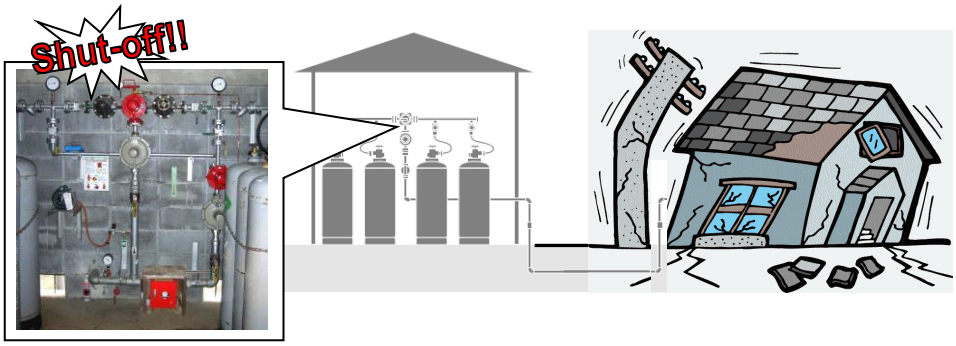
The Earthquake-actuated Shut-off System

Events such as massive earthquakes can cause gas pipes and tanks to break and the leaking gas can cause fires and explosions. The sensor and the shut-off valve are installed with the LP-gas cylinders to prevent this from happening.



This system is activated by a spring and pressure of the supplied gas, and it does **not depend on electrical energy at all**. **Therefore**….

- **Easy Operation**
- **Easy installation**
- **Easy maintenance**
- **Reasonable Price**

This system is installed throughout Japan, where our market share is more than 90%.[Note]

Note Japanese laws require the Community Gas Utility Business which supplies LPG to 70 or more houses to install an earthquake-actuated shut-off system. (Approx. 7,700 installation sites exist)

The Earthquake-actuated Shut-off System comprises the sensor and the shut-off valve.

The Sensor

Model C2 Series	Model CP Series
C2-250B *for 250 gal* **C2-400B** *for 400 gal* Application **ITO Shut off valve** **EQ, EQT, EQH**	**CP-250B** *for 250 gal* **CP-400B** *for 400 gal* Application **Compressed Air-actuated type** **Emergency Shut off valve**

Specifications of the Sensors

Model	C2-400B	C2-250B	CP-400B	CP-250B*1
Quake Detection Method	Double Sensor Detection: Steel Ball Dropping Type + Magnet & Heavy Bob Dropping Type			
Acceleration Setting	320～400gal	200～250gal	320～400gal	200～250gal
Inlet Pressure Range	0.025～0.20MPa (0.25～2.0bar)		0.10～0.35MPa (1.0～3.5bar)	
Control Gas type	Propane, Butane, Mixture of the two gases, or City gas		Compressed Air or Nitrogen	
Air-tightness Test	0.30MPa (3.0bar)		Inlet Side	0.50MPa (5.0bar)
			Outlet Side	0.15MPa (1.5bar)
Hydrostatic Test	0.80MPa (8.0bar)		Inlet Side	0.80MPa (8.0bar)
			Outlet Side	0.30MPa (3.0bar)
Display for Activation	By Incorporated Pressure Gauge			
	Normal Situation 0.025～0.20MPa (0.25～2.0bar)		Normal Situation 0.08～0.12MPa (0.8～1.2bar)	
	Shutoff Situation 0MPa			
Reset Method	Manual Operation by the Reset Lever			
Installation Method	Ground Line Installation			
Connection	Copper Pipe (φ8 Outer Diameter)			
Dimensions	W 299 x D 130 x H 352(mm)		W 490 x D 130 x H 380(mm)	

*1: This is the custom-built product.

Worry it's accuracy?

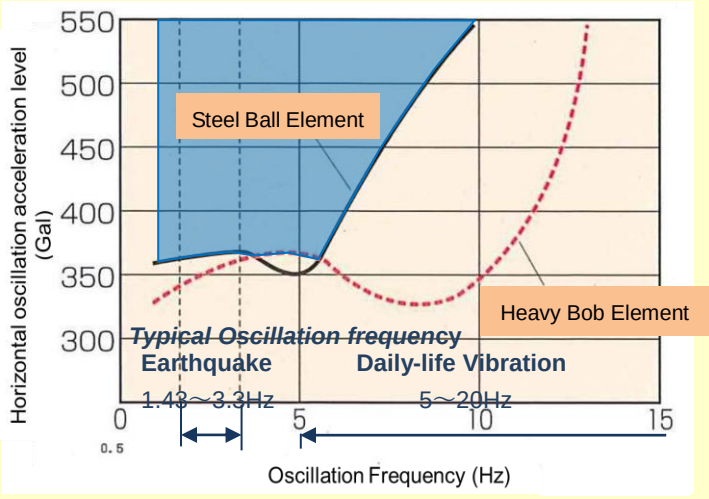
Don't worry!

The combination of the simple elements with different operational characteristics provides the sensor with operational stability.

In order to prevent the device from shutting down the gas supply in response to daily-life vibration (5-20Hz) [Note1], two different elements are installed to motivate the sensor.
That is, the device works to shut down the gas only when both of the two elements (Steel ball element & Heavy bob element) fall down to activate the sensor, which will happen in response to seismic vibration, but will not be the case for daily-life vibration.
On the other hand, in response to daily-life vibration (5-20Hz), the sensor is not easily activated to shut down the gas because "Heavy bob element" will fall down, but "Steel bob element" will not fall.

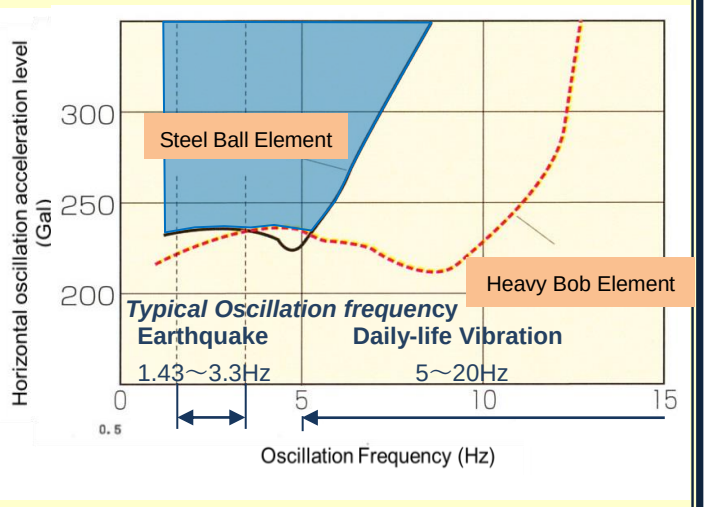
< Operational characteristics of the two elements >
1. "Steel Ball Element" doesn't fall down easily by vibration of high oscillation frequency.
2. "Heavy Bob Element" falls down by wider range of vibration of oscillation frequency including daily-life vibration and seismic vibration (3-10Hz) .

[Note1] Daily-life Vibration: We define "Daily-life vibration" as vibration of oscillation frequency 5-20 Hz, which is higher than that of seismic vibration [Note2]. Among Daily-life vibration are those from far away construction site and heavy truck passing nearby.
[Note2] Seismic Vibration: generated by earthquakes. Its main oscillation frequency is mostly lower than 5Hz. (1.43-3.3Hz)



Operational Ranges of both Elements

For C2-400B



Operational Ranges of both Elements

For C2-250B

- If any vibrations whose oscillation, acceleration and frequency are in the range of the upper area of these curves occur, each element falls separately.
- If the vibrations whose properties are in the range of blue-shaded area occur, both of the elements fall.

The Shut-off Valve

EQ Series	EQT Series	EQH Series
From 0.025 MPa to 0.20 MPa (From 0.25 bar to 2.0 bar)	*From 0.025 MPa to 0.20 MPa (From 0.25 bar to 2.0 bar)*	*From 0.07 MPa to 1.56 MPa (From 0.7 bar to 15.6 bar)*
		
For LPG Installed between a 1st stage regulator & 2nd stage regulator. **For City Gas Natural Gas** Installed on an intermediate or a middle pressure supply line.	**For LPG** Installed between a 1st stage regulators of a separated automatic changeover & a 2nd stage regulator. **For City Gas Natural Gas** Not-Applied	**For LPG** Installed at the inlet of a single-stage regulator. **For City Gas Natural Gas** Installed on a middle pressure supply line.

※The shut-off valve with transmitting function is also available as an option. (EQ・EQT Series)

Specifications of the Shut-off Valve

Model		Inlet Pressure Range (MPa)	Flow Rate		Connection		Spacing (WxH mm)
			Propane(kg/h)	Air(m3/h)	Inlet	Outlet	
EQ Series	EQ-15	0.025～0.20	30	18	Rc1/2	Rc1/2	94
	EQ-20		70	43	JIS20K20A flange	JIS20K20A flange	120
	EQ-25		100	62	JIS20K25A flange	JIS20K25A flange	130
	EQ-40		300	187	JIS20K40A flange	JIS20K40A flange	180
	EQ-50		500	313	JIS10K50A flange	JIS10K50A flange	220
	EQ-80*1		800	501	JIS10K80A flange	JIS10K80A flange	320
	EQ-100*1		1000	626	JIS10K100A flange	JIS10K100 flange	360
EQT Series (T-joint)	EQT-20	0.025～0.20	70	43	JIS10K20A flangex2	JIS10K25A flange	150x120
	EQT-25		100	62	JIS10K25A flangex2	JIS10K25A flange	180x150
	EQT-40		300	187	JIS10K40A flangex2	JIS10K40A flange	180x150
	EQT-50		500	313	JIS10K50A flangex2	JIS10K50A flange	200x150
EQH Series	EQH-20	0.07～1.56 (operating pressure: 0.025～0.20)*2	70	43	JIS20K20A flange	JIS20K20A flange	120
	EQH-25		100	62	JIS20K25A flange	JIS20K25A flange	130
	EQH-40		300	187	JIS20K40A flange	JIS20K40A flange	180

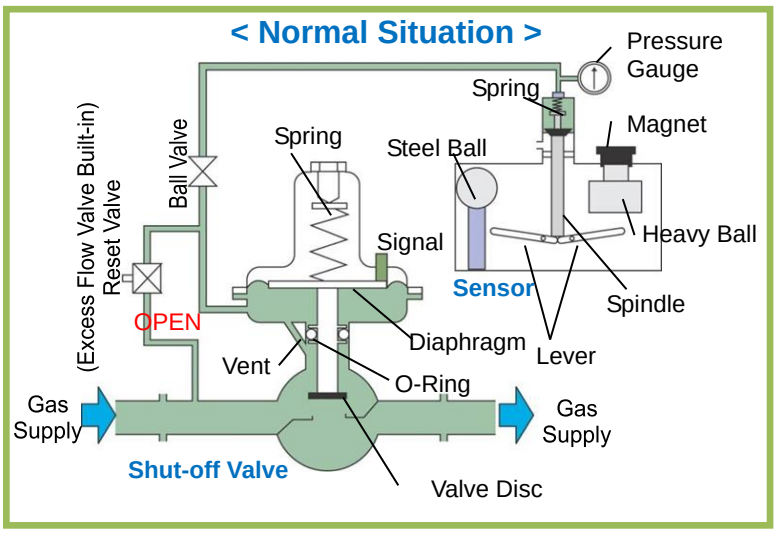
*1: This is the custom-built product.

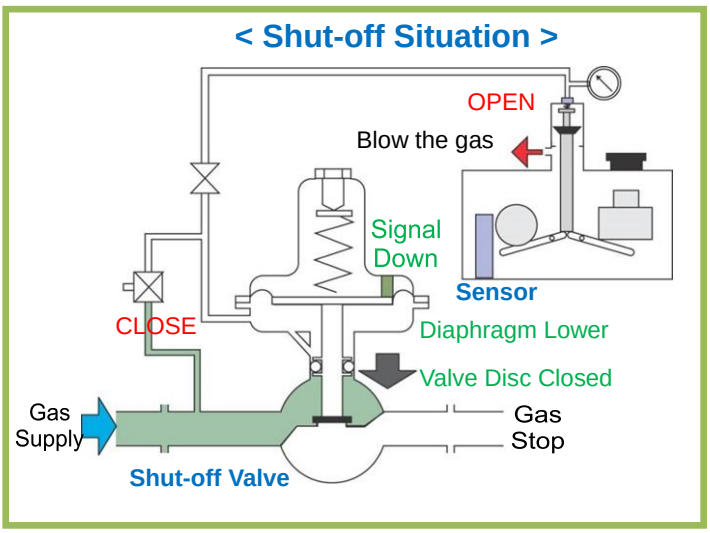
*2: A valve to reduce pressure by operational valve is additionally needed for using EQH.

Mechanism of Shut-Off

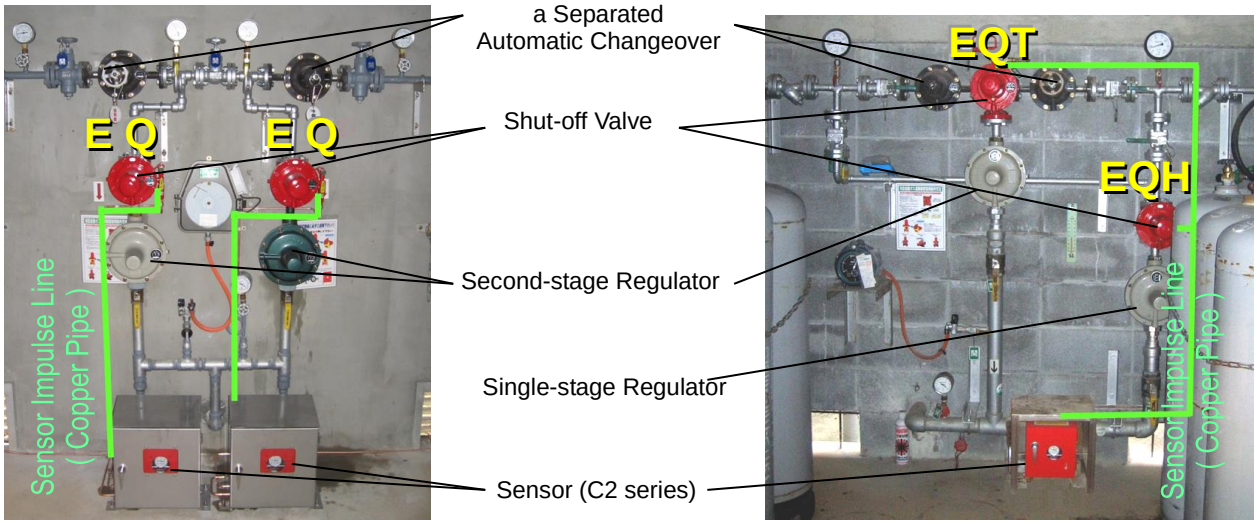
The system first detects when an earthquake is actually taking place. Then the sensor sends a pressure signal that shuts off the gas supply. The sensor consists of a steel ball and the heavy bob held up by a powerful magnet.

When an earthquake occurs, the gas supply is shut off when the steel ball and the heavy bob fall.
As a result, a spindle pushes up to open the valve disc of the blow valve and release the filler gas.





Example of Installation



Double Low Pressure Line Method

Bypass Method

ITO Europe Limited

9 Field View Offices, UBF Industrial Park

Bicester Road, Westcott, HP18 0JX

United Kingdom Tel: +44(0)1296655655

E-Mail: sales@ito-europe.com

Web: http://www.ito-europe.com

ITO f SYSTEM Corporation

8-6 Shinmachi Higashiosaka-city, Osaka 579-8037 JAPAN
TEL:+81-72-983-7017
FAX:+81-72-983-7018
E-mail: itofsys@itokoki.co.jp
Web: http://www.itokoki.co.jp/english/