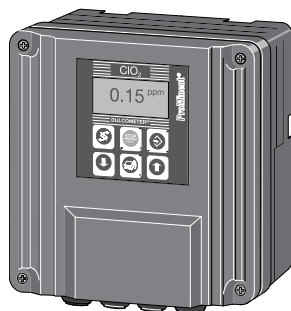


## ProMinent® D1C and D2C Analyzers

## Technical Data



Wall Mount



Panel Mount

Measurement range:	<b>Type of connection mV:</b> pH 0.00 ... 14.00 ORP - 1000 ... +1000 mV <b>Type of connection mA:</b> 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 mg/l Dissolved oxygen: 0.1...10/0.1...20 ppm pH: 0.00...14.00 ORP: 0...+1.000 mV Conductivity: 0...20/200/1,000 mS/cm
Resolution:	pH: 0.01 pH / ORP: 1 mV Amperometric 0.001/0.01 ppm/l/0.1 %
Accuracy:	0.5 % from measurement range
Measurement input:	SN6 (input resistance > 0.5 x 10 <sup>12</sup> Ω)
Correction variable:	pH (Cl <sub>2</sub> version only) Temperature via Pt 100 (ClO <sub>2</sub> version only)
Correction range temp.:	50 - 113 °F (10 - 45°C) (ClO <sub>2</sub> version only)
Correction range pH:	7.0 - 8.5 pH (ClO <sub>2</sub> version only)
Disturbance signals:	Additive/multiplicative
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 96 mm x 145 mm)  
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/denitrification

**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

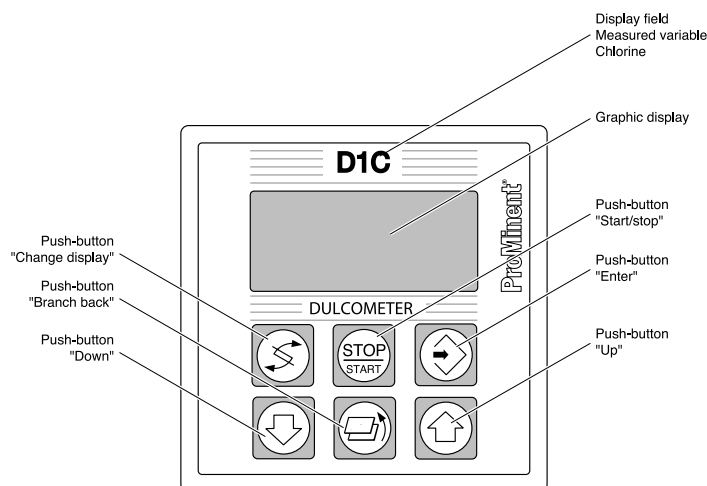
**Temperature** - Control heater or heat exchanger to maintain bath temperature or process cooling

**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



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

	<b>UP</b> menu button To increase a displayed numerical value and to change variables (flashing display)
	<b>BRANCH BACK</b> menu button To exit operating menu (back to start of relevant setting).
	<b>DOWN</b> 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, 5.70" (145 mm) 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.

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).

F = Fluoride; SN6 with transducer and connection 1

I = Chlorite; use connection 1

### 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<sup>-</sup>). 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 positioners 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 (proportional 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:

<sup>†</sup>E = English (D, F, N)

<sup>†</sup>D = German (E, F, N)

<sup>†</sup>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.

<sup>†</sup>Languages available for measured variables A and H

**NOTE:** Power cord not included.

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

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

## ProMinent® D1C and D2C Analyzers

## Identcode Ordering System D1C (Version a)

D1C	Series																																								
A	<p><b>Type of Mounting:</b></p> <p>W Wall Mount</p> <p>D Panel Mount</p> <p><b>Operating Voltage:</b></p> <p>0 230 V, 50/60 Hz</p> <p>1 115 V, 50/60 Hz</p> <p>4 24 V AC/DC</p> <p><b>Measured Variables:</b></p> <table border="1"> <tr> <td>0</td> <td>None</td> <td>L</td> <td>Conductivity</td> </tr> <tr> <td>A</td> <td>Peracetic acid</td> <td>I</td> <td>Chlorite</td> </tr> <tr> <td>B</td> <td>Bromine</td> <td>P</td> <td>pH</td> </tr> <tr> <td>C</td> <td>Chlorine</td> <td>R</td> <td>ORP (Redox)</td> </tr> <tr> <td>D</td> <td>Chlorine dioxide</td> <td>S</td> <td>0/4-20 mA norm signal</td> </tr> <tr> <td>F</td> <td>Fluoride</td> <td>X</td> <td>Dissolved oxygen</td> </tr> <tr> <td>H</td> <td>Hydrogen peroxide</td> <td>Z</td> <td>Ozone</td> </tr> </table> <p><b>Connection for Sensor Input:</b></p> <p>1 Standard signal 0/4-20 mA, all measured variables</p> <p>2 SN6 plug (mounting type "W" only)</p> <p>3 Terminal for standard conductivity cell (L)</p> <p>4 Terminal for PT 100 temperature sensor</p> <p>5 Terminal for mV signal (From pH or ORP sensor cable)</p> <p>6 Terminal for inductive conductivity sensors</p> <p>7 Standard signal 0/4-20 mA (for PAA and H2O2 25mm sensors)</p> <p><b>Correcting variable: (Not available for measured variables A&amp;H)</b></p> <p>0 None</p> <p>1 pH for free chlorine via 4-20 mA signal</p> <p>2 Temperature correction terminal for P or L (Ttemp. For all other variables)</p> <p>3 Temperature correction terminal for 4-20 mA signal for P&amp;L (Ttemp. For all other variables)</p> <p>4 Manual temperature input for P&amp;L</p> <p><b>Feed forward control:</b></p> <p>0 None</p> <p>2 0-500 Hz signal</p> <p>3 0-10 Hz signal</p> <p><b>Pause contact:</b></p> <p>0 None</p> <p>1 Pause contact</p> <p><b>Analog signal output (0/4-20 mA):</b></p> <table border="1"> <tr> <td>0</td> <td>None</td> <td>3</td> <td>Measured correcting value</td> </tr> <tr> <td>1</td> <td>Measured value</td> <td>4</td> <td>Two current outputs</td> </tr> <tr> <td>2</td> <td>Control action</td> <td></td> <td></td> </tr> </table> <p><b>Relay Outputs:</b></p> <p>G Alarm and 2 limit relays</p> <p>M Alarm and 2 control relays</p> <p>R Alarm and positioner relays w/ position feedback potentiometer</p> <p><b>Pump pacing:</b></p> <p>0 None</p> <p>2 Two pulse control outputs</p> <p><b>Control Action:</b></p> <p>0 None</p> <p><b>Language:</b></p> <p>00 Language neutral</p>	0	None	L	Conductivity	A	Peracetic acid	I	Chlorite	B	Bromine	P	pH	C	Chlorine	R	ORP (Redox)	D	Chlorine dioxide	S	0/4-20 mA norm signal	F	Fluoride	X	Dissolved oxygen	H	Hydrogen peroxide	Z	Ozone	0	None	3	Measured correcting value	1	Measured value	4	Two current outputs	2	Control action		
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