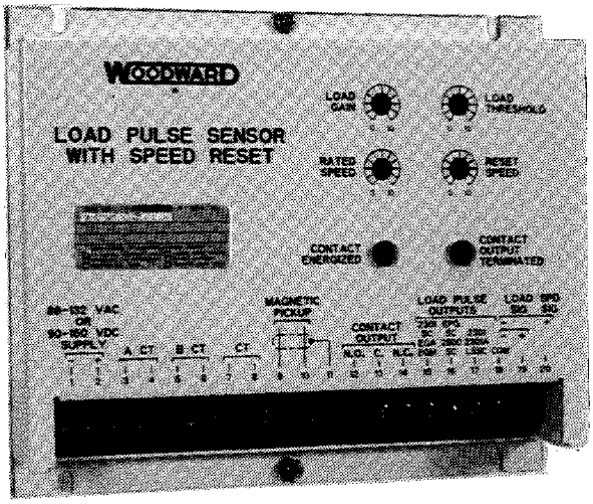
WOODWARD

Product Manual 82022
(Revision NEW)
Original Instructions



Load Pulse Sensor with Speed Reset

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 Out-of-date translations are marked with ⚠.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

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.

Chapter 1.
General Information

Description

The Woodward Load Pulse Sensor with Speed Reset module is made for use with engine-driven generator sets which need enhanced response to load changes. The use of the module helps the system meet transient load swings with minimal frequency excursions.

The load-pulse module monitors the power level of the generator, noticing changes before the engine speed drops or increases due to a change in load. When a change in generator load is sensed, the module sends a pulse to the engine-speed controller (2301, 2301A, EPG, or 2500) which causes an immediate increase or decrease in the signal to the actuator controlling the engine-fuel setting. This change overcomes the normal lag in response due to the effect of inertia in the engine and generator.

Figure 1-1 shows a system using a Load Pulse Sensor with Speed Reset module.

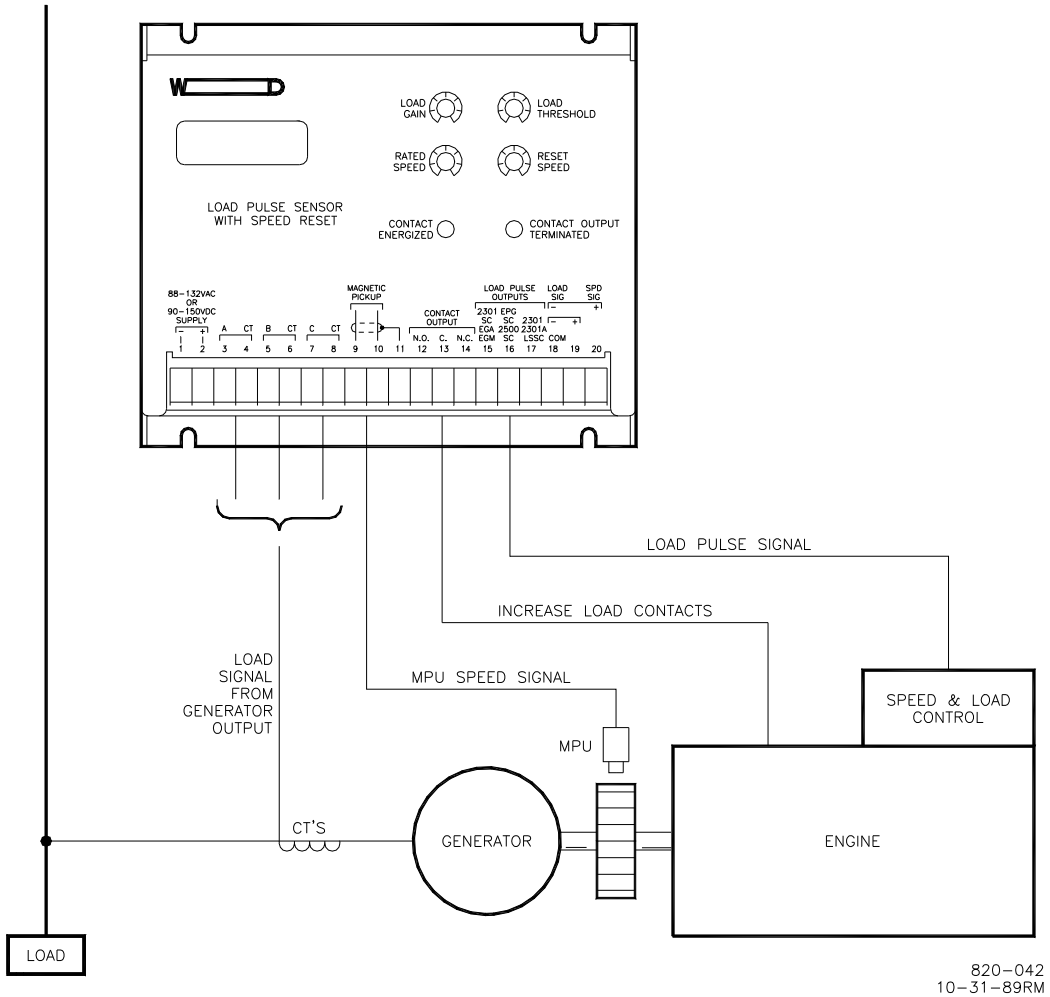


Figure 1-1. System using a Load Pulse Sensor with Speed Reset

Relay Contacts

The Load Pulse module includes relay contacts which can be used to modify the engine fuel or combustion system to better meet increased load conditions. The contacts close only on increases in load and remain closed until speed recovers or for a maximum of eight seconds.

The relay contacts are rated for a maximum of 5 A. Intermediate relays should be used if the devices being controlled by the relays draw current greater than 5 A.

Chapter 2.
Theory of Operation

General

The Load Pulse module senses the current load on the generator through current transformers on the three phases. (The module is not phase sensitive.) Any change in load is converted by the load-pulse dynamics into a load pulse signal which is sent to the connected speed or load control. This causes a change in that control's output, before the normal control channel has had an opportunity to recognize the change in load.

The load pulse signal sent to the control is proportional in length and magnitude to the amount of difference between the load reference and the actual load reading.

The load pulse signal is capable of changing the speed reference of the attached control about 2% from rated, enough to cause the control to call for maximum fuel in the case of increased load or minimum fuel in the case of reduction in load.

Part number 8272-687 provides pulse signals for auxiliary air only. The speed reference pulse is not present. Both air and speed pulses are available with part numbers 8272-8705 and 9900-465.

Relays

When load increases beyond a preset amount the module closes relay contacts. These contacts remain closed until speed returns to the preset position near the rated speed. If the speed does not leave the preset window, or if it does not return to the window within eight seconds, the module resets the relay contacts.

Adjustments

Four adjustments are available on the Load Pulse with Speed Reset module.

Load Gain

The Load Gain adjustment allows the module to be matched to the load signal from the current transformers. This adjustment allows for CT variations from the ideal 5-amp-at-rated load signal.

The Load Gain pot is the only setting available for the load pulse signal to the speed control.

Load Threshold

The Load Threshold adjustment allows setting the amount of load change permitted without causing the relay contacts to change position. This amount of change is called deadband in the block diagram.

The 0.6 second historical load average is provided to the comparator which also receives the present load. The difference between these two signals (historical and present) is provided to the deadband detector where it is compared to a reference load signal. If the difference is great enough to exceed the deadband setting the relay contacts are closed. (The contacts are not activated if the actual load change is less than the reference, even if the difference should exceed the deadband setting. The contacts are not activated for drops in load)

Speed Setting

Adjustment of the rated speed and the reset speed provides the automatic reset position for the relay. When the relay is activated it sets a comparator which compares the actual speed signal with the reset speed signal. When the actual speed goes above the reset speed signal it causes an automatic reset of the relay. If the actual speed signal does not drop below the reset speed level the comparator does not cause a reset of the relay.

Reset Timers

Two timers are involved with the relay reset. Whenever the relay is activated an eight-second timer is started. This timer continues to count until the automatic reset occurs because of speed recovery. Should the automatic reset not occur, the timer sends a reset signal after eight seconds.

When the eight-second timer causes a reset, it starts a one second timer which causes a red lamp to light while it is running.

A yellow lamp lights while the relay is activated.

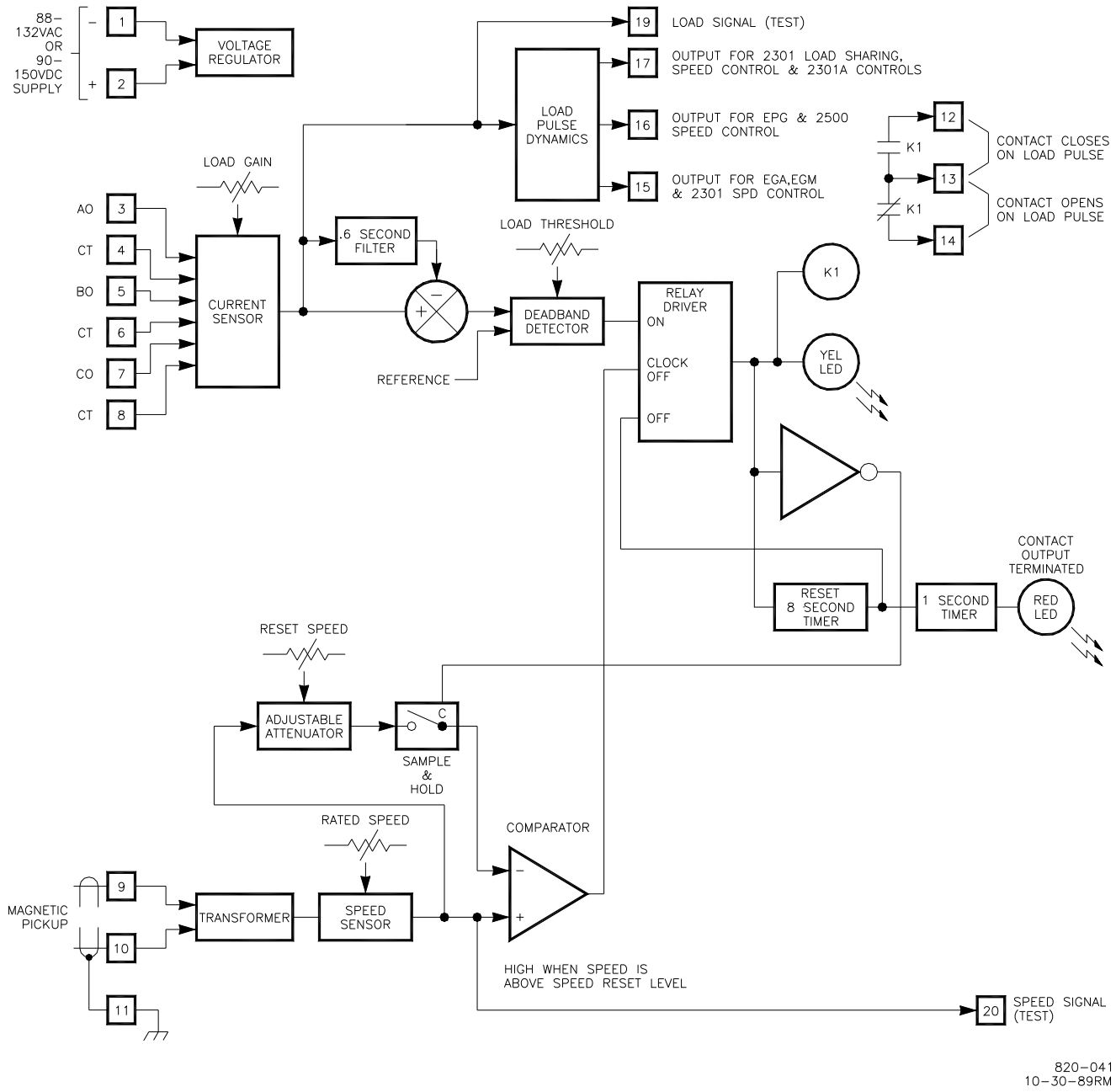


Figure 2-1. Block Diagram of Load Pulse with Speed Reset

Chapter 3. Installation

Unpacking

Before handling the control, read page ii, "Electrostatic Discharge Awareness." Be careful when unpacking the electronic control. Check the control for signs of damage such as bent or dented panels, scratches, and loose or broken parts. Notify the shipper of any damage.

Location Considerations

Consider these requirements when selecting the mounting location:

- Adequate ventilation for cooling
- Space for servicing and repair
- Protection from direct exposure to water or to a condensation-prone environment
- Protection from high-voltage or high-current devices, or devices which produce electromagnetic interference
- Protection from excessive vibration
- An ambient operating temperature range of –40 to +85 °C (–40 to +185 °F)

Do not mount the control on the engine.

Figure 3-3 is an outline drawing of the Load Pulse Sensor with Speed Reset module. Install the module near the electronic engine control. It may be installed in any position.

Electrical Wiring

External wiring connections and shielding requirements for a typical installation are shown in the plant wiring diagram, Figure 3-4. These wiring connections and shielding requirements are explained in the balance of this section.

Shielded Wiring

All shielded cable must be twisted conductor pairs. Do not attempt to tin (solder) the braided shield. All signal lines should be shielded to prevent picking up stray signals from adjacent equipment. Connect the shields to the terminals indicated in the plant wiring diagram. Keep shielding connections under 6 inches (15 cm) length.

Wire exposed beyond the shield should be as short as possible, not exceeding 6 inches (15 cm). The other end of the shields must be left open and insulated from any other conductor. Do not run shielded signal wires with other wires carrying large currents. See Application Note 50532, *EMI Control for Electronic Governing Systems*, for more information.

Where shielded cable is required, cut the cable to the desired length and prepare the cable as instructed below and shown in Figure 3-1.

1. Strip outer insulation from both ends, exposing the braided or spiral wrapped shield. Do not cut the shield on the control end. Cut off the shield on the end away from the Load Sharing Module.

2. Use a sharp, pointed tool to carefully spread the strands of the shield.

3. Pull the inner conductors out of the shield. Twist braided shields to prevent fraying.

4. Connect lugs to the shield and to the control wires. Number 6 slotted or round crimp-on terminals are used for most installations. Connect the wires to the appropriate terminals on the module.

Installations with severe electromagnetic interference (EMI) may require shielded wire run in conduit, double shielded wire, or other precautions. Contact Woodward for additional information.

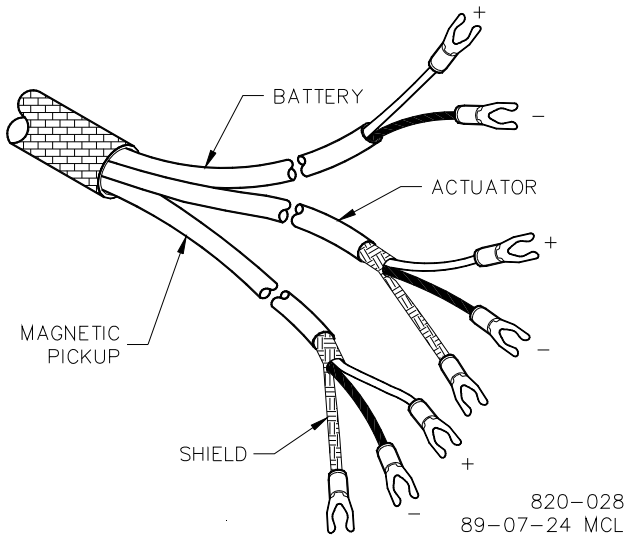


Figure 3-1. Preparation of Shielded Cables

Electrical Connections

Power Supply

The Load Pulse Sensor with Speed Reset module requires a supply voltage of 88 to 132 Vac or 90 to 150 Vdc. The module draws a maximum of 0.15 A. If appropriate voltage is available from the generator it may be used to power the module. Use 18 AWG (0.8 mm²) or larger wire to power the module.

Current Transformer Connections

Current transformers should be sized to produce 5 amps secondary current with maximum generator current. If a load-sharing control is being used on the engine the same CT current can be used for both controls. When using the same CTs, wire in series. The module is not phase sensitive, but all three phases must be used to provide an accurate load signal to the module.

Use 16 AWG (1.0 mm²) or larger wire to connect the CT circuits to terminals 3 through 8.

⚠WARNING

HIGH VOLTAGE—The Load Pulse Sensor contains CT burdens which are necessary to keep the current transformers from accumulating possible lethal voltages. Do not run the generator without the current transformers connected to either the control or to other burden resistors. Failure to follow this procedure can cause life threatening explosion of the current transformers and/or lethal voltage on the CT connections.

Magnetic Pickup

The Load Pulse module requires a magnetic-pickup (MPU) signal from the engine being controlled. This signal may be provided by the same magnetic pickup that is installed for the electronic speed control (2301A, 2300, EPG, EGM, or 2500 control). A minimum signal of 1 volt, p to p, is required at both the load pulse and the speed control. It may be necessary to adjust the MPU sensor to obtain enough voltage to service both controls. Separate MPUs may be used, if desired.

The 9900-465 Load Pulse Sensor is designed to receive an MPU input of from 2000 to 6000 Hz.

Use shielded wire from the MPU to sensor terminals 9 and 10. Connect the shield to terminal 11. It is important to shield this wire to prevent an erroneous signal to the speed control.

Relay Contacts

The relay contacts are rated for a maximum of 5 amps. Most installations will call for terminals 12 and 13 to be connected, completing the circuit when the sensor reacts to an increase in load. Connections to terminals 13 and 14 will have an open circuit when the sensor reacts to an increase in load, with the circuit closed the rest of the time.

Output Connections

Connect the positive (+) connection to the speed or speed and load control to terminal 15, 16, or 17 as specified on the plant wiring diagram. Connect the negative (–) wire to terminal 18 (common). Use shielded wire for the connection to the speed control and ground the shield at the speed control end only, not at the Load Pulse Sensor.

2301A Load Sharing and Speed Control

Connect terminal 17 (+) from the Load Pulse module to terminal 25 on the 2301A Load Sharing and Speed Control. Connect terminal 18 on the Load Pulse module with terminal 26 on the 2301A control. These are the 2301 SPM-A or Precise Frequency Control terminals on the 2301A. If an SPM-A is used in the system connect terminal 26 on the 2301A to terminal 23 on the SPM-A. Connect terminal 24 on the SPM-A with terminal 18 on the Load Pulse module and connect terminal 17 from the Load Pulse module to terminal 25 on the 2301A.

If a Precise Frequency Control is being used connect terminal 26 on the 2301A to terminal 6 on the Precise Frequency Control. Connect terminal 7 on the Precise Frequency Control with terminal 18 on the Load Pulse module and connect terminal 17 from the Load Pulse module to terminal 25 on the 2301A.

2301A Speed Control

Connect terminal 17 (+) on the Load Pulse module with terminal 15 on the 2301A. Connect terminal 18 on the Load Pulse module with terminal 16 on the 2301A. If a Precise Frequency Control or an SPM-A is in the system connect it between terminal 16 on the 2301A Speed Control and 18 on the Load Pulse module.

2301 Load Sharing and Speed Control

Connect Terminal 17 on the Load Pulse module with terminal 24 on the 2301 control. Connect terminal 18 on the Load Pulse module with terminal 23 on the 2301 control.

If a Precise Frequency control or an SPM-A is in the system, connect it between terminal 23 on the 2301 control and 18 on the Load Pulse module. (See 2301A instructions.)

2301 Speed Control

Connect terminal 15 (+) on the Load Pulse module to terminal 14 on the 2301 Speed Control. Connect terminal 18 (-) on the Load Pulse module to terminal 15 on the 2301 Speed Control.

EPG or 2500 Control

Connect terminal 16 on the Load Pulse module with terminal 10 on the speed control. Connect terminal 18 on the Load Pulse module with terminal 2 on the speed control. (Reverse this wiring when using a 2500 reverse acting speed control.)

When more than one control is being used wire as shown in the accompanying diagram. A 3 microfarad, 50 V non-polarized capacitor, Woodward P/N 1660-277 or equivalent, is used with each additional module.

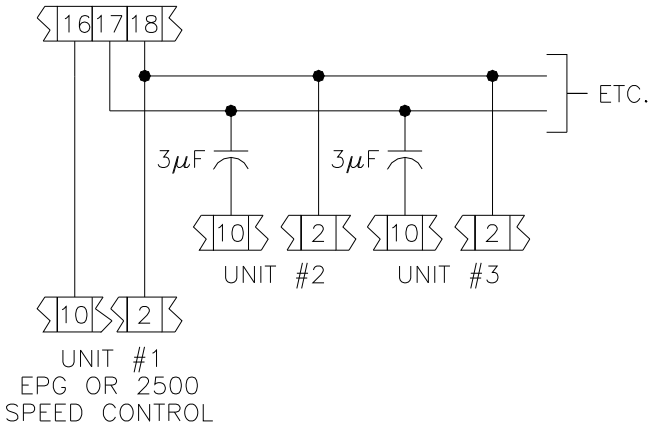


Figure 3-2. Multiple Unit Wiring

EGM Control

Connect terminal 15(+) on the Load Pulse module with terminal 11(+) on the EGM control. Connect terminal 18(–) on the Load Pulse module with terminal 12(–) on the EGM control. (The EGM terminals listed are typical. Consult the EGM plant wiring diagram for Load Signal Input terminals.)

EGA Control

Connect terminal 15 (+) on the Load Pulse module to terminal 12 on the EGA. connect terminal 18 (common) to terminal 13 on the EGA. If an SPM-A or precise Frequency Control is included in the system connect this device in series with the common connection.

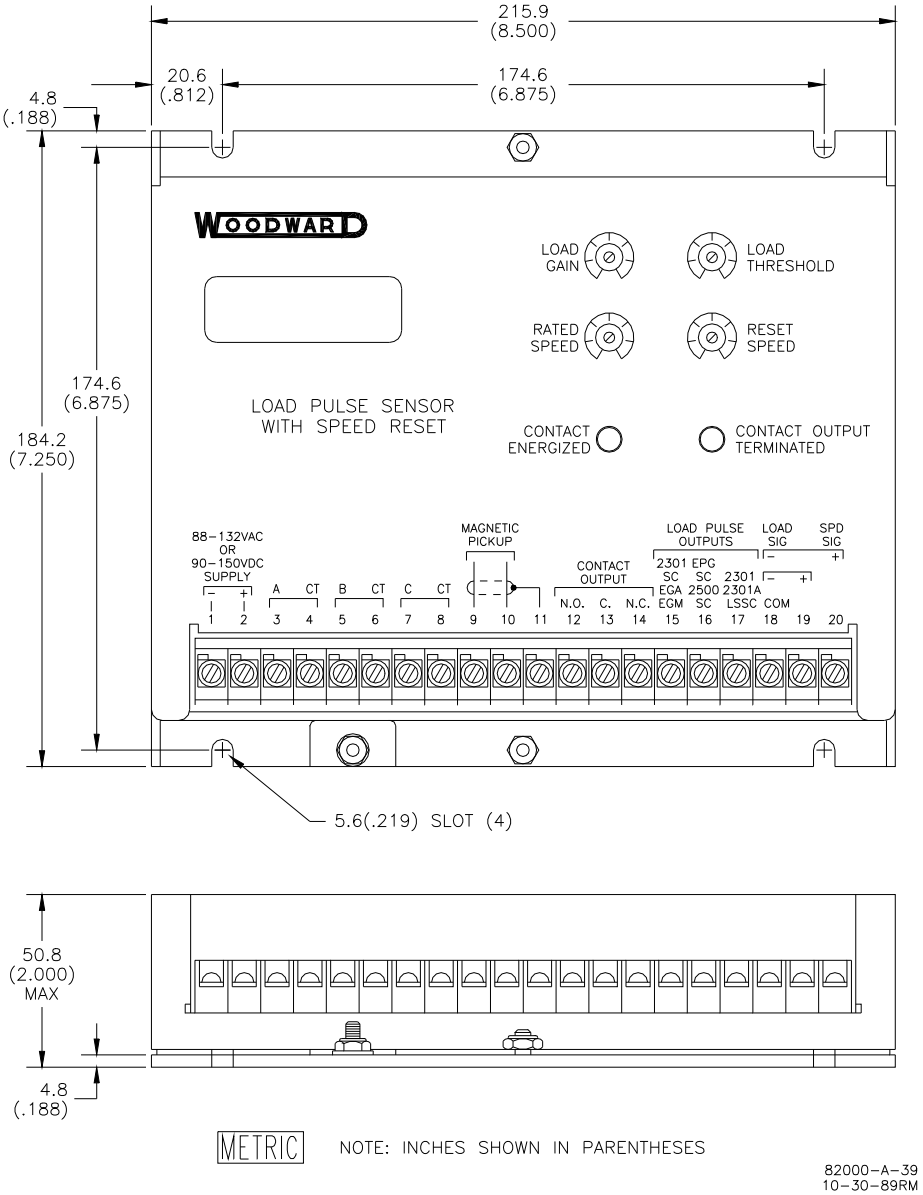


Figure 3-3. Load Pulse Sensor with Speed Reset Outline Drawing

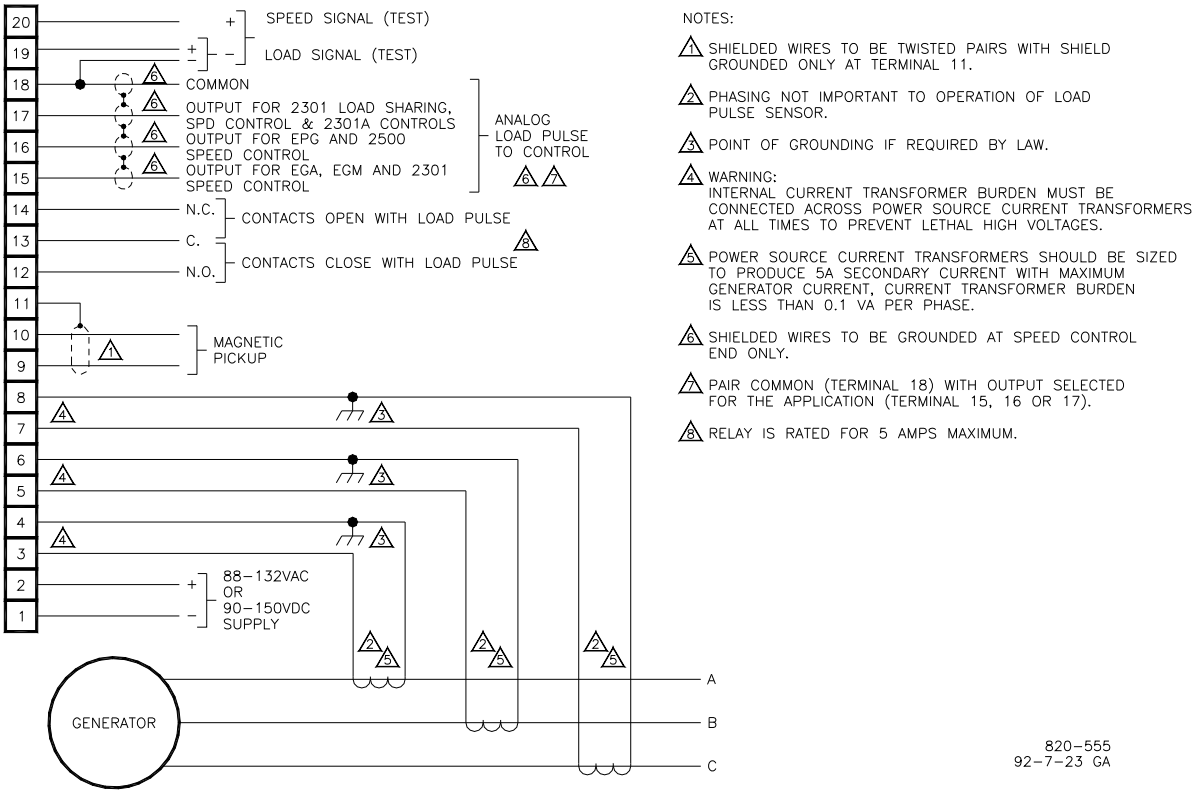


Figure 3-4a. Plant Wiring Diagram for 8272-805 and 9900-465

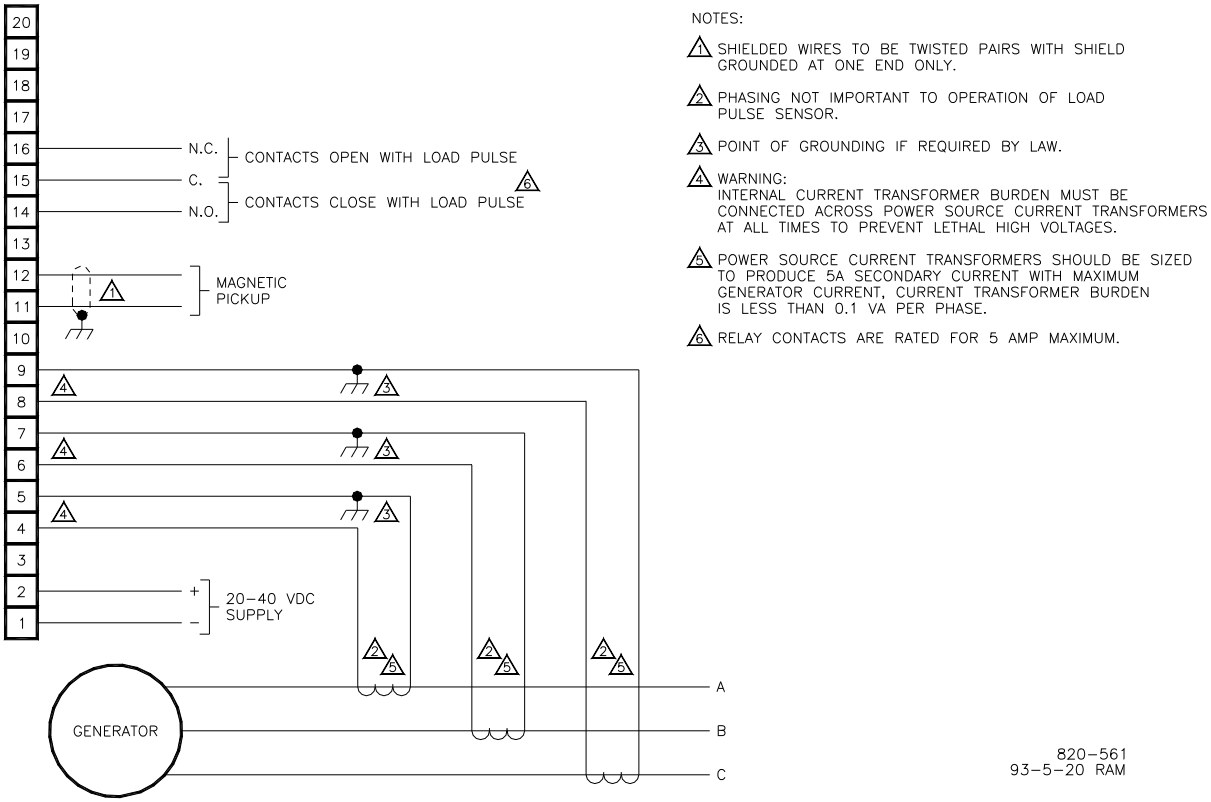


Figure 3-4b. Plant Wiring Diagram for Part Number 8272-687

Chapter 4.
Setup Procedure

1. Make sure that all installation procedures have been followed.

2. With the engine running at rated speed, load the generator to as close to 100% as possible. Monitor voltage across terminals 19 (+) and 18 (–). Set the LOAD GAIN adjustment on the Load Pulse module for 6.0 ±0.1 Vdc. (Reading will be proportional to the amount of load. If only 50% load is available, set the LOAD GAIN adjustment for 3.00 ±0.05 Vdc.) The one-turn potentiometer is nonlinear.)

3. Monitor the voltage across terminals 20 (+) and 18 (–). Adjust the RATED SPEED fully counterclockwise. With the engine running at rated speed, adjust RATED SPEED clockwise on the Load Pulse module for a reading of 6.0 ±0.5 Vdc. (The one-turn adjustment is non-linear. In some cases there may be more than one adjustment spot which produces 6.0 Vdc. Use the first setting from counterclockwise which provides 6.0 Vdc.)

4. Set the LOAD THRESHOLD adjustment on the Load Pulse module for the load change at which the load-pulse contacts across terminals 12 (N.O.), 13 (C) and 14 (normally closed) are to operate. With the LOAD THRESHOLD adjusted fully counterclockwise, a 10% load change will operate the contacts. A 75% load change is required to operate the contacts with the adjustment full clockwise. (The one-turn potentiometer adjustment is linear.)

5. Set the RESET SPEED adjustment on the Load Pulse module for the speed at which the contacts across terminals 12 (normally open), 13 (common) and 14 (normally closed) are to return to the normal position. With the RESET SPEED adjustment fully clockwise, the contacts will return to normal at 98.3% of rated speed. With the RESET SPEED adjustment fully counterclockwise, the contacts will return to normal position at 93.8% of rated speed. (The RESET SPEED adjustment is a one-turn, nonlinear potentiometer.)

The red light turns on for one second when the contacts have not reset after eight seconds. The yellow light turns on while the contacts are activated. If the red light turns on while the engine speed recovers in less than eight seconds, adjust the LOAD THRESHOLD clockwise or the RESET SPEED clockwise. (This indicates that the engine speed did not drop below the reset speed for the load change set by the LOAD THRESHOLD.)

IMPORTANT

The LOAD GAIN adjustment will effect the LOAD THRESHOLD setting and should always be set first. The RATED SPEED setting will effect the RESET SPEED setting and should always be made first.

Chapter 5.
Product Support and Service Options

Product Support Options

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

1. Consult the troubleshooting guide in the manual.
2. Contact the **OE Manufacturer or Packager** of your system.
3. Contact the **Woodward Business Partner** serving your area.
4. Contact Woodward technical assistance via email (**EngineHelpDesk@Woodward.com**) with detailed information on the product, application, and symptoms. Your email will be forwarded to an appropriate expert on the product and application to respond by telephone or return email.
5. If the issue cannot be resolved, you can select a further course of action to pursue based on the available services listed in this chapter.

OEM or 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 current list of Woodward Business Partners is available at **www.woodward.com/directory**.

Product Service Options

Depending on the type of product, the following options for servicing Woodward products may be available through your local Full-Service Distributor or the OEM or Packager of the equipment system.

- 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 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.

Flat Rate Repair: Flat Rate Repair is available for many of the standard mechanical products and some of the electronic 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.

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. 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 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's Full-Service Distributors offer various Engineering Services for our products. For these services, you can contact the Distributor by telephone or by email.

- 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.

Product Training is available as standard classes at many Distributor locations. Customized classes are also available, which can be tailored to your needs and held at one of our Distributor 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 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 one of the Full-Service Distributors listed at **www.woodward.com/directory**.

Contacting Woodward's Support Organization

For the name of your nearest Woodward Full-Service Distributor or service facility, please consult our worldwide directory published at **www.woodward.com/directory**.

You can also contact the Woodward Customer Service Department at one of the following Woodward facilities to obtain the address and phone number of the nearest facility at which you can obtain information and service.

Products Used In Electrical Power Systems

Facility	Phone Number
Brazil	+55 (19) 3708 4800
China	+86 (512) 6762 6727
Germany:	
Kempen	+49 (0) 21 52 14 51
Stuttgart	+49 (711) 78954-510
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

Products Used In 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

Products Used In Industrial Turbomachinery 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

For the most current product support and contact information, please visit our website directory at **www.woodward.com/directory**.

Technical Assistance

If you need to contact technical assistance, you will need to provide the following information. Please write it down here before contacting the Engine OEM, the Packager, a Woodward Business Partner, or the Woodward factory:

General

Your Name _____

Site Location _____

Phone Number _____

Fax Number

Prime Mover Information

Manufacturer _____

Engine Model Number _____

Number of Cylinders _____

Type of Fuel (gas, gaseous, diesel, dual-fuel, etc.) _____

Power Output Rating _____

Application (power generation, marine, etc.)

Control/Governor Information

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

Symptoms

Description _____

_____

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.

We appreciate your comments about the content of our publications.

Send comments to: icinfo@woodward.com

Please reference publication 82022.

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2012/9/Colorado