Remote Terminal Units - Data sheet

Input output module 530IOD01

RTU530 product line

Combined binary input and output module with 8 input and 4 output channels

- 8 binary inputs, to be used for single indications, double indications, digital measurands and pulse counters
- Pulse counters up to 120 Hz
- 4 binary outputs, to be used for single or double commands with 1 or 2 pole output, regulation step command 1 or 2 pole, bitstring output 1 or 2 Bit
- Max. switching voltage: 60 V DC ± 20 %
- Continuous current: 5 A
- Individual output contacts, without common return
- LED signal for all inputs and outputs

Application

The 530IOD01 is a module of the RTU530 product line and provides:

- up to 8 galvanic isolated binary process inputs with a common return
- up to 4 binary process outputs using relay contacts without a common return.

The module allows:

- process voltages from 24 ... 60 V DC
- switching voltages up to 72 V DC or max. 5 A continious current.

The module is available in two versions (rubrics):

- 530IOD01 R0001
- 530IOD01 R1001 conformal coated

Characteristics

Binary input unit

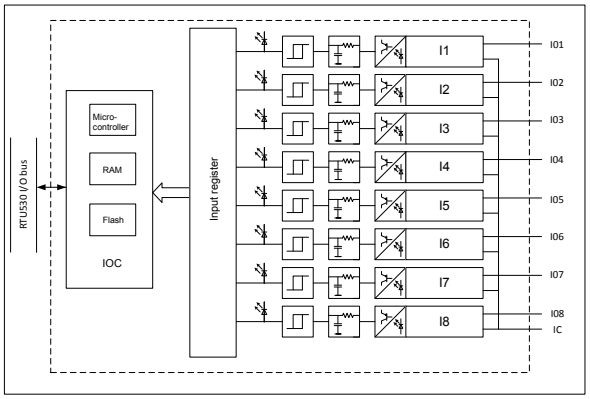

Figure 1: Block diagram binary input unit

The module 530IOD01 of the RTU530 product line provides 8 galvanic isolated inputs for up to 8 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 530IOD01 is able to process the following types of signals or a combination of them:

- 8 single point information with time stamp (SPI)
- 4 double point information with time stamp (DPI)
- 1 digital measured values each with 8 bit (DMI8)
- 8 integrated totals (max. 120 Hz) (ITI)
- 1 step position information each with 8 bit (STI)
- 1 bitstring input each with 8 bit (BSI8)

The module allows process voltages from 24 to 60 V DC. LED signaling is available for all inputs. The module has a common return for all inputs.

The inputs are galvanic isolated by means of optical couplers.

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.

Binary output unit

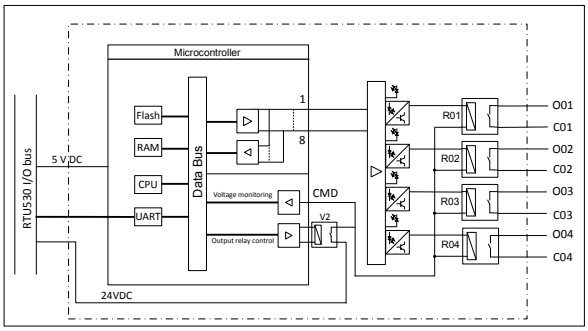

Figure 2: Block diagram binary output unit

The module 530IOD01 of the RTU530 product line can be used for the control of 4 binary process signals using relay contacts. The allocation of an output signal to the processing functions can be done according to the rules of configuration.

The module 530IOD01 is able to process the following types of signals:

- Single or double commands (SCO or DCO) with 1 or 2 pole output
- Regulation step command (RCO), 1 or 2 pole
- Bitstring output, 1 or 2 Bit (BSO1 or BSO2)

The module allows switching voltages up to 72 V DC or max. 5 A continious current.

Relay contacts are used for the binary outputs.

The 4 outputs are isolated from one another and against the internal electronic. All 4 relays contacts have individual contacts without a common return.

Two output relays are required for each command in case of 2 pole commands.

Before and during command output the module 530IOD01 carries out several command monitoring functions. These tests ensure correct output.

If the command monitoring detects fault the command will be canceled.

I/O controller (IOC)

The micro-controller on the module processes all time critical I/O tasks of the parameterized processing functions. Moreover it carries out the interactive communication with the RTU530 I/O bus. All configuration data and processing parameters are loaded by the communication unit via the RTU530 I/O bus.

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 binary output unit can execute the following processing functions on the individual signal types:

- Control of the command output duration

Command monitoring functions:

- monitoring of the output bit patterns by reading back the output state
- switching voltage monitoring (24 V DC coil voltage) before and during output
- command output duration monitoring

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 carries out a number of tests. If a fault occurs it is reported to the communication unit. A failure of the module is detected and signalized by the communication unit.

Power supply input

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

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 Hz...60 Hz) 5 m/s² (60 Hz...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	2,192,769 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	0.2 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
Connector to next I/O module (X3)	2 x 6 pin, female

Current consumption for power supplied via RTU530 I/O bus	
5 V DC	max. 96 mA, typ. 72 mA
24 V DC	max. 50 mA

Binary input channels 530IOD01 R0001	
Inputs	8 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 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 (level 4)
Conducted disturbances, induced by radio-frequency fields, IEC 61000-4-6	10 V (level 3), criterion A
Ring wave, IEC 61000-4-12	2.5 kV line to earth, 1 kV line to line (level 3), criterion A
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	2.5 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)

Binary inputs - immunity and insulation tests	
Insulation resistance, IEC 60255-27	> 50 MΩ @ 500 V DC

Binary output channels 530IOD01	
Outputs	4 Relay contacts, single pole, normal open
Coil voltage	24 V DC @ 10 mA
Max. switching voltage	72 V DC
Continuous current	5 A
Max breaking current (resistive load)	5 A ≤ 30 V DC 1 A @ 60 V DC
Max. breaking capacity (inductive load)	50 VA (L/R= 40 ms)
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
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Signaling by LEDs	
I1… I8	LED displays the active inputs
O1… O4	LED displays the active output relays

Ordering information	
530IOD01 R0001	1KGT049600R0001
530IOD01 R1001 conformal coated	1KGT049600R1001

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