TRS-CAT

Remote Module

Documentation

T.P.A. Srl Tecnologie e Prodotti per l'Automazione
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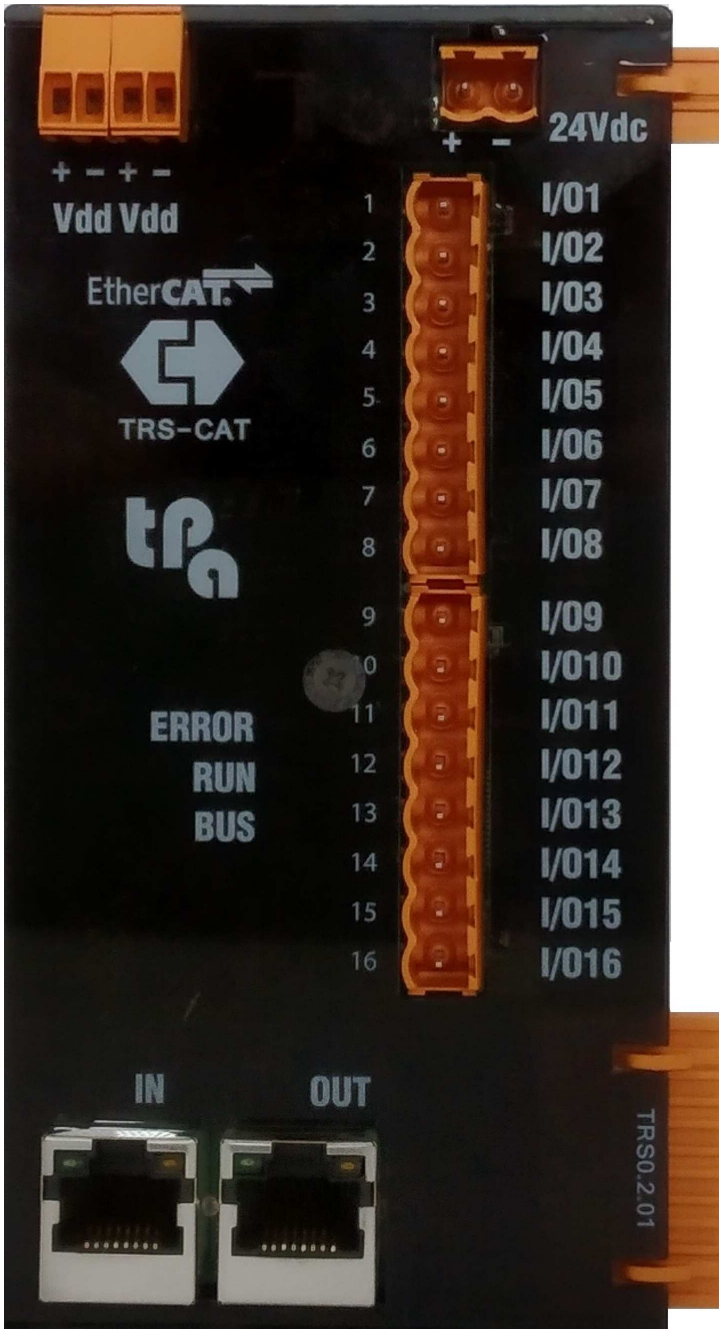
REVISIONS

Revision number	Date	Protocol	Changes and/or changed paragraphs
Rev 0	02/07/2012		First release
Rev 1	13/12/2012		Update in document format and integration smart expansions
Rev 2	01/12/2015		Update to 01.00 revision
Rev 3	02/07/2019		Update chassis

1 TOPICS

Requirements and production specification of TRS-CAT remote module.



2 REFERENCE DOCUMENTS

- EtherCAT Protocol Enhancements – ETG 1020
- EtherCAT Indicator Labelling Specifications – ETG 1300
- EtherCAT Slave Informations Specifications – ETG 2000
- EtherCAT Modular Device Profile General Specifications – ETG 5001
- CANOpen Application Layer and Communication Profile – CiA DS 301
- CANOpen Device Profile for Generic I/O Modules – CiA DS 401

3 DESCRIPTION

- 16 bidirectional INPUT/OUTPUT lines (PNP logic made with High Side Driver) with signal of the status by a yellow led.
- INPUT/OUTPUT optoelectronic decoupling.
- Connection on EtherCAT®[1] bus by means of RJ45 connectors.
- Possibility of communication synchronized to the time of the bus cycle (minimum time: 500us).
- It requires +24VDc nominal field power supply (+24Vdc terminals) to activate the outputs.
- Power supply of the 16 OUTPUT groups, software control, signal of power presence, control of the error of missing power supply
- Hardware protection against wrong connections.
- Assembly on DIN rails type EN50022 and EN50035.
- Anti-rebound digital filter: the input is considered stable, if persisting in its state for 4 samples.
- Expansion possibility by means of TRS-Expansion modules.
- Total compatibility with TRS expansion modules.
- Dimensions 138x70x23.5 mm

[1] EtherCAT® is registered trademark and patented technology, licensed by Beckhoff Automation GmbH, Germany

4 TECNICAL DATA

- Input threshold levels:
  - 0 = from 0V to 10V
  - 1 = from 14V to 24V
- Max. Output power supply: 0.5 A
- Outputs protection against:
  - short-circuit
  - overload
  - overvoltage (40V)
- 1 terminal for each input/output referred to 0V of the +24Vdc field supply.
- Connections with AWG 24 ÷ 12.
- Field power supply galvanically separated from the power supply of logic circuits.
- 24 Volt DC (Vdd terminals) logic supply.
- Protection against field supply inversion.
- Protection against logic supply inversion.
- Software control and led signal of available power supply
- Led signal of module status activity, of the communication and input/output status.
- Possibility to activate the outputs and the sampling of the field inputs in synchronised way with constant delay.

5 EXPANDABILITY

TRS-CAT module can be expanded by connecting to its bus the expansions of the TRS-nn-E series in any sequence. Its maximum expandability is shown in the table below.

Internal expansion	N° max standard expansions	N° max smart expansions	Occupied Slots
1	7	-	8
1	5	1	7
1	3	2	6
1	1	3	5

6 ELECTRICAL FEATURES

6.1 Highest accepted values

Parameter	Conditions	Min	Type	Max	Units
Vdd, Power Supply	24 Volt DC	18		30	V
On Output Current max	VO = 24 Volt DC			1	A
VO Output Power Supply	by external power supply	16		36	V
IO, Power Supply current max	by external power supply			8	A
Temperature		0		65	°C

6.2 Operating parameters

Parameter	Conditions	Min	Type	Max	Units
Vdd, Power Supply			24		V
Iq, Quiescent Current	Link off, Vdd=24V, VO=0V,		40		mA
Ip, Operating Current	Link On. State = OP, all active outputs, Vdd=24V, VO = 24V		70		mA
On Output Current	VOn = 24 Volt DC	0	--	0.5	A
VO Output Power Supply		18	24	30	V
Voh, output high state voltage	VO = 24V, Rl = 10KOhm,Cl = 50pF	18			V
Vol, output low state voltage	VO = 24V, Rl = 10KOhm,Cl = 50pF			6	V
Vih, input high state voltage	VO = 24V	18			V
Vil, input low state voltage	VO = 24V			10	V
Operative Temperature		5		60	°C

6.3 Other parameters

Parameter	Conditions	Min	Type	Max	Units
Logic to ouput isolation	1 minute duration		500		Vac
	100 ms duration		1100		Vac
Input to logic isolation	1 minute duration		2500		Vac

7 INSTRUCTIONS

Generally, the values of power supply, temperature and humidity must not exceed the values indicated in the chapter 6.

You must interface TRS-CAT using cables/terminals and everything else, as shown in the following chapters.

Terminal blocks must be inserted, even if the are not cabled.

TRS-CAT must be fixed on EN50022 or EN50035 DIN rails by means of the rear spring connection. For coupling and removal, you must work on the connecting tongue with a flat-blade screwdriver, in a way that you can move it back and allow the coupling, or the release from the guide.

Warning! The metal coupling for the DIN rail is electrically connected to the circuit earth of TRS-AX: the connection to earth MUST be provided through this connection (that is the DIN rail must be earthed).

Warning! For the connection to EtherCAT®, to prevent from the effect of possible electromagnetic interferences, we suggest the use of Cat.6 S/STP cables.

Warning! The connection/disconnection of TRS-mm-E expansion with logic and/or from available field is not accepted.

TRS-CAT is an electronic device for general purposes in the environment of the light industry.

This is a class A product. In a domestic environment this product may cause radio interference, in which case the user may be required to take the due precautions.

8 SIGNAL LEDS

8.1 Led RUN, LINK-ACT and ERROR.

Colour, typology, positioning, label and functioning of the signal leds (led LINK-ACT, led RUN and led ERROR) for the communication on EtherCAT® bus are specified in the ETG documents [2].

8.2 Bus green led

- Green led on means active TRS and communication on working TRS bus.
- Green led off means non-active TRS and communication on TRS bus at a standstill (it is the normal condition at the start-up, but also a non-recoverable error condition on TRS bus).

8.3 I/O yellow leds

Show the status of the corresponding Output.

- it is on, when the logic status is 1;
- it is off, when the logic status is 0

8.4 +24Vdc green led

Shows that +24Vdc power is available

- It is on, when the power supply is available;
- It is off, when it is not powered or outside the acceptability range.

[2] ETG: EtherCAT Technology Group, please, read the chapter "Reference documents".

9 INTERFACE WITH ETHERCAT MASTER

TRS-CAT uses 4 Sync Manager:

- SM0 : Mailbox Out Sync Manager
- SM1 : Mailbox In Sync Manager
- SM2 : Process Output SyncManager
- SM3 : Process Input SyncManager

TRS-CAT uses 3 FMMU:

- Outputs
- Inputs
- Mailbox State

As for the Mailbox, the data link layer is implemented and more specifically the Co/E protocol supported by the SDO information service with complete access and the possibility to segment the frames.

In addition to the CoE protocol, a diagnostic protocol is implemented.

9.1 Working mode

9.1.1 Synchronisation to the Distributed Clock

The mechanism called Distributed Clock is the base of the synchronisation of the EtherCAT communication. Using Distributed Clock, all EtherCAT network devices can be synchronised by sharing the same reference clock. TRS-CAT synchronises its internal application thanks to the event (interrupt) SYNC0, generated by the reference clock.

Supported synchronisation modes are DC_SYNC and FREE-RUN.

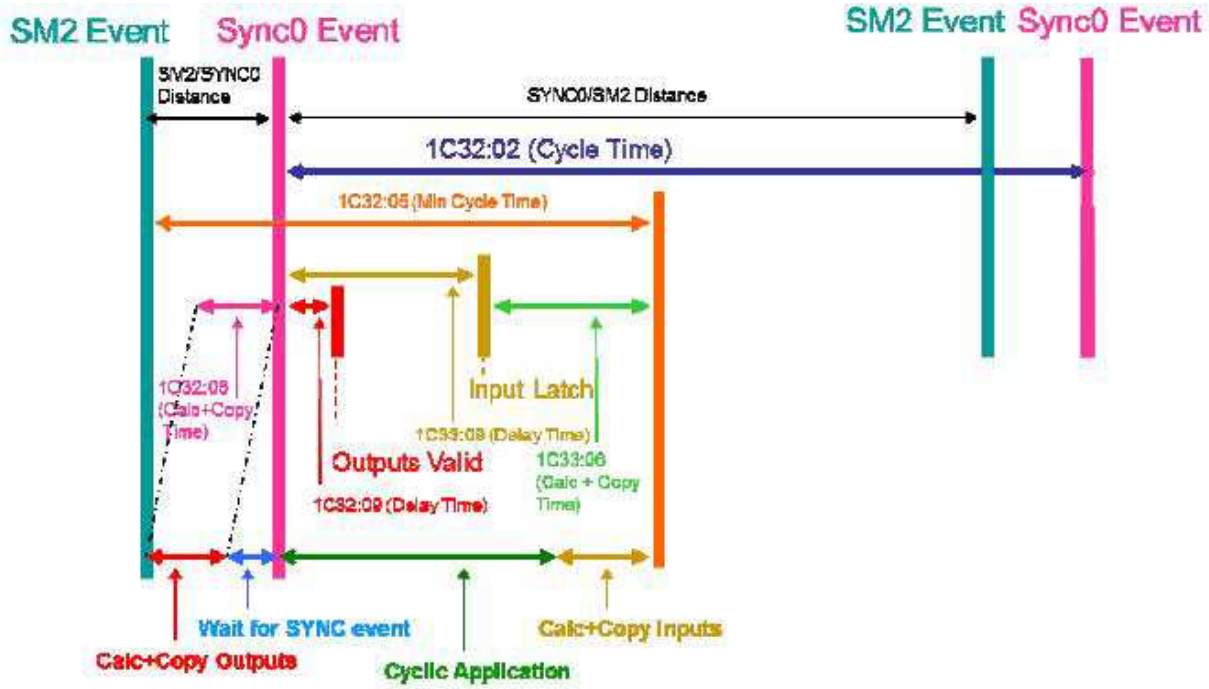
The synchronisation mode can be changed by means of Sync Control Register of ESC[3] (registers 0x980 e 0x981). This mode is shown in the objects 0x1C32 and 0x1C33 (see description below).

DC-SYNC distributed clock synchronization (DC-Mode with Sync0) is the default mode. In this mode TRS-CAT can be synchronised with EtherCAT master by means of SYNC0 event. The synchronisation ratio of the local cycle is 1:1 with the communication cycle/master cycle (each master cycle corresponds to 1 synchronous cycle of TRS-CAT). The value of 0x980 register must be 0x0300.

Warning! When *DC-SYNC* is operating, the master must guarantee that the jitter of SM2 (that is of the data frame transmitted via LAN) does not invade either the CALC+COPY TIME OUTPUT, or the DELAY TIME + CALC+COPY TIME INPUT,

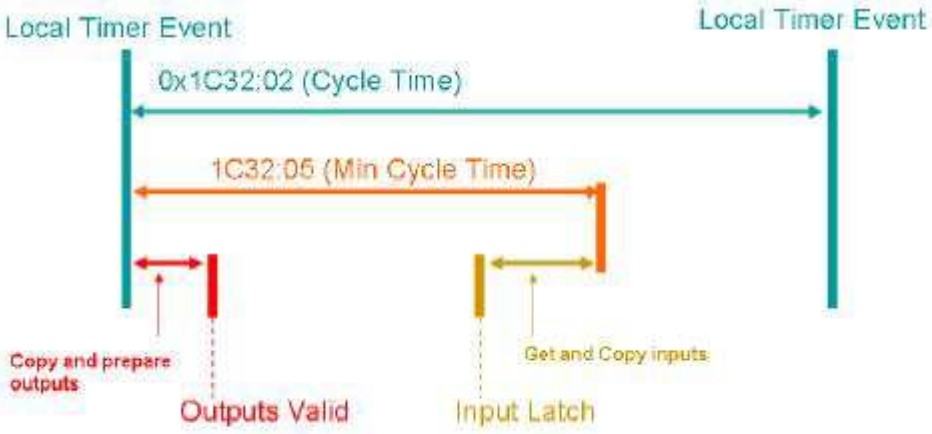
[3] ESC: EtherCAT Slave Controller

under penalty of loss of synchronism (please, see the objects 0x1C32, 0x1C33 and the errors managed in the object 0x10F1, described later).



Local Cycle synchronous to Sync0 Event

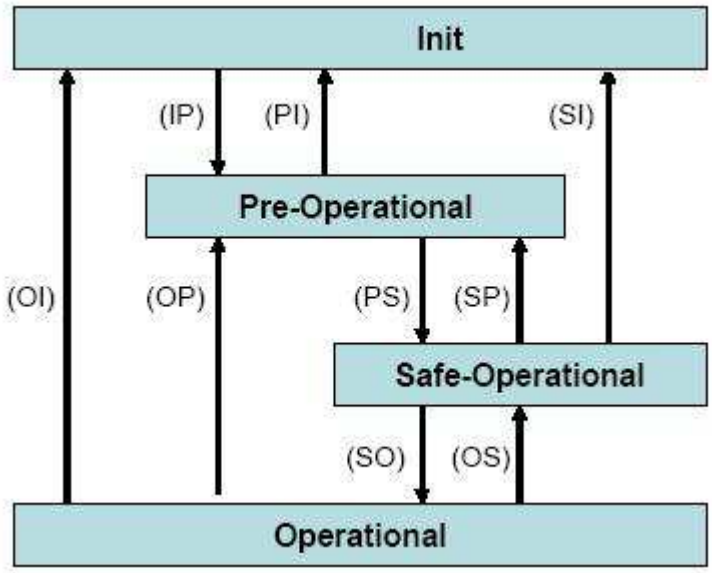
In the *FREE-RUN* mode the local cycle of TRS-CAT is independent of the communication cycle and of the master cycle. In this case the local cycle fix time is 500 µs. The value of 0x980 register must be 0x0000.



Local Cycle with Free Run synchronization

9.2 EtherCAT state machine

State machine is responsible for the coordination between master application and TRS-CAT application. EtherCAT state machine has been implemented in TRS-CAT according the the ETG specifications.



In the following table, you can find the actions performed (or still to perform) in the states or during the transitions among states to move from the Init state to the Operational state: normally, the transitions are controlled by the master.

State	Description
INIT	State at the power-up TRS-CAT initialises its own hardware and detects the configuration on the TRS bus. Neither Mailbox or Process Data communications are possible.
INIT to PRE-OPERATIONAL (IP)	The master configures the DataLink (DL) Address and the channels SyncManager (SM) for the Mailbox communication. The master initialises the DC clock sync. The master requires the PRE-OP state. The master sets the ESC Application Layer (AL) registers. TRS-CAT verifies that the Mailbox initialisation is correct.
PRE-OPERATIONAL (PRE-OP)	Mailbox communication is possible. Process Data communication is not possible.
PRE-OPERATIONAL to SAFE-OPERATIONAL (PS)	The master configures the SM and FMMU channels for the Process Data. According to the TRS configuration set the master • verifies the TRS configuration by means of the object 0xF050; • sends the TRS configuration by means of the object 0xF030;4 The master requires the SAFE-OP state. TRS-CAT verifies that the configuration of the SM channels for the Process Data and of the DC is correct. TRS-CAT verifies that the received TRS configuration with the detected one (0xF030 = 0xF050) is correct.
SAFE-OPERATIONAL (SAFE-OP)	Mailbox communication is possible. Process Data communication is possible, but the Inputs only are evaluated, while the Outputs remains in "safe-state".
SAFE-OPERATIONAL to OPERATIONAL (SO)	The master sends valid Outputs. The master requires the OP state.
OPERATIONAL (OP)	Mailbox communication is possible. Process Data communication is possible.

9.3 Can Over EtherCAT (COE)

TRS-CAT implements the COE protocol (CAN over EtherCAT) with the support of the SDO information service; the access is complete and the fames can be segmented

As for the PDO map, TRS-CAT configures itself. In fact, the mapped PDOs are those of the detected/set configuration, that is the actual expansions available in the module, without that the master necessarily performs a download and or assigns the PDOs.

The only and indispensable configuration is then that of of the slot configuration (i.e. composition of the TRS module) during the PS transition. In this state TRS-CAT will

[4] The configuration of the PDO map and of the PDO SM parameters (0x1C12 and 0x1C13 object compilation) in this operation is implicit.

compare the object 0xF030 (configuration set by the master) with the object 0xF050 (configuration detected when the application starts).

Further options to be set in the master are: enhanced link detect of the slaves and how TRS-CAT (mode) must work ((*DC-SYNC* o *FREE-RUN*).

The implemented objects are those included in the ETG specifications (generic and/or concerning the "Modular Device Profiles") and in accordance with the CiA DS301 technical data. For further details, please read the file ESI[5].

9.3.1 Objects 0x1C32 e 0x1C33

The object 0x1C32 includes information on the synchronisation of the 2 SM channel for the Processes Data Output.

The object 0x1C32 includes information on the synchronisation of the 3 SM channel for the Processes Data Output.

In the following tables you will find the more significant subindeces of these objects. Please, note that some data are significant in the DC-SYNC mode only.

Index	Sub	Name	Access	PDO Map	Type	Remarks
0x1C32	1	Sync Mode	RW	No	U16	Current status of DC mode 0x0000 = FREE-RUN 0x0002 = DC-SYNC
	2	Cycle Time	RO	No	U32	TRS-CAT cycle in ns
	4	Sync Mode Supported	RO	No	U16	0x0005 (supported FREE-RUN and DC-SYNC only)
	5	Min Cycle time	RO	No	U32	Minimum supported SYNC0 cycle = 500000 ns.
	6	Calc and copy time	RO	No	U32	Time required from outputs available in SM2 to SYNC0 = 100000 ns.
	9	Delay Time	RO	No	U32	Time from SYNC0 and valid outputs = 150000 ns
	11	SM event missed counter	RO	No	U32	Number of consecutive losses of SM events
	32	Sync Error	RO	No	Bool	Error of synchronisation: TRUE or FALSE

[5] ESI File: TPA_TRSCAT.xml file including the EtherCAT information on TRS-CAT slave.

Index	Sub	Name	Access	PDO Map	Type	Remarks
0x1C33	1	Sync Mode	RW	No	U16	Current status of DC mode 0x0000 : FREE-RUN 0x0002 : DC-SYNC
	2	Cycle Time	RO	No	U32	TRS-CAT cycle in ns
	4	Sync Mode Supported	RO	No	U16	0x0005 (supported FREE-RUN and DC-SYNC only)
	5	Min Cycle time	RO	No	U32	Minimum supported SYNC0 cycle = 500000 ns.
	6	Calc and copy time	RO	No	U32	Time required from SUNC0 to inputs available in SM3 = 100000 ns.
	9	Delay Time	RO	No	U32	Time between SYNC0 and input latch = 150000ns.
	11	SM event missed counter	RO	No	U32	Number of consecutive losses of SM events
	32	Sync Error	RO	No	Bool	Error of synchronisation: TRUE or FALSE

9.3.2 0xF030 and 0xF050 objects

The object 0xF030 (Configured Module Ident List) includes information on the TRS composition set that must be sent from the master to TRS-CAT during the PS transition.

The object 0xF050 (Detected Module Ident List) includes information on the composition of the TRS detected when it starts from TRS-CAT.

The objects are identical with the following exception: while the entire object 0xF030 has all sub-indices with access RO and WRITE in PRE-OP, the object 0xF050 has all sub-indices with access RO.

In both the objects the sub-index 0 shows the number of lost (TRS modules) actually occupied in the configuration of the TRS module. Remember that the slot 0 (module 0) is that directly integrated in TRS-CAT.

The TRS modules (integrated in TRS-CAT and expansions) can be identified in the list by a 32 bit value. The values accepted as specified in the object 0xF000 (Modular Device Profile) are respectively:

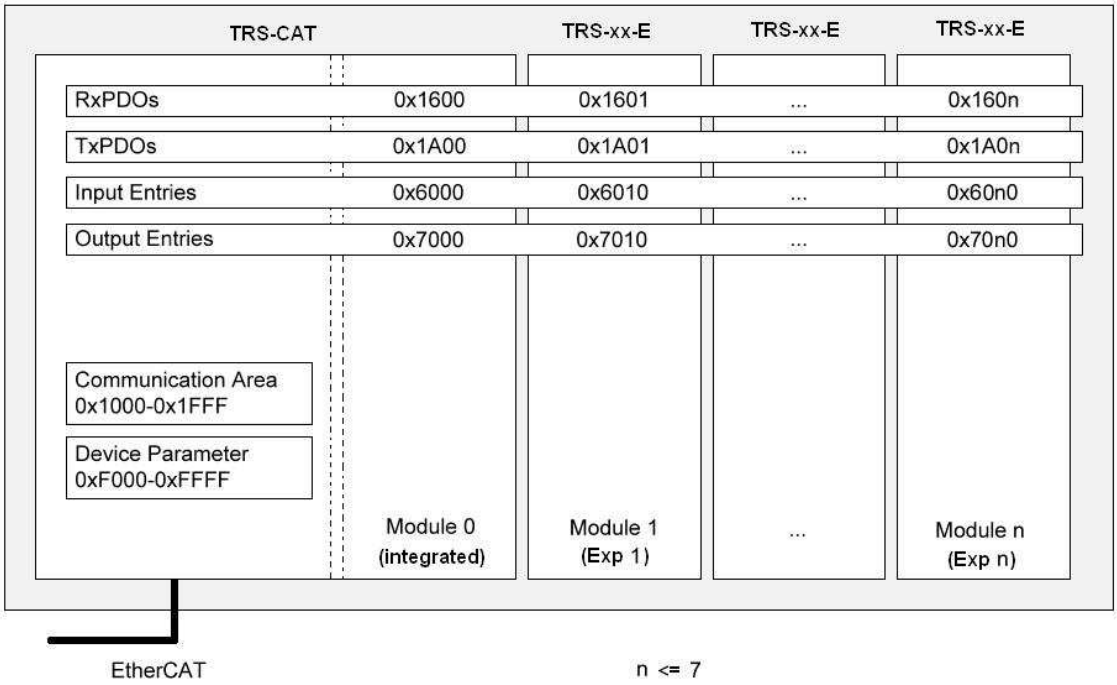
- Integrated TRS-CAT : 0x494F2D42 (“IO-B” in ASCII)
- TRS-IO-E : 0x494F2D45 (“IO-E” in ASCII)
- TRS-AN-E: 0x414E2D45 (“AN-E” in ASCII)
- TRS-AC-E: 0x41432D45 (“AC-E” in ASCII)
- TRS-XX-E: 0x58582D45 (“XX-E” in ASCII) standard generic expansion
- TRS-KK-E: 0x4B4B2D45 (“KK-E” in ASCII) smart generic expansion

Index	Sub	Name	Accesso	PDO Map	Type	Remarks
0xF030	0	Subindex0	R-WPS	No	U8	Number of following expansions: values from 1 to 8 Default 1
	1	Integrated object Id	R-WPS	No	U32	Integrated object Id: accepted 0x494F2D42 only (default)
	2..7	Expansion object Id 1..6	R-WPS	No	U32	Expansion object Id from 1 to 6 TRS-IO-E: 0x494F2D45 TRS-AN-E: 0x414E2D45 TRS-AC-E: 0x41432D45 TRS-XX-E: 0x58582D45 TRS-KK-E: 0x4B4B2D45
	8	Expansion object Id 7	R-WPS	No	U32	Expansion object Id 7 TRS-IO-E: 0x494F2D45 TRS-AN-E: 0x414E2D45 TRS-XX-E: 0x58582D45

Index	Sub	Name	Accesso	PDO Map	Type	Remarks
0xF050	0	Subindex0	RO	No	U8	Number of following expansions: values from 1 to 8 Default 1
	1	Integrated object Id	RO	No	U32	0x494F2D42 (default)
	2..7	Expansion object Id 1..6	RO	No	U32	Expansion object Id from 1 to 6 TRS-IO-E: 0x494F2D45 TRS-AN-E: 0x414E2D45 TRS-AC-E: 0x41432D45 TRS-XX-E: 0x58582D45 TRS-KK-E: 0x4B4B2D45
	8	Expansion object id 7	RO	No	U32	Expansion object Id 7 TRS-IO-E: 0x494F2D45 TRS-AN-E: 0x414E2D45 TRS-XX-E: 0x58582D45

The objects and corresponding to the PDO Tx/Rx assignments are RO. These objects are automatically mapped by TRS-CAT by sending the correct configuration by means the object 0xF030 during the PS transition.

9.3.3 Mapping a remote TRS



A TRS (TRS-CAT or TRS-CAT with TRS-nn-E expansions) is mapped in accordance with the 'Modular Device Profile' ETG (rif. ETG5001) specifications.

Please, note the each module (included that integrated in TRS-CAT) has an object RxPDO and an object TxPDO. For TRS-CAT, RxPDO (0x1600) corresponds to the writing of the 16 integrated outputs (object 0x7000), while the TxPDO (0x1A00) corresponds to the reading of the 16 integrated inputs (objects 0x6000).

To get such a map you only need to download the configuration of the slots, i.e. to send the correct configuration of the remote by means of the object 0xF030 during the PS transition.

Moreover, in the TRS-CAT module an additional TxPDO 0x1AFF, matching the standard object 0xF100 Device status - according to the 'Modular Device Profile' ETG (rif. ETG5001) - is mapped.

9.3.4 Object 0xF100 and mapping 0x1AFF

The standard object 0xF100 includes information on the device state. In TRS-CAT this is defined as follows:

Index	Sub	Name	Access	PDO Map	Type	Remarks
0xF100	0	Subindex0	RO	No	U8	
	1	Diagnostic status	RO	Yes	U8	
	2	TRS bus communication status	RO	Yes	Bool	TRUE = OK
	3	TRS bus voltage status	RO	Yes	Bool	TRUE = OK
	4	TRS bus current status	RO	Yes	Bool	TRUE = OK

The 'Diagnostic status' field (8 bit in subindex 1) is the word for the status of the slots (internal expansions and TRS-nn-E expansions connected to TRS-CAT) whose meaning is :

7	6	5	4	3	2	1	0
State exp 8	State exp 7	State exp 6	State exp 5	State exp 4	State exp 3	State exp 2	State exp 1

A state '1' shows that the corresponding device works correctly, a state '0' shows that the corresponding device has a failure or it is not available in the configuration.

The object 0xF100 is mapped according a 1:1 association in the object 0x1AFF. In the object 0x1AFF there is also the sub-index 5, where the Bool field "New message available" is mapped and corresponds to the sub-index 4 of the object for the diagnosis 0x10F3.

For each error signalled in the object 0F100 a diagnosis message is generated that can be queried via SDO in the object for the diagnosis 0x10F3.

9.3.5 Objects 0xF700 e 0xF701

These objects allow you to set standard behaviour of the exits in case of an error.

The managed errors are listed in the ETG1020 and are communication errors on EtherCAT bus, arising in the Operational status and that involve the autonomous return to the Safe-Operational(-Error) state.

The objects were implemented from the 01.20 firmware version that corresponds to the 01.00 revision of TRS-CAT.

Up to that time in case of an error the digital and analogic outputs should keep by default (implicit) the last state previously known.

This standard behaviour remains, if the field (subindex) of the slot (expansion) of the 0xF701 is 0 (default value when the TRS-CAT device is reset)

Index	Sub	Name	Accesso	PDO Map	Type	Remarks
0xF700	0	Subindex0	RO	No	U8	is worth 8 equal to the max. possible number of slot in TRS-CAT
	1	Integrated Object Error Value	RW	No	U16	Value of the outputs in the case of error for the integrated expansion (ErrorVal0)
	2..8	Expansion Error Value 1..7	RW	No	U16	Value of the outputs in the case of error for the integrated expansion from 1 to 7 (ErrorVal1..7)

Index	Sub	Name	Access	PDO Map	Type	Remarks
0xF701	0	Subindex0	RO	No	U8	is worth 8 equal to the max. possible number of slot in TRS-CAT
	1	Integrated Object Error Mode	RW	No	U16	Error mode from the outpus for the integrated expansion (ErrorMode0)
	2..8	Expansion Error Mode 1..7	RW	No	U16	Error mode from the outputs in the case of error for the expansion from 1 to 7 (ErrorMode 1..7)

Case of integrated expansion or TRS-IO-E: To each bit of ErrorModeN corresponds an output of the expansion.

- If the bit is 0, the output in case of an error will keep the last value known.
- If the bit is 1, the output in case of an error will take the value corresponding to the ErrorVaIN mask.

Case or TRS-AN-E expansion or normal generic expansion:

- If ErrorModeN = 0xFFFF in case of an error the output will take the value of ErrorValN.
- Any other value set in ErrorModeN and the output will keep the last value known. Objects 0xF710.

Case or TRS-AC-E expansion or smart generic expansion: the values of the objects are ignored. The outputs take ALWAYS the last value known.

Warning! A 1 value set in a bit of the 0xF710 objects overwrites any setting with the 0xF700 and =xF701 objects.

9.3.6 0xF710 objects

0xF710 objects (SysOk Mask) is a specific object of TRS-CAT.

This objects allows you to set a default behaviour for the outputs of integrated expansion in the case of error, that is, it assigns the SYSOK properties (taken from GreemBus) to one or more outputs of integrated expansion.

The managed errors are those in the document ETG1020, that is, they are communication errors on EtherCAT bus, arising in the Operational state and that involve the autonomous return of the device to the Safe-Operational(-Error) status.

The object was implemented from the 01.20 firmware version corresponding to the TRS-CAT 01.00 revision.

Up to that time and in case of an error the digital and analogic outputs should keep by default (implicit) the last state previously known.

This standard behaviour still remains, if the field (subindex) of the slot (expansion) of the 0xF701 is 0 (default value when the TRS-CAT device is reset).

Index	Sub	Name	Access	PDO Map	Type	Remarks
0xF710	0	Subindex0	RO	No	U8	Vale 1
	1	SysOK Mask	RW	No	U16	Value taken from the outputs in case of an error of the integrated expansion (ErrorVal0)

For each bit of SysOK Mask an output of the integrated expansion is available.

- If the bit is 0, the output in case of an error will keep the last value known.
- If the bit is 1, the output in case of an error will take 0 as a logic value

Warning! The value 1 set in a bit in the 0xF710 overwrites any settings carried out with the 0xF700 and 0xF701 objects.

9.3.7 Objects for the diagnosis

The diagnosis protocol is implemented using the object 0x10F3 (diagnosis history) in acknowledge mode (queue of max. 20 diagnostic messages before overwriting) in addition to the obligatory object 0x10F1 that with 0x1C32:32 reports possibile synchronisation errors between the master and the slave.

During the diagnosis, in addition to the error and warning messages generated by SM check/DC check of a slave, following error application messages can be generated:

- configuration error (cod. 0xA000);
- internal hardware error ((cod 0x7100 power error in case of TRS bus in overcurrent or undervoltage, cod. 0x7500 communication error in case of error communication on TRS bus);
- +12V power supply error in AN-E (cod 0x5114) module;

- -12V power supply error in AN-E (cod 0x5115) module;
- +24V field power supply error in TRS-nn-E module or in base (code 0x3220);
- Internal software error (cod 0x6100).

The error codes are those concerning the emergency code specified in the documents CiA DS301 and DS4xx with the specific codes defined above. The text of the message is specified in the ESI file.

Warning! Any error of the "Internal hardware error" family brings the non-recoverable shutdown of the TRS bus. TRS-CAT keeps on operating in EtherCAT bus®..

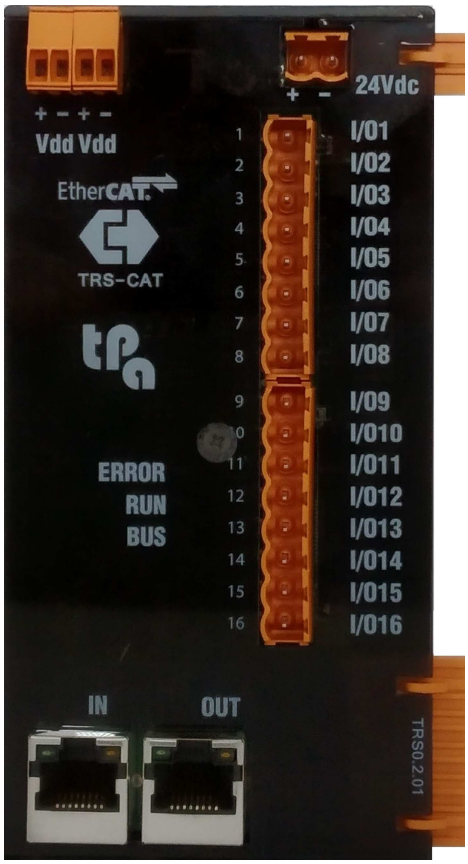
Warning! The "Internal software error" brings the non-recoverable shutdown of the TRS bus and brings the machine back to EtherCAT statuses in PRE-OPERATIONAL condition and subsequent DeadLock.

In the following tables you will find the more significant sub-indeces of these objects.

Index	Sub	Name	Access	PDO Map	Type	Remarks
0x10F1	2	Sync error counter limit	RO	No	U32	Max number of consecutive synchronisation errors: 3

Index	Sub	Name	Access	PDO Map	Type	Remarks
0x10F3	2	Newest message	RO	No	U8	Index of the more recent message
	3	Newest acknovledged message	RW	No	U8	Index of the more recent message sent to which an acknowledge was replied.
	4	New message available	RO	Yes	Bool	New available message: TRUE or FALSE
	5	Flags	RW	No	U16	Enabled flag of messages default 0x00 all enabled Bit1 = 1 disables information messages Bit2 = 1 disables warning messages Bit3 = 1 disables error messages

10 CABLING MAPS



1	+Vdd		
2	-Vdd		

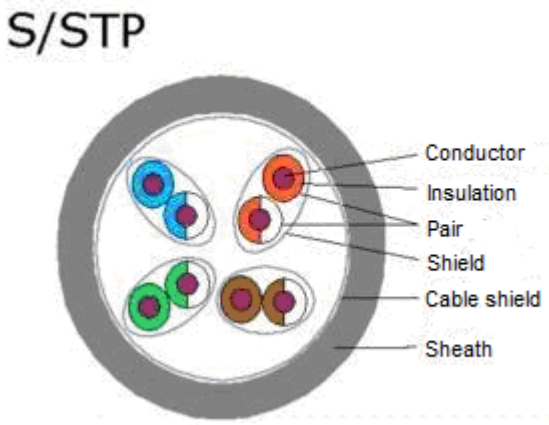
1	+24Vdc		
2	GND24		

1	I/O 1		
2	I/O 2		
3	I/O 3		
4	I/O 4		
5	I/O 5		
6	I/O 6		
7	I/O 7		
8	I/O 8		

1	I/O 9		
2	I/O 10		
3	I/O 11		
4	I/O 12		
5	I/O 13		
6	I/O 14		
7	I/O 15		
8	I/O 16		

10.1 EtherCAT bus cable

EtherCAT channel needs a device-to-device cabling system made with Ethernet cable segments terminated with RJ45 connector. To prevent from the effect of possible electromagnetic interferences, we suggest the use of Cat.6 S/STP cables. All the wires of S/STP cables are double twisted, individually shielded and have an overall screen.



Warning! Do not use Ethernet cross-cables (also called "patch cables")

10.2 Vdd logic power supply

This is the power supply (24 Volt DC) that is used for the operation of TRS-CAT and of the logic of possible expansions connected to TRS-CAT.

We have 2 terminal blocs with 2 poles placed side by side: the first one is used for the power supply of the module, while the second one can be used as a cross-reference to power another module. In any case both the terminal blocks must be inserted.

Warning! The logic power supply (+24V and its GND) is to be removed from the field logic power supply to prevent field electromagnetic interferences influencing the TRS-CAT operation.

10.3 +24Vdc Field Power Supply

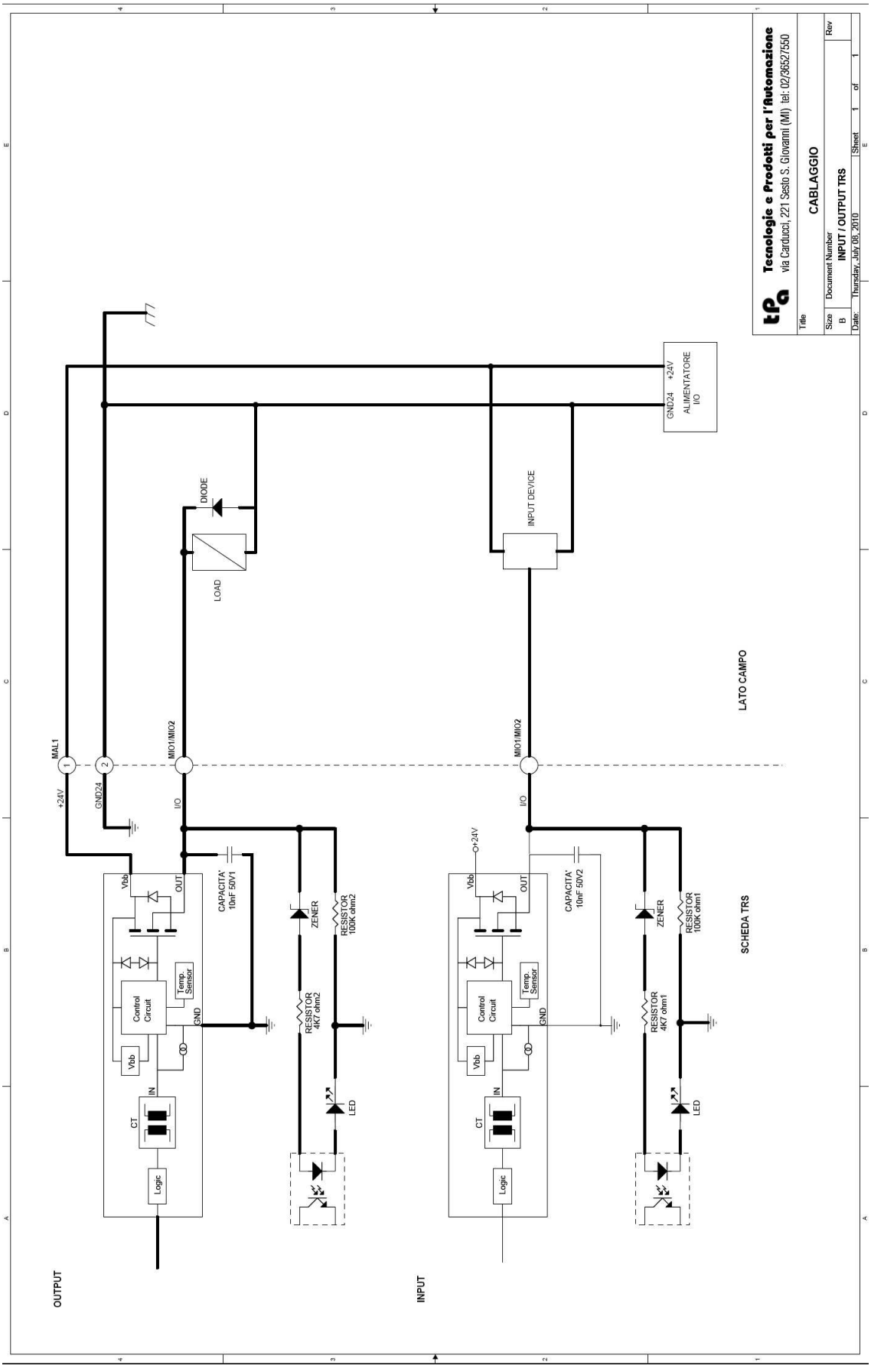
24 Volt DC power supply is used for the driver of the output and it is normally supplied to the TRS bus to power the available expansions, if any, connected to TRS-CAT.

Please note that the max. limit of current that can be supplied by the +24Vdc supplier along the TRS bus of a remote device (receiver plus possible expansions) is 8A. This means that the total loads controlled by a remote device whose +24Vdc power supply is taken from this terminal block only must be sized for a max. 8A absorption, within the limits specified in the chapter 6.

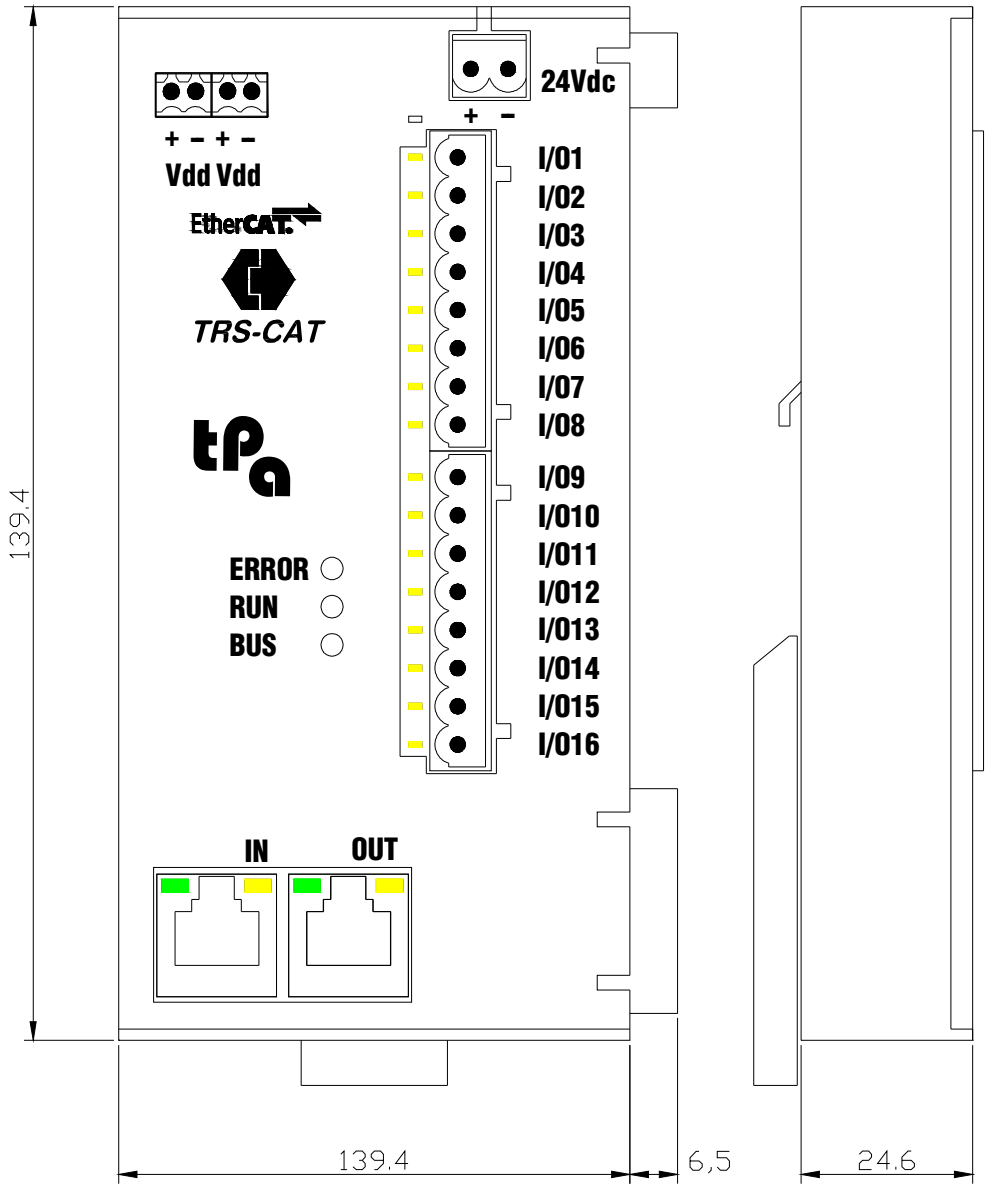
The field power supplied must be separated from the logic one.

In any case the terminal block must be inserted.

11 INPUT/OUTPUT CABLING



12 DIMENSIONS



T.P.A. Srl Tecnologie e Prodotti per l'Automazione
Via Carducci, 221 - 20099 Sesto S. Giovanni
https:\\www.tpaspa.it