

# RTU513 Remote Terminal Unit DataSheet

## Digital Input 513DIR01

### Application

The module 513DIR01 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 513DIR01 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 one version:

- 513DIR01 : process voltage 24 to 60 V DC.  
LED signaling for each input, common return per 8 inputs.



# Characteristics

## Binary inputs

The inputs are galvanic isolated by means of optical couplers. 8 inputs are building a group with a common return. The input circuit is designed to keep the input current constant by using current regulative diodes.

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 follow direct the input signal.

The maximum permissible frequency for counter pulses is 120 Hz.

## Power supply input

The required power for the module is supplied via the RTU513 backplane.

## I/O controller (IOC)

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.

The module is equipped with a serial interface to the RTU513 I/O bus on the backplane.

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

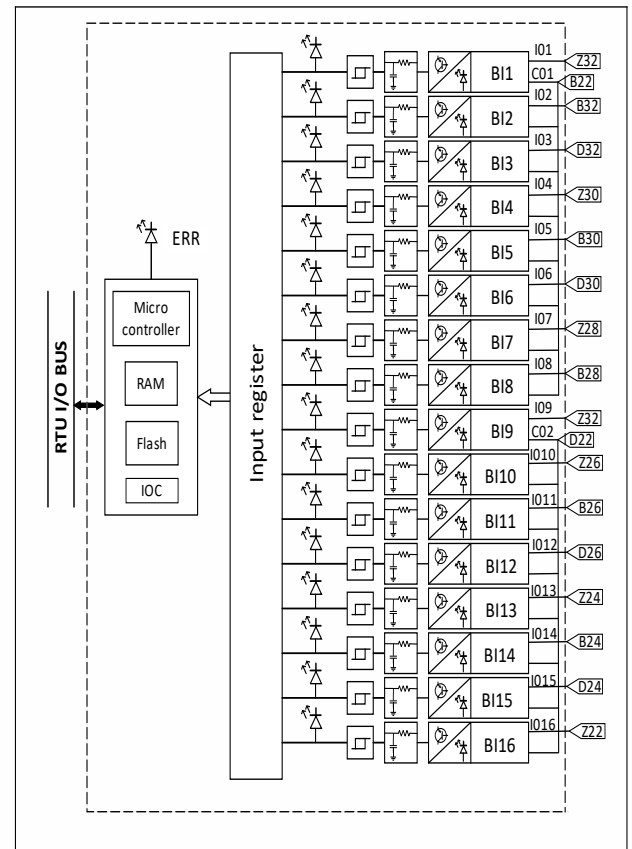


Figure 1: Block diagram 513DIR01

## Characteristics

- Validity check and suppression of intermediate input states for double indications
- Consistency 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 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.

## Operation

The binary input module 513DIR01 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.

## Setting

The device has no switches or jumpers.

## Signaling

The 513DIR01 has 16 yellow LED's on the front plate indicating the state of the inputs.

The LED's indicate the signal after the conversion by the optocouplers. So the LED's follow the signal directly.

## LED ERR

The module monitors and checks the own functionality as well as the dialog via the I/O bus. Detected errors are

## Setting

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 Flash)
- micro-controller is faulty
- no dialog via the I/O bus for at least 2 minutes. The module is not polled by the CMU

## Connections

### Connection to RTU513 racks

The module is intended to be used in an RTU513 rack. The connection to the power supply, the RTU513 I/O bus and the process terminals is done via the backplane connector in the RTU513 rack.

### Compatibility

The 513DIR01 module is plug and functional compatible to the module 16DIM10 used in RTU513. It can replace this modules.

### Safety instructions

#### **Dangerous process voltages**

Hazardous voltage.

Contact with live circuits will cause electric shock or burn.

Verify that all terminals feeding dangerous contact voltages (supply voltage, input or output channels) is in secure OFF state before connecting or withdrawing the terminals.

## Connections

WMS11 WMS12	SMS12 Sub-connector			Signal Identification	
				Identification	Meaning
1			z32	I01	Binary input 1 +
2		b32		I02	Binary input 2 +
3	d32			I03	Binary input 3 +
4			z30	I04	Binary input 4 +
5		b30		I05	Binary input 5 +
6	d30			I06	Binary input 6 +
7			z28	I07	Binary input 7 +
8		b28		I08	Binary input 8 +
9	d28			I09	Binary input 9 +
10			z26	I10	Binary input 10 +
11		b26		I11	Binary input 11 +
12	d26			I12	Binary input 12 +
13			z24	I13	Binary input 13 +
14		b24		I14	Binary input 14 +
15	d24			I15	Binary input 15 +
16			z22	I16	Binary input 16 +
17	A			A	Not used
18		b22		C01	Connection return input 1 to 8 -
19	d22			C02	Connection return input 9 to 16 -
The pin configuration of SMS12 Subrack corresponds to the pin configuration of the board connector					

Connections

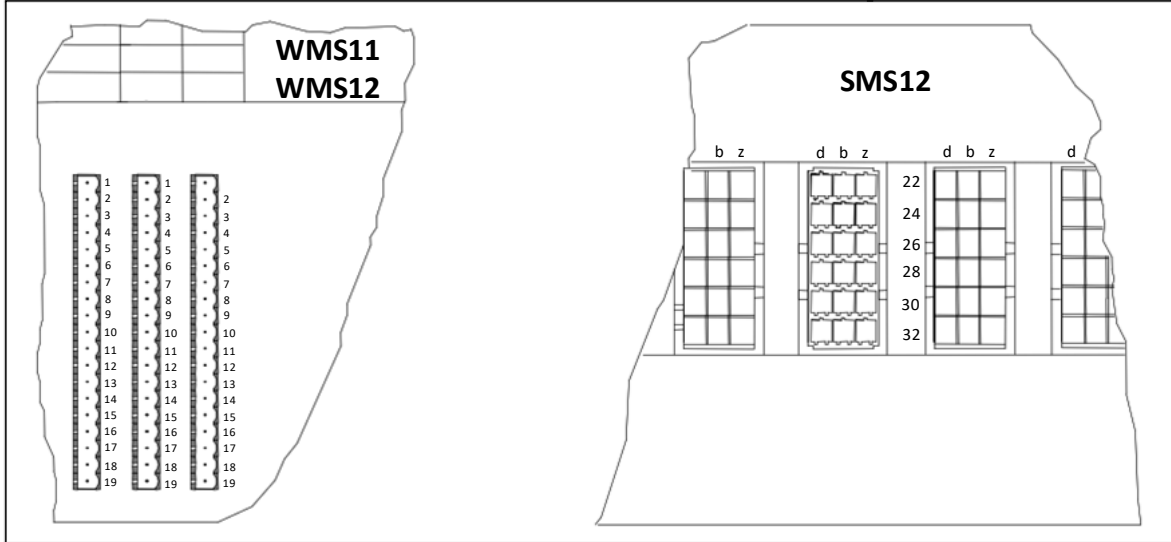
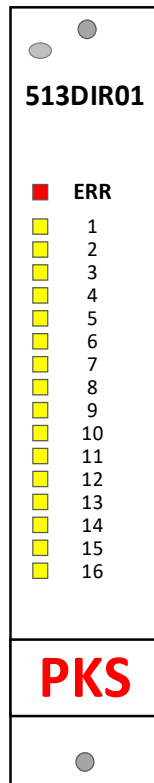


Figure 2: Placement of signal terminal connectors on subracks



Front plate

Connections

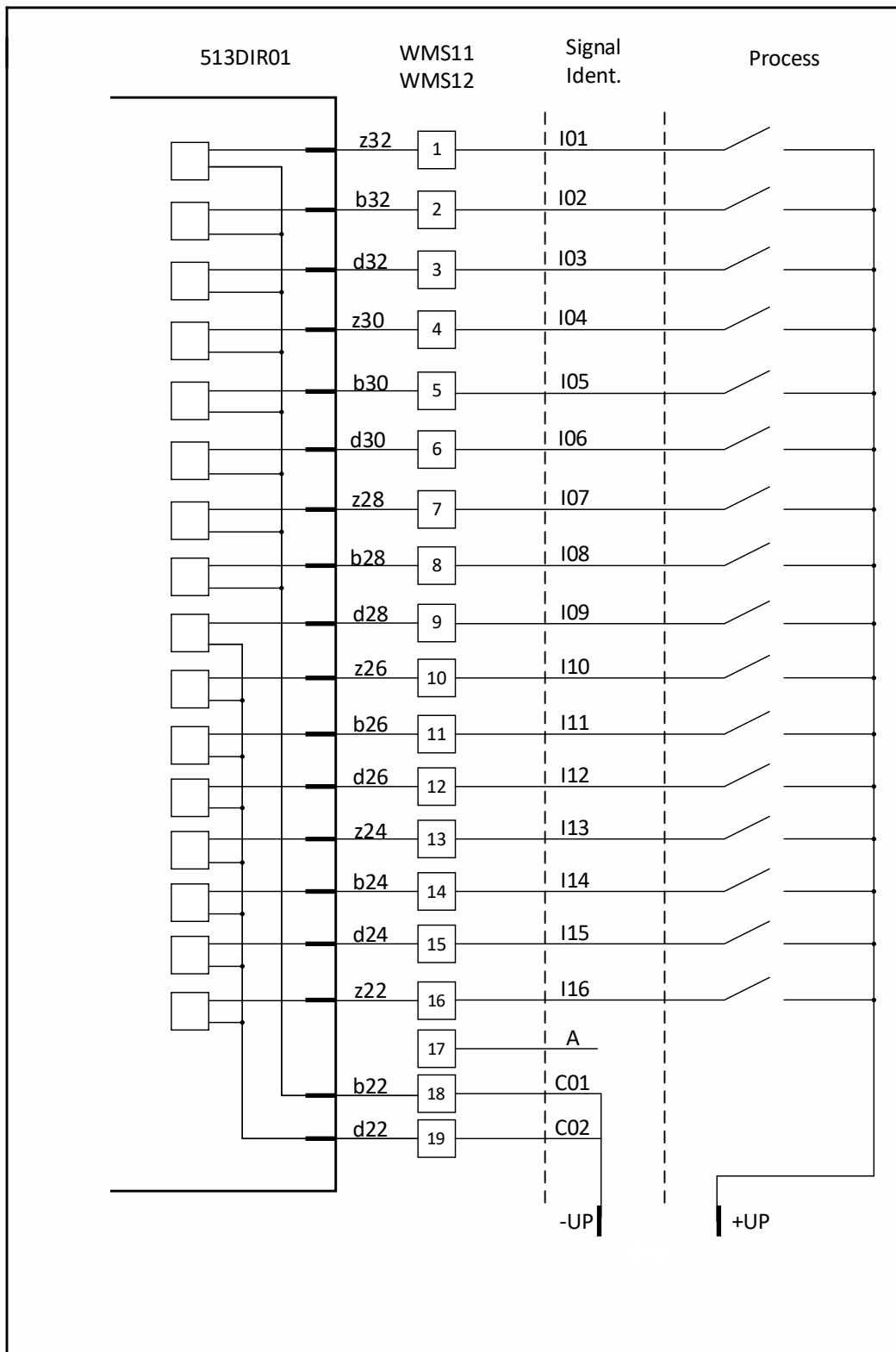


Figure 3: Process connection

## Technical Data

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

### Binary input channels 513DIR01

Input	16channels, common return for 2 groups of 8 channels, isolated by opto-couplers
Nominal input voltage	24... 60 V DC (+/- 20%)
Max. input voltage	72 V DC
Input current	1.8... 2.2 mA constant
Logical '1' definitely detected	>=18 VDC
Logical '0' definitely detected	>=9 VDC
Reverse voltage protection	yes
Max. input frequency for integrated totals	120Hz

### Current consumption for power supplied via RTU513 backplane

5V DC	100 mA
24V DC	-

### Signaling by LEDs

ERR (red)	Common fault information for the module
1... 16	LED displays the active inputs

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### Mechanical layout

Dimensions	mm x 100 mm, 3HE 16 euro card format 4R (20 mm) front panel
Housing type	Printed circuit board

### Mechanical Layout

PCB	160 x 100 mm
Weight	App. 0.3 kg

### Environmental conditions

Temperature	-25 ... 70 °C
Relative humidity	5 ... 95 % (non condensing)

### Insulation tests

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



## Technical Data

### Immunity test

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