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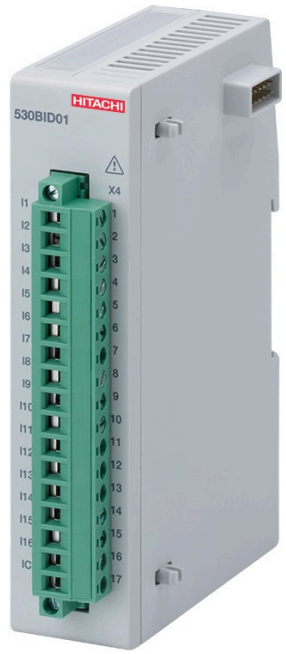
Remote Terminal Units - Data sheet

Binary input 530BID01
RTU530 product line



Binary input module with 16 channels, to be used for single indications, double indications, digital measurands and pulse counters

- Resolution: 1ms
- Process voltage: 24…60 V DC / 110...125 V DC
- LED signal for each input
- One common return for all 16 inputs
- Pulse counters up to 120 Hz

Application

The module 530BID01 of the RTU530 product line provides 16 galvanic isolated inputs for up to 16 binary process signals. Scanning and processing of the inputs are executed with the high time resolution of 1 ms. The allocation of an input signal to the processing functions can be done according to the rules of configuration.

The module 530BID01 is able to process the following types of signals or a combination of them:

- 16 single point information with time stamp (SPI)
- 8 double point information with time stamp (DPI)
- 2 digital measured values each with 8 bit (DMI8)
- 1 digital measured value with 16 bit (DMI16)
- 16 integrated totals (max. 120 Hz) (ITI)
- 2 step position information each with 8 bit (STI)
- 2 bitstring input each with 8 bit (BSI8)
- 1 bitstring input with 16 bit (BSI16)
- or combinations of this signal types

The module is available in four versions (rubrics):

- 530BID01 R0001: process voltage 24 to 60 V DC. LED signaling for each input, one common return for all inputs.
- 530BID01 R0002: process voltage 110 to 125 V DC. LED signaling for each input, one common return for all inputs.
- 530BID01 R1001: process voltage 24 to 60 V DC. LED signaling for each input, one common return for all inputs.,
  assembled printed circuit board (PCBA) conformal coated
- 530BID01 R1002: process voltage 110 to 125 V DC. LED signaling for each input, one common return for all inputs.,
  assembled printed circuit board (PCBA) conformal coated

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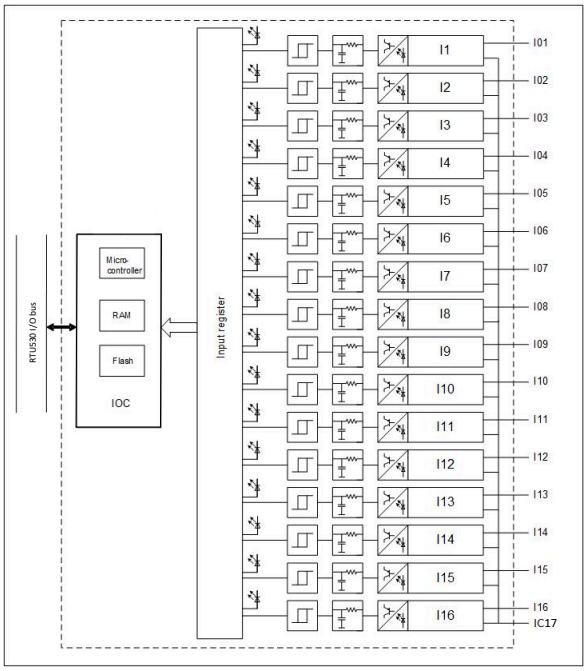

Figure 1: Block diagram 530BID01

Characteristics

Binary inputs

The inputs are galvanic isolated by means of optical couplers. All 16 inputs are building one group with a common return.

The binary input channels are protected against reverse voltage installation. If the input signal is installed with wrong polarity the input current will be zero.

The module has 16 LEDs to indicate the signal state at the inputs. The LEDs are switched by the input state.

The maximum frequency for counter pulses is 120 Hz.

Power supply input

The required power for the module is supplied via the RTU530 I/O bus connector.

I/O controller (IOC)

The micro-controller (MPU) on the module processes all time critical I/O tasks of the parameterized processing functions. Moreover it carries out the interactive communication with theI/O bus. All configuration data and processing parameters are loaded by the communication unit via the RTU530 I/O bus. Communication speed on the RTU530 I/O bus is 1 MBits/sec.

In connection with an I/O adapter (e. g. 530ADD01) or the RTU530 communication unit the module is interfaced to the RTU530 I/O bus.

The binary input unit can execute the following processing functions for the different types of signals:

- Digital filtering to suppress contact bounce
- Suppression of oscillating signals caused by the process
- Validity check and suppression of intermediate input states for double indications
- Consistancy check for all channels allocated to digital measured values or step position information
- Summation of increment pulses to form integrated totals in registers of 31 bit resolution
- Copying of integrated totals values into freezing registers for data conservation

The module provides a data buffer for temporally storing of up to 50 event messages including time stamps. The events are stored in chronological order designated for transmission to the communication unit (CMU).

During initialization and operation the module executes a number of tests. If a fault occurs it is reported to the communication unit. A failure of the connected module(s) is detected and signalized by the communication unit.

Technical data

In addition to the RTU500 series general technical data, the following applies:

General standards	
Safety tested according to	• IEC 61010-1 • IEC 61010-2-201
Environmental conditions tested according to	• IEC 60255-21-1 class 1 • IEC 60255-21-2 class 1 • IEC 60870-2-2 class Bm and C1
Electromagnetic compatibility (EMC) tested according to	• IEC 61000-6-2 • IEC 61000-6-4 • IEC 61000-6-5
Insulation classification according to	IEC 60664-1 • Pollution degree 2 • Overvoltage category II • Altitude: ≤ 3,000 m

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

Environmental conditions - mechanical	
Vibration sinusoidal, Test Fc , IEC 60068-2-6	3.5 mm (3 ... 9 Hz) 10 m/s² (9 ... 35 Hz) 1 octave/min, 1 cycle per axis IEC 60255-21-3 class 1 3 mm (3 ... 9 Hz) 10 m/s² (9 ... 200 Hz) 15 m/s² (200 ... 500 Hz) 1 octave/min, 10 cycles per axis IEC 60870-2-2 class Bm 0.035 mm (10 ... 60 Hz) 5 m/s² (60 ... 150 Hz) 1 octave/min, 1 cycle per axis IEC 60255-21-1 class 1
Shock and Bump, Test Ea, IEC 60068-2-27	250 m/s², 10 ms 4 shocks per direction IEC 60721-3-3 class 3M5 150 m/s², 11 ms 3 shocks per direction IEC 60255-21-2 class 1 IEC 60870-2-2 class Bm 100 m/s², 16 ms 1000 shocks per direction IEC 60255-21-2 class 1

Emission test	
Radiated emissions - enclosure ports (30 Mhz to 1 GHz), CISPR 16-2-3/ EN 55016-2-3	EN 55011/ CISPR 11 class A

Immunity test	
Electrostatic discharge, IEC 61000-4-2	8 kV air / 6 kV contact (level 3), criterion A
Radiated radio-frequency electromagnetic field, IEC 61000-4-3	80 MHz to 1 GHz: 10 V/m (level 3), criterion A 1 GHz to 2.7 GHz: 10 V/m (level 3), criterion A
Power frequency magnetic field, IEC 61000-4-8	100 A/m (level 5), criterion A
Impulse magnetic field, IEC 61000-4-9	100 A/m (level 3), criterion A

Mean time between failure (MTBF)	
Calculation according to Telcordia III 40°C	2,453,908 h

Mechanical layout	
Dimensions	30 mm x 125 mm x 85 mm (Width x Height x Depth)
Housing type	Plastic housing (V-2), RAL 7035 light gray
Mounting	DIN rail mounting (EN 50022 TS35: 35 mm x 15 mm or 35 mm x 7.5 mm)
Enclosure protection class	IP30
Weight	0.15 kg

Conformal coating	
Material base	Acrylate resins (AR)
Standards	• IPC-CC-830B • MIL-I-46058C • UL 94 • UL 746E
Noxious gas protection (coating material)	Noxious gas test according to DIN EN 60068-2-60 or BMW GS 95003-4
Dielectric strength (coating material)	60 kV/ mm according to IPC-TM-650 or DIN EN 60243-1
Resistance to condensation (coating material)	1.0 x 10^{10} Ohm based on DIN EN ISO 6270-2

Connection type	
Process connector (X4)	1 x 17 pole 5.08 mm pluggable screw terminals (included in delivery), 0.2... 2.5 mm²/ AWG 24 - AWG 12
Connector from CMU/ADD or other I/O module (X2)	2 x 6 pin, male

Connection type	
Connector to the I/O modules (X3)	2 x 6 pin, 2.54mm female header
Connector to next I/O module (X3)	

Current consumption for power supplied via RTU530 I/O bus	
5 V DC	max. 144 mA, typ. 96 mA
24 V DC	--

Binary input channels 530BID01 R0001 and R1001	
Inputs	16 channels, 1 common return for all channels, isolated by opto-couplers
Nominal input voltage	24... 60 V DC (+/- 20%)
Max. input voltage	72 V DC
Input current	1.2... 5 mA
Logical ‘1’ definitely detected	≥ 18 V DC
Logical ‘0’ definitely detected	≤ 9 V DC
Reverse voltage protection	yes
Max. input frequency for integrated totals	120 Hz

Binary input channels 530BID01 R0002 and R1002	
Inputs	16 channels, 1 common return for all channels, isolated by opto-couplers
Nominal input voltage	110... 125 V DC (+/- 20%)
Max. input voltage	150 V DC
Input current	1.4... 2.1 mA
Logical ‘1’ definitely detected	≥ 85 V DC
Logical ‘0’ definitely detected	≤ 45 V DC
Reverse voltage protection	yes
Max. input frequency for integrated totals	120 Hz

Binary inputs - immunity and insulation tests	
Electrical fast transient / Burst, IEC 61000-4-4	4 kV (level 4), criterion A
Surge 1.2/50 µs, IEC 61000-4-5	4 kV line to earth, 2 kV line to line (level 4), criterion A
Conducted disturbances, induced by radio-frequency fields, IEC 61000-4-6	10 V (level 3), criterion A
Ring wave, IEC 61000-4-12	2 kV line to earth, 1 kV line to line (level 3), criterion A

Binary inputs - immunity and insulation tests	
Conducted, common mode disturbances in the frequency range 0 Hz to 150 kHz, IEC 61000-4-16	30 V continuous disturbance/ 300 V short duration disturbance (level 4), criterion A
Damped oscillatory wave, IEC 61000-4-18	2.5kV line to earth, 1 kV line to line (level 3), criterion A
AC dielectric voltage test, IEC 60255-27, IEC 61000-4-16, IEC 60870-2-1 (class VW3)	2.5 kV, 50 Hz, 1 min
Impulse voltage withstand test of insulation, IEC 60255-27, IEC 60870-2-1 (class VW3)	5 kV (1.2 / 50 µs)
Insulation resistance, IEC 60255-27	> 50 MΩ @ 500 V DC

Signaling by LEDs	
I1… I16	LED displays the active inputs

Ordering information	
530BID01 R0001 24 V DC... 60 VDC process voltage	1KGT049800R0001
530BID01 R0002 110 V DC... 125 VDC process voltage	1KGT049800R0002
530BID01 R1001 24 V DC... 60 VDC process voltage, conformal coated	1KGT049800R1001
530BID01 R1002 110 V DC... 125 VDC process voltage, conformal coated	1KGT049800R1002

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