Chapter 10

Voltage/Current Analog Input/Output Blocks

Voltage/Current 4 Input/2 Output Analog Input/Output Blocks have four independent input circuits and two independent output circuits. Two block versions are available:

- **115 VAC Analog I/O Block** (IC660BBA100)
- **24/48 VDC Analog I/O Block** (IC660BBA020)

They are identical except for the power supply.

Features

Each circuit on a Voltage/Current Analog I/O Block can accept or provide signals in one of five analog ranges: 0 to 10 volts DC, –10 volts DC to +10 volts DC, –5 volts DC to +5 volts DC, 0 to 5 volts DC, or 4 to 20 mA (1 to 5 volts DC). External resistance can be used to interface these blocks to current–loop devices with other signal ranges.

The block converts the input and output signal levels to/from digital count values and translates them into engineering units values that relate to the application.

The block's internal power supply drives current mode output loads up to 300 ohms each. For loads up to 2K ohms, an external 24 or 48 VDC power supply can be used. For current-loop applications, Current-source Analog blocks may be more suitable. See chapters 11 through 13.

Individual inputs can be set up to operate in Alarm Input Mode. In this mode, the input's analog value is not sent to the HHM or the CPU. Instead, the block will report values that indicate whether the input signal exceeds either of its alarm levels.

Additional configurable features include:

- Selectable Input Filter Time up to 1024mS
- Output powerup defaults
- Output Hold Last State or default
- CPU Redundancy

Block diagnostics are performed automatically:

- Input Low Alarm and High Alarm detection
- Open Wire detection
- Input Underrange or Overrange
- Output Underrange or Overrange

a44487
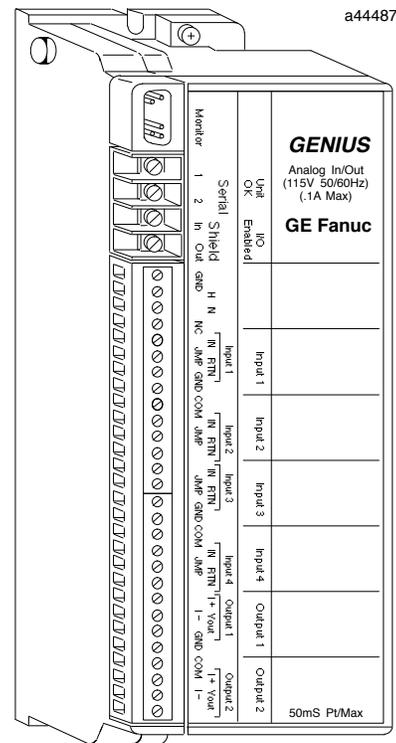
Compatibility

These blocks are compatible with all Genius bus controllers, PCIM and QBIM modules. Any Genius Hand–held Monitor can be used.

For a Series Six™ PLC, the CPU must be rev. 105 or later. For a Series Six Plus, rev. 110 or later is required. The programming software must be Logicmaster™ Six rel. 4.02 or later.

For a Series Five™ PLC, the CPU must be rev. 3.0 or later. The Logicmaster Five programming software must be rel. 2.01 or later.

Specifications

Block Type:	4 input / 2 output circuits
Catalog Numbers:	
115 VAC Analog I/O Block	IC660BBA100
Terminal Assembly only	IC660TSA100
Electronics Assembly only	IC660EBA100
24/48 VDC Analog I/O Block	IC660BBA020
Terminal Assembly only	IC660TSA020
Electronics Assembly only	IC660EBA020

Size (height x width x depth)**:**	8.83" (22.44 cm) x 3.50" (8.89 cm) x 3.94" (10.00 cm)
Weight:	4 lbs. (1.8 kg)
LEDs (block)**:**	Unit OK, I/O Enabled
Block to Block Isolation:	1500 V
Heat Dissipation:	6 Watts

Block Power (nominal):	**115 VAC**	**24/48 VDC**
Operating range	98–132 VAC	18–56
Maximum power	10 VA	8 W
Frequency / ripple	47–63 Hz	10% max. ripple
Power supply dropout time	1 cycle	10 mS

Common mode rejection:	60 dB (0–1 KHz)
Common mode voltage:	" 170 volts, maximum

Absolute accuracy (at 25C):	Typical: " 0.2% of full scale; Maximum: " 0.5% of full scale: within 50 mV on the 10 volt range, 25 mV on the 5 volt range, and 100 mA on the 4 to 20 mA range.

Thermal drift (from 25C):	Typical: 10 PPM per C; Maximum: 40 PPM per C

Circuit range selections:	0–10 VDC, " 10 VDC, " 5 VDC, 0–5 VDC, 4–20 mA (or 1–5 VDC)

Input Characteristics:	
Input resolution	12 bit + sign
Input update frequency	Once every 4 mS
Input filter ranges	none, 8, 16, 32, 64, 128, 256, 512, 1024 mS
Input diagnostics	Underrange, Overrange, High Alarm, Low Alarm, Open Wire

Output Characteristics:	
Output resolution	12 bit + sign
Output update frequency	Once every 4 mS
Output diagnostics	Underrange, Overrange.
Output load	Voltage mode: 2000Ω or greater; Current mode: 0 to 300Ω

| **Environmental:**	
Operating temperature	0 to 60C (+32 to 140F)
Storage temperature	–40 to +100C (–40 to +212F)
Humidity	5% to 95% (non–condensing)
Vibration	5–10 Hz 0.2" (5.08 mm) displacement; 10–200 Hz at 1G

Field Wiring

Field devices are wired to terminals 5–32, which accept AWG #22 through AWG #14 wires. Do not overtorque the terminal screws.

Power Source Wiring

For block power, connect the power source to terminals 6 and 7. For a 24/48 VDC block, connect the source to the DC+ terminal and the return to the DC− terminal. For a 115 VAC block, connect the source to the H terminal and neutral to N.

For the 115 VAC block (IC660BBA100) only, if Class 1 Division 2 conditions must be met for Factory Mutual, install a 250 volt 1/8 amp slow–blow fuse in series with the Hot AC power connector:

250V, 1/8 Amp Slow-Blow Fuse   a44474
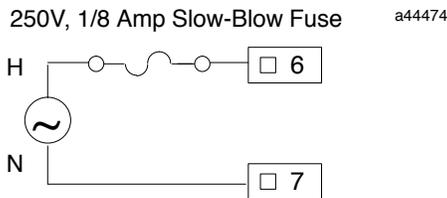
Wiring for I/O Devices

The ground (GND) terminal (5) is for block safety. It is connected internally to the block chassis, and to terminals 12, 20, and 28, which are marked GND. Each pair of signals has one ground terminal and one common terminal, for shield termination if desired. The three common terminals are connected together internally to the source.

For a voltage input device, connect the device in series between V+ and the terminal marked IN for that input. Connect V− to RTN.

For a voltage output device, connect the load to the terminals marked VOUT and COM for that output.

If current mode (4–20mA) is used for an input circuit without an external resistor, connect a jumper from the terminal marked JMP to the terminal marked RTN for that circuit.

If an input current device operates outside the 4–20mA range, connect a resistor across the voltage inputs. For example, to measure 10mA to 50mA current loop signals, install a 100 ohm resistor.

If current mode is used for an output circuit, use the terminals marked I+ and I−. For outputs set up in current mode, the block's internal power supply can be used to drive loads up to 300 ohms per output. For loads up to 2K ohms, use an external power supply. Connect the positive lead of the external supply to one side of the load, and the negative lead of the external supply to block common on terminal 29. If the external supply is between 24V and 50V, you can use terminal 25 or 30 as a tie point for the positive connection. This point will be disconnected from the external supply by a reverse biased diode.

a41560

* External Connection

** External 100 Ohm, 1 W Precision Resistor for 10mA 50mA range