Martin Lishman

Barn Owl *Wireless*
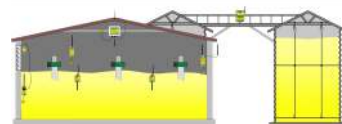
Installation Guide

Important!
Read these instructions BEFORE installation

22.5 °C

TEMPERATURE SENSOR

See our video installation guide at:

barnowldata.com/help

@Martin_Lishman

/martinlishmanltd

Martin Lishman Ltd
Unit 2B Roman Bank, Bourne, PE10 9LQ
Tel: +44 (0)1778 426600
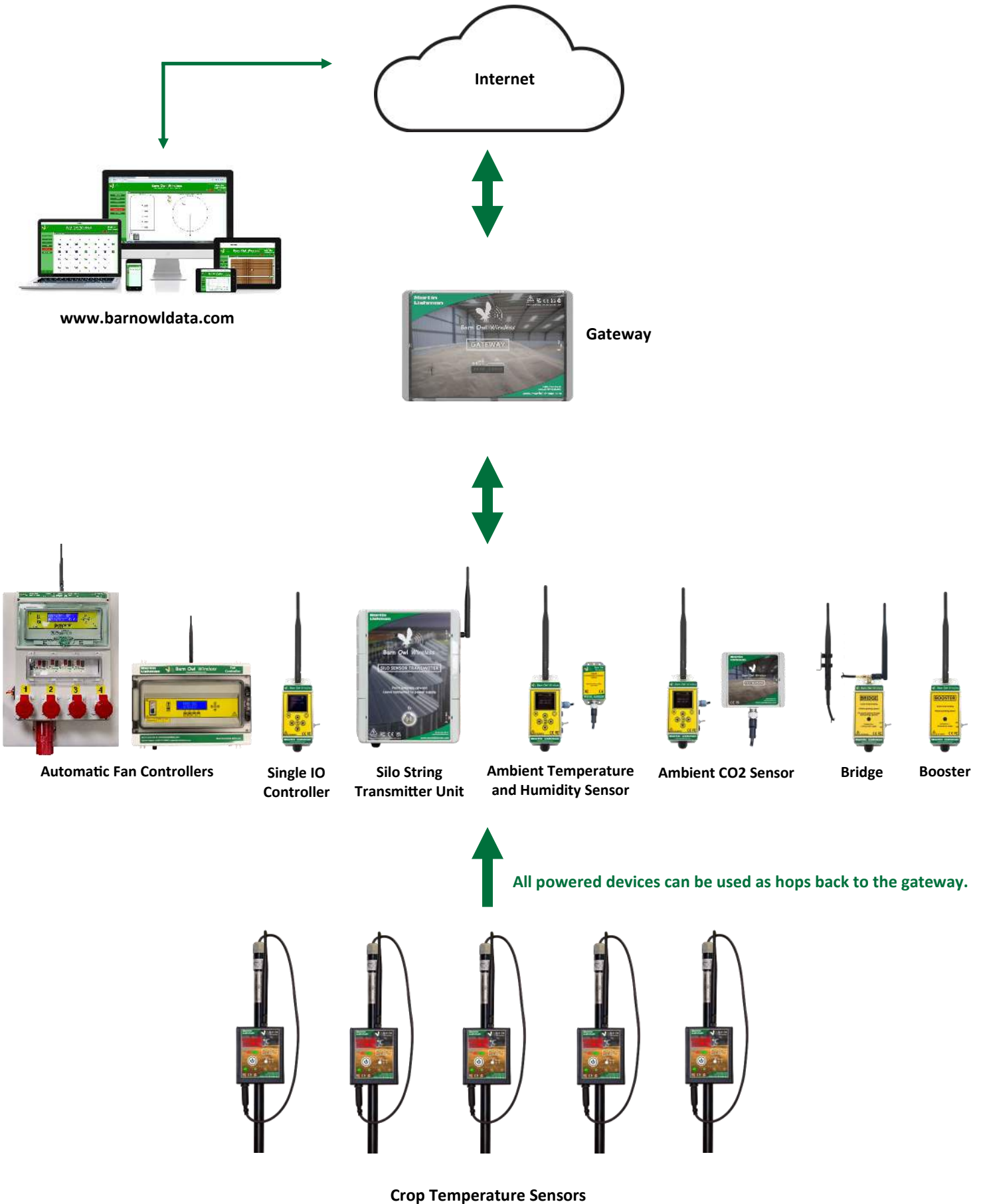www.martinlishman.com
www.barnowldata.com

Contents

The site plan needs following when installing the equipment

We are here to help ensure the system installation goes smoothly. Give us a call and we will confirm that all of the equipment is transmitting correctly. It is always best if any installation errors can be rectified whilst an electrician is still on site.

Call 01778 426600 and ask for Barn Owl Wireless support.

Internet

www.barnowldata.com

Gateway

Automatic Fan Controllers

Single IO Controller

Silo String Transmitter Unit

Ambient Temperature and Humidity Sensor

Ambient CO2 Sensor

Bridge

Booster

All powered devices can be used as hops back to the gateway.

Crop Temperature Sensors

Introduction

Barn Owl Wireless is controlled by a cloud server. It can be accessed from anywhere with internet access. Data can be downloaded and viewed in a graphical or table format. Equipment can be controlled automatically from the user's webpage without having to go to the store.

The system should initially be installed according to the site drawing and users web page (see page 22) If any physical positions of crop sensors or fans are changed, make a note of the new positions and make equivalent changes to the webpage so that the programme knows where the equipment is located. The user can change the programme setting for each individual controller output via the webpage. See page 17 for more details.

Gateway

- Collects data from the temperature and humidity sensors and communicates with the webpage using a SIM card. The SIM card is not network specific. It finds the strongest signal from many network operators.

- Programme determines whether fans should be running or not, depending on which temperature and humidity settings are selected by the user for each output on an automatic controller.

- Communicates with the controllers to operate fans when the programmed conditions are met.

- Can be connected using a 3amp plug or by wiring into a 3 amp fused spur. Will require an IP rated socket if used externally.

- If the Gateway SIM loses the mobile network signal, the last automatic programme set by the user will continue to operate even though icons on the webpage may turn grey.

If you do experience network issues, please contact us and we will investigate the issue for you. Usually, such issues are resolved quickly by the network operator (Vodafone, O2 etc).

Bridge

- Allows data to be transmitted through walls and between buildings.
- Supplied with an antenna and an extension antenna for mounting either side of a wall.
- Requires a 230V 13amp socket.

Booster

- Boosts the data signal between controllers, sensors and the Gateway, when the store contains a large number of sensing points.
- Supplied with an antenna.
- Requires a 230V 13amp socket.

Crop Sensor Transmitter Unit and Sensing Probes

- Transmits data to the Gateway every 3 hours.
- Battery powered .
- Supplied with an antenna and either a rigid 2 or 3 metre sensor or flexible cable sensor.

Silo Temperature Sensor String

- Up to 60m long with sensors spaced 2m or 3m apart.
- Connected directly into a Silo Sensor Transmitter Unit or daisy-chained to other strings.
- Supplied with glands, gel connectors and 20m Cat5e external UTP cable per string.

Silo Sensor Transmitter Unit

- Transmits temperature data to the Gateway every 10 minutes.
- Up to 8 Silo Temperature Sensor Strings can be connected directly or by daisy-chaining.
- IP rated waterproof enclosure. Can be mounted internally or externally (externally requires an IP rated socket)
- Requires a 230V 13amp socket.

Ambient Temperature and Humidity Transmitter Unit and Sensor

- Transmits data to the Gateway every 10 minutes.
- Requires a 230V 13amp socket.
- Sensor attaches to the transmitter unit via a 4 pin plug .

Ambient CO2 Transmitter Unit and Sensor

- Transmits data to the Gateway every 10 minutes.
- Requires a 230V 13amp socket.
- Sensor attaches to the transmitter unit via a 4 pin plug .

Static Fan Controller

- Supplied with up to 12, 24V DC outputs which should be connected to an automatic starter for each fan being controlled.
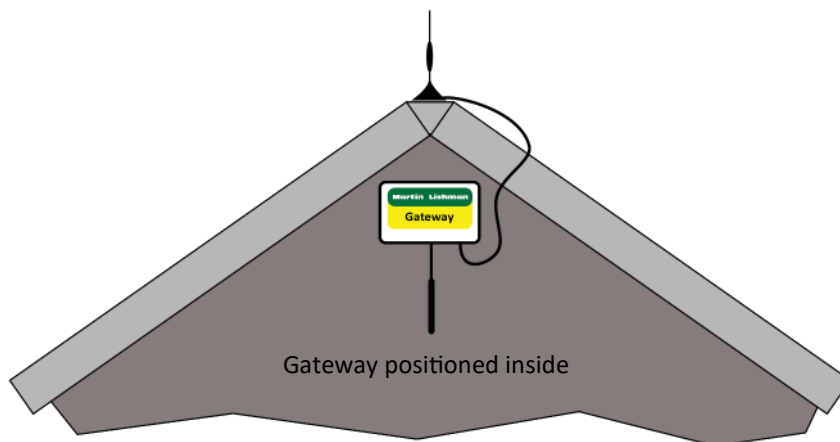- Requires a 230V 13amp socket.

Portable Fan Controller

- Supplied in either Single or Three Phase versions, with all plugs, sockets and automatic starters for up to 5 fans (depending on fan current rating).
- Requires a 32 amp supply to the board.

Note: Any external equipment needs cable protection from water, ultra violet rays and mechanical stress or damage.

Gateway

1.   Mount the Gateway as high as possible, for example:
  •   In the apex of the building.
  •   On a silo walkway.
2.   It requires a 3 amp fused spur or a 3 amp 3 pin plug for the power supply.
3.   Place the whip antenna labelled 'cellular antenna' outside on the roof of the building. The antenna should be mounted vertically and without any metal structures adjacent to it.
4.   The antenna labelled 'network antenna' should hang down vertically below the enclosure, inside the building. It must have line of sight to ALL pieces of equipment unless a Bridge is being used.
5.   The Gateway should be switched on, before the rest of the equipment is turned on.
6.   The Gateway shows a green LED when switched on.

Gateway positioned inside

Bridge

1.   Place the Bridge inside the store, making sure that the antenna has line of sight to the Gateway or another plugged-in device.
2.   The Bridge requires connection to a 230V 13amp socket.
3.   Place the extension antenna on the outside of the store, using the mounting bracket provided.
4.   Connect the extension antenna back to the Bridge.
5.   If bridging through walls to an adjacent building, make sure that the extension antenna is in line of sight to the corresponding extension antenna of a Bridge on the outside of the second building.

Ambient Temperature and Humidity Transmitter Unit (ATH)

1. Mount the ATH securely on a wall in a location that allows line of sight to the Gateway.

2. It requires a 230V 13amp socket.

3. Place the sensor (that plugs in to the transmitter unit) near the fresh air intake to the building's ventilation or drying system.

4. If placed externally, the sensor housing must be positioned away from any direct weather influence in order to read accurately. Avoid direct sunlight, rain or wind.

5. The ATH can be switched on after the gateway even if the rest of the equipment isn't due to be turned on.

6. The ATH shows the Temperature, Humidity and network strength when turned on.

7. Pressing the left arrow button on the keypad shows a graph of the last 24hrs data.
    Press right to return to the current reading.
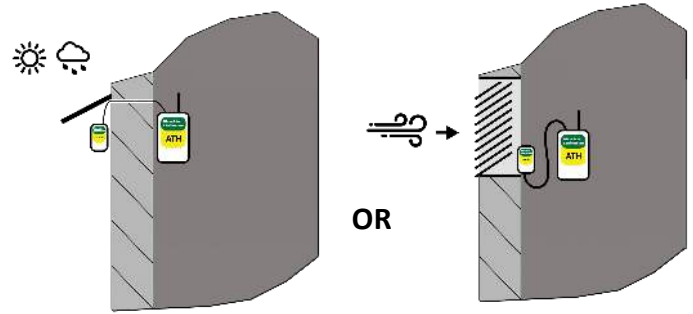
Ambient CO2 Transmitter Unit and Sensor

1. Mount the CO2 transmitter unit securely on a wall that allows line of sight to the Gateway.

2. It requires a 230V 13amp socket.

3. Mount the sensor (that plugs in to the transmitter unit) on the wall near the stored grain. The sensor must be positioned away from fresh air intakes or any direct weather influence in order to read accurately. Avoid direct sunlight, rain or wind.

4. The mounting holes for the CO2 sensor are located inside the enclosure. To access these, remove the enclosure lid by inserting a flat head screwdriver in the right-hand slot indicated by the label and twisting to release the catch. (Fig. A)

5. The CO2 transmitter unit can be switched on after the gateway even if the rest of the equipment isn't due to be turned on. **The CO2 sensor does not require any setup procedures, it is setup and calibrated from factory.**

6. The CO2 unit shows the current ambient CO2 in PPM (parts per million) and network strength when turned on. Use Fig.B as a guide for the effect of CO2 in the grain store.

7. Pressing the left arrow button on the keypad shows a graph of the last 24hrs data. Press right to return to the current reading.
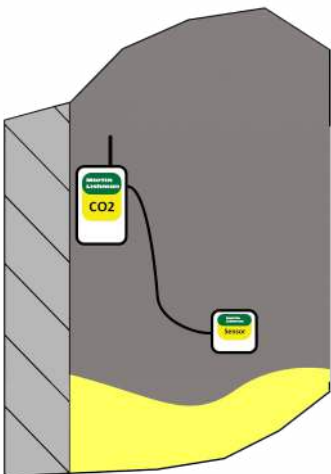
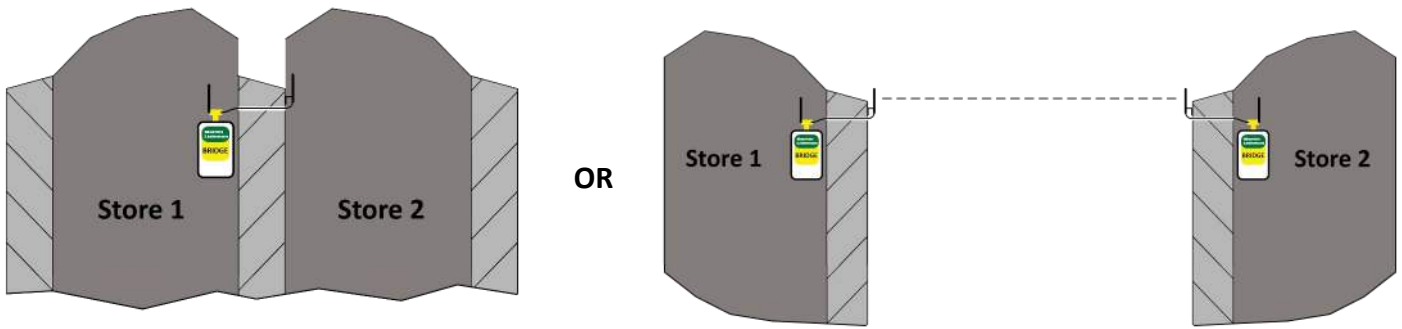**NOTE: The operating range of the CO2 sensor is 0°C - 50°C**

Fig.A

PPM	Condition
0-600	Good
600-1500	Potential mould or insects present
1500+	High chance of severe mould or insects

Fig.B

OR

Booster

1.	Mount the Booster inside the building as high up as possible in line of sight of all sensors.
2.	The Booster location is determined by the number and location of other powered devices such as ATH or controllers. The aim is to ensure that the data signal from all battery powered crop sensors reaches the Gateway, by using the Booster as a staging point.
3.	As with the other powered devices, the Booster can transmit data from up to 10 crop sensors.
4.	The Booster requires connection to a 230V 13amp socket.
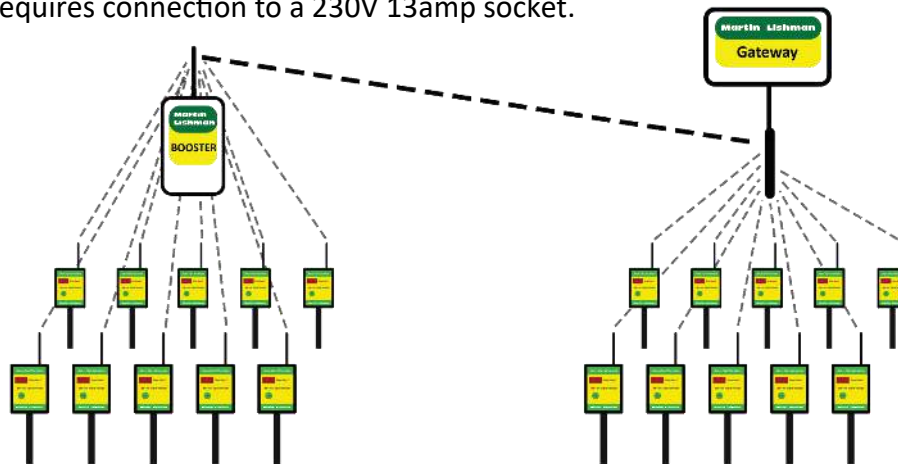
Crop Sensor Transmitter Unit

1.	Clip the crop sensor onto the sensor probe as close to the top as possible.
2.	Place the probe into the grain leaving 30cm above the surface of the crop.
3.	Ensure the antenna has line of sight to either the Gateway, Bridge, ATH sensor or fan controller.
4.	Crop sensors should be located midway between ventilating columns or ducts - as that will be the last point to be cooled.
5.	To maximise battery life, ensure sensors are turned off when not in use or are out of range of a plugged-in device or the Gateway.

30cm
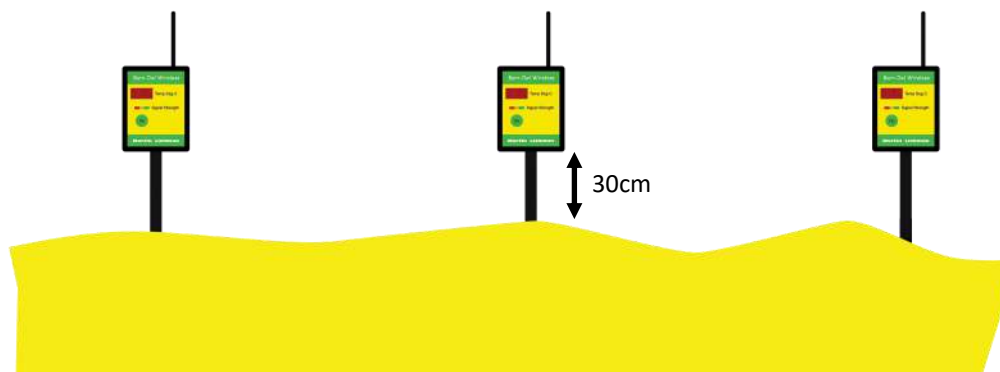
Silo Sensor Transmitter Unit (SSTU)

1. Mount the SSTU internally or externally in a position where the display can be read easily and the unit connected to the silos being monitored. A position on the silo gantry often suits.
2. The antenna must have line of sight to either the Gateway, a Bridge or another powered device.
3. The bottom box on the unit is fitted with a gland for each silo string supplied. Only one cable from a silo string should be fitted through a gland (see Figure 1 below).
4. If additional silo strings are daisy-chained before connection to the SSTU, there should still only be one cable per gland (see Figure 2 below).

Fig. 1

Fig. 2
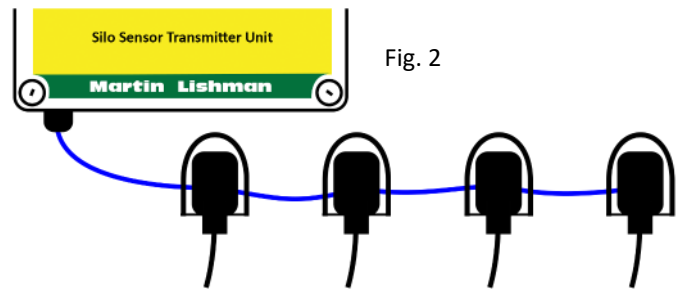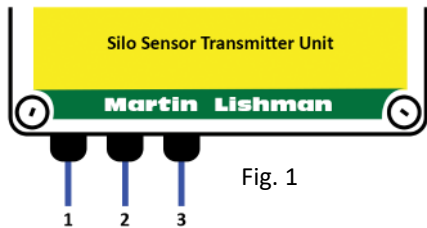
5. To connect the sensors, remove the front cover from the bottom box using a suitable sized flat headed screwdriver.
6. Push one cable through each gland and tighten to prevent water ingress.
7. Strip the UTP cable back and identify the data and ground wires.

8. Connect the UTP cable into the terminals on the bottom of the circuit board, as shown below.
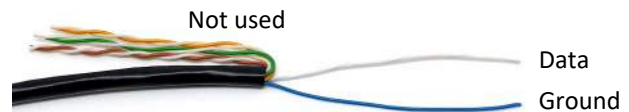9. Label each cable with its string number at the point before it passes through its gland, to make identification easier for future reference. The string number can be found on the bulkhead at the top of each string.
10. Replace the cover but DO NOT OVERTIGHTEN. Overtightening causes the cover to break and lose its IP rating, which will invalidate the warranty.

11. If mounted and connected externally to a power supply, the 230V, 13 amp plug must be housed in an IP rated socket that prevents water ingress.
12. Alternatively the power cable can be hard wired into an IP rated fused spur.
13. Switch on the power to the SSTU. The LCD display in the top box will light up.
14. Once the unit has gone through its start-up sequence, open the box lid and use the right/left arrows to navigate through the strings and the up/down arrows to navigate between the individual sensors on the strings.
15. Close the top box and keep it closed at all other times to maintain its IP rating.

Silo Temperature Sensor

Connection - It does not matter if the silo sensors are connected before installing them, or vice versa.

1. There are two ways to connect the silo temperature sensor strings to the SSTU: individually or daisy-chained.

2. In both instances, remove the cap from the hexagonal bulkhead at the top of the string.

3. Strip back the sensor wires inside and identify the data and ground as follows:

   Data = Red
   Ground = Blue

4. Feed the UTP cable (supplied) through the gland in the side to the centre of the bulk head.

5. If connecting strings individually to the SSTU, use the gel connectors provided:
   - Select the blue Ground wire from the silo string and the blue wire from the UTP cable.
   - Slide the exposed core of each wire into either side of the gel connector, making sure they can be seen through the translucent connector.
   - Push the connector shut to seal the connection between the string and the UTP cable.

6. Follow the same procedure with the red Data wire from the silo string and the white wire from the UTP cable.

7. Push the connectors and any surplus wire back into the bulkhead and replace the cap - tighten with a 36mm spanner.

8. Tighten the gland that the UTP cable was passed through.

9. If connecting strings by daisy-chaining, measure and cut to length the UTP cable that will connect the sensors together. Pass the UTP cable through both sides of the bulkhead using the gland on each side.

10. Continue to connect the sensor string wires as for individual strings, but use all three sections of the gel connector (making sure all colours used are uniform).

Individual Connection

Ensure all wires are aligned in the grooves of the gel connector

From Silo Transmitter Unit

To Silo String

Daisy Chain Connection

To next Silo String (daisy chain)

From Silo Transmitter Unit

To Silo String

End cap

Gland

From Silo Transmitter Unit

To next Silo String (daisy chain)

Gland

Gland

From Silo Transmitter Unit
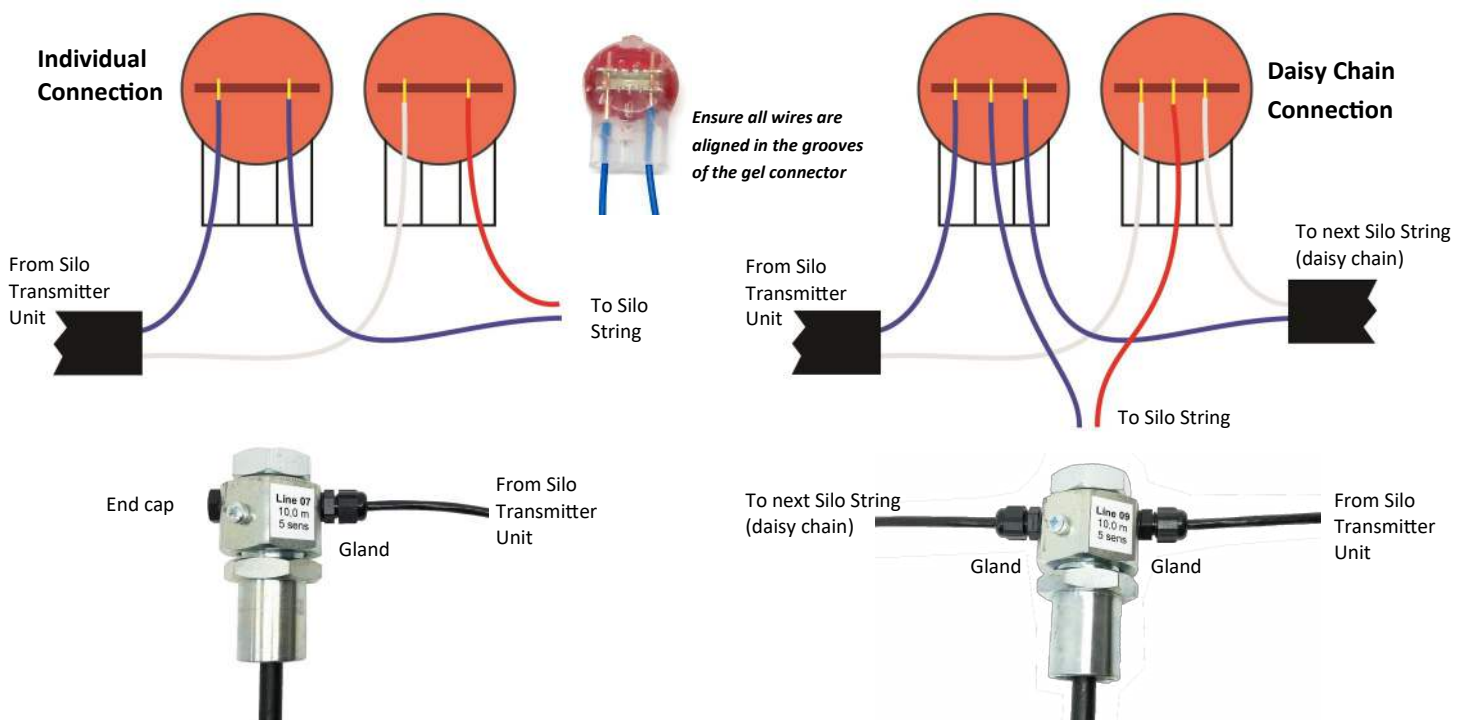
Installation of Silo Temperature Sensor Strings

1. Silo strings should be installed in an empty silo or store.

2. The suspension loop must be hung from a suitable structure that will be strong enough to resist the downward forces of filling and emptying.

    - It is the responsibility of the user to ensure that the strings are installed according to all relevant health and safety regulations.

    - It is also the responsibility of the user to ensure that appropriate surveys are carried out prior to installation to establish that the string fixing points are suitable in relation to the structure of the silo and the circumstances of use.

3. The string must be anchored to the floor so that it stays vertical during filling.

    - The anchoring line must be capable of breaking during filling, after it has served its purpose of keeping the string vertical. It is suggested to use a line with a breaking strain of no more than 50kg.

    - Exceeding 50kg can result in the eye at the bottom of the string becoming detached and could cause structural damage to the building.

    - If multiple strings are being installed in the same silo, they can be anchored to the walls of the silo and then to each other, creating a mesh to hold them in place.

4. Each string is labelled to correspond with the store layout (see page 19).

    - G1 is the Gateway number .

    - SSTU1 is the numbered Silo Sensor Transmitter Unit that the string will be attached to.

    - STR1 is the string number.

    Strings must be attached to the SSTU in number order.
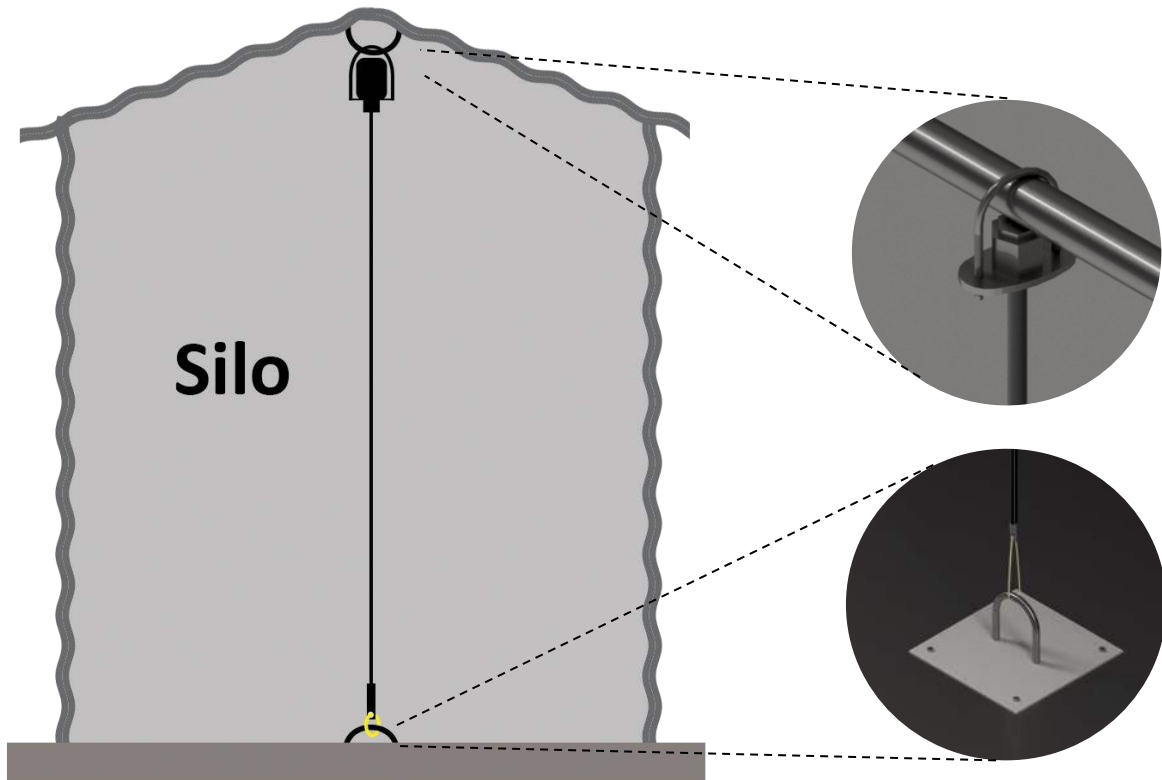
Pictures for illustrative purposes only

Static Automatic Controller

1. Mount the static controller on a flat vertical surface where it can easily be accessed by the operator. Use the wall mounting points located in the feet of the enclosure.
    - Make sure the antennae have line of sight to the Gateway, Booster or a Bridge.
    - Ensure that the antenna is not enclosed and is vertical.
2. The controller requires connection to a 230V 13amp power supply.
3. The controller should be connected to the fans being controlled, either via Martin Lishman Starters or by the user's own panel which will contain a contactor and an overload for each fan.
4. The following assumes that the controller has 12 outputs. A controller with 6 outputs would be connected in the same way. Each output is *24VDC and is individually fused with a 250ma 5x20mm cartridge fuse. (*When ordered as a standard model.)
5. Connect each output via a suitable IP rated gland.
6. For connection please follow the wiring diagram overleaf.
7. When all wiring is correct, power up the controller by plugging into a 13Amp socket and turning on the circuit breaker on the front.

Operating your new controller.

> After the initial information on the controller has been displayed the display will read the mode it is in and the signal strength of the network.
>
> Modes are automatic, based on the settings from the web system ,or manual from the "M" pushbutton on the front of the controller.
>
> "No Gateway" or "No Network" means the gateway for this location or a network cannot be seen. Please ensure the correct gateway is turned on and all equipment is in its correct position with the antennae connected.
>
> To toggle to manual mode, press the "M" button.
> Manual will start each output one at a time.
> Switch back to Automatic by pressing the "M" button again.
>
> It is good practice to leave the switch on the front of the controller set to 'Automatic'. This allows the fans to be operated remotely using the *Control* function from the users webpage.

Warnings.

Any overload warnings are indicated by a red LED, shown on the screen and reported back to the system.

Once the warning state has been physically removed the warning must be cleared on the display by pressing F1 to clear a single warning or F2 to clear all warnings.

A warning will come back if the physical state is not fixed.

The same procedure is applied if an output fuse is blown.

Fuses should only be replaced by the same type.

Screen saver

After a period of inactivity, the screen will go dark and the LED's will cycle, indicating the screen has been turned off to save power, the controller will still function as normal. To wake the screen, press a button.

Advanced.

Diagnostic information such as the input, output and fuse status can be seen using the down arrow, with each bit displayed representing a channels status.

Manual time delay between outputs can be set when it is displayed.

This is done by pressing enter and selecting the digit to adjust using left and right. Pressing up to increase and down to decrease the digit. Once the required value is selected press enter to store.

The default minimum time is 10 seconds.

The Automatic delay is set in the web "Control" page.

If the gateway or network cannot be found and the controller is in automatic, the outputs will turn off after 60 minutes to prevent continuous uncontrolled operation. This can be overridden with the manual button if required. When the gateway is seen this will come back on without intervention.

Signal strength % value refers to the last packet, received from its closest network link.

Static Automatic Controller Continued

((O))

Static Controller

PCB1 (Channel 1 to 6.)
(No connection to 7-12)

Earth/Screen [1][2][3][4][5][6]

+vdc [1][2][3][4][5][6]

Ground 0v [1][2][3][4][5][6]

(LED on = healthy.)

Outputs+ [1][2][3][4][5][6]

Inputs [1][2][3][4][5][6]

PCB2 (Channel 7 to 12.)
(No Connection to1-6)

Earth/Screen [7][8][9][10][11][12]

+vdc [7][8][9][10][11][12]

Ground 0v [7][8][9][10][11][12]

(LED on = healthy.)

Outputs+ [7][8][9][10][11][12]

Inputs [7][8][9][10][11][12]

Customer panel

Channel 1

Customer
Start
Circuit

White

23
24

13
14

OL/Trip
Healthy
State

250mA max

A1
A2

Customer
Start Circuit

Channel 7

Customer
Start
Circuit

White

23
24

13
14

OL/Trip
Healthy
State

250mA max

A1
A2

Customer
Start Circuit

0v can be linked to coil 1-6 only
+vdc can be linked to feed Aux 1-6 only

0v can be linked to coil 7-12 only
+vdc can be linked to feed Aux 7-12 only

Important Information

All DC cables must be separated from AC cables!

Shielded cables must be used with the earth connected at the static controller end only.
Coil suppressors are used to protect electronic
components and comply with electro magnetic compatibility.
Voltage DC Standard is 24vdc,12vdc is non-standard replacement only.

Example 24vdc Starter:
Schneider LP1K1210BD Contactor 24vdc.
With a LA4KC1B clip in suppressor.
Schneider GV2 Overload
With GVAE20 Aux contact.

Schneider GV2AF01 Joiner.
To join the two together.

Portable Automatic Controller

1. Before connecting a power supply to a Portable Controller, check the rating of each overload protector in the unit is suitable for each fan that is going to be plugged in.

2. Connect the fans to the plugs supplied using suitable cable.

3. Plug the fans into the sockets on the board. Using the store plan diagram supplied, put the correct fan plug into its correctly numbered socket.

4. Connect the controller to a 32 amp power supply using the plug supplied and suitable cable.

5. The operation is the same as for a static controller . Please follow the operating instructions (Page 10).

6. For Pile-Dry Pedestal fans, ensure the fan impellers are spinning anticlockwise when viewed from above.

Single Input and output controller (SIO Controller)

1. The SIO Controller can be mounted vertically near a local starter, please see the block diagram overleaf.
2. Its position must have good line of site back to the Barn Owl Wireless mains powered devices, such as a Gateway, Booster or a Bridge.
3. Ensure that the antennae is in a vertical position and has good line of sight.
4. Follow the wiring diagram on page 16 to connect.
   When all wiring is correct, power up the controller by toggling the switch the right hand side.

Operating your new controller.
   After the initial information on the controller has been displayed, the display will read the mode it is in and the signal strength of the network.

   The SIO Controller works in the same way as the Static controller with the exception that it only has one output and one input.

   To clear warnings press the button with a circular arrow.
   Signal strength is shown as an icon it the top right of the display.
   The number of waves on the icon correspond to the strength of the signal.
   A cross is shown in the icon when no connection is made.

   Follow the Static controller operating information on page 10.

Block Diagram

Protected power supply.
Constant
230vac or 3ph +N
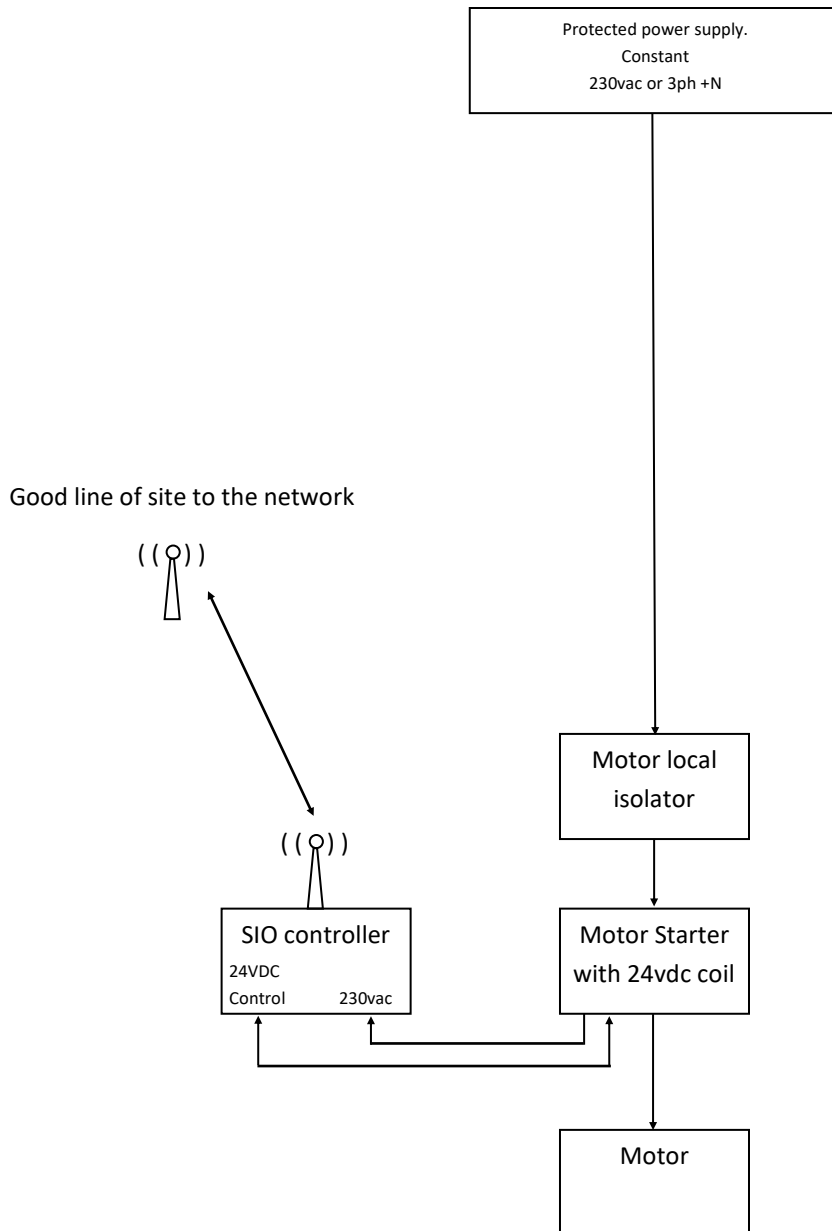
SIO Physical Dimensions

Good line of site to the network

((O))

((O))

Motor local isolator

SIO controller

24VDC

Control   230vac

Motor Starter with 24vdc coil

Motor
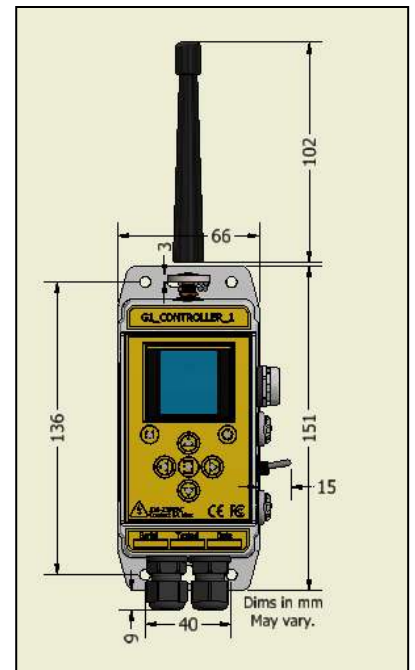
Coil suppressors should be fitted to protect electronic components and comply with electro-magnetic compatibility.

Example:
Schneider LP1K1210BD Contactor 24vdc.
With a LA4KC1B clip in suppressor.

Schneider GV2 Overload
With GVAE20 Aux contact.

Schneider GV2AF01 Joiner.
To join the two together.

Single Input /Output controller Wiring 24 vdc coil Customer Guide

Example shown from Local isolator only
Supply must be constant.

230vac

N   L1   L2   L3   E

Motor Local Isolator

SIO Controller

230vac Fused @1A
24vdc Fused @ 1A

Cable Max 7mm OD
Screen connected this end only

Output 24vdc   0v   +24vdc   Input 24vdc (OL healthy)   230vac

6.   7.   8.   9.   E   L   N

23   A2   13   14

A2.   14.

Motor Starter

23   13

24   14

14.

-QA1

24vdc coil
900ma max

A2.

-F
5A

This fuse must be added to protect the cable.

Overload

Contactor

M1
M 3~

Overload is healthy when input is +24vdc.
Cables should be fixed in position to prevent wear in cold conditions.
Coil supressors need to be fitted to protect electronic components and comply with electromagnetic compatibility.
Keep DC and AC seperate.

Customer wiring is not the responsibillity of Martin Lishman Ltd.
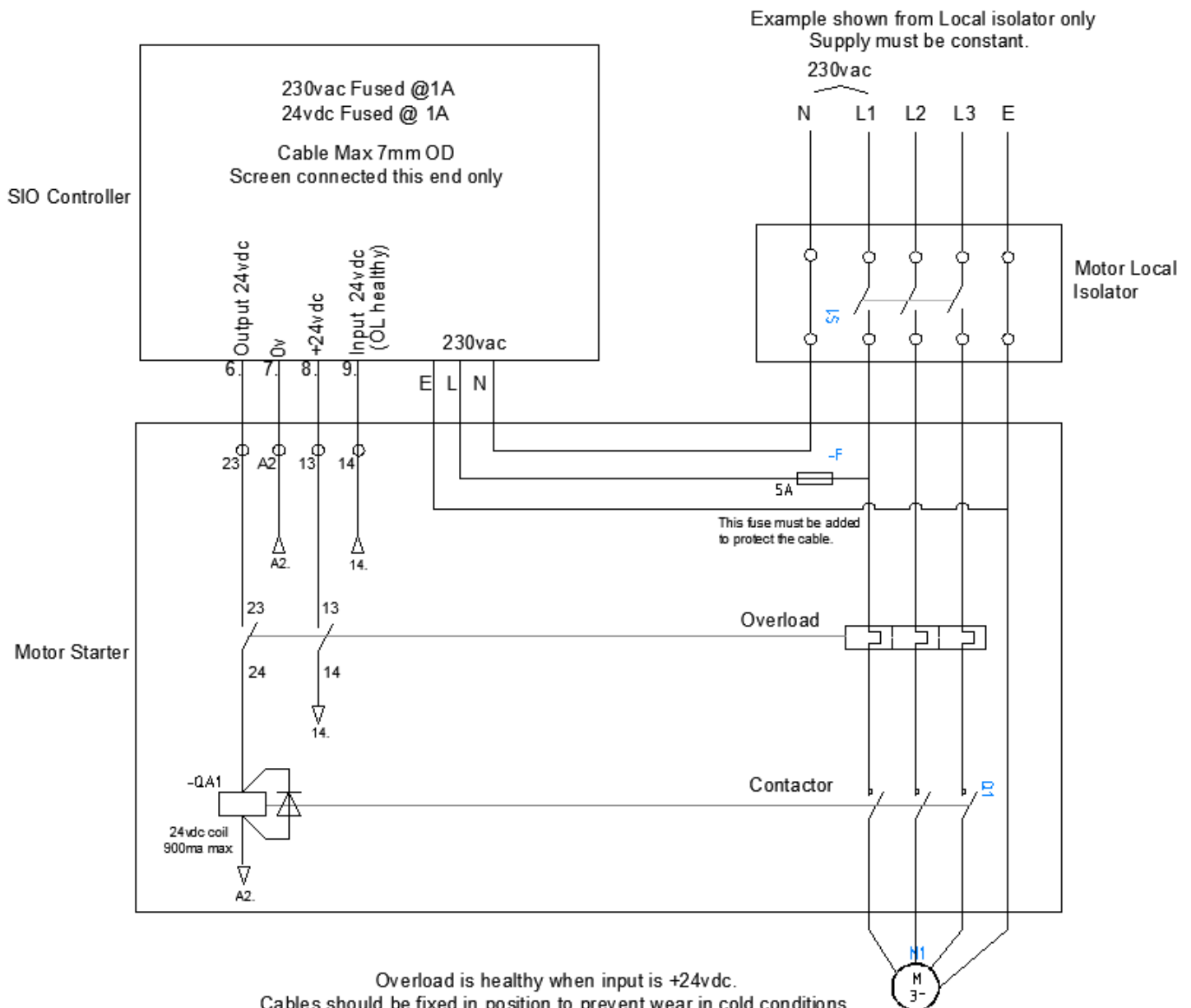All wiring must be done to current standards and regulations by a qualified professional.

Getting Started

After receipt of the system equipment and completion of the data contract, the user's unique User Name and Password will be issued. The user name will be lowercase. The web address is:

 https://barnowldata.com. Enter User Name and Password as instructed and log in.

Site Set-up

Enter contact details as indicated in the tab labelled 'Site set-up'. Keep this information up to date as it may be used to contact the user in connection with site maintenance.

Fan size and energy cost can also be entered and is used to calculate the fan running costs when data is downloaded and exported from the history page.
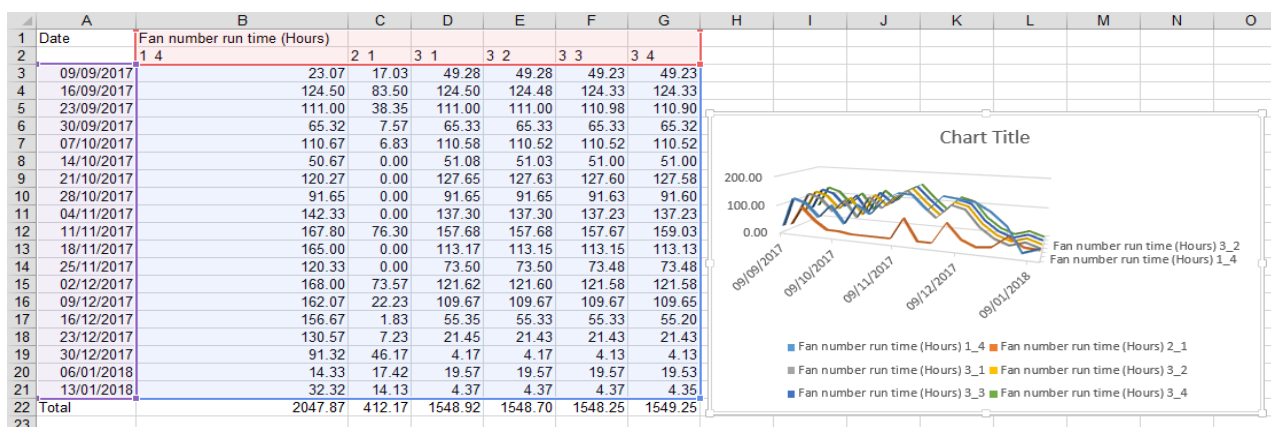
Latest Update

Click on this button on the left of the screen to display the store layout and equipment status. Use the mouse or touch the screen over the equipment to display a dialogue box showing date and time of the last reading, what the reading was and what programme is running a fan.

Key - explains the meaning of all symbols and colours on the webpage.

History

- Click on this button to display graphically the historical data recorded by the system.
- Select the equipment to be included in the display from the tabs at the bottom of the screen.
- Focus on an area of the graph by left clicking the mouse to grab an area and zoom in.
- Select a date range in the top right hand corner. Selecting a short date range increases the resolution of the data display.
- Choose to see daily, weekly or whole season data within the selected time period.
- Select to export the data to Excel or as a CSV file. Select *Create* to download the data. If it doesn't open automatically, the file will be in Windows Explorer in the Downloads folder, named *barnowldata.xls* for Excel or *barnowldata.csv* for CSV files.
- Once opened, the document will display tabs showing data from the webpage. The data can be converted into a line graph by selecting the data, clicking Insert and selecting a graph that fits your needs *(see example below)*.

	A	B	C	D	E	F	G
1	Date	Fan number run time (Hours)					
2		1_4	2_1	3_1	3_2	3_3	3_4
3	09/09/2017	23.07	17.03	49.28	49.28	49.23	49.23
4	16/09/2017	124.50	83.50	124.50	124.48	124.33	124.33
5	23/09/2017	111.00	38.35	111.00	111.00	110.98	110.90
6	30/09/2017	65.32	7.57	65.33	65.33	65.33	65.32
7	07/10/2017	110.67	6.83	110.58	110.52	110.52	110.52
8	14/10/2017	50.67	0.00	51.08	51.03	51.00	51.00
9	21/10/2017	120.27	0.00	127.65	127.63	127.60	127.58
10	28/10/2017	91.65	0.00	91.65	91.65	91.63	91.60
11	04/11/2017	142.33	0.00	137.30	137.30	137.23	137.23
12	11/11/2017	167.80	76.30	157.68	157.68	157.67	159.03
13	18/11/2017	165.00	0.00	113.17	113.15	113.15	113.13
14	25/11/2017	120.33	0.00	73.50	73.50	73.48	73.48
15	02/12/2017	168.00	73.57	121.62	121.60	121.58	121.58
16	09/12/2017	162.07	22.23	109.67	109.67	109.67	109.65
17	16/12/2017	156.67	1.83	55.35	55.33	55.33	55.20
18	23/12/2017	130.57	7.23	21.45	21.43	21.43	21.43
19	30/12/2017	91.32	46.17	4.17	4.17	4.13	4.13
20	06/01/2018	14.33	17.42	19.57	19.57	19.57	19.53
21	13/01/2018	32.32	14.13	4.37	4.37	4.37	4.35
22	Total	2047.87	412.17	1548.92	1548.70	1548.25	1549.25
23							

Manage

Click on this button to move equipment around on the page so that it portrays the exact layout of the store. Equipment can be removed from the page when not in use and stored in the equipment box by dragging and dropping the items, or removed from the box and placed on the page when needed again. Remember to save any changes when finished.

Control

Clicking on *Control* displays the control settings for each fan. Click on the headings to display a description of each programme. Click in the column for the required programme for each fan to select it. For programmes 'Temp Diff', 'Dry 1', 'Dry 2', 'Dry 3' and 'T/H' change the settings for the programme for each fan by double-clicking the green 'Tick'. An options dialogue box with recommended defaults is shown.

Warnings Current

This button will flash red if there is an unread warning. It will be solid red if this has been acknowledged but not been cleared. A warning can be cleared once the action indicated has been carried out. Once a warning has been cleared it will move into the **Warnings History** page where it will remain as an archive.

Martin Lishman Help and Support:

Call: 01778 426600

Email: support@martinlishman.com

Service address: Martin Lishman Ltd, Unit 2B Roman Bank, Bourne, Lincs PE10 9LQ, UK

Forgotten log on details and/or password? Contact us.

How long will the batteries in the crop sensors last?
The batteries are under warranty for 1 year in normal use. Battery life is an average of 2 years, but can be 3 years or more. If a crop sensor is out of range of the Gateway or another powered device then it will transmit continuously. This will shorten its life significantly. It is advisable to power off any sensors that are not being used.

What is the battery replacement procedure?
We can change sensor batteries and service the sensor for a small charge, or we can supply replacement battery packs for the user to change them, as follows:

- Remove the antenna.
- The crop sensor enclosure is a 'clam shell' type. Carefully prise both vertical edges on the front of the enclosure outwards and the back shell will pull off.
- Insert and connect the replacement battery.
- Reassemble the case and replace the antenna.

My Crop Assurance Scheme (e.g. TASCC) requires proof that my crop temperatures have been recorded with a calibrated meter. How do I do this?
The simplest method is to purchase a certificated calibrated reference meter from Martin Lishman and compare its readings with the crop temperature readings from your Barn Owl Wireless system.

Alternatively, send your temperature sensors to us for an annual calibration check which we will carry out using a certificated calibrated meter.

For more complex sites, we can calibrate your equipment on site at a suitable time. Please contact us to request a quotation.

What does the fee for the data contract include?
The fee covers the following:

- The SIM contract to transmit the data to and from the user's site and the webpage.
- Storage of data on the cloud server with access to view and download data at any time .
- Ability to control the fans from any internet-enabled device. Alerts are generated automatically when fans have overloaded.
- Operation and day-to-day functioning of the site monitored for any issues by dedicated Martin Lishman technicians.
- Continuous upgrades and improvements to the operating system and webpage are downloaded remotely to equipment at the user's site, at no extra cost.

Some of the equipment is greyed out on the webpage

Equipment will be greyed out because connection to the Gateway has been lost. Carry out the following checks:

- Ensure the power supply to the Gateway or Bridge units is connected and the green LED is on
- Ensure antennae on the equipment have line of sight to the Gateway or another plugged-in device.
- Turn the equipment off for a minute and on again and wait to see if the icons change on the webpage (this may take several minutes while the transmission cycle is completed). If the problem doesn't rectify after 20 minutes, contact us for further assistance.

A silo string is missing from the display on the SSTU and is greyed out on the webpage

- Turn the unit off and on again. If the problem persists turn off the power supply to the unit.
- Open the bottom box and check that the string connections are correct and secure. Ensure the wiring from the SSTU to the string, including any connections, is secure.
- Remove all of the strings from the bottom box. Place one string back in, turn it on, wait for it to load and see if it transmits to the webpage. If that string is OK, power off the unit, add in the next string, power it back up again and wait to see if that string appears alongside the first string. Continue this process until you find a string that fails to read or confirm everything is working.

Some of the temperature readings are abnormally high

Crop Sensor Transmitter Unit

- Move the sensor transmitter to another sensor probe. Press the ON button to refresh the reading.
- If the reading is still high then the transmitter unit is at fault and should be returned to Martin Lishman for repair. If the reading displays an accurate result then the probe is at fault.

Ambient temperature and humidity Transmitter Unit (ATH)

- Make sure the sensor unit is correctly plugged in to the transmitter unit.
- Check the sensor is out of the direct influence of sunlight. Turn the device off and on again and wait 10 minutes for a new reading to be transmitted. If it is still abnormally high return the complete unit of sensor and transmitter to Martin Lishman for testing and repair.

Silo Temperature Sensor String

- Compare the temperatures with readings measured using another temperature sensor nearby.
- Restart the SSTU and once loaded, cycle through the strings and re-check the temperature. If it is still incorrect, contact us for further assistance.

The fans do not turn on automatically when expected, but will operate in Manual

- Check the control programme settings on the webpage. If the outputs are set to 'Temp Diff', 'Dry 1', 'Dry 2', 'Dry 3' or 'T/H' , double click each green tick for every fan output and check what settings are listed.
- Check the temperature reading from the ATH. Consider whether the ambient temperature is less than the 'Frost Stat' setting (the fan icon will have changed to a snowflake to indicate this), or whether the crop temperature reading is less than 5°C above the ambient temperature. In both cases the fan will not turn on automatically.
- Check the time shown for the last reading from the ambient temperature and humidity sensor by hovering over the equipment on the 'Latest Update' page with the mouse. If the reading hasn't updated recently, turn the ATH off and on again.

The Silo Sensing Transmitter Unit display says 'No Strings Connected'

- Power off the device, open the bottom box and check that the strings are correctly connected
- Check that the wiring protocol has been followed: blue/white - data, solid blue - ground. The blue/white should be connected to the red wire in the top of the silo string; the solid blue connects to the blue wire in the silo string. Do not over tighten the screws when putting the cover back on the bottom box. Power up the unit and wait to see if the strings can be seen.

The fan(s) keep tripping the overload

- Check that the dial on the overload matches the full load current on the motor plate of the fan.
- Check the wiring to the fan motor for obvious damage.
- Otherwise, ask a qualified electrician to check the power supply circuit and all connections to the fan.

Crop sensor transmitter unit display is showing things other than temperatures.

Three dashes on the display indicate that the probe isn't connected.

- Check that the probe is plugged in correctly.
- Check the cable condition.
- Move the cable around whilst pressing the On button repeatedly to try and obtain a reading.
- Plug the probe into another crop sensor, if no reading appears then the probe is faulty. A replacement can be ordered from us.

AFF or A21 is displayed.

This would indicate that the crop sensor has lost its connection to the gateway

- Make sure that the crop sensor has line of sight to the correct gateway. The crop sensor will be labelled with G#_1. The gateway itself will be labelled with its own number e.g. G1.
- Hold the crop sensor unit in the vicinity to the gateway and power it up.
- If it still says AFF or A21 then you can either send in for testing or contact us whilst you're near the crop sensor and we can try to diagnose remotely.

Martin Lishman Help and Support:

If you experience any problems using the system contact the Barn Owl Wireless team

Call: 01778 426600 and ask for Barn Owl Wireless support

Email: support@martinlishman.com

Service address: Martin Lishman Ltd, Unit 2B Roman Bank, Bourne, Lincs PE10 9LQ, UK

Warranty

12 months from date of purchase against mechanical and electrical manufacturing defects. To claim, return the equipment to the supplier. If accepted, the equipment will be repaired or replaced and returned without charge. If rejected, the cost of replacement or repair will be notified before any work is carried out. Martin Lishman Ltd will not pay any costs associated with a claim without agreement in advance. Warranty is invalid if the equipment has been modified or damage has been caused by incorrect use or not following the instructions. The user is responsible for ensuring the equipment is operating correctly and all safety regulations are followed. Martin Lishman Ltd will not accept responsibility for loss or injury arising from misuse of the equipment or any use not in accordance with these instructions. Liability will not exceed the cost of replacement or repair. Martin Lishman Ltd will not be liable for any consequential or indirect loss suffered by purchasers or users of the equipment, whether due to correct or incorrect use, defect or malfunction caused by faulty parts or workmanship or in any other way. Non-exhaustive illustrations of consequential or indirect loss are loss of profits, loss of contracts and damage to property.

Terms and Conditions of Sale can be provided on request or downloaded from our website