VersaMax * *I/O*
Analog Input Module, 15-Bit Voltage, 15 Channels, IC200ALG265
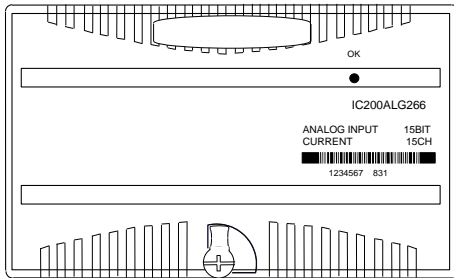**Analog Input Module, 15-Bit Current, 15 Channels, IC200ALG266**

October 2016   GFK-2474F

Product Description

Analog input module IC200ALG265 provides an interface to 15 voltage inputs. Analog input module IC200ALG266 provides an interface to 15 current inputs. Both modules are certified for use in safety applications (see GFK-1277).

No external power source is required for module operation. Power for the user's transceivers must be supplied from an external source.

Intelligent processing for this module is performed by the CPU or NIU. The module provides 15 words of analog input data.

Modules IC200ALG265 and IC200ALG266 are enhanced versions of analog modules IC200ALG263 and IC200ALG264. The IC200ALG265 and IC200ALG266 feature improved overvoltage protection and improved internal diagnostics. In addition, IC200ALG265 and IC200ALG266 are approved by TUV for use in the safety-relevant portion of a GMR system.

Input Protection

IC200ALG265 and IC200ALG266 protect against overvoltages up to 30VDC (IC200ALG263 and IC200ALG264 provide protection to 15VDC). When one channel is operating within this overvoltage limit, the operation of the other 14 channels is not affected.

The IC200ALG266 has the following additional considerations for input protection:

- The current input module IC200ALG266 contains active circuitry to protect the input sense resistors. If an input is accidentally connected to +24V field power, the module limits input current to 40mA maximum (30 mA typical) to prevent damage from excessive power.
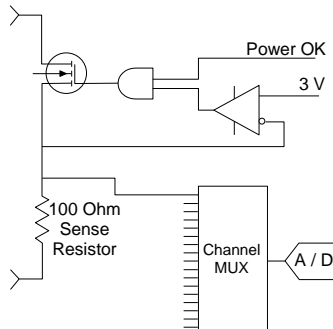
- Additional protection for the sense resistors is provided by opening the input loop while the ALG266 module is powered off. That means when the module is powered off, any connected external transmitters that perform Open Wire fault detection will see the open input loop as an Open Wire fault, and any external receivers connected in series with the module will not receive a valid signal. Both should be considered when planning the application.

Configuration Parameters

The analog inputs are software-configurable to either default or hold last state in the event of a module failure or loss of user side power.

For the current input module, IC200ALG266, a jumper on the carrier terminals is used to select 4-20mA or 0-20mA input ranges. With no jumper installed, the module expects 4-20mA input signals. With a jumper installed, the module expects 0-20mA input signals.

Diagnostics

Both modules report an Internal Hardware fault upon detection of an A/D conversion malfunction in excess of ±6%. The module detects this malfunction by applying a known stimulus to the A/D conversion path and verifying the expected result. If an unexpected result occurs three times consecutively, the module turns off the OK LED and reports the malfunction to the CPU/NIU. If fault reporting is enabled, the CPU/NIU will generate a Loss of I/O Module fault. The module must be power cycled and/or replaced to clear this fault.

Both modules also report a Loss of User Side Power fault for field-side circuits.

Module IC200ALG266 also reports an Open Wire fault for individual channels, when configured for 4-20mA mode if Fault Reporting is enabled. If the field common wire is disconnected, the ALG266 module will report at least one open wire fault for one of its 15 channels.

Module Specifications

Module Characteristics	
Channels	15 single ended, one group
Module ID	FFFFB00F Module IC200ALG265 FFFFB50F Module IC200AG266 in 4-20mA mode FFFFB40F Module IC200AG266 in 0-20mA mode
Isolation: User input to logic (optical) and to frame ground	250VAC continuous; 1500VAC for 1 minute
Group to group Channel to channel	Not applicable None
LED indicators	OK LED
Thermal derating	None
Backplane current consumption, maximum	IC200ALG265: 5V = 150mA, +3.3V = 50mA IC200ALG266: 5V = 100mA, +3.3V = 50mA
External power supply	None
Input Characteristics	
Input voltage, IC200ALG265	-10V to +10V
Input current, IC200ALG266	4 to 20mA (default: no terminal jumper installed) 0 to 20mA (with terminal jumper installed)
Input Fault Withstand	IC200ALG265: +/-30V; IC200ALG266: +30V
Input Impedance	IC200ALG265: 100K Ohms IC200ALG266: 100 Ohms

Accuracy at:
     25 degrees C *
 	
     0 to 60 degrees C
	+/-0.3% typical of full scale,
	+/-0.5% maximum of full scale
	+/-1% maximum of full scale

Resolution, 15 bits	IC200ALG265: 0.3125mV = 1 count IC200ALG266 in 4-20mA range: $0.5\mu A$ = 1 count IC200ALG266 in 0-20mA range: $0.625\mu A$ = 1 count
Filter response (3dB Corner Freq)	IC200ALG265: 32Hz +/-20% IC200ALG266: 24 Hz +/-20%
Update rate	7.5ms

* In the presence of severe RF interference, (IEC 1000-4-3, 10V/m), accuracy may be degraded to +/-2%. Also note, the TUV certified safety function for these modules allows an inaccuracy up to +/-6% before diagnostic detection occurs.

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Product Revision History

IC200ALG266G IC200ALG265F	Oct 2016	EU RoHS compliant module per directive 2011/65/EU dated 8-June-2011. No changes to features, performance or compatibility.
IC200ALG266F IC200ALG265E	Jan 2012	Label change. No changes to features, performance or compatibility.
IC200ALG266E IC200ALG265D	Mar 2011	Label change. No changes to compatibility, functions or performance.
IC200ALG266D IC200ALG265C	Aug 2009	Changed manufacturing location. No changes to compatibility, functionality or performance.
IC200ALG266C IC200ALG265B	Sept 2008	Updated Power Supply OK signal circuitry.
IC200ALG266B	Jan 2008	Increased isolation dielectric voltage to 1500VAC.
IC200ALG265A IC200ALG266A	Jan 2007	Initial Release

Compatibility

Modules IC200ALG265 and IC200ALG266 are compatible with all VersaMax carriers and CPU/NIUs except the DeviceNet NIU (IC200DBI001). Note that if replacing ALG263/ALG264 with ALG265/ALG266, the keying dials on the carriers must be modified. The key for the ALG265 is G5, and the key for the ALG266 is G4. (The difference helps prevent accidental replacement of a safety-approved module with module that is not safety-approved.)

Operating Notes/Restrictions

Do not attempt to change the current input range jumper on the IC200ALG266 module while it is operating.

Preinstallation Check

Carefully inspect all shipping containers for damage. If any equipment is damaged, notify the delivery service immediately. Save the damaged shipping container for inspection by the delivery service. After unpacking the equipment, record all serial numbers. Save the shipping containers and packing material in case it is necessary to transport or ship any part of the system.

Installation in Hazardous Locations

- EQUIPMENT LABELED WITH REFERENCE TO CLASS I, GROUPS A, B, C & D, DIV. 2 HAZARDOUS LOCATIONS IS SUITABLE FOR USE IN CLASS I, DIVISION 2, GROUPS A, B, C, D OR NON-HAZARDOUS LOCATIONS ONLY

⚠ WARNING - EXPLOSION HAZARD - SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR CLASS I, DIVISION 2;

⚠ WARNING - EXPLOSION HAZARD - WHEN IN HAZARDOUS LOCATIONS, TURN OFF POWER BEFORE REPLACING OR WIRING MODULES; AND

⚠ WARNING - EXPLOSION HAZARD - DO NOT DISCONNECT EQUIPMENT UNLESS POWER HAS BEEN SWITCHED OFF OR THE AREA IS KNOWN TO BE NONHAZARDOUS.

Cable Shield Connections

Shielded twisted pair cable is recommended for the analog channel connections. If possible, the cable should be grounded at the source device. If that is not possible, the cable shield must be grounded at the I/O module. This can be done using an Auxiliary I/O Terminal (IC200TBM001/2/5).

If the module is installed on a Terminal-style I/O Carrier, shield connections can be made on an Auxiliary I/O Terminal that is attached to the I/O carrier.

If the module is installed on a Compact Terminal-style I/O Carrier, shield connections can be made on an Auxiliary I/O Terminal that is mounted near the I/O carrier.

If the module is installed on a Connector-style I/O Carrier, the cable shield can be connected directly to an Interposing Terminal. A shielded interposing cable (shielded cables are available separately) must be used between the Connector-style I/O Carrier and the Interposing Terminal.

An Auxiliary I/O Terminal Strip can also be added to the Interposing Terminal if additional shield connections are required.

An optional Shorting Bar (IC200ACC303) or Auxiliary I/O Terminal Strip can be used for wiring convenience, when multiple Return paths need to be wired together.

Field Wiring Terminals

Terminal assignments for the module are shown below.

Number	Connection		Number	Connection
	IC200ALG265	IC200ALG266		
A1	V1	I1	B1	No connection
A2	V2	I2	B2	No connection
A3	V3	I3	B3	No connection
A4	V4	I4	B4	No connection
A5	V5	I5	B5	No connection
A6	V6	I6	B6	No connection
A7	V7	I7	B7	No connection
A8	V8	I8	B8	No connection
A9	V9	I9	B9	No connection
A10	V10	I10	B10	No connection
A11	V11	I11	B11	No connection
A12	V12	I12	B12	No connection
A13	V13	I13	B13	No connection
A14	V14	I14	B14	No connection
A15	V15	I15	B15	No connection
A16	NC	Range JMPR*	B16	No connection
A17	Return (common)	RTN	B17	No connection
A18	NC	NC	B18	No connection

*To select 0-20mA mode, connect A16 to A17. To select 4-20mA mode, make no connection to A16.

LED Indicators

The green OK LED is on when backplane power is present, internally generated field power is functioning properly and the module has been configured.

VersaMax* I/O
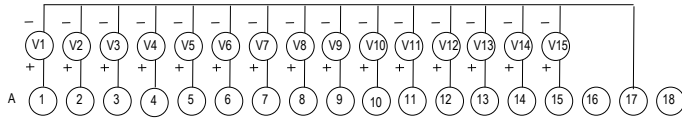## Analog Input Module, 15-Bit Voltage, 15 Channels, IC200ALG265
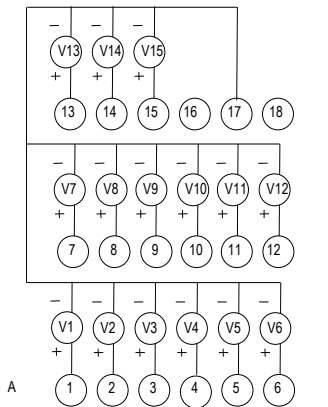## Analog Input Module, 15-Bit Current, 15 Channels, IC200ALG266

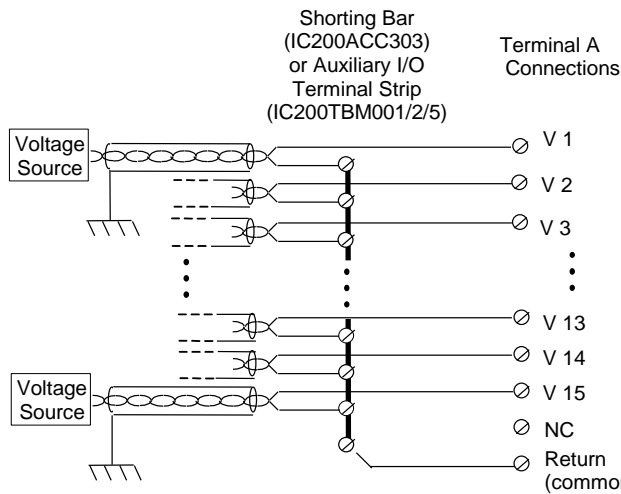October 2016   GFK-2474F

Field Wiring: Module IC200ALG265

Wiring Connections for Carriers with Two Rows of Terminals

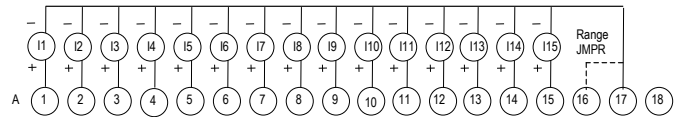### Wiring Connections for Carriers with Three Rows of Terminals

Wiring Example

Shorting Bar (IC200ACC303) or Auxiliary I/O Terminal Strip (IC200TBM001/2/5)

Terminal A Connections

* In the presence of severe RF interference, (IEC 1000-4-6), shield grounding near the input terminal is recommended.
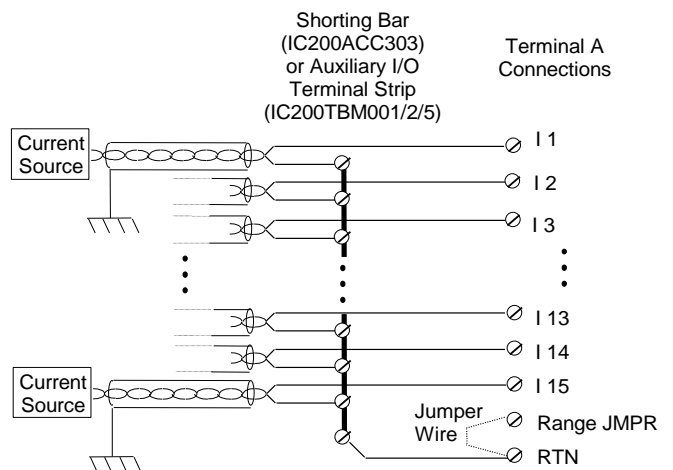
Field Wiring: Module IC200ALG266

Wiring Connections for Carriers with Two Rows of Terminals

Wiring Connections for Carriers with Three Rows of Terminals

Wiring Example

Shorting Bar (IC200ACC303) or Auxiliary I/O Terminal Strip (IC200TBM001/2/5)

Terminal A Connections
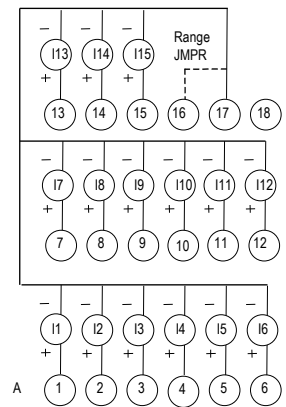
The jumper on the module selects the current input range.

Jumper	Range
None	4-20mA
Installed from A16 to A17	0-20mA

Do not attempt to change the current input range jumper on the IC200ALG266 module while it is operating.

* In the presence of severe RF interference, (IEC 1000-4-6), shield grounding near the input terminal is recommended.

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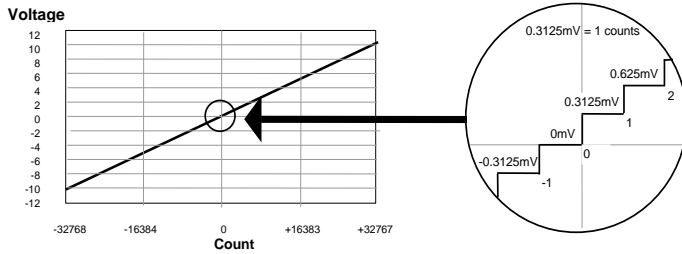October 2016   GFK-2474F

Scaling

The illustrations below show the relationship between the input current or voltage measured at the field terminals and the data that is output by the module.
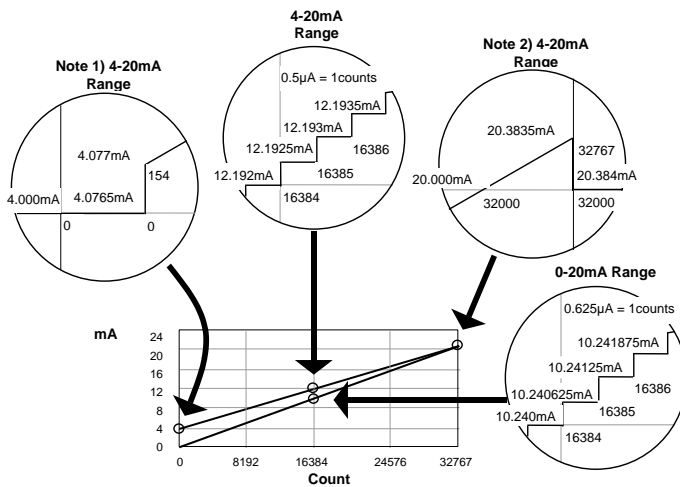
Module IC200ALG265: Count and Input Voltage

The following equation can be used to calculate count values:

$$\text{Counts} = (\text{Input Voltage}) \times (32000 / 10V)$$

Module IC200ALG266: Count and Input Current

The following equations can be used to calculate count values:

4-20mA Range: Counts = (Current in mA - 4mA) x (32000 / 16mA)

0-20mA Range: Counts = (Current in mA) x (32000 / 20mA)

Note 1: In 4-20mA mode, signal inputs below 4.077mA are converted to zero counts.

Note 2: In 4-20mA mode, signal inputs at 20.000mA or above 20.383mA are converted to 32000 counts.