Innovation In and
Out of Parlour

M2 Bus Pegasus Sorting Gate System Manual

Version - 1.0

Date - February 2019

Part Number - 39-0311

Index

Manual Versions

Version 1.0 - February 2019.....FirstVersion of Manual (Software v?.??)

Good Practice: Mains Supply

- 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 (BS 1362 Standard) 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. All mains work should be referred to a Qualified Electrician.

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 Supply: Input and Output Voltages

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

  Input: 110vAC - 230vAC

  Output*: Nominal 12vDC*

Control, Power and Data 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. Where ever 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 multi-core 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 valve. These should be fitted as close as possible to feeder motor or solenoid coil.

Good Installation 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 and with appropriate filters. 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 system.

Important Installation Notes

The Pegasus sorting gate system has been designed to withstand all the normal rigours of the farm - including impact from runaway cattle-and with careful installation will serve faithfully and reliably for many years.

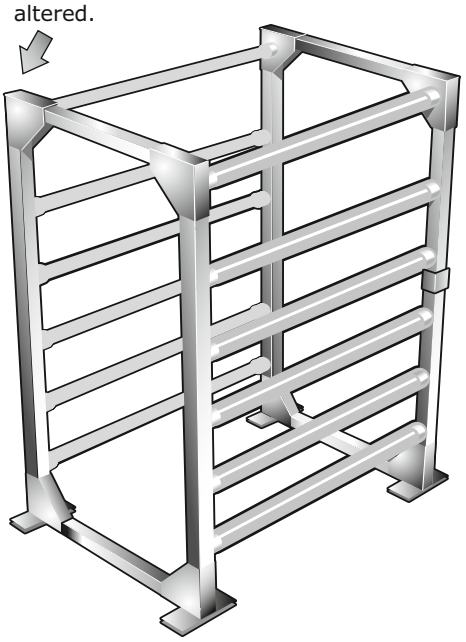
The Pegasus walkthrough antenna is a unitary design; it cannot be:

- ✖ Changed or modified
- ✖ Opened or unbolted
- ✖ Connected to any other piece of equipment, radio frequency or otherwise, that is not part of the Pegasus system or an approved computer and then only in strict conformance to the guidelines in this publication.

...and MUST NOT be:

- ✖ Cut open
- ✖ Drilled
- ✖ Welded
- ✖ Operated while welding is being carried out nearby.

The Antenna cables emerge here and are enclosed in a flexible conduit. Neither the conduit or the multi pin connector should be altered.



Fix the antenna using ½inch (12mm) bolts through the holes in the feet. The base should be weatherproof timber decking or concrete laid over a suitable aggregate. Check for re-inforcing metal in the floor.

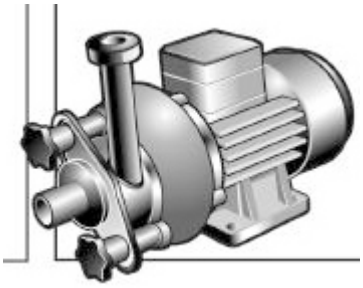
It transmits and receives precise radio waves which could be affected by equipment close by so please read the following guides to siting before deciding upon a permanent position.

The control module is connected to an antenna at a maximum distance of 5 metres (15 feet). The connecting cable, an integral part of the antenna, is sealed within a flexible conduit, and the multi pin connecter is internally weatherproofed so neither should be altered. Mount the control by its feet only positioned to be accessible but away from the cattle. Do not drill the casing. Use the pre-drilled and plugged holes for all cable entry.

Mains power must come through an appropriate protection device-residual current detector(RCD) or current interrupter - via a fused, double pole switched outlet. Mains supply must conform to local and national guidelines and be installed by an authorised engineer.

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. See Page 18 for testing the Pegasus antenna.
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.

Pegasus Sorting Gate System Elements

The complete Pegasus Sorting Gate system comprises:

 # Micro M5 Control to store the cow data;

 # 60W power supply;

 # Pegasus M2Bus Interface Unit;

 # Pegasus Air Control Module;

 # Pegasus Antenna;

 # Gate assembly.

Cow Data

The cow records, each of which includes the cow's herd number, ear tag number, and possibly ration details and milk yields, are stored and updated by the Micro M5 control which is either dedicated to the sorting gate system or part of the parlour feeding and Auto-ID installation.

Existing Micro M5 Control Installations

The Micro M5 Control may be part of an existing parlour installation in which it is responsible for feeding, parlour automatic identification and milk meters. Any of these machines may be used to provide cow data to the gate installation.

An existing Micro M5 will need a cable link to the Pegasus Interface Unit. This is a data exchange cable; tag data is sent from the Pegasus antenna via the Interface to the Micro M5 where the cow is identified, her warning flags checked and if necessary, the commands sent back to move the gate.

Existing Micro M5 installations will already have a power supply. This will remain but must not be used to power any part of the gate system which has its own power supply.

IMPORTANT - Please note that M2Bus systems cannot be linked to the MicroM3S.

New Micro M5 Installations

New installations which do not have an existing Micro M5 and do *not* require parlour feeding, are supplied with a Micro M5 that has all of the cow data facilities but not the feeder output relays. It is provided with its own separate power supply.

NB - See also Micro M5 instructions.

Data Cable

The data cable supplied is a 'twisted pair' configuration especially designed for communications. No other cables should be used as replacements. Ensure it is connected exactly as shown in the diagrams and keep the cable run as short as possible.

Do not run near or parallel to, or cross over AC mains supplies or wires carrying switched current-milk pumps for example.

Generally, avoid fluorescent lighting or radio wave sources.

Ideally, data cable should be run through suitable conduit by itself, especially if it is exposed to the weather. Sharing conduit with power wires invariably corrupts data.

60W Power Supply

The Pegasus Interface Unit requires it's own separate 60W power supply. Neither power supply nor the Antenna Control should be exposed to the weather.

The power supply should be sited as close to the Pegasus Interface Unit as possible but sufficiently far away from the antenna not to interfere with tag reading. A double pole switched, fused (5Amp) mains outlet (110-230vAC) is required. A 13Amp'plug and socket' is not suitable. We strongly recommend the use of Residual Current Circuit Breakers (RCCB) in all mains outlets.

The power supply casing is splash proof but not guaranteed to withstand direct pressure washing, so position it well away from areas that are likely to be washed down regularly. Use only the cable entries and glands fitted to the case and ensure that cables are a 'snug', sealed fit. Do not drill additional holes in the sides, top or back.

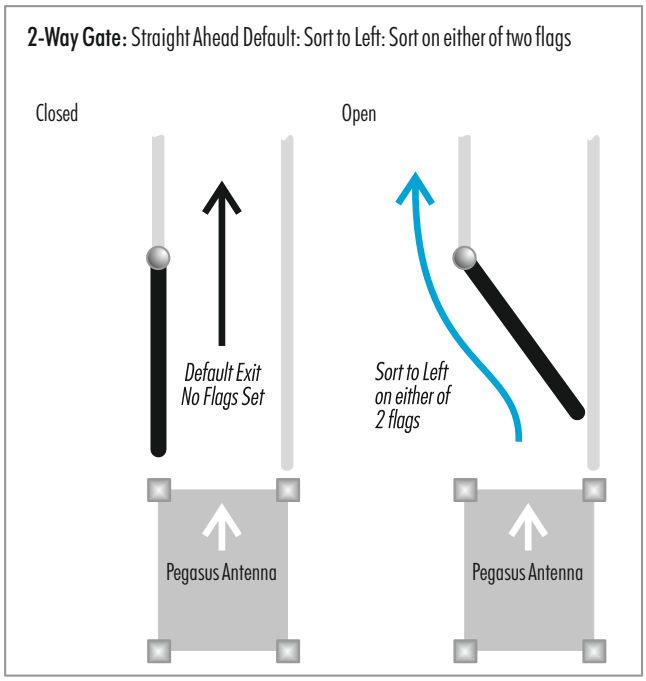
All mains wiring should be installed by a competent electrician and comply with all relevant regulations.

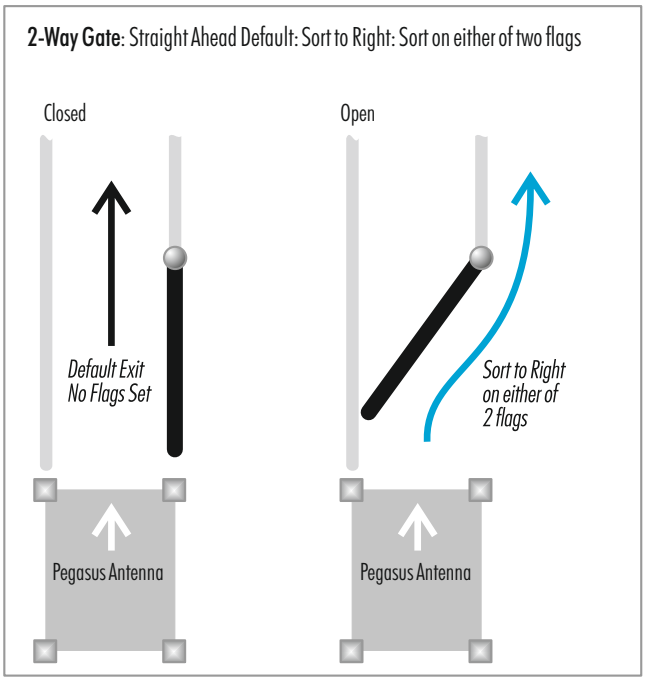
Antenna, Interface Unit and Pneumatic Unit

The 5, 10 or 20 metre cable conduit fitted to the antenna cannot be extended or shortened so the Pegasus Interface Unit must be sited within this radius, on a firm wall that is not subject to vibrations or 'cow impact!' **NB** - Do not mount the Pegasus Interface Unit on the gate frame as the vibrations will de-tune the antenna or cause permanent damage.

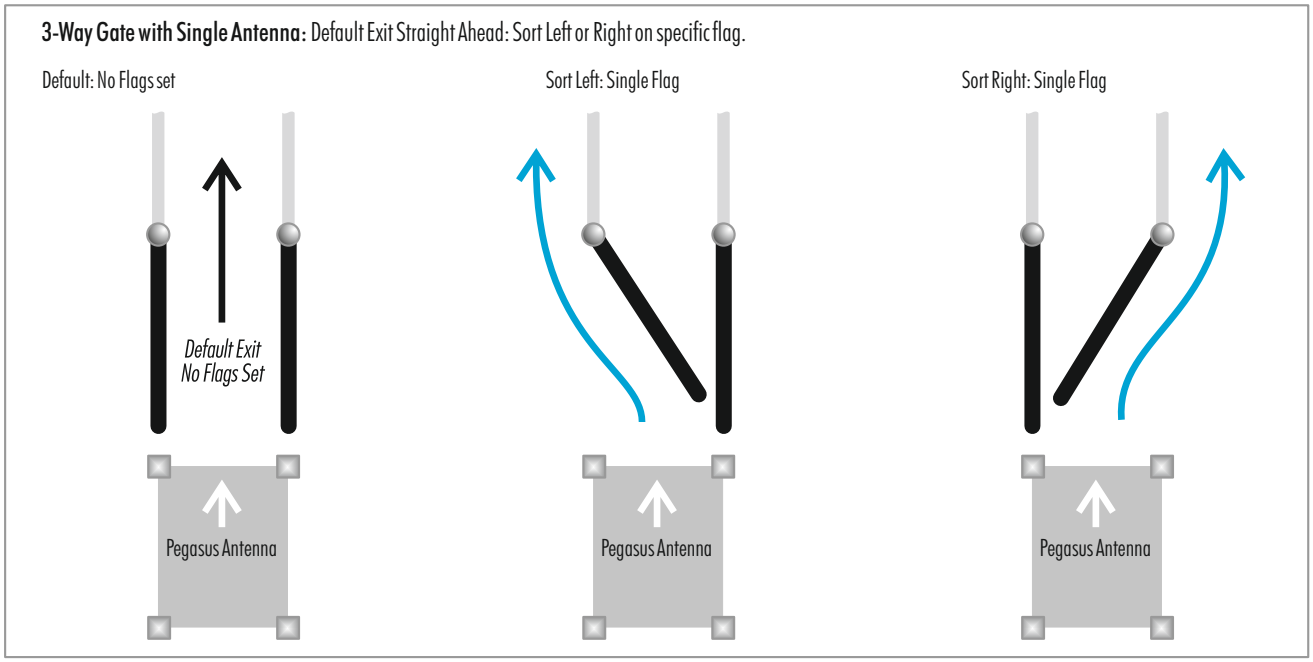
Position the Pneumatic Unit adjacent to the Pegasus Interface Unit - a single cable connects them - and as close to the gate as possible to keep the air lines short.

2-Way Sorting Gate Layouts





The default exit can be set to be either left or right and the sorted exit to be straight through.

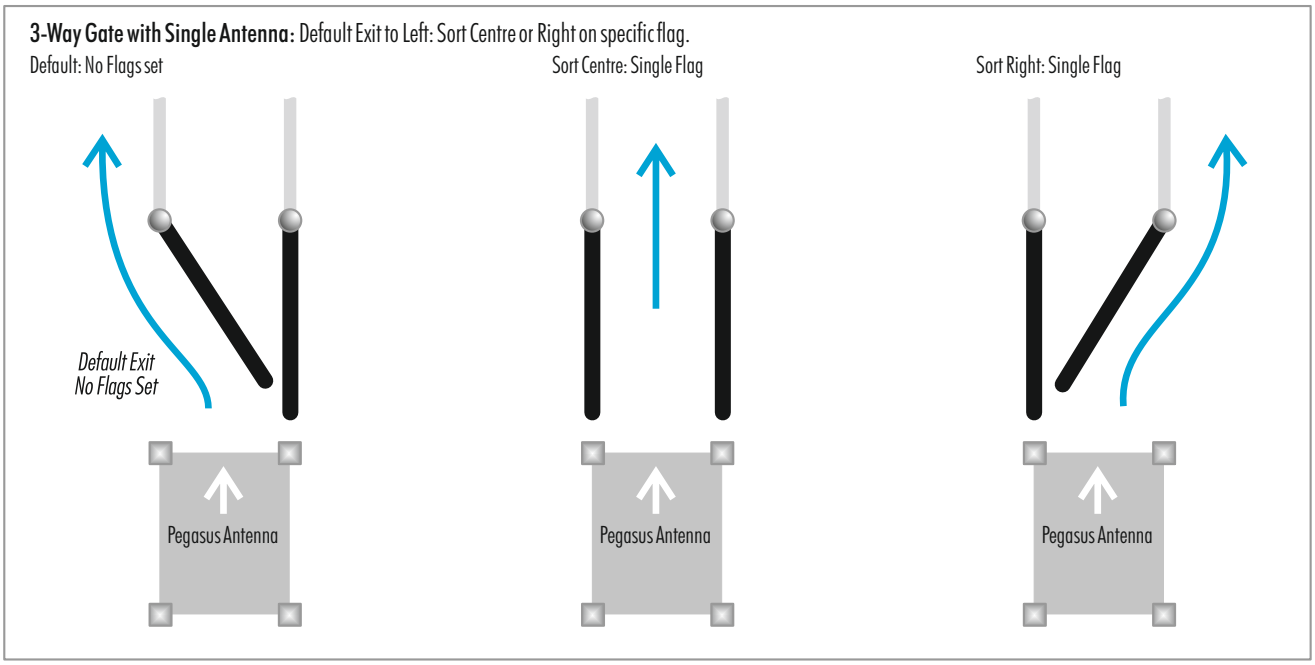


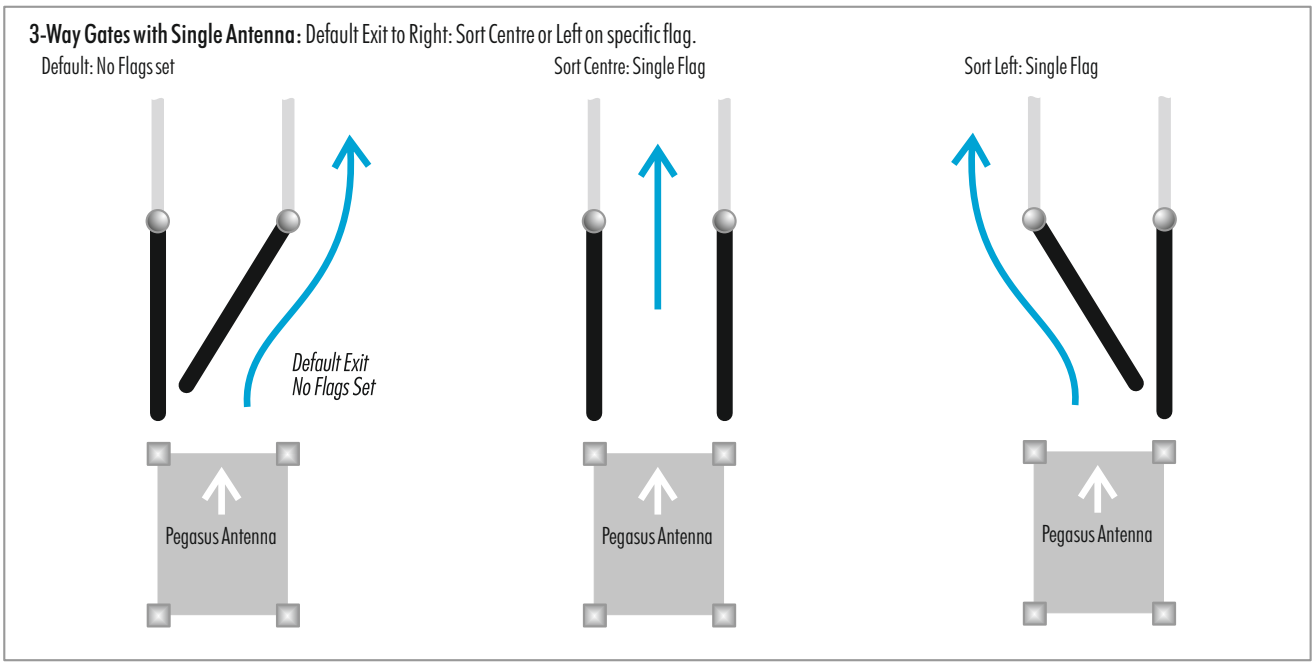
The 3-way gate option in the configurations shown requires only one Gate Interface, one 60W power supply and a MicroM5

The gates *must* be positioned close to the antenna using the positioning guidelines. If a sorting position is required further along the 'route', it will require an additional antenna and interface.

2-way gate systems sorting left or right will operate with either of 2 flags set so, for example cows with either *or both* 'VET' and 'AI' set will be sorted into a common holding area providing those flags are selected on the Interface switches.

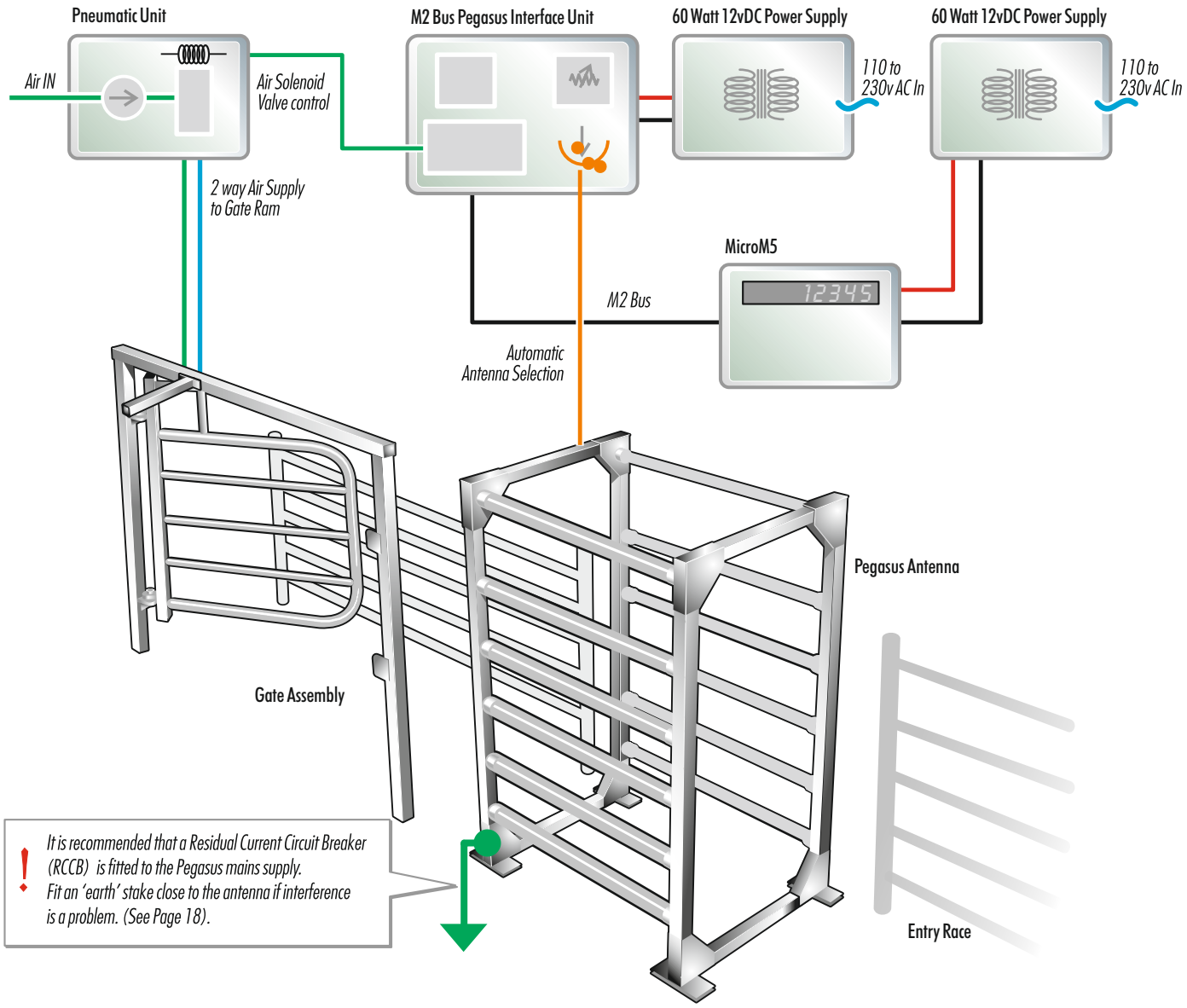
3-Way Sorting Gate Layouts





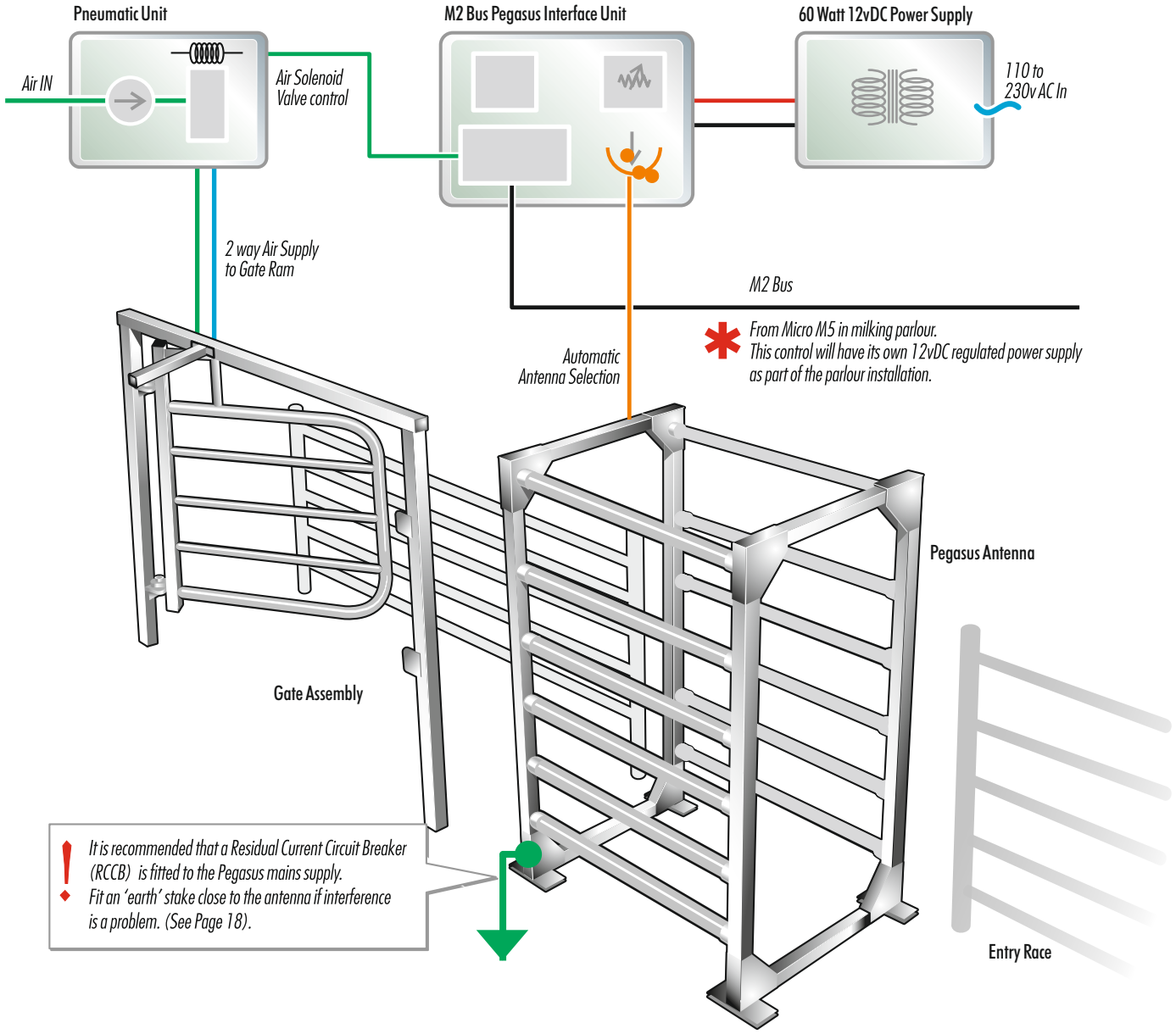
3-way gate systems have 2 sort exits each operated by a different flag. The flags are set on the Interface switches with Gate 1 having priority. So, if the sorting flags are selected as 'VET' and 'AI' with the 'VET' flag being sorted through Gate 1, a cow with both flags set will be sorted to 'VET'

M2 Bus Pegasus Sorting Gate with Dedicated MicroM5 Control



Do NOT mount any of the electronic controls or power supplies on the Antenna, Gate or any of the Races. Vibration from the gate and passing animals will alter the tuning and could damage sensitive components.

M2 Bus Pegasus Sorting Gate with Micro M5 Control in Milking Parlour



Do NOT mount any of the electronic controls or power supplies on the Antenna, Gate or any of the Races. Vibration from the gate and passing animals will alter the tuning and could damage sensitive components.

Pegasus Portal Antenna: Siting Considerations

Individual rails or races: *Generally OK but ensure a gap of 6 inches (150mm) minimum between the rails and the antenna. Do not drill, bolt, clamp or weld rails to the antenna.*

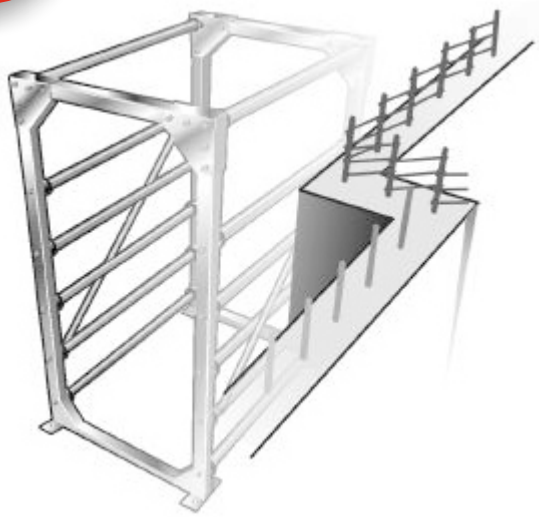
Half loops in which the sides of a race are connected but the legs are separate: *Leave a gap of about 6 inches (150mm) minimum between the loop and the antenna. However, problems can occur if the loop anchor bolts penetrate hidden floor reinforcement creating an electrical 'loop'.*

Loop and mounting plate form a complete electrical 'circuit': *Definitely not! This is in effect an electrical 'circuit' which will distort and weaken the magnetic field set up by the antenna - making it unusable!*

Stanchions, RSJ's and building girders: *Vertical metal posts do not normally affect the antenna, but if they are supporting steel panels, wire fencing or metal rails and are too close, they will cause performance deterioration. So, leave a minimum clearance of 24 inches (600mm).*

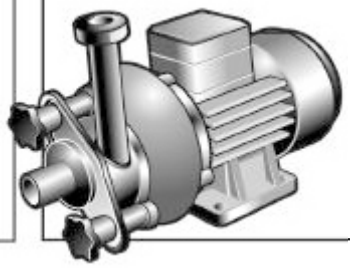
Pegasus Portal Antenna: Siting Considerations Continued

Reinforced walls: *Number one enemy - because the steel reinforcement rods and mesh are hidden... and usually forgotten. Check for metal in the walls with a detector rather than relying upon memory or trusting to luck! Steel reinforcement may affect performance.*



Motors, solenoids, variable speed drives (VSD), variable frequency drives (VFD), invertors and generators: *Stop-start. Stop-start. And every stop induces a massive transient on the mains whilst every start draws precious current away from any other device sharing the power lines. Keep the antenna at least 6 feet (1.8 metres) from*

electric motors, solenoids and generators - and that includes tractors and automobiles with alternators, automatic gates and doors and pulsating solenoid valves. NEVER share a mains supply with an electric motor, especially those which include a speed control.



Give power cables a wide berth: *There are no simple rules for coping with power cables - other than keep as far away as possible; accept running the mains up to the power supply unit. Some lighting systems can spoil the antenna's performance, so if results are unpredictable, check out the mains and the lights.*

For variable speed drives (VSD), variable frequency drives (VFD) and invertors, please see separate section.

...And here are some other situations that could cause trouble:

Local Radio and 'phone' masts: *Mobile telephones don't affect Pegasus - they don't transmit at the same frequencies - but sheer power alone could cause data instability.*

Hand-held readers: *Although the reading range of hand-held readers is quite small - a dozen or so inches at most - close to the antenna there could be conflict and performance degradation.*

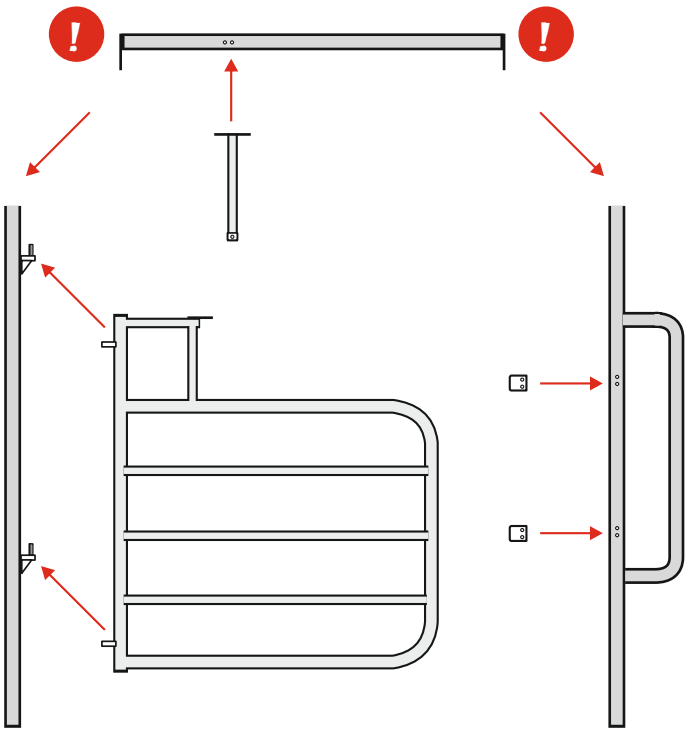
Office equipment: *Tv's, computers, faxes and all the other office gizmos - probably not a problem in themselves but monitors, especially two close together, can swamp the antenna field. Some machines use switched mode power supplies which work at a frequency very close to TIRIS and can reduce reliability.*

Toll routes, parking lots and product tracking: *Texas instruments' systems are used for toll charging, parking and vehicle keys. So if you are near a toll road watch out for interference and avoid tuning the antenna with tagged keys in your pocket. If you have bulk deliveries they may be tracked by electronic tagging; check them out with your supplier. And watch out for other readers which work at frequencies close to 134.2kHz.*

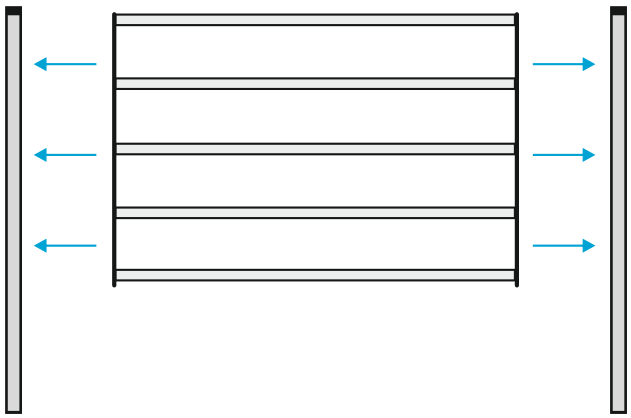
Fitting The Gate Frame and Gate Fence Together

The gate frame is supplied as seven separate parts complete with all necessary fixings.

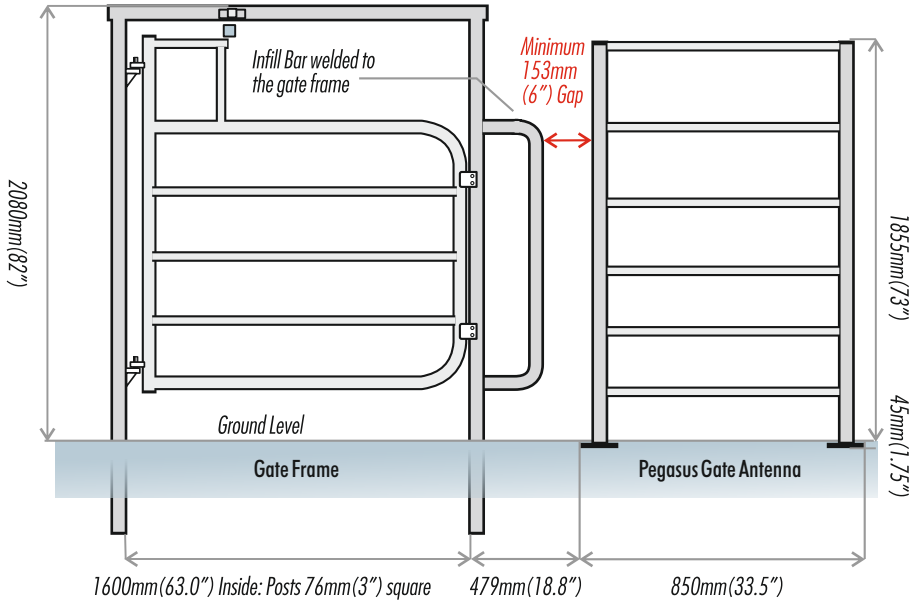
The flanges on each end of the top rail of the gate frame must be on the outside of the uprights otherwise the gate will not fit together correctly.



The gate fence and entry race (optional extra) are supplied in 3 separate parts complete with all necessary fixings.



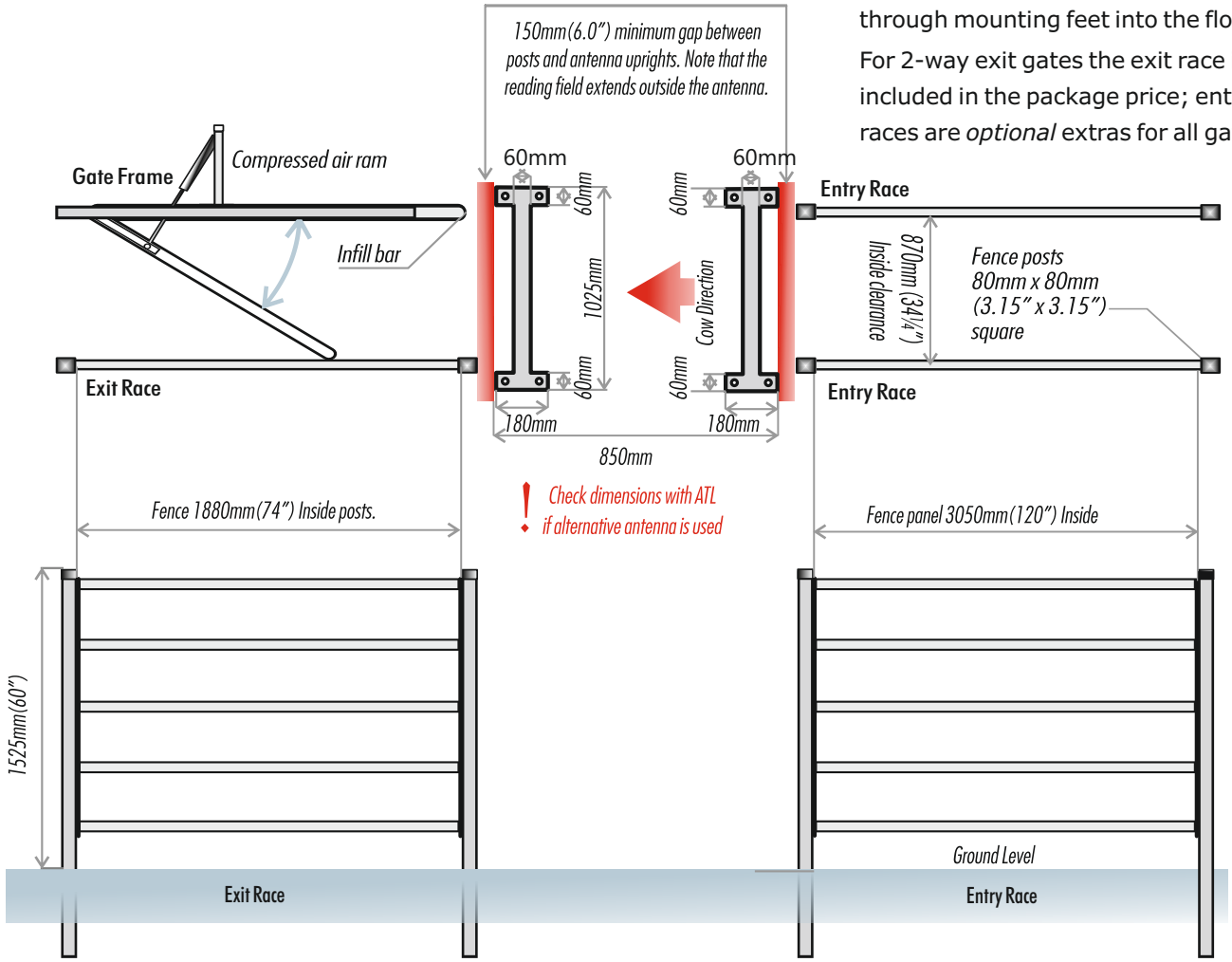
2-Way Sorting Gate with the Pegasus Walkthrough Antenna



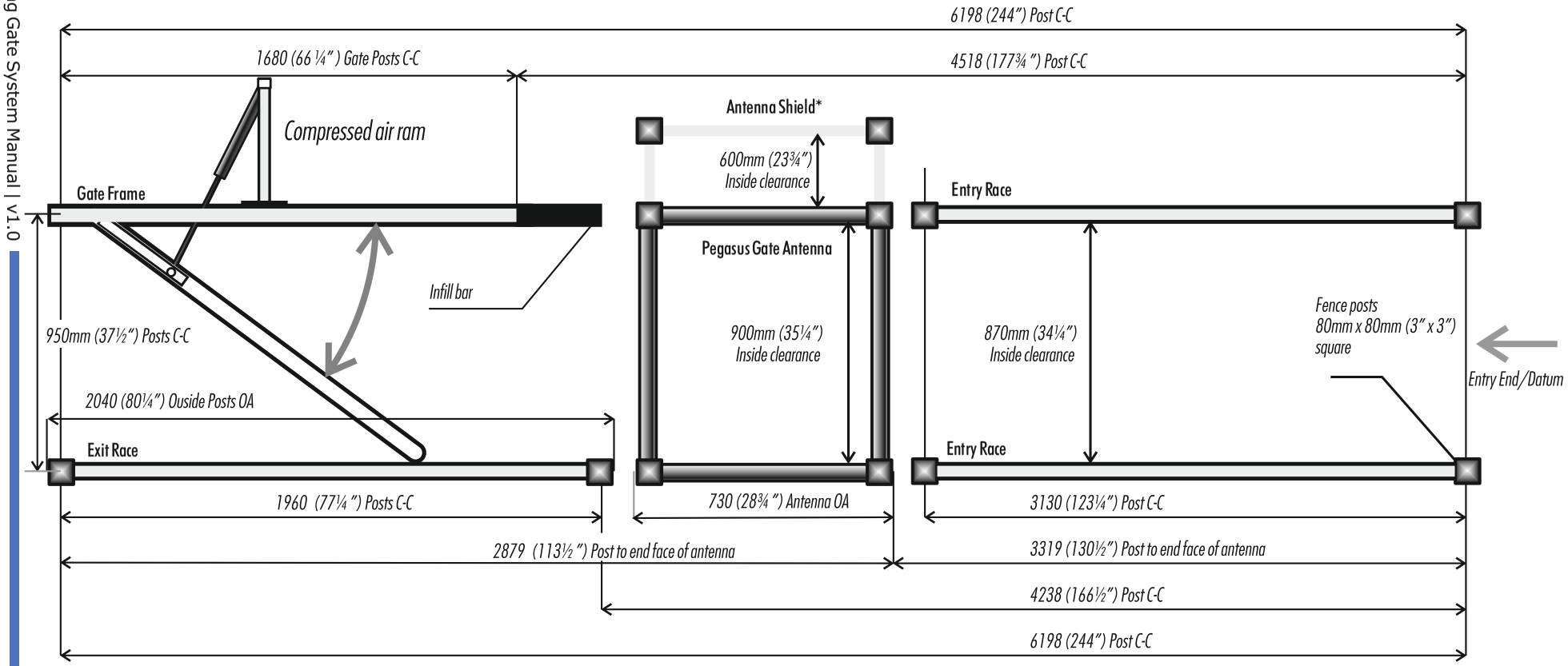
Designed for compressed air operation, the basic gate unit may be positioned on either side of the 'race' to suit the yard layout. The gate stop plates are secured by two bolts to either side of the frame. The fences are supplied as panels comprising 5 bars of 48mm galvanised steel tube welded to flat end supports. Posts (80mm x 80mm square galvanised steel) are supplied separately, pre-drilled to suit the fence panels. The gate frame is supplied pre-drilled in seven separate parts. Nuts and bolts are included.

There must be a minimum of 150mm (6") between the antenna uprights and any adjacent steelwork. The antenna is secured with 8 x M10 x 75mm expanding bolts (supplied) through mounting feet into the floor.

For 2-way exit gates the exit race is included in the package price; entry races are *optional* extras for all gates.

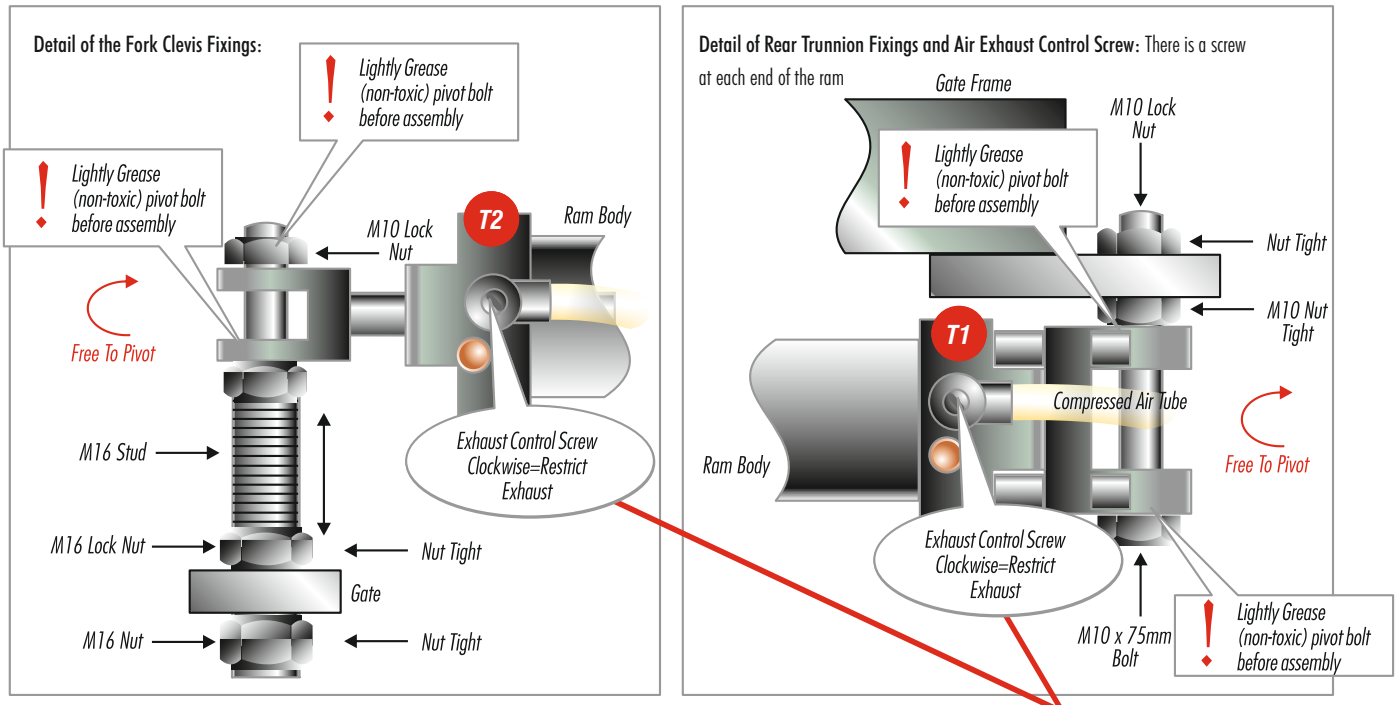


2-Way Pegasus Sorting Gate System Dimensions



C-C - Centre to Centre
OA - Overall
NB - The Entry Race is an Optional Extra
* Antenna shield required if cows have access to outside of antenna once sorted, prevents antenna from reading ear tags and allowing cows to walk back down the race - not supplied by ATL.

Fitting the Compressed Air Cylinder onto the Gate Frame



The Fork Clevis on the end of the rod is fitted to a similar lug on the moving gate by one M16 stud, one M10 lock nut and two M16 nuts (all fixings are stainless steel). The M16 stud allows for adjustment and corrects any slight mis-alignment in the fixing points (i.e. If gate is slightly sloping in the gate frame).

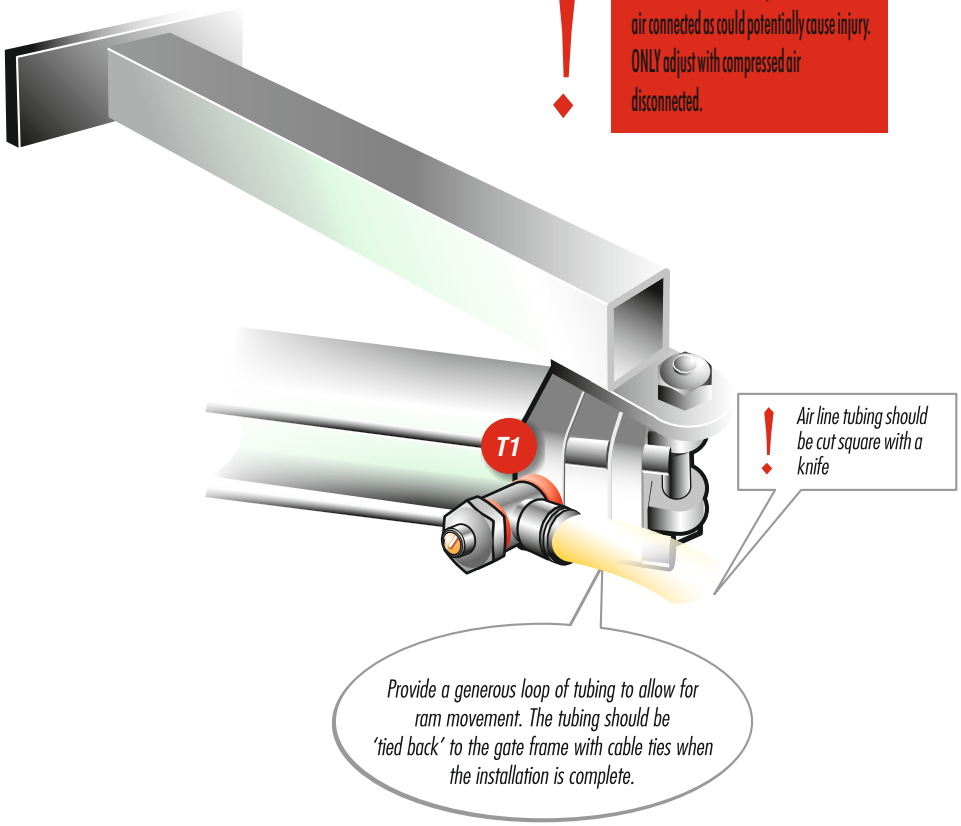
The ram support projects from the side of the gate frame and terminates in a lug. The Rear Trunnion of the Air Ram is secured to the lug by one M10 x 75mm bolt, one M10 nut and one M10 lock nut (all fixings are stainless steel). Ensure that the nuts are fully tightened without 'pinching' the Ram yoke.

Lightly lubricate the bolts with non-toxic grease before assembly.

There are 2 tube connectors on the ram; in the illustrations they are marked T1/T2 both at the Pneumatic Unit and at the ram. Connect T1 to T1 and T2 to T2 for normal operation.

On the end of each connector is a small Exhaust Control Screw which 'throttles' the air flow and smooths the gate movement. Together with the Pressure Regulator, they may also control the speed of opening and closing.

Do NOT unscrew with compressed air connected as could potentially cause injury. ONLY adjust with compressed air disconnected.



2-Way Sort Gate Pneumatic Unit

Compressed air enters the Pneumatic Unit casing through a gland on the left hand side, passes though the Pressure Regulator and into the solenoid valve. Two tubes leave the module on the right hand side and connect to the air ram.

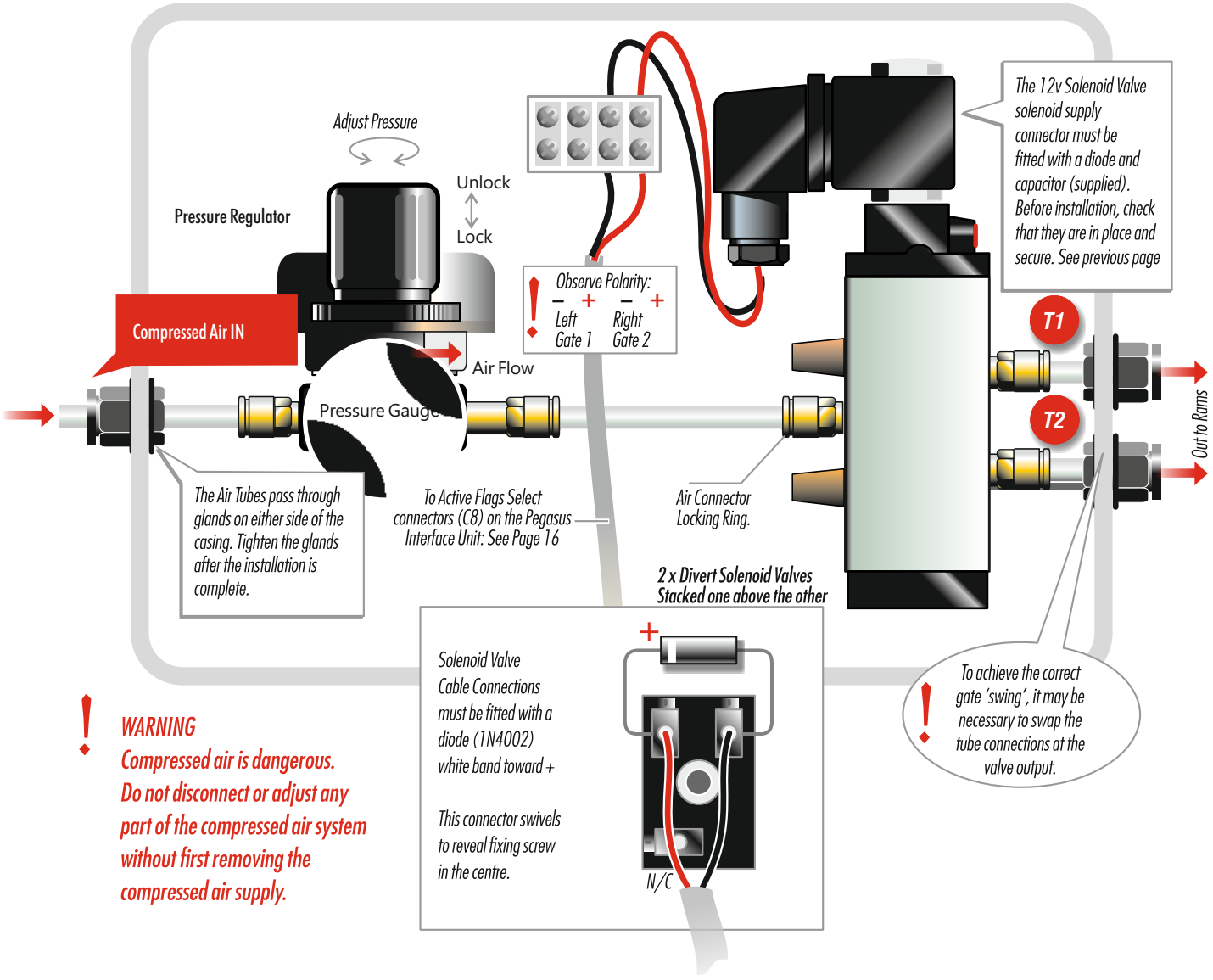
Six millimeter nylon tubing is used throughout; 30metres are supplied with every installation. The tube connectors are simply push fit and, providing the tube is cut clean and 'square' will make a rapid, air-tight connection. To remove a tube, press the locking ring down and at the same time pull the tube out of the connector. On the diagram the tubes are labelled T1 and T2; follow this connection arrangement for normal operation.

The air supply must come from the compressor receiver; filtered air used to purge the milk lines should not be used.

Compressed Air Supply - 4 bar clean, dry air

Air Compressor Specification - Minimum 4 bar with 10 litre receiver tank

IMPORTANT: The Pegasus gate System is designed to run to 4 bar maximum - please note factory tested to 6 bar.



3-Way Sort Gate Pneumatic Unit

The Pneumatic Unit for 3-way gate systems operates in the same way as the 2-way gate unit except that the air line 'splits' after the pressure regulator to feed two solenoid valves stacked one above the other. Each solenoid valve has its own connections- 12v (+) Red and negative Black- to a four-way connector block fitted to the chassis. The polarity MUST be observed because diodes and capacitors are fitted inside the solenoid connectors.

Four glands- two for each of the solenoid valves- secure the air tubing as it passes through the enclosure wall. It may be necessary to swap the tubes to ensure correct gate swing.

6mm nylon tubing is used throughout; 30metres are supplied as standard with every installation. The tube connectors are simply push fit and, providing the tube is cut clean and 'square' will make a rapid, air-tight connection. To remove a tube, press the locking ring down and at the same time pull the tube out of the connector. On the diagram the tubes are labelled T1 and T2; follow this connection arrangement for normal operation.

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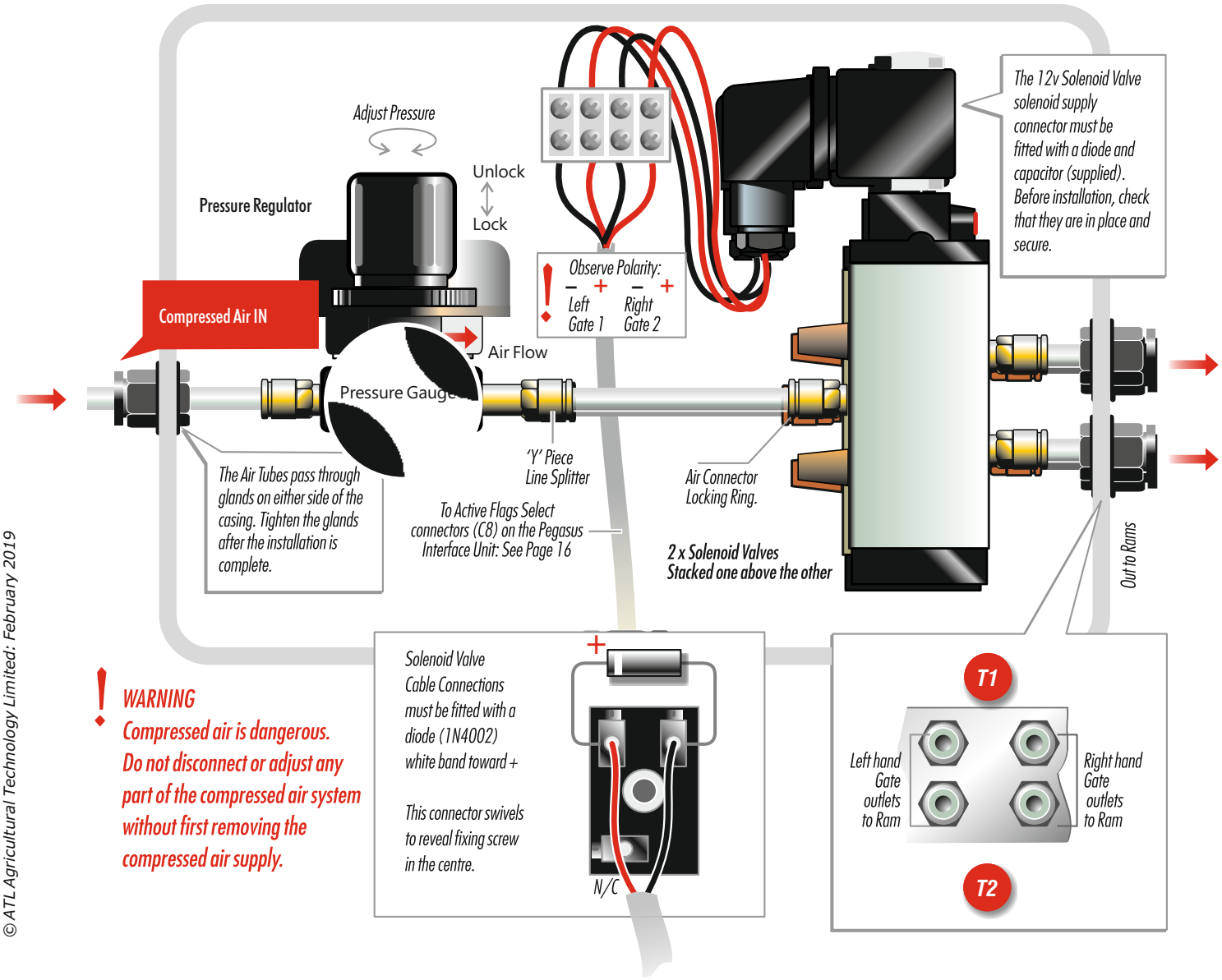
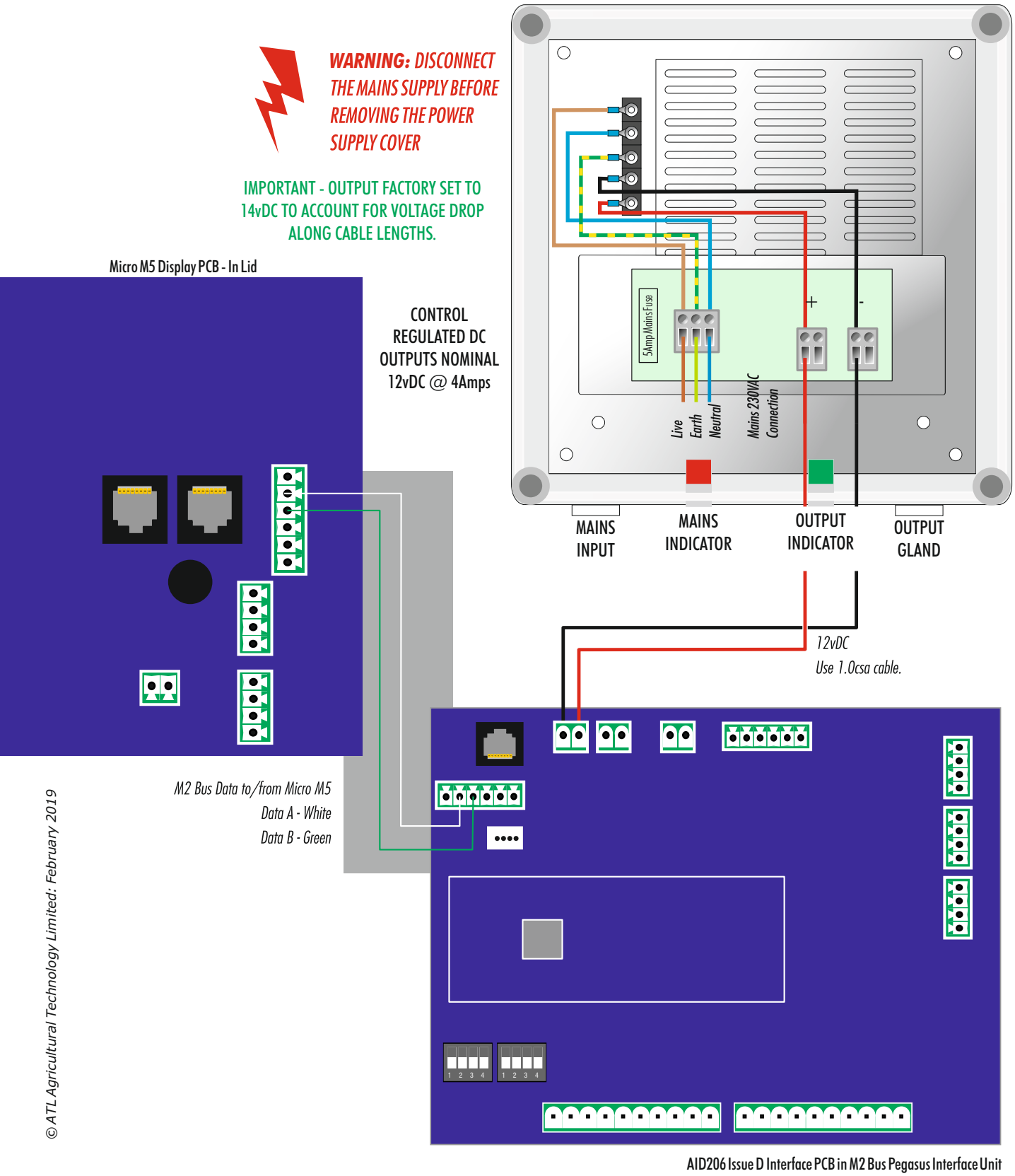
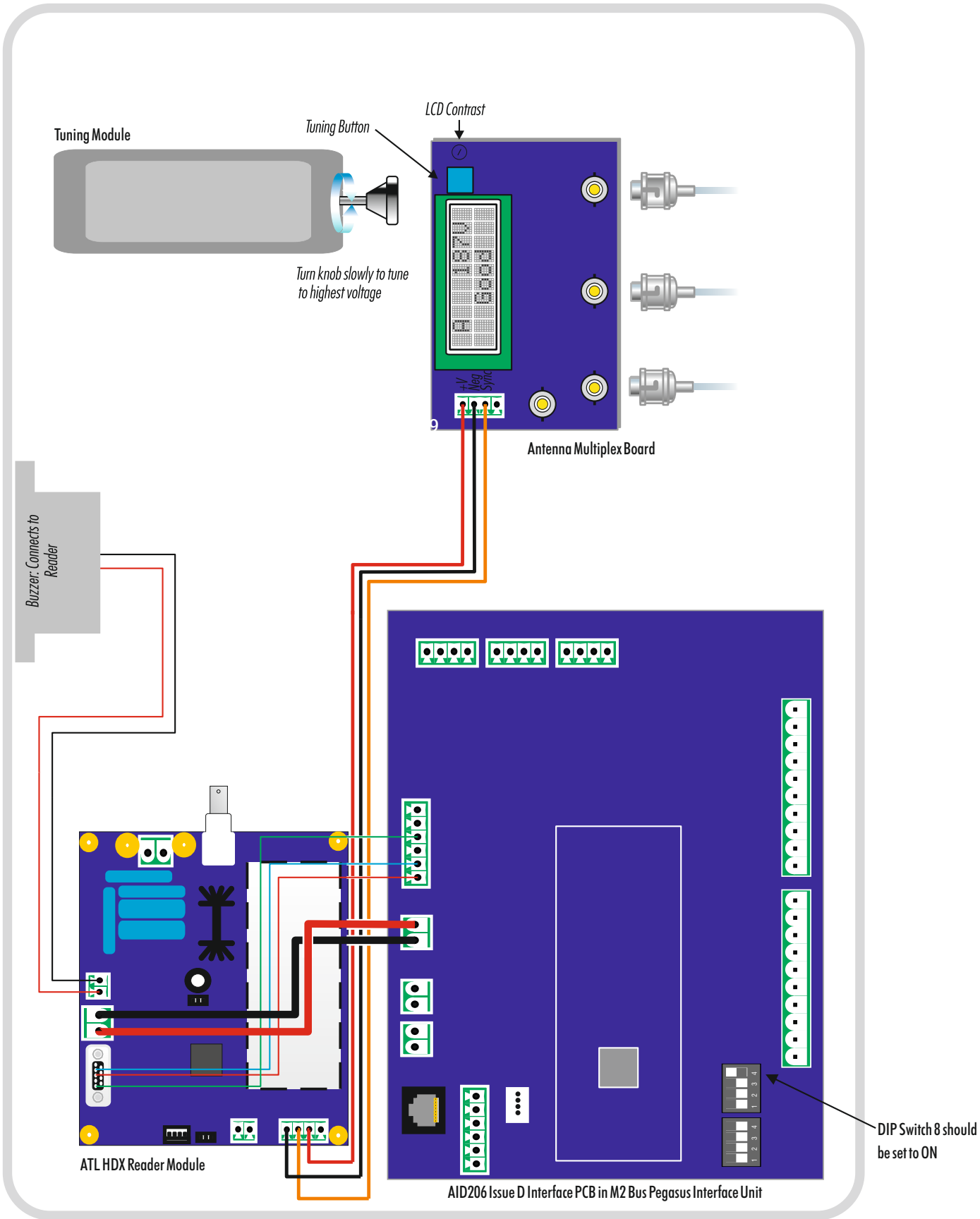


M2 Bus Pegasus Interface to 60 Watt 12vDC Power Supply Connections



AID206 Issue D Interface PCB in M2 Bus Pegasus Interface Unit

M2 Bus Pegasus Interface Unit: Connections: ATL HDX Reader with WLK148G Multiplex PCB

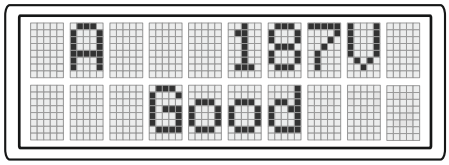


Tuning the Pegasus Antenna using the WLK148G Multiplex PCB

The top left corner displays which antenna is being scanned (A, B or C).

The top right hand corner displays the voltage output (vDC).

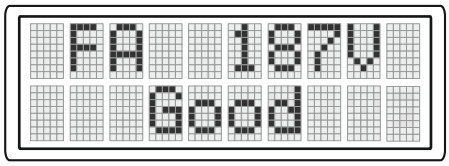
The bottom middle displays the condition of the output voltage.



The output voltage can have three possible outcomes:

1. LOW - This is shown when the output voltage range is between 0vDC and 90vDC.
2. OK - This is shown when the output voltage range is between 91vDC and 100vDC.
3. GOOD - This is shown when the output voltage range is greater than 101vDC.

Pressing the BLUE button to the side of the display allows testing on each of the 3 antennas.



1. Press the button once to see FA on the screen with the output voltage and condition display.
2. Press the button once to see FB on the screen with the output voltage and condition display.
3. Press the button once to see FC on the screen with the output voltage and condition display.

Use the tuning coil to get the best voltage possible. For tuning instructions, please refer to page 17.

Antenna Tuning

Refer to page 23 for instructions on using the LED screen and button control on the WLK148 Issue G PCB.

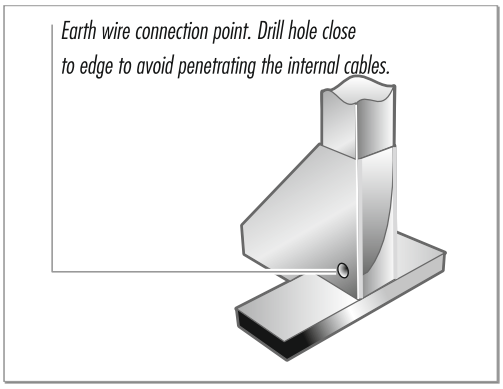
For tuning, turn the small knob on the side of the Tuning Module in either direction aiming to achieve the highest reading on the voltmeter. A 'high' reading of 50volts or less indicates external interference affecting the antenna's performance. Fitting an earth stake may be the solution (see below). Average readings in the range 80 to 130 volts are 'good'.

Repeat the process for Test 2 and Test 3 and then repeat the entire process to check that any voltage has not declined substantially. The windings do affect each other so some small reduction on voltages is likely.

Earth Considerations

In most situations the antenna will function perfectly from the first switch-on, but there may be local conditions- metal embedded in walls or floor, radio sources close by or general electrical radiation- which are not obvious at the initial survey but can affect performance. An indicator to 'below par' performance may be difficulty obtaining a high enough voltage during tuning. Earthing is often the solution to external interference.

The earth arrangement must be a dedicated earth stake driven through the concrete into the soil as close to the antenna as possible. This is connected to the antenna by heavy gauge wire (6.0csa) attached by an eyelet, nut and bolt to either of the four bottom corner braces. Drill the hole toward the outer edge of the brace so that it does not penetrate the internal cables.



Testing the Antenna Tuning with a Tag

There are three simple tests which determine the efficiency of the antenna; they should be carried out at the installation and then every week or so just to make sure everything is in order. If weekly checks are carried out then it's a good idea to maintain a notebook of results. Always use a wooden or plastic measure to check the read range.

Once installed and set up, there is little to go wrong with the antenna. If the read range at the ends or sides is reduced, suspect new equipment installations - especially similar RFID systems and motor circuits with speed controllers which *should be fitted with suppressors.* Faults within the most mundane fittings - flourescent lights for example - are likely to affect performance.

Test 1: End Range

Hold a tag at about mid-rail height, its face aligned with the end of the antenna and about 30" (76cm) away. Slowly move toward the antenna until the beeper starts to sound . Measure the tag position from the end frame: it should be about 24" (60cm). Repeat the procedure at the other end.

Test 2: Side Range

The same process as the End Range test but carried out from the sides. Keep the tag aligned with the side. Again, the range should be 24" (60cm). Repeat the procedure on the other side.

Test 3: Diagonal Read Rate

Hold a tag with the hole aligned with an imaginary diagonal 'drawn' from opposite corners as shown in the diagram (at 45 degrees to the ends, side and top). The beeper should sound rapidly.