

721 Digital Marine Control



APPLICATIONS

The Woodward 721 Digital Marine Control controls reciprocating engines in marine propulsion applications with single or multiple engines operating at variable or fixed engine speed, with either fixed or controllable pitch propellers.

The 721 marine control provides excellent control performance for low, medium and high speed engines and has flexible dynamics which allow you to tailor the performance for each engine's operating conditions.

An advanced speed sensing algorithm has a torsional canceling feature with no speed sensing delay. This technology provides stable operation for all engine conditions.

For maximum safe operation and the added benefit of a ballhead backup governor, the 721 control can be used with the PG-EG family of marine governor/actuators with ballhead backup, with EMA all-electric marine actuators, or with any Woodward electric-hydraulic actuator.

The 721 Digital Marine Control is designed to meet applicable standards of ship classification agencies (type approvals pending).

DESCRIPTION

The Woodward Hand Held Programmer makes all adjustments quickly and easily. (A standard ASCII character computer terminal with an RS-422 serial port may also be used). The control saves all set points in permanent memory, which does not require batteries or other power sources to retain data. The Handheld Programmer prevents tampering with set points, yet allows entries to be easily changed when necessary.

Service Mode

Monitor Analog – monitors analog values (engine speed, speed reference, actuator output, limit condition, etc.)

Dynamic – adjusts the control (gain, reset, compensation, gain slope, etc.)

Speed Set – sets the control adjustments related to speed setting

Limit Set – sets the fuel limit adjustments that limit and define the actuator output current (manifold, torque, start, rough sea limit)

Monitor Alarm – monitors alarm conditions

Control Mode – monitors control conditions

Idle Droop – Sets idle droop

Configure Mode

This mode permits setting the control configuration (rated speed, gear teeth, actuator output, alarms, etc.).

- Flexible Dynamics for Marine Engines
- Advanced Speed-Sensing Algorithms for Smoother Steady-State Operation
- Custom or Standard Application Software
- Compact, Reliable, Single Chassis Control
- EU Directive Compliant; UL/cUL Listed

SPECIFICATIONS

Environmental Specifications

Operating Temperature	40 to +70 °C (-40 to +158 °F)
Storage Temperature	-55 to +105 °C (-67 to +221 °F)
Humidity	95% at 38 °C (100 °F)
.....	US MIL-STD 810D, Method 507.2, Proc. III
EMI/RFI Specification	EN 50082-2 and EN 50081-2 (and/or US MIL-STD 810D, Method 507.2, Procedure III)
Salt Spray	ASTM B 117-73
Mechanical Vibration	24–2000 Hz swept sine, 2.5Gs constant accel
Mechanical Shock.....	US MIL-STD 810C, Method 516.2, Proc. I, II, V

Control Characteristics

Steady State Speed Band	Rated speed $\pm 1/4$ of 1% over all operating conditions
Control Parameters.....	Flexible controls are available with the following functions: <ul style="list-style-type: none">•Map Dynamics Adjustment•Gain Slope•Window Control•Fuel Indexing Control•Compound Engine Load Sharing•Idle Droop•Fuel Control by Manifold Limiter, Torque Limiter, or Start Limiter

Inputs

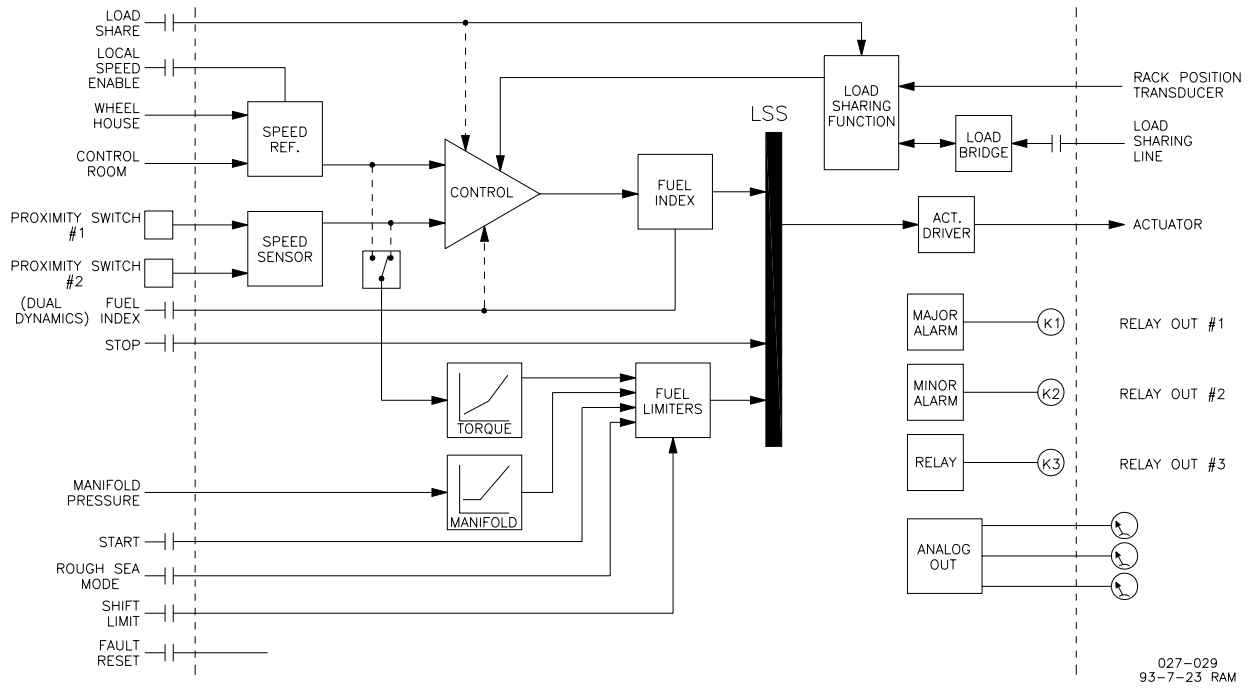
Speed Signal Input and	Range 1–2 magnetic pickups or 1–2 proximity switches
.....	400 Hz to 15 000 Hz (10–2100 rpm)
Power Supply	18–40 Vdc (24 or 32 Vdc nominal)
.....	88–132 Vac 50/60 Hz (120 Vac nominal)
.....	90–150 Vdc (125 Vdc nominal)
Power Consumption	18 W nominal
Discrete Inputs (8)	Typically assigned to any of the following: <ul style="list-style-type: none">•Start/Stop•Local Speed Setting Enable•Rough Sea Mode•Enable Load Sharing/(Dual Dynamics)•Enable Fuel Indexing/(Dual Dynamics)•Idle/Rated•Shift Fuel Limiter Level•Fault Reset
Analog Inputs (4)	Typically assigned to any of the following: <ul style="list-style-type: none">•1–2 Remote Speed Inputs (4–20 mA or 1–5 Vdc for remotely setting engine speed)•Manifold Air Pressure Input (4–20 mA or 1–5 Vdc from manifold air pressure sensor, for smoke limiting and to prevent overfueling during transients)•Rack Position Sensor (for load sharing)

Outputs

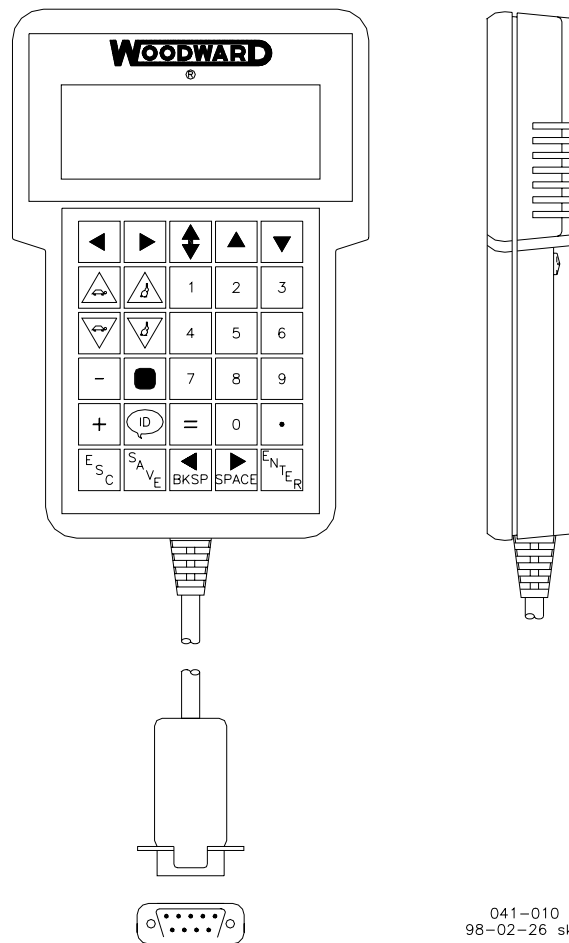
Actuator	20–160 mA or 4–20 mA
Analog Outputs (3)	Typically assigned to any of the following: <ul style="list-style-type: none">•Speed Input•Actuator Output•Limit LSS
Relays (3)	Major Alarm, Minor Alarm, and one other relay from any of the following: <ul style="list-style-type: none">•Speed Setting•Manifold Pressure•Rack Position•Fuel Limiter Condition•Rough Sea Mode•Speed Setting Match (bridge and control room, or other parameter)•Fuel Index Control

Compliance

UL/cUL.....	Listed
European Union (EU).....	Compliant with EMC Directive 89/336/EEC (some models)
American Bureau of Shipping (ABS).....	Some Models



721 FUNCTIONAL BLOCK DIAGRAM (TYPICAL EXAMPLE)



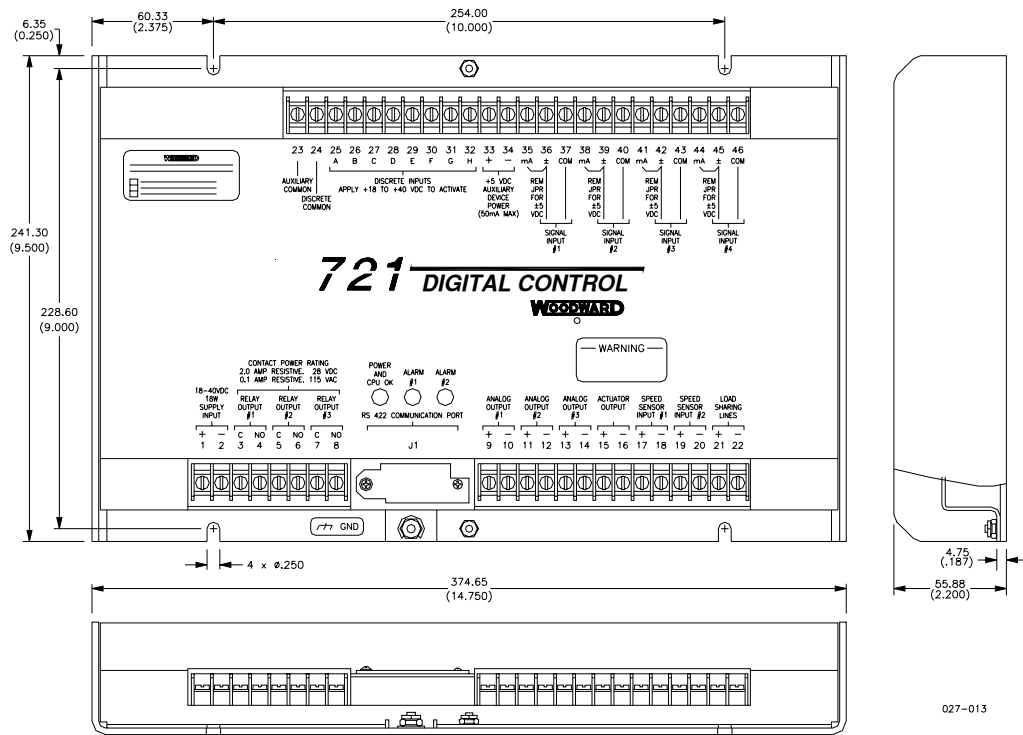
HAND-HELD PROGRAMMER

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

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

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

www.woodward.com



721 DIGITAL SPEED CONTROL OUTLINE DRAWING

DECLARATION OF INCORPORATION

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

NOTICE: 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.

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

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For more information contact: