

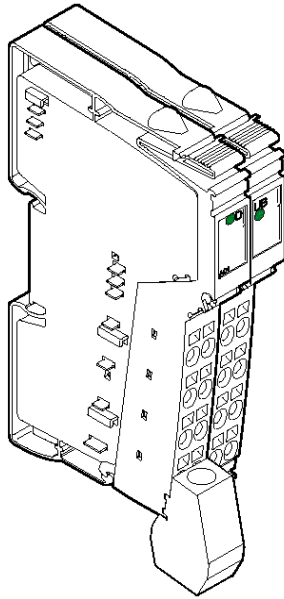
VersaPoint I/O Module

Analog Out 16 Bit Voltage/Current 1 Channel IC220ALG320

GFK-1907

April 2001

Module IC220ALG320 is used to output analog voltage or current signals. The signals are available with a 16 bit resolution.



Module with the I/O Terminal Strip plugged in

Module IC220ALG320 requires one (1) I/O Terminal Strip Set, IC220TBK203, ordered separately. See the ordering information below.

Features

- One analog signal output to connect either voltage or current signals. **Only one output must be used on the module.**
- Actuator connection (using 2-wire technology and shield connection)
- Two current ranges, one voltage range: 0mA to 20mA, 4mA to 20mA, 0V to 10V
- Process data update including conversion time of the digital/analog converter < 1ms

Ordering Information

IC220ALG320 Analog Out 16 Bit Voltage/Current 1 Ch
 IC220TBK203 Terminal Strip Set

Module Specifications

Housing dimensions (width x height x depth)	24.4mm x 120mm x 71.5mm (0.98in. x 4.8in. x 2.86in.)
Connection style	2-wire technology
Operating temperature	-25°C to +55°C (-13°F to +131°F)
Storage temperature	-25°C to +85°C (-13°F to +185°F)
Operating humidity	75% on average, 85% occasionally. Take appropriate measures against increased humidity (> 85%).
Storage humidity	75% on average
Degree of protection	IP 20 according to IEC 60529
Class of protection	Class 3 according to VDE 0106, IEC 60536

Power Consumption

Communications power UL	7.5V
Current consumption from local bus UL	Approx. 30mA, typical; 40mA, maximum
I/O supply voltage UANA	24VDC
Current consumption UANA	50mA, typical; 65mA, max.
Total power consumption	Approximately 1.425W, typical

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Installation Instruction

High current flowing through the segment and main power busses raises the temperature of the components within the module. To keep the current flowing through the power busses of the analog modules as low as possible, **a separate main circuit should be used for analog modules**. If analog modules must be used in a main circuit together with other modules place the analog modules to the right of the standard modules, at the end of the main circuit.

Connections

Connect sensors using shielded, twisted-pair cables. Connect one end of the shielding to protective earth ground (PE). At the module, fold the outer cable sheath back and connect the shield to the module via the shield connector clamp. The clamp connects the shield directly to FE (functional earth ground) on the module side.

When using cables longer than 10 m (32.8 ft.) in environments with heavy noise, connect the shield through an RC element to the FE potential of the actuator. Typically, the capacitor C should be rated between 1 and 15nF. The resistor R should be at least 10MΩ .

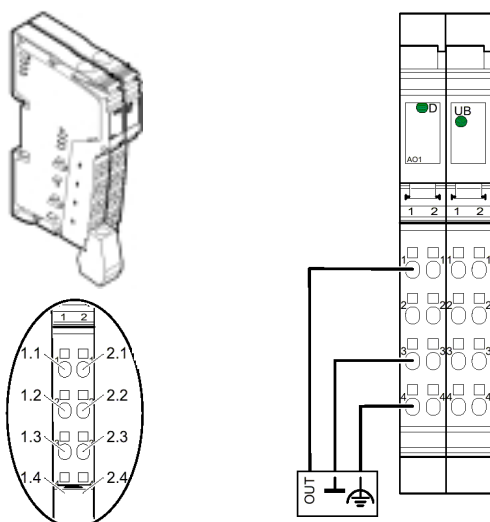
Use a connector with the shield connection from the Terminal Strip Set (IC229TBK203) when installing the actuator. On the side of the module not used to connect an actuator, use the non-shielded connector included in the Terminal Strip Set. The module layouts are different depending on the output used. This is shown below. The diagrams show the connection without shield connector.

Connector	Terminal	Signal	Assignment
1	1.1	U	Voltage output 0V to 10V
	2.1	--	Not used
2	1.1	I	Current output 0mA to 20mA
	2.1	I	Current output 4mA to 20mA
1 and 2	1.2, 2.2	--	Not used
	1.3, 2.3	GND	Ground
	1.4, 2.4	Shield	Shield connection

LED	Color	Meaning
D	Green	Bus diagnostics
UB	Green	I/O voltage for analog terminals present (current level)

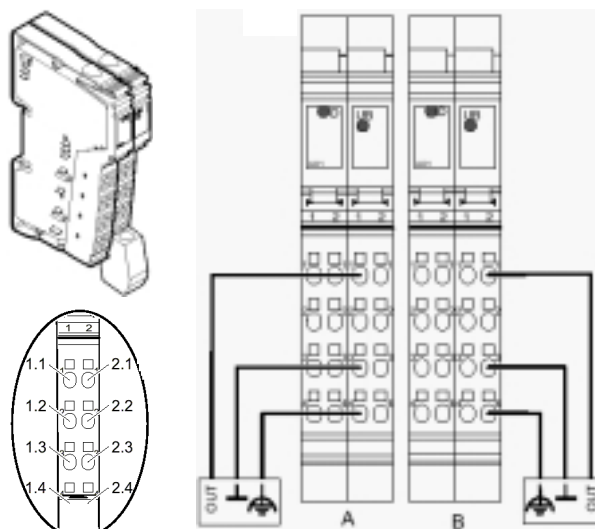
Voltage Mode

Connection of an actuator to the voltage output 0V to 10V (using 2-wire technology with shield connection).



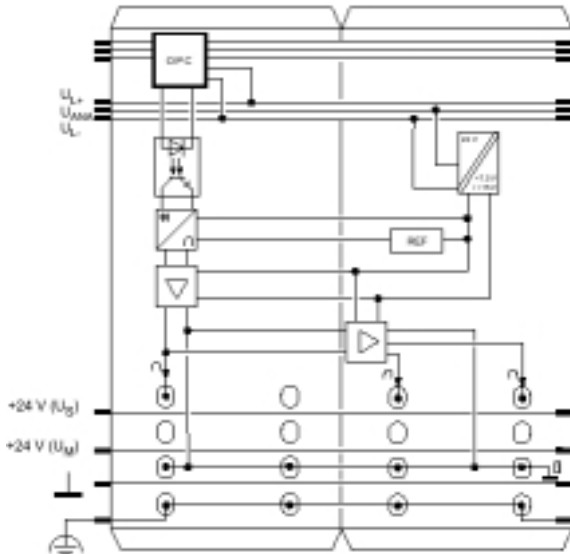
Current Mode

Connection of an actuator to the current output (using 2-wire technology with shield connection).

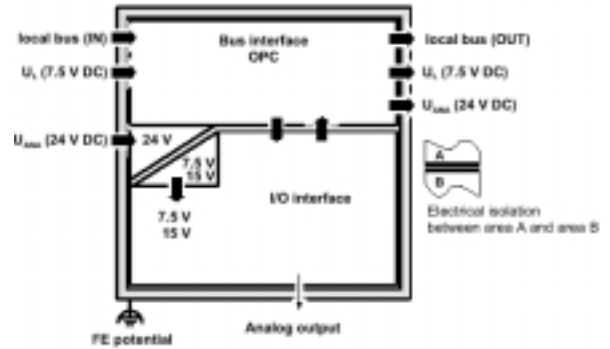



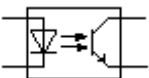






- A. Actuator at the current output 0mA to 20mA
- B. Actuator at the current output 4mA to 20mA

Internal Circuit Diagram



Electrical Isolation



-  Protocol chip (bus logic including voltage conditioning)
-  Optocoupler
-  DC/DC converter with electrical isolation
-  Reference voltage
-  Amplifier
-  Digital/analog converter
-  Analog output
-  Analog ground, electrically isolated from ground of the voltage jumper

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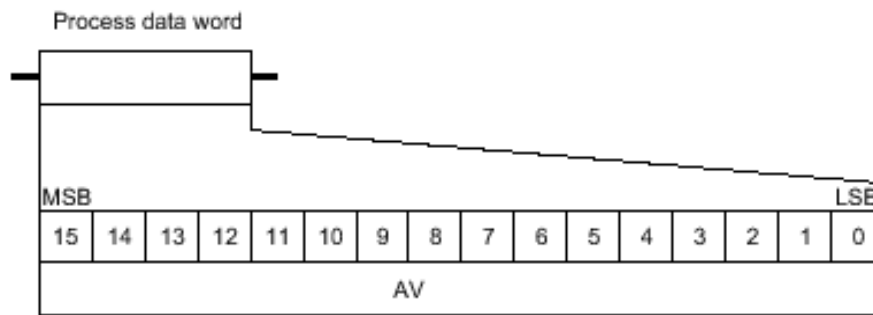
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Programming Data

ID code	7D hex (125 decimal)
Length code	01 hex
Input address area	0 bytes
Output address area	2 bytes
Parameter channel (PCP)	0 bytes
Register length (bus)	2 bytes

Process Data Output Words



MSB Most Significant Bit
LSB Least Significant Bit
AV Analog Value

The process data output word specifies the output value in each cycle. All output values have 16 bit resolution.

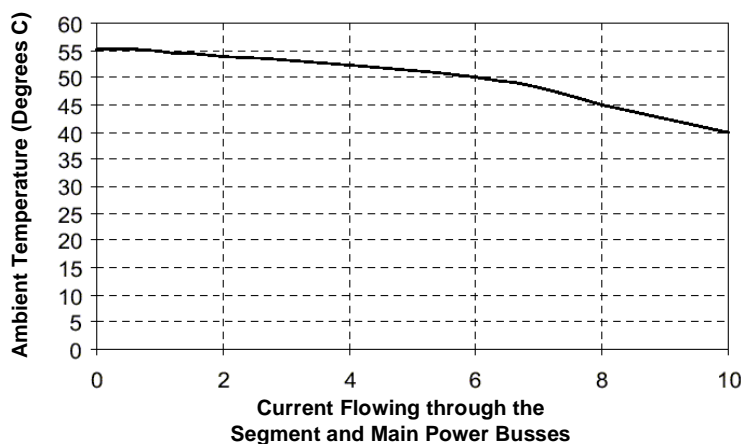
Technical Data

Deviations From Common Technical Data Indicated in the User Manual

Shock test according to IEC 60068-2-27	15g load for 11ms, half sinusoidal wave, three shocks in each space direction and orientation. 25g load for 6ms, half sinusoidal wave, three shocks in each space direction and orientation
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Module Derating

The permissible ambient temperature for the module depends on the total current.



Analog Output

Number	1; configured depending on the terminal point used
<i>Resolution</i>	
Voltage 0 to 10V	1 count = 0.153mV
Current 0 to 20mA	1 count = 0.305µA
4mA to 20mA	1 count = 0.244µA
Measuring value representation	16 bits straight binary
Basic error limit in the current range	±0.05%, typical
Output load Voltage output	2KΩ, minimum
Current output	500KΩ, maximum
Process data update including the conversion time of the digital/analog converter	< 1ms

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Tolerance and Temperature Response of the voltage Output (The error indications refer to the output range final Value of 10V.)

	Typical	Maximum
<i>Error at 23°C (73.4°F)</i>		
Total offset voltage	±0.03%	±0.05%
Gain error	±0.10%	±0.15%
Differential non-linearity	±0.0012%	±0.003%
<i>Total error at 23°C (73.4°F)</i>	<i>±0.15%</i>	<i>±0.25%</i>
<i>Temperature response at -25°C to 55°C (-13°F to 131°F)</i>		
Offset voltage drift	±10 ppm/K	±65 ppm/K
Gain drift	±30 ppm/K	±35 ppm/K
Total voltage drift (offset voltage drift + gain drift)	±40 ppm/K	±100 ppm/K
<i>Total error of the voltage output (-25°C to 55°C [-13°F to 131°F]) Offset error + gain error + linearity error + drift error</i>	<i>±0.30%</i>	<i>±0.60%</i>

Additional Tolerances Influenced by Electromagnetic Fields

Type of electromagnetic interference	Criterion	Typical, Relative Deviation of the Measuring Range Final Value
Electromagnetic fields Field strength 10V/m acc. to IEC 61000-4-3	A	< 1%
Fast transients Supply 2 kV, output 1 kV acc. to IEC 61000-4-4	B	< 1%
Conducted interference Class 3 (test voltage 10V) acc. to IEC 61000-4-6	A	< 6%

Safety Devices

None

Electrical Isolation

The DC/DC converter ensures electrical isolation between the logic level and the I/O area.

Common potentials

24V main power, 24V segment voltage, and GND have the same potential. FE (functional earth ground) is a separate potential area.

Separate system potentials consisting of bus terminal/power terminal and I/O terminal

- Test distance	- Test voltage
7.5V supply (bus logic) / 24V supply UANA / I/O	500VAC, 50Hz, 1 min.
7.5V supply (bus logic) / 24V supply UANA / functional earth ground	500VAC, 50Hz, 1 min.
24V supply (I/O) / functional earth ground	500VAC, 50Hz, 1 min.

Error Messages to Control System

Breakdown or dropping of communications power	I/O error message to the NIU
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