WindObserverIS

Intrinsically Safe Ultrasonic Anemometer

User Manual

IS WindObserver with Low-Voltage Power Supply
Part: 1360-PK-060 & 1360-PK-106
Anemometer serial number 30000 onwards
Low-Voltage Power Supply Unit serial number 040001 onwards

gillinstruments.com

Doc No: 1360-PS-0001
Issue 18

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1. Welcome to the IS WindObserver User Manual

1.1. About this manual

This manual provides the information needed to get the best results from IS WindObserver.
The most recent version of this manual is available at gillinstruments.com.
Please read this manual before setting up and installing IS WindObserver.

1.2. Downloadable Software

Two software packages are available to help customers use the IS WindObserver :

- Wind – this software can be used as a terminal program to set-up the product.
- WindView – this software can be used to view and log data provided by the product.

Both software packages can be downloaded from https://gillinstruments.com/downloads/

1.3. Overview of Content

The manual is split into 8 chapters. Each chapter represents an activity in the use of the product. Additional detailed information is contained in the Appendices at the end of the manual.

- Chapter 1 explains how the manual is set out
- Chapter 2 provides a contents list and spare parts list, and overview of the product
- Chapter 3 provides installation information for the product
- Chapter 4 explains how to connect the product
- Chapter 5 explains how to use the product with Gill software
- Chapter 6 explains how to configure the product
- Chapter 7 provides maintenance and fault-finding information for the product
- Chapter 8 contains some additional drawings

1.4. Description of Icons

The following icons are used in this manual

Icon	Description
	A note that is important and that should be observed
	Information or a recommendation to ensure best results
	The start of a set of instructions

1.5. General Notes

Before IS WindObserver is used for the first time it is essential to read and understand this manual. Please keep the manual safe for future reference.

Care should be taken with the IS WindObserver at all times. The product should be transported to site in the box, and only removed when ready to install.

During installation the IS WindObserver should be supported and care should be taken not to drop the product.

Care should be taken when wiring the IS WindObserver to power and communications.

Maintenance should be limited to the procedures described in this manual. Additional maintenance or cleaning may damage the sensors.

No attempt should be made to open or repair any of the parts of the product. Any attempt to dismantle any part of the product will invalidate the warranty provided by Gill Instruments.

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

1.6. User Manual Revision History

Document Issue	Release Date	Key Changes
Issue 16	March 2024	Upgrade to new format, removal of 1360-PK-022.
Issue 17	May 2024	Corrected installation drawings, added safety notes for ac adapter.
Issue 18	June 2024	Format change and various minor corrections.

1.7. 1360-PK-106 IS WindObserver System Contents

Part Number	Part Description
1360-PK-052	Intrinsically safe IS WindObserver anemometer
1255-10-057	Anemometer mounting kit
1360-PK-054	Anemometer 20 Way Connector kit
1277-30-045	Head Cover (2 halves)
1360-PK-105	Intrinsically safe Power Supply Unit (And Communications Interface)
5319-10-005	AC/DC Power Supply Cable Assembly
5319-10-003	DC Power Cable Assembly
1360-10-008	3 Metre Anemometer Test Cable

1.8. 1360-PK-060 IS WindObserver System Contents

Part Number	Part Description
1360-PK-052	Intrinsically safe IS WindObserver anemometer
1255-10-057	Anemometer mounting kit
1360-PK-054	Anemometer 20 Way Connector kit
1277-30-045	Head Cover (2 halves)
1360-PK-055 / 1954-00-002	Intrinsically safe Power Supply Unit and Communications Interface.
1360-10-008	3 Metre Anemometer Test Cable

1.9. Spare Parts List

Part Number	Part Description
1360-PK-052	Intrinsically safe IS WindObserver anemometer
1360-PK-054	Anemometer 20 Way Connector kit
1360-PK-055	Intrinsically Safe Power Supply Unit and Communications Interface
1360-PK-105	IS Power Supply Unit and Communications Interface with mains power adaptor
5319-10-005	AC/DC Power Supply Cable Assembly
5319-10-003	DC Power Cable Assembly
1360-10-008	3 Metre Anemometer Test Cable

2. Product Overview

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 units 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 5.4. Digital Serial Output Formats on page 33.

2.1. IS WindObserver Rating (1360-PK-052) Certification

- ATEX European Standard (Sira 15ATEX2014)
- UKCA UK Standard (IECEx SIR 15.0013)
- IECEx International Standard (CSAE 21UKEX2364)

To be used in Zones 0, 1 and 2

2.2. Low Voltage Power Supply Unit Rating (1360-PK-055) Certification

- ATEX European Standard (Sira 13ATEX2384)
- IECEx International Standard (SIR 13.0159)
- CSAE 21UKEX2363

NOT to be used in Zones 0, 1 or 2. Use in Non-Hazardous Areas only.

Please refer to ATEX, UKCA and IECEx Certificates in Appendix D on page 69, Appendix E on page 70 and Appendix F on page 78 for further details.

3. Installation

WARNING

Intrinsically Safe Power Supply Unit & Communications Interface
Part number: 1954-00-002

MUST BE MOUNTED IN A NON-HAZARDOUS AREA

Do NOT remove the black "rubber" transducer caps.

Take care not to knock the four Transducer arms. All the time the IS WindObserver is not in its final location, it should be protected from damage by keeping it in the original packaging as long as possible, treating it as a delicate instrument.

Warranty is void if the unit case is removed.

When selecting a site three attributes need to be considered:

- Physical location and obstructions
- Distance from the power supply and data collection system
- EMC interference

3.1. Pre-Installation Requirements

3.1.1. 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.

3.1.2. 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 10 and can be downloaded free from: http://www.gillinstruments.com/main/software.html
- Other Terminal software packages e.g. Tera Term, PuTTY , etc.

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

3.1.3. Cable and Junction Box

Installation and wiring to/from the PCI must be carried out in accordance with IEC 60079-14.
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.

3.1.4. Mounting

The Intrinsically Safe WindObserver can be attached to a mount as detailed in Figure 10 on page 26.
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 Low Voltage Power Supply Unit mounting details are as per Figure 1 on page 16.

3.1.5. Earthing

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

3.2. Installation Siting Guidelines

The IS WindObserver has been designed to meet and exceed the stringent standards listed in its specification. Operating in diverse environments all over the world, IS 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 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.
- 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 16 to 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 IS 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 IS 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.

3.3. Hazardous Area Installation

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, SIRA 15ATEX2014 and CSAE 21UKEX2364.

Number	Instruction		
1.	The certification marking is as follows:		
	Certificate number:	IECEx SIR 15.0013 CSAE 21UKEX2364	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°C to +70°C)	UK CA | UK NI Ex II 1GD
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.		

3.4. Low Voltage Power Supply Installation

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, Sira 13ATEX2384 and CSAE 21UKEX2363.

Number	Instruction		
1.	The certification marking is as follows:		
	Certificate number:	IECEx SIR 13.0159 CSAE 21UKEX2363	Sira 13ATEX2384
	Certification code:	[Ex ia Ga] IIC [Ex ia Da] IIIC	[Ex ia Ga] IIC [Ex ia Da] IIIC
	Other marking:	(Ta = -30°C to +60°C)	UK CA | UK NI Ex II 1GD
2.	The equipment may only be used in non-hazardous area.		
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.		
4.	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.		
5.	The equipment is only certified for use in ambient temperatures in the range -30°C to +60°C and should not be used outside this range.		
6.	Installation shall be carried out in accordance with the applicable code of practice by suitably trained personnel.		
7.	There are no special checking or maintenance conditions other than a periodic check.		
8.	With regard to explosion safety, it is not necessary to check for correct operation.		
9.	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.		
10.	Repair of this equipment shall be carried out in accordance with the applicable code of practice.		
11.	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.		

3.5. Key Installation Notes

1. Ensure the LVPCI box cable gland compresses on the cables outer sheath only. The minimum cable insertion depth is 45mm for M16x1.5 cable gland and 55mm for M25x1.5 cable gland.
2. Ensure the outer seal nut is torque tightened to 2.5Nm for M16x1.5 cable gland and 5Nm for M25x1.5 cable glands.
3. When joining the open ends of cables provided to the appropriate terminal block inside the LVPCI box, ensure the screws are torque tightened to 0.5Nm minimum and 0.6Nm maximum.
4. Following installation of cables at LVPCI end, replace the LVPCI box lid and ensure the screws provided are torque tightened to 2Nm.

3.6. Installation using low voltage power supply

3.6.1. Key Safety Notes

The unit must be installed in accordance with Figure 1 on page 16 and Figure 2 on page 17.

Safety notes (PCI box)

- Ensure the PCI box is mounted in the Safe area

Safety notes (PCI box and ac-dc mains adapter)

- the PCI box and its power supply are mounted in the Safe area.
- when using an electrical appliance basic safety precautions should always be followed.
- DANGER – to reduce risk of burns, fire, electric shock read all the instructions before using the power supply provided with this product.
- A power supply should never be left unattended when plugged in.
- WARNING – to reduce risk of burns, fire, electric shock of injury to persons of animals:
    1. Use this power supply only for its intended use as described in this manual.
    2. Do not use outdoors.
    3. Use only attachments supplied by Gill Instruments.
    4. Never operate this power supply if it has a damaged cord or plug, if it has been dropped or damaged or if it has fallen into water. In such cases return the power supply to Gill Instruments for examination or repair.
    5. Never drop or insert an object into any openings.
    6. Do not operate where aerosol (spray) products are being used or where oxygen is being administered.
    7. The power supply should be used near to a convenient and easily accessible mains socket.

3.6.2. Key Installation Notes

- M12 connector between two cable sub-assemblies to be located indoors.
- AC-DC power supply plug-in adaptor to be used with indoor mains supply only.

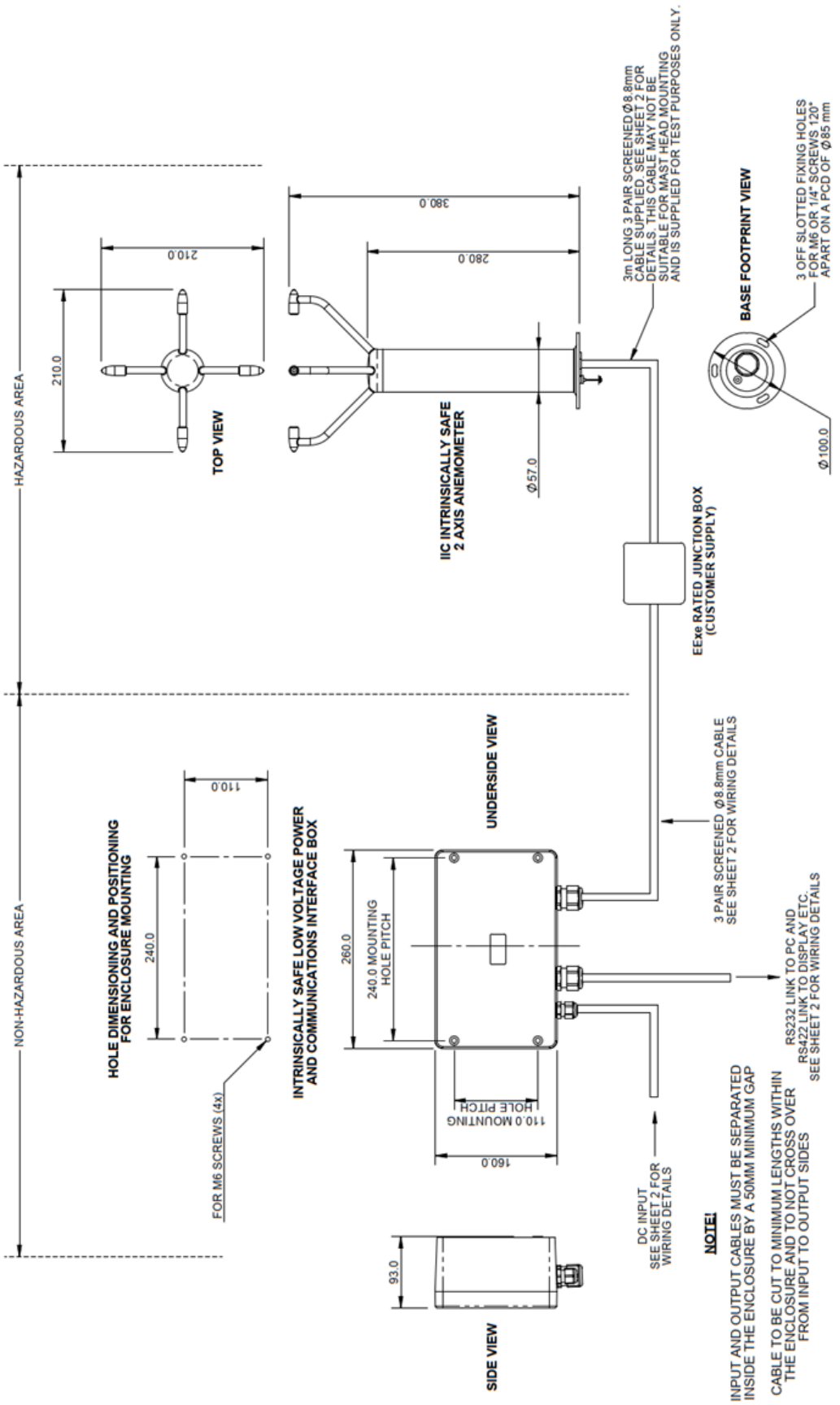

Figure 1 - Drawing 1954-30-026 issue 3 part 1, IS WindObserver System Diagram

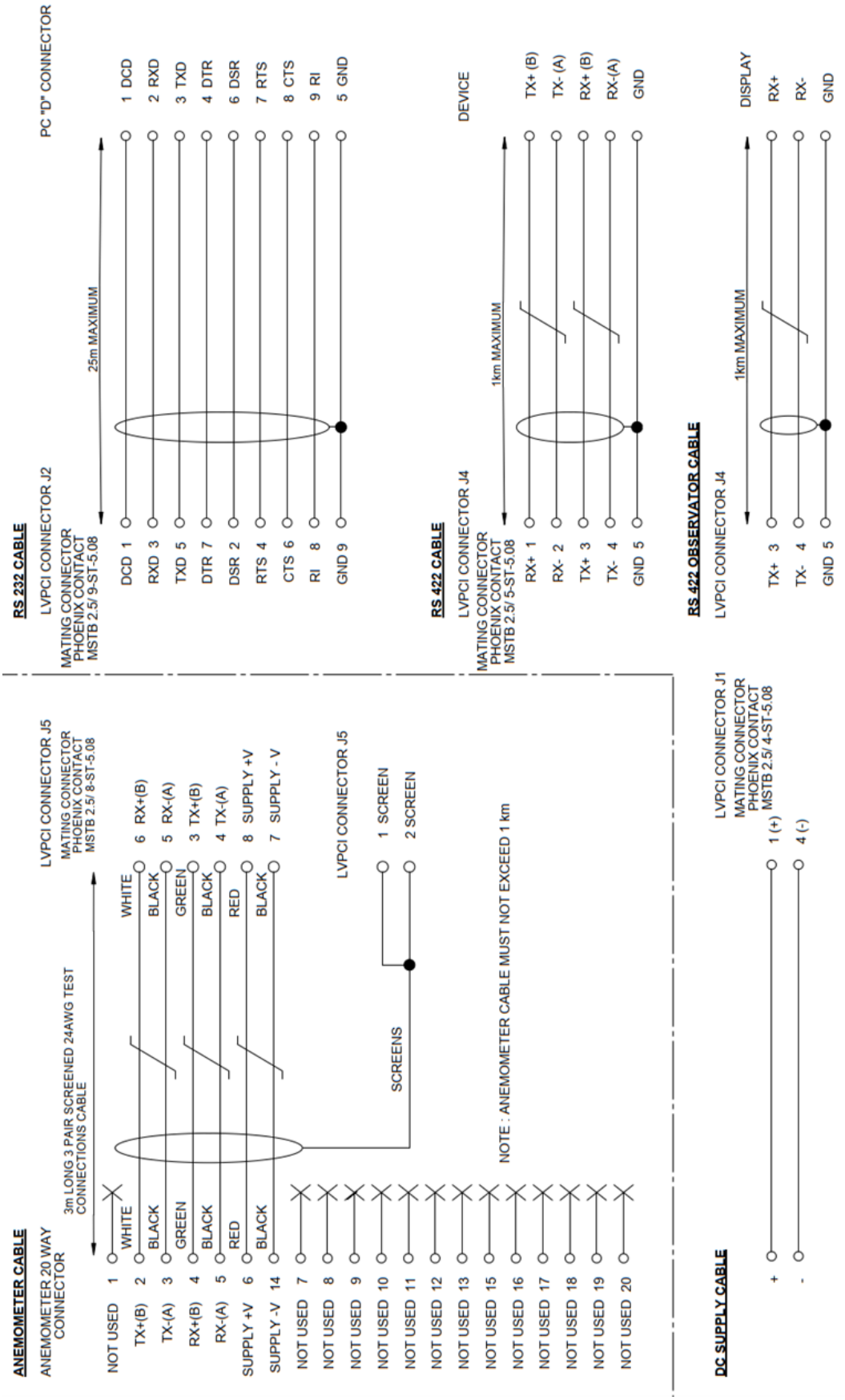

Figure 2 - Drawing 1954-30-026 issue 3 part 2, IS WindObserver System Diagram

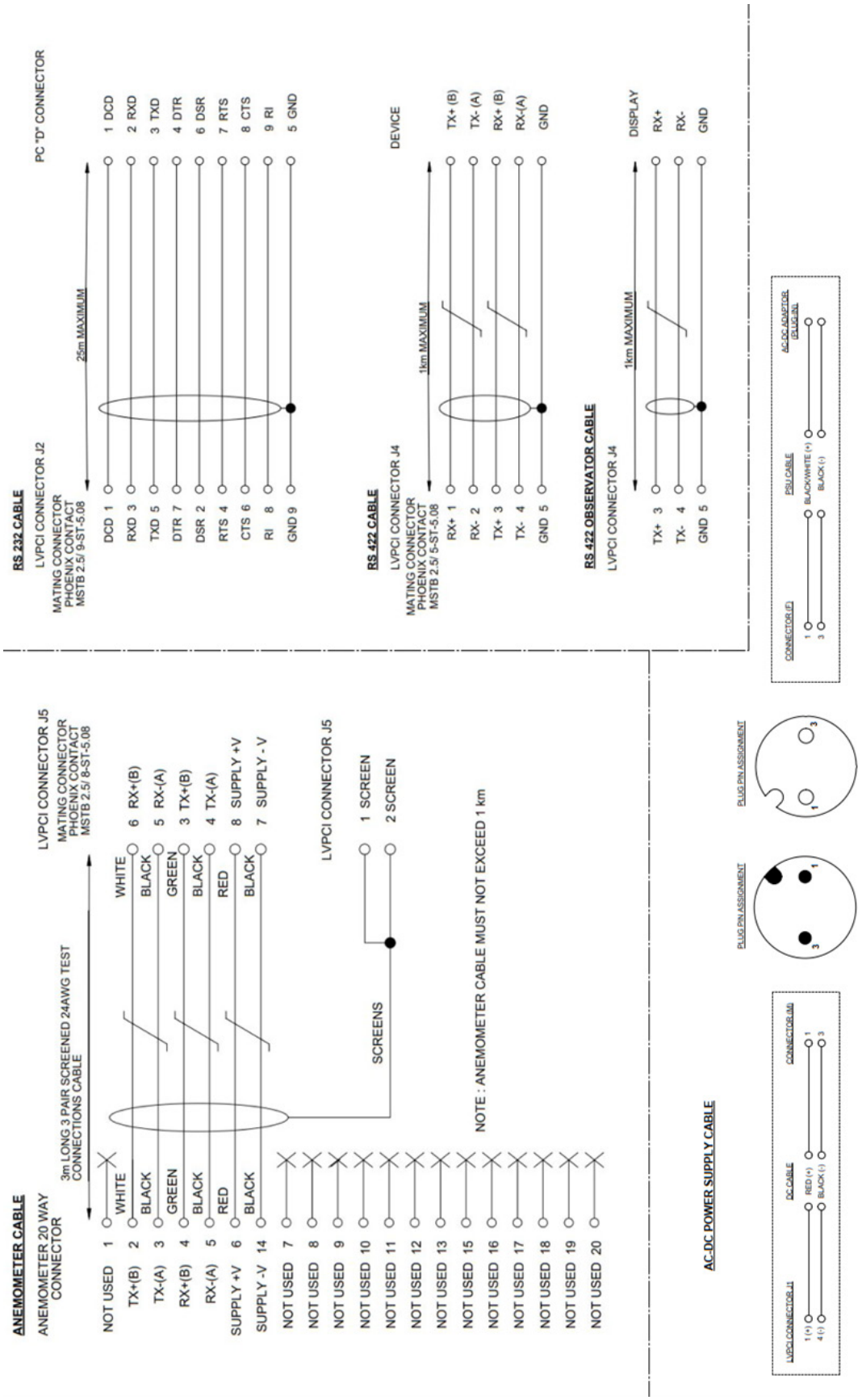

Figure 3 - Drawing 1360-PK-105 Issue 2

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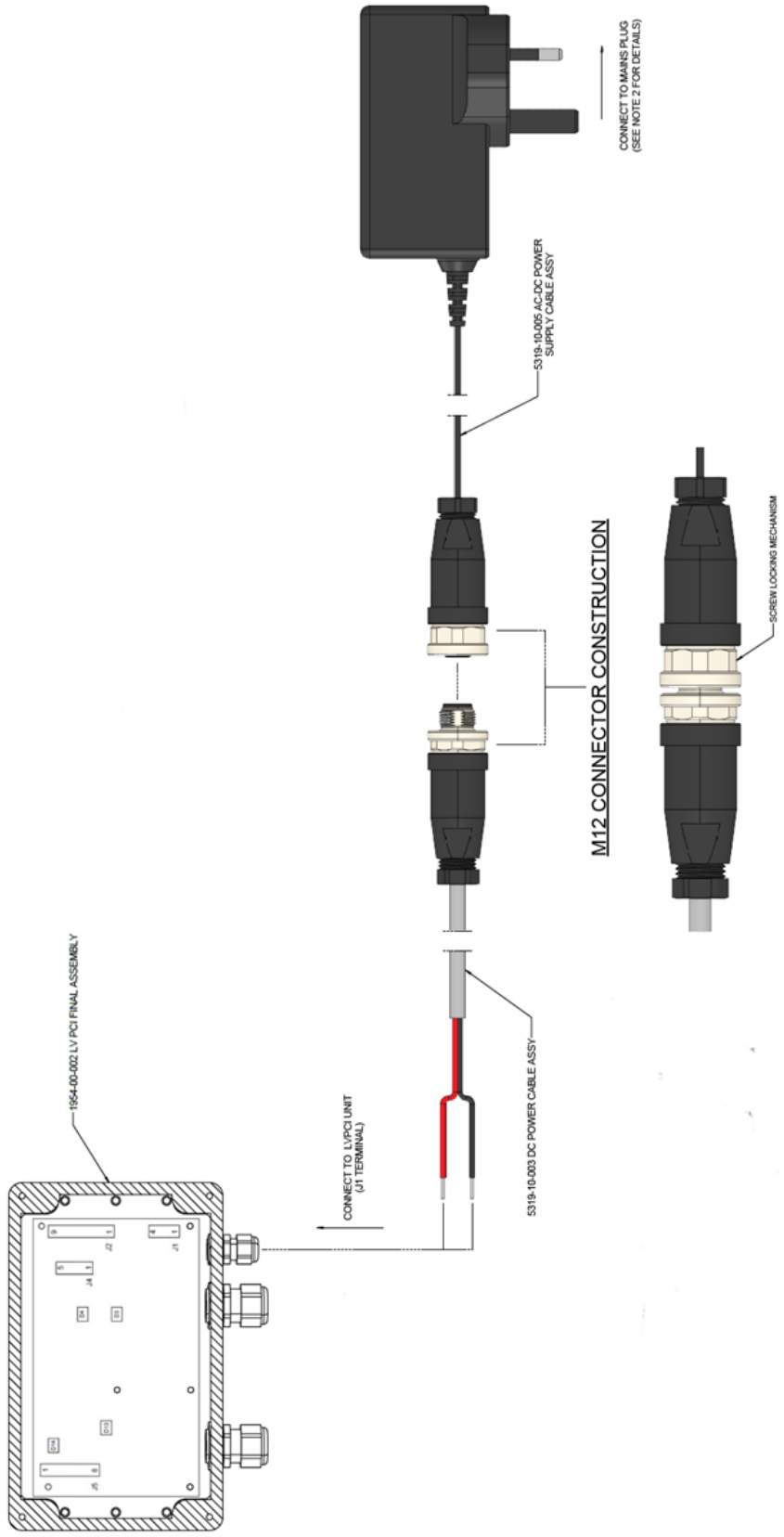

Figure 4 - Drawing 1360-PK-105 issue 2, AC-DC Supply Cable

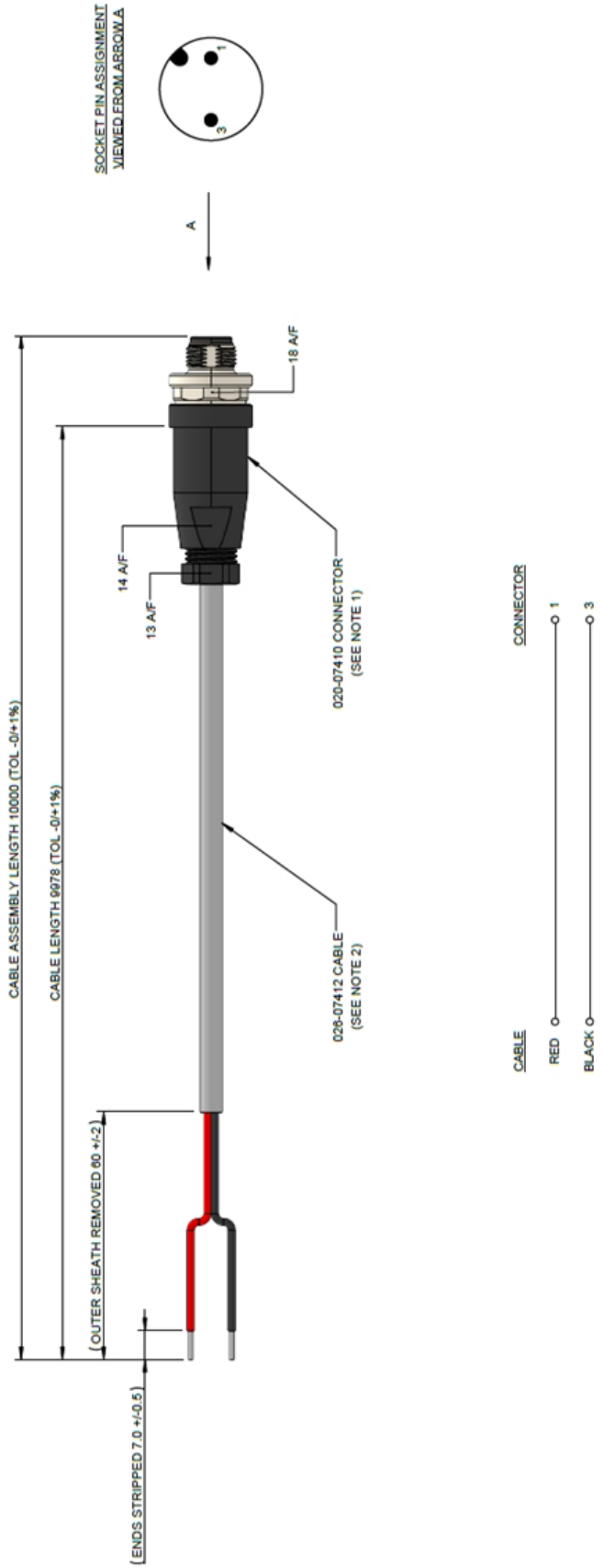

Figure 5 - Drawing 5319-10-003 issue 2, DC Power Cable Diagram

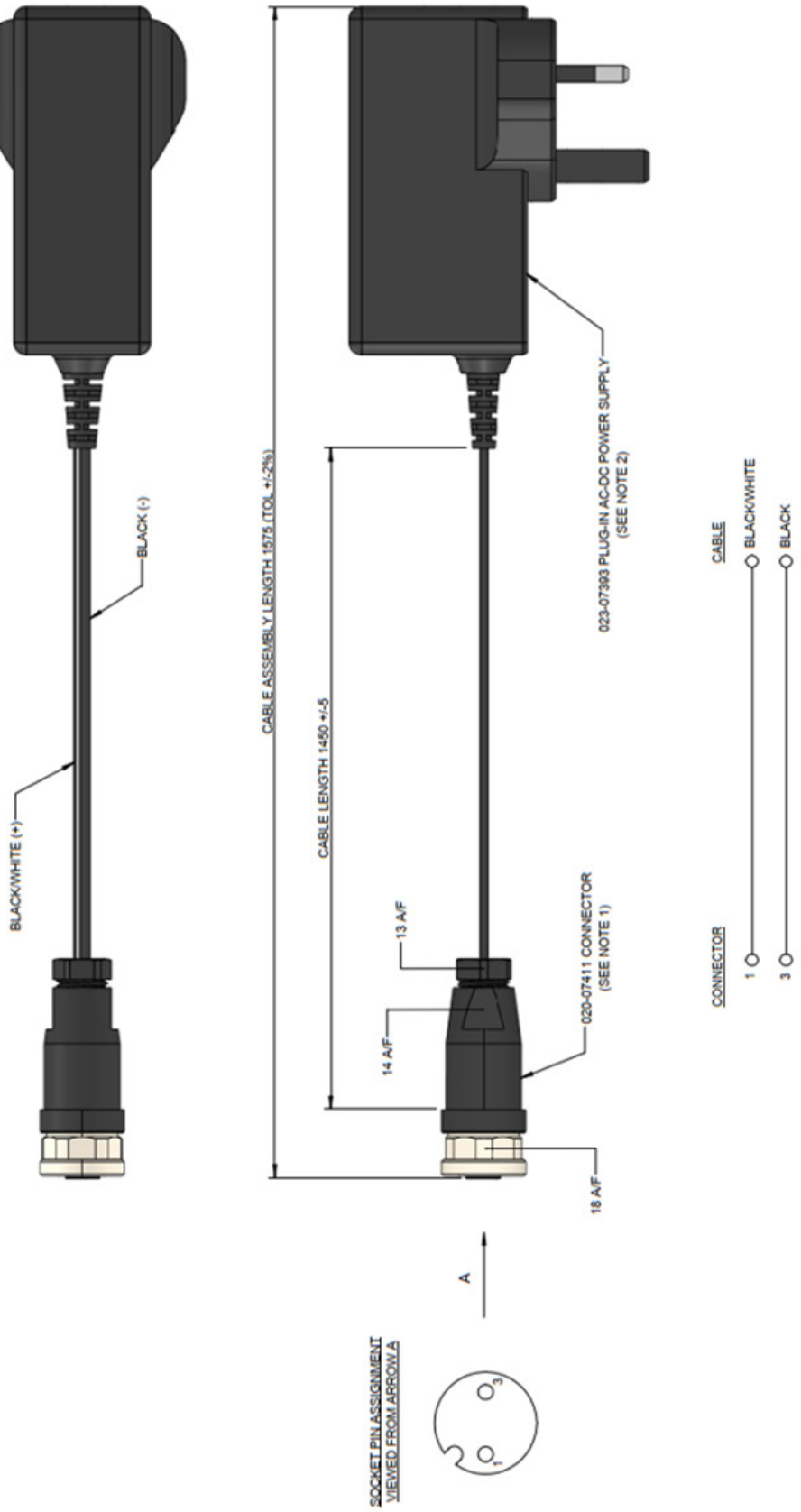

Figure 6 - Drawing 5319-10-005 issue 2, AC/DC Power Supply Diagram

3.7. Cabling

Installation and wiring to/from the PCI must be carried out in accordance with IEC 60079-14.

3.7.1. Anemometer

The Intrinsically Safe WindObserver and Power Supply Interface Box is supplied with a 3-Metre long, 3 pair, 24 AWG, screened, 8mm ± 0.2mm 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, IECEx and UKCA Certifications in Appendix 2 & 3

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.

3.7.2. 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.

3.7.3. 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).

Part Name	Gill Part Number	Hirose Part Number
Connector plug, 20-way	020-02673	RM21WTP20P71
Extended backshell	1284-30-006	Not Available
Cord Clamp 8mm	020-02872	JR13WCCA-8(72)

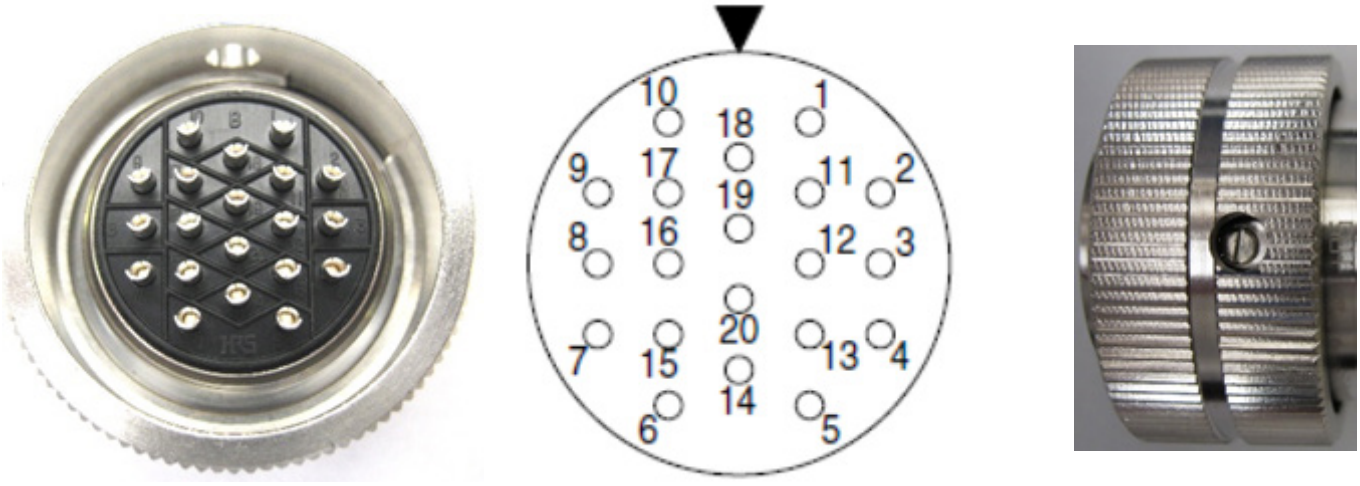

Figure 7 - 20-way connector terminal positions viewed from the solder connection side. Slot position indicated by black triangle. Note grub-screw in right-hand image.

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

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

Arrange IS WindObserver Connector Parts as follows (see Figure 8).

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

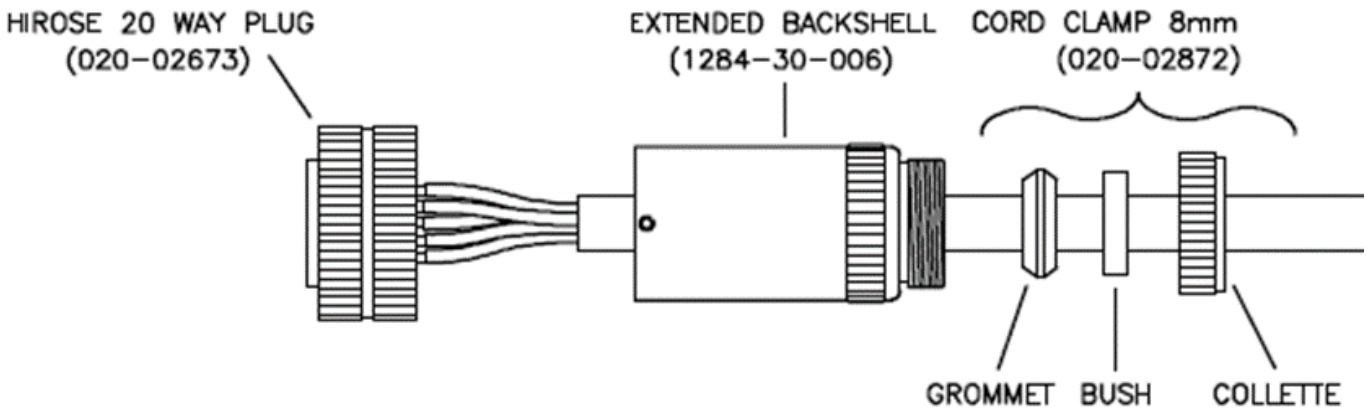

Figure 8 - Hirose 20-way plug assembly

3.8. Mounting

Do NOT remove the black "rubber" transducer caps. Take care not to knock the four transducer arms. All the time the IS 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 (Figure 9) and secured in place using supplied Tie wraps.
Upon install completion remove the head cover.

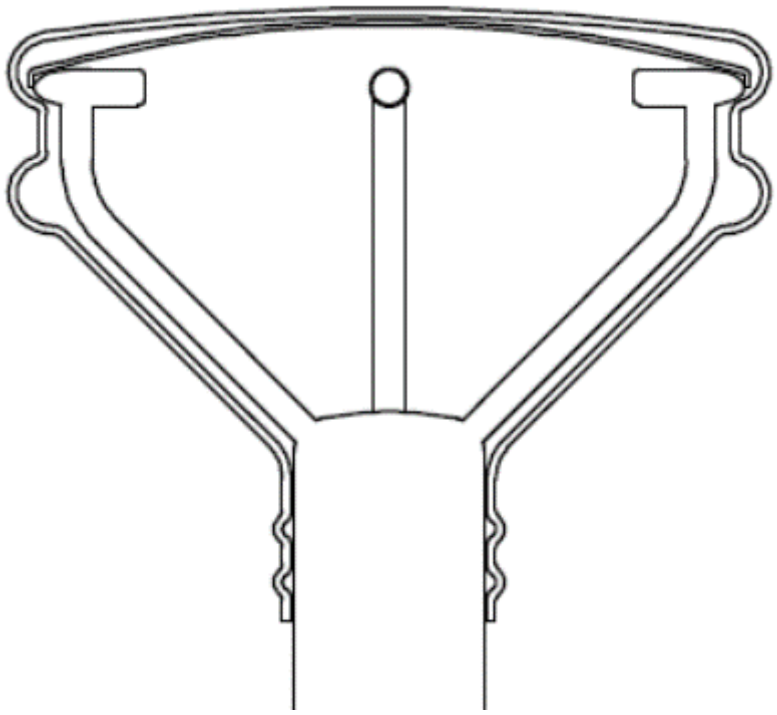

Figure 9 - IS WindObserver Head showing application of protective head cover (Part/s 1277-30-045)

The Anemometer should be mounted on a suitable surface as shown in Figure 10, using the mounting kit supplied and described in the Packing List. Warranty and Certification is void if the case is removed.

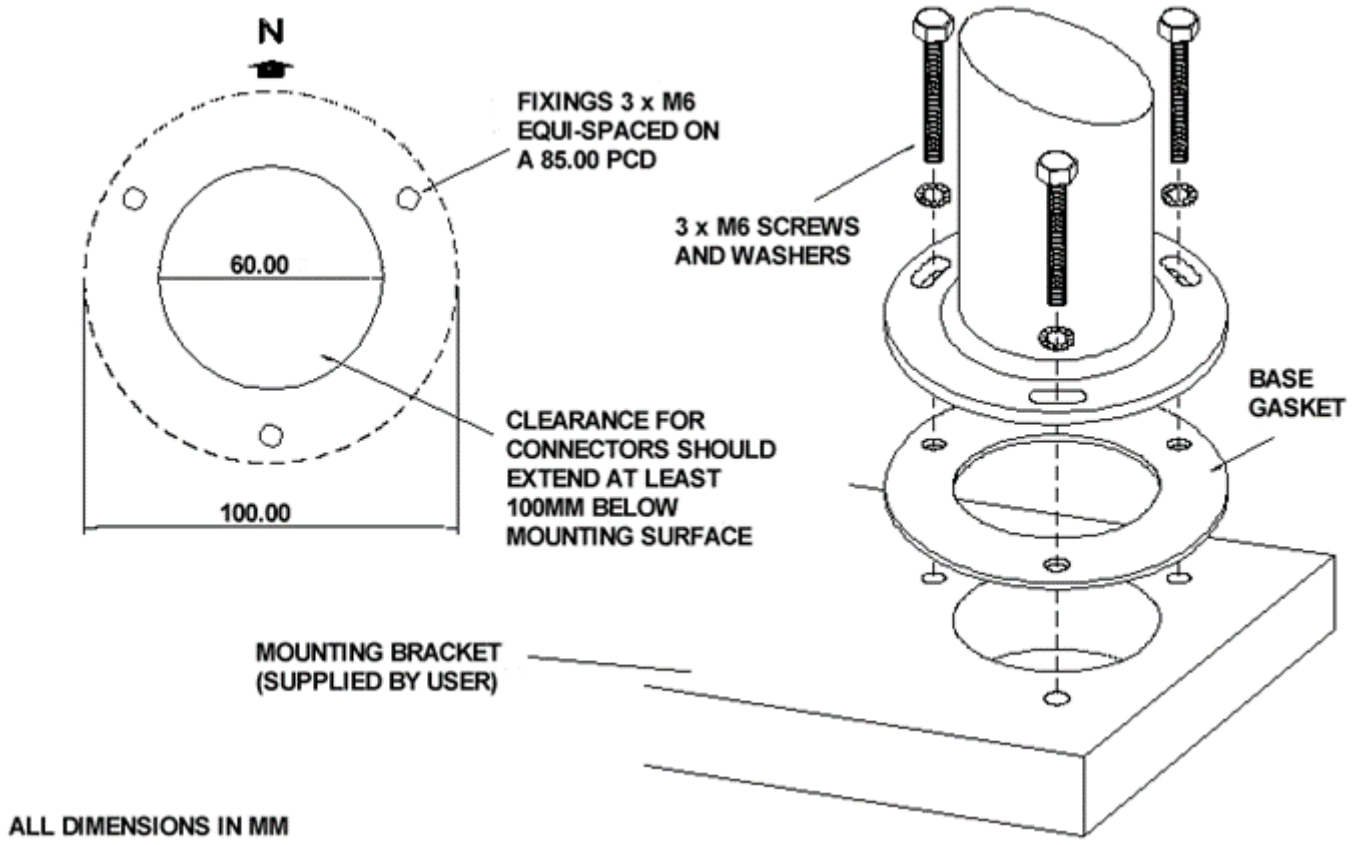

Figure 10 - Drawing 1086-G-045 Issue 2 Anemometer Mounting Details

3.9. Alignment

The anemometer should be set to point North (or to some other known reference direction), see Figure 11 on page 27. This is facilitated by slots in the base for the mounting screws, which allow rotation of the anemometer for fine alignment.

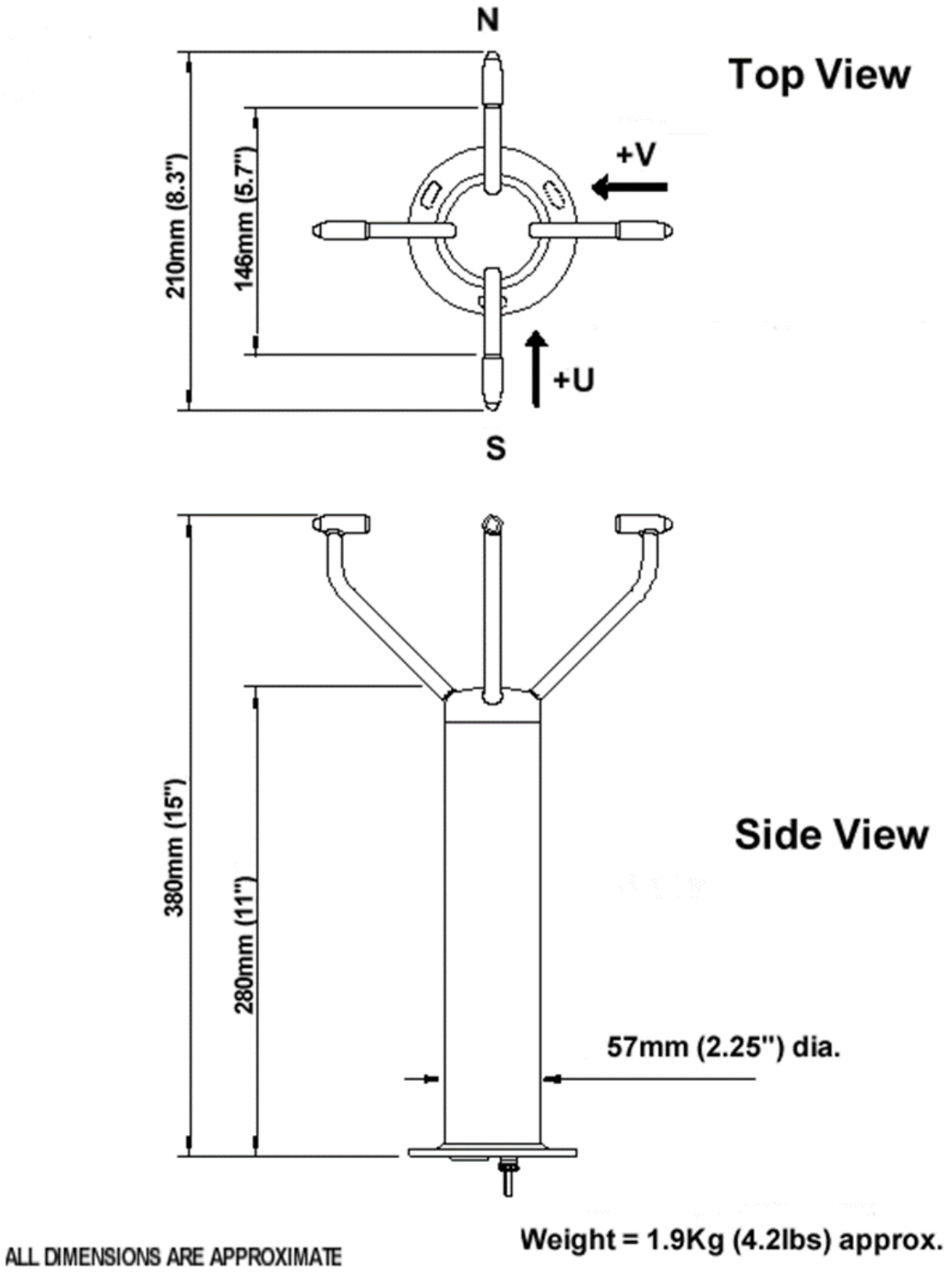

Figure 11 - Drawing 1360-G-026 Issue 1, Type IIc I.S. Anemometer Dimensions

3.10. 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.

3.11. 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.

3.12. 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.

3.13. 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.
User modifications to the PCB are not permissible and will invalidate the Approval Certificates and Warranty

4. 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 AND PREVENTION OF DAMAGE TO THE ANEMOMETER 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.

4.1. 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.

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

4.3. Connecting to a PC or External Device using the RS232 Output

Maximum suggested RS232 approved screened cable length is 25 Metres.

4.4. R232 Connections on the Low Voltage Power Supply Box

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

Doc No: 1360-PS-0001
Issue 18

5. Using the Anemometer with a computer and software

This section describes the modes and format of the data output by the anemometer.
Use only the approved Gill Instruments IS Supply otherwise damage is likely to occur to the Anemometer and invalidate certification.

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.

5.1. Wind Speed format

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

5.2. 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.

5.3. Output Formats Table

Output format	Mode	Tri-state o/p	Configuration code
ASCII UV	Continuous	No	M1
ASCII UV	Polled	Yes	M3
ASCII Polar	Continuous	No	M2
ASCII Polar	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

5.4. Digital Serial Output Formats

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

5.4.1. Mode 1- ASCII, UV, Continuous

Example outputs:

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).

Format:

<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

5.4.2. Mode 2 - ASCII, Polar, Continuous

Example outputs:

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).

Format:

<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

5.4.3. Mode 3 - ASCII, UV, Polled (Point to Point only)

Example outputs:

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).

Format:

<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

5.4.4. Mode 4 - ASCII, Polar, Polled (point to Point only)

Example outputs:

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).

Format:

<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

5.4.5. Mode 5 - ASCII, NMEA, continuous

Example outputs:

$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).

Format:
$IIMWV,DDD1,R,MMM.MM,U,A,*cc<CR><LF>
where:

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

5.4.6. Mode 6 - Binary Tunnel Continuous

In a terminal program the Binary output may look like a series of unfamiliar non-standard characters.

Converted it will read as, for example:
0x81 0x81 +000.04 1 00 1

The format is:
<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

5.4.7. Mode 7 - Binary UV Short Continuous

In a terminal program the Binary output may look like a series of unfamiliar non-standard characters.

Converted it will read as, for example:
0x81 0x81 +000.04 -000.02 00 1

Format:
<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

5.4.8. Mode 8 - Binary Polar Continuous

In a terminal program the Binary output may look like a series of unfamiliar non-standard characters.

Converted it will read as, for example:
0x81 0x81 006.04 265 00 1

Format:
<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

5.4.9. Mode 12 - ASCII Tunnel Continuous

Example outputs:

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).

Format:
<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

5.4.10. Mode 13 - ASCII Tunnel Polled (point to Point only)

Example outputs:

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).

Format:
<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

5.4.11. Mode 14 - ASCII Polar Polled (Point to Pont only) Road Weather Average (RWA)

Example outputs:

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

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

<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 (HEX byte)	-	Checksum of all Characters between <STX> and <ETX>
<CR><LF>	-	Carriage Return and LineFeed

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

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.

5.4.12. Mode 14 – Averaging Polled (Point to Point only) 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.

5.4.13. 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.

Example outputs:

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

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

<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 (HEX byte)	-	Checksum of all Characters between <STX> and <ETX>
<CR><LF>	-	Carriage Return and LineFeed

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

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.

5.4.14. Mode 15 – Averaging Data in Continuous mode

The format of averaged digital data output is in the format:
<Start of String>, Node, Mode, Averaged Direction, Averaged Magnitude, units, Maximum Gust Direction, Maximum Gust Magnitude, Status, <End of String>, checksum

Examples:
<stx>A,M15,293,000.03,M,338,000.05,51,<etx>47
(Status code 51 shows measurement average building, non-heat enabled units only).
<stx>A,M15,198,000.04,M,088,000.39,51,<etx>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:
RWASHORT Number
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.

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).

5.4.15. 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, see Figure 12:

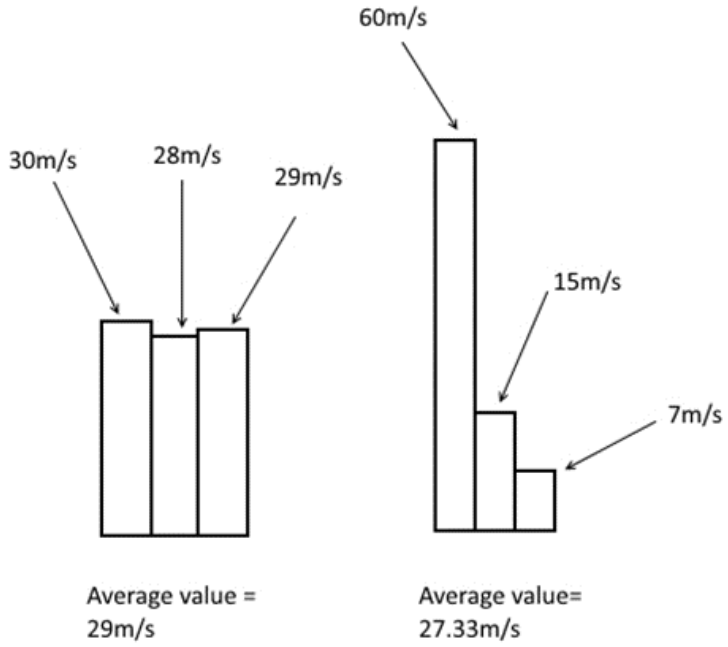

Figure 12 - Example demonstrating how gust is calculated

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.

5.5. Digital Format Notes

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

This is available only as Point to Point (not networkable).

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.

5.6. 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

5.6.1. 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 in CSV mode and in fixed field mode freeze at the last valid direction reading. All other parameters will update at the output rate.

5.6.2. 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.

5.6.3. 45° Offset

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

5.6.4. Vertical Output Padding

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

5.7. 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:

5.7.1. 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.

5.7.2. 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.

5.7.3. 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.

5.7.4. 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.

5.7.5. 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.

5.7.6. 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.

5.7.7. 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.

5.7.8. 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.

5.7.9. Code A - NMEA OK

NMEA measurement status - measurement ok.

5.7.10. Code V - NMEA Void

NMEA measurement status - measurement is void.

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6. Configuration & 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 10 and can be downloaded from: - https://gillinstruments.com/downloads/

6.1. Configuring using HyperTerminal

Note: Other terminal emulators are usually configured in a 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 (e.g. TEST) and click on OK.

Figure 13 - Setting the name and icon for a new connection using HyperTerminal

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.

Figure 14 - Configuring a connection using HyperTerminal

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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

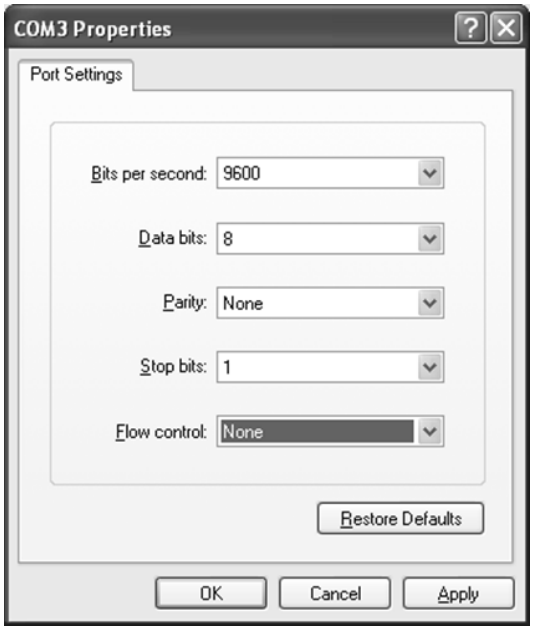

Figure 15 - Configuring port settings using HyperTerminal

Click on OK and data similar to that shown in Figure 16 will scroll on screen at the output rate.
Note: if strange characters or garbled data are seen try opening the HyperTerminal link at a different Baud rate e.g. 4800 Baud.

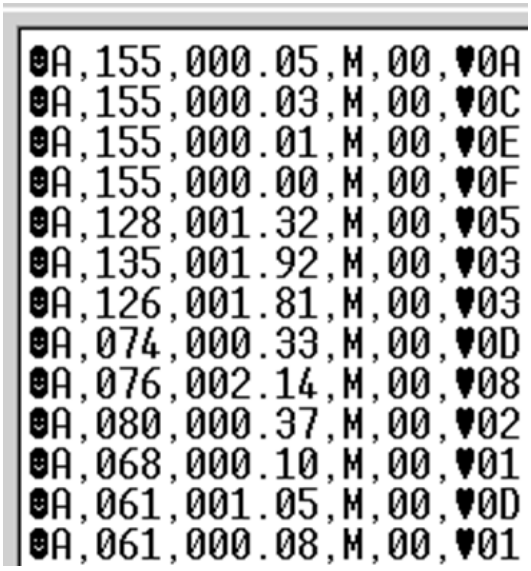

Figure 16 - Example WindObserver data viewed on HyperTerminal

6.2. Entering Configuration Mode

Depending upon which Output Mode is in use, the method for entering Configuration Mode differs.

6.2.1. From Continuous mode

Type: *

6.2.2. From Polled mode

Type: *N
(where N is the Unit Identifier.)

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.

6.3. Measurement Mode

To return to Measurement Mode from Configuration Mode, type Q and press the ENTER key.

6.3.1. Continuous Measureent Mode

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

6.3.2. Polled Measurement Mode

If in Polled mode: -

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

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 in case the power has been switched off or power interrupted.

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6.4. 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 parameters. We suggest you note down your settings, so that you can easily return to them.

Enter Configuration Mode (see 6.2. Entering Configuration Mode on page 48).

Type D3 and press the 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 the ENTER key.

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

So, for Example:

1. If in continuous mode, type * (may take more than one attempt). This will bring up the text CONFIGURATION MODE.
2. Type D1 and press the Enter key to view the unit serial number.
3. Type D2 and press the Enter key to view the unit software version.
4. Type D3 and press the Enter key to view the unit configuration.
5. Type Q and press the Enter key to go back into Measurement Mode.

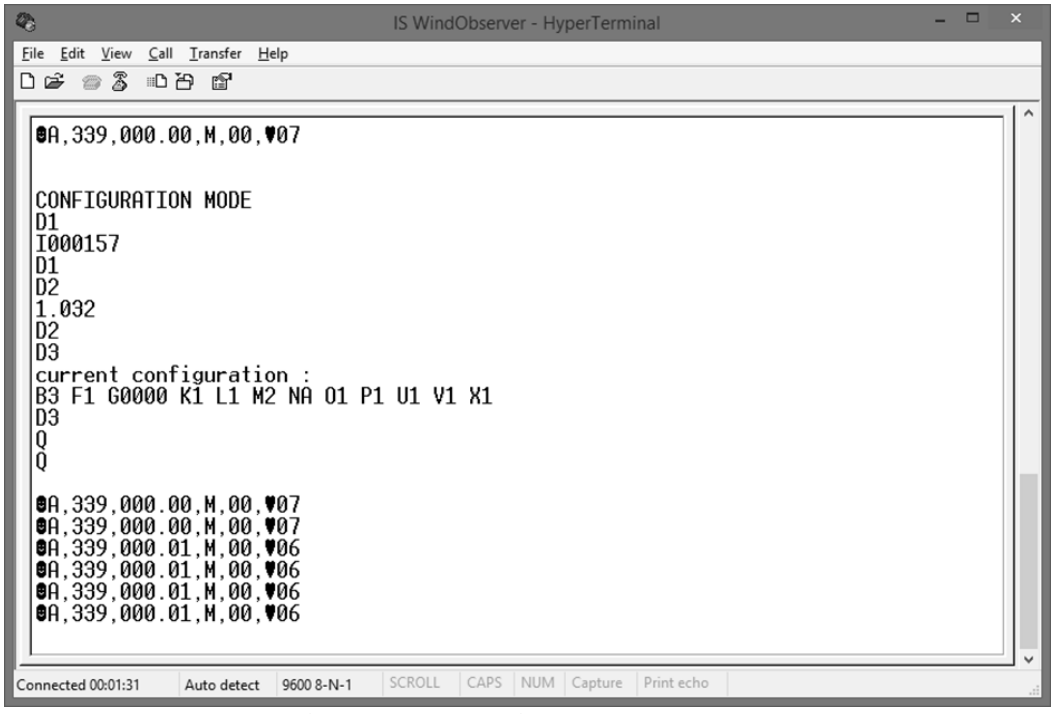

Figure 17 - Example responses after entering configuration mode, executing commands, and exiting

6.5. 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 the 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.

6.6. Configuration Settings

Settings applicable to the IS WindObserver are as follows: -

6.6.1. BX - Baud Rate

Setting	Command
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).

1. Enter Configuration Mode (see 6.2. Entering Configuration Mode on page 48).
2. Type B2 and press ENTER, (do not type any further commands at this stage).
3. Close the 9600 Baud HyperTerminal connection.
4. Open HyperTerminal and set the new connection Baud Rate to 4800 baud.
5. Type B and press ENTER, the letter B will be shown followed by B2
6. Type Q and press ENTER, data will scroll at the new baud rate

6.6.2. Dx- Diagnostic and Configuration Command

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

Item	Command	Typical response
Type and serial No.	D1	I03000
Software version	D2	1.032
Unit configuration	D3	Current configuration, e.g.: 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

6.6.3. Fx- Data and Parity Options

Setting	Command
8 bits, no parity, 1 stop bit	**F1**
8 bits, even parity, 1 stop bit	F2
8 bits, odd parity, 1 stop bit	F3

6.6.4. Gx to Gxxxx - Averaging

Setting	Command
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.

6.6.5. Kx – NMEA Settings

Setting	Command
NMEA string "IIMWV"	**K1**
NMEA string "WIMWV"	K2

6.6.6. Lx - ASCII Message Terminator

Message Terminator Setting	Command
CR LF	**L1**
LF	L2

6.6.7. Mx to Mxx - Message Format

Message Format Setting	Command
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

6.6.8. Nx - Node Address (A default)

Setting	Command
Node Address	**N<A> where <A> is a capital letter from A to Z. e.g. NQ**

6.6.9. Ox – ASCII Output Format (Output String Padding)

This function changes the way invalid measurements are output. In CSV Mode, invalid measurements are simply ommitted. In Fixed Field mode, invalid measurements are represente as a value of 999 or 999.99.

Format Setting	Command	Example Polar Mode outputs	Example NMEA Mode outputs
Comma Separated Variable (CSV)	**O1**	A,235,000.77,M,00, 0A (valid) A,,,M,04, 24 (invalid)	$IIMWV,191,R,000.55,M,A*19 $IIMWV,,R,,M,V*29 (invalid)
Fixed Field	O2	A,266,000.73,M,00, 08 (valid) A,999,999.99,M,04, 0A (invalid)	$IIMWV,191,R,000.55,M,A*19 $IIMWV,999,R,999.99,M,V*07

6.6.10. Px - Output Rate

Output Rate Setting	Command
1 Hz	**P1**
2 Hz	P3
4 Hz	P2

6.6.11. Q- Returning to Measurement Mode

When in configuration mode, simply press Q to return to measurement mode (see 6.3. Measurement Mode on page 48).

6.6.12. Road Weather Averaging Settings

Road Weather Averaging	Command
Short-term averaging	RWASHORT XX (where XX = 10 to 60, associated with Mode 14 and Mode 15 averaging)
Long-term averaging	RWALONG XX (where XX = 1 to 10, associated with Mode 14 and Mode 15 averaging)

6.6.13. Ux – Digital Output Units

Units	Command
metres per second (m/s)	**U1**
knots	U2
miles per hour (mph)	U3
kilometres per hour (kmph)	U4
feet per minute (fpm)	U5

6.6.14. Vx- Vertical Output Padding

Setting	Command
Disable vertical output padding	**V1**
Enable vertical output padding	V2

6.6.15. Xx - 45° Alignment Offset/Inverted Operation

Setting	Command	Notes
Align U axis with transducer axis	**X1**	**X1. Aligns U axis with North/South axis - see Figure 18.**
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).

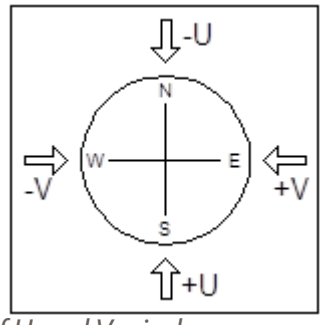

Figure 18 - The polarity of U and V wind components for a given wind direction.

7. Maintenance & fault-finding

7.1. 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 carefully cleaned with a cloth, moistened with gentle 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 3.8. Mounting on page 25) before installation or when removing the sensor from the installation.

Do NOT remove black "rubber" transducer caps.

7.2. 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 description of advised bench tests can be found in 7.5. Bench Tests on page 58.
- Contact your supplier for advice if failure persists.

7.3. Fault-finding

Symptom	Action
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 comms	Check wiring is in accordance with the manual.
Invalid measure	Check that transducer path is not blocked.

7.4. 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.

7.4.1. 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).

7.4.2. 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 repeat the above steps.

7.4.3. 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.

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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 unit's original baud rate setting (the default setting would be 9600 Bauds to view data).

7.5. Bench Tests

7.5.1. Alignment test

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

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.

7.5.2. 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 in Figure 19).

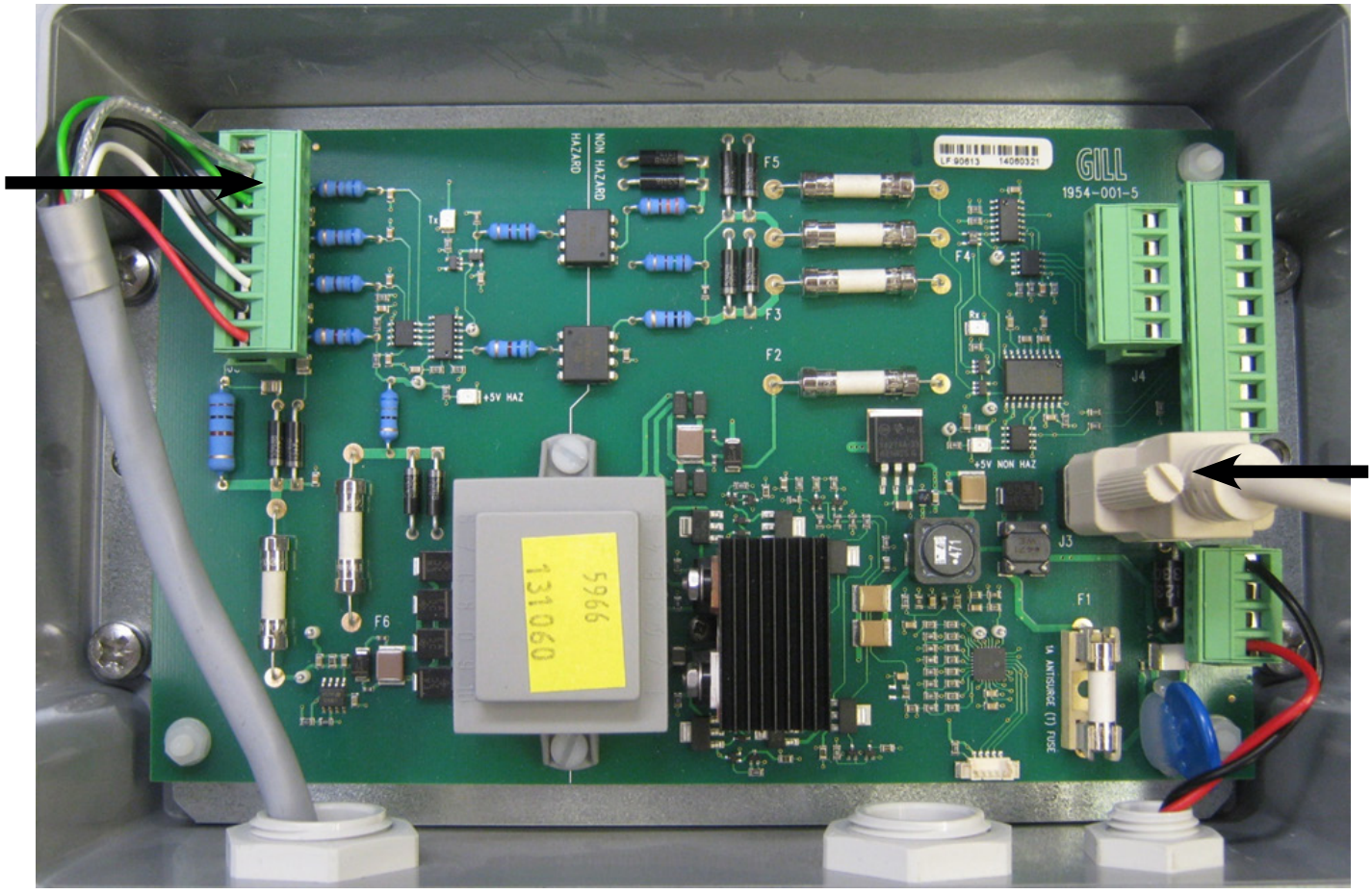

Figure 19 - main connections to the IS WindObserver Power Supply - note the J5 Terminal 2 (top-left) and J3 connector (right)

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

7.5.3. 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 may 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

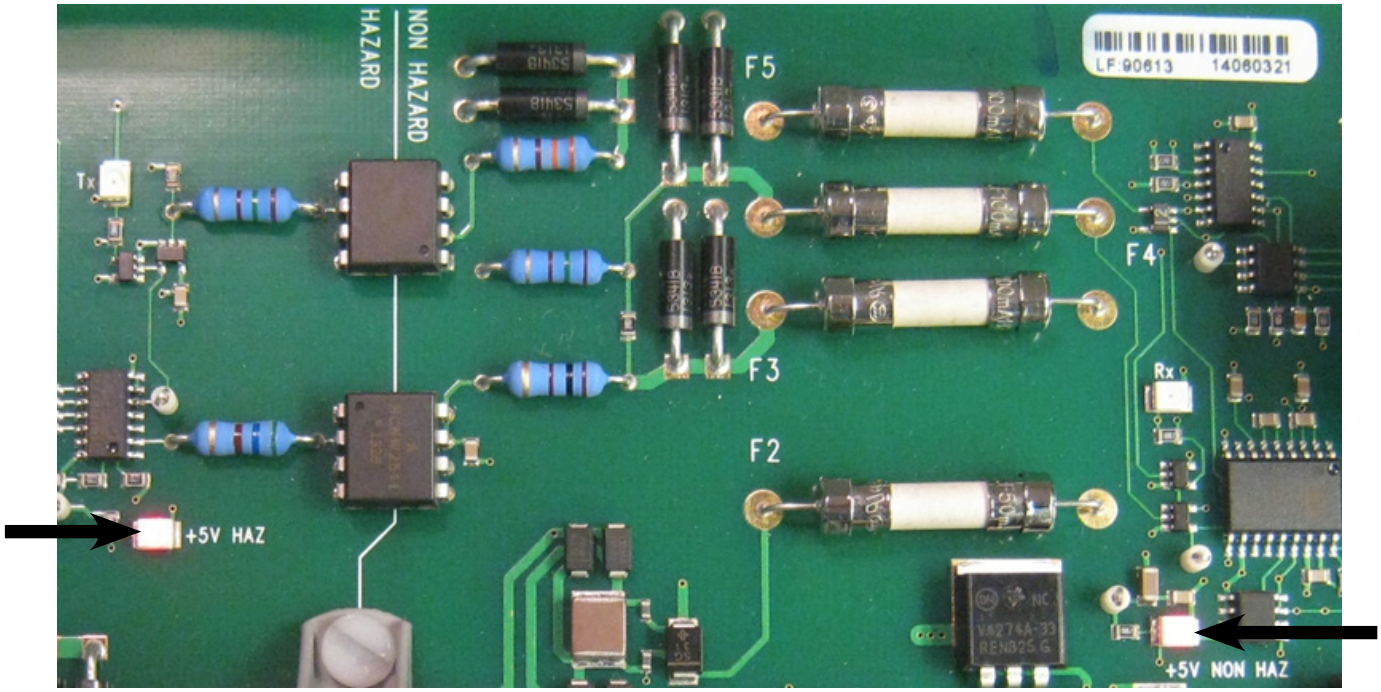

Figure 20 - internals of the IS Anemometer Power Supply - note the +5V HAZ LED (bottom-left) and +5V NON HAZ LED (bottom-right)

7.5.4. 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.

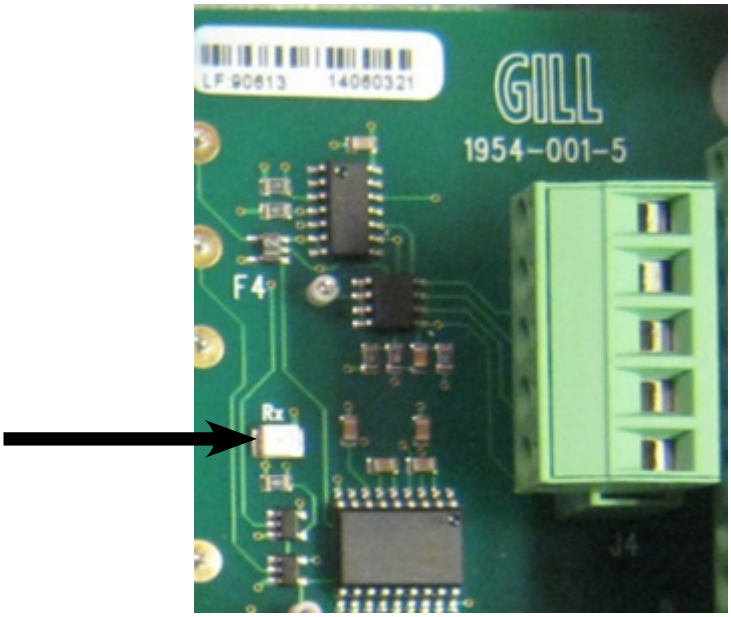

Figure 21 - close-up of the red Rx LED (bottom-left)

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 6.4. Checking the Configuration on page 49.

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.

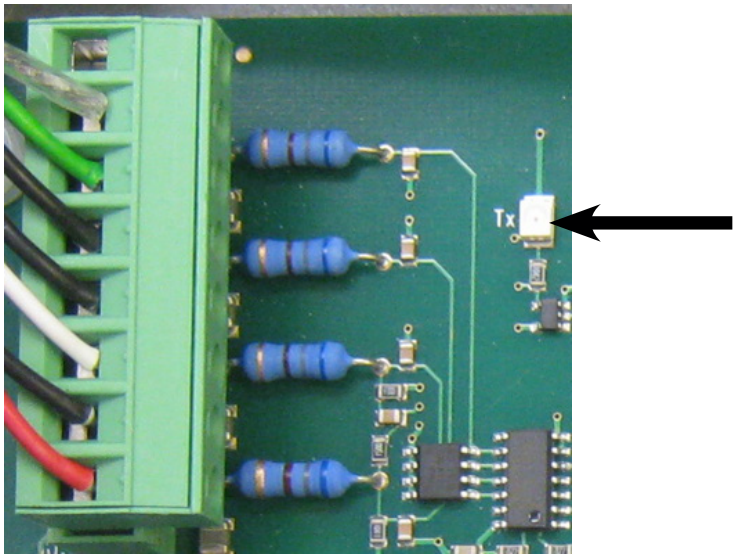

Figure 22 - close-up of the red Tx LED (right)

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 5.7. Status Codes on page 45.
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.

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.

7.5.5. 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.

7.6. 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.

8. Drawings

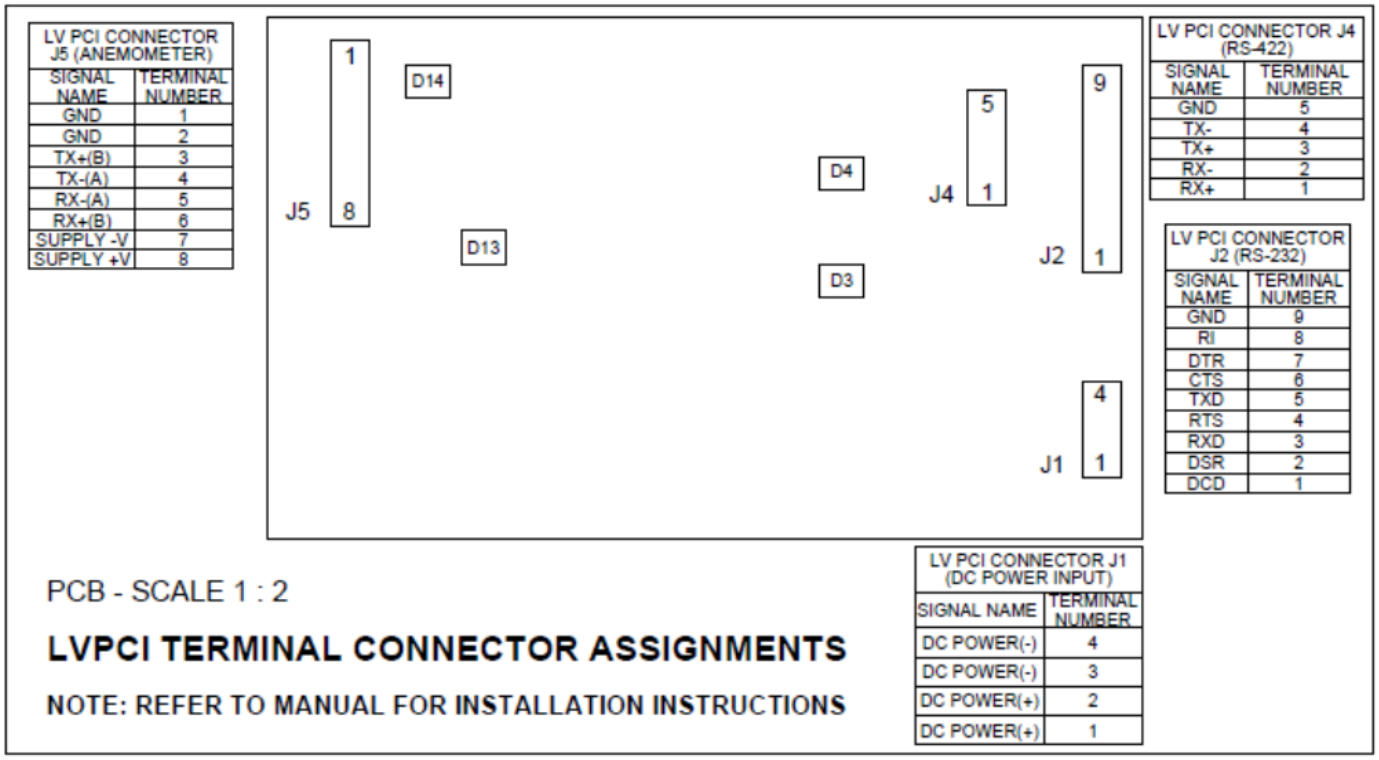

Figure 23 - Low Voltage Power Supply Drawing 1954-30-023 Issue 2 Terminal Arrangement

Appendix A. Technical Specification for IS WindObserver

Part number 1360-00-097
For use in Zone 0, 1, and 2

General Wind Measurement	
Parameters	Wind Vectors U (South to North) and V (East to West) Polar Wind Measurements (Speed and Direction)
Output Rates	1Hz (Default), 2 and 4Hz as a user configuration
Averaging	Flexible 0-3600 seconds or Adjustable Averaging for Road Weather applications
Status	Included as part of standard message

Wind Speed	
Range	0 - 75m/s (0-167mph)
Accuracy	5% RMSE
Resolution	0.01m/s
Units	m/s, knots, mph, km/h, ft/min

Wind Direction	
Range	0-359 Degrees
Accuracy	4° RMSE
Resolution	1°
Starting threshold	0.01 m/s
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.

Power Requirement when used with: Low Voltage Power Supply Unit Mounted in Non-Hazardous Area (1360-PK-055)	
Input Voltage	9v to 30v dc at 200mA max (Fused 20mm, 1 amp, and anti-surge). Galvanic isolation between input power and anemometer supply.
Output Voltage	10.5v dc at 50mA to IS WindObserver (fused 100mA)
Formats	8 data bits, odd, even or no parity, 1 stop bit
Circuit protection	0.8 Joules (all circuits)

Please refer to the following certifications contained in appendices 2, 3, & 4 for power-related information: Sira 15ATEX2014, IECEx SIR 15.0013, CSAE 21UKEX2364

Digital Output	
Communication	RS422, Full duplex to power and control enclosure
Baud rates	1200, 2400, 4800, 9600, 19200
Formats	8 data, odd, even or no parity

Mechanical Information	
External Construction	Stainless Steel 316
Size	See Figure 1 on page 16 for full details.
Weight	IS WindObserver 1.9kg

Environmental Information	
Moisture protection	IP66 (NEMA4X)
Operating temperature	-30°C to +70°C
Humidity	0% to 100% RH
Precipitation	300mm/hr
Humidity	0 to 100%

Standards	
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

Appendix B. Technical Specification for Low Voltage Power Supply

Part number 1954-00-002
NOT for use in Zone 0, 1, and 2

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

Power Requirement	
Input Voltage	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)

Mechanical	
External Construction	Fibox Euronord Polyester
Size	See Figure 1 on page 16
Weight	2.4 kg

Environmental	
Moisture protection	IP54
Operating temperature	-30°C to +60°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

Appendix C. Technical Specification for wall-plug 5319-10-005

Power Requirement	
Input Voltage	90 VAC to 264 VAC
Output Voltage	24VDC
Unit Power Consumption (No Load Input Power)	75 mW
Input Power Over Voltage Protection Limit	not present
Input Power Reverse-Polarity Protection Limit	N/A
Input Power Protection Duration Limit	Internal T1.0A/250 VAC fuse

Environmental	
Moisture protection	IP20
Operating temperature	0°C to +60°C
Storage temperature	-40°C to +85°C
Humidity	5% to 95% RH
EMC	EN 61000-6-3:2007 EN 61000-6-1:2007

Appendix D. Applicable Certificate Table

Part Number	Certified Component	Applicable Certificates
1360-PK-052	1360-00-097	Sira 15ATEX2014 CSAE 21UKEX2364 IECEx SIR 15.0013
1360-PK-055	1954-00-002	Sira 13ATEX2384 CSAE 21UKEX2363 IECEx SIR 13.0159
1360-PK-105		

Appendix E. European Approvals

Sira ATEX Certifications

1. Certificate Number: Sira 15ATEX2014 Issue 4 for the IS WindObserver Anemometer. (P/N 1360-00-097)

2. Certificate Number: Sira 13ATEX2384 Issue 4 for the IS Low Voltage Power Supply and Communications Unit. (P/N 1954-00-002)

To check the current status and issue number of above certificates please visit the CSA Group website by following the link below.

https://www.csagroup.org/en-gb/information-centre/certificate-database/

1 **EU-TYPE EXAMINATION CERTIFICATE**

2 Equipment intended for use in Potentially Explosive Atmospheres Directive 2014/34/EU

3 Certificate Number: **Sira 15ATEX2014** Issue: **4**

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 CSA Group Netherlands B.V., notified body number 2813 in accordance with Articles 17 and 21 of Directive 2014/34/EU of the European Parliament and of the Council, dated 26 February 2014, 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 IEC 60079-0:2018 EN 60079-11:2012

10 If the sign 'X' is placed after the certificate number, it indicates that the equipment is subject to Specific Conditions of Use identified in the schedule to this certificate.

11 This EU-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 80087596

Signed: J A May

Title: Director of Operations

CSA Group Netherlands B.V.
Utrechtseweg 310, Building B42,
6812AR Arnhem, The Netherlands

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SCHEDULE

EU-TYPE EXAMINATION CERTIFICATE **Sira 15ATEX2014**
Issue 4

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

Variation 1 - This variation introduced the following changes:

i. Allow modification of the component part number for TR9.
ii. Allow modification of the part number for the transducer disc.

Variation 2 - This variation introduced the following changes:

i. 4 off PCB mounting holes increased in diameter.
ii. Drawing amendments, none of which affect compliance with the standards listed.

Variation 3 - This variation introduced the following changes:

i. Revise nameplate drawing 1360-30-040 to add UKCA certificate information.
ii. Following appropriate assessment to demonstrate compliance with the latest technical knowledge, EN 60079-0:2012/A11:2013 was replaced by EN IEC 60079-0:2018.
iii. Remove standard EN 60079-26:2015 from the certificate since it is no longer required

14 **DESCRIPTIVE DOCUMENTS**

14.1 **Drawings**

Refer to Certificate Annexe.

14.2 **Associated Reports and Certificate History**

Issue	Date	Report number	Comment
0	25 March 2015	R70015853A	The release of the prime certificate.

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SCHEDULE

EU-TYPE EXAMINATION CERTIFICATE **Sira 15ATEX2014**
Issue 4

Issue	Date	Report number	Comment
1	26 May 2016	R70075853A	This Issue covers the following changes: • EC Type-Examination Certificate in accordance with 94/9/EC updated to EU Type-Examination Certificate in accordance with Directive 2014/34/EU. *(In accordance with Article 41 of Directive 2014/34/EU, EC Type-Examination Certificates referring to 94/9/EC that were in existence prior to the date of application of 2014/34/EU (20 April 2016) may be referenced as if they were issued in accordance with Directive 2014/34/EU. Variations to such EC Type-Examination Certificates may continue to bear the original certificate number issued prior to 20 April 2016.)* • The introduction of Variation 1.
2	06 September 2019	R80011688A	The introduction of Variation 2.
3	15 October 2019	1310	Transfer of certificate Sira 15ATEX2014 from Sira Certification Service to CSA Group Netherlands B.V.
4	10 December 2021	R80087597C	The introduction of Variation 3.

15 **SPECIFIC CONDITIONS OF 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 MANUFACTURE**

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

17.2 Holders of EU-Type Examination Certificates are required to comply with the conformity to type requirements defined in Article 13 of Directive 2014/34/EU.

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Certificate Annexe

Certificate Number: **Sira 15ATEX2014**
Equipment: **1360 IS II Anemometer, Part No. 1360-00-097**
Applicant: **Gill Instruments Ltd**

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

Issue 1

Drawing	Sheets	Rev.	Date(Sira stamp)	Title
1360-10-070	1 to 4	02	09 May 16	PCB Assembly Bill Of Materials
1360-10-080	1 of 1	02	09 May 16	I.S. 2 Axis Transducer Arm Assembly
1360-C-070	1 of 1	02	09 May 16	Windobserver II – GPA –IS Circuit Diagram

Issue 2

Drawing	Sheets	Rev.	Date(Sira stamp)	Title
1360-C-070	1 of 1	03	22 Aug 19	Windobserver II – GPA –IS Circuit Diagram
1360-10-070	1 to 4	03	22 Aug 19	PCB Assembly Bill Of Materials
1360-30-070	1 to 8	02X	22 Aug 19	PCB Artwork

Issue 3. No new drawings were introduced

Issue 4

Drawing	Sheets	Rev.	Date	Title
1360-30-040	1 of 1	11	15 Sep 21	I.S. PCI Nameplate

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1 **EU-TYPE EXAMINATION CERTIFICATE**

2 Equipment intended for use in Potentially Explosive Atmospheres Directive 2014/34/EU

3 Certificate Number: Sira 13ATEX2384 Issue: 4

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 CSA Group Netherlands B.V., notified body number 2813 in accordance with Articles 17 and 21 of Directive 2014/34/EU of the European Parliament and of the Council, dated 26 February 2014, 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 IEC 60079-0:2018 EN 60079-11:2012

10 If the sign 'X' is placed after the certificate number, it indicates that the equipment is subject to Specific Conditions of Use identified in the schedule to this certificate.

11 This EU-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 +60°C

Project Number 80087596

Signed: J A May

Title: Director of Operations

CSA Group Netherlands B.V.
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6812AR Arnhem, The Netherlands

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SCHEDULE

EU-TYPE EXAMINATION CERTIFICATE **Sira 13ATEX2384**
Issue 4

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 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

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**

Variation 2 - This variation introduced the following changes:

i. **Upgrade the upper certified ambient temperature from +40°C to +60°C. No changes have been made to the products.**
ii. **EN 60079-0:2012 has been replaced by EN 60079-0:2012/A11:2013.**
iii. **EN 60079-26:2007 was removed as all requirements are covered in EN 60079-0:2012 for Ex ia Ga.**

Variation 3 - This variation introduced the following changes:

i. **Revise nameplate drawing 1954-30-025 to add UKCA certificate information.**
ii. **Following appropriate assessment to demonstrate compliance with the latest technical knowledge, EN 60079-0:2012/A11:2013 was replaced by EN IEC 60079-0:2018.**

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SCHEDULE

EU-TYPE EXAMINATION CERTIFICATE **Sira 13ATEX2384**
Issue 4

14 DESCRIPTIVE DOCUMENTS

14.1 Drawings

Refer to Certificate Annexe.

14.2 Associated 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.
2	13 October 2016	R70091747A	This Issue covers the following changes: • EC Type-Examination Certificate in accordance with 94/9/EC updated to EU Type-Examination Certificate in accordance with Directive 2014/34/EU. *(In accordance with Article 41 of Directive 2014/34/EU, EC Type-Examination Certificates referring to 94/9/EC that were in existence prior to the date of application of 2014/34/EU (20 April 2016) may be referenced as if they were issued in accordance with Directive 2014/34/EU. Variations to such EC Type-Examination Certificates may continue to bear the original certificate number issued prior to 20 April 2016.)* The introduction of Variation 2.
3	15 October 2019	1154	Transfer of certificate Sira 13ATEX2384 from Sira Certification Service to CSA Group Netherlands B.V.
4	10 December 2021	R80087597B	The introduction of Variation 3.

15 SPECIFIC CONDITIONS OF 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 MANUFACTURE

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

17.2 Holders of EU-Type Examination Certificates are required to comply with the conformity to type requirements defined in Article 13 of Directive 2014/34/EU.

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 1500Vac applied between the input and output windings for 60s. Alternatively, a voltage of 20% higher may be applied for 1s. There shall be no evidence of flashover or breakdown and the maximum current flowing shall not exceed 5mA.

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Appendix F. International Approvals

Sira IECEx Certifications

1. Certificate Number: Sira IECEx SIR 15.0013 Issue 3 for the IS WindObserver Anemometer. (P/N 1360-00-097)

2. Certificate Number: Sira IECEx SIR 13.0159 Issue 3 for the IS Low Voltage Power Supply and Communications Interface. (P/N 1954-00-002)

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

IS II WindObserver Anemometer

https://www.iecex-certs.com/#/deliverables/CERT/58252/view

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

https://www.iecex-certs.com/#/deliverables/CERT/58248/view

IECEx Certificate of Conformity

INTERNATIONAL ELECTROTECHNICAL COMMISSION
IEC Certification System for Explosive Atmospheres
for rules and details of the IECEx Scheme visit www.iecex.com

Certificate No.:	**IECEx SIR 15.0013**	Page 1 of 4	Certificate history:
Status:	**Current**	Issue No: 3	Issue 2 (2019-09-06) Issue 1 (2016-05-26) Issue 0 (2015-03-25)
Date of Issue:	2021-12-10		
Applicant:	**Gill Instruments Ltd** Saltmarsh Park 67 Gosport St Lymington SO41 9EG **United Kingdom**		
Equipment:	**1360 IS II Anemometer, Part No. 1360-00-097**		
Optional accessory:			
Type of Protection:	**Intrinsic Safety and Dust**		
Marking:	Ex ia IIC T4 Ga Ex ia III C T135°C Da Tamb = -30°C to +70°C		

Approved for issue on behalf of the IECEx Certification Body: **N Jones**

Position: **Certification Manager**

Signature: (for printed version) *PP McHalliwell*

Date: 2021-12-10

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 www.iecex.com or use of this QR Code.

Certificate issued by:

CSA Group Testing UK Ltd
Unit 6, Hawarden Industrial Park
Hawarden, Deeside CH5 3US
United Kingdom

IECEx Certificate of Conformity

Certificate No.: **IECEx SIR 15.0013** Page 2 of 4

Date of issue: 2021-12-10 Issue No: 3

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

Additional manufacturing locations:

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 equipment 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 60079-0:2017 Explosive atmospheres - Part 0: Equipment - General requirements
Edition:7.0

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

This Certificate **does not** indicate compliance with 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 Reports:

GB/CSAE/ExTR21.0173/00 GB/SIR/ExTR15.0082/00 GB/SIR/ExTR16.0128/00
GB/SIR/ExTR19.0232/00

Quality Assessment Report:

GB/SIR/QAR10.0007/09

IECEx Certificate of Conformity

Certificate No.: **IECEx SIR 15.0013** Page 3 of 4

Date of issue: 2021-12-10 Issue No: 3

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

SPECIFIC CONDITIONS OF USE: NO

IECEx Certificate of Conformity

Certificate No.: **IECEx SIR 15.0013** Page 4 of 4

Date of issue: 2021-12-10 Issue No: 3

DETAILS OF CERTIFICATE CHANGES (for issues 1 and above)

Issue 1 – this Issue introduced the following changes:

1. Allow modification of the component part number for TR9.
2. Allow modification of the part number for the transducer disc.

Issue 2 – this Issue introduced the following changes:

1. 4 off PCB mounting holes increased in diameter.
2. Drawing amendments, none of which affect compliance with the standards listed.

Issue 3 – this Issue introduced the following changes:

1. Revise nameplate drawing 1360-30-040 to add UKCA certificate information.
2. Following appropriate assessment to demonstrate compliance with the latest technical knowledge, IEC 60079-0:2011 Ed.6 was replaced by IEC 60079-0:2017 Ed.7.
3. Remove standard IEC 60079-26:2014-10 Ed.3 from the certificate since it is no longer required.

IECEx Certificate of Conformity

INTERNATIONAL ELECTROTECHNICAL COMMISSION
IEC Certification System for Explosive Atmospheres
for rules and details of the IECEx Scheme visit www.iecex.com

Certificate No.:	**IECEx SIR 13.0159**	Page 1 of 5	Certificate history:
Status:	**Current**	Issue No: 3	Issue 2 (2016-10-13) Issue 1 (2015-03-16) Issue 0 (2014-03-10)
Date of Issue:	2021-12-10		

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

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

Optional accessory:

Type of Protection: **Intrinsically Safe**

Marking: [Ex ia Ga] IIC
[Ex ia Da] IIIC
Ta = -30°C to +60°C

Approved for issue on behalf of the IECEx Certification Body: **N Jones**

Position: **Certification Manager**

Signature: (for printed version) PP McHalliwell

Date: 2021-12-10

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 www.iecex.com or use of this QR Code.

Certificate issued by:

CSA Group Testing UK Ltd
Unit 6, Hawarden Industrial Park
Hawarden, Deeside CH5 3US
United Kingdom

IECEx Certificate of Conformity

Certificate No.: **IECEx SIR 13.0159** Page 2 of 5

Date of issue: 2021-12-10 Issue No: 3

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

Additional manufacturing locations:

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 equipment 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 60079-0:2017 Explosive atmospheres - Part 0: Equipment - General requirements
Edition:7.0

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

This Certificate **does not** indicate compliance with 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 Reports:

GB/CSAE/ExTR21.0172/00 GB/SIR/ExTR14.0054/00 GB/SIR/ExTR15.0071/00
GB/SIR/ExTR16.0260/00

Quality Assessment Report:

GB/SIR/QAR10.0007/09

IECEx Certificate of Conformity

Certificate No.: **IECEx SIR 13.0159** Page 3 of 5

Date of issue: 2021-12-10 Issue No: 3

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

SPECIFIC CONDITIONS OF USE: NO

IECEx Certificate of Conformity

Certificate No.: **IECEx SIR 13.0159** Page 4 of 5

Date of issue: 2021-12-10 Issue No: 3

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** Page 5 of 5

Date of issue: 2021-12-10 Issue No: 3

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.

Issue 2 – this Issue introduced the following changes:

1. Upgrade the upper ambient certified temperature from +40°C to +60°C. No changes have been made to the products.
2. IEC 60079-26:2006 was removed as all requirements are covered in IEC 60079-0:2011 for Ex ia Ga.

Issue 3 – this Issue introduced the following changes:

1. Revise nameplate drawing 1954-30-025 to add UKCA certificate information
2. Following appropriate assessment to demonstrate compliance with the latest technical knowledge, IEC 60079-0:2011 Ed.6 was replaced by IEC 60079-0:2017 Ed.7.

Appendix G. United Kingdom & Northern Ireland Approvals

UKCA & UKSI 2016:1107 Certifications

1. Certificate Number: CSAE 21UKEX2364 Issue 0 for the IS WindObserver Anemometer. (P/N 1360-00-097)

2. Certificate Number: CSAE 21UKEX2363 Issue 0 for the IS Low Voltage Power Supply and Communications Interface. (P/N 1954-00-002)

If you wish to confirm the status of the above CSAE certificates, please visit the CSA Group website below.

https://www.csagroup.org/en-gb/information-centre/certificate-database/

Should you require PDF copies of the certificates please contact Gill Instruments.

UNITED KINGDOM CONFORMITY ASSESSMENT

1 **UK TYPE EXAMINATION CERTIFICATE**

2 Equipment Intended for use in Potentially Explosive Atmospheres
UKSI 2016:1107 (as amended) – Schedule 3A, Part 1

3 Certificate Number: **CSAE 21UKEX2364** Issue: **0**

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

5 Manufacturer: **Gill Instruments Limited**

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

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

8 CSA Group Testing UK Limited, Approved Body number 0518, in accordance with Regulation 42 of the Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres Regulations 2016, UKSI 2016:1107 (as amended), certifies that this product has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of products intended for use in potentially explosive atmospheres given in Schedule 1 of the Regulations. 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 has been assured by compliance with:

EN IEC 60079-0:2018 **EN 60079-11:2012**

Except in respect of those requirements listed at Section 16 of the schedule to this certificate. The above standards may not appear on the UKAS Scope of Accreditation, but have been added through flexible scope of accreditation, which is available on request.

10 If the sign 'X' is placed after the certificate number, it indicates that the product is subject to Specific Conditions of Use identified in the schedule to this certificate.

11 This UK TYPE EXAMINATION CERTIFICATE relates only to the design and construction of the specified product. Further requirements of the Regulations apply to the manufacturing process and supply of this product. These are not covered by this certificate.

12 The marking of this product shall be in accordance with Regulation 41 and include the following:

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

Name: J A May
Title: Director of Operations

Certificate No. CSAE21UKEX2364
CSA Group Testing UK Ltd., Unit 6 Hawarden Industrial Park, Hawarden, CH5 3US, UK

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SCHEDULE

UK TYPE EXAMINATION CERTIFICATE **CSAE 21UKEX2364**
Issue 0

13 **DESCRIPTION OF PRODUCT**

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

The product description includes the following applicable amendments, only amendments directly applicable to UKCA certification have been included in this list.
The amendments are numbered to include a reference to the previous ATEX variation at which these were introduced.

1a Allow modification of the component part number for TR9
1b Allow modification of the part number for the transducer disc
2a 4 off PCB mounting holes increased in diameter

14 **DESCRIPTIVE DOCUMENTS**

14.1 **Drawings**

Refer to Certificate Annexe.

14.2 **Associated Reports and Certificate History**

Issue	Date	Report number	Comment
0	16 December 2021	R80087601A	The release of the prime certificate.

15 **SPECIFIC CONDITIONS OF USE** (denoted by X after the certificate number)

None

16 **ESSENTIAL HEALTH AND SAFETY REQUIREMENTS (REGULATIONS SCHEDULE 1)**

In addition to the Essential Health and Safety Requirements covered by the standards listed in Section 9, all other requirements are demonstrated in the relevant reports.

17 **PRODUCTION CONTROL**

17.1 Holders of this certificate are required to comply with production control requirements defined in Schedule 3A, as applicable, and CSA Group Testing UK Regulations for Certificate Holders

Certificate Annexe

Certificate Number: CSAE 21UKEX2364
Product: 1360 IS II Anemometer, Part No. 1360-00-097
Manufacturer: Gill Instruments Limited

Issue 0

Drawing	Sheets	Rev.	Date (Stamp)	Title
1360-C-070	1 of 1	03	22 Aug 19	Windobserver II – GPA - IS Circuit Diagram
1360-10-070	1 to 4	03	22 Aug 19	PCB Assembly Bill Of Materials
1360-10-080	1 of 1	02	09 May 16	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	02X	22 Aug 19	PCB Artwork
1360-30-040	1 of 1	11	15 Sep 21	Housing Tube Printed Marking Drawing

UK UK CA NI

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UNITED KINGDOM CONFORMITY ASSESSMENT

1 **UK TYPE EXAMINATION CERTIFICATE**

2 Equipment Intended for use in Potentially Explosive Atmospheres

UKSI 2016:1107 (as amended) – Schedule 3A, Part 1

3 Certificate Number: **CSAE 21UKEX2363** Issue: **0**

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

5 Manufacturer: **Gill Instruments Limited**

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

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

8 CSA Group Testing UK Limited, Approved Body number 0518, in accordance with Regulation 42 of the Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres Regulations 2016, UKSI 2016:1107 (as amended), certifies that this product has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of products intended for use in potentially explosive atmospheres given in Schedule 1 of the Regulations. 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 has been assured by compliance with:

EN IEC 60079-0:2018 **EN 60079-11:2012**

Except in respect of those requirements listed at Section 16 of the schedule to this certificate. The above standards may not appear on the UKAS Scope of Accreditation, but have been added through flexible scope of accreditation, which is available on request.

10 If the sign 'X' is placed after the certificate number, it indicates that the product is subject to Specific Conditions of Use identified in the schedule to this certificate.

11 This UK TYPE EXAMINATION CERTIFICATE relates only to the design and construction of the specified product. Further requirements of the Regulations apply to the manufacturing process and supply of this product. These are not covered by this certificate.

12 The marking of this product shall be in accordance with Regulation 41 and include the following:

Ex
II (1) GD
[Ex ia Ga] IIC
[Ex ia Da] IIIC
Ta = -30°C to +60°C

Name: J A May
Title: Director of Operations

UK UK CA NI

Certificate No. CSAE21UKEX2363
CSA Group Testing UK Ltd., Unit 6 Hawarden Industrial Park, Hawarden, CH5 3US, UK

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SCHEDULE

UK TYPE EXAMINATION CERTIFICATE **CSAE 21UKEX2363**
Issue 0

13 **DESCRIPTION OF PRODUCT**

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 include 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

The product description includes the following applicable amendments, only amendments directly applicable to UKCA certification have been included in this list.

The amendments are numbered to include a reference to the previous ATEX variation at which these were introduced.

1a 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).
1b 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
2a Upgrade the upper certified ambient temperature from +40°C to +60°C. No changes have been made to the products

14 **DESCRIPTIVE DOCUMENTS**

14.1 **Drawings**

Refer to Certificate Annexe.

14.2 **Associated Reports and Certificate History**

Issue	Date	Report number	Comment
0	16 December 2021	R80087600A	The release of the prime certificate.

15 **SPECIFIC CONDITIONS OF USE** (denoted by X after the certificate number)

None

Certificate Annexe

Certificate Number: CSAE 21UKEX2363

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

Manufacturer: Gill Instruments Limited

Issue 0

Drawing	Sheets	Rev.	Date (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
1954-10-001	1 to 5	5B	03 Oct 16	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
1954-30-025	1 of 1	4	15 Sep 21	External Lid Engraving

UK UK CA NI

CSA Group Testing UK Ltd., Unit 6 Hawarden Industrial Park, Hawarden, CH5 3US, UK

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Appendix H. Principle of operation

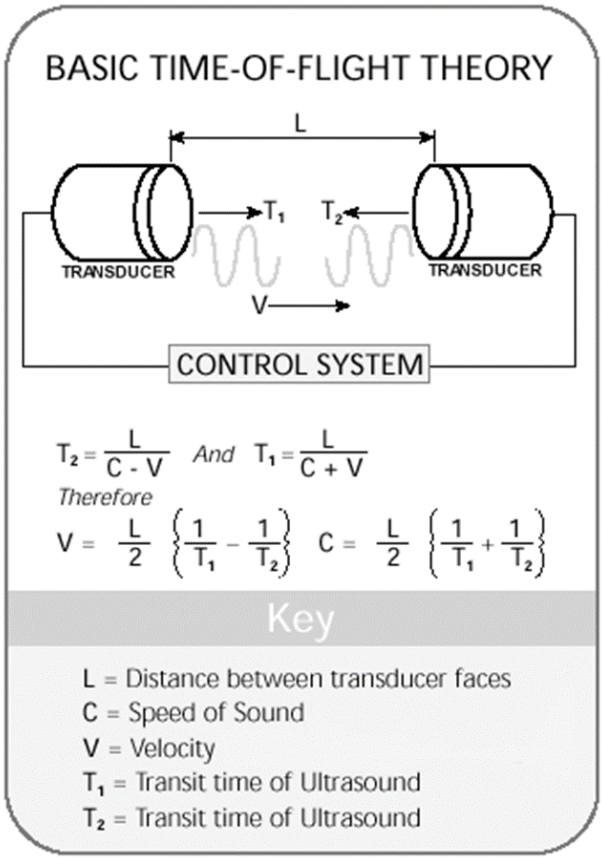

Figure 24 -Summary of the principle of operation

The instrument measures the time taken for an ultrasonic pulse to travel from one transducer to the transducer opposite. The device measures the time of flight of the pulse, and compares it to a measurement performed in the opposite direction. By calcuating the difference in time-of-flight in each direction (as shown in Figure 24) the wind velocity component in that axis can be deduced.

The measurement in the other axis is made in the same way, and from these orthogonal measurements it is straightforward to calculate the total wind speed and direction.

It can be seen that these calculations are largely indifferent to changes in temperature.