

**OMRON** **SU**

**Type G9SX-AD322-T□□**  
**Type G9SX-BC202-□**

Flexible Safety Unit

**English USER'S MANUAL**

Thank you for purchasing G9SX Flexible Safety 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**  
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**EU Declaration of Conformity**

OMRON declares that G9SX is in conformity with the requirements of the following EU Directives:

EMC Directive 2014/30/EU  
Machinery Directive 2006/42/EC

**Standards**

G9SX is designed and manufactured in accordance with the following standards:

EN ISO13849-1:2015 Category 4 PL e,  
IEC/EN61508 SIL3,  
IEC/EN61000-6-2, IEC/EN61000-6-4,  
UL508, UL1998,  
CAN/CSA C22.2 No.142

**Safety Precautions**

**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. Wire G9SX properly so that supply voltages or voltages for loads do NOT touch the safety inputs accidentally or unintentionally.

Serious injury may possibly occur due to damages of safety inputs. Apply protection circuitry against back electromotive force in case connecting inductive loads to safety outputs.

Serious injury may possibly occur due to loss of safety functions. Use appropriate devices referring to the information shown below.

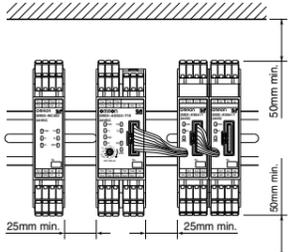
| Controlling Devices                 | Requirements  |
|-------------------------------------|---|
| Emergency stop switch               | Use approved devices with Direct Opening Mechanism complying with IEC/EN 60947-5-1  |
| Door interlocking switch            | Use approved devices with Direct Opening Mechanism complying with IEC/EN 60947-5-1 and capable of switching micro loads of 24VDC, 5mA.  |
| Safety Sensor                       | Use approved devices complying with the relevant product standards, regulations and rules in the country where it is used.  |
| Relay with forcibly guided contacts | Use approved devices with forcibly guided contacts complying with IEC 61810-3 (EN 50205). For feedback purpose use devices with contacts capable of switching micro loads of 24VDC, 5mA.                            |
| Contactors                          | Use approved devices complying with IEC/EN 60947-4-1 auxiliary contact linked with power contact (mirror contact). For feedback purpose use devices with contacts capable of switching micro loads of 24 VDC, 5 mA. |
| Other devices                       | Evaluate whether devices used are appropriate to satisfy the requirements of safety category level.   |

**Precautions for Safe Use**

- Use G9SX within an enclosure with IP54 protection or higher of IEC/EN60529
- Incorrect wiring may lead to loss of safety function. Wire conductors correctly and verify the operation of G9SX before commissioning the system in which G9SX is incorporated.
- Do not apply DC voltages exceeding the rated voltages, nor any AC voltages to G9SX. Do not connect to DC distribution network.
- Use DC supply satisfying requirements below to prevent electric shock.
  - DC power supply with double or reinforced insulation, for example, according to IED/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 inputs. Applying inappropriate voltages cause G9SX to fail to perform its specified function, which leads to the loss of safety functions or damages to G9SX.
- 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 and its relevant system. Also Logical connection outputs can only be used for logical connections between G9SXs.
- After installation of G9SX, 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 is to be installed, should conduct and verify the installation.
- Turn OFF the signal to Safety input or Logical AND connection input every 24hours and make sure G9SX operates without faults by checking the state of the ERR indicator.
- Do not dismantle, repair, or modify G9SX. 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 from power supply when wiring. Devices connected to G9SX may operate unexpectedly.
- Be cautious not to have your fingers caught when attaching terminal sockets to the plugs on G9SX.

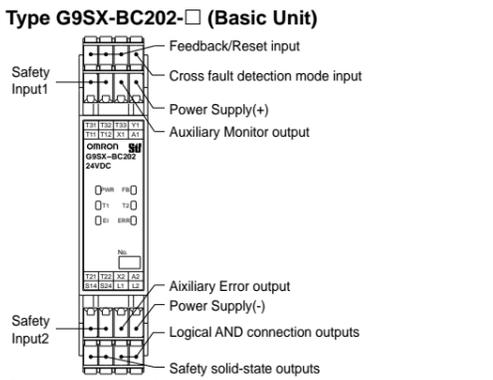
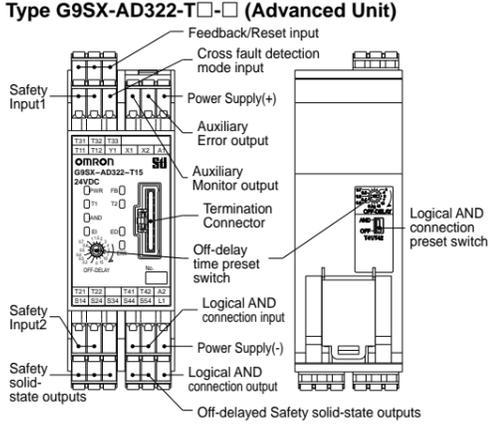
**Precautions for Correct Use**

- Handle with care. Do not drop G9SX to the ground or expose to excessive vibration or mechanical shocks. G9SX may be damaged and may not function properly.
- Conditions of storage. Do not store in such conditions stated below.
  - In direct sunlight
  - At ambient temperatures out of the range of -10 to 55 °C
  - At relative humidity out of the range of 25% to 85% or under such temperature change that causes condensation.
  - In corrosive or combustible gases
  - With vibration or mechanical shocks out of the rated values.
  - Under splashing of water, oil, chemicals
  - In the atmosphere containing dust, saline or metal powder. G9SX 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.
- Following spacing around G9SX should be available to apply rated current to outputs of G9SX and for enough ventilation and wiring:
  - At least 25 mm beside side faces of G9SX.
  - At least 50 mm above top face of G9SX and below bottom face of G9SX.



- Wiring
  - For model G9SX-□
    - Use the following to wire to G9SX-□.
      - Solid wire: 0.2 to 2.5mm<sup>2</sup> AWG24 to AWG12
      - Stranded wire (Flexible wire): 0.2 to 2.5mm<sup>2</sup> AWG24 to AWG12
    - Strip the cover of wire no longer than 7mm.
    - Tighten each screw with a specified torque of 0.5 to 0.6N·m, or the G9SX-□ may malfunction or generate heat.
  - For model G9SX-□-RT (with screw terminals)
    - Tighten each screw with a specified torque of 0.5 to 0.6N·m, or the G9SX-□ may malfunction or generate heat.
  - For Logical AND Connection
    - Use VCTF cable or shielded cable for Logical AND connection between units.
- When connecting Expansion Units (G9SX-EX□□) to Advanced Unit:
  - Follow the procedure below:
    - Remove the termination connector from the receptacle on Advanced Unit.
    - Insert the head of the connecting cable of Expansion Unit to the receptacle on the Advanced Unit
    - Set the termination connector to the receptacle on the Expansion Unit at the end position. When Advanced Unit is used without expansion units, leave the termination connector set on the Advanced Unit.
  - Do not remove the termination connector while the system is operating.
  - Before applying supply voltage, confirm that the connecting sockets and plugs are locked firmly.
  - All of the Expansion Units should be supplied with its specified voltages within 10s after the connected Advanced Unit is supplied with voltage. Otherwise, Advanced Unit detects the power-supply error for the Expansion Units.
- Use cables with length less than 100m to connect to Safety Inputs, Feedback/Reset inputs, or between Logical AND connection inputs and Logical connection outputs, respectively.
- Set the time duration of OFF-delay to an appropriate value that does not cause the loss of safety function of the system.
- Logical connection between Units:
  - When using Logical AND connection inputs, set the Logical connection preset switch to 'AND' position for the units which the logical connection signal are input to.
  - Connect Logical connection outputs appropriately to Logical AND connection inputs of the relevant unit. Verify the operation of G9SX before commissioning the system.
  - When configuring the safety related system, be sure to consider that the delay of response time caused by logical connections do not degrade the safety function of the system.
- To determine safety distance to hazards, take into account the delay of Safety outputs caused by the following time:
  - Response time of Safety inputs
  - Response time of Logical AND connection input (See also "Ratings and specifications, note5")
  - Preset off-delay time
  - Accuracy of off-delay time
- Start entire system after more than 5s have passed since applying supply voltage to all G9SXs in the system.
- G9SX may malfunction due to electro-magnetic disturbances. Be sure to connect the terminal A2 to ground. When using a DC power supply with light curtains, use DC power supply which has no interruption by a power failure of 20ms.
- Devices connected to G9SX may operate unexpectedly. When replacing G9SX, 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 illegible and cause deterioration of parts.
- 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.
- Operate the reset input more than 0.4 seconds immediately after the safety outputs are OFF. G9SX does not accept the reset input from when the outputs are turned ON and until 0.4 seconds passes after the outputs are turned OFF.

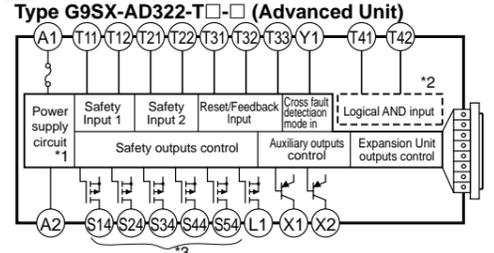
**1 Appearance and Explanation of Each Parts**



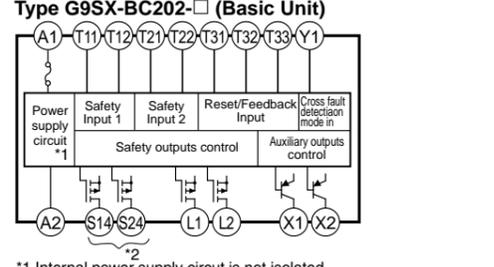
**LED Indicators**

| Marking | Color  | Name                                | Function  |
|---------|--------|-------------------------------------|---|
| PWR     | Green  | Power Supply Indicator              | - Lights up while power is supplied.  |
| ERR     | Red    | Error Indicator                     | - Lights up or blinks corresponding to the occurring error (*1)   |
| T1      | Orange | Safety input #1 Indicator           | - Lights up while high signal is input to T12<br>- Blinks when error relating to Safety input #1 occurs. (*1)   |
| T2      | Orange | Safety input #2 Indicator           | - Lights up while high signal is input to T22<br>- Blinks when error relating to Safety input #2 occurs. (*1)   |
| AND     | Orange | Logical AND input Indicator         | - Lights up while high signal is input to T41.<br>- Blinks when error relating to Logical AND connection input occurs. (*1)   |
| FB      | Orange | Feedback/Reset input Indicator      | - Lights up in the following cases:<br>-- With automatic reset while high signal is input to T33<br>-- With manual reset while high signal is input to T32.<br>- Blinks when an error relating to Feedback/Reset input occurs. (*1) |
| EI      | Orange | Safety output indicator             | - Lights up while Safety solid-state outputs (S14, S24, S34) are in ON-state.<br>- Blinks when an error relating to Safety solid-state output occurs. (*1)  |
| ED      | Orange | Off-delayed Safety output Indicator | - Lights up while Safety off-delayed solid-state outputs (S44, S54) are in ON-state.<br>- Blinks when an error relating to Safety off-delayed solid-state output occurs. (*1)   |

**2 Internal Connection**



- \*1 Internal power supply circuit is not isolated.
- \*2 Logical AND input is isolated.
- \*3 The Safety solid-state outputs, S14 - S54, are internally redundant, respectively.



- \*1 Internal power supply circuit is not isolated.
- \*2 The Safety solid-state outputs, S14 and S24, are internally redundant, respectively.

**4 Ratings and Specifications**

**Ratings**

| Item             | TYPE G9SX-AD322-T□□                               | TYPE G9SX-BC202-□   |
|------------------|---|---|
| Power input      | Rated supply voltage                              | 24VDC   |
|                  | Operating voltage range                           | -15% to +10% of rated supply voltage  |
|                  | Rated power consumption (See Note1)               | 4 W Max. 3 W Max.   |
| Outputs          | Safety solid-state output (See Note3)             | P channel MOS FET output  |
|                  | Off-delayed safety solid-state output (See Note3) | Load current:<br>Using 2 outputs or less: 1A DC Max.<br>Using 3 outputs or more: 0.8A DC Max. (See Note4) |
| Auxiliary output | PNP transistor output                             | Load current: 100mA Max.  |

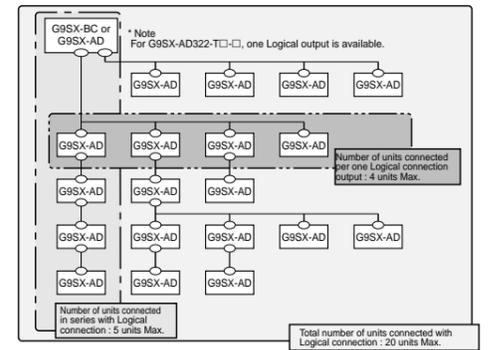
**Specifications and Performance**

| Item  | TYPE G9SX-AD322-T□□  | TYPE G9SX-BC202-□  |
|---|--|--|
| Over voltage category (IEC/EN 60664-1)                              | II   |  |
| Operating time (OFF to ON state) (See Note5,6)                      | 50ms Max. (Safety input)   | 50 ms Max. (Safety input)  |
|   | 100ms Max. (Logical AND connection input)  |  |
| Response time (ON to OFF state)                                     | 15 ms Max. (See Note5)   |  |
| Input   | Input current  | 10 mA min.   |
|   | ON voltage   | 11 V min.  |
|   | OFF voltage  | 5 V min.   |
|   | OFF current  | 1 mA max.  |
|   | Maximum wiring length  | 100 m max. (External connection impedance: 100ohm max. and 10 nF max.) |
| Output  | Reset input time   | 100 ms min.  |
|   | ON-state residual voltage  | 3.0 V max. (safety output, auxiliary output)                           |
| OFF-state leakage current   | 0.1 mA max. (safety output, auxiliary output)  |  |
| Maximum cable length for Logical connection input and Safety inputs | 100m Max. (Permissible impedance of inputs : 100ohm Max and 10nF Max)                    |  |
| Number of units connected per one Logical connection output         | 4 units Max. (See Note7)   |  |
| Total number of units connected with Logical connection             | 20 units Max. (See Note7,8)  |  |
| Number of units connected in series with Logical connection         | 5 units Max. (See Note8)   |  |
| Accuracy of Off-delay time  | Within plus or minus 5% of the set value   |  |
| Reset input time  | 100ms Min.   |  |
| Vibration resistance  | Frequency: 10 to 55 to 10Hz, Amplitude: 0.375mm half amplitude (0.75mm double amplitude) |  |
| Mechanical shock resistance   | 300 m/s <sup>2</sup> (destruction), 100 m/s <sup>2</sup> (malfunction)                   |  |
| Ambient temperature   | -10 to +55°C (No freezing or condensation)   |  |
| Ambient humidity  | 25 to 85 %RH   |  |
| Terminal tightening torque  | 0.5Nm (Applicable only to TYPEG9SX-□-RT: screw terminal model)                           |  |
| Weight  | Approx. 200g   | Approx. 125 g  |

**Isolation specifications**

| Item                  | TYPE G9SX-AD322-T□□   | TYPE G9SX-BC202-□              |
|-----------------------|---|--------------------------------|
| Insulation resistance | - Between Logical AND connection terminals, and Power supply input terminals and other input and output terminals connected together  | 20Mohm Min. (by 100VDC megger) |
|                       | - Between all terminals connected together and DIN rail.  | 20Mohm Min. (by 100VDC megger) |
| Dielectric strength   | - Between Logical AND connection terminals, and Power supply input terminals and other input and output terminals connected together. | 500VAC for 1min                |
|                       | - Between all terminals connected together and DIN rail.  | 500VAC for 1min                |

- Note:
- Power consumption of loads not included.
  - Ensure that the current exceeds the minimum applicable load of the device connected.
  - While safety outputs are at its ON state, signal sequence shown below is output continuously for diagnosis. When using the safety outputs as input signals to control devices (e.i. programmable controller), consider the off pulse below.
- 
- The following derating is required when Units are mounted side-by-side. G9SX-AD322-□/G9SX-BC202-□ : 0.4 A max. load current
  - When multiple units are connected by logical connection, the total operating/response time is an accumulation of the operating/response time connected.
  - Required time for safety solid-state output to turn ON, after necessary inputs turn ON.
  - For details of the system with logical connection refer to the illustration below.



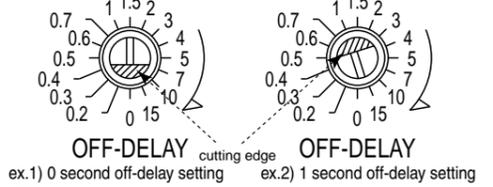
(8) The number of Type G9SX-EX401-□ (Expansion Unit) and TYPE G9SX-EX041-T□ (Expansion Unit, Off-delayed model) not included.

**Preset Switches** (only applies to TYPE G9SX-AD322-T□□)

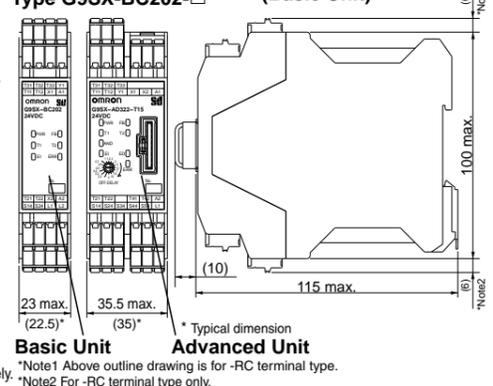
Change the value of the preset switches only when G9SX is disconnected from power supply. The states of the preset switches come into effect when the power supply to G9SX turns on.

| Name   | Function   | State/Value (position of switch)   |
|--|--|--|
| Logical AND Connection Inputs to Preset Switch | Sets Logical AND Connection Inputs to valid or invalid. (*2) | OFF (Invalid: default setting)/ AND (valid)  |
| Off-delay Time Preset Switch                   | Presets Off-delay time (duplicate) (*3), (*4)                | For Type G9SX-AD322-T150-□ 0 (default setting value) /10/20/30/40/50/60/70/80/90/100/110/120/130/140/150 (s) (*5)<br>For Type G9SX-AD322-T15-□ 0 (default setting value) /0.2/0.3/0.4/0.5/0.6/0.7/1.1/1.5/2/3/4/5/7/10/15 (s) (*5) |

- Note:
- See 7 Fault Detection for details.
  - When operating G9SX using Logical AND Connection function, be sure to set the preset switch to AND (valid) position for the units which the logical input signal is input to. When the switch is set to OFF (invalid) position, it is detected as a fault.
  - Set both of the two Off-delay Time Preset Switches, one each on the front and back, to the same value.
  - Off-delay time duration of Expansion Unit (Off-delay model) synchronize with the OFF-delay time duration set by Off-delay Time Preset Switch of Advanced Unit.
  - See following illustration for setting position of Off-delay Time Preset Switch. Make sure that the direction of cutting edge of preset switch is correctly pointed to the off-delay time value which must be set.



**3 Dimensions**



\*Note1 Above outline drawing is for -RC terminal type.  
\*Note2 For -RC terminal type only.

**Suitability for Use**

Omron Companies shall not be responsible for conformity with any standards, codes or regulations which apply to the combination of the Product in the Buyer's application or use of the Product. At Buyer's request, Omron will provide applicable third party certification documents identifying ratings and limitations of use which apply to the Product. This information by itself is not sufficient for a complete determination of the suitability of the Product in combination with the end product, machine, system, or other application or use. Buyer shall be solely responsible for determining appropriateness of the particular Product with respect to Buyer's application, product or system. Buyer shall take application responsibility in all cases.

NEVER USE THE PRODUCT FOR AN APPLICATION INVOLVING SERIOUS RISK TO LIFE OR PROPERTY OR IN LARGE QUANTITIES WITHOUT ENSURING THAT THE SYSTEM AS A WHOLE HAS BEEN DESIGNED TO ADDRESS THE RISKS, AND THAT THE OMRON PRODUCT(S) IS PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.

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**Regional Headquarters**

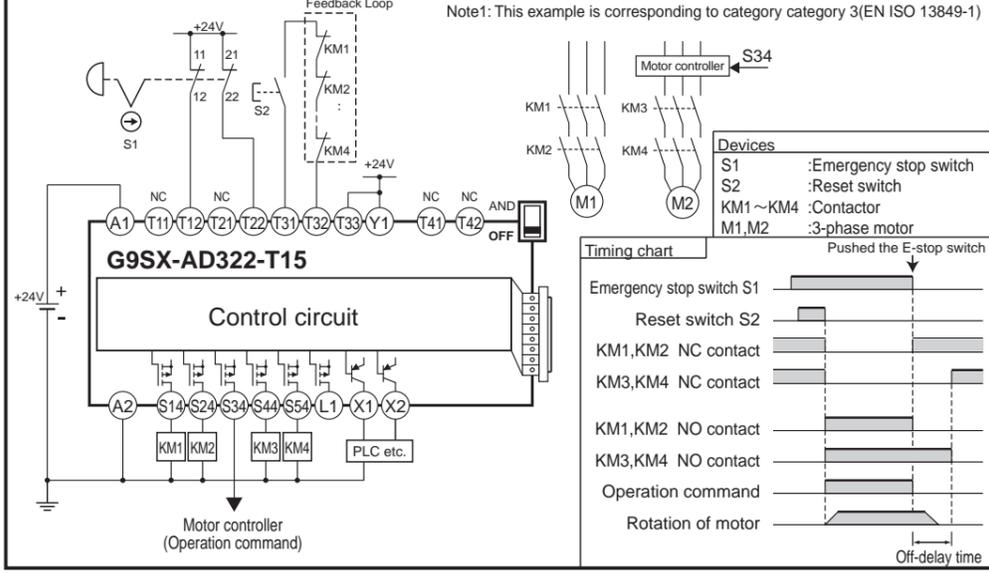
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## 5 Examples of application

### Application and timing chart

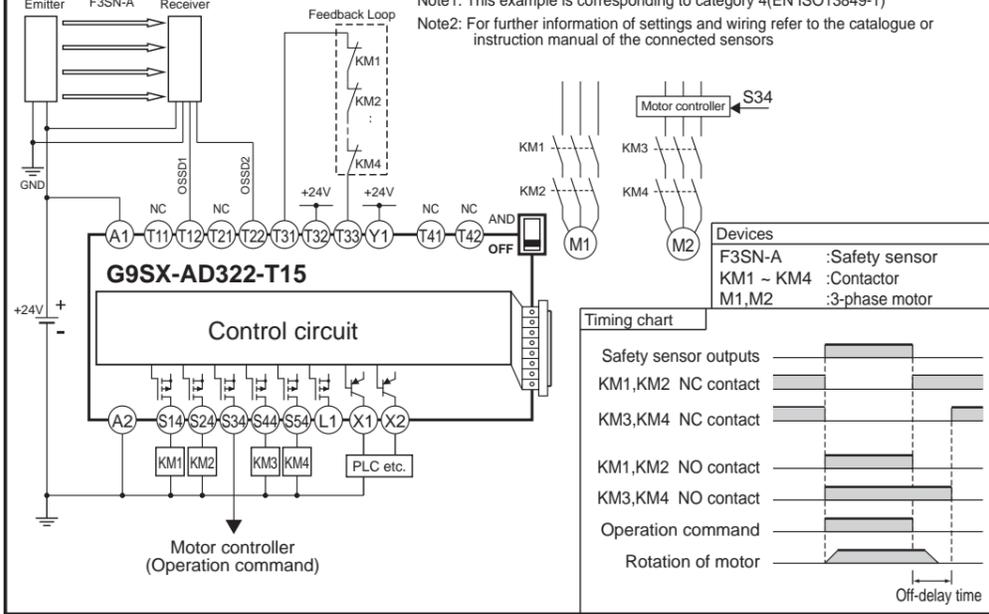
#### G9SX-AD322-T15 (24VDC)

##### (2-channel emergency stop switch input / Manual reset)



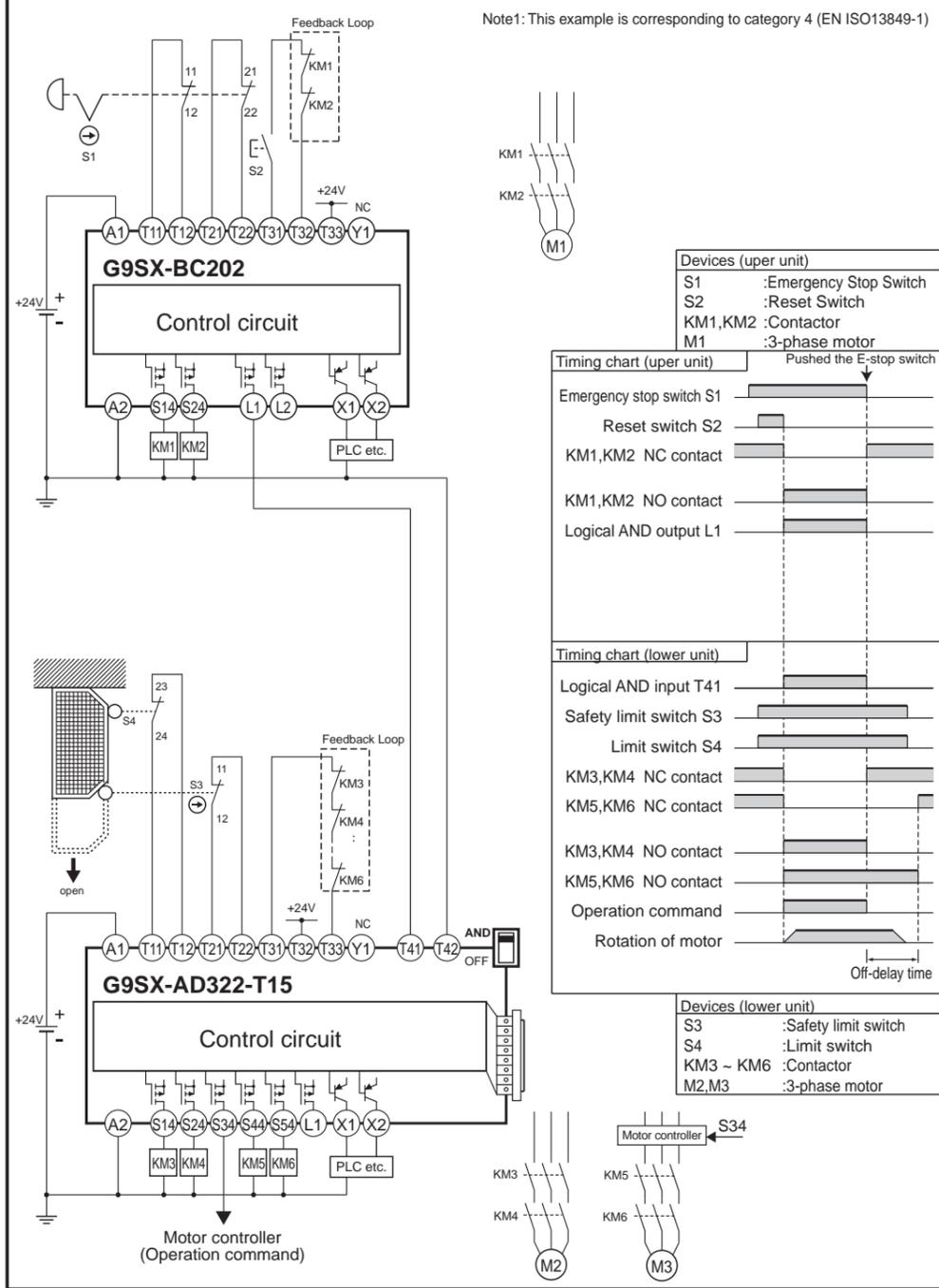
#### G9SX-AD322-T15 (24VDC)

##### (2-channel safety sensor / Auto reset)



#### G9SX-BC202 (24VDC) (2-channel emergency stop switch input / Manual reset)

##### + G9SX-AD322-T15 (24VDC) (2-channel safety limit switch input / Auto reset)

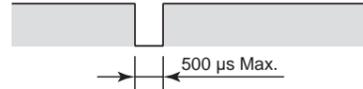


## Wiring of inputs and outputs

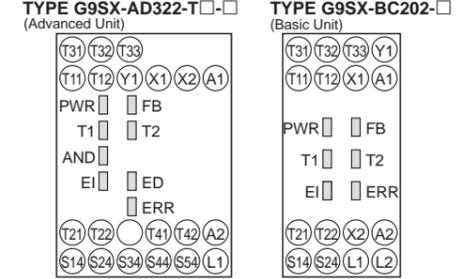
| Signal Name                           | Terminal Name | Description of operation   | Wiring   |
|---------------------------------------|---------------|--|--|
| Power supply input                    | A1, A2        | The input terminals for power supply. Connect the power source to the A1 and A2 terminals.   | Connect the power supply plus to the A1 terminal. Connect the power supply minus to the A2 terminal.   |
| Safety input 1                        | T11, T12      | To set Safety solid-state outputs in ON state, HIGH state signals must be input to both of Safety input 1 and Safety input 2. Otherwise Safety solid-state outputs cannot be in ON state.  | Using 1 safety input channel<br>Using 2 safety input channels (cross fault detection OFF)<br>Using 2 safety input channels (cross fault detection ON)  |
| Safety input 2                        | T21, T22      |  |  |
| Feedback/Reset input                  | T31, T32, T33 | To set Safety solid-state outputs in ON state, ON state signal must be input to T33. Otherwise Safety solid-state outputs cannot be in ON state.   | Auto reset<br>Manual reset   |
| Logical AND connection input          | T41, T42      | Logical AND connection means that lower unit (Unit B) calculates the logical multiplication (AND) of the safety output information from upper unit (Unit A) and safety input signal "b", which is input to lower unit. In the example of a right picture, the safety output of Unit C is "a" AND "b". Connect L1 or L2 of upper unit to T41 of lower unit, and connect GND of upper unit to T42 of lower unit. To set Safety solid-state outputs of the subsequent Unit in ON state, its Logical AND Connection Preset Switch must be set to AND (enable) and High state signal must be input to T41 of the subsequent unit. |  |
| Cross fault detection input           | Y1            | Selects a mode of failure detecting (Cross fault detecting) function for safety inputs of G9SX corresponding to the connection of Cross fault detection input.   | Keep Y1 open when using T11, T21. (Wiring corresponding to category 4)<br>Connect Y1 to 24VDC when NOT using T11, T21. (Wiring corresponding category 2 or 3, or when connecting safety sensors and corresponding up to category 4.) |
| Safety solid-state output             | S14, S24, S34 | Turns ON/OFF according to the state of safety inputs, Feedback/Reset inputs, and Logical AND connection inputs. During off-delay state, safety solid-state outputs are not able to turn ON.  | Keep these outputs Open when NOT used.   |
| Off-delayed Safety solid-state output | S44, S54      | Off-delayed safety solid-state outputs. Off-delay time is set by off-delay preset switch. When the delay time is set to zero, these outputs can be used as non-delay outputs.  | Keep these outputs Open when NOT used.   |
| Logical connection output             | L1, L2        | Outputs a signal of the same logic as Safety solid-state outputs.  | Keep these outputs Open when NOT used.   |
| Auxiliary Monitor output              | X1            | Outputs a signal of the same logic as Safety solid-state outputs   | Keep these outputs Open when NOT used.   |
| Auxiliary Error output                | X2            | Outputs during error indicator is lighting up or blinking.   | Keep these outputs Open when NOT used.   |

### Connecting Safety Sensors and G9SX

- When connecting Safety sensors with G9SX, Y1 terminal must be connected to 24VDC. G9SX will detect the connection error, if Y1 terminal is open.
- In many case, Safety Sensor outputs include the off-shot pulse for its self test. The following condition of test pulse is applicable as safety inputs for G9SX.
  - Off-shot pulse width of the sensor, during the ON-state : 500  $\mu$ s Max.



### Terminal arrangement and LED indicators



## 6 Performance Level and Safety category of EN ISO 13849-1

The G9SX can be used up to PL = e and Category 4 required by EN ISO 13849-1 European standard. Refer to the following link for the Safety-relay characteristic data:

[http://www.fa.omron.co.jp/safety\\_6en/](http://www.fa.omron.co.jp/safety_6en/)

This does NOT mean that G9SX can always be used for required category under all the similar conditions and situations. Conformity to the categories must be assessed as a whole system.

When using G9SX for safety categories, make sure the conformity of the whole system.

- Input the signals to both of the Safety inputs (T11-T12 and T21-T22)
- Input a signal to the Safety inputs (T11-T12 and T21-T22) through switches with Direct Opening Mechanism. When using limit switches, at least one of them must have Direct Opening Mechanism.
- When connecting Safety sensor with G9SX, use TYPE 4 safety sensor.
- Input the signal through a NC contact of the contactor to Feedback/Reset input (T31-T32 for manual reset or T31-T33 for auto reset). (Refer to "5.Examples of Application")
- Keep Cross fault detection mode input (Y1) open. However, when connecting devices with self-diagnosis function, such as safety sensors, apply 24VDC to Y1.
- Be sure to Connect A2 to ground.

## 7 Fault Detection

When G9SX detects a fault, ERR indicator and/or other indicators light up or blink to show the information of the fault.

Check and take needed measures referring to the following table. and then apply supply voltage to G9SX.

| ERR indicator | Other indicators                       | Faults  | Expected causes of the faults   | Checking points and measures to take   |
|---------------|--|---|---|--|
| Blink         | —                                      | Faults by electro-magnetic disturbance or of internal circuits.               | 1) By excessive electro-magnetic disturbance<br>2) Failures of the parts of internal circuits   | 1) Check the disturbance level around G9SX and its related system.<br>2) Replace with a new product.   |
|               | T1 Blink                               | Faults involved with Safety input 1   | 1) Failures involving the wiring of Safety input 1<br>2) Incorrect setting of Cross fault detection mode.<br>3) Failures of the parts of the circuits of Safety input 1.  | 1) Check the wiring to T11 and T12.<br>2) Check the wiring to Y1.<br>3) Replace with a new product.  |
|               | T2 Blink                               | Faults involved with Safety input 2   | 1) Failures involving the wiring of Safety input 2<br>2) Incorrect setting of Cross fault detection mode.<br>3) Failures of the parts of the circuits of Safety input 2.  | 1) Check the wiring to T21 and T22.<br>2) Check the wiring to Y1.<br>3) Replace with a new product.  |
|               | FB Blink                               | Faults involved with Feedback/Reset input                                     | 1) Failures involving the wiring of Feedback/Reset input.<br>2) Failures of the parts of the circuits of Feedback/Reset input   | 1) Check the wiring to T31, T32, and T33<br>2) Replace with a new product.   |
|               | ERR Blink                              | Faults of Expansion units   | 1) Improper feedback signals from Expansion units<br>2) Abnormal supply voltage to Expansion units<br>3) Failures of the parts of the circuits of Safety relay contact outputs  | 1) Check the connecting cable of Expansion units and the connection of the termination socket.<br>2) Check the supply voltage to Expansion units.<br>* Make sure that all Expansion units' PWR indicators are lighting.<br>3) Replace the Expansion unit with a new one.   |
|               | EI Blink                               | Faults involved with Safety solid-state outputs or Logical connection outputs | 1) Failures involving the wiring of Safety solid-state outputs<br>2) Failures of the parts of the circuits of Safety solid-state outputs<br>3) Failures involving the wiring of Logical connection output<br>4) Failures of the parts of the circuits of Logical connection output<br>5) Impermissible high ambient temperature | 1) Check the wiring to S14, S24, and S34<br>2) Replace with a new product.<br>3) Check the wiring to L1 and L2<br>4) Replace with a new product.<br>5) Check the ambient temperature and spacing around G9SX.  |
|               | ED Blink                               | Faults involved with Off-delayed Safety solid-state outputs                   | 1) Failures involving the wiring of Off-delayed Safety relay contact outputs<br>2) Incorrect set values of Off-delay time<br>3) Failures of the parts of the circuits of Off-delayed Safety relay contact outputs<br>4) Impermissible high ambient temperature  | 1) Check the wiring to S44 and S54<br>2) Confirm the set values of the two of Off-delay time preset switches.<br>3) Replace with a new product.<br>4) Check the ambient temperature and spacing around G9SX.   |
|               | AND Blink                              | Faults involved with Logic AND connection input                               | 1) Failures involving the wiring of Logic AND connection input<br>2) Incorrect setting for Logic AND connection input   | 1) Check the wiring to T41 and T42<br>* Make sure that the wiring length for T41 or T42 terminals is less than 100 meters, respectively.<br>* Make sure that the Logical AND connection signal is branched for less than 4 units.<br>2) Confirm the set value of the Logical AND connection preset switch.<br>3) Replace with a new product. |
|               | The All (without PWR) indicators Blink | Supply voltage outside the rated value  | 1) Supply voltage outside the rated value   | 1) Check the supply voltage to Expansion units.  |

When indicators other than ERR indicator while ERR indicator keeps lit off, check and take needed actions referring to the following table.

| ERR indicator | The other indicators       | Conditions                            | Expected causes of the faults  | Expected causes of the faults  |
|---------------|----------------------------|---------------------------------------|--|--|
| Light off     | T1 Blink or / and T2 Blink | Mismatch between input 1 and input 2. | 1) Input status between input 1 and input 2 is different, cause of contact failure or short circuit of safety input device(s) or any wiring fault. | 1) Check the wiring from safety input devices to G9SX. Or check the inputs sequence of safety input devices. After removing the fault, turn both safety inputs to OFF state. |