

Control Accessories Selection

Control Accessories

I/O and Communication Modules

Type	Name	Model	Function
Drive Mounted Option Cards	I/O Expansion Cards	Analog input	- Allows high precision, high resolution analog reference input - Input channels: 3 - Voltage input: -10 to 10 Vdc (20 kΩ), 13-bit signed - Current input: 4 to 20 mA or 0 to 20 mA (250 Ω), 12 bit
		Analog monitor	- Provides extra multi-function analog output terminals - Output channels: 2 - Output voltage: -10 to 10 V, 11 bit (signed)
		Digital Input	- Sets the frequency reference by digital inputs - Input channels: 16 (including SET signal and SIGN signal) - Input signal type: BCD 16-bit (4-digit), 12-bit (3-digit), 8 bit (2-digit) - Input signal: 24 Vdc, 8 mA
		Digital output	- Provides extra insulated multi-function digital outputs - Photocoupler relays: 6 (48 V, up to 50 mA) - Contact relays: 2 (250 Vac/up to 1 A, 30 Vdc/up to 1 A)
	Feedback Cards	Line Driver Encoder interface	- For speed feedback input by connecting a motor encoder - A QUAD B, and Z output matches RS-422 level, line driver, 300 kHz max - Encoder power supply: 5 V or 12 V, max current 200 mA
		Complimentary Encoder interface	- For speed feedback input by connecting a motor encoder - A QUAD B, and Z output, HTL encoder connection, 50 kHz max - Output: open collector 24 V max. 30 mA - Encoder power supply: 12 V, max current 200 mA
		Resolver Interface	For speed feedback
	Communication Cards	EtherNet/IP	Connects to an EtherNet/IP network
		Modbus TCP/IP	Connects to a Modbus TCP/IP network
		DeviceNet	Connects to a DeviceNet network
		PROFIBUS-DP	Connects to a PROFIBUS-DP network
		MECHATROLINK-II	Connects to a MECHATROLINK-II network.
		PROFINET	Connects to a PROFINET network
		EtherCAT	Connects to a EtherCAT network
		Metasys N2 / Apogee FLN (P1)	Connects to a Metasys N2 / Apogee FLN (P1) network
		BACnet	Connects to a BACnet network
		LonWorks	Connects to a LonWorks network

Note: When using configuration software installed in a drive on various field networks, a file is required to connect the software to the drive.

* Consult factory for availability

24VDC Auxiliary Control Power Input

The 24VDC auxiliary control power input maintains drive control circuit power in the event of a main power outage. The control circuit keeps the network communications and I/O data operational in the event of a power outage. It supplies external power to the control circuit only.

Drive Model	Part No.
240V Class	PS-A10L
480V and 600V Class	PS-A10H



The installed option adds 50 mm to the total width of the drive.



Control Terminal Functions

Input Terminals

Classification	Terminal	Terminal Name (Function)	Default Setting	Function (Signal Level)
Multi-function Digital Inputs	S1	Multi-function input selection 1	Closed: Forward run (Open: Stop)	- Photocoupler 24 Vdc, 8 mA - Set the S3 jumper to select between sinking, sourcing mode, and the power supply.
	S2	Multi-function input selection 2	Closed: Reverse run (Open: Stop)	
	S3	Multi-function input selection 3	External fault, N.O.	
	S4	Multi-function input selection 4	Fault reset	
	S5	Multi-function input selection 5	Multi-step speed reference 1	
	S6	Multi-function input selection 6	Multi-step speed reference 2	
	S7	Multi-function input selection 7	Jog reference	
	S8	Multi-function input selection 8	Closed: External baseblock	
	SC	Multi-function input common		Multi-function input common
	SP	Digital input power supply +24 Vdc		24 Vdc power supply for digital inputs, 150 mA max (only when not using digital input option DI-A3)
	SN	Digital input power supply 0 V		NOTICE: Do not jumper or short terminals SP and SN. Failure to comply will damage the drive
Safe Disable Inputs	H1	Safe Disable input 1 ^{*2}		24 Vdc, 8 mA - One or both open: Output disabled - Both closed: Normal operation - Internal impedance: 3.3 kΩ - Off time of at least 1 ms - Disconnect the wire jumpers shorting terminals H1, H2, and HC to use the Safe Disable inputs. Set the S5 jumper to select between sinking, sourcing mode, and the power supply
	H2	Safe Disable input 2 ^{*2}		
	HC	Safe Disable input common		Safe Disable input common
Multi-function Analog/Pulse Train Inputs	RP	Multi-function pulse train input	Frequency reference	- Input frequency range: 0 to 32 kHz - Signal Duty Cycle: 30 to 70% - High level: 3.5 to 13.2 Vdc, low level: 0.0 to 0.8 Vdc - Input impedance: 3 kΩ
	+V	Power supply for analog inputs		+10.5 Vdc (max allowable current 20 mA)
	-V	Power supply for analog inputs		- 10.5 Vdc (max allowable current 20 mA)
	A1	Multi-function analog input 1	Frequency reference	-10 to 10 Vdc, 0 to 10 Vdc (input impedance: 20 kΩ)
	A2	Multi-function analog input 2	Frequency reference	-10 to 10 Vdc, 0 to 10 Vdc (input impedance: 20 kΩ) 4 to 20 mA, 0 to 20 mA (input impedance: 250 Ω) - Voltage or current input must be selected by DIP switch S1 and H3-09.
	A3	Multi-function analog input 3	Auxiliary frequency reference/PTC Input	-10 to 10 Vdc, 0 to 10 Vdc (input impedance: 20 kΩ) - Use DIP switch S4 on the terminal board to select between analog and PTC input.
	AC	Frequency reference common		0 V
	E(G)	Ground for shielded lines and option cards		-

Output Terminals

Classification	Terminal	Terminal Name (Function)	Default Setting	Function (Signal Level)
Fault Relay Outputs	MA	N.O		30 Vdc, 10 mA to 1 A; 250 Vac, 10 mA to 1 A Minimum load: 5 Vdc, 10 mA
	MB	NC		
	MC	Fault output common		
Multi-Function Digital Output ^{*1}	M1	Multi-function digital output	During run	30 Vdc, 10 mA to 1 A; 250 Vac, 10 mA to 1 A Minimum load: 5 Vdc, 10 mA
	M2	Multi-function digital output		
	M3	Multi-function digital output	Zero speed	
	M4	Multi-function digital output		
	M5	Multi-function digital output	Speed Agree 1	
	M6	Multi-function digital output		
Monitor Output	MP	Pulse train output	Output frequency	32 kHz (max)
	FM	Analog monitor output 1	Output frequency	-10 to +10 Vdc, or 0 to +10 Vdc
	AM	Analog monitor output 2	Output current	
	AC	Monitor common		0 V
Safety Monitor Output ^{*2}	DM+	Safety monitor output		Outputs status of Safe Disable function. Closed when both Safe Disable channels are closed. Up to +48 Vdc 50 mA
	DM-	Safety monitor output common		

Communication Terminals

Classification	Terminal	Signal Function	Description	Function (Signal Level)
Modbus Communication ^{*3}	R+	Communication input	Modbus communication: use an RS-485 or RS-422 cable to connect the A1000	RS-485/422 Modbus communication protocol 115.2 kbps (max.)
	R-			
	S+	Communication output		
	S-			
	IG	Shield ground		

*1: Refrain from assigning functions to digital relay outputs that involve frequent switching, as doing so may shorten relay performance life. Switching life is estimated at 200,000 times (assumes 1 A, resistive load).

*2: Terminals H1, H2, DM+, and DM- on 600V class models are designed to the functionality, but are not certified to EN61800-5-1, EN954-1/ISO13849 Cat. 3, IEC/EN61508 SIL2, Insulation coordination: class 1.

*3: Enable the termination resistor in the last drive in a Modbus network by setting DIP switch S2 to the ON position.