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ULTRA PRECISION TECHNOLOGIES

Solartron Metrology
Precision Driven

PROTOCOL INTERFACE MODULE (PIM)

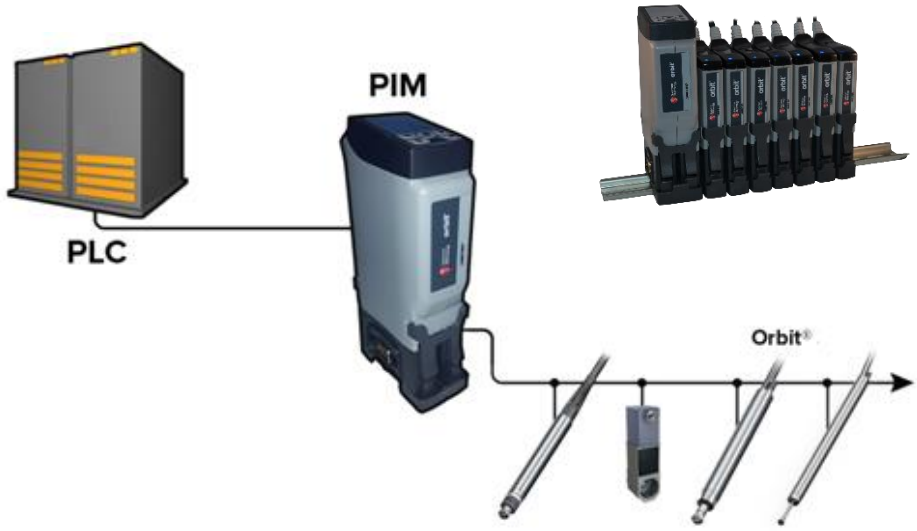
Connect Solartron's Orbit® Network to the world's leading PLC protocols

EtherNet/IP

PROFINET®

EtherCAT®

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
  - *MODBUS RTU (RS485 Serial) can be interfaced using Solartron's standard MODIM Interface. (PSIM required)*

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

ODVA CONFORMANT

Precision. Quality. Reliability

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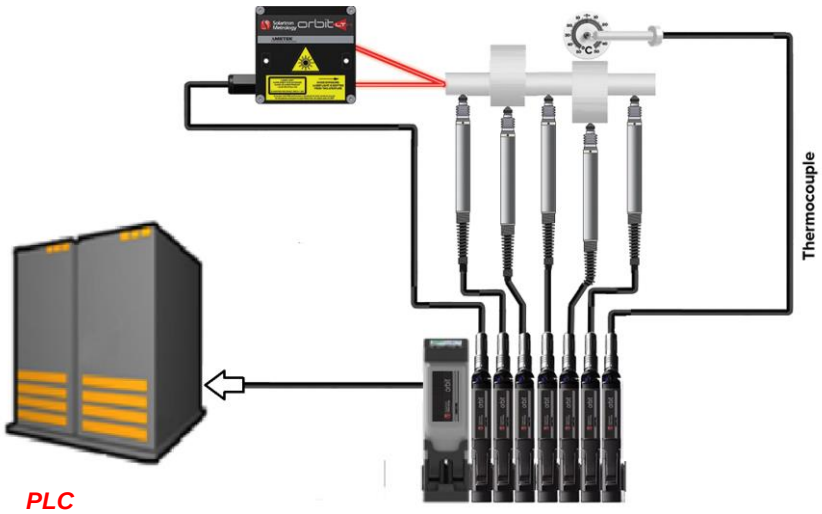
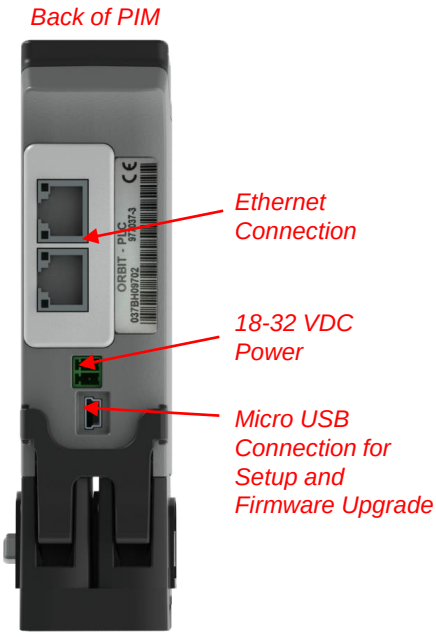
PIM PLC Interface to Orbit





General Protocol Specifications

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

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 latenct 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.

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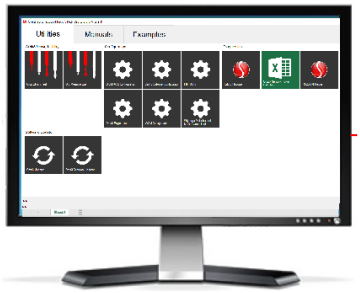
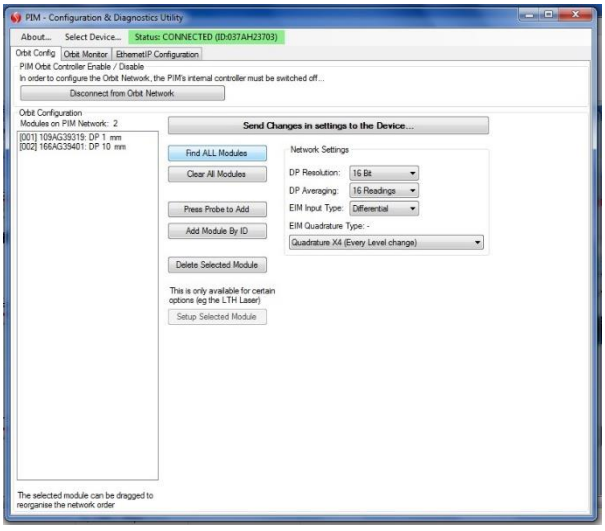
Simple set up for a PIM



- 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

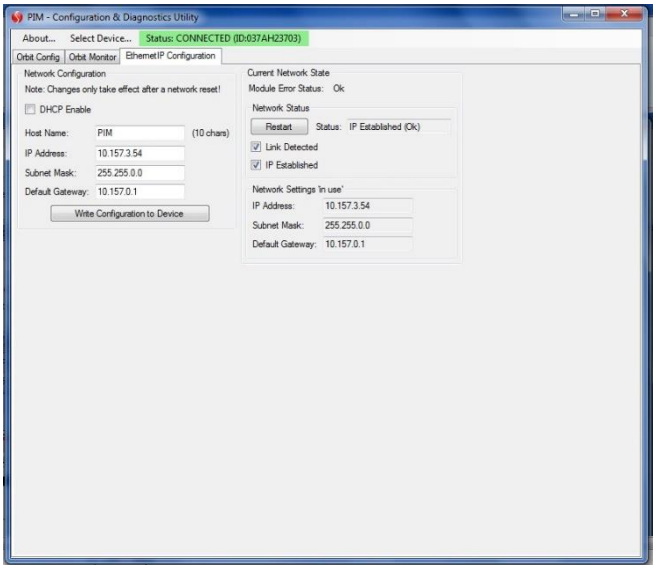


Configure Solartron Probes

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

Configure output to PLC

- Set **EtherNet/IP™ , PROFINET®, EtherCat** 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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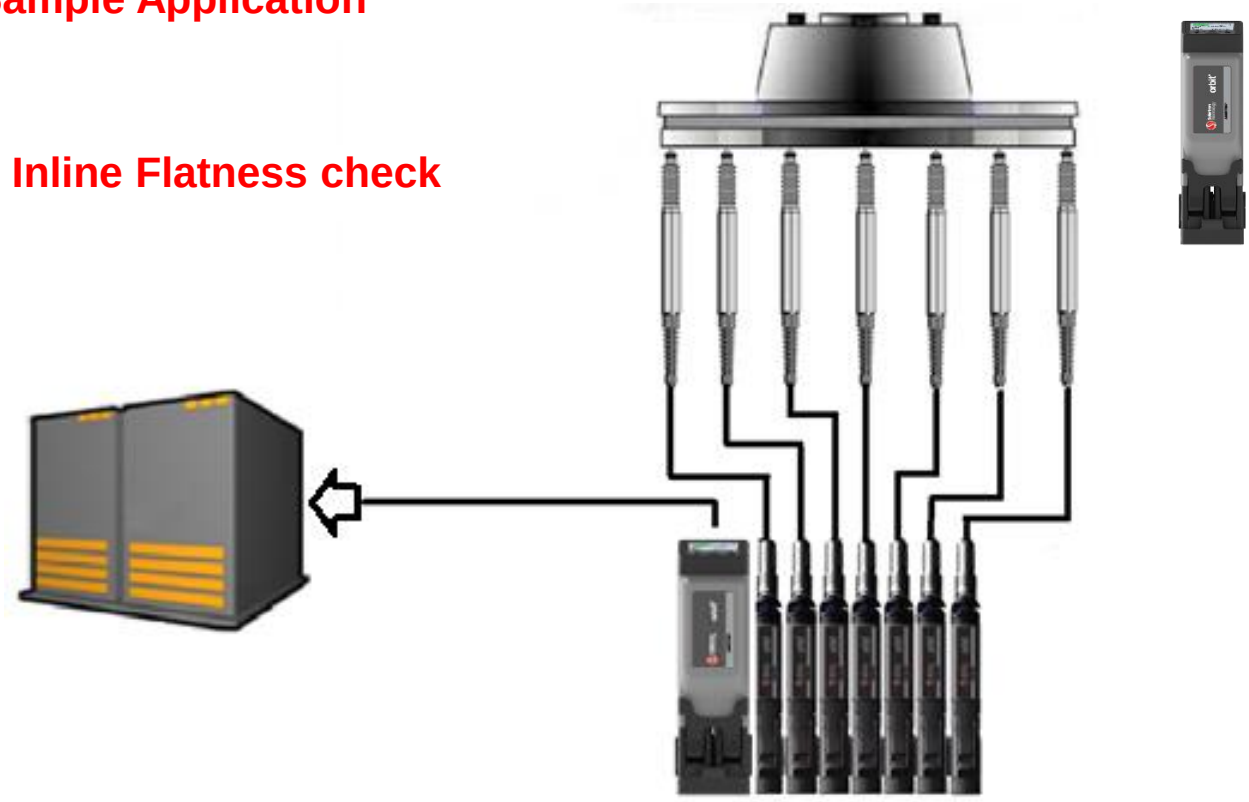
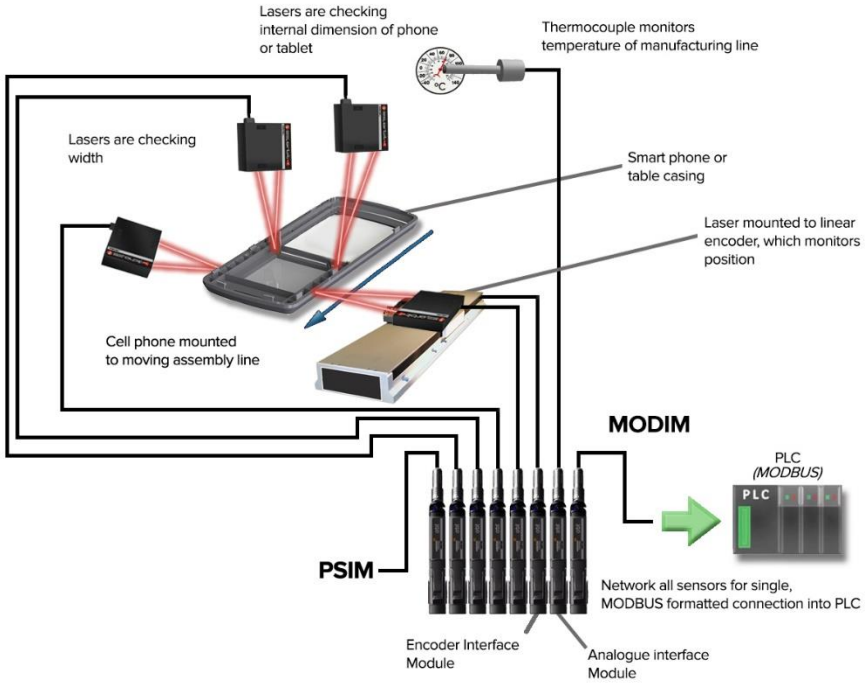
Sample Application

Inline Flatness check



Cell Phone Casing



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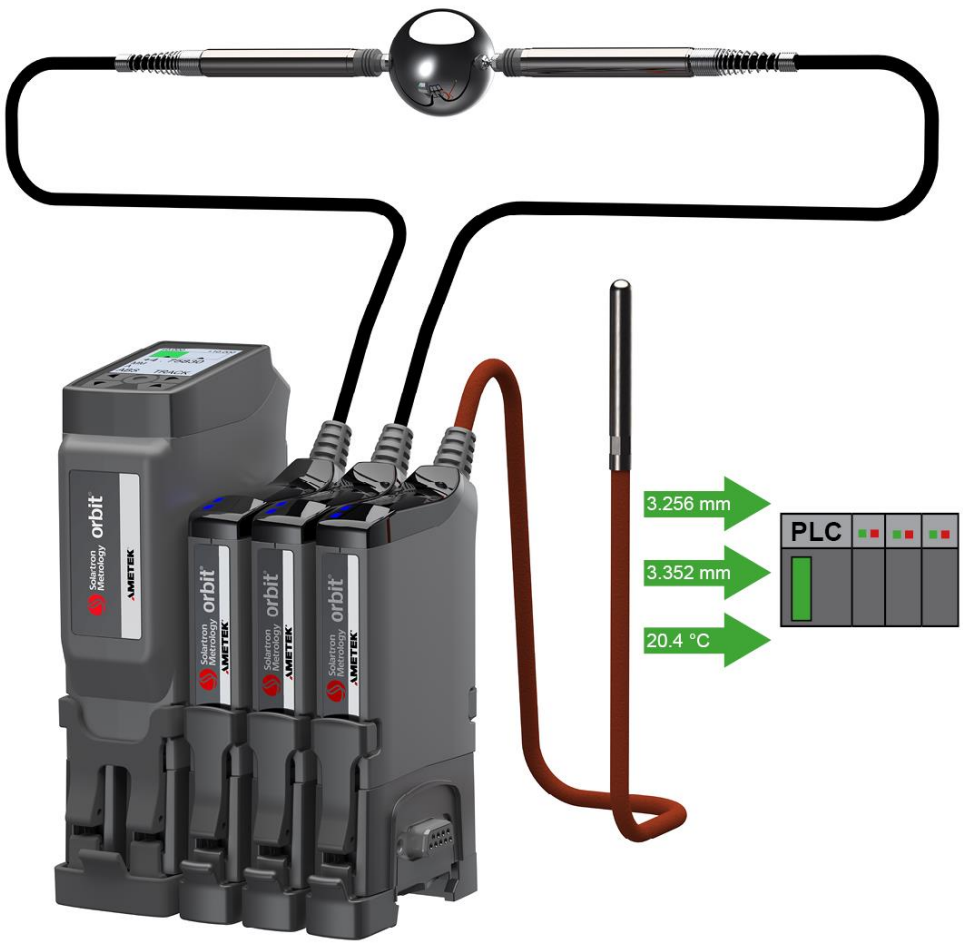
Sample Application

Diameter and temperature check



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

Technical Specification

Product	Ethernet/IP
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
Messaging Types	Explicit and Cyclic
Ethernet/IP Server Specifications	
Connections	4 cyclic, 6 explicit
CIP Services Supported	0x4C - CIP Data Table Read
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 Supply	150 Using Explicit Messaging
	50 Using Cyclic Messaging
Display	Colour LCD with acrylic sealed cover
Electrical Interface	Etherent 2x RJ485 Connectors Micro USB for Configuration
Note 1: Explicit messaging can read the following: pmeasurment, status, max and min, from 150 sensors.	
Cyclic measurment can read measuement and status synchronised from 50 sensors.	

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.

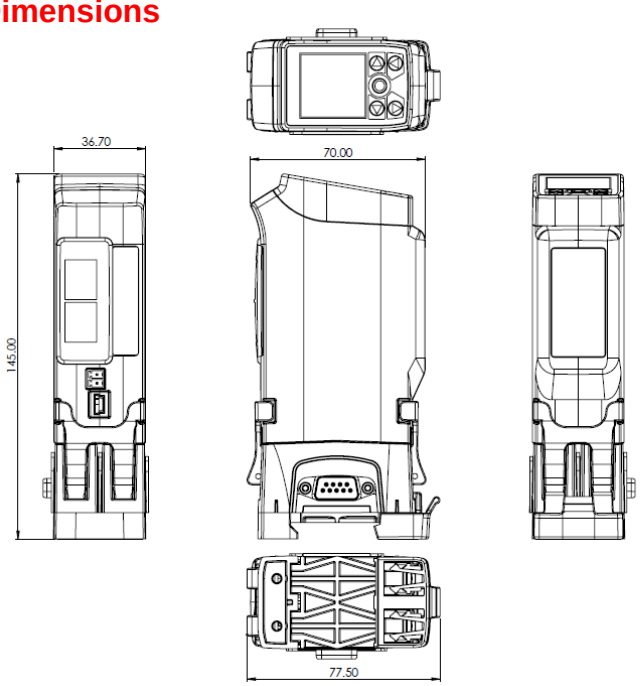
Number of Modules	Reading Sets/Second	Total Modules Read/Second
1	318	318
2	318	636
3	314	942
5	312	1560
10	208	2080
20	123	2460
30	90	2700
48	57	2736
64	41	2667

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



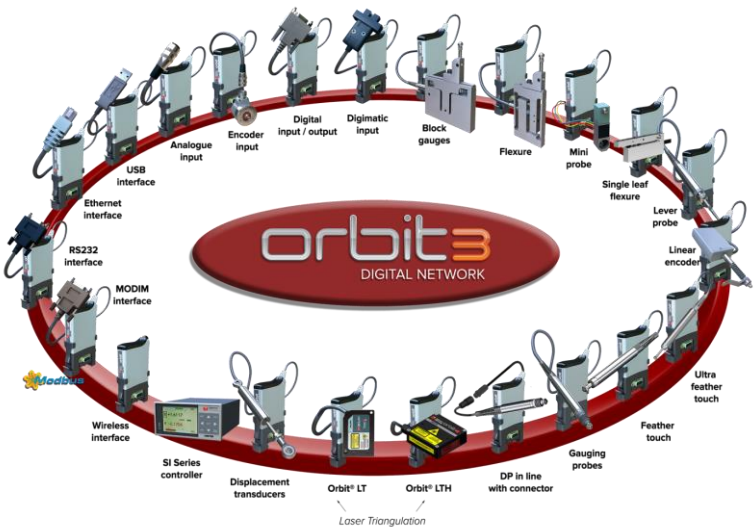
Note: MODIM dimensions are the same as a Standard PIE module (see catalogue)

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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In the laboratory, on the shop floor or in the field, Solartron Metrology's products provide precise linear measurements for quality control, test and measurement and machine control. Solartron Metrology is a world leader in the innovation, design and manufacture of precision digital and analogue dimensional LVDT gauging probes, displacement sensors, optical linear encoders and associated instrumentation.

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