

AWT420

Universal 4-wire, dual-input transmitter



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dual-input transmitter

Introduction

This Communication Supplement provides procedures specifically related to the Profibus® option for the AWT420 transmitter. Refer to the AWT420 Operating instructions ([OI/AWT420-EN](#)) for general information on installation, operation and maintenance.

Profibus connection/configuration
and reference tables

Measurement made easy

For more information

Further publications for the AWT420 transmitter are available for free download from:

www.abb.com/measurement

or by scanning this code:



Links and reference numbers for the transmitter publications are also shown below:

Search for or click on:

AWT420 transmitter – Data Sheet	DS/AWT420-EN
AWT420 transmitter – Operating Instruction	OI/AWT420-EN
AWT420 transmitter – Commissioning Instruction	CI/AWT420-EN

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1 Health & Safety

Document symbols

Symbols that appear in this document are explained below:

DANGER

The signal word '**DANGER**' indicates an imminent danger. Failure to observe this information will result in death or severe injury.

WARNING

The signal word '**WARNING**' indicates an imminent danger. Failure to observe this information may result in death or severe injury.

CAUTION

The signal word '**CAUTION**' indicates an imminent danger. Failure to observe this information may result in minor or moderate injury.

NOTICE

The signal word '**NOTICE**' indicates potential material damage.

Note

'Note' indicates useful or important information about the product.

Safety precautions

Be sure to read, understand and follow the instructions contained within this manual before and during use of the equipment. Failure to do so could result in bodily harm or damage to the equipment.

WARNING

Bodily injury

Installation, operation, maintenance and servicing must be performed:

- by suitably trained personnel only
- in accordance with the information provided in this manual
- in accordance with relevant local regulations

Potential safety hazards

AWT420 transmitter – electrical

WARNING

Bodily injury

To ensure safe use when operating this equipment, the following points must be observed:

- Up to 240 V AC may be present. Be sure to isolate the supply before removing the terminal cover.

Safety advice concerning the use of the equipment described in this manual or any relevant Material Safety Data Sheets (where applicable) can be obtained from the Company, together with servicing and spares information.

Safety standards

This product has been designed to satisfy the requirements of IEC61010-1:2010 3rd edition 'Safety Requirements for Electrical Equipment for Measurement, Control and Laboratory Use' and complies with US NEC 500, NIST and OSHA.

...1 Health & Safety

Product symbols

Symbols that may appear on this product are shown below:



Protective earth (ground) terminal.



Functional earth (ground) terminal.



Alternating current supply only.



Direct current supply only.



This symbol, when noted on a product, indicates a potential hazard which could cause serious personal injury and/or death. The user should reference this instruction manual for operation and/or safety information.



This symbol, when noted on a product enclosure or barrier, indicates that a risk of electrical shock and/or electrocution exists and indicates that only individuals qualified to work with hazardous voltages should open the enclosure or remove the barrier.



The equipment is protected through double insulation.



Recycle separately from general waste under the WEEE directive.

Product recycling and disposal (Europe only)



ABB is committed to ensuring that the risk of any environmental damage or pollution caused by any of its products is minimized as far as possible. The European Waste Electrical and Electronic Equipment (WEEE) Directive that initially came into force on August 13 2005 aims to reduce the waste arising from electrical and electronic equipment; and improve the environmental performance of all those involved in the life cycle of electrical and electronic equipment. In conformity with European local and national regulations, electrical equipment marked with the above symbol may not be disposed of in European public disposal systems after 12 August 2005.

NOTICE

For return for recycling, please contact the equipment manufacturer or supplier for instructions on how to return end-of-life equipment for proper disposal.

End-of-life battery disposal

The transmitter contains a small lithium battery (located on the processor/display board) that must be removed and disposed of responsibly in accordance with local environmental regulations.

Information on ROHS Directive 2011/65/EU (RoHS II)



ABB, Industrial Automation, Measurement & Analytics, UK, fully supports the objectives of the RoHS II directive. All in-scope products placed on the market by IAMA UK on and following the 22nd of July 2017 and without any specific exemption, will be compliant to the RoHS II directive, 2011/65/EU.

2 Cyber security

This product is designed to be connected to and to communicate information and data via a digital communication interface. It is your sole responsibility to provide and continuously ensure a secure connection between the product and your network or any other network (as the case may be). You shall establish and maintain any appropriate measures (such as but not limited to the application of authentication measures etc.) to protect the product, the network, its system and the interface against any kind of security breaches, unauthorized access, interference, intrusion, leakage and/or theft of data or information.

ABB Ltd and its affiliates are not liable for damages and/or losses related to such security breaches, any unauthorized access, interference, intrusion, leakage and/or theft of data or information.

The PROFIBUS DP protocol is an unsecured protocol, as such the intended application should be assessed to ensure that these protocols are suitable before implementation.

3 Overview

Profibus is a manufacturer-independent, open Fieldbus standard for a wide range of applications in manufacturing, process and building automation. Manufacturer independence and openness are ensured by the international standard EN 50170.

Using the Profibus protocol, devices from different manufacturers exchange information on the same communications bus without the need for special interface equipment.

For further information on Profibus, refer to:

www.profibus.com.

Profibus DP

Profibus DP is designed for high-speed data exchange and is commonly used by complex or externally-powered devices. The central controller or 'master' device (for example, PLC or PC) utilizes Profibus DP as a fast serial connection with distributed (slave) Profibus-enabled field devices.

The master device reads the input information cyclically in a defined, recurring order from the slave(s). When configuring the bus system, the user assigns an address in the range 0 to 125 to each slave device and also defines which of the slaves are to be included in, or excluded from, the data acquisition cycle.

Profibus and ABB products

AWT420 utilizes Profibus DP as this protocol is optimized for high speed and low connection costs (see www.abb.com/fieldbus and follow the Profibus link).

...3 Overview

Profibus DP transmission technology

The most common transfer method of Profibus-DP is RS485 – a proven technology. A twisted, shielded, 2-wire copper cable is used as the transfer medium.

The bus structure enables addition and removal of stations or step-by-step commissioning of the system without affecting other stations. Later expansion has no influence on stations already in operation.

Transmission speeds from 9.6 kbps up to 12 Mbps are supported. One uniform transmission speed is selected for all devices on the bus when the system is commissioned.

Acronyms and abbreviations

Input	Data passed into a Master device (for example, from a Slave device)
I&M	Profibus Identification and Maintenance function
MS1	Class 1 Master-Slave acyclic transaction
Output	Data passed out of a Master device (for example, to a Slave device)
PCS/DCS	Process control system/distributed control system
PI/PNO	Profibus International / Profibus User Organization (www.profibus.com)

Profibus interface

Physical layer	RS485
Supported baud rates	9.6 kbps to 12 Mbps
Supported DP Protocol	DPV0, DPV1 services
Concurrent MS2 connections	1
Device stub length	250 mm (9.8 in.)
Master components available	GSD, FD1, EDD

4 Installation

All devices are connected in a bus structure ('line') as shown in Figure 1. Up to 32 stations (master or slaves) can be linked to create one 'segment', although it is recommended not to install more than 16 devices on a single segment.

Each end of a segment must be terminated by an active bus terminating resistor. Both bus terminators must always be powered to ensure fault-free operation, therefore it is strongly recommended that they are connected to a back-up power supply. The use of bus amplifiers (repeaters) and segment couplers can be used to extend the network.

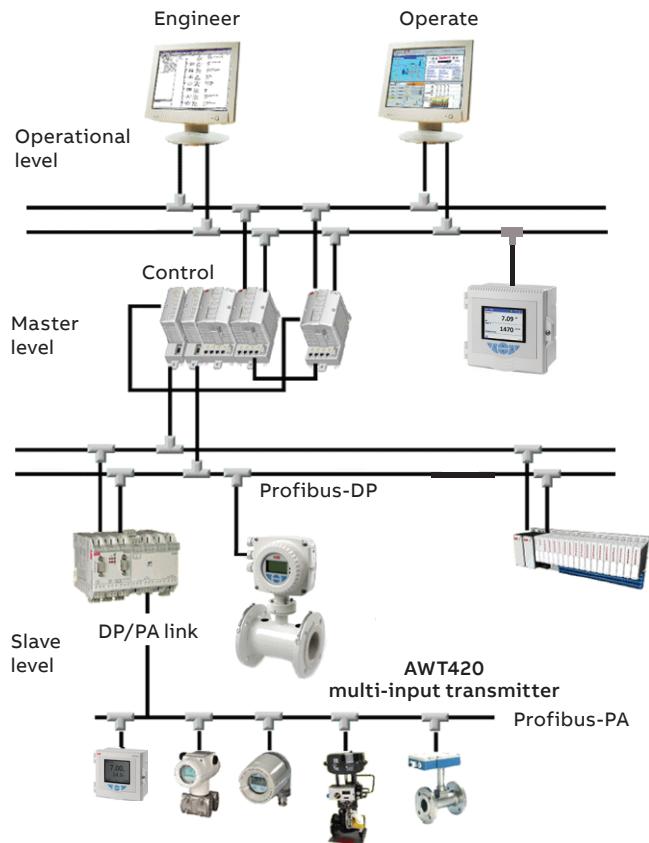


Figure 1 Typical Profibus network

Cable length

The maximum cable length of a segment is determined by the transmission speed (see Table 1). The cable length specified can be extended using repeaters, but it is recommended that no more than 3 repeaters are connected in series.

Transmission rate (bits per second)	Maximum segment length in m (ft.)	Maximum total network length in m (ft.)
9.6 to 93.75 kbps	1200 (3937)	4800 (15748)
187.5 kbps	1000 (3280)	4000 (13123)
500 kbps	400 (1312)	1600 (5249)
1.5 Mbps	200 (656)	800 (2624)
3 to 12 Mbps	100 (328)	400 (1312)

Table 1 Cable length

Cable specification

The cable lengths in Table 1 apply to cable to the following specification:

Impedance	135 to 165 Ω
Capacitance per unit length	<30 pf/m
Loop resistance	110 Ω/km
Core diameter	0.64 mm
Core cross section	>0.34 mm ²

Suitable Profibus cable (part numbers PCA010, PCA011 and PCA012) can be obtained from ABB. Refer to Data Sheet 10/63-6.46-EN.

...4 Installation

Network connection

WARNING

Refer to the AWT420 Operating instruction ([OI/AWT420-EN](#)) before making electrical connections.

NOTICE

Property damage

When connecting an AWT420 to a Profibus-DP RS485 network:

- Use cable that meets Profibus specifications for reliable RS485 communications – see Section 4.
- Ensure RS485 signals are not reversed.
- Ensure a Profibus active terminator is fitted to each end of each RS485 bus segment.
- Route data lines clear of the source of any strong electrical and magnetic fields.

Profibus network connections are made to the terminal blocks on the AWT420 PCB located behind the PCB terminal cover – refer to the Operating instruction ([OI/AWT420-EN](#)).

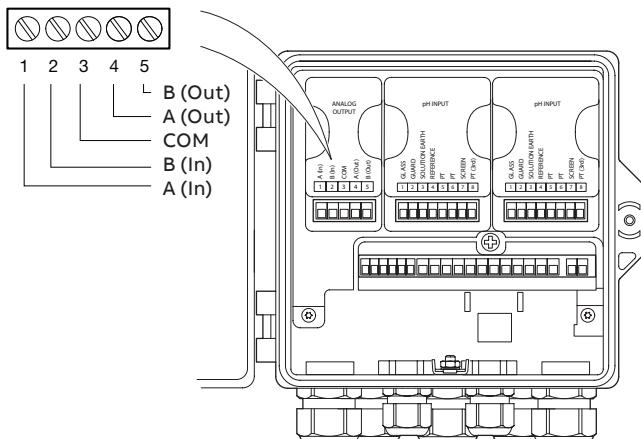


Figure 2 AWT420 PCB connections to Profibus network

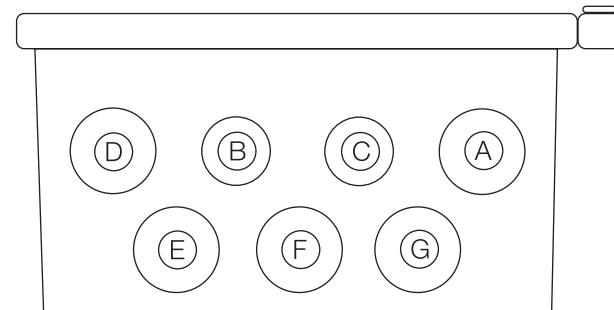
Data signal	Cable color	Description	Sub-D	M12
A	Green	Data Line Minus	Pin 8	Pin 2
B	Red	Data Line Plus	Pin 3	Pin 4
Braided screen	N/A	Cable screen	Pin 1 and Shell	Pin 5

Table 2 Profibus DP data cable signals

When 9-pin sub-D connectors or M12 connectors are used, the wiring must comply with that shown in the above table. Note that the cable shield should always be connected on every device.

To avoid reflections from the ends of the cable it is essential that each segment is terminated at the two ends and nowhere else.

Cable entries



- A M20 – mains power
- B M16 – sensor 1
- C M16 – sensor 2
- D M20 – Profibus (IN)
- E M20 – Profibus (OUT)
- F M20 – analog outputs
- G M20 – relay contacts

Figure 3 Cable entries

5 Configuration

Setting the Profibus slave address

Menu	Comment	Default
Profibus		
Slave Address	Set a device-specific slave address to identify the transmitter on the network.	
Baud Rate	Displays a read-only value (range 0 to 12000 K baud) read from the network the AWT420 is connected to	

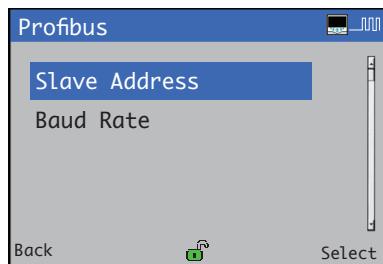
The Profibus slave address for an AWT420 transmitter can be set locally using the keypad and menus **however it is recommended that the slave address is set remotely** by a master using the SET_SLAVE_ADDRESS service.

When the Profibus master sets the transmitter's slave address, the address is stored and overwrites the value previously held in the transmitter.

To change the Slave Address locally using the keypad and menus:

- 1 Refer to [OI/AWT420-EN](#) and access the Profibus communication page.
- 2 Press the **7** key (below the **Select** prompt).

The Profibus page is displayed:



- 3 Use the **▲** and **▼** keys to scroll to Slave Address and press the **7** (below the **Select** prompt).

The current Slave Address setting is displayed.

- 4 To edit the Slave Address value, press the **7** key to enter the Slave Address edit page.
- 5 Use the **7** key to move between editable numbers and use the **▲** and **▼** keys to increase / decrease each number.
- 6 Press the **7** key to accept the new value and exit the Slave Address page, then press the **7** key repeatedly to return to the Operator page.

NOTICE

To cancel a changed value, press and hold (or press repeatedly) the **7** key (below the Next prompt) until the Cancel prompt is displayed at the bottom right side off the page, then press the **7** key to return to the previous page.

...5 Configuration

Integration using GSD

Profibus devices differ with respect to available functionality and parameters for each device type and manufacturer. In order to obtain 'Plug-and-Play' configuration for Profibus, characteristic device communication features such as manufacturer name, device name, hardware / software versions, baud rate and the number and nature of inputs / outputs are defined in an electronic device data sheet known as a GSD (Generic Station Description) file.

A GSD file is readable ASCII text file that contains both general and device-specific specifications for communication. Each of the entries describes a feature supported by a device. By using keywords, a configuration tool reads the device identification, the adjustable parameters, the corresponding data type and the permitted limit values for the configuration of the device from the GSD. Some keywords are mandatory (for example, Vendor_Name), others are optional (for example, Sync_Mode_supported).

The GSD file for AWT420 transmitters specifies the device-specific Ident No. 3405 and conforms to the Profibus standard, providing a clear and comprehensive description of each instrument in a precisely defined format. The description enables the system configuration tool to use the information automatically when configuring a Profibus bus system.

The ABB GSD file (Ident No. 3405) is divided into 2 sections:

- **General specifications**
Identification of the device, together with hardware and software versions, baud rates supported and the possible time intervals for monitoring times.
- **DP Slave-related specifications**
Information about the user parameter block for device-specific configuration and modules containing details of the input and output data that can be exchanged cyclically with a Profibus master.

The AWT420 GSD file (ABB_3405.gsd) is available for download from the ABB website at: www.abb.com/fieldbus (follow the link for Profibus DP field devices).

AWT420 Profibus data sheet

Item	Detail
Profibus device name	AWT420
Applicable standards	IEC61158 (Type 3) IEC61784 (CPF3/1)
Protocols supported	Profibus-DP (DPV0) Profibus-DP extensions (DPV1 Class 1 and 2 supported)
Profile ident support	Device specific: 3405
Profibus unit type	Profibus DP Slave
Profibus media type	RS485 (EIA-485), galvanically isolated
Profibus bus connection	Wiring terminals A1/B1 (in) and A2/B2 (out)
Profibus slot / index	Profibus commands must include length (in bytes) as well as slot / index. This is so that multiple values from the same slot (except strings) can be read / written in a single transaction (up to the maximum of 240 bytes). The length for a multiple index read must be a multiple of the number of bytes value for the required slot multiplied by the number of values to be read. The index specifies the starting index for the values returned. The starting index plus the number of bytes must not go beyond the end of the table. Strings must also specify the correct length in bytes but only single strings can be accessed in one transaction.
Bus address range	1 to 126 via local display interface 1 to 125 via Set_Slave_Addr service
Baud rates supported	9.6 kbps 19.2 kbps 45.45 kbps 93.75 kbps 187.5 kbps 500 kbps 1.5 Mbps 3 Mbps 6 Mbps 12 Mbps
Master Class 1 – Slave cyclic services (MS0)	Set_Prm Chk_Cfg Set_Slave_Addr Data_Exchange Get_Diag Get_Cfg Rd_Inp Rd_Outp
Master Class 1 – Slave acyclic services (MS1)	MS1_Read MS1_Write
Device-specific GSD file	ABB_3405.gsd
Configuration support	Local display interface/EDD/FD1

6 Profibus slots

Slot 1

Index	Description	Object type	Data type	Bytes	Access	Values
0	Tx Failure Signal indicating failure diagnostics is active for TX	Simple	Unsigned 8	1	R	0 – Inactive 1 – Active
1	Tx Out Of Spec Signal indicating out of spec diagnostics is active for TX	Simple	Unsigned 8	1	R	0 – Inactive 1 – Active
2	Tx Maintenance Signal indicating maintenance diagnostics is active for TX	Simple	Unsigned 8	1	R	0 – Inactive 1 – Active
3	Tx Function Check Signal indicating function check diagnostics is active for TX	Simple	Unsigned 8	1	R	0 – Inactive 1 – Active
4	Sensor 1 Failure Signal indicating failure diagnostics is active for sensor 1	Simple	Unsigned 8	1	R	0 – Inactive 1 – Active
5	sensor 1 Out Of Spec Signal indicating out of spec diagnostics is active for sensor 1	Simple	Unsigned 8	1	R	0 – Inactive 1 – Active
6	sensor 1 Maintenance Signal indicating maintenance diagnostics is active for sensor 1	Simple	Unsigned 8	1	R	0 – Inactive 1 – Active
7	sensor 1 Function Check Signal indicating function check diagnostics is active for sensor 1	Simple	Unsigned 8	1	R	0 – Inactive 1 – Active
8	Sensor 2 Failure Signal indicating failure diagnostics is active for sensor 2	Simple	Unsigned 8	1	R	0 – Inactive 1 – Active
9	sensor 2 Out Of Spec Signal indicating out of spec diagnostics is active for sensor 2	Simple	Unsigned 8	1	R	0 – Inactive 1 – Active
10	sensor 2 Maintenance Signal indicating maintenance diagnostics is active for sensor 2	Simple	Unsigned 8	1	R	0 – Inactive 1 – Active
11	sensor 2 Function Check Signal indicating function check diagnostics is active for sensor 2	Simple	Unsigned 8	1	R	0 – Inactive 1 – Active
12	Relay 1 status	Simple	Unsigned 8	1	R	0 – De-energized 1 – Energized
13	Relay 2 status	Simple	Unsigned 8	1	R	0 – De-energized 1 – Energized
14	Relay 3 status	Simple	Unsigned 8	1	R	0 – De-energized 1 – Energized 3
15	Relay 4 status	Simple	Unsigned 8	1	R	0 – De-energized 1 – Energized
16	Alarm 1 status	Simple	Unsigned 8	1	R	0 – Inactive 1 – Active
17	Alarm 2 status	Simple	Unsigned 8	1	R	0 – Inactive 1 – Active
18	Alarm 3 status	Simple	Unsigned 8	1	R	0 – Inactive 1 – Active
19	Alarm 4 status	Simple	Unsigned 8	1	R	0 – Inactive 1 – Active
20	Alarm 5 status	Simple	Unsigned 8	1	R	0 – Inactive 1 – Active
21	Alarm 6 status	Simple	Unsigned 8	1	R	0 – Inactive 1 – Active
22	Alarm 7 status	Simple	Unsigned 8	1	R	0 – Inactive 1 – Active
23	Alarm 8 status	Simple	Unsigned 8	1	R	0 – Inactive 1 – Active

Index	Description	Object type	Data type	Bytes	Access	Values
24	Alarm 1 acknowledge status	Simple	Unsigned 8	1	R	0 – Acknowledged 1 – Not acknowledged
25	Alarm 2 acknowledge status	Simple	Unsigned 8	1	R	0 – Acknowledged 1 – Not acknowledged
26	Alarm 3 acknowledge status	Simple	Unsigned 8	1	R	0 – Acknowledged 1 – Not acknowledged
27	Alarm 4 acknowledge status	Simple	Unsigned 8	1	R	0 – Acknowledged 1 – Not acknowledged
28	Alarm 5 acknowledge status	Simple	Unsigned 8	1	R	0 – Acknowledged 1 – Not acknowledged
29	Alarm 6 acknowledge status	Simple	Unsigned 8	1	R	0 – Acknowledged 1 – Not acknowledged
30	Alarm 7 acknowledge status	Simple	Unsigned 8	1	R	0 – Acknowledged 1 – Not acknowledged
31	Alarm 8 acknowledge status	Simple	Unsigned 8	1	R	0 – Acknowledged 1 – Not acknowledged
32	Sensor 1 hold status	Simple	Unsigned 8	1	R	0 – Inactive 1 – Active
33	Sensor 2 hold status	Simple	Unsigned 8	1	R	0 – Inactive 1 – Active
34	Clean 1 status	Simple	Unsigned 8	1	R	0 – Inactive 1 – Active
35	Clean 2 status	Simple	Unsigned 8	1	R	0 – Inactive 1 – Active
36	Digital I/O status	Simple	Unsigned 8	1	R	Digital input Digital output 0 – Open 1 – Closed 0 – Inactive 1 – Active

Slot 2

Index	Description	Object type	Data type	Bytes	Access	Values
0	Alarm 1 acknowledge	Simple	Unsigned 8	1	W	Write 1 to acknowledge alarm Always reads as 0
1	Alarm 2 acknowledge	Simple	Unsigned 8	1	W	Write 1 to acknowledge alarm Always reads as 0
2	Alarm 3 acknowledge	Simple	Unsigned 8	1	W	Write 1 to acknowledge alarm Always reads as 0
3	Alarm 4 acknowledge	Simple	Unsigned 8	1	W	Write 1 to acknowledge alarm Always reads as 0
4	Alarm 5 acknowledge	Simple	Unsigned 8	1	W	Write 1 to acknowledge alarm Always reads as 0
5	Alarm 6 acknowledge	Simple	Unsigned 8	1	W	Write 1 to acknowledge alarm Always reads as 0
6	Alarm 7 acknowledge	Simple	Unsigned 8	1	W	Write 1 to acknowledge alarm Always reads as 0
7	Alarm 8 acknowledge	Simple	Unsigned 8	1	W	Write 1 to acknowledge alarm Always reads as 0

...6 Profibus slots

Slot 3

Index	Description	Object type	Data type	Bytes	Access	Values
0	Sensor 1 primary variable value (PV)	Simple	Float	4	R	Dependant upon sensor 1 type
1	Sensor 1 secondary variable value (SV)	Simple	Float	4	R	
2	Sensor 2 primary variable value (PV)	Simple	Float	4	R	Dependant upon sensor 2 type
3	Sensor 2 secondary variable value (SV)	Simple	Float	4	R	
4	Calculated value	Simple	Float	4	R	Dependant upon calculation type
5	Reserved					
6	Sensor 1 primary variable sensor range high limit (base units)	Simple	Float	4	R	
7	Sensor 1 primary variable sensor range low limit (base units)	Simple	Float	4	R	
8	Sensor 1 secondary variable sensor range high limit (base units)	Simple	Float	4	R	
9	Sensor 1 secondary variable sensor range low limit (base units)	Simple	Float	4	R	
10	Sensor 2 primary variable sensor range high limit (base units)	Simple	Float	4	R	See Engineering range limits, page 47
11	Sensor 2 primary variable sensor range low limit (base units)	Simple	Float	4	R	
12	Sensor 2 secondary variable sensor range high limit (base units)	Simple	Float	4	R	
13	Sensor 2 secondary variable sensor range low limit (base units)	Simple	Float	4	R	
14	Calculated value high limit (base units)	Simple	Float	4	R	
15	Calculated value low limit (base units)	Simple	Float	4	R	
16-17	Reserved					
18	Sensor 1 signals view, signal 1	Simple	Float	4	R	Dependant upon sensor 1 type see Signals view allocation, page 46
19	Sensor 1 signals view, signal 2	Simple	Float	4	R	
20	Sensor 1 signals view, signal 3	Simple	Float	4	R	
21	Sensor 1 signals view, signal 4	Simple	Float	4	R	
22	Sensor 1 signals view, signal 5	Simple	Float	4	R	
23	Sensor 1 signals view, signal 6	Simple	Float	4	R	
24	Sensor 1 signals view, signal 7	Simple	Float	4	R	
25	Sensor 1 signals view, signal 8	Simple	Float	4	R	
26	Sensor 2 signals view, signal 1	Simple	Float	4	R	Dependant upon sensor 2 type see Signals view allocation, page 46
27	Sensor 2 signals view, signal 2	Simple	Float	4	R	
28	Sensor 2 signals view, signal 3	Simple	Float	4	R	
29	Sensor 2 signals view, signal 4	Simple	Float	4	R	
30	Sensor 2 signals view, signal 5	Simple	Float	4	R	
31	Sensor 2 signals view, signal 6	Simple	Float	4	R	
32	Sensor 2 signals view, signal 7	Simple	Float	4	R	
33	Sensor 2 signals view, signal 8	Simple	Float	4	R	
34	Analog output 1: mA output	Simple	Float	4	R	mA
35	Analog output 1: % of range	Simple	Float	4	R	%
36	Analog output 2: mA output	Simple	Float	4	R	mA
37	Analog output 2: % of range	Simple	Float	4	R	%
38	Sensor 1 pH: Temperature sensor High limit	Simple	Float	4	R	Temperature units (°C or °F)
39	Sensor 1 pH: Temperature sensor Low limit	Simple	Float	4	R	Temperature units (°C or °F)
40	Sensor 1 pH: pH glass resistance	Simple	Float	4	R	MΩ
41	Sensor 1 pH: pH dual reference mV difference	Simple	Float	4	R	mV
42	Sensor 1 pH: Reference electrode resistance	Simple	Float	4	R	kΩ
43	Sensor 2 pH: Temperature sensor High limit	Simple	Float	4	R	Temperature units (°C or °F)
44	Sensor 2 pH: Temperature sensor Low limit	Simple	Float	4	R	Temperature units (°C or °F)
45	Sensor 2 pH: pH glass resistance	Simple	Float	4	R	MΩ
46	Sensor 2 pH: pH dual reference mV difference	Simple	Float	4	R	mV
47	Sensor 2 pH: Reference electrode resistance	Simple	Float	4	R	kΩ
48	SD Card: % of card used	Simple	Float	4	R	%
49	Controller 1: control output	Simple	Float	4	R	%
50	Controller 2: control output	Simple	Float	4	R	%
51	Reserved	Simple	Float	4	R	mA
52	Reserved	Simple	Float	4	R	%
53	Reserved	Simple	Float	4	R	
54	Reserved	Simple	Float	4	R	

Slot 4

Index	Description	Object type	Data type	Bytes	Access	Values
0	Sensor 1 active diagnostic classes	Simple	Unsigned 32	4	R	see Namur class bit allocation, page 44
1	Sensor 2 active diagnostic classes	Simple	Unsigned 32	4	R	
2	Transmitter active diagnostic classes	Simple	Unsigned 32	4	R	
3	Transmitter diagnostics	Simple	Unsigned 32	4	R	
4	Sensor 1 pH diagnostics	Simple	Unsigned 32	4	R	
5	Sensor 2 pH diagnostics	Simple	Unsigned 32	4	R	
6	Sensor 1 2-electrode conductivity diagnostics	Simple	Unsigned 32	4	R	
7	Sensor 2 2-electrode conductivity diagnostics	Simple	Unsigned 32	4	R	
8	Sensor 1 4-electrode conductivity diagnostics	Simple	Unsigned 32	4	R	
9	Sensor 2 4-electrode conductivity diagnostics	Simple	Unsigned 32	4	R	
10	Sensor 1 RDO diagnostics	Simple	Unsigned 32	4	R	See Diagnostic bit allocation, page 44
11	Sensor 2 RDO diagnostics	Simple	Unsigned 32	4	R	
12	Sensor 1 TSS diagnostics	Simple	Unsigned 32	4	R	
13	Sensor 2 TSS diagnostics	Simple	Unsigned 32	4	R	
14	Sensor 1 Turbidity diagnostics	Simple	Unsigned 32	4	R	
15	Sensor 2 Turbidity diagnostics	Simple	Unsigned 32	4	R	
16-22	Reserved					
23	Sensor 1 diagnostics	Simple	Unsigned 32	4	R	
24	Sensor 2 diagnostics	Simple	Unsigned 32	4	R	
25	Transmitter diagnostics	Simple	Unsigned 32	4	R	
26	Sensor 1 RDO Cap expiry date	Simple	Unsigned 32	4	R	Number of seconds since 01/01/2000
27	Sensor 2 RDO Cap expiry date	Simple	Unsigned 32	4	R	
28-87	Reserved					
88	Clean 1 duration	Simple	Unsigned 32	4	R	seconds
89	Clean 2 duration	Simple	Unsigned 32	4	R	seconds
90	Transmitter date of manufacture	Simple	Unsigned 32	4	R	
91	Sensor 1 date of manufacture	Simple	Unsigned 32	4	R	Number of seconds since 01/01/2000
92	Sensor 2 date of manufacture	Simple	Unsigned 32	4	R	

Slot 5

Index	Description	Object type	Data type	Bytes	Access	Values
0	Sensor 1 hardware version	Simple	Unsigned 16	2	R	
1	Sensor 2 hardware version	Simple	Unsigned 16	2	R	
2	Profibus module hardware version	Simple	Unsigned 16	2	R	

...6 Profibus slots

Slot 6

Index	Description	Object type	Data type	Bytes	Access	Values
0	Sensor 1 active diagnostic classes	Simple	Unsigned 8	1	R	see Namur class bit allocation, page 44
1	Sensor 2 active diagnostic classes	Simple	Unsigned 8	1	R	
2	Transmitter active diagnostic classes	Simple	Unsigned 8	1	R	
3	Sensor 1 Primary value status	Simple	Unsigned 8	1	R	0 – OK
4	Sensor 1 Secondary value status	Simple	Unsigned 8	1	R	1 – Overrange 2 – Underrange
5	Sensor 2 Primary value status	Simple	Unsigned 8	1	R	3 – Poor accuracy
6	Sensor 2 Secondary value status	Simple	Unsigned 8	1	R	4 – Hold
7	Calculated value value status	Simple	Unsigned 8	1	R	5 – Hold low limit
8	Reserved					
9	SD Card status	Simple	Unsigned 8	1	R	0 – Offline 1 – Online
10	SD Card presence	Simple	Unsigned 8	1	R	0 – Card not inserted 1 – Card inserted
11	Transmitter hardware revision	Simple	Unsigned 8	1	R	
12	Slot 1 Sensor module type	Simple	Unsigned 8	1	R	0 – Unrecognized 10 – 2-electrode conductivity 30 – 4-electrode conductivity 42 – RDO 60 – pH 77 – TSS 255 – None
13	Calculated inferred pH range	Simple	Unsigned 8	1	R	0 – 7 to 10 pH 1 – 7 to 11 pH
14	Sensor 1 pH: pH sensor model	Simple	Unsigned 8	1	R	0 – 100 general purpose 1 – 100 Ultra 2 – 500 Pro 3 – 700 Ultra 4 – 500X 5 – 700S 6 – 700M 7 – Analog
15	Sensor 1 pH: pH glass type	Simple	Unsigned 8	1	R	0 – Standard 1 – Low temperature 2 – High temperature 3 – HF resistant 4 – Flat 5 – Standard ORP
16	Slot 2 Sensor module type	Simple	Unsigned 8	1	R	0 – Unrecognized 10 – 2-electrode conductivity 30 – 4-electrode conductivity 42 – RDO 60 – pH 77 – TSS 255 – None
17	Sensor 1 pH: pH sensor model	Simple	Unsigned 8	1	R	0 – 100 general purpose 1 – 100 Ultra 2 – 500 Pro 3 – 700 Ultra 4 – 500X 5 – 700S 6 – 700M 7 – Analog
18	Sensor 1 pH: pH glass type	Simple	Unsigned 8	1	R	0 – Standard 1 – Low temperature 2 – High temperature 3 – HF resistant 4 – Flat 5 – Standard ORP

Index	Description	Object type	Data type	Bytes	Access	Values
19	Sensor 1 = signals view units (signal 1)	Simple	Unsigned 8	1	R	
20	Sensor 1 = signals view units (signal 2)	Simple	Unsigned 8	1	R	
21	Sensor 1 = signals view units (signal 3)	Simple	Unsigned 8	1	R	
22	Sensor 1 = signals view units (signal 4)	Simple	Unsigned 8	1	R	
23	Sensor 1 = signals view units (signal 5)	Simple	Unsigned 8	1	R	
24	Sensor 1 = signals view units (signal 6)	Simple	Unsigned 8	1	R	
25	Sensor 1 = signals view units (signal 7)	Simple	Unsigned 8	1	R	
26	Sensor 1 = signals view units (signal 8)	Simple	Unsigned 8	1	R	
27	Sensor 2 = signals view units (signal 1)	Simple	Unsigned 8	1	R	
28	Sensor 2 = signals view units (signal 2)	Simple	Unsigned 8	1	R	
29	Sensor 2 = signals view units (signal 3)	Simple	Unsigned 8	1	R	
30	Sensor 2 = signals view units (signal 4)	Simple	Unsigned 8	1	R	
31	Sensor 2 = signals view units (signal 5)	Simple	Unsigned 8	1	R	
32	Sensor 2 = signals view units (signal 6)	Simple	Unsigned 8	1	R	
33	Sensor 2 = signals view units (signal 7)	Simple	Unsigned 8	1	R	
34	Sensor 2 = signals view units (signal 8)	Simple	Unsigned 8	1	R	
35	Number of analog outputs	Simple	Unsigned 8	1	R	2 – baseboard only 3 – baseboard + HART 4 – baseboard + analog option
36	EZLink 0 connection	Simple	Unsigned 8	1	R	
37	EZLink 1 connection	Simple	Unsigned 8	1	R	0 – Not fitted
38	Communications board is fitted	Simple	Unsigned 8	1	R	1 – Fitted

Slot 7

Index	Description	Object type	Data type	Bytes	Access	Values
0	Transmitter software revision	Array	Unsigned 8	19	R	
1	Transmitter serial number	Array	Unsigned 8	15	R	
2	Sensor 1 software version	Array	Unsigned 8	19	R	
3	Sensor 1 serial number	Array	Unsigned 8	14	R	
4	Sensor 2 software version	Array	Unsigned 8	19	R	
5	Sensor 2 serial number	Array	Unsigned 8	14	R	
6	Sensor 1 RDO cap serial number	Array	Unsigned 8	15	R	
7	Sensor 2 RDO cap serial number	Array	Unsigned 8	15	R	
8	Log Data	Array	Unsigned 8	240	R	See Log data register allocation, page 48
9	Bluetooth device name	Array	Unsigned 8	20	R	
10	Bluetooth MAC address	Array	Unsigned 8	20	R	
11	Bluetooth Firmware revision	Array	Unsigned 8	20	R	
12	Bluetooth pairing PIN	Array	Unsigned 8	7	R	
13	Profibus module software version	Array	Unsigned 8	19	R	
14	S1 pH Sensor product code	Array	Unsigned 8	14	R	
15	S2 pH Sensor product code	Array	Unsigned 8	14	R	

...6 Profibus slots

Slot 8

Index	Description	Object type	Data type	Bytes	Access	Values
0	Sensor 1: primary variable sensor range high	Simple	Float	4	R/W	See Engineering range limits, page 47
1	Sensor 1: primary variable sensor range low	Simple	Float	4	R/W	
2	Sensor 2: primary variable sensor range high	Simple	Float	4	R/W	
3	Sensor 2: primary variable sensor range low	Simple	Float	4	R/W	
4	Alarm 1: Trip point	Simple	Float	4	R/W	
5	Alarm 2: Trip point	Simple	Float	4	R/W	
6	Alarm 3: Trip point	Simple	Float	4	R/W	
7	Alarm 4: Trip point	Simple	Float	4	R/W	
8	Alarm 5: Trip point	Simple	Float	4	R/W	See Engineering range limits, page 47
9	Alarm 6: Trip point	Simple	Float	4	R/W	
10	Alarm 7: Trip point	Simple	Float	4	R/W	
11	Alarm 8: Trip point	Simple	Float	4	R/W	
12	Alarm 1: hysteresis	Simple	Float	4	R/W	
13	Alarm 2: hysteresis	Simple	Float	4	R/W	
14	Alarm 3: hysteresis	Simple	Float	4	R/W	
15	Alarm 4: hysteresis	Simple	Float	4	R/W	See Engineering range limits, page 47
16	Alarm 5: hysteresis	Simple	Float	4	R/W	
17	Alarm 6: hysteresis	Simple	Float	4	R/W	
18	Alarm 7: hysteresis	Simple	Float	4	R/W	
19	Alarm 8: hysteresis	Simple	Float	4	R/W	
20	Analog output 1: Electrical range high	Simple	Float	4	R/W	0 to 22 mA
21	Analog output 1: Electrical range low	Simple	Float	4	R/W	
22	Analog output 1: Engineering range high	Simple	Float	4	R/W	See Engineering range limits, page 47
23	Analog output 1: Engineering range low	Simple	Float	4	R/W	
24	Analog output 1: Failure current	Simple	Float	4	R/W	
25	Analog output 2: Electrical range high	Simple	Float	4	R/W	
26	Analog output 2: Electrical range low	Simple	Float	4	R/W	
27	Analog output 2: Engineering range high	Simple	Float	4	R/W	See Engineering range limits, page 47
28	Analog output 2: Engineering range low	Simple	Float	4	R/W	
29	Analog output 2: Failure current	Simple	Float	4	R/W	
30	Controller 1: manual output	Simple	Float	4	R/W	Reverse or Direct Dual Acting 0 to 100 % -100 to 100 %
31	Controller 1: Power recovery default output	Simple	Float	4	R/W	Reverse or Direct Dual Acting 0 to 100 % -100 to 100 %
32	Controller 1: PV failure default output	Simple	Float	4	R/W	Reverse or Direct Dual Acting 0 to 100 % -100 to 100 %
33	Controller 1: Proportional band for direct or acid control	Simple	Float	4	R/W	0.1 to 999.9 %
34	Controller 1: Derivative action time for direct or acid control	Simple	Float	4	R/W	0.1 to 999.9 s
35	Controller 1: Manual reset for direct control	Simple	Float	4	R/W	0 to 100 %
36	Controller 1: Time proportioning cycle time for direct or acid control	Simple	Float	4	R/W	1 to 300 s

Index	Description	Object type	Data type	Bytes	Access	Values
37	Controller 1: Control Setpoint for direct or acid control	Simple	Float	4	R/W	Direct Acid See Engineering range limits, page 47 (Base setpoint + 0.5) to 16.0 pH
38	Controller 1: Proportional band for reverse or base control	Simple	Float	4	R/W	0.1 to 999.9 %
39	Controller 1: Derivative action time for reverse or base control	Simple	Float	4	R/W	0.1 to 999.9 s
40	Controller 1: manual reset for reverse control	Simple	Float	4	R/W	0 to 100 %
41	Controller 1: Time proportioning cycle time for reverse or base control	Simple	Float	4	R/W	1 to 300 s
42	Controller 1: Control Setpoint for reverse or base control	Simple	Float	4	R/W	Reverse Base See Engineering range limits, page 47 -2.0 to (Acid setpoint - 0.5) pH
43	Controller 2: manual output	Simple	Float	4	R/W	Reverse or Direct Dual Acting 0 to 100 % -100 to 100 %
44	Controller 2: Power recovery default output	Simple	Float	4	R/W	Reverse or Direct Dual Acting 0 to 100 % -100 to 100 %
45	Controller 2: PV failure default output	Simple	Float	4	R/W	Reverse or Direct Dual Acting 0 to 100 % -100 to 100 %
46	Controller 2: Proportional band for direct or acid control	Simple	Float	4	R/W	0.1 to 999.9 %
47	Controller 2: Derivative action time for direct or acid control	Simple	Float	4	R/W	0.1 to 999.9 s
48	Controller 2: manual reset for direct control	Simple	Float	4	R/W	0 to 100 %
49	Controller 2: Time proportioning cycle time for direct or acid control	Simple	Float	4	R/W	1 to 300 s
50	Controller 2: Control Setpoint for direct or acid control	Simple	Float	4	R/W	Direct Acid See Engineering range limits, page 47 (Base setpoint + 0.5) to 16.0 pH
51	Controller 2: Proportional band for reverse or base control	Simple	Float	4	R/W	0.1 to 999.9 %
52	Controller 2: Derivative action time for reverse or base control	Simple	Float	4	R/W	0.1 to 999.9 s
53	Controller 2: manual reset for reverse control	Simple	Float	4	R/W	0 to 100 %
54	Controller 2: Time proportioning cycle time for reverse or base control	Simple	Float	4	R/W	1 to 300 s
55	Controller 2: Control Setpoint for reverse or base control	Simple	Float	4	R/W	Reverse Base See Engineering range limits, page 47 -2.0 to (Acid setpoint - 0.5) pH
56	Before cation limit	Simple	Float	4	R/W	0 to 100µS/cm
57	After cation limit	Simple	Float	4	R/W	0.06 to 100µS/cm
58	Sample collection, new pH value	Simple	Float	4	R/W	0 to 14 pH
59	Sample collection, new temperature value	Simple	Float	4	R/W	0 to 50 °C
60	Sensor 1 pH: Sample coefficient	Simple	Float	4	R/W	-1.999 to 1.999
61	Sensor 1 pH: Manual temperature	Simple	Float	4	R/W	-20 to 150 °C -4 to 302 °F
62	Sensor 1 pH: Low slope limit	Simple	Float	4	R/W	40 to 70 %
63	Sensor 1 2-electrode conductivity: Manual temperature	Simple	Float	4	R/W	-40 to 200 °C -40 to 392 °F
64	Sensor 1 2-electrode conductivity: Temperature compensation coefficient	Simple	Float	4	R/W	0 to 9.99 %/deg C
65	Sensor 1 2-electrode conductivity: Cell constant	Simple	Float	4	R/W	0.003 to 1.999
66	Sensor 1 4-electrode conductivity: Manual temperature	Simple	Float	4	R/W	-40 to 200 °C -40 to 392 °F
67	Sensor 1 4-electrode conductivity: Temperature compensation coefficient	Simple	Float	4	R/W	0 to 9.99 %/deg C

...6 Profibus slots

...Slot 8

Index	Description	Object type	Data type	Bytes	Access	Values
68	Sensor 1 RDO: Salinity correction	Simple	Float	4	R/W	0 to 42 PSU
69	Sensor 1 RDO: Barometric pressure correction	Simple	Float	4	R/W	506.625 to 1113.242 mbar
70	Sensor 2 pH: Sample coefficient	Simple	Float	4	R/W	-1.999 to 1.999 pH/ 10 °C
71	Sensor 2 pH: manual Temperature	Simple	Float	4	R/W	-20 to 150 °C -4 to 302 °F
72	Sensor 2 pH: Low slope limit	Simple	Float	4	R/W	40 to 70 %
73	Sensor 2 2-electrode conductivity: manual Temperature	Simple	Float	4	R/W	-40 to 200 °C -40 to 392 °F
74	Sensor 2 2-electrode conductivity: Temperature compensation coefficient	Simple	Float	4	R/W	0 to 9.99 %/deg C
75	Sensor 2 2-electrode conductivity: Cell constant	Simple	Float	4	R/W	0.003 to 1.999
76	Sensor 2 4-electrode conductivity: manual Temperature	Simple	Float	4	R/W	-40 to 200 °C -40 to 392 °F
77	Sensor 2 4-electrode conductivity: Temperature compensation coefficient	Simple	Float	4	R/W	0 to 9.99 %/deg C
78	Sensor 2 RDO: Salinity correction	Simple	Float	4	R/W	0 to 42 PSU
79	Sensor 2 RDO: Barometric pressure correction	Simple	Float	4	R/W	506.625 to 1113.242 mbar
80	Sensor 1 pH: primary variable reference limit	Simple	Float	4	R/W	20 to 100 kΩ
81	Sensor 2 pH: primary variable reference limit	Simple	Float	4	R/W	20 to 100 kΩ
82		conductivity X0	Simple	Float	4	R/W
83		conductivity X1	Simple	Float	4	R/W
84	Sensor 1 2-electrode conductivity: User defined concentration curve	conductivity X2	Simple	Float	4	R/W
85	Conductivity	conductivity X3	Simple	Float	4	R/W
86		conductivity X4	Simple	Float	4	R/W
87		conductivity X5	Simple	Float	4	R/W
88		concentration Y0	Simple	Float	4	R/W
89		concentration Y1	Simple	Float	4	R/W
90	Sensor 1 2-electrode conductivity: User defined concentration curve	concentration Y2	Simple	Float	4	R/W
91	Concentration	concentration Y3	Simple	Float	4	R/W
92		concentration Y4	Simple	Float	4	R/W
93		concentration Y5	Simple	Float	4	R/W
94		conductivity X0	Simple	Float	4	R/W
95		conductivity X1	Simple	Float	4	R/W
96	Sensor 2 2-electrode conductivity: User defined concentration curve	conductivity X2	Simple	Float	4	R/W
97	Conductivity	conductivity X3	Simple	Float	4	R/W
98		conductivity X4	Simple	Float	4	R/W
99		conductivity X5	Simple	Float	4	R/W
100		concentration Y0	Simple	Float	4	R/W
101		concentration Y1	Simple	Float	4	R/W
102	Sensor 2 2-electrode conductivity: User defined concentration curve	concentration Y2	Simple	Float	4	R/W
103	Concentration	concentration Y3	Simple	Float	4	R/W
104		concentration Y4	Simple	Float	4	R/W
105		concentration Y5	Simple	Float	4	R/W

0 to 20000 µS/cm

See Engineering range
limits, page 47

0 to 20000 µS/cm

See Engineering range
limits, page 47

Index	Description	Object type	Data type	Bytes	Access	Values
106		Temperature X0	Simple	Float	4	R/W
107		Temperature X1	Simple	Float	4	R/W
108	Sensor 1 2-electrode conductivity: User defined temperature compensation curve	Temperature X2	Simple	Float	4	R/W
109	Temperature	Temperature X3	Simple	Float	4	R/W
110		Temperature X4	Simple	Float	4	R/W
111		Temperature X5	Simple	Float	4	R/W
112		conductivity ratio Y0	Simple	Float	4	R/W
113		conductivity ratio Y1	Simple	Float	4	R/W
114	Sensor 1 2-electrode conductivity: User defined temperature compensation curve	conductivity ratio Y2	Simple	Float	4	R/W
115	Conductivity ratio (G_t/G_{25})	conductivity ratio Y3	Simple	Float	4	R/W
116		conductivity ratio Y4	Simple	Float	4	R/W
117		conductivity ratio Y5	Simple	Float	4	R/W
118		Temperature X0	Simple	Float	4	R/W
119		Temperature X1	Simple	Float	4	R/W
120	Sensor 2 2-electrode conductivity: User defined temperature compensation curve	Temperature X2	Simple	Float	4	R/W
121	Temperature	Temperature X3	Simple	Float	4	R/W
122		Temperature X4	Simple	Float	4	R/W
123		Temperature X5	Simple	Float	4	R/W
124		conductivity ratio Y0	Simple	Float	4	R/W
125		conductivity ratio Y1	Simple	Float	4	R/W
126	Sensor 2 2-electrode conductivity: User defined temperature compensation curve	conductivity ratio Y2	Simple	Float	4	R/W
127	Conductivity ratio (G_t/G_{25})	conductivity ratio Y3	Simple	Float	4	R/W
128		conductivity ratio Y4	Simple	Float	4	R/W
129		conductivity ratio Y5	Simple	Float	4	R/W
130		conductivity X0	Simple	Float	4	R/W
131		conductivity X1	Simple	Float	4	R/W
132	Sensor 1 4-electrode conductivity: User defined concentration curve	conductivity X2	Simple	Float	4	R/W
133	Conductivity for group B sensors	conductivity X3	Simple	Float	4	R/W
134		conductivity X4	Simple	Float	4	R/W
135		conductivity X5	Simple	Float	4	R/W
136		conductivity X0	Simple	Float	4	R/W
137		conductivity X1	Simple	Float	4	R/W
138	Sensor 1 4-electrode conductivity: User defined concentration curve	conductivity X2	Simple	Float	4	R/W
139	Conductivity for group A sensors	conductivity X3	Simple	Float	4	R/W
140		conductivity X4	Simple	Float	4	R/W
141		conductivity X5	Simple	Float	4	R/W
142		concentration Y0	Simple	Float	4	R/W
143		concentration Y1	Simple	Float	4	R/W
144	Sensor 1 4-electrode conductivity: User defined concentration curve,	concentration Y2	Simple	Float	4	R/W
145		concentration Y3	Simple	Float	4	R/W
146		concentration Y4	Simple	Float	4	R/W
147		concentration Y5	Simple	Float	4	R/W

See Engineering range
limits, page 47

...6 Profibus slots

...Slot 8

Index	Description	Object type	Data type	Bytes	Access	Values
148	Sensor 2 4-electrode conductivity: User defined concentration curve, for group B sensors	conductivity X0	Simple	Float	4	R/W
149		conductivity X1	Simple	Float	4	R/W
150		conductivity X2	Simple	Float	4	R/W
151		conductivity X3	Simple	Float	4	R/W
152		conductivity X4	Simple	Float	4	R/W
153		conductivity X5	Simple	Float	4	R/W
154	Sensor 2 4-electrode conductivity: User defined concentration curve, for group A sensors	conductivity X0	Simple	Float	4	R/W
155		conductivity X1	Simple	Float	4	R/W
156		conductivity X2	Simple	Float	4	R/W
157		conductivity X3	Simple	Float	4	R/W
158		conductivity X4	Simple	Float	4	R/W
159		conductivity X5	Simple	Float	4	R/W
160	Sensor 2 4-electrode conductivity: User defined concentration curve	concentration Y0	Simple	Float	4	R/W
161		concentration Y1	Simple	Float	4	R/W
162		concentration Y2	Simple	Float	4	R/W
163		concentration Y3	Simple	Float	4	R/W
164		concentration Y4	Simple	Float	4	R/W
165		concentration Y5	Simple	Float	4	R/W
166	Sensor 1 4-electrode conductivity: User defined temperature compensation curve Temperature	Temperature X0	Simple	Float	4	R/W
167		Temperature X1	Simple	Float	4	R/W
168		Temperature X2	Simple	Float	4	R/W
169		Temperature X3	Simple	Float	4	R/W
170		Temperature X4	Simple	Float	4	R/W
171		Temperature X5	Simple	Float	4	R/W
172	Sensor 1 4-electrode conductivity: User defined temperature compensation curve Conductivity ratio (G_t/G_{25})	conductivity ratio Y0	Simple	Float	4	R/W
173		conductivity ratio Y1	Simple	Float	4	R/W
174		conductivity ratio Y2	Simple	Float	4	R/W
175		conductivity ratio Y3	Simple	Float	4	R/W
176		conductivity ratio Y4	Simple	Float	4	R/W
177		conductivity ratio Y5	Simple	Float	4	R/W
178	Sensor 2 4-electrode conductivity: User defined temperature compensation curve Temperature	Temperature X0	Simple	Float	4	R/W
179		Temperature X1	Simple	Float	4	R/W
180		Temperature X2	Simple	Float	4	R/W
181		Temperature X3	Simple	Float	4	R/W
182		Temperature X4	Simple	Float	4	R/W
183		Temperature X5	Simple	Float	4	R/W

0 to 2000 $\mu\text{S}/\text{cm}$ 0 to 2000 mS/cm See Engineering range
limits, page 47-40 to 200 °C
-40 to 392 °F

0 to 20

-40 to 200 °C
-40 to 392 °F

Index	Description	Object type	Data type	Bytes	Access	Value
184		conductivity ratio Y0	Simple	Float	4	R/W
185		conductivity ratio Y1	Simple	Float	4	R/W
186	Sensor 2 4-electrode conductivity: User defined temperature compensation curve	conductivity ratio Y2	Simple	Float	4	R/W
187	Coductivity ratio (Gt/G ₂₅)	conductivity ratio Y3	Simple	Float	4	R/W
188		conductivity ratio Y4	Simple	Float	4	R/W
189		conductivity ratio Y5	Simple	Float	4	R/W
190	Analog output 3: Electrical range high		Simple	Float	4	R/W
191	Analog output 3: Electrical range low		Simple	Float	4	R/W
192	Analog output 3: Engineering range high		Simple	Float	4	R/W
193	Analog output 3: Engineering range low		Simple	Float	4	R/W
194	Analog output 3: Failure current		Simple	Float	4	R/W
195	Analog output 4: Electrical range high		Simple	Float	4	R/W
196	Analog output 4: Electrical range low		Simple	Float	4	R/W
197	Analog output 4: Engineering range high		Simple	Float	4	R/W
198	Analog output 4: Engineering range low		Simple	Float	4	R/W
199	Analog output 4: Failure current		Simple	Float	4	R/W
200	Sensor 1 pH: PV Calibration slope		Simple	Float	4	R/W
201	Sensor 1 pH: PV Calibration offset		Simple	Float	4	R/W
					pH	2 to 12 pH
					ORP/ Redox	-240 to +240 mV
202	Sensor 1 pH: Temperature Calibration slope		Simple	Float	4	R/W
						20 to 150 %
203	Sensor 1 pH: Temperature Calibration offset		Simple	Float	4	R/W
						-40 to +40 degC -72 to + 72 °F
204	Sensor 2 pH: PV Calibration slope		Simple	Float	4	R/W
						40 to 150 %
205	Sensor 2 pH: PV Calibration offset		Simple	Float	4	R/W
					pH	2 to 12 pH
					ORP/ Redox	-240 to +240 mV
206	Sensor 2 pH: Temperature Calibration slope		Simple	Float	4	R/W
						20 to 150 %
207	Sensor 2 pH: Temperature Calibration offset		Simple	Float	4	R/W
						-40 to +40 °C -72 to + 72 °F
208	Sensor 1 2-electrode conductivity: PV Calibration slope		Simple	Float	4	R/W
						20 to 500 %
209	Sensor 1 2-electrode conductivity: PV Calibration offset		Simple	Float	4	R/W
						-20 to +20 μS/cm
210	Sensor 1 2-electrode conductivity: Temperature Calibration slope		Simple	Float	4	R/W
						20 to 150 %
211	Sensor 1 2-electrode conductivity: Temperature Calibration offset		Simple	Float	4	R/W
						-40 to +40 °C -72 to + 72 °F
212	Sensor 2 2-electrode conductivity: PV Calibration slope		Simple	Float	4	R/W
						20 to 500 %
213	Sensor 2 2-electrode conductivity: PV Calibration offset		Simple	Float	4	R/W
						-20 to +20 μS/cm
214	Sensor 2 2-electrode conductivity: Temperature Calibration slope		Simple	Float	4	R/W
						20 to 150 %
215	Sensor 2 2-electrode conductivity: Temperature Calibration offset		Simple	Float	4	R/W
						-40 to +40 °C -72 to + 72 °F

...6 Profibus slots

...Slot 8

Index	Description	Object type	Data type	Bytes	Access	Value
216	Sensor 1 4-electrode conductivity: PV Calibration slope	Simple	Float	4	R/W	20 to 500 %
217	Sensor 1 4-electrode conductivity: PV Calibration offset	Simple	Float	4	R/W	-20 to +20 $\mu\text{S}/\text{cm}$
218	Sensor 1 4-electrode conductivity: Temperature Calibration slope	Simple	Float	4	R/W	20 to 150 %
219	Sensor 1 4-electrode conductivity: Temperature Calibration offset	Simple	Float	4	R/W	-40 to +40 °C -72 to + 72 °F
220	Sensor 2 4-electrode conductivity: PV Calibration slope	Simple	Float	4	R/W	20 to 500 %
221	Sensor 2 4-electrode conductivity: PV Calibration offset	Simple	Float	4	R/W	-20 to +20 $\mu\text{S}/\text{cm}$
222	Sensor 2 4-electrode conductivity: Temperature Calibration slope	Simple	Float	4	R/W	20 to 150 %
223	Sensor 2 4-electrode conductivity: Temperature Calibration offset	Simple	Float	4	R/W	-40 to +40 °C -72 to + 72 °F
224	User defined pH buffer 1	Temperature X0	Simple	Float	4	R/W
225		Temperature X1	Simple	Float	4	R/W
226		Temperature X2	Simple	Float	4	R/W
227		Temperature X3	Simple	Float	4	R/W
228		Temperature X4	Simple	Float	4	R/W
229	User defined pH buffer 1	pH Y0	Simple	Float	4	R/W
230		pH Y1	Simple	Float	4	R/W
231		pH Y2	Simple	Float	4	R/W
232		pH Y3	Simple	Float	4	R/W
233		pH Y4	Simple	Float	4	R/W
234	User defined pH buffer 2	Temperature X0	Simple	Float	4	R/W
235		Temperature X1	Simple	Float	4	R/W
236		Temperature X2	Simple	Float	4	R/W
237		Temperature X3	Simple	Float	4	R/W
238		Temperature X4	Simple	Float	4	R/W
239	User defined pH buffer 2	pH Y0	Simple	Float	4	R/W
240		pH Y1	Simple	Float	4	R/W
241		pH Y2	Simple	Float	4	R/W
242		pH Y3	Simple	Float	4	R/W
243		pH Y4	Simple	Float	4	R/W

Slot 9

Index	Description	Object type	Data type	Bytes	Access	Values
0	Transmitter diagnostics mask	Simple	Unsigned 32	4	R/W	
1	Sensor 1 pH: diagnostics mask	Simple	Unsigned 32	4	R/W	
2	Sensor 2 pH: diagnostics mask	Simple	Unsigned 32	4	R/W	
3	Sensor 1 2-electrode conductivity: diagnostics mask	Simple	Unsigned 32	4	R/W	
4	Sensor 2 2-electrode conductivity: diagnostics mask	Simple	Unsigned 32	4	R/W	
5	Sensor 1 4-electrode conductivity: diagnostics mask	Simple	Unsigned 32	4	R/W	See Diagnostic bit allocation, page 44
6	Sensor 2 4-electrode conductivity: diagnostics mask	Simple	Unsigned 32	4	R/W	
7	Sensor 1 RDO: diagnostics mask	Simple	Unsigned 32	4	R/W	
8	Sensor 2 RDO: diagnostics mask	Simple	Unsigned 32	4	R/W	
9	Sensor 1 TSS: diagnostics mask	Simple	Unsigned 32	4	R/W	
10	Sensor 2 TSS: diagnostics mask	Simple	Unsigned 32	4	R/W	
11-19	Reserved					
20	Transmitter diagnostics simulation	Simple	Unsigned 32	4	R/W	
21	Sensor 1 pH: diagnostics simulation	Simple	Unsigned 32	4	R/W	
22	Sensor 2 pH: diagnostics simulation	Simple	Unsigned 32	4	R/W	
23	Sensor 1 2-electrode conductivity: diagnostics simulation	Simple	Unsigned 32	4	R/W	See Diagnostic bit allocation, page 44
24	Sensor 2 2-electrode conductivity: diagnostics simulation	Simple	Unsigned 32	4	R/W	
25	Sensor 1 4-electrode conductivity: diagnostics simulation	Simple	Unsigned 32	4	R/W	
26	Sensor 2 4-electrode conductivity: diagnostics simulation	Simple	Unsigned 32	4	R/W	
27	Sensor 1 RDO: diagnostics simulation	Simple	Unsigned 32	4	R/W	
28	Sensor 2 RDO: diagnostics simulation	Simple	Unsigned 32	4	R/W	
29	Sensor 1 TSS: diagnostics simulation	Simple	Unsigned 32	4	R/W	
30	Sensor 2 TSS: diagnostics simulation	Simple	Unsigned 32	4	R/W	
31-39	Reserved					
40	Time & Date	Simple	Unsigned 32	4	R/W	Number of seconds since 01/01/2000
41	Sensor 1 TSS: Next clean time & date	Simple	Unsigned 32	4	R/W	Number of seconds since 01/01/2000
42	Sensor 2 TSS: Next clean time & date	Simple	Unsigned 32	4	R/W	Number of seconds since 01/01/2000
43	Clean 1: Next clean time & date	Simple	Unsigned 32	4	R/W	Number of seconds since 01/01/2000
44	Clean 2: Next clean time & date	Simple	Unsigned 32	4	R/W	Number of seconds since 01/01/2000
45	Sensor 1: Turbidity: Next clean date and time	Simple	Unsigned 32	4	R/W	Number of seconds since 01/01/2000
46	Sensor 2: Turbidity: Next clean date and time	Simple	Unsigned 32	4	R/W	Number of seconds since 01/01/2000

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Slot 10

Index	Description	Object type	Data type	Bytes	Access	Unit value	Unit
0	Alarm 1: Time hysteresis	Simple	Unsigned 16	2	R/W	0 to 9999	s
1	Alarm 2: Time hysteresis	Simple	Unsigned 16	2	R/W		
2	Alarm 3: Time hysteresis	Simple	Unsigned 16	2	R/W		
3	Alarm 4: Time hysteresis	Simple	Unsigned 16	2	R/W		
4	Alarm 5: Time hysteresis	Simple	Unsigned 16	2	R/W		
5	Alarm 6: Time hysteresis	Simple	Unsigned 16	2	R/W		
6	Alarm 7: Time hysteresis	Simple	Unsigned 16	2	R/W		
7	Alarm 8: Time hysteresis	Simple	Unsigned 16	2	R/W		
8	Controller 1: Integral action time for direct or acid control	Simple	Unsigned 16	2	R/W	1 to 7200	s
9	Controller 2: Integral action time for reverse or base control	Simple	Unsigned 16	2	R/W		
10	Controller 1: Integral action time for direct or acid control	Simple	Unsigned 16	2	R/W		
11	Controller 2: Integral action time for reverse or base control	Simple	Unsigned 16	2	R/W		
12	S1 PV units	Simple	Unsigned 16	2	R/W	1001 1002 1105 1138 1157 1211 1212 1243 1281 1283	°C °F g/l mbar mmHg mA μA mV Ω-cm MΩ-cm
13	S1 SV units	Simple	Unsigned 16	2	R/W	1302 1342 1422 1423 1424 1425 1552	mS/cm %
14	Calculated value units	Simple	Unsigned 16	2	R/W	1553 1554 1558 1559 1563 1577 1997	mS/M μS/M mg/l μg/l ml/min ml/s (none)
15	S2 PV units	Simple	Unsigned 16	2	R/W	32768 32768 32768 32768 32772 32773 32774 32775	NTU FNU FTU FAU μg/Kg mg/Kg NM³/H BAR A
16	S2 SV units	Simple	Unsigned 16	2	R/W	32776 32777 32778 32779 32780	TDS % Sat PSU weeks days
17	Reserved						

Slot 11

Index	Description	Object type	Data type	Bytes	Access	Value
0	Alarm 1: Type	Simple	Unsigned 8	1	R/W	0 – Off 1 – High Process 2 – Low Process 3 – High Latch 4 – Low Latch
1	Alarm 1: Source	Simple	Unsigned 8	1	R/W	see Analog sources, page 45 0 – Off
2	Alarm 2: Type	Simple	Unsigned 8	1	R/W	1 – High Process 2 – Low Process 3 – High Latch 4 – Low Latch
3	Alarm 2: Source	Simple	Unsigned 8	1	R/W	see Analog sources, page 45 0 – Off
4	Alarm 3: Type	Simple	Unsigned 8	1	R/W	1 – High Process 2 – Low Process 3 – High Latch 4 – Low Latch
5	Alarm 3: Source	Simple	Unsigned 8	1	R/W	see Analog sources, page 45 0 – Off
6	Alarm 4: Type	Simple	Unsigned 8	1	R/W	1 – High Process 2 – Low Process 3 – High Latch 4 – Low Latch
7	Alarm 4: Source	Simple	Unsigned 8	1	R/W	see Analog sources, page 45 0 – Off
8	Alarm 5: Type	Simple	Unsigned 8	1	R/W	1 – High Process 2 – Low Process 3 – High Latch 4 – Low Latch
9	Alarm 5: Source	Simple	Unsigned 8	1	R/W	see Analog sources, page 45 0 – Off
10	Alarm 6: Type	Simple	Unsigned 8	1	R/W	1 – High Process 2 – Low Process 3 – High Latch 4 – Low Latch
11	Alarm 6: Source	Simple	Unsigned 8	1	R/W	see Analog sources, page 45 0 – Off
12	Alarm 7: Type	Simple	Unsigned 8	1	R/W	1 – High Process 2 – Low Process 3 – High Latch 4 – Low Latch
13	Alarm 7: Source	Simple	Unsigned 8	1	R/W	see Analog sources, page 45 0 – Off
14	Alarm 8: Type	Simple	Unsigned 8	1	R/W	1 – High Process 2 – Low Process 3 – High Latch 4 – Low Latch
15	Alarm 8: Source	Simple	Unsigned 8	1	R/W	see Analog sources, page 45
16	Relay 1: Source	Simple	Unsigned 8	1	R/W	see Digital sources, page 45
17	Relay 1: Polarity	Simple	Unsigned 8	1	R/W	0 – Inverted 1 – Not inverted
18	Relay 2: Source	Simple	Unsigned 8	1	R/W	see Digital sources, page 45
19	Relay 2: Polarity	Simple	Unsigned 8	1	R/W	0 – Inverted 1 – Not inverted
20	Relay 3: Source	Simple	Unsigned 8	1	R/W	see Digital sources, page 45

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Index	Description	Object type	Data type	Bytes	Access	Value
21	Relay 3: Polarity	Simple	Unsigned 8	1	R/W	0 – Inverted 1 – Not inverted
22	Relay 4: Source	Simple	Unsigned 8	1	R/W	see Digital sources, page 45
23	Relay 4: Polarity	Simple	Unsigned 8	1	R/W	0 – Inverted 1 – Not inverted
24	Analog output 1: Source	Simple	Unsigned 8	1	R/W	see Analog sources, page 45
25	Analog output 1: Type	Simple	Unsigned 8	1	R/W	0 – Linear 1 – Log (2 decades) 2 – Log (3 decades) 3 – Log (4 decades)
26	Analog output 1: Output failure enable	Simple	Unsigned 8	1	R/W	0 – Disabled 1 – Enabled
27	Analog output 2: Source	Simple	Unsigned 8	1	R/W	see Analog sources, page 45
28	Analog output 2: Type	Simple	Unsigned 8	1	R/W	0 – Linear 1 – Log (2 decades) 2 – Log (3 decades) 3 – Log (4 decades)
29	Analog output 2: Output failure enable	Simple	Unsigned 8	1	R/W	0 – Disabled 1 – Enabled
30	Digital I/O: Type	Simple	Unsigned 8	1	R/W	0 – Off 1 – Digital Input 2 – Digital Output
31	Digital Input function	Simple	Unsigned 8	1	R/W	0 – None 34 – S1 Hold 35 – S2 Hold 36 – Start clean 1 37 – Start clean 2
	Digital output source	Simple	Unsigned 8	1	R/W	see Digital sources, page 45
32	Digital I/O: polarity	Simple	Unsigned 8	1	R/W	0 – Inverted 1 – Not inverted
33	Diagnostics view enable	Simple	Unsigned 8	1	R/W	
34	Signals view enable	Simple	Unsigned 8	1	R/W	
35	Analog output view enable	Simple	Unsigned 8	1	R/W	
36	Alarm view enable	Simple	Unsigned 8	1	R/W	
37	Chart view enable	Simple	Unsigned 8	1	R/W	0 – Disabled 1 – Enabled
38	Calibration log enable	Simple	Unsigned 8	1	R/W	
39	Diagnostics log enable	Simple	Unsigned 8	1	R/W	
40	Audit log enable	Simple	Unsigned 8	1	R/W	
41	Alarm log enable	Simple	Unsigned 8	1	R/W	

Index	Description	Object type	Data type	Bytes	Access	Value
42	Controllers 1 & 2: Operator control enable	Simple	Unsigned 8	1	R/W	0 – Disabled 1 – Enabled
43	Controller 1: Control action	Simple	Unsigned 8	1	R/W	0 – Off 1 – Direct acting 2 – Reverse acting 3 – Dual (Acid & Base)
44	Controller 1: Control mode	Simple	Unsigned 8	1	R/W	0 – Automatic 1 – Manual
45	Controller 1: Power recovery mode	Simple	Unsigned 8	1	R/W	0 – Automatic 1 – Manual (default output) 2 – Last
46	Controller 1: Process variable failure action	Simple	Unsigned 8	1	R/W	0 – None 1 – Hold 2 – Manual (default output)
47	Controller 1: Control type for direct or acid control	Simple	Unsigned 8	1	R/W	0 – Proportional only 1 – Proportional + Integral 2 – Proportional + Integral + Derivative 3 – Proportional + Derivative
48	Controller 1: Output type for direct or acid control	Simple	Unsigned 8	1	R/W	0 – Analog 1 – Time proportioning 2 – Pulse frequency
49	Controller 1: Output pulse frequency for direct or acid control	Simple	Unsigned 8	1	R/W	1 to 120 pulses/min
50	Controller 1: Control type for reverse or base control	Simple	Unsigned 8	1	R/W	0 – Proportional only 1 – Proportional + Integral 2 – Proportional + Integral + Derivative 3 – Proportional + Derivative
51	Controller 1: Output type for reverse or base control	Simple	Unsigned 8	1	R/W	0 – Analog 1 – Time proportioning 2 – Pulse frequency
52	Controller 1: Output pulse frequency for reverse or base control	Simple	Unsigned 8	1	R/W	1 to 120 pulses/min
53	Controller 2: Control action	Simple	Unsigned 8	1	R/W	0 – Off 1 – Direct acting 2 – Reverse acting 3 – Dual (Acid & Base)
54	Controller 2: Control mode	Simple	Unsigned 8	1	R/W	0 – Automatic 1 – Manual
55	Controller 2: Power recovery mode	Simple	Unsigned 8	1	R/W	0 – Automatic 1 – Manual (default output) 2 – Last
56	Controller 2: Process variable failure action	Simple	Unsigned 8	1	R/W	0 – None 1 – Hold 2 – Manual (default output)
57	Controller 2: Control type for direct or acid control	Simple	Unsigned 8	1	R/W	0 – Proportional only 1 – Proportional + Integral 2 – Proportional + Integral + Derivative 3 – Proportional + Derivative
58	Controller 2: Output type for direct or acid control	Simple	Unsigned 8	1	R/W	0 – Analog 1 – Time proportioning 2 – Pulse frequency

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Index	Description	Object type	Data type	Bytes	Access	Value
59	Controller 2: Output pulse frequency for direct or acid control	Simple	Unsigned 8	1	R/W	1 to 120 pulses/min
60	Controller 2: Control type for reverse or base control	Simple	Unsigned 8	1	R/W	0 – Proportional only 1 – Proportional + Integral 2 – Proportional + Integral + Derivative 3 – Proportional + Derivative
61	Controller 2: Output type for reverse or base control	Simple	Unsigned 8	1	R/W	0 – Analog 1 – Time proportioning 2 – Pulse frequency
62	Controller 2: Output pulse frequency for reverse or base control	Simple	Unsigned 8	1	R/W	1 to 120 pulses/min
63	Media card datalogging enable	Simple	Unsigned 8	1	R/W	0 – Disabled 1 – Enabled
64	Media card datalogging: Channel 1: Source	Simple	Unsigned 8	1	R/W	
65	Media card datalogging: Channel 2: Source	Simple	Unsigned 8	1	R/W	
66	Media card datalogging: Channel 3: Source	Simple	Unsigned 8	1	R/W	
67	Media card datalogging: Channel 4: Source	Simple	Unsigned 8	1	R/W	
68	Media card datalogging: Channel 5: Source	Simple	Unsigned 8	1	R/W	
69	Media card datalogging: Channel 6: Source	Simple	Unsigned 8	1	R/W	
70	Media card datalogging sample time	Simple	Unsigned 8	1	R/W	0 – 5 seconds 1 – 10 seconds 2 – 30 seconds 3 – 1 minute 4 – 5 minutes 5 – 10 minutes 6 – 30 minutes 7 – 1 hour
71 – 72	Reserved					
73	Clean 1: Sensor to clean	Simple	Unsigned 8	1	R/W	0 – Sensor 1 1 – Sensor 2
74	Clean 1: Clean frequency	Simple	Unsigned 8	1	R/W	0 – Off 1 – 15 minutes 2 – 30 minutes 3 – 45 minutes 4 to 27 – 1 hour to 24 hours
75	Clean 1: Clean type	Simple	Unsigned 8	1	R/W	0 – Continuous 1 – Pulsed
76	Clean 1: On time	Simple	Unsigned 8	1	R/W	1 to 60 minutes
77	Clean 1: Off time	Simple	Unsigned 8	1	R/W	1 to 60 minutes
78	Clean 1: Number of pulses	Simple	Unsigned 8	1	R/W	0 – 1 pulse ↓ 9 – 10 pulses
79	Clean 1: Recovery time	Simple	Unsigned 8	1	R/W	0 – 1 minute ↓ 9 – 10 minutes
80	Clean 2: Sensor to clean	Simple	Unsigned 8	1	R/W	0 – Sensor 1 1 – Sensor 2
81	Clean 2: Clean frequency	Simple	Unsigned 8	1	R/W	0 – Off 1 – 15 minutes 2 – 30 minutes 3 – 45 minutes 4 to 27 – 1 hour to 24 hours

Index	Description	Object type	Data type	Bytes	Access	Value
82	Clean 2: Clean type	Simple	Unsigned 8	1	R/W	0 – Continuous 1 – Pulsed
83	Clean 2: On time	Simple	Unsigned 8	1	R/W	1 to 60 minutes
84	Clean 2: Off time	Simple	Unsigned 8	1	R/W	1 to 60 minutes
85	Clean 2: Number of pulses	Simple	Unsigned 8	1	R/W	0 – 1 pulse ↓ 9 – 10 pulses
86	Clean 2: Recovery time	Simple	Unsigned 8	1	R/W	0 – 1 minute ↓ 9 – 10 minutes
87	Sensor 1: Hold Outputs	Simple	Unsigned 8	1	R/W	0 – Inactive 1 – Active
88	Sensor 2: Hold Outputs	Simple	Unsigned 8	1	R/W	0 – Inactive 1 – Active
89	Date format	Simple	Unsigned 8	1	R/W	0 – DD/MM/YYYY 1 – MM/DD/YYYY 2 – YYYY/MM/DD
90	Daylight saving enable/region	Simple	Unsigned 8	1	R/W	0 – Disabled 1 – Europe 2 – North America 3 – Custom
91	Custom daylight saving Start of daylight saving period – hour	Simple	Unsigned 8	1	R/W	0 to 23
92	Custom daylight saving Start of daylight saving period – day of week	Simple	Unsigned 8	1	R/W	0 – Sunday ↓ 6 – Saturday
93	Custom daylight saving Start of daylight saving period – day	Simple	Unsigned 8	1	R/W	0 – First 1 – Second 2 – Third 3 – Last
94	Custom daylight saving Start of daylight saving period – month	Simple	Unsigned 8	1	R/W	1 – January ↓ 12 – December
95	Custom daylight saving End of daylight saving period – hour	Simple	Unsigned 8	1	R/W	0 to 23
96	Custom daylight saving End of daylight saving period – day of week	Simple	Unsigned 8	1	R/W	0 – Sunday ↓ 6 – Saturday
97	Custom daylight saving End of daylight saving period – day	Simple	Unsigned 8	1	R/W	0 – First 1 – Second 2 – Third 3 – Last
98	Custom daylight saving End of daylight saving period – month	Simple	Unsigned 8	1	R/W	1 – January ↓ 12 – December
99	Temperature units	Simple	Unsigned 8	1	R/W	13 – °C 14 – °F
100	RDO salinity correction units	Simple	Unsigned 8	1	R/W	30 – PSU 31 – ppt
101	RDO Pressure correction units	Simple	Unsigned 8	1	R/W	32 – millibars 33 mmHg

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Index	Description	Object type	Data type	Bytes	Access	Value
102	Calculated value: Calculation type	Simple	Unsigned 8	1	R/W	0 – None 1 – Inferred pH (NaOH) 2 – Inferred pH (NaOH + NaCl) 3 – Inferred pH (NH ₃) 4 – Inferred pH (NH ₃ + NaCl) 5 – Difference 6 – Ratio 7 – % Passage 8 – % Rejection
103	Calculated value: Signal arrangement	Simple	Unsigned 8	1	R/W	0 – A = S1, B = S2 1 – A = S2, B = S1
104	Sensor 1 pH: Filter type	Simple	Unsigned 8	1	R/W	0 – Off 1 – Low 2 – Medium 3 – High
105	Sensor 1 pH: Temperature compensation type	Simple	Unsigned 8	1	R/W	0 – Manual 1 – Automatic 2 – Automatic solution
106	Sensor 1 pH: Reference positioning diagnostic enable	Simple	Unsigned 8	1	R/W	0 – Disabled 1 – Enabled
107	Sensor 1 pH: Out of solution diagnostic enable	Simple	Unsigned 8	1	R/W	0 – Disabled 1 – Enabled
108	Sensor 1 pH: Broken glass diagnostic enable	Simple	Unsigned 8	1	R/W	0 – Disabled 1 – Enabled
109	Sensor 1 pH: Reference failure diagnostic enable	Simple	Unsigned 8	1	R/W	0 – Disabled 1 – Enabled
110	Sensor 1 pH: Electrode type	Simple	Unsigned 8	1	R/W	0 – pH 1 – REDOX/ORP
111	Sensor 1 2-electrode conductivity: Filter type	Simple	Unsigned 8	1	R/W	0 – Off 1 – Low 2 – Medium 3 – High
112	Sensor 1 2-electrode conductivity: Conductivity units	Simple	Unsigned 8	1	R/W	1 – $\mu\text{S}/\text{cm}$ 2 – mS/cm
113	Sensor 1 2-electrode conductivity: Concentration units	Simple	Unsigned 8	1	R/W	0 – None 5 – ppm 6 – mg/l 7 – ppb 8 – $\mu\text{g}/\text{l}$ 25 – % 254 – Custom
114	Sensor 1 2-electrode conductivity: Temperature compensation type	Simple	Unsigned 8	1	R/W	0 – Manual 1 – Automatic 2 – None
115	Sensor 1 2-electrode conductivity: Temperature compensation curve type	Simple	Unsigned 8	1	R/W	0 – TC Coefficient 1 – Standard KCl 2 – UPW (low TC) 3 – UPW (high TC) 9 – Pure H ₂ O (Neutral) 10 – Pure H ₂ O (Acid) 11 – Pure H ₂ O (Base) 12 – NaOH 13 – HCl 14 – NaCl 15 – NH ₃ 17 – User-defined

Index	Description	Object type	Data type	Bytes	Access	Value
116	Sensor 1 2-electrode conductivity: Polarization diagnostic enable	Simple	Unsigned 8	1	R/W	0 – Disabled 1 – Enabled
117	Sensor 1 2-electrode conductivity: Out of solution diagnostic enable	Simple	Unsigned 8	1	R/W	0 – Disabled 1 – Enabled
118	Sensor 1 2-electrode conductivity: Measurement type	Simple	Unsigned 8	1	R/W	0 – Conductivity 1 – Concentration 2 – Resistivity
119	Sensor 1 4-electrode conductivity: Filter type	Simple	Unsigned 8	1	R/W	0 – Off 1 – Low 2 – Medium 3 – High
120	Sensor 1 4-electrode conductivity: Measurement type	Simple	Unsigned 8	1	R/W	0 – Conductivity 1 – Concentration
121	Sensor 1 4-electrode conductivity: Conductivity units	Simple	Unsigned 8	1	R/W	1 – $\mu\text{S}/\text{cm}$ 2 – mS/cm
122	Sensor 1 4-electrode conductivity: Concentration solution	Simple	Unsigned 8	1	R/W	0 – NaOH 1 – HCl 2 – H_2SO_4 3 – H_3PO_4 4 – NaCl 5 – Custom 10 – KOH
123	Sensor 1 4-electrode conductivity: Concentration units	Simple	Unsigned 8	1	R/W	0 – None 5 – ppm 6 – mg/l 7 – ppb 8 – $\mu\text{g/l}$ 25 – % 254 – Custom
124	Sensor 1 4-electrode conductivity: Temperature compensation type	Simple	Unsigned 8	1	R/W	0 – Manual 1 – Automatic 2 – None
125	Sensor 1 4-electrode conductivity: Automatic temperature compensation option	Simple	Unsigned 8	1	R/W	0 – TC Coefficient 1 – Standard KCl 4 – NaOH 5 – NaCl 6 – HCl 7 – H_2SO_4 8 – H_3PO_4 16 – KOH 17 – User-defined
126	Sensor 1 4-electrode conductivity: Dirty sensor diagnostic enable	Simple	Unsigned 8	1	R/W	0 – Disabled 1 – Enabled
127	Sensor 1 4-electrode conductivity: Out of solution diagnostic enable	Simple	Unsigned 8	1	R/W	0 – Disabled 1 – Enabled
128	Sensor 1 4-electrode conductivity: Sensor group	Simple	Unsigned 8	1	R/W	0 – Group A 1 – Group B
129	Sensor 1 RDO: Filter type	Simple	Unsigned 8	1	R/W	0 – Off 1 – Low 2 – Medium 3 – High
130	Sensor 1 RDO: Measurement type	Simple	Unsigned 8	1	R/W	0 – Concentration 1 – % saturation
131	Sensor 1 RDO: Process variable signal resolution	Simple	Unsigned 8	1	R/W	0 – Normal 1 – High
132	Sensor 1 TSS: Filter type	Simple	Unsigned 8	1	R/W	0 – Off 1 – Low 2 – Medium 3 – High
133	Sensor 1 TSS: Measurement type	Simple	Unsigned 8	1	R/W	0 – Turbidity 1 – Suspended solids

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Index	Description	Object type	Data type	Bytes	Access	Value
134	Sensor 1 TSS: Turbidity units	Simple	Unsigned 8	1	R/W	1 – NTU 2 – FNU
135	Sensor 1 TSS: Suspended solids units	Simple	Unsigned 8	1	R/W	5 – ppm 6 – mg/l
136	Reserved					
137	Sensor 1 TSS: Clean frequency	Simple	Unsigned 8	1	R/W	0 – Off 1 – 10 seconds 2 – 1 minute 3 – 5 minutes 4 – 15 minutes 5 – 30 minutes 6 – 45 minutes 7 – 1 hour ↓ 30 – 24 hours
138	Sensor 1 TSS: Range switching	Simple	Unsigned 8	1	R/W	0 – Automatic 1 – High 2 – Low
139	Sensor 2 pH: Filter type	Simple	Unsigned 8	1	R/W	0 – Off 1 – Low 2 – Medium 3 – High
140	Sensor 2 pH: Temperature compensation type	Simple	Unsigned 8	1	R/W	0 – Manual 1 – Automatic 2 – Automatic solution
141	Sensor 2 pH: Reference positioning diagnostic enable	Simple	Unsigned 8	1	R/W	0 – Disabled 1 – Enabled
142	Sensor 2 pH: Out of solution diagnostic enable	Simple	Unsigned 8	1	R/W	0 – Disabled 1 – Enabled
143	Sensor 2 pH: Broken glass diagnostic enable	Simple	Unsigned 8	1	R/W	0 – Disabled 1 – Enabled
144	Sensor 2 pH: Reference failure diagnostic enable	Simple	Unsigned 8	1	R/W	0 – Disabled 1 – Enabled
145	Sensor 2 pH: Electrode type	Simple	Unsigned 8	1	R/W	0 – pH 1 – REDOX/ORP
146	Sensor 2 2-electrode conductivity: Filter type	Simple	Unsigned 8	1	R/W	0 – Off 1 – Low 2 – Medium 3 – High
147	Sensor 2 2-electrode conductivity: Conductivity units	Simple	Unsigned 8	1	R/W	1 – $\mu\text{S}/\text{cm}$ 2 – mS/cm
148	Sensor 2 2-electrode conductivity: Concentration units	Simple	Unsigned 8	1	R/W	0 – None 5 – ppm 6 – mg/l 7 – ppb 8 – $\mu\text{g}/\text{l}$ 25 – % 255 – Custom
149	Sensor 2 2-electrode conductivity: Temperature compensation type	Simple	Unsigned 8	1	R/W	0 – Manual 1 – Automatic 2 – None

Index	Description	Object type	Data type	Bytes	Access	Value
150	Sensor 2 2-electrode conductivity: Temperature compensation curve type	Simple	Unsigned 8	1	R/W	0 – TC Coefficient 1 – Standard KCl 2 – UPW (low TC) 3 – UPW (high TC) 9 – Pure H ₂ O (Neutral) 10 – Pure H ₂ O (Acid) 11 – Pure H ₂ O (Base) 12 – NaOH 13 – HCl 14 – NaCl 15 – NH ₃ 17 – User-defined
151	Sensor 2 2-electrode conductivity: Polarization diagnostic enable	Simple	Unsigned 8	1	R/W	0 – Disabled 1 – Enabled
152	Sensor 2 2-electrode conductivity: Out of solution diagnostic enable	Simple	Unsigned 8	1	R/W	0 – Disabled 1 – Enabled
153	Sensor 2 2-electrode conductivity: Measurement type	Simple	Unsigned 8	1	R/W	0 – Conductivity 1 – Concentration 2 – Resistivity
154	Sensor 2 4-electrode conductivity: Filter type	Simple	Unsigned 8	1	R/W	0 – Off 1 – Low 2 – Medium 3 – High
155	Sensor 2 4-electrode conductivity: Measurement type	Simple	Unsigned 8	1	R/W	0 – Conductivity 1 – Concentration
156	Sensor 2 4-electrode conductivity: Conductivity units	Simple	Unsigned 8	1	R/W	1 – μS/cm 2 – mS/cm
157	Sensor 2 4-electrode conductivity: Concentration solution	Simple	Unsigned 8	1	R/W	0 – NaOH 1 – HCl 2 – H ₂ SO ₄ 3 – H ₃ PO ₄ 4 – NaCl 5 – Custom 10 – KOH
158	Sensor 2 4-electrode conductivity: Concentration units	Simple	Unsigned 8	1	R/W	0 – None 5 – ppm 6 – mg/l 7 – ppb 8 – μg/l 25 – % 255 – Custom
159	Sensor 2 4-electrode conductivity: Temperature compensation type	Simple	Unsigned 8	1	R/W	0 – Manual 1 – Automatic 2 – None
160	Sensor 2 4-electrode conductivity: Automatic temperature compensation option	Simple	Unsigned 8	1	R/W	0 – TC Coefficient 1 – Standard KCl 4 – NaOH 5 – NaCl 6 – HCl 7 – H ₂ SO ₄ 8 – H ₃ PO ₄ 16 – KOH 17 – User-defined
161	Sensor 2 4-electrode conductivity: Dirty sensor diagnostic enable	Simple	Unsigned 8	1	R/W	0 – Disabled 1 – Enabled
162	Sensor 2 4-electrode conductivity: Out of solution diagnostic enable	Simple	Unsigned 8	1	R/W	0 – Disabled 1 – Enabled
163	Sensor 2 4-electrode conductivity: Sensor group	Simple	Unsigned 8	1	R/W	0 – Group A 1 – Group B

...6 Profibus slots

...Slot 11

Index	Description	Object type	Data type	Bytes	Access	Value
164	Sensor 2 RDO: Filter type	Simple	Unsigned 8	1	R/W	0 – Off 1 – Low 2 – Medium 3 – High
165	Sensor 2 RDO: Measurement type	Simple	Unsigned 8	1	R/W	0 – Concentration 1 – % saturation
166	Sensor 2 RDO: Process variable signal resolution	Simple	Unsigned 8	1	R/W	0 – Normal 1 – High
167	Sensor 2 TSS: Filter type	Simple	Unsigned 8	1	R/W	0 – Off 1 – Low 2 – Medium 3 – High
168	Sensor 2 TSS: Measurement type	Simple	Unsigned 8	1	R/W	0 – Turbidity 1 – Suspended solids
169	Sensor 2 TSS: Turbidity units	Simple	Unsigned 8	1	R/W	1 – NTU 2 – FNU
170	Sensor 2 TSS: Suspended solids units	Simple	Unsigned 8	1	R/W	5 – ppm 6 – mg/l
171	Reserved					0 – Off 1 – 10 seconds 2 – 1 minute 3 – 5 minutes 4 – 15 minutes 5 – 30 minutes 6 – 45 minutes 7 – 1 hour ↓ 30 – 24 hours
172	Sensor 2 TSS: Clean frequency	Simple	Unsigned 8	1	R/W	0 – Automatic 1 – High 2 – Low
173	Sensor 2 TSS: Range switching	Simple	Unsigned 8	1	R/W	See: Log data register allocation, page 48 0 – None 1 – Alarm log 2 – Audit log 3 – Calibration log (Sensor 1) 4 – Calibration log (Sensor 2) 5 – Diagnostic log
174	Log access: Log ID	Simple	Unsigned 8	1	R/W	See: Log data register allocation, page 48 0 – Page 1 (entries 1 – 6) ↓ 8 – Page 9 (entries 49 – 54)
175	Log access: Page ID	Simple	Unsigned 8	1	R/W	0 – English 1 – German 2 – French 3 – Spanish 4 – Italian
176	Language	Simple	Unsigned 8	1	R/W	0 – Disabled 1 – Enabled
177	Sensor 1 pH: Reference blocked diagnostic enable	Simple	Unsigned 8	1	R/W	0 – Disabled 1 – Enabled
178	Sensor 2 pH: Reference blocked diagnostic enable	Simple	Unsigned 8	1	R/W	0 – Disabled 1 – Enabled
179	Sensor 1 RDO: Concentration units	Simple	Unsigned 8	1	R/W	5 – ppm 6 – mg/l
180	Sensor 2 RDO: Concentration units	Simple	Unsigned 8	1	R/W	5 – ppm 6 – mg/l
181	Write protection	Simple	Unsigned 8	1	R/W	0 – Disabled 1 – Enabled

Index	Description	Object type	Data type	Bytes	Access	Value
182	Chart view: chart duration	Simple	Unsigned 8	1	R/W	15 – 1 hour 30 – 2 hours 60 – 4 hours 120 – 8 hours 180 – 12 hours 240 – 16 hours 254 – 20 hours 255 – 24 hours
183	HART Current output failure current	Simple	Unsigned 8	1	R/W	0 – High (22mA) 1 – Low (3.6mA)
184	Analog output 3: Source	Simple	Unsigned 8	1	R/W	see Analog sources, page 45
185	Analog output 3: Type	Simple	Unsigned 8	1	R/W	0 – Linear 1 – Log (2 decades) 2 – Log (3 decades) 3 – Log (4 decades)
186	Analog output 3: Output failure enable	Simple	Unsigned 8	1	R/W	0 – Disabled 1 – Enabled
187	Analog output 4: Source	Simple	Unsigned 8	1	R/W	see Analog sources, page 45
188	Analog output 4: Type	Simple	Unsigned 8	1	R/W	0 – Linear 1 – Log (2 decades) 2 – Log (3 decades) 3 – Log (4 decades)
189	Analog output 4: Output failure enable	Simple	Unsigned 8	1	R/W	0 – Disabled 1 – Enabled
190	Controller 1: Setpoint units	Simple	Unsigned 8	1	R/W	0 – None 1 – NTU 2 – FNU 5 – ppm 6 – mg/l 7 – ppb 8 – µg/l 15 – µS/cm 17 – mS/cm 22 – pH 23 – mV 25 – % 36 – g/l 37 – ppt 38 – MΩ-cm 254 – Custom
191	Controller 2: Setpoint units	Simple	Unsigned 8	1	R/W	0 – None 1 – NTU 2 – FNU 5 – ppm 6 – mg/l 7 – ppb 8 – µg/l 15 – µS/cm 17 – mS/cm 22 – pH 23 – mV 25 – % 36 – g/l 37 – ppt 38 – MΩ-cm 255 – Custom

...6 Profibus slots

...Slot 11

Index	Description	Object type	Data type	Bytes	Access	Value
192	Bluetooth device enable	Simple	Unsigned 8	1	R/W	0 – Disabled 1 – Enabled
193	Sensor 1 TSS: Wiper Fitted	Simple	Unsigned 8	1	R/W	0 – Not fitted 1 – Fitted
194	Sensor 2 TSS: Wiper Fitted	Simple	Unsigned 8	1	R/W	0 – Not fitted 1 – Fitted
195	pH Buffer 1 type	Simple	Unsigned 8	1	R/W	0 – ABB Capsule 4.01pH AWR126B026EN 1 – ABB Capsule 7.00pH AWR126B027EN 2 – ABB Capsule 9.00pH 3KXA163000L0201 3 – ABB Capsule 10.00pH AWR126B028EN 4 – Technical 4.01pH AWR126B011EN 5 – Technical 7.00pH AWR126B013EN 6 – Technical 10.01pH AWR126B015EN 7 – DIN19266 1.679pH AWR126B017EN 8 – DIN19266 4.005pH AWR126B018EN 9 – DIN19266 6.865pH AWR126B019EN 10 – DIN19266 9.180pH AWR126B020EN 11 – DIN19266 10.012pH AWR126B021EN 12 – NIST 4.001pH AWR126B022EN 13 – NIST 6.881pH AWR126B023EN 14 – NIST 9.225pH AWR126B024EN 15 – NIST 10.062pH 3KXA163000L0202 16 – Phth. Free 4.00pH AWR126B025EN 17 – ABB Sachet 4.01pH 0400/110 18 – ABB Sachet 7.00pH 0400/120 19 – ABB Sachet 9.18pH 0400/130 20 – User-defined
196	pH Buffer 2 type	Simple	Unsigned 8	1	R/W	0 – ABB Capsule 4.01pH AWR126B026EN 1 – ABB Capsule 7.00pH AWR126B027EN 2 – ABB Capsule 9.00pH 3KXA163000L0201 3 – ABB Capsule 10.00pH AWR126B028EN 4 – Technical 4.01pH AWR126B011EN 5 – Technical 7.00pH AWR126B013EN 6 – Technical 10.01pH AWR126B015EN 7 – DIN19266 1.679pH AWR126B017EN 8 – DIN19266 4.005pH AWR126B018EN 9 – DIN19266 6.865pH AWR126B019EN 10 – DIN19266 9.180pH AWR126B020EN 11 – DIN19266 10.012pH AWR126B021EN 12 – NIST 4.001pH AWR126B022EN 13 – NIST 6.881pH AWR126B023EN 14 – NIST 9.225pH AWR126B024EN 15 – NIST 10.062pH 3KXA163000L0202 16 – Phth. Free 4.00pH AWR126B025EN 17 – ABB Sachet 4.01pH 0400/110 18 – ABB Sachet 7.00pH 0400/120 19 – ABB Sachet 9.18pH 0400/130 21 – User-defined
197	Hold outputs during calibration	Simple	Unsigned 8	1	R/W	0 – Disabled 1 – Enabled
198	Sensor 1: PV Unit	Simple	Unsigned 8	1	R/W	
199	Sensor 1: SV Unit	Simple	Unsigned 8	1	R/W	
200	Calculated Value: Unit	Simple	Unsigned 8	1	R/W	See Appendix C, Units table, page 45.
201	Sensor 2: PV Unit	Simple	Unsigned 8	1	R/W	
202	Sensor 2: SV Unit	Simple	Unsigned 8	1	R/W	
203	Reserved	Simple	Unsigned 8	1	R/W	
204	Reserved	Simple	Unsigned 8	1	R/W	

Index	Description	Object type	Data type	Bytes	Access	Value
205	Sensor 1: Turbidity: Sensor type	Simple	Unsigned8	1	R/W	0 – 7996/011 1 – 7996/012 6 – 7996/016
206	Sensor 2: Turbidity: Sensor Type	Simple	Unsigned8	1	R/W	0 – 7996/011 1 – 7996/012 6 – 7996/016
207	Sensor 1: Turbidity: Units	Simple	Unsigned8	1	R/W	0 – NTU 1 – FNU
208	Sensor 2: Turbidity: Units	Simple	Unsigned8	1	R/W	0 – NTU 1 – FNU
209	Sensor 1: Turbidity: Filter Type	Simple	Unsigned8	1	R/W	0 – None 1 – Low 2 – Medium 3 – High
210	Sensor 2: Turbidity: Filter Type	Simple	Unsigned8	1	R/W	0 – None 1 – Low 2 – Medium 3 – High
211	Sensor 1: Turbidity: Bubble Rejection	Simple	Unsigned8	1	R/W	0 – None 1 – Low 2 – Medium 3 – High
212	Sensor 2: Turbidity: Bubble Rejection	Simple	Unsigned8	1	R/W	0 – None 1 – Low 2 – Medium 3 – High
213	Sensor 1: Wiper Clean Frequency	Simple	Unsigned8	1	R/W	0 – Off 1 – 15 minutes 2 – 30 minutes 3 – 45 minutes 4 to 27 – 1 hour to 24 hours
214	Sensor 2: Wiper Clean Frequency	Simple	Unsigned8	1	R/W	0 – Off 1 – 15 minutes 2 – 30 minutes 3 – 45 minutes 4 to 27 – 1 hour to 24 hours

Slot 12

Index	Description	Object type	Data type	Bytes	Access	Values
0	Instrument tag	Array	Unsigned 8	16	R/W	
1	Sensor 1: Tag	Array	Unsigned 8	16	R/W	
2	Sensor 2: Tag	Array	Unsigned 8	16	R/W	
3	Alarm 1: Tag	Array	Unsigned 8	16	R/W	
4	Alarm 2: Tag	Array	Unsigned 8	16	R/W	
5	Alarm 3: Tag	Array	Unsigned 8	16	R/W	
6	Alarm 4: Tag	Array	Unsigned 8	16	R/W	
7	Alarm 5: Tag	Array	Unsigned 8	16	R/W	
8	Alarm 6: Tag	Array	Unsigned 8	16	R/W	
9	Alarm 7: Tag	Array	Unsigned 8	16	R/W	
10	Alarm 8: Tag	Array	Unsigned 8	16	R/W	
11	Chart tag – Trace 1	Array	Unsigned 8	3	R/W	
12	Chart Tag – Trace 2	Array	Unsigned 8	3	R/W	
13	Reserved					
14	Sensor 1: Custom Units String	Array	Unsigned 8	6	R/W	
15	Sensor 1: Custom Units String	Array	Unsigned 8	6	R/W	

Appendix A – Extended diagnostic bits

Slot/Index	Byte	Format	Description
4/3	0.0	Bit	Transmitter – S1 Communications Error
	0.1	Bit	Transmitter – S2 Communications Error
	0.2	Bit	Transmitter – Analog Output 1 Out of Range
	0.3	Bit	Transmitter – Analog Output 2 Out of Range
	0.4	Bit	Transmitter – Analog Output 3 Out of Range
	0.5	Bit	Transmitter – Analog Output 4 Out of Range
	0.6	Bit	Transmitter – SD Card Nearly Full
	0.7	Bit	Transmitter – SD Card Full
	1.0	Bit	Transmitter – Alarm Active
	1.1	Bit	Transmitter – Memory Write Error
	1.2	Bit	Transmitter – S1 Write Error
	1.3	Bit	Transmitter – S2 Write Error
	1.4	Bit	Transmitter – S1: PV Out of Range
	1.5	Bit	Transmitter – S2: PV Out of Range
	1.6	Bit	Transmitter – Simulation Active
	1.7	Bit	Transmitter – Inferred pH Invalid
	2.0	Bit	Transmitter – Before Cation Conductivity High
	2.1	Bit	Transmitter – After Cation Conductivity High
	2.2	Bit	Transmitter – Before Cation Conductivity Low
	2.3	Bit	Transmitter – Clean 1 in Progress
	2.4	Bit	Transmitter – Clean 2 in Progress
	2.5	Bit	Transmitter – Undefined
	2.6	Bit	Transmitter – Undefined
	2.7	Bit	Transmitter – Undefined
	3.0	Bit	Transmitter – Undefined
	3.1	Bit	Transmitter – Undefined
	3.2	Bit	Transmitter – Undefined
	3.3	Bit	Transmitter – Undefined
	3.4	Bit	Transmitter – Undefined
	3.5	Bit	Transmitter – Undefined
	3.6	Bit	Transmitter – Undefined
	3.7	Bit	Transmitter – Undefined
4/4	4.0	Bit	S1 pH – Undefined
	4.1	Bit	S1 pH – ADC failure
	4.2	Bit	S1 pH – Memory failure
	4.3	Bit	S1 pH – Undefined
	4.4	Bit	S1 pH – Broken glass
	4.5	Bit	S1 pH – Reference failure
	4.6	Bit	S1 pH – Temperature failure
	4.7	Bit	S1 pH – Undefined
	5.0	Bit	S1 pH – Cal Failed
	5.1	Bit	S1 pH – PV out of limits
	5.2	Bit	S1 pH – Undefined
	5.3	Bit	S1 pH – Undefined
	5.4	Bit	S1 pH – Process Temp Out of Range
	5.5	Bit	S1 pH – Undefined
	5.6	Bit	S1 pH – Undefined
	5.7	Bit	S1 pH – Ambient Temp Out of Range
	6.0	Bit	S1 pH – Undefined
	6.1	Bit	S1 pH – Undefined
	6.2	Bit	S1 pH – Undefined
	6.3	Bit	S1 pH – Ref. Blocked
	6.4	Bit	S1 pH – Reference Warning
	6.5	Bit	S1 pH – Low pH slope
	6.6	Bit	S1 pH – Out of solution
	6.7	Bit	S1 pH – Low Electrolyte
	7.0	Bit	S1 pH – Undefined
	7.1	Bit	S1 pH – Undefined
	7.2	Bit	S1 pH – Undefined
	7.3	Bit	S1 pH – Undefined
	7.4	Bit	S1 pH – Undefined
	7.5	Bit	S1 pH – Undefined
	7.6	Bit	S1 pH – Undefined
	7.7	Bit	S1 pH – Undefined

Slot/Index	Byte	Format	Description
4/5	8.0	Bit	S2 pH – Undefined
	8.1	Bit	S2 pH – ADC failure
	8.2	Bit	S2 pH – Memory failure
	8.3	Bit	S2 pH – Undefined
	8.4	Bit	S2 pH – Broken glass
	8.5	Bit	S2 pH – Reference failure
	8.6	Bit	S2 pH – Temperature failure
	8.7	Bit	S2 pH – Undefined
	9.0	Bit	S2 pH – Cal Failed
	9.1	Bit	S2 pH – PV out of limits
	9.2	Bit	S2 pH – Undefined
	9.3	Bit	S2 pH – Undefined
	9.4	Bit	S2 pH – Process Temp Out of Range
	9.5	Bit	S2 pH – Undefined
	9.6	Bit	S2 pH – Undefined
	9.7	Bit	S2 pH – Ambient Temp Out of Range
4/6	10.0	Bit	S2 pH – Undefined
	10.1	Bit	S2 pH – Undefined
	10.2	Bit	S2 pH – Undefined
	10.3	Bit	S2 pH – Ref. Blocked
	10.4	Bit	S2 pH – Reference Warning
	10.5	Bit	S2 pH – Low pH slope
	10.6	Bit	S2 pH – Out of solution
	10.7	Bit	S2 pH – Low Electrolyte
	11.0	Bit	S2 pH – Undefined
	11.1	Bit	S2 pH – Undefined
	11.2	Bit	S2 pH – Undefined
	11.3	Bit	S2 pH – Undefined
	11.4	Bit	S2 pH – Undefined
	11.5	Bit	S2 pH – Undefined
	11.6	Bit	S2 pH – Undefined
	11.7	Bit	S2 pH – Undefined
4/7	12.0	Bit	S1 2-electrode conductivity – PV Failure
	12.1	Bit	S1 2-electrode conductivity – ADC failure
	12.2	Bit	S1 2-electrode conductivity – Memory failure
	12.3	Bit	S1 2-electrode conductivity – Undefined
	12.4	Bit	S1 2-electrode conductivity – Polarization
	12.5	Bit	S1 2-electrode conductivity – Undefined
	12.6	Bit	S1 2-electrode conductivity – PT failure
	12.7	Bit	S1 2-electrode conductivity – Undefined
	13.0	Bit	S1 2-electrode conductivity – Cal Failed
	13.1	Bit	S1 2-electrode conductivity – PV out of limits
	13.2	Bit	S1 2-electrode conductivity – Undefined
	13.3	Bit	S1 2-electrode conductivity – Undefined
	13.4	Bit	S1 2-electrode conductivity – Process Temp Out of Range
	13.5	Bit	S1 2-electrode conductivity – Undefined
	13.6	Bit	S1 2-electrode conductivity – Undefined
	13.7	Bit	S1 2-electrode conductivity – Internal temp. out of range
4/8	14.0	Bit	S1 2-electrode conductivity – Undefined
	14.1	Bit	S1 2-electrode conductivity – Undefined
	14.2	Bit	S1 2-electrode conductivity – Undefined
	14.3	Bit	S1 2-electrode conductivity – Undefined
	14.4	Bit	S1 2-electrode conductivity – Undefined
	14.5	Bit	S1 2-electrode conductivity – Undefined
	14.6	Bit	S1 2-electrode conductivity – Out of solution
	14.7	Bit	S1 2-electrode conductivity – Undefined
	15.0	Bit	S1 2-electrode conductivity – Calibrating
	15.1	Bit	S1 2-electrode conductivity – Recovery
	15.2	Bit	S1 2-electrode conductivity – Undefined
	15.3	Bit	S1 2-electrode conductivity – Undefined
	15.4	Bit	S1 2-electrode conductivity – Undefined
	15.5	Bit	S1 2-electrode conductivity – Undefined
	15.6	Bit	S1 2-electrode conductivity – Undefined
	15.7	Bit	S1 2-electrode conductivity – Undefined

Slot/Index	Byte	Format	Description
	16.0	Bit	S2 2-electrode conductivity – PV Failure
	16.1	Bit	S2 2-electrode conductivity – ADC failure
	16.2	Bit	S2 2-electrode conductivity – Memory failure
	16.3	Bit	S2 2-electrode conductivity – Undefined
	16.4	Bit	S2 2-electrode conductivity – Polarization
	16.5	Bit	S2 2-electrode conductivity – Undefined
	16.6	Bit	S2 2-electrode conductivity – PT failure
	16.7	Bit	S2 2-electrode conductivity – Undefined
	17.0	Bit	S2 2-electrode conductivity – Cal Failed
	17.1	Bit	S2 2-electrode conductivity – PV out of limits
	17.2	Bit	S2 2-electrode conductivity – Undefined
	17.3	Bit	S2 2-electrode conductivity – Undefined
	17.4	Bit	S2 2-electrode conductivity – Process Temp Out of Range
	17.5	Bit	S2 2-electrode conductivity – Undefined
	17.6	Bit	S2 2-electrode conductivity – Undefined
4/7	17.7	Bit	S2 2-electrode conductivity – Internal temp. out of range
	18.0	Bit	S2 2-electrode conductivity – Undefined
	18.1	Bit	S2 2-electrode conductivity – Undefined
	18.2	Bit	S2 2-electrode conductivity – Undefined
	18.3	Bit	S2 2-electrode conductivity – Undefined
	18.4	Bit	S2 2-electrode conductivity – Undefined
	18.5	Bit	S2 2-electrode conductivity – Undefined
	18.6	Bit	S2 2-electrode conductivity – Out of solution
	18.7	Bit	S2 2-electrode conductivity – Undefined
	19.0	Bit	S2 2-electrode conductivity – Calibrating
	19.1	Bit	S2 2-electrode conductivity – Recovery
	19.2	Bit	S2 2-electrode conductivity – Undefined
	19.3	Bit	S2 2-electrode conductivity – Undefined
	19.4	Bit	S2 2-electrode conductivity – Undefined
	19.5	Bit	S2 2-electrode conductivity – Undefined
	19.6	Bit	S2 2-electrode conductivity – Undefined
	19.7	Bit	S2 2-electrode conductivity – Undefined
	20.0	Bit	S1 4-electrode conductivity – PV Failure
	20.1	Bit	S1 4-electrode conductivity – ADC Failure
	20.2	Bit	S1 4-electrode conductivity – Memory Failure
	20.3	Bit	S1 4-electrode conductivity – Undefined
	20.4	Bit	S1 4-electrode conductivity – Undefined
	20.5	Bit	S1 4-electrode conductivity – Undefined
	20.6	Bit	S1 4-electrode conductivity – PT failure
	20.7	Bit	S1 4-electrode conductivity – Undefined
	21.0	Bit	S1 4-electrode conductivity – Cal Failed
	21.1	Bit	S1 4-electrode conductivity – PV Out of Limits
	21.2	Bit	S1 4-electrode conductivity – Undefined
	21.3	Bit	S1 4-electrode conductivity – Undefined
	21.4	Bit	S1 4-electrode conductivity – Process Temp Out of Range
	21.5	Bit	S1 4-electrode conductivity – Undefined
	21.6	Bit	S1 4-electrode conductivity – Undefined
4/8	21.7	Bit	S1 4-electrode conductivity – Internal Temp Out of Range
	22.0	Bit	S1 4-electrode conductivity – Undefined
	22.1	Bit	S1 4-electrode conductivity – Undefined
	22.2	Bit	S1 4-electrode conductivity – Undefined
	22.3	Bit	S1 4-electrode conductivity – Undefined
	22.4	Bit	S1 4-electrode conductivity – Dirty Sensor
	22.5	Bit	S1 4-electrode conductivity – Undefined
	22.6	Bit	S1 4-electrode conductivity – Out of Solution
	22.7	Bit	S1 4-electrode conductivity – Undefined
	23.0	Bit	S1 4-electrode conductivity – Calibrating
	23.1	Bit	S1 4-electrode conductivity – Recovery
	23.2	Bit	S1 4-electrode conductivity – Undefined
	23.3	Bit	S1 4-electrode conductivity – Undefined
	23.4	Bit	S1 4-electrode conductivity – Undefined
	23.5	Bit	S1 4-electrode conductivity – Undefined
	23.6	Bit	S1 4-electrode conductivity – Undefined
	23.7	Bit	S1 4-electrode conductivity – Undefined

Slot/Index	Byte	Format	Description
	24.0	Bit	S2 4-electrode conductivity – PV Failure
	24.1	Bit	S2 4-electrode conductivity – ADC Failure
	24.2	Bit	S2 4-electrode conductivity – Memory Failure
	24.3	Bit	S2 4-electrode conductivity – Undefined
	24.4	Bit	S2 4-electrode conductivity – Undefined
	24.5	Bit	S2 4-electrode conductivity – Undefined
	24.6	Bit	S2 4-electrode conductivity – PT failure
	24.7	Bit	S2 4-electrode conductivity – Undefined
	25.0	Bit	S2 4-electrode conductivity – Cal Failed
	25.1	Bit	S2 4-electrode conductivity – PV Out of Limits
	25.2	Bit	S2 4-electrode conductivity – Undefined
	25.3	Bit	S2 4-electrode conductivity – Undefined
	25.4	Bit	S2 4-electrode conductivity – Process Temp Out of Range
	25.5	Bit	S2 4-electrode conductivity – Undefined
	25.6	Bit	S2 4-electrode conductivity – Undefined
4/9	25.7	Bit	S2 4-electrode conductivity – Internal Temp Out of Range
	26.0	Bit	S2 4-electrode conductivity – Undefined
	26.1	Bit	S2 4-electrode conductivity – Undefined
	26.2	Bit	S2 4-electrode conductivity – Undefined
	26.3	Bit	S2 4-electrode conductivity – Undefined
	26.4	Bit	S2 4-electrode conductivity – Dirty Sensor
	26.5	Bit	S2 4-electrode conductivity – Undefined
	26.6	Bit	S2 4-electrode conductivity – Out of Solution
	26.7	Bit	S2 4-electrode conductivity – Undefined
	27.0	Bit	S2 4-electrode conductivity – Calibrating
	27.1	Bit	S2 4-electrode conductivity – Recovery
	27.2	Bit	S2 4-electrode conductivity – Undefined
	27.3	Bit	S2 4-electrode conductivity – Undefined
	27.4	Bit	S2 4-electrode conductivity – Undefined
	27.5	Bit	S2 4-electrode conductivity – Undefined
	27.6	Bit	S2 4-electrode conductivity – Undefined
	27.7	Bit	S2 4-electrode conductivity – Undefined
	28.0	Bit	S1 RDO – Undefined
	28.1	Bit	S1 RDO – User Cal Expired
	28.2	Bit	S1 RDO – Factory Cal Expired
	28.3	Bit	S1 RDO – D.O Conc Meas Error
	28.4	Bit	S1 RDO – Sensor Warm-up
	28.5	Bit	S1 RDO – Sensor Warning
	28.6	Bit	S1 RDO – Calibrating
	28.7	Bit	S1 RDO – Internal Comms Error
	29.0	Bit	S1 RDO – %Sat Meas Error
	29.1	Bit	S1 RDO – Temp. Meas Error
	29.2	Bit	S1 RDO – Cap Expired
	29.3	Bit	S1 RDO – Replace Cap
	29.4	Bit	S1 RDO – Cap Removed
	29.5	Bit	S1 RDO – Cal Failed
	29.6	Bit	S1 RDO – Undefined
	29.7	Bit	S1 RDO – Undefined
4/10	30.0	Bit	S1 RDO – Undefined
	30.1	Bit	S1 RDO – Undefined
	30.2	Bit	S1 RDO – Undefined
	30.3	Bit	S1 RDO – Undefined
	30.4	Bit	S1 RDO – Undefined
	30.5	Bit	S1 RDO – Undefined
	30.6	Bit	S1 RDO – Undefined
	30.7	Bit	S1 RDO – Undefined
	31.0	Bit	S1 RDO – Undefined
	31.1	Bit	S1 RDO – Undefined
	31.2	Bit	S1 RDO – Undefined
	31.3	Bit	S1 RDO – Undefined
	31.4	Bit	S1 RDO – Undefined
	31.5	Bit	S1 RDO – Undefined
	31.6	Bit	S1 RDO – Undefined
	31.7	Bit	S1 RDO – Undefined

...Appendix A – Extended diagnostic bits

Slot/Index	Byte	Format	Description
4/11	32.0	Bit	S2 RDO – Undefined
	32.1	Bit	S2 RDO – User Cal Expired
	32.2	Bit	S2 RDO – Factory Cal Expired
	32.3	Bit	S2 RDO – D,O Conc Meas Error
	32.4	Bit	S2 RDO – Sensor Warm-up
	32.5	Bit	S2 RDO – Sensor Warning
	32.6	Bit	S2 RDO – Calibrating
	32.7	Bit	S2 RDO – Internal Comms Error
	33.0	Bit	S2 RDO – %Sat Meas Error
	33.1	Bit	S2 RDO – Temp. Meas Error
	33.2	Bit	S2 RDO – Cap Expired
	33.3	Bit	S2 RDO – Replace Cap
	33.4	Bit	S2 RDO – Cap Removed
	33.5	Bit	S2 RDO – Cal Failed
	33.6	Bit	S2 RDO – Undefined
	33.7	Bit	S2 RDO – Undefined
	34.0	Bit	S2 RDO – Undefined
	34.1	Bit	S2 RDO – Undefined
	34.2	Bit	S2 RDO – Undefined
	34.3	Bit	S2 RDO – Undefined
	34.4	Bit	S2 RDO – Undefined
	34.5	Bit	S2 RDO – Undefined
	34.6	Bit	S2 RDO – Undefined
	34.7	Bit	S2 RDO – Undefined
	35.0	Bit	S2 RDO – Undefined
	35.1	Bit	S2 RDO – Undefined
	35.2	Bit	S2 RDO – Undefined
	35.3	Bit	S2 RDO – Undefined
	35.4	Bit	S2 RDO – Undefined
	35.5	Bit	S2 RDO – Undefined
	35.6	Bit	S2 RDO – Undefined
	35.7	Bit	S2 RDO – Undefined
4/12	36.0	Bit	S1 TSS – PV Failure
	36.1	Bit	S1 TSS – ADC Failure
	36.2	Bit	S1 TSS – Memory Failure
	36.3	Bit	S1 TSS – Commission Error
	36.4	Bit	S1 TSS – Undefined
	36.5	Bit	S1 TSS – Undefined
	36.6	Bit	S1 TSS – Undefined
	36.7	Bit	S1 TSS – Undefined
	37.0	Bit	S1 TSS – Cal Failed
	37.1	Bit	S1 TSS – PV Out of Limits
	37.2	Bit	S1 TSS – Replace Wiper
	37.3	Bit	S1 TSS – Service Overdue
	37.4	Bit	S1 TSS – Process Temp Out of Range
	37.5	Bit	S1 TSS – LED Expired
	37.6	Bit	S1 TSS – Excess Light
	37.7	Bit	S1 TSS – Undefined
	38.0	Bit	S1 TSS – Flow Error
	38.1	Bit	S1 TSS – Service Due
	38.2	Bit	S1 TSS – Wiper Failed
	38.3	Bit	S1 TSS – Replace Wiper
	38.4	Bit	S1 TSS – Undefined
	38.5	Bit	S1 TSS – Undefined
	38.6	Bit	S1 TSS – Undefined
	38.7	Bit	S1 TSS – Undefined
	39.0	Bit	S1 TSS – Calibrating
	39.1	Bit	S1 TSS – Recovery
	39.2	Bit	S1 TSS – Undefined
	39.3	Bit	S1 TSS – Clean Inhibited
	39.4	Bit	S1 TSS – Undefined
	39.5	Bit	S1 TSS – Undefined
	39.6	Bit	S1 TSS – Undefined
	39.7	Bit	S1 TSS – Undefined

Slot/Index	Byte	Format	Description
4/13	40.0	Bit	S2 TSS – PV Failure
	40.1	Bit	S2 TSS – ADC Failure
	40.2	Bit	S2 TSS – Memory Failure
	40.3	Bit	S2 TSS – Commission Error
	40.4	Bit	S2 TSS – Undefined
	40.5	Bit	S2 TSS – Undefined
	40.6	Bit	S2 TSS – Undefined
	40.7	Bit	S2 TSS – Undefined
	41.0	Bit	S2 TSS – Cal Failed
	41.1	Bit	S2 TSS – PV Out of Limits
	41.2	Bit	S2 TSS – Replace Wiper
	41.3	Bit	S2 TSS – Service Overdue
	41.4	Bit	S2 TSS – Process Temp Out of Range
	41.5	Bit	S2 TSS – LED Expired
	41.6	Bit	S2 TSS – Excess Light
	41.7	Bit	S2 TSS – Undefined
	42.0	Bit	S2 TSS – Flow Error
	42.1	Bit	S2 TSS – Service Due
	42.2	Bit	S2 TSS – Wiper Failed
	42.3	Bit	S2 TSS – Replace Wiper
	42.4	Bit	S2 TSS – Undefined
	42.5	Bit	S2 TSS – Undefined
	42.6	Bit	S2 TSS – Undefined
	42.7	Bit	S2 TSS – Undefined
	43.0	Bit	S2 TSS – Calibrating
	43.1	Bit	S2 TSS – Recovery
	43.2	Bit	S2 TSS – Undefined
	43.3	Bit	S2 TSS – Clean Inhibited
	43.4	Bit	S2 TSS – Undefined
	43.5	Bit	S2 TSS – Undefined
	43.6	Bit	S2 TSS – Undefined
	43.7	Bit	S2 TSS – Undefined
4/14	44.0	Bit	S1 Turbidity - Undefined
	44.1	Bit	S1 Turbidity - ADC Failure
	44.2	Bit	S1 Turbidity - NV Failure
	44.3	Bit	S1 Turbidity - Wiper Failed
	44.4	Bit	S1 Turbidity - Undefined
	44.5	Bit	S1 Turbidity - Undefined
	44.6	Bit	S1 Turbidity - Undefined
	44.7	Bit	S1 Turbidity - Undefined
	45.0	Bit	S1 Turbidity - Cal Failed
	45.1	Bit	S1 Turbidity - PV out of limits
	45.2	Bit	S1 Turbidity - Undefined
	45.3	Bit	S1 Turbidity - Undefined
	45.4	Bit	S1 Turbidity - Undefined
	45.5	Bit	S1 Turbidity - Replace Wiper
	45.6	Bit	S1 Turbidity - Undefined
	45.7	Bit	S1 Turbidity - Undefined
	46.0	Bit	S1 Turbidity - Replace Wiper Overdue
	46.1	Bit	S1 Turbidity - Undefined
	46.2	Bit	S1 Turbidity - Undefined
	46.3	Bit	S1 Turbidity - Undefined
	46.4	Bit	S1 Turbidity - Undefined
	46.5	Bit	S1 Turbidity - Undefined
	46.6	Bit	S1 Turbidity - Undefined
	46.7	Bit	S1 Turbidity - Undefined
	47.0	Bit	S1 Turbidity - Calibrating
	47.1	Bit	S1 Turbidity - Recovery
	47.2	Bit	S1 Turbidity - Clean Inhibited
	47.3	Bit	S1 Turbidity - Undefined
	47.4	Bit	S1 Turbidity - Undefined
	47.5	Bit	S1 Turbidity - Undefined
	47.6	Bit	S1 Turbidity - Undefined
	47.7	Bit	S1 Turbidity - Undefined

Slot/Index	Byte	Format	Description
4/15	48.0	Bit	S2 Turbidity - Undefined
	48.1	Bit	S2 Turbidity - ADC Failure
	48.2	Bit	S2 Turbidity - NV Failure
	48.3	Bit	S2 Turbidity - Wiper Failed
	48.4	Bit	S2 Turbidity - Undefined
	48.5	Bit	S2 Turbidity - Undefined
	48.6	Bit	S2 Turbidity - Undefined
	48.7	Bit	S2 Turbidity - Undefined
	49.0	Bit	S2 Turbidity - Cal Failed
	49.1	Bit	S2 Turbidity - PV out of limits
	49.2	Bit	S2 Turbidity - Undefined
	49.3	Bit	S2 Turbidity - Undefined
	49.4	Bit	S2 Turbidity - Undefined
	49.5	Bit	S2 Turbidity - Replace Wiper
	49.6	Bit	S2 Turbidity - Undefined
	49.7	Bit	S2 Turbidity - Undefined
	50.0	Bit	S2 Turbidity - Replace Wiper Overdue
	50.1	Bit	S2 Turbidity - Undefined
	50.2	Bit	S2 Turbidity - Undefined
	50.3	Bit	S2 Turbidity - Undefined
	50.4	Bit	S2 Turbidity - Undefined
	50.5	Bit	S2 Turbidity - Undefined
	50.6	Bit	S2 Turbidity - Undefined
	50.7	Bit	S2 Turbidity - Undefined
	51.0	Bit	S2 Turbidity - Calibrating
	51.1	Bit	S2 Turbidity - Recovery
	51.2	Bit	S2 Turbidity - Clean Inhibited
	51.3	Bit	S2 Turbidity - Undefined
	51.4	Bit	S2 Turbidity - Undefined
	51.5	Bit	S2 Turbidity - Undefined
	51.6	Bit	S2 Turbidity - Undefined
	51.7	Bit	S2 Turbidity - Undefined

Appendix B – Diagnostic bit allocation

Bit	Sensor type							Transmitter diagnostics
	pH	2-electrode conductivity	4-electrode conductivity	RDO	TSS	Turbidity		
LSB 0		PV failure	PV failure	PV failure				
1	ADC failure	ADC failure	ADC failure	User cal expired	ADC failure	ADC failure	Sensor 2 communication error	
2	Memory failure	Memory failure	Memory failure	Factory cal expired	Memory failure	NV Failure	Analog output 1 out of range	
3				D.O conc meas error	Commission error	Wiper failed	Analog output 2 out of range	
4	Broken glass	Polarization		Sensor warm-up			Analog output 3 out of range	
5	Reference failure			Sensor warning			Analog output 4 out of range	
6	Temperature failure	PT failure	PT failure	Calibrating			SD card nearly full	
7				Internal comms error			SD card full	
8	Cal failed	Cal failed	Cal failed	% sat meas error	Cal failed	Cal failed	Alarm active	
9	PV out of limits	PV out of limits	PV out of limits	Temperature meas. error	PV out of limits	PV out of limits	Memory write error	
10				Cap expired	Replace wiper		Sensor 1 write error	
11				Replace cap	Service overdue		Sensor 2 write error	
12	Process temperature out of range	Process temperature out of range	Process temperature out of range	Cap removed	Process temp out of range		Sensor 1 PV out of range	
13				Cal failed	LED expired	Replace wiper	Sensor 2 PV out of range	
14					Excess light		Simulation active	
15	Ambient temperature out of range	Internal temperature out of range	Internal temperature out of range				Inferred pH invalid	
16				Flow error	Replace wiper overdue	Before cation high		
17				Service due			After cation high	
18				Wiper failed			Before cation low	
19	Ref. blocked				Replace wiper		Sensor 1 clean in progress	
20	Reference warning		Dirty sensor				Sensor 2 clean in progress	
21	Low pH slope							
22	Out of solution	Out of solution	Out of solution					
23	Low electrolyte							
24		Calibrating	Calibrating		Calibrating	Calibrating		
25		Recovery	Recovery		Recovery	Recovery		
26					Clean inhibited			
27					Clean inhibited			
28								
29								
30								
MSB 31								

Namur class bit allocation

32 bit read only data

Bit	Class
0	Check function diagnostic active
1	Out of specification diagnostic active
2	Maintenance required diagnostic active
3	Failure diagnostic active
4 - 31	Not used

8 bit read only data

Bit	Class
0	Check function diagnostic active
1	Out of specification diagnostic active
2	Maintenance required diagnostic active
3	Failure diagnostic active
4 - 7	Not used

Appendix C – Units table

Value	Unit
0	None
1	NTU
2	FNU
3	FTU
4	FAU
5	ppm
6	mg/l
7	ppb
8	µg/l
9	µg/kg
10	mg/kg
13	Deg. C
14	Deg. F
15	µS/cm
16	µS/m
17	mS/cm
18	mS/m
19	TDS
20	MΩ-cm
21	Ω
22	pH
23	mV
24	% Saturation
25	%
26	mA
28	µA
30	PSU
32	millibars
33	mmHg
34	Weeks
35	Days
36	g/l
37	ppt
38	MΩ-cm
39	User defined 1
40	User defined 2

Appendix D – Signal sources

Analog source list

Value	Assignment
0	None
1	S1 primary variable state
2	S1 secondary variable state
3	Calculated value state
4	S2 primary variable state
5	S2 secondary variable state
6	Not used

Digital output source list

Value	Assignment
0	None
13	Alarm 1 state
14	Alarm 2 state
15	Alarm 3 state
16	Alarm 4 state
17	Alarm 5 state
18	Alarm 6 state
19	Alarm 7 state
20	Alarm 8 state
21	Sensor 1 Failure diagnostic
22	Sensor 2 Failure diagnostic
23	Sensor 1 Out of specification diagnostic
24	Sensor 2 Out of specification diagnostic
25	Sensor 1 Maintenance required diagnostic
26	Sensor 2 Maintenance required diagnostic
27	Sensor 1 Check function diagnostic
28	Sensor 2 Check function diagnostic
29	Transmitter Failure diagnostic
30	Transmitter Out of specification diagnostic
31	Transmitter Maintenance required diagnostic
32	Transmitter Check function diagnostic
33	Sensor 1 calibration in progress
34	Sensor 2 calibration in progress
35	Sensor 1 calibration failed
36	Sensor 2 calibration failed
37	Clean 1 in progress
38	Clean 2 in progress
39	Any diagnostic active
40	Sensor 1, Direct or Reverse acting controller, time proportioning or pulse frequency control output
41	Sensor 1 Acid controller, time proportioning or pulse frequency control output
42	Sensor 1 Base controller, time proportioning or pulse frequency control output
43	Sensor 2 Direct or Reverse acting controller, time proportioning or pulse frequency control output
44	Sensor 2 Acid controller, time proportioning or pulse frequency control output
45	Sensor 2 Base controller, time proportioning or pulse frequency control output

Digital input source list

Value	Assignment
0	None
34	S1 in hold mode
35	S2 in hold mode
36	S1 start clean
37	S2 start clean

Appendix E – Signals view allocation

Signal	Sensor type					
	pH	2-electrode	4-electrode	RDO	TSS	Turbidity
1	pH or REDOX (ORP)	Conductivity or concentration	Conductivity or concentration	Concentration	Turbidity	Turbidity
2	Temperature	Temperature	Temperature	% Saturation	Suspended solids	Millivolts
3	Millivolts	Uncompensated conductivity	Uncompensated conductivity	Temperature	Temperature	Active Slope
4	Active slope	Active slope	Active slope	Calibration slope	Wiper blade life	Active Offset
5	Active offset	Active offset	Active offset	Calibration offset	90 °	Last Slope
6	Last slope	Last slope	Last slope	RDO cap expiry (weeks)	Backscatter	Last Offset
7	Last offset	Last offset	Last offset	N/A	Suspended solids slope	Wiper blade life
8	N/A	N/A	N/A	N/A	Suspended solids offset	

Appendix F – Engineering range limits

Sensor type	Signal	Measurement type	Range limits			Base units
			Low	High	Units	
pH	Primary Variable	pH	-2	16	pH	●
		Redox/ORP	-2000	2000	mV	●
	Secondary Variable	Temperature	-20	160	°C	●
			-4	320	°F	●
2-electrode conductivity	Primary Variable	Conductivity	0	20000 x Cell constant	µS/cm	●
		Concentration	0	20 x Cell constant	mS/cm	●
		Resistivity	0	20	MΩ.cm	●
	Secondary Variable	Temperature	-40	200	°C	●
			-40	392	°F	●
		Conductivity (Group A)	0	2000000	µS/cm	●
4-electrode conductivity	Primary Variable	Conductivity (Group B)	0	2000	µS/cm	●
		Concentration	0	2	mS/cm	●
			User set			●
	Secondary Variable	Temperature	-40	200	°C	●
			-40	392	°F	●
		Dissolved Oxygen	0	50	mg/l	●
RDO	Primary Variable	% saturation	0	1000	%	●
			0	50	ppm	●
	Secondary Variable	Temperature	0	50	°C	●
			32	122	°F	●
TSS	Turbidity		0	4000	NTU	●
			0	4000	FNU	●
	Suspended solids		0	1000	mg/l	●
			0	1000	ppm	●
Turbidity	Turbidity (Low Range)		0.00	40.00	NTU	●
			0.00	40.00	FNU	●
	Turbidity (High Range)		0.0	400.0	NTU	●
			0.0	400.0	FNU	●

Appendix G – Log data register allocation

Log ID (Slot 11 Index 174) = 1 Alarm log

Slot 7, Index 8		Page ID (Slot 11 Index 175)								
byte		0 (page 1)	1 (page 2)	2 (page 3)	3 (page 4)	4 (page 5)	5 (page 6)	6 (page 7)	7 (page 8)	8 (page 9)
0 to 38	39 bytes	Entry 1	Entry 7	Entry 13	Entry 19	Entry 25	Entry 31	Entry 37	Entry 43	Entry 49
39 to 77	39 bytes	Entry 2	Entry 8	Entry 14	Entry 20	Entry 26	Entry 32	Entry 38	Entry 44	Entry 50
78 to 116	39 bytes	Entry 3	Entry 9	Entry 15	Entry 21	Entry 27	Entry 33	Entry 39	Entry 45	
117 to 155	39 bytes	Entry 4	Entry 10	Entry 16	Entry 22	Entry 28	Entry 34	Entry 40	Entry 46	
156 to 194	39 bytes	Entry 5	Entry 11	Entry 17	Entry 23	Entry 29	Entry 35	Entry 41	Entry 47	
1954 to 233	39 bytes	Entry 6	Entry 12	Entry 18	Entry 24	Entry 30	Entry 36	Entry 42	Entry 48	
		<u>234 bytes</u>								

Byte number	Description	Values
0	1 byte	Alarm Event Type
		21 High process alarm inactive
		22 High process alarm active
		23 Low process alarm inactive
		24 Low process alarm active
		25 High latch alarm inactive
		26 High latch alarm active
		27 Low latch alarm inactive
		28 Low latch alarm active
1 to 2	2 bytes	Entry number
		2-character string
3	1 byte	Alarm source
		13 Sensor 1
		15 Sensor 2
4 to 20	17 bytes	Alarm tag
21 to 30	10 bytes	Date of event
31 to 38	8 bytes	Time of event
		8-character string
		<u>39 bytes</u>

Log ID (Slot 11 Index 174) = 2 Audit log

Slot 7, Index 8		Page ID (Slot 11 Index 175)								
byte		0 (page 1)	1 (page 2)	2 (page 3)	3 (page 4)	4 (page 5)	5 (page 6)	6 (page 7)	7 (page 8)	8 (page 9)
0 to 38	39 bytes	Entry 1	Entry 7	Entry 13	Entry 19	Entry 25	Entry 31	Entry 37	Entry 43	Entry 49
39 to 77	39 bytes	Entry 2	Entry 8	Entry 14	Entry 20	Entry 26	Entry 32	Entry 38	Entry 44	Entry 50
78 to 116	39 bytes	Entry 3	Entry 9	Entry 15	Entry 21	Entry 27	Entry 33	Entry 39	Entry 45	
117 to 155	39 bytes	Entry 4	Entry 10	Entry 16	Entry 22	Entry 28	Entry 34	Entry 40	Entry 46	
156 to 194	39 bytes	Entry 5	Entry 11	Entry 17	Entry 23	Entry 29	Entry 35	Entry 41	Entry 47	
195 to 233	39 bytes	Entry 6	Entry 12	Entry 18	Entry 24	Entry 30	Entry 36	Entry 42	Entry 48	
		<u>234 bytes</u>								

Byte number	Description	Values
0	1 byte	Audit Event Type
		1 Power failure
		2 Power recovery
		3 Configuration changed
		4 SD card file created
		5 SD card file deleted
		6 SD card online
		7 SD card offline
		8 Time/date changed
		10 SD card inserted
		11 SD card removed
		48 SD card formatted
		49 SD card full
		50 SD card error
1 to 2	2 bytes	Entry number
		2-character string
3	1 byte	Not used
		Always reads as zero
4 to 20	17 bytes	Audit event details
21 to 30	10 bytes	Date of event
31 to 38	8 bytes	Time of event
		8-character string
		<u>39 bytes</u>

Log ID (Slot 11 Index 174) = 3 Calibration log S1**Log ID (Slot 11 Index 174) = 4 Calibration log S2**

Slot 7, Index 8 byte		Page ID (Slot 11 Index 175)								
		0 (page 1)	1 (page 2)	2 (page 3)	3 (page 4)	4 (page 5)	5 (page 6)	6 (page 7)	7 (page 8)	8 (page 9)
0 to 38	39 bytes	Entry 1	Entry 7	Entry 13						
39 to 77	39 bytes	Entry 2	Entry 8	Entry 14						
78 to 116	39 bytes	Entry 3	Entry 9	Entry 15						
117 to 155	39 bytes	Entry 4	Entry 10							
156 to 194	39 bytes	Entry 5	Entry 11							
195 to 233	39 bytes	Entry 6	Entry 12							
		234 bytes								

Byte number	Description	Values
0	1 byte Calibration event type	38 Calibration missed 39 Calibration coefficients reset 40 Calibration passed 41 Calibration failed
1 to 2	2 bytes Entry number	2-character string
3	1 byte Not used	Always reads as zero
4 to 20	17 bytes Calibration details	17-character string
21 to 30	10 bytes Date of event	10-character string
31 to 38	8 bytes Time of event	8-character string
		39 bytes

Log ID (Slot 11 Index 174) = 5 Diagnostic log

Slot 7, Index 8 byte		Page ID (Slot 11 Index 175)								
		0 (page 1)	1 (page 2)	2 (page 3)	3 (page 4)	4 (page 5)	5 (page 6)	6 (page 7)	7 (page 8)	8 (page 9)
0 to 38	39 bytes	Entry 1	Entry 7	Entry 13	Entry 19	Entry 25	Entry 31	Entry 37	Entry 43	Entry 49
39 to 77	39 bytes	Entry 2	Entry 8	Entry 14	Entry 20	Entry 26	Entry 32	Entry 38	Entry 44	Entry 50
78 to 116	39 bytes	Entry 3	Entry 9	Entry 15	Entry 21	Entry 27	Entry 33	Entry 39	Entry 45	
117 to 155	39 bytes	Entry 4	Entry 10	Entry 16	Entry 22	Entry 28	Entry 34	Entry 40	Entry 46	
156 to 194	39 bytes	Entry 5	Entry 11	Entry 17	Entry 23	Entry 29	Entry 35	Entry 41	Entry 47	
195 to 233	39 bytes	Entry 6	Entry 12	Entry 18	Entry 24	Entry 30	Entry 36	Entry 42	Entry 48	
		234 bytes								

Byte number	Description	Values
0	1 byte Diagnostic event class	31 Failure 32 Check function 33 Out of specification 34 Maintenance required
1 to 2	2 bytes Entry number	2-character string
3	1 byte Not used	Always reads as zero
4 to 20	17 bytes Diagnostic details	17-character string
21 to 30	10 bytes Date of event	10-character string
31 to 38	8 bytes Time of event	8-character string
		39 bytes

Notes

Acknowledgements

- PROFIBUS is a registered trademark of PROFIBUS organization.
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