

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 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. The 9900 Transmitter (Generation III) has the added capability of a Dissolved Oxygen sensor type option and has added capability of optional 4 to 20 mA Output Module, which adds a second output. 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 Module 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

- Multi-Parameter input selection
- "Dial-type" digital bar graph
- Intuitive and "user-friendly" interface consistent with legacy Signet ProPoint® and ProcessPro® devices
- Optional field upgradable relays
- Selectable error mode for current outputs, 3.6 mA or 22 mA
- **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
- Factory reset capability
- Optional PC COMM configuration tool for configuration at a PC
- Optional H COMM module for two-way communication
- Optional Batch Module for Batch Control



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 ³ L)	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 1999.9 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
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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
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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
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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 (S³L) or AC frequency

4 to 20 mA input via the 8058

pH/ORP input via the Digital (S³L) output from the 2750 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 ³ L)	Serial ACSII, TTL level, 9600 bps
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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	$\pm 1 \mu\text{A}$ 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	$\pm 32 \mu\text{A}$ max. error @ 25 °C @ 24 VDC		
Resolution	6 μA or better		
Temperature Drift	$\pm 1 \mu\text{A}$ per °C		
Power Supply Rejection	$\pm 1 \mu\text{A}$ per V		
Isolation	Low voltage (< 48 VAC/DC)		
Voltage	12 to 32 VDC $\pm 10\%$		
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)		

Open Collector Output 50 mA DC max., 30 VDC

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

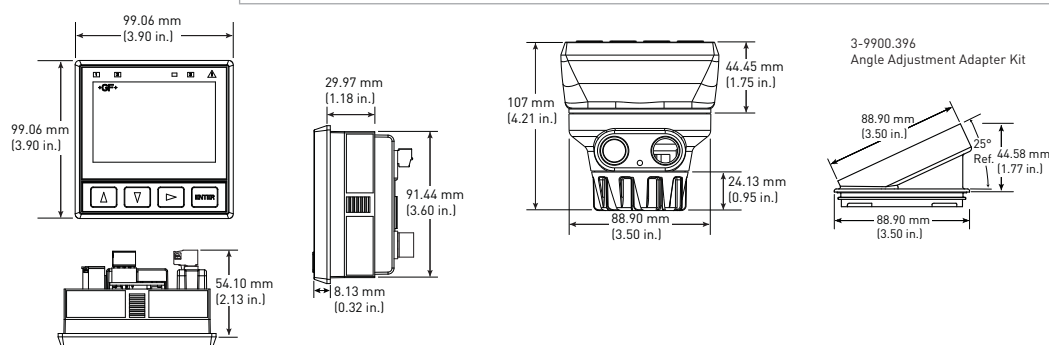
Standards and Approvals







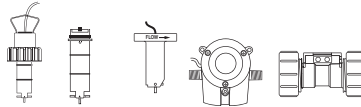
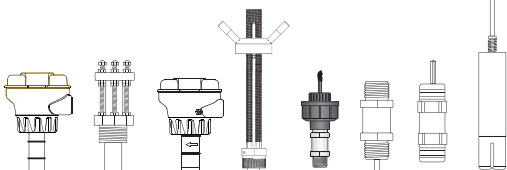





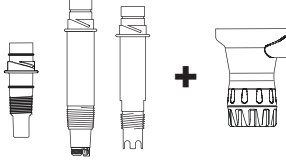
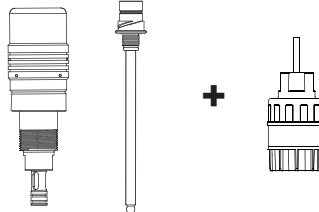






CE, UL, CUL, FCC

RoHS Compliant, China RoHS

Manufactured under ISO 9001 and ISO 14001 for Environmental Management and OHSAS 18001 for Occupational Health and Safety

Dimensions



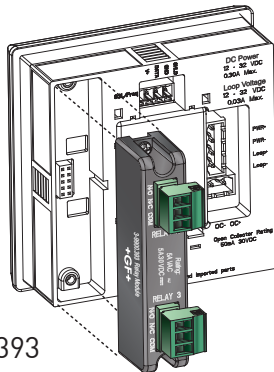
Panel Mount	Field Mount - Pipe, Tank, Wall
Signet Model 9900 Transmitter (Includes mounting bracket and panel gasket) 	Signet Model 9900 Transmitter with Junction Box (varies with sensor and installation)  +  3-8050  3-8051-X  3-8052 +  3-9900.396 (optional)
Signet Sensors - Flow, Level, Temperature, Pressure, DO use one input with from a choice of sensors *  515 8510 525 2000 2100 2507 2536 8512  2540 2551 2552 2250 2350 2450 2610	
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)  +  3-8050  3-8052 +  3-9900.396 (optional)
Signet Sensors - pH/ORP use one input from a choice of sensors With 2750 Sensor Electronics 	
Signet Wet-Tap Electrode Model 2756, 2757 and 3719 Wet-Tap with 2750 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)  +  3-9900.396**  3-8050  3-8052
Signet Sensors - Conductivity/Resistivity and Salinity Electrodes use one input from a choice of electrodes with Conductivity Module or 2850 Sensor Electronics 	
Signet Fittings - See individual sensor data sheets All sold separately	

* See individual sensor datasheets for additional information

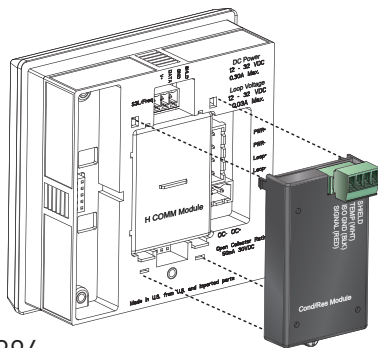
**3-9900.396 is required with the Conductivity Module and either 3-8050 or 3-8052 to provide sufficient clearance.

Plug in Modules

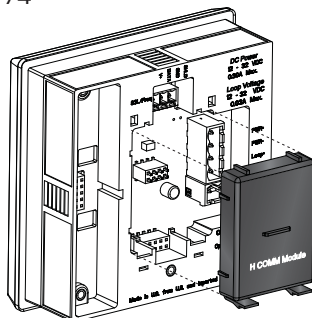
Optional modules are available to customize your 9900:
All modules come enclosed in a plastic cover. Modules are field installable and replaceable any time.



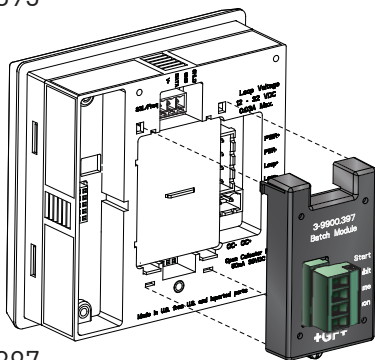
3-9900.393



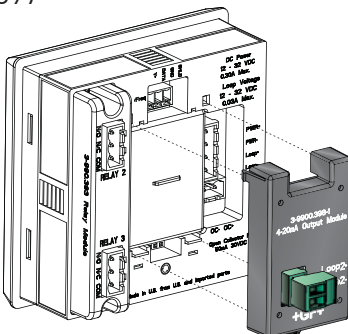
3-9900.394



3-9900.395



3-9900.397



3-9900.398-1

Relay Module (Panel Installations only)

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.

This module adds two programmable dry-contact relays to the standard Open Collector output in the base unit.

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. (Conductivity/Resistivity and Salinity measurements may also be performed via the 2850 Sensor Electronics connected through the 9900 Digital (S³L) inputs).

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.

Refer to the 9900 H COMM Module Manual 3-9900.094 for further details.

Batch Module

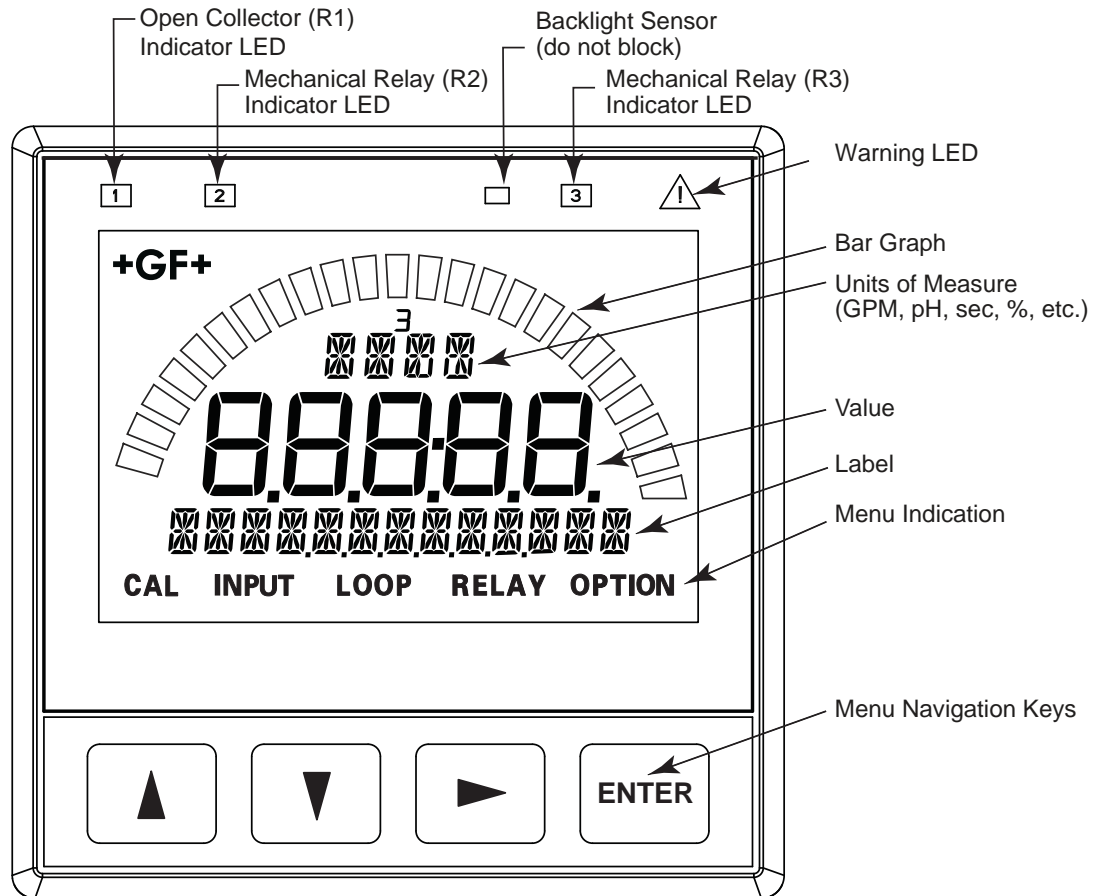
The Batch Module adds batch capability to the 9900 Transmitter (Generation II and newer). It is compatible with all Signet flow sensors. Up to 10 batch sizes can be stored in one 9900 with customized names and K-Factors available for each batch.

Refer to the Batch Control System datasheet for further details.

4 to 20 mA Output Module

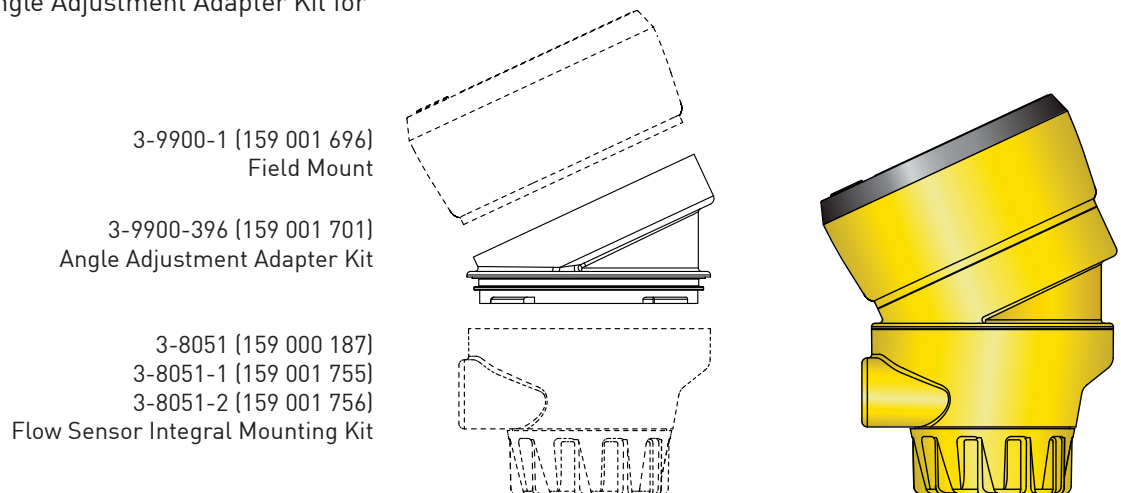
The 4 to 20 mA Output Module adds a second 4 to 20 mA Output to the 9900 Transmitter (Generation III and newer). Each of the outputs can be used to output the primary and/or secondary measurement. Outputs have individual settings available.

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

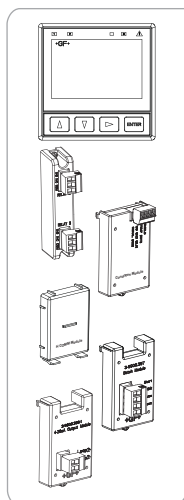


All possible segments shown in this illustration. The instrument's software controls which segments are shown at any particular time. Only the bar graph segment outline and GF logo are visible when the unit is turned off.

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.



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 ³ L 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)