Signet 9900 Transmitter

Member of the SmartPro® Family of Instruments

Panel Mount

Field Mount

The Signet 9900 Transmitter provides a single channel interface for many different parameters including Flow, pH/ORP, Conductivity/Resistivity, Salinity, Pressure, Temperature, Level, Dissolved Oxygen, and other sensors that output a 4 to 20 mA signal. The 9900 Transmitter can also be used as a Batch Controller when a Batch Module is installed. New in Generation IV: view pH/ORP sensor calibration and sensor usage information stored at the sensor. This feature requires sensor with memory chip and a 2751 Preamp.

The extra large (3.90" x 3.90") auto-sensing backlit display features "at-a-glance" visibility that can be viewed at 4-5 times the distance over traditional transmitters. The highly illuminated display and large characters reduce the risk of misreading or misinterpreting the displayed values. The display shows separate lines for units, main and secondary measurements as well as a "dial-type" digital bar graph.

The 9900 is offered in both panel or field mount versions. Both configurations can run on 12 to 32 VDC power (24 VDC nominal). The 9900 can also be loop powered with compatible sensors.

Designed for complete flexibility, plug-in modules allow the unit to easily adapt to meet changing customer needs. Optional modules include Relay, Direct Conductivity/Resistivity, H COMM, Batch, 4 to 20 mA Output, and a PC COMM configuration tool. The unit can be used with default values for quick and easy programming or can be customized with labeling, adjustable minimum and maximum dial settings, and unit and decimal measurement choices.

Features

- **Multiple sensor types supported with one instrument**
- **"Dial-type" digital bar graph**
- **NEW! View pH/ORP sensor calibration and sensor usage information stored at the sensor (requires compatible sensor and Preamp)**
- **Modules are field installable and replaceable anytime**
- **Optional Relay Module for addition of two dry contact relays**
- **Optional H COMM Module for two-way communication**
- **Optional Batch Module for Batch Control**
- **NEW! One 4 to 20 mA output in base unit. One additional 4 to 20 mA available with optional module.**
- **4 to 20 mA input (with optional 8058 Signal Converter)**
- **Warning and Relay LED indicators for "at a glance" visibility**
- **Customizable features including label for custom identification**
- **Optional PC COMM configuration tool for configuration at a PC**

Applications

- **Wastewater Treatment**
- **Reverse Osmosis**
- **Deionization**
  - **Ultra Pure Water**
  - **Two Bed System**
  - **Mixed Bed System**
- **Chemical Manufacturing/Addition**
- **Metal and Plastic Finishing**
- **Fume Scrubber**
- **Cooling Towers**
- **Media Filtration**

Specifications

General			
Input Channels		One	
Input Types	Digital (S^3L)	Serial ASCII, TTL level, 9600 bps	
	Frequency	Range	0.5 to 1500 Hz
		Accuracy	0.5% of reading
Measurement Types		Flow, pH/ORP, Conductivity/Resistivity, Salinity, Pressure, Temperature, Level, Dissolved Oxygen, Batch or user-defined (via 8058)	
Enclosure and Display			
Case Material		PBT	
Window		Shatter-resistant glass	
Keypad		4 buttons, injection-molded silicone rubber seal	
Display		Backlit, 7 and 14-segment	
Update Rate		1 s	
LCD Contrast		5 settings	
Indicators		"Dial-type" digital bar graph. LEDs for Open Collector, Relays and Warning Indicator	
Enclosure Size		¼ DIN	
Mounting	Panel	¼ DIN, ribbed on four sides for panel mounting clip inside panel, silicon gasket included	
	Field	Mounts to standard Signet field mount junction boxes. Optional angle adjustment adapter available.	
	Wall	Large enclosure (sold as an accessory) that encases the panel mount transmitter	
Display Ranges			
pH		0.00 to 15.00 pH	
pH Temperature		-99 °C to 350 °C	-146 °F to 662 °F
ORP		-1999 to +1999 mV	
Flow Rate		-9999 to 99999 units per second, minute, hour or day	
Totalizer		0.00 to 99999999 units	
Conductivity		0.0000 to 99999 µS, mS, PPM and PPB (TDS), kΩ, MΩ	
Conductivity Temperature		-99 °C to 350 °C	–146 °F to 662 °F
Temperature		-99 °C to 350 °C	–146 °F to 662 °F
Pressure		-40 to 1000 psi	
Level		-9999 to 99999 m, cm, ft, in, %	
Volume		0 to 99999 cm^3, m^3, in^3, ft^3, gal, L, lb, kg, %	
Salinity		0 to 100 PPT	
Dissolved Oxygen		PPM 0-50, % SAT 0-200, 0 to 999.9 TORR	
Dissolved Oxygen Temperature		-99 °C to 350 °C	–146 °F to 662 °F
Environmental			
Ambient Operating Temperature			
Backlit LCD		-10 °C to 70 °C	14 °F to 158 °F
Storage Temperature		-15 °C to 70 °C	5 °F to 158 °F
Relative Humidity		0 to 100% condensing for field mount; 0 to 95% non-condensing for panel mount	
Maximum Altitude		4,000 m (13,123 ft)	
Enclosure Rating		Designed to meet NEMA 4X/IP65 (front face only on panel mount); field mount is 100% NEMA 4X/IP65	

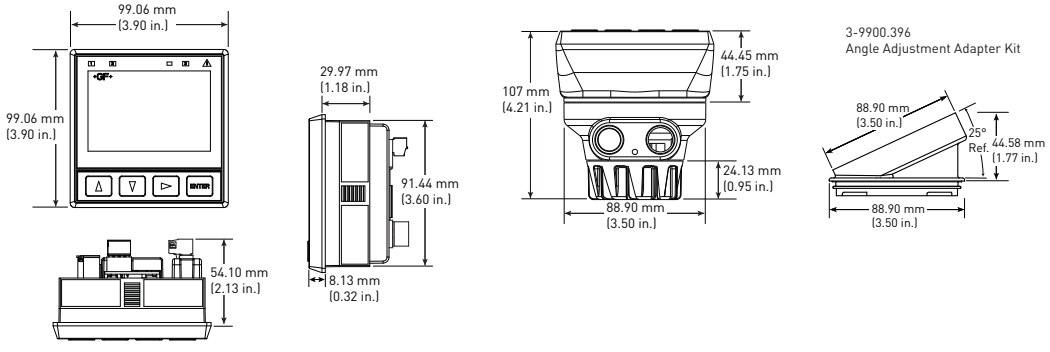
Specifications (continued)

Electrical Requirements				
Power to Sensors				
Voltage		+4.9 to 5.5 VDC @ 25 °C, regulated		
Current		1.5 mA max in loop power mode (up to 2.0 mA with 24 V @ 300 Ω max. loop impedance); 20 mA max when using DC power		
Short Circuit		Protected		
Isolation		Low voltage (< 48V AC/DC) to loop with DC power connected		
No isolation when using loop power only				
Terminal Blocks		Pluggable screw type		14 AWG max wire gauge
Input Power				
DC		10.8 to 35.2 VDC, regulated		
9900 without Relay Module		200 mA @ 10.8 VDC to 35.2 VDC		
9900 with Relay Module		300 mA @ 10.8 VDC to 35.2 VDC		
Overvoltage Protection		48 Volt Transient Protection Device		
Current limiting for circuit protection				
Reverse-Voltage Protection				
Loop Power				
No DC Power Input				
	Max. Loop Impedance	50 Ω @ 12 V	325 Ω @ 18 V	600 Ω @ 24 V
With DC Power Input or with 2nd loop, all the time				
	Max. Loop Impedance	250 Ω @ 12 V	500 Ω @ 18 V	750 Ω @ 24 V
Relay Specifications				
		Dry-Contact Relays (2)	Open Collector (1)	
Type		SPDT	N/A	
Form		C	N/A	
Max. Current Rating		5 A resistive	50 mA DC	
Max. Voltage Rating		30 VDC or 250 VAC	30 VDC	
Hysteresis		Adjustable (absolute in engineering units) (EUs)		
Latch		Reset in test screen only		
Delay		9999.9 seconds (max.)		
Test Mode		Set On or Off		
Cycle Time		99999 seconds (max.)		
Maximum Pulse Rate		300 pulses/minute		
Proportional Pulse		400 pulses/minute		
Volumetric Pulse Width		0.1 to 3200 s		
Pulse Width Modulation		0.1 to 320 s		
Input Types				
Digital (S^3L) or AC frequency				
4 to 20 mA input via the 8058				
pH/ORP input via the Digital (S^3L) output from the 2750/2751 pH/ORP Sensor Electronics				
Raw Conductivity/Resistivity input directly from Signet Conductivity/Resistivity electrodes via Direct Conductivity/ Resistivity Module or via 2850				
Input Specifications				
Digital (S^3L)		Serial ACSII, TTL level, 9600 bps		
Frequency Input				
	Sensitivity	80 mV @ 5 Hz, gradually increasing with frequency		
	Span	0.5 Hz to 1500 Hz @ TTL level input		
	Accuracy	± 0.5% or reading max error @ 25 °C		
	Resolution	1 µS		
	Repeatability	± 0.2% of reading		

Specifications (continued)

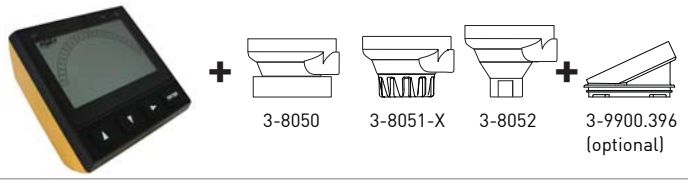
Input Specifications continued				
Power Supply				
	Rejection	±1 µA per volt		
	Short Circuit	Protected		
Update Rate		(1/frequency) + 150 ms		
Output Specifications				
Current Output - One (1); Two (2) with 4 to 20 mA Output Module				
	Current Loop Output Standard	ANSI-ISA 50.00.01 Class H		
	Current Output	4 to 20 mA, isolated, fully adjustable and reversible		
	Span	3.8 to 21 mA		
	Zero	4.0 mA factory set; user programmable from 3.8 to 5.0 mA		
	Full Scale	20.00 mA factory set; user programmable from 19.0 to 21.0 mA		
	Accuracy	±32 µA max. error @ 25 °C @ 24 VDC		
	Resolution	6 µA or better		
	Temperature Drift	±1 µA per °C		
	Power Supply Rejection	±1 µA per V		
	Isolation	Low voltage (‹ 48 VAC/DC)		
	Voltage	12 to 32 VDC ±10%		
	Max. Impedance (with DC power input)	250 Ω @ 12 VDC	500 Ω @ 18 VDC	750 Ω @ 24 VDC
	Max. Impedance (no DC power input)	50 Ω @ 12 VDC	325 Ω @ 18 VDC	600 Ω @ 24 VDC
	Update Rate	150 mS nominal		
	Short circuit and reverse polarity protected			
	Adjustable Span	Reversible		
	Error Condition	Selectable error condition 3.6 or 22 mA		
	Actual update rate determined by sensor type			
	Test Mode	Increment to desired current (range 3.8 to 21.00 mA)		
Shipping Weights				
Base Unit		0.63 kg	1.38 lb	
H COMM Module		0.16 kg	0.35 lb	
Conductivity Module		0.16 kg	0.35 lb	
Relay Module		0.19 kg	0.41 lb	
Batch Module		0.16 kg	0.35 lb	
4 to 20 Output Module		0.16 kg	0.35 lb	
Standards and Approvals				
		CE, UL, CUL, FCC		
		RoHS Compliant, China RoHS		
		Lloyd's Register		
		Manufactured under ISO 9001 and ISO 14001 for Environmental Management and OHSAS 18001 for Occupational Health and Safety		

Dimensions

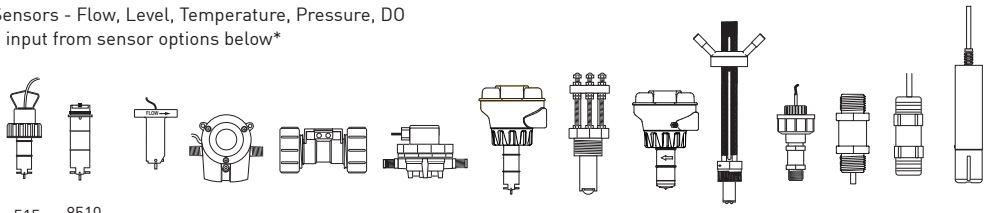


System Overview

Panel Mount	Field Mount - Pipe, Tank, Wall
Signet Model 9900 Transmitter (Includes mounting bracket and panel gasket)	**Signet Model 9900 Transmitter** with Junction Box (varies with sensor and installation)



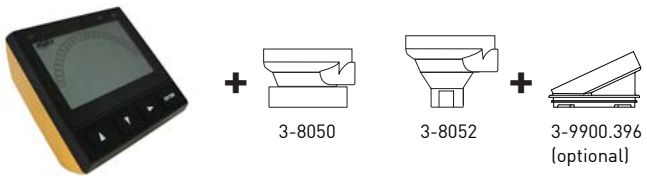
Signet Sensors - Flow, Level, Temperature, Pressure, DO
Use one input from sensor options below*



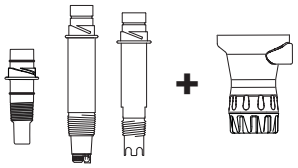
Signet Fittings - See individual sensor data sheets

All sold separately

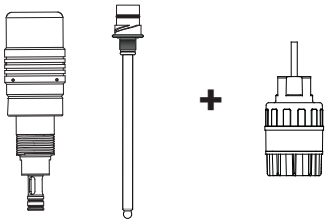
Panel Mount	Field Mount - Pipe, Tank, Wall
Signet Model 9900 Transmitter (Includes mounting bracket and panel gasket)	**Signet Model 9900 Transmitter** with Junction Box (varies with sensor and installation)



Signet Sensors - pH/ORP
Use one input from sensor options below*
With 2750/2751 Sensor Electronics



Signet Wet-Tap Electrode Model 2756, 2757 and
3719 Wet-Tap with 2750/2751 Sensor Electronics

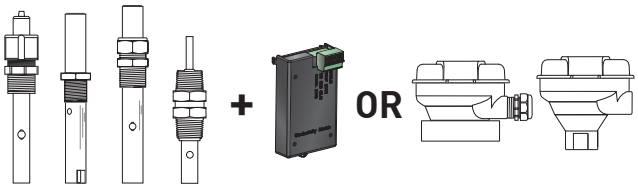


Signet Fittings - See individual sensor data sheets

All sold separately

Panel Mount	Field Mount - Pipe, Tank, Wall
Signet Model 9900 Transmitter (Includes mounting bracket and panel gasket)	**Signet Model 9900 Transmitter** with 3-9900.396 Angle Adapter and Junction Box (varies with sensor and installation)

Signet Sensors - Conductivity/Resistivity and Salinity Electrodes
Use one input from electrode options below*
with Conductivity Module or 2850 Sensor Electronics



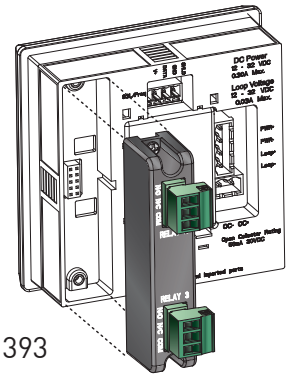
Signet Fittings - See individual sensor data sheets

All sold separately

* See individual sensor datasheets for additional information
**3-9900.396 is required with the Conductivity Module and either 3-8050 or 3-8052 to provide sufficient clearance.

Plug in Modules

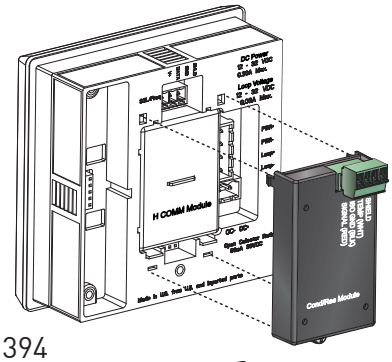
Optional modules are available to customize your 9900:
All modules come enclosed in a plastic cover. Modules are field installable and replaceable any time.



3-9900.393

Relay Module (Panel Installations only)

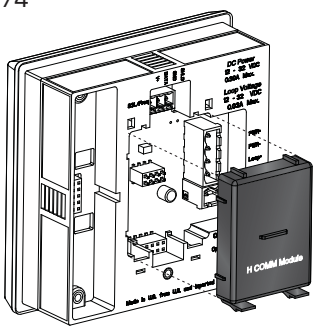
This module adds two programmable dry-contact relays to the standard Open Collector output in the base unit. Dry-contact relays are electromechanical switches with a moving contact armature. They are suitable for many general purpose applications, AC or DC, including loads up to 250 V. Install RC Filter kits (3-8050.396) on relays used to switch motor or inductive loads.



3-9900.394

Direct Conductivity/Resistivity Module

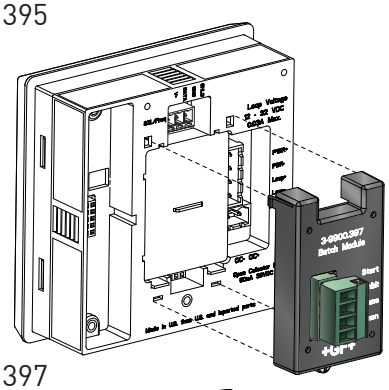
The Direct Conductivity/Resistivity Module interfaces Signet 2819-2823 and 2839-2842 Conductivity electrodes directly to the 9900. The module also provides filtering and conditioning. The 2850 Sensor Electronics can be used in place of the Direct Conductivity/Resistivity Module wired through the 9900 Digital (S^3L) input.



3-9900.395

H COMM Module (HART®)

The H COMM Module enables communication between the 9900 and a HART®-enabled device. The HART (Highway Addressable Remote Transducer) Protocol superimposes digital signals on top of the 4 to 20 mA analog signal.

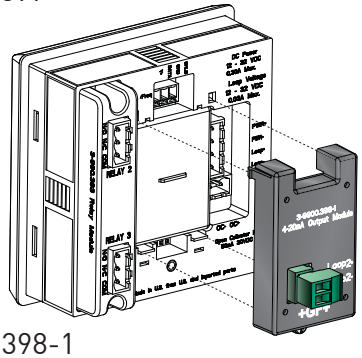


3-9900.397

Batch Module

The Batch Module adds batch capability to the 9900 Transmitter (Generation II and newer). It is compatible with all Signet flow sensors. Up to 10 batch sizes can be stored in one 9900 with customized names and K-Factors available for each batch.

Refer to the Batch Control System datasheet for further details.

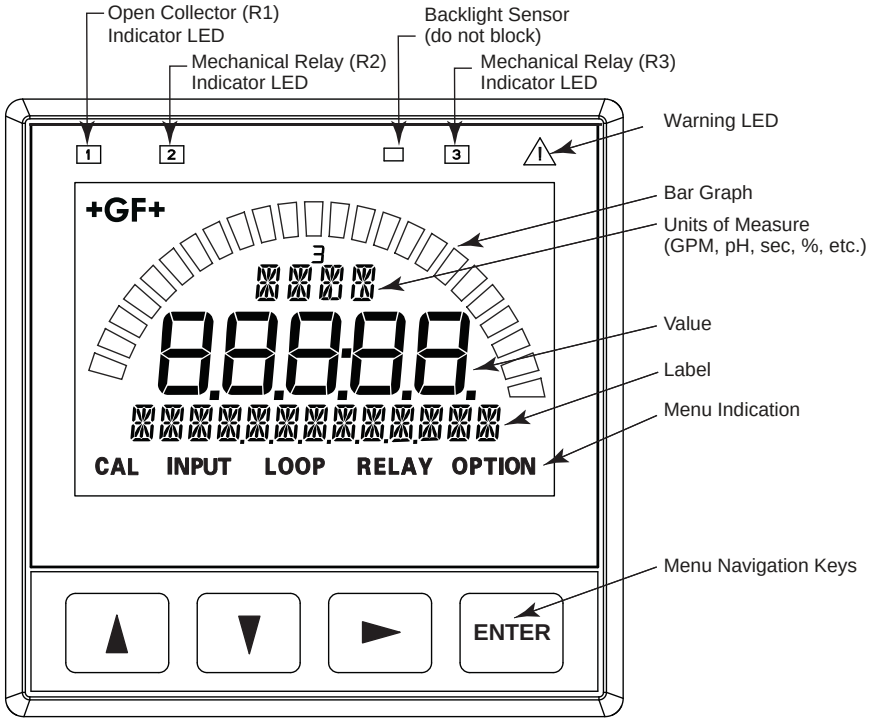


3-9900.398-1

4 to 20 mA Output Module

The 4 to 20 mA Output Module adds a second 4 to 20 mA Output to the 9900 Transmitter (Generation III and later). Each of the outputs can be used to output the primary and/or secondary measurement. Outputs have individual settings available.

Refer to the 4 to 20 mA Output Module manual for further details.



All possible segments shown in this illustration. The instrument's software controls which segments are shown at any particular time. Only the bar graph segment outline and GF logo are visible when the unit is turned off.

9900 Module	9900 Generation			
	I	II	III	IV
H COMM	X	X	X	X
Relay	X	X	X	X
Conductivity/Resistivity	X	X	X	X
Batch		X	X	X
4 to 20 mA Output			X	X

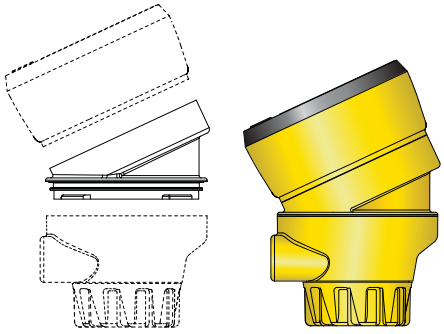
Sensor model	9900 Generation			
	I	II	III	IV
515/8510	X	X	X	X
525	X	X	X	X
2000	X	X	X	X
2100	X	X	X	X
2250	X	X	X	X
2350	X	X	X	X
2450	X	X	X	X
2507	X	X	X	X
2536/8512	X	X	X	X
2537-5	X	X	X	X
2540	X	X	X	X
2551	X	X	X	X
2552	X	X	X	X
2610-41			X	X
2610 + 8058	X	X	X	X
2724-2726	X	X	X	X
2734-2736	X	X	X	X
2750	X	X	X	X
2751	X	X	X	X
2756-2757	X	X	X	X
2764-2767	X	X	X	X
2774-2777	X	X	X	X
2819-2823	X	X	X	X
2839-2842	X	X	X	X
2850	X	X	X	X
4150 + 8058	X	X	X	X

The Angle Adjustment Adapter Kit enables the 9900 transmitter to be mounted virtually anywhere. Field Mount Installations with a Conductivity/Resistivity Module require the Angle Adjustment Adapter Kit for wiring clearance.

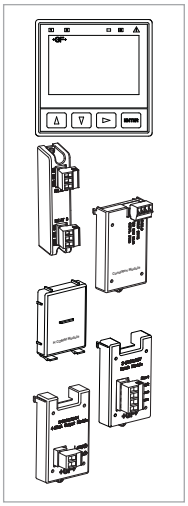
3-9900-1
(159 001 696)
Field Mount

3-9900-396
(159 001 701)
Angle Adjustment
Adapter Kit

3-8051 (159 000 187)
3-8051-1 (159 001 755)
3-8051-2 (159 001 756)
Flow Sensor
Integral Mounting Kit



Ordering Information



Mfr. Part No	Code	Description
9900 Base Unit - Single Channel, Multi-Parameter, 4 to 20 mA, Open Collector, DC power		
3-9900-1P	**159 001 695**	9900 Panel Mount Transmitter
3-9900-1	**159 001 696**	9900 Field Mount Transmitter
3-9900-1BC	**159 001 770**	Batch Controller System
Optional Accessory Modules		
3-9900.393	**159 001 698**	Relay Module - 2 DCR (Dry-contact relays)
3-9900.394	**159 001 699**	Direct Conductivity/Resistivity Module
3-9900.395	**159 001 697**	H COMM Module
3-9900.397	**159 310 163**	Batch Module
3-9900.398-1	**159 001 784**	4 to 20 mA Output Module

Accessories and Replacement Parts

Mfr. Part No	Code	Description
6682-0204	**159 001 709**	Conductivity Module Plug, 4 Pos, Right Angle
6682-1102	**159 001 710**	DC Power Plug, 2 Pos, Right Angle
6682-1103	**159 001 711**	Relay Module Plug, 3 Pos, Right Angle
6682-1104	**159 001 712**	Loop Power Plug, 4 Pos, Right Angle
6682-3104	**159 001 713**	Freq/S^3L Plug, 4 Pos, Right Angle
6682-3004	**159 001 725**	Terminal Block Plug
7310-1024	**159 873 004**	24 VDC Power Supply, 0.42 A, 10W
7310-2024	**159 873 005**	24 VDC Power Supply, 1.0 A , 24W
7310-4024	**159 873 006**	24 VDC Power Supply, 1.7 A, 40W
7310-6024	**159 873 007**	24 VDC Power Supply, 2.5 A, 60W
7310-7024	**159 873 008**	24 VDC Power Supply, 4.0 A, 96W
3-0251	**159 001 724**	PC COMM Configuration Tool
3-8050	**159 000 184**	Universal Mount Kit
3-8050.396	**159 000 617**	RC Filter kit (for relay use), 2 per kit
3-8051	**159 000 187**	Flow Sensor Integral Mounting Kit, NPT, Valox
3-8051-1	**159 001 755**	Flow Sensor Integral Mounting Kit, NPT, PP
3-8051-2	**159 001 756**	Flow Sensor Integral Mounting Kit, NPT, PVDF
3-8052	**159 000 188**	¾ in. Integral Mount Kit
3-8058-1	**159 000 966**	I-Go® Signal Converter, wire-mount
3-8058-2	**159 000 967**	I-Go® Signal Converter, DIN rail mount
3-9000.392-1	**159 000 839**	Liquid Tight Connector Kit, NPT (1 pc.)
3-9900.390	**159 001 714**	Standard Connector Kit, Right Angle, 9900 Transmitter
3-9900.391	**159 001 715**	Optional Connector Kit, In-Line, 9900 Transmitter
3-9900.392	**159 001 700**	Wall Mount Accessory Kit for 9900
3-9900.396	**159 001 701**	Angle Adjustment Adapter Kit (for Field Mounting)

3-9900.099 Rev J (1/15)

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