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1. APPLICATION

The UNICONT PJK-100-4 is a universal interface module that can be controlled via HART or MODBUS protocol through an RS485 interface, and (depending on type) provides relay(s) and/or 4 – 20 mA current output(s).
The device is intelligent, the internal functions and services can be set with the help of a communication protocol: the transmitter outputs can be scaled. The error detection function can be switched on and off. The state, in which a given output unit should be when an error occurs, can also be set. The device can be used with NIVELCO's MultiCONT PRO-100-4 units as an output extension module, and also as a peripheral device for PLC or PC controlled process control systems.

2. TECHNICAL DATA

2.1 GENERAL DATA

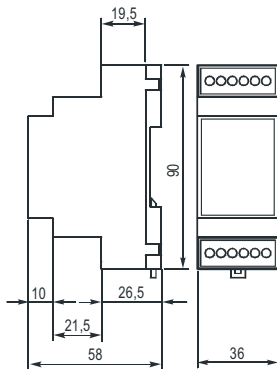
TYPE	PJK-100-4
Power supply	24 VDC±10%
Current consumption	(10 mA + N _{Relay} × 11 mA + N _{Current generator} × 25 mA) ±10%
Ambient temperature	-20 °C ... +50 °C
Electrical connection	max. 2.5 mm ² twisted, max. 4 mm ² solid cable
Mechanical connection	DIN EN 60715 rail
Ingress protection	IP20
Weight	≈ 0.11 kg

N: number of outputs of a given type of output units

2.2 TYPE SPECIFIC DATA

TYPE (A)	PJK-102-4		PJK-111-4		PJK-110-4		PJK-120-4	
	B	C	B	C	B	C	B	C
OUTPUT UNITS								
Relay	- Output: 1x SPDT - Rating: 250 V AC, 8 A, AC1 - Insulation voltage: 2500 V 50 Hz - Electrical / Mechanical life span: 10 ⁵ / 2 x 10 ⁶ switches - Pulse width in pulse mode: 0.1 – 25.5 s							
Current generator	- Linear range: – - Error indication: – - Resolution: 14 bit - Accuracy: – - Temperature dependence: max. 15 µA / 10 °C - Maximal load resistance: ≤ 800 Ohm							

2.4 DIMENSIONS



2.5 ORDER CODE

P J K - 1 [] [] - 4

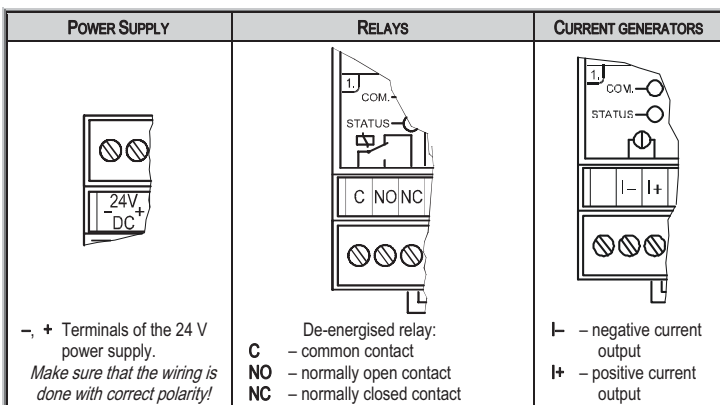
CURRENT OUTPUT	CODE	RELAY	CODE
–	0	–	0
1x 4 – 20 mA	1	1x SPDT	1
2x 4 – 20 mA	2	2x SPDT	2

3. MOUNTING

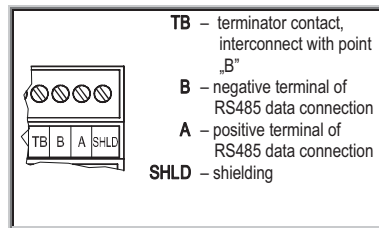
The PJK-100-4 device can be mounted on a DIN EN 60715 rail.

4. ELECTRICAL CONNECTION

4.1 ELECTRICAL CONNECTIONS OF POWER SUPPLY AND OUTPUTS



4.2 RS485 COMMUNICATION TERMINALS

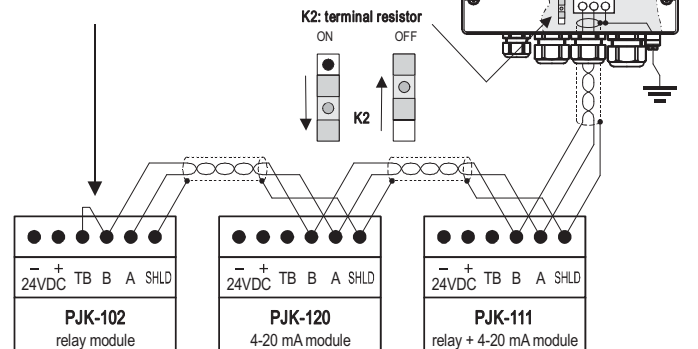


The Universal Interface Modules should be connected one after another to one cable pair. Star topology is not allowed. Max. cable length is 1000 m, but in this case a shielded twisted cable pair (STP – Shielded Twisted Pair) should be used. Max. cable capacity should be less than 100 pF/m. All of the Universal Interface Modules in one system should have different addresses (0 – 31), see: 5.1.2.

Wiring example when using a MultiCONT:

Connection with shielded twisted pair cable, shielding is grounded at one point on the MultiCONT side.

The terminal resistor is connected to the two farthest points of the cable. (TB and B contacts are connected in PJK 100; and on the MultiCONT the K2 terminal resistor, located next to the terminals, is switched on.)



5. INSTALLATION, SETTING UP AND PROGRAMMING

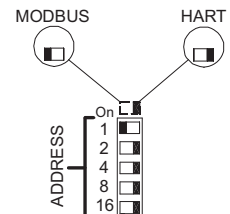
5.1. PREPARATION

5.1.1 CHOOSING A COMMUNICATION PROTOCOL

Open the housing via the four snap-on clips to access the DIP switch for protocol selection. DEFAULT SETTING: HART

5.1.2 SETTING THE DEVICE ADDRESS

A communication line can contain max. 32 Universal Interface Modules. These modules should have different addresses. Set the address with the „ADDRESS“ DIP switches (0 – 31), on the front panel of the device. Settings will take effect when the unit is switched on again!



Example for setting the address:
4+8=12

5.2. WIRING

See: 2. Technical Data and 4. Electrical connection

5.3. INSTALLATION

5.3.1 POWER ON AND SELF TEST

After correctly wiring and switching the device on, it runs a few self tests whose results are shown with LED indications.

SEQUENCE OF SELF TESTS		'COM.' LED-s		'STATUS' LED-s		
		1.	2.	1.	2.	
1.	Test of red LED-s:	Red		Red		
2.	Test of green LED-s:	Green		Green		
3.	DIP switch test:	Blinking green	Dark	Dark	Dark	
	result:	Green: OK. Red: Error	Dark	Dark	Dark	
4.	RESET button test:	Blinking green	Dark	Dark	Dark	
	result:	Green: OK. Red: Error	Dark	Dark	Dark	
5.	Detecting Relay on 1. unit:	Blinking green Green: OK. Red: Error	Blinking green	Dark	Dark	
	result:		Green: Exists Red: Error Dark: Doesn't exist	Dark	Dark	
6.	Detecting Relay on 2. unit:		Blinking green	Dark	Dark	
	result:		Green: Exists Red: Error Dark: Doesn't exist	Dark	Dark	
7.	Detecting Current output on 1. unit, (if relay doesn't exist):		Blinking green	Dark	Dark	
	result:		Green: Exists Red: Error Dark: Doesn't exist	Dark	Dark	
8.	Detecting Current output on 2. unit, (if relay doesn't exist):		Blinking green	Dark	Dark	
	result:		Green: Exists Red: Error Dark: Doesn't exist	Dark	Dark	
9.	Peripheral self test results for 1sec:					
10.	EEPROM block test result (block1, block2):		Green: OK. Red: Error	Green: OK. Red: Error	Dark	Dark
	If content of one block is erroneous, it is corrected from the other one, if both are erroneous, they are corrected by loading default values:	Green: OK.	Green: OK.	Dark	Dark	
11.	RAM, ROM, EEPROM tests and their results:	Pale green	Pale green	Dark	Dark	
	Device is ready: Device is ready: Device is unable to operate:	Pale green	Pale green	Dark	Dark	
		Red blinking together				

5.3.2 OPERATION

- After the self test sequence, if the device is ready for operation, states and operation of the module and its units are shown as follows:

- **'COM' LED** – indicates the communication with the unit that belongs to it, (all LED-s flash in case of communication with the module), it also indicates the operation state of the device.

- **'STATUS' LED** – indicates the state of the unit that belongs to it.

OPERATION STATES			
LED:	DISPLAY:	COMMENT:	
COM.	PALE GREEN	Device is ready	
	GREEN FLASH	Successful communication	
	RED FLASH	Communication failure	
	RED	Communication cycle time-out	
STATUS		RELAY UNIT	CURRENT GENERATOR UNIT
	GREEN	Energised	Current in linear range
	DARK	De-energised	-
	RED	-	Error (signal) current
	BLINKING RED	Relay error	Current generator error

5.3.3. PROGRAMMING, SETTING THE CURRENT GENERATOR AND RELAY OPERATION

Depending on the application, re-programming of the device may be needed. Programming can be done with either a PC that controls the communication network via HART or MODBUS protocol, or a **Multicont** (see MultiCONT's User Manual). Parameters determining the operation:

PARAMETERS AVAILABLE FOR ALL UNITS:			FACTORY SETTING
Communication watchdog			Off
RELAY UNIT PARAMETERS:	FACTORY SETTING	CURRENT GENERATOR UNIT PARAMETERS:	FACTORY SETTING
- 0 – 25.5 s pulse time (non restartable)	0.1 s	- Configurable error-current ≤ 3.6 mA or ≥ 22 mA:	
- Configurable energised or de-energised error state:		- for device hardware error	Off
- for device hardware error	Off	- for comm. cycle time-out	Off
- for comm. cycle time-out	Off	- Scaling values at 4 and 20 mA	Calibrated

5.3.3.1 MODBUS COMMUNICATION PROTOCOL

Physical format: RS485, Slave, RTU, 9600 Baud, 1-8-Odd-1. Registers of the device can be accessed (read or write) with command 3 (Read Holding Registers) and command 16 (Preset Multiply Registers). Device address is adjustable in 1 – 31 range only. Detailed description of registers can be found in a separate document.

5.3.3.2 HART COMMUNICATION PROTOCOL

Physical format: RS485, Slave, RTU, 9600 Baud, 1-8-Odd-1. Device address is adjustable in 1...31 range. Detailed description of HART (standard 5) commands can be found in a separate document.

Logical set-up of the device:

MODUL Factory: 151 Type: 50 ID: xxxxxx Polling: 0...31	UNIT 1. Factory: 151 Type: 51 ID: xxxxxx+1	UNIT 2. Factory: 151 Type: 51 ID: xxxxxx+2
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Interpreted commands:

COMMAND CODE	ADDRESSING		Module-level HART commands
	SHORT	LONG	
0	•	•	Read Unique ID
6	•	•	Write Polling Address
7	•	•	Read Polling Address
12	•	•	Read Message
13	•	•	Read Tag, Descriptor, Date
16	•	•	Read Final Assembly Number
17	•	•	Write Message
18	•	•	Write Tag, Descriptor, Date
38	•	•	Reset 'Config Change Flag'
140	•	•	Write Device ID
200	•	•	Read Device Table
206	•	•	Read Firmware Version
Unit-level HART commands			
13	-	•	Read Tag, Descriptor, Date
18	-	•	Write Tag, Descriptor, Date
201	-	•	Read Slot Output/Input
202	-	•	Write Slot Output
203	-	•	Read Slot Configuration
204	-	•	Write Slot Configuration
205	-	•	Write Slot Calibration
206	-	•	Read Firmware Version

5.3.4 OTHER OPERATING SERVICES

MODULE SERVICES:	
Operating time count	
COMMON SERVICES OF THE UNITS:	
Communication watchdog (comm. cycle time-out)	
RELAY UNITS' SERVICES:	CURRENT GENERATORS' SERVICE:
- Static or pulse output - Eligible pulse default state - Detection of coil splitting (error indication) - Sum of energised state times - Nr. of switching cycles - Life-time (max. numbers of switching cycles)	- Monitoring correct operation of current generator (error indication)

5.3.5. RESET, TEST MODE, AND LOADING FACTORY DEFAULTS

The mentioned operations can be done, without restarting the device, with the small recessed 'RESET(TEST)' button on the front panel:

RESET:	- Press
Entering TEST mode:	- Press and Hold
Loading factory default settings:	- Hold pressed while power on, and release when all LEDs flash red.
Attention! The current generator units should be recalibrated!	
The HART long addresses will change!	

TEST MODE

Once in test mode by consecutive pressing the 'RESET(TEST)' button you can cycle through the following tests. Pressing this button until all Red LED-s are flashing will exit the test mode, without pressing the button the device quits test mode after 30 seconds.

CONSECUTIVE TESTS:		'COM.' LED-s: (identifying tested unit)	'STATUS' LED-s correct operation:
RELAY UNIT	energised	Red	As described in 5.3.2
	de-energised		
CURRENT GENERATOR UNIT	3.6 mA	Flashing red together	
	4 mA		
	12 mA		
	20 mA		
DIP SWITCH	correct operation	Alternate flashing red	
	- switching to left: - switching to right:		
		Red flashing on 1 st unit, on 2 nd unit.	

6. MAINTENANCE, REPAIR

The device does not require regular maintenance.

Repair within and beyond the warranty period is carried out at the Manufacturer's location.

7. STORAGE

Ambient temperature: -30 °C ... +60 °C. Relative humidity: max. 98%