



Monitors

EcoLine / QuadroLine® – Analog monitors for D.O., pH and Conductivity

Easy of use and maximum operating safety at an attractive price were the basic design criteria for the development of the EcoLine monitors. As a result of the logical further development of the successful EMC concept, WTW has also been able to make these advantages available to customers at an attractive price.

Analog monitors

- Outstanding price/performance ratio
- Built-in lightning protection
- Galvanically isolated inputs and outputs

Oxi 170, pH 170, LF 170

With the EcoLine series WTW offers an economical and technically flexible and reliable system solution which is suitable for a wide range of applications water and wastewater applications.

Oxi 296, pH 296, LF 296

The QuadroLine® series is an extremely powerful monitor in a compact form and at an attractive price-performance ratio. These monitors are intended to be built into control panels and fulfill all the requirements which industrial practice demands from such systems today. Based on the proven technology of the WTW monitors of the EcoLine family, the QuadroLine® instruments have the same impressive performance features. EcoLine and QuadroLine® monitors are the right choice when single point measurements require a dedicated monitor.



EcoLine 170



QuadroLine® 296

Configuration Guide

		EcoLine Oxi 170	QuadroLine® Oxi 296
1. Measuring range 2. Response time t_{90} 3. SensCheck Function		Field monitor	Panel mount
TriOxmatic® 690 D.O. sensor for water / wastewater	1.: 0.0 ... 60,0 mg/l 0 ... 600% 2.: <180 s 3.: –	<ul style="list-style-type: none"> • Low-cost system without sensor diagnostic • Water / wastewater • Oxygenation 	
TriOxmatic® 700 D.O. sensor for water / wastewater	1.: 0.0 ... 60.0 mg/l 0 ... 600% 2.: <180 s 3.: SensLeck SensReg	<ul style="list-style-type: none"> • Water / wastewater • Oxygenation 	
TriOxmatic® 700 IN D.O. sensor for water / wastewater with permanent polarization	1.: 0.0 ... 60.0 mg/l 0 ... 600% 2.: <180 s 3.: SensLeck	<ul style="list-style-type: none"> • Industrial wastewater • Oxygenation 	
TriOxmatic® 701 D.O. sensor for water / wastewater	1.: 0.00 ... 20.00 mg/l 0.0 ... 60.0 mg/l 0.0 ... 200.0% 0 ... 600% 2.: <30 s 3.: SensLeck SensReg	<ul style="list-style-type: none"> • Water / wastewater • Oxygenation • Residual D.O. 	
		EcoLine pH 170	QuadroLine® pH 296
		Field Monitor	Panel Mount
SensoLyt® 650 Sensor Assembly w/o preamplifier, high-impedance output, integrated temp. measurement, 32 ... 122 °F (0 ... 50 °C)	Compatible electrodes: SEA: 2 ... 12 pH SEA-HP: 4 ... 12 pH DWA: 0 ... 14 pH ECA: 2 ... 12 pH PtA: ±1000 mV 32 ... 140 °F (0 ... 60 °C)	<ul style="list-style-type: none"> • Low-cost configuration • High impedance signal transmission • pH measurement in highly polluted wastewater (municipal/industrial) Type SEA • pH measurement in normally polluted wastewater (municipal/industrial) Type ECA • pH measurement in drinking water (DWA) • ORP measurement in highly polluted wastewater (municipal/industrial) Type PtA • Inline installation (SEA or SEA-HP) 	
SensoLyt® 650 Sensor Assembly w/integrated preamplifier, low-impedance output, integrated temp., measurement 32 ... 122 °F (0 ... 50 °C)	Compatible electrodes: SEA: 2 ... 12 pH SEA-HP: 4 ... 12 pH DWA: 0 ... 14 pH ECA: 2 ... 12 pH PtA: ±1000 mV 32 ... 140 °F (0 ... 60 °C)	<ul style="list-style-type: none"> • Low-cost configuration • Low impedance signal transmission • pH measurement in highly polluted wastewater (municipal/industrial) Type SEA • pH measurement in normally polluted wastewater (municipal/industrial) Type ECA • pH measurement in drinking water (DWA) • ORP measurement in highly polluted wastewater (municipal/industrial) Type PtA • Inline installation (SEA or SEA-HP) 	
SensoLyt® 700 Sensor Assembly w/integrated pre-amplifier, low-impedance output, integrated temp. measurement 32 ... 122 °F (0 ... 50 °C) and SensorCheck	Compatible electrodes: SEA: 2 ... 12 pH SEA-HP: 4 ... 12 pH DWA: 0 ... 14 pH ECA: 2 ... 12 pH PtA: ±1000 mV 32 ... 140 °F (0 ... 60 °C)	<ul style="list-style-type: none"> • Low impedance signal transmission • SensCheck • pH measurement in highly polluted wastewater (municipal/industrial) Type SEA • pH measurement in normally polluted wastewater (municipal/industrial) Type ECA • pH measurement in drinking water (DWA) • ORP measurement in highly polluted wastewater (municipal/industrial) Type PtA • Inline installation (SEA or SEA-HP) 	
CHEMtrac 830 M pH/ORP Valve assembly with flushing for cleaning and calibration; Material: 316 L SS 16 bar/284 °F (140 °C)	Compatible electrodes: PL 80-225 pH 0 ... 14 pH, 0 ... 130 °C PL 81-225pHT VP 0 ... 14 pH, 0 ... 130 °C PL 82-225pHT VP 0 ... 14 pH, 0 ... 130 °C PL 89-225pt 0 ... 14 pH, 0 ... 130 °C	<ul style="list-style-type: none"> • High impedance signal transmission • In-line pH measurement in process lines or pressure vessels • Increased pressure/temperature requirements 16 bar/284 °F (140 °C) • Built-in temperature measurement with PL 81-225pHT VP or PL 82-225pHT VP 	

— Not Applicable

Configuration Guide

	1. Measuring range 2. Cell constant 3. Probe type 4. Temperature compensation 5. Temperature range 6. Pressure range 7. Protection rating	EcoLine LF 170 Field Monitor	QuadroLine® LF 296 Pannel Mount Monitor
TetraCon® 700	1.: 10 µS/cm ... 1000 mS/cm 2.: K=0.917 cm ⁻¹ 3.: 4-electrode cell 4.: NTC 5.: 32 ... 122 °F (0 ... 50 °C) 6.: 10 bar 7.: IP 68 (electrode)	Water/Wastewater Usable Measuring Range: 0,0 ... 199,0 µS/cm 0,000 ... 1,999 mS/cm 0,00 ... 19,99 mS/cm 0,0 ... 199,9 mS/cm 32 ... 122 °F (0 ... 50 °C)	
LRD 01	1.: 0,01 ... 200 µS/cm 2.: K=0.1 cm ⁻¹ 3.: 2-electrode cell 4.: NTC 5.: 32 ... 266 °F (0 ... 130 °C) 6.: 14 bar (68 °F/20 °C) 7.: IP 68 (electrode)	Boiler Feed Water/Ion Exchanger; In-Line Measurements/Pipework Mounting 1/2" NPT Thread Usable Measuring Range: 0,00 ... 19,99 µS/cm 0,0 ... 199,9 µS/cm 32 ... 266 °F (0 ... 130 °C); 14 bar (68 °F/20 °C)	
LRD 325	1.: 1 µS/cm ... 2 S/cm 2.: K=0.475 cm ⁻¹ 3.: 4-electrode cell 4.: NTC 5.: 32 ... 212 °F (0 ... 100 °C) 6.: 10 bar 7.: IP 68 (electrode)	Large Usable Measuring Range; In-Line Measurements/Pipework Mounting 1/2" (3/4" Adapter) NPT Thread 0,0 ... 199,0 µS/cm 0 ... 1999 µS/cm 0,00 ... 19,99 mS/cm 0,0 ... 199,9 mS/cm (MR: 0,0 ... 199,9 mS/cm to 110,0 mS/cm at 122 °F/50 °C) 32 ... 212 °F (0 ... 100 °C); 10 bar at 68 °F (20 °C)	
LR 325/01	1.: 0.001 ... 300 µS/cm 2.: K=0.1 cm ⁻¹ 3.: 2-electrode cell 4.: NTC 5.: 32 ... 212 °F (0 ... 100 °C) 6.: 2 bar 7.: IP 68 (electrode)	Boiler Feed Water/Ion Exchanger; Conductivity Cell with Flow-thru Chamber; Usable Measuring Range: 0,00 ... 19,99 µS/cm 0,0 ... 199,9 µS/cm 0,000 ... 0,200 mS/cm 32 ... 122 °F (0 ... 50 °C)	
LR 325/001	1.: 0.0001 ... 30 µS/cm 2.: K=0.01 cm ⁻¹ 3.: 2-electrode cell 4.: NTC 5.: 32 ... 212 °F (0 ... 100 °C) 6.: 2 bar 7.: IP 68 (electrode)	Boiler Feed Water/Ion Exchanger; Conductivity Cell with Flow-thru Chamber, Trace Measurements Usable Measuring Range: 0.000 ... 1.999 µS/cm 0.00 ... 19.99 µS/cm 32 ... 122 °F (0 ... 50 °C)	
TetraCon® 325	1.: 1 µS/cm ... 2 S/cm 2.: K=0.475 cm ⁻¹ 3.: 4-electrode cell 4.: NTC 5.: 32 ... 212 °F (0 ... 100 °C) 6.: 2 bar 7.: IP 68 (electrode)	General Application/Water; Large Measuring Range 0.00 ... 19.99 µS/cm 0.0 ... 199.9 µS/cm 0.000 ... 1.999 mS/cm 0.00 ... 19.99 mS/cm 0.0 ... 199.9 mS/cm (32 ... 77 °F/0 ... 25 °C) 32 ... 122 °F (0 ... 50 °C) (MR: 0.0 ... 199.9 mS/cm up to 110.0 mS/cm at 122 °F/50 °C)	
TetraCon® DU/T	1.: 1 µS/cm ... 2 S/cm 2.: K=0.778 cm ⁻¹ 3.: 4-electrode cell 4.: NTC 5.: 32 ... 140 °F (0 ... 60 °C) 6.: 2 bar 7.: IP 65	Flow-thru cell Usable Measuring Range: 0.00 ... 19.99 µS/cm 0.0 ... 199.9 µS/cm 0.000 ... 1.999 mS/cm 0.00 ... 19.99 mS/cm 0.0 ... 199.9 mS/cm 32 ... 122 °F (0 ... 50 °C)	

— Not Applicable

Technical Data EcoLine Oxi 170 / QuadroLine® Oxi 296

	D.O. Measurement	
Measuring Ranges	0.0 ... 60.0 mg/l or 0 ... 600% saturation, user-selectable, depending on sensor type	
Resolution	0.1 mg/l or 0.01 mg/l; 1% or 0.1% (depending upon the sensor)	
Accuracy	±1% of value, ±1 Digit	
Signal Input	Low-impedance, isolated from output	
Temperature Measurement	NTC resistor (integrated in the sensor), 23 ... 122 °F (–5 °C ... +50 °C); 0.1 K resolution	
Temperature Compensation	Range: 23 ... 212 °F (–5 °C ... +100 °C)	
Atmospheric Pressure Correction	Range: 500 ... 1100 mbar; manual parameter input	
Salinity Correction	2.0 ... 70.0	
Relay Outputs	1 Sensor alarm relay (SensReg/SensLeck function) 2 programmable relays (setpoints, delay, hysteresis), ① + ② Relays are from C rated 5 A at 250 VAC, max. 5 A @ 30 VDC resistive	
Analog Outputs	0/4–20 mA output for D.O. and in versions ① + ② additionally for temperature, max. load 600 Ω; output span and recorder damping adjustable by software	
Digital Interface	RS 485 Interface; bus operation possible with up to 31 units ②	
Ambient Conditions	Operating temperature: –13 °F ... 131 °F (–25 °C ... +55 °C); Storage temperature: –13 °F ... 149 °F (–25 °C ... +65 °C); Clima class 4 (VDI/VDE 3540)	
Electrical Connections	Oxi 170	Sensor input: quick disconnect 7-pole receptacle Outputs, mains supply: via plug-in terminal strips
	Oxi 296	Sensor input, signal inputs and outputs, mains supply: via plug-in terminal strips; accessible from rear
Input Power	115/230 VAC (–15/+10%), 48 ... 62 Hz (18 VA max.), 24 VAC (–15/+10%), 24 VDC (–30/+20%)	
Integrated Lightning Protection	Coarse and fine protection, surpasses EN 61326 requirements	
EMI/RFI Conformance	EN 61326 class B, FCC Class A	
Certifications	CE	
Housing	Oxi 170	Watertight housing (PC/GF20) with threaded receptacle and four cable feed-through connections (PG compression fittings, 10–14 mm dia.); Protection rating IP 66 (exceeds NEMA 4X)
	Oxi 296	Fiberglass-reinforced Noryl housing with membrane keypad (Polyester); Protection rating IP 54 (front panel)
Dimensions	Oxi 170	8.74 x 7.95 x 4.13 in. (222 x 202 x 105 mm, W x H x D)
	Oxi 296	3.78 x 3.78 x 7.32 in. (96 x 96 x 186 mm, W x H x D)
Weight	Oxi 170	Approx. 7.7 lb (3.5 kg)
	Oxi 296	Approx. 2.2 lb (1 kg)
Guaranty	3 years for defects of quality	

Ordering Information

EcoLine Oxi 170		Order No.
Oxi 170, 230 VAC	D.O. field monitor, 230 VAC 50/60 Hz; standard model	281 112
Oxi 170 RT, 230 VAC	Same as standard model, with 2 programmable relays and second analog output for temperature	282 212
Oxi 170 RT RS, 230 VAC	Same as standard model, with 2 programmable relays and second analog output for temperature and RS 485 interface	282 222
QuadroLine® Oxi 296		Order No.
Oxi 296, 230 VAC	D.O. panel mount monitor, 230 VAC 50/60 Hz; standard model	291 112
Oxi 296 RT, 230 VAC	Same as standard model, with 2 programmable relays and second analog output for temperature	292 212
Oxi 296 RT RS, 230 VAC	Same as standard model, with 2 programmable relays and second analog output for temperature and RS 485 interface	292 222

EcoLine Oxi 170:



QuadroLine® Oxi 296:



Other power supplies see brochure "Product Details"

① R-T-version, ② R-T-RS-version

Technical Data EcoLine pH 170 / QuadroLine® pH 296

	pH Measurement	ORP Measurement	Temperature Measurement
Measuring Ranges	0.00 ... 14.00 pH	-1500 mV ... +1500 mV	NTC: 23 °F ... 212 °F (-5 °C ... 100 °C) Pt 100/Pt 1000: -4 °F ... 266 °F (-20 °C ... 130 °C)
Resolution	0.01 pH	1 mV	0,1 K
Accuracy (±1 Digit)	±0.01 pH	±2 mV	NTC: ±0.2 K; Pt 100/Pt 1000: ±0.1 K fine adjustment ±0.5 K
Signal Input	Low-impedance or high impedance	Low-impedance or high impedance	2-conductor (NTC); 3-conductor (Pt 100/Pt 1000)
Temperature Measurement	NTC thermistor, integrated in SensoLyte® sensor assembly; or separate NTC/Pt 100/Pt 1000		
Temperature Compensation	NTC: 23 °F ... 212 °F (-5 °C ... 100 °C); Pt 100/Pt 1000: -4 °F ... 266 °F (-20 °C ... 130 °C)		
Calibration	AutoCal1: automatic calibration with technical buffer solutions AutoCal2: automatic calibration with technical buffer solutions and subsequent analog output of buffer used in calibration ConCal®: manual calibration with any buffer solution		
Calibration Range	Slope range: -62 mV/pH ≤ S ≤ -50 mV/pH Asymmetry potential: -45 mV ≤ U _{asy} ≤ +45 mV		
Display	Dual numeric LCD-readout, 3 1/2 digits for values and display of units; graphic symbols for auxiliary information and operator guidance		
Relay Outputs	Ⓢ Sensor alarm relay (sensor failure); 2 programmable relays (setpoints, delay, hysteresis, control functions) Ⓢ + Ⓢ; Relays are from C rated 5 A at 250 VAC, max. 5 A @ 30 VDC resistive		
Analog Outputs	0/4 - 20 mA output for pH/ORP and in versions Ⓢ + Ⓢ additionally for temperature; max. load 600 Ω; output span and recorder damping adjustable by software		
Digital Interface	RS 485 Interface; bus operation with up to 31 instruments possible Ⓢ		
Ambient Conditions	Operating temperature: -13 °F ... 131 °F (-25 °C ... +55 °C); Storage temperature: -13 °F ... 149 °F (-25 °C ... +65 °C); Clima class 4 (VDI/VDE 3540)		
Electrical Connections	pH 170	Sensor input: quick disconnect 7-pole receptacle Signal inputs and outputs, mains supply: via plug-in terminal strips	
	pH 296	Sensor input, signal inputs and outputs, mains supply: via plug-in terminal strips; accessible from rear	
Input Power	115/230 VAC (-15/+10%), 48-62 Hz (18 VA max.); 24 VAC (-15/+10%), 24 VDC (-30/+20%)		
Integrated Lightning Protection	Coarse and fine protection, surpasses EN 61326 requirements		
EMI/RFI Conformance	EN 61326 class B, FCC Class A		
Certifications	CE		
Housing	pH 170	Watertight housing (PC/GF20) with threaded receptacle and four cable feed-through connections (PG compression fittings, 10 - 14 mm dia.); Protection rating IP 66 (exceeds NEMA 4X)	
	pH 296	Fiberglass-reinforced Noryl housing with membrane keypad (Polyester); Protection rating IP 54 (front panel)	
Dimensions	pH 170	8.74 x 7.95 x 4.13 in. (222 x 202 x 105 mm, WxHxD)	
	pH 296	3.78 x 3.78 x 7.32 in. (96 x 96 x 186 mm, WxHxD)	
Weight	pH 170	Approx. 7.7 lb (3.5 kg)	
	pH 296	Approx. 2.2 lb (1 kg)	
Guaranty	3 years for defects of quality		

Ordering Information

EcoLine pH 170		Order No.
pH 170, 230 VAC	pH/ORP field monitor, 230 VAC 50/60 Hz; standard model	181 112
pH 170 RT, 230 VAC	Same as standard model, with 2 programmable relays and second analog output for temperature	182 212
pH 170 RT RS, 230 VAC	Same as standard model, with 2 programmable relays and second analog output for temperature and RS 485 interface	182 222
QuadroLine® pH 296		Order No.
pH 296, 230 VAC	pH/ORP panel mount monitor, 230 VAC 50/60 Hz; standard model	191 112
pH 296 RT, 230 VAC	Same as standard model, with 2 programmable relays and second analog output for temperature	192 212
pH 296 RT RS, 230 VAC	Same as standard model, with 2 programmable relays and second analog output for temperature and RS 485 interface	192 222

EcoLine pH 170:



QuadroLine® pH 296:



Other power supplies see brochure "Product Details"

Ⓢ R-T-version, Ⓢ R-T-RS-version

Technical Data EcoLine LF 170 / QuadroLine® LF 296

	Conductivity Measurement	
Compatible Sensors	2-electrode or 4-electrode conductivity cells	
Signal Input	Galvanically isolated	
Measuring Ranges (Cell Constants)	0.000 ... 1.999 µS/cm (0.01 cm ⁻¹); 0.00 ... 19.99 µS/cm (0.01 cm ⁻¹ , 0.1 cm ⁻¹); 0.0 ... 199.9 µS/cm (0.1 cm ⁻¹ , 1 cm ⁻¹); 0.000 ... 1.999 mS/cm (0.1 cm ⁻¹ , 1 cm ⁻¹); 0.00 ... 19.99 mS/cm (1 cm ⁻¹); 0.0 ... 199.9 mS/cm (1 cm ⁻¹ , 10 cm ⁻¹); 0 ... 1000 mS/cm (10 cm ⁻¹)	
Resolution	0.001 µS/cm to 1 mS/cm (depending on measuring range)	
Accuracy	±0.5% of value, ±1 digit	
Span of Cell Constants	0.09 cm ⁻¹ ... 1.5 cm ⁻¹ (variable)	
Reference Temperature	68 °F or 77 °F (20 °C or 25 °C), user-selectable	
Measuring Range/ Salinity	0.0 ... 70.0; resolution 0.1 (reference temperature 68 °F/20 °C)	
Temperature Measurement	23 °F ... 266 °F (-5 °C ... +130 °C); depending on temperature sensor	
Temperature Accuracy	±0.2 K, ±1 Digit	
Temperature Compensation	Linear temperature coefficient: 0,5 to 3,0%/K (freely adjustable); non-linear function "nLF": according to DIN EN 27888 for natural waters	
Display	Dual numeric LCD-readout, 3 1/2 digits for values and display of units; graphic symbols for auxiliary information and operator guidance	
Relay Outputs	2 programmable relays (limit values, hysteresis) ① + ②; Relays are from C rated 5 A at 250 VAC, max. 5 A @ 30 VDC resistive	
Analog Outputs	0/4 - 20 mA output for conductivity (σ) and in versions ① + ② additionally for temperature, (600 Ω max. load); output span and recorder damping adjustable via software	
Digital Interface	RS 485 Interface; bus operation with up to 31 instruments possible ②	
Ambient Conditions	Operating temperature: -13 °F ... 131 °F (-25 °C ... +55 °C); Storage temperature: -13 °F ... 149 °F (-25 °C ... +65 °C); Clima class 4 (VDI/VDE 3540)	
Electrical Connections	LF 170	Sensor input: 7-pole AMP socket, IP 66 rating, Outputs, mains supply: via internal plug-in terminal strips
	LF 296	Sensor input, signal inputs and outputs, mains supply: via plug-in terminal strips; accessible from rear
Input power	115/230 VAC (-15/+10%), 48 ... 62 Hz (18 VA max.), 24 VAC (-15/+10%), 24 VDC (-30/+20%)	
Integrated Lightning Protection	Coarse and fine protection, surpasses EN 61326 requirements	
EMI/RFI Conformance	EN 61326 class B, FCC Class A	
Certifications	CE	
Housing	LF 170	Watertight housing (PC/GF20) with threaded receptacle and four cable feed-through connections (PG compression fittings, 10 - 14 mm dia.); Protection rating IP 66 (exceeds NEMA 4X)
	LF 296	Fiberglass-reinforced Noryl housing with membrane keypad (Polyester); Protection rating IP 54 (front panel)
Dimensions	LF 170	8.74 x 7.95 x 4.13 in. (222 x 202 x 105 mm, W x H x D)
	LF 296	3.78 x 3.78 x 7.32 in. (96 x 96 x 186 mm, W x H x D)
Weight	LF 170	Approx. 7.7 lb (3.5 kg)
	LF 296	Approx. 2.2 lb (1 kg)
Guaranty	3 years for defects of quality	

Ordering Information

EcoLine LF 170		Order No.
LF 170, 230 VAC	Conductivity field monitor, 230 VAC 50/60 Hz; standard model	381 112
LF 170 RT, 230 VAC	Same as standard model, with 2 programmable relays and second analog output for temperature	382 212
LF 170 RT RS, 230 VAC	Same as standard model, with 2 programmable relays and second analog output for temperature and RS 485 interface	382 222
QuadroLine® LF 296		Order No.
LF 296, 230 VAC	Conductivity panel mount monitor, 230 VAC; standard model	391 112
LF 296 RT, 230 VAC	Same as standard model, with 2 programmable relays and second analog output for temperature	392 212
LF 296 RT RS, 230 VAC	Same as standard model, with 2 programmable relays and second analog output for temperature and RS 485 interface	392 222

EcoLine LF 170:



QuadroLine® LF 296:



Other power supplies see brochure "Product Details"

① R-T-version, ② R-T-RS-version