

BONENG

AX 驱动器 CM53

A1-Series Drive CM53

快速调试手册

QUICK COMMISSIONING
MANUAL



CONTACT US

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中文

EN

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前言

欢迎使用博能驱动器！

在安装使用前请务必认真阅读本说明书，以便正确安全地使用驱动器。

更多详细资料，请访问博能传动官方网站：
博能传动 (<http://www.boneng.com>)。

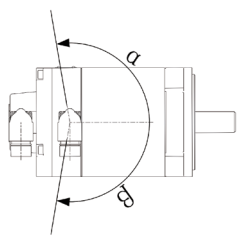


扫码了解产品详情

博能传动官方网站

1. 伺服马达电气连接注意事项

- 确保马达动力线、信号、接地和屏蔽线均连接良好。
- 确保制动器连接和功能正常。
- 确保连接器的密封性和密封面，以确保符合防护等级。
- 动力线连接器旋转范围：

马达座机号 角度 α_1 角度 β_1			
	MX028	135°	140°
	MX036	135°	140°
	MX048	135°	140°
	MX063	135°	140°
	MX080	135°	200°
	MX100	135°	200°

- 编码器线连接器旋转范围：

马达座机号 角度 α_1 角度 β_1			
	MX028	140°	135°
	MX036	140°	135°
	MX048	143°	135°
	MX063	105°	110°
	MX080	100°	100°
	MX100	95°	95°



注意：

触电危险！

- 务必确保在驱动器及马达断电状态下拆装连接线缆。
- 请遵守电气设备工作规范，只允许由专业人员安装驱动器和连接器。
- 马达含有静电元器件，请采取防静电措施。

2. 伺服马达制动器参数

制动器型号	BN028	BN036	BN048	BN063	BN080	BN080L
静摩擦力矩 (N·m)	≥1.9	≥2.4	≥3.8	≥10	≥22	≥60
制动器功率 (W)	8.76	6.74	13.4	14	19	25
转动惯量 (kg·cm ²)	0.09	0.11	0.39	0.78	2.55	14.7
工作电压 (VDC)	24±10%	24±10%	24±10%	24±10%	24±10%	24±10%
工作温度 (℃)	-15~120	-15~120	-15~120	-15~120	-15~120	-15~120
制动器吸合时间 (ms)	≤20	≤20	≤30	≤25	≤30	≤50
制动器释放时间 (ms)	≤35	≤80	≤50	≤90	≤100	≤220
紧急制动次数 (次)	2000	2000	2000	500	2000	500
紧急制动次数 (次/小时)	20	20	20	20	20	20
最大紧急制动转速 (r/min)	6000	6000	6000	3000	3000	3000
适配马达机座号	028	036	048	063/080S	080M/100S	100M/100L

3.伺服马达常见故障排查与维修方法

常见故障	原因	维修方法
马达无法启动	过载堵转	降低负载
	驱动器故障报错	检查动力线和信号线连接/ 检查驱动器参数设置
马达加速缓慢	过载	降低负载
	驱动器参数设置不合理	检查驱动器参数设置
	动力线中某一相在接通后断开	检查驱动器和动力线连接以及航插连接/检查绕组电阻
	定子绕组中出线匝间短路或相间短路	确定绕组电阻和绝缘电阻，并联系厂家进行维修
起动时发出隆隆声	动力线的某一相在接通后断开	检查驱动器和动力线连接以及航插连接/检查绕组电阻
	定子绕组中出线匝间短路或相间短路	确定绕组电阻和绝缘电阻，并联系厂家进行维修
运行时发出隆隆声	过载	降低负载
	动力线的某一相在接通后断开	检查驱动器和动力线连接以及航插连接/检查绕组电阻
	定子绕组中出线匝间短路或相间短路	确定绕组电阻和绝缘电阻，并联系厂家进行维修
空载运行时马达过热	冷却风的通风被异物阻挡	清除阻碍物，保证冷却风自由通畅
负载运行时马达过热	过载	降低负载
	动力线的某一相在接通后断开	检查驱动器和动力线连接以及航插连接/检查绕组电阻
	冷却风的通风被异物阻挡	清除阻碍物，保证冷却风自由通畅
运行不平稳	马达动力电缆和信号电缆屏蔽不充分	检查屏蔽和接地情况/检查周围附近是否存在干扰源
	线路中有虚接	重新锁紧动力及信号航插/检查驱动器和动力及信号电缆连接
刺耳的摩擦声，运行噪音	驱动器增益设置不合理	重新合理设置驱动器的增益
	旋转部件打滑	确定原因，修整部件
	电机内部有异物	联系厂商修理
	轴承损坏	联系厂商修理

常见故障	原因	维修方法
径向振动	转子失衡	拆开转子，重新平衡转子
	转子不圆，轴弯曲	联系厂商修理
	校准不佳	校准设备，联查联轴器
	相连设备失衡	重新平衡相连设备
	齿轮箱运行不平稳	使齿轮箱正常运行
轴向振动	校准不佳	校准设备，联查联轴器
	相连设备失衡	重新平衡相连设备
	齿轮箱运行不平稳	使齿轮箱正常运行

4.驱动器技术参数

功能		技术数据
总线接口	AX-CM53-**-**	• 支持PROFINET或EtherCAT、DriveLink
		• RJ45接口
工作电源	功率模块供电	• DC 24V/1.0A
	外部端子供电	• 电压范围：DC 20.8 ... 28.8V • 最大电流：1.0A
输出电源	+24V输出	• 电压范围：DC 18V ... 26.8V • 最大电流：100mA
	+10V输出	• 电压范围：DC 9.5V ... 10.5V • 最大电流：10mA
数字量输入	6个	• DI0、DI1 ... DI5共公共端子M0
		• 电气隔离
		• 支持Source和Sink模式
		• 电压：DC 24V、AC 36V
		• "1"信号电压：>11V
		• "0"信号电压：<5V
		• 24V典型电流：4mA
数字量输出	1个继电器（D00）	• 响应时间：6ms（含软件滤波）
		• 电压：DC 24V、AC 220V
		• 连续电流：2A
		• 切换电流：2A
		• 触点类型：1常开1常闭

功能		技术数据
脉冲输出	3个 (POA ~ POZ)	- 电压：DC 5V - 电流：最大20mA - 频率：最大2MHz - 差分输出 - Z相支持开集电极输出
模拟量输入	1个 (AI0)	- 电子开关切换电压和电流模式 - 电压型支持0V ... 10V - 电流型支持0mA ... 20mA, 4mA ... 20mA - 电流型内阻500Ω - 响应时间：2ms (含软件滤波) - 精度：±1%
温度传感器	1个	- 位于RJ45编码器端子X11 - 支持KTY84-130、PTC
编码器信号输入	ABZ	- 支持24V或5V的差分信号 - 输入频率：最大250kHz - 最大长度：100m - 断线侦测功能
	SSI	- 支持5V的差分信号 - 波特率：最大1Mbps
	BISS-C	- 波特率：最大2Mbps - RJ45接口 - 最大长度：500kbps时50m
	RS485	- 波特率：最大2.5Mbps - 最大长度：500kbps时50m
USB接口	1个	- USB 2.0 - Type-C
键盘显示	支持	数码管和机械按键
STO功能	DI4和DI5	接线方式与普通DI致，功能码A03.28置1则开启STO功能

备注：更多详细说明参见官网详细使用手册。

5. 驱动器配线

5.1 驱动器接口一览

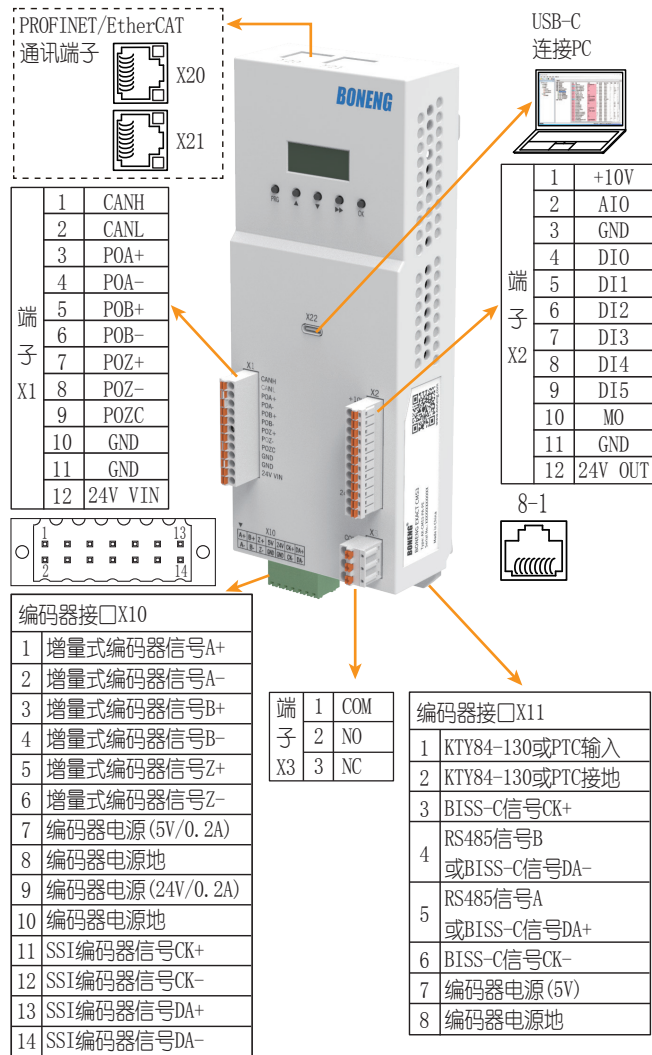
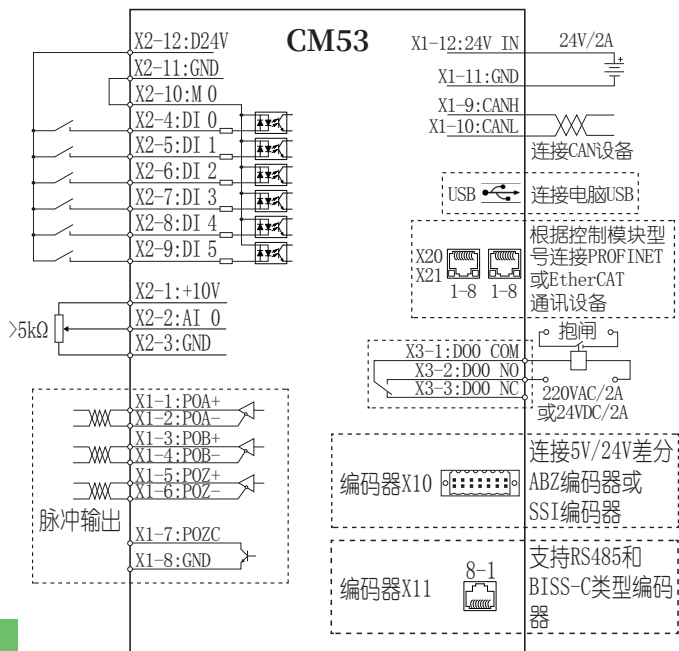


表1. 主电源端子名称与功能描述

端子编号	端子名称	说明
主电源输入端子	L1, L2, L3	主电源输入端子, 三相380V电源 (三相380VAC ~ 480VAC, ±10%, 47Hz ~ 63 Hz)。
	PE	三相电源接地保护。
制动电阻端子	DC+, R	制动电阻接入端子。
电机连接端子	U, V, W	连接电机U, V, W相。
	PE	连接电机接地线。

5.2 驱动器接口一览

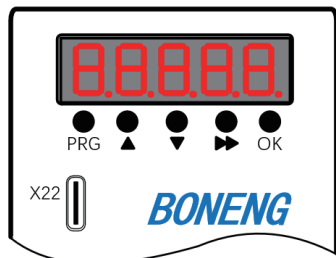


注：PROFINET不分IN和OUT，EtherCAT区分IN和OUT，其中X20为IN，X21为OUT。

6. 驱动器操作说明

6.1 操作面板说明

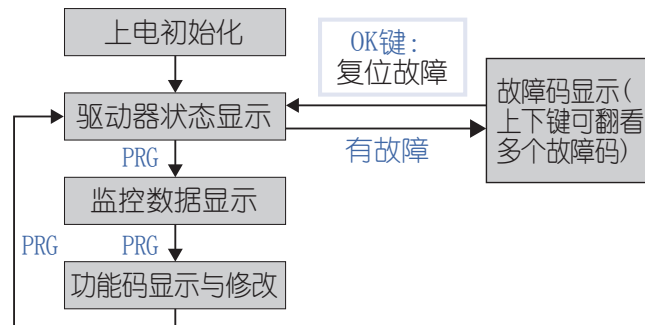
数码管与功能按键：



按键	按键名称	功能
PRG	编程/返回	主监控界面时，按此键进入功能选择界面；其他界面，按此键返回上一级界面或状态。
▲	递增键	数据或功能码的递增。
▼	递减键	数据或功能码的递减。

按键	按键名称	功能
►►	右移位键	对5位数码管进行选择，在修改参数时，可以循环向右选择参数的修改位。
OK	确认键	设定参数确认，故障显示页面按确认键，复位故障。

面板显示与按键操作说明：

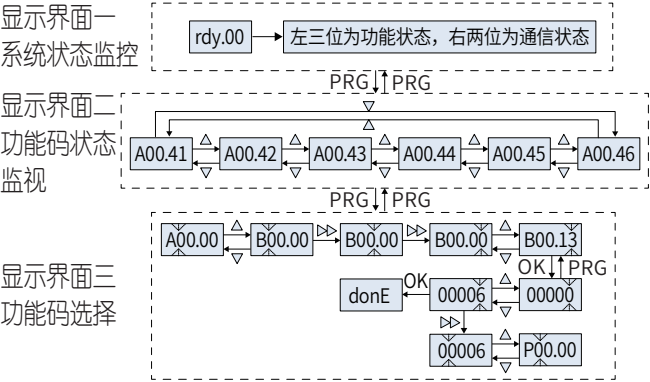


1. 驱动器状态显示界面显示驱动器当前状态，有如下几种状态：

显示	名称	表示含义
889.88	Rdy:满足运行条件	驱动器可运行，等待使能信号。
88.8.88	Nrd:开机封锁	驱动器未准备好，不满足运行条件。
8.0888	Run:运行中	驱动器正在运行。
8.0888	Tun:电机参数辨识中	正在对电机进行参数辨识。
88.8.88	Off:减速停机中	电机处于制动状态。
888.88 888.88	总线通信报文	PROFINET通信报文类型： 0: 报文无效； 1: 标准报文1； 2: 标准报文3； 3: 西门子102报文； 4: 西门子105报文； 5: 西门子111报文； 6: 西门子352报文；

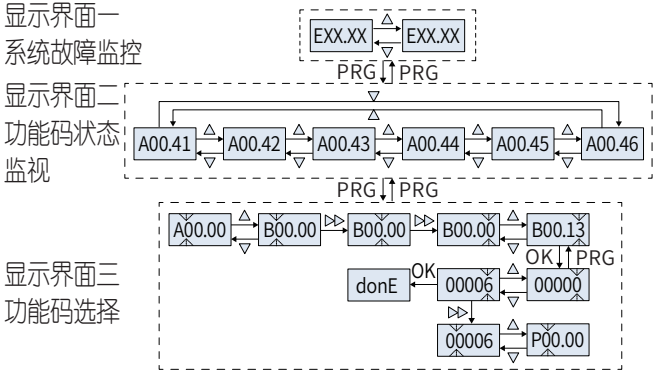
显示	名称	表示含义
	总线通信状态	字符显示总线通讯状态： 0: 未建立通讯； A: AR建立； C: DCP请求； E: 通讯故障； P: 过程通信建立；
	总线通信报文	EtherCAT通信报文类型： 0: 模式未定义； 1: PP模式； 2: 不支持； 3: PV模式； 4: PT模式； 5: 不支持； 6: 原点回归模式； 7: 不支持； 8: CSP模式； 9: CSV模式； 10: CST模式；
	总线通信状态	字符显示总线通信状态： 0: 无意义； 1: init； 2: PRE_OP； 4: SAFE_OP； 8: OP；

2. 功能码显示与修改界面操作流程如下所示：
当驱动器无故障时



如果选择互联参数，光标移到数码管最高位按△可选择参数互联，按▽可取消参数互联

当驱动器存在故障时，显示界面一改变，显示界面二和三不变。

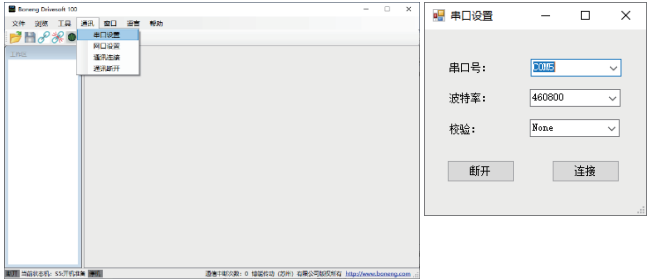


如果选择互联参数，光标移到数码管最高位按△可选择参数互联，按▽可取消参数互联

当驱动第一次启动且没有故障时，AN 驱动器面板会自动显示界面一。按下PRG，面板会显示参数A00. 41。此时，如果按下增加/减少键，面板将在A00. 41 和 A00. 46 之间循环。按下PRG，面板将进入功能码选择界面。使用右键和增减键可以选择需要修改或查看的功能码参数。按“OK”键。功能码的当前参数显示在面板上。

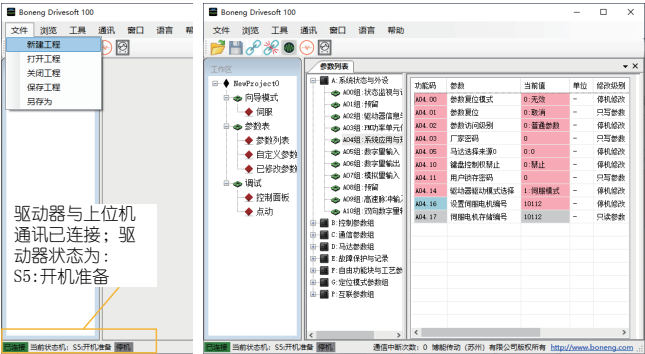
6.2 调试软件Boneng Drivesoft 100操作说明

- 1. 请使用标准USB线缆连接伺服驱动器与PC，确保PC端已安装好博能驱动器上位机软件 Boneng Drivesoft 100。
- 2. 在PC端打开博能上位机软件 Boneng Drivesoft 100，并完成其与驱动器的通讯连接：菜单→通讯→通讯设置→串口号，选择对应的串口号→连接，如下图所示。



驱动器与上位机软件Boneng Drivesoft的通讯连接

3. 在上位机软件 Boneng Drivesoft 100中建立工程：文件→新建工程→确定。



上位机软件中建立工程并查看参数

7.快速启动（试运转）

注意：

- ◆ 试运转前请务必知悉各个伺服单元操作的安全与注意事项。

7.1 调试前准备

使用上位机对博能AX伺服驱动器带伺服电机进行试运转前需要准备以下设备：

- ◆ 博能AX伺服驱动器一套以及匹配的伺服电机；
- ◆ 伺服驱动器电源线缆及开关若干；
- ◆ 一端为 USB-C公口（Type-C）的USB数据线一条；
- ◆ PC及博能上位机软件Boneng Drivesoft 100。

请按照接线图连接好伺服驱动器、伺服电机以及编码器线缆，并连接好伺服驱动器与PC。

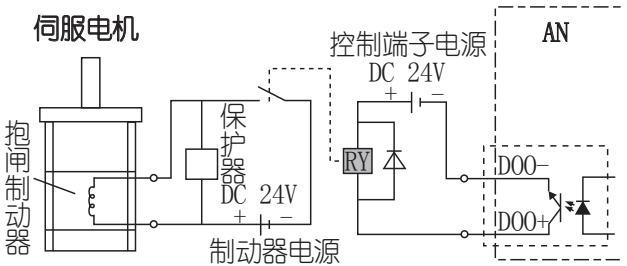
7.2 试运转前检查和注意事项

- 伺服电机与外部机械装置
试运转前请检查伺服电机的安装，务必确保伺服电机安装固定稳定安全可靠。试运转前请务必将

伺服电机的输出轴与后级负载分离。

- 安装与配线检查
 - a. 请确保驱动器与伺服电机的功率匹配。例如电机功率和驱动器功率不可相差太多，否则不保证运行正常。
 - b. 送电前请根据驱动器铭牌确认伺服驱动器的供电电源电压是否和伺服单元的额定工作电压匹配。
 - c. 请确保伺服的动力线缆及信号线缆可靠连接，动力线缆的屏蔽层和PE信号都已正确接在驱动器上。
 - d. 请确保伺服驱动器的接地保护线缆可靠接地，以防触电。
 - e. 请确保ST0端子接线正确可靠。
 - f. 切勿将原厂线缆切断后再延长，否则容易产生干扰，甚至损坏。
- 电机制动器接线检查
 - a. 试运转前请检查伺服电机抱闸的配线是否正确，伺服电机端的抱闸输入信号有正负极性，请勿接反，接反后制动器将无法正常工作。
 - b. 请为电机抱闸提供单独的供电电源，请勿使用伺服驱动器的24V端子输出电源作为电机的抱闸电源，同样不可使用同一开关电源为驱动器端子与电机抱闸共同供电，否则可能引起干扰问题。

使用伺服驱动器的D0端子控制伺服电机抱闸，请按下图所示方法接线。



- 注意：**
- * 继电器应按图示安装保护装置；
 - * MN电机抱闸线有正负之分，不可接反，否则抱闸无法打开。

伺服电机抱闸制动器接线示意图

7.3 使用BonengDriveSoft 100调试

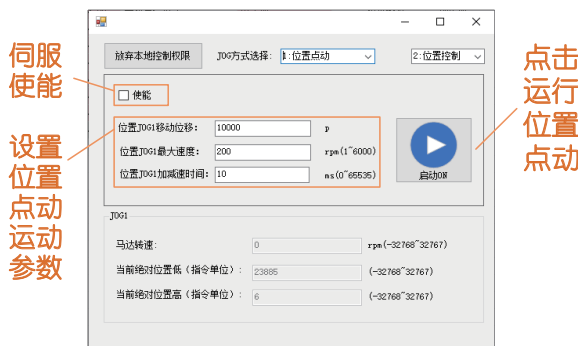
以下是使用博能驱动器上位机软件Boneng Drive-soft 100进行电机试运转的步骤:

- 步骤1. 在上位机软件 Boneng Drivesoft 100 中建立工程 (参见章节3. 2), 可实时显示当前参数。
- 步骤2. (可选项) 参数恢复出厂设置: $A04.00 = \text{【3:全部参数恢复出厂】} \rightarrow A04.01 = \text{【1:确认】} \rightarrow$ 等待参数恢复完成 (看调试软件左下角状态机) 后驱动器重新上电。
- 步骤3. 设置、检查电机参数: 若驱动博能伺服电机, 检查 $A04.17$ 与电机铭牌上的马达ID是否一致^①。
- 步骤4. 检查电机参数 ($D00 \sim D02$ 组参数) 是否与电机铭牌一致。
- 步骤5. 电机旋转检查: VF模式下运行电机 (设置参数 $B05.00 = \text{【0:VF】}$, 通过上位机控制面板 **启动** 驱动器, 并在 **给定速度** 框中给定运行速度, 例如 $[10\%]$, **确认**), 查看速度给定值 ($P13.11$) + 与编码器速度反馈值 ($P13.17$) 的符号, 其符号应当一致; 若不一致, 请检查驱动器动力输出相序与伺服电机UVW线相序是否匹配。
- 步骤6. 完成步骤5后, **停机**, 修改参数 $B05.00 = \text{【2: FVC】}$ 。
- 步骤7. 取本地控制权限 $\rightarrow$ 设置JOG方式为速度点动 $\rightarrow$ 设置点动目标速度 $\rightarrow$ 按 **启动** 按钮电机轴开始加速到目标速度, 松开 **启动** 按钮, 轴减速停止。

^① 编码器线缆正常连接后方可读取马达 ID。



速度点动界面



位置点动界面

若运行速度控制, 到此试运转完成; 若运行位置控制, 继续执行步骤9及后续步骤。

- 步骤8. 设置电子齿轮比参数 $G00.04 = \text{【10000】}$ (该参数为试运转测试用, 实际使用时应根据电机轴后级传动比例计算后设置)。
- 步骤9. 修改控制模式为 **【2: 位置控制】** (或手动更改参数 $B05.01 = \text{【2:位置控制】}$)^②。
- 步骤10. 使用上位机点动面板进行位置点动控制: 获取本地控制权限 $\rightarrow$ 设置JOG方式为位置点动 $\rightarrow$ 设置位置点动运动参数 (若电机输出轴与减速机连接, 应根据减速机速比设置位移量和最大速度) $\rightarrow$ 伺服使能 $\rightarrow$ 点按 **启动** 按钮触发位置点动, 电机轴开始运转, 直到位置指令完成, 轴减速停止。可再次点按启动按钮, 轴再次运动目标位置后停止 $\rightarrow$ 去使能, 停机。

^② 位置控制模式下支持速度点动和位置点动, 速度控制模式下仅支持速度点动。

8.常用参数

8.1 常用设置参数

功能码	名称	说明
A04.00	参数复位模式	3：全部参数复位，需要通过A04.01确认后才可复位参数
A04.01	参数复位确认	0：取消 1：确认（需等参数复位完成之后方可重新设置驱动器参数）
D00.01	马达额定功率	应与电机铭牌参数一致。
D00.02	马达额定电压	
D00.03	马达额定电流	
D00.04	马达额定频率	
D00.05	马达额定转速	
B05.00	马达控制方式	0：VF 1：SVC 2：FVC
F04.00	抱闸功能选择	0：不使用抱闸功能，1：使用抱闸功能。通常用于提升设备时需要使用此抱闸功能，若通过D0端子控制抱闸，将D0功能设为P01.11即可。
A06组	数字量输出	可设置D0输出端子功能，详见使用手册。
B00.00	启停控制命令来源	若设置B00.00=【0：端子控制模块】，请在B01组设置端子相关参数；若设置B00.00=【1：自定义控制模块】，请在B00组设置端子相关参数。使用Profinet通讯或EtherCAT通讯时，通讯建立时会自动设置相关参数。
B01.01	端子控制命令1方式	端子启停命令，详见操作手册。
B01.03	端子控制命令1输入IN1	
B01.04	端子控制命令1输入IN2	
B01.05	端子控制命令1输入IN3	
B00.21	辨识请求	B05.00设置为1或2时需要辨识。异步机辨识步骤：按LOC/REM键设为本地模式，B00.21设为2，按RUN键启动，等驱动器辨识停止后，按STOP键，再按LOC/REM键切换到远程即可。仅适用于异步电机，博能伺服电机无需进行马达参数辨识。

功能码	名称	说明
B00.23	OFF1 停机方式	0：自由停机 1：减速停机
速度控制模式	B02.00	速度控制主设定选择
	B03组	多段速设置
	B04.02	斜坡加减速时间
	B04.09	斜坡加速时间来源
	B04.41	斜坡减速时间来源
位置控制参数	D02.18	绝对值编码器类型
	G00.04	马达旋转一圈的位置指令数
	G00.06	电子齿轮比1（分子）
	G00.08	电子齿轮比1（分母）
	G00.22	马达旋转方向选择
	G00.53	原点开关来源选择
	G00.55	正限位命令来源选择
	G00.56	负限位命令来源选择
	G01.13	负载转动惯量比
	G02.01	刚性等级选择
	G03.03	位置偏差过大故障值（圈）
	G03.04	位置偏差阈值比例系数

功能码	名称	说明
位置控制参数	G03. 33	EPOS最大加速度，通常与ProfiD- rive 111报文 OverAcc配合使用。
	G03. 35	EPOS最大减速度，通常与ProfiD- rive 111报文 OverDec配合使用。
	G03. 37	EPOS任务取消减速度倍率， 基准值为G03. 35。

8.2 常用监控参数

功能码	名称	说明
A00. 00	当前状态机	驱动器当前状态。
A00. 05	给定速度	位置、速度控制模式下，实时速度 给定值；[rpm]。
A00. 06	马达转速	实时速度反馈，[rpm]。
A00. 08	输出电流	实时输出电流。
A00. 09	输出功率	实时输出功率。
P00组	硬件状态	显示DI，DO，DIO等硬件接口物理状态。
P12. 13	Panel给定值	速度控制模式下通过0P给定的目标 速度值。单位为0. 1%。
P12. 14	PC给定值	速度控制模式下通过PC上位机给定 的目标速度值。单位由上位机控制 面板选择。
P12. 16	DI状态	DI实时状态。
P12. 17	DO状态	DO实时状态。
P13. 00	马达实际速度	马达实时速度反馈值；4096对应 100%额定转速。
P13. 01	马达最终设定 速度	位置、速度控制模式下最终速度指 令值；4096对应100%额定转速。
P13. 02~ P13. 11	-	速度控制模式下速度给定监控数据。
P14. 04, P14. 06	绝对位置累计 值 (Enc1)	两个32位有符号数据，分别表示实 时位置值，编码器单位。
P14. 20	位置指令（指 令单位）	实时位置指令，指令单位，32位有 符号数。
P14. 22	位置反馈（指 令单位）	实时位置反馈，指令单位，32位有 符号数。
P14. 66	位置目标设定值	目标位置，指令单位，32位有符号数。
E00~E07 组	-	显示故障记录与相关信息。

9.故障说明

故障码	故障名称	子码	含义	解决措施
1	过流	1	U相过流	1. 确认D00组电机参数与 电机铭牌一致。 2. 排除动力线破损问题； 3. 检查线缆是否短路； 4. 适当增加加减速时间； 5. VF控制下减小VF转矩提 升量； 6. 请确认电机停止稳定后 再启动； 7. 减小或取消负载排查问 题； 8. 对于异步电机矢量控制 下请确认是否进行过正 确的参数辨识操作； 9. 子码8代表制动电阻异常， 驱动器断电，确认制动 电阻连接是否正确；测 量DC+和R之间的电阻，与 手册推荐值对比确认； 10. 更换PM。 11. 恢复出厂值，重新设 参数。 12. 联系售后或厂家，寻 求技术支持。
		2	V相过流	
		3	UV两相过流	
		4	W相硬件过流	
		5	UW两相过流	
		6	VW两相过流	
		7	UVW三相过流	
		8	制动管硬件过流	
		9	U相VCE短路	
		10	V相VCE短路	
		11	UV两相VCE短路	
		12	W相VCE短路	
		13	UW两相VCE短路	
		14	VW两相VCE短路	
		15	过流异常	
		16	过流异常	
2	直流过压	1	快速检测中 母线电压过 压	1. 请检查输入电源是否在 合理范围，确认输入端接 线可靠 2. 请增加加减速时间 3. 加装制动电阻或制动单元 4. 重新设置参数，参数辨 识后运行 5. 确认驱动器功率与马达 功率匹配 6. 检查编码器是否损坏 7. 联系售后或厂家，寻求 技术支持

故障码	故障名称	子码	含义	解决措施
3	直流欠压	1	直流欠压	1. 请检查输入电源是否在合理范围，确认输入端接线可靠 2. 请确认电网是否瞬间断电 3. 正确设置A03. 21软件欠压点 4. 更换PM 5. 联系售后或厂家，寻求技术支持
4	速度搜索失败	1	速度搜索参数设置不当	1. 修改转速追踪模式 (B05. 13) 为从最大频率开始搜索或增大搜索时间 (B05. 14) 2. 联系售后或厂家，寻求技术支持
5	驱动器过载	1	驱动器过载	1. 请确认驱动器选型是否合适，A03. 00设置与铭牌一致 2. VF控制下减小VF转矩提升量 3. 矢量控制下减小转矩限值 4. 请确认负载是否过重，或者抱闸等锁死情况 5. 矢量控制时请确认是否进行正确的参数自学习操作 6. 带编码器应用下，请确认编码器方向及参数设定是否正确 7. 重新设置参数，参数辨识后运行 8. 降低载波频率，或更换更大功率驱动器 9. 等电机完全停止后再启动； 10. 联系售后或厂家，寻求技术支持
6	马达过载	1	马达过载	1. 请确认电机负载是否过大 2. 矢量控制时请确认是否进行过电机参数自学习

故障码	故障名称	子码	含义	解决措施
6	马达过载	1	马达过载	3. 带编码器应用下，请确认编码器方向及参数设定是否正确 4. 请确认负载是否过重，或者抱闸等锁死情况 5. 请确认D00组参数是否与电机铭牌参数一致 6. 联系售后或厂家，寻求技术支持
7	输入缺相	1	输入缺相检测	1. 请检查动力输入电缆是否接触良好 2. 确保输入电源稳定 3. 联系售后或厂家，寻求技术支持
8	输出缺相	1	U相输出缺相	1. 请检查对应的输出电缆是否接线正确及接触良好 2. 请确认电机是否运行平稳 3. D00组参数按马达铭牌参数设置，A03. 00设置与铭牌一致 4. 更换PM 5. 联系售后或厂家，寻求技术支持
		2	V相输出缺相	
		3	W相输出缺相	
		4	FVC控制输出缺相	
		5	三相输出严重不平衡	
		6	定子电阻辨识输出缺相	
		7	UVW三相输出缺相	
9	驱动器过温	1	检测到驱动器 (37Kw及以下机型) IGBT温度超过阈值	1. 请确认环境温度是否过高 2. 请检查散热器风扇是否正常运转 3. 请检查散热器风道是否堵塞 4. 更换PM 5. 机型A03. 00参数设置与铭牌一致 6. 联系售后或厂家，寻求技术支持
		2	检测到驱动器 (37Kw以上机型) IGBT - U相温度超过阈值	
		3	检测到驱动器 (37Kw以上机型) IGBT - V相温度超过阈值	

故障码	故障名称	子码	含义	解决措施
9	驱动器过温	4	检测到驱动器 (37Kw以上机型) IGBT - W相温度超过阈值	
10	PWM发波异常	1	U相发波异常	1. 重新断电上电, 如果持续存在, 则联系售后或厂家, 寻求技术支持
		2	V相发波异常	
		4	W相发波异常	
11	电流零漂错误	1	U相零漂偏大	1. 检查机型 (A03.00) 设置是否与铭牌一致 2. PM异常, 更换PM, 或联系售后或厂家, 寻求技术支持
		2	V相零漂偏大	
		3	W相零漂偏大	
12	对地短路故障	1	对地短路时U相过流	1. 请检查相应输出相是否对地短接 2. 检查电机线缆是否破损 3. 更换电机或更换驱动器 4. 联系售后或厂家, 寻求技术支持
		2	对地短路时V相过流	
		4	对地短路时W相过流	
		5	对地短路电流超过阈值	
		6	对地短路时过压	
13	马达调谐故障	1	异步马达动态调谐异常	1. 确认D00组电机参数是否与电机铭牌一致 2. 确认输出端接线可靠 3. 确认编码器接线及其参数正确 4. 更换PM 5. 联系售后或厂家, 寻求技术支持
		2	异步马达静态调谐异常	
		3	同步马达调谐异常	
		4	编码器调谐异常 (测速异常)	
		5	编码器调谐异常 (编码器信号干扰严重)	
		6	编码器调谐异常 (编码器Z信号异常)	

故障码	故障名称	子码	含义	解决措施
		1	闭环动态调谐时编码器未接	1. 规范走线, 使用带屏蔽层的线缆, 编码器屏蔽层接地 2. 请确认编码器接线是否可靠 3. 请检查编码器相关参数是否设置正确 4. 请检查编码器电源是否选择正确 5. 检查D00 组电机参数是否与铭牌一致, 确认电机级数 D00.09 6. 确认运行后电机是否转起来, 排出堵转的情况 7. 联系售后或厂家, 寻求技术支持
		2	动态闭环调谐时编码器测速不吻合	
		3	闭环运行时编码器断线	
		4	编码器Z 信号异常	
		9	增量编码器A 相断线	
		10	增量编码器B 相断线	
		11	增量编码器AB 相断线	
		12	增量编码器Z 相断线	
		13	增量编码器AZ 相断线	
		14	增量编码器BZ 相断线	
		15	增量编码器ABZ 相断线	
		16	通讯编码器通讯异常	
14	编码器异常			
15	矢量失速报警	1	速度在外力作用下被反向	1. 请确认电机铭牌参数设置是否正确, 进行参数辨识 2. 请确认是否做过电机参数自学习操作 3. 确认D02 组编码器参数是否设置正确, 编码器接线是否正确 4. 请检查和失速相关的参数设置是否合理 5. 联系售后或厂家, 寻求技术支持
		2	速度偏差过大	

故障码	故障名称	子码	含义	解决措施
16	FPGA读写错误	1	初始化中FPGA 读写错误	1. PM 异常，断电重启，如果继续存在则联系售后或厂家，寻求技术支持
17	驱动电源故障	1	驱动电源电压偏低	1. 联系售后或厂家，寻求技术支持 2. 更换 PM
		3	对地短路检测时驱动电源故障	
18	一级电源故障	1	24V 一级电源电压偏低	1. 联系售后或厂家，寻求技术支持 2. 更换 PM
19	CM 与 PM 通信异常	1	CM 无应答	1. 请确认 CM 的锁扣是否锁紧，确保 CM 与 PM 可靠连接。 2. 更换CM 或 PM，判断更换前后能否排除故障 3. 联系售后或厂家，寻求技术支持
		2	CM 无应答	
		3	通讯数据异常	
		4	初始化异常	
20	PM-EEPROM 故障	1	EEPROM写入数据溢出	1. 联系售后或厂家，寻求技术支持
		2	EEPROM读取数据溢出	
		3	EEPROM读取数据超时	
		4	EEPROM写入数据超时	
		5	EEPROM读取地址越界	
		6	EEPROM写入地址越界	
21	PM机型设置错误	1	PM机型当前设置值小于正常值	1. 重新烧录 PM 程序 2. 重新设置机型至正常值 3. 联系售后或厂家寻求技术支持
		3	PM机型当前设置值大于正常值	

故障码	故障名称	子码	含义	解决措施
22	逐波限流故障	1	U相电流异常	1. 增长加速时间 2. 重新设置参数，参数辨识后运行 3. 更换电机，排出电机故障 4. 更换 PM。 5. 联系售后或厂家，寻求技术支持
		2	V相电流异常	
		3	W相电流异常	
		16	逐波限流中断异常	
23	整流桥过热	1	整流桥温度超过 90°（仅18.5Kw及以上机型检测）	1. 清理风扇中异物，关闭风扇调速功能（B06.48=0），风扇仍然不转，联系厂家更换风扇。 2. 查看机型值是否与铭牌对应 3. 可适当降低驱动器载波频率，打开配电柜门散热，增大配电柜进出风口风量 4. 联系售后或厂家，寻求技术支持
24	ST0故障	1	ST01为低电平	1. 请检查ST01或ST02开关是否触发 2. 请检查ST01和ST02接线是否可靠 3. 请检查ST01和ST02的电源是否正常 4. 联系售后或厂家，寻求技术支持
		2	ST02为低电平	
		3	ST01端子和ST02端子均为低电平	
25	制动管过热	1	制动管温度超过 85℃（仅45Kw及以上机型检测）	1. 请确认环境温度是否过高 2. 请检查散热器风扇是否正常运转 3. 请检查散热器风道是否堵塞 4. 安装合适的制动电阻 5. 联系售后或厂家，寻求技术支持

故障码	故障名称	子码	含义	解决措施
26	伺服初始位置错误	1	UVW编码器初始位置检测错误	1. 使用带屏蔽层的线缆, 编码器屏蔽层接地; 重新连接或更换编码器线缆 2. 确认编码器参数设置是否设置正确 3. 辨识零点, 保证伺服零点位置正确; 按照正确电机相序接线; 4. 联系售后或厂家, 寻求技术支持
		2	绝对值编码器通讯异常	
		3	绝对值编码器初始位置未校正	
		4	绝对值编码器初始位置检测超时	
		5	绝对值编码器零点矫正数据读写错误	
		6	绝对值编码器初始位置矫正失败	
		7	绝对值编码器数据读取错误	
		8	换相角偏差过大	
		9	换向角错误	
33	驱动器预过载	1	驱动器过载预警告	1. 请确认是否开启驱动器预过载功能 2. 处理方法参考“5: 驱动器过载”故障。 3. 联系售后或厂家, 寻求技术支持
34	马达预过载	1	马达过载预警告	1. 请确认是否开启驱动器预过载功能 2. 处理方法参考“6: 马达过载”故障。 3. 联系售后或厂家, 寻求技术支持

故障码	故障名称	子码	含义	解决措施
35	通信异常	1	上位机控制驱动器运行时CM模块与上位机通信中断	1. 重新连接或更换连接线 2. 联系售后或厂家, 寻求技术支持
		2	OP键盘获取本地控制权后CM模块与OP键盘通信中断	1. 检查操作面板与驱动器的通信线缆是否连接异常 2. 联系售后或厂家, 寻求技术支持
		3	Modbus控制时在功能码C02. 04设置的时间内没有进行交互	1. 检查Modbus线缆是否断开或者损坏 2. 检查相应PLC等控制器程序是否正确, 交互间隔是否在功能码C02. 04设置的时间内 3. 联系售后或厂家, 寻求技术支持
		5	Canopen通信断线	1. 检查主站是否关闭 2. 通讯线是否损坏、是否过长; 与干扰源过近。 3. 联系售后或厂家, 寻求技术支持
		6	DriveLink通讯故障	1. 接收数据超时 2. 节点设置冲突 3. 联系售后或厂家, 寻求技术支持
		7	PROFINET通信断线	1. PLC断电或连接线损坏。 2. 调节合适的通讯周期。 3. 在使用IRT模式的情况下, 需确保IRT设备优先连接PLC, RT设备连接至IRT设备后端, 并使用支持IRT模式的交换机。 4. 联系售后或厂家, 寻求技术支持

故障码	故障名称	子码	含义	解决措施
		10	EtherCAT 通讯异常	1. 连上PLC后查看C06.06 查看提示信息；根据提示信息联系售后或厂家。 2. 联系售后或厂家，寻求技术支持
37	马达速度超限	1	马达转速超出最大转速限制	1. 请检查和马达超速相关的参数设置是否合理。 2. 检查是否有外部设备带着马达旋转的情况。 3. 联系售后或厂家，寻求技术支持
38	马达速度偏差大	1	马达转速与给定转速偏差过大	1. 请检查和马达速度偏差过大相关的参数设置是否合理。 2. 是否负载过重，抱闸是否及时打开。 3. 联系售后或厂家，寻求技术支持。
39	重新上电	1	驱动器部分参数修改需要重新上电	驱动器重新上电。
40	PID 反馈丢失	1	PID 反馈采样值丢失	1. 检查PID 反馈输入的信号 2. 联系售后或厂家，寻求技术支持
41	外部故障	1	产生外部故障 1	1. 检查外部输入信号 2. 联系售后或厂家，寻求技术支持
		2	产生外部故障 2	
42	外部警告	1	产生外部警告 1	1. 检查外部输入信号 2. 联系售后或厂家，寻求技术支持
		2	产生外部警告 2	

故障码	故障名称	子码	含义	解决措施
43	预驱动失败	1	运行命令产生时没有母线电压	1. 检查外部供电电压是否异常 2. 联系售后或厂家，寻求技术支持
44	控制板异常	1	CM芯片类型识别异常	1. 控制模块硬件异常，更换控制模块 2. IO板与控制板不匹配或连接异常。 3. 联系售后或厂家，寻求技术支持
		2	配置时钟失败	
		3	控制模块IO板与主控板不匹配	
45	抱闸控制异常	1	抱闸打开异常	1. 检查外部继电器是否异常 2. 检查抱闸接线是否正常，抱闸相关参数是否设置正确。 3. 联系售后或厂家，寻求技术支持
		2	抱闸关闭异常	
46	控制板电压异常	1	PM24V 电源电压过大	1. 检查PM 的24V供电电压是否异常 2. 联系售后或厂家，寻求技术支持
		2	外部24V 电源电压过大	1. 检查外部24V 供电电压是否异常 2. 联系售后或厂家，寻求技术支持
		3	PM24v 或外部24V 电源电压过低	1. 检测PM 的24V或者外部24V 电源电压是否低于 17V 2. 联系售后或厂家，寻求技术支持
		4	3. 3V电压过高	1. 联系售后或厂家寻求技术支持
		5	3. 3V电压过低	1. 联系售后或厂家寻求技术支持

故障码	故障名称	子码	含义	解决措施
46	控制板电压异常	6	抱闸继电器短路	1. 确认抱闸继电器的阻抗是否大于 450Ω ? 2. 确认抱闸继电器是否短路 ? 3. 联系售后或厂家, 寻求技术支持
47	马达温度异常	1	马达温度过温	1. 减轻马达负载, 减少马达自身发热。 2. 检查环境温度 3. 检查温度传感器的布线和连接。 4. 联系售后或厂家, 寻求技术支持
		2	马达温度过低	1. 马达所在环境温度低于 -40°C 2. 温度传感器短接 3. 联系售后或厂家, 寻求技术支持
48	马达温度警告	1	马达温度过高警告	1. 马达温度是否正常。 2. 检查B06. 41设置的马达温度过温警告值是否合理。 3. 联系售后或厂家, 寻求技术支持
49	AI断线故障	1	AI1 4~20mA 输入断线	1. 检查AI电路是否正确 2. 检查是否有外部电流输入 3. 检查A07. 20设置值是否正确
		2	AI2 4~20mA 输入断线	4. 联系售后或厂家寻求技术支持
50	电容侧风扇故障	1	电容侧风扇断线	1. 检查电容侧风扇接线是否中断 2. 电容侧风扇损坏, 联系厂家更换 3. 联系售后或厂家, 寻求技术支持

故障码	故障名称	子码	含义	解决措施
51	ROM 故障 (CM-EEPROM) 故障	1	上电自检EEPROM中所存参数值不在设定范围内	1. 参数恢复出厂值后再次上电 2. 联系售后或厂家, 寻求技术支持
		2	ARM与EEPROM交互超时	1. 联系售后或厂家寻求技术支持
		3	升级后, EEPROM写入默认值, 回读校验出现错误。	1. 可重新上电, 若还故障, 则是EEPROM元件存在问题 2. 联系售后或厂家, 寻求技术支持
		4	写EEPROM次数超过1000	1. 恢复故障即可 2. 联系售后或厂家, 寻求技术支持
		5	字库版本不正确	1. 烧录正确的字库 2. 联系售后或厂家, 寻求技术支持
52	位置偏差过大	1	马达给定指令与电机编码器反馈指令偏差过大	1. 减小目标速度、增大加减速时间, 速度转矩限制是否过小 2. 检查马达所带负载是否过大。 3. 确认运行时电机抱闸是否已经打开 4. 进行电机参数辨识, 获取更准确的电机参数 5. 联系售后或厂家, 寻求技术支持。
53	全闭环位置偏差过大	1	马达给定指令与负载编码器反馈指令偏差过大	1. 检查马达所带负载是否过大, 两个编码器方向是否一致。 2. 负载端编码器安装是否牢固 3. 联系售后或厂家, 寻求技术支持。

故障码	故障名称	子码	含义	解决措施
54	到达正向极限位置	1	正向限位开关已激活	1. 检查是否到达正向限位；若到达限位可向相反方向运行； 2. 检查驱动器G00组相关参数设置是否正确；
55	到达负向极限位置	1	负向限位开关已激活	3. 检查驱动器DI端子接线是否正常； 4. 联系售后或厂家，寻求技术支持
56	定位中使能丢失	1	马达运行位置指令时驱动器去使能	1. 确保马达执行位置指令过程中驱动器为使能状态。 2. 联系售后或厂家，寻求技术支持
57	电机参数错误	1	电机储存的电机编号不正确	1. 将功能码A04. 16设置为正确的电机编号后，进行零点校正。 2. 联系售后或厂家，寻求技术支持。
		2	马达储存的编号中左数第4,5位错误	
		3	马达储存的编号中第3位错误	
		4	马达储存的编号中左数第2位错误	
		5	马达储存的编号中左数第1位错误	
58	固定挡块在监视窗口外	1	轴位置脱离监控窗口(G03. 40)	1. 确定转矩限幅是否符合要求 2. 确定G03. 40监控窗口设定值是否过小 3. 联系售后或厂家，寻求技术支持。
59	未到达固定停止点	1	给定位置指令已经运行完，但未找	1. 确定固定停止点在给定位置指令运行范围内。

故障码	故障名称	子码	含义	解决措施
59		1	到固定停止点	2. 联系售后或厂家，寻求技术支持。
60	原点回归错误	1	原点回归超时。原点回归时，在G00. 49设置的最大回原时间内未找到原点信号。	1. 检查原点开关信号是否正常； 2. 增大原点回归搜索速度(G00. 46,G00. 47)。 3. 检查限定查找原点时间G00. 49设置值是否合理 4. 联系售后或厂家，寻求技术支持
62	制动电阻过热	1	制动电阻过热	1. 联系售后或厂家，寻求技术支持
63	编码器电池电压低(警告)	1	编码器电池电压低于报警阈值(3. 2V)	1. 检查确保电池盒中电池接线可靠。 2. 确保电池盒中电池电压有效 3. 联系售后或厂家，寻求技术支持
64	编码器电池失效	1	编码器电池电压低于故障阈值(3. 0V)	1. 检查接线或更换电池。 2. BISS-C编码器执行故障复位操作 3. RS485编码器,将D02. 21置1后，重新上电 4. 联系售后或厂家，寻求技术支持
65	编码器多圈数据错误	1	编码器多圈数据溢出	1. 手动将多圈计数值清零(D02. 21置1)，重新上电。 2. 联系售后或厂家，寻求技术支持
		2	多圈编码器主电源和备份电源均断电后，重新上电。	1. 执行故障复位操作，复位后多圈值恢复为初始值(0或±1) 2. 手动将多圈计数值清零(D02. 21置1),重新上电。 3. 联系售后或厂家，寻求技术支持

故障码	故障名称	子码	含义	解决措施
66	参考点未设置	1	在绝对模式下未设定原点	1. 在绝对模式下进行回原操作，确定原点 2. 联系售后或厂家，寻求技术支持

9.售后服务

售后服务请按以下步骤提交售后流程。

登录 “www.boneng.com”

点击 “服务” 和 “售后服务”



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0589

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其他地区

控制器/驱动器 : 0512-66182005
马达/齿轮马达/齿轮箱 : 0512-66189918

博能传动（沈阳）有限公司
控制器/驱动器 : 024-31271571
马达/齿轮马达/齿轮箱 : 024-31292571

博能传动（天津）有限公司
控制器/驱动器 : 022-86928559
马达/齿轮马达/齿轮箱 : 022-26929558

博能传动（开封）有限公司
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马达/齿轮马达/齿轮箱 : 0371-23277771

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马达/齿轮马达/齿轮箱 : 0536-4699667

博能传动（长沙）有限公司
控制器/驱动器 : 0731-88386958
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博能传动设备（成都）有限公司
控制器/驱动器 : 028-87740066
马达/齿轮马达/齿轮箱 : 028-87740066

博能传动（肇庆）有限公司
控制器/驱动器 : 0757-86719757
马达/齿轮马达/齿轮箱 : 0758-2699830

博能传动（苏州）有限公司
控制器/驱动器 苏南区: 0512-66182005
马达/齿轮马达/齿轮箱 苏南区: 0512-66189918
控制器/驱动器 浙沪区: 0512-66182005
马达/齿轮马达/齿轮箱 浙沪区: 0512-66189918
控制器/驱动器 苏皖区: 0512-66182005
马达/齿轮马达/齿轮箱 苏皖区: 025-52171612

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Introduction

Welcome to use BONENG Drive!

Before installation and use, please make sure to carefully read this manual to ensure the correct and safe use of the drive.

For more detailed information, please visit the BONENG Transmission official website: [BONENG \(http://www.boneng.com\)](http://www.boneng.com).

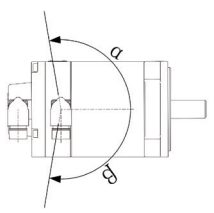


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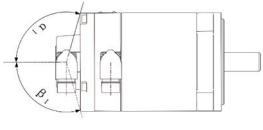
BONENG Transmiss
-ion Official Website

1.Servo Motor Electrical Connection Precautions

- a. Ensure that the motor power cables, signal cables, grounding, and shielded cables are all properly connected.
- b. Ensure that the brake connections and functions are normal.
- c. Ensure the sealing integrity and sealing surface of the connector to meet the required protection level.
- d. The power line connector rotation range is as follows:

	Motor Size	Angle α_1	Angle β_1
	MX028	135 °	140 °
	MX036	135 °	140 °
	MX048	135 °	140 °
	MX063	135 °	140 °
	MX080	135 °	200 °
	MX100	135 °	200 °

- e. Encoder cable connector rotation range:

	Motor Size	Angle α_1	Angle β_1
	MX028	140 °	135 °
	MX036	140 °	135 °
	MX048	143 °	135 °
	MX063	105 °	110 °
	MX080	100 °	100 °
	MX100	95 °	95 °



Attention:

Risk of electric shock!

- ◆ Ensure that the drive and motor are disconnected from power before connecting or disconnecting cables.
- ◆ Comply with electrical safety regulations and have only qualified professionals install the drive and connectors.
- ◆ The motor contains static-sensitive components; take appropriate anti-static measures.

2. Servo Motor Brake Parameters

Brake Model	BN028	BN036	BN048	BN063	BN080	BN080
Static frictional(N.m)	≥ 1.9	≥ 2.4	≥ 3.8	≥ 10	≥ 22	≥ 60
Brake power (W)	8.76	6.74	13.4	14	19	25
Inertia (kg.cm ²)	0.09	0.11	0.39	0.78	2.55	14.7
Operating Voltage(VDC)	24 $\pm$ 10%	24 $\pm$ 10%	24 $\pm$ 10%	24 $\pm$ 10%	24 $\pm$ 10%	24 $\pm$ 10%
Operating temperature(°C)	-15~120	-15~120	-15~120	-15~120	-15~120	-15~120
Braking time (ms)	≤ 20	≤ 20	≤ 30	≤ 25	≤ 30	≤ 50
Release time (ms)	≤ 35	≤ 80	≤ 50	≤ 90	≤ 100	≤ 220
Emergency braking Endurance(times)	2000	2000	2000	500	2000	500
Max.frequency of emergency braking (times/h)	20	20	20	20	20	20
Max.braking speed(rpm)	6000	6000	6000	3000	3000	3000
Matched motor size	028	036	048	063/080S	080M/100S	100M/100L

3. Servo motor troubleshooting and maintenance

Problems	Cause	Measures
Motor can not rotate	Overload/stalled	Reduce the load.
	At least one fault occur in the servo drive.	Check the servo drive to eliminate the faults.

Problems	Cause	Measures
	Overload	Reduce the load.
	Motor parameters error in servo drive.	Ensure that right motor parameters are set.
	There is a loose connection in the motor power supply.	Check the connection between the motor and servo drive.
Motor ramp-up slowly	Inter-turn short circuit or interphase short circuit in the stator winding.	Measure the winding resistance and insulation resistance, and contact the manufacturer for repair.
Rumble when ramping	One phase of the power line is disconnected after being switched on.	Check driver and power line connections as well as jack connections/check winding resistance
	Inter-turn short circuit or interphase short circuit in the stator winding.	Determine winding resistance and insulation resistance, and contact the manufacturer for repair
Rumble when rotating	Overload	Reduce the load.
	One phase of the power line is disconnected after being switched on.	Check the connection between the motor and servo drive.
	Inter-turn short circuit or interphase short circuit in the stator winding.	Determine winding resistance and insulation resistance, and contact the manufacturer for repair
Motor over-heat when load-free rotating	The ventilation duct does not ventilate smoothly.	Remove obstructions and ensure that the cooling air is unobstructed.
Motor overheat when full-load rotating	Overload	Reduce the load.
	One phase of the power line is disconnected after being switched on.	Check the connection between the motor and servo drive.

Problems	Cause	Measures
	The ventilation duct does not ventilate smoothly	Remove obstructions and ensure that the cooling air is unobstructed.
Rotate not smooth	The motor power cable and signal cable are not fully shielded.	Check shielding and grounding, Check for interference sources in the vicinity.
	There is a loose connection in the motor power supply.	Check the connection between the motor and servo drive.
	The control gain parameters not match the mechanism.	Optimize the control gain parameters.
Piercing grinding sounds, running noisy	Rotating parts slip	Check the mechanism and troubleshooting.
	Foreign objects inside the motor.	Contact manufacturer for repair.
	Bearing failure.	Contact manufacturer for repair.
Radial vibration	Rotor unbalance.	Disassemble the rotor and rebalance the rotor.
	Rotor not round, shaft bent.	Contact manufacturer for repair.
	Poor of calibration.	Calibrate equipment, check couplings.
	Unbalance of connected Equipment	Rebalance the connected devices
	The gear box is not running smoothly	Make the gearbox work properly
Axial vibration	Poor of calibration.	Calibrate equipment, check couplings
	Unbalance of connected equipment	Rebalance the connected devices
	The gear box is not running smoothly	Make the gearbox work properly

4. Technical data of Control Module

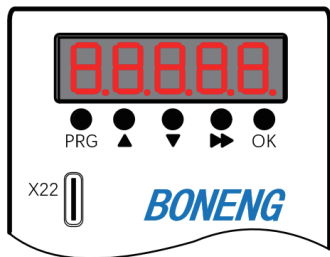
Function		Technical Data
Bus interface	AX-CM53-*****	• PROFINET or EtherCAT, DriveLink bus
		• RJ45 interface
Power supply	By power module	• DC 24V/1.0A
	By external terminals	• Voltage range: DC 20.8~28.8V
		• Maximum current: 1.0A
Power output	+24V output	• Voltage range: DC 18V ... 26.8V
		• Maximum current: 100mA
	+10V output	• Voltage range: DC 9.5V ... 10.5V
		• Maximum current: 10mA
Digital input	6	• Single inputs: DI0, DI1 ... DI5 share M0
		• Electrical isolation
		• Support Source and Sink mode
		• Voltage: DC 24V, AC 36V
		• Level "1" voltage: >11V
		• Level "0" voltage: <5V
		• 24V typical current: 4mA
		• Response time: 6ms (Including software filter)
Digital output	1 relay (DO0)	• Voltage: DC 24V, AC 220V
		• Continuous current: 2A
		• Switching current: 2A
		• Contact type: 1 normally open and 1 close
Pulse output	3 (POA ~ POZ)	• Voltage: DC 5V
		• Current: Maximum 20mA
		• Frequency: Maximum 2MHz
		• Differential output
		• Z-phasesupports open collector output

Function		Technical Data
Analog input	1 (AI0)	• Electronic switch to choose voltage and current mode
		• Voltage range(voltage mode): 0V ~ 10V
		• Current range(current mode): 0mA ~ 20mA, 4mA ~ 20mA
		• Internal resistance in current mode: 500Ω
		• response time: 2ms (including software filter)
		• Precision: ±1%
Temperature sensor	1	• Respectively at the X11
Encoder interface	ABZ	• 24V or 5V differential signal
		• Input frequency: 250kHz maximum
		• Maximum wire length: 100m
		• Disconnection detection
	SSI	• 5V differential signal
		• Baud rate: 1Mbps maximum
	BISS-C	• Baud rate: 2 Mbps maximum
		• RJ45 interface
	RS485	• Maximum wire length: 50m at 500kbps
		• Baud rate: 2.5 Mbps maximum
		• Maximum wire length: 50m at 500kbps
		• Baud rate: 2.5 Mbps maximum
USB interface	1	• USB 2.0
		• Type-C
Keyboard display	support	• LED segment displays and mechanical buttons

6. Operation guide

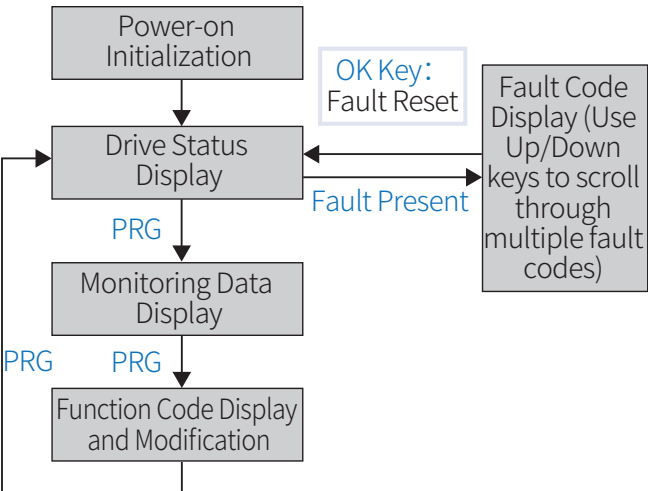
6.1 Operation Panel Instructions

Digital Tube Display and Function Keys:



Key	Key Name	Function
PRG	Program/Return	In the Main Monitoring Interface, pressing this key enters the Function Selection Interface; in other interfaces, pressing this key returns to the previous interface or state.
▲	Increase Key	Increases data or function code
▼	Decrease Key	Decreases data or function code
▶▶	Right Shift Key	Selects the 5-digit digital tube cyclically; shifts parameter modification bit rightward during parameter editing.
OK	Confirm Key	Confirms parameter settings; resets faults when pressed on the fault display page.

Panel Display and Keypad Operation Instructions:



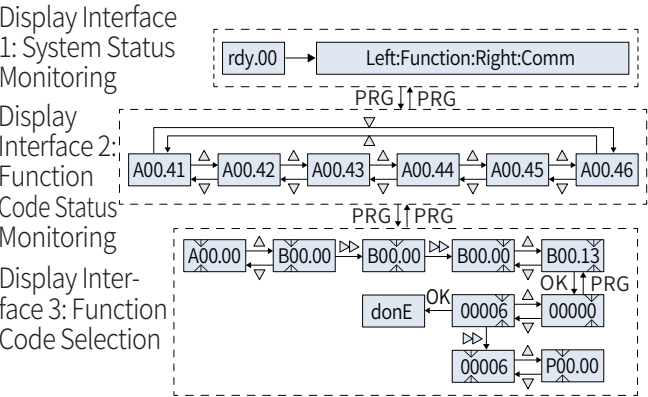
1. Drive Status Display Interface displays the current status of the drive, with the following possible statuses:

Display	Name	Description
	Rdy: Drive Ready for Operation	Drive is ready for operation, waiting for enable signal.
	Nrd: Power-on Blocked	Drive not ready, condition not met for operation.
	Run: Running	Drive is running.
	Tun: Motor Parameter Identification	Motor parameter identification in progress.
	Off: Deceleration Stop	Motor is in braking state.
	Bus Communication Message	PROFINET Communication Message Types: 0: Message Invalid; 1: Standard Message 1; 2: Standard Message 3; 3: Siemens 102 Message; 4: Siemens 105 Message; 5: Siemens 111 Message; 6: Siemens 352 Message;
	Bus Communication Status	Character Display for Bus Communication Status: 0: Communication Not Established; A: AR Established; C: DCP Request; E: Communication Fault; P: Process Communication Established;
	Bus Communication Message	EtherCAT Communication Message Types: 0: No mode set; 1: PP Mode; 2: Not supported; 3: PV Mode; 4: PT mode;

Display	Name	Description
		5: Not supported; 6: Home Return Mode; 7: Not supported; 8: CSP Mode; 9: CSV Mode; 10: CST Mode;
	Bus Communication Status	Character displays bus communication status: 0: It has no meaning; 1: init; 2: PRE_OP; 4: SAFE_OP; 8: OP;

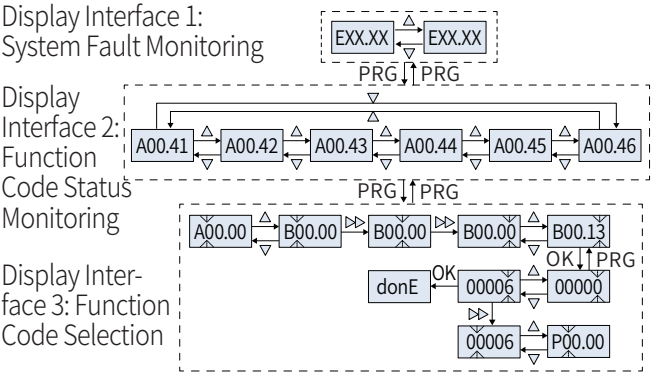
2. Function Code Display and Modification Interface operational workflow is as follows:

When the drive is fault-free



If selecting parameter linking, move the cursor to the highest digit of the digital display. Press Δ to link parameters, and press ∇ to cancel.

When the driver malfunctions, display interface one changes, while display interfaces two and three remain unchanged.

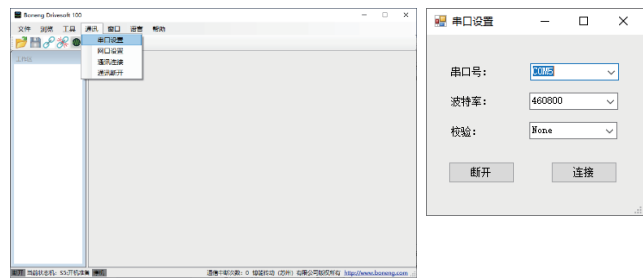


If selecting parameter linking, move the cursor to the highest digit of the digital display. Press Δ to select parameter linking, and press ∇ to cancel.

When the drive is started for the first time and there are no faults, the AN drive panel will automatically display Interface 1. Press [PRG] and the panel will display parameter A00.41. At this point, pressing the Up/Down keys will cycle the display between A00.41 and A00.46. Press [PRG] to enter the function code selection interface. Use the Right key and Up/Down keys to select the function code parameter to be modified or viewed. Press [OK] to display the current parameter value of the function code on the panel.

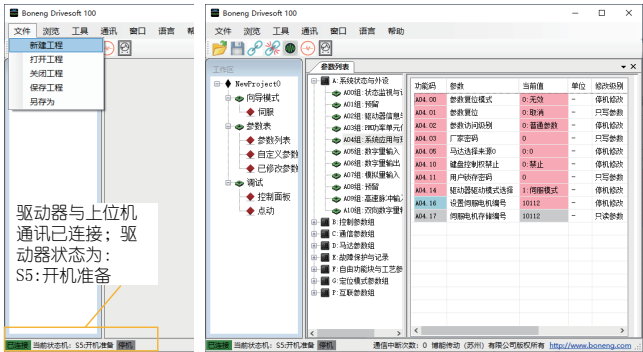
6.2 Operation guide for software Boneng Drivesoft 100

- 1. Please connect the drive and PC with a standard USB cable, and ensure that you have installed the software Boneng Drivesoft 100.
- 2. Run software Boneng Drivesoft 100 in your PC, and establish an online connection to the drive unit: on the menu bar: Communication → Set Comm → Serial port No, select the serial port number → Connect ,as follow:



Establish online connect between the drive and the software Boneng Drivesoft 100

- 3. Create new project in Boneng Drivesoft 100: File → New project → Confirm.



Create a new project in Boneng Drivesoft 100 and configure parameters

7. Commissioning a drive

WARNING:

- ◆ Be sure to be aware of all the safety precautions for the operation of each servo module.

7.1 Requirements for commissioning

The following requirements must be fulfilled for commissioning a AX-series Servo drive system:

- ◆ A set of Boneng AX servo drive and matched servo motor;
- ◆ Servo drive power cables and switches;
- ◆ A USB cable featuring a USB Type-C male connector (Type-C) on one end;
- ◆ A PC with Boneng Drivesoft 100 installed.

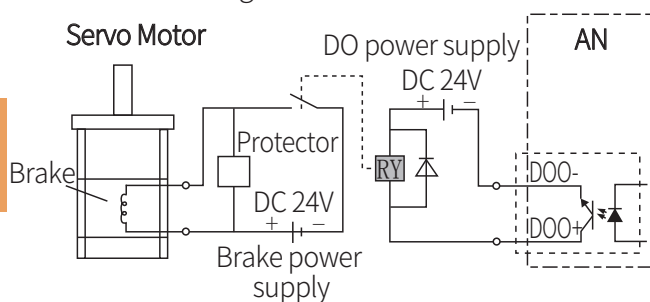
Please connect the servo drive, servo motor and encoder cables according to the wiring diagram, and connect the servo drive to the PC.

7.2 Safety instructions for commissioning

- Servo motor and external mechanical transmission device: Before the commissioning, please check the installation of the servo motor and ensure that it is securely and reliably fixed. Before the trial operation, please make sure to separate the output shaft of the servo motor from the load.
- Installation and wiring inspection:
 - g. Please ensure that the power of the driver matches that of the servo motor. For example, the power of the motor and the power of the driver should not differ significantly; otherwise, normal operation cannot be guaranteed.
 - h. Before supplying power, please confirm whether the power supply voltage of the servo drive matches the rated operating voltage of the servo unit according to the drive nameplate.
 - i. Please ensure that the power cables and signal cables of the servo are reliably connected, and that the shielding layer of the power cables and the PE signal are correctly connected to the driver.

- j. Please ensure that the grounding protection cable of the servo drive is reliably grounded to prevent electric shock.
- k. Please ensure correct and reliable wiring of the STO terminal
- l. Do not modify the original factory cables without authorization, as it may cause interference and even damage the driver.
- Inspection of the electric brake wiring:
 - c. Before trial operation, please check whether the wiring of the servo motor brake is correct. The input signal of the brake at the servo motor end has positive and negative polarity; please do not connect it incorrectly, as the brake will not open properly.
 - d. Please provide a separate power supply for the motor brake and do not use the 24V terminal output of the servo driver as the power supply for the motor brake. Similarly, do not use the same power supply to power both the driver terminals and the motor brake, as this may cause interference issues.

To control the servo motor brake using the DO terminal of the servo driver, please connect the wiring as shown in the figure below.



Schematic diagram of servo motor brake wiring



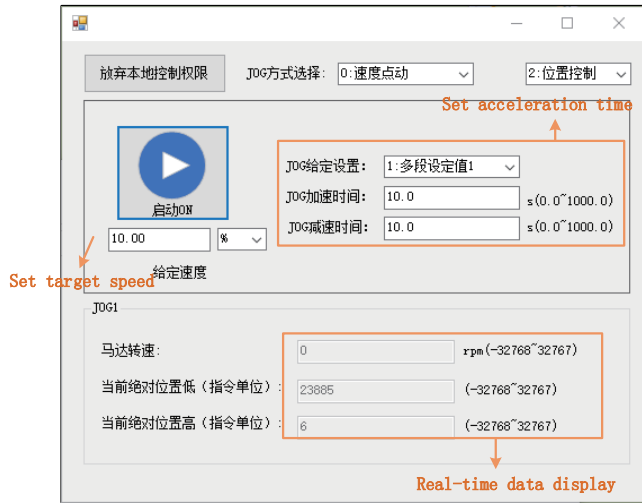
WARNING:

- ◆ Relays must be installed with protective devices as shown in the diagram;
- ◆ MN motor brake wiring has polarity and must not be reversed, otherwise the brake cannot be released.

7.3 Commissioning with BonengDriveSoft 100

The following are the steps for motor test operation using Boneng Drivesoft 100 software for Boneng drives:

- Step1. Create a project in the Boneng Drivesoft 100 software (refer to Section 3.2), which allows real-time display of current parameters.
- Step2. (Optional) Restore factory settings: Set A04.00 = [3: Restore all parameters to factory defaults] → A04.01 = [1: Confirm] → Wait for the parameter restoration to complete (monitor the status machine in the lower-left corner of the debugging software) before power-cycling the drive.
- Step3. Set and check motor parameters: If using a Boneng servo motor, verify whether A04.17 matches the motor ID on the motor nameplate.
- Step4. Check motor parameters (D00-D02 group parameters) against the motor nameplate.
- Step5. Motor rotation check: Run the motor in VF mode (set B05.00 = [0: VF], **start** the drive via the upper computer control panel, and **input a target speed** in the "Speed Command" field, e.g., [10%], then **confirm**). Check the sign of the speed command value (P13.11) and encoder speed feedback value (P13.17). Their signs must match. If not, inspect whether the drive output phase sequence matches the servo motor UVW wiring phase sequence.
- Step6. After completing Step 5, **stop** the motorⁱ and set B05.00 = [2: FVC].
- Step7. Use the upper computer JOG panel for speed jogging control: Acquire local control authority → Set JOG mode to speed jogging → Set JOG target speed → Press the **Start** button to accelerate the motor shaft to the target speed. Release the Start button to decelerate and stop.



Speed JOG window



Position JOG window

If speed control operation is complete, the test run ends here. For position control, proceed to Step 9 and subsequent steps.

Step8. Set the electronic gear ratio parameter G00.04 = [10000] (this parameter is for test operation; actual settings should be calculated based on the motor shaft's downstream transmission ratio).

Step9. Change the control mode to [2: Position Control] (or manually set B05.01 = [2: Position Control]).

Step10. Use the upper computer JOG panel for position jogging control: Acquire local control authority → Set JOG mode to position jogging → Set position JOG motion parameters (if the motor output shaft is connected to a gearbox, set displacement and maximum speed based on the gearbox ratio) → Enable servo → Press the **Start button** to trigger position jogging. The motor shaft will run until the position command completes, then decelerate and stop. Press the Start button again to move the shaft to the target position and stop → Disable servo and stop the motor.

8. Frequently used parameters

8.1 Changeable parameters

Function Code	Name	Description
A04.00	Parameter reset mode	3: All parameters reset. Reset performs only after confirming A04.01.
A04.01	Parameters reset	0: cancel 1: Confirm (Wait for reset complete before change other parameters.)
D00.01	Rated motor power	Should be same as the motor nameplate.
D00.02	Rated motor voltage	
D00.03	Rated motor current	
D00.04	Rated motor frequency	
D00.05	Rated motor speed	
B05.00	Motor control mode	0:VF 1:SVC 2:FVC

Function Code	Name	Description
F04.00	Braking function select	0: no brake, 1: Brake without status detection. (Use the drive's DO to control the brake by setting DO source to P01.11).
A06	Digital output	Settings for the Digital Output. Refer to the user manual for details.
B00.00	Start/stop select	If set B00.00=[0: Switch control], set terminal parameters in group B01. If B00.00=[1: Custom control module] is set, set terminal parameters in group B00. When using Profinet or EtherCAT communication, the relevant parameters are automatically set when the communication is established.
B01.01	Switch control 1 mode	Start/Stop the drive the switches. Refer to the user manual for details.
B01.03	Switch control 1 IN1	
B01.04	Switch control 1 IN2	
B01.05	Switch control 1 IN3	
B00.21	Parameter Identification Request	When B05.00 is set to 1 or 2, parameter identification is required. Asynchronous motor identification procedure: Press LOC/REM key to enter local mode; set B00.21 to 2; press RUN key to initiate identification process; after drive completes identification, press STOP key, then press LOC/REM key to switch to remote mode. This procedure applies exclusively to asynchronous motors. Boneng servo motors do not require motor parameter identification.

Function Code		Name	Description
B00.23		OFF1 Stop mode	0:Coast to stop 1:Ramp to stop
Speed control	B02.00	Speed control Main speed SEL	Settings for target speed. Refer to the user manual for details.
	B03组	Multi-speed setting	Settings foe multiple target speeds. Refer to the user manual for details.
	B04.02 ~ B04.09	Ramp acceleration and deceleration time	Speed control acceleration and deceleration time setting. Only one group is valid at a time.
	B04.40	Slope acceleration time source	Select the source of acceleration and deceleration time in speed control mode, which can be set as the constant value (B04.00~B04.09), or the upper controller (through the interconnection parameters).
	B04.41	Slope deceleration time source	
Position control	D02.18	Absolute encoder type	When a battery is connected with the encoder line, select [1: multi-circle absolute encoder]; Otherwise select [0: single-turn absolute encoder].
	G00.04	Number of POS COMD for turn COMD	The first available Electronic-Gear. Valid for G00.04_0, and the final Electronic-Gear is: Encoder Resolution/G00.04.
	G00.06	E-Gear ratio 1 (Num)	The second available Electronic-Gear. Valid for G00.04=0, and the final Electronic-Gear is: G00.06/G00.08.
	G00.08	E-Gear ratio 1 (Den)	
	G00.22	Motor rotation direction SEL	Set the direction of motor rotation when giving positive command.

Function Code	Name	Description
Position control	G00.53 Home switch SRC SEL	Select the DI terminal connected to the home switch. It should be selected according to the physical connection of the home switch; High level active.
	G00.55 Positive limit COMD SRC SEL	Select the DI terminal connected to the limit switch. The limit switch should be selected according to the physical connection; High level active.
	G00.56 Negative limit COMD SRC SEL	
	G01.13 Load moment of inertia ratio	Set the ratio of load to motor rotor inertia. Should be set to the actual ratio.
	G02.01 Rigidity grade selection	Set the rigidity level of the mechanical system. This parameter affects the position, velocity loop gain, and the dynamic response performance of the system, and should be matched with the physical system.
	G03.03 Position error fault value(r)	When the position deviation this threshold, the driver reports a fault [52: POS Dev too large]. This parameter is the number of circles on the motor side.
	G03.04 Position Deviation Threshold Proportional Coefficient	Position Deviation Threshold = MAX(G03.04 * Velocity Command, G03.03)
	G03.33 EPOS Maximum Acceleration	Set EPOS Maximum Acceleration, typically used in conjunction with ProfiDrive 111 telegram OverAcc parameter.

Function Code	Name	Description
Position control	G03.35 EPOS Maximum Deceleration	Set EPOS Maximum Deceleration, typically used in conjunction with ProfiDrive 111 telegram OverDec parameter.
	G03.37 EPOS Task Cancellation Deceleration Factor	Set the deceleration factor during EPOS task cancellation, referenced to parameter G03.35.

8.2 Monitoring parameters

Function Code	Name	Description
A00.00	Current state machine	Current status of the drive.
A00.05	Given speed	The real-time speed reference value in the position and speed control mode. [rpm].
A00.06	Motor rotating speed	Actual speed, [rpm].
A00.08	Output current	Actual output current.
A00.09	Output power	Actual output power.
Group P00	Hardware state	Physical status of DI, DO, and DIO.
P12.13	Panel given value	Target speed value given by OP in speed control mode, with the unit 0.1%
P12.14	PC given value	Target speed value given by Boneng Drivesoft 100 in speed control mode. The unit is selected by the control panel in Boneng Drivesoft 100.
P12.16	DI state	Actual status of DI.
P12.17	DO state	Actual status of DO.
P13.00	Motor actual speed	Actual speed of motor, the value 4096 corresponds to 100% of rated speed.

Function Code	Name	Description
P13.01	Motor final set speed	Final speed reference value in position and speed control mode; 4096 corresponds to 100% of the rated speed.
P13.02~P13.11	-	Speed set monitoring data in speed control mode.
P14.04, P14.06	Cumulative absolute position (Pe1)	Actual position (two 32-bit signed data), corresponding to motor encoder.
P14.20	Position setpoint (Instruction unit)	Position command in user length unit (32-bit signed data).
P14.22	Position Feedback (Command Unit)	Real-time position feedback, command unit, 32-bit signed integer.
P14.66	Position Target Setpoint	Target position value, command unit, 32-bit signed integer.
Group E00~E07	-	Fault configure and record.

9. Faults and alarms

Fault Code name	Sub-code	Meaning	Measures
1	Over current	1 U-phase over current	a. Confirm that D00 motor parameters are consistent with motor nameplate. b. Eliminate the problem of power line damage; c. Check whether the cable is short-circuited. d. Increase the acceleration and deceleration time appropriately;
		2 V-phase over current	
		3 U & V-phase overcurrent	
		4 W phase hardware over current	

Fault Code name	Sub-code	Meaning	Measures
1	Over current	5 U & W-phase over current	e.Reduce VF torque increase under VF control; f. Please confirm that the motor stops and stabilizes before starting; g.Reduce or cancel the load to trouble-shoot problems; h.For induction motor vector control, please confirm whether the correct parameter identification operation has been carried out; i. Sub-code 8 indicates that the brake resistance is abnormal and the driver is powered off. Confirm whether the brake resistance is connected correctly. Measure the resistance between DC+ and R and compare with the recommended value in the manual. j. Replace the PM. k.Restore factory defaults and reset parameters. l. Contact the manufacturer for technical support.
		6 V & W-phase over current	
		7 U&W three-phase over current	
		8 Brake hose hardware over current	
		9 U-phase VCE short-circuit	
		10 V-phase VCE short-circuit	
		11 U & V-phase VCE short circuit	
		12 W phase VCE short circuit	
		13 U & W-phase VCE short circuit	
		14 V & W-phase VCE short circuit	
		15 Over current anomaly	
		16 Over current anomaly	

Fault Code	Fault name	Sub-code	Meaning	Measures
2	DC bus Over Voltage	1	Rapid detection of DC bus voltage over-voltage	a. Check whether the input power supply is within a reasonable range and that the input cable is reliably connected. b. Please increase the acceleration and deceleration time. c. Install brake resistance or brake unit d. Reset parameters and run after parameter identification. e. Check that the driver power matches the motor power. f. Check whether the encoder is damaged. g. Contact the manufacturer for technical support.
3	DC bus under-voltage	1	DC bus under-voltage	a. Check whether the input power supply is within a reasonable range and that the input cable is reliably connected. b. Check whether the power grid is powered off immediately. Set the A03.21 software under-voltage value correctly. c. Replace the Power Module.

Fault Code	Fault name	Sub-code	Meaning	Measures
4	Speed match fail	1	Speed search parameters are improperly set.	a. Modify speed tracking mode (B05.13) to search from maximum frequency or increase search time (B05.14) b. Contact the manufacturer for technical support
5	Driver over-load	1	Driver over-load	a. Ensure that the driver type is appropriate and the A03.00 is consistent with the nameplate. b. Reduce VF torque lift under VF control. c. Reduce the torque limiting value under vector control. d. Please confirm whether the load is too heavy, or lock the brake. e. Check whether the correct parameter self-learning operation is performed during vector control. f. With the encoder application, please confirm that the encoder direction and parameter Settings are correct. g. Reset parameters and run after parameter identification.

Fault Code	Fault name	Subcode	Meaning	Measures
5	Driver over-load	1	Driver over-load	h.Reduce the carrier frequency, or replace more powerful drivers. i. Wait for the motor to stop completely before starting. j. Contact the manufacturer for technical support.
6	Motor over-load	1	Motor over-load	a.Please confirm whether the motor load is too large. b.When vector control, please confirm whether the motor parameter self-learning has been carried out. c.With the encoder application, please confirm that the encoder direction and parameter Settings are correct. d.Please confirm whether the load is too heavy, or lock the brake. e.Please confirm whether the motor nameplate parameters are set correctly. f. Contact the manufacturer for technical support.
7	Input phase miss	1	Input phase missing detection	a.Check whether the power input cable is in good contact. b.Ensure that the input power supply is stable.

Fault Code	Fault name	Subcode	Meaning	Measures
				C.Contact the manufacturer for technical support.
8	Output phase miss	1	U p h a s e output missing phase	a.Check whether the corresponding output cable is connected correctly and in good contact. b.Please confirm whether the motor is running smoothly. c.Set D00 parameters according to the motor nameplate parameters, A03.00 set the same as the nameplate. d.Replace the PM. e.Contact the manufacturer for technical support.
		2	V p h a s e output missing phase	
		3	W p h a s e output missing phase	
		4	FVC control output out of phase	
		5	The three-phase output is seriously unbalanced	
		6	Stator resistance identification output phase deficiency	
		7	U V W three-phase output phase missing	
9	Driver over heat	1	The IGBT temperature of the driver (37Kw and below) exceeds the threshold.	a.Check whether the ambient temperature is too high. b.Check whether the radiator fan works properly. c.Check whether the radiator air duct is blocked. d.Replace the PM.
		2	The IGBT temperature of the driver (37Kw and below) exceeds the threshold.	

Fault Code	Fault name	Sub-code	Meaning	Measures
9	Driver over heat	3	The IGBT-V phase temperature of the driver (37 Kw or higher) exceeds the threshold.	e. Model A03.00 Parameter Settings are consistent with the nameplate. f. Contact the manufacturer for technical support.
		4	The IGBT-V phase temperature of the driver (37 Kw or higher) exceeds the threshold.	
10	PWM wave warn	1	U - phase wave is abnormal	a. Power off and power on the device again. If the fault persists, contact the manufacturer for technical support.
		2	W - phase wave is abnormal	
		3	V - phase wave is abnormal	
11	Zero-Crossing Err	1	U phase zero drift is large	a. Check whether the model (A03.00) Settings are consistent with the nameplate. b. If the PM is abnormal, replace the PM, or contact the manufacturer for technical support.
		2	V phase zero drift is large	
		3	W phase zero drift is large	
12	Ground short	1	U phase overcurrent in short circuit to ground.	

Fault Code	Fault name	Sub-code	Meaning	Measures
12	Ground short	2	V phase overcurrent in short circuit to ground.	a. Check whether the corresponding output phase is short-circuited to ground. b. Check whether the motor cable is damaged. c. Replace the motor or the driver. d. Contact the manufacturer for technical support.
		4	W phase overcurrent in short circuit to ground.	
		5	The short-circuit current to the ground exceeds the threshold. Procedure.	
		6	Overvoltage during short circuit to ground.	
13	Motor tune fault	1	The asynchronous motor dynamic tuning is abnormal.	a. Confirm whether the parameters of the D00 motor are consistent with the motor nameplate. b. Ensure that cables to the output terminal are reliable. c. Ensure that the encoder cables and parameters are correct. d. Replace the PM. e. Contact the manufacturer for technical support.
		2	The asynchronous motor static tuning is abnormal.	
		3	Synchronous motor tuning is abnormal	
		4	Encoder tuning anomaly (Detecting velocity anomaly).	
		5	Abnormal encoder tuning (serious encoder signal interference).	

Fault Code	Fault name	Sub-code	Meaning	Measures
13	Motor tune fault	6	Abnormal encoder tuning (abnormal encoder Z signal).	
14	Encoder fault	1	The encoder is not connected during closed-loop dynamic tuning.	a. Use cables with a shielded layer and ground the shielded layer of the encoder. b. Check whether the cable connection to the encoder is reliable. c. Check whether encoder parameters are set correctly. d. Check whether the encoder power supply is correct. e. Check whether the parameters of the D00 motor are consistent with the nameplate, and confirm the motor series D00.09. f. Confirm whether the motor turns up after operation and discharge the blocked rotation. g. Contact the manufacturer for technical support.
		2	The speed measurement of the encoder does not match during dynamic closed-loop tuning	
		3	The encoder is disconnected during closed loop operation	
		4	The encoder Z signal is abnormal	
		9	Incremental encoder A phase break	
		10	Incremental encoder B phase break	
		11	Incremental encoder ABZ phase break	
		12	Incremental encoder Z phase break	

Fault Code	Fault name	Sub-code	Meaning	Measures
14	Encoder fault	13	Incremental encoder AZ phase break	
		14	Incremental encoder BZ phase break	
		15	Incremental encoder ABZ phase break	
		16	The communication encoder is abnormal	
15	Vector stall fault	1	The velocity is reversed by an external force.	a. Check whether the motor nameplate parameter Settings are correct; b. Check whether the motor parameter self-learning operation has been done; c. Check whether the stall parameters are properly set; d. Contact the manufacturer for technical support.
		2	Excessive velocity deviation	
16	FPGA read/write Err	1	An FPGA read/write error occurred during initialization.	a. If the PM is abnormal, power off and restart. If the PM persists, contact the manufacturer for technical support.
17	Driver power fault	1	The drive voltage is low.	

Fault Code	Fault name	Sub-code	Meaning	Measures
17	Driver power fault	3	The driving power supply is faulty during short-circuit detection to ground	a. Contact the manufacturer for technical support b. Replace the PM.
18	Primary power fault	1	24V primary supply voltage is low	a. Contact the manufacturer for technical support b. Replace the PM.
19	CM-PM Comm fault	1	CM no response	a. Check whether the CM latch is tightly locked; b. Replace the CM or PM to locate the problem; c. Contact the manufacturer for technical support.
		2	CM no response	
		3	Communication data exception	
		4	Initialization exception	
20	PM-EEPROM fault	1	EEPROM write data overflow	a. Contact the manufacturer for technical support.
		2	EEPROM read data overflow	
		3	Data read from the EEPROM timed out	
		4	Data written to the EEPROM timed out	
		5	The EEPROM read address is out of bounds	
		6	The EEPROM write address is out of bounds	

Fault Code	Fault name	Sub-code	Meaning	Measures
21	PM model error	1	The current setting value of the PM model is less than the minimum value	a. Re-burn the PM program b. Reset the model to the normal value c. Contact the manufacturer for technical support
		3	The current setting value of the PM model is less than the maximum value	
22	CBC current clamping error	1	The U phase current is abnormal	a. Increase the value of acceleration time; b. Reset parameters and run after parameters are identified. c. Replace the motor and discharge the motor fault 4. Replace the Power Module. d. Contact the manufacturer for technical support.
		2	The V phase current is abnormal	
		3	The W phase current is abnormal	
		16	There is a problem with CBC interrupt.	
23	Bridge over-heat	1	Reduce output power	a. Clean foreign bodies in the fan and disable the fan speed control function (B06.48=0). If the fan still does not rotate, contact the manufacturer to replace the fan. b. Check whether the model value corresponds to the nameplate

Fault Code	Fault name	Sub-code	Meaning	Measures
23	Bridge over-heat	1	Reduce output power	c. The carrier frequency of the driver can be properly reduced, the heat dissipation of the PDC door can be opened, and the air volume of the inlet and outlet of the PDC can be increased d. Contact the manufacturer for technical support.
24	STO fault	2	STO1 is low level.	a. STO triggered. b. STO wire disconnected
		3	STO2 is low level.	
		4	Both the STO1 and STO2 are low level.	
25	Brake coil over-heat	1	The driver brake tube temperature is too high	a. Check whether the ambient temperature is too high b. Check whether the radiator fan works properly c. Check whether the radiator air duct is blocked d. Install a suitable brake resistance e. Contact the manufacturer for technical support
26	Servo initial position Error	1	UVW encoder initial position detection error	

Fault Code	Fault name	Sub-code	Meaning	Measures
26	Servo initial position Error	2	Absolute value encoder communication is abnormal	a. Use a cable with a shielded layer and ground the shielded layer of the encoder. Reconnect or replace the encoder cable b. Check whether the encoder parameter Settings are correct c. Identify the zero point to ensure the correct servo zero position; Wiring according to correct motor phase sequence d. Contact the manufacturer for technical support
		3	Absolute pair value encoder initial position is not corrected	
		4	Absolute value encoder initial position detection timeout	
		5	Absolute encoder zero corrects data read/write errors	
		6	Absolute encoder initial position correction failed	
		7	Absolute value encoder data read error	
		8	The commutation Angle deviation is too large	
		9	Wrong commutation Angle	
33	Drive pre-overload	1	Drive overload warning	a. Check whether the drive pre-overload function is enabled b. Troubleshoot the fault by referring to fault "5: Drive Overload". c. Contact the manufacturer for technical support

Fault Code	Fault name	Sub-code	Meaning	Measures
34	Motor pre-overload	1	Motor overload warning	a. Check whether the drive pre-overload function is enabled b. Handling method refer to "6: motor overload" fault. c. Contact the manufacturer for technical support
35	Communication fault	1	Communication between CM module and host computer is interrupted when host computer control driver is running.	a. Reconnect or replace the cable b. Contact the manufacturer for technical support
		2	After the OP keyboard obtains the local control, the communication between the CM module and the OP keyboard is interrupted.	a. Check the communication cable between the operation panel and the driver. b. Contact the manufacturer for technical support
		3	After the OP keyboard obtains the local control, the communication between the CM module and the OP keyboard is interrupted.	a. Check whether the Modbus cable is disconnected or damaged b. Check whether the corresponding PLC and other controller programs are correct and whether the interaction interval is within the time set by function code C02.04 c. Contact the manufacturer for technical support

Fault Code	Fault name	Sub-code	Meaning	Measures
35	Communication fault	5	C a n o p e n communication is disconnected	a. Check whether the primary station is closed b. Whether the communication line is damaged or too long; Too close to an interference source. c. Contact the manufacturer for technical support
		6	DriveLink communication failed	a. Receiving data times out b. Node Settings conflict c. Contact the manufacturer for technical support
		7	The PROFINET communication is disconnected	a. The PLC is powered off or the connection cable is damaged. b. Adjust the appropriate communication cycle. c. When the IRT mode is used, ensure that the IRT device is preferentially connected to the PLC, the RT device is connected to the back end of the IRT device, and the switch that supports the IRT mode is used. d. Contact the manufacturer for technical support
		10	The EtherCAT communication is abnormal	a. Connect to the PLC and view the C06.06 to view the prompt. Contact the customer or manufacturer as prompted. b. Contact the manufacturer for technical support

Fault Code	Fault name	Sub-code	Meaning	Measures
37	Motor speed over limit	1	Motor speed exceeds maximum speed limit	a. Check whether the parameters related to motor overspeed are set properly. b. Check whether an external device rotates with a motor. c. Contact the manufacturer for technical support
38	Motor speed Dev large	1	The motor speed deviates too much from the set speed	a. Check whether the parameter Settings related to the motor speed deviation are reasonable. b. Whether the load is too heavy, and whether the lock is opened in time. c. Contact the manufacturer for technical support.
39	Power reset	1	The drive needs to be powered off and restarted.	a. Power off the drive and then power it on
40	PID feedback loss	1	The PID feedback sampling value is lost	a. Check the PID feedback signal; b. Contact the manufacturer for technical support.
41	Extern Fault	1	External fault 1 occurs	a. Check the external input signal. b. Contact the manufacturer for technical support.
		2	External fault 2 occurs	
42	Extern Fault	1	External warning 1 occurs	
		2	External warning 2 occurs	

Fault Code	Fault name	Sub-code	Meaning	Measures
43	Pre-drive failure	1	Check failure before running.	a. Check whether the external power supply voltage is abnormal; b. Contact the manufacturer for technical support.
44	Control board anomaly	1	The CM-MPU is abnormal identified.	a. If the controller module is faulty, replace the controller module b. The I/O board does not match the controller board or the connection is abnormal. c. Contact the manufacturer for technical support
		2	Clock configuration failure.	
		3	The I/O board of the controller module is incompatible with the main control board.	
45	Brake control fault	1	The brake is open abnormally	a. Check the external relay. b. Check the cable to the brake; c. Check the parameters corresponding to brake(group-F04). d. Contact the manufacturer for technical support.
		2	The brake is closed abnormally	
46	The voltage of the control board is abnormal	1	The PM-24V power supply voltage is too high	a. Check the 24 V power supply on the Power Module and/or the X1 terminal. b. Contact the manufacturer for technical support.
		2	The external 24 V power supply voltage is too high	
		3	The PM24v or external 24V supply voltage is too low	

Fault Code	Fault name	Subcode	Meaning	Measures
46	The voltage of the control board is abnormal	4	3.3V overvoltage	a. Contact the manufacturer for technical support.
		5	3.3V undervoltage	
		6	Lock relay short circuit	a. Check whether the impedance of the lock relay is greater than 450Ω b. Check whether the lock relay is short-circuited. c. Contact the manufacturer for technical support
47	Motor over-heat	1	The motor temperature is too hot.	a. Reduce the motor load and reduce the motor's own heat. b. Check the ambient temperature. c. Check the cabling and connections of the temperature sensor. d. Contact the manufacturer for technical support
		2	Temperature wire abnormal.	a. The ambient temperature of the motor is lower than -40°C ; b. The temperature sensor is short circuited. c. Contact the manufacturer for technical support.
48	Motor over-heat warn	1	The temperature of the motor is higher than the value set in B06.41.	a. Check whether the motor temperature is normal. b. Check whether the motor temperature overtemperature warning value set on B06.41 is reasonable.

Fault Code	Fault name	Subcode	Meaning	Measures
				c. Contact the manufacturer for technical support.
49	Analog Input disconnection fault	1	The 4 to 20mA input is disconnected in the AI1 terminal	a. Check whether the AI circuit is correct; b. Check whether an external current is input; c. Check whether the value of A07.20 is correct;
		2	The 4 to 20mA input is disconnected in the AI2 terminal	d. Contact the manufacturer for technical support.
50	Cap fan fault	1	The fan on the capacitor side is disconnected	a. Check whether cables to the capacitor fan are disconnected b. Contact the manufacturer to replace the capacitor fan c. Contact the manufacturer for technical support
51	ROM fault (CM-EEPROM fault)	1	During power-on self-test, the parameter values stored in the EEPROM are out of the specified range.	a. After the parameters are restored to factory defaults, power on the device again. b. Contact the manufacturer for technical support.
		2	The interaction between ARM and EEPROM times out	a. Contact the manufacturer for technical support.

Fault Code	Fault name	Sub-code	Meaning	Measures
51	ROM fault (CM-EEPROM fault)	3	After the upgrade, the default value of the EEPROM is written into the EEPROM.	a. It can be powered on again. If the fault persists, there is a problem with the EEPROM component. b. Contact the manufacturer for technical support.
		4	Write EEPROM for more than 1000 times	a. Rectify the fault; b. Contact the manufacturer for technical support.
		5	The font version is incorrect	a. Load the correct font library; b. Contact the manufacturer for technical support
52	POS Dev too large	1	The motor given instruction deviates too much from the load encoder Feedback instruction	a. Reduce the target speed, increase the acceleration and deceleration time, and whether the speed torque limit is too small b. Check whether the load carried by the motor is too large. c. Confirm whether the motor lock has been opened during operation d. Identify motor parameters to obtain more accurate motor parameters e. Contact the manufacturer for technical support.

Fault Code	Fault name	Sub-code	Meaning	Measures
53	Full closed-loop POS Dev too large	1	The load encoder feedback instruction deviates too much from the given instruction.	a. Check whether the load carried by the motor is too large and whether the direction of the two encoders is consistent; b. Whether the encoder at the load end is securely installed; c. Contact the manufacturer for
54	Reach P-limit	1	Forward Limit Switch Activated	a. Check whether the positive/ negative direction limit has been reached. If the limit is reached, it can run in the opposite direction; b. Check whether the parameters of the drive G00 group are correctly set. c. Check whether the DI terminal of the driver is connected properly.
55	Reach N-limit	1	Reverse Limit Switch Activated	
56	Drive disabled while positioning	1	Drive Disabled During Motor Position Command Execution	a. Ensure that the drive is enabled when the motor executes the position command. b. Contact the manufacturer for technical support
57	Motor Parameter error	1	Stored Motor ID Number Invalid	a. Set function code A04.16 to the motor and perform zero correction.
		2	4th/5th Digit Error in Stored Motor ID	b. Contact the manufacturer for technical support.

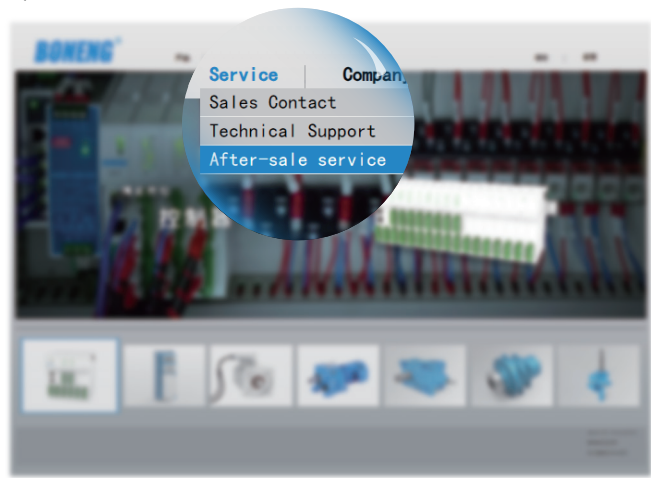
Fault Code	Fault name	Subcode	Meaning	Measures
57	Motor Param-error	3	3rd Digit Error in Stored Motor ID	
		4	2nd Digit Error in Stored Motor ID	
		5	1st Digit Error in Stored Motor ID	
58	Fixed Stop Outside Monitoring Window	1	Axis Position Out of Monitoring Window (G03.40)	a. Determine whether the torque limiting meets the requirements; b. Check whether the G03.40 monitoring window setting is too small; c. Contact the manufacturer for technical support.
59	Not Reached Fixed Stop Position	1	Position Command Completed but Fixed Stop Not Found	a. Make sure that the fixed stop point is within the operating range of the given position instruction; b. Contact the manufacturer for technical support.
60	Home Return Error	1	Home Return Timeout. No home signal detected within max homing time (G00.49)	a. Check whether the origin switch signal is normal; b. Increase the origin regression search speed (G00.46, G00.47). c. Check whether the search origin time G00.49 is set properly; d. Contact the manufacturer for technical support.

Fault Code	Fault name	Subcode	Meaning	Measures
62	Braking Resistor Overheating	1	Braking Resistor Overheating	a. Re-match the Braking Resistor.
63	Encoder Battery Voltage Low (Warning)	1	Encoder Battery Voltage Below Warning Threshold (3.2V)	a. Replace the encoder battery with a new one.
64	Encoder Battery Failure	1	Encoder Battery Voltage Below Fault Threshold (3.0V)	a. Replace with a new battery for the encoder. b. Check encoder wiring and external battery. c. RS485: Set D02.21 to 1 to reset multi-turn data and all error, and reset drive power, and then perform Homing procedure.
65	Encoder multi-turn error	1	Encoder Multi-turn Data Overflow	a. Set D02.21 to 1 to reset multi-turn data and all error, and reset drive power.
		2	Multi-turn Encoder Main and Backup Power Supply Disconnected, Then Re-powered	a. Perform acknowledge fault, and then perform Homing procedure.
66	Reference Point Not Set	1	Origin Not Set in Absolute Mode	a. Perform Homing procedure, and then absolute positioning.

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