# PENKO Engineering B.V.

Your Partner for Fully Engineered Factory Solutions



Manual:

1020 Supplement Check Weigher Controller

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# 1020 Check Weigher

## Table of Contents

# 1020 Check Weigher

## 1  Introduction

This manual is applicable for the following Check Weigher devices:

- 1020 CHK
- 1020 CAN-RS232-RS422 CHK
- 1020 Profibus CHK


To configure and control the Belt Weigher, the following options are available:

Full control:

- PENKO Pi Mach II software
- PENKO PDI Client software
- Modbus protocol
- Profibus protocol
- EtherNet/IP protocol
- ASCII protocol

Basic control:

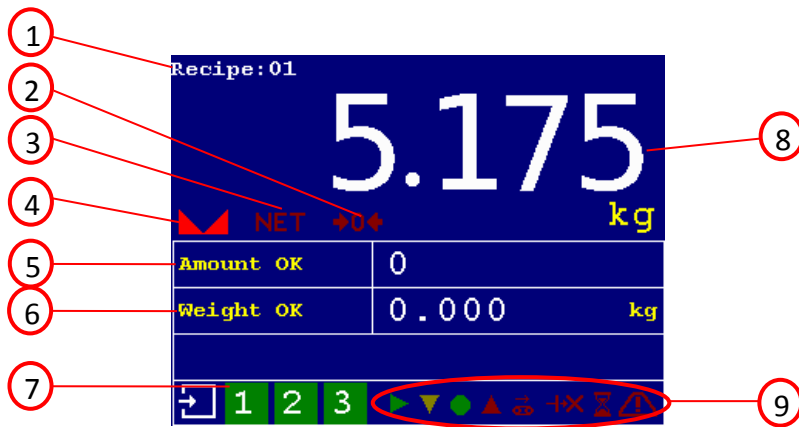- Fins protocol*
- PENKO TP protocol*

*Register functions not available*


Note:

This manual does not describe the basic functionality of the device. Consult the device manual for this.

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## 2   Indication of display



| | | | |
|---|---|---|---|
| **1** | Current selected recipe | **6** | Total correct product weight |
| **2** | Zero active | **7** | Inputs 1, 2, 3 |
| **3** | Tare active | **8** | Value |
| **4** | Weigher stable | **9** | Status Indications |
| **5** | Total correct product amount | | |

***Options for indication 2nd screen***

Use the LEFT or RIGHT key to switch between the four main screens.

The 2nd screen shows the flow as the largest indication.



or

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| | | |
|---|---|---|
| **5a** | Currently selected low level from recipe | **5b** | Currently selected high level from recipe |

**Status Indications:**



| | | | | |
|---|---|---|---|---|
|  | Start | |  | Reject – reject output active |
|  | Low – last checked value was too low | |  | Busy – check weighing in progress |
|  | OK – last checked value was ok | |  | Alarm – alarm output active |
|  | High – last checked value was too high | | | |
|  | Transport – transport belt running | | | |

## 3 Configure and control

To configure and control the Check Weigher, the following options are available:

- PENKO configuration software
- Device
- Industrial protocols

### 3.1 PENKO configuration software

PENKO Pi Mach II and PENKO PDI Client can be downloaded from www.penko.com

USB driver and user manual are included in the download

Pi Mach II supports USB and Ethernet connection. PDI Client is USB only.

Consult the manuals on how to install and connect to the device.

In the tree structure of the device, the configuration parameters are found at:

**PENKO - PENKO 1020 - System Setup - Configuration**

*Configuration parameters*



The parameters are explained in chapters 4

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In the tree structure of the device, the recipe parameters are found at:

**PENKO - PENKO 1020 - Recipe**

### *Recipe parameters*



The parameters are explained in chapters 4

## 3.2 Device

*Configuration*

Select **System Setup** from the **Main Menu** and press **Enter**.
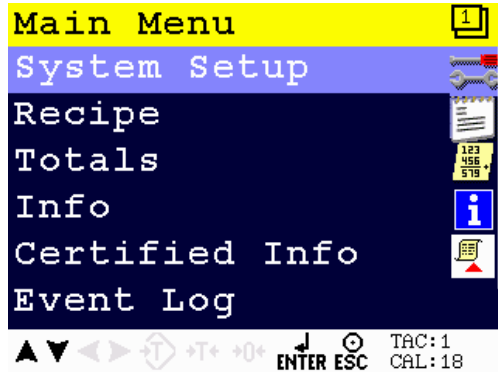


Select **Configuration** from the **System Setup Menu** and press **Enter**.
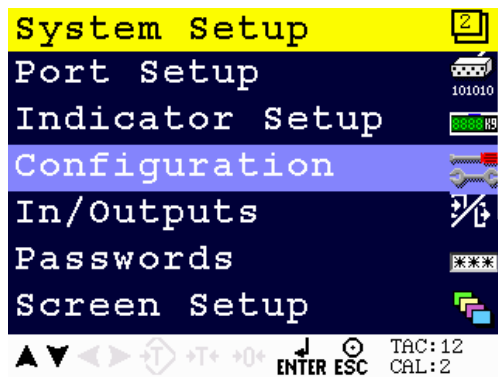


The following error is visible if no configuration is present.
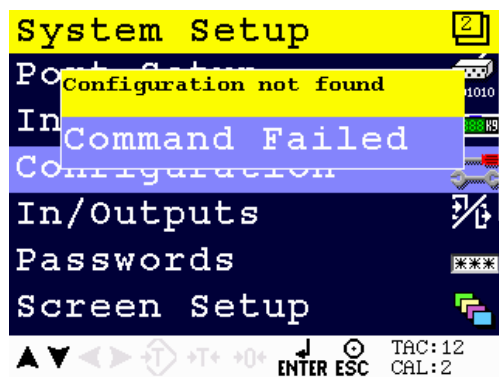
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Press **Enter** to start with default values.
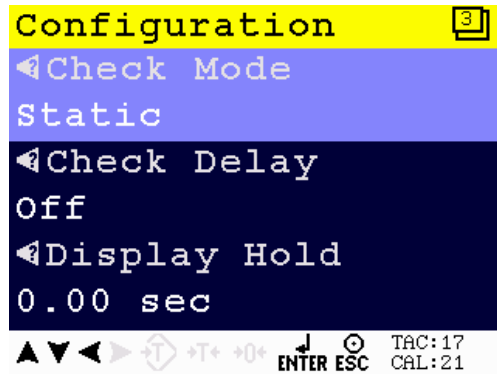


When pushing the LEFT key, the help text of the parameter is shown.

Below the example of a help text for the parameter Check Mode.
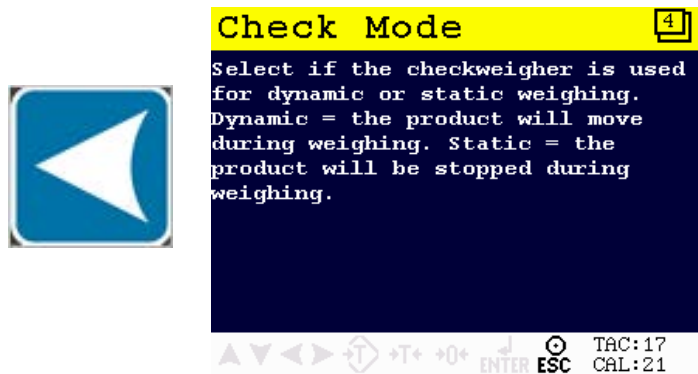


The parameters are explained in chapters 4

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*Recipe*

Select **Recipe** from the **Main Menu** and press **Enter**.
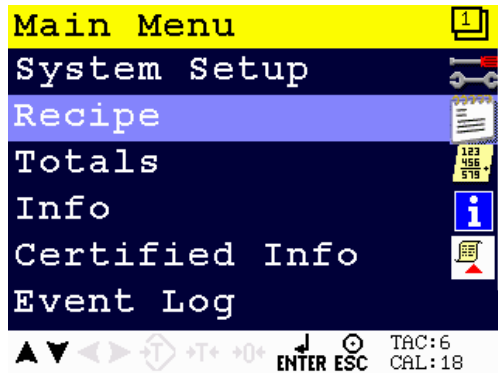


Select **Recipe** and press **Enter**.
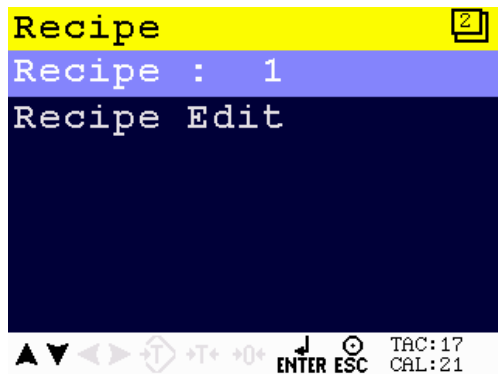


Enter the recipe that you want to edit and press **Enter**.



A maximum of 10 recipes can be stored.

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If the selected recipe does not exist, the following error is visible:

```
Recipe                    [2]
Re  Recipe not found
Re  Error 10

▲ ▼ ◄ ► ⊤ →T← →0←  ↵  ⊙   TAC:12
              ENTER ESC  CAL:2
```

To edit current selected recipe parameters, select **Recipe Edit** and press **Enter**.

```
Recipe                    [2]
Recipe :   1
Recipe Edit

▲ ▼ ◄ ► ⊤ →T← →0←  ↵  ⊙   TAC:12
              ENTER ESC  CAL:2
```

**ENTER**
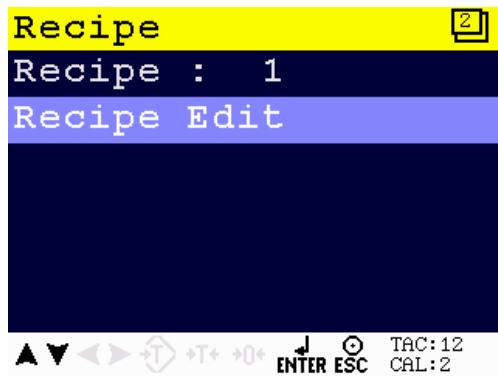
The following screen is visible:

```
Recipe                    [3]
◄Low Level
5.000 kg
◄High Level
2.000 kg
◄Preset Tare
0.000 kg
▲ ▼ ◄ ► ⊤ →T← →0←  ↵  ⊙   TAC:17
              ENTER ESC  CAL:21
```
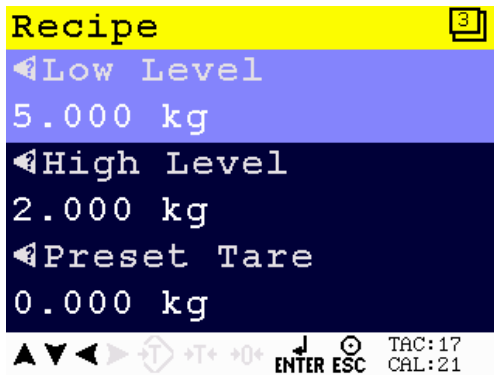
# 1020 Check Weigher

When pushing the LEFT key, the help text of the parameter is accessed.

Below an example of the help text for the parameter Low Level.
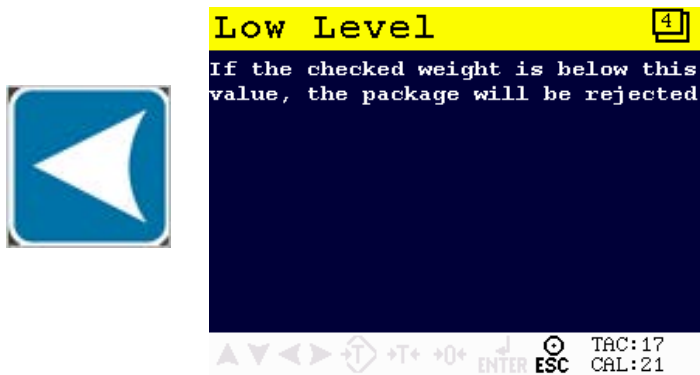


The parameters are explained in [chapters 4](#)

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## 3.3   Industrial protocols

The PENKO protocols Modbus, Profibus, EtherNet/IP and ASCII have a function set called register functions. These functions allow the user to configure and control the device.

Protocol descriptions can be downloaded from www.penko.com

Consult these on how to connect the device and use the register functions.

|  | 1020 | 1020 CAN-RS232/422 | 1020 Profibus |
|---|:---:|:---:|:---:|
| **Modbus TCP** | ✓ | ✓ | ✓ |
| **Modbus SERIAL** |  | ✓ |  |
| **Profibus** |  |  | ✓ |
| **EtherNet/IP** | ✓ | ✓ | ✓ |
| **ASCII TCP** | ✓ | ✓ | ✓ |
| **ASCII SERIAL** |  | ✓ |  |

*Note: the FINS and PENKO TP protocol do not support register functions, only basic read and write operations for markers and registers.*

The parameters are explained in chapters 4

## 4   Parameters

These parameters correspond with the parameters in the tree structure of the device Recipe. When using the industrial protocol register functions, each parameter can be reached using its number.

Some parameters can be reached directly using ASCII, TP protocol, Modbus RTU, Modbus TCP, Fins, Profibus or EtherNet/IP. The parameters for Profibus or EtherNet/IP are prefixed with **PB** or **EIP**.

*Note: when the device is rebooted or the recipe is manually changed, all recipe parameters are changed back to the value that were last set manually in the recipe.*

### 4.1   Configuration parameters

| No. | Name | Description |
|---|---|---|
| 1 | Check mode | Select if the check weigher is used for dynamic or static weighing.<br><br>• Dynamic => the product will move during weighing (belt is running).<br>• Static => the product will be stopped during weighing (belt is stopped when check input is high and restarted when check is done). |
| 2 | Stability | Select the type of check delay. In static check mode the belt will stop during the check delay.<br><br>• Off => check starts directly<br>• Stable => check starts after Stable<br>• H-Time => check starts after H-time<br>• H-Time+Stable => check starts after H-time and then Stable<br>• H-Time/Stable => check starts after H-time or Stable<br>• Stable+H-Time => check starts after Stable and then H-Time |
| 3 | H-Time | Time to wait for stable weight measurement.<br><br>Δ *Not used if Stability parameter is set to Off or Stable* |
| 4 | Display hold | The time to freeze the checked value on the display after the check is done. When a check starts before the display hold time is elapsed, the hold time will be cut off. |

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| | | |
|---|---|---|
| | | Δ *Not used if Stability parameter is set to Off or Stable* |
| **5** | Rejector mode | Select when the packages should be rejected. <br><br> • Time => reject after a set time (settings are in recipe) <br> • Photocell => reject when passing the photocell (input 3) |
| **6** | Fixed speed | Select if the belt speed is fixed or variable. <br><br> • No => belt speed is variable between set minimum and maximum speed and is controlled by the analog output <br> • Yes => belt speed is fixed (setting is in recipe) |
| **7** | Min. speed | Enter the minimum variable belt speed. |
| **8** | Max. speed | Enter the maximum variable belt speed. |
| **9** | Recipe | Select the used recipe. <br><br> • Local => use the recipe selected on the device <br> • Remote => use the recipe from a remote device (e.g. PLC) |
| **10** | Online ticket | Select if a printer ticket must be printed for each checked product. |
| **11** | Use alibi memory | Select if a result must be written to the internal alibi memory. |

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## 4.2 Recipe parameters

These parameters correspond with the parameters in the tree structure of the device Recipe. When using the industrial protocol register functions, each parameter can be reached using its number.

Some parameters can be reached directly using ASCII, TP protocol, Modbus RTU, Modbus TCP, Fins, Profibus or EtherNet/IP. The parameters for Profibus or EtherNet/IP are prefixed with **PB** or **EIP**.

*Note: when the device is rebooted or the recipe is manually changed, all recipe parameters are changed back to the value that were last set manually in the recipe.*

| No. | Name | Description | Location |
|-----|------|-------------|----------|
| 1 | Low level | If the checked value is below this value, the package will be rejected. | PB-R85 EIP-R11 |
| 2 | High level | If the checked value is above this value, the package will be rejected. | PB-R86 EIP-R2 |
| 3 | Preset tare | The preset tare will be subtracted from the checked value. | PB-R87 EIP-R13 |
| 4 | Sample time | Duration of the package weight measurement. | PB-R88 EIP-R14 |
| 5 | Correction | Correction factor to correct the fault caused by the dynamic characteristics of the machine. Correction can be set from 0% to 200%. 100% means no correction is used. | |
| 6 | Check delay | Enter the time between detecting a product and start checking or stopping the belt. | |
| 7 | Belt speed | The speed of the transport belt in % | |
| 8 | Rejector delay | Delay time to activate the rejector after detecting a faulty package. | |
| 9 | Reject hold | Time to hold the rejector output active for a certain time after activating. | |
| 10 | Batch code | Enter a Batch code for printing reports. | |

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## 4.3 Live process parameters

When using the industrial protocol register functions, each parameter can be read using its number.

*Example: to read the value of low level, Use the function code 701 and value 1.*

| No. | Name | Description | Marker |
|-----|------|-------------|--------|
| 1 | Low level | Get the low level value. | M401 |
| 2 | High level | Get the high level value. | M402 |
| 3 | Subtotal std.dev | Get the standard deviation of the subtotal. | M403 |
| 4 | Subtotal average | Get the average value of the subtotal. | M404 |
| 5 | Subtotal (weight) ok | Get the weight of the accepted products of the subtotal. | M405 |
| 6 | Subtotal count ok | Get the number of accepted product of the subtotal. | M406 |
| 7 | Subtotal count low | Get the number of too low product of the subtotal. | M407 |
| 8 | Subtotal count high | Get the number of too high product of the subtotal. | M410 |
| 9 | Subtotal count total | Get the number of all product of the subtotal. | M411 |
| 10 | Total std.dev | Get the standard deviation of the total batch. | M412 |
| 11 | Total average | Get the average value of the total batch. | M414 |
| 12 | total (weight) ok | Get the weight of the accepted products of the total batch. | M415 |
| 13 | Total count ok | Get the number of accepted product of the total batch. | M416 |
| 14 | Total count low | Get the number of too low product of the total batch. | M417 |
| 15 | Total count high | Get the number of too high product of the total batch. | Marker |
| 16 | total count total | Get the number of all product of the total batch. | M401 |
| 17 | Alibi no. | Get the number of the Alibi record. | M402 |

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## 5    Inputs and outputs

The following inputs and outputs are used.

### 5.1    Inputs

| Input | Name | Description | Profibus marker | EtherNet/IP marker |
|---|---|---|---|---|
| 1 | Start/Stop | Input must be high to set the program in run mode. | 969 | 433 |
| 2 | Start Sampling | Input to start sampling the package. | 970 | 434 |
| 3 | Reject Sensor | Input to detect the package on the reject position. Input must be placed diagonal over the belt. | 971 | 435 |

### 5.2    Outputs

| Output | Name | Description |
|---|---|---|
| 1 | Rejector | Output to enable the rejector after the package is detected on the reject position. |
| 2 | Sampling Busy | Output to enable the busy output.<br>Output is high from detecting the package until sampling is done. |
| 3 | Transport Belts | Output to enable the transport belts.<br>In dynamic mode the output is always on if no alarm is generated.<br>In static mode the output is off during sampling and during an indicator alarm. |
| 4 | Alarm | Output to enable the indicator alarm.<br>This output is used to activate the indicator alarm.<br>This alarm can be reset by switching off input 1. |
| Analog out | Belt Speed | Belt Speed will be available from 0.00% to 100.00%. |

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## 6   Printer Ticket

Example of the 1020 Printer recipe when 'Ticket' layout is selected.

```
Programmable header 1

Programmable header 2

Programmable header 3

Programmable header 4

------------------------------------
---

DATE                        07-10-11

TIME                        05:57.13

RECIPE                           001

TICKET NUMBER                    100


CHECKED NET            00000.00 kg

------------------------------------
---

Programmable footer 1

Programmable footer 2
```

## 7　Program basics

This chapter describes a few basics of the Check Weigher program which can be used when starting the program for the first time.

### 7.1　Static check mode, Reject mode set to Time

With input 1 you can Start (input high) and Stop (input low) the program. The Transport Belt (output 3) will start. With a pulse on Start Sampling (input 2) the checking will start. During checking the Transport Belt (output 3) will stop and Sample Busy (output 2) is on.

When the checking is complete and the weight is ok, the Transport belt (output 3) will start again, Sample Busy (output 2) is off. With a pulse on Start Sampling (input 2) the checking will start again.

If the weight is below Low Level or above High Level the Transport belt (output3) will start again. After the Reject Delay time, the Rejector (output 1) will turn on, and will remain on for the duration of the Reject Hold time. With a pulse on Start Sampling (input 2) the checking will start again.

### 7.2　Static check mode, Reject mode set to Photocell

With input 1 you can Start (input high) and Stop (input low) the program. The Transport Belt (output 3) will start. With a pulse on Start Sampling (input 2) the checking will start. During checking the Transport Belt (output 3) will stop and Sample Busy (output 2) is on.

When the checking is complete and the weight is ok, the Transport belt (output 3) will start again, Sample Busy (output 2) is off. With a pulse on Start Sampling (input 2) the checking will start again.

If the weight is below Low Level or above High Level the Transport belt (output3) will start again. When the photocell (connected to input 3) has detected the product, the Rejector (output 1) will turn on, and will remain on as long as input 3 (photocell) in on. With a pulse on Start Sampling (input 2) the checking will start again.
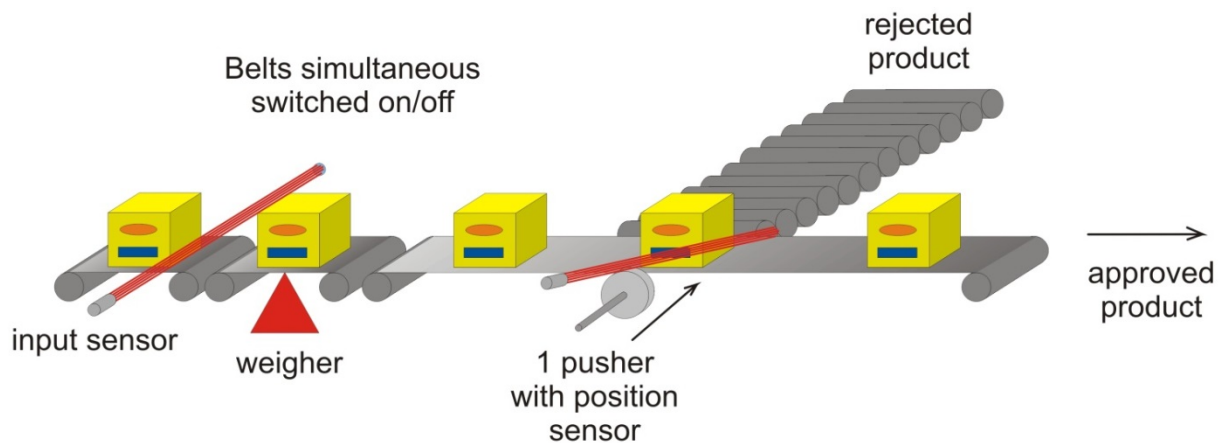
## 7.3   Dynamic check mode, Reject mode set to Time

With input 1 you can Start (input high) and Stop (input low) the program. The Transport Belt (output 3) will start. With a pulse on Start Sampling (input 2) the checking will start. During the checking  the Sample Busy (output 2) is on.

When the checking is complete and the weight is ok. The Transport belt (output 3) will start again, Sample Busy (output 2) is off. With a pulse on Start Sampling (input 2) the checking will start again.

If the weight is below Low Level or above High Level the Transport belt (output3) will start again. After the Reject Delay time, the Rejector (output 1) will turn on, and will remain on for the duration of the Reject Hold time. With a pulse on Start Sampling (input 2) the checking will start again.

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## 8 Default settings

Configuration:

| Configuration | Static check mode, Reject mode set to Time | Static check mode, Reject mode set to Photocell | Dynamic check mode, Reject mode set to Time |
| --- | --- | --- | --- |
| **Check Mode** | Static | Static | Dynamic |
| **Stability** | Stable + H-Time | Stable + H-Time | Stable + H-Time |
| **H-Time** | 1.00 sec | 1.00 sec | 1.00 sec |
| **Display Hold** <br><br>**(Disabled if stability parameter is set to off or stable)** | 1.00 sec | 1.00 sec | 1.00 sec |
| **Rejector Mode** | Time | Photocell | Time |
| **Fixed Speed** | Yes | Yes | Yes |
| **Min. Speed** | 0.00% | 0.00% | 0.00% |
| **Max. Speed** | 100.00% | 100.00% | 100.00% |
| **Recipe** | Local | Local | Local |
| **Online Ticket** | No | No | No |
| **Use Alibi Memory** | No | No | No |

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To access the DAC setup, select **In/Outputs** from the **System Setup Menu** and press **Enter**. Select **DAC Setup** and press **Enter**. If you don't have the DAC output, **In/Outputs** is not available.

| DAC setup | Setting |
|-----------|---------|
| Indicator | Speed |
| Min | 0.00% |
| Max | 100.00% |
| Mode | 4 – 20 mA |

To access the Weigher setup, select **Indicator Setup** from the **System Setup Menu** and press **Enter**. Select **Indicator** and press **Enter,** enter the **TAC code** (the TAC code is visible in the bottom right corner of the LCD screen) and press **Enter**. Select **Weigher** and press **Enter**.

| Weigher | Setting |
|---------|---------|
| Unit Label | Kg |
| Step | 1 |
| Decimal point | 0.00 |
| Operation Mode | Industrial |
| Max Load | 1000.00 |

To access the Stable Condition setup, select **Indicator Setup** from the **System Setup Menu** and press **Enter**. Select **Indicator** and press **Enter,** enter the **TAC code** (the TAC code is visible in the bottom right corner of the LCD screen) and press **Enter**. Select **Stable Condition** and press **Enter**.

| Stable Condition | Setting |
|------------------|---------|
| Range | 0.10 kg |

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| Time | 0.50 sec |
|---|---|

To access the Stable Condition setup, select **Indicator Setup** from the **System Setup Menu** and press **Enter**. Select **Indicator** and press **Enter,** enter the **TAC code** (the TAC code is visible in the bottom right corner of the LCD screen) and press **Enter**.  Select **Filter** and press **Enter**. Select **Digital** and press **Enter**.

| Filter Digital | Setting |
|---|---|
| Digital Filter | Dynamic App. |
| Cutoff Frequency | 1.0 Hz |
| Frequency | 10 Hz |

## 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**

## PENKO Alliances

PENKO's worldwide network: Australia, Belgium, Brazil, China, Denmark, Germany, Egypt, Finland, France, India, Italy, Netherlands, Norway, Poland, Portugal, Slovakia, Spain, Syria, Turkey, United Kingdom, South Africa, Slovakia Sweden and Switzerland, Singapore. A complete overview you will find on: **www.penko.com/dealers**