DOC022.98.80315

sympHony™ Benchtop Meters

B10P, B10C, B20PI, B30PCI & B40PCID models

09/2012, Edition 2

sympHony™

User Manual
Manual del Usuario
Manuel d'utilisation
Bedienungsanleitung
Manuale d'uso

Table of Contents

Section 1 Specifications

Specifications are subject to change without prior warning.

Specification	Details
Dimensions	22.9 x 14.5 x 8.5 cm (9 x 5.7 x 3.4 in.)
Weight	900 g (1.98 lb)
Meter enclosure	IP 54 (with cables and rear covers installed)
Housing materials	PC/ABS, Santoprene, PC
Measurement modes	By Stability (user-adjustable in pH, ORP and ISE values) By Time (user-adjustable) Continuous
Data storage (Data logger)	Up to 500 measurements 10 most recent calibrations Sensor history
Self test	The user can test the keypad and screen
Languages	English, Spanish, French, German and Italian
Power requirements (external)	Class II, external power adapter 100-240 VAC, 0.4 A, 47-63 Hz input, 12 VDC, 1.1 A output
Input and output connectors	pH/mV/ISE: BNC connector (imp. ≥ 10^{12} **Ω**) DO: BNC connector Reference electrode: banana plug (4 mm) Temperature: banana plug or phone jack Conductivity: phone jack RJ45 (8c) Stirrer: RCA connector Printer or PC: mini-USB connector External PC keyboard: mini-DIN connector
Temperature	Storage: –15 to 65 °C (5 to 149 °F) Operating: 5 to 40 °C (41 to 104 °F)
Operating humidity	80% (non-condensing)
Certifications	cETLus (to current standards UL, CSA) CE
Warranty	3 years
Measurement configuration (PROFILES)	Up to 10 (user defined)
pH	
Instrument range	-2 to 19 pH
Resolution	0.1/0.01/0.001 (selectable)
Reproducibility	± 0.001 pH (± 1 digit)
Relative accuracy	≤ 0.002 pH (± 1 digit)****
Temperature compensation	Via an ATC probe or by entering the value manually

Specifications

Specification	Details
Input impedance (pH)	≥ 10^{12} Ω
Calibration	Up to 5 calibration points Buffer Types: Technical Buffers, NIST Buffers, Custom Values, To a Specific Value, Data Introduction and Theoretical Values Isothermal point, manual entry or calculation User defined calibration frequency: from 0 to 168 hours Automatic re-calibration warning Automatic rejection of electrodes in poor condition
ORP	
Instrument range	± 2000 mV
Resolution	0.1/1 mV (selectable)
Reproducibility	± 0.1 mV (± 1 digit)****
Relative accuracy	≤ 0.2 mV
Calibration	Automatic recognition (220 mV @ 25° C), To a Specific Value, Data Introduction or Theoretical Values
Temperature	
Instrument range	-20 to 150 °C (-4 to 302 °F)
Resolution	0.1 ºC
Relative accuracy	≤ 0.2 ºC (≤ 0.4 °F) (± 1 digit)
Calibration	Probe deviation correction (25 and 85 ºC)
Probe type	Automatic recognition of the connected probe Pt 1000 or NTC 22 KΩ ***
Conductivity	
Instrument range	Conductivity: 0.001 µS/cm* to 1000 mS/cm**
	Resistivity: 1 Ω** to 1000 MΩ*
	Salinity: 0.0 to 42 ppt practical salinity (standard method 2520B)
	TDS: 0.000 mg/L to 4444.4 g/L
Resolution	Variable (auto-range)
Reproducibility	± 0.1% (± 1 digit)
Relative accuracy	≤ 0.5 % of the measured value (± 1 digit)
Temperature compensation	Via a probe or by manual entry Reference temperature (Ref. Temp.): 20, 25 ºC or any value between 0 and 99 ºC Temperature Coefficient (TC): Linear, variable 0 to 9.99 %/ºC Non-linear function for natural waters (UNE EN 27888)

Specification	Details
Calibration	Up to 3 calibration points Standard types: Molar (KCl), Demal (KCl), NaCl St. 1014.9 µS/cm, To a Specific Value, Data Introduction or Theoretical Values User defined calibration frequency: from 0 to 2376 hours Automatic re-calibration warning Cell constants accepted: 0.001 to 199.9 cm^{-1}
TDS Factor	Programmable between 0.01 and 4.44
ISE	
Instrument range	10^{-5} to 10^{-1} mol/L
Calibration	From 2 to 5 programmable standards Automatic blank correction Up to 4 calibration curves Selection of calibration units: mol/L, mmol/L, µmol/L, g/L, mg/L, µg/L, %, M, mM or none
Dissolved Oxygen (DO)	
Instrument range	0.00 to 60.0 mg/L (0.0 to 600 %)
Resolution	0.01 mg/L (from 0.00 to 19.99 mg/L) 0.1 mg/L (from 20.0 to 60.0 mg/L) 0.1 % (from 0.0 to 19.9 %) 1% (from 20 to 600 %)
Reproducibility	± 0.2 % (± 1 digit)
Relative accuracy	≤ 0.5 % of the measured value (± 1 digit)
Temperature compensation	Automatic with NTC sensor
Calibration	Water Saturated Air, Water Sat. Air & Zero, To a Specific Value or Theoretical Values
Pressure compensation range	600 mBar to 1133 mBar (450 to 850 mm Hg)
Salinity correction	From 0 to 45 ppt

* with C = 0.1 cm^{-1}

** with C = 10 cm^{-1}

*** In the range 70 to 90 ° C the instrument doesn't automatically recognize the probe. If a probe is connected while measuring in this range, the instrument will ask the type of probe connected.

****The meter may have slight deviations in the measurement error (maximum 0.6 mV) when exposed to the following external electromagnetic frequencies: 162 MHz, 190 MHz and 1769 MHz.

Section 2 General information

2.1 Safety information

NOTICE

The manufacturer is not responsible for any damages due to misapplication or misuse of this product including, without limitation, direct, incidental and consequential damages, and disclaims such damages to the full extent permitted under applicable law. The user is solely responsible to identify critical application risks and install appropriate mechanisms to protect processes during a possible equipment malfunction.

Please read this entire manual before unpacking, setting up or operating this equipment. Pay attention to all danger and caution statements. Failure to do so could result in serious injury to the operator or damage to the equipment.

Make sure that the protection provided by this equipment is not impaired. Do not use or install this equipment in any manner other than that specified in this manual.

2.1.1 Use of hazard information

⚠ DANGER

Indicates a potentially or imminently hazardous situation which, if not avoided, will result in death or serious injury.

⚠ WARNING

Indicates a potentially or imminently hazardous situation which, if not avoided, could result in death or serious injury.

⚠ CAUTION

Indicates a potentially hazardous situation that could result in accident or minor injury.

NOTICE

Indicates a situation which, if not avoided, may cause damage to the instrument. Information that requires special emphasis.

2.1.2 Precautionary labels

	Electrical equipment marked with this symbol may not be disposed of in European public disposal systems after August 12, 2005. In conformity with European local and national regulations (EU Directive 2002/98/EC). European electrical equipment users must now return old or end-of-life equipment to the Producer for disposal at no charge to the user.
	This is the safety alert symbol. Obey all safety messages that follow this symbol to avoid potential injury. If on the instrument refer to the instruction manual for operation or safety information.

2.2 Certification

Canadian Radio Interference-Causing Equipment Regulation, IECS-003, Class A:

Supporting test records reside with the manufacturer.

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

FCC Part 15, Class "A" Limits

Supporting test records reside with the manufacturer. The device complies with Part 15 of the FCC Rules. Operation is subject to the following conditions:

1. The equipment may not cause harmful interference.
2. The equipment must accept any interference received, including interference that may cause undesired operation.

Changes or modifications to this equipment not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment. This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at their expense. The following techniques can be used to reduce interference problems:

1. Disconnect the equipment from its power source to verify that it is or is not the source of the interference.
2. If the equipment is connected to the same outlet as the device experiencing interference, connect the equipment to a different outlet.
3. Move the equipment away from the device receiving the interference.
4. Reposition the receiving antenna for the device receiving the interference.
5. Try combinations of the above.

Section 3 Product overview

The VWR sympHony™ meters are used with probes to measure various parameters in solutions. Benchtop sympHony™ meters are available in 5 models:

1. B10P: pH/mV/ORP meter
2. B10C: conductivity meter
3. B20PI: pH/mV/ORP and ISE meter
   - Ch1: can measure pH, ORP or ISE
   - Ch2: can measure pH, ORP or ISE
4. B30PCI: pH/mV/ORP, conductivity and ISE meter
   - Ch1: can measure pH, ORP or ISE
   - Ch2: can measure pH, ORP or ISE
   - Ch3: can measure conductivity
5. B40PCID: pH/mV/ORP, conductivity, ISE and DO meter
   - Ch1: can measure pH, ORP or ISE
   - Ch2: can measure dissolved oxygen
   - Ch3: can measure conductivity

3.1 Product components

Refer to Figure 1 Components to make sure that all components have been received. If any items are missing or damaged, contact the manufacturer or a sales representative immediately.

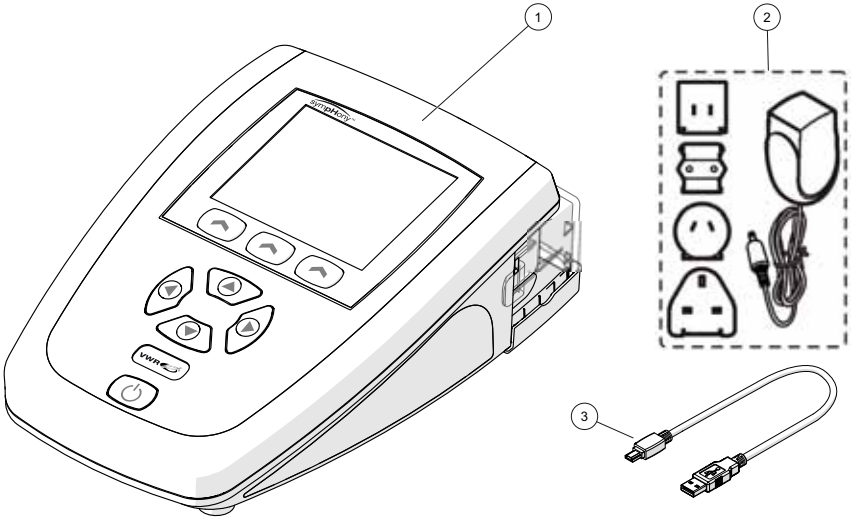


Figure 1 Components

1 Meter	**2** Power supply (universal adaptor)	**3** USB cable

Section 4 Installation

4.1 Probe and peripheral circuit connection

Follow the steps indicated below to connect the probes and peripheral circuits.

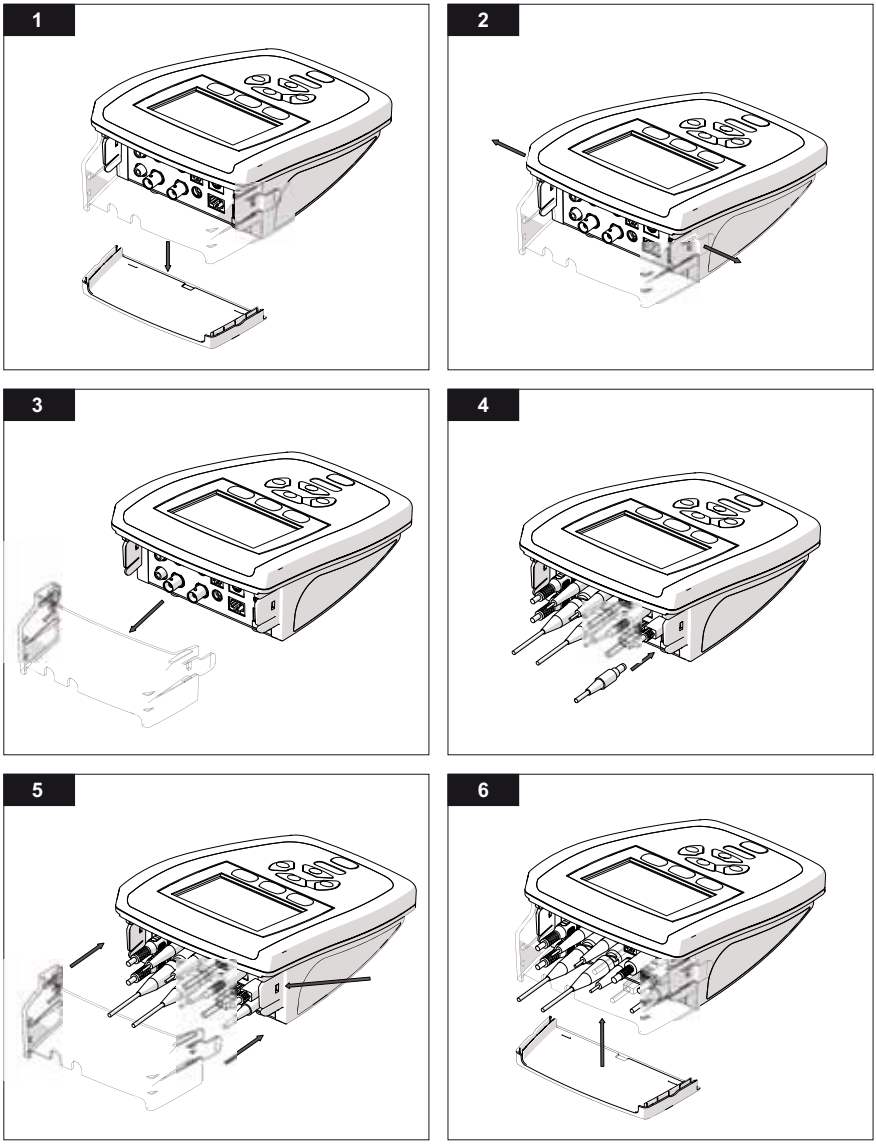


Figure 2 Connecting a probe

4.2 Connect to AC power

DANGER	
	***Electrocution hazard. If this equipment is used outdoors or in potentially wet locations, a Ground Fault Circuit Interrupt (GFCI/GFI) device must be used to connect the equipment to the power source.***

The meter can be powered by AC power with the universal power adapter.

1. Select the correct adapter plug for the power outlet from the adapter kit.
2. Connect the universal power adapter to the meter (Figure 2 on page 9).
3. Connect the universal power adapter to an AC receptacle (Figure 3).
4. Turn the meter on.

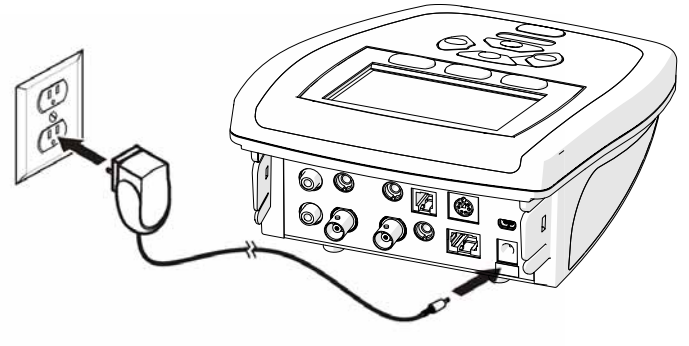


Figure 3 AC power connection

4.3 Connector panels

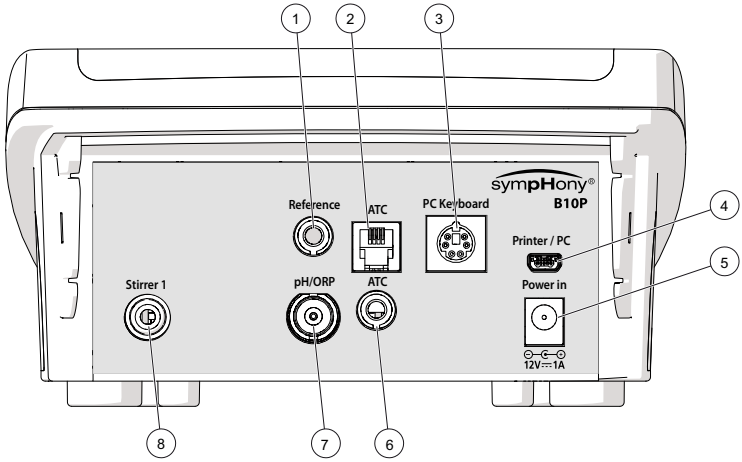


Figure 4 B10P connector panel

1	Reference electrode connector (banana plug)	**5**	Power supply connector (jack)
2	Temperature probe connector (RJ22)	**6**	Temperature probe connector (banana plug)
3	PC keyboard connector (mini-DIN)	**7**	Combination pH/ORP electrode connector (BNC)
4	Printer/PC connector (mini USB)	**8**	Magnetic stirrer connector (RCA)

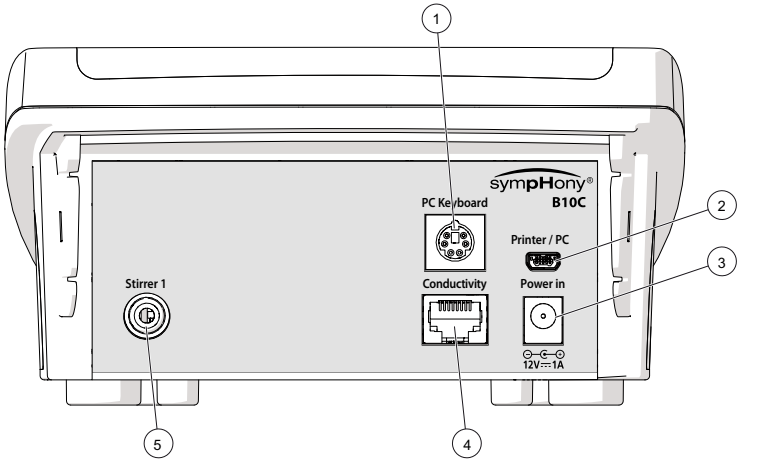


Figure 5 B10C connector panel

1	PC keyboard connector (mini-DIN)	**4**	Conductivity cell connector (RJ45)
2	Printer/PC connector (mini USB)	**5**	Magnetic stirrer connector (RCA)
3	Power supply connector (jack)		

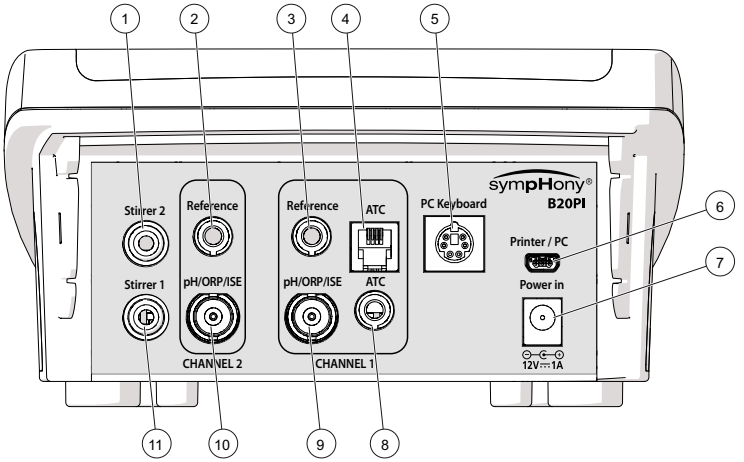


Figure 6 B20PI connector panel

1	Magnetic stirrer 2 connector (RCA)	**7**	Power supply connector (jack)
2	Ch2: Reference electrode connector (banana plug)	**8**	Ch1: Temperature probe connector (banana plug)

3	Ch1: Reference electrode connector (banana plug)	**9**	Ch1: Combination pH/ORP/ISE connector (BNC)
4	Ch1: Temperature probe connector (RJ22)	**10**	Ch2: Combination pH/ORP electrode connector (BNC)
5	PC keyboard connector (mini-DIN)	**11**	Magnetic stirrer 1 connector (RCA)
6	Printer/PC connector (mini USB)		

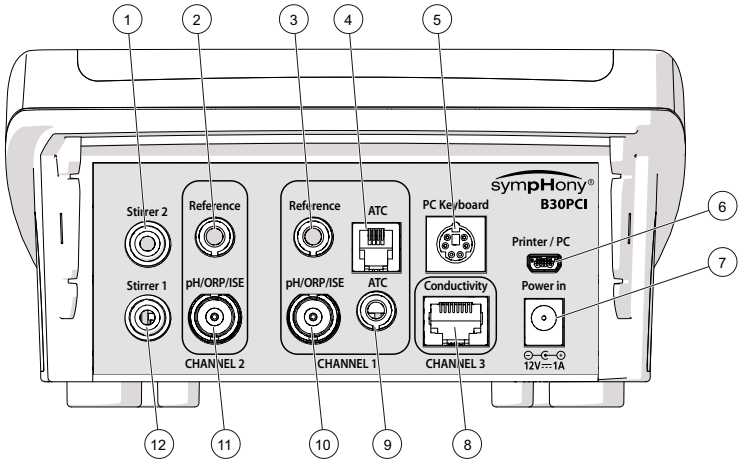


Figure 7 B30PCI connector panel

1	Magnetic stirrer 2 connector (RCA)	**7**	Power supply connector (jack)
2	Ch2: Reference electrode connector (banana plug)	**8**	Ch3: Conductivity cell connector (RJ45)
3	Ch1: Reference electrode connector (banana plug)	**9**	Ch1: Temperature probe connector (banana plug)
4	Ch1: Temperature probe connector (RJ22)	**10**	Ch1: Combination pH/ORP/ISE connector (BNC)
5	PC keyboard connector (mini-DIN)	**11**	Ch2: Combination pH/ORP/ISE connector (BNC)
6	Printer/PC connector (mini USB)	**12**	Magnetic stirrer 1 connector (RCA)

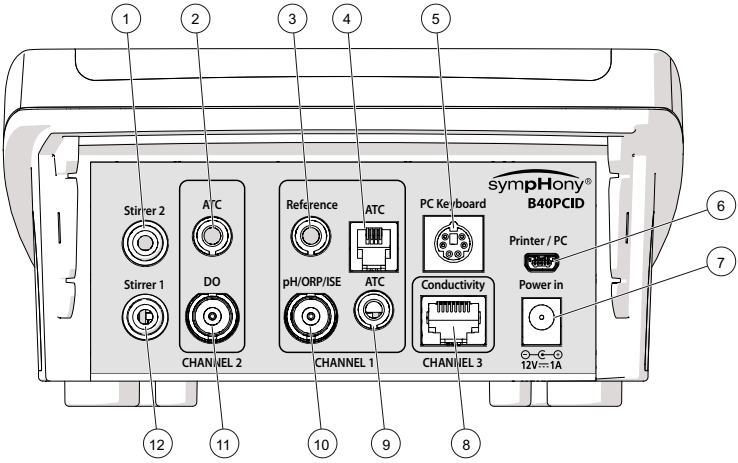


Figure 8 B40PCID connector panel

1	Magnetic stirrer 2 connector (RCA)	**7**	Power supply connector (jack)
2	Ch2: Temperature probe (banana plug)	**8**	Ch3: Conductivity cell connector (RJ45)
3	Ch1: Reference electrode connector (banana plug)	**9**	Ch1: Temperature probe connector (banana plug)
4	Ch1: Temperature probe connector (RJ22)	**10**	Ch1: Combination pH/ORP/ISE connector (BNC)
5	PC keyboard connector (mini-DIN)	**11**	Ch2: DO electrode connector (BNC)
6	Printer/PC connector (mini USB)	**12**	Magnetic stirrer 1 connector (RCA)

Section 5 User interface and navigation

5.1 User interface

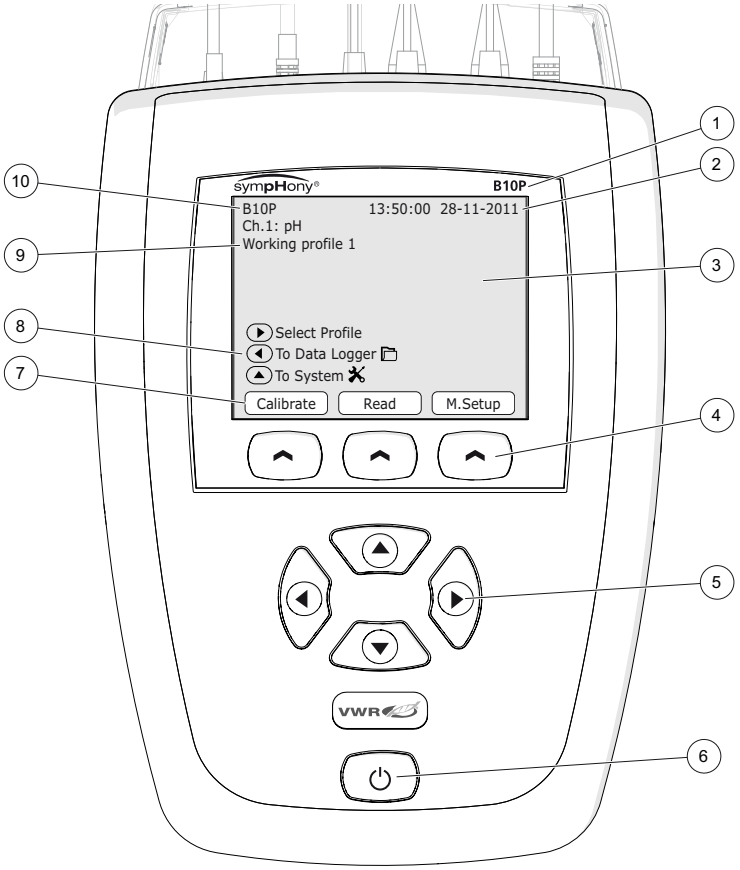


Figure 9 View of the instrument

1	Instrument model	**6**	Power key (turns meter on/off)
2	Date and time	**7**	Soft key display (varies depending on the operation)
3	Display	**8**	Direct options (arrow keys access the options shown)
4	Keypad, soft keys (selects the option shown above the key)	**9**	Profile ID (if active)
5	Keypad, arrow keys (scrolls through menu options)	**10**	Instrument ID and parameter(s)

5.2 Display description

The display shows different views, depending on the operation.

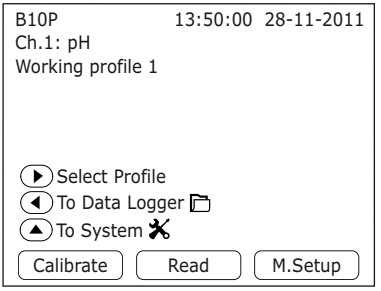


Figure 10 Standby screen

Standby screen. The meter display shows the time and date, the instrument ID, the active profile* and the measurement channel(s).

Using the soft keys the user can:

- *CALIBRATE*: access the calibration options
- *READ*: start a measurement
- *M. SETUP*: access measurement setup

Using the arrow keys the user can:

- Select a different profile: *SELECT PROFILE**
- Access *TO DATA LOGGER* *
- Access *TO SYSTEM* setup

* These options appear if activated, see 8.1 Meter options on page 36.

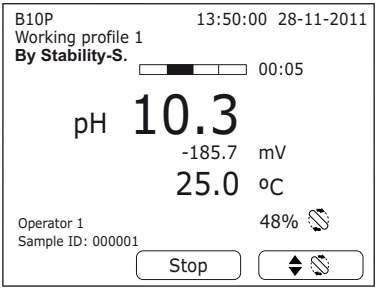


Figure 11 Single channel measurement view

Single channel measurement view. The meter display shows: time and date, instrument ID, active profile*, measurement mode programmed, measurement timer, value measured, alternative units**, sample temperature***, stirring**, active user* and sample ID**.

*These messages appear if they are activated.

** These options appear if they are set up, see 8.1 Meter options on page 36

*** The sample temperature may be automatic (temperature sensor) or manually entered by the user.

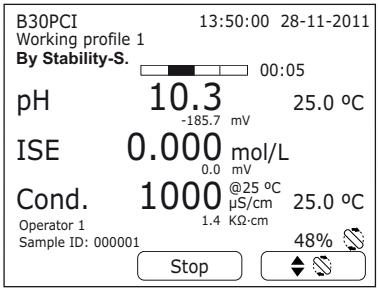


Figure 12 Multiple channel measurement view

Multiple channel measurement view. The meter display shows: date and time, instrument ID, active profile*, measurement mode programmed, measurement timer, values measured, alternative units**, sample temperature***, stirring**, active user* and sample ID **.

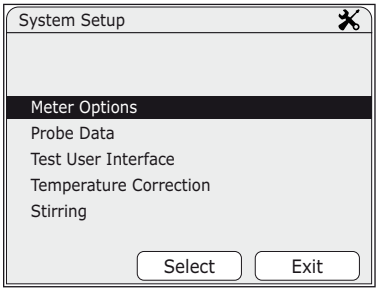
* These messages appear if they are activated.

** These options appear if they are set up, see 8.1 Meter options on page 36

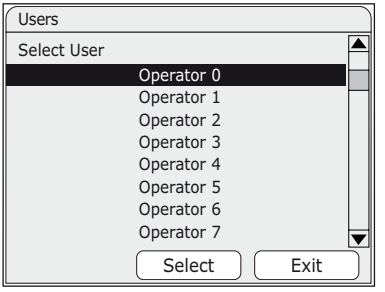
*** The sample temperature may be automatic (temperature sensor) or entered manually by the user.

5.3 Navigation

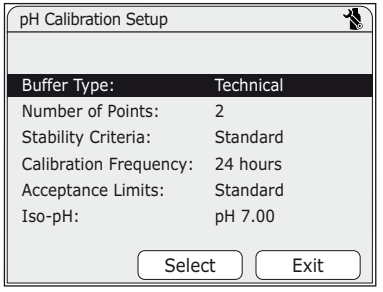
VWR sympHony™ meters display different options and messages to guide the user in the use and setup of the meter. Examples of several display views are shown below.



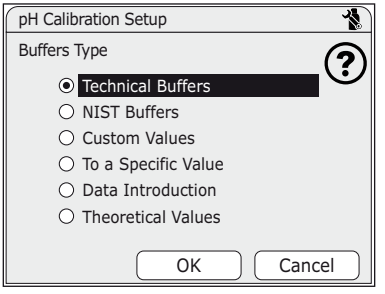
Selection menu. Use the arrow keys to highlight the desired option and press *SELECT* to enter the menu. Press *EXIT* to go back.



Selecting from a list. Use the arrow keys to highlight the desired option and press *SELECT* to select it. Press *EXIT* to go back.

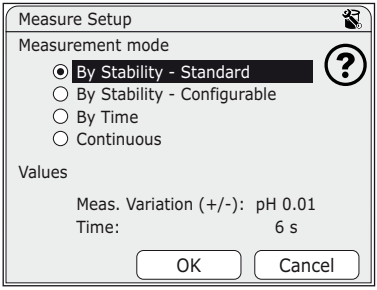


Setup menu. Use the arrow keys to highlight the desired option. The list shows the current setup values. Press *SELECT* to enter the menu and change the setup. Press *EXIT* to go back.

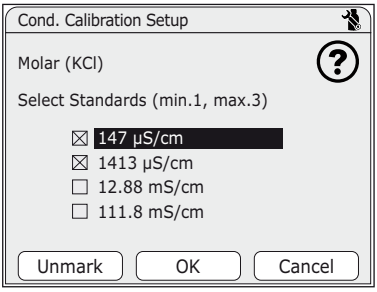


Setup options. Use the arrow keys to highlight the desired option. Press *OK* to select it and return to the setup menu. Press *CANCEL* to leave without making any changes.

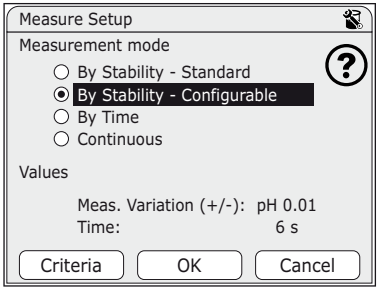
Changing/Entering values. Change the value using the *UP/DOWN* keys, scroll to the next value using the *LEFT/RIGHT* keys. Press *OK* to accept the new value. Press *CANCEL* to return to the menu without making any changes.



Configuration with values. The meter will show the options at the top of the display and the corresponding values at the bottom. Use the arrow keys to highlight an option.



Multiple selections. The user may select more than one parameter from some lists. Use the arrow keys to highlight the desired value and press *MARK/UNMARK* to select or deselect. Press *OK* to accept the changes or *CANCEL* to exit without making any changes.



User-configurable options. When the options are user-configurable, the meter will show a button to access the modification screens (*CRITERIA* in this example). Press *OK* to accept the changes or *CANCEL* to leave without making any changes.

Section 6 Startup

6.1 Turn the meter on and off

NOTICE

Make sure that the probe is connected to the meter before the meter is turned on.

Push the power key to turn the meter on or off. If the meter does not turn on, make sure that the AC power supply is properly connected to an electrical outlet.

6.2 Initial startup

The display language and other parameters are selected when the meter is started up for the first time.

1. The “startup screen” shows the model, serial number, date, time and software version.
2. Use the arrow keys to select a language from the list.
3. Use the arrow keys to change the date and time format and select by pressing *OK*. Press *DATE/TIME* to change the date and time. Move to the next screen using *OK*.
4. Select temperature units.
5. Select stirrer activation (the B20PI, B30PCI and B40PCID models can configure two stirrers).
6. Select Data Logger setup:
   - *OFF*: Data logger options are turned off.
   - *OVERWRITE:* The data logger is on. When the memory is full new data will replace the oldest data.
   - *ALARM WHEN FULL:* The data logger is on. When the memory is full the instrument will display an alarm message.
7. *Data output*. Select *PC CSV* or *PC REPORT* to send data to a PC connected to the meter or *PRINTER* to send data to a printer connected to the meter.
8. Standby screen; indicates when calibration is required.
9. Perform a calibration; the instrument is not factory-calibrated. The user must perform a calibration or select a theoretical calibration (see 7.1.1 Calibration settings on page 21) before sample measurements will be possible.

Note: *Upon subsequent startups, the meter will change from the “startup” to the “standby” screen.*

Note: *All of these parameters can be changed in the Meter options on page 36 menu.*

Section 7 Standard operations

7.1 Calibration

⚠ CAUTION

Chemical exposure hazard. Obey laboratory safety procedures and wear all of the personal protective equipment appropriate to the chemicals that are handled. Refer to the current material safety data sheets (MSDS) for safety protocols.

7.1.1 Calibration settings

The calibration settings contain the calibration type, frequency, stability criteria and the calibration limits.

The factory settings for calibration are:

1. pH calibration:
   - Buffer type: Technical buffers (set: 1.68, 4.01, 7.00, 10.01, 12.45)
   - Number of points: 2
   - Stability criteria: Standard (values: measurement variation ± 0.01 pH, time 6s)
   - Calibration frequency: 24 hours
   - Acceptance limits (for calibration): Standard (values: offset 30.0 mV, slope 70-105%)
   - Iso-pH: 7.00 pH
2. ORP calibration:
   - Buffer type: Theoretical Values
3. ISE calibration:
   - Units: mg/L
   - Number of points: 5
   - Standards: 0.001 mg/L, 0.010 mg/L, 0.100 mg/L, 1.000 mg/L, 10.000 mg/L
   - Stability criteria: Standard (values: ± 0.1 mV, time 06 s)
4. Conductivity calibration:
   - Standard type: Molar (KCl)
   - Molar (KCl): 1412 µS/cm
   - Calibration frequency: 168 hours
   - Acceptance limits (for calibration): Standard (constant theoretical from 0.001 to 199.999 cm^{-1})
5. Dissolved oxygen calibration:
   - Standard type: Water saturated air

To change these settings:

1. Press *CALIBRATE* from the standby screen

2. Select the channel of the parameter, if appropriate
3. Select *CALIBRATION SETUP* to enter the calibration menu
4. Select the following options:

Note: *the calibration menus can be password-protected, see* *Meter options on page 36*.

Table 1 Calibration setup

Option	Description
pH calibration	
Buffer Type (type of calibration)	Technical Buffers (select from the sets provided): Set 1 (USA): pH 1.68, 4.01, 7.00, 10.01 and 12.45 (at 25 ºC) Set 2 (EU): pH 1.68, 4.01, 6.87 and 9.18 (at 25 ºC)
	NIST Buffers (select from the sets provided): Set 1: pH 1.679, 4.005, 6.865, 9.180 and 12.454 (at 25 ºC) Set 2: pH 1.679, 4.005, 6.865, 10.012 and 12.454 (at 25 ºC) Set 3: pH 1.679, 4.005, 7.000, 9.180 and 12.454 (at 25 ºC) Set 4: pH 1.679, 4.005, 7.000, 10.012 and 12.454 (at 25 ºC)
	Custom Values: The instrument offers the possibility to program the pH/Temperature table for up to 3 buffers
	To a Specific Value: Manually define a single custom buffer value
	Data Introduction: Manually enter the probe constant (no physical calibration) Select the Offset from - 70 mV to +70 mV (preset 0.0 mV) Select the Slope between -70.00 mV/pH to -35.00 mV/pH (preset -59.16 mV/pH) Select the Temperature between 0.0 ºC to 99.9 ºC (preset 25 ºC)
	Theoretical Values: Calibration is based on theoretical data at 25 ºC (no physical calibration). Refer to table Standard solutions on page 63
Number of Points	Up to 5 calibration points Technical Buffers: 1 to 5 for Set 1 and 1 to 4 for Set 2 NIST Buffers: 1 to 5
Stability Criteria	Standard: Variation of ± 0.01* pH, time 6 s
	Configurable: Select the pH variation allowed with time pH: select between 0.02 and 0.99 pH (preset to ± 0.02*) Time: select from 2 to 10 seconds (preset to 5 s)
Calibration Frequency	Calibration reminder can be set between 0 and 168 hours. Select 0 to deactivate the calibration reminder
Acceptance Limits (for calibration)	Standard Offset ± 30.0 mV Slope 70% to 105%
Acceptance Limits (for calibration)	Configurable Offset: Select between ±5 mV to ± 70 mV (preset to ± 20.0 mV) Slope-Maximum limit: Select between 100% and 150% (preset to 105%) Slope-Minimum limit: Select between 70% and 105% (preset to 85%)

Table 1 Calibration setup

Option	Description
Iso-pH (isothermal point)	pH 7.00 (standard value)
	Data Introduction: manually enter the value (no physical calibration)
	Calculable: Select to calculate the isothermal point of the electrode. See, 7.1.7 Isothermal point on page 27
ORP calibration	
Standard Type (type of calibration)	Standard 220 mV @ 25 ºC
	To a Specific Value: Manually define a single custom standard value
	Data Introduction: Manually enter the probe constant (no physical calibration) Select offset between - 500.0 mV to +500.0 mV (preset to ± 000.0 mV)
	Theoretical Values: Calibration is based on theoretical data at 25 °C (no physical calibration)
Stability Criteria	Standard: Variation of ± 1 mV, time 6 seconds***
	Configurable: Select the mV variation allowed with time mV: Select between ± 1 mV and ± 5 mV (preset ± 1 mV) Time: Select from 2 to 10 seconds (preset to 5 s)
Acceptance Limits (for calibration)	Standard, Offset ± 50.0 mV
	Configurable: Select the allowable mV variation Select Offset between ± 5.0 and ± 500.0 (preset to ± 45.0 mV)
Conductivity calibration	
Standard Type (type of calibration)	Molar (KCl)
	Demal (KCl)
	NaCl St. 1014.9 µS/cm
	To a Specific Value: Manually define a single custom standard value
	Data Introduction: Manually enter the cell constant (no physical calibration). Select between 0.001 and 199.999 cm^{-1} (preset to ± 1.000 cm^{-1})
	Theoretical Values: Calibration is based on theoretical data at 25 °C, cell constant C=1.00 cm^{-1} (no physical calibration)
Molar Standards / Demal Standards (standard selection)	Molar (KCl): Select at least 1 standard, 147 µS/cm, 1412 µS/cm (preset), 12.89 mS/cm and 111.8 mS/cm
	Demal (KCl): Select at least 1 standard, 1409 µS/cm (preset), 12.85 mS/cm and 111.31 mS/cm
Calibration Frequency	Calibration reminder can be set between 0 and 2376 hours (preset to 168 hrs.) Select 0 to deactivate the calibration reminder

Table 1 Calibration setup

Option	Description
Acceptance Limits (for Calibration)	Standard, theoretical values from 0.001 to 199.999 cm^{-1}
	Configurable: Select the theoretical constant and the variation percentage permitted Constant, select between 0.001 and 199.999 cm^{-1} (preset to 1.000 cm^{-1}). Percentage, select between 2% and 100% (preset to ± 30%)
ISE calibration	
Units	Select the ISE units from: mol/L, mmol/L, µmol/L, g/L, mg/L (preset), µg/L, %, M, mM or none
Number of Standards	Select 2 to 5 standards
Standards	Select and set the standard values
Stability Criteria	Standard: Variation ± 0.1 mV, Time 6 seconds
	Configurable: Select the mV variation allowed with time mV: select between ± 0.1 mV and ± 5.0 mV (preset to ± 0.5 mV) Time: select from 2 to 10 seconds (preset to 5 s)
Name of Ion	Enter the name of the ion (6 character limit)
Auto. Blank Correction	No
	Yes. Select to compensate for non-linearity of the ion selective electrode in low-level standards and samples
Dissolved Oxygen (DO) calibration	
Standard Type** (type of Calibration)	Water Saturated Air
	Water Sat. Air & Zero
	To a Specific Value: Manually define a single custom standard value
	Theoretical Values: Calibration is based on theoretical values (no physical calibration)

*The measurement variation of the stability criteria depends on the selected buffer type:

- For technical buffers, measurement variation = ± 0.01 pH (0.02 to 0.99 pH)
- For NIST buffers, measurement variation = ± 0.005 pH (0.002 and 0.999 pH)
- For calibration “To a Specific Value”, depends on the selected measurement resolution.

**The units for dissolved oxygen calibration are always %

***The measurement variation of the stability criteria depends on the selected buffer type:

- For “Standard 220 mV @25 ºC” buffer, measurement variation = ± 1 mV
- For calibration “To a Specific Value”, measurement variation = ± 1.0 mV (from 0.1 to 5.0mV)

7.1.2 Calibration procedure

This procedure is for general use with liquid calibration solutions. Refer to the documents that are included with each probe for additional information.

Note: *For more information on stirring adjustments, refer to* *Configure the sample stirring on page 39*.

1. Pour the buffer or calibration standards into a labeled calibration vessel.
2. Rinse the probe with deionized water and put the probe into the first calibration vessel. Make sure there are no air bubbles under the probe tip.
3. From the standby screen press *CALIBRATE*. Select the parameter for calibration, if appropriate.
4. Press *READ* to measure the first calibration solution. When the measurement is stable, the instrument will request the next calibration solution.
5. Rinse the probe with deionized water and put the probe into the second calibration vessel. Make sure there are no air bubbles under the probe tip.
6. Press *READ* to measure the second calibration solution.
7. Repeat steps 5 and 6 to measure subsequent calibration points. Calibration points are defined as the “Number of points” see Calibration setup on page 22.
8. If the calibration is correct the meter will display the message *CALIBRATION OK* and will save the calibration data. If not it will display an error message.

Note: *Press STOP during a calibration to cancel the calibration.*

Note: *If using a probe without a temperature sensor, an option will appear during calibration enabling the user to enter the temperature manually. Select the temperature option and use the direction arrows during calibration to change the temperature. Wait 5 seconds until the new value is set.*

7.1.3 Calibration to a specific value

The user can manually define a single custom standard value. When “To a Specific Value” is selected as Buffer/Standard type, the instrument behaves as though it were calibrated with a single standard solution.

1. From the standby screen press *CALIBRATE*. Select the parameter for calibration, if appropriate.
2. Select *CALIBRATION SETUP* .
3. Select the option *BUFFER/STANDARD TYPE* and choose *TO A SPECIFIC VALUE* by pressing *OK*. Press *EXIT* to leave the calibration setup menu.
4. Press *READ* to measure in the calibration solution.
5. When the measurement is stable the instrument will prompt for adjusting the measured value. Adjust the value and press *OK*.
6. If the calibration is correct the meter will display the message *CALIBRATION OK* and will save the calibration data. If not it will display an error message.

7.1.4 Custom values

When the buffers used in calibration are different from the pre-programmed options, the meter allows pH calibration setup for up to 3 buffers.

1. From the standby screen press *CALIBRATE*. Select the pH parameter, if appropriate.
2. Select *CALIBRATION SETUP* .
3. Select the option *BUFFER TYPE* and choose *CUSTOM VALUES* by pressing *OK.*
4. Select the option *CONFIGURE BUFFERS* and set the number of buffers (up to 3 buffers can be defined).
5. Select *CONFIGURE BUFFER 1*. Up to 4 points of pH/Temperature can be defined for each buffer (preset to 2 buffer points. Points 3 and 4 appear after points 1 and 2 are configured).
6. Select *POINT 1* and set the custom values of pH and temperature.
7. Repeat the procedure to set the pH and temperature values for the rest of the points. Select *NOT DEFINED* to skip setting a specific point.
8. Repeat steps 5-7 to define the rest of buffers.

Note: *The temperature values of buffer 2 and 3 will be assigned automatically in accordance with the values introduced for buffer 1.*

7.1.5 View the calibration data

To view the current calibration data:

1. From the standby screen press *CALIBRATE*. Select the parameter, if appropriate.
2. Select *CAL.DATA.*
3. Select the *CURRENT CALIBRATION* option. The data from the last calibration is shown.

The instrument saves the last 10 calibrations in the memory for each parameter. To view stored calibration data:

1. From the standby screen press *CALIBRATE*. Select the calibrated parameter, if appropriate.
2. Select *CAL.DATA.*
3. Select the *CALIBRATION RECORDS* option.
4. Use the arrow keys to view the different records.

The calibration data include: date and time, total time for calibration, the standard(s) used, stirring percentage and user. Also, depending on the parameter calibrated:

- pH: the slope and slope % values, the mV value measured, the deviation (in mV), isothermal point, time and calibration temperature for each buffer
- ORP: the deviation (in mV) and temperature
- Conductivity: the cell constant, the time and the calibration temperature for each standard

- ISE: ISE units, standards used and slope
- DO: the current (in nA) and temperature

7.1.6 Temperature correction

The temperature can be adjusted to 25 °C (77 °F) and 85 °C (185 °F) to correct potential probe deviations.

1. Put the probe and a reference thermometer in a container of water at approximately 25 °C and allow the temperature to stabilize.
2. Compare the temperature read by the meter with that of the reference thermometer. The difference is the adjustment value for the meter. Example: reference thermometer: 24.5 °C; meter: 24.3 °C. Adjustment value: 0.2 °C.
3. Enter the adjustment value for the 25 °C reading:
   a. From the standby screen press *TO SYSTEM*
   b. Select *TEMPERATURE CORRECTION*. Select the channel in which you wish to make the adjustment, if applicable.
   c. Select *CORRECTION AT 25 °C*
   d. Use the arrow keys to enter the adjustment value for 25 °C. Select *OK* to confirm.
4. Put the probe and a reference thermometer in a container of water at approximately 85 °C and allow the temperature to stabilize.
5. Compare the temperature from the meter with that of the reference thermometer. The difference is the adjustment value for the meter.
   e. Select *CORRECTION AT 85 °C*
   f. Use the arrow keys to enter the adjustment value for 85 °C. Select *OK* to confirm.

Note: *The deviation adjustment can be between -2.0 ºC and +2.0 ºC.*

7.1.7 Isothermal point

The isothermal point is the potential (mV) of one pH electrode that does not alter with temperature. Normally this value corresponds to pH 7, but in reality the value is slightly different.

If measurements will be performed at different temperatures and high precision is required, it is recommended to calculate the isothermal point after room temperature calibration.

1. From the standby screen press *CALIBRATE*. Select the pH parameter, if appropriate.
2. Select *CALIBRATION SETUP* and the option *ISO-pH*.
   a. pH 7.00: standard value, generally accepted by all probe manufacturers.
   b. Data Introduction: If the isothermal point is known it can be entered manually.
   c. Calculable: the instrument will calculate the isothermal point of the connected pH electrode. Follow this procedure:

- Calibrate the instrument with 2 or 3 points with buffers at room temperature.
- From the main Calibration screen press *CALCULATE ISOTHERMAL POINT*.
- The instrument will prompt for the standards previously used at temperatures higher than or equal to 35.0 °C.
- The instrument uses the calculated isothermal point for future measurements.

7.1.8 Calibration Reminder

If the calibration reminder is turned on, the meter will display a calibration reminder when the next calibration is required. The reminder may be adjusted between 0 and 168 hours (for pH calibrations) and between 0 and 2376 hours (for conductivity calibrations).

Note: *When 0 is selected, the calibration reminder is turned off.*

1. From the standby screen press *CALIBRATE*. Select the parameter for calibration, if appropriate.
2. Select *CALIBRATION SETUP* and the option *CALIBRATION FREQUENCY*.
3. Enter the calibration reminder interval in hours, then select *OK*.

7.2 Sample measurements

Each probe has specific preparation steps and procedures for taking sample measurements. For step-by-step instructions, refer to the user manual included with the probe.

To take a reading:

1. Prepare the probe and the measurement samples.
2. Insert the probe into the sample to be measured. Make sure there are no air bubbles under the probe tip.
3. Press *READ* on the standby screen.
4. Select the channel for the parameter to be measured, if appropriate.
5. Modify the stirring or the temperature, see Configure the sample stirring on page 39 and Manually enter the temperature on page 40.

The instrument will measure the sample according to the parameters configured in the measurement setup (see Measurement setup on page 30).

7.2.1 Simultaneous measurement without PROFILES

Only for models B20PI, B30PCI and B40PCID.

The meter is configured by default to carry out independent measurements from each channel. Configure the meter to take simultaneous measurements (see Meter options on page 36).

1. Press *TO SYSTEM* to access the instrument setup.
2. Select *METER OPTIONS*.

3. Select *MEASURE* and select *SIMULTANEOUS*.

To establish the options in each channel:

1. From the standby screen press *M.SETUP* to change the measurement setup.
2. Select *Channel 1/Channel 2/Channel 3* to access the configurable options for each channel.
3. Select *NONE* as the electrode type (cell for conductivity channels) of a channel to deactivate it.

Note: *When performing simultaneous measurements, the reading(s) of the different parameter(s) must be taken on the same sample.*

7.2.2 Simultaneous measurements with PROFILES

Only for models B20PI, B30PCI and B40PCID.

The meter can save up to 10 different measurement setup profiles, see Manage profiles on page 41. Working with PROFILES, the instrument takes simultaneous measurements of the channels configured in the profile. To establish the options for each channel:

1. From the standby screen press *SELECT PROFILE* and select a profile.
2. Press *M.SETUP* to change the profile setup.
3. Select *Channel 1/Channel 2/Channel 3* to access the configurable options for each channel.
4. Select *NONE* as the electrode type (cell for conductivity channels) of a channel to deactivate it.

7.2.3 Channel setup

The sympHony™ series meters can measure different electrode specific parameters according to the settings selected in the measurement channel.

1. B10P: 1 channel to measure pH or ORP
2. B10C: 1 channel to measure conductivity
3. B20PI:
   - Channel 1: to measure pH, ORP or ISE
   - Channel 2: to measure pH, ORP or ISE
4. B30PCI:
   - Channel 1: to measure pH, ORP or ISE
   - Channel 2: to measure PH, ORP or ISE
   - Channel 3: to measure conductivity
5. B40PCID:
   - Channel 1: to measure pH, ORP or ISE
   - Channel 2: to measure dissolved oxygen
   - Channel 3: to measure conductivity

To change the settings of a measurement channel:

1. From the standby screen press *M.SETUP* and select the channel for configuration (if applicable).
2. Select the *ELECTRODE* option (*CELL* in conductivity channels).
3. Select the measurement parameter for the channel (*NONE* to deactivate it).

7.2.4 Measurement setup

The measurement setup contains the measurement mode, sample ID and the options specific to each measurement parameter.

1. Press *M.SETUP* to change the measurement setup.
2. Select the channel of the parameter to setup, if appropriate.
3. Use arrow keys for navigation, press *SELECT* to view details or change.

Note: *The measurement setup menus can be password-protected, see* *Meter options on page 36.*.

Table 2 Measurement setup

Option	Description
pH setup	
Electrode	Select from: pH, ORP, ISE* or None to deactivate the channel*
Resolution	Select between 0.1, 0.01 and 0.001
View mV	Select “Yes” or “No” to display simultaneous mV measurement
Measurement Mode	By Stability - Standard criteria pH measurement variation ± 0.01** pH, time 6 s
	By Stability - Configurable criteria Measurement variation, select between 0.002 pH and 0.999 pH (preset to ± 0.02** pH) Time, select between 2 and 10s (preset to 5 s)
	By Time Select the measurement duration (hh:mm:ss) Select the measurement acquisition interval (hh:mm:ss) This option appears when the “Data Record” option is set to automatic
	Continuous: with a programmable acquisition interval Select the measurement acquisition interval (hh:mm:ss) This option appears when the “Data Record” option is set to automatic
ORP setup	
Electrode	Select from: pH, ORP, ISE* or none* (to deactivate the channel)
Resolution	Select between 0.1 and 1
Measurement Mode	By Stability - Standard criteria Measurement variation ± 1*** mV, time 6 s
	By Stability - Configurable criteria Measurement variation, select between ± 1 and ± 5 mV (preset to ± 1*** mV) Time, select between 2 and 10 s (preset to 5 s)

Table 2 Measurement setup

Option	Description
Measurement Mode	By Time Select the measurement duration (hh:mm:ss) Select the measurement acquisition interval (hh:mm:ss) This option appears when the “Data Record” option is set to automatic
	Continuous: with a programmable acquisition interval Select the measurement acquisition interval (hh:mm:ss) This option appears when the “Data Record” option is set to automatic
ISE setup	
Electrode	Select from: pH, ORP, ISE* or None* (to deactivate the channel)
Sensor ID	A list of up to 5 sensor IDs may be created. Select the sensor ID from the list. See Use a sensor ID (for ISEs) on page 37
Number of Decimals	Select from 0 to 3**** decimals for the measurement resolution
View mV	Select “Yes” or “No” to simultaneously display mV values
Factor	Select a factor between 0.001 and 9.999 (preset to 1.000)
Measurement Mode	By Stability - Standard criteria Measurement variation ± 0.1 mV, time 6 s
	By Stability - Configurable criteria Measurement variation, select between 0.1 and 5.0 mV (preset to ± 0.2 mV) Time, select between 2 and 10 s (preset to 6 s)
	By Time Select the measurement duration (hh:mm:ss) Select the measurement acquisition interval (hh:mm:ss) This option appears when the “Data Record” option is set to automatic
	Continuous: with a programmable acquisition interval Select the measurement acquisition interval (hh:mm:ss) This option appears when the “Data Record” option is set to automatic
Conductivity setup	
Cell	Select from: Conductivity or None (to deactivate the channel, only in models B30PCI and B40PCID)
Parameters	Select from: Conductivity, Resistivity, Salinity or TDS
Temperature Coefficient	Linear: select between 0.00 and 9.99 %/ºC (preset to 2.00 %/ºC)
	Natural waters
Ref. Temp. (reference temperature)	Select between: 15, 20, 25 ºC or Configurable Configurable: enter a reference temperature between 0 and 99 ºC (preset to 25 ºC)
View Ohms	Select “Yes” or “No” to simultaneously display the resistivity measurement
TDS Factor	This option appears if TDS is selected as the parameter Enter a factor between 0.01 and 4.44 (preset to 0.64)

Table 2 Measurement setup

Option	Description
Measurement Mode	By Stability
	By Time Select the measurement duration (hh:mm:ss) Select the measurement acquisition interval (hh:mm:ss) This option appears when the “Data Record” option is set to automatic
	Continuous: with a programmable acquisition interval Select the measurement acquisition interval (hh:mm:ss) This option appears when the “Data Record” option is set to automatic
Dissolved Oxygen (DO) Settings	
Electrode	Select from: DO or None (to deactivate the channel).
Units	Select % or mg/L
Barometric Pressure	Select a pressure between 600 and 1133 mBar (450 mmHg and 850 mmHg). Preset to 1013 mBar
Salinity Correction	Enter a correction factor between 00.0 and 45.0 g/L (preset to 1.0 g/L)
View nA	Select Yes or No to simultaneously show the nA measurement
Measurement mode	By Stability
	By Time: Select the measurement duration (hh:mm:ss) Select the measurement acquisition interval (hh:mm:ss) This option appears when the “Data Record” option is set to automatic
	Continuous: with a programmable acquisition interval Select the measurement acquisition interval (hh:mm:ss) This option appears when the “Data Record” option is set to automatic
Options available for all channels	
Data Record	This option appears when the data logger or data output is active (see Meter options on page 36) Automatic-All Readings Stored. The instrument will save/send the measurements according to the measurement mode configured: - By stability: when the measurement is stable - By time: according to the programmed acquisition interval and when the measurement is complete - Continuous: according to the programmed acquisition interval
	Manual-Press to Record Data. An option will appear on the display for saving/sending the measurement data manually
Stirrer	Activate the stirrer. Select between: Stirrer 1, Stirrer 2 (if applicable) or none
Sample ID	This option appears when the data logger or data output is active (see Meter options on page 36) Automatic: the instrument will assign a consecutive numeric ID for each sample. Manual: the user will identify each sample

* Only in models B20PI, B30PCI and B40PCID

** The stability criteria depends on the resolution selected

- For resolution 0.1, measurement variation: ± 0.1 pH

- For resolution 0.01, measurement variation: ± 0.01 pH

- For resolution 0.001, measurement variation: ± 0.005 pH

*** The stability criteria depends on the resolution selected

- For resolution 1 mV, measurement variation: ± 1 mV

- For resolution 0.1 mV, measurement variation: ± 0.2 mV

**** The number of decimals depends on the selected ISE units

7.2.5 Measurement modes

The instrument has 3 different measurement modes:

1. **Measurement by stability**: The measurement is complete when the signal from the probe remains constant for the specified time. Select the standard stability criteria or custom-define one in the measurement setup. Press *STOP* during a measurement to stop the measurement. When the measurement is complete, press *READ* to take a new measurement or *EXIT* to quit.

Note: *If the Data Record option is on and set to "Automatic" it will store the measurement once it has stabilized. If the Data Record is active and set to "Manual" a soft key option to store will appear once the measurement is stabilized; select to store the measurement.*

2. **Measurement by time**: The measurement will be displayed after a defined period of time. Select the measurement duration in the measurement setup. Press *STOP* during a measurement to stop the measurement. When the measurement is complete, press *READ* to take a new measurement or *EXIT* to quit.

Note: *If the Data Record option is on and set to "Automatic" it will store the measurement according to the defined acquisition interval and at the end of the defined time. If the Data Record is on and set to "Manual" a soft key option to store will appear once the measurement is completed; select to store the measurement.*

3. **Continuous measurement**: The instrument displays the value measured at any given moment. To complete the measurement press *HOLD* and then *EXIT*.

Note: *If the Data Record is on and set to "Automatic" it will store the measurement according to the defined acquisition interval. If the Data Record is on and set to "Manual" a soft key option to store will appear; select to store the measurement.*

7.2.6 pH and ORP measurement setup

Once the meter has been calibrated it is ready for pH or ORP measurements without additional setup.

Factory settings for pH measurements:

- Electrode: pH
- Resolution: 0.01
- Measurement mode: By Stability-S. (standard criteria: ± 0.01 pH, 6 s)
- View mV: No

Factory settings for ORP measurements

- Resolution: 1 mV
- Measurement mode: By Stability-S. (standard criteria: ± 1 mV, 6 s)

Press *M.SETUP* to change the measurement setup.

7.2.7 Conductivity measurement setup

Once the meter has been calibrated it is ready for conductivity measurements without additional setup.

Factory settings for conductivity measurements:

- Parameter: Conductivity
- Temperature coefficient (TC): Linear 2.00 %/ºC
- Reference temperature (Ref. Temp.): 25 ºC
- View Ohms: No
- Measurement mode: By Stability

Note: *The stability criteria for conductivity measurements is not user definable.*

Note: *The meter will display the temperature coefficient on conductivity measurement screens. "TC:L" for linear coefficients and "TC:NW" for natural waters.*

Press *M.SETUP* to change the measurement setup.

7.2.8 Ion Selective Electrode (ISE) measurement setup

Once the meter has been calibrated it is ready for ISE measurements without additional setup.

Factory settings for ISE measurements:

- Number of decimals: 3
- View mV: No
- Factor: 1.000
- Measurement mode: By Stability-S (standard criteria, ± 0.1 mV, 6 s)

Press *M.SETUP* to change the measurement setup.

7.2.9 Dissolved oxygen measurement setup

Factory settings for dissolved oxygen measurements:

- Units: mg/L
- Barometric pressure: 1013
- Salinity correction: 1.0
- View nA: No
- Measurement mode: By Stability

Note: *The stability criteria for dissolved oxygen measurement is not user definable.*

Press *M.SETUP* to change the measurement setup.

Before calibration or measurement of dissolved oxygen, the probe must be polarized and the settings for atmospheric pressure and salinity must be entered.

7.2.9.1 Polarizing the DO electrode

If the probe or power supply are disconnected, connect the probe and/or power supply. Next, wait until the electrode polarizes (per the times indicated in Table 3)

Table 3 Polarizing the OD probe

Disconnect time	Polarization time
< 5 minutes	10 minutes
5 to 15 minutes	45 minutes
> 15 minutes	6 hours

Section 8 Advanced operations

8.1 Meter options

To access the meter options:

1. Press *TO SYSTEM* from the standby screen.
2. Select *METER OPTIONS.*

Note: *Press PRINT/SEND to print the settings or send a report to a PC (data output options activated).*

3. Select and modify the following options:

Note: *The meter options menu can be password-protected.*

Table 4 Meter options

Option	Description
Contrast Screen	Select the display contrast (0 to 100%)
Backlight	Select the display backlight (0 to 100%)
Date & Time	Select to change the date format, date and time
Data Output	None: data output is deactivated
	Printer: reports for measurements, calibrations and meter setup may be sent to a connected printer
	PC CSV: reports for measurements, calibrations and meter setup in CSV format may be sent to a PC connected with a USB cable
	PC Report: reports for measurements, calibrations and meter setup in printed ticket format may be sent to a PC connected with a USB cable
Data Logger	OFF: The data logger options are inactive
	Overwrite: The data logger is on. When the memory is full, new data will replace the oldest data
	Alarm When Full: The data logger is on. When the memory is full, the instrument will display an alarm message
Sounds	Key Press: OFF, turns off key sounds
	Key Press: ON, turns on key sounds
Instrument ID	The user can enter up to 20 characters that will identify the instrument (the preset ID is the meter model)
Password	None: password deactivated
	Active: A 5 digit programmable password restricts access to “Calibration Setup”, “Measurement Setup” and “Meter Options”
Profiles	None: The instrument will work with the default program. This program can be changed in Measurement setup on page 30
	Active: Up to 10 configurable measurement programs (PROFILES) can be created, see Manage profiles on page 41
Temperature Units	Select between ºC and ºF
Language	Select language: English, Spanish, French, German and Italian

Table 4 Meter options

Option	Description
Stirrer	None: deactivates the use of the stirrer
	Active: activates the use of the stirrer B20PI, B30PCI and B40PCID models can activate two stirrers
Measure (B20PI, B30PCI and B40PCID models)	(only with profiles deactivated) Individual: The instrument will request a channel before taking a measurement. It will display the parameter of the channel selected on the display
	Simultaneous: The instrument will measure and display the channels simultaneously on the display
Users	(Only with data logger or data output active) None: The instrument will not identify users
	Active: A list of up to 10 users can be created. The instrument will store the user ID for measurements and calibration data
Reset Sample ID	(only with data logger or data output active) This option resets the data counter from the data logger and starts the automatic sample ID at sample 000001
Restore to Factory Settings	This options restores the meter to the factory default settings

8.2 Use a sensor ID (for ISEs)

The instrument can identify up to 5 different ISEs for each channel. The sensor IDs are associated with ISE calibrations. The measurement and calibration data saved will include the sensor ID. If the user doesn't setup the sensor ID, the meter will store calibrations and measurements as the "Default" sensor.

1. Press *M.SETUP and select the appropriate ISE channel*.
2. Select the option *SENSOR ID*.
3. Select the sensor ID from the list or press *MANAGE* to edit, delete or add sensor IDs.
4. Press *NEW SENSOR* to add a new sensor ID.
5. Enter the name of the sensor ID.

Note: *Once a list of sensor IDs has been created, select the appropriate sensor ID and perform a calibration. This will associate the calibration to that specific sensor ID.*

8.3 Use a sample ID

The sample ID is used to associate measurements with a particular sample location. If assigned, stored data will include this ID.

This option is available when data logger or data output are active.

1. From the standby screen press *M.SETUP*
1. Select the parameter, if applicable.
2. Select the option *SAMPLE IDENTIFICATION*

a. Automatic: A consecutive number will be automatically assigned to each sample.

b. Manual: The user is required to enter the sample ID name before taking a measurement (maximum of 15 characters).

Note: *Data entry can be facilitated using a standard PC keyboard connected to the meter.*

8.4 Data Output

The measurement, calibration and meter setup data may be saved or sent to a printer or PC. See Data logger on page 43.

1. Press *TO SYSTEM* from the standby screen.
2. Select *METER OPTIONS.*
3. Select the *DATA OUTPUT* option.
4. Select from the following options:
   a. None: Select if no PC or printer is connected.
   b. Printer: Select to send the data to a printer connected to the meter.
   c. PC CSV: Select to send the data to a PC connected to the meter in CSV format.
   d. PC Report: Select to send the data to a PC connected to the meter in “printed ticket” format.

Important Note: *Don’t connect the printer to the instrument before selecting “Printer” in the data output option.*

Note: *If an option other than “NONE” is selected, the “PRINT” or “SEND” option will appear on the measurement, calibration and setup screens.*

8.5 Password

The user can define a 5 digit numerical password that restricts access to “Calibration Setup”, “Measurement Setup” and “Meter Options”.

1. Press *TO SYSTEM* from the standby screen.
2. Select *METER OPTIONS.*
3. Select the *PASSWORD* option.
4. Select *ACTIVE* and press *PASSWORD* to enter the password.

Note: *This option is password-protected. When the ACTIVE option is activated, the meter will request the default password: 54321.*

5. Enter a 5 digit numerical password.
6. Confirm the new password.

Note: *If password-protection is disabled, the meter will set the default password for subsequent activation.*

8.6 Change the date and time

The date and time can be changed from the Date / Time menu.

1. Press *TO SYSTEM* from the standby screen.

2. Select *METER OPTIONS*.
3. Select the *DATE AND TIME* option.
4. Select the date format and confirm by pressing *OK*.
5. Press *DATE/TIME* to change the date and time. Scroll through and change values with the arrow keys. Confirm with *OK*.
6. Press *OK* to exit.

8.7 Adjust the display contrast and backlight

The meter screen can be set to specific light conditions making it easier to read.

1. Press *TO SYSTEM* from the standby screen.
2. Select *METER OPTIONS*.
3. Select *CONTRAST SCREEN*. Select a setting and confirm.
4. Select *BACKLIGHT*. Select a setting and confirm.

8.8 Configure the sample stirring

The magnetic stirrer can be activated and the stirring speed can be changed.

1. Press *TO SYSTEM* from the standby screen.
2. Select *METER OPTIONS*.
3. Select *STIRRER*.
4. Select *NONE* to deactivate the stirrer or *ACTIVE* to activate it. For meters with two stirrers, select *MARK* to activate a stirrer, select *UNMARK* to deactivate a stirrer.
5. To change the stirring speed during a measurement or calibration press the temperature/stirring *key* twice.
6. Use the arrow keys to change the stirring speed. The new value will be set if no key is pressed for 5 seconds.

Note: *In meters with two stirrers one stirrer may be assigned to a specific channel in the* *Measurement setup on page 30**.*

Note: *When performing Simultaneous measurements only one stirrer can be selected at measurement setup.*

8.9 Activate the stirrer

To use the stirrers without the need for a measurement or calibration.

1. Press *TO SYSTEM* from the standby screen.
2. Select *STIRRING* (this option is active if the Stirrers have been activated at *METER OPTIONS*)
3. Press the *LEFT/RIGHT* keys to turn ON/OFF the desired stirrer.
4. Select the stirrer speed icon with the appropriate soft key, press the UP/DOWN keys to change the stirring speed.

Note: *The stirrer speed icon appears when the stirrer is in the OFF position. After adjusting the stirrer speed, the stirrer can be changed to ON.*

8.10 Manually enter the temperature

Temperatures can be entered manually while measuring or calibrating when working with non-temperature compensating probes.

1. Press the temperature/stirring key on a measurement or calibration. The temperature will be highlighted on the display.
2. Use the arrow keys to change the temperature. The new value will be set if no key is pressed for 5 seconds.

8.11 Probe data

The instrument can store various information about the probe being used.

1. Press *TO SYSTEM* from the standby screen.
2. Select *PROBE DATA,* select the desired channel if appropriate.
3. Select *HISTORY.* The following information will be displayed on the screen:
   - Initial Time: Date and time of installation
   - Service Time: Total time of sensor use
   - Number of measurements
   - Maximum and minimum values measured by the sensor
4. Select *RESET HISTORY* to erase the stored probe data.

Note: *The option RESET HISTORY is password protected.*

8.12 Test user interface

The user can test for functionality of the display and the keypad.

1. Press *TO SYSTEM* from the standby screen.
2. Select *TEST USER INTERFACE*.
3. Select *TEST DISPLAY* to test the screen. The instrument will turn off/on all of display's pixels for 6 seconds.
4. Select *TEST BUTTONS & SOUND* to test the keypad. Press the keys to test their operation. The instrument will quit the test if no keys are pressed within 6 seconds.

8.13 Manage users

The instrument can identify up to 10 different users. User IDs are stored with the measurements and calibrations.

1. Activate users in Meter options on page 36.
2. Press *MANAGE* to edit, delete or add users.
3. Perform a calibration. The instrument will ask for the user ID.
4. Perform a reading. The instrument will ask for the user ID.

8.14 Manage profiles

Profiles are different measurement setup configurations that can be stored inside the meter. The instrument can store up to 10 different profiles. This enables the user to alternate between different measurement setups, simply by selecting the appropriate Profile.

If profiles are off, the instrument will store the measurement setup options in the default profile (PROFILE 0).

To activate profiles:

1. Press *TO SYSTEM* from the standby screen, then select *METER OPTIONS*.
2. Select *PROFILES*, then select *ACTIVE*.
3. Press *MANAGE* to add, delete or edit Profiles.

Note: *When creating a profile, the instrument will copy the current measurement setup to the new profile.*

4. Press *SELECT PROFILE* on the standby screen to select the appropriate profile.
5. Select *M.SETUP* to change the setup. The changes will be saved in the Profile selected.
6. Perform the readings with the Profile selected.
7. Press *SELECT PROFILE* on the standby screen to select a different profile.

8.15 Restore the factory settings

This option erases all data stored in the meter and reverts all settings and configurations to the factory default settings.

1. Press *TO SYSTEM* from the standby screen.
2. Select *METER OPTIONS*.
3. Select the *RESTORE TO FACTORY SETTINGS* option and confirm.

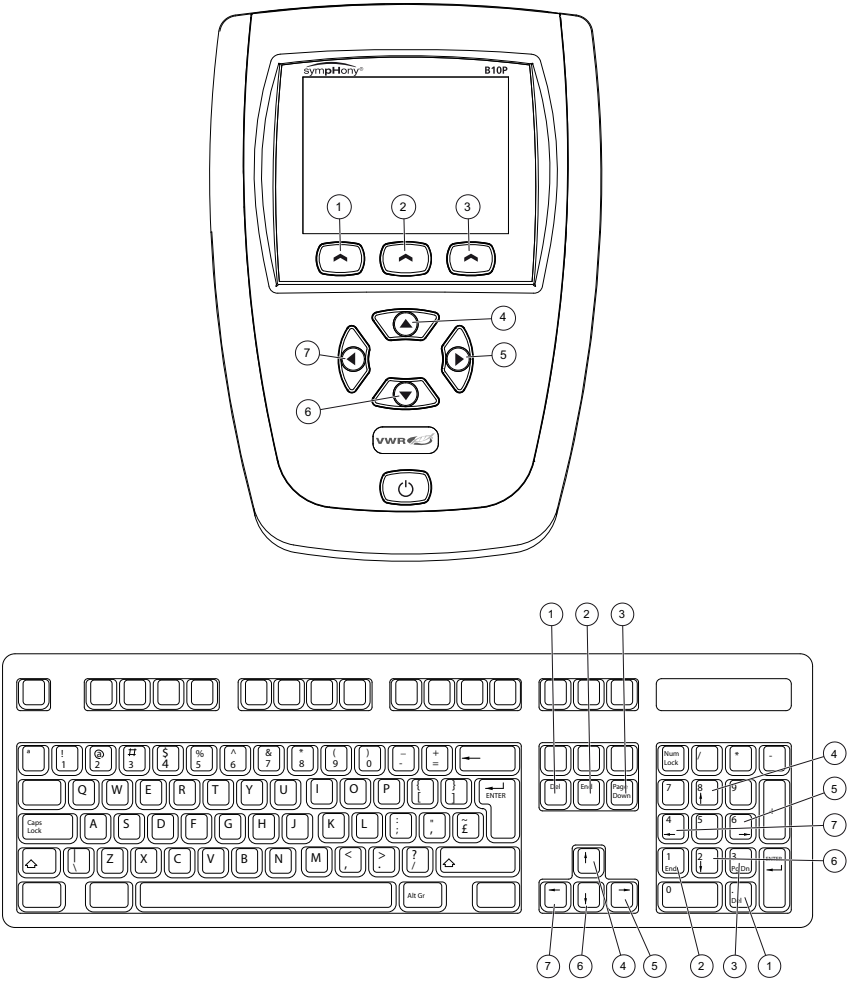
8.16 Use a PC keyboard

Connect a standard PC keyboard to operate with the meter or to facilitate alphanumeric data entry (Figure 13 on page 42)

1. Connect the keyboard to the rear panel (see Connector panels on page 11).
2. The meter can be operated from the PC keyboard using these keys:

Note: *If using the “Numeric keyboard,” switch between direction keys and numbers using the “CAPS NUM” key.*

Figure 13 Equivalence between meter keys and PC keyboard



Section 9 Data logger

The instrument can store up to 500 measurements.

9.1 Activate the data logger

1. Press *TO SYSTEM* and select *METER OPTIONS.*
2. Select *DATA LOGGER*. Select one of the following options:
   a. *OFF*: The data logger options are turned off.
   b. *OVERWRITE*: The data logger is on. When the memory is full, new data will replace the oldest data.
   c. *ALARM WHEN FULL*: The data logger is on. When the memory is full, the instrument will display an alarm message.

9.2 Store data

Each record in the data logger includes: Sample ID, value measured, measurement duration, sample temperature, stirring speed, date and time the sample was taken, user (where applicable) and Profile (where applicable).

The instrument stores the data either automatically or manually, depending on how the data logger option is programmed, see Measurement setup on page 30.

1. On the ***AUTOMATIC* setting** the instrument stores data according to the Measurement Mode settings:
   - By stability: the measurement is stored when the reading is stable.
   - By time: measurements are stored according to the programmed acquisition interval and at the end of the programmed measurement duration.
   - Continuous: measurements are stored according to the programmed acquisition interval.
2. On the ***MANUAL* setting** a soft-key option becomes available on the measurement and calibration screens, which enables the user to save data manually. This option varies according to the configuration of the *DATA LOGGER* and *DATA OUTPUT.* Press the key whenever you wish to save/print a measurement.
   - → (save to data logger): this option appears when the *DATA LOGGER* is activated and the *DATA OUTPUT* is deactivated. The data is saved in the instrument's internal memory. .
   - → (print): this option appears when the *DATA LOGGER* is deactivated and the *DATA OUTPUT* is configured with a printer.
   - → (send to PC): this option appears when the *DATA LOGGER* is deactivated and the *DATA OUTPUT* is configured with a PC.
   - → & / → & (Data Record): this option appears when the *DATA LOGGER* is activated and the *DATA OUTPUT* is configured with a printer or PC. The data is saved in the instrument's internal memory and also sends it to the printer or PC.

- When the meter stores data the data logger will display the icon:

- If the data logger is full and the meter can't save the data, the following icon will be displayed:

9.2.1 Sample identification

The instrument identifies samples either automatically or manually, depending on the programming in Measurement setup on page 30.

- Automatic identification: a consecutive number is automatically assigned to each sample.

Note: *This counter can be reset to zero by selecting the "RESET SAMPLE ID" option in Meter options on page 36.*

- Manual sample ID: the user must manually enter the ID of each sample.

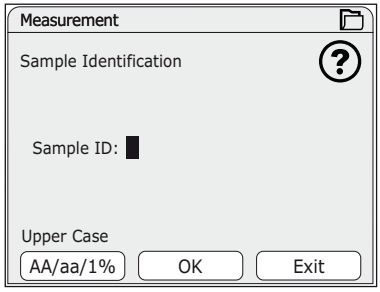


Figure 14 Manual sample ID entry

Press the "AA/aa/1%" button to move between the different character options: capitals, lower case and numbers/symbols. Use the *UP/DOWN* direction keys to change the value. Use the *LEFT/RIGHT* directions keys to scroll to the next character. Confirm with *OK*.

Note: *Data entry can be facilitated using a standard PC keyboard connected to the meter.*

9.3 View measurement data

1. Press *TO DATA LOGGER* *from the standby screen.*
2. Select one of the following options:

Table 5 Viewing measurement data

Option	Description
View All	Displays a list of all of the stored measurements

Table 5 Viewing measurement data

Option	Description
View by Date	Displays a list of measurements stored within a certain date interval. Select the start and end date.
View by Profile	Displays a list of the measurements stored in each PROFILE when the PROFILES option is activated.
View by User	Displays a list of measurements stored by each user when the USERS option is activated.
Delete All Data	Clear all data stored in the DATA LOGGER

3. The instrument displays a list of stored measurements, based on the selected data view option.
4. Select a measurement and press *VIEW* to see measurement details.
5. Press *EXIT* to return to the list.

9.4 Print data

Measurement records, calibration records, meter configuration and the data loger can be sent to a connected printer.

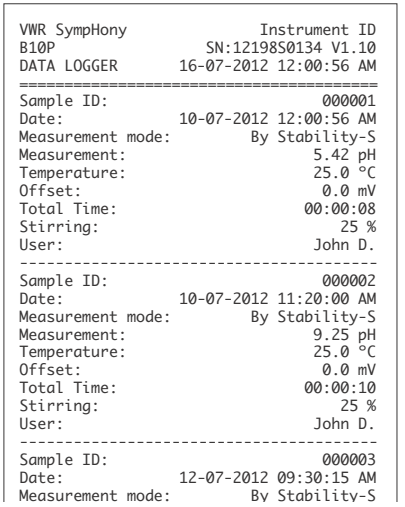
To print data the *DATA OUTPUT* options must be enabled at *METER OPTIONS*.

1. From the standby screen press *TO SYSTEM* ✂
2. Select *METER OPTIONS*.
3. Select the *DATA OUTPUT* option and then select *PRINTER.*
4. The meter configuration and the data logger screens will have *PRINT* as a soft-key option. Press *PRINT* to send these data to the connected printer.

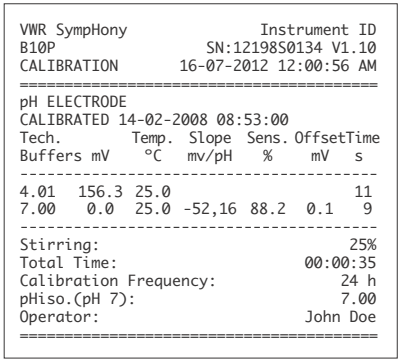
Important Note: *When changing data output options in the meter from "PRINTER" to any other option, the printer will need to be disconnected from the meter.*

Note: *Connect meter to a printer compatible with ESC/POS communication protocol, i.e. the CITIZEN CD-S500A (Cat. No 89236-586).*

5. The meter configuration and the data logger will have PRINT as a soft-key option. Press PRINT to send these data to the connected printer.



```
VWR SymphHony                Instrument ID
B10P                  SN:12198S0134 V1.10
DATA LOGGER       16-07-2012 12:00:56 AM
========================================
Sample ID:                         000001
Date:              10-07-2012 12:00:56 AM
Measurement mode:          By Stability-S
Measurement:                     5.42 pH
Temperature:                     25.0 °C
Offset:                           0.0 mV
Total Time:                     00:00:08
Stirring:                           25 %
User:                            John D.
----------------------------------------
Sample ID:                         000002
Date:              10-07-2012 11:20:00 AM
Measurement mode:          By Stability-S
Measurement:                     9.25 pH
Temperature:                     25.0 °C
Offset:                           0.0 mV
Total Time:                     00:00:10
Stirring:                           25 %
User:                            John D.
----------------------------------------
Sample ID:                         000003
Date:              12-07-2012 09:30:15 AM
Measurement mode:          By Stability-S
```



```
VWR SymphHony                Instrument ID
B10P                  SN:12198S0134 V1.10
CALIBRATION       16-07-2012 12:00:56 AM
========================================
pH ELECTRODE
CALIBRATED 14-02-2008 08:53:00
Tech.        Temp.  Slope  Sens. OffsetTime
Buffers mV    °C   mv/pH    %     mV   s
----------------------------------------
4.01   156.3 25.0                      11
7.00    0.0  25.0 -52,16  88.2  0.1   9
----------------------------------------
Stirring:                           25%
Total Time:                     00:00:35
Calibration Frequency:              24 h
pHiso.(pH 7):                      7.00
Operator:                       John Doe
========================================
```

Figure 15 Ticket examples

9.5 Send data to a PC: PC CSV format

To send data to a connected PC the *DATA OUTPUT* options must be enabled at *METER OPTIONS*. Configure the *DATA RECORD* option at the *MEASUREMENT SETUP* with the desired sending option: automatic or manual.

1. From the standby screen press *TO SYSTEM*

2. Select *METER OPTIONS*.

3. Select the *DATA OUTPUT* option and then select *PC CSV*.

The serial port parameters of the PC application receiving the information must be set as follows:

Table 6 Serial port configuration

Baud rate	115200
Data bits	8
Parity	None
Stop bits	1
Flow control	None

Important Note: *A serial COM ports application, i.e. Windows Hyperterminal, should be used to communicate the instrument with the PC. Refer to the OS help to configure the application.*

Important Note: *When using a computer program to communicate with the meter, close the computer program* ***before*** *turning off the meter. Failure to close the computer program will result in lost communication.*

Note: *To send the data to a PC, the instrument must be connected to the PC via a mini-USB/USB cable (Cat. No. 89236-588).*

See Appendix A CSV Format on page 51.

9.6 Send data to a PC: PC Report format

To send data to a connected PC the *DATA OUTPUT* options must be enabled at *METER OPTIONS*. Configure the *DATA RECORD* option at the *MEASUREMENT SETUP* with the desired sending option: automatic or manual.

1. From the standby screen press *TO SYSTEM* 🛠
2. Select *METER OPTIONS*.
3. Select the *DATA OUTPUT* option and select *PC REPORT*
4. Data is sent to the PC in a similar format as a “printed ticket”.

Important Note: *When using a computer program to communicate with the meter, close the computer program* ***before*** *turning off the meter. Failure to close the computer program will result in lost communication.*

Note: *To send the data to a PC, the instrument must be connected to the PC via a mini-USB/USB cable (Cat. No. 89236-588).i*

Section 10 Maintenance

⚠ CAUTION

Personal injury hazard. Only qualified personnel should carry out the tasks described in this section of the manual.

10.1 Clean the instrument

NOTICE

Never use cleaning agents such as turpentine, acetone, or similar products to clean the instrument, including the screen and accessories.

Clean the outside of the instrument with a moist cloth and a mild soap solution.

10.2 Clean the probe

Clean the probe as required.

Refer to Troubleshooting on page 49 for more information about cleaning.

Refer to the probe documentation for information about probe maintenance.

Use the cleaning agents listed in Table 7 to address specific pH probe contaminants.

Table 7 pH probe cleaning agents

Contamination	Cleaning agent
Proteins	Pepsin cleaning solution
Oils and fats	Electrode cleaning solution
Lime-scale	0.1 M HCl solution

Section 11 Troubleshooting

Refer to the following table for common error messages, symptoms, possiible causes and corrective actions.

Table 8 Calibration warnings and errors

Error/Warning	Solution
Calibration out of range	Measured value out of range Re-calibrate Connect a new probe
Unstable measurement (time> 120 s)	For pH, conductivity and DO calibrations Re-calibrate Check the probe* Make sure the probe is properly immersed in the sample
Unstable measurement (time> 240 s)	For ISE calibrations Re-calibrate Check the probe* Make sure the probe is properly immersed in the sample
Same buffer/standard	Re-calibrate Check the probe* Examine the buffer solution: Make sure that the buffer used matches the buffer specified in the setup; check the temperature specification in the setup; use a new buffer solution
Unknown buffer	
Temperature difference > 3.0 °C	Adjust the calibration solutions to the same temperature Check the temperature sensor
Temperature out of range	Check the temperature sensor Connect a new probe
Outside allowable range	Offset or slope outside the range Check the specification in the setup Connect a new probe
Signal too low/high	DO probe error Check the probe* Examine the standard solutions
Cell constant over limits	Insert the probe into the appropriate standard and read again Check the probe* Connect a new probe
Cell constant deviation error	
Not calibrated	There are no calibration data stored in the instrument Perform calibration

* Clean the probe (refer to Clean the probe on page 48 for more information); make sure that there are no air bubbles at the tip. Shake the probe like a thermometer. Disconnect and then re-connect the probe. Connect a different probe to check whether the problem is with the probe or the meter.

Table 9 Measurement warnings and errors

Error/Warning	Solution
- - - - - - - - (Measurement out of range)	Measured value out of range Check the probe*
>>>>>> (too high) <<<<<< (too low) (ISE measurement out of range)	The measured value is out of calibration range Re-calibrate Check the probe*
Unstable measurement (time> 120 s)	For pH, conductivity and DO measurements Check the probe* Make sure the probe is properly immersed in the sample
Unstable measurement (time> 240 s)	For ISE measurements Check the probe* Make sure the probe is properly immersed in the sample

Table 10 Miscellaneous warnings and errors

Error/Warning	Solution
Data logger full	Empty the data logger
All data will be deleted. Are you sure?	Confirm the data to be deleted from the data logger
Invalid empty input	Blank data inputs/settings are rejected

Appendix A CSV Format

A.1 CSV measurement lines

The first time that a measurement is executed, a CSV calibration line is sent to the PC. Then, every time a measurement is taken the meter sends a CSV line to the PC. When the user sends the data logger to the PC the meter sends a CSV measurement line for every data logger record. Each CSV measurement line can contain the following comma separated values:

GI;MO;ID;RID;PRF;TOM;SID;UN;STV;STU;DTF;DATE;TIME;TMT;SEID1;ION1;M1;TCT1;TCV1;TCU1;TREF1;TREFU1;MU1;AM1;AMU1;TEMP1;TEMPU1;SEID2;ION2;M2;MU2;AM2;AMU2;TEMP2;TEMPU2;TCT3;TCV3;TCU3;TREF3;TREFU3;M3;MU3;AM3;AMU3;TEMP3;TEMPU3;**EOLCR**

Note: *Items are always sent in the same order as above.*

Note: *Bold items are common to all meter models*

A.1.1 CSV measurement item descriptions

Table 11 CSV measurement item descriptions

Item	Name	Description
GI	General index	Index number that consecutively logs each measurement and each time the data log is sent to a PC
MO	Equipment model	Identifies the instrument model (B10P, B10C)
ID	Instrument ID	Optional instrument identifier in the meter options menu that user can set
RID	Record ID	Possible values are: M_ST; DL_ST; M_IT; DL_IT; M_RE; DL_RE
M_ST; DL_ST	Record ID (value)	Identifies the record as the first measurement of a “By Time” or “Continuous” measurement (DL_ST in data logger records)
M_IT; DL_IT	Record ID (value)	Identifies the record as an intermediate measurement of a “By Time” or “Continuous” measurement (DL_IT in data logger records)
M_RE; DL_RE	Record ID (value)	Identifies the record as a “By Stability” measurement or as the last record of a “By Time” or “Continuous” measurement (DL_RE in data logger records)
PRF	Profile name	Identifies the profile name used (if any)
TOM	Type of measurement	Possible values are: S (for Stability); C (for Continous); T (for By Time)

Table 11 CSV measurement item descriptions

Item	Name	Description
SID	Sample ID	Identifies the “Sample ID” when the meter is set to automatic sample identification, or the user entered ID when the meter is set to manual
UN	User name	User name of the operator that took the reading
STV	Stirrer value	Identifies which stirrer (if any) was used during the measurement
STU	Stirrer units	Indicates the percentage of stirring capacity that was used during the measurement
DTF	Data time format	Possible values are: 0 (MM/DD/YYYY 12H); 1 (DD-MM-YYYY 12H); 2 (YYYY-MM-DD 12H); 3 (MM/DD/YYYY 24H); 4 (DD-MM-YYYY 24H); 5 (YYYY-MM-DD 24H)
DATE	Date	Date of the measurement
TIME	Time	Time of the measurement
TMT	Total measuring time	Total elapsed time between start and end of measurement
SEID1, SEID 2	Sensor ID	Identifies the sensor in ISE channels. User can set this value in ISE measurement setup
ION1, ION2	Ion name	Identifies the ion in ISE channels. User can set this value in ISE calibration setup
M1,M2,M3	Channel x measured value	Measured value of the indicated channel
MU1,MU2,MU3	Channel x measurement units	Measurement units of the indicated channel
AM1,AM2,AM3	Channel x auxiliary measurement	Optional accompanying measurement (example: mV when measuring pH; resistivity when measuring conductivity)
AMU1, AMU2, AMU3	Channel x auxiliary measurement units	Units of the optional accompanying measurement (example: ohms for resistivity)
TEMP1, TEMP2, TEMP3	Channel x temperature value	Temperature value of the indicated channel
TEMPU1, TEMPU2, TEMPU3	Channel x temperature units	Temperature units of the indicated channel
TCT1, TCT3	Temperature compensation type	Type of temperature compensation (TC) in conductivity channels. Possible values are: Linear or Natural Waters
TCV1, TCV3	Temperature compensation value	Identifies the value of the temperature compensation in conductivity channels
TCU1, TCU3	Temperature compensation units	Units of temperature compensation in conductivity channels. Always set to %

Table 11 CSV measurement item descriptions

Item	Name	Description
TREF1, TREF3	Reference temperature value	Identifies the value of reference temperature in conductivity channels
TREFU1, TREFU3	Reference temperature units	Unist of reference temperature in conductivity channels. Always set to %
EOLCR		Characters to signify the end of the CSV report

A.1.2 CSV measurement items depending on the model

1. For B10P models:

GI;MO;ID;RID;PRF;TOM;SID;UN;STV;STU;DTF;DATE;TIME;TMT;M1;MU1;AM1;AMU1;TEMP1;TEMPU1;**EOLCR**

B10P example:
00001;B10P;B10P;M_RE;Profile01;S;000005;;30;%;4;28-06-2012;09:25:29;00:06;7.52;pH; -31.1;mV; 27;ºC;

2. For B10C models:

GI;MO;ID;RID;PRF;TOM;SID;UN;STV;STU;DTF;DATE;TIME;TMT;TCT1;TCV1:TCU1;TREF1;TREFU1;M1;MU1;AM1;AMU1;TEMP1;TEMPU1;**EOLCR**

B10C example:
*00001;B10C;B10C;M_RE;;S;000004;;25;%;4;28-06-2012;09:30:28;00:06;Linear;2.00;%;25;ºC; 1.00;µS/cm;1000;KOhm*cm; 25;ºC;*

3. For B20PI models

GI;MO;ID;RID;PRF;TOM;SID;UN;STV;STU;DTF;DATE;TIME;TMT;SEID1;ION1;M1;MU1;AM1;AMU1;TEMP1;TEMPU1;SEID2;ION2;M2;MU2;AM2;AMU2;TEMP2;TEMPU2;**EOLCR**

Note: *All items are always sent, even if channel x is inactive (item values of inactive channels are left blank). SEID1, ION1, SEID2 and ION2 items are always sent (item values are left blank if channel is not ISE, there is not a sensor ID, and/or there is not an ion name for the channel).*

B20PI example, both channels active:
00001;B20PI;B20PI;M_RE;;S;000001;;25;%;4;28-06-2012;09:33:51;00:10;;;7.52;pH; -31.1;mV; 27;ºC; Sensor_ID_1234;ION_C2;0.000010;mol/L;25.4;mV; 25;ºC;

B20PI example, channel 1 inactive:
00001;B20PI;B20PI;M_RE;;S;000001;;25;%;4;28-06-2012;09:33:51;00:10;;;;;;;;;Sensor_ID_1234;ION_C2;0.000010;mol/L; 25.4;mV; 25;ºC;

B20PI example, channel 2 inactive:
00001;B20PI;B20PI;M_RE;;S;000001;;25;%;4;28-06-2012;09:33:51;00:10;;;7.52;pH; -31.1;mV; 27;ºC;;;;;;;;;

4. For B30PCI models

GI;MO;ID;RID;PRF;TOM;SID;UN;STV;STU;DTF;DATE;TIME;TMT;SEID1;ION1;M1;MU1;AM1;AMU1;TEMP1;TEMPU1;SEID2;ION2;M2;MU2;AM2;AMU2;TEMP2;TEMPU2;TCT3;TCV3;TCU3;TREF3;TREFU3;M3;MU3;AM3;AMU3;TEMP3;TEMPU3; **EOLCR**

Note: *All items are always sent, even if channel x is inactive (item values of inactive channels are left blank). SEID1, ION1, SEID2 and ION2 items are always sent (item values are left blank if channel is not ISE, there is not a sensor ID, and/or there is not an ion name for the channel).*

B30PCI example, all channels active:
*00001;B30PCI;B30PCI;M_RE;;S;000001;;25;%;4;28-06-2012;09:38:00;00:10;;;7.72;pH; -32.1;mV; 25;ºC;Sensor_ID_1234;ION_C2;0.000010;mol/L;25.4;mV; 25;ºC;Linear;2.5;%;26;ºC; 1.00;µS/cm;1000;KOhm*cm; 25;ºC;*

B30PCI example, channel 2 inactive:
*00001;B30PCI;B30PCI;M_RE;;S;000001;;25;%;4;28-06-2012;09:38:00;00:10;;;7.72;pH; -32.1;mV; 25;ºC;;;;;;;;; Linear;2.5;%;26;ºC;1.00;µS/cm;1000;KOhm*cm; 25;ºC;*

5. For B40PCID models

GI;MO;ID;RID;PRF;TOM;SID;UN;STV;STU;DTF;DATE;TIME;TMT;SEID1;ION1;M1;MU1;AM1;AMU1;TEMP1;TEMPU1;M2;MU2;AM2;AMU2;TEMP2;TEMPU2;TCT3;TCV3;TCU3;TREF3;TREFU3;M3;MU3;AM3;AMU3;TEMP3;TEMPU3; **EOLCR**

Note: *All items are always sent, even if channel x is inactive (item values of inactive channels are left blank). SEID1 and ION1 items are always sent (item values are left blank if channel is not ISE, there is not a sensor ID, and/or there is not an ion name for the channel).*

B40PCID example, all channels active:
*00001;B40PCID;B40PCID;M_ST;;S;000001;;25;%;4;28-06-2012;09:42:03;00:10;;;7.78;pH; -32.1;mV; 25;ºC; 3.04;mg/L; 25.00;nA; 25;ºC;Linear;2.5;%;26;ºC; 1.00;µS/cm;100;KOhm*cm; 25;ºC;*

B40PCID example, channel 3 inactive:
00001;B40PCID;B40PCID;M_ST;;S;000001;;25;%;4;28-06-2012;09:42:03;00:10;;;7.78;pH; -32.1;mV; 25;ºC; 3.04;mg/L; 25.00;nA; 25;ºC;;;;;;;;;;

B40PCID example, all channels active and channel 1 ISE:
*00001;B40PCID;B40PCID;M_ST;;S;000001;;25;%;4;28-06-2012;09:42:03;00:10;Sensor_ID_0001;ION_C1;0.000010;mol/L; 25.4;mV; 25;ºC;3.04;mg/L; 25.00;nA; 25;ºC; Linear;2.5;%;26;ºC; 1.00;µS/cm;100;KOhm*cm; 25;ºC;*

A.2 CSV calibration lines

Each CSV calibration line can contain the following comma separated items:

GI;MO;ID;RID;CH1_ITEMS;CH2_ITEMS;CH3_ITEMS;**EOLCR**

Note: *Items are always sent in the same order as the line above.*

Note: *Bold items are common to all meter models*

CH1_ITEMS;CH2_ITEMS;CH3_ITEMS: First, second and third channel calibration items. Calibration items can be PH_ISE_ORP_CAL_ITEMS, EC_CAL_ITEMS or DO_CAL_ITEMS.

Measurement items are described below depending on the type of sensor. Items are are always sent in the order below.

PH_ISE_ORP_CAL_ITEMS (for pH, ISE or ORP sensor):

```
SENSTYP;TEMP;TEMPU;STV;STU;DTF;DATE;TIME;UN;CALTYPE;NPOINTS;SEID;ION;BUFFV1;BUFFU1;MVV1;MVU1;TEMP1;TEMPU1;TIME1;BUFFV2;BUFFU2;MVV2;MVU2;TEMP2;TEMPU2;TIME2;BUFFV3;BUFFU3;MVV3;MVU3;TEMP3;TEMPU3;TIME3;BUFFV4;BUFFU4;MVV4;MVU4;TEMP4;TEMPU4;TIME4;BUFFV5;BUFFU5;MVV5;MVU5;TEMP5;TEMPU5;TIME5;SLOPE1;SLOPEU1;SENS1;SENSU1;OFF1;OFFU1;SLOPE2;SLOPEU2;SENS2;SENSU2;OFF2;OFFU2;SLOPE3;SLOPEU3;SENS3;SENSU3;OFF3;OFFU3;SLOPE4;SLOPEU4;SENS4;SENSU4;OFF4;OFFU4;PHISO;PHISOU;PHISOTEMP;PHISOTEMPU;
```

Note: *All values are sent, some values may be blank if not applicable.*

EC_CAL_ITEMS (for EC sensor):

```
SENSTYP;TEMP;TEMPU;STV;STU;DTF;DATE;TIME;UN;CALTYPE;NPOINTS;STDV1;STDU1;CTV1;CTU1;TEMP1;TEMPU1;TIME1;STDV2;STDU2;CTV2;CTU2;TEMP2;TEMPU2;TIME2;STDV3;STDU3;CTV3;CTU3;TEMP3;TEMPU3;TIME3;
```

Note: *All values are sent, some values may be blank if not applicable.*

DO_CAL_ITEMS (for DO sensor):

```
SENSTYP;TEMP;TEMPU;STV;STU;DTF;DATE;TIME;UN;CALTYPE;NPOINTS;STDV1;STDU1;CURR1;CURRU1;TEMP1;TEMPU1;TIME1;STDV2;STDU2;CURR2;CURRU2;TEMP2;TEMPU2;TIME2;
```

Note: *All values are sent, some values may be blank if not applicable.*

A.2.1 CSV calibration item descriptions

Table 12 CSV Calibration item descriptions

Item	Name	Description
GI	General index	Increased every time a calibration is recorded. Set to 0 every time a calibration is started
MO	Equipment model	Fixed value B10P, B10C....
ID	Instrument ID	User can set this value through Meter Options, Instrument ID
RID	Record ID	Possible values are: C_RE
C_RE	Record ID (value)	Identifies the record as a calibration register
SENYSTYP	Type of sensor	pH, ISE, ORP, DO or conductivity

Table 12 CSV Calibration item descriptions

Item	Name	Description
TEMP	Temperature value	Recorded temperature value of the standard during calibration
TEMPU	Temperature units	Temperature units based on meter settings (celsius or fahrenheit)
STV	Stirrer value	Identifies which stirrer (if any) was used during the measurement
STU	Stirrer units	Indicates the percentage of stirring capacity that was used during the measurement
DTF	Data time format	Possible values are: 0 (MM/DD/YYYY 12H); 1 (DD-MM-YYYY 12H); 2 (YYYY-MM-DD 12H); 3 (MM/DD/YYYY 24H); 4 (DD-MM-YYYY 24H); 5 (YYYY-MM-DD 24H)
DATE	Date	Date of calibration
TIME	Time	Time of calibration
UN	User name	User name of the operator that performed the calibration
CALTYPE	Calibration type	Type of calibration selected depending on the standards. (Examples: NIST Buffers, Standard 220 mV @ 25ºC, Molar (KCl))
NPOINTS	Number of points	Number of buffers/standards used in calibration
SEID	Sensor ID	Identifies the ISE that was used for calibration
ION	Ion name	Identifies the user programmed ion name for ISE measurements
BUFFV1, BUFFV2, BUFFV3, BUFFV4, BUFFV5	Buffer value	Identifies the value(s) of the single or multiple standards used during calibration.
BUFFU1, BUFFU2, BUFFU3, BUFFU4, BUFFU5	Buffer units	Identifies the units of the calibration standards
MVV1, MVV2, MVV3, MVV4, MVV5	mV value	Identifies the millivolt reading of the buffer(s) or standard(s) used during calibration.
MVU1, MVU2, MVU3, MVU4, MVU5	mV units	Identifies the millivolt reading of the buffer(s) or standard(s) used during calibration.
TEMP1, TEMP2, TEMP3, TEMP4, TEMP5	Temperature	Temperature of the standard(s) during calibration

Table 12 CSV Calibration item descriptions

Item	Name	Description
TEMPU1, TEMPU2, TEMPU3, TEMPU4, TEMPU5	Temperature units	Temperature units of the standard(s) used in calibration (celsius or fahrenheit)
TIME1, TIME2, TIME3, TIME4, TIME5	Time	Identifies the amount of time each calibration standard took to lock in
SLOPE1, SLOPE2, SLOPE3, SLOPE4	Slope	Identifies the slope based on the values received during calibration
SLOPEU1, SLOPEU2, SLOPEU3, SLOPEU4	Slope units	Identifies the units used for the slope (example: for pH the slope units would be mV/pH)
SENS1, SENS2, SENS3, SENS4	Slope %	Identifies the slope % based on the values received during calibration. Uses the formula: (Actual Slope / Theoretical slope) * 100
SENSU1, SENSU2, SENSU3, SENSU4	Slope % units	Identifies the units for slope % (always set to percent)
OFF1, OFF2, OFF3, OFF4	Offset	Identifies the offset for each calibration point
OFFU1, OFFU2, OFFU3, OFFU4	Offset units	Identifies the offset units from the calibration (always mV)
PHISO	pH Isothermal	Isothermal point pH value
PHISOU	pH Isothermal units	Isothermal point pH value units. Always set to pH
PHISOTEMP	pH Isothermal temperature	Isothermal point temperature
PHISOTEMPU	pH Isothermal temperature units	Units of isothermal point temperature (celsius or fahrenheit)
STDV1, STDV12 STDV3	Standard value	Identifies the value(s) of the standards used during calibration
STDU1, STDU2, STDU3	Standard units	Identifies the units for the standards used during calibration
CTV1, CTV2, CTV3	Constant value	Cell constant 1 value of conductivity calibration result
CTU1, CTU2, CTU3	Constant units	Cell constant 1 units of conductivity calibration result. Always set to cm-1
CURR1, CURR2	Current	Values of the current DO calibration

Table 12 CSV Calibration item descriptions

Item	Name	Description
CURRU1, CURRU2	Current units	Units for the current DO calibration
EOLCR		Characters to signify the end of the CSV calibration report

A.2.2 CSV calibration items depending on the model

1. **For B10P models**:

```
GI;MO;ID;RID;SENSTYP;TEMP;TEMPU;STV;STU;DTF;DATE;TIME;UN;CALTYP
E;NPOINTS;SEID;ION;BUFFV1;BUFFU1;MVV1;MVU1;TEMP1;TEMPU1;TIME1;
BUFFV2;BUFFU2;MVV2;MVU2;TEMP2;TEMPU2;TIME2;BUFFV3;BUFFU3;MVV
3;MVU3;TEMP3;TEMPU3;TIME3;BUFFV4;BUFFU4;MVV4;MVU4;TEMP4;TEMP
U4;TIME4;BUFFV5;BUFFU5;MVV5;MVU5;TEMP5;TEMPU5;TIME5;SLOPE1;SL
OPEU1;SENS1;SENSU1;OFF1;OFFU1;SLOPE2;SLOPEU2;SENS2;SENSU2;O
FF2;OFFU2;SLOPE3;SLOPEU3;SENS3;SENSU3;OFF3;OFFU3;SLOPE4;SLOP
EU4;SENS4;SENSU4;OFF4;OFFU4;PHISO;PHISOU;PHISOTEMP;PHISOTEMP
U;EOLCR
```

B10P example, 5 technical buffers calibration:
00001;B10P;B10P;C_RE;pH;25;°C;;;4;01-06-2012;00:04:46;;Technical;5;;;1.68;pH;313.6;mV;25;°C;16;4.01;pH;175.1;mV;25;°C;13;7.00;pH;-0.9;mV;25;°C;8;10.01;pH;-177.1;mV;25;°C;15;12.45;pH;-318.7;mV;25;°C;22;-59.44;mV/pH;100.5;%;-2.6;mV;-58.86;mV/pH;99.5;%;-0.9;mV;-58.54;mV/pH;99.0;%;-0.9;mV;-58.03;mV/pH;98.1;%;-2.4;mV;7.00;pH;25.0;ºC;

B10P example, theoretical values calibration:
00001;B10P;B10P;C_RE;pH;25;°C;;;4;01-06-2012;00:06:55;;Theoretical Values;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;-59.16;mV/pH;100.0;%;0.0;mV;;;;;;;;;;;;;;;;;;;7.00;pH;25.0;ºC;

B10P example, data introduction calibration:
00001;B10P;B10P;C_RE;pH;25;°C;;;4;01-06-2012;00:06:35;;Data Introduction;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;-58.03;mV/pH;107.1;%;0.5;mV;;;;;;;;;;;;;;;;;;;;7.00;pH;25.0;ºC;

1. **For B10C models**:

```
GI;MO;ID;RID;SENSTYP;TEMP;TEMPU;STV;STU;DTF;DATE;TIME;UN;CALTYP
E;NPOINTS;STDV1;STDU1;CTV1;CTU1;TEMP1;TEMPU1;TIME1;STDV2;STDU
2;CTV2;CTU2;TEMP2;TEMPU2;TIME2;STDV3;STDU3;CTV3;CTU3;TEMP3;TE
MPU3;TIME3;EOLCR
```

B10C example, 3 Molar standards calibration:
00001;B10C;B10C;C_RE;Cond.;25;°C;4;01-06-2012;00:02:33;;Molar (KCl);3;147;µS/cm;0.756;cm-1;25;°C;13;1412;µS/cm;0.722;cm-1;25;°C;7;12.89;mS/cm;0.718;cm-1;25;°C;11;

B10C example, 1Demal standard calibration:
00001;B10C;B10C;C_RE;Cond.;25;°C;4;01-06-2012;00:04:28;;Demal (KCl);1;12.85;mS/cm;0.633;cm-1;25;°C; 6;;;;;;;;;;;;;;;

B10C example, To a specific value calibration:
00001;B10C;B10C;C_RE;Cond.;25;°C;4;01-06-2012;00:05:53;;To a Specific Value;1;1000;µS/cm;0.511;cm-1;25;°C; 6;;;;;;;;;;;;;;;

2. For B20PI models

```
GI;MO;ID;RID;SENSTYP;TEMP;TEMPU;STV;STU;DTF;DATE;TIME;UN;CALTYP
E;NPOINTS;SEID;ION;BUFFV1;BUFFU1;MVV1;MVU1;TEMP1;TEMPU1;TIME1;
BUFFV2;BUFFU2;MVV2;MVU2;TEMP2;TEMPU2;TIME2;BUFFV3;BUFFU3;MVV
3;MVU3;TEMP3;TEMPU3;TIME3;BUFFV4;BUFFU4;MVV4;MVU4;TEMP4;TEMP
U4;TIME4;BUFFV5;BUFFU5;MVV5;MVU5;TEMP5;TEMPU5;TIME5;SLOPE1;SL
OPEU1;SENS1;SENSU1;OFF1;OFFU1;SLOPE2;SLOPEU2;SENS2;SENSU2;O
FF2;OFFU2;SLOPE3;SLOPEU3;SENS3;SENSU3;OFF3;OFFU3;SLOPE4;SLOP
EU4;SENS4;SENSU4;OFF4;OFFU4;PHISO;PHISOU;PHISOTEMP;PHISOTEMP
U;SENSTYP;TEMP;TEMPU;STV;STU;DTF;DATE;TIME;UN;CALTYPE;NPOINTS
;SEID;ION;BUFFV1;BUFFU1;MVV1;MVU1;TEMP1;TEMPU1;TIME1;BUFFV2;BU
FFU2;MVV2;MVU2;TEMP2;TEMPU2;TIME2;BUFFV3;BUFFU3;MVV3;MVU3;TE
MP3;TEMPU3;TIME3;BUFFV4;BUFFU4;MVV4;MVU4;TEMP4;TEMPU4;TIME4;B
UFFV5;BUFFU5;MVV5;MVU5;TEMP5;TEMPU5;TIME5;SLOPE1;SLOPEU1;SEN
S1;SENSU1;OFF1;OFFU1;SLOPE2;SLOPEU2;SENS2;SENSU2;OFF2;OFFU2;S
LOPE3;SLOPEU3;SENS3;SENSU3;OFF3;OFFU3;SLOPE4;SLOPEU4;SENS4;S
ENSU4;OFF4;OFFU4;PHISO;PHISOU;PHISOTEMP;PHISOTEMPU;EOLCR
```

B20PI example, channel 1 (pH) 5 technical buffers calibration and channel 2 (ISE) 5 standards calibration:
00001;B20PI;B20PI;C_RE;pH;25;°C;4;01-06-2012;00:03:06;;Technical;5;;;1.68;pH;315.8;mV;25;°C;16;4.01;pH;176.0;mV;25;°C;14;7.00;pH;-1.0;mV;25;°C;8;10.01;pH;-182.3;mV;25;°C;20;12.45;pH;-318.7;mV;25;°C;6;-60.00;mV/pH;101.4;%;-3.4;mV;-59.20;mV/pH;100.1;%;-1.0;mV;-60.23;mV/pH;101.8;%;-1.0;mV;-55.90;mV/pH;94.5;%;-14.0;mV;7.00;pH;25.0;°C;ISE;25;°C;4;01-06-2012;00:06:25;;mg/L;5;ZZZYZZZZZZZZZZZZZZZY;AAAAAA;0.001;mg/L;16.8;mV;25;°C;12;0.010;mg/L;46.9;mV;25;°C;8;0.100;mg/L;97.3;mV; 25;°C;10;1.000;mg/L;147.1;mV;25;°C;11;10.000;mg/L;197.9;mV;25;°C;13;-30.09;mV/pX;;;107.1;mV;-50.39;mV/pX;;;147.7;mV;-49.87;mV/pX;;;147.1;mV;-50.80;mV/pX;;;147.1;mV;;;;;

B20PI example, channel 1 inactive (sensor set to none), and channel 2 (ISE) 5 standards calibration:
00001;B20PI;B20PI;C_RE;None;;;ISE;25;°C;4;01-06-2012;00:06:25;;mg/L;5;ZZZYZZZZZZZZZZZZZZZY;AAAAAA;0.001;mg/L;16.8;mV;25;°C;12;0.010;mg/L;46.9;mV;25;°C;8;0.100;mg/L;97.3;mV;25;°C;10;1.000;mg/L;147.1;mV;25;°C;11;10.000;mg/L;197.9;mV;25;°C;13;-30.09;mV/pX;;;107.1;mV;-50.39;mV/pX;;;147.7;mV;-49.87;mV/pX;;;147.1;mV;-50.80;mV/pX;;;147.1;mV;;;;;

B20PI example, channel 1 (ISE) 5 standards calibration, and channel 2 inactive (sensor set to none):
00001;B20PI;B20PI;C_RE;ISE;25;°C;4;01-06-2012;00:13:19;;mg/L;5;Default;BBBBBB;0.001;mg/L;49.6;mV;25;°C;20;0.010;mg/L;99.7;mV;25;°C;14;0.100;mg/L;150.5;

mV;25;°C;9;1.000;mg/L;201.7;mV;25;°C;6;10.000;mg/L;252.7;mV;25;°C;9;-50.11;mV/pX;;;
200.0;mV;-50.75;mV/pX;;;201.2;mV;-51.22;mV/pX;;;201.7;mV;-51.03;mV/pX;;;201.7;mV;;;;;None;;;

B20PI example, channel 1 inactive (sensor set to none), and channel 2 (ORP) 220mV standard calibration:
00001;B20PI;B20PI;C_RE;None;;;ORP;25;°C;4;01-06-2012;00:00:22;;Standard 220 mV @25ºC;1;;;0.0;mV;;;;;;;;;;;;;;;;;;;;;;;;;

3. For B30PCI models

GI;MO;ID;RID;SENSTYP;TEMP;TEMPU;STV;STU;DTF;DATE;TIME;UN;CALTYPE;NPOINTS;SEID;ION;BUFFV1;BUFFU1;MVV1;MVU1;TEMP1;TEMPU1;TIME1;BUFFV2;BUFFU2;MVV2;MVU2;TEMP2;TEMPU2;TIME2;BUFFV3;BUFFU3;MVV3;MVU3;TEMP3;TEMPU3;TIME3;BUFFV4;BUFFU4;MVV4;MVU4;TEMP4;TEMPU4;TIME4;BUFFV5;BUFFU5;MVV5;MVU5;TEMP5;TEMPU5;TIME5;SLOPE1;SLOPEU1;SENS1;SENSU1;OFF1;OFFU1;SLOPE2;SLOPEU2;SENS2;SENSU2;OFF2;OFFU2;SLOPE3;SLOPEU3;SENS3;SENSU3;OFF3;OFFU3;SLOPE4;SLOPEU4;SENS4;SENSU4;OFF4;OFFU4;PHISO;PHISOU;PHISOTEMP;PHISOTEMPU;SENSTYP;TEMP;TEMPU;STV;STU;DTF;DATE;TIME;UN;CALTYPE;NPOINTS;SEID;ION;BUFFV1;BUFFU1;MVV1;MVU1;TEMP1;TEMPU1;TIME1;BUFFV2;BUFFU2;MVV2;MVU2;TEMP2;TEMPU2;TIME2;BUFFV3;BUFFU3;MVV3;MVU3;TEMP3;TEMPU3;TIME3;BUFFV4;BUFFU4;MVV4;MVU4;TEMP4;TEMPU4;TIME4;BUFFV5;BUFFU5;MVV5;MVU5;TEMP5;TEMPU5;TIME5;SLOPE1;SLOPEU1;SENS1;SENSU1;OFF1;OFFU1;SLOPE2;SLOPEU2;SENS2;SENSU2;OFF2;OFFU2;SLOPE3;SLOPEU3;SENS3;SENSU3;OFF3;OFFU3;SLOPE4;SLOPEU4;SENS4;SENSU4;OFF4;OFFU4;PHISO;PHISOU;PHISOTEMP;PHISOTEMPU;SENSTYP;TEMP;TEMPU;STV;STU;DTF;DATE;TIME;UN;CALTYPE;NPOINTS;STDV1;STDU1;CTV1;CTU1;TEMP1;TEMPU1;TIME1;STDV2;STDU2;CTV2;CTU2;TEMP2;TEMPU2;TIME2;STDV3;STDU3;CTV3;CTU3;TEMP3;TEMPU3;TIME3;EOLCR

B30PCI example, channel 1(pH) 5 NIST buffers calibration, channel 2 (ISE) 5 standards calibration, and channel 3 (EC) 3 Molar standards calibration:
00001;B30PCI;B30PCI;C_RE;pH;25;°C;4;01-06-2012;00:05:33;;NIST Buffers;5;;;1.679;pH;314.9;mV;25;°C;22;4.005;pH;174.4;mV;25;°C;25;6.865;pH;8.4;mV;25;°C;32;9.180;pH;-130.1;mV;25;°C;14;12.454;pH;-321.4;mV;25;°C;20;-60.40;mV/pH;102.1;%;-6.5;mV;-58.04;mV/pH;98.1;%;0.6;mV;-59.83;mV/pH;101.1;%;0.3;mV;-58.43;mV/pH;98.8;%;-2.7;mV;7.00;pH;25.0;ºC;ISE;25;°C;4;01-06-2012;00:11:33;;mg/L;5;ZZZZZZZZZZZZZZZZZZZY;Z00001;0.001;mg/L;-54.6;mV;25;°C;18;0.010;mg/L;-106.4;mV;25;°C;33;0.100;mg/L;-151.7;mV;25;°C;19;1.000;mg/L;-264.9;mV;25;°C;141;10.000;mg/L;-313.5;mV;25;°C;16;51.82;mV/pX;;;-210.1;mV;45.28;mV/pX;;;-197.0;mV;113.15;mV/pX;;;-264.9;mV;48.68;mV/pX;;;-264.9;mV;;;;;Cond.;25;°C;4;01-06-2012;00:12:43;;Molar(KCl);3;147;µS/cm;0.754;cm-1;25;°C;12;1412;µS/cm;0.721;cm-1;25; °C;11;12.89;mS/cm;0.711;cm-1;25;°C;12;

B30PCI example, channel 1 (ISE) 5 standards calibration, channel 2 (ISE) 5 standards calibration, and channel 3 inactive (sensor set to none):
00001;B30PCI;B30PCI;C_RE;ISE;25;°C;4;01-06-2012;00:23:12;;mmol/L;5;Default;;0.001;mmol/L;-41.7;mV;25;°C;13;0.010;mmol/L;-100.8;mV;25;°C;16;0.100;mmol/L;-151.3;mV;25;°C;11;1.000;mmol/L;-200.1;mV;25;°C;11;10.000;mmol/L;-252.5;mV;25;°C;10;59.10;mV/pX;;;-219.0;mV;50.50;mV/pX;;;-201.8;mV;48.84;mV/pX;;;-200.1;m

V;52.41;mV/pX;;;-200.1;mV;;;;;ISE;25;°C;4;01-06-2012;00:11:33;;mg/L;5;ZZZZZZZZ ZZZZZZZZZZZY;Z00001;0.001;mg/L;-54.6;mV;25;°C;18;0.010;mg/L;-106.4;mV;25;° C;33;0.100;mg/L;-151.7;mV;25;°C;19;1.000;mg/L;-264.9;mV;25;°C;141;10.000;mg/ L;-313.5;mV;25;°C;16;51.82;mV/pX;;;-210.1;mV;45.28;mV/pX;;;-197.0;mV;113.15;m V/pX;;;-264.9;mV;48.68;mV/pX;;;-264.9;mV;;;;;None;;;;;;;;;;;;;;;;;;;;;;;;;;;;;

B30PCI example, channel 1 inactive (sensor set to none), channel 2 (ISE) 5 standards calibration, and channel 3 inactive (sensor set to none):
00001;B30PCI;B30PCI;C_RE;None;;I SE;25;°C;4;01-06-2012;00:11:33;;mg/L;5;ZZZZZZZZZZZZZZZZZZZZY;Z00001;0.001 ;mg/L;-54.6;mV;25;°C;18;0.010;mg/L;-106.4;mV;25;°C;33;0.100;mg/L;-151.7;mV;25 ;°C;19;1.000;mg/L;-264.9;mV;25;°C;141;10.000;mg/L;-313.5;mV;25;°C;16;51.82;m V/pX;;;-210.1;mV;45.28;mV/pX;;;-197.0;mV;113.15;mV/pX;;;-264.9;mV;48.68;mV/p X;;;-264.9;mV;;;;;None;;;;;;;;;;;;;;;;;;;;;;;;;;;;;

B30PCI example, channel 1 (ORP) 220mV standard calibration, channel 2 (ISE) 5 standards calibration, and channel 3 (EC) 3 Molar standards calibration:
00001;B30PCI;B30PCIZ;C_RE;ORP;25;°C;4;01-06-2012;00:00:26;;Standard 220 mV @25ºC;1;;;0.0;mV;;;;;;;;;;;;;;;;;;;;;;ISE;25;°C;4;01-06-2012;0 0:11:33;;mg/L;5;ZZZZZZZZZZZZZZZZZZZZY;Z00001;0.001;mg/L;-54.6;mV;25;°C;18 ;0.010;mg/L;-106.4;mV;25;°C;33;0.100;mg/L;-151.7;mV;25;°C;19;1.000;mg/L;-264. 9;mV;25;°C;141;10.000;mg/L;-313.5;mV;25;°C;16;51.82;mV/pX;;;-210.1;mV;45.28; mV/pX;;;-197.0;mV;113.15;mV/pX;;;-264.9;mV;48.68;mV/pX;;;-264.9;mV;;;;;Cond.;2 5;°C;4;01-06-2012;00:12:43;;Molar (KCl);3;147;µS/cm;0.754;cm-1;25;°C;12;1412;µS/cm;0.721;cm-1;25;°C;11;12.89;m S/cm ;0.711;cm-1;25;°C;12;

4. For B40PCID models

GI;MO;ID;RID;SENSTYP;TEMP;TEMPU;STV;STU;DTF;DATE;TIME;UN;CALTYP E;NPOINTS;SEID;ION;BUFFV1;BUFFU1;MVV1;MVU1;TEMP1;TEMPU1;TIME1; BUFFV2;BUFFU2;MVV2;MVU2;TEMP2;TEMPU2;TIME2;BUFFV3;BUFFU3;MVV 3;MVU3;TEMP3;TEMPU3;TIME3;BUFFV4;BUFFU4;MVV4;MVU4;TEMP4;TEMP U4;TIME4;BUFFV5;BUFFU5;MVV5;MVU5;TEMP5;TEMPU5;TIME5;SLOPE1;SL OPEU1;SENS1;SENSU1;OFF1;OFFU1;SLOPE2;SLOPEU2;SENS2;SENSU2;O FF2;OFFU2;SLOPE3;SLOPEU3;SENS3;SENSU3;OFF3;OFFU3;SLOPE4;SLOP EU4;SENS4;SENSU4;OFF4;OFFU4;PHISO;PHISOU;PHISOTEMP;PHISOTEMP U;SENSTYP;TEMP;TEMPU;STV;STU;DTF;DATE;TIME;UN;CALTYPE;NPOINTS ;STDV1;STDU1;CURR1;CURRU1;TEMP1;TEMPU1;TIME1;STDV2;STDU2;CUR R2;CURRU2;TEMP2;TEMPU2;TIME2;SENSTYP;TEMP;TEMPU;STV;STU;DTF; DATE;TIME;UN;CALTYPE;NPOINTS;STDV1;STDU1;CTV1;CTU1;TEMP1;TEMP U1;TIME1;STDV2;STDU2;CTV2;CTU2;TEMP2;TEMPU2;TIME2;STDV3;STDU3; CTV3;CTU3;TEMP3;TEMPU3;TIME3;EOLCR

B40PCID example, channel 1 (pH) 5 technical calibration buffers, channel 2 (DO) theoretical calibration, and channel 3 (EC) 3 Molar standards calibration:
00001;B40PCID;B40PCID;C_RE;pH;25;°C;4;01-06-2012;00:04:34;;Technical;5;;;1. 68;pH;317.0;mV;25;°C;16;4.01;pH;176.1;mV;25;°C;22;7.00;pH;-0.6;mV;25;°C;8;10. 01;pH;-180.0;mV;25;°C;22;12.45;pH;-323.1;mV;25;°C;24;-60.47;mV/pH;102.2;%;-4. 7;mV;-59.10;mV/pH;99.9;%;-0.6;mV;-59.60;mV/pH;100.7;%;-0.6;mV;-58.65;mV/pH; 99.1;%;-3.5;mV;7.00;pH;25.0;ºC;DO;25;°C;4;01-06-2012;00:00:39;;Theoretical Values;;; 67.5;nA;25;;;;;;;Cond.;25;°C;4;01-06-2012;00:06:36;;Molar

(KCl);3;147;µS/cm;0.737;cm-1;25;°C;6;1412;µS/cm;0.721;cm-1;25;°C;10;12.89;mS/cm;0.713;cm-1;25;°C;10;

B40PCID example, channel 1 (ORP) 220mV standard calibration, channel 2 (DO) theoretical calibration, and channel 3 (EC) 3 Molar standards calibration:
00001;B40PCID;B40PCID;C_RE;ORP;25;°C;4;01-06-2012;00:00:39;;Standard 220 mV @ 25 ºC;1;;;0.0;mV;;;;;;;;;;;;;;;;;;;;;DO;25;°C;4;01-06-2012;00:00:39;;Theoretical Values;;; 67.5;nA;25;;;;;;;Cond.;25;°C;4;01-06-2012;00:06:36;;Molar (KCl);3;147;µS/cm;0.737;cm-1;25;°C;6;1412;µS/cm;0.721;cm-1;25;°C;10;12.89;mS/cm ;0.713;cm-1;25;°C;10;

B40PCID example, channel 1 (ISE) 5 standards calibration, channel 2 inactive (sensor set to none), and channel 3 (EC) 3 Molar standards calibration:
00001;B40PCID;B40PCID;C_RE;ISE;25;°C;4;01-06-2012;00:11:35;;mg/L;5;00000000000000001111;AAAAAC;0.001;mg/L;-14.9;mV;25;°C;28;0.010;mg/L;-55.5;mV;25;°C;33;0.100;mg/L;-100.9;mV;25;°C;12;1.000;mg/L;-154.0;mV;25;°C;16;10.000;mg/L;-202.3;mV;25;°C;25;40.62;mV/pX;;;-136.8;mV;45.33;mV/pX;;;-146.2;mV;53.08;mV/pX;;;-154.0;mV;48.39;mV/pX;;;-154.0;mV;;;;;None;;;;;;;;;;;;;;;;;;;;Cond.;25;°C;4;01-06-2012;00:06:36;;Molar (KCl);3;147;µS/cm;0.737;cm-1;25;°C;6;1412;µS/cm;0.721;cm-1;25;°C;10;12.89;mS/cm;0.713;cm-1;25;°C;10;

B40PCID example, channel 1 (ORP) 220mV standard calibration, channel 2 (DO) theoretical calibration, and channel 3 inactive (sensor set to none):
00001;B40PCID;B40PCID;C_RE;ORP;25;°C;4;01-06-2012;00:00:39;;Standard 220 mV @ 25 ºC;1;;;0.0;mV;;;;;;;;;;;;;;;;;;;;;DO;25;°C;4;01-06-2012;00:00:39;;Theoretical Values;;; 67.5;nA;25;;;;;;;None;;;;;;;;;;;;;;;;;;;;;;;;;;;

Appendix B Standard solutions

B.1 Technical buffer solutions

VWR sympHony™ instruments store the following pH/temperature tables in their memory for automatic pattern recognition.

Table 13 pH patterns - Set 1 (EU)

Temperature		Solution			
ºC	**ºF**	**1.68**	**4.01**	**6.87**	**9.18**
0	32	1.67	4.01	6.98	9.46
10	50	1.67	4.00	6.92	9.33
20	68	1.68	4.00	6.88	9.23
25	**77**	**1.68**	**4.01**	**6.87**	**9.18**
30	86	1.68	4.01	6.87	9.14
40	104	1.69	4.03	6.84	9.07
50	122	1.71	4.06	6.83	9.01
60	140	1.72	4.10	6.84	8.96
70	158	1.74	4.16	6.85	8.92
80	176	1.77	4.22	6.86	8.89
90	194	1.79	4.30	6.88	8.85

Table 14 pH patterns - Set 2 (US)

Temperature		Solution				
ºC	**ºF**	**1.68**	**4.01**	**7.00**	**10.01**	**12.45**
0	32	1.67	4.01	7.12	10.30	13.42
10	50	1.67	4.00	7.06	10.17	13.00
20	68	1.68	4.00	7.02	10.06	12.63
25	**77**	**1.68**	**4.01**	**7.00**	**10.01**	**12.45**
30	86	1.68	4.01	6.99	9.96	12.29
40	104	1.69	4.03	6.97	9.88	11.98
50	122	1.71	4.06	6.97	9.83	11.71
60	140	1.72	4.10	6.98	9.76	11.45
70	158	1.74	4.16	7.00	9.71	11.21
80	176	1.77	4.22	7.04	9.67	10.99
90	194	1.79	4.30	7.09	9.64	10.78

B.2 NIST buffer solutions

VWR sympHony™ instruments store the following pH/temperature tables in their memory for automatic pattern recognition.

Table 15 NIST pH standards

Temperature		Solution						
ºC	**ºF**	**1.679**	**4.005**	**6.865**	**7.000**	**9.180**	**10.012**	**12.454**
0	32	1.666	4.000	6.984	7.118	9.464	10.317	13.424
10	50	1.670	3.997	6.923	7.059	9.332	10.179	13.003
20	68	1.675	4.001	6.881	7.016	9.225	10.062	12.627
25	**77**	**1.679**	**4.005**	**6.865**	**7.000**	**9.180**	**10.012**	**12.454**
30	86	1.683	4.011	6.853	6.987	9.139	9.966	12.289
40	104	1.694	4.027	6.838	6.970	9.068	9.889	11.984
50	122	1.707	4.050	6.833	6.964	9.010	9.828	11.705
60	140	1.723	4.080	6.836	6.968	8.962	9.784	11.449
70	158	1.743	4.116	6.845	6.982	8.921	9.754	11.211
80	176	1.765	4.159	6.859	7.004	8.884	9.739	10.989
90	194	1.792	4.208	6.876	7.034	8.850	9.736	10.778

B.3 Conductivity standard solutions

VWR sympHony™ instruments store the following pH/temperature tables in their memory for automatic pattern recognition.

Table 16 Conductivity standards

Temperature		Demal			Molar				NaCl
ºC	**ºF**	**KCl 1D (mS/cm)**	**KCl 0.1D (mS/cm)**	**KCl 0.01D (µS/cm)**	**KCl 0.001M (µS/cm)**	**KCl 0.01M (µS/cm)**	**KCl 0.1M (mS/cm)**	**KCl 1M (mS/cm**	**0.05% (µS/cm)**
0	**32.0**	**65.14**	**7.13**	**773**		**776**	**7.15**	**65.41**	540.4
1	33.8	66.85	7.34	796		800	7.36	67.13	557.73
2	35.6	68.58	7.56	820		824	7.57	68.86	525.2
3	37.4	70.32	7.77	843		848	7.79	70.61	592.79
4	39.2	72.07	7.98	867		872	8.00	72.37	610.53
5	41.0	73.84	8.2	891		896	8.22	74.14	628.4
6	42.8	75.62	8.42	915		921	8.44	75.93	646.4
7	44.6	77.41	8.64	940		945	8.66	77.73	664.55
8	46.4	79.21	8.86	965		970	8.88	79.54	682.83
9	48.2	81.03	9.08	989		995	9.11	81.36	701.26

Table 16 Conductivity standards

Temperature		Demal			Molar				NaCl
°C	°F	KCl 1D (mS/cm)	KCl 0.1D (mS/cm)	KCl 0.01D (µS/cm)	KCl 0.001M (µS/cm)	KCl 0.01M (µS/cm)	KCl 0.1M (mS/cm)	KCl 1M (mS/cm	0.05% (µS/cm)
10	50.0	82.85	9.31	1014	**105**	1020	9.33	83.19	719.82
11	51.8	84.68	9.54	1039	107	1045	9.56	85.04	738.53
12	53.6	86.54	9.76	1065	110	1070	9.79	86.89	757.37
13	55.4	88.39	9.99	1090	113	1095	10.02	88.76	776.36
14	57.2	90.26	10.22	1116	116	1121	10.25	90.63	795.48
15	59.0	92.13	10.46	1142	119	1147	10.48	92.52	814.74
16	60.8	94.02	10.69	1168	122	1173	10.72	94.41	834.14
17	62.6	95.91	10.93	1194	125	1199	10.95	96.31	853.68
18	64.4	97.81	11.16	1220	127	1225	11.19	98.22	873.36
19	66.2	99.72	11.4	1247	130	1251	11.43	100.14	893.18
20	68.0	101.63	11.64	1273	133	1278	11.67	102.07	913.13
21	69.8	103.56	11.88	1300	136	1305	11.91	104.00	933.22
22	71.6	105.49	12.12	1327	139	1332	12.15	105.94	953.44
23	73.4	107.42	12.36	1354	142	1359	12.39	107.89	973.8
24	75.2	109.36	12.61	1381	145	1386	12.64	109.84	994.28
25	**77.0**	**111.31**	**12.85**	**1409**	**147**	**1412**	**12.89**	**111.80**	**1014.9**
26	78.8	113.27	13.1	1436	150	1440	13.13	113.77	1035.65
27	80.6	115.22	13.35	1464	153	1467	13.37	115.74	1056.53
28	82.4		13.59	1491	156	1494	13.62	115.70	1077.54
29	84.2		13.84	1519	159	1522	13.87	115.70	1098.67
30	86.0		14.09	1547	162	1549	14.12	115.70	1119.92
31	87.8		14.34	1575	165	1581	14.37	115.70	1141.3
32	89.6		14.59	1603	168	1609	14.62	115.70	1162.8
33	91.4		14.85	1632	171	1638	14.88	115.70	1184.41
34	93.2		15.1	1660	174	1667	15.13	115.70	1206.15
35	95.0		16.35	1688	177		15.39	115.70	1228
36	96.8		15.61	1717			15.64		1249.96
37	98.6		15.86	1745					1272.03
38	100.4		16.12	1774					1294.21
39	102.2		16.37	1803					1316.49
40	104.0		16.63	1832					1338.89
41	105.8		16.89	1861					1361.38
42	107.6		17.15	1890					1383.97
43	109.4		17.4	1919					1406.66

Table 16 Conductivity standards

Temperature		Demal			Molar				NaCl
ºC	ºF	KCl 1D (mS/cm)	KCl 0.1D (mS/cm)	KCl 0.01D (µS/cm)	KCl 0.001M (µS/cm)	KCl 0.01M (µS/cm)	KCl 0.1M (mS/cm)	KCl 1M (mS/cm	0.05% (µS/cm)
44	111.2		17.66	1948					1429.44
45	113.0		17.92	1977					1452.32
46	114.8		18.18	2007					1475.29
47	116.6		18.44	2036					1498.34
48	118.4		18.7	2065					1521.48
49	120.2		18.96	2095					1544.71
50	122.0		19.22	2124					1568.01
51	123.8								1591.39
52	125.6								1614.84
53	127.4								1638.37
54	129.2								1661.97
55	131.0								1685.63

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