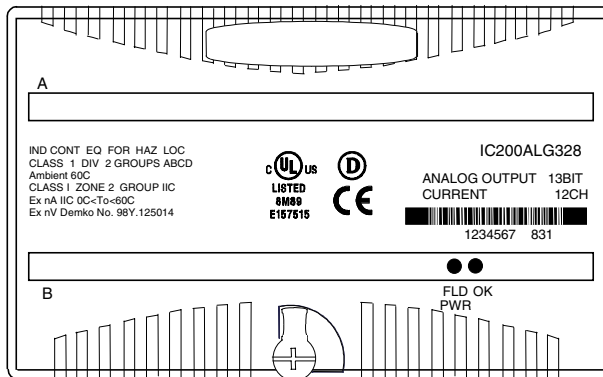


IC200ALG328

Analog Output Module, 13 Bit Current, 12 Channels

Analog output module IC200ALG328 provides twelve 4mA to 20mA analog current-sourcing outputs. Including a modest amount of overrange current, approximately 20.38mA of output current per channel is available to drive output loads.



An external source of DC power is required for the outputs.

Intelligent processing for this module is performed by the CPU or NIU. The module receives 12 words of analog output data.

LED Indicators

The green FLD PWR LED indicates the presence of user-side power for the analog field-side circuits.

The green OK LED is on when backplane power is present to the module.

Diagnostics

The module reports a Loss of User Side Power fault for field-side circuits.

Configuration Parameters

The module can be configured for either the 4-20 mA or 0-20 mA output current range by installing a jumper wire on the field terminal strip.

The module can also be easily set up with a jumper for the outputs to either hold their last states or default to the low end of their range if backplane power or communications are interrupted or the PLC is stopped. External user power must remain uninterrupted.

Outputs remain in their default or last state until the module receives different output data from the backplane, or until field power is removed.

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Module Specifications

Module Characteristics	
Channels	12 single-ended, one group
Module ID	FFFF94C0
Isolation:	
User input to logic and to frame ground	250VAC continuous; 1500VAC for 1 minute
Group to group	Not applicable
Channel to channel	None
LED indicators	FLD PWR LED indicates field power is present OK LED indicates backplane power is present
Backplane current consumption	5V output: 50mA maximum
External power supply:	
Range	+18 to +30VDC (including ripple)
Current consumption	2A inrush maximum 100 mA maximum (no load) 270 mA maximum (all 12 outputs at full scale)
Thermal derating	See diagram
Configuration parameter	Range, output default
Diagnostics	Loss of User Side (Field) Power
Output Characteristics	
Output current	4 to 20mA (default) 0 to 20mA (configured with jumper)
Load characteristics:	
Resistive	0 to 800 Ohms maximum*
Capacitive	0.1µF maximum
Inductive	0.5H maximum
Accuracy:	
+25 deg C**	+/- 0.3% of full scale (typical), +/- 0.5% of full scale (max.)
0 to +60 degrees C	+/-1% of full scale (max.)
Resolution	4-20 mA: 5 counts = 2.5 uA (~12.7 bits) 0-20 mA: 4 counts = 2.5 uA (13 bits)
Update rate per module	15 mSec maximum
Channel-to-channel crosstalk rejection	70dB minimum
Output default	Hold Last State (default) Low End of Range(configurable)

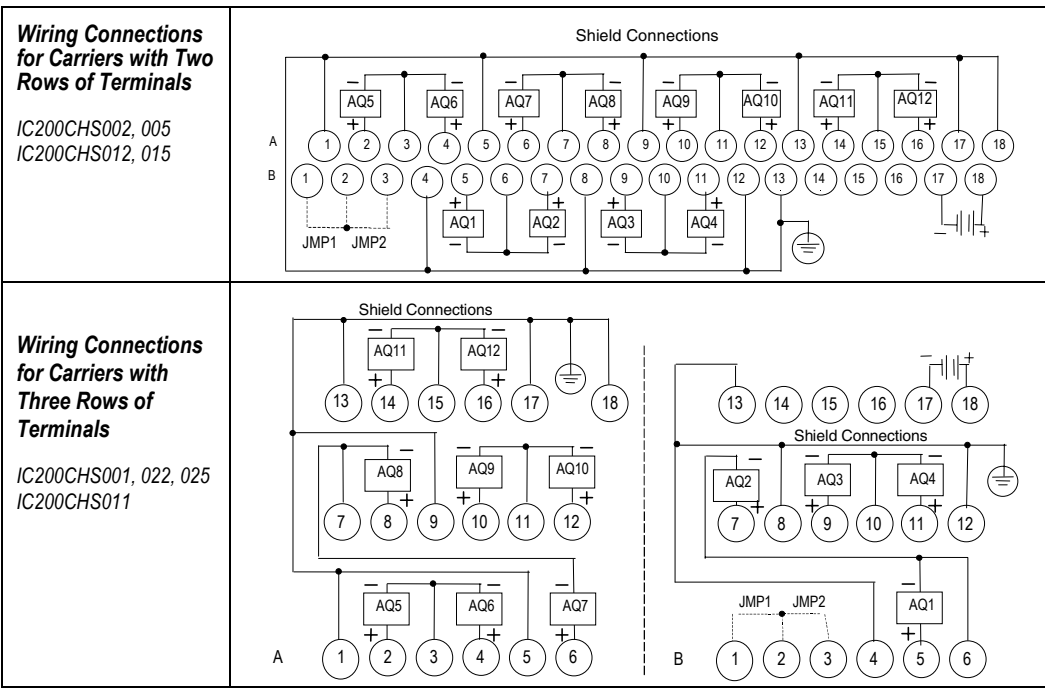
* $R_{L(MAX)} = (V_{FIELD PS} - 4V) / 20.38mA$

** In the presence of severe RF interference, (IEC 1000-4-3, 10V/m), accuracy may be degraded an additional +/-1%.

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Field Wiring

Terminal	Connection	Terminal	Connection
A1	Shield Termination Point	B1	Range Jumper
A2	I OUT 5	B2	Jumper RET
A3	RET	B3	Hold Jumper
A4	I OUT 6	B4	Shield Termination Point
A5	Shield Termination Point	B5	I OUT 1
A6	I OUT 7	B6	RET
A7	RET	B7	I OUT 2
A8	I OUT 8	B8	Shield Termination Point
A9	Shield Termination Point	B9	I OUT 3
A10	I OUT 9	B10	RET
A11	RET	B11	I OUT 4
A12	I OUT 10	B12	Shield Termination Point
A13	Shield Termination Point	B13	Shield Termination Point
A14	I OUT 11	B14	No connection
A15	RET	B15	No connection
A16	I OUT 12	B16	No connection
A17	Shield Termination Point	B17	DC-
A18	Shield Termination Point	B18	DC+



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Jumper Selection

Range Jumper

If no jumper is installed the output current range will be 4 to 20 mA. With a jumper installed the output current range is 0 to 20 mA. This should only be changed with field power and backplane power removed. The corresponding parameter in the hardware configuration must also be adjusted accordingly.

Range Jumper	Default
None	4 to 20 mA
JMP 1	0 to 20 mA

Hold Jumper

If no jumper is installed outputs hold their last states (the last commanded values from the backplane) if backplane power or communications are interrupted or the PLC is stopped. With a jumper installed, if such conditions occur outputs default to 0/4mA. This should only be changed with field power and backplane power removed. The corresponding parameter in the hardware configuration must also be adjusted accordingly.

Hold Jumper	Default
None	Hold Last State
JMP 2	0/4mA

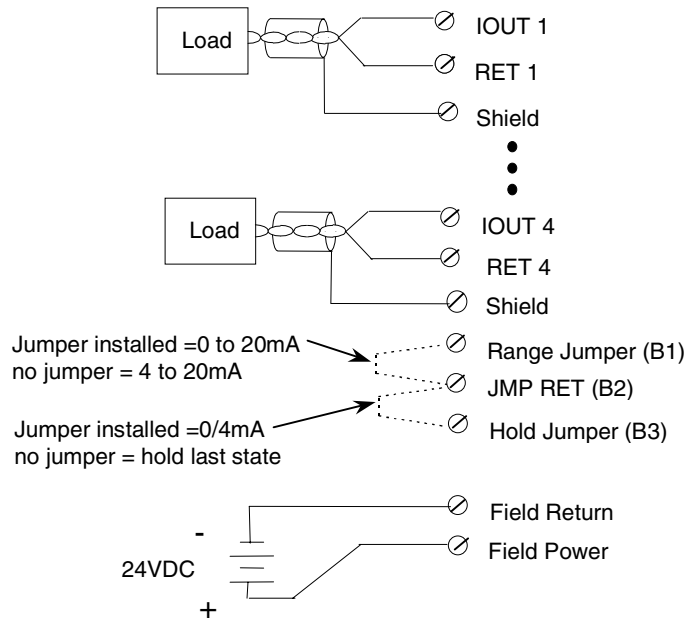
The “Default Low End of Range” value can be either 4mA or 0mA. The default depends on the PLC status, output current range selected, and whether the module is controlled by a VersaMax PLC CPU or a Network Interface Unit (NIU) module. In some cases, the module will output 0mA instead of 4mA, even when configured for the 4-20mA range as shown in the following chart.

Action	Module Set to Default Low End of Range (Default)				Module Set to Hold Last State (HLS)			
	Module in NIU Rack		Module in CPU Rack		Module in NIU Rack		Module in CPU Rack	
	0-20mA	0-20mA	4-20mA	0-20mA	4-20mA	4-20mA	0-20mA	4-20mA
Run to Stop	0mA	0mA	4mA	0mA	HLS	HLS	HLS	HLS
Loss of Field Power	0mA	0mA	0mA	0mA	0mA	0mA	0mA	0mA
Loss of Backplane Power	0mA	0mA	0mA	0mA	HLS	HLS	HLS	HLS
Loss of Communication	0mA	0mA	4mA	N/A	HLS	HLS	N/A	N/A
Loss of Module	0mA	0mA	0mA	0mA	0mA	0mA	0mA	0mA
Loss of CPU/NIU Power	0mA	0mA	0mA	0mA	HLS	HLS	HLS	HLS

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Wiring Example



Cable Shield Connections

Shielded twisted pair cable is recommended for all of the analog channel connections. If the module is installed on a Terminal-style I/O Carrier (IC200CHS001, 002, or 005) or a Compact Terminal-style I/O Carrier (IC200CHS022, 025), the cable shield can be connected directly to the carrier per the Field Wiring Table. An Auxiliary I/O Terminal Strip (IC200TBM001, 002, or 005) can also be added to the Terminal-style I/O Carriers to aid in grounding shields. Be sure to ground the Auxiliary I/O Terminal Strip as well if you plan to use it for this purpose.

If the module is installed on a Connector-style I/O Carrier (IC200CHS003), the cable shield can be connected directly to an Interposing Terminal (IC200CHS011, 012, 015). Be sure to ground the Interposing Terminal. It is recommended to use a shielded interposing cable as well between the Interposing Terminal and the Connector Base. A custom shielded cable can be made using the Connector kit (IC200ACC302). In addition, a custom shield braid can be wrapped around standard Interposing Cables (IC200CBL105, 110, 120, 230). If this approach is used be sure to ground the braid.

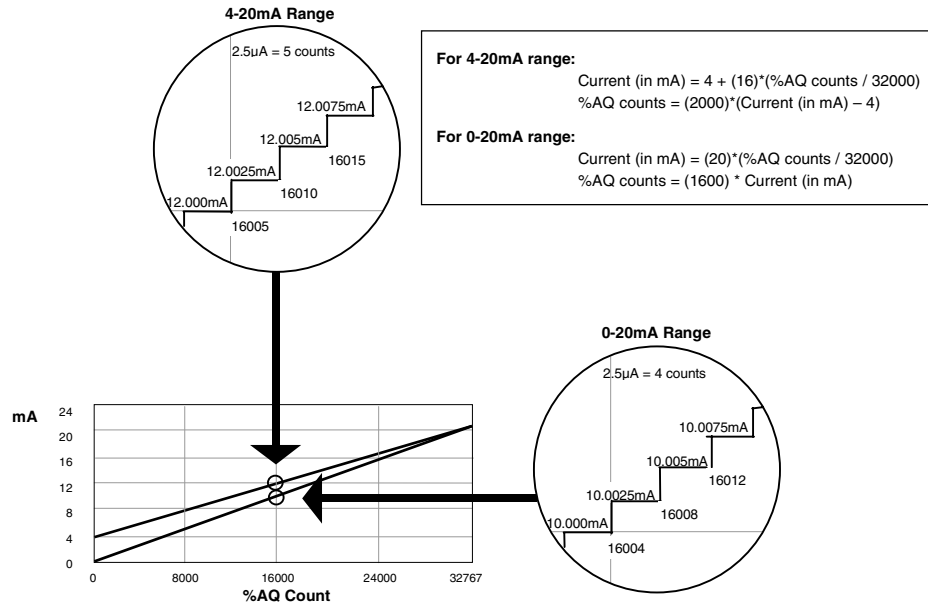
All cable shield connections should be connected to earth ground and be kept as short as practical. The power cable does not need to be shielded.

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Output Current Range Scaling / Step Change

In 0-20mA range mode, a current output signal value of 0mA corresponds to a %AQ value of 0 counts, and 20mA corresponds to a %AQ value of +32,000 counts. In 4-20mA range mode, a value of 0 %AQ counts corresponds to an output current of 4mA and a value of +32,000 %AQ counts corresponds to an output current of 20mA. If the module is installed in a Versamax PLC, it converts negative value commands to 0 mA regardless of range selected. If the module is controlled by a Network Interface Unit (NIU), it converts any negative value commands to the low end of range.

The illustration below shows the relationship between output signal strength and commanded %AQ counts. It depicts the step change in output current level for various command values. Not every command value results in a change in the output current level due to the module's resolution.



4-20 mA Range Step Change Example

Count	Current
16000	12.0000 mA
16005	12.0025 mA
16008	12.0025 mA
16009	12.0025 mA
16010	12.0050 mA

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Thermal Derating

The number of channels that can be active at the same time depends on the ambient temperature, the external voltage, and the orientation of the module and DIN rail. There is no thermal derating for this module at 24V. The chart below shows thermal deratings for this module, on certain carriers, at 30VDC with the module and DIN rail in the orientations shown. There is no derating at 30V in other orientation and carrier combinations.

To meet thermal derating requirements, inactive channels should be distributed evenly across the total number of output. For example, the "A" orientation graph below reflects the derating with channels 1, 5, and 9 inactive.

