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“analytical instrumentation” T.O.C. VIII

CATALOG SECTION TABS

ProMinent® D1C and D2C Analyzers

Overview: D1C and D2C

An Introduction to Process Measurement and Control

Process control in water treatment involves measurement of a variable related to water quality, combined with automation of chemical feed equipment or other physical/chemical processes to keep the measured value as close as possible to the desired setpoint or between high and low control limits.

ProMinent's approach combines the functions of an analyzer and a controller into one instrument, dedicated to a specific water quality parameter to simplify calibration and operation.

Each ProMinent DULCOTEST® sensor measures a specific water quality parameter and sends an electronic signal back to a DULCOMETER® controller. The operator calibrates that sensor to a known standard. It then displays any changes that are measured in that parameter within the sensor's range.

Measured Value Outputs

Up to two outputs are available. DULCOMETER® controllers offer the ability to continuously record measured values to document water quality or to send to another control device. Analog 4-20 mA or 0-20 mA measured value outputs are proportional to the measuring range of the sensor or spannable to provide greater detail within a smaller range, for connection to a chart recorder, datalogger or distributed control system [D1C/D2C controllers and DULCOMETER® transmitters (monitor only)]

Control Outputs

Different control outputs are available to control virtually any type of actuating device.

Setpoint relays change state (open or close contact) when the measured value drops below or exceeds the setpoint to start a process control device or alarm, and shut it off when the setpoint is reached (D1C or D2C).

Analog control outputs (4-20 or 0-20 mA) can drive a variable speed analog control device, such as a DC SCR drive or AC inverter, according to the control action used (D1C or D2C).

Pulse outputs are brief contact closures to pace pulse-input metering pumps corresponding to the control action used (D1C).

Modulating relay outputs cause a relay to open and close according to the control action used. These are used with solenoid valves or constant-speed motor-driven metering pumps. Minimum on-times may be set to prevent overheating of motors (D1C or D2C).

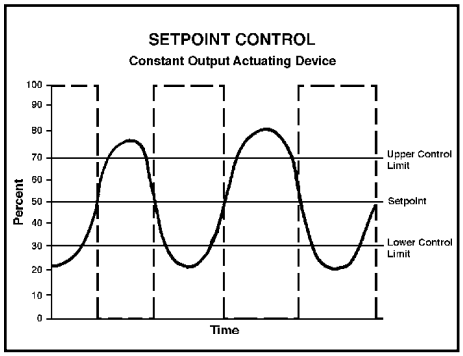
3P relays provide two relay outputs to control a bi-directional actuator (such as a stroke length controller on a metering pump) with provision for feedback potentiometer from the actuator to display the position according to the control action used (D1C or D2C).

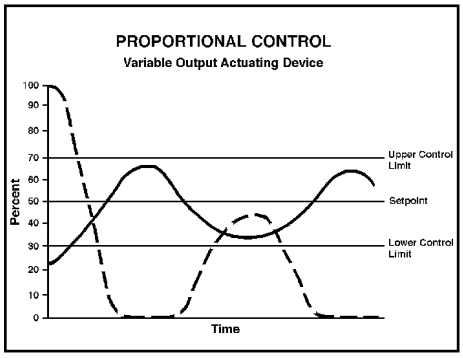
CONTROL ACTION RESPONSE IN ONCE-THROUGH SYSTEMS

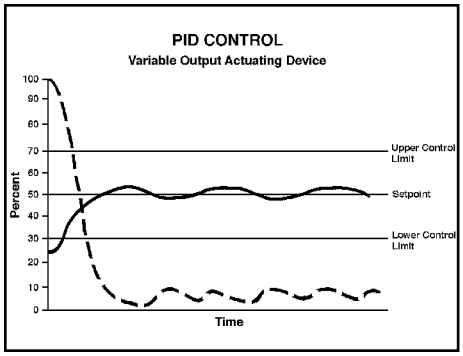
Note: Actuating device output increases measured value in example (e.g. chlorine feed)

—— Measured value (as percent of measurement range)

– – Actuating device output (as percent)







Control Actions

A variety of control actions are available to suit the application and budget. Any variable control output listed above may be used with any of the control actions listed below.

Setpoint Control

Setpoint control uses a setpoint relay to start a constant output pump or open a solenoid valve when the measured value drops below (or exceeds) the setpoint. Once the measured value reaches setpoint again, the pump stops or the valve closes. This always results in overshooting the setpoint because of the lag time between the point of chemical addition and the point of measurement. This can waste chemicals and cause excessive variation on either side of the setpoint. It is suited only for closed systems or batch applications where tight control is not required (D1C or D2C).

ProMinent® D1C and D2C Analyzers

Overview: D1C and D2C

Proportional Control

Proportional control gives an output that is directly proportional to the measured value's deviation from the setpoint. The farther from setpoint, the greater the output of the actuating device, and the closer to setpoint, the lesser the output. Proportional control is suitable for closed systems or batch applications where more precise control is required. The proportional bandwidth may be spanned to set the distance from setpoint at which the actuating device is operating at maximum output. A small bandwidth results in maximum output at a measured value close to setpoint, and may cause overshooting. A large bandwidth may result in long time periods required until the setpoint is reached (D1C or D2C).

PID Control

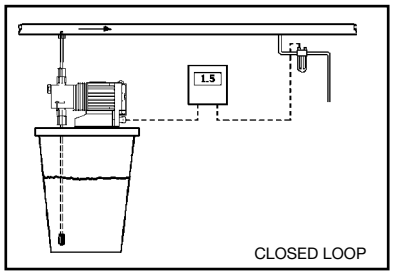
PID control combines proportional, integral and derivative control actions, or any combination thereof.

Integral control considers the time interval of deviation and increases output when the deviation exceeds a programmed time interval. Derivative control considers the rate of change of deviation and increases the output when the rate of deviation exceeds a programmed rate. PID control ensures the least deviation from setpoint possible (D1C, D2C).

Control Techniques

The control technique used depends on the location of the sensor in relation to the actuating device, the presence of other inputs which may effect the measured value, or the requirement for secondary actuating devices to handle large swings. Some common control techniques are described below.

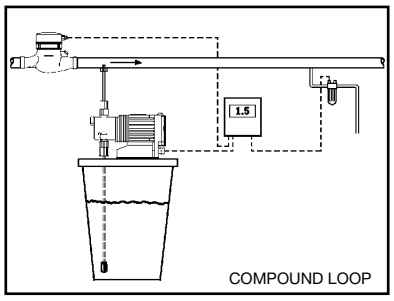
Closed loop control is where the sensor is located downstream of the actuating device and measures changes caused by the device. The controller varies the device's output to maintain the desired setpoint. This is usually used in recirculating or batch applications,



CLOSED LOOP

or once-through systems with constant flow rate. The sensor must be located far enough downstream to ensure that any physical/chemical changes are complete, whether measuring pH, oxidant residuals or other variables (D1C or D2C).

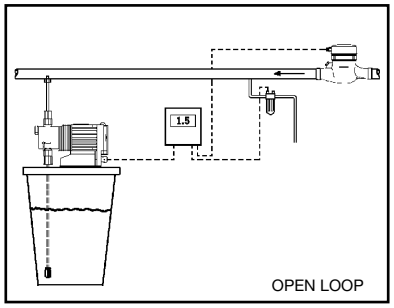
Compound loop control combines the closed loop signal from the



COMPOUND LOOP

sensor with a second (disturbance) input, normally water flow rate, and changes the actuating device's output in response to both variables. This is typically used in once-through applications with varying flow rates (D1C).

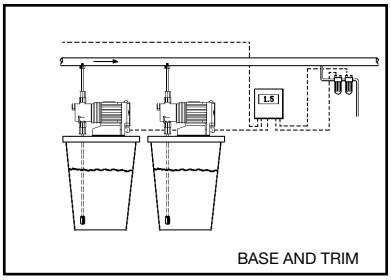
With open loop control, the sensor is upstream of the actuating device



OPEN LOOP

and a control signal changes the actuating device's output. Usually, this is only used when the resulting measured value would be outside of the sensor's measuring range (D1C or D2C).

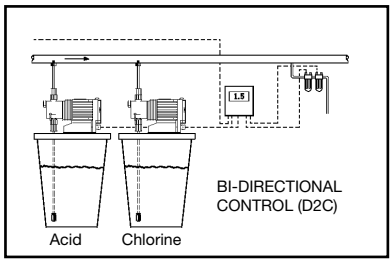
Base and trim control uses two actuating devices to bring large fluctuations into control very quickly, yet provide tight control under normal operation. A variable output actuating device is normally used with proportional or PID control for the trim or fine tuning. A constant



BASE AND TRIM

output device would be started by a setpoint relay for the base load to make fast changes in the event of large fluctuations that the trim device cannot handle (D1C or D2C).

Bi-directional control of two opposing actuating devices, such as pumps for acid and base in a pH control application, is possible with one controller (D1C or D2C). To prevent repeated corrections caused by overshooting on both sides, a deadband may be programmed (between two setpoints) in which both actuating devices are stopped (D1C or D2C).



PROPORTIONAL CONTROL ONLY (BATCH LINE)

ProMinent® D1C and D2C 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® D1C and D2C Analyzers

Specifications

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); -50 W (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)
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)
Disturbance variable: Up to 10 Hz or up to 500 Hz (as per identity code/ programmable)

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)

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)

for pump control:

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® D1C and D2C Analyzers

Specifications

Power relay output for	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:

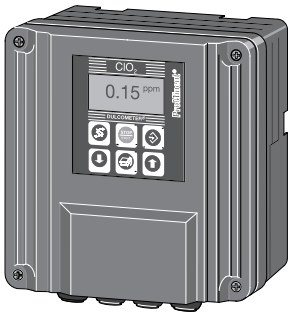
EC low voltage directive (73/23/EEC) subsequently 93/44/EEC
EC EMC directive (89/336/EEC) subsequently 92/31/EEC
Supply voltage in accordance with DIN IEC 38
Electrical safety in accordance with EN 61010-1
Electromagnetic emitted interference in accordance with EN 55011 Gr. 1/Cl B
Noise immunity in accordance 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® D1C and D2C Analyzers

Technical Data

Measurement range:	Cl_2	0.00 - 0.500/2.00/5.00/10.0/ 20/50/100 ppm
	ClO_2	0.00 - 0.500/2.00/10.0/20.0 ppm
	Br	0.02 - 2.00/0.1 - 10.0 ppm
	O_3	0.00 - 2.00 ppm/l
	Dissolved oxygen	0.1 - 10/0.1 - 20 ppm
	Chlorite	0.02 - 0.50/0.1 - 2 ppm
Resolution:	0.001/0.01 ppm/l/0.1 %	
Accuracy:	0.5 % from measurement range	
Measurement input:	Standard signal terminal 0/4-20 mA	
Correction variable:	pH (Cl_2 version only) Temperature via Pt 100 (ClO_2 version only)	
Correction range temp.:	50 - 113 °F (10 - 45°C) (ClO_2 version only)	
Correction range pH:	7.0 - 8.5 pH (ClO_2 version only)	
Disturbance signals:	Additive/multiplicative	
Control characteristic:	P/PID control	
Control:	Bidirectional control	
Signal current output:	2 x electrically isolated 0/4-20 mA max. load 600 Ω (2nd output, 400 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) 2 x 0/4-20 mA	
Alarm relay:	250 V~3 A, 700 VA changeover contact	
Power supply:	24 V~ =/100 V~/115 V~/200 V~/230 V~ ±10 %	
Ambient temperature:	Control panel version: 32 - 122°F (0-50°C) [32 - 113°F (0-45°C) with fully expanded units]	
	Wall mounted: 23 - 122°F (-5 - 50°C) [23 - 104°F (-5 - 40°C) with fully expanded units]	



Wall Mount

Mounting

- **Wall mount**: Nonmetallic enclosure with protective gland-style strain relief cable sockets

  Dimensions: 7.87”H x 7.87”W x 3.00”D (200 mm x 200 mm x 76 mm)

  Cable glands: Five Pg11, Five Pg7

  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 5.50”D (96 mm x 96mm x 140 mm)

  Weight: Approximately 1.87 lbs. (850 g); 2.6 lbs. (1200 g) shipping weight

  Protection class: NEMA 3 (IP 54) when mounted in panel

ProMinent® D1C and D2C Analyzers

Typical Applications

pH - Control acid and/or base feed via metering pumps or valves to adjust pH

ORP - Control hypochlorite metering pump to maintain oxidant residual; or control sulfonator or bisulfite metering pump for dechlorination

Free Chlorine - Control chlorination or hypochlorite metering pump to maintain residual

Total Chlorine - Control chlorination or hypochlorite metering pump to maintain residual; or control sulfonator or bisulfite metering pump for dechlorination

Bromine - Control tablet brominator via solenoid valve; or bromine solution metering pump to maintain residual

Conductivity - Control conductivity through valve on blowdown/makeup for rinse bath, boiler or cooling tower

Dissolved Ozone - Control ozone generator output to maintain residual

Dissolved Oxygen - Control aeration units to limit energy usage or for nitrification/dentrification

Chlorite - Control chlorite as a by-product of the chlorine dioxide process

Fluoride - Monitor fluoride concentration in potable water

Chlorine Dioxide - Control chlorine dioxide generator output to maintain residual

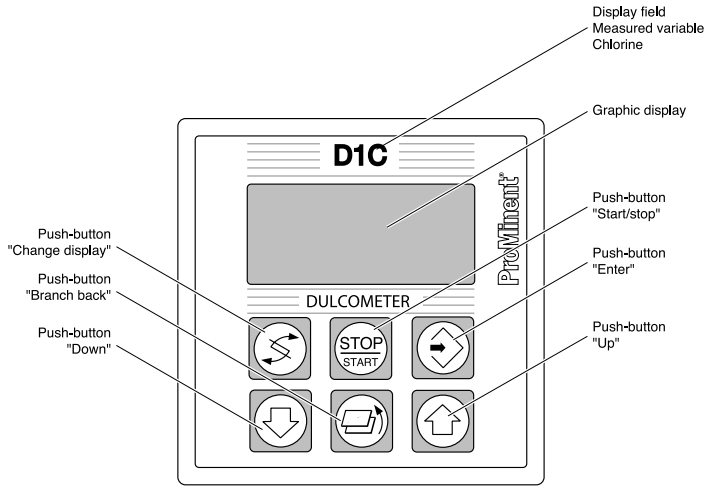
Temperature - Control heater or heat exchanger to maintain bath temperature or process cooling

Analog Signal Inputs - Control virtually any measureable and adjustable process where the measuring device has an analog output and the adjusting device may be controlled by one of the D1C's available control outputs

Peracetic Acid - Monitor or control concentration to ensure disinfection

Hydrogen Peroxide - Control peroxide metering pump for oxidation or advanced oxidation (AOX) systems

User Interface



	CHANGE DISPLAY menu button To change over within a menu level and to change from one variable to another within a menu point.
STOP START	START/STOP menu button Start/stop of control and metering function.
	ENTER menu button To accept, confirm or save a displayed value or status. For alarm acknowledgement.

	UP menu button To increase a displayed numerical value and to change variables (flashing display)
	BRANCH BACK menu button To exit operating menu (back to start of relevant setting).
	DOWN menu button To decrease a displayed numerical value and to change variables (flashing display).

ProMinent® D1C and D2C Analyzers

Identcode Overview (D1C/ D2C)

NOTE: OPTIONS ARE NOT IDENTICAL FOR THE D1C / D2C CONTROLLERS. REFER TO THE IDENTITY CODE.

SERIES:

D1C = Single variable controller

D2C = Dual variable controller

SERIES VERSION:

A = Standard

MOUNTING:

W = Wall mount enclosed in NEMA 4X non-metallic housing. Includes detachable mounting plate in back to allow easy removal from wall. Features five Pg11 and five Pg7 glands for wiring power cord, relays, SN6 connectors, etc.

D = Panel mount (no enclosure). Fits 3.78" x 3.78" (9.6 cm x 9.6 cm) opening, 5.51" (14 cm) depth. The unit must be mounted in an enclosure suitable for the environment. The controllers's membrane switch face and gasketed frame provide NEMA 3 (IP 54) protection; mounting hardware included. For optional wall mount enclosure for the panel mount controller, see PN 790235.

OPERATING VOLTAGE:

0 = 230 VAC, 50/60 Hz, 1 phase
1 = 115 VAC, 50/60 Hz, 1 phase
4 = 24 V AC/DC

Note: Power cord not included with unit. For 115 V US power cord, see PN 741203.

D1C MEASURED VARIABLES:

P = pH: For wall mount, use connection 2 (SN6) for push-and-twist connectors with pH sensors. For panel mount, use terminal connection 5 for same sensors. For distances between 30 and 300 feet from sensor to controller, add impedance converter, PN 305350. For distances > 300 feet from sensor to controller or with stray currents, use connection 1 with signal converter pH-V1 (PN 809126) giving 4-20 mA output.

R = Oxidation Reduction Potential: For wall mount, use connection 2 (SN6) for push-and-twist connectors with ORP sensors. For panel mount, use terminal connection 5 for same sensors. For distances between 30 and 300 feet from sensor to D1C, add impedance converter, PN 305350. For distances > 300 feet from sensor to D1C or with stray currents, use connection 1 with signal converter RH-V1 (PN 809127) giving 4-20 mA output.

C = Chlorine; use connection 1. For free chlorine (hypochlorous acid) measurement, use CLE-3-mA sensors. See "correcting value" for optional pH correction on free chlorine. For total chlorine, use CTE-mA sensors.

B = Bromine; use connection 1 and bromine BRE 1-mA-10 ppm sensor.

L = Conductivity; use connection 1 for conductivity cells with transducer giving 4-20 mA output. Use connection 3 for standard conductivity cells.

Z = Ozone; use connection 1 and OZE 3-mA-2 ppm sensor.

X = Dissolved Oxygen; Use connection 1 and DO1-mA-20 ppm sensor.

D = Chlorine Dioxide; use connection 1 and CDE 2-mA - 0.5 ppm, 2 ppm or 10 ppm sensors, or the CDP with PT 100.

T = Temperature; use connection 4, terminal, with PT100 sensor. For distances > 30 feet from sensor to D1C, use connection 1 with signal converter PT-100-V1 (PN 809128) giving 4-20 mA output.

S = Standard signal 0/4-20 mA. Use connection 1 with any measuring device that outputs a 0-20 or 4-20 mA signal corresponding to the measured value. Display is as a percent of input current.

A = Peracetic Acid; use connection 1 with PAA transducer (PN 741128).

H = Hydrogen Peroxide; use connection 1 with Perox transducer (PN 741129).

D2C MEASURED VARIABLES:

PC= pH/chlorine: See above descriptions for each variable.

PR= pH/Oxidation Reduction Potential: See above descriptions for each variable. (Requires Signal Converter PN 809127)

PP = pH/pH: See above descriptions for each variable. (Requires Signal Converter PN 809126) Variable 1 can be controlled, Variable 2 is for monitoring.

CC= Free Chlorine/Total chlorine: See above descriptions for each variable.

PD=pH/chlorine dioxide: See above descriptions for each variable. (Requires Signal Converter PN 809126) Variable 1 can be controlled, Variable 2 is for monitoring.

CONNECTION FOR SENSOR INPUT (FOR VARIABLE 1 CONNECTION ON D2C CONTROLLERS):

1 = Standard signal 0/4-20 mA

2 = SN6 plug connector for pH (P) or ORP (R). Usually, this is only used with the wall mount since SN6 plugs cannot pass through cable glands on a panel mount enclosure.

3 = Terminal for standard conductivity cell (L)

4 = Terminal for PT 100 temperature sensor (T)

5 = Terminal for mV input on standard pH (P) or ORP (R) sensors

CORRECTING VALUE:

0 = None

1 = pH for free chlorine (total chlorine does not require pH correction); corrects CLE sensor's hypochlorous acid (HOCl) measurement by chlorine dissociation curve to display free chlorine (HOCl + OCl^-).The correcting pH input must be a 4-20 mA signal, requiring signal converter PH-V1 (PN 809126).

2 = Temperature for P or L via terminal for PT-100 sensor. Required for accurate pH measurement when operating at extreme pH values and high temperatures. Required for accurate conductivity measurement at varied temperatures. (Temperature monitoring only for other variables)

3 = Temperature for P or L via 0/4-20 mA signal; used with signal converter PT-100-V1 (PN 809128) and PT-100 sensor. Feed Forward control is not possible with this option. (Temperature monitoring only for other variables)

4 = Manual temperature entry for P or L (no sensor); used where temperature is constant.

ProMinent® D1C and D2C Analyzers

Identcode Overview (D1C/ D2C)

FEED FORWARD CONTROL - The D1C's control output is based on measured value; however, with feed forward control, a signal from a flow meter proportions the control output considering both the measured value and process flow rate. This eliminates the need for both variable speed drives and stroke positoners on compound loop control metering pumps. Several types of signals may be accepted proportional to process flow:

0 = None

1 = 0/4-20 mA signal (such as from a magmeter or open channel flow meter) Note: cannot be used for chlorine measurement with pH compensation (D1C)

2 = 0-500 Hz signal (such as from a paddlewheel sensor)

3 = 0-10 Hz (0-600 pulses/min.) signal (such as from a pulse-type water meter)

PAUSE CONTACT - The pause contact allows the controller to continue monitoring measured value, but stops control outputs when the NC contact is opened. This may be used to stop metering when a main water pump is stopped, or when water flow in the sample line to the sensor is blocked as signaled by the DGMa rotameter:

0 = None (D1C); Pause contact (D2C)

1 = Pause contact (D1C)

ANALOG OUTPUTS (0/4-20 mA) - Analog outputs can be programmed as a control output or a measured value output for recording. Up to 2 analog outputs are possible except for Hydrogen Peroxide and Peracetic Acid controllers.

0 = None

1 = Measured value; normally used for chart recorder, datalogger or DCS.

2 = Control action; normally used to control a variable speed drive or actuator.

3 = Measured correcting value; normally used for recording or as input to a second D1C.

4 = Two current outputs (Not for measured variables A and H)

RELAY OUTPUTS:

G= Alarm + 2 limit relays: limits may be on either side of setpoint, or both limits may alarm on one side, such as low limit and low, low limit. May be used to start a constant rate feeder for simple setpoint control, or a baseline feeder to handle large swings with trim pump on the control output.

M = Alarm + 2 control relays: used to start and stop constant speed pumps or to open and close solenoid valves for opposing functions. Modulating output corresponds to the control action selected (proportional or PID). The minimum "on-time" period may be adjusted from 1 to 9,999 seconds.

R = Alarm + 2 positioner relays with positioner feedback from 1 kOhm feedback potentiometer. Positioner status displayed on LCD. Used for ProMinent 3P stroke positioning motors or valve positioners. Output corresponds to the control action selected (propor tional or PID).

PUMP PACING - gives pulse outputs for controlling 1 or 2 metering pumps:

0 = None

2 = Outputs for one or two pulse-control metering pumps (spannable from 0-500 pulses per minute); for opposing functions. Pulse (dry contact) output corresponds to the control action selected (proportional or PID).

CONTROL ACTION:

0 = None; for use as monitor or setpoint relay controller only.

1 = Proportional control; used for batch processes, where output signal is proportional to the measured variable such that the farther from setpoint the greater the output; the closer to setpoint the lesser the output.

2 = PID control; used for once-through or difficult to control processes, providing proportional, integral and derivative control actions, or a combination thereof.

INTERFACE:

0 = None (Future versions will have RS interface available)

LANGUAGE - Note that it is possible to change among other languages in the field, as indicated in parentheses:

†E = English (D, F, N)
†D = German (E, F, N)
†F = French (D, E, N)
H = German (F, I, S)
S = Spanish (D, I, F)
I = Italian (D, F, S)

Call for other available languages.

†Languages available for measured variables A and H

NOTE: Power cord not included.

Power cord, 6 ft. (2 m) 115 VAC
741203

Power cord, 6 ft. (2 m) 230 VAC
7724015

ProMinent® D1C and D2C Analyzers

Identcode Ordering System (D1C)

D1C **DULCOMETER one-variable**

Series version:
A Standard

Type of mounting:
W Wall mounting
D Panel mounting

Operating voltage:
0 230 V, 50/60 Hz
1 115 V, 50/60 Hz
2 200 V, 50/60 Hz (control panel version only)
3 100 V, 50/60 Hz (control panel version only)
4 24 V AC/DC

Note: Power cord not included with unit. For 115 V US & Canada power cord, see PN. 741203

Measured variables:
P pH 0-14 (mV)
R Redox/ORP -1000...+1000 (mV)
C Chlorine (0-0.5/2/5/10/20/50/100 ppm) (mA)
B Bromine (0-10 ppm) (mA)
L Conductivity (Separate)
Z Ozone (0-2 ppm) (mA)
X Dissolved oxygen (0.1-10/20 ppm) (mA)
D Chlorine dioxide (mA)
T Temperature (32-212 F, 0-100 C) (Seperate)
S Standard process signal (0/4-20 mA)
A Peracetic acid (mA)
H Hydrogen peroxide (mA)
K Conductivity for cooling tower control
I Chlorite (0-0.5/2 ppm) (mA)

Measured variable connection:
1 Standard signal 0/4-20 mA (old style PAA and H202 sensors)
2 SN6 plug (From pH or ORP sensor cable)
3 Terminal for standard conductivity cell (L)
4 Terminal for PT 100 temperature sensor (T)
5 Terminal for mV signal (From pH or ORP sensor cable)
6 Terminal inductive conductivity sensors
7 Standard signal 0/4-20 mA (for PAA and H202 25mm sensors)

Correcting value: (** Not available for measured variables A & H)
0 None**
1 pH for free chlorine via 4-20 mA signal
2 Temperature correction terminal for P or L (Temperature monitoring only for other variables)
3 Temperature correction terminal for 4-20 mA signal for P or L (Temperature monitoring only for other variables)
4 Manual temperature setting for P or L

Feed forward control:
0 None
1 0/4-20 mA standard signal
2 0-500 Hz signal
3 0-10 Hz signal
4 0/4-20 mA standard signal, parameter set switching
5 Parameter set switching

Pause contact:
0 None
1 Pause contact

Analog signal output (0/4-20 mA): (** Not available for measured variables A & H)
0 None
1 Measured value (For recording)
2 Control action
3 Measured correcting value
4 Two current outputs **

Relay outputs:
G Alarm + 2 limit relays
M Alarm + 2 control relays
R Alarm + positioner relays w/ position feedback potentiometer
S Alarm + servomotor (desalination vavle only)

Pump pacing:
0 None
2 Two pulse control outputs

Control action:
0 None
1 Proportional control
2 PID control

Interface:
0 None

Language: (Other Languages available)
E English

D1C A W 1 P 2 2 1 1 1 G 2 2 0 E

ProMinent® D1C and D2C Analyzers

Identcode Ordering System (D2C)

D2C **DULCOMETER two channel controller**

Series version:
A Standard

Type of mounting:
W Wall mounting (IP 65)
D Panel mounting (IP 54)

Operating voltage:
0 230 VAC, 50/60 Hz, 1 ph.
1 115 VAC, 50/60 Hz, 1 ph.
4 24 V AC/DC

Note: Power cord not included with unit. For 115 V US & Canada power cord, see PN. 741203

Measured variables (measured variable 1/ measured variable 2):
PC pH/chlorine (pH 0-14; 0-0.5/2/5/10/20/50/100 ppm)
PR pH/redox (pH 0-14; 0-1000 mV)
PP pH/pH (0-14 pH)
CC Free chlorine/Total chlorine (0-0.5/2/5/10/20/50/100 ppm)
PD pH/chlorine dioxide (0-0.5/2/10/20 ppm)

Measured variable 1 connector (m.v. 2 always via 4-20 mA):
1 Standard signal 0/4-20 mA
2 SN6 plug (From pH or ORP sensor cable)
5 Terminal for mV signal (From pH or ORP sensor cable)

Correcting variable (temperature compensation for pH):
0 None**
2 Temperature for P via terminal (Pt 100) for pH only
4 Manual temperature setting for P or L

Disturbance signal:
0 None

Signal output:
0 None
4 2 Programmable 0/4-20 mA standard signal outputs

Relay outputs:
G Alarm + 2 limit values relay
M Alarm + 2 solenoid valve relay (pulse length control)

Control characteristic:
1 Proportional control
2 PID control

Protocol output:
0 None

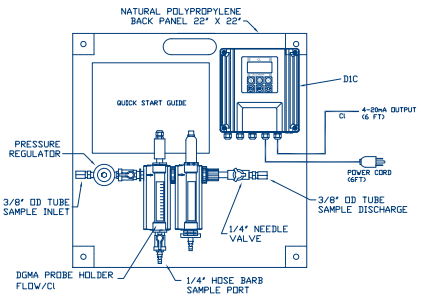
Language:
D German
E English

Note:
The pH/pH version contains only a 2-way controller.
Measured variable 2 can be used for moniitoring tasks.

D2C A W 0 PC 1 0 0 4 G 1 0 E

ProMinent® D1C and D2C Analyzers

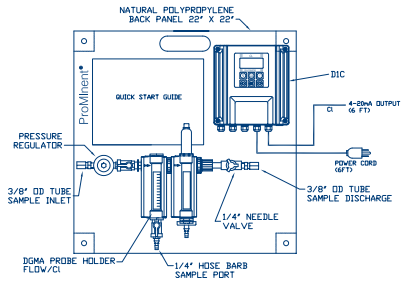
D1C Chlorine QuickPick Packages



Total Chlorine Analyzer

D1C part no. (D1CAW1C10114G220E)
Total chlorine analyzer mounted on a backplate for easy installation. The package is pre-wired and plumbed with 3/8" tubing connectors for sample inlet and outlet connections.

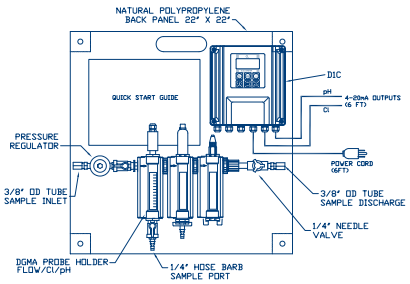
	Part No.
Total Chlorine Analyzer	7745160
Please indicate sensor when ordering package	
Total Chlorine Sensor (10 ppm)	740684
Total Chlorine Sensor (5 ppm)	1003203
Total Chlorine Sensor (2 ppm)	740685



Total Chlorine Monitor

D1C part no. (D1CAW1C10001G000E)
Total chlorine monitor mounted on a backplate for easy installation. The package is pre-wired and plumbed with 3/8" tubing connectors for sample inlet and outlet connections.

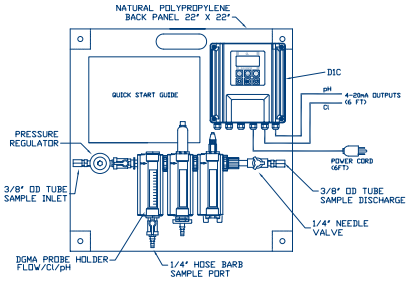
	Part No.
Total Chlorine Monitor	7745161
Please indicate sensor when ordering package	
Total Chlorine Sensor (10 ppm)	740684
Total Chlorine Sensor (5 ppm)	1003203
Total Chlorine Sensor (2 ppm)	740685



Free Chlorine Analyzer

D1C part no. (D1CAW1C11214G220E)
Free chlorine analyzer mounted on a backplate for easy installation. The package is pre-wired and plumbed with 3/8" tubing connectors for sample inlet and outlet connections.

	Part No.
Free Chlorine Analyzer	7745162
Please indicate sensor when ordering package	
Free Chlorine Sensor (50 ppm)	1020531
Free Chlorine Sensor (20 ppm)	1002964
Free Chlorine Sensor (10 ppm)	792919



Free Chlorine Monitor

D1C part no. (D1CAW1C11004G000E)
Free chlorine monitor mounted on a backplate for easy installation. The package is pre-wired and plumbed with 3/8" tubing connectors for sample inlet and outlet connections.

	Part No.
Free Chlorine Monitor	7745163
Please indicate sensor when ordering package	
Free Chlorine Sensor (50 ppm)	1020531
Free Chlorine Sensor (20 ppm)	1002964
Free Chlorine Sensor (10 ppm)	792919

ProMinent® D1C and D2C 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 (1)
- Fluoride sensor (2): FLE 010 SE with PG 13.5 male threaded connector & SN6 plug
- Reference electrode (3): REFP-SE with PG 13.5 male connector & SN6 plug
- Temperature sensor (4): PT 100 SE with PG 13.5 connector & SN6 plug
- 4-20 mA Measurement transducer (5): FV1 for connection to fluoride monitor & reference electrode
- DLG IV In-line sensor housing (6): with PG 13.5 threaded connector
- Sample outlet (7)
- Magnetic stirrer and magnet (8)
- PVC piping with ball stop/adjusting valve, rotameter with limit contact (9), sampling tap (10)
- Sample inlet (11)
- 115V Power cord, connectors from monitor to sensors
- PP Backpanel (12)

Options

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

ProMinent® D1C and D2C 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 100 SE Temperature Sensor with PG 13.5 male connector and SN6 plug	305063
FPV1 4-20 mA Measurement Transducer for connection to fluoride monitor and reference electrode	1028280

Fluoride Photometer

The D2TA or D2TB Photometer (see DULCOMETER section, pp. 34-35) 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® D1C and D2C 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 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, 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.

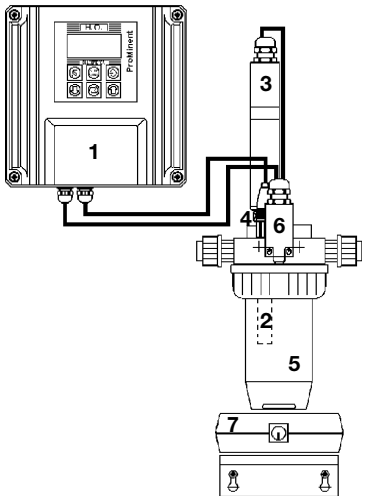
Operating conditions

Measuring ranges and applications	H2O2	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® D1C and D2C 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

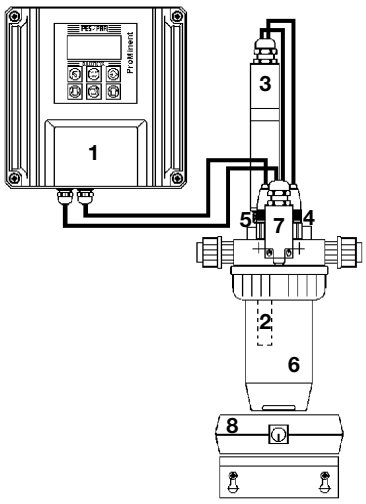
Accessories/Spare Parts

Replacement membrane cap:

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

ProMinent® D1C and D2C 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
		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 (6)		1000165
	(includes limit sensor with 2 n/o contacts) (7)		
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.

Perox Signal Converter

The signal converter controls and activates the pracetic 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® DMT Transmitters

Overview: DMT

DULCOMETER® DMT type transmitters are compact 2-wire transmitters for measured variables pH, redox, chlorine, conductive conductivity, temperature.

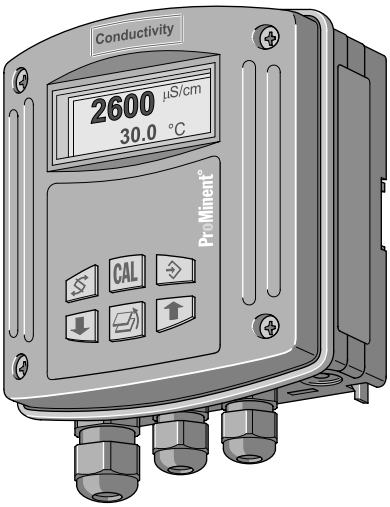
Easily combined with programmable memory controllers.

Summary of advantages:

- Reliable measurement due, e.g., to symmetrical input for pH and redox signals
- 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 stations**

Technical Data



pk_5_001

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); imput 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 (see section 6.5)
- Chlorine sensor (see section 6.3.1, dependent on Identcode)
- Assembly set for chlorine sensor (see section 6.5)
- pH sensor (see section 6.2.1, dependent on Identcode)
- Redox sensor (see section 6.2.4, dependent on Identcode)
- Temperature sensor Pt 100 /Pt 1000 (see section 6.2.3, dependent on Identcode)
- Conductivity sensor (see section 6.4.1)
- Sensor cable (see section 6.5)
- PROFIBUS®-DP connection accessories (see section 1.9.15)

PROFI® PROCESS FIELD BUS BUS

ProMinent® DMT Transmitters

Identcode Ordering System

DMT DULCOMETER® Transmitters

A **Version**

Type of Mounting:
- W Wall mounted (also pillar mounted)
- S Control panel installation[1)]

Version:
- 0 With ProMinent® logo

Electrical connection:
- 9 Ring main 4-20 mA (two wire technology), operating voltage16 - 40 V DC, nominal 24 V DC (only if communication point = none)
- 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:
- D German
- E English
- F French
- S Spanish
- I Italian

Presetting A, probe:
- 0 Standard ProMinent® buffer solution pH 4-7-10
- D Ref. buffer DIN 19266 pH 4-7-9
- V Variable buffer recognition

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

The last four digits in the Identcode indicate the software presettings, e.g. cell constants for conductivity, temperature compensation etc.

0 = Standard setting.

The measuring transducer can be supplied with presettings already installed. Changes to the presettings can easily be carried out in the operating menu.

DMT A W 0 9 0 P 1 0 D 0 0 0 0

Note:

1) The panel-mounting variant does not have the back housing section.

2) AC Adapter (wall pack) PN/ 7500039

ProMinent® DDC Analyzers

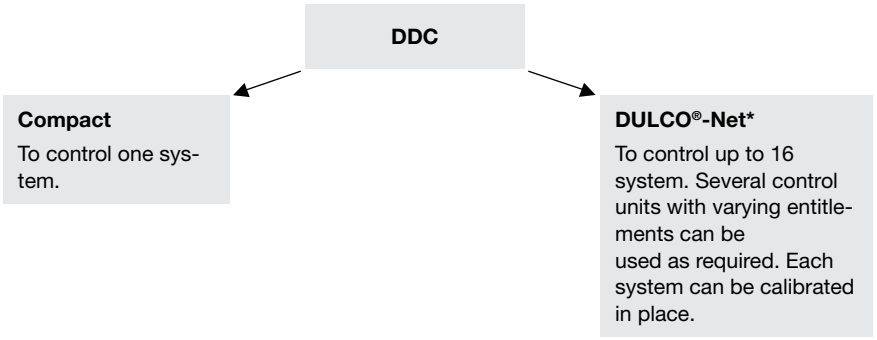
Overview: DDC

pk_5_045

The DULCOMETER® Disinfection Controller (DDC) contains the following features:

- 1/4 VGA colour display: simplest operation
- Controls 1 to 16 locations
- Integrated screen recorder plus datalogger: saves space and money
- CANopen BUS system: Simple to wire and expand
- LAN interface: Simple to connect to a PC or PC network
- Intelligent control with metering fault checks: monitors numerous variables and safely prevents incorrect dosing
- Intelligent sensors: with CANopen-Bus ... digital system stores sensor data and is always within the optimum measurement range thanks to AUTO Ranging
- Intelligent metering pumps: with CANopen Bus ... digital system provides information about operating parameters such as chemical level and feed rate
- Feed quantity display: determines the amount of chemicals used
- Calibration/maintenance timer: can be set as a reminder for calibration or maintenance
- OPC server: provides simple connection to SCADA systems
- Visualising: simple with Embedded Webserver
- Alarm: via SMS(System management server) or eMail
- SD Memory Card: easy to transfer measurement data to PC

The system can be supplied depending on requirements as a compact version **DULCOMETER® DISINFECTION CONTROLLER (DDC) compact** or as a external modular system **DULCOMETER® DISINFECTION CONTROLLER (DDC) DULCO®-Net**.



ProMinent® DDC Analyzers

Overview: DDC

The DULCOMETER® DISINFECTION CONTROLLER (DDC) compact system is designed for the control of one system and is characterized, in addition to the features outlined above, by the following options:

M module (measurement module):

- Measurement and display of the pH value
- Measurement and display of the Redox potential
- Measurement and display of the sample water temperature
- Sample water monitoring
- Measurement of free chlorine
- Measurement of combined chlorine (optional, calculated from difference of total chlorine and free chlorine)

Chlorine sensors:

- Measurement and control of the free chlorine content
- Total chlorine measurement and calculation of the combined chlorine content

A module (actuator module):

- 3 frequency outputs for actuation of pumps for pH correction and disinfectant metering with 3 switch outputs for pump errors or tank contents level monitoring
- 4 of 4 - 20 mA analog outputs, user-programmable and scalable for pH, Redox, free chlorine or total chlorine or combined chlorine or temperature

P module (power supply module):

- Pulse length output for pH correction solenoid valve or peristaltic pump
- Pulse length output for disinfectant solenoid valve or peristaltic pump
- Pulse length output for flocculant peristaltic pump or relay output for purging combined chlorine
- Alarm relay

Module R (Cl_2 actuator module)

- Control of a chlorine dosing system and a remote potentiometer position feedback signal (0 - 1kΩ)
  (only as external module)

ProMinent® DDC Analyzers

Technical Data

Measurement range:	pH	-1 - 15
	Redox:	-1200 - +1200 mV
	Chlorine free	0.01 - 10 ppm/l
	Chlorine total	0.01 - 10 ppm/l
	Combined chlorine	0.01 - 2 ppm
Temperature:	Pt 100 or Pt 1000, 28 to 302 ºF (-20 to +150 °C)	
Resolution:	0.01 pH / 1 mV / 0.01 ppm/l / 0.1 °C	
Reproducibility:	0.5 % of the measurement range (at 25 °C)	
Measurement inputs:	pH and Redox via terminal mV Chlorine via CANopen Bus	
Control type:	P/PI/PID-control	
Control:	Acid or alkali, chlorine	
Digital inputs:	Voltage free inputs (sample water, pause, 3 pump faults	
Signal current outputs:	4 x 0/4-20 mA (electrically isolated for each measured variable) Max. burden 600 Ω , range adjustable	
Control outputs:	Reed contacts, acid, alkali and chlorine (pulse rate for actuation of metering pumps) 2 relays (pulse length) make/break switches for actuation of solenoid valves or peristaltic pumps 250 V~, 3 A	
Alarm relay:	250 V ~3 A, 700 VA make/break switches	
Interfaces:	LAN, RS 232 as configuration interfaces, SD-expansion slot (for SD cards)	
Power supply:	85 - 265 V~, 50/60 Hz	
Ambient temperature.:	23 to 118ºF (-5 to 45 °C)	
Storage temp.:	14 to 158ºF (-10 to 70 °C)	
Enclosure rating:	IP 65	
Climate:	Admissible relative humidity: 95% non condensing DIN IEC 60068-2-30	
Dimensions:	342 x 227 x 78 mm (WxHxD)	

Guaranteed CANopen specifications, all devices:

All devices meet the standardised CAN specification for hardware 2.0 (ISO99-1, ISO99-2). This includes the CAN protocol (ISO 11898-1) and details about the physical application layer in accordance with ISO 11898-2 (high speed CAN to 1Mbit/sec.) and ISO 11898-3 (Low speed CAN to 125kBit/sec).

The device complies with the CAN-Open specification CIA-DS401, the basis of the European standard EN50325-4. It complies with the controller device profile CiA-404.

ProMinent® DDC Analyzers

Identcode Ordering System

DXCa DULCOMETER® Disinfection Controller, DXC Series

Mounting type:
- **W** Wall mounted (IP 65)
- S Control cabinet (IP 54)

Design:
- **0** With controls

Communication interfaces:
- **0** None
- 5 Embedded Web Server, LAN

Data logging:
- **0** None
- 1 Screen recorder with data storage incl. SD card

Module 1:
- **M** Measurement module pH, Redox, temperature

Module 2:
- 0 Not in use
- **A** Actuator module 3 pumps and 4 analog outputs

Module 3:
- **P** Power supply, 1 alarm relay, 3 solenoid valve relays
- N Power supply module without relay

Applications:
- **0** Standard
- S Swimming pool

Preset language:
- **EN** English

Approvals:
- 01 CE-mark

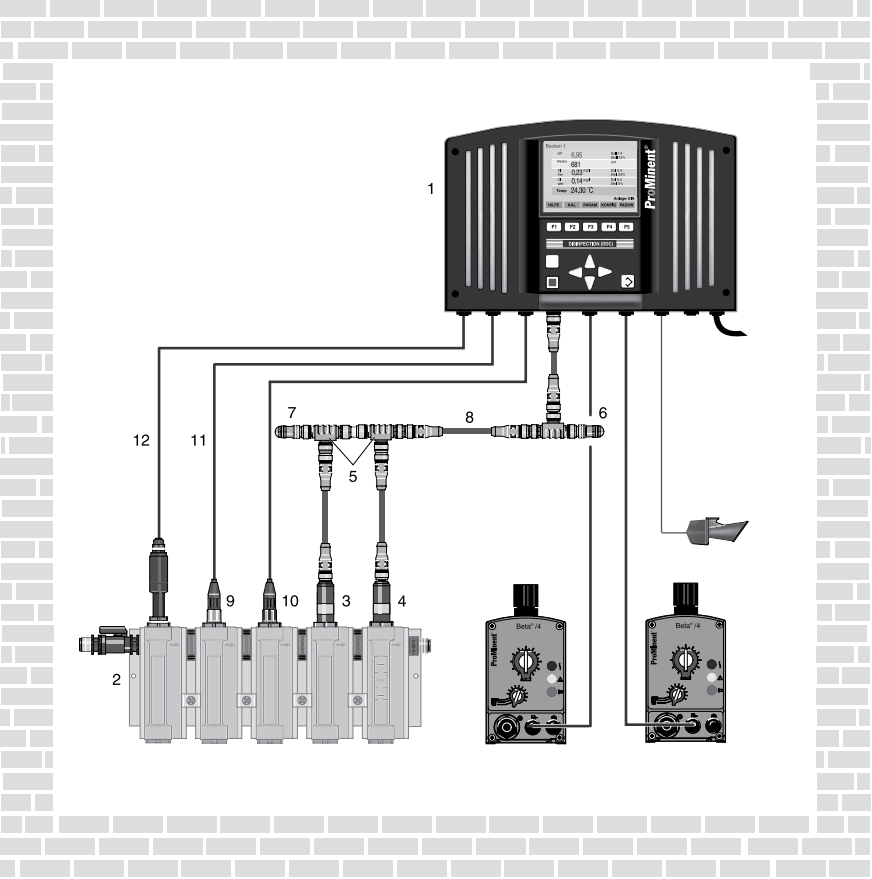
The Identcode describes the entire **DULCOMETER® (DDC) compact** unit.

The peripheral components itemised in the part list above are not included

DXCa W 0 0 0 M A P 0 EN 01

ProMinent® DDC Analyzers

Configuration



pk_5_020

The measurement and control system shown above for a single system comprises the following components (without metering equipment):

Item	Quantity	Name	Part No.
1	1	DULCOMETER® (DDC) central unit with actuator and measurement modules DXCa W 0 0 0 M A P 0 EN 01	
2	1	DULCOTEST® in-line probe housing DGMa 3 2 2 T 0 0 0	
3	1	Chlorine sensor CTE 1-CAN-10 ppm	1023427
4	1	Chlorine sensor CLE 3.1-CAN-10 ppm	1023426
5	3	T-distributors M12 5 pole CAN	1022155
6	1	Load resistor M12-coupler	1022154
7	1	Load resistor M12-plug	1022592
8	5	Connecting cable - CAN M12 5 pole. 1.5 ft (0.5 m)	1022137
9	1	pH electrode	As per application
10	1	Redox electrode	As per application
11	2	Coaxial cable, 6 ft. (2 m) - SN6 - pre-assembled*	1024106
12	6 ft. (2 m)	2 wire cable	7740215

* other lengths available

DULCO®-Net

The DULCOMETER® (DDC) DULCO®-Net control system uses the CANopen – BUS as the medium for transmission of the data between the measurement and actuator units and the sensors and the central unit.

In its maximum expanded form the system can control up to 16 systems, i.e. 16 measurement units and 16 dosing units and corresponding sensors can be operated from a single central unit.

For this purpose a central unit is combined with the number of measurement and dosing units required for the application.

A M12 T-distributor is required for connection to any CANopen device (sensors module, actuator module, metering pumps and chlorine sensors). This connects the device to the main bus via a stub cable.

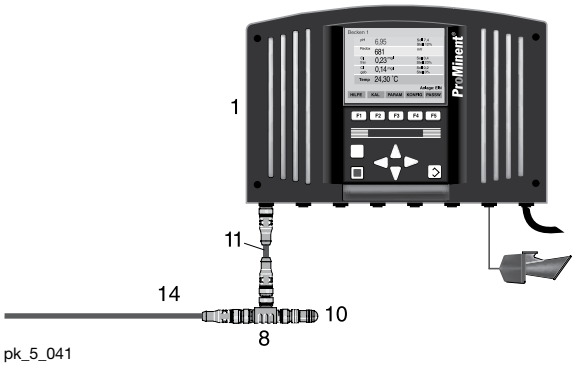
The sum of the lengths of all stub cables in a CANopen system cannot exceed 45 ft. (15 m.)

DULCOMETER® (DDC) DULCO®-Net and compact can both be easily expanded later.

What components make up a DULCOMETER® (DDC) DULCO®-Net system?

A DULCOMETER® (DDC) DULCO®-Net system comprises:

- One central unit **and** an individual combination of the following components:
- Measurement unit
- Dosing unit without main power module
- Dosing unit with main power module (optional)
- Chlorine gas dosing unit



pk_5_041

Central unit

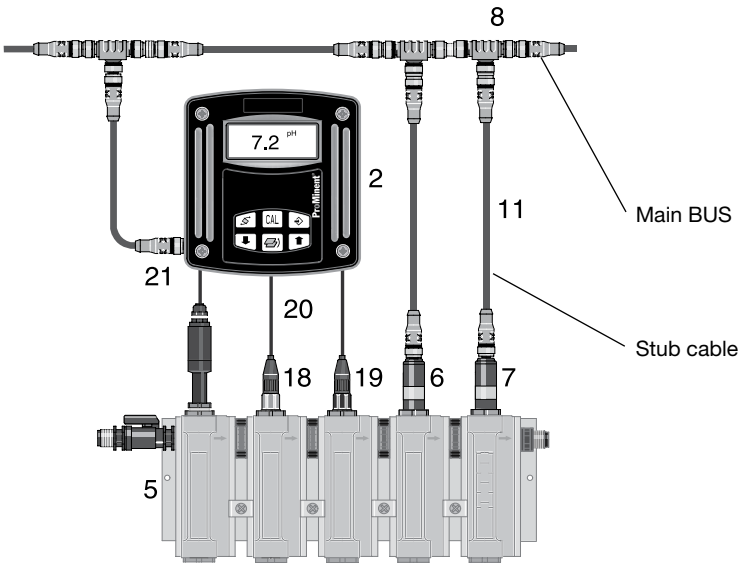
The central unit can be installed anywhere, e.g. in a control room or in the office. It serves as an input/output module (for viewing and configuring individual modules) and has the following functions: screen recorder, interface, Embedded Web Server and power supply. The central unit may optionally incorporate a sensor and an actuator module. The central unit is connected with the other units via the main Bus. CAN connection cables are used for this purpose. The main Bus of the first unit must be connected with a M 12 load resistor coupling and the final unit with a M 12 load resistor plug.

A unit always consists of a module, a T-connector and a CAN stub connection cable, 1.5 ft. (0.5 m) long.

The central unit in the above example comprises the following components:

Item	Quantity	Name	Part No.
1	1	DULCOMETER® (DDC) Central unit DXCa W 0 5 1 M A P 0 EN	
8	1	T-distributor M12 5 pole. CAN	1022155
11	1	Connecting cable - CAN M12 5 pole. 0.5 m	1022137
14	1	Connecting cable - CAN M12 5 pole 5 m	1022141
10	1	M 12 load resistor coupling	1022154

The measurement module



pk_5_042

The measurement module allows the display of the measured value and the calibration of the sensors for the respective loop. The following parameters can be measured: pH value, Redox potential, total and free available chlorine, and the sample water temperature.

The measurement module has digital inputs for pause or monitoring of the sample water. The illuminated graphic display and a keypad allow presetting of all parameters including total and free available chlorine, measured variables.

The measurement module is connected with the other units via the main Bus. CAN connection cables are used for this purpose. The main bus segment of the last unit must be connected by a M 12 load resistor plug.

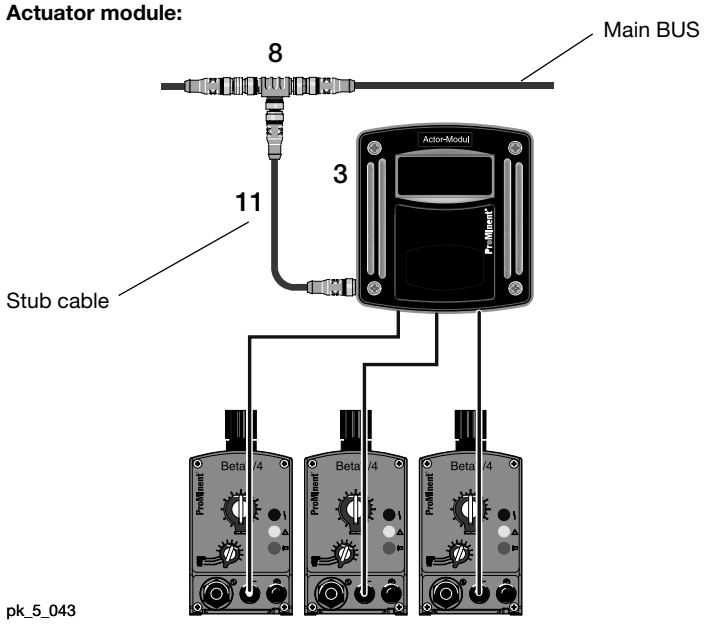
The measurement module in the above example comprises the following components:

Item	Quantity	Name	Part No.
2	1	Measurement module DXMa M W 0 0 EN 01	
5	1	In-line probe housing DGMa 3 2 2 T 0 0 0	
6	1	Chlorine sensor CTE 1 -CAN-10 ppm	1023427
7	1	Chlorine sensor CLE 3.1-CAN-10 ppm	1023426
8	3	T-distributors M12 5 pole CAN	1022155
11	4	Connecting cable - CAN M12 5 pole	
		1.5 ft. (0.5 m)	1022137
18	1	pH electrode	As per application
19	1	Redox electrode	As per application
20	2	Coaxial cable, 2 m - SN6 - pre-assembled*	1024106
21	6 ft. (2 m)	2 wire cable	7740215

* other lengths available

Actuator Module

Actuator module:



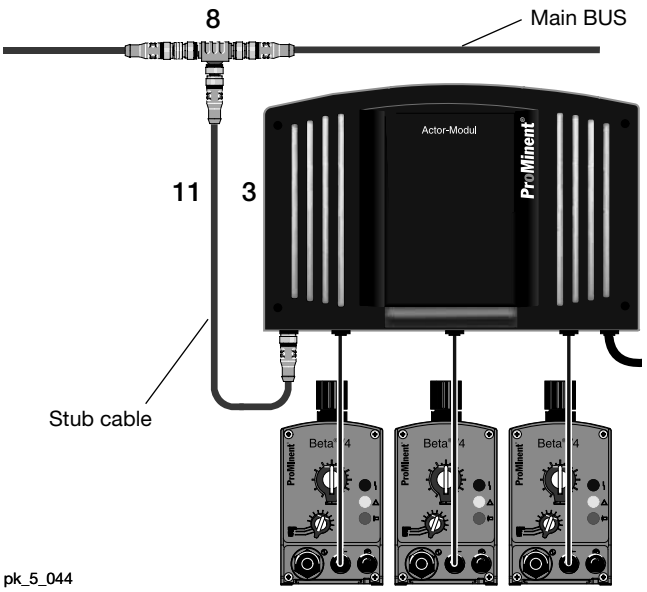
The actuator module allows control of up to 3 dosing pumps via pulse frequency control. Possible dosing combinations are: acid, alkaline solution and disinfectant, or acid and disinfectant.

It comprises 3 digital inputs for evaluation of the fault indication relays of the dosing pumps, 4 freely-configurable 0/4 - 20 mA standard signal outputs for documentation of data. The dosing unit is connected with the other units via the main bus. CAN connection cables are used for this purpose. The main Bus segment of the last unit must be connected by a M 12 load resistor plug.

The actuator module in the above example consists of the following components (without metering equipment):

Item	Quantity	Name	Part No.
3	1	Actuator module DXMa A W 2 0 0 0 01	
8	1	T-distributor M12 5 pole CAN	1022155
11	1	Connecting cable - CAN M12 5 pole	
		1.5 ft. (0.5 m)	1022137

Actuator module with power supply:



The actuator module with power supply allows control of up to 3 solenoid-operated dosing pumps via pulse frequency control, or motor-driven dosing pumps via pulse length control.

Possible dosing combinations are: acid, alkaline solution and disinfectant, or acid and disinfectant.

It consists of 3 digital inputs for evaluation of the fault indication relays of the dosing pumps, or level switch on motor pumps, 4 freely-configurable 0/4 - 20 mA standard signal outputs for documentation of data.

This unit is connected with the other units via the main bus. CAN connection cables are used for this purpose. The main bus of the last unit must be connected by a M 12 load resistor plug.

An additional power module is required after every third circuit.

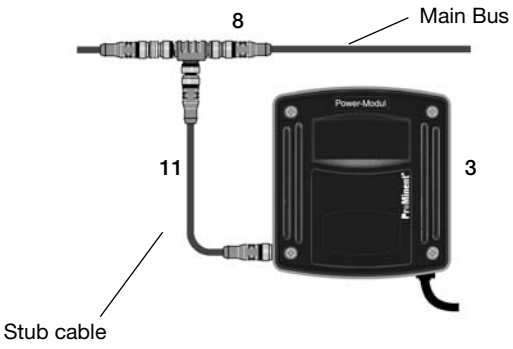
Module must be powered for operation.

The actuator module with power supply in the above example consists of the following components (without metering equipment):

Item	Quantity	Name	Part No.
3	1	Actuator module DXCa A W 2 0 0 0 A P 0 0 0 01	
8	1	T-distributor M12 5 pole CAN	1022155
11	1	Connecting cable - CAN M12 5 pole	
		1.5 ft. (0.5 m)	1022137

Power Module

Power module:



pk_5_043_C_power

If the combination of actuator module with power supply is not required, the power module is used.

This power module is used to supply power to the bus.

It must be powered for operation.

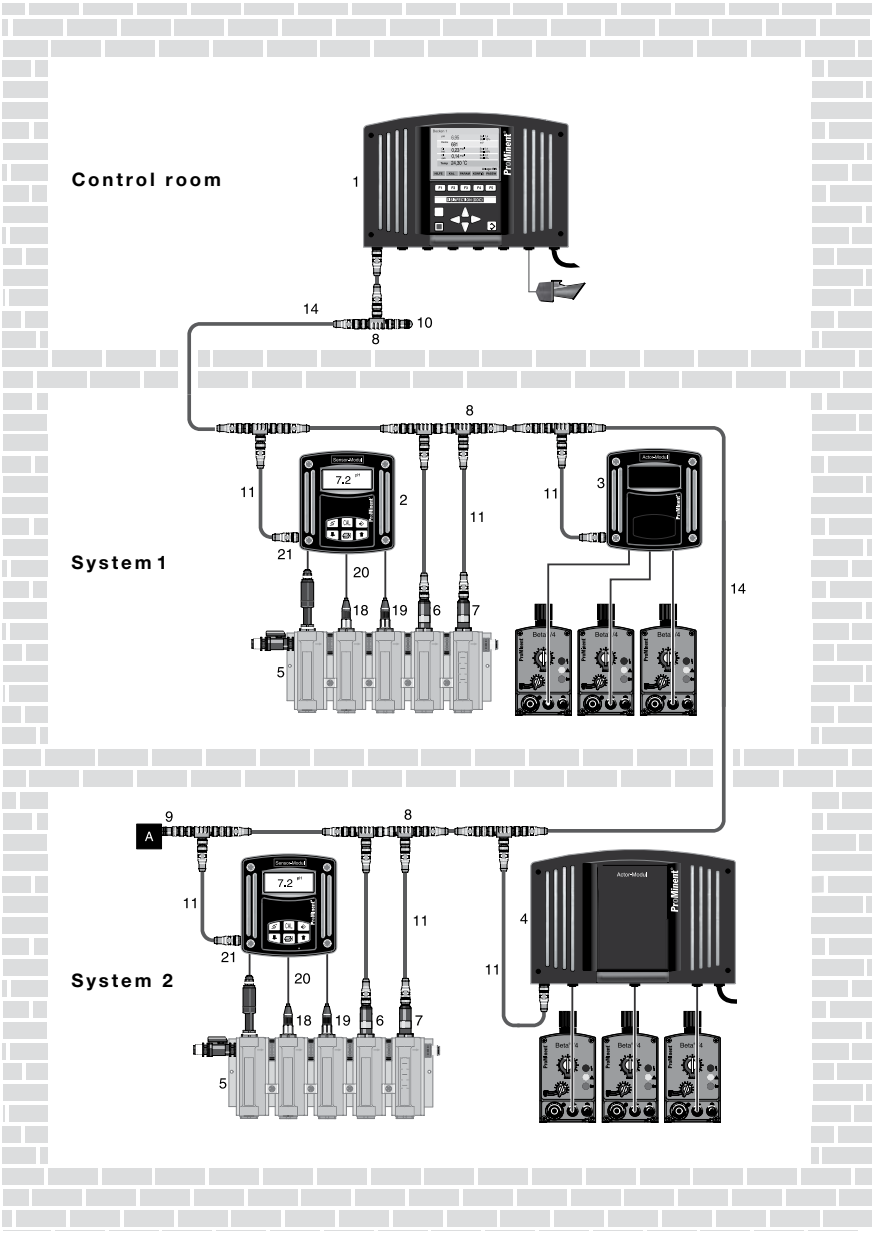
The power module in the above example comprises the following components:

Item	Quantity	Name	Part No.
3	1	Power-module DXMa N W 2 0 00 01	
8	1	T-distributor M12 5 Pol. CAN	1022155
11	1	Connecting cable - CAN M12 5 Pol. 1.5 ft. (0.5 m)	1022137

ProMinent® DDC Analyzers

Complete System

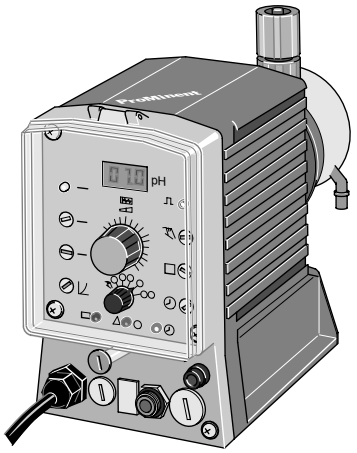
Example of configuration for two control systems:



pk_5_022

ProMinent® D_4a Analyzer & Pump

Overview: D_4a



pk_5_018

- Process controller with integrated metering pump
- pH and Redox measured variables
- Simple to operate using adjusting potentiometer
- Chemical resistant plastic housing (IP 65)
- Compact design

Applications: **laboratory**
pilot systems
electroplating
cooling water
neutralization
swimming pool
potable water

Capacity Data

D4a Pump Version	Maximum Pressure psig	(bar)	Capacity at max. Backpressure US GPH	(L/h)	mL/ stroke	mL/min	Capacity at 1/2 max. Backpressure US GPH	(L/h)	mL/ stroke	mL/min	Connections O.D. x I.D. (inches)
1601	232	16	0.22	(0.84)	0.14	14.0	0.26	(0.99)	0.16	16.5	1/4 x 3/16
1201	174	12	0.38	(1.45)	0.24	24.2	0.42	(1.59)	0.26	26.5	1/4 x 3/16
0803	101	7	0.76	(2.86)	0.48	47.7	0.84	(3.17)	0.53	52.9	1/4 x 3/16
1002	145	10	0.50	(1.91)	0.32	31.8	0.58	(2.18)	0.36	36.3	1/2 x 3/8
0308	43.5	3	1.85	(7.00)	1.17	116.6	2.01	(7.60)	1.27	126.6	1/2 x 3/8
0215	22	1.5	3.25	(12.30)	2.05	205.0	3.49	(13.20)	2.20	220.0	1/2 x 3/8

D4a with NS liquid end

D4a NS Pump Version	Capacity at Maximum Backpressure psig	(bar)	U.S. GPH	(L/h)	mL/ stroke	mL/ min	Max. Stroking Rate spm	Connections O.D. x I.D. (inches)	Suction Lift ft.	(m)
1601	232	(16)	0.14	(0.54)	0.09	9	100	1/4 x 3/16	5.9	(1.8)
1201	174	(12)	0.22	(0.84)	0.14	14	100	1/4 x 3/16	6.6	(2.0)
0803	116	(8)	0.52	(1.98)	0.33	33	100	1/4 x 3/16	9.2	(2.8)
1002	145	(10)	0.40	(1.50)	0.25	25	100	1/4 x 3/16	6.6	(2.0)

Materials in Contact With Chemicals

Material Version	Liquid End	Suction and Discharge	Seals	Ball valves (1/4"-1/2" connection)
NP	Acrylic	PVC	Viton®	Ceramic
PP	Polypropylene	Polypropylene	EPDM	Ceramic
TT	PTFE	PTFE	PTFE	Ceramic
SS	316 Stainless Steel	316 Stainless Steel	PTFE	Ceramic
NS*	Acrylic	PVC	Viton®	Ceramic

ProMinent® D_4a Metering Pumps

Identity Code Ordering System

D_4a D Pump Type 4, Version a

Measured variable:

PH	pH measurement range 0-14
RH	ORP measurement range 0-999 mV

Pump type:

1601	232 psi; 0.26 gph
1201	174 psi; 0.42 gph
0803	101 psi; 0.84 gph
1002	145 psi; 0.58 gph
0308	43.5 psi; 2.01 gph
0215	22 psi, 3.25 gph

Liquid end material:

NP	Acrylic with Viton® O-ring
NS	Auto-degassing Acrylic with Viton® O-ring
PP	Polypropylene with EPDM O-ring
TT	PTFE + 25 % carbon with PTFE seal
SS	316 Stainless steel with PTFE seal

Operating Voltage:

A	230 V, 50/60 Hz Euro plug
D	115 V, 50/60 Hz USA plug

Sensor connection:

2	SN6 pH/RH
8	SN6 with reference electrode connector pH/RH

Correcting value:

0	None
1	Temperature (SN6) for pH only

Control direction:

1	Raise measured value
2	Lower measured value
3	Control direction switchable (for pH only)

Signal current output:

0	None
1	0/4-20 mA ≙ pH 1-12; 0-1000 mV; 0-2 mg/l
2	0/4-20 mA =^ 0-20 mg/l

Relay:

0	None
A	Liquid level relay output (n/c)
B	Stroke pacing relay output (n/c)
C	Pump stop relay output (n/c)
D	Set point indicating relay output (n/c)
E	Control period exceeded (n/c)
F	Fuse and power supply failure indicating relay (n/o)

D_4a PH 1601 NP A 2 0 1 0 0

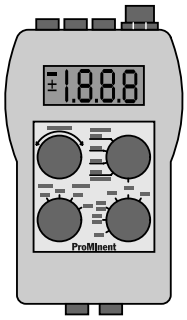
ProMinent® Measurement Simulator

Overview: Simulator

- Simulation of pH and mV signals
- Simulation of Pt 100/Pt 1000 (25 °C and 80 °C)
- Simulation and measurement of mA signals

Applications:
testing DULCOMETER® devices, service and laboratory

Technical Data



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Measurement range U_+:	5…30 V DC (measures the supply voltage for external passive 4…20 mA transmitters)
Simulation:	pH 2.00…12.00 ±2000 mV 0…20 mA Pt 100, Pt 1000 (25 °C and 80 °C)
Simulation output:	SN6 banana socket
Battery:	9 V battery pack
Operating life:	Approx. 150 hours
Weight:	Approx. 265 g (with battery)
Enclosure rating:	IP 20
Ambient temperature:	0…40 °C
Accessories:	9 V battery, signal lead kit

	Part No.
	1004042

ProMinent® Portable DT Photometer

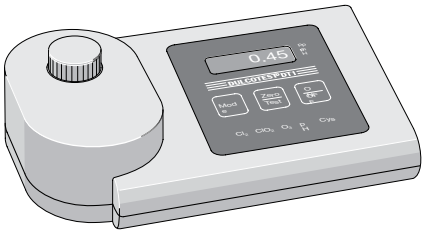
Overview: Photometer

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 cyanic 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:	Dependant 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 **DT2B photometer**, complete with carrying case	1010394
Type **DT3 photometer**, complete with carrying case	1023143
Type **DT4 photometer**, complete with carrying case	1022736

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

Features

- Controls Cooling Towers or Boilers
- Timed or Continuous Sample
- Boiler Blowdown
- Chemical Relay Timer
- Conductivity Input
- Water Meter Input
- CE Approved
- Web Browser Interface
- Supports "Bleed Then Feed"
- Dry Contact Alarm Relay
- Single 4-20mA Output
- Built-In Diagnostics
- "Configure and View" from remote locations
- Single point calibration
- Feed chemical based on water volume
- NEMA 4X Enclosure
- Detect leaks in the system
- Supports Percentage Time Bleed & Feed

SlimFLEX Controllers

Features

- Conductivity and Temperature Inputs
- Two Digital Inputs
- Four Relay Outputs
- 5-Key Universal Keypad
- 2 Line, 16 character LCD
- Built-In Diagnostics
- Built-In Web Server
- LAN Accessible
- pH Control
- ORP Control
- Dry Contact Alarm Relay
- Flow Switch
- Single 4-20mA Output
- NEMA 4X Enclosure
- 120VAC, 60Hz
- Built-In Diagnostics
- CE Approved

MultiFLEX Controllers

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 Upgradeable 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
- Detect leaks in the system
- Supports "Percentage Time Bleed & Feed"

AEGIS Controllers

Features

- Inhibitor Feed Using PPM Setpoints
- Volumetric Timer Controls
- Relay Mirroring
- Optional Ethernet Communications
- MODBUS
- Industrial and Commercial Series
- Plug and Play Upgrades
- Works with Trackster 3 Software
- Aquatrac Thermal Flow Switch
- Easily Upgradeable with Plug-in Modules
- Program Chemical Feed
- CE Approved
- NEMA 4X Enclosure
- Variable Frequency Pump Controls
- Data Logging
- Drum Level Alarms
- ProMinent Pump integration