

LSSVL12D Servo valve interface module

LS communication LVDT Servo valve interface

Summary



- * Terminal block input / output unit
 - Digital input : 2
 - Valve position demand output : 1
 - LVDT input / output : 1 (6/4/3 Line type)
- * Auxiliary output connector
 - Analog output : 3
- * Panel I/O connector
 - Connector dropout detection DI : 1
 - Digital input / output : 5 / 3
 - Analog input / Input and output : Input (Fixing) 3 / Input and output (variable) 3
Input and output (variable) Setting pattern:
In internal logic four types can be set
- * USB connector : 1 (For maintenance communication mini-B)

Overview Specifications

ITEM	SPECIFICATION
Digital input (52 G ON/ External forced closed input)	DC 24 V × 2, minimum ON Current 2 mA
Valve position demand output	±20 mA / ±60 mA × 1
LVDT input / output	6/4/3 Line type × 1, Output: 5 to 8 Vrms, Frequency: 800 to 8000 Hz, Input: 8 Vrms or less
Analog output (Auxiliary output connector)	1 to 5 V DC × 3
Digital input (Panel I/O)	DC 24 V × 5, Minimum ON current 2 mA Connector dropout detection DI × 1
Digital output (Panel I/O)	Open collector output × 3, Maximum voltage DC 30 V, Maximum load current 0.1 A
Analog input / Input and output (Panel I/O)	1 to 5 V DC × 3 / 1 to 5 V DC × 3 (Switchable input / output by the internal logic setting)
Indicator	Display LED × 4: Run / Status / Network status A / Network status B Channel State LED × 16: Ch 1 to Ch 16 Arbitrarily set by internal logic
USB connector	For maintenance communication mini-B × 1
Self-diagnostic functions	Power voltage check, Clock check, Heartbeat check, CRC check
IDOL Implementation	Possible
Module Duplication	Supported (backplane uses LSI0B02 or LSI0B03) However, the signals of the auxiliary output connector and panel I/O connector are not duplicated
Dielectric strength	AC 1500 V Digital input / output terminal - PE Between AC 1000 V Analog input / output terminal - PE Between AC 1000 V LVDT input / output terminal - PE Between
Environmental conditions	Ambient temperature (Operating / Storage) -5 to 60°C Ambient humidity (Operating / Storage) 0 to 95% RH (No condensation)
Operating power supply	DC 24 V ±20% Dual power reception (The voltage supplied from the backplane)
Shock / Vibration	15 G 11 ms / 3.5 mm @5 to 8.4 Hz, 1G @8.4 to 150 Hz
Dimensions	152.5 mm (D) x 94 mm (H) x 46 mm (W) (Except projection)

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■ Details Specifications

ITEM		SPECIFICATION				
Terminal block Input/output section	Ch 1: 52 G ON Digital input	Number of channels		1		
		Insulation method		Photocoupler insulation		
		Dielectric strength		AC 1500 V Digital input terminal - PE Between		
		Current range	ON current	DC 2 mA or more		
			OFF current	External power supply voltage: DC 24 V ±10%		
	Ch 2: External forced closed input	Number of channels		1		
		Insulation method		Photocoupler insulation		
		Dielectric strength		AC 1500 V Digital input terminal - PE Between		
		Current range	ON current	DC 2 mA or more		
			OFF current	Sense supply voltage: DC 24 V ±10%		
	Ch 3, Ch 4: Valve position demand output *The type of 01/02 is switched by EMS	Number of channels		1		
		Insulation method		Digital isolator insulation		
		Dielectric strength		AC 1000 V Analog output terminal - PE Between		
		Rated output current		01 type	-20 to +20 mA (full scale)	
				02 type	-60 to +60 mA (full scale)	
		Load resistance range		01 type	40 to 400 Ω	
				02 type	10 to 160 Ω	
		Absolute precision	@25°C	01 type	±0.1% FS (±0.04 mA) @Calibration load (Factory shipped: 250 Ω)	
				02 type	±0.1% FS (±0.12 mA) @Calibration load (Factory shipped: 40 Ω)	
		Temperature drift		@-5 to 60°C	01 type 02 type	±100 ppm/°C (Against full scale)
		Output current monitor		Built-in		
Absolute precision		@25°C	01 type	±0.3% FS (±0.12 mA) @Calibration load		
			02 type	±0.3% FS (±0.36 mA) @Calibration load		
Temperature drift	@-5 to 60°C	01 type	±200 ppm/°C (Against full scale)			
		02 type				
Ch 7: LVDT primary output *Output voltage and output frequency can be changed by internal logic setting	Number of channels		1			
	Insulation method		Digital isolator insulation, Photocoupler insulation			
	Dielectric strength		AC 1000 V Analog output terminal - PE Between			
	Excitation output voltage		5 to 8 V rms (Variable according to internal logic setting)			
	Excitation output frequency		800 to 8000 Hz (Variable according to internal logic setting)			
	Output voltage accuracy	Absolute precision	@25°C	±0.2% 230 Ω (at 5 kHz), @300 Ω (at 1 kHz)		
		Temperature drift	@-5 to 60°C	±200 ppm/°C		
	Output frequency accuracy	Absolute precision	@25°C	±1%		
		Temperature drift	@-5 to 60°C	±200 ppm/°C		
	Drive minimum coil impedance		120 Ω			
Output voltage monitor		Built-in				
Absolute precision	@25°C	±0.3% FS (full scale: 5 to 8 Vms [Internal logic setting value])				
		@-5 to 60°C	±200 ppm/°C (Against full scale)			
Ch 8, Ch 9: LVDT secondary input *The detection method of the effective value detection/synchronous (With or without phase correction) detection can be selected (Set by internal logic)	Number of channels		2			
	Insulation method		Digital isolator insulation, Photocoupler insulation			
	Dielectric strength		AC 1000 V Analog input terminal - PE Between			
	Rated input voltage		8 Vrms or less			
	Input voltage accuracy	Absolute precision	@25°C	±0.3% FS (full scale: 8 Vms)		
Temperature drift		@-5 to 60°C	±200 ppm/°C (Against full scale)			

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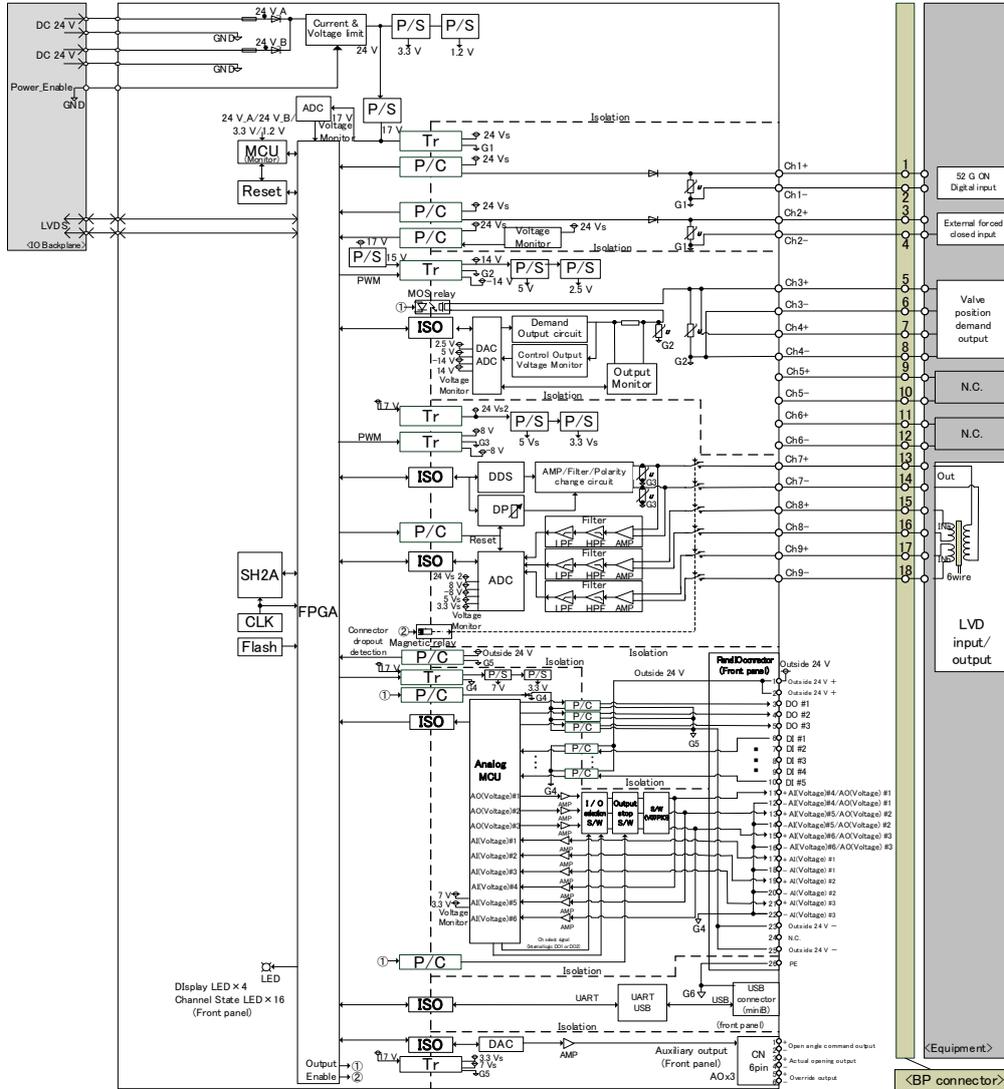
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ITEM		SPECIFICATION																																					
Auxiliary output connector	Analog output	Number of channels	3																																				
		Insulation method	Digital isolator insulation																																				
		Dielectric strength	AC 500 V Analog output terminal - PE Between																																				
		Rated output voltage	1 to 5 V (full scale)																																				
		Minimum load resistance	2 kΩ																																				
		Absolute precision @25°C	±0.3% FS (±12 mV)																																				
Temperature drift @-5 to 60°C	±200 ppm/°C (Against full scale)																																						
Panel I / O connector	Digital input	Number of channels	DI (External power supply): 5 Connector dropout detection DI × 1																																				
		Insulation method	Photocoupler insulation																																				
		Dielectric strength	AC 500 V Digital input terminal - PE Between																																				
		Current range	ON current DC 2 mA or more External power supply voltage: DC 24 V ±10% OFF current DC 1 mA or less																																				
	Digital output	Number of channels	3																																				
		Insulation method	Photocoupler insulation																																				
		Dielectric strength	AC 500 V Digital output terminal - PE Between																																				
		Maximum applied voltage	DC 30 V																																				
		Maximum load current	0.1 A																																				
		Leakage current at OFF	0.1 mA or less																																				
	Maximum residual voltage when ON	DC 1.0 V @100 mA																																					
	Analog input	Number of channels	3 (AI#1 to #3 in the Block diagram)																																				
		Insulation method	Digital isolator insulation																																				
		Dielectric strength	AC 500 V Analog input terminal - PE Between																																				
		Rated input voltage	1 to 5 V (full scale)																																				
		Input impedance	100 kΩ or more																																				
		Absolute precision @25°C	±0.3% FS (±12mV)																																				
	Temperature drift @-5 to 60°C	±200 ppm/°C (Against full scale)																																					
	(AI / AO can be switched by internal logic setting)	Analog input/output	Number of channels	3 (AI#4 to #6/AO#1 to #3 in the Block diagram)																																			
			Insulation method	Digital isolator insulation																																			
		①When the analog input selection	Dielectric strength	AC 500 V Analog input / output terminal - PE Between																																			
			Rated output voltage	1 to 5 V (full scale)																																			
			Input impedance	100 kΩ or more																																			
			Absolute precision @25°C	±0.3% FS (±12 mV)																																			
Temperature drift @-5 to 60°C		±200 ppm/°C (Against full scale)																																					
②When the analog output selection		Insulation method	Digital isolator insulation																																				
		Dielectric strength	AC 500 V Analog input / output terminal - PE Between																																				
		Rated output voltage	1 to 5 V (full scale)																																				
		Minimum load resistance	9 kΩ																																				
Absolute precision @25°C		±0.3% FS (±12mV)																																					
Temperature drift @-5 to 60°C	±200 ppm/°C (Against full scale)																																						
Output voltage monitor	1 to 5 V																																						
Remarks	<p>When used as an analog output, AI#4 to #6 of the analog MCU in the block diagram becomes the read back of AO#1 to #3. Panel IO terminals AI#4/AO#1, AI#5/AO#2, and AI#6/AO#3 can be set with the following combinations. (The table below shows 2-bit representation of 4 ways 00 to 11 using two point numbers of internal logic)</p> <table border="1"> <thead> <tr> <th rowspan="2">Internal logic (Number used as AO)</th> <th colspan="2">Terminal name</th> <th rowspan="2">AI#4 / AO#1</th> <th rowspan="2">AI#5 / AO#2</th> <th rowspan="2">AI#6 / AO#3</th> <th rowspan="2">Pattern</th> </tr> <tr> <th>DO1 (Binary number)</th> <th>DO2 (Binary number)</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>0</td> <td>AI</td> <td>AI</td> <td>AI</td> <td>3 inputs / 0 output (Factory setting)</td> </tr> <tr> <td>1</td> <td>0</td> <td>1</td> <td>AI</td> <td>AI</td> <td>AO</td> <td>2 inputs / 1 output</td> </tr> <tr> <td>2</td> <td>1</td> <td>0</td> <td>AI</td> <td>AO</td> <td>AO</td> <td>1 inputs / 2 outputs</td> </tr> <tr> <td>3</td> <td>1</td> <td>1</td> <td>AO</td> <td>AO</td> <td>AO</td> <td>0 inputs / 3 outputs</td> </tr> </tbody> </table>		Internal logic (Number used as AO)	Terminal name		AI#4 / AO#1	AI#5 / AO#2	AI#6 / AO#3	Pattern	DO1 (Binary number)	DO2 (Binary number)	0	0	0	AI	AI	AI	3 inputs / 0 output (Factory setting)	1	0	1	AI	AI	AO	2 inputs / 1 output	2	1	0	AI	AO	AO	1 inputs / 2 outputs	3	1	1	AO	AO	AO	0 inputs / 3 outputs
Internal logic (Number used as AO)	Terminal name			AI#4 / AO#1	AI#5 / AO#2					AI#6 / AO#3	Pattern																												
	DO1 (Binary number)	DO2 (Binary number)																																					
0	0	0	AI	AI	AI	3 inputs / 0 output (Factory setting)																																	
1	0	1	AI	AI	AO	2 inputs / 1 output																																	
2	1	0	AI	AO	AO	1 inputs / 2 outputs																																	
3	1	1	AO	AO	AO	0 inputs / 3 outputs																																	
Operation cycle usable in DPS	10 msec or more																																						
Communication specification between IOA	Communication method , communication speed	LVDS, 100 Mbps																																					

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■ Block diagram



- | | | | |
|---|--------------------------------------|-----------------------------|---|
| P/S | : Power supply | MCU | : Micro control unit |
| SH2A | : Renesas SH-2A micro processor | FPGA | : Field programmable gate array |
| CLK | : Clock generation circuit | LED | : Light emitting diode |
| ISO | : Digital isolator | ADC | : Analog digital converter |
| LPF | : Low pass filter | GND, G1, G2, G3, G4, G5, G6 | : Ground |
| LVDS | : Low Voltage Differential Signaling | BP | : Backplane |
| DP | : Digital potentiometer | DDS | : Direct digital synthesizer |
| PWM | : Pulse width modulation | DAC | : Digital analog converter |
| AMP | : Amplifier | HPF | : High pass filter |
| P/C | : Photo Coupler | Tr | : Transformer |
| N.C. | : No Connection | CN | : Connector |
| AO | : Analog Output | Flash | : Flash ROM |
| PE | : Protective Earth | MOS relay | : Photo Metal-Oxide-Semiconductor relay |
|  | : Vistor | Resistor | : Resistor |
|  | : Fuse | Diode | : Diode |

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