Innovation In and
Out of Parlour

Herringbone M2Bus Individual Auto-ID System Manual

Manual Version - v1.00

Date - January 2020

Part Number - 39-0230

Index

Manual Versions

Version 1.00 - January 2020.....First version of manual

Good Practice During the Installation

- A separate mains supply and earth running directly from the consumer meter is essential.
- Avoid routing the mains cable to the power supply close to other supplies especially those providing intermittent current motors that are starting and stopping continually or high power heaters with thermostatic control.
- Terminate in a sealed, fused, double pole switched outlet fitted with a 13Amp (Type 1362) fuse or trip. A 3-pin ring main socket is not suitable in parlour conditions. All mains cabling must be contained in a firmly secured durable conduit.

Power Supply: Siting

- Fix the power supply to a wall or suitable brackets in a well ventilated area sufficiently high to avoid physical contact or damage, leaving a gap of at least 250mm (10") between the top of the power supply casing and the ceiling.
- Position the power supply so that the output (low DC voltage) cables are as short as possible even if this means extending the mains supply.

ATL Power Supplies: Output Voltages

- ATL power supply outputs are factory set and should not be adjusted.

60 Watt 12vDC PSU
Input: 100 - 240vAC
Output: Nominal 12vDC

- The 60 Watt 12vDC power supply has a thermal cutout and overload protection which removes power from the outputs in the event of an overload.
- There are two indicators fitted to the base of the power supply casing; red indicates that the mains is present and green that the output supply is available.

Control and Feeder Cables and Conduit

- Cables must be kept as short as possible running directly from point to point. Cut out any excess cable rather than leaving it coiled.
- Wherever possible cables should be contained in a waterproof conduit using the correct csa cable specified in the diagrams.
- **Entries must be made into the bottom of power supply or control casings but never into the top. This will invalidate the warranty.**
- Strip existing cables back to bright copper before connection.
- Keep data cables away from other cables especially those carrying mains or heavy currents. Cross only at 90° where necessary and do not enclose in conduit with other cables.
- Keep feeder cables and coaxial cables in separate conduits.
- Make sure diodes are fitted to all feeders, pulsators and solenoid valves. These should be fitted as close as possible to the feeder motor or solenoid coil.

Good Engineering Practice

Adopting good engineering practice during installation will avoid most problems with electronic control systems.

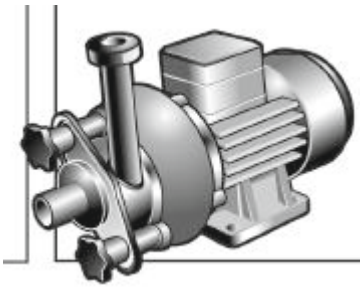
- Check the existing wiring carefully. Do not assume that it will be up to the required standard. It may have been extended with thinner wire and be unable to carry the current without a volt drop.
- Termination of cables in enclosures. Do not coil excess cable in enclosures. Loops are good transmitters of interference.
- Do not use a single aperture gland for several cables. Moisture can migrate through the gaps between the cables and cause damage to internal electronic components. Moisture damage caused in this way is not covered under warranty.
- Never run cables which are connected to ATL control units alongside mains cables. Even if they have been disconnected, they can still be carrying and transmitting interference.
- Do not place data or coaxial cables connected to ATL control units within existing conduits with other cables connected to other systems; especially unsmoothed power cables. This is a prime source of interference especially if connected to pulsators or feeder motors without diodes installed. NB - When a solenoid coil is switched off the reverse voltage is generally 10 times the peak supply voltage, with a 24vDC supply, this can be in excess of 300 volts.
- Interference is most likely on mains systems which exhibit volt drops when the parlour load is switched on.
- Variable speed drives are becoming very common. Make sure that they are installed to the manufacturers instructions. Screened cable must be used between the drive and any motors, if not electronic systems can be affected.
- RFID antennas are looking for signals around 130Khz. Variable speed drives often operate at frequencies around this value. Good installation of the variable speed drive circuit is essential to prevent interference.
- Mains earth supplies can be a source of interference. Check the voltage between the mains earth and the neutral. If there is a voltage above 3-4volts, there is a possibility that interference will be present. Earth problems of this nature can usually be avoided by fitting earth trips and separate earth electrode, which is isolated from the mains earth.

Preventing the Reading of Ear Tags through the Parlour Walls

If cows have access to the back of the parlour walls, whether this be on exit from the parlour or in cubicles, the individual Auto-ID system wall mounted antennas may read ear tags through the wall. This depends entirely on the thickness and construction of the walls. Where this is the case, the back of the parlour walls should be clad with galvanised steel sheets to prevent this occurring. For more advice and information, please contact ATL.

Variable Speed Drives (VSDs), Variable Frequency Drives (VFDs) or Invertor Drives

Variable speed drives should not affect Auto-ID systems if installed with correct filtering. However if filtering is not installed or incorrectly installed, they can seriously affect, if not totally disable ANY Auto-ID system. Where a drive is connected to the same mains supply as the Auto-ID system, distance between the drive and the Auto-ID system is irrelevant since the interference will be carried within the mains circuit. Please ensure the manufacturer's installation instructions are followed including using the correct glands, cable lengths and cable types.



Correct installation includes the fitting of filters to protect other equipment. These may be separate units or they may be incorporated within the control unit itself. Ideally filters will be incorporated between the control and the motor and also in the mains supply to the control.

If the performance of an Auto-ID system deteriorates after a variable speed drive is installed, carry out the following simple checks. The objective is to compare the performance with and without the variable speed drive operating.

1. Switch off the variable speed drive.
2. Check the read range of the antenna. Check all the antennas and make notes on performance if necessary.
3. Switch the variable speed drive ON.
4. Repeat the checks on all the antennas.
5. Ensure that the variable speed drive runs at its lowest and highest speeds and check antenna performance at all speeds and whilst 'ramping' between.
5. If there is a significant difference (i.e. there is a reduction in read range or a complete failure to read tags at a reasonable distance, then the drive should be suspected).
6. Consult the installation engineers or the manufacturer of the drive.
7. Ask if filters have been included.
8. If not then they must be added, if they have, the filter settings may need to be adjusted to make them effective.

Power Supply and Scan Switch Wiring

To aid clarity, the diagrams on the following pages do not show the power supplies or the start scan switches.

Connect the feeder power supply according to the Micro M5 manual and the Auto-ID power supply to the Auto-ID Interface unit shown in this manual.

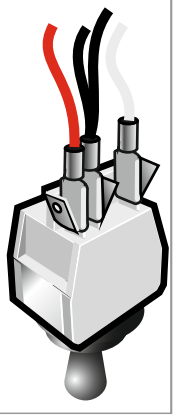
Up to 3 optional external scan switches may be fitted to the Auto-ID Interface as shown below. If the external scan switch is fitted on site, the cable gland entry hole must be drilled into the bottom edge of the interface casing.

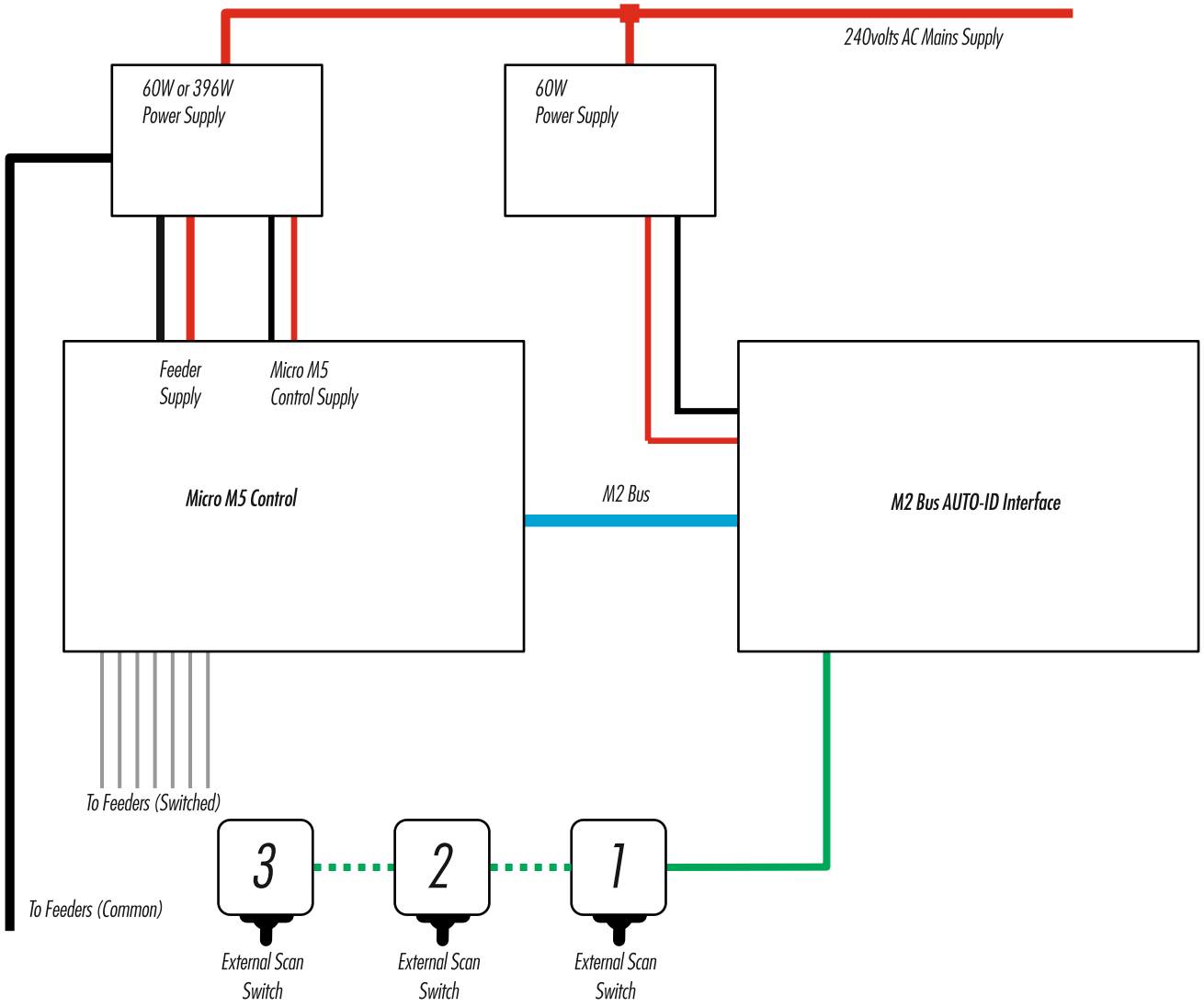
Scan Switch Connections

Wires are Black (Common), White and Red

Wires are Black x 2 (common), White and Red pre-fitted to crimp terminals. If the scan side does not correspond to the parlour side, reverse the White: Red wires or rotate the switch body.

Up to 3 external scan switches may be fitted to a system either by connecting back to the Interface board or by 'daisy chaining' from one switch to the next. In the latter case piggy-back terminals are fitted to the switches as shown in the illustration.





Antenna Position and Installation

Installing ATL Auto-ID is a straightforward procedure and experience shows that when antennas are installed correctly, systems work perfectly at switch on. Those that don't, invariably have a problem with antenna positioning which compromises both the tag reading range and the reading speed.

Before fitting the antenna read the manual and work strictly to the instructions given for the type of parlour stall.

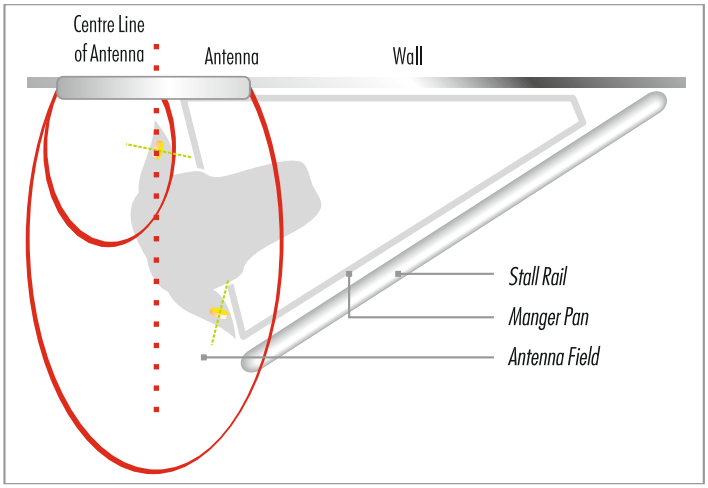
The Auto-ID reader can read 10 tags every second so it is able to scan a complete side very quickly. The most effective performance is achieved when the tags are read just as the cow enters the stall providing the lateral position and the height of the antennas are as specified in the installation manual.

How a Tag is Read

There are two areas adjacent to an antenna where the tags are read. These are illustrated by the two lobes on the diagrams below. The larger extends beyond the stall and reads the ear tag when either face is facing the antenna. The smaller lobe reads the tag when its edge is facing the antenna. The lobes extend over the full length of the antenna but not beyond the bottom or top.

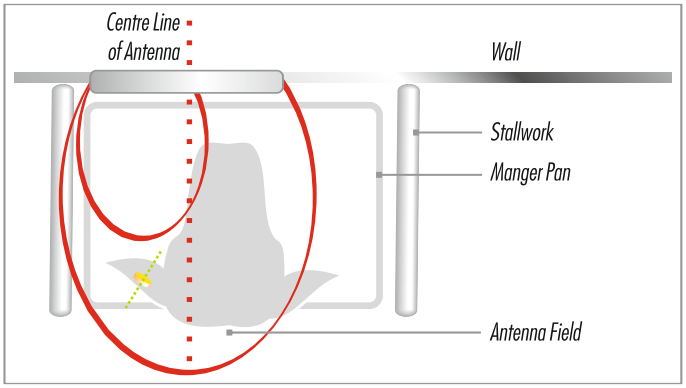
Antenna Lateral Position

30° and 50° Herringbone Parlours: Mount the antenna on the wall so that the imaginary centre line- dotted on the diagram- would pass through the centre of the eartag in the cow's ear. The antenna will be mounted differently on each side of the parlour.



Free advice regarding installation is available by telephone, fax, letter or e-mail. Site visits will be made at the discretion of ATL, but on site and travel time are charged at the prevailing hourly rate.

90° Parallel Parlours: All cows MUST have the ear tags fitted on the same side. Antennas should be installed on LHS of stall on one side of parlour and on RHS of stall on the other.



The antennas MUST be fitted so that they are offset from the centre of the stall and as close to the stall divider as possible on the same side as the ear tags.

If feeder down pipe brackets prevent the antennas being mounted in the correct position, then spacers must be used between the brackets and wall to allow the antennas to fit behind. Suitable spacers, 35mm diameter x 15mm long can be made from PVC rod.

Height of Antenna

The antenna must be mounted at a height that will enable the tag to be read both when the cow is standing normally and when eating in the manger. The ideal height is 1.5m to 1.6m to the top edge of the antenna depending upon cow size. If the base of the manger is less than 300mm from the floor then the antenna may need to be lowered a little to ensure tag reading when the cow is eating.

The Effects of Metal on Tag Read and Performance

Generally steel feeder down pipes have little effect on read range, assuming all stall fittings are similar. If there are variations, for example when a parlour is extended using different feeders or if some downpipes are connected directly to the feeder body whereas others are attached by a plastic or rubber collar, antenna performance could alter radically. Achieving acceptable performance in both 'stall varieties' will require special tuning procedures which will inevitably add to installation costs.

ATL cannot be held responsible for indifferent performance if they are not made aware of parlour discrepancies or if these guidelines or installation instructions have not been followed.

Stall Select Module Position and Installation

The cable length between the antennae and the M2 Bus Auto-ID Interface is required to be balanced for optimal performance. Therefore, the position of the stall select modules is critical. The following table displays the correct position of the M2 Bus Stall Select Modules and SHOULD BE ADHERED TO IN ALL INSTALLATIONS.

If there are obstructions preventing installation is the correct position, please contact ATL for advice, as changing the position will adversely affect system performance.

Free advice regarding installation is available by telephone, fax, letter or e-mail. If ATL has not been contacted during installation and the stall select modules are NOT INSTALLED in the correct position, adversely effecting performance. ANY remedial work to correct the problem will be chargeable at the prevailing hourly rate.

Number of Stalls Each Side	***Stall Select Module Position Both LHS and RHS***
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	8
10	8
11	8
12	8
13	8
14	8
15	8
16	8
17	8+17
18	8+18
19	8+19
20	8+20
21	8+21
22	8+22
23	8+23
24	8+24
25	8+24
26	8+24
27	8+24
28	8+24
29	8+24
30	8+24
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41	8+24+40
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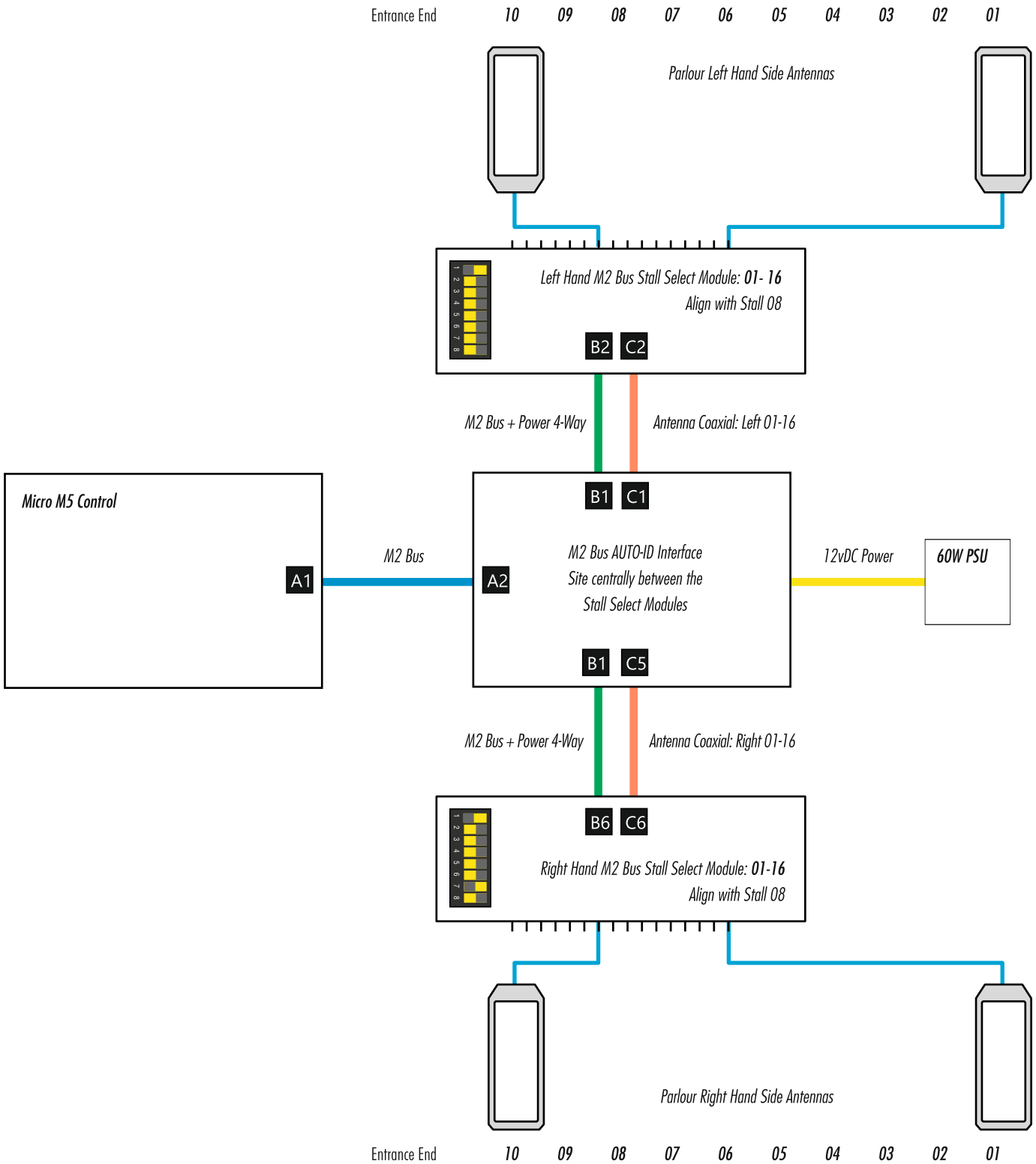
56	8+24+40+56
57	8+24+40+56
58	8+24+40+56
59	8+24+40+56
60	8+24+40+56
61	8+24+40+56
62	8+24+40+56
63	8+24+40+56
64	8+24+40+56

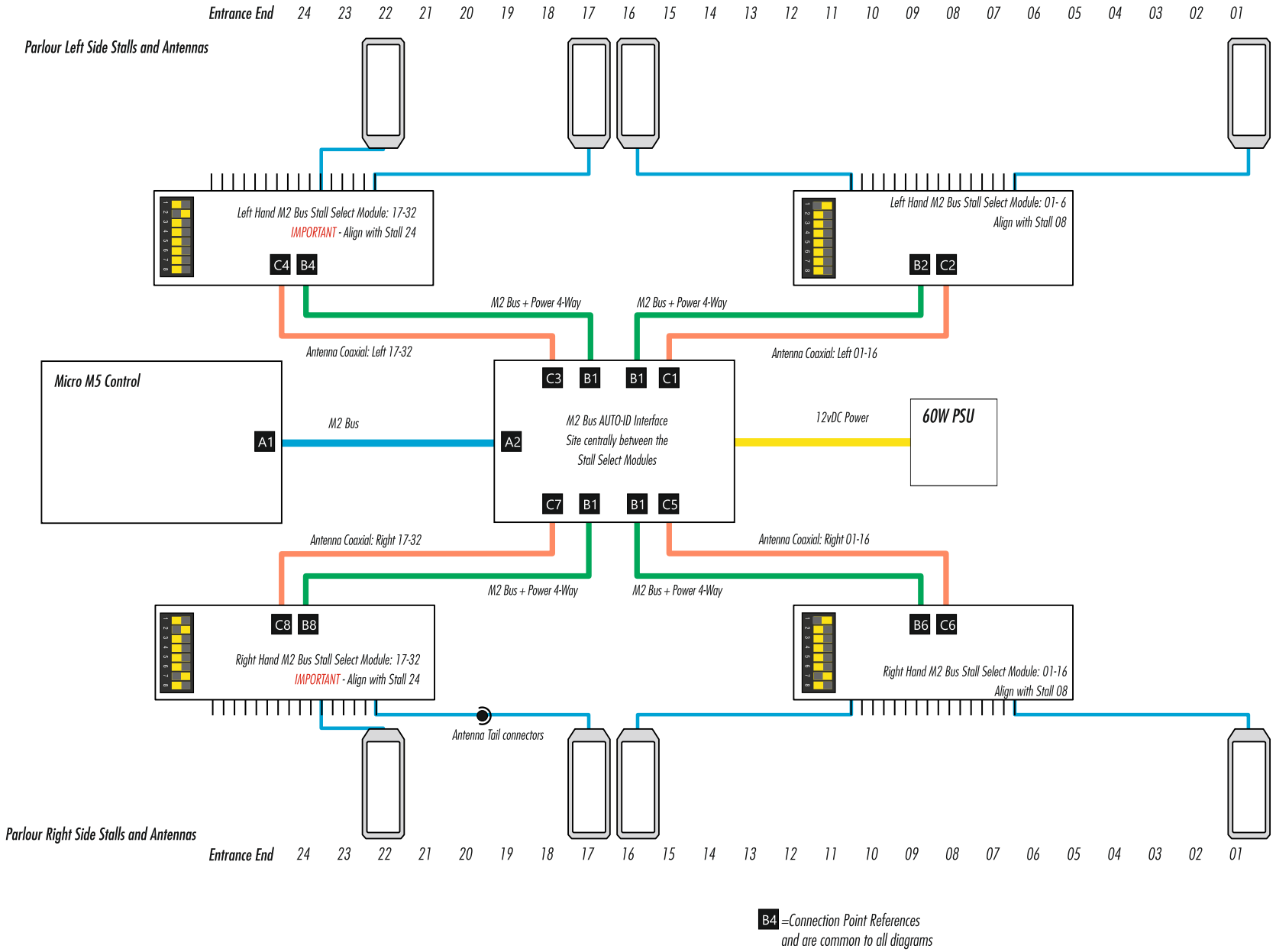
10/20 or 20/20 Parlour: Typical Layout:

To maintain balance with the cable lengths, the Auto-ID Interface has been designed to work with the Stall Select modules positioned opposite stall (8) in up to 16 a side parlours.

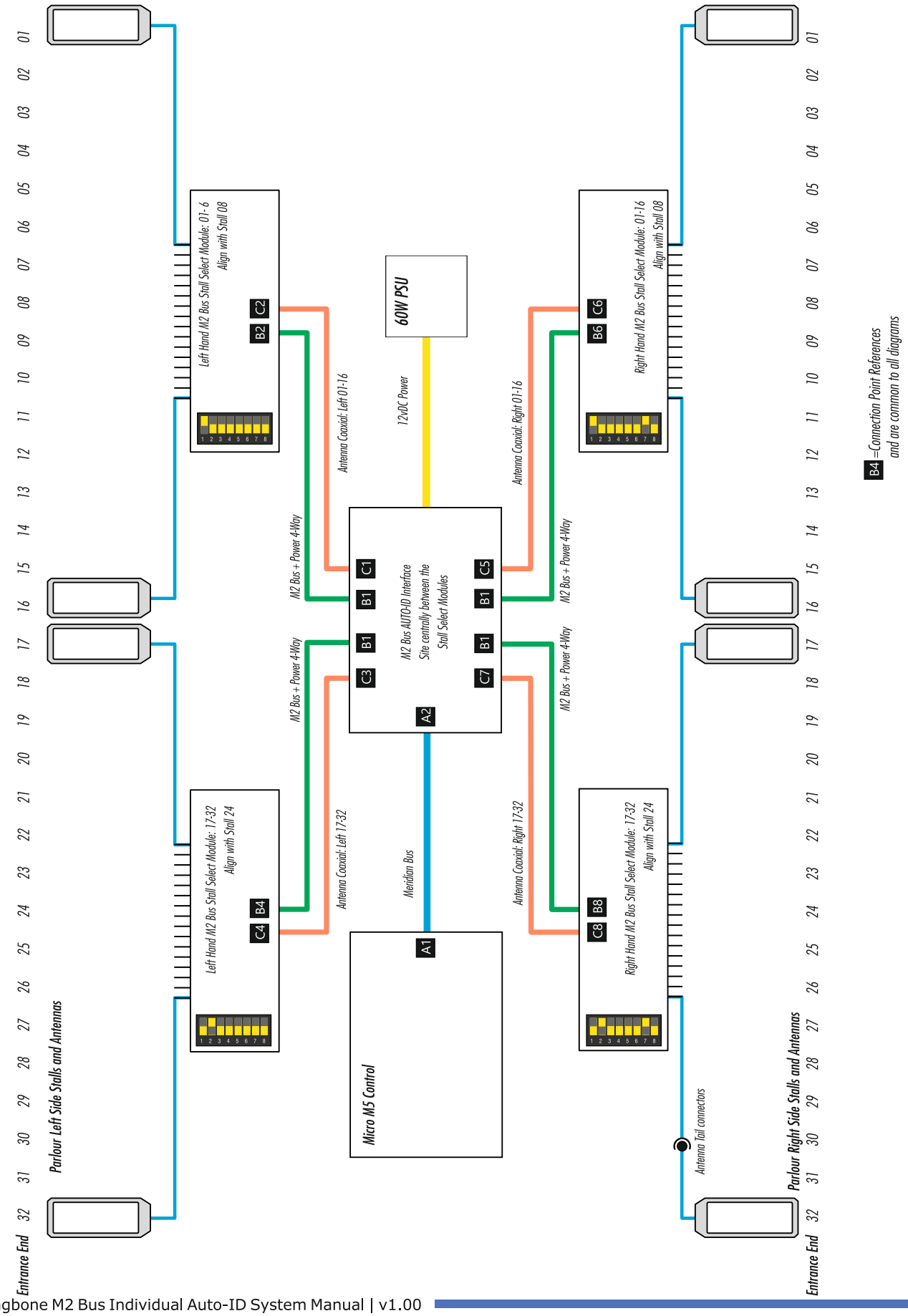


22/44 or 44/44 Parlour: Typical Layout:

IMPORTANT - Even though system only has 22 antennas each side, stall select module should be aligned as close as physically possible to stall 24.



32/64 or 64/64 Parlour: Typical Layout:

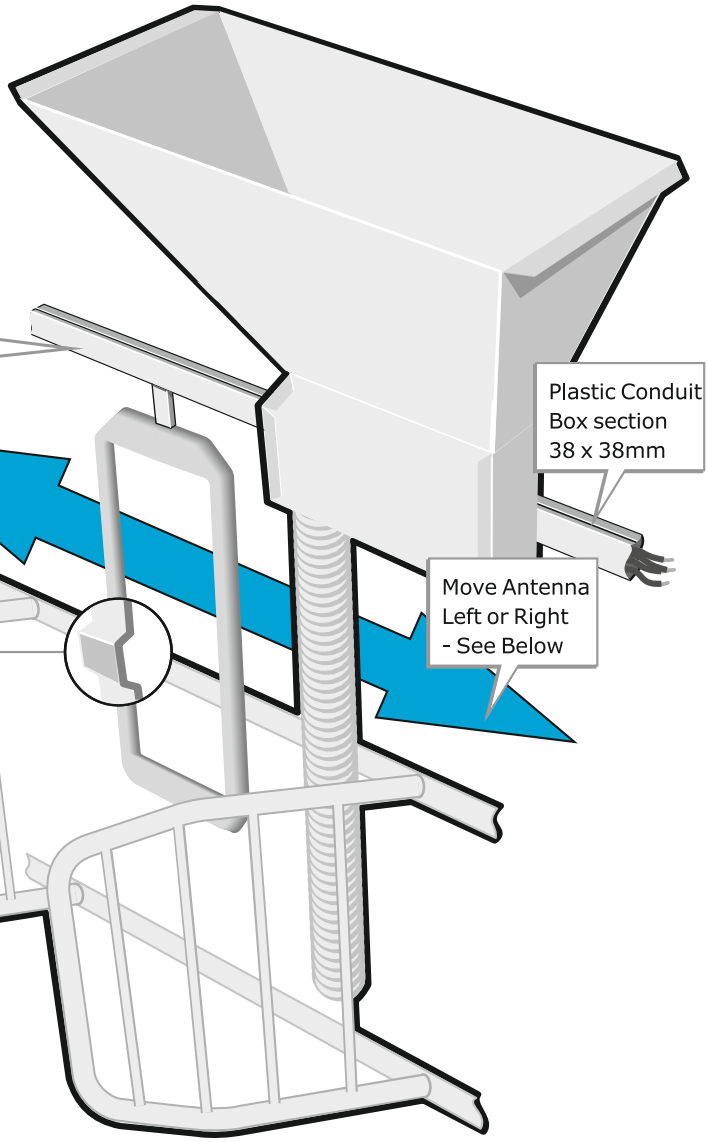


Antenna Positioning: 30° and 50° Herringbone Parlours

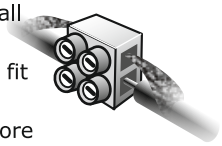
Antennas are electronically balanced to suit the steelwork within the parlour and should be positioned as accurately as possible to the dimensions shown below.

Use the stainless steel screws and wall plugs supplied to secure the antennas. Position the 38 x 38mm box section conduit supplied as conveniently high as possible and out of cow reach.

IMPORTANT - Do not run coaxial cables in same conduit as feeder cables. This can cause the Auto-ID system to function incorrectly.

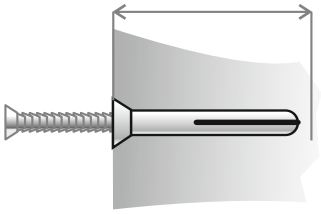


Connect the antenna coaxial 'tail' to a run of coaxial up to the Stall Select module using 2-way connectors supplied. They will fit comfortably inside the 38 x 38mm box conduit. Connect core to core and screen to screen overlapping the ends within the connector to ensure good conductivity.

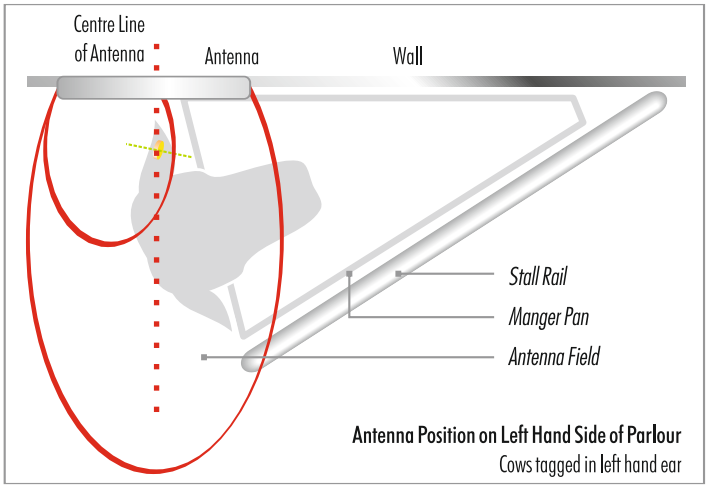


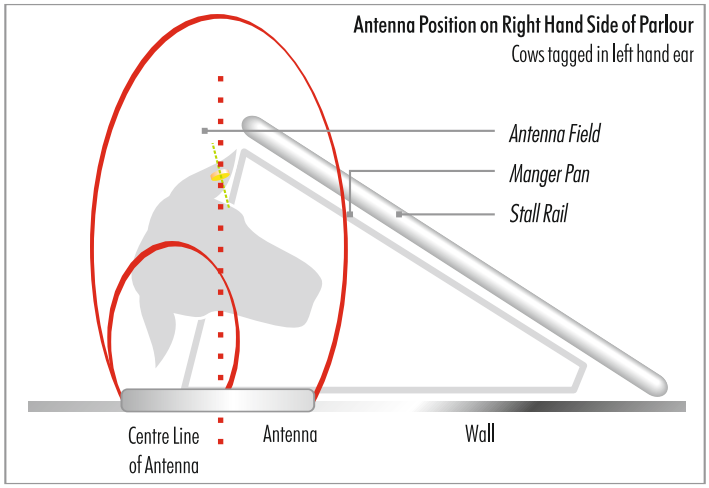
Antennas with 'cranked' side rails are available for parlours with stall support rails (up to 25mm)

6mm x 50mm(2") hole



The antenna fixings supplied are drive screws and MUST be hammered not screwed into the plastic plug. Drill a 6mm diameter hole at least 50mm (2") deep to accept the plastic plug. Ensure that the screw is driven fully home and does not 'bottom' on the hole.





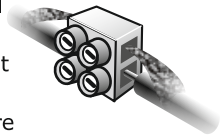
Antenna Positioning: 90° Parallel Parlours

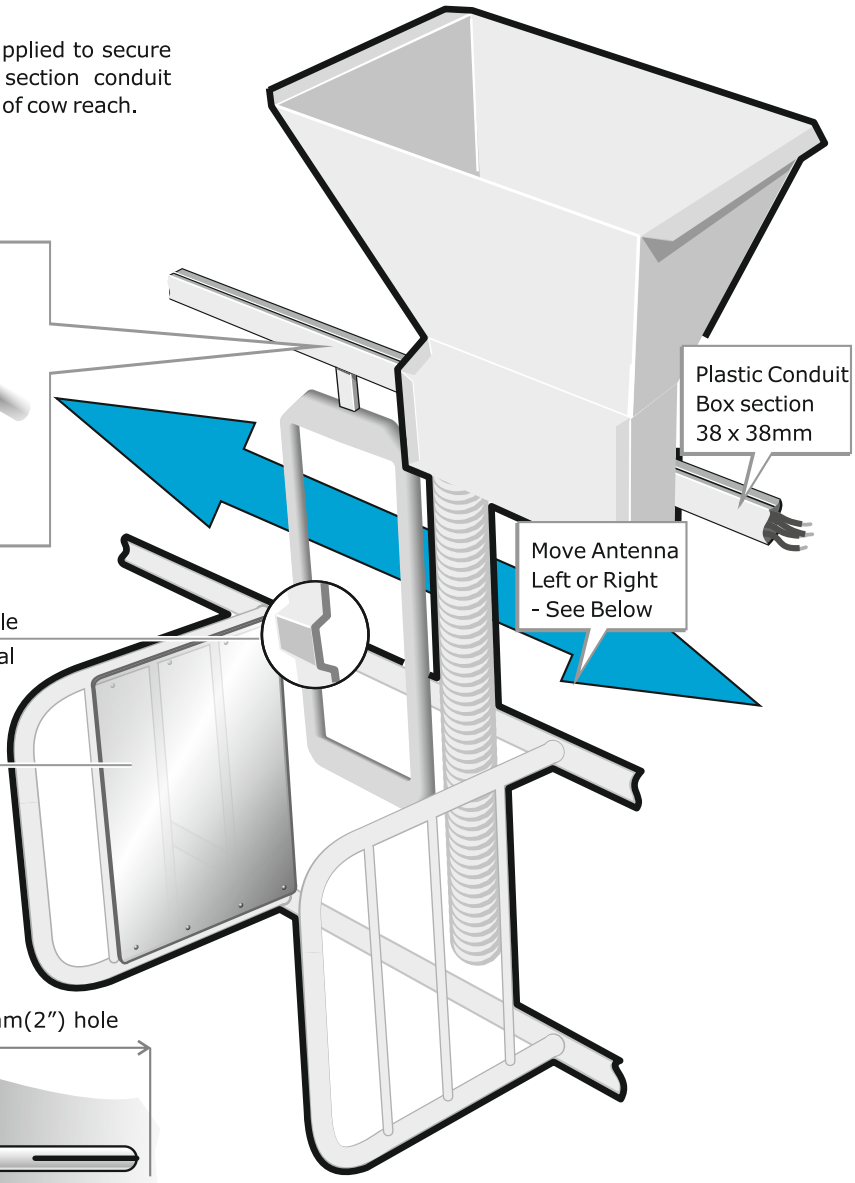
Antennas are electronically balanced to suit the steelwork within the parlour and should be positioned as accurately as possible to the dimensions shown below.

Use the stainless steel screws and wall plugs supplied to secure the antennas. Position the 38 x 38mm box section conduit supplied as conveniently high as possible and out of cow reach.

IMPORTANT - Do not run coaxial cables in same conduit as feeder cables. This can cause the Auto-ID system to function incorrectly.

Connect the antenna coaxial 'tail' to a run of coaxial up to the Stall Select module using 2-way connectors supplied. They will fit comfortably inside the 38 x 38mm box conduit. Connect core to core and screen to screen overlapping the ends within the connector to ensure good conductivity.

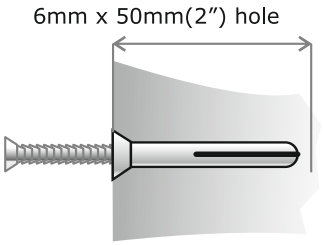


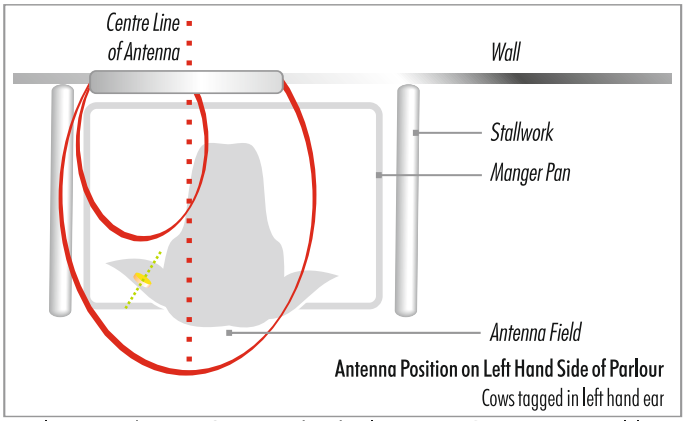


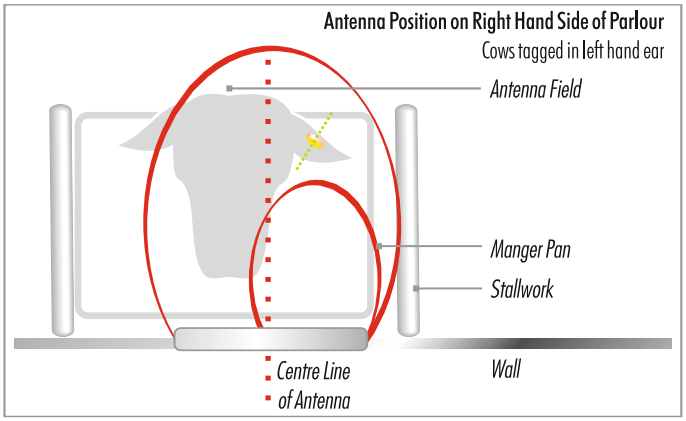
Antennas with 'cranked' side rails are available for parlours with stall support rails - additional charges apply.

Some parlour types may require galvanised steel sheeting securely fixed to each stall divider to prevent 'cross-reading' between stalls. These have to be made to suit the parlour and are not included in the price.

The antenna fixings supplied are drive screws and MUST be hammered- not screwed- into the plastic plug. Drill a 6mm diameter hole at least 50mm (2") deep to accept the plastic plug. Ensure that the screw is driven fully home and does not 'bottom' on the hole.







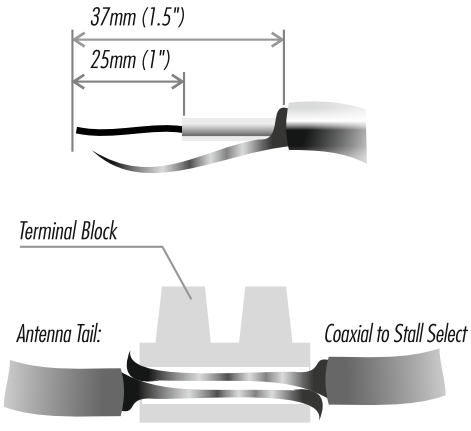
Installation Sequence

The M2 Bus Stall Select Modules must be located adjacent to stall 08, 24, 40 or 56, on the right and left hand sides of the parlour (see page 9), with the M2 Bus Auto-ID Interface positioned equidistant from them. The Interface must not be mounted close to large areas of metal.

- Position and fit the antennas according to the illustrations on previous pages or refer to ATL for special layouts.

- Fit the 38 x 38mm box section conduit supplied as high as possible above the antennas. IMPORTANT - Do not run coaxial cables in the same conduit as feeder cables. This can cause the Auto-ID system to function incorrectly.

- Directly above each antenna, drill a hole 6.5mm (¼") diameter through the lower edge of the conduit. This will be the antenna tail entry. Pass the antenna tails through the holes and lay them neatly along the conduit.



Extending the tail. Screen to screen and core to core. Both screens and cores will now be overlapping ensuring a good, low resistance connection when the screws are tightened.

- If the tail will reach the Stall Select Module connectors, trim, strip (as shown below) and fit it. If the tail is too short, cut a pair of connector blocks from the strip provided, strip the ends of an additional piece of coaxial and connect it to the tail by overlapping as shown below. Take the extended tail directly to the M2 Bus Stall Select Module and connect it without leaving 'spare' cable in the conduit. Refer to page 16.

Referring to pages 16, 17 and 18:

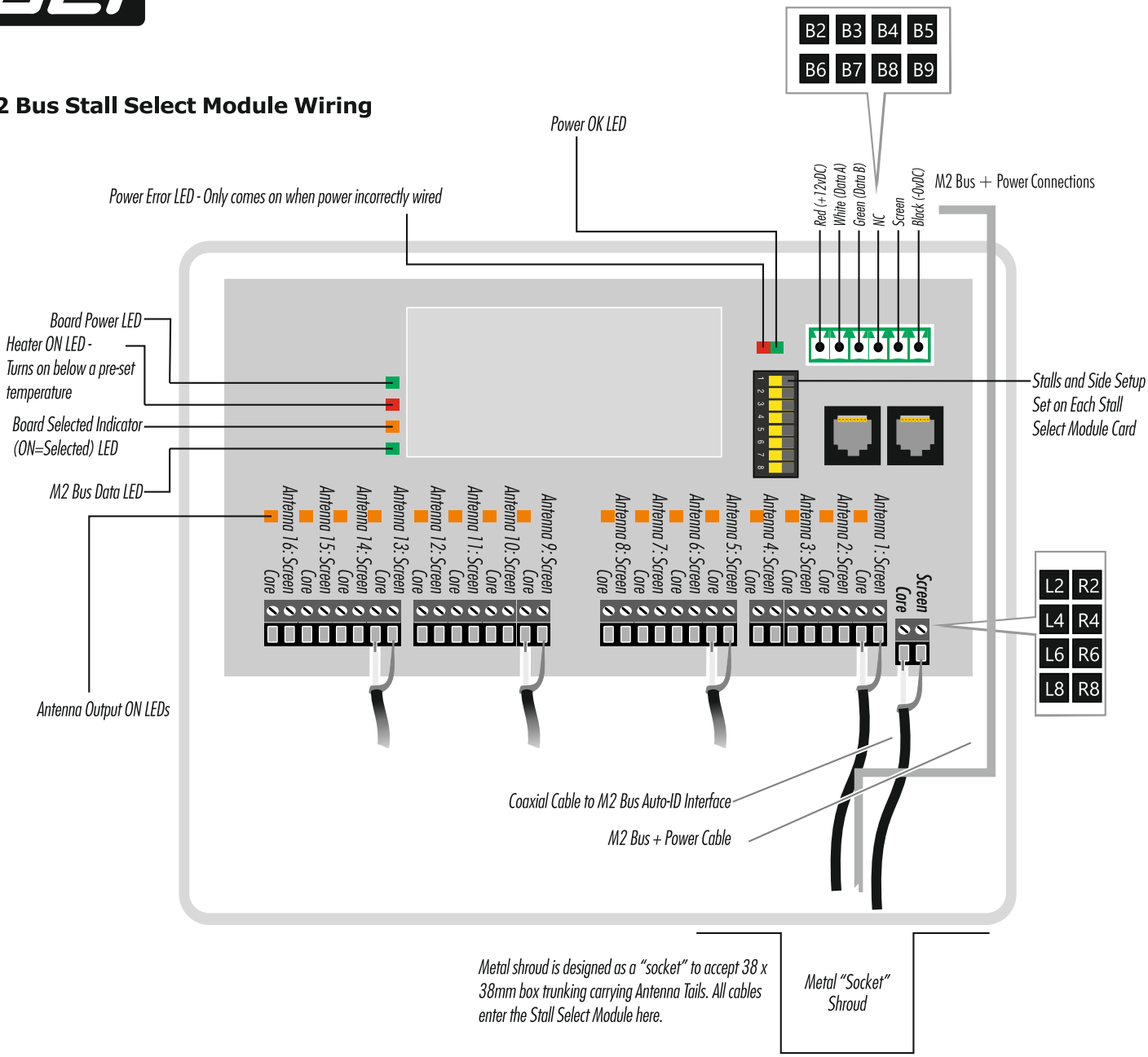
- Fit the 6-way Control Cable plug to the right hand socket of the M2 Bus Stall Select Module (B2/B3/B4/B5/B6/B7/B8) feeding the cable back to the Auto-ID Interface (B1 is common to B2/B3/B4/B5/B6/B7/B8).

- Through the same conduit, feed a new length of coaxial cable also back to the M2 Bus Auto-ID Interface. Strip the end of the cable at the M2 Bus Stall Select Module and fit to the 'Common' Terminal (L2/L4/L6/L8 or R2/R4/R6/R8). Check screen and core positions.

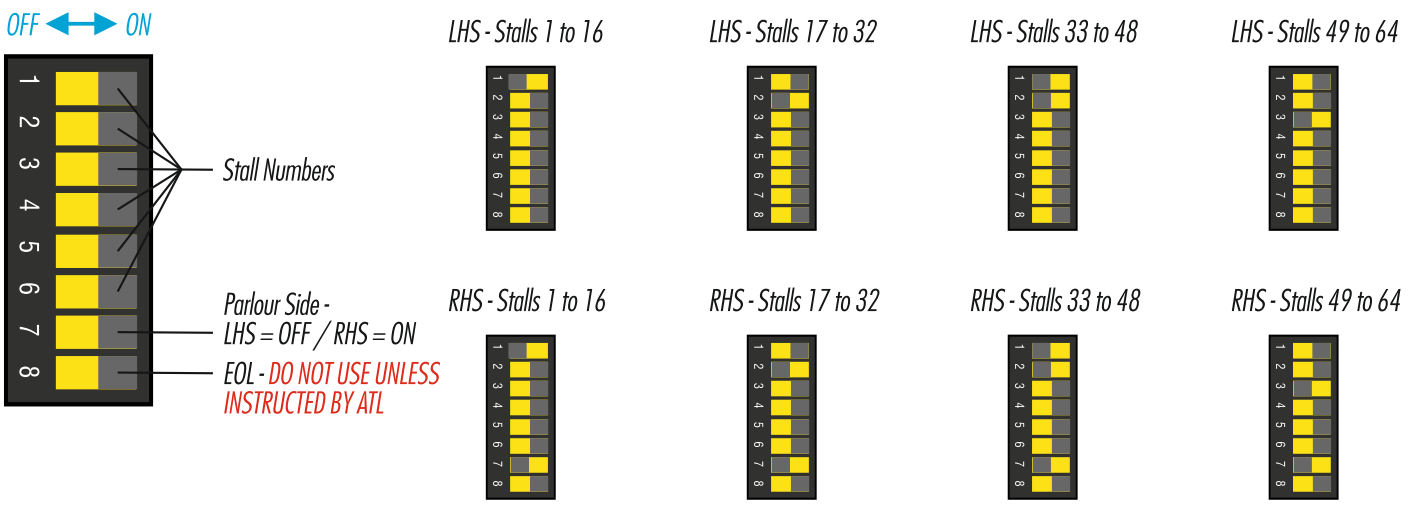
- At the M2 Bus Auto-ID Interface, strip and connect the 'Common' coaxial cable to the appropriate connector (L1/L3/L5/L7 or R1/R3/R5/R7).

- Set the Board Select DIP Switch to the M2 Bus Stall Select Module according to the information on page 16.

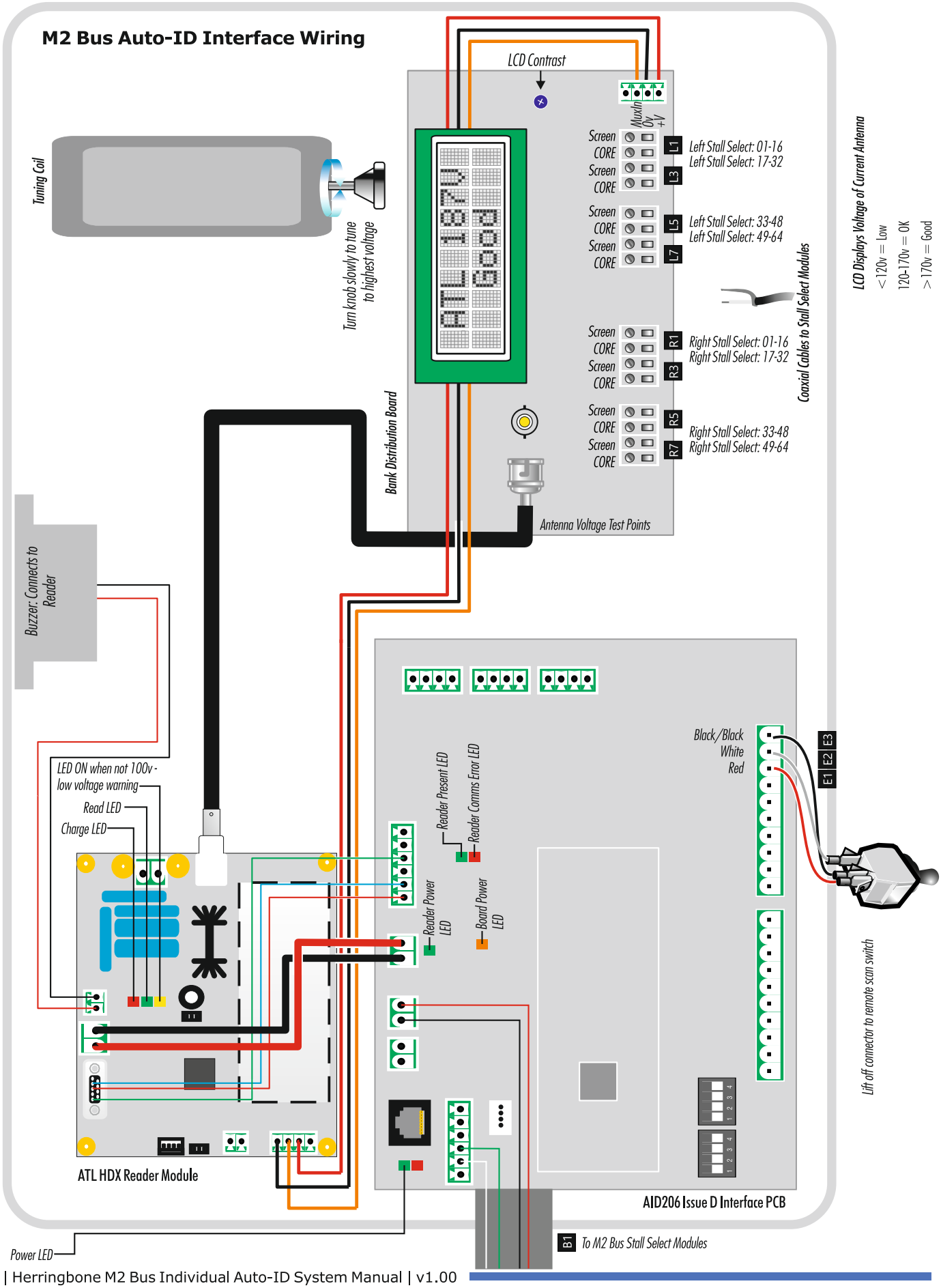
M2 Bus Stall Select Module Wiring



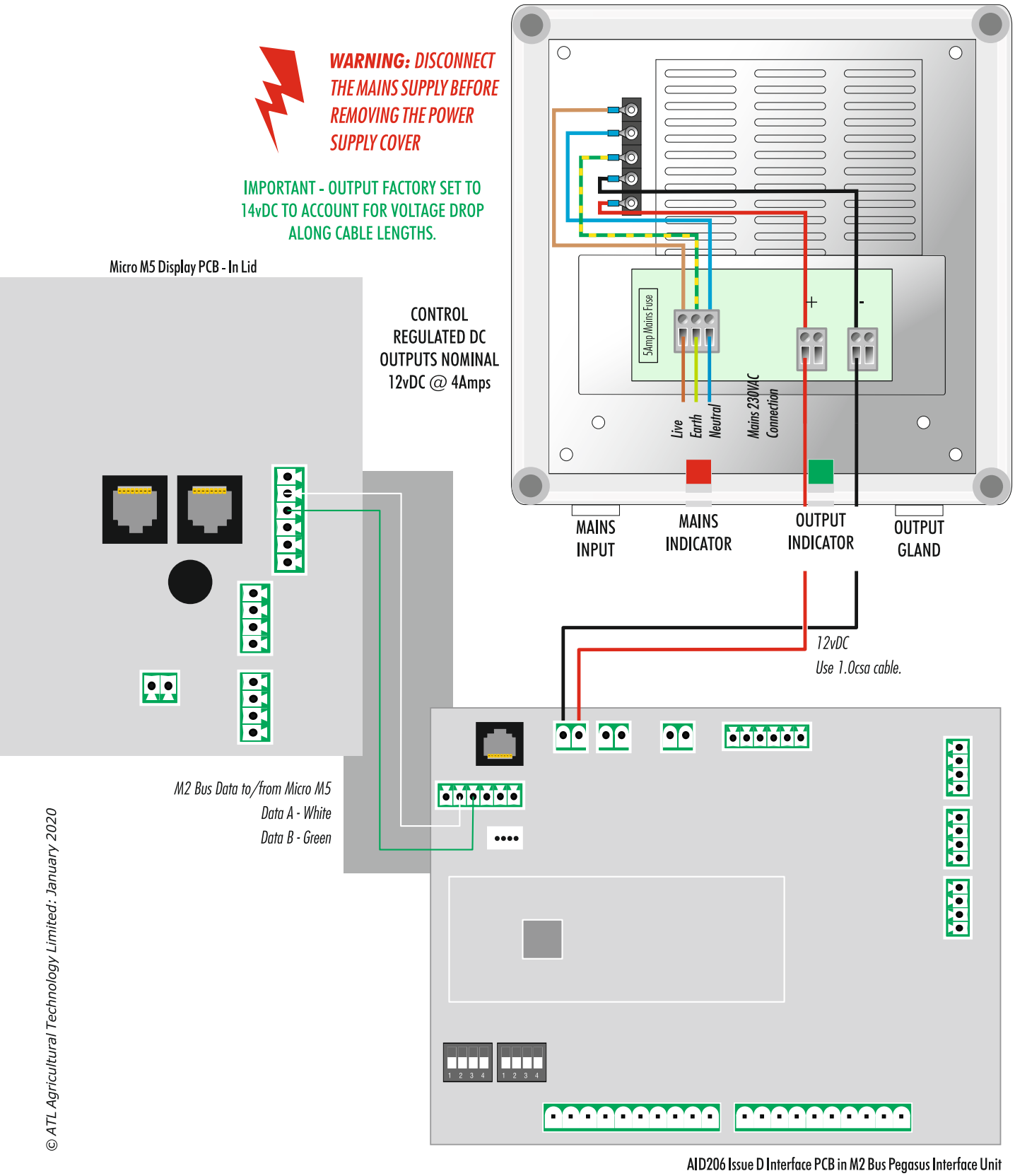
DIP Switches for Setting Herringbone/Parallel Parlour Side and Stalls

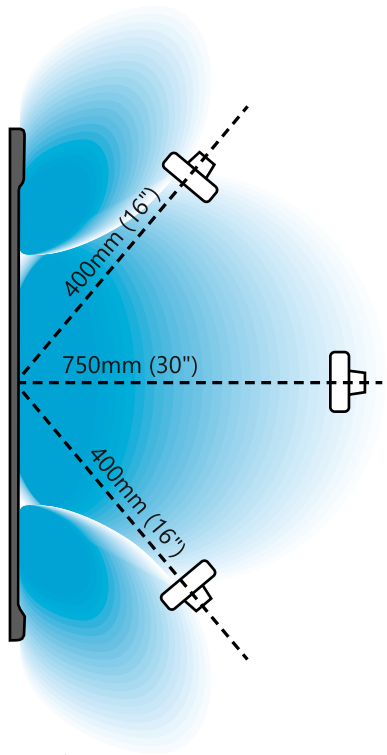


M2 Bus Auto-ID Interface Wiring



M2 Bus Auto-ID Interface to 60 Watt 12vDC Power Supply Wiring





Side view of the antenna.
The magnetic field around the antenna is complex and the reading range will vary depending upon the tag's position within the field. Keep the tag's face toward the antenna.

Testing Antenna Reading

The magnetic field surrounding an antenna is not uniform and will be distorted by metal objects close by. The reading range is further complicated by the ear tag orientation; the best range will be achieved with the tag flat face toward the antenna with a noticeable deterioration if the tag is held edge on. However, this is not a cause for concern since cows seldom, if ever keep their ears stationary for more than a few seconds at a time!

But for the sake of consistent testing, hold the ear tag flat face toward the antenna as shown in the diagram. To test the reading range:

Run the AID Diagnostics routine on the Micro M5 - see Micro M5 manual for how to do this.

When measuring the range, use a wooden or plastic lathe marked in cms or inches; do not use a metal rule.

Hold an ear tag with the hole pointing toward the *centre* of the antenna. Move the tag toward the antenna until the beeper sounds then move it away until the beeper ceases. Make a note of the distance.

Use the STEP key to step to the next stall and repeat the process.

When the right hand side is complete, press the SIDE key to change to the left hand side and repeat the process.

If any antenna exhibits a significantly shorter read range than the average, or is less than 750mm (30") contact ATL.