Version 1.00

User's Guide

M2200

P02 1022 Application

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P02 1022 Application

About This Section

This is a technical description of the M2200-P02 1022 application.

The application's Lua source code is available from Marel hf free of charge but subject to conditions. For more information please contact service@marel.is.

The "Programming" chapter of the *M2200 P02 & M02 Packing Scale User's Guide* contains more information on Lua scripts and M2200 programming.

About P02 1022

P02 1022 is an MPS-compatible M2200 application for a packing scale that can be used with MPS programs such as pklist.

The application includes a pack-filling control which operates up to three infeed conveyors running at different speeds or transporting products at different volumes. This type of control has previously been used with M2000 scales.

Using P02 1022

Starting Up

To start using the P02 1022 application for the first time you must set the application parameters (see table on page 3 with a description of all parameters).

To set application parameters

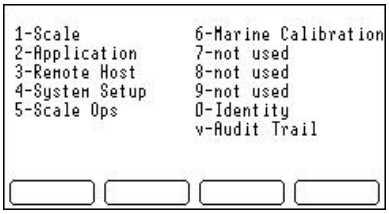


Figure 1 The Top Level Menu page.

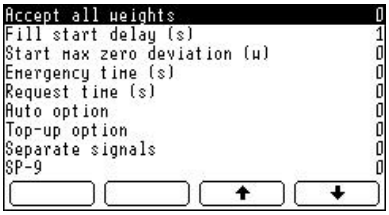


Figure 2 Parameter list A.

1 Press and hold the PAGE key for ca. three seconds to display the Top Level Menu page.

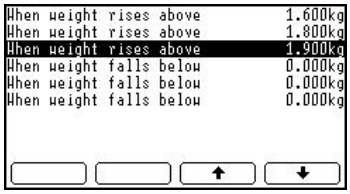
2 Select **4–System Setup → Settings → System parameters A**.

3 Select a line in the parameter list, press the CHECK key to enter a value for the parameter, and then confirm by pressing again.

4 Press to return to the parameter list.

Note: You must scroll down with the arrow keys to see all parameters in the list.

The table below lists all available weighing parameters.

Parameter:	Description:
Accept all weights	If this option is selected, the application will record packs without regard to packing limits (this has nothing to do with the control).
Fill start delay (s)	The length of time the control waits after taring the platform and before starting the infeed conveyors.
Start max zero deviation (w)	Sets the weight limit at which the control attempts to tare the scale and proceed to filling. If this value is e.g. 0.5, the weight limit is from –0.5 to +0.5. The weight limits for the coarse, fine and dribble conveyors are configured through the program parameters (by the MPS system). To view/modify these limits, access the System page and select **Settings→Limit detection events**.  In this example the coarse limit has been set to 1.6 kg, the fine limit to 1.8 and the dribble limit to 1.9 kg.
Emergency time (s)	The time allowed before an emergency is signalled. No emergencies are signalled if this value is 0.
Request time (s)	The duration of the request signal given when the infeed conveyors are started. This should not be confused with the duration of a signal to the infeed conveyors since those stay on while the weights have not reached the set limits.
Auto option	If this option is selected, the start/stop signal is not required to start every batch.
Top-up option	If this option is selected, the system will restart infeed conveyors as necessary if the stable weight of the batch is less than any of the infeed limits.
Separate signals	If this option is selected, the signals for each infeed conveyor are activated separately. If the option is not selected, the signals are combined (coarse infeed runs all three conveyors and fine infeed the fine and dribble conveyors).

The Scale page

The Scale page in P02 1022 shows the MPS terminal window (1), the packing bar (2), and the weight display (3).

You can use the arrow keys to select the previous or the next product.

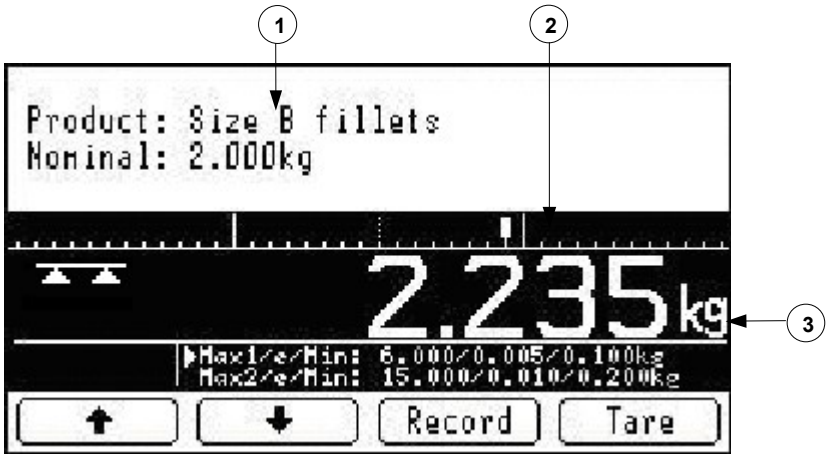


Figure 3 The P02 1022 application, Scale page.

The Application Page

From the Scale page press  to display the Application display.

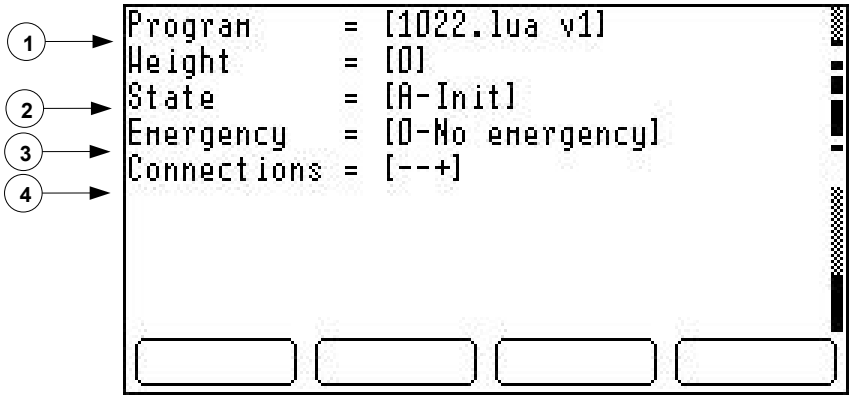


Figure 4 The Application display.

This page shows the application's name and version (1), the current state (2), emergency number (3), and connection status string (4):

Connection status indicators

- The first character in the connection status string is "+" if there is an active connection on the message port, otherwise the flag is set to "-".
- The second character shows the same for the terminal port.
- The third character is "+" if the CAN unit is online, otherwise the flag is set to "-".

Troubleshooting

Start the troubleshooting by checking the following:

Basic problems

- If the problem is with the **host connection**, check the first and second connection status indicators (on the Application page) to see if the scale is connected to the host computer.
- If the problem is with the **hardware**, check by looking at the third connection status indicator whether the CAN unit is online.
- Verify that all **control lines** are working as intended.
- Check the **state** and **emergency** to try to figure out where in the weighing cycle the problem occurs and what the problem is.

Common problems

The following is a list of common problems, possible causes and suggestions for solutions.

Refer to page 3 for information on setting the various application parameters.

Problem	Possible cause and solution
Infeed conveyors do not start	• State = A: Run signal is off. Verify that input 1 is high. • State = B: The control is stopped. Toggle the start/stop signal. • State = C: The max zero deviation is set to a value that is too low. • The fill limits are zero.
Pack overfills	• The fill limit is incorrectly set. • The scale is incorrectly calibrated or the load cell is damaged. Verify the calibration and the load cell by placing a known weight on the platform.
Infeed conveyor start too soon	• The fill start timer is too short.
The batches are lighter than the target batch weight	• This may be normal since the stable weight is not known when the infeed is stopped. Consider selecting the top-up option in the program parameters.
Emergencies are not indicated	• The emergency time is set to zero.
Emergencies are indicated too often	• The emergency time is set to a value that is too low.
State = C and emergency = 1	• If the weight is outside the max zero deviation consider increasing the allowed deviation.
State = H and emergency = 2	• The platform is unstable.

The Weighing Cycle and State Labels

The scale's position in the P02 1022 weighing cycle is easily determined by looking at the state labels on the Application page.

The states are:

A – Init	The run signal is off
B – Start	Waiting for a start signal
C – Zero	Waiting for a weight near or at zero
D – StartTimer	Waiting for start timer to expire
E – Coarse	Coarse fill
F – Fine	Fine fill
G – Dribble	Dribble fill
H – Unstable	Waiting for weight to stabilize
I – Ready	Waiting for weight to be removed

The current state of the control is displayed on the Debug page. See below for more information.

Figure 5 shows a diagram of the P02 1022 weighing cycle:

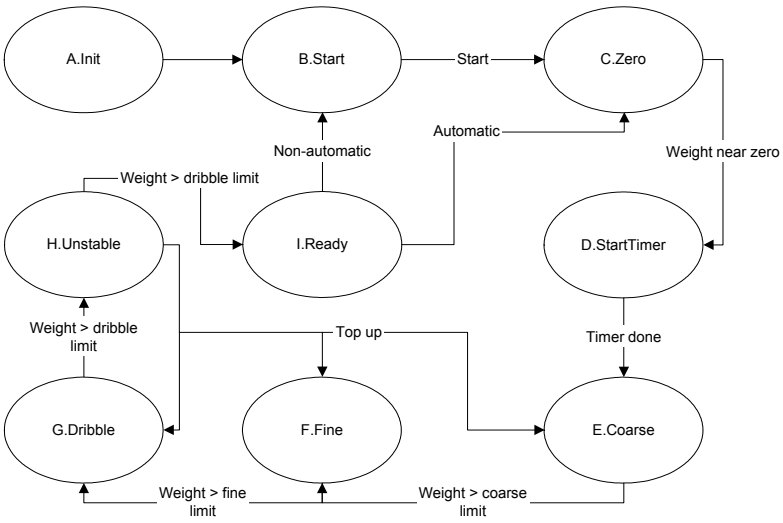


Figure 5 Weighing cycle with state labels.

The following is a description of each state and how transitions between states occur:

State 1	Conditions →→	State 2
	The run signal is off	A – Init
A – Init	The run signal is on	B – Start
B – Start	The tare/stop signal goes on	C – Zero
Neither A – Init nor B – Start	The start/stop signal goes on	B – Start
C – Zero	The scale is stable and the weight is inside the zero limit (as defined by the maximum zero deviation)	D – StartTimer and the scale is tared
D – StartTimer	The time elapsed since entering the state is greater than the fill start delay	E – Coarse
E – Coarse	The weight exceeds the coarse limit	F – Fine
F – Fine	The weight exceeds the fine limit	G – Dribble
G – Dribble	The weight exceeds the dribble limit	H – Unstable
H – Unstable	The scale is stable	I – Ready, if the top-up option is not selected or if the weight exceeds all the fill limits (coarse, fine and dribble). If the top-up option is selected and the stable weight is less than any of the fill limits, the corresponding fill state is selected (**Coarse, Fine** or **Dribble**)
I – Ready	The weight is less than $1/10^{th}$ of the coarse limit	C – Zero or B – Start, depending on whether the Auto option is selected.

Outputs are set as follows:

- All signals are off when the state is **A–Init**, **B–Start**, **C–Zero**, **D–StartTimer**, **H–Unstable.**

Outputs

- The coarse infeed signal is on in state **E–Coarse**.
- The fine infeed signal is on in state **F–Fine**, and in state **E–Coarse** if the separate signals option is not selected.
- The dribble infeed signal is on in state **G-Dribble**, and in states **E–Coarse** and **F–Fine** if the separate signals option is not selected.

- The ready signal is on in state **I-Ready**.
- The infeed request signal goes on when the state is changed to **E–Coarse** and stays on for the time specified by the request time.

Emergencies

The following emergencies are defined:

- **Zero emergency** (1) occurs in state **C–Zero**, if the weight fails to stabilize within the zero limit or if the scale cannot be tared within the emergency period.
- **Unstable emergency** (2) occurs in state **H–Unstable**, if the scale does not stabilize within the emergency period.

Controls

The P02 1022 application requires a CAN module with at least 8 inputs and 8 outputs, for example an MC88 module.

Inputs

Input	Description
1	**Run signal** This signal is always active. All controls are immediately disabled when the run signal is off.
2	**Start/stop** When the run signal turns on this signal must be toggled to activate the control. After that the control can be toggled on/off at any time with the start/stop signal. In non-automatic systems the start/stop signal must also be toggled to start each pack.

Table 1: Digital inputs

Outputs

Output	Description
1	**Coarse infeed** The three infeed signals control up to three infeed mechanisms. They can be separate or combined. For example when doing coarse infeed, it is possible to select whether only the coarse infeed is active or whether all infeeds are active.
2	**Fine infeed**
3	**Dribble infeed**
4	**Pack ready** This signal indicates that a pack has been completed.
5	**Infeed request** This signal can be used to request a batch from another system such as a hopper. The signal is turned on when coarse infeed starts and its duration is configurable.
8	**Emergency** Indicates that there is a problem with the control. It might for example indicate that the platform cannot be tared.

Table 2: Digital outputs

Host Interface

Specific Interface

ID button message

A REC_IDBUTTON message is sent to the persistent output queue when an ID button is read. The message is only sent if there is an open socket connection on the output queue.

Field	ID Value	Value
REC_IDBUTTON	80	N/a
FLD_BUTTONID	55	Button number

Table 3 REC_IDBUTTON format.

Sample message:

<STX>(80<TAB>55<TAB>9f000002fe64d609<ETX>

Serial port 2 message

A REC_SCAN message is sent to the persistent output queue when serial data is input to comm port 2. The message is only sent if there is an open socket connection on the output queue.

Field	ID Value	Value
REC_SCAN	84	N/a
FLD_SCAN	60	Serial input
FLD_PORTID	62	Port ID

Table 4: REC_SCAN format

Sample message:

<STX>(84<TAB>60<TAB>780879306045<TAB>62<TAB>2<ETX>

Packing message

A REC_PACK message is sent to the persistent output queue every time a pack is recorded.

Field	ID Value	Value
REC_PACK	103	N/a
FLD_WEIGHT	1	Pack weight
FLD_NOMINAL	77	Pack nominal weight
FLD_UNIT	2	Unit for nominal weight
FLD_TARGET	78	Pack target weight
FLD_ACCEPT	11	Accept status
FLD_TARE	59	Active tare
FLD_TARETYPE	81	Tare type, “preset” or “button”
FLD_FGIVEAWAY	79	Fixed giveaway
FLD_VGIVEAWAY	80	Giveaway percentage
FLD_MATERIAL	6	Product ID

Table 5: REC_PACK format

Sample message:

<STX>(103<TAB>1<TAB>2.235<TAB>77<TAB>2.000kg<TAB>2<TAB>kg<TAB>78<TAB>2.2<TAB>11<TAB>0<TAB>59<TAB>0<TAB>81<TAB>button<TAB>79<TAB>0<TAB>.2<TAB>80<TAB>0<TAB>6<TAB>0<ETX>

REC_LUA messages to the indicator

REC_LUA messages are application specific control messages for the indicator. These messages do not define identifiers for individual fields.

Field	ID Value	Value
REC_LUA	87	N/a
#1	1	Lua command
#2	2	Send state message
	3	Send emergency message

Table 6: REC_LUA format

Sample message:

<STX>(87<TAB>1<TAB>1<ETX>