

6. EC and FCC regulations

Most electronic equipment produces some undesired interference at a close distance. To make sure the increasing numbers of electronic equipment will not cause harmful interference, the CE (Europe) and FCC (US) regulations state very low levels of interference that should not be exceeded. The AMB equipment does not exceed these levels.

The CE regulations also state the levels of interference generated by other sources which the equipment must be able to tolerate without malfunctioning. These levels are considerably higher than the interference levels produced by the electronic equipment itself. Cellular telephones however may generate interference levels which may cause other electronic equipment to malfunction. AMB made sure its equipment is insensitive to the interference generated by cellular telephones or other modern forms of personal radio communications.

The FCC regulations for Information Technology equipment which must be printed in the manuals state that you must tolerate interference produced by others and you must switch-off when interference produced by your equipment is experienced by others. The level of interference is strongly reduced when you increase the distance between two pieces of electronic equipment. For example: your portable radio will most probably experience interference when placed on top of your monitor, but will work very well a few feet away. Since the AMB transponders operate on magnetic induction they have no antenna, but a built-in coil instead. The transponders do not produce an electromagnetic (radio) wave but only a magnetic wave. The difference between an electromagnetic (radio) wave and a magnetic wave is that the electromagnetic wave travels by itself over great distances and the magnetic wave does not. As the distance increases the strength of the magnetic wave is greatly reduced. This is why AMB transponders are no transmitters.

This equipment complies with part 15 of the FCC rules. Operation is subject to the following two conditions: (1) This equipment may not cause harmful interference, and (2) this equipment must accept any interference received, including interference that may cause undesired operation.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected

EC Declaration of Conformity

The EC Declaration of Conformity is the method by which AMB i.t. declares that the AMB TranX260 system complies with the EMC directive (89/336/EEC) and low voltage directive (73/23/EEC).

The AMB active loop consists of:

- AMB TranX active loop
- Mains adapter 230 V AC/12 V DC

Applicable harmonised EMC standards

EN 55022
EN 50082-1

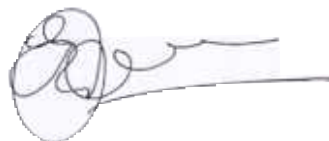
Class B, Information Technology Equipment
IEC 801-2 Electrostatic Discharge
IEC 801-3 Immunity to Radiated Electromagnetic Fields
IEC 801-4 Electrical Fast Transient, Burst
Low voltage directive

EN 60335

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***TranX160 Activated loop
upgrade MANUAL***

The AMB TranX 160 activated loop upgrade is specially designed to let an existing AMB TranX 120/160 detection loop function normally, but function as well as a beacon for the AMB DisplayIT.

The AMB DisplayIT, which is usually fitted to the steering wheel of a kart, detects the signal produced by the activated detection loop while passing the loop and indicates the actual lap time on its display.

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AMB i.t. B.V.

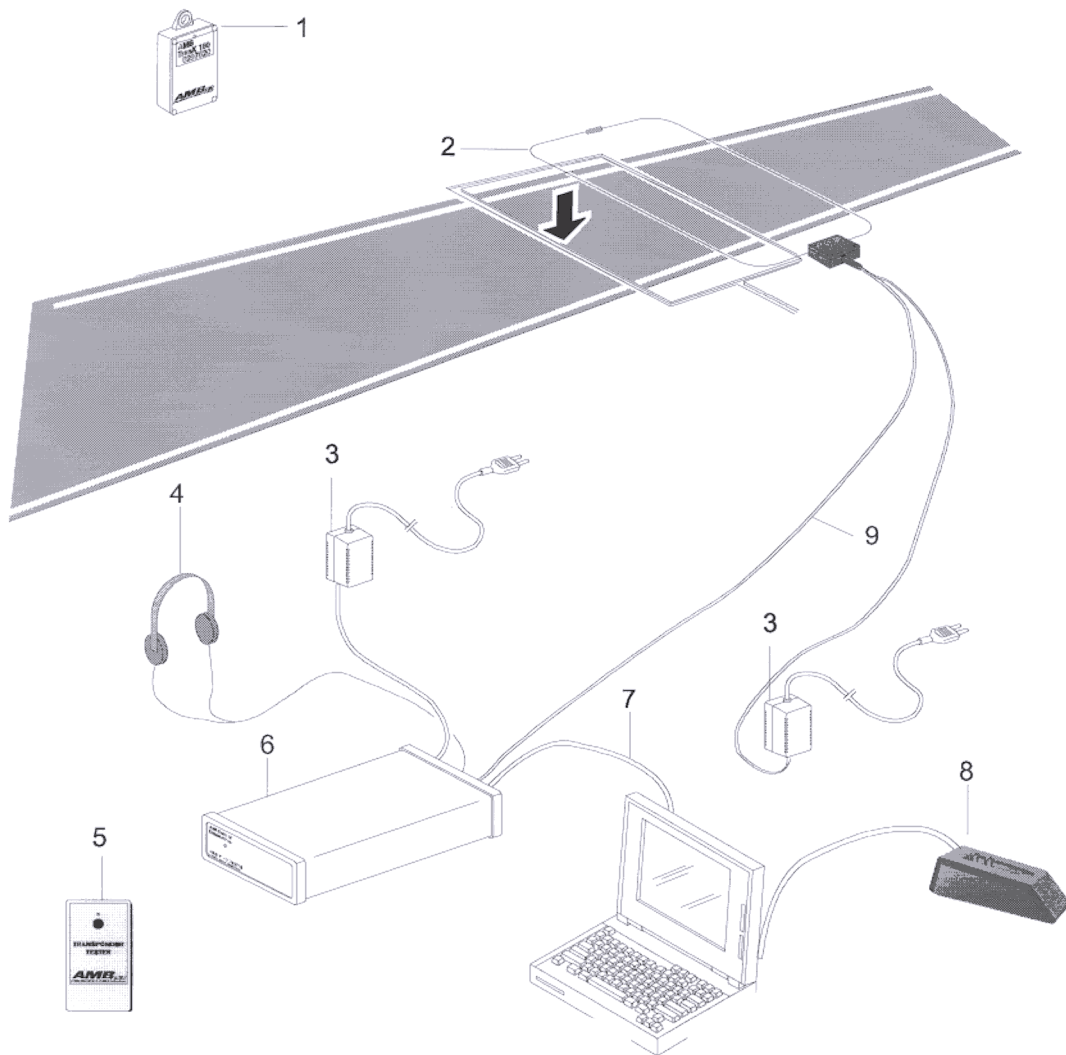
Manual number: AMB xxx/xx

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1. Components of the system

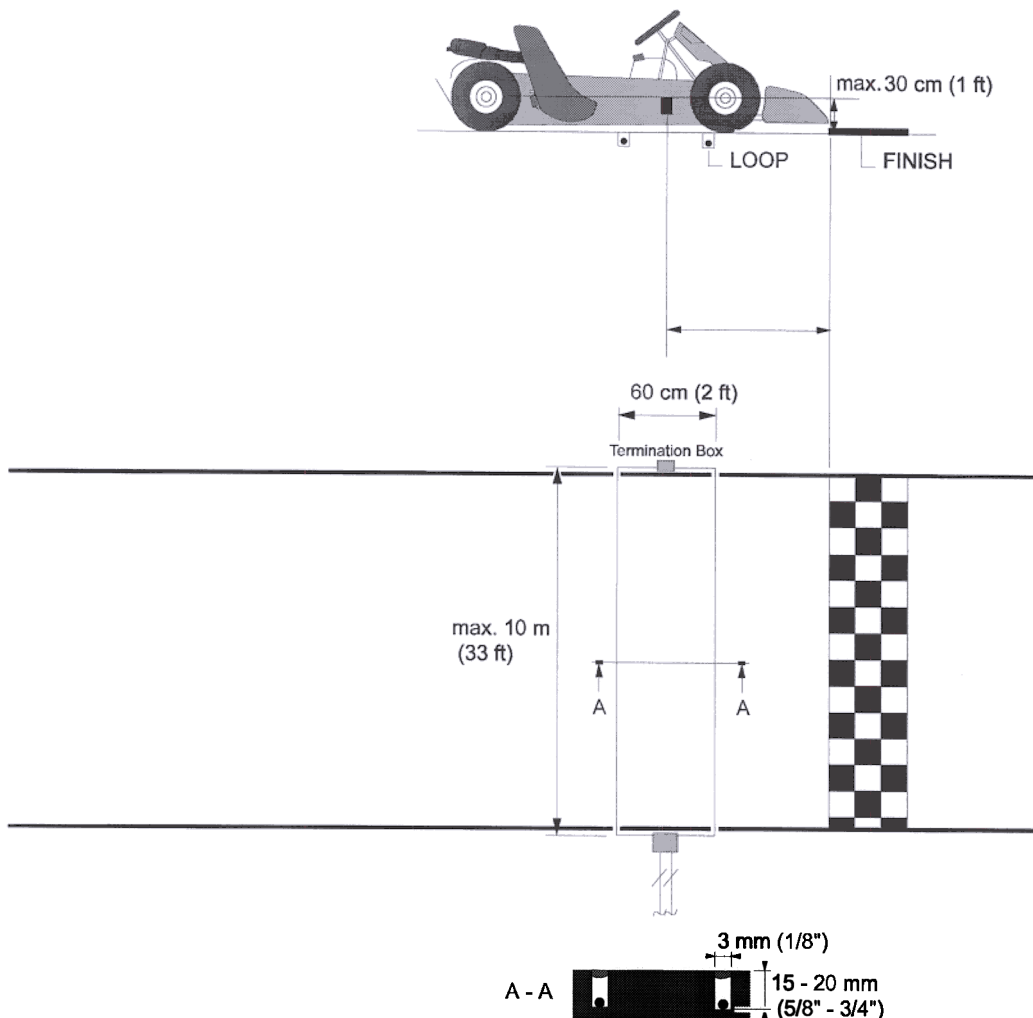


- | | |
|---|---|
| 1. TranX160 transponder (1711/1712) | 6. TranX single loop decoder (3711) |
| 2. Detection loop (4701/4702) | 7. Connection cable RS232 (6201) |
| 3. Adapter for AMB decoder (6501/6502) | 8. Transponder reader (optional) (5722) |
| 4. Headphones for decoder (6701) | 9. Coax cable (part of 4701/4702) |
| 5. Transponder tester (optional) (5721) | |

Not in picture: charger rack (2421)

For the upgrade, the parts numbered 2, 9 and 3 are to be replaced / added.

2. Installation of the activated detection loop

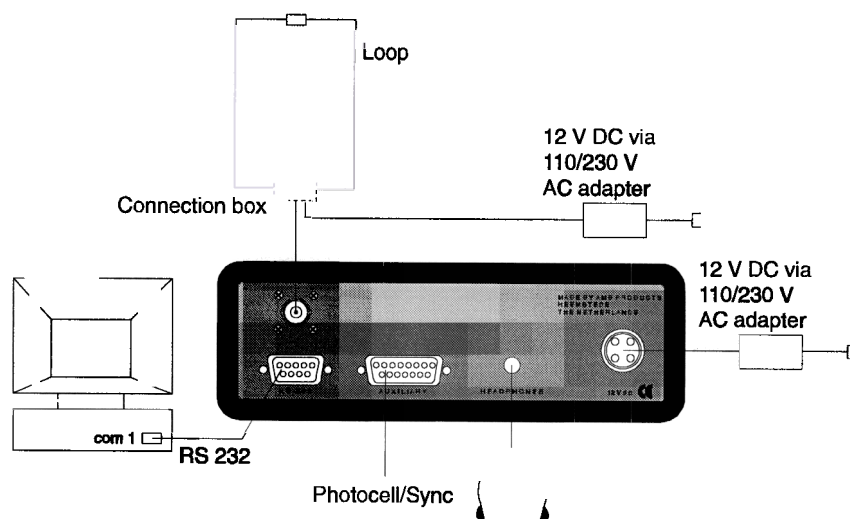


1. Remove the existing loop wires and connection box plus the coax cable. If the coax cable was put into a duct, use the old coax cable to pull the new coax plus 12V power cable through.
2. Put the wires of the activated detection loop in the slots, with the termination box in the spot where the 470 Ohm resistor used to be and cut the excess length of the wires. Make sure karts can not pass outside the detection loop. Extend the detection loop outside the track if necessary.
3. Put a heat shrinkage sleeve over each detection loop wire end and strip both wire ends. The Soldering necessary is best done with help of a propane fired soldering iron. Solder both loop wires each to one of the two yellow wires from the new (larger) connection box now housing the connection box plus the electronics producing the beacon signal. Slip the shrink sleeves over the solder joints and hold them over a heat source. Please make sure insulation is perfect, in order to have best performance over a very long period of time.
4. Fill the slot with silicon. Make sure the silicon is fully under the surface of the track, otherwise the tires may pull out the silicone.
5. The detection loop is sensitive to interference, possibly emitted by nearby cables. When possible keep all cables 5 m / 15 ft away. Also make sure karts on other parts

of the track will not get closer than 5 m / 15 ft to the detection loop, to avoid false inputs.

6. The 12V power cable may be installed alongside the coax cable leading to the AMB TranX160 decoder. The 12V adapter powering the TranX activated detection loop may be installed permanently, but must be well protected from water and humidity.
7. The activated detection loop may be powered permanently, even when the AMB TranX decoder etc. are not installed or present. In this way producing the beacon signal continuously for any DisplayIT that may be present on the track. Power consumption is around 10 watts in total, depending on loop size.
8. All wiring of the loop must be installed according to the drawing in order to avoid a serious degradation in performance. When joints in the loop are not soldered, the beacon signal may, over time, when the joints become oxidised, interfere strongly with the signals coming from passing transponders.

3. Wiring diagram of complete AMB TranX160 System



4. Operating the system / Trouble shooting

Install the existing AMB TranX 160 system as usual and according to the instructions in the manual. When the (new) coax cable is connected to the decoder, the TranX 160 system should operate as before.

Now plug in the 12V adapter powering the activated detection loop. The background noise level may rise about 10 points, due to the (very low) noise level of the beacon now operating.

When a connected sensor of an AMB DisplayIT is passed over the loop (not higher than 30 cm / 1 foot) the DisplayIT should indicate.

The AMB TranX 160 system and the Activated loop (beacon) work fully independent of each other and do not interact.

Beacon signal not present

Check if the AMB mains adapter powering the activated loop is connected to the mains and that mains voltage is present. Make sure the 12V wiring to the activated loop is not broken or short circuited. A properly operating activator consumes between 0.3 and 0.6 Amps depending of loop size.

When a loop wire is broken, the AMB TranX 160 system usually still operates, although with reduced received signal strength and hits, but the activating signal (beacon) is no longer present.

High background noise level

If, after installation of the activated loop, the background noise level has increased strongly, disconnect the 12V adapter from the mains, in order to see if noise enters the detection loop from the mains. Please make also sure the 12V cable leading to the activated loop does not run alongside power and/or data cables, which may also be a source of interference.

Other uses of the activated loop

The beacon signal generated for the AMB DisplayIT is identical to the signal to activate the AMB 130 transponder which is used for rental karts. The signal produced by the AMB 130 transponder, when passing the activated loop can also be decoded by the AMB 160 decoder, so a mixed use of (personal) AMB 160 transponders and AMB 130 transponders is possible.

The AMB 130 transponders have the advantage that they consume only power from their built-in permanent battery, when passing the activated loop, and will continue to do so for several 100.000 passings. Accuracy, max. height and max. speed is less than for the AMB 160 transponders

5. Technical Specifications

Dimensions (without cables)	150 x 75 x 62 mm (6"x3"x2.5")
Weight	max 14 kg (30 lb) dependent of length of connected cables
Max. track width	max. 10m (33')
Loop width	: 60cm (2')
Coax to decoder	: max. 100m (330') double shielded 75 ohm
Power supply	: 10 - 15VDC / 1A via 115 or 230 VAC table top adapter
Power cable	: max. 100m (330') twin wire 2x 0.75mm ² (18AWG)
Loop wire	: d=3mm (1/8"), tinned copper, 0.75mm ² (18AWG)

Specifications are subject to change without notice