ORIENTAL MOTOR

HM-9177

使用说明书

V系列

无激磁动作型　附电磁刹车马达

c UL us　VDE　CE

English version follows Chinese version

竭诚感谢您对本公司产品的惠顾。
本使用说明书就产品的使用方法与安全注意事项进行说明。
・请仔细阅读使用说明书，并在产品使用中注意安全。
・阅读完使用说明书后，务必请将其保存在合适的地方，以便随时可以查阅。

前言

■使用前

请由有适当资格的人使用本产品。
使用前，请仔细阅读“安全注意事项”，以便正确使用。
需要对本产品内部进行检查和修理时，请与东方马达株式会社香港分公司联系。
本产品是作为组装入一般产业机器中使用的配套机器而设计的。请勿将其用于其他用途。无视本忠告而造成的损害，本公司将不承担任何赔偿责任，特此声明，敬请见谅。

■产品概要

V系列产品是与精度高、使用寿命长的减速机对应的马达。包括已与减速机组装完毕的组合型和可与另售的减速机搭配使用的齿轮轴型两种。

■规格・CE标记

本马达根据下述规格进行设计和检验，并已取得了认证。认证品名为马达品名。
VDE认证为马达单体的认证（不包括90W）。
单相马达已在与附属的电容器组合的状态下通过了 EN60950 Annex B.8 项的试验。
*马达符合低电压指令。

・认证规格　UL2111、UL1004、CSA C22.2 No.100、CSA C22.2 No.77、EN60950
认证规格档案 No.
马达：UL File No.E64199(6W)、E64197(15W～90W)
VDE Licence No.114919ÜG(6W)、No.6751ÜG、6752ÜG或 6753ÜG(15W～60W)
电容器：UL File No.E83671(CYWT2)、
VDE Licence No.114747（仅限电容器额定电压450VAC）
电容器套：UL File No.E56078(YDTU2)

・适合规格　EN60034-1、EN60034-5、IEC60034-11、IEC60664-1
上述规格所要求的超负载运转试验及拘束温度上升试验已在附减速机的状态下进行。

・安装条件　过电压范围Ⅱ、污染度２、等级Ⅰ机器（适用规格EN/IEC规格）
因机器而异，若要求过电压范围Ⅲ、污染度３的规定值时，请将马达安装在相当于IP54的箱体内，并通过绝缘变压器向马达提供额定电压。

安全注意事项

这里提示的注意事项，其目的是为了使您能安全、正确地使用产品，并防患于未然，以免造成危害和损伤。请您对其内容充分理解以后再使用本产品。

⚠警告　在操作时违反本警告事项所示的内容要求，就有可能导致人员死亡或负重伤。

⚠注意　在操作时违反本注意事项所示的内容要求，就有可能导致人员受伤或造成物品损坏。

重要　为了使您能正确使用产品，在正文的相关使用项目中记载着请用户务必遵守的事项。

⚠警告

●请勿在爆炸性环境、可燃性气体环境、腐蚀性环境、容易沾水的场所以及可燃物的附近使用本产品，否则有可能引起火灾、触电或致伤。
●安装、接线、运转・操作、检查・故障诊断作业请由有适当资格的人实施，否则有可能引起火灾、触电或致伤。
●请勿在通电状态下进行移动、安装、接线和检查作业。请切断电源后再进行作业，否则有可能引起触电。
●电磁刹车用于保持可动部及马达的位置，请勿作为刹车、安全刹车使用，否则有可能致伤或造成设备破损。
●马达的过热保护装置(Thermal Protector)动作时，请切断电源，否则当过热保护装置自动复位时，马达将会突然起动，有可能致伤或造成设备破损。
●马达的过热保护装置（Thermal Protector）动作时，负载不被保持，请另外采取安全措施，否则有可能致伤或造成设备破损。
●马达只能使用在等级Ⅰ的机器上，否则有可能引起触电。
●请将马达安装在框体内，否则有可能引起触电或致伤。
●安装马达时，请采取措施使手无法触及马达，或加以接地，否则有可能引起触电。
●电源输入电压请务必控制在额定范围内，否则有可能引起火灾或触电。
●请按照接线图确实地进行接线，否则有可能引起火灾或触电。
●请勿强行弯曲、拉扯或夹住电缆线，否则有可能引起火灾或触电。
●附属的电容器的接线端子请进行绝缘处理，否则有可能引起触电。
●停电时，请切断电源，否则恢复供电后马达会突然起动，有可能致伤或造成设备破损。
●在切断电源后短时间内（30秒钟之内）请勿触摸电容器的接线端子，否则有可能因残留电压而引起触电。
●请勿对马达进行拆解或改造，否则有可能引起触电或致伤。

⚠注意

●使用马达时，请勿超过其规格值，否则有可能引起触电、致伤或造成设备破损。
●运转中或停止后短时间内，请勿碰触马达，否则有可能因马达表面的高温而引起烫伤。
●搬运时请勿利用马达出力轴和马达的导线，否则有可能致伤。
●马达周围请勿堆放可燃物，否则有可能引起火灾或致伤。
●马达周围请勿堆放妨碍通风的障碍物，否则有可能造成设备破损。
●运转中请勿碰触旋转部(出力轴、散热风扇)，否则有可能致伤。
●出现异常时，请立即切断电源，否则有可能引起火灾、触电或致伤。
●马达即使处于正常的运转状态，有时其表面温度也会超过70℃。人有可能接近运转中的马达时，请在显著位置张贴如下图所示的警告标志，否则有可能引起烫伤。



警告标志

●马达报废时，请作为产业废弃物处理。

准备

■产品的确认验货

打开包装箱后，请确认下述产品是否齐全。

若有缺件或破损，请与东方马达株式会社香港分公司联系。

- 马达　1台
- 平行键　1个（仅限组合型）
- 安装用螺丝组　1套（仅限组合型）
  安装用螺丝、六角螺帽、平垫圈、弹簧垫圈　各4个
- 电容器　1个（仅单相马达）
- 电容器套　1个（仅单相马达）
- 使用说明书　1册

■品名的确认

请通过标记于产品上的品名确认产品是否相符。

＊1 品名的□中填入以下文字。

组合型…表示减速机减速比的数字

齿轮轴型 6W～25W…… **GV**

齿轮轴型 40W、60W…… **GVH**

齿轮轴型 90W…… **GVR**

＊2 减速机品名的□中填入表示减速机减速比的数字。

●单相马达

品名*1	马达品名	电容器品名	减速机品名*2
VHR206AM-□JG	**VHR206AM-GV**	**CH45FAUL**	**GV2G□**
VHR206AM-□UG	**VHR206AM-GV**	**CH35FAUL**	
VHR206CM-□JG	**VHR206CM-GV**	**CH10BFAUL**	
VHR206CM-□EG	**VHR206CM-GV**	**CH08BFAUL**	
VHR315AM-□JG	**VHR315AM-GV**	**CH75CFAUL**	**GV3G□**
VHR315AM-□UG	**VHR315AM-GV**	**CH60CFAUL**	
VHR315CM-□JG	**VHR315CM-GV**	**CH18BFAUL**	
VHR315CM-□EG	**VHR315CM-GV**	**CH15BFAUL**	
VHR425AM-□JG	**VHR425AM-GV**	**CH100CFAUL**	**GV4G□**
VHR425AM-□UG	**VHR425AM-GV**	**CH80CFAUL**	
VHR425CM-□JG	**VHR425CM-GV**	**CH25BFAUL**	
VHR425CM-□EG	**VHR425CM-GV**	**CH20BFAUL**	
VHR540AM-□JG	**VHR540AM-GVH**	**CH160CFAUL**	**GVH5G□**
VHR540AM-□UG	**VHR540AM-GVH**	**CH120CFAUL**	
VHR540CM-□JG	**VHR540CM-GVH**	**CH40BFAUL**	
VHR540CM-□EG	**VHR540CM-GVH**	**CH35BFAUL**	
VHR560AM-□JG	**VHR560AM-GVH**	**CH250CFAUL**	
VHR560AM-□UG	**VHR560AM-GVH**	**CH200CFAUL**	
VHR560CM-□JG	**VHR560CM-GVH**	**CH60BFAUL**	
VHR560CM-□EG	**VHR560CM-GVH**	**CH50BFAUL**	
VHR590AM-□JG	**VHR590AM-GVR**	**CH350CFAUL**	**GVR5G□**
VHR590AM-□UG	**VHR590AM-GVR**	**CH300CFAUL**	
VHR590CM-□JG	**VHR590CM-GVR**	**CH80BFAUL**	
VHR590CM-□EG	**VHR590CM-GVR**	**CH70BFAUL**	

●三相马达

品名*1	马达品名	减速机品名*2
VHI425SM-□G	**VHI425SM-GV**	**GV4G□**
VHI540SM-□G	**VHI540SM-GVH**	**GVH5G□**
VHI560SM-□G	**VHI560SM-GVH**	
VHI590SM-□G	**VHI590SM-GVR**	**GVR5G□**

安装

■安装场所

马达是为组装到机器上使用而设计、制造的。

请将马达安装在通风良好、检查方便的下述场所。

- 安装在室内的框体内（请开设换气孔）
- 使用环境温度 －10℃～＋40℃（不得冻结）
  100/200V运转时为 －10℃～＋50℃
- 使用环境湿度　85%以下（不得结露）
- 无爆炸性气体、有害气体(硫化氢气体等)及液体
- 无直射阳光照射
- 尘埃、铁粉等较少
- 不会沾染水（风雨或水滴）、油（油滴）及其他液体
- 盐分较少
- 无连续性振动和过度冲击
- 电磁杂讯（焊接机、动力机器等）较少
- 无放射性物质、磁场，且非真空
- 海拔1000m以下

■马达的安装方法

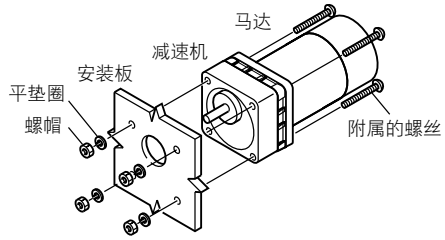
齿轮轴型马达与减速机(另售)组装。有关组装的详细说明，请参阅减速机的使用说明书。

90W的马达已在凸缘安装了O型密封圈。马达与减速机组装时请确实安装好O型密封圈，以免损坏，否则减速机内的润滑剂有可能泄漏。

●安装在设备上

请在安装板上开设安装孔，用附属的4支螺丝将马达和减速机固定在安装板上。

齿轮轴型的安装用螺丝组附属在减速机上。



使用附属螺丝时的最大板厚如下表所示。

减速机品名	螺丝规格	安 装 力 矩	适用最大板厚t
GV2G□	M4	1.8N•m (18kgfcm)	5mm
GV3G□、GV4G□	M6	6.4N•m (64kgfcm)	8mm
GVH5G□、GVR5G□	M8	15.5N•m (155kgfcm)	12mm

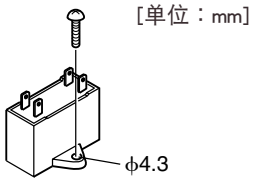
●附散热风扇的马达

安装附散热风扇的马达时，为了避免堵塞马达后部的散热孔，请在风扇罩后部空出10mm以上或开换气孔。

■电容器安装须知（仅单相马达）

请确认电容器的容量与马达铭板上所标注的容量是否一致。

请使用M4的螺丝（未附属）确实安装牢固。

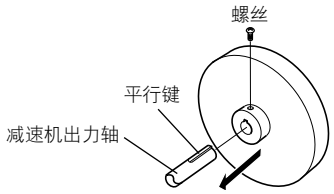


重要

- 电容器的螺丝的安装力矩请控制在1N･m(10kgfcm)以下，以免损伤安装脚。
- 安装电容器时，请与马达保持10cm以上的距离，否则有可能由于马达产生的热量而缩短电容器的寿命。

■负载的安装

减速机的出力轴外径公差为ｈ7，且为安装传动部件已经过键槽加工。安装传动部件时，出力轴与传动部件间应采用间隙配合。另外，为防止传动部件松动，请用螺丝将平行键固定在出力轴上。



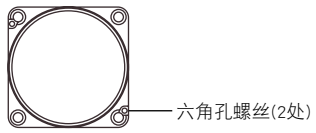
重要

请勿使用锤子等对减速机出力轴施加强力，否则有可能造成出力轴、轴承的破损。

■组合型的减速机的更换

将固定马达和减速机的六角孔螺丝（２处）拧下后，即可将减速机拆下。组装时，请参阅另售的减速机的使用说明书。

从马达外壳侧的观测图

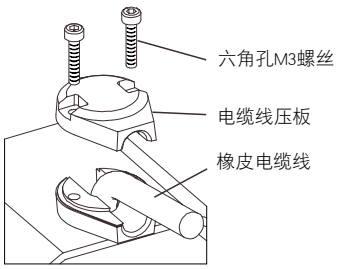


减速机品名	螺丝规格
GV2G□、GV3G□ GV4G□	M2.6
GVH5G□、GVR5G□	M3

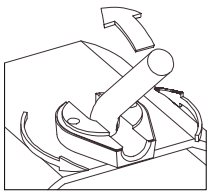
■变更橡皮电缆线方向的方法

60W、90W马达的橡皮电缆线的引线方向出厂时设定为马达出力轴方向。引线方向可转动180°。请按下图所表示里变更引线方向。

①拆除电缆线压板的螺丝和电缆线压板上部，将橡皮电缆线扳到相反侧。

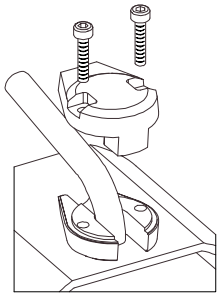


②将电缆线压板旋转180°。



③安装电缆线压板上部并用螺丝固定。

安装力矩：0.5～0.7N･m(5～7kgfcm)



连接

・请按「接线图」所示进行连接。

・马达导线与电源连接部、电容器端子连接部等所有连接部分须作绝缘处理。

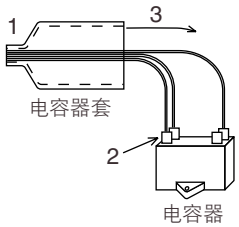
进行电容器端子连接部的绝缘处理时，请使用附属的电容器套。

电容器套的安装顺序

１．首先将导线穿过电容器套。

２．将导线连接端子。

３．套上电容器套。



■接线图

马达运转方向为从马达出力轴上目测到的方向。顺时针方向为ＣＷ，逆时针方向为ＣＣＷ。

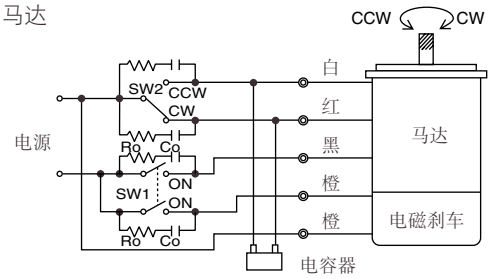
［关于齿轮出力轴的运转方向］

由于齿轮减速比的不同，齿轮出力轴的运转方向有可能与马达出力轴的运转方向相反。

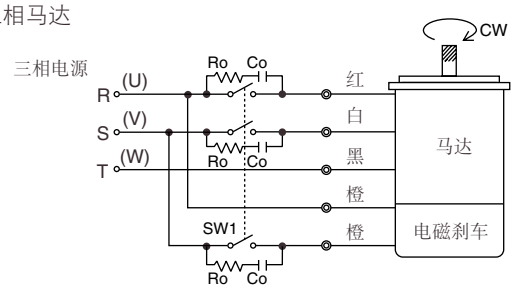
请先确认所使用的齿轮出力轴的运转方向，再确定马达的运转方向，然后接线。

减速机品名	减　速　比	
	与马达轴方向相同	与马达轴方向相反
GV2G□、GV3G□	5～25	30～120
GV4G□	150～360	
GVH5G□	5～18	25～100
	120～300	
GVR5G□	5～15	18～60
	75～180	

●单相马达



●三相马达



［6～40W型］

开关号码	开关的接点容量			备考
	单相100V/110V/115V输入	单相200V/220V/230V输入	三相200V/220V/230V输入	
ＳＷ1	ＡＣ125Ｖ 3Ａ以上	ＡＣ250Ｖ 1.5Ａ以上	ＡＣ250Ｖ 1.5Ａ以上	连动
ＳＷ2			—	—

［60W，90W型］

开关号码	开关的接点容量			备考
	单相100V/110V/115V输入	单相200V/220V/230V输入	三相200V/220V/230V输入	
ＳＷ1	ＡＣ125Ｖ 5Ａ以上	ＡＣ250Ｖ 5Ａ以上	ＡＣ250Ｖ 5Ａ以上	连动
ＳＷ2			—	—

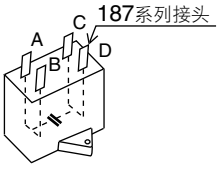
为保护接点，请按照接线图连接吸收突波电压用的CR电路()。

Ro=5～200Ω
Co=0.1～0.2μF 200WV

本公司备有选购配件。选购配件品名**EPCR1201-2**(另售)

重要
60W、90W型进行橡皮电缆线表皮剥离处理时，请勿损伤里面的导线。

■电容器接线方法（仅单相马达附属）



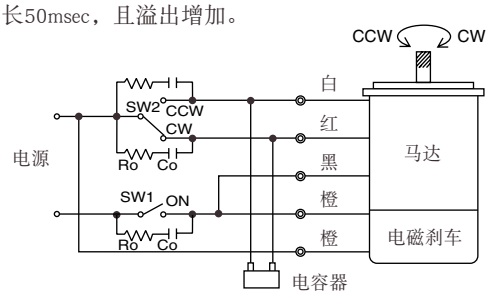
电容器内部的接线如左图所示。
电容器的端子在电气上为2个端子。
A和B、C和D已在内部连接。

使用简易的压着端子连接时，请使用以下的压着端子。
Tyco Electronics AMP 公司制品
AMP FASTON Terminal187 系列
请在 1 个端子上连接 1 根导线。

■接线的简化

重要
采用上下驱动运转方式及三相马达的场合接线不能简化。

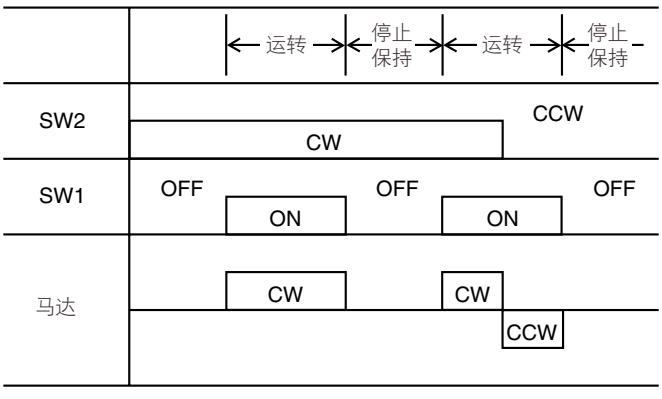
用1个开关（接点）操作马达的「运转 / 停止」和电磁刹车的「运转 / 停止」时，请按照下图所示进行接线。但是，由于马达的磁能作用于电磁刹车的线圈，所以制动时间会比基本接线（P.3）的制动时间长50msec，且溢出增加。



运转

重要
- 此产品为B种绝缘马达。请注意运转中的马达外壳温度不能超过90℃，否则会缩短线圈及滚珠轴承的使用寿命。马达外壳温度可通过在马达表面固定温度计的方法来测定，亦可使用热敏纸或热电藕来测量。
- 要切换单相马达的运转方向时，请在马达完全停止后再进行切换。若在运转中进行切换，有可能无法切换运转方向，或切换时间很长。
- 单相马达请勿必使用附属的电容器，马达起动后亦必须与电容器保持连接状态。

[SW1与SW2的时序例]
此时序例为基本接线时(P.3)的时序



■运转 / 停止
SW1用来进行马达「运转 / 停止」及电磁刹车「运转 / 停止」的操作。
SW1 ON时，电磁刹车被解除、马达运转；SW1 OFF时，则电磁刹车动作、马达停止。

重要
电磁刹车动作时，由于刹车为摩擦式因此会发出摩擦音，并非异常。

用于上下驱动时，负载有可能滑落，请在确认负载状况后再进行操作。

■运转方向的切换

●单相马达
将SW2扳到CW时按顺时针方向运转，扳到CCW时则按逆时针方向运转。

●三相马达
按照接线图连接时为顺时针方向运转，只要交换U、V、W中任何两根线的连接则为逆时针方向运转。

■其他的操作方法
●加快马达启动时间的方法
提前开放电磁刹车可使马达更快启动。
请在马达启动10msec之前开放电磁刹车。
●马达停止时电磁刹车的开放方法
在2根电磁刹车用导线（橙色）之间通电则电磁刹车被解除，马达可手动启动。

运转额定时间

■感应马达
可以连续运转（连续额定值）。

■可逆马达
可连续运转时间为30分钟(30分钟额定值:在铭板上标有“30min”）。

过热保护功能

本产品具备当马达因某种原因异常发热时能防止马达烧毁的过热保护功能。保护方式有以下两种。

■过热保护装置（马达铭板上记载为ＴＰ及ＴＰ２１１）
当温度上升到规定温度时，内藏的过热保护装置会自动动作，马达则会自然停止。因是自动恢复型，所以当马达温度下降后马达会自动重新运转。检点作业等须在切断电源后实行。

过热保护装置的动作温度　开（断电）……130℃±5℃
关（通电）……82℃±15℃

■阻抗型保护器（铭板上记载为ＺＰ）
当马达发生异常呈拘束状态时，此保护器能增大线圈的阻抗值，抑制电流输入马达以避免烧坏马达线圈。

不能正常动作时的检查要点

马达动作异常时，请按下表进行检点。
若检点结果为全部符合要求但马达无法正常动作时，请向东方马达株式会社咨询。另外，事故发生时请勿自行分解检修，一旦破坏产品事故原状则会妨害检查判定，也可能难以查出确实的事故原因。

现象	确认内容
马达不转或作低速运转	①马达电压是否符合规格要求? ②电源接线是否正确? ③负载是否过大? ④使用端子台或压接端子时，是否有接触不良的现象? ⑤单相马达附属的电容器或与铭板记载要求相符的电容器是否按P.3或P.4的接线图连接? ⑥电磁刹车导线（橙色）是否施加规定电压?
马达时转时停	①电源接线是否正确? ②使用端子台或压接端子时，是否有接触不良的现象? ③单相马达附属的电容器或与铭板记载要求相符的电容器是否按P.3或P.4的接线图连接?
马达反转	①是否按接线图正确接线？请再次参照P.3或P.4的接线图。 ②减速机出力轴的运转方向因减速比的不同而异。请参照P.3「关于齿轮出力轴的运转方向」 ③单相马达附属的电容器或与铭板记载要求相符的电容器是否按P.3或P.4的接线图连接? ④目测方向是否有误？马达运转方向是以目测出力轴运转方向来判断是顺时针方向还是逆时针方向。
马达异常发热（马达外壳温度超过90℃）	①马达电压是否符合规格要求? ②环境温度是否超过规定极限? ③单相马达附属的电容器或与铭板记载要求相符的电容器是否按P.3或P.4的接线图连接?
马达发出异音	①马达与减速机的搭配是否正确？请参照减速机的产品说明书。 ②是否使用与马达同样的齿轮型减速机?

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ORIENTAL MOTOR

HM-9177

OPERATING MANUAL

V Series

Electromagnetic Brake Motors

Thank you for purchasing an Oriental Motor product.
This Operating Manual describes product handling procedures and safety precautions.

- Please read it thoroughly to ensure safe operation.
- Always keep the manual where it is readily available.

Before using the motor

■Introduction

Only qualified personnel should work with the product.
Use the product correctly after thoroughly reading the section “Safety precautions”.
Should you require the inspection or repair of internal parts, contact the Oriental Motor office where you purchased the product.
The product described in this manual has been designed and manufactured for use in general industrial machinery, and must not be used for any other purpose. Oriental Motor Co., Ltd. is not responsible for any damage caused through failure to observe this warning.

■Overview of the product

V series motors—which are suitable for use with high-accuracy, long-life gearheads—are available in two types: a combination type with the motor and gearhead pre-assembled together, and a pinion shaft type that can be combined with a gearhead sold separately.

■Standard and CE marking

Motors are recognized by UL and certified by VDE. Recognized name and certified name are motor model name.
The certificate by VDE is valid only for the motor assembly itself (except for 90 W type). The capacitor is not included in the certificate. However, both the motor assembly and capacitor combined have been tested against and have passed EN60950 Annex B.8.

∗ Voluntary display of the CE mark conforming to the Low Voltage Directives.

- **Standards** UL2111, UL1004, CSA C22.2 No.100, CSA C22.2 No.77, EN60950
  Standards File No.
  Motor: UL File No. E64199 (6 W type), E64197 (15 W ~ 90 W type)
  VDE Licence No.114919ÜG (6 W type), No.6751ÜG, 6752ÜG, or 6753ÜG (15 W ~ 60 W type)
  Capacitor: UL File No. E83671 (CYWT2), VDE Licence No.114747 (Capacitor rated voltage 450 VAC only)
  Capacitor cap: UL File No. E56078 (YDTU2)
- **Applications for standard** EN60034-1, EN60034-5, IEC60034-11, IEC60664-1

A Running Heating Test and a Locked-Rotor Test have been conducted with a gearhead instead of the radiation plate.

- **Installation conditions** Overvoltage category II, Pollution degree 2, Class I equipment (For EN/IEC standards)

When the machinery to which the motor is mounted requires overvoltage category III and pollution degree 3 specifications, install the motor in a cabinet that complies with IP54 and connect to power supply via an isolation transformer.

Safety precautions

The precautions described below are intended to prevent danger or injury to the user and other personnel through safe, correct use of the product. Use the product only after carefully reading and fully understanding these instructions.

⚠Warning Handling the product without observing the instructions that accompany a “Warning” symbol may result in serious injury or death.

⚠Caution Handling the product without observing the instructions that accompany a “Caution” symbol may result in injury or property damage.

Note The items under this heading contain important handling instructions that the user should observe to ensure safe use of the product.

⚠Warning

- Do not use the product in explosive or corrosive environments, in the presence of flammable gases, locations subjected to splashing water, or near combustibles. Doing so may result in fire, electric shock or injury.
- Assign qualified personnel the task of installing, wiring, operating/controlling, inspecting and troubleshooting the product. Failure to do so may result in fire, electric shock or injury.
- Do not transport, install the product, perform connections or inspections when the power is on. Always turn the power off before carrying out these operations. Failure to do so may result in electric shock.
- Do not use the electromagnetic brake for stopping or for safety purposes. Using it for purposes other than holding the moving parts and motor in position may cause injury or damage to equipment.
- Turn off the power in the event the overheat protection device (thermal protector) is triggered. Failure to do so may result in injury or damage to equipment, since the motor will start abruptly when the overheat protection device (thermal protector) is automatically reset.
- In the event the overheat protection device (thermal protector) is triggered, the load will not be held in position. A safety device should be provided separately. Failure to do so may result in injury or damage to equipment.
- To prevent the risk of electric shock, use the motor for class I equipment only.
  Motore zur Verwendung in Geräten der Schutzklasse I.
- Install the motor in an enclosures in order to prevent electric shock or injury.
- Install the motor so as to avoid contact with hands, or ground it to prevent the risk of electric shock.
  Die Gehäuse der Motore sind mit einer Schraube und Zahnscheibe sicher mit dem geerdeten Gehäuse des Gerätes zu verbinden.
- Keep the input-power voltage within the specification to avoid fire and electric shock.
- Connect the cables securely according to the wiring diagram in order to prevent fire and electric shock.
- Do not forcibly bend, pull or pinch the cable. Doing so may result in fire and electric shock.
- Be sure to insulate the connection terminal of the capacitor. Failure to do so may result in electric shock.
- Turn off the power in the event of a power failure, or the motor will suddenly start when the power is restored and may cause injury or damage to equipment.
- Do not touch the connection terminal of the capacitor immediately after the power is turned off (for a period of 30 seconds). The residual voltage may cause electric shock.
- Do not disassemble or modify the motor. This may cause electric shock or injury.

⚠Caution

- Do not use the motor beyond its specifications, or electric shock, injury or damage to equipment may result.
- Do not touch the motor during operation or immediately after stopping. The surface is hot and may cause a burn.
- Do not hold the motor output shaft or motor lead wires. This may cause injury.
- Keep the area around the motor free of combustible materials in order to prevent fire or a burn.
- To prevent the risk of damage to equipment, leave nothing around the motor that would obstruct ventilation.
- To prevent bodily injury, do not touch the rotating parts (output shaft, cooling fan) of the motor during operation.
- When an abnormality is noted, turn off the power immediately, or fire, electric shock or injury may occur.
- The motor’s surface temperature may exceed 70°C, even under normal operating conditions. If a motor is accessible during operation, post the warning label shown in the figure in a conspicuous position to prevent the risk of burns.



Warning label

- When disposing of the motor, treat it as ordinary industrial waste.

Preparation

■Checking the product

Upon opening the package, verify that the items listed below are included. Report any missing or damaged items to the branch or sales office from which you purchased the product.

- Motor 1 unit
- Parallel key 1 piece (only for combination type)
- Set of mounting bolts 1 set (only for combination type)
  Mounting screws, Hexagonal nuts, Washer, Spring washer
  4 pieces each
- Capacitor 1 piece (only for single-phase motor)
- Capacitor cap 1 piece (only for single-phase motor)
- Operating manual 1 copy

■Checking the model name

Check the model number against the number indicated on the product.

∗1 The box (□) of the model will be filled with the numeral or letter as shown below.
Combination type···numeral to represent the gear reduction ratio
Pinion shaft type 6 W ~ 25 W···**GV**
Pinion shaft type 40 W, 60 W···**GVH**
Pinion shaft type 90 W·····**GVR**

∗2 The box (□) of the gearhead model will be filled with the numeral to represent the gear reduction ratio.

●Single-phase motors

Model∗1	Motor model	Capacitor model	Gearhead model∗2
VHR206AM-□JG	**VHR206AM-GV**	**CH45FAUL**	**GV2G□**
VHR206AM-□UG	**VHR206AM-GV**	**CH35FAUL**	
VHR206CM-□JG	**VHR206CM-GV**	**CH10BFAUL**	
VHR206CM-□EG	**VHR206CM-GV**	**CH08BFAUL**	
VHR315AM-□JG	**VHR315AM-GV**	**CH75CFAUL**	**GV3G□**
VHR315AM-□UG	**VHR315AM-GV**	**CH60CFAUL**	
VHR315CM-□JG	**VHR315CM-GV**	**CH18BFAUL**	
VHR315CM-□EG	**VHR315CM-GV**	**CH15BFAUL**	
VHR425AM-□JG	**VHR425AM-GV**	**CH100CFAUL**	**GV4G□**
VHR425AM-□UG	**VHR425AM-GV**	**CH80CFAUL**	
VHR425CM-□JG	**VHR425CM-GV**	**CH25BFAUL**	
VHR425CM-□EG	**VHR425CM-GV**	**CH20BFAUL**	
VHR540AM-□JG	**VHR540AM-GVH**	**CH160CFAUL**	**GVH5G□**
VHR540AM-□UG	**VHR540AM-GVH**	**CH120CFAUL**	
VHR540CM-□JG	**VHR540CM-GVH**	**CH40BFAUL**	
VHR540CM-□EG	**VHR540CM-GVH**	**CH35BFAUL**	
VHR560AM-□JG	**VHR560AM-GVH**	**CH250CFAUL**	
VHR560AM-□UG	**VHR560AM-GVH**	**CH200CFAUL**	
VHR560CM-□JG	**VHR560CM-GVH**	**CH60BFAUL**	
VHR560CM-□EG	**VHR560CM-GVH**	**CH50BFAUL**	
VHR590AM-□JG	**VHR590AM-GVR**	**CH350CFAUL**	**GVR5G□**
VHR590AM-□UG	**VHR590AM-GVR**	**CH300CFAUL**	
VHR590CM-□JG	**VHR590CM-GVR**	**CH80BFAUL**	
VHR590CM-□EG	**VHR590CM-GVR**	**CH70BFAUL**	

●Three-phase motors

Model∗1	Motor model	Gearhead model∗2
VHI425SM-□G	**VHI425SM-GV**	**GV4G□**
VHI540SM-□G	**VHI540SM-GVH**	**GVH5G□**
VHI560SM-□G	**VHI560SM-GVH**	
VHI590SM-□G	**VHI590SM-GVR**	**GVR5G□**

Installation

■Location for installation

The motor is designed and manufactured for installation in equipment. Install it in a well-ventilated location that provides easy access for inspection. The location must also satisfy the following conditions:

- Inside an enclosure that is installed indoors (provide vent holes)
- Operating ambient temperature
  −10°C to +40°C (+14°F to +104°F) (non-freezing)
  −10°C to +50°C (+14°F to +122°F) for 100/200 V (non-freezing)
- Operating ambient humidity 85%, maximum (no condensation)
- Area that is free from an explosive atmosphere or toxic gas (such as sulfuric gas) or liquid
- Area not exposed to direct sun
- Area free of excessive amount dust, iron particles or the like
- Area not subject to splashing water (storms, water droplets), oil (oil droplets) or other liquids
- Area free of excessive salt
- Area not subject to continuous vibration or excessive shocks
- Area free of excessive electromagnetic noise (from welders, power machinery, etc.)
- Area free of radioactive materials, magnetic fields or vacuum
- 1000 m or less above sea level

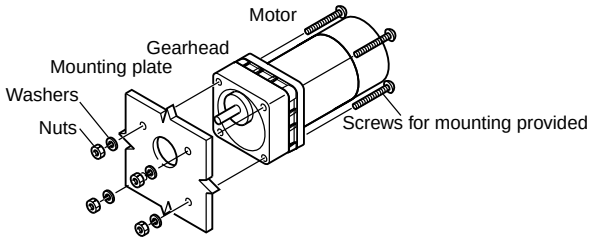
■How to install the motor

For the pinion shaft type, assemble the motor and gearhead (sold separately). For the detail of assembling, refer to the operating manual for the gearhead.

An O-ring is attached to the flange of the 90 W type motor. Do not pinch the O-ring when assembling the motor and gearhead. Pinching the O-ring causes a grease leak from the gearhead.

●Installation to equipment

Drill holes on the mounting plate and fix the motor and gearhead on the plate using four screws (provided). For pinion shaft type, the mounting bolts are provided with gearhead.



Maximum thickness of mounting plate for the case of using provided screws is as below chart.

Gearhead model	Nominal diameter of screw	Tightening torque	Maximum thickness of mounting plate t
GV2G□	M4	1.8 N·m (15.9 lb-in)	5 mm (0.2 in.)
GV3G□, **GV4G□**	M6	6.4 N·m (56 lb-in)	8 mm (0.31 in.)
GVH5G□, **GVR5G□**	M8	15.5 N·m (137 lb-in)	12 mm (0.47 in.)

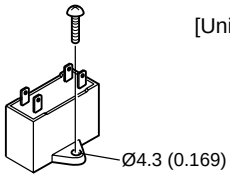
●Motor with cooling fan

To install a motor with an integrated cooling fan, provide 10 mm (0.39 in.) or more space at back of the fan cover to prevent blockage of cooling fan air inlet at the end of the motor, or provide a ventilation hole.

■Mounting the capacitor (Only for single-phase motors)

Before mounting the provided capacitor, check that the capacitor's capacitance matches that stated on the motor's name plate. Mount the capacitor securely by using M4 screws (not provided).

[Unit: mm (in.)]

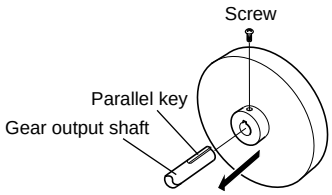


Note

- Do not let the screw fastening torque exceed 1 N·m (8.8 lb-in) to prevent damage to the mounting foot.
- Mount capacitor at least 10 cm (3.94 in.) away from the motor. If it is located closer, the life of the capacitor will be shortened.

■Installing a load

The shaft of the gearhead has been machined to an outer diameter tolerance of h7 and is provided with a key slot for connecting the transmission parts. When connecting the transmission parts, ensure that the shaft and parts have a clearance fit, and fix the parallel key to the output shaft with a screw to prevent the parts from wobbling.



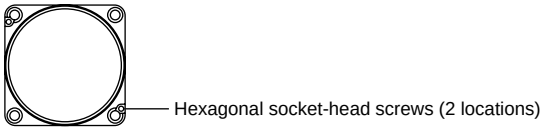
Note

Do not apply excessive force to the gear output shaft by using a hammer or similar tool. Application of strong impact may damage the output shaft or bearings.

■Changing gearhead of the combination type

Remove the gearhead by unscrewing the hexagonal socket-head screws holding the gearhead to the motor (2 locations). For motor/gearhead assembly, see the operating manual provided with the gearhead, which is sold separately.

Illustration shows the view from motor case side.

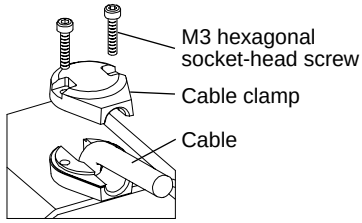


Gearhead model	Nominal diameter of bolt
GV2G□, **GV3G□**, **GV4G□**	M2.6
GVH5G□, **GVR5G□**	M3

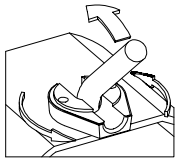
■Changing direction of the cable outlet

In the case of the 60 W type and 90 W type, the direction of the cable outlet is to the output shaft side of the motor when shipping.
The direction of the outlet can be changed by 180°, if desired.
Change the direction of the cable outlet according to following steps.

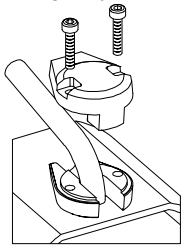
1. Remove screws and upper unit of cable clamp. Move the cable toward the opposite direction.



2. Turn the cable clamp to change the direction of cable outlet.



3. Refasten upper unit of cable clamp with screws.
   Screw tightening torque: 0.5 ~ 0.7 N·m (71 ~ 99 oz-in)

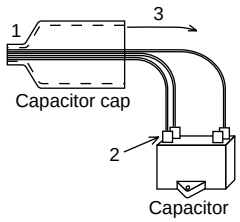


Connection and operation

- Connect the motor according to the “Wiring diagram”.
- Insulate all the wire connections, such as the connection between the motor and the capacitor connection.
  Capacitor cap is available to insulate capacitor connection.

Capacitor cap

1. Pass the lead wires through the capacitor cover as shown in the figure.
2. Connect the lead wires to the terminals or use terminal ends.
3. Cap the capacitor with the capacitor cover.



■Wiring diagram

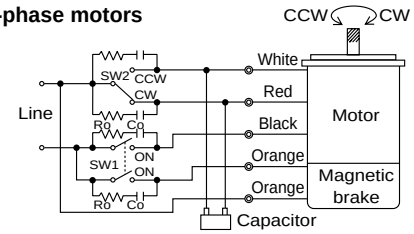
The direction of motor rotation is as viewed from motor output shaft side. “CW” indicates clockwise and “CCW” counterclockwise.

[Rotating direction of the gear output shaft]

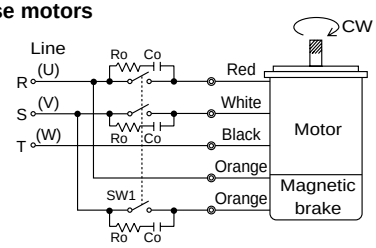
The rotating direction of the gear output shaft may be opposite that of the motor shaft, depending on the gear ratio. Before performing wiring, be sure to check the rotating direction of the gear output shaft to be used and determine the desired direction of motor rotation.

Gearhead model	Gear ratio	
	Same as the rotating direction of motor shaft	Opposite the rotating direction of motor shaft
GV2G□, **GV3G□**, **GV4G□**	5 ~ 25	30 ~ 120
	150 ~ 360	
GVH5G□	5 ~ 18	25 ~ 100
	120 ~ 300	
GVR5G□	5 ~ 15	18 ~ 60
	75 ~ 180	

●Single-phase motors



●Three-phase motors



[6 W ~ 40 W type]

Switch No.	Input specification			Note
	Single-phase 100 V/110 V/115 V	Single-phase 200 V/220 V/230 V	Three-phase 200 V/220 V/230 V	
SW1	125 VAC 3 A or more	250 VAC 1.5 A or more	250 VAC 1.5 A or more	Switched simultaneously
SW2			–	–

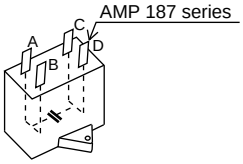
[60 W, 90 W type]

Switch No.	Input specification			Note
	Single-phase 100 V/110 V/115 V	Single-phase 200 V/220 V/230 V	Three-phase 200 V/220 V/230 V	
SW1	125 VAC 5 A or more	250 VAC 5 A or more	250 VAC 5 A or more	Switched simultaneously
SW2			–	–

SW1 emits sparks when turned on and off. In order to protect the relay contacts, a CR circuit (⌐∿∿⊣⊢) must be connected. Refer to the wiring diagram.
Ro=5 ~ 200 Ω
Co=0.1 ~ 0.2 μF 200 WV
Optional surge absorber is available (sold separately).
Model: **EPCR1201-2**

Note
In case of 60 W type and 90 W type, when removing the sheath of the cable, be careful not to damage the inside lead wire.

■Capacitor connection (Only for single-phase motors)



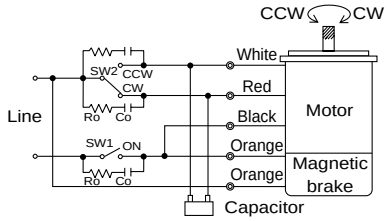
The capacitor internal wiring as follows: Capacitor terminals are internally electrically connection in twos; A-B and C-D for easy connection.

For easy to install terminals use 187 series AMP FASTON terminals. For lead wire connection, use one lead wire for each individual terminal.

■Simplified connection

Note
Wiring cannot be simplified for vertical drive applications or three-phase motors.

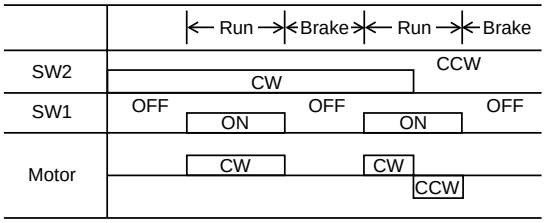
If the "RUN/STOP" operation of the motor and "RUN/STOP" operation of the electromagnetic brake are controlled via a single switch (contact), connect the lead wires as shown in the figure below. Note that the motor's magnetic energy affects the electromagnetic brake windings, resulting in a longer braking time than that of the basic wiring (shown in page 3) by approximately 50 ms and thus increased overruns.



Operation

Note
- Insulation class of this motor is B.
  Make sure that the motor case temperature does not exceed 90°C (194°F) during operation of the motor. Operation exceeding case temperature 90°C (194°F) may significantly deteriorate the coils and ball bearings of the motor and shorten the motor's life span. Motor case temperature can be measured by fixing a thermometer on the motor surface. It can also be measured using thermo tape or a thermocouple.
- To change rotation direction of the single-phase induction motor, wait until the motor completely stops. Otherwise its direction may not change or may take much time to change.
- Single-phase motors use a capacitor and keep it connected even after rotation of the motor has started.

[Timing chart of SW1 and SW2]
This timing chart is case of the basic connection (shown in page 3).



■Starting and stopping

SW1 operates motor and electromagnetic brake action.
Motor will rotate when SW1 is switched simultaneously to ON (short circuit). When SW1 is switched simultaneously to OFF (open), the motor stops immediately by electromagnetic brake and holds the load.

Note
When operating the electromagnetic brake, there may be a scraping noise because this braking system uses friction, but this is not a problem.

The load may move downward in vertical drive applications. Check the position of the load prior to operation.

■Direction of rotation

●Single-phase motors
To rotate the motor in a clockwise (CW) direction, switch SW2 to CW.
To rotate it in a counter-clockwise (CCW) direction, switch SW2 to CCW.

●Three-phase motors
To change the direction of rotation, change any two connections between U, V and W.

■Other ways of operating

●Shortening the motor's starting time
If the electromagnetic brake is left release, the motor can be started much faster.
Optimum timing for release of the brake is at least 10 ms before starting up the motor.

●Releasing electromagnetic brake
If you wish to release the brake while the motor is stopped, apply voltage between only the two orange lead wires. The electromagnetic brake is released and the motor shaft can be rotated easily by hand.

Time rating

■Induction motors

Induction motors have a continuous rating.

■Reversible motors

Reversible motors have a 30 minutes rating. "30 min" is indicated on the nameplate.

Locked rotor burnout protection

This motor is equipped with one of two methods to prevent burning the motor as a result of abnormal heating.

■Thermal protection ("TP" "TP211" is stamped on the motor name plate)

When the motor reaches a predetermined temperature, the internal thermal protector is activated and the motor is stopped.
In this stage, the electromagnetic brake is left released so that the motor does not keep hold of the load. Adopt another safety measure.
With the automatic resume feature, the motor automatically begins operating again as soon as the motor temperature falls to a certain temperature. Always turn the power off before performing inspections.
Thermal protector activation range:
Power is turned off at 130°C ±5°C (266°F ±9°F)
Power is turned back on at 82°C ±15°C (180°F ±27°F)

■Impedance protection ("ZP" is stamped on the motor name plate)

When the motor goes into locked rotor condition due to a malfunction, coil impedance rises, suppressing input power to the motor and protecting the motor coil from burnout.

Troubleshooting

When the motor cannot be operated correctly, refer to the contents provided in this section and take appropriate action. If the problem persists, contact your nearest office.

Phenomena	Check items
Motor does not rotate or rotates slowly.	1) Is supplied voltage appropriate? 2) Is the power source securely connected? 3) Is the load on the motor too much? 4) Is there a faulty contact on terminal blocks or crimped terminals if the cable is extended? 5) For a single-phase motor is the capacitor properly connected as per the “Wiring diagram” shown in page 3 or 4? 6) Is voltage applied to the brake lead wires (orange)?
Motor sometimes rotates and stops.	1) Is the power source securely connected? 2) Is there a faulty contact on terminal blocks or crimping terminals if the cable is extended? 3) For a single-phase motor is the capacitor properly connected as per the “Wiring diagram” shown in page 3 or 4?
Motor rotates in reverse direction.	1) Is the motor connected differently than the “Wiring diagram” shown in this manual. Check wiring by referring to the “Wiring diagram” in page 3 or 4. 2) In some gearheads, rotation direction of the gearhead output shaft may differ from rotation direction of the motor. Refer to the “Rotating direction of the gear output shaft” shown in page 3. 3) For a single-phase motor is the capacitor properly connected as per the “Wiring diagram” shown in page 3 or 4? 4) Is your understanding of rotation direction different than the manual description? In this manual rotation direction of the motor is defined as viewed at the motor from shaft side.
Motor temperature abnormally high [Motor case temperature exceeds 90°C (194°F)]	1) Is appropriate voltage applied to the motor? 2) Does ambient temperature exceed the specified range? 3) For a single-phase motor is the capacitor properly connected as per the “Wiring diagram” shown in page 3 or 4?
Noisy operation	1) Are the motor and gearhead appropriately coupled? See the operating manual for the gearhead. 2) Is the coupled gearhead the same pinion type as the motor shaft?

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