Manual F5

PMV Valve Control System
Manual F5

Manufacturers declaration • Hersteller-Erklärung • Déclaration de fabricant

GB

Manufacturers declaration


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/91/368/EEC, 89/336/EEC, 73/23/EEC and 93/68/EEC.

This manufacturers declaration is applicable to the following PMV series:

F5.

D

Hersteller-Erklärung

im Sinne der EG-Richtlinie 89/392/EWG/91/368/EWG, 89/336/EWG, 73/23/EWG und 93/68/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/91/368/EWG, 89/336/EWG, 73/23/EWG und 93/68/EWG entspricht.

Diese Herstellererklärung hat für folgende PMV-Serien Gültigkeit:

F5.

F

Déclaration de fabricant

au sens dela directive de la 89/392/CEE/91/368/CEE, 89/336/CEE, 73/23/CEE et 93/68/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/91/368/CEE, 89/336/CEE, 73/23/CEE et 93/68/CEE.

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

F5.
PMV Feedback module storage and handling procedures

PMV feedback modules are precision instruments which should be stored and handled accordingly to avoid problems or damage. Feedback modules contain electronic components which can be damaged by exposure to water. 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, 60-80°F) and dry, out of direct sunlight or weather exposure.

Field storage
- If feedback units must be stored outdoors, make sure front covers are tightened, all conduits entries are sealed and that units not are 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 feedback housing through ports left open. Dependent on the local temperature variations, humidity and dew points and time in storage, condensation could occur and accumulate inside causing erratic operation or failure due to water and 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 you nearest PMV office.

Storage Seal
F5 is supplied with conduit entry points sealed. The seal is only a storage seal, not to be used as seal when F5 is in operation. If Storage Seal is removed or damaged, make sure conduit entry points are resealed before further shipping or storage. Use proper cable glands or vapour proof tape.

Mount F5 on positioner P5/EP5 or actuator/valve package. Remove Storage Seal for conduit entry E₁ & E₂, make electrical connections, install proper cable glands or plugs to ensure the units sealing.
Description

The PMV F5 is a feedback unit uniquely designed to mount on top of the PMV P5, EP5 or P-2000 positioners with minimum parts required. The F5 can also be mounted on actuators with an additional mounting kit. The F5 is available in two different enclosures, standard or explosion proof.

The standard enclosure for F5 offers a gasketed NEMA 4/ IP66 enclosure with optional American and European intrinsically safe approvals. The explosion proof version is approved NEMA 7 / IP66 and carries North American and European approvals. Both enclosures can be furnished with Namur sensors, mechanical or proximity switches, potentiometer or 4-20 mA position transmitter or a combination of these items.
Mounting on P5 or EP5

- Remove the front cover and the indicator from the positioner.
- Loosen and remove the Allen head screw (3) (5mm hex-wrench)
- Install drive coupling (4) on the positioner shaft, secure it with screw (3)
- Check that F5 is fitted with 4 nos of screws 5 and O-ring 9, install the F5 on top of the positioner unit, make sure that the coupling is properly engaged before tightening the four screws 5.
- Make connections and calibrate.
- Reinstall indicator 2 and front cover 1 on the F5.

Mounting F5 on actuator (On/Off control valves)

Install the spindle adaptor 1 into F5 shaft, make sure that a spring clip 2 is fitted. A solid click should be heard when the spindle adaptor is properly installed into the F5 shaft.
Mount F5 on the actuator using a mounting kit and the ISO F05 mounting holes on the bottom of the F5. Make sure that the F5 spindle is properly aligned on top of the actuator.
Check that the four fasteners 3 are installed into F5.
Mounting on P-2000/P-2020

- Remove front cover, indicator and cam nut from the positioner.
- Replace the cam nut with coupling 1, calibrate the positioner.
- Check that the gasket is fitted to the bottom of plate 2, install screws 5 (3x long, 1x short) plastic washer 6 and O-rings 7.
- Secure the F5 to the plate 2 with screws 3.
- Install assembly onto the positioner, make sure that coupling 1 is properly engaged.
- Make electrical connections and calibrate.
The F5-EX is approved explosion proof by CSA, FM and CENELEC. Front cover screws shall be tightened 7 Nm (5.2 lbf x ft).

Approvals:
CSA, FM Div. 1, Class 1,2 & 3 Group BCDEFG T4-T6

CENELEC EEx d IIB + H2 T4-T6 LCIE 97.D6140
Installing F5-EX on P5/EP5

- Remove front cover, indicator and Allen head screw from the positioner.
- Install drive coupling 4 and secure it with the Allen head screw.
- Remove front covers and indicator from the F5-EX unit.
- Remove screws 3.
- Install F5-EX on P5/EP5, make sure drive coupling is properly engaged before tightening screws 5.
- Reinstall and tight screws 3. Connect and calibrate.
- Reinstall front covers and indicator.
- Front cover screws 2 shall be tightened to 7 Nm (5.2 lbf x ft).

Installing on an actuator

- Remove front covers and indicator from the F5-EX unit.
- Remove screws 3 and (5). Reinstall and tight screws 3.
- Install drive shaft into F5-EX, a solid click should be heard when spindle adapter is properly installed.
- Mount F5-EX on the actuator using the F05 holes and a mounting kit.
- Connect and calibrate, reinstall front covers and indicator.
- Front cover screws 2 shall be tightened to 7 Nm (5.2 lbf x ft).
Connections

WARNING!
Units installed in hazardous locations must have proper agency approvals and be installed according to installation drawing F5-2-4-9516.

Conduit entries are PG13.5 (M20) or NPT 1/2”
Make electrical connections according to wiring diagrams and tighten cable glands. Terminals are 2.5 mm² (AVG 14) screw terminals.

Adjustments

CAUTION! Moving parts – risk of injury.
The cams/gear wheel are secured in position by friction provided from the cam/shaft assembly. To adjust switches and/or position transmitter, rotate gear wheel 2 and cams 3 to desired position using tool F5-22 or tip of a screw driver that fits snugly in one of the slotted holes. Start calibration procedure by adjusting position transmitter first, then continue with the lower switch and complete with the upper switch.
If cams exhibit high stiction, rotate them back and forth rapidly several times. Do not adjust nut 4 or lubricate cams, call PMV for assistance.
Calibration

**Potentiometer**

1. Make electrical connections to terminals 7, 8 and 9. Check that the potentiometer is connected to connector C on the printed circuit board.
2. Stroke the actuator to check direction of travel indicated by the potentiometer. To change direction of travel, swap wires at terminals 7 and 9.
3. Stroke the actuator to the position where the minimum potentiometer resistance is desired.
4. Adjust the potentiometer output reading to approx. 50 Ohm by rotating gear wheel 2 with special tool F5-22 or tip of a screw driver placed in one of the slotted holes.
5. Stroke the actuator to desired maximum resistance position and check reading.
6. Repeat steps 3-5 if necessary to obtain desired resistance change.
7. Set switches or install front cover.

**4-20 mA position transmitter**

1. Set direction of rotation by placing potentiometer jumper in location A or B. (Location A for counter clockwise CCW valve/actuator rotation (Direct), location B for clockwise CW valve/actuator rotation (Reverse).
2. Set jumper X to the desired valve rotation angle, for 30 deg or 45 deg rotation choose position 30,
   For 60 deg or 90 deg rotation choose position 90, for 180 deg rotation choose position 30 and for 270 deg rotations choose position 90.
   For 30° deg - 45° deg choose pos 30.
3. Make electrical connections according to wiring diagram. Power supply should be >9 to <28 VDC (24 VDC recommended).
4. Connect a 4-20 mA meter to test outlet 1. Adjust potentiometer P1 20 revolutions CW & P2 20 revolutions CCW. Stroke actuator to the desired 4 mA position and check that current deflection is correct. Rotate gear wheel 2 with tool F5-22 or tip of a screw driver placed in one of the slotted holes until minimum valve is reached.
5. Adjust the output signal 4,0 mA with potentiometer P2. LED will illuminate when out put is 4 mA (±1%) or less. Stroke actuator to the desired 20 mA position and adjust the output to 20,0 mA with potentiometer P1. LED will illuminate when out put is 20 mA (±1%) or more.
6. Stroke actuator again, check and adjust 4 mA and 20 mA readings. Install front cover or set switches first, as follows:
Limit switches cams must be adjusted separately with valve in an open and closed position. With the valve in fully open or closed position adjust the lower cam to desired position by rotating it with special tool F5-22 or by the tip of a screw driver placed in one of the slotted holes on the cam. Stroke the valve fully and repeat the procedure above to set the upper cam. Stroke valve open/closed to check proper limit switch operation.

### Technical specifications

**Switches, mechanical**
- **Type**: Mechanical SPDT V3
- **Ratings**: *6/2.5A 250 VAC 10A 125 VAC* *Res/Ind*
- **Approvals**: CSA, UL, VDE
- **Temp range**: -20°C to 80°C (-4°F to 185°F)

**Sensors, Namur**
- **Type**: Proximity DIN 19234 NAMUR
- **Load Current**: ≤ 1mA ≥ 3mA
- **Voltage range**: 5-25 VDC
- **Hysteresis**: 0.2%
- **Temp range**: -20°C to 80°C (-4°F to 185°F)

**Potentiometer**
- **Out put**: 5kΩ (4kΩ at 90°)
- **Elements**: Conductive plastic
- **Power rating at 70°**: 1 W
- **Linearity**: 1%
- **Resolution**: Essentially infinite
- **Temp range**: -20°C to 80°C (-4°F to 185°F)

**4-20 mA position transmitter**
- **Power supply**: 9-28 VDC (24VDC recommended)
- **Out put signal**: 4-20 mA
- **LED indication at 4 mA**: ±1%
- **LED indication at 20 mA**: ±1%
- **Resolution**: Infinite
- **Minimum rotation travel**: 30°
- **Maximum rotation travel**: 90°
- **Linearity**: <1% of full scale
- **Hysteresis**: <0.5% of full scale
- **Out put current limit**: 24 mA DC
- **Load impedance**: 800Ω at 24 VDC
- **Temp range**: -20°C to 80°C (-4°F to 185°F)
CERTIFICATE OF CONFORMITY LCIE 95.D6111 X

This certificate is issued for the electrical apparatus or system:

MONITORING UNIT (FEED-BACK UNIT) type:

- F5-SWMEC
- F5-SWMEC-420
- F5-SWMEC-POT
- F5-SWINAM
- F5-SWINAM-420
- F5-SWINAM-POT
- F5-POT
- F5-420

Manufactured and submitted for certification by:

PALMSTIERNAS INSTRUMENTS AB
TULEGATAN 15
S 11353 STOCKHOLM SWEDEN

This electrical apparatus or system and any acceptable variation thereto are specified in the schedule to this certificate and the documents therein referred to.

LCIE being an approved certification body in accordance with article 14 of the European Communities Council Directive 73/117/EEC of December 18, 1975,

- certifies that the electrical apparatus has been found to comply with the harmonized European standards:
  - EN 50014 (1977), NF C 23514 (1982) + amendments 1 to 5
  - EN 50020 (1977), NF C 23520 (1982) + amendments 1 to 5

and has successfully met the examination and test requirements specified in these standards,

- certifies to have issued a confidential test report of these examinations and tests.

The code of the electrical apparatus is as follows:

EEx ia IIC T4

By the marking of the apparatus delivered, the supplier confirms under his sole responsibility, that the apparatus conforms to the descriptive documents listed in the schedule to this certificate and that it has satisfied the individual examinations and tests set forth by the harmonized European standards mentioned above under item (6).

The electrical apparatus delivered may bear the distinctive community mark specified in annex II to the Council Directive 73/190/EEC of February 6, 1976. This mark figures on page 1 of this certificate; it must be affixed on the electrical apparatus in a visible, readable, and durable manner.

If the letter X figures after the certificate of conformity number, it indicates that the electrical apparatus is submitted to special conditions for safe operation, as listed in the schedule to the present certificate.

Fontenay-aux-Roses, on August 30, 1985

For the Certification Body Director,

M. BRENON
Head of Department
Apparatus for explosive atmospheres

30, Av. du Général Lecerc - F 92260 Fontenay-aux-Roses - Tel.: 33-(1) 40 85 60 80

CODE: EEx ia IIC T4

This document may only be reproduced in full.
CERTIFICATE OF CONFORMITY LCIE 95.D6111 X dated August 30, 1995

SCHEDULE

(A1) NAME OF THE CERTIFIED ELECTRICAL APPARATUS OR SYSTEM:

MONITORING UNIT (FEED-BACK UNIT) type:
F5-SWINAM  F5-SWINAM-420  F5-SWINAM-POT  F5-SWINAM
F5-SW/MEC  F5-SW/MEC-420  F5-SW/MEC-POT  F5-SW/MEC

(A2) DESCRIPTION OF THE CERTIFIED ELECTRICAL APPARATUS OR SYSTEM:
The electrical apparatus detects the position and the direction of displacement of a disk or a shaft. Depending on integrated sensors, there are eight different models. Some of the models include a 4/20 mA transmitter.

(A3) DESCRIPTIVE DOCUMENTS
- Certification file No. F5-24 Doc Rev. 1 dated 06.07.1995, including 30 chapters in 33 pages.

(A4) SPECIFIC PARAMETERS OF THE PROTECTION MODE OR MODES CONCERNED:
- 4/20 mA transmitter - Terminals 8-9
  \( U_i = 28 \text{ V} \quad I_i = 0 \text{ mA} \quad C_i = 68 \text{ nF} \)
- Inductive sensors - Terminals 2-3 and 5-6
  \( U_i = 15.5 \text{ V} \quad I_i = 31 \text{ mA} \quad \mu F_i = 190 \text{ nF} \)
- Potentiometer - Terminals 7-8-9
  \( U_i = 28 \text{ V} \quad I_i = 0.65 \text{ mA} \)

(A5) MARKING OF THE CERTIFIED ELECTRICAL APPARATUS:
The marking must be visible, readable and durable and must include the following indications:
- Palmierna or PMV
- Type F5-...
- Serial number
- LCIE 95.D6111 X
- EEx ia IIC T4

(1) to be completed according to the variants defined in (A1)

Furthermore, the electrical apparatus or system must bear the usual standard marking for the concerned manufactured electrical apparatus.

(A6) INDIVIDUAL EXAMINATIONS AND TESTS:
- Not applicable.

(A7) SPECIAL CONDITIONS FOR SAFE OPERATION:
The various circuits of the electrical apparatus must only be connected to intrinsically safe certified electrical apparatus or to intrinsically safe accessories, and these associations must be compatible with the rules of intrinsic safety.
The various circuits may be considered as separated if none of the voltages applied exceeds 30 V.

(7) CODE: EEx ia IIC T4

(8) This document may only be reproduced in full.
Connection of F5 intrinsically safe version

Hazardous area

Non hazardous area

Connection alternatives

Alt. 1
Mechanical switches
Not in combination with alt. 2–5

Alt. 2
Mechanical switches

Alt. 3
Inductive Namur switches

Alt. 4
Potentiometer

Alt. 5
4–20mA Position transmitter

CSA, FM approved safety barrier

Stahl 9001/01–280–075–10

Stahl 9001/01–280–075–10

Stahl 925/02–10,20,40,80

Stahl 925/02–10,20,40,80

Stahl 9001/01–168–50–10

Stahl 9001/01–168–50–10

Option

INSTALLATION INSTRUCTIONS:
1. Barriers must be installed in accordance with manufacturer's instructions.
2. Maximum non-hazardous voltage must not exceed 250V.
3. (For FM and CSA NRTL) Install in accordance with the NEC (ANSI/NFPA 70) and ANSI/ISA RP12.6
4. (For CSA) Install in accordance with the Canadian electrical code, part 1
5. WARNING! Substitution of components may impair intrinsic safety.
   AVERTISSEMENT! La substitution de composants peut compromettre la sécurité intrinsèque.

<table>
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<tr>
<th>F5 TYPE</th>
<th>CONNECTION ALTERNATIVE</th>
<th>HAZARDOUS APPROVALS</th>
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<td>ALT.2</td>
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<td>ALT.3 + ALT.5</td>
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Connection diagram

PMV Feedback unit
F5

Palmstierna Instrument AB
TALGÉNATOR 19, S-75 13 STOCKHOLM
TELEFON NO: 08-6726793/68-181489/50-10 TEL: 08-673129 SWEDEN
## Spare Parts List

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<th>PMV Part no</th>
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Dimension drawing

P5 with F5 and H5

For selection of the feedback-spindle pls see "Drive shaft dimension drawing" SPNDLS. F5 DWG.

F5-EX

Manual F5
Trouble shooting

Switches
Check electrical connections and cam settings.

Potentiometer
If there is no output signal, check electrical connections and for open circuit, check that potentiometer is not out of it’s mechanical range.
If output deflection is wrong reverse connection terminals 7 and 9.

4-20 mA position transmitter
If there is no output signal, check electrical connections, polarity, loop power supply, and that the potentiometer is within its range.
If full output signal cannot be achieved by adjustment, check supply voltage and jumper X settings.
If output signal increases and decreases in the wrong direction, move connector from A to B or vice versa.
If the 4 mA fine adjustment P2 does not have enough span, zero must be mechanically realigned as follows: Turn P2 20 revolutions counter clockwise, then repeat the transmitter calibration procedure.