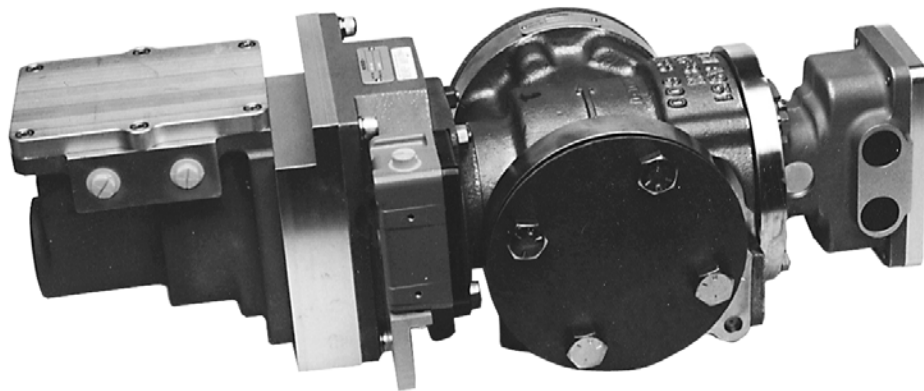


# 3103 Gas Valve with EM35 Actuator



## APPLICATIONS

The 3103 gas valve is a stainless steel valve capable of metering gas flow between 23 and 18 144 kg/hr (50 and 40 000 lb/hr). It is designed to be corrosion resistant and self-cleaning, allowing it to operate in sour gas environments (high sulfur content gas) that can cause problems for other valves. When used in conjunction with an EM35 actuator and EM35 digital driver, the 3103 valve delivers the demanding accuracy needed for DLE applications.

The EM35 actuator is all electric, so hydraulic contamination and maintenance problems are eliminated. Cost is reduced since there is no HPU to maintain or replace. In addition, the EM35 actuator is designed for long life, although it may be replaced in the field if necessary.

## DESCRIPTION

The 3103 gas valve is a rotary sleeve-and-shoe type throttling valve. The metering

port area is determined by input shaft position from the actuator. Valve position feedback to the actuator driver is accomplished using a high accuracy resolver. The EM35 actuator is designed for use with both analog and digital EM35 motor drivers. The motor is a brushless dc motor with a motor clutch and gearhead assembly. The motor uses Samarium Cobalt permanent magnets bonded and sleeved to the rotor element. Rotor position sensing is performed through the use of a brushless field director, and motor velocity feed is performed by means of a brushless tachometer.

## FEATURES

The EM35 motor assembly is housed in a cast aluminum, explosion-proof housing. A thermal potting compound is used to transfer heat generated by the motor to the cast housing and out to the ambient environment. The motor output shaft is directly coupled to the valve input shaft through the use of a stainless steel torsional coupling.

- Highly accurate
- Explosion-proof design
- Ideal for demanding DLE applications
- All electric
- Low maintenance
- Designed for long life
- Integral part of the total turbine control system
- Approved for use in hazardous locations
- CE Marking

## EM35 ANALOG DRIVER

---

The analog driver contains an analog position controller that receives a demand signal via a 4–20 mA input. The feedback signal is generated by a brushless resolver that is mounted on the fuel metering valve. The driver contains fault detection circuitry which provides the status of the 4–20 mA interface, position controller, driver, and feedback to the shutdown logic. A fault condition or an external shutdown command will disable the output (removing power to the motor), which in turn causes the valve return spring to close the valve. An analog velocity controller is used to reduce the effect of friction in the valve.

## EM35 DIGITAL DRIVER

---

This driver, designed for use with a Woodward NetCon® control system, consists of a position controller module and a remote driver. The position controller module and the digital driver exchange information over serial communication lines. The digital form of the data preserves the 16-bit feedback resolution necessary to meet the system accuracy requirements. The position controller module is configured during the system initialization with data selected off-line by the MOE™ (Menu Oriented Editor) or the GAP™ (Graphical Application Program) software. Controller, driver, and feedback status is provided by the IACT\_EM software block.

## 3103 GAS VALVE SPECIFICATIONS

---

### SUPPLY CHARACTERISTICS

#### Contaminants

Solid particles

<10 µm diameter 13.6 kg/hr (30 lb/hr) by volume maximum

>10 µm diameter 0.14 kg/hr (0.3 lb/hr) by volume maximum

#### Metered Fuel Types

Natural, propane, methane service

#### Specific Gravity

0.5 to 1.05

#### Temperature

–40 to +149 °C (–40 to +300 °F)

### GAS FLOW REQUIREMENTS

#### Inlet Pressure

6206 kPa (900 psia) maximum

#### Pressure Differential

172 to 6206 kPa (25 to 900 psi)

#### Gas Flow Range

23 to 18 144 kg/hr (50 to 40 000 lb/hr) (0.6 sp gr)  
maximum flow capacity is dependent upon available gas conditions

#### Accuracy Standard

+5% of point, or +0.25% of maximum flow, whichever is larger

#### High Accuracy Dry Low Emissions Applications

2% of point (consult Woodward)

## EM35 ACTUATOR

---

### MECHANICAL

#### Output Shaft Rotation

60° (rotation limited by valve stops)

#### Continuous Output Torque

+24.86 N·m (+220 lb-in) maximum

#### Peak Output Torque

+45.20 N·m (+400 lb-in) minimum

### ELECTRICAL

#### Power Input

28 Vdc nominal

18–32 Vdc operating

#### Current

25 A, maximum for 100 ms

15 A, maximum continuous

3 A, expected steady state

### PERFORMANCE

#### Slew Rate

>600°/sec (24 Vdc @ motor)

#### Bandwidth

>5 Hz

#### Position Accuracy

0.50° analog

0.10° digital

## LISTINGS

---

### Actuator and Resolver

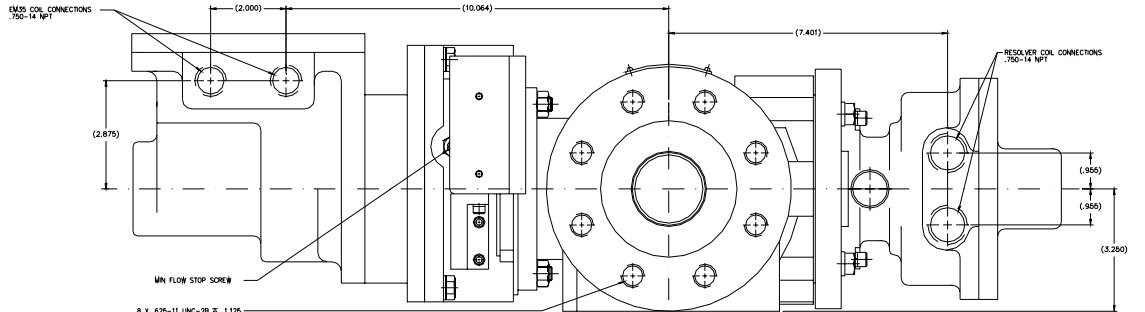
CSA Listed, Class I, Division 1, Groups C, D, and  
Class I, Division 2, Groups B, C, D with NRTL/C  
LCIE Zone 1 Group IIB

### EM35 Analog Driver and EM35 Digital Driver

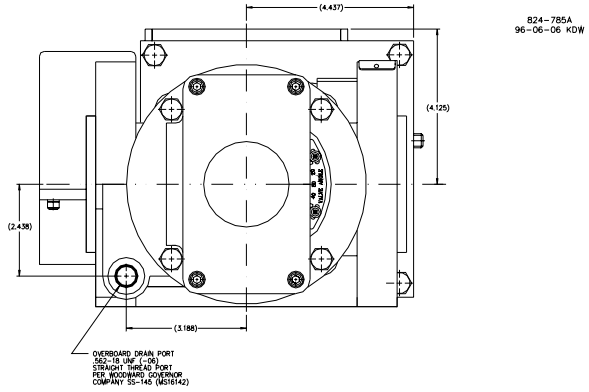
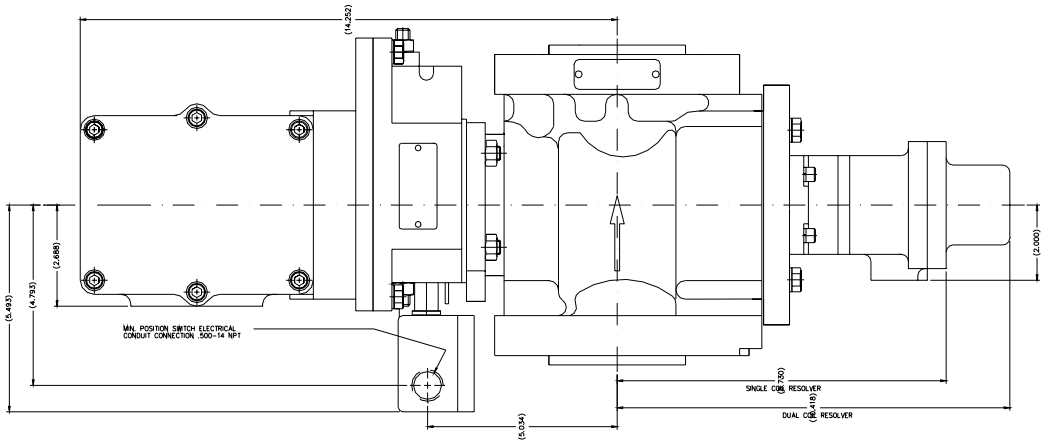
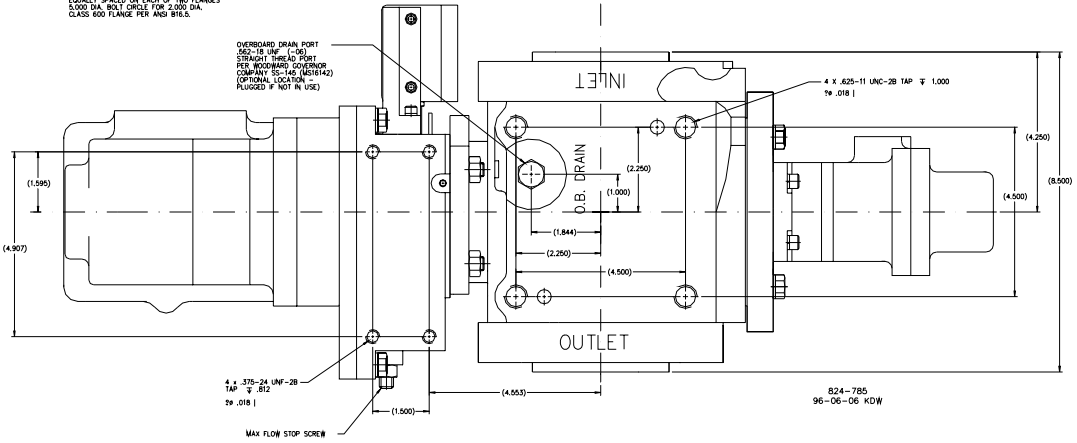
CSA Listed, Class I, Division 2, Groups A, B, C, D, with  
NRTL/C  
LCIE Zone 2 Group IIC

### Valve

Pressure Equipment Directive (97/23/EC) Compliant  
as Category II



8 X .625-11 UNC-2B F 1.125  
EQUALLY SPACED ON EACH OF TWO FLANGES  
2.000 DIA. BOLT CIRCLE FOR 2.000 DIA.  
CLASS 300 FLANGE PER ANSI B16.5



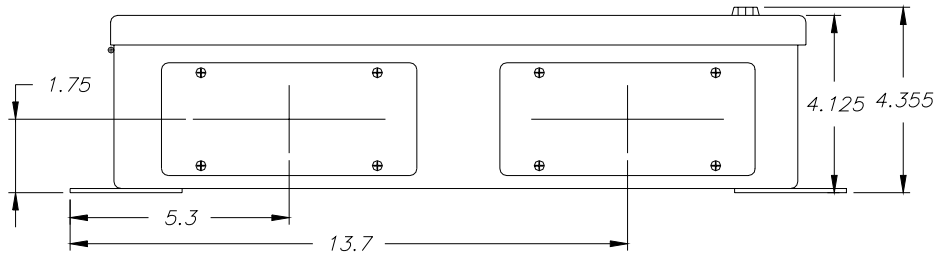
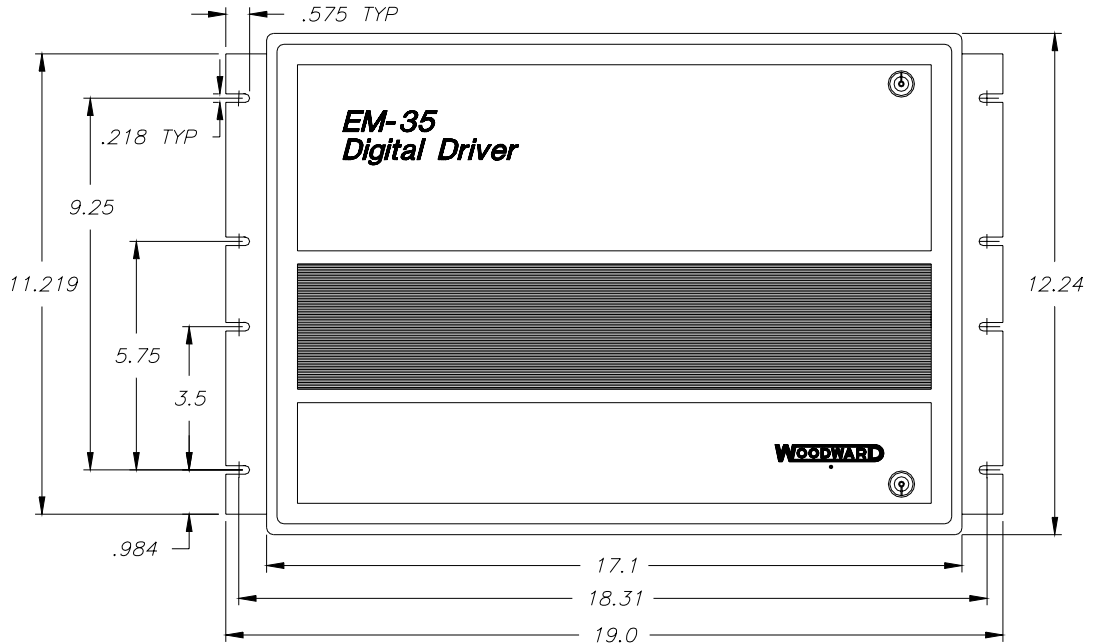
Outline Drawing of EM35 Actuator/3103 Gas Valve

Woodward  
 Industrial Controls  
 PO Box 1519  
 Fort Collins CO, USA  
 80522-1519  
 1000 East Drake Road  
 Fort Collins CO 80525  
 Ph: +1 (970) 482-5811  
 Fax: +1 (970) 498-3058

**Distributors & Service**  
 Woodward has an international network of distributors and service facilities. For your nearest representative, call the Fort Collins plant or see the Worldwide Directory on our website.

**Corporate Headquarters**  
 Rockford IL, USA  
 Ph: +1 (815) 877-7441

[www.woodward.com](http://www.woodward.com)



824-783  
 95-09-26 KDW

**Dimensions of Driver Box**

This document is distributed for informational purposes only. It is not to be construed as creating or becoming part of any Woodward Governor Company contractual or warranty obligation unless expressly stated in a written sales contract.

© Woodward Governor Company, 1994  
 All Rights Reserved

02/10/F

For more information contact: