ARISO
CONTACTLESS COUPLER

TE Connectivity Germany GmbH
Pfnorstrasse 1
64293, Darmstadt
Germany
Tel.: +49 (0) 6151 607 0
Fax: +49 (0) 6151 607 1223
www.te.com
Link to ARISO Products in TE.com

1. SCOPE

1.1 Part Numbers (PNs) and applicable Documents

This Specification applies to the Part Numbers of ARISO GPIO listed in the Datasheet DS 116-19004 and covers the requirements for the application of ARISO M30 GPIO Contactless Coupler Pair.
The full set of documents describing the product is listed in the Datasheet mentioned above.

The coupler pair is designed to transfer Power from the Transmitter (TX) part to the Receiver (RX) part while a Data Communication is possible through 2 or 8 Digital Channels (with PNP Logic) from the RX to the TX.

All ARISO M30 General Contactless Coupler pairs have Dynamic Pairing and therefore a M30 General Contactless Transmitter can be mated with any M30 General Contactless Receiver.

For configuration details, see Customer Product Drawing.

1.2 Approvals and Certifications

The products have the following Agency Approvals Certifications:

Europe	CE (*Conformité Européenne*)
United States	FCC (Federal Communications Commission)
Canada	ISED (Innovation, Science and Economic Development)
United States and Canada	UL (Underwriters Laboratories) as Recognized Component
China	China RoHS

1.3 Nomenclature

TX	Power Transmitter
RX	Power Receiver
GPIO	General Purpose Input/Output
GPI	General Purpose Input (Digital)
GPO	General Purpose Output (Digital)
FOD	Foreign Object Detection
X, Y, Z	Three distance coordinates
Θ, Ψ, Φ	Three rotation coordinates
Δz	Axial distance between TX and RX front caps
Δr	Misalignment between TX and RX front caps
$\Delta\Omega$	Tilt angle between TX and RX
N.C.	Not Connected

2. GENERIC INFORMATION

2.1 Typical Setup

Transmitter 2287598-1/-3 and Receiver 2287598-2/-4/-5 are designed as a connector pair TX - RX.

During the mating cycle, the TX should be aligned to the RX and within a maximum axial distance of 7 mm measured between the caps of the products. There is no physical contact between TX and RX.

The M30 nuts can be used to fixate the coupler in the application, max. torque should be less than 40 N·m.

An application diagram of TX and RX is shown below:

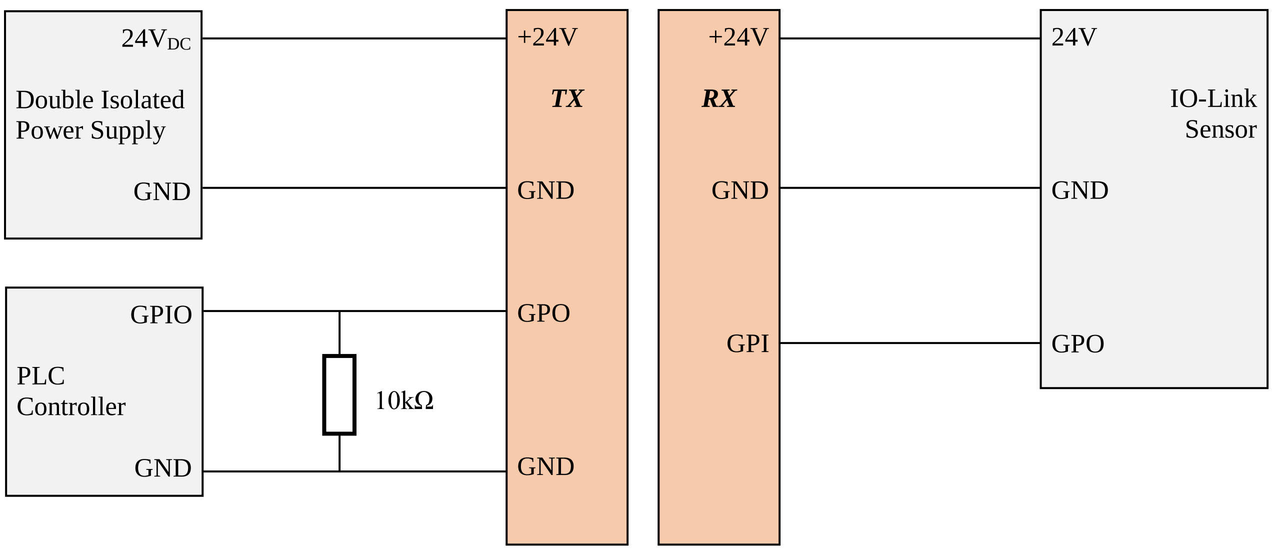

Figure 2.1.1 – Typical Application Setup of the product

The housing of the product shall be connected to ground.

Only provided or equivalent defined accessories shall be used.

2.2 Coordinate definitions

2.2.1 Coordinate and misalignment definitions

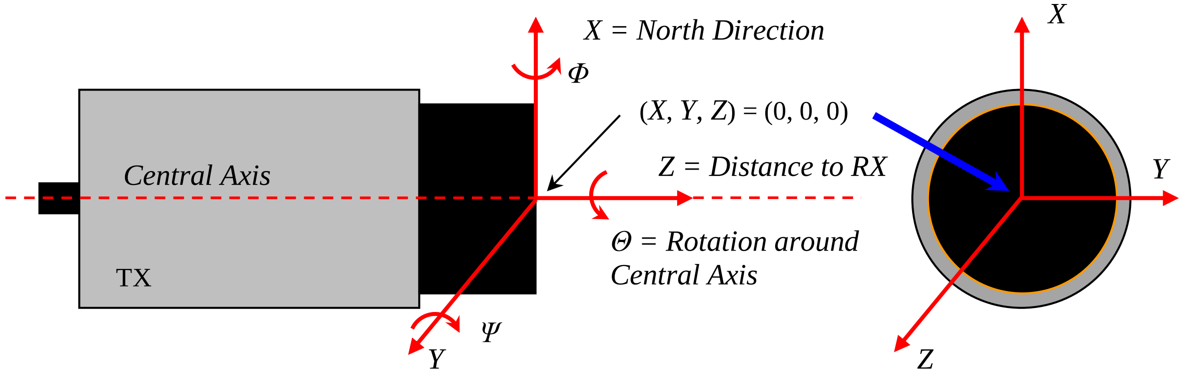

Figure 2.2.1.1 – Coordinate Definitions

The point $(X, Y, Z) = (0, 0, 0)$ coincides with the front midpoint of the Power Transmitter device (TX).
When TX North Direction is coincident to RX North Direction, then $\Theta = 0$.

The Φ, Ψ, and Θ define respectively the Rotation Angle around the X-, Y-, and Z-axes.
$(\Phi, \Psi) = (0, 0)$ means that the TX and RX Axes of Symmetry (Central Axes) coincide.
Since the setup has a cylindrical symmetry, there is no difference between the angles Φ and Ψ.
The angle Ω refers either to Φ or Ψ or a combination of the two.

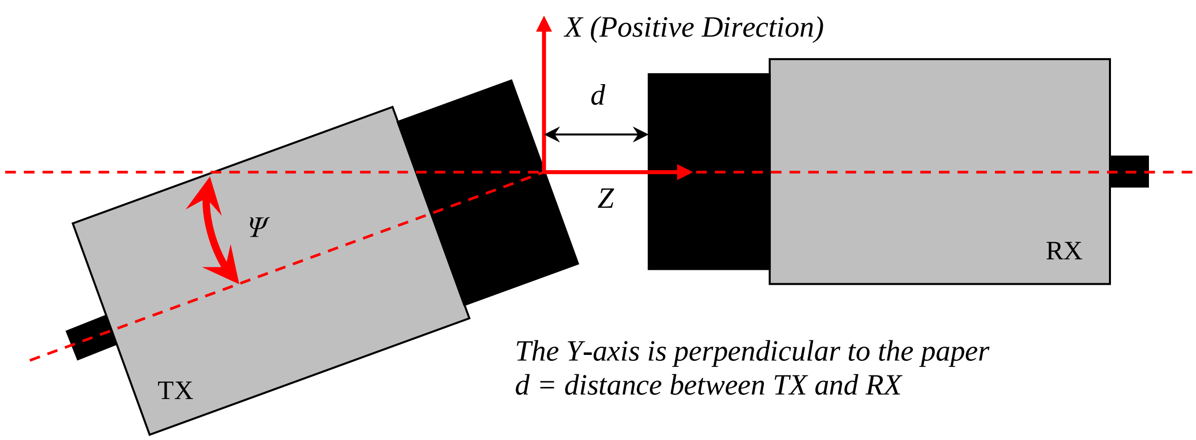

Figure 2.2.1.2 – Definition of tilt angle Ψ

Δx defines the misalignment in vertical direction while Δy defines the misalignment in horizontal direction.
The point $(X, Y, Z) = (0, 0, 0)$ coincides with the front midpoint of the Power Transmitter device (TX).
$\Delta z = d$ defines the distance between the midpoint of the front surface of the Transmitter and the midpoint of the front surface of the Receiver (the so called "Mating Distance").

When $(\Delta x, \Delta y) \neq (0, 0) \rightarrow \Delta r \neq 0$: there is a Displacement Misalignment.
When $(\Delta\Phi, \Delta\Psi) \neq (0, 0) \rightarrow \Delta\Omega \neq 0$): there is a Tilt Misalignment.
There is no Misalignment if $(\Delta x, \Delta y) = (0, 0)$ and $(\Delta\Phi, \Delta\Psi) = (0, 0)$.
The radial distance r gives the misalignment: $\Delta r = \sqrt{\Delta x^2 + \Delta y^2}$.

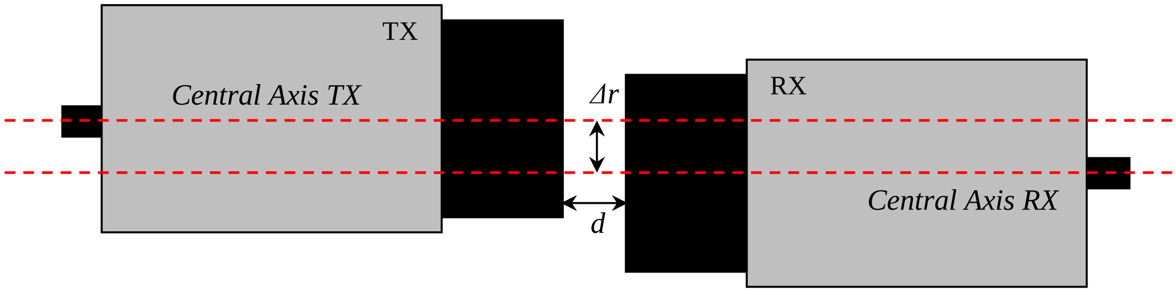

Figure 2.2.1.3 – Definition of misalignment *Δr*

2.2.2 Inter Coupler Distance

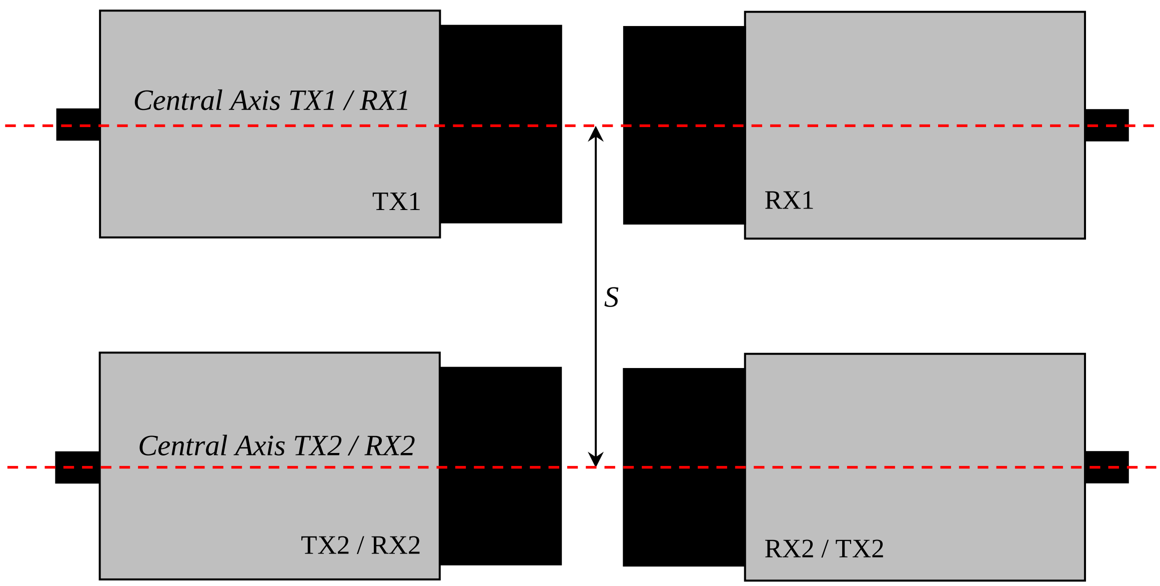

Figure 2.2.2.1 – Definition of Inter Coupler Distance *S*

The Inter Coupler Distance S is the distance between two Parallel Central Axes of two different Couplers.

2.2.3 Rotational Freedom of Couplers

The Rotational Freedom is defined as the capability of TX and RX to rotate independently along their axes.
Couplers have been tested with a RPM (Revolutions Per Minute) of max. 1250 for one hour.
The rotational speed is defined as dΘ/dt: this is the rotational speed of the RX around its own axis, while the TX is kept fixed.

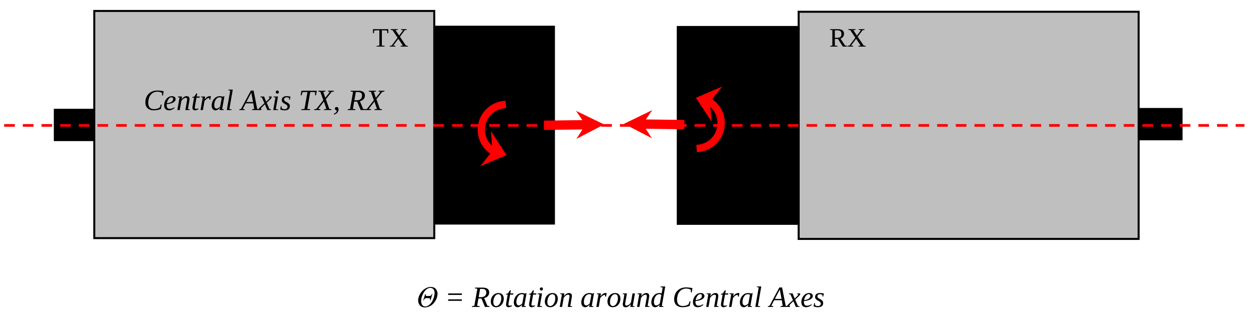

Figure 2.2.3.1 – Definition of Rotational Freedom

No Performance Degradation was detected during the test.

2.2.4 Metal Clearance

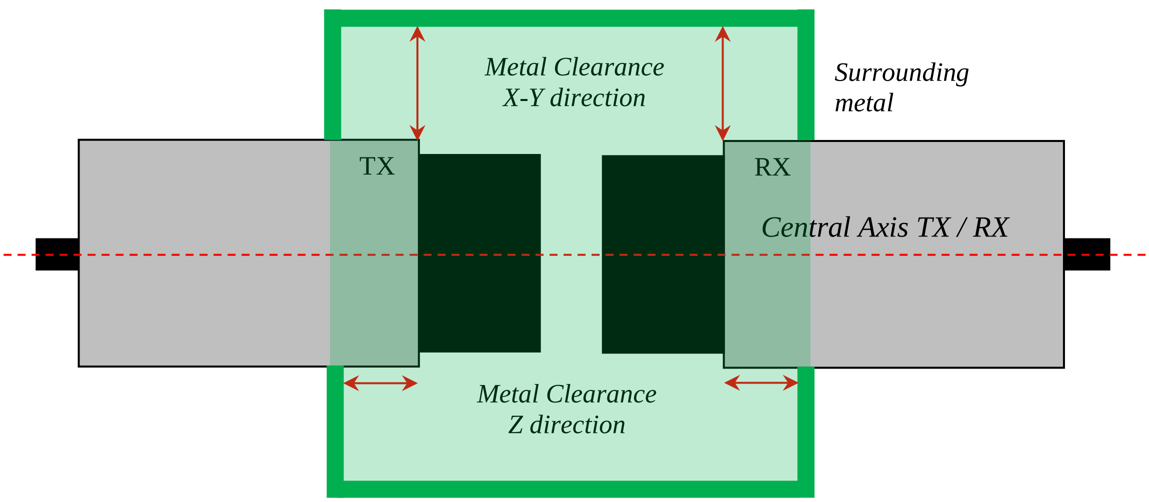

Figure 2.2.4.1 – Definition of Metal Clearance

The Metal Clearance is the shortest distance between any part of the metal housing or the plastic front-end of the TX or the RX and any eventual metal surrounding them. Note that there is a difference between the metal clearance in the X-Y direction and the metal clearance in the Z direction.

2.2.5 Foreign Object Detection

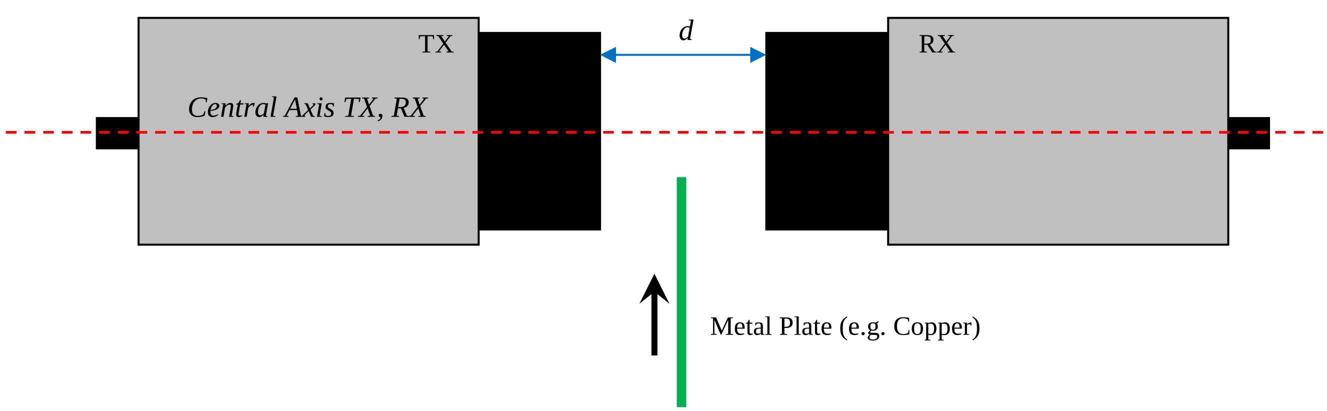

Figure 2.2.5.1 – Definition of Foreign Object Detection

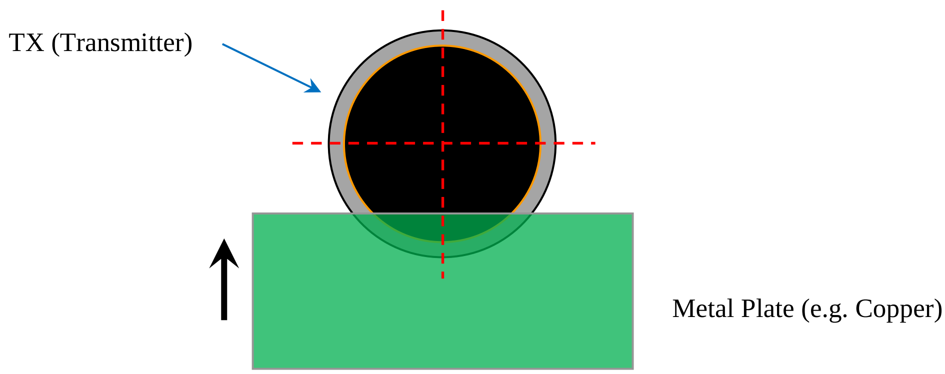

Figure 2.2.5.2 – Definition of Foreign Object Detection

The Foreign Object Detection is defined as the percentage of the coupler Front-End area covered by a metal.

When an electrically conducting material, like a metal, covers the 40% of the area of the frontal cap, then the TX switches off.