FLOWSERVE

USER INSTRUCTIONS

PMV WS/WM Ultraswitch™
Switchbox

Installation
Operation
Maintenance

FCD PMENIM0010-04 - 10/21

Experience In Motion

CONTENTS

FLOWSERVE

1. GENERAL INFORMATION

WS/WM Ultraswitch™ enclosures provide local and remote position indication for automated valves. They generally feature a visual black/yellow or red/green indicator for intuitive local position determination. The WS/WM Ultraswitch™ is available with a number of limit switch options for remote indication, in a variety of electrical applications. They may also be used as a junction box for direct installation of solenoid valves.

2. SAFETY INSTRUCTION

Read the safety instructions in this manual carefully before using the product. If any questions arise during installation, contact supplier/sales office before continuing further.

This equipment is suitable for use in Class 1, Division 1&2, groups ABCDFG or non-hazardous locations.

Warning!

Special condition of safe use.

The Rotary Limit Switch Box is marked with the following warning marking: "WARNING – POTENTIAL ELECTROSTATIC CHARGING HAZARD – SEE INSTRUCTIONS".

The classification Ex ia IIIC T_{200} 85°C Da is applicable only to product type key:

A B CC D E F G H II JJ

Letters E and F being A(aluminum): E = A and F = A , Device with body and cover made of aluminum. External indicator may be of plastic material.

Enclosure material limits for EPL Ga are exceeded, as aluminum content is greater than 10%. User must determine the suitability of the equipment for the particular application, for example, to avoid an ignition hazard due to impact or friction.

The Intrinsic Safety Parameters must not exceed the values indicated in the control drawing, W-43C.

The ambient temperature is indicated in the control drawing, W-43C.

The T classification is indicated in the control drawing, W-43C.

All switches are intended for gas Group IIC. The FE (NS5002) and FK (NS5003) are intended for Gas group IIB. It is indicated in the control drawing, W-43C.

POTENTIAL ELECTROSTATIC HAZARD. DO NOT OPEN WHEN AN EXPLOSIVE ATMOSPHERE MAY BE PRESENT. CABLE ENTARNCES MAY REACH A TEMPERATURE OF MAX 83 C. SEE MANUAL FOR SAFE USE. CERTIFICATES, MANUAL AND CONTROL DRAWING CAN BE DOWNLOADED FROM WWW.PMV.NU

3. PACKAGING AND PROPER SEALING

Report transport damage to the carrier immediately. In case of discrepancies - contact your nearest FLOWSERVE location.

Instructions for proper sealing.

- Take care to ensure that cover gasket seal is properly located in seal groove
- While closing cover of the switch box, take care that sealing of the cover is in a proper position when you apply the cover to the casing.
- Tighten the screws with torque of 0,9 Nm (7,965 lb-in.)

Tightening the screws clockwise in a diagonal pattern helps reduce stress in any one side of a component.

4. CERTIFICATES

General Purpose

ATEX II 1G Ex ia IIC T4/T5/T6 Ga

ATEX II 1G Ex ia IIB T4/T5/T6 Ga

ATEXII 1D Ex ia IIIC T_{200}85°C Da IP 66/67

cCSAus Class I Division 1, Groups A,B,C,D; Class II Division 1 Groups F,G; Class III

cCSAus Class I Division 2, Groups A,B,C,D; Class II Division 2 Groups F,G; Class III

CSA Certificate Nr. 2593521

Nemko 13ATEX1537X

IECEx PRE 20.0112X

5. SPECIFICATIONS

5.1 Technical data

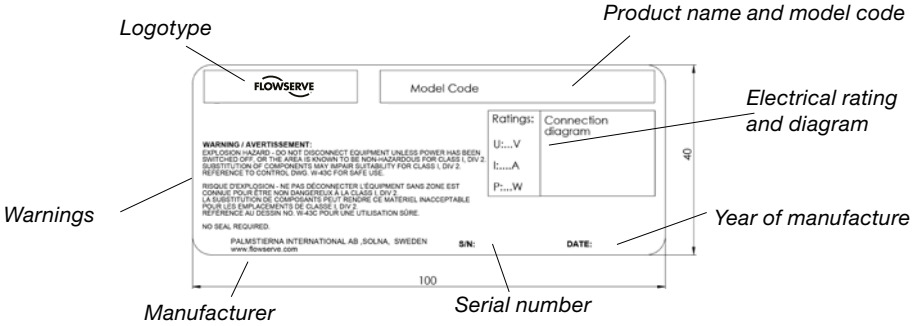
Ingress protection IEC 529 IP 66/67, NEMA Type 4X Weight (max) 0.7 kg / 1.55 lbs

5.2 Materials of construction

Part	Material
Housings	Powder Epoxy painted Aluminum or PA6/PA66 engineered resin, 25 – 30% fiberglass filled
Covers	Powder Epoxy painted Aluminum or PA6/PA66 engineered resin, 25 – 30% fiberglass filled or Transparent Polycarbonate
Shaft	Stainless Steel SS EN 2346 / AISI 303
Cams/Splines	Nylon
Terminal Block	Nylon
Internal Brackets	Nylon, Aluminum or Stainless Steel
All Internal Fasteners	Stainless Steel
All External Fasteners	Stainless Steel
All Molded in Fasteners	Anodized Aluminum
Indicators	Polycarbonate or PA66

5.3 Type sign Example

* **NOTE:** If the equipment is likely to come in contact with aggressive substances, it is the responsibility of the user to take suitable precautions to prevent it from being adversely affected, thus ensuring that the type of protection provided by the equipment is not compromised.



5.4 WS/WM UltraSwitch™ nomenclature

A= Brand sticker

X	Automax	☐
B	Automax painted blue (RAL 5000)	☐
A	Accord	☐
P	PMV	☐
V	Valtek	☐
W	Worcester Controls	☐

B= Shaft type

N	NAMUR shaft, EN 15714	☐
S	Low profile shaft	☐
T	For NAF Turnex	☐
D	Double ”D” 1/4 Inch Flats	☐

C= Body style

WS	General Purpose/I.S. Enclosure / 1/2” NPT Conduit entries	☐
WM	General Purpose/I.S. Enclosure / M20x1,5mm Conduit entries	☐

D= Number of conduit entries

2	2 conduit entries both on same side (Default)	☐
4	4 conduit entries (2 + 2 on short ends)	☐

E= Body material

A	Aluminium	☐
R	Engineered resin (J=14 only)	☐

F= Cover material

A	Aluminium (E=A only)	☐
R	Engineered resin (E=R only)	☐
P	Polycarbonate Cover (clear)	☐

G= Indicator

1	No indicator (F = A or R only)	☐
2	Flat Arrow Indicator Yellow / Black	☐
3	Flat Indicator Red/Green	☐
4	Flat Indicator Black/Yellow	☐
H	Black/Yellow Ultradome (Yellow open/Black Close)	☐
U	Standard Ultradome (Red Close/Green Open)	☐
C	90° 3-Way Ultradome Red/Green (F = A or R only)	☐
D	180° 3-Way Ultradome (F = A or R only)	☐
R	Reversed Standard Ultradome (Red Open/Green Closed)	☐

H= Number of switch elements

0	No switches (empty housing, I = M1 only, J=14 only)	☐
1	1x Switch (Optional)	☐
2	2 x Switches Default	☐

I= Switch type - Standard

		1x	2x
D1	Device net	■	☐
F1	IN5129 10-36VDC 3-Wire (J=14 only)	☐	☐
F3	IF5250, 10-36VDC NC PNP, 150mA, 3-wire NC (J=14 only)	☐	☐
F5	IF6001, 18-32VDC, NO PNP, 150mA@50°C (J=14 only)	☐	☐
F6	IF6034, 10-36VDC, NO PNP, 150mA, Stainless steel (J=14 only)	☐	☐
F7	IN0073, 20-250 AC/DC, NO, 350mA/100mA (J=14 only)	☐	☐
F8	IN0081, 20-250 AC/DC, NO, 350mA/100mA w/LED (J=14 only)	☐	☐
F9	IN0097 20-250V AC/DC NO 2-Wire (J=14 only)	☐	☐
FC	IF5718, 10-36VDC NO PNP/NPN, 150mA, plastic (J=14 only)	☐	☐
FE	NS5003 IS-2002-N	☐	☐
FG	IS5070 IS3004-BPKG (J=14 only)	☐	☐
FH	IS5001 IS-3002-BPOG (J=14 only)	☐	☐

	FJ	IN5207 IN-2002-FRKG/PH RT (J=14 only)	
	FK	NS5002 IS-2002-N	
	FZ	AS-i Controller card 2x P4 switches	■
	M1	SPDT Mechanical 15A @ 250VAC ; 0,5A@125VDC SIL3 Capable	
	MG	SPDT Mechanical - Gold Contacts SIL3 Capable	
	N1	NJ4-12GM40-E	
	N2	NJ2-12GK-N	
	N3	SJ3,5-S1N SIL3 Capable	
	N4	NJ2-12GK-SN SIL3 Capable	
	N5	NJ4-12GK40-E	
	N6	NJ4-12GK40-E1	
	N7	NBB2-V3-E0	
	N8	NJ2-V3-N SIL3 Capable	
	N9	NBB3-V3-Z4	
	NA	NBN4-12GM40-E2	
	NB	NJ2-12GM-N	
	NC	NJ4-12GM-N	
	ND	NCB2-12GM40-Z1	
	NE	NCB2-12GM35-N0	
	NF	NCN4-12GM35-N0	
	NG	NJ5-11-N-G SIL3 Capable	
	NH	NCB4-12GM40-N0	
	NK	NCN4-12GM40-Z0	
	NL	NCB2-V3-N0	
	NM	NJ2-11-SN-G SIL3 Capable	
	NN	NBB2-V3-E2	
	NP	SJ3.5-N SIL3 Capable	
	NQ	NJ4-12GK-N SIL3 Capable	
	NR	NJ4-12GM40-E1 (J=14 only)	
	NS	NJ4-12GM40-E2 (J=14 only)	
	NT	NJ4-12GK40-E2 (J=14 only)	
	NV	NJ2-11-N-G	
	NW	SJ3,5-SN SIL3 Capable	
	NX	NBB2-V3-E3	
	NY	NJ4-12GK-SN SIL3 Capable	
	P4	SPST Proximity	
	P5	SPDT Proximity SIL3 Capable	
	PE	Sabre™ SPDT Proximity SIL3 Capable	
	PP	Phazer™ SPDT Proximity (J=14 only) SIL3 Capable	
	PT	Phazer BRS™ SPST Proximity SIL3 Capable	
	R1	NBB3-V3-Z4-3G-3D (J=14 only)	
	R2	NBB2-V3-E3-3G-3D (J=14 only)	
	R3	NBN4-V3-E2-3G-3D (J=14 only)	

J= Certificate

14	General Purpose	
15	ATEX Exia	
21	IECEx ia	
28	cCSAus NI	
29	cCSAus IS	
43	CCC/Nepsi Ex ia	

A	B	C	D	E	F	G	H	II	JJ

***Note :- SIL 3 Approved**

5.5 WS/WM UltraSwitch™ switch options

Code	Cert.	Switch Option	Manufacturer	Load Capacity
M1	A	SPDT Mechanical	Honeywell MicroSwitch	15A @ 125/250 VAC; 0,5A @ 125 VDC; 0,25A @ 250VDC; 5A @ 120VAC (resistive load)
MG	A, B	SPDT Gold Mechanical	Honeywell MicroSwitch	1A @ 125 VAC; 50 mA @ 24 VDC (resistive load)
F1		IN5129	IFM	10-36VDC NO PNP, 250mA, 3-wire
F3		IF5250	IFM	10-36VDC NC PNP, 150mA, 3-wire
F5		IF6001	IFM	18-32VDC, NO PNP, 150mA@50°C
F6		IF6034	IFM	10-36VDC, NO PNP, 150mA, Stainless steel
F7		IN0074	IFM	20-250 AC/DC NO, 350mA/100mA
F8		IN0081	IFM	20-250 AC/DC NO, 350mA/100mA w/LED
FJ		IN5263	IFM	10-55 VDC PNP/NPN, 400mA
P4	A, B, C	SPST Proximity	Aleph PS-6132	0.35A @ 140 VAC; 0.25A @ 200 VDC, 1A @ 50 VDC (50 W Max. contact rating)
P5	A, B, C	SPDT Proximity	Hamlin	0.25A @ 120 VAC; 0.25A @ 28 VDC (3 W Max.)
PE	A, B, C	SPDT Sabre Proximity	Flowserve	1A @ 120 VAC; 1A @ 24 VDC
PP	C	SPDT Phazer Proximity	Flowserve	3A @ 120 VAC; 2A @ 24 VDC
PT	A, B, C	SPST BRS Proximity	Flowserve	3A @ 120 VAC; 0.5 @ 24 VDC
N8	A	Solid State Proximity	PF NJ2 V3 N	NAMUR NC Sensor; 8 VDC
NP	A	Solid State Proximity	PF SJ3.5-N	NAMUR Sensor Output; 5-25 VDC Supply
NQ	A	Solid State Proximity	PF NJ4-12GK-N	NAMUR NC Sensor; 8 VDC
NR		Solid State Proximity	PF NJ4-12GM40-E1	NPN Sinking; 200 mA max. Current; 10-60 VDC
NS		Solid State Proximity	PF NJ4-12GM40-E2	PNP Sourcing; 200 mA max. Current; 10-60 VDC
NT		Solid State Proximity	PF NJ4-12GK40-E2	NPN Sourcing; 200 mA max. Current; 10-60 VDC
N9		Solid State Proximity	PF NBB3-V3-Z4	NPN Sourcing; 100 mA max. Current; 5-60 VDC
NW	A	Solid State Proximity	PF SJ3.5-SN	NAMUR NC Sensor; 8 VDC

More switch options available

Code	Certificate
A	ATEX II 1G Ex ia IIC T4/T5/T6 ATEX II 1G Ex ia IIB T4/T5/T6 ATEX II 1D ta IIIC T80°C T_{200}85°C Da IP66/67
B	cCSAus IS
C	cCSAus NI

Notes

1) Valid certification codes according to table in WS/WM Nomenclature on page 7.
2) Some models have more than two open terminal locations open as standard. Consult factory for details.

6. INSTALLATION

The WS/WM Ultraswitch™ may be installed to valves or valve actuators with a variety of mounting hardware.

For best results, specify the NAMUR shaft option and NAMUR mounting hardware when fitting to a NAMUR compliant actuator. These options allow direct coupling to actuators without couplings, reducing dead band.

Bolt bracket to actuator and WS/WM

Ultraswitch™ to bracket, leaving bolts finger tight.

For NAMUR applications the WS/WM Ultraswitch™ switch shaft features an integral alignment pin. This pin must engage the tapped hole in the actuator shaft.

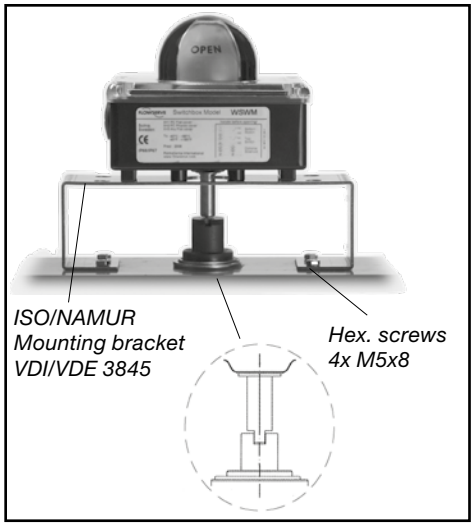
For non-NAMUR applications, make sure to properly install a coupler between the WS/WM Ultraswitch™ and actuator. Once the WS/WM Ultraswitch™ is installed with fasteners loosely tightened, stroke the actuator two or three times to align the bracket. Then tighten all fasteners.

Ambient temperature working conditions.

The WS/WM Ultraswitch™ switch box is tested and operational in following temperature range:

-40° – 180°F

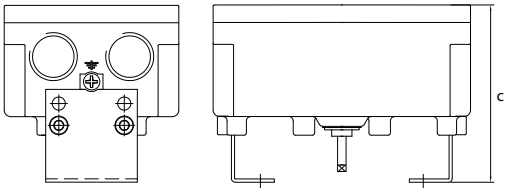
-40° – 80°C



WS/WM switch mounted on rotary actuator

Mounting kits

For compact/low profile installation - use mounting kit KL01 or KL02. Use with shaft type ”S” only. These kits allow the user to install it on actuators with a shaft height of 20, 30 or 50mm. The kits also adapt easily to both 80/30mm actuator top pattern as well as 130/80mm actuator top pattern (see table below for reference). Standard NAMUR mounting brackets are also available.



⚠ **Note! Shaft type ”S” only!**

Mounting kit p/n	Actuator shaft height (mm)	Bolt pattern 80/30 (mm)	Bolt pattern 130/30 (mm)	C = Height (mm)
KL01	20/30	yes	yes	80/90
KL02	50	yes	yes	110

6.1 Wiring instructions

- Perform all wiring according to the wiring diagram found on the label in the housing (see picture) and instructions given below.
- Make sure that the ground wire is correctly connected
- Seal unused entries with proper and suitable conduit plugs.

The WS/WM Ultraswitch™ enclosures feature pre-wired switches. All user connections are made at a numbered terminal strip. Both external and internal grounding locations have been provided for use in installation. A wiring diagram is located on the product label and indicates which terminal number corresponds to which switch contact: normally open, normally closed, common, etc. Follow the wiring diagram, and electric code to connect switches to your system.

For field wiring: ensure that any excess wire lengths or loops are routed away from any moving parts and are short enough, or secured to ensure a 1/4" clearance between the wire and the inside surface of the switchbox cover.

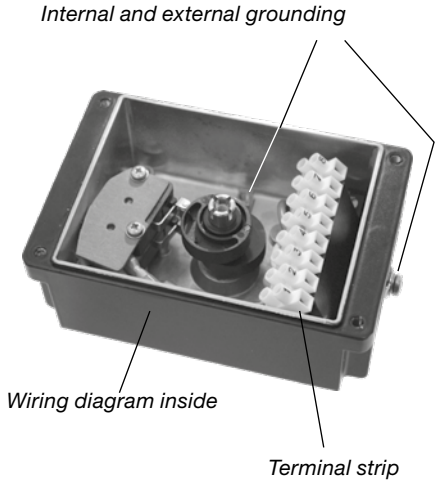
Note: for all magnetically tripped proximity switches, the top switch should only be used to indicate the clockwise position: the bottom switch should only be used to indicate the counter-clockwise position. Any deviation from these settings may result in erratic indication.

Solenoids may also be wired through the WS/WM

Ultraswitch™ enclosure. At least two auxiliary

terminals are included as standard. Wire the solenoid to auxiliary terminals, then connect power leads to the opposite terminal side. Be sure to properly ground the solenoid at the provided ground terminal.

WS UltraSwitch™ Series enclosures include two 1⁄2" NPT conduit entries and the WM Series includes two M20x1.5 conduit entries.



Caution!

- Proper and suitable conduit plugs must be installed in unused conduit entries before putting the unit into service.
- Installation must be according to National Electric Code, local codes, local certificates and manufacturer's instructions in all cases. Environmental seals must be used to protect ingress of water through the conduits.
- Prevent electrostatic build-up for safe use. The enclosure of the WS/WM Ultraswitch™ switch box is made of PA6/PA66 and any impact or friction caused by external objects should be avoided to prevent electrostatic build-up.

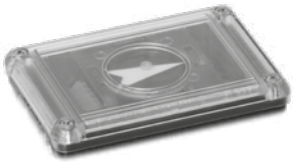
6.2 Cover and housing options

Aluminum or Resin cover Dome Indicator

Aluminum or Resin cover flat

Aluminum or Resin cover Arrow Indicator

Polycarbonate transparent cover Dome Indicator



Polycarbonate transparent cover Arrow Indicator

Aluminum housing

Resin housing

7. Switches (certified)

Substitution of components may impair suitability for hazardous (classified) locations. Do not disconnect equipment unless area is known to be non-hazardous.

To prevent ignition of flammable or combustible atmospheres, disconnect power before servicing, or; read, understand and adhere to the manufacturer's live maintenance procedures.

7.1 Installation in hazardous locations

Refer to control drawing RA-2. Consult factory.

7.2 Adjusting limit switches

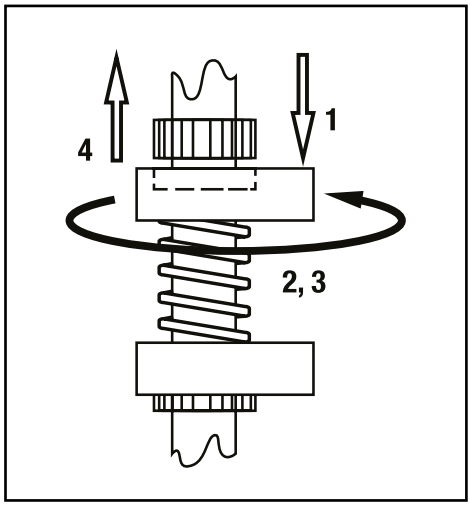
UltraSwitch™ enclosures feature Quick-Set™ cams which are used to trip the limit switches. These cams are easily adjusted without tools.

Caution: disconnect power before removing cover when installed in hazardous locations.

Remove cover and set aside. Rotate actuator/valve to full clockwise (CW) position. Adjust cam(s) associated with CW as follows:

- Push or pull cam against spring to disengage it from splines.
- Rotate cam CW breaking contact with switch (or moving magnet away from switch).
- Continue rotating cam CW just until switch trips.
- Release cam and re-engage it with splines.

Rotate actuator/valve to full counter-clockwise (CCW) position. Adjust cam(s) associated with CCW as described in steps 1 through 4, except rotate cam(s) CCW.



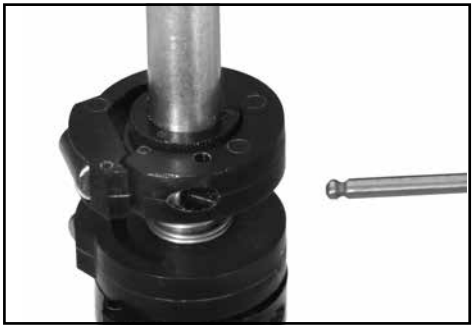
Cam adjustment

Note: factory setting is:
Top switch = CW (closed)
Second switch = CCW (open)

7.3 Cam fine adjustment

Some cams have a fine adjustment available. These cams will have a small screw embedded in the side of the cam.

Adjusting this screw clockwise or counter clockwise will deform the cam, changing the trip point slightly.


Cam fine adjustment

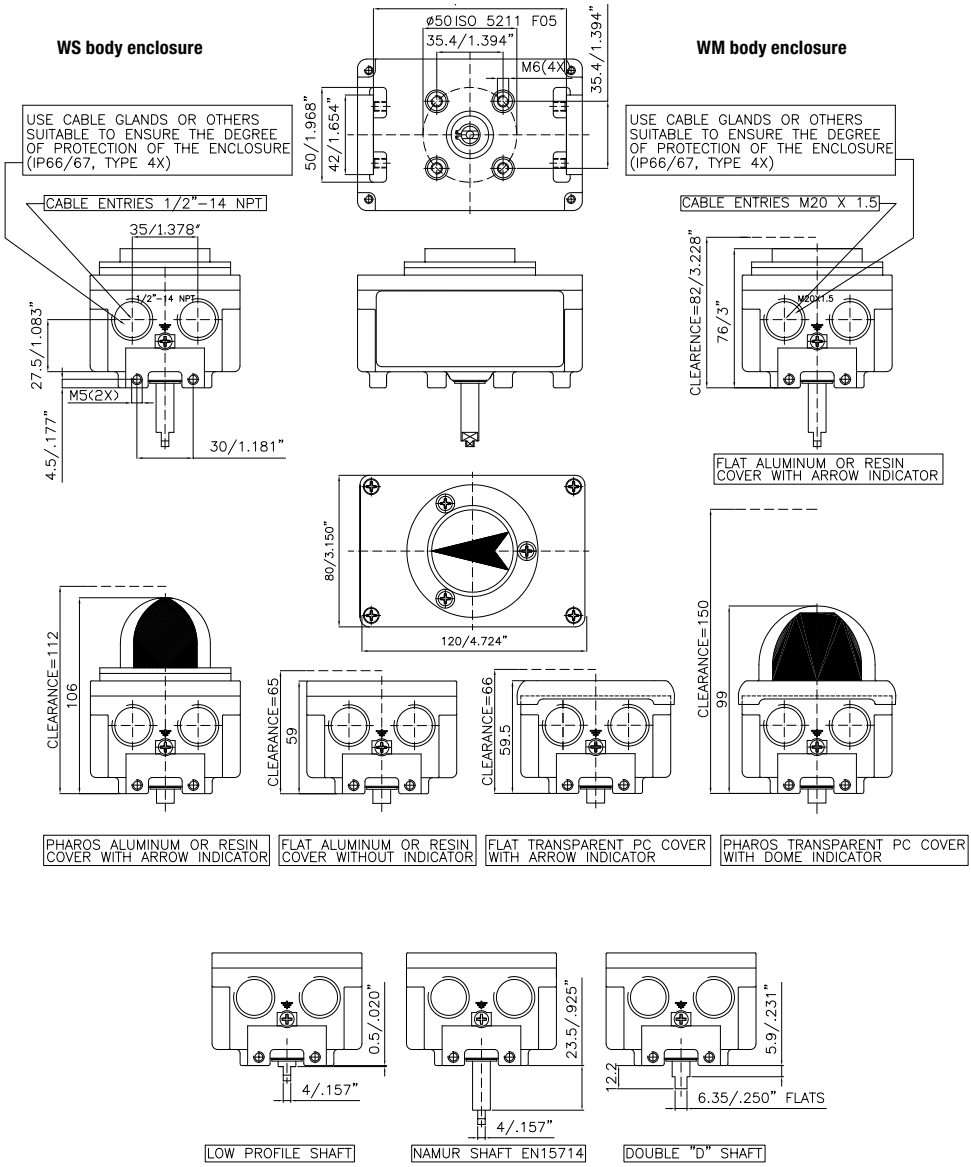
7.5 Switch option specifications (all)

Code	Switch Option	Manufacturer	Part Number	Load Capacity
00	No switches (empty housing)			
F1		FM	IN5129	10-36VDC (J=14only)
F3		IFM	IF5250	10-36VDC NC PNP, 150mA, 3-wire NC
F5		IFM	IF6001	18-32VDC, NO PNP, 150mA@50°C
F6		IFM	IF6034	10-36VDC, NO PNP, 150mA, Stainless Steel
F7		IFM	IN0074	20-250 AC/DC NO, 350mA/100mA
F8		IFM	IN0081	20-250 AC/DC NO, 350mA/100mA w/LED (J=14)
F9		IFM	IN0097	20-250 AC/DC NO
FB		IFM	IF5249	10-36VDC NO PNP, 150mA, 3-wire NO
FC		IFM	IF5718	10-36VDC NO PNP/NPN, 150mA, plastic
FE		IFM	NS5003	IS-2002-N
FG		IFM	IS5070	FB3004-APKG
FH		IFM	IS5001	IS-3002-BPOG
FJ		IFM	IN5263	IN-2002-FRKG/PH RT
FK		IFM	NS5002	IS-2002-N
FZ	AS-i Bus Card		31VDC 28 mA	
M1	SPDT Mechanical	Honeywell MicroSwitch	V7-1C13D8-201	15.1A (1/2 HP) at 125/250 VAC; 1/4A at 125 VDC; 1/4A at 250 VDC; 5A at 120 VAC (resistive load)
MG	SPDT Gold Mechanical	Honeywell MicroSwitch	V7-1D19D8-201	1A at 125 VAC / 50 mA at 24 VDC (resistive load)
N1		Pepperl+Fuchs	NJ4-12GM40-E	
N2		Pepperl+Fuchs	NJ2-12GK-N	
N3		Pepperl+Fuchs	SJ3,5-S1N	
N4		Pepperl+Fuchs	NJ2-12GK-SN	
N5		Pepperl+Fuchs	NJ4-12GK40-E	
N6		Pepperl+Fuchs	NJ4-12GK40-E1	
N7		Pepperl+Fuchs	NBB2-V3-E0	
N8	Solid State Proximity	Pepperl+Fuchs	NJ2-V3-N	NAMUR Sensor Output / 5-25 VDC Supply
N9	Solid State Proximity	Pepperl+Fuchs	NBB3-V3-Z4	NPN Sourcing/ 100 mA max. Current / 5-60 VDC
NA		Pepperl+Fuchs	NBN4-12GM40-E2	
NB		Pepperl+Fuchs	NJ2-12GM-N	
NC		Pepperl+Fuchs	NJ4-12GM-N	

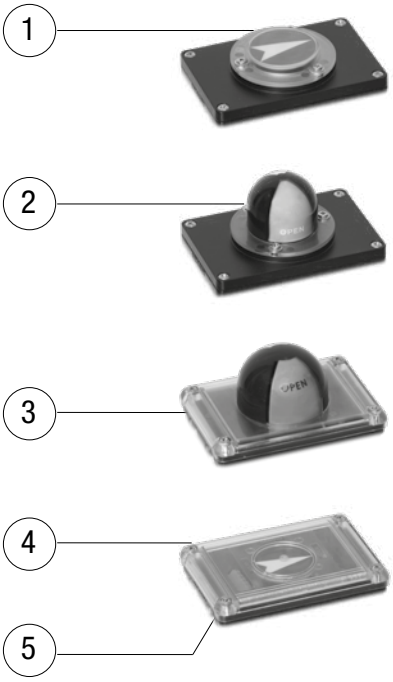
7.5 Switch option specifications (continued)

Code	Switch Option	Manufacturer	Part Number	Load Capacity
ND		Pepperl+Fuchs	NCB2-12GM40-Z1	
NE		Pepperl+Fuchs	NCB2-12GM35-N0	
NF		Pepperl+Fuchs	NCN4-12GM35-N0	
NG		Pepperl+Fuchs	NJ5-11-N-G	
NH		Pepperl+Fuchs	NCB4-12GM40-N0	
NK		Pepperl+Fuchs	NCN4-12GM40-Z0	
NL		Pepperl+Fuchs	NCB2-V3-N0	
NM		Pepperl+Fuchs	NJ2-11-SN-G	
NN		Pepperl+Fuchs	NBB2-V3-E2	
NP	Solid State Proximity	Pepperl+Fuchs	SJ3.5-N	
NQ	Solid State Proximity	Pepperl+Fuchs	NJ4-12GK-N	
NR	Solid State Proximity	Pepperl+Fuchs	NJ4-12GM40-E1	NPN Sinking / 200 mA max. Current / 10-60 VDC
NS	Solid State Proximity	Pepperl+Fuchs	NJ4-12GM40-E2	PNP Sourcing / 200 mA max. Current / 10-60 VDC
NT	Solid State Proximity	Pepperl+Fuchs	NJ4-12GK40-E2	NPN Sourcing / 200 mA max. Current / 10-60 VDC
NV	Solid State Proximity	Pepperl+Fuchs	NJ2-11-N-G	NAMUR Sensor Output / 5-25 VDC Supply
NW	Solid State Proximity	Pepperl+Fuchs	SJ3,5-SN	NAMUR Sensor Output / 5-25 VDC Supply
NX			NBB2-V3-E3	
NY	Solid State Proximity	Pepperl+Fuchs	NJ4-12GK-SN	NAMUR Sensor Output / 5-25 VDC Supply
P4	SPST Proximity	Aleph	PS-6132	0.35A at 140 VAC / .25A at 200VDC (50 W Max.)
P5	SPDT Proximity	Hamlin	59135-030	0.25A at 120 VAC / 0.25A at 28 VDC (3 W Max.)
PE	SPDT Sabre Pxy	Flowserve	XA0199	1A at 120 VAC / 1A at 24 VDC
PP	SPDT Phazer Pxy	Flowserve	XA0155	3A at 120 VAC / 2A at 24 VDC
PT	SPST BRS Pxy	Flowserve	XA0157	3A at 120 VAC / 0.5 at 24 VDC
R1		Pepperl+Fuchs	NBB3-V3-Z4-3G-3D	
R2		Pepperl+Fuchs	NBB2-V3-E3-3G-3D	
R3		Pepperl+Fuchs	NBN4-V3-E2-3G-3D	

8. Dimensions



9. Spare parts



Pos	Part No	Description
1	D20-SP52	Arrow indicator assembly
2	D20-17G	Dome indicator assembly red/green
2	D20-17Y	Dome indicator assembly black/yellow
3	M800214	Polycarbonate transparent cover with dome indicator red/green
4	M800215	Polycarbonate transparent cover with arrow indicator
5	ME1967	Gasket for cover (all cover types)

Table 1

Model code pos. II				Temperatures in Celsius						Model code pos. JJ			15	21	29	28
	Note	SWITCH	Type	Ci nF	Li uH	Ui V	Ii mA	Pi mW	Min. temp	T4 [*]	T5 [*]	T6 [*]	ATEX ia	IECEx ia	CSA II$	CSA DIV.2
FE	4,10	NS5003 - IS-2002-N/1D/1G/2G	N	80	110	15	50	120	-20	-	70	60	x	x		
FK	9,10	NS5002 - IS-2002-N/OLED/1D/	N	80	110	15	50	120	-20	-	65	55	x	x		
M1		Mechanical switch silver		1	1	28	45	31,5	-40	78	60	45	x	x	x	
MG		Mechanical switch gold		1	1	28	45	31,5	-40	78	60	45	x	x	x	
N2	1,2,7	NJ2-1GK-N	N	45	50	16	52	169	-25	80	66	51	x	x		
N3	1,2,5	SJ3,5-SN	N	30	100	16	52	169	-25	68	40	28	x	x		
N4	1,2,5	NJ2-1GK-SN	N	50	150	16	52	169	-40	74	46	34	x	x		
N8	1,2,6	NJ2-V3-N	N	40	50	16	52	169	-25	68	40	28	x	x		
NB	1,2,7	NJ2-1GM-N	N	30	50	16	52	169	-25	80	57	45	x	x		
NC	1,2,7	NJ4-1GM-N	N	45	50	16	52	169	-25	67	44	32	x	x		
NE	1,2,7	NCB2-12GM35-N0	N	90	100	16	52	169	-25	80	57	45	x	x		
NF	1,2,7	NCN4-12GM35-N0	N	95	100	16	52	169	-25	80	57	45	x	x		
NG	2,7	NJ5-11-N-G	N	45	50	16	52	169	-25	80	57	42	x	x		
NH	1,2,7	NCB4-12GM40-N0	N	120	50	16	52	169	-25	74	46	34	x	x		
NL	1,2,6	NCB2-V3-N0	N	100	100	16	52	169	-25	80	60	45	x	x		
NM	1,2,5	NJ2-11-SN-G	N	50	150	16	52	169	-40	80	57	45	x	x		
NP	1,2,8	SJ3,5-N	N	50	250	16	52	169	-25	68	40	28	x	x		
NQ	1,2,7	NJ4-1GK-N	N	45	50	16	52	169	-25	80	66	51	x	x		
NR	2	NJ4-1GM40-E1	I	40	50	16	52	169	-25	67	64	49				
NS	2	NJ4-1GM40-E2	I	40	50	16	52	169	-25	60	60	49				
NT	2	NJ4-1GK40-E2	I	40	50	16	52	169	-25	60	60	51				
NV	1,2,7	NJ2-11-N-G	N	30	50	16	52	169	-25	80	57	45	x	x		
NW	1,2,5	SJ3,5-SN	N	30	100	16	52	169	-40	68	40	28	x	x		
NY	1,2,5	NJ4-1GK-SN	N	70	150	16	52	169	-40	74	46	34	x	x		
P4		ALEPH Proximity	P	1	1	28	45	31,5	-10	40			x	x	x	x
P5		Hamlin Proximity	P	1	1	28	45	31,5	-40	80			x	x	x	x
PE		Sabre Proximity	P	1	1	28	45	31,5	-40	80[**]	70 [**]	55	x	x	x	x
PP		Phazer Proximity	P	1	1	28	45	31,5	-40	80[**]	70 [**]	55				x
PT		Phazer IIKS Proximity	P	1	1	28	45	31,5	-40	80[**]	70 [**]	55	x	x	x	x

Type: I= Inductive; N= NAMUR (Inductive); P= Proximity

Table 1 (*) T6 is not valid for CSA intrinsically safe , Maximum temperature for CSA IS and Class I, Div.2 is never above 50C for all temperature classes
Example : If table say 67 C, value for CSA is 50C . If table say 44C value for CSA is 44C)
Table 1 (**) CSA max temp. +50C

Table 1 note 1: FM US recognized Control Dwg. 116-0165F
Table 1 note 2: UL listed NRKH E87056 and CSA certificate 1007121 (LR 91321-2)
Table 1 note 3: CSA certificate 1226851
Table 1 note 4: CSA certificate 1350433, FM certificate 3015422 , ATEX PTB02ATEX2217
Table 1 note 5: For additional values see PTB 00 ATEX 2049 X or IECEx PTB 11.0092X
Table 1 note 6: For additional values see PTB 00 ATEX 2032 X or IECEx PTB 11.0021X
Table 1 note 7: For additional values see PTB 00 ATEX 2048 X or IECEx PTB 11.0037X
Table 1 note 8: For additional values see PTB 99 ATEX 2219 X or IECEx PTB 11.0091X
Table 1 note 9: ATEX PTB02ATEX2191
Table 1 note 10: Gas group for FE and FK switches ar limited to IIB

switches (1 through 2 quantaty)

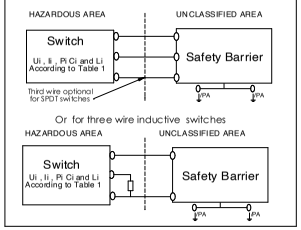


Table 2

Model code Pos.II	Imax	Vmax	Pmax
P4	1A	200Vdc	50W max.
P5	0.5A 0.25A	NO:200Vdc NC:175Vdc	10W max 5W
PE	1A 1A	29Vdc 29Vac	25W 25W
PP	3A 2A	120Vac 24Vdc	100W 48W
PT	1.5A 0.55A	120Vac 24Vdc	180W 69W

Standard model code guide

1	2	3	4	5	6	7	8	9	10	11	12	13
A	B	C	C	D	E	F	G	H	I	I	J	J

II = Switch code JJ = Certification code

h code position E (nr 6) must be designated . **xxxxxAxxxxxxx**

REVISIONS			
REV.	DESCRIPTION	DATE	SIGNATURE
1	Updated with information relating to IECEx	2020-10-06	LRW

WARNINGS/AVERTISSEMENT:

Substitution of components may impair intrinsic safety and suitability for Class I,Div. 2 locations.
Do not disconnect equipment unless area is known to be non-hazardous.
To prevent ignition of flammable or combustible atmospheres, disconnect power before servicing,or; read, understand and adhere to the manufacturer's live maintenance procedures.
Potential electrostatic charging hazard- see instructions.

La substitution de composants peut compromettre la sécurité intrinsèque et l'aptitude à la Class I, Div. 2.
Ne pas déconnecter l'équipement sans zone est connue pour être non dangereux.
Pour éviter l'inflammation d'atmosphères inflammables ou combustibles, débrancher l'alimentation avant l'entretien ou, lire,comprendre et respecter les procédures d'entretien du fabricant en direct.
Danger potentiel de charges électrostatiques voir les instructions

Caution/ Attention:
Bonding between conduit and connections is not automatic and must be provided as part of installation.
Collage entre le conduit et connexions n'est pas automatique et doit être fournie dans le cadre de l'installation.

IECEx and ATEX:
II 1G Ex ia IIB T4/T5/T6
II 1G Ex ia IIC T4/T5/T6
II 1D Ex ta IIIC T80°C..T$_{500}$85°C Da IP66/67

- The equipment shall withstand dielectric strength test with 500 VAC for 1 minute, acc. to clause 6.3.12 of the IEC EN 60079-11 requirements.

CSA:
Class I Division 1 Group A,B,C,D ; Class II Division 1 Group F,G ; Class III T3
Class I Division 2 Group A,B,C,D ; Class II Division 2 Group F,G ; Class III T3

INSTALLATION NOTES:
- Control equipment connected to the associated apparatus shall not use or generate more than 250Vrms or Vdc.
- Associated apparatus manufacturer's installations drawing shall be followed when installing this equipment.
- If more than one conduit is used, make sure that they are bonded together acc. to NEC article 250.100.

The intrinsically safety entity concept:
Allows the interconnection of two intrinsically safe devices FM approved with entity parameters not specifically examined in combination as a system when:
Uo or Voc or Vt ≤ Vmax*, Io or Isc or It ≤ Imax*, Po ≤ Pi, Ca or Co ≥ Ci + Ccable, La or Lo ≥ Li + Lcable.
(Table 1)

The Class I, Div. 2 field wiring concept:
Allows the interconnection of Class I, Div. 2 field wiring apparatus with associated Class I, Div. 2 field apparatus, using any of the wiring methods permitted for non-hazardous (unclassified) locations when:
Uo or Voc or Vt ≤ Vmax*, Io or Isc or It ≤ Imax*, Po ≤ Pi, Ca or Co ≥ Ci + Ccable, La or Lo ≥ Li + Lcable.

Class I, Div. 2:
Use IS values as general (Vmax = Ui ; Imax = Ii), except for proximity switches see Table 2 for values.

Ex **Scheduled drawing**
No modification permitted without reference to Notified Body
Printed copy not controlled

		Control Drawing	–	–	
PART NO.	PCS	DESCRIPTION	MATERIAL	DIMENSION	ANNOTATION
HOLE TOL. –		UNSPECIFIED TOLERANCES ACCORDING TO –	SURFACE –	PROJECTION: EUROPA	–
FLOWSERVE		PMV Switchboxes WS/WM		DRW BY LRW / APPR. BY –	SCALE – / DATE 130706
PMV Automation AB				DRAWING NO. W–43C	

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

11. Applied standards

EN IEC 60079-0:2018

EN 60079-11: 2012

IEC 60079-0:2017

IEC 60079-11:2011

EN 61000-6-2

EN 61000-6-3

EN 61000-6-4

EN 60204-1

PMV Automation AB
Korta Gatan 9
SE-171 54 SOLNA
SWEDEN
Phone: +46 (0)8-555 106 00
E-mail: infopmv@flowserve.com

PMV USA
14219 Westfair West Drive
Houston, TX 77041, USA
Phone: +1 281 671 9209
Fax: +1 281 671 9268
E-mail: pmvsales@flowserve.com

Flowserve Flow Control
Burrell Road, Haywards Heath
West Sussex RH16 1TL
Phone: +44(0)1444 314400
E-mail: pmvuksales@flowserve.com

Flowserve Flow Control Benelux
Rechtzaad 17
4703 RC Roosendaal
THE NETHERLANDS
Phone: +31 (0) 30 6771946
Fax: +27 (0) 30 6772471
E-mail: fcbinfo@flowserve.com

Flowserve Flow Control GmbH
Rudolf-Plank Strasse 2
D-76275 Ettlingen
GERMANY
Phone: +49 (0) 7243 103 0
Fax: +49 (0) 7243 103 222
E-mail: argus@flowserve.com

Flowserve Corporation
No. 35, Baiyu Road
Suzhou Industrial Park
Suzhou 215021, Jiangsu Province,
PRC
Phone: +86-512-6288-1688
Fax: +86-512-6288-8737

Flowserve (China)
585, Hanwei Plaza
7 Guanghau Road
Beijing, China 100004
Phone: +86 10 6561 1900

Flowserve Pte Ltd
No. 12 Tuas Avenue 20
Singapore 638824
Phone: +65 6879 8900
Fax: +65 6862 4940

Flowserve do Brasil Ltda
Rua Tocantins, 128 - Bairro Nova Gerti
São Caetano do Sul,
São Paulo 09580-130 Brazil
Phone: +5511 4231 6300
Fax: +5511 4231 6329 - 423

To find your local Flowserve representative:

To find your local Flowserve representative please use the Sales Support Locator System found at www.flowserve.com

FCD PMENIM0010-04 - 10/21