
Torque sensor system

Introduction

The Torque sensor system uses a Torque sensor transmitter in conjunction with strain gauges and a Torque sensor receiver to measure the torque being applied to a drive shaft. Strain gauges are fitted to a drive shaft and are connected to the torque sensor transmitter which is also fitted on the drive shaft. The transmitter converts the output from the strain gauges into a data stream which is then transmitted to a receiver located on the car close to the transmitter unit. The analogue output from the receiver is connected to an analogue channel of a Pi System. The logged data can be then be analysed using Pi software.

The strain gauges must be fitted onto the drive shaft by Pi Research. The Torque sensor transmitter units can be fitted by your engineers or by Pi Research. Torque sensor transmitter units can be manufactured to fit drive shafts with diameters up to 30mm. (Torque sensor transmitter units can be manufactured to other sizes on request.)

To allow Torque sensor transmitters to be used on both drive shafts simultaneously, different transmit frequencies are available.

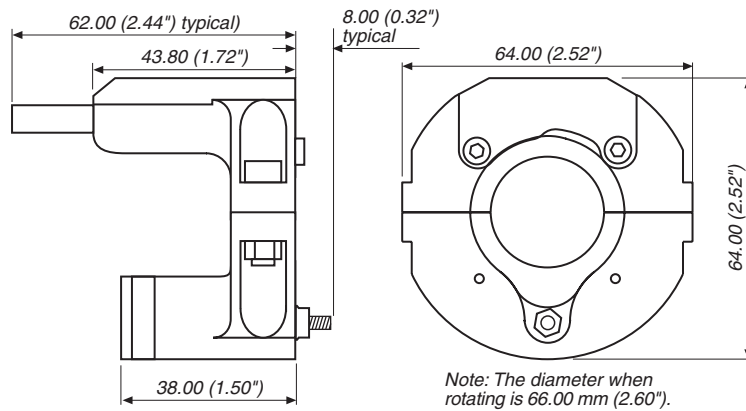
Always consult Pi Research for recommended gauge installations.

Torque transmitter Installation

When installing the torque sensor transmitter:

- ensure that the torque sensor transmitter is the correct size for the drive shaft diameter;
- fit the red coloured transmitter to the left hand drive shaft and the green coloured transmitter to the right hand drive shaft;
- fit the transmitter as near as you can to the centre of the drive shaft;
- clean the shaft and inside mounting faces of the transmitter unit with brake cleaner;
- fit the bolts so that you can see only one bolt head and one nut at a time;
- tighten the nuts evenly, and finally torque each nut to 8 Nm (6lbf/ft) (70lbf/in);
- remove the lid and attach the HE14 connector and then insert the torque sensor transmitter battery after fitting the torque sensor transmitter unit to the drive shaft and connecting the strain gauges to the torque sensor transmitter.

Torque sensor transmitter dimensions



Dimensions in millimetres and (inches)

Torque sensor transmitter connector details

Connector	Mating connector
AMP HE14 (5 pin plug)	AMP HE14 (5 pin socket)

Connector pin details

Pin	Function	Pin	Function
1	Battery +	4	Signal -
2	Excitation +	5	Excitation - (Ground)
3	Signal +		

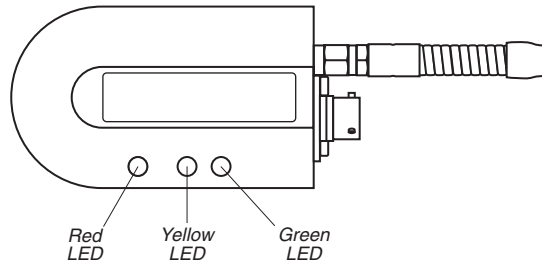
Torque sensor transmitter specifications

Description	Value
Max RPM	2500
Battery life at 20°C	100% on 32 hrs 10% on 147 hrs
Battery life at 50°C	100% on 15 hrs 10% on 79 hrs
Battery life at 80°C	100% on 7.5 hrs 10% on 53 hrs
Strain gauge type	2% shear
Strain gauge resistance	2.5k Ohms
Measurements	240 readings/sec
Resolution	13 bits
Gain of strain gauge amplifier	60
Transmit frequency	400-450 MHz ¹
Operating temperature	+10°C to +80°C
Weight	150 grams including battery
Environmental	IP64

¹ Transmit frequency depends upon use

Torque sensor receiver

The Torque sensor receiver is used in conjunction with a Torque sensor transmitter and strain gauges to measure the torque being applied to a drive shaft.



The torque sensor receiver has three coloured LED indicators whose functions when illuminated are:

- Red LED: Power on
- Yellow LED: Data received
- Green LED: Data OK, output valid

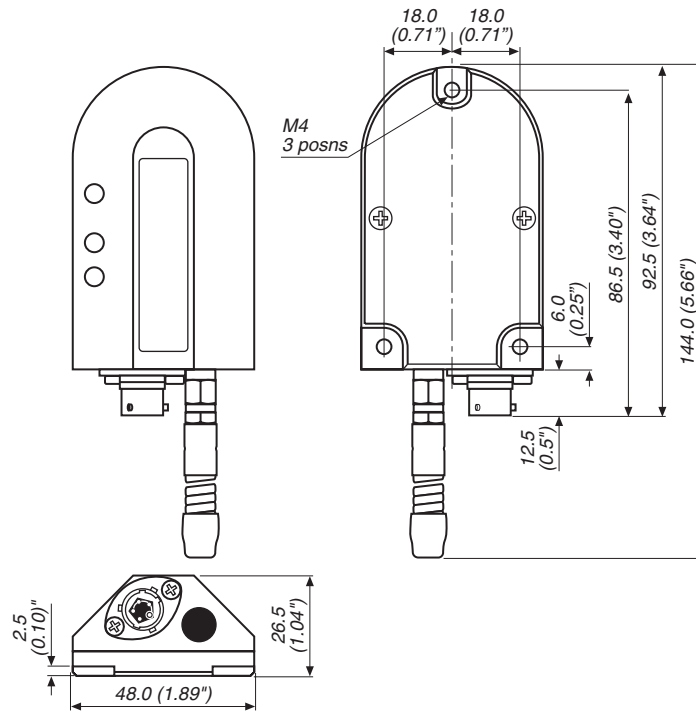
Torque sensor receiver installation

Installing the torque sensor receiver

When installing the torque sensor receiver:

- line of sight operation between the correct torque sensor transmitter unit and the torque sensor receiver antenna is required;
- the receiver antenna can be mounted remotely using an antenna extension loom from Pi Research (the antenna does not require an earth plane);
- the siting should be such that one torque sensor receiver is screened as much as possible from the other torque sensor receiver;
- looms must be screened and must be run separately as far as is possible;
- looms must not have any loops at the torque sensor receiver;
- fit the torque sensor receiver with the red coloured base to left hand side of the car and the torque sensor receiver with the green coloured base to the right hand side of the car;
- use anti vibration mounts.

Torque sensor receiver dimensions

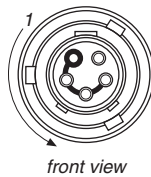


Dimensions in millimetres and (inches)

Connector details

Connector	Mating connector
AS0-06-05SN-HE	AS6-06-05PN-HE
SMA RF socket	SMA RF plug

AS0-06-05SN-HE connector pin details



Pin	Function	Pin	Function
1	+12V	4	No connection
2	Ground	5	No connection
3	Sensor output		

Torque sensor receiver specifications

Description	Value
Supply voltage	10–16V
Supply current	50 mA
Resolution	12 bits
Frequency response	0 to 25Hz
Gain of receiver	1
Output voltage	±2.5V
Offset voltage	2.5V
Operating temp. range	+10°C to +80°C
Weight	75 grams
Environmental	IP65

System Ordering information

Description	Part number
Torque Sensor Kit Europe	30B-050331
433MHz helical antenna SMA	31A-0073
Antenna extension loom ¹	03V-00013
Torque Sensor receiver loom	03F-01569

¹ Specify loom length at time of order.

