

PENKO Engineering B.V.

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How to...

Connect a 1020 to a PC or PLC using
RS232 and the ASCII protocol



an ETC Company

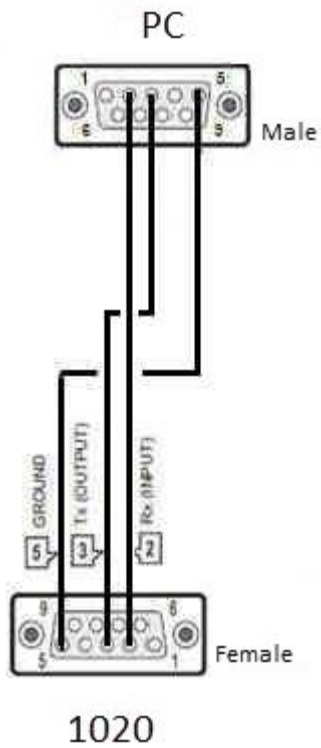
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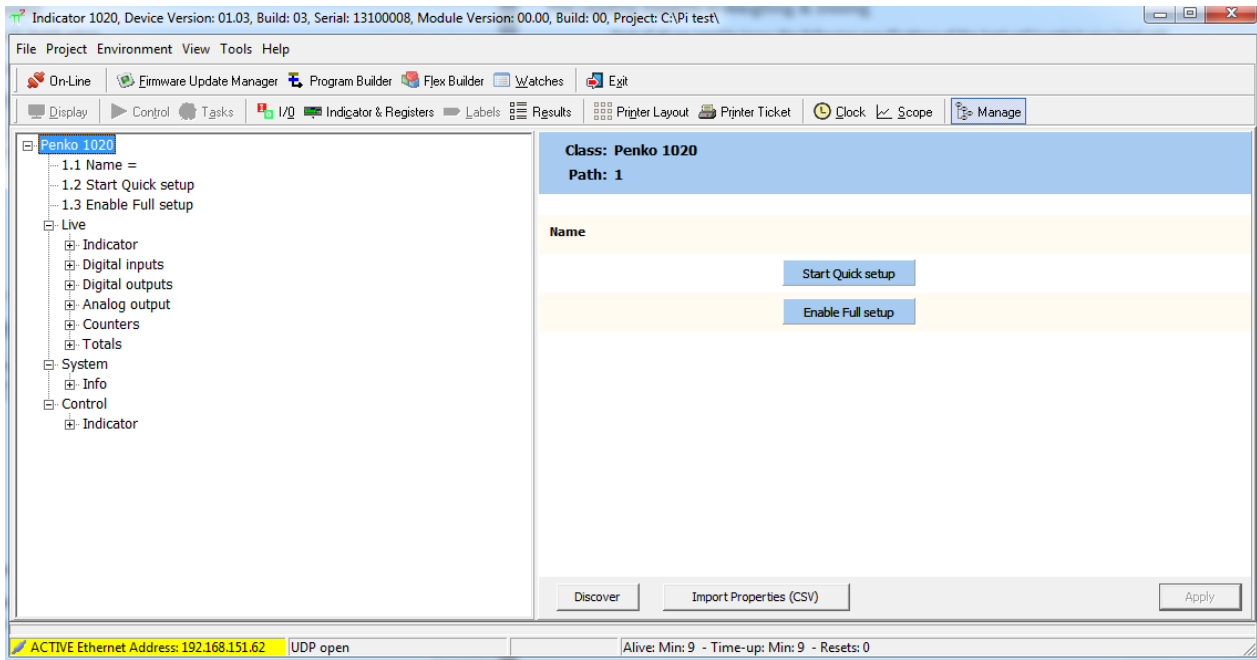
Connect a 1020 to a PC or PLC using RS232 and the ASCII protocol

Connect the 1020's to the PC using a straight RS232 cable.

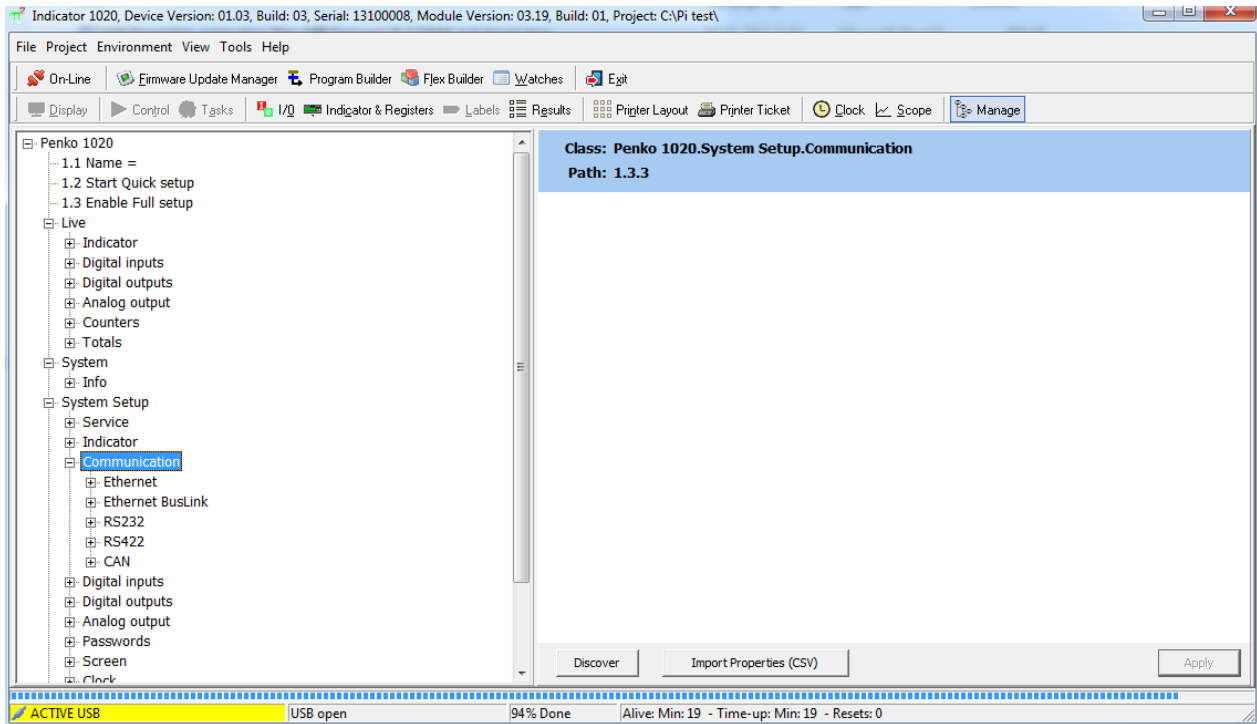


Setting up the 1020 with PI Mach II

Connect the 1020 via a USB-cable to the PC. Open Pi Mach II and click on **Start Quick setup**.



Double click on **Communication**.

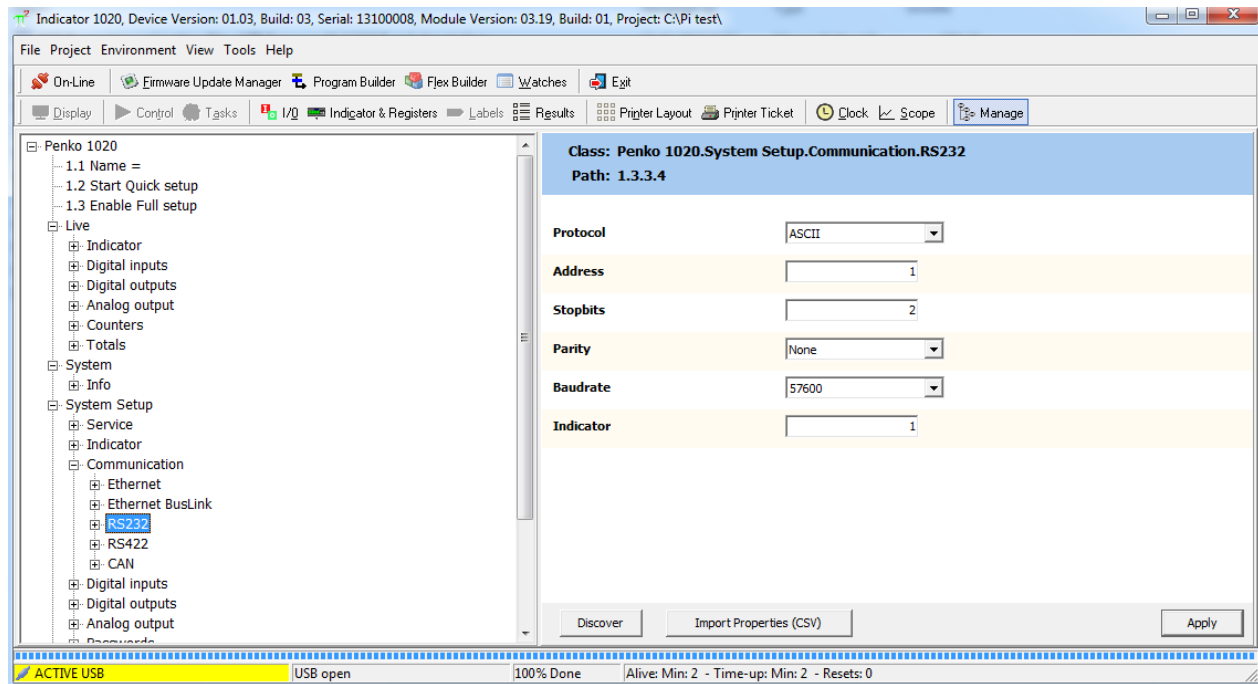


PENKO How to...

Connect a 1020 to a PC or PLC using RS232 and the ASCII protocol

Double click on **RS232**.

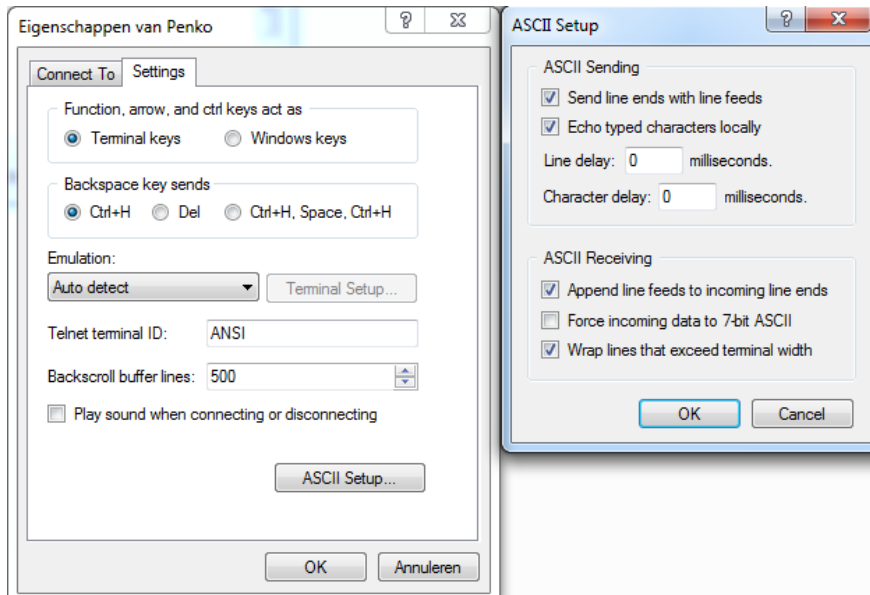
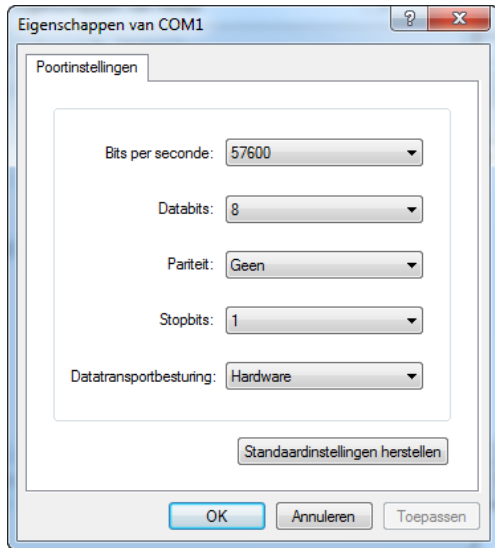
Set the parameters as below and click on **Apply** in the bottom right corner. The 1020 is set up correctly.



How to use the ASCII commands

In the example below we use HyperTerminal to get the Gross weight of Indicator 1. The weight of indicator 1 is 3.466kg.

HyperTerminal port setting:



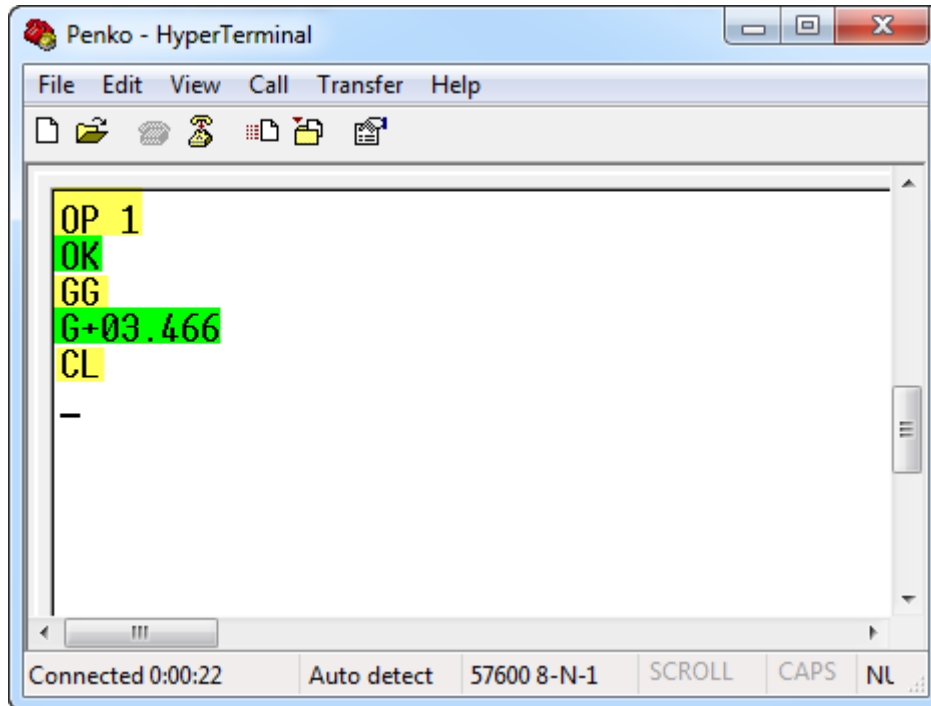
Send **OP 1** press “**enter**” (this will Open Port 1)

You will get an answer back (this will be **OK** if everything went OK or an **Err** if it didn't work.

Send **GG** press “**enter**”(this will ask the Gross Weight of indicator 1)

You will get an answer back G+03.466 (the answer you will receive always consists of 5 numbers and the

Send **CL** press “**enter**” (this will close the last used port.)



Supported ASCII commands

The following commands are available in the ASCII protocol.

Open/Close connection

Use these commands to open or close a connection.

Device address > 0 and < 255

Request	Reply	Description
OP _[space] 1<CR>	OK<CR>	Open connection to device with address = 1
OP<CR>	O:001<CR>	Check open connection
CL<CR>		Close connection, no reply
OP<CR>		Check open connection, no reply so no connection

Device address 0

Always open mode

Open or close connection is not possible. The connection is always open.

Request	Reply	Description
OP<CR>	O:000<CR>	Check open connection, connection is always open if device address is 0
CL<CR>		Close connection not possible, is always open, no reply

Device address 255

Auto transmit mode

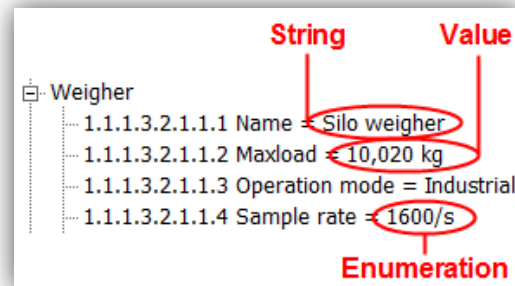
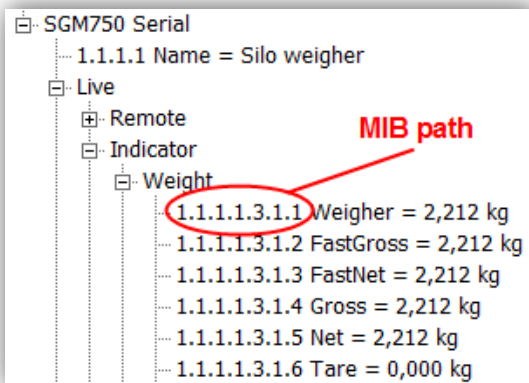
Open or close connection is not possible. The connection is always open.

The instrument will send the selected indicator value continuously.

Request	Reply	Description
OP<CR>		Open connection not possible, connection is always open if device address is 255
CL<CR>		Close connection not possible, is always open, auto reply

MIB commands

When a device is equipped with MIB, all properties can be reached with the MIB ASCII commands. The MIB paths can be found in Manage in PI Mach II. Properties can hold a value, a string or an enumeration.



Request	Reply	Description
MIB available?		
GM<CR>	OK<CR>/ERR<CR>	Check if MIB interface is available
Values		
GM1.1.1.1.3.1.1<CR>	M1.1.1.1.3.1.1: 2.212kg<CR>	Get MIB property Weigher
GM1.1.1.3.2.1.1.2<CR>	M1.1.1.3.2.1.1.2: 10.020kg	Get MIB property Maxload
GM1.1.1.3.2.1.1.2=10050<CR>	OK<CR>/ERR<CR>	Set MIB property Maxload
Strings		
GM1.1.1.3.2.1.1.1<CR>	M1.1.1.3.2.1.1.1:Silo weigher<CR>	Get MIB property Name
GM1.1.1.3.2.1.1.1=Silo 2<CR>	OK<CR>/ERR<CR>	Set MIB property Name
Enumerations		
GM1.1.1.3.2.1.1.4<CR>	M1.1.1.3.2.1.1.4:8<CR>	Get MIB property Sample rate
GM1.1.1.3.2.1.1.4=6<CR>	OK<CR>/ERR<CR>	Set MIB property Sample rate
<i>(Enumerations always start at 0. Sample rate for example has 9 options. The options correspond with values 0 - 8)</i>		
Auto repeat		
SM1.1.1.1.3.1.1<CR>	M1.1.1.1.3.1.1: 2.212kg<CR>	Set auto repeat read MIB property

Interpreter commands

The interpreter commands are available on the FLEX series, 1020 series and SGM700 series.

Request	Reply	Description
Interpreter Extended Register		
IX<CR>	X000900<CR>	Get number of registers
IX _[space] 5: _[space] 1234<CR>	OK<CR>/ERR<CR>	Set register 5
IX _[space] 5<CR>	X001234<CR>	Get register 5
Recipe parameters		
IR<CR>	R000014<CR>	Get number of recipes
IR _[space] 3: _[space/sign] 1234<CR>	OK<CR>/ ERR<CR>	Set recipe value 3 [*1]
IR _[space] 3<CR>	R001234<CR>	Get recipe value 3 [*1]
Indicators		
II<CR>	I000030<CR>	Get number of indicators
II _[space] 18: _[space/sign] 1234<CR>	OK<CR>/ ERR<CR>	Set indicator 18
II _[space] 18<CR>	I+01234<CR>	Get indicator 18
II _[space] 19<CR>	I-- --<CR>	Get indicator 19 (=not available)
Inputs, Outputs and Marker		
IM<CR>	IM001000<CR>	Get number of I/O/M
IM _[space] 401: _[space] 1<CR>	OK<CR>/ ERR<CR>	Set marker 401
IM _[space] 401<CR>	IM 00100000<CR>	Get markers 401..408
IM _[space] 409: _[space] 0<CR>	OK<CR>/ ERR<CR>	Reset marker 409
Query and Mark result		
I=<CR>	=+00029+001000121< CR>	Query result value <i>Result index: +00029</i> <i>Result value: +00100</i> <i>Result tag: 01 (hex format)</i> <i>Checksum: 21(hex format)</i>
I= _[space] 29<CR>	OK<CR>/ ERR<CR>	Mark result value (=delete)

***1 - Not supported on 1020 series and SGM700 series**

Calibration commands

The calibration commands are not available on the FLEX series.

Request	Reply	Description
Calibration support		
CE<CR>	E000002<CR>	Get CAL code
CE _[space] 02<CR>	OK<CR>/ERR<CR>	Enter CAL code
CZ<CR>	OK<CR>/ERR<CR>	Set zero value
CG _[space] 0500<CR> (value)	OK<CR>/ERR<CR>	Set gain value
CS<CR>	OK<CR>/ERR<CR>	Save calibration
CM<CR>	M+10009<CR>	Get max load
CM _[space] 10009<CR> (value)	OK<CR>/ERR<CR>	Set max load

When using the ASCII protocol for calibration, follow these steps.

- Empty the weigher
- Enter CE<CR> to get the CAL code // Reply for example E000003
- Enter CE 3<CR>
- Enter CZ<CR> to set the zero point
- Load the weigher // For example 500kg
- Enter CE<CR> to get the CAL code // Reply for example E000004
- Enter CE 4<CR>
- Enter CG 500<CR> to set the gain point
- Enter CS<CR> to save the calibration

Configuration commands

The configuration commands are not available on the FLEX series.

Request	Reply	Description
s/w damping factor		
FL<CR>	F000005<CR>	Get s/w damping factor (overall filter)
FL _[space] 5<CR>	OK<CR>/ERR<CR>	Set s/w damping factor (overall filter)
Virtual display support		
DR<CR>	R000004<CR>	Get display refresh rate
DR _[space] 4<CR>	OK<CR>/ERR<CR>	Set display refresh rate
DS<CR>	S000006<CR>	Get weigher format step size
DS _[space] 6<CR>	OK<CR>/ERR<CR>	Set weigher format step size
DP<CR>	D000003<CR>	Get weigher format decimal point position
DP _[space] 3<CR>	OK<CR>/ERR<CR>	Set weigher format decimal point position
Display filter support		
DD<CR>	D000006<CR>	Get display filter damping
DD _[space] 6<CR>	OK<CR>/ERR<CR>	Set display filter damping
DZ<CR>	Z+00.050<CR>	Get display zero suppress
DZ _[space] 00050<CR>	OK<CR>/ERR<CR>	Set display zero suppress
DA<CR>	A+00.060<CR>	Get display filter range
DA _[space] 00060<CR>	OK<CR>/ERR<CR>	Set display filter range
Zero-tracking support		
TR<CR>	R+00.020<CR>	Get zero tracking range
TR _[space] 00020<CR>	OK<CR>/ERR<CR>	Set zero tracking range
TS<CR>	S+00.020<CR>	Get zero tracking step
TS _[space] 00020<CR>	OK<CR>/ERR<CR>	Set zero tracking step
TT<CR>	T000020<CR>	Get zero tracking time
TT _[space] 000020<CR>	OK<CR>/ERR<CR>	Set zero tracking time
No-motion/stable support		
NR<CR>	R+00.002<CR>	Get stable range
NR _[space] 00002<CR>	OK<CR>/ERR<CR>	Set stable range
NT<CR>	T000100<CR>	Get stable time
NT _[space] 000100<CR>	OK<CR>/ERR<CR>	Set stable time

Weighing commands

The weighing commands are available on the FLEX series, 1020 series and SGM700 series.

Request	Reply	Description
Current display value		
SD<CR>	+02.212<CR>/ERR<CR>	Set auto-transmit Display value
GD<CR>	+02.212<CR>/ERR<CR>	Get Display value
Set/reset system zero		
SZ<CR>	OK<CR>/ERR<CR>	Set Zero
RZ<CR>	OK<CR>/ERR<CR>	Reset Zero
Set/reset tare		
ST<CR>	OK<CR>/ERR<CR>	Set Tare
RT<CR>	OK<CR>/ERR<CR>	Reset Tare
Reset peak/valley		
RP<CR>	OK<CR>/ERR<CR>	Reset Peak
RV<CR>	OK<CR>/ERR<CR>	Reset Valley
Get various channels		
GN<CR>	N+00.456<CR>	Get net
GG<CR>	G+00.694<CR>	Get gross
GT<CR>	T+00.238<CR>	Get tare
GP<CR>	P+03.074<CR>	Get peak
GV<CR>	V+00.082<CR>	Get valley
GF<CR>	F+00.456<CR>	Get fast net (no display damping)
GS<CR>	S000.985<CR>	Get A/D sample
GX<CR>	X+0.0456<CR>	Get extended net (net x 10)
Long string commands		
GW<CR>	W+00456+006944CD9<CR>	Get fast net+gross, status & checksum
LW<CR>	W+00456+006944CD9<CR>	Get long net+gross, status & checksum
LN<CR>	N+00456+004564CE6<CR>	Get net+fast net , status & checksum
LF<CR>	F+00456+006944CEA<CR>	Get long fast net+gross, status & checksum
LX<CR>	X+04556+069364CCE<CR>	Get long extended net (net x 10) + extended gross (gross x 10), status & checksum
Auto-transmit mode support		
SN<CR>	N+00.456<CR>	Set auto-transmit net
SG<CR>	G+00.694<CR>	Set auto-transmit gross
SW<CR>	W+00456+006944CD9<CR>	Set auto-transmit long weight
SP<CR>	P+03.074<CR>	Set auto-transmit peak
SV<CR>	V-00.082<CR>	Set auto-transmit valley
SF<CR>	F+00.456<CR>	Set auto-transmit fast net
SX<CR>	X+0.0456<CR>	Set auto-transmit extended net (net x 10)
Weigher preset tare support		
PT<CR>	P+00.231<CR>	Get preset tare value
PT _[space] 00231<CR>	OK<CR>/ERR<CR>	Set preset tare value
PS<CR>	OK<CR>/ERR<CR>	Set preset tare on
Stub function to fool SAIASSI		
AG<CR>	OK<CR>/ERR<CR>	Stub function to fool SAIASSI
Info		
IV<CR>	V:0101<CR>	Get version number
IS<CR>	S:001000<CR>	Get system status
ID<CR>	D:0624<CR>	Get device ID code

Status and checksum

The long string commands return 2 weigher values, status and checksum. The status and checksum are represented in a hexadecimal format.

For example, the command `GW<CR>` returns `W+00324+003244CE9<CR>` where "4C" represents the status bits and "E9" represents the checksum. Status bits:

Bit #	Called	Definition
0	Hardware overload	Hardware overload/underload detected on load cell
1	Maximum load	Overload detected on load cell
2	Stable weight	Weigher signal is stable
3	Stable range	Weigher signal is in stable range
4	Zero set	Weigher zero is corrected
5	Zero center	Weigher in center of zero range
6	Zero range	Weigher is in zero range, zero is possible
7	Zero track range	Weigher signal is in zero tracking range, zero tracking is possible

"4C" from the example is binary 0100 1100, so stable weight, stable range and zero range are active.

The checksum is the inverted sum of all ASCII characters. The return value `W+00324+003244C` from the example:

W + + + 0 + 0 + 3 + 2 + 4 + + + 0 + 0 + 3 + 2 + 4 + 4 + C =

57+2B+30+30+33+32+34+2B+30+30+33+32+34+34+43 = 316 (hex)

Remove the most significant digit = 16 (hex)

Invert the hex value = E9

Convert the hex value E9 to ASCII characters 'E' and '9'

Setup example

MIB setup RS232 address 0, indicator 1

- [-] RS232
 - 1.3.3.4.1 Protocol = ASCII
 - 1.3.3.4.2 Address = 0
 - 1.3.3.4.3 Stopbits = 1
 - 1.3.3.4.4 Parity = None
 - 1.3.3.4.5 Baudrate = 115200
 - 1.3.3.4.6 Indicator = 1

MIB setup RS232 address 255(=auto transmit), indicator 8

- [-] RS232
 - 1.3.3.4.1 Protocol = ASCII
 - 1.3.3.4.2 Address = 255
 - 1.3.3.4.3 Stopbits = 1
 - 1.3.3.4.4 Parity = None
 - 1.3.3.4.5 Baudrate = 115200
 - 1.3.3.4.6 Indicator = 8



About PENKO

Our design expertise include systems for manufacturing plants, bulk weighing, check weighing, force measuring and process control. For over 35 years, PENKO Engineering B.V. has been at the forefront of development and production of high-accuracy, high-speed weighing systems and our solutions continue to help cut costs, increase ROI and drive profits for some of the largest global brands, such as Cargill, Sara Lee, Heinz, Kraft Foods and Unilever to name but a few.

Whether you are looking for a simple stand-alone weighing system or a high-speed weighing and dosing controller for a complex automated production line, PENKO has a comprehensive range of standard solutions you can rely on.

Certifications

PENKO sets high standards for its products and product performance which are tested, certified and approved by independent expert and government organizations to ensure they meet – and even – exceed metrology industry guidelines. A library of testing certificates is available for reference on:

http://penko.com/nl/publications_certificates.html



PENKO Professional Services

PENKO is committed to ensuring every system is installed, tested, programmed, commissioned and operational to client specifications. Our engineers, at our weighing center in Ede, Netherlands, as well as our distributors around the world, strive to solve most weighing-system issues within the same day. On a monthly basis PENKO offers free training classes to anyone interested in exploring modern, high-speed weighing instruments and solutions. A schedule of training sessions is found on: www.penko.com/training

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