Why do Transponders Miss laps?

HEDNESFORD INDOOR RACEWAY STAFFORD OUTDOOR RACEWAY

This is a question we get from time to time. The story usually goes “I went to a track and my transponder missed laps, it works fine everywhere else” or “My transponder has started missing laps at my local track”.

To understand why this happens and more important do something about it you need to understand a few things about how transponders work. In simple terms they are a small transmitter sending out a coded signal about 300 times a second. The coded signal contains the transponder number. The strength of the signal and the number of signals available to the loop depends on where the transponder is mounted.

If your transponder signal is low and you visit a track with a less sensitive loop, then you might miss laps. To avoid missed laps you should aim to get the transponder signal outside the car as strong as possible. The two materials in RC cars (and boats) that block the transponder signal are metal and carbon fibre. Fibreglass and plastic are OK. To illustrate this here is the transponder signal data from a Rallycross car. The signal graphic has two components, strength (horizontal) and number of signals received (vertical). Notice the sudden change from 5pm on the 7th to 10am on the 8th. This was achieved by moving the transponder from the centre of an aluminium chassis to the edge and raising it up off the chassis. The strength improves but the number of signals received increases significantly. Increasing the number of signals received makes the timing more accurate but significantly reduces the chances of a missed lap particularly for off road.

If your car has a carbon fibre chassis the blocking of the signal will be even greater than aluminium. If you imagine the transponder is a light source, carbon fibre is cardboard and aluminium is smoked glass consider how much light is illuminating the track. This will give you an indication of how much of the signal is able to be detected. In practice the decoder can detect a transponder with only a few signals provided it is consistently in the same position on the track when it passes the loop and on all 4 wheels. This is less likely to be the case with off road cars than with circuit cars. Loops in on road circuits lend to be just below the surface of the track but at off road tracks might be deeper to prevent the loop being ripped up during a race. **The signal from the transponder is directional!**

In short if you mount your PT. on its side it could miss laps

If you mount your PT Flat, it has less Chance of missing laps

Mounting the transponder on its side on the steering servo will “illuminate” the track to the side of the car but not directly below it. If the transponder is on the left side of a car with a metal or carbon fibre chassis and the car goes to the left side of the loop the signal might “miss” the loop. In the case of an Off Road car on its right hand wheels the signal is going to be reduced even if the car is in the centre of the track.