HORIBA

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pH/Water Quality Meter F-7X
High-spec Command Reference

Preface

This manual describes the communication command list of the pH/Water Quality Meters with serial communication function, F-72G/F-73G/F-74G/DS-72G.
The contents of this manual are subject to change without notice.

Caution

- Use the optional USB cable (part number: 3200373941) or serial cable (part number: 3014030151) to connect the instrument to a personal computer (referred to as PC in the rest of this document).
- Make sure that the transfer format used in the instrument and a PC are the same.
  When different transfer format is used, a communication error occurs and the online mode does not start up, and as a result RS-232C communication cannot be performed. Also, when the transfer format is changed, turn OFF the power of the instrument and PC and then reboot them.

  The transfer format of the instrument is as follows.
  - ・Baud rate: 2400 bps
  - ・Character length: 8 bits
  - ・Parity: None
  - ・Stop bit: 1 bit
- If you write the program for serial communication, at first, write the command to change the instrument to the online mode. By changing the instrument to the online mode, its operation keys except for ⏻ key are locked and it changes to serial communication mode.
  If the instrument's power is turned OFF, reset the online mode.
- If the instrument does not receive the command or occurs any errors after it requested the data, add the waiting time of a few seconds before request the data again.
  If the instrument received the data continuously, the instrument does not response.
- The instrument cannot be controlled by using the DCD, CTS, and DSR.
- It is necessary to switch RTS to ON to perform communication. Set it 2.4 V above.
- Pin assignment of the instrument and the external instrument are follows.
  Instrument side (A connector MINI DIN 8 PIN)
  - 2 TX
  - 3 RX
  - 4 CTS
  - 5 COM

  External instrument side (B connector DSUB 9 PIN)
  - 2 TX (RX at an external instrument side)
  - 3 RX (TX at an external instrument side)
  - 5 COM
  - 7 CTS (RTS at an external instrument side)

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・**Command function list (control)**

Item	Command		Function
	Header	Name	
Online/Offline	C (Control)	OL	Changes between the online mode and the offline mode.
Potential follow-up stop		BR	Releases the hold state and returns to instantaneous value display state.
pH measurement mode		PH	Waits for the pH measurement.
mV measurement mode		MV	Waits for the ORP measurement mode result.
Ion measurement mode		IO	Waits for the ion measurement.
ORP measurement mode		OR	Waits for the ORP measurement.
Conductivity measurement mode		CO	Waits for the conductivity measurement.
Salinity measurement mode		SA	Waits for the salinity measurement.
Resistivity measurement mode		OH	Waits for the resistivity measurement.
TDS measurement mode		TD	Waits for the TDS measurement.
Measurement start		MS	Starts the interval memory when the interval memory is valid.
			Measures in the specified mode when the interval memory is invalid.
pH calibration start		CP	Starts the calibration and inspection before use in the pH measurement mode or hold state.
Ion calibration start		CI	Starts the ion calibration in the ion measurement mode or hold state.
Conductivity calibration start		CD	Starts the conductivity calibration in the conductivity measurement or hold state.
Salinity calibration start		CS	Starts the salinity calibration in the salinity measurement or hold state.
ORP calibration start		CR	Starts the ORP calibration in the ORP measurement or hold state.
Calibration clear		CC	Clears the calibration data in the measurement mode.
Data clear		DC	Clears all measurement data in the memory.
Data IN		IN	Starts the interval memory when the interval memory is valid.
			Stores the measurement memory when the interval memory is invalid.
Interval memory stop		CN	Stops the interval memory.
Display channel		CH	Toggles the display between 2-ch or 1-ch.
Hold condition		HC	Changes the hold condition.

Changes the display corresponding to the command (Command ≒ operation with touch panel)
To toggle from 2-ch mode to 1-ch mode, use each calibration start command or display channel command.
When the specified measurement is selected at a channel that is not displayed on the screen,
the calibration can be performed without toggling the channel.

Response from pH meter

OK, zzzzz･･･ [CR][LF]

or

ER, n, zzzzz･･･ [CR][LF]

User ID (variable length from 1 to 50 characters)
Allowable code: Alpha-numeric characters, symbols (0x21 to 0x7E of ASCII code)

n = 1: A non-existent command was entered.
n = 2: The command was entered when the pH meter cannot accept it.
n = 3: An unacceptable number was entered in the command.

●Online/Offline command

C, OL, x, zzzzz･･･ [CR][LF]

- zzzzz･･･: User ID (variable length from 1 to 50 characters) Allowable code: Alpha-numeric characters, symbols (0x21 to 0x7E of ASCII code)
- x: 0 or 1 0: Offline 1: Online
- OL: Name (Online/Offline operation)
- C: Header

When the instrument accepts the online command,
it enters the online mode and the keys cannot be operated.

●Potential follow-up stop command

C, BR, zzzzz･･･ [CR][LF]

- zzzzz･･･: User ID (variable length from 1 to 50 characters) Allowable code: Alpha-numeric characters, symbols (0x21 to 0x7E of ASCII code)
- BR: Name (Potential follow-up stop)
- C: Header

Releases the hold state and measurement state, then returns to instantaneous value display state.

●pH measurement mode command

C, PH, x, zzzzz･･･ [CR][LF]

- zzzzz･･･: User ID (variable length from 1 to 50 characters) Allowable code: Alpha-numeric characters, symbols (0x21 to 0x7E of ASCII code)
- x: Channel (1 or 2)
- PH: Name (pH measurement mode)
- C: Header

When the instrument is in the online mode, this is always valid.
Waits for the pH measurement.

●mV measurement mode command

C, MV, x, zzzzz･･･ [CR][LF]

User ID (variable length from 1 to 50 characters)
Allowable code: Alpha-numeric characters,
symbols (0x21 to 0x7E of ASCII code)
Channel (1 or 2)
Name (mV measurement mode)
Header

When the instrument is in the online mode, this is always valid. (*1)
Waits for the mV measurement mode result.

●Ion measurement mode command

C, IO, x, zzzzz･･･ [CR][LF]

User ID (variable length from 1 to 50 characters)
Allowable code: Alpha-numeric characters,
symbols (0x21 to 0x7E of ASCII code)
Channel (1 or 2)
Name (Ion measurement mode)
Header

When the instrument is in the online mode, this is always valid. (*1)
Waits for the ion measurement.

●ORP measurement mode command

C, OR, x, zzzzz･･･ [CR][LF]

User ID (variable length from 1 to 50 characters)
Allowable code: Alpha-numeric characters,
symbols (0x21 to 0x7E of ASCII code)
Channel (1 or 2)
Name (ORP measurement mode)
Header

When the instrument is in the online mode, this is always valid. (*1)
Waits for the ORP measurement mode result.

●Conductivity measurement mode command

C, CO, zzzzz··· [CR][LF]

User ID (variable length from 1 to 50 characters)
Allowable code: Alpha-numeric characters,
symbols (0x21 to 0x7E of ASCII code)

Name (Conductivity measurement mode)

Header

When the instrument is in the online mode, this is always valid. (*1)
Waits for the conductivity measurement.

*1: Except for the hold judgement

●Salinity measurement mode command

C, SA, zzzzz··· [CR][LF]

User ID (variable length from 1 to 50 characters)
Allowable code: Alpha-numeric characters,
symbols (0x21 to 0x7E of ASCII code)
Name (Salinity measurement mode)
Header

When the instrument is in the online mode, this is always valid. (*1)
Waits for the salinity measurement.

●Resistivity measurement mode command

C, OH, zzzzz··· [CR][LF]

User ID (variable length from 1 to 50 characters)
Allowable code: Alpha-numeric characters,
symbols (0x21 to 0x7E of ASCII code)
Name (Resistivity measurement mode)
Header

When the instrument is in the online mode, this is always valid. (*1)
Waits for the resistivity measurement.

●TDS measurement mode command

C, TD, zzzzz··· [CR][LF]

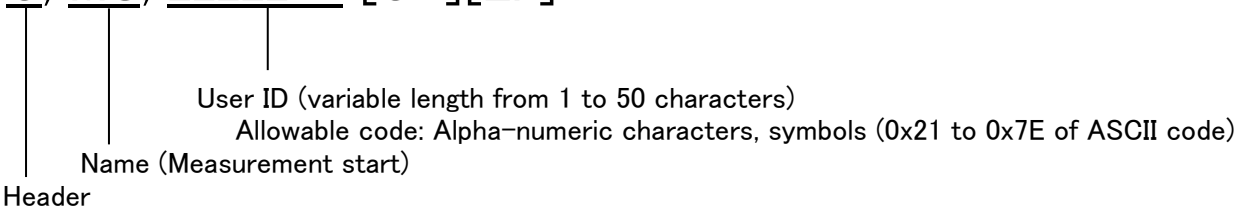
User ID (variable length from 1 to 50 characters)
Allowable code: Alpha-numeric characters,
symbols (0x21 to 0x7E of ASCII code)
Name (TDS measurement mode)
Header

When the instrument is in the online mode, this is always valid. (*1)
Waits for the TDS measurement.

*1: Except for the hold judgement

●Measurement start command

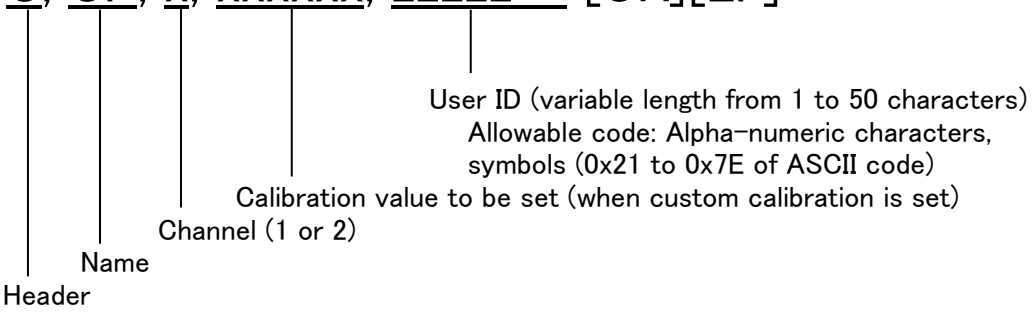
C, MS, zzzzz･･･ [CR][LF]



(When the interval memory is invalid) Waits for measurement in the specified mode (channel displayed on the screen, measurement mode).
(When the interval memory is valid) Starts the interval memory.

●pH calibration start command

C, CP, x, xxxxxx, zzzzz･･･ [CR][LF]



Starts the calibration and inspection before use when waiting for pH measurement or hold state.
Even when the setting is other than the custom calibration, it is necessary to enter the calibration value (It will not be used.).

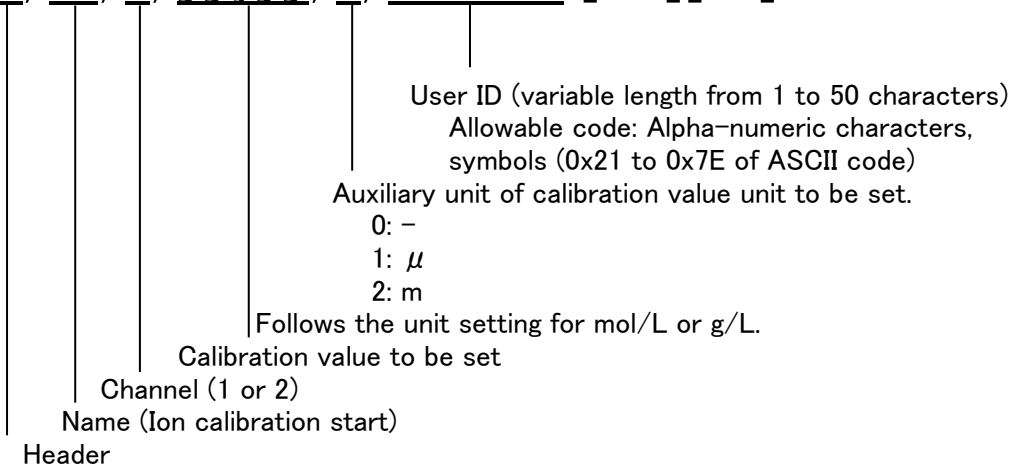
Setting range of calibration value (fixed length)

Specified by three decimal places.

[SP]0.000 to 14.000

●Ion calibration start comman

C, CI, x, yyyyy, z, zzzzz･･･ [CR][LF]



Starts the ion calibration when waiting for ion measurement or hold state.
When the calibration start command is transmitted from the measurement mode,
the calibration value is overwritten by the previous calibration value of same standard solution.

Setting range of calibration value (fixed length)

0.001 to 9.999
10.00 to 99.99
100.0 to 999.9
1000 to 9999

●Conductivity cell constant calibration start command

C, CD, yyyyy, z, zzzzz··· [CR][LF]

- C: Header
- CD: Name (Conductivity calibration start)
- yyyyy: Calibration solution concentration to be set
- z: Follows the unit setting for S/m or S/cm.
  - 0: –
  - 1: μ
  - 2: m
- zzzzz···: Auxiliary unit of calibration value unit to be set.
  User ID (variable length from 1 to 50 characters)
  Allowable code: Alpha-numeric characters, symbols (0x21 to 0x7E of ASCII code)

Starts the conductivity calibration when waiting for conductivity calibration or hold state.

Setting range of calibration value (fixed length)

μS/m	[SP][SP]1.0 to 999.9
mS/m	0.001 to 199.9
S/m	0.001 to 199.9
μS/cm	0.010 to 1999
mS/cm	0.001 to 199.9
S/cm	0.001 to 1.999
mS/cmFIX	0.001 to 999.9

●Salinity calibration start command

C, CS, xxxxx, zzzzz··· [CR][LF]

- C: Header
- CS: Name (Salinity calibration start)
- xxxxx: Calibration solution concentration to be set
- zzzzz···: User ID (variable length from 1 to 50 characters)
  Allowable code: Alpha-numeric characters, symbols (0x21 to 0x7E of ASCII code)

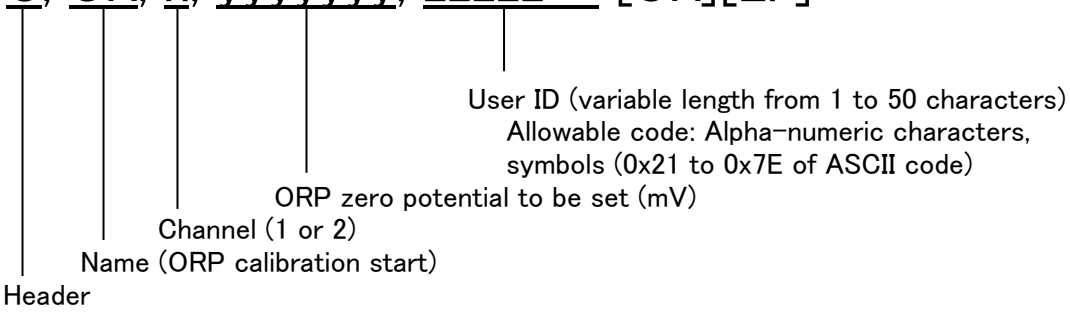
Starts the salinity calibration when waiting for salinity calibration or hold state.

Setting range of calibration value

PPT	[SP]0.01 to 80.00
%	0.001 to 8.000

●ORP calibration start command

C, CR, x, yyyyyyy, zzzzz･･･ [CR][LF]

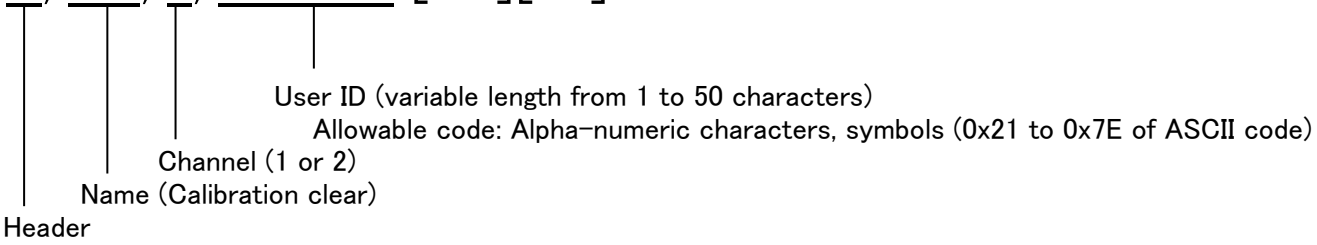


Starts the ORP calibration when waiting for ORP calibration or hold state.

Setting range of calibration value (fixed length)
-1999.9 to [SP]1999.9 (mV)

●Calibration clear command

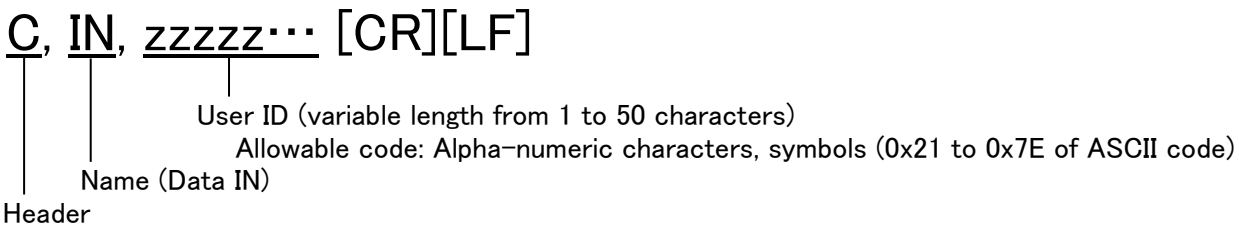
C, CC, x, zzzzz··· [CR][LF]



Clears the calibration data in the measurement mode.

●Data IN command

C, IN, zzzzz··· [CR][LF]



(When the interval memory is valid) Starts the interval memory.
(When the interval memory is invalid) Stores the measurement data.

ER, 2 is returned when the data memory is full.

●Interval memory stop command

C, CN, zzzzz··· [CR][LF]

User ID (variable length from 1 to 50 characters)
Allowable code: Alpha-numeric characters, symbols (0x21 to 0x7E of ASCII code)
Name (Interval memory stop)
Header

This is valid during interval memory.
Stops the interval memory.

●Display channel command

C, CH, x, zzzzz··· [CR][LF]

User ID (variable length from 1 to 50 characters)
Allowable code: Alpha-numeric characters, symbols (0x21 to 0x7E of ASCII code)
Channel (1, 2, 0) When the channel is 0, 2 channels are simultaneously displayed.
Name (Display cahnnel)
Header

Changes the measurement channel displayed on the screen.
When selecting 2-channel display:
・Does not show the 1-channel display with the measurement mode change command.
・Shows the 1-channel display with the calibration start command.

●Hold condition setting command

C, HC, x, zzzzz··· [CR][LF]

User ID (variable length from 1 to 50 characters)
Allowable code: Alpha-numeric characters, symbols (0x21 to 0x7E of ASCII code)
Hold condition
0: High-precision hold
1: Standard
2: Simple
3: Time
4: Custom (Precise hold conditions depend on the system settings.)
5: Manual hold
Name (Hold condition setting)
Header

Sets the hold condition.
ER, 2 is returned during hold judgement.
ER, 2 is returned in every mode except the measurement mode (for example, calibration mode).

・Command function list (Request data)

Item	Command		Function
	Header	Name	
Request of the calibration history of pH	R (Request Data)	PC	Gets the latest calibration history of pH.
Request of the calibration history of ion		IC	Gets the latest calibration history of ion.
Request of the calibration history of conductivity		CC	Gets the latest calibration history of conductivity.
Requests the salinity calibration history		SC	Gets the calibration history of salinity.
Requests the ORP calibration history		OC	Gets the calibration history of ORP.
Request of the measurement value		MD	Gets the measurement value of specified channel.
Request of the clock data		OT	Gets the clock data.
Request of the number of stored memories		MC	Gets the number of data stored in the memory.
Request of memory data		MS	Gets the memory data to be specified.
Alarm inquiry		AL	Gets the alarm code in the instrument.
Clear alarm		AR	Clears the alarm code in the instrument.

Response from pH meter
When it is OK:
Described for each command
or

ER, n, zzzzz··· [CR][LF]

User ID (variable length from 1 to 50 characters)
Allowable code: Alpha-numeric characters, symbols (0x21 to 0x7E of ASCII code)

n = 1: A non-existent command was entered.
n = 2: The command was entered when the pH meter cannot accept it.
n = 3: An unacceptable number was entered in the command.

●**Request command and response of the calibration history of pH**

Request command

R, PC, x, zzzzz･･･ [CR][LF]

- R: Header
- PC: Name (Request of calibration history of pH)
- x: Cannnel
- zzzzz･･･: User ID (variable length from 1 to 50 characters)
  Allowable code: Alpha-numeric characters, symbols (0x21 to 0x7E of ASCII code)

Response from pH meter

RPC, xxxxxxxxxxxx, x, x, x, x, xxxxxx, x, (⇒)

- RPC: Header
- xxxxxxxxxxxx: Operator name
- x: Channel 1 digit 1: CH1 2: CH2
- x: Calibration points 1 digit 1 to 5
- x: Calibration result
  0: good, 1: check
  2: error
- x: Temperature setting 1 digit 0: ATC 1: MTC
- xxxxxx: Asymmetry potential
  (6 digits including decimal point and symbol)
  ±XXXX.XmV
- x: Inspection before use 0: No 1: Yes

(⇒) xxxx, xx, xx, xx, xx, xx, (⇒)

- xxxx, xx, xx, xx, xx, xx: Calibration date
  - Year 4 digits A.D.
  - Month 2 digits 01 to 12
  - Day 2 digits −1 to 31
  - Hour 2 digits 00 to 23
  - Minute 2 digits 00 to 59
  - Second 2 digits 00 to 59

Slope (sensitivity) (5 digits including decimal point and symbol)
*For 1−point or 2−point calibration, the potential is output as the 1st or 2nd calibration data.

(⇒)

xxx.xx,	xxx.x,	xxxxxxx,	xxx.x,	First point calibration data
xxx.xx,	xxx.x,	xxxxxxx,	xxx.x,	Second point calibration data
xxx.xx,	xxx.x,	xxxxxxx,	[SP]*5	Third point calibration data
,xxx.xx,	xxx.x,	xxxxxxx,	xx.xx	, zzzzz··· [CR][LF]

Inspection data before use

- zzzzz···: User ID (variable length from 1 to 50 characters)
  Allowable code: Alpha−numeric characters, symbols (0x21 to 0x7E of ASCII code)
- xx.xx: Repeatability
  (5 digits including decimal point and symbol)
- xxxxxxx: Potential (7 digits including symbol)
- xxx.x: Temperature (5 digits including decimal point and symbol)
- xxx.xx: Calibration solution value
  (6 digits including decimal point and symbol)

Response from the instrument if it does not have the calibration data

RPC,**********,x,0,3, zzzzz･･･

Display format is fixed. If no data exist, [SP] is displayed.
The number of transmitted calibration data is the number of calibration points.
Displayed calibration date and time is the latest calibration date and time.
When there are two or more calibration points,
slope data is diplayed and the slope data of the third point is a space.
If an inspection is carried out before use, its data will be transmitted after the calibration data is forwarded.

Slope data
For the slope data, the calibration efficiency, A X 100, between each point is output.
When it exceeds 999.9 or is a negative value, [SP][SP][SP][SP][SP] is output.

●**Request command and response of the calibration history of ion**

Request command

R, IC, x, zzzzz･･･ [CR][LF]

User ID (variable length from 1 to 50 characters)
Allowable code: Alpha-numeric characters, symbols (0x21 to 0x7E of ASCII code)

Cannel

Name (Request of the calibration history of ion)

Header

Collects the selected ion data.

Response from pH meter

RIC, xxxxxxxxxxxx, x, xx, x, x, x, xxxxxx, x, (⇒)

- RIC: Header
- xxxxxxxxxxxx: Operator name
- x: Channel 1 digit 1: CH1 2: CH2
- xx: Ion type
  - 01: Na+
  - 02: K+
  - 03: NH4+
  - 04: Ag+
  - 05: X+
  - 06: CN−
  - 07: Cl−
  - 08: I−
  - 09: Br−
  - 10: SCN−
  - 11: F−
  - 12: NO3−
  - 13: X−
  - 14: Cu2+
  - 15: Cd2+
  - 16: Pb2+
  - 17: Ca2+
  - 18: X2+
  - 19: S2−
  - 20: X2−
- x: Calibration points 1 digit 1 to 5
- x: Electrode status 0: OK 1: CHECK
- x: Temperature setting 1 digit 0: ATC 1: MTC
- xxxxxx: Asymmetry potential (6 digits including decimal point and symbol)
- x: Inspection before use 0: Non, 1: Done

(⇒) xxxx,xx,xx,xx,xx,xx, (⇒)

- xxxx,xx,xx,xx,xx,xx: Calibration date
  - Year 4 digits A.D.
  - Month 2 digits 01 to 12
  - Day 2 digits −1 to 31
  - Hour 2 digits 00 to 59
  - Minute 2 digits 00 to 59
  - Second 2 digits 00 to 59

(⇒) xxxxx,x,x,xxxxx,xxxxxxx,xxxxxx･･･, zzzzz･･･ [CR][LF]

- xxxxx: Calibration solution concentration (5 digits including symbol)
  (5 digits including symbol)
  0.001 to 9.999
  10.00 to 99.99
  100.0 to 999.9
  1000 to 9999
- x: Concentration auxiliary unit 0: Non 1: μ 2: m
- x: Concentration unit 0: g/L 1: mol/L
- xxxxx: Temperature (5 digits including symbol)
- xxxxxxx: Potential (7 digits including symbol)
- xxxxxx: Sensitivity (6 digits including symbol)
  As with RIC, repeatable for the inspection before use.
- ･･･: Repeated for the number of calibration points.
- zzzzz･･･: User ID
  (variable length from 1 to 50 characters)
  Allowable code: Alpha−numeric characters, symbols (0x21 to 0x7E of ASCII code)
- Repeatability: XXXX,X (4 digits including symbol), auxiliary unit

Response from the instrument if it does not have the calibration data

RIC,**********,x,0,0,3, zzzzz･･･

●**Request command and response of the calibration history of conductivity**

Request command

R, CC, zzzzz･･･ [CR][LF]

User ID (variable length from 1 to 50 characters)
Allowable code: Alpha-numeric characters, symbols (0x21 to 0x7E of ASCII code)

Name (Request of the calibration history of conductivity)

Header

Response from pH meter

RCC, xxxxxxxxxxxx, x, x, x, x, (⇒)

- Header
- Operator name
- Channel
- No. of calibration points 1
- Electrode status
  0: Don't care
- Temperature compensation

(⇒) xxxx,xx,xx,xx,xx,xx, (⇒)

Calibration date
- Year 4 digits A.D.
- Month 2 digits 01 to 12
- Day 2 digits −1 to 31
- Hour 2 digits 00 to 23
- Minute 2 digits 00 to 59
- Second 2 digits 00 to 59

(⇒)

xxxx,	xxxxx,	x,	x,	xxxxx,	x.xxx,	
	xxxxx,	x,	x,	xxxxx,	x.xxx,	
	xxxxx,	x,	x,	xxxxx,	x.xxx,	
	xxxxx,	x,	x,	xxxxx,	x.xxx,	
	xxxxx,	x,	x,	xxxxx,	x.xxx	, zzzzz··· [CR][LF]

- Cell constant
- Calibration solution value (5 digits including decimal point and symbol) 0.000 to 199.9
- Unit
  0: S/m 1: μ
  1: S/cm 2: m
- Auxiliary unit
  0: —
- Temperature (5 digits including decimal point and symbol)
- Cell coefficient
- User ID
  (variable length from 1 to 50 characters)
  Allowable code: Alpha-numeric characters, symbols (0x21 to 0x7E of ASCII code)

Displayed calibration date and time is the latest calibration date and time.
For the calibration solution concentration, unit, auxiliary unit, temperature, and potential of non-calibration range, enter [SP].
For the cell coefficiency of non-calibration range, the reference value before or after the calibrated range is displayed.

Response from the instrument if it does not have the calibration data

RCC,**********,x,0,3, zzzzz･･･

●**Request command and response of the calibration history of salinity**

Request command

R, SC, zzzzz･･･ [CR][LF]

User ID (variable length from 1 to 50 characters)
Allowable code: Alpha-numeric characters, symbols (0x21 to 0x7E of ASCII code)
Name (Request of the calibration history of salinity)
Header

Response from pH meter

RSC, xxxxxxxxxxxx, x, x, x, x, (⇒)

Temperature compensation
Electrode status 0: Don't care
No. of calibration points
Channel
Operator name
Header

(⇒) xxxx,xx,xx,xx,xx,xx, (⇒)

Calibration date
Year 4 digits A.D.
Month 2 digits 01 to 12
Day 2 digits -1 to 31
Hour 2 digits 00 to 23
Minute 2 digits 00 to 59
Second 2 digits 00 to 59

(⇒)

xxxxx, xxxxx, zzzzz･･･ [CR][LF]

User ID (variable length from 1 to 50 characters)
Allowable code: Alpha-numeric characters, symbols (0x21 to 0x7E of ASCII code)
Temperature
Calibration coefficient

Response from the instrument if it does not have the calibration data

RSC,**********,x,0,3, zzzzz･･･

Displayed calibration date and time is the latest calibration date and time.

●**Request command and response of the calibration history of ORP**

Request command

R, OC, x, zzzzz･･･ [CR][LF]

- R: Header
- OC: Name (Request of the calibration history of ORP)
- x: Channel
- zzzzz･･･: User ID (variable length from 1 to 50 characters)
  Allowable code: Alpha-numeric characters, symbols (0x21 to 0x7E of ASCII code)

Response from pH meter

ROC, xxxxxxxxxxxx, x, x, x, x, (⇒)

- ROC: Header
- xxxxxxxxxxxx: Operator name
- x: Channel
- x: No. of calibration points
- x: Electrode status 0: Don't care
- x: Temperature compensation

(⇒)xxxx,xx,xx,xx,xx,xx,(⇒)

Calibration date
- Year 4 digits A.D.
- Month 2 digits 01 to 12
- Day 2 digits -1 to 31
- Hour 2 digits 00 to 59
- Minute 2 digits 00 to 59
- Second 2 digits 00 to 59

(⇒)

xxxxx, xxxxx, zzzzz･･･ [CR][LF]

- xxxxx: Offset potential
- xxxxx: Temperature
- zzzzz･･･: User ID (variable length from 1 to 50 characters)
  Allowable code: Alpha-numeric characters, symbols (0x21 to 0x7E of ASCII code)

Response from the instrument if it does not have the calibration data

ROC,**********,x,0,3, zzzzz･･･

●**Request command and response of the measurement value**

Request command

R, MD, x, zzzzz･･･ [CR][LF]

User ID (variable length from 1 to 50 characters)
Allowable code: Alpha-numeric characters, symbols (0x21 to 0x7E of ASCII code)

Channel

Name (Request of the measurement value)

Header

Requests the measurement value of the specified channel.

Response from pH meter

RMD, xxxxxxxxxxx, xxxxxxxxxx, xx, x, x, x, xx, (⇒)

- Header: RMD
- Operator name: xxxxxxxxxxx
- ID number: xxxxxxxxxx
- Measurement component: xx
  - 01: PH
  - 02: Absolute mV
  - 03: Relative mV
  - 04: ORP
  - 05: Ion
  - 06: Sample addition method 1
  - 07: Sample addition method 2
  - 08: Known amount addition method 1
  - 09: Known amount addition method 2
  - 10: Conducdtivity
  - 11: Salinity
  - 12: Resistivity
  - 13: TDS
  - 14: Conducdtivity phermacopoeia mode
- Channel: x
- Status: x
  - 0: MEAS
  - 1: CAL
  - 2: Inspection before use
  - 3: Interval memory
- Hold: x
  - 0: Instantaneous value
  - 1: Hold
  - 2: Measurement
- Ion type: xx

(⇒) xxxx,xx,xx,xx,xx,xx, (⇒)

- Calibration date: xxxx,xx,xx,xx,xx,xx
  - Year 4 digits A.D.
  - Month 2 digits 01 to 12
  - Day 2 digits −1 to 31
  - Hour 2 digits 00 to 23
  - Minute 2 digits 00 to 59
  - Second 2 digits 00 to 59

(⇒)

xxxxxxxx, x, x, x, xxxxx, xxxxxxx, x, zzzzz··· [CR][LF]

- Data: xxxxxxxx
- Data auxiliary unit: x
  - 0: None
  - 1: μ
  - 2: m
  - 3: k
  - 4: M
- Data unit: x
  - Ion 0: g/L 1: mol/L
  - COND 0: S/m 1: S/cm
  - RESI 0: Ω/m 1: Ω/cm
  - SALI 0: PPT 1: %
  - Others 0
- Temperature compensation: x
- Temperature: xxxxx
- Electromotive force: xxxxxxx
- Error status: x
  - 2: At upper limit alarm
  - 1: At lower limit alarm
  - 0: At no alarm
- User ID (variable length from 1 to 50 characters): zzzzz···
  - Allowable code: Alpha-numeric characters, symbols (0x21 to 0x7E of ASCII code)

●**Request command and response of the clock data**

Request command

R, OT, zzzzz･･･ [CR][LF]

User ID (variable length from 1 to 50 characters)
Allowable code: Alpha-numeric characters, symbols (0x21 to 0x7E of ASCII code)
Name (Request of clock data)
Header

Requests the clock data.

Response from pH meter

ROT, xxxx, xx, xx, xx, xx, xx, zzzzz･･･ [CR][LF]

User ID (variable length from 1 to 50 characters)
Allowable code: Alpha-numeric characters, symbols (0x21 to 0x7E of ASCII code)
Second 2 digits 00 to 59
Minute 2 digits 00 to 59
Hour 2 digits 00 to 23
Day 2 digits 01 to 31
Month 2 digits 01 to 12
Year 4 digits A.D. (Leading zero suppression)
Header

●**Write command of the clock data**

R, TO, xxxx, xx, xx, xx, xx, xx, zzzzz･･･ [CR][LF]

User ID (variable length from 1 to 50 characters)
Allowable code: Alpha-numeric characters, symbols (0x21 to 0x7E of ASCII code)
Second 2 digits 00 to 59
Minute 2 digits 00 to 59
Hour 2 digits 00 to 23
Day 2 digits 01 to 31
Month 2 digits 01 to 12
Year 4 digits A.D. (Leading zero suppression)
Name (Writing of clock data)
Header

Writes the clock data.
An error response is returned when the a date and time that cannot be set are entered.

●**Request command and response of the number of stored memories**

Request command

R, MC, zzzzz･･･ [CR][LF]

User ID (variable length from 1 to 50 characters)
Allowable code: Alpha-numeric characters, symbols (0x21 to 0x7E of ASCII code)

Name (Request the number of stored memories)

Header　　Requests the data for the number of data stored in the memory.

Response from pH meter

RMC, xxxx, zzzzz･･･ [CR][LF]

User ID (variable length from 1 to 50 characters)
Allowable code: Alpha-numeric characters, symbols (0x21 to 0x7E of ASCII code)

Number of memories

Header

●**Request command and response of memory data**

Request command

R, MS, xxxx, zzzzz･･･ [CR][LF]

User ID (variable length from 1 to 50 characters)
Allowable code: Alpha-numeric characters,
symbols (0x21 to 0x7E of ASCII code)

Memory number (fixed length) **([SP][SP][SP]1～2000)**

Name (Request of the measurement value)

Header

Requests the memory data to be specified.

Response from pH meter

RMS, xxxx, xxxxxxxxxxxx, xxxxxxxxxx, xx, x, x, x, xx, (⇒)

- Header: RMS
- Memory number: xxxx
- Operator name: xxxxxxxxxxxx
- ID number: xxxxxxxxxx
- Measurement component (See R, MD.): xx
- Channel: x
- Status: x
  - 0: MEAS
  - 1: CAL
  - 3: Interval memory
- Hold: x
  - 0: Instantaneous value
  - 1: Hold
  - 2: Measurement
- Ion type: xx

(⇒) xxxx,xx,xx,xx,xx,xx, (⇒)

- Calibration date: xxxx,xx,xx,xx,xx,xx
  - Year 4 digits A.D.
  - Month 2 digits 01 to 12
  - Day 2 digits −1 to 31
  - Hour 2 digits 00 to 23
  - Minute 2 digits 00 to 59
  - Second 2 digits 00 to 59

(⇒)

xxxxxxxx, x, x, x, xxxxx, xxxxxxx, x, zzzzz··· [CR][LF]

- Data: xxxxxxxx
- Data auxiliary unit: x
- Data unit: x
- Temperature compensation: x
- Temperature: xxxxx
- Electromotive force: xxxxxxx
- Error status: x
  - 2: At upper limit alarm
  - 1: At lower limit alarm
  - 0: At no alarm
- User ID (variable length from 1 to 50 characters): zzzzz···
  - Allowable code: Alpha-numeric characters, symbols (0x21 to 0x7E of ASCII code)

●Alarm inquiry command and response

Request command

R, AL, x, y, zzzzz··· [CR][LF]

- zzzzz···: User ID (variable length from 1 to 50 characters)
  Allowable code: Alpha-numeric characters, symbols (0x21 to 0x7E of ASCII code)
- y: Request mode
  0: Instrument alarm
  1: pH
  2: mV
  3: Ion
  4: Conductivity, salinity, resistivity
- x: Channel
- AL: Name (Alarm inquiry)
- R: Header

Requests the alarm code in the instrument.

Response from pH meter

RAL, x, y, zzzzzzzz, zzzzz··· [CR][LF]

- zzzzz···: User ID (variable length from 1 to 50 characters)
  Allowable code: Alpha-numeric characters, symbols (0x21 to 0x7E of ASCII code)
- zzzzzzzz: Error code
- y: Request mode
- x: Channel
- RAL: Header

Error code

zzzzzzzz	Description
0x00000001	Internal memory error (instrument)
0x00000002	Lower battery error (instrument)
0x00000004	Electrode stability error (other than the instrument)
0x00000008	Asymmetry potential error (pH)
0x00000010	Sensitivity error (pH, ion)
0x00000020	Maximum calibration points exceeded (pH, ion)
0x00000040	Cannot identify standard solution (pH, conductivity)
0x00000080	Calibration interval error (pH)
0x00000100	Printer error (instrument)
0x00000200	Memory full (instrument)
0x00000400	Cell constant is out of range (conductivity)
0x00000800	USB memory write error (instrument)
0x00001000	USB memory capacity exceeded (instrument)
0x00002000	USB memory not inserted (instrument)
0x00004000	PC connection timeout (instrument)

If the plural number of errors are generated with the specified mode, the plural number of error bits are set.

●**Clear of the currently displayed alarm information**

Request command

R, AR, zzzzz··· [CR][LF]

User ID (variable length from 1 to 50 characters)
Allowable code: Alpha-numeric characters, symbols (0x21 to 0x7E of ASCII code)

Name (Request of alarm reset)

Header

Clears the currently displayed alarm information.

・Command function list (Setting)

Item	Command		Function
	Header	Name	
Clock data setting	S (Set)	OT	Writes the clock data.

Response from pH meter
When it is OK:
Describes in each command.
or

ER, n, zzzzz··· [CR][LF]

User ID (variable length from 1 to 50 characters)
Allowable code: Alpha-numeric characters, symbols (0x21 to 0x7E of ASCII code)

n = 1: A non-existent command was entered.
n = 2: The command was entered when the pH meter cannot accept it.
An unacceptable number was entered in the command.

●Write command of the clock data

S, OT, xxxx, xx, xx, xx, xx, xx, zzzzz･･･ [CR][LF]

- Header
- Name (Writing of clock data)
- Year 4 digits A.D. (Leading zero suppression)
- Month 2 digits 01 to 12
- Day 2 digits 01 to 31
- Hour 2 digits 00 to 23
- Minute 2 digits 00 to 59
- Second 2 digits 00 to 59
- User ID (variable length from 1 to 50 characters)
  Allowable code: Alpha-numeric characters, symbols (0x21 to 0x7E of ASCII code)

Writes the clock data.
An error response is returned when the a date and time that cannot be set are entered.