PCA300 Family

Chlorine, pH, ORP and Temperature Analyzers

- Backlit LCD display
- Nema 4X protection
- DPD chlorine measurement method
- Colorimeter diagnostics
- Reagent reminder
- Amplified pH/temperature probe
- Data logging of up to 3500 measurements
- GLP data for review of calibration information
- Digital RS485 output
- Two analog outputs for recording or dosing devices (PCA340)
- Two dosing relays
- SPDT alarm relay
- SPDT system error relay
- Warning messages

The PCA family are process analyzers for the continuous measurement of chlorine, pH (PCA320, PCA330, PCA340) and temperature. These analyzers feature built in data logging, RS485 digital output, dosing relays, and alarm relays packaged in a wall mount Nema 4x enclosure. The PCA340 also features two analog outputs.

This family uses DPD Colorimetric method in which N, N-Diethyl-p-phenylenediamine indicator and a buffer are mixed together with the sample. The resulting chemical reaction causes a magenta color to form in the presence of chlorine. The color intensity is proportional to the concentration. The color intensity is measured photometrically (light source at a specific wavelength and a photodetector) and converted to chlorine concentration, in mg/L, which is displayed on the front panel. The sampling interval for chlorine measurement is adjustable from 3 to 90 minutes. These analyzers have a dosing relay for the addition of chlorine by a dosing pump or chlorine generator when a reading is below the programmable set point. The technology used by this family for chlorine measurement is the same as that found in portable and benchtop colorimeters providing for consistent results when performing process verification with one of those types of meters.

The PCA320, PCA330 and PCA340 also utilize the HI1005 amplified pH electrode with a built in pt100 temperature sensor and matching pin to measure both pH and temperature. The built in amplifier and matching pin provide for exceptional performance against any electrical noise generated by pumps and motors. These analyzers have a programmable dosing relay for the adjustment of pH. The dosing relay can be activated by either on/off or proportional control.

The PCA340 features two selectable 0-20 or 4-20 mA signal output that are scalable for the transmission of readings to external recording devices. The analog outputs can also be set for dosing and used with dosing pumps that accept a 4-20 mA analog input. The analog outputs can be used for any of the three measured parameters.

Through the system setup menu, users have the ability to enable or disable the low and high level of alarms for all parameters. The PCA family also offers overdosing protection that generates an alarm if something within the system is not working properly. The system will stop processes until the user corrects the error.

Backlit LCD Display

The PCA family has a backlit display that is easy to read from a distance and allows for up to three parameters to be displayed at a time.

Nema 4X Protection

These analyzers are enclosed in waterproof casing for superior protection against the elements. The front door of the case has a window for the measurement display while also shielding the DPD reagents from UV light to prevent premature degradation.

DPD Chlorine Measurement Method

The DPD colorimetric method is one of the most common and reliable methods to measure chlorine. The PCA family can use either free or total chlorine reagents and allow for 16,000 measurements to be performed.

Reagent Reminder

The PCA family has a reagent reminder feature to alert the user when the reagents are running low. When the reagents are changed the counter is reset and the meter automatically tracks the number of readings performed.

Colorimeter Diagnostics

Advanced diagnostics allow for easy troubleshooting of the colorimeter. In the setup menu it is possible to select an option that allows the user to determine the difference between a dark read (LED off) and a blank read (LED on). These analyzers also automatically perform this check in order to determine when to alert the user that the sample cell needs to be cleaned.

Amplified pH/Temperature Probe (PCA320, PCA330, PCA340)

An integrated pt100 temperature sensor allows for automatic temperature compensation of pH measurements and allows for monitoring temperature as well. The built in amplifier and matching pin provides for exceptional performance where other probes fail when placed in line with pumps and motors.

Data Logging

The analyzers can store up to 3500 readings (at least 7 days worth of records when set to a a3 minutes sampling interval) that can be reviewed or downloaded to a Windows compatible PC using the HI92500 software and the RS485 serial port. Logged records contain the date time and reading of all parameters measured along with any alarm status.

GLP Data

The GLP data allows for the user to review the data and time for the last Chlorine and pH calibration.

Digital RS485 Output

These analyzers have a RS485 digital output that allows for connection to a Windows compatible PC running the HI92500 software. The software allows for remote monitoring, review of logged data, events and errors, and executing setup options.

Two Analog Outputs (PCA340)

The PCA340 features two selectable 0-20 or 4-20 mA signal output that are scalable for the transmission of readings to external recording devices. The analog outputs can also be set for dosing and used with dosing pumps that accept a 4-20 mA analog input. The analog outputs can be used for any of the three measured parameters.

Two Dosing Relays

The dosing relays of these analyzers can be connected to a pH and/or chlorine dosing pumps. The chlorine relays are proportionally controlled while the pH relay can be set for on/off or proportional control. The proportional control offers very fine control of doing to prevent any overshoot and wastage of chemicals.

Alarm Relay

One SPDT alarm relay is provided that can be activated by adjustable upper and lower chlorine, pH and temperature limits.

Error Relay

One SPDT error relay is provided and is activated when an error is present including a problem with the colorimeter such as when the reagent counter has reached zero, or when a reading is outside the range for a measured parameter.

Warning Messages

Error messages are displayed when the reagents are expired or low and if the colorimeter cell needs to be cleaned.

See page 16.15 for spare parts and solutions

Specifications		PCA310	PCA320	PCA330	PCA340
Free and Total Chlorine	Range	0.00 to 5.00 mg/L (ppm)	0.00 to 5.00 mg/L (ppm)	0.00 to 5.00 mg/L (ppm)	0.00 to 5.00 mg/L (ppm)
	Resolution	0.01 mg/L (ppm)	0.01 mg/L (ppm)	0.01 mg/L (ppm)	0.01 mg/L (ppm)
	Accuracy	± 8% or ±0.05 mg/L whichever is greater	± 8% or ±0.05 mg/L whichever is greater	± 8% or ±0.05 mg/L whichever is greater	± 8% or ±0.05 mg/L whichever is greater
pH	Range	–	0.00 to 14.00 pH	0.00 to 14.00 pH	0.00 to 14.00 pH
	Resolution	–	0.01 pH	0.01 pH	0.01 pH
	Accuracy	–	±0.05 pH	±0.05 pH	±0.05 pH
ORP	Range	–	–	0 to 2000 mV	–
	Resolution	–	–	1 mV	–
	Accuracy	–	–	±1 mV	–
Temperature	Range	–	5.0 to 75.0 °C (41 to 167 °F)	5.0 to 75.0 °C (41 to 167 °F)	5.0 to 75.0 °C (41 to 167 °F)
	Resolution	–	0.1 °C	0.1 °C	0.1 °C
	Accuracy	–	±0.5°C	±0.5°C	±0.5°C
Additional Specifications	Chlorine Calibration	one-point process calibration			
	Chlorine Sampling Rate	adjustable from 3 to 90 minutes			
	Chlorine Dosage	proportional			
	Chlorine Delta	selectable from 0.1 to 5 mg/L (ppm)			
	pH Calibration	automatic one or two points; one point process calibration			
	pH Sampling Rate	adjustable from 3 to 120 seconds			
	pH Dosage	ON/OFF or proportional, relay or 4-20mA output			
	pH Delta	selectable from 0.1 to 2 pH (hysteresis adjustable from 0.05 to 2 pH)			
	Analog Output	–			(2) 4-20mA, 0-20mA for recorder or dosing
	Recorder Output	4-20mA, 0-20mA			–
	PC Connectivity	RS485 port, galvanically isolated			
	Baud Rate	1200, 2400, 4800, 9600 bps			
	Data Logging	up to 3500 data points			
	Alarm Relay	SPDT contact with 5A, 230V resistive load			
	Dosing Relay	SPDT contact with 5A, 230V resistive load			
	System Error	SPDT contact with 5A, 230V resistive load			
	Inlet Pressure	0.07 to 4 bar with no external pressure regulator (for pressure exceeding four bar an external pressure regulator is required)			
	Sample Flow	100 to 300 mL/min			
	Sample Temperature	5 to 40°C (41 to 104°F)			
	Sample Inlet/Outlet Connection	12mm (1/2") male NPT fitting			
	Drain Connection	10mm (3/8") barb			
	Power Supply	115 VAC ±10% or 230 VAC ±10%; 50/60 Hz; 20 VA			
	Enclosure	NEMA-4X standard, molded fiberglass polyester with transparent Lexan window			
	Dimensions / Weight	318 x 267 x 159 mm (12.5 x 10.5 x 6.25") / 5 kg (11 lb.) without reagents			

Ordering Information

Each PCA300 series model is supplied with reagent bottles (2), reagent caps (2), 1 DPD compound powder, tubing and instructions.;

PCA310-1 Free & total chlorine analyzer/control (115V);

PCA310-2 Free & total chlorine analyzer/control (230V);

PCA320-1 Free & total chlorine analyzer/control, pH control, temperature (115V);

PCA320-2 Free & total chlorine analyzer/control, pH control, temperature (230V) ;

PCA330-1 Free & total chlorine analyzer/control, pH control, ORP monitoring, temperature (115V);

PCA330-2 Free & total chlorine analyzer/control, pH control, ORP monitoring, temperature (230V)

PCA340-1 Free & total chlorine analyzer/control, pH control, temperature with dual analog outputs (115V);

PCA340-2 Free & total chlorine analyzer/control, pH control, temperature with dual analog outputs (230V)

Swimming Pools and Chlorine for Disinfection

In regards to swimming pool treatment, disinfection or sanitizing basically means to rid the pool of bather contamination, destroy bacteria, and control nuisance organisms like algae, which may occur in the pool, filtration equipment, and piping. Of the many techniques used (chlorine, bromine and iodine dosing systems), chlorine is the most common.

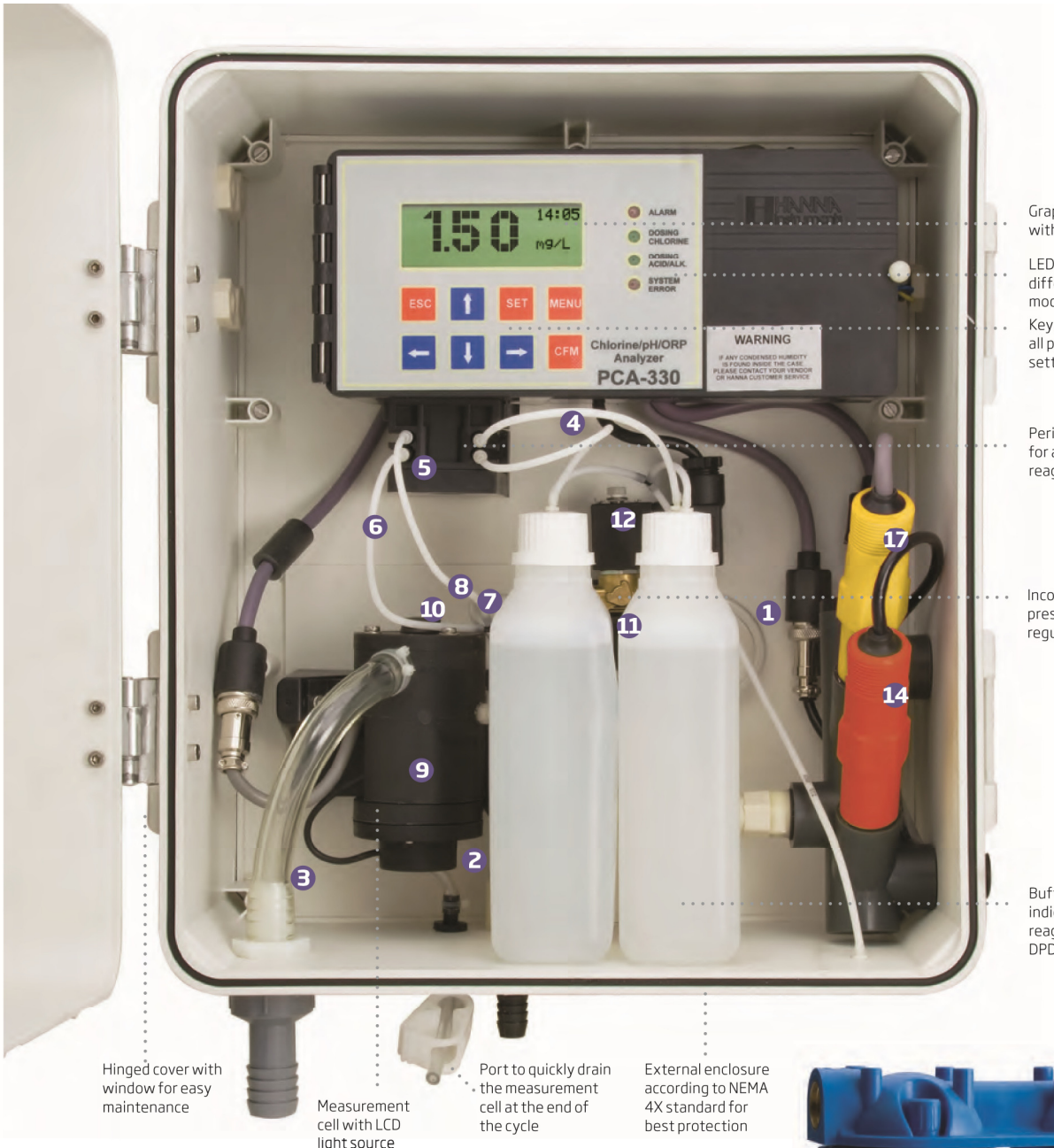
Chlorine

Chlorine is a strong oxidizing agent that destroys mostly organic pollutants and bacteria and can combine with nitrogen containing compounds, forming chloramines. When dosing chlorine for disinfection, only a portion of the dosed chlorine remains active to actually continue the disinfection process.

When free chlorine combines with a nitrogen containing compound it becomes a less efficient disinfectant called chloramines. The addition of these two parts gives total chlorine. The target is to keep free and total chlorine equal, and thus to maintain the combined chlorine concentration chloramines) near zero. The presence of chloramines is not desired because of the distinctive 'swimming pool' smell caused by combined chlorines like di-chloramines. Beside this unpleasant odor, chloramines can irritate the eyes and the mucous membranes.

Commercial chlorine for disinfection may be available as a gas (Cl_2), a liquid like sodium hypochlorite or bleach (NaOCl) or in a solid state like calcium hypochlorite, chloro-hydantoins or chloro-cyanuric acid compounds. These compounds, once dissolved in water do establish equilibrium between the hypochlorous acid (HOCl) and the hypochlorite ions (OCl^-). Although both forms are considered free chlorine, it is the hypochlorous acid that provides the strongest disinfecting and oxidising characteristic of chlorine solutions; the amount of hypochlorous acid in chlorinated water dependends upon the pH value of the solution. Changes in pH value will affect the HOCl equilibrium in relation to the hydrogen and hypochlorite ion; HOCl decreases and OCl^- increases as pH increases. At a low pH, almost all the free chlorine is in the molecular form HOCl and at a pH of around 7.5, the ratio between HOCl and OCl^- is 50:50. Since the ionic form OCl^- is a slow acting sanitizer while the molecular HOCl is a fast acting, it is important to regularly measure the pH. As a general rule a pH of about 7.2 is recommended to maintain fast acting disinfection conditions.

PCA Parts and Solutions



PCA Parts and Solutions

Parts

HI70473	PCA tubing kit, pressure regulator to drain (2). Each kit includes: transparent Tygon tubes 86L x 3.2ID mm (3.4 x 0.1") (Length x Internal Diameter) **(1, 2)** and 105 x 9.5 mm (4.1 x 0.4") **(3)**
HI70474	PCA peristaltic pump tubing kit (6). Each kit includes: non-transparent C-flex tubes 55L x 0.8ID mm (2.1 x 0.03") **(5)**
HI70475	PCA peristaltic pump tubing kit (2). Each kit includes: non-transparent C-flex tubes 55L x 0.8ID mm (2.1 x 0.03") **(5)**
HI70476	PCA reagent bottle tubing kit (6). Each kit includes: non-transparent C-flex tubes 155L x 0.8ID mm (6.1 x 0.03") **(11)**
HI70477	PCA tubing set for measuring cell (2). Each set includes: non-transparent C-flex tube 50L x 0.8ID mm (2.0 x 0.03") **(8)** and Y strainer **(7)**
HI70478	PCA tubing kit, bottle to pump (6). Each kit includes: non-transparent C-flex tube 150L x 0.8ID mm (5.9 x 0.03") **(4)**
HI70479	PCA tubing kit, pump to Y strainer (6 pcs). Each kit includes: non-transparent C-flex tube 150L x 0.8ID mm (5.9 x 0.03") **(6)**
HI70482	PCA filters. The kit includes 0.5 µm and 50 µm filters **(13)**
HI70496	Replacement filter, 0.5 µm **(15)**
HI70497	Replacement filter, 50 µm **(16)**
HI70483	PCA complete tubing kit. The kit includes: non-transparent C-flex tubes **(4, 6)** 150L x 0.8ID (5.9 x 0.03") (4 pcs), non-transparent C-flex tubes **(5)** 55L x 0.8ID (2.1 x 0.03") (2 pcs), non-transparent C-flex tubes **(8)** 50L x 0.8ID (2.0 x 0.03") and Y strainer **(7)**
HI70484	PCA complete tubing kit (3). Each kit includes: non-transparent C-flex tubes **(4, 6)** 150L x 0.8ID (5.9 x 0.03") (4 pcs), non-transparent C-flex tubes **(5)** 55L x 0.8ID (2.1 x 0.03") (2 pcs), non-transparent C-flex tubes **(8)** 50L x 0.8ID (2.0 x 0.03"), Y strainer **(7)**
HI70485	PCA stirrer motor
HI70486	PCA stirring bar **(2)**
HI70487/N	Measuring cell **(9)**
HI70488	Electrovalve, 24VAC/60Hz **(12)**
HI70489	Electrovalve, 24VAC/50Hz **(12)**
HI70492	Electrode holder (PCA330)
HI70493	Closing cap for electrode holder

Electrodes

HI1005	Amplified pH electrode with Matching Pin and Pt100 **(14)** (PCA320/330 only)
HI2008	Amplified ORP electrode with Matching Pin **(17)** (PCA330 only)

Reagent Sets

HI70431	Total Chlorine reagent set for PCA (buffer citrate), 500 mL (2)
HI70481	Total chlorine reagent set for PCA, 500 mL (2) + 5 powder sachets (DPD)
HI70491	Total chlorine reagent set for PCA, 500 mL (2) + 5 poweder sachets (DPD)
HI70430	Free chlorine reagents set for PCA (the most stable), recommended for long term measurements, 500 mL (2) + 6 g powder
HI70480	Free chlorine reagents set for PCA, recommended for short term measurements, 500 mL (2) + 5 sachets (DPD)
HI70490	Free chlorine reagents set for PCA, 500 mL (2) + 5 sachets (DPD)
HI70452	DPD reagent,5 sachets

Solutions

HI70460	Total chlorine indicator solution for PCA, 500 mL*
HI70461	Total chlorine buffer solution for PCA, 500 mL
HI70450	Free chlorine indicator solution for PCA, 500 mL*
HI70451	Free chlorine buffer solution for PCA, 500 mL
HI7004L	pH 4.01 buffer solution, 500 mL
HI7006L	pH 6.86 buffer solution, 500 mL
HI7007L	pH 7.01 buffer solution, 500 mL
HI7009L	pH 9.18 buffer solution, 500 mL
HI7010L	pH 10.01 buffer solution, 500 mL
HI7020L	200-275 mV buffer solution, 500 mL
HI7091L	Pretreatment reducing solution, 500 mL
HI7092L	Pretreatment oxidizing solution, 500 mL
HI70300L	Storage solution, 500 mL
HI7082	3.5M KCL electrolyte, 30 mL
HI7061L	Electrode cleaning solution, 500 mL

Software

HI92500	Windows® compatible software

* After addition of 5 powder sachets (HI70452-0)