

DULCOMETER® Instrumentation

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“DULCOMETER® Instrumentation” T.O.C. VIII

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polymer blending & dry feed solutions

ProMinent® DULCOMETER® Analyzers

DULCOMETER® Measuring and Control Units

DULCOMETER® measuring and control units combine maximum process safety with a broad application spectrum. Different measured variables can be accurately determined. Depending on the application, the control behavior of DULCOMETER® measuring and control unit is adapted to meet the relevant application. Different designs permit flexible use.

Advantages at a glance:

High measuring reliability, e.g. thanks to symmetrical input for pH/ORP

High measuring accuracy, e.g. thanks high-impedance input for pH/ORP

Minimum disturbance, e.g. thanks to alternating current disturbance suppression

Two-wire technology for disturbance-resistant measurement

Highly versatile thanks to many options and different designs

DULCOMETER® measuring and control units, DULCOTEST® sensors with ProMinent® metering pumps - the complete control cycle, measuring-controlling-metering and recording, everything from one single source, perfectly coordinated.

Function	Compact Controller	D1Cb	D1Cc	DACb
Control outputs				
Control of metering pump by pulse frequency	✓	✓, 2	✓, 2	✓, 2/4
Control of solenoid valve/motor-driven metering pump	✓	✓	✓	✓
Interference variable processing (flow) via mA				✓
Interference variable processing flow via frequency (e.g. of contact water meter)				✓
Metering time monitoring with deactivation of the control variable	✓	✓	✓	✓
Output relay configurable as limit value relay	✓, 1	✓, 2	✓, 2	✓, 2
Cycle timer		✓, 2	✓, 2	✓, 2
Real time timer	✓, 2			
Outputs				
Analog output 0/4-20 mA	✓, 1	✓, 1	✓, 1	✓, 2/3
Outputs				
Data logger with SD card				✓
Web server via LAN				✓
Parameter set switch-over via timer				✓
Parameter set switch-over via contact				✓
PROFIBUS® DP				✓
Modbus RTU				✓
Subsequent extension of functions via enabling code		✓	✓	✓
Operating hour counter		✓	✓	✓

ProMinent® DULCOMETER® Analyzers

DULCOMETERz Measuring and Control Units

Function	Compact Controller	D1Cb	D1Cc	DACb
Measured variable				
pH	✓	✓	✓	✓
ORP	✓	✓	✓	✓
Chlorine	✓	✓	✓	✓
Chlorine dioxide		✓	✓	✓
Chlorite		✓	✓	✓
Bromine		✓	✓	✓
Conductivity, conductive	✓			✓
Conductivity, inductive	✓			
Conductivity via mA		✓	✓	✓
Peracetic acid		✓	✓	✓
Hydrogen peroxide		✓	✓	✓
Ozone		✓	✓	✓
Dissolved oxygen		✓	✓	✓
Fluoride		✓	✓	
0/4-20 mA standard signal general measured variables		✓	✓	✓
Power Supply				
90-253V	✓	✓	✓	
~24 V DC				✓
Method of installation, degree of protection				
Wall mounted IP 65		✓		
Panel mounted, IP 54			✓	
Combination housing (wall-mounting, pillar assembly) IP 66 + IP 67. Installation on control	✓			✓
Measurement				
Number of measuring channels	1	1	1	2 or 3 optionally
Sensor monitoring of pH	✓	✓	✓	✓
Temperature compensation for pH	✓	✓	✓	✓
Temperature compensation for conductivity	✓			
pH compensation for chlorine				✓
Control				
PID controller	✓	✓	✓	✓
Monodirectional controller (ex. with pH acid or	✓			✓
Bidirectional controller (ex. with pH acid or alkali)		✓	✓	✓
Control Inputs				
Digital control inputs	✓, 1	✓, 1	✓, 1	✓, 4/7

product overview

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motor-driven metering pumps

pump spare parts & accessories

DULCOMETER® instrumentation

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polymer blending & dry feed solutions

ProMinent® D1Cb and D1Cc Analyzers

D1Cb/D1Cc Single Channel Controller

- Flexibly upgradable thanks to subsequent activation option for functions by means of activation code
- Equipped for the essential basic requirements in water treatment
- Large, illuminated graphic display
- Operator guidance with clear text menu available in 14 languages in the controller
- Automatic buffer detection for pH

Standard configuration

The following functions are included in the D1Cb/D1Cc controller (the measured variables depend on the type of connection of the measured variable)

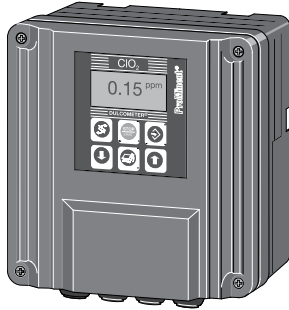
- Sensor monitoring for pH
- Switchable between all measured variables via mV or mA
- 2 power relays for limit value monitoring or timer functions
- Metering time monitoring with switch-off of the control variable
- Extended range voltage supply: 90-253 V, 50/60 Hz
- mA sensor input safely protected against short-circuit and polarization reversal
- Method of installation, wall mounting: D1Cb
- Method of installation, control panel: D1Cc

Applications

- Waste water treatment
- Cooling water treatment
- Treatment of potable water
- Neutralization

ProMinent® D1Cb and D1Cc Analyzers

Technical Data



Wall Mount

Measurement range:	Type of connection mV: pH 0.00 ... 14.00 ORP +1000 mV Type of connection mA: Chlorine: 0.00...0.500/2.00/5.00/10.0/20.0/50.0/100.0 ppm Chlorine dioxide: 0.00...0.500/2.00/10.0/20.0 ppm Chlorite: 0.02...0.50/0.1...2 ppm Bromine: 0.02...2.0/0.1...10.0 ppm Ozone: 0.00...2,00 ppm Hydrogen peroxide, sensor PER1: 2.0...200.0/20...2,000 ppm Hydrogen peroxide, sensor PEROX: 0...20/200/2,000 ppm, 1 vol.% Peracetic acid: 1...20/10...200/100...2,000 ppm Dissolved oxygen: 0.1...10/0.1...20 ppm pH: 0.00...14.00 ORP: 0...+1000 mV Conductivity: 0...20/200/1,000 mS/cm
Resolution:	pH: 0.01 pH / ORP:1 mV Amperometric 0.001/0.01 ppm/l/0.1 %
Accuracy:	0.5 % from measurement range
Measurement input:	SN6 (input resistance > 0.5 x 10 ¹² Ω)
Correction variable:	Temperature via Pt 100 (conductivity or PT1000)
Correction range temp.:	50 - 113 °F (10 - 45°C) (pH and conductivity only)
Control characteristic:	P/PID control
Control:	2-way control
Signal current output:	1 x electrically isolated 0/4-20 mA max. load 450 Ω Adjustable range and direction (measured, correction and control variable)
Control outputs:	2 reed contacts (pulse rate, for pump control) 2 relays (pulse length, 3P or limit value) 1 x 0/4-20 mA
Alarm relay:	250 V~3 A, 700 VA changeover contact
Power supply:	90 - 253 V, 50/60 Hz
Ambient temperature:	Wall mounted: 23 - 122°F (-5 - 50°C)



Panel Mount

Mounting

- **Wall mount:** Nonmetallic enclosure with protective gland-style strain relief cable sockets
 Dimensions: 7.79"H x 7.87"W x 3.00"D (198 mm x 200 mm x 76 mm)
 Weight: Approx. 2.6 lbs. (1.2 kg) Shipping Weight: 4.4 lbs. (2.0 kg)
 Mounting: Detachable wall mount bracket
 Protection class: NEMA 4X (IP 65)
- **Panel mount:**
 Dimensions: 3.78"H x 3.78"W x 5.70"D (96 mm x 96mm x 145 mm)
 Protection class: NEMA 3 (IP 54) when mounted in panel

ProMinent® D1Cb and D1Cc Analyzers

Specifications

Temperature data (Panel Mount)

Permissible ambient temperature

Basic version:

Control panel installation: 32° to 122°F (0° to 50°C)
Installation in wall-mounted housing: 23° to 113°F (-5° to 45°C)

Extended version (with status feedback or with correction value via mA or with disturbance variable via mA):

Control panel installation: 32° to 113°F (0° to 45°C)
Installation in wall-mounted housing: 23° to 104°F (-5° to 40°C)
Control panel installation: 14° to 158°F (-10° to 70°C)

Permissible storage temperature:

Material data/chemical resistance:

Part	Material
Housing and frame	PPO GF 10
Rear panel	PPE GF 20
Membrane keypad	Polyester film PET
Seal, outside	Cellular rubber CR
Seal, inside	Silicon-based sealing compound
Retaining clip and screws	Galvanized steel

Temperature data (Wall Mount)

Permissible ambient temperature

Basic version:

23° to 122°F (-5° to 50°C)
Installation in wall-mounted housing: 23° to 113°F (-5° to 45°C)

Extended version (with status feedback or with correction value via mA or with disturbance variable via mA):

23° to 104°F (-5° to 40°C)
14° to 158°F (-10° to 70°C)

Permissible storage temperature:

Material data/chemical resistance:

Part	Material
Housing	Luranyl PPE GF 10
Membrane keypad	Polyester film PET
Housing seal	Cellular rubber CR
Outer seal	Cellular rubber CR
Retaining bracket	Galvanized steel
M5 screws	A2

Standards:

Supply voltage in accordance with DIN IEC 38
Electrical safety in accordance with EN 61010-1
Electromagnetic emitted interference in accordance with EN 55011 Gr.1/C1.A
CSA special inspection

Electrical data:

Rated voltage: Max. power input:

Panel Mount	Wall Mount
115/230 VAC, 50/60 Hz	115/230 VAC, 50/60 Hz
140 mA at 115 V	120 mA at 115 V
70 mA at 230 V	60 mA at 230 V
Internal fuse protection:	Internal fuse protection:
Fine-wire fuse 5 x 20 mm	Fine-wire fuse 5 x 20 mm
250 V slow-blow	250 V slow-blow
100-115 V = 315 mA	100-115 V = 315 mA
200-230 V = 160 mA	200-230 V = 160 mA

Rated voltage: Max. power input:

Internal fuse protection:

100/200 VAC, 50/60 Hz
150 mA at 100 V
75 mA at 200 V
Fine-wire fuse 5 x 20 mm
250V slow-blow
100-115 V = 315 mA
200-230 V = 160 mA

Electrical data for both wall mount and panel mount D1C's

Rated voltage: Internal fuse protection:

24 VDC or 24 VAC, 50/60 Hz (low voltage operation only)
Fine-wire fuse 5 x 20 mm
250 V slow-blow, 100-115 V = 315 mA, 200-230 V = 160 mA

ProMinent® D1Cc and D1Cc Analyzers

Specifications (cont.)

Sensor input via SN6 socket:	<p>Input impedance > 10¹² W</p> <p>Input impedance with reference electrode with respect to:</p> <p>Device ground: <1 kW</p> <p>Input range: ±1 V</p> <p>Accuracy: ±0.5% of input range</p> <p>Resolution: 0.0625% of input range</p> <p>Connection facility for one potential equalization electrode (solution ground). As an alternative, two connection terminals can be connected with a wire jumper.</p>
Sensor input via terminals:	<p>Input impedance: >5 x 10¹¹ W</p> <p>Input impedance with reference electrode with respect to:</p> <p>Device ground: <1 kW</p> <p>Input range: ±1 V</p> <p>Accuracy: ±0.5% of input range</p> <p>Resolution: 0.0625% of input range</p> <p>Connection facility for one potential equalization electrode (solution ground). As an alternative, two connection terminals can be connected with a wire jumper.</p>
Standard signal input for measured variable:	<p>Input range: 0/4...20 mA (programmable)</p> <p>Input impedance: 50 W (Panel Mount) and (Wall Mount)</p> <p>Accuracy: 0.5% of input range</p> <p>Resolution: 0.014/0.012 mA</p> <p>Supply voltage and current for external electronics: 20 V ±0.5 V, 20 mA</p>
Standard signal input for correction measured value or disturbance variable mA:	<p>Galvanically isolated from remaining inputs and outputs</p> <p>Insulation voltage: 500 V</p> <p>Input range: 0/4...20 mA (programmable)</p> <p>Input resistance: 50 W</p> <p>Accuracy: 0.5% of input range</p> <p>Resolution: 0.014/0.012 mA</p> <p>Supply voltage and current for external electronics: 23 V ±1 V, 20 mA (Panel) 19 V ±1.5 V, 20 mA (Wall)</p>
Pt100 input:	<p>Input range: 32° to 212°F (0° to 100°C)</p>
Pt1000:	<p>Accuracy: ±0.5°C</p> <p>Resolution: 0.1°C</p>
Digital inputs:	<p>Common reference potential with respect to each other and with the RS 232 interface, but galvanically isolated from remaining inputs and outputs</p> <p>Insulation voltage: 500 V (Wall Mount only)</p>
Status signaling input:	<p>Galvanically isolated from remaining inputs and outputs</p> <p>Insulation voltage: 500 V</p> <p>Potentiometer to be connected: 800 W ...10 kW</p> <p>Accuracy (without potentiometer error): 1% of input range</p> <p>Resolution: 0.5% of input range</p>
Current output:	<p>Galvanically isolated from remaining inputs and outputs</p> <p>Insulation voltage: 500 V (Wall Mount only)</p> <p>Output range: 0/4...20 mA (programmable)</p> <p>Maximum load: 600 W</p> <p>Accuracy: 0.5% of output range with respect to displayed value</p>
Frequency outputs (Reed relay)	<p>Type of contact: n/o contact, interference suppressed with varistors</p> <p>Load capacity: 100 V peak, 0.5 A switching current (Panel Mount) 25 V peak, 0.5 A switching current (Wall Mount)</p>
for pump control:	<p>Contact service life: >50 x 10⁶ switching operations at contact load 10 V, 10 mA</p> <p>Max. frequency: 8.33 Hz (500 strokes/min)</p> <p>Closing time: 100 ms</p>
Power relay output for alarm signaling:	<p>Type of contact: Changeover contact, interference suppressed with varistors</p> <p>Load capacity: 250 VAC, 3 A, 700 VA</p> <p>Contact service life: >50 x 10⁶ switching operations (Panel Mount) >20 x 10⁶ switching operations (Wall Mount)</p>

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ProMinent® D1Cb and D1Cc Analyzers

Specifications (cont.)

<i>Power relay output</i>	Type of contact:	n/o contact, interference suppressed with varistors
<i>for control variable output</i>	Load capacity:	250 VAC, 3 A, 700 VA
<i>or limit value signaling:</i>	Contact service life:	>20 x 10 ⁶ switching operations

Electrotechnical Safety/Radio Interference Protection:

	EC low voltage directive (73/23/EEC) subsequently 93/44/EEC
	EC EMC directive (89/336/EEC) subsequently 92/31/EEC
	Supply voltage in accordance with DIN IEC 38
	Electrical safety in accordance with EN 61010-1
	Electromagnetic emitted interference in accordance with EN 55011 Gr. 1/CI B
	Noise immunity in accordance with IEC 801-2, -3, -4 or DIN VDE 0843, Part 2, Part 3, Part 4 or EN 50082-2
<i>EN 60335-1:</i>	Safety of electrical devices for domestic use
<i>EN 50081-1:</i>	EMC, emitted interference, residential
<i>EN 50082-2:</i>	EMC, noise immunity, industrial
<i>EN 60555-2:</i>	EMC, reactions in power supply networks, harmonics
<i>EN 60555-3:</i>	EMC, reactions in power supply networks, voltage fluctuations

ProMinent® D1Cb and D1Cc Analyzers

Identcode Ordering System D1C (Version b & c)

D1C Series																		
B	Wall mount version																	
C	Panel mount version																	
Type of Mounting:																		
W	Wall mounting (IP 65, D1Cb only)																	
D	Panel mounting (IP 54, D1Cc only)																	
Execution:																		
00	w/h LCD + keypad, w/h PM - Logo																	
Operating Voltage:																		
6	90 - 253 VAC 50/60 Hz																	
Approvals:																		
01	CE approval																	
Hardware add-on I:																		
0	None																	
Hardware add-on II:																		
0	None																	
1	RC protection for power relays (only D1Cb)																	
External connection:																		
0	None																	
Preset software functions:																		
V	Preset software functions																	
Measured Variables:																		
0	None								I	Chlorite								
A	Peracetic acid								P	pH								
B	Bromine								R	ORP (Redox)								
C	Chlorine								S	0/4-20 mA norm signal								
D	Chlorine dioxide								X	Dissolved oxygen								
F	Fluoride								Z	Ozone								
H	Hydrogen peroxide								T	Temperature via mA transducer								
L	Conductivity via mA transducer								*Must include signal converter (pn. 809128)									
Connection of measured variable:																		
1	Standard signal 0/4-20 mA, all measured variables																	
2	SN6 plug (mounting type "W" D1Cb only)																	
5	mV input for pH/redox via guard terminal																	
Correction variable:																		
0	None																	
2	Temperature Pt 100 / Pt 1000 (pH/conductivity)																	
4	Manual temperature input (pH/conductivity)																	
Control inputs:																		
0	None																	
1	Pause																	
Signal Output																		
0	None (Standard)																	
1	4-20 analog output																	
Relay Outputs:																		
G	Alarm and 2 limit relays or 2 timer relays																	
M	Alarm and 2 limit relays or 2 relays																	
Pump pacing:																		
0	No pumps																	
2	Two pumps																	
Control Action:																		
0	None																	
1	Proportional control																	
2	PID control																	
Language:																		
00	Language neutral																	
D1C	B	W	00	6	01	0	0	0	V	0	1	0	0	0	G	0	0	00

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ProMinent® D1Cb and D1Cc Analyzers

Fluoride Monitoring System

The D1C fluoride monitoring system incorporates the first buffer or reagent-free, ion specific sensor with a DULCOMETER® D1C fluoride monitor. The monitor features upper and lower limit relays with alarm, and analog output for recording.

Note: The fluoride D1C is for monitoring only.

Measuring Principle & Application

The D1C fluoride monitoring system is based on the principles of potentiometric measuring using a reagent-free, ion specific sensor & reference electrode. The fluoride sensor features a continuous electrode activation function, ensuring long-term stability of the measurement without the need for frequent recalibration or conditioning chemicals. The fluoride sensor automatically compensates temperature, but a temperature sensor is also used to compensate for fluctuation during application.

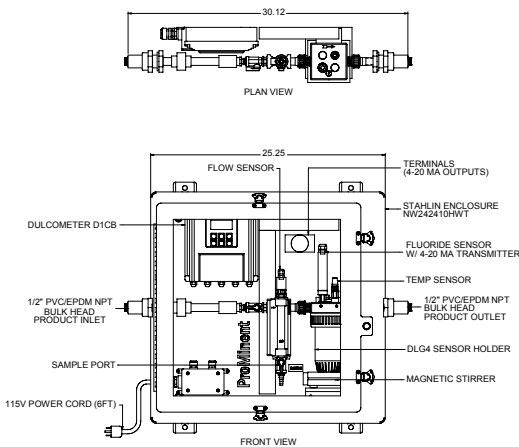
The fluoride sensor is recommended for use in water treatment only (patent pending). We recommend installation at atmospheric pressure.

Measuring Ranges & Operating Conditions of Fluoride Sensor

Measurement Range:	0.05 to 10 ppm fluoride
pH Operating Range:	5.5 to 8.5
Temperature Range:	34 to 95°F (1 to 35°C)
Max. Operating Pressure:	101.5 psi (7 bar) Note: the maximum admissible operating pressure for the monitoring system is 14.5 psi (1 bar) determined by the in-line sensor housing.
Sensor Response Rate T₉₀:	approx. 30 seconds
Reproducible Measuring Accuracy:	0.1 ppm
Measurement Water Flow Rate:	16 gph (60 L/h)

Fluoride Monitoring System

Part No.
7744836



- D1C Fluoride Monitor
- Fluoride sensor: FLE 010 SE with PG 13.5 male threaded connector & SN6 plug
- Reference electrode REFP-SE with PG 13.5 male connector & SN6 plug
- Temperature sensor: PT 100 SE with PG 13.5 connector & SN6 plug
- 4-20 mA Measurement transducer: FV1 for connection to fluoride monitor & reference electrode
- DLG IV In-line sensor housing: with PG 13.5 threaded connector
- Sample outlet
- Magnetic stirrer and magnet
- PVC piping with ball stop/adjusting valve, rotameter with limit contact, sampling tap
- Sample inlet
- 115V Power cord, connectors from monitor to sensors
- PP Backpanel

Options

Stand Base	7744837
NEMA 4X enclosed	7744711
Heater	7744722
Sun shield	7744723

ProMinent® D1Cb and D1Cc Analyzers

Fluoride Monitoring System Accessories

Replacement Sensors

FLEP 010 Fluoride Sensor with PG 13.5 male threaded connector and SN6 plug	1028279
REFP-SE Reference Electrode with PG 13.5 male connector and SN6 plug	1018458
PT 1000 SE Temperature Sensor with PG 13.5 male connector and SN6 plug	1002856
FPV1 4-20 mA Measurement Transducer for connection to fluoride monitor and reference electrode	1028280

Fluoride Photometer

The D2TA or D2TB Photometer (see page 229) can be used to calibrate the fluoride monitor.

Measurement Range:	DT2A	0.05 to 2 mg/L fluoride
	DT2B	0.05 to 2 mg/L fluoride
		0.05 to 6 mg/L free or total chlorine
		0.01 to 11 mg/L chlorine dioxide

D2TA kit with carry case	1010383
D2TB kit with carry case	1010394

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ProMinent® D1Cb and D1Cc Analyzers

Overview: Hydrogen Peroxide and Peracetic Acid

Measuring principle

The Perox measuring systems are based on amperometric/potentiostatic measuring principles incorporating several special features compared to conventional measuring technologies. The platinum [hydrogen peroxide (H₂O₂) measurement] or gold (peracetic acid measurement) working electrode with a small surface area is covered by a microporous membrane cap to achieve a degree of selectivity and independence from flow influences. The entire stainless steel shaft of the Perox sensor serves as the counter-electrode. This represents the complete sensor section for H₂O₂ measurement; a reference pH electrode is also required for peracetic acid measurement.

A special, continuous electrode activation facility which represents the actual know-how, ensures long-term stability of the measurement without the need for frequent recalibration.

Since all amperometric measure-

ment methods are relatively dependent of temperature, we recommend additional temperature compensation with the Pt 100 sensor if temperature fluctuations occur during applications. With the Pt 100, H₂O₂ measurement is a 2-electrode system while peracetic acid measurement is based on a 3-electrode system.

Applications

The environmentally-friendly substance hydrogen peroxide is used to an increasing extent in process control applications as an oxidizing or reduction agent. Examples of applications where continuous Perox H₂O₂ measurement control is used either alone or in advanced oxidation systems (with ozone, UV or Fenton's reagent) are:

- Odor control scrubbers
- Ground water purification
- Drinking water oxidation
- Utility water/cooling water disinfection
- Dechlorination, e.g. in chemical

processes

- Landfill leachate treatment
- Biotechnology
- Vat dying/textile industry
- Swimming pool water disinfection

Peracetic acid as a disinfectant is used in the following industries:

- Food and beverage
- Cosmetics
- Pharmaceuticals
- Medicine

Continuous measurement and control is necessary wherever more demanding requirements are made with regard to disinfection and quality assurance.

Increasing the peracetic acid concentration in CIP processes as well as concentration control in bottle cleaning machines are typical applications of Perox peracetic acid measurement.

Operating conditions

Measuring ranges and applications	H ₂ O ₂	Peracetic acid
Measuring range (selectable) mg/l	1 - 20 / 10 - 200 / 100 - 2000	10 - 200 / 100 - 2000
pH range	pH 2.5 - 10	pH 1 - 8
Temperature range	32 - 104°F (0 - 40°C)	41 - 95°F (5 - 35°C)
Permissible changes in temperature	less than 0.9°F (0.5°C) per minute	
Sensor response rate T ₉₀ approx.	20 seconds	2 minutes
Reproducible measuring accuracy	better than 2% referred to end value of measuring range	
Min. conductivity of measurement solution at:		
measuring range 20 mg/L	50 µS/cm	-
measuring range 200 mg/L	200 µS/cm	500 µS/cm
up to 1000 mg/L	500 µS/cm	2000 µS/cm
up to 2000 mg/L	1000 µS/cm	4000 µS/cm
Measurement water flow rate	recommended 16 gph (60 L/h)	
Max. operating pressure	29 psig (2 bar)	

Depending on the application, other parameters or water constituents may be of significance. For instance, higher concentrations of surface-active substances, such as fats or tensides, or suspended solids can have a detrimental effect on the measurement.

ProMinent® D1Cb and D1Cc Analyzers

Hydrogen Peroxide Analyzers

Perox Signal Converter

The signal converter controls and activates the hydrogen peroxide sensor and evaluates the sensor signal. It is screw-mounted directly on the head of the sensor.

The signal converter has a length of approx. 8.1" (205 mm) and a 1.25" (32 mm) Ø.

Signal converter for H₂O₂ measurement

A changeover switch for the three measuring ranges 1 - 20, 10 - 200 and 100 - 2000 mg/L H₂O₂ is located on the inside.

	Part No.
Perox-micro-H 1.20-mA	741129

In-line Sensor Housing

The DLG-PER in-line sensor housing must be used for hydrogen peroxide measurement where all (max. 3) individual sensors are installed in a measuring cup. A limit sensor must also be used which switches off the power supply for the signal converter when the measuring cup is removed. The DLG-PER in-line sensor housing features a body made of rigid PVC with a transparent polyamide cup and measurement water connection with 1/2" MNPT fittings.

DLG-PER In-line sensor housing (includes limit sensor with 2 n/o contacts)	1000165
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Two-wire cable for connection between the limit switch on the DLG-PER and the controller - priced per foot (specify length)	7740215
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For calibration of the DLG-PER in-line sensor housing, we recommend a magnetic stirrer to facilitate flow independent calibration.

Magnetic stirrer 115 VAC	7790915
Stirrer magnet	7790916
Mounting bracket for magnetic stirrer PVC (includes screws with wall anchor)	1000166

Accessories/Spare Parts

Replacement membrane cap:

M 2.0 P for H ₂ O ₂	792978
Polishing paste for Perox sensor, 3 oz. (90 g) tube	559810

ProMinent® D1Cb and D1Cc Analyzers

Peracetic Acid Analyzers

Perox Signal Converter

The signal converter controls and activates the peracetic acid sensor and evaluates the sensor signal. It is screw-mounted directly on the head of the sensor.

The signal converter has a length of approx. 8.1" (205 mm) and a 1.25" (32 mm) Ø.

Signal converter for peracetic acid measurement

A changeover switch for the two measuring ranges 10 - 200 and 100 - 2000 mg/L peracetic acid is located on the inside; the standard scope of delivery includes a measuring line with SN6 plug connector to facilitate connection to the reference electrode.

	Part No.
Perox-micro-P 1.30-mA	741128

In-line Sensor Housing

The DLG-PER in-line sensor housing must be used for peracetic acid measurement where all (max. 3) individual sensors are installed in a measuring cup. A limit sensor must also be used which switches off the power supply for the signal converter when the measuring cup is removed. The DLG-PER in-line sensor housing features a body made of rigid PVC with a transparent polyamide cup and measurement water connection with 1/2" MNPT fittings.

DLG-PER In-line sensor housing (includes limit sensor with 2 n/o contacts)	1000165
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Two-wire cable for connection between the limit switch on the DLG-PER and the controller - priced per foot (specify length)	7740215
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For calibration of the DLG-PER in-line sensor housing, we recommend a magnetic stirrer to facilitate flow independent calibration.

Magnetic stirrer 115 VAC	7790915
Stirrer magnet	7790916
Mounting bracket for magnetic stirrer PVC (includes screws with wall anchor)	1000166

Accessories/Spare Parts

Replacement membrane cap: M 2.0 B for peracetic acid	809154
Polishing paste for Perox sensor, 3 oz. (90 g) tube	559810

ProMinent® diaLog DACb

DACb Multi-parameter Controller: Overview



Water parameter analysis made easy – with the DULCOMETER® diaLog DACb. With its specially designed functionalities, processing or interference variables and switchover of control parameters, it closes the control circuit between DULCOTEST® sensors and ProMinent® metering pumps.

The two measuring and control channels of the DULCOMETER® diaLog DACb can be individually configured to meet customer requirements. Everything that you need for the reliable treatment of industrial process water, potable water, and swimming pool water.

Your Benefits

- Simple operation thanks to a clearly arranged display
- More for your money: two measuring and control channels
- Versatile use: all common measured variables can be set per Channel and reconfigured as needed
- Control from everywhere: LAN-capable and convenient remote access via integrated web server
- Maximum flexibility: individually adjustable to different operating statuses, example: Day-Night mode
- Excellent process safety and reliability: precise metering by time-based monitoring of control variables
- Minimal time and effort: effortless duplication of device settings
- Precise monitoring and documentation: Event, calibration and measured data logger with easy-to-access SD memory card
- Optimum communication: Integration into customer networks through different fieldbus systems (PROFIBUS® DP and Modbus RTU, PROFINET)

Technical Details

- Measured variables: pH, ORP, chlorine, chlorine dioxide, chlorite, bromine, conductivity, peracetic acid, hydrogen peroxide, ozone, dissolved oxygen and fluoride
- Method of installation, degree of protection: Combination housing (wall mounting, control panel mounting, pillar assembly) IP 67 and IP 66
- Control: two measuring and control channels, each with independent monodirectional PID controller (optional: two bidirectional PID controllers)
- Temperature compensation for pH and for chlorine dioxide process sensor CDP, pH compensation for chlorine
- Digital inputs for the processing of control signals, of process water limit contacts, remote stop control and to monitor the liquid levels in chemical storage tanks
- Control outputs for electronically controlled metering pumps and solenoid valves
- Interference variable processing: simple control of water parameters in flowing water by processing the flow in the control algorithm
- Adaptation of the controller set point to changed process conditions is possible via remote control by means of the mA signal of a PLC Programmable Logic Controller or with higher requirements via the fieldbus option

ProMinent® DACb

DACb Multi-parameter Controller: Technical data

Measuring range	mV connection type: pH: 0.00 - 14.00 ORP voltage: (-1500) - (+1500) mV Connection type mA (amperometric measured variables, measuring ranges corresponding to the sensors): Chlorine Chlorine dioxide Chlorite Bromine Ozone Hydrogen peroxide (PER sensor) Hydrogen peroxide (PEROX sensor with PEROX transducer V2 Order No. 1047979) Peracetic acid Dissolved oxygen Connection type mA (potentiometer measured variables, measuring ranges corresponding to the transmitter): pH ORP voltage Fluoride Conductivity (measuring ranges corresponding to the transmitters): via Transmitter 0/4 - 20 mA Temperature: via Pt 100/Pt 1000, measuring range 32°F - 302°F
Resolution	pH: 0.01 ORP voltage: 1 mV Temperature: 32.18°F
Accuracy	Amperometric analysis (chlorine etc.): 0.001/0.01 ppm, 0.01 vol.%, 0.1 vol.% 0.3% based on the full-scale reading
Measurement input	pH/ORP (input resistance > 0.5 x 10 ¹² Ω)
Temperature compensation	Pt 100/Pt 1000 for pH, chlorine dioxide (CDP) sensor and fluoride
Correction range	32°F - 302°F
pH compensation range for chlorine	Sensor CLE 3 and CLE 3.1: 6.5 - 8.5, sensor CBR: 6.5 - 9.5
Disturbance signals	Flow via 0/4 - 20 mA or contact water meter 1 - 500 Hz, the interference variable acts on both channels
Control characteristic	P/PID control
Control	2 x bidirectional control
Analogue outputs	2 (3) x 0/4 - 20 mA electrically isolated, max. load 450 Ω, range and assignment (measured, correction, control variable) can be set
Control outputs	2 x 2 pulse frequency outputs for metering pump control 2 relays (limit value, 3-point step or pulse length control)
Alarm relay	250 V ~3 A, 700 VA contact type changeover contact
Digital control inputs	2 (5) as a remote-control input for the functions pause control / sample water fault, parameter set switch-over, level monitoring of chemical tanks
Electrical connection	90 - 253 V, 50/60 Hz, 25 VA, 24 V DC
Field bus connection	PROFIBUS®-DP, Modbus RTU, PROFINET
Ambient temperature	32°F - 122°F (for use indoors or with a protective enclosure)
Enclosure rating	Wall-mounted: IP 66 and IP 67 (NEMA 4X) Installation in the control cabinet: IP 54 for control cabinet door
Tests and approvals	CE, MET (corresponding to UL according to IEC 61010)
Housing material	PC with flame proofing equipment
Dimensions	9.84 x 8.66 x 4.80 mm (WxHxD)
Weight	2.86 lb

Standard equipment**Basic measuring variable**

- AA: 2 measuring channels with freely selectable measured variables for mA, including interference variable and pH compensation for chlorine
- VA: 2 measuring channels with freely selectable measured variables for mV (pH and ORP) and mA, including interference variable and pH compensation for chlorine
- VV: 2 measuring channels for pH and ORP
- L3: 2 measuring channels for the measured variable conductive conductivity
- PID controller with pulse frequency-based metering pump control for 2 metering pumps
- 2 analog outputs for measured value, correction value or control variable (dependent on the optional equipment)
- 4 digital inputs for sample water fault detection, pause and parameter switch-over
- 2 output relays selectable as limit value, cycle timer, real-time timer or intermittent programmable control output (depending on the optional equipment)
- Measured variables and language selection during commissioning
- Temperature compensation of the pH, chlorine dioxide (CDP) and fluoride measurement via Pt 100/Pt 1000
- Saving and transfer of device parameters by means of the SD card
- Calibration and event data logger (without SD card, data is saved in the controller)
- Interference variable processing (flow) via frequency (contact water meter)
- Subsequent upgrade of the software function by means of an activation key or firmware update

Optional equipment for 3rd pH measuring channel**Package 2**

- 3rd mA output
- Two additional metering pumps control
- External remote set-point via an analog signal for Channel 1

Package 3

- Third complete measuring and control channel with PID controller
- 3rd analog output for measured value, correction value or control variable (depending on the optional equipment)
- 3 additional digital inputs: level monitoring, pause and sample water alarm for Channel 2
- Temperature compensation of the pH, chlorine dioxide (CDP) and fluoride measurement

Package 4

- Combination of packages 2 and 3 (only one Channel for amperometric sensors is available with the interference variable mA)

Communication options:

- Measurement data logger with SD card
- Visualization of the measured data using a web server via LAN NS, PC/tablet and web browser
- PROFIBUS®-DP, Modbus RTU

Hardware extension:

- Protective RC circuit for output relay: Protects the output relay if inductive loads are to be switched (example: solenoid valves or motors), not with 24 V DC electrical connector

A complete measuring point comprises:

- Transmitter/controller DACb (see identity code)
- Fitting: DGMa, DLG III, immersion fitting
- pH sensor (identity code-dependent)
- ORP sensor (identity code-dependent)
- Chlorine, chlorine dioxide, chlorite, bromine, dissolved oxygen sensor
- Transducer for pH or ORP dependent on the cable length (> 10 m)
- Sensor cable

ProMinent® DACb

Identcode Ordering System DACb

DACb Version:															
Type of Mounting:															
W	Wall mounted														
Logo:															
00	with ProMinent Logo														
Operation Voltage:															
6	100-230VAC, 50/60Hz														
Channel 1 & 2															
AA	mA/mA Measurement input														
L3	2x Conductivity conductivity, Temperature														
VA	mV/mA Measurement input														
W	mV/mV Measurement input														
Channel 3:															
4	M&C + 2DP + 3DI + FFWRD + pH														
Software Presets:															
0	No default settings														
Channel Connections:															
0	Channel 1, 2 & 3 hardwired														
1	1x mV input on SN6 connection														
2	2x mV input on SN6 connection														
3	3x mV input on SN6 connection														
Connection of Digital Sensors:															
0	Without														
Communication:															
0	None														
A	Mod RTU (RS485 or R232)														
B	PROFIBUS DPV1														
E	Ethernet/LAN with Web Server														
Data Logger:															
1	with Data Logger														
Hardware Upgrade:															
0	None														
Approvals:															
01	CE														
Certificates:															
0	without														
Document Language:															
EN	EN														
DACb	W	00	4	AA	4	0	0	0	0	0	1	0	01	0	EN

product overview
 solenoid-driven metering pumps
 motor-driven metering pumps
 pump spare parts & accessories
 DULCOMETER® instrumentation
 DULCOTEST® sensors
 polymer blending & dry feed solutions

ProMinent® DACb Reagentless Analyzers

DACb Complete Package Part Numbers



Free Chlorine Package



Fluoride/ Total Chlorine Package

Part Number	Package Type	Part Number	Package Type
	Chlorine		Chlorine
1055407	2 PPM Total Chlorine	1083297	5 PPM Total/Total Chlorine
1055408	2 PPM Free Chlorine/pH	1093232	5 PPM Free/Total Chlorine/pH
1080700	2 PPM Total Chlorine/pH	1049062	10 PPM Total Chlorine
1083296	2 PPM Total/Total Chlorine	1049063	10 PPM Free Chlorine/pH
1093231	2 PPM Free/Total Chlorine/pH	1080702	10 PPM Total Chlorine/ pH
1079048	5 PPM Total Chlorine	1083298	10 PPM Total/Total Chlorine
1079050	5 PPM Free Chlorine/pH	1093233	10 PPM Free/Total Chlorine/pH
1080701	5 PPM Total Chlorine/pH	1081716	20 PPM Total Chlorine/pH
	Fluoride		
1058259	10 PPM Fluoride/ 2 PPM Total Chlorine		
1093227	10 PPM Fluoride		
	Hydrogen Peroxide (H₂O₂)		
1082570	2,000 PPM Hydrogen Peroxide		
	Peracetic Acid (PAA)		
1093229	200 PPM Peracetic Acid		
1093230	2,000 PPM Peracetic Acid		

ProMinent® Compact Controller

Overview: Compact



DULCOMETER
Compact

The Measuring Transducer DULCOMETER® Compact with control function for the measured variables pH and redox provides basic functions for applications in water treatment. It has a fixed configuration with the following features.

Summary of advantages:

- Measured variables pH and ORP (can be changed on the controller)
- Operation independent of the operating language (use of abbreviations, such as CAL, PARAM, CONFIG, ERROR)
- Illuminated display
- 3 LED display operating state (relay 1 / 2 active, Error)
- Sensor monitoring for pH
- P and PID control characteristics
- Selectable control direction (raise or lower measured value)
- Pulse frequency relay for control of metering pump
- Power relay can be configured as an alarm, limit value or pulse width modulated control output for metering pumps (connection function or switch on operating voltage)
- Analog output 4-20 mA can be configured as a writer output or control output
- Digital input to switch off the control or to process a sample water limit contact by remote control
- Temperature sensor input (Pt 1000) for temperature compensation of the pH and chlorine value

Applications

- Waste water treatment
- Treatment of drinking water
- Swimming pool water treatment

Technical Data

Measurement range:	pH: 0.00 - 14 ORP: -1000 - +1000 mV
Resolution:	pH: 0.01 pH ORP: 1 mV
Correction variable:	Temperature for pH via Pt 1000
Correction range:	32 - 248 °F, (0 - 120 °C)
Control characteristic:	P/PID
Control:	1-way controller with selectable control direction (raise/lower)
Signal current output:	1 x 4-20 mA galvanically isolated max. load 400 Ω Range and assignment (measured or actuating variable) can be set
Control outputs:	1 pulse frequency output for control of the metering pump 1 relay (alarm or limit value relay or pulse length control) 1 x analog output 4-20 mA
Electrical connection:	90 - 253 V ~
Ambient temperature:	14 - 140 °F, (-10 - +60 °C)
Enclosure rating:	IP 67
Dimensions:	135 x 125 x 75 mm (H x W x D)
Weight:	1.10 lbs, (0.5 kg)

Part no.

Compact controller for pH/ORP

1035638

ProMinent® DMT Transmitters

Overview: DMT

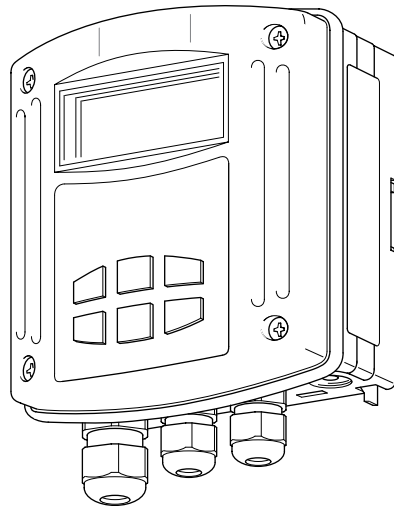
DULCOMETER® DMT type transmitters are compact 2-wire transmitters for measured variables pH, redox, chlorine, conductive conductivity, temperature. Easily combined with programmable memory controllers.

Summary of advantages:

- Reliable measurement
- High level of operating safety, e.g. probe monitoring (pH), electrical isolation
- Simple flexible installation
- Full text user guidance
- Automatic buffer recognition (pH)
- Autoranging (conductivity)
- Compact design
- Switch between pH, redox and temperature

Applications: process control, food and beverage industry, chemical and pharmaceutical industries, water treatment, waste water treatment, power plant

Technical Data



Measurement range:	pH -1.00 - 15.00 -1200...+1200 mV redox voltage 0.01...50.0 ppm/l chlorine -20 - +150 °C 1 µS/cm - 200 mS/cm (autoranging)
Cell constant:	0.006...12.0/cm for conductivity
Resolution:	pH 0.01 1 mV 0.1 % from measurement range for chlorine 0.1 °C Conductivity 1/1000 of display value (min. 0.001 µS/cm)
Reproducibility:	0.5 % from measurement range
Measurement input:	mV terminal (pH, redox); input resistance >5 x 10 ¹¹ Ω Chlorine terminal (DMT chlorine probes) Pt 100/1000 terminal Conductivity terminal (2 or 4 wire connector)
Correction variable:	Temperature via Pt 100/1000 (pH, chlorine, conductivity)
Correction range:	chlorine: 5 - 45 °C, pH: 0 - 100 °C, Cond: 0 - 100 °C
Current output:	4 - 20 mA, fault current 23 mA
Supply voltage:	16 - 40 V DC
Feed voltage:	2-wire transmitter, 16 - 40 V DC, nominal 24 V PROFIBUS® DP version, 16 - 30 V DC, nominal 24 V communication interface:
Communication interface:	PROFIBUS® DP (wall-mounted version only)
Ambient temperature:	-5 - +55 °C
Climatic conditions:	up to 95 % relative humidity (non-condensing)
Enclosure rating:	IP 65 (wall/pipe mounted) IP 54 (control panel installation)
Display:	graphical display
Housing:	PPE
Dimensions:	125 x 135 x 75 mm (WxHxD)
Weight:	approx. 450 g

A complete measuring station comprises the following:

- Measuring transducer DMTa (see Identcode)
- In-line probe housing: DGMa..., DLG III ..., immersible in-line probe housing
- Chlorine sensor
- Assembly set for chlorine sensor
- pH sensor
- Redox sensor
- Temperature sensor Pt 100 /Pt 1000
- Conductivity sensor
- Sensor cable
- PROFIBUS®-DP connection accessories

ProMinent® DMT Transmitters

Identcode Ordering System

DMT	Version:													
	A													
		Type of Mounting:												
		W	Wall mounted (also rail mounted)											
		S	Control panel installation¹											
		Logo:												
		0	With ProMinent® logo											
		Electrical connection:												
		9	Ring main 4-20 mA (two wire technology), operating voltage 16-40 V DC, nominal 24 V DC											
		5	PROFIBUS® DP, operating voltage 16 - 30 V DC, nominal 24 V DC (only if communication interface = PROFIBUS® DP)											
		Communication interface:												
		0	None											
		4	PROFIBUS® DP (assembly type W only)											
		Measured variable 1:												
		P	pH											
		R	Redox											
		T	Temperature											
		C	Chlorine											
		L	Conductivity											
		Measured variable 2 (Correcting value):												
		1	Temperature Pt 1000 / Pt 100											
		0	None (in the case of measured variable T)											
		Enclosure rating:												
		0	Standard											
		Language:												
		E	English											
		Presetting A, probe:												
		0	Standard ProMinent® buffer solution pH 4-7-10											
		Presetting B, probe:												
		0	Autom. Temperature measurement (standard)											
		1	Manual temperature measurement											
		2	Autom./manual temperature measurement											
		9	No temperature measurement											
		Presetting C, output:												
		0	Prop. Measured variable (standard)											
		1	Manual adjustable current value											
		2	Proportional or manual											
		3	Proportional or manual hold											
		4	4 mA constant current											
		Presetting C:												
		0	Standard											
DMT	A	W	0	9	0	P	1	0	E	0	0	0	0	0

ProMinent® Portable DT Photometer

Overview: Photometer

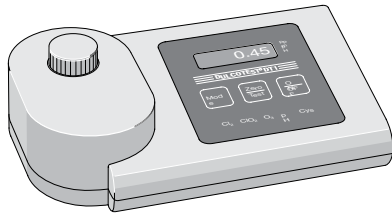
Photometer DT1, DT2, DT3 and DT4

- Portable compact Photometer
- Simple to operate with support text
- Reliable, simple measurement of chlorine, chlorine dioxide, fluoride, chlorite, H₂O₂, bromine, ozone, pH and cyanuric acid
- Self-diagnostic

Applications:

swimming pool, drinking water, process water

Technical Data



pk_5_021

<p>Measurement range of DT1:</p> <p>Measurement range of DT2B:</p> <p>Measurement ranges, DT3:</p> <p>Measurement ranges, DT4:</p> <p>Measuring tolerance:</p> <p>Battery:</p> <p>Ambient temperature:</p> <p>Relative humidity:</p> <p>Housing material:</p> <p>Keypad:</p> <p>Dimensions:</p> <p>Weight:</p>	<p>0.05...6.0 mg/l free chlorine (DPD 1) + total chlorine (DPD3) 0.1...13.0 mg/l bromine (DPD 1) 0.05...11 mg/l chlorine dioxide (DPD 1) 0.03...4.0 mg/l ozone (DPD 4) pH 6.5...8.4 (phenol red) 1...80 mg/l cyanuric acid</p> <p>0.05...2.0 mg/l fluoride 0.05...6.0 mg/l free chlorine and total chlorine 0.05...11.0 mg/l chlorine dioxide</p> <p>1 - 50 / 40 - 500 mg/l hydrogen peroxide</p> <p>0.03 - 2.5 mg/l chlorite, 0.05 - 11 mg/l chlorine dioxide, 0.05 - 6 mg/l chlorine</p> <p>Dependent upon measured value and measuring method</p> <p>9 V battery (approx. 600 x 4-minute measurement cycles)</p> <p>41 - 104° F (5 - 40 °C)</p> <p>30 - 90 % (non-condensing)</p> <p>ABS</p> <p>Polycarbonate</p> <p>7.5 x 4.3 x 2.2 in (190 x 110 x 55 mm (LxWxH))</p> <p>approx. 1 lb. (0.4 kg)</p>
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Part No.

Type DT1 photometer , complete with carrying case	1003473
Type DT2B photometer , complete with carrying case	1010394
Type DT3 photometer , complete with carrying case	1023143
Type DT4B photometer , complete with carrying case	1039318

Photometers supplied with accessories, container vessels and reagents.

Consumable items:

Part No.

DPD 1 buffer, 15 ml	1002857
DPD 1 reagent, 15 ml	1002858
DPD 3 solution, 15 ml	1002859
Phenol red tablets R 175 (100 in each)	305532
Cyanuric acid tablets R 263 (100 in each)	305531
SPADNS reagent, 250 ml for fluoride detection	1010381
Calibration standard fluoride 1 mg/l for calibration of photometer (fluoride detection)	1010382
3 spare cells: round cells with covers for DPD phenol red and cyanuric acid detection (DT1 and DT2B)	1007566
3 spare cells for fluoride detection (DT2A and B)	1010396
DPD reagents set, 15 ml each: 3 x DPD 1 buffer, 1 x DPD 1 reagent, 2 x DPD 3 solution	1007567
Chlorine dioxide tablets Nr. 1 R 127	501317
Chlorine dioxide tablets Nr. 2 R 128	501318

Spare parts

Chlorite meter:

Foamer for expulsion of chlorine dioxide (DT4)	1022754
3 No. spare cuvettes for chlorite determination	1007566

H₂O₂ meter:

Reagent for H ₂ O ₂ (DT3), 15 ml	1023636
Spare cuvettes, 5 No., for H ₂ O ₂ (DT3)	1024072

ProMinent® Cooling Tower & Boiler Controllers

MicroFLEX Controllers



ProMinent's microFLEX controller is the perfect economical solution that provides the latest in water management technology for Cooling Towers and Boilers. The microFLEX water treatment controller offers a worry-free thermal flow switch that does not require any user adjustments. It also integrates built-in diagnostics with real-time monitoring in a compact design (5.9"W x 5.9"H x 3.5"D).

Features

- **Models:** Boiler, Cooling, Condensate diverter, Closed loop – reverse conductivity
- **Inhibitor Modes:** Bleed & Feed, Bleed then Feed, Percent Time, Meter Volume
- **Inputs:** Conductivity, Meter, System status
- **Outputs:** Two Powered Relays
- **Standard:** Single point calibration, 2 Line – 16 Character LCD, Built-In Diagnostics NEMA 4X Enclosure, CE Approved, 5 Key Universal Keypad
- **Options:** Web Browser Interface for remote view and configuration or Dry contact alarm or 4-20mA out on conductivity

Identcode Ordering System

M02	Series Version:				
	A	MicroFLEX 2 Controller Version A: Two relay controller with conductivity and temperature inputs, single inhibitor feed based on water meter input, bleed or % time with overfeed protection, flow switch/status input, 2 line display and 5 key universal keypad.			
		Application:			
		COIN	Cooling Tower		
		BBIN	Boiler		
		CLAH	Closed loop reverse conductivity		
		CMAH	Condensate monitor		
		Expansion Option:			
		XX	None		
		CL	4-20 mA output on conductivity		
		LB	Ethernet networking		
		AR	Dry contact alarm relay		
		Remote communications:			
		0	None		
		Approvals:			
		01	Standard		
M02	A	COIN	XX	0	01

ProMinent® Cooling Tower & Boiler Controllers

MultiFLEX Controllers



ProMinent's MultiFLEX water treatment controllers exemplify the latest in water management technology. Packed with features, the MultiFLEX line of products are designed to provide the highest degree of control and flexibility. With one MultiFLEX you can control and monitor multiple towers, multiple boilers, or tower/boiler combos.

Features

- Control up to 4 Towers at once
- Control up to 8 Boilers at once
- Web Browser Accessible
- LAN Accessible
- Up to 14 Analog Inputs
- Twelve Digital Inputs
- Ten Relay Outputs
- Works with Trackster 3 Software 5-Key Universal Keypad
- 4 Line, 20 Character Backlit Display
- Easily Upgraded with Plug-in Modules
- Fully Programmable
- Ethernet with user definable static IP address
- NEMA 4X Enclosure
- 120 or 240VAC 50/60Hz, Switch Selectable
- CE Approved
- Supports "Percentage Time Bleed & Feed" ■

ProMinent® Cooling Tower & Boiler Controllers

Identcode Ordering System (M5)

M05	Series Version:												
	A	MultiFLEX 5 Controller Version A: Includes 5 universally controlled powered (120/240VAC) relays, 6 status/water meter digital inputs, 7 analog input/output channels, a 4 line 20 character back lit display, 5 key universal keypad and an Ethernet port with Browser communications. Can be programmed for cooling, boiler, process or mixture of all on one unit.											
		Application:											
	B	Boiler											
	T	Tower, combination, or monitor											
	X	Custom application with factory configuration											
		I/O Expansion Slot 'A' and 'B'. (*options marked are tower only):											
		XX	None				RR*	Dual ORP - Relay					
		B1	Single Boiler Conductivity with Blowdown Relay				O2*	Dual ORP - Monitor					
		BM	Single Boiler Conductivity - Monitor				OP*	ORP and pH - Relay					
		B2	Dual Boiler Conductivity with Blowdown Relay				MM*	ORP and pH - Monitor					
		BB	Dual Boiler Conductivity - Monitor				CR*	Single corrosion rate					
		CC	Boiler Condensate Conductivity/Temp - Relay				DC*	Dual corrosion rate					
		CN	Boiler Condensate Conductivity/Temp - Monitor				CI	Single 4-20 mA Input - Relay					
		PC	Single Boiler Condensate pH - Relay				IM	Single 4-20 mA Input - Monitor					
		PN	Single Boiler Condensate pH - Monitor				2I	Dual 4-20 mA Input 1 relay					
		CO*	Cooling Tower Conductivity/Temp - Relay				I2	Dual 4-20 mA Input 2 relays					
		CM*	Cooling Tower Conductivity/Temp - Monitor				2M	Dual 4-20 mA Input Monitor					
		PH*	Single Cooling Tower pH - Relay				II	Dual 4-20 mA Input (isolated) 1 relay					
		PM*	Single Cooling Tower pH - Monitor				I3	Dual 4-20 mA Input (isolated) 2 relays					
		PP*	Dual Cooling Tower pH - Relay				I4	Dual 4-20 mA Input (isolated) Monitor					
		P2*	Dual Cooling Tower pH - Monitor				IO	Single 4-20 mA Output					
		PT*	Single pH/Temp (Temperature compensated pH)				OO	Dual 4-20 mA Output					
		OR*	Single ORP - Relay				RS	Rate to Stroke driver					
		OM*	Single ORP - Monitor				CS	Conduct continuous sample monitor					
		I/O Expansion Slot 'C' and 'D':											
		XX	Use same selection options as expansion slot 'A' and 'B'										
		I/O Expansion Slot 'E' and 'F':											
		XX	Use same selection options as expansion slot 'A' and 'B'										
		I/O Expansion Slot 'G':											
		XX	Same choices as Slot A/B except only single expansion card options allowed										
		Pre-wired power relay plug box:											
		0	None		3	Three outlets							
		1	One outlet		4	Four outlets							
		2	Two outlets		5	Five outlets							
		Inhibitor powered relays (tower only):											
		0	None		3	Three							
		1	One		4	Four							
		2	Two										
		Timed biocide powered relays:											
		0	None		3	Three							
		1	One		4	Four							
		2	Two										
		Internal boiler treatment:											
		0	None		5	Five							
		1	One		6	Six							
		2	Two		7	Seven							
		3	Three		8	Eight							
		4	Four										
		Remote communications:											
		0	None										
		Feed verifications:											
		0	None		3	Feed verification (3)							
		1	Feed verification (1)		4	Feed verification (4)							
		2	Feed verification (2)										
		Operating Voltage:											
		A	115 VAC 50/60 Hz										
		B	230 VAC 50/60 Hz										
M05	A	B	XX	XX	XX	XX	0	0	0	0	0	0	A

product overview

solenoid-driven metering pumps

motor-driven metering pumps

pump spare parts & accessories

DULCOMETER® instrumentation

DULCOTEST® sensors

polymer blending & dry feed solutions

ProMinent® Cooling Tower & Boiler Controllers

Identcode Ordering System (M10)

M10	Series Version:																
A	MultifLEX 10 Controller Version A: Includes 10 universally controlled powered (120/240VAC) relays, 12 status/water meter digital inputs, 14 analog input/output channels, 4 line 20 character backlit display, 5 key universal keypad and an Ethernet port with Browser communications. Can be programmed for cooling, boiler, process or a mixture of all on one unit.																
	Application:																
	B	Boiler															
	T	Tower, combination, or monitor															
	X	Custom application with factory configuration															
	I/O Expansion Slot 'A' and 'B'. (*options marked are tower only):																
	XX	None	RR*	Dual ORP - Relay													
	B1	Single Boiler Conductivity with Blowdown Relay	O2*	Dual ORP - Monitor													
	BM	Single Boiler Conductivity - Monitor	OP*	ORP and pH - Relay													
	B2	Dual Boiler Conductivity with Blowdown Relay	MM*	ORP and pH - Monitor													
	BB	Dual Boiler Conductivity - Monitor	CR*	Single corrosion rate													
	CC	Boiler Condensate Conductivity/Temp - Relay	DC*	Dual corrosion rate													
	CN	Boiler Condensate Conductivity/Temp - Monitor	CI	Single 4-20 mA Input - Relay													
	PC	Single Boiler Condensate pH - Relay	IM	Single 4-20 mA Input - Monitor													
	PN	Single Boiler Condensate pH - Monitor	2I	Dual 4-20 mA Input 1 relay													
	CO*	Cooling Tower Conductivity/Temp - Relay	I2	Dual 4-20 mA Input 2 relays													
	CM*	Cooling Tower Conductivity/Temp - Monitor	2M	Dual 4-20 mA Input Monitor													
	PH*	Single Cooling Tower pH - Relay	I1	Dual 4-20 mA Input (isolated) 1 relay													
	PM*	Single Cooling Tower pH - Monitor	I3	Dual 4-20 mA Input (isolated) 2 relays													
	PP*	Dual Cooling Tower pH - Relay	I4	Dual 4-20 mA Input (isolated) Monitor													
	P2*	Dual Cooling Tower pH - Monitor	IO	Single 4-20 mA Output													
	PT*	Single pH/Temp (Temperature compensated pH)	OO	Dual 4-20 mA Output													
	OR*	Single ORP - Relay	RS	Rate to Stroke driver													
	OM*	Single ORP - Monitor															
	I/O Expansion Slot 'C' and 'D':																
	XX	Use same selection options as expansion slot 'A' and 'B'															
	I/O Expansion Slot 'E' and 'F':																
	XX	Use same selection options as expansion slot 'A' and 'B'															
	I/O Expansion Slot 'G' and 'H':																
	XX	Use same selection options as expansion slot 'A' and 'B'															
	I/O Expansion Slot 'I' and 'J':																
	XX	Use same selection options as expansion slot 'A' and 'B'															
	I/O Expansion Slot 'K' and 'L':																
	XX	Use same selection options as expansion slot 'A' and 'B'															
	I/O Expansion Slot 'M' and 'N':																
	XX	Use same selection options as expansion slot 'A' and 'B'															
	Pre-wired power relay plug box:																
	0	None	6	Six outlets													
	1	One outlet	7	Seven outlets													
	2	Two outlets	8	Eight outlets													
	3	Three outlets	9	Nine outlets													
	4	Four outlets	A	Ten outlets													
	5	Five outlets															
	Inhibitor powered relays (tower only):																
	0	None	3*	Three													
	1*	One	4*	Four													
	2*	Two															
	Timed biocide powered relays:																
	0	None	3	Three													
	1	One	4	Four													
	2	Two															
	Internal boiler treatment:																
	0	None	5	Five													
	1	One	6	Six													
	2	Two	7	Seven													
	3	Three	8	Eight													
	4	Four															
	Remote communications:																
	0	None															
	Feed verifications:																
	0	None															
	1	Feed verification (1)															
	2	Feed verification (2)															
	3	Feed verification (3)															
	4	Feed verification (4)															
	Operating Voltage:																
	A	115 VAC 50/60 Hz															
	B	230 VAC 50/60 Hz															
M10	A	B	XX	XX	XX	XX	XX	XX	XX	0	0	0	0	0	0	0	A

product overview
solenoid-driven metering pumps
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ProMinent® Cooling Tower & Boiler Controllers

Overview AEGIS II

The most innovative and flexible water treatment controller available

The new AEGIS II provides reliable control and offers the most flexible communication options to optimize efficiency and profitability for all your cooling, boiler, and waste water or disinfection applications.



Features:

- Built In Wireless Access Point, Bluetooth and Ethernet
- New Keypad design for easy menu navigation
- Enhanced responsive browser views for Smart Phones and Tablets
- Flurometer connection via 4-20mA or (Future) direct Modbus
- 8 digital inputs for multiple flow meters for status indicators
- 10 Status LED's
- Integral Data Logger
- (Future) Optional Modbus/BACnet communications
- 9 Flexible control outputs include: ON/OFF setpoint or time based control & Frequency (Pulse) Proportional or volumetric control
- Conductivity, pH, ORP, Corrosion, Chlorine, Bromine, PAA, CLO2, Fluorescence and more

Technical Data AEGIS II

	Rating - Detail	Notes
Analog-Digital I/O		
Conductivity Serial Sensor	Tower & Integral Flowswitch sensors	Default tower sensor includes 1 GPM integral flowswitch & temperature
Conductivity Sensor	Boiler & Condensate sensors	Standard sensor
Fixed Temperature Sensor Input	Thermal compensation for both pH and Conductivity	Displayed as oF, oC or oK
Fixed 4-20 mA Current Loop Input	Assignable to control any relay or variable frequency control	Single point calibration if 4 mA = 0
4-20 mA Current	DC isolated, Manual & Auto modes, Interlocking, Alarm	Each optional current output uses a dual sensor card slot
Manual-Inventory-Inputs	Track drop counts, inventory, tank level, ppm	Alarmed delay prevents premature system ppm alarms
Communications User Interface		
Keypad - OLED	9 Key tactile feedback, 3 Function keys, 4 line Backlit	
10/100 Mbps, TCP/IP Ethernet, wifi, (Optional LAN, Future Modbus & Modbus RTU)	HTML micro web server with user definable IP address	Static IP Browser shows controller in real time
Controls for ON/OFF & Variable Frequency		
Sequential Volume Setpoints	Feed a fixed volume for every make-up volume	Meter only, fault tolerant feed controls
Blocking	Any of 9 controls may block any other control	Prevents incompatible concurrent controls
Interlocking	Up to 4 contact sets can be 'AND'ed or 'OR'ed	Relays & Frequency controls OFF when contact set opens
Biocide Event Controls	Each of 9 controls includes 28 timed events	Each control selectable for 1, 7 & 28 day cycles
System		
Electrical	100-240 VAC, 50/60 Hz, Single Phase	Universal power supply
Fusing for 2 AC powered loads	6.3 Amps @ 250VAC	Alarm on open AC load fuse
Surge Suppression	5 snubbed contacts	RC / Varistor on AC line input
Enclosure	Non-metallic, IP 65 / NEMA 4X	13.46" x 8.94" x 3.07" (342 x 227 x 78 mm) (WxHxD)

ProMinent® Cooling Tower & Boiler Controllers

AEgis II Part Numbered Packages

AEgis II - Cooling Tower (with Panel)

Part Number	Description
1079066	Conductivity, dual biocide
1079067	Conductivity, dual biocide, pH w/acid feed
1079068	Conductivity, dual biocide, ORP w/bleach feed
1079069	Conductivity, dual biocide, pH w/acid feed, ORP w/bleach feed
1079070	Conductivity, dual biocide, pH w/acid feed, ORP w/bleach feed, CS and CU corrosion

AEgis II - Cooling Tower (with Pyxis)

Part Number	Description
1082241	Conductivity, dual biocide-includes Pyxis
1082242	Conductivity, dual biocide, pH w/acid feed-includes Pyxis
1082243	Conductivity, dual biocide, ORP w/bleach feed-includes Pyxis
1082244	Conductivity, single bio, pH w/acid feed, ORP w/bleach feed-includes Pyxis
1081939	Conductivity, single bio, pH w/acid feed, ORP w/bleach feed, CS and CU corrosion, includes Pyxis

AEgis II - Cooling Tower with Little Dipper

Part Number	Description
1082245	Conductivity, dual biocide-includes Little Dipper
1082246	Conductivity, dual biocide, pH w/acid feed-includes Little Dipper
1082247	Conductivity, dual biocide, ORP w/bleach feed-includes Little Dipper
1082248	Conductivity, single bio, pH w/acid feed, ORP w/bleach feed-includes Little Dipper
1082249	Conductivity, single bio, pH w/acid feed, ORP w/bleach feed, CS and CU corrosion, includes Little Dipper

AEgis II - Boiler (No Panel)

Part Number	Description
1079064	Single Boiler - 2
1079065	Dual Boiler / 2 chemical feed

Note: Other configurations available, please consult factory.

ProMinent® Cooling Tower & Boiler Controllers

Overview SlimFlex 5

The most innovative and flexible water treatment controller available

Say hello to flexible programming with ProMinent's SlimFlex 5 Built-in WiFi Hotspot. Enhanced, responsive browser views for smart phones and tablets makes programming fast and easy! Built-in Ethernet and integral data logger creates the total communications package for all of your cooling tower and boiler applications.



Features:

- Cooling Tower or Boiler
- 5 Flexible control outputs include: ON/OFF setpoint or time based control
- Built In Wireless Access Points, Ethernet and USB
- New Keypad design for easy menu navigation
- Enhanced responsive browser views for Smart Phones and Tablets
- pH and/or ORP along with conductivity
- 6 digital inputs for multiple flow meters or status indicators
- 6 Status LED's
- 5 Powered relays
- Integral Data Logger
- Conductivity, pH, ORP and Fluorometer
- Email out data and alarms

ProMinent® Cooling Tower & Boiler Controllers

Technical Data SlimFlex 5

	Rating - Detail	Notes
Analog-Digital I/O		
Conductivity Serial Sensor	Tower & Integral Flowswitch sensors	Default tower sensor includes 1 GPM integral flowswitch & temperature
Conductivity Sensor	Boiler & Condensate sensors	Standard sensor
4-20 mA Current	DC isolated, Manual & Auto modes, Interlocking, Alarm	Each optional current output uses a dual sensor card slot
Manual-Inventory-Inputs	Track drop counts, inventory, tank level, ppm	Alarmed delay prevents premature system ppm alarms
Communications User Interface		
Keypad - OLED	9 Key tactile feedback, 3 Function keys, 4 line Backlit	
10/100 Mbps, TCP/IP Ethernet, WiFi	HTML micro web server with user definable IP address	Static IP Browser shows controller in real time
Controls for ON/OFF & Variable Frequency		
Sequential Volume Setpoints	Feed a fixed volume for every make-up volume	Meter only, fault tolerant feed controls
Blocking	Any of 5 controls may block any other control	Prevents incompatible concurrent controls
Interlocking	Up to 4 contact sets can be 'AND'ed or 'OR'ed	Relays control OFF when contact set opens
Biocide Event Controls	Each of 5 controls includes 28 timed events	Each control selectable for 1, 7 & 28 day cycles
System		
Electrical	100-240 VAC, 50/60 Hz, Single Phase	Universal power supply
Fusing for 2 AC powered loads	6.3 Amps @ 250VAC	Alarm on open AC load fuse
Surge Suppression	5 snubbed contacts	RC / Varistor on AC line input
Enclosure	Non-metallic, IP 65 / NEMA 4X	13.46" x 8.94" x 3.07" (342 x 227 x 78 mm) (WxHxD)

ProMinent® Cooling Tower & Boiler Controllers

SlimFlex 5 Part Numbered Packages

SlimFlex 5 - Cooling Tower Panel

Part Number	Description
1095560	Conductivity
1095561	Conductivity, with dual 4-20mA Output
1095598	Conductivity, pH
1095599	Conductivity, pH, with dual 4-20mA Output
1095600	Conductivity,ORP
1095601	Conductivity,ORP, with dual 4-20mA Output
1095562	Conductivity, pH, ORP
1095563	Conductivity, pH, ORP, dual 4-20mA Output

SlimFlex 5 - Cooling Tower Panel with Pyxis

Part Number	Description
1095603	Conductivity - includes Pyxis
1095605	Conductivity, with dual 4-20 ma Output, includes Pyxis
1095607	Conductivity, pH, includes Pyxis
1095609	Conductivity, ORP, includes Pyxis
1095611	Conductivity, pH, ORP, includes Pyxis

SlimFlex 5 - Cooling

Part Number	Description
1095602	Conductivity, includes Little Dpper
1095604	Conductivity, with dual 4-20 mA Output, includes Little Dipper
1095606	Conductivity, pH, includes Little Dpper
1095608	Conductivity, ORP, includes Little Dpper
1095610	Conductivity, pH, ORP, includes Little Dpper

SlimFlex 5 - Cooling

Part Number	Description
1095564	Single Boiler Blowdown with chemical feed timers
1095565	Single Boiler Blowdown with chemical feed timers, dual 4-20 mA out
1095566	Dual Boiler Blowdown with chemical feed timers
1095567	Dual Boiler Blowdown with chemical feed timers, dual 4-20 mA out

Note: Other configurations available, please consult factory.

ProMinent® Cooling Tower & Boiler Controllers

Cooling Tower and Boiler Accessories

	Controller Choice	Part No.
Analog Sensors		
ORP Sensor Package - Chlorination with cable, Tee and probe holder	B,C, D	7760768
ORP Electrode, flat faced double junction 100 psi @175°F - cable required PN 1036595	B,C,D	7761399
PHED Sensor Package with cable, Tee and probe holder	B,C,D	7760729
pH Electrode, flat faced double junction 100 psi @ 175°F - cable required PN 1036595	B,C,D	7760998
Conductivity/Temperature Electrode 125 psi @125°F with Tee - Cooling applications	B,C,D	7760200
Aquatrac Conductivity/Temperature/Thermal Flow Switch CTF (Cooling)	A,B,D	7760021
Corrosion Rate Electrode, Admiralty	C,D	7760748
Corrosion Rate Electrode, Carbon Steel	C,D	7760746
Corrosion Rate Electrode, Copper	C,D	7760747
Corrosion Rate Electrode, Cupro-Nickle	C,D	7760750
Corrosion Rate Electrode, Stainless Steel	C,D	7760749
Corrosion Rate Electrode, Zinc	C,D	7760745
Aquatrac Thermal Flow Switch 100psi @125°F	A,B,C,D	7760175
Conductivity Electrode 3/4" NPT 250psi steam max (Boiler - standard sensor)	A,C,D	7760002
Conductivity/Temperature Electrode 250psi steam max 3/4" NPT 4 wire (Condensate)	A,C,D	7760191
pH Electrode, 1/2" NPT SS, 230°F max (Condensate)	B,C,D	7760465
High Pressure Flow Switch 1.5GPM, 400 psi max 3/4" NPT , Bronze	A,B,C,D	7760203
Water Meters		
3/4" Contacting head water meter, 1GPC, 3/4" FNPT	B,C,D	7760518
1" Contacting head water meter, 10GPC, 1" FNPT	B,C,D	7760515
1 1/2" Contacting head water meter, 100 GPC, 1" FNPT	B,C,D	7760516
2" Contacting head watermeter 100GPC, 2"FNPT	B,C,D	7760517
3/4in Paddlewheel Water Meter Sensor. Supplied in PVC pipe section.	B,C,D	7760514
1in Paddlewheel Water Meter Sensor. Supplied in PVC pipe section.	B,C,D	7760508
1.5" Paddlewheel Water Meter Sensor. Supplied in PVC pipe section.	B,C,D	7760509
2" Paddlewheel Water Meter Sensor. Supplied in PVC pipe section.	B,C,D	7760510
3" Paddlewheel Water Meter Sensor. Supplied in PVC pipe section.	B,C,D	7760511
4" Paddlewheel Water Meter Sensor. Supplied in PVC pipe section.	B,C,D	7760512
Solenoids and Valves		
1/2" Solenoid valve for cooling application. 150 psi max	A B,C,D	7760212
3/4" Solenoid valve for cooling application. 150 psi max	A,B,C,D	7760213
1" Solenoid valve for cooling application. 150 psi max	A,B,C,D	7760214
Needle valve 1/2", rated 250 psi steam, color coded shaft, numbered handle	A,B,C,D	7760006
Orifice Union, 1/2" NPT, 250 psi steam, with four orifice plates	A,B,C,D	7760109
Motorized blowdown valve 1/2"NPT, 120VAC, 250psi steam	A,B,D	7760217
Motorized blowdown valve 3/4"NPT, 120VAC, 250psi steam	A,B,D	7760218
Motorized blowdown assembly, 1/2"NPT, 120VAC 250psi steam w/needle valve and T	A,B,D	7760013
A - microFLEX B - SlimFlex 5 C - multiFLEX D - AEGIS II		