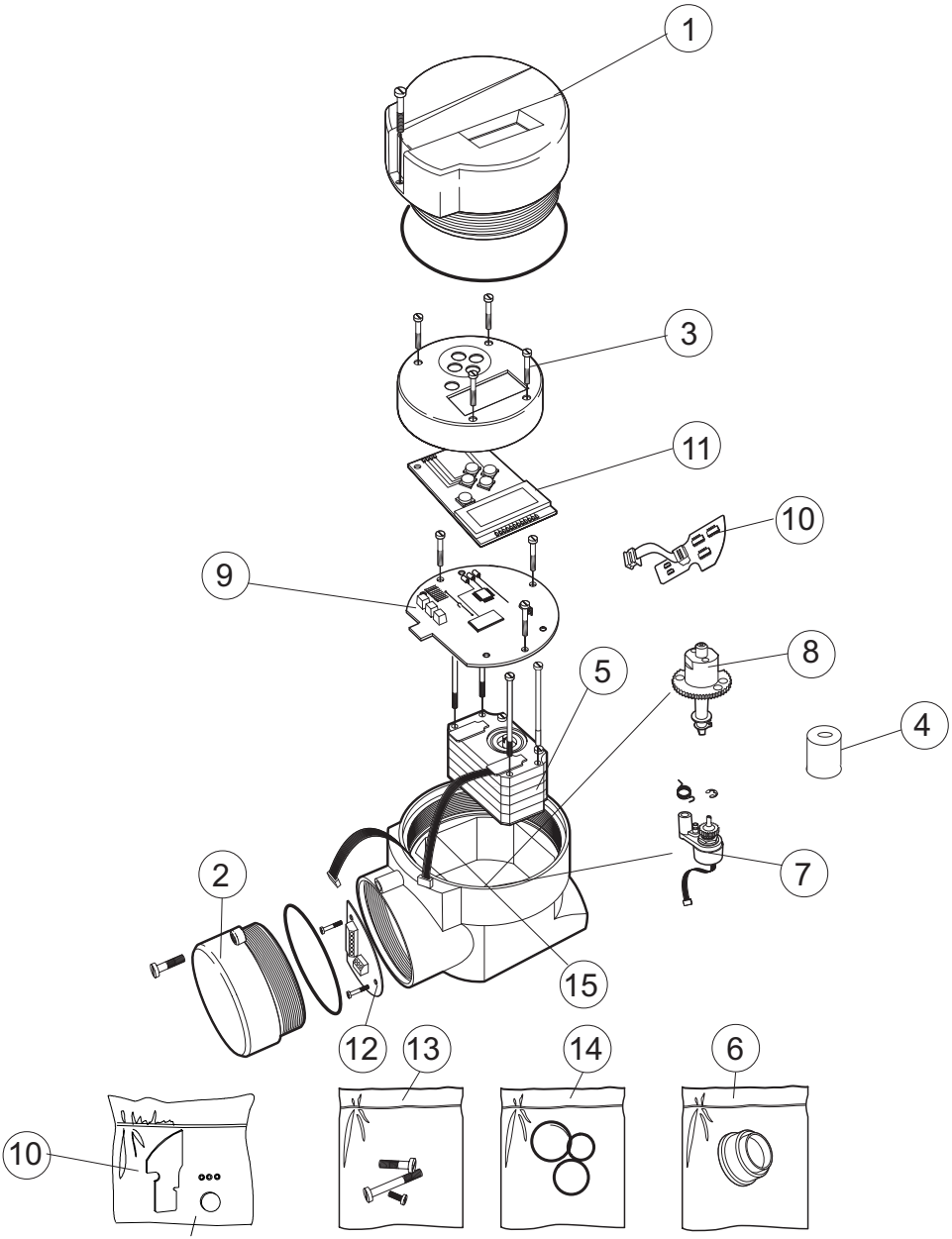




11. Spare parts



No	Part no	Description
1	D3-SP6	Black cover incl. Screws
1	D3-SP6W	White cover incl. Screws
1	D3-SP6WC	Worcester cover incl. Screws
2	D3-SP11	Internal cover incl. screws
3	P3-SP13	Cover plate incl. screw
4	3-SXX	Spindle adaptor (XX = 01, 06, 26, 30, 36)
5	3-AS23	S23 Shaft compl. Incl. gearwheel, friction clutch, spring
5	3-AS39	S39 Shaft compl. Incl. gearwheel, friction clutch, spring
5	3-AS09	S09 Shaft compl. Incl. gearwheel, friction clutch, spring
6	D3-SP1	Block complete, incl cable, rubber seal, filter plug
6	D3-SP1-IS	Block complete, incl cable, rubber seal, filter plug IS
6	D3-SP1-PS	Block complete, Pressure sensors, incl cable, seal, filter plug
6	D3-SP1-PI	Block complete, Pressure sensors, incl cable, seal, filter plug, IS
6	D3-SP1-FF	Block complete, incl cable, rubber seal, filter plug, Fail Freeze
6	D3-SP1-PFF	Block complete, Pressure sensors, incl cable, rubber seal, filter plug, Fail Freeze
7	D3-SP9	Filterplug, incl. O-ring, filter
8	3-SP8	Potentiometer compl. incl. spring, holder, cable
9	3-SP37HR	PCB LCD Display assy Hi Res type
10	D3-SP35P	PCBs (Terminal and processor) Profibus
10	3-SP80X	PCB Motherboard
10	3-SP80H	PCB Motherboard HART
10	3-SP80I	PCB Intrinsically safe
10	3-SP80IH	PCB Intrinsically safe, HART
11	3-SP84	Pressure sensor PCB assy complete.
12	3-SP48A	Indicator arrow assy
13	D3-SP/SCREW	Kit, bag with screws
14	D3-SP/SEAL	Kit, bag with O-rings, seals
15	D3-SP42	Cables & PC boards to pneumatic block
16	D3-SP34G	Gauge block G, complete
16	D3-SP34N	Gauge block NPT, complete
17	3-AS81T	PCB Transmitter 4-20mA assy
17	3-AS81M	PCB Transmitter and Mechanical switches, assy
17	3-AS81N	PCB Transmitter and Namur sensors, assy
17	3-AS81P	PCB Transmitter and Proximity switches, assy
17	3-AS81N4	PCB Transmitter, slot type Namur sensors(P+F SJ2 S1N), assy
17	3-AS81N5	PCB Transmitter, slot type Namur sensors(P+F SJ2 SN), assy
17	3-AS81N6	PCB Transmitter, slot type Namur sensors(P+F SJ2N), assy
18	D3-67	Silencer, Sintered brass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No	Part no	Description
1	D3E-SP2	Front cover assy incl. Screw, O-ring, black
1	D3E-SP2W	Front cover assy incl. Screw, O-ring, white
1	D3E-SP2WC	Front cover assy incl. Screw, O-ring, Worcester
2	D3E-SP3	Terminal cover complete, incl. Screw, black
3	D3E-SP4	Internal cover incl. screws
4	3-SXX	Spindle adaptor (XX = 01, 06, 26, 30, 36)
5	D3-SP1	Block complete, incl cable, rubber seal, filter plug
5	D3-SP1-PS	Block complete, Pressure sensors, incl cable, seal, filter plug
6	D3-SP9	Filterplug, incl. O-ring, filter
7	3E-SP8	Potentiometer compl. incl. spring, holder, cable
8	3-AS23	S23 Shaft compl. Incl. gearwheel, friction clutch, spring
8	3-AS39	S39 Shaft compl. Incl. gearwheel, friction clutch, spring
8	3-AS09	S09 Shaft compl. Incl. gearwheel, friction clutch, spring
9	3E-SP80X	PCB Mother board
9	3E-SP80XT	PCB Mother board, 4-20mA transmitter
9	3E-SP80H	PCB Mother board HART
9	3E-SP80HT	PCB Mother board, HART 4-20mA transmitter
10	3-SP84	Pressure sensor PCB assy complete.
11	3-SP37HR	PCB LCD Display assy Hi Res type
12	3E-SP83	PCB Terminals
13	D3E-SP/SCREW	Kit, bag with screws
14	D3E-SP/SEAL	Kit, bag with O-rings, seals
15	D3E-SP42	Cables & PC boards to pneumatic block

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