Version U2 & C2-3.1

Calibration Instructions

M1100

Packing & Grading Scale

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Introduction

About the Manual

These instructions on how to calibrate the M1100 Packing and Grading Scale are intended for service personnel and Marel agents.
The instructions describe how to enter the Setup Mode and use the available commands to calibrate the scale.

For detailed information on how to operate the M1100 scale, refer to the *M1100 Packing & Grading Scale, User's Guide.*

Note: The M1100 scale is supplied with an adjustment seal which, if enabled, prevents the user changing certain calibration and configuration parameters. The seal is located at the back of the scale's print board.

This means that after calibration there are two ways of sealing the scale:

- by using the adjustment seal combined with an exterior lead seal or
- by using the event counters and a label seal (see "Sealing the Scale after Calibration" on page 23).

M1100 Marine and Land Based Scales

Different calibration procedures for marine and land based scales

These instructions apply to both types of the M1100 scale, the motion compensated marine scale (M1100-Ux) and the land based scale (M1100-Cx), with the exception of instructions on calibration procedures.

The calibration procedure is different for marine scales. Marine scales should be calibrated at sea according to the instructions in "Calibrating Marine Scales" on page 17.

Land based scales, on the other hand, should be calibrated using the instructions in the "Calibration" chapter on page 17. The description of the C1 (Calibration) command on page 13 applies to land based scales only.

Setup Mode

About the Setup Mode

The Setup Mode gives access to the more advanced functions of the M1100 scale, for example various service commands. Also, you must be in Setup Mode to calibrate the scale.

To enter the Setup Mode:

♦ Press the ZERO key and the TARE key simultaneously.

A message, CodE, prompting for a password (see "Password" on page 5) appears on the Weight Display. When you have entered the password, the first available command, APP, appears on the Config Display.

While in Setup Mode, the keys function as described in Table 1:

Table 1 Function of Keys in Setup Mode.

Key:	Function:
DOWN arrow	Move to the next item on the current level.
UP arrow	Return to previous item on the current level.
PRINT key	Confirm an entry, run a command, or enter a sub-menu.
MENU key	Return to a previous menu or exit the Setup Mode.

Password

Entering the Setup Mode requires a password. Until the correct password has been entered, the message CodE is shown on the Weight Display. The Setup Mode password is fixed and is entered as described below:

To enter the password:

1. Press the PRINT key once.
2. Press the DOWN arrow four times.
3. Press the UP arrow once.

The keys must be pressed in this order. If you enter an incorrect password, start again by pressing the PRINT key.

Setup Mode Commands

The Setup Mode commands are listed in Table 2.

Table 2 Setup Mode commands.

Command:	Description:
APP	*Application switches* To change the status of the application switches.
Ad1	*A/D converter 1* To show the direct reading of A/D converter 1.
Ad2	*A/D converter2* To show the direct reading of A/D converter 2. Only on marine scales.
Out	*Output* To print information on the calibration.
C id	*CAN ID* To view and/or modify CAN IDs.
Un	*Unit* To set the unit of weight used during calibration.
CAP	*Capacity* To set the weighing capacity (Max weight) of the scale.
rES	*Resolution* To select single or dual resolution.
CS	*Size* To set the size of the calibration weight.
C0	*Zero point* To set the calibration zero point.
C 1	*Calibration* To calibrate with a calibration weight on the weighing platform.
AdJ	*Gain adjustment* To compensate for variations caused by the earth's gravity, which could affect the scale's weighing accuracy. Only on land based scales.
SEt	*Switches* To set the configuration switches.

dEF	*Default settings* The factory default settings for the application switches, and the packing and grading memories.
AdJ	*Adjusting zero* To adjust the calibration zero point.

Note: The first four commands, APP, Ad1, Ad2, and Out, are always available, whereas the remaining commands are not available unless Application switch A 16 has been turned on. For instructions on how to turn the switch on, see "The APP Command" below.

Note: If the scale's adjustment seal is enabled, the following commands can only be displayed but not modified: Un, CAP, rES, CS, CO, C 1, SEt, and AdJ.

The following sections provide detailed descriptions of the Setup Mode commands.

The APP Command (Application switches)

Use this command to turn the application switches ON or OFF. There are sixteen application switches available:

- A01 Zero tracking, normally ON
- A02 Automatic tare, normally OFF
- A03 Automatic recording, normally OFF
- A04 Reserved, normally OFF
- A05 Response time,[1] small scale OFF, very large scale ON
- A06 Response time, small scale OFF, very large scale ON
- A07 Optimize for accuracy,[2] ON
Optimize for speed, OFF
- A08 Reserved, normally OFF
- A09 Extra resolution available in packing menu; only for test purposes, normally OFF
- A 10 Continuous transmission,[3] normally OFF
- A 11 Continuous transmission, normally OFF

[1] See more details on switches #5 and #6 in "Appendix B — Response Times, Transmission Rates and Printouts" on page 26. In some market areas switches #5, #6 and #7 may not be available; the corresponding Set-switches will be used instead.

[2] When there is a trade-off between accuracy and speed in automatic recording of grading results.

[3] See more details on switches #10 and #11 in "Appendix B — Response Times, Transmission Rates and Printouts" on page 26.

- A 12 Disable power-down mode, battery operated models only, normally OFF
- A 13 Reserved, normally OFF
- A 14 CAN transmission rate, normally OFF
- A 15 CAN transmission rate, normally OFF
- A 16 Enable calibration (default status after start-up is OFF).

1 When you have selected the command with the arrow keys, press PRINT to display the switches.

2 Switch A 0 1 appears on the Config Display and the current status (On/Off) is displayed above on the Weight Display.

3 Press PRINT again. The status indicator starts to flash and can now be changed with the arrow keys.

4 Press PRINT to confirm the change.

5 Press the MENU key to return to the Setup Menu.

Use this method to turn switch #16 ON to calibrate the scale.

The Ad1 and Ad2 Commands (A/D Converters)

These commands display the direct value of the A/D converter readings shown on the Weight Display.

1 Select the command with the arrow keys, and press PRINT to submit.

2 Return to the Setup Menu by pressing the MENU key.

The Out Command (Output)

Use this command to print information on the calibration:

♦ Select the command with the arrow keys, and press PRINT.

The output is sent to an attached label printer or PC.

After the command has been completed, the scale returns to the top of the setup menu (the APP command).

The following is an example of a printout from the Out command:

```
M1100:    U2-3.10 / CAL=2 / CON=2
App:      1000 0000 0000 0000
Cap:      15.000 kg
Res:      Single
CS:       5 kg
C0:       601495
C1:       840888
Gain:     2.088615e-05 kg/cnt
g-adj:    1.00000
Set:      0000 0000 0000 1000
aP:       10.0
aZ:       5.0
aY:       0
aX:       0
bP:       10.0
bZ:       5.0
bY:       0
bX:       0
```

The CAN Command (CAN ID)

Use this command to view and set the CAN identification number if the M1100 scale is (to be) connected to other equipment via a CAN connection:

1. Select the command with the arrow keys, and press PRINT to display the current ID on the Weight Display.
2. Press PRINT again. The first digit to the right on the display starts to flash, indicating that it can be changed to a new value.
3. Use the UP/DOWN arrows to change the value for the ID number. Press PRINT to activate each digit.

Note: You must activate all digits (press PRINT six times) or no change will take place.

4. Press the MENU key to return to Setup Mode.
5. Press the MENU key a second time to return to Operating Mode.

The Un Command (Calibration unit of weight)

Use this command to set the unit of weight for the calibration:

1. Use the UP or DOWN arrow keys to scroll the Config Display until the Un command appears.
2. Press the PRINT key to display the currently active unit of weight (the indicator to the right on the Weight Display lights up).
3. Press PRINT again to select a different unit. The unit indicator starts to blink, and you can select a different unit with the arrow keys.

Note: Only kg or lb are valid units of weight for the calibration.

4. When you have selected a unit, press PRINT to confirm the selection.
5. Press the MENU key to return to the Setup Menu.

The CAP Command (Capacity)

Use this command to set the maximum capacity of the scale:

1. Select the CAP command with the arrow keys.
2. The Max capacity of the scale is shown on the Weight Display.
3. Press PRINT to start the capacity value to flash, and use the arrow keys to set a new value.
4. Press PRINT to confirm the selection.
5. Press the MENU key to return to the Setup Menu.

Table 3 shows the available Max capacity values for single range scales while Table 4 shows the values for multiple range scales. Table 5 shows the Max capacity values for single range scales when the rES command is set to Hi.

Table 3 Max capacity, single range.

Single range

Metric Units		Avoirdupois Units			
Max	e =d	Max	e =d	Max	e =d
300 g	0.1 g	(0.6 lb)	-	9.6 oz	0.005 oz
600 g	0.2 g	(1.5 lb)	-	24 oz	0.01 oz
1500 g	0.5 g	3 lb	0.001 lb	48 oz	0.02 oz
3000 g	1 g	6 lb	0.002 lb	96 oz	0.05 oz
6000 g	2 g	15 lb	0.005 lb	240 oz	0.1 oz
3 kg	1 g	6 lb	0.002 lb	96 oz	0.05 oz
6 kg	2 g	15 lb	0.005 lb	240 oz	0.1 oz
15 kg	5 g	30 lb	0.01 lb	480 oz	0.2 oz
25 kg	10 g	50 lb	0.02 lb	800 oz	0.5 oz
30 kg	10 g	60 lb	0.02 lb	960 oz	0.5 oz
60 kg	20 g	150 lb	0.05 lb	2400 oz	1 oz
150 kg	50 g	300 lb	0.1 lb		
300 kg	100 g	600 lb	0.2 lb		
600 kg	200 g	1500 lb	0.5 lb		
1000 kg	500 g	2000 lb	1 lb		
1500 kg	500 g	3000 lb	1 lb		
2000 kg	1 kg	4000 lb	2 lb		
3000 kg	1 kg	6000 lb	2 lb		
4000 kg	2 kg	8000 lb	5 lb		
6000 kg	2 kg	15000 lb	5 lb		

Multiple range

Table 4 Max capacity, multiple range.

Metric Units		Avoirdupois Units			
Max1/Max2	e =d	Max	e =d	Max	e =d
300 / 600 g	0.1 / 0.2 g	(0.6 / 1.5 lb)	-	9.6 / 24 oz	0.005 / 0.01 oz
600 / 1500 g	0.2 / 0.5 g	(1.5 / 3 lb)	-	24 / 48 oz	0.01 / 0.02 oz
1500 / 3000 g	0.5 / 1 g	3 / 6 lb	0.001 / 0.002 lb	48 / 96 oz	0.02 / 0.05 oz
3000 / 6000 g	1 / 2 g	6 / 15 lb	0.002 / 0.005 lb	96 / 240 oz	0.05 / 0.1 oz
3 / 6 kg	1 / 2 g	6 / 15 lb	0.002 / 0.005 lb	96 / 240 oz	0.05 / 0.1 oz
6 / 15 kg	2 / 5 g	15 / 30 lb	0.005 / 0.01 lb	240 / 480 oz	0.1 / 0.2 oz
15 / 25 kg	5 / 10 g	30 / 50 lb	0.01 / 0.02 lb	480 / 800 oz	0.2 / 0.5 oz
15 / 30 kg	5 / 10 g	30 / 60 lb	0.01 / 0.02 lb	480 / 960 oz	0.2 / 0.5 oz
30 / 60 kg	10 / 20 g	60 / 150 lb	0.02 / 0.05 lb	960 / 2400 oz	0.5 / 1 oz
60 / 150 kg	20 / 50 g	150 / 300 lb	0. 5 / 0.1 lb		
150 / 300 kg	50 / 100 g	300 / 600 lb	0.1 / 0.2 lb		
300 /600 kg	0.1 / 0.2 kg	600 / 1500 lb	0.2 / 0.5 lb		
600 / 1000 kg	0.2 / 0.5 kg	1500 / 2000 lb	0.5 / 1 lb		
600 / 1500 kg	0.2 / 0.5 kg	1500 / 3000 lb	0.5 / 1 lb		
1500 / 2000 kg	0.5 / 1 kg	3000 / 4000 lb	1 / 2 lb		
1500 / 3000 kg	0.5 / 1 kg	3000 / 6000 lb	1 / 2 lb		
3000 / 4000 kg	1 / 2 kg	6000 / 8000 lb	2 / 5 lb		
3000 / 6000 kg	1 / 2 kg	6000 / 15000 lb	2 / 5 lb		

High res, Single range

Table 5 Max capacity, high res single range.

Metric Units		Avoirdupois Units			
Max	e =d	Max	e =d	Max	e =d
600 g	0.1 g	(1.5 lb)	-	24 oz	0.005 oz
1500 g	0.2 g	(3 lb)	-	48 oz	0.01 oz
3000 g	0.5 g	6 lb	0.001 lb	96 oz	0.02 oz
6000 g	1 g	15 lb	0.002 lb	240 oz	0.05 oz
6 kg	1 g	15 lb	0.002 lb	240 oz	0.05 oz
15 kg	2 g	30 lb	0.005 lb	480 oz	0.1 oz
25 kg	5 g	50 lb	0.01 lb	800 oz	0.2 oz
30 kg	5 g	60 lb	0.01 lb	960 oz	0.2 oz
60 kg	10 g	150 lb	0.02 lb	2400 oz	0.5 oz
150 kg	20 g	300 lb	0.05 lb		
300 kg	50 g	600 lb	0.1 lb		
600 kg	100 g	1500 lb	0.2 lb		
1000 kg	200 g	2000 lb	0.5 lb		
1500 kg	200 g	3000 lb	0.5 lb		
2000 kg	500 g	4000 lb	1 lb		
3000 kg	500 g	6000 lb	1 lb		
4000 kg	1 kg	8000 lb	2 lb		
6000 kg	1 kg	15000 lb	2 lb		

The rES Command (Resolution)

Use this command to set the resolution for the scale.

There are three options available:

- SINGLE *(Single range)* is the default. The resolution is 2000 to 3000 divisions depending on the selected unit of weight (kg, lb, g, or oz).
- dUAL *(Multiple range)*. The scale has two weighing ranges, Max1 and Max2, each with a resolution of 2000 to 3000 divisions.
- Hi *(Single range, high resolution)*. The resolution is 6000 to 7500 divisions depending on the selected unit of weight (kg, lb, g, or oz).[4]

Note: Some settings may not be allowed due to approval restrictions.

1. Select the command with the arrow keys.
2. Press PRINT to display the current resolution.
3. Press PRINT again to start the value to flash, and use the arrow keys to set a new value.
4. Press PRINT to confirm the selection.
5. Press the MENU key to return to the Setup Menu.

The CS Command (Size of calibration weight)

Use this command to set the weight of the calibration weight:

1. Select the CS command with the arrow keys.
2. Press PRINT. The current size of the calibration weight is shown on the Weight Display. The weight is shown in the unit of weight (kg or lb) you selected with the Un command.
3. Press PRINT again to activate the first digit on the Weight Display. When the digit starts to flash, you can change its value with the UP/DOWN arrows.
4. Press PRINT to activate the remaining digits, until all digits have been set.

   Note: You must activate all digits (press PRINT six times) or no change will take place.

5. Press the MENU key to return to the Setup Menu.

[4] Although the M1100 Indicator is certified for 7500 divisions, there are only a few load cells currently available on the market certified for that number of divisions.

The C 0 Command (Calibration zero)

Applies to land based scales only!

Use this command to set the calibration zero of the scale:

1. Select the C 0 command with the arrow keys.
2. Before you submit the C 0 command, make sure the platform is empty and resting on a stable and non-vibrating surface.
3. During the execution of the command, the direct reading of the A/D converter is shown on the Weight Display.

The zero has been set when the reading disappears from the display. The scale automatically returns to the Setup Menu.

The C 1 Command (Calibration)

Applies to land based scales only!

This command performs the actual calibration of land based M1100 scales.

IMPORTANT! To ensure a successful calibration, the C 5 and C 0 commands must be submitted prior to the C 1 command.

1. Make sure the platform is empty and resting on a stable and non-vibrating surface.
2. Select the C 1 command with the arrow keys.
3. Place the calibration weight (specified by the C 5 command) on the platform.
4. Press PRINT to submit the C 1 command.

Tip

- While the scale starts up, and before the light test, the value of a non-resetable event counter appears on the Weight Display. The value of this counter increases with every calibration of the scale. The calibration number can be used to determine if the calibration of the scale has been altered.

Note: A notified body or WM authority will inscribe the calibration number on a sealed label on the side of the indicator or otherwise record its value.
If the adjustment seal is used, the notified body will seal the indicator with an exterior lead seal.

The AdJ Command (Gain Adjustment)

Applies to land based scales only!

This command sets a gain adjustment factor to compensate for variations in the earth's gravitiy (g) between the location where the scale is calibrated (e.g. at the manufacturer's) and where it is later installed for use.

The adjustment factor is normally 1.00000, but can be set to the ratio between g in the two locations, e.g. 1.00100 or 0.99900.

1. Select the AdJ command with the arrow keys.
2. Press PRINT to display the current gain factor.
3. Press PRINT again. The first digit to the right on the display starts to flash, indicating that it can be changed to a new value.
4. Use the UP/DOWN arrows to change the value of the gain factor. Press PRINT to activate each digit.

   Note: You must activate all digits (press PRINT six times) or no change will take place.

5. Press the MENU key to return to the Setup Menu.

The SEt Command (Set configuration switches)

Use this command to set the status of the 16 configuration switches, S01 to S16:

- S01 Skip initial zero. Push-button zero range is ±10% of Max.
- S02 Reserved. Status should be OFF.
- S03 Wide automatic tare (the range is 30% of the last push-button or semi-automatic tare weight)
  (S03=OFF - automatic tare range is 10% of tared weight)
  (S03=On - automatic tare range is 30% of tared weight)
- S04 Allow pounds and ounces
  (S04=OFF - only kg or g are allowed)
  (S04=On - all four units of weight are allowed)
- S05-S06 Response time (sealed version).
  See table in Appendix B page 26 for more details.
- S07 Optimize for accuracy (sealed version)[5]
  (S07=OFF - Optimize for speed)
  (S07=On - Optimize for accuracy)
- S08 Sealed response
  (S08=OFF - Application switches #5-7 are available)
  (S08=On - Set switches #5-7 replace the App. switches)

[5] Used when a trade-off between speed and accuracy can be made, e.g. in reverse grading.

- S09 Direct sale to the public (according to standard regulations on conditions for direct sale to the public)
  (S09=OFF - scale cannot be used for direct sale)[6]
  (S09=On - scale can be used for direct sale)
- S10 Allow remote setting of sealed parameters
  (S10=OFF - no change allowed)
  (S10=On - sealed parameters can be changed via the CAN connection)[7]
- S11 Allow remote operation of Zero and Tare
- S12-S16 Reserved. Status should be OFF

1. When you have selected the command with the arrow keys, press the PRINT key to submit.
2. A switch appears on the Config Display, and the current status of the switch, On or OFF, is shown on the Weight Display.
3. Use the arrow keys to select a switch, and press PRINT.
4. The status indicator, On or OFF, starts to flash. The status can now be changed with the arrow keys.
5. Press PRINT to confirm the change.
6. Press the MENU key to return to the Setup Menu.

[6] Used in certain market areas. Changes the way you work with tare: you must remove tare before you can set a new tare value that is lower than the current tare value.
[7] When switch #10 is ON, the Weight Display shows flashing decimal points to indicate that remote setting of sealed parameters is enabled.

The dEF Command (Default settings)

Use this command to set the status of the application switches and the packing and grading memories back to factory defaults.

When you submit this command the scale returns to the top of the Setup Mode menu (APP).

The AdJ Command (Adjusting calibration zero)

Applies to land based scales only!

Use this command to adjust the calibration zero point that is used as a reference during power-on or start-up of the scale:

1. Select the AdJ command with the arrow keys.
2. Before you submit the AdJ command, make sure the platform is empty and resting on a stable and non-vibrating surface.
3. During the execution of the command, the direct reading of the A/D converter is shown on the Weight Display.

The zero has been set when the reading disappears from the display. The scale automatically returns to the Setup Menu.

If the dead weight of the weighing platform changes, the signal from an empty platform may end up outside the 20% limit set for the initial zero. In that case, the AdJ command can be used to correct the setting of the initial zero point.

Note: After adjusting the calibration zero, make sure the Max weight + 10% is still within the measuring range of the A/D converter:

- Place 1.12 x Max on the platform and check the A/D reading (use the Adi command). The reading should not result in an E03 AD overrange error.

Calibration

Calibrating Marine Scales

The motion compensation of the M1100 marine scale must be calibrated every once in a while to ensure the weighing results are accurate and stable.

IMPORTANT! For optimum marine calibration results always calibrate the scale in the physical environment where it will be used for weighing, i.e. at sea and not on land or in the shelter of harbour.

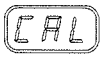

Figure 1 Calibration message

The scale must be calibrated at initial start-up. After that the scale submits a warning, the message CAL flashes in the Config Display, whenever a calibration must be performed.

The scale must also be calibrated

- when the scale is unstable without the weighing platform being touched.
- when the displayed weight is inaccurate, even when the scale has a correct zero.
- when the scale is unable to assume the initial zero point, even with an empty platform.

Tip

- It is a good maintenance rule to check the calibration routinely by placing a weight on the weighing platform to verify that the Weight Display shows a steady and accurate weight.

To calibrate the scale

1 Make sure the platform is empty.

2 Press the MENU and ZERO keys simultaneously to put the scale in Cal Mode.
The Config Display shows: CAL
The Weight display shows: - - -

3 Wait until the scale asks for a reference weight.
The Weight Display shows: Put 2k[8]

4 Place the reference weight on the platform.

5 Press the PRINT key to start the calibration.
The Weight Display shows = = = while the scale performs the calibration.

6 When the calibration is completed, the message F1 t nn (where nn is a number between 0 and 99) appears on the Weight Display.
Values above 25 indicate a poor calibration. In that case you should repeat steps 1 to 4 above.

Note: The message F1 t_ nn (with underscore) appears when a marine scale has been calibrated without the platform being in motion.

7 Remove the reference weight from the platform.

8 The Weight Display returns to zero and the calibration is now completed.

Calibrating Land Based Scales

The M1100 scale is calibrated using a known weight which is normally close to the maximum capacity of the weighing platform.

Follow the instructions below to calibrate the M1100 scale.

Note: If the adjustment seal supplied with the scale is enabled, the calibration instructions below do not apply unless you open the seal first as described in "Sealing the Scale after Calibration" on page 23.

To calibrate the scale:

1 Start the calibration by letting the scale run for at least 10 minutes to warm up.

2 Level the scale platform and remove all objects from the platform.

3 Make sure the platform feet are correctly adjusted on a stable and non-vibrating surface.

4 Press the ZERO and TARE keys simultaneously to put the scale in Setup Mode.
The Weight Display shows: CodE

[8] The unit and weight displayed in this message varies with the size of the scale's weighing platform.

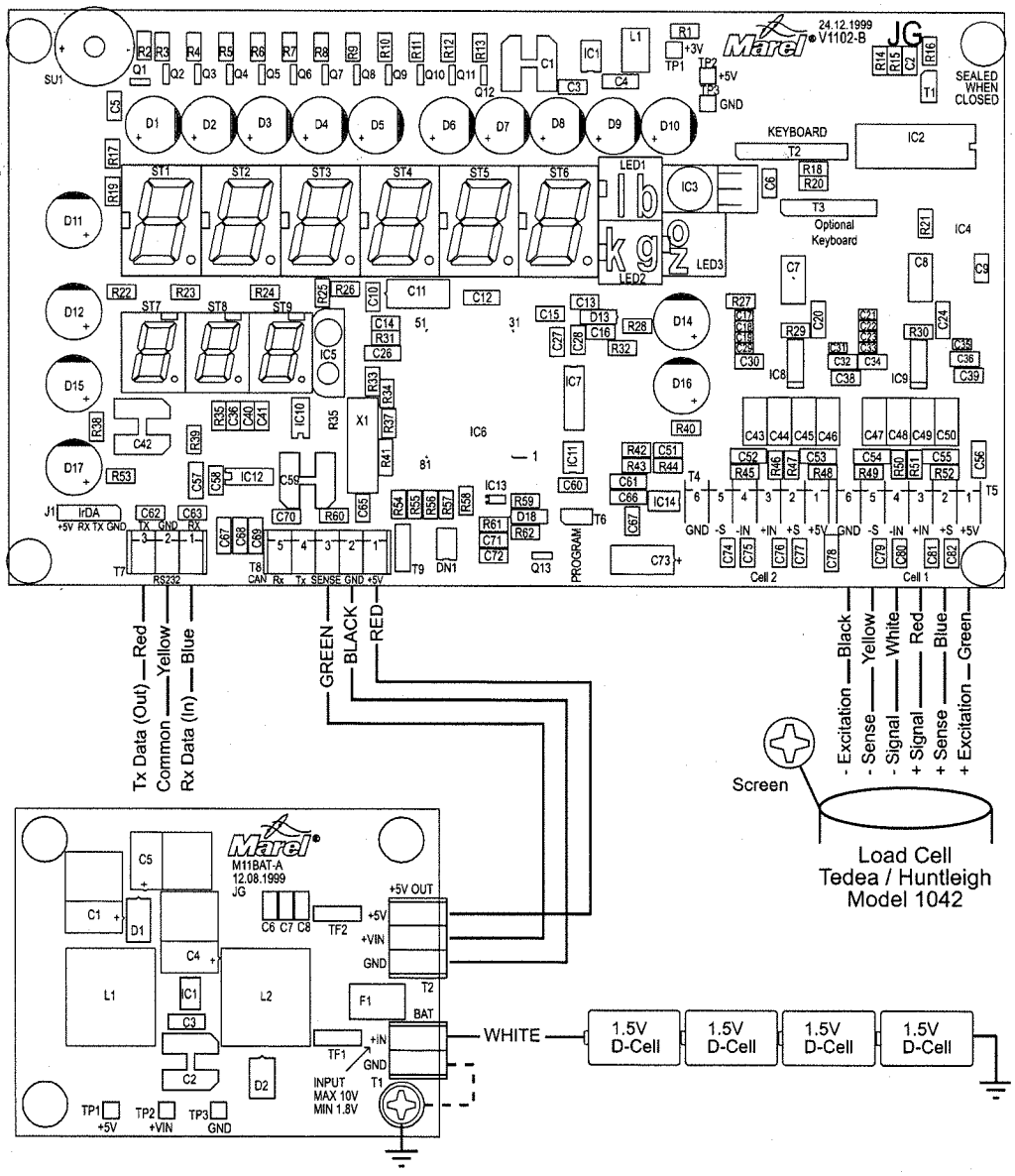

Figure 8 M1100 Cable Connections
Battery Operation

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5 Make sure that switch A Ib is open (ON):

- Enter the Setup Mode password: press PRINT once, the DOWN arrow four times, and the UP arrow once, in this order.
  The Config Display shows: APP
- Press PRINT again.
  The Config Display shows: A0 1
- Press the UP arrow once.
  The Config Display shows: A Ib
  The Weight Display shows: OFF.
- Press the PRINT key.
  The value on the Weight Display starts flashing.
- Press the UP arrow (or the DOWN arrow).
  The Weight Display changes from OFF to On, still flashing.
- Press the PRINT key.
  The Config Display shows: A Ib
  The Weight Display shows: On
- Press the MENU key.
  The Config Display shows: APP

6 Verify that the unit of weight is either kg or lb, in line with the reference weight you intend to use for the calibration. If necessary, use the Un command to set the calibration unit of weight to kg or lb.

Setting the calibration unit of weight:

- Press the DOWN arrow five times.
  The Config Display shows: Un
- Press the PRINT key.
  The Weight Display shows: the currently active calibration unit of weight (kg or lb)[9].
- Press the PRINT key again.
  The unit of weight starts flashing.
- Use the DOWN arrow to select either kg or lb, and then press the PRINT key to confirm your selection.
- Press the MENU key.
  The Weight Display shows: the unit you have just selected.
  The Config Display shows: Un

7 Set the capacity and range of the scale before you continue with the calibration.

[9] The calibration unit of weight is only used during calibration. During normal operation the unit of weight for each packing or grading memory may be selected individually.

Setting the capacity:

- Press the DOWN arrow ⌄ once (assuming you have just set the unit of weight).
  The Config Display shows: CAP
- Press the PRINT key ⎙
  The Weight Display shows: the current capacity of your scale, e.g. 30.00 kg.
  The Config Display shows: CAP
- Press the PRINT key ⎙ again.
  The capacity value starts flashing.
- Use the UP arrow ⌃ or the DOWN arrow ⌄ to set the capacity value.
- Press the PRINT key ⎙ to confirm the new value.
- Press the MENU key ⚙.
  The Config Display shows: CAP

Selecting single or dual resolution capability:

- Press the DOWN arrow ⌄ once.
  The Config Display shows: rES
- Press the PRINT key ⎙
  The Weight Display shows: the current capability of your scale, SINGLE or dUAL.
  The Config Display shows: rES
- Press the PRINT key ⎙ again.
  The capability value (SINGLE or dUAL) starts flashing.
- Use the UP arrow ⌃ or the DOWN arrow ⌄ to set the range value.
- Press the PRINT key ⎙ to confirm the new value.
- Press the MENU key ⚙.
  The Config Display shows: rES

You can now continue with the calibration process, step 8.

Setting the size of the calibration weight:

8 Press the DOWN arrow ⌄ once, or until the CS command appears on the Config Display).

9 Press the PRINT key ⎙.
The Weight Display shows: the size of your currently selected calibration weight in the unit of weight you selected in step 6.
The Config Display shows: CS

10 To change the size of the calibration weight[10], press the PRINT key ⎙ to activate the first digit on the Weight

[10] The size of the calibration weight should not be less than a third of the scale's maximum capacity. For example, you can use a 5 kg weight to calibrate a 15 kg scale. You should, however, use a weight close to the maximum capacity to verify the correctness of the calibration.

Display. When the digit starts flashing, you can change its value using the ⌃ or ⌄ arrows.

11 Press the PRINT key ⎙ to activate the remaining digits, until all digits have been set.

Note: You must activate all digits (press the PRINT key ⎙ six times), or no change will take place.

---

12 Press the MENU key ⎙.
The Config Display shows: C 5

Setting the calibration zero:

13 Press the DOWN arrow ⌄ once.
The Config Display shows: C 0
Before you carry out the next step, make sure the platform is empty and resting on a stable and non-vibrating surface.

14 Press the PRINT key ⎙.
During the execution of the C 0 command, the direct reading of the A/D converter is shown on the Weight Display.

15 The calibration zero has been set when the reading disappears from the display. The scale automatically returns to the Setup Menu.
The Config Display shows: C 0

Calibrating the scale:

16 Press the DOWN arrow ⌄ once.
The Config Display shows: C 1

17 Make sure the platform is empty and resting on a stable and non-vibrating surface.

18 Place the calibration weight on the platform.

19 Press the PRINT key ⎙.
During the execution of the C 1 command, the direct reading of the A/D converter is shown on the Weight Display.

20 The calibration is completed when the reading disappears from the Weight Display.
The Config Display shows: C 1

21 Press the MENU key ⎙ to return the scale to operating mode.

Tip

- Note the number on the event counter that appears on the Weight Display when the scale starts up after the calibration. You can use this number later to determine if the calibration of the scale has been altered.

Adjusting the Calibration Zero

If the dead weight on the platform changes, you may have to adjust the calibration zero:

1. Let the scale run for at least ten minutes in order to warm up.
2. Press the ZERO ⊕ and TARE ⊖ keys simultaneously to put the scale in Cal Mode.
   The Weight Display shows: CodE
3. Make sure that switch A 1b is open (ON):
   - Enter the Setup Mode password: Press PRINT ⎙ once, the DOWN arrow ⌄ four times, and the UP arrow ⌃ once, in this order.
     The Config Display shows: APP
   - Press PRINT ⎙ again.
     The Config Display shows: A0 1
   - Press the UP arrow ⌃ once.
     The Config Display shows: A 1b
     The Weight Display shows: OFF.
   - Press the PRINT ⎙ key.
     The value on the Weight Display starts flashing.
   - Press the UP arrow ⌃ (or the DOWN arrow ⌄).
     The value on the Weight Display changes from OFF to On, still flashing.
   - Press the PRINT ⎙ key.
     The Config Display shows: A 1b
     The Weight Display shows: On
4. Press the MENU key ⎙.
   The Config Display shows: APP
5. Press the UP arrow ⌃ once.
   The Config Display shows: AdJ0
   Before you carry out the next step, make sure the platform is empty and resting on a stable and non-vibrating surface.
6. Press the PRINT ⎙ key.
   During the execution of the AdJ0 command, the direct reading of the A/D converter is shown on the Weight Display. The zero has been set when the reading disappears from the display.
   The scale returns automatically to the Setup Menu.
   The Config Display shows: AdJ0
7. Press the MENU key ⎙.
   The scale starts up again.

Note: To comply with OIML requirements the scale must be able to reach max weight + 12%. The calibration zero point must therefore not be set too high.

Sealing the Scale after Calibration

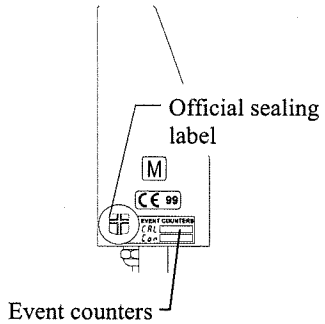

Figure 2 M1100 Indicator; event counters and sealing label.

When the calibration has been completed or after adjustments have been made in the Setup Mode, the scale must be sealed again to maintain the official authorization of the scale. There are two ways of sealing the scale, either with a sealing label on the calibration sticker (when the event counters, Cal and Con, are used to monitor modifications on the scale) or with an exterior lead seal (when the adjustment seal is used to lock the scale).

The event counters are displayed briefly on the Weight Display whenever the scale is restarted. The Cal counter protects the CO, C 1, AdO, and AdJ commands, while the Con counter protects the SEt, CAP, rES, CS, and Un commands.

Follow the instructions below to seal the scale.

To seal the scale (sealing label):

1. Note the new calibration number on the Weight Display when the scale is started again after the calibration.
2. Write the number on a new calibration sticker.
3. Replace the old sticker on the M1100 Indicator with the new one.
4. Have a notified body or a WM authority seal the new sticker with a new official sealing label.

In some market areas the use of the event counters as a sealing device is not recognized by the authorities. The scale is shipped to these markets in a sealed state using the adjustment seal at the front of the scale's print board, shown in Figure 3:

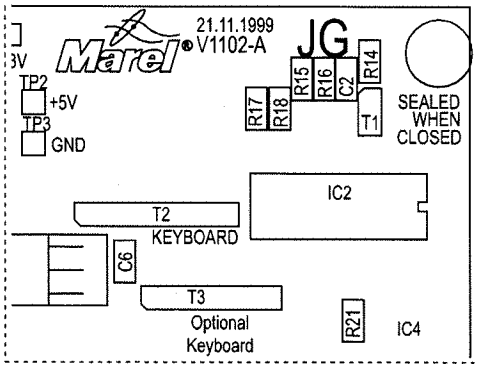

Figure 3 Detail of the print board, the adjustment seal.

A notified body or a WM authority must calibrate the scale and then seal it as described below.

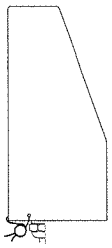

Figure 4 Exterior lead seal.

To seal the scale (lead seal):

1. Open the top cover of the scale.
2. Unlock the adjustment seal.
3. Calibrate the scale according to instructions in "Calibrating Land Based Scales" on page 18.
4. Put the adjustment seal back on in a locked position. Modification of the calibration and configuration settings is no longer possible.
5. Seal the scale with an exterior lead seal as shown in Figure 4.

Appendices

Appendix A — Error codes

Error code:	Description:	Action:
E-03	ADC overrange or underrange	Bring the weight on the platform within the AD converter limits.
E-05	Unstable weight (initial zero)	Stabilize the scale
E-06	Weight outside range (initial zero)	Make sure the platform is empty
E-08	Operation in progress (initial zero)	Wait until completed
E-11	Invalid initial zero	Remove or reduce the weight on the platform
E-13	Program failure (checksum)	Restart the scale
E-14	ADC not responding	Restart the scale
E-15	W&M setup checksum failure	Temporarily change one setting, then verify all settings
E-23	24 V power voltage too high	Provide correct voltage
E-25	Low power supply voltage	Check the power supply voltage
E-81	Invalid static marine calibration. Fit value too high.	Repeat calibration
E-82	Invalid static marine calibration. Calibration weight not detected.	Repeat calibration
E-84	Marine static calibration not allowed	Scale requires motion
E-91	Invalid marine calibration. Fit value too high.	Repeat calibration
E-92	Invalid marine calibration. Calibration weight not detected.	Repeat calibration
E-93	Invalid initial zero	Make sure the platform is empty

Note: If the error persists contact Marel hf. or your local Marel agent for assistance.

Appendix B — Response Times, Transmission Rates and Printouts

Reports are printed via the RS-232 interface, at 4800 Baud, using 8 data bits and no parity. The scale transmits XON and XOFF characters. Reception of XON and XOFF is not supported.

- Manual/Automatic/Continuous Printout:

```
1.278 kg P1 yyyyy
 160. g  P2 yyyyy
2.045 lb G3 yyyyy
  5.6 oz P4 yyyyy
 2.76 kg G5 yyyyy
(2.76 kg xx)yyyyy
```

where

x = packing or grading memory number
y = computer code

- Response times and transmission rates:
  The tables below show the available response times for M1100 scales.

#A5 or S05[11] Response A	#A6 or S06 Response B	Response mode	Response time	Fixed rate printout
OFF	OFF	Automatic response	~ 0.5 seconds variable	4.9 Hz
ON	OFF	Fast response	~ 0.5 seconds	4.9 Hz
OFF	ON	Medium response	~ 0.9 seconds	2.4 Hz
ON	ON	Slow response	~ 1.2 seconds	1.2 Hz

#A10 Transmission A	#A11 Transmission B	Output mode
OFF	OFF	No continuous printout. Manual and automatic printing only.
ON	OFF	Printout when stability indication changes; also manual and automatic printing.
OFF	ON	Fixed-rate printout; also manual and automatic printing.
ON	ON	No continuous printout. Manual and automatic printing only. Enables printing at a high fixed rate to the CAN interface.

[11] If switch S08 is OFF, application switches #A5 and A6 control the response of the scale.
If switch S08 is ON, setup switches S05 and S06 control the response.

Choosing the appropriate weighing response:

- **5=Off, 6=Off Automatic response**
  In most cases the best setting for the scale. Enables the scale to adapt to the current environment. The weighing response will be fast in a stable environment, but will become progressively slower as environmental disturbances increase.

- **5=On, 6=Off Fast response**
  In a stable environment expert operators may achieve their highest speed in grading and packing using this setting.

- **5=Off, 6=On Medium response**
  Use this setting only if a fixed medium response is desired.

- **5=On, 6=On Slow response**
  This setting may be useful for large scales and when a fixed slow response is desired.

Note: Switch #7 affects the operating speed of reverse grading. When this switch is off, the scale operates at maximum speed.

Printout example

- Printout from the Out command (marine scale):

```
M1100:  U2-3.10 / CAL=2 / CON=2
App:    1000 0000 0000 0000
Cap:    15.000 kg
Res:    Single
CS:     5 kg
C0:     601495
C1:     840888
Gain:   2.088615e-05 kg/cnt
g-adj:  1.00000
Set:    0000 0000 0000 1000
aP:     10.0
aZ:     5.0
aY:     0
aX:     0
bP:     10.0
bZ:     5.0
bY:     0
bX:     0
```

Appendix C — CAN Connections

The M1100 scale offers the option of CAN connections to other equipment. Use of the CAN connections is described below.

To view CAN network status

1 Press the MENU key ▣ and the UP arrow ▲ simultaneously.

2 The current CAN status is displayed on the Weight Display:

- PrE n **Preoperational mode**. The CAN module has not been started from the master.
- OP n **Operational mode**. The CAN module has been started from the master.

  A **steady** n to the right in the display indicates that the CAN bus is active and in order.

  A **blinking** n indicates that
  a) the scale's CAN bus is not connected to the CAN network or
  b) there is no other CAN module on the network.

3 Press the MENU key ▣ to return to Operating Mode.

Appendix D — Connection Diagrams

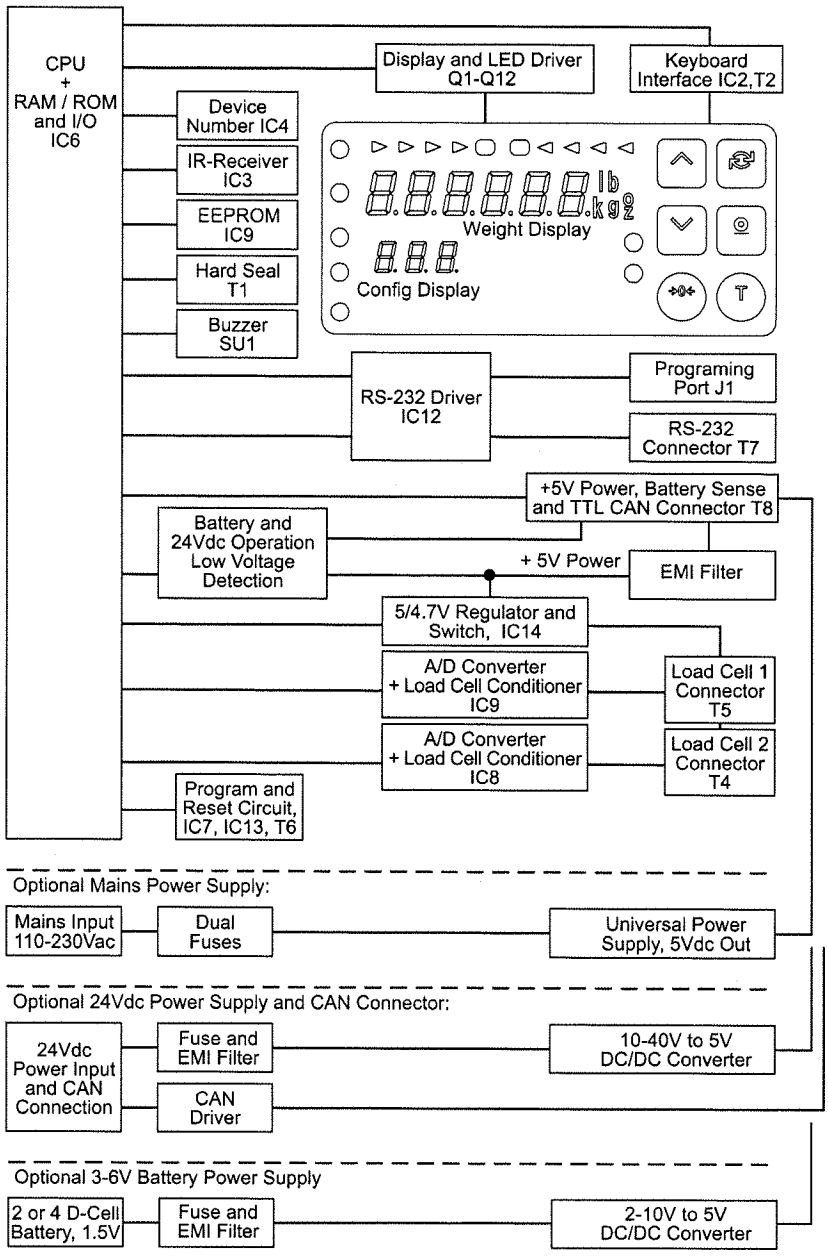

Figure 5 M1100 Block Diagram.

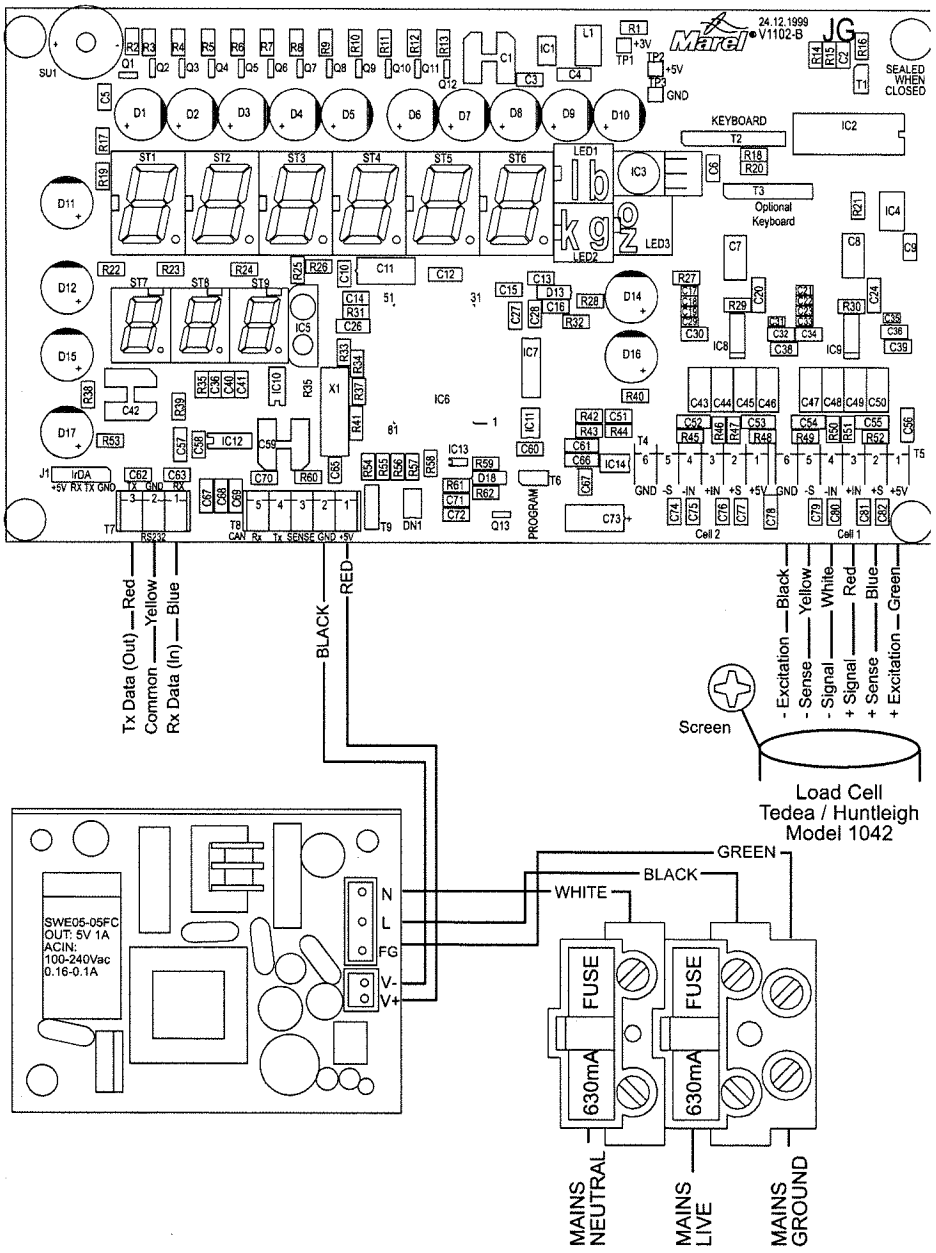

Figure 6 M1100 Cable Connections
110-230Vac Mains Operated

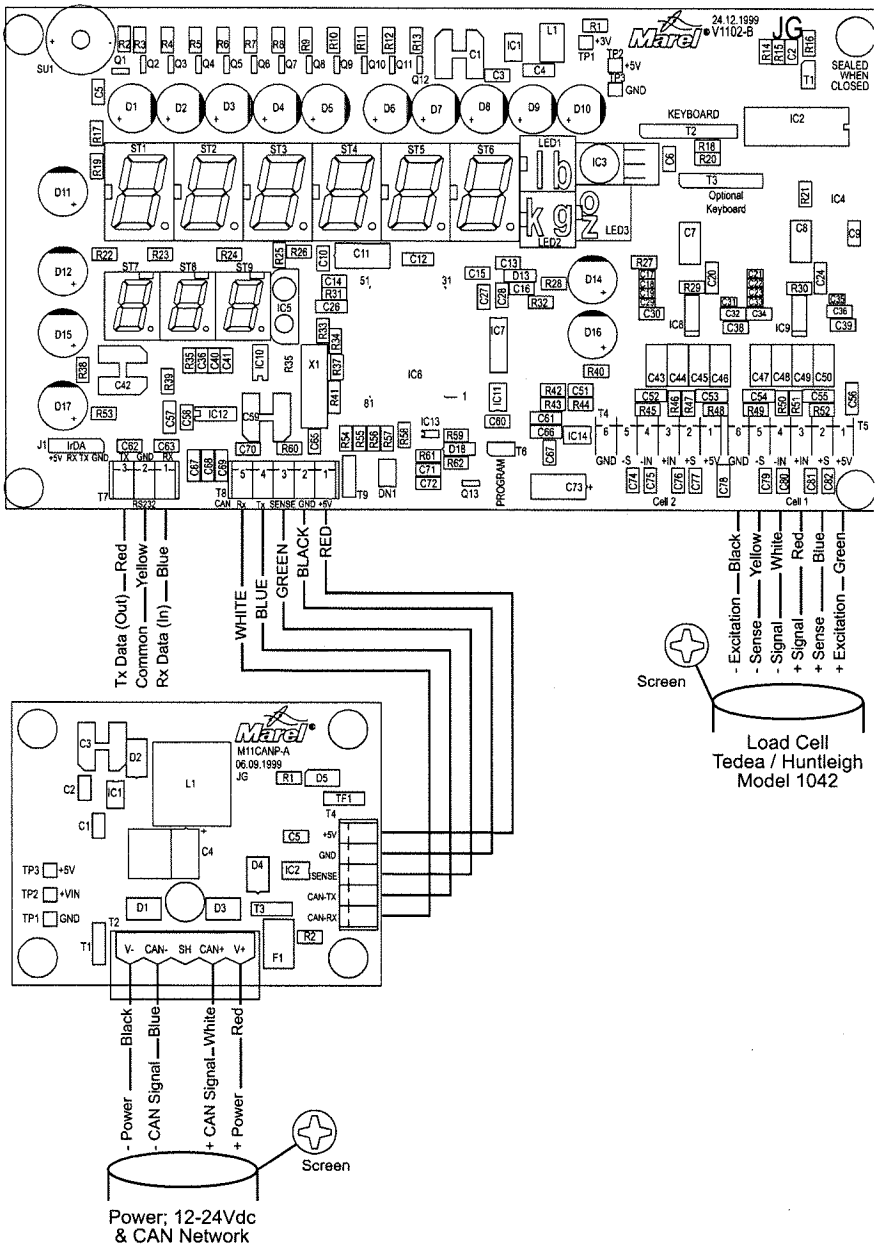

Figure 7 M1100 Cable Connections
24Vdc Operation and a CAN Network Connection