

OMRON **ST**

型号 **G9SX-SM032-□**

电动机停止检出单元

Chinese **使用说明书**

感谢您此次购买型号G9SX-SM□电动机停止检测单元。本使用说明书中描述了型号G9SX-SM□使用上所需的功能、性能、使用方法等信息。

请遵循以下几点，使用G9SX-SM□产品。

- 型号G9SX-SM□需由掌握电气知识的专门人员操作。
- 请务必仔细阅读本说明书后正确使用。
- 请妥善保管以备随时参阅。

欧姆龙株式会社 2166131-1 B

EU符合性宣言

欧姆龙声明G9SX-SM□符合以下EU指令要求。

EMC指令 2004/108/EC
机械指令 2006/42/EC

规格

型号G9SX-SM□是根据以下规格要求，设计/制造的产品。

EN954-1 安全等级4
EN ISO13849-1:2008 安全等级4 PL e,
IEC/EN61508 SIL3, IEC/EN62061 SIL3,
IEC/EN61000-6-2, IEC/EN61000-6-4,
UL508,
CAN/CSA C22.2 No. 142

安全注意事项

●警告标识的含义

警告 如果不正确处理，则有可能对人身造成轻度或中度伤害。严重情况下，甚至会导致重伤和死亡。另外可能会造成重大损失。

●图案符号的含义

⊘

●表示非特定、一般的禁止通告。

! ●表示非特定、指示一般使用者行为的图案符号。

●警告标识

警告

输出故障可能造成重大人身伤害。切勿使用超出安全输出额定值的负载。

安全功能损坏可能造成重大人身伤害。请勿在只用一台变频器和接触器驱动多个电动机的系统中使用本产品。

安全功能损坏可能造成重大人身伤害。为了避免供电电源以及负载电源短路请妥善进行接线。

输出故障可能造成重大人身伤害。在安全输出中连接感性负载时，请加装反电动势保护电路。

安全功能损坏可能造成重大人身伤害。检测对象电动机请在G9SX-SM□的额定输入频率数（120Hz）以下的条件下运行。

安全功能损坏可能造成重大人身伤害。请使用相适合的控制设备。

控制设备	必要事项
电磁闭锁安全-门开关	请使用满足IEC/EN60947-5-1的强制断开动作机构要求事项的规格认证品。 此外，请使用适用于电磁螺线管规格（在DC24V、300mA以下）螺线管型机械闭锁机构开关。
安全继电器	请使用满足安全继电器EN50205的强制定位机构所要求事项的规格认证品。 反馈用接点请使用适用于微小负载（DC24V、5mA）的接点。
接触器	为了及时发现接触器接点的不能开，请使用强制定位式接触器，并将接触器的b接点连接到EDM输入上。 反馈用接点请使用适用于微小负载（DC24V、5mA）的接点。 如果连接EDM输入的接触器b接点并非强制定位式接触器的b接点，那么即使连接接触器的b接点也不能发现接触器接点的不能开现象。
其他控制设备	请在充分验证是否满足要求的安全等级后再使用。

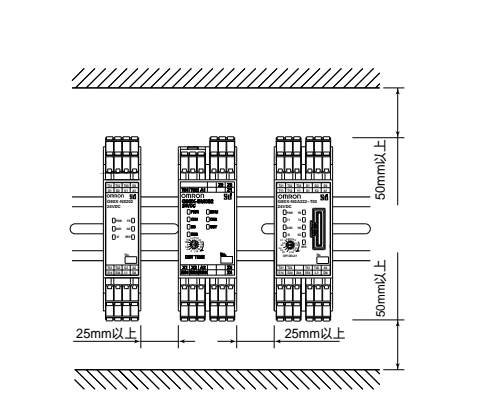
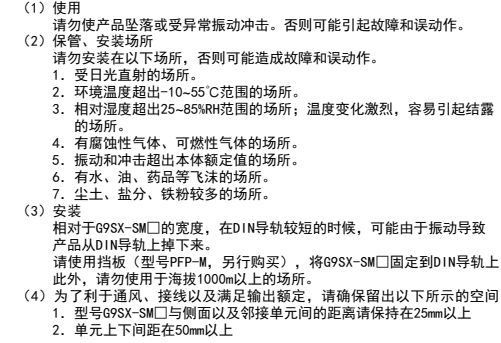
安全上的要点

- 请将要型G9SX-SM□放置于防护等级IP54（IEC/EN60529）以上的控制箱中使用。控制箱请务必接地（PE）。
- 输入输出端子请正确接线并在运行前进行动作确认。如果接线错误可能造成安全功能损坏。
- G9SX-SM□的电源输入，请不要连接额定值以上的DC或AC电源输出。
- 有触电的危险。
DC电源装置请满足以下几项内容。
-符合IEC/EN60950、EN50178等具有双重绝缘或强化绝缘的DC电源装置，或是符合IEC/EN61558的变压器。
-满足由UL508定义的2级电路或限制电压电流电路的输出特性要求。
- 请确保输入端子上施加的电压为规定电压。
施加错误电压会导致产品不能发挥既定的功能，安全功能降低、产品发生损坏、烧毁等情况。
- 监视输出、报错输出不是安全输出。请勿作为安全输出使用。
G9SX-SM□或外围设备发生故障时，会损坏安全功能。
- 型号G9SX-SM□的安装、点检、维护是否正确实行，请务必与“责任人”进行确认。
所谓“责任人”是指在机械的设计、安装、运用、维护、废弃各阶段，具有确保安全的资格、权限或责任的人。
- 型号G9SX-SM□的安装与安装后的确认，应由对安装机械非常熟悉的“责任人”进行操作。
- G9SX-SM□是根据所设定的停止检测输入电压判定值来判定电动机是否需要停止。当停止检测输入电压低于判定值时电动机停止运转。有时因为电动机的特性和负载条件，电动机在还未完全停止前已进行停止检测输出。若出现上述情况，应由“责任人”确认停止检测输出后的电动机旋转状态是否在风险容许度之内，再进行使用。
- G9SX-SM□必须进行日常点检、六个月一次的点检。
否则可能造成系统无法正常运转的重大损坏。

- 请勿拆卸、修理、改造本产品。否则原本的安全功能可能有失效的危险。
- 连接到G9SX-SM□的具有安全功能的设备、部件，请根据安全等级以及安全等级的要求使用相应的规格品。
对于系统的安全性以及安全等级的符合性，需要对系统整体进行评价。关于安全等级符合性判定相关事宜，请与具有权限的第三方认定机构等详谈。
- 系统整体的安全标准符合性，由客户自行负责。
- 接线时，请务必在断电状态下进行。
否则本装置连接的外部装置可能发生无法预测的动作。
- 在安装端子台的时候，请小心以免夹到手指。
- 请勿在易燃易爆环境下使用。
- 由于停止检测输入上加有电动机驱动电压，所以请务必使用保险丝和电流断路器过电流保护装置（3A以下），并且按规定的紧固扭矩接线安装。

使用上的注意

- 使用
请勿使产品坠落或受异常振动冲击。否则可能引起故障和误动作。
- 保管、安装场所
请勿安装在以下场所，否则可能造成故障和误动作。
1. 受日光直射的场所。
2. 环境温度超出-10~55℃范围的场所。
3. 相对湿度超出25~85%RH范围的场所；温度变化激烈，容易引起结露的场所。
4. 有腐蚀性气体、可燃性气体的场所。
5. 振动和冲击超出本体额定值的场所。
6. 有水、油、药品等飞沫的场所。
7. 尘土、盐分、铁粉较多的场所。
- 安装
相对于G9SX-SM□的宽度，在DIN导轨较短的时候，可能由于振动导致产品从DIN导轨上掉下来。
请使用挡板（型号PFP-M，另行购买），将G9SX-SM□固定到DIN导轨上。此外，请勿使用于海拔1000m以上的场所。
- 为了利于通风、接线以及满足输出额定，请确保留有以下所示的空间。
1. 型号G9SX-SM□与侧面以及邻接单元间的距离请保持在25mm以上
2. 单元上下间距在50mm以上



- 接线
1. 型号G9SX-SM032-□
-接线时，请使用以下尺寸的电线。
 - 单线 (steel wire): 0.2~2.5mm² AWG24~12
 - 绞线 (flexible wire): 0.2~2.5mm² AWG24~12
- 电线剥离长度请保持在7mm以上。
2. 型号G9SX-SM032-RT（螺丝端子型）
- 为防止产品误动作、发热等情况，请按规定扭矩拧紧端子螺丝。
 - 端子螺丝扭矩为：0.5~0.6N·m
- 停止检测输入、EDM输入的接线距离，请各保持在100m以内。
- 停止检测输入上加有电动机的驱动电压，这可能会造成高强度干扰的重复。所以请与其他信号线分开接线。
- 用户设定中的停止判定时间，请设定为不损害安全控制系统安全性的感知度级别。
- 调整模式是用户用来设定“敏感度调整”的动作模式。停止检测时，有“监视输出”，但没有“安全停止检测输出”。所以调整结束后，一定要返回监视模式再继续使用。
- “停止检测输出”是仅用于带机械闭锁机构的电磁闭锁门开关。既不能作为安全输出来驱动接触器使用，也不能作为安全输出与螺线管型闭锁机构开关配套使用。
- 在决定距离危险源的安全距离的时候，请考虑由以下时间所引起的安全输出的延迟问题。
（1）请在控制系统相关的所有G9SX-□电源接通5秒以后再进行动作。
（2）为了防止因干扰而造成的误动作，请务必将电源的A2端子接地。
- 本产品为Class A工业环境产品。如果用于住宅环境可能会引起电磁干扰。因此当用于住宅环境时，请做好电磁干扰的对应措施。
- 请务必切断电源后再进行单元更换。否则本装置所连接的外部装置可能发生无法预料的动作。
- 溶剂附着
产品请勿附着酒精、稀释剂、三氯乙烯、汽油等溶剂。此类溶剂可能导致标识模糊、部品老化等原因。
- 可连接的电动机
作为停止检测对象连接的电动机，请使用交流感应式电动机。
-请勿使用属于连接对象外的同服电动机等。
-使用电源规格在AC240V以上的电动机时，请将电源中性点接地。
- 本产品不具有电动机的故障检出以及保护功能，所以请另外使用防止过载、缺相等问题的专用保护设备。
- 与变频器的并用
动力制动器的设定时间请设定在30秒以内。超过30秒时，可能会被误检测为断线故障。
另外，在以下情况下，即使电动机在停止中也可能出现停止检测功能不运行的情况。
1、使用输出线电压较高的变频器，并且与变频器串联的接触器为ON时。
2、正使用变频器自动整定功能时。

Controlling Devices	Requirements
Guard Lock Safety-door Switch	Use approved devices with Direct Opening Mechanism complying with IEC/EN 60947-5-1, mechanical lock type and capable of solenoid coil 24VDC, less than 300mA.
Relay with forcibly guided contacts	Use approved devices with forcibly guided contacts complying with EN 50205. For feedback purpose use devices with contacts capable of switching micro loads of 24VDC, 5mA.
Contactors	To be able to detect an open failure of a contactor, use contactors with forcibly guided mechanism and connect the NC contact to the EDM input of G9SX. For feedback purpose use devices with contacts capable of switching micro loads of 24VDC, 5mA. If a contactor without a forcibly-guided mechanism is connected to EDM inputs through the NC contact, failure of the contactor will not be detectable.
Other devices	Evaluate whether devices used are appropriate to satisfy the requirements of safety category level.

使用时的承诺事项

本产品是用于机械安全的Component商品，不同的使用方法有时可能无法满足要求的安全性。请遵守安全Component综合商品样本卷首所记载的“警告”内容。
①风险评估的实行②安全策略③安全设备的作用④安全设备的设置⑤遵守法律⑥使用上的注意事项⑦装置/设备转移/转让”并使用时。
a) 在室外、存在潜在科学污染或者电气干扰等情况下使用，或者在参考手册中未记载的条件下使用。
b) 用于原子能控制设备、焚烧设备、铁路、航空、车辆设备、医疗设备、娱乐机械、以及必须符合行政机关或个别业界的规定的设备。
c) 有可能危害到人身、财产安全的系统、机械、装置。
d) 天然气、自来水、电气供给系统或其他24小时连续运转系统等，对可靠性要求较高的设备。
e) 其他遵循上述a)~d)，对安全性要求高的用途。

*上述仅列出一部分适用用途。使用前，请先仔细阅读本公司的最佳、综合商品样本、规格书等，最新版的商品样本、规格书中所记载的保证·免责声明。

■联系方式

- 制造商
欧姆龙(上海)有限公司
地址: 中国上海市浦东新区金桥出口加工区金吉路789号
电话: (86)21-50509888
- 技术咨询
欧姆龙自动化(中国)有限公司
地址: 中国上海市浦东新区银城中路200号中银大厦2211室
电话: (86)21-5037-2222
技术咨询热线: 400-820-4535
网址: http://www.tl.omron.com.cn

OMRON **ST**

Type **G9SX-SM032-□**
Standstill Monitoring Unit

English **USER'S MANUAL**

Thank you for purchasing G9SX Standstill Monitoring Unit.
Please read and understand this manual before using the products.
Keep this manual ready to use whenever needed.
Only qualified person trained in professional electrical technique should handle G9SX.
Please consult your OMRON representative if you have any questions or comments.
Make sure that information written in this document are delivered to the final user of the product.

OMRON Corporation 2166131-1 B

EU Declaration of Conformity

OMRON declares that G9SX-SM□ is in conformity with the requirements of the following EU Directives:
EMC Directive 2004/108/EC
Machinery Directive 2006/42/EC

Standards

G9SX-SM□ is designed and manufactured in accordance with the following standards:
EN954-1 Category 4,
EN ISO13849-1:2008 Category 4 PL e,
IEC/EN61508 SIL3, IEC/EN62061 SIL3,
IEC/EN61000-6-2, IEC/EN61000-6-4,
UL508,
CAN/CSA C22.2 No.142

Precautions for Safe Use

Meanings of Signal Words
The following signal words are used in this manual.

⚠ WARNING Indicates a potentially hazardous situation which, if not avoided, will result in minor or moderate injury, or may result in serious injury or death. Additionally there may be significant property damage.

Meaning of Alert Symbols
The following alert symbols are used in this manual.

⊘

Indicates prohibited actions.

! Indicates mandatory actions.

Alert Statements

	⚠ WARNING
Serious injury may possibly occur due to breakdown of safety outputs. Do not connect loads beyond the rated value to the safety outputs.	⊘
Serious injury may possibly occur due to loss of required safety functions. Do not use G9SX-SM in the system where plurality of motors are driven by one inverter or contactor.	⊘
Serious injury may possibly occur due to loss of required safety functions. Wire G9SX properly so that supply voltages or voltages for loads do NOT touch safety outputs accidentally or unintentionally.	!
Serious injury may possibly occur due to damages of safety outputs. Apply protection circuitry against back electromotive force in case connecting inductive loads to safety outputs.	!
Serious injury may occur due to failure of safety functions. Operate the motor at rated G9SX-SM input frequency (120Hz) or less.	!
Serious injury may possibly occur due to loss of safety functions. Use appropriate devices referring to the information provided below.	!
Controlling Devices	Requirements
Guard Lock Safety-door Switch	Use approved devices with Direct Opening Mechanism complying with IEC/EN 60947-5-1, mechanical lock type and capable of solenoid coil 24VDC, less than 300mA.
Relay with forcibly guided contacts	Use approved devices with forcibly guided contacts complying with EN 50205. For feedback purpose use devices with contacts capable of switching micro loads of 24VDC, 5mA.
Contactors	To be able to detect an open failure of a contactor, use contactors with forcibly guided mechanism and connect the NC contact to the EDM input of G9SX. For feedback purpose use devices with contacts capable of switching micro loads of 24VDC, 5mA. If a contactor without a forcibly-guided mechanism is connected to EDM inputs through the NC contact, failure of the contactor will not be detectable.
Other devices	Evaluate whether devices used are appropriate to satisfy the requirements of safety category level.

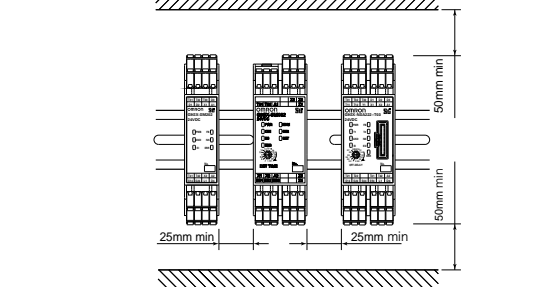
Precautions for Safe Use

- Use G9SX-SM□ within an enclosure with IP54 protection or higher according to IEC/EN60529. Be sure to connect the enclosure to earth(PE).
- Incorrect wiring may lead to loss of safety function. Wire conductors correctly and verify the operation of G9SX-SM□ before using the system in which G9SX-SM□ is incorporated.
- Do not apply DC voltages exceeding the rated voltages, nor any AC voltages to G9SX-SM□.
- Use DC supply satisfying requirements below to prevent electric shock.
 - DC power supply with double or reinforced insulation, for example, according to IEC/EN60950 or EN50178 or a transformer according to IEC/EN61558.
 - DC supply satisfies the requirement for class 2 circuits or limited voltage/current circuit stated in UL 508.
- Apply properly specified voltages to G9SX-SM□ inputs. Applying inappropriate voltages cause G9SX-SM□ to fail to perform its specified function, which leads to the loss of safety functions or damages to G9SX-SM□.
- Auxiliary error outputs and auxiliary monitoring outputs are NOT safety outputs. Do not use auxiliary outputs as any safety output. Such incorrect use causes loss of safety function of G9SX-SM□ and its relevant system.
- After installation of G9SX-SM□, qualified personnel should confirm the installation, and should conduct test operations and maintenance. The qualified personnel should be qualified and authorized to secure the safety on each phases of design, installation, running, maintenance and disposal of system.
- A person in charge, who is familiar to the machine in which G9SX-SM□ is to be installed, should conduct and verify the installation.
- G9SX-SM□ determines that motor stops when the standstill detection input voltage is predetermined value or less. According to the characteristic or load condition of motor, it may turn on safety detection outputs before motor stops completely. In that case, before operation, the qualified personnel should verify that risk of the rotation condition after output is acceptable.
- Perform daily and 6-month inspections for the G9SX-SM□. Otherwise, the system may fail to work properly, resulting in serious injury.
- Do not dismantle, repair, or modify G9SX-SM□. It may lead to loss of its safety functions.

- Use only appropriate components or devices complying with relevant safety standards corresponding to the required level of safety categories.
Conformity to requirements of safety category is determined as an entire system.
It is recommended to consult a certification body regarding assessment of conformity to the required safety level.
- OMRON shall not be responsible for conformity with any safety standards regarding to customer's entire system.
- Disconnect G9SX-SM□ from power supply when wiring. Devices connected to G9SX-SM□ may operate unexpectedly.
- Be cautious not to have your fingers caught when attaching terminal sockets to the plugs on G9SX-SM□.
- Do not use in combustible gases or explosive gases.
- Driving voltage of the motor is impressed to the standstill detection inputs. Connect overcurrent protective equipment; fuse, circuit-breaker etc., (3A Max.) and tighten the wirings by rated tightening torque to the standstill detection inputs.

Precautions for Correct Use

- Handle with care
Do not drop G9SX-SM□ to the ground or expose to excessive vibration or mechanical shocks. G9SX-SM□ may be damaged and may not function properly.
- Conditions of storage and usage
Do not store or use in such conditions stated below.
 - 1) In direct sunlight
 - 2) At ambient temperatures out of the range of -10 to 55 °C
 - 3) At relative humidity out of the range of 25% to 85% or under such temperature change that causes condensation.
 - 4) In corrosive or combustible gases
 - 5) With vibration or mechanical shocks out of the rated values.
 - 6) Under splashing of water, oil, chemicals
 - 7) In the atmosphere containing dust, saline or metal powder.
G9SX-SM□ may be damaged and may not function properly.
- Mounting
Mount G9SX to DIN rails with attachments (TYPE PFP-M, not incorporated to this product), not to drop out of rails by vibration etc. especially when the length of DIN railing is short compared to the widths of G9SX.
Do not use G9SX-SM□ at altitudes over 1,000 meters
- Following spacing around G9SX should be available to apply rated current to outputs of G9SX and for enough ventilation and wiring:
 - a) At least 25 mm beside side faces of G9SX.
 - b) At least 50 mm above top face of G9SX and below bottom face of G9SX.



- Wiring
 - 1) For model G9SX-SM□
Use the following to wire to G9SX-SM□.
-Solid wire: 0.2 to 2.5mm² AWG24 to AWG12
-Stranded wire (Flexible wire): 0.2 to 2.5mm² AWG24 to AWG12
Strip the cover of wire no longer than 7mm.
 - 2) For model G9SX-SM□-RT (with screw terminals)
Tighten each screw with a specified torque of 0.5 to 0.6N·m, or the
G9SX-SM□ may malfunction or generate heat.
- Use cables with length less than 100m to connect to standstill detection inputs and EDM input respectively.
- Driving voltage of the motor is impressed to the standstill detection input and there is a possibility that a high level of noise is superimposed. The line of the standstill input must be separately installed from other signal lines.
- Set the time duration of Standstill detection time to an appropriate value that does not cause the loss of safety function of system.
- Turning mode in User configuration is only for adjusting the Standstill determining time. In Tuning mode, auxiliary monitor output is enable however Safety Standstill detection outputs are not enabled. After the tuning is complete, be sure to change from Tuning mode to Monitoring mode for actual operation.
- Safety standstill detection outputs are only for controlling a guard lock safety-door switch with mechanical lock. They can not be used as safety outputs to drive contactors, or to control a guard lock safety-door switch with solenoid lock.
- To determine safety distance to hazards, take into account the delay of safety standstill detection outputs caused by the response time
- Start entire system after more than 5s have passed since applying supply voltage to all G9SXs in the system.
- G9SX-SM□ may malfunction due to electro-magnetic disturbances.
Be sure to connect the terminal A2 to ground.
- This is a class A product. In residential areas it may cause radio interference, in which case the user may be required to take adequate measures to reduce interference.
- Devices connected to G9SX-SM□ may operate unexpectedly. When replacing G9SX-SM□, disconnect it from power supply.
- Adhesion of solvent such as alcohol, thinner, trichloroethane or gasoline on the product should be avoided. Such solvents make the marking on G9SX-SM□ illegible and cause deterioration of parts.
- Connectable motor
AC induction motors can be connected to the G9SX-SM□. Servo motors cannot be connected.
When a motor with AC240V or more is used, connect neutral point of the power supply to earth.
- G9SX-SM□ does not have motor fault detective function or motor protective function. For motor protection, use designated external protective devices.
- For use with inverter
The dynamic break setting time should be set to 30 seconds or shorter. Otherwise, the G9SX-SM□ may detect a disconnect fault of the wiring.
Also in the following cases, the standstill detection function may not properly work even while the motor is in standstill.
 1. An inverter with a large output residual voltage is used, and the contactor connected in serial with the inverter is in the ON state.
 2. The inverter is executing the auto tuning function.

Suitability for Use

OMRON shall not be responsible for conformity with any standards, codes, or regulations that apply to the combination of the products in the customer's application or use of the product.
Take all necessary steps to determine the suitability of the product for the systems, machines, and equipment with which it will be used. Know and observe all prohibitions of use applicable to this product.
NEVER USE THE PRODUCTS FOR AN APPLICATION INVOLVING SERIOUS RISK TO LIFE OR PROPERTY WITHOUT ENSURING THAT THE SYSTEM AS A WHOLE HAS BEEN DESIGNED TO ADDRESS THE RISKS, AND THAT THE OMRON PRODUCT IS PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.

OMRON

OMRON Corporation (Manufacturer)
Shiokoji Horikawa, Shimogyo-ku, Kyoto, 600-8530 JAPAN

OMRON EUROPE B.V. (Importer in EU)
Wegalaan 67-69, NL-2132 JD Hoofddorp THE NETHERLANDS
PHONE 31-2356-81-300 FAX 31-2356-81-388

OMRON SCIENTIFIC TECHNOLOGIES INC.
6550 Dumbarton Circle, Fremont CA 94555-3605 U.S.A
PHONE 1-510-608-3400 FAX 1-510-744-1442

OMRON ASIA PACIFIC PTE. LTD.
438A Alexandra Road # 05-05/08,
Alexandra Technopark Singapore 119967 SINGAPORE
PHONE 65-6-835-3011 FAX 65-6-835-2711

OMRON (CHINA) CO., LTD.
Room 2211, Bank of China Tower, 200 Yin Cheng Zhong Road,
PuDong New Area, Shanghai, 200120, China
PHONE 86-21-5037-2222 FAX 86-21-5037-2200

Note: Specifications subject to change without notice.

