

GF 9950-X Chlorine Controller



Member of the SmartPro® Family of Instruments



The 9950-X Chlorine Controller is a two channel controller that can support two sensors in one instrument. The sensor types supported by the 9950-X are GF Free Chlorine (FCl), Chlorine Dioxide (ClO₂) and pH.

The 9950-X (which is used in the GF Chlorine panels) software, combined with smart electronics connected to the Chlorine sensor (FCl, ClO₂) and the pH electrode, delivers a real-time, accurate Chlorine measurement of the application process.

Includes improved calibration support by automatically time-stamping the successful single-point calibration of the Chlorine electrode and a two-point calibration of the pH electrode. An operator can enter the next calibration date and the 9950-X will display a message and illuminate the red background light to alert the operator when a calibration is due.

The new "Chemical Guard" relay mode for free chlorine ensures that the proper dosing of oxidants and pH-adjusting chemicals are delivered safely and accurately. When Chemical Guard mode is selected, the pH control and adjustment is always a priority over dosing oxidizing chemicals whose concentration is pH dependent.

The 9950-X comes standard with the 3-9950.393-3 Relay Module, comprising four binary inputs and two mechanical relays. Binary input #1 is dedicated to an external flow switch input which enables access to the new relay mode "Chemical Guard" that disables the relays when there is no flow through the system. The 9950-X also supports the -1 and -2 relay modules without flow switch or Chemical Guard.

The 3-9950-X also comes standard with four, 4 to 20 mA outputs. The optional 3-9950.395-M Modbus module makes adding the GF Chlorine Controller / panel assembly into a new or existing communication network very simple.

- **One instrument for multiple disinfectant sensor types:**
 - Free Chlorine
 - Chlorine dioxide
 - pH
- **Multiple language support for Simplified Chinese, English, French, German, Italian and Spanish**
- **Two different sensor types can be combined in one instrument**
- **Chemical Guard (for free chlorine): software that controls relay actions to safely deliver oxidizing and pH adjustment chemicals**
- **Flow switch interrupt to disable alarms and chemical dosing when there is no flow to the system**
- **Four standard, 4 to 20 mA current loop outputs (2 in base unit, 2 in additional module)**
- **USB Port for Field Firmware Upgrades using standard USB Flash Drive**
- **Modbus Module for connections to Serial RS485 Automation networks**



Applications

Residual Chlorine Monitoring:

- **Water Distribution**
- **Ground Water**
- **Surface Water**
- **HVAC Applications (cooling water)**
- **Food and Beverage**
- **Swimming Pools**
- **Water Parks**

* NOTE: The 9950-X Chlorine Controller is not compatible with the standard 9950 controller.

Specifications

General		
Input Channels	Two Channels	
Enclosure and Display		
Case Material	PBT	
Window	Shatter-resistant glass	
Keypad	4 buttons, injection-molded silicone rubber seal	
Display	Dot matrix, LCD	
Indicators	Two horizontal digital bar graphs, four LED relay status indicators	
Update Rate	1 s	
LCD Contrast	5 settings	
Enclosure Size	¼ DIN	
Mounting		
Panel	¼ DIN, ribbed on four sides for panel mounting clip inside panel, silicon gasket included	
Wall	Wall Mount enclosure (sold as an accessory)	
Terminal Blocks		
Pluggable Screw Type	Use minimum 105 °C rated wire	
Torque Ratings		
	Power/Loop	0.49 Nm (4.4 lb-in.)
	Freq/S ³ L	0.49 Nm (4.4 lb-in.)
	Relay Module	0.49 Nm (4.4 lb-in.)
Connector Wire Gauge		
	Power, Loop	12 to 22 AWG
	Freq/S ³ L	16 to 22 AWG
Module Connector Wire Gauge		
	Relay	12 to 22 AWG
Environmental		
Ambient Operating Temperature		
DC Power	-10 °C to 70 °C	14 °F to 158 °F
AC Power	-10 °C to 60 °C	14 °F to 140 °F
Storage Temp	-15 °C to 70 °C	5 °F to 158 °F
Relative Humidity	0 to 100% condensing for (front only); 0 to 95% non-condensing (rear panel)	
Maximum Altitude	4,000 m (13,123 ft)	
Enclosure Rating	NEMA 4X/IP65 (front face only)	
Performance Specifications		
System Accuracy	Primarily dependent upon the electrode	
System Response	Primarily dependent upon the electrode. Controller adds a maximum of 150 ms processing delay to the sensor electronics.	
	Minimum update period is 500 ms	
	System response is tempered by the display rate, output averaging	
Electrical Requirements		
Power to Electrodes		
	Voltage	+4.9 to 5.5 VDC @ 25 °C, regulated
	Current	30 mA Maximum
Short Circuit	Protected	
Isolation	Low voltage (< 48 V AC/DC)	

Specifications (continued)

Power Requirements	
DC (3-9950-3, 3-9950-5)	24 VDC nominal (12 to 32 VDC, $\pm 10\%$ regulated), UL60950-1 or UL61010-1 certified power supply rated for operation at 4,000 m (13,123 ft) altitude
AC (9950-4)	100 to 240 VAC, 50 to 60 Hz. 24 VA
Sensor Input Specifications	
Digital (S ³ L) Sensors	Serial ASCII, TTL level, 9600 bps
Accuracy	$\pm 0.5\%$ of reading max error @ 25 °C
Resolution	1 μ s
Repeatability	$\pm 0.2\%$ of reading
Input Types	
	Chlorine (FCI/ClO ₂) input via the Digital (S ³ L) output from the 2650 Amperometric Electronics
	pH input via the Digital (S ³ L) output from the 2751-7 pH Electronics
Sensor Types	Chlorine and pH
Power Supply	
Rejection	No Effect $\pm 1 \mu$ A per volt
Short Circuit	Protected
Reverse Polarity	Protected
Binary Input (3-9950.393-3)	
Input Voltage Range (without damage)	-5 VDC to 30 VDC (No operation below 0 VDC)
Maximum Current Rating	6.0 mA
Maximum Voltage Rating	30 VDC
Maximum Input Voltage for signal "Off" (low or "0")	1.5 VDC
Minimum Input Voltage for signal "On" (high or "1")	3.0 VDC
Maximum Current Draw for Signal "0" (low)	$\leq 500 \mu$ A DC
Minimum Current Draw for Signal "1" (high)	500 μ A
Typical Current Draw for Signal "1" (high)	6.0 mA at 30 VDC
	4.8 mA at 24 VDC
	2.4 mA at 12 VDC
	1.0 mA at 5 VDC

Specifications (continued)

Current Loop Specifications

Current Loop Out	ANSI-ISA 50.00.01 Class H (Passive, external voltage required)		
Voltage	12 to 32 VDC, $\pm 10\%$ regulated, UL 60950-1 or UL 61010-1 Power Supply rated for operation at 4,000 m (13,123 ft) altitude		
Maximum Impedance	250 Ω @ 12 VDC	500 Ω @ 18 VDC	750 Ω @ 24 VDC
Span	3.8 to 21 mA Adjustable, reversible		
Accuracy	± 32 μ A max. error @ 25 $^{\circ}$ C @ 24 VDC		
Resolution	6 μ A or better		
Temperature Drift	± 1 μ A per $^{\circ}$ C		
Isolation	Low voltage (< 48 VAC/DC)		
Update Rate	100 mS nominal		
Zero	4.0 mA factory set; user programmable from 3.8 to 5.0 mA		
Full Scale	20.0 mA factory set; user programmable from 19.0 to 21.0 mA		
Power Supply Rejection	± 1 μ A per V		
Actual Update Rate Determined by Sensor Type			
Short Circuit and Reverse Polarity Protected			
Adjustable Span, Reversible			
Error Condition	Selectable error condition 3.6 or 22 mA or None		
Test Mode	Increment to desired current (range 3.8 to 21.00 mA)		
Analog Outputs	2 Passive		

Relay Specifications

Dry Contact Relays

Type	SPDT
Form	C
Maximum Voltage Rating	30 VDC or 250 VAC
Maximum Current Rating	5 A resistive

Solid State Relay, Optional Relay Module

Type	SPDT
Form	C
Maximum Voltage Rating	30 VDC or 30 VAC
Maximum Current Rating	0.050 A
Hysteresis	Adjustable (absolute in Engineering Units)
On Delay	9999.9 seconds (max)
Test Mode	Set On or Off
Maximum Pulse Rate	300 pulses/minute

Specifications (continued)

Display Ranges

Free Chlorine (FCl)	0 to 20 ppm	
Chlorine Dioxide (ClO ₂)	0 to 2 ppm	
pH	-1.00 to 15.00 pH	
pH Temperature	-99 °C to 350 °C	-146 °F to 662 °F

Shipping Weights

Base Unit	0.63 kg	1.38 lb
9950-X	1.0 kg	2.2 lb
9950-5	0.63 kg	1.38 lb
Relay Module	0.19 kg	0.41 lb

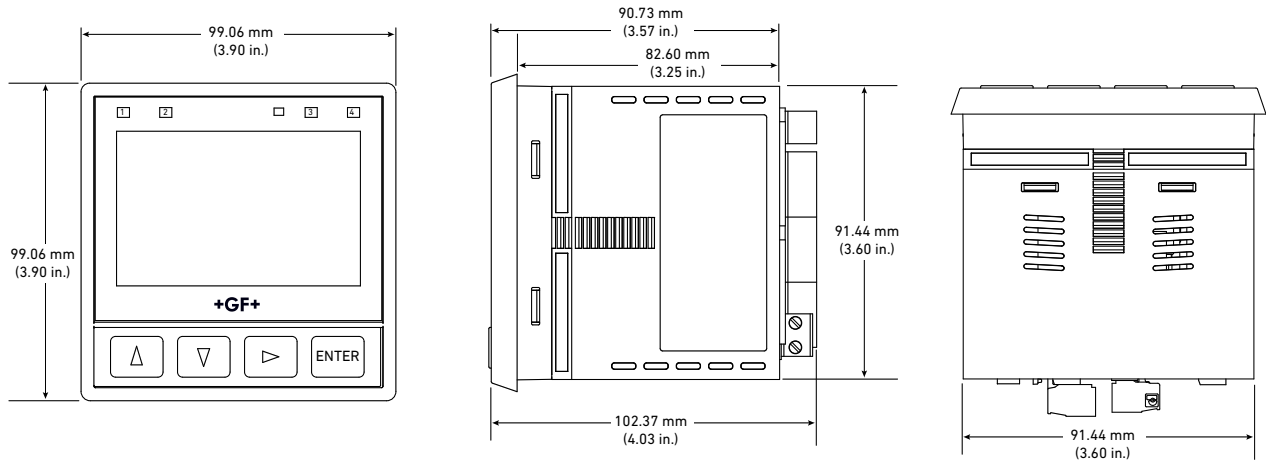
Standards and Approvals

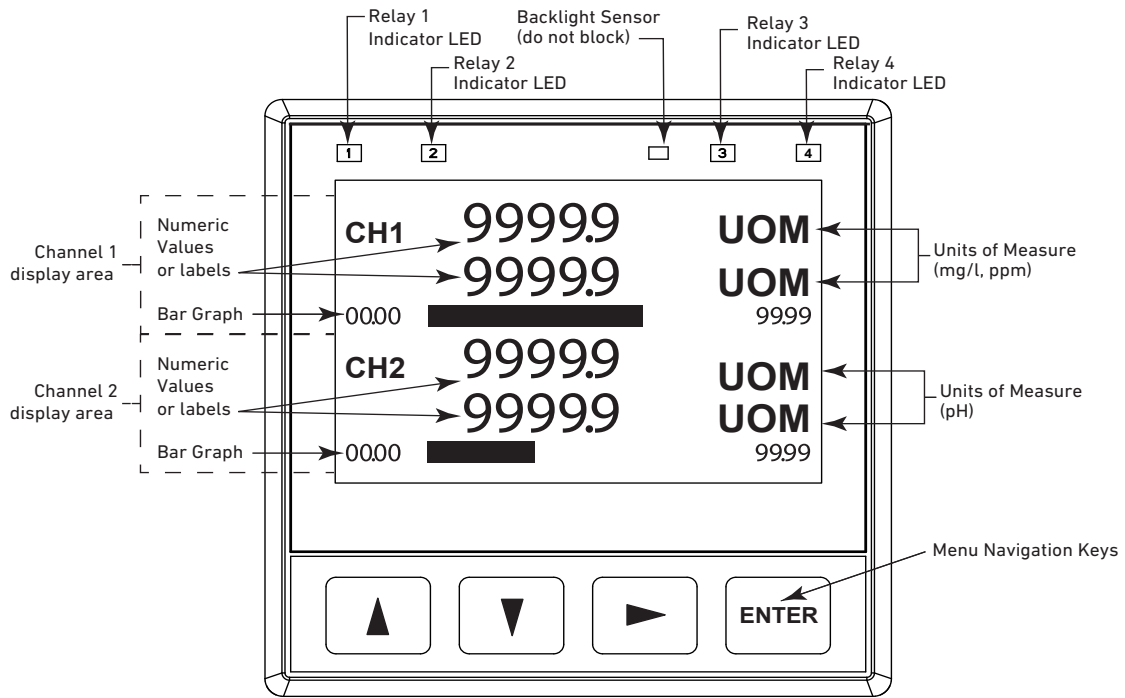
CE, UL, CUL, WEEE, FCC

RoHS Compliant, China RoHS

Manufactured under ISO 9001, ISO 14001, and ISO 45001

Dimensions





System Overview

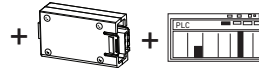
Panel or Wall Mount

GF Model 9950-X Transmitter
(Includes mounting bracket and panel gasket)

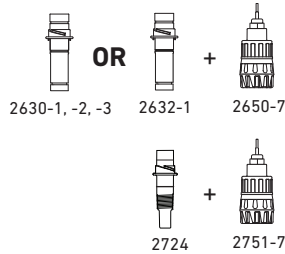
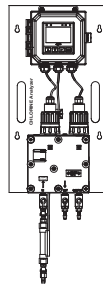


Automation System

GF Model 9950-X Transmitter with Modbus Module
and
- PLC (Customer supplied)



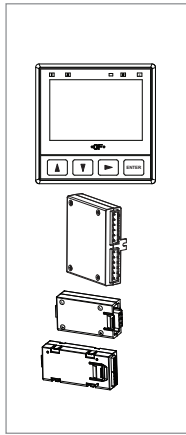
GF Sensors - Chlorine, pH
Use with 2751-7 or 2650-7
Smart Sensor Electronics



GF Fittings - See individual sensor data sheets

All Sold Separately

Ordering Information



Mfr. Part No	Code	Description
3-9950-3	159 001 954	9950 Base Unit - DC Powered, 2 Channel Input, 2 Passive 4 to 20 mA Output, 2 Active 4 to 20 mA Output (Module) 2 Mechanical Relays, 4 Binary Inputs
3-9950-4	159 001 955	9950 Base Unit - AC Powered, 2 Channel Input, 2 Passive 4 to 20 mA Output, 2 Active 4 to 20 mA Output (Module), 2 Mechanical Relays, 4 Binary Input
3-9950-5	159 001 956	9950 Base Unit - DC Powered, 2 Channel Input, 2 Passive 4 to 20 mA Output
Optional Accessory Modules		
3-9950.393-1	159 310 268	Relay Module with 4 Mechanical Relays
3-9950.393-2	159 310 269	Relay Module with 2 Mechanical and 2 Solid State Relays
3-9950.393-3	159 310 270	Relay Module with 2 Mechanical Relays and 4 Binary Inputs
3-9950.395-M	159 001 905	9950 Modbus Module
3-9950.398-2	159 001 848	Dual Channel 4 to 20 mA Current Loop Output Module

Accessories and Replacement Parts



Mfr. Part No	Code	Description
3-8050.396	159 000 617	RC Filter Kit (for relay use), 2 per kit
3-9950.391	159 310 278	Connector Kit, In-Line, 9950 Transmitter
3-9950.392	159 310 279	Relay Module Connector Kit, 9950 Transmitter
3-9900.392	159 001 700	Wall Mount Enclosure Kit
3-9000.392-1	159 000 839	Liquid Tight Connector Kit, NPT (1 pc.)