

# 9410 Power Quality Meter

## Technical Overview

2018

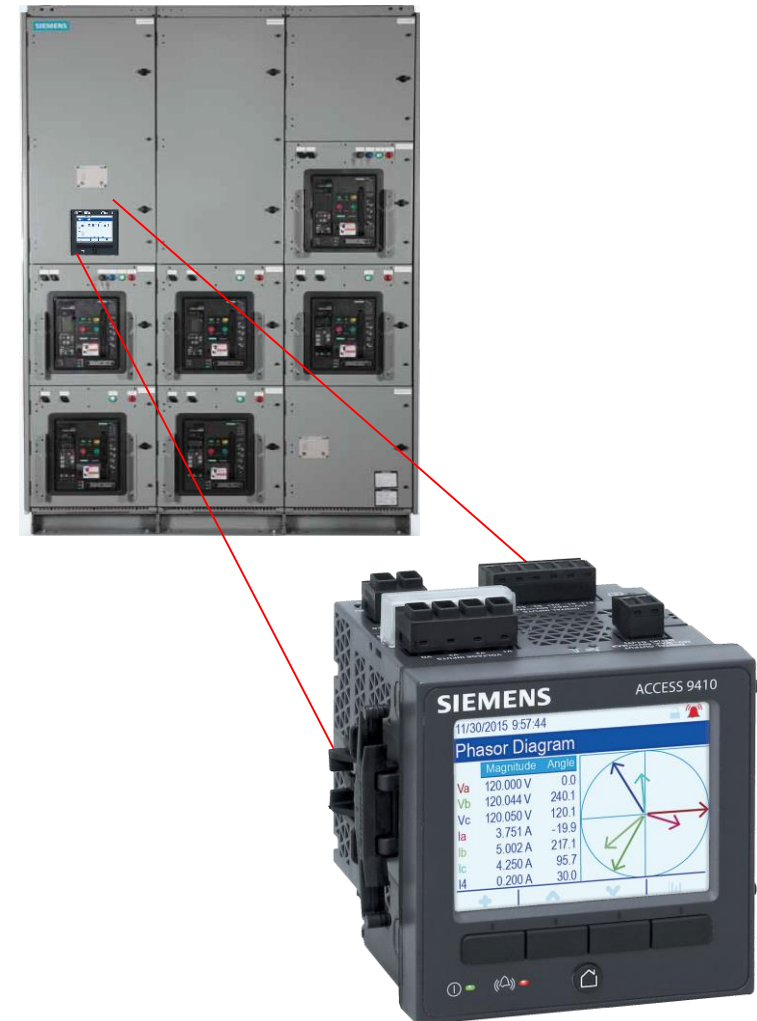
## 9410 Power Quality Meter Overview

The **9410 Power Quality** meter is an affordable, compact, high end power quality meter that can be installed in any key metering location requiring advanced power quality features.

The meter is designed with many high end metering features such as Color display, WFC, Emailing, Modbus Mastering, Extensive 1 msec inputs, remote display and more!

Integration to Siemens EPMS software and other systems through Ethernet or Serial communications.

Accuracy is ANSI C12.20-2010 Class 0.2S, IEC 62053-22 Class, IEC 62586, EN50160 and IEC6100-4-30 Class S



## 9410 Power Quality Meter Overview

The 9410 power meter provides advanced metering and power quality features typically found in more high-end metering. Key features Include:

- ✓ Waveform capture (pre & post) for sag/swell events (256 samples/cycle) up to 96 cycles on all phases, with Disturbance Direction Detection to pin point the location of the fault.
- ✓ GPS (sequence of events recording) to 1msec for Inputs.
- ✓ Customizable on board data logging, event recording and email capability
- ✓ Customizable color display – display downstream data!
- ✓ Expandable I/O for both digital and analog signals – 3 standard, option up to 27
- ✓ Gateway (serial to Ethernet) communications available with add on Ethernet Card. Also provides web pages for meter and connected downstream devices
- ✓ Remote display available and non-display (tran) available
- ✓ Modbus RTU/TCP, and IEC61850 protocols, HTML web server, NTP and FTP transfer
- ✓ Email alarms, SMTP email



24 digital input setup

# 9410 Power Quality Meter Overview

## Market Focus Applications - Consumption data recording

### Gather and act on energy and consumption data

- ✓ Precise, consistent metering
- ✓ Real energy - Class 0.2S (IEC 62053-22, ANSI C12.20 (0.2) Class 10)
- ✓ Reactive energy - Class 0.5S (IEC 62053-24)
- ✓ Measurement method - IEC 61557-12 PMD-S
- ✓ Billing flexibility
- ✓ Supports Time Of Use metering (4 seasons, 5 day types, 20 year calendar)
- ✓ Utility sealable
- ✓ Time synchronization
- ✓ WAGES metering support (input metering)



## 9410 Power Quality Meter Overview

### Market Focus Applications - *Input metering for “advanced” WAGES monitoring*

**Siemens 9410 series meter is configured for input metering as standard and can accommodate up to 27 digital inputs**

- ✓ Digital inputs connected to pulse counting devices (gas meters, water meters, etc) for local display can be tied into the meter
- ✓ Use the Ethernet gateway connection to SIEMENS WinPM.Net Software to allow for remote monitoring
- ✓ SIEMENS WinPM.Net Power Monitoring software displays, reports and alarms the information as if connected directly to water meters, gas meters, etc.



## 9410 Power Quality Meter Overview

### General Meter Features Overview

#### Key features designed into the 9410 meter:

- ✓ Modbus RTU, Modbus TCP, XML and IEC 61850 protocols
- ✓ Color display with color alarm notifications
- ✓ Two Ethernet ports & RS-485 port as “standard”
- ✓ Ethernet-to-serial gateway
- ✓ Modbus Master functionality
- ✓ COMTRADE / FTP
- ✓ SNMP
- ✓ SNTP/NTP Time Synch (+/-1 sec)
- ✓ GPS IRIG-B Serial Time Synch (+/- 1ms)
- ✓ Standard 5amp secondary CT's – 3 phases
- ✓ Customizable displays, Custom logic and extensive I/O



Hundred's of metering measurements are monitored points. A complete listing is in the Modbus register listing in the 9410 meter manual.

# 9410 Power Quality Meter Overview

## Design Features

Siemens 9410 series meter is configured for maximum flexibility and expandability with four unique designs



### Four meter styles

- One piece – panel mount
- Two piece – remote display
- Tran (No display)
- Optional custom NEMA enclosures are also offered



Panel-mount meter



DIN rail-mount meter with remote display



DIN rail-mount meter with no display



Custom Enclosure Designs

# 9410 Power Quality Meter Overview

## Design Features - *Display*

Unique **COLOR** display with clear, color coded information that provides easy to read information

- ✓ Integrated 320x240 VGA Color LCD
- ✓ Eleven standard displays with multiple sub displays and custom screens can be designed with up to 6 variables on each with ION setup
- ✓ Alarm notification (upper right corner), LED light and the Entire screen flashes for a high priority alarm. Red (High Level), Yellow (Med level), Blue (low level) and Gray (no alarm)
- ✓ Multiple languages: English, French, Spanish, Portuguese, German, Italian and Chinese
- ✓ Two LED indicators for Alarm and Meter Status
- ✓ IP 54, UL Type 12

A screenshot of the Siemens ACCESS 9410 display showing the 'Active Alarms' screen. The screen displays the date and time '11/30/2015 9:49:18' and a red alarm icon in the upper right corner. The title is 'Active Alarms (4)'. Below the title is a table with three columns: 'Date', 'Alarm', and 'Ack'. The table contains four rows of alarm data, each with a yellow warning icon in the 'Date' column. At the bottom of the table is a button labeled 'Acknowledge All (4)'. The screen also shows navigation icons at the bottom.



# 9410 Power Quality Meter Overview

## Design Features – Front View

Panel mount meter



DIN-rail mount meter



1. Voltage inputs
2. Control power
3. Digital inputs
4. Digital output
5. Alarm LED
6. Status LED

# 9410 Power Quality Meter Overview

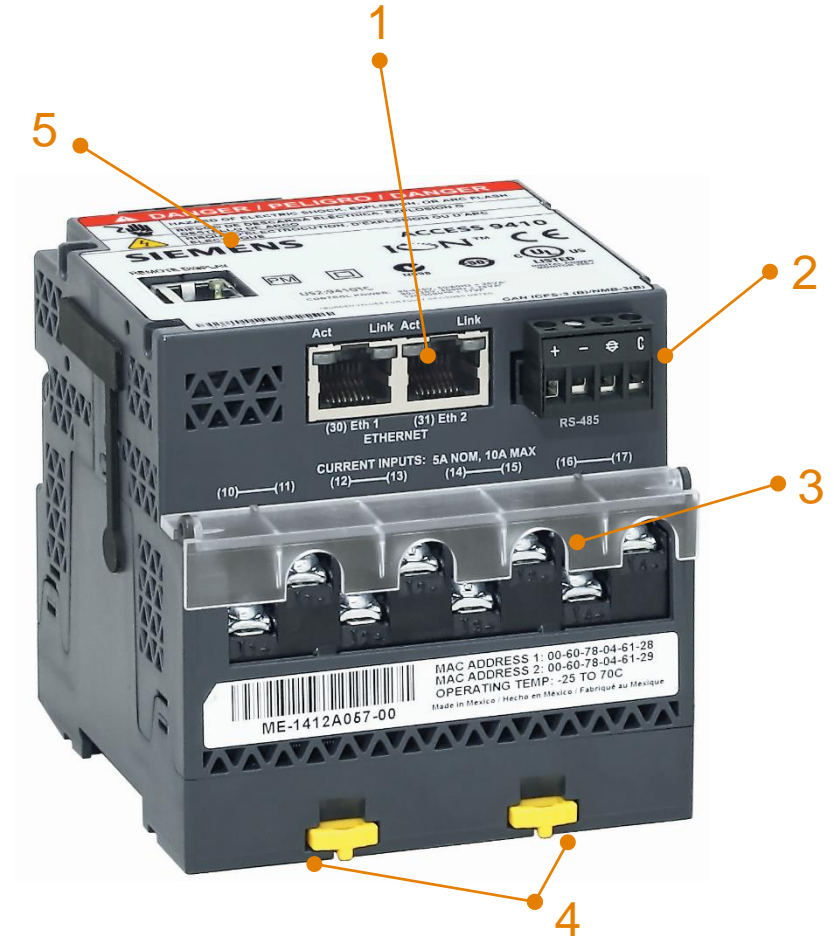
## Design Features – Bottom View

Panel mount meter



1. Dual-port Ethernet for daisy chaining meters via Ethernet
2. RS-485
3. Current inputs
4. Mounting clips
5. Expansion port

DIN-rail mount meter



# 9410 Power Quality Meter Overview

## Design Features - *Build value of your investment*

**Modular I/O options (up to four), and downloadable firmware offer unique flexibility to meet customer needs today and adapt to changing requirements tomorrow.**

✓ With up to four optional modules, the 9410 can be expanded to support 27 digital inputs! Analog Input (4-20mA, 0-30V) and Output (4-20mA; 0-10V) are available.

✓ Simple plug in design requires no tools to install.



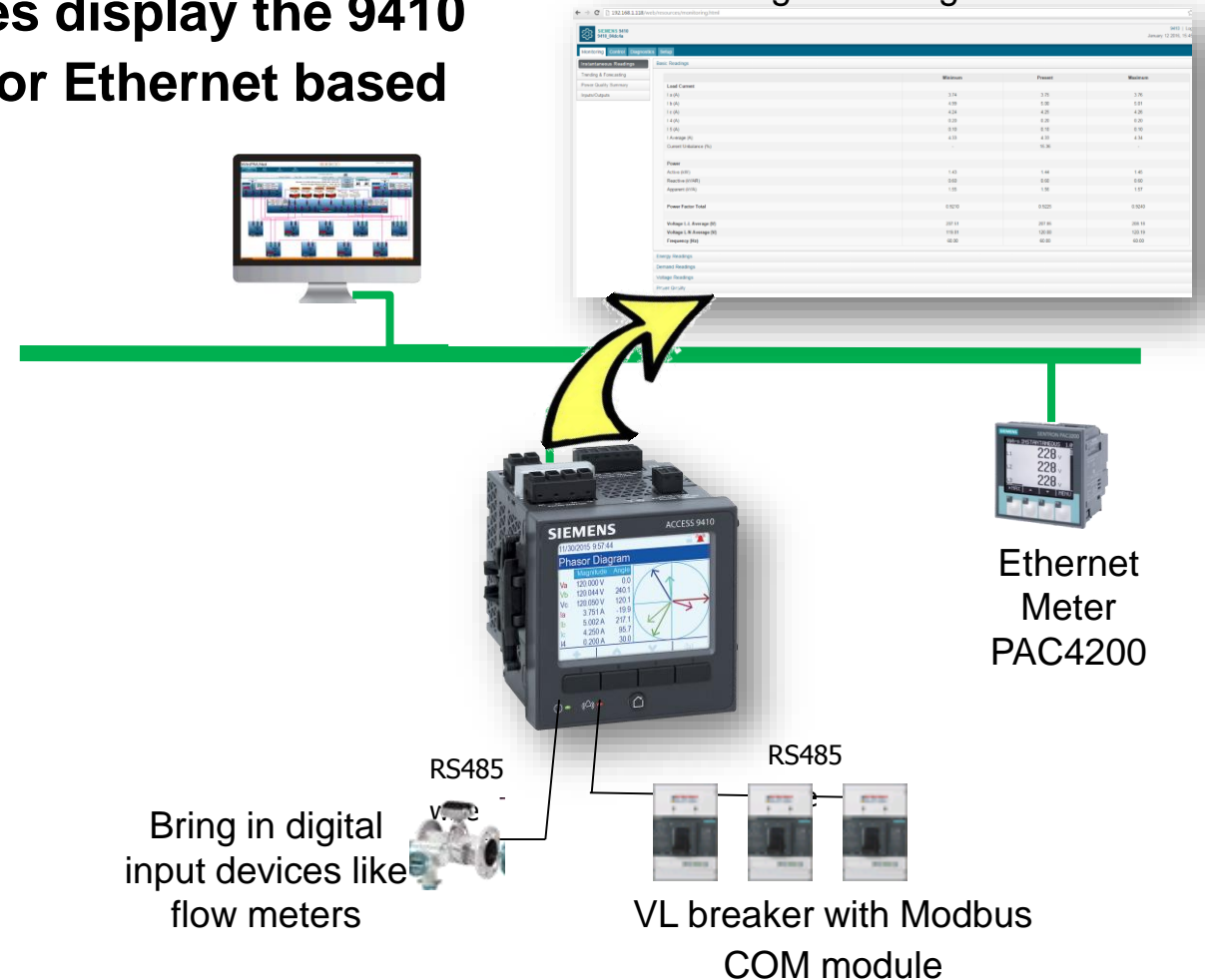
# 9410 Power Quality Meter Overview

## Design Features – HTML Web Pages

Unique HTML / XML web pages built into the meter can be displayed on a remote computer. Web pages display the 9410 meter data, downstream serial device data or Ethernet based devices!

- ✓ Two Integrated 10/100Base-TX RJ45 ports
- ✓ 8 Simultaneous Ethernet connections
- ✓ I/O can be displayed on Web Pages
- ✓ Built in FTP server location can hold custom Web pages and COMTRADE files
- ✓ Up to 32 serial devices allowed

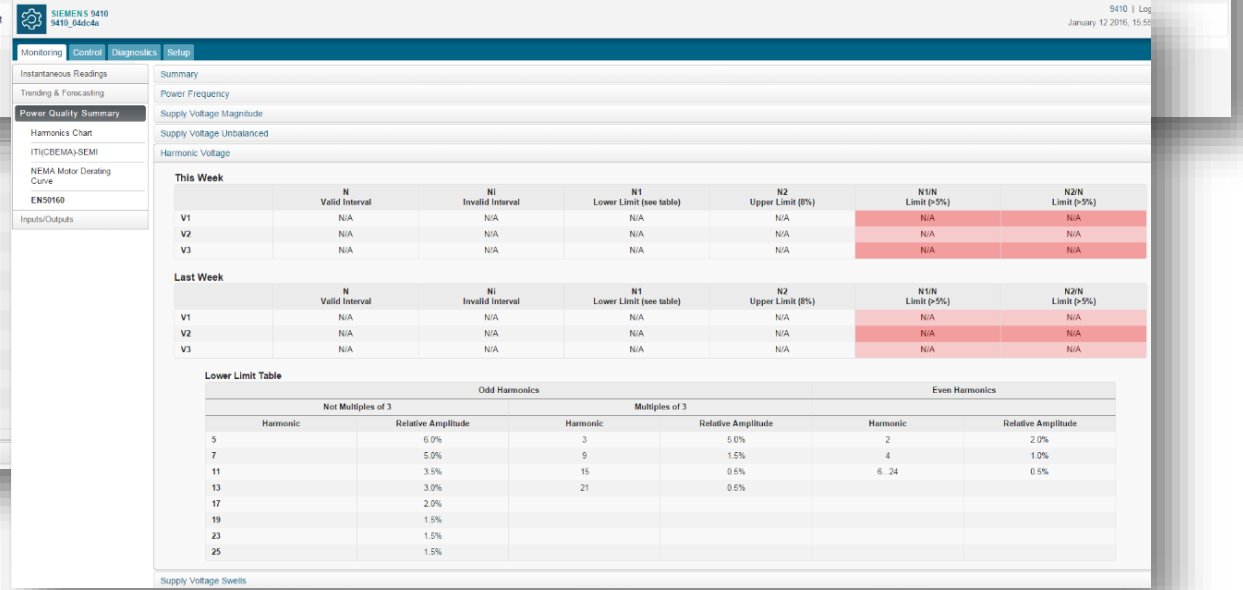
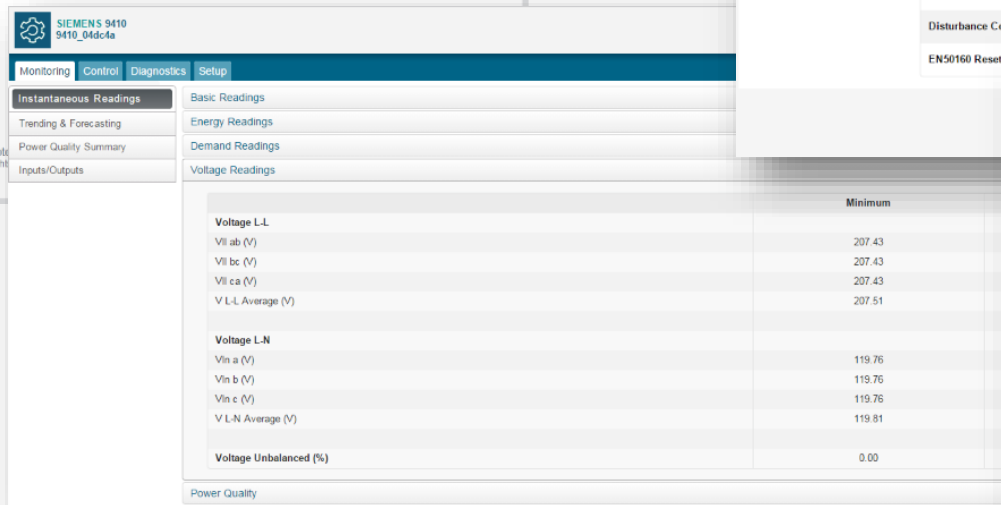
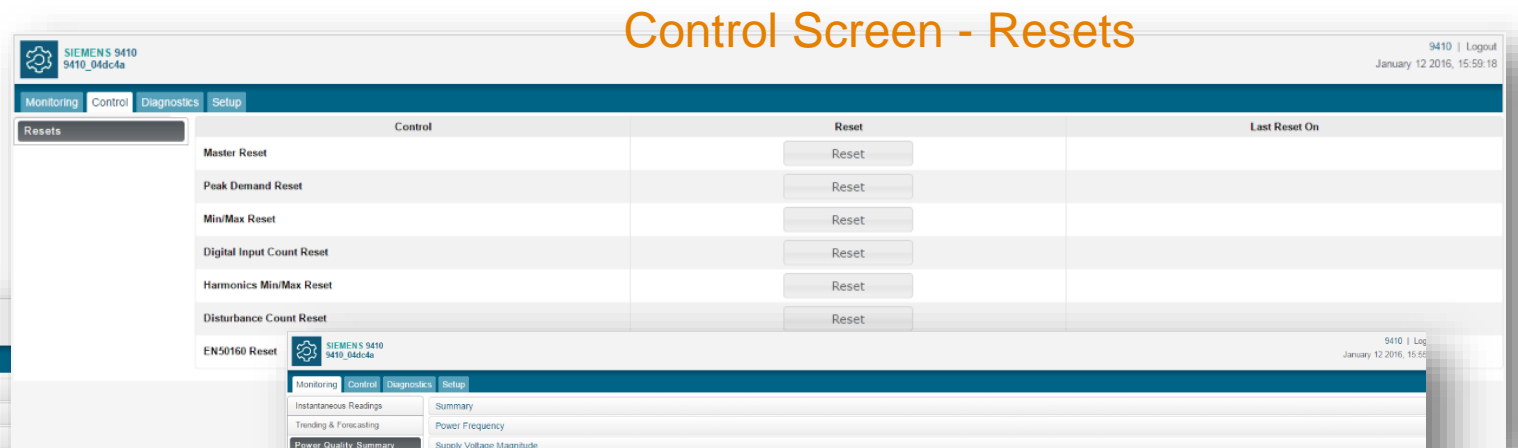
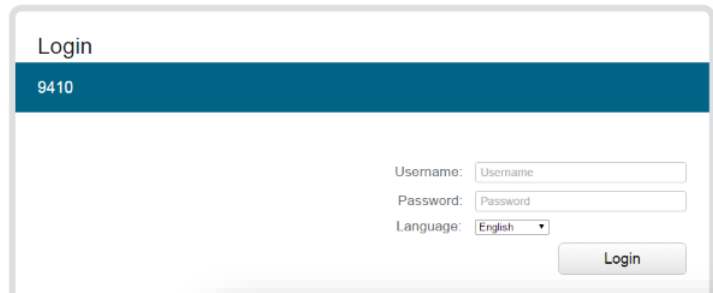
9410 Web Page showing Master meter data



# 9410 Power Quality Meter Overview

## Design Features – Standard HTML Web Pages

Standard screens include the Login, Monitoring, Control, Diagnostics, and Setup



Monitoring Screen – Real time

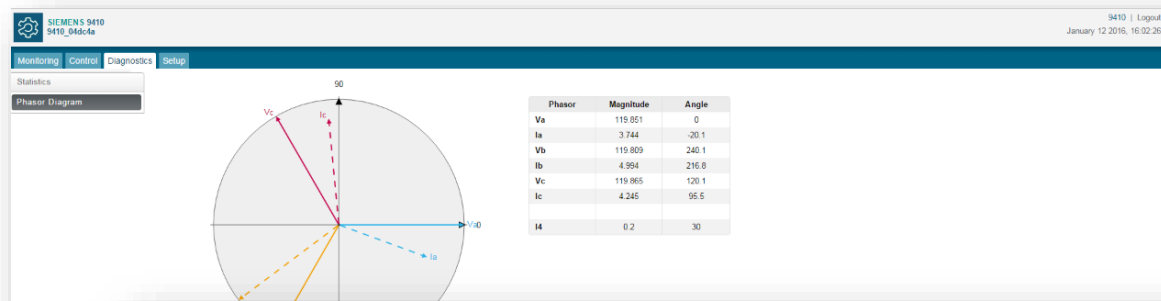
Monitoring Screen – Week vs Week Data

# 9410 Power Quality Meter Overview

## Design Features – Standard HTML Web Pages

Standard screens include the Login, Monitoring, Control, Diagnostics, and Setup

### Diagnostics Screen – Phasor



**SIEMENS 9410**  
9410\_04dc4a

Monitoring Control Diagnostics Setup

Ethernet

Serial Port

SNMP Parameters

NTP

SMTP

Date & Time

Preferences

Metering

Basic Settings

Ethernet

MAC Address: 00607804dc4a

Ethernet Device Name: 9410\_04dc4a

IP Parameters

IP Address: 192.168.1.118

Subnet Mask: 255.255.0.0

Gateway: None

Primary DNS: None

Secondary DNS: None

Apply

**SIEMENS 9410**  
9410\_04dc4a

Monitoring Control Diagnostics Setup

Statistics

Phasor Diagram

Communications

MAC Address	00607804dc4a
Ethernet Device Name	9410_04dc4a
IP Address	192.168.1.118

Ethernet

Serial Port

Meter - Basic

Meter - Advanced

Setup Screens – Ethernet, Serial, NTP, SMTP, Basic Settings (V, Amps, Nominal V, Amps, PF) and more

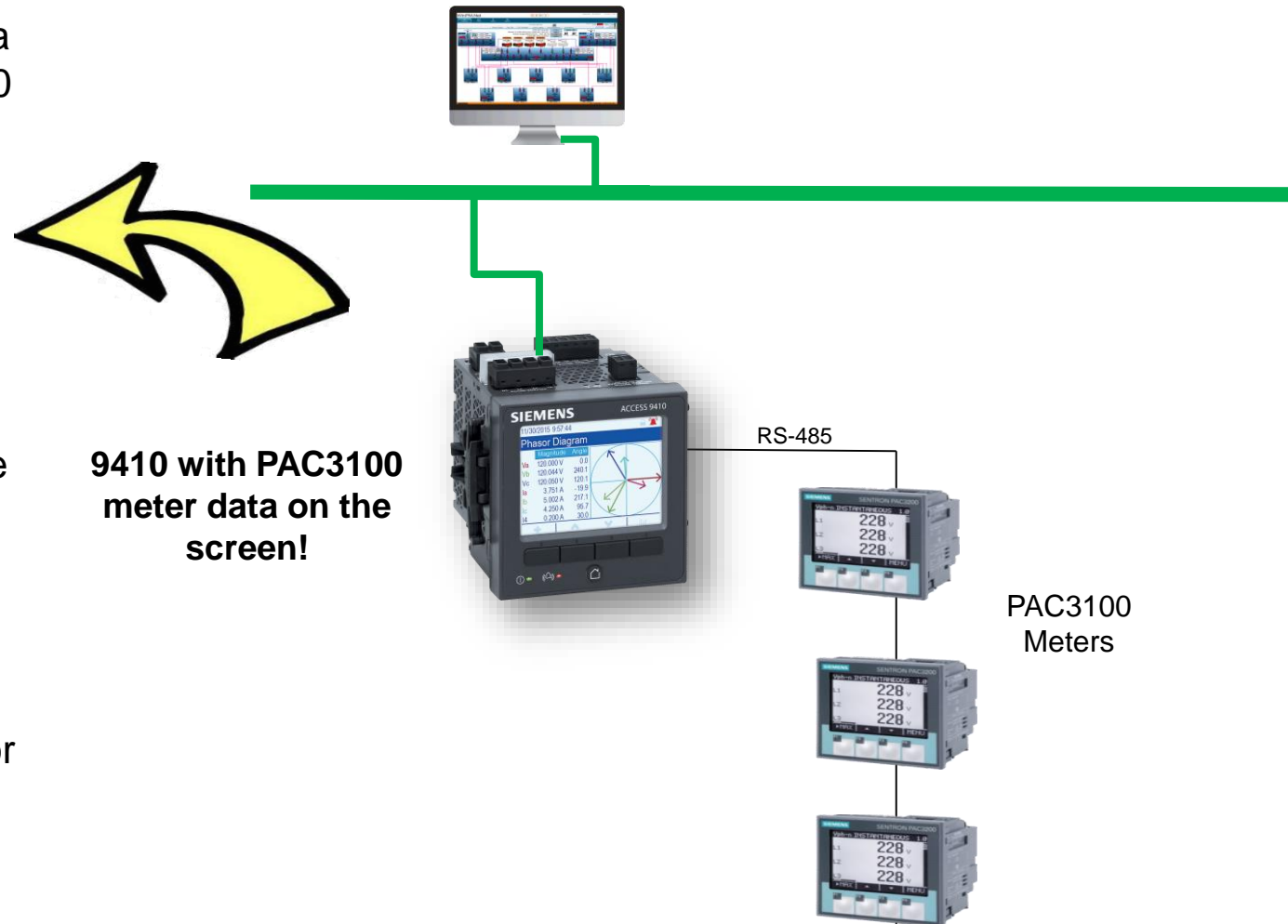
Diagnostics Screens – Ethernet Port Setup, Serial Numbers, COM port setups, and Memory allocation

# 9410 Power Quality Meter Overview

## Modbus Mastering and Custom Displays

The **Modbus MASTER** feature allows you to log data a small amount of data from other devices in the 9410 and display that basic data on the screen.

- ✓ The 9410 display will allow up to six (6) variables on the screen at one time.
- ✓ Up to 20 custom screens can be designed.
- ✓ Great feature if a customer wants to display on the screen and internal web pages Energy usage information.
- ✓ Building the screens requires WinPM.Net or ION Setup software.
- ✓ To display and log more data, the Siemens 9510 or 9610 meter should be used.



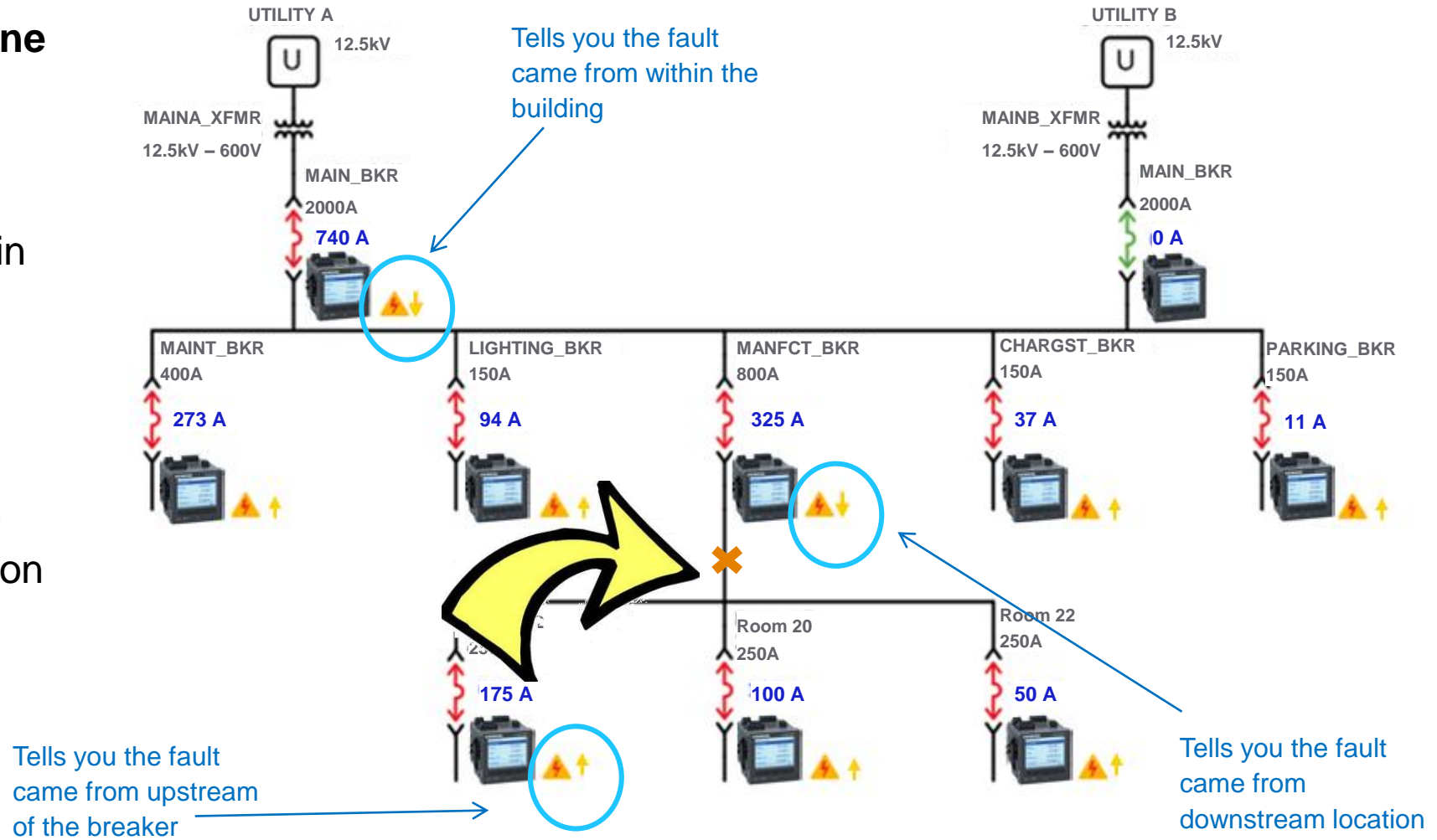
# 9410 Power Quality Meter Overview

## Key Feature - Disturbance Direction Detection

**Use multiple meters to determine the general location of the disturbance.**

If the meter is on the building main incomer, it determines if the disturbance occurred within the building or from the utility.

If more meters are installed more detailed analysis and exact location can be determined.



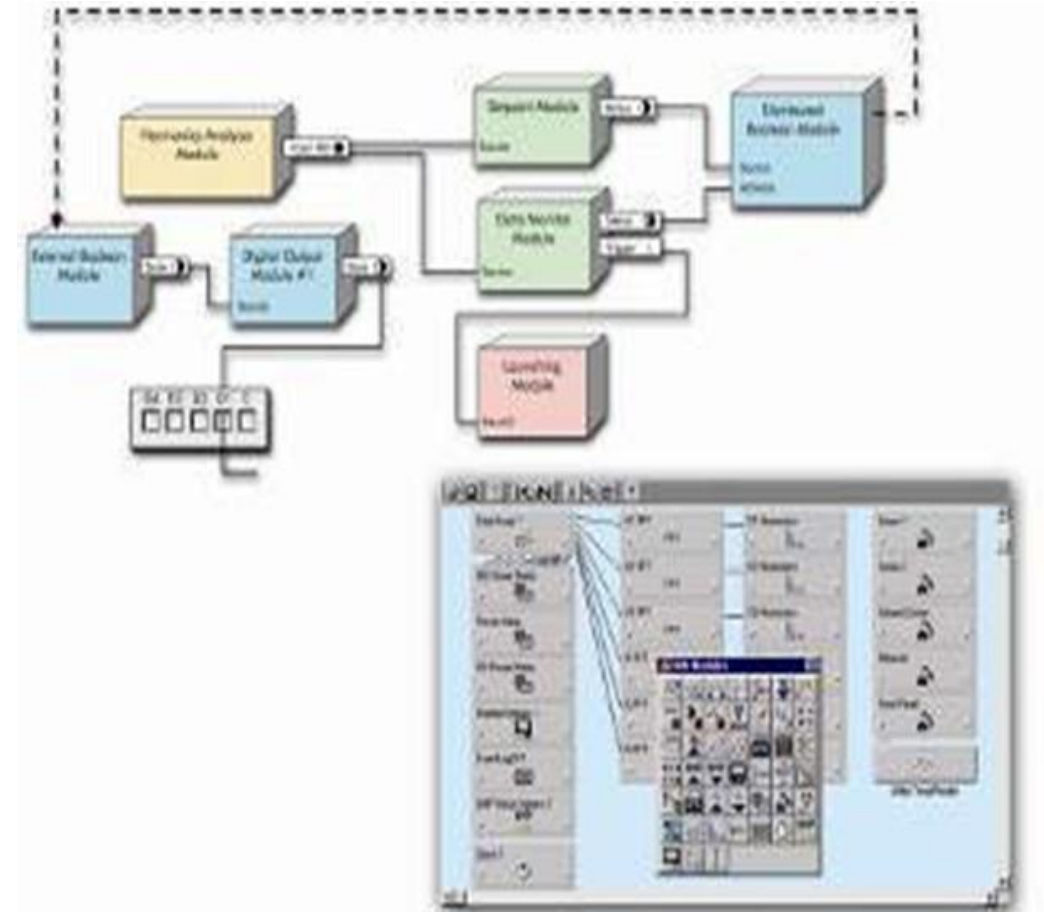


# 9410 Power Quality Meter Overview

## Design Features – *adapt to your future needs tomorrow*

**Custom Framework Programming** is modular, powerful, flexible and can be used to create custom logic / programs without the need for a PLC.

- ✓ Based on a simple “building block” approach
- ✓ Uniquely addresses advanced monitoring and control applications
- ✓ Configured in ION setup software
- ✓ Allows for changing needs



# 9410 Power Quality Meter Overview

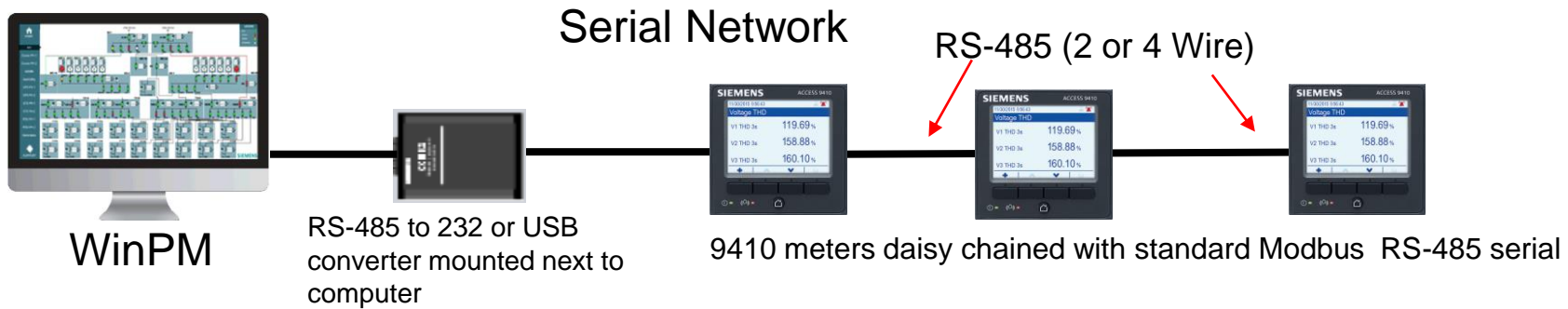
## Design Features- Summary of compliant standards

- ✓ IEC 61557-12
  - ✓ PMD-S
  - ✓ IEC 62586
  - ✓ IEC 62053-22
  - ✓ Class 0.2S
  - ✓ IEC 62053-24
  - ✓ Class 0.5S
  - ✓ IEC 61000-4-30
  - ✓ Class S
  - ✓ ANSI 12.20
  - Class 0.2 (accuracy)
- ✓ UL - C & US as per UL 61010
  - ✓ C-tick
  - ✓ FCC Part 15, Class B
  - ✓ Green premium



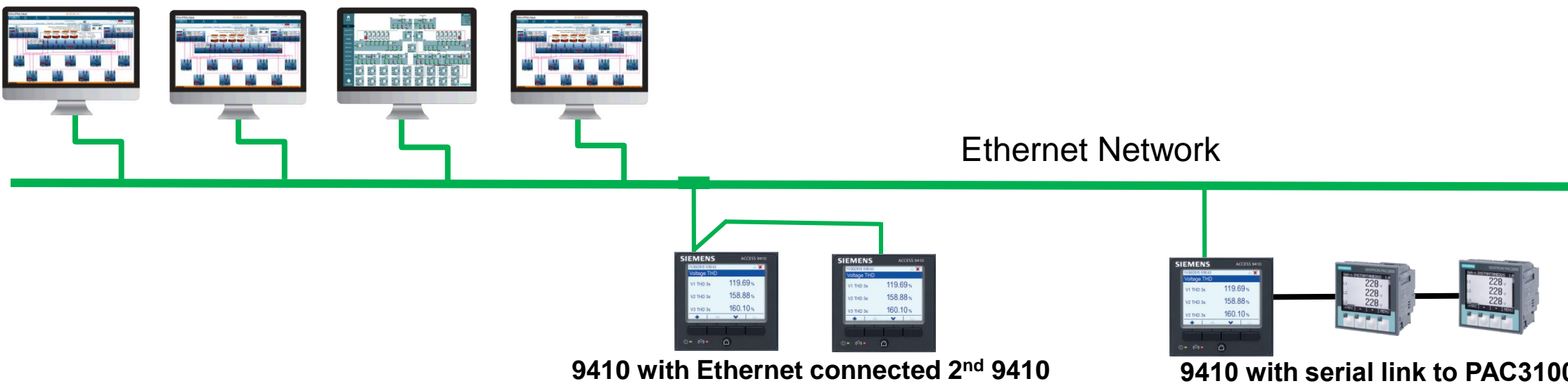
# 9410 Power Quality Meter Overview

## Communications Examples



Direct connection to a computer via RS-485 serial wire (up to 4000 ft). One RS-485 string can support up to 32 meters.

**Up to eight (8) Supervisory systems can ping the 9410 Ethernet meters**

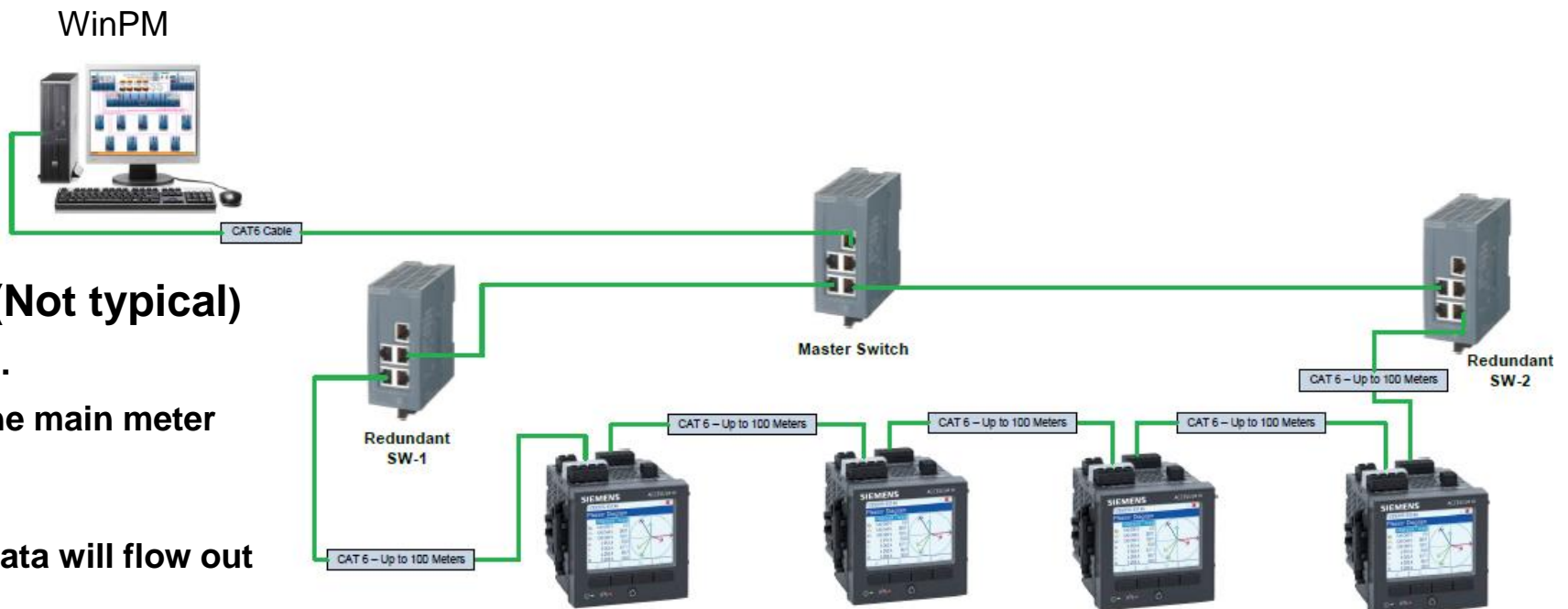


# 9410 Power Quality Meter Overview

## Communications Examples – Daisy-Chain Ethernet!

### Straight line Ethernet Daisy-Chain

- ✓ Ethernet -Max. 100m length.
- ✓ Each meter has a unique IP address



### Loop Ethernet Network (Not typical)

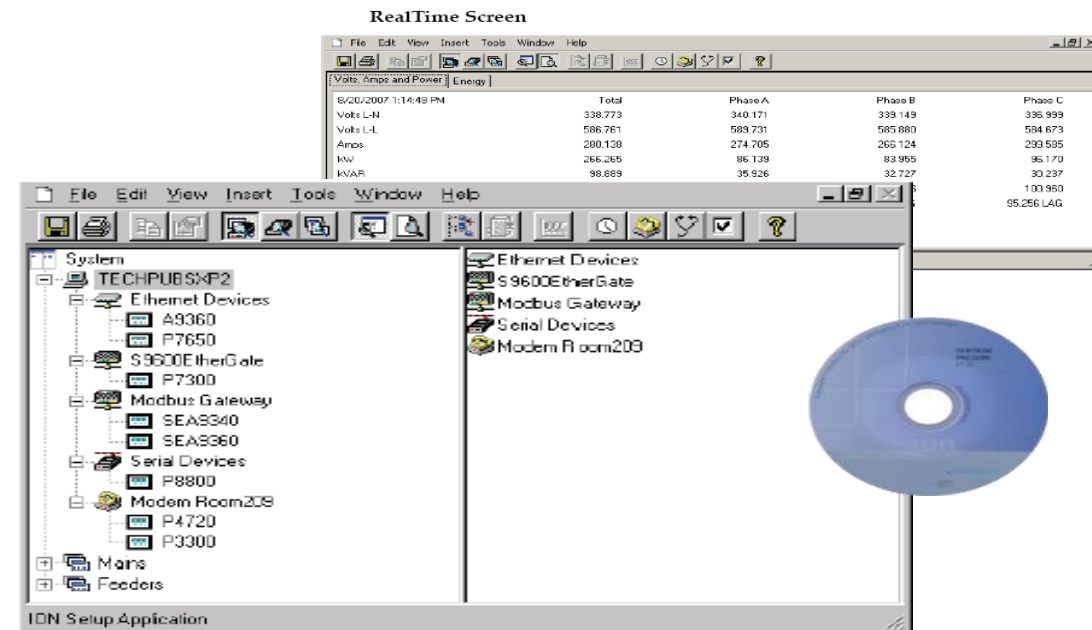
- ✓ Ethernet -Max. 100m length.
- ✓ RSTP needs to be turn on the main meter
- ✓ Each meter has a unique IP address
- ✓ Benefit – if network is cut, data will flow out the other direction

## 9410 Power Quality Meter Overview

### Siemens ION Setup Software

#### Easy configuration with Siemens ION Setup Software:

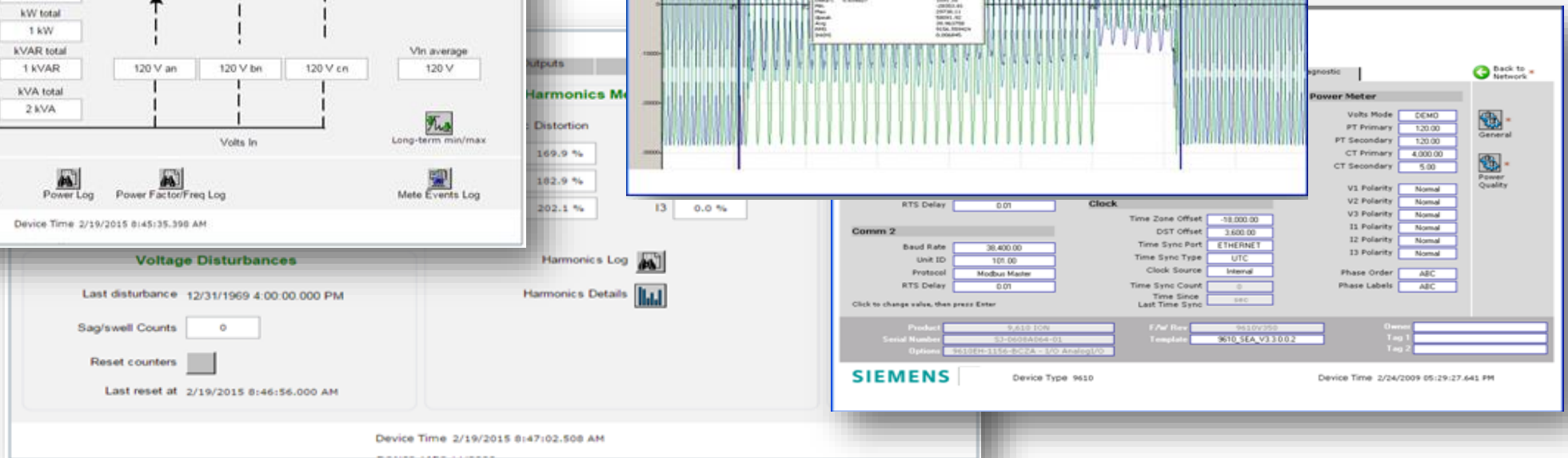
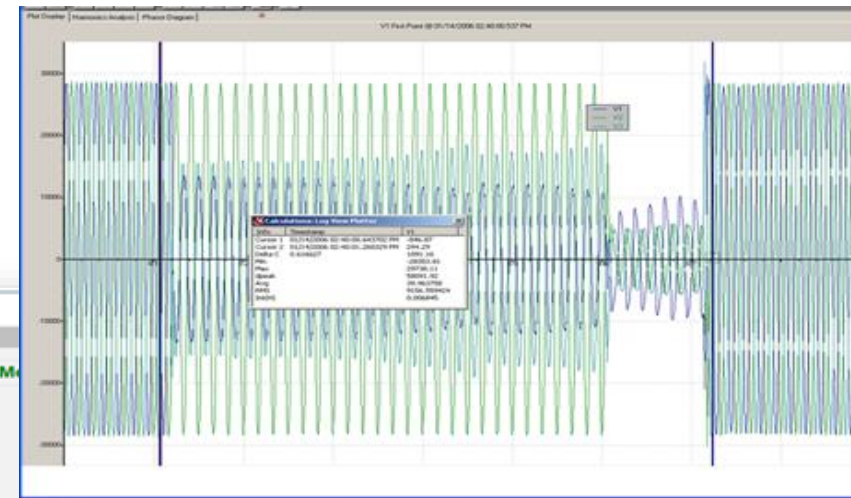
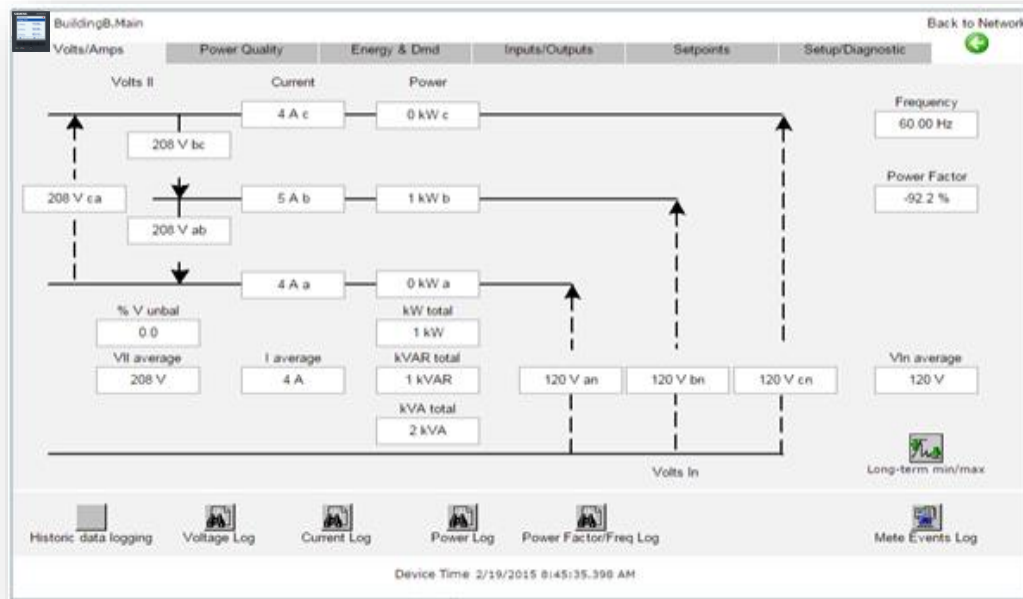
- ✓ Free configuration software can be downloaded from the PDS web site.
- ✓ The ION Setup software will allow direct serial or Ethernet connection to any ION style meter ( 93xx, 9410, 9510, and 9610).
- ✓ It will connect to only “**one**” meter at a time and will allow setup, configuration and downloading of “any” variable in the meter. Screens are basic and do not look like the WinPM.Net software.
- ✓ Extensive online help menu.
- ✓ Quick access buttons for printing, saving, viewing and help.
- ✓ Easy setup for multiple meters:
  - Device configuration can be stored on the PC
  - Easily copy a configuration to other devices
  - Offline configuration of devices and modules
  - Configure I/O, logging, Alarms, Logic, etc.



# 9410 Power Quality Meter Overview

## Integration with Siemens WinPM.Net Software

The 9410 meter is a standard device in WinPM.Net with all the standard screens, logging, alarms, etc. that are found with other Siemens meters.



# 9410 Power Quality Meter Overview

## Integration with Siemens WinPM.Net Software – Learning Feature!



Demo.9410\_Demo Back to Power Quality

Power Quality Setup

### Sag/Swell Basic

Click to change value, then press Enter

Swell limit	110	Volts Mode	DEMO	
Sag limit	90	VIn average	120 V	Vll average
Change criteria	10			208 V
Nominal voltage	120.00			

### Sag/Swell Limit Learning

Click to change value, then press Enter

Learned Swell limit		Start Learning	
Learned Sag limit			
Learn Duration (days)	30		
* Learn Mode	Manual		

\* If Learn Mode is Automatic, learned limits will be applied when learning is complete

**Enables**

Sag/Swell Recording

Waveform Recording

Harmonics Logging

SIEMENS Device Time 1/15/2016 09:52:11.289 PM  
Device Type 9,410.0

Have the meter “learn” what your Sag/swell, Voltage, current, KW min //max are instead of guessing!



Demo.9410\_Demo Back to Setpoints

Setpoint Setup

Over kW Demand			Setpoint Learning				
High Limit (kW)	Low Limit (kW)	Setpoint Enable	Learned High Limit	Learned Low Limit	Learn Duration (days)	* Learn Mode	Learn Status
1,000,000,000	-1,000,000,000				30	Automatic	

Demo.9410\_Demo Demo.9410\_Demo

Over Current			Setpoint Learning				
High Limit (Amps)	Low Limit (Amps)	Setpoint Enable	Learned High Limit	Learned Low Limit	Learn Duration (days)	* Learn Mode	Learn Status
1,000,000,000	-1,000,000,000				30	Automatic	
1,000,000,000	-1,000,000,000				30	Automatic	
1,000,000,000	-1,000,000,000				30	Automatic	
1,000,000,000	-1,000,000,000				30	Automatic	

Demo.9410\_Demo Demo.9410\_Demo

Over Voltage Unbalance			Setpoint Learning				
High Limit (%)	Low Limit (%)	Setpoint Enable	Learned High Limit	Learned Low Limit	Learn Duration (days)	* Learn Mode	Learn Status
5	5				30	Manual	

\* If Learn Mode is Automatic, learned limits will be applied when learning is complete

Click to change value, then press Enter Start Learning

SIEMENS Device Time 1/15/2016 09:59:51.217 PM  
Device Type 9,410.0

# 9410 Power Quality Meter Overview

## Integration with Siemens WinPM.Net Software – On line Setup & Configuration!



Demo.9410\_Demo

I/O Option Card A      Type       Status       [Back to Inputs/Outputs](#)

**Analog**

Analog Inputs

Port A	Value (Scaled)
A1	<input type="text"/>
A2	<input type="text"/>
A3	<input type="text"/>
A4	<input type="text"/>

Analog Outputs

Port A	Value (normalized)
Q1	<input type="text"/>
Q2	<input type="text"/>

**Digital**

Digital Inputs

Port A	Status	Count
S1	<input type="text"/>	0
S2	<input type="text"/>	0
S3	<input type="text"/>	0
S4	<input type="text"/>	0
S5	<input type="text"/>	0
S6	<input type="text"/>	0

Digital Outputs

Port A	Status
D1	<input type="text"/>
D2	<input type="text"/>

**Links**

[I/O Option Card B](#)

[I/O Option Card C](#)

[I/O Option Card D](#)

Device Time 1/15/2016 09:58:35.141 PM  
Device Type 9.410.0

Easy on-line setup of all the Analog and Digitals, along with communications, system type and more!



Demo.9410\_Demo

Volts/Amps    Power Quality    Energy & Dmd    Inputs/Outputs    Setpoints    Setup/Diagnostic      [Back to Network](#)

**Comm 1**

Serial Port	8N1
Baud Rate	19200
Unit ID	1
Protocol	SEAbus/ION
Rx Timeout	3.00
RS485 Bias	OFF
RTS Delay	0.01

**Meter**

Product	9.410
Serial Number	ME-1509A468-01
F/W Rev	000.000.43
Template	9410_SEA-PQ_V1.1.0.0.1

**Clock**

Time Zone Offset	-18,000
DST Offset	3,600
Time Sync Port	ETHERNET
Time Sync Type	UTC
Clock Source	Line Freq
Time Sync Count	0
Time Since Last Time Svnc	sec

**Options**

Options	<input type="text"/>
Owner	<input type="text"/>
Tag 1	<input type="text"/>
Tag 2	<input type="text"/>

**Power Meter**

Volts Mode	DEMO
PT Primary	120.00
PT Secondary	120.00
CT Primary	5.00
CT Secondary	5.00
V1 Polarity	Normal
V2 Polarity	Normal
V3 Polarity	Normal
I1 Polarity	Normal
I2 Polarity	Normal
I3 Polarity	Normal
Phase Order	ABC
Phase Labels	ABC

Device Time 1/15/2016 10:00:16.166 PM  
Device Type 9.410.0



# 9410 Power Quality Meter Overview

## 9410 Series part numbers



**US2:9410DC**

- Class 0.2S meter, dual Ethernet, load profile, extendable I/O, Power quality features, panel mount **with Integrated display**



**US2:9410TC**

- Class 0.2S meter, dual Ethernet, load profile, extendable I/O, Power quality features, DIN rail mount **with no display**



**US2:9410RC**

- **DIN rail mount meter + remote display + 3m Cable** combined in one package

# 9410 Power Quality Meter Overview

## Accessories part numbers



**US2:948M2DO6DI**

- **I/O Module** with 2 relay outputs, and 6 digital inputs (wetted)



**US2:948M2AO4AI**

- **I/O Module - Analog**, 2 analog outputs (4 - 20 mA, 0- 10 VDC), and 4 analog inputs (4 - 20 mA, 0 - 30 VDC)



**US2:948DISP96**

- Color **remote display + 3m cable**



**US2:948DCAB10**

- Remote display **cable**, 10 meters

# Thank You

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*Ingenuity for life*



For additional information on Siemens Digital Solutions contact:

- ✓ Technical Support line at 1-800-333-7421 (M-F) 8-5pm Eastern US.
- ✓ Web Support:
  - ✓ [www.usa.Siemens.com/pds](http://www.usa.Siemens.com/pds)
- ✓ Request for Information / Proposal
  - ✓ [www.usa.Siemens.com/pds-request](http://www.usa.Siemens.com/pds-request)