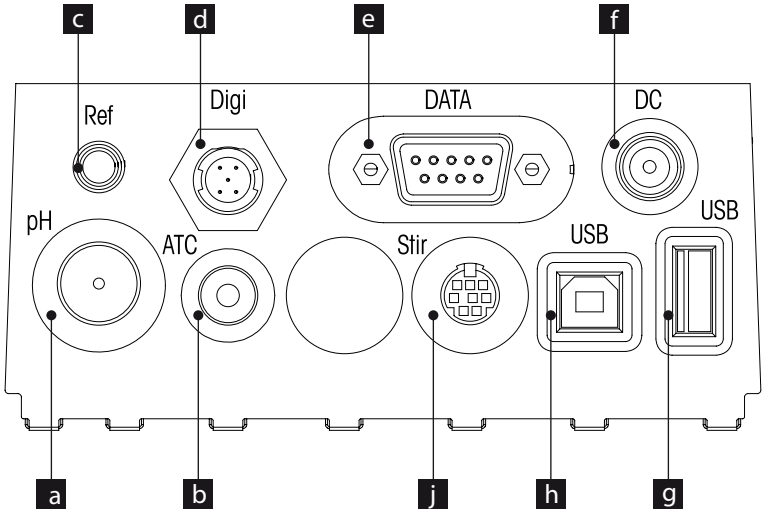
4 Operating the meter

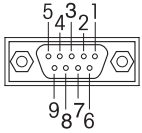
4.1 Backside layout



a	**BNC socket** for mV/pH signal input
b	**RCA (Cinch) socket** for temperature signal input
c	**Reference socket for reference electrodes**
d	**Digital socket for digital electrodes**
e	**RS232 interface**
f	**DC power supply socket**
g	**USB A interface**
h	**USB B interface**
i	**Mini DIN socket for METTLER TOLEDO stirrer**

4.1.1 Pin assignments RS232 connection

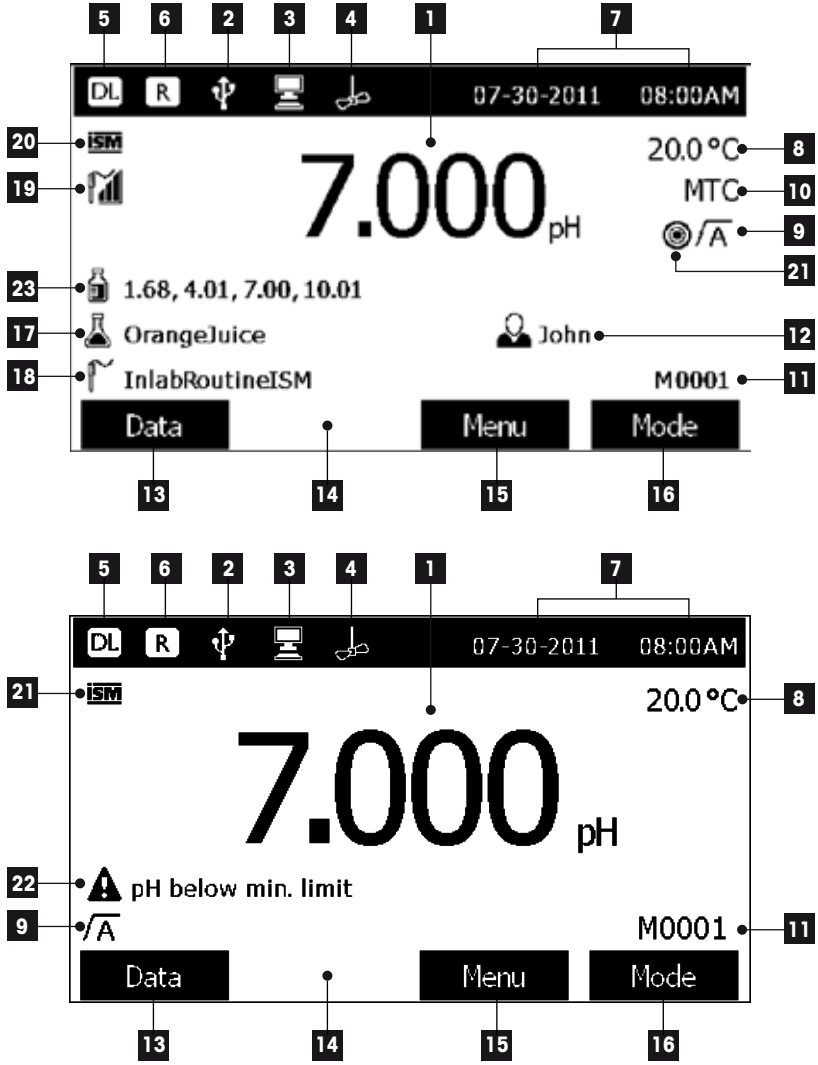
Below the PIN assigments for the RS-232 interface are shown. To this interface can be connected METTLER TOLEDO printers such as RS-P25.



Pin 1	NC	Pin 6	NC
Pin 2	TxD (out)	Pin 7	NC
Pin 3	RxD (in)	Pin 8	NC
Pin 4	NC	Pin 9	NC
Pin 5	RSGND		

4.2 The display

There are two modes for the display: the full-information screen with all the information on the display and the measurement close-up screen (superview) in which the measurement information is shown with large font. Switching between these views is possible by pressing READ for 2 s, both during a measurement or after/before a measurement.



1 Measurement value
2 USB device connected
3 PC connected (for LabX direct)

4 **Stirrer** icon (when stirring is taking place)

5 **Data logging** icon (timed interval reading)

6 **Routine mode** icon (user access rights are restricted)

7 Date and time

8 Measurement temperature

9 Endpoint format

10 Temperature compensation

ATC: Temperature sensor connected	**MTC**: no temperature sensor connected or detected

11 Number of data sets in memory

12 User ID

13 Softkey

14 Softkey

15 Softkey

16 Softkey

17 Sample ID

18 Sensor ID

19 **pH electrode condition** icon

		
Slope: 95-105% Offset: ±(0-20)mV Electrode is in good condition	Slope: 94-90% Offset: ±(20-35)mV Electrode needs cleaning	Slope: 89-85% Offset: ±(>35)mV Electrode is faulty

20 **ISM® sensor connected**

21 Stability criterion

Strict	Medium	Fast
		

22 Warning messages

23 Buffer groups or standards

4.3 Key controls

Key	Press and release	Press and hold for 2 seconds
ON/OFF 	Switch meter on or off	Switch meter on or off
READ 	Start or end measurement (measurement screen) Confirm input or start editing a table Exit menu and go back to measurement screen	Switch between measurement close-up screen and full-information screen
CAL 	Start calibration	Review the last calibration data
Softkeys	The function of the softkeys varies from screen to screen (see "Using the softkeys")	

4.4 Using the softkeys

The meter has four softkeys. The functions assigned to them change during operation depending on the application. The assignment is shown on the bottom line of the screen.

In the measurement screen, the softkeys are assigned as follows:

Data	**Menu**	**Mode**
Access data menu	Access meter settings	Change measurement mode

The other softkey functions are:

→	Move one position to the right	**Edit**	Edit table or value
←	Move one position to the left	**End**	End calibration
↑	Scroll up in the menu	**Yes**	Confirm
↓	Scroll down in the menu	**No**	Reject
+	Increase value	**Review**	Review selected data
–	Decrease value	**Save**	Save data, setting or value
⌄⌄	Scroll to next data set in memory	**Select**	Select the highlighted function or setting
⌫	Delete letters or numbers on alphanumeric keypad	**Start**	Begin the reference measurement
Delete	Delete selected data	**Trans**	Transfer selected data

4.5 Selecting a measurement mode

Press the **MODE** softkey to switch between the different measurement modes.

The sequence of the alternating measurement modes is:

1. pH
2. mV
3. rel. mV
4. ion

4.6 Navigating between menus

The meter display consists of a measurement frame, softkeys, areas for status icons and underlying menu areas.

To access the menu areas and to navigate between them, use various softkeys (see "Using the softkeys").

- Press **Menu**.
  → The **Setup** menu appears and the **pH/Ion** tab is highlighted.
- Press ← to highlight the **Setup** tab, or
- Press ↓ to highlight **Sensor ID / SN**.
- Press **EXIT** to return to the measurement screen.

4.7 Navigating within a menu

This example is based on the **Setup** menu, but the procedure applies to the other menus as well.

- Press **Menu**.

→ The **Setup** menu appears and the **pH/Ion** tab is highlighted.

- Press ↓ as often as needed to navigate to a menu item.
- Press **Select** to move deeper in the menu for the chosen operation.
- Continue navigating with ↑, ↓ or **Select** until the final destination is reached within the menu.
- Press **MODE/EXIT** to go back to the previous menu.
  — or —
- Press **READ** to return to the measurement screen directly.

4.8 Using the alphanumeric keypad

4.8.1 Alphanumeric input

The meter has a screen keypad for entering IDs, SNs and PINs. Both numbers and letters are allowed for these entries.

When entering a PIN, each character entered will be displayed as (*).

1 Press **READ** to start editing the cell in the table.

⇨ The softkeys on the display change.

2 Press + and − to enter the value and press **READ** to confirm.

⇨ The softkeys change back to ↑ and ↓.

3 Navigate to a cell and press **Delete** to remove a value.

4 To finish editing the table, navigate with the ↑ and ↓ to highlight **Save**.

5 Press **READ** to confirm the action and exit the menu.

4.9 Calibration

The meter allows you to perform pH/ion calibrations with up to 5 points.

Calibration is only possible in the full-information screen. When starting a calibration by pressing the **CAL** key while the instrument displays the close-up screen, it will automatically switch to the full-information screen.

4.9.1 Running a one-point pH/ion calibration

1 Place the electrode in a calibration buffer/standard and press **CAL**.

⇨ **Cal 1** appears on the display

2 The meter endpoints according to the preselected endpoint mode after the signal has stabilized or after pressing **READ**.

⇨ The relevant buffer/standard value is shown on the display.

3 Press **End** to accept the calibration.

⇨ The calibration result is shown on the display.

4 Press **Save** to save the result.
— or —

5 Press **Exit** to reject the calibration and return to sample measurement.

- With the one-point calibration only the offset is adjusted. If the sensor was previously calibrated with a multipoint calibration the previously stored slope will remain. Otherwise the theoretical slope (-59.16mV/pH) will be used.

4.9.2 Running a multi-point pH/ion calibration

pH and ion calibrations can be run with this meter for up to 5 points.

1 Run the calibration as described in "Running a one-point pH/ion" (steps 1 - 2).

2 Rinse the electrode with deionized water.

3 Place the electrode in the next calibration buffer.

4 Press **CAL**.

⇨ **Cal 2** appears on the display. The meter endpoints according to the preselected endpoint mode after the signal has stabilized or after pressing **READ**. The relevant buffer value is shown on the display.

5 Repeat the steps 2 - 4 for all calibration buffers.

6 Press **End** to end the calibration procedure.

⇨ Alternatively, the meter ends the calibration automatically when 5 calibrations are performed. The offset value and slope are shown on the display.

7 Press ≫ to scroll down to next data set

8 Press **Save** to keep the calibration.

9 Press **EXIT** to reject the calibration.

4.10 Automatic buffer recognition

The meter features automatic pH buffer recognition for the predefined buffer groups (see "Appendix") and the user-defined buffer groups. The buffers within a buffer group are automatically recognized by the meter and displayed during calibration.
This feature allows the calibration in any order within a predefined or user-defined pH buffer group.

4.11 Sample measurements

- Place the sensor in the sample and press **READ** to start a measurement.
  - The display shows the readings of the sample.
  - The endpoint format blinks, indicating a measurement is in progress.

→ As soon as the measurement is stable according to the selected stability criterion, the **Stability** icon appears.

- If the "automatic endpoint" format is selected, the measurement stops automatically as soon as the **Stability** icon appears.
- If the "manual endpoint" format is selected, press **READ** to manually stop the measurement.
- If the "timed endpoint" format is selected, the measurement stops after the preset time.

4.12 Data transfer

It is possible to transfer either all data or a user-defined set of data from the memory to a METTLER TOLEDO printer (for example RS-P26), to a PC by using LabX direct or to a USB memory stick.

The following section describes how to proceed with the different configurations.

Data transfer from the meter to a printer

1 Connect the RS232 cable to the meter and the corresponding interface on the backside of the printer.

2 Select the interface "printer" in the data transfer settings menu (see "Setup: Data Transfer Settings").

3 Start transfer in the data menu.

For some printers (e.g. RS-P25, RS-P26 and RS-P28), the baud rate settings will be automatically synchronized with those of the instrument.

For other printers the settings for data transfer in the printer need to be adjusted as follows:

- Baud rate: 1200
- Data bits: 8
- Parity: none
- Stop bits: 1

Data transfer from the meter to LabX direct pH

1 Connect the instrument via USB B to the PC.

⇨ The icon appears on the display.

2 Select the interface "LabX direct" in the data transfer settings menu (see "Setup: Data Transfer Settings").

3 Open **LabX direct pH** and select the correct instrument.

8.4 Error messages

Message	Description and Resolution
pH/mV/ion/temperature exceeds max. limit	Measurement limits are activated in the menu settings and measured value is outside these limits. • Check the sample. • Check sample temperature. • Make sure that the pH electrode wetting cap has been removed and that the electrode is properly connected and placed in the sample solution.
pH/mV/ion/temperature below min. limit	
Memory is full	Max. 1000 measurement data can be stored in the memory. • Delete all or partial data in the memory, otherwise you will not be able to store new measurement data.
Please calibrate electrode	Calibration reminder has been switched on in the menu settings and last calibration has expired. • Calibrate the electrode.
Active sensor cannot be deleted	Deleting the calibration data of the selected sensor ID is not possible, because it is currently the active sensor ID in the meter shown on the display. • Enter new sensor ID in the menu settings. • Select another sensor ID from the list in the menu settings.
Wrong buffer	Meter cannot recognize the buffer or standard/buffer has been used twice for calibration/two buffers differ less than 60 mV. • Make sure that you have the correct buffer and that it is fresh. • Make sure that the buffer has not been used more than once during the calibration.
Slope out of range	The calibration result is outside the following limits: Slope < 85% or > 110%, Offset < -60 mV or > + 60 mV. • Make sure that you have the correct buffer and that it is fresh. • Check mV signal of electrode, clean or replace the electrode.
Offset out of range	
Standard temp. out of range Buffer temp. out of range	The ATC measured temperature is out of pH calibration buffer range: 5 … 50 °C. • Keep the buffer/standard temperature within the range. • Change the temperature setting.

Message	Description and Resolution
Temperature differs from setting	ATC measured temperature differs by more than 0.5°C from the user-defined value/temperature range. • Keep the buffer/standard temperature within the range. • Change the temperature setting.
ISM® sensor communication error	Data has not been transferred correctly between ISM® sensor and meter. Reconnect the ISM® sensor and try again.
Self-test failure	Self-test has not been completed within 2 minutes or meter is defective. • Restart self-test and finish within 2 minutes. • Contact METTLER TOLEDO service if problem persists.
Wrong settings	Entered value differs by less than 1 pH unit/5°C from other preset values. • Enter a higher/lower value in order to get a bigger difference.
Out of range	Either entered value is out of range. • Enter a value which is within the range shown on display. or Measured value out of range. • Make sure the electrode wetting cap has been removed and that the electrode is properly connected and placed in the sample solution. • If no electrode is connected, put the shorting clip in the socket.
Wrong password	The entered PIN is not correct. • Re-enter the PIN. • Reset to factory settings, all data and settings will be lost.
Passwords do not match	The confirmation PIN does not match with the entered PIN. • Reenter PIN.
Program memory error	Meter recognizes internal error during start-up. • Switch the meter off and back on. • Contact METTLER TOLEDO service if the problem persists.

Message	Description and Resolution
Data memory error	The data could not be stored into memory. • Switch the meter off and back on. • Contact METTLER TOLEDO service if the problem persists.
No matching data found in memory	The entered filter criterion does not exist. • Enter a new filter criterion.
Sensor ID already exists, previous SN will be overwritten	Two sensors with the same ID but different SN are not allowed in the meter. If a different SN has been entered for this sensor ID previously, the old SN will be overwritten. • Enter a different Sensor ID in order to keep the previous ID and SN.
Update failed	The software update process failed. This could be due to the following reasons: • The USB stick is not connected or it is disconnected during the update process • The update software is not in the correct folder
Export failed	The exporting process failed. This could be due to the following reasons: • The USB stick is not connected or it is disconnected during the exporting process • The USB stick is full

8.5 Error limits

Message	Range not accepted	
Out of range, determine again	pH	<-2.000 or > 20.000
	mV	<-2000.0 or > 2000.0
Buffer/standard temp. out of range	T (pH)	< 5 or > 50 °C
Offset out of range	I Eref1-Eb I > 60 mV	
Slope out of range	Slope < 85% or > 110%	
Wrong buffer	I ΔEref1I < 10 mV	
Invalid pH for user-defined buffer	I ΔpHI < 1 pH	
ATC measured temperature is different to the user-defined value	I T(ATC)T(buffer) I > 1 °C	