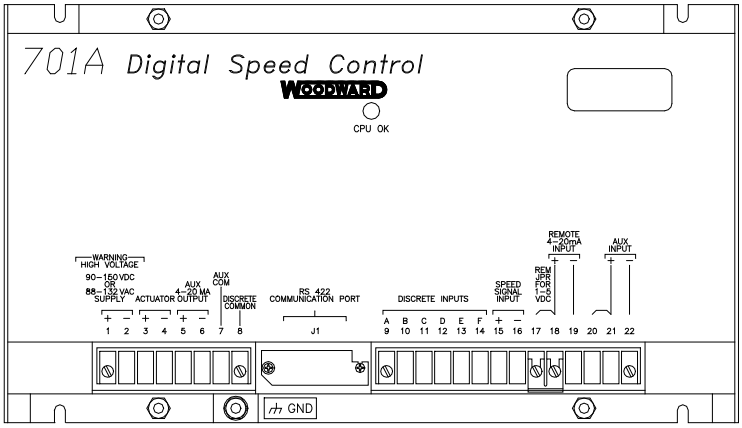
WOODWARD

Product Manual 02814
(Revision A)
Original Instructions



701A Digital Speed Control for Reciprocating Engines

8280-192, 8280-193, 8280-194

Installation and Operation Manual

IMPORTANT



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.

DEFINITIONS

- **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

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.



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.



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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.

NOTICE

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.

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*.

Revisions—Text changes are indicated by a black line alongside the text.

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Chapter 1.
General Information

Introduction

This manual describes the Woodward 701A Digital Speed Control, models 8280-192, 8280-193, and 8280-194.

Declaration of Incorporation

In accordance with the EMC Directive 89/336/EEC and its amendments, this controlling device, manufactured by the Woodward Governor Company, is applied solely as a component to be incorporated into an engine prime mover system. Woodward declares that this controlling device complies with the requirements of EN50081-2 and EN50082-2 when put into service per the installation and operating instructions outlined in the product manual.

IMPORTANT **This controlling device is intended to be put into service only upon incorporation into an engine prime mover system that itself has met the requirements of the above Directive and bears the CE mark.**

Application

The 701A Digital Speed Control controls the speed of reciprocating engines in mechanical drive or generator set service. The control includes an input for a 4 to 20 mA remote speed reference setting, an internal speed reference for local control of speed, and an auxiliary voltage input for load sensor connection in load sharing applications.

The 701A control system includes:
- a 701A Digital Speed Control;
- an external power source;
- a speed-sensing device;
- a proportional actuator to position the fuel rack;
- a terminal for adjusting control parameters;
- an optional load sensing device.

The 701A control (Figure 1-1) consists of a single printed circuit board in a sheet-metal chassis. Connections are via two terminal strips and a 9-pin subminiature D connector.

Control Options

The 701A control provides the following power supply input voltages, with 8 watts as the nominal power consumption at rated voltage:
- 18-40 Vdc (24 or 32 Vdc nominal; low-voltage control);
- 88-132 Vac 45-65 Hz (120 Vac nominal; high-voltage control);
- 90-150 Vdc (125 Vdc nominal; high-voltage control).

Discrete input voltages provide on/off command signals to the electronic control, such as Raise Speed, Lower Speed, etc. Each discrete input requires 10 mA at its nominal voltage rating:

- 24 Vdc where 24 volts is used for switching logic;
- internal auxiliary voltage provided on the control for use on high voltage versions of the 701A control in systems where 24 Vdc switching logic voltage is unavailable (dry contact switches or relays must be used).

Other available options are:

- proximity switch input for speed signal frequencies below 100 Hz;
- tandem actuator outputs;
- speed filter.

These models of the 701A Digital Speed Control are available with the following option combinations. The part number is stamped on the identification tag on the front of the control.

Part Number	Speed Input	Power Supply Voltage	Actuator Current	Speed Range
8280-192	Mag. Pickup	Low	0-200 mA	8-2100 rpm
8280-193	Mag. Pickup	High	0-200 mA	8-2100 rpm
8280-194	Mag. Pickup	Low	0-20 mA	8-2100 rpm

The magnetic pickup versions are limited to operating speeds providing 60 Hz magnetic pickup frequency minimum.

701A Digital Speed Control Accessories

Hand Held Programmer (Figure 1-2), part number 9907-205, is used for adjusting the 701A control. It plugs into the serial port of the control.

Generator Load Sensor, for load sharing or droop-parallel generator applications.

SPM-A Synchronizer, for synchronizing the generator phase to that of the power bus. The synchronizer generates a close generator breaker signal to parallel the generator with the power bus.

Power Output Sensor, for load sharing or droop operation in mechanical load applications.

Real Power Sensor, for load sharing or droop-parallel generator applications.

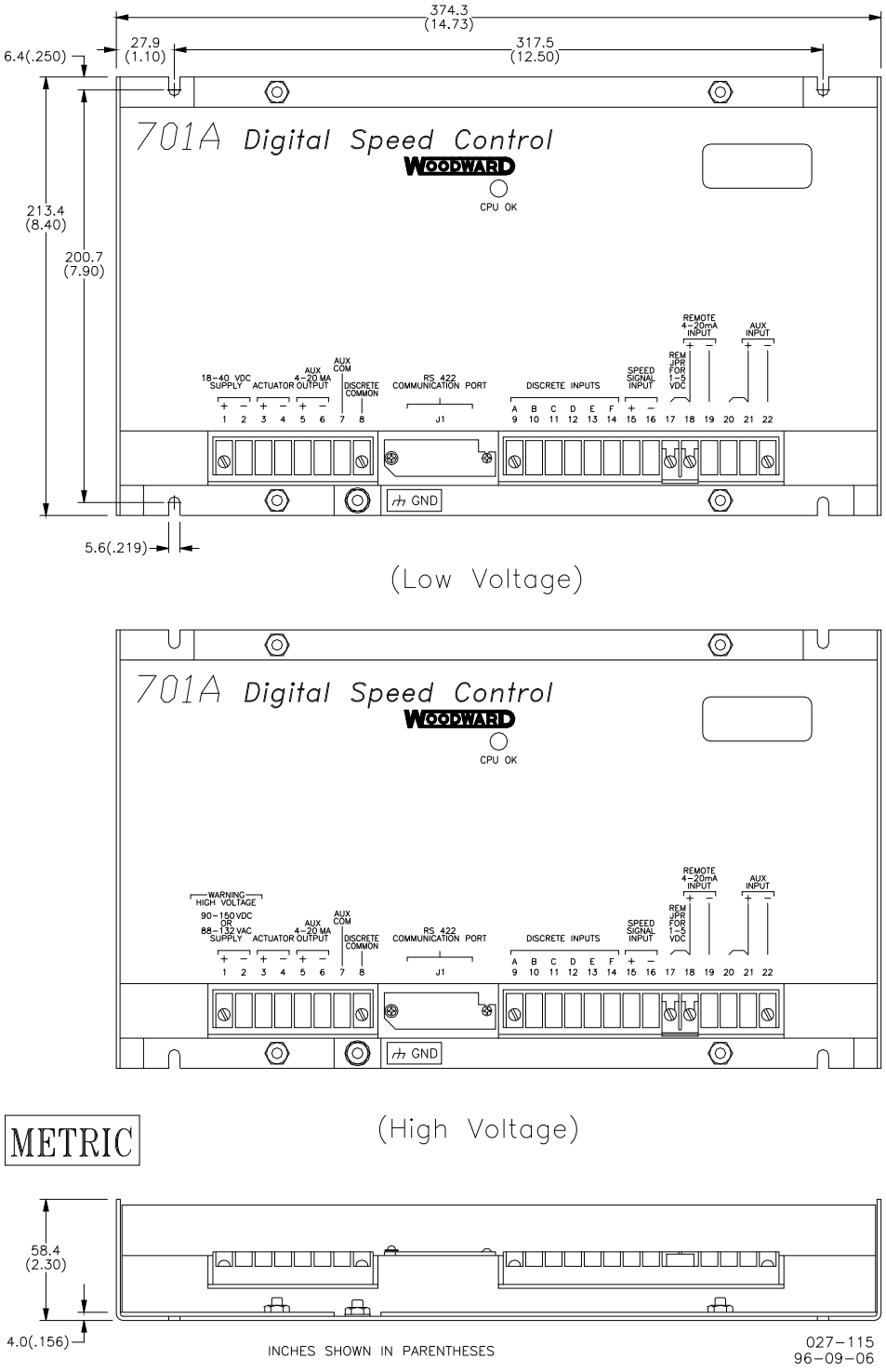


Figure 1-1. 701A Digital Speed Control

701A Menu Summary

1. — Dynamics Menu
1. Gain 1
2. Stability 1
3. Compensation 1
4. Gain Ratio 1
5. Window Width 1
6. Gain Breakpoint 1
7. Gain Slope 1

2 — Alternate Dynamics Menu
1. Gain 2
2. Stability 2
3. Compensation 2
4. Gain Ratio 2
5. Window Width 2
6. Gain Breakpoint 2
7. Gain Slope 2

3 — Speed Setting Menu
1. Raise Limit
2. Lower Limit
3. Idle Speed
4. Accel Time
5. Decel Time
6. Raise Rate
7. Lower Rate
8. 20ma Remote Ref
9. 4ma Remote Ref
10. 20ma Tach RPM
11. 4ma Tach RPM
12. Droop
13. Idle Breakpoint
14. Idle Droop
15. Torsional Filter

4 — Fuel Limiters and Control Output Menu
1. Max Fuel Limit
2. Start Fuel Limit
3. Start Speed
4. Idle Fuel Limit
5. Torque Limit BP
6. Min Torque Limit
7. BP Torque Limit
8. Max Torque Limit
9. 20ma Aux Actuator
10. 4ma Aux Actuator

5 — Configuration Menu
1. Configuration Key
2. Rated Speed
3. Num Gear Teeth
4. Num Samples
5. Engine Type
6. Actuator Sense
7. Dynamics Map
8. Remote Fault
9. Actuator Sense
10. Aux Output

6 — Calibration Menu
1. Calibration Key
2. Remote In Cal
3. Aux Input Cal
4. Aux Output Cal

7 — Display Menu 1
1. Engine Speed
2. Speed Reference
3. Actuator Output
4. Aux Output
5. Remote Input
6. Aux Input
7. Control Mode

9 — Display Menu 2
1. Run/Stop Contact
2. Idle / Rated
3. Lower Speed
4. Raise Speed
5. Dynamics Switch
6. Failsafe Override

0 — Status
1. Watchdog Status
2. Diagnostics Result
3. ROM Checksum

701A Control Specifications

Woodward Part Numbers:	
8280-192	701A w/ MPU, low-voltage power supply, 0-200 mA output
8280-193	701A w/ MPU, high-voltage power supply, 0-200 mA output
8280-194	701A w/ MPU, low-voltage power supply, 0-20 mA output
9907-205	Hand Held Programmer
Power Supply Rating	18–40 Vdc (24 or 32 Vdc nominal) 88–132 Vac 50/60 Hz (120 Vac nominal) 90–150 Vdc (125 Vdc nominal)
Power Consumption	8 watts nominal
Steady State Speed Band	MPU: 60–15 000 Hz (8–2100 rpm) proximity switch: 7.5–1000 Hz (8–2100 rpm)
Remote Speed Setting Input	4–20 mA
Tachometer Output	4–20 mA
Ambient Operating Temperature	–40 to +70 °C (–40 to +158 °F)
Storage Temperature	–55 to +105 °C (–67 to +221 °F)
EMI/RFI Specification	US MIL-STD 461C (Parts 5 & 9)

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Send comments to: icinfo@woodward.com

Please reference publication 02814A.

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