



## TECHNICAL INFORMATION

### ADVANTAGES

- Measurement of free chlorine corrected in accordance with the pH value of the water and temperature
- The working principle omits chemical buffering
- Modular structure
- Modern, user-friendly microprocessor technology with dialogue-menu assistance
- Electrically isolated signal inputs and outputs
- Digital input for automatic sample water monitoring
- Automatic error detection and measuring cell monitoring
- Self-illuminated display with adjustable contrast
- Plain text menu assistance in five freely selectable languages
- Adjustable limit contacts
- RS485 interface
- CE conformity (89/336/EC)

# MULTI FUNCTION ANALYSIS SYSTEM MFA-Cl<sub>2</sub>++

## FOR PH-CORRECTED CHLORINE MEASUREMENT

The new range of **MFA** Multi Function Analysers represents a modern generation of devices for the measurement and control of water treatment processes. The **MFA-Cl<sub>2</sub>++** module is a genuine innovation in the field of chlorine measurement technology. Its major application is where chlorine measurements at varying pH levels need to be undertaken. The **MFA-Cl<sub>2</sub>++** does not require difficult-to-handle expensive pH buffers. The system consists of a **DEPOLOX<sup>®</sup> 4** measuring cell, a pH measuring electrode and a temperature measurement device. The **MFA-Cl<sub>2</sub>++** measuring module corrects arithmetically the behaviour of the **DEPOLOX<sup>®</sup> 4** measuring cell taking into account the pH value and temperature of the sample water and thus shows the value of free chlorine set by DIN 38408, part 4 using the DPD method.



### PROCEDURE

Sample water is taken from the flow of process water and fed to the **DEPOLOX<sup>®</sup> 4** measuring cell through a sample water pipe. The **DEPOLOX<sup>®</sup> 4** measuring cell which holds an additional pH electrode and an optional Pt100 temperature sensor.

The measuring cell, pH electrode and optional Pt100 sensor are connected to the **MFA-Cl<sub>2</sub>++** electronic module which calculates the corrected chlorine measurement in order to display and process the measured data to allow for functions such as monitoring limit values. Up to four limit values can be monitored. The limit contacts – as all other stages of the operation – can be adjusted simply and with menu assistance.

An RS485 interface is integrated into the **MFA** module for exchanging data with LPC systems or supervisory consoles. In addition, the special **MF485** interface module makes it possible for direct printer logging in 24-hour line graphics with a table of measurements.

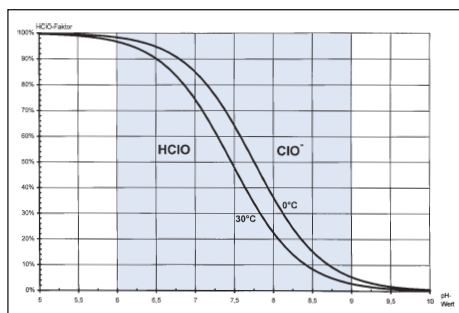


Fig. 1: Dissociation characteristics of HClO and ClO<sup>-</sup> with pH value and showing effects of temperature.

### GENERAL INDICATIONS AND APPLICATIONS

The free chlorine dosed into water for disinfection purposes is found in three forms. Free chlorine consists of elemental chlorine (Cl<sub>2</sub>), hypochlorous acid (HClO) and hypochlorite ions (ClO<sup>-</sup>).

Undissociated hypochlorous acid is found in the acidic to neutral pH range in water. Only when the pH value rises does it break down into H<sup>+</sup> and ClO<sup>-</sup> ions.

To understand the mode of functioning of chlorine as a disinfectant it is necessary to know the chemical reactions which take place when water is chlorinated. Firstly there is the hydrolysis of the chlorine. This is the reaction of the chlorine with water. If you dissolve chlorine gas in water this results in the formation of hypochlorous acid and hydrochloric acid. All other disinfectants based on chlorine also react with water and form hypochlorous acid. The hypochlorous acid is the active substance for the disinfection process.

Fig. 1 shows the dependence of the form of chlorine on the pH value of the water. With rising pH value the proportion of hypochlorous acid decreases by dissociating to form H<sup>+</sup> and ClO<sup>-</sup>. In other words, the hypochlorous acid needed as the active substance in disinfection becomes less as the pH value increases, whilst there is an increase in the proportion of ClO<sup>-</sup> ions which are meaningless for disinfection.

**US WALLACE & TIERNAN**

a U.S. Filter Company

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# TECHNICAL DATA

## MFA-Module for Cl<sub>2</sub> measurement:

corrected for pH value and temperature in accordance with the dissociation characteristics of HClO and ClO<sup>-</sup> in the range of pH 6.0 to 9.0.

## Cl<sub>2</sub> measurement input:

designed for the DEPOLOX® 4 measuring cell electrically isolated up to 100 V to earth.

## Measurement ranges:

0 ... 100 µg/l	0 ... 1.00 mg/l
0 ... 200 µg/l	0 ... 2.00 mg/l
0 ... 500 µg/l	0 ... 5.00 mg/l
	0 ... 10.0 mg/l

Flashing display in the case of exceeding limits of measuring range.

## pH value measuring input:

for combined pH measuring and reference electrodes to DIN 19263

pH 4.0 ... pH 9.0

electrically isolated to 100 V to earth

## Temperature measuring input (optional):

for Pt100, NTC or AD592 sensors

-10 °C ... 55 °C

electrically isolated to 100 V to earth

## Switching input:

(e.g. for external release)

selectable input 24 V, 115 V, 230 V AC or DC

electrically isolated to 500 V to earth

## Analogue output (0/4..20mA):

Load ≤ 600 Ohm, accuracy ± 0.1% FS

electrically isolated to 500 V to earth

## Switching outputs:

for max. four limit contacts

max. 1250 VA to 250 V AC

max. 150 W to 220 V DC

## Interface:

RS485 asynchronous, to EIA RS485, DIN 66259 T4 or ISO 8482

19200 baud, non-isolated

## Power supply:

115/230 V ± 10%, 50 – 60 Hz, 14 VA

## Module dimensions (W x H x D):

76 x 129 x 175 mm (incl. contact strip)

## Weight (incl. packaging):

1.8 kg

## MFA PLUG-IN HOUSINGS

### Wall-mounted housing, triple

Dimensions (W x H x D): 360 x 266 x 235 mm

Weight: 2.8 kg

Enclosure: IP 66

### Wall-mounted housing, single

Dimensions (W x H x D): 212 x 266 x 235 mm

Weight: 1.7 kg

Enclosure: IP 66

### Housing for control panel mounting, triple

Dimensions (W x H x D): 288 x 144 x 195 mm

Weight: 1.7 kg

Enclosure: IP 41 (IP 65 with cover)

### Housing for control panel mounting, single

Dimensions (W x H x D): 144 x 144 x 195 mm

Weight: 1.2 kg

Enclosure: IP 41 (IP 65 with cover)

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