

气动分度台 MT 系列

关于安全与安装的说明

〈安全使用MT系列的指引〉

22.12

强制 请将此安装说明书交给使用者。
非常感谢您使用本公司的产品。
使用MT产品之前，请认真阅读此说明书并妥善保管。若有不明之处，请与我公司联系。

1. 安全事项

1.1 警告标识说明

警告 如果无视此标识进行安装，有可能导致使用者的死亡或重伤。

注意 如果无视此标识错误安装，有可能导致使用者的负伤及物品的损坏。

此外，**注意** 记载的事项也可能根据具体情况不同，引发其他的严重问题，2种标识都记载着相当重要的信息，请务必仔细阅读。

■记号的说明

记号	说 明	记号	说 明
	强制执行		禁止执行

1.2 关于搬运

注意 搬运时务必确保以下事项

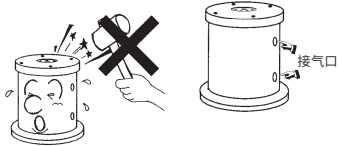
- 本产品为精密机械，请勿碰撞或使产品跌落。
 - 可能会导致产品在使用中发生故障。
- 产品跌落可能对身体部位造成损伤，请确认好产品型号、重量后再进行搬运。

2. 安装事项

2.1 基础要点

注意

- 不得混入异物
 - 接气口不得混入金属片等异物。
 - 可能导致内部损坏。
- 不得强行旋转
 - 不得从外部强行旋转转台。
 - 可能导致内部损坏。
- 不得撞击
 - 请勿撞击产品，在负载安装产品时请小心注意。
 - 可能导致内部损坏，而不能正确进行分度动作。
 - 本产品在出货时会涂布防锈剂暂时防锈。组装时请用酒精或煤油等进行擦拭，将防锈膜除去后再进行使用。
 - ◎防锈剂品种:油性涂料
 - 【防锈剂的去除方法】 取适量的涂料用酒精或煤油，用布擦拭去除。



2.2 定位安装

注意

- 确保固定
 - 请务必确保MT产品在使用时已经固定。安装前，请确认安装方法和使用条件及本体重量相匹配。
 - 可能在动作中脱落，导致二次伤害。
 - 请勿安装已经损坏的MT产品。
 - 可能导致受伤及二次伤害。
- 保护本体
 - 本品不是防水式样。如果在滴水、滴油和粉尘较多的环境下使用，请务必采用防水/防尘罩进行防护。（防水・防尘是特殊式样。）
 - 可能导致运行不良，损坏等情况。



3. 调整・参考回路

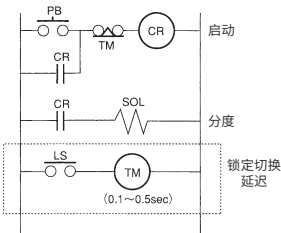
3.1 关于调整的注意事项

警告 请务必进行试运行 **重要**

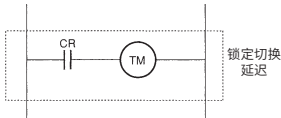
- 运行前请务必确认各个控制部分。
 - 根据设备的不同，可能会出现不可预期的动作，非常危险。

注意 请务必进行调试

- 为避免在停止端发生冲击或产生裂痕，请由低速开始，缓慢提高速度。
 - 若初次启动就进行高速运转，可能会导致转台内部损坏。
- 请勿进行极端状态的调试。
 - 可能导致动作不稳定，造成设备损坏等危险情况。



回路1. 使用LS感应开块



回路2. 使用计时器

3.2 参考回路图（单螺线管）

〈解 説〉

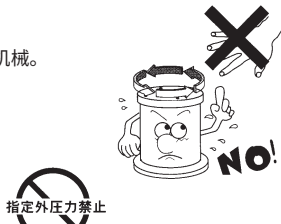
- SOL电磁阀开启后，转台开始旋转，旋转至距离规定分度角5°~7°前停止。此位置由LS感应块检出并随后关闭电磁阀，转台将转动剩余5°~7°并完成锁定。（回路1）
 - 为了保证活塞正确运行，请勿设置LS感应触发后立即关闭阀门，而是将阀门关闭时间设置在LS触发后0.1~0.5秒左右。
- 若分度时间充裕，也可以使用计时器进行控制。
 - 请设定适合的时间。（回路2）

4. 使用注意事项

4.1 使用中

警告

- 运行中禁止接触
 - 绝对不可以用手直接接触动作中的旋转部分，请勿使衣物卷入机械。
 - 身体或衣物的卷入十分危险。
- 禁止超压
 - 请在气/油压力允许范围内使用。
 - 超压使用可能导致重大事故。
- 注意** 禁止旋转负载侧
 - 本产品在停止后，请勿旋转负载侧。
 - 强行旋转可能导致产品内部损坏，从而导致不能正常运行，引发故障。



4.2 紧急停止时动作的状态

注意 根据选择的气阀的不同，启动时突然前进以及紧急停止时的动作状态可能会有所不同。

■ 2点单向SOL电磁阀			
紧急停止时的状态	活塞状态	转台的状态	再启动的情况
分度中途的情况	即下降行程	在分度中途立即停止	继续完成剩下的分度动作
锁定中途的情况	即上升行程	继续进行锁定动作（5°~7°）	重新开始分度

■ 2点双向SOL电磁阀			
紧急停止时的状态	活塞状态	转台的状态	再启动的情况
分度中途的情况	继续进行下降动作	旋转至分度结束	重新开始分度
锁定中途的情况	继续进行上升动作	继续进行锁定动作（5°~7°）	重新开始分度

非立即停止，请注意

2.3 关于负载安装

注意 请按照螺丝尺寸及深度要求配件

- 请遵守右表负载安装螺丝的深度尺寸要求。
 - 螺丝过长有可能产生干涉，导致无法旋转。

禁止超载

- 承载重量不得超过允许值。
 - 可能导致产品内部损坏。
- 横向（轴水平）安装的情况下，相对于负载旋转方向，负载时请注意左右平衡。
 - 悬臂、单方偏重可能导致旋转方向的失速。

型 号	螺丝尺寸	深度
MT100	M6	10mm
MT125	M6	10mm

2.4 配管・配线的注意事项

警告 请设置紧急停止回路

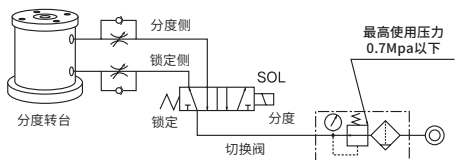
- 在紧急情况下必须停气断电，请进行紧急断电及安全性功能的设计。
 - 紧急状态时如不能停机是非常危险的。

注意 请正确配管配线

- 请熟读配管方法，正确配置气管。
 - 可能引起动作异常、损坏、损伤。
- 请勿碰伤配管，请勿在配管上施加过大的压力或夹坏配管。
 - 可能导致配管破裂。
- 请勿弄混分度与锁定配管。
 - 可能导致设备失控。
- 请勿在紧急停止回路上使用三相回路。
 - 否则可能导致初始速度不稳定而损害内部结构。
- 本体附近的速控器必须用节气阀进行配管。
 - 可能导致不能正常动作。
- 配管前请务必进行管内清洗。
 - 可能导致动作不良。
- 请正确安装限位开关。
 - 可能导致设备失控。

2.5 配管方法

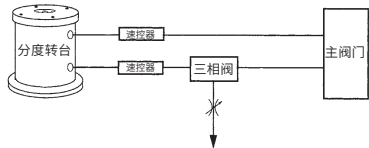
- 本品内部有往复活塞、次活塞往复一次为一次分度。因此配管与普通往复型气缸的配管相同。
- 如右图所示台面旋转侧是分度接气口（前进用）、下侧是锁定接气口（后退用）。请分别进行出口节流式回路设定并安装速控器。
- 请使用与周边设备相符的部件。



■关于缓冲

本品是匀速旋转，在高速及负荷较大的情况下会在停止端发生撞击。在外部利用导杆与压板的减震器或弹簧等，可以做到一定的缓冲。

也可以在排气回路上安装三项阀，在旋转结束前得到信号，切换三项阀，使用旁路回路用速控器进行调节。



2.6 电气控制

停电及有可能发生危险时，请务必切断电源。

- 控制方法与一般往复气缸相同，切换气阀需要信号。
- 相当于气缸前进端开关的传感器挡片可以安装在台面侧边或传动轴后部。（如左图）
- 如果不使用限位开关，请使用计时器进行时间控制。
- 请正确设定切换空气的时机。特别是低速的情况下，若在锁定之前启动开关并立刻切换气阀，可能会导致无法锁定位置。
 - 此种情况可以利用计时器，在开关启动之后稍过片刻，再切换气阀。

5. 维护・检修

5.1 异常情况处理方法

警告

- 停电及有可能发生危险时，请务必切断电源。
 - 再次通电后可能引发设备失控，十分危险。
- 紧急停止并不会立即终止运行，请务必注意。
 - 误操作可能产生危险，导致受伤。
- 再启动设备时请勿过于靠近设备。
 - 设备在启动后可能会产生不可预期的动作，十分危险。

注意

- 如发生过载，撞击等异常情况，请联系本公司。
 - 有可能导致的意想不到二次灾害。

5.2 维护・检修

注意 安全保管

- 请勿在以下场所存放机械设备及附属品。

儿童可以轻易接触并带出的场所・温度与湿度变化极大的场所・高湿度场所・阳光直射的场所・放置易挥发物品的场所

禁止分解・改造

- 不得分解，改造本产品。
 - 否则不保证正常的运行。
- 本产品拆卸时，请务必断气以及泄压。
 - 可能引发人身伤害或机械失控。
- 内部的密封环为JIS标准，密封环的磨损或破损等可能导致气体泄露或输出效率低下。为了防止二次灾害的发生，本公司推荐5年左右更换密封环（一般环境）。
- 请不要揭掉本体上的标签。如果标签剥离，请联系本公司进行更换。
 - 若无标签，本公司无法进行正规质保。

6. 其他

关于保修（ 请确认保修期及保修内容）

- MT的免费保修期为：在样本条件内使用的前提下，出货后1年或实际使用2500小时。（以先达到时间的准）
- 在保修期内、确是由于MT的品质问题引起的故障、本公司对此进行无偿维修，但不负担拆卸工时及相关费用。
- 对于使用人无端进行改造，解体等情况，本公司无法进行无偿服务。
- 本公司不对出售海外的产品进行保修或技术支持。
- 关于产品的长期保存，请联系本公司或相关代理商。

关于售后

- 本商品因技术改良，时常有式样变更的情况，请您知晓。
- 如需产样本录及其他技术资料，请联系本公司销售部门。
- 我们还提供产品选型技术咨询等服务。

维修委托

- 问题产品・维修等，请联系本公司销售部或相关代理商。（销售部）TEL 0565—76—0029 FAX 0565—76—0023

关于废弃

- 请将本产品作为一般工业废弃物处理。



加茂精工株式会社

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URL www.kamo.co.jp
KAMO FA(韓国)
ソウル特別市神川區加山洞550-1 A.P.T.形工場IT CASTLE1洞216号
TEL 02-761-5621
URL www.kamofa.co.kr E-mail kamofa@kamofa.co.kr
加茂佐輪科技(南京)有限公司(中国)
南京市秦淮区太平南路166号远洋国际中心北区3幢1单元901室 邮编:210001
TEL 025-5223-0890
URL www.kamoasia.com E-mail ztc@kamoasia.com

Mini-table MTSeries



Manual For Handling the Device With Safety (Handbook for using Mini-table correctly and safely)

強制 Deliver the manual to those who actually use the device.
We sincerely appreciate purchase of our products. Read the manual before using the device correctly, and keep it carefully for future reference. Contact us if you found something not understandable.

1. Note for safety.

1.1 Description of signs

The manual includes notices marked by signs in order to prevent accident from being occurred due to incorrectly using the device.

Warning This sign means that there is a possibility of getting damaged or fatally injured if used incorrectly by ignoring the warning.

Caution This sign means that there is a possibility of getting injured or doing damage on other material if used incorrectly by ignoring the caution.

* Noted that the sign designated by **Caution** involves a grave consequences. Abide by the rule designated at the signs because they contain important descriptions.

What symbols mean

pictograph	meaning
	This sign includes content which notifies to force and instruct to do.
	This sign notifies to prohibit to do.

1.2. Transportation

- Caution** **Positively hold in place upon transportation.**
- Device is precision machine. Don't give any strong impact and don't drop on ground.
 - It may be cause of breakdown.
 - When device drops, it may give damage on feet or hand of body.
 - Confirm type and weight of device upon transportation.

2. Setting

2.1 Handling

- Caution** **Don't get in foreign matters**
- Don't admit metal chips of foreign matters via air-port hole.
 - It may cause internal damage.
- Don't turn forcibly.**
- Don't forcibly turn table outside.
 - It may cause internal damage.
- Don't give unduly impact.**
- Don't give strong impact to device. Be very careful when attaching load or the like.
 - It may cause internal damage, and fail to insure accurate index action.
 - Our products including Mini-table have been coated with rust preventing agent on the shaft to prevent rust temporarily. When mounting Mini-table to the machine, remove the rust preventing agent.
 - Rust preventing agent type : Oil-based varnish
 - 【How to remove the rust preventing agent】
 - Wipe with a cloth or the like soaked with alcohol for coating or white kerosene.

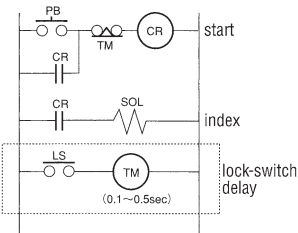
2.2 Installation

- Caution** **Positively fix**
- Fix the device positively to machine. Attach the device in accordance with users' requirements and weight of the device.
 - If otherwise, the device may drop during operation or it may invite secondary disaster.
 - Don't install the device when it is broken.
 - If otherwise, it may invite injuries or secondary disaster.
- Protect device**
- No measures are taken for the device to attach water proof and dust proof equipments. Protect the device against the water and dust with the use of a sheet cover or the like. (* measure is taken for protecting the device against the water drop and dust is compensated by special equipments)
 - If otherwise, it may invite malfunction or damage on the device.

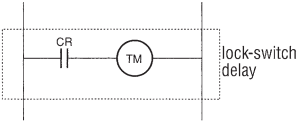
3. Adjustment and reference circuit

3.1 Note for adjustment

- Warning** **Make sure to do trial operation.** **Important**
- Confirm controller at each place before starting operation.
 - Otherwise, it may unexpectedly move depending on device, and invite very dangerous situation.
- Caution** **Make sure to do adjustment.**
- Raise speed gradually from low speed range so that shock or chattering would not occur at stoppage end.
 - When operated at high speed from start, it may invite internal damage or the like.
 - Don't do adjustment alteration excessively.
 - Otherwise, it may render movement unstable and dangerous. It may also be cause of breakdown.



Circuit 1. Index switch (LS) is used,



Circuit 2. Timer-control is implemented to control time without using index switch (LS),

3.2 Reference circuit (for single solenoid)

- Explanation**
- Actuate solenoid [ON] to rotate by 5-7 degrees left before entering index completion until ceased. This position is detected by index switch (LS) before turning off solenoid. Upon turning off solenoid, table turns rest of 5-7 degrees to complete lock (Circuit 1).
 - In order to positively make piston move, predetermine time of 1-0.5 sec after turning on limit switch instead of turning off valve soon after energizing limit switch.
 - When implementing index action with some latitude, it is possible to use timer instead of employing limit switch. Upon setting timer, predetermine appropriate time (Circuit 2).

4. Note upon usage

4.1 In use

- Warning** **Contact prohibited in use**
- Don't touch rotary portions actuated. Make sure that heed should be paid for clothes not to be caught in.
 - It may be very dangerous when clothes or body is caught in.
- Pressure prohibited other than specified**
- Abide by air (oil) pressure strictly specified.
 - To use pressure other than specified may invite very dangerous situation (breakage).
- Caution** **Don't actuate where load is placed.**
- When device stops, don't actuate where load is placed upon restarting.
 - When rotated forcibly, it may invite internal damage and lose normal function. It may also invite cause of breakdown.

4.2 Manners of action at emergency stop

Caution **Manners become different in action at quick start and at emergency stop depending on selected valve.**

two-position, single solenoid valve

situation in emergency stop	manner of piston	situation of table	at time of restarting
in middle of index action	downward stroke instantly set	instantaneous stop in middle of index	restarting rest of index action
in middle of locking action	upward stroke instantly set	resuming locking action (moves by 5-7 degrees)	restarting index action

two-position, double solenoid valve

situation in emergency stop	manner of piston	situation of table	at time of restarting
in middle of index action	resuming downward stroke	rotating until index action completed	restarting index action
in middle of locking action	resuming upward stroke	resuming locking action (moves by 5-7 degrees)	restarting index action

Be careful because it does not stop immediately.

2.3 Attaching load

- Caution** **Abide to screw depth**
- As for load-attaching screws, depth of four screws on table surface should be abided by dimensional list raised at right side.
 - If screw bolt is too long, interference occurs to disable rotational movement.
- Don't apply load more than allowable.**
- Don't apply load weight exceeding an allowable value.
 - If otherwise, it may invite an internal breakage.
 - Upon laterally setting (axially horizontal), place load to be well-balanced right and left against rotational center.
 - Offset load like arm lever may cause to rotationally move preemptively.

Type	Screw Size	Depth
MT100	M6	10mm
MT125	M6	10mm

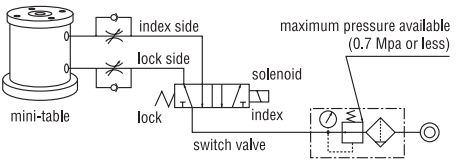
2.4 Note for placing pipe and routing wire

- Warning** **Install Emergency Stop Circuit**
- Do safety-emphasized design so that device is instantaneously ceased with quick interruption from air and electrical power source at emergency.
 - Otherwise, it may be very dangerous if rendered unable to stop device at emergency.

- Caution** **Place pipe and route wire correctly.**
- Read manual sufficiently before placing air pipe correctly.
 - Otherwise, it may invite damage, injury or malfunction.
 - Don't injure pipe, don't apply load forcibly and don't clamp pipe.
 - Otherwise, it may invite breakage.
 - Be sure not to mistake pipe for index and locking pipe.
 - Otherwise, it may invite runaway.
 - Don't use three-position to emergency stop circuit.
 - Otherwise, it may render starting speed unstable and invite internal damage.
 - Arrange pipe so that speed controller is located near device with exit side directed squeezably (meter-out circuit).
 - Otherwise, it may disable normal function.
 - Make always sure to sufficiently flush pipe before arranging pipe.
 - Otherwise, it may invite malfunction.
 - Positively secure limit switch or the like in right place.
 - Otherwise, it may invite runaway.

2.5 How to arrange pipe

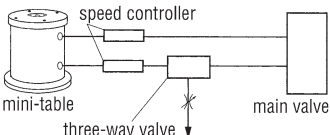
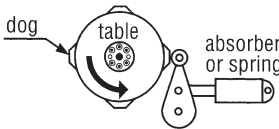
- Device has reciprocal piston internally. One single reciprocal movement corresponds to one single index action. Pipe is arranged in same manner as placing for reciprocal air-cylinder.
- Index air-port hole (forward side) is provided at turn table side, and lock air-port hole (backward side) provided at lower side (see drawing below). Set speed controller with meter-out circuit (exit-squeeze circuit).
- Use peripheral equipments in conformity with specification.



Cushion

Device uniformly rotates so that it induces impact at stoppage end when used at high speed with high load. With use of roller and dog attached to absorber or spring, it is possible to reduce shock in some degree.

Install three-way valve in exhaust circuit. Change three-way valve due to signal received immediately before end of rotation. This enables user to squeeze speed controller in bypass circuit.



2.6 How to implement electrical control

- Device needs two-step operation to implement predetermined index action.
- Device needs electrical signal to change valve, and controlled in same manner as air-cylinder in general.
- Dog used for sensor may be attached to table side or rear end of shaft (see left drawing). Dog corresponds to forward end switch in air-cylinder.
- When limit switch is not used, employ timer-control equipment to control time.
- Determine air-switch timing correctly. Be careful that switch is actuated before entering locking position particularly when operating at low speed. This instantaneously renders valve to change, thus failing to insure positioning lock.
 - In this case, use timer to take a little time upon turning on switch and implement to change valve.

5. Check and maintenance

5.1 How to cope with abnormal situation

- Warning**
- Make sure to cut off electrical power source circuit when power failure occurs or dangerous situation is supposed.
 - Otherwise, it may be very dangerous if runaway or the like is induced when power failure is recovered.
 - Be careful that device does not cease immediately at emergency stop.
 - It may be very dangerous if get injury when mistakenly touch device with hand.
 - Make sure not to approach device when operated again.
 - Otherwise, it may unexpectedly move depending on device, and invite very dangerous situation.
- Caution**
- Contact our company when abnormal situation arises under influence of overload, impact or the like.
 - It may invite unexpected secondary disaster.

5.2 Check and maintenance

- Caution**
- Take safety measure when storing device.
 - Upon storing unused machines and accessories in a place, don't keep them in the following places.

Where is accessed by child, where they are easily taken out, where temperature and humidity change abruptly, where is in high humidity environment, where admits direct sunshine, and where volatile liquid substance is deposited.
- Disassemble and remodeling are prohibited.**
- Don't disassemble and improve the device.
 - If otherwise, we can't guarantee normal operation of the device.
 - Make sure to interrupt air, and release rest of air upon mounting and removing device.
 - Otherwise, it may invite injury or runaway.
 - Every internal seal is JIS-based component part. Wear and breakage of seal may be cause of air leakage and decline output power. In order to prevent secondary disaster due to breakdown, replacing seals in five-year terms would be recommended even when used under normal environment.
 - Don't take off label. Contact our company and replace with new one when label is likely to comes off.
 - Otherwise, it may fail to insure normal guarantee.

6. Other notice

6.1 Guarantee (Check the terms & contents of guarantee)

- On the understanding that the device (mini-table device) is used in accordance with our specification, we guarantee the period to repair the device free of charge until a time which earlier relapses after operating 2500 hours on delivery or within one year after delivery.
- If trouble or defect appears with in the guaranteed period of time obviously due to deteriorated quality of mini-table device, we guarantee to repair the device free of charge.
 - Note that we charge device-related expenditures and expenses arisen from steps of detaching parts from and attach parts to the device.
- If the device is repaired, disassembled or improved at customers' side, Repair free of charge should be outside our guaranteed requirements.
- We don't have overseas maintenance and technological support in connection with the device.

6.2 After-Sales-Service

- For the sake of quality improvement, the specification may be subject to change without notice.
- As for our catalogue and other technological documents, contact sales department of our company.
- We are always ready to arrange technological inquiry and meeting, contact us by telephone without hesitation.

6.3 Repair and trouble

- In case of trouble or inquiry for repair, contact sales department of our company or sales shop where you purchased the device.
 - Sales department TEL +81-565-76-0029 FAX +81-565-76-0023
 - (* We hope that the catalogue will be of your help. Your inquiries and information would be highly appreciated. We always wait and welcome your direct contact.)

6.4 Disposal

- Dispose the device as general industrial wastes.



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