



MR-JET 伺服放大器

型号

MR-JET-10G ~ MR-JET-300G

安全使用AC伺服

IB (NA) (3304)93CIB-A (9110) MEE
MODEL:

三菱电机自动化(中国)有限公司

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内容如有更改 恕不另行通知

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包装内容
打开包装后，请客户根据额定铭牌的记载内容确认是否为自己所订购的伺服放大器。

包装品	数量
伺服放大器	1
安全使用MR-JET系列 AC伺服 (本资料)	1

额定铭牌
以下对额定铭牌的显示项目进行示例说明。

认证标志
认证标志的示例如下。

系列号
M R - J E T - 1 0 G -

系列号	软件特殊规格
10	空白、In、S、Un等 (1 ~ 5个的英数字)
20	支持
40	支持
70	支持
100	支持
200	支持
300	支持

认证标志
认证标志的示例如下。

型号
此处对型号的内容进行说明。有些符号的组合不存在。

记号	额定输出 [kW]
10	0.1
20	0.2
40	0.4
70	0.75
100	1
200	2
300	3

警告铭牌
警告铭牌的示例如下。

WARNING 警告
BEFORE OPERATION, READ THE INSTRUCTION MANUAL CAREFULLY.
安全使用MR-JET系列 AC伺服 (本资料)

警告
危险：请勿触摸带电部分。
危险：请勿触摸正在旋转的部件。
危险：请勿触摸正在加热的部件。
危险：请勿触摸正在加热的部件。
危险：请勿触摸正在加热的部件。
危险：请勿触摸正在加热的部件。
危险：请勿触摸正在加热的部件。

第1章 关于手册

为了安全使用MR-JET系列，请熟读MR-JET用户手册。

1.1 MR-JET相关手册
本资料就MR-JET伺服放大器的安装进行说明。请咨询营业窗口。
此外，安装保护装置时，还需具备本资料未详细记载的专业技能。

1.2 本资料的目的
本资料以机器制造商的技术人员及操作人员为对象，就MR-JET伺服放大器的安全操作进行说明。关于本产品的详细信息，请参阅MR-JET用户手册。

第2章 关于安全

本章就用户安全及机器装置操作人员的安全进行说明。开始安装前，应熟读本章内容。此外，为了安全正确地使用产品，本资料列出了以下重要的特别警告。

警告 表示错误操作可能造成危险后果，导致死亡或重伤事故。

注意 表示错误操作可能造成危险后果，导致中度伤害或轻伤。

在本资料中，将会造成设备损失的注意事项及其它功能等的注意事项作为“要点”进行区分。

2.1 专业技术人员
MR-JET伺服放大器的安装务必由专业技术人员进行。专业技术人员须符合以下全部条件的人员。

- (1) 接受过适当技术培训、能够从事电气设备相关业务的人员，或基于经验能够事前避免危险的人员。
- (2) 熟读、熟知本资料及与安全控制系统连接的保护装置（例：光幕）的操作手册的人员。

2.2 装置的用途
MR-JET伺服放大器遵循以下的规格。
* IEC/EN 61800-5-1/GB 12668.501、IEC/EN/KN 61800-3/GB 12668.3

2.3 正确使用方法
请在规格范围内使用MR-JET伺服放大器。关于电压、温度等规格，请参阅MR-JET用户手册。包括本装置的安装及设置在内，通过上述以外的方法使用装置、或对装置进行某些改造的情况下，一旦出现问题，三菱电机株式会社（本公司）将不接受任何形式的赔偿请求。

警告 请勿在切断电源后立刻触摸模块及端子部，否则可能会导致触电。
电容器放电时间：15分钟。

2.3.1 外围设备及电线选定
根据IEC/EN/UL 61800-5-1及CSA C22.2 No. 274进行选定。

(1) 现场接线及压接工具
下表所示为75 °C/额定纹线 [AWG] 与压接端子选定符号。

伺服放大器 *	75 °C/60 °C 绞线 [AWG]			记号	伺服放大器侧压接端子		厂商名称
	L1/L2/L3/φ	P+/C	U/V/W/φ		压接端子	适用工具	
MR-JET-10G/ MR-JET-20G/ MR-JET-40G/ MR-JET-70G/ MR-JET-100G/ MR-JET-200G (三)	14/14:a	14/14	14/14	a	R2-4	YHT-2210	JST (J.S.T. Mfg. Co., Ltd.)
MR-JET-200G (单)/MR-JET-300G	12/12:b	-	-	b	3, 5-4	YHT-2210	-

*1 应根据伺服电机的额定输出选定电线尺寸。表中的数值是基于伺服放大器的额定输出得出的尺寸。
*2 表中的“(单)”表示输入单相AC 200 V电源，“(三)”表示输入三相AC 200 V电源。
*3 压接端子仅可用于接地时的接线。

(2) MCCB和熔断器的选定示例
应使用下表所示的半导体熔丝或无熔丝断路器。表中的半导体熔丝或无熔丝断路器是根据伺服放大器的额定输入输出选定的示例。减小连接到伺服放大器的伺服电机容量时，可使用比表中容量更小的半导体熔丝或无熔丝断路器。关于此处所示的半导体熔丝或无熔丝断路器以外的选定，请参阅MR-JET用户手册（硬件篇）。

伺服放大器（200 V版）*	无熔丝断路器（AC 240 V） SCRR 50 kA	熔丝（700 V） SCRR 100 kA *
MR-JET-10G/ MR-JET-20G/ MR-JET-40G/ MR-JET-70G (三)	NF125-SVU-15A (125 A额定15 A)	170M1408 (10 A)
MR-JET-70G (单)/MR-JET-100G (三)	NF125-SVU-15A (125 A额定15 A)	170M1409 (16 A)
MR-JET-100G (单)/MR-JET-200G (三)	NF125-SVU-15A (125 A额定15 A)	170M1412 (32 A)
MR-JET-200G (单)/MR-JET-300G	NF125-SVU-20A (125 A额定20 A)	170M1413 (40 A)

*1 表中的“(单)”表示输入单相AC 200 V电源，“(三)”表示输入三相AC 200 V电源。
*2 对英属及加拿大的标准时，应使用熔丝。

(3) 电源
伺服放大器可以在中性点接地的星型接线电源中，过电压类别III的条件下使用。用于接口的电源，输入输出应使用经强化绝缘的DC 24 V外部电源。

(4) 接地
为了防止触电，应将伺服放大器的保护接地 (PE) 端子（带有Ⓧ符号的端子）连接到控制柜的保护接地 (PE) 上。将用于接地的电线连接到保护接地 (PE) 端子上时，请勿将两者紧固在一起。连接时，务必1个端子连接1根电线。

(5) 伺服电机过载及过热保护
MR-JET伺服放大器内置有伺服电机过载保护功能。（以伺服放大器额定电流的115 % (full load current) 为基准而定。）
伺服放大器无法检测伺服电机的过热情况。
内部的电子伺服电机过载保护功能不保持过热保护存储器。此外，不是速度感应型。伺服电机需要过热保护。关于适合的连接，请参阅第4章。

2.3.2 对应EU
欧洲CE指令是以统一欧盟成员国之间的规则从而使安全有保障的产品能够顺畅流通为目的而发布的。CE标志是证明制造商的产品符合CE指令的标志，组建了伺服的机械和装置也为CE标志的对象。

(1) EMC要求事项
MR-JET伺服放大器遵守EN 61800-3标准定义的类别C3。输入输出电线（最长10 m。）及编码电缆（最长50 m）应使用屏蔽线，并且应将屏蔽线接地。应在EMC滤波器的二次侧安装浪涌保护器。以下所示为推荐品。

EMC滤波器：COSEL FSB系列、Soshin Electric HF3000C-SB系列
浪涌保护器：Okaya Electric Industries RSPD系列、Soshin Electric LT-CS-WS系列
线性噪声滤波器：三菱电机 FR-B1F

MR-JET系列未设想用于针对家庭建筑物供给低电压的公共通信线路中。在此类线路中使用时，可能会发生无线频率干扰。设置人员必须提供包括所推荐的降噪设备在内的设置及使用指南。为避免信号线的混线风险，建议隔离电源线及信号线。
应使用与伺服放大器安装于同一控制柜的DC电源。请勿在DC电源上连接其它电气设备。

(2) 符合性声明 (DoC)
MITSUBISHI ELECTRIC EUROPE B.V.声明，伺服放大器符合CE指令（机械指令（2006/42/EC）、EMC指令（2014/30/EU）、低电压指令（2014/35/EU）及RoHS指令（2011/65/EU））。关于符合性声明的复印件，请咨询营业窗口。

2.3.3 对应美国/加拿大标准
本伺服放大器遵循UL 61800-5-1、CSA C22.2 No. 274标准设计而成。

- (1) 设置
最小控制柜尺寸为各个MR-JET伺服放大器体积的150 %。此外，应将控制柜内温度设计为60 °C以下。伺服放大器应设置在金属制的控制柜内。此外，应将伺服放大器设置于根据IEC/EN 60204-1规格正确连接了保护接地的控制柜中，应在开放式（UL 50）及8.1节的表中所示的过电压等级的环境下使用。应将伺服放大器设置在污染度2以下的环境中。应使用铜电线作连接用导线。
- (2) 额定短路电流（SCCR）
已通过短路试验确认本伺服放大器适用于最大电压240 V、对象电流100 kA以下的电路。
- (3) 分支电路保护
在美国设置时，分支电路的保护应按照National Electrical Code及当地的规格实施。在加拿大设置时，分支电路的保护应按照Canada Electrical Code及各州的规格实施。

2.3.4 对应韩国标准
本产品遵循电磁法（KC标志）的规定。使用本产品时，应注意下述事项。
이 기기는 업무용 (A급) 전자파적합기기로서 판매자 또는 사용자는 이 점을 주의하시기 바랍니다. 가정외의 지역에서 사용하는 것을 목적으로 합니다.
（本产品为业务用（A级）对应电磁波的设备，销售者和使用者应注意该事项并在家庭以外的场所使用。）
此外，输入使用应EMC滤波器、二次侧的浪涌保护器、铁氧体磁芯及线性噪声滤波器，输出应使用铁氧体磁芯及线性噪声滤波器。

2.4 一般安全保护注意事项及保护措施
应遵守以下事项以确保正确使用MR-JET伺服放大器。
(1) 仅限由具备相关资质的人员及专业技术人员进行系统的设置。
(2) 安装、设置、使用MR-JET伺服放大器时，应遵守各国的适用规格及指令。

- 2.5 残留风险
(1) 与安全相关的所有继电器、传感器等，应使用满足安全规格的产品。
(2) 应对整个装置或整个系统实施所有的风险评估与安全等级证明。
(3) 伺服放大器内部的功率模块发生上下短路故障后，伺服电机轴最多转动0.5转。
(4) 应通过适当方法（设置在控制柜内、使用电缆护理等）保护电缆。
(5) 应根据使用电压确保适当的空间/爬电距离。

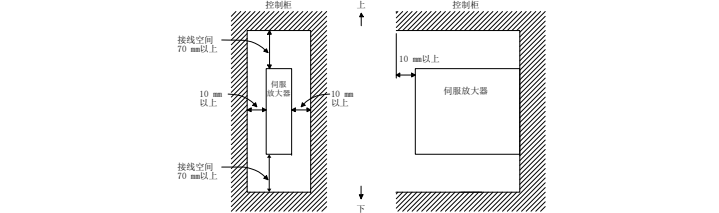
2.6 废弃
无法使用或无法修理的设备，通常应按照各国的废弃物处理规定进行适当处理。（例：European Waste 16 02 14）

2.7 锂电池运输
锂电池需要按照联合国（UN）、国际民用航空组织（ICAO）、国际航空运输协会（IATA）、国际海事组织（IMO）等的方针及规定进行运输。
电池（MR-BAT6V1SET-B及MR-BAT6V1）是使用2个单电池（锂离子电池CR17335A）的电池产品，其不属于联合国关于危险货物运输的规划劝告的危险品（Class9）。

第3章 安装/拆卸

安装方向和间隔

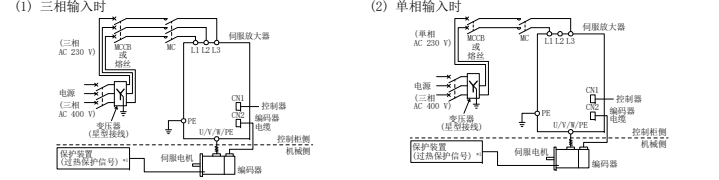
要点
●应按照指定方向进行设置，否则会导致故障。
●为了维持污染度2，应将伺服放大器正确垂直地设置在满足IP54的控制柜内。



第4章 安装与构成图

要点
●按照IEC/EN 60204-1进行安装。对于机器，应通过IEC/EN 60204-1中规定的瞬时停电承受能力为20 ms以上的电源来供电。
●应按照规定的方法及转矩切实地连接电线，否则会导致伺服电机发生预料之外的动作。

以下所示为符合IEC/EN/UL/CSA标准的代表性构成示例。
图中的（○）所示的连接器具与（○）所示的主电路安全断开。

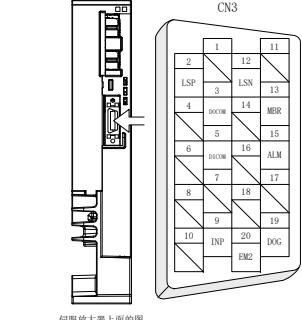


*1 客户应使用热传感器等对伺服电机进行过热保护。

第5章 信号

5.1 信号

作为代表性信号，MR-JET-10G的信号如下所示。关于其它伺服放大器，请参阅MR-JET用户手册（硬件篇）。



第6章 维护与检查

应由专业技术人员进行检查。
修理及更换部件请联系附近的营业窗口。

- 6.1 检查项目
建议定期进行以下检查。
 - (1) 应确认伺服放大器的保护接地（PE）端子的螺丝没有松动。若有松动应对其进行紧固。（紧固转矩：1.2 N·m）
 - (2) 确认伺服电机的轴承、断路器部位等不存在异常声音。
 - (3) 确认电缆没有伤痕或裂痕。应根据使用条件进行定期检查。
 - (4) 确认连接器已确实连接到伺服电机上。
 - (5) 确认电线没有从连接器中跳出。
 - (6) 确认伺服放大器没有灰尘堆积。
 - (7) 确认伺服放大器没有发出异常声音。
 - (8) 确认伺服电机轴与联轴器不存在匹配不良。
 - (9) 确认紧急停止电路可正常动作，例如通过紧急停止开关可即时停止运行并切断电源等。

6.2 部件的检查
部件的更换寿命如下。但是，根据不同的使用方法和环境条件，更换寿命会有变化，发现异常时需要更换。部件更换可委托Mitsubishi Electric System & Service Co., Ltd.。

部件名	寿命标准
平滑电容器	10年*
继电器	电源接通次数、强制停止次数和控制紧急停止次数10万次
冷却风扇	5万小时~7万小时 (7~8年)
电池备份时间 *	约2万小时（装置未通电状态下环境温度20 °C时）
电池使用年限 *	从生产日期起5年

*1 使用MR-JET伺服放大器与构建绝对位置检测系统时需要电池的旋转伺服电机搭配，并使用MR-BAT6V1SET-B电池。关于详细内容及其他电池备份时间，请参阅MR-JET用户手册（硬件篇）。
*2 根据使用条件，电池的寿命可能会缩短。所以即使不连接到伺服放大器上，电池的使用年限也为从生产日期起5年。
*3 在有空气调节的环境下（标高1000 m以下时，环境温度为40 °C以下，标高于1000 m但不超过2000 m时，环境温度为30 °C以下）连续运行时，寿命为10年（三相电源输入）、平滑电容器受振动电流等影响其特性会劣化。电容器的寿命在很大程度上取决于使用寿命和使用条件。

第7章 环境条件

应根据产品的大小、质量正确运输。
电池的运输及操作的详细信息，请参阅MR-JET用户手册（硬件篇）。
应根据用户手册，将伺服放大器及伺服电机设置在能充分承受其质量的牢固场所。
请勿对机器施加过大负载。

	运行	运输	储存
环境温度	0 °C ~ 55 °C (无结露) 等级3K3 (IEC 60721-3-3)	-25 °C ~ 70 °C (无结露) 等级2K3 (IEC 60721-3-2)	-25 °C ~ 70 °C (无结露) 等级1K3 (IEC 60721-3-1)
环境湿度	5 %RH ~ 95 %RH (无凝露)	5 %RH ~ 95 %RH (无凝露)	5 %RH ~ 95 %RH (无凝露)
空气质量	室内（无阳光直射）、无腐蚀性气体、易燃性气体、油漆、灰尘	-	-
标准大气压	标高：2000 m以下 *	运输条件：通过陆地/海上或气压为700 hPa以上的加压机舱内进行运输	气压：700 hPa ~ 1000 hPa (标高：相当于400 m ~ 3000 m)
有间震动时：	10 Hz ~ 57 Hz，位移振幅0.075 mm	-	-
无连续震动时：	57 Hz ~ 150 Hz，加速度振幅9.8 m/s ²	2 Hz ~ 8 Hz，位移振幅 (0-P振幅) 7.5 mm 8 Hz ~ 200 Hz，加速度振幅20 m/s ²	2 Hz ~ 9 Hz，位移振幅 (0-P振幅) 1.5 mm 9 Hz ~ 200 Hz，加速度振幅5 m/s ²
有连续震动时：	10 Hz ~ 55 Hz，加速度振幅5.9 m/s ²	等级2M3 (IEC 60721-3-2)	等级1M2 (IEC 60721-3-1)

*1 关于标高超过1000 m时的使用限制事项，请参阅MR-JET用户手册（硬件篇）。

第8章 技术规格

8.1 MR-JET伺服放大器

项目	MR-JET-10G/ MR-JET-20G/ MR-JET-40G/ MR-JET-70G/ MR-JET-100G/ MR-JET-200G	MR-JET-300G
电源	三相或单相AC 200 V ~ 240 V 50 Hz/60 Hz	三相AC 200 V ~ 240 V 50 Hz/60 Hz
接口 (SELV)	DC 24 V (最小电流：300 mA)	-
控制方式	正弦波PWM控制 电流控制方式	
污染度	2 (IEC/EN 60664-1)	
过电压类别	III (IEC/EN 60664-1)	
防护等级	1 (IEC/EN 61800-5-1)	
额定短路电流 (SCCR)	100 kA	



伺服放大器	变化尺寸 [mm]				质量 [kg]
	W	H	D	Ø	
MR-JET-10G/ MR-JET-20G/ MR-JET-40G	40	168	205	0.8	
MR-JET-70G/ MR-JET-100G	60	168	205	1.6	
MR-JET-200G/ MR-JET-300G	80	168	205	2.1	

伺服放大器	变化尺寸 [mm]					螺栓尺寸
	a	a1	b	c	d	
MR-JET-10G/ MR-JET-20G/ MR-JET-40G	6.8	6.8	183 ± 0.5	6.5	-	M5
MR-JET-70G/ MR-JET-100G	6.8	6.8	183 ± 0.5	6.5	40 ± 0.5	M5
MR-JET-200G/ MR-JET-300G	6.8	6.8	183 ± 0.5	6.5	60 ± 0.5	M5

第9章 用于用户文档的检查清单示例

制造商/安装商MR-JET安装检查清单

在最初的试运行之前，应至少满足以下项目。项目中的规格，制造商/安装商对重要事项负有确认责任。应将此检查清单与机器的相关文件资料一同妥善保管，以便在定期检查时作为参考资料使用。

- 是否符合适用机器的指令/规格。是 []、否 []
- 指令/规格是否包含符合性声明 (DoC) 中。是 []、否 []
- 保护装置是否与所要求的类别一致。是 []、否 []
- 电防保护装置（防触电等）是否有效。是 []、否 []

由专业技术人员实施的最初的试运行及定期检查不能取代检查清单的实施。

[质保]

1. 免费质保期和免费质保范围
如果产品在免费质保期限内发生了因本公司责任而导致的故障或瑕疵（以下统称“故障”）时，本公司将通过销售商或本公司的售后服务公司免费对产品进行修理。但如果需要在国内或海外出差维修时，则要求派遣技术人员的服务人员的实际费用。此外，因故障部件的更换而发生的现场再调试、试运行不属于本公司责任范围。

2. 产品停产后的免费质保期限
（1）本公司在本产品停产后的7年内受理该产品的有偿维修。关于停产的消息将通过本公司销售和售后服务部门等进行通告。
（2）产品停产前，将不再提供产品（包括维修零件）。

3. 售后服务
在海外，由本公司在当地的海外FA中心受理维修业务。但是，请注意各个FA中心的维修条件等可能会有所不同。

4. 机会损失和间接损失等不在质保责任范围内
无论是否在免费质保期限内，本公司对于以下内容都不承担责任。
（1）非本公司责任的故障导致的损失。
（2）因本产品故障而引起用户机会损失、利润损失。
（3）无论本公司能否预防的特殊事件引起的损失和间接损失、事故赔偿、对本公司产品以外的损伤。
（4）用户更换设备、现场机械设备的再调试、运行测试及其他作业的费用。

5. 产品规格的更改
样本、手册及技术资料等所记载的规格如有变更，恕不另行通知。

6. 关于产品的适用范围
（1）在使用本公司伺服设备时，应符合以下条件，即使在AC伺服设备出现问题或故障时也不会导致重大事故，并且应在设备外部系统地配备能应付任何问题或故障的备用设备及失效安全功能。
（2）本公司伺服设备是以一般工业用途为对象设计和制造的通用产品。因此，AC伺服设备不适用于面向各电力公司的核电站及其他发电厂等对公众有较大影响的用途、及面向各铁路公司或行政机关等要求构建特殊质量保证体系的用途。此外，AC伺服设备也不适用于航空航天、医疗、铁路、焚烧、燃料装置、载人运输装置、娱乐设备、安全设备等预计对人身安全有较大影响的用途。
但是，对于上述用途，在用户同意限定用途且无特殊质量要求的条件下，可对其适用性进行研讨讨论，请与本公司服务窗口联系。



MR-JET Servo amplifier
Model
MR-JET-10G_ to MR-JET-300G_

Safety Instructions and Precautions for AC Servos

Country/Region	Sales office	Tel/Fax
USA	Mitsubishi Electric Automation, Inc. 500 Corporate Woods Parkway, Vernon Hills, IL 60061, U.S.A. Tel: +1-847-478-2100 Fax: +1-847-478-2253	
Germany	Mitsubishi Electric Europe B.V. German Branch Mitsubishi Electric Platz 1, 40862 Ratingen, Germany Tel: +49-2102-486-0 Fax: +49-2102-486-120	
China	Mitsubishi Electric Automation (China) Ltd. Mitsubishi Electric Automation Center, No.1388 Hongqiao Road, Shanghai, China Tel: +86-21-2322-3030 Fax: +86-21-2322-3000	
Korea	Mitsubishi Electric Automation Korea Co., Ltd. 7F-9F, Gangseo Hangang Xi-lower A, 401, Yangcheon-ro, Gangseo-Gu, Seoul 07528, Korea Tel: +82-2-3660-9510 Fax: +82-2-3664-8372/8335	
Japan	Mitsubishi Electric Corporation Tokyo Building, 2-7-3, Marunouchi, Chiyoda-ku, Tokyo 100-8310, Japan Tel: +81-3-3218-2111	

- 2.1 Professional engineer
Only professional engineers should mount MR-JET servo amplifiers.
Here, professional engineers should meet all the conditions below.
- Persons who took a proper training of related work of electrical equipment or persons who can avoid risk based on past experience.
 - Persons who have read and familiarized himself/herself with this installation guide and operating manuals for the protective devices (e.g. light curtain) connected to the safety control system.

- 2.2 Applications of the devices
MR-JET servo amplifiers comply with the following standards.
• IEC/EN 61800-5-1/GB 12668.501, IEC/EN/KN 61800-3/GB 12668.3

- 2.3 Correct use
Use the MR-JET servo amplifiers within specifications. Refer to MR-JET User's Manual for specifications such as voltage, temperature, etc. Mitsubishi Electric Co. accepts no claims for liability if the equipment is used in any other way or if modifications are made to the device, even in the context of mounting and installation.

WARNING Risk of electrical shock. Do not touch drive unit or terminals immediately after power-off. Allow approx. 15 minutes for capacitor to discharge.

- 2.3.1 Peripheral device and power wiring
The following are selected based on IEC/EN/UL 61800-5-1, and CSA C22.2 No. 274.

- (1) Power Wiring (local wiring and crimping tool)
The following table shows the stranded wire sizes [AWG] and the crimp terminal symbols rated at 75 °C/60 °C.

Table. Recommended wires

Servo amplifier *	75 °C/60 °C stranded wire [AWG]			Symbol	Servo amplifier-side crimp terminals		Manufacturer
	L1/L2/L3 (3φ)	P+ / C	UV/W/PE (3φ)		Crimp terminal	Applicable tool	
MR-JET-10G_ / MR-JET-20G_ / MR-JET-40G_ / MR-JET-70G_ / MR-JET-100G_ (T)	14/14; a **	14/14	14/14	a	R2-4	YHT-2210	JST (J.S.T. Mfg. Co., Ltd.)
MR-JET-200G_ (S) / MR-JET-300G_	12/12; b **			b	3-5-4	YHT-2210	

*1 Select wire sizes depending on the rated output of the servo motors. The values in the table are sizes based on rated output of the servo amplifiers.
*2 *(S) means 1-phase 200 V AC power input and *(T) means 3-phase 200 V AC power input in the table.
*3 The crimp terminals are used only for grounding

- (2) Selection example of Mccb and fuse
Use the semiconductor fuses or the molded-case circuit breakers shown in the following table. The semiconductor fuses and molded-case circuit breakers in the table are selected examples based on rated I/O of the servo amplifiers. When you select a smaller capacity servo motor to connect it to the servo amplifier, you can also use smaller capacity semiconductor fuses or molded-case circuit breaker than those listed in the table. For the selection of the semiconductor fuses and the molded-case circuit breakers that are not shown in the following table, refer to "MR-JET User's Manual (Hardware)".

Servo amplifier (200 V class) **	Molded-case circuit breaker (240 V AC) SCRR 50 kA	Fuse (700 V) SCCR 100 kA *
MR-JET-10G_ / MR-JET-20G_ / MR-JET-40G_ / MR-JET-70G_ (T)	NF125-SVLU-15A (125 A frame 15 A)	170M140B (10 A)
MR-JET-70G_ (S) / MR-JET-100G_ (T)	NF125-SVLU-15A (125 A frame 15 A)	170M140B (16 A)
MR-JET-100G_ (S) / MR-JET-200G_ (T)	NF125-SVLU-15A (125 A frame 15 A)	170M1412 (32 A)
MR-JET-200G_ (S) / MR-JET-300G_	NF125-SVLU-20A (125 A frame 20 A)	170M1413 (40 A)

*1 *(S) means 1-phase 200 V AC power input and *(T) means 3-phase 200 V AC power input in the table.
*2 Use semiconductor fuses for use in the United States of America and Canada.

- (3) Power supply
This servo amplifier can be supplied from star-connected supply with grounded neutral point of overvoltage category III. For the interface power supply, use an external 24 V DC power supply with reinforced insulation on I/O terminals.

- (4) Grounding
To prevent an electric shock, always connect the protective earth (PE) of the servo amplifier to the protective earth (PE) of the cabinet. Do not connect two grounding cables to the same protective earth (PE) terminal. Always connect cables to the terminals one-to-one. This product can cause a DC current in the protective earth conductor. To protect direct/indirect contact using an earth-leakage current breaker (RCD), only an RCD of type B can be used for the power supply side of the product.

- (5) Motor overload and Over temperature protection
The MR-JET servo amplifiers have a solid-state motor overload protection (Set on the basis of 115% (full load current) rated current of the servo amplifier). Motor Over temperature sensing is not provided by the drive. The internal electronic motor overload protection does not have thermal memory retention and speed sensitive. Integral thermal protection(s) is necessary for the servo motor. Refer to chapter 4 for the proper connection.

- 2.3.2 EU compliance
The EC directives were issued to standardize the regulations of the EU countries and ensure smooth distribution of safety-guaranteed products. The CE marking proves the compliance of the manufacturer with the EC directives, and this marking also applies to machines and equipment incorporating servos.

- (1) EMC requirement
MR-JET servo amplifiers comply with category C3 in accordance with EN 61800-3. As for I/O wires (max. length 10 m) and encoder cables (max. length 50 m), use shielded wires and ground the shields. Install the surge protector on the primary side of the EMC filter. The recommended products are as follows:
EMC filter: COSEL FSB Series or Soshin Electric HF3000C-SZB series
Surge protector: Okaya Electric Industries RSPD series or Soshin Electric LT-CS-WS series
Line noise filter: Mitsubishi Electric FR-B1F

MR-JET Series are not intended to be used on a low-voltage public network which supplies domestic premises; radio frequency interference is expected if used on such a network. The installer shall provide a guide for installation and use, including recommended mitigation devices. To avoid the risk of crosstalk to signal cables, the installation instructions shall either recommend that the power interface cable be segregated from signal cables. Use the DC power supply installed with the amplifiers in the same cabinet. Do not connect the other electric devices to the DC power supply.

- (2) For Declaration of Conformity (DoC)
MITSUBISHI ELECTRIC EUROPE B.V. hereby declares that the servo amplifiers are in compliance with EC directives (Machinery directive (2006/42/EC), EMC directive (2014/30/EU), Low-voltage directive (2014/35/EU), and RoHS directive (2011/65/EU)). For the copy of Declaration of Conformity, contact your local sales office.

- 2.3.3 USA/Canada compliance
This servo amplifier is designed in compliance with UL 61800-5-1 and CSA C22.2 No. 274.

- (1) Installation
The minimum cabinet size is 150 % of each MR-JET servo amplifier's volume. Also, design the cabinet so that the ambient temperature in the cabinet is 55 °C or less. The servo amplifier must be installed in the metal cabinet. Additionally, mount the servo amplifier on a cabinet that the protective earth based on the standard of IEC/EN 60204-1 is correctly connected. For environment, the units should be used in open type (UL 50) and overvoltage category shown in table in section 8.1. The servo amplifier needs to be installed at or below pollution degree 2. For connection, use copper wires.
- (2) Short-circuit current rating (SCCR)
Suitable For Use On A Circuit Capable Of Delivering Not More Than 100 kA rms Symmetrical Amperes, 240 Volts Maximum.
- (3) Branch circuit protection
For installation in United States, branch circuit protection must be provided, in accordance with the National Electrical Code and any applicable local codes. For installation in Canada, branch circuit protection must be provided, in accordance with the Canada Electrical Code and any applicable provincial codes.

2.3.4 South Korea compliance
This product complies with the Radio Wave Law (KC mark). Please note the following to use the product. 이 기기는 엄격함 (A급) 전자파적합기기로서 판매자 또는 사용자는 이 점을 주의하시기 바라며, 가정외의 지역에서 사용하는 것을 목적으로 합니다. (The product is for business use (Class A) and meets the electromagnetic compatibility requirements. The seller and the user must note the above point, and use the product in a place except for home.) In addition, use an EMC filter, surge protector, ferrite core, and line noise filter on the primary side for inputs. Use a ferrite core and line noise filter for outputs.

- 2.4 General cautions for safety protection and protective measures
Observe the following items to ensure proper use of the MR-JET servo amplifiers.

- Only qualified personnel and professional engineers should perform the installation of systems.
- When mounting, installing, and using the MR-JET servo amplifier, always observe the standards and directives applicable in the respective countries.

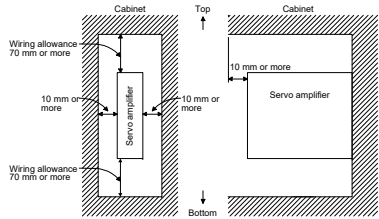
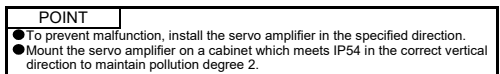
- 2.5 Residual risk
- Be sure that all safety related switches, relays, sensors, etc., meet the required safety standards.
 - Perform all risk assessments and safety level certification to the machine or the system as a whole.
 - If the upper and lower power module in the servo amplifier are shorted and damaged simultaneously, the servo motor may make a half revolution at a maximum.
 - Protect the cables with appropriate ways (routing them in a cabinet, using a cable guard, etc.).
 - Keep the required clearance/creepage distance depending on voltage you use.

2.6 Disposal
Disposal of unusable or irreparable devices should always occur in accordance with the applicable country-specific waste disposal regulations. (Example: European Waste 16 02 14)

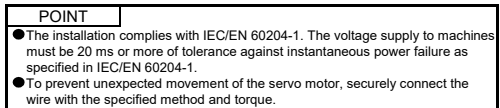
2.7 Lithium battery transportation
To transport lithium batteries, take actions to comply with the instructions and regulations such as the United Nations (UN), the International Civil Aviation Organization (ICAO), and the International Maritime Organization (IMO).

The batteries (MR-BAT6V1SET-B and MR-BAT6V1) are assembled batteries from two batteries (lithium metal battery CR17335A) which are not subject to the dangerous goods (Class 9) of the UN Recommendations.

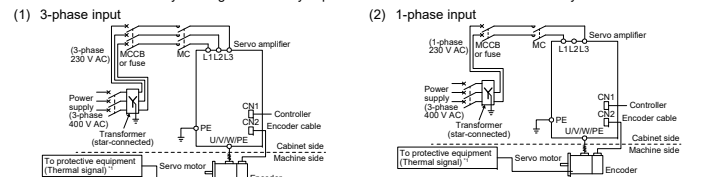
3. Mounting/dismounting
Installation direction and installation



4. Electrical Installation and configuration diagram



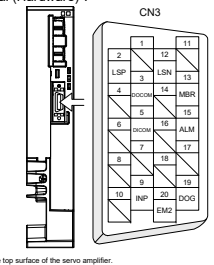
The following shows representative configuration examples to conform to the IEC/EN/UL/CSA standards. The connectors described by rectangles are safely separated from the main circuits described by circles.



*1 Please use a thermal sensor, etc. for thermal protection of the servo motor.

5. Signals

5.1 Signal
The following shows MR-JET-10G signals as a typical example. For other servo amplifiers, refer to "MR-JET User's Manual (Hardware)".



Symbol	Device	Connector	Pin No.
EM2	Forced stop 2	CN3	20
LSP	Forward rotation stroke end		2
LSN	Reverse rotation stroke end		12
DOG	Proximity dog		19

Symbol	Device	Connector	Pin No.
MBR	Electromagnetic brake interlock	CN3	13
INP	In-position		9
ALM	Malfunition		15

Symbol	Device	Connector	Pin No.
DICOM	Digital I/F power supply input	CN3	5
DOCOM	Digital I/F common		3
SD	Shield		Plate

The top surface of the servo amplifier.

6. Maintenance and service
Only qualified personnel should attempt inspections.
For repair and parts replacement, contact your local sales office.

- 6.1 Inspection items
It is recommended that the following points periodically be checked.
- Check for loose screws on the protective earth (PE) terminal. Retighten any loose screws. (tightening torque: 1.2 N·m)
 - Servo motor bearings, brake section, etc. for unusual noise.
 - Check the cables and the like for scratches or cracks. Perform periodic inspection according to operating conditions.
 - Check that the connectors are securely connected to the servo motor.
 - Check that the wires are not coming out from the connector.
 - Check for dust accumulation on the servo amplifier.
 - Check for unusual noise generated from the servo amplifier.
 - Check the servo motor shaft and coupling for connection.
 - Make sure that the emergency stop circuit operates properly such that an operation can be stopped immediately and a power is shut off by the emergency stop switch.

6.2 Parts having service life
Service life of the following parts is listed below. However, the service life varies depending on operation and environment. If any fault is found in the parts, they must be replaced immediately regardless of their service life. For parts replacement, please contact your local sales office.

Part name	Life guideline
Smoothing capacitor	10 years *
Relay	Number of power-on, forced stop and controller forced stop times: 100,000 times
Cooling fan	50,000 hours to 70,000 hours (7 years to 8 years)
Battery backup time *	Approximately 20,000 hours (equipment power supply: off, ambient temperature: 20 °C)
Battery life *	5 years from date of manufacture

*1 When MR-JET servo amplifier is being used in combination with a rotary servo motor that requires battery to configure an absolute position detection system, and if being used with MR-BAT6V1SET-B. For details and other battery backup time, refer to "MR-JET User's Manual (Hardware)".

*2 Quality of the batteries degrades by the storage condition. The battery life is 5 years from the production date regardless of the connection status. *3 If a 3-phase power supply is used, the service life of the capacitor is 10 years under continuous operation in air-conditioned environments (ambient temperatures of 40 °C or less at altitudes of up to 1000 m and 30 °C or less at altitudes of up to 2000 m). The characteristic of smoothing capacitor is deteriorated due to ripple currents, etc. The service life of the capacitor greatly varies depending on ambient temperatures and operating conditions.

7. Environment

Transport the products correctly according to their mass.
For detailed information on transportation and handling of the battery, refer to "MR-JET User's Manual (Hardware)".
Install the product in a load-bearing place of servo amplifier and servo motor in accordance with the User's manual.
Do not put excessive load on the machine.

When you keep or use it, please fulfill the following environment.

	Operation	Transportation	Storage
Ambient temperature	0 °C to 55 °C (non-freezing) Class 3K3 (IEC 60721-3-3)	-25 °C to 70 °C (non-freezing) Class 2K3 (IEC 60721-3-2)	-25 °C to 70 °C (non-freezing) Class 1K3 (IEC 60721-3-1)
Ambient humidity	5 %RH to 95 %RH (non-condensing)	5 %RH to 95 %RH (non-condensing)	5 %RH to 95 %RH (non-condensing)
Ambience	Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist or dust		
Altitude/ atmospheric pressure	Altitude: Max. 2000 m *	Transportation conditions: Overland/sea transportation, or transporting by an airplane whose cargo compartment is pressurized at 700 hPa or higher	Atmospheric pressure: 700 hPa to 1050 hPa (Equivalent to altitudes from -400 m to 3000 m)
Vibration resistance	Under intermittent vibration: 10 Hz to 57 Hz, displacement amplitude 0.075 mm 57 Hz to 150 Hz, acceleration amplitude 9.8 m/s² Class 3M1 (IEC 60721-3-3) Under continuous vibration: 10 Hz to 55 Hz, acceleration amplitude 5.9 m/s²	2 Hz to 8 Hz, displacement amplitude (single amplitude) 7.5 mm 8 Hz to 200 Hz, acceleration amplitude 20 m/s² Class 2M3 (IEC 60721-3-2)	2 Hz to 9 Hz, displacement amplitude (single amplitude) 1.5 mm 9 Hz to 200 Hz, acceleration amplitude 5 m/s² Class 1M2 (IEC 60721-3-1)

*1 For the restrictions on the use of this product at altitude exceeding 1000 m, refer to MR-JET User's Manual (Hardware).

8. Specifications

8.1 MR-JET servo amplifier

Item	MR-JET-10G_ / MR-JET-20G_ / MR-JET-40G_ / MR-JET-70G_ / MR-JET-100G_ / MR-JET-200G_ / MR-JET-300G_
Power supply	Line voltage: 3-phase or 1-phase 200 V AC to 240 V AC, 50 Hz / 60 Hz Interface (SELV): 24 V DC (required current capacity: 300 mA)
Control method	Sine-wave PWM control, current control method
Pollution degree	2 (IEC/EN 60664-1)
Overvoltage category	III (IEC/EN 60664-1)
Protective class	I (IEC/EN 61800-5-1)
Short-circuit current rating (SCCR)	100 kA

8.2 Dimensions/mounting hole process drawing

Servo amplifier	Variable dimensions [mm]			Mass [kg]
	W	H	D	
MR-JET-10G_ / MR-JET-20G_ / MR-JET-40G_	40	168	205	0.8
MR-JET-70G_ / MR-JET-100G_	60	168	205	1.6
MR-JET-200G_ / MR-JET-300G_	80	168	205	2.1

Servo amplifier	Variable dimensions [mm]					Screw size
	a	a1	b	c	d	
MR-JET-10G_ / MR-JET-20G_ / MR-JET-40G_	6.8	6.8	183 ± 0.5	6.5	40 ± 0.5	M5
MR-JET-70G_ / MR-JET-100G_	6.8	6.8	183 ± 0.5	6.5	60 ± 0.5	M5
MR-JET-200G_ / MR-JET-300G_	6.8	6.8	183 ± 0.5	6.5	60 ± 0.5	M5

9. Check list for user documentation

MR-JET installation checklist for manufacturer/installer
The following items must be satisfied by the initial test operation at least. The manufacturer/installer must be responsible for checking the standards in the items.
Maintain and keep this checklist with related documents of machines to use this for periodic inspection.

- Is it based on direct/standard applied to the machine? Yes No
- Is direct/standard contained in Declaration of Conformity (DoC)? Yes No
- Does the protection instrument conform to the category required? Yes No
- Are electric shock protective measures (protective class) effective? Yes No

Checking the items will not be instead of the first test operation or periodic inspection by professional engineers.

[Warranty]

1. Warranty period and coverage
We will repair any failure or defect hereinafter referred to as "failure" in our FA equipment hereinafter referred to as the "Product" arisen during warranty period at no charge due to causes for which we are responsible through the distributor from which you purchased the Product or our service provider. However, we will charge the actual cost of dispatching our engineer for an on-site repair work on request by customer in Japan or overseas countries. We are not responsible for any on-site readjustment and/or trial run that may be required after a defective unit are repaired or replaced.

[Term]

For terms of warranty, please contact your original place of purchase.

[Limitations]

- You are requested to conduct an initial failure diagnosis by yourself, as a general rule. It can also be carried out by us or our service company upon your request and the actual cost will be charged. However, it will not be charged if we are responsible for the cause of the failure.
 - This limited warranty applies only when the condition, method, environment, etc. of use are in compliance with the terms and conditions and instructions that are set forth in the instruction manual and user manual for the Product and the caution label affixed to the Product.
 - Even during the term of warranty, the repair cost will be charged on you in the following cases.
 - a failure caused by your improper storing or handling, carelessness or negligence, etc., and a failure caused by your hardware or software problem
 - a failure caused by any alteration, etc. to the Product made on your side without our approval
 - a failure which may be regarded as avoidable, if your equipment in which the Product is incorporated is equipped with a safety device required by applicable laws and has any function or structure considered to be indispensable according to a common sense in the industry
 - a failure which may be regarded as avoidable if consumable parts designated in the instruction manual, etc. are duly maintained and replaced
 - any replacement of consumable parts (battery, fan, smoothing capacitor, etc.)
 - a failure caused by external factors such as inevitable accidents, including without limitation fire and abnormal fluctuation of voltage, and acts of God, including without limitation earthquake, lightning and natural disasters
 - a failure generated by an unforeseeable cause with a scientific technology that was not available at the time of the shipment of the Product from our company
 - any other failures which we are not responsible for or which you acknowledge we are not responsible for
2. Term of warranty after the stop of production
 - We may accept the repair at charge for another seven (7) years after the production of the product is discontinued. The announcement of the stop of production for each model can be seen in our Sales and Service, etc.
 - Please note that the Product (including its spare parts) cannot be ordered after its stop of production.
 - Service in overseas countries
Our regional FA Center in overseas countries will accept the repair work of the Product. However, the terms and conditions of the repair work may differ depending on each FA Center. Please ask your local FA Center for details.
4. Exclusion of loss in opportunity and secondary loss from warranty liability
Regardless of the gratis warranty term, Mitsubishi shall not be liable for compensation to:
 - Damages caused by any cause found not to be the responsibility of Mitsubishi.
 - Loss in opportunity, lost profits incurred to the user by Failures of Mitsubishi products.
 - Special damages and secondary damages whether foreseeable or not, compensation for accidents, and compensation for damages to products other than Mitsubishi products.
 - Replacement by the user, maintenance of on-site equipment, start-up test run and other tasks.
5. Change of Product specifications
Specifications listed in our catalogs, manuals or technical documents may be changed without notice.

6. Application and use of the Product
 - For the use of our AC Servo, its applications should be those that may not result in a serious damage even if any failure or malfunction occurs in AC Servo, and a backup or fail-safe function should operate on an external system to AC Servo when any failure or malfunction occurs.
 - Our AC Servo is designed and manufactured as a general purpose product for use at general industries. Therefore, applications substantially influential on the public interest for such as atomic power plants and other power plants of electric power companies, and also which require a special quality assurance system, including applications for railway companies and government or public offices are not recommended, and we assume no responsibility for any failure caused by these applications when used. In addition, applications which may be substantially influential to human lives or properties for such as airlines, medical treatments, railway service, incineration and fuel systems, man-operated material handling equipment, entertainment machines, safety machines, etc. are not recommended, and we assume no responsibility for any failure caused by these applications when used. We will review the acceptability of the abovementioned applications, if you agree not to require a specific quality for a specific application. Please contact us for consultation.

WARNING Indicates that incorrect handling may cause hazardous conditions, resulting in death or severe injury.

CAUTION Indicates that incorrect handling may cause hazardous conditions, resulting in minor or slight injury.

In this installation guide, cautionary items such as precautions that may lead to property damages, and instructions for other functions are classified as "POINT".