Configuration Setup Guide

Multi–parameter M800 PN
Profinet Setup Guide

PLC / DCS
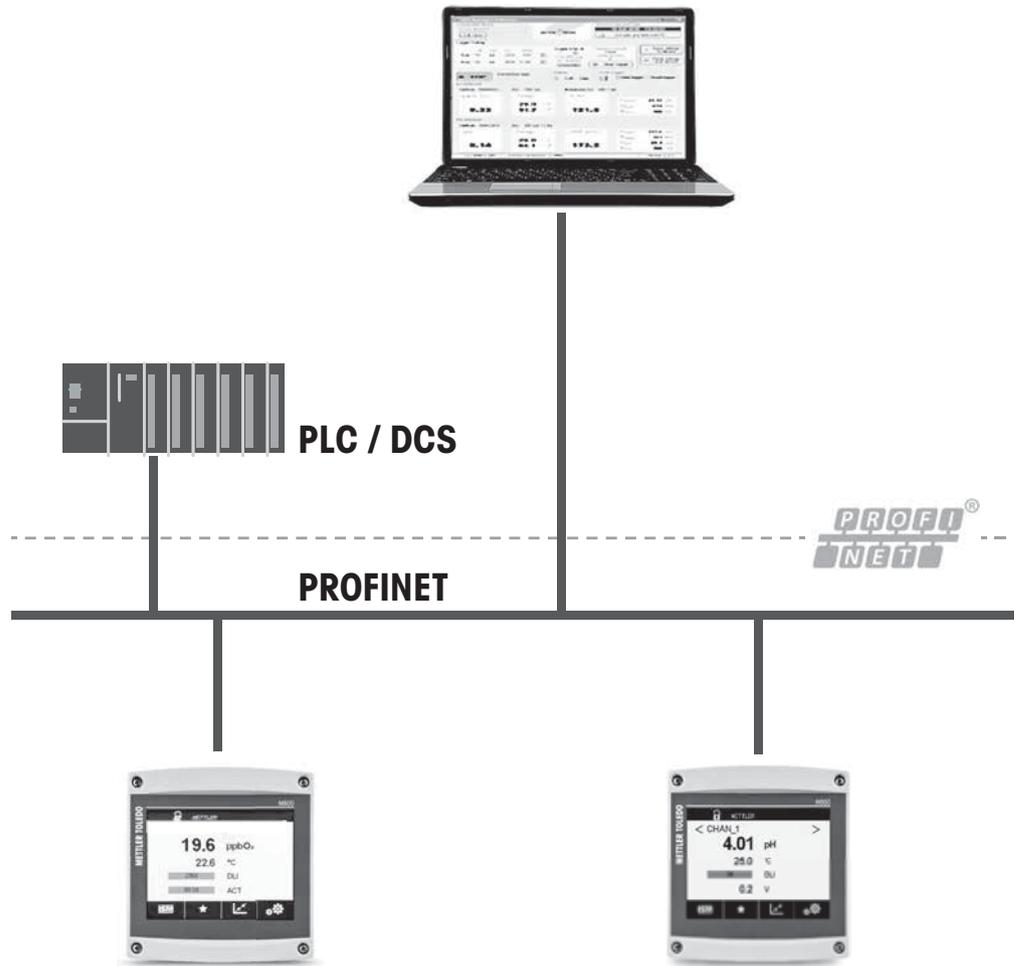
PROFINET

METTLER TOLEDO

Content

1   Introduction

The M800 multi−parameter transmitter with Profinet communication is an on−line process instrument for measuring various properties of fluids and gases. These include pH/ORP, conductivity, optical DO, amperometric oxygen (DO as well as O_2 gas), dissolved carbon dioxide and turbidity. The M800 Profinet has 1−channel and 2−channel versions, the versions are compatible with the following (digital) ISM sensors.

Version	Process 1−ch	Process 2−ch
Part no.	30 530 021	30 530 022
pH/ORP	●	●
pH/pNa	●	●
UniCond 2e/4e	●	●
Cond 4e	●	●
Amp. DO ppm/ppb/trace	●/●/●*	●/●/●*
Amp. O_2 gas ppm/ppb/trace	●/●/●*	●/●/●*
Optical DO	●**	●**
Dissolved Carbon Dioxide	●	●
CO_2 hi (thermal conductivity)	●**	●**
InPro 86X0i	●	●
Dissolved O_3	–	–
Flow	–	–

*   Ingold sensors
**   Only one optical DO or thermal conductivity CO_2 sensor can be used together with 2−channel transmitter

2   METTLER TOLEDO Parameters

The following tables list the manufacturer−specific instrument parameters of function blocks.

General explanatory remarks
Data type
– DS: data structure, contains data types such as Unsigned8, Octet String etc.
– Float: IEEE 754 format
– Visible String: ASCII coded
– Unsigned:

       Unsigned8: value range = 0 to 255
       Unsigned16: value range = 0 to 65535
       Unsigned32: value range = 0 to 429496729

Storage class
– C: constant parameter
– D: dynamic parameter
– N: nonvolatile parameter
– S: static parameter

3 Wiring

3.1 M800 1–ch Profinet Wiring

Power connections:
N(–) for Neutral and L(+) for Line for 20 to 30 VDC. N for Neutral and L for Line for 100 to 240 VAC.

Terminal number	TB1	TB2 (ISM Ch1/2)	TB3	TB4	TB5	TB6
						L(+)
						N(–)
						Ground
1	DI1+	DI2+		n.a.	AI1+	Relay1_NC
2	DI1–	DI2–		n.a.	AI1–	Relay1_NC
3	n.a.			n.a.	DI4+	Relay2_NO
4	n.a.			n.a.	DI4–	Relay2_COM
5	n.a.			n.a.	DI5+	n.a.
6	n.a.			Ground	DI5–	n.a.
7	n.a.			Ground	DI6+	n.a.
8	n.a.		n.a.	Ground	DI6–	n.a.
9	n.a.	24V_Ch1		n.a.	n.a.	n.a.
10	n.a.	GND 24V_Ch1		n.a.	n.a.	n.a.
11	n.a.	1–Wire_Ch1		n.a.	n.a.	n.a.
12	n.a.	GND 5V_Ch1		n.a.	n.a.	n.a.
13	n.a.	RS485 B_Ch1		n.a.	n.a.	n.a.
14	n.a.	RS485 A_Ch1		n.a.	n.a.	n.a.
15	n.a.	GND 5V_Ch1		n.a.	n.a.	n.a.
16	n.a.	5V_Ch1		n.a.	n.a.	n.a.

NO: normally open (contact open if un–actuated).
NC: normally closed (contact closed if un–actuated).
n.a. not available.

3.2 M800 2–ch Profinet Wiring

Power connections:

N(−) for Neutral and L(+) for Line for 20 to 30 VDC. N for Neutral and L for Line for 100 to 240 VAC.

Terminal number	TB1	TB2 (ISM Ch1/2)	TB3	TB4	TB5	TB6
						L(+)
						N(−)
						Ground
1	DI1+	DI2+		n.a.	AI1+	Relay1_NC
2	DI1−	DI2−		n.a.	AI1−	Relay1_COM
3	n.a.	1−Wire_Ch1		n.a.	DI4+	Relay2_NO
4	n.a.	GND 5V_Ch1		n.a.	DI4−	Relay2_COM
5	n.a.	RS485 B_Ch1		n.a.	DI5+	n.a.
6	n.a.	RS485 A_Ch1		n.a.	DI5−	n.a.
7	n.a.	GND 5V_Ch1		Ground	DI6+	n.a.
8	n.a.	5V_Ch1		Ground	DI6−	n.a.
9	n.a.	24V_Ch2	n.a.	Ground	n.a.	n.a.
10	n.a.	GND 24V_Ch2		n.a.	n.a.	n.a.
11	n.a.	1−Wire_Ch2		n.a.	n.a.	n.a.
12	n.a.	GND 5V_Ch2		n.a.	n.a.	n.a.
13	n.a.	RS485 B_Ch2		n.a.	n.a.	n.a.
14	n.a.	RS485 A_Ch2		n.a.	n.a.	n.a.
15	n.a.	GND 5V_Ch2		n.a.	n.a.	n.a.
16	n.a.	5V_Ch2		n.a.	n.a.	n.a.

NO: normally open (contact open if un−actuated).

NC: normally closed (contact closed if un−actuated).

n.a. not available
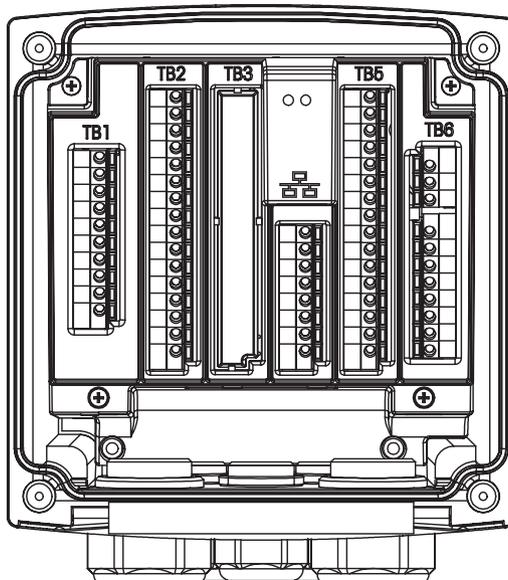
3.3 Transmitter Terminal Assignment

TB2 – Terminal Assignment for Optical Oxygen, CO$_2$ hi, UniCond2e, UniCond4e and Turbidity ISM Sensors

Terminal	1–Ch version (ISM Ch1)	2–Ch version (ISM Ch1,2)	Optical Oxygen(1), CO$_2$ hi(1) Turbidity (InPro 86x0i)		UniCond2e/4e(2)
	Function	Function	VP8 cable wire color	5–pin cable wire color	Cable wire color
1	DI2+	DI2+	–	–	–
2	DI2–	DI2–	–	–	–
3	–	1–Wire_Ch1	–	–	–
4	–	GND5V_Ch1	–	–	–
5	–	RS485B_Ch1	–	–	black
6	–	RS485A_Ch1	–	–	red
7	–	GND5V_Ch1	–	–	white
8	–	5V_Ch1	–	–	blue
9	24V_Ch1	24V_Ch2	grey	brown	–
10	GND24V_Ch1	GND24V_Ch2	blue	black	–
11	1–Wire_Ch1	1–Wire_Ch2	–	–	–
12	GND5V_Ch1	GND5V_Ch2	green/yellow	grey	–
13	RS485B_Ch1	RS485B_Ch2	brown	blue	black
14	RS485A_Ch1	RS485A_Ch2	pink	white	red
15	GND5V_Ch1	GND5V_Ch2	–	yellow	white
16	5V_Ch1	5V_Ch2	–	–	blue

1) Only one O2 optical or CO2 hi sensor can be connected to 2-ch version.

2) Transparent wire not connected.

TB2 – Terminal Assignment for for pH, Amp. Oxygen, Cond 4e, CO2 and O3 ISM Sensors

Terminal	1–Ch version (ISM Ch1)	2–Ch version (ISM Ch1,2)	pH, Amp. Oxygen, Cond 4e, CO$_2$ and O$_3$
	Function	Function	Cable wire color
1	DI2+	DI2+	–
2	DI2–	DI2–	–
3	–	1–Wire_Ch1	transparent (cable core)
4	–	GND5V_Ch1	red
5	–	RS485B_Ch1	–
6	–	RS485A_Ch1	–
7	–	GND5V_Ch1	–
8	–	5V_Ch1	–
9	24V_Ch1	24V_Ch2	–
10	GND24V_Ch1	GND24V_Ch2	–
11	1–Wire_Ch1	1–Wire_Ch2	transparent (cable core)
12	GND5V_Ch1	GND5V_Ch2	red
13	RS485B_Ch1	RS485B_Ch2	–
14	RS485A_Ch1	RS485A_Ch2	–
15	GND5V_Ch1	GND5V_Ch2	–
16	5V_Ch1	5V_Ch2	–

3.4 Ethernet Cable Assignment

The physical interface support RJ45 or M12 (included in delivery), the Ethernet cable assignment is below.

RJ45	Standard cable	Description	Industrial normed cable	M12
2	OR	TxD−	Amber	3
1	OR/WH	TxD+	Yellow	1
6	GN	RxD−	Blue	4
3	GN/WH	RxD+	White	2
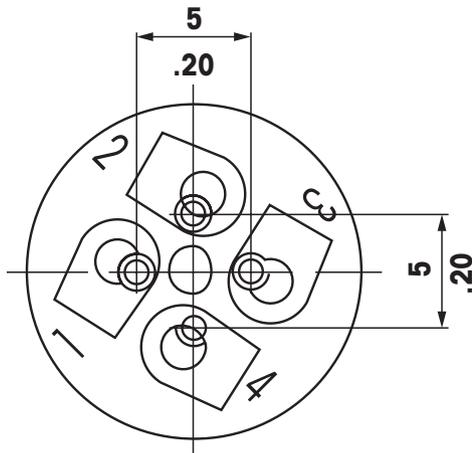
3.5 Connecting the Cable

Note: The sensor, fieldbus and Ethernet cables must be shielded.

3.5.1 Connect the M12 Cable

1. Take out the Ethernet cable. Spare part number PN: 30530035

2. Route the cable in the housing (through the M20) as per the wiring diagram

3. Tighten the M12 **(1)** connector

4. Attach the RJ45 connector **(1)** to the socket **(2)**.
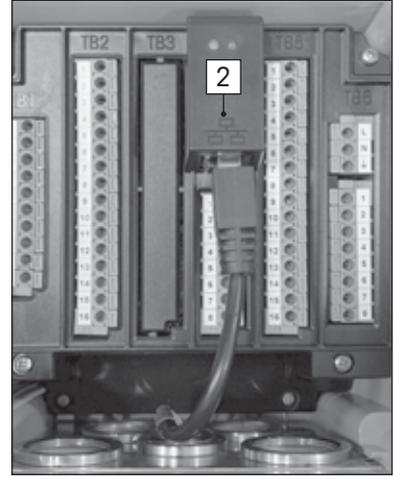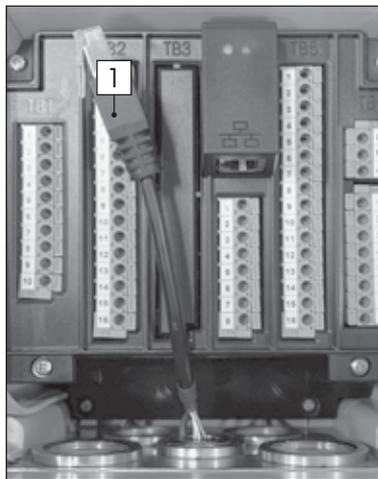
3.5.2 Connect RJ45 Cable

1) Release a suitable cable length
2) Route the cable in the housing through M25 hole
3) Insert the RJ45 connector to the socket

4 Commissioning Network

4.1 Network Configuration

1) Install the GSD file which is included in the delivery with the engineering tool.
2) Update the hardware catalogue.
3) Integrate the M800 Profinet transmitter into the network.
4) Set the allocation device name and IP address via the local display menu (PATH:\Configuration\Profinet Setting) or engineering tool.
5) Perform parameterization via on–site. For more information see user manual of M800 series.
6) Upon successful integration of the M800 Profinet transmitter, the symbol "PN" appears on the upper right corner of the main display.

4.2 LED Definition

There are two LEDs inside the transmitter that display information as shown below.

Green	Red	Status
Off	Off	Check power supply
Off	Blink every 0.5 sec	Device defective
Off	On	PLC communication error
Blink every 0.5 sec	Off	Internal RS232 communication error
Blink every 0.5 sec	On	PLC and RS232 error
On	Off	System normal
Blink every 0.3 sec		Device in bootloader mode

5 Schematic Diagram
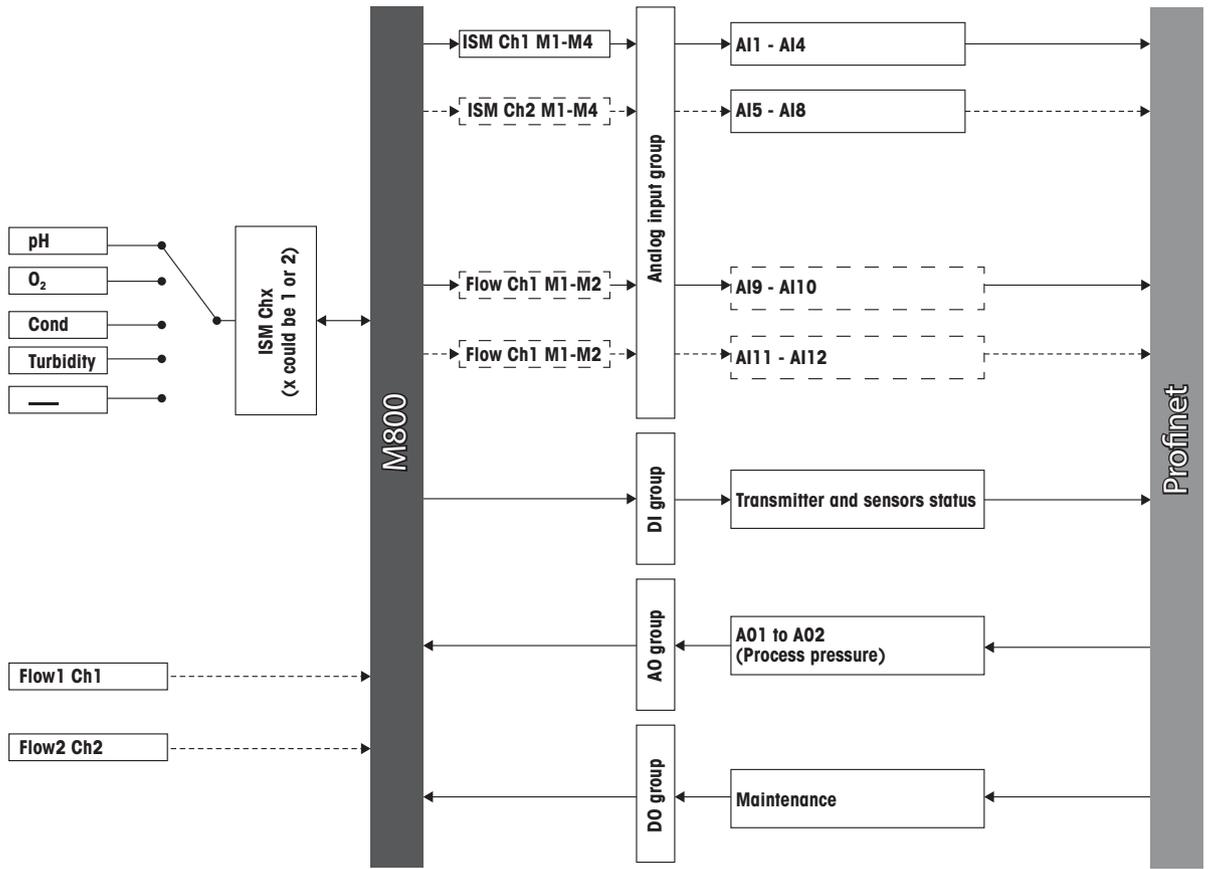
Note: ISM ch2 only for M800 2ch Profinet version.
Note: Flow sensors are reserved for future use.

6 Function Block Definition

6.1 Analog Output Function Blocks

	Meaning
AO1	1st Process Pressure (mbar)
AO2	2nd Process Pressure (mbar)

Note: Only valid when the related channel is configured to oxygen sensor and ProcPress options is "Bus AO1" or "Bus AO2".

6.2 Discrete Output Function Blocks

	Bit	Meaning
Ch1	0	System Hold Control On – 1 Off = 0
	1	000 – Invalid
	2	001 – LED on
	3	010 – LED off Only valid when LED mode is Auto and only for 1–ch PN version
	4	
	5	
	6	
	7	
Ch2	8	System Hold, same as Bit0
	9	
	10	same as Ch1 ODO LED
	11	
	12	
	13	
	14	
	15	
Flow1	16	System Hold, same as Bit0
	17	
	18	
	19	
	20	
	21	
	22	
	23	
Flow2	24	System Hold, same as Bit0
	25	
	26	
	27	
	28	
	29	
	30	
	31	

6.3 Discrete Input Function Blocks

DI1		Bit	Meaning
HW and SP status		1	RELAY 1 Status
		2	RELAY 2 Status
		3	
		4	
		5	
		6	
		7	
		8	Digital input 1 Status (High=1, Low = 0)
		9	Digital input 2 Status
		10	Digital input 3 Status
		11	Digital input 4 Status
		12	Digital input 5 Status
		13	Digital input 6 Status
		14	Communication Error
		15	
		16	SP1 alarm (On=1; Off=0)
		17	SP2 alarm (same as SP1)
		18	SP3 alarm (same as SP1)
		19	SP4 alarm (same as SP1)
		20	SP5 alarm (same as SP1)
		21	SP6 alarm (same as SP1)
		22	SP7 alarm (same as SP1)
		23	SP8 alarm (same as SP1)
		24	Flow Ch1 Hold Status (Active=1; Inactive=0)
		25	Flow Ch2 Hold Status (Same as Flow Ch1)
		26	
		27	
		28	
		29	
		30	
		31	

Configuration	DI2	Bit	Meaning
Measurement Status	AI1 Status	0	0 – Normal
		1	1 – Over range 2 – Under range 3 – Invalid
	AI2 Status	2	same as AI1
		3	
	AI3 Status	4	same as AI1
		5	
	AI4 Status	6	same as AI1
		7	
	AI5 Status	8	same as AI1
		9	
	AI6 Status	10	same as AI1
		11	
	AI7 Status	12	same as AI1
		13	
	AI8 Status	14	same as AI1
		15	
	AI9 Status	16	same as AI1
		17	
	AI10 Status	18	same as AI1
		19	
	AI11 Status	20	same as AI1
		21	
	AI12 Status	22	same as AI1
		23	

DI3 for ch1 DI4 for ch2		Bit	Meaning
ISM Ch1 Universal Status		0	Calibration Data Warning eg: Slope > 102% for pH sensor
		1	Calibration Data Error eg: Slope > 103% for pH sensor
		2	
		3	Hold Status (Active or inactive)
		4	Clean Status (Active or inactive)
		5	
		6	Maint Required
		7	Calibration Required
		8	CIP Counter Expired
		9	SIP Counter Expired
		10	Autoclave Counter Expired
		11	
		12	Sensor Disconnected
		13	Change Sensor
		14	
		15	

DI3 for ch1 DI4 for ch2		Bit	Meaning
ISM Chx pH/ ORP Status		16	Warning pHGls change < 0.3
		17	Warning pHGls change > 3
		18	Warning pHRef change < 0.3
		19	Warning pHRef change > 3
		20	Error pH Ref Res > 150KΩ
		21	Error pH Ref Res < 1000Ω
		22	Error pH Gls Res > 2000MΩ
		23	Error pH Gls Res < 5MΩ
		24	Error pNa Gls Res > 2000MΩ
		25	Error pNa Gls Res < 5MΩ
		26	Warning pNaGls change<0.3
		27	Warning pNaGls change>3
		28	
		29	
		30	
		31	

DI3 for ch1 DI4 for ch2		Bit	Meaning
ISM Chx Optical Status		16	ODO LED Status
		17	Change Spot
		18	Shaft Error
		19	Signal Error
		20	Hardware Error
		21	
		22	
		23	
		24	
		25	
		26	
		27	
		28	
		29	
		30	
		31	

DI3 for ch1 DI4 for ch2		Bit	Meaning
ISM Chx Cond Status		16	Error Dry Sensor
		17	Error Sensor Shorted
		18	Error Cell Deviation
		19	
		20	
		21	
		22	
		23	
		24	
		25	
		26	
		27	
		28	
		29	
		30	
		31	

DI3 for ch1 DI4 for ch2		Bit	Meaning
ISM Chx Oxygen Status		16	Error Electrolyte Level
		17	
		18	
		19	
		20	
		21	
		22	
		23	
		24	
		25	
		26	
		27	
		28	
		29	
		30	
		31	

DI3 for ch1 DI4 for ch2		Bit	Meaning
ISM Chx Turbidity		16	Electronic Error
		17	Stray Light too High
		18	Measurement not Reliable
		19	
		20	
		21	
		22	
		23	
		24	
		25	
		26	
		27	
		28	
		29	
		30	
		31	

DI3 for ch1 DI4 for ch2		Bit	Meaning
ISM Chx CO_2 Beverage		16	Hardware Error
		17	Software Error
		18	CO_2 out of Range
		19	Change Membrane
		20	CO_2 not Reliable
		21	Temp. out of Range
		22	
		23	
		24	
		25	
		26	
		27	
		28	
		29	
		30	
		31	

7   Default

Device Name	m800pn–xxxxxx	RW
IP Address	192.168.0.2	RW
Netmask	255.255.255.0	RW
Gateway	192.168.0.2	RW
MAC Address	xx:xx:xx:xx:xx:xx	RO

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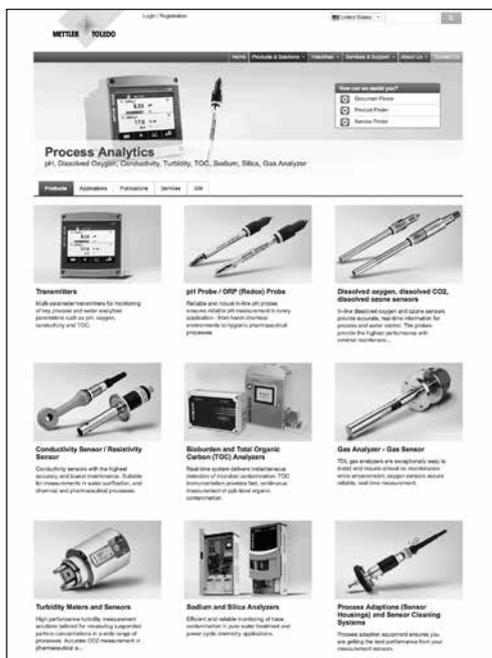
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