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"DULCOMETER Instrumentation" T.O.C. VIII

CATALOG SECTION TABS

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

DULCOMETER 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

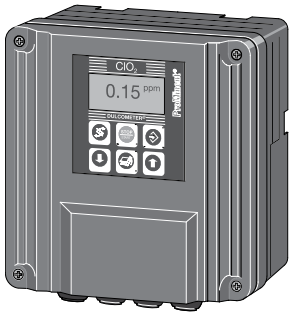
ProMinent® D1Cb and D1Cc Analyzers

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

Panel 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 1012 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)

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)

Permissible storage temperature: Control panel installation: 14° to 158°F (-10° to 70°C)

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)

Permissible storage temperature: 14° to 158°F (-10° to 70°C)

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

Rated voltage: 100/200 VAC, 50/60 Hz
Max. power input: 150 mA at 100 V
75 mA at 200 V

Internal fuse protection: 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: 24 VDC or 24 VAC, 50/60 Hz (low voltage operation only)
Internal fuse protection: 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:

Input impedance > 10^{12} W
Input impedance with reference electrode with respect to:
Device ground: <1 kW
Input range: ±1 V
Accuracy: ±0.5% of input range
Resolution: 0.0625% of input range
Connection facility for one potential equalization electrode (solution ground). As an alternative, two connection terminals can be connected with a wire jumper.

Sensor input via terminals:

Input impedance: >5 x 10^{11} W
Input impedance with reference electrode with respect to:
Device ground: <1 kW
Input range: ±1 V
Accuracy: ±0.5% of input range
Resolution: 0.0625% of input range
Connection facility for one potential equalization electrode (solution ground). As an alternative, two connection terminals can be connected with a wire jumper.

Standard signal input for measured variable:

Input range: 0/4...20 mA (programmable)
Input impedance: 50 W (Panel Mount) and (Wall Mount)
Accuracy: 0.5% of input range
Resolution: 0.014/0.012 mA
Supply voltage and current for external electronics: 20 V ±0.5 V, 20 mA

Standard signal input for correction measured value or disturbance variable mA:

Galvanically isolated from remaining inputs and outputs
Insulation voltage: 500 V
Input range: 0/4...20 mA (programmable)
Input resistance: 50 W
Accuracy: 0.5% of input range
Resolution: 0.014/0.012 mA
Supply voltage and current for external electronics: 23 V ±1 V, 20 mA **(Panel)**
19 V ±1.5 V, 20 mA **(Wall)**

Pt100 input:

Input range: 32° to 212°F (0° to 100°C)

Pt1000:

Accuracy: ±0.5°C
Resolution: 0.1°C

Digital inputs:

Common reference potential with respect to each other and with the RS 232 interface, but galvanically isolated from remaining inputs and outputs
Insulation voltage: 500 V (Wall Mount only)

Status signaling input:

Galvanically isolated from remaining inputs and outputs
Insulation voltage: 500 V
Potentiometer to be connected: 800 W ...10 kW
Accuracy (without potentiometer error): 1% of input range
Resolution: 0.5% of input range

Current output:

Galvanically isolated from remaining inputs and outputs
Insulation voltage: 500 V (Wall Mount only)
Output range: 0/4...20 mA (programmable)
Maximum load: 600 W
Accuracy: 0.5% of output range with respect to displayed value

Frequency outputs (Reed relay) for pump control:

Type of contact: n/o contact, interference suppressed with varistors
Load capacity: 100 V peak, 0.5 A switching current (Panel Mount)
25 V peak, 0.5 A switching current (Wall Mount)
Contact service life: >50 x 10^6 switching operations at contact load 10 V, 10 mA
Max. frequency: 8.33 Hz (500 strokes/min)
Closing time: 100 ms

Power relay output for alarm signaling:

Type of contact: Changeover contact, interference supressed with varistors
Load capacity: 250 VAC, 3 A, 700 VA
Contact service life: >50 x 10^6 switching operations (Panel Mount)
>20 x 10^6 switching operations (Wall Mount)

ProMinent® D1Cb and D1Cc Analyzers

Specifications (cont.)

Power relay output	Type of contact:	n/o contact, interference supressed with varistors
for control variable output	Load capacity:	250 VAC, 3 A, 700 VA
or limit value signaling:	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/Cl 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*

EN 60335-1:	Safety of electrical devices for domestic use
EN 50081-1:	EMC, emitted interference, residential
EN 50082-2:	EMC, noise immunity, industrial
EN 60555-2:	EMC, reactions in power supply networks, harmonics
EN 60555-3:	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 Ouputs:	
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	

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.

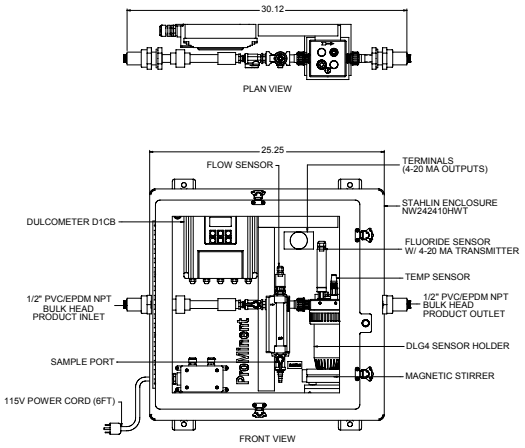
The fluoride sensor is recommended for use in water treatment only (patent pending). We recommend installation at atmospheric pressure.

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 T_{90}:	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

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 (H_2O_2) 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 H_2O_2 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 measurement 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, H_2O_2 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 H_2O_2 measure-ment 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.

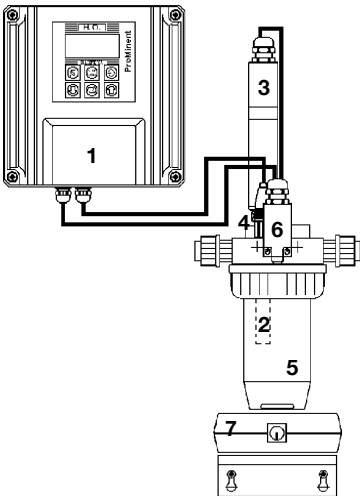
Operating conditions

Measuring ranges and applications	H^2O^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



Recommended Hydrogen Peroxide System (descriptions follow)

			Part No.
1	D1C H_2O_2 Controller (1)		
1	Hydrogen Peroxide Sensor: H 2.10 P, complete with membrane cap (2)		792976
1	Perox signal converter: Perox-micro-H 1.20-mA (3)		741129
1	Connection between Perox signal converter and limit sensor Three-wire cable, priced per foot (specify length)		791948
1	Temperature Sensor: Pt 100 SE (4)		305063
1	Connection between the temperature sensor and the controller: (Based on distance between the controller and temperature sensor)		
	Up to 30 ft	SN6 open end cable	6 ft. (2 m) long 305030 15 ft. (5 m) long 305039 30 ft. (10 m) long 305040
	Over 30 ft.	Signal converter 4-20 mA Pt 100 V1	809128
		Two-wire cable - priced per foot (specify length)	7740215
1	DLG-PER In-line sensor housing (5) (includes limit sensor with 2 n/o contacts) (6)		1000165
1	Connection between the limit switch on the DLG-PER and the controller: Two-wire cable - priced per foot (specify length)		7740215
1	Magnetic stirrer 115 VAC (7)		7790915
1	Stirrer Magnet		7790916
1	Compact stand (PE, UV protected, black)		7740000
1	Power Cord, 6 ft.		741203

Accessories:

Replacement membrane cap: M 2.0 P for H_2O_2 sensor	792978
Polishing paste for sensor, 3 oz. (90 g) tube	559810

Note: We can also provide measuring and control instruments mounted and wired, e.g. on PVC board or in a control cabinet. See PCM Systems in Feed & Control Packages section.

Sensors: Hydrogen Peroxide Measurement

The H_2O_2 sensor shaft is made of stainless steel (counter and reference electrode) with a platinum working electrode. Installation length 4.7" (120 mm), 0.5" (12 mm) Ø, PG 13.5 internal thread and SN6 plug connection.

H 2.10 P, complete with membrane cap	792976

Temperature sensor Pt 100 for temperature compensation of H_2O_2 measurement; necessary when temperature fluctuations can occur in the measurement medium.

Pt 100 SE	305063

A coaxial measuring line with an SN6 connector is required for direct connection of a temperature sensor:

SN6 open end	6 ft. (2 m) long	305030
SN6 open end	15 ft. (5 m) long	305039
SN6 open end	30 ft. (10 m) long	305040

When distances between the measuring unit and sensor exceed 30 ft. (10 m), it is recommended to use a temperature signal converter which transmits the temperature signal via a 2-wire connection at 4-20 mA. Temperature compensation input should be taken into consideration when selecting the D1C-Perox controller from the identity code.

Signal converter 4-20 mA Pt 100 V1	809128
Two-wire cable for connection between point-of-use signal converter 4-20 mA and controller - priced per foot (specify length).	7740215

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 H_2O_2 measurement

A changeover switch for the three measuring ranges 1 - 20, 10 - 200 and 100 - 2000 mg/L H_2O_2 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
Two-wire cable for connection between the limit switch on the DLG-PER and the controller - priced per foot (specify length)	7740215

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

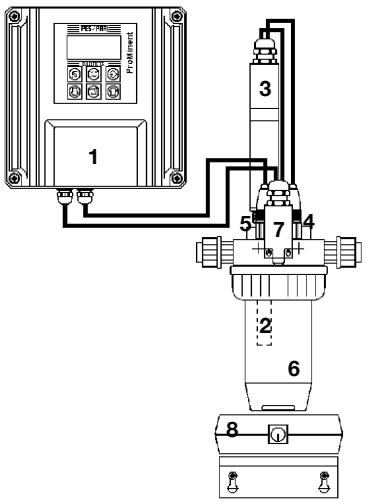
Accessories/Spare Parts

Replacement membrane cap:

M 2.0 P for H_2O_2	792978
Polishing paste for Perox sensor, 3 oz. (90 g) tube	559810

ProMinent® D1Cb and D1Cc Analyzers

Peracetic Acid Analyzers



Recommended Peracetic Acid System (descriptions follow)

			Part No.
1	D1C PAA Controller (1)		
1	Peracetic Acid Sensor: P2.10 B, complete with membrane cap (2)		809150
1	Perox signal converter: Perox-micro-P 1.30-mA (3)		741128
1	Connection between Perox signal converter and limit sensor Three-wire cable, priced per foot (specify length)		791948
1	pH Sensor: REFP - SE (4)		1000505
1	Temperature Sensor: Pt 100 SE (5)		305063
1	Connection between the temperature sensor and the controller: (Based on distance between the controller and temperature sensor)		
	Up to 30 ft	SN6 open end cable, 6 ft. (2 m) long	305030
		SN6 open end cable, 15 ft. (5 m) long	305039
		SN6 open end cable, 30 ft. (10 m) long	305040
	Over 30 ft.	Signal converter 4-20 mA Pt 100 V1	809128
		Two-wire cable - priced per foot (specify length)	7740215
1	DLG-PER In-line sensor housing (6) (includes limit sensor with 2 n/o contacts) (7)		1000165
1	Connection between the limit switch on the DLG-PER and the controller: Two-wire cable - priced per foot (specify length)		7740215
1	Magnetic stirrer 115 VAC (8)		7790915
1	Stirrer Magnet		7790916
1	Compact stand (PE, UV protected, black)		7740000
1	Power Cord, 6 ft.		741203

Accessories:

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

Note: We can also provide measuring and control instruments mounted and wired, e.g. on PVC board or in a control cabinet. See PCM Systems in Feed & Control Packages section.

Sensors: Peracetic Acid Measurement

The peracetic acid sensor shaft is made of stainless steel (counter electrode) with a gold working electrode. Installation length 4.7" (120 mm), 0.5" (12 mm) Ø.

P 2.10 B, complete with membrane cap	809150

A pH sensor is also required as a reference electrode for peracetic acid measurement

REFP - SE	1000505

Temperature sensor Pt 100 for temperature compensation of peracetic acid measurement; necessary when temperature fluctuations can occur in the measurement medium.

Pt 100 SE	305063

A coaxial measuring line with an SN6 connector is required for direct connection of a temperature sensor:

SN6 open end	6 ft. (2 m) long	305030
SN6 open end	15 ft. (5 m) long	305039
SN6 open end	30 ft. (10 m) long	305040

When distances between the measuring unit and sensor exceed 30 ft. (10 m), it is recommended to use a temperature signal converter which transmits the temperature signal via a 2-wire connection at 4-20 mA. Temperature compensation input should be taken into consideration when selecting the D1C-Perox controller from the identity code.

Signal converter 4-20 mA Pt 100 V1	809128
Two-wire cable for connection between point-of-use signal converter 4-20 mA and controller - priced per foot (specify length).	7740215

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
Two-wire cable for connection between the limit switch on the DLG-PER and the controller - priced per foot (specify length)	7740215
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
- Amperometric analysis (chlorine etc.): 0.001/0.01 ppm, 0.01 vol.%, 0.1 vol.%
- Accuracy 0.3% based on the full-scale reading
- Measurement input pH/ORP (input resistance > 0.5 x 1012 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

ProMinent® DACb

DACb Multi-parameter Controller: Technical data

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									
				VV	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
DACb	**W**	**00**	**4**	**AA**	**4**	**0**	**0**	**0**	**0**	**1**	**0**	**01**	**0**	**EN**

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 (H_2O_2)		
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	1050627

ProMinent® DMT Transmitters

Overview: DMT

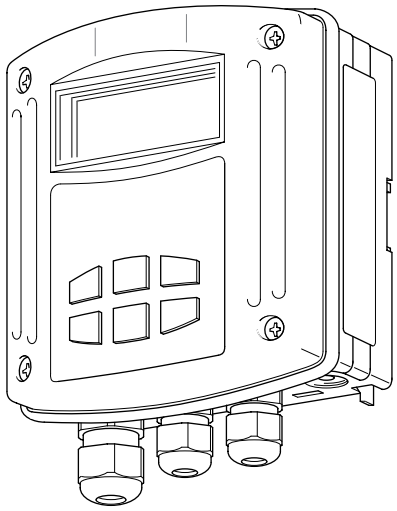
DULCOMETER DMT type transmitters are compact 2-wire transmitters for measured variables pH, redox, chlorine, conductive conductivity, temperature.
Easily combined with programmable memory controllers.

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



PROFIBUS® PROCESS FIELD BUS

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 installation[1]										
			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**

ProMinent® Portable DT Photometer

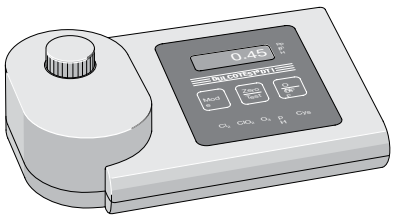
Overview: Photometer

Photometer DT1, DT2, DT3 and DT4

- Portable compact Photometer
- Simple to operate with support text
- Reliable, simple measurement of chlorine, chlorine dioxide, fluoride, chlorite, H_2O_2, bromine, ozone, pH and cyanuric acid
- Self-diagnostic

Applications:
swimming pool, drinking water, process water

Technical Data



pk_5_021

Measurement range of DT1:	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
Measurement range of DT2B:	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
Measurement ranges, DT3:	1 - 50 / 40 - 500 mg/l hydrogen peroxide
Measurement ranges, DT4:	0.03 - 2.5 mg/l chlorite, 0.05 - 11 mg/l chlorine dioxide, 0.05 - 6 mg/l chlorine
Measuring tolerance:	Dependent upon measured value and measuring method
Battery:	9 V battery (approx. 600 x 4-minute measurement cycles)
Ambient temperature:	41 - 104° F (5 - 40 °C)
Relative humidity:	30 - 90 % (non-condensing)
Housing material:	ABS
Keypad:	Polycarbonate
Dimensions:	7.5 x 4.3 x 2.2 in (190 x 110 x 55 mm (LxWxH))
Weight:	approx. 1 lb. (0.4 kg)

	Part No.
Type **DT1 photometer**, complete with carrying case	1003473
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

H_2O_2 meter:

Reagent for H_2O_2 (DT3), 15 ml	1023636
Spare cuvettes, 5 No., for H_2O_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 conductivty			
		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

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	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		

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 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	A

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 SlmFlex 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

SlimFex 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

Analog Sensors	Controller Choice	Part No.
ORP Sensor Package - Chlorination with cable, Tee and probe holder	B,C, D	7760768
ORP Electrode, flat faced double junction 100 psi @175ºF - 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 @ 175ºf - cable required PN 1036595	B,C,D	7760998
Conductivity/Temperature Electrode 125 psi @125ºF with Tee - Cooling applications	B,C,D	7760200
Aquatrac Conductivity/Temperature/Thermal Flow Switch CTF (Cooling)	A,B,D	7760021
Corrosion Rate Electrode, Admirality	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 @125ºF	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, 230ºF 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		