Diaphragm Operated 2-Way Gas Valve
Model 2180E

Typical applications

- Gas shut off valve
- Gas engine fuel shut off valve
- Gas turbine fuel shut off valve
- Air starting valve

Model 2180ES
Cast steel

Key benefits

- Easy low cost installation
- Replaceable rubber valve seats
- Valve factory set, no adjustments required
- Simple, low cost maintenance

Key features

- Compact design
- Open-Closed position indicators
- Large capacity double seated valve
- Large vent

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Diaphragm Operated 2-Way Gas Valve - Model 2180E

Contents

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Overview

AMOT Model 2180 valves will shut off the fuel gas and vent the manifold when used on an internal combustion engine. Normal application of this model is for shutting down a gas engine in the event of a dangerous condition such as high jacket water temperature, low lubrication oil pressure, excessive vibration, high gas discharge temperature etc.

The valves are used in combination with a complete AMOT control system using AMOT sensors for monitoring the condition of the engine.

Operation

When pressure is applied to the diaphragm, the vent port closes and the main ports open to admit fuel gas to the engine. When the diaphragm pressure is released, a spring closes the main ports and the large vent port vents the engine intake manifold causing quick shutdown. Because of it's capability for high pressure, this valve can also be used as a starting air valve for engines.

Steel versions of the Model 2180E valves are equipped with a valve position indicator located under the diaphragm housing which indicates, in an extended position, that the valve is open.

Ductile iron versions of the Model 2180E valves may be fitted with a valve position indicator located on top of the diaphragm housing which, in an extended position, shows that the valve is closed.

Installation

- The valve may be mounted in any position. Check the flange alignment to assure sufficient flange face contact without distortion of the valve flanges or body.
- The air or gas supply to the diaphragm actuator should be clean and dry.
- Connecting piping should be cleaned to remove excess thread sealant, chips, or other foreign matter which might be trapped in the diaphragm chamber and cause failure of the diaphragm.
- The vent valve should be piped or situated in such a manner that the sudden exhaust upon valve closing will not affect personnel.
- Specific to the **Ductile iron version:**
  - Make sure to use full face gaskets and flat face mating flanges. Also, when the 5564X position indicator assembly ㊼ is ordered it is shipped loose with the valve.
  - Install with quality thread sealant and tighten until bubble tight.
  - With no pressure on the valve diaphragm the rod will be extended as far as it will go to show "valve closed".
  - Mark the indicator rod with a hacksaw cut about 1/16" deep right next to the top of the indicator body.
  - Next, pressurize the diaphragm to 40-50 psi and cut off the rod flush with the top of the indicator body to show full open.

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Valve Characteristics

Flow coefficient

Flow coefficient (calculated)		
Size	**Kv**	**Cv**
2″	74	85
3″	95	110

Kv = 0.865 Cv

Cv = 1.156 Kv

Cv is the imperial coefficient. It is defined as the flow rate in Cubic Feet per Hour (ft^3/hr) of air at a temperature of 60º Fahrenheit with a pressure drop across the valve of 1 psi. The basic formula to find a valve's Cv is shown below:

$$Cv = \frac{Q}{1360}\sqrt{\frac{SG(°F+460)}{P_{up}\ DP}}$$

$$Q = 1360\ Cv\sqrt{\frac{P_{up}\ DP}{SG(°F+460)}}$$

$$DP = \left[\frac{Q}{1360\ Cv}\right]^2\left[\frac{SG(°F+460)}{P_{up}}\right]$$

Q = Flow in ft^3/hr

DP = Pressure drop (psi)

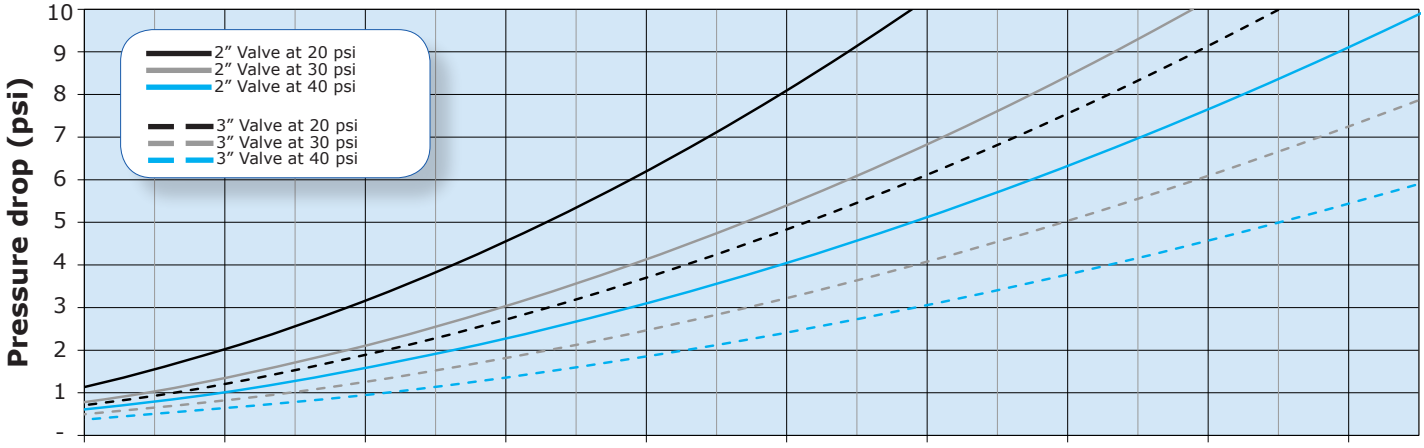
P_{up} = Valve supply pressure (psi)

SG = Specific gravity of gas (Air = 1.0)

Cv = Valve flow coefficient (English units)

°F = Temperature in °F

Pressure drop



Size	Valve inlet pressure								
2″	**20 psi**	40,000	50,000	60,000	70,000	80,000	90,000	100,000	110,000	120,000
	30 psi	48,990	61,237	73,485	85,732	97,980	110,227	122,474	134,722	146,969
	40 psi	56,569	70,711	84,853	98,995	113,137	127,279	141,421	155,563	169,706
3″	**20 psi**	51,765	64,706	77,647	90,588	103,529	116,471	129,412	142,353	155,294
	30 psi	63,399	79,248	95,098	110,947	126,797	142,647	158,496	174,346	190,196
	40 psi	73,206	91,508	109,810	128,111	146,413	164,714	183,016	201,317	219,619

Flow rate (ft^3/hr) - Natural Gas at 60°F and 0.65 Specific Gravity

1 ft^3/hr = 1.7 m^3/hr

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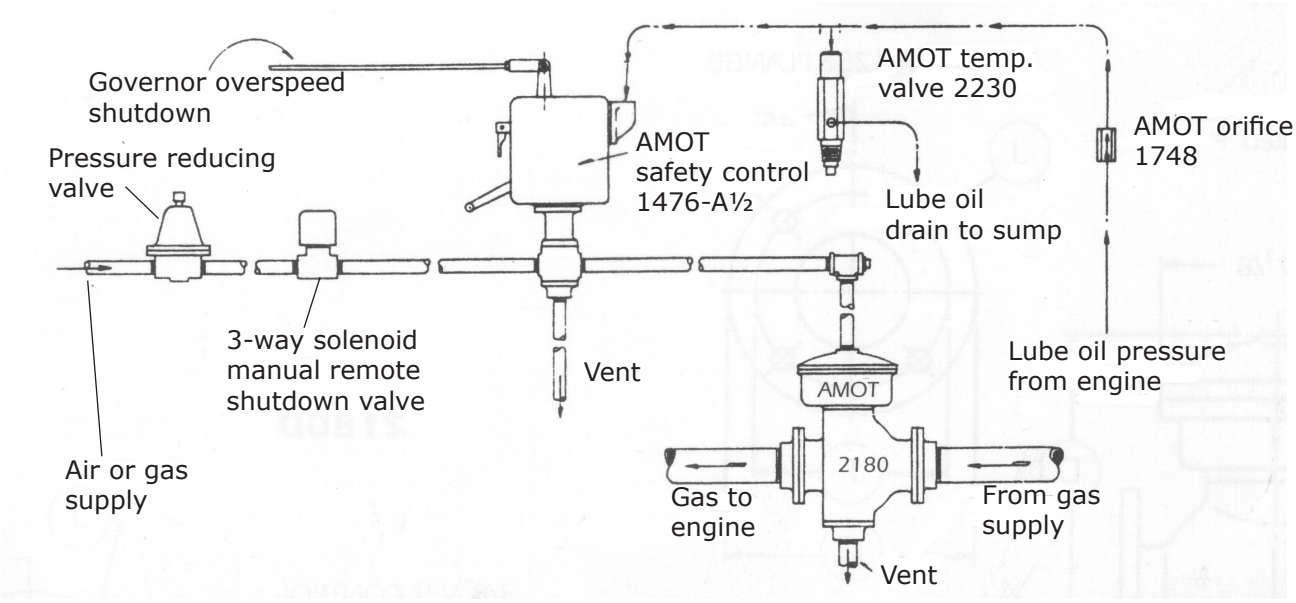
Valve Characteristics Continued

Typical piping



This system will shut down the engine by closing off the gas supply in the event of high water jacket temperature or low oil pressure. Other sensors may be added for overspeed, bearing temperature, compressor interstage pressure, exhaust temperature, crankcase pressure, water pump differential pressure, vibration, and a variety of other parameters.

How to Order

Use the table below to select the unique specification of your Model 2180E Diaphragm Operated 2-Way Gas Valve.

Example	2180E	S	3	1	B	-AA	**Code description**	**Comments**
							Basic model (A)	
Basic model (A)	2180E							
							Valve material (B)	
Valve material (B)		D					Ductile iron	
		S					Cast steel	
							Body size and pressure rating (C)	
Body size and pressure rating (C)			1				2” - 125 psi	Ductile iron ONLY
			2				2” - 150 psi	
			3				2” - 300 psi	
			4				3” - 125 psi	Ductile iron ONLY
			5				3” - 150 psi	
			6				3” - 300 psi	
							Thread and finish (D)	
Thread and finish (D)				1			NPT Standard	
				3			BSP (TR) Standard	
							Seal material (E)	
Seal material (E)					A		Buna N/Nitrile	
					B		Viton	
							Customer special requirements (F)	
Customer special requirements (F)						-AA	Standard	May be omitted

Diaphragm Operated 2-Way Gas Valve - Model 2180E

Specification

2180ED

		Metric units	English units
Valve body	Ductile iron		
Diaphragm housing	Cast aluminum		
Valve seats	Buna N/Nitrile, Viton		
Standard diaphragm, dynamic seals and vent seal	Buna N/Nitrile, Viton		
Valve working pressure rating		862 kPa	125 psi
Minimum diaphragm pressure for full stroke		138 kPa	20 psi
Maximum continuous diaphragm pressure		552 kPa	80 psi
Flow coefficient	2″ Valve	Kv = 74	Cv = 85
	3″ Valve	Kv = 95	Cv = 110
Net weight	2″ Valve	20 kg	45 lbs
	3″ Valve	27 kg	60 lbs

2180ES

		Metric units	English units
Valve body	Cast steel		
Diaphragm housing	Pressed steel		
Valve seats	Buna N/Nitrile, Viton		
Standard diaphragm, dynamic seals and vent seal	Buna N/Nitrile, Viton		
Valve working pressure rating	150 psi Valve	1033 kPa	150 psi
	300 psi Valve	2067 kPa	300 psi
Minimum diaphragm pressure for full stroke	150 psi Valve	138 kPa	20 psi
	300 psi Valve	276 kPa	40 psi
Maximum continuous diaphragm pressure		552 kPa	80 psi
Flow coefficient	2″ Valve	Kv = 74	Cv = 85
	3″ Valve	Kv = 95	Cv = 110
Net weight	2″ Valve	20 kg	45 lbs
	3″ Valve	27 kg	60 lbs

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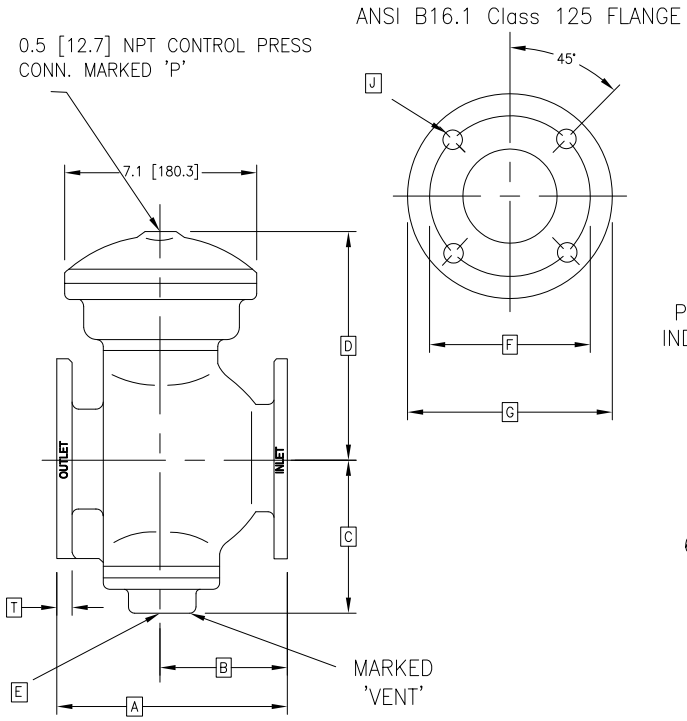
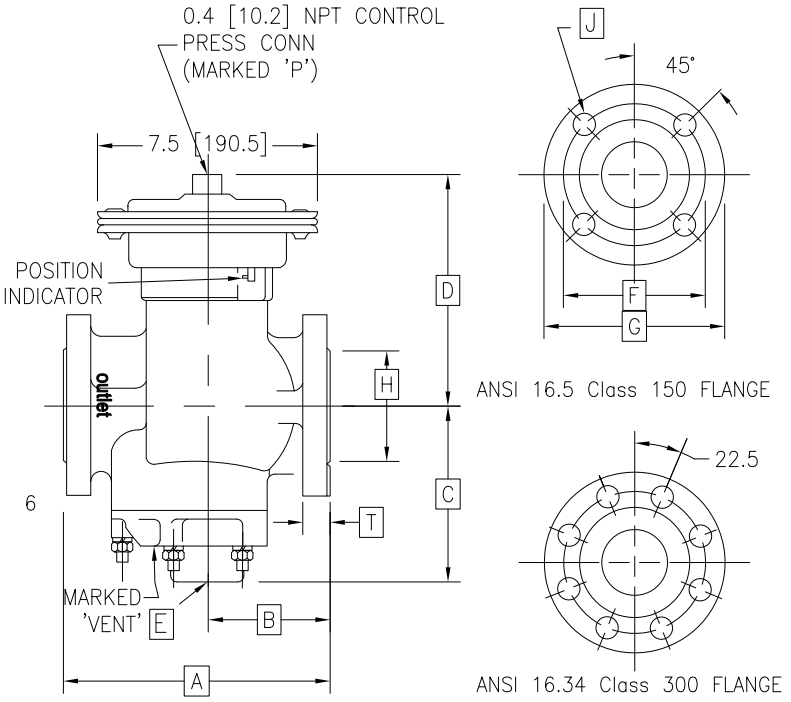
Dimensions

Dimensions - inches (mm)

2180ED



2180ES



Valve model	2180ED				2180ES							
Valve size	2″		3″		2″		2″		3″		3″	
ANSI flange	125 psi		125 psi		150 psi		300 psi		150 psi		300 psi	
Connection	mm	inches	mm	inches	mm	inches	mm	inches	mm	inches	mm	inches
Face to face (A)	194	7 5⁄8″	219	8 5⁄8″	225	8 7⁄8″	225	8 7⁄8″	273	10 3⁄4″	273	10 3⁄4″
CL to inlet (B)	98	3 7⁄8″	117	4 5⁄8″	105	4 1⁄8″	105	4 1⁄8″	127	5″	127	5″
Depth (C)	159	6 1⁄4″	194	7 5⁄8″	152	6″	152	6″	187	7 3⁄8″	187	7 3⁄8″
Height (D)	200	7 7⁄8″	213	8 3⁄8″	191	7 1⁄2″	191	7 1⁄2″	203	8″	203	8″
Vent size (E)	1 NPT		1 1⁄2 NPT		1 NPT		1 NPT		1 1⁄2 NPT		1 1⁄2 NPT	
Bolt circle (F)	121	4 3⁄4″	152	6″	121	4 3⁄4″	127	5″	153	6″	168	6 5⁄8″
Flange diameter (G)	152	6″	191	7 1⁄2″	153	6″	165	6 1⁄2″	191	7 1⁄2″	210	8 1⁄4″
Face diameter (H)	-	-	-	-	92	3 5⁄8″	92	3 5⁄8″	127	5″	127	5″
Diameter of holes (J)	19	3⁄4″	19	3⁄4″	19	3⁄4″	19	3⁄4″	19	3⁄4″	22	7⁄8″
Number of holes	4		4		4		8		4		8	
Minimum thickness (T)	16	5⁄8″	19	3⁄4″	22	7⁄8″	22	7⁄8″	28.5	1 1⁄8″	28.5	1 1⁄8″

Maintenance and Service Parts

Over time, exposure to foreign chemicals, particulate matter and prolonged operation at extreme conditions may reduce the effectiveness of the valve. At such time, AMOT 2-Way Gas Valves can be restored to original performance by installing an AMOT 2-way gas valve service kit. Service kits include all new seals, diaphragm and gaskets required for normal maintenance.

AMOT recommends that all seats, seals and seal components be checked every 12 months for leakage and hardness, and replaced if necessary.

AMOT designs and tests all its products to ensure that high quality standards are met. For good product life, carefully follow the installation and maintenance instructions; failure to do so could result in damage to the equipment being protected or controlled.

How to order service kits

Service kits are available with seals and gaskets required to service the valve. Order service kits using the service kit model number, which is identified by the material code, body size and rating, and seal material code found in the AMOT valve part number.

Refer to the AMOT valve part number that is printed on the valve nameplate and the AMOT valve part number structure in the how to order section on page 5.

Service kit model number structure

1) Identify the material code located in the Valve material (B) section of the AMOT valve part number.

2) Identify the body size and rating located in the Body size and pressure rating (C) section of the AMOT valve part number.

3) Identify the seal material code located in the Seal material (E) section of the AMOT valve part number.

4) Use those three codes in the table below to identify the proper service kit required to service the valve.

Service kit identification					
	Material code (B)	**Body size and rating (C)[1]**		**Seal material (E)[2]**	**Service kit model number**
2180E	D	1		A	9146X001
		4			9146X002
		1		B	9146X003
		4			9146X004
	S	2,3		A	9172X001
		5,6			9172X002
		2,3		B	9172X003
		5,6			9172X004
Examples					
Valve part number					**Service kit model number**
2180E	D	4	1	A	9146X002
2180E	S	3	1	B	9172X003

NOTES:

[1] If your body size and rating code does not correspond with the given values, please contact the facility to confirm your body size and rating code.

[2] If your seal material code does not correspond with the given values, please contact the facility to confirm your seal material code.

Maintenance and Service Parts Continued

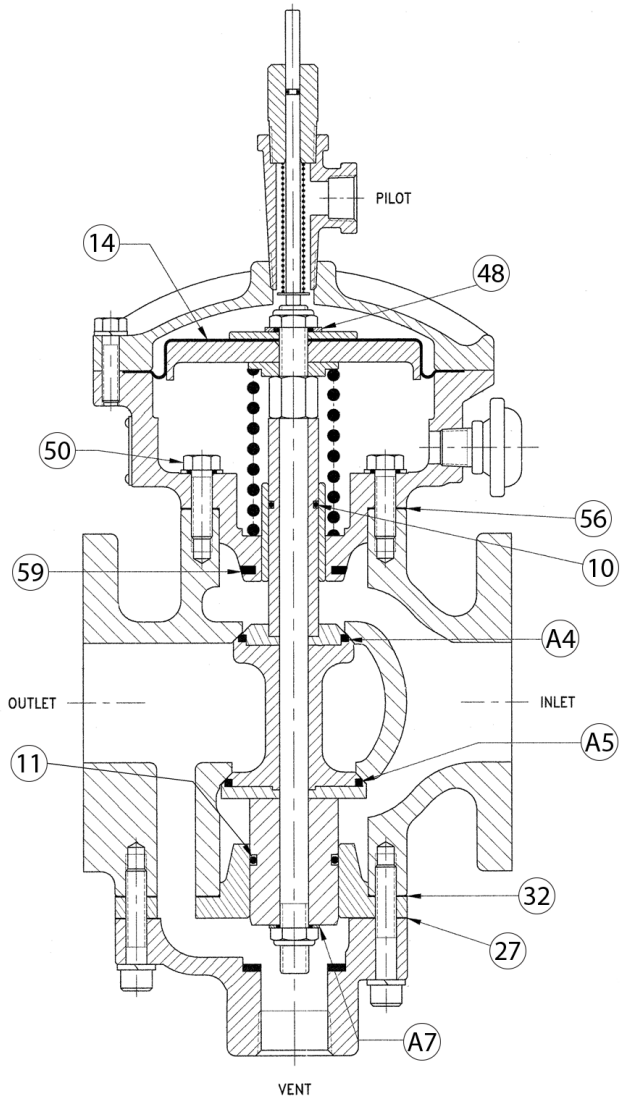
Service parts

Service kit parts							
Ref no.	Qty.[3] 9146X(---)	Qty.[3] 9172X(---)	Description	Ref no.	Qty.[3] 9146X(---)	Qty.[3] 9172X(---)	Description
10	1	1	Stem seal	50	4	-	Seal washer
11	1	1	Vent valve seal	56	1	-	Upper bearing gasket
14	1	1	Diaphragm	59	1	-	Bearing Seal
27	1	1	Vent housing gasket	A4	1	1	Upper spool seal
32	1	-	Lower bearing gasket	A5	1	1	Lower spool seal
37	-	1	Bearing seal	A7	1	1	Seal washer
39	-	1	Bushing seal	A9	-	1	Seal
48	1	-	Seal washer				

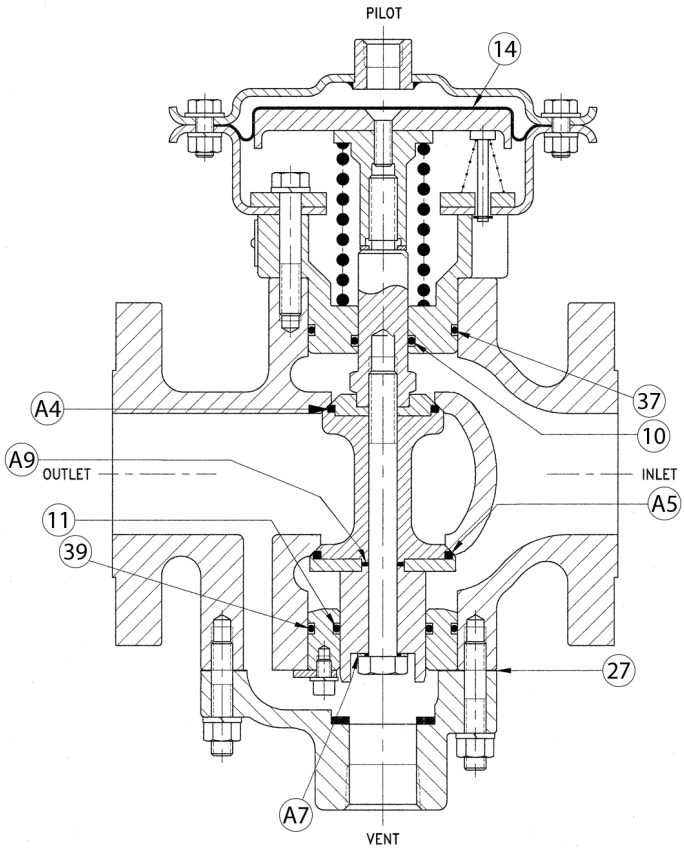
NOTES:

[3] Some service kits may contain extra parts. Please discard of any extra parts.

Model 2180ED



Model 2180ES



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⚠ WARNING
This product can expose you to chemicals including Lead, which is known to the state of California to cause cancer and birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.

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