

E90S & E90SM Valves

Automatic Engine Overspeed Shutdown Valves

Part of the E series range of easily installed diesel engine air intake valves which automatically close on engine overspeed.

ATEX &
UKEX
Certified



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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, a range of G Series Mechanical Engine Safety Products 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 Ex equipment under Quality Assurance Notification CML ATEXQ11003 in the UK, CML ATEXQ13649 in the EU and IECEx Quality Assurance Report GB/CML/QAR17.0023/01.

- Equipment supplied with an UK Declaration Conformity is CA marked and meets the provision of the UK directive SI 2016No. 1107
- Equipment supplied with an EU Declaration of Conformity is CE marked and meets the provision of the ATEX directive 2014/34/EU.

E90S Valve: Application

The E90S valve is the largest valve in the E Series range of Wyndham Page automatic overspeed shutdown valves. These are designed to be fitted to the air intakes of Diesel engines operating in areas where flammable gas, vapour or dust may enter the atmosphere and are certified for use in **Zone 1, gas group IIB and Zone 21, dust group IIIB hazardous areas**.

Should such flammable material be drawn into the engine intake this may result in uncontrolled engine overspeed and a situation in which shutdown of the normal diesel fuel supply may fail to stop the engine.

Under these circumstances a rapid shutdown of the engine is required by immediate closure of the engine air intake thereby reducing the potential for major damage and possible ignition of the flammable material in the surrounding atmosphere.

The E Series of Wyndham Page automatic engine air intake shutdown valves are suitable for installation in the intakes of either naturally aspirated or turbocharged engines.

Once installed and set, the repeatability of the actual engine automatic shutdown speed has a greater scatter in the case of turbocharged engines than for naturally aspirated types. However, unless there is a special requirement for a very precise shutdown speed, adequate protection from excessive engine overspeed is achieved.

E90SM Valve -Enhanced Protection [Manual Shutdown]

The Wyndham Page E90SM valve is certified for use in **Zone 2, gas group IIB and Zone 22, dust group IIIB hazardous areas** and includes a manual actuator connected to the valve via a mechanical pull cable to enable manual emergency valve closure.

Principle of Operation [Automatic Overspeed Shutdown]

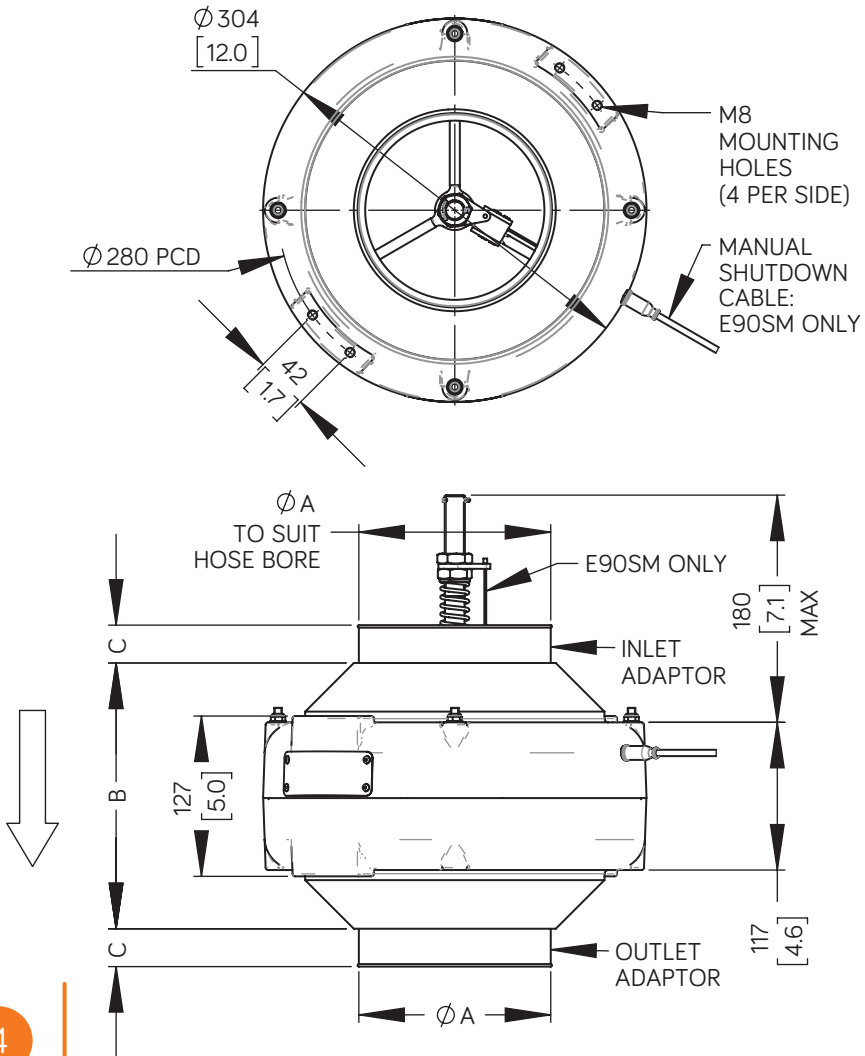
The actuation force to close the valve is derived from the engine intake airflow passing through the valve. As the airflow increases this actuation force also increases. This force is resisted by the valve spring, the pre-load of which is adjusted via the "Trip Adjuster Nut".

Once the actuation force exceeds the resisting force of the valve spring, the valve rapidly moves to the closed position. Once closed the E valve remains shut until the engine has fully stopped. The valve then resets to the open position after a delay of some seconds.

Description and Main Dimensions

The E90S valve is shown below. The valve is supplied complete with hose adaptors [to slide into the engine air intake hose] machined to order.

The dimensions for the valve with typical hose adaptor diameters are given in the tables on page 5. The valve can be supplied machined with any hose adaptor diameter between 152 (6") and 229 (9"). Please contact Wyndham Page or your Wyndham Page supplier to discuss your requirements in more detail.



METRIC TABLE	ENGINE POWER RANGE 270 TO 600 KW		
A	B	C	MASS (KG)
152	211	30	8.04
159	204		7.95
165	198		7.87
171	192		7.79
178	185		7.69
184	179		7.60
191	172		7.49
197	166		7.39
203	160		7.29
210	153		7.17
216	125		40
222	125	7.15	
229	125	7.50	

IMPERIAL TABLE	ENGINE POWER RANGE 362 TO 804 HP		
A	B	C	MASS (LB)
6.00	8.31	1.18	17.7
6.25	8.03		17.5
6.50	7.80		17.4
6.75	7.56		17.2
7.00	7.28		17.0
7.25	7.05		16.8
7.50	6.77		16.5
7.75	6.54		16.1
8.00	6.30		16.1
8.25	6.02		15.8
8.50	4.92		1.57
8.75		15.8	
9.00		16.5	

Contact Wyndham Page or your Wyndham Page supplier for additional details. Data subject to change.

Valve Power Range

The E90S valve is suitable for use on engines up to 600KW (804HP).

Valve Selection

To enable Wyndham Page to select the most suitable shutdown valve for a given application the following data is required:

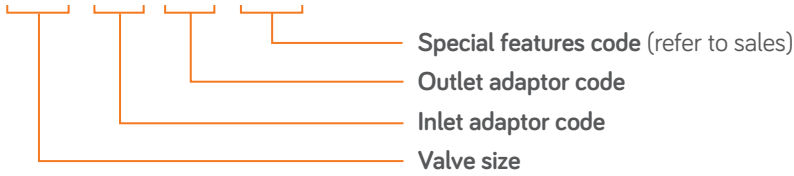
- Engine type and model.
- Engine rating and / or application details.
- The internal bore of the intake system hose at the position the valve is to be fitted.
- Requirement for manual emergency stop and length of cable required.

Order Coding

Use metric value for adaptor code (dim A)
Combine inlet and outlet adaptor codes if the same.
Special features by arrangement with Wyndham Page.

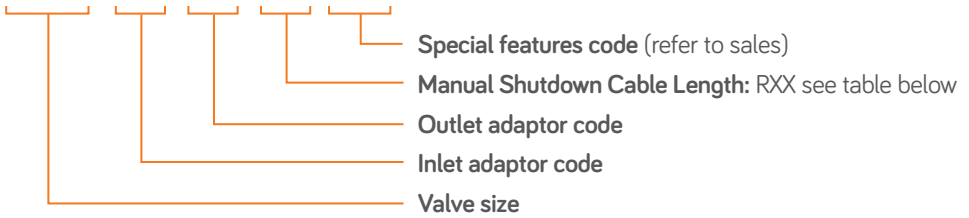
E90S Valve

E90S - XXX - XXX - SXXX



E90SM Valve

E90SM - XXX - XXX - RXX -SXXX



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

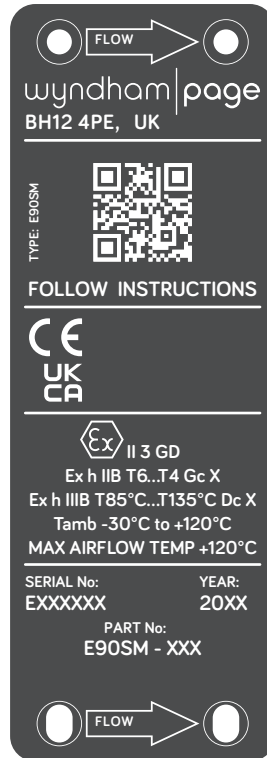
Valve Marking

Valves are marked using labels as shown below with following information

- Serial No
- Part Number
- Year of Manufacture
- CE Mark and ATEX NB technical file reference (E90S)
- UKCA Mark and UKCA NB technical file reference (E90S)
- Ex Equipment marking, protection type etc
- Ambient temperature limits
- Max Airflow temperature
- Airflow direction arrow
- Instruction Notice and handbook QR code link



Marking E90S



Marking E90SM

E90S & E90SM Valve Installation

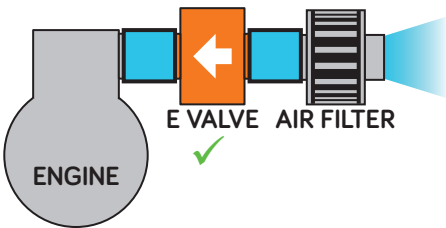
Subject to the comments below generally install the Wyndham Page E Series valve as close to the engine intake manifold as practical. The valve may be fitted in any attitude from vertical to horizontal. When planning and checking an installation always ensure that:

- a. Adjustment and locking of the setting screw is possible.
- b. A suitable run for the manual shutdown cable is accommodated (E90SM only).
- c. The direction of airflow is in compliance with the arrow marked on the body of the valve.
- d. An **Air Filter Element** must always be fitted in the engine air intake system **upstream** of the Valve.
- e. **Valve location in the Air Intake System** (refer to schematics below):

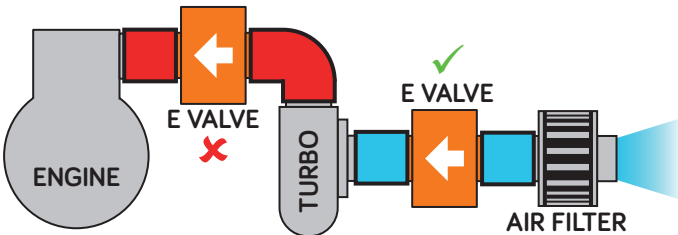
Yes ✓ No ✗ See Notes !

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

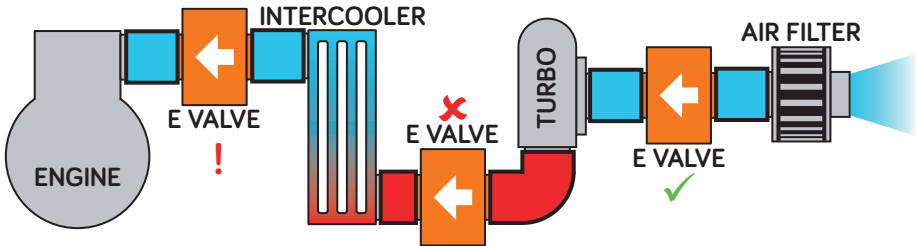
- **Normally Aspirated Engines (no turbocharger):** fit the valve between the engine and the air filter (see schematic below).



- **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. If this is not possible the valve may be fitted downstream of the intercooler **only** if the hose adaptor size for the valve is not too restrictive. (!) Note a reduced engine performance may result from this arrangement. If in doubt consult Wyndham Page for further assistance. **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.
- In the case of an engine with **Multiple Intake Systems** requiring the fitting of more than one Wyndham Page E valve, a suitable balance pipe must be installed between the intake system pipes downstream [engine side] of the valves to give simultaneous shutdown of the fitted valves. Typically such a balance pipe should be 30% to 40% of the intake pipe diameter.
- Any engine **Crankcase Breather** arrangement venting directly into the intake ports or into the air intake system downstream of the Wyndham Page E valve must be sealed and replaced by an external breather system connected to the intake system upstream of the E valve or [if permitted at the operating site] vented to atmosphere.

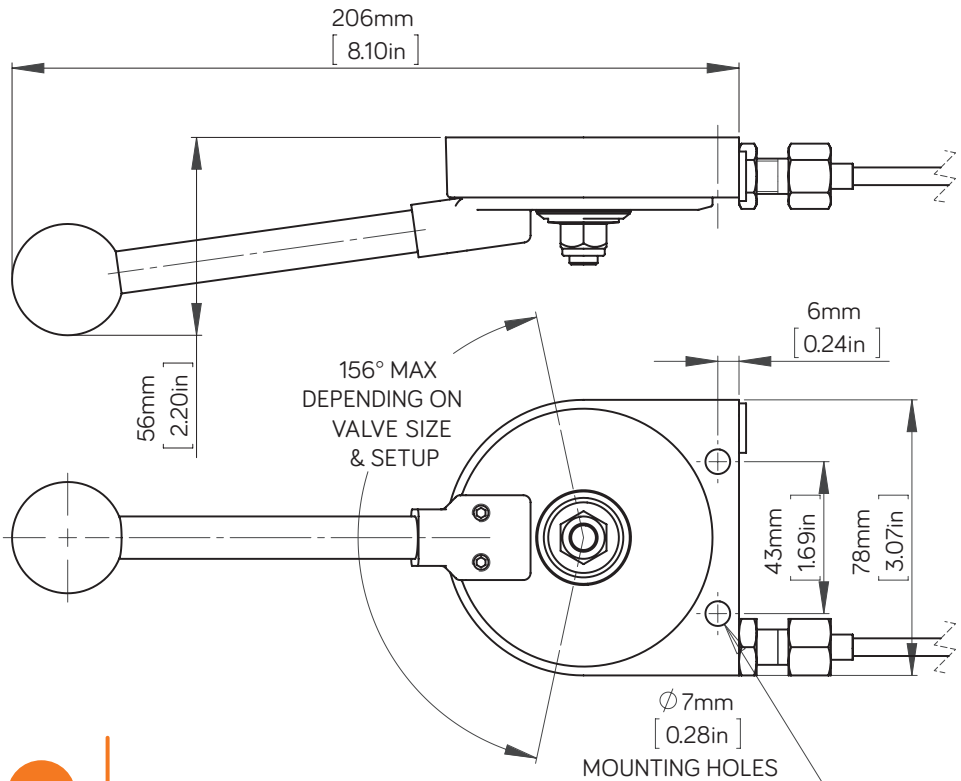
E90SM - Manual Emergency Stop Installation

The Wyndham Page E90SM valve is supplied complete with the manual shutdown lever and the selected length of cable fitted and adjusted. It is recommended that the lever and cable are not separated from the valve when installing.

Details of the lever are shown below. Always install the lever in a convenient position such that it can be easily accessed during an emergency situation. Two 7mm diameter holes are provided through the body for fixing.

Note. A significant force is required to operate the manual emergency stop when the engine is not running. To avoid premature wear and possible failure of the pull cable the manual emergency stop should only be operated when the engine is running. The force required to carry out a manual emergency stop reduces as the engine speed increases.

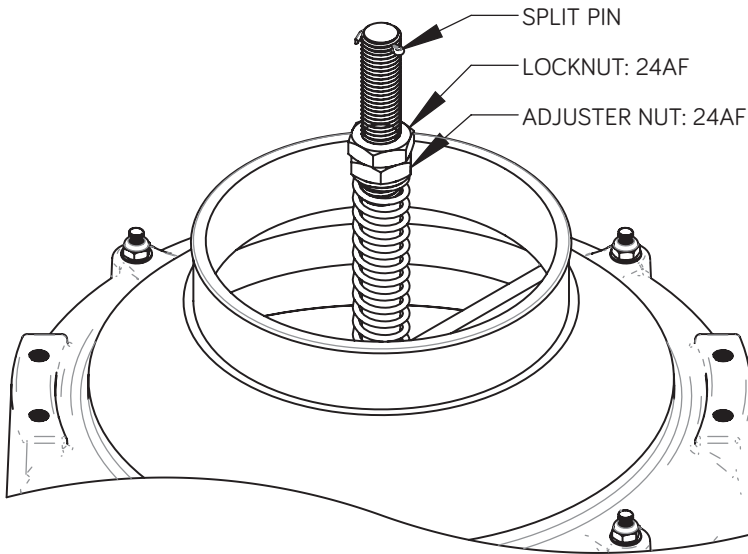
Important Note. Always retain the standard fuel stop provided with the engine. The E90SM valve manual stop should never be used as the normal way to stop an engine. It is intended for emergency operation only or when checking for correct functioning.



Valve Trip Speed Setting

The Wyndham Page E valve as supplied will normally be set to trip at a speed below that required. To adjust the trip speed use adjuster nut and associated locknut. See diagram and instructions below.

The E90S valve is supplied with 3 valve springs, S1, S2 & S3. The S2 spring is fitted as standard, for engines at the bottom of the power range it may be advantageous to fit the weaker S1 spring and for engines at the top of the power range the strongest S3 spring may be needed. The procedure for changing the spring follows this section.



Rotating the adjuster nut clockwise increases the trip speed. To set :

- [1]. Check the adjuster locknut is tight and that the intake system from air cleaner to intake manifold is fitted and secured and is leak free.
- [2]. Start engine. Slowly increase speed until a shutdown occurs.
[Note; if no shutdown occurs up the maximum available engine speed with maximum throttle, remove air hose connection from the inlet end of the Wyndham Page valve as necessary to gain access to the adjuster and locknut. Release the adjuster locknut and rotate the adjuster nut two turns anticlockwise. Tighten locknut, refit hose and recheck for shutdown].

- [3]. Following initial shutdown remove air hose at the inlet end of the shutdown valve as necessary to gain access to the adjuster and lock nut.
- [4]. Release locknut and rotate adjuster nut one turn clockwise.
- [5]. Tighten locknut, refit hose, start engine and slowly increase speed up to the maximum available.
- [6]. Repeat steps [3], [4] and [5] until the first time that no shutdown occurs up to the highest speed available. Then rotate the adjuster a further one half turn clockwise and tighten the locknut. With the intake system fully fitted and the engine fully warmed up slowly run up and down the engine speed range a number of times to check no further shutdown occurs. If a further shutdown occurs reset the adjuster one further half turn clockwise and check again until no shutdown occurs.

Notes:

In the case of turbocharged engines it is important that the final check above is carried out with the engine under load.

A more precise method to set the trip speed is achieved by monitoring and recording the engine speed during adjustment and by temporarily raising the engine high idle speed [if safe to do so] to enable the final trip setting speed to be measured. Once the trip speed is set, the high idle must be reset to its standard setting.

Changing Valve Spring

To change the valve spring

1. Remove the split pin and discard.
2. Release and remove the locknut along with the cable arm (E90SM only), adjuster nut, washer and spring.
3. Fit the new spring then replace the parts listed in step 2 in reverse order.
4. Fit a new split pin.

Maintenance

The following maintenance schedule should be undertaken. Subject to experience of local operating conditions the frequency of the maintenance requirements may need to be varied.

- MONTHLY:
- [1]. Check intake pipework between valve and engine to ensure all pipe fixings and any support brackets are properly fitted and secure and that the engine intake is leak free and shows no signs of significant damage.
 - [2]. Check the shutdown trip speed setting is correct by either:
 - [a]. Carrying out the trip speed adjustment as outlined herein or;
 - [b]. Temporarily raise the engine high idle and check trip speed using an engine tacho.
- 3 MONTHLY:
- [1]. Remove valve.
 - [2]. Clean valve as necessary using a soft brush/air line plus white spirit or similar if necessary taking all normal precautions. Dry valve.
 - [3]. Check that the valve moves smoothly over its complete operating stroke and that there are no signs of significant damage or excessive wear. Do not lubricate.
 - [4]. E90SM only: Check the manual stop cable for damage or wear. Check for freedom of operation.
 - [5]. Refit valve and complete “monthly “ checks as above.
- NOTES:
- [a]. Carry out the above maintenance whilst the engine is in a non-hazardous area.
 - [b]. Where applicable ensure that the high idle speed of the engine is reset to the correct value.
 - [c]. Any problems identified must be rectified before returning the equipment to a hazardous area.

Specification Table

ATEX CERTIFICATION		
The E90S and E90SM series of Wyndham Page automatic overspeed shutdown valves are certified and marked as follows:		
Valve model	E90S Valve	E90SM Valve
Notified Body Technical File Ref: ATEX	CML 24ATEX315	
Notified Body Technical File Ref: UKEX	CML 24UKEXT316	
Equipment Marking:	Ex II 2 GD	Ex II 3 GD
	Ex h IIB T6...T3 Gb X	Ex h IIB T6...T4 Gc X
	Ex h IIIB T85°C...T200°C Db X	Ex h IIIB T85°C...T135°C Dc X
	Tamb -30°C to +150°C	Tamb -30°C to +120°C
Process temperature:	MAX AIRFLOW TEMP +150°C	MAX AIRFLOW TEMP +120°C
Special conditions for safe use:	An air filter element shall be fitted in the engine air intake system upstream of the Valve.	
Standards used in compliance:	EN 60079-36: 2016, EN 60079-0: 2018	
GENERAL SPECIFICATION		
Ambient Temperature:	-30°C to +150°C	-30°C to +120°C
Intake Air Temperature:	-30°C to +150°C	-30°C to +120°C
Construction:	Body: Aluminium - powder coated	

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

www.wyndhampage.com