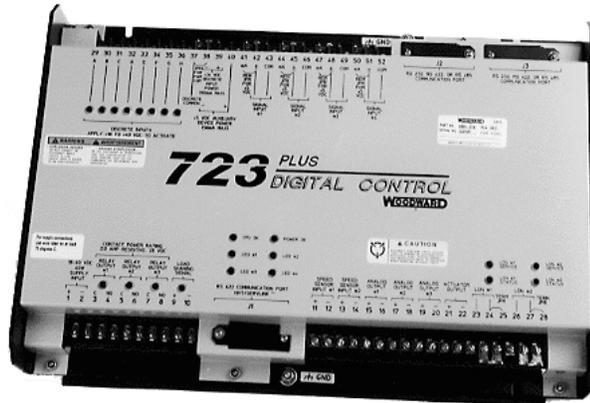


723H

Digital Control for Hydro Turbines Using 723PLUS Hardware Platform



APPLICATION

The 723H Digital Control (P/N 8280-225) controls hydro turbines driving electrical generators, using a standard configurable program. The 723H operates as either a stand-alone unit governor or in conjunction with a plant's Distributed Control System (DCS). The 723H control interfaces with a variety of Woodward distributing valves.

DESCRIPTION

The 723H uses a 32-bit microprocessor to perform all of its control functions. The microprocessor control package consists of printed circuit boards in an enclosure designed to be mounted within a system control panel, or inside a cabinet.

The 723H contains a standard program with a limited number of inputs and outputs. It also provides several user-selectable features including: starting, stopping, gate positioning, speed control, pond-level control, and automatic-manual/local-remote operation. An optional menu-driven PC application program allows user-friendly configuration of the control. A first-out indication feature for system shutdowns reduces troubleshooting time. (For more information on the 723PLUS hardware platform, see product specification number 02759.)

COMMUNICATIONS

Discrete and analog input and output signals can be wired directly to the 723H to control the unit externally.

It can communicate directly with CRT-based operator control panels and/or the plant's DCS through a ModBus[®] communication port. The port supports RS-232, RS-422, and RS-485 communications using ASCII or RTU ModBus transmission protocols.

A separate PC port facilitates tunable program changes on an off-line PC which can then be downloaded to the 723H control when the turbine is stopped. A hand-held programmer is also available for programming and tuning the control.

FLEXIBILITY

The 723H is field configurable, allowing site engineers to configure the control to their specific application, and to make future control configuration changes. On-line tunables are available to allow set point adjustments while the unit is running. Inputs and outputs are programmable as required by the application or interface.

- 32-bit microprocessor-based digital control
- Field-configurable
- User-friendly menu format
- View program and change dynamics while running
- ModBus[®] communications
- Programmable through PC or hand-held programmer
- Manual gate position control
- Level control
- Interfaces to DSLC[™] Digital Synchronizer and Load Control
- Creep detection
- Speed and gate position switches

SYSTEM PROTECTION

- Integral overspeed protection logic
- Bumpless transfer between control modes
- Failsafe shutdown logic
- Creep detection
- Emergency shutdown (ESD)

CONTROL

- Gate droop and isochronous speed control
- Gate position (with speed droop) and pond level (tailrace or forebay)
- Local/remote control priority and selection
- Manual/maintenance
- Gate limit
- Brakes
- MW control (when used with DSLC control)

CONTROL SPECIFICATIONS

INPUTS

Voltage	18–40 Vdc (24 or 32 Vdc nominal)
Power Consumption	40 W nominal
Inrush Current (LV)	22 A for 15 ms
Speed	2 separately configurable from proximity probes (ZVPUs), MPUs (1–30 Vrms), and PTs (potential transformers)
Discrete Inputs	8 contact inputs (5 dedicated, 3 configurable), and 16 contact inputs (dedicated) via an optional LinkNet [®] module
Analog Inputs	4 (4–20 mA): 3 dedicated, 1 configurable

OUTPUTS

Valve/Actuator Drivers	1 actuator output (4–20 mA or 20–160 mA)
Discrete Outputs	3 relay outputs, 2 A at 28 Vdc resistive/0.5 A at 110 Vac resistive, (1 dedicated, 2 configurable), and 8 relay outputs via an optional LinkNet module (configurable for speed or gate position switches), 5 A at 28 Vdc resistive/0.5 A at 110 Vac resistive
Analog Outputs	3 current outputs (all configurable): 2 (0–1 mA) or (4–20 mA) 1 (4–20 mA only)

COMMUNICATION

1 ModBus (ASCII or RTU) Comm Port (RS-232, RS-422, or RS-485 compatible)
2 LON Comm Ports

DIMENSIONS

424 x 286 x 56 mm (16.7 x 11.25 x 2.2 inches)

FUNCTIONALITY

Speed/frequency control including Isochronous and droop modes
Auxiliary control modes for level and gate position
Integrated manual control

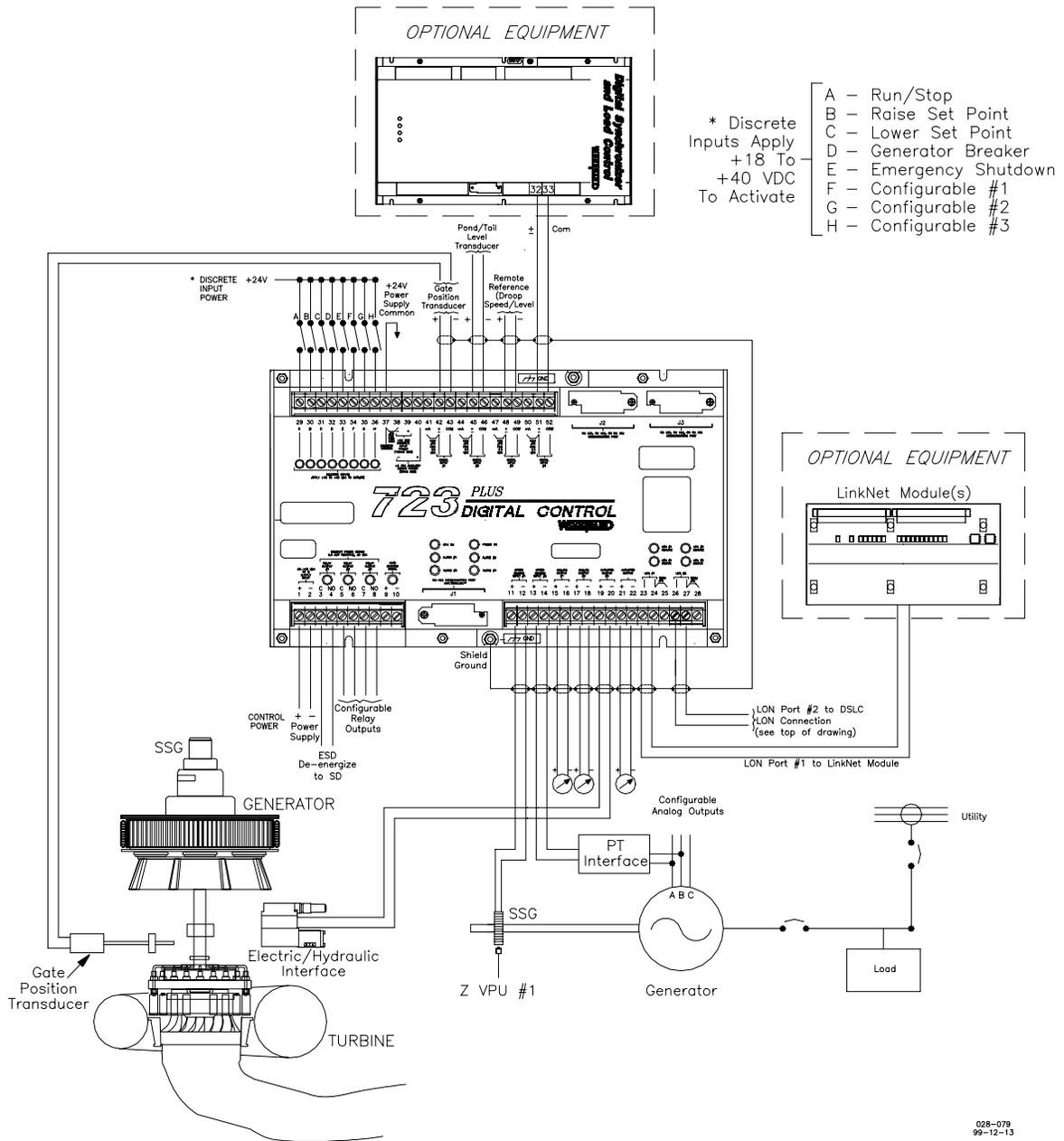
FEATURES

Not all features are available in a single application

- Remote analog configurable set points for speed, level, and manual control
- Isochronous load sharing via Woodward DSLC control
- Gate limit control
- Selectable start mode (auto/manual)
- Selectable actuator output (4–20 mA/20–160 mA)
- Dual speed inputs
- Creep detection option (available with proximity probes)
- Local/remote control (hand-held programmer, external contacts, or ModBus)
- Bumpless control mode transfer
- Level switches for speed and gate position
- Selectable brake operation
- Security (password protected)
- First-out indication of alarm events
- Two independent ModBus communications ports
- Program upload/download capability via PC

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 +20 to +55 °C (+68 to +131 °F) Lloyd's Register of Shipping Specification; Humidity Test 1
Mechanical Vibration	Lloyd's Register of Shipping Specification; Vibration Test 2
Mechanical Shock	US MIL-STD 801C Method 516.2, Proc. I, II, V
EMI/RFI Specification	Lloyd's Register of Shipping Specification EN 50081-2 and EN 50082-2



723H Digital Control Typical Application

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723H I/O Definition

Analog Inputs (4)
Gate Position Feedback
Level Input
Remote Reference
Configurable (1):
Auxiliary Input
DSLCTM Speed Bias

Analog Outputs (3)
Configurable (3):
Tachometer
Gate Position Readout
Gate Limit Readout
Speed Adjustment
Pond/Tail Level Readout
Auxiliary/DSLCTM input Indicator
Pond/Tail Level Set Point
Actuator #2 (4–20 mA or 20–160 mA)

Discrete Outputs (3)
Emergency Shutdown (ESD) (normally energized)
Configurable (2):
General Alarm Indication
Brake Permissive
Creep Indication
Enable DSLCTM
Level Switch For:
Speed
Gate Position

LED Outputs (4)
Speed Sensor Failed (2)
Optional LEDs (2)
General Alarm
Gate Position Signal Failure
Comm Failed
Minor Gate Mismatch
Overspeed
Creep Detection
Incomplete Start
ModBus Com Fail
LON Comm Fail
Pond Level Signal Failure
Remote Ref Signal Failure
Aux Input Signal Failure
Dirty Oil Indication

Discrete Inputs (8)
Reference Raise (Speed/Load)
Reference Lower (Speed/Load)
Run/Stop
Online/Offline
ESD (emergency shutdown)
Configurable (3):
Gate Limit Raise
Gate Limit Lower
Creep Input #1
Creep Input #2
DSLCTM Control Enable
Level Control Enable
Governor Reset
Dirty Oil Indicator
Manual Control Enable
Auto Follow

Speed Inputs (2)
Speed Probe 1 (MPU or ZVPU)
Speed Probe 2 (MPU or ZVPU)
Potential Transformer through PT Interface

Actuator Outputs (1)
Actuator #1 (4–20 mA or 20–160 mA)

Digital Communications Ports (2)
ModBus ASCII or ModBus RTU (RS-232, RS-422, and RS-485)
DSLCTM Interface
Optional LinkNet® 8 Relay Output Module for use with speed switches and/or gate position switches
Optional LinkNet® 16 Discrete Input Module (for additional functionality)

The 723H is also available in a standard NEMA-4 enclosure which houses the following:
723H Digital Control (P/N 8280-225)
Universal Power Supply (100–240 Vac, 130–270 Vdc) with Surge Protection
PT Interface Module (for PT speed sensor)
Shutdown relays (2 form C contacts 120 Vac @ 10 A, 125 Vdc @ 0.5 A)
(2) Auxiliary Relays (each relay 2 form C contacts 120 Vac @ 10 A, 125 Vdc @ 0.5 A)
Terminal Strip

This 723H with standard enclosure is P/N 8262-489.

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