orbitACS

SI400

A Four Channel system for easy connections into PLC or Automation

Description

Solartron Metrology, the world leader in linear measurement innovation, introduces a new Orbit®3 based system for easy, low cost connections into PLCs and process control systems. The SI400 will connect to, and power, three additional sensors for a four channel reading. You can even combine gauging probes, Orbit® LT, and Orbit® LTH on the same stack of modules. No other digital system offers this!

Features

Integral Readout with colour LCD Display and keypad.

Set tolerance and process limits via keypad

Detachable probe plug on housing for easy installation. *(Gauging probes, Block Gauges & Flexures only)*

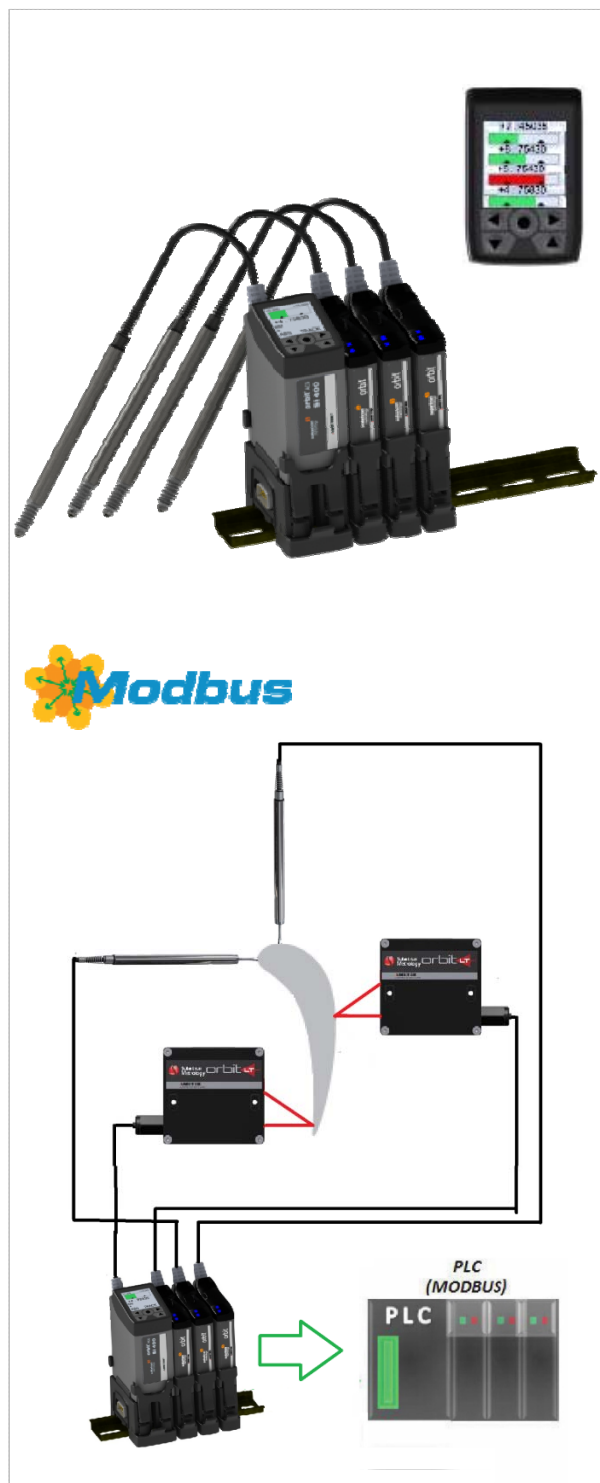Replace probe with no calibration or reprogramming

Modbus output (RTU or ASCII) over RS485 or RS232

Programmable discrete I/O (4 inputs, 3 outputs)

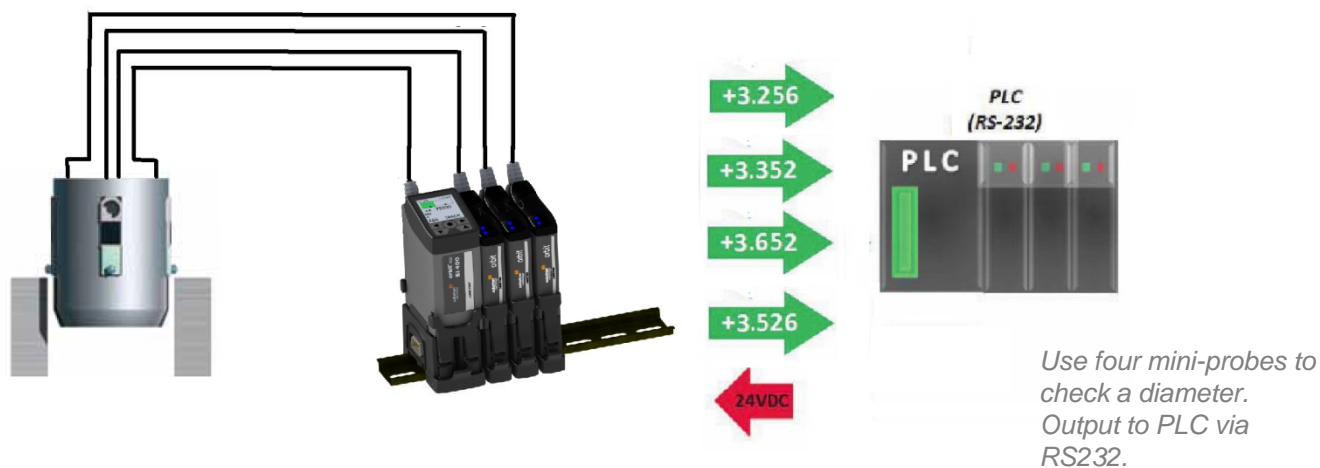Track, Peak, and Max-Min Modes for each channel
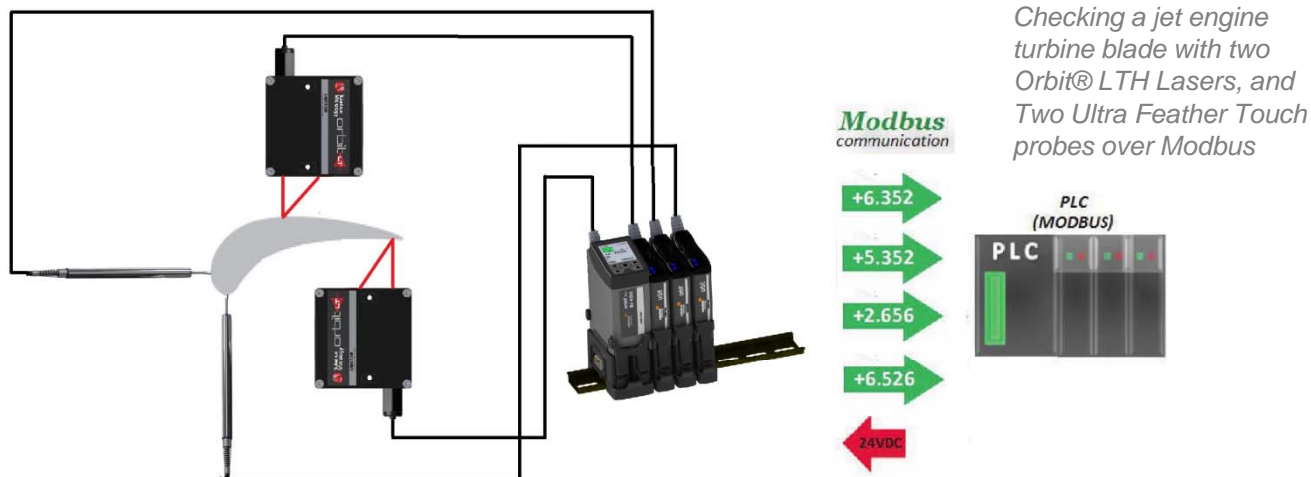
24 VDC Power Supply

Works with Gauging Probes (all types), Displacement, Orbit® LT, and Orbit® LTH.

Precision. Quality. Reliability

www.solartronmetrology.com • sales.solartronmetrology@ametek.com

SI 400 Applications

Checking a jet engine turbine blade with two Orbit® LTH Lasers, and Two Ultra Feather Touch probes over Modbus

Modbus communication

+6.352
+5.352
+2.656
+6.526
24VDC

PLC (MODBUS)
PLC

Check four corners of cell phone glass with Ultra Feather Touch Probes, via Print command over RS232

Print
+2.356
+2.352
+2.656
+2.526
24VDC

PLC (RS-232)
PLC

+3.256
+3.352
+3.652
+3.526
24VDC

PLC (RS-232)
PLC

Use four mini-probes to check a diameter. Output to PLC via RS232.

www.solartronmetrology.com • sales.solartronmetrology@ametek.com

Pin Configuration

12	Input 4
11	Input 3
10	Input 2
9	Input 1
8	Output Supply In
7	Output 3
6	Output 2
5	Output 1
4	Modbus B (RS485 or RS232)
3	Modbus A (RS485 or RS232)
2	0V Power in Return
1	18-32 V DC Power In

Mini-USB Port for configuration via a PC and firmware updates

- **Input pins can be set Active Hi or Active Lo**
- **Output pins can be Active Hi or Active Lo and set to NPN, PNP or Logic**
- **DIN Rail mount**
- **Input pins are programmable (typical functions: Zero, Print, Preset)**
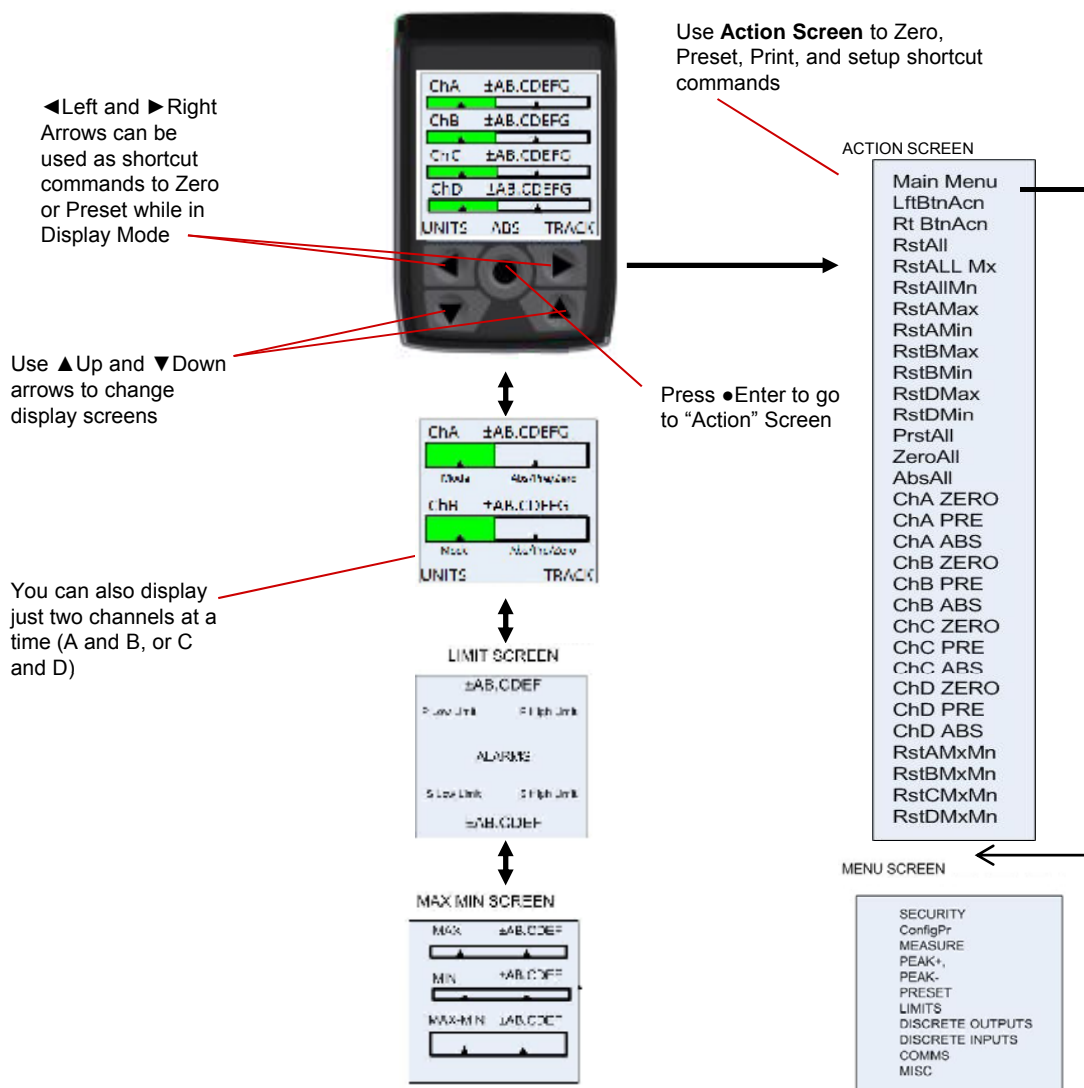
Serial Output Options

The SI400 has a standard Modbus interface (RTU or ASCII). However, pins 3 & 4 can be configured as an ASCII serial interface. (Pin 3: RS232TX, Pin 4: RS232 RX). In this mode, the user can select from several different ASCII protocols, including compatibility with Solartron's SI1500, SI3500 and C55.
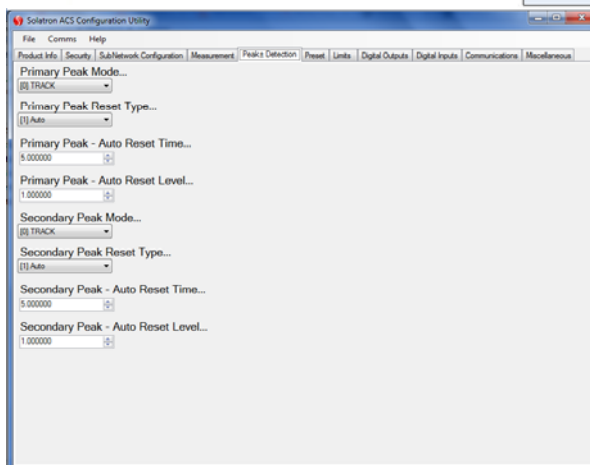
Accessories

+24 V Power Block with Mains Leads. Available with UK, EU, and US plugs
Spare T-con Mounts
USB to Mini-USB cable for PC connection

www.solartronmetrology.com • sales.solartronmetrology@ametek.com

Display and Interface

◄Left and ►Right Arrows can be used as shortcut commands to Zero or Preset while in Display Mode

Use ▲Up and ▼Down arrows to change display screens

You can also display just two channels at a time (A and B, or C and D)

Use **Action Screen** to Zero, Preset, Print, and setup shortcut commands

Press ●Enter to go to "Action" Screen

ACTION SCREEN

Main Menu
LftBtnAcn
Rt BtnAcn
RstAll
RstALL Mx
RstAllMn
RstAMax
RstAMin
RstBMax
RstBMin
RstDMax
RstDMin
PrstAll
ZeroAll
AbsAll
ChA ZERO
ChA PRE
ChA ABS
ChB ZERO
ChB PRE
ChB ABS
ChC ZERO
ChC PRE
ChC ABS
ChD ZERO
ChD PRE
ChD ABS
RstAMxMn
RstBMxMn
RstCMxMn
RstDMxMn

MENU SCREEN

SECURITY
ConfigPr
MEASURE
PEAK+,
PEAK-
PRESET
LIMITS
DISCRETE OUTPUTS
DISCRETE INPUTS
COMMS
MISC

Configurator Software

Connect SI400 to PC via Mini-USB to USB cable. Then use Solartron provided software to configure unit, and backup settings to PC file!

Products						
Spring Push Axial Cable	SI400P/1/S	SI400P/2/S	SI400P/5/S	SI400P/10/S	SI400P/20/S	SI400P10/2S
Spring Push Radial Cable		SI400PR/2/S	SI400PR/5/S	SI400PR/10/S	SI400PR/20/S	SI400PR10/2/S
Spring Push Axial Cable Feather Touch		SI400T/2/S	SI400T/5/S	SI400T/10/S	SI400T/20/S	SI400T10/2S
Spring Push Radial Cable Feather Touch		SI400TR/2/S	SI400TR/5/S	SI400TR/10/S	SI400TR/20/S	SI400TR10/2S
Pneumatic Axial Cable		SI400P/2/P	SI400P/5/P	SI400P/10/P	SI400P/20/P	SI400P10/2S
Pneumatic Radial Cable		SI400PR/2/P	SI400PR/5/P	SI400PR/10/P	SI400PR/20/P	SI400PR10/2/P
Pneumatic Axial Cable Feather Touch		SI400T/2/P	SI400T/5/P	SI400T/10/P	SI400T/20/P	SI400T10/2S
Pneumatic Radial Cable Feather Touch		SI400TR/2/P	SI400TR/5/P	SI400TR/10/P	SI400TR/20/P	SI400TR10/2S

Measurement Performance						
Measurement Range	1	2	5	10	20	2
Accuracy (% of Reading) (Note 1)	0.2	0.2	0.15	0.15	0.15	0.2
Repeatability (worst case) µm (Note 2)	0.15	0.15	0.15	0.15	0.15	0.15
Repeatability (typical) µm (Note 3)	0.05	0.05	0.05	0.07	0.07	0.05
Resolution (µm)	0.01	0.01	0.05	0.05	0.1	0.01
Pre Travel (mm)	0.15	0.15	0.15	0.15	0.15	0.15
Post Travel (mm)	0.35	0.85	0.85	0.85	0.85	8.85
Tip Force (N) at Middle of Range ±20%						
Spring Push	0.7	0.7	0.7	0.7	0.7	0.7
Spring Push Feather Touch	0.3	0.3	0.3	0.3	0.3	0.3
Pneumatic at 0.4 bar	N/A	0.7	0.7	0.7	0.7	0.7
Pneumatic at 1 bar	N/A	2.6	2.6	2.6	2.6	2.6
Pneumatic Feather Touch ±30% at 0.3 bar	N/A	0.18	0.18	0.18	0.18	0.18
Pneumatic Feather Touch ±30% at 1 bar	N/A	1.1	1.1	1.1	1.1	1.1
Pneumatic Jet	N/A	0.85	0.85	0.85	0.85	0.85
Temperature Coefficient %FS/ºC	0.01	0.01	0.01	0.01	0.01	0.01

Environmental	
Sealing for Probe	IP65 with gaiter or IP50 without gaiter
Sealing for Probe Interface Electronics	Top and Front: IP41, Rear: IP20, In line connector: IP67
Storage Temperature (ºC)	-20 to +70
Probe Operating Temperature with Gaiter (ºC)	+5 to +80
Probe Operating Temperature without Gaiter (ºC)	-10 to +80
Electronics Operating Temperature (ºC)	0 to 60
EMC Emissions	EN61000-6-3 and EN61326
EMC Immunity	EN61000-6-2 and EN61326
Power	18 to 32 VDC @ 0.07A typical

Material	
Probe Body	Stainless Steel
Probe Tip (options)	Nylon, Ruby, Silicon Nitride, Tugsten Carbide
Gaiter (standard)	Fluoroelastomer
Cable	PUR
Electronics Module	ABS

Electronics Interface (Orbit ACS)	
Alarm Outputs - selectable High, OK, Low	3 outputs either NPN, PNP, logic Programable Active Hi or Lo
Discrete Inputs - user selectable	4 inputs user configurable eg. Print, Zero, Preset
Update Rate for I/O discretes (ms)	5
Bandwidth of Electronics (Hz) - user selectable	460, 230, 115, 58, 29, 14, 7,4
Communications Interface Protocol	MODBUS (RTU or ASCII) or Solartron Serial Formats
Communications Interface Hardware	RS485 or RS232 (User selectable) Up to 115,200 Baud
Update Rate for Serial Data (ms)	25

Note 1: Accuracy 0.1 µm or % reading whichever greater
Note 2: Obtained by repeated operation against a carbide target with side load applied to the bearing using max-min
Note 3: Obtained by repeated operation against a carbide target standard deviation from average (68%)

For specifications of other Gauging and Displacement Transducers, Orbit® LT, or Orbit® LTH, please refer to their respective datasheets.

www.solartronmetrology.com • sales.solartronmetrology@ametek.com

Instrument Functionality							
Measurement							
Measurement SI400 Measurement Types Measurement Modes Measurement Units	A, MAXA-MINA, B, MAXB-MINB, C, MAXC-MINC, D, MAXD-MIND, Track. Peak+, Peak - Absolute, Zero (tare), Preset mm, inches, mils						
Display							
Analogue SI400 Digital SI400	Four Bars representing reading showing limits Four Digital up to 5 decimal places mm (6 for inches)						
Keypad							
Type	Sealed Membrane						

For Gauging probes, SI100 and SI200 can also be ordered with no plug for higher accuracy, or inline plug along cable
- Specs are for standard, plugged, gauging probes only. Specs will vary with other sensors. If considering another sensor, contact your local Solartron representative for details.
- Standard cable length is 2 meters. Special cable lengths can be ordered.

www.solartronmetrology.com • sales.solartronmetrology@ametek.com

Drawing

DP IN LINE CONNECTORS - ASSEMBLED

For 3D drawings, please contact sales.solartronmetrology@ametek.co.uk

AMETEK®
ULTRA PRECISION TECHNOLOGIES

Precision. Quality. Reliability

www.solartronmetrology.com • sales.solartronmetrology@ametek.com

orbitACS

SI 100 & SI 200

Single and Dual Channel systems for easy connections into PLC or Automation

Description

Solartron Metrology, the world leader in linear measurement innovation, introduces two new Orbit®3 based systems for easy, low cost connections into PLCs and process control systems.   The SI 100 is a single channel, stand alone system, while the SI 200 also connects to an Orbit®3 probe for a two channel reading.

Features

Integral Readout with colour LCD Display and keypad.

Set tolerance and process limits via keypad

Detachable probe plug on housing for easy installation.
(Gauging probes, Block Gauges & Flexures only)

Replace probe with no calibration or reprogramming

Modbus output (RTU or ASCII) over RS485 or RS232

Programmable discrete I/O (4 inputs, 3 outputs)

Multiple formulas available for SI 200 (A+B, A-B, etc.)

Available with all Solartron Gauging probes, Displacement sensors, Orbit LT, and LTH.

SI 200 can stack laser with gauging probe or displacement sensor.

24V DC Power Supply

Precision. Quality. Reliability

www.solartronmetrology.com • sales.solartronmetrology@ametek.com

AMETEK®
ULTRA PRECISION TECHNOLOGIES

SI 100 Applications

Simple height check measurement to PLC via MODBUS

Chip height check with Orbit LT. Measurement sent to PLC on print command via RS232
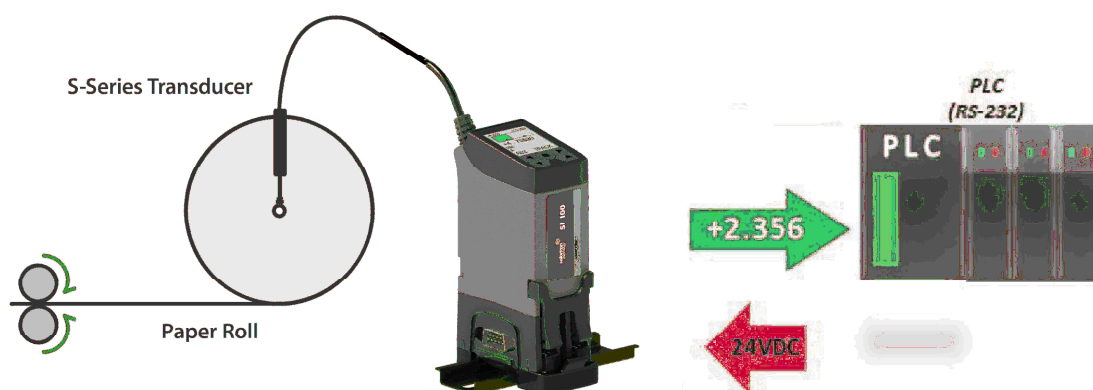
SI 200 Applications

Simple diameter check

Use 2 Orbit LT Lasers for piston height check

Use 2 S-Series Transducers to monitor a sample under strain

www.solartronmetrology.com • sales.solartronmetrology@ametek.com

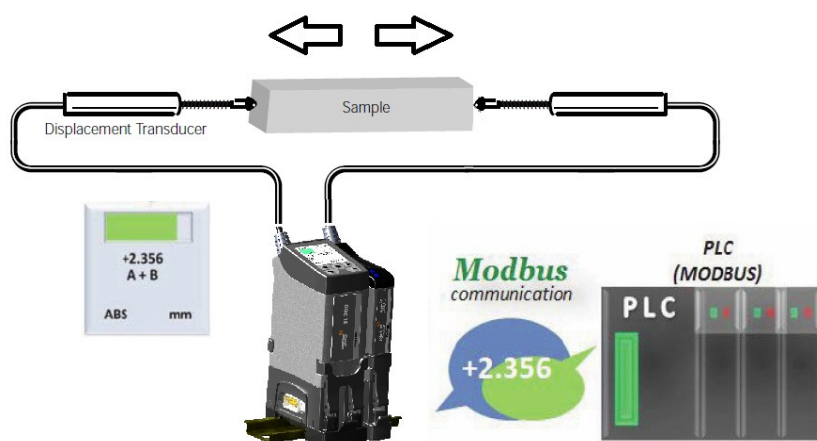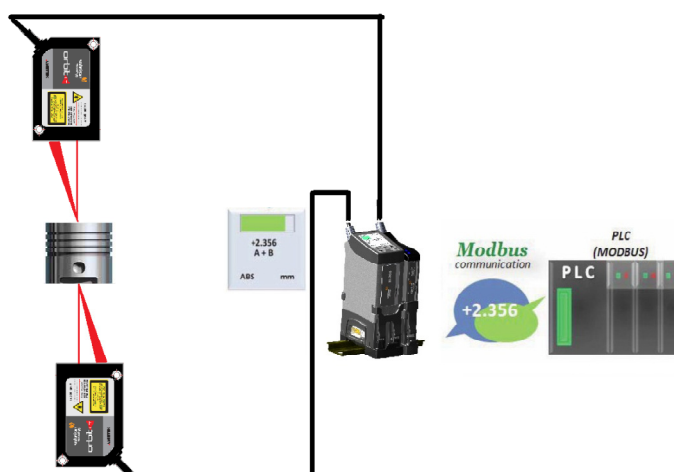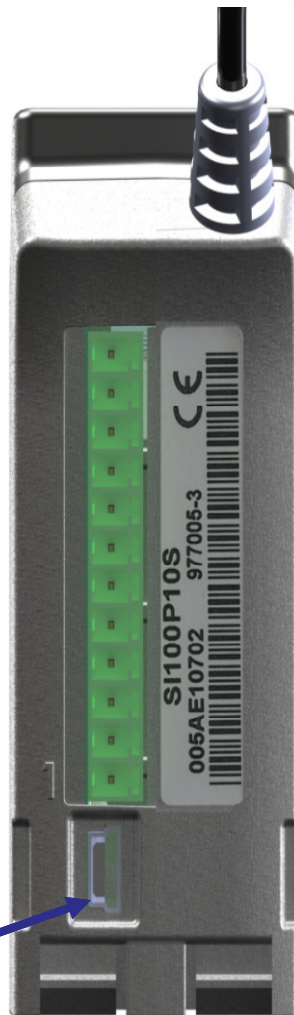## Pin Configuration

12	Input 4
11	Input 3
10	Input 2
9	Input 1
8	Output Supply In
7	Output 3
6	Output 2
5	Output 1
4	Modbus B (RS485 or RS232)
3	Modbus A (RS485 or RS232)
2	0V Power in Return
1	18-32 V DC Power In

Mini-USB Port for configuration via a PC and firmware updates

- **Input pins can be set Active Hi or Active Lo**
- **Output pins can be Active Hi or Active Lo and set to NPN, PNP or Logic**
- **DIN Rail mount**
- **Input pins are programmable (typical functions: Zero, Print, Preset)**

Serial Output Options

The SI 100 and SI 200 have a standard Modbus interface (RTU or ASCII). However, pins 3 & 4 can also be configured as an ASCII Serial Interface mode, allowing the user to select from several different protocols, including compatibility with Solartron's SI 1500, SI 3500 and C55.

Accessories

+24V Power Block with Mains Leads. Available with UK, EU, and US plugs
Spare T-con Mounts
USB to Mini-USB cable for PC connection

www.solartronmetrology.com • sales.solartronmetrology@ametek.com

Display and Interface

Use **Action Screen** to Zero, Preset, Print, and setup shortcut commands

SI 100

SI 200

◄Left and ►Right Arrows can be used as shortcut commands to Zero or Preset while in Display Mode

ACTION SCREEN

```
MENU
LeftBtnActn
RightBtnActn
●TRACK,
●PEAK+,
●PEAK-
●PEAK RESET
●ABS
●ZERO
●PRESET
●PRINT
●MAX/MIN RESET
```

Press ●Enter to go to "Action" Screen

LIMIT DISPLAY SCREEN

```
±AB.CDEF
MODE          TYPE
MCalc         UNITS

HiAlm  +0
±AB.CDEF
LoAlm  +0
±AB.CDEF
```

LIMIT SCREEN

```
±AB.CDEF
P Low Limit    P High Limit

ALARMS

S Low Limit    S High Limit
±AB.CDEF
```

MENU SCREEN

```
SECURITY
ConfigPr
MEASURE
PEAK+,
PEAK-
PRESET
LIMITS
DISCRETE OUTPUTS
DISCRETE INPUTS
COMMS
MISC
```

Use ▲Up and ▼Down arrows to change display screens

MAX/MIN DISPLAY SCREEN

```
MAX      ±AB.CDEF

MIN      ±AB.CDEF

MAX-MIN  ±AB.CDEF

UNITS
```

MAX/MIN DISPLAY SCREEN

```
MAX      ±AB.CDEF

MIN      ±AB.CDEF

MAX-MIN  ±AB.CDEF

UNITS
```

Configurator Software

Connect SI 100/200 to PC via Mini-USB to USB cable. Then use Solartron provided software to configure unit, and backup settings to PC file!

www.solartronmetrology.com • sales.solartronmetrology@ametek.com
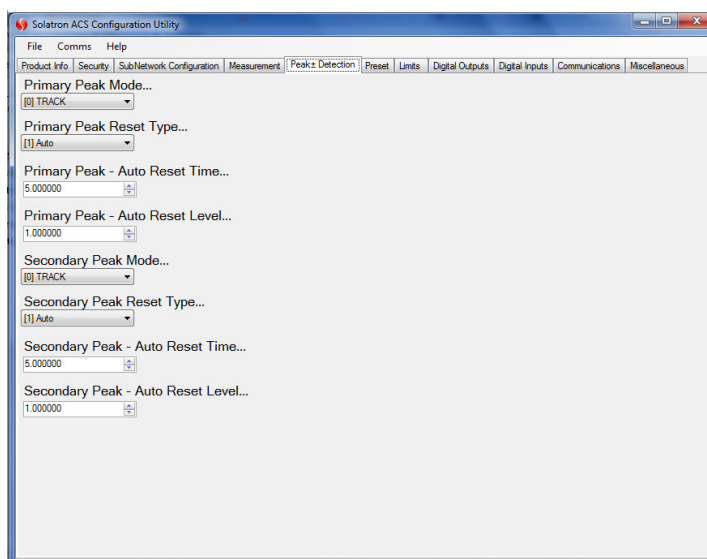
Orbit ACS Digital Gauging Probes (with connector between probe and electronivs module)

Product

	SIxxxP/1/S	SIxxxP/2/S	SIxxxP/5/S	SIxxxP/10/S	SIxxxP/20/S	SIxxx6P/2/S
Spring Push Axial Cable	SIxxxP/1/S	SIxxxP/2/S	SIxxxP/5/S	SIxxxP/10/S	SIxxxP/20/S	SIxxx6P/2/S
Spring Push Radial Cable	SIxxxPR/1/S	SIxxxPR/2/S	SIxxxPR/5/S	SIxxxPR/10/S	SIxxxPR/20/S	N/A
Pneumatic Axial Cable	N/A	SIxxxP/2/P	SIxxxP/5/P	SIxxxP/10/P	SIxxxP/20/P	N/A
Pneumatic Radial Cable	N/A	SIxxxPR/2/P	SIxxxPR/5/P	SIxxxPR/10/P	SIxxxPR/20/P	N/A
Measuring Range (mm)	1	2	5	10	20	2
Body Diameter	8h6					6h6

Note SIxxx can be either SI100 or SI200

Performance

Accuracy (% of Reading)[1]	0.2		0.15		0.2
Repeatability µm[2]	0.15				
Resolution µm -user selectable	<0.01		<0.05	<0.1	<0.01
Alarm Outputs - selectable High, OK, Low	3 outputs either NPN, PNP, logic Programable Active Hi or Lo				
Discrete Inputs - user selectable	eg. Print, Zero, Preset (see manual for other options)				
Update Rate for I/O discretes (ms)	5				
Bandwidth of Electronics (Hz) - user selectable	460, 230, 115, 58, 29, 14, 7,4				
Communications Interface Protocol	MODBUS (RTU or ASCII) or Solartron Serial Formats				
Communications Interface Hardware	RS485 or RS232 (User selectable) Up to 115,200 Baud				
Update Rate for Serial Data (ms)	25				
Pre Travel (mm)	0.15				
Post Tavel (mm)	0.35		0.85		0.35
Tip Force (N) at Middle of Range ±20%					
Spring Push	0.7				
Pneumatic at 0.4 bar	N/A	0.8	0.85	0.7	N/A
Pneumatic at 1 bar	N/A	2.8		2.5	N/A

Environmental

Sealing for Probe	IP65 with gaiter or IP50 without gaiter
Sealing for Probe Interface Electronics	Top and Front: IP41, Rear: IP20, In line connector: IP67
Storage Temperature (ºC)	-20 to +70
Probe Operating Temperature with Gaiter (ºC)	+5 to +80
Probe Operating Temperature without Gaiter (ºC)	-10 to +80
Electronics Operating Temperature (ºC)	0 to 60
EMC	Emissions EN61000-6-3, EN61326
	Immunity EN61000-6-2, EN61326
Power	18 to 32 VDC @ 0.07A typical

Material

Probe Body	Stainless Steel
Probe Tip (options)	Nylon, Ruby, Silicon Nitride, Tugsten Carbide
Gaiter (standard)	Fluoroelastomer
Cable	PUR
Electronics Module	ABS

[1] Accuracy 0.1µm or % reading, whichever greater

[2] Obtained by repeated operation against a carbide target with side load applied to bearing

www.solartronmetrology.com • sales.solartronmetrology@ametek.com

Instrumentation Functionality

Measurement

Measurement Modes - SI100	A, MAX-MIN
Measurement Modes - SI200	A,B, A+B, A-B, (A+B)/2, (A-B)/2, MAXA-MINA, MAXB-MINB
Measurement Types	Track, Peak+, Peak-
Measurement Modes	Absolute, Zero (tare), Preset
Measurement Units	mm, inches or mils

Display

Analogue	Bar representing reading
Digital	Digital up to 5 decimal places mm (6 for inches)
Warnings	Red bar and red digital reading indicates measurment outside of limits

**Keypad**

Type	Sealed Membrane

The SI 100 and SI 200 can also be ordered connected directly to the digital gauging probe for higher accuracy.

The SI100 and SI200 can also be ordered with the connector between the digital gauging probe and the Electronics Module placed in line along the cable.

Performance specifications will vary if the SI100 or SI200 is supplied connected to other transducers or laser products – see the Solartron website or contact your local sales office/distributor for further information.
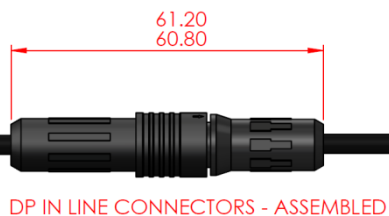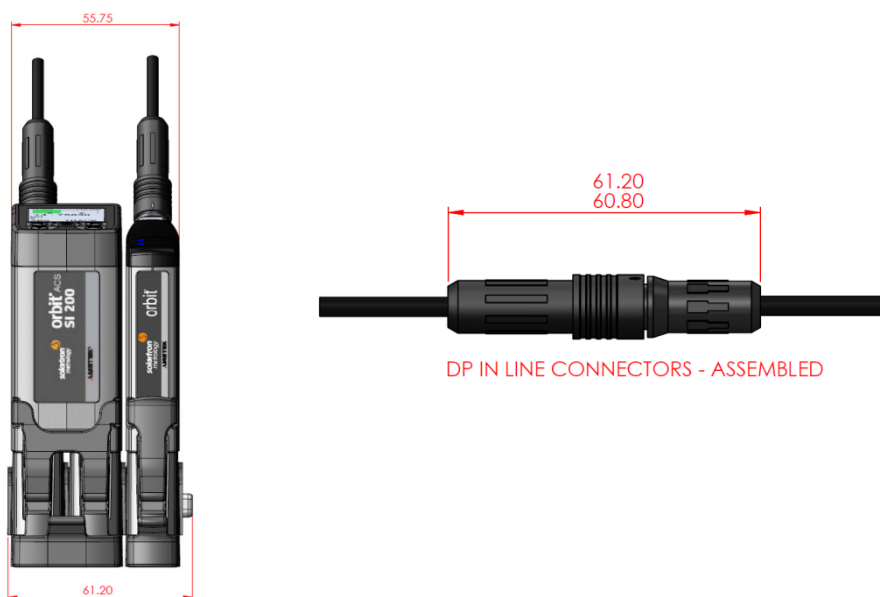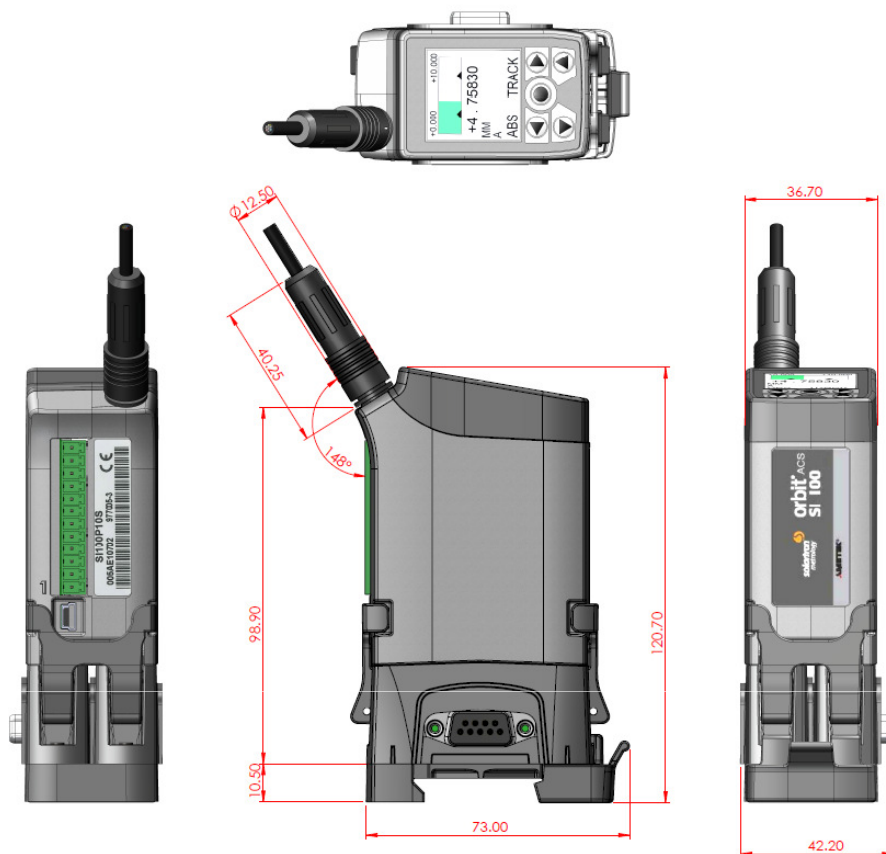
www.solartronmetrology.com • sales.solartronmetrology@ametek.com

Drawing

For 3D drawings, please contact sales.solartronmetrology@ametek.co.uk

United Kingdom - Head Office
Solartron Metrology
Steyning Way
Bognor Regis
West Sussex
PO22 9ST
Tel: +44 (0) 1243 833333
Fax: +44 (0) 1243 833322
Sales.solartronmetrology@ametek.com

France
Solartron Metrology
Rond-point de l'Espine des Champs
Buroplus - Bat. D
Elancourt 78990
Tel: +33 (0)1 30 68 89 50
Fax: +33 (0)1 30 68 89 59
france.solartronmetrology@ametek.com

Germany
Ametek GmbH
Solartron Metrology Division
Rudolf-Diesel-Strasse 16
40670 Meerbusch
Tel: +49 (0) 2159 9136 500
Fax: +49 (0) 2159 9136 505
vertrieb.solartron@ametek.de

Brazil
Ametek do Brasil, Ltda
Rod. Eng Ermenio de Oliveira Penteado, Km 57, SP75
Bairro Tombadouro
13337-300, Indaiatuba, SP, Brazil
Tel: +55 19 2107 4126

India
Ametek Instruments India Private Limited
1st Floor, Left Wing
Prestige Featherlite Tech Park
Plot #148, EPIP II Phase
Whitefield, Bengaluru 560 066
Karnataka, India
Tel: +91 80 6782 3200
Fax: +91 80 6782 3232

USA
Solartron Metrology
USA Central Sales Office
915 N.New Hope Road, Suite C
Gastonia, NC 28054
Tel: +1 800 873 5838
Fax: +1 704 868 8466
usasales.solartronmetrology@ametek.com

China
AMETEK Commercial Enterprise (Shanghai) Co. Ltd
No. 1 AMETEK Road
Ju Ting Economic Development Zone
Shanghai 201615
Tel: +86 21 5763 2509
Fax: +86 21 5866 0969 Ext. 261/262
china.solartronmetrology@ametek.com

Solartron Metrology
Precision Driven

Offices worldwide
Agent and distributor details
available at
www.solartronmetrology.com

bsi. UKAS MANAGEMENT SYSTEMS 003
Q 09540

Solartron pursues a policy of continuous
development. Specifications in this
document may therefore be changed
without notice.

AMETEK®
ULTRA PRECISION TECHNOLOGIES

Precision. Quality. Reliability
www.solartronmetrology.com • sales.solartronmetrology@ametek.com