

OMRON

Model
G9SR: BC201-□, AD201-□, EX031-□

ORIGINAL INSTRUCTION SHEET

Thank you for purchasing an OMRON product. Read this thoroughly and familiarize yourself with the functions and characteristics of the product before using it. Keep this instruction sheet for future reference.

OMRON Corporation

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■ Safety Precautions

- WARNING** Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury. Also there may be severe property damage.
- Caution** Indicates a potentially hazardous situation, which, if not avoided, may result in minor or moderate injury, or property damage.

Refer to the *Operation Manual* for more detailed information.

■ Warnings and Cautions

WARNING	Installation, wiring, maintenance and inspection must be performed by authorized personnel. Not doing so may result in dangerous situations.
WARNING	Electric shock may occur. Do not touch any terminals while power is being supplied.
WARNING	Serious injury may possibly occur due to loss of required safety functions. Do not use the G9SR-series relay's test outputs or standard outputs as safety outputs.
WARNING	Serious injury may possibly occur due to loss of required safety functions. Do not use indicators on the G9SR-series relay for safety operations.
WARNING	Serious injury may possibly occur due to breakdown of safety outputs or test outputs. Do not connect loads beyond the rated values to the safety outputs and test outputs.
WARNING	Serious injury may possibly occur due to loss of required safety functions. Wire the G9SR series Controller properly so that the 24VDC line does NOT touch the outputs accidentally or unintentionally.
WARNING	Do not connect the 0V line to PE. Serious injury may possibly occur due to loss of required safety functions.
WARNING	Serious injury may possibly occur due to loss of required safety functions. Perform user testing and confirm that all of the G9SR-series relay's configuration data and operation is correct before starting system operation.
WARNING	Serious injury may possibly occur due to loss of required safety functions. When replacing a G9SR-series relay, confirm the model of the Controller is correct and configure the replacement Controller suitably and confirm that it operates correctly.

WARNING	Serious injury may possibly occur due to loss of required safety functions. Use devices and parts related to safety functions according to legal regulations in the applicable country. Use certified items compliant with safety standards corresponding to the intended application.
WARNING	Do not try to disassemble, repair, or modify this product. Doing so may cause the safety functions to stop working properly.
WARNING	Do not use the G9SR safety relays in environments where flammable or explosive gases are present. Doing so may result in an explosion.
WARNING	Perform daily and 6-monthly inspections for the G9SR safety relays. Otherwise, the system may fail to work properly, resulting in serious injury.
WARNING	Do not use the auxiliary output for safety applications.
Caution	Connect the AD201-□ and EX031-□ units to the same power supply.
Caution	Do not remove a terminal block while the unit is powered ON. It may damage the unit.
Caution	Do not remove the 0V connection while the unit is powered ON. It may damage the unit.

Provide external measure to ensure appropriate overvoltage protection to 30Vdc max.
Refer to the *Operation Manual* for more detailed information.

■ Handling, Storage and Disposal

- The information of section 'Operating Environment' is also applicable for storage and transport of G9SR products.
- Never dispose electrical components by incineration. Contact your local environmental agency for details on disposal of electrical components and packaging.

■ Compliance with EC Directives

- This product complies with the following EC Directives:
- EMC Directive (2014/30/EU)
 - Machinery Directive (2006/42/EC)

For details and translations refer to the *EC Conformity Declaration* and the *Operation Manual*.

■ References

Please be sure to read the related *Operation manual* of the G9SR units. This manual with Cat. No. J12E-EN-01 is available at www.Omron.com. Ensure you are using the most current version of the manual.

SUITABILITY FOR USE	
OMRON shall not be responsible for conformity with any standards, codes, or regulations that apply to the combination of products in the customer's application or use of the products.	
Take all necessary steps to determine the suitability of the product for the systems, machines, and equipment with which it will be used.	
Please know and observe all prohibitions of use applicable to the products.	
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 PRODUCTS ARE PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.	
See also product catalogs for Warranty and Limitations of Liability.	

G9SR Safety Relay Units: Intended use

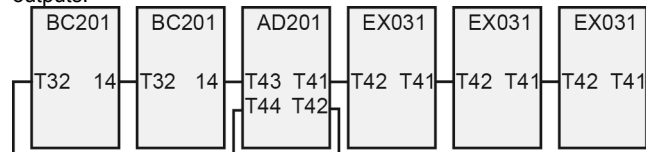
The G9SR units are intended for the functions listed in the table below:

	G9SR-BC	G9SR-AD	G9SR-EX
E-Stop function	Yes	Yes	No
Door monitoring (safety limit switches)	Yes	Yes	No
Door monitoring (key operated switches)	Yes	Yes	No
Door monitoring (non-contact switches)	Yes	Yes	No
ESPE monitoring	Yes	Yes	No
Additional safety outputs	No	No	Yes

Note on the G9SR-EX unit:
The extra outputs realised with the G9SR-EX units have an ON-delay timer and an OFF-delay timer for additional control of your outputs.

G9SR Safety Relay Units: Family Description

The product family G9SR consists of a BC201 (BC=Basic), an AD201 (AD=Advanced) and an EX031 (EX=Extension) unit to give you flexibility configuring your specific situation. The AD201-□ module can be extended with max. 2 BC201-□ for extra inputs and with max.3 EX031-□□ for extra outputs.



■ Operating Environment

Caution The operating environment of the G9SR unit(s) can have a large effect on the longevity and reliability of the system. A bad operating environment can lead to malfunction and other unforeseeable problems with the system. Make sure that the operating environment is within the specifications at installation and remains within the specified conditions during the life of the system.

■ Installation Conditions

Space must be provided around the G9SR-series relay, at least 25 mm from its side surfaces and at least 50 mm from its top and bottom surfaces, for ventilation, wiring and Unit replacement.

Refer to the *Operation Manual*, Section *Installation and Configuration* for more detailed information.

■ Specifications

Item	Details
Mounting	DIN rail
Material Housing & Connectors	Plastic (grey)
Connectors	Removable cage clamp terminals
Operating temperature range	-10 to + 55°C
Storage temperature range	-25 to + 70°C
Humidity	0 to 95% RH. No icing or condensation
Enclosure rating (EN 60529)	IP20 (mount in a IP54 cabinet or higher according to IEC/ EN 60529)
Resistance to Vibration (to IEC 68-2-6) Shock (to IEC 68-2-27)	0,375mm 10 to 70Hz 30G 18ms
Operating voltage	24V DC ±20%
Current consumption excluding auxiliary output	150mA maximum
Minimum input current for EDM and RESTART	6mA
Minimum EDM and RESTART voltage for an ON signal	19V DC
Minimum voltage for T12 and T22 for an ON signal	17V DC
Minimum input current for T12 and T22	6mA
Maximum T12, T22, EDM and RESTART voltage for an OFF signal	11V DC
Power-ON delay	< 2 sec.
Outputs static	2A continuous for OSSD 0.5A for Auxiliary output Unit supply voltage -1V 0V
G9SR-BC Output voltage High G9SR-BC Output voltage Low Output relays on -AD and -EX	Max. 4A AC1 @ 250V * Max. 5A AC15 @ 250V Max. 4A DC1 @ 30V * Max. 5A DC13 @ 30V * See Derating curve.
Output relays circuit protection	None internal. External fuse (5A) required.
Unit power supply circuit protection	External fuses: G9SR-AD□□ = 1A F, G9SR-EX□-T90□ = 1A F, G9SR-BC□□ = 5A F
Input circuit protection	Over voltage protection. Short circuit creates an error situation. Incorrect polarity creates an error situation.

Input test pulse duration	1ms
Response timing:	
Stand-alone G9SR-BC	< 54ms
Stand-alone G9SR-AD	< 52ms
1 G9SR-BC & G9SR-AD	< 214ms for system
2 G9SR-BC & G9SR-AD	< 294ms for system
G9SR-AD & 1 G9SR-EX	< 58ms
G9SR-AD & 2 G9SR-EX	< 61ms
G9SR-AD & 3 G9SR-EX	< 64ms
1 BC & AD & 1 EX	< 218ms
2 BC & AD & 1 EX	< 298ms
1 BC & AD & 2 EX	< 222ms
2 BC & AD & 2 EX	< 302ms
1 BC & AD & 3 EX	< 225ms
2 BC & AD & 3 EX	< 306ms
Restart time (OFF=>ON)	< 150ms
Insulation resistance	> 20Mohm
Dielectric voltage strength	2500V AC, 50/60Hz for 1 minute
Operating modes	Automatic/manual restart, EDM, Input Loop chain and Output Loop chain.
Maximum cabling length for safety inputs	Maximum length < 100m and total cable impedance < 250Ohm
Maximum capacitance for BC model OSSD	330nF
Maximum peak current for cable (OSSD)	5A
Cable terminal requirements:	
• 3 poles connector:	0,2mm ² to 2,5mm ² (AWG 24 to 12)
• 4 poles connector:	0,2mm ² to 2,5mm ² (AWG 24 to 12)
• 5 poles connector:	0,2mm ² to 1,5mm ² (AWG 24 to 16)
Cable types allowed:	Stranded, Fixed, Ferrules.
Power supply requirement	Double insulation acc. EN 60950

■ External Dimensions

External dimensions of G9SR units in millimeters: Height: 114,5. Thickness: BC201-□ unit = 17,6, AD201-□ and EX031-□ = 22,5. Width: 99 without terminal blocks, 117 spring type terminal blocks, 107 screw type terminal blocks.

Refer to the *Operation Manual*, § *Mechanical Dimensions* for more detailed information and dimensional drawings.

■ LEDs BC201-□, AD201-□, EX031-□-□

LED / for	Status	Meaning
POWER = Power BC,AD,EX	Green Lit	Power supply correctly applied
	Not Lit	No power or internal error
COM EX	Yellow Lit	Valid communication signal in or out
	Yellow Flashing	On- or Off-delay in progress Fast blinking & ERR fast blinking = Communication error of another unit Slow blinking & ERR slow blinking = Communication error of this unit
	Not Lit	No valid input signal @ T42
	Not Lit	No valid input signal @ T42
IN1 = Input1 BC,AD	Yellow Lit	A valid input signal @ T12
	Yellow Flashing	n.a.
	Not Lit	No valid input signal @ T12
IN2 = Input1 BC,AD	Yellow Lit	A valid input signal @ T22
	Yellow Flashing	n.a.
	Not Lit	No valid input signal @ T22
RESTART = Restart BC,AD	Yellow Lit	Restart input is activated
	Yellow Flashing	Error situation Fast blinking & ERR fast blinking = Communication error of another unit Slow blinking & ERR slow blinking = Communication error of this unit
	Not Lit	Restart action not required / not allowed
EDM = ExDevMo BC,AD,EX	Yellow Lit	External Device Monitor enabled
	Yellow Flashing	External Device Monitor error
	Not Lit	External Device Monitor disabled
ON = Outputs BC,AD,EX	Green Lit	Outputs activated
	Green Flashing	Input-loop OK
	Not Lit	Outputs de-activated
OFF/ERR = Error BC,AD,EX	Red Lit	OSSDs de-activated
	Red Flashing	Error. Check LEDs (EDM, Res, Com) Fast blinking & ERR fast blinking = Communication error of another unit Slow blinking & ERR slow blinking = Communication error of this unit
	Not Lit	Internal checks OK and OSSD activated
	Not Lit	Internal checks OK and OSSD activated

G9SR unit: BC201-□ (BC = Basic)

The BC201-□ unit can handle one double-channel input device and 2 output signals. The outputs must be DC loads with a maximum of 2A switching current each. This unit can be used stand-alone or as an Input extension for the AD. In input extension application BC201 can be supplied using a separate power supply. Refer to the *Operation Manual* for more detailed information.

■ DIP switches for BC201-□

Both dip-switch groups should be set identically.

Function	Switch	BC201-□
Restart	1	ON = Auto restart OFF = Manual restart
Dynamic Input Test	2	ON = Enabled OFF = Disabled
EDM	3	ON = Enabled OFF = Disabled
Input loop	4	ON = Enabled OFF = Disabled
Aux Outputs	5	ON = Aligned OFF = Inverted

■ Connections for BC201-□

Label	Description
T12	Input Channel 1
44	Output Auxiliary (Status)
A1	Power Supply
T31	Restart Input
T11	Test Signal 1
A2	Power Supply GND
T32	EDM Input or Input Loop IN (depending on dip switches)
T21	Test Signal 2
14	Output 1 OSSD1 or Input Loop OUT (depending on dip switches)
24	Output 2 OSSD2
T22	Input Channel 2

G9SR unit: AD201-□ (AD = Advanced)

The AD201-□ unit can handle one double-channel input device and 2 output signals. Output relays for max. 250V AC 4A for AC1 loads. This unit can be expanded with max. 3 EX031-□□ units to handle more output signals and max. 2 BC201-□ units to handle more input signals.

■ DIP switches for AD201-□

Both dip-switch groups should be set identically.

Function	Switch	AD201-□
Restart	1	ON = Auto restart OFF = Manual restart
Dynamic Input Test	2	ON = Enabled OFF = Disabled
EDM	3	ON = Enabled OFF = Disabled
INPUT LOOP	4/5	OFF/OFF = 0 BC201-□ connected OFF/ON = Setting not allowed ON/OFF = 1 BC201-□ connected ON/ON = 2 BC201-□ connected
OUTPUT LOOP	6/7	OFF/OFF = 0 EX031-□□ connected OFF/ON = 1 EX031-□□ connected ON/OFF = 2 EX031-□□ connected ON/ON = 3 EX031-□□ connected

■ Connections for AD201-□

Label	Description
13	Relay Output 1.1 (NO)
23	Relay Output 2.1 (NO)
T12	Input Channel 1
44	Output Auxiliary (Status)
A1	Power Supply
T31	Restart Input
T11	Test Signal 1
T43	Input loop IN
T44	Input loop OUT
A2	Power Supply GND
T32	EDM input
T21	Test Signal 2
T41	Output loop OUT
14	Relay Output 1.2 (NO)
24	Relay Output 2.2 (NO)
T22	Input Channel 2
T42	Output loop IN

G9SR unit: EX031-T90-□ (EX = Extension)

The EX031-T90-□ unit can be connected to the AD201-□ unit as an Output extension unit. Outputs are switched with relays designed for 250V AC with a maximum of 4A switching current for AC1 loads. The output signals of the EX031-T90-□ unit can be switched with 16 timing presets for an ON-delay and 16 timing presets for an OFF-delay.

■ Rotary switches for EX031-T90-□

Switches 1 and 3 set the ON-delay. Both switches should be set identically. Switches 2 and 4 set the OFF-delay. Both switches should be set identically.

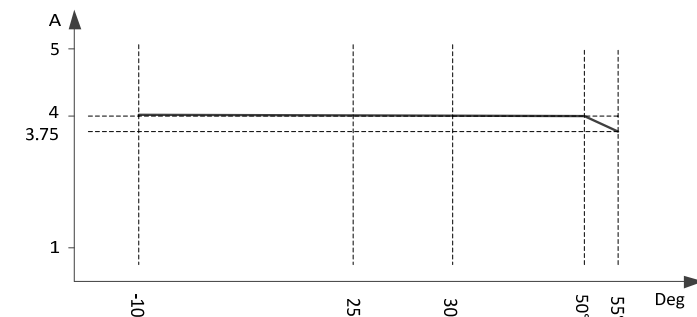
Setting	= Seconds
0	0s
1	0.1s
2	0.2s
3	0.5s
4	1s
5	1.5s
6	2s
7	2.5s
8	5s
9	10s
A	20s
B	30s
C	45s
D	60s
E	75s
F	90s

■ Connections for EX031-T90-□

Label	Description
13	Relay Output 1.1 (NO)
23	Relay Output 2.1 (NO)
33	Relay Output 3.1 (NO)
44	Output Auxiliary (Status)
A1	Power Supply
A2	Power Supply GND
T32	EDM Input
T41	Output Loop OUT
14	Relay Output 1.2 (NO)
24	Relay Output 2.2 (NO)
34	Relay Output 3.2 (NO)
T42	Output Loop IN

Derating curve of relay contact current

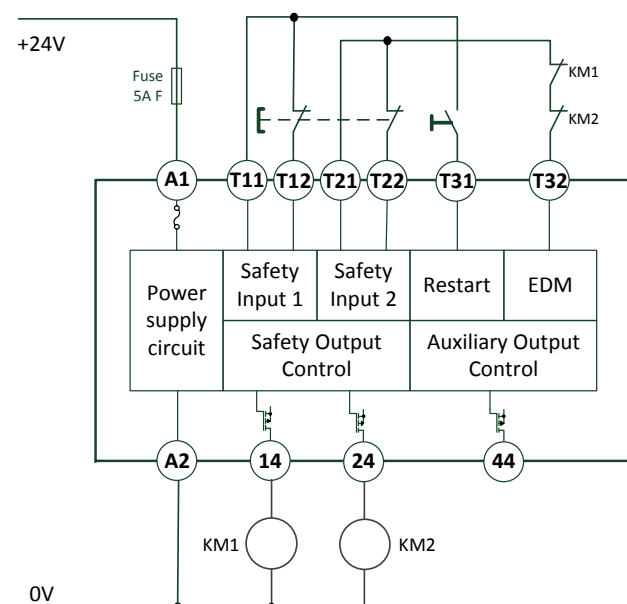
Use the derating curve to determine the maximum allowed relay contact current for the actual operating temperature of the unit.



When mounting multiple units close to each other, the rated current will be 2A. Do not apply current higher than 2A. If the rated current is higher than 2A please follow installation instructions in the manual (2.2)

Wiring Examples

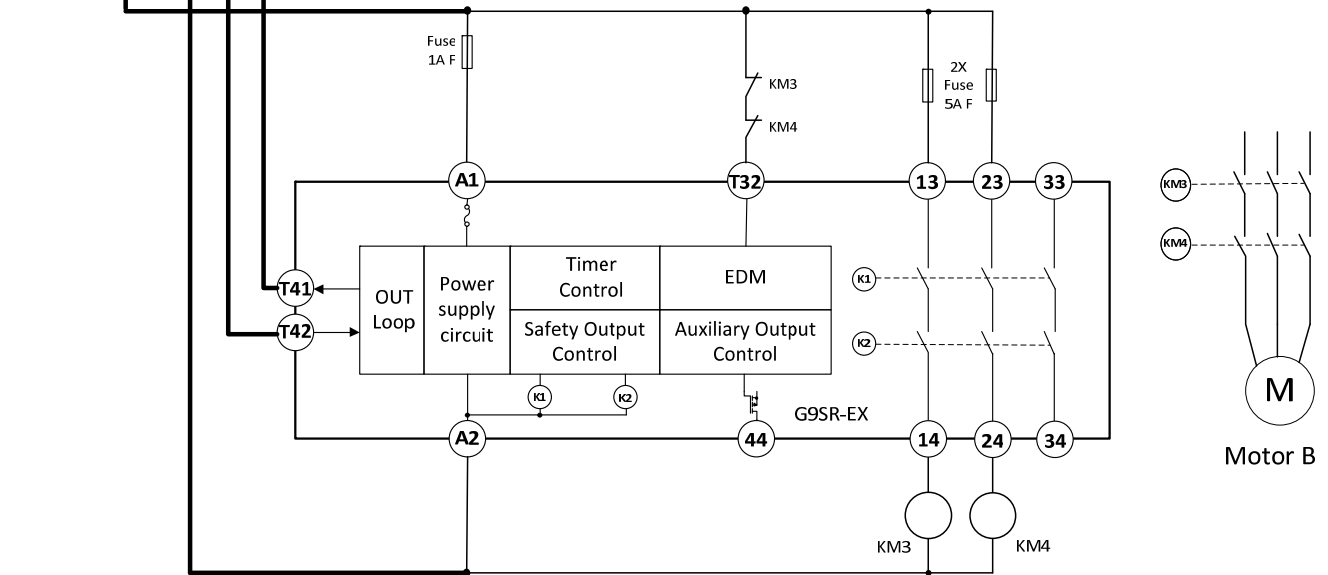
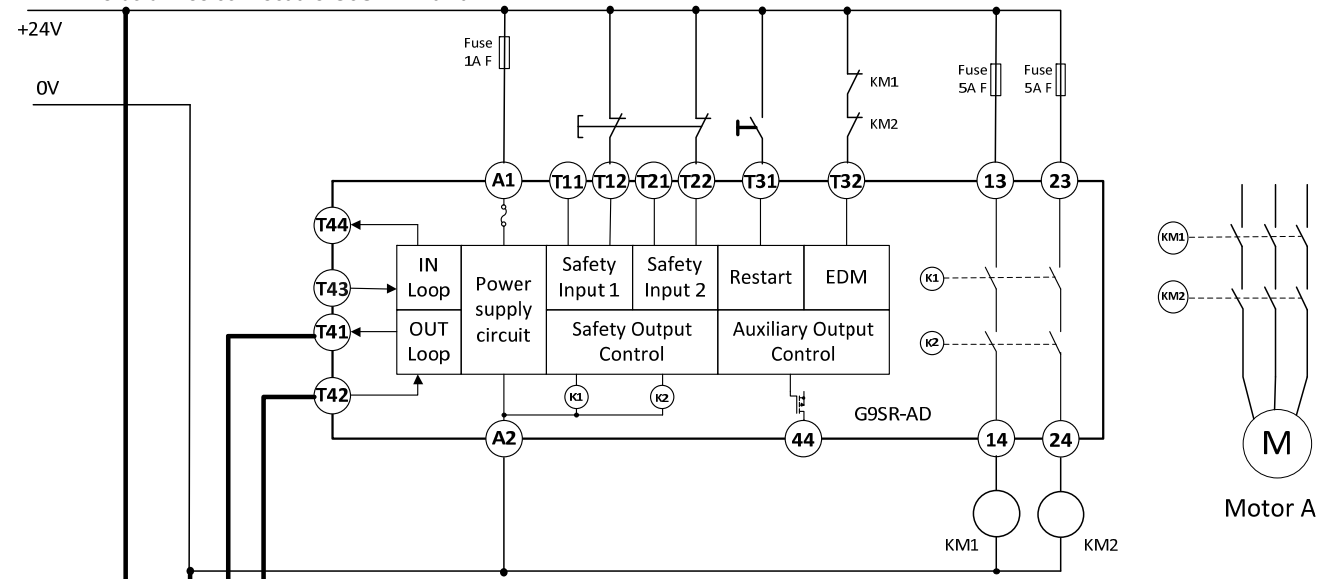
■ Wiring example for G9SR-BC



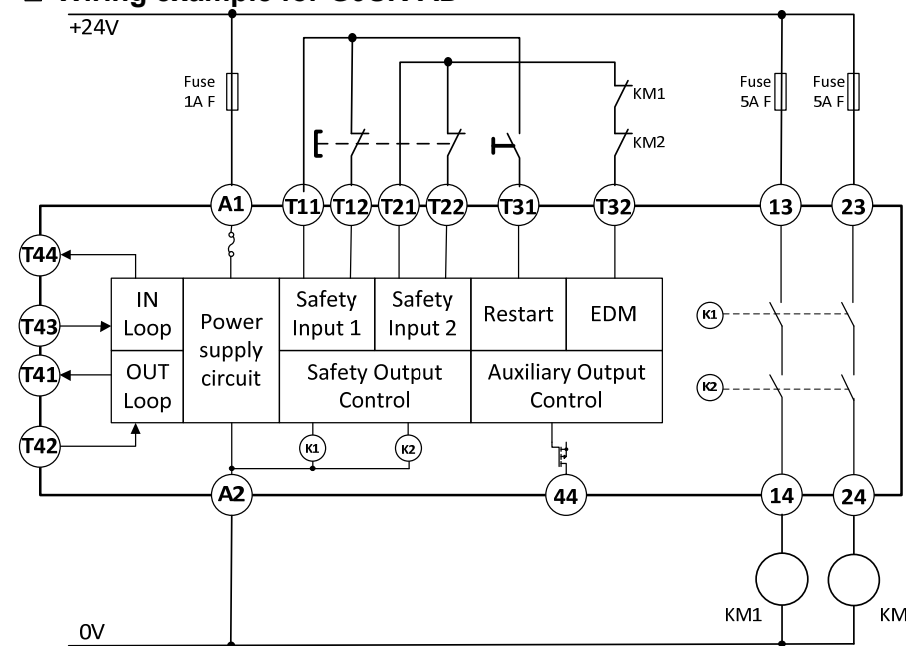
■ Wiring example for G9SR-EX (and G9SR-AD)

Remarks:

- Use one power supply for both units.
- The bold lines connect the G9SR-EX unit



■ Wiring example for G9SR-AD



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Note: These are the Original Instructions.
Note: This Instruction sheet and the product specifications are subject to change without notice.