

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、常见故障对策、产品尺寸和能效数据。

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，并等待不短于变频器上标注的时间。

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

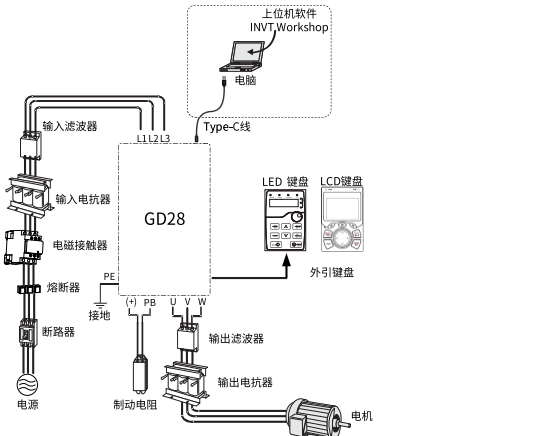
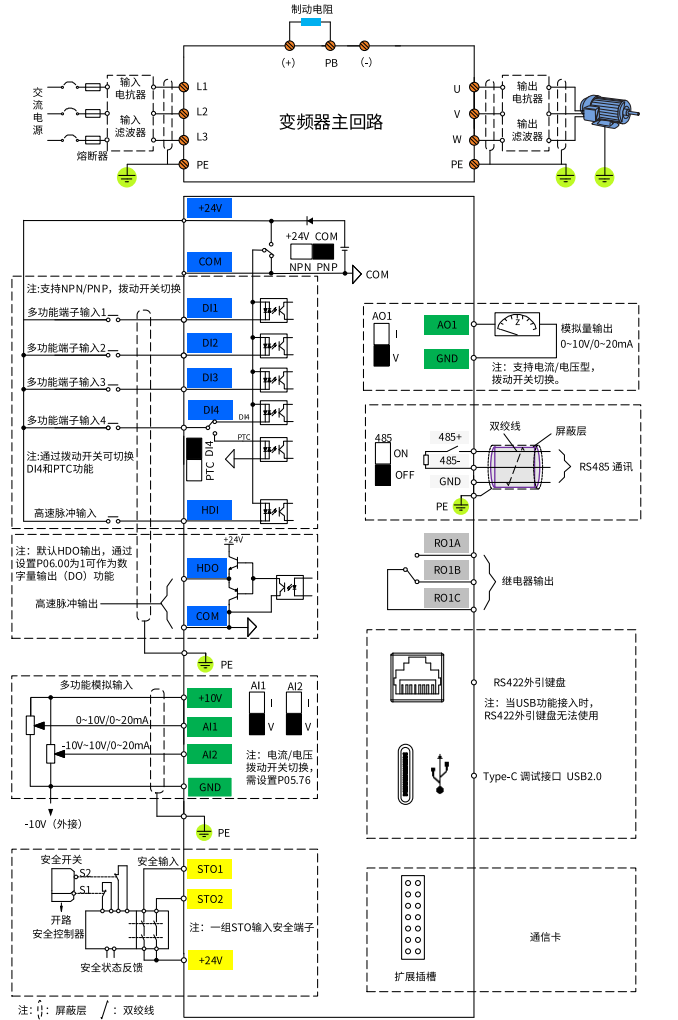


图 2-1 变频器典型接线

2 电气接线图

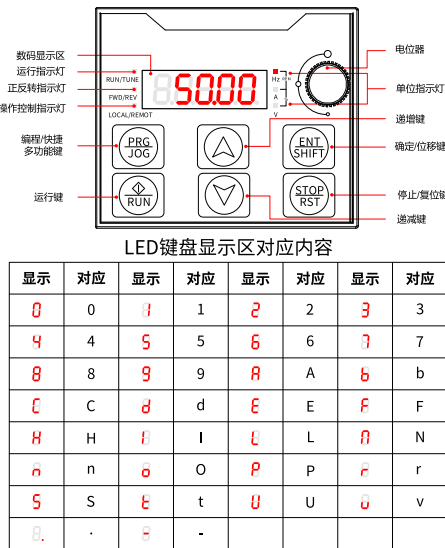


3 端子功能说明

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
(-)	(+), (-) 共直流母线端子
PB	外接制动电阻端子
PE	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 AI2(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 RO1B RO1C	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
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（接漏需打到 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：100Hz 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
HD11	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
STO2	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
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



显示	对应	显示	对应	显示	对应
0	0	1	2	3	3
4	4	5	6	7	7
8	8	9	A	a	a
C	C	d	E	F	F
H	H	I	L	N	N
n	n	O	P	r	r
S	S	t	U	v	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	变频器处于待机状态
FWD/REV	常亮	变频器运行指令通道
	常灭	变频器正转
	常亮	变频器使用通信运行指令通道
LOCAL/REMOT	闪烁	变频器使用本地运行指令通道
	常灭	变频器使用通信运行指令通道
	常亮	变频器处于故障状态
RUN/TUNE FWD/REV LOCAL/REMOT	同时常亮且显示故障代码	变频器处于报警状态
	同时闪烁	
	同时常亮且显示故障代码	

按键	作用
PROG/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； 在待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。

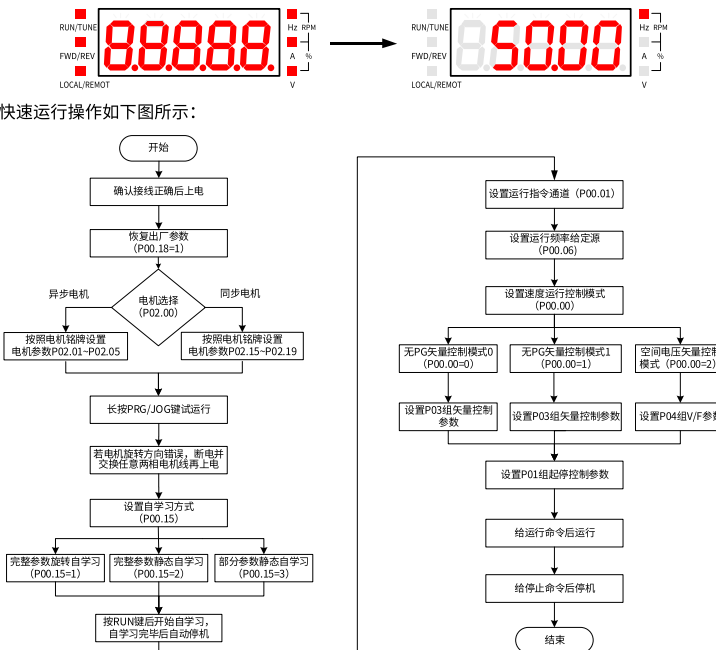
5 快速运行

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。



功能码	名称	说明	缺省值	更改
		49: I/O201 卡 50: 隔离 485 卡 52: CAN 二合一扩展卡-CANopen 通信卡 53: CAN 二合一扩展卡-CAN 主从通信卡		

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 ● 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 ● 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 ● 按电机铭牌设置额定参数，通过 P00.15 进行参数自学 ● 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
		● 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 ● 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 ● 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	● 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 ● 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
		● 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 ● 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
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 ● 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
		● 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 ● 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
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
		● 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
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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	● 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
		● 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

故障代码	故障类型	可能的原因	故障解决方法
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
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 ● 建议改用屏蔽线缆，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 ● 自学出错的参数与标准参数偏差过大 ● 自学超时 ● 脉冲电流设置值是否过大 ● 控制参数的读写发生错误	● 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，重新辨识 ● 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 ● 按 STOP/RST 复位 ● 更换控制板
E21	EEPROM 操作故障	● 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
E22	PID 反馈断线	● 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
E23	制动单元故障	● 变频器实际运行时间大于内部设定运行时间	● 联系厂家
E24	运行时间到达	● 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
E25	电子过载	● 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，重新插接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
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一致
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 ● 键盘或主板通信部分电路故障	● 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，接线是否正确 ● 拆除电机线是否正常 ● 更换主控板
E34	速度偏差故障	● 负载过重或者者被堵转	● 检查负载是否过重或堵转，增加速度偏差输出时间或把加速时间加长 ● 电机参数设置是否正确，重新做电机参数自学 ● 检查速度反馈控制参数是否合适
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 ● 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

故障代码	故障类型	可能的原因	故障解决方法
E40	STO 安全转矩停止	● 外部使能安全转矩停止功能	-
E41	STO 通道 1 安全回路异常	● 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消除此故障。	
E42	STO 通道 2 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	
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	电机过热故障	● 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，但无法识别到该类卡型	● 确认是否插入了不支持该卡槽内的扩展卡 ● 断电后，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	● 检查通信卡接线是否松动或掉线
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	● 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
E94	AI3 断线	● AI3 输入过低 ● AI3 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
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	● 双 CPU 通信故障	● 联系厂家

8 产品尺寸

图 8-1 外形结构 A、B 的尺寸和孔位

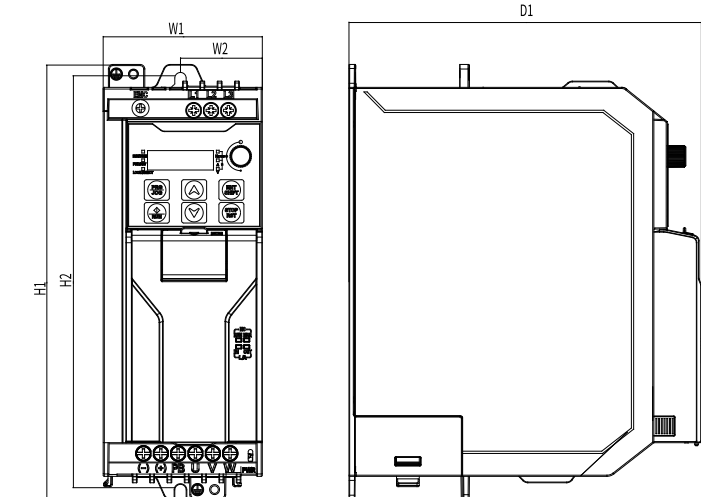


表 8-1 外形结构 A、B 的尺寸和孔位

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	B	70	190	155	36	180	Ø5
GD28-1R1G-S2		70	190	155	36	180	Ø5
GD28-1R5G-S2		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	
GD28-2R2G-S2	C	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	D	70	190	155	36	180	Ø5

图 8-2 外形结构 C 的尺寸和孔位

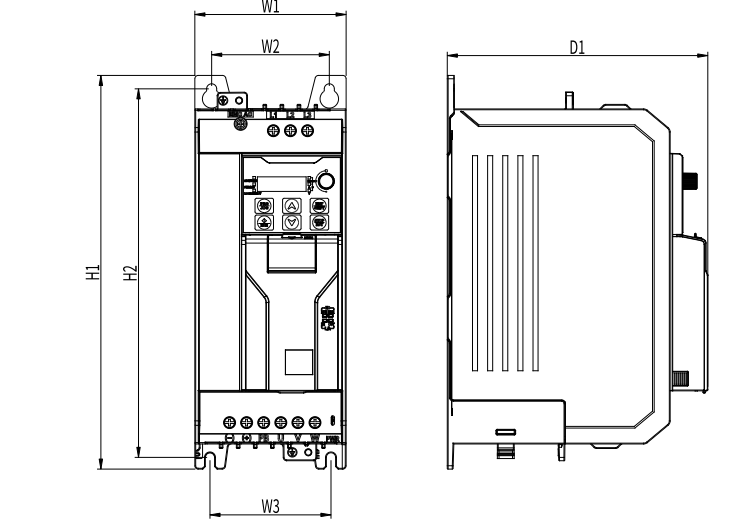


表 8-2 外形结构 C 的尺寸和孔位

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	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
GD28-7R5G-5		90	235	155	70	72	220	Ø6

图 8-3 外形结构 D 尺寸和孔位

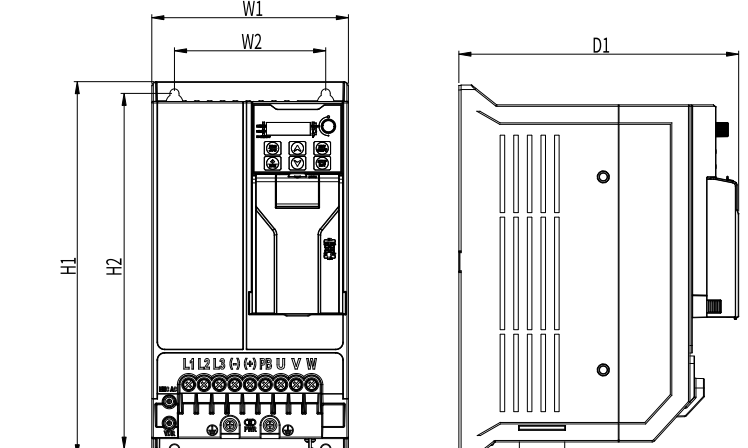


表 8-3 外形结构 D 尺寸和孔位

产品型号	外形结构	外形尺寸 (mm)	安装孔位 (mm)
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Goodrive28 Series VFD Quick Start Guide

This guide briefly describes the external wiring, terminals, Scan the QR code to view keypads, quick running, common function parameter settings, the full version of GD28 common faults and solutions, product dimensions, and energy series product e-manual. 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.



Warning

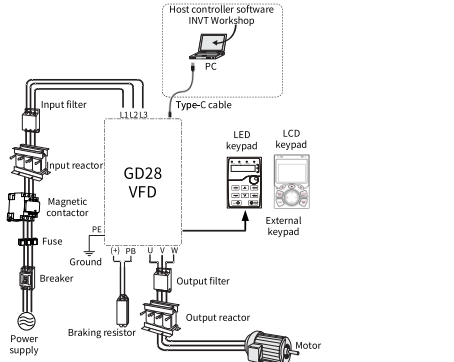
- This guide only provides the basic installation and commissioning information. Failure to comply with the safety instructions and installation and commissioning instructions in the relevant documentation may result in accidents such as equipment damage, personal injury, or even death.
- Only trained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

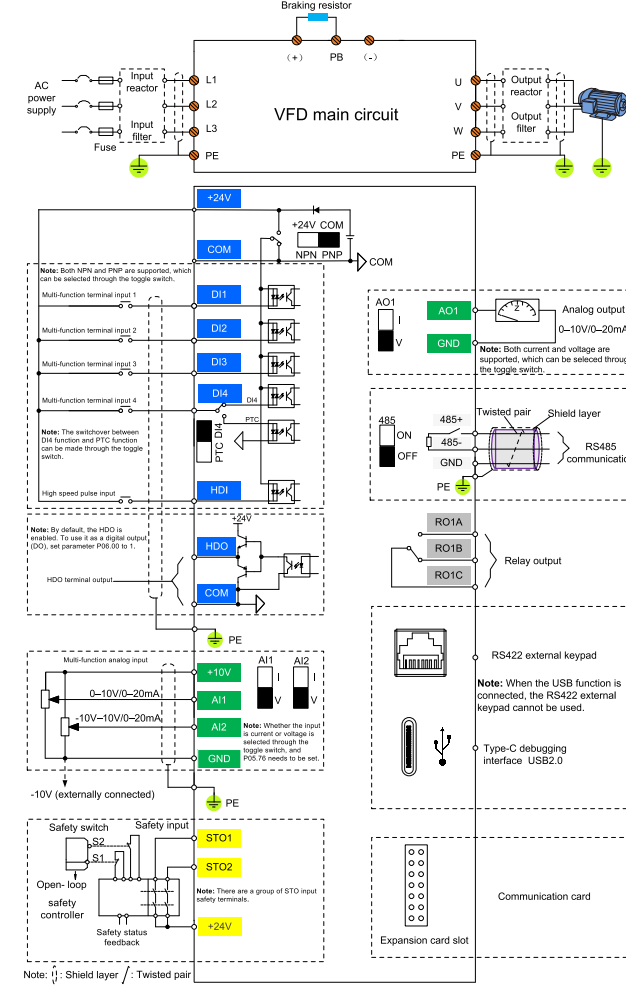
Minimum waiting time	VFD model
5 minutes	1PH 220V 0.2~4kW; 3PH 220V 0.2~15kW; 3PH 380V 0.4~22kW; 3PH 575V 0.4~22kW

1 External wiring



2 Electrical wiring

Figure 2-1 Typical VFD wiring

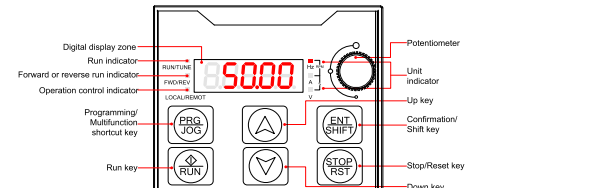


3 Function

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.
PE	PE terminal. The PE terminals of each machine must be grounded reliably.
Control circuit terminals	
+10V	+10V power supply provided locally, maximum output current: 50 mA.
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 AI2 (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, RO1B, RO1C	Relay output. RO1A: NO; RO1B: NC; RO1C: common Contact capacity: 3A/AC 250V, 1A/DC 30V
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: 100Hz 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 STO redundant input, connected to the external NC contact. When the contact opens, STO acts and the VFD stops output.
STO2	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



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
a	a	b	b	P	P	r	r
S	S	t	t	U	U	v	v
-	-	-	-	-	-	-	-

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

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 select display parameters in the interface for the VFD in stopped or running state. Press and hold it (at least 1s) 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 key	Press it to run or perform autotuning under keypad operation mode. 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.
Stop/Reset key	

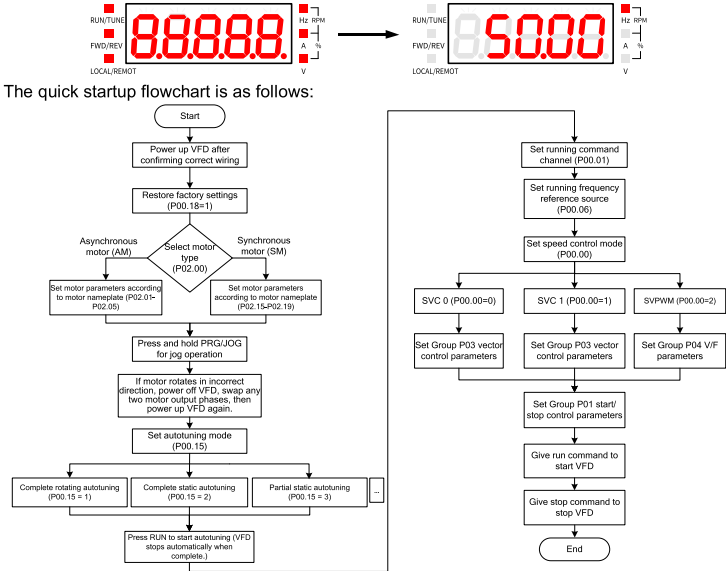
5 Quick running

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.



6 Common function parameter setup

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

"o" 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 cannot 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: Keyapd 1: Terminal 2: Communication	0	o
P00.02	Communication mode of running commands	0: Modbus/Modbus TCP 1: CANopen 2: EtherNet UDP 3: EtherCAT/PROFINET/EtherNet IP	0	o
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 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 11: Modbus/Modbus TCP communication 13: CANopen communication 14: Ethernet communication 12: EtherCAT/PROFINET/EtherNet IP communication 19: EA11	0	o
P00.07	Setting channel of B frequency command	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	o
P00.10	Set frequency via keypad	0.00Hz~P00.03	50.00Hz	o
P00.11	ACC time 1	0~3600.0s	Model depended	o
P00.12	DEC time 1	0~3600.0s	Model depended	o
P00.13	Running direction	0: Run at the default direction. 1: Run at the opposite direction. 2: Disable reverse running.	0	o
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	o
P01.09	Starting frequency of braking for stop	0.00Hz~P00.03	0.00Hz	o
P01.11	DC braking current for stop	0~100.0%	0.0%	o
P01.12	DC braking time for stop	0.00~50.00s	0.00s	o
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	1~6000rpm	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-ent of SM 1	0~10000	300	o
P03.00	Speed-loop proportional gain 1	0~200.0	20.0	o
P03.01	Speed-loop integral time 1	0.000~10.000s	0.200s	o
P03.03	Speed-loop proportional gain 2	0~200.0	20.0	o
P03.04	Speed-loop integral time 2	0.000~10.000s	0.200s	o
P03.11	Torque setting method selection of	0: P03.12 1: AI1 2: AI2 3: AI3 5: High-speed pulse HDI1	0	o

Function code	Name	Description	Default	Modify
	motor 1	7: Simple PLC program 8: Multi-step speed running 9: PID control 10: Modbus/Modbus TCP communication 11: CANopen communication 12: Ethernet communication 14: EtherCAT/PROFINET/ EtherNet IP communication 19: EAI1		
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	1	⊗
P05.02	Function of DI2	3: Three-wire running control 4: Jog forward 5: Jog reversely	4	⊗
P05.03	Function of DI3	6: Coast to stop 7: Reset faults	7	⊗
P05.04	Function of DI4	8: Pause running 9: External fault input 10: Increase frequency setting (UP) 11: Decrease frequency setting (DOWN)	0	⊗
P05.11	Function of HDI1	57: Motor overtemperature fault input (supported only by DI4)	0	⊗
P05.42	AI1 lower limit	0.00V~P05.44	0.00V	○
P05.43	Corresponding setting of AI1 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	⊗
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 4: Jogging	0	○
P06.05	RO1 output	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	○

Function code	Name	Description	Default	Modify
P29.00	Expansion card type	5: EtherNet UDP 6: PROFINET + EtherNet UDP 7: EtherCAT + EtherNet UDP 15: No communication expansion card	0	•
		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 49: I/O 201 card 50: RS-485 communication card 52: 2-in-1 CAN expansion card—CANopen communication card 53: 2-in-1 CAN expansion card—CAN master-slave communication card		

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.
		● 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.
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.
		● Load too large or sudden change of load. ● Software current limit point setting too high. ● 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.	● 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. ● 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

Fault code	Fault type	Possible cause	Solution
E7	Overvoltage during ACC	● Hardware fault.	● contactors and ensure reliable grounding of the system. ● Improve the power quality, or increase the VFD capacity. ● Replace the VFD.
		● ACC time too short. ● Grid voltage too high. ● Start during motor rotating. ● The load has a significant energy feedback. ● Improper setting of 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 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.
		● 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.
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.
		● 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. ● Check for abnormal input power and loose input cables.
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. ● Check for abnormal input power and loose input cables.
		● 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.
E11	Motor 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.
		● 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.
E12	VFD overload	● 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 phase loss, instability may occur, potentially leading to overcurrent, overvoltage, overload, or speed deviation fault being reported first.	● Check for loose or broken output cables. ● Check for sharp load fluctuation and motor 3PH resistance imbalance.
		● The VFD reports pre-alarm according to the setting. ● Safe torque off function is enabled by external forces.	● Check the load and underload pre-alarm threshold.
E13	Input side phase loss	● 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.
		● DI terminal external fault input signal acted.	● Check whether external device input is normal.
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 phase loss, instability may occur, potentially leading to overcurrent, overvoltage, overload, or speed deviation fault being reported first.	● Check for loose or broken output cables. ● Check for sharp load fluctuation and motor 3PH resistance imbalance.
		● The VFD reports pre-alarm according to the setting. ● Safe torque off function is enabled by external forces.	● Check the load and underload pre-alarm threshold.
E15	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.
		● DI terminal external fault input signal acted.	● Check whether external device input is normal.
E16	External 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
		● Modbus/Modbus TCP	● Set the communication address correctly.
E17	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
		● 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
		● DI terminal external fault input signal acted.	● Check whether external device input is normal.

Fault code	Fault type	Possible cause	Solution
E19	Current detection fault	● Abnormal motor cable or motor insulation.	● shielded cables to improve anti-interference. ● Remove motor cables to check. ● Contact us.
		● 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.
E20	Motor autotuning fault	● Error in reading or writing control parameters. ● EEPROM damaged. ● PID feedback offline. ● PID feedback source disappears.	● Press STOP/RST to reset. ● Replace the control board.
		● Braking circuit fault or braking transistor damage. ● External braking resistor with small resistance.	● Check the braking unit, and replace with new braking transistor. ● Increase the braking resistance.
E21	PID feedback offline.	● Actual VFD running time longer than internally set running time.	● Contact us.
		● The VFD reports overload according to the setting.	● Check whether the overload pre-alarm point is set properly.
E22	Braking unit fault	● 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.
		● 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.
E23	Running time reached	● No data transmission between the communication card and the host controller (or PLC).	● Check whether the communication card wiring is loose or disconnected.
		● 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.
E24	Electronic overload	● 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.
		● No data transmission between the communication card and the host controller (or PLC).	● Check whether the communication card wiring is loose or disconnected.
E25	Parameter upload error	● 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.
		● No data transmission between the communication card and the host controller (or PLC).	● Check whether the communication card wiring is loose or disconnected.
E26	Parameter download error	● 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.
		● No data transmission between the communication card and the host controller (or PLC).	● Check whether the communication card wiring is loose or disconnected.
E27	Ethernet communication 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.
		● No data transmission between the communication card and the host controller (or PLC).	● Check whether the communication card wiring is loose or disconnected.
E28	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.
		● No data transmission between the communication card and the host controller (or PLC).	● Check whether the communication card wiring is loose or disconnected.
E29	Speed deviation fault	● Load too heavy or stalled.	● Check motor parameter settings and re-perform motor parameter autotuning. ● Check speed loop control parameter settings.
		● Load exception. ● Incorrect SM parameter settings. ● Autotuned motor parameters are inaccurate. ● The VFD is not connected to the motor. ● Flux weakening application.	● 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 and current loop parameters.
E30	Mal-adjustment fault	● The VFD reports pre-alarm according to the setting. ● Safe torque off function is enabled by external forces.	● Check the load and underload pre-alarm threshold.
		● The VFD reports pre-alarm according to the setting. ● Safe torque off function is enabled by external forces.	● Check the load and underload pre-alarm threshold.
E31	Underload fault	● Safety circuit exception of STO channel 1	● Check whether terminal wiring of STO is proper and firm enough. ● Check whether the external switch of STO can work properly ● Replace the control board. ● Note: Re-power on is required to clear the fault.
		● Safety circuit exception of STO channel 2	● Check whether terminal wiring of STO is proper and firm enough. ● Check whether the external switch of STO can work properly ● Replace the control board. ● Note: Re-power on is required to clear the fault.
E32	Safe torque off	● Hardware fault occurred to STO circuit.	● Replace the drive board.
		● Exception to both STO channel 1 and channel 2	● Replace the drive board.
E33	FLASH CRC check fault	● Drive board fault.	● Replace the drive board.
		● No data transmission	● Check whether the communication
E34	PROFINET	● No data transmission	● Check whether the communication
		● No data transmission	● Check whether the communication

Fault code	Fault type	Possible cause	Solution
E35	communication timeout	● between the communication card and the host controller (or PLC)	● card wiring is loose or disconnected.
		● 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.
E36	Motor overtemperature fault	● 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. ● Check whether the insertion port or card slot is damaged. If yes, replace the insertion port or card slot after power-off.
		● No data transmission in the communication card interface.	● Check whether the communication card wiring is loose or disconnected.
E37	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.
		● AI1 input too low. ● AI1 wiring disconnected.	● Connect a 5V or 10mA power source to check whether the input is normal. ● Check the wiring or replace the cable.
E38	AI2 disconnection	● AI2 input too low. ● AI2 wiring disconnected.	● Connect a 5V or 10mA power source to check whether the input is normal. ● Check the wiring or replace the cable.
		● AI3 input too low. ● AI3 wiring disconnected.	● Check whether the communication card wiring is loose or disconnected.
E39	AI3 disconnection	● No data transmission between the communication card and the host controller (or PLC).	● Check whether the communication card wiring is loose or disconnected.
		● Upgrade boot loader.	● Contact us.
E40	No upgrade boot loader	● Upgrade boot loader.	● Contact us.
		● Dual CPU communication fault 1	● Contact us.
E41	Dual CPU communication fault 1	● Dual CPU communication fault 2	● Contact us.
		● Dual CPU communication fault 2	● Contact us.

8 Product dimensions

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

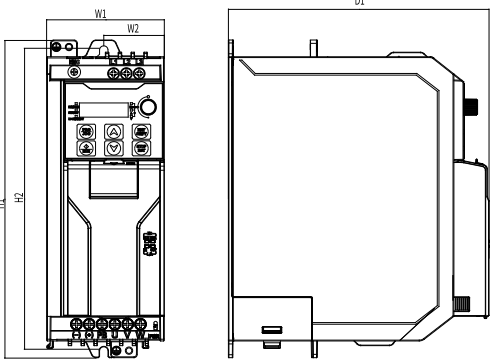


Table 8-1 Dimensions and hole positions for VFDs in frames A and B

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	
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	