WindObserver™ /S

User Manual

Intrinsically Safe Ultrasonic Anemometer

Doc No: 1360-PS-0001

Issue 10 (Applies to Anemometers with Serial Numbers 3000 onwards)

Parts 1360-PK-022

and 1360-PK-060

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WARNING:

ENSURE CORRECT SUPPLY VOLTAGE IS USED/SELECTED ON POWER SUPPLY BEFORE INSTALLATION

1. FOREWORD

Thank you for purchasing the Gill Instruments Limited Intrinsically Safe WindObserver ultrasonic anemometer system.
The Anemometer has no customer serviceable parts and requires no calibration or maintenance.
To achieve optimum performance we recommend that you read the whole of this manual before proceeding with use. Do **NOT** remove the Anemometer black "rubber" transducer caps.

Gill products are in continuous development and therefore specifications may be subject to change and design improvements without prior notice.

The information contained in this manual remains the property of Gill Instruments and must not be copied or reproduced for commercial gain.

Modifications to the Intrinsically Safe WindObserver Anemometer or associated Power Supply unit will invalidate the Approval Certificates and Warranty.

2. INTRODUCTION

The Gill Intrinsically Safe WindObserver is a very robust unit with no moving parts, outputting wind speed and direction. The units of wind speed, output rate and formats are all user selectable.

The Intrinsically Safe WindObserver can be used in conjunction with a PC, data logger or other device, provided it is compatible with the Power Supply Unit Box which provides the RS232 or RS422 output.

The RS422 Output of the Power Supply Unit Box is designed to connect directly to the Gill WindDisplay unit to provide a complete wind speed direction system.

The Anemometer output message format can be configured in Polar, UV (2-axis), NMEA (0183 Version 3), tunnel or Binary and as either a Continuous output or Polled (requested by host system), detailed in full in Para 8.1 Digital Serial Output Formats.

3. IS SYSTEM PACKING LIST

3.1 Gill Part 1360-PK-022

Comprising of:-

- **1360-PK-052** Intrinsically Safe WindObserver 2 axis anemometer.
- 1255-10-057 Anemometer Mounting kit.
- 1360-PK-054 Anemometer 20 Way Connector kit.
- 1000-10-034 This manual on a CD.
- 1277-30-045 Head Cover (2 halves).
- **1360-PK-053** Intrinsically Safe Power Supply Unit (and Communications Interface). Mains Power Supply.
- 1360-10-008 3 Metre Anemometer Test Cable.

3.2 Gill Part 1360-PK-060

Comprising of:-

- **1360-PK-052** Intrinsically Safe WindObserver 2 axis anemometer.
- 1255-10-057 Anemometer Mounting kit.
- 1360-PK-054 Anemometer 20 Way Connector kit.
- 1000-10-034 This manual on a CD.
- 1277-30-045 Head Cover (2 halves).
- **1360-PK-055** (1954-00-002) Intrinsically Safe Power Supply Unit and Communications Interface. Low Voltage Power Supply.
- 1360-10-008 3 Metre Anemometer Test Cable.

3.3 Spares

- 1360-PK-052 Intrinsically Safe WindObserver 2 axis anemometer.
- 1360-PK-053 Intrinsically Safe Power Unit (and Communications Interface). Mains power supply.
- 1360-PK-055 (1954-00-002) Intrinsically Safe Power Unit and Communications Interface. Low voltage power supply.
- 1360-PK-054 Anemometer 20 Way Connector kit.
- 1360-10-008 3 Metre Anemometer Test Cable.

4. SPECIFICATION

4.1 Intrinsically Safe WindObserver 1360-PK-052. Mounted in Hazardous Area.

I.S. Rating – ATEX European and IECEx International (For use in Zone 0, 1 and 2 Areas).
See ATEX and IECEx Certificates in Appendix 2.

Measurement

Output	1, 2 and 4Hz
Parameters	UV, Polar, NMEA, Tunnel, Binary
Units	m/s, Knots, MPH, KPH ft/min
Averaging	Flexible 0 to 3600 seconds or Adjustable averaging (Road Weather Averaging)

Wind Speed

Range	0 - 75m/s
Accuracy	±5% RMS
Resolution	0.01m/s

Starting Threshold 0.01 m/s

Direction

Range	0 - 359°
Accuracy	± 4°
Resolution	1°

Dead Band Wind Direction None

Note Wind Speed and Direction accuracy apply from +5 deg C to +35 Deg C and for Wind incidence within ± 10° of horizontal.

Anemometer Status Supplied as part of standard message

Power Requirement Anemometer only, 6V-12VDC, 30mA peak (from Gill ATEX/IECEX Certified Power and Communications Box only) all circuits protected to 0.8 Joules.

Digital Output

Communication	RS422, full duplex (to Power and Control Box).
Baud rates	1200, 2400, 4800, 9600, 19200.
Formats	8 data, odd, even or no parity

Dimensions

Size	See this manual Page 11 for dimensions
Weight	IS WindObserver 1.9kg.

Materials

External Construction	Stainless Steel 316

Environmental

Moisture protection	IP66 (NEMA4X)
Ambient Operating temperature	-30°C to +70°C
Storage Temperature	-50°C to +75°C
Humidity	0% to 100% RH
Precipitation	300mm/hr.
EMC	EN 61000-6-3:2007 EN 61000-6-1:2007

Intrinsic Safety

EN60079-0:2012

EN60079-11:2012

EN60079-26:2007

IEC60079-0:2011 Edition 6.0

IEC60079-11:2011 Edition 6.0

IEC60079-26:2006 Edition 2.0

Standards Traceable to UK national standards

UK CAA CAP 437 Specification compared to be compliant to this standard

Site Calibration None required.

4.2 Power Supply Unit 1360-PK-053. Mounted in Non Hazardous Area.

The I.S. PCI may be used with either Model 1360 IS Anemometer (SIRA 00ATEX2218, IECEx SIR 13.0157) or IS II Anemometer (SIRA 15ATEX2014 and IECEx SIR 13.0013).

I.S. Rating – ATEX European, IECEx International.
NOT for use in Zone 0, 1 and 2 Areas (Non Hazardous Area Use Only).
See ATEX and IECEx Certificates in Appendix 2.

Input and Outputs

Digital Input	RS422 Interface (Data to/from IS WindObserver connected via galvanic isolation).
Digital Outputs	RS232 and RS422 Interface (Data to/from IS WindObserver)

Power Requirement

Input Power	100Vac - 120Vac, 10VA for the 115V switch position. 200Vac - 250Vac, 10VA for the 230V switch position.
Output Power	10.5v dc at 50mA to IS WindObserver (fused 100mA)

Dimensions

Size	See this manual Page 11 for dimensions
Weight	9.5kg.

Materials

External Construction	Stainless Steel 316

Environmental

Moisture protection	IP65
Ambient Operating temperature	-30°C to +40°C
Storage Temperature	-50°C to +75°C
Humidity	5% to 90% RH
EMC	EN 61000-6-3:2007 EN 61000-6-1:2007

Intrinsic Safety

EN60079-0:2012
EN60079-11:2012
IEC60079-0:2011 Edition 6.0
IEC60079-11:2011 Edition 6.0

Low Voltage Directive	EN61558-1:1997 EN61558-2-6:1997
Standards	Traceable to UK national standards
Site Calibration	None required.

4.3 Power Supply Unit 1360-PK-055 (1954-00-002) Mounted in Non Hazardous Area.

I.S. LVPCI may be used with either Model 1360 IS Anemometer (SIRA 00ATEX2218, IECEx SIR 13.0157) or IS II Anemometer (SIRA 15ATEX2014 and IECEx SIR 13.0013).

I.S. Rating – ATEX European, IECEX International.
NOT for use in Zone 0, 1 and 2 Areas (Non Hazardous Area Use Only).
See ATEX and IECEX Certificates in Appendix 2.

Input and Outputs

Digital Input	RS422 Interface (Data to/from IS WindObserver connected via galvanic isolation).
Digital Outputs	RS232 and RS422 Interface (Data to/from IS WindObserver)

Power Requirement

Input Power	9v to 30v dc at 200mA max (Fused 20mm, 1 amp, anti-surge). Galvanic isolation between input power and anemometer supply.
Output Power	10.5v dc at 50mA to IS WindObserver (fused 100mA)

Dimensions

Size	See page 13 for dimensions.
Weight	2.4kg.

Materials

External Construction	Fibox Euronord Polyester

Environmental

Moisture protection	IP54	
Ambient Operating temperature	-30°C to +40°C	
Storage Temperature	-50°C to +75°C	
Humidity	5% to 90% RH	
EMC	Emissions and Immunity	EN 61326-2-1:2013 EN 61204-3:2000
	Emissions	EN 60945:2002 Clause 9
	Immunity	EN 60945:2002 Clause 10

Intrinsic Safety

EN60079-0:2012
EN60079-11:2012
EN60079-26:2007
IEC60079-0:2011 Edition 6.0
IEC60079-11:2011 Edition 6.0
IEC60079-26:2006 Editions 2.0

Standards	Traceable to UK national standards
Site Calibration	None required.

5. INSTALLATION

5.1 Pre-Installation requirements

Host system - One or more of the following:

PC with an internal or external interface compatible with the RS422 or RS232 output from the Intrinsically Safe WindObserver Power Supply Interface Box.

Gill WindDisplay.

Other equipment with I/O compatibility to the Intrinsically Safe WindObserver System.

Software - One of the following:

Gill Wind Software used as a Terminal program only (Wizard and Sync Comms not applicable). Wind will run on PC's up to and including Windows 8 and can be downloaded free from:- http://www.gillinstruments.com/main/software.html

HyperTerminal (supplied with Windows™ 95 to XP).

Other Terminal Emulation software packages.

Use the above Software to configure the IS WindObserver system for the installation.

Cable and Junction Box

The Intrinsically Safe WindObserver has a base mounted 20 way socket and is supplied with a mating 20 way connector requiring connection to a suitable IS cable.

Intrinsically Safe Cable and Junction Boxes are not available from Gill Instruments and must be determined to be suitable for use by the customer.

IS cable resistance must not exceed 17 ohms in each cable wire run. E.g.

If using 24 awg wire with cable resistance of 0.08 ohms per metre then maximum cable run is 213 Metres.

If using 22 awg wire with cable resistance of 0.05 ohms per metre then maximum cable run is 340 Metres.

It is advised that the installed cable is retained with a cable tie within 150mm of the base of the anemometer.

A 3 metre test cable is supplied with the IS System to enable system testing and configuration to be carried out.

Mounting

The Intrinsically Safe WindObserver can be attached to a mount as detailed in Drawing 1086-G-045 on page 21. Always ensure that the gasket supplied is fitted to the base of the anemometer mount.

It is important that the gasket supplied forms a watertight seal on the base of the anemometer.

The Mains Powered Power Supply Unit mounting details are as per drawing 1360-G-028 on page 11. Lid screws should be torqued to 2Nm, Gland Plate screws to 4Nm and Earth stud to 10Nm.

The Low Voltage Power Supply Unit mounting details are as per drawing 1954-30-026 on page 13.

Earthing

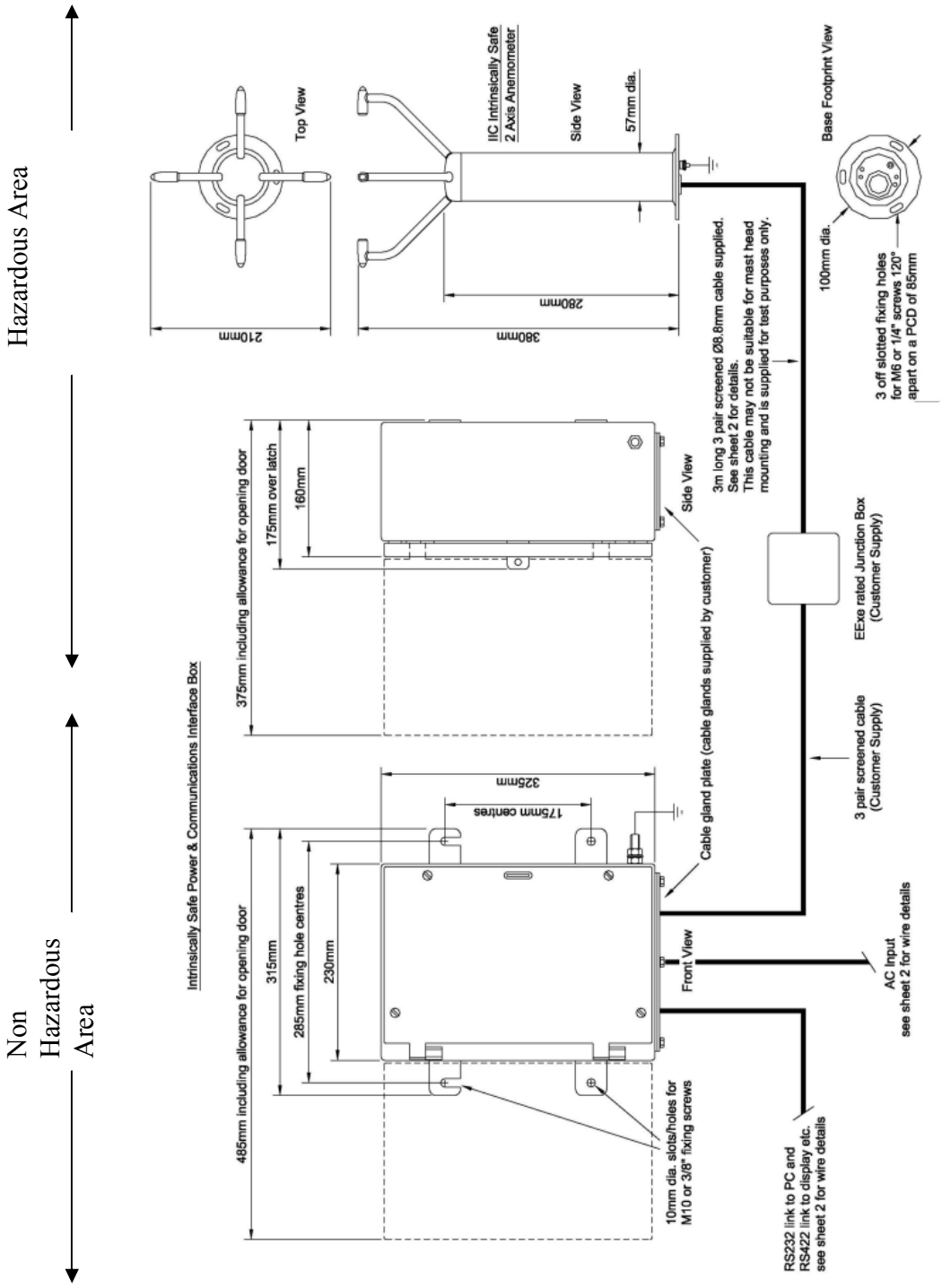
Ensure that the IS Anemometer and Power Supply Unit are Earthed via the Earth terminal provided on the equipments in accordance with the Local or National regulations.

5.1.1 Installation using a Mains Power Supply.

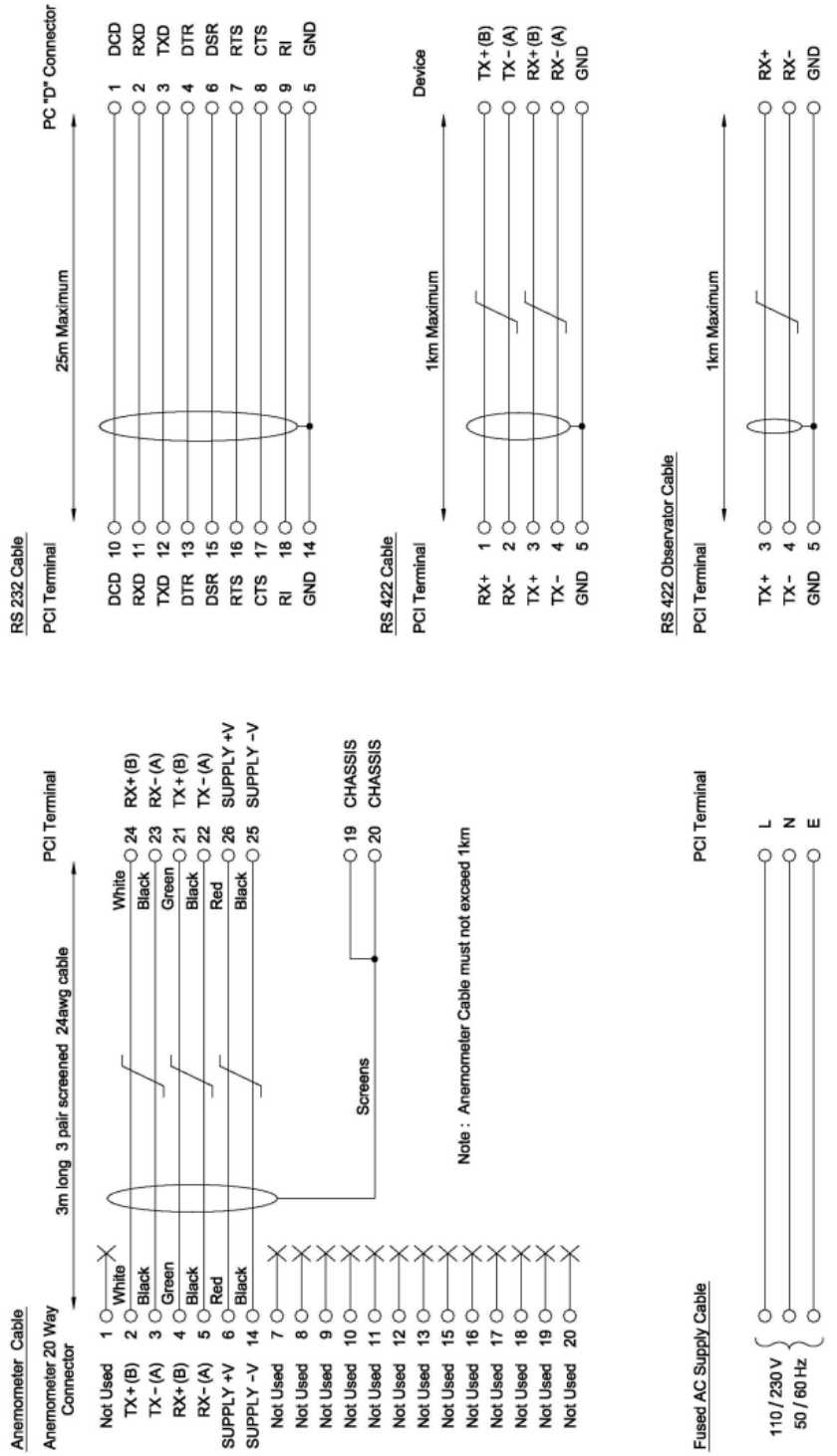
The unit must be installed in accordance with the Control Drawing 1360-G-028. Note that the PCI box is mounted in the Non Hazardous area.

Drawing 1360-G-028 I.S. Issue 3, IS WindObserver System Diagram Sheet 1 of 2.

Power Supply Lid screws should be torqued to 2Nm, Gland Plate screws to 4Nm and Earth stud to 10Nm.

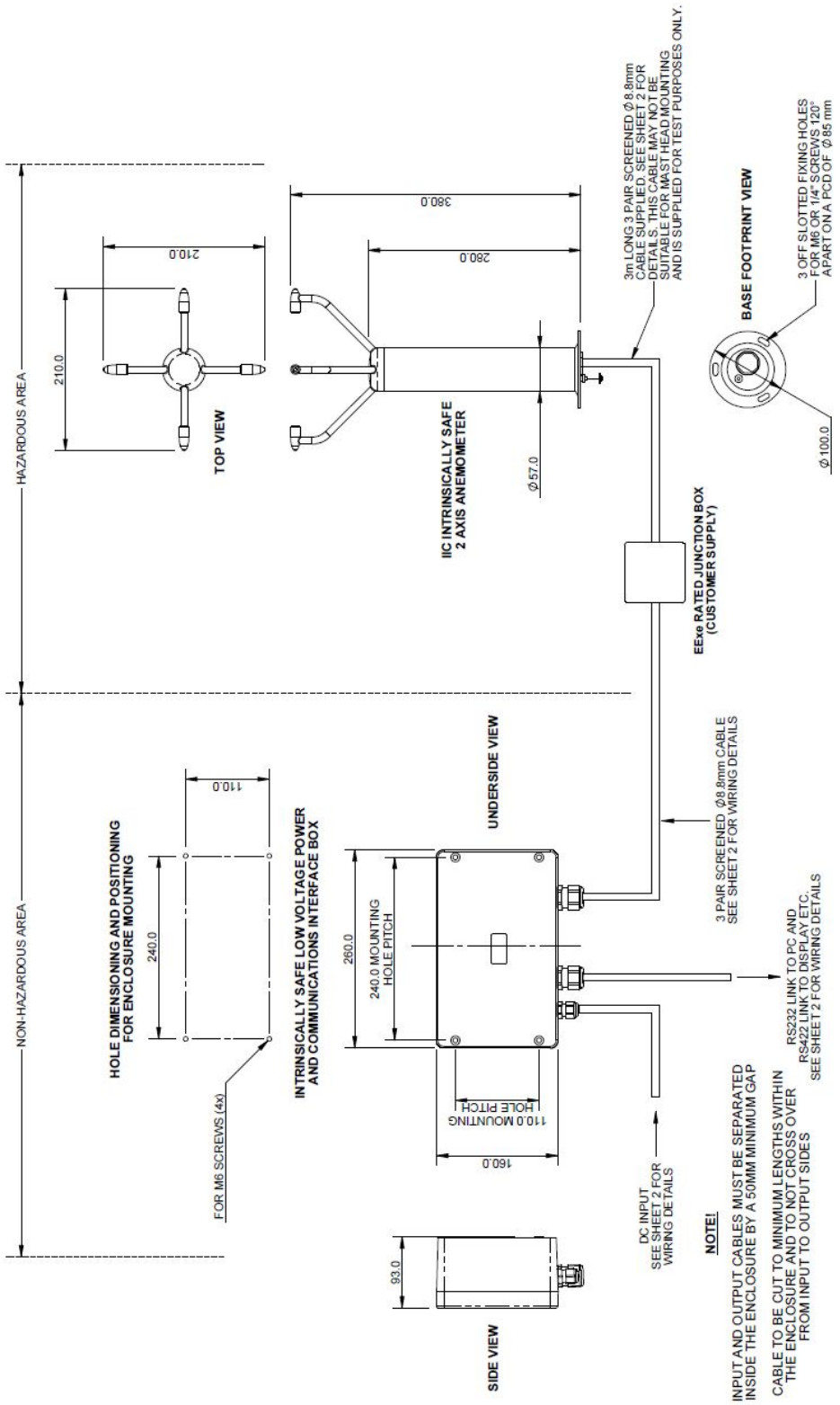


Drawing 1360-G-028 Issue 3, I.S. WindObserver System Diagram Sheet 2 of 2.

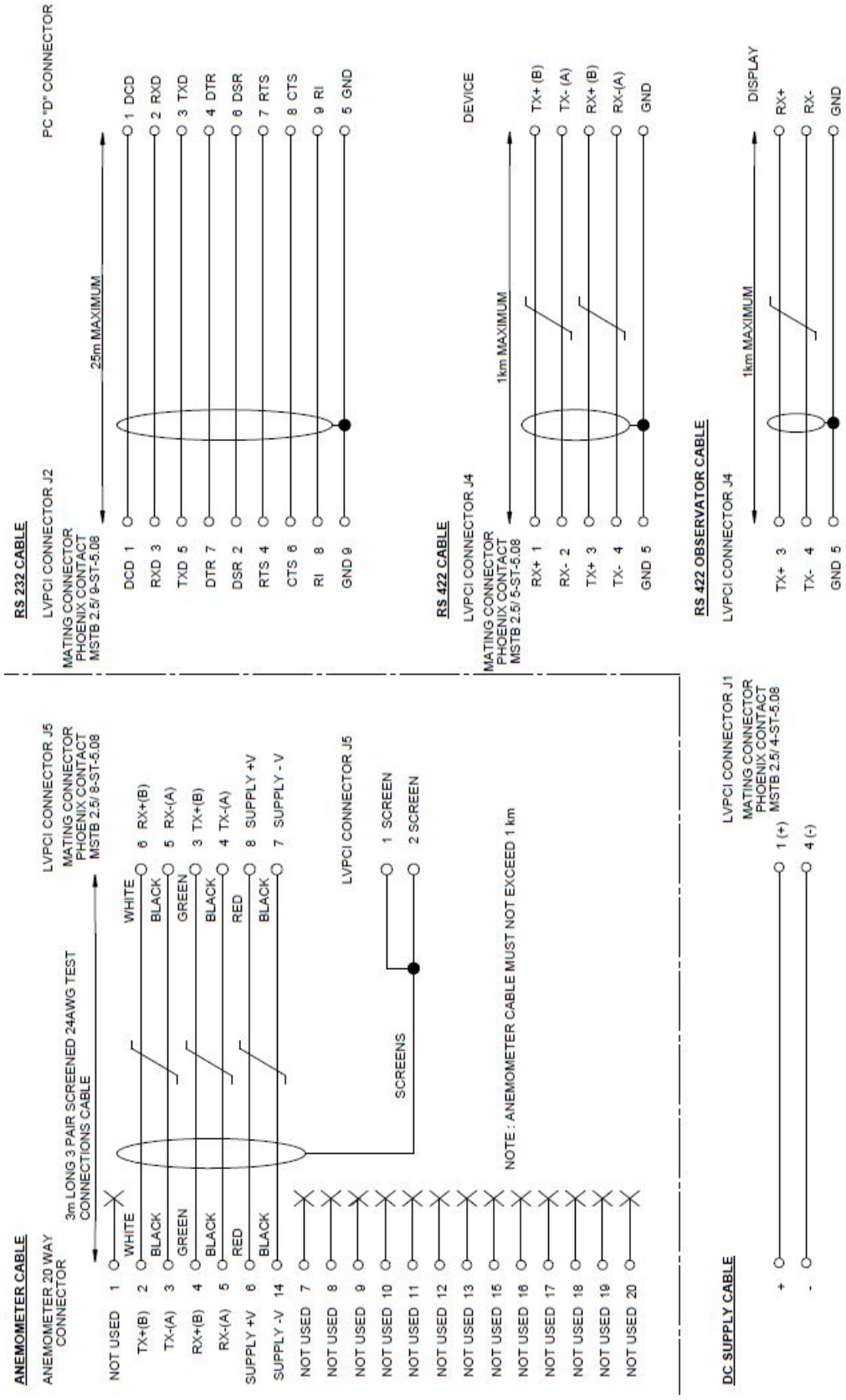


5.1.2 Installation using a Low Voltage Power Supply.

The unit must be installed in accordance with the Drawing 1954-30-026.
Note that the PCI box is mounted in the Safe area.
Drawing 1954-30-026 issue 3, IS WindObserver System Diagram
Sheet 1 of 2.



Drawing 1954-30-026 issue 3, IS WindObserver System Diagram Sheet 2 of 2.



5.2 Installation Guidelines

5.2.1 Power Supply Mains

Instructions specific to hazardous area installations (in accordance with IEC60079-0:2011 clause 30)

The following instructions relevant to safe use in a hazardous area apply to equipment covered by certificate numbers IECEx SIR 13.0156 and Sira 00ATEX2217.

1.	The certification marking is as follows:		
	Certificate number:	IECEx SIR 13.0156	Sira 00ATEX2217
	Certification code:	[Ex ia Ga] IIC [Ex ia Da] IIIC	[Ex ia Ga] IIC [Ex ia Da] IIIC
	Other marking:	(Ta = -30^{0}C to +40^{0}C)	CE 0518 Ex II(1)GD
2.	The equipment may only be used in non-hazardous area.		
3.	The equipment is only certified for use in ambient temperatures in the range -30ºC to +40ºC and should not be used outside this range.		
4.	Installation shall be carried out in accordance with the applicable code of practice by suitably-trained personnel.		
5.	There are no special checking or maintenance conditions other than a periodic check.		
6.	With regard to explosion safety, it is not necessary to check for correct operation.		
7.	The equipment contains no user-replaceable parts and is not intended to be repaired by the user. Repair of the equipment is to be carried out by the manufacturer, or their approved agents, in accordance with the applicable code of practice.		
8.	Repair of this equipment shall be carried out in accordance with the applicable code of practice.		
9.	If the equipment is likely to come into contact with aggressive substances, e.g. acidic liquids or gases that may attack metals or solvents that may affect polymeric materials, then it is the responsibility of the user to take suitable precautions that prevent it from being adversely affected thus ensuring that the type of protection is not compromised.		

5.2.2 Power Supply Low Voltage

Instructions specific to hazardous area installations in accordance with IEC60079-0:2011 clause 30.

The following instructions relevant to safe use in a hazardous area apply to equipment covered by certificate numbers IECEx SIR 13.0159 and Sira 13ATEX2384.

<table>
<tr><td>1.</td><td colspan="3">The certification marking is as follows:</td></tr>
<tr><td></td><td>Certificate number:</td><td>IECEx SIR 13.0159</td><td>Sira 13ATEX2384</td></tr>
<tr><td></td><td>Certification code:</td><td>[Ex ia Ga] IIC
[Ex ia Da] IIIC</td><td>[Ex ia Ga] IIC
[Ex ia Da] IIIC</td></tr>
<tr><td></td><td>Other marking:</td><td>(Ta = -30°C to +40°C)</td><td>CE 0518 Ex II(1)GD</td></tr>
<tr><td>2.</td><td colspan="3">The equipment may only be used in non-hazardous area.</td></tr>
<tr><td>3.</td><td colspan="3">This is an associated equipment which interfaces with equipment that may be used in zones 0, 1 & 2 with flammable gases and vapours with apparatus groups IIC.</td></tr>
<tr><td>4.</td><td colspan="3">This is an associated equipment which interfaces with equipment that may be used in zones 20, 21 & 22 with flammable dusts, fibres and flyings in groups IIIC.</td></tr>
<tr><td>5.</td><td colspan="3">The equipment is only certified for use in ambient temperatures in the range -30°C to +40°C and should not be used outside this range.</td></tr>
<tr><td>6.</td><td colspan="3">Installation shall be carried out in accordance with the applicable code of practice by suitably-trained personnel.</td></tr>
<tr><td>7.</td><td colspan="3">There are no special checking or maintenance conditions other than a periodic check.</td></tr>
<tr><td>8.</td><td colspan="3">With regard to explosion safety, it is not necessary to check for correct operation.</td></tr>
<tr><td>9.</td><td colspan="3">The equipment contains no user-replaceable parts (with the exception of the F1 user replaceable fuse) and is not intended to be repaired by the user. Repair of the equipment is to be carried out by the manufacturer, or their approved agents, in accordance with the applicable code of practice. Note: FI fuse must be replaced with Ceramic Anti-surge time lag fuse 20mm x 5mm, rating 250Vac 1A.</td></tr>
<tr><td>10.</td><td colspan="3">Repair of this equipment shall be carried out in accordance with the applicable code of practice.</td></tr>
<tr><td>11.</td><td colspan="3">If the equipment is likely to come into contact with aggressive substances, e.g. acidic liquids or gases that may attack metals or solvents that may affect polymeric materials, then it is the responsibility of the user to take suitable precautions that prevent it from being adversely affected thus ensuring that the type of protection is not compromised.</td></tr>
</table>

5.2.3 Anemometer

Instructions specific to hazardous area installations (in accordance with IEC60079-0:2011 clause 30)

The following instructions relevant to safe use in a hazardous area apply to equipment covered by certificate numbers IECEx SIR 15.0013 and SIRA 15ATEX2014.

1.	The certification marking is as follows:		
	Certificate number:	IECEx SIR 15.0013	SIRA 15ATEX2014
	Certification code:	Ex ia IIC T4 Ga Ex ia IIIC T135°C Da IP66	Ex ia IIC T4 Ga Ex ia IIIC T135°C Da IP66
	Other marking:	(Ta = -30^{0}C to +70^{0}C)	CE 0518 Ex II 1 GD
2.	The equipment may be used in zones 0, 1 & 2 with flammable gases and vapours with apparatus groups IIA, IIB & IIC and with temperature classes T4.		
3.	The equipment is only certified for use in ambient temperatures in the range -30ºC to +70ºC and should not be used outside this range.		
4.	The equipment may be used in zones, 20, 21 & 22 with flammable dusts, fibres and flyings in groups IIIA, IIIB and IIIC, T135ºC.		
5.	Installation shall be carried out in accordance with the applicable code of practice by suitably-trained personnel.		
6.	There are no special checking or maintenance conditions other than a periodic check.		
7.	With regard to explosion safety, it is not necessary to check for correct operation.		
8.	The equipment contains no user-replaceable parts and is not intended to be repaired by the user. Repair of the equipment is to be carried out by the manufacturer, or their approved agents, in accordance with the applicable code of practice.		
9.	Intrinsically Safe operation is strictly dependant on the use of approved power supplies and maximum cable lengths lying within the limits recommended in the manual.		
10.	If the equipment is likely to come into contact with aggressive substances, e.g. acidic liquids or gases that may attack metals or solvents that may affect polymeric materials, then it is the responsibility of the user to take suitable precautions that prevent it from being adversely affected thus ensuring that the type of protection is not compromised.		

Anemometer Siting General Guidelines

The Intrinsically Safe WindObserver has been designed to meet and exceed the stringent standards listed in its specification. Operating in diverse environments all over the world, Intrinsically Safe WindObserver requires no calibration or adjustment whatsoever.

As with any sophisticated electronics, good engineering practice should be followed to ensure correct operation.

Always check the installation to ensure the Intrinsically Safe WindObserver is not affected by other equipment operating locally, which may not conform to current standards, e.g. radio/radar transmitters, boat engines, generators etc.

Guidelines should any of the following be encountered:-

Avoid mounting in the plane of any radar scanner – a vertical separation of at least 2m should be achieved.

Radio transmitting antennas, the following minimum separations (all round) are suggested

VHF IMM – 1m

MF/HF – 5m

Satcom – 5m (avoid likely lines of sight)

Ensure the product is correctly earthed in accordance with this manual

Use cables recommended for the IS installation, keeping the length below the maximum allowed (see Pages 19 and 25). Where the cables are cut and re-connected (junction boxes, plugs and sockets) the cable screen integrity must be maintained, to prevent the EMC performance being compromised.

Earth loops should not be created – earth the system in accordance with the installation guidelines.

Ensure the power supply operates to the Intrinsically Safe WindObserver specification at all times.

Avoid positioning where gas flare stack temperatures in surrounding air exceed unit operating limits.

Avoid turbulence caused by surrounding structures that will affect the accuracy of the Intrinsically Safe WindObserver such as trees, masts and buildings. The World Meteorological Organisation makes the following recommendation:

The standard exposure of wind instruments over level open terrain is 10m above the ground. Open terrain is defined as an area where the distance between the sensor and any obstruction is at least 10 times the height of the obstruction.

When installing the unit degrease the unit and hold with lint free gloves to reduce the build-up of deposits.

5.2.4 Cabling

Anemometer
The Intrinsically Safe WindObserver and Power Supply Interface Box is supplied with a 3-Metre long, 3 pair, 24 AWG, screened, 8mm diameter **test cable** connected to a 20 way Hirose connector at one end and stripped wires at the other.
A 20 way connector kit is supplied with the Anemometer to connect to customer supplied cable.
The customer supplied cable between the Anemometer and the Power Supply Box should be a 3 pair twisted, screened and / or armoured, and have a minimum of 0.75mm cross sectional area and a maximum of 2.5mm cross sectional area.
The cable should meet the Cable Parameter requirements of the Sira Certificate in Appendix 2 and IECEx Certificate in Appendix 2.
Do not attach the screen of the anemometer to earth at the junction box; it must be attached to cable screen terminals in the PCI box via the field cable screen.
If armoured cable is used the armour must be connected to earth. **DO NOT** join the cable armour to the screen.

Cable length

IS cable resistance must not exceed 17 ohms in each cable wire run. E.g.

If using 24 awg wire with cable resistance of 0.08 ohms per metre then maximum cable run is 213 Metres.

If using 22 awg wire with cable resistance of 0.05 ohms per metre then maximum cable run is 340 Metres.

It is advised that the installed cable is retained with a cable tie within 150mm of the base of the anemometer.

If any problems of data corruption are experienced (due to, for example, a high local electrical 'noise' level), then a lower baud rate should be used. Alternatively, a thicker or higher specification cable can be tried.

Ensure that strain relief measures are employed when installing the cables. Do not allow the whole weight of the cable to be applied to the connector.

Note: Gill Instruments do not supply Intrinsically Safe cables; it is the responsibility of the customer to determine the type of cable that is suitable for each individual IS installation.

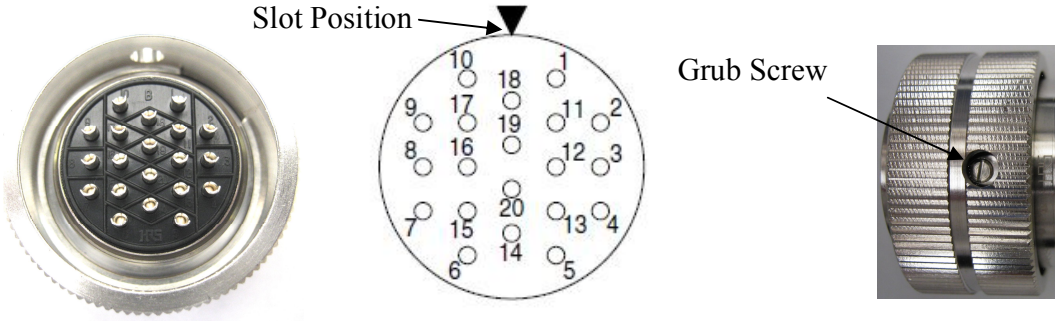
Connector Assembly.

The IS WindObserver is supplied with a mating 20 way connector.

Open the pack of connector parts supplied (Gill Part 1360-PK-054).

Table of Equivalent Part Numbers		
Part Name	**Gill Part No.**	**Hirose Part No.**
Connector plug, 20 way	020-02673	RM21WTP20P71
Extended backshell	1284-30-006	Not Available
Cord Clamp 8mm	020-02872	JR13WCCA-8(72)

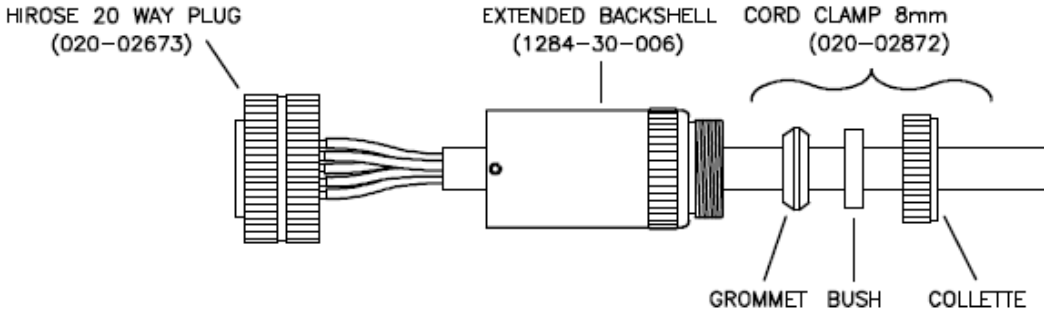
20 Way Connector terminal positions viewed from the solder connection side.



Wiring Connections between the 20 way Anemometer connector and the Power Supply Interface Box.

20 Way Connector Pin Number	Mains Power Supply Terminal Number	Low Voltage Supply J5 Terminal Number	Anemometer Function
2	24	6	TX+ RS422 Transmit Data to the Power Box
3	23	5	TX- RS422 Transmit Data to the Power Box
4	21	3	RX+ RS422 Receive Data to the Anemometer
5	22	4	RX- RS422 Receive Data to the Anemometer
6	26	8	Supply +ve
14	25	7	Supply –ve
-	19 or 20	1 or 2	Cable Screen

Arrange IS WindObserver Connector Parts as Follows.



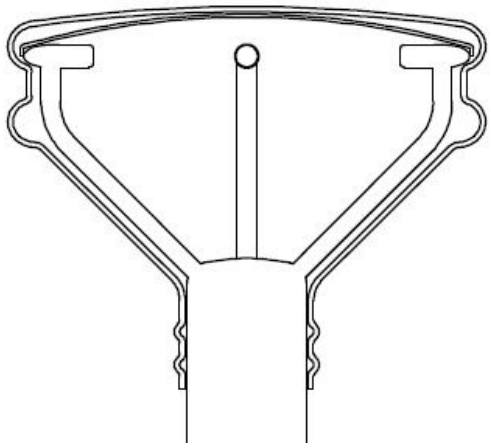
- Align the 20 way plug rotatable ring to allow access of a jeweller's screwdriver to remove the miniature grub screw.
- Fit parts over the IS cable in the order shown above.
- Prepare IS cable for soldering wires to the 20 way connector.
- Solder wires to contacts as per the above table.
- Screw the extended backshell into the connector (ensure that a sealing ring is fitted internally) and tighten to a torque of 3Nm
- Align the connector ring to allow re-fitting of the grub screw to a torque of 0.2 to 0.3Nm.
- Complete assembly of the cord clamp.

5.2.5 Mounting

Do NOT remove the black "rubber" transducer caps. Take care not to knock the four transducer arms. All the time the WindObserver is not in its final location, it should be protected from damage by keeping it in its original packaging, treating it as a delicate instrument.

When transporting the Anemometer from its box to its install location the supplied head cover parts (1277-30-045) should be fitted around the anemometer head (see below) and secured in place using supplied Tyraps.

Upon install completion remove the head cover.

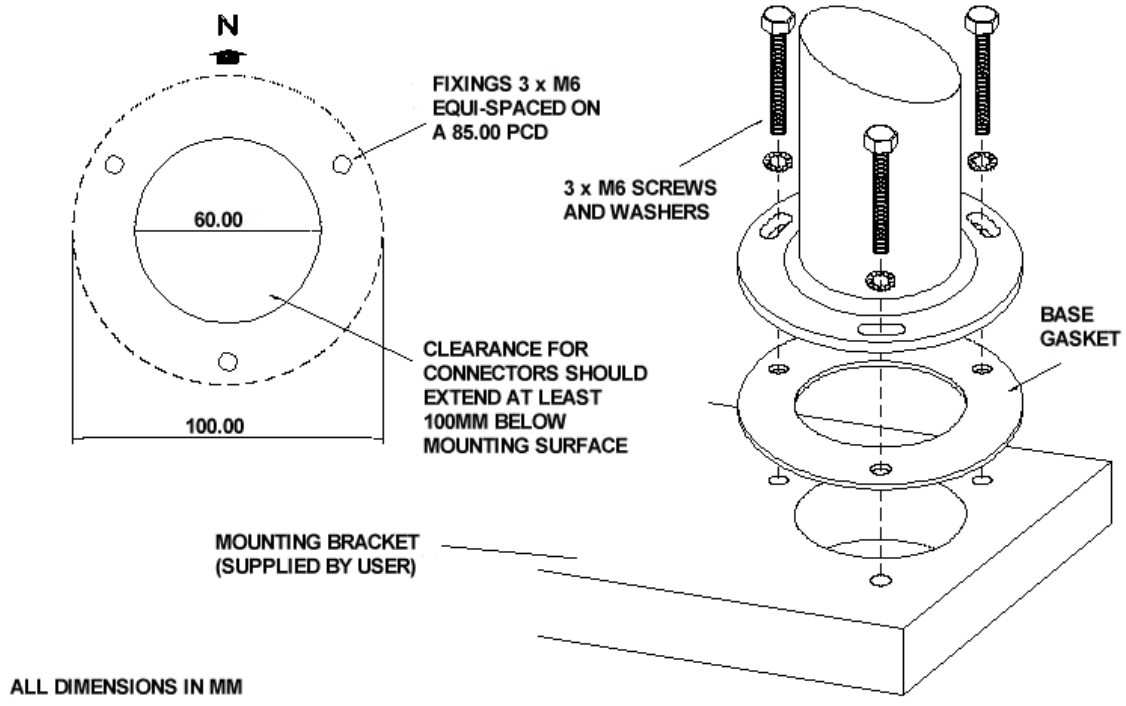


IS WindObserver Head showing application of protective head cover (Part/s 1277-30-045).

The Anemometer should be mounted on a suitable surface as defined in drawing 1086-G-045 shown below, using the mounting kit supplied and described in the Packing List.

Warranty and Certification is void if the case is removed.

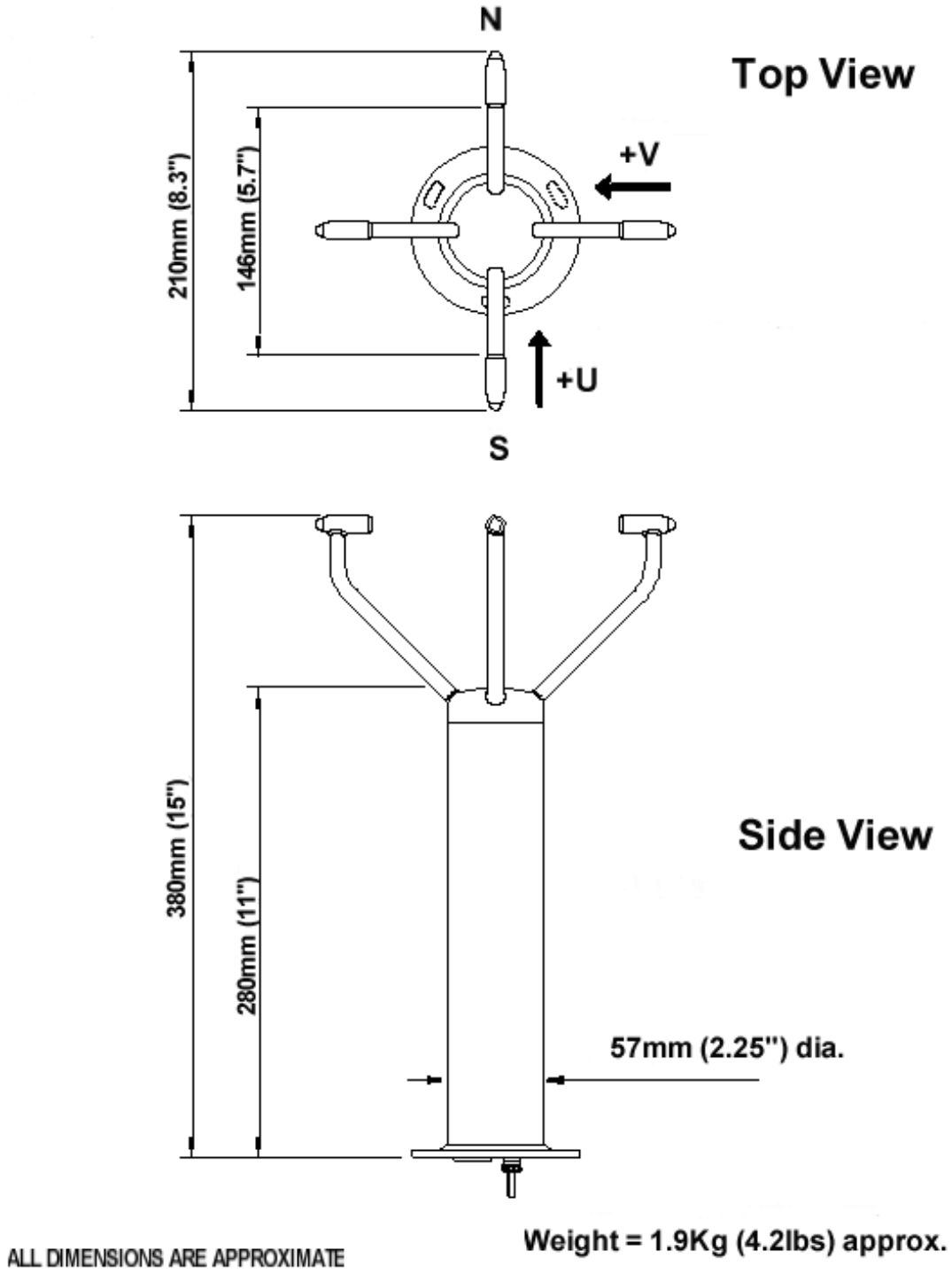
Drawing 1086-G-045 Issue 2 Anemometer Installation Details



5.2.6 Alignment

The anemometer should be set to point North, see drawing 1360-G-026 as shown below, (or to some other known reference direction). This is facilitated by slots in the base for the mounting screws, which allow rotation of the anemometer for fine alignment.

Drawing 1360-G-026 Issue 1, Type IIc I.S. Anemometer Dimensions



5.2.7 Sealing

The connector area at the base of the anemometer **should not** be directly exposed to moisture or solvents, as whilst the connectors are sealed when mated, the anemometer is **vented to air at the base** to avoid pressure build up. Therefore **use the gasket** provided in the mounting kit.

5.2.8 Corrosion

Careful note should be taken of the possibility of galvanic corrosion by incorrect mounting. It is vital that only stainless steel fixings are used and that the instrument is insulated from the mounting surface with the rubber gasket. This will ensure that the anemometer will provide long service under extreme conditions.

5.2.9 Earthing

The system must be earthed in accordance with local or national regulations. Intrinsically safe operation will be affected if incorrectly earthed. An Earth terminal is located at the base of the IS Anemometer and to ensure correct operation, and for maximum protection against lightning, the anemometer **MUST** be correctly earthed (grounded) via its mountings. Inadequate Earthing will degrade anemometer performance, particularly in the presence of radio frequency interference.

5.2.10 General

DO NOT attempt to remove or unscrew any fixing. Any unauthorised adjustment of the unit could affect intrinsic safety and will void the warranty.

6. SYSTEM OPERATION

6.1 Anemometer Default Settings

The factory default settings are:-

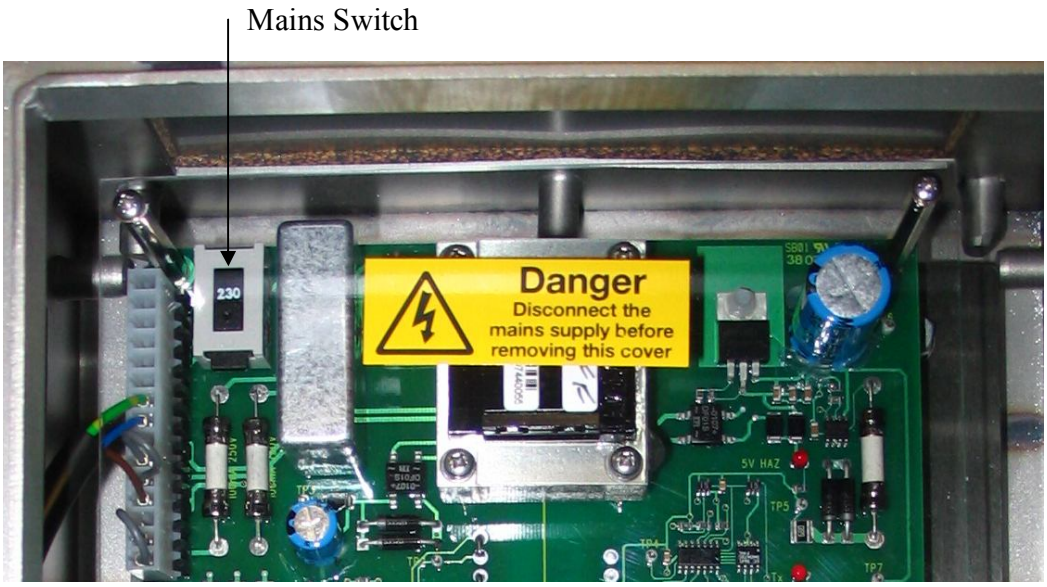
B3 F1 G0000 K1 L1 M2 NA O1 P1 U1 V1 X1

(Refer to Para 9.2 for a full explanation of the available settings).

B3:	9600 baud.
F1:	8 bits, no parity, 1 stop bit.
G0000	No averaging.
K1	IIMWV NMEA prefix.
L1	CR, LF.
M2	Polar ASCII continuous data.
NA	Node address A.
O1	Commas Separated Variable Output.
P1	1 output per second.
U1	Metres/Second.
V1	Vertical padding disabled.
X1	Align U axis with the transducer axis.

6.2 IS Power Supply Unit Mains Voltage Default Setting

The IS Mains Operated Power Supply Unit is shipped set for 230v AC operation and will not self-adjust for 115 AC operation.
If 115v AC operation is required then set the internal slide switch to the 115V setting.



Changing the supply voltage may be accomplished by first ensuring mains power is not applied to the Power Supply box.

Open the Power Supply box lid.

Remove 4 screws and washers retaining the protective Perspex cover over the PSU pcb.

Remove the Perspex cover and then set the slide switch to the appropriate voltage position.

Reverse the above to re-assemble the unit the lid screws should be torqued to 2NM.

7. CONNECTION TO A PC OR OTHER DEVICE

Connection to a PC or other device requires the use of:

1) The specified Intrinsically Safe Power Supply Unit Interface – MUST BE USED UNDER ALL CIRCUMSTANCES, CERTIFICATION DEPENDS UPON THIS.

2) Power Supply Interface to PC / Other device cable – e.g. Digital RS232 9 way "D Type" connector.

The IS Power Supply Unit supplies power to the anemometer electronics and provides conversion of the RS422 signal sent by the anemometer to a RS422 or RS232 signal for a PC. An RS422 or RS232 to USB converter may be required to interface with some PC's.

The anemometer outputs wind data through a single 20 way circular connector in the base. Details of the pin allocations can be found on Page 20. Data is provided in Digital format.

Connecting to a PC or External Device using the RS422 Output

Maximum suggested RS422 approved twisted pair screened cable length is 1000 Metres.

Intrinsically Safe Power Supply Box				PC or Device with RS422 Input
Signal Name	Mains PSU Terminal	Low Voltage PSU J4 Terminal		Signal Name
TX +	3	3	→	RX+
TX -	4	4	→	RX-
GND	5	5	Cable Shield Wire	Ground Earth
RX +	1	1	←	TX +
RX -	2	2	←	TX -

Connecting to a PC or External Device using the RS232 Output

Maximum suggested RS232 approved screened cable length is 25 Metres.

Intrinsically Safe Power Supply Box				PC 9 way Connector Serial Port Input
RS232 Signal Name	Mains PSU Terminal	Low Voltage PSU J2 Terminal		Terminal Number
RXD	11	3	→	2
TXD	12	5	→	3
GND	14	9	Cable Shield Wire	5 (GND)

Connecting to a Gill WindDisplay using an RS422 Connection

Maximum suggested RS422 approved twisted pair screened cable length is 1000 Metres.
Refer to the WindDisplay User Manual for the method of operation.

Intrinsically Safe Power Supply Box				WindDisplay	
Signal Name	Mains PSU Terminal	Low Voltage PSU J4 Terminal		Terminal Number	Signal Name
TX +	3	3	→	8	RS422 +
TX -	4	4	→	7	RS422 -
GND	5	5	Cable Shield Wire	Ground Earth	

- The Intrinsically Safe WindObserver is designed to interface with the Gill WindDisplay unit via the Power Supply Interface to provide a complete wind speed and direction system. To interface to a non NMEA WindDisplay the WindObserver is set for Polar (M2) and 9600 (B3) configuration settings.
- When coupled to a WindDisplay, the Intrinsically Safe WindObserver can be used as supplied, however if a fault occurs the WindDisplay may lock into the last valid reading. Re-configuring the Intrinsically Safe WindObserver to Fixed Field output (O2) will ensure that any fault is flagged on the WindDisplay.
- After coupling to a WindDisplay, the Wind Speed units and the Averaging period can be selected using the WindDisplay controls. *See the WindDisplay User Manual*.
- Note that although the WindDisplay can display wind speed in various units, these are calculated within the WindDisplay. The data coming to the WindDisplay **must** be in metres/sec (the IS WindObserver factory default output setting).

Meteorological Display

Marine Display

NOTES:-

- **If the WindDisplay is configured for NMEA mode then the Intrinsically Safe WindObserver must also be configured for NMEA mode and normally 4800 baud operation (configuration settings M5 and B2).**
- **The WindDisplay cannot provide power for the sensor circuitry.**

8. USING THE ANEMOMETER WITH A COMPUTER AND SOFTWARE

This section describes the modes and format of the data output by the anemometer.

On first applying power to the WindObserver, it will be in 'Measurement Mode', and it will output wind measurement information within 3 seconds in one of the formats as described below.

Setting the output format, units, other parameters, options and the communication settings are all carried out in the alternative 'Configuration Mode'.

See Section 9 Anemometer Software Commands for details of how this is done.

The factory default settings are shown here in **bold***, and for convenience some 'Configuration codes' (as used to set the configuration) are shown in blue boxes. For example* M3.

Wind Speed format

The wind speed measurements can be output in one of the following formats:
UV, Polar, Customer formats (NMEA, Tunnel and Binary).

Output formats

The UV and Polar wind speed parameters are output in either ASCII or binary.
These parameters can be transmitted continuously or polled from the user.
Polar is also available in continuous NMEA format.

Output Formats Table

Output format	Output	Tri-state o/p	Configuration code
ASCII UV	Continuous	No	M1
	Polled	Yes	M3
ASCII Polar	**Continuous**	**No**	**M2**
	Polled	Yes	M4
ASCII Tunnel	Continuous	No	M12
ASCII Tunnel	Polled	Yes	M13
NMEA	Continuous	No	M5
Binary Tunnel	Continuous	No	M6
Binary UV short	Continuous	No	M7
Binary Polar	Continuous	No	M8
ASCII Polar	Continuous Averaged (RWA)	No	M15
ASCII Polar	Polled Average (RWA)	Yes	M14

8.1 Digital Serial Output Formats

The following data modes are available from the serial output of the anemometer:-

Mode 1

ASCII, UV, Continuous

A,+000.00,+000.01,M,00,21	Fault free conditions.
A,,,M,04,24	Fault report condition with CSV setting (O1).
A,+999.99,+999.99,M,04,24	Fault report condition with Fixed Field setting (O2).

Where:

<STX><ID>,±UUU.UU,±VVV.VV,U,SS,<ETX>CC<CR><LF>

where:

<STX>	-	Start of string character (ASCII value 2)
<ID>	-	Anemometer IDentification (A-Z)
±UUU.UU	-	'U' axis velocity (*1)
±VVV.VV	-	'V' axis velocity (*2)
U	-	Units (M=m/s, N=knots, P=mph, K=kph, F=fpm)
SS	-	Status Code (see Para 10.5)
<ETX>	-	End of string character (ASCII value 3)
CC	-	Checksum of all Characters between <STX> and <ETX> (HEX byte)
<CR><LF>	-	Carriage Return and LineFeed

(*1) In Feet per Minute output mode, the string changes to ±UUUU.U

(*2) In Feet per Minute output mode, the string changes to ±VVVV.V

Mode 2

ASCII, Polar, Continuous

A,279,000.05,M,00, 07	Fault free conditions.
A,,,M,04,24	Fault report condition with CSV setting (O1).
A,999,999.99,M,04,0A	Fault report condition with Fixed Field setting (O2).

Where:

<STX><ID>,DDD,MMM.MM,U,SS,<ETX>CC<CR><LF>

where:

<STX>	-	Start of string character (ASCII value 2)
<ID>	-	Anemometer IDentification (A-Z)
DDD	-	Direction in degrees
MMM.MM	-	Wind Magnitude (*3)
U	-	Units (M=m/s, N=knots, P=mph, K=kph, F=fpm)
SS	-	Status Code (see Para 10.5)
<ETX>	-	End of string character (ASCII value 3)
CC	-	Checksum of all Characters between <STX> and <ETX> (HEX byte)
<CR><LF>	-	Carriage Return and LineFeed

(*3) In Feet per Minute output mode, the string changes to MMMM.M

Mode 3
ASCII, UV, Polled

A,+000.00,+000.01,M,00,21 Fault free conditions.
A,,,M,04,24 Fault report condition with CSV setting (O1).
A,+999.99,+999.99,M,04,24 Fault report condition with Fixed Field setting (O2).
Where:
<STX><ID>,±UUU.UU,±VVV.VV,U,SS,<ETX>CC<CR><LF>

<STX>	-	Start of string character (ASCII value 2)
<ID>	-	Anemometer IDentification (A-Z)
±UUU.UU	-	'U' axis velocity (*1)
±VVV.VV	-	'V' axis velocity (*2)
U	-	Units (M=m/s, N=knots, P=mph, K=kph, F=fpm)
SS	-	Status Code (see Para 10.5)
<ETX>	-	End of string character (ASCII value 3)
CC	-	Checksum of all Characters between <STX> and <ETX> (HEX byte)
<CR><LF>	-	Carriage Return and LineFeed

(*1) In Feet per Minute output mode, the string changes to ±UUUU.U
(*2) In Feet per Minute output mode, the string changes to ±VVVV.V

Mode 4
ASCII, Polar, Polled

A,279,000.05,M,00, 07 Fault free conditions.
A,,,M,04,24 Fault report condition with CSV setting (O1).
A,999,999.99,M,04,0A Fault report condition with Fixed Field setting (O2).
Where:
<STX><ID>,DDD,MMM.MM,U,SS,<ETX>CC<CR><LF>

<STX>	-	Start of string character (ASCII value 2)
<ID>	-	Anemometer IDentification (A-Z)
DDD	-	Direction in degrees
MMM.MM	-	Wind Magnitude (*3)
U	-	Units (M=m/s, N=knots, P=mph, K=kph, F=fpm)
SS	-	Status Code (see Para 10.5)
<ETX>	-	End of string character (ASCII value 3)
CC	-	Checksum of all Characters between <STX> and <ETX> (HEX byte)
<CR><LF>	-	Carriage Return and LineFeed

(*3) In Feet per Minute output mode, the string changes to MMMM.M

Mode 5
ASCII, NMEA, continuous

$IIMWV,262,R,000.84,M,A*1A	Fault free conditions.
$IIMWV,,R,,M,V*29	Fault report condition with CSV setting (O1).
$IIMWV,999,R,999.99,M,V*07	Fault report condition with Fixed Field setting (O2).

Where:

$IIMWV,$DDD_1$,R,MMM.MM,U,A,*cc<CR><LF>

'$'	-	Start of string character
'II'	-	Integrated instrument (or WI = Wind Instrument)
'MWV'	-	Mean wind direction and velocity
DDD	-	Direction in degrees
'R'	-	Relative wind measurement
MMM.MM		Wind Speed
U	-	Units (M=m/s, N=knots, P=mph, K=kph, F=fpm)
A	-	Data Status flag (A = Acceptable, V = Void)
'*'	-	Checksum delimiter
cc		Checksum, Exclusive OR of all characters between '$' and '*' reported as ASCII hex.

MODE 6

Binary Tunnel Continuous
In a terminal program the Binary output will look like:-
Converted it will read like:-
0x81 0x81 +000.04 1 00 1
<STX>,±MMM.MM, ±P,SS,U<ETX><CR><LF>
Where:-

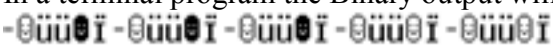
<STX>	-	Start of string character (ASCII value 2)
±MMM.MM	-	Wind Magnitude along U axis.
±P		Direction along U Axis (1 - +U, 0 = -U)
SS	-	Status Code (see Para 10.5)
U	-	Units (1=m/s, 2=knots, 3=mph, 4=kph, 5=fpm)
<ETX>	-	End of string character (ASCII value 3)
<CR><LF>	-	Carriage Return and LineFeed

Mode 7
Binary UV Short Continuous
In a terminal program the Binary output will look like:-

Converted it will read like:-
0x81 0x81 +000.04 -000.02 00 1
<STX>,±UUU.UU, ±VVV.VV,SS,U<ETX><CR><LF>
Where:-

<STX>	-	Start of string character (ASCII value 2)
±UUU.UU	-	Wind Magnitude along U axis.
±VVV.VV	-	Wind Magnitude along V axis.
SS	-	Status Code (see Para 10.5)
U	-	Units (1=m/s, 2=knots, 3=mph, 4=kph, 5=fpm)
<ETX>	-	End of string character (ASCII value 3)
<CR><LF>	-	Carriage Return and LineFeed

Mode 8
Binary Polar Continuous
In a terminal program the Binary output will look like:-



Converted it will read like:-
0x81 0x81 006.04 265 00 1
<STX>,MMM.MM, DDD,SS,U<ETX><CR><LF>
Where:-

<STX>	-	Start of string character (ASCII value 2)
MMM.MM	-	Wind Magnitude along U axis.
DDD	-	Wind Magnitude along V axis.
SS	-	Status Code(see Para 10.5)
U	-	Units (1=m/s, 2=knots, 3=mph, 4=kph, 5=fpm)
<ETX>	-	End of string character (ASCII value 3)
<CR><LF>	-	Carriage Return and LineFeed

Mode 12
ASCII Tunnel Continuous

A,000.00,1,00,M,0F	Fault free conditions.
A,,1,04,M,15	Fault report condition with CSV setting (O1).
A,999.99,1,04,M,02	Fault report condition with Fixed Field setting (O2).

<STX>,ID,MMM.MM, ±P,SS,U<ETX><CR><LF>
Where:-

<STX>	-	Start of string character (ASCII value 2)
<ID>	-	Anemometer IDentification (A-Z)
MMM.MM	-	Wind Magnitude along U axis.
±P		Direction along U Axis (1 - +U, 0 = -U)
SS	-	Status Code (see Para 10.5)
U	-	Units (M=m/s, N=knots, P=mph, K=kph, F=fpm)
<ETX>	-	End of string character (ASCII value 3)
<CR><LF>	-	Carriage Return and LineFeed

Mode 13
ASCII Tunnel Polled

A,000.00,1,00,M,0F	Fault free conditions.
A,,1,04,M,15	Fault report condition with CSV setting (O1).
A,999.99,1,04,M,02	Fault report condition with Fixed Field setting (O2).

<STX>,ID,MMM.MM, ±P,SS,U<ETX><CR><LF>
Where:-

<STX>	-	Start of string character (ASCII value 2)
<ID>	-	Anemometer IDentification (A-Z)
MMM.MM	-	Wind Magnitude along U axis.
±P		Direction along U Axis (1 - +U, 0 = -U)
SS	-	Status Code(see Para 10.5)
U	-	Units (M=m/s, N=knots, P=mph, K=kph, F=fpm)
<ETX>	-	End of string character (ASCII value 3)
<CR><LF>	-	Carriage Return and LineFeed

Mode 14
ASCII Polar Polled Road Weather Average (RWA)

A,M14,000,000.00,M,000,000.00,51,40	Poll result upon unit start up whilst building up an average (Status code 51 reported).
A,M14,009,000.02,M,029,000.06,00,42	Poll result when average building completed (Status code 00 reported).
A,M15,000,000.02,M,000,000.06,04,45	CSV data, fault condition (status code 04)
A,M15,000,000.03,M,,,04,6C	CSV data with fault condition remaining
A,M15,,,M,,,04,41	CSV data with continuous fault condition
A,M15,296,000.01,M,174,000.08,04,47	Fixed Field, fault condition (status code 04)
A,M15,296,000.02,M,999,999.99,04,4E	Fixed Field with fault condition remaining
A,M15,999,999.99,M,999,999.99,04,41	Fixed Field with continuous fault condition

Where:
<STX><ID>,MXX,DDD,MMM.MM,EEE,NNN.NN,U,SS,<ETX>CC<CR><LF>

<STX>	-	Start of string character (ASCII value 2)
<ID>	-	Anemometer IDentification (A-Z)
MXX		Mode Setting (M14 for polled mode)
DDD	-	Direction in degrees
MMM.MM	-	Wind Magnitude (*3)
U	-	Units (M=m/s, N=knots, P=mph, K=kph, F=fpm)
EEE		Maximum Gust Direction
NNN.NN		Maximum Gust Speed
SS	-	Status of data (code 51 means unit still average building)
<ETX>	-	End of string character (ASCII value 3)
CC	-	Checksum of all Characters between <STX> and <ETX> (HEX byte)
<CR><LF>	-	Carriage Return and LineFeed

(*3) In Feet per Minute output mode, the string changes to MMMM.M

Mode 15
ASCII Continuous Road Weather Average (RWA)

With default factory RWA unit settings then upon switch on by default it will take 60 seconds before outputting the first reading and thereafter a reading will occur once per minute.

A,M15,000,000.02,M,350,000.07,51,42	Average building (status code 51)
A,M15,000,000.02,M,005,000.07,00,45	Averaged result (status code 00)
A,M15,000,000.02,M,000,000.06,04,45	CSV data, fault condition (status code 04)
A,M15,000,000.03,M,,,04,6C	CSV data with fault condition remaining
A,M15,,,M,,,04,41	CSV data with continuous fault condition
A,M15,296,000.01,M,174,000.08,04,47	Fixed Field, fault condition (status code 04)
A,M15,296,000.02,M,999,999.99,04,4E	Fixed Field with fault condition remaining
A,M15,999,999.99,M,999,999.99,04,41	Fixed Field with continuous fault condition

Where:
<STX><ID>,MXX,DDD,MMM.MM,EEE,NNN.NN,U,SS,<ETX>CC<CR><LF>

<STX>	-	Start of string character (ASCII value 2)
<ID>	-	Anemometer IDentification (A-Z)
MXX		Mode Setting (M15 for continuous mode)
DDD	-	Direction in degrees
MMM.MM	-	Wind Magnitude (*3)
U	-	Units (M=m/s, N=knots, P=mph, K=kph, F=fpm)
EEE		Maximum Gust Direction
NNN.NN		Maximum Gust Speed
SS	-	Status of data (code 51 means unit still average building)
<ETX>	-	End of string character (ASCII value 3)
CC	-	Checksum of all Characters between <STX> and <ETX> (HEX byte)
<CR><LF>	-	Carriage Return and LineFeed

(*3) In Feet per Minute output mode, the string changes to MMMM.M

Modes 14 and 15 Road Weather Averaging Notes.

The averaging is implemented with reference to the following standard:

Guide to Meteorological Instruments and Methods of Observation – World Meteorological Organization WMO-No8 seventh edition 2008 ISBN 978-92-63-10008-S.

The direction and magnitude outputs are derived from the vector sum of U and V over the RWALONG averaging period (default 10 minutes in P1 (1Hz output)).

The gust output is derived from the vector sum of U and V over 3 readings (3 seconds in P1), and the max gust is the maximum of the gust value over the RWASHORT period (default 60 seconds in P1). The max gust value is reset to zero at the end of each RWASHORT period.

Mode 15 – Averaging Data in Continuous mode.

Averaged Digital Data Output comprises of.

<Start of String>, Node, Mode, Averaged Direction, Averaged Magnitude, units, Maximum Gust Direction, Maximum Gust Magnitude, Status, <End of String>, checksum

e.g.

```
0A,M15,293,000.03,M,338,000.05,51,47
```

(status code 51 shows measurement average building, non-heat enabled units only).

```
0A,M15,198,000.04,M,088,000.39,00,4B
```

(status code 00 code shows measurement average building period complete and normal operation, non-heat enabled units only).

Principle set up commands associated with this averaging mode are:-

Px:- Measurement Rate, (P1 to P3) this command sets the underlying measurement rate from 1Hz to 4Hz.

RWASHORT xx: - Short Term Number, where xx is a number from 10 to 60.

RWALONG xx: - Long Term Number, where xx is a number from 1 to 10.

The Averaged Data Output period in seconds is:-

$$\frac{\text{RWASHORT Number}}{\text{Measurement Rate (P Setting Hz value)}}$$

Therefore with the RWASHORT number set for 60 (default) and P command set for 1Hz (P1 default) the unit will output a rolling averaged reading every 60 seconds.

The Averaged Direction and Magnitude reading is based on:-

RWALONG Number * Averaged Data Output period.

Therefore if the RWALONG number is 10 (default) and Averaged Data Output Period is 60 seconds, then the rolling averaged Direction and Magnitude data is calculated over rolling 600 readings.

```
aA,M15,293,000.03,M,338,000.05,51,♥47
aA,M15,301,000.03,M,304,000.04,51,♥43
aA,M15,299,000.03,M,285,000.02,51,♥4D
aA,M15,303,000.02,M,336,000.02,51,♥47
aA,M15,291,000.03,M,200,000.64,51,♥48
aA,M15,291,000.02,M,301,000.03,51,♥48
aA,M15,243,000.04,M,172,001.52,51,♥42
aA,M15,236,000.03,M,090,000.08,51,♥44
aA,M15,243,000.03,M,099,000.09,51,♥4E
aA,M15,198,000.04,M,088,000.39,00,♥4B
aA,M15,180,000.04,M,099,000.09,00,♥41
aA,M15,180,000.03,M,345,000.03,00,♥4E
```

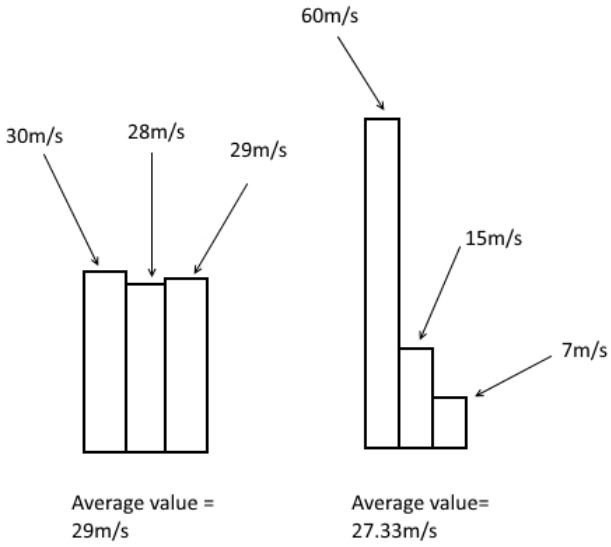
Whenever the unit is powered up then until the unit has reached its minimum long term averaging interval the status code will read 51 (Measurement Average Building).

Gust Outputs

The Maximum Gust Direction is the direction of the maximum gust measured over the short term output period. Gust is generated from a rolling 3s average of the short term output period, and reset at the end of short term output period.

The maximum Gust Magnitude is the magnitude of the maximum gust measured over the short term output period. Gust is generated from a rolling 3s average of the short term output period, and reset at the end of short term output period.

The Gust value is derived from the highest average value based on 3 consecutive samples within one average data output period. For example:



Two gust events are observed within one average data output period. The first produces an average value of 29m/s, the second an average value of 27.33m/s. The event with the highest average value is the one that the WindObserver will output, which in this case would be the average value from the first event, even though the peak gust was higher during the second event.

The G Command setting has no effect on Mode 15 Settings.

Mode 14 – Averaging Polled Mode

See Mode 15 for data output format and command explanations.

For ease of use before changing to this Mode set all other WindObserver parameters first including:-

Px:- Measurement Rate, (P1 to P4) this command sets the underlying measurement rate from 1Hz to 4Hz.

RWASHORT xx: - Short Term Number, where xx is a number from 10 to 60.

RWALONG xx: - Long Term Number, where xx is a number from 1 to 10.

Once set for Mode 14, to Poll for averaged data use the ? command followed by the unit designator A (default setting, ensure capital letter used).

When polled with the default Mode 14 factory setting the WindObserver (set for default 1Hz output) will output the last valid 10 minute wind speed and direction average, updated every minute along with last valid 1 minute Gust magnitude.

If the unit is powered up and polled before the unit has reached its minimum averaging interval the status code will read 51 (Measurement Average Building, non-heat enabled units only).

The G Command setting has no effect on Mode 14 Settings.

8.2 Digital Format Notes

ASCII Polled Modes (Mode 3 UV, 4 Polar, 13 Tunnel and 14 RWA).

When in the Polled mode, an output is only generated when the host system sends a Poll signal to the WindObserver consisting of the WindObserver Unit Identifier – that is, the relevant letter A – Z.

The output formats are otherwise as described above.

The commands available in this mode are:

Description	Command	WindObserver response
WindObserver Unit Identifier	A ….. Z	Wind speed output generated
Enable Polled mode	?	(None)
Disable Polled mode	!	(None)
Request WindObserver Unit Identifier	*&	A ….. Z (as configured)
Enter Configuration mode	*<N>	CONFIGURATION MODE

It is suggested that in polled mode the following sequence is used for every poll for information.

? Ensures that the Sensor is enabled to cover the event that a power down has occurred.

A-Z Appropriate unit designator sent to retrieve a line of data.

! Sent to disable poll mode and reduce possibility of erroneous poll generation.

When in polled mode the system will respond to the data command within 30mS with the last valid data sample as calculated by the Output rate (P Mode Setting).

If the unit is powered down after use or upon switch on then allow 3 seconds from switch on before sending poll commands.

G Command Averaging.

Using the G Command in association with modes other than M14, M15 and polled modes.

The Averaging Period can be set from zero to 3600 secs. (1 hour). The default setting is zero**.** When averaging is enabled, data is output at a rate determined by the averaging period. The data is an average of valid data collected during the averaging period.

If G is set to zero then averaging settings will be disabled.

For instance if the unit is set for G0025 then every 25 seconds there will be a single result output that provides the average of the wind direction and magnitude data over the last 25 seconds.

A,219,000.78,M,00,└ 0D
A,202,000.79,M,00,└ 06
A,207,001.22,M,00,└ 0C
A,220,000.48,M,00,└ 04

Low Wind Speed Condition (Less than 0.05m/s)

If wind speed is below 0.05m/s then the direction parameter in ASCII modes will remain blank in CSV mode and in fixed field mode the direction parameter will freeze at the last valid direction reading. All other parameters will update at the output rate.

Checksum

The checksum is the EXCLUSIVE OR of the 8 data bits of each character between and excluding <STX> and <ETX>. The HEX value of the most significant and least significant four bits of the result are converted to 2 ASCII characters for transmission.

1) If the anemometer detects a checksum error in the non-volatile memory, the following ASCII string is output in place of the normal output:
   NO CONFIGURATION DATA<CR><LF>.
2) In fixed field mode an error will result in value +99.999 for UV and Magnitude and 999 for direction being reported.

45° Offset

If required, the U axis can be offset +45° to the transducer axis.

Vertical Output Padding

Inserts a dummy W vector to simulate a 3 axis output reading.

8.3 Status Codes

A two character 'Status code' will be transmitted in the serial string. This value will denote the system and measurement status. The codes are:

Code 00 - O.K.
This indicates that the system is operating correctly. The transducers signals are within the required limits and no memory faults have occurred.

Code 01 - Transducer Pair 1 Failed.
This error occurs when there is a blockage in the path of transducer pair one, or when a transducer has failed. Software judges that the data is invalid.

Code 02 - Transducer Pair 2 Failed.
This error occurs when there is a blockage in the path of transducer pair two, or when a transducer has failed. Software judges that the data is invalid.

Code 04 - Transducer Pairs 1 and 2 Failed.
This error occurs when there is a blockage in the path of transducer pairs one and two, or when transducers have failed. Software judges that the data is invalid.

Code 08 - Non-Volatile Memory Checksum Error.
The non-volatile memory (EEPROM) holds the user set up, internal system parameters and calibration data. If the internal checksum programmed in production does not match the one calculated by the system during operation, then this status code will be flagged. An EEPROM error could be caused by a faulty read/write cycle or a complete chip failure.

Code 09 - Volatile Memory Checksum Error.
The volatile memory (SRAM) holds the data, which is used during the vector calibration codes. If the internal checksum programmed in production does not match the one calculated during system operation then this status code is flagged. The unit is operating in uncalibrated mode.

Code 10 - System Gain at Maximum.
This indicates that an ultrasonic signal has been received but the receive gain had to be set to maximum to recover the pulse. This is normally due to partially blocked transducer paths. The wind velocity reported could be in error.

Code 51 - Measurement Average Building.
This code is output until the average period determined in Modes 14 and 15 has been reached. The reported velocities during this period are only the average calculated for the length of time that the unit has been operational. This code only occurs after a power on or exit from configuration mode.

9. ANEMOMETER SOFTWARE COMMANDS

The Intrinsically Safe WindObserver can be configured using Terminal emulator software such as HyperTerminal.

Alternatively it is possible to use Gill Wind Software as a Terminal program only (Wizard and Sync Comms not applicable). Wind will run on PC's up to and including Windows 8 and can be downloaded from:-
http://www.gillinstruments.com/main/software.html.

9.1 Configuring using HyperTerminal

Note – Other terminal emulators are configured in a very similar way.

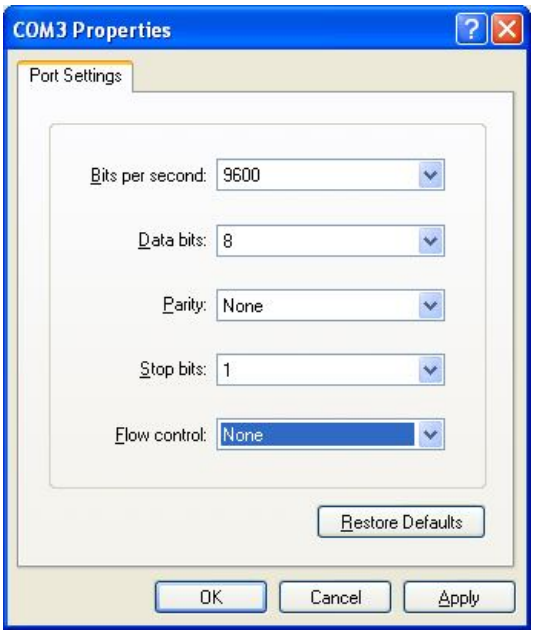
1. Check the PC Hardware settings to find which Com port that the unit is connected to.
2. Open HyperTerminal.
3. Create a New Connection (File → New Connection).
4. Enter a **Name** (eg TEST) and click on OK.

5. On the next screen use drop down menu for 'Connect using', select COM 1 Port (for a PC RS232 serial port connection to a 9 way D Type connector) or applicable COM port. Click on OK.

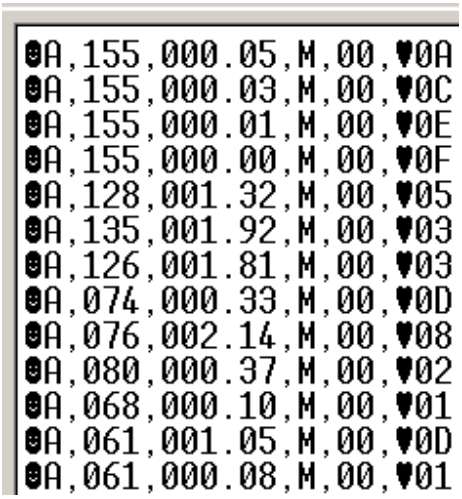
6. Adjust the Port settings to match WindObserver settings. WindObserver default settings are :

   Bits per second 9600
   Data bits 8
   Parity None
   Stop bits 1
   Flow Control None

   Click on OK and data similar to the following example will scroll on screen at the output rate:



The WindObserver should be outputting data as per the following screen. **Note if strange characters or garbled data are seen try opening the HyperTerminal link at a different Baud rate i.e. 4800 Baud.**



Entering Configuration mode

From Continuous mode

Type *

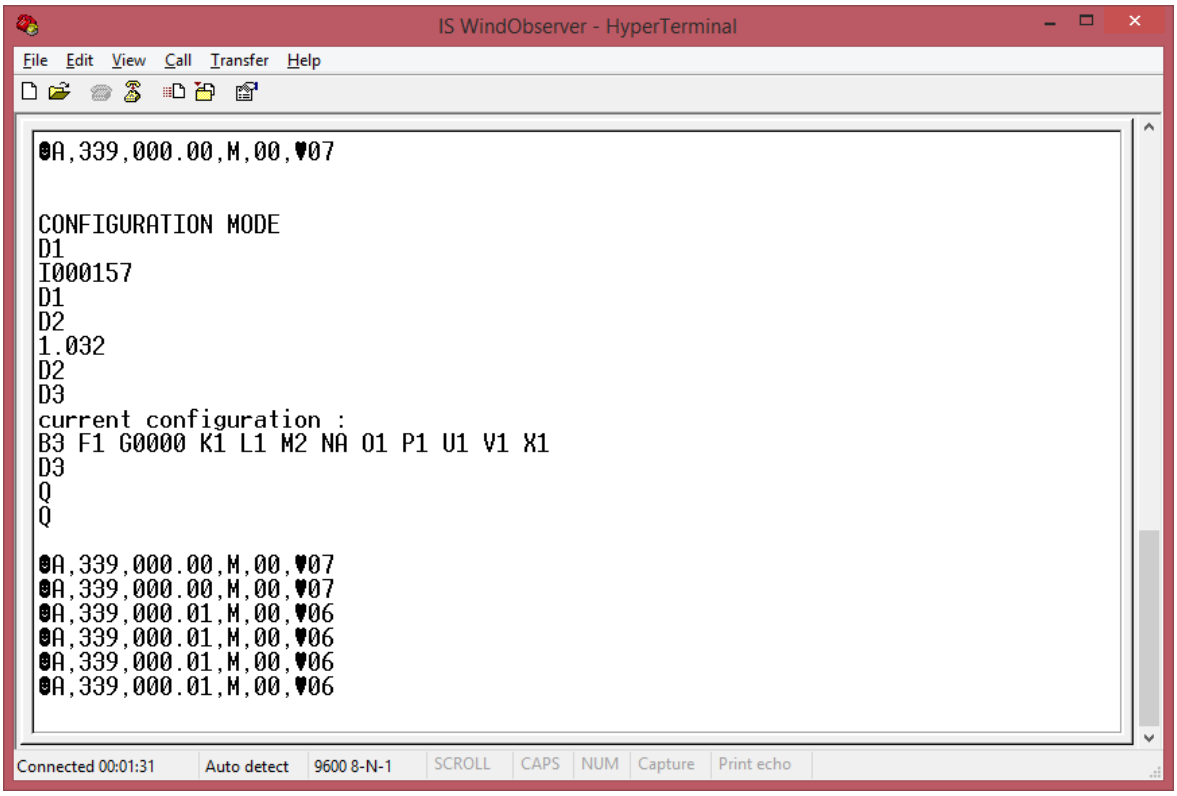
From Polled mode

Type *N - where N is the Unit Identifier.
Note - the Unit Identifier must be entered as upper-case

The Intrinsically Safe WindObserver responds with a CONFIGURATION MODE message, stops reporting wind measurements, and waits for a command (as detailed below).

So for Example:-

Type * (may take more than one attempt).
This will bring up the text CONFIGURATION MODE.
Type D1 and press the Enter key to view the unit serial number.
Type D2 and press the Enter key to view the unit software version.
Type D3 and press the Enter key to view the unit configuration.
For IS WindObserver configuration settings refer to the IS WindObserver Manual in Para 9.2.
Type Q and press the Enter key to go back into Measurement Mode.



Returning to Measurement mode

Type Q and press ENTER key

If in **Continuous** mode, the anemometer responds with wind measurements immediately, continuing at the selected Sampling rate.

If in **Polled** mode:-

?	Enables poll
N	Polls anemometer (where N is the Unit identifier entered as upper-case)
	The anemometer replies with a single set of wind measurements
&	Anemometer replies with Unit identifier
!	Disables poll

Note:- If the unit is in Polled Mode it is always best to interrogate the unit for data with a ? before the poll identifier to cater for the event that the power has been switched off or power interrupted.

Checking the configuration

We strongly recommend that, as a standard procedure, you use this command (D3) prior to, and after, changing any settings. It shows the current settings for all the alterable settings. We suggest you note down your settings, so that you can easily return to them.

	Type *	Enters Configuration Mode (from Continuous mode)
Or	Type *N	Enters Configuration Mode (from Polled mode)

Type D3 and press ENTER key — The Intrinsically Safe WindObserver responds with the current configuration settings.

The factory default settings are:-

B3 F1 G000 K1 L1 M2 NA O1 P1 U1 V1 X1

To return to Measurement mode — Type Q and press ENTER key

How to change these settings is explained in the following sections.

Changing settings

To change a setting, first go into Configuration mode and then refer to the sections below. Enter the Configuration code of the new setting required, followed by press ENTER key. If successful, the new setting will be echoed back as a message by the Intrinsically Safe WindObserver.

For example, to change the message format to NMEA, Type M5 and press the ENTER key . The Intrinsically Safe WindObserver will reply with M5. When the unit is returned to the Measurement mode Type Q and press the ENTER key, it will be in NMEA format.

Note: The factory-set (default) settings are shown in **bold** in the following sections.

9.2 Configuration Settings

Settings applicable to the IS WindObserver are as follows:-

BX - Baud Rate

Setting	Configuration code
2400	B1
4800	B2
9600	**B3**
19200	B4
1200	B6

To change the Baud rate when using HyperTerminal: -

E.g. If set to B3 (9600 baud) and it is required to set to Baud rate to B2 (4800 baud).

Type * to enter Configuration Mode.

Type B 2 and press ENTER, **(Do not type any further commands at this stage).**

Close the 9600 Baud HyperTerminal connection.

Open HyperTerminal and set the new connection Baud Rate to 4800 baud.

Type B and press ENTER, the letter B will be shown followed by B2

Type Q and press ENTER, data will scroll at the new baud rate.

Dx- Diagnostic and Configuration Command

Each of these commands causes a response from the Intrinsically Safe WindObserver.

Item	Command code	Typical response
Type and serial No.	D1	I03000
Software version	D2	1.032
Unit configuration	D3	Current configuration: B3 F1 G0000 K1 L1 M2 NA O1 P1 U1 V1 X1
Anemometer power supply voltage	D5	+07.9
Integrity check	D6	See Para 10.6 Bench Tests

Fx- Data and Parity Options

Setting	Configuration code
8 bits, no parity, 1 stop bit	F1
8 bits, even parity, 1 stop bit	F2
8 bits, odd parity, 1 stop bit	F3

Gx to Gxxxx - Averaging

Setting	Configuration code
No Averaging (Default)	G0000

Enter the required averaging period in seconds as a four figure number between 0000 and 3600.

If for example set for G0005 then there will be a single output once every 5 seconds based on the average of the previous five once second results.

Kx – NMEA Settings

Setting	Configuration code
NMEA string "IIMWV"	K1
NMEA string "WIMWV"	K2

Lx - ASCII Message Terminator

Setting	Configuration code
CR LF	L1
LF	L2

Mx to Mxx - Message Format

Output format	Configuration code
ASCII UV Continuous	M1
ASCII Polar Continuous	**M2**
ASCII UV Polled (tri-state)	M3
ASCII Polar Polled (tri-state)	M4
NMEA Continuous	M5
Binary Tunnel Continuous	M6
Binary UV Continuous	M7
Binary Polar Continuous	M8
ASCII Tunnel Continuous	M12
ASCII Tunnel Polled (tri-state)	M13
ASCII Polar Polled Averaged	M14
ASCII Polar Continuous Averaged	M15

Nx - Node Address (A default)

Item	Options	Command
Node Address	**A**… -(A to Z)	**N<A>**

Ox – ASCII Output Format (Output String Padding)

Setting	Configuration code
Comma Separated Variable (CSV)	**O1**
Fixed Field	O2

Example data strings:-

POLAR	NMEA
CSV data changing to error status code condition.	**CSV** data changing to error status code condition**.**
┐A,235,000.77,M,00,└0A	$IIMWV,191,R,000.55,M,A*19
┐A,,,M,04,└24	$IIMWV,,R,,M,V*29
Fixed Field data changing to error status code condition.	**Fixed Field** data changing to error status code condition.
┐A,266,000.73,M,00,└08	$IIMWV,191,R,000.55,M,A*19
┐A,999,999.99,M,04,└0A	$IIMWV,999,R,999.99,M,V*07

Px - Output Rate

Outputs per second	1	2	4
Configuration code	P1	P3	P2

Q- Returning to Measurement Mode (see page 42)

Road Weather Averaging Settings

RWASHORT XX (Short term number)

Where XX = 10 to 60, associated with Mode 14 and Mode 15 averaging.

RWALONG XX (Long term number)

Where XX = 1 to 10, associated with Mode 14 and Mode 15 averaging.

Ux – Digital Output Units

Units	**metres/sec (m/s)**	knots (knots)	miles / hour (MPH)	kilometre/hour (kph)	feet / minute (fpm)
Configuration code	U1	U2	U3	U4	U5

Vx- Vertical Output Padding

Setting	Configuration code
Disable vertical output padding	V1
Enable vertical output padding	V2

Xx - 45° Alignment Offset/Inverted Operation

Setting	Configuration code	Notes
Align U axis with transducer axis	X1	**X1. Aligns U axis with North/South axis.**
Align U axis +45° to transducer axis	X2	X2. This re-aligns both U&V and polarity 45˚ to transducer axis.
Reverses Polar Direction	X3	X3 reverses reported polar direction to allow the instrument to be mounted upside down. N.B. Does NOT affect UV alignment (Mode 1, 3).
Align @ 45° from North	X4	X4 set polar alignment at 45 degrees from North when instrument is mounted upside down. Does NOT affect UV alignment (Mode 1, 3).

The figure below shows the polarity of U and V if the wind components along the U and V axis are blowing in the direction of the respective arrows.

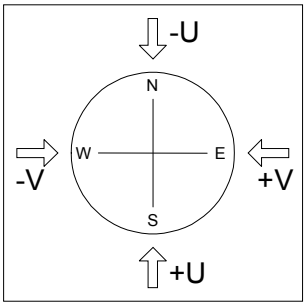


Figure of Anemometer UV Polarity

10. Maintenance & fault-finding

10.1 Cleaning and Handling

When installing the unit handle with lint free gloves and degrease the unit to reduce the build-up of deposits.

If there is any build-up of deposit on the unit, it should be gently cleaned with a cloth, moistened with soft detergent. Solvents should not be used, and care should be taken to avoid scratching any surfaces. The unit must be allowed to defrost naturally after being exposed to snow or icy conditions, do NOT attempt to remove ice or snow with a tool.

Always fit the protective cover supplied (see Para 5.2.5) before installation or when removing the sensor from the installation.

Do NOT remove black "rubber" transducer caps.

10.2 Servicing

There are no moving parts or user-serviceable parts requiring routine maintenance.

Opening the unit or breaking the security seal will void the Warranty, Calibration and Certification.

In the event of failure, prior to returning the unit to your authorised Gill distributor, it is recommended that:

- All cables and connectors are checked for continuity, bad contacts, corrosion etc.
- A bench test is carried out as described in Section 10.6.
- Contact your supplier for advice if failure persists.

10.3 Fault-finding

Symptom	Solution
No output	Check DC power to the Intrinsically Safe WindObserver, cable and connections. Check comms settings of Intrinsically Safe WindObserver and host system match, including correct Com port. Check unit is in Continuous mode. Check Status code in data string (see 10.5). Check that in-line communication devices are wired correctly. NOTE: It is usual for Anemometer TX + to be connected to converter device RX +.
Corrupted output	Check comms settings of Intrinsically Safe WindObserver and host system match. Try a slower baud rate. Check cable lengths and type of cable.
One way communication	Check wiring is in accordance with the manual.
Failed / Incorrect Intrinsically Safe WindObserver output, data invalid flag	Check that transducer path is not blocked.

10.4 Safe Mode

If a unit is received that will not communicate or the configuration settings are not known then Safe Mode can be used to establish communication with the IS WindObserver and change configuration settings.

Initial Set Up.
Connect the IS WindObserver to a PC as detailed in Para 7 using an RS422 or RS232 connection.

Open a Terminal program e.g. HyperTerminal, Tera Term or use Gill Wind Software as a Terminal program.

Select the required COM port.

Set the Baud rate to **19200 baud** (if using the Wind Terminal program it opens at 19200 baud).

To Place the unit into Safe Mode.
Turn off the IS WindObserver power supply.

Ensure the Terminal program is set for 19200 baud,

Hold down the PC keyboard * key and turn on the IS WindObserver Power Supply.

The words SAFE MODE should appear on the terminal screen (press the Enter key to start a new line).

If not then power down the IS WindObserver, hold the * key and power up the sensor.

To Check the Unit Settings or Change settings

Type D1 and press Enter, to see serial number.

Type D2 and Press Enter to see Firmware version.

Type D3 to see configuration settings, e.g.

```
SAFE MODE
**************************
D1
I000157
D1
D2
1.021
D2
D3
current configuration :
B3 F1 G0000 K1 L1 M2 NA O1 P1 U1 V1 X1
D3
```

Change settings if required referring to the previous configuration details.

Type Q and press Enter to go back into measurement mode.

If powering down the instrument and repowering and no change has been made to the baud rate (B command) then open a new terminal program at the units original baud rate setting (the default setting would be 9600 Bauds to view data).

10.5 Status (error) codes

Code	Status	Condition
00	**OK**	**Sufficient samples in average period**
A	**OK**	**NMEA data Acceptable**
01	Axis 1 failed	Insufficient samples in average period on U axis
02	Axis 2 failed	Insufficient samples in average period on V axis
04	Axis 1 and 2 failed	Insufficient samples in average period on both axes
08	NVM error	NVM checksum failed, data could be uncalibrated.
09	ROM error	ROM checksum failed, data could be uncalibrated.
51	Measurement average building.	Data valid but warns that average period not reached when averaging used.
V	NMEA data Void	Invalid data output

The Status code is sent as part of each wind measurement message.

10.6 Bench Tests

10.6.1 Alignment Check.

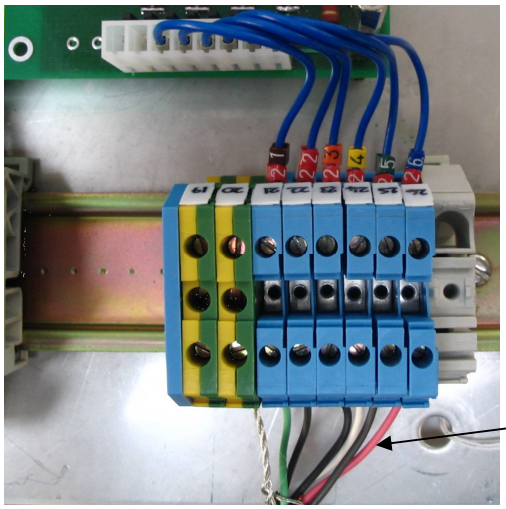
If unexplained data drop outs (code 01, 02, 04 or V code errors) are occurring then it may be possible that the IS WindObserver transducer arms have become misaligned.

Mechanical Test

The simplest check for Anemometer alignment is to invert the anemometer with the four transducers in contact with a flat surface. Gently hold the anemometer cylinder and then see if it is possible to feel the Anemometer rock on the transducers. If this occurs then it is likely the transducer arms are misaligned requiring return to Gill Instruments for re-alignment.

10.6.2 Connections and tests with the Mains Supply Unit

Couple the Intrinsically Safe WindObserver to the power supply using a known working test cable (The 3 metre test cable connections are shown following).



IS Box Terminal Block	Test Cable Wire Colour	Description
Terminal 20	Cable Screen	Screen
Terminal 21	Green (Green and black pair)	RS422 Transmit data from Anemometer
Terminal 22	Black (Green and black pair)	RS422 Transmit data from Anemometer
Terminal 23	Black (White and black pair)	RS422 Data to Anemometer (Config only).
Terminal 24	White (White and black pair)	RS422 Data to Anemometer (Config only)
Terminal 25	Black (Red and black Pair)	Power Supply –ve
Terminal 26	Red (Red and black pair)	Power Supply +ve

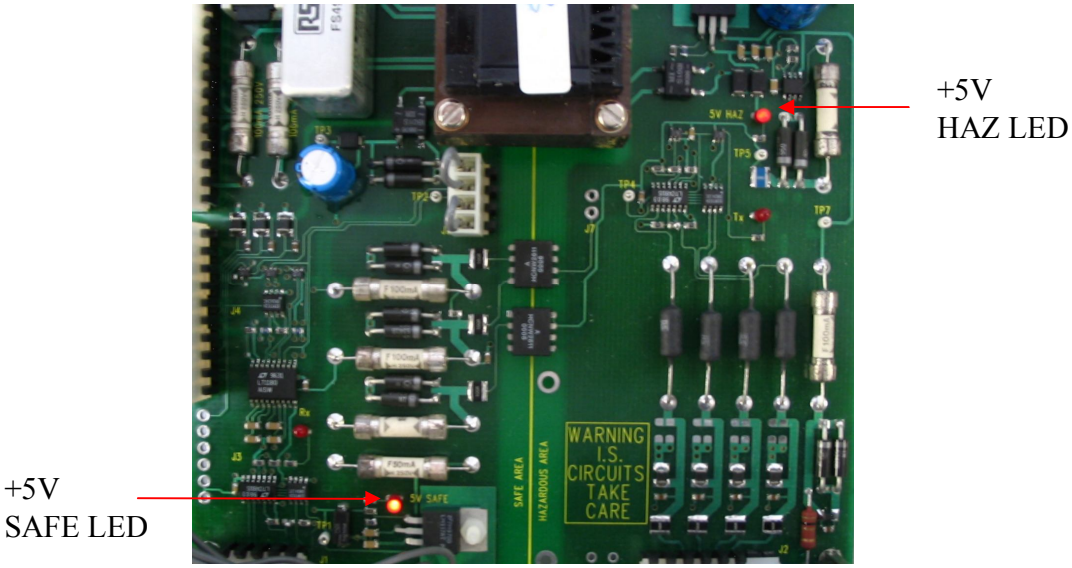
Anemometer Supply Voltage and Current

With the PCI box powered the Supply Voltage between Terminal 26 +ve and Terminal 25 (-ve) must be between 6v dc to 12v dc. Typically 9v dc.

(If the supply voltage exceeds 12 v dc damage to the Anemometer might result).

The IS anemometer current through terminal 26 will typically be 14mA (maximum. 30mA).

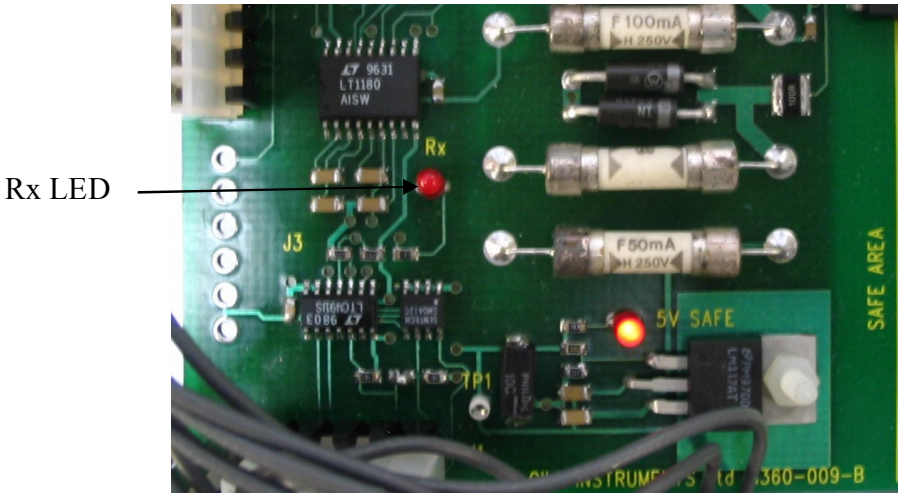
When the IS Power Supply is powered up the +5v SAFE and +5v HAZ LED's will be illuminated.



Data Tests

With the Sensor connected and outputting data to the PCI box.

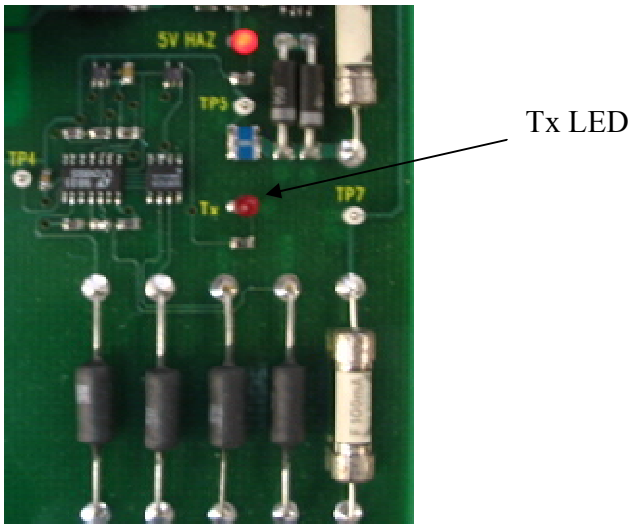
Examine the Main PCB and the Red RX LED at the bottom left of the PCB will be seen to flash on and off at the sensor output rate (1Hz to 4Hz). This indicates that data is being successfully output from the IS Anemometer.



With the Sensor connected and outputting data to the PCI box.

Check that the unit is correctly configured by going into Configuration mode and using D3 (See Page 37).

If a HyperTerminal connection is established to change the sensor configuration then when a PC keystroke is undertaken then the PCI box Red Tx LED at the top right on the PCB will be seen to momentarily flash on and off. This indicates a good connection between the PC and the PCI box.



1. Check for normal output data, and that the Status Code is OK – 00 (or A for NMEA format).
2. If the status code is other than these, refer to Page 41 Status (error) codes.
3. Use an office fan or similar to check that the unit is sensing wind, turning the unit to simulate changing wind direction and to check that both axes are functioning.
4. Note that this is a quick functional test. There are no calibration adjustments; the unit is designed NOT to require re-calibration within its lifetime.

Use of the Protective Head Cover for an Integrity Check

An Integrity Check is designed to:

1. Identify any gross changes in the head geometry that would affect the performance.
2. Confirm the IS WindObserver zero calibration.

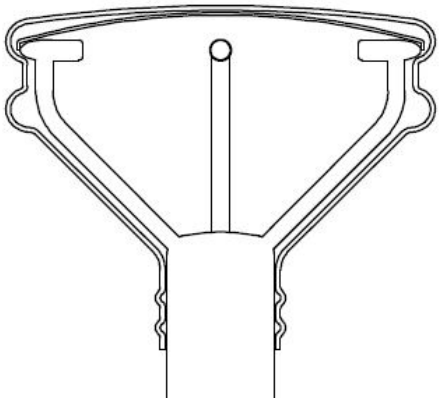
The Integrity Check must be used in an indoor still air environment with an ambient temperature between 17°C and 23°C. When conducting the test it is important that the protective cover is assembled on to the IS WindObserver head and not touched or moved during the test.

Zero Wind Check

Configure your PC to run HyperTerminal and assemble the protective cover around the WindObserver by inserting the reflector cases and the two halves of the ICC onto the IS WindObserver. The protective cover must be secured together using for example Cable ties/Tyraps or similar. Then:

1. Ensure that the IS WindObserver is set for a Continuous Polar or NMEA mode.
2. Record/View data.

In still air wind speed measurements should not exceed 0.03m/s. If wind speed exceeds 0.03m/s contact Gill Instruments.



IS WindObserver Head showing application of the protective head cover (Part/s 1277-30-045).

Alignment Check

Ensure the Protective Cover is assembled correctly on the IS WindObserver. Using HyperTerminal, enter Configuration Mode as described in Section 9.

Type in D6 and press Enter.

A typical report as shown below will be displayed.

```
D6
ALIGMENT LIMITS: U=2424,2524
                 V=2434,2434
ALIGNMENT U:2474 *PASS*
ALIGNMENT V:2484 *PASS*
D6
```

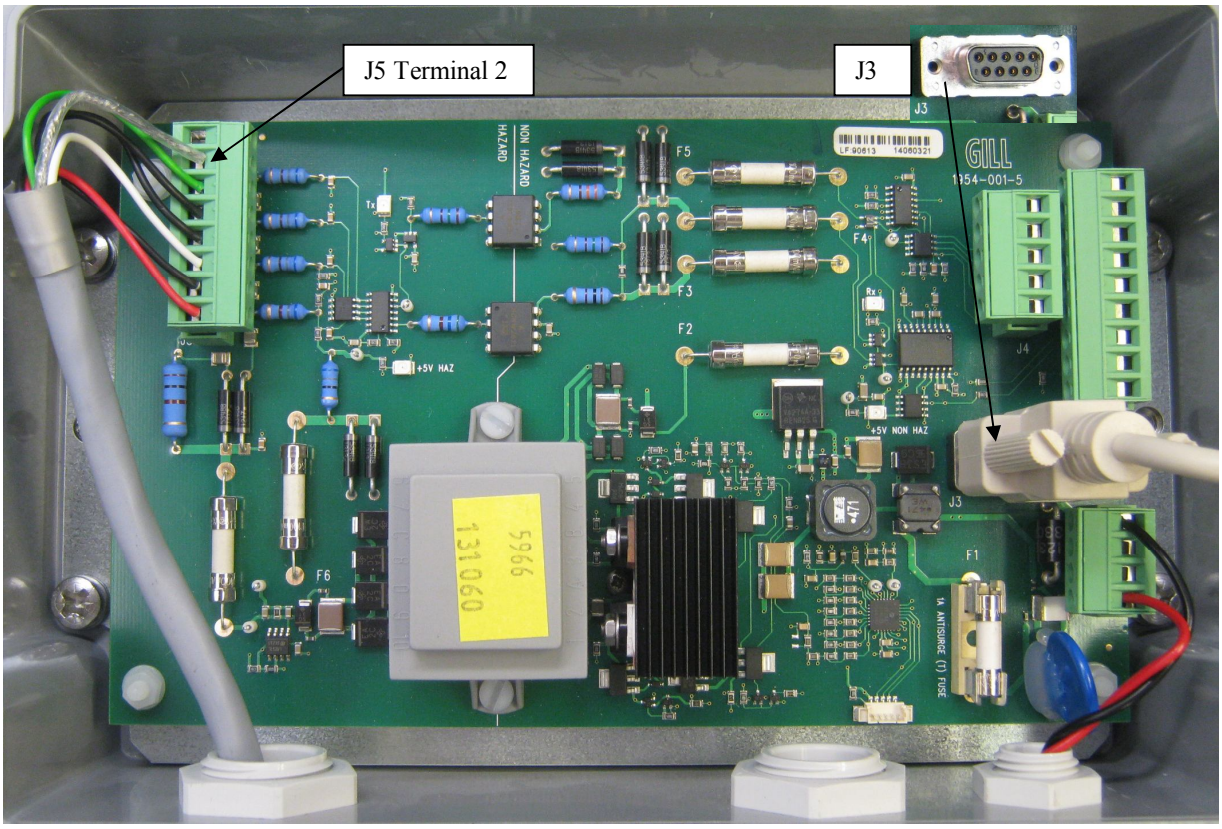
If 'Refer to Manual' is shown check test temperature conditions are 17 to 23 deg C and tested under zero wind condition.

If there has been no significant changes to the IS WindObserver head configuration then *PASS* will confirm correct operation.

Alterations to the head geometry can result in a *FAIL* or 'Insufficient Samples' message. If this occurs please contact Gill Instruments.

10.6.3 Connections and tests with the Low Voltage Supply Unit

Couple the Intrinsically Safe WindObserver to the power supply unit using a known working test cable (The 3 metre test cable connections to terminal block J5 are shown following).



IS WindObserver 3 Metre Test Cable Connection Table to LVPCI Box J5.

LVPCI Box J5 Connector	Test Cable Wire Colour	Description
Terminal 2	Cable Screen	Screen
Terminal 3	Green (Green and Black Pair)	RS422 Data +ve to Anemometer (Config only)
Terminal 4	Black (Green and Black Pair)	RS422 Data –ve to Anemometer (Config only)
Terminal 5	Black (White and Black Pair)	RS422 Transmit -ve data from Anemometer
Terminal 6	White (White and Black Pair)	RS422 Transmit +ve data from Anemometer
Terminal 7	Black (Red and Black Pair)	Power Supply –ve
Terminal 8	Red (Red and Black Pair)	Power Supply +ve

Connect a standard RS232, 9 pin D Type to D Type connector lead to the LVPCI Box socket J3.
Connect this lead to a PC via its Serial Com port or via an RS232 to USB converter.

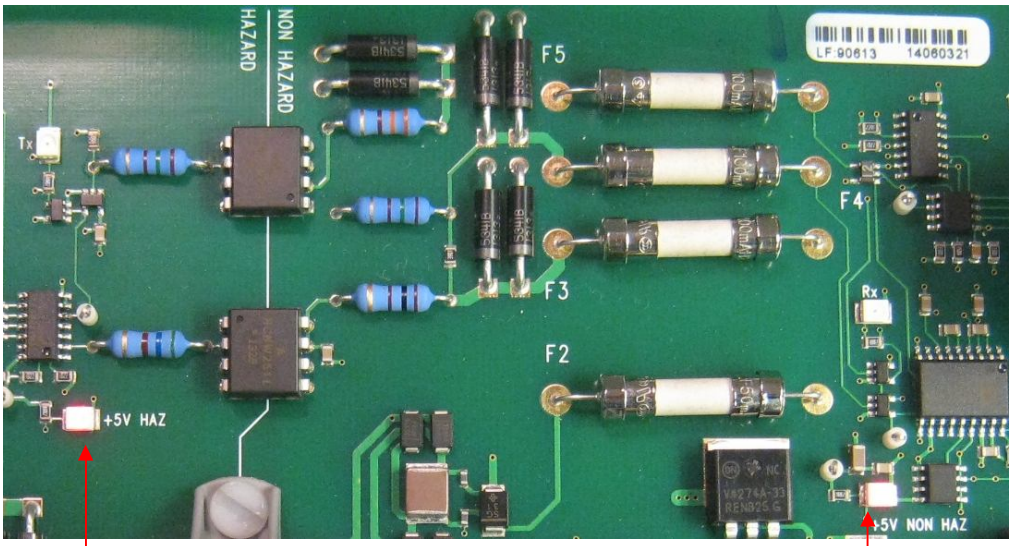
PC Serial COM Port Connection to LVPCI Box J3.

LVPCI Box J3	PC, 9 Way D Type Serial COM Port
2	2
3	3
5	5

Anemometer Supply Voltage and Current
With the LVPCI box powered, the Supply Voltage between J5 Terminal 8 +ve and Terminal 7 (-ve) must be between 6v dc to 12v dc. Typically 9v dc.
(If the supply voltage exceeds 12 v dc damage to the Anemometer might result).

The IS anemometer current through J5, Terminal 8 will typically be 14mA (maximum. 30mA).

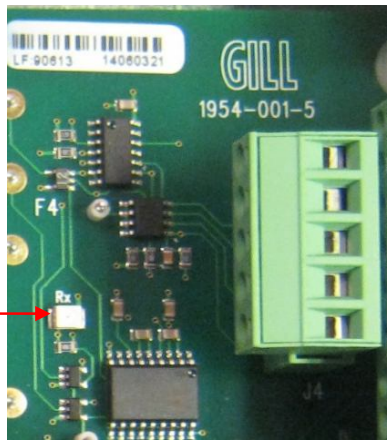
When the IS Power Supply is powered up the +5v NON HAZ and +5v HAZ LED's will be illuminated.



+5V
HAZARD SIDE LED

+5V
NON HAZARDOUS SIDE LED

Data Tests
With the Sensor connected and outputting data to the PCI box.
Examine the Main PCB and the Red RX LED will be seen to flash on and off at the sensor output rate (1Hz to 4Hz). This indicates that data is being successfully output from the IS Anemometer.

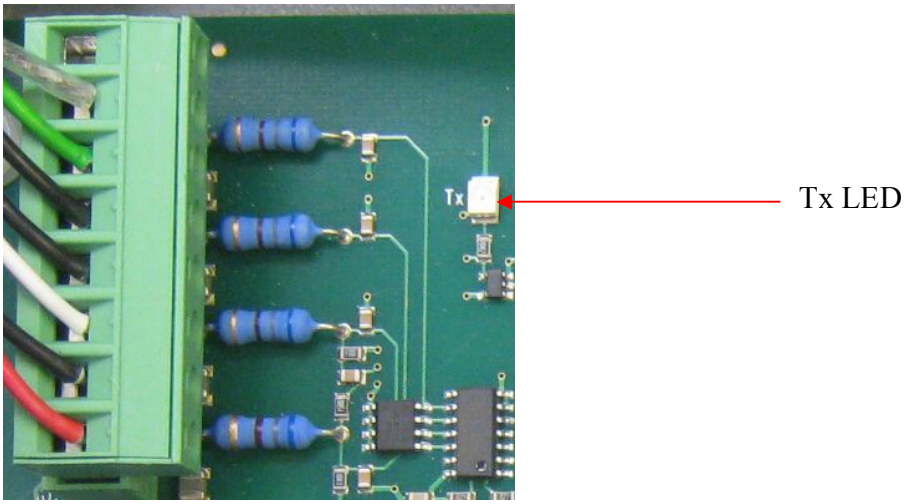


Rx LED

With the Sensor connected and outputting data to the PCI box.

1. Check that the unit is correctly configured by going into Configuration mode and using D3 , see Page 37.

   If a HyperTerminal connection is established to change the sensor configuration then when a PC keystroke is undertaken then the PCI box Red Tx LED on the PCB will be seen to momentarily flash on and off. This indicates a good connection between the PC and the PCI box.



2. Check for normal output data, and that the Status Code is OK – 00 (or A for NMEA format).
3. If the status code is other than these, refer to Page 41 Status (error) codes.
4. Use an office fan or similar to check that the unit is sensing wind, turning the unit to simulate changing wind direction and to check that both axes are functioning.
5. Note that this is a quick functional test. There are no calibration adjustments; the unit is designed NOT to require re-calibration within its lifetime.

Use of the Protective Head Cover for an Integrity Check

An Integrity Check is designed to:

3. Identify any gross changes in the head geometry that would affect the performance.
4. Confirm the IS WindObserver zero calibration.

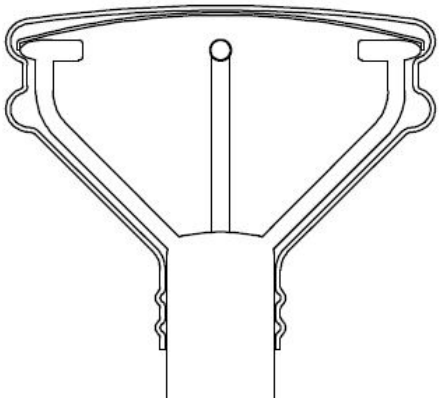
The Integrity Check must be used in an indoor still air environment with an ambient temperature between 17°C and 23°C. When conducting the test it is important that the protective cover is assembled on to the IS WindObserver head and not touched or moved during the test.

Zero Wind Check

Configure your PC to run HyperTerminal and assemble the protective cover around the WindObserver by inserting the reflector cases and the two halves of the ICC onto the IS WindObserver. The protective cover must be secured together using for example Cable ties/Tyraps or similar. Then:

3. Ensure that the IS WindObserver is set for a Continuous Polar or NMEA mode.
4. Record/View data.

In still air wind speed measurements should not exceed 0.03m/s. If wind speed exceeds 0.03m/s contact Gill Instruments.



IS WindObserver Head showing application of the protective head cover (Part/s 1277-30-045).

Alignment Check

Ensure the Protective Cover is assembled correctly on the IS WindObserver. Using HyperTerminal, enter Configuration Mode as described in Section 9.

Type in D6 and press Enter.

A typical report as shown below will be displayed.

D6
ALIGMENT LIMITS: U=2424,2524
V=2434,2434
ALIGNMENT U:2474 *PASS*
ALIGNMENT V:2484 *PASS*
D6

If 'Refer to Manual' is shown check test temperature conditions are 17 to 23 deg C and tested under zero wind condition.

If there has been no significant changes to the IS WindObserver head configuration then *PASS* will confirm correct operation.

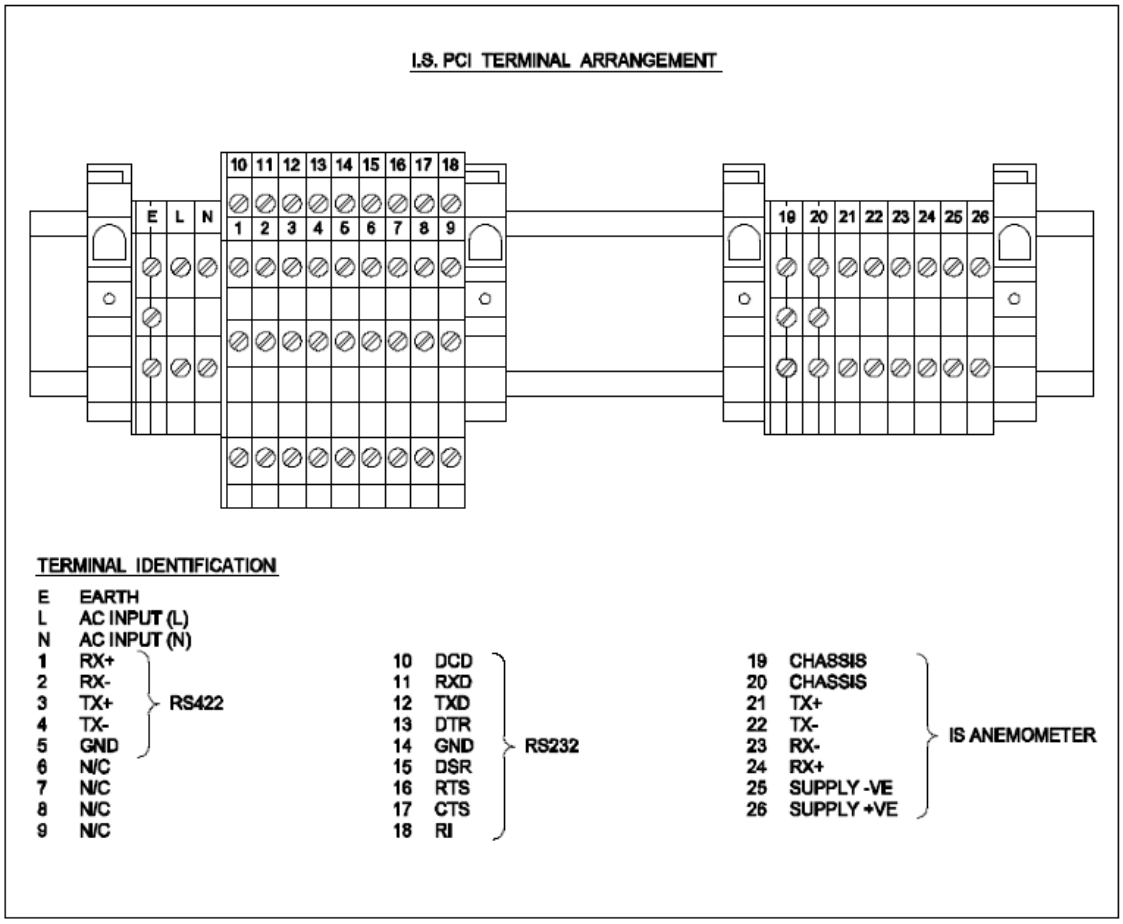
Alterations to the head geometry can result in a *FAIL* or 'Insufficient Samples' message. If this occurs please contact Gill Instruments.

10.7 Returning Units

If the unit has to be returned, it should be carefully packed in the original packaging and returned to your authorised Gill distributor, with a full description of the fault condition.

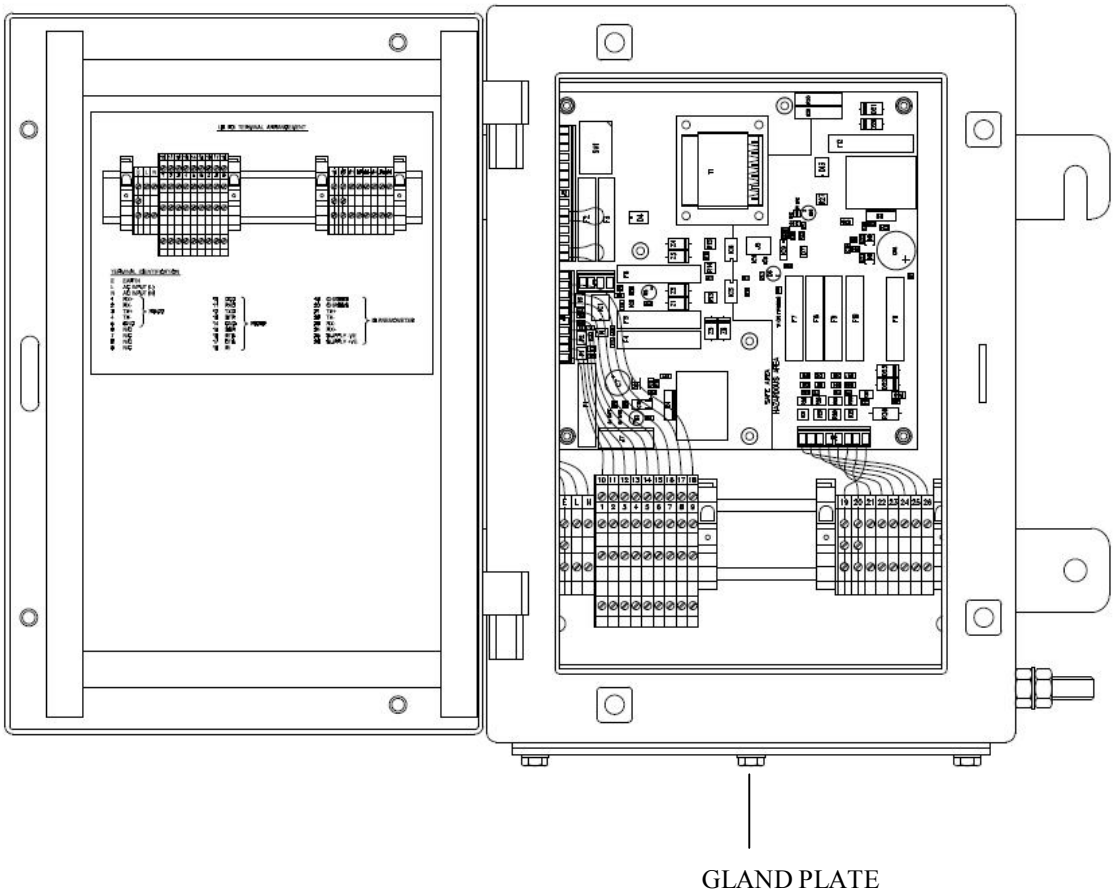
11. DRAWINGS

11.1 Mains Power Supply Drawing 1360-M-039 Issue 3, I.S.Terminal Arrangement.



11.2 Mains Power Supply Drawing 1360-G-043 Issue 2 I.S. PCI Unit

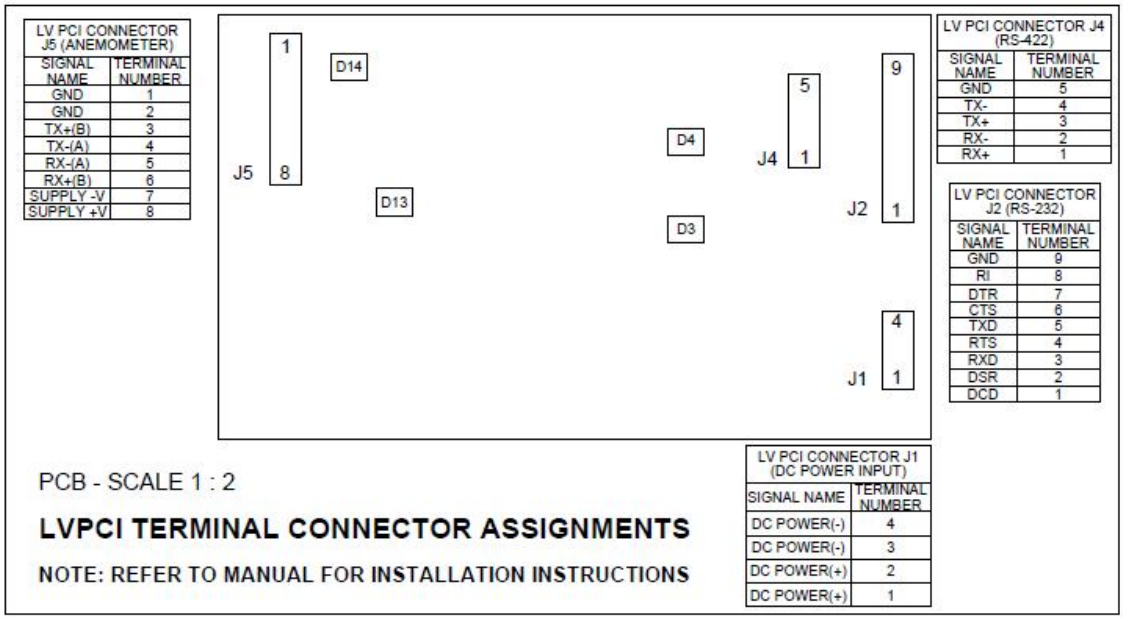
VIEW OF PCI WITH LID OPEN



GLAND PLATE

The Gland plate may be removed to allow fitting of customer supplied cable glands. Gland plate screws should be torqued to 4NM.

11.3 Low Voltage Power Supply Drawing 1954-30-023 issue 2 Terminal Arrangement.



APPENDIX 1

SUMMARY OF ABBREVIATIONS USED IN THIS MANUAL

AC	Alternating Current
ANEM	Anemometer
ASCII	American Standard Code for Information Interchange
CR	Carriage Return
CSV	Comma Separated Variable
CSA	Cross Sectional Area
CTS	Clear To Send
DC	Direct Current
DCD	Data Carrier Detect
DDD	Direction parameter
DEG	DEGrees
DSR	Data Set Ready
DTR	Data Terminal Ready
EEPROM	Electrically Erasable Programmable Read Only Memory
EMC	Electro-Magnetic Compatibility
ETX	End of string character
FPM	Feet Per Minute
GND	GrouND
HEX	Hexadecimal
HZ	Hertz
IP65	Ingress Protection Classification
I.S	Intrinsic Safety
K	Kilometres per hour
Knots	Nautical Measurement of speed
KM	KiloMetre
KPH	KiloMetres Per Hour
LF	Line Feed
M3	Operating Mode 3
M4	Operating Mode 4
mA	MilliAmperes
MPH	Miles Per Hour
mm	MilliMetres
ms	MilliSecond
m/s	Metres per Second
PC	IBM PC or compatible computer
PCI	Power and Communications Interface
POR	Power On Reset
RH	Relative Humidity
RMS	Root Mean Squared
RS232	Communications standard
RS422	Communications standard
RTS	Request To Send
RI	Ring Initiate
RX	Receive

SEC	SECond
RAM	Static Random Access Memory
STX	Start of string character
S/W	SoftWare
TX	Transmit
UV	Cartesian Co-ordinate System
V	Volts
V+	positive Voltage
V-	negative Voltage
VA	VoltAmperes

APPENDIX 2

PRODUCT APPROVALS

SIRA ATEX CERTIFICATION

1. Certificate Number: Sira 00ATEX2217 Issue 8 for the IS WindObserver Power Supply Unit 1360.
2. Certificate Number: Sira 15ATEX2014 Issue 0 for the model 1360 IS II Anemometer.
3. Certificate Number: Sira 13ATEX2384 Issue 1 for the IS Low Voltage Power Supply and Communications Unit 1954-00-002.

SIRA IECEx CERTIFICATION

4. Certificate Number: Sira IECEx SIR 13.0156 Issue 1 for the IS WindObserver Power Supply Unit 1360.
5. Certificate Number: Sira IECEx SIR 15.0013 Issue 0 for the model 1360 IS II Anemometer.
6. Certificate Number: Sira IECEx SIR 13.0159 Issue 1 for the IS Low Voltage Power Supply and Communications Interface 1954-00-002.

   Copies of the above SIRA IECEx certificates may be downloaded from:-

   I.S. WindObserver Power Supply Unit 1360
   http://iecex.iec.ch/iecex/iecexweb.nsf/certificatesAjax/IECEx%20SIR%2013.0156%20issue%20No.%201?opendocument

   I.S. II WindObserver Anemometer
   http://iecex.iec.ch/iecex/iecexweb.nsf/certificatesAjax/IECEx%20SIR%2015.0013%20issue%20No.%200?opendocument

   IS Low Voltage Power Supply and Communications Interface 1954-00-002
   http://iecex.iec.ch/iecex/iecexweb.nsf/certificatesAjax/IECEx%20SIR%2013.0159%20issue%20No.%201?opendocument

Certificate Number: Sira 00ATEX2217 for the IS WindObserver Power Supply Unit 1360.

sira CERTIFICATION

1 **EC TYPE-EXAMINATION CERTIFICATE**

2 Equipment intended for use in Potentially Explosive Atmospheres Directive 94/9/EC

3 Certificate Number: **Sira 00ATEX2217** Issue: **8**

4 Equipment: **I.S. WindObserver Power Supply Unit 1360**

5 Applicant: **Gill Instruments Limited**

6 Address: Saltmarsh Park
67 Gosport Street
Lymington
Hampshire SO41 9EG
UK

7 This equipment and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.

8 Sira Certification Service, notified body number 0518 in accordance with Article 9 of Directive 94/9/EC of 23 March 1994, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment intended for use in potentially explosive atmospheres given in Annex II to the Directive.

The examination and test results are recorded in the confidential reports listed in Section 14.2.

9 Compliance with the Essential Health and Safety Requirements, with the exception of those listed in the schedule to this certificate, has been assured by compliance with the following documents:

EN 60079-0:2012 EN 60079-11:2012

The above list of documents may detail standards that do not appear on the UKAS Scope of Accreditation, but have been added through Sira's flexible scope of accreditation, which is available on request.

10 If the sign 'X' is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use specified in the schedule to this certificate.

11 This EC type-examination certificate relates only to the design and construction of the specified equipment. If applicable, further requirements of this Directive apply to the manufacture and supply of this equipment.

12 The marking of the equipment shall include the following:

II (1) GD
[Ex ia Ga] IIC
[Ex ia Da] IIIC
(Ta = -30°C to +40°C)

Project Number 70015851

C Ellaby
Deputy Certification Manager

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Form 9400 Issue 1

SCHEDULE

EC TYPE-EXAMINATION CERTIFICATE **Sira 00ATEX2217**
Issue 8

13 **DESCRIPTION OF EQUIPMENT**

The I.S. WindObserver Power Supply Unit 1360 is designed to provide an intrinsically safe supply and signal connections to a model 1360 I.S. Anemometer certified as Sira 00ATEX2218. The equipment comprises a printed circuit board that accommodates; an intrinsically safe transformer, opto isolators and voltage clamping, current and power limiting circuitry. A DIN rail accommodates the terminals. The PCB and terminals are housed inside a metal enclosure that affords a degree of ingress protection of at least IP20. The connections to the certified Anemometer are made via connector J2 to DIN rail mounted terminals 19 to 26.

Non-Hazardous are connections

Terminals marked E, L and N and Terminals 1 to 18:

Um = 250 Vrms.

Terminals 1 to 18 enable the equipment signal circuits to connect to low power RS422 and RS232 non-hazardous area circuits respectively.

Hazardous area connections

Terminals 19 to 26

Uo = 11.55 V
Io = 162 mA
Po = 0.417 W
Ci = 0
Li = 0

Cable parameters

The capacitance and either the inductance or the inductance to resistance (L/R) ratio of the load connected to each separate circuit listed above must not exceed the following values.

Group	Capacitance (μF)	Inductance (μH)	L/R Ratio (μH/Ω)
IIC	1.59	800	90
IIB	10.8	3200	360
IIA	43	6400	720

Variation 1 - This variation introduced the following change:

i. The recognition of minor drawing modifications; these changes were administrative and do not affect the aspects of the product that are relevant to explosion safety.

Variation 2 - This variation introduced the following changes:

i. An alternative washer was allowed to be used on the IIC I.S. Electronics PCB assembly.
ii. The removal of the fibre washer used on the Outdoor Galvanic Isolated PCI Final assembly was recognised.
iii. The rivet bush was removed from the parts list.

Variation 3 - This variation introduced the following change:

i. The recognition of minor drawing modifications; these changes were administrative and do not affect the aspects of the product that are relevant to explosion safety.

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SCHEDULE

EC TYPE-EXAMINATION CERTIFICATE **Sira 00ATEX2217**
Issue 8

Variation 4 - This variation introduced the following changes:

i. Following appropriate re-assessment to demonstrate compliance with the requirements of the EN 60079 series of standards, the documents originally listed in section 9, EN 50014:1997 plus Amendments 1 and 2, EN 50020:1994, EN 50284:1999 and EN 50281-1-1:1998, were replaced by those currently listed, the markings in section 12 were updated accordingly and the condition was modified to recognise the application of the latest standards.
ii. The ambient temperature range was changed from -20°C to +40°C to -30°C to +40°C.

Variation 5 - This variation introduced the following change:

i. The introduction of an alternative pillar and fixing components was recognised.

Variation 6 – This variation introduced the following changes:

i. Following appropriate re-assessment to demonstrate compliance with the requirements of the latest technical knowledge, the documents originally listed in section 9, EN 60079-0:2009, EN 60079-11:2007 and IEC 61241-11:2005, were replaced by those currently listed, the markings in section 12 were updated accordingly and the Condition of Certification was modified to recognise the application of the latest standards.
ii. A new label was allowed to be fitted; this label recognises the additional marking required for the IECEx certification also associated with these products.
iii. The recognition of minor drawing changes that are administrative or involve changes to the design that do not affect the aspects of the product that are relevant to explosion safety.
iv. Drawing number 1360-C-009 Rev. 1 was reinstated.

Variation 7 - This variation introduced the following change:

i. To recognise that the IS WindObserver Power Supply Unit 1360 may be used with either the Model 1360 IS Anemometer (Sira 00ATEX 2218) or IS II Anemometer Part 1360-00-097 (Sira 15ATEX2014)

14 **DESCRIPTIVE DOCUMENTS**

14.1 **Drawings**

Refer to Certificate Annexe.

14.2 **Associated Sira Reports and Certificate History**

Issue	Date	Report No.	Comment
0	19 December 2000	R52A7045A	The release of the prime certificate.
1	8 March 2001	R52A7045A	Re-issued to amend the list of certified drawings.
2	10 September 2001	R52A8120A	The introduction of Variation 1.
3	4 September 2007	R52A17115A	The introduction of Variation 2.
4	22 October 2009	R21032A	This Issue covers the following changes: • All previously issued certification was rationalised into a single certificate, Issue 4, Issues 0 to 3 referenced above are only intended to reflect the history of the previous certification and have not been issued as documents in this format. • The introduction of Variation 3.
5	4 March 2010	R21571A/00	The introduction of Variation 4.

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SCHEDULE

EC TYPE-EXAMINATION CERTIFICATE

Sira 00ATEX2217
Issue 8

Issue	Date	Report No.	Comment
6	19 October 2011	R25877A/00	The introduction of Variation 5.
7	29 January 2014	R32015A/00	The introduction of Variation 6.
8	26 February 2015	R70015851A	The introduction of Variation 7.

15 **SPECIAL CONDITIONS FOR SAFE USE** (denoted by X after the certificate number)

None

16 **ESSENTIAL HEALTH AND SAFETY REQUIREMENTS OF ANNEX II** (EHSRs)

The relevant EHSRs that are not addressed by the standards listed in this certificate have been identified and individually assessed in the reports listed in Section 14.2.

17 **CONDITIONS OF CERTIFICATION**

17.1 The use of this certificate is subject to the Regulations Applicable to Holders of Sira Certificates.

17.2 Holders of EC type-examination certificates are required to comply with the production control requirements defined in Article 8 of directive 94/9/EC.

17.3 The Power supply unit transformer, T1, is subject to routine tests at voltages of 2500 V between input and output windings, 1000 V rms between windings and core, and 1500 V between the winding supplying I.S. circuit and the other output winding, in accordance with clause 11.2 of EN 60079-11: 2012.

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Form 9400 Issue1

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Certificate Annexe

Certificate Number: **Sira 00ATEX2217**

Equipment: **I.S. WindObserver Power Supply Unit 1360**

Applicant: **Gill Instruments Ltd**

sira CERTIFICATION

Issue 0 to 6 (The drawings listed with these Issues were rationalised and have been superseded by those detailed in Issue 5)

Issue 7

Drawing no.	Sheets	Rev.	Date (Sira stamp)	Title
1360-10-003	3 to 3	01F	09 Jan 14	I.S. PCI PCB Assembly (Galvanic Isolation)
1360-M-036	1 of 1	05	29 Jan 14	I.S. PCI Box Nameplate
1360-10-041	1 of 1	02	16 Oct 09	I.S. PCI Box Lid Assembly
1360-M-037	1 of 1	1	08 Dec 00	Cover Plate
1360-M-038	1 of 1	1	08 Dec 00	DIN Rail Machined
1360-30-039	1 of 1	03	16 Oct 09	Wiring Label
1360-M-009	1 of 1	1C	16 Oct 09	I.S. PCI PCB Manufacturing Details
1360-T-009	1 of 1	1	06 Dec 00	IS Anem PSU PCB Tracking Details
1360-M-001	1 of 1	02	21 Feb 01	I.S. Transformer Assembly
1360-10-011	1 of 1	01	08 Dec 00	DIN Rail Sub Assembly
1360-10-012	1 of 1	03	28 Aug 07	IIC I.S. Electronics PCB Assembly parts list
1360-00-013	1 of 1	06	22 Sep 11	Outdoor Galvanic Isolated PCI Final Assembly parts list
1360-G-028	1 & 2	03	03 Sep 01	I.S. Wind Observer II System Diagram
1360-C-009	1 of 1	1	15 Dec 00	Intrinsically Safe Power & Communications Interface

Issue 8 No new drawings were introduced.

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Page 1 of 1

Form 9400 Issue 1

Certificate Number: Sira 15ATEX2014 for the model 1360 IS Anemometer.

sira CERTIFICATION

1 **EC TYPE-EXAMINATION CERTIFICATE**

2 Equipment intended for use in Potentially Explosive Atmospheres Directive 94/9/EC

3 Certificate Number: **Sira 15ATEX2014** Issue: **0**

4 Equipment: **1360 IS II Anemometer, Part No. 1360-00-097**

5 Applicant: **Gill Instruments Ltd**

6 Address: Saltmarsh Park
67 Gosport St
Lymington SO41 9EG
UK

7 This equipment and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.

8 Sira Certification Service, notified body number 0518 in accordance with Article 9 of Directive 94/9/EC of 23 March 1994, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment intended for use in potentially explosive atmospheres given in Annex II to the Directive.

The examination and test results are recorded in the confidential reports listed in Section 14.2.

9 Compliance with the Essential Health and Safety Requirements, with the exception of those listed in the schedule to this certificate, has been assured by compliance with the following documents:

EN 60079-0:2012/A11:2013 EN 60079-11:2012 IEC 60079-26:2014

The above list of documents may detail standards that do not appear on the UKAS Scope of Accreditation, but have been added through Sira's flexible scope of accreditation, which is available on request.

10 If the sign 'X' is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use specified in the schedule to this certificate.

11 This EC type-examination certificate relates only to the design and construction of the specified equipment. If applicable, further requirements of this Directive apply to the manufacture and supply of this equipment.

12 The marking of the equipment shall include the following:

II 1GD
Ex ia IIC T4 Ga
Ex ia IIIC T135°C Da
Tamb = -30°C to +70°C

Project Number 70015853

C Ellaby
Deputy Certification Manager

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Form 9400 Issue 3

SCHEDULE

EC TYPE-EXAMINATION CERTIFICATE **Sira 15ATEX2014**
Issue 0

13 **DESCRIPTION OF EQUIPMENT**

The 1360 IS II Anemometer, Part No. 1360 00 097, is an intrinsically safe unit with no moving parts that uses ultrasonic pulse time of flight in free air for the measurement of wind speed and direction at locations. The IS II Anemometer can be used in conjunction with a PC, data logger or other device, compatible with and isolated by the approved IS Power Supplies associated with this device.

The equipment comprises; four transducer arms attached to a stainless steel enclosure that houses printed circuit board, piezo electric transducers and connector, all of which are completely encapsulated within the enclosure.

External electrical connections are made to a twenty way connector located in the base of the apparatus.

The Anemometer is designed to connect to the intrinsically safe outputs of the I.S. WindObserver Power Supply Unit 1360 (certificate number Sira 00ATEX2217) or LV PCI Unit 1954-00-002 (certificate number Sira 13ATEX2384).

Input Parameters:

Ui =11.55 V
Ii = 162 mA
Pi = 417 mW
Ci = 0
Li = 0

14 **DESCRIPTIVE DOCUMENTS**

14.1 **Drawings**

Refer to Certificate Annexe.

14.2 **Associated Sira Reports and Certificate History**

Issue	Date	Report no.	Comment
0	25 March 2015	R70015853A	The release of the prime certificate.

15 **SPECIAL CONDITIONS FOR SAFE USE** (denoted by X after the certificate number)

None

16 **ESSENTIAL HEALTH AND SAFETY REQUIREMENTS OF ANNEX II** (EHSRs)

The relevant EHSRs that are not addressed by the standards listed in this certificate have been identified and individually assessed in the reports listed in Section 14.2.

17 **CONDITIONS OF CERTIFICATION**

17.1 The use of this certificate is subject to the Regulations Applicable to Holders of Sira Certificates.

17.2 Holders of EC type-examination certificates are required to comply with the production control requirements defined in Article 8 of directive 94/9/EC.

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Form 9400 Issue3

Certificate Annexe

Certificate No.: **Sira 15ATEX2014**

Equipment: **1360 IS II Anemometer, Part No. 1360-00-097**

Applicant: **Gill Instruments Ltd**

sira CERTIFICATION

Issue 0

Drawing	Sheets	Rev.	Date (Sira stamp)	Title
1360-C-070	1 of 1	01	12 Mar 15	Windobserver II – GPA - IS Circuit Diagram
1360-10-070	1 to 4	01	12 Mar 15	PCB Assembly Bill Of Materials
1360-10-080	1 of 1	01	12 Mar 15	I.S. 2 Axis Transducer Arm Assembly
1360-10-082	1 of 1	01	12 Mar 15	Type IIC I.S. Anemometer with Alternative PCB
1360-10-083	1 of 1	01	12 Mar 15	I.S. WOII Potting Areas Diagram
1360-30-070	1 to 8	01	12 Mar 15	PCB Artwork
1360-M-040	1 of 1	10	12 Mar 15	Housing Tube Printed Marking Drawing

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Page 1 of 1

Form 9400 Issue3

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Certificate Number: Sira 23ATEX2384 for the IS Low Voltage Power Supply and Communications Unit 1954-00-002.

1 **EC TYPE-EXAMINATION CERTIFICATE**

2 Equipment intended for use in Potentially Explosive Atmospheres Directive 94/9/EC

3 Certificate Number: **Sira 13ATEX2384** Issue: **1**

4 Equipment: **I.S Low Voltage Power Supply and Communications Interface (LV PCI) Unit 1954-00-002**

5 Applicant: **Gill Instruments Ltd**

6 Address: Saltmarsh Park
67 Gosport Street
Lymington
Hampshire SO41 9EG
England

7 This equipment and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.

8 Sira Certification Service, notified body number 0518 in accordance with Article 9 of Directive 94/9/EC of 23 March 1994, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment intended for use in potentially explosive atmospheres given in Annex II to the Directive.

The examination and test results are recorded in the confidential reports listed in Section 14.2.

9 Compliance with the Essential Health and Safety Requirements, with the exception of those listed in the schedule to this certificate, has been assured by compliance with the following documents:

EN 60079-0:2012 EN 60079-11:2012 EN 60079-26:2007

The above list of documents may detail standards that do not appear on the UKAS Scope of Accreditation, but have been added through Sira's flexible scope of accreditation, which is available on request.

10 If the sign 'X' is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use specified in the schedule to this certificate.

11 This EC type-examination certificate relates only to the design and construction of the specified equipment. If applicable, further requirements of this Directive apply to the manufacture and supply of this equipment.

12 The marking of the equipment shall include the following:

II (1)GD
[Ex ia Ga] IIC
[Ex ia Da] IIIC
Ta = -30°C to +40°C

Project Number 70015851

C Ellaby
Deputy Certification Manager

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Page 1 of 3

Form 9400 Issue 3

SCHEDULE

EC TYPE-EXAMINATION CERTIFICATE **Sira 13ATEX2384**
Issue 1

13 **DESCRIPTION OF EQUIPMENT**

The LVPCI Model 1954 is a galvanically-isolated power supply and communications interface between non-intrinsically safe equipment sited in non-hazardous and intrinsically safe equipment sited in hazardous environments. The LVPCI comprises an electronic circuit mounted on a printed circuit board which is housed in a plastic endosure.

The safe area side terminals include J1 which is the DC input, J2 & J3 which are the RS 232 connectors, J4 which is an RS 422 connector.

At Connector J1, J2, J3 and J4

U_m = 250 V.

The hazardous area side terminals includes the J5(7 & 8) which connects to the Anemometer and J5 (1 to 6) which are the comms connectors. The terminals are marked up on the lid of the enclosure to help the user to make correct connections.

Anemometer supply out terminals J5(7 & 8)

Uo = 11.55 V Io = 122 mA Po = 352 mW Co = 1.59 µF Lo = 2.38 mH

Comms Connectors J5 (1 to 6)

Uo = 6.51 V Io = 29 mA Po = 47 mW Co = 22 µF Lo = 42.8 mH

Variation 1 - This variation introduced the following changes:

i. The IS Low Power Supply and Comms. Interface (LV PCI) unit 1954-00-002 is allowed to be used with either the Model 1360 IS Anemometer (Sira 00ATEX 2218) or IS II Anemometer Part 1360-00-097 (Sira 15ATEX2014).
ii. A typographical correction was made to the Lo electrical parameters (µH changed to mH) of the IS Low Power Supply and Comms. Interface (LV PCI) unit 1954-00-002

14 **DESCRIPTIVE DOCUMENTS**

14.1 **Drawings**

Refer to Certificate Annexe.

14.2 **Associated Sira Reports and Certificate History**

Issue	Date	Report number	Comment
0	10 March 2014	R32340A/00	The release of the prime certificate.
1	26 February 2015	R70015851A	The introduction of Variation 1.

15 **SPECIAL CONDITIONS FOR SAFE USE** (denoted by X after the certificate number)

None

16 **ESSENTIAL HEALTH AND SAFETY REQUIREMENTS OF ANNEX II** (EHSRs)

The relevant EHSRs that are not addressed by the standards listed in this certificate have been identified and individually assessed in the reports listed in Section 14.2.

This certificate and its schedules may only be reproduced in its entirety and without change.

Form 9400 Issue3

Sira Certification Service
Rake Lane, Eccleston, Chester, CH4 9JN, England
Tel: +44 (0) 1244 670900
Fax: +44 (0) 1244 681330
Email: info@siracertification.com
Web: www.siracertification.com

SCHEDULE

EC TYPE-EXAMINATION CERTIFICATE

Sira 13ATEX2384
Issue 1

17 **CONDITIONS OF CERTIFICATION**

17.1 The use of this certificate is subject to the Regulations Applicable to Holders of Sira Certificates.

17.2 Holders of EC type-examination certificates are required to comply with the production control requirements defined in Article 8 of directive 94/9/EC.

17.3 In accordance with IEC 60079-11:2011 clause 10.3, the power supply transformer of each manufactured sample of the equipment shall be subjected to an electric strength test using a test voltage of 1500 Vac applied between the input and output windings for 60s. Alternatively, a voltage of 20% higher may be applied for 1 s. There shall be no evidence of flashover or breakdown and the maximum current flowing shall not exceed 5 mA.

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Form 9400 Issue3

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Email: info@siracertification.com
Web: www.siracertification.com

Certificate Annexe

Certificate Number: Sira 13ATEX2384

Equipment: I.S Low Voltage Power Supply Communications Interface (LV PCI) Unit 1954-00-002

Applicant: Gill Instruments Ltd

sira CERTIFICATION

Issue 0

Drawing no.	Sheets	Rev.	Date (Sira stamp)	Title
1954-C-001	1 of 1	5	24 Feb 14	Intrinsically safe low voltage power and communications interface (LV PCI) Circuit diagram
1954-00-002	1 & 2	1	24 Feb 14	LVPCI Final General Assembly
1954-00-002 BOM	1 & 2	2	05 Mar 14	LVPCI BOM
1954-30-025	1 of 1	1	24 Feb 14	LVPCI Label drawing
1954-10-001	1 to 5	5	24 Feb 14	LVPCI PCB Bill of Material
1954-001 PCBSPC	1 of 1	5	24 Feb 14	PCB Specification
1954-30-023	1 of 1	2	24 Feb 14	LVPCI Internal Lid Label
1954-30-024	1 of 1	1	24 Feb 14	IS Transformer Assembly
1954-I-001	1 & 2	5	24 Feb 14	LV PCI PCB Top and Bottom Ident

Issue 1

Drawing no.	Sheets	Rev.	Date (Sira stamp)	Title
1954-30-025	1 of 1	02	04 Feb 15	External lid engraving

This certificate and its schedules may only be reproduced in its entirety and without change.

Form 9400 Issue3

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Tel: +44 (0) 1244 670900
Fax: +44 (0) 1244 681330
Email: info@siracertification.com
Web: www.siracertification.com

Certificate Number: Sira IECEx SIR 13.0156 for the IS WindObserver Power Supply Unit 1360.

IECEx Certificate of Conformity

INTERNATIONAL ELECTROTECHNICAL COMMISSION
IEC Certification Scheme for Explosive Atmospheres

for rules and details of the IECEx Scheme visit www.iecex.com

Certificate No.:	IECEx SIR 13.0156 issue No.:1	Certificate history: Issue No. 1 (2015-3-16) Issue No. 0 (2014-2-5)
Status:	**Current**	
Date of Issue:	**2015-03-16** Page 1 of 5	
Applicant:	**Gill Instruments Ltd** 67 Gosport Street Lymington Hampshire S041 9EG **United Kingdom**	
Electrical Apparatus: *Optional accessory:*	**I.S. WindObserver Power Supply Unit 1360**	
Type of Protection:	**Intrinsically Safe and Dust**	
Marking:	[Ex ia Ga] IIC [Ex ia Da] IIIC Ta = -30°C to +40°C	
Approved for issue on behalf of the IECEx Certification Body:	C Ellaby	
Position:	Deputy Certification Manager	
Signature: *(for printed version)*	C. Ellaby	
Date:	2015-03-16	

1. This certificate and schedule may only be reproduced in full.
2. This certificate is not transferable and remains the property of the issuing body.
3. The Status and authenticity of this certificate may be verified by visiting the Official IECEx Website.

Certificate issued by:

SIRA Certification Service
Rake Lane
Eccleston
Chester
CH4 9JN
United Kingdom

IECEx Certificate of Conformity

Certificate No.: IECEx SIR 13.0156

Date of Issue: **2015-03-16** Issue No.: 1

Manufacturer: **Gill Instruments Ltd**
67 Gosport Street
Lymington
Hampshire S041 9EG
United Kingdom

Additional Manufacturing location (s):

This certificate is issued as verification that a sample(s), representative of production, was assessed and tested and found to comply with the IEC Standard list below and that the manufacturer's quality system, relating to the Ex products covered by this certificate, was assessed and found to comply with the IECEx Quality system requirements. This certificate is granted subject to the conditions as set out in IECEx Scheme Rules, IECEx 02 and Operational Documents as amended.

STANDARDS:
The electrical apparatus and any acceptable variations to it specified in the schedule of this certificate and the identified documents, was found to comply with the following standards:

IEC 60079-0 : 2011 Edition: 6.0	Explosive atmospheres - Part 0: General requirements
IEC 60079-11 : 2011 Edition: 6.0	Explosive atmospheres - Part 11: Equipment protection by intrinsic safety "i"

*This Certificate **does not** indicate compliance with electrical safety and performance requirements other than those expressly included in the Standards listed above.*

TEST & ASSESSMENT REPORTS:
A sample(s) of the equipment listed has successfully met the examination and test requirements as recorded in

Test Report:
GB/SIR/ExTR14.0018/00 GB/SIR/ExTR15.0071/00

Quality Assessment Report:

GB/SIR/QAR10.0007/02

IECEx Certificate of Conformity

Certificate No.: IECEx SIR 13.0156

Date of Issue: **2015-03-16** Issue No.: 1

Page 3 of 5

Schedule

EQUIPMENT:
Equipment and systems covered by this certificate are as follows:

The I.S. WindObserver Power Supply Unit 1360 is designed to provide an intrinsically safe supply and signal connections to a model 1360 I.S. Anemometer certified as IECEx SIR 13.0157. The equipment comprises a printed circuit board that accommodates: an intrinsically safe transformer, opto isolators and voltage clamping, current and power limiting circuitry. A DIN rail accommodates the terminals. The PCB and terminals are housed inside a metal enclosure that affords a degree of ingress protection of at least IP20. The connections to the certified Anemometer are made via connector J2 to DIN rail mounted terminals 19 to 26.
Non-Hazardous area connections
Terminals marked E, L and N and Terminals 1 to 18:
Um = 250 Vrms
Terminals 1 to 18 enable the equipment signal circuits to connect to low power RS422 and RS232 non-hazardous area circuits respectively.
Refer to EQUIPMENT (Continued) for additional information

CONDITIONS OF CERTIFICATION: NO

IECEx Certificate of Conformity

Certificate No.: IECEx SIR 13.0156

Date of Issue: **2015-03-16** Issue No.: **1**

Page 4 of 5

EQUIPMENT(continued):

Hazardous area connections
Terminals 19 to 26
Uo = 11.55 V Io = 162 mA Po = 0.417W Ci = 0 Li = 0

Cable parameters
The capacitance and either the inductance or the inductance to resistance (L/R) ratio of the load connected to each separate circuit listed above must not exceed the following values.

Group	Capacitance (µF)	Inductance (µH)	L/R Ratio (µH/W)
IIC	1.59	800	90
IIB	10.8	3200	360
IIA	43	6400	720

Conditions of manufacture
The Manufacturer shall comply with the following:
1. The Power supply unit transformer, T1, is subject to routine tests at voltages of 2500 V between input and output windings, 1000 V rms between windings and core, and 1500 V between the winding supplying I.S. circuit and the other output winding, in accordance with clause 11.2 of IEC 60079-11:2011.

IECEx Certificate of Conformity

Certificate No.: IECEx SIR 13.0156

Date of Issue: **2015-03-16** Issue No.: **1**

Page 5 of 5

DETAILS OF CERTIFICATE CHANGES (for issues 1 and above):

Issue 1 – this Issue introduced the following change:	
1.	To recognise that the IS WindObserver Power Supply Unit 1360 may be used with either the Model 1360 IS Anemometer (IECEx SIR 13.0157) or IS II Anemometer Part 1360-00-097 (IECEx SIR 15.0013)

Certificate Number: Sira IECEx SIR 15.0013 for the model 1360 IS Anemometer.

IECEx Certificate of Conformity

INTERNATIONAL ELECTROTECHNICAL COMMISSION
IEC Certification Scheme for Explosive Atmospheres

for rules and details of the IECEx Scheme visit www.iecex.com

Certificate No.:	IECEx SIR 15.0013 issue No.:0	Certificate history:
Status:	**Current**	
Date of Issue:	**2015-03-25** Page 1 of 3	
Applicant:	**Gill Instruments Ltd** Saltmarsh Park 67 Gosport St Lymington SO41 9EG **United Kingdom**	
Electrical Apparatus: *Optional accessory:*	**1360 IS II Anemometer, Part No. 1360-00-097**	
Type of Protection:	**Intrinsic Safety and Dust**	
Marking:	Ex ia IIC T4 Ga Ex ia IIIC T135°C Da Tamb = -30°C to +70°C	
Approved for issue on behalf of the IECEx Certification Body:	C Ellaby	
Position:	Deputy Certification Manager	
Signature: *(for printed version)*	C. Ellaby	
Date:	2015-03-25	

1. This certificate and schedule may only be reproduced in full.
2. This certificate is not transferable and remains the property of the issuing body.
3. The Status and authenticity of this certificate may be verified by visiting the Official IECEx Website.

Certificate issued by:

SIRA Certification Service
Rake Lane
Eccleston
Chester
CH4 9JN
United Kingdom

IECEx Certificate of Conformity

Certificate No.: IECEx SIR 15.0013

Date of Issue: **2015-03-25** Issue No.: **0**

Page 2 of 3

Manufacturer: **Gill Instruments Ltd**
Saltmarsh Park
67 Gosport St
Lymington SO41 9EG
United Kingdom

Additional Manufacturing location (s):

This certificate is issued as verification that a sample(s), representative of production, was assessed and tested and found to comply with the IEC Standard list below and that the manufacturer's quality system, relating to the Ex products covered by this certificate, was assessed and found to comply with the IECEx Quality system requirements. This certificate is granted subject to the conditions as set out in IECEx Scheme Rules, IECEx 02 and Operational Documents as amended.

STANDARDS:
The electrical apparatus and any acceptable variations to it specified in the schedule of this certificate and the identified documents, was found to comply with the following standards:

IEC 60079-0 : 2011 Edition: 6.0	Explosive atmospheres - Part 0: General requirements
IEC 60079-11 : 2011 Edition: 6.0	Explosive atmospheres - Part 11: Equipment protection by intrinsic safety "i"
IEC 60079-26 : 2014-10 Edition: 3.0	Explosive atmospheres – Part 26: Equipment with Equipment Protection Level (EPL) Ga

*This Certificate **does not** indicate compliance with electrical safety and performance requirements other than those expressly included in the Standards listed above.*

TEST & ASSESSMENT REPORTS:
A sample(s) of the equipment listed has successfully met the examination and test requirements as recorded in

Test Report:
GB/SIR/ExTR15.0082/00

Quality Assessment Report:

GB/SIR/QAR10.0007/03

IECEx Certificate of Conformity

Certificate No.: IECEx SIR 15.0013

Date of Issue: **2015-03-25** Issue No.: **0**

Page 3 of 3

Schedule

EQUIPMENT:
Equipment and systems covered by this certificate are as follows:

The 1360 IS II Anemometer, Part No. 1360 00 097, is an intrinsically safe unit with no moving parts that uses ultrasonic pulse time of flight in free air for the measurement of wind speed and direction at locations. The IS II Anemometer can be used in conjunction with a PC, data logger or other device, compatible with and isolated by the approved IS Power Supplies associated with this device.
The equipment comprises; four transducer arms attached to a stainless steel enclosure that houses printed circuit board, piezo electric transducers and connector, all of which are completely encapsulated within the enclosure.
External electrical connections are made to a twenty way connector located in the base of the apparatus.
The Anemometer is designed to connect to the intrinsically safe outputs of the I.S. WindObserver Power Supply Unit 1360 (certificate number IECEx SIR 13.0156) or LV PCI Unit 1954-00-002 (certificate number IECEx SIR 13.0159).
Input Parameters:
Ui =11.55 V
Ii = 162 mA
Pi = 417 mW
Ci = 0
Li = 0

CONDITIONS OF CERTIFICATION: NO

Certificate Number: Sira IECEx SIR 13.0159 for the IS Low Voltage Power Supply and Communications Interface 1954-00-002.

IECEx Certificate of Conformity

INTERNATIONAL ELECTROTECHNICAL COMMISSION
IEC Certification Scheme for Explosive Atmospheres

for rules and details of the IECEx Scheme visit www.iecex.com

Certificate No.:	IECEx SIR 13.0159 issue No.:1	Certificate history: Issue No. 1 (2015-3-16) Issue No. 0 (2014-3-10)
Status:	**Current**	
Date of Issue:	**2015-03-16**	Page 1 of 5
Applicant:	**Gill Instruments Ltd** Saltmarsh Park 67 Gosport Street Lymington Hampshire SO41 9EG **United Kingdom**	
Electrical Apparatus: *Optional accessory:*	**I.S Low Voltage Power Supply and Communications Interface (LV PCI) Unit 1954-00-002**	
Type of Protection:	**Intrinsically Safe**	
Marking:	[Ex ia Ga] IIC [Ex ia Da] IIIC Ta = -30°C to +40°C	
Approved for issue on behalf of the IECEx Certification Body:	C Ellaby	
Position:	Deputy Certification Manager	
Signature: *(for printed version)*	C. Ellaby	
Date:	2015-03-16	

1. This certificate and schedule may only be reproduced in full.
2. This certificate is not transferable and remains the property of the issuing body.
3. The Status and authenticity of this certificate may be verified by visiting the Official IECEx Website.

Certificate issued by:

SIRA Certification Service
Rake Lane
Eccleston
Chester
CH4 9JN
United Kingdom

sira CERTIFICATION

IECEx Certificate of Conformity

Certificate No.: IECEx SIR 13.0159

Date of Issue: **2015-03-16** Issue No.: **1**

Manufacturer: **Gill Instruments Ltd**
Saltmarsh Park
67 Gosport Street
Lymington
Hampshire SO41 9EG
United Kingdom

Additional Manufacturing location (s):

This certificate is issued as verification that a sample(s), representative of production, was assessed and tested and found to comply with the IEC Standard list below and that the manufacturer's quality system, relating to the Ex products covered by this certificate, was assessed and found to comply with the IECEx Quality system requirements. This certificate is granted subject to the conditions as set out in IECEx Scheme Rules, IECEx 02 and Operational Documents as amended.

STANDARDS:
The electrical apparatus and any acceptable variations to it specified in the schedule of this certificate and the identified documents, was found to comply with the following standards:

IEC 60079-0 : 2011 Edition: 6.0	Explosive atmospheres - Part 0: General requirements
IEC 60079-11 : 2011 Edition: 6.0	Explosive atmospheres - Part 11: Equipment protection by intrinsic safety "i"
IEC 60079-26 : 2006 Edition: 2	Explosive atmospheres - Part 26: Equipment with equipment protection level (EPL) Ga

*This Certificate **does not** indicate compliance with electrical safety and performance requirements other than those expressly included in the Standards listed above.*

TEST & ASSESSMENT REPORTS:
A sample(s) of the equipment listed has successfully met the examination and test requirements as recorded in

Test Report:
GB/SIR/ExTR14.0054/00 GB/SIR/ExTR15.0071/00

Quality Assessment Report:

GB/SIR/QAR10.0007/02

IECEx Certificate of Conformity

Certificate No.: IECEx SIR 13.0159

Date of Issue: **2015-03-16** Issue No.: **1**

Schedule

EQUIPMENT:
Equipment and systems covered by this certificate are as follows:

The LVPCI Model 1954 is a galvanically-isolated power supply and communications interface between non-intrinsically safe equipment sited in non-hazardous and intrinsically safe equipment sited in hazardous environments. The LVPCI comprises an electronic circuit mounted on a printed circuit board which is housed in a plastic enclosure.
The safe area side terminals include J1 which is the DC input, J2 & J3 which are the RS 232 connectors, J4 which is an RS 422 connector.
At Connector J1, J2, J3 and J4
Um = 250 V.
The hazardous area side terminals includes the J5(7 & 8) which connects to the Anemometer and J5 (1 to 6) which are the comms connectors. The terminals are marked up on the lid of the enclosure to help the user to make correct connections.

Anemometer supply out terminals J5(7 & 8)

Uo = 11.55 V	Io = 122 mA	Po = 352 mW	Co = 1.59 µF	Lo = 2.38 mH

Comms Connectors J5 (1 to 6)

Uo = 6.51 V	Io = 29 mA	Po = 47 mW	Co = 22 µF	Lo = 42.8 mH

CONDITIONS OF CERTIFICATION: NO

IECEx Certificate of Conformity

Certificate No.: IECEx SIR 13.0159

Date of Issue: **2015-03-16** Issue No.: **1**

Page 4 of 5

EQUIPMENT(continued):

Conditions of manufacture

The Manufacturer shall comply with the following:

1. In accordance with IEC 60079-11:2011 clause 10.3, the power supply transformer of each manufactured sample of the equipment shall be subjected to an electric strength test using a test voltage of 1500 Vac applied between the input and output windings for 60s. Alternatively, a voltage of 20% higher may be applied for 1 s. There shall be no evidence of flashover or breakdown and the maximum current flowing shall not exceed 5 mA.

IECEx Certificate of Conformity

Certificate No.: IECEx SIR 13.0159

Date of Issue: **2015-03-16** Issue No.: **1**

Page 5 of 5

DETAILS OF CERTIFICATE CHANGES (for issues 1 and above):

Issue 1 – this Issue introduced the following changes:	
1.	The IS Low Power Supply and Comms. Interface (LV PCI) unit 1954-00-002 is allowed to be used with either the Model 1360 IS Anemometer (IECEx SIR 13.0157) or IS II Anemometer Part 1360-00-097 (IECEx SIR 15.0013).
2.	A typographical correction was made to the Lo electrical parameters (µH changed to mH) of the IS Low Power Supply and Comms. Interface (LV PCI) unit 1954-00-002

APPENDIX 3 ELECTRICAL CONFORMITY

EC Declaration of Conformity

We Gill Instruments Limited
of Saltmarsh Park
67 Gosport Street
Lymington
SO41 9EG
England

in accordance with the following Directives:

94/9/EC	ATEX Equipment Directive
2004/108/EC	EMC Directive
2006/95/EC	Low Voltage Directive (Mains Power Supply only)
2011/65/EH	RoHS Directive

Hereby declare that the following products have been designed and where appropriate, manufactured and tested in accordance with the applicable requirements of the following European harmonised standards and IEC Standards:

Model 1360 IS Anemometer

EMC	EN 61000-6-3:2007
	EN 61000-6-1:2007
Intrinsic Safety	EN60079-0:2012
	EN60079-11:2012
	EN60079-26:2007
	IEC60079-0:2011 Edition 6.0
	IEC60079-11:2011 Edition 6.0
	IEC60079-26:2006 Edition 2.0

IS WindObserver Power Supply 1360

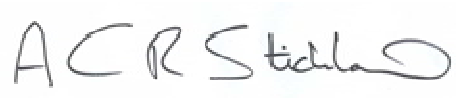
EMC	EN 61000-6-3:2007
	EN 61000-6-1:2007
Intrinsic Safety	EN60079-0:2012
	EN60079-11:2012
	IEC60079-0:2011 Edition 6.0
	IEC60079-11:2011 Edition 6.0
Low Voltage Directive	EN61558-1:1997
	EN61558-2-6:1997

IS Low Voltage Power Supply and Communications Interface 1954-00-002

EMC Emissions and Immunity	EN 61326-2-1:2013	
		EN 61204-3:2000
	Emissions	EN 60945:2002 Clause 9
	Immunity	EN 60945:2002 Clause 10
Intrinsic Safety	EN60079-0:2012	
	EN60079-11:2012	
	EN60079-26:2007	
	IEC60079-0:2011 Edition 6.0	
	IEC60079-11:2011 Edition 6.0	
	IEC60079-26:2006 Editions 2.0	

and that the equipment has been issued with Type Examination Certificates, Sira 15ATEX2014 (Model 1360 IS II Anemometer), Sira 00ATEX2217 (IS WindObserver Power Supply 1360), SIRA 13ATEX2384 (IS Low Voltage Power Supply and Communications Unit 1954-00-002) by Notified Body 0518 as Group II Category I equipment bearing the markings:-

Anemometer	II I GD Ex ia IIC T4 Ga Ex ia IIIC T135°C Da IP66 (Ta = -30°C to +70°C)
Power Supply 1360	II(I) GD [Ex ia Ga] IIC [Ex ia Da] IIIC (Ta = -30°C to +40°C)
Power Supply 1954-00-002	II(I) GD [Ex ia Ga] IIC [Ex ia Da] IIIC (Ta = -30°C to +40°C)



CE 01

Signed by

A.C.R. Stickland – Director

Date of issue: 26/05/2015

Place of issue: Gill Instruments Limited, Lymington.

nqa. ISO 9001 Registered Quality Management

Change Note: 8446 Doc:1360-0021 Date: 26th May. 2015