



## AUTOMATIC ENGINE OVERSPEED SHUTDOWN VALVE SPINDLE TYPE

Procurement, Implementation, Calibration and Preservation

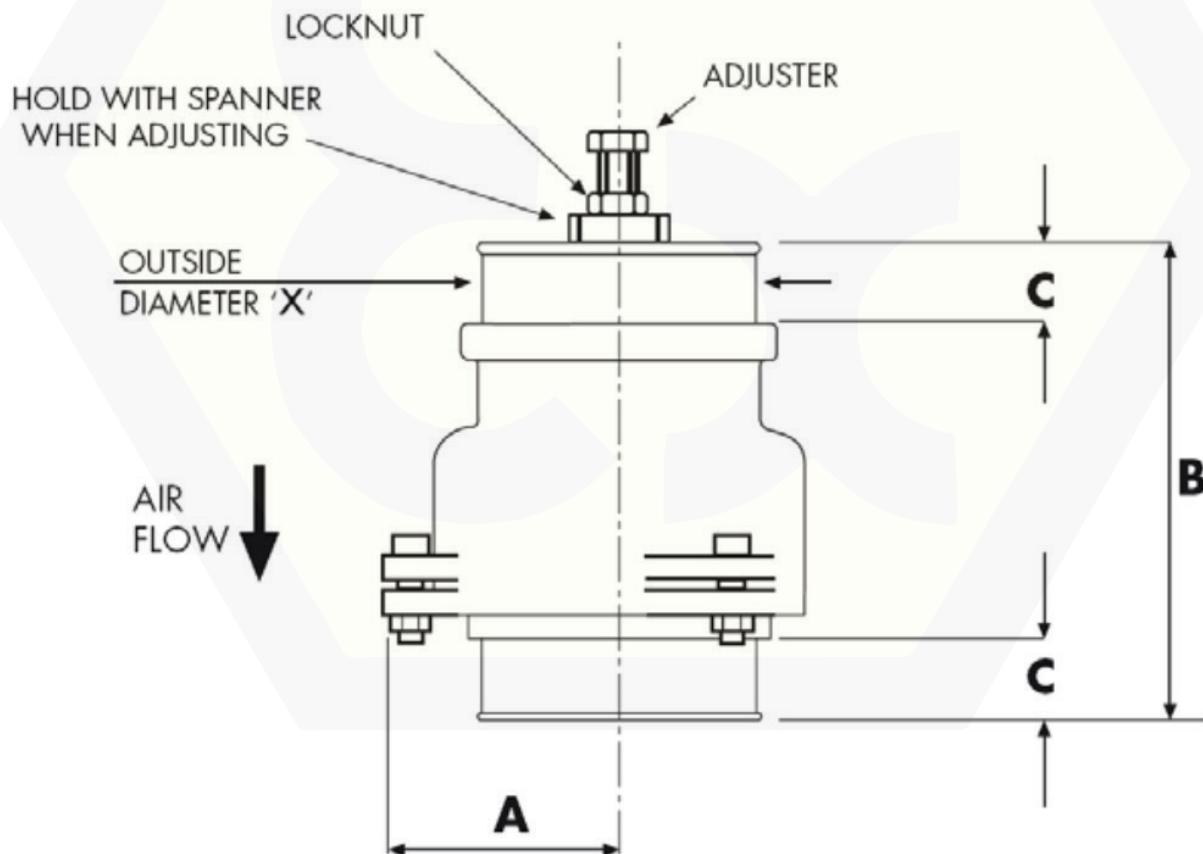


## DESCRIPTION

Our range of spring-loaded poppet valves are specifically engineered to automatically halt engine operation by closing the air intake when excessive over speeding is detected. These valves are customizable to fit nearly all popular engine ratings and air intake pipe sizes.

The closing mechanism of these valves relies on the intake airflow. As the airflow increases, it generates a closing force on the valve. This force is counteracted by an adjustable valve spring. When the airflow reaches a certain threshold, it overcomes the spring resistance, causing the valve to shut. Once the valve has closed, it remains in this position until the engine comes to a complete stop.

These valves are suitable for both naturally aspirated and turbocharged engines. However, it should be noted that in turbocharged engines, the actual shutdown speed may vary slightly more compared to naturally aspirated engines. Nevertheless, the valves still ensure adequate protection against over speeding and potential damage, except in cases where an exact repeatable shutdown speed is necessary. The specific dimensions for this valve family are detailed in the table below.





Valve Model	A mm	B mm	C mm	Weight Kg
ENX BT 75 38	75mm	143mm	21mm	1.4 kg
ENX BT 90 45	37.5mm	107mm	25mm	0.45 kg
ENX BT 100 51	58mm	154mm	19mm	0.65 kg
ENX BT 125 63	63mm	117mm	19mm	0.7 kg
ENX BT 150 76	77mm	125mm	19mm	1.2 kg
ENX BT 175 89	77mm	125mm	25mm	1.2 kg
ENX BT 200 102	78mm	139mm	25mm	1.45 kg
ENX BT 250 127	118mm	199mm	25mm	3.5 kg
ENX BT 300 252	118mm	199mm	25mm	4.65 kg

## PROCUREMENT

To determine the appropriate valve for your engine, first identify the engine's rating and whether it is turbocharged. Find the below table provided to find suitable valves based on this information.

Valve Model	Engine Power at Rated Speed Hp		Engine Air Intake X (Inches)
	Naturally Aspirated	Turbo Charged	
ENX BT 75 38	7 to 13	7 to 13	1.5
ENX BT 90 45	8 to 53	7 to 50	1.75
ENX BT 100 51	20 to 97	20 to 90	2
ENX BT 125 63	60 to 161	60 to 150	2.5
ENX BT 150 76	67 to 240	67 to 220	3
ENX BT 175 89	85 to 255	80 to 245	3.5
ENX BT 200 102	100 to 335	100 to 300	4
ENX BT 250 127	150 to 525	150 to 500	5
ENX BT 300 252	150 to 525	150 to 500	6

Engine power is determined through mathematical calculations in standard application

Air Velocity may vary by intake configuration

Valves should be sized as close to the middle of the range as possible.



## IMPLEMENTATION

### **Safety Warning:**

Here are some safety guidelines to follow:

- Handle with care during unpacking to avoid injury.
- Exhaust gases can cause severe respiratory issues, suffocation, or death; therefore, all exhaust systems must vent outside of enclosed spaces.
- Always allow a hot engine to cool adequately before beginning any maintenance.
- Ensure the engine cannot start accidentally before starting work.
- Position the BT Valve in a safe, easily accessible location to prevent injuries from moving parts or contact with hot surfaces during valve adjustment.
- Design and construct machinery parts where workers stand or move to set the valve to prevent slipping, tripping, or falling.
- Conduct a thorough risk assessment before starting work to eliminate or minimize hazards such as exhaust fumes, moving parts, noise, and hot surfaces.

### **Guidelines:**

1. The Betbolt valve is designed to be installed as close to the engine air intake manifold as possible. If an engine air intake flame trap is also installed, the Betbolt valve must always be positioned upstream (air cleaner side) of the flame trap. For turbocharged engines, consider the following:

- a) If there isn't enough space between the turbocharger and engine, the valve may be installed upstream of the turbocharger.
- b) If the turbocharger air outlet temperature exceeds 150°C, fit the valve downstream of the intercooler or upstream of the turbocharger.

2. If multiple Betbolt valves are fitted to an engine with multiple intake pipes, install a balance pipe arrangement to connect the intake pipes downstream (engine side) of the shutdown valves. Typically, balance pipe diameters should be approximately 30% of the diameter of the intake pipe.

3. When fitting the valves, ensure that the direction of airflow complies with the direction indicated on the body.

4. Use reinforced flexible cuffs at the inlet and outlet of the valve to provide adequate support and prevent excessive vibration. Consider additional support brackets mounted from the engine if necessary.

5. Pay special attention to the integrity of the intake pipework between the Betbolt valve and intake manifold. Preferably, use metal pipework and minimize any gaps (considering relative movement) closed by reinforced hoses. Avoid the possibility of hose collapse upon closure of the shutdown valve.

6. Seal any engine crankcase breather connections into the intake system between the Betbolt valve and engine. Replace any internal crankcase breather arrangement venting directly into the engine intake ports with an external breather system. This system should vent either to the atmosphere or to the intake system upstream of the shutdown valve. External breather system kits for various engine types are available.

### **Notes:**

- *There are no special handling requirements for the BT Valve.*
- *Before starting work, thoroughly read and understand the installation instructions.*
- *Installation of the BT Valve should be performed only by competent personnel.*
- *Ensure to wear suitable Personal Protective Equipment (PPE), including safety footwear, safety glasses, thermal and oil-resistant gloves and earplugs.*



## CALIBRATION

### Safety warning:

When calibrating the Betbolt valve, ensure precautions are taken to avoid contact with hot surfaces or entanglement with adjacent equipment.

Once the Betbolt valve is installed, adjusting the overspeed trip setting is done using the adjuster and locknut (refer to diagram). Rotating the adjuster clockwise increases the engine speed at which automatic shutdown occurs. Initially, the valve is set to shut down well below the engine's high idle speed. To adjust the shutdown speed to the desired setting, follow these steps:

1. Start the engine and gradually increase the speed. Note the speed at which shutdown occurs.
2. Disconnect the hose at the air inlet to expose the adjuster and locknut (see diagram).
3. Loosen the locknut and turn the adjuster clockwise by one turn. Tighten the locknut.
4. Reconnect the inlet hose to the Betbolt valve.
5. Start the engine again and gradually increase the speed. Note the shutdown speed.
6. Repeat steps 2 to 5 until you find the setting where the engine no longer shuts down at high idle speed (maximum throttle, no load).
7. Depending on your needs:
  - a) Use the shutdown speed versus adjuster setting results as a calibration check and make a final adjustment to achieve the desired setting (typically 10% to 15% above high idle).
  - b) For less precise requirements, turn the adjuster clockwise by one additional turn to ensure shutdown occurs above high idl speed by a suitable margin.
8. During this adjustment process, you may find the engine occasionally shuts down during normal operation. If so, adjust the adjuster clockwise by an additional half turn.
9. Ensure the adjuster locknut is fully tightened and consider using thread lock adhesive on the locknut threads.

### Notes:

- *If a manual shut down cable assembly is fitted, ensure that excessive effort is not required to operate the manual override.*
- *Turbo charged Engines. When setting up a valve on a turbo charged engine using the preceding method, it may be found that at high power outputs, the engine will shut down at a lower speed than required. If this occurs, further small adjustments in steps of one halfturn clockwise should be made until the problem is eliminated.*
- *Jammed Valve. If in the course of adjusting the valve it jams on its seat, release by turning CLOCKWISE viewed from adjuster end of valve.*



## PRESERVATION

### **Safety warning:**

When cleaning the Betbolt valve externally, ensure the engine has cooled adequately before beginning work. If cleaning a hot valve, exercise caution to avoid contact with hot surfaces and prevent entanglement with nearby equipment. Be mindful not to trap fingers when adjusting the valve setting. During disassembly, handle equipment containing springs with care to safely release spring forces. When cleaning internal components with chemical agents, avoid skin contact, inhalation, and ingestion of cleaning agents and removed dirt/debris. Wear appropriate Personal Protective Equipment (PPE) for safety.

### **Three Monthly**

1. Disconnect the intake pipework and remove any support brackets or other attachments to facilitate valve removal.
2. Internally inspect the Betbolt valve for cleanliness. If needed, clean using paraffin or white spirit, following standard safety precautions. Ensure the valve is thoroughly dried.
3. Verify there is no excessive wear and confirm smooth movement of the valve throughout its full operating range. Do not apply lubrication.
4. Reinstall the valve and verify its setting based on the adjustment instructions provided here.

### **Quality**

EnvisionX, the manufacturer of BETBOLT engine shut down valve, is committed to delivering products of the highest quality. Each engine shut down valve comes with a one year guarantee, reflecting the company's confidence in the product's reliability and durability. EnvisionX is a quality assessed company, certified to ISO 9001:2015 standards. This certification underscores the company's dedication to maintaining robust quality management systems, ensuring that all products meet stringent quality requirements. The ISO 9001: 2015 certification involves regular audits and assessments to verify that the company's processes consistently produce high quality. This commitment to quality assurance provides customers with confidence in the reliability and performance of BETBOLT engine shut down valve.

### **Notes:**

*Here are the guidelines for handling the Betbolt valve:*

- *The Betbolt valve does not have any special handling requirements.*
- *Before starting maintenance, thoroughly read and understand the maintenance instructions.*
- *Maintenance of the Betbolt valve should only be conducted by competent personnel.*
- *Wear suitable Personal Protective Equipment (PPE) including safety footwear, safety glasses, thermal and oil- resistant gloves, and earplugs.*
- *The frequency of routine maintenance every three months depends on the operating conditions of the equipment and may need adjustment based on experience.*
- *For any maintenance issues not addressed in the routine schedule, consult your Betbolt valve distributor before initiating any repair work.*

*Betbolt valve are tested for certification to ensure they met high standard. All the documents are as per standard ENIEC 60079-0:2018, EN ISO 80079-36:2016, EN ISO 80079-37:2016. The certification is granted by an Atex Body having notified body number 2336, SCA Belgelendirme Ve Özel Eğitim Hizmetleri Ltd. Şti.*