# 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 119EZS come with a variable restrictor that allows for tuning of valve opening speed.

## 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 119EZS:** 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 119EZS:**

| 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 119EZS with ASCO™ 8320 Series solenoid

**Pressure Setting Adjustment**

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

**Type 119EZS 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 119EZS:**

| 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 119EZS 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

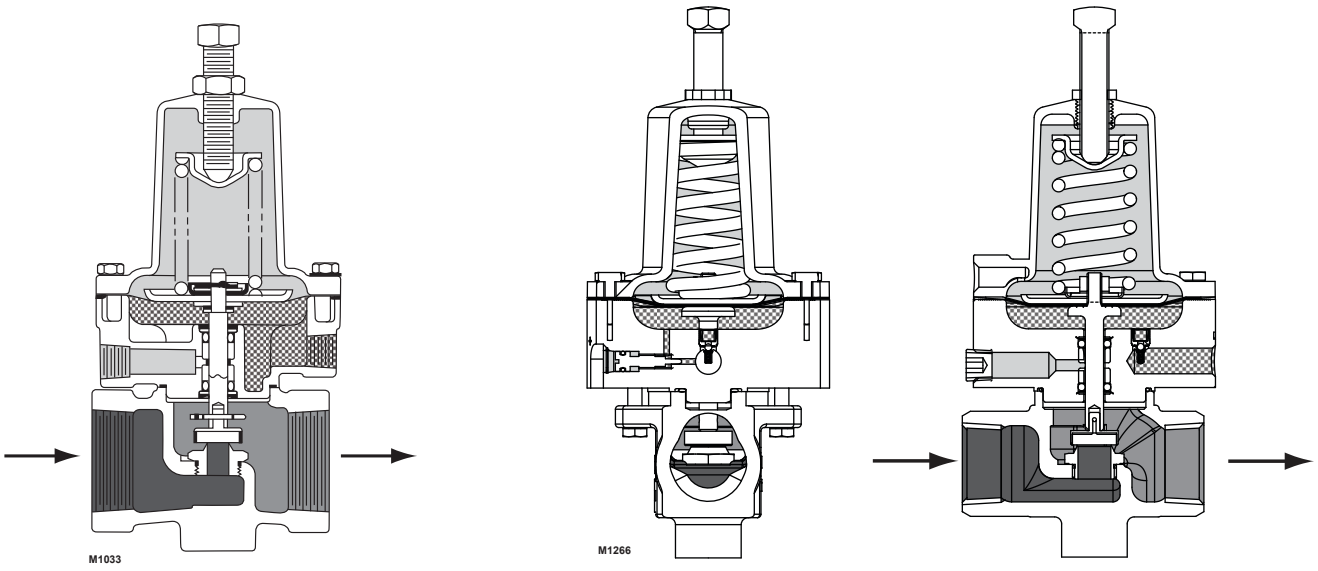
**NACE Construction**

*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 ($NH_3$).
4. Minimum temperature for Cast Iron body is -20°F / -29°C.




1. Solenoid valve connects to loading pressure port.

***Figure 2.*** *119 Series Operational Schematics*

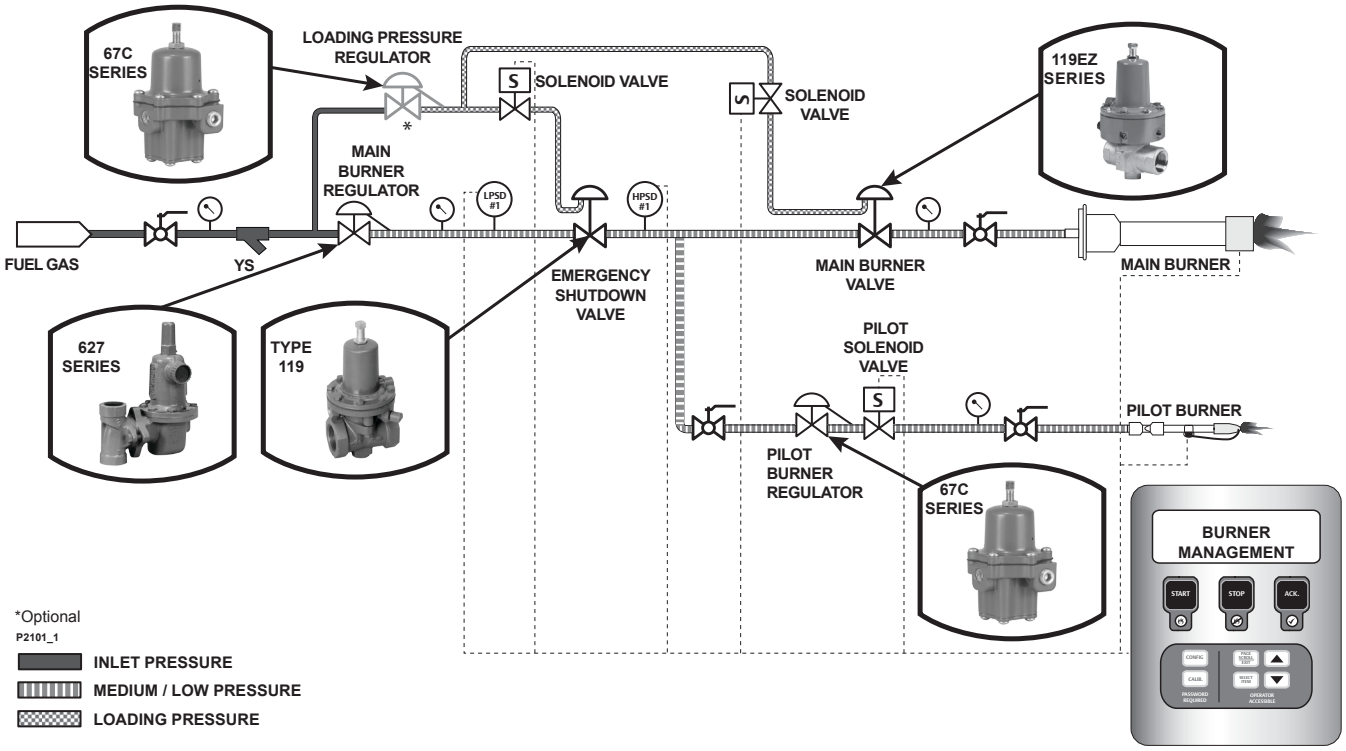



***Figure 3.*** *Burner Management Operational Schematics*

***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 | $C_v$ | $C_g$ | $C_1$ | $C_v$ | $C_g$ | $C_1$ | $C_v$ | $C_g$ | $C_1$ |
| 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 119EZS only available in 1 in. body size.

# Principle Of Operation

## 119 Series

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 119EZS 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).

$$Q = \sqrt{\frac{520}{GT}}\, C_g P_1 \mathrm{SIN}\left(\frac{3417}{C_1}\sqrt{\frac{\Delta P}{P_1}}\right)\mathrm{DEG}$$

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
$\Delta P$ = 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.

## 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
$\Delta P$ = 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
☐ 119EZS

**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

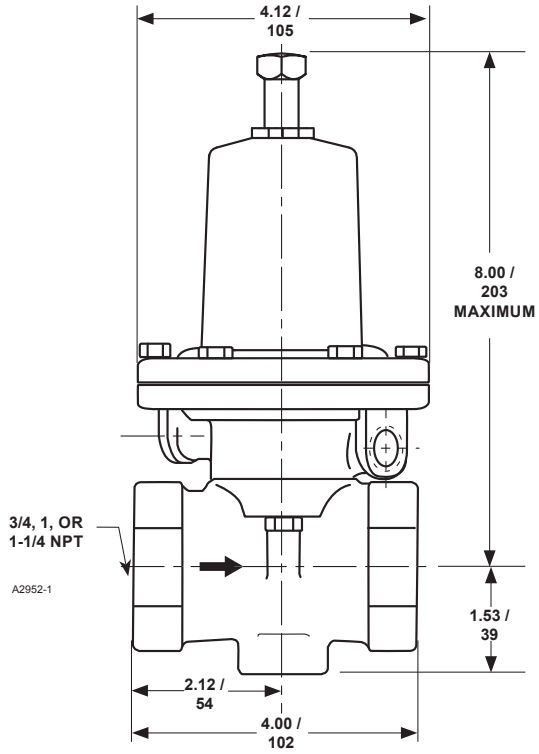
**Spring Ranges**
☐ 3 to 15 psig / 0.21 to 1.0 bar, Red
☐ 5 to 20 psig / 0.34 to 1.4 bar, Silver
☐ 5 to 35 psig / 0.34 to 2.4 bar, Blue
☐ 30 to 60 psig / 2.1 to 4.1 bar, Green

**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

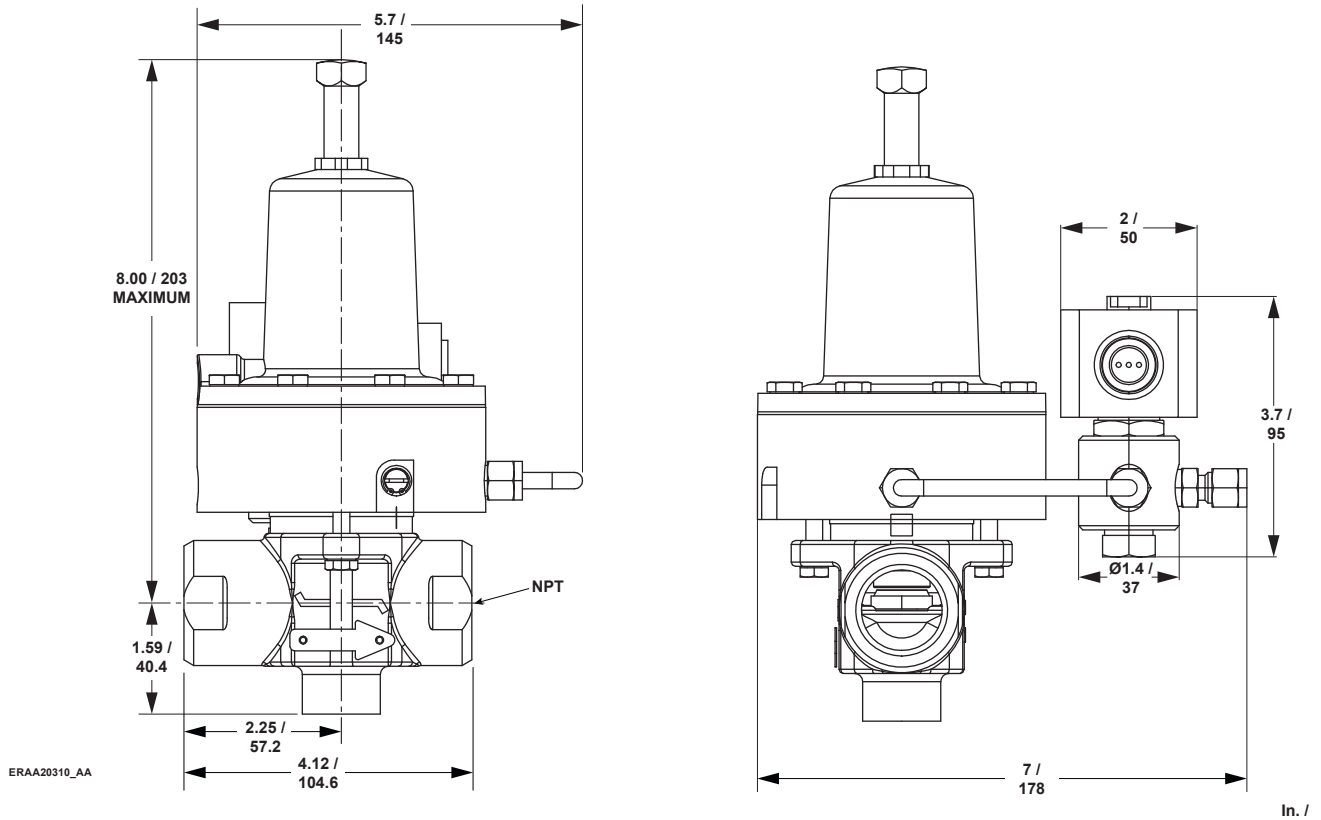
**NACE Standard MR0175-2002 Construction**
☐ Yes

**NACE MR0175/ISO 15156 Construction**
(for Type 119EZ only)
☐ Yes

**Replacement Parts Kit** (Optional)
☐ Yes, send one replacement parts kit to match this order.




TYPE 119




TYPE 119EZS

***Figure 4.*** *Dimensions*

Webadmin.Regulators@emerson.com
Fisher.com
Facebook.com/EmersonAutomationSolutions
LinkedIn.com/company/emerson-automation-solutions
Twitter.com/emr_automation

**Emerson Automation Solutions**

**Americas**
McKinney, Texas 75070 USA
T +1 800 558 5853
+1 972 548 3574

**Europe**
Bologna 40013, Italy
T +39 051 419 0611

**Asia Pacific**
Singapore 128461, Singapore
T +65 6770 8337

**Middle East and Africa**
Dubai, United Arab Emirates
T +971 4 811 8100



EMERSON™