Installation Instructions

Original Instructions

Allen-Bradley
by ROCKWELL AUTOMATION

MicroLogix 1400 Programmable Controllers

Catalog numbers 1766-L32AWA, 1766-L32AWAA, 1766-L32BWA, 1766-L32BWAA, 1766-L32BXB, 1766-L32BXBA

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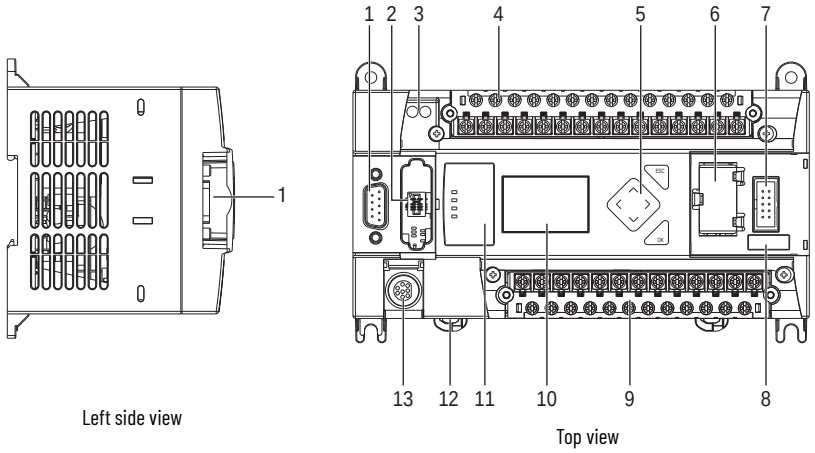
Summary of Changes

This publication contains the following new or updated information. This list includes substantive updates only and is not intended to reflect all changes.

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Updated template	throughout
Updated Environment and Enclosure	3
Added Table 1 in topic Connect 1762 I/O Expansion Modules	9
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Rockwell Automation

Figure 1 - MicroLogix 1400 Controller Overview



Left side view

Top view

Controller Description

	Description		Description
1	Comm port 2 - 9-pin D-Shell RS-232C connector	8	Battery connector
2	Memory module (see MicroLogix 1400 Memory Module Installation Instructions, publication 1766-IN010 for detailed installation instructions)	9	Output terminal block
3	User 24V (**for 1766-L32BWA and 1766-L32BWAA only**)	10	LCD display
4	Input terminal block	11	Indicator LED panel
5	LCD display keypad (ESC, OK, Up, Down, Left, Right)	12	Comm port 1 - RJ45 connector
6	Battery compartment	13	Comm port 0 - 8-pin mini DIN RS-232C/RS-485 connector
7	1762 expansion bus connector		

Controller Input and Output Description

Catalog Number	Description				
	Input Power	User Power	Embedded Discrete I/O	Embedded Analog I/O	Comm. Ports
1766-L32BWA	100/240V AC	24V DC	12 Fast 24V DC Inputs 8 Normal 24V DC Inputs 12 Relay Outputs	None	1 RS-232/RS-485[1] 1 EtherNet/IP™ 1 RS-232[2]
1766-L32AWA		None	20 120V AC Inputs 12 Relay Outputs		
1766-L32BXB	24V DC		12 Fast 24V DC Inputs 8 Normal 24V DC Inputs 6 Relay Outputs 3 Fast DC Outputs 3 Normal DC Outputs		
1766-L32BWAA	100/240V AC	24V DC	12 Fast 24V DC Inputs 8 Normal 24V DC Inputs 12 Relay Outputs	4 Voltage Inputs 2 Voltage Outputs	
1766-L32AWAA		None	20 120V AC Inputs 12 Relay Outputs		
1766-L32BXBA	24V DC		12 Fast 24V DC Inputs 8 Normal 24V DC Inputs 6 Relay Outputs 3 Fast DC Outputs 3 Normal DC Outputs		

(1) Isolated RS-232/RS-485 combo port. Same as MicroLogix 1100 Comm 0.

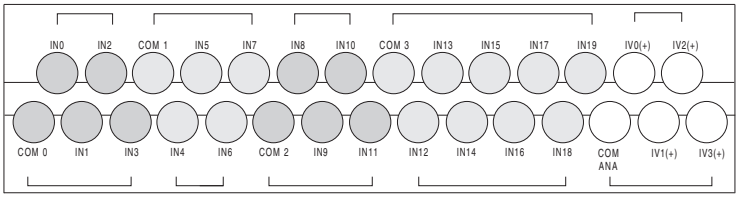
(2) Non-isolated RS-232. Standard D-sub connector.

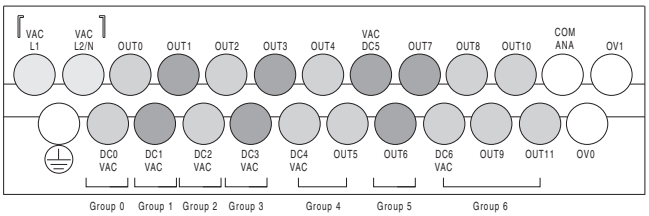
ATTENTION: Unsupported Connection

- Do not connect the Comm 0 port on the MicroLogix 1400 controller to another MicroLogix family controller such as MicroLogix 1000, MicroLogix 1200, or MicroLogix 1500 controller using a 1761-CBL-AM00 (8-pin mini-DIN to 8-pin mini-DIN) cable or equivalent.
- This type of connection will cause damage to the RS-232/RS-485 communication port (Channel 0) of the MicroLogix 1400 controller and/or the controller itself. Communication pins used for RS-485 communications are alternately used for 24V power on the other MicroLogix controllers.

1766-L32BWA/L32BWAA - Terminal Block Layout

Input Terminal Block

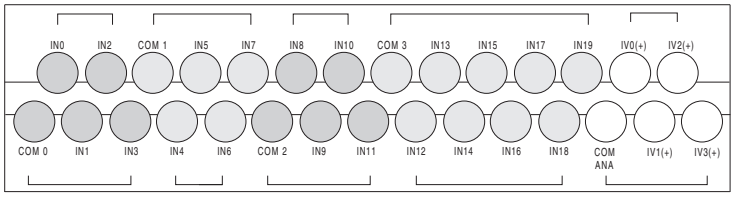


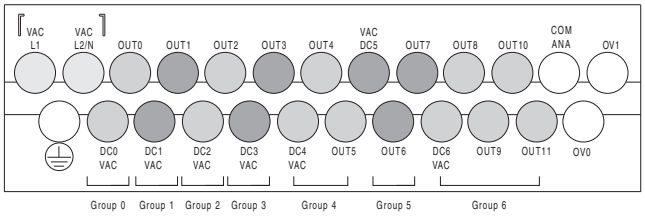


Output Terminal Block

1766-L32AWA/L32AWAA - Terminal Block Layout

Input Terminal Block

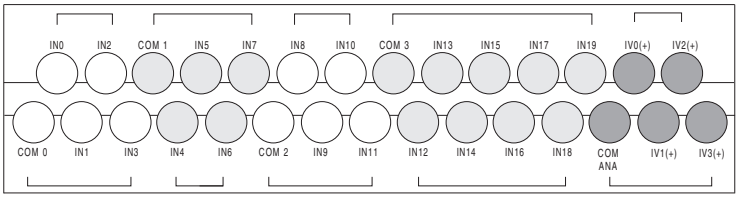


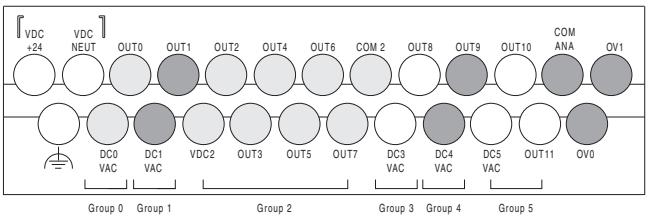


Output Terminal Block

1766-L32BXB/L32BXBA - Terminal Block Layout

Input Terminal Block





Output Terminal Block

Wire Type		Wire Size
Solid wire	Cu-90 °C (194 °F)	0.25…2.5 mm^2 (22…14 AWG)
Stranded wire	Cu-90 °C (194 °F)	0.25…1.5 mm^2 (22…16 AWG)

Wiring torque = 0.791 N•m (7 lb•in) rated.

Output Terminal Grouping

Controller	Output Group	Description	Outputs Voltage Terminal	Output Terminal
1766-L32BWA 1766-L32BWAA	Group 0	Isolated relay output	VAC/DC0	OUT 0
	Group 1	Isolated relay output	VAC/DC1	OUT 1
	Group 2	Isolated relay output	VAC/DC2	OUT 2
	Group 3	Isolated relay output	VAC/DC3	OUT 3
	Group 4	Isolated relay output	VAC/DC4	OUT 4, OUT 5
	Group 5	Isolated relay output	VAC/DC5	OUT 6, OUT 7
	Group 6	Isolated relay output	VAC/DC6	OUT 8…11
1766-L32AWA 1766-L32AWAA	Group 0	Isolated relay output	VAC/DC0	OUT 0
	Group 1	Isolated relay output	VAC/DC1	OUT 1
	Group 2	Isolated relay output	VAC/DC2	OUT 2
	Group 3	Isolated relay output	VAC/DC3	OUT 3
	Group 4	Isolated relay output	VAC/DC4	OUT 4, OUT 5
	Group 5	Isolated relay output	VAC/DC5	OUT 6, OUT 7
	Group 6	Isolated relay output	VAC/DC6	OUT 8…11
1766-L32BXB 1766-L32BXBA	Group 0	Isolated relay output	VAC/DC0	OUT 0
	Group 1	Isolated relay output	VAC/DC1	OUT 1
	Group 2	FET output	VDC2/COM 2	OUT 2…7
	Group 3	Isolated relay output	VAC/DC3	OUT 8
	Group 4	Isolated relay output	VAC/DC4	OUT 9
	Group 5	Isolated relay output	VAC/DC5	OUT 10, OUT 11

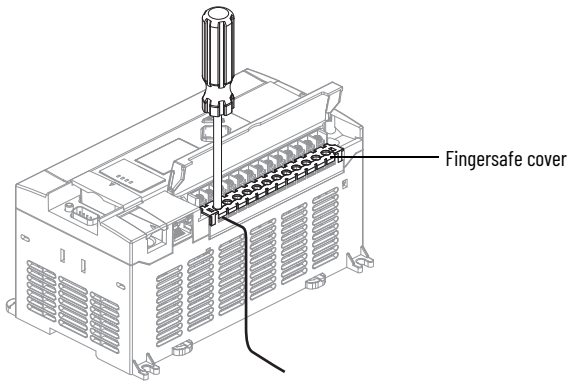
WARNING:
- If you connect or disconnect wiring while the field-side power is on, an electric arc can occur. This could cause an explosion in hazardous location installations. Be sure that power is removed or the area is nonhazardous before proceeding
- The local programming terminal port is intended for temporary use only and must not be connected or disconnected unless the area is free of ignitable concentrations of flammable gases or vapors.

Wiring Recommendation

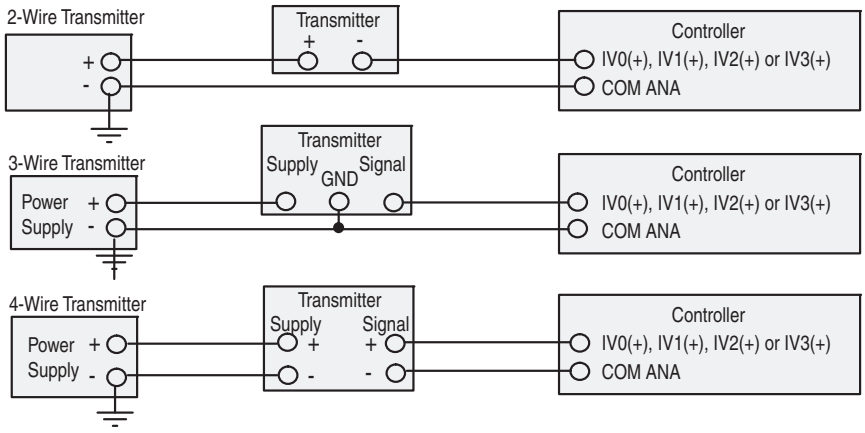
When wiring without spade lugs, keep the fingersafe covers in place.

1. Loosen the terminal screw and route the wires through the opening in the fingersafe cover.
2. Tighten the terminal screw to make sure that the pressure plate secures the wire. Recommended torque for terminal screws is 0.791 N•m (7 lb•in).

ATTENTION:
Be careful when stripping wires. Wire fragments that fall into the controller could cause damage. Once wiring is complete, be sure that the controller is free of all metal fragments before removing the protective debris strip. Failure to remove the strip before operating can cause overheating.



Analog Input Transmitter Specifications



Minimizing Electrical Noise on Analog Channels

Inputs on analog channels employ digital high-frequency filters that significantly reduce the effects of electrical noise on input signals. However, because of the variety of applications and environments where analog controllers are installed and operated, it is impossible to make sure that input filters removes all the environmental noise.

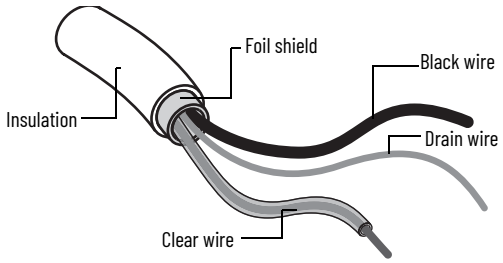
Several specific steps can be taken to help reduce the effects of environmental noise on analog signals:

- Install the MicroLogix 1400 system in a properly rated (NEMA) enclosure. Make sure that the MicroLogix 1400 system is properly grounded.
- Use Belden cable #8761 for wiring the analog channels, making sure that the drain wire and foil shield are properly earth grounded, (see Grounding Your Analog Cable topic for more information).
- Route the Belden cable separately from any AC wiring. Additional noise immunity can be obtained by routing the cables in grounded conduit.

Grounding Your Analog Cable

Use a shielded communication cable (Belden #8761). The Belden cable has two signal wires (black and clear), one drain wire, and a foil shield. The drain wire and foil shield must be grounded at one end of the cable.

IMPORTANT Do not ground the drain wire and foil shield at both ends of the cable.



Specifications

General Specifications

Attribute	1766-L32AWA 1766-L32AWAA	1766-L32BWA 1766-L32BWAA	1766-L32BXB 1766-L32BXBA
Dimensions H x W x D	90 x 180 x 87 mm (3.5 x 7.087 x 3.43 in.)		
Shipping weight	0.9 kg (2.0 lbs)		
Number of I/O	24 inputs (20 digital and 4 analog) and 14 outputs (12 digital and 2 analog)		
Power supply voltage	100...240V AC @ 47...63 Hz		24V DC Class 2 SELV
Heat dissipation	See MicroLogix 1400 Programmable Controllers User Manual, publication 1766-UM001		
Power supply inrush current	120V AC: 25 A for 8 ms 240V AC: 40 A for 4 ms		24V DC: 15 A for 20 ms
Power consumption	100 VA	120 VA	50 W 7.5 W (with no 1762 expansion I/O)
24V DC sensor power	None	24V DC @ 250 mA 400 µF max	None

General Specifications (Continued)

Attribute	1766-L32AWA 1766-L32AWAA	1766-L32BWA 1766-L32BWAA	1766-L32BXB 1766-L32BXBA
Input circuit type	Digital: 120V AC Analog: 0…10V DC	Digital: 24V DC sink/source (standard and high-speed) Analog: 0…10V DC	Digital: 24V DC sink/source (standard and high-speed) Analog: 0…10V DC
Output circuit type	Relay		Relay/FET
Relay life - Electrical	2 x 10^5 operations min (2.5 A, 250V AC/30V DC)		
Enclosure type rating	None (open-style)		
Wire size	0.25…2.5 mm^2 (22…14 AWG) solid or stranded copper wire rated @ 90 °C (194 °F) or greater		
Wiring category(1)	2 - on signal ports 2 - on power ports 3 - on communications ports		
Terminal screw torque	0.79 N•m (7.0 lb•in) rated		
Pilot duty rating	R300, C300		
Expansion bus	Supports up to seven 1762 modules, up to a maximum of 5V, 1500 mA (1300 mA for Series C only), and 24V, 1500 mA (1300 mA for Series C only).		
North American temp code	T3C		

(1) Use this Conductor Category information for planning conductor routing. See Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1.

Digital Input Specifications

Attribute	1766-L32AWA 1766-L32AWAA	1766-L32BWA, 1766-L32BWAA, 1766-L32BXB, 1766-L32BXBA	
		Inputs 0…11 (12 high-speed DC inputs)	Inputs 12 and higher (8 standard DC inputs)
On-state voltage range	79…132V AC	4.5…24V DC, Class 2 (4.5…26.4V DC @ 60 °C/140 °F) (4.5…30V DC @ 30 °C/86 °F)	10…24V DC, Class 2 (10…26.4V DC @ 60 °C/140 °F) (10…30V DC @ 30 °C/86 °F)
Off-state voltage range	0…20V AC	0…1.5V DC	0…5V DC
Operating frequency	47…63 Hz	0 Hz…100 kHz	0 Hz…1 kHz (scan time dependent)
On-state current Min Nom Max	 5.0 mA @ 79V AC 12 mA @ 120V AC 16.0 mA @ 132V AC	 7.1 mA @ 4.5V DC 9.9 mA @ 24V DC 10.5 mA @ 30V DC	 3.2 mA @ 10V DC 5.3 mA @ 24V DC 5.5 mA @ 30V DC
Off-state leakage current, max	2.5 mA	0.2 mA	1.5 mA
Nominal impedance	12 kΩ @ 50 Hz 10 kΩ @ 60 Hz	2.4 kΩ	4.5 kΩ
Inrush current, max @ 120V AC	250 mA		

Analog Input Specifications

Attribute	1766-L32AWAA, 1766-L32BWAA, 1766-L32BXBA
Voltage input range	0…10.0V DC - 1 LSB
Type of data	12-bit unsigned integer
Input coding (0…10V DC - 1 LSB)	0…4,095
Voltage input impedance	>199 kΩ
Input resolution	12 bit
Non-linearity	±1.0% of full scale
Overall accuracy -20…+60 °C (-4…+140 °F)	±1.0% of full scale
Voltage input overvoltage protection	10.5V DC
Field wiring to logic isolation	Non-isolated with internal logic

Analog Output Specifications

Attribute	1766-L32AWAA, 1766-L32BWAA, 1766-L32BXBA
Number of outputs	2 single-ended
Voltage output range	0…10V DC - 1 LSB
Type of data	12 bit unsigned integer
Step response	2.5 ms @ 95%
Load range Voltage output	1 KΩ
Output resolution	12 bit

Analog Output Specifications (Continued)

Attribute	1766-L32AWAA, 1766-L32BWAA, 1766-L32BXBA
Analog output setting time, max	3 ms
Overall Accuracy -20...+60 °C (-4...+140 °F)	±1.0% of full scale
Electrical isolation	Non-isolated with internal logic
Cable length	30 m (98 ft) shielded cable

Relay and FET Outputs

Attribute		1766-L32AWA, 1766-L32AWAA, 1766-L32BWA, 1766-L32BWAA	1766-L32BXB, 1766-L32BXBA
Maximum controlled load		1440 VA	1080 VA
Maximum Continuous Current:			
Current per channel and group common		2.5 A per channel 8 A max channel 8...11 common	2.5 A per channel
Current per controller	at 150V max	28 A or a total of per-point loads, whichever is less	
	at 240V max	20 A or a total of per-point loads, whichever is less	

Relay Outputs

Attribute	1766-L32AWA, 1766-L32AWAA, 1766-L32BWA, 1766-L32BWAA, 1766-L32BXB, 1766-L32BXBA
Turn On Time/Turn Off Time, max	10 ms[1]
Load current, max	10 mA

(1) Scan time dependent.

Maximum Volts	Amperes		Amperes Continuous	Voltamperes	
	Make	Break		Make	Break
240V AC	7.5 A	0.75 A	2.5 A	1800 VA	180 VA
120V AC	15.0 A	1.5 A	2.5 A	1800 VA	180 VA
250V DC	0.11 A		1.0 A	28 VA	
125V DC	0.22 A		1.0 A	28 VA	

1766-L32BXB, 1766-L32BXBA FET Output

Attribute	General Operation	High-speed Operation[1] (Output 2, 3, and 4 Only)
Power supply voltage	24V DC (-15%, 10%) Class 2	
On-state voltage drop: At max load current At max surge current	 1V DC 2.5V DC	 Not Applicable Not Applicable
Current rating per point: Max load Min load Max leakage	 See Figure 8 on page 17 1.0 mA 1.0 mA	 100 mA 20 mA 1.0 mA
Surge current per point: Peak current Max surge duration Max rate of repetition @ 30 °C (86 °F) Max rate of repetition @ 60 °C (140 °F)	 4.0 A 10 ms Once every second Once every 2 seconds	 Not Applicable Not Applicable Not Applicable Not Applicable
Turn-On Time (maximum)	11 µs	28 ns (250 ns for Series C only)
Turn-Off Time (maximum)	89 µs	2.3 µs (3.5 µs for Series C only)

(1) Output 2, 3, and 4 are designed to provide increased functionality over the other FET outputs. Output 2, 3, and 4 may be used like the other FET transistor outputs, but in addition, within a limited current range, they may be operated at a higher speed. Output 2, 3, and 4 also provide a pulse train output (PTO) or pulse-width modulation output (PWM) function.

1766-L32AWA, 1766-L32AWAA

