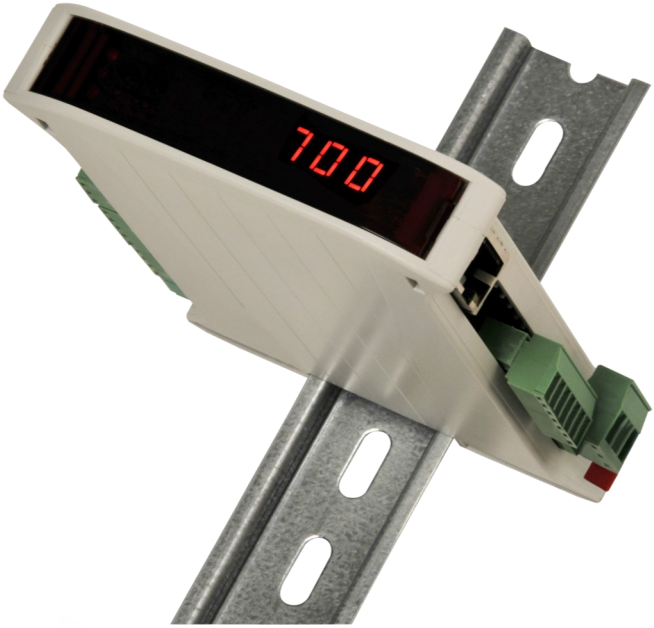
PENKO Engineering BV

The Leading Experts In Weighing & Dosing

RIO700

Remote I/O

Manual



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RIO700 Remote I/O

IMPORTANT SAFETY INFORMATION

READ THIS PAGE FIRST!

Penko Engineering manufactures and tests its products to meet all applicable national and international standards. It is vital that this instrument is correctly installed, used, and maintained to ensure it continues to operate to its optimum specification.

The following instructions must be adhered to and incorporated into your safety program when installing, using, and maintaining Penko products. Failure to follow the recommended instructions can affect the system's safety and may increase the risk of serious personal injury, property damage, damage to this instrument and may invalidate the product's warranty.

• Read the instructions fully prior to installing, operating, or servicing the product. If this Instruction Manual is not the correct manual for the Penko product you are using, call 0031(0)318-525630 for a replacement copy. Keep this Instruction Manual in a safe place for future reference.

• If you do not fully understand these instructions, contact your Penko representative for clarification.

• Pay careful attention to all warnings, cautions, and instructions marked on and supplied with the product.

• Inform and educate your personnel about the correct installation, operation, and maintenance procedures for this product.

• Install your equipment as specified in the installation instructions of the appropriate Instruction Manual and as per applicable local and national codes. Connect all products to the proper electrical sources.

• To ensure correct performance, use qualified personnel to install, operate, update, program, and maintain the product.

• When replacement parts are required, ensure that qualified technicians use replacement parts specified by Penko. Unauthorized components and procedures can affect the product's performance and may affect the continued safe operation of your processes. The use of non-specified 'look-alike' substitution parts may result in the risk of fire, electrical hazards, or improper operation.

• Ensure that all equipment doors are closed and protective covers are in place, except when maintenance is being performed by qualified persons, to prevent electrical shock and personal injury.

WARNING

ELECTRICAL SHOCK HAZARD

Installing cable connections and servicing this instrument require access to shock hazard level voltages which can cause death or serious injury.

Disconnect separate or external power sources to relay contacts before commencing any maintenance.

The electrical installation must be carried out in accordance with CE directions and/or any other applicable national or local codes.

Unused cable conduit entries must be securely sealed by non-flammable blanking plates or blind grommets to ensure complete enclosure integrity in compliance with personal safety and environmental protection requirements.

To ensure safety and correct performance this instrument must be connected to a properly grounded, three-wire power source.

Proper relay use and configuration is the responsibility of the user.

Do not operate this instrument without the front cover being secured. Refer any installation, operation or servicing issues to qualified personnel.

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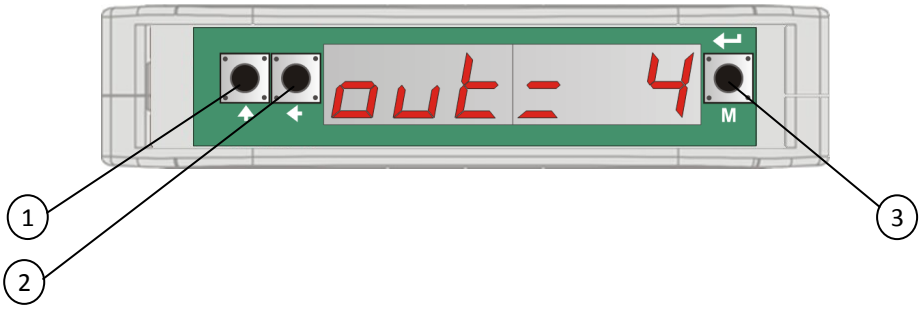
TABLE OF CONTENT

1. Indication of Display

With cover closed

1. Input / Output status

With cover opened



1. key 1 press <2sec.= 1 SHORT
   key 1 press >2sec.= 1 LONG
2. key 2 press <2sec.= 2 SHORT
   key 2 press >2sec.= 2 LONG
3. key 3 press <2sec.= 3 SHORT
   key 3 press >2sec.= 3 LONG

Functions of these keys will be described on the next page.

2. Explanation of front keys

Pressing key 1 "short".
In Menu mode: increase value by 1 or move up in menu.

Pressing key 1 "long".
In Menu mode: decrease value by 1 or move down in menu.

Pressing key 2 "short".
In Menu mode: go into sub-menu or move cursor 1 position to the left.

Pressing key 2 "long".
In Menu mode: move cursor 1 position to the right.

Pressing key 3 "short".
In Menu mode: escape and move back in menu without saving changes.

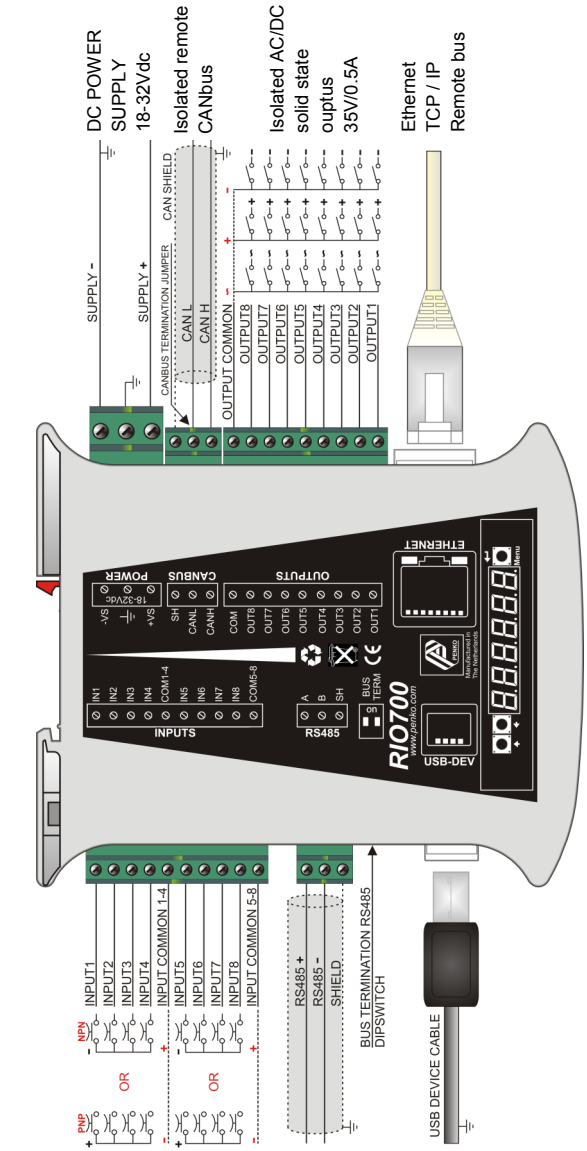
Pressing key 3 "long".
In Normal mode: enter configuration menu.
In Menu mode: confirm made changes.

Menu will jump back one level every 30 seconds of inactivity.

RIO700 Remote I/O

3. Load cell / power connection

This product is intended to be supplied by a NEC class 2 or Limited Power Source, rate 18 - 32 Vdc, 0.2A@24Vdc.

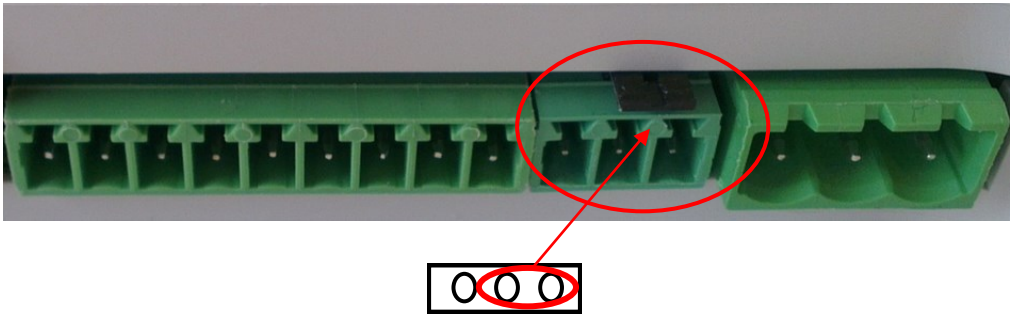


3. Load cell / power connection

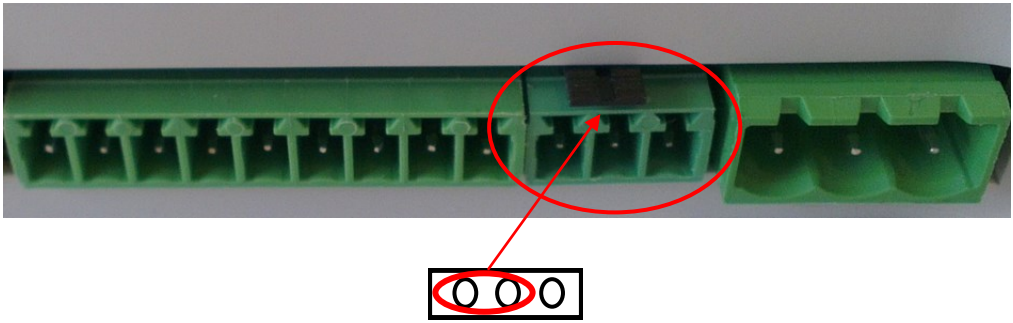
3.1. CAN BUS termination

The CAN bus termination is done with a jumper.

Jumper setting termination off:



Jumper setting termination on (120 Ω)



4. Configuration Menu

Press button 3 >2 sec to enter the Configuration Menu.

In the Configuration Menu the following options are available:

- - - 485	Local bus communication setting (RS485)
- - - CbL	CAN Buslink settings
- - - Eth	Ethernet settings
- - - EbL	Ethernet Buslink settings
- - - out	Output control
- - - rcL	Recall
- - - SoF	Firmware update

Scroll through the menu options pressing key 1 and enter a sub-menu pressing key 2 <2 sec or key 3 >2 sec.

Up Down Enter Enter

4. Configuration Menu –485-

4.1 - - - 485 Local bus communication setting (RS485)

In this menu, the communication address can be set for communication with multiple devices. Press key 2 <2 sec to enter the settings.

The following screen will be visible:

In **485 1** you set the **address** of the RIO700. Press 2 <2sec to enter 485 1.
Set the address using key 1 and key 2. Key 1 is for changing the number (1-9), key 2 is for changing the position of the cursor. Confirm by pressing key 3 > 2 sec. (options are 1-32)

Increase Decrease Left Right Confirm

The following screen will be visible:

4. Configuration Menu –CbL-

4.2 - - - CbL CAN Buslink protocol

The options for configuring the CAN Buslink protocol are:

CbL 1	Protocol
CbL 2	Buslink address
CbL 3	Buslink subaddress
CbL 4	Baudrate

Press key 2 < 2 sec to enter the settings.

2 SHORT

The following screen is visible:

In **CbL1** you set the **protocol** for the CAN bus. Press key 2 <2 sec to change the protocol. Use key 1 to change the value (1-2). Confirm by pressing key 3 >2sec.

2 SHORT

1 SHORT — Up

1 LONG — Down

3 LONG — Confirm

The protocol options are:

1	None
2	Buslink

The following screen will be visible:

4. Configuration Menu –CbL– continue

4.2 - - - CbL CAN Buslink protocol

In **CbL 2** you set the Buslink **address**. Press key 2 <2 sec to change the address.Use key 1 to change the value (1-8). Confirm by pressing key 3 >2 sec.

The following screen will be visible:

In **CbL 3** you set the Buslink **Subaddress**. Press key 2 <2sec to change the subaddress. Use key 1 to change the value (1-5). Confirm by pressing key 3 >2sec.

The following screen will be visible:

4. Configuration Menu –CbL– continue

4.2 - - - CbL CAN Buslink protocol

In **CbL 4** you set the **baudrate** for the communication. Press key 2 <2sec to change the baudrate. Use key 1 to change the value (1-4). Confirm by pressing key 3 >2sec.

The baudrate options are:

1	100k
2	125k
3	250k
4	500k

The following screen will be visible:

4. Configuration Menu –Eth-

4.3 - - - Eth Ethernet port settings

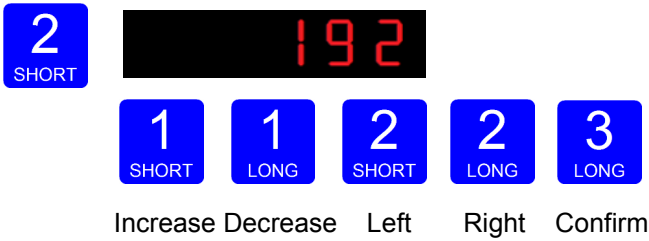
In this menu, the communication settings can be set for the ethernet port. The options for the Ethernet port communication settings are:

Adr 1-4	4 bytes of the IP address	192 . 168 . 1 . 2 Adr1 Adr2 Adr3 Adr4
Sub 1-4	4 bytes of the Subnet address	255 . 255 . 255 . 0 Sub1 Sub2 Sub3 Sub4
gAt 1-4	4 bytes of the Gateway address	192 . 168 . 1 . 1 gAt1 gAt2 gAt3 gAt4
dHCP	Disable or enable Dynamic Host Configuration Protocol	

Press key 2 <2sec to enter the settings.

The following screen will be visible:

In **Adr 1** you set the first **first three numbers of the IP address** you want to give the RIO700 (example: 192.168.151.112).of the IP address. Press key 2 <2sec te change the number. Set the numbers using key 1 and key 2. Key 1 for is changing the number (1-9), key 2 is for changing the position of the cursor. Confirm by pressing key 3 >2sec. (options are 0-255).



4. Configuration Menu –Eth– continue

4.3 - - - Eth Ethernet port settings

The following screen will be visible:

Follow the same steps as for Adr 2, Adr 3 and Adr 4 to set the IP address, Subnet address (Sub 1, Sub 2, Sub 3, Sub 4) and Gateway address (gAt 1, gAt 2, gAt 3, gAt 4).

After completing these steps, the following screen will be visible:

In **dHCP** you can **disable or enable** the Dynamic Host Configuration Protocol (DHCP). Press key 2 <2sec to disable or enable the protocol. Use key 1 to change the value (1-2). Confirm by pressing key 3 >2sec.

The options are:

1	Disable
2	Enable

The following screen will be visible:

4. Configuration Menu –EbL-

4.4 - - - EbL Ethernet Buslink protocol

In this menu, the Ethernet Buslink protocol can be configured.
The options are:

EbL 1	Buslink address
EbL 2	Buslink subaddress

Press key 2 <2 sec to enter the settings.

The following screen will be visible:

In **EbL1** you set the **Buslink address** of the RIO700. Press key 2 <2 sec. to enter EbL 1. Use key 1 to set the address (1-8). Confirm by pressing key 3 >2sec.

The following screen will be visible:

4. Configuration Menu –EbL– continue

4.4 - - - EbL Ethernet Buslink protocol

In **EbL2** you set the **Buslink subaddress** of the RIO700. Press key 2 <2 sec. to enter EbL 2. Use key 1 to set the address (1-8). Confirm by pressing key 3 >2sec.

The following screen will be visible:

4. Configuration Menu –out-

4.5 - - - out Output Control

In this menu, the Output control settings can be set for the output when using the Buslink protocol.
Options are:

Out 1	Address
Out 2	Subaddress
Out 3	I/O start

Press key 2 <2 sec to enter the output control settings.

The following screen is visible:

In **out 1** you set the **Buslink address** of the device to communicate with. Press key 2 <2 sec. to enter out 1. Use key 1 to set the address (1-8). Confirm by pressing key 3 >2sec.

The following screen will be visible:

4. Configuration Menu –out– continue

4.5 - - - out Output Control

In **out 2** you set the **Buslink subaddress** of the device to communicate with. Press key 2 <2sec. to enter out 2. Use key 1 to set the address (1-8). Confirm by pressing key 3 >2sec.

The following screen is visible:

In **out 3** you set the markers of the Flex that will control the outputs of the RIO. The markers are grouped by 8 and have fixed locations. Up to 5 RIO's can be setup for 1 Flex.
The markers are fixed. When, for example, entering start address 405 marker 401 - 408 will still be used.

Start address:

401	Marker 401 - 408
409	Marker 409 - 416
417	Marker 417 - 424
425	Marker 425 - 432
433	Marker 433 - 440

4. Configuration Menu –out– continue

4.5 - - - out Output Control

Press key 2 <2 sec. to enter out 3. Set the numbers using key 1 and key 2. Key 1 for is changing the number (1-9), key 2 is for changing the position of the cursor. Confirm by pressing key 3 >2sec. (options are 401-440).

The following screen will be visible:

In case the start address is valid and the connection fails, the following screen will be visible to indicate a connection error.

When this error occurs, check the connection and the Buslink and output settings.

4. Configuration Menu –rcL-

4.6 - - - rcL Recall

In **Recall**, you can reset all parameters back to factory settings.

Press key 2 <2sec to enter **Recall**.

The following screen is visible:

To set all parameters back to factory settings Press key 3 >2sec.

The following screen is visible:

To reset the file system back to standard factory settings, press key 1 >2sec.

The following screen is visible:

Confirm by pressing key 3 >2 sec.

The RIO700 will reboot after the file system is reset.

4. Configuration Menu –SoF-

4.7 - - - SoF Firmware update

In **SoF**, you can set the RIO700 in boot mode for a software update.

Press key 2 <2sec to enter boot mode.

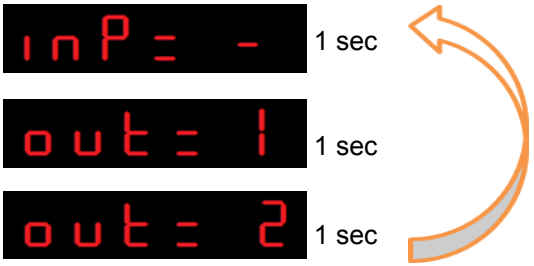
The following screen is visible:

Press key 3 >2sec to set the RIO700 in boot mode.

5. Display Notification

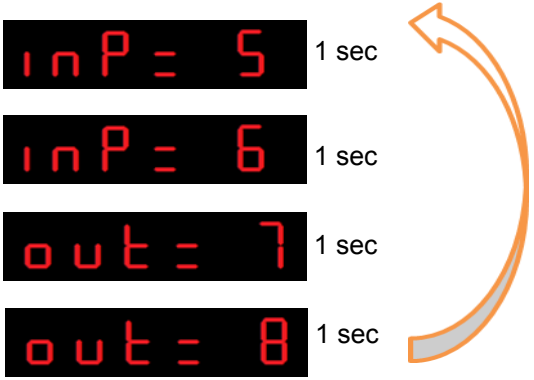
When acitve, the RIO700 constantly shows the status of its inputs and outputs. Every active input or output is showns for about a second in the display. In case no input or output is active, a '-' is shown.

Example 1:
No inputs are active. Output 1 and 2 are active.



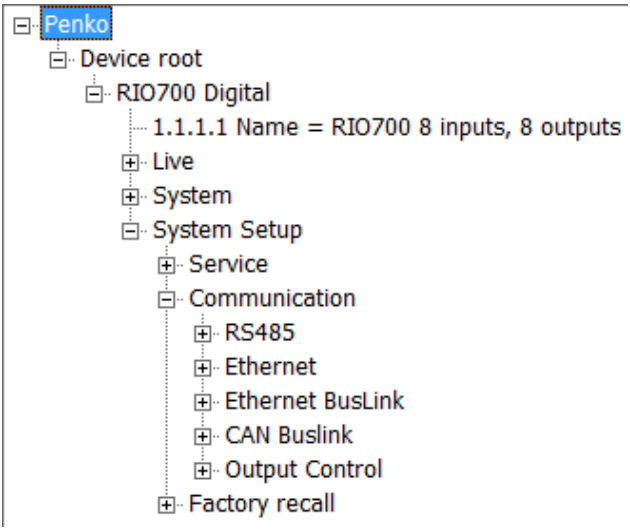
Example 2:

Input 5 and 6 are active. Output 7 and 8 are active.



6. Configure RIO700 with Pi Mach II Manage

All setting that can be made on the device can also be configured with Pi Mach II Manage. This program provides a clear overview of all settings and makes it easy to adjust them. See the Pi Mach II manual for how to use Manage.



Class: Penko.Device root.RIO700 Digital.System Setup.Communication.CAN Buslink
Path: 1.1.1.3.2.5

Protocol	Buslink
Buslink Address	1
Buslink Subaddress	1
Baudrate	250k

7. Firmware update

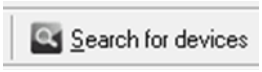
7.1 Ethernet

Connect the SGM to the computer through Ethernet. Start PI Mach II. Set communication to Ethernet.

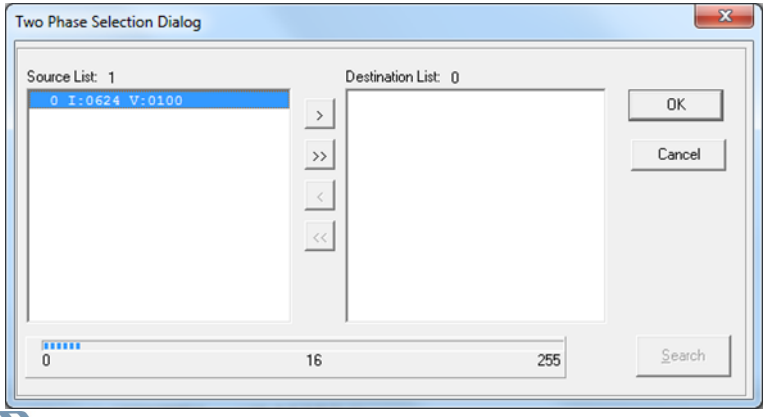
Start the Firmware Update Manager.

Click Open and select the PIP file.

Click Search For Devices and select the device IP address fo the RIO700.



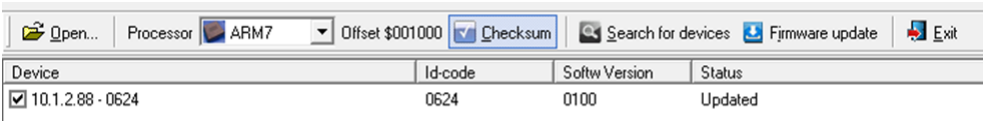
Use double click or the arrow button to put the address in the Destination List and click OK.



7. Firmware update -continue-

Now click Firmware Update to start the update.

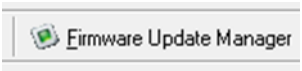
The RIO700 will reboot automatically and the Firmware Update Manager will show Updated.



7.2 USB

Connect the RIO700 to the computer through USB. Start Pi Mach II. Set the communication to USB.

Start the Firmwarer Update Manager.



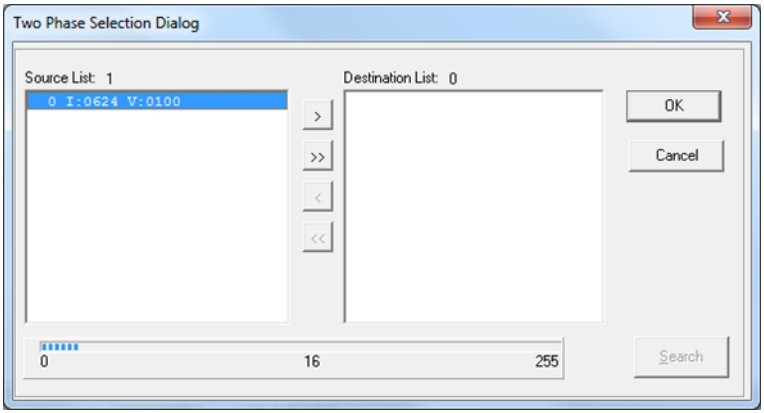
Click Open and select the PIP file.

Click Search For Devices and select the device with source “0”.

7. Firmware update -continue-

7.2 USB

Use double click or the arrow button to put the address in the Destination List and click OK.



Now set the RIO700 in Update mode:

Go into the configuration menu by pressing key 3 >2 sec.

Go to**- - - SoF** by pressing key 1 <2 sec untll you see **- - - SoF**

Press key 2 <2 sec to enter Boot mode.

The following screen is visible:

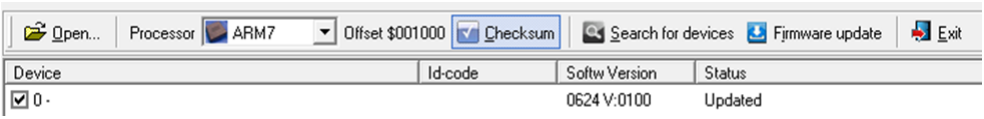
7. Firmware update -continue-

7.2 USB

Press key 3 >2sec to get the RIO700 in Boot mode.

Now click Firmware Update to start the update.

The RIO700 will reboot automatically and the Firmware Update Manager will show Updated.



8. Back up and Restore

With the RIO700 it's possible to make a back up of the software as it's installed in the device. The software will be saved as an FDI file which stands for Flex Data Image. The Backup data assures that when the device fails, a replacement device can be programmed as a copy of the original device. In case of multiple devices which have to be configured similarly, one device can be programmed, and a backup of this device can be used to program the other device.

8.1 Back up

To back up the device, open Pi Mach II. Go to MENU → ENVIRONMENT → BACKUP DEVICE.

A save dialog is shown. Choose a destination and filename, and click SAVE. The image will be created and saved to this destination.

8.2 Restore

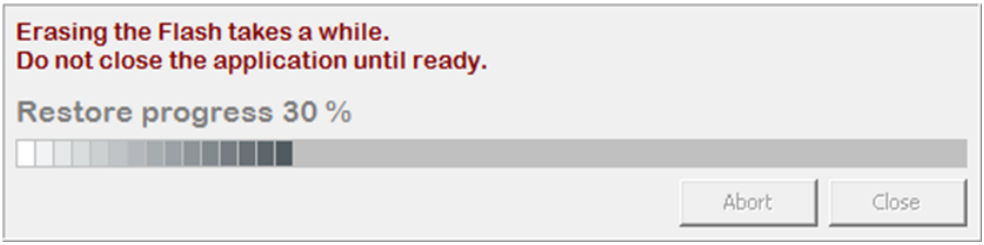
To restore the device, open Pi Mach II. Go to MENU → ENVIRONMENT → RESTORE DEVICE.

An open dialog is shown. Select the backup file, and click OPEN. The image will be programmed into the device, and the device will restart.

8. Backup and Restore -continue

8.3 Progress

The progress of reading and writing is shown in a progress bar. The action can fail by a loss in communication between the PC and the controller. In that case the progress bar will be stuck somewhere between 0 and 100 %. In this case, check the communication and retry.



9. Standard Factory Settings

Description	Display	Value	Your setting
Local bus communication	485 1	1	
CAN Buslink	CbL 1	2	
	CbL2	1	
	CbL3	1	
	CbL4	250k	
Ethernet	Adr 1	010	
	Adr 2	001	
	Adr 3	002	
	Adr 4	004	
	Sub 1	255	
	Sub 2	255	
	Sub 3	255	
	Sub 4	0	
	gAT 1	0	
	gAT 2	0	
	gAT 3	0	
	gAT 4	0	
DHCP	dHCP 1	disable	
Ethernet Buslink	EbL 1	0	
	EbL 2	0	
Output control	Out 1	0	
	Out 2	0	
	Out 3	0	

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Appendix I

Communication exampels

Connect a PENKO FLEX and a PENKO RIO700 to an Ethernet network using the following settings:

IP address	10.1.2.4	10.1.2.5
Subnet Mask	255.255.255.0	255.255.255.0
Buslink address	1	1
Buslink subaddress	1	2
Output control address	1	
Output control subaddress	2	
Output control I/O start	401	

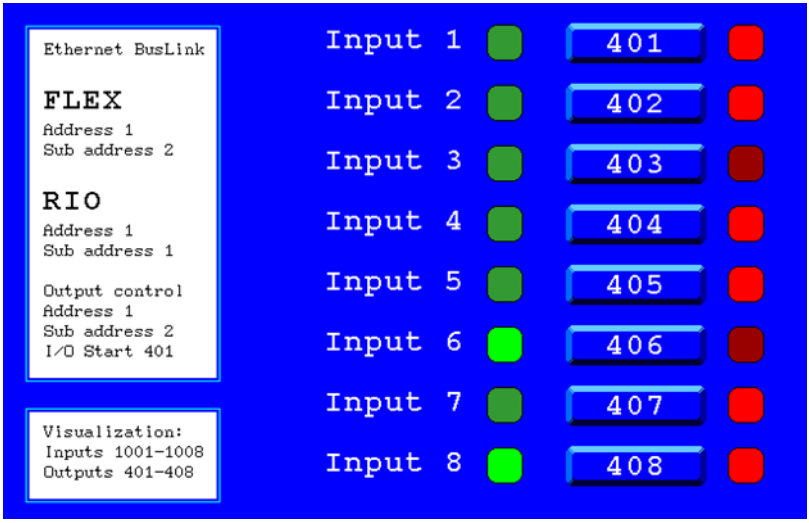
The RIO700 has Buslink address 1-1, so its inputs are available in the FLEX under number 1001-1008.

The RIO700 is setup to start listen fro marker 401, so its outputs will respond to the status of marker 401-408.

Following FLEX visualization demo[1)] monitors the 8 inputs and controls the 8 outputs.

Appendix I

Communication exampels



1. FLEX visualization screen for demonstration purpose only—not avialable as standard FLEX screen.

When connecting using CAN bus, make sure the baudrate settings are the same on both devices. The display will show the connection error message if the settings are not the same.

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Appendix II

Mapping RIO700-FLEX

Buslink settings RIO700		FLEX inputs							
Address	Subaddress	1	2	3	4	5	6	7	8
1	1	1001	1002	1003	1004	1005	1006	1007	1008
1	2	1041	1042	1043	1044	1045	1046	1047	1048
1	3	1081	1082	1083	1084	1085	1086	1087	1088
1	4	1121	1122	1123	1124	1125	1126	1127	1128
1	5	1161	1162	1163	1164	1165	1166	1167	1168
2	1	2001	2002	2003	2004	2005	2006	2007	2008
2	2	2041	2042	2043	2044	2045	2046	2047	2048
2	3	2081	2082	2083	2084	2085	2086	2087	2088
2	4	2121	2122	2123	2124	2125	2126	2127	2128
2	5	2161	2162	2163	2164	2165	2166	2167	2168
3	1	3001	3002	3003	3004	3005	3006	3007	3008
3	2	3041	3042	3043	3044	3045	3046	3047	3048
3	3	3081	3082	3083	3084	3085	3086	3087	3088
3	4	3121	3122	3123	3124	3125	3126	3127	3128
3	5	3161	3162	3163	3164	3165	3166	3167	3168
4	1	4001	4002	4003	4004	4005	4006	4007	4008
4	2	4041	4042	4043	4044	4045	4046	4047	4048
4	3	4081	4082	4083	4084	4085	4086	4087	4088
4	4	4121	4122	4123	4124	4125	4126	4127	4128
4	5	4161	4162	4163	4164	4165	4166	4167	4168

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Appendix II

Mapping RIO700-FLEX

Buslink settings RIO700		FLEX inputs							
Address	Subaddress	1	2	3	4	5	6	7	8
5	1	5001	5002	5003	5004	5005	5006	5007	5008
5	2	5041	5042	5043	5044	5045	5046	5047	5048
5	3	5081	5082	5083	5084	5085	5086	5087	5088
5	4	5121	5122	5123	5124	5125	5126	5127	5128
5	5	5161	5162	5163	5164	5165	5166	5167	5168
6	1	6001	6002	6003	6004	6005	6006	6007	6008
6	2	6041	6042	6043	6044	6045	6046	6047	6048
6	3	6081	6082	6083	6084	6085	6086	6087	6088
6	4	6121	6122	6123	6124	6125	6126	6127	6128
6	5	6161	6162	6163	6164	6165	6166	6167	6168
7	1	7001	7002	7003	7004	7005	7006	7007	7008
7	2	7041	7042	7043	7044	7045	7046	7047	7048
7	3	7081	7082	7083	7084	7085	7086	7087	7088
7	4	7121	7122	7123	7124	7125	7126	7127	7128
7	5	7161	7162	7163	7164	7165	7166	7167	7168
8	1	8001	8002	8003	8004	8005	8006	8007	8008
8	2	8041	8042	8043	8044	8045	8046	8047	8048
8	3	8081	8082	8083	8084	8085	8086	8087	8088
8	4	8121	8122	8123	8124	8125	8126	8127	8128
8	5	8161	8162	8163	8164	8165	8166	8167	8168

RIO700 Remote I/O

Our design expertise includes systems for manufacturing plants, bulk weighing, check weighing, force measuring and process control. For over 35 years, PENKO Engineering has been at the forefront of high-accuracy, high-speed weighing systems and our solutions continue to help cut costs and drive profits for some of the largest global brands, like Cargill, Sara Lee, Heinz, Kraft Foods and Unilever.

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