Application

The 8AIM10 board records up to eight analog measured values. The 8AIM10 board allows it to connect all typical measured value ranges. It can be configured for the following measurement ranges by simple switches and jumpers

- ±2mA (only for channel 1)
- ±10mA
- ±20mA
- ±1V



Characteristic

Other effective ranges and live zero signals become generated out of these ranges through conversion of the communication unit CMU. Processing functions will already be done on the board and remove therefore the burden from the central unit. Relevant changes transmits the board as event via the peripheral bus.

The 8 differential inputs are not potentially isolated against the PKS RTU 513 power supply.

Unipolar or bipolar values resolves the 8AIM10 into 4096 steps (12 bit plus sign) for 100 % of the measuring signal. The differential inputs are protected against static and dynamic over-voltages by a protection circuit. A low -pass filter suppresses non line frequency ac disturbance.

The analog input board 8AIM10 can carry out the following processing functions on the measured values:

- Zero point monitoring
- Switch-over recognition
- Smoothing
- Threshold value monitoring on absolute value or with accumulation and periodic background transmission



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Characteristic

Measuring ranges are easily to configure by switch registers respectively jumpers. The micro controller needs these configurations parameters to setup the AD-converter.

The micro controller controls the A/D converter and executes all of the processing functions of the configured measured values within the conversion time. Furthermore the micro controller is responsible for interactive communication with the PKS RTU513 system bus. All configuration characteristics and processing parameters are downloaded from the CMU via the RTU system bus. During initialization and operation the board carries out a number of tests. If a fault occurs it is reported to the CMU. All fault conditions impairing the function of the board are displayed as common fault signal with a light emitting diode (ST) on the front panel. A failure of the board is detected by the CMU.



Fig. 1: Block diagram Analog Input Module 8AIM10

The board has a serial connection to the PKS RTU 513 peripheral bus.

Setting

Input signal range

A measuring range can be differently configured for each of the eight channels. Therefore the configuration has to be done for all eight channels. For each channel:

- the switch register S1 AND
- the jumper Xx1



Input signal range

Should be configured to the same measuring range. Only if jumper and switch register setting corrsponds the 8AIM10 scans and converts the measuring value correct.

The configuration of jumper Xx1 is shown in Table 1. Hereby is x the channel to be configured. Table 2 shows the corresponding settings for switch register S1 and the corresponding position of jumper Xx1. For channel 5 = 20 mA as an example it should be set:

- Xx1 jumper 5 = position 1-2
- S1= OFF

The firmware of the 8AIM10 uses the position of switch register S1 for the scaling and calculation to the nominal measuring range. In addition it identifies by the position which rating value it should use.

Pos.	Xx1	Measuring range
1	1 2 3	20 mA
2	1 2 3 x	2 mA 10mA
3		1 V
x = 1 to 8 for the respective channel		

Table 1: configuration jumper Xx1



Input signal range

Measuring range	S1	Xx1
± 2 mA (only for channel 1)	ON	1 2 3
± 10 mA	OFF	
± 20 mA	OFF	1 2 3
± 1 V	OFF	1 2 3
$ \begin{array}{c} & \\ & \\ & \\ & \\ & \\ & \\ & \\ & $		
The configuration of S1 and Xx1 should correspond to each other		

Table 2: configuration S1 and Xx1



Factory calibration

The 8AIM10 will be calibrated for all channels using of a multiturn on the board at the factory.

Signaling

The board monitors and checks its functionality as well as the dialog via the peripheral bus. Detected errors are indicated and/or transmitted by the board:

- by the red LED "ST" on the front plate
- by diagnostic messages
- in the process signal messages (signal status)

The **"ST" LED** indicates board errors, peripheral bus errors and/or A/D converter failures. The "ST"-LED indicates:

- board runs initialization procedure
- board has detected a memory error (RAM or EPROM)
- micro controller faulty
- no dialog via the peripheral bus for at least two minutes. The board is not polled by the PBP (Peripheral Bus Processor) of CMU.
 - A/D converter faulty

Each configured measuring value will be indicated faulty by the CMU for the listed errors.



Setting



Fig.2: Logic block diagram



Fig.3: Board layout with setting positions



Setting

	SMS10 Sub-connector		Signal Identification		
WMS10			ldentificatio n	Meaning	
1			z32	AI10 -	Analog input 1 -
2		b32		Al11 +	Analog input 1 +
3	d32			Al20 -	Analog input 2 -
4			z30	Al21 +	Analog input 2 +
5		b30		AI30 -	Analog input 3 -
6	d30			Al31 +	Analog input 3 +
7			z28	Al40 -	Analog input 4 -
8		b28		Al41 +	Analog input 4 +
9	d28			AI50 -	Analog input 5 -
10			z26	AI51 +	Analog input 5 +
11		b26		Al60 -	Analog input 6 -
12	d26			Al61 +	Analog input 6 +
13			z24	AI70 -	Analog input 7 -
14		b24		AI71 +	Analog input 7 +
15	d24			AI80 -	Analog input 8 -
16			z22	Al81 +	Analog input 8 +
17					Not used
18		b22			Not used
19	d22				Not used

Table 3: Subrack terminal connection: 8AIM10



Setting







Fig. 5: connection diagram WMS10 subrack



Technical Data

In addition to the PKS RTU 513 general technical data, the following applies:

Input channel

Inputs	8 differential inputs
Measuring ranges	± 2 mA (only for channel 1) ± 10 mA ± 20 mA ± 1V
Shunt/ impedance	50Ω at 20 mA 100 Ω at 2/10 mA 164 KΩ at 1V
Resolution	12bit + sign = ±100%

Power Supply

Supply	5 V / 190 mA
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Mechanical Layout

Printed circuit board	3HE, Euro card format (160 x 100)
Front panel	4R, 1 Slot (20 mm)
weight	approx. 0.2 kg

Connection Type

Connector	Indirect, 48 pole Type F DIN 41612
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Electromagnetic Compatibility

Electrostatic discharge Immunity IEC 61000-4-2 (level3)	6 kV Contact 8 kV Air Performance criteria A
Radiated Radio- Frequency Electromagnetic Field Immunity Test IEC 61000-4-3 (level 3)	10 V/m Performance criteria A
Immunity to Electrical Fast Transient IEC 61000-4-4 (level 3)	2 kV Performance criteria A
Surge Immunity Test IEC 61000-4-5 (level 3)	2 kV Performance criteria A
Immunity to Conducted Disturbances, induced by Radio Frequency IEC 61000-4-6 (level 3)	10 V Performance criteria A

Environmental conditions

Temperature	-10 65 °C
Relative humidity	5 95 % (non condensing)

