

# FS3 Valves

Solenoid Powered to Open / Spring to Close (failsafe)

*Part of the F Series of easily installed, compact, air intake valves for diesel engine emergency shutdown.*



wyndham|page

## About Wyndham Page Ltd

Based in the UK Wyndham Page specialise in the design and manufacture of safety equipment for diesel engines.

Our product range of Air Intake Shutdown Valves includes our E Series Automatic Valves and our F Series Butterfly Valves with solenoid, pneumatic or manual actuation options. We offer Speedswitch kits for the F Series valves and a range of Spark Arresters designed to prevent the emission of high energy sparks from diesel exhaust systems.

Wyndham Page is headed by Freddy Page-Roberts who brings over 20 years' experience in the diesel safety industry and was previously managing director of Chalwyn Ltd.

All members of the senior management team have considerable experience in organisations specialising in the design and manufacture of hazardous area equipment for diesel engines.

## Quality Assurance

Wyndham Page Valves are manufactured and tested under our EN ISO 9001: 2015 quality management system.

Wyndham Page Ltd are certified to supply ATEX equipment under Quality assurance Certificate CML ATEXQ11003.

- Equipment supplied with an EC Type Examination Certificate is CE marked and meets the provision of the ATEX directive 2014/34/EU.
- Self-certified equipment supplied with an EU Type Examination Certificate is CE marked and meets the provision of the ATEX directive 2014/34/EU.

## FS3 Valves: Application

The FS3 version of the Wyndham Page F Series of shutdown valves is designed to be installed in the air intake system of a diesel engine to provide an emergency means of rapid shutdown.

An electrical signal must be applied continuously to hold the FS3 valve in the open state to enable the engine to be started and run. Loss of this electrical signal results in closure of the valve thereby bringing the running engine to a stop within a few seconds.

An electrical shutdown control system is required to interrupt the electrical signal to the valve automatically on engine overspeed or any other selected fault condition. Additionally a manual emergency stop button to enable the electrical signal to the valve to be switched off should be incorporated.

Any loss of power supply to the shutdown control circuit or fault within the control circuit causing loss of signal output would also result in an engine shutdown.

The low intake air flow restriction through the open valve makes it generally compatible with the requirements of low emission diesel engines.

Corrosion resistant materials are used where applicable in the construction of the valve. This lightweight and compact valve design together with the availability of factory fitted hose adaptors selected from a wide range of optional sizes assists in easy installation.

The valve may be fitted to either turbocharged or naturally aspirated engines. In the case of turbocharged engines temperature limitations may restrict the position in which the valve may be installed in the intake system.

**Note.** An ATEX version of this valve is available. Wyndham Page also supply engine speed switches for incorporation into the emergency shutdown control circuit of this type of application. Please contact Wyndham Page or your Wyndham Page supplier for details.

## Description and Main Dimensions

Versions of the FS3 valve can be selected to operate by either a 12 or 24 volt DC run signal.

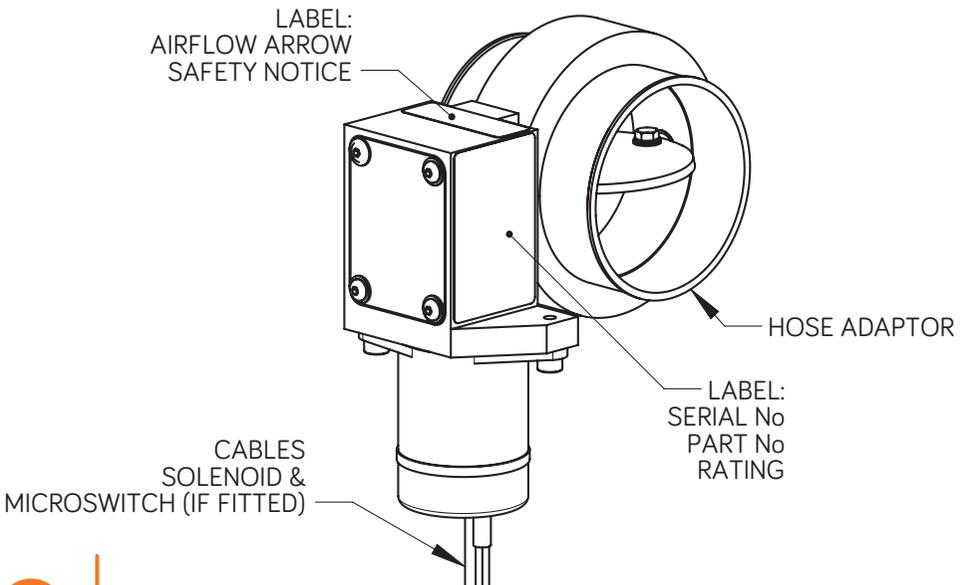
In standard form the FS3 valve is available complete with hose adaptors as selected by the customer from a range of standard sizes – see diagram below and data on pages 5 and 6. Where a requirement exists for a non-standard adaptor size or other alternative form of intake pipe connection such as a flanged joint, please pass details of requirement to Wyndham Page or your Wyndham Page supplier for investigation.

Optionally the valve can be supplied fitted with an internal microswitch to indicate the open/closed status of the valve.

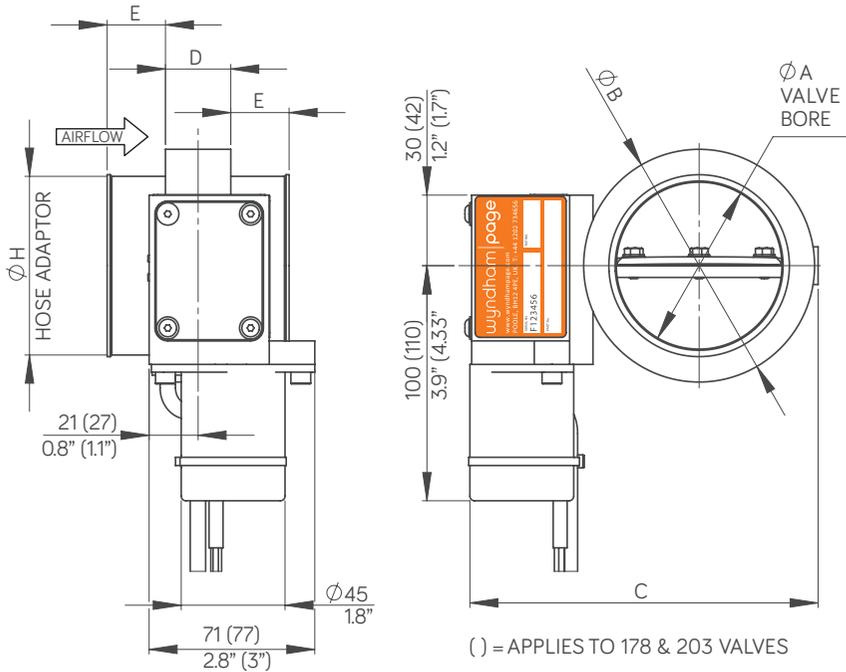
The valve has a metal to metal seal when closed. It is designed for low closing friction and long life of the sealing surfaces. The internal mechanism is configured to withstand high shock loads without malfunction.

The electrical enclosure is to IP66.

The diagram below and the diagrams and data on pages 5 to 7 cover the main features and basic dimensions of the FS3 range including selection of options and order coding.



METRIC TABLE		DIMENSIONS (MM)					WEIGHT KG	ORDER CODE
MODEL	H TO SUIT HOSE BORE	BORE A	B	C	D	E		
FS3	38	57	81	131	50	20	1.47	038
	44						1.47	044
	51						1.47	051
	57						1.46	057
	64						1.46	064
	70	65	91	141	28	25	1.51	070
	70						1.38	70S
	76						1.44	076
	83	71	99	149	28	25	1.53	083
	89						1.60	089
	95						1.68	095
	102	95	125	175	35	25	1.77	102
	108						1.85	108
	114						1.94	114
	121						2.05	121
	127						2.24	127
	133	120	154	204	42	25	2.34	133
	140						2.47	140
	146						2.58	146
	152						3.04	152
159	145	185	236	49	25	3.18	159	
165						3.30	165	
171						3.44	171	
178						4.31	178	
203	171	215	270	56	30	4.31	178	
	192	238	291	65	40	5.69	203	



IMPERIAL TABLE		DIMENSIONS (INCHES)					WEIGHT LB	ORDER CODE
MODEL	H TO SUIT HOSE BORE	BORE A	B	C	D	E		
FS3	1.50	2.2	3.18	5.14	1.97	0.79	3.24	038
	1.73						3.24	044
	2.01						3.24	051
	2.24						3.22	057
	2.52						3.22	064
	2.76						3.33	070
	2.76	2.56	3.58	5.55	1.10	0.98	3.04	70S
	2.99	2.80	3.90	5.87	1.10	0.98	3.18	076
	3.27						3.37	083
	3.50						3.53	089
	3.74						3.70	095
	4.02						3.90	102
	4.25	3.74	4.92	6.89	1.38	0.98	4.08	108
	4.49						4.28	114
	4.76						4.52	121
	5.00						4.94	127
	5.24	4.72	6.06	8.03	1.65	0.98	5.16	133
	5.51						5.45	140
	5.75						5.69	146
	5.98						6.70	152
6.26	5.71	7.28	9.29	1.93	0.98	7.01	159	
6.50						7.28	165	
6.73						7.59	171	
7.01						6.73	8.46	10.63
7.99	7.56	9.37	11.46	2.56	1.57	12.55	203	

# Valve Selection

To enable Wyndham Page to select the most suitable version of the FS3 valve for the Customers application the following data is required:

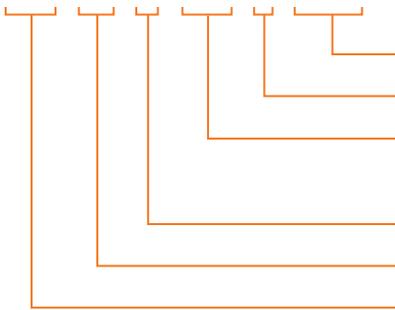
- [1]. Bore size of the intake hose into which the intake valve is to be fitted - refer to section headed "Installation [mechanical]".
- [2]. Whether a 12 or 24 volt DC shutdown signal is to be used.

**The following additional options are available**

- [3]. A built in microswitch (see page 10)
- [4]. A manual pull cable to open the valve, hold coil only operation (see page 11).
- [5]. A Flametrap Housing fitted on the outlet side of the Valve. Only available on valve sizes 070 and below (see page 12).

# Order Coding

**FS3 - XXX - XX - M - RXX - T - SXXX**



**Special features code** (refer to sales) only included in code if required

**Flametrap Housing Option:** T

**Manual Open Cable Option:** RXX (see table below for standard cable lengths)

**Microswitch option:** M

**Voltage:** 12 or 24

**Adaptor size** (order code in table)

STANDARD CABLE LENGTHS	
CABLE XX CODE	LENGTH (M)
05	0.5
10	1.0
15	1.5
20	2.0
25	2.5
30	3.0

**Flametrap Element for T option:**

Order code: **FTE-020**

**Special Features:**

By arrangement with Wyndham Page.

# Valve Installation [mechanical]

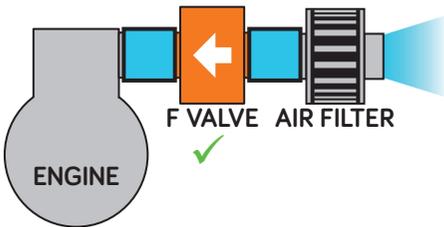
Select a position for the valve which meets the requirements below. The valve may be fitted in any attitude from horizontal to vertical but not in a position where it is subjected to temperatures, internal or external, outside of the range  $-40^{\circ}\text{C}$  to  $+120^{\circ}\text{C}$ . When planning and checking installation always ensure that:

- a. There is a suitable run for the connected electrical cables and manual start cable if fitted.
- b. The direction of airflow is in compliance with the arrow marked on the body of the valve.
- c. An **Air Filter Element** must always be fitted in the engine air intake system **upstream** of the Valve.
- d. Valve location in the Air Intake System (refer to schematics below):

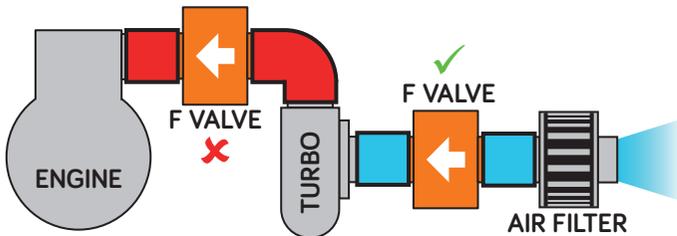
Yes  No 

In all cases the Valve must be located where both ambient and intake air temperature does not exceed  $120^{\circ}\text{C}$ .

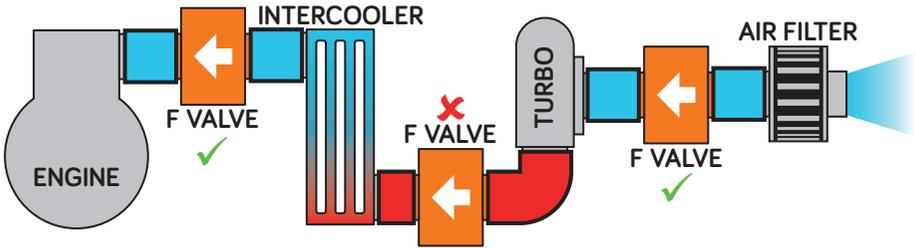
- **Normally Aspirated Engines (no turbocharger):** fit the valve between the engine and the air filter (see schematic below).



- **Turbocharged Engines:** fit the valve upstream [air filter side] of the turbocharger. **Do not** fit the valve between turbocharger and engine (see schematic below).



- **Turbocharged Engines with Intercooler:** fit the valve upstream (air filter side) of the turbocharger or downstream of the intercooler. **Do not** fit the valve between turbocharger and intercooler (see schematic below).



- In all cases where an **Intake Flametrap** is also fitted, the valve must be installed **upstream** of the flametrap.
- The hose into which the valve is fitted should be adequate to fully support the valve whilst not permitting excessive vibration of the valve. For the heavier valves in the range a support bracket for the valve may be necessary. Generally ensure that there is sufficient flexibility in the finalised intake system installation to allow for the relative movement between the system components over the full range of engine operating conditions thereby avoiding excessive mechanical stresses.
- Any engine **Crankcase Breather** arrangement venting directly into the intake ports or into the air intake system downstream of the Wyndham Page valve must be sealed and replaced by an external breather system connected to the intake system upstream of the valve or [if permitted at the operating site] vented to atmosphere.
- When installing valves fitted with the manual cable RXX option ensure that the bend radius of the Cable does not restrict the mechanism from pulling the T Handle back into the run position. If it is found that the T Handle is not being pulled fully in then a straighter run for the reset cable must be used.

**Important Note.** Retain the standard fuel shutdown stop fitted to the engine. The Wyndham Page FS3 air intake valve is designed for emergency stop only.

# Valve Installation [electrical]

The wiring diagrams show the connections for the valve solenoid and, where applicable, the optional microswitch.

The electrical data for the solenoid and microswitch is tabulated on page 13.

It is recommended that a manual switch for emergency stop is **always** incorporated into the shutdown control circuit to switch off the electrical signal to the FS3. This manual switch should be a type that requires reset to the run status after operation.

The solenoid power supply cable must be adequately secured along its length to avoid excessive mechanical stress at the connection to the solenoid or any other physical damage under all normal operating conditions and during equipment servicing.

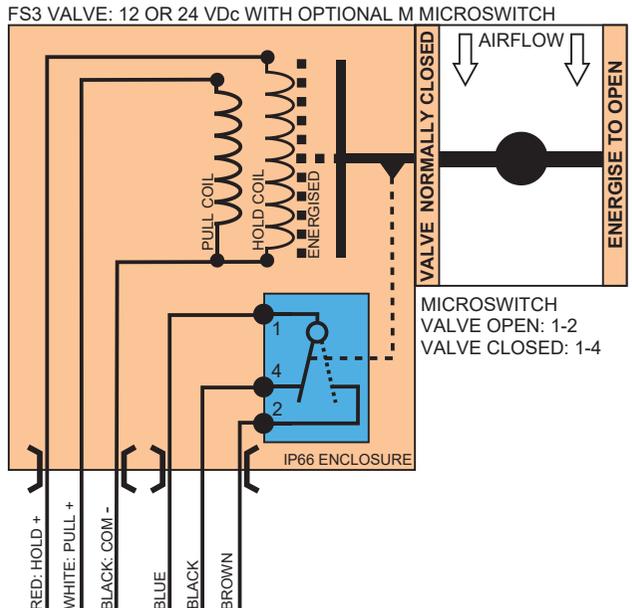
### Important notes.

Design of the electrical shutdown system must take into account the limitations applicable in terms of applying power to the solenoid [see solenoid electrical specification on page 13].

## Wiring Schematic & Microswitch Option

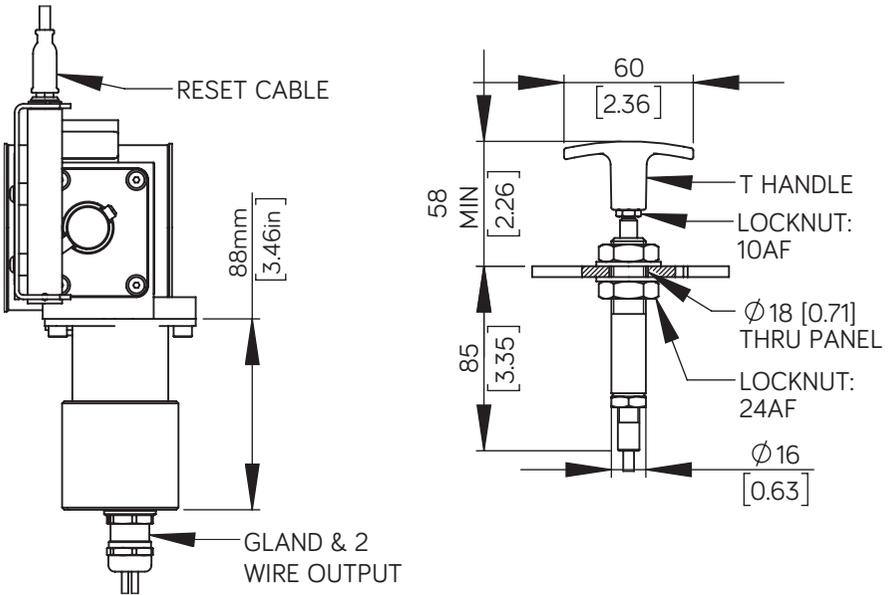
### FS3 Valve:

Internal wiring schematic



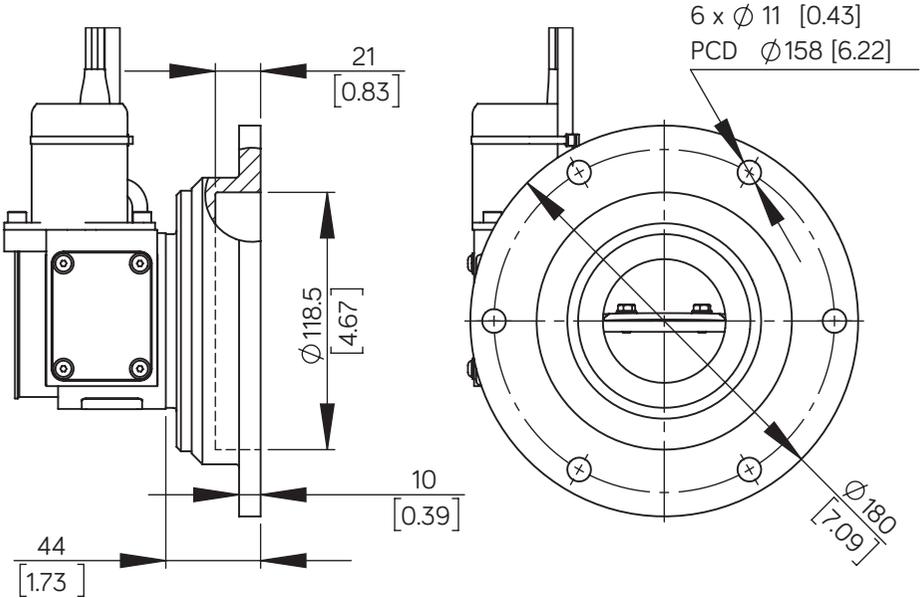
## Additional Options:

**Manual Open / Hold Coil operation - Order Code "RXX":** For applications where electrical power is not available at engine startup the valve is supplied with a T Handle to manually hold the valve open via a mechanical pull cable. When power is available to energise the solenoid the T handle can be released and the valve is held in the open position by the solenoid hold coil. The solenoid is supplied with a 2 wire output for connection of the hold coil only.



## Additional Options (cont):

**Flametrapp Housing Option - Order Code "T":** A Flametrapp housing, fitted in place of the outlet adaptor, is suitable for a 118mm diameter x 20mm crimped ribbon type flametrapp element. The housing has a mounting flange as shown in the drawing below. Note this option is only available on valve sizes 070 and below.



# General and Electrical Specification

<b>GENERAL DESCRIPTION:</b>	
A slim solenoid operated butterfly valve designed for emergency shutoff of the engine air intake.	
Operating mode*: Spring closed, energise to open.	
Duel coil solenoid.	
<b>GENERAL SPECIFICATION:</b>	
Temperature:	Max ambient: 120°C Max intake air temp: 120°C
Construction:	Body and disk: Hard anodized aluminium Other main components: Stainless steel, aluminium Hose adaptors: Aluminium
<b>ELECTRICAL SPECIFICATION:</b>	
Energise pull coil to open, energise hold coil to hold valve in open position for engine start & run.	
12 or 24 volt DC option specified when ordering	
Solenoid rating:	12 Volt DC: Pull Coil - 46A, Hold Coil - 1.1A 24 Volt DC: Pull Coil - 25A, Hold Coil - 0.5A
Pull coil max single pulse:	1.5 seconds
Max 4 cycles in one minute	
Recommended engine controller setting:	1 second pull
<b>MICROSWITCH OPTION:</b>	
S.P.D.T - 24V, 10A Max	
<b>MICROSWITCH CABLE:</b>	
SIHF silicone insulated multicore cable: Standard length 3m	

\* The operating mode of the RXX version varies from that above, refer to the applicable section of this handbook for details.

## Operation

Arrange the shutdown control circuit system such that the 12 or 24 volt DC run signal as applicable is applied to the FS3 valve when engine start up is required.

Normal engine shutdown should always be via the standard fuel shutdown.

Should the engine standard fuel shutdown fail to stop the engine operate the manual emergency stop in the shutdown control system to break the 12 or 24 volt DC supply to the FS3 valve.

The FS3 valve has no manual reset facility. It can only be operated by the application or removal of an electrical signal at the appropriate voltage.

Where fitted the valves internal microswitch permits an indication of the valves open / closed status.

## 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.

FOLLOWING INITIAL INSTALLATION AND THEREAFTER AT WEEKLY INTERVALS:

- [1]. Check all intake pipework between the FS3 valve and engine intake manifold to ensure all pipe fittings and any support brackets are properly fitted and secure and that the engine intake is leak free and shows no sign of significant deterioration or damage.
- [2]. Start engine. Carry out a shutdown using the stop signal from the shutdown control system. Check that the valve snaps shut and brings the engine to a stop within a few seconds.

SIX MONTHLY:

Remove the FS3 valve. Wipe clean as necessary and visually inspect for damage or excessive wear. Bench test valve function. Refit and complete the “Weekly” maintenance as listed above.

Notes:

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Unit 1c Chalwyn Industrial Estate, Parkstone, Poole,  
Dorset BH12 4PE United Kingdom

Tel: +44 (0)1202 734 656

Email: [sales@wyndhampage.com](mailto:sales@wyndhampage.com)

[www.wyndhampage.com](http://www.wyndhampage.com)