atl

Pegasus

Portal Antenna Installation

United States 115volt

This is ***Pegasus****- *the* tag reading system especially designed for the livestock industry to bring greater reliability and consistency to animal identification.

Based upon Texas Instruments' ™ TIRIS ™ electronic tag and 2000 reader designs which are rapidly becoming the world standard, ***Pegasus*** provides the vital antenna component crucial to a dependable installation.

TIRIS ™ is a 'battery-less' system. The tiny tag receives its power from the radio waves generated by the reader and transmitted by the antenna. When a tag is powered up, it then becomes the transmitter sending out a stream of data, and the antenna becomes a receiver picking up the data. Passed on to the reader, the radio signals are converted to digital information which can be used by a computer. It is a truly ingenious arrangement.

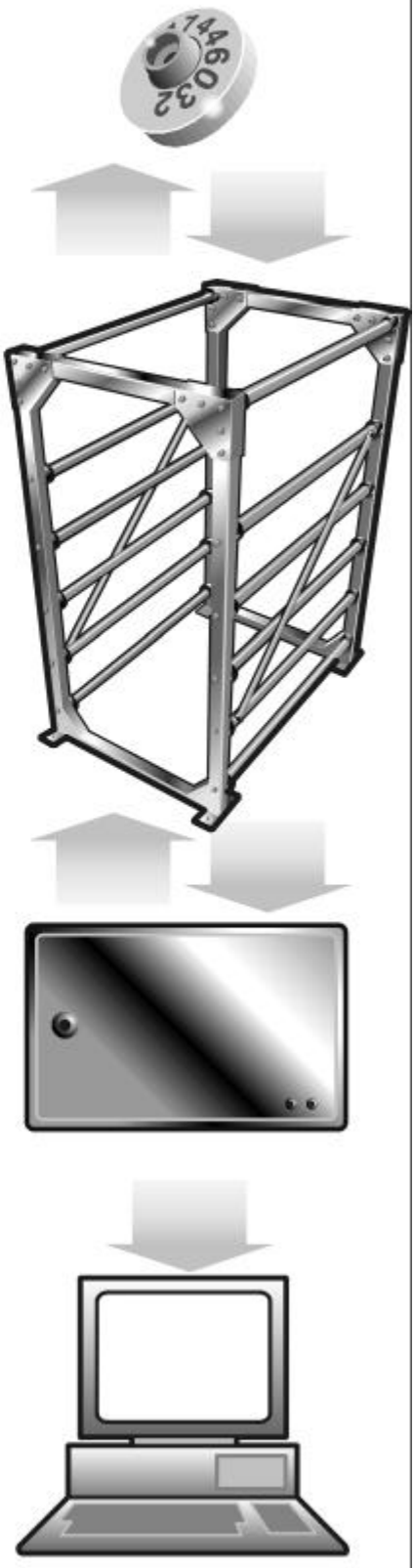
But the really clever part is the data itself. Each stream is uniquely derived from a pattern actually etched onto the microchip at the heart of the tag, so it is unvarying, never changing, always the same. If the data stream is unique then so too is the tag and the animal to which it is attached. Inimitable identification becomes a reality; no two animals will have the same ID number.

A carefully designed and constructed antenna is essential if the system is to work properly. It must be robust enough to rapidly deliver charging power to the tag and yet precise enough to receive its minute data signals. ***Pegasus*** is all this and more. Tag orientation- how the tag is positioned with regard to the antenna- has an important bearing upon the reliability of the charging-reading process. If antenna and tag are aligned then a 'read' is generally guaranteed, but turn the tag through 90 degrees and the chances decline pretty quickly. The tag data won't be wrong, it just will not arrive!

Sadly, animals cannot be trusted to present the tag to the antenna at just the right orientation so most of the ID systems before ***Pegasus*** failed to live up to their claims of 'unerring accuracy'.

Pegasus is a collection of antennas, neatly packaged in a tough, weatherproof steel frame, each carefully matched to the TIRIS ™ reader and each positioned differently from its neighbor so that together they virtually 'surround' the tag. Irrespective of the tag orientation, at least one of the ***Pegasus*** antennas will get a good read.

'Smart' electronics complete the system making sure that the antenna radio fields don't swamp each other and the data stream is delivered perfectly to the reader.



PegasusPortal

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

Pegasus 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.*

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 the antenna at a maximum distance of 3meters (10feet). The connecting cable, an integral part of the antenna, is sealed within a flexible conduit, and the multi pin connector is internally weatherproofed so neither should be altered. Mount the Control by its feet only positioned to be accessible but away from cattle. *Do not drill the casing or weld extra brackets to it.*

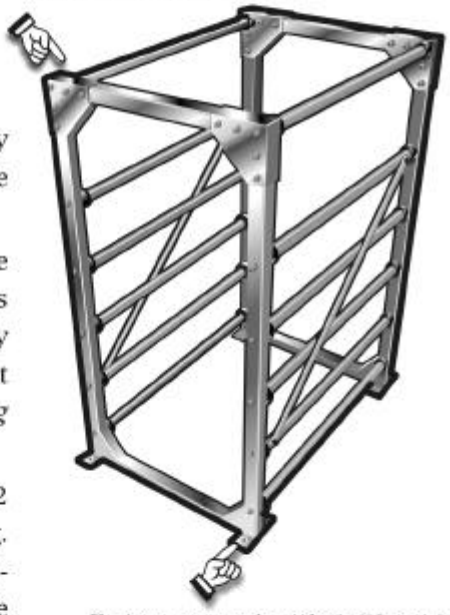
The antenna is secured by the holes in the feet using ½ inch or M12 expanding bolts into a proper concrete base or suitable timber decking.

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 State statutes and be installed by an authorized engineer.

Data is sent to a computer by a multi-core cable link using the standard RS232-C protocol. The cable must not extend further that 20meters (66feet) otherwise the signal will be affected. The cable must be high quality with an integral screen, specially designed for data transmission; ideally it should be enclosed in plastic conduit. The data connections are described later in this publication.

Software is not provided with the ***Pegasus*** system but is available through third party suppliers.

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-forcing metal in the floor.

atl 3

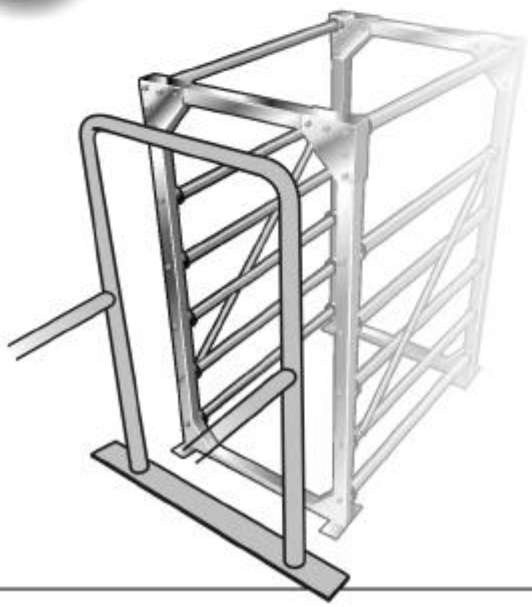
Pegasus Portal Antenna: Siting Considerations:

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.*

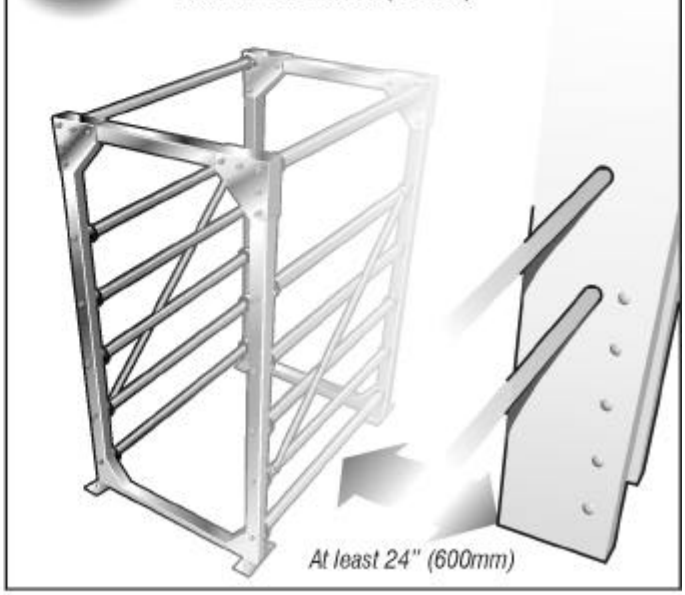
Half loops in which the two sides of a race are connected but the legs are separate: *Leave a gap of about 6 inches (150mm) minimum between the loop and the antenna.*

However, problems can occur if the loop anchor bolts penetrate hidden floor reinforcement creating an electrical 'loop'.antenna.

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 anterna- making it unusable!*



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

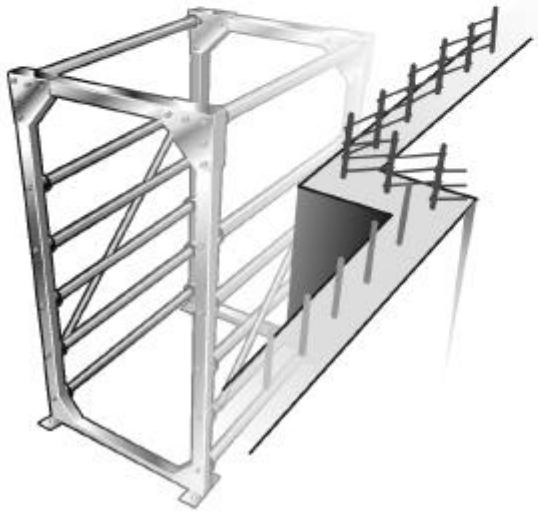


PegasusPortal

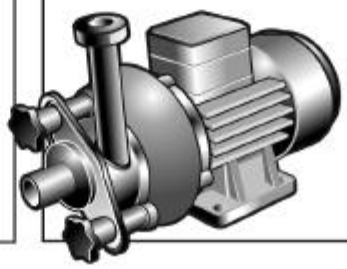
atl 4

Pegasus Portal Antenna: Siting Considerations:

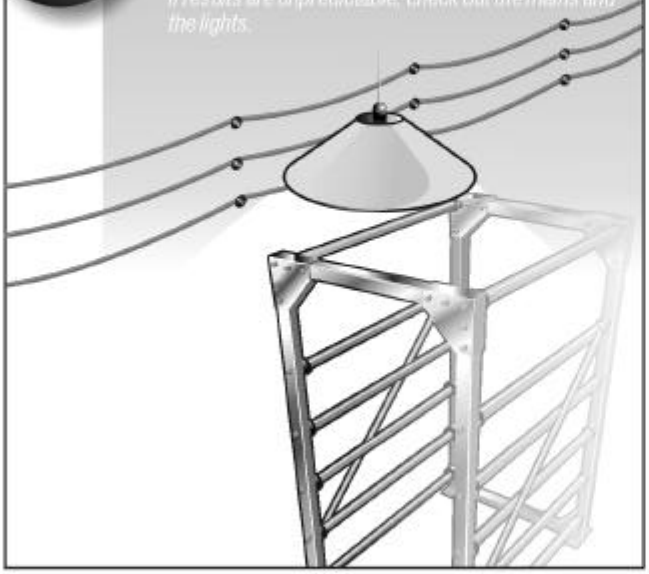
Reinforced walls: *Number one enemy- because the steel reinforcement rods and mesh are hidden... and usually forgotten. Check for metal in the walls with a detector rather than relying upon memory or trusting to luck! Steel reinforcement may affect performance.*



Motors, solenoids 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 (1.8meters) 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 commensurate with running mains up to the control unit. Some lighting systems too can spoil the antenna's performance, so if results are unpredictable, check out the mains and the lights.*



...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 TIRIS.*

PegasusPortal

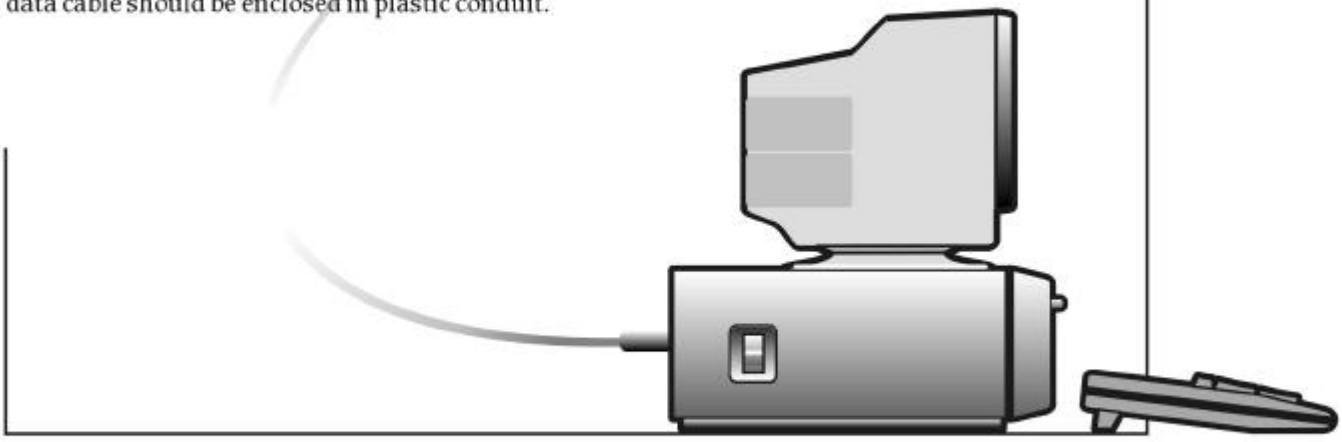
Connecting the Control Module to a Personal Computer:

The Control module is fitted with a moisture-resistant 9-pin 'D' plug wired to the TIRIS reader as shown on Page 13.

Using standard RS-232-C communications protocol which is an in-built feature of the TIRIS reader, data may be sent 66feet (20meters) to the computer. A high quality screened data cable terminated in high quality connectors are essential.

IMPORTANT:
Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

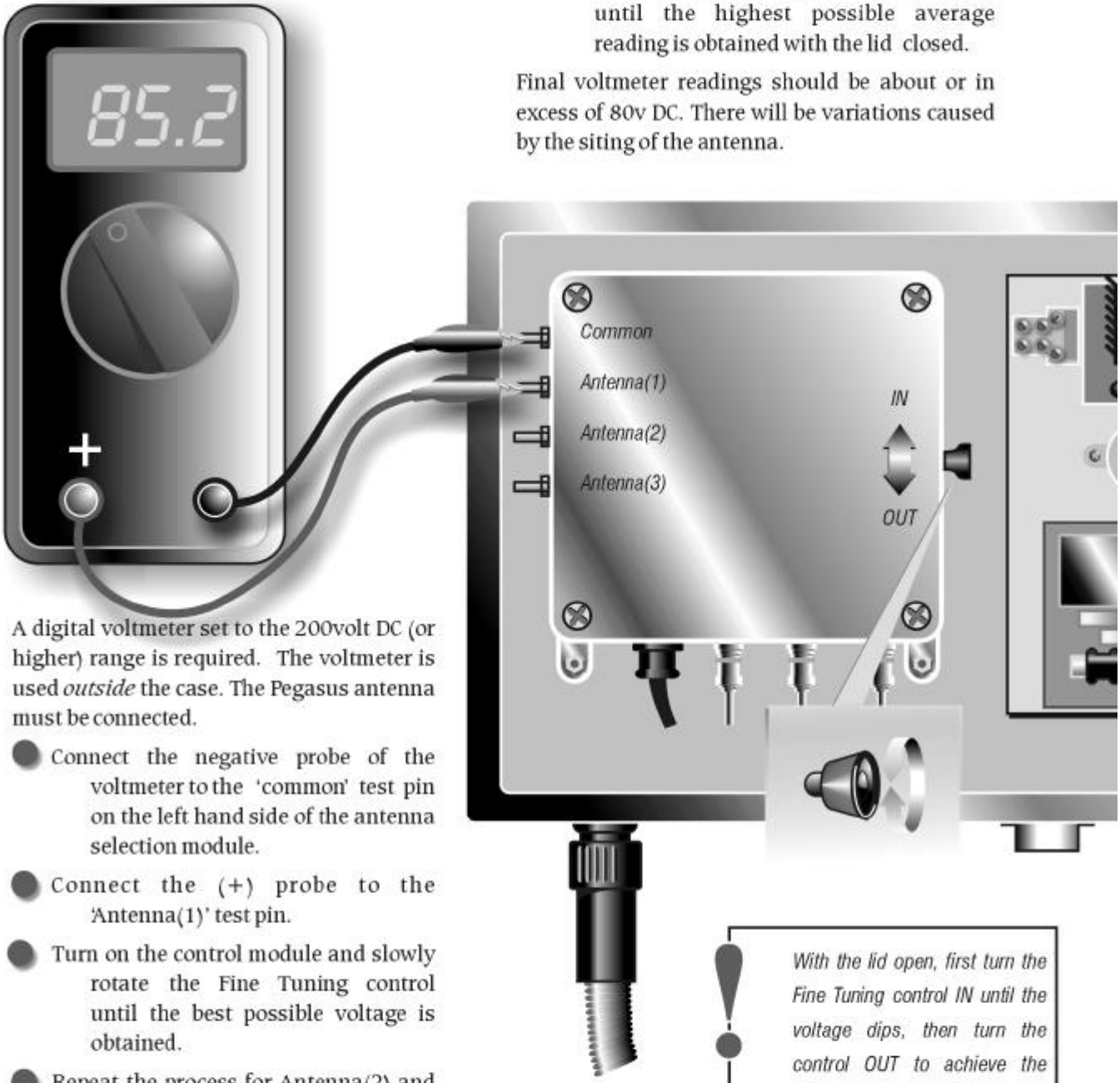
Keep the cable well away from AC and any other switched DC cables, especially avoiding situation in which cables run parallel to each other. The data cable should be enclosed in plastic conduit.



Control Module: System Tuning

If it declines, repeat the process until the highest possible average reading is obtained with the lid closed.

Final voltmeter readings should be about or in excess of 80v DC. There will be variations caused by the siting of the antenna.



A digital voltmeter set to the 200volt DC (or higher) range is required. The voltmeter is used *outside* the case. The Pegasus antenna must be connected.

- Connect the negative probe of the voltmeter to the 'common' test pin on the left hand side of the antenna selection module.
- Connect the (+) probe to the 'Antenna(1)' test pin.
- Turn on the control module and slowly rotate the Fine Tuning control until the best possible voltage is obtained.
- Repeat the process for Antenna(2) and (3) test pins aiming for the best average of all three antennas.
- Close the control lid gently taking care not to trap the voltmeter probe cables and re-check the reading.

With the lid open, first turn the Fine Tuning control IN until the voltage dips, then turn the control OUT to achieve the highest possible voltage. Finally, turn the control IN about half-a-turn which will compensate for the lid when it is closed.

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 installation and then every week or so just to make sure that 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- fluorescent lights for example- are likely to affect performance.

Test 1: End Range:

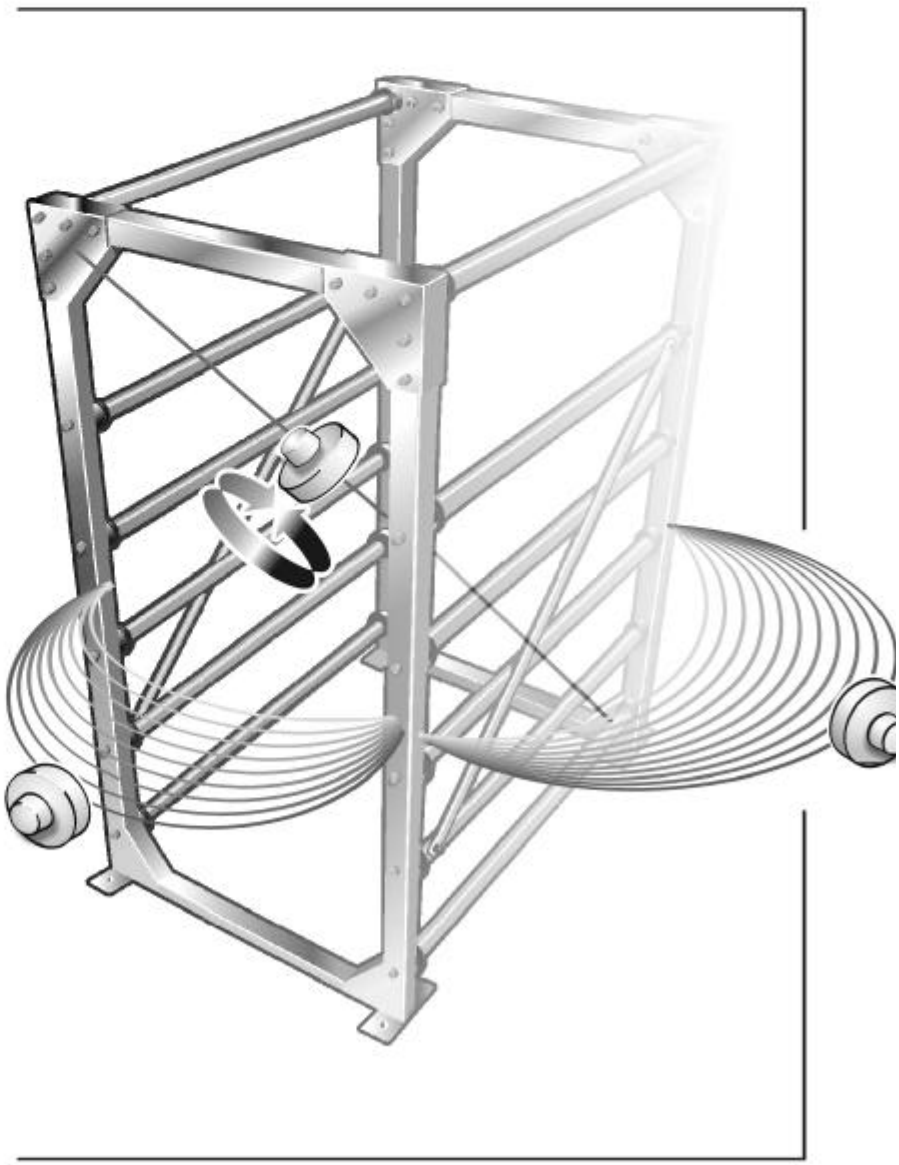
Hold a tag at about mid-rail height, its face aligned with the end of the antenna and about 30" (76cm) away. Slowly move toward the antenna until the beeper starts to sound or the GREEN LED on the front of the Control module flashes at one-third the rate of the RED LED. Measure the tag position from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

Test 2: Side Range:

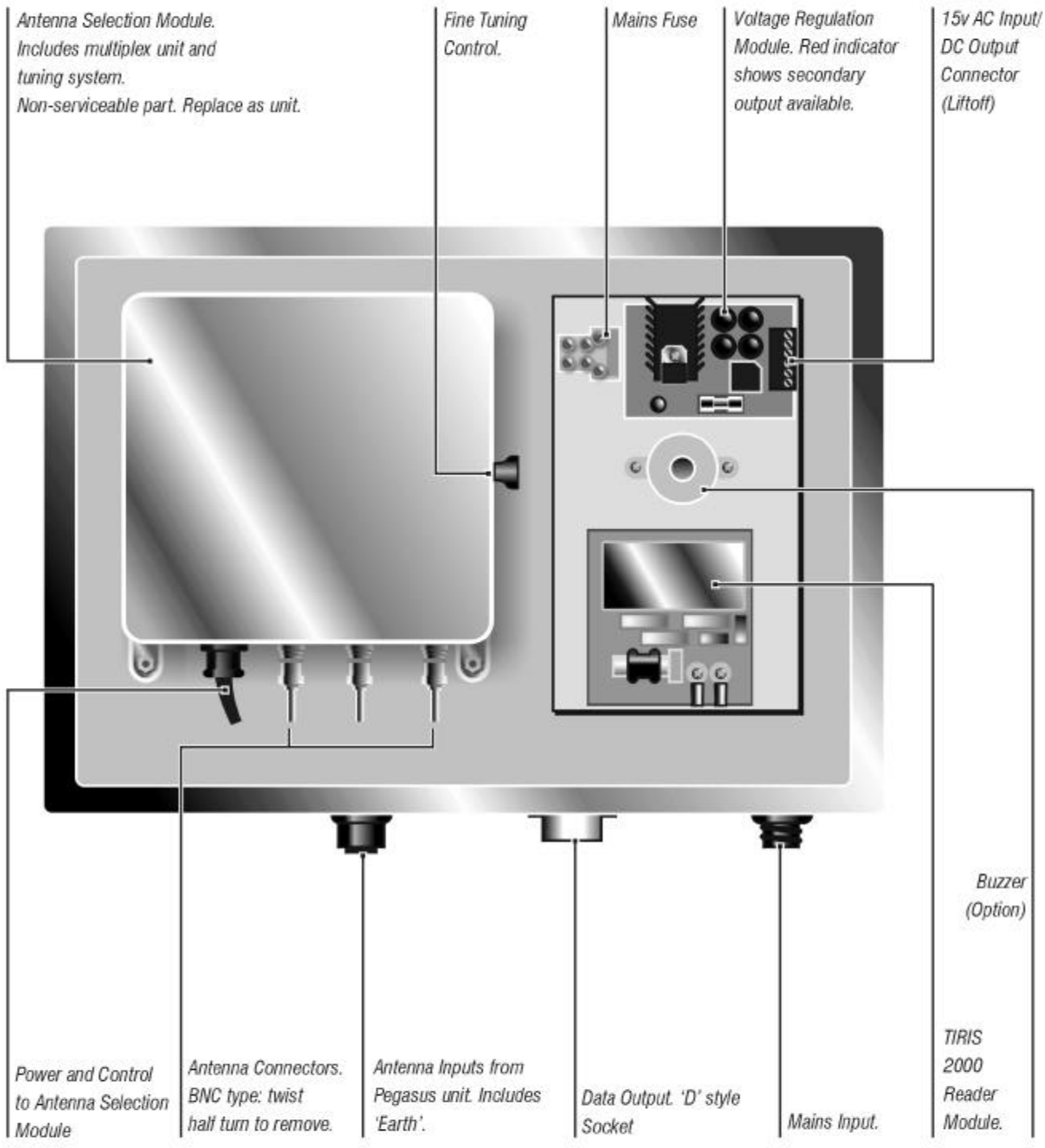
The same process as the End Range test but carried out from the sides. Keep the tag aligned with the side. Again, the range should be 24" (60cm). Repeat the procedure on the other side.

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° to the ends, sides and top). The beeper should sound rapidly or both LEDs flash at the same fast rate.

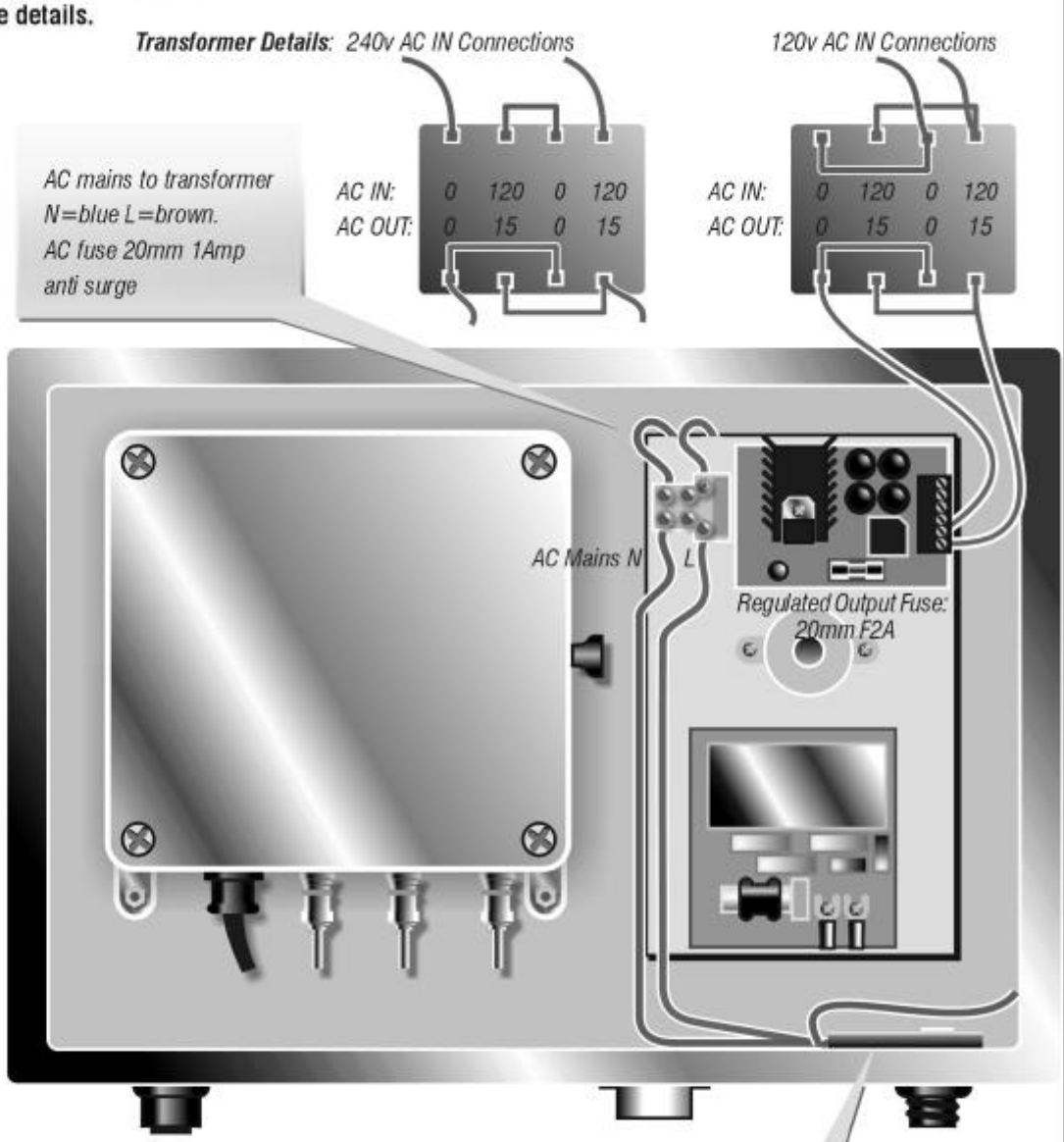


Control Module: Main Components



9

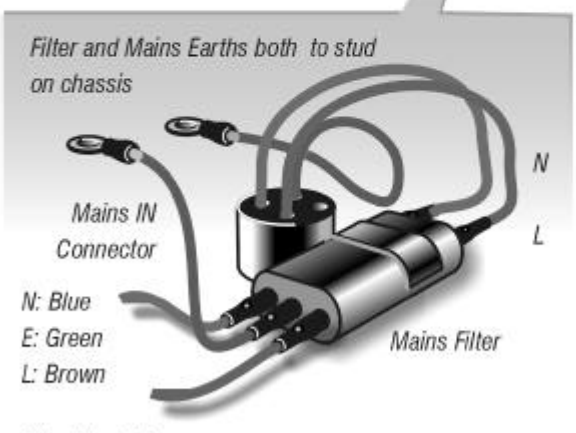
Control Module: AC Mains input and secondary voltage details.



Mains Input Connector

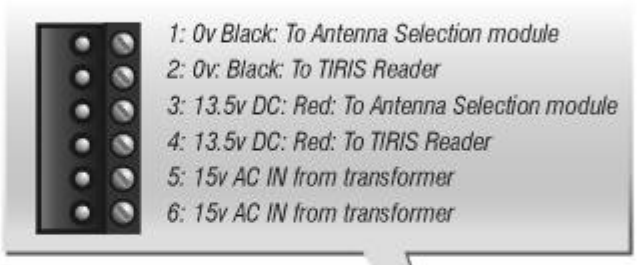
Viewed from outside enclosure

Check Voltage Label for correct local mains voltage before connecting



All cables 1.0csa

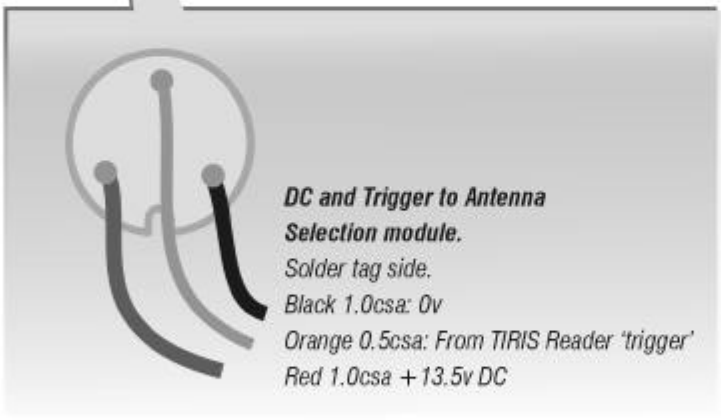
Control Module: DC Connections to the Antenna Selection Module and TIRIS Reader



1: 0v Black: To Antenna Selection module
2: 0v: Black: To TIRIS Reader
3: 13.5v DC: Red: To Antenna Selection module
4: 13.5v DC: Red: To TIRIS Reader
5: 15v AC IN from transformer
6: 15v AC IN from transformer

LED Indicators
Viewed from front
Read OK *Active*

Indicator PCB fitted to lid. From rear.

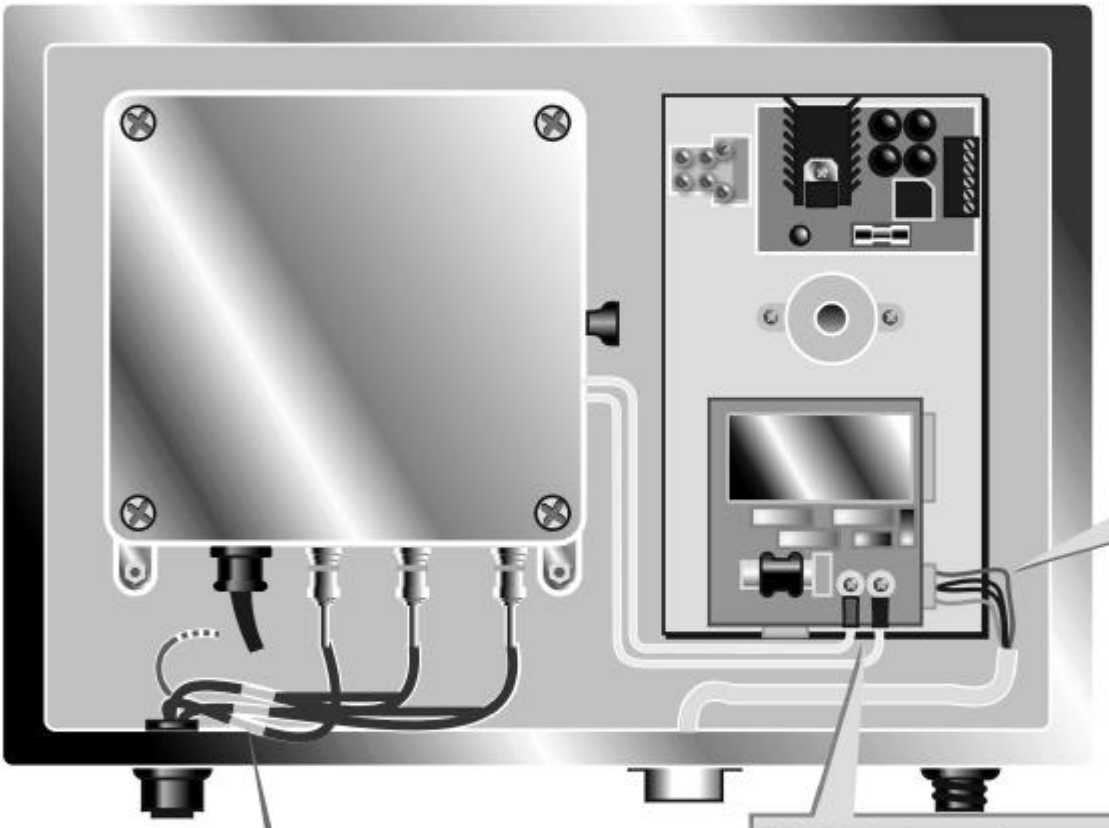


DC and Trigger to Antenna Selection module.
Solder tag side.
Black 1.0csa: 0v
Orange 0.5csa: From TIRIS Reader 'trigger'
Red 1.0csa +13.5v DC

The nominal 13.5vDC is wired red(+) and black(-) both in 1.0csa. Local signals from the TIRIS Reader are wired in 0.5csa. To remove the Voltage Regulation module, remove the AC mains connector and lift off the 6-way low voltage connector. Lift the PCB from its plastic pillars and pull off the earth connector at the transformer chassis.

The AC fuse is 20mm 1Amp Anti-surge (T1A) and the DC fuse is 20mm 2Amp (F2A).

Control Module: Reader, Data and Antenna connections



TIRIS Reader Data Connector.
This is a 4 x 0.22csa sheathed cable with a foil sheath and an overall lap.
Do not connect either foil or lap to ground.

Antenna Input Connector
The screens must be clamped to the case close to the connector.

TIRIS Reader Antenna Connectors
Two low-loss cables extend from the Antenna Selection module to the reader terminating in soldered eyelets. They are sleeved red and black; red must be connected to the 'ANT' screw on the reader and black to the 'GNDA' screw.

Control Module: Earth Connections

The primary Earthing point is the M6 Case Stud located on the right hand side of the casing toward the base.

0v is connected to Earth via the flying lead and a male 'blade' connector bolted to the transformer chassis.

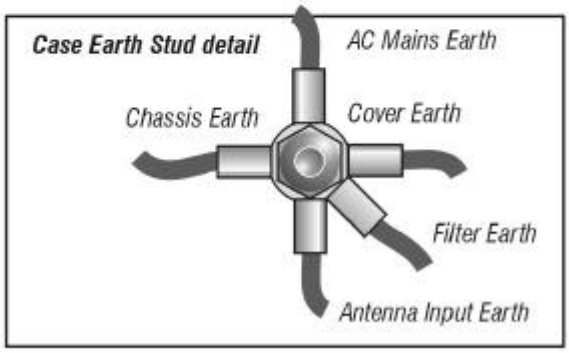
Chassis Earth: *Retained at chassis by self-locking nut(M6) then to case stud.*

Lid Earth: *Retained on lid by self locking nut(M6) then to case stud.*

Antenna Earth: *Centre pin of connector to case stud.*

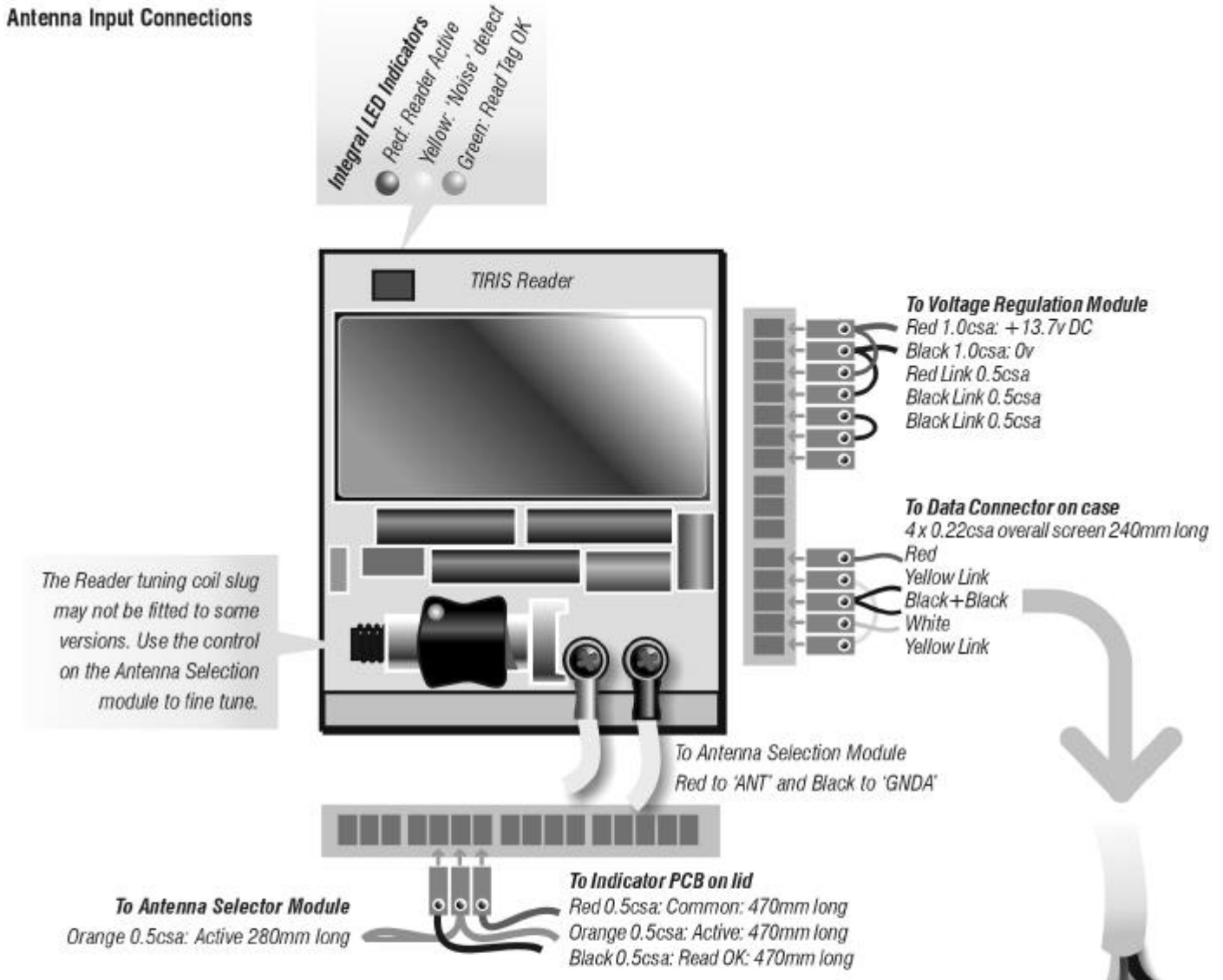
Filter Earth: *To case stud*

Mains Earth: *Primary fitted to case stud first. All are retained by a self locking nut(M6)*

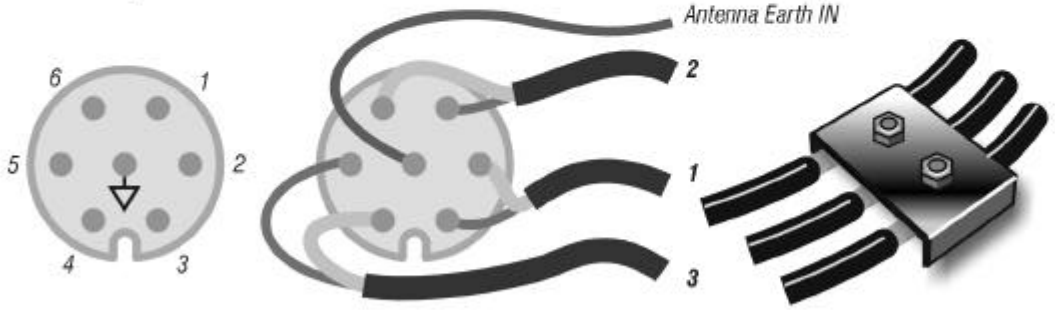


This equipment must be earthed

TIRIS 2000 Reader Connections and Antenna Input Connections



Antenna Input Connector

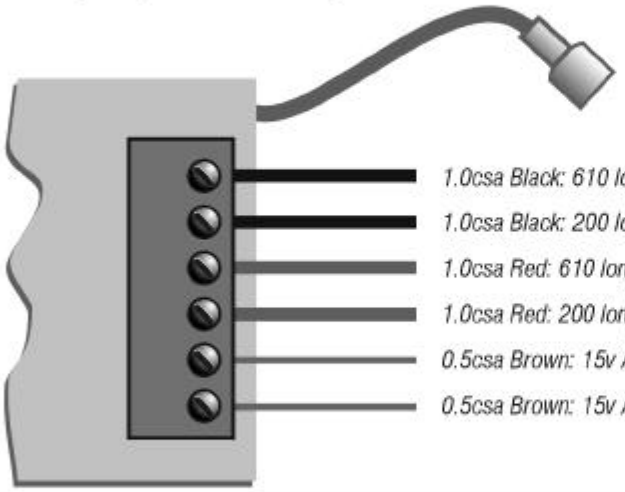


Pin Numbering and Antenna 'Tail' connections from outside

Detail of the screen Earth Clamp: Use M3 Nyloc nuts

atl 14

Voltage Regulation PCB: 6 way liftoff connector.



1.0csa Green: 110mm long soldered to 0v pads beneath PCB. Free end terminates in ¼ " female spade crimp which locates on male blade fitted to Transformer mounting bolt.

1.0csa Black: 610 long: 0v to Antenna Select module

1.0csa Black: 200 long: 0v to TIRIS Reader module

1.0csa Red: 610 long: +13.7v to Antenna Select module

1.0csa Red: 200 long: +13.7v to TIRIS Reader module

0.5csa Brown: 15v AC from Transformer

0.5csa Brown: 15v AC from Transformer

Eyelet Assemblies: *All Eyelets: 6mm Farnell part: 586-730 blue crimp*

Earth: Chassis to Case: 1.0csa Green: 160mm long:

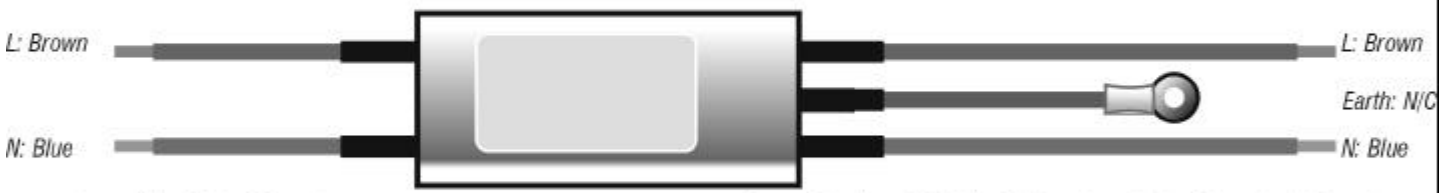
Earth: Case to Lid: 1.0csa Green 120mm long

Earth: Antenna Input Connector to Case: 1.0csa Green: 470mm long

Earth: Mains input connector to Case: 1.0mm Green 120mm long

Mains Filter: Roxburgh RX730

All cables 1.0csa: Soldered and sleeved with 3.2mm heat shrink black:
Output Earth is connected to case Earth stud.



Input side: Cables120mm long

Output side: L and N Cables 350mm long: Earth with eyelet 170mm long

---

Antenna Input Connector: Coaxial Tails to Selector module

3 tails each 320mm long terminated at one end with BNC connector (crimp)

November 12 2000

Product Specifications for the United States of America.

Pegasus Active Triple Field Antenna and Control.

Description: Purpose built 'portal' style antenna connected to a Texas Instruments TIRIS 2000 Reader via a patented multiplexing and tuning system.

Antenna:

Dimensions: 1890H x 1020W x 1330L mm: 74.5H x 40.25W x 52.5L inches nominal

Material: Galvanised or stainless steel.

Weight: 78Kg: 172pounds approximately.

Cables: 3000mm: 118inches enclosed in a flexible conduit and terminated in a 7-pin weatherproof plug. An 'earth' cable is integral.

Service: Not serviceable. Sealed construction.

Control:

Dimensions: 300H x 400W x 150D mm: 12H x 15¾W x 6D inches without fixings.

Material: Stainless steel.

Weight: 10.5Kg: 23pounds approximately.

Connections: Mains input 4-pin weatherproof panel plug: Free socket supplied.
Antenna input 7-pin weatherproof panel plug: Free socket fitted to antenna.
Data output sealed standard 9-pin 'D' serial: Free plug not supplied.

Service: Generally by module replacement and *only* by qualified service personnel.

System:

AC Mains: 115v/60Hz

Power: 20W max.

Frequency: 134.2KHz fundamental.

Transmitting: Burst sequential FM (fsk): 20KHz bandwidth. Charge burst of 50mS followed by a read and sync period of 40mS.

Comms: RS232-C communication interface. Protocol ASCII 9600Baud:8 data bits: No parity: 1 stop bit/ XON/XOFF enabled
Distance 20meters: 66feet.

Fuses: AC Mains 1A Anti-surge: T1A 20mm.
DC volts 2A F2A 20mm.

PegasusPortal