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WEIGHING CONTROLLER TYPE MCE9625G

Installation guide for system with digital loadcells and LCD display

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2) Installation

2.1 Introduction

This guide explains the installation of the EILERSEN ELECTRIC's MCE9625G (with graphic LCD display) weighing terminal with 1-8 digital loadcells with MCE9610 loadcell modules (Microchip PIC17 based):

- Possibility for until 8 loadcells. All loadcells must used in the same system.
- Three digital inputs (5-30VDC) and three digital outputs (24VDC).
- RS485 connection between loadcells and MCE9625 display.
- Two RS232 interfaces
- One RS422/RS485 interface.

This manual is to be used in combination with the *Users guide* for the installed software and applies to software of type: STDLCD, LCDLIM, LCDRCP and software derived from these standard applications.

2.2 Mains

The supply should be as stable as possible. Avoid connecting the weighing terminal to the mains at points where interference generating equipment is connected. The earth connection should only be made if a sufficiently noise-free earth is available (a separate earth connection may be required). It is **strongly** recommended that the weighing system is always powered.

As soon as power is applied the following will happen:

- BIOS date and revision number is displayed along with the compilation date and time.
- The application code checksum is checked (the display shows "APPLICATION CHECKSUM" and then "APPLICATION CHECKSUM: OK".)
- The display shows "Press 'Shift' to enter setup." To allow the user to enter BISO set-up. Please check the detail in the separate BIOS reference.
- The application program is started (the display shows "STARTING APPLICATION").
- After the reboot the software version (name, date and revision) is displayed.
- Compilation date and time is display.
- The terminal is ready and showing the actual load.

If an error is present during power-on the display will show **"-PXXXX-"**, where XXXX is an error code. To select normal reading press ⸤Esc⸥ (= ⸤Shift⸥ + ⸤Del⸥). The error may then be corrected by correcting parameter setting etc. Please check the list of error codes below.
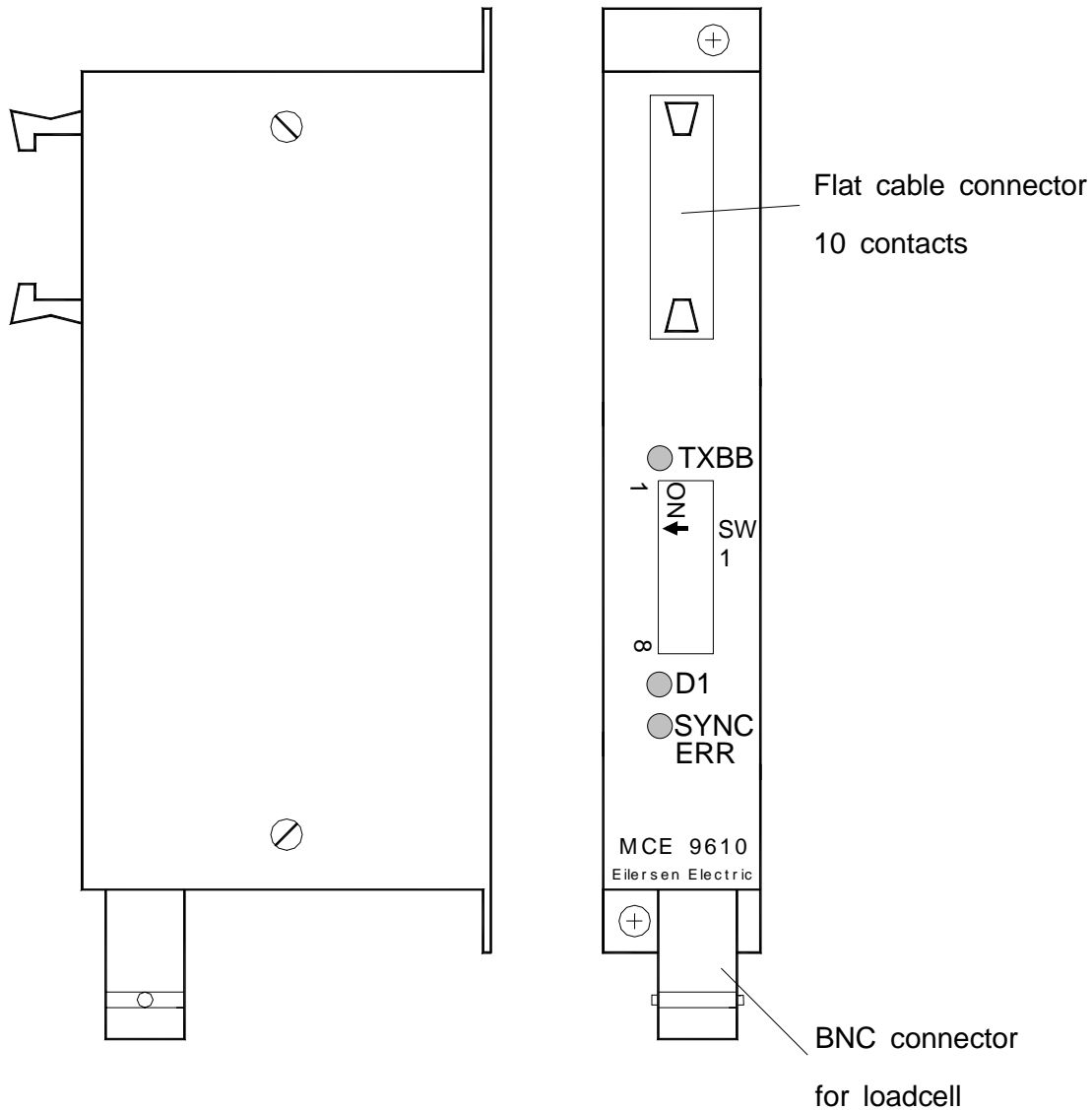
2.3 Loadcell modules (MCE9610)

Below the layout of the MCE9610 loadcell module is shown. Before using the system the loadcells must be connected to the loadcell modules.

Please notice that the loadcell and the PIC in the loadcell module **MUST** have the same number. Loadcells and loadcell modules **MUST NOT** be mixed. The loadcell module **MUST** be connected to exactly the loadcell it is intended for and vice versa.

All switches (SW1) in the loadcell module must be at the correction position.

Please notice that the switches are only read at power-up. So if a change in the switch setting is necessary the power has to be disconnected and then reconnected (after 10 seconds) before the MCE9610 loadcell module recognises the new switch setting.

Flat cable connector

10 contacts

TXBB

SW 1

D1

SYNC ERR

MCE 9610
Eilersen Electric

BNC connector

for loadcell

The LED's are used to indicate the following conditions:

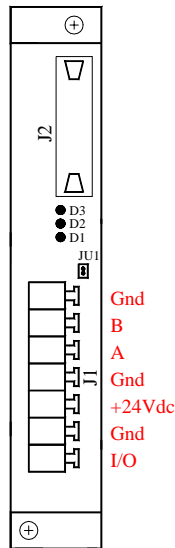| MCE9610 LED'S		
TXBB	Green	Communication. Must be on/flashing rapidly whenever the system is has started the application program.
D1	Yellow	No synchronisation between loadcell modules: One or more loadcells not connected to loadcell module or poor connection.
SYNC ERR	Red	No loadcell synchronisation: No loadcell connected to loadcell module or poor connection.

The switches SW1.1-4 are used to select different modes of operation. Normally when used with a MCE9625 the default settings must be used.

MCE9610 SW1.1-4		
SW1 No	**Default setting**	**Function**
1	OFF	Test mode
2	ON	Filter
3	ON	Compensation look-up table (for some loadcell module software versions this feature is always enabled)
4	OFF	Baud rate OFF: 115200 ON: 9600

Switch SW1.5-8 is used for address selection. All loadcell modules must have unique addresses ascending from 0 with no gaps. In systems with 1-8 load cells switch SW1.5 must be set to OFF. Please refer to the separate manual for special systems using more than eight loadcells for further details.

MCE9610 SW1.6-8				
SW1.5	**SW1.6**	**SW 1.7**	**SW1.8**	**Address**
OFF	OFF	OFF	OFF	0
OFF	OFF	OFF	ON	1
OFF	OFF	ON	OFF	2
OFF	OFF	ON	ON	3
OFF	ON	OFF	OFF	4
OFF	ON	OFF	ON	5
OFF	ON	ON	OFF	6
OFF	ON	ON	ON	7

2.4 MCE9601 Terminal Module

```
        ⊕
       ▽
  J2
       △
     ● D3
     ● D2
     ● D1
       JU1
       ▣
      ⊟  Gnd
      ⊟  B
      ⊟  A
      ⊟  Gnd
      ⊟  +24Vdc
      ⊟  Gnd
      ⊟  I/O
        ⊕
```

Above the layout of the MCE9601 terminal module is shown. The MCE9601 module is used for connection between the Eilersen Electric digital loadcell bus at one side and power supply/equipment at the other side.

The J1 terminal block is used for connection of the following:

- Terminals **Gnd** and **B** (-) and **A** (+) gives access to the RS485 bus of all equipment connected to the loadcell bus. These terminals are used to connect it to the loadcell modules.

- Terminals Gnd and +24Vdc provides external power to the equipment connected to the loadcell bus. These terminals has to be connected to an external +24VDC power supply.

- Terminals Gnd and I/O are the internal syncronization signal used by the loadcell modules. Normally these terminals have no external connection and must be left open.

The J2 connector is used for connecting equipment (loadcell modules, communication modules etc.) on the digital loadcell bus by using the supplied ribbon cable with mounted connectors.

The JU1 jumper is used for hardware synchronisation. Normally this jumper should be left in the default factory setting which is ON.

The light emitting diodes on the MCE9601 module have the following function:

LED	Function
D1 (Green)	**RS485 Communication**. This LED should be **ON** during normal operation (Actually it is flashing quickly, but this can look like a steady light).
D2 (Yellow)	This LED should be **OFF** during normal operation. If this lamp is lit, the I/O pin are at reversed polarity.
D3 (Red)	**Hardware Synchronisation**. This LED should be **ON** during normal operation (Actually it is flashing quickly, but this can look like a steady light).

2.5 Installation of the system

First check that the weight display is showing no status codes (the display could however be showing "MAX" or "MIN" to indicate that the weight is out of range). If a status code is shown please see below for the reason and correct the error.

Please notice that all parameter description texts used below assumes that the language is set to *English*.

Please notice that details about how to select and use the different screens and the exact appearance of the screen may differ slightly for some special software. Please refer to the separate *Users guide* for a complete description of special screens. Software for special use (e.g. more than one weighing system on the same display) has a separate installation guide.

Installation of the system is done by following the instructions given in his section sequentially.

- Entering of weighing range parameters
- Tare compensation (Coarse taring)
- Checking loadcell connection
- Corner calibration (where applicable)
- Fine adjustment of calibration (where applicable)

2.6 Weighing range

Before the system can be used it is necessary to insert the number of loadcells and the weighing range parameters for both normal and calibration mode. This is done by selecting the **SYSTEM** screen (F5) and then the **WEIGHING** screen (F1). Below the **WEIGHING** screen is shown along with the function keys that can be used.

```
WEIGHING                  'Stop' = Return
 RAN. ('+/-'): Normal
 MIN  ('F6') : -10.000
 MAX  ('F7') : 310.000           (F10)
                                     1
                                  FACTOR
400     KG       1        0.1        4
MEAS.T. UNIT     DP     DIVISION LC.NO
```

Stop

+/-

F1   F2   F3   F4   F5

F6   F7

In this screen all parameters relating to selection of weighing range, number of loadcells and integration period can be selected. At the top it is shown whether the values applies to normal or calibration reading. Please notice that values for BOTH normal AND calibration reading MUST be entered (except integration period and number of loadcells). The function keys are used as follows:

F1   Selects entry of the integration period in milliseconds (a fairly good default values would be 400). A large number gives a calm reading while a smaller value gives a faster update of the display.

F2   Selects the unit: G, KG or T (grams, kilogram or tonnes).

F3   Selects the next possible *decimal point position* (depending on the loadcells connected).

F4	Selects the next possible *display division* (depending on the loadcells connected).
F5	Selects entry of loadcells. If this number does not match the actual number of loadcells found, an error code will be given.
F6	Selects entry of the *minimum weight.*
F7	Selects entry of the *maximum weight.*
F10	Selects entry of *loadcell factor*. The factor (1-6) indicates the number of supporting points compared to the number of loadcells. E.g. if You have a 3-legged tank with one loadcell this factor must be 3 while a 4-legged tank with two loadcells should have this factor set to 2. Please notice that this feature is optional and not included in all programs.
✘	Selects between showing and entering values used for normal weight reading and calibration weight reading. Please notice that values for BOTH normal AND calibration reading MUST be entered (except integration period and number of loadcells).
Stop	Reselects the **SYSTEM** screen.

Please notice that when one value is changed one or more of the other values may have to be changed due to the limited number of digits in the display, These changes are done automatically. Please check all values before returning from this screen to insure that the correct weighing range is selected. The values entered for *Maximum* and *minimum weight* are the load where the display reading is switch to **"MAX"** or **"MIN"** to indicate that the reading is outside the allowed range. The *Minimum weight* is normally always a negative number to allow the reading to be 0 (otherwise the reading will be **"MIN"** when the scale is empty). Negative values are entered by pressing ✘ as the first key when the value is entered.

2.7 Coarse tare (compensation of the weighing arrangement load)

To compensate for the weight of the mechanical weighing arrangement perform the following procedure:

1. The weighing arrangement must be empty and clean.
2. Select the **COARSETARE** screen (**F5** for **SYSTEM,** **F2** for **CALIBRATION**, **F5** for **COARSETARE**)
3. Press **F10** (= **Shift** + **F5**) to coarse tare the system.

Below the **COARSETARE** screen is shown along with the function keys that can be used.

```
COARSETARE              'Stop' = Return
TOTAL:    1.235 (  1.237)
LC
     0:    0.333 (  0.334)
     1:    0.333 (  0.333)
     2:    0.334 (  0.333)
     3:    0.235 (  0.235)
         TARE     ACTUAL  C. TARE:   F10
```

Stop

F2

F10

Furthermore the cursor keys ($\uparrow$, $\downarrow$, $\leftarrow$ and $\rightarrow$) can be used. The function keys are used as follows:

|	
F2	Selects entry of a new coarse tare value for the loadcell displayed at the bottom of the screen. This can be used if the correct tare values are known from a prior coarse tare but has been changed accidental.
F10	Perform coarse taring for all loadcells with the actual load.
4, **8**, $\uparrow$ and $\leftarrow$	Select the previous loadcell. The current selected loadcell is displayed at the bottom of the screen.
6, **2**, $\downarrow$ and $\rightarrow$	Select the next loadcell. The current selected loadcell is displayed at the bottom of the screen.
Stop	Reselects the **CALIBRATION** screen.

2.8 Checking of loadcell connection

Check that all loadcells are connected correct, that all loadcell modules have unique addresses ascending from 0 with no gaps and that the weighing arrangement mechanically does not touch the surroundings, by executing the following procedure:

1. Select a load that weighs more than 1% of the weighing range, and that can be placed on the weighing-arrangement just above each loadcell.

2. Select the **NORMAL** screen and gross weight reading

3. In turn, place the load just above each loadcell. The changes in the reading (the upper display) should always be positive and equal no matter what loadcell the load is placed on. If the changes are not equal or are not positive, maybe the weighing-arrangement mechanically is touching the surroundings or one or more of the load-cells are connected wrong or one or more loadcell module addresses are wrong. If the changes are not within +/-10% of the load value check and correct the weighing ranges (as described above) and the loadcell module addresses.

If the checking of the loadcell connections causes any changes to the mechanical system, the loadcell connections, the loadcell module addresses or the weighing range parameters please redo the coarse taring as described above.

2.9 Corner calibration

Corner calibration is not necessary if the loadcells are levelled and there is no tension in the weighing arrangement and/or the load is always distributed in the same way (e.g. tanks). To perform the corner calibration a reference load is necessary. To compensate for the mechanical differences and levelling inaccuracies perform the following procedure:

1. The weighing arrangement must be empty and clean.

2. Zero the system (**>0<**).

3. Select the **CORNERCALIBRATION** screen (**F5** for **SYSTEM,** **F2** for **CALIBRATION**, **F4** for **CORNERCALIBRATION**)

4. Enter the weight of a reference load (press **F1**, enter the weight of the reference load, accept the entry by pressing **Enter**)
    NOTICE: The accuracy of the calibration is strongly dependant on the accuracy of the reference load.

5. Press **Start** to start the corner calibration procedure.

6. For every loadcell/corner repeat he following steps:

    a. Place the reference load directly above the loadcell with the address shown. Please notice that it is absolutely necessary for a correct corner calibration that the load is place over the loadcell with the address displayed

    b. Press ⌶F3⌶.

    c. Remove the load.

    d. Zero (⌶ >0< ⌶) if the reading does not return for 0.

7. After this procedure the system calculates the corner calibrations factors while counting from 0 to 100%. This make take a while. The load may be removed during this calculation.

The procedure described above can be aborted by pressing ⌶ Esc ⌶.

Below the **CORNERCALIBRATION** screen is shown along with the function keys that can be used.

```
┌─────────┐   ┌──────────────────────────────────────────┐
│  Start  │   │ CORNERCALIBRATION        'Stop' = Return  │
└─────────┘   │ GROSS:     5.000      'Start' = Cal.proc. │
              │ LC:                                        │
┌─────────┐   │           0: 524288   5.000               │
│  Stop   │   │           1: 524288   5.000               │
└─────────┘   │           2: 524288   5.000               │
              │   5.000   3: 524288   5.000               │
              │    LOAD    FACTOR     REG.   CALIBRATE: F10│
              └──────────────────────────────────────────┘

      ┌──────┐   ┌──────┐   ┌──────┐
      │  F1  │   │  F2  │   │  F3  │
      └──────┘   └──────┘   └──────┘

                                          ┌──────┐
                                          │ F10  │
                                          └──────┘
```

Furthermore the cursor keys (⌶↑⌶, ⌶↓⌶, ⌶←⌶ and ⌶→⌶) can be used. The function keys are used as follows:

⌶ Start ⌶   Starts the pre-programmed corner calibration procedure.

⌶ F1 ⌶   Selects entry of the weight of the reference load used for corner calibration. Please notice that the accuracy of the calibration is strongly dependant on the accuracy of the reference load. The weight of the load must be selected so it is not less than the normal load applied to each corner, e.g. 1/3 off the normal total load.

⌶ F2 ⌶   Selects entry of a new corner calibration factor for the loadcell displayed at the bottom of the screen. This can be used if the correct calibration factors are known from a prior corner calibration but has been changed accidental.

⌶ F3 ⌶   Register the actual load for the loadcell displayed at the bottom of the screen.

⌶ F10 ⌶   Calculate the corner calibration factors with the loads previously registered. If the pre-programmed procedure is used this will be done automatically when the last registrations is made.

⌶4⌶, ⌶8⌶, ⌶↑⌶ and ⌶←⌶

                  Select the previous loadcell. The current selected loadcell is displayed at the bottom of the screen.

6 , 2 , ↓ and ➡

        Select the next loadcell. The current selected loadcell is displayed at the bottom of the screen.

Stop   Reselects the **CALIBRATION** screen.

2.10 Fine adjustment of the calibration

The system can now be calibrated with a reference load by performing this procedure:

1. The system must be coarse tared and corner calibrated as described above. If their is any question about that please check the corner calibration with a reference load.

2. The weighing arrangement must be empty and clean.

3. Zero the system (>0<).

4. Select the **CALIBRATION** screen (F5 for **SYSTEM** and F2 for **CALIBRATION**)

5. Enter the weight of a reference load (press F1 , enter the weight of the reference load, accept the entry by pressing Enter)

    NOTICE: The accuracy of the calibration is strongly dependant on the accuracy of the reference load.

6. Place the reference load on the weighing arrangement. The weight reading will now be within +/- 10% off the correct value. If not so the mechanical and electrical connections must be checked along with the weighing range settings (calibation reading).

7. Press F8 (= Shift + F3) to calibrate.

Below the **CALIBRATION** screen is shown along with the function keys that can be used.

```
CALIBRATION                'Stop' = Return

GROSS:    5.000



 5.000    524288 KALIBRÉR
  LOAD     FAKCOR    F8.:   CORNERS COARSET
```

Stop

F1   F2   F4   F5

F8

The function keys are used as follows:

F1   Selects entry of the weight of the reference load used for corner calibration. Please notice that the accuracy of the calibration is strongly dependant on the accuracy of the reference load. The weight of the load must be selected so it is not less than the normal total load.

F2   Selects entry of a new common calibration factor This can be used if the correct calibration factor is known from a prior calibration but has been changed accidental.

F4   Selects the **CORNERCALIBRATION** screen.

F5	Selects the **COASRSETARE** screen.
F8	Performs calibration.
Stop	Reselects the **SYSTEM** screen.

3) Status codes

Status codes are shown as a 4 hex digit number (**-XXXX-**). If an error is present when the system is powered a P will be preceding the code (**PXXXX-**). If more than one error is present the individual status codes will be OR'ed.

Code	Type	Reason
0001	Sample ID missing	Poor connection between loadcell module(s) and display.
0002	Loadcell time-out	No loadcell connected to loadcell module or poor connection.
0004	No loadcell synchronisation	No loadcell connected to loadcell module or poor connection.
0008	No synchronisation between loadcell modules	One or more loadcells not connected to loadcell module or poor connection.
000E	Synchronisation error	All of the above error codes OR'ed together: One or more loadcells not connected to the loadcell module or poor connection. This is normally the result when one or more loadcells are not connected.
0010	Loadcell module overflow	Internal loadcell module error.
0040	Latch ID wrong or missing	Poor connection between loadcell module(s) and display
0080	Loadcell module not answering	Poor connection between loadcell module(s) and display or loadcell module not connected or not powered.
0400	Weight buffer overflow	Weighing time to long..
0800	No load modules connected	Poor connection between loadcell modules and display or loadcell modules not connected or not powered.
8000	Wrong number of loadcells	The number of loadcells found during power-on does not match the number entered (in the **WEIGHING** screen). If the parameter entered is correct please check the **LOADCELL STATUS** screen to see that all loadcell modules addresses etc are correct.

If an error is present during power-on the display will show **"-PXXXX-"**, where XXXX is an error code. To select normal reading press `Esc` (= `Shift` + `Del`). The error may then be corrected by correcting parameter setting etc. Please check the list of error codes below.
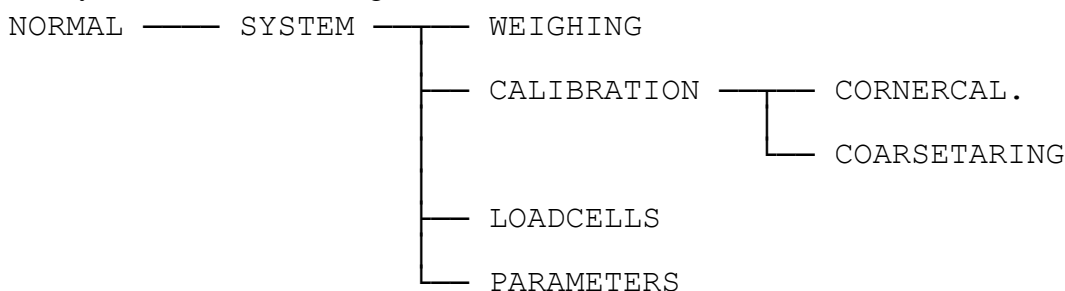
4) Operator panel

The operator panel holds a keyboard and a LCD display (40 * 8). The display will always show the actual state of the controller and the user entries possible. Below the display five function keys are located; the function of these keys depends on the screen selected. The function of the key will always be printed directly above the key. Normally the function keys are used to switch between the different screens or to initiate the entry of a data value. Depending on the screen etc. the following keys ca be used:

| 0 | - | 9 |:   Used to key in numbers.

.:   Decimal point. Used to key in decimal numbers.

✗:   Initiates the entry of a negative number

Enter: Accepts the entry of a number.

Del: Deletes the last entered digit.

Esc = Shift + Del:

         Aborts the entry and keeps the old value.

F1 - F10:   Function keys (F6 - F10 is activated by holding down Shift and pressing F1 - F10)

Stop: Returns to the previous screen.

↑ = Shift + 8:

         Move cursor up.

↓ = Shift + 2:

         Move cursor down

>0<:   Zeroes the weighing system.

AT: Automatic taring.

The functions stated above is the general function of the keys. Below the specific used of the keys in all screens is shown.

The system has the following screens:

```
NORMAL ——— SYSTEM ———┬——— WEIGHING
                     │
                     ├——— CALIBRATION ———┬——— CORNERCAL.
                     │                   │
                     │                   └——— COARSETARING
                     │
                     ├——— LOADCELLS
                     │
                     └——— PARAMETERS
```

For every software version a number of special screens is implemented. Please check the separate *Users guide* for a description of these screens

4.1 Data entry

Below an example of a typical data entry screen is shown:

```
12.

TIME (HH.MM)      : 11.59
```
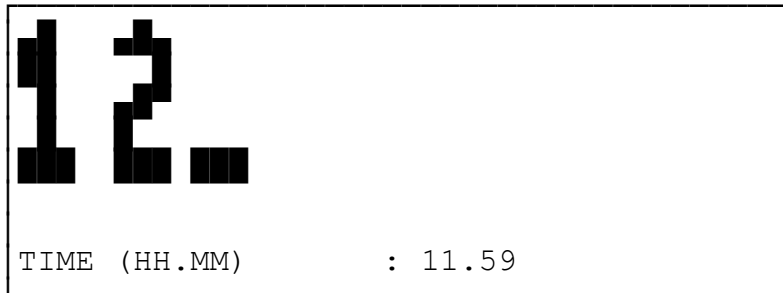
In the bottom an identification of the value being entered is shown. When the new number is keyed `Enter` must be pressed to accept the entry. To abort the entry press `Stop` or `Esc` (= `Shift` + `Del`). To enter a negative number `⌧` must be pressed before any digits are entered.

5) Connections

The connection shown below applies to the terminal block on the back of the MCE9625. If the system is connected via a motherboard please refer to the documentation for this motherboard. Please notice that the different groups (RS232, DIG.OUT. etc.) must normally **NOT** be powered from the terminals on the MCE9625, when the connection is made via a motherboard; the groups will then be powered from the motherboard.

POWER

No.	Function		Connection
+	+24VDC		Supply
-	0VDC		Supply

DIG.OUT

No.	Function		Connection
1	Output 1		
2	Output 2		
3	Output 3		
4	Common	+24VDC	

DIG.IN

No.	Function		Connection
1	Input 1		(closing switch to +24VDC)
2	Input 2		(closing switch to +24VDC)
3	Input 3		(closing switch to +24VDC)
4	Common	0VDC	

RS232

No.	Function		Connection
1	Supply	+24VDC	Supply
2	Txd-0		(RXD)
3	Rxd-0		(TXD)
4	Txd-1		(RXD)
5	Rxd-1		(TXD)
6	Supply	0VDC	Supply (and GND)

RS485 (Loadcells)

No.	Function		Connection
1	Supply	+24VDC	Supply
2	B	B	Loadcells: B
3	A	A	Loadcells: A
4	Supply	0VDC	Supply

RS485/422

No.	Function		Connection
1	Supply	+24VDC	Supply
2	R-		(T-)
3	R+		(T+)
4	Supply	0VDC	Supply (and GND)
5	T-		(R-)
6	T+		(R+)

AUX (LED –display mm.)

No.	Function		Connection
1	Supply	+24VDC	Supply
2	B		External devices: B
3	A		External devices: A
4	Supply	0VDC	Supply and external devices: Gnd

6) Download of new software to MCE9625

6.1 Download

1. Connect a RS232 cable from the PC COM port to one of the MCE9525 RS232 ports. Any COM-port can be used, but the batch-file on the download disk defaults to COM1. The COM-port can be change in the batch file (DL.BAT), replace '-c1' (for COM1) with e.g. '-c2' (for COM2). The cable must apply to this standard:

Download cable for MCE9625				
	PC COMx (Uses either 9 or 25 pin SUB-D connector)		MCE9625 (RS232 on block) (Use either RS232.0 or RS232.1)	
	9 pin connector	25 pin connector	RS232.0	RS232.1
PC.RxD	Pin 2	Pin 3	Terminal 2 *)	Terminal 4 *)
PC.TxD	Pin 3	Pin 2	Terminal 3 *)	Terminal 5 *)
GND	Pin 5	Pin 7	Terminal 6	Terminal 6

   *)   Either RS232.0 or RS232.1 can be used. However RxD and TxD for the same port MUST be used.

   All other connections to the RS232 port used for download must be disconnected.

   Any kind of equipment connection to the RS232 port not used for download must be switch off. If this is not possible it must be disconnected.

2. Power on the MCE9625. If any doubt that the MCE9625 RS232 port is powered correctly (The RS232 has a separate supply) the voltage between terminal 1 and 6 on the MCE9625 RS232 section must be checked. The voltage on terminal 6 must be +24VDC (+/-20%) when terminal 1 is used as reference. If not so a +24VDC supply must be connected as described above.

3. When the PC is running the download disk must be inserted. Please observed that the disk MUST NOT be write protected during download as a temporary file is written to the disk.

4. If Microsoft Windows 95/98 is used a DOS box must be started by selecting "MS-DOS-prompt" in the "Start" menu.

5. Select the floppy drive (A: or B:) by keying:

        "A: <ENTER>"
    or
        "B: <ENTER>".

6. Run the batch file 'DL.BAT' by keying:
        "DL <ENTER>"
    After a copyright notice the screen will display:
        Connecting...... etc.
    When using a floppy disp it may take 1-2 minutes before this happens.

7. Now download by switching the MCE9625 off shortly and then back on or press SHIFT, STOP and DEL simultaneously until the MCE9625 resets.

8. When the PC has made a connection to the MCE9625 the "Connecting" message will disappear and the PC will download the program. After this the PC program will stop and the MCE9625 will reboot with the new program. Download will take less than 5 minutes. Otherwise restart the procedure above.

The software version must be checked in the display when the MCE9625 reboots to assure that the download procedure was performed correct.

6.2 Errors

If this procedure is not working it is likely to be cause by one of these errors:

1. Cable error. Recheck the connections and try to switch TxD and RxD. Check the PC.TXD signal. The DC voltage must be between -3 and -25 VDC when GND is used as reference when download is not started. If not so the cable or the COM port is faulty.

2. The wrong COM port is used on the PC

3. No power supply for the MCE9625 RS232 block. Check this as described above.