

FREE CHLORINE MONITORS COMPARISON SPREADSHEET

	SWAN AMI Trides**	W&T (Siemens) Micro 2000	Capital Controls CL1900/CL1000B	ABB AW401*	Capital Controls CL500*	Prominent Dulcometer	Rosemount FCL	E & H LiquiSys M CCM 223	Hach 9184c Sensor only	W&T Depolox 4 with MFA	ATI Q45H**	SWAN AMI Codes**	Hach CL17	HF Scientific CLX**	Hanna Instruments PCA**
Method	3-Electrode Direct Amperometric	3-Electrode Direct Amperometric	3-Electrode Direct Amperometric	2-Electrode Direct Amperometric	2-Electrode Direct Amperometric	2-Electrode Membraned Amperometric	2-Electrode Membraned Amperometric	2-Electrode Membraned Amperometric	2-Electrode Membraned Amperometric	3-Electrode Potentiostatic	2-Electrode Membraned Polarographic	Colorimetric DPD, Continuous	Colorimetric DPD, Batchwise (2.5 min.)	Colorimetric DPD, Batchwise	Colorimetric DPD, Batchwise
Consumables	None	Buffer Solution or CO2 Gas for pH Adjustment, Cleaning Grit	pH Buffer (CL1000)	Cleaning Sand, pH Buffer for pH>7.5	pH Buffer	Membranes, Electrolyte	Membranes, Electrolyte	Membranes, Electrolyte	Membranes, Electrolyte, pH Buffer for Most Applications	Cleaning Grit, ??	Membranes, Electrolyte	Buffer & DPD, Optional Cleaning Solution	Buffer & DPD	Buffer & DPD	Buffer & DPD
pH Compensation	Automatic with Optional pH Sensor	Automatic with Buffer	Automatic with Buffer and pH Sensor Or with pH Sensor Dry (CL1000B)	Optional with Reagent Pump	Automatic with Buffer	Optional via 0/4-20mA	Optional pH Sensor	Optional pH Sensor	Optional with pH Sensor	Optional with Additional MFA Module	Optional with pH Sensor	Automatic with Buffer but Optional pH Sensor Available	Automatic with Buffer	Automatic with Buffer	Optional with pH Sensor
Temperature Comp.	Automatic with NTK Sensor	None	Automatic with Pt100	Automatic with Pt100	Automatic with Pt100	Automatic with Pt100 or 4-20mA	Automatic	Optional Automatic with NTC 10kOhm	Automatic	Optional Pt100	Automatic	Not Needed but NTK Sensor Available	Not Stated	Not Stated	Optional
Sensor Cleaning	Automatic with Hydraulic Rotor And Efficiency Monitoring	Hydromechanical with Grit	Automatic with Motorized PVC Balls	Automatic with Sand	Automatic with Motorized PVC Balls	None	None	Optional Chemoclean System	Can inject cleaning solution through cell	Hydromechanical with Grit	None	Optional Automatic Cleaning Module	None	None	None
Sample Delivery	Constant-Head Overflow System with Integral Needle Valve	Manic Valve Filled to Inlet	Gravity Feed (Overflow System?)	Pressure Regulated Sample Flow	Overflow System	Manual Flow Control Valve??	Constant-Head Overflow System	Direct Flow from External Manual Valve	Constant Head Overflow Integral Needle Valve (regulator)	Manual Flow Control Valve	Constant-Head Overflow System External Manual Valve	Constant-Head Overflow System with Integral Needle Valve	Inlet Switching Valve	Integral Pressure Regulator	Inlet Switching Valve
Flow Monitoring	Continuous via Paddlewheel with Analog Output or Relay for Alarm	None	Continuous with IR Flow Monitor	Not Stated	None	Possible with External Switch Device at Sample Flow Cell	None	Optional Switch Except with 963 Sensor	None	Continuous via Flow Switch	None	Continuous via Bubble Detector with Analog Output or Relay for Alarm	None	None	None
Analog Outputs	2 x 0/4-20mA Programmable Standard 1 x 0/4-20 mA Optional	1 x 4-20mA	2 x 0/4-20mA	Not Stated	2 x 0/4-20mA	Up to 2 x 0/4-20mA (1 Preset or 2 Programmable)	2 Programmable 0/4-20mA	1 x 0/4-20mA 1 x 0/4-20mA Optional	Dependent on Controller Used	1 x 0/4-20 mA on each MFA Module	1 x 4-20mA, Optional Additional Assignable 4-20mA on AC Version	2 x 0/4-20mA Programmable Standard 1 x 0/4-20 mA Optional	1 x 4-20 mA Programmable 1 x 0/4-20 mA Programmable	1 x 4-20mA	0/4-20mA, 0-10V, 0-100mV, 0-1V
Relay Outputs	3 Programmable (1 for Alarm)	3 Programmable Relays (1 for Alarm)	3 Programmable Relays	Not Stated	6 Programmable Relays	2 Relays, 1 Alarm Relay	3 Programmable Relays	Up to 4 Contacts	Dependent on Controller Used	Up to 4 Limit Contacts or Two Limit Contacts and Control Output	2 Programmable, AC Version only	3 Programmable Relays (1 for Alarm)	2 Relays	2 Relays for Alarms, User Selectable	3 Relays (1 is for System Error)
Inputs	1 Digital, Programmable	None	None	Not Stated	None	1 Optional	None	2 x Digital Inputs, 1 x Current Input	Dependent on Controller Used	1 Digital (e.g. for Flow Switch)	None	1 Digital, Programmable	None	None	None
Digital Communications	- Profibus DP Interface (Opt.) - HyperTerminal RS-232 Interface (Opt.) - Modbus Interface (Opt.)	None	RS-232/RS-485	Not Stated	RS-232/RS-485	- PROFIBUS - CANopen-Bus	None	Optional Profibus PA or DP or HART	Optional RS-485 Modbus Optional RS-232 Modbus	- RS-485 - Direct Output to Printer (line graphics)	None	- Profibus DP Interface (Opt.) - HyperTerminal RS-232 Interface (Opt.) - Modbus Interface (Opt.) - Webserver via Modbus	None	Bidirectional RS-485 with Modbus Simple Communication (HyperTerminal)	Bidirectional RS-485
Control Function	P, PI, PD, or PID Control with 2 or 3 Analog or 3 Relay Outputs	None	Not Stated	Optional PID	Not Stated	P, PI, PD, or PID Control with 2 Reed Contacts, 2 Relays, Servomotor Output, or 2 x 0/4-20mA	None	P, PI, PD, PID for Chlorine and pH	Dependent on Controller Used	PI Control	PID with Analog or Relay Outputs	P, PI, PD, or PID Control with 2 or 3 Analog or 3 Relay Outputs	Not Stated	None	Proportional, On/Off
Display	Multi-Function Backlit LCD	Alphanumeric LED	Dot Matrix Graphical Display	LCD?	Dot Matrix Graphical Display	Graphic LCD	2-Line Backlit LCD	2-Line LCD, Five and Nine Digit	Dependent on Controller Used	Backlit LCD	4 Digit Main, 12 Digit Second Alphanumeric Line	Multi-Function Backlit LCD	3 Digit LCD with 6-Character Alphanumeric Scrolling	Multi-Line Backlit LCD	Graphical Backlit LCD Indicator LED's
Calibration	Manual with any Standard Method	??	Not Stated	Not Stated	Not Stated	Manual Zero and Slope with the DPD-1 Method, Repeated Twice in 2 Days	Manual with any Standard Method	Manual with DPD Method	Manual with Hach Photometers	Not Stated	Manual with any Standard Method	Manual with any Standard Method	with Hach CAL/Verification Kit	Manual with any Standard Method	Manual with any Standard Method
Range(s)	0.00 - 5.00 ppm	0-0.10 to 0-50.0 mg/l	Autoranging, 0-60 mg/l	Not Stated	Autoranging, 0-20 mg/l	0.005 - 0.500 up to 0.05 - 100.00 ppm	0 - 10 ppm	0 - 5 mg/l or 0 - 20 mg/l	0 to 20 ppm (mg/L)	From 0 to 100 ug/l to 0 to 100 mg/l	0-200 ppb, 0-2, 0-20, and 0-200 ppm	0.00 - 5.00 ppm	0 to 5 mg/L	0 - 10 mg/l	0 - 10 mg/l
Accuracy	± 0.01 ppm 0.00 - 1.00 ppm ± 0.06 ppm 1.00 - 3.00 ppm ± 0.2 ppm 3.00 - 5.00 ppm	0.001 mg/l or 1% of full scale, whichever is greater, dependent on the accuracy of the standardizing procedure used	1% of reading or ±0.002 mg/l, whichever is greater (up to 20 mg/L)	Not Stated	2% of reading or ±0.003 mg/l, whichever is greater	0.5 % of measuring range	Depends on the accuracy of the chemical test used to calibrate the sensor	0.01 mg/l (CCS 140/240/963 Sensor) 0.001 mg/l (CCS 141/241 Sensor)	2% or ±10 ppb TFC, whichever is greater at pH < 7.5 2% or ±10 ppb HCl, whichever is greater at pH < 8	±0.01 mg/l ± 1 digit (2% F.S.)	± 0.02 ppm or 0.5% of full scale	± 0.01 ppm 0.00 - 1.00 ppm ± 0.06 ppm 1.00 - 3.00 ppm ± 0.2 ppm 3.00 - 5.00 ppm	±5% or ±0.035 mg/L as CL2, whichever is greater	±6 mg/l - ±5% or 0.03 mg/l of CL2 6-10 mg/l - ±10% or 0.06 mg/l if CL2	±8% ±0.05 mg/l, whichever is greater
Stability	± 1% drift per month	± 1% full scale drift per month	Not Stated	Not Stated	Not Stated	Not Stated	Not Stated	Not Stated	Not Stated	±2% F.S. per month	< 0.01 ppm zero drift per month Span Drift not indicated	Not Stated	Not Stated (batchwise)	Not Stated (batchwise)	Not Stated (batchwise)
Response Time	90% of change in 60 seconds	90 seconds with 2 rpm pump motor 160 seconds with 1 rpm pump motor	90% of full scale in 1.5 to 2 minutes	ABB states "instant response"	90% of full scale in 1.5 to 2 minutes	Not Stated	<80 sec to 95% of final reading at 3 gph	Not Stated	90% in less than 90 seconds	T90 = 20 seconds	90% in 60 seconds	90% of change in 60 seconds Selectable 1, 2, 3, or 4 Minute Update	2.5 Minutes Between Tests	110 seconds to 10 Minutes Between Tests, User Selectable	Selectable 3 Minutes to 90 Minutes
Datalogging	1500 Data Points and Optional RS-232 Output	None	Previous 28 days, 7 days, or 24 hours	Not Stated	Previous 28 days, 7 days, or 24 hours	None	None	Not Stated	Yes	None	32,000 Points Battery Version Only	1500 Data Points and Optional RS-232 Output	None	None	3500 Points
Protection	IP 66/NEMA 4X Aluminum Enclosure	NEMA 4X	NEMA 4X	Not Stated	NEMA 4X	IP 65 or IP 54 (panel version)	NEMA 4X	IP 65 or IP 54 & IP 30 for Panel Version	IP 66/NEMA 4X	Not Stated	NEMA 4X (IP 66)	IP 66/NEMA 4X Aluminum Enclosure	IP 62	NEMA 4X, IP 66	NEMA 4X
Password Protection	Yes	Yes	Not Stated	Not Stated	Yes	Yes	Yes	Dependent on Controller Used	Not Stated	Yes	Yes	Yes	None	Yes	Yes
Water Usage	Approximately 40 l/hr.	450 to 600 l/hr. with Flushing Unit	21 to 27 l/hr.	Approx. 50 l/hr.	21 to 27 l/hr.	40-60 l/hr. Recommended	11 to 300 l/hr.	30 l/hr. minimum	14 L/hr minimum	33 l/hr. (factory setting)	26 to 56 l/hr.	Approximately 10 l/hr.	12 to 30 l/hr.	3.2 to 6.4 l/hr.	6 to 18 l/hr.
Moving Parts	Hydraulically Powered Cleaning Rotor	Pumps, Motor for Cleaning	Cleaning Motor, pH Buffer Pump (CL1000)	Motor for pH Buffering	Cleaning Motor, pH Buffer Solenoid Valve	None	None	Pump on Acidification Unit?	Not Stated	None	None	2 Pumps	Pump, Sample Inlet Valve, Stirrer Motor	Pump, 2 Solenoid Valves	Peristaltic Pump, Valves
Other Features	- 2nd Needle Valve for Calibration - Grab Sample - Self Diagnostics and Reporting - Mounted on PVC Panel for Wall Mounting - Stores 150 Events, Alarms, Calibrations - Internal Case Temperature Monitor - Non Volatile Memory Storage - Inputs and Outputs Overvoltage Protected	Tie up to 3 sensors into a monitor or controller (Cl2, pH, ORP)	Graph Previous 24 Hrs. Datalogging	- Bidirectional Control - Neutral Zone Control - Additive Basic Load Metering - 2 Times - Calibration via Sample Tap on Flowcell	ORP Sensor Optional instead of pH	Multiple Power Supply Options	- mix and match MFA modules for Cl2, pH, ORP (can act as backup) - Feedback Input with Manual - Automatic ID of V10K Gas Feed System	- Panel Mount - Pipe Mount - Non Volatile Memory Storage	- Continuous DPD Method - Reagent Level Monitoring - Self Diagnostics and Reporting - Mounted on PVC Panel for Wall Mounting - Stores 150 Events, Alarms, Calibrations - Internal Case Temperature Monitor - Non Volatile Memory Storage - Inputs and Outputs Overvoltage Protected	- Manual or auto feed pump Control	- RS-485 Serial Communications Port - ORP Electrode - Inlet Pressure Regulator				
Options	pH and Temperature Third 0/4-20mA Output Profibus DP Interface HyperTerminal RS-232 Interface Modbus Interface 24 VDC Power Supply Panel-Mount Electronics	Remote Sample Flow Pump CO2 Injection System for pH Buffering Panel Mount Electronics	Sample Pump Y-Strainer Pressure reducing valve Patented purging circuit	ORP Sensor PID Controller Reagent Pump	Sample Pump Y-Strainer Pressure reducing valve Patented purging circuit	Multiple Voltage Options Feed Forward Control 1 Input for Pause of Control Function Control for 2 Pumps Power Control Functions	Timer for simple rinse processes Chemoclean cleaning system 2 or 4 Limit Contacts Post Mount Kit Flow Assemblies ORP Sensor	Intermittent Flow	pH, Redox & Temperature with Additional MFA Modules Pressurized Sample Return Wall Mount Enclosure 24 VDC Power Supply	Submersible Sensor Loop Powered 9V Battery Powered (10 days) with Internal Datalogger Low-Volume Flowcell CO2 Buffer Injection System	pH and Temperature Third 0/4-20mA Output Profibus DP Interface HyperTerminal RS-232 Interface Modbus Interface 24 VDC Power Supply Panel-Mount Electronics AMI Relaybox for High Power Feed Control	Aqua-Trend® Network Interface	GSM communications package (SMS) ORP Monitoring		
Restrictions Stated	Presence of following substances may perturb the measurement: cyanuric acid, 5,5-D-methylimidazole, phosphates, copper, sand	Not Stated	Where sample interruption may be required, provision must be made to keep electrodes wet. High concentrations of metal ions, oils or certain corrosion inhibitors may affect analyzer operation	Prevent direct sunlight, vibration, oils, air bubbles	Where sample interruption may be required, provision must be made to keep electrodes wet. High concentrations of metal ions, oils or certain corrosion inhibitors may affect analyzer operation	Surfactants, stabilizers such as cyanuric acid, organic chlorine preparations such as technosynthetic acid	Not Stated	Not Stated	Chlorine dioxide and ozone interfere with measurement	Not Stated	Not Stated	Not Stated	Other oxidizing agents such as bromine, chlorine dioxide, permanganate and ozone will cause a positive interference. Hexavalent chromium will cause a positive interference, hardness must not exceed 1,000 mg/L as CaCO3	Not Stated	Not Stated
Other Parameters	hypochlorous acid, chlorine dioxide, ozone, bromine, iodine, potassium permanganate	chlorine dioxide, potassium permanganate	Can be configured for total chlorine, bromine, iodine	Not Stated	none, however multiple controllers can be tied together for other parameters	chlorine dioxide	None	chlorine dioxide, ozone, potassium permanganate	chlorine dioxide, ozone, potassium permanganate	chlorine dioxide, ozone, potassium permanganate	hypochlorous acid, chlorine dioxide, ozone, bromine, iodine, monochloramine	Can be configured for total chlorine	Can be configured for total chlorine	Can be configured for total chlorine	Can be configured for total chlorine
Website Information	http://www.swan.ch/products/02tablewaterch	http://www.water.siemens.com/StrcCollection	http://www.sevententhservices.com/Literature	http://www.abb.com/products/963/963050	http://www.sevententhservices.com/Literature	http://www.prominent.com/products/instrument	http://www.emersonprocess.com/home/hatch	http://www.andress.com/eh/products/en/home	http://www.hach.com/hc/search/product_detail	http://www.wallace-fernan.de/WFtechnische	http://analyticaltechnology.com/oms/Default	http://www.swan.ch/products/02tablewaterch	http://www.hach.com/hc/search/product_detail	http://www.hfscientific.com/cx_tpacx.htm	http://www.hannainst.com/us/product_cfm?id
Photo															
Notes:	<p>* Capital Controls and ABB monitors may also be private-labeled by Severn Trent Services Inc. and/or vice-versa.</p> <p>The information in this comparison has been compiled by Sheldon Wrubleski of WJF Instrumentation Ltd.</p> <p>** WJF Instrumentation is a distributor for SWAN Analytical Instruments, Analytical Technology Inc., HF Scientific, and Hanna Instruments. The specifications and information have been gathered from the public domain i.e. websites, product brochures, manuals, etc. "Not Stated" means no information could be found relating to that topic.</p> <p>In no way does WJF Instrumentation Ltd. warrant this information to be 100% accurate. If in doubt, please contact the manufacturer of the equipment directly.</p> <p>If you wish to contact WJF Instrumentation, we can be reached at 403(291-5570) or at info@wjf.ca. Our website address is www.wjf.ca. Your feedback is always appreciated.</p> <p>Ref: 052808-1.0</p>														