# FS1 Valves

## Solenoid Powered to Close / Manual Reset Butterfly Valves

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

New Speed Switch Kit available for a complete overspeed installation

See page 3


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## 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.

# FS1 Valves: Application

The FS1 version of the Wyndham Page F Series of engine air intake closure valves is designed to provide an emergency means for rapid shutdown of a diesel engine when triggered by a 12 or 24 Volt DC signal. This signal may be generated automatically by engine overspeed or any other selected fault condition or via a manually operated electrical engine stop button. Optionally for additional safety the valve can also be supplied with a mechanical emergency engine stop button either directly mounted on the valve or remotely mounted for operation via a mechanical cable.

Once the FS1 valve has operated to stop the engine, a restart is only possible after manually resetting the valve to the run position.

The low intake airflow 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:** This handbook is not applicable to the FS1-178 & 203 sizes of this valve. Please refer to the separate handbook for these valves.

## New Speed Switch Kits now available

Wyndham Page also supplies Speed Switches and a range of Installation Kits for incorporation into the emergency shutdown control circuit of this type of application. Details can be found in our **"Speedswitch Kits - FS1 Valve"** handbook available for download on our website. Please contact Wyndham Page or your Wyndham Page supplier for additional details.

**Note.** The FS1 valve needs to have a M3 microswitch configuration to use with our kit.

# Description and Main Dimensions

The FS1 butterfly valve is a latched open type. Either operation of the manual engine shutdown button [where fitted] or applying a 12 or 24 volt DC signal is required to trip the valve to the closed [engine stop] position. Following valve closure the manual reset lever on the valve is used to reset to the latched open position. Optionally the valve can be supplied with a cable and lever arrangement to permit manual reset from a position remote from the engine.

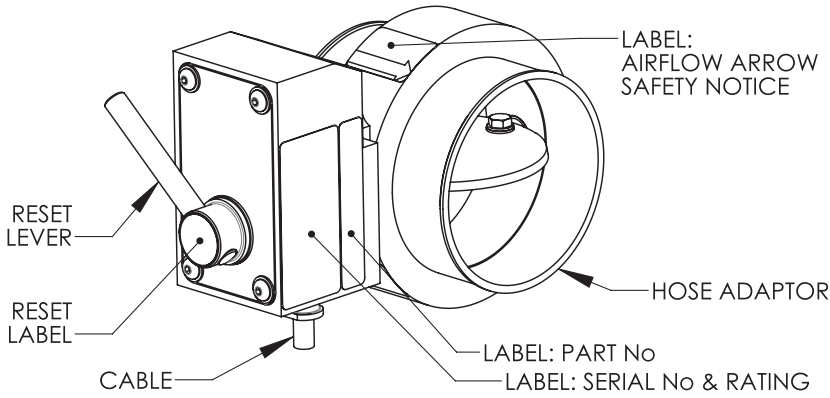
In standard form the FS1 valve is available complete with integrated hose adaptors as selected by the Customer from a range of standard sizes – see diagram below and data on pages 5 and 6. Where a requirement exists for a non-standard adaptor size or other alternative form of pipe connection such as a flanged joint please pass details of your requirement to Wyndham Page or your Wyndham Page supplier for investigation.

The valve is supplied fitted as standard with an internal microswitch to indicate the open/closed status of the valve. For details on the microswitch options see pages 7 and 8.

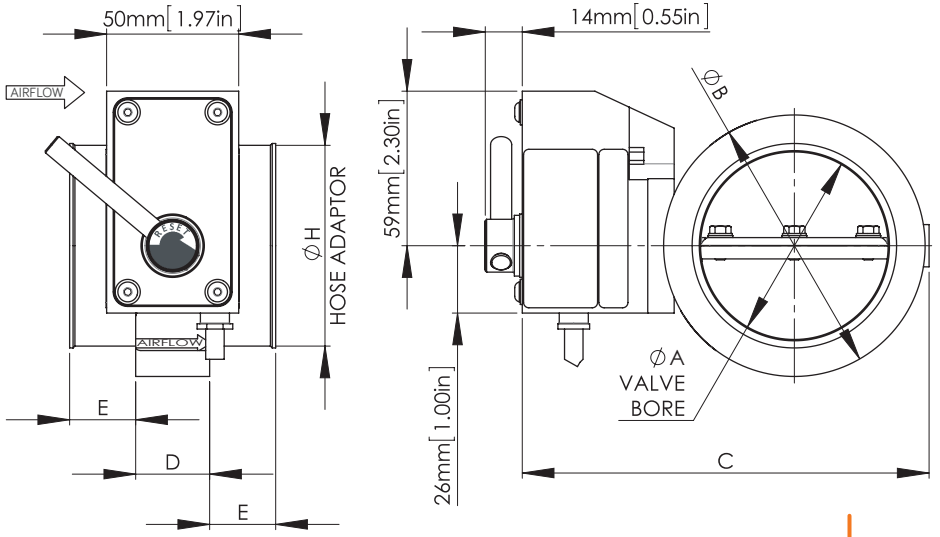
The valve has a metal to metal seal when closed. It is designed for low closing friction and long life of the sealing surfaces. The latching / release mechanism is configured to withstand high shock loads without malfunction.

The electrical enclosure is to IP66.

The diagram below and the diagrams and data on pages 5 to 9 cover the main features and basic dimensions of the FS1 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 | | |
| FS1 | 38 | 57 | 81 | 136 | 50 | 20 | 1.08 | 038 |
| | 44 | | | | | | 1.08 | 044 |
| | 51 | | | | | | 1.08 | 051 |
| | 57 | | | | | | 1.07 | 057 |
| | 64 | | | | | | 1.08 | 064 |
| | 70 | | | | | | 1.11 | 0.70 |
| | 70 | 65 | 91 | 146 | 28 | 25 | 0.97 | 070S |
| | 76 | 71 | 99 | 154 | 28 | 25 | 1.05 | 076 |
| | 83 | | | | | | 1.14 | 083 |
| | 89 | | | | | | 1.21 | 089 |
| | 95 | | | | | | 1.28 | 095 |
| | 102 | 95 | 125 | 180 | 35 | 25 | 1.38 | 102 |
| | 108 | | | | | | 1.46 | 108 |
| | 114 | | | | | | 1.55 | 114 |
| | 121 | | | | | | 1.66 | 121 |
| | 127 | 120 | 154 | 209 | 42 | 25 | 1.84 | 127 |
| | 133 | | | | | | 1.95 | 133 |
| | 140 | | | | | | 2.07 | 140 |
| | 146 | | | | | | 2.19 | 146 |
| | 152 | 145 | 185 | 241 | 49 | 25 | 2.64 | 152 |
| | 159 | | | | | | 2.79 | 159 |
| | 165 | | | | | | 2.92 | 165 |
| | 171 | | | | | | 3.05 | 171 |



| IMPERIAL TABLE | | DIMENSIONS (INCHES) | | | | | WEIGHT LB | ORDER CODE |
|---|---|---|---|---|---|---|---|---|
| MODEL | H TO SUIT HOSE BORE | BORE A | B | C | D | E | | |
| FS1 | 1.50 | 2.2 | 3.18 | 5.33 | 1.97 | 0.79 | 2.38 | 038 |
| | 1.73 | | | | | | 2.38 | 044 |
| | 2.01 | | | | | | 2.38 | 051 |
| | 2.24 | | | | | | 2.36 | 057 |
| | 2.52 | | | | | | 2.38 | 064 |
| | 2.76 | | | | | | 2.45 | 070 |
| | 2.76 | 2.56 | 3.58 | 5.75 | 1.10 | 0.98 | 2.14 | 070S |
| | 2.99 | 2.80 | 3.90 | 6.06 | 1.10 | 0.98 | 2.32 | 076 |
| | 3.27 | | | | | | 2.51 | 083 |
| | 3.50 | | | | | | 2.67 | 089 |
| | 3.74 | | | | | | 2.82 | 095 |
| | 4.02 | 3.74 | 4.92 | 7.09 | 1.38 | 0.98 | 3.04 | 102 |
| | 4.25 | | | | | | 3.22 | 108 |
| | 4.49 | | | | | | 3.42 | 114 |
| | 4.76 | | | | | | 3.66 | 121 |
| | 5.00 | 4.72 | 6.06 | 8.23 | 1.65 | 0.98 | 4.06 | 127 |
| | 5.24 | | | | | | 4.30 | 133 |
| | 5.51 | | | | | | 4.56 | 140 |
| | 5.75 | | | | | | 4.83 | 146 |
| | 5.98 | 5.71 | 7.28 | 9.49 | 1.93 | 0.98 | 5.82 | 152 |
| | 6.26 | | | | | | 6.15 | 159 |
| | 6.50 | | | | | | 6.44 | 165 |
| | 6.73 | | | | | | 6.73 | 171 |

## 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.

[3]. The microswitch operating mode – see schematics on pages 7 and 8.

**The following additional options are available**

[4]. A remote manual reset (see page 9) select suitable cable length - see range on page 7.

[5]. A mechanical engine stop button (see page 9) select cable length if applicable - see range on page 7.

# Order Coding

**FS1 - XXX - XX - MX - RXX - EXX - S00**

- **Special features code** (refer to sales) only included in code if required
- **Manual stop option:** E or EXX for cable length (see table below)
- **Reset cable option:** Length RXX (see table below)
- **Microswitch option:** M1, M2 or M3
- **Voltage:** 12 or 24 VDc
- **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 |

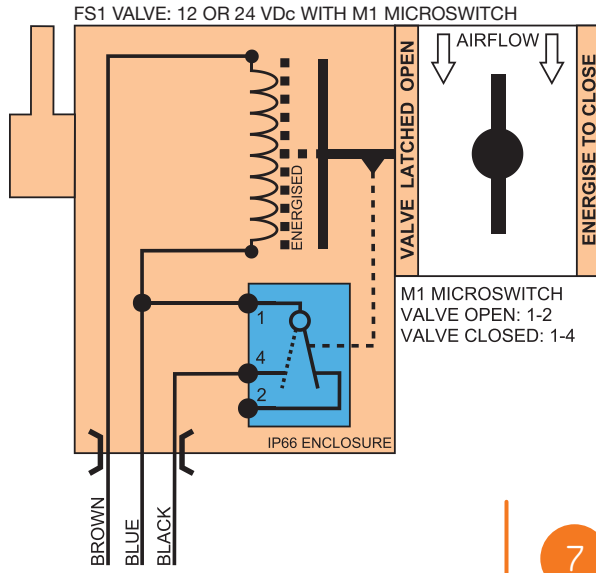
**Special Features:**
By arrangement with Wyndham Page.

# Wiring Schematics & Microswitch Options

**Microswitch option M1**
Suitable for customers controlling the valve via their own electrical systems.

**FS1 - M1 Valve:**
Internal wiring schematic

Not applicable to the FS1-178/203



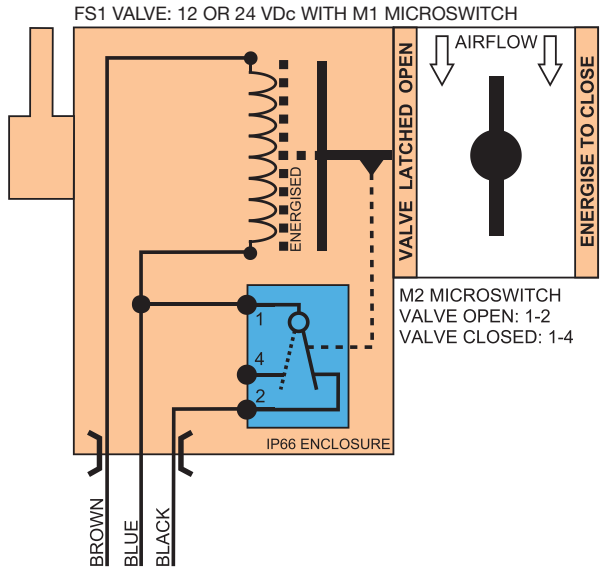
## Microswitch option M2

Suitable for customers controlling the valve via their own electrical systems.

### FS1 - M2 Valve:

Internal wiring schematic

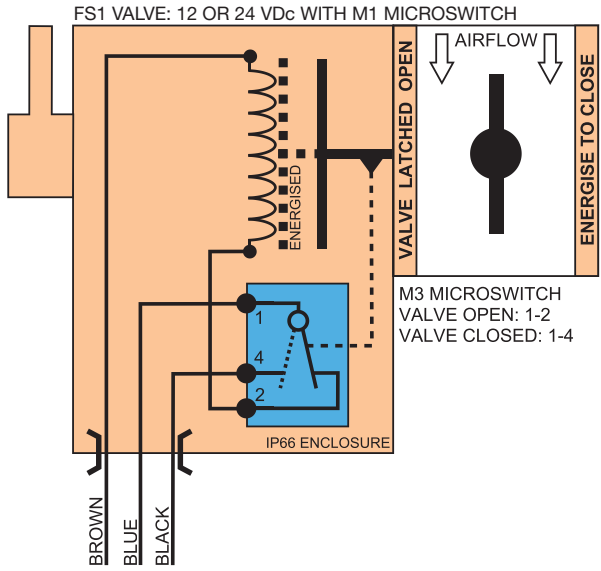
Not applicable to the FS1-178/203



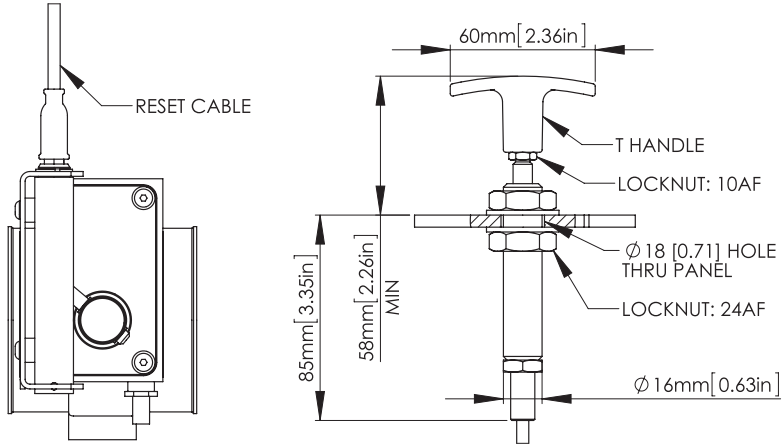

## Microswitch option M3

Provides inbuilt protection for the solenoid which is wired through the microswitch. Designed for use with the Wyndham Page FK-S1 range of Speedswitch kits.

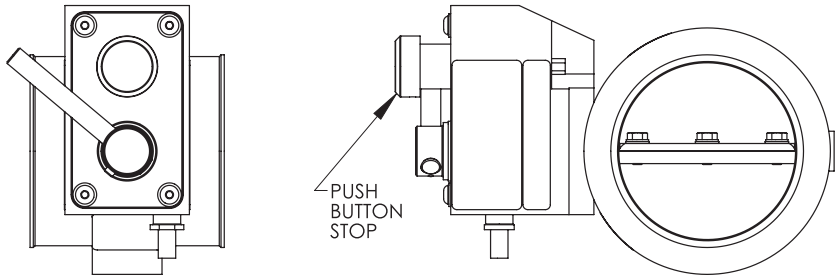
Not applicable to the FS1-178/203



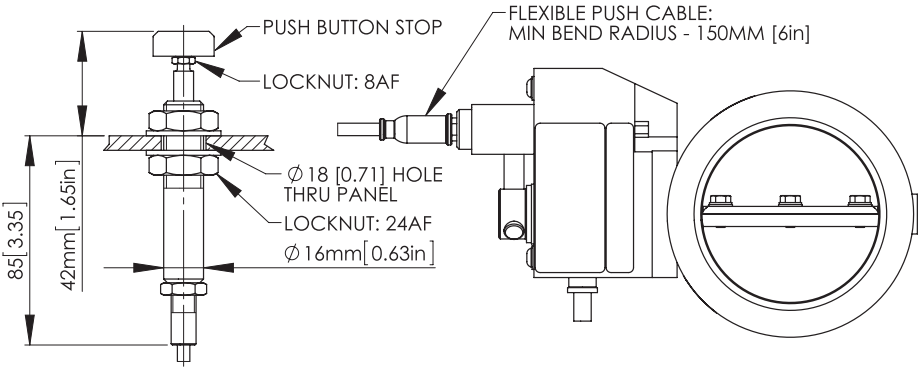
# Additional Options:




RESET CABLE OPTION: ORDER CODE RXX




PUSH BUTTON MANUAL STOP OPTION: ORDER CODE E




REMOTE PUSH BUTTON MANUAL STOP OPTION: ORDER CODE EXX

# 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°C to +120°C. When planning and checking installation always ensure that:

a. There is safe access to operate the Reset Lever & E stop button (if fitted) and a suitable run for the electrical cables and manual cables (if fitted).

b. The direction of airflow is in compliance with the arrow marked on the body of the valve.

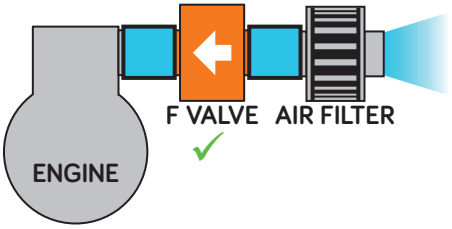
c. An **Air Filter Element** must always be fitted in the engine air intake system **upstream** of the Valve.

d. Valve location in the Air Intake System (refer to schematics below):

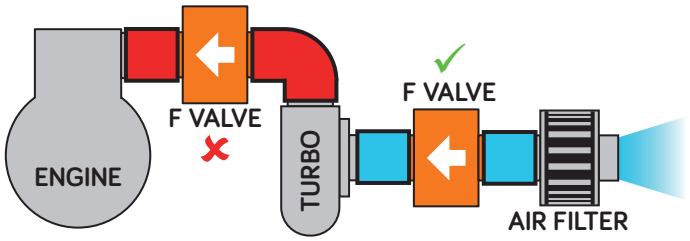
**Yes** ✓ **No** ✗

In all cases the Valve must be located where both ambient and intake air temperature does not exceed 120°C.

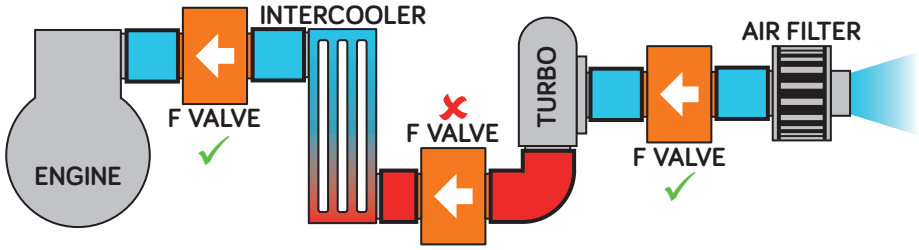
- **Normally Aspirated Engines (no turbocharger):** fit the valve between the engine and the air filter (see schematic below).




- **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).




e. In all cases where an **Intake Flametrap** is also fitted, the valve must be installed **upstream** of the flametrap.

f. 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.

g. 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.

h. 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 FS1 air intake valve is designed for emergency stop only.

# Valve Installation [electrical]

The wiring diagrams on pages 7 and 8 show the connections for the valve solenoid and microswitch.

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

It is recommended that either a manually operated electrical engine stop button or a remotely operated mechanical engine stop button is always incorporated.

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.**

[1]. The electrical system must include means to restrict the maximum time the closure signal may be applied to the solenoid to within the limits stated on page 13. This restriction must also be applied where a manually operated electrical engine stop button is also incorporated in the electrical shutdown circuit.

[2]. It is recommended that for additional safety when a manually operated electrical engine stop button is incorporated it should be directly supplied by the required voltage from source and not via the shutdown control circuit.

# General and Electrical Specification

| GENERAL DESCRIPTION: | |
|---|---|
| A slim butterfly valve designed for emergency shutoff of the engine air intake. | |
| Mechanically latched open, energise to close, manual reset by rotation of reset knob. | |
| **GENERAL SPECIFICATION:** | |
| Temperature: | Max ambient: 120°C<br>Max intake air temp: 120°C |
| Construction: | Body and disk: Hard anodized aluminium<br>Other main components: Stainless steel, aluminium<br>Hose adaptors: Aluminium |
| **ELECTRICAL SPECIFICATION:** | |
| Solenoid energise to close operation | |
| 12 or 24 Volt DC option specified when ordering | |
| Solenoid rating: | 12 Volt DC, 7.5A, 90W<br>24 Volt DC, 3.75A, 90W<br>Solenoid rating 10% |
| Max single pulse @20°C: | 8 seconds |
| Max on time in 1 minute @20°C: | 6 seconds |
| Recommended engine controller setting: | 1 second |
| **MICROSWITCH:** | |
| S.P.S.T - 24V, 10A Max | |
| Code M1: Switch open when valve in open position | |
| Code M2: Switch closed when valve in open position | |
| Code M3: Refer to schematic on page 8 | |
| **CABLE:** | |
| SIHF silicone insulated multicore cable: Standard length 3m | |

## Operation

The valve closure disc is sprung towards the engine stop [closed] position. It is latched in the engine run [open] position by rotating the reset latch as indicated on the valve body, or, where a remote manual reset is fitted, by pulling the reset 'T' handle. During engine operation the valve remains open until the 12 or 24 volt DC shutdown signal is applied or the manual emergency stop button is operated. This releases the valve disc from the run position to the stop position thereby shutting down the engine.

**Note.** Unless released to the closed position by an electrical signal or the manual emergency stop button the valve disc will continue to remain in the latched open state and therefore following a normal engine stop by fuel shut down it will not require reset.

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 FS1 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]. Where the valve has been fitted with a Reset Cable RXX option inspect and if required clean off any contamination from the reset lever, reset mechanism slide and T Handle shaft and spray with a suitable light cleaner/lubricant. Check that the Reset mechanism pulls the T Handle fully back into the run position.

[3]. Start engine. Carry out a shut down using the stop signal from the shut down control system. Check that the valve snaps shut and brings the engine to a stop within a few seconds.

SIX MONTHLY:
Remove the FS1 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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