

SV-M6 系列 40-130 法兰说明书 伺服电机安全及安装接线

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http://www.hcfa.cn

感谢您使用本产品, 关于使用说明书。
本操作手册主要提供 SV-M6 系列 40-130 法兰伺服电机安全及安装接线信息。
如需更详尽信息请参考《SV-M6 系列 40-130 法兰伺服产品使用说明书》。

开箱时请确认

确认包装物件及数量是否正确, 包装清单如下:			
序号	名称	数量	
1	伺服电机	1	
2	配件	平键	1
		4PIN 端子	1
		2PIN端子 (带刹车伺服电机有)	1
4	合格证	1	

* 请确认物件在运输途中是否有损坏, 如果发现问题, 请联系经销商。

安全注意事项

在接收检验、安装、配线、操作、维护及检查时, 应随时注意以下安全注意事项。
■ 对错误的使用本产品而可能带来的危害和损害的程度按下列表示加以区分和说明。

⚠ 危险	该标志表示「可能会发生导致死亡或重伤事故的危險」的内容
⚠ 注意	该标志表示「可能会导致伤害或财产损失事故发生」的内容

■ 对应当遵守的事项用以下的图形标志进行说明。

⊘	该图形表示禁止实施的「禁止」事项内容
ⓘ	该图形表示必须实施的「强制」内容

⚠ 危险		
关于安装和配线		
ⓘ	切勿将电机直接连接到商用电源。 请勿在电机、驱动器的周围放置可燃物。	否则, 会引发火灾、故障。 否则, 会引发火灾事故。
ⓘ	驱动器必须用外箱保护, 设置保护外箱时, 外箱壁、其他机器和驱动器之间要保持使用说明书规定的距离。 应安装在尘埃较少、不会接触到水、油等的地方。 电机、驱动器安装在金属等非可燃物上。 务必由专业电工进行接线作业。 电机、驱动器的 FG 端子必须接地。 必须先切断上位断路器的电源, 进行正确的接线。 电缆应确保连接好, 通电部位用绝缘物切实地做到绝缘。	否则, 会引发触电、火灾、故障。 否则, 会引发触电、火灾、故障。 否则, 会引发火灾事故。 否则, 会引发触电、火灾、故障。 否则, 会引发触电、火灾、故障。 否则, 可能会引发触电、受伤、故障、破损。 否则, 会引发触电、火灾、故障。
关于操作和运行		
⊘	请勿触摸驱动器内部。 请勿让电缆线受到损伤、承受过大的外力、重压、受夹。 切勿接触运转中的电机旋转部。 请勿在有水的地方、存在腐蚀性、易燃性气体的环境和靠近可燃物的场所使用。 请勿在有激烈振动、冲击的地方使用。 请勿将电缆线浸在油和水中使用。 请勿用湿手进行接线和操作。 使用轴端带键槽的电机时, 请勿用手接触键槽。 电机、驱动器、散热器的温度会升高, 请勿触摸。 请勿用外部动力驱动电机。	否则, 会引发烧伤、触电事故。 否则, 会引发触电、故障、破损。 否则, 会引发受伤事故。 否则, 会引发火灾。 否则, 会引发触电、受伤、火灾事故。 否则, 会引发触电、受伤、火灾事故。 否则, 会引发受伤事故。 否则, 会引发烧伤或部件损伤事故。 否则, 会引发火灾事故。
关于其它使用上的注意事项		
ⓘ	在地震发生后务必进行相关安全确认。 为防止发生地震时造成火灾及人身事故, 应切实地进行设置、安装。 务必在外部设置紧急停止电路, 以确保紧急时以及及时地停止运转、切断电源。	否则, 会引发触电、受伤、火灾事故。 否则, 会引发受伤、触电、火灾、故障、破损。 否则, 引发受伤、触电、火灾、故障、破损。
关于维护和点检		
ⓘ	驱动器有危险高压部分。进行配线和点检工作时, 必须切断电源放置使其放电后(5分钟以上)进行。并且, 绝对不允许对其进行分解。	会引发触电事故。

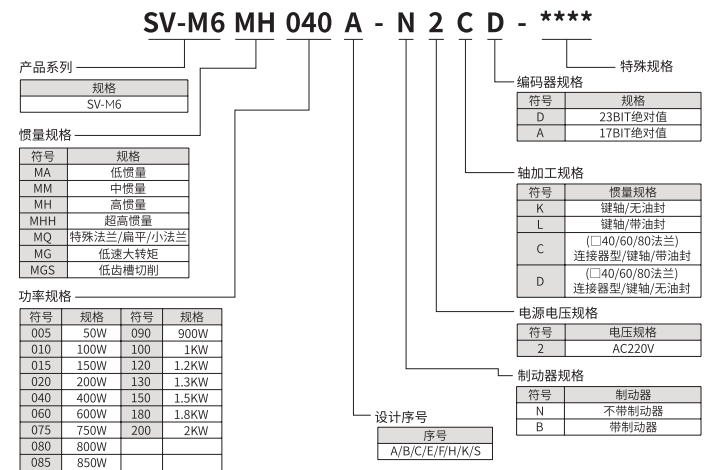
⚠ 注意		
关于安装和接线		
ⓘ	电机和驱动器要按指定的匹配组合。不可直接接触连接器端子。 注意通风口不可堵塞, 或异物进入。 试运转请在电机固定, 并与其他机械系统分离状态下实施。动作确认后再次安装到机械系统上。 遵守指定的安装方法、安装方向。 请根据设备本身的重量和产品的额定输出进行妥当安装。	否则, 会引发火灾、故障。 否则, 会引发触电、故障。 否则, 会引发触电、火灾。 否则, 会引发受伤事故。 否则, 会引发受伤、故障。 否则, 会引发受伤、故障。
关于操作和运转		
⊘	请勿站在产品上、或在产品上放置重物。 禁止极端的增益调整及变更, 会导致运转不稳定。 停电后恢复供电时, 有可能出现突然启动的情况。故请勿靠近机器, 务必做好机器设定, 以确保即使重启也可确保人身安全。 请勿在受日光直接照射的地方使用。 请勿使电机及电机轴部受到较强的冲击。 电机内置制动器是保持用制动, 禁止用在通常的制动。 不要使用有故障、破损的电机和驱动器。 请确认电源规格是否正常。	否则, 会引发触电、受伤、故障、破损。 否则, 会引发故障、破损。 否则, 会引发受伤事故。 否则, 会引发故障。 否则, 会引发故障。 否则, 会引发受伤、故障。 否则, 会引发触电、火灾、受伤、引发故障发生原因。
ⓘ	保持制动器不是确保机械安全的停止装置。请在机械侧设置确保安全的停止装置。 报警时, 排除故障原因, 确保安全后, 解除报警, 重启。 制动器用继电器与紧急停止用断路器继电器串联。	否则, 会引发受伤事故。 否则, 会引发受伤事故。 否则, 会引发受伤、故障。
关于搬运和保管		
⊘	不能保存在雨水及水滴溅到的场所、有毒性气体及液体的地方。 搬运时, 切勿抓持电缆或电机轴部。 进行搬运时或安装作业时要以防滑下或翻倒。 需长期保存时, 请按本说明书记载的联系方法进行咨询。 请保管在符合本说明书中规定保管环境的保管场所。	否则, 会引发故障的。 否则, 会引发受伤、故障。 否则, 会引发受伤、故障。 引发故障的原因。 否则, 会引发故障。
关于其他使用上的注意事项		
ⓘ	废弃电池时, 请将电池用胶带等进行绝缘处理, 并根据有关部门的规定废弃处理。 废弃时请作为工业废弃物处理。	
关于维护和点检		
⊘	除本公司外请勿进行拆卸修理工作。 主回路电源开关不要频繁的打开和关闭。 通电中或切断电源后的一定时间内, 电机、驱动器的散热器及再生电阻器等可能会处于高温状态。切勿触摸。 驱动器发生故障时, 请切断控制电源和主回路电源。 长时间不使用时务必切断主电源。	否则, 会引发故障。 否则, 会引发故障。 否则, 会烧伤或触电。 否则, 会引发火灾事故。 因误动作等引发受伤事故。
关于维护和点检		
<保证期间> · 产品的保证期间为本公司制造月起 18 个月。但是, 对应当制动器的电机, 轴的加速、减速次数不超出寿命。 <保证内容> · 按照本说明书的正常使用状态下, 在保证期间内, 发生故障时为无偿修理。但是, 即使在保证期间内有如下的故障发生时为有偿修理。 ① 错误的使用方法, 以及不适当的修理以及改造时。 ② 购买之后的掉落, 以及在运输过程中受到损伤的原因时。 ③ 超出产品规格使用该产品的原因时。 ④ 火灾、地震、落雷、风灾与水灾、盐害、电压异常等其他天灾的原因时。 ⑤ 水、油、金属片、其他异物侵入的原因时。 · 保证范围为交付品本体, 如由交付产品的故障诱发的损害, 判定为补偿范围外。		

第一章 产品说明及系统选型

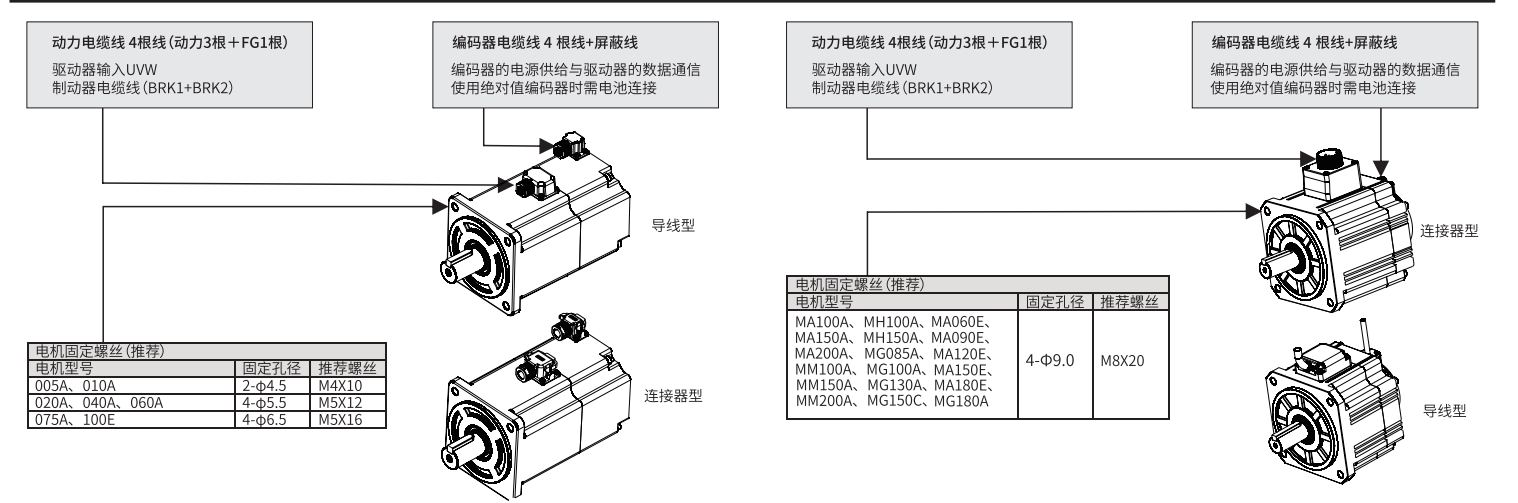
电机铭牌说明

电机名称	○ MODEL:SV-M6MH040A-N2CD	
序列号、版本号	○ P: 400W P/N: 1010219018800000000	
电机规格	S/N: 90121086001	nMAX: 6500rpm
	Mn: 127Nm In: 2.1A	nN : 3000rpm
	○ V: AC200~240V IP67	
	Ambient: 40 Ins.class: F	
	HCFA MADE IN CHINA	

机型识别



Part Names and Functions



第二章 产品规格

项目	单位	规格				
电压	V	220V				
电机型号		MH005A	MH010A	MH010H	MQ010A	MH015A
安装法兰盘尺寸	mm	□40	□40	□40	□60	□40
质量	kg	0.33	0.45	0.44	0.68	0.83
额定输出功率	W	50	100	100	100	150
额定转矩	N.m	0.16	0.32	0.32	0.32	0.477
瞬时最大转矩	N.m	0.56	1.11	1.11	0.96	1.43
额定电流	Arms	1.1	0.92	0.92	0.95	1.5
最大瞬时电流	Arms	3.89	3.89	3.6	2.8	4.5
额定转速	r/min	3000	3000	3000	3000	3000
最高转速	r/min	6500	6500	6500	6500	6000
转矩常数	N.m/A	0.168	0.327	0.347	0.369	0.33
每相感应电压常数	mV/(r/min)	5	11.1	13.3	11.6	13.1
额定功率	无制动器	6.7	14.4	11.13	6.4	17.5
变化率	有制动器	6.1	13.8	10.78	5.69	17.1
机械时间常数	无制动器	2.6	1.67	2.23	2.96	1.9
	有制动器	2.85	1.74	2.3	3.33	1.94
电气时间常数	ms	0.89	1.1	0.986	1.76	1.22
转子惯量	无制动器	0.038	0.071	0.092	0.16	0.13
	有制动器	0.042	0.074	0.095	0.18	0.133
容许负载	径向负载	68	68	68	68	68
	轴向负载	58	58	58	58	58
编码器		17bit-23bit SV-M6系列/M7系列 保持用制动器				
用途	-	由于是SELV电源/危险电压请使用强化绝缘的电源				
电源	-	DC24V±10%				
额定电压	V	0.25	0.25	0.25	0.9	0.375
额定电流	A	0.25	0.25	0.25	0.9	0.375
静摩擦转矩	N.m	0.38 以上	0.38 以上	0.38 以上	0.38-1.1	0.58 以上
吸合时间	ms	35 or less	35 以下	35 以下	60 以下	50 以下
释放时间	ms	20 or less	20 以下	20 以下	40 以下	20 以下
释放电压	ms	DC1V 以上	DC1V 以上	DC1V 以上	DC1.5V 以上	DC1V 以上

* 为弱磁控制下最高转速

项目	单位	规格												
电压	V	220V												
电机型号		MA020A	MH020A	MH020H	MQ020A	MA040A	MH040A	MH040H	MQ040A	MA060E	MA075A	MH075A	MH075H	MG075A
安装法兰盘尺寸	mm	□60	□60	□60	□80	□60	□60	□60	□80	□110	□80	□80	□80	□80
质量	kg	0.9	0.87	0.95	1.24	1.28	1.22	1.45	1.6	3.1	2.25	2.25	2.65	3.46
额定输出功率	W	200	200	200	200	400	400	400	400	600	750	750	750	750
额定转矩	N.m	0.64	0.64	0.64	0.637	1.27	1.27	1.27	1.27	1.91	2.39	2.39	2.39	4.77
瞬时最大转矩	N.m	1.91	2.23	2.23	1.91	3.82	4.46	4.46	3.82	5.73	7.16	8.36	8.36	14.3
额定电流	Arms	1.7	1.4	1.4	2	2.7	2.1	2.4	2.6	3	4.2	3.8	3.8	4.2
最大瞬时电流	Arms	6.5	4.87	4.87	6.4	10.2	7.36	8.2	8.4	9	17.4	13.3	18.8	15
额定转速	r/min	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	1500
最高转速	r/min	5000/6000*	5000/6500*	5000/6500*	6500	5000/6000*	5000/6500*	5000/6500*	5000/6500*	5000/6500*	4500/6000*	4500/6000*	4500/6000*	2000
转矩常数	N.m/A	0.427	0.5	0.5	0.318	0.488	0.67	0.531	0.488	0.63	0.583	0.648	0.648	1.135
每相感应电压常数	mV/(r/min)	14.5	14.61	14.61	12.2	17.9	20.85	20.4	19.6	24.48	21.33	22.65	22.65	43.3
额定功率	无制动器	25.6	14.1	8.71	8.63	57.6	28.8	22.09	18.5	11.3	59.5	36.6	18.1	79
变化率	有制动器	24.1	13.2	8.36	8.12	55.6	27.8	21.5	17.92	10.6	53.4	34.4	17.85	75.84
机械时间常数	无制动器	0.775	1.57	2.54	2.51	0.561	1.24	1.15	1.51	1.77	0.463	0.97	1.95	1.01
	有制动器	0.824	1.68	2.65	2.67	0.581	1.29	1.18	1.57	1.87	0.516	1.03	1.98	1.05
电气时间常数	ms	6.3	2.58	2.58	3.52	6.1	2.97	4.1	5.41	7.8	12.7	6.59	6.59	5.1
转子惯量	无制动器	0.16	0.29	0.47	0.47	0.28	0.56	0.73	0.87	3.1	0.96	1.56	3.15	2.88
	有制动器	0.17	0.31	0.49	0.5	0.29	0.58	0.75	0.9	4.2	1.07	1.66	3.2	3
容许负载	径向负载	245	245	245	245	245	245	245	245	392	392	392	392	392
	轴向负载	98	98	98	98	98	98	98	98	147	147	147	147	147
编码器		17bit-23bit												

项目	单位	规格												
电压	V	220V												
电机型号		MA020A	MH020A	MH020H	MQ020A	MA040A	MH040A	MH040H	MQ040A	MA060E	MA075A	MH075A	MH075H	MG075A
适配驱动		SV-M6系列/M7系列												
用途	-	保持用制动器												
电源	-	由于是SELV电源/危险电压请使用强化绝缘的电源												
额定电压	V	DC24V±10%												
额定电流	A	0.36	0.36	0.36	0.9	0.36	0.36	0.36	0.9	0.81	0.42	0.42	0.42	0.42
静摩擦转矩	N.m	1.6 以上	1.6 以上	1.6 以上	1.6 以上	1.6 以上	1.6 以上	1.6 以上	1.6 以上	12 以上	0.38 以上	0.38 以上	0.38 以上	0.38 以上
吸合时间	ms	50 以下	50 以下	50 以下	60 以下	50 以下	50 以下	50 以下	60 以下	100 以下	70 以下	70 以下	70 以下	70 以下
释放时间	ms	20 以下	20 以下	20 以下	40 以下	20 以下	20 以下	20 以下	40 以下	60 以下	20 以下	20 以下	20 以下	20 以下
释放电压	ms	DC1V 以上	DC1V 以上	DC1V 以上	DC1.5V 以上	DC1V 以上	DC1V 以上	DC1V 以上	DC1.5V 以上	DC1.5V 以上	DC1V 以上	DC1V 以上	DC1V 以上	DC1V 以上

项目	单位	规格													
电压	V	220V													
电机型号		MG085A	MG085S	MA090E	MA100A	MM100A	MM100S	MQ100E	MH100A	MG100A	MA120E	MG130A	MG130S	MA150A	
安装法兰盘尺寸	mm	□130	□130	□110	□100	□130	□130	□80	□130	□130	□110	□130	□130	□100	
质量	无制动器	kg	5.53	5.7	3.7	3.5	4.67	5.87	2.68	6.4	6.91	4.3	6.89	7.3	4.4
	有制动器	kg	7.13	7.7	5	4.5	6.27	7.47	3.45	8.0	8.51	5.6	8.49	9.2	5.4
额定输出功率	W	850	850	900	1000	1000	1000	1000	1000	1000	1200	1300	1300	1500	
额定转矩	N.m	5.41	5.39	2.86	3.18	4.77	4.77	3.185	4.77	9.55	4	8.28	8.28	4.77	
瞬时最大转矩	N.m	16.2	16.2	8.6	9.55	14.3	14.31	14.3	28.6	12	24.84	24.84	14.3		
额定电流	Arms	5.9	6.7	4.5	6.6	5.2	8.25	5.7	5.2	6	9.3	9.6	8.2		
最大瞬时电流	Arms	18	20.1	13.5	28	15.6	25	21.2	15.6	16	18	28	28.8	35	
额定转速	r/min	1500	1500	3000	3000	2000	2000	3000	2000	1000	3000	1500	1500	3000	
最高转速	r/min	3000	4000	5000	5000	3000	5000	4500/6000*	3000	1500	5000	3000	4000	5000	
转矩常数	N.m/A	0.918	0.859	0.63	0.52	0.918	0.573	0.552	0.918	1.83	0.63	0.895	0.891	0.628	
每相感应电压常数	mV/(r/min)	33.65	31.04	24.52	18.15	33.65	21.2	21.2	33.65	67.3	23.55	34.84	32.08	21.92	
额定功率变化率	无制动器	KW/S	63.29	20.9	17.1	49.82	36.8	24.84	50.7	7.39	75.4	23.1	33.9	35	80.12
	有制动器	KW/S	58.26	18.2	16.4	43.03	30.7	21.88	48.31	7.11	68.6	22.1	32	31.6	71.775
机械时间常数	无制动器	ms	3.43	2.74	1.98	0.619	1.51	1.24	0.85	7.54	1.12	1.5	2.57	2.23	0.507
	有制动器	ms	3.72	3.16	2.07	0.717	1.81	1.41	0.897	7.84	1.23	1.57	2.72	2.46	0.566
电气时间常数	ms	11.1	10.2	6.78	7.22	11.1	13.3	7.6	11.1	9.65	8.86	14.63	10.7	8.08	
转子惯量	无制动器	x10-4kg.m ²	14	13.9	4.5	2.03	6.18	9.16	2	30.8	12.1	5.9	20.2	19.9	2.84
	有制动器	m ²	15.2	16	5.6	2.35	7.4	10.4	2.1	32	13.3	7	21.4	22	3.17
容许负载	径向负载	N	490	490	392	392	490	490	392	490	392	490	490	392	
	轴向负载	N	160	196	147	147	196	196	147	196	160	147	160	196	147

项目	单位	规格												
电压	V	220V												
电机型号		MA150E	MM150A	MM150S	MH150A	MA180E	MG180A	MG180S	MA200A	MM200A	MM200S			
安装法兰盘尺寸	mm	□110	□130	□130	□130	□110	□130	□130	□100	□130	□130	□130	□130	□130
质量	无制动器	kg	4.95	5.87	6.98	7.8	5.4	8.14	8.8	5.3	12.1	6.91		
	有制动器	kg	6.25	7.47	8.58	9.4	6.7	9.74	11.2	6.3	13.3	10.1		
额定输出功率	W	1500	1500	1500	1500	1800	1800	1800	2000	2000	2000			
额定转矩	N.m	4.77	7.16	7.16	7.16	5.73	11.5	11.5	6.37	9.55	9.55			
瞬时最大转矩	N.m	14.3	21.5	21.5	21.5	17.2	34.5	34.5	19.1	28.6	28.6			
额定电流	Arms	7.6	8	9.5	8	9.5	11.8	15.6	11.3	9.9	15			
最大瞬时电流	Arms	24	24	29	24	29	35.5	46.8	48	30	50			
额定转速	r/min	3000	2000	2000	2000	3000	1500	1500	3000	2000	2000			
最高转速	r/min	5000	3000	5000	3000	5000	3000	4000	5000	3000	5000			
转矩常数	N.m/A	0.63	0.895	0.672	0.895	0.63	0.964	0.748	0.607	0.9645	0.627			
每相感应电压常数	mV/(r/min)	23.2	34.84	25.9	34.84	22.3	40.18	27	21.247	37.95	23			
额定功率变化率	无制动器	KW/S	28	56	42.37	13.3	34.7	50.87	50.9	110.26	75.4	54.13		
	有制动器	KW/S	27.3	49.3	38.55	12.9	34	48.6	47.1	101.19	68.6	50.53		
机械时间常数	无制动器	ms	1.47	1.16	1.08	4.9	1.38	2.06	1.95	0.425	1.05	0.93		
	有制动器	ms	1.51	1.3	1.18	5.05	1.4	2.15	2.29	0.463	1.16	1		
电气时间常数	ms	9.35	14.6	16.13	14.63	9.54	15.99	11.14	9.37	15.38	13.75			
转子惯量	无制动器	x10-4kg.m ²	7.3	9.16	12.1	38.5	8.6	26	26	3.68	12.1	16.85		
	有制动器	m ²	8.4	10.4	13.3	39.7	9.7	27.2	28.1	4.01	13.3	18.05		
容许负载	径向负载	N	392	490	490	490	392	490	490	392	490	490		
	轴向负载	N	147	196	196	196	147	160	196	147	196	196		

* 为弱磁控制下最高转速

项目	单位	规格												
电压	V	220V												
电机型号		MA150E	MM150A	MM150S	MH150A	MA180E	MG180A	MG180S	MA200A	MM200A	MM200S			
安装法兰盘尺寸	mm	□110	□130	□130	□130	□110	□130	□130	□100	□130	□130	□130	□130	
质量	无制动器	kg	4.95	5.87	6.98	7.8	5.4	8.14	8.8	5.3	12.1	6.91		
	有制动器	kg	6.25	7.47	8.58	9.4	6.7	9.74	11.2	6.3	13.3	10.1		
额定输出功率	W	1500	1500	1500	1500	1800	1800	1800	2000	2000	2000			
额定转矩	N.m	4.77	7.16	7.16	7.16	5.73	11.5	11.5	6.37	9.55	9.55			
瞬时最大转矩	N.m	14.3	21.5	21.5	21.5	17.2	34.5	34.5	19.1	28.6	28.6			
额定电流	Arms	7.6	8	9.5	8	9.5	11.8	15.6	11.3	9.9	15			
最大瞬时电流	Arms	24	24	29	24	29	35.5	46.8	48	30	50			
额定转速	r/min	3000	2000	2000	2000	3000	1500	1500	3000	2000	2000			
最高转速	r/min	5000	3000	5000	3000	5000	3000	4000	5000	3000	5000			
转矩常数	N.m/A	0.63	0.895	0.672	0.895	0.63	0.964	0.748	0.607	0.9645	0.627			
每相感应电压常数	mV/(r/min)	23.2	34.84	25.9	34.84	22.3	40.18	27	21.247	37.95	23			
额定功率变化率	无制动器	KW/S	28	56	42.37	13.3	34.7	50.87	50.9	110.26	75.4	54.13		
	有制动器	KW/S	27.3	49.3	38.55	12.9	34	48.6	47.1	101.19	68.6	50.53		
机械时间常数	无制动器	ms	1.47	1.16	1.08	4.9	1.38	2.06	1.95	0.425	1.05	0.93		
	有制动器	ms	1.51	1.3	1.18	5.05	1.4	2.15	2.29	0.463	1.16	1		
电气时间常数	ms	9.35	14.6	16.13	14.63	9.54	15.99	11.14	9.37	15.38	13.75			
转子惯量	无制动器	x10-4kg.m ²	7.3	9.16	12.1	38.5	8.6	26	26	3.68	12.1	16.85		
	有制动器	m ²	8.4	10.4	13.3	39.7	9.7	27.2	28.1	4.01	13.3	18.05		
容许负载	径向负载	N	392	490	490	490	392	490	490	392	490	490		
	轴向负载	N	147	196	196	196	147	160	196	147	196	196		

* 为弱磁控制下最高转速

伺服电机的使用环境条件及注意事项

使用环境条件	规格
额定时间	连续
使用环境温度	0° C-40° C (无结露)
使用环境湿度	20 ~ 85%RH (无结露)
保存环境温度	-20° C - 65° C (无结露)
保存环境湿度	20 ~ 85%RH (无结露)
使用保存环境	屋内 (不接触直射阳光)、无腐蚀性气体、无易燃性气体、无油性物、无灰尘
耐热等级	Class B
绝缘电阻	DC1000V-5MΩ 以上
绝缘耐压	AC1500V 一分钟
使用海拔	海拔 1000m 以下
振动等级	V15 (JEC2121)
耐振动	49m/s ² (5G)
耐冲击	98m/s ² (10G)
保护构造	IP67
Precautions	<ul style="list-style-type: none"> · 按照规定接地, 适用 Class I · 适用过电压范围II「Overvoltage category II」 · 适用污染度 2「Pollution degree 2」 · 额定转矩是指安装在按电机法兰盘尺寸的约 2 倍大小的 L 型钢上的条件下所显示的值得 · 制动器连接线分极性。红导线: 与 +24V 连接黑导线: 与 GND 连接。

Installation and Wiring Instructions for SV-M6 Series Servo Motor (40-130 flange)

Number: M6MQ075B001A01
Version: V 1.0
Date: 2024.06

<http://www.hcfa.cn>

Thank you for using this product. These instructions mainly provide information on the safe installation and wiring of the SV-M6 Series Servo Motor (40-130 flange). For more detailed information, please refer to <SV-M6 Series Servo Motor (40-130 flange) User Instruction>.

Item List

Please confirm the following items and their quantities when unpacking:			
No.	Item	Quantity	
1	Servo motor	1	
2	Accessories	Flat key	1
		4 PIN terminal	1
		2 PIN terminal (for servo motor with brake)	1
4	Quality certification	1	

*Please confirm that there is no damage to those items during transportation. For any damages, please contact HCFA.

Safety Precautions

Please always pay attention to the following safety precautions during acceptance, inspection, installation, wiring, operation, and maintenance.

■ The safety instruction levels, which may be caused by the incorrect use of this product, are classified and described in the following table.

	Indicates that incorrect handling may result in death or severe injury.
	Indicates that incorrect handling may result in injury or property damage.

■ What must not be done and what must be done are indicated by the following diagrammatic symbols.

	Indicates what must not be done.
	Indicates what must be done.

⚠ DANGER

Installation and Wiring

Do not connect the motor directly to a commercial power. Otherwise, it may cause fire or malfunction. Do not place any combustibles near the servo motor and drive. Otherwise, it may cause a fire.

Please place the drive within a protective case, and leave specified clearances between the drive and control enclosure walls or other equipments. Otherwise, it may cause an electric shock, fire, or malfunction.

Please install the drive in a place that frees from excessive dust, water, and oil. Otherwise, it may cause an electric shock, fire, malfunction, or damage.

Please install a motor or a drive to incombustible, such as metal. The wiring must be done by a professional electrician. Otherwise, it may cause an electric shock. The FG terminal of the motor or the drive must be grounded. Otherwise, it may cause an electric shock.

Please cut off the upper circuit breaker before wiring. Otherwise, it may cause an electric shock, injury, malfunction, or damage.

Please ensure a good connection of the cable with its electrified part being well insulated. Otherwise, it may cause an electric shock, fire, or malfunction.

Operation and Running

Do not touch the internal parts of the drive. Otherwise, it may cause burns or an electric shock.

The cables must not be excessively damaged, stressed, loaded, or pinched. Otherwise, it may cause an electric shock, malfunction, or damage.

Do not touch the rotating parts of the servo motor during operation. Otherwise, it may cause injury.

Do not use the drive in any place near water, corrosive or flammable gases, and flammables. Otherwise, it may cause a fire.

Do not subject the drive to any extreme vibration and impact. Otherwise, it may cause an electric shock, injury, or fire.

Do not immerse the cables in oil or water during operation. Otherwise, it may cause an electric shock, injury, or fire.

Do not conduct wiring or perform operations with wet hands. Otherwise, it may cause an electric shock, injury, or fire.

Do not touch the keyway with bare hands when using a motor with a keyway at the shaft end. Otherwise, it may cause injury.

Do not touch the motor, driver, or heat sink as their temperatures may rise. Otherwise, it may cause fire or damage.

Do not use external force to drive the motor. Otherwise, it may cause fire.

Other Safety Precautions

Please ensure equipment safety after earthquakes. Otherwise, it may cause an electric shock, injury, or fire.

Ensure a correct installation and setting to prevent fire or personal injury during earthquakes. Otherwise, it may cause injury, electric shock, fire, malfunction, or damage.

Please provide an external emergency stop circuit to ensure that operation can be stopped and power switched off immediately. Otherwise, it may cause injury, electric shock, fire, malfunction, or damage.

Maintenance and Inspection

As there's dangerous and high-voltage inside the drive, before wiring or inspection, turn off the power and wait for 5 minutes or more until the charge lamp turns off. Do not disassemble the drive. Otherwise, it may cause an electric shock.

⚠ CAUTION

Installation and Wiring

Please install the servo motor and drive following the combinations specified in the instructions. Otherwise, it may cause fire or malfunction.

Do not touch the connector terminals directly. Otherwise, it may cause an electric shock or malfunction.

	Do not block the air intake or let any foreign materials enter into the equipment. The test operation must be done with the motor being fixed but separated from the mechanical system. Only after confirming the operation can the motor be installed to the mechanical system. The servo motor must be installed following the specified directions and methods. Ensure a proper installation in accordance with the weight and rated output of the equipment.	Otherwise, it may cause an electric shock or fire. Otherwise, it may cause injury. Otherwise, it may cause injury and malfunction. Otherwise, it may cause injury and malfunction.
Operation and Running		
	Do not stand or put any heavy objects on the equipment. Do not make extreme gain adjustments or changes, which will result in unstable running. When power is restored after an instantaneous power outage, keep away from the machine because it may be restarted suddenly. Set the machine so that it is secured against personal injury if restarted. Keep it away from the direct sunlight. Do not subject the motor and its axis to heavy impact.	Otherwise, it may cause an electric shock, injury, malfunction, or damage. Otherwise, it may cause malfunction or damage. Otherwise, it may cause injury. Otherwise, it may cause malfunction.
	The electromagnetic brake on the motor is designed to hold its shaft and should not be used for ordinary braking. Do not use any malfunctioning or damaged motor or drive. Please confirm that the power supply specification is normal. Holding brake is not a safety stopper used for ensuring machine safety. To ensure safety, install a stopper on the machine side. When any alarm has occurred, eliminate its cause, ensure safety, and deactivate the alarm before restarting operation. The brake relay and the emergency stop relay must be connected in series.	Otherwise, it may cause injury and malfunction. Otherwise, it may cause an electronic shock, fire, or injury. Otherwise, it may cause malfunction. Otherwise, it may cause injury. Otherwise, it may cause injury and malfunction.
Transportation and Storage		
	Do not subject the equipment to rain, droplets, toxic gas, or fluid. Do not carry the motor by the cables or shaft during transportation. Do not drop or overturn the product during transportation and installation.	Otherwise, it may cause malfunction. Otherwise, it may cause injury and malfunction. Otherwise, it may cause injury and malfunction.
	For long-term storage, please contact HCFA via the contact information listed in the instructions. Please store the product in the places following the environmental conditions specified in these instructions.	Otherwise, it may cause malfunction.
Other Safety Precautions		
	Please insulate the battery with adhesive tape and dispose of it following the law of each country (area). When disposing of the equipment, treat it as an industrial waste.	
Maintenance and Inspection		
	Please contact HCFA for further instructions on removal, installation, and repair. Do not turn on and off the main circuit power switch too frequently. Do not touch the heat sink and regenerative resistor of the motor and drive because their temperatures may be high while power is on or for some time after power-off.	Otherwise, it may cause malfunction. Otherwise, it may cause malfunction. Otherwise, it may cause burns or electric shock.
	When the drive becomes faulty, switch off the control circuit and main power. If the equipment is to be stored for a long time, please switch off the main circuit power.	Otherwise, it may cause a fire. Otherwise, it may lead to injury caused by the malfunction of the equipment.
Maintenance and Inspection		
< Warranty Period >		
• The term of warranty for the product is eighteen (18) months from the date of manufacture. However, for the motor with a brake, the warranty period does not exceed the maximum period that the shaft can accelerate or decelerate.		
< Warranty Coverage >		
• This warranty applies only when the condition, method, environment, etc. of use are in compliance with the terms and conditions and the instructions that are stated in the instructions. However, even during the warranty period, the repair cost will be charged to customers in the following cases.		
• ① A failure caused by improper storing or handling, repair, and modification.		
• ② A failure caused by drops or damages during transportation.		
• ③ A failure caused by using without following the product specifications.		
• ④ A failure caused by external factors such as inevitable accidents, including without limitation fire, earthquake, thunder and lightning, flooding and wind hazard, salty damage, and abnormal fluctuation of voltage.		
• ⑤ A failure caused by the intrusion of water, oil, metals, and other foreign objects.		
• The warranty coverage is only for the product itself. HCFA bears no joint responsibility and makes no compensation for any further damages caused by product malfunction.		

Chapter One Product Description and Model Selection

Motor Nameplate Introduction

Model Name: MODEL:SV-M6MH040A-N2CD
Serial Number & Version number: S/P: 400W P/N: 1010219018800000000
S/N: 90121086001 nMAX: 6500rpm
Mn: 127Nm In: 2.1A nN : 3000rpm
Power Specifications: V: AC200~240V | IP67
Ambient: 40 | Ins.class: F

Model Number Notation

SV-M6 MH 040 A - N 2 C D - ****

Product Series: SV-M6
Specifications: SV-M6

Inertia Specifications:

Symbol	Specifications
MA	Low inertia
MM	Medium inertia
MH	High inertia
MHH	Ultra-high inertia
MQ	Special flange / Flat flange / Small flange
MG	Low speed and high torque
MGS	Low cogging cutting

Design Serial Number: A/B/C/E/F/H/K/S

Encoder Specifications:

Symbol	Specifications
D	23BIT Absolute
A	17BIT Absolute

Shaft Machining Specification:

Symbol	Inertia Specification
K	Shaft key/without oil seal
L	Shaft key/with oil seal
C	Connector/shaft key/with oil seal (∮40/60/80 flange)
D	Connector/shaft key/without oil seal (∮40/60/80 flange)

Power Specifications:

Symbol	Specifications	Symbol	Specifications
005	50W	090	900W
010	100W	100	1KW
015	150W	120	1.2KW
020	200W	130	1.3KW
040	400W	150	1.5KW
060	600W	180	1.8KW
075	750W	200	2KW
080	800W		
085	850W		

Voltage Specifications:

Symbol	Voltage Specification
Z	AC220V

Brake specifications:

Symbol	Brake
N	Without brake
B	With brake

Part Names and Functions

4 Power cables (3 power cables + 1 FG cable)
Drive input UVW
Brake cable (BRK1+BRK2)

4 Encoder cables+ Shield cable
Encoder power supply and drive data communication
Battery connection is required when using absolute encoders

4 Power cables (3 power cables + 1 FG cable)
Drive input UVW
Brake cable (BRK1+BRK2)

4 Encoder cables+ Shield cable
Encoder power supply and drive data communication
Battery connection is required when using absolute encoders

Recommended Fixing Screws for Motor

Motor Model	Hole Size	Screw Type
005A, 010A	2-φ4.5	M4X10
020A, 040A, 060A	4-φ5.5	M5X12
075A, 100E	4-φ6.5	M5X16

Recommended Fixing Screws for Motor

Motor Model	Hole Size	Screw Type
MA100A, MH100A, MA060E, MA150A, MH150A, MA090E, MA200A, MG085A, MA120E, MM100A, MG100A, MA150E, MM150A, MG130A, MA180E, MM200A, MG150C, MG180A	4-φ9.0	M8X20

Chapter Two Product Specifications

Item	Unit	Specifications				
		220V				
Motor Model		MH005A	MH010A	MH010H	MQ010A	MH015A
Mounting Flange Dimension	mm	□40	□40	□40	□60	□40
Mass	Without Brake	0.33	0.45	0.44	0.68	0.83
	With Brake	0.55	0.66	0.65	0.92	0.69
Rated Output Power	W	50	100	100	100	150
Rated Torque	N.m	0.16	0.32	0.32	0.32	0.477
Max. Instantaneous Torque	N.m	0.56	1.11	1.11	0.96	1.43
Rated Current	Arms	1.1	1.1	0.92	0.95	1.5
Max. Instantaneous Current	Arms	3.89	3.89	3.6	2.8	4.5
Rated Rotation Velocity	r/min	3000	3000	3000	3000	3000
Max. Rotation Velocity	r/min	6500	6500	6500	6500	6000
Torque Constant	N.m/A	0.168	0.327	0.347	0.369	0.33
Phase Inductive Voltage Constant	mV/(r/min)	5	11.1	13.3	11.6	13.1
Rated Power Change Rate	Without Brake	6.7	14.4	11.13	6.4	17.5
	With Brake	6.1	13.8	10.78	5.69	17.1
Mechanical Time Constant	Without Brake	2.6	1.67	2.23	2.96	1.9
	With Brake	2.85	1.74	2.3	3.33	1.94
Electrical Time Constant	ms	0.89	1.1	0.986	1.76	1.22
Motor Rotor Inertia	Without Brake	0.038	0.071	0.092	0.16	0.13
	With Brake	0.042	0.074	0.095	0.18	0.133
Permissible Load	Radial Load	68	68	68	68	68
	Axial Load	58	58	58	58	58
Encoder		17bit-23bit				
Adaptive Drive		SV-M6 Series/M7 Series				
Usage	-	Holding brake				
Power	-	Use a reinforced insulated power supply due to SELV power supply/hazardous voltage				
Rated Voltage	V	DC24V±10%				
Rated Current	A	0.25	0.25	0.25	0.9	0.375
Static Friction Torque	N.m	0.38 or more	0.38 or more	0.38 or more	0.38-1.1	0.58 or more
Absorption time	ms	35 or less	35 or less	35 or less	60 or less	50 or less
Release Time	ms	20 or less	20 or less	20 or less	40 or less	20 or less
Release Voltage	ms	DC1V or more	DC1V or more	DC1V or more	DC1.5V or more	DC1V or more

Maximum Rotation velocity under weak magnetic control is marked with *.

Item	Unit	Specifications												
		220V												
Motor Model		MA020A	MH020A	MH020H	MQ020A	MA040A	MH040A	MH040H	MQ040A	MA060E	MA075A	MH075A	MH075H	MG075A
Mounting Flange Dimension	mm	□60	□60	□60	□80	□60	□60	□60	□80	□110	□80	□80	□80	□80
	Mass	kg	0.9	0.87	0.95	1.24	1.28	1.45	1.6	3.1	2.25	2.25	2.65	3.46
Rated Output Power	W	200	200	200	200	400	400	400	400	600	750	750	750	750
	Rated Torque	N.m	0.64	0.64	0.64	0.637	1.27	1.27	1.27	1.91	2.39	2.39	2.39	4.77
Max. Instantaneous Torque	N.m	1.91	2.23	2.23	1.91	3.82	4.46	4.27	3.82	5.73	7.16	8.36	8.36	14.3
Rated Current	Arms	1.7	1.4	1.4	2	2.7	2.1	2.4	2.6	3	4.2	3.8	3.8	4.2
Max. Instantaneous Current	Arms	6.5	4.87	4.87	6.4	10.2	7.36	8.2	8.4	9	17.4	13.3	18.8	15
Rated Rotation Velocity	r/min	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	1500
Max. Rotation Velocity	r/min	5000/6000*	5000/6500*	5000/6500*	6500	5000/6000*	5000/6500*	5000/6500*	5000/6500*	5000	4500/6000*	4500/6000*	4500/6000*	2000
Torque Constant	N.m/A	0.427	0.5	0.5	0.318	0.488	0.67	0.531	0.488	0.63	0.583	0.648	0.648	1.135
Phase Inductive Voltage Constant	mV/(r/min)	14.5	14.61	14.61	12.2	17.9	20.85	20.4	19.6	24.48	21.33	22.65	22.65	43.3
Rated Power Change Rate	Without Brake	25.6	14.1	8.71	8.63	57.6	28.8	22.09	18.5	11.3	59.5	36.6	18.1	79
	With Brake	24.1	13.2	8.36	8.12	55.6	27.8	21.5	17.92	10.6	53.4	34.4	17.85	75.84
Mechanical Time Constant	Without Brake	0.775	1.57	2.54	2.51	0.561	1.24	1.15	1.51	1.77	0.463	0.97	1.95	1.01
	With Brake	0.824	1.68	2.65	2.67	0.581	1.29	1.18	1.57	1.87	0.516	1.03	1.98	1.05
Electrical Time Constant	ms	6.3	2.58	2.58	3.52	6.1	2.97	4.1	5.41	7.8	12.7	6.59	6.59	5.1
Motor Rotor Inertia	Without Brake	0.16	0.29	0.47	0.47	0.28	0.56	0.73	0.87	3.1	0.96	1.56	3.15	2.88
	With Brake	0.17	0.31	0.49	0.5	0.29	0.58	0.75	0.9	4.2	1.07	1.66	3.2	3
Permissible Load	Radial Load	245	245	245	245	245	245	245	245	392	392	392	392	392
	Axial Load	98	98	98	98	98	98	98	98	147	147	147	147	147
Encoder		17bit-23bit												

Item	Unit	Specifications												
Voltage	V	220V												
Motor Model		MA020A	MH020A	MH020H	MQ020A	MA040A	MH040A	MH040H	MQ040A	MA060E	MA075A	MH075A	MH075H	MG075A
Adaptive Drive		SV-M6 Series/M7 Series												
Usage	-	Holding brake												
Power	-	Use a reinforced insulated power supply due to SELV power supply/hazardous voltage												
Rated Voltage	V	DC24V±10%												
Rated Current	A	0.36	0.36	0.36	0.9	0.36	0.36	0.36	0.9	0.81	0.42	0.42	0.42	0.42
Static Friction Torque	N.m	1.6 or more	1.6 or more	1.6 or more	1.6 or more	1.6 or more	1.6 or more	1.6 or more	1.6 or more	12 or more	0.38 or more	0.38 or more	0.38 or more	0.38 or more
Absorption time	ms	50 or less	50 or less	50 or less	60 or less	50 or less	50 or less	50 or less	60 or less	100 or less	70 or less	70 or less	70 or less	70 or less
Release Time	ms	20 or less	20 or less	20 or less	40 or less	20 or less	20 or less	20 or less	40 or less	60 or less	20 or less	20 or less	20 or less	20 or less
Release Voltage	ms	DC1V or more	DC1V or more	DC1V or more	DC1.5V or more	DC1V or more	DC1V or more	DC1V or more	DC1.5V or more	DC1V or more	DC1V or more	DC1V or more	DC1V or more	DC1V or more

Item	Unit	Specifications												
Voltage	V	220V												
Motor Model		MG085A	MG085S	MA090E	MA100A	MM100A	MM100S	MQ100E	MH100A	MG100A	MA120E	MG130A	MG130S	MA150A
Mounting Flange Dimension	mm	□130	□130	□110	□100	□130	□130	□80	□130	□130	□110	□130	□130	□100
Mass	kg	5.53	5.7	3.7	3.5	4.67	5.87	2.68	6.4	6.91	4.3	6.89	7.3	4.4
Rated Output Power	W	850	850	900	1000	1000	1000	1000	1000	1000	1200	1300	1300	1500
Rated Torque	N.m	5.41	5.39	2.86	3.18	4.77	4.77	3.185	4.77	9.55	4	8.28	8.28	4.77
Max. Instantaneous Torque	N.m	16.2	16.2	8.6	9.55	14.3	14.31	11.13	14.3	28.6	12	24.84	24.84	14.3
Rated Current	Arms	5.9	6.7	4.5	6.6	5.2	8.25	5.7	5.2	5.2	6	9.3	9.6	8.2
Max. Instantaneous Current	Arms	18	20.1	13.5	28	15.6	25	21.2	15.6	16	18	28	28.8	35
Rated Rotation Velocity	r/min	1500	1500	3000	3000	2000	2000	3000	2000	1000	3000	1500	1500	3000
Max. Rotation Velocity	r/min	3000	4000	5000	5000	3000	5000	4500/6000*	3000	1500	5000	3000	4000	5000
Torque Constant	N.m/A	0.918	0.859	0.63	0.52	0.918	0.573	0.552	0.918	1.83	0.63	0.895	0.891	0.628
Phase Inductive Voltage Constant	mV/(r/min)	33.65	31.04	24.52	18.15	33.65	21.2	21.2	33.65	67.3	23.55	34.84	32.08	21.92
Rated Power Change Rate	KW/S	63.29	20.9	17.1	49.82	36.8	24.84	50.7	7.39	75.4	23.1	33.9	35	80.12
Mechanical Time Constant	ms	3.43	2.74	1.98	0.619	1.51	1.24	0.85	7.54	1.12	1.5	2.57	2.23	0.507
Electrical Time Constant	ms	11.1	10.2	6.78	7.22	11.1	13.3	7.6	11.1	9.65	8.86	14.63	10.7	8.08
Motor Rotor Inertia	x10 ⁻⁴ kg·m ²	14	13.9	4.5	2.03	6.18	9.16	2	30.8	12.1	5.9	20.2	19.9	2.84
Permissible Load	N	490	490	392	392	490	490	392	490	490	392	490	490	392
Encoder		17bit-23bit												
Adaptive Drive		SV-M6 Series/M7 Series												
Usage	-	Holding brake												
Power	-	Use a reinforced insulated power supply due to SELV power supply/hazardous voltage												
Rated Voltage	V	DC24V±10%												
Rated Current	A	0.9	0.41	0.81	0.81	0.9	0.9	0.42	0.9	0.9	0.81	0.9	0.41	0.81
Static Friction Torque	N.m	14 or more	14 or more	12 or more	8 or more	14 or more	14 or more	3.8 or more	14 or more	14 or more	12 or more	14 or more	14 or more	8 or more
Absorption time	ms	100 or less	100 or less	100 or less	50 or less	100 or less	100 or less	70 or less	100 or less	100 or less	100 or less	100 or less	100 or less	50 or less
Release Time	ms	60 or less	80 or less	60 or less	60 or less	60 or less	60 or less	60 or less	60 or less	60 or less	60 or less	60 or less	80 or less	15 or less
Release Voltage	ms	DC1V or more	DC1V or more	DC1.5V or more	DC1V or more	DC1V or more	DC1V or more	DC1V or more	DC1V or more	DC1V or more	DC1.5V or more	DC1V or more	DC1V or more	DC1V or more

Maximum rotation velocity under weak magnetic control is marked with *.

Item	Unit	Specifications										
Voltage	V	220V										
Motor Model		MA150E	MM150A	MM150S	MH150A	MA180E	MG180A	MG180S	MA200A	MM200A	MM200S	
Mounting Flange Dimension	mm	□110	□130	□130	□130	□110	□130	□130	□100	□130	□130	
Mass	kg	4.95	5.87	6.98	7.8	5.4	8.14	8.8	5.3	12.1	6.91	
Rated Output Power	W	1500	1500	1500	1500	1800	1800	1800	2000	2000	2000	
Rated Torque	N.m	4.77	7.16	7.16	7.16	5.73	11.5	11.5	6.37	9.55	9.55	
Max. Instantaneous Torque	N.m	14.3	21.5	21.5	21.5	17.2	34.5	34.5	19.1	28.6	28.6	
Rated Current	Arms	7.6	8	9.5	8	9.5	11.8	15.6	11.3	9.9	15	
Max. Instantaneous Current	Arms	24	24	29	24	29	35.5	46.8	48	30	50	
Rated Rotation Velocity	r/min	3000	2000	2000	2000	3000	1500	1500	3000	2000	2000	
Max. Rotation Velocity	r/min	5000	3000	5000	3000	5000	3000	4000	5000	3000	5000	
Torque Constant	N.m/A	0.63	0.895	0.672	0.895	0.63	0.964	0.748	0.607	0.9645	0.627	
Phase Inductive Voltage Constant	mV/(r/min)	23.2	34.84	25.9	34.84	22.3	40.18	27	21.247	37.95	23	
Rated Power Change Rate	KW/S	28	56	42.37	13.3	34.7	50.87	50.9	110.26	75.4	54.13	
Mechanical Time Constant	ms	1.47	1.16	1.08	4.9	1.38	2.06	1.95	0.425	1.05	0.93	
Electrical Time Constant	ms	9.35	14.6	16.13	14.63	9.54	15.99	11.14	9.37	15.38	13.75	
Motor Rotor Inertia	x10 ⁻⁴ kg·m ²	7.3	9.16	12.1	38.5	8.6	26	26	3.68	12.1	16.85	
Permissible Load	N	392	490	490	490	392	490	490	392	490	490	
Encoder		17bit-23bit										
Adaptive Drive		SV-M6 Series/M7 Series										
Usage	-	Holding brake										
Power	-	Use a reinforced insulated power supply due to SELV power supply/hazardous voltage										
Rated Voltage	V	DC24V±10%										
Rated Current	A	0.81	0.9	0.9	0.9	0.81	0.9	0.41	0.81	0.9	0.9	
Static Friction Torque	N.m	12 or more	14 or more	14 or more	14 or more	12 or more	14 or more	14 or more	8 or more	14 or more	14 or more	
Absorption time	ms	100 or less	100 or less	100 or less	100 or less	100 or less	100 or less	100 or less	50 or less	100 or less	100 or less	
Release Time	ms	60 or less	60 or less	60 or less	60 or less	60 or less	60 or less	80 or less	15 or less	60 or less	60 or less	
Release Voltage	ms	DC1.5V or more	DC1V or more	DC1V or more	DC1V or more	DC1.5V or more	DC1V or more	DC1V or more	DC1V or more	DC1V or more	DC1V or more	

Maximum Rotation velocity under weak magnetic control is marked with *.

Environmental Specifications and Precautions

Environmental Specifications	Rated Time	Continuous
	Ambient Operating Temperature	0°C - 40°C (with no condensation)
	Ambient Operating Humidity	20 ~ 85%RH (with no condensation)
	Ambient Storage Temperature	-20°C - 65°C (with no condensation)
	Ambient Storage Humidity	20 ~ 85%RH (with no condensation)
	Operating & Storage Atmosphere	Indoors (no direct sunlight), free from corrosive gas, flammable gas, oil mist, dust and dirt
	Heat Resistance	Class B
	Insulation Resistance	DC1000V-5MΩ or more
	Insulation Withstand Voltage	AC1500V for one minute
	Altitude	Below 1000m above the sea level
Precautions	Vibration Class	V15 (JEC2121)
	Vibration Resistance	49m/s ² (5G)
	Impact Resistance	98m/s ² (10G)
	Protection	IP67
		<ul style="list-style-type: none"> Grounding should follow the instructions. Class I is available. Overvoltage category II is available/allowable. Pollution degree 2 is available. Torque ratings are shown when mounted on an L-beam approximately two times the size of the motor flange. The brake connection wire has different polarities. Red wire: Connects to +24V Black wire: Connects to GND