



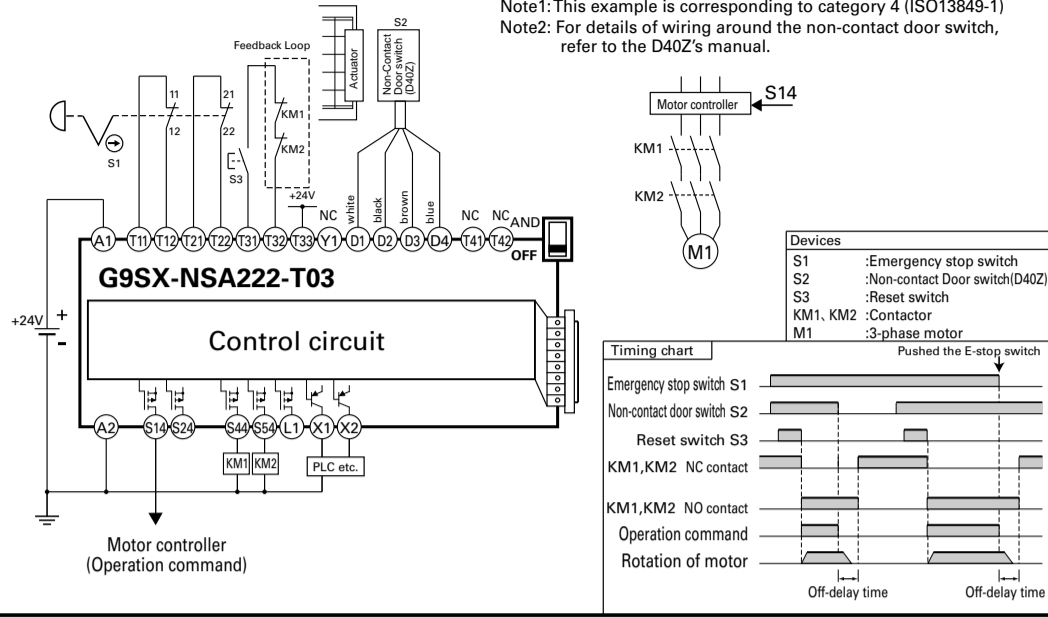
## 5 Examples of application

### Application and timing chart

#### G9SX-NSA222-T03 (24VDC)

#### (2-channel emergency stop switch input + non-contact door switch input / Manual reset)

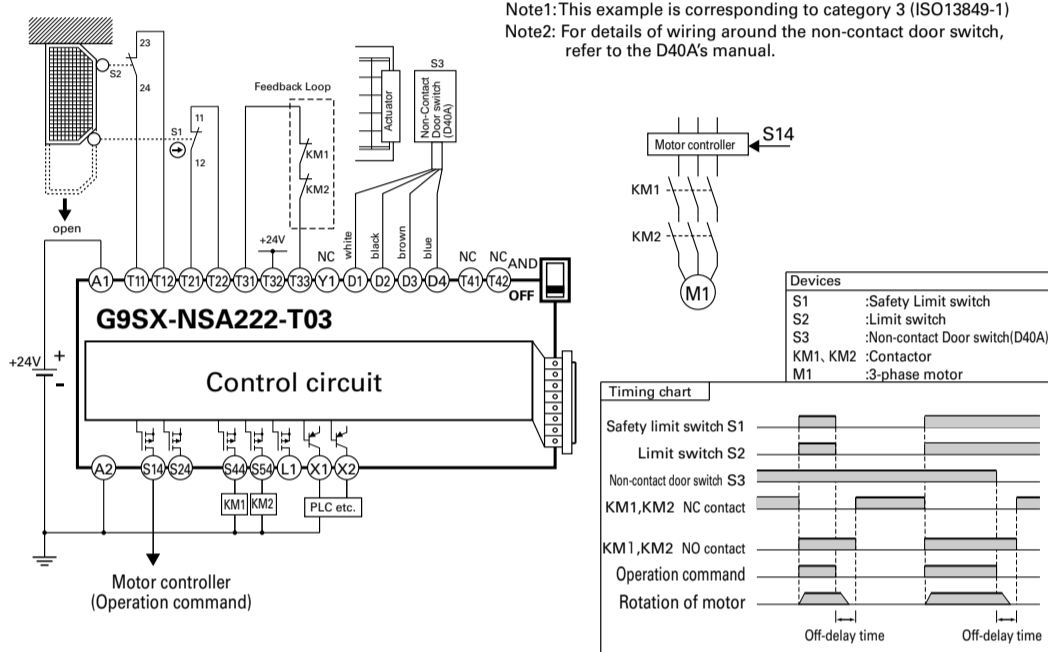
Note1: This example is corresponding to category 4 (ISO13849-1)  
Note2: For details of wiring around the non-contact door switch, refer to the D40Z's manual.



#### G9SX-NSA222-T03 (24VDC)

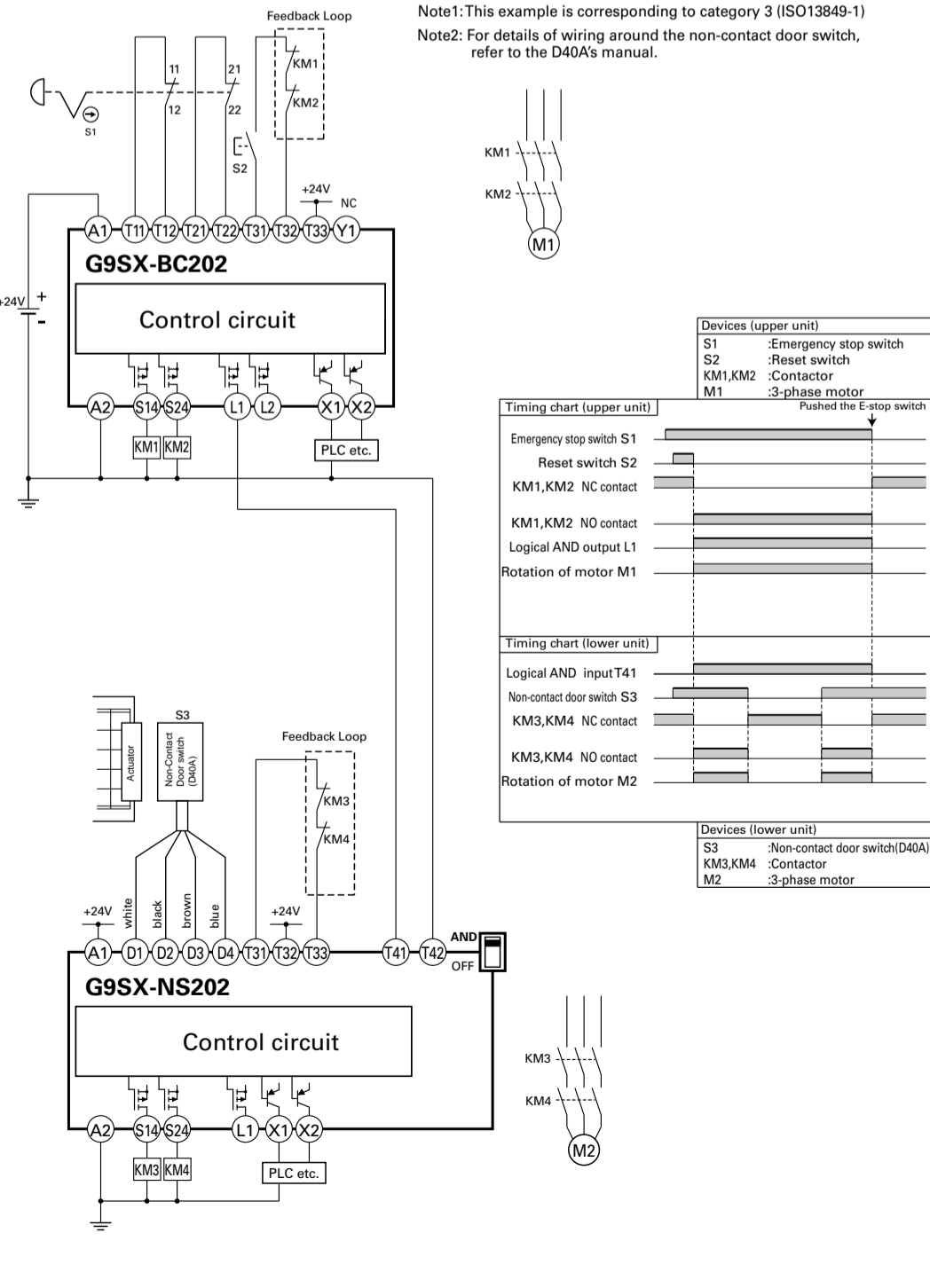
#### (2-channel safety limit switch input + non-contact door switch input / Auto reset)

Note1: This example is corresponding to category 3 (ISO13849-1)  
Note2: For details of wiring around the non-contact door switch, refer to the D40A's manual.



#### G9SX-BC202(DC24V) (2-channel emergency stop switch input / Manual reset) + G9SX-NS202(DC24V) (Non-contact door switch input / Auto reset)

Note1: This example is corresponding to category 3 (ISO13849-1)  
Note2: For details of wiring around the non-contact door switch, refer to the D40A's manual.



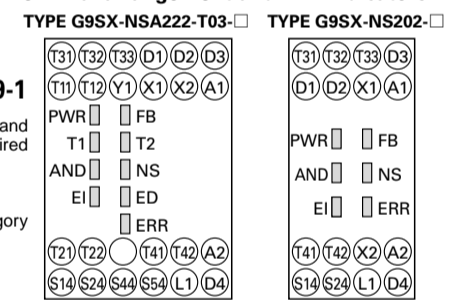
## Wiring of inputs and outputs

Signal Name	Terminal Name	Description of operation	Wiring
Power supply input	A1, A2	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 safety input 1 system Using safety input 2 system (without short-circuit monitoring between systems) Using safety input 2 system (with short-circuit monitoring between systems)
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.  To set Safety solid-state outputs in ON state, the signal input to T32 must change from OFF state to ON state, and then to OFF state. Otherwise Safety solid-state outputs cannot be in ON state.	Auto reset 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.	Logical AND connection sig. (1st layer) Logical AND connection sig. (2nd layer) Next unit (4 unit Max.) Next unit (4 unit Max.) Next unit (4 unit Max.) Next unit (4 unit Max.)
Cross fault detection input	Y1	Selects a mode of failure detecting (Cross fault detecting) function for safety inputs of G9SX-NSA222-T03-□ corresponding to the connection of Cross fault detection input.	Keep Y1 open when using T11, T21. (Cross fault detecting mode) Connect Y1 to 24VDC when NOT using T11, T21. (Wiring corresponding category 2 or 3)
Safety solid-state output	S14, S24	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	Outputs a signal of the same logic as Safety solid-state outputs.	Keep these outputs Open when NOT used.
Non-contact Door Switch input	D1, D2, D3, D4	To set Safety solid-state outputs in ON state, all non-contact door switch must be ON state. Otherwise Safety solid-state outputs cannot be in ON state.	Non-contact Door Switch (type D40A, type D40Z)
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.

### Multiple Connecting of Non-contact Door Switches and G9SX-NS□

For connecting multiple non-contact door switch to G9SX-NS□, refer to the wiring examples on D40A/D40Z's manual.

### Terminal arrangement and LED indicators



## 6 Performance Level and Safety Category of ISO 13849-1

The G9SX-NS□ together with D40A can be used up to PL=d and Category 3, and the G9SX-NS□ together with D40Z can be used for PL=e and Category 4, required by EN ISO 13849-1 European standard.

Refer to the following link for the Safety-related characteristic data:

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

This does NOT mean that G9SX-NS□ 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-NS□ for safety categories, make sure the conformity of the whole system.

1) Connect D40A/D40Z inputs and outputs with terminals D1, D2, D3 and D4.

2) Input the signals to both of the Safety inputs (T11-T12 and T21-T22)

3) 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.

4) Input the signal through a NC contact of the contactor to Feedback/Reset input (T31-T32 for manual reset or T31-T32 for auto reset). (Refer to '5 Examples of Application')

5) Be sure to Connect A2 to ground.

## 7 Fault Detection

When G9SX-NS 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-NS□.

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 2) Failures of the parts of internal circuits	1) Check the disturbance level around G9SX-NS□ and its related system. 2) Replace with a new product.
T1 Blink	—	Faults involved with Safety input 1	1) Failures involving the wiring of Safety input 1 2) Incorrect setting of Cross fault detection mode. 3) Failures of the parts of the circuits of Safety input 1.	1) Check the wiring to T11 and T12. (See Note1, 2) 2) Check the wiring to Y1. (See Note1) 3) Replace with a new product.
T2 Blink	—	Faults involved with Safety input 2	1) Failures involving the wiring of Safety input 2 2) Incorrect setting of Cross fault detection mode. 3) Failures of the parts of the circuits of Safety input 2.	1) Check the wiring to T21 and T22. (See Note1, 2) 2) Check the wiring to Y1. (See Note1) 3) Replace with a new product.
FB Blink	—	Faults involved with Feedback/Reset input	1) Failures involving the wiring of Feedback/Reset input 2) Failures of the parts of the circuits of Feedback/Reset input	1) Check the wiring to T31, T32, and T33 (See Note1, 2) 2) Replace with a new product.
Light up	—	Faults of Expansion units	1) Improper feedback signals from Expansion units 2) Abnormal supply voltage to Expansion units 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. 2) Check the supply voltage to Expansion units. * Make sure that all Expansion units' PWR indicators are lighting. 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 2) Failures of the parts of the circuits of Safety solid-state outputs 3) Failures involving the wiring of Logical connection output 4) Failures of the parts of the circuits of Logical connection output 5) Impermissible high ambient temperature	1) Check the wiring to S14 and S24 (See Note1) 2) Replace with a new product. 3) Check the wiring to L1. (See Note1, 2) 4) Replace with a new product. 5) Check the ambient temperature and spacing around G9SX-NS.
ED Blink	—	Faults involved with Off-delayed Safety solid-state outputs	1) Failures involving the wiring of Off-delayed Safety relay contact outputs 2) Incorrect set values of Off-delay time 3) Failures of the parts of the circuits of Off-delayed Safety relay contact outputs 4) Impermissible high ambient temperature	1) Check the wiring to S44 and S54 (See Note1) 2) Confirm the set values of the two of Off-delay time preset switches. (See Note3) 3) Replace with a new product. 4) Check the ambient temperature and spacing around G9SX-NSA222-T03-□.
AND Blink	—	Faults involved with Logic AND connection input	1) Failures involving the wiring of Logic AND connection input 2) Incorrect setting for Logic AND connection input 3) Failures of the parts of the circuits of Logical AND connection input	1) Check the wiring to T41 and T42 (See Note1, 2, 4) 2) Confirm the set value of the Logical AND connection preset switch. 3) Replace with a new product.
NS Blink	—	Faults involved with Non-contact Door Switch input	1) Failures involving the wiring of Non-contact Door Switches 2) Failures involving the wiring of multiple Non-contact Door Switches 3) Failures of the parts of the circuits of G9SX-NS□ 4) Failures of the parts of the circuits of D40A/D40Z	1) Check the wiring to D1, D2, D3 and D4 (See Note1, 2) 2) Check the wirings between D40As 3) Replace with a new G9SX-NS□ 4) Replace with a new D40A/D40Z
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.

Note: (1) Check miswiring, short, or open, etc. (See 'Wiring of inputs and outputs')

(2) Make sure that the wiring length is 100 meters or less. (See 'Precautions for Correct Use(8)')

(3) See 'Preset Switches'.

(4) See '4 Ratings and Specifications' Note 9

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-NS□. Or check the inputs sequence of safety input devices. After removing the fault, turn both safety inputs to OFF state.