SPC Servo Position Controller

Applications

The Servo Position Controller (SPC) is a servo-valve driver that accepts a DeviceNet or 4–20 mA based position demand signal from a system controller, and accurately positions proportional or integrating servo-valves. The SPC has the required accuracy, responsiveness, and redundancy required for steam or gas turbine fuel valve control. For valve position sensing, the SPC accepts feedback signals from one or two (redundant) ac devices or one dc device.

A Windows based software program is used to configure the SPC, adjust tunables, and monitor parameters via a personal computer. For ease of service, SPC configurations can be done while connected or disconnected to the unit. Once a configuration has been created, this program allows configurations to be uploaded and downloaded to other SPCs as desired.

The SPC's position feedback circuit includes integral excitation and signal-conditioning circuitry for LVDT and RVDT based position sensing devices.

Description

The SPC is a field programmable servo-driver that controls one integrating or proportional servo-valve, and accepts single or dual feedback signals for valve position sensing.

This compact digital driver can be commanded (controlled) via a DeviceNet based network, and functions as a DeviceNet (Group II only) slave device on this network. As an alternative or backup to DeviceNet, a 4–20 mA input signal can be used to command servo position.

The SPC's associated PC interface software program allows a user to configure, auto-calibrate, dynamically adjust, and manually stroke the controlled servo. Auto-calibration routines make servo setup easy and greatly reduce installation times.

The SPC driver is classified for heavy industrial environments, and can be easily bulkhead mounted in IP20 locations.

Protection

The SPC includes protection and alarm indication for the following faults:

- DeviceNet Comm Time-out
- Feedback Open-Wire
- Position Error
- Actuator Open/Short
- Analog Input Out-of-Range
- Feedback Voltage Out-of-Range
- Internal SPC Faults
- Driver Overcurrent

A hard-wired shutdown contact input and relay driver output are provided to allow for interfacing with external protection circuits.

- Fieldbus controlled (via DeviceNet)
- Field configurable
- Accepts redundant command signals
- Accepts redundant feedback signals
- Compatible with ac or dc feedback signals
- Includes LVDT or RVDT excitation circuitry
- 4–20 mA position readout
- Certified for Class I, Division 2, Groups A, B, C, D, T4 locations
- Certified for Zone 2, IIC, T4 locations
- CE compliant

Redundancy

Optionally the SPC can be configured to accept redundant position commands and redundant servo position feedback signals. The SPC has the capability to accept DeviceNet and 4–20 mA based position demand signals and upon the failure of either demand signal to switch to the healthy input demand signal. The SPC also has the capability to accept two servo position feedback signals and switch to the healthy feedback signal when one of the feedback signals fails.

Driver Specifications

Input Power:
24 Vdc (18–32 Vdc)

Actuator Drive Output (Configurable Options):
Bipolar Output with adjustable null current and the following configurable ranges:
(±250 mA, ±100 mA, ±50 mA, ±25 mA, ±10 mA)
Unipolar Output Current with the following configurable ranges:
(0–250 mA, 0–100 mA, 0–50 mA, 0–25 mA)
Dither—Adjustable current amplitude at a frequency of 25 Hz, and a duty cycle of 25%

Position Loop Accuracy:
DeviceNet Commanded: ±0.25% of full scale at 25 °C, temperature sensitivity of less than ±150 ppm/°C
Analog (4–20 mA) Commanded: ±0.25% of full scale at 25 °C, temperature sensitivity of less than ±300 ppm/°C

Position Sensing (2 Channels):
Voltage Feedback: Accepts 3, 4, 5, or 6 wire LVDTs or RVDTs (single excitation driver), 0–12 Vdc, 12–0 Vdc
Current Feedback: Accepts 4–20 mA, 20–4 mA position transducer feedback signals

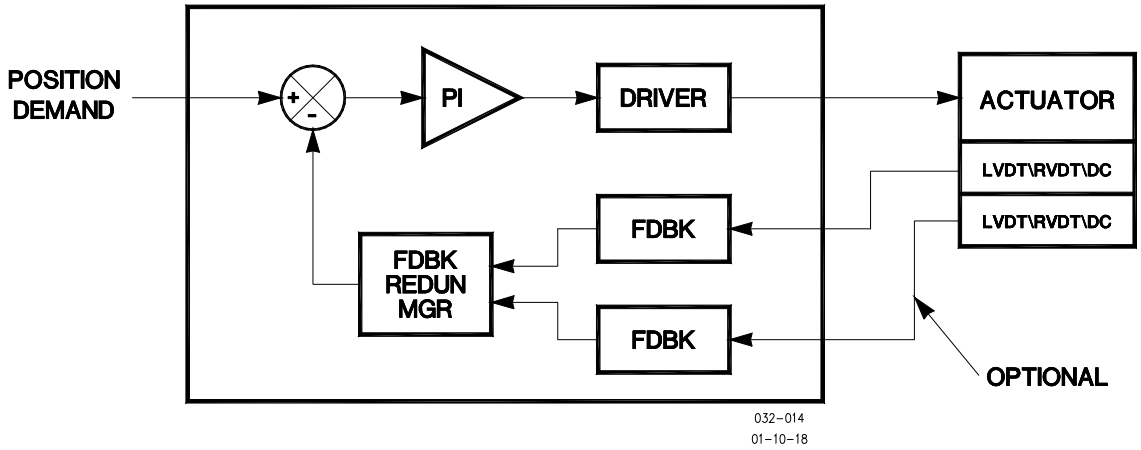
Relay Driver Outputs (Alarm & Shutdown):
Isolated FETs designed for direct control connection with or without interposing relays
Voltage Range:18–32 Vdc
Max Current: 500 mA, (10 µA leakage)

ENVIRONMENTAL
Operating Temperature Range: –40 to +70 °C
Electromagnetic Compatibility:
European directive 89/336/EEC (To EN61000-6-2 – mandatory as of 4/2002)
Immunity: EN 61000-6-2 (4/1999)
Emissions: EN 50081-2 (1993)
Shock: US MIL-STD-810C method 516.2, procedure 1 (30 Gs, 11 ms half sine pulse)
Vibration: Lloyd's Register Test Specification No.1, 1996, Vibration Test 1 (5–13 Hz, ±1 mm, 13.2–100 Hz, ±0.7 g)
Humidity: Lloyd's Register Test Specification No.1, 1996, Humidity Test (48 Hr Cyclic – Condensing)
Size: 13 x 8 x 3 inches (330 x 203 x 76 mm)
Mounting: Bulkhead mounted
Ingress Protection: IP20

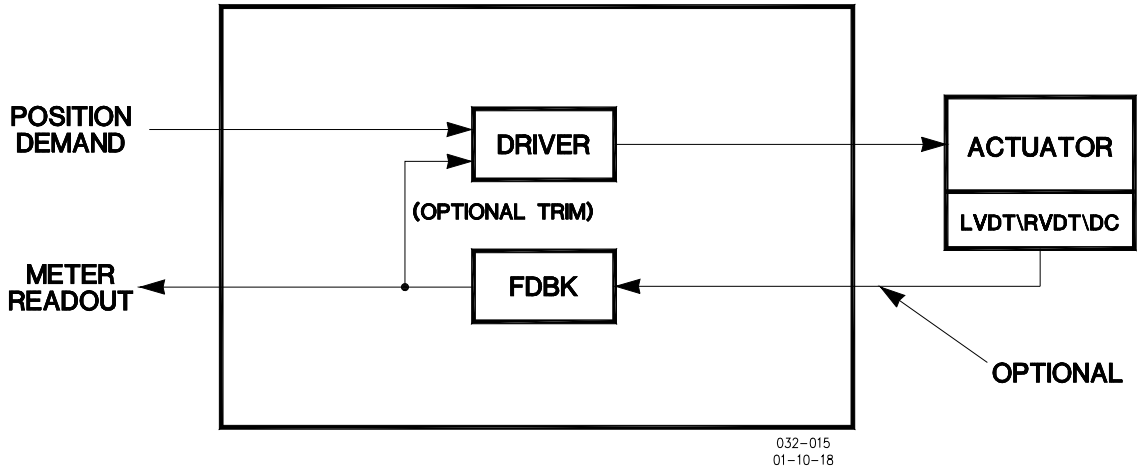
Agency Approvals:
CSA: Class I, Division 2, Groups A, B, C, D, T4
LCIE: Zone 2, IIC, T4
American Bureau of Shipping, Steel Vessel Rules 4-9-7/13, 1-1-4/3.7, 2003
Det Norske Veritas, Rules for Classification of Ships, High Speed and Light Craft and Mobile Offshore Units
Lloyd’s Register for ENV1, ENV2, and ENV3 as specified in Test Specification No.1, 1996

Technical Manual 26236

Functional Block Diagram

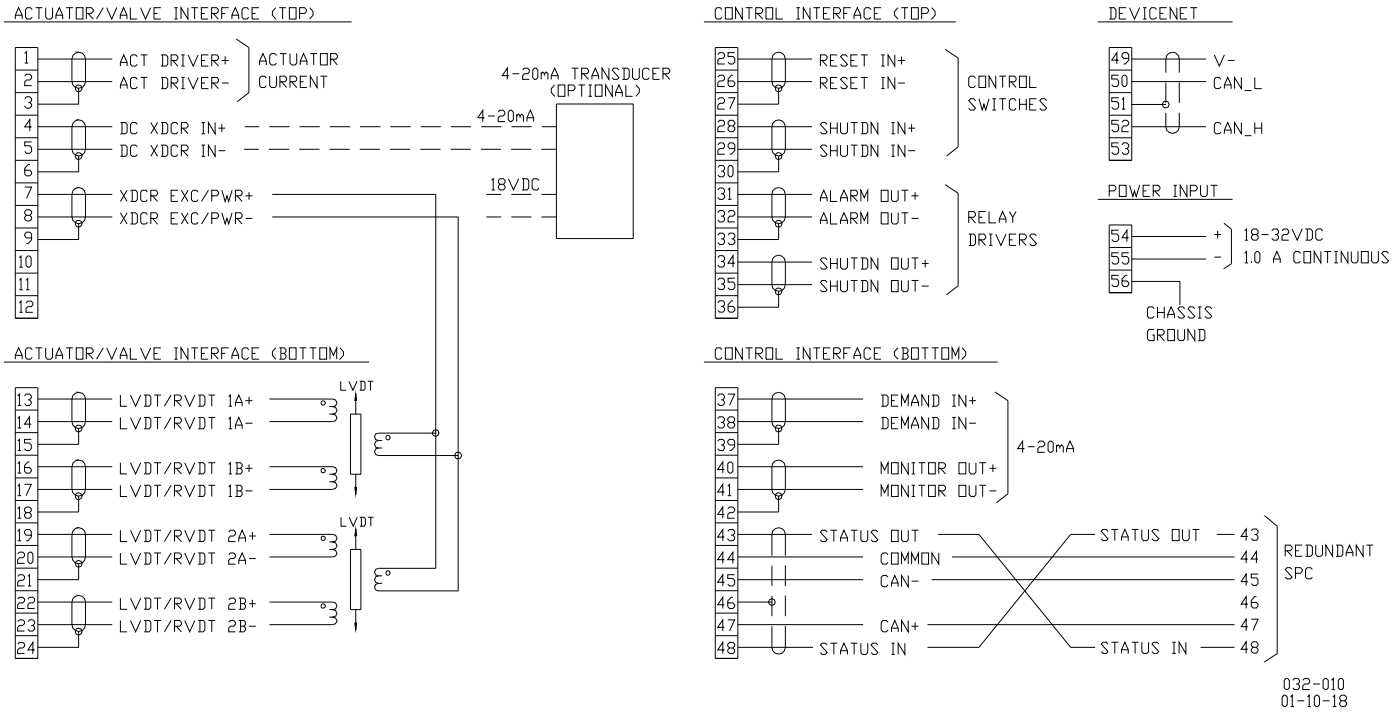


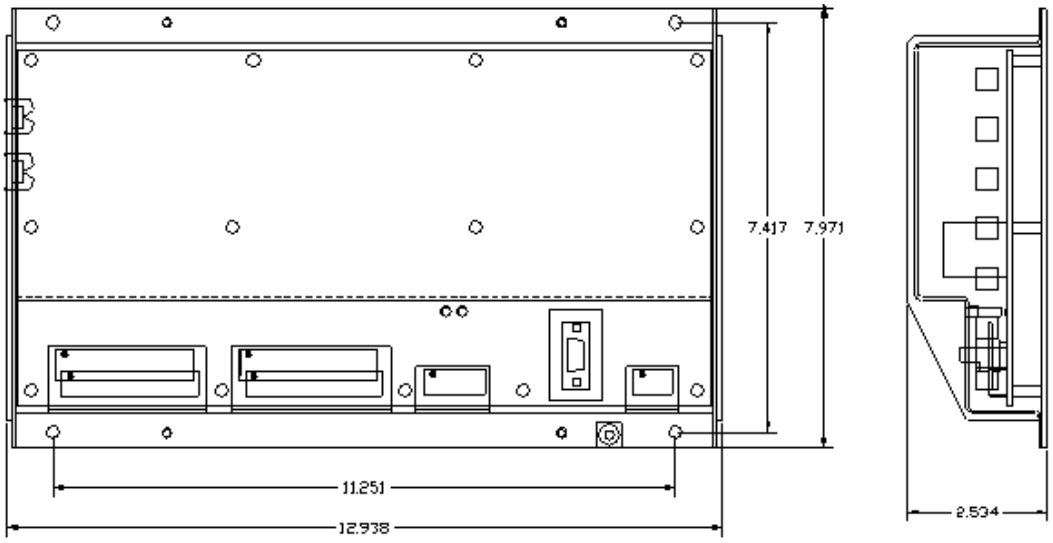
Typical Integrating Actuator Block Diagram



Typical Proportional Actuator Block Diagram

Wiring Diagram





SPC Outline Drawing
(Do not use for construction)

WOODWARD

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