

RTU620 Remote Terminal Unit DataSheet

Analog Input 620AIU01

Application

The 620AIU01 module records up to 6 analog measured values.

The module 620AIU01 is able to process the following types of signals:

- Analog measured values (AMI)
- Measured floating point information (MFI)

Following measurement ranges can be configured for 620AIU01 R0001:

- ± 2.5 mA
- ± 5 mA
- ± 10 mA
- ± 20 mA



Other effective ranges and live zero signals become generated out of these ranges through conversion of the communication unit (CMU).

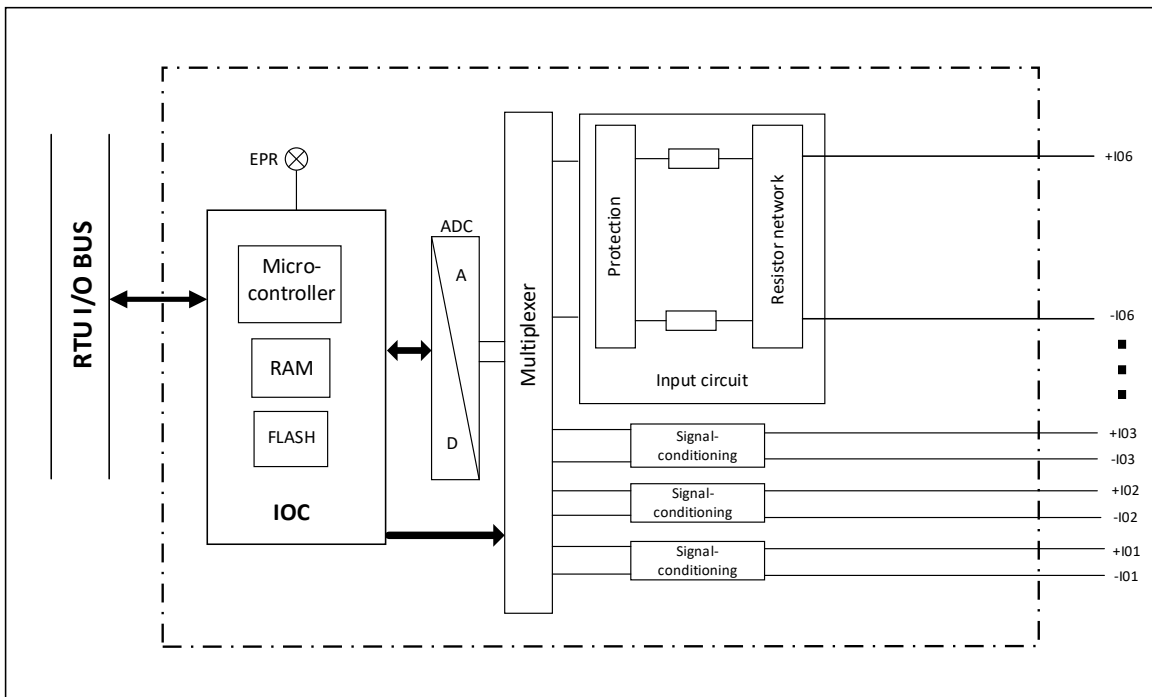


Figure 1: Block diagram 620AIU01

Characteristic

Analog inputs

Basic signal checks and cyclic processing functions are already be done locally in order to unburden the communication unit. The module transmits relevant changes as event via the RTU I/O bus.

The 6 differential inputs are not galvanic isolated against the power supply.

Single-ended or differential input values are resolved by up to 2048 steps (11 bit plus sign) for 100 % measurement amplitude.

The differential inputs are protected against static and dynamic over-voltages by a protection circuit. A low-pass filter suppresses unwanted frequency components.

The internal high resolution of the AD converter allows to scan all measuring ranges with the same resolution. 2 additional measurement channels are used for automatic zero calibration. This compensates the longterm drift of the components.

For elimination of tolerances a calibration is done during production .

Processing functions

The micro-controller on the module processes all time critical tasks of the parameterized processing functions. Moreover it carries out the interactive communication with the RTU I/O bus. All configuration data and processing parameters are loaded by the communication unit via the RTU I/O bus.

In connection with an I/O adapter (e. g. 620ADU01) or the RTU620 communication unit the module is interfaced to the RTU620 I/O bus.

During initialization and operation the module carries out a number of tests. If a fault occurs it is reported to the communication unit. All fault conditions impairing the function of the module are displayed as common fault signal by a red LED. A failure of the module is detected by the communication unit.

Processing functions

The analog input unit can execute the following processing functions on the measured values:

- Scan cycle and line frequency interference suppression
- Zero value supervision and switching detection
- Smoothing
- Threshold value monitoring on absolute value or with accumulation
- Periodic transmission and background cycles

Parameter name	Default	Parameter location
Zero range	±0.25 %	AMI, MFI – PDP parameters
value range: ±0.1... ±5 %		
Zero value supervision forces low input signals in the configured range to 0%		

Parameter name	Default	Parameter location
Smoothing factor	disabled	AMI, MFI – PDP parameters
value range: 2, 4, 8, 16, 32, 64, 128 or disabled		
Unstable input signals can be smoothed to prevent too many value transmissions		

Parameter name	Default	Parameter location
Aquisition mode	Integrated threshold supervision	AMI, MFI – PDP parameters
Aquisition mode:		
<ul style="list-style-type: none"> • Integrated threshold supervision • absolute threshold supervision • periodic update • Integrated threshold + periodic update 		

Scan cycle and line frequency interference suppression

Beside the information about the configured measuring range the information about the line frequency is required for the A/D conversion. The scan cycle time is determined by the AC line frequency:

Frequency	Conversion time per channel	Scan cycle time (same for all channels)
60Hz	50 ms	400 ms
50Hz	60 ms	480 ms
16.7Hz	200 ms	1600 ms

The scan frequency is independent from the number of configured channels. The synchronization of the scan cycle with the line frequency is used to increase the line frequency interference suppression of the DC input signal.

Parameter name	Default	Parameter location
Line frequency	50 Hz	AMI, MFI – PDP parameters
value range: 50 Hz, 60 Hz, 16.7 Hz		
Depending in the line frequency the scan cycle of the analog input is determined.		
Parameter has to be the same for all channels of the analog input module.		

Settings

All input signal ranges of the 620AIU01 R0001 are selected by the RTU configuration .

Following measurement ranges can be configured for 620AIU01 R0001:

- ± 2.5 mA
- ± 5 mA
- ± 10 mA
- ± 20 mA

Setting

Parameter name	Default	Parameter location
Input signal type	20 mA	AMI, MFI – PDP parameters
select the required input range according to the analog input module variant		
Input signal type	bipolar	AMI, MFI – PDP parameters
input signal types: <ul style="list-style-type: none"> • bipolar (e. g. ± 20 mA) • unipolar (e. g. 0... 20 mA) • live zero (e. g. 4... 20 mA) 		
Adjust zero value for live zero signal	deactivated	AMI, MFI – PDP parameters
only valid for live zero values <ul style="list-style-type: none"> • deactivated: 4... 20 mA -> 0... 100% • activated: 4... 20 mA -> -100... 100% 		

Signaling

The module monitors and checks the own functionality as well as the dialog via the I/O bus. Detected errors are indicated by the red LED ERR on the front plate and transmitted via the I/O bus to the communication unit (CMU). Additional diagnostic messages are available using the Web-Server on the CMU.

The LED ERR indicates module errors or I/O bus errors:

- module runs initialization procedure
- module is performing a cold or warm start
- module has detected a memory error (RAM or PROM)
- micro-controller is faulty
- no dialog via the I/O bus for at least 2 minutes. The module is not polled by the CMU
- A/D converter faulty

Connections

I/O bus connection

The module is connected to the RTU I/O bus via the connectors X1 and X2.

ADVICE

To prevent damage on the connected modules de-energize the system before plugging or unplugging the I/O bus connectors.

ADVICE

To prevent unintended disconnection of the I/O bus connectors end stops shall be used at both ends of the I/O assembly.

Process connections

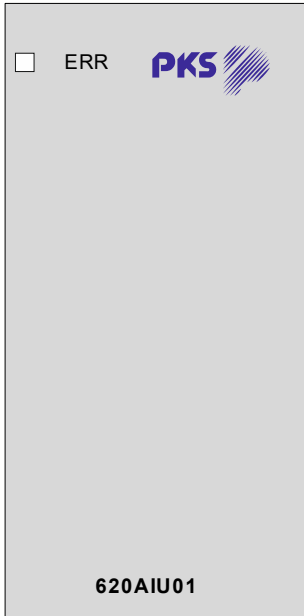
The process signals will be connected to the terminals X3 (see Fig. 3). The input channels are not potential isolated from the internal power supply

Automatic calibration

Two internal measuring channels of the 620AIU01 are performing an automatic zero calibration at each cycle. The A/D converter uses the result as a rating factor.

An on-site calibration of the A/D converter is not necessary. The 620AIU01 is calibrated for all channels and measuring ranges at the factory.

Setting



PKS-RTU620	620AIU01 ± 20 mA			
	X1	X2	X3	
	Output To I/O	Input From I/O Or AD	1 I1 2 3 I2 4 5 I3 6 7 I4 8 9 I5 10 11 I6 12 13	
			Max In put Voltage: 1VDC	

Fig.2: 620AIU01 front plate

Fig.3: 620AIU01 R0001 label

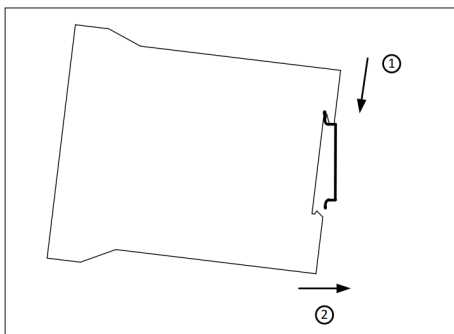


Fig.4: RTU620 DIN rail mounting - step 1

- 1 Insert upper edge into DIN rail and push downwards
- 2 Push lower edge towards DIN rail and snap in the module

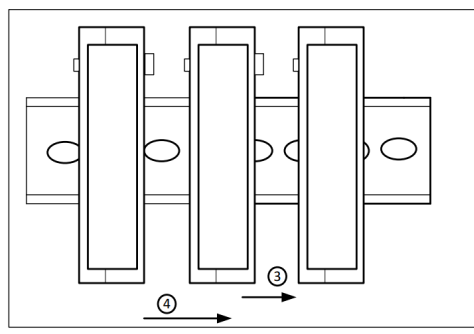


Fig.5: RTU620 DIN rail mounting - step 2

3 + 4 :

Shift one module connector into the other starting from right to left

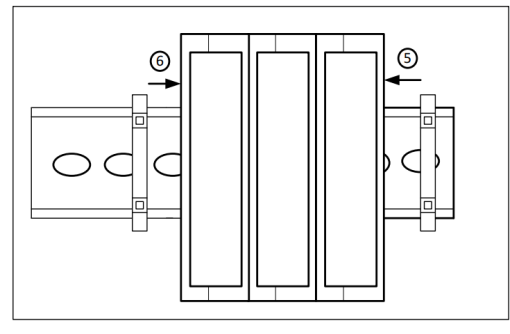


Fig.6: RTU620 DIN rail mounting - step 3

5 + 6 :

Mount end stops at the left and right side

Setting

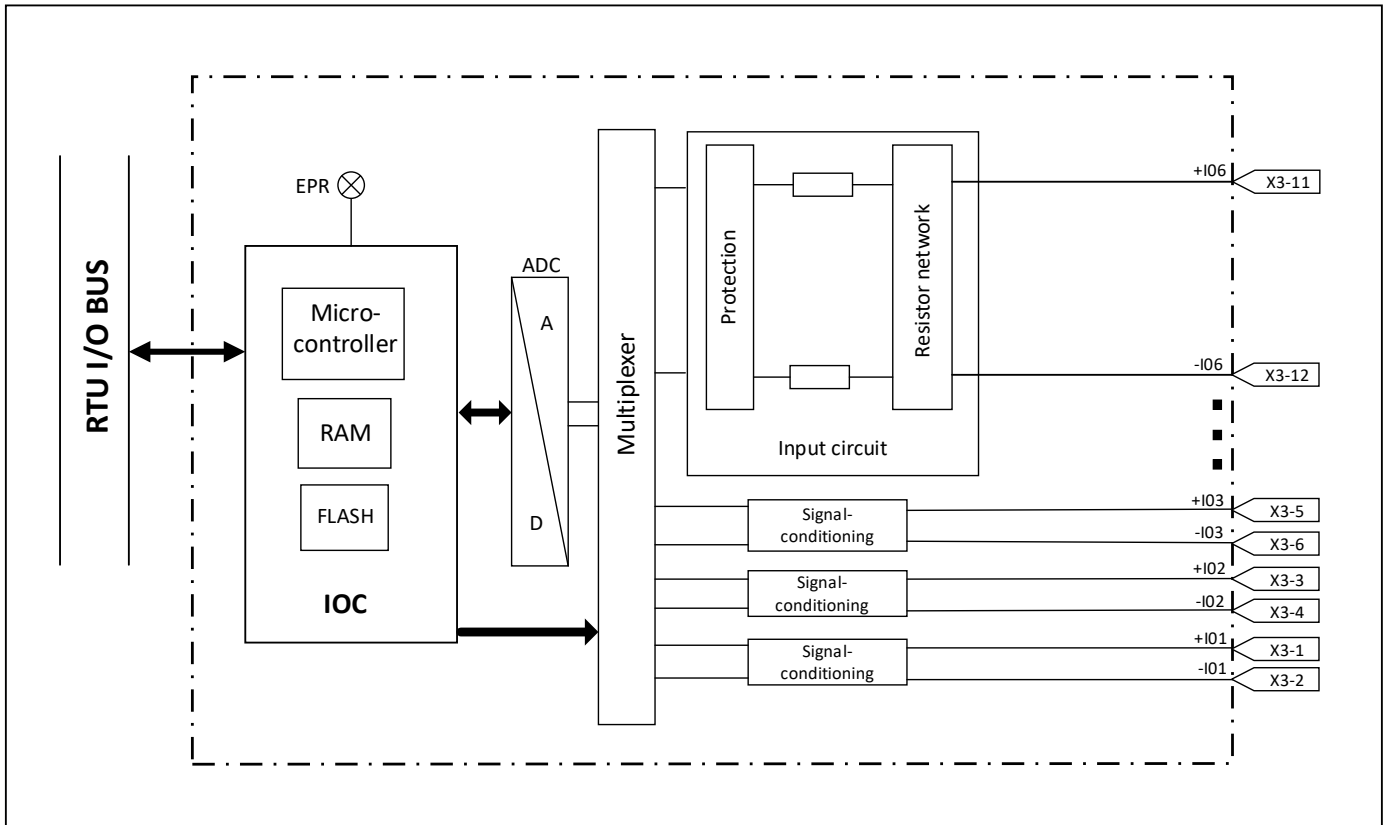


Figure 7: 620AIU01 connection diagram

Technical Data

In addition to the PKS RTU620 general technical data, the following applies:

Input channels 620AIU01

Inputs	6 differential inputs
Configurable measuring range	– ± 2.5 mA – ± 5 mA – ± 10 mA – ± 20 mA
Input impedance	50 Ω
Max. load	50 mA for 1 min
Resolution	11 bit + sign 10 bit + sign @ ± 2.5 mA
AD converter resolution	13 bit
Accuracy at 25 °C	< 0.25 % < 0.5 % @ ± 2.5 , ± 5 , ± 10 mA
Linearity error at 25 °C	< 0.15 % (positive range) < 0.25% (negative range)
Temperature drift (0... 70 °C)	< 150 ppm/K
Max. common mode input voltage	± 150 V DC (electrical limit) ± 10 V DC (functional limit)
Max. differential input voltage	1 V DC (current inputs)
Common mode rejection	> 85 dB @ 25 °C
Configurable line frequency fN	– 16.7 Hz – 50 Hz – 60 Hz
line frequency interference suppression	> 75 dB @ fN ± 5 %

Current consumption for power supplied via WRB bus

5 V DC	25mA
15 V DC	10mA
18 V DC
24 V DC

Signaling by LEDs

ERR (red)	Common fault information for the module
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Insulation tests

AC test voltage IEC 61000-4-16 IEC 60870-2-1 (class VW3)	2.5 kV, 50 Hz Test duration: 1 min
Impulse voltage withstand test IEC 60255-5 IEC 60870-2-1 (class VW 3)	5 kV (1.2 / 50 μ s)
Insulation resistance IEC 60255-5	> 100 M Ω at 500 V DC

Technical Data

Mechanical layout

Dimensions	35 mm x 98 mm x 117 mm (Width x Height x Depth)
Housing type	Plastic housing (V-0), IP20, RAL 7035 light gray
Mounting	DIN rail mounting EN 50022 TS35: 35 mm x 15 mm or 35 mm x 7.5 mm
Weight	0.14 kg

Connection type

Power supply input	1 x 3 pole 5.08 mm pluggable screw terminals (included in delivery) 0.2... 2.5 mm ² / AWG 24 - AWG 12
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Environmental conditions

Nominal operating temperature range	-25°C ... 70°C
Start up	-40°C
Max. operating temperature, max.96h	+85°C
EN 60068-2-1, -2-2, -2-14	
Relative humidity EN 60068-2-30	5 ... 95 % (non condensing)

Immunity Test

Electrostatic discharge IEC 61000-4-2 (level3)	8kV / 6 kV Contact Performance criteria A
Radiated Radio- Frequency Electromagnetic Field IEC 61000-4-3 (level 3)	10 V/m Performance criteria A
Electrical Fast Transient / Burst IEC 61000-4-4 (level 3)	2 kV Performance criteria A
Surge IEC 61000-4-5 (level 3)	4 kV Performance criteria A
Conducted Disturbances, induced by Radio- Frequency Fields IEC 61000-4-6 (level 3)	10 V Performance criteria A
Damped oscillatory wave IEC 61000-4-18(level 3)	2.5 / 1kV Performance criteria A