WOODWARD

Product Manual 26574
(Revision A)
Original Instructions

LM6000PD/PF 3- and 5-DVP Cabinet

Single or Redundant DVP Power Input Versions

Installation 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 Out-of-date translations are marked with ⚠.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.

Revisions—Changes in this publication since the last revision are indicated by a black line alongside the text.

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

North American Compliance:
These listings are limited only to those units bearing the CSA identification.

CSA: CSA Certified for Ordinary Locations for use in Canada and the United States

Special Conditions for Safe Use:

This equipment is to be installed by professional service personnel according to the instructions given in this manual.

Wiring must be in accordance with the authority having jurisdiction. PERMANENTLY CONNECTED EQUIPMENT requires the special considerations to satisfy the CEC and the Canadian deviations to IEC 61010-1, including overcurrent and fault protection as required.

This device is considered permanently connect and requires a fixed wiring installation. Protective Earth Grounding is required by the input PE terminals (see Chapter 2, Installation).

A disconnection device is not supplied with the system. A disconnecting switch or circuit breaker shall be included in the building installation. It shall be in close proximity to the equipment and within easy reach of the operator. This device shall be clearly marked as the disconnecting device for the equipment. The disconnecting switch or circuit breaker shall not interrupt the protective earth conductor.

To ensure stability and to prevent accidental tipping, lift equipment only as described in the installation chapter, and bolt the system cabinet to the building structure before operation of the equipment.

Measurement inputs are classified as permanently connected IEC measurement Category I and are designed to safely withstand occasional transient overvoltages up to 707 V (pk).

⚠WARNING

To avoid the danger of electric shock, do not use measurement inputs to make measurements within measurement categories II, III, or IV.

⚠WARNING

The control cabinet contains hazardous live voltages. Only individuals who have received proper training should open the cabinet door and perform service. Equipment should be isolated or disconnected from hazardous live voltages before servicing.

Safety Symbols


Alternating current


Direct current


Caution, risk of electrical shock


Caution, refer to accompanying documents


Protective conductor terminal

Chapter 1.
General Information

Introduction

The LM6000PD/PF DVP Cabinets uses three or five Digital Valve Positioners (DVP) used to control actuation systems on reciprocating engines and turbines. This DVP Cabinet accepts redundant CAN inputs and redundant Power Inputs (applicable configurations).

The 5-DVP cabinet consists of 5 DVP assemblies mounted on a steel plate, installed vertically inside an IP66 metal cabinet. Each DVP is powered by a separate 125 V (dc) bus, and is individually protected by a 20 A (dc) circuit breaker. At the bottom of the cabinet there is a separate 125 V (dc) branch connected to a power supply (protected by a 5 A circuit breaker), that provides 24 V (dc) power. This power is then fed through a thermostat, to operate either a DC fan or a heating element. Input-output cables enter-exit the cabinet through the bottom. A redundant DVP Power Input Version is also available.

The 3-DVP cabinet is identical to the 5-DVP cabinet except that it only incorporates 3 DVP assemblies.

The operation of the DVP cabinet is very tightly tied to the operation of the DVP that is inside this cabinet. Woodward manual 26329 documents the operation and capabilities of the DVP itself. Also refer to the Woodward Control Wiring Diagram for wiring to the cabinet. This diagram is included with the cabinet.

Purpose and Scope

The purpose of this manual is to provide the necessary background information for installing the DVP cabinet appropriately. Topics covered include mechanical installation and electrical wiring.

IMPORTANT

Be sure that you have the latest revision of this manual. Updates are available through Woodward. Contact your Customer Service Representative or check the Woodward website (www.woodward.com/searchpublications.aspx).

How to Use the DVP Cabinet

The following summarizes how to install DVP cabinet:

- Unpack and inspect the hardware.
- Mount and wire the hardware following the procedures and recommendations in Chapter 2.
- DVP Electronic configuration (2-board stack) and operation can be found in DVP manual 26329.
- Troubleshooting guidelines for the system are provided in this manual.
- Specifications are provided in the DVP Control Specifications section.

Intended Applications

The Woodward DVP is a state-of-the-art driver for electric actuation. It features a rugged and compact design. The DVP provides positioning based on a demand signal from the control systems, and it is designed for use with various Woodward valves and actuators. Multiple-input-type configurations allow the DVP to be used with many different turbine controllers. The driver supports redundant installations.

Chapter 2. Installation

⚠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.

⚠WARNING

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

The overspeed/misfire/detonation detection shutdown device must be totally independent of the prime mover control system.

Mechanical Installation Requirements

This section provides the general information for mounting location selection, installation, and wiring of the DVP cabinet. A detailed control wiring diagram is supplied with the cabinet.

Unpacking the Shipping Carton

- Before unpacking the cabinet, refer to the inside front cover of this manual and to the Regulatory Compliance page for warnings and cautions. Be careful when unpacking the cabinet. Check for signs of damage such as bent or dented panels, scratches, and loose or broken parts. If any damage is found, immediately notify the shipper.
- The DVP cabinet is shipped from the factory in a wooden crate. This crate or one that is similar should always be used for transport or storage of the DVP when it is not installed. Read the Electrostatic Discharge Awareness page before handling the DVP.
- Check for and remove all manuals, connectors, mounting screws, and other items before discarding the shipping box.
- Notify the shipper and Woodward if damage is found.

General Installation Notes and Warnings

When selecting a location for mounting the DVP cabinet consider the following:

- Protect the unit from environments harsher than IP66.
- Provide adequate ventilation for cooling. Shield the unit from radiant heat sources like direct sunlight.
- The DVP cabinet must be floor-mounted and secured with appropriate hardware to a flat surface.
- Allow adequate space around the unit for servicing and cable routing. All cabling must come from the bottom of the cabinet.
- Do not install near high-voltage or high-current devices.
- Verify that cable lengths do not exceed 40 m between the DVP cabinet and valve. Verify the cable lengths do not exceed 100 m between the DVP cabinet and the engine control system.

NOTICE **Do not mount the DVP cabinet near sources of excessive radiant heat such as exhaust manifolds or other excessively hot engine components.**

⚠WARNING **For communication wires, use wires with a temperature rating of at least 5 °C above surrounding ambient. All others use wires with a temperature rating of at least 10 °C above surrounding ambient.**

Mounting the DVP Cabinet

See Figure 2-1 for mounting-hole locations and mounting-hole pattern. The DVP cabinet should be securely attached to a surface that will not exceed the vibration limits specified in the DVP Cabinet Specifications in this manual.

- The DVP cabinet must be lifted using the eyebolts on top of the cabinet.
- Open the DVP cabinet door.
- Install the mounting bolts in the four lower mounting holes.
- Now tighten all four bolts to the required torque value for this bolt size grade.

Cabinet

The standard cabinet is a floor-mounted and front-access version. Input power and field cable access are available through the bottom of the cabinet. The system is shipped fully wired and assembled within the cabinet. The provided cabinet meets IP66 ratings using the supplied BG01 gasket.

Cabinet

Dimensions:	2000 mm (78.74 inches) high x 1000 mm (39.37 inches) wide x 400 mm (15.75 inches) deep
Material:	Door—2 mm painted steel. Surface-mounted with hinges including door frame and 25 mm hole pattern Body—Rear and roof panels: 1.5 mm painted steel. Four times folded and seam-welded frame, integrated double row hole pattern Rear Mounting Plate—3.0 mm / 11 gauge steel Bottom Plates—1 mm galvanized steel (three pieces)
Finish:	Structure powder paint, gray, RAL 7035
Ratings:	NEMA 4, 12, 13 or IP66 (achieved using gasket kit BG01 supplied with cabinet)
Operating Ambient Temperature:	–10 °C (14 °F) to +55 °C (131 °F)
Weight:	3-DVP cabinet, 219 kg (483 lb) (including DVPs) 5-DVP cabinet, 235 kg (518 lb) (including DVPs)

DVP Cabinet Outline Drawing

Figure 2-1 shows the DVP outline and mounting holes location.
NOTE: W = 1000 mm and H = 2000 mm.

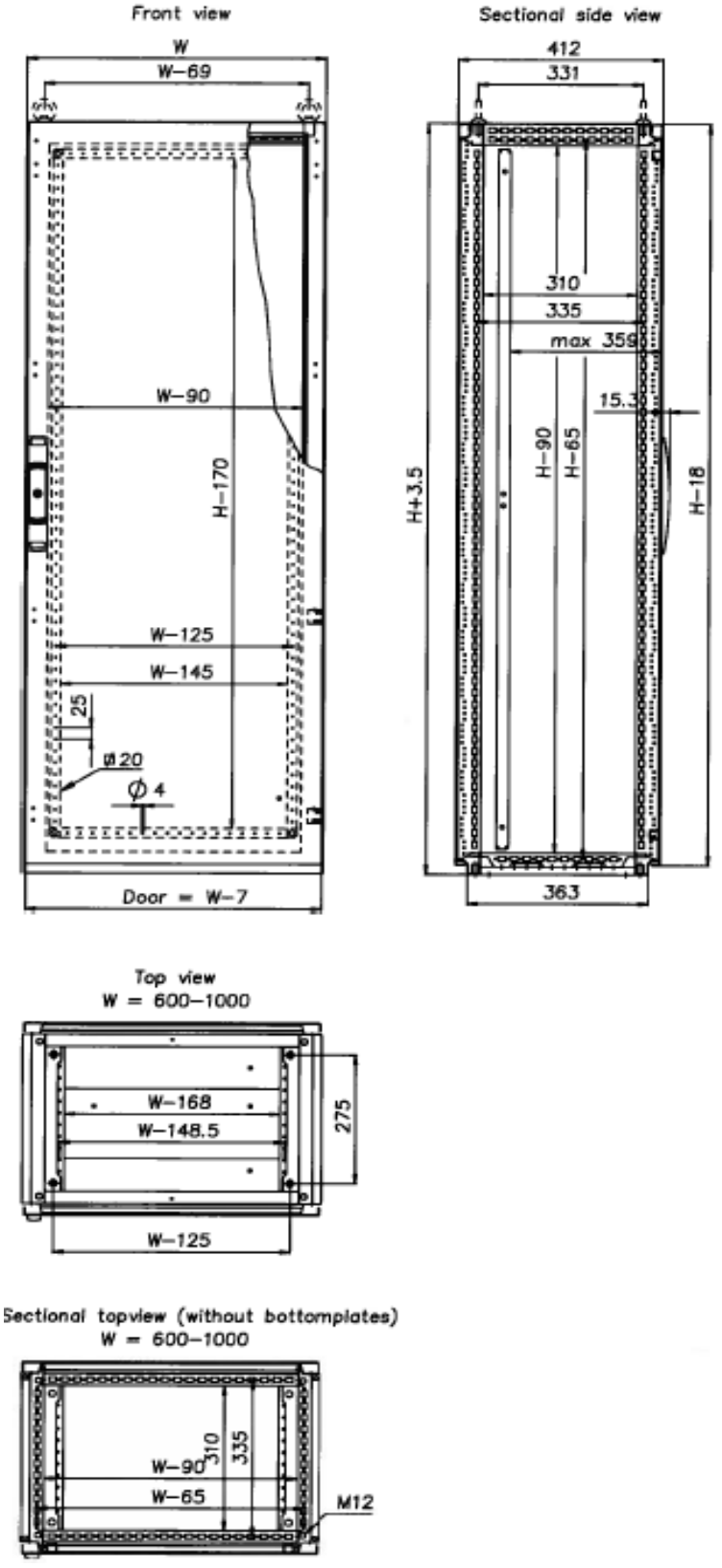


Figure 2-1. Outline Drawing

Wiring, Grounding and Shielding

The use of shielded-twisted cabling is required where indicated by the control wiring diagram in order to insure EMC compliance. Terminate the cable shield as indicated by the control wiring diagram, following the installation notes below.

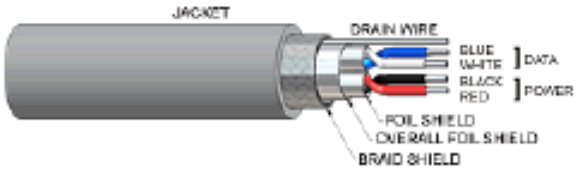
Installation Notes

- All wires will be twisted shielded wiring except for input power and actuator drive wiring which will be twisted wires. The shield must be passed through the interface connector using a pin(s) of the connector. These shields will be terminated inside the DVP cabinet.
- All wires will be inside an overbraid shield except the input power. This overbraid shield will be bonded to the interface connector using a 360-degree bond.
- If the shielded cables described above are contained in a metal armored cable, the metal armor (shield) will be grounded to the same interface connectors.
- Use CAN Communication Cable specified in Figure 2-2.
- Terminal blocks for 125 V (dc) will accept 2.5 mm² to 25 mm² (12–4 AWG). PE Ground Terminal Block connections are available next to each 125 V (dc) Input.
- Terminal blocks for CAN will accept 0.2 mm² to 6 mm² (24–10 AWG).
- Wire per the control wiring diagram provided with the DVP cabinet. See Figure 2-4 for typical wiring of a DVP.
- Use the cable clamps provided to support the DVP cables at the bottom rail. See Figure 2-3.

NOTICE

Failure to provide shielding can produce future conditions which are difficult to diagnose. Proper shielding at the time of installation is required to assure satisfactory operation of the product.

Thick cable is preferred and recommended for all uses. Most CAN / DeviceNet™ (trademark of ODVA, Inc.) cable is not rated for temperatures above 80 °C so be careful during installation to avoid hot routing areas. Always use shielded cables for improved communications in industrial environments.



Impedance:	120Ω ±10% at 1MHz
DC resistance:	< 7ohms per 1000 ft.
Cable capacitance:	12 pF/ft at 1kHz
Propagation delay	1.36 ns/ft (maximum)
Data Pair:	19 strands, 1.0 mm² corresponds to 18 AWG, individually tinned, 3 twists/foot
Power Pair:	19 strands, 1.5 mm² corresponds to 15 AWG, individually tinned, 3 twists/foot
Drain / Shield Wire:	19 strands Tinned Copper shielding braid or shielding braid and foil
Cable type:	twisted pair cable. 2x2 lines
Bend Radius:	20x diameter during installation or 7x diameter fixed position
Signal attenuation:	0.13 dB/100 ft @ 125 kHz (maximum) 0.25 dB/100 ft @ 500 kHz (maximum) 0.40 dB/100 ft @ 1000 kHz (maximum)

Recommended Bulk Cable

Cable manufacturer Turck and Belden are widely available in North America. Turck, Lumberg, and Lapp Cable products are available in Europe. All cables below are suitable for DeviceNet trunk and drop cabling. Be aware that cable vendors may not use the same wire colors on individual conductors.

***Note:** Turck and Lumberg can also provide custom length cordsets with connectors.

Manufacturer	part number	Website
Belden	3082A DeviceNet Thick Cable–Grey	www.belden.com
Belden	3083A DeviceNet Thick Cable–Yellow	www.belden.com
Lapp Cable	2710-250 Unitronic DeviceNet Thick	www.lappcable.com
Lumberg	STL 613	www.lumbergusa.com
Turck	Type 575, DeviceNet Thick Cable – Grey	www.turck.com

Figure 2-2. CAN Cable

Figure 2-3. DVP Cable Clamps to Secure to Rail

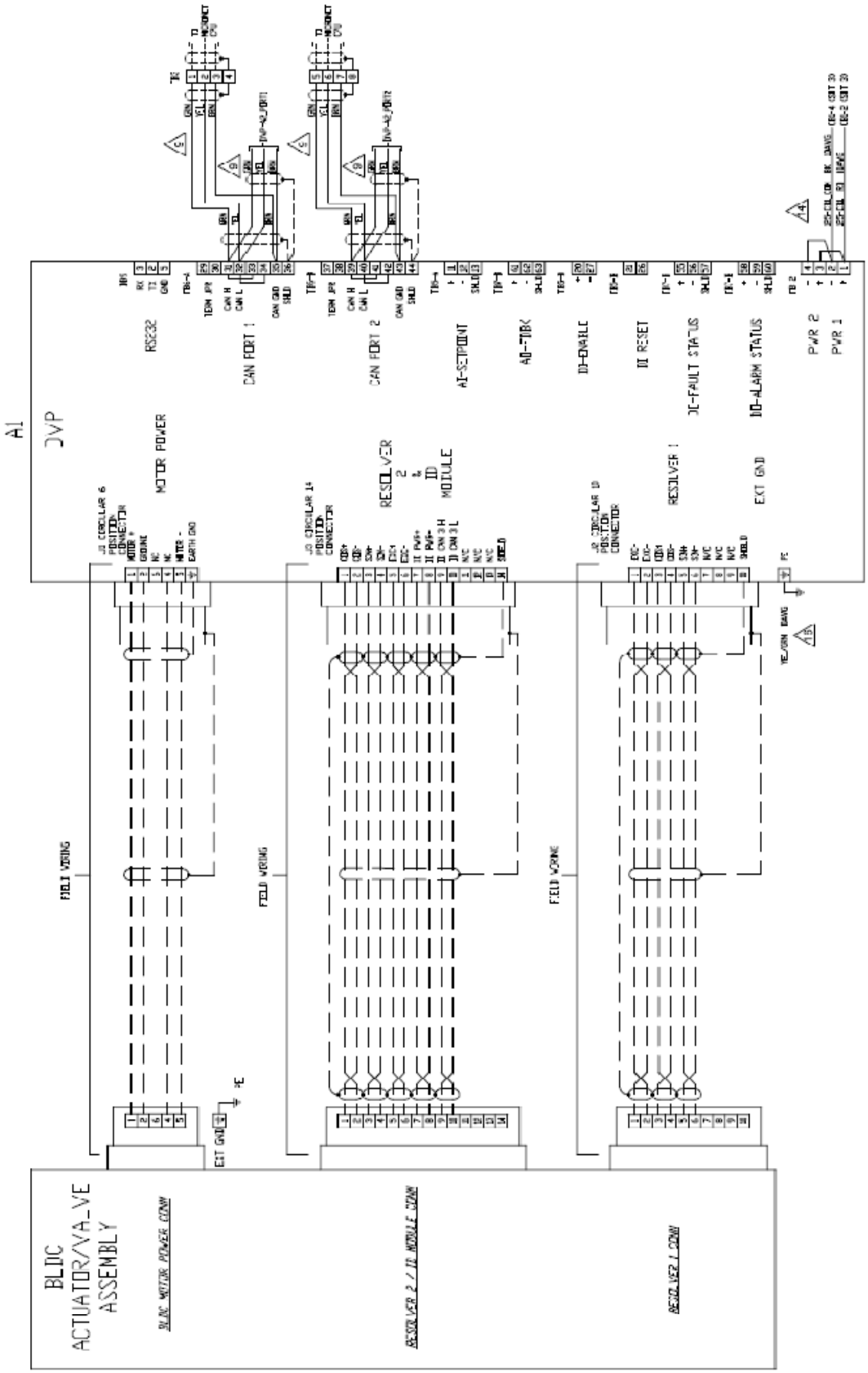


Figure 2-4. Typical DVP Wiring

Power Input Requirements

There are single and redundant DVP Power Input versions. Each DVP is powered by a separate 125 V (dc) bus (single or redundant), and is individually protected by a 20 A (dc) circuit breaker(s). There is also a separate 125 V (dc) branch connected to a power supply (protected by a 5 A circuit breaker), that provides 24 V (dc) power. This power is then fed through a thermostat, to operate either a DC fan or a heating element. Input-output cables enter-exit the cabinet through the bottom.

IMPORTANT

For the redundant DVP Power Input version, please observe the following:

DVP A1–A5 are powered by redundant 125 V (dc) sources
Turn-off both CB's to remove power to:

- **DVP A1: CB1 and CB1A**
- **DVP A2: CB2 and CB2A**
- **DVP A3: CB3 and CB3A**
- **DVP A4: CB4 and CB4A**
- **DVP A5: CB5 and CB5A**
- **PS1 (Fans and Heater): CB6**

To remove power from entire system, turn off all above CBs.

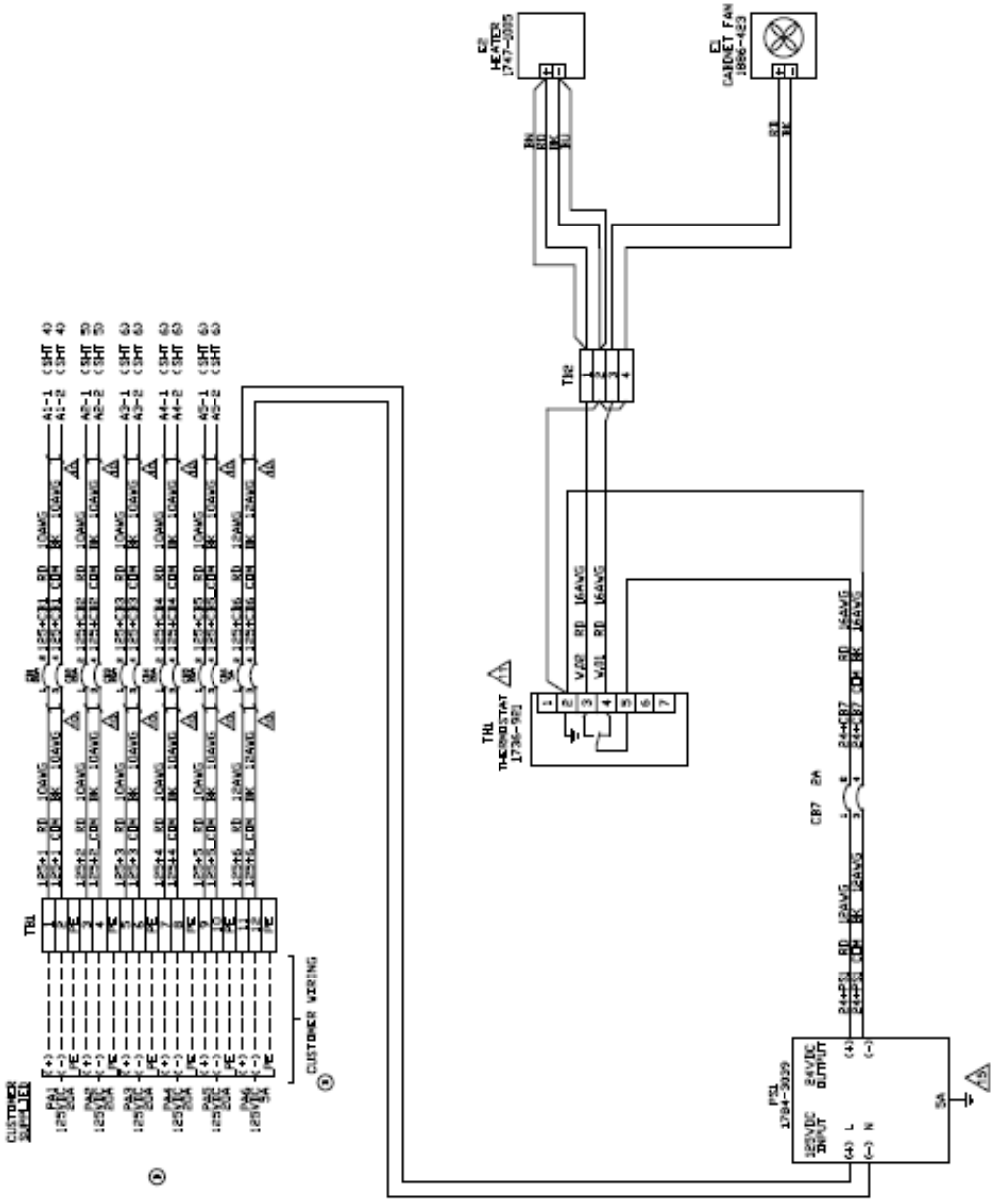


Figure 2-5. DVP Single Power Input Wiring

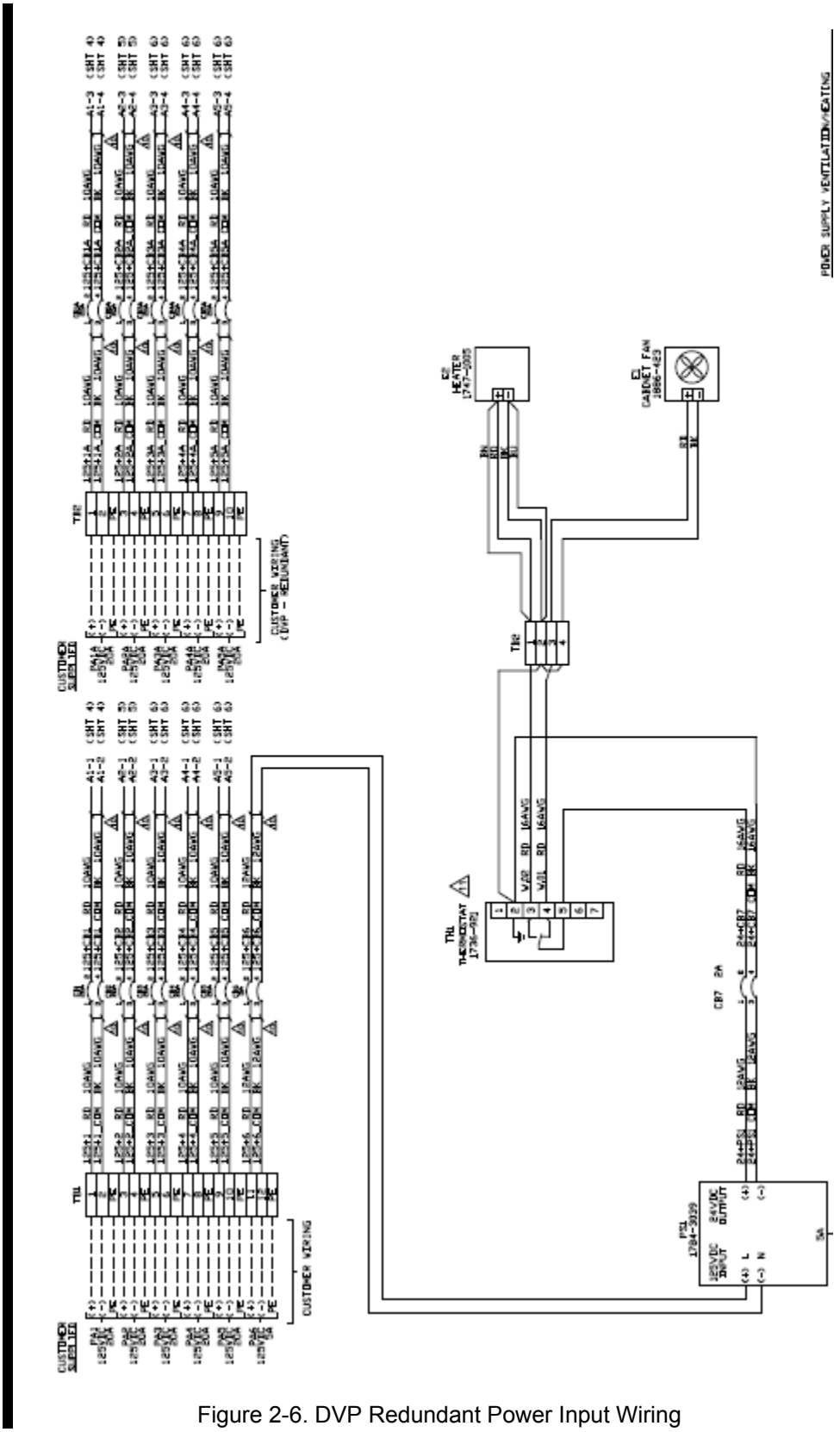


Figure 2-6. DVP Redundant Power Input Wiring

Chapter 3. Troubleshooting

WARNING

Follow all local plant and safety instruction and precaution before proceed with Troubleshooting.

Introduction

This chapter addresses several possible causes and recommended actions for many common problems that may be encountered with a system including the DVP cabinet, its power source, the actuator/valve assembly, and the wiring interconnect between these components.

Woodward manual 26329 provides a detailed troubleshooting guide for the DVP that is inside the DVP cabinet. The diagnostic codes received over the CAN interface and/or through the DVP Service Tool can be found in the DVP manual (26329).

WARNING

This troubleshooting guide is not recommended nor intended to resolve all possible issues. Contact Woodward Technical Support for assistance (see Chapter 4).

DVP Troubleshooting Guide

Diagnostic Indications	Probable Causes	Recommended Action
--- I/O Diagnostics ---		
Power-up Detection: No power to DVP Cabinet.		
	Open power wire to Cabinet.	Inspect power wiring to the DVP cabinet.
	Wiring is correct but the power is not present.	Ensure power breaker/fuse for DVP cabinet is operating properly.
Power-up Detection: No power to DVP Cabinet	If the breaker inside the cabinet is open, power will not reach the DVP module in the cabinet.	Check the breaker in the DVP cabinet is closed.
	Power is out of range, proper operation will not occur.	Ensure input voltage is 125 V (dc) +0 %, –28 %.
	The DVP is functioning improperly.	Refer to DVP manual 26329, Chapter 3, External DVP Diagnostics section.
No Communication Detection: No CAN Interface	Open CAN wire in the CAN cable.	Inspect CAN wiring to the DVP cabinet. Ensure CAN connector is installed properly.
	CAN Interface is not over a controlled impedance interface.	Ensure CAN terminators are in place. Ensure the CAN interface is over a controlled impedance cable (110 Ω).
	CAN Information is present at the input to the DVP Cabinet.	Check that the breaker in the DVP Cabinet is closed. Ensure the power supply output voltage is (120 ± 8) V (dc). Ensure the DVP is functioning properly. Refer to DVP manual 26329, Chapter 3, External DVP Diagnostics section. Use Service Tool to access the diagnostic from the DVP, Refer to DVP manual 26329, Chapter 4, Getting Started with the DVP Service Tool section.
Shutdown Detection: Alarm and Fault diagnostic codes received over CAN	Diagnostic codes received with system shutdown.	Use Service Tool to access the diagnostic from the DVP, Refer to DVP Manual 26329, Chapter 4, Getting Started with the DVP Service Tool section.
No Shutdown Detection: Alarm and fault diagnostic codes received over CAN	Diagnostic codes received with no system shutdown.	Use Service Tool to access the diagnostic from the DVP, Refer to DVP Manual 26329, Chapter 4, Getting Started with the DVP Service Tool section.

Chapter 4.
System Maintenance

Cleaning and decontamination are not required.

Cables and Connections

Periodically check the cables to make sure they are still in good condition, and check the connectors to make sure they are plugged in all the way.

Fans

Power must be removed prior to replacing the heater fan or the cooling fan. Only qualified personnel should replace the fans. As a preventive maintenance, it is recommended that the cooling fan be replaced every 50 000 hours and the heater fan assembly every 75 000 hours. For replacement, use fans of like specification, or purchase replacement fans from Woodward.

⚠WARNING **Substitution of components may impair suitability of the equipment and is not recommended.**

Chapter 5.
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.

DVP Cabinet Specifications

General Specifications

Woodward Part Numbers:	8301-1216, 8301-1217, 8301-1262 and 8301-1264
Description:	Digital Valve Positioner (DVP)
Power Supply Input:	125 V (dc) +0 %, –28 % (to each DVP—single power input or redundant)
Current Draw:	2 A steady state, 40 A peak for 200 ms (Current draw includes actuator power.)
Package Heat Dissipation:	43 W nominal per DVP
Dimensions:	(2000 x 1000 x 400) mm
Weight:	235 kg (518 lb), 5-DVP Cabinet 219 kg (483 lb), 3-DVP Cabinet

Environmental Specifications

Ambient Operating Temperature:	(–10 to +55) °C / (+14 to +131) °F 70 °C (2 hours transient)
Storage Temperature:	(–40 to +75) °C / (–40 to +167) °F
Storage Life:	2 years maximum
Humidity:	0 to 95% non-condensing
Altitude	<3000 m (<9842 ft)
Ingress Protection:	IP66 per IEC60529
Mechanical Vibration:	Woodward Specification RV5 (0.04 G^2/Hz, (10 to 500) Hz, 2 hours/axis, 1.04 Grms)
Mechanical Shock:	Woodward Specification MS2 (30 G, 11 ms half sine pulse)
EMI/RFI Specification:	EN61000-6-2: Immunity for Industrial Environments EN61000-6-4: Emissions for Industrial Environments Woodward imposed requirements: Conducted low frequency Immunity 50 Hz to 10 kHz

Revision History

Changes in Revision A—

- Added information about redundant DVP Power Input version

We appreciate your comments about the content of our publications.

Send comments to: icinfo@woodward.com

Please reference publication 26574A.

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Email and Website—www.woodward.com

**Woodward has company-owned plants, subsidiaries, and branches,
as well as authorized distributors and other authorized service and sales facilities throughout the world.**

Complete address / phone / fax / email information for all locations is available on our website.

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