



TRM Project

TRM-ECAT

Ether**CAT**® 

Hardware Architecture

User Manual

Technical Documentation

DOCUMENT DATA

Data	05/12/2025
Revision	0
FileName	enTRM-ECAT.pdf
Document type	User manual
Authors	UT – TPA Srl
Department	DIP
Notes	Customer document
	This documentation is the property of TPA s.r.l. Any unauthorized duplication is forbidden. The Company reserves the right to modify the content of the document at any time."

REVISIONS

Revision Number	Data	List of changes
Rev.0	05/12/2025	

INDEX

REVISIONS.....	2
CONTENTS	4
1 FUNCTIONAL SPECIFICATIONS	5
2 MECHANICAL DATA	7
3 ETHERCAT COMMUNICATION.....	8
4 TRM-ECAT VIEW	9



TRM-ECAT

CONTENTS

This document is the User Manual for TRM-ECAT device. TRM-ECAT belongs to the TRM series of devices by TPA s.r.l. which are bus field devices to remote the CNC action on a tool machinery or, generally, in a controlled system; the devices are connected to a standard EtherCAT bus.

This document is the User Manual for TRM-ECAT, the bus coupler device to interface EtherCAT bus with other IO devices from the TRM serie.

This document is the property of TPA Srl

Not authorized duplication is forbidden.

This description is only intended for the use of trained specialists in control and automation engineering who are invited to always use the currently valid documentation.

It is recommended that the documentation (notes, explanations, diagrams, ecc.) are followed when installing and commissioning these components.

The responsible staff must ensure that the application or use of the products described satisfies all the requirements for safety, including all the relevant laws, regulations, guidelines and standards.

Disclaimer

The Company reserves the right to revise and modify the current documentation at any time.

The Company doesn't respond of uncorrect or improper use of the device.

Safeguard clause

If any information about this device will result not clear, please do not esitate to take contacts with TPA.srl Service.



Albatros – Logo



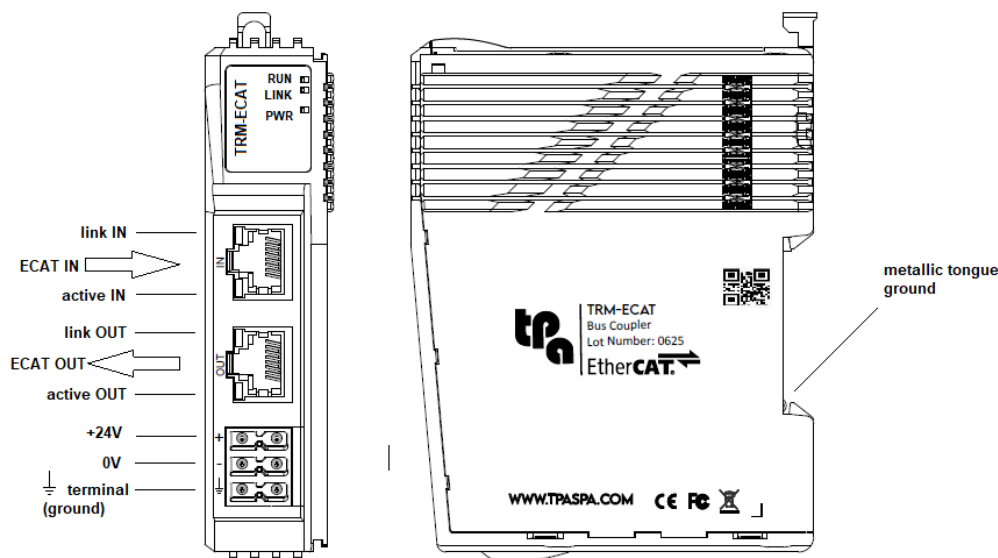
TPA S.r.l - Logo

1 FUNCTIONAL SPECIFICATIONS

TRM-ECAT is a bus coupler for ETG EtherCAT 100Base-Tx (ECAT). It must be used to connect other TRM's serie terminal modules to ECAT bus.

It converts the 100base-Tx data stream into local bidirectional communication over E-BUS signals. Each added module is mechanically and electrically joined to the TRM-ECAT or to the proceeding TRM module one, to form a blockchain. Different kinds of TRM serie's modules can be combined to form the block. Only TRM devices can be supported by TRM-ECAT.

TRM-ECAT provides for +5V power supply (max 2A) to externally joined TRM-serie's modules.



On the right side, a gray silkscreen is printed and it reports:

- the device Name and its main function
- the batch production number
- the consortium EtherCAT logo to specify the environment of use and compatibility
- the TPA reference - TPA's logo, QR code and site address
- CE certification logo

From the front image, 2 connections RJ45 for LAN cables are provided, one for input (IN) and one for output (OUT). According to the EtherCAT ETG requirements, cables must be CAT 5 shielded min., better is STSP.

Pay attention to connect the cable from CNC, or the nearest along the chain, to input (IN) port. Other ECAT nodes can be connected from output (OUT) port.

To protecti the integrity of signals, it is strongly raccomandend to use STSP CAT5 cables (or more, ex. CAT6, especially in critical electrical environment for EMC). Verify the connection of the copper shield to GROUND terminal.

This can be done by the same hook which block the module to the DIN bar (metal tongue) or cabling to ground the GND terminal of the black 6 poles connector sited close to OUT port. The other terminals of the black connector are set for Power Supply.

Terminal	Name	Function	Notes
" + "	+24Vdc (-15%, +20%)	Power Supply	2 terminals joined – max 10A
" - "	0Vdc	0V of Power Supply	2 terminals joined – max 10A
⏏	GND	Ground	2 terminals joined

Black connector mating plug is:



HSCP-SP 1,5-6 POWER-9005 – Phoenix code 1634000

On the top of the front image of TRM-ECAT a list of LED indicators is set.

RUN shows the behaviour of the device when connected to the ECAT LAN (Green)
LINK the link status (Green)
PWR internal power supply is ON (Green)

LED	Object	Color	Behaviour
RUN	Device operating status led	Green	Extinguished: INIT state Blink: PreOP state Single flash: SafeOP state Bright: OP state
LINK	Communication Status	Green	Extinguished: no communication Long bright/occasional blink: link is on, waiting for data Random blinking: normal communication
PWR	Power Supply	Green	Extinguished: no internal power supply Bright: internal power supply is on

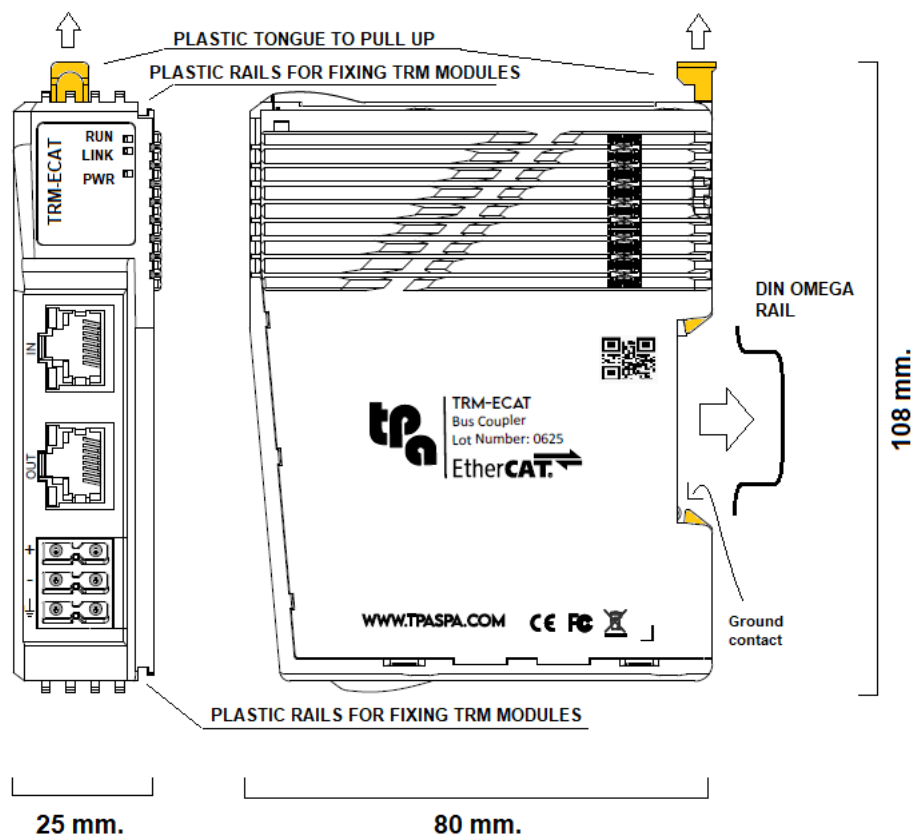
Electrical parameters	Values
Data transfer	100Mb/s STSP CAT5 (min)
Distance between two stations	Max 100m.
Number of ECAT terminals	Max 65535
Delay	Approx 1us
Voltage Input	+24Vdc (-15% +20%) max 600mA
Voltage Output (EBUS)	+5V (±10%) max 2A
Work Temperature	-20°C – 60°C
Storage Temperature	-40°C – 60°C
Relative humidity	5 – 95% (not condensating)
Dimensions	100x24x80mm.
Net weight	90g.
Operating vibration	5-500Hz, 1.5Grms, according to IEC60068-2-64
Operating stock	20G peak acceleration (11ms duration), according to IEC60068-2-27
Protection rating	IP20

2 MECHANICAL DATA

TRM-ECAT module can be installed onto a metallic rail DIN 60715, with “OMEGA” profile, model 7,5mm. or 15mm.

On the back of the plastic enclosure there is a plastic orange tongue. By means of a flat blade screwdriver, please, exercise a pression in direction UP to open the lock. In this condition, accommodate the device on the DIN rail, then release the orange tongue.

To add a TRM module device, let's introduce it along the right side of the TRM-ECAT module. Please, remove the plastic cover to protect terminals; it can be used to protect the terminals of the block of modules at the last one. There are two plastic rails on the TRM module device's side that help to get the correct position of the TRM I/O device. Then, throw up the orange tongue to fix it to the DIN rail.



Dimension	Value	Notes
Height	108 mm.	Let's consider the extension of the tongue and the possibility of having a min. extended space to handle it
Dept	80 mm.	Let's consider the extension of the connectors and the curves of the cables
Thickness	25 mm.	

3 ETHERCAT COMMUNICATION

The TRM-ECAT module is compliant with standard EtherCAT normed by ETG in IEC61158. Data communication is full-duplex, real time clocked and based on 100Base-Tx exchange on copper STSP Cat5 cable (RJ45 terminated).

The max exchange rate (the real Time Clock of the network) can be accorded in this range: 250µs, 500µs, 1ms, 2ms, 4ms or more. It is a Master station dependent parameter.

TRM-ECAT can be connected to every standard EtherCAT network. Methods to access and to run it are provided by a description ESI file (**TRM-ECAT.xml** is provided for setting up the device into the control system).

TRM-ECAT is only a bus-coupler, and it is addressed as a station in the EtherCAT network; it can run only in an ECAT network. The ID setting is made automatically by the enumeration procedure of the ECAT system, following a positional logic.

Alias ID value is set to 0 as production default value and in SII file in EEPROM.

Other TRM's serie modules can be mechanically and electrically joined to TRM-ECAT, to constitute a I/O remote block, connected in blockchain.

Data communication into the blockchain is supported by E-BUS, a local bus derived from ECAT. The aim of TRM-ECAT is to provide this sort of electrical translation to/from the other TRM modules, so they can be seen as ECAT nodes into the ECAT network by the control unit.

Pay attention. There is not a logical limit to the number of modules joined to TRM-ECAT; limitation is due to the current request for powering the modules. Each module is electrically specified regarding its need of power (current consumption); do not exceed the max 2A current limit of TRM-ECAT.



TRM-ECAT doesn't present any COE Object or protocol. It is only a bus coupler.

Thus, the ECAT Master control unit sees it as a Hardware Station point, with no configurable objects or PDOs.

4 TRM-ECAT VIEW



TRM-ECAT - Front view



TRM-ECAT – Left side

