WOODWARD

Product Manual 26597
(Revision A)
Original Instructions

GS16DR Mass Flow Metering Leg

Installation and Operation Manual

General Precautions

Read this entire manual and all other publications pertaining to the work to be performed before installing, operating, or servicing this equipment.

Practice all plant and safety instructions and precautions.

Failure to follow instructions can cause personal injury and/or property damage.

Revisions

This publication may have been revised or updated since this copy was produced. To verify that you have the latest revision, check manual *26311* , *Revision Status & Distribution Restrictions of Woodward Technical Publications*, on the *publications page* of the Woodward website:

www.woodward.com/publications

The latest version of most publications is available on the *publications page*. If your publication is not there, please contact your customer service representative to get the latest copy.

Proper Use

Any unauthorized modifications to or use of this equipment outside its specified mechanical, electrical, or other operating limits may cause personal injury and/or property damage, including damage to the equipment. Any such unauthorized modifications: (i) constitute "misuse" and/or "negligence" within the meaning of the product warranty thereby excluding warranty coverage for any resulting damage, and (ii) invalidate product certifications or listings.

Translated Publications

If the cover of this publication states "Translation of the Original Instructions" please note:

The original source of this publication may have been updated since this translation was made. Be sure to check manual *26311* , *Revision Status & Distribution Restrictions of Woodward Technical Publications*, to verify whether this translation is up to date. Out-of-date translations are marked with ⚠. Always compare with the original for technical specifications and for proper and safe installation and operation procedures.

Contents

Illustrations and Tables

Warnings and Notices

Important Definitions

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

- **DANGER**—Indicates a hazardous situation which, if not avoided, will result in death or serious injury.
- **WARNING**—Indicates a hazardous situation which, if not avoided, could result in death or serious injury.
- **CAUTION**—Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.
- **NOTICE**—Indicates a hazard that could result in property damage only (including damage to the control).
- **IMPORTANT**—Designates an operating tip or maintenance suggestion.

⚠WARNING

Overspeed / Overtemperature / Overpressure

The engine, turbine, or other type of prime mover should be equipped with an overspeed shutdown device to protect against runaway or damage to the prime mover with possible personal injury, loss of life, or property damage.

The overspeed shutdown device must be totally independent of the prime mover control system. An overtemperature or overpressure shutdown device may also be needed for safety, as appropriate.

⚠WARNING

Personal Protective Equipment

The products described in this publication may present risks that could lead to personal injury, loss of life, or property damage. Always wear the appropriate personal protective equipment (PPE) for the job at hand. Equipment that should be considered includes but is not limited to:

- **Eye Protection**
- **Hearing Protection**
- **Hard Hat**
- **Gloves**
- **Safety Boots**
- **Respirator**

Always read the proper Material Safety Data Sheet (MSDS) for any working fluid(s) and comply with recommended safety equipment.

⚠WARNING

Start-up

Be prepared to make an emergency shutdown when starting the engine, turbine, or other type of prime mover, to protect against runaway or overspeed with possible personal injury, loss of life, or property damage.

⚠WARNING

Automotive Applications

On- and off-highway Mobile Applications: Unless Woodward's control functions as the supervisory control, customer should install a system totally independent of the prime mover control system that monitors for supervisory control of engine (and takes appropriate action if supervisory control is lost) to protect against loss of engine control with possible personal injury, loss of life, or property damage.

NOTICE

Battery Charging Device

To prevent damage to a control system that uses an alternator or battery-charging device, make sure the charging device is turned off before disconnecting the battery from the system.

Electrostatic Discharge Awareness

NOTICE

Electrostatic Precautions

Electronic controls contain static-sensitive parts. Observe the following precautions to prevent damage to these parts:

- **Discharge body static before handling the control (with power to the control turned off, contact a grounded surface and maintain contact while handling the control).**
- **Avoid all plastic, vinyl, and Styrofoam (except antistatic versions) around printed circuit boards.**
- **Do not touch the components or conductors on a printed circuit board with your hands or with conductive devices.**

To prevent damage to electronic components caused by improper handling, read and observe the precautions in Woodward manual *82715*, *Guide for Handling and Protection of Electronic Controls, Printed Circuit Boards, and Modules*.

Follow these precautions when working with or near the control.

1. Avoid the build-up of static electricity on your body by not wearing clothing made of synthetic materials. Wear cotton or cotton-blend materials as much as possible because these do not store static electric charges as much as synthetics.
2. Do not remove the printed circuit board (PCB) from the control cabinet unless absolutely necessary. If you must remove the PCB from the control cabinet, follow these precautions:
   - Do not touch any part of the PCB except the edges.
   - Do not touch the electrical conductors, the connectors, or the components with conductive devices or with your hands.
   - When replacing a PCB, keep the new PCB in the plastic antistatic protective bag it comes in until you are ready to install it. Immediately after removing the old PCB from the control cabinet, place it in the antistatic protective bag.

Regulatory Compliance

European Compliance for CE Marking:
This suitability is the result of ATEX compliance of the individual components as follows:

EMC Directive: Declared to 2004/108/EC COUNCIL DIRECTIVE of 15 Dec 2004 on the approximation of the laws of the Member States relating to electromagnetic compatibility.

Pressure Equipment Directive: Certified to Pressure Equipment Directive 97/23/EC of 29 May 1997 on the approximation of the laws of the Member States concerning pressure equipment, Category II.
Preceding: Moody International Certificate 90 174, Module H
Succeeding: TÜV Rheinland Certificate 01 202USA/ Q-11 6617 Module H

ATEX – Potentially Explosive Atmospheres Directive: Declared to 94/9/EC COUNCIL DIRECTIVE of 23 March 1994 on the approximation of the laws of the Member States concerning equipment and protective systems intended for use in potentially explosive atmospheres.
Zone 2, Category 3, Group II G, Ex d IIB T3 X

Refer to Special Conditions for Safe Use at the end of this section.

Other European Compliance:
Compliance with the following European Directives or standards does not qualify this product for application of the CE Marking:

ATEX: Exempt from the non-electrical portion of the ATEX Directive 94/9/EC due to no potential ignition sources per EN 13463-1.

Machinery Directive: Compliant as partly completed machinery with Directive 2006/42/EC of the European Parliament and the Council of 17 May 2006 on machinery.

North American Compliance:
This suitability is the result of CSA compliance of the individual components as follows:

CSA: CSA Certified for Class I, Division 2, Groups B, C, and D, T3C at 93 °C ambient for use in USA and Canada

Individual Component Listings:
Compliance of the flow leg to the ATEX Directive for Zone 2, Category 3, Group II G IIB, is based upon the individually compliant components as follows:

Woodward GS16DR Dual Resolver
Zone 2, Category 3, Group II G IIB, Ex nA IIC T3

Woodward DLE Smart Pressure Transducer Manifold
per LCIE 02 ATEX 6142 X
Zone 1, Category 2, Group II G, Ex d IIB T4

Compliance of the flow leg to CSA compliance Class I Div 2 Group B, C, D is based upon the individually compliant components as follows:

Special Conditions for Safe Use:

GS16DR
Wiring of the GS16DR valve must be in accordance with European or other international Zone 2-Category 3 as applicable and in accordance with the authority having jurisdiction.

Smart Pressure Transducer
A conduit seal must be installed within 50 mm (2 inches) of the conduit entry of the Smart Pressure Transducer when used in any ATEX classified explosive atmosphere. This is a Category 2, type 'd' flameproof product and type 'd' wiring methods must be maintained in any explosive atmosphere (Zone 1 or Zone 2).

For Class I, Division 1 or Class I, Zone 1 North American Applications: A conduit seal must be installed within 457 mm (18 inches) of the conduit entry when the Smart Pressure Transducer is used in a Class I, Division 1 or Class I, Zone 1 hazardous atmosphere.

Metering Leg
Use supply wires suitable for at least 103 °C.

Refer to manual 26418 for complete wiring, installation, operation and maintenance instructions for the GS16DR valve.

Refer to manual 26080 for complete wiring, installation, operation and maintenance instructions for the Smart Pressure Transducer.

T3 reflects conditions without process fluid. The surface temperature of this valve approaches the maximum temperature of the applied process media. It is the responsibility of the user to ensure that the external environment contains no hazardous gases capable of ignition in the range of the process media temperatures.

Compliance with the Machinery Directive 2006/42/EC noise measurement and mitigation requirements is the responsibility of the manufacturer of the machinery into which this product is incorporated.

⚠WARNING

EXPLOSION HAZARD—Do not remove covers or connect/disconnect electrical connectors unless power has been switched off or the area is known to be non-hazardous.

Substitution of components may impair suitability for Class I, Division 2 or Zone 2 applications.

⚠AVERTISSEMENT

RISQUE D'EXPLOSION—Ne pas enlever les couvercles, ni raccorder / débrancher les prises électriques, sans vous en assurez auparavant que le système a bien été mis hors tension; ou que vous situez bien dans une zone non explosive.

La substitution de composants peut rendre ce matériel inacceptable pour les emplacements de Classe I, applications Division 2 ou Zone 2.

Chapter 1.
General Information

The Woodward GS16DR Mass Flow Metering Leg is an integrated valve and pressure-sensing unit that has the ability to meter gas fuel accurately for low-emissions turbines. The position demand from the supervisory control is generated by a calculation based on the pressures, temperature, and other properties of the gas fuel. To achieve accurate gas fuel metering, a digital position demand signal from the supervisory control must be sent to the Digital Valve Positioner (DVP *) driver to position the valve.

The GS16DR valve calibration flow characteristics are kept within the valve driver onboard the unit and are communicated to the DVP driver.

The pressures are received from the Woodward Smart Pressure Transducer manifold affixed to the flow leg. The pressure transmitter sends the pressure data digitally via an RS-422 protocol to the supervisory control.

*—The DVP Driver and GS16DR cables are not included as part of the metering leg assembly. Contact your certified Woodward sales associate for purchasing information.

Chapter 2.
Installation

Introduction

⚠WARNING

The Woodward GS16DR Mass Flow Metering Leg weighs 64 kg (140 lb). In order to prevent injury, use a lifting strap when handling the flow leg. Do not lift or handle the unit by any conduit, cable or tubing.

⚠WARNING

Due to typical noise levels in the turbine environments, hearing protection should be worn when working on or around the Woodward GS16DR Mass Flow Metering Leg.

⚠WARNING

The surface of this product can become hot enough or cold enough to be a hazard. Use protective gear for product handling in these circumstances. Temperature ratings are included in the specification section of this manual.

⚠WARNING

External fire protection is not provided in the scope of this product. It is the responsibility of the user to satisfy any applicable requirements for their system.

⚠WARNING

The engine, turbine, or other type of prime mover should be equipped with an overspeed, misfire, detonation detection shutdown device(s), that operate totally independently of the prime mover control device(s) to protect against runaway or damage to the engine, turbine, or other type of prime mover with possible personal injury or loss of life should the system fail.

⚠WARNING

The surface temperature of this product approaches the maximum temperature of the applied process media. It is the responsibility of the user to ensure that the external environment contains no hazardous gases capable of ignition in the range of the process media temperatures.

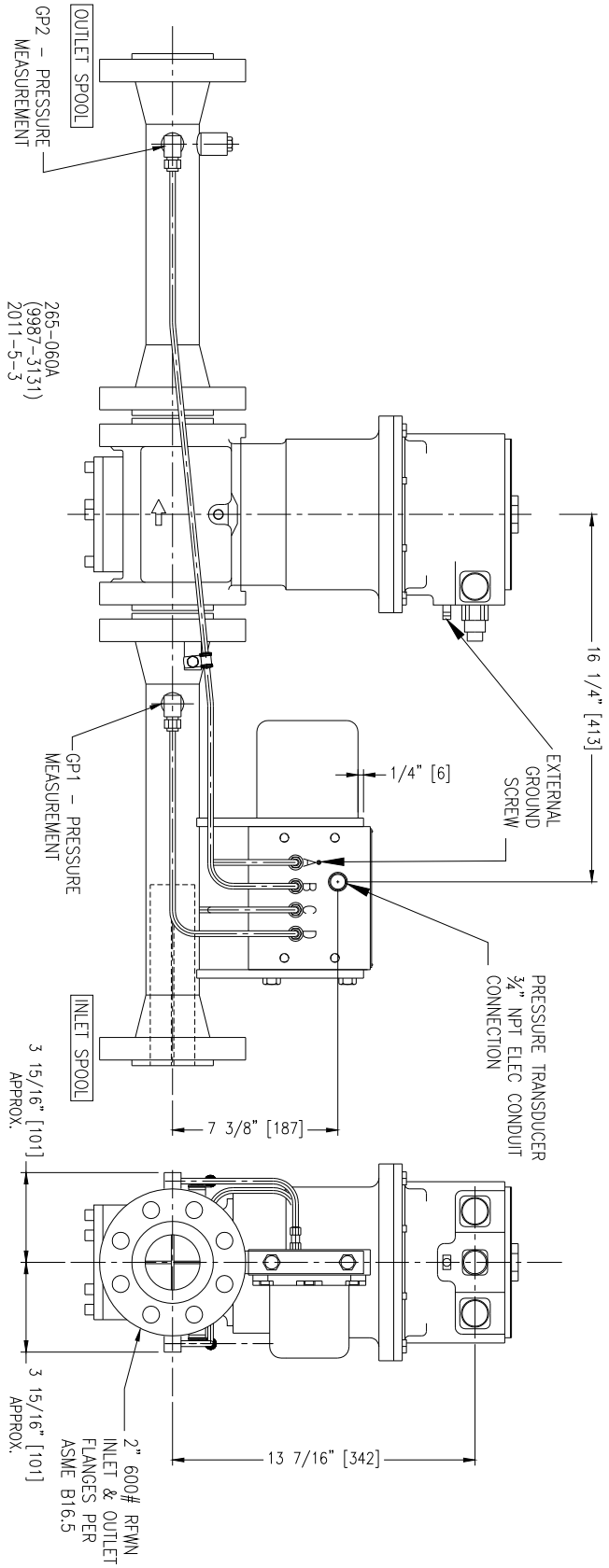

Figure 1-1. Installation Drawing
(inches [metric])

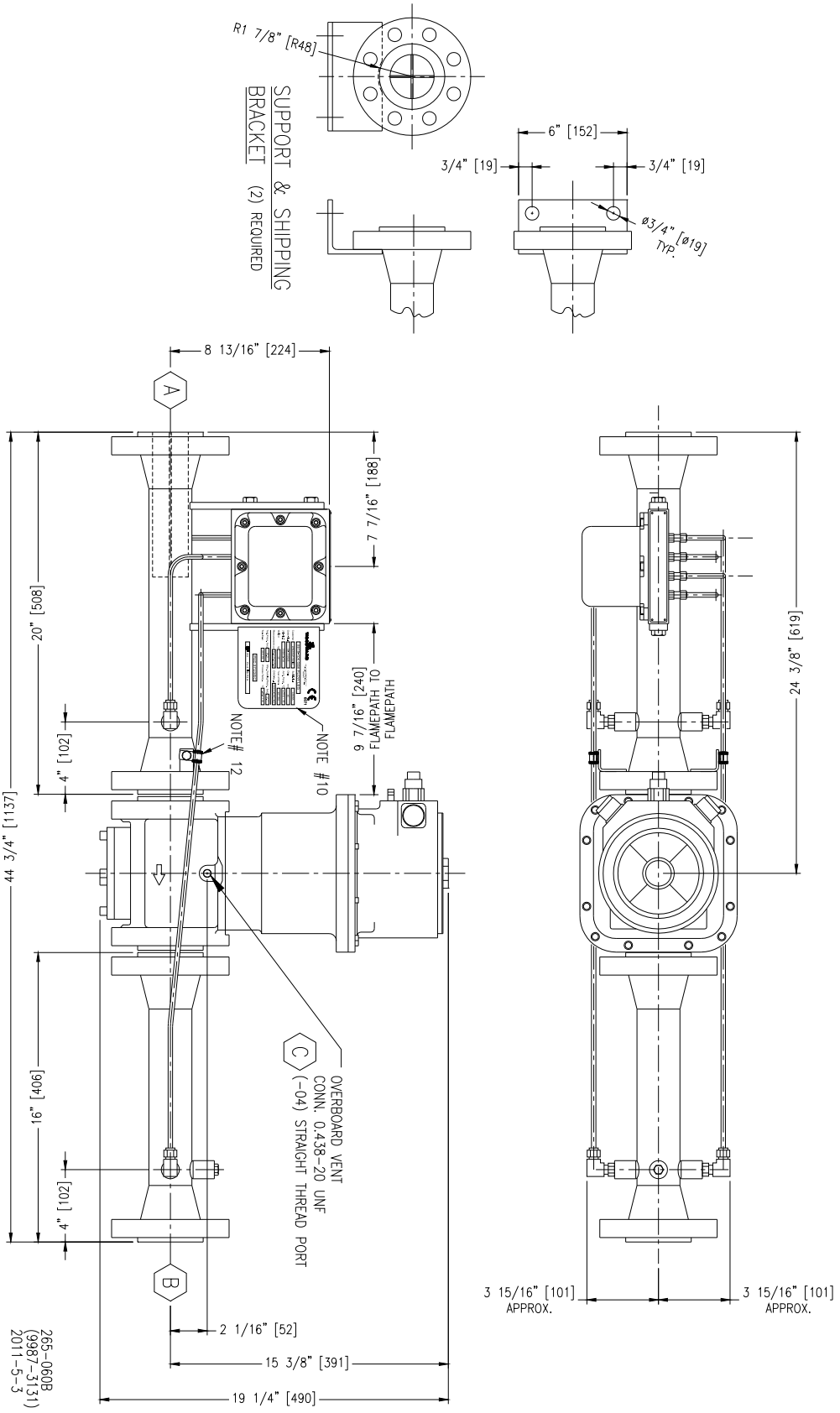

Figure 1-2. Installation Drawing
(inches [metric])

Unpacking

Be careful when unpacking the flow leg. Check the assembly for signs of damage, such as bent or dented covers, scratches, and loose or broken parts. Notify the shipper and Woodward if damage is found.

The Woodward GS16DR Mass Flow Metering Leg can be supplied with support and shipping brackets. These brackets are indicated on the appropriate outline drawing and are typically painted a different color (usually yellow). These brackets must be removed from the flow leg prior to installation into the piping.

The Woodward GS16DR Mass Flow Metering Leg ships with covers on the pipe flanges and OBVD vent port. These shipping covers must be removed before installation into the piping system, but keep the covers in place until final assembly into the piping system. This will ensure that debris is unable to enter the flow leg before final assembly into the fuel system.

Mechanical Installation

Overboard Drain

The GS16DR overboard (OBVD) drain port is a vent between dual redundant shaft seals. It must be connected by means of rigid steel piping to a fuel connection, purge, vent, or flare-off system so as not to be exposed to danger of obstruction, physical damage, or back pressure in excess of 69 kPa (g) (10 psig).

Mounting

⚠WARNING **DROPPING HAZARD—Do not use the valve cover threads to lift the entire flow leg assembly.**

The strength of the flow leg mounting structure must be sufficient to support the 64 kg (140 lb) of the flow leg.

The GS16DR valve is a straight-through type valve. Verify the directional arrow cast into the GS16DR valve body points in the desired direction of flow. Verify that the process piping centerline-to-flange-face dimensions meet the requirements of the outline drawings within standard piping tolerances. The valve should mount between the piping interfaces such that the flange bolts can be installed with only manual pressure applied to align the flanges. Mechanical devices such as hydraulic or mechanical jacks, pulleys, chain-falls, or similar should never be used to force the piping system to align with the valve flanges. Follow ASME B16.5 for piping fastener requirements.

If flame path surfaces can be exposed during installation or service, damage to sealing surfaces may result in moisture ingress, fire, or explosion. Clean the surface with rubbing alcohol if necessary. Inspect the Smart Transducer and GS16DR Valve joint surfaces to ensure that they are not damaged or contaminated. Note: Cleaning is required for any explosion-proof products with a free internal volume of 6000 cm^3 or greater.

Pipe Installation

Flange gasket materials should conform to ASME B16.20. The user should select a gasket material which will withstand the expected bolt loading without injurious crushing, and which is suitable for the service conditions. When installing the valve into the process piping, it is important to properly torque the studs/bolts in the appropriate sequence in order to keep the flanges of the mating hardware parallel to each other. A two-step torque method is recommended. Once the studs/bolts are hand tightened, torque the fasteners in a crossing pattern to half the required torque value. Once all studs/bolts have been torque to half the appropriate value, repeat the pattern until the rated torque value is obtained. Torque values must be determined from appropriate standards, gasket material and stud/bolt information.

⚠WARNING **Leak-check all gaseous fuel connections. Leaking gaseous fuel can cause explosion hazards, property damage, or loss of life.**

Orientation

Woodward recommends that the GS16DR Mass Flow Metering Leg be installed with the GS16DR valve in the upright position and the piping in the horizontal position. The fuel metering leg can be mounted in other orientations as well. Take special care to ensure that tubing low points are minimized. These low points can accumulate condensation, oil and/or debris, which can cause erroneous pressure transducer readings on that channel.

Electrical Installation

NOTICE **Do not connect any cable grounds to “instrument ground”, “control ground”, or any non-earth ground system. Make all required electrical connections based on the wiring diagrams.**

The conduits provided on the flow leg devices are pre assembled at the Woodward factory. They consist of various connection components that are certified for the hazardous environment and provide protection. The conduits have connectors for the customer to interface to the product.

The conduit system contains potted barrier glands that cannot be serviced. Twisting or removal of these products may damage the internal wires resulting in malfunction of the product. It is recommend contacting Woodward customer support for information regarding replacement or repair.

NOTICE **Do not attempt to open the connectors for inspection or repair. These items are factory sealed. Opening of the connector will result in damage to the internal wiring.**

A conduit seal must be installed within 50 mm (2 inches) of the conduit entry of the Smart Pressure Transducer when used in any ATEX classified explosive atmosphere. This is a Category 2, type ‘d’ flameproof product and type ‘d’ wiring methods must be maintained in any explosive atmosphere (Zone 1 or Zone 2).

⚠WARNING

EXPLOSION HAZARD—Do not remove, decouple or twist conduit connectors or connections. These items are not serviceable. Damage to the internal wires or cable or conduit protection system may result.

⚠WARNING

EXPLOSION HAZARD—Do not remove covers or connect/disconnect electrical connectors unless power has been switched off or the area is known to be non-hazardous.

Substitution of any component shall not be performed. Substitution of any component will compromise the certification of the Zone 1 protected product.

⚠WARNING

Take care not to damage the threads when removing or replacing the covers. Damage to threads or flat surfaces may result in moisture ingress, fire or explosion. Clean the surface with rubbing alcohol if necessary. Inspect the threads to ensure that they are not damaged or contaminated.

⚠WARNING

For Division 1/Zone 1 products: Proper torque is very important to ensure that the unit is sealed properly.

⚠WARNING

A conduit seal must be installed within 50 mm (2 inches) of the conduit entry of the Smart Pressure Transducer when used in any ATEX classified explosive atmosphere. This is a Category 2, type 'd' flameproof product and type 'd' wiring methods must be maintained in any ATEX explosive atmosphere (Zone 1 or Zone 2).

⚠WARNING

Detailed specifications, requirements and warnings are included in each component's respective manual.

Refer to manual 26418 for complete wiring, operation, installation and maintenance instructions for the GS16DR Valve.

Refer to manual 26080 for complete wiring, operation, installation and maintenance instructions for the Smart Pressure Transducer.

GS16DR Valve Setup/Configuration

The GS16DR requires the use of an external driver (DVP) and pre-manufactured cables for installation. Refer to manual 26329 for complete Service Tool setup instructions, cable information and driver connection details.

Chapter 3.
Service Options

Product Service Options

If you are experiencing problems with the installation, or unsatisfactory performance of a Woodward product, the following options are available:

- Consult the troubleshooting guide in the manual.
- Contact the manufacturer or packager of your system.
- Contact the Woodward Full Service Distributor serving your area.
- Contact Woodward technical assistance (see "How to Contact Woodward" later in this chapter) and discuss your problem. In many cases, your problem can be resolved over the phone. If not, you can select which course of action to pursue based on the available services listed in this chapter.

OEM and Packager Support: Many Woodward controls and control devices are installed into the equipment system and programmed by an Original Equipment Manufacturer (OEM) or Equipment Packager at their factory. In some cases, the programming is password-protected by the OEM or packager, and they are the best source for product service and support. Warranty service for Woodward products shipped with an equipment system should also be handled through the OEM or Packager. Please review your equipment system documentation for details.

Woodward Business Partner Support: Woodward works with and supports a global network of independent business partners whose mission is to serve the users of Woodward controls, as described here:

- A **Full Service Distributor** has the primary responsibility for sales, service, system integration solutions, technical desk support, and aftermarket marketing of standard Woodward products within a specific geographic area and market segment.
- An **Authorized Independent Service Facility (AISF)** provides authorized service that includes repairs, repair parts, and warranty service on Woodward's behalf. Service (not new unit sales) is an AISF's primary mission.
- A **Recognized Engine Retrofitter (RER)** is an independent company that does retrofits and upgrades on reciprocating gas engines and dual-fuel conversions, and can provide the full line of Woodward systems and components for the retrofits and overhauls, emission compliance upgrades, long term service contracts, emergency repairs, etc.
- A **Recognized Turbine Retrofitter (RTR)** is an independent company that does both steam and gas turbine control retrofits and upgrades globally, and can provide the full line of Woodward systems and components for the retrofits and overhauls, long term service contracts, emergency repairs, etc.

You can locate your nearest Woodward distributor, AISF, RER, or RTR on our website at:

www.woodward.com/directory

Woodward Factory Servicing Options

The following factory options for servicing Woodward products are available through your local Full-Service Distributor or the OEM or Packager of the equipment system, based on the standard Woodward Product and Service Warranty (5-01-1205) that is in effect at the time the product is originally shipped from Woodward or a service is performed:

- Replacement/Exchange (24-hour service)
- Flat Rate Repair
- Flat Rate Remanufacture

Replacement/Exchange: Replacement/Exchange is a premium program designed for the user who is in need of immediate service. It allows you to request and receive a like-new replacement unit in minimum time (usually within 24 hours of the request), providing a suitable unit is available at the time of the request, thereby minimizing costly downtime. This is a flat-rate program and includes the full standard Woodward product warranty (Woodward Product and Service Warranty 5-01-1205).

This option allows you to call your Full-Service Distributor in the event of an unexpected outage, or in advance of a scheduled outage, to request a replacement control unit. If the unit is available at the time of the call, it can usually be shipped out within 24 hours. You replace your field control unit with the like-new replacement and return the field unit to the Full-Service Distributor.

Charges for the Replacement/Exchange service are based on a flat rate plus shipping expenses. You are invoiced the flat rate replacement/exchange charge plus a core charge at the time the replacement unit is shipped. If the core (field unit) is returned within 60 days, a credit for the core charge will be issued.

Flat Rate Repair: Flat Rate Repair is available for the majority of standard products in the field. This program offers you repair service for your products with the advantage of knowing in advance what the cost will be. All repair work carries the standard Woodward service warranty (Woodward Product and Service Warranty 5-01-1205) on replaced parts and labor.

Flat Rate Remanufacture: Flat Rate Remanufacture is very similar to the Flat Rate Repair option with the exception that the unit will be returned to you in “like-new” condition and carry with it the full standard Woodward product warranty (Woodward Product and Service Warranty 5-01-1205). This option is applicable to mechanical products only.

Returning Equipment for Repair

If a control (or any part of an electronic control) is to be returned for repair, please contact your Full-Service Distributor in advance to obtain Return Authorization and shipping instructions.

When shipping the item(s), attach a tag with the following information:

- return authorization number;
- name and location where the control is installed;
- name and phone number of contact person;
- complete Woodward part number(s) and serial number(s);
- description of the problem;
- instructions describing the desired type of repair.

Packing a Control

Use the following materials when returning a complete control:

- protective caps on any connectors;
- antistatic protective bags on all electronic modules;
- packing materials that will not damage the surface of the unit;
- at least 100 mm (4 inches) of tightly packed, industry-approved packing material;
- a packing carton with double walls;
- a strong tape around the outside of the carton for increased strength.

NOTICE

To prevent damage to electronic components caused by improper handling, read and observe the precautions in Woodward manual 82715, *Guide for Handling and Protection of Electronic Controls, Printed Circuit Boards, and Modules*.

Replacement Parts

When ordering replacement parts for controls, include the following information:

- the part number(s) (XXXX-XXXX) that is on the enclosure nameplate;
- the unit serial number, which is also on the nameplate.

Engineering Services

Woodward offers various Engineering Services for our products. For these services, you can contact us by telephone, by email, or through the Woodward website.

- Technical Support
- Product Training
- Field Service

Technical Support is available from your equipment system supplier, your local Full-Service Distributor, or from many of Woodward's worldwide locations, depending upon the product and application. This service can assist you with technical questions or problem solving during the normal business hours of the Woodward location you contact. Emergency assistance is also available during non-business hours by phoning Woodward and stating the urgency of your problem.

Product Training is available as standard classes at many of our worldwide locations. We also offer customized classes, which can be tailored to your needs and can be held at one of our locations or at your site. This training, conducted by experienced personnel, will assure that you will be able to maintain system reliability and availability.

Field Service engineering on-site support is available, depending on the product and location, from many of our worldwide locations or from one of our Full-Service Distributors. The field engineers are experienced both on Woodward products as well as on much of the non-Woodward equipment with which our products interface.

For information on these services, please contact us via telephone, email us, or use our website: **www.woodward.com**.

How to Contact Woodward

For assistance, call one of the following Woodward facilities to obtain the address and phone number of the facility nearest your location where you will be able to get information and service.

Electrical Power Systems

Facility	Phone Number
Brazil	+55 (19) 3708 4800
China	+86 (512) 6762 6727
Germany	+49 (0) 21 52 14 51
India	+91 (129) 4097100
Japan	+81 (43) 213-2191
Korea	+82 (51) 636-7080
Poland	+48 12 295 13 00
United States	+1 (970) 482-5811

Engine Systems

Facility	Phone Number
Brazil	+55 (19) 3708 4800
China	+86 (512) 6762 6727
Germany	+49 (711) 78954-510
India	+91 (129) 4097100
Japan	+81 (43) 213-2191
Korea	+82 (51) 636-7080
The Netherlands	+31 (23) 5661111
United States	+1 (970) 482-5811

Turbine Systems

Facility	Phone Number
Brazil	+55 (19) 3708 4800
China	+86 (512) 6762 6727
India	+91 (129) 4097100
Japan	+81 (43) 213-2191
Korea	+82 (51) 636-7080
The Netherlands	+31 (23) 5661111
Poland	+48 12 295 13 00
United States	+1 (970) 482-5811

You can also locate your nearest Woodward distributor or service facility on our website at:

www.woodward.com/directory

Technical Assistance

If you need to telephone for technical assistance, you will need to provide the following information. Please write it down here before phoning:

Your Name	
Site Location	
Phone Number	
Fax Number	
Engine/Turbine Model Number	
Manufacturer	
Number of Cylinders (if applicable)	
Type of Fuel (gas, gaseous, steam, etc)	
Rating	
Application	
Control/Governor #1	
Woodward Part Number & Rev. Letter	
Control Description or Governor Type	
Serial Number	
Control/Governor #2	
Woodward Part Number & Rev. Letter	
Control Description or Governor Type	
Serial Number	
Control/Governor #3	
Woodward Part Number & Rev. Letter	
Control Description or Governor Type	
Serial Number	

If you have an electronic or programmable control, please have the adjustment setting positions or the menu settings written down and with you at the time of the call.

Chapter 4.
Asset Management and Refurbishment Scheduling Period

This product is designed for continuous operation in a typical industrial environment and includes no components that require periodic service. However, to take advantage of related product software and hardware improvements, we recommend that your product be sent back to Woodward or to a Woodward authorized service facility after every five to ten years of continuous service for inspection and component upgrades. Please refer to the above service programs when returning products.

⚠WARNING

EXPLOSION HAZARD—Remove inputs. To prevent possible serious personal injury or damage to the equipment, be sure that all electric power, hydraulic pressure and gas pressure have been removed from the GS16DR Mass Flow Metering Leg before beginning any maintenance or repairs.

⚠WARNING

EXPLOSION HAZARD—Do not remove covers or connect/disconnect electrical connectors unless power has been switched off or the area is known to be non-hazardous.

Substitution of any component shall not be performed. Substitution of any component will compromise the certification of the Zone 1 protected product.

⚠WARNING

Due to typical noise levels in turbine environments, hearing protection should be worn when working on or around the GS16DR Flow Leg.

⚠WARNING

The surface of this product can become hot enough or cold enough to be a hazard. Use protective gear for product handling in these circumstances. Temperature ratings are included in the specification section of this manual.

Refer to manual 26418 for complete troubleshooting and maintenance instructions for the GS16DR Valve.

Refer to manual 26080 for complete field servicing and maintenance instructions for the Smart Pressure Transducer.

Product Specifications

Fuel Type	Natural Gas
Electrical Characteristics	
GS16DR Electrical Information	Refer to GS16DR manual 26418
Smart Pressure Transducer Electrical Information	Refer to Smart Pressure Transducer manual 26080
Mechanical Characteristics	
Weight	64 kg (140 lb)
Mounting	Pipes are suitable for mounting the weight of the product.
Fuel Connections	Refer to installation drawings.
Temperature	
Ambient Operating Temperature	(–40 to +93) °C / (–40 to +199) °F
Fuel Temperature	(–40 to +125) °C / (–40 to + 257) °F
Pressure	
Maximum Fuel Pressure	51.7 bar (750 psig)
Maximum Overboard Vent Pressure	0.69 bar (10 psig)
Pipe Flanges	
ASME Designation	Refer to installation drawing for flange interface connections.

Declarations

DECLARATION OF CONFORMITY

Manufacturer's Name:	WOODWARD GOVERNOR COMPANY (WGC)
Manufacturer's Address:	1000 E. Drake Rd. Fort Collins, CO, USA, 80525
Model Name:	GS16DR Gas Fuel Metering Valves
Conformance to Directive(s):	97/23/EC COUNCIL DIRECTIVE of 29 May 1997 on the approximation of the laws of the Member States concerning Pressure Equipment 94/9/EC COUNCIL DIRECTIVE of 23 March 1994 on the approximation of the laws of the Member States concerning equipment and protective systems intended for use in potentially explosive atmospheres 2004/108/EC COUNCIL DIRECTIVE of 15 December 2004 on the approximation of the laws of the Member States relating to electromagnetic compatibility and all applicable amendments
Marking(s):	Ⓔx Category 3 Group II G, Ex nA IIC T3 X IP56
Applicable Standards:	ASME B31.3 Process Piping, 2008 ASME Boiler and Pressure Vessel Code VIII, Div. 1, 2007/A08. ASME Boiler and Pressure Vessel Code II, Part D, 2007/A08 EN 1503-2 : 2000 Valves – Materials for bodies, bonnets, and covers – Part 2 : Steels other than those specified in European Standards EN 60079-0, 2004: Electrical apparatus for explosive gas atmospheres – Part 0: General Requirements EN 60079-15, 2005: Electrical apparatus for explosive gas atmospheres – Part 15: Type of protection 'n' EN 61000-6-4, 2007: EMC Part 6-4: Generic Standards - Emissions for Industrial Environments EN 61000-6-2, 2005: EMC Part 6-2: Generic Standards - Immunity for Industrial Environments
Conformity Assessments:	PED Module H – Full Quality Assurance, Certificate 90174
Notified Body For Pressure Equipment:	Moody International Certification Limited (1277) Merlin House, Stanier Way, Wyvern Business Park Derby DE21 6BF United Kingdom

We, the undersigned, hereby declare that the equipment specified above conforms to the above Directive(s).

MANUFACTURER

Signature

Suhail Horan

Full Name

Quality Manager

Position

WGC, Fort Collins, CO, USA

Place

Date 09/21/2009

Declaration of Incorporation

Woodward Governor Company
1000 E. Drake Road
Fort Collins, Colorado 80525
United States of America

Product: **GS16DR Gas Fuel Metering Valves**

The undersigned hereby declares, on behalf of Woodward Governor Company of Loveland and Fort Collins, Colorado, that the above-referenced product is in conformity with the following EU Directives as they apply to a component:

98/37/EC (Machinery)

This product is intended to be put into service only upon incorporation into an apparatus/system that itself will meet the requirements of the above Directives and bears the CE mark.

MANUFACTURER

Signature

Sam Coleman

Full Name

Compliance Engineering Supervisor

Position

WGC, Fort Collins, CO, USA

Place

July 17, 2009

Date

Declaration of Incorporation

Woodward Governor Company
1000 E. Drake Road
Fort Collins, Colorado 80525
United States of America

Product: **DLE Smart Pressure Transducer Manifold Assemblies**
Part Number: **9907-961, 9907-962, 9907-963, 9907-964 and similar**

The undersigned hereby declares, on behalf of Woodward Governor Company of Loveland and Fort Collins, Colorado, that the above-referenced product is in conformity with the following EU Directives as they apply to a component:

98/37/EC (Machinery)

This product is intended to be put into service only upon incorporation into an apparatus/system that itself will meet the requirements of the above Directives and bears the CE mark.

MANUFACTURER

Signature

Dan Gear
Full Name

Engineering Manager
Position

WGC, Fort Collins, CO, USA
Place

4/27/06
Date

DECLARATION OF CONFORMITY

Manufacturer's Name:	WOODWARD GOVERNOR COMPANY (WGC)
Manufacturer's Address:	1000 E. Drake Rd. Fort Collins, CO, USA, 80525
Model Name:	GS6 and GS6DR Gas Fuel Metering Valves
Conformance to Directive(s):	97/23/EC COUNCIL DIRECTIVE of 29 May 1997 on the approximation of the laws of the Member States concerning Pressure Equipment 94/9/EC COUNCIL DIRECTIVE of 23 March 1994 on the approximation of the laws of the Member States concerning equipment and protective systems intended for use in potentially explosive atmospheres 2004/108/EC COUNCIL DIRECTIVE of 15 December 2004 on the approximation of the laws of the Member States relating to electromagnetic compatibility and all applicable amendments
Marking(s):	Ⓔx Category 2, Group II G, Ex d IIB T3 or Category 3 Group II G, Ex nA IIC T3 IP56
Applicable Standards:	ASME B31.3 Process Piping, 2008 ASME Boiler and Pressure Vessel Code VIII, Div. 1, 2007/A08. ASME Boiler and Pressure Vessel Code II, Part D, 2007/A08 EN 1503-2 : 2000 Valves – Materials for bodies, bonnets, and covers – Part 2 : Steels other than those specified in European Standards EN 60079-0, 2006: Electrical apparatus for explosive gas atmospheres – Part 0: General Requirements EN 60079-1, 2007: Electrical apparatus for explosive gas atmospheres – Part 15: Type of protection 'd' EN 60079-15, 2005: Electrical apparatus for explosive gas atmospheres – Part 15: Type of protection 'n' EN 13463-1:2006; Non-electrical equipment for potentially explosive atmospheres, Part 1: Basic method and requirements EN 61000-6-4, 2007: EMC Part 6-4: Generic Standards - Emissions for Industrial Environments EN 61000-6-2, 2005: EMC Part 6-2: Generic Standards - Immunity for Industrial Environments
Third Party Certification:	LCIE 02ATEX6049 X for Category 2 only LCIE (0081) 33, Avenue du Général Leclerc F 92260 Fontenay-Aux-Roses, France
Conformity Assessments:	PED Module H – Full Quality Assurance, Certificate 90174 ATEX Production Quality Assessment Certificate ITS05ATEXQ4211
Notified Body For ATEX:	Intertek (0359) Intertek House, Cleeve Road Leatherhead, Surrey, KT22 7SB United Kingdom
Notified Body For Pressure Equipment:	Moody International Certification Limited (1277) Merlin House, Stanier Way, Wyvern Business Park Derby DE21 6BF United Kingdom

We, the undersigned, hereby declare that the equipment specified above conforms to the above Directive(s).

MANUFACTURER

Signature

Suhail Horan

Full Name

Quality Manager

Position

WGC, Fort Collins, CO, USA

Place

18 - JAN - 2010

Date

DECLARATION OF CONFORMITY

Manufacturer's Name:	WOODWARD GOVERNOR COMPANY (WGC) Industrial Controls Group
Manufacturer's Address:	1000 E. Drake Rd. Fort Collins, CO, USA, 80525
Model Name/Numbers:	DLE Smart Pressure Transducer Manifold Assemblies 9907-961, 9907-962, 9907-963, 9907-964, 9907-1124, 9907-1131
Conformance to Directive(s):	2004/108/EC COUNCIL DIRECTIVE of 15 December 2004 on the approximation of the laws of the Member States relating to electromagnetic compatibility and all applicable amendments. 94/9/EC COUNCIL DIRECTIVE of 23 March 1994 on the approximation of the laws of the Member States concerning equipment and protective systems intended for use in potentially explosive atmospheres.
Markings:	9904-1131: Ⓔx II 3 G Ex nA IIC T3 X All others: Ⓔx II 2 G EEx d IIB T4
Applicable Standards (All models):	EN61000-6-2, 2005: EMC Part 6-2: Generic Standards – Immunity for Industrial Environments EN61000-6-4, 2007: EMC Part 6-4: Generic Standards – Emissions for Industrial Environments EN50014, 1997 + Amendments 1 and 2: Electrical Apparatus for Potentially Explosive Atmospheres – General Requirements
(9904-1131):	EN60079-15, 2005: Electrical Apparatus for Explosive Gas Atmospheres – Part 15. Construction, Test, and Marking of Type Protection 'n' Electrical Apparatus.
(All others):	EN50018, 2000: Electrical Apparatus for Potentially Explosive Atmospheres – Flameproof Enclosure 'd'
3rd Party Certification (Zone 1):	LCIE 02 ATEX 6142X to Standards EN50014 and EN50018
Conformity Assessment:	ATEX Production Quality Assessment, ITS05ATEXQ4211
Notified Body For ATEX (Zone 1):	Intertek (0359) Intertek House, Cleeve Road Leatherhead, Surrey, KT22 7SB UK

We, the undersigned, hereby declare that the equipment specified above conforms to the above Directive(s).

MANUFACTURER

Signature	Joseph A. Driscoll
Full Name	Joseph Driscoll
Position	Engineering Manager
Place	WGC, Fort Collins, CO, USA
Date	5/22/08

Declaration of Conformity

In accordance with Pressure Equipment Directive 97/23/EC

Certificate No.: 23471A-10-DC-001

Description of Equipment:	2918-103 Standard GS6 Flow Leg
Hebeler Job Number:	23471A
Customer Part Number:	PS-447
Manufacturer:	HEBELER CORPORATION 2000 Military Road Tonawanda, NY 14150 USA
Notified Body for PED:	Hartford Steam Boiler International, GmbH (I.D. 0871) Landersumer Weg 40 D-48431 Rheine, Germany
Applicable Directive(s):	2004/108/EC Electromagnetic Compatibility Directive (EMC) 97/23/EC Pressure Equipment Directive (PED) 94/9/EC Potential Explosive Atmosphere Directive (ATEX)
Applicable Standard(s):	ASME B31.1 2007, 2009 Addenda BS EN ISO 15614-1: 2004 — BS EN 10204:2004 — BS EN 287-1:2004 BS EN 13463-1:2002-04 — BS EN 60079-14:2003 — IEC 60204-1:2005-10 BS EN 61000-6-4:2001 — ISO 14121-1:2007 — BS EN 12100-2:2003 BS EN 60079-15:2005 — BS EN 983:1996 — BS EN 61000-6-2:2005
PED Compliance:	The Piping system have been assessed under: Conformity Assessment Module H – Full Quality Assurance. Certificate No.: HSBI-08-01-044 Safety accessories to be installed by the end user to protect this product from over-pressurization. Safety accessories for this product must be CE marked.
ATEX Compliance:	This product has been assessed under: Conformity Assessment Group II, Category 3 – Internal control of production. Equipment shall be marked as follows: Ⓔx II 2G Ex d IIB T3 X or Ⓔx II 3G Ex d nA IIB T3 X
2008/385/EC RoHS Compliance:	This product is Exempt under Directive 2008/385/EC per Article 2.1
2002/96/EC WEEE Compliance:	This product is Exempt under Directive 2002/96/EC WEEE (and Amended 2008/34/EC) per Article 2 – 1. Scope and Annex 1-A

Hebeler Corporation declares that the equipment detailed herein conforms to all above listed directives.

Ahmed Lahrache 2010.05.11 13:48:15 -04'00'

Signature

5/11/2010

Date

Ahmed Lahrache / Chief Operating Officer

Name / Title

Tonawanda, New York

Place

We appreciate your comments about the content of our publications.

Send comments to: icinfo@woodward.com

Please reference publication 26597A.

B26597:A

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Email and Website—www.woodward.com

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