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UNICONT

PJK-100

UNIVERSAL INTERFACE MODULE

User's manual

Manufacturer:
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1. APPLICATION

The **UNICONT PJK–1□□–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 our **MultiCONT PR□–1□□–□ units** as an output extension module, and also as a peripheral device for PLC or PC controlled process control systems.

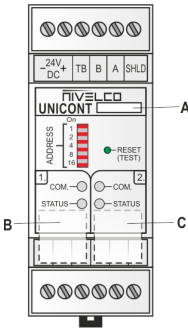
2. TECHNICAL DATA

2.1 GENERAL DATA

PJK–1□□–4	
Supply voltage	24 V DC ± 10%
Power consumption	(10 mA + $N^{(*)}_{Relay}$ x 11 mA + $N^{(*)}_{Current\ generator}$ x 25 mA) ±10%
Ambient temperature	−20…+50 °C (−4…+122 °F)
Electrical connection	max. 2.5 mm² (AWG14) twisted, max. 4 mm² (AWG12) solid wire
Mechanical connection	DIN EN 60715 rail
Ingress protection	IP20
Weight	≈ 0.11 kg (≈ 0.25 lbs)

(*)*N: number of outputs of a given type of output units*

2.2 TYPE SPECIFIC DATA

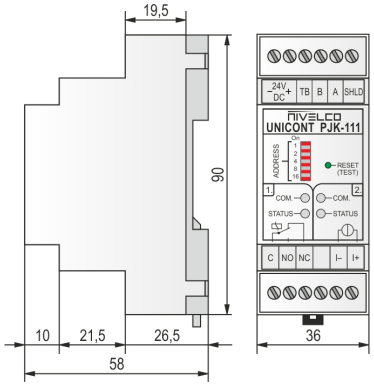


TYPE (A)		PJK–102–4		PJK–111–4		PJK–110–4		PJK–120–4	
OUTPUT UNITS		B	C	B	C	B	C	B	C
		C NO NC	C NO NC	C NO NC	I– I+		I– I+	I– I+	I– I+
Relay	Output	1x SPDT							
	Rating	250 V AC, 8 A, AC1							
	Insulation voltage	2500 V 50 Hz							
	Electrical / Mechanical life span	10^5 / 2 x 10^6 switches							
	Pulse width in pulse mode	0.1…25.5 s							
Current generator	Linear range	–		3.601 mA…21.999 mA					
	Error indication	–		≤ 3.6 mA or ≥ 22 mA					
	Resolution	–		14 bit					
	Accuracy	–		40 µA					
	Temperature dependence	–		max. 15 µA / 10 °C					
	Maximal load resistance	–		≤ 800 Ω					

2.3 ACCESSORIES

- User's Manual
- Certificate of Warranty
- EU Declaration of Conformity
- Description of the Communication Protocol

2.4 DIMENSIONS



2.5 ORDER CODE

P J K – 1 □ □ – 4

CURRENT OUTPUT	CODE
–	0
1x 4…20 mA	1
2x 4…20 mA	2

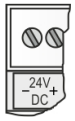
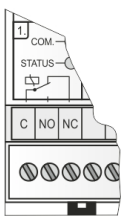
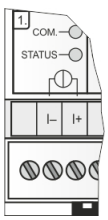
RELAY	CODE
–	0
1x SPDT	1
2x SPDT	2

3. MOUNTING

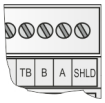
The **PJK–1□□–□** device can be mounted on a DIN EN 60715 rail.

4. ELECTRICAL CONNECTION

4.1 ELECTRICAL CONNECTIONS OF POWER SUPPLY AND OUTPUTS

POWER SUPPLY	RELAYS	CURRENT GENERATORS
		
–, + Terminals of the 24 V power supply.	De-energized relay: **C** – common contact	**I–** – negative current output
Make sure that the wiring is done with correct polarity!	**NO** – normally open contact **NC** – normally closed contact	**I+** – positive current output

4.2 RS485 COMMUNICATION TERMINALS



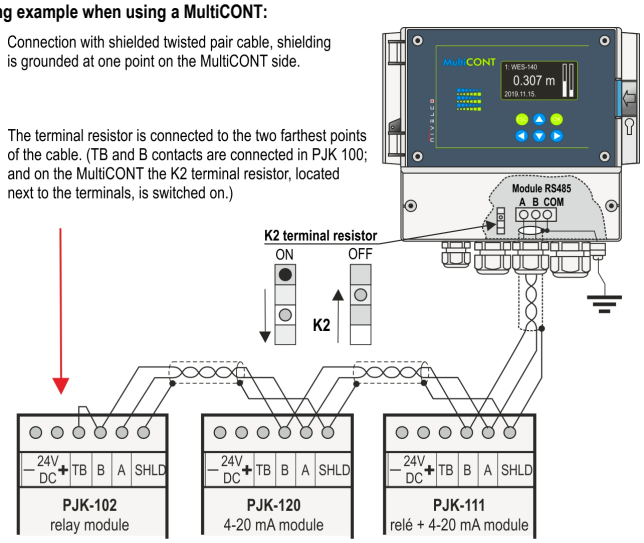
TB – terminator contact, interconnect with point "B"
B – negative terminal of RS485 data connection
A – positive terminal of RS485 data connection
SHLD – shielding

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

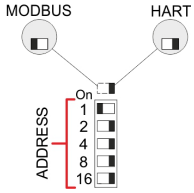
5.1. PREPARATION

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.' LEDs		'STATUS' LEDs	
			1st	2nd	1st	2nd
1.	Test of red LEDs		Red		Red	
2.	Test of green LEDs		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
	result			Green: OK. Red: Error	Dark	Dark
5.	Detecting Relay on 1st unit				Blinking green	Dark
	result				Green: Exists Red: Error Dark: Doesn't exist	Dark
6.	Detecting Relay on 2nd unit					Blinking green
	result					Green: Exists Red: Error Dark: Doesn't exist
7.	Detecting Current output on 1st unit, (if relay doesn't exists)				Blinking green	
	result				Green: Exists Red: Error Dark: Doesn't exist	
8.	Detecting Current output on 2nd unit, (if relay doesn't exist)					Blinking green
	result					Green: Exists Red: Error Dark: Doesn't exist
9.	**Peripheral self test results for 1 sec**					
10.	EEPROM block test result (block1, block2)		Green: OK. Red: Error	Green: OK. Red: Error		
	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		
11.	RAM, ROM, EEPROM tests and their results	**Device is ready**	Pale green	Pale green		
		Device is ready	Pale green	Pale green	Dark	Dark
		Device is unable to operate	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 LEDs 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	**DISPLAY:**	**RELAY UNIT**	**CURRENT GENERATOR UNIT**
	GREEN	Energized	Current in linear range
	DARK	De-energized	-
	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 energized or de-energized 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

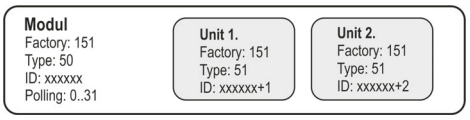
5.3.3.1 MODBUS COMMUNICATION PROTOCOL

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:



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 energized 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 LEDs are flashing will exit the test mode, without pressing the button the device quits test mode after 30 seconds.

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

6. MAINTENANCE, REPAIR

The device does not require regular maintenance. The warranty card contains the terms and conditions. Before returning the device for repairs, it must be cleaned thoroughly. The parts in contact with the medium may contain harmful substances; therefore, they must be decontaminated. Our official form (Returned Equipment Handling Form) must be filled and enclosed in the parcel. Download it from our website www.nivelco.com. The device must be sent back with a declaration of decontamination. A statement must be provided in the declaration that the decontamination process was successfully completed and that the device is clean from any hazardous substances.

7. STORAGE

Ambient temperature: –30…+60 °C (–22…+140°F). Relative humidity: max. 98%

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