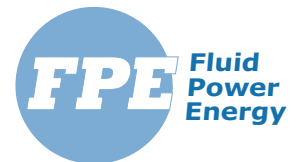


# CM Series

## Combined Manual and Automatic Engine Overspeed Shut Down Valves

*A range of easily installed diesel engine air intake valves that automatically close on engine overspeed, and also incorporate a manual shut down feature for additional safety.*



## Application

The Fluid Power Energy (FPE) CM Series combined manual and automatic overspeed air intake shut down valves are designed for situations where flammable gas or vapor may enter the atmosphere in an area in which a diesel engine is operating.

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

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

The FPE CM Series automatic engine air intake shut down 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 shut down speed has a greater scatter in the case of turbocharged engines than for naturally aspirated types. However, unless there is an individual requirement for an exact shut down speed, adequate protection from excessive engine overspeed is achieved.

## Principle of Operation

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

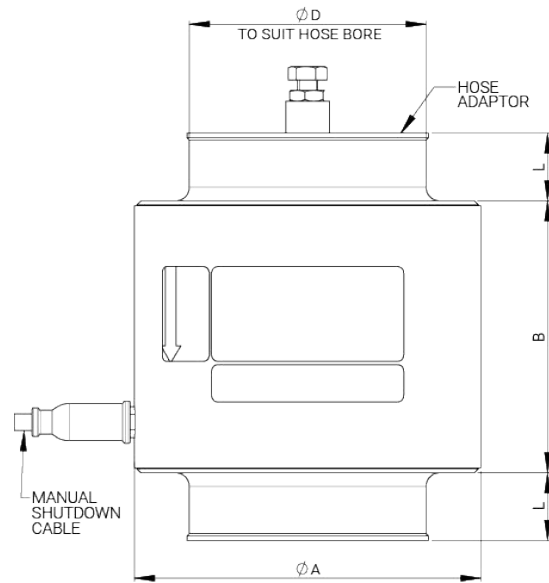
Once the actuation force exceeds the resisting force of the valve spring, the valve rapidly moves to the closed position. Once closed, the CM Series valve remains shut until the engine has entirely stopped. The valve then resets to the open position after a slight delay.

The FPE CM Series of automatic overspeed intake shut down valve kits include a manual actuator connected to the valve via a mechanical cable to enable emergency valve closure.

# Description

Below is an illustration of the typical CM series valve. Overall dimensions for the range of the valve are on page 5.

The valve is supplied complete with hose adapters (to slide into the engine air intake hose) as selected in consultation with the customer from a range typical for the rating of the engine to be protected. The standard stock lengths of cable may be selected. Alternative cable lengths may be available for specific applications.



# Imperial Dimensions

IMPERIAL TABLE	ENGINE POWER RANGE (HP)		DIMENSIONS (INCHES)											
	MIN	MAX	A	B	L (MAX)	MASS (LB)	STOCK HOSE ADAPTERS D (OTHER SIZES AVAILABLE ON REQUEST)							
CM018	4	24	2.60	2.36	0.79	1.0	1.4	1.5	1.8	1.8				
CM027	5	36	3.19	2.36	0.79	0.8	1.4	1.5	1.6	1.8	1.9	2.0		
CM045	10	60	4.04	2.99	0.79	1.3	1.8	1.9	2.0	2.3	2.4	2.4	2.5	2.8
CM078	40	105	4.78	3.17	0.79	1.5	2.0	2.4	2.5	2.8	3.0			
CM090	54	121*	5.12	3.46	0.98	2.0	2.8	3.0	3.3	3.5				
CM110	67	148*	5.67	3.78	0.98	2.6	2.8	3.0	3.3	3.5				
CM140	107	188*	6.22	4.06	0.98	3.3	3.5	3.9	4.0					
CM185	134	248*	6.89	4.29	0.98	4.2	3.5	4.0	4.5					
CM235	174	315*	8.15	4.92	0.98	6.8	4.0	4.8	5.0	5.5				
CM290	201	389*	9.13	5.31	1.18	8.4	6.0							
CM450	362	603*	11.93	8.3-6.2	1.2-1.6	18.7	6 TO 9 - TO ORDER							

Power values marked with an asterisk \* may be increased under certain restricted circumstances.

Contact FPE or your FPE supplier for details. Data subject to change.

# Metric Dimensions

METRIC TABLE	ENGINE POWER RANGE (KW)		DIMENSIONS (MM)											
MODEL	MIN	MAX	A	B	L (MAX)	MASS (LB)	STOCK HOSE ADAPTERS D (OTHER SIZES AVAILABLE ON REQUEST)							
CM018	3	18	66	65	20	0.26	25	35	38	45				
CM027	4	27	81	65	20	0.35	35	38	41	45	48	51		
CM045	7.5	45	102.5	80.5	20	0.57	45	48	51	58	60	62	64	70
CM078	30	78	121.5	83.5	20	0.7	51	60	64	70	77			
CM090	40	90*	130	90	20	0.9	70	77	83	89				
CM110	50	110*	144	101	25	1.2	70	77	83	89				
CM140	80	140*	158	109.5	25	1.5	89	98	102					
CM185	100	185*	175	114.5	25	1.9	89	102	114					
CM235	103	235*	207	131	25	3.1	102	121	127	140				
CM290	150	290*	232	141.5	30	3.8	153							
CM450	270	450*	303	210-158	30-40	8.5	152 TO 229 - TO ORDER							

Power values marked with an asterisk \* may be increased under certain restricted circumstances.

Contact FPE or your FPE supplier for details. Data subject to change.

# Valve Selection

The following data is required for FPE to select the most suitable valve for your application:

- 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
- The cable length for the manual shut down

FPE Coding											
CM Series											
CM	XXX	-	XXX	-	OXXX	-	T or L	-	XX	-	SXXX
CM Series	Max. Engine Power (KW)		Inlet Adapter Size (MM)		Outlet Adapter Size (MM) (Only use if different from inlet)		Manual Close Handle Style (T = T-Handle; L = Lever)		Manual Shut Down Cable Length (Meters)		Special Features Code

Use metric value for adapter code, add zero to make 3 digit code (e.g. 25 = 025)

Combine inlet and outlet adapter, if the same

Special features by arrangement with FPE

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

# General Usage & Instruction

## Valve Installation

Fluid Power Energy (FPE) valves are supplied complete with the manual shut down pull handle and the selected length of shut down cable fitted and adjusted. It is not recommended to separate the pull handle and cable from the valve during installation.

Subject to the comments below, install the CM Series valve as close to the engine intake manifold as possible. Always ensure the following during installation:

- A).** Adjustment and locking of the setting screw is possible
- B).** A suitable run for the manual shut down cable is accommodated

## Turbocharged Engines

Turbocharged engines fit the CM Series valve upstream (air cleaner side) of the turbocharger. If an intercooler (charge cooler) is also fitted, site the valve downstream of the intercooler or, if this is not possible, upstream of the turbocharger. Never fit the valve between the turbocharger and the intercooler.

## Flame Traps

In cases where an intake flame trap is also fitted, the CM Series valve must be installed upstream of the flame trap.

## Fitting

When fitting always ensure the direction of air flow complies with the arrow marked on the body of the CM Series valve. The valve may be fitted in any orientation from vertical to horizontal.

The hose into which the valve is fitted should be adequate to fully support the valve while not permitting excessive vibration of the valve. For the heavier valves in the CM series range, a support bracket for the valve may be necessary.

Generally, ensure that there is sufficient flexibility in the finalized 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.

# General Usage & Instruction, continued

## Crankcase Breathers

Any engine crankcase breather arrangement, venting directly into the intake ports or the air intake system downstream of the valve must be sealed and replaced by an external breather system. This connection needs to be to the intake system upstream of the CM Series valve or vented into the atmosphere (if permitted at the operating site).

## Manual Close Handles

For valve types CM018 to CM110, a pull "T" handle is supplied for manual emergency valve closure. Valve types CM140 to CM450 have a lever operated manual shut down actuator (shown on page 11). Always install the manual shut down actuator in a convenient position such that it can be easily accessed during an emergency.

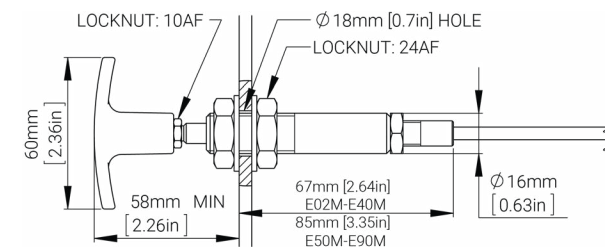
The "T" handle type can be located in a suitable bulkhead or mounting bracket by providing an 18mm diameter hole. To fit the pull handle assembly release the handle locknut and remove the handle. Remove the body locknut and washer at the handle end and push the handle body through the 18mm hole. Refit body washer and locknut adjusting both body locknuts as required. Refit handle locknut and handle and tighten.

In the case of the lever type actuator supplied with the larger valve types, two 7mm diameter holes are provided through the body for fixing.

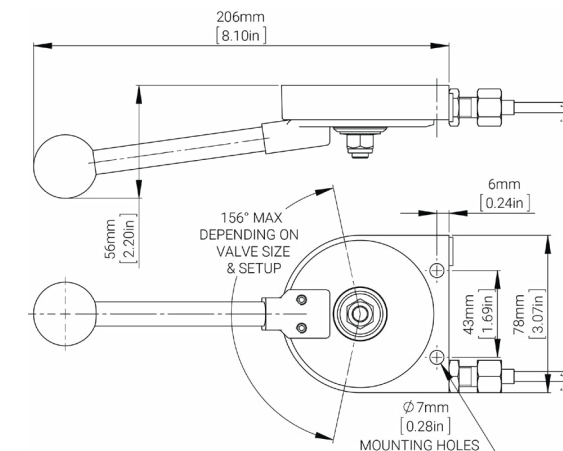
The larger sizes of the CM series for both types of manual actuator require a significant force to operate when the engine is not running. Once the engine is running the force required to carry out a manual emergency stop is reduced significantly.

### Important Note:

Always retain the standard fuel stop provided with the engine. The CM valve should never be used as the primary way to stop an engine. It is intended for emergency operation only or when checking it is correctly functioning.



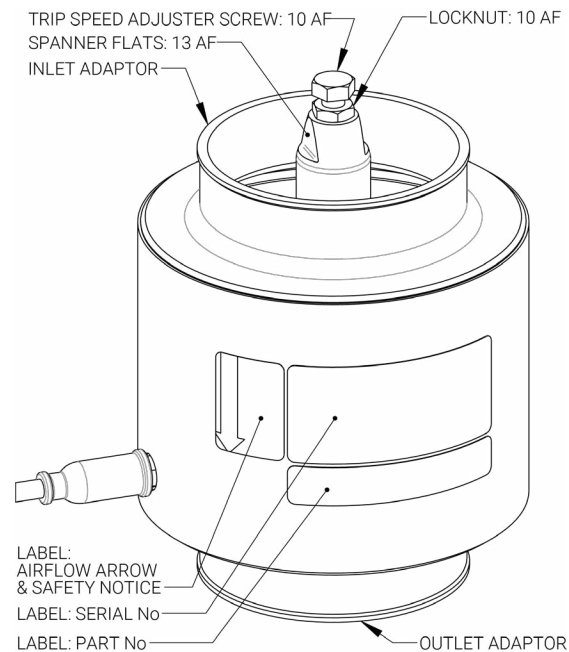
T HANDLE AS STANDARD



LEVER OPTION FOR VALVES E50M TO E90M

# Adjusting the Valve Trip Speed Setting

The FPE CM valve as supplied will normally be set to trip at a speed below that required. To adjust the trip speed use the trip adjuster screw and associated lock nut, see diagram below and instructions on the following page.



## Rotating the adjuster screw clockwise increases the trip speed, to set:

1. Make sure the adjuster screw locknut is tight and that the intake system from the air cleaner to the intake manifold is fitted, secured, and leak free.
2. Start engine, slowly increase speed until shut down occurs. (**Note:** If no shut down occurs, up the maximum available engine speed with the maximum throttle. Remove air hose connection from the inlet end of the CM series valve to gain access to the setting screw and lock nut. Release setting screw lock nut and rotate the setting screw two turns, count clockwise. Tighten locknut, refit hose and recheck for a shut down.)
3. Following the shut down, remove air hose at the inlet end of the valve to gain access to the setting screw and locknut.
4. Release setting screw locknut and rotate the setting screw one turn clockwise.
5. Tighten locknut, refit hose, start the engine and slowly increase speed up to the maximum available.
6. Repeat steps 3, 4, and 5, until the first time that no shut down occurs up to the highest speed available. Then adjust the setting screw a further half turn clockwise and tighten the lock nut. With the intake system fully fitted and the engine fully warmed up, slowly run up and down the engine speed range numerous times to make sure that no further shut down occurs. If a further shut down does occur, reset the adjuster screw another half turn clockwise and check again until no shut down occurs.

**Note:** In the case of a turbocharged engine, it is essential 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 adjustment and by temporarily raising the engines high idle speed (if safe to do so). Raising the high idle speed allows the final trip setting speed to be measured. Once the trip speed is set, the high idle must be reset to its standard setting.

# Maintenance

Follow the maintenance schedule below. Subject to the unique operating condition of your CM Series valve workload, 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 correctly fitted and secure. Make sure that the engine intake is leak free and shows no signs of significant damage.
2. Check the shut down trip speed setting is correct by either:
  - a). Carrying out the trip speed adjustment as outlined herein, under “Adjusting the Valve Trip Speed Setting.”
  - b). Temporarily raise the engine high idle and check trip speed using an engine tachometer.

## Quarterly:

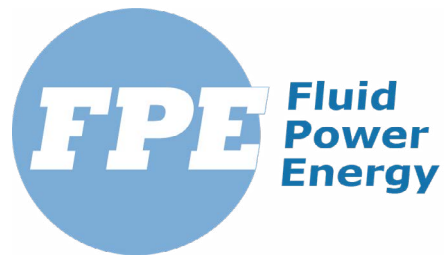
1. Remove the valve.
2. Clean the valve as necessary using a soft brush or compressed air, plus white spirit or similar, take all standard precautions.
3. Allow valve to dry thoroughly.
4. Check that the valve moves smoothly over its complete operating stroke. Also, check there are no signs of significant damage or excessive wear - do not lubricate.
5. Refit valve and complete “Monthly” check, as previously mentioned.

## Notes:

- A). Carry out the above maintenance while the engine is in a non-hazardous area or state of operation.
- B). Ensure that the high idle speed of the engine is reset to the correct value, if applicable.
- C). Any problems identified must be rectified before returning the equipment to a hazardous area.







In 1975 Fluid Power Energy (FPE) was established as a family business by Richard Bayerlein and his son Doug. FPE is the world's largest manufacturer of industrial thermostatic control valves (TCV) and serves customers on all continents, with plants and offices around the globe.

FPE continues to relentlessly pursue the same corporate values its founders established over 40 years ago:

- Customer Service,
- Highest Quality at the Best Price
- Fastest Lead Times
- Innovation: product & process

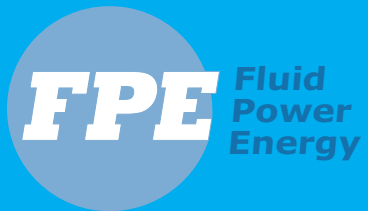
FPE continually collaborates, this allows our company to become an integrated engineering and manufacturing extension for many of our customers thereby allowing them to focus on their core mission. FPE can hold inventory, private labels and develop customized thermostatic temperature control valves solutions for maximum performance, cost reduction, and packaging integration.



In 1980, the Bayerlein's founded Filtration Systems, Inc. (FSI), as a sister company to FPE, to manufacture a wide range of industrial filtration solutions. Recognized as one of the world's leading industrial filter manufacturers, FSI builds and delivers standard, non-standard and competitor filters at any quantity for global distribution.

FSI is recognized for having created and patented "Swirl Flow" technology which combines high flow rates and exceptional dirt holding capacity in a depth-type filtration cartridge.

As with all the Bayerlein family of companies, FSI continues to relentlessly pursue the protection of engines and equipment worldwide - as a customer first company built upon family values, we hope you will join us in that pursuit.



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