

## 9500 and 9600 I/O Card Installation Instructions

This document describes how to install, configure, and verify the operation of the optional Input/Output card (“I/O card”) into your 9500 or 9600 power meter. It supplements your meter’s *Installation & Basic Setup Instructions* and *User’s Guide*.

### In this Document

- ◆ **Installation and Wiring** ..... 2
  - Preparing the Meter for Installation ..... 3
  - Installing the I/O Card ..... 3
  - Connecting to the Digital Inputs ..... 4
  - Connecting to the Analog Outputs ..... 5
  - Connecting to the Analog Inputs ..... 5
- ◆ **Configuring the I/O Card** ..... 6
  - Specifying a Port in an ION Module ..... 6
  - Configuring the Digital Inputs ..... 7
  - Configuring the Analog Outputs ..... 8
  - Configuring the Analog Inputs ..... 8
- ◆ **Verifying Operation** ..... 9

### Getting More Information



#### NOTE

Softcopies are available for download from the Siemens website at [www.siemens.com](http://www.siemens.com).

#### *INSTALLATION & BASIC SETUP INSTRUCTIONS*

This document provides instructions on mounting and wiring the meter to the power system, wiring the COM ports, configuring the meter’s basic settings from the front panel, and verifying operation.


#### *USER’S GUIDE*

This manual provides the operation and usage details including: displaying data, making configuration changes, customizing operation with ACCESS software, using the standard inputs/outputs, and more.

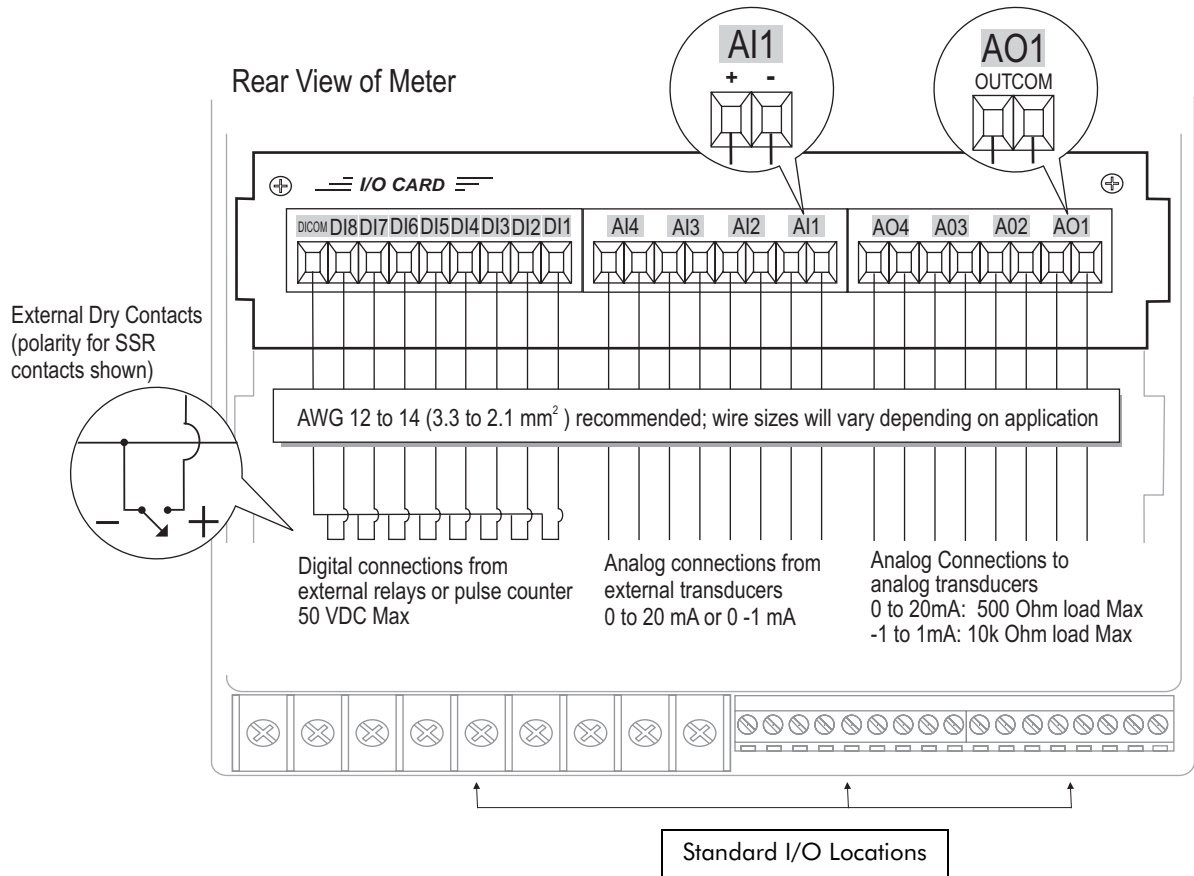
#### *ION PROGRAMMER’S REFERENCE*

This online programming manual describes how to make configuration changes to an ION compliant node with Designer software, and provides a detailed functional description of every ION module in the ION architecture.

# Installation and Wiring

 **DANGER** During normal operation of the meter, hazardous voltages are present which can cause severe injury or death. These voltages are present on the terminal strips of the device and throughout the connected potential transformer (PT), current transformer (CT), status input, relay, and control power circuits. Only qualified, properly trained personnel should perform installation and servicing.

The standard model I/O card has 8 digital inputs. Depending on what you ordered, the I/O card will also contain either 4 analog inputs, or 4 analog outputs, or both. Check the label on the I/O card for your I/O specifications.



## Preparing the Meter for Installation

The following steps should be taken before inserting an I/O card into the 9500 or 9600:

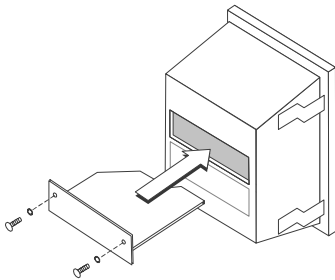


The components inside the meter are extremely sensitive to electrostatic discharge. Wear an anti-static wrist strap at all times when working inside the unit. Failure to use proper equipment during servicing will void the meter's warranty.

1. Turn off all power to the meter.
2. Open all PT fuses (or direct voltage input fuses). Close all CT shorting blocks.
3. Disconnect the Line and Neutral (or DC power) wires from the Control Power inputs of the unit.
4. Disconnect all other wiring (or power off all other circuits) which may present potentially hazardous voltage levels to the unit, such as connections to the relay outputs, status inputs, etc.
5. Ensure that all cables still connected to the meter are **NOT** live.

## Installing the I/O Card

The I/O card consists of a circuit board with an attached polarized CHAMP connector on the component side. Follow these steps to install the I/O card:



1. If present, remove the plastic tab that seals the I/O card's cover plate to the meter. Use the Phillips screwdriver to remove the plate's two screws, then remove the plate.
2. Hold the I/O card by the sides and slide it into the base unit with the component side facing up. Slide the edge of the circuit board down the slots along each side of the chassis.
3. Align the CHAMP connector with the socket and press the I/O card firmly into place. The socket and the connector are polarized, so the pins in the connector will not fit into the socket if the card is not oriented correctly. The I/O card is securely inserted into the socket when the backplate of the I/O card meets the chassis of the meter.
4. Ensure the cover meets the chassis of the base unit. Use the Phillips screwdriver to replace the two backplate screws with their lock-washers. They must be installed firmly to preserve transient immunity.
5. Reinstall the Line and Neutral (or DC power) wiring to the Control Power inputs of the unit.
6. Reconnect all other wiring (or re-enable all other circuits). Close the PT fuses (or direct voltage input fuses), and open the CT shorting blocks.
7. Turn on power to the meter and verify the correct operation of the unit.

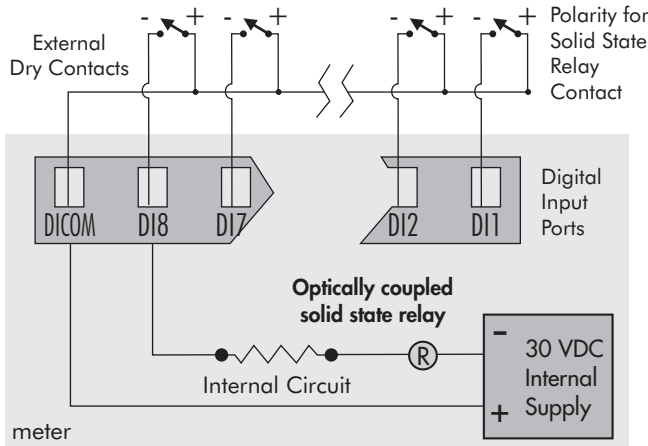
# Connecting to the Digital Inputs

Connections to the eight digital inputs are made via a captured-wire terminal block (refer to page 2 for wiring locations). AWG 12 to 14 (3.3 to 2.1 mm<sup>2</sup>) wire is recommended for all digital input connections. Specifications are as follows:

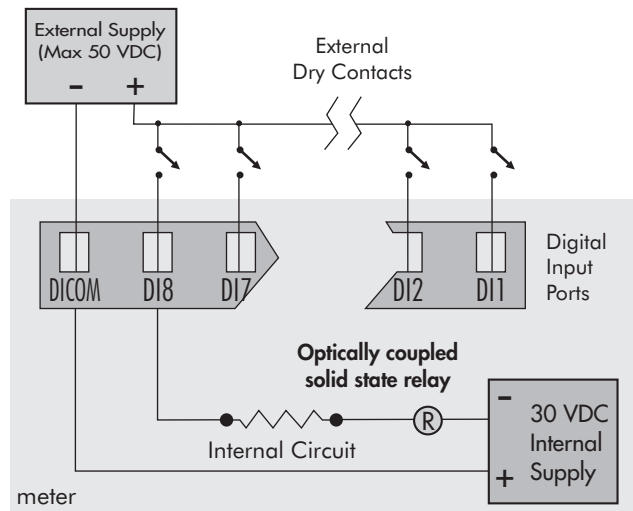
Specification	Value
Min Pulse Width	20 ms
Max Pulse Rate	25 Hz
Scan Time	20 milliseconds for all inputs (min)
Isolation to Ground	300 VDC for 10 seconds
Max Voltage	50 VDC (continuous)
Timestamp Accuracy	2 milliseconds

The inputs are primarily intended for *dry* contact sensing applications. For *self-excitation*, the meter uses a current sensing technique to monitor contact status by providing an internal 30 VDC supply. Note that no ground or external voltage connections are required. For voltage sensing applications, external excitation can be applied with an external supply (50 VDC max) placed in series with the internal 30 VDC supply.

### Internal Excitation



### External Excitation



Instructions for configuring the digital inputs are provided on page 7.

## Connecting to the Analog Outputs

The I/O card contains 4 analog outputs that can deliver a continuous DC signal. Two varieties are available:

### 0-20 mA Analog Outputs (scalable to 4-20 mA)

Capable of driving up to 500  $\Omega$

### -1 to 1 mA Analog Outputs (scalable to 0-1 mA)

Capable of driving up to 10 k $\Omega$

Both types of analog output provide DC outputs at an accuracy of  $\pm 0.30\%$  of full scale.

Connection to the analog outputs is made through a set of captured wire connectors (refer to page 2 for the wiring locations). Instructions for configuring the analog outputs are provided page 8.

## Connecting to the Analog Inputs



Due to internal circuit design, it is recommended that the analog inputs of the I/O card not be driven with the outputs on the same card.

The I/O card can be ordered with 4 unidirectional analog inputs. Two varieties are available with accuracy of 0.3% of full scale:

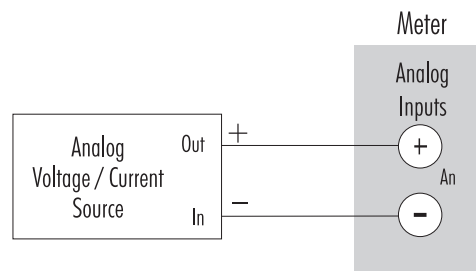
### 0-20 mA Analog Inputs (scalable to 4-20 mA)

- ◆ Input impedance of 25  $\Omega$
- ◆ Isolation impedance (channel/channel) > 400 k $\Omega$

### 0-1 mA Analog Inputs

- ◆ Input impedance of 475  $\Omega$
- ◆ Isolation impedance (channel/channel) > 400 k $\Omega$

These inputs are capable of measuring DC signals from various transducers within the system.



Connection to the analog inputs is made through a set of captured wire connectors (refer to page 2 for the wiring locations). Refer to page 8 for instructions on configuring the analog inputs.

## Configuring the I/O Card

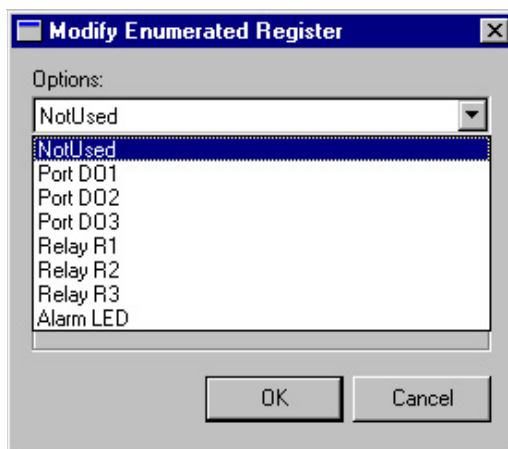
Use Designer software to configure your meter's I/O ports. Refer to the Designer section of the online *WinPM.Net Help*, or the online *ION Programmer's Reference* for instructions on using Designer.

- ◆ Status inputs are controlled by Digital Input modules.
- ◆ Analog Inputs are controlled by Analog Input modules.
- ◆ Analog Outputs are controlled by Analog Output modules.

All of the above ION modules can act as intermediaries between the physical hardware port and the other ION modules in the meter. They either define the characteristics of outgoing signals, or tell the meter how to interpret incoming signals. Instructions on assigning the ports to these ION modules are provided below.

## Specifying a Port in an ION Module

The Digital Output, Analog Input, and Analog Output modules have *Port* setup registers that allow you to specify which port will handle the incoming or outgoing signals. To assign a port to one of these modules, modify the *Port* setup register by picking a port from the enumerated list. **The enumerated list will only show the ports that have not already been assigned to another module.**



To make a port available, you must locate the ION module controlling the port and set its *Port* setup register to NotUsed (or delete the module entirely). The port will then appear in the list.

## Configuring the Digital Inputs

The I/O card has eight status input ports. The function of each status input is controlled by a Digital Input module. These ION modules can be linked with other modules for counting status changes.

Double-click on the “Digital Inputs” folder (under Advanced Setup) to view the default configuration of the meter’s status inputs. The function of each status input is controlled by the Digital Input modules S1 to S8. The Digital Inputs folder also contains eight Counter modules for counting status changes and an External Pulse module for resetting them.

The settings in the Digital Input modules are as follows:

Setup Register	Available Settings	Creation Default	Description
Input Mode	Pulse or KYZ	Pulse	Complete pulse or KYZ transition pulse
EvLog Mode	Log Off or Log On	Log Off	Whether or not to log status changes in the Event Log
Debounce	0 to 65.25	0.010	Mechanical contact bounce, in seconds
Polarity	Non-Inverting or Inverting	Non-Inverting	Non-inverted (or level) pulse
Port	Not Used S1 to S8 inclusive	Not Used	The input hardware channel

## Configuring the Analog Outputs

The I/O card provides four analog outputs. The function of each port can be controlled by a single Analog Output module.

By default, four Analog Output modules (labeled AO1 to AO4) are already created for this purpose. Double-click on the “Analog Outputs” folder (in the Advanced Setup area) to view them. Configure the settings of the controlling module to match your requirements. The settings in these modules are as follows:

Setup Registers	Available Settings	Creation Default	Description
Port	Not Used AO1 to AO4 inclusive	Not Used	The output hardware channel
Full Scale	$-1 \times 10^9$ to $1 \times 10^9$	1	The highest possible output on the analog hardware port
Zero Scale	$-1 \times 10^9$ to $1 \times 10^9$	0	The lowest possible output on the analog hardware port

## Configuring the Analog Inputs

The I/O card provides four analog inputs. By default, four Analog Input modules (labeled AI1 to AI4) are already created for this purpose. Double-click on the “Analog Inputs” folder (in the Advanced Setup area) to view their default configuration. Configure the settings of the controlling module to match your requirements.

The settings in these modules are as follows:

Setup Registers	Available Settings	Creation Default	Description
Port	Not Used or AI1 to AI4 inclusive	Not Used	The input hardware channel
Full Scale	$-1 \times 10^9$ to $1 \times 10^9$	1	The highest possible output on the analog hardware port
Zero Scale*	$-1 \times 10^9$ to $1 \times 10^9$	0	The lowest possible output on the analog hardware port

\* An arbitrary input value can be treated as the Zero Scale (ie, a 4-20mA input is capable of generating a 0 to X output).



# Verifying Operation

## Checking Status on Front Panel

The 9500 or 9600's onboard status inputs and digital outputs can be monitored using the **D-Input** and **D-Output** softkey items. Two additional softkey items have been added to monitor the status and values provided by the I/O card's Analog Input and Analog Output ports. These menus are located in the main softkey list, and are named **DI-I/O** and **Anlg-I/O**.

## WinPM.Net Vista Diagram

The 9500 or 9600 Vista screens have provisions for monitoring and altering the states of each I/O port.

## Testing Analog I/O Operation

Most analog devices (such as dial-type gauges) connected to your analog input and output ports allow you to see whether the port is delivering current. If your connected device cannot help you determine the port's operation, follow these steps:

1. Ensure that the meter is properly configured as described on page 8. Disconnect supply power from your meter and make sure that no static charge remains in the circuit.
2. Place an ammeter in series with the port.
3. Power up the meter, and measure the current.

If your analog ports are not producing the output current as expected, contact Customer Service.