Goodrive28 系列变频器快速使用指南

本指南简要介绍了 Goodrive28 系列变频器（简称 GD28）的外围接线、端子、键盘、快速运行、常用功能参数设置、常见故障及对策、产品尺寸和能效数据。

扫描二维码，查阅 GD28 系列产品完整电子说明书。

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。

⚠ 警告

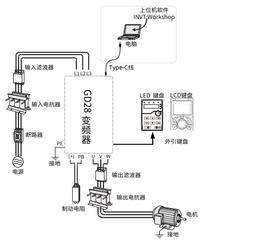
- 本指南仅包含基本的安装调试信息。若不遵守相关文档中的安全说明和安装调试说明，可能导致设备损坏、人身伤害、甚至人员死亡等事故。
- 只有培训合格的专业人员才允许进行相关操作。

⚠ 危险

- 禁止在电源接通的情况下进行接线、检查或更换器件等作业。进行这些作业前，须确认所有输入电源已断开，并等待不短于安频器上标注的时间。

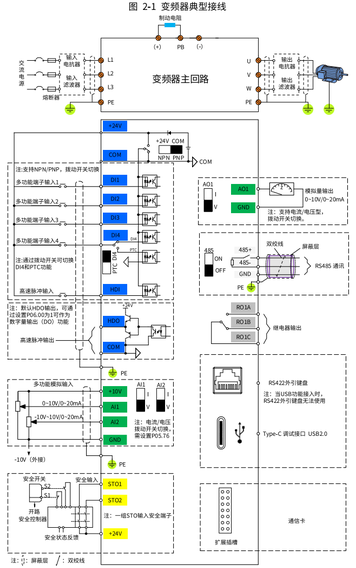
至少等待时间	变频器机型
5 分钟	1PH 220V 0.2~4kW；3PH 220V 0.2~15kW； 3PH 380V 0.4~22kW；3PH 575V 0.4~22kW

1 外围接线



2 电气接线图

图 2-1 变频器典型接线



3 端子功能说明

表 3-1 变频器端子说明

端子标识	功能说明	
主回路端子		
L1, L2, L3（L1、L2）	三相（或单相）交流输入端子，与电网连接	
U, V, W	三相（或单相）交流输出端子，一般接电机	
(+)	(+)、(-) 共直流母线端子 PB、(+) 外接制动电阻端子	
(-)		
PB		
⏚	PE 端子，每台机器 PE 端子必须可靠接地	
控制回路端子		
+10V	本机提供+10V 电源，最大输出电流 50mA	
AI1	输入范围：0~10V/0~20mA 输入阻抗：电压输入时 33kΩ，电流型输入 250Ω 电压或电流输入由拨动开关 AI1(I/V)切换设定，同时对功能码 P05.76 需做设置 分辨率：全量程 1%精度	
AI2	输入范围：-10~10V/0~20mA 输入阻抗：电压输入时 33kΩ，电流型输入 250Ω 电压或电流输入由拨动开关 AI1(I/V)切换设定，同时功能码 P05.76 需做设置 分辨率：全量程 1%精度	
AO1	输出范围：0~10V/0~20mA 电压或电流输出由拨动开关 AO1(I/V)设定 分辨率：全量程 1%精度	
RO1A	继电器输出：RO1A 常开，RO1B 常闭，RO1C 公共端 触点容量：3A/AC 250V，1A/DC 30V	
RO1B		
RO1C		
GND	+10V 电源参考地和模拟信号参考地	
HDO1	开关容量：50mA/30V；输出频率范围：0~50kHz 可作普通 DO 端子，推挽输出,功能码 P06.00 配置选择	
485+	485 差分信号通信端口，标准 485 通信接口请使用屏蔽双绞线，485 通信的 120Ω 终端匹配电阻通过拨动开关 485(ON/OFF)选择接入	
485-		
USB	Type-C 接口，可直接连接 PC，通信协议为 Modbus RTU。变频器不接主电源时，可修改、保存、导入与导出参数；变频器接主电源时，可以控制变频器运行、监控变频器运行参数	
+24V	变频器提供对外输出用户电源，最大输出电流 100mA 可作 DI 端子外部 NPN 模式电源输入（拨码需打到 NPN 档位）	
COM	+24V 数字参考地，可用作外部 PNP 模式输入（拨动开关必须设置在 PNP 位置）	
DI1~DI4（PTC）	DI1~DI4 数字量功能： 有效输入高电平范围：10~30V 有效输入低电平范围：0~5V 最大输入频率：1kHz 可编程数字量输入端子，用户可通过功能码设定端子功能 可通过拨动开关选择 NPN/PNP 模式，可支持外部电源接法 PTC 功能：仅 DI4 端子可配置为 PTC 过温保护功能，功能码 P05.04=57 及拨动开关打到 PTC 位置设置，过温阻值 3.6kΩ,恢复 1.5kΩ	
HDI1	满足 NPN 和 PNP 切换，除具有开关量输入功能外，还可作为高频脉冲输入通道 最大输入频率：50kHz 占空比：30%~70%	
STO1	安全转矩停止（STO）输入 STO 冗余输入，外接常闭触点，触点断开时 STO 动作，变频器停止输出 安全输入信号线使用屏蔽线，接线长度控制在 25 米以内 出厂时 STO1、STO2 均与+24V 短接，使用 STO 功能时需将端子上的短接线拆除	
STO2		
通信扩展卡端子		
+24E	外部接入 24V，可用于通信调试	
COM		
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	
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	

4 键盘

LED键盘显示区对应内容

显示	对应	显示	对应	显示	对应	显示	对应
0	0	1	1	2	2	3	3
4	4	5	5	6	6	7	7
8	8	9	9	A	A	b	b
C	C	d	d	E	E	F	F
H	H	I	I	L	L	n	N
o	n	o	O	P	P	r	r
S	S	t	t	U	U	u	v
.	.	-	-				

指示灯	状态	含义
RUN/TUNE	常亮	变频器处于运转状态
	闪烁	变频器处于参数自学习状态
	常灭	变频器处于停机状态
FWD/REV	常亮	变频器反转
	常灭	变频器正转
LOCAL/REMOT	常亮	变频器使用通信运行指令通道
	闪烁	变频器使用端子运行指令通道
	常灭	变频器使用键盘运行指令通道
RUN/TUNE FWD/REV LOCAL/REMOT	同时常亮且显示故障代码	变频器处于故障状态
	同时闪烁	变频器处于预报警状态

单位指示灯		
亮显表示键盘当前显示的单位。		
	Hz	频率单位
	RPM	转速单位
	A	电流单位
	%	百分数
	V	电压单位

按键		作用
PRG JOG	编程/快捷多功能键	一级菜单进入或退出，快捷参数删除； 长按（1s以上）此键可实现功能码P07.02个位定义的此键功能，默认点动运行。
ENT SHIFT	确定/位移键	逐级进入菜单画面、设定参数确认； 在停机显示界面和运行显示界面下，可循环选择显示参数； 参数修改界面，长按（1s以上）此键可循环移位。
∧	递增键	数据或功能码的递增。
∨	递减键	数据或功能码的递减。
RUN	运行键	在键盘操作方式下，用于运行或自学习。
STOP RST	停止/复位键	功能码P07.04指定该键功能的有效性； 运行状态时，按此键可用于停止运行或自学习； 故障报警状态时，按此键可实现复位。

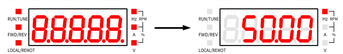
5 快速运行

5.1 上电前检查

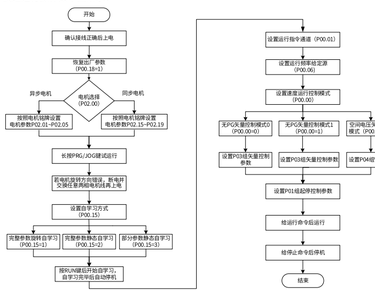
⚠
- 请确认所有的端子已正确紧固连接。
- 请确认电机与变频器功率匹配。

5.2 首次上电操作

接线及电源检查确认无误后，合上变频器输入侧交流电源的空气开关，给变频器上电。



快速运行操作如下图所示：



6 常用功能参数设置

下述功能参数表仅列出部分常见功能参数，并进行了简要描述、列举典型取值。

“○”：表示该参数的设定值在变频器处于停机、运行状态中，均可更改；

“◎”：表示该参数的设定值在变频器处于运行状态时，不可更改；

“●”：表示该参数的数值是实际检测记录值，不能更改。

变频器已对各参数的修改属性作了自动检查约束，可帮助用户避免误修改。

功能码	名称	说明	缺省值	更改
P00.00	速度控制模式	0：无PG矢量控制模式0 1：无PG矢量控制模式1 2：空间电压矢量控制模式	2	◎
P00.01	运行指令通道	0：键盘运行指令通道 1：端子运行指令通道 2：通信运行指令通道	0	○
P00.02	通信运行指令通道	0：Modbus/Modbus TCP 2：以太网 3：EtherCAT/PROFINET/EtherNet IP	0	○
P00.03	最大输出频率	Max(P00.04)~599.00Hz	50.00Hz	◎
P00.04	运行频率上限	P00.05~P00.03	50.00Hz	◎
P00.05	运行频率下限	0.00Hz~P00.04	0.00Hz	◎
P00.06	A频率指令选择	0：P00.10设定 1：模拟量AI1设定 2：模拟量AI2设定 3：模拟量AI3设定 5：高速脉冲HDI1设定 7：简易PLC程序设定 8：多段速运行设定 9：PID控制设定 10：Modbus通信设定 12：以太网通信设定 14：EtherCAT/PROFINET/EtherNet IP通信设定	0	○
P00.07	B频率指令选择		1	○
P00.10	键盘设定频率	0.00Hz~P00.03	50.00Hz	○
P00.11	加速时间1	0.0~3600.0s	机型确定	○
P00.12	减速时间1		机型确定	○
P00.13	运行方向选择	0：默认方向运行 1：相反方向运行 2：禁止反转运行	0	○
P00.15	电机参数自学习	0：无操作 1：完整参数旋转自学习 2：完整参数静态自学习 3：部分参数静态自学习	0	◎
P00.17	变频器类型	2：重载型 3：轻载型	2	◎
P00.18	功能参数恢复	0：无操作 1：恢复出厂值（不含电机参数） 2：清除故障记录 3：键盘参数锁定	0	◎
P01.00	起动运行方式	0：直接起动 1：先直流制动再起动 4：转速追踪再起动（软件）	0	◎
P01.08	停机方式选择	0：减速停车 1：自由停车	0	○
P01.09	停机制动开始频率	0.00Hz~P00.03	0.00Hz	○
P01.11	停机直流制动电流	0.0~100.0%	0.0%	○
P01.12	停机直流制动时间	0.00~50.00s	0.00s	○
P01.18	上电端子运行保护选择	0：上电时端子运行命令无效 1：上电时端子运行命令有效	0	◎
P02.00	电机1类型	0：异步电机 1：永磁同步电机	0	◎
P02.01	异步电机1额定功率	0.1~3000.0kW	机型确定	◎
P02.02	异步电机1额定频率	0.01Hz~P00.03	50.00Hz	◎
P02.03	异步电机1额定转速	1~60000rpm	机型确定	◎
P02.04	异步电机1额定电压	0~1200V	机型确定	◎
P02.05	异步电机1额定电流	0.08~600.00A	机型确定	◎
P02.15	同步电机1额定功率	0.1~3000.0kW	机型确定	◎
P02.16	同步电机1额定频率	0.01~P00.03Hz	50.00Hz	◎
P02.17	同步电机1极对数	1~128	2	◎
P02.18	同步电机1额定电压	0~1200V	机型确定	◎
P02.19	同步电机1额定电流	0.08~600.00A	机型确定	◎
P02.23	同步电机1反电势	0~10000	300	○
P03.00	速度环比例增益1	0.0~200.0	20.0	○
P03.01	速度环积分时间1	0.000~10.000s	0.200s	○
P03.03	速度环比例增益2	0.0~200.0	20.0	○
P03.04	速度环积分时间2	0.000~10.000s	0.200s	○
P03.11	电机1转矩设定方式选择	0：P03.12设定 1：模拟量AI1设定 2：模拟量AI2设定 3：模拟量AI3设定转矩 5：高速脉冲HDI1设定 8：多段速运行设定 10：Modbus/Modbus TCP通信设定 12：以太网通信设定 14：EtherCAT/PROFINET/EtherNet IP通信设定	0	○
P03.32	电机1转矩控制使能	0：禁止 1：使能	0	○
P03.54	电机1电流环带宽	0~2000	400	○
P04.01	电机1转矩提升	0.0~10.0%	0.0%	○
P04.09	电机1 V/f转差补偿增益	0.0~200.0%	100.0%	○

功能码	名称	说明	缺省值	更改
P04.10	电机1低频抑制振荡因子	0~100	10	○
P04.11	电机1高频抑制振荡因子	0~100	10	○
P05.00	HDI输入类型选择	0：HDI1为高速脉冲输入 1：HDI1为开关量输入	0	◎
P05.01	DI1端子功能选择	0：无功能 1：正转运行 2：反转运行 3：三线式运行控制 4：正转寸动 5：反转寸动 6：自由停车 7：故障复位 8：运行暂停 9：外部故障输入 10：频率设定递增（UP） 11：频率设定递减（DOWN） 57：电机过温故障输入（仅DI4支持）	1	◎
P05.02	DI2端子功能选择		4	◎
P05.03	DI3端子功能选择		7	◎
P05.04	DI4端子功能选择		0	◎
P05.11	HDI1端子功能选择		0	◎
P05.42	AI1下限值	0.00V~P05.44	0.00V	○
P05.43	AI下限对应设定	-300.0%~300.0%	0.0%	○
P05.44	AI1上限值	P05.42~10.00V	10.00V	○
P05.45	AI1上限对应设定	-300.0%~300.0%	100.0%	○
P05.47	AI2下限值	-10.00V~P05.49	-10.00V	○
P05.48	AI2下限对应设定	-300.0%~300.0%	-100.0%	○
P05.49	AI2上限值1	P05.47~P05.51(V)	0.00V	○
P05.50	AI2中间值1对应设定	-300.0%~300.0%	0.0%	○
P05.51	AI2中间值2	P05.49~P05.53(V)	0.00V	○
P05.52	AI2中间值2对应设定	-300.0%~300.0%	0.0%	○
P05.56	AI3下限值	0.00V~P05.58	0.00V	○
P05.57	AI3下限对应设定	-300.0%~300.0%	0.0%	○
P05.58	AI3上限值	P05.56~10.00V	10.00V	○
P05.59	AI3上限对应设定	-300.0%~300.0%	100.0%	○
P05.66	HDI1下限频率	0.000kHz~P05.68	0.000kHz	○
P05.67	HDI1下限频率对应设定	-300.0%~300.0%	0.0%	○
P05.68	HDI1上限频率	P05.66~50.000kHz	50.000 kHz	○
P05.69	HDI1上限频率对应设定	-300.0%~300.0%	100.0%	○
P05.76	AI输入信号类型选择	Bit0：AI1输入信号选择 0：电压型 1：电流型 Bit1：AI2输入信号选择 0：电压型 1：电流型	0x0	◎
P06.00	HDO1输出类型选择	0：高速脉冲输出 1：数字量输出	0	◎
P06.04	HDO1输出选择	0：无效 1：运行中 2：正转运行中 3：反转运行中 4：点动运行中 5：变频器故障 6：频率水平检测FDT1 7：频率水平检测FDT2 8：频率到达	0	○
P06.05	继电器RO1输出选择	0x00~0x1F Bit0~bit2：保留 Bit3：HDO1 Bit4：RO1	1	○
P06.09	输出端子极性选择		0x00	○
P06.26	AO1输出选择	0：运行频率 1：设定频率 2：斜坡给定频率 3：运行转速 4：输出电流 5：输出电流 6：输出电压 7：输出功率	0	○
P06.28	HDO1 高速脉冲输出选择		0	○
P06.29	AO1 输出下限	-300.0%~P06.31	0.0%	○
P06.30	下限对应 AO1 输出	0.00~10.00V	0.00V	○
P06.31	AO1 输出上限	P06.29~300.0%	100.0%	○
P06.32	上限对应 AO1 输出	0.00~10.00V	10.00V	○
P06.21	AO1 输出滤波时间	0.000s~10.000s	0.000s	○
P06.41	HDO1 输出下限	-300.0%~P06.43	0.0%	○
P06.42	下限对应 HDO1 输出	0.00~50.00kHz	0.00kHz	○
P06.43	HDO1 输出上限	P06.41~300.0%	100.0%	○
P06.44	上限对应 HDO1 输出	0.00~50.00kHz	50.00kHz	○
P07.00	用户密码	0~65535	0	○
P07.27	最近故障类型	-	-	●
P07.28	前1次故障类型	-	-	●
P07.29	前2次故障类型	-	-	●
P07.30	前3次故障类型	-	-	●

功能码	名称	说明	缺省值	更改
P07.31	前4次故障类型	-	-	●
P07.32	前5次故障类型	-	-	●
P08.28	故障自动复位次数	0~10	0	○
P08.29	故障自动复位间隔时间设置	0.1~3600.0s	1.0s	○
P08.41	冷却散热风扇运行模式	设定范围：0x00~0x12 个位：运行模式 0：正常运行模式 1：上电后风扇一直运行 2：运行模式2 十位：调速模式 0：调速禁用 1：调速模式1	0x10	○
P11.00	缺相保护	设定范围：0x000~0x011 个位： 0：软件输入缺相保护禁止 1：软件输入缺相保护允许 十位： 0：输出缺相保护禁止 1：输出缺相保护允许 百位：保留	0x011	○
P14.00	本机通信地址	1~247 注意：从机地址不可为0。	1	○
P14.01	通信波特率设置	0：1200bps 1：2400bps 2：4800bps 3：9600bps 4：19200bps 5：38400bps 6：57600bps 7：115200bps	4	○
P14.02	数据位校验设置	0：无校验（N，8，1）for RTU 1：偶校验（E，8，1）for RTU 2：奇校验（O，8，1）for RTU 3：无校验（N，8，2）for RTU 4：偶校验（E，8，2）for RTU 5：奇校验（O，8，2）for RTU	1	○
P23.02	PZD2接收	0：无效 1：设定频率 2：PID给定 3：PID反馈 4：转矩设定值 5：正转上限频率设定值 6：反转上限频率设定值 7：电动转矩上限转矩 8：制动转矩上限转矩 9：虚拟输入端子命令 10：虚拟输出端子命令 11：V/F分离电压设定值 12：AO1输出设定值1	0	○
P23.03	PZD3接收		0	○
P23.04	PZD4接收		0	○
P23.05	PZD5接收		0	○
P23.06	PZD6接收		0	○
P23.07	PZD7接收		0	○
P23.08	PZD8接收		0	○
P23.09	PZD9接收		0	○
P23.10	PZD10接收		0	○
P23.11	PZD11接收		0	○
P23.12	PZD12接收		0	○
P23.13	PZD2发送	0：无效 1：运行频率 2：设定频率 3：母线电压 4：输出电压 5：输出电流 6：输出转矩实际值 7：输出功率实际值 8：运行转速 9：运行线速度 10：斜坡给定频率 11：故障代码 27：变频器状态字2	0	○
P23.14	PZD3发送		0	○
P23.15	PZD4发送		0	○
P23.16	PZD5发送		0	○
P23.17	PZD6发送		0	○
P23.18	PZD7发送		0	○
P23.19	PZD8发送		0	○
P23.20	PZD9发送		0	○
P23.21	PZD10发送		0	○
P23.22	PZD11发送		0	○
P23.23	PZD12发送		0	○
P24.00	扩展卡协议选择	0：PROFINET 1：EtherCAT 3：EtherNet IP 4：Modbus TCP 5：EtherNet UDP 6：PROFINET + EtherNet UDP 7：EtherCAT + EtherNet UDP 15：无通信扩展卡	15	◎
P29.00	扩展卡类型	0：无卡 36：多合一扩展卡-PROFINET 通信卡 41：多合一扩展卡-EtherCAT 通信卡 43：多合一扩展卡-EtherNet IP 通信卡 44：多合一扩展卡-Modbus TCP 通信卡 45：多合一扩展卡-以太网通信卡 46：多合一扩展卡-PROFINET+EtherNet 通信卡 47：多合一扩展卡-EtherCAT+EtherNet 通信卡	0	●

7 常见故障及对策

故障代码	故障类型	可能的原因	故障解决方法
E4	加速过电流	● 加速时间设置过短 ● 负载过大或负载突变 ● 在电机旋转过程中启动 ● 三相输出电流不平衡 ● 电机控制方式为无 PG 矢量控制方式时，没有进行参数自学习 ● 电机控制方式为 V/F 控制时，V/F 曲线设置异常 ● 外部存在强干扰源（系统有接触器切换、系统接地不良） ● 电网电压偏低 ● 硬件故障	● 增加加速时间，或通过 P11.06 降低软件限流点；若工艺要求急加速，则增大变频器容量 ● 增大变频器容量，确保电机无堵转，负载设备无异常 ● 待电机停稳后启动，或通过参数 P01.00 选择转速追踪启动 ● 检查变频器输出电压和电机阻抗，确保三相平衡 ● 按电机铭牌设置额定参数，通过 P00.15 进行参数自学习 ● 重新调整 V/F 曲线设定的频率和电压关系，降低频率对应的电压值 ● 避免存在强干扰现象，电机线远离接触器、系统可靠接地 ● 改善用电质量，或增大变频器容量 ● 更换变频器
E5	减速过电流	● 减速时间设置过短 ● 软件限流点设置过高 ● 负载过大或负载突变 ● 三相输出电流不平衡 ● 电机控制方式为无 PG 矢量控制方式时，没有进行参数自学习 ● 电机控制方式为 V/F 控制时，V/F 曲线设置异常 ● 外部存在强干扰源（系统有接触器切换、系统接地不良） ● 硬件故障	● 增加减速时间，或通过 P11.06 降低软件限流点若工艺要求急减速，则可以尝试增大变频器容量 ● 降低 P11.06 软件限流点 ● 增大变频器容量，确保电机无堵转，负载设备无异常 ● 检查变频器输出电压和电机阻抗，确保三相平衡 ● 按电机铭牌设置额定参数，通过 P00.15 进行参数自学习 ● 重新调整 V/F 曲线设定的频率和电压关系，降低频率对应的电压值 ● 避免存在强干扰现象，电机线远离接触器、系统可靠接地 ● 更换变频器
E6	恒速过电流	● 负载过大或负载突变 ● 软件限流点设置过高 ● 三相输出电流不平衡 ● 电机控制方式为无 PG 矢量控制方式时，没有进行参数自学习 ● 电机控制方式为 V/F 控制时，V/F 曲线设置异常 ● 外部存在强干扰源（系统有接触器切换、系统接地不良） ● 电网电压偏低 ● 硬件故障	● 增大变频器容量，确保电机无堵转，负载设备无异常 ● 降低 P11.06 软件限流点 ● 检查变频器输出电压和电机阻抗，确保三相平衡 ● 按电机铭牌设置额定参数，通过 P00.15 进行参数自学习 ● 重新调整 V/F 曲线设定的频率和电压关系，降低频率对应的电压值 ● 避免存在强干扰现象，电机线远离接触器、系统可靠接地 ● 改善用电质量，或增大变频器容量 ● 更换变频器
E7	加速过电压	● 加速时间过短 ● 电网电压偏高 ● 在电机旋转过程中启动 ● 负载存在较大能力回馈 ● 过压失速功能设置不合理	● 增加加速时间或开启过压失速功能。 ● 改善用电质量，符合变频器输入电压规格（见产品规格） ● 待电机停稳后启动，或通过参数 P01.00 选择转速追踪启动 ● 加装制动单元、能量回馈单元，或排除外力拖动负载发电的因素 ● 通过 P11.03 开启过压失速保护功能，降低 P11.04 过压失速保护电压值
E8	减速过电压	● 减速时间过短 ● 电网电压偏高 ● 负载存在较大能力回馈 ● 过压失速功能设置不合理	● 增加减速时间；若工艺要求急减速，则可以加装制动单元、能量回馈单元或使用磁通制动功能 ● 改善用电质量，符合变频器输入电压规格（见产品规格） ● 加装制动单元、能量回馈单元，或排除外力拖动负载发电的因素 ● 通过 P11.03 开启过压失速保护功能，降低 P11.04 过压失速保护电压值
E9	恒速过电压	● 电网电压偏高 ● 负载存在较大能力回馈 ● 过压失速功能设置不合理	● 改善用电质量，符合变频器输入电压规格（见产品规格） ● 加装制动单元、能量回馈单元，或排除外力拖动负载发电的因素 ● 通过 P11.03 开启过压失速保护功能，降低 P11.04 过压失速保护电压值
E10	直流母线欠压	● 电网电压偏低 ● 母线电压显示异常 ● 缓冲接触器吸合异常 ● 输入侧缺相时带重载运行	● 调高电网输入电压 ● 联系厂家 ● 联系厂家 ● 检查输入电源是否正常和输入线缆是否松动

故障代码	故障类型	可能的原因	故障解决方法
E11	电机过载	● 电网电压过低 ● 电机额定电流设置不正确 ● 电机堵转或负载突变过大	● 调高电网输入电压 ● 重新设置电机参数组的电机额定电流 ● 检查负载，调节转矩提升量
E12	变频器过载	● 加速太快 ● 对旋转中的电机实施再启动 ● 电网电压过低 ● 负载过大 ● 变频器功率选型偏小	● 增大加速时间 ● 避免停机再启动 ● 调高电网输入电压 ● 选择功率更大的变频器
E13	输入侧缺相	● 输入 L1，L2，L3 缺相或者波动大 ● 输入侧螺丝松动	● 检查输入电源是否正常和输入线缆是否有松动 ● 可选择设置 P11.00 参数屏蔽
E14	输出侧缺相	● 输出线缆有破损或对地短路 ● 输出 U，V，W 缺相（或负载三相严重不对称） **备注：**输出缺相检测时间至少需要 2.5s，在缺相后容易失稳，可能先报过流、过压过载和速度偏差故障。	● 检查输出线缆是否有松动或破损 ● 检查负载是否波动大和电机三相阻抗是否平衡
E16	逆变模块过热	● 风道堵塞或风扇损坏 ● 环境温度过高 ● 长时间过载运行	● 疏通风道或更换风扇 保持现场通风顺畅，降低环境温度 ● 选择功率更大的变频器
E17	外部故障	● DI 端子外部故障输入信号动作	● 检查外部设备输入是否正常
E18	Modbus/ Modbus TCP 通信故障	● 波特率设置不当 ● 通信线路故障 ● 通信地址错误 ● 通信受到强干扰	● 设置合适的波特率 ● 检查通信接口配线连接是否正常 ● 设置正确通信地址 ● 建议更换使用屏蔽线缆，提高抗扰性
E19	电流检测故障	● 电机线或电机绝缘异常	● 拆除电机线进行验证 ● 联系厂家
E20	电机自学习故障	● 电机容量与变频器容量不匹配，相差 5 个功率等级以上容易出现此故障 ● 电机参数设置不当 ● 自学习出的参数与标准参数偏差过大 ● 自学习超时 ● 脉冲电流设置值是否过大	● 更换变频器型号，或者采用 VF 模式控制 ● 检查电机接线，电机类型和参数设置 ● 使电机空载，重新辩识 ● 检查上限频率是否大于额定频率的 2/3 适当减小脉冲电流设置值
E21	EEPROM 操作故障	● 控制参数的读写发生错误 ● EEPROM 损坏	● 按 STOP/RST 复位 ● 更换控制板
E22	PID 反馈断线	● PID 反馈断线 ● PID 反馈源消失	● 检查 PID 反馈信号线 ● 检查 PID 反馈源
E23	制动单元故障	● 制动线路故障或制动管损坏； ● 外接制动电阻阻值偏小	● 检查制动单元，更换新制动管 ● 增大制动电阻
E24	运行时间到达	● 变频器实际运行时间大于内部设定运行时间	● 联系厂家
E25	电子过载	● 变频器按设定值进行过载预警	● 检查过载预警点设置是否合理
E27	参数上传错误	● 键盘线接触不良或断线 ● 键盘线太长，受到强干扰 ● 键盘或主板通信部分电路故障	● 检查键盘线，重新插拔键盘线确认故障是否存在 ● 检查环境，排除干扰源 ● 更换硬件，寻求维修服务
E28	参数下载错误	● 键盘线接触不良或断线 ● 键盘线太长，受到强干扰 ● 键盘中存储数据错误	● 检查环境，排除干扰源 ● 更换硬件，寻求维修服务 ● 确定键盘备份参数的控制板软件版本是否与变频器的控制板软件版本是否一致
E30	以太网通信故障	● 通信卡与上位机（或 PLC）之间没有数据传输	● 检查通信卡接线是否松动或掉线
E32	对地短路故障	● 变频器输出与地短接 ● 电流检测电路出故障	● 检查电机对地是否短路，接线是否正常 ● 拆除电机线是否正常 ● 更换主控板
E34	速度偏差故障	● 负载过重或者被堵转	● 检查负载是否正常或过重，增加速度偏差检出时间或把加减速时间加长 ● 电机参数设置是否正确，重新做电机参数自学习 ● 检查速度环控制参数是否合适
E35	失调故障	● 负载异常 ● 同步电机参数设置不当 ● 电机自学习参数不准 ● 变频器未接电机 ● 弱磁应用	● 检查负载是否正常、过重、堵转 ● 检查电机参数设置是否正确，反电动势设置是否正确 ● 重新做电机参数自学习 ● 增加失调检出时间 ● 适当调整弱磁系数，电流环参数
E36	欠载故障	● 变频器按设定值进行欠载预警	● 检测负载和欠载预警点
E40	STO 安全转矩停止	● 外部使能安全转矩停止功能	-

故障代码	故障类型	可能的原因	故障解决方法
E41	STO 通道 1 安全回路异常	● STO 功能接线不正确 ● STO 功能外部开关故障 ● 通道安全回路硬件故障	● 检查 STO 功能端子接线是否正确、牢固 ● 检查 STO 功能外部开关是否正常 ● 更换控制板 **注意：**此故障后，需断电后重新上电才能清除此故障。
E42	STO 通道 2 安全回路异常		
E43	STO 通道 1 和通道 2 同时异常	● STO 功能电路硬件故障	● 更换驱动板
E44	STO 安全代码 FLASH CRC 校验故障	● 驱动板故障	● 更换驱动板
E57	PROFINET 通信超时故障	● 通信卡与上位机（或 PLC）之间没有数据传输	● 检查通信卡接线是否松动或掉线
E59	电机过温故障	● 设备或环境温度过高 ● AIAO 测温不准确 ● DI4 端子输入电机过温信号	● 降低设备或环境温度 ● 更换测温电阻 ● 检查外部测温端子信号
E60	通信卡识别失败	● 通信扩展卡接口有数据传输，但无法识别到该卡类型	● 确认是否插入了不支持该卡槽内的扩展卡 ● 掉电后，稳固扩展卡接口，并重新上电确认是否还存在故障 ● 检测插卡口或卡槽是否损坏，若损坏，掉电后换一个插卡口或卡槽
E63	通信卡通信超时故障	● 通信扩展卡接口没有数据传输	
E66	EtherCAT 通信超时故障	● 通信卡与上位机（或 PLC）之间没有数据传输	● 检查通信卡接线是否松动或掉线
E92	AI1 断线	● AI1 输入过低 ● AI1 接线断开	● 用 5V 电压（或 10mA 电流）源来检查输入是否正常 ● 检查接线或更换导线查看是否正常
E93	AI2 断线	● AI2 输入过低 ● AI2 接线断开	
E94	AI3 断线	● AI3 输入过低 ● AI3 接线断开	
E95	EtherNet IP 通信超时故障	● 通信卡与上位机（或 PLC）之间没有数据传输	● 检查通信卡接线是否松动或掉线
E96	无升级引导程序	● 升级引导程序丢失	● 联系厂家
E587	双 CPU 通信故障 1	● 双 CPU 通信故障	● 联系厂家
E588	双 CPU 通信故障 2		

8 产品尺寸

图 8-1 外形结构 A、B 的尺寸和孔位

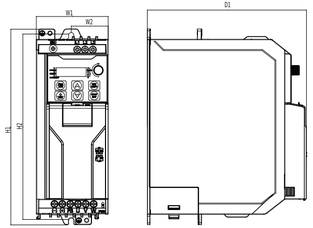


表 8-1 外形结构 A、B 的尺寸和孔位

产品型号	外形结构	外形尺寸（mm）			安装孔位（mm）		安装孔径（mm）
		W1	H1	D1	W2	H2	
GD28-0R2G-S2	A	60	190	155	36	180	Ø5
GD28-0R4G-S2		60	190	155	36	180	Ø5
GD28-0R7G-S2		60	190	155	36	180	Ø5
GD28-0R2G-2		60	190	155	36	180	Ø5
GD28-0R4G-2		60	190	155	36	180	Ø5
GD28-0R7G-2		60	190	155	36	180	Ø5
GD28-0R4G-4		60	190	155	36	180	Ø5
GD28-0R7G-4		60	190	155	36	180	Ø5
GD28-1R1G-4		60	190	155	36	180	Ø5
GD28-0R4G-5		60	190	155	36	180	Ø5
GD28-0R7G-5		60	190	155	36	180	Ø5
GD28-1R1G-S2	B	70	190	155	36	180	Ø5
GD28-1R5G-S2		70	190	155	36	180	Ø5
GD28-2R2G-S2		70	190	155	36	180	Ø5
GD28-1R1G-2		70	190	155	36	180	Ø5
GD28-1R5G-2		70	190	155	36	180	Ø5
GD28-2R2G-2		70	190	155	36	180	Ø5
GD28-1R5G-4		70	190	155	36	180	Ø5
GD28-2R2G-4		70	190	155	36	180	Ø5

产品型号	外形结构	外形尺寸（mm）			安装孔位（mm）		安装孔径（mm）
		W1	H1	D1	W2	H2	
GD28-003G-4	B	70	190	155	36	180	Ø5
GD28-004G-4		70	190	155	36	180	Ø5
GD28-1R5G-5		70	190	155	36	180	Ø5
GD28-2R2G-5		70	190	155	36	180	Ø5
GD28-004G-5		70	190	155	36	180	Ø5

图 8-2 外形结构 C 的尺寸和孔位

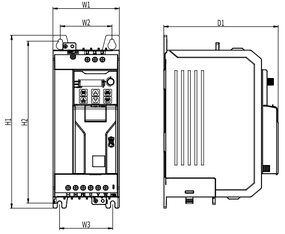


表 8-2 外形结构 C 的尺寸和孔位

产品型号	外形结构	外形尺寸（mm）			安装孔位（mm）			安装孔径（mm）
		W1	H1	D1	W2	W3	H2	
GD28-004G-S2	C	90	235	155	70	72	220	Ø6
GD28-004G-2		90	235	155	70	72	220	Ø6
GD28-5R5G-2		90	235	155	70	72	220	Ø6
GD28-5R5G-4		90	235	155	70	72	220	Ø6
GD28-7R5G-4		90	235	155	70	72	220	Ø6
GD28-5R5G-5		90	235	155	70	72	220	Ø6
GD28-7R5G-5		90	235	155	70	72	220	Ø6

图 8-3 外形结构 D 尺寸和孔位

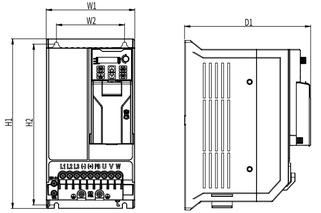


表 8-3 外形结构 D 尺寸和孔位

产品型号	外形结构	外形尺寸（mm）			安装孔位（mm）		安装孔径（mm）
		W1	H1	D1	W2	H2	
GD28-7R5G-2	D	130	250	185	100	237	Ø6
GD28-011G-2		130	250	185	100	237	Ø6
GD28-011G-4		130	250	185	100	237	Ø6
GD28-015G-4		130	250	185	100	237	Ø6
GD28-011G-5		130	250	185	100	237	Ø6
GD28-015G-5		130	250	185	100	237	Ø6

图 8-4 外形结构 E 尺寸和孔位

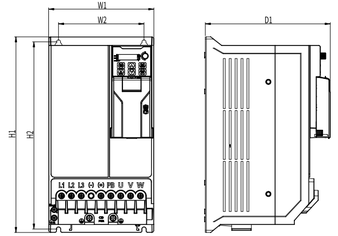


表 8-4 外形结构 E 尺寸和孔位

产品型号	外形结构	外形尺寸（mm）			安装孔位（mm）		安装孔径（mm）
		W1	H1	D1	W2	H2	
GD28-015G-2	E	160	300	190	130	287	Ø6
GD28-018G-4		160	300	190	130	287	Ø6
GD28-022G-4		160	300	190	130	287	Ø6
GD28-018G-5		160	300	190	130	287	Ø6
GD28-022G-5		160	300	190	130	287	Ø6

附录A 能效数据

表 A-1 能耗和 IE 等级

产品型号	相对损耗（%）								待机损耗（W）	IE 等级
	(0;25)	(0;50)	(0;100)	(50;25)	(50;50)	(50;100)	(90;50)	(90;100)		
GD28-0R2G-S2	2.45	2.78	2.98	2.8	3.01	3.26	3.08	3.29	7	IE2
GD28-0R4G-S2	1.96	2.24	2.54	2.05	2.4	2.65	2.52	2.81	7	IE2
GD28-0R7G-S2	1.48	1.68	1.84	1.54	1.84	2.54	1.93	2.71	7	IE2
GD28-1R1G-S2	1.39	1.61	2.21	1.68	1.9	2.55	2.03	2.71	7	IE2
GD28-1R5G-S2	1.41	1.44	1.91	1.69	1.91	2.35	1.92	2.59	7	IE2
GD28-2R2G-S2	1.2	1.42	2.02	1.38	1.68	2.41	1.75	2.95	7	IE2
GD28-004G-S2	1.33	1.65	2.34	1.47	1.84	2.74	2.04	3.09	11	IE2
GD28-0R2G-2	2.39	2.69	2.97	2.66	2.95	3.2	3.02	3.24	7	IE2
GD28-0R4G-2	1.95	2.19	2.5	2.13	2.38	2.74	2.45	2.81	7	IE2
GD28-0R7G-2	1.48	1.67	2.26	1.59	1.84	2.5	1.9	2.62	7	IE2
GD28-1R1G-2	1.28	1.52	2.08	1.56	1.77	2.23	1.84	2.42	7	IE2
GD28-1R5G-2	1.36	1.44	1.77	1.68	1.73	1.94	1.87	2.34	7	IE2
GD28-2R2G-2	1.31	1.37	1.72	1.6	1.73	1.95	1.82	2.2	7	IE2
GD28-004G-2	1.45	1.63	1.93	1.51	1.72	2.1	1.9	2.26	11	IE2
GD28-5R5G-2	0.79	1.32	1.99	0.87	1.34	2.22	1.41	2.39	11	IE2
GD28-7R5G-2	0.62	0.9	1.76	0.8	1.15	2.04	1.46	2.28	14	IE2
GD28-011G-2	0.54	0.78	1.87	0.77	1.18	2.09	1.23	2.48	14	IE2
GD28-015G-2	0.92	0.93	0.95	1.06	1.37	1.49	2.6	2.98	16	IE2
GD28-0R4G-4	2.13	2.28	2.59	2.2	2.54	2.81	2.54	2.94	9	IE2
GD28-0R7G-4	1.41	1.64	2.11	1.67	1.86	2.29	1.92	2.43	9	IE2
GD28-1R1G-4	1.45	1.61	1.83	1.64	1.94	2.16	2.03	2.29	9	IE2
GD28-1R5G-4	1.25	1.34	1.52	1.41	1.63	2.01	1.62	2.15	9	IE2
GD28-2R2G-4	1.27	1.29	1.61	1.56	1.77	2.12	1.61	2.23	9	IE2
GD28-003G-4	1.19	1.27	1.55	1.48	1.65	2.01	1.59	2.11	9	IE2
GD28-004G-4	1.11	1.21	1.46	1.34	1.62	1.83	1.54	2.35	9	IE2
GD28-5R5G-4	1.22	1.37	1.56	1.46	1.77	2.12	1.77	2.26	11	IE2
GD28-7R5G-4	0.76	0.96	1.54	0.98	1.17	1.91	1.22	2.04	11	IE2
GD28-011G-4	0.79	0.89	1.79	0.78	0.9	1.77	0.93	1.8	20	IE2
GD28-015G-4	0.7	1.01	1.98	0.74	1.02	1.87	1.17	2.23	20	IE2
GD28-018G-4	0.53	0.76	1.23	0.56	0.86	1.73	0.86	2.01	20	IE2
GD28-022G-4	0.63	0.71	1.38	0.6	0.9	1.73	1.02	1.95	20	IE2
GD28-0R4G-5	1.29	1.48	1.76	1.48	1.72	2.13	2.05	2.51	12	IE2
GD28-0R7G-5	1.26	1.41	1.74	1.42	1.67	2.07	2.01	2.44	12	IE2
GD28-1R5G-5	1.20	1.35	1.66	1.39	1.63	1.99	1.92	2.24	13	IE2
GD28-2R2G-5	1.17	1.32	1.62	1.34	1.59	1.95	1.85	2.24	13	IE2
GD28-004G-5	1.14	1.29	1.57	1.28	1.55	1.91	1.83	2.17	13	IE2
GD28-5R5G-5	1.11	1.27	1.51	1.20	1.48	1.87	1.78	2.07	15	IE2
GD28-7R5G-5	1.06	1.24	1.48	1.17	1.47	1.85	1.73	2.02	15	IE2
GD28-011G-5	0.88	1.18	1.40	1.03	1.44	1.82	1.69	1.97	32	IE2
GD28-015G-5	0.73	0.97	1.34	0.89	1.31	1.72	1.52	1.94	32	IE2
GD28-018G-5	0.70	0.88	1.24	0.85	1.25	1.68	1.50	1.85	36	IE2
GD28-022G-5	0.68	0.85	1.25	0.79	1.21	1.56	1.36	1.77	36	IE2

表 A-2 额定规格（重/轻载）

产品型号	重载				轻载				额定电源频率（Hz）	额定电源电压（V）
	视在功率（kVA）	电机功率（kW）	输出电流（A）	最高工作温度（°C）	视在功率（kVA）	电机功率（kW）	输出电流（A）	最高工作温度（°C）		
GD28-0R2G-S2	0.7	0.2	1.5	50°C	0.94	0.4	2	40°C	50Hz 或 60Hz，允许范围 47~63Hz	AC 1PH 220V~240V
GD28-0R4G-S2	1.15	0.4	2.5	50°C	1.52	0.75	3.3	40°C		
GD28-0R7G-S2	1.88	0.75	4.2	50°C	2.26	1.1	5.1	40°C		
GD28-1R1G-S2	2.28	1.1	6.5	50°C	2.85	1.5	7.5	40°C		
GD28-1R5G-S2	3.35	1.5	7.5	50°C	4.37	2.2	9.8	40°C		
GD28-2R2G-S2	4.35	2.2	10	50°C	5.44	4	12.5	40°C		
GD28-004G-S2	6	4	16	50°C	-	-	-	40°C		
GD28-0R2G-2	0.69	0.2	1.5	50°C	0.91	0.4	2	40°C	50Hz 或 60Hz，允许范围 47~63Hz	AC 3PH 200~240V
GD28-0R4G-2	1.16	0.4	2.5	50°C	1.51	0.75	3.3	40°C		
GD28-0R7G-2	1.91	0.75	4.2	50°C	2.29	1.1	5.1	40°C		
GD28-1R1G-2	3.06	1.1	6.5	50°C	3.53	1.5	7.5	40°C		
GD28-1R5G-2	3.54	1.5	7.5	50°C	4.63	2.2	9.8	40°C		
GD28-2R2G-2	4.71	2.2	10	50°C	5.88	4	12.5	40°C		
GD28-004G-2	6.1	4	16	50°C	8	5.5	21	40°C		
GD28-5R5G-2	8.24	5.5	20	50°C	9.9	7.5	26	40°C		
GD28-7R5G-2	14.69	7.5	30	50°C	21.5	11	39	40°C		
GD28-011G-2	19.95	11	42	50°C	-	-	-	40°C		
GD28-015G-2	21	15	55	50°C	26.7	22	64	40°C		

产品型号	重载				轻载				额定电源频率（Hz）	额定电源电压（V）
	视在功率（kVA）	电机功率（kW）	输出电流（A）	最高工作温度（°C）	视在功率（kVA）	电机功率（kW）	输出电流（A）	最高工作温度（°C）		
GD28-0R4G-4	1.26	0.4	1.5	50°C	1.66	0.75	2	40°C	50Hz 或 60Hz，允许范围 47~63Hz	AC 3PH 380~480V
GD28-0R7G-4	2.1	0.75	2.5	50°C	2.73	1.1	3.3	40°C		
GD28-1R1G-4	2.41	1.1	3	50°C	2.94	1.5	3.7	40°C		
GD28-1R5G-4	3.56	1.5	4.2	50°C	4.66	2.2	5.5	40°C		
GD28-2R2G-4	4.53	2.2	5.5	50°C	5.76	3	7	40°C		
GD28-003G-4	6.17	3	7.5	50°C	7.82	4	9.5	40°C		
GD28-004G-4	7.67	4	9.5	50°C	9.28	5.5	11.5	40°C		
GD28-5R5G-4	9.21	5.5	14	50°C	11.84	7.5	18	40°C		
GD28-7R5G-4	12.96	7.5	18.5	50°C	13.49	11	21	40°C		
GD28-011G-4	19.97	11	25	50°C	25.56	15	32	40°C		
GD28-015G-4	29.15	15	32	50°C	34.6	18.5	38	40°C		
GD28-018G-4	25.2	18.5	38	50°C	29.6	22	45	40°C		
GD28-022G-4	25	22	45	50°C	38.17	30	58	40°C		
GD28-0R4G-5	1.79	0.4	1.7	50°C	2.19	0.75	2.1	40°C	50Hz 或 60Hz，允许范围 47~63Hz	AC 3PH 525~600V
GD28-0R7G-5	2.42	0.75	2.3	50°C	2.85	1.5	2.7	40°C		
GD28-1R5G-5	3.45	1.5	3	50°C	4.16	2.2	4.2	40°C		
GD28-2R2G-5	5.79	2.2	4.2	50°C	6.87	4	5.5	40°C		
GD28-004G-5	7.98	4	6.5	50°C	9.31	5.5	9	40°C		
GD28-5R5G-5	11.76	5.5	9	50°C	12.24	7.5	12	40°C		
GD28-7R5G-5	14.43	7.5	12	50°C	16.98	11	17	40°C		
GD28-011G-5	20.10	11	17	50°C	25.12	15	22	40°C		
GD28-015G-5	28.65	15	22	50°C	31.08	18.5	27	40°C		
GD28-018G-5	26.47	18.5	27	50°C	32.89	22	34	40°C		
GD28-022G-5	27.69	22	34	50°C	40.66	30	42	40°C		

66001-01398

202601 (V1.4)

Goodrive28 Series VFD Quick Start Guide

This guide briefly describes the external wiring, terminals, keypads, quick running, common function parameter settings, common faults and solutions, product dimensions, and energy efficiency data of Goodrive28 (GD28 for short) series variable-frequency drive (VFD).
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 GD28 series product e-manual.

⚠ Warning

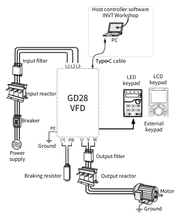
- This guide only provides the basic installation and commissioning information. Failure to comply with the safety instructions and installation and commissioning instructions in the relevant documentation may result in accidents such as equipment damage, personal injury, or even death.
- Only trained and qualified professionals are allowed to carry out related operations.

⚠ Danger

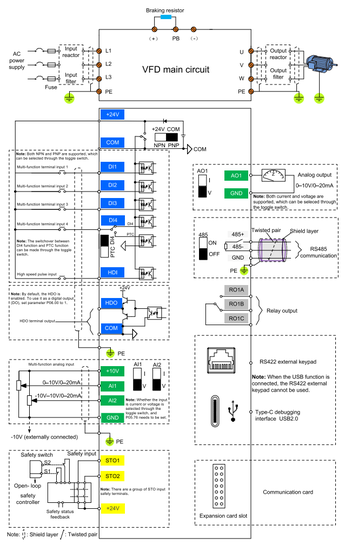
- Do not perform any operations including wiring, inspection, or component replacement when power supply is applied. Before performing these operations, ensure all the input power supplies have been disconnected, and wait for at least the time designated on the VFD.

Minimum waiting time	VFD model
5 minutes	1PH 220V 0.2–4kW; 3PH 220V 0.2–15kW; 3PH 380V 0.4–22kW; 3PH 575V 0.4–22kW

1 External wiring



2 Electrical wiring

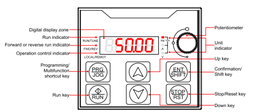


3 Function

Table 3-1 VFD terminal description

Terminal symbol	Function
Main circuit terminals	
L1, L2, L3 (L1, L2)	3PH (or 1PH) AC input terminals, connected to the grid.
U, V, W	3PH (or 1PH) AC output terminals, connected to the motor usually.
(+)	(+) and (-) connect to the shared DC bus terminals.
(-)	PB and (+) connect to external braking resistor terminals.
PB	
⏚	PE terminal. The PE terminals of each machine must be grounded reliably.
Control circuit terminals	
+10V	+10V power supply provided locally.
AI1	Input range: 0–10V/0–20mA Input resistance: 33kΩ for voltage input or 250Ω for current input Whether the input is current or voltage is selected through the toggle switch AI1 (I/V), and the function code P05.76 also needs to be set accordingly. Resolution: 1% accuracy across the full range
AI2	Input range: -10–10V/0–20mA Input resistance: 33kΩ for voltage input or 250Ω for current input Whether the input is current or voltage is selected through the toggle switch AI1 (I/V), and the function code P05.76 also needs to be set accordingly. Resolution: 1% accuracy across the full range
AO1	Output range: 0–10V/0–20mA Whether the output is current or voltage is selected through the toggle switch AO1 (I/V). Resolution: 1% accuracy across the full range
RO1A	Relay output. RO1A: NO; RO1B: NC; RO1C: common Contact capacity: 3A/AC 250V, 1A/DC 30V
RO1B	
RO1C	
GND	+10V power supply reference ground and analog signal reference ground.
HDO1	Switch capacity: 50mA/30V. Output frequency range: 0–50kHz It can be used as a standard DO terminal with push-pull output. You can set its function by setting P06.00.
485+	RS485 differential signal communication port. Use shielded twisted pairs for standard RS485 communication interfaces. You can determine whether to connect the 120Ω terminal matching resistor of RS485 communication through the toggle switch 485(ON/OFF).
485-	
USB	Type-C interface, which can be directly connected to a PC, using Modbus RTU as the communication protocol. When the VFD is not connected to the main power supply, it can be used to modify, save, import, and export parameters; when the VFD is connected to the main power supply, it can be used to control the VFD operation and monitor its running parameters.
+24V	User power supply provided by the VFD. Max. output current: 100mA It can be used as an external NPN mode power input for the DI terminal (the switch must be turned to the NPN position).
COM	+24V digital reference ground, which can be used as an external PNP mode input (the toggle switch must be set to the PNP position).
DI1–DI4 (PTC)	DI1–DI4 functions: Effective input high level range: 10–30V Effective input low level range: 0–5V Max. input frequency: 1kHz Programmable digital input terminals, the functions of which can be set through the related parameters Whether the NPN or PNP mode is used can be selected through the toggle switch, and the external power wiring is supported. PTC function: DI4 can be configured with PTC overtemperature protection, which can be enabled through P05.04=57 and toggle switch setting. Overtemperature resistance: 3.6kΩ. Recovery resistance: 1.5kΩ.
HDI1	It supports the switchover between NPN and PNP. It can act as a high frequency pulse input channel, in addition to a digital input channel. Max. input frequency: 50kHz Duty ratio: 30%–70%
STO1	Safe torque off (STO) inputs
STO2	STO redundant input, connected to the external NC contact. When the contact opens, STO acts and the VFD stops output. Safety input signal wires use shielded wires whose length is within 25m. The STO1 and STO2 terminals are short connected to +24V by default. Remove the jumper from the terminals before using the STO function.
Communication expansion card terminals	
+24E	An external 24V connection can be used for communication commissioning.
COM	
EC IN	Five bus types are supported: PROFINET, EtherCAT, EtherNet IP, Modbus TCP, and EtherNet UDP EtherCAT can be only used in the IN port, while other protocols do not distinguish the direction.
EC OUT	Five bus types are supported: PROFINET, EtherCAT, EtherNet IP, Modbus TCP, and EtherNet UDP EtherCAT can be only used in the OUT port, while other protocols do not distinguish the direction.

4 Keypad



Digital display on LED keypad

Display	Means	Display	Means	Display	Means	Display	Means
0	0	1	1	2	2	3	3
4	4	5	5	6	6	7	7
8	8	9	9	A	A	b	b
C	C	d	d	E	E	F	F
H	H	I	I	L	L	n	N
o	n	o	O	P	P	r	r
S	S	t	t	U	U	u	v
-	-	_	_				

Indicator	Status		Meaning
RUN/TUNE	Steady on		The VFD is running.
	Blinking		The VFD is in parameter autotuning.
	Steady off		The VFD is stopped.
FWD/REV	Steady on		The VFD runs reversely.
	Steady off		The VFD runs forward.
LOCAL/REMOT	Steady on		The VFD uses communication as the command running channel.
	Blinking		The VFD uses terminal as the command running channel.
	Steady off		The VFD uses keypad as the command running channel.
RUN/TUNE FWD/REV LOCAL/REMOT	All steady on, displaying the fault code		The VFD is in fault state.
	Blinking at the same time		The VFD is in pre-alarm state.
Unit indicator	A unit indicator that is on indicates the unit currently displayed on the keypad.		
		Hz	Frequency unit
		RPM	Rotation speed unit
		A	Current unit
		%	Percentage
		V	Voltage unit

Key	Function
PRG ESC Programming/ Multifunction shortcut key	Press it to enter or exit level-1 menus or delete a parameter. Press and hold it (at least 1s) to implement the function defined by the ones place of P07.02, which is jogging by default.
ENT SHIFT Confirmation/ Shifting key	Press it to enter menus in cascading mode or confirm the setting of a parameter. Press it to select display parameters in the interface for the VFD in stopped or running state. Press and hold it (at least 1s) or to select digits to change during parameter setting.
∧ Up key	Press it to increase data or move upward.
∨ Down key	Press it to decrease data or move downward.
RUN Run key	Press it to run or perform autotuning under keypad operation mode.
STOP RST Stop/Reset key	P07.04 specifies the validity of the key function. Press it to stop running or autotuning in running state. Press it to reset in fault alarm state.

5 Quick running

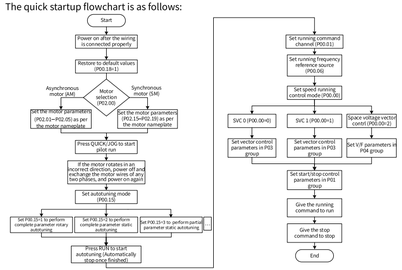
5.1 Check before power-on

⚠
- Ensure that all terminals have been securely connected.
- Ensure that the motor power matches the VFD power.

5.2 Operating upon first power-on

After confirming the wiring and power are correct, close the air switch of the AC power at the VFD input side to power on the VFD.

The quick startup flowchart is as follows:



6 Common function parameter setup

The following briefly describes only some common function parameters and typical values.

"○" indicates that the value of the parameter can be modified when the VFD is in stopped or running state.

"◎" indicates that the value of the parameter can be modified when the VFD is in running state.

"●" indicates that the value of the parameter is detected and recorded, and cannot be modified.

(The VFD automatically checks and constrains the modification of parameters, which helps prevent incorrect modifications.)

Function code	Name	Description	Default	Modify
P00.00	Speed control mode	0: SVC mode 0 1: SVC mode 1 2: Space voltage vector control mode	2	◎
P00.01	Channel of running commands	0: Keypad 1: Terminal 2: Communication	0	○
P00.02	Communication mode of running commands	0: Modbus/Modbus TCP 2: Ethernet 3: EtherCAT/PROFINET/EtherNet IP	0	○
P00.03	Max. output frequency	Max(P00.04)~599.00Hz	50.00Hz	◎
P00.04	Upper limit of running frequency	P00.05~P00.03	50.00Hz	◎
P00.05	Lower limit of running frequency	0.00Hz~P00.04	0.00Hz	◎
P00.06	Setting channel of A frequency command	0: P00.10 1: AI1 2: AI2 3: AI3 5: High-speed pulse HDI1 7: Simple PLC program 8: Multi-step speed running 9: PID control 10: Modbus communication 12: Ethernet communication 14: EtherCAT/PROFINET/ EtherNet IP communication	0	○
P00.07	Setting channel of B frequency command		1	○
P00.10	Set frequency via keypad	0.00Hz~P00.03	50.00Hz	○
P00.11	ACC time 1	0.0~3600.0s	Model depended	○
P00.12	DEC time 1		Model depended	○
P00.13	Running direction	0: Run at the default direction. 1: Run at the opposite direction. 2: Disable reverse running.	0	○
P00.15	Motor parameter autotuning	0: No operation 1: Complete parameter rotary autotuning 2: Complete parameter static autotuning 3: Partial parameter static autotuning	0	◎
P00.17	VFD type	2: Heavy duty 3: Light duty	2	◎
P00.18	Function parameter restoration	0: No operation 1: Restore default values (excluding motor parameters) 2: Clear fault records 3: Lock keypad parameters	0	◎
P01.00	Running mode of start	0: Direct start 1: Start after DC braking 4: Start after speed tracking (software)	0	◎
P01.08	Stop mode	0: Decelerate to stop 1: Coast to stop	0	○
P01.09	Starting frequency of braking for stop	0.00Hz~P00.03	0.00Hz	○
P01.11	DC braking current for stop	0.0~100.0%	0.0%	○
P01.12	DC braking time for stop	0.00~50.00s	0.00s	○
P01.18	Terminal-based running command protection at power-on	0: Invalid at power-on 1: Valid at power-on	0	◎
P02.00	Type of motor 1	0: Asynchronous motor (AM) 1: Permanent magnet synchronous motor	0	◎
P02.01	Rated power of AM 1	0.1~3000.0kW	Model depended	◎
P02.02	Rated frequency of AM 1	0.01Hz~P00.03	50.00Hz	◎
P02.03	Rated speed of AM 1	1~60000rpm	Model depended	◎
P02.04	Rated voltage of AM 1	0~1200V	Model depended	◎
P02.05	Rated current of AM 1	0.08~600.00A	Model depended	◎
P02.15	Rated power of SM 1	0.1~3000.0kW	Model depended	◎
P02.16	Rated frequency of SM 1	0.01~P00.03Hz	50.00Hz	◎
P02.17	Number of pole pairs of SM 1	1~128	2	◎
P02.18	Rated voltage of SM 1	0~1200V	Model depended	◎
P02.19	Rated current of SM 1	0.08~600.00A	Model depended	◎
P02.23	Counter-emf of SM 1	0~10000	300	○

Function code	Name	Description	Default	Modify
P03.00	Speed-loop proportional gain 1	0.0~200.0	20.0	○
P03.01	Speed-loop integral time 1	0.000~10.000s	0.200s	○
P03.03	Speed-loop proportional gain 2	0.0~200.0	20.0	○
P03.04	Speed-loop integral time 2	0.000~10.000s	0.200s	○
P03.11	Torque setting method selection of motor 1	0: P03.12 1: AI1 2: AI2 3: AI3 5: High-speed pulse HDI1 8: Multi-step speed running 10: Modbus/Modbus TCP communication 12: Ethernet communication 14: EtherCAT/PROFINET/ EtherNet IP communication	0	○
P03.32	Enabling torque control of motor 1	0: Disable 1: Enable	0	○
P03.54	Current-loop band width of motor 1	0~2000	400	○
P04.01	Torque boost of motor 1	0.0~10.0%	0.0%	○
P04.09	V/F slip compensation gain of motor 1	0.0~200.0%	100.0%	○
P04.10	Low-frequency oscillation control factor of motor 1	0~100	10	○
P04.11	High-frequency oscillation control factor of motor 1	0~100	10	○
P05.00	HDI input type	0: HDI1 is high-speed pulse input 1: HDI1 is digital input	0	◎
P05.01	Function of DI1	0: No function 1: Run forward 2: Run reversely 3: Three-wire running control 4: Jog forward 5: Jog reversely 6: Coast to stop 7: Reset faults 8: Pause running 9: External fault input 10: Increase frequency setting (UP) 11: Decrease frequency setting (DOWN) 57: Motor overtemperature fault input (supported only by DI4)	1	◎
P05.02	Function of DI2		4	◎
P05.03	Function of DI3		7	◎
P05.04	Function of DI4		0	◎
P05.11	Function of HDI1		0	◎
P05.42	AI1 lower limit	0.00V~P05.44	0.00V	○
P05.43	Corresponding setting of AI lower limit	-300.0%~300.0%	0.0%	○
P05.44	AI1 upper limit	P05.42~10.00V	10.00V	○
P05.45	Corresponding setting of AI1 upper limit	-300.0%~300.0%	100.0%	○
P05.47	AI2 lower limit	-10.00V~P05.49	-10.00V	○
P05.48	Corresponding setting of AI2 lower limit	-300.0%~300.0%	-100.0%	○
P05.49	AI2 middle value 1	P05.47~P05.51(V)	0.00V	○
P05.50	Corresponding setting of AI2 middle value 1	-300.0%~300.0%	0.0%	○
P05.51	AI2 middle value 2	P05.49~P05.53(V)	0.00V	○
P05.52~	Corresponding setting of AI2 middle value 2	-300.0%~300.0%	0.0%	○
P05.56	AI3 lower limit	0.00V~P05.58	0.00V	○
P05.57	Corresponding setting of AI3 lower limit	-300.0%~300.0%	0.0%	○
P05.58	AI3 upper limit	P05.56~10.00V	10.00V	○
P05.59	Corresponding setting of AI3 upper limit	-300.0%~300.0%	100.0%	○
P05.66	HDI1 lower limit frequency	0.000kHz~P05.68	0.000kHz	○
P05.67	Corresponding setting of HDI1 lower limit frequency	-300.0%~300.0%	0.0%	○
P05.68	HDI1 upper limit frequency	P05.66~50.000kHz	50.000 kHz	○
P05.69	Corresponding setting of HDI1 upper limit frequency	-300.0%~300.0%	100.0%	○
P05.76	AI input signal type selection	Bit0: AI1 input signal type selection 0: Voltage 1: Current Bit1: AI2 input signal type selection 0: Voltage 1: Current	0x0~0xF	◎
P06.00	HDO1 output type	0: High-speed pulse output 1: Digital output	0	◎
P06.04	HDO1 output	0: Invalid 1: Running 2: Running forward 3: Running reversely	0	○

Function code	Name	Description	Default	Modify
P06.05	RO1 output	4: Jogging 5: VFD in fault 6: Frequency level detection FDT1 7: Frequency level detection FDT2 8: Frequency reached	1	○
P06.09	Output terminal polarity selection	0x00~0x1F Bit0~bit2: Reserved Bit3: HDO1 Bit4: RO1	0x00	○
P06.26	AO1 output	0: Running frequency 1: Set frequency 2: Ramp reference frequency 3: Rotational speed 4: Output current 5: Output current 6: Output voltage 7: Output power	0	○
P06.28	HDO1 high-speed pulse output		0	○
P06.29	AO1 output lower limit	-300.0%~P06.31	0.0%	○
P06.30	AO1 output corresponding to lower limit	0.00~10.00V	0.00V	○
P06.31	AO1 output upper limit	P06.29~300.0%	100.0%	○
P06.32	AO1 output corresponding to upper limit	0.00~10.00V	10.00V	○
P06.21	AO1 output filter time	0.000s~10.000s	0.000s	○
P06.41	HDO1 output lower limit	-300.0%~P06.43	0.0%	○
P06.42	HDO1 output corresponding to lower limit	0.00~50.00kHz	0.00kHz	○
P06.43	HDO1 output upper limit	P06.41~300.0%	100.0%	○
P06.44	HDO1 output corresponding to upper limit	0.00~50.00kHz	50.00kHz	○
P07.00	User password	0~65535	0	○
P07.27	Present fault type	-	-	●
P07.28	Last fault type	-	-	●
P07.29	2nd-last fault type	-	-	●
P07.30	3rd-last fault type	-	-	●
P07.31	4th-last fault type	-	-	●
P07.32	5th-last fault type	-	-	●
P08.28	Auto fault reset count	0~10	0	○
P08.29	Auto fault reset interval	0.1~3600.0s	1.0s	○
P08.41	Cooling-fan running mode	Setting range: 0x00~0x12 Ones place: Run mode 0: Normal mode 1: Permanent running after power-on 2: Run mode 2 Tens place: Speed regulation mode 0: Disable speed regulation 1: Speed regulation mode 1	0x10	○
P11.00	Protection against phase loss	Setting range: 0x00~0x011 Ones place: 0: Disable software input phase loss protection. 1: Enable software input phase loss protection. Tens place: 0: Disable output phase loss protection. 1: Enable output phase loss protection. Hundreds place: Reserved	0x011	○
P14.00	Local communication address	1~247 **Note:** The communication address of a slave cannot be to 0.	1	○
P14.01	Communication baud rate	0: 1200 bps 1: 2400 bps 2: 4800 bps 3: 9600 bps 4: 19200 bps 5: 38400 bps 6: 57600 bps 7: 115200 bps	4	○
P14.02	Data bit check	0: No check (N, 8, 1) for RTU 1: Even check (E, 8, 1) for RTU 2: Odd check (O, 8, 1) for RTU 3: No check (N, 8, 2) for RTU 4: Even check (E, 8, 2) for RTU 5: Odd check (O, 8, 2) for RTU	1	○
P23.02	Received PZD2	0: Invalid 1: Set frequency 2: PID reference 3: PID feedback 4: Torque setting 5: FWD rotation upper-limit frequency setting 6: REV rotation upper-limit frequency setting 7: Electromotive torque upper limit 8: Braking torque upper limit 9: Virtual input terminal command 10: Virtual output terminal command 11: V/F separation voltage setting 12: AO1 setting 1	0	○
P23.03	Received PZD3		0	○
P23.04	Received PZD4		0	○
P23.05	Received PZD5		0	○
P23.06	Received PZD6		0	○
P23.07	Received PZD7		0	○
P23.08	Received PZD8		0	○
P23.09	Received PZD9		0	○
P23.10	Received PZD10		0	○
P23.11	Received PZD11		0	○
P23.12	Received PZD12		0	○
P23.13	Sent PZD2	0: Invalid 1: Running frequency 2: Set frequency 3: Bus voltage 4: Output voltage	0	○
P23.14	Sent PZD3		0	○
P23.15	Sent PZD4		0	○
P23.16	Sent PZD5		0	○
P23.17	Sent PZD6		0	○

Function code	Name	Description	Default	Modify
P23.18	Sent PZD7	5: Output current	0	○
P23.19	Sent PZD8	6: Actual output torque	0	○
P23.20	Sent PZD9	7: Actual output power	0	○
P23.21	Sent PZD10	8: Rotational speed	0	○
P23.22	Sent PZD11	9: Linear speed	0	○
P23.23	Sent PZD12	10: Ramp reference frequency 11: Fault code 27: VFD status word 2	0	○
P24.00	Expansion card protocol selection	0: PROFINET 1: EtherCAT 3: EtherNet IP 4: Modbus TCP 5: EtherNet UDP 6: PROFINET + EtherNet UDP 7: EtherCAT + EtherNet UDP 15: No communication expansion card	15	◎
P29.00	Expansion card type	0: No card 36: All-in-one expansion card—PROFINET communication card 41: All-in-one expansion card—EtherCAT communication card 43: All-in-one expansion card—EtherNet IP communication card 44: All-in-one expansion card—Modbus TCP communication card 45: All-in-one expansion card—Ethernet communication card 46: All-in-one expansion card—PROFINET + EtherNet communication card 47: All-in-one expansion card—EtherCAT + EtherNet communication card	0	●

7 Common faults and solutions

Fault code	Fault type	Possible cause	Solution
E4	Overcurrent during ACC	● ACC time too short. ● Load too large or sudden change of load. ● Start during motor rotating. ● 3PH output current imbalance. ● When sensorless vector control is used for motor control, parameter autotuning is not performed. ● When V/F control is used for motor control, V/F curve setting is abnormal. ● There are strong external interference sources (contactor switchover or improper grounding). ● Grid voltage too low. ● Hardware fault.	● Increase the ACC time, or reduce the software current limit point through P11.06; if the process requires rapid ACC, increase the VFD capacity. ● Increase the VFD capacity to ensure that the motor does not experience stalling, and that the load equipment functions without any exception. ● Start after the motor stops, or select speed tracking start through P01.00. ● Check the VFD output voltage and motor resistance to ensure three-phase balance. ● Set the rated parameters according to the motor nameplate, and perform parameter autotuning through P00.15. ● Adjust the frequency and voltage relationship set by the V/F curve, and reduce the voltage corresponding to the frequency. ● To avoid strong interference, keep the motor cables away from contactors and ensure reliable grounding of the system. ● Improve the power quality, or increase the VFD capacity. ● Replace the VFD.
E5	Overcurrent during DEC	● DEC time too short. ● Software current limit point setting too high. ● Load too large or sudden change of load. ● 3PH output current imbalance. ● When sensorless vector control is used for motor control, parameter autotuning is not performed. ● When V/F control is used for motor control, V/F curve setting is abnormal. ● There are strong external interference sources (contactor switchover or improper grounding). ● Hardware fault.	● Increase the DEC time, or reduce the software current limit point through P11.06; if the process requires rapid DEC, increase the VFD capacity. ● Reduce the software current limit point through P11.06. ● Increase the VFD capacity to ensure that the motor does not experience stalling, and that the load equipment functions without any exception. ● Check the VFD output voltage and motor resistance to ensure three-phase balance. ● Set the rated parameters according to the motor nameplate, and perform parameter autotuning through P00.15. ● Adjust the frequency and voltage relationship set by the V/F curve, and reduce the voltage corresponding to the frequency. ● To avoid strong interference, keep the motor cables away from contactors and ensure reliable grounding of the system. ● Replace the VFD.
E6	Overcurrent during constant speed running	● Load too large or sudden change of load. ● Software current limit point setting too high. ● 3PH output current imbalance. ● When sensorless vector	● Increase the VFD capacity to ensure that the motor does not experience stalling, and that the load equipment functions without any exception. ● Reduce the software current limit point through P11.06.

Fault code	Fault type	Possible cause	Solution
		control is used for motor control, parameter autotuning is not performed. ● When V/F control is used for motor control, V/F curve setting is abnormal. ● There are strong external interference sources (contactor switchover or improper grounding). ● Grid voltage too low. ● Hardware fault.	● Check the VFD output voltage and motor resistance to ensure three-phase balance. ● Set the rated parameters according to the motor nameplate, and perform parameter autotuning through P00.15. ● Adjust the frequency and voltage relationship set by the V/F curve, and reduce the voltage corresponding to the frequency. ● To avoid strong interference, keep the motor cables away from contactors and ensure reliable grounding of the system. ● Improve the power quality, or increase the VFD capacity. ● Replace the VFD.
E7	Overvoltage during ACC	● ACC time too short. ● Grid voltage too high. ● Start during motor rotating. ● The load has a significant energy feedback. ● Improper setting of overvoltage stall protection.	● Increase the ACC time or enable overvoltage stall protection. ● Improve the power quality to comply with the VFD input voltage specifications (refer to product specifications). ● Start after the motor stops, or select speed tracking start through P01.00. ● Install a braking unit and energy feedback unit, or remove external factors that cause the load to generate power. ● Enable overvoltage stall protection through P11.03, and lower the overvoltage stall protection voltage value of P11.04.
E8	Overvoltage during DEC	● Deceleration time too short. ● Grid voltage too high. ● The load has a significant energy feedback. ● Improper setting of overvoltage stall protection.	● Increase the DEC time; if the process requires rapid DEC, braking units, energy feedback units can be added, or the magnetic flux braking function can be used. ● Improve the power quality to comply with the VFD input voltage specifications (refer to product specifications). ● Install a braking unit and energy feedback unit, or remove external factors that cause the load to generate power. ● Enable overvoltage stall protection through P11.03, and lower the overvoltage stall protection voltage value of P11.04.
E9	Overvoltage during constant speed running	● Grid voltage too high. ● The load has a significant energy feedback. ● Improper setting of overvoltage stall protection.	● Improve the power quality to comply with the VFD input voltage specifications (refer to product specifications). ● Install a braking unit and energy feedback unit, or remove external factors that cause the load to generate power. ● Enable overvoltage stall protection through P11.03, and lower the overvoltage stall protection voltage value of P11.04.
E10	DC bus undervoltage	● Grid voltage too low. ● Abnormal bus voltage display. ● Abnormal precharge contactor closing. ● Running under heavy load in the event of input phase loss.	● Increase grid input voltage. ● Contact us. ● Contact us. ● Check for abnormal input power and loose input cables.
E11	Motor overload	● Grid voltage is too low. ● Motor rated current is set incorrectly. ● Motor stall or load jumps violently.	● Increase grid input voltage. ● Reset the motor rated current in the motor parameter group. ● Check the load and adjust torque boost.
E12	VFD overload	● ACC is too fast. ● The motor is restarted during rotating. ● Grid voltage is too low. ● Load is too heavy. ● VFD power is too small.	● Increase ACC time. ● Avoid restart after stop. ● Increase grid input voltage. ● Select a VFD with larger power.
E13	Input side phase loss	● Phase loss or significant fluctuations in input L1, L2, or L3. ● Input-side screws are loose.	● Check for abnormal input power and loose input cables. ● Set P11.00 to screen out the fault.
E14	Output side phase loss	● Output cables are broken or short connected to the ground. ● UVW phase loss (or the three phases of load are seriously asymmetrical). **Note:** The output phase loss detection time requires at least 2.5s. After	● Check for loose or broken output cables. ● Check for sharp load fluctuation and motor 3PH resistance imbalance.

Fault code	Fault type	Possible cause	Solution
		phase loss, instability may occur, potentially leading to overcurrent, overvoltage, overload, or speed deviation fault being reported first.	
E16	Inverter module overheat	● Air duct is blocked or fan is damaged. ● Ambient temperature is too high. ● Long-time overload running.	● Ventilate the air duct or replace the fan. ● Keep good ventilation to lower ambient temperature. ● Select a VFD with larger power.
E17	External fault	● DI terminal external fault input signal acted.	● Check whether external device input is normal.
E18	Modbus/Modbus TCP communication fault	● Incorrect baud rate ● Communication line fault. ● Incorrect communication address. ● Communication suffers from strong interference.	● Set a proper baud rate. ● Check the communication port wiring. ● Set the communication address correctly. ● You are recommended to use shielded cables to improve anti-interference.
E19	Current detection fault	● Abnormal motor cable or motor insulation.	● Remove motor cables to check. ● Contact us.
E20	Motor autotuning fault	● Motor capacity does not match with the VFD capacity. This fault may occur if the capacity difference exceeds five power classes. ● Incorrect motor parameter setting. ● The parameters gained from autotuning deviate sharply from the standard parameters. ● Autotuning timeout. ● Pulse current setting is too large.	● Change the VFD model, or adopt V/F mode for control ● Check motor wiring, motor type, and parameter settings. ● Empty the motor load and re-perform autotuning. ● Check whether the upper limit frequency is larger than 2/3 of the rated frequency. ● Decrease the pulse current setting properly.
E21	EEPROM operation fault	● Error in reading or writing control parameters ● EEPROM damaged.	● Press STOP/RST to reset. ● Replace the control board.
E22	PID feedback offline	● PID feedback offline. ● PID feedback source disappears.	● Check PID feedback signal wires. ● Check PID feedback source.
E23	Braking unit fault	● Braking circuit fault or braking pipe damage. ● External braking resistor with small resistance.	● Check the braking unit, and replace with new braking pipe ● Increase the braking resistance.
E24	Running time reached	● Actual VFD running time longer than internally set running time.	● Contact us.
E25	Electronic overload	● The VFD reports overload pre-alarm according to the setting.	● Check whether the overload pre-alarm point is set properly.
E27	Parameter upload error	● Keypad cable connected improperly or disconnected. ● Keypad cable too long, causing strong interference. ● Keypad or mainboard communication circuit error	● Check the keypad cable and re-plug to determine whether a fault occurs. ● Check the surroundings to rule out interference source ● Replace the hardware and seek maintenance services.
E28	Parameter download error	● Keypad cable connected improperly or disconnected. ● Keypad cable too long, causing strong interference. ● Keypad data storage error	● Check the surroundings to rule out interference source ● Replace the hardware and seek maintenance services. ● Check whether the version of the control board software of keypad backup parameter copy is the same as the version of the control board software of the VFD.
E30	Ethernet communication fault	● No data transmission between the communication card and the host controller (or PLC).	● Check whether the communication card wiring is loose or disconnected.
E32	To-ground short-circuit fault	● The output of the VFD is short circuited to the ground. ● Current detection circuit fault.	● Check whether the motor is short circuited to the ground and wiring is normal. ● Check whether the motor wiring is normal. ● Replace the main control board.
E34	Speed deviation fault	● Load too heavy or stalled.	● Check for overload, increase speed deviation detection time, or prolong ACC/DEC time. ● Check motor parameter settings and re-perform motor parameter autotuning. ● Check speed loop control parameter settings.
E35	Mal-adjustment fault	● Load exception. ● Incorrect SM parameter settings. ● Autotuned motor parameters are inaccurate. ● The VFD is not connected to the motor.	● Check for overload or stalling. ● Check motor parameter and counter EMF settings. ● Re-perform motor parameter autotuning. ● Increase the maladjustment detection time. ● Adjust flux weakening coefficient

Fault code	Fault type	Possible cause	Solution
		● Flux weakening application.	and current loop parameters.
E36	Underload fault	● The VFD reports underload pre-alarm according to the setting.	● Check the load and overload pre-alarm threshold.
E40	Safe torque off	● Safe torque off function is enabled by external forces.	-
E41	Safety circuit exception of STO channel 1	● The wiring of STO is improper ● Fault occurred to external switch of STO.	● Check whether terminal wiring of STO is proper and firm enough. ● Check whether the external switch of STO can work properly
E42	Safety circuit exception of STO channel 2	● Channel safety circuit hardware fault.	● Replace the control board. **Note:** Re-power on is required to clear the fault.
E43	Exception to both STO channel 1 and channel 2	● Hardware fault occurred to STO circuit.	● Replace the drive board.
E44	STO safety code FLASH CRC check fault	● Drive board fault.	● Replace the drive board.
E57	PROFINET communication timeout	● No data transmission between the communication card and the host controller (or PLC).	● Check whether the communication card wiring is loose or disconnected.
E59	Motor overtemperature fault	● Equipment or ambient temperature too high. ● AI/AO detected temperature inaccurate. ● DI4 input motor overtemperature signal.	● Lower the equipment or ambient temperature. ● Replace the temperature measuring resistor. ● Check the external temperature measuring terminal signal.
E60	Communication card identifying failure	● There is data transmission in communication card interface, but the card type cannot be identified.	● Check whether the expansion card in the slot is supported. ● Stabilize the expansion card interface after power-off, and check whether the fault persists at next power-on.
E63	Communication card communication timeout fault	● No data transmission in the communication card interface.	● Check whether the insertion port or card slot is damaged. If yes, replace the insertion port or card slot after power-off.
E66	EtherCAT communication timeout	● No data transmission between the communication card and the host controller (or PLC).	● Check whether the communication card wiring is loose or disconnected.
E92	AI1 disconnection	● AI1 input too low.	● Connect a 5V or 10mA power source to check whether the input is normal. ● Check the wiring or replace the cable.
E93	AI2 disconnection	● AI1 wiring disconnected. ● AI2 input too low. ● AI2 wiring disconnected.	
E94	AI3 disconnection	● AI3 input too low. ● AI3 wiring disconnected.	
E95	EtherNet IP communication timeout fault	● No data transmission between the communication card and the host controller (or PLC).	● Check whether the communication card wiring is loose or disconnected.
E96	No upgrade bootloader	● Upgrade bootloader missing.	● Contact us.
E587	Dual CPU communication fault 1	● Dual CPU communication fault.	● Contact us.
E588	Dual CPU communication fault 2		

8 Product dimensions

Figure 8-1 Dimensions and hole positions for VFDs in frames A and B

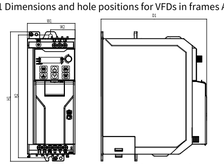


Table 8-1 Dimensions and hole positions for VFDs in frames A and B

Product model	Frame	Outline dimensions (mm)			Mounting hole distance (mm)		Mounting hole diameter (mm)
		W1	H1	D1	W2	H2	
GD28-0R2G-S2	A	60	190	155	36	180	Ø5
GD28-0R4G-S2		60	190	155	36	180	Ø5
GD28-0R7G-S2		60	190	155	36	180	Ø5
GD28-0R2G-2		60	190	155	36	180	Ø5
GD28-0R4G-2		60	190	155	36	180	Ø5
GD28-0R7G-2		60	190	155	36	180	Ø5
GD28-0R4G-4		60	190	155	36	180	Ø5
GD28-0R7G-4		60	190	155	36	180	Ø5
GD28-1R1G-4		60	190	155	36	180	Ø5
GD28-0R4G-5		60	190	155	36	180	Ø5
GD28-0R7G-5		60	190	155	36	180	Ø5

Product model	Frame	Outline dimensions (mm)			Mounting hole distance (mm)		Mounting hole diameter (mm)
		W1	H1	D1	W2	H2	
GD28-1R1G-S2	B	70	190	155	36	180	Ø5
GD28-1R5G-S2		70	190	155	36	180	Ø5
GD28-2R2G-S2		70	190	155	36	180	Ø5
GD28-1R1G-2		70	190	155	36	180	Ø5
GD28-1R5G-2		70	190	155	36	180	Ø5
GD28-2R2G-2		70	190	155	36	180	Ø5
GD28-1R5G-4		70	190	155	36	180	Ø5
GD28-2R2G-4		70	190	155	36	180	Ø5
GD28-003G-4		70	190	155	36	180	Ø5
GD28-004G-4		70	190	155	36	180	Ø5
GD28-1R5G-5		70	190	155	36	180	Ø5
GD28-2R2G-5		70	190	155	36	180	Ø5
GD28-004G-5		70	190	155	36	180	Ø5

Figure 8-2 Dimensions and hole positions for VFDs in frame C

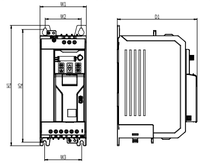


Table 8-2 Dimensions and hole positions for VFDs in frame C

Product model	Frame	Outline dimensions (mm)			Mounting hole distance (mm)			Mounting hole diameter (mm)
		W1	H1	D1	W2	W3	H2	
GD28-004G-S2	C	90	235	155	70	72	220	Ø6
GD28-004G-2		90	235	155	70	72	220	Ø6
GD28-5R5G-2		90	235	155	70	72	220	Ø6
GD28-5R5G-4		90	235	155	70	72	220	Ø6
GD28-7R5G-4		90	235	155	70	72	220	Ø6
GD28-5R5G-5		90	235	155	70	72	220	Ø6
GD28-7R5G-5		90	235	155	70	72	220	Ø6

Figure 8-3 Dimensions and hole positions for VFDs in frame D

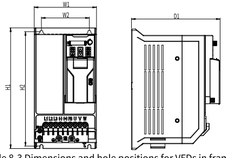


Table 8-3 Dimensions and hole positions for VFDs in frame D

Product model	Frame	Outline dimensions (mm)			Mounting hole distance (mm)		Mounting hole diameter (mm)
		W1	H1	D1	W2	H2	
GD28-7R5G-2	D	130	250	185	100	237	Ø6
GD28-011G-2		130	250	185	100	237	Ø6
GD28-011G-4		130	250	185	100	237	Ø6
GD28-015G-4		130	250	185	100	237	Ø6
GD28-011G-5		130	250	185	100	237	Ø6
GD28-015G-5		130	250	185	100	237	Ø6

Figure 8-4 Dimensions and hole positions for VFDs in frame E

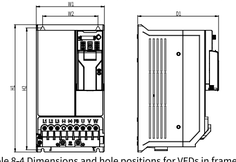


Table 8-4 Dimensions and hole positions for VFDs in frame E

Product model	Frame	Outline dimensions (mm)			Mounting hole distance (mm)		Mounting hole diameter (mm)
		W1	H1	D1	W2	H2	
GD28-015G-2	E	160	300	190	130	287	Ø6
GD28-018G-4		160	300	190	130	287	Ø6
GD28-022G-4		160	300	190	130	287	Ø6
GD28-018G-5		160	300	190	130	287	Ø6
GD28-022G-5		160	300	190	130	287	Ø6

Appendix A Energy efficiency data

Table A-1 Power loss and IE class

Product model	Relative loss (%)									Standby loss (W)	IE class
	(0;25)	(0;50)	(0;100)	(50;25)	(50;50)	(50;100)	(90;50)	(90;100)			
GD28-0R2G-S2	2.45	2.78	2.98	2.8	3.01	3.26	3.08	3.29		7	IE2
GD28-0R4G-S2	1.96	2.24	2.54	2.05	2.4	2.65	2.52	2.81		7	IE2
GD28-0R7G-S2	1.48	1.68	1.84	1.54	1.84	2.54	1.93	2.71		7	IE2
GD28-1R1G-S2	1.39	1.61	2.21	1.68	1.9	2.55	2.03	2.71		7	IE2
GD28-1R5G-S2	1.41	1.44	1.91	1.69	1.91	2.35	1.92	2.59		7	IE2
GD28-2R2G-S2	1.2	1.42	2.02	1.38	1.68	2.41	1.75	2.95		7	IE2
GD28-004G-S2	1.33	1.65	2.34	1.47	1.84	2.74	2.04	3.09		11	IE2
GD28-0R2G-2	2.39	2.69	2.97	2.66	2.95	3.2	3.02	3.24		7	IE2
GD28-0R4G-2	1.95	2.19	2.3	2.13	2.38	2.74	2.45	2.81		7	IE2
GD28-0R7G-2	1.48	1.67	2.26	1.59	1.84	2.5	1.9	2.62		7	IE2
GD28-1R1G-2	1.28	1.52	2.08	1.56	1.77	2.23	1.84	2.42		7	IE2
GD28-1R5G-2	1.36	1.44	1.77	1.68	1.73	1.94	1.87	2.34		7	IE2
GD28-2R2G-2	1.31	1.37	1.72	1.6	1.73	1.95	1.82	2.2		7	IE2
GD28-004G-2	1.45	1.63	1.93	1.51	1.72	2.1	1.9	2.26		11	IE2
GD28-5R5G-2	0.79	1.32	1.99	0.87	1.34	2.22	1.41	2.39		11	IE2
GD28-7R5G-2	0.62	0.9	1.76	0.8	1.15	2.04	1.46	2.28		14	IE2
GD28-011G-2	0.54	0.78	1.87	0.77	1.18	2.09	1.23	2.48		14	IE2
GD28-015G-2	0.92	0.93	0.95	1.06	1.37	1.49	2.6	2.98		16	IE2
GD28-0R4G-4	2.13	2.28	2.59	2.2	2.54	2.81	2.54	2.94		9	IE2
GD28-0R7G-4	1.41	1.64	2.11	1.67	1.86	2.29	1.92	2.43		9	IE2
GD28-1R1G-4	1.45	1.61	1.83	1.64	1.94	2.16	2.03	2.29		9	IE2
GD28-1R5G-4	1.25	1.34	1.52	1.41	1.63	2.01	1.62	2.15		9	IE2
GD28-2R2G-4	1.27	1.29	1.61	1.56	1.77	2.12	1.61	2.23		9	IE2
GD28-003G-4	1.19	1.27	1.55	1.48	1.65	2.01	1.59	2.11		9	IE2
GD28-004G-4	1.11	1.21	1.46	1.34	1.62	1.83	1.54	2.35		9	IE2
GD28-5R5G-4	1.22	1.37	1.56	1.46	1.77	2.12	1.77	2.26		11	IE2
GD28-7R5G-4	0.76	0.96	1.54	0.98	1.17	1.91	1.22	2.04		11	IE2
GD28-011G-4	0.79	0.89	1.79	0.78	0.9	1.77	0.93	1.8		20	IE2
GD28-015G-4	0.7	1.01	1.98	0.74	1.02	1.87	1.17	2.23		20	IE2
GD28-018G-4	0.53	0.76	1.23	0.56	0.86	1.73	0.86	2.01		20	IE2
GD28-022G-4	0.63	0.71	1.38	0.6	0.9	1.73	1.02	1.95		20	IE2
GD28-0R4G-5	1.29	1.48	1.76	1.48	1.72	2.13	2.05	2.51		12	IE2
GD28-0R7G-5	1.26	1.41	1.74	1.42	1.67	2.07	2.01	2.44		12	IE2
GD28-1R5G-5	1.20	1.35	1.66	1.39	1.63	1.99	1.92	2.24		13	IE2
GD28-2R2G-5	1.17	1.32	1.62	1.34	1.59	1.95	1.85	2.24		13	IE2
GD28-004G-5	1.14	1.29	1.57	1.28	1.55	1.91	1.83	2.17		13	IE2
GD28-5R5G-5	1.11	1.27	1.51	1.20	1.48	1.87	1.78	2.07		15	IE2
GD28-7R5G-5	1.06	1.24	1.48	1.17	1.47	1.85	1.73	2.02		15	IE2
GD28-011G-5	0.88	1.18	1.40	1.03	1.44	1.82	1.69	1.97		32	IE2
GD28-015G-5	0.73	0.97	1.34	0.89	1.31	1.72	1.52	1.94		32	IE2
GD28-018G-5	0.73	0.88	1.24	0.85	1.25	1.68	1.50	1.85		36	IE2
GD28-022G-5	0.68	0.85	1.25	0.79	1.21	1.56	1.36	1.77		36	IE2

Table A-2 Rated specifications (in heavy/light load)

Product model	Heavy load				Light load				Rated power Frequency (Hz)	Rated power voltage (V)
	Apparent power (kVA)	Motor power (kW)	Output current (A)	Max. working temperature (°C)	Apparent power (kVA)	Motor power (kW)	Output current (A)	Max. working temperature (°C)		
GD28-0R2G-S2	0.7	0.2	1.5	50°C	0.94	0.4	2	40°C	50Hz or 60Hz, Allowed range: 47–63Hz	AC 1PH 220V–240V
GD28-0R4G-S2	1.15	0.4	2.5	50°C	1.52	0.75	3.3	40°C		
GD28-0R7G-S2	1.88	0.75	4.2	50°C	2.26	1.1	5.1	40°C		
GD28-1R1G-S2	2.28	1.1	6.5	50°C	2.85	1.5	7.5	40°C		
GD28-1R5G-S2	3.35	1.5	7.5	50°C	4.37	2.2	9.8	40°C		
GD28-2R2G-S2	4.35	2.2	10	50°C	5.44	4	12.5	40°C		
GD28-004G-S2	6	4	16	50°C	-	-	-	40°C		
GD28-0R2G-2	0.69	0.2	1.5	50°C	0.91	0.4	2	40°C	50Hz or 60Hz, Allowed range: 47–63Hz	AC 3PH 200–240V
GD28-0R4G-2	1.16	0.4	2.5	50°C	1.51	0.75	3.3	40°C		
GD28-0R7G-2	1.91	0.75	4.2	50°C	2.29	1.1	5.1	40°C		
GD28-1R1G-2	3.06	1.1	6.5	50°C	3.53	1.5	7.5	40°C		
GD28-1R5G-2	3.54	1.5	7.5	50°C	4.63	2.2	9.8	40°C		
GD28-2R2G-2	4.71	2.2	10	50°C	5.88	4	12.5	40°C		
GD28-004G-2	6.1	4	16	50°C	8	5.5	21	40°C		
GD28-5R5G-2	8.24	5.5	20	50°C	9.9	7.5	26	40°C		
GD28-7R5G-2	14.69	7.5	30	50°C	21.5	11	39	40°C		
GD28-011G-2	19.95	11	42	50°C	-	-	-	40°C		
GD28-015G-2	21	15	55	50°C	26.7	22	64	40°C		
GD28-0R4G-4	1.26	0.4	1.5	50°C	1.66	0.75	2	40°C	50Hz or 60Hz, Allowed range: 47–63Hz	AC 3PH 380–480V
GD28-0R7G-4	2.1	0.75	2.5	50°C	2.73	1.1	3.3	40°C		
GD28-1R1G-4	2.41	1.1	3	50°C	2.94	1.5	3.7	40°C		
GD28-1R5G-4	3.56	1.5	4.2	50°C	4.66	2.2	5.5	40°C		
GD28-2R2G-4	4.53	2.2	5.5	50°C	5.76	3	7	40°C		
GD28-003G-4	6.17	3	7.5	50°C	7.82	4	9.5	40°C		
GD28-004G-4	7.67	4	9.5	50°C	9.28	5.5	11.5	40°C		
GD28-5R5G-4	9.21	5.5	14	50°C	11.84	7.5	18	40°C		
GD28-7R5G-4	12.96	7.5	18.5	50°C	13.49	11	21	40°C		
GD28-011G-4	19.97	11	25	50°C	25.56	15	32	40°C		
GD28-015G-4	29.15	15	32	50°C	34.6	18.5	38	40°C		
GD28-018G-4	25.2	18.5	38	50°C	29.6	22	45	40°C		
GD28-022G-4	25	22	45	50°C	38.17	30	58	40°C		
GD28-0R4G-5	1.79	0.4	1.7	50°C	2.19	0.75	2.1	40°C	50Hz or 60Hz, Allowed range: 47–63Hz	AC 3PH 525–600V
GD28-0R7G-5	2.42	0.75	2.3	50°C	2.85	1.5	2.7	40°C		
GD28-1R5G-5	3.45	1.5	3	50°C	4.16	2.2	4.2	40°C		
GD28-2R2G-5	5.79	2.2	4.2	50°C	6.87	4	5.5	40°C		
GD28-004G-5	7.98	4	6.5	50°C	9.31	5.5	9	40°C		
GD28-5R5G-5	11.76	5.5	9	50°C	12.24	7.5	12	40°C		
GD28-7R5G-5	14.43	7.5	12	50°C	16.98	11	17	40°C		
GD28-011G-5	20.10	11	17	50°C	25.12	15	22	40°C		
GD28-015G-5	28.65	15	22	50°C	31.08	18.5	27	40°C		
GD28-018G-5	26.47	18.5	27	50°C	32.89	22	34	40°C		
GD28-022G-5	27.69	22	34	50°C	40.66	30	42	40°C		

66001-01398

202601 (V1.4)