



## 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

**Technical Data EcoLine LF 170/QuadroLine® LF 296**

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



QuadroLine® Oxi 296:



Other power supplies see brochure "Product Details"

① R-T-version, ② R-T-RS-version