OMRON

Safety Relay Units
G9SR family

- Diagnosis with LEDs
- Selectable operating modes and times
- Increased extension possibilities

industrial.omron.eu/g9sr

Safety competence built in

Omron's proven safety knowledge is backed by many years of experience in producing safety solutions covering the entire safety chain. This means full safety protection in all phases of the machine lifecycle, as provided by the G9SR family of Safety Relay Units.

- Covers safety input, control and output functions
- Failure-rate reduction through electronic safety systems
- Maximises safety process control
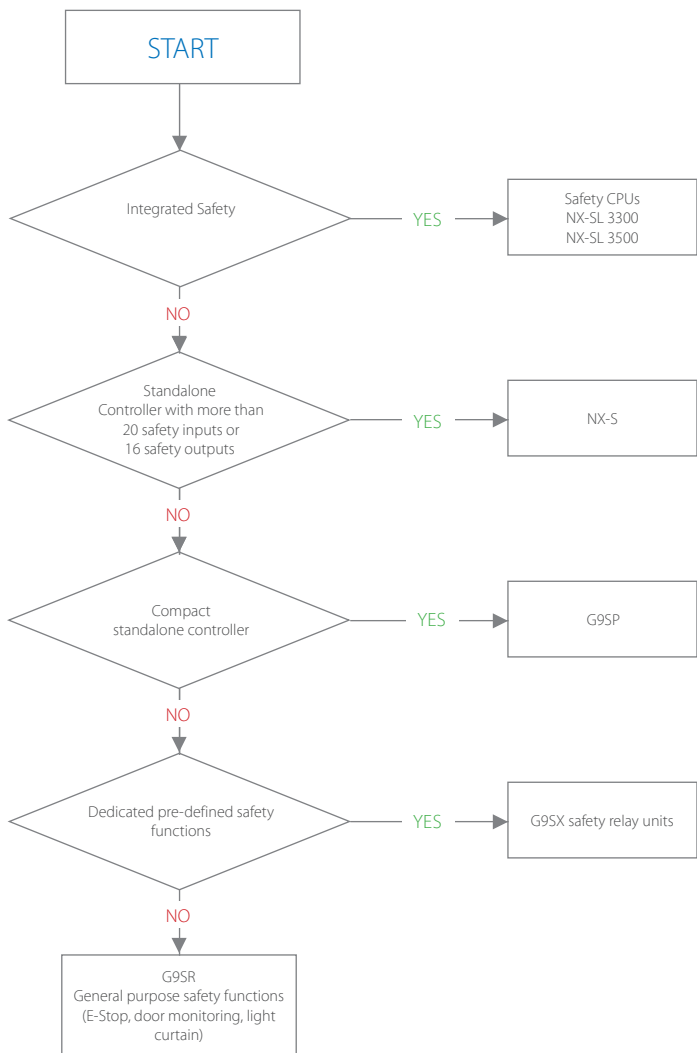- Supports all phases of the machine lifecycle

Product Lineup

Hardwired and programmable safety control

Stand-alone Controllers · Integrated Safety Controller

Programmable

G9SP · NX-S · NX

Hard-wired

G9SX

G9SR

Small · < Application size > · Large

Safety control that meet every requirement

The Omron safety control units have just the right product for your machine, whatever the application. Make the perfect choice from just five product families using the quick selection guide.

GLOBAL
application knowledge
partner

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        ┌─────────────────┐
        │      START      │
        └─────────────────┘
                 │
                 ▼
          ◇ Integrated Safety ◇ ──── YES ───▶ ┌──────────────────┐
                 │                              │   Safety CPUs    │
                 NO                             │   NX-SL 3300     │
                 │                              │   NX-SL 3500     │
                 ▼                              └──────────────────┘
        ◇ Standalone        ◇
        ◇ Controller with more than ◇ ── YES ──▶ ┌──────────────────┐
        ◇ 20 safety inputs or 16 safety outputs ◇ │      NX-S        │
                 │                                 └──────────────────┘
                 NO
                 │
                 ▼
          ◇ Compact           ◇ ──── YES ───▶ ┌──────────────────┐
          ◇ standalone controller ◇            │      G9SP        │
                 │                              └──────────────────┘
                 NO
                 │
                 ▼
          ◇ Dedicated pre-defined safety ◇ ── YES ──▶ ┌──────────────────────┐
          ◇ functions                    ◇            │ G9SX safety relay units │
                 │                                     └──────────────────────┘
                 NO
                 │
                 ▼
        ┌─────────────────────────────────┐
        │              G9SR               │
        │  General purpose safety functions │
        │  (E-Stop, door monitoring, light │
        │              curtain)            │
        └─────────────────────────────────┘
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SAFETY PRODUCTS
Safety services
SAFETY CHAIN (I-L-O)

The G9SR Safety Relay Unit family

The three family members G9SR basic, advanced and extension are all equipped with removable spring-type terminal blocks for fast installation and front-view LED diagnosis. DIP-switches in the front panel are used to configure the control functions of the Safety Relay modules.

G9SR basic unit

The basic unit of the G9SR family is 17.5mm wide and has semiconductor safety outputs with up to 2A switching current to easily drive even large contactors.

- Compatible for a variety of safety solutions like E-Stop, guard monitoring devices, light curtains and others
- Fast response time for short safety distance
- Semiconductor outputs for wear-free operation
- DIP-switch configurable for fast setup/customized function
- Removable spring-type terminals for fast installation
- Certified to PLe category (EN/ISO 13849-1) standards
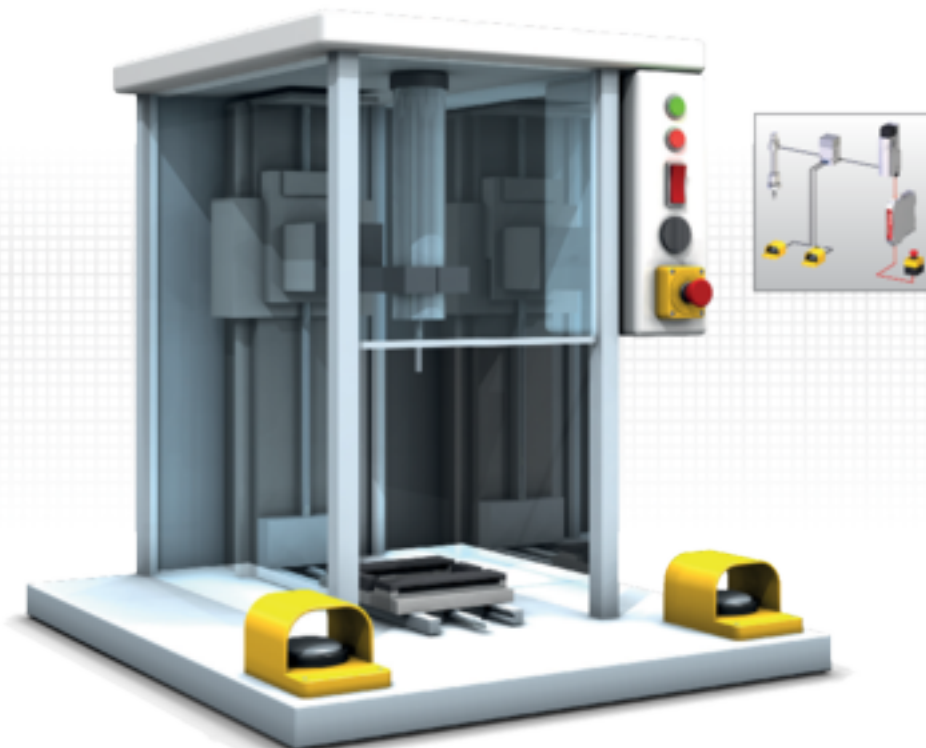
G9SR advanced unit

The advanced unit of the G9SR family is 22.5mm wide and can drive up to 5A/250V using safety relay outputs. In addition, the advanced unit can be set up as a master module to control additional inputs and outputs.

- Compatible for a variety of safety solutions like E-Stop, guard monitoring devices, light curtains and others
- Safety relay outputs with 5A loading
- DIP-switch configurable for fast setup/customized function
- Removable spring-type terminals for fast installation
- Control centre for input/output extension modules
- Certified to PLe category (EN ISO 13849-1) standard

Built-in input and output extension

The G9SR input and output extension capability gives flexibility to the designer of the safety control system in the number of safety in- and outputs needed by a two wire connection system.

Input extension of G9SR advanced unit

Each advanced unit of the G9SR family can control up to two G9SR basic units that are configured as additional safety inputs. Maximum distance between the G9SR input modules is 10m.

- Compatible for a variety of safety solutions like E-Stop, guard monitoring devices, light curtains and others
- Up to three high-level safety input functions
- Safe connection up to PLe of modular machines (eg. E-Stop pushbutton per machine module)
- Up to 10 m distance between G9SR basic units

Output extension of G9SR advanced unit

Additional safety realy outputs are provided by the G9SR extension unit with a 22.5mm wide housing and safe on- and off delay timer on board up to PLe, and a maximum delay time of 90 seconds each.

Up to three of the G9SR extension units can be connected to a G9SR advanced unit to increase the number of safety relay outputs, each of them with 5A switching capacity. The maximum distance between G9SR extension modules can be up to 1m.

- Up to four safety output functions in PLe
- One immediate safety output and three with safe timing function
- Up to 1m distance between G9SR extension units

The configurable safety control unit to meet your additional safety needs
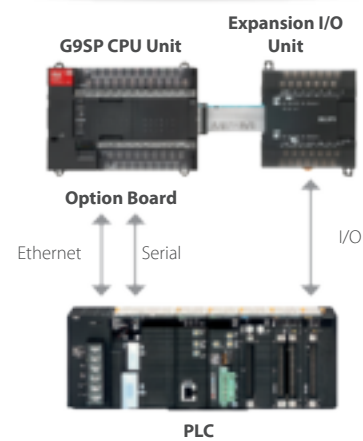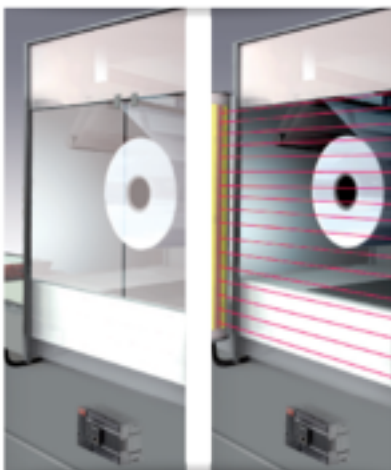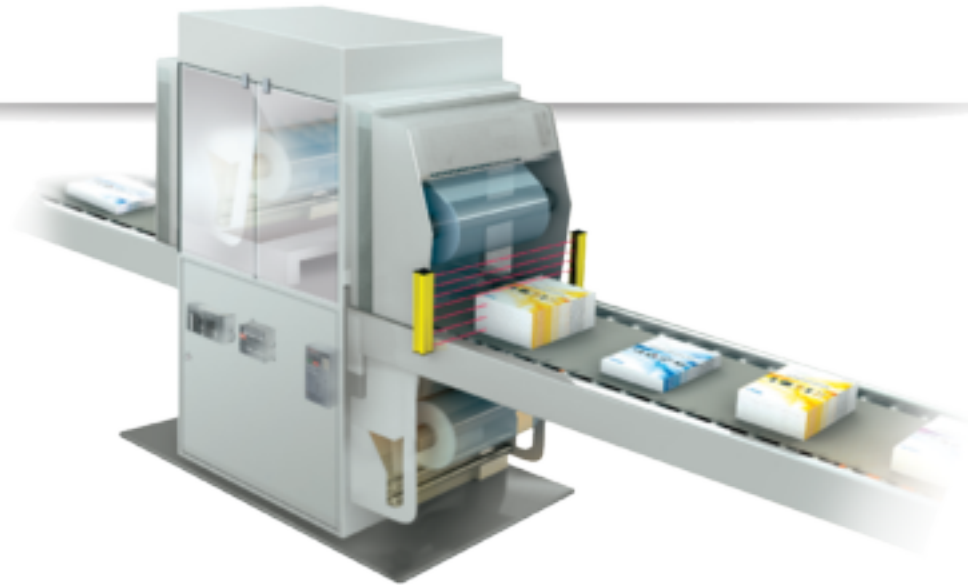
The configurable G9SP safety control unit is ideal for applications where future reconfiguration may be necessary to add new safety features to your setup.

- Ideal for quickly reconfiguring an existing setup
- Also for multiple stand-alone systems with the same specs
- Direct connection to non-contact switches, single-beam sensors, safety mats
- Single GUI for configuration, simulation, testing and validation
- Certified to PLe category (EN ISO 13849-1) standard

Configurations matrix

1   Safety controller G9SP
2   Expansion I/O Units
3   Memory cassette
4   Ethernet option board
5   RS-232C option board
6   Compact non-contact door switch
7   Safety mats
8   CJ1/PLC
9   Relays with forcibly guided contacts
10 AC Servomotor/Drives G5 series
11 Configurator
12 Programmable terminal NB series

G9SP CPU Unit

Expansion I/O Unit

Option Board

Ethernet   Serial

I/O

PLC

Designing   Reusing

Simulating   Packaging
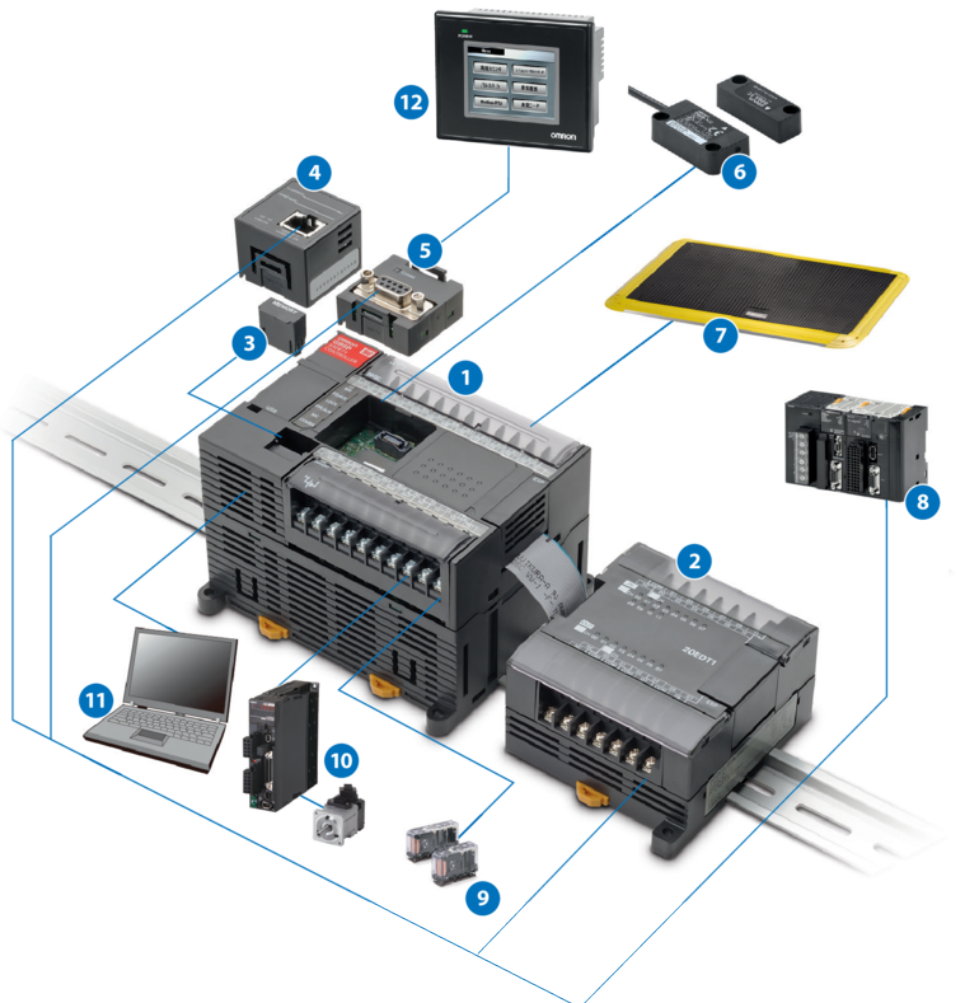
Reconfigurable
- Omron configuration tool with easy-to-use graphic interface
- Easy definition, simulation, testing and validation of all inputs and output
- Configurations can be copied and applied to all systems using a make-once/use-many profile
- Set-up can be adapted quickly and easily to meet changing needs

Flexible
- Can be reconfigured for multiple purpose
- Direct connection to non-contact switches or safety mat
- Three I/O sizes are available: 20/8, 10/16 and 10/4
- Covers the full range of small to mid sized systems
- Optional expansion units for standard I/O signals (12/8 and 0/Up to 128 function blocks

Simple
- On-screen text and icon-driven menus for quick guidance
- Clear alerts and system status updates

Compact safety relay unit family

G9SR family modules operate standalone and as a system with input and output extension. All modules are simple to set up using DIP-switches and provide clear diagnosis via LEDs on the front.

- Three modules for all safety relay unit applications
- Solid-state outputs for long life and high current safety relay outputs
- Detailed LED indications enable easy diagnosis
- Safe on- and off-delay function up to PLe
- Up to PLe according to EN ISO 13949-1 and SIL 3 according to EN 61508

Ordering information

Basic unit

Safety outputs	Auxiliary outputs	No. of input channels	Rated voltage	Terminal block type	Order code
Instantaneous					
2 P channel MOS FET transistor output	1 PNP transistor output	1 or 2 channels	24 VDC	removable cage clamp terminals	G9SR-BC201-RC

Advanced unit

Safety outputs	Auxiliary outputs	No. of input channels	Rated voltage	Terminal block type	Order code
Instantaneous					
2 PST-NO (contact)	1 PNP transistor outputs	1 or 2 channels	24 VDC	removable cage clamp terminals	G9SR-AD201-RC

Expansion unit

Safety outputs		Auxiliary outputs	Rated voltage	Terminal block type	Order code
Instantaneous	ON/OFF-delayed				
–	3 PST-NO (contact)[*1]	1 (solid state) PNP transistor outputs	24 VDC	removable cage clamp terminals	G9SR-EX031-T90-RC

[*1] The ON/OFF delay time can be set in 16 steps as follows: 0/0.1/0.2/0.5/1/1.5/2/2.5/5/10/20/30/45/60/75/90 s

Specifications

Power input

Item	G9SR-BC_	G9SR-AD_	G9SR-EX_
Rated supply voltage	19.2 to 28.8 VDC (24 VDC ±20%)		

Inputs

Item	G9SR-BC_	G9SR-AD_	G9SR-EX_
Safety input	Operating voltage: 17 VDC to 28.8 VDC, internal impedance: Approx. 3 kΩ		
Feedback/reset input			

Outputs

Item	G9SR-BC_	G9SR-AD_	G9SR-EX_
Instantaneous safety output	P channel MOS FET transistor output Load current (Using 2 outputs): 2 A DC max.	–	
Auxiliary output	PNP transistor output Load current: 500 mA max.		
Rated load	–	250 VAC, 5 A AC15 (inductive load)	
Rated carry current	–	5 A	
Maximum switching voltage	–	250 VAC	

Characteristics

Item		G9SR-BC_	G9SR-AD_	G9SR-EX_
Operating time (OFF to ON state)		150 ms max.		
Response time (ON to OFF state)		50 ms max.		
Durability	Electrical	–	100,000 cycles min.	
	Mechanical	–	10,000,000 cycles min.	
Ambient temperature		–10°C to +55°C (with no icing or condensation)		

Reliability Data

Item	G9SR-BC_	G9SR-AD_	G9SR-EX_
EN ISO 13849-1:2008	PLe		
EN ISO 13849-1:2008	Cat.4		
PFHd (EN ISO 13849-1:2008)	1.25×10^{-9}	7.6×10^{-11}	4.1×10^{-10}
MTTFd (EN ISO 13849-1:2008)	593 Years	789 Years	4329 Years
DCavg (EN ISO 13849-1:2008)	98%		
Type (IEC 61496-1: ed 2 2004)	Type 4		
SIL (EN 62061/EN 61508:2010)	SIL 3		
Proof test interval (IEC 62061: 2005)	20 Years		
MTTR (EN61508-1:2008)	8h		

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Item	G9SR-BC_	G9SR-AD_	G9SR-EX_
Type (EN61508:2010)	Type B		
HFT (EN61508:2010)	HTF 1		

Dimensions

Unit	G9SR-BC_-_	G9SR-AD_-_	G9SR-EX_-_-_
Height	114.5 mm	114.5 mm	114.5 mm
Width	99.0 mm	99.0 mm	99.0 mm
Thickness	17.6 mm	22.5 mm	22.5 mm
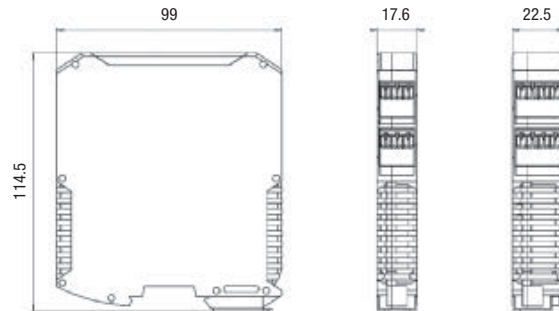
Wiring example

G9SR-AD with extension module G9SR-EX
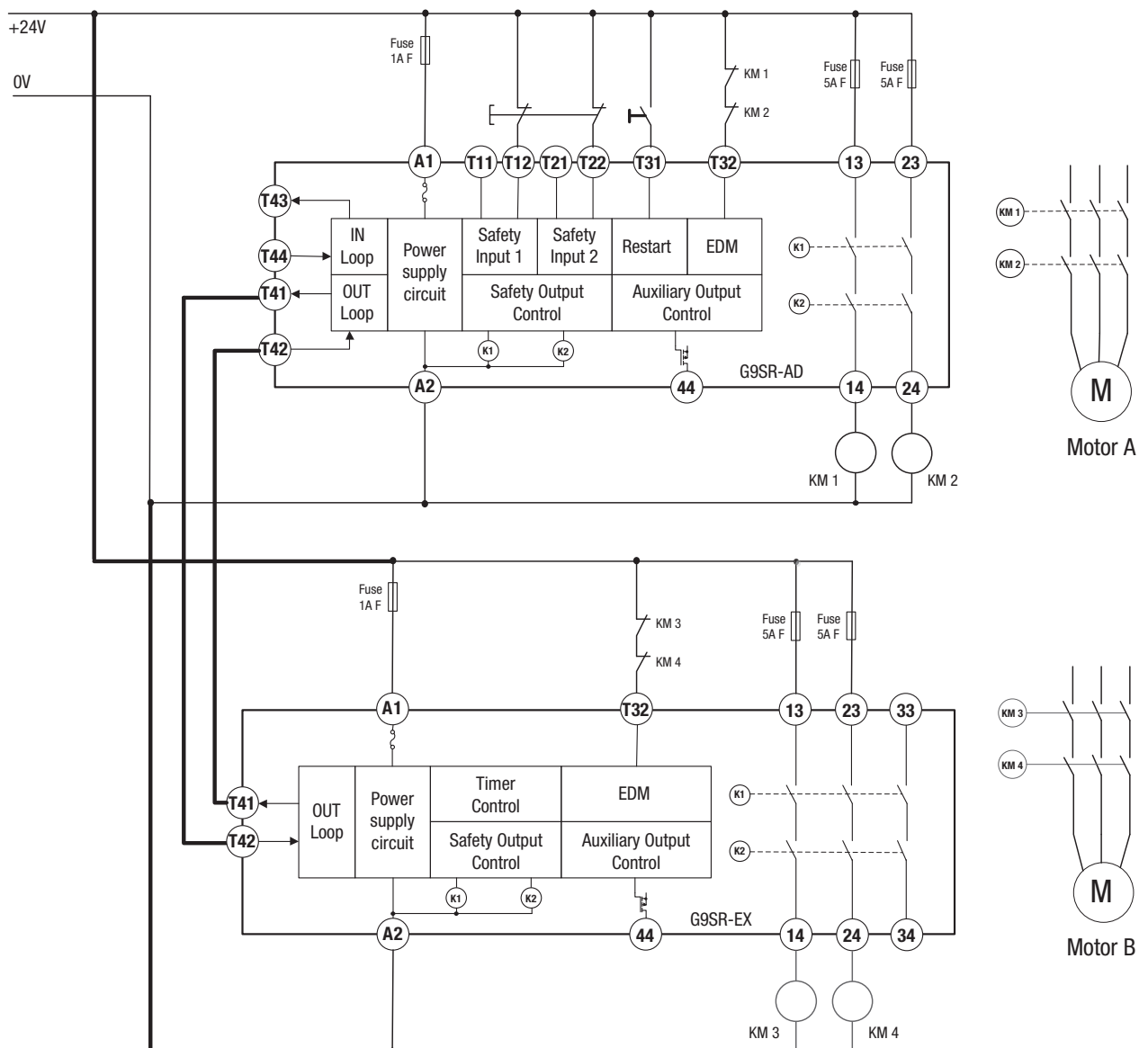
Note 1. Use one power supply for both units.
2. The bold lines connect the G9SR-EX unit

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