EC-TX149 工业以太网通信卡快速使用指南

本指南简要介绍了 EC-TX149 工业以太网通信卡的产品信息、安装与接线、调试说明。

扫描二维码，查阅工业以太网通信卡完整电子说明书。

拨打服务热线 400-700-9997 或访问 www.invt.com.cn 获取更多信息及资源下载。保修条款详见完整版电子说明书。

前言

感谢您使用英威腾 EC-TX149 工业以太网通信卡！

EC-TX149 是一款支持多种协议的工业以太网通信卡，需与 GD28 等系列变频器配合使用，通过多种通信协议与以太网主站通信。

本手册提供了产品信息、安装与接线及调试说明。为确保能正确地安装及操作本产品，发挥其优越性能，请在装机之前，详细阅读本手册。

产品特点：

- 支持通过功能码选择协议
- 支持 5 种协议：PROFINET、EtherCAT、EtherNet IP、EtherNet UDP、Modbus TCP 通信协议
- 部分协议支持同时运行监控功能，满足现场监控示波需求
- 具备 2 个 RJ45 端口
- 通信速率可达 100Mbit/s，通信周期短
- 支持线型和星型网络拓扑，部分协议支持环形网络拓扑

1 产品信息

1.1 型号说明

EC - TX 149
① ② ③

表 1-1 型号说明

标识	标识说明	命名举例
①	产品类别	EC：扩展卡
②	板卡类别	TX：通信扩展卡
③	产品代码	149：PROFINET/EtherCAT/EtherNet IP/Modbus TCP 四合一扩展卡

1.2 规格参数

表 1-2 规格参数

参数	指标
工作温度	-10~50℃
存储温度	-20~60℃
相对湿度	5%~95%(无凝结)
使用环境	无腐蚀性气体
安装方式	卡槽加螺钉固定
防护等级	IP00
散热方式	自然风冷
通信速率	100M bit/s
网络拓扑	支持线型和星型网络拓扑，部分协议支持环形网络拓扑

1.3 产品结构

图 1-1 产品部件示意图

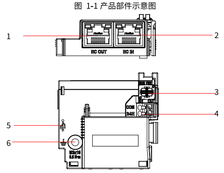


表 1-3 产品部件说明

序号	名称	说明
1	通信网口（EC OUT）	支持 5 种总线类型：PROFINET、EtherCAT、EtherNet IP、Modbus TCP、EtherNet UDP EtherCAT 为 OUT 端口，其它协议不区分方向
2	通信网口（EC IN）	支持 5 种总线类型：PROFINET、EtherCAT、EtherNet IP、Modbus TCP、EtherNet UDP EtherCAT 为 IN 端口，其它协议不区分方向
3	+24E COM	外部接入 24V，可用于通信调试
4	指示灯	详见 1.4 指示灯
5	Type-C	厂家保留
6	固定孔	用于扩展卡和控制板安装及固定

1.4 指示灯

表 1-4 PROFINET 通信指示灯

指示灯位号	颜色	定义	功能
RUN	绿	常亮	通信建立成功，且 IO 数据正常交互
		闪烁 （亮 500ms，灭 500ms）	通信建立成功，但是无有效的 IO 数据交互
		闪烁 （亮 100ms，灭 100ms）	处于通信配置阶段，如 DCP 配置指令时触发等，会与 ERR 灯同时闪烁
		常灭	通信卡和 PLC 通信不在“在线”状态
L/A IN (HOST)	绿	常亮	通信卡正在和变频器握手
		闪烁 （亮 500ms，灭 500ms）	通信卡和变频器处于正常通信阶段 **注意：**握手完成后的阶段，不管通信卡和主控板间是否有数据传输，都应闪烁。
		常灭	通信卡处于初始化或参数配置阶段
L/A OUT (DATA)	绿	常亮	通信卡与主控板间无数据更新或更新异常
		闪烁 （亮 500ms，灭 500ms）	通信卡与主控板间数据更新正常
ERR	红	常灭	无故障
		闪烁 （亮 100ms，灭 100ms）	通信建立异常

表 1-5 EtherCAT 通信指示灯

指示灯位号	颜色	定义	功能
RUN	绿	常灭	处于 Init 状态
		闪烁 （亮 200ms，灭 200ms）	处于 PreOP 状态
		单闪 （亮 200ms，灭 1s）	处于 SafeOP 状态
		常亮	处于 OP 状态
L/A IN	绿	常亮	接口 IN LinK 确立，无数据收发
		闪烁 （亮 50ms，灭 50ms）	接口 IN LinK 确立，有数据收发
		常灭	接口 IN LINK 未确立
L/A OUT	绿	常亮	接口 OUT Link 确立，无数据收发
		闪烁 （亮 50ms，灭 50ms）	接口 OUT Link 确立，有数据收发
		常灭	接口 OUT LINK 未确立
ERR	红	常灭	无故障
		闪烁 （亮 200ms，灭 200ms）	出现 Init/Preop 故障
		单闪 （亮 200ms，灭 1s）	出现 Safeop 故障
		常亮	出现 OP 故障

表 1-6 EtherNet IP 通信指示灯

指示灯位号	颜色	定义	功能
RUN	绿	常亮	通信卡和 PLC 通信在线，且可进行数据交互
		闪烁 （亮 500ms，灭 500ms）	通信卡和 PLC 的 IP 地址配置异常
		常灭	通信卡和 PLC 通信不在“在线”状态
L/A IN (HOST)	绿	常亮	通信卡正在和变频器握手
		闪烁 （亮 500ms，灭 500ms）	通信卡和变频器处于正常通信阶段 **注意：**握手完成后的阶段，不管通信卡和主控板间是否有数据传输，都应闪烁。
		常灭	通信卡处于初始化或参数配置阶段
L/A OUT (DATA)	绿	常亮	通信卡与主控板间无数据更新或更新异常
		闪烁 （亮 500ms，灭 500ms）	通信卡与主控板间数据更新正常
ERR	红	常亮	无故障
		闪烁 （亮 500ms，灭 500ms）	PLC 配置错误
		闪烁 （亮 250ms，灭 250ms）	通信卡向 PLC 发送数据失败
		闪烁 （亮 125ms，灭 125ms）	通信卡和 PLC 连接超时
		常亮	通信卡和 PLC 通信数据建立失败

表 1-7 Modbus TCP 通信指示灯

指示灯位号	颜色	定义	功能
RUN	绿	常亮	通信卡和 PLC 通信在线，且可进行数据交互
		闪烁 （亮 500ms，灭 500ms）	通信卡或 PLC 的 IP 地址配置异常
		常灭	通信卡与 PLC 通信不在“在线”状态
L/A IN (HOST)	绿	常亮	通信卡正在和变频器握手
		闪烁 （亮 500ms，灭 500ms）	通信卡和变频器处于正常通信阶段 **注意：**握手完成后的阶段，不管通信卡和主控板间是否有数据传输，都应闪烁。
		常灭	通信卡处于初始化或参数配置阶段
L/A OUT (DATA)	绿	常亮	通信卡与主控板间无数据更新或更新异常
		闪烁 （亮 500ms，灭 500ms）	通信卡与主控板间数据更新正常
ERR	红	常亮	通信卡和 PLC 通信处于掉线状态
		闪烁 （亮 500ms，灭 500ms）	操作不支持的 CMD 控制字指令或 PR 功能码值

指示灯位号	颜色	定义	功能
		闪烁 （亮 62.5ms，灭 62.5ms）	操作不存在的节点地址
		常灭	通信卡与 PLC 通信正常

1.5 协议选择

表 1-8 通信协议选择

功能码	通信协议	缺省值
P24.00	PROFINET	0（出厂默认）
	EtherCAT	1
	保留	2
	EtherNet IP	3
	Modbus TCP	4
	EtherNet UDP	5
	PROFINET + EtherNet UDP	6
	EtherCAT + EtherNet UDP	7
	保留	8~14
	无通信扩展卡	15

1.6 协议参数

表 1-9 协议参数说明

功能码	通信协议	说明
P24.00	PROFINET	● 支持 PROFINET 协议，支持 PROFINET IO 设备，支持介质冗余协议 MRP，搭配从站 GSDML 配置文件，可与西门子 PLC 等主站进行通信。 ● 可实现读写变频器过程量、读取变频器状态量和读写变频器功能码等对变频器的基本操作，本通信卡支持 32 个 IO。 ● 支持线型、星型和环型网络拓扑。
	EtherCAT	● 支持 CiA301、CiA402 CoE 协议，搭配从站 XML 配置文件，可与倍福 PLC、英威腾 AX 控制器等主站进行通信。 ● 支持 PDO 服务、SDO 服务、制造商定义的对象字典和 SDO 读写变频器功能码，满足广内 EtherCAT 一致性测试认证要求。 ● 支持线型、星型和环型网络拓扑。 ● 具备 2 个 RJ45 端口，区分方向 IN 和 OUT。
	EtherNet IP	● 支持 ODVA 行规、DLR 环网协议，搭配从站 EDS 配置文件，可与罗克韦尔 PLC 等主站进行通信。 ● 可实现读写变频器过程量、读取变频器状态量、读写变频器功能码等对变频器的基本操作，本通信卡支持 32 个 IO。 ● 支持线型、星型和环型网络拓扑。
	Modbus TCP	● 支持 Modbus TCP 协议、Modbus TCP 从站可与多个主站同时通信，可与施耐德 PLC、英威腾 AX 控制器等主站进行通信。 ● 可实现读写变频器过程量、读取变频器状态量、读写变频器功能码等对变频器的基本操作。 ● 支持线型和星型网络拓扑。
	EtherNet UDP	● 支持英威腾 Ethernet 协议，支持连接英威腾上位机 INVT Workshop,进行监控和示波，允许多卡组网监控。 ● 支持线型和星型网络拓扑。
	PROFINET + EtherNet UDP	● 支持同一网络同时运行 PROFINET 和 EtherNet UDP。
	EtherCAT + EtherNet UDP	● 支持同一网络同时运行 EtherCAT 和 EtherNet UDP，且 EtherCAT 处于在线状态。

2 安装与接线

2.1 安装注意事项

安装前请先对变频器断电。

安装所需工具：十字螺丝刀 PH1。

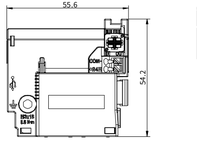
表 2-1 螺丝扭矩要求

螺丝规格	紧固力矩
M3	0.55 N·m

2.2 尺寸说明

尺寸为 108.5×39mm，如下图所示。

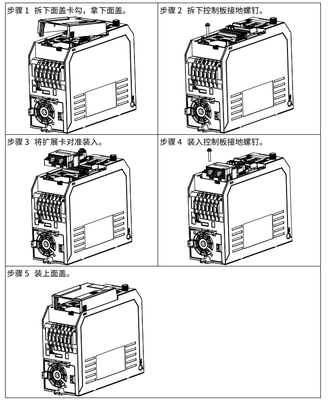
图 2-1 产品外形及安装尺寸（单位：mm）



2.3 安装说明

按照如下图示操作：

图 2-2 安装位置示意



注意：

- 扩展卡与控制板通过插槽实现电气连接，请务必安装到位。
- 为保证扩展卡的可靠运行和 EMC 需求，请将螺丝按照推荐的扭矩进行紧固连接，确保可靠接地。

2.4 拆卸说明

步骤 1 拆下面盖卡勾，拿下面盖。
步骤 2 拆下控制板接地螺钉。
步骤 3 取出扩展卡。
步骤 4 装入控制板接地螺钉。
步骤 5 装上面盖。

2.5 用户接线端子

图 2-3 RJ45 端子结构

表 2-2 RJ45 端子功能定义

序号	端子说明	功能描述
1	TX+	Transmit Data+ (发信号+)
2	TX-	Transmit Data- (发信号-)
3	RX+	Receive Data+ (收信号+)
4	n/c	Not connected (空脚)
5	n/c	Not connected (空脚)
6	RX-	Receive Data- (收信号-)
7	n/c	Not connected (空脚)
8	n/c	Not connected (空脚)
9	LED1+	LED1+(黄色)
10	LED1-	LED1-(黄色)
11	LED2+	LED2+(绿色)
12	LED2-	LED2-(绿色)

2.6 接线注意事项

扩展卡采用标准的 RJ45 接口，其电气接线如图 2-4、图 2-5 和图 2-6 所示。

注意：推荐使用双绞屏蔽超五类网线，其水晶头需带铁壳满足接地屏蔽保护。

图 2-4 线型网络拓扑电气连接

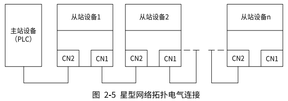
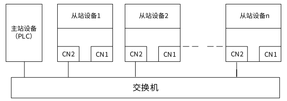
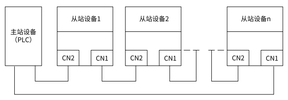


图 2-5 星型网络拓扑电气连接



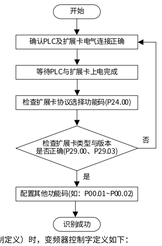
注意：对于星型网络拓扑，用户需准备交换机。

图 2-6 环型网络拓扑电气连接



3 调试

图 3-1 扩展卡调试流程



P14.71 选择 0（按十进制定义）时，变频器控制字定义如下：

表 3-1 Goodrive28 系列的控制字(CW) “十进制” 表示

位（bit）	名称	值	说明
0~7	通信控制命令	1	正转运行
		2	反转运行
		3	正转点动
		4	反转点动
		5	停机
		6	自由停机
		7	故障复位
		8	点动停止
		9	紧急停机
8	读写使能	1	读写使能（PKW1~PKW4）
9~10	选择电机组别	00	选择电机 1
		01	选择电机 2
11	控制模式选择	1	转矩控制/速度控制选择使能
		0	不选择
12	用电量清零	1	用电量清零使能
		0	用电量清零禁止
13	预励磁	1	预励磁使能
		0	预励磁禁止
14	直流制动	1	直流制动使能
		0	直流制动禁止
15	心跳给定	1	心跳使能
		0	心跳禁止

P14.71 选择 1（按二进制定义）时，变频器控制字定义如下：

表 3-2 Goodrive28 系列的控制字(CW) “二进制” 表示

位（bit）	名称	说明	优先级
0	正向运行	0：减速停机 1：正向运行	1
1	反向运行	0：减速停机 1：反向运行	2
2	故障复位	0：无 1：故障复位	3
3	自由停机	0：无 1：自由停机	4
4	正向点动	0：无 1：正向点动	5
5	反向点动	0：无 1：反向点动	6
6	点动停止	0：无 1：点动停止	7
7	-	保留	-
8	读写使能 （PKW1~PKW4）	0：无 1：读写使能	-
9	-	保留	-
10	紧急停机	0：无 1：紧急停机	0（最优先）
11~15	保留	-	-

P14.71 选择 0（按十进制定义）时，变频器状态字定义如下：

表 3-3 Goodrive28 系列状态字(SW) “十进制” 表示

位（bit）	名称	值	说明
0~7	运行状态字节	1	正转运行中
		2	反转运行中
		3	变频器停机中
		4	变频器故障中
		5	变频器 POFF 状态
8	母线电压建立	1	运行准备就绪
		0	运行准备未就绪
9~10	电机组别反馈	0	电机 1 反馈
		1	电机 2 反馈
11	电机类型反馈	1	同步电机
		0	异步电机
12	过载预警反馈	1	过载预报警
		0	未过载预报警
13~14	运行模式选择	0	键盘控制
		1	端子控制
		2	通信控制
		3	保留
15	心跳反馈	1	心跳反馈
		0	无心跳反馈

P14.71 选择 1（按二进制定义）时，变频器状态字定义如下：

表 3-4 Goodrive28 系列的状态字(SW) “二进制” 表示

位（bit）	名称	说明	优先级
0	正向运行	0：无 1：正向运行中	1
1	反向运行	0：无 1：反向运行中	2
2	停机	0：无 1：变频器停机中	3
3	故障	0：无 1：变频器故障中	4
4	POFF	0：无 1：变频器 POFF 状态	5
5	预励磁	0：无 1：变频器预励磁状态	6
6~15	保留	-	-

注意：关于扩展卡的其他参数设置，请参考《EC-TX149 工业以太网通信卡用户手册》。

66001-01518

EC-TX149 Industrial Ethernet Communication Card Quick Start Guide

This guide briefly introduces the product information, installation and wiring, and commissioning instructions of EC-TX149 industrial Ethernet communication card.

Visit www.invt.com for more information and source download. For details, see the full version of corresponding product e-manual.

Scan the QR code to view the full version of corresponding product e-manual.

Preface

Thank you for choosing INVT EC-TX149 industrial Ethernet communication card.

The EC-TX149 is an industrial Ethernet communication card that supports multiple protocols and is designed to be integrated into VFDs like the GD28 series, enabling communication with Ethernet master stations across various protocols.

This guide provides the product overview, installation and wiring, and commissioning instructions. To ensure safe and proper use of the product and to maximize its performance, read the guide carefully before installation.

Product features

- Supports protocol selection through function codes.
- Supports five types of protocols: PROFINET, EtherCAT, EtherNet IP, EtherNet UDP, and Modbus TCP.
- Certain protocols allow for the concurrent operation of monitoring to meet the requirements for on-site oscilloscope monitoring.
- Equipped with two RJ45 ports.
- With a communication rate up to 100Mbit/s, and short communication cycle.
- Supports both linear and star network topologies, with certain protocols also accommodating ring network topology.

1 Product overview

1.1 Model description

EC - TX 149
① ② ③

Table 1-1 Model description

Symbol	Description	Naming example
①	Product category	EC: Expansion card
②	Board card category	TX: Communication expansion card
③	Product code	149: PROFINET/EtherCAT/EtherNet IP/Modbus TCP four-in-one expansion card

1.2 Specifications

Table 1-2 Specifications

Parameter	Specifications
Working temperature	-10–50°C
Storage temperature	-20–60°C
Relative humidity	5%–95% (No condensation)
Operating environment	No corrosive gas
Mounting method	Secured in the slot with screws
Ingress protection (IP) rating	IP00
Heat dissipation method	Natural air cooling
Communication rate	100M bit/s
Network topology	Supports both linear and star network topologies, with certain protocols also accommodating a ring network topology.

1.3 Product structure

Figure 1-1 Product components

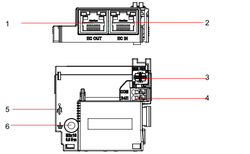


Table 1-3 Product components description

No.	Name	Description
1	Communication port (EC OUT)	Supports five bus types: PROFINET, EtherCAT, EtherNet IP, Modbus TCP, and EtherNet UDP. EtherCAT is only supported on the OUT port, while other protocols do not distinguish the direction.
2	Communication port (EC IN)	Supports five bus types: PROFINET, EtherCAT, EtherNet IP, Modbus TCP, and EtherNet UDP. EtherCAT is only supported on the IN port, while other protocols do not distinguish the direction.
3	+24E	An external 24V connection can be used for communication commissioning.
	COM	
4	Indicator	See section 1.4 Indicator.
5	Type-C	Reserved.
6	Fixed hole	Used for the installation and fastening of the communication card and control board.

1.4 Indicator

Table 1-4 PROFINET communication indicators

Indicator	Color	Definition	Function
RUN	Green	Steady on	Communication established successfully, with normal IO data exchange.
		Blink (On: 500ms; Off: 500ms)	Communication established successfully, but without valid IO data exchange.
		Blink (On: 100ms; Off: 100ms)	In the communication configuration phase. For example, when DCP configuration commands are triggered, it will blink simultaneously with the ERR indicator.
		Steady off	The communication between the communication card and PLC is not in Online state.
L/A IN (HOST)	Green	Steady on	The communication card is in the process of handshaking with the VFD.
		Blink (On: 500ms; Off: 500ms)	The communication card and VFD communicate normally. **Note:** After the handshaking is completed, it should blink regardless of whether there is data transmission between the communication card and the main control board.
		Steady off	The communication card is in the initialization or parameter configuration phase.
L/A OUT (DATA)	Green	Steady off	No data update or abnormal update between the communication card and main control board.
		Blink (On: 500ms; Off: 500ms)	The data update between the communication card and main control board is normal.
ERR	Red	Steady off	No fault.
		Blink (On: 100ms; Off: 100ms)	Abnormal communication establishment.

Table 1-5 EtherCAT communication indicators

Indicator	Color	Definition	Function
RUN	Green	Steady off	In Init state.
		Blink (On: 200ms; Off: 200ms)	In PreOP state.
		Single flash (On: 200ms; Off: 1s)	In SafeOP state.
		Steady on	In OP state.
L/A IN	Green	Steady on	IN Link established, without data transmission.
		Blink (On: 50ms; Off: 50ms)	IN Link established, with data transmission.
		Steady off	IN LINK not established.
L/A OUT	Green	Steady on	OUT Link established, without data transmission.
		Blink (On: 50ms; Off: 50ms)	OUT Link established, with data transmission.
		Steady off	OUT LINK not established.
ERR	Red	Steady off	No fault.
		Blink (On: 200ms; Off: 200ms)	The Init/Preop fault occurred.
		Single flash (On: 200ms; Off: 1s)	The Safeop fault occurred.
		Steady on	The OP fault occurred.

Table 1-6 EtherNet IP communication indicators

Indicator	Color	Definition	Function
RUN	Green	Steady on	The communication between the communication card and the PLC is online, and data exchange is allowed.
		Blink	Abnormal setting of the IP address for the

Indicator	Color	Definition	Function
		(On: 500ms; Off: 500ms)	communication card and PLC.
		Steady off	The communication between the communication card and PLC is not in Online state.
L/A IN (HOST)	Green	Steady on	The communication card is in the process of handshaking with the VFD.
		Blink (On: 500ms; Off: 500ms)	The communication card and VFD communicate normally. **Note:** After the handshaking is completed, it should blink regardless of whether there is data transmission between the communication card and the main control board.
		Steady off	The communication card is in the initialization or parameter configuration phase.
L/A OUT (DATA)	Green	Steady off	No data update or abnormal update between the communication card and main control board.
		Blink (On: 500ms; Off: 500ms)	The data update between the communication card and main control board is normal.
ERR	Red	Steady off	No fault.
		Blink (On: 500ms; Off: 500ms)	Incorrect PLC configuration.
		Blink (On: 250ms; Off: 250ms)	The communication card fails to send data to the PLC.
		Blink (On: 125ms; Off: 125ms)	Connection timeout between the communication card and PLC.
		Steady on	Communication data establishment failure between the communication card and PLC.

Table 1-7 Modbus TCP communication indicators

Indicator	Color	Definition	Function
RUN	Green	Steady on	The communication between the communication card and the PLC is online, and data exchange is allowed.
		Blink (On: 500ms; Off: 500ms)	Abnormal setting of the IP address for either the communication card or the PLC.
		Steady off	The communication between the communication card and PLC is not in Online state.
L/A IN (HOST)	Green	Steady on	The communication card is in the process of handshaking with the VFD.
		Blink (On: 500ms; Off: 500ms)	The communication card and VFD communicate normally. **Note:** After the handshaking is completed, it should blink regardless of whether there is data transmission between the communication card and the main control board.
		Steady off	The communication card is in the initialization or parameter configuration phase.
L/A OUT (DATA)	Green	Steady off	No data update or abnormal update between the communication card and main control board.
		Blink (On: 500ms; Off: 500ms)	The data update between the communication card and main control board is normal.
ERR	Red	Steady on	The communication between the communication card and PLC is offline.
		Blink (On: 500ms; Off: 500ms)	An attempt to execute an unsupported CMD control word or PR function code value.
		Blink (On: 62.5ms; Off: 62.5ms)	An attempt to operate on a non-existent node address.
		Steady off	The communication between the communication card and PLC is normal.

1.5 Communication protocol selection

Table 1-8 Communication protocol selection

Function code	Communication protocol	Default
P24.00	PROFINET	0 (Factory setting)
	EtherCAT	1
	Reserved	2
	EtherNet IP	3
	Modbus TCP	4
	EtherNet UDP	5
	PROFINET + EtherNet UDP	6
	EtherCAT + EtherNet UDP	7

Function code	Communication protocol	Default
	Reserved	8–14
	No communication card	15

1.6 Protocol parameter

Table 1-9 Protocol parameter description

Function code	Communication protocol	Description
P24.00	PROFINET	• Supports the PROFINET protocol, PROFINET IO devices, and medium redundancy protocol (MRP). With the slave GSDML configuration file, it can communicate with Siemens PLC and other master devices. • Enables basic operations on VFDs, such as reading and writing process values, reading status values, as well as reading and writing function codes. This communication card supports up to 32 IOs. • Applicable to linear, star, and ring network topologies.
	EtherCAT	• Supports the CiA301 and CiA402 CoE protocols. With the slave XML configuration file, it can communicate with master devices such as Beckhoff PLCs and INVT AX controllers. • Supports PDO and SDO services, manufacturer-defined object dictionaries, and SDO reading/writing of VFD function codes, meeting the EtherCAT compliance testing certification requirements within the factory. • Applicable to linear, star, and ring network topologies. • Equipped with two RJ45 ports, designated for IN and OUT directions.
	EtherNet IP	• Supports ODVA standards and DLR ring protocol. With the slave EDS configuration file, it can communicate with Rockwell PLCs and other master devices. • Enables basic operations on VFDs, such as reading and writing process values, reading status values, as well as reading and writing function codes. This communication card supports up to 32 IOs. • Applicable to linear, star, and ring network topologies.
	Modbus TCP	• Supports the Modbus TCP protocol. The Modbus TCP slave can communicate with multiple master devices simultaneously. It can communicate with Schneider PLCs, INVT AX controllers, and other master devices. • Enables basic operations on VFDs, such as reading and writing process values, reading status values, as well as reading and writing function codes. • Applicable to linear and star network topologies.
	EtherNet UDP	• Supports INVT Ethernet protocol, connecting to the INVT Workshop for monitoring and oscilloscope functions, allowing for multi-card network monitoring. • Applicable to linear and star network topologies.
	PROFINET + EtherNet UDP	• Supports concurrent PROFINET and EtherNet UDP communications on the same network.
	EtherCAT + EtherNet UDP	• Supports concurrent EtherCAT and EtherNet UDP communications on the same network, with EtherCAT required to remain online.

2 Installation and wiring

2.1 Installation precautions

⚠	Before installation, ensure the VFD is powered off.

Required tools: Phillips screwdriver PH1.

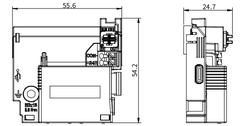
Table 2-1 Screw torque requirements

Screw size	Fastening torque
M3	0.55 N·m

2.2 Dimensions

The dimensions are 108.5×39mm, as shown in the following figure.

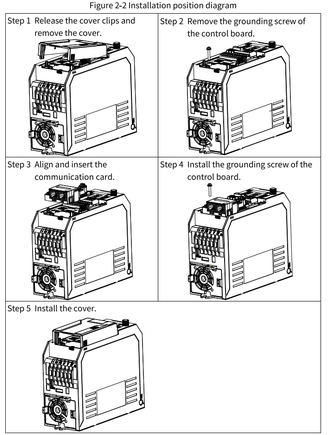
Figure 2-1 Product outline and installation dimensions (unit: mm)



2.3 Installation instructions

Follow the steps shown in the diagram below:

Figure 2-2 Installation position diagram



Note:

- The communication card and control board are electrically connected through slots. Install them in place.
- To ensure the reliable operation of the communication card and meet the EMC requirements, tighten the screws according to the recommended torque for reliable grounding.

2.4 Disassembly instructions

Step 1 Release the cover clips and remove the cover.
Step 2 Remove the grounding screw of the control board.
Step 3 Remove the communication card.
Step 4 Install the grounding screw of the control board.
Step 5 Install the cover.

2.5 User's wiring terminals

Figure 2-3 RJ45 terminal structure

Table 2-2 RJ45 terminal functions

No.	Description	Function
1	TX+	Transmit Data+
2	TX-	Transmit Data-
3	RX+	Receive Data+
4	n/c	Not connected
5	n/c	Not connected
6	RX-	Receive Data-
7	n/c	Not connected

No.	Description	Function
8	n/c	Not connected
9	LED1+	LED1+ (Yellow)
10	LED1-	LED1- (Yellow)
11	LED2+	LED2+ (Green)
12	LED2-	LED2 - (Green)

2.6 Wiring precautions

The communication card uses standard RJ45 interfaces, and its electrical connections are shown in Figure 2-4, Figure 2-5, and Figure 2-6.

Note: It is recommended to use double-twisted shielded Category 5e Ethernet cables, with crystal heads equipped with iron shells to meet the grounding shield protection.

Figure 2-4 Linear network topology electrical connection

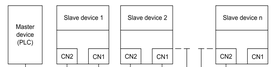
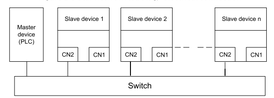
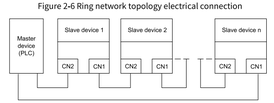


Figure 2-5 Star network topology electrical connection



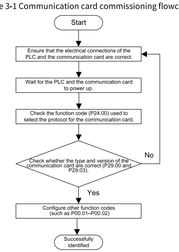
Note: For the star network topology, you need to prepare switches.

Figure 2-6 Ring network topology electrical connection



3 Commissioning

Figure 3-1 Communication card commissioning flowchart



When 14.71 is 0 (defined in decimal), the VFD control word (CW) definitions are as follows:

Table 3-1 Goodrive28 series VFD CWs in decimal

Bit	Name	Value	Description
0–7	Communication-based control command	1	Run forward
		2	Run reversely
		3	Jog forward
		4	Jog reversely
		5	Stop
		6	Coast to stop
		7	Reset faults
		8	Jogging stop
		9	Emergency stop
8	Enable read and write	1	Enable read and write (PKW1–PKW4)
9–10	Motor group selection	00	Select motor 1
		01	Select motor 2
11	Control mode selection	1	Enable torque/speed control selection
		0	No selection

Bit	Name	Value	Description
12	Reset power consumption to zero	1	Enable the function for resetting power consumption to zero
		0	Disable the function for resetting power consumption to zero
13	Pre-excitation	1	Enable pre-excitation
		0	Disable pre-excitation
14	DC braking	1	Enable DC braking
		0	Disable DC braking
15	Heartbeat reference	1	Enable heartbeat
		0	Disable heartbeat

When P14.71 is 1 (defined in binary), the VFD CW definitions are as follows:

Table 3-2 Goodrive28 series VFD CWs in binary

Bit	Name	Description	Priority
0	Run forward	0: Decelerate to stop 1: Run forward	1
1	Run reversely	0: Decelerate to stop 1: Run reversely	2
2	Reset faults	0: None 1: Reset faults	3
3	Coast to stop	0: None 1: Coast to stop	4
4	Forward jogging	0: None 1: Forward jogging	5
5	Reverse jogging	0: None 1: Reverse jogging	6
6	Jogging stop	0: None 1: Jogging stop	7
7	-	Reserved	-
8	Enable read and write (PKW1–PKW4)	0: None 1: Enable read and write	-
9	-	Reserved	-
10	Emergency stop	0: None 1: Emergency stop	0 (Top priority)
11–15	Reserved	-	-

When P14.71 is 0 (defined in decimal), the VFD status word (SW) definitions are as follows:

Table 3-3 Goodrive28 series VFD SWs in decimal

Bit	Name	Value	Description
0–7	Running status	1	Running forward
		2	Running reversely
		3	In stop state
		4	In fault state
		5	In POFF state
8	Bus voltage established	1	Ready to run
		0	Not ready for running
9–10	Motor group feedback	0	Feedback of motor 1
		1	Feedback of motor 2
11	Motor type feedback	1	Synchronous motor (SM)
		0	Asynchronous motor (AM)
12	Overload pre-alarm feedback	1	Pre-alarm upon overload
		0	No pre-alarm upon overload
13–14	Running mode selection	0	Keypad-based control
		1	Terminal-based control
		2	Communication-based control
		3	Reserved
15	Heartbeat feedback	1	Enable
		0	Disable

When P14.71 is 1 (defined in binary), the VFD SW definitions are as follows:

Table 3-4 Goodrive28 series VFD SWs in binary

Bit	Name	Description	Priority
0	Run forward	0: None 1: Running forward	1
1	Run reversely	0: None 1: Running reversely	2
2	Stop	0: None 1: In stop state	3
3	Fault	0: None 1: In fault state	4
4	POFF	0: None 1: In POFF state	5
5	Pre-excitation	0: None 1: In the pre-excitation state	6
6–15	Reserved	-	-

Note: For other parameter settings of the communication card, refer to the *EC-TX149 Industrial Ethernet Communication Card User Manual*.

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