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 ±¼ of 1% over all operating conditions
Control Parameters ..... Flexible controls are available with the following functions:

- •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 ..... Range1–2 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:

- •Start/Stop
- •Idle/Rated
- •Local Speed Setting Enable
- •Shift Fuel Limiter Level
- •Rough Sea Mode
- •Fault Reset
- •Enable Load Sharing/(Dual Dynamics)
- •Enable Fuel Indexing/(Dual Dynamics)

Analog Inputs (4) ..... Typically assigned to any of the following:

- •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:

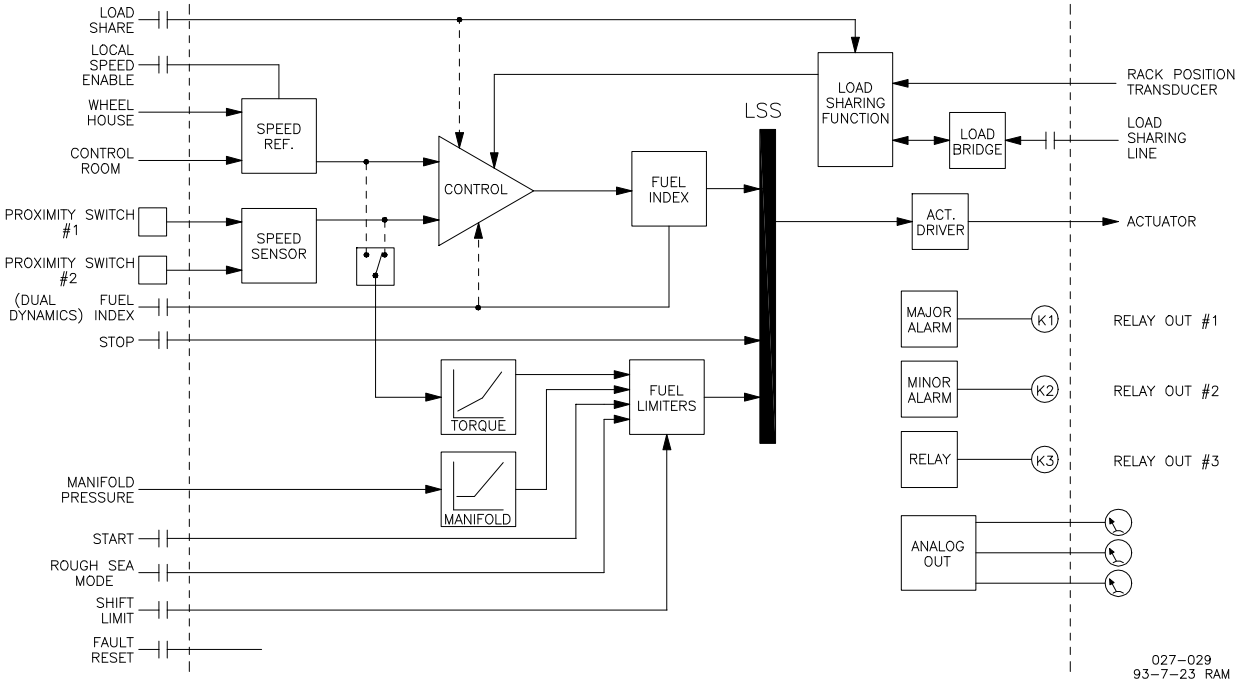
- •Speed Input
- •Speed Setting
- •Actuator Output
- •Manifold Pressure
- •Limit LSS
- •Rack Position

Relays (3)..... Major Alarm, Minor Alarm, and one other relay from any of the following:

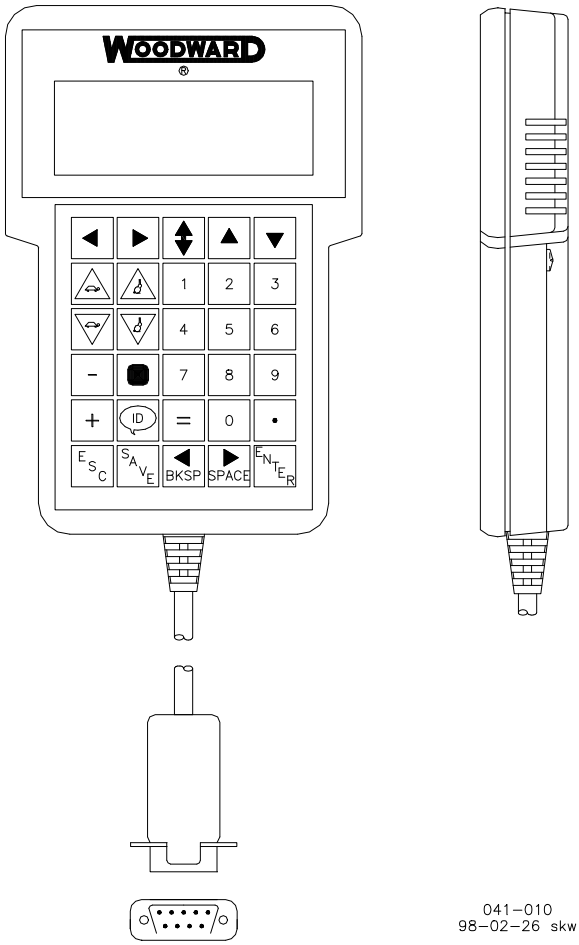
- •Fuel Limiter Condition
- •Fuel Index Control
- •Rough Sea Mode
- •Speed Setting Match (bridge and control room, or other parameter)

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

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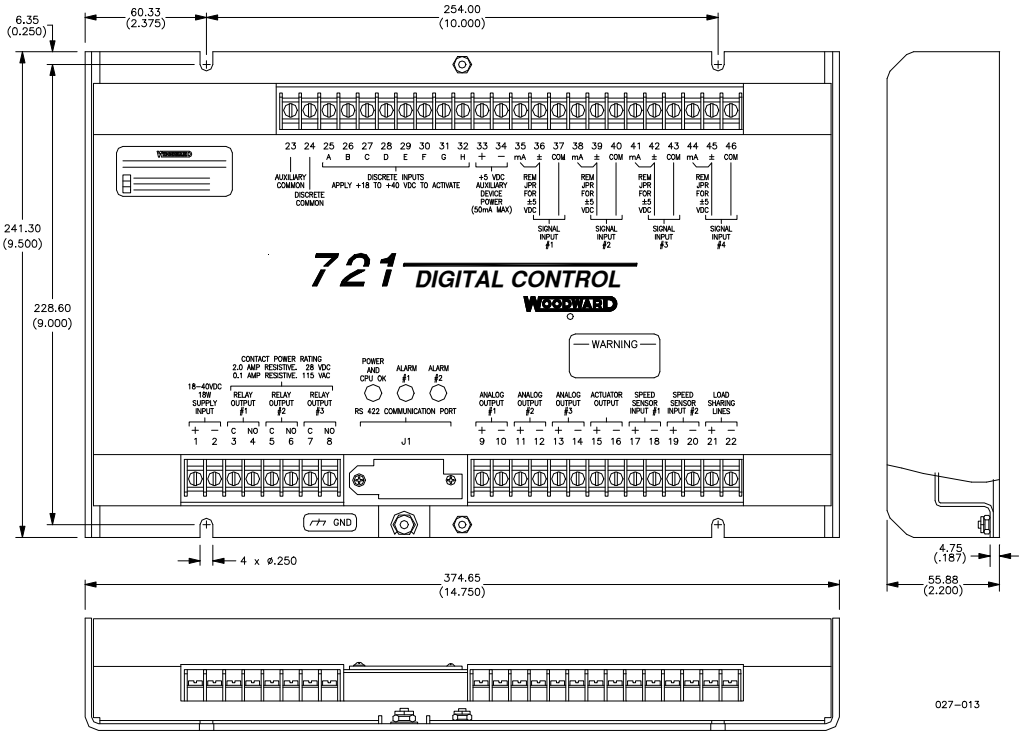

721 DIGITAL SPEED CONTROL OUTLINE DRAWING

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.

For more information contact:

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