

Speedswitch Kit - FP Valves

Complete Installation Kits for the FP2 & FP3 Valves

Kit codes, wiring schematics and installation guidelines for installing the FP shutdown valves with a speedswitch.



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Application

This handbook, the associated wiring schematics and installation kits are only for use with the FP2 and FP3 valves as coded below.

FP2-XXX: Normally open, air to close (auto reset)

FP3-XXX: Normally closed, air to open (failsafe)

The different operating modes of the 2 valves types requires that the control circuits are also different, please refer to the FP2 or FP3 sections of this handbook for wiring schematics and installation requirements specific to each valve.

FK-P Installation Kits

The kits include the Speedswitch, Fuse Holder and Fuse, Connection Block, an E.Stop Button and LED indicator mounted in the lid of the IP66 enclosure which is fitted with 4 cable glands and for the FK-P2 kit only the reset button is mounted in the side. All components are fully wired up and ready for simple connection via the connection block to the pneumatic control valve and to the power supply and speed signal using the 3 meter leads which are also supplied. The enclosure has a Wyndham Page label with part number, serial number and ratings.

The main dimensions and features of the IP66 enclosure are shown on page 5.

Please note the kits **do not** include pneumatic fittings or hose for connecting the pneumatic control valve to the FP Valve.

Speedswitch Features

Push Button Trip Speed Setting & Adjustable Overspeed Differential: To avoid the requirement to reline the engine or override the engine governor during setup the Speedswitch features an adjustable overspeed differential. This enables the trip speed to be set at between 115% and 200% of the engine rpm by simply pressing the Set Trip button. The trip differential is adjusted between the 115% and 200% limits via a $\frac{3}{4}$ turn potentiometer.

Push Button Overspeed Test function: Operation of the Test Trip button will test the overspeed shutdown function by tripping the system at a test offset of 75% of the trip speed. This again avoids the requirement to reline the engine or override the engine governor during setup and periodic testing.

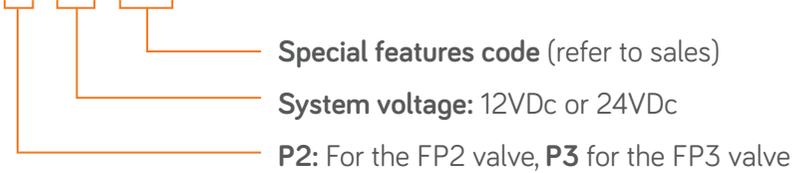
FK Installation Kit Selection

To enable Wyndham Page to select the most suitable kit for a customers application the following data is required.

- [1]. Is the kit for an FP2 or FP3 Valve
- [2]. System voltage: 12V DC or 24V DC

FK Installation Kit Order Codes

FK - PX - XX - S00

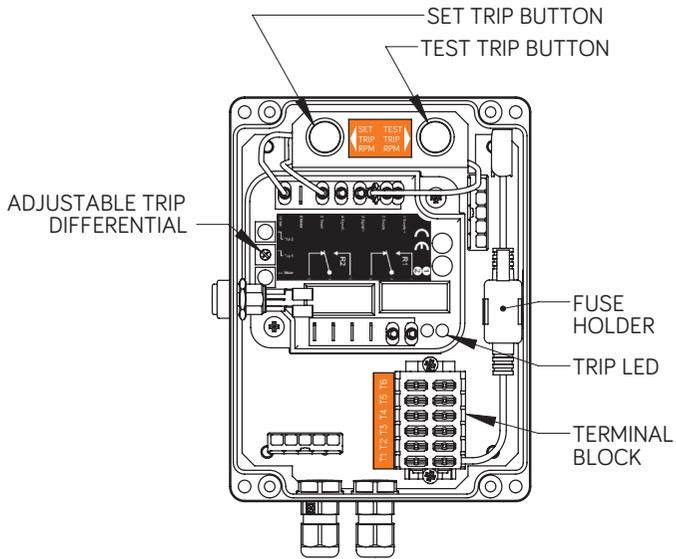


Special Features: Wyndham Page can supply the Speedswitch pre-programmed with a specific trip speed and test offset. Please contact sales for additional details.

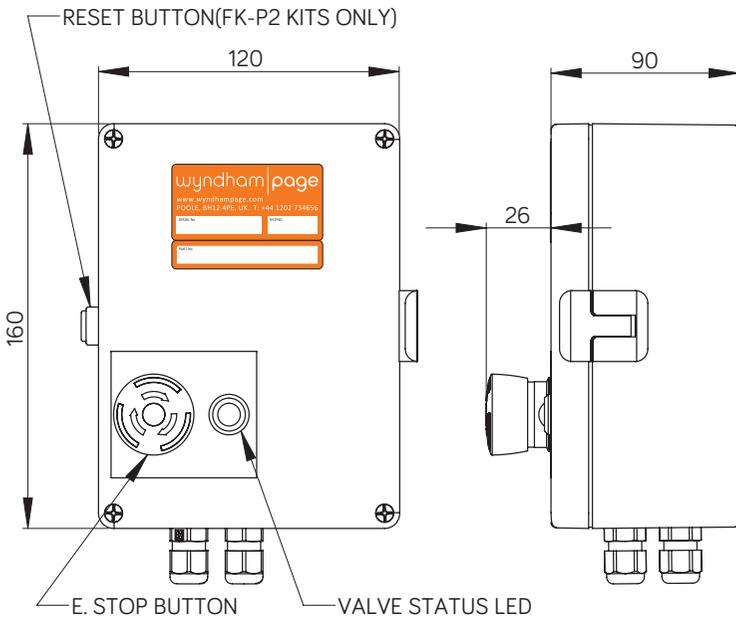
KIT CONTENTS

ITEM	QTY	DESCRIPTION AND NOTES
1	1	KIT PARTS FULLY ASSEMBLED AND WIRED INTO IP66 ENCLOSURE
		
2	1	2/3 WAY PNEUMATIC CONTROL VALVE 12Vdc OR 24Vdc. INCLUDES CONNECTION PLUG FITTED WITH PROTECTIVE VARISTOR
		
3	3M	BROWN WIRE - 2MM ² - CONNECTION TO +VE
4	3M	BLACK WIRE - 2MM ² - CONNECTION TO -VE
5	3M	WHITE WIRE - 2MM ² - CONNECTION TO SPEED SIGNAL
6	3M	3 CORE CABLE FOR CONNECTING THE PNEUMATIC C.V

NOTES: PARTS MAY VARY FROM THOSE SHOWN, CUSTOMERS MAY NEED TO PROVIDE ADDITIONAL PARTS FOR CONNECTION TO ELECTRICAL SYSTEM, ALTERNATOR ETC.



IP66 ENCLOSURE COVER REMOVED - MAIN INTERNAL COMPONENTS



IP66 ENCLOSURE - EXTERNAL

FP2 Valve: Kit FK-P2 Installation Notes

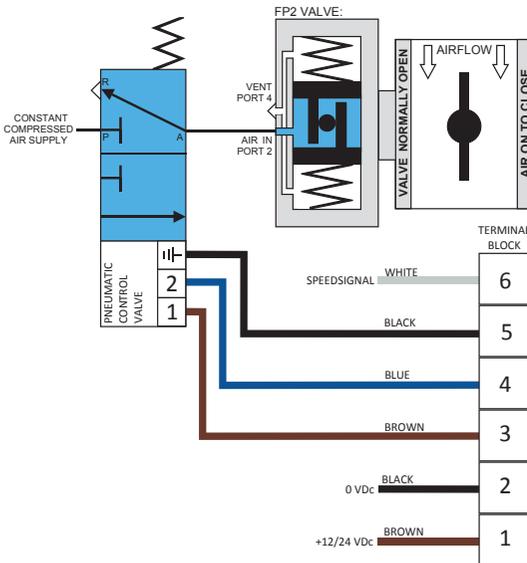
General Information: The following instructions are for guidance only, it is the responsibility of the installer or end user to ensure the FP2 valve is connected and operated as appropriate to the type of equipment being protected and to meet the safety requirements of the hazardous area in which the equipment will be operating.

Safety: Installation, servicing and repair of this equipment should only be carried out by suitably qualified personnel. Do not carry out installation, setup or maintenance until all instructions in this handbook have been fully reviewed and understood. For full FP2 Valve installation guidelines **always refer to the FP2 Valve Handbook** supplied with the valve and available for download from the Wyndham Page website.

Important Notes for installers and operators:

1. Always retain the standard fuel shutdown stop fitted to the engine. The Wyndham Page FP2 valve is designed for emergency stop only.
2. We recommend that the speedswitch **is not** connected through the ignition but is wired directly to the battery, this avoids the risk that the system will not function if the operator turns off the ignition before the engine has stopped in an emergency situation. If this arrangement is not possible we recommend that the wiring is modified so that the Emergency Stop Button is connected directly to the battery.
3. The FP2 valve will only close if the compressed air supply is uninterrupted during an overspeed or emergency situation.
4. The external valve status LED will light when the valve closes either through an overspeed trip or operation of the emergency stop. Providing the system is energised the LED will remain on until the speedswitch or emergency stop is reset. Do not attempt to start the engine with the LED on. The LED only shows the status of the pneumatic control valve. It does not directly indicate the valve status which is dependent on the compressed air supply (see 3).

5. The speedswitch output is set to latch. In the event of an overspeed trip the FP2 valve will remain closed when the engine revs drop below the set trip speed. An electrical reset (power off/on) of the speedswitch is required to re-open the Valve. This is facilitated by the Reset Button included in the FK-P2 kit.
6. The Emergency Stop Button has a twist to reset operation. The FP2 valve will not re-open until the Emergency Stop Button is reset.
7. The Speedswitch has a second R2 output which is not used with the FP3 valve, the LED trip indicator on the speedswitch for this output will turn on when setting the trip speed but will not turn on when testing the trip setting as it has been configured to trip at 400% of the nominal speed.
8. The Pneumatic Control Valve supplied with this kit includes a connection plug fitted with a protective diode. Any replacement Valve must be fitted with a similar diode to protect the electronic components in the system from the inductive load of the Valve Coil. Alternatively a protective diode must be fitted at an alternative location in the circuit to provide this protection.



FK-P2 CONNECTION DIAGRAM

FP3 Valve: Kit FK-P3 Installation Notes

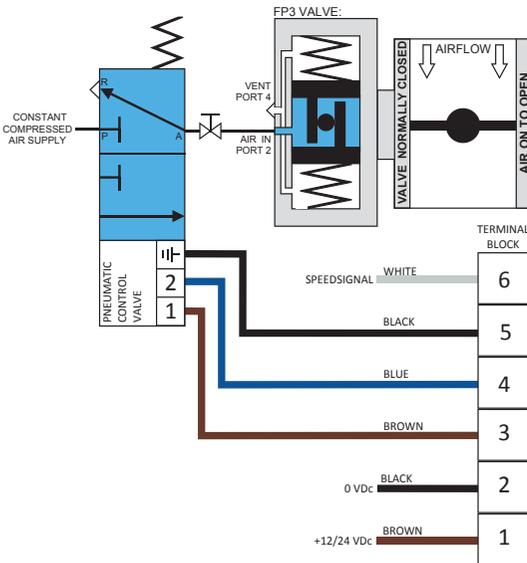
General Information: The following instructions are for guidance only, it is the responsibility of the installer or end user to ensure the FP3 valve is connected and operated as appropriate to the type of equipment being protected and to meet the safety requirements of the hazardous area in which the equipment will be operating.

Safety: Installation, servicing and repair of this equipment should only be carried out by suitably qualified personnel. Do not carry out installation, setup or maintenance until all instructions in this handbook have been fully reviewed and understood. For full FP3 Valve installation guidelines **always refer to the FP3 Valve Handbook** supplied with the valve and available for download from the Wyndham Page website.

Important Notes for installers and operators:

1. Always retain the standard fuel shutdown stop fitted to the engine. The Wyndham Page FP3 valve is designed for emergency stop only.
2. The speedswitch can be connected through the ignition, if so the FP3 valve will open or closed depending on the ignition state. The installer must ensure that the system is connected in a manner compatible with the start/stop requirements of the engine and equipment.
3. A compressed air supply must be available before engine startup to open the FP3 Valve.
4. The external valve status LED will light when the valve closes either through an overspeed trip or operation of the emergency stop. Providing the system is energised the LED will remain on until the speedswitch or emergency stop is reset. Do not attempt to start the engine with the LED on. The LED only shows the status of the pneumatic control valve. It does not directly indicate the valve status which is dependent on the compressed air supply (see 3).

5. The speedswitch output is set to latch. In the event of an overspeed trip the FP3 valve will remain closed when the engine revs drop below the set trip speed. An electrical reset (power or ignition off/on) of the speedswitch is required to re-open the Valve.
6. The Emergency Stop Button has a twist to reset operation. The FP3 valve will not re-open until the Emergency Stop Button is reset.
7. The Speedswitch has a second R2 output which is not used with the FP3 valve, the LED trip indicator on the speedswitch for this output will turn on when setting the trip speed but will not turn on when testing the trip setting as it has been configured to trip at 400% of the nominal speed.
8. The Pneumatic Control Valve supplied with this kit includes a connection plug fitted with a protective diode. Any replacement Valve must be fitted with a similar diode to protect the electronic components in the system from the inductive load of the Valve Coil. Alternatively a protective diode must be fitted at an alternative location in the circuit to provide this protection.



FK-P3 CONNECTION DIAGRAM

Installation

The FP Valve should be installed and tested in accordance with the guidelines in the separate FP Valve handbook supplied with the valve.

Before installing and wiring up the Speedswitch ensure a suitable power supply is available and determine the approach to connecting the power supply to the system (see installation note 2). The Speedswitch will operate from any standard 12V or 24V DC battery system.

Ensure a suitable speed signal is available from the alternator or MPU and determine the best method of connecting this to the system. If an MPU is used the MPU earth must be connected to a common ground point.

Select a mounting position for the Enclosure which enables safe access for setup and operation and allows a suitably protected run for the cables. Ensure the selected location will not expose the parts to temperatures outside of those stated in the specification table at the end of this section .

Setup

1. Determine the required trip speed (TS) for the engine.
2. Determine the preferred trip differential (TD) i.e 115% or 200% then calculate the nominal engine speed (NS) at which to set the trip speed as follows;

$$NS = TS / TD\%$$

Eg. for a trip speed of 4500rpm using a trip differential of 115% the nominal speed will be $4500/115\% = 3913$ rpm or

For a trip speed of 4500rpm using a trip differential of 200% the nominal speed will be $4500/200\% = 2250$ rpm

3. Adjust the $\frac{3}{4}$ turn Trip 1 potentiometer to the required TD setting as follows:
 - Fully anticlockwise = 115%
 - Fully clockwise = 200%
 - The trip differential can be set at any value between 115% and 200% by adjusting the potentiometer between the 2 end stop positions. This adjustment is linear therefore a midpoint setting would give a TD of 157%.
4. Calculate the Test Trip speed (TT)
 - $TT = TS \times 75\%$
 - Eg. For a TS of 4500rpm when tested using the Test Trip function the system will trip at $4500 \times 75\% = 3375$ rpm
5. When setting a new trip speed, higher than one already stored, the Speedswitch will trip as the speed signal increases past the currently stored value. For this reason before setting a new trip speed the following action is required to ensure the FP Valve does not close:
 - a. **FP2 Valves** - The pneumatic control Valve **must be disabled** by disconnecting the power supply plug at the valve or shutting off the compressed air supply.
 - b. **FP3 Valves** - When the FP3 valve is open close a shut off valve in the air supply line to the FP3 valve to maintain the air pressure in the actuator during trip speed setting.
6. Run the engine up to the “NS” speed calculated in step 2 then press and hold “Set Trip” button for approximately 2 seconds, when the Trip 1 LED comes on release the button, the LED will go off indicating the new trip speed has been stored. If setting a trip speed value higher than that previously stored the LED will come on at the lower value, continue increasing the engine speed to the “NS” speed calculated then operate the “Set Trip” button as described, the LED will go off indicating the new higher trip speed has been stored.
7. Reverse the steps taken in 5a or 5b to return the Valve to normal operation.

System Testing

1. E.Stop button. Operate the emergency stop button, the valve should close and the valve status LED come on.
2. Overspeed function testing. Press and hold the “Test Trip” button. Slowly increase engine RPM, check that the system trips at the calculated “TT” speed and that the valve status LED come on.

The complete FP Valve installation must also be tested in accordance with the guidelines in the separate FP valve handbook supplied with the valve.

Maintenance

The following maintenance schedule should be undertaken. Subject to experience of local operating conditions the frequency of the maintenance schedule may be varied. Carry out the proposed maintenance work when the equipment is in a safe area and record details of the work carried out. Rectify any problems identified before returning the diesel powered equipment back into service. The points listed below should be carried out **in addition** to the regular inspection and maintenance schedule detailed in the main FP Valve handbook.

Following initial installation and thereafter:

At Weekly intervals;

Operate the E.Stop button and check that the FP Valve snaps shut and that the valve status LED comes on.

Using the Test Trip button carry out a test of the engine overspeed shutdown and check the FP Valve snaps shut and that the valve status LED comes on.

At Monthly intervals;

Inspect wiring and pneumatic pipework to ensure it is properly supported and free from damage.

Inspect terminals on the Speedswitch and E.Stop button to ensure they are secure and free from corrosion.

SPEEDSWITCH SPECIFICATION	
SUPPLY	
DC SUPPLY	8 VOLTS TO 35 VOLTS CONTINUOUS 60 VOLT SURGE PROTECTION
REVERSE POLARITY PROTECTION	-35V CONTINUOUS
MAX OPERATING CURRENT	100mA at 24VDc 95mA at 12VDc
MAX STANDBY CURRENT	20mA at 24VDc 20mA at 12VDc
OUTPUTS	
R1 & R2	VOLT FREE RELAYS, BUILT IN LOAD DUMP, 15A DC MAX
FREQUENCY SENSING	
MIN FREQUENCY	3.5Hz
MAX FREQUENCY	10,000Hz
MIN VOLTAGE	0.6V RMS
ENVIRONMENTAL	
MIN AMBIENT	-30°C
MAX AMBIENT	70°C
PNEUMATIC CONTROL VALVE SPECIFICATION	
TYPE	3/2 WAY N.C
PORT CONNECTIONS	G1/8
MAX AMBIENT	55°C
PROTECTION CLASS	IP65
POWER	12VDc OR 24VDc, 9 WATTS

Calculations

Trip Speed TS: rpm

Trip Differential TD: %

Nominal Speed NS: $TS/TD =$ rpm

Test Trip Speed TT: $TS \times 75\% =$ rpm

Commissioning Test

Measured Test Trip TT: rpm

By: Date:

Notes

Notes

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