RTU513 Remote Terminal Unit DataSheet
Digital output 513DOR01

Application

The module 513DOR01 can be used for the control of 16 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 513DOR01 is able to process the following type of signals:

- Single or double commands (SCO or DCO) with 1 or 2 pole output without (1 out of n) check

- Single or double commands (SCO or DCO) with 1.5 or 2 pole output with (1 out of n) check

- Regulation step command (RCO), 1 or 2 pole

- Binary output, 16 channels

  16 output contacts configured as

    1-pole command

    2-pole command

    1.5-pole command in configuration with 16DOSM10

- Digital setpoints commands, 8 or 16 Bit without strobe (DSO8 or DSO16)

- Digital setpoint commands, 8 or 16 Bit with strobe (DSO8 or DSO16)

- Bitstring output, 1, 2, 8 or 16 Bit (BSO1, BSO2, BSO8 or BSO16)

The module allows switching voltages up to 150 V DC or max. 2 A continious current

Characteristic

Binary outputs

Relay contacts are used for the binary outputs. The 16 outputs are combined into two groups Each 8 outputs have

Characteristic

a common return. The groups are isolated from one another as well as from the internal electronic.

The supply voltage for the coils of the relays (24 V DC) is switched by an internal relay (R17).

The supply voltage for the coils of the relays (24 V DC) is monitored internally before and during the command output.

The command output to the process equipment can be effected either directly or in conjunction with a command output supervision module.

The command output supervision module covers the (1 out of n) check of the output circuits. More details can be found in the data sheet of the command output monitoring module.

Following modules with command output supervision function are supported:

- 16DOSM10 (max. 60 V DC)

The 1.5 pole command output is only possible in combination with a command output supervision module. With the 1.5 pole command output, one output relay of the 513DOR01 switches the command to the interposing relay. The process voltage for the interposing relay is switched by the command output supervision module.

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

Another possibility for direct switching of process relays on electrical apparatus (disconnections, circuit breakers) with high switching capacity is given by using an additional booster relay connected to the command output monitoring module 16DOSM10.

Before and during command output the module 513DOR01 carries out several command monitoring functions. These tests ensure correct output.

With a command output monitoring module these tests can be further improved. If the command monitoring detects fault the command will be canceled. The switching through of the output relays by the release relay R17 occurs only after a successful test. A defective driver or a fault in the release relay R17 leads to complete inhibition of the command output module.

Power supply input

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

Characteristic

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

- Control of the command output duration Command monitoring functions
- (m out of 16) check of the output relays on the module
- 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

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 function

The I/O micro controller (EAP Ein- Ausgabe-Prozessor / Input output processor) activates any output forced by the VAP of communication unit (CMU) by a command output request. The EAP controls the time duration of a pulse output by the loaded pulse length time value.

Output monitoring and supervision

Any output is checked and monitored by the EAP by different tests and supervision functions:

Output monitoring and supervision

- The output pattern is read back before the output is activated.

- The 24 V DC from backplane bus to switch the output relays is supervised during an active output.

- The pulse duration is controlled by the EAP.

- Any detected error is indicated by LEDs.

One or two pole outputs

The figures "Fig. 2: Placement of signal terminal connectors on subracks" to Fig. 5: show the different principle wirings for one or two pole output channels.

Signalling

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 ERR on the front plate
- by diagnostic messages

LED ERR

The LED ERR indicates board errors or peripheral bus errors.

The LED ERR indicates:

- board runs initialization procedure

- board is doing a cold- or warm start

- board has detected a memory error (RAM or EPROM)

- micro controller faulty

- no dialog via the peripheral bus for at least 2 minutes. The board is not polled by the PBP of CMU.

LED CMD

At least one output relay is switched on. The LED CMD is direct connected to the 24 VDC. The LED CMD is ON for the time an output is active (pulse or persistent).
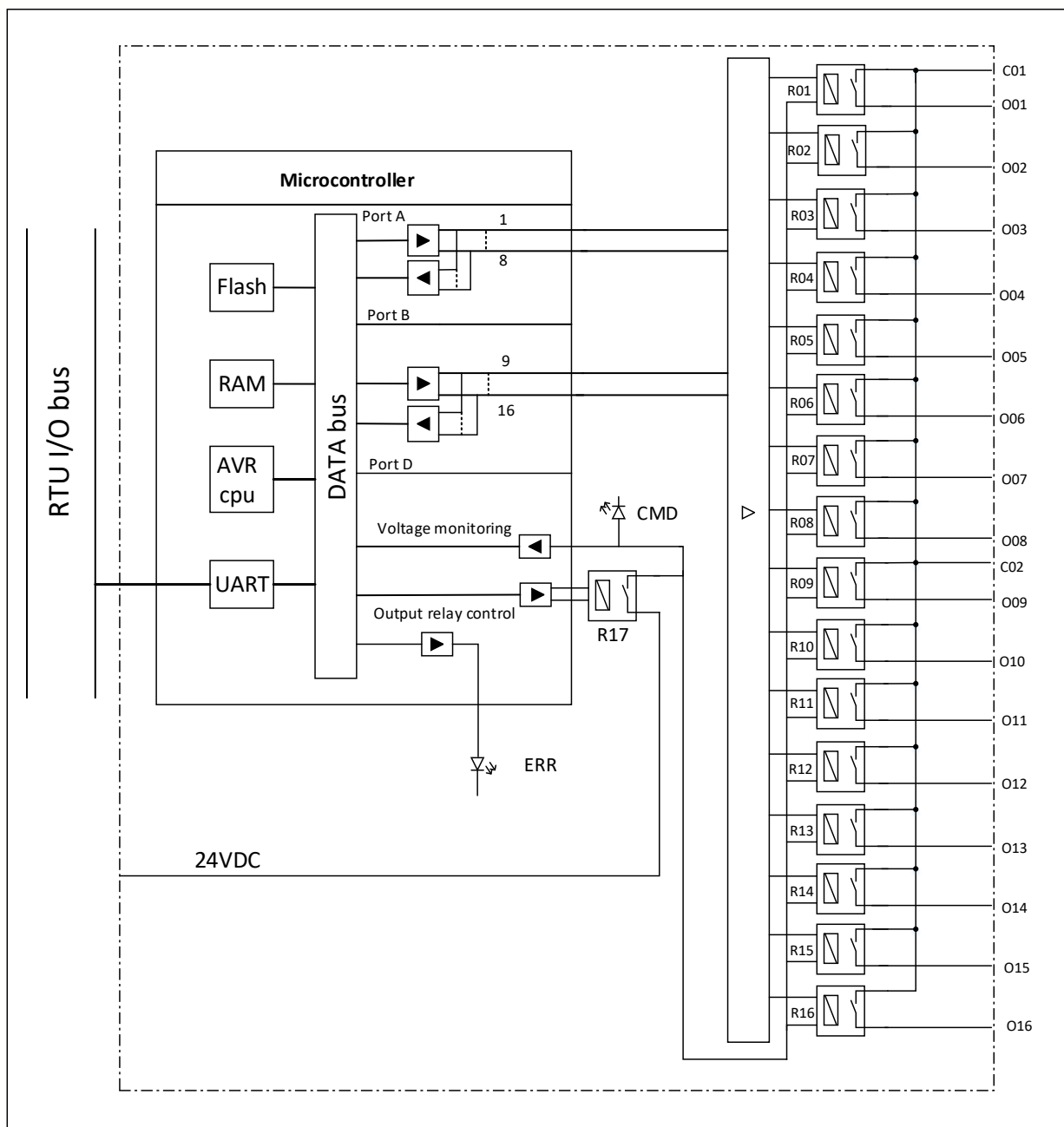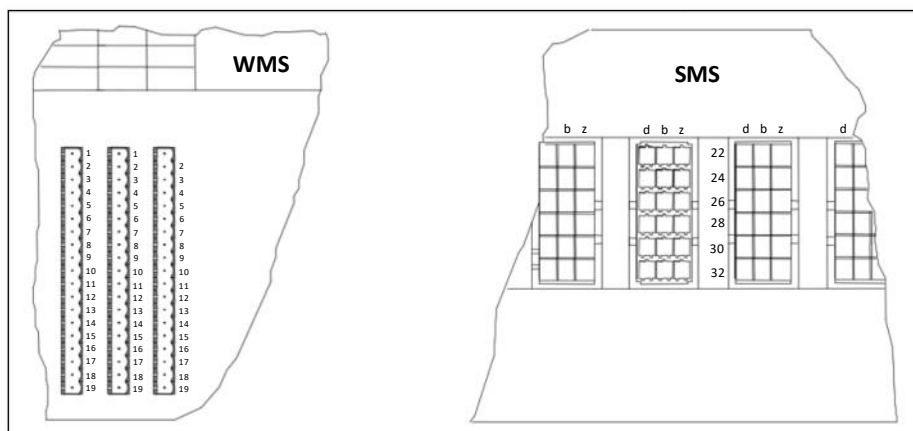
Setting

Figure 1: Block diagram 513DOR01

Setting

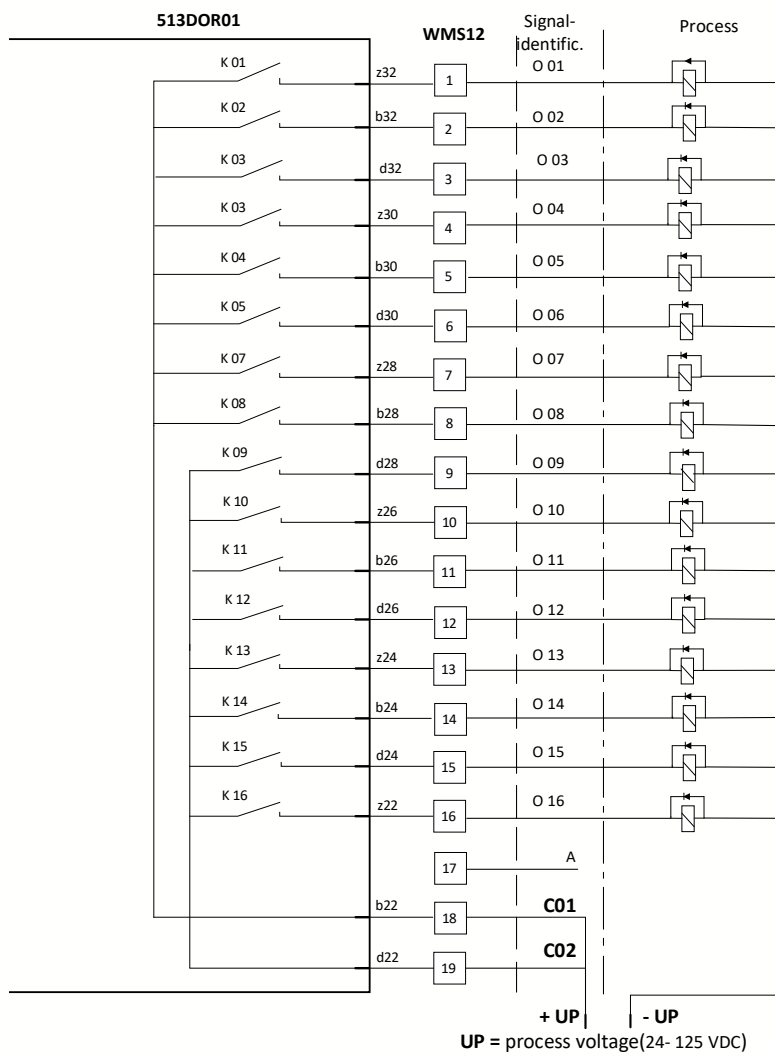Figure 2: Placement of signal terminal connectors on subracks

UP = process voltage(24- 125 VDC)

Figure 3: Binary output 1 pole - same process voltage circuit on both output groups

Setting

513DOR01		WMS12	Signal-identific.	Process
K 01	z32	1	O 01	
K 02	b32	2	O 02	
K 03	d32	3	O 03	
K 03	z30	4	O 04	
K 04	b30	5	O 05	
K 05	d30	6	O 06	
K 07	z28	7	O 07	
K 08	b28	8	O 08	
K 09	d28	9	O 09	
K 10	z26	10	O 10	
K 11	b26	11	O 11	
K 12	d26	12	O 12	
K 13	z24	13	O 13	
K 14	b24	14	O 14	
K 15	d24	15	O 15	
K 16	z22	16	O 16	
		17	A	
	b22	18	**C01**	
	d22	19	**C02**	

+ UP   - UP   + Pn   -Pn

UP = process voltage (24 – 125 VDC)
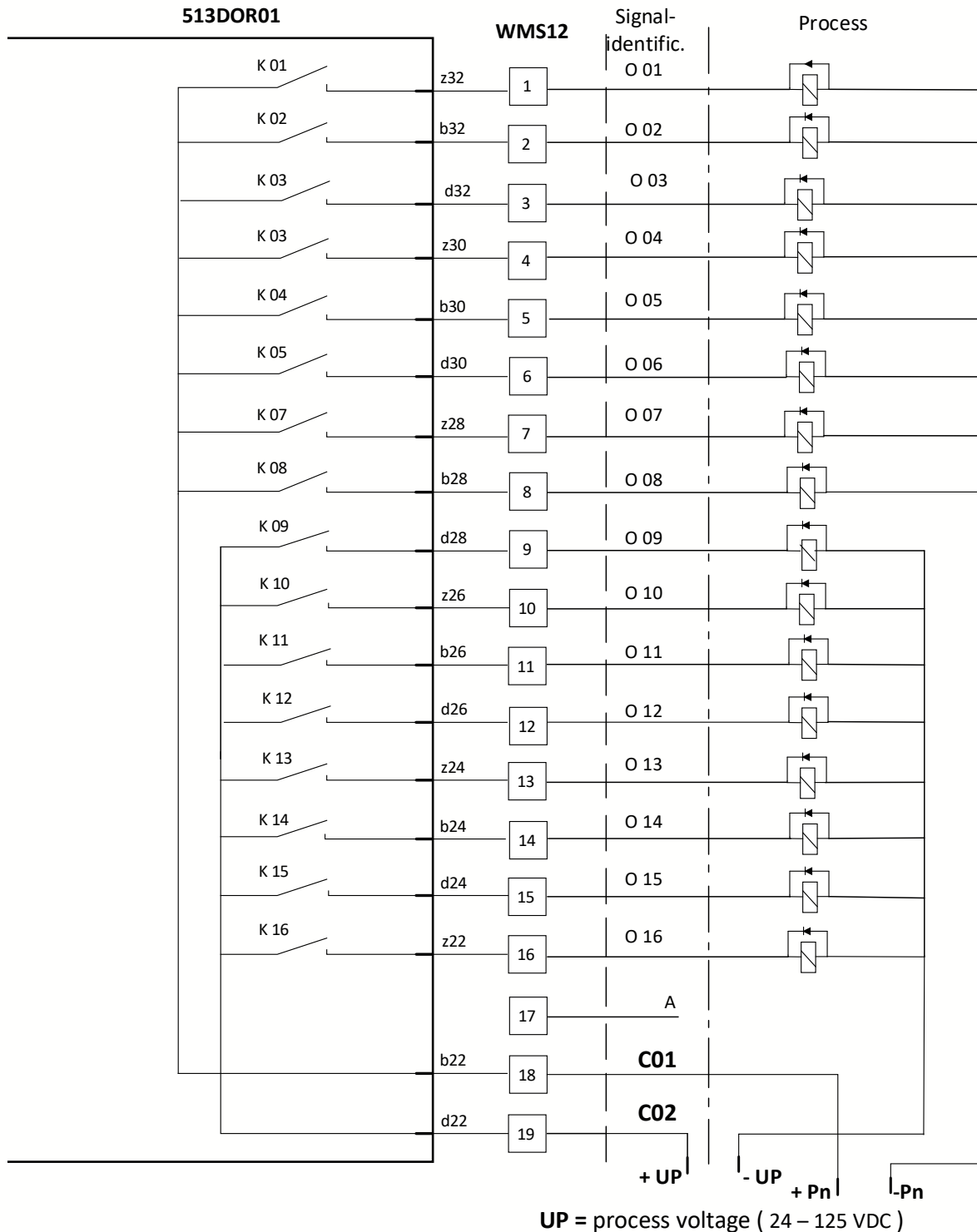
Figure 4: Binary output 1 pole - different process voltage sources on k 01 - k 08 and k 09 - k 16

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Peyman Khotoot Shargh

Setting
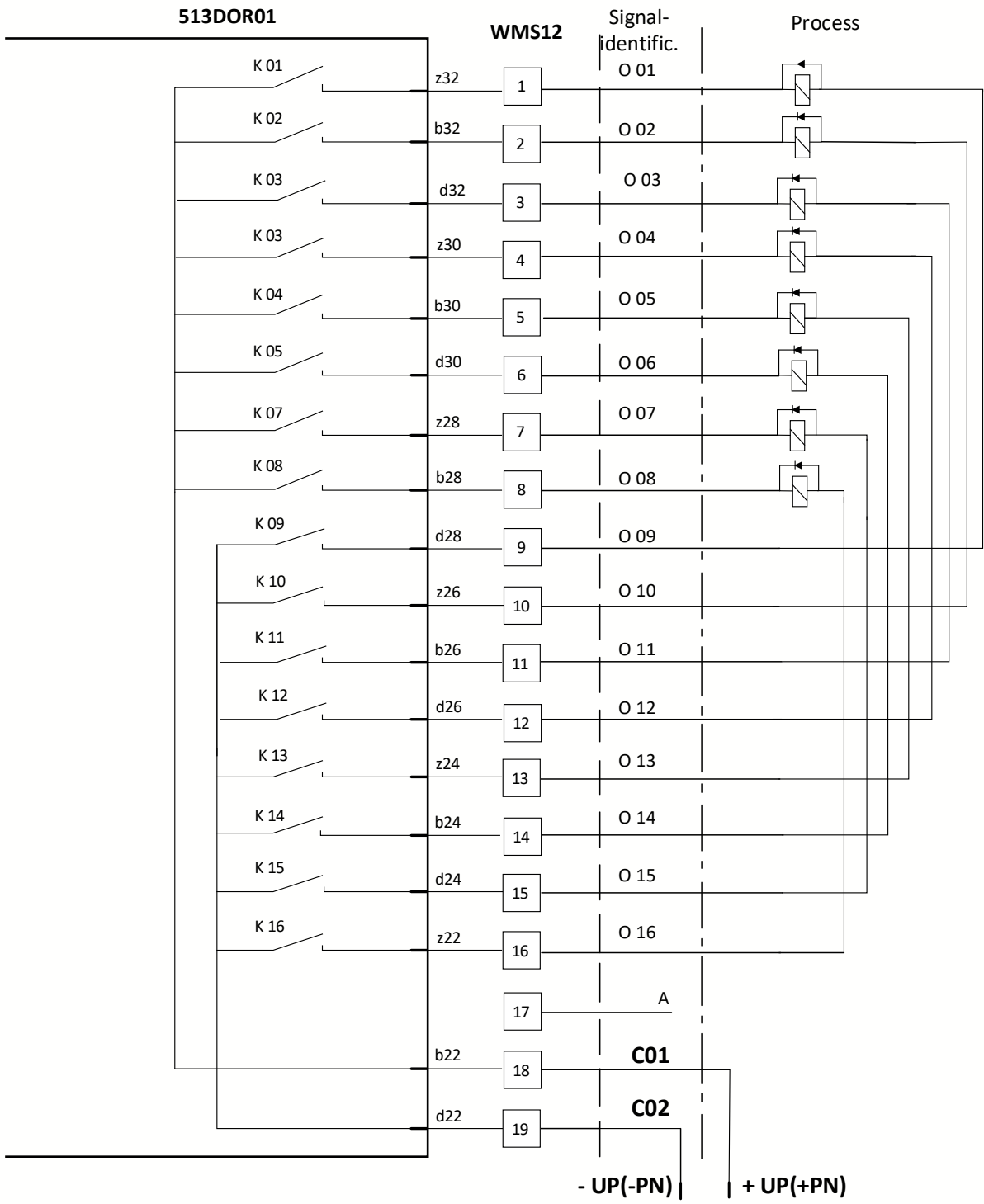
Figure 5: Binary output 2 pole - either direct or by 1 out of n check

UP = process voltage (24 – 125 VDC)

Technical Data

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

Binary output characteristics

Outputs	16 Relay contacts, single pole, normal open, 2 groups of 8 outputs with common return
Max. switching voltage	150 V DC
Continuous current	2 A total current for one group with the same common return
Max breaking current (resistive load)	2 A ≤ 30 V DC 0.8 A @ 60 V DC 0.15 A @ 150 V DC
Max. breaking capacity (inductive load)	50 VA (L/R= 40 ms)

Current consumption for power supplied via RTU513 backplane

5 V DC	120 mA
24 V DC	10 mA per active relay

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 withstands test IEC 60255-5 IEC 60870-2-1 (class VW 3)	5 kV (1.2 / 50 µs)
Insulation resistance IEC 60255-5	> 100 MΩ at 500 V DC

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	2 kV (level 3) Performance criteria A
Surge IEC 61000-4-5	2 kV (level 3) Performance criteria A
Conducted Disturbances, induced by Radio-Frequency Fields IEC 61000-4-6	10 V (level 3) Performance criteria A

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	2 kV (level 3) Performance criteria A
Relative humidity EN 60068-2-30	5 ... 95 % (non condensing)

Connection type

RTU513 backplane connector	48 pole type F DIN 41612

Peyman Khotoot Shargh