AMETEK®
ULTRA PRECISION TECHNOLOGIES

SCIENCE GATE
Your Automation Partner

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Solartron Metrology
Precision Driven

PROTOCOL INTERFACE MODULE (PIM)

Connect Solartron's Orbit® Network to the world's leading PLC protocols

EtherNet/IP
PROFINET®
EtherCAT®
CC-Link
Modbus

DESCRIPTION

Solartron Metrology's Protocol Interface Module (PIM) provides a simple way of interfacing the Orbit® Digital Measuring Network to most Programmable Logic Controllers (PLCs). A distinct PIM is created for each protocol, including:

- Ethernet/IP™
- ProfiNet ™
- EtherCat ™
- Modbus TCP
- CC Link ™
  - *MODBUS RTU (RS485 Serial) can be interfaced using Solartron's standard MODIM Interface. (PSIM required)*

ODVA CONFORMANT

The PIM includes the following features:

- Communicate with up to 150 Orbit modules with Explicit Messaging or 50 with Cyclic Messaging
- Power up to 10 Orbit modules (depending on type). *(A PSIM can be used when more than 10 is required)*
- Connect any Solartron Digital sensor including lasers
- Connect 3rd party sensors via the Analog Interface Module (AIM)
- Set up via free software interface

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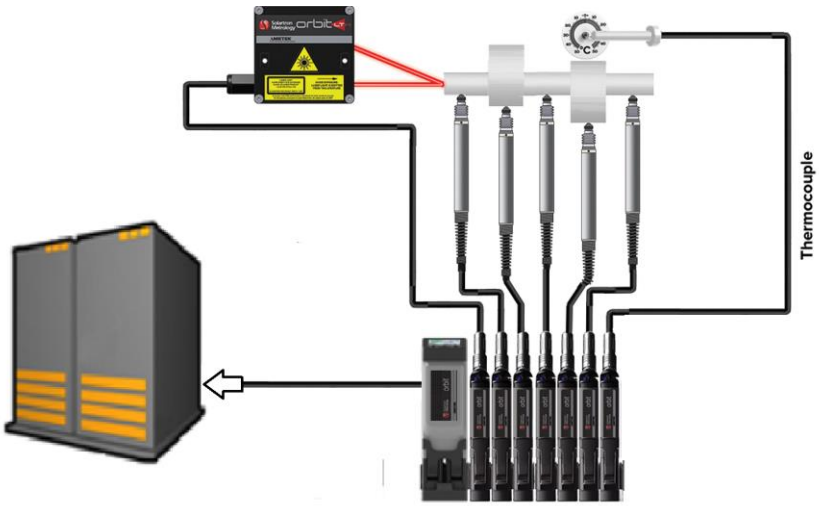
PIM PLC Interface to Orbit



PLC

Back of PIM

Ethernet Connection (Screw Terminals for CC Link ™

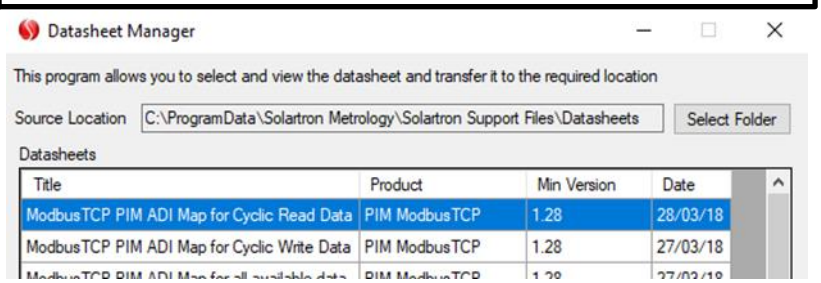
18-32 VDC Power

Micro USB Connection for Setup and Firmware Upgrade

General Protocol Specifications

Messaging	Explicit and Cyclic Messaging Supported
	125 word read and write data length

Datasheet manager comes with free software pack



EtherNet/IP

- One of the primary connectivity tools to different Rockwell Automation platforms, or any other PC's that support EtherNet/IP™
- Explicit Messaging aspect of the protocol has been implemented for reading and setting individual parameters,
- Cyclic messaging has been implemented to facilitate synchronised readings
- **Ethernet I/P Server Mode**: In server mode, the module accepts commands from one or more clients to read/write data stored in the modules internal registers

Connections	6 explicit, 4 cyclic
CIP Services Supported	0x4C CIP Data Table Read

PIM PLC Interface to Orbit (cont.)

PROFINET®

- One of the primary connectivity tools to different Siemens platforms or any other devices that support ProfiNet®.
- The Explicit Messaging aspect of the protocol has been implemented for reading and setting individual parameters, cyclic messaging has been implemented to facilitate synchronised readings

EtherCAT®

- EtherCAT is the open real-time Ethernet network originally developed by Beckhoff.
- The EtherCAT variant of the PIM provides both Explicit and Implicit data sets. However, they are all communicated through the same EtherCat backbone, there is a data latency reading the explicit non cyclic data.

Modbus

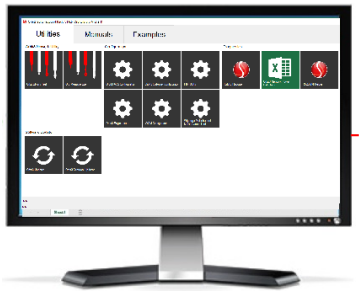
- The **ModbusTCP** PIM variant provides communications between an Orbit® network of instruments and an ModbusTCP Master.
- The address ranges define the cyclic and implicit data sections with Input registers and output from 0 to being the cyclic data and holding registers from 4112
- The **ModbusRTU** Interface Module (MODIM) provides a simple interface for MODBUS RTU operating over RS485.
- Data transfer from Orbit is either individual readings of modules or synchronised readings of multiple modules
- Up to 115,000 Baud Rate
- Set up as standard Orbit module that must be powered by PSIM.

CC-Link

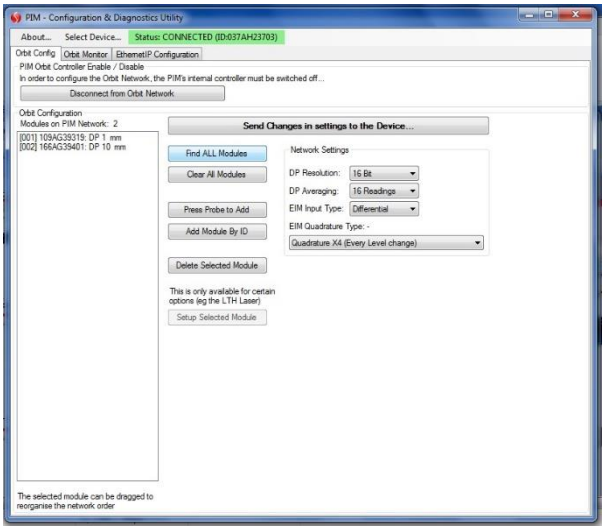
- CC-Link ™ is the main communication protocol for Mitsubishi PLCs.
- Status information (if supported) for each Orbit® module is mapped into the Remote Input (RX) area of the PIMs address space. The status code for each module is packed into 8-bits.
- Readings from each Orbit® module are mapped into the Remote Register (RWr) area of PIMs address space. The reading for each module is packed into two words (32-bits).

Version	1.10				2.00															
Cycles	1				1				2				3				4			
Stations	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Number of Orbit Modules	2	4	6	8	2	4	6	8	4	8	12	16	8	16	24	32	16	32	48	64
Module Status Available	✓	✓	✓	✓	✓	✓	✓	✓	x	✓	✓	✓	x	✓	✓	✓	x	✓	✓	✓

Simple set up for a PIM



- Download Orbit Support Pack for Windows
- Stack Orbit Modules to PIM
- Plug PIM to Comuter using MicroUSB to USB Cord (Included)
- Set up Orbit and Protocol Parameters

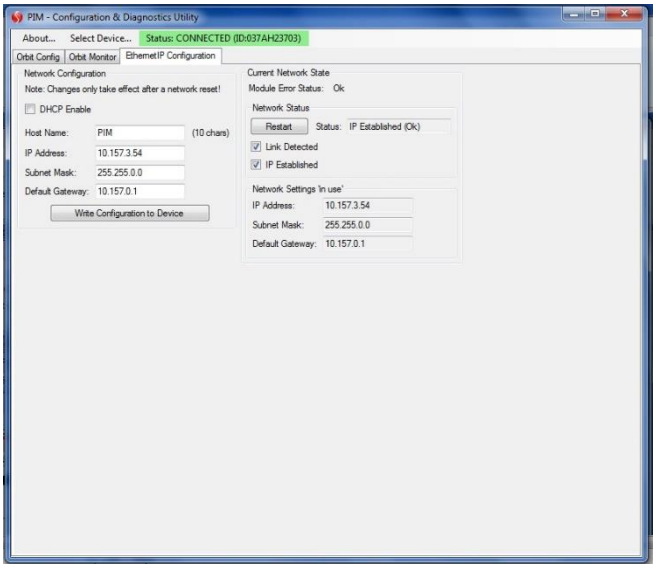


Configure Solartron Probes

- ID all probes/sensors
- Set order of probes
- Set up EIM

Configure output to PLC

- Set **EtherNet/IP™ , PROFINET®, EtherCat and CC Link ™** settings such as DHCP enable, host name, IP address, subnet mask and default gateway.
- For PROFINET this can also be done through the standard PROFINET methods – TIA portal, Pronetta).
- The configuration application is also used to set Modbus settings such as baud rate, parity, Modbus address etc.



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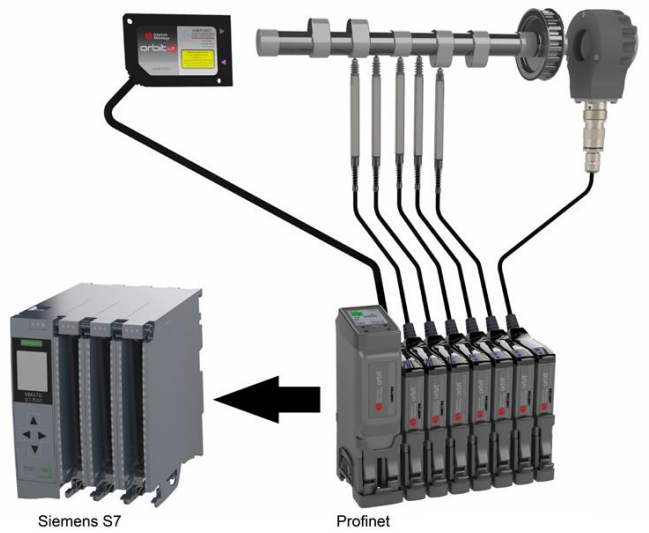
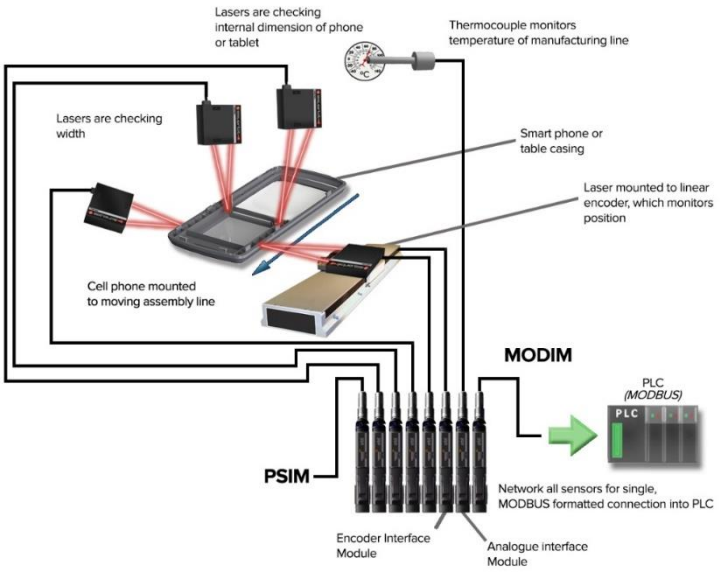
Sample Application

PIM Checking OD

- PIM takes readings from Laser and probes
- Also draws readings from Encoder via Encoder Interface Module
- More versatility with PIM gateway





PIM Checking Cell Phone Casing

- PIM takes readings from Laser and

PIM with Wi Gauge

- PIM can connect to Solartron Wi Gauges via the Wireless Connection Module (WCM) and readings automatically sent to PLC.

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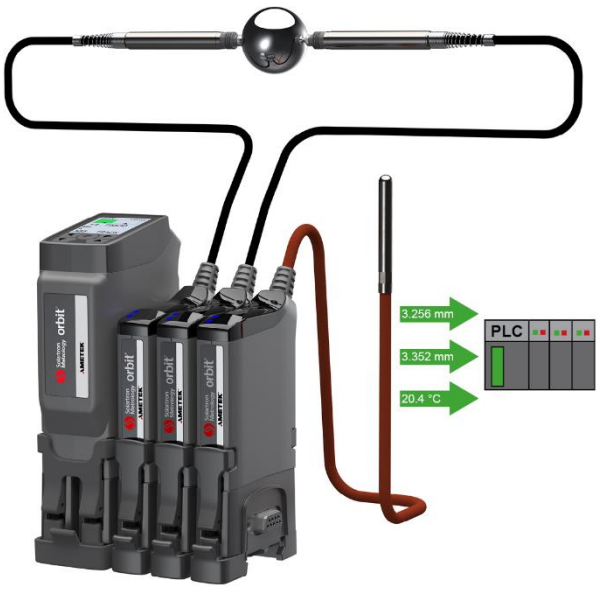
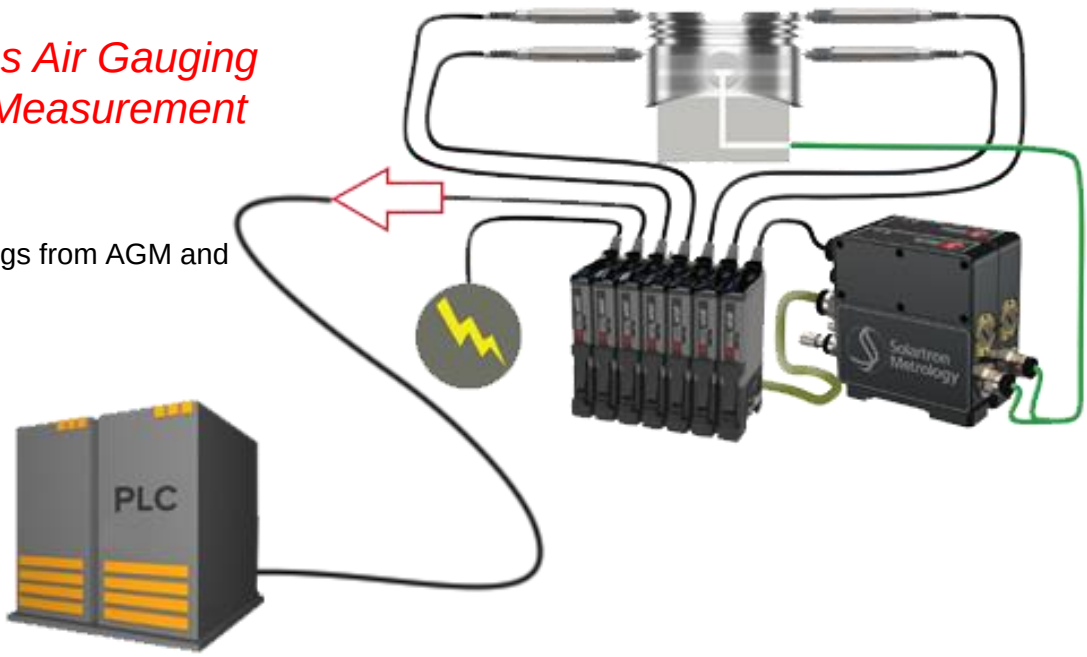
Sample Application



PIM being used with 2 digital probes to measure diameter and an AIM module to check ambient temperature

PIM Integrates Air Gauging and Contact Measurement into PLC

- PIM takes readings from AGM and probes



Technical Specification

Product	Ethernet/IP	Profinet	EtherCAT	MODBUS TCP	CC LINK
Environmental					
Sealing	IP43				
Storage Temperature (ºC)	0 to +60				
Operating Temperature (ºC)	+5 to +60				
EMC Emissions	EN61000-6-3				
EMC Immunity	EN61000-6-2				
EMC Immunity	EN 61326-1:2013				
Shock	Do not subject to excessive shocks or loads				
Material					
PIM	ABS, Nylon, Acrylic				
Interface					
Protocol	Ethernet/IP	Profinet	EtherCAT	MODBUS TCP	CC LINK
Messaging Types	Explicit and Cyclic				Cyclic
Connections	4 cyclic, 6 explicit				1
CIP Services Supported	0x4C - CIP Data Table Read	N/A	N/A	N/A	N/A
Reading Rate (Readings per second)	see separate data in this data sheet				
Power (input)	+18 to +32 VDC				
No of Orbit Modules (powered)	Up to 10 depending on Modue type				
No of Orbit Modules using additonal Power Suppl	150 Using Explicit Messaging				Up to 64 modules
	50 Using Cyclic Messaging				N/A
Display	Colour LCD with acrylic sealed cover				
Electrical Interface	Etherent 2x RJ485 Connectors				Screw Terminal
	Micro USB for Configuration				

Note 1: Explicit messaging can read the following: pmeasurment, status, max and min, from 150 sensors.
Note 2: Cyclic measurment can read measuement and status synchronised from 50 sensors.
Note 3: Only Ethernet/IP supports CIP Table

Reading Rates PIMS (not applicable to MODIM)

The PIM reads synchronised data from the Orbit Network. Reading rate is dependent on the number of Modules on the Orbit Network. For one module the PIM performs 318 sets of readings per second. As the number of modules increases the number of sets of readings reduces as shown in the table below.

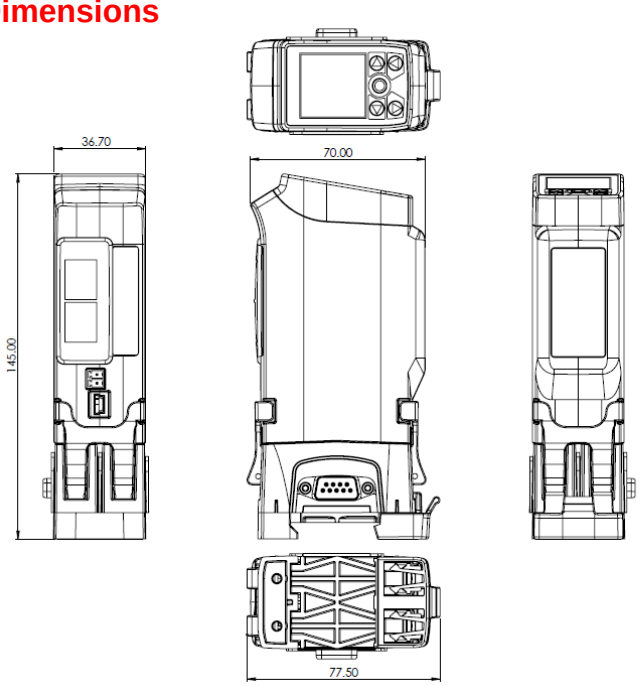
Number of Modules	Reading Sets/Second	Total Modules Read/Second
1	318	318
2	318	636
3	314	942
5	312	1560
10	208	2080
20	123	2460
30	90	2700
48	57	2736
64	41	2667

The Data rates will vary depending on the system and the numbers are indication only

Accessories

+24V Power Block with Mains leads. Available with UK, EU and US plugs
Spare T-con Mounts
Spare Earthing/Mounting brackets

PIM Dimensions



Note: MODIM dimensions are the same as a Standard PIE module (see catalogue)

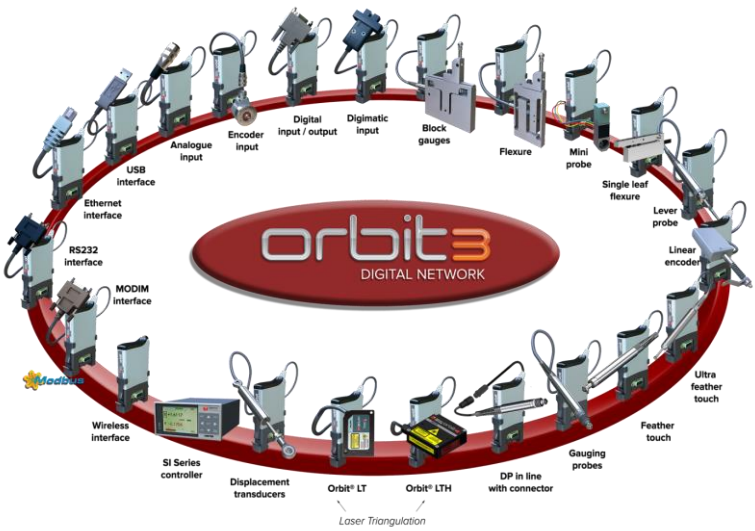
Note: CC Link ™
PIM has screw terminals in place of Ethernet Ports)

Orbit® 3 Digital Measurement System

The Solartron Orbit® 3 Digital Measurement System, in conjunction with Solartron's wide range of transducers, provides a limitless set of measuring system solutions, with numerous different interfaces to computers and PLC's, making Orbit® 3 completely flexible. Compatible products include both Contact and Non-Contact linear measuring transducers (gauging probes), specialist transducers and third party transducer interfaces.

FEATURES

- **Excellent metrology performance**, high **accuracy,** high resolution and excellent **repeatability**
- Excellent lifetime value – low maintenance costs due to the high reliability of mechanics and electronics
- Wide range of compatible transducers
- **Fast reading rates** with **high data integrity**
- Network up to 150 different transducers with one interface
- Communicate with any computer or PLC
- Range of Software drivers and tools for easy set up



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