

November 2017

119 Series Fuel Gas Valve



TYPE 119



TYPE 119EZ

Figure 1. 119 Series Fuel Gas Valve

Introduction

The 119 Series fuel gas valve (Figure 1) is used for on-off or throttling control of non-corrosive or mildly corrosive flow media. It is designed to meet low-pressure application requirements in many varied industries.

Features

- **Easy Installation**—Compact, lightweight construction permits easy handling and installation.
- **Easy Leak Detection**—Vent hole between body and actuator stem seals allows detection of body or actuator seal leakage.
- **Easily Adjusted Spring**—The 119 Series spring is adjusted by rotating the adjusting screw on the top of the spring case.
- **Easy Maintenance**—The fuel gas valve can be completely disassembled without removing the valve body from the line.
- **Low Leakage**—The composition disk assembly provides positive shutoff, minimizing seat leakage when downstream demand is zero.
- **Sour Gas Service Capability**—Optional materials are available for applications handling sour gases. These constructions comply with the recommendations of NACE International MR0175-2002 and NACE MR0175/ISO 15156.
- **Variable Opening Speed**—The Types 119EZ and 119EVS come with a variable restrictor that allows for tuning of valve opening speed.

119 Series

Specifications

The Specifications table lists the specifications for the 119 Series fuel gas valve. Some of the specifications of the given valve that originally comes from the factory, are stamped on the nameplate located on the spring case flange.

Available Configuration

Type 119: Direct-operated valve used for on-off or throttling control of noncorrosive or mildly corrosive liquids and gases

Type 119EZ: Direct-operated valve with adjustable opening speed for reliable startup operation on gas burner systems

Type 119EVS: Type 119EZ equipped with solenoid for valve to be operated by local control system

Body Sizes and End Connection Styles

Type 119:

BODY SIZE, NPT	BODY MATERIAL
3/4	Cast Iron, WCC steel
1	
1-1/4	

Types 119EZ and 119EVS:

BODY SIZE, NPT	BODY MATERIAL
1	CF8M Stainless steel, Cast Iron

Spring Ranges

See Table 1

Orifice Size and Flow Coefficients

See Table 2

Maximum Inlet Pressure⁽¹⁾

150 psig / 10.3 bar

Maximum Control Pressure to Diaphragm

150 psig / 10.3 bar

Maximum Pressure Drop⁽¹⁾

150 psig / 10.3 bar for all port diameters

115 psig / 7.9 bar for Type 119EVS with

ASCO™ 8320 Series solenoid

Pressure Setting Adjustment

May be adjusted throughout each spring range by rotating the adjusting screw

Type 119EVS Solenoid Specifications

Electric Train: Refer to ASCO™ 8320 Series General Service Solenoid Valve Catalog (Document Number: 8320R2)

Low Power/Solar: Refer to ASCO™ Low Power Solutions Catalog (Document Number: V7704)

Valve Plug Travel

3/16 in. / 4.8 mm

Actuator Control Line Connection

1/4 FNPT

Spring Case and Bonnet Vents

1/4 FNPT

Flow Direction

Up through the orifice

Material Temperature Capabilities⁽¹⁾⁽²⁾

Type 119:

MATERIAL	TEMPERATURE RANGE
Nitrile (NBR)	-20 to 180°F / -29 to 82°C
Fluorocarbon (FKM) ⁽³⁾	0 to 250°F / -18 to 121°C

Types 119EZ and 119EVS:

MATERIAL	TEMPERATURE RANGE
Nitrile (NBR) ⁽⁴⁾	-40 to 180°F / -40 to 82°C
Fluorocarbon (FKM) ⁽³⁾	0 to 250°F / -18 to 121°C

Type 119EVS Solenoid Temperature Capabilities⁽¹⁾

ASCO™ 8320 Series Solenoid:

32 to 125°F / 0 to 52°C

ASCO™ 8314 Series Solenoid:

-13 to 131°F / -25 to 55°C

Construction Materials

Standard Construction

Valve Body: Cast iron, WCC steel or Stainless steel

Spring Case: Aluminum

Bonnet: Aluminum

Disk Holder Assembly: Aluminum and Nitrile (NBR)

(standard), Stainless steel and Nitrile (NBR) or Stainless steel and Fluorocarbon (FKM)

Orifice: Aluminum **(standard)** or Stainless steel

Diaphragm: Nitrile (NBR) or Fluorocarbon (FKM)

O-rings: Nitrile (NBR) **(standard)** or Fluorocarbon (FKM)

Stem Wiper: Polytetrafluoroethylene (PTFE)

Adjusting Screw: Steel

Spring: Steel

NACE Construction

Body: Steel or Stainless steel

Disk Holder Assembly: Aluminum or Fluorocarbon (FKM)

Diaphragm and Stem Assembly: Aluminum or Fluorocarbon (FKM)

O-rings and Internal Retaining Rings: Fluorocarbon (FKM)

Approximate Weight

6 lbs / 3 kg

1. The pressure/temperature limits in this Bulletin, ASCO™ solenoid documentation and any applicable standard or code limitation should not be exceeded.

2. Pressure and/or the body end connection may decrease these maximum temperatures.

3. Not for use with hot water or Ammonia (NH₃).

4. Minimum temperature for Cast Iron body is -20°F / -29°C.

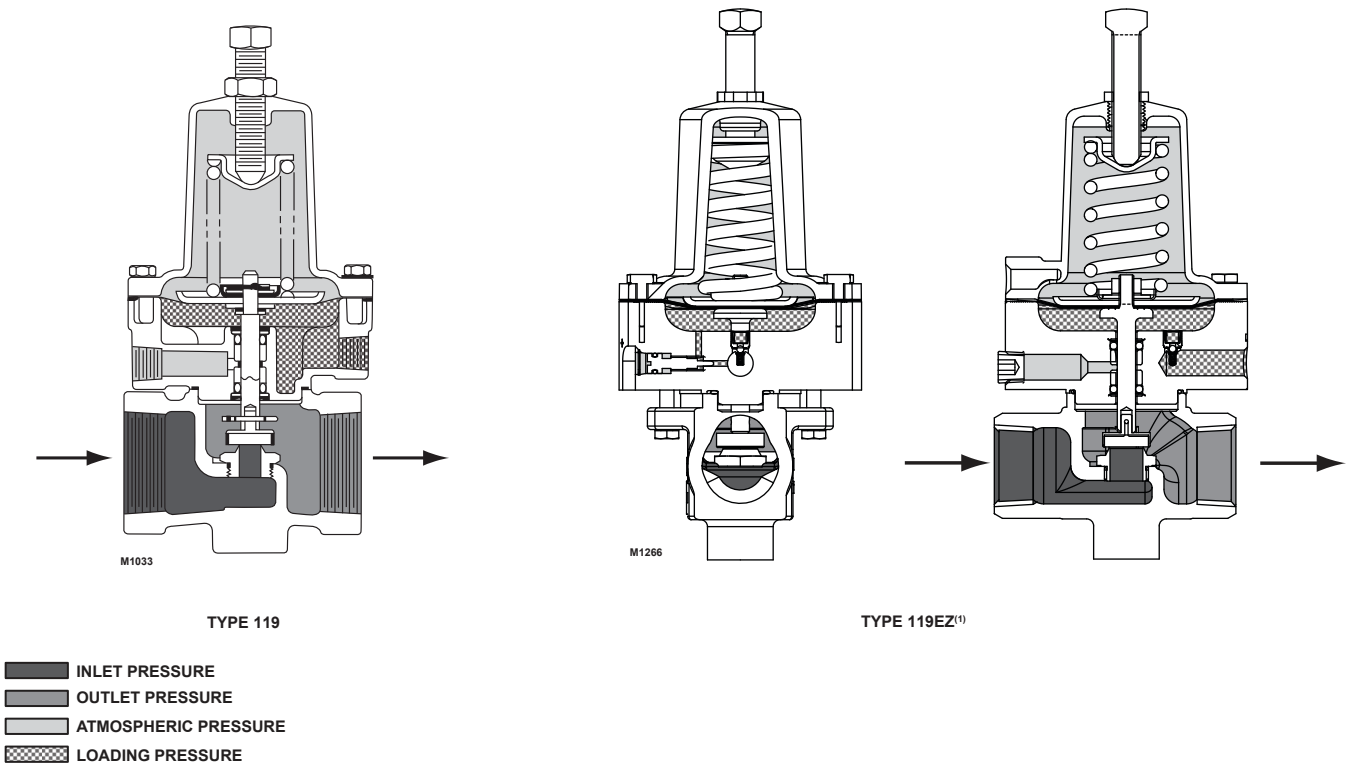


Figure 2. 119 Series Operational Schematics

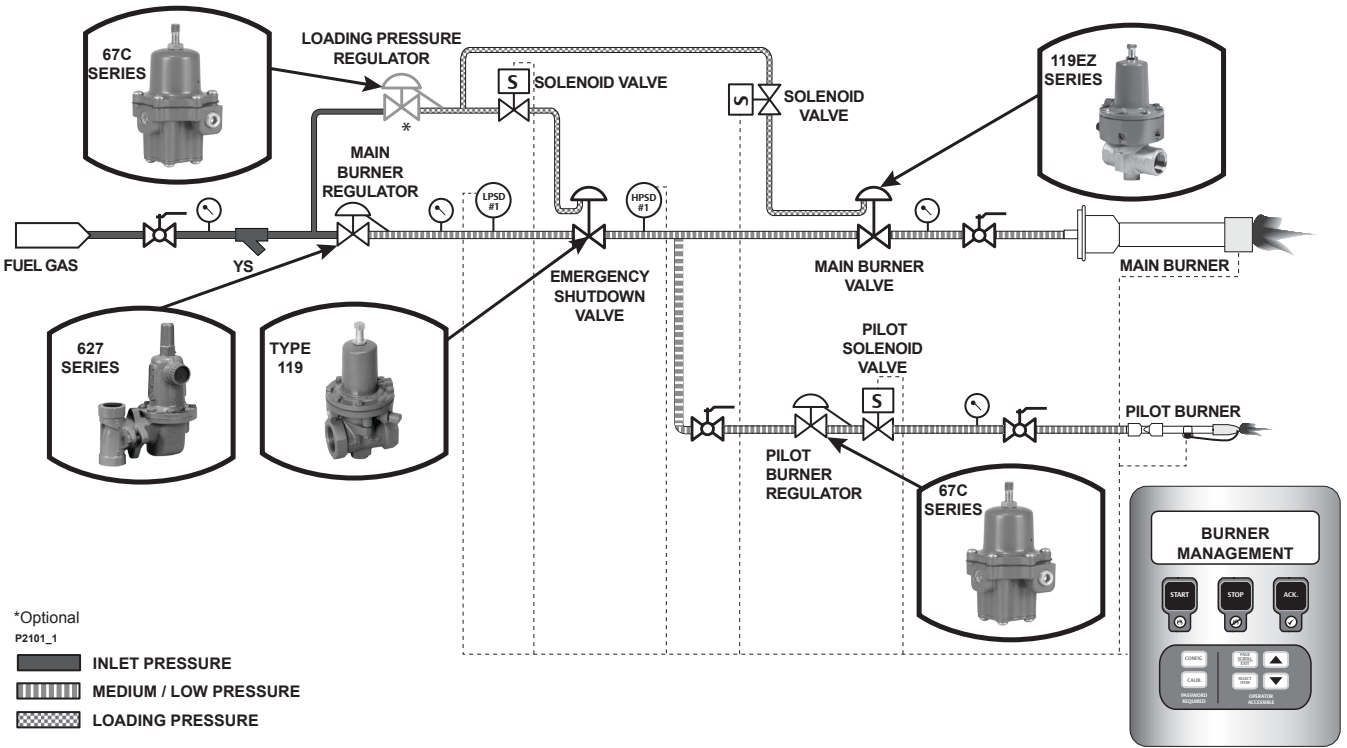


Figure 3. Burner Management Operational Schematics

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Table 1. Spring Selection

SPRING RANGE		SPRING PART NUMBER	SPRING COLOR CODE	FREE LENGTH		WIRE DIAMETER	
psig	bar			in.	mm	in.	mm
3 to 15	0.21 to 1.0	1D89230X0A0	Red	2.94	75	0.168	4.27
5 to 20	0.34 to 1.4	1D75150X0A0	Silver	2.81	71	0.187	4.75
5 to 35	0.34 to 2.4	1D66590X0A0	Blue	2.50	64	0.218	5.54
30 to 60	2.1 to 4.1	ERAA01910A0	Green	2.60	66	0.234	5.94

Table 2. 119 Series Valve Flow Coefficients

VALVE TRAVEL		ORIFICE SIZE		BODY SIZE ⁽¹⁾								
				3/4 In.			1 In.			1-1/4 In.		
in.	mm	in.	mm	C _v	C _g	C _i	C _v	C _g	C _i	C _v	C _g	C _i
3/16	4.8	1/8	3.2	0.43	12.5	29.1	0.43	12.5	29.1	0.43	12.5	29.1
		3/16	4.8	0.95	27.8	29.3	0.95	27.8	29.3	0.95	27.8	29.3
		1/4	6.4	1.70	48.3	28.4	1.70	48.3	28.4	1.70	48.3	28.4
		5/16	7.9	2.64	76.5	29.0	2.64	76.5	29.0	2.64	76.5	29.0
		3/8	9.5	3.22	104	32.3	3.3	105	31.8	3.57	106	29.7
		1/2	13	4.7	176	37.4	5.0	178	35.6	5.75	183	31.8
		9/16	14	5.6	213	38.0	5.9	218	36.8	7.2	230	31.9

1. Types 119EZ and 119EZX only available in 1 in. body size.

Principle Of Operation

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As loading pressure is applied to the 119 Series fuel gas valve diaphragm, the disk holder moves away from the orifice. As loading pressure is reduced, the opposing spring force moves the disk holder toward the closed position, resulting in spring-close action should a loss of loading supply pressure occur.

The Type 119EZ comes equipped with an adjustment tool that can be used to modulate the valve opening speed, while still allowing for quick closing speeds. The Type 119EZX comes equipped with a solenoid control valve that opens and closes based on signal responses from the burner management system.

Burner Management System

A Burner Management System (BMS) is a safety solution for Oil and Gas facilities that enables the safe start-up, operation and shut down of the burner section of a fire tube vessel. It reduces maintenance, improves up-time and provides a safe environment for fire tube vessels and field personnel.

Reliable pressure control elements are essential to ensure a safe and efficient burner system. A burner pressure regulator needs to be able to open slow during startup, close fast during shutdown and throttle to maintain temperature during normal operation. Poor main burner pressure regulation contributes to an inefficient fuel gas pressure control system.

In addition, if the main burner regulators require frequent monitoring, maintenance and replacement, increased operation and maintenance costs could be incurred.

Emerson simplifies the complexity of fuel gas pressure control system by providing a one-stop solution, eliminating procurement challenges. Emerson's solution works with a BMS to ensure efficient burner ignition/re-ignition, shutdown and steadily throttles to maintain temperature during normal operation. The solution is proven and robust, thereby significantly lowering maintenance expenses.

Installation

The 119 Series may be installed in any position, but normally the actuator is vertical above the valve body. Install the valve body such that the direction of the process flow matches the flow direction arrow on the side of the body.

Each fuel gas valve has a screened vent in the spring case and in the valve bonnet. On indoor installations, these vents should be piped outdoors with the shortest, straightest pipe of the largest practical diameter. For both indoor and outdoor installation the vents or vent pipe must be protected from debris, weather, condensation, or anything else that might clog it.

Overall dimensions are shown in Figure 4.

NACE Compliance

Optional materials are available for applications handling sour gases. These constructions comply with the recommendations of NACE International sour service standards.

The manufacturing processes and materials used by Emerson assure that all products specified for sour gas service comply with the chemical, physical, and metallurgical requirements of NACE MR0175-2002 and/or NACE MR0175/ISO 15156. Customers have the responsibility to specify correct materials. Environmental limitations may apply and shall be determined by the user.

Capacity Information

Air Capacities

To determine wide-open flow capacity for fuel gas valve sizing, use one of the following equations:

For Critical Pressure Drops

Use this equation for critical pressure drops (absolute outlet pressure equal to one-half or less than one-half the absolute inlet pressure).

$$Q = P_{1(abs)} C_g$$

where,

Q = gas flow rate, SCFH

C_g = gas sizing coefficient

P_1 = absolute inlet pressure, psia

For Non-Critical Pressure Drops

Use this equation for pressure drops lower than critical (absolute outlet pressure greater than one-half of absolute inlet pressure).

$$Q = \sqrt{\frac{520}{GT}} C_g P_1 \sin \left[\frac{3417}{C_1} \sqrt{\frac{\Delta P}{P_1}} \right] \text{ DEG}$$

where,

Q = gas flow rate, SCFH

G = specific gravity of the gas

T = absolute temperature of gas at inlet, °Rankine

C_g = gas sizing coefficient

P_1 = absolute inlet pressure, psia

C_1 = flow coefficient

ΔP = pressure drop across the regulator, psi

Then, if capacity is desired in normal cubic meters per hour at 0°C and 1.01325 bar, multiply SCFH by 0.0268.

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Liquid Capacities (for Type 119 only)

To determine regulating capacities or to determine wide-open capacities for relief sizing at any inlet pressure, use the following equation.

$$Q = C_v \sqrt{\frac{\Delta P}{G}}$$

where,

- Q = liquid flow rate, GPM
- ΔP = pressure drop across the regulator, psi
- C_v = regulating or wide-open flow coefficient
- G = specific gravity of the liquid

Ordering Information

Use the Specifications section on page 2 and carefully review the description to the right of each specification. Use this information to complete the Ordering Guide on this page. Specify the desired selection wherever there is a choice to be made. Then send the Ordering Guide to your local Sales Office.

Ordering Guide

Type (Select One)

- ☐ 119
- ☐ 119EZ
- ☐ 119EVS

Body Size and Material (Select One)

3/4 NPT (Available for Type 119 only)

- ☐ Cast iron
- ☐ WCC Steel

1 NPT

- ☐ Cast iron
- ☐ WCC Steel
- ☐ Stainless Steel (available for Type 119EZ only)

1-1/4 NPT (Available for Type 119 only)

- ☐ Cast iron

Spring Ranges

- ☐ 3 to 15 psig / 0.21 to 1.0 bar, Red
- ☐ 5 to 20 psig / 0.34 to 1.4 bar, Silver
- ☐ 5 to 35 psig / 0.34 to 2.4 bar, Blue
- ☐ 30 to 60 psig / 2.1 to 4.1 bar, Green

Orifice Size

- ☐ 1/8 in. / 3.2 mm
- ☐ 3/16 in. / 4.8 mm
- ☐ 1/4 in. / 6.4 mm
- ☐ 5/16 in. / 7.9 mm
- ☐ 3/8 in. / 9.5 mm
- ☐ 1/2 in. / 13 mm
- ☐ 9/16 in. / 14 mm

NACE Standard MR0175-2002 Construction

- ☐ Yes

NACE MR0175/ISO 15156 Construction

(for Type 119EZ only)

- ☐ Yes

Replacement Parts Kit (Optional)

- ☐ Yes, send one replacement parts kit to match this order.

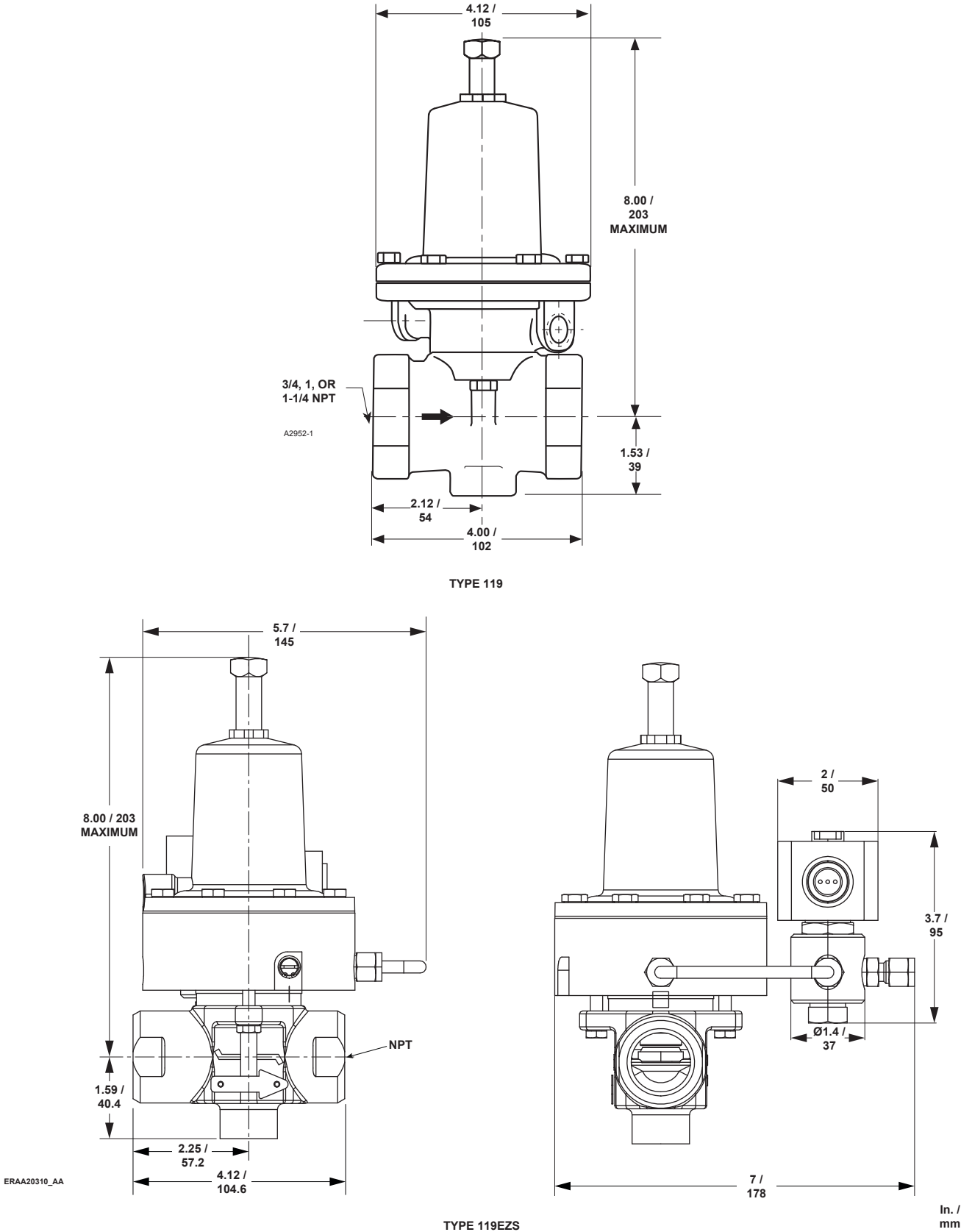


Figure 4. Dimensions

