6. Specifications

Specifications for the various Series C Turbomachinery I/O modules are given below.

For information on environmental specifications, please refer to the Series C Turbomachinery IO Platform Specification and Technical Data Sheet EP03-540-400.

7. Servo Valve Positioner Module (SVPM) – CC-PSV201

7.1. Function

This Series C I/O module provides an onboard PID positioning loop for positioning a servo valve typically used in a turbomachinery control application. It can accept LVDT/RVDT/4-20 mA position feed back signals from the control valve, receive a control valve demand remote set point from a C300-20msCEE controller and execute onboard PID positioning loop to issue current output to servo valve coil to control the control valve position.

7.2. Notable Features

- Onboard PID positioning loop execution with overall loop latency within 10 mS
- Onboard excitation supply for LVDT and support for various configurations of LVDT connections
- LVDT input channel can be optionally configured to accept 4-20 mA analog input signal
- Supports wide range of unidirectional/bidirectional current output to servo valve coil
- Servo valve output channel can optionally be configured for 4-20 mA analog output signal
- Accepts two digital inputs, which can be configured to drive servo valve output to safe value
- PID execution using the position measurement and remote set point received from the C300 20 ms controller
- Extensive module level diagnostics (PV qualification for AI & AO, LVDT excitation frequency drift check, internal reference check, power supply diagnostic, memory diagnostics, etc.)
- Extensive field level diagnostics (open wire detection for Servo, LVDT, AI [4-20 mA] and DI; LVDT core fallout; read back current diagnostics for Servo and AO [4-20 mA])
- Drive Servo output to safe value on detecting abnormal condition of control components
- Point processing at 2.5 mS period for "LVDT/RVDT signal" and PID execution
- Provides digital dither (current modulation) to compensate stiction in the controlled device (servo valve)
- Supports servo valve position calibration
- Supports redundant solution
- Supplies non-incendive field power

7.3. SVPM supports the following I/O interfaces

- LVDT/RVDT/analog input – 2 channels
- Digital input – 2 channels
- Servo/analog output – 2 channels
- 2 PID blocks

7.4. Detail Specifications – SVPM

Parameter	Specification		
Input/Output Model	CC-PSV201 - Servo Valve Positioner Module		
	CC-TSV211	Redundant	18"
Servo Output			
Output Type	Bipolar current (Ranges: 10, 20, 40, 80, 160, 320 mA) Unipolar current (Ranges: 50, 300 mA)		
Output Channels	2		
Dither	0-10% of FS, 25-60 Hz		
Output Temperature Drift	300 ppm per deg C		
Output Current Linearity	0.325%		
Resolution	16-bit DAC		
Maximum Resistive Load (24 V supply = 22 VDC through 28 VDC)	Maximum coil resistances allowed for different current ranges with this interface are available in Honeywell DFS document		
Maximum Open Circuit Voltage	±14 V		
Gap (0 mA) of Output to Field on Switchover	15 mS maximum		
LVDT Interface			
Input/Feedback	3/4/5/6 wires LVDT feedback signals, 8 V RMS max., 2.5-3.2 KHz		
Excitation	8 V RMS max, 2.5-3.2 KHz (max. internal excitation is 50 mA)		
Frequency Stability	2.5-3.2 KHz ±5 Hz from set value		
Channels	2		
Galvanic Isolation (any input terminal voltage referenced to common)	±500 VDC		
Isolation Technique	Isolation transformer		
A/D Converter Resolution	16-bits		
Input/Output Range (1)	8 V RMS max., 2.5-3.2 KHz		
Input Impedance (voltage inputs)	Impedance > 25 Kohm (2.5 KHz to 3.2 KHz)		
Input Scan Rate	2.5 mS		
Hardware Accuracy (@ CMV = 0 V)	< 1%		
Analog Inputs	* AI & LVDT signals are mutually exclusive		
Input Type	Voltage, current (2-wire or self-powered transmitters)		
Input Channels	2		
Common Mode Voltage, DC to 60 Hz	-6 to +5 V peak		
A/D Converter Resolution	16-bits		
Input Range (1)	0 to 5 V, 1 to 5 V, 0.4 to 2 V, 4-20 mA (through 250 Ω)		

Maximum Normal Mode Input (differential inputs, no damage)	±30 V
Input Impedance (voltage inputs)	> 10 M Ω powered
Maximum Input Voltage (any input referenced to common, no damage)	±30 V
Input Scan Rate	5 ms
Hardware Accuracy (@ CMV = 0 V)	± 0.075% of full scale (23.5°± 2°C) ± 0.15% of full scale (0 to 60°C)
Analog Outputs	* AO & Servo signals are mutually exclusive
Output Type	4-20 mA
Output Channels	2
Output Ripple	< 100 mV across 250 Ω load
Output Temperature Drift	0.005% of full scale/°C
Output Readback Accuracy	±4% of full scale
Output Current Linearity	±0.05% of full scale nominal
Resolution	±0.05% of full scale
Calibrated Accuracy	±0.35% of full scale (25^{o}C) including linearity
Directly Settable Output Current Range	0 mA, 2.9 mA to 21.1 mA
Maximum Resistive Load (24 V supply = 22 VDC through 28 VDC)	760 ohms
Maximum Output Compliant Voltage (24 V supply = 22 VDC through 28 VDC)	16 V
Maximum Open Circuit Voltage	18 V
Response Time (DAC input code to output)	1 mS
Gap (0 mA) of Output to Field on Switchover	15 mS max.
Digital Inputs	
Input Channels	2
DI Power Voltage Range	22 to 28 VDC
ON Sense Voltage/Current	13 VDC (min.) or 6.12 mA (min.)
OFF Sense Voltage/Current	5 VDC (max.) or 2.1 mA (max.)
Input Impedance	4.6K
Absolute Delay Across Input Filter and Isolation	1.78 mS
Field Resistance for Guaranteed ON Condition	300 Ω max. @ 15 VDC
Field Resistance for Guaranteed OFF Condition	30 KΩ min. @ 30 VDC

8. Speed Protection Module (SPM) – CC-PSP401

8.1. Function

This Series C I/O module accepts up to four speed probe signals in the form of electrical pulses. It provides onboard signal conditioning and two out of three voting. Voted speed signal takes part in speed regulation through a control loop built into the C300 controller. It also provides onboard limit value monitoring to trigger the over speed trip protection relay provided on the same module IOTA. It is intended for use in over-speed protection of turbomachinery. General purpose I/Os provided on this module may also be used in fast applications such as centrifugal compressor anti surge control

8.2. Notable Features

- Accepts up to four pulse input signals with two out of three voting and computes the speed and acceleration
- Accepts up to eight digital input signals which can be configured as "trip" input in protection logic
- Provides up to four digital output signals on activation of protection criteria
- Multiple configurable trip limits for speed and acceleration
- Overall loop latency from input change to triggering protection device within 40 mS
- Accepts up to eight analog input signals
- Provides one analog output signal
- Point processing at 2.5 mS and 10 mS period for pulse and analog inputs, respectively
- Supports redundant solution
- Supplies non-incendive field power
- Field diagnostic (zero speed, reverse rotation, missing/deformed tooth, open wire detection for AI and DI, and current read back for AO) supported
- HW/SW diagnostics - PV qualification for AI & DI

SPM supports the following I/O interfaces:

- Analog inputs – 8 channels
- Analog outputs – 1 channel
- Digital inputs – 8 channels
- Digital outputs – 4 channels
- Speed (active/passive probes) inputs – 4 channels

8.3. Detail Specifications – SPM

Parameter	Specification		
Input/Output Model	CC-PSP401 - Speed Protection Module		
	CC-TSP411	Redundant	18"
Speed (Active/Passive Probes) Inputs			
Input Channels	4		
Galvanic Isolation (any input terminal voltage referenced to common)	±1000 VDC for passive probes interface		