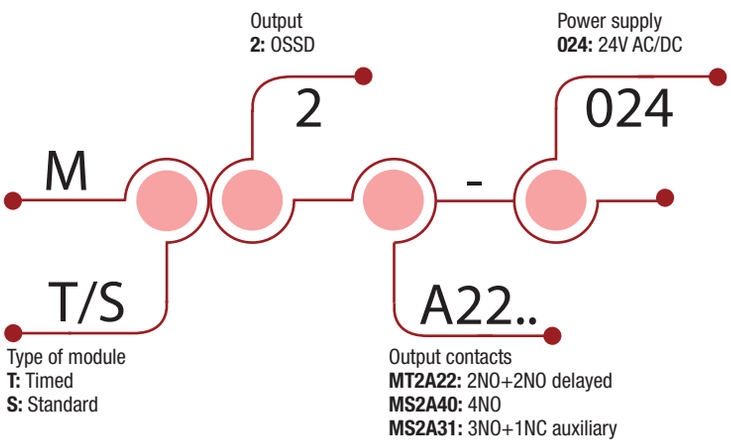
# Safety modules
## Multifunction Safety modules

**APPROVALS:** UL 508 / EN 60947-5-1

**Type examination certificate number:** 4420515176917
issued by TUV NORD
In accordance with the Machinery Directive 2006/42 / EC




## HOW IS IT MADE?

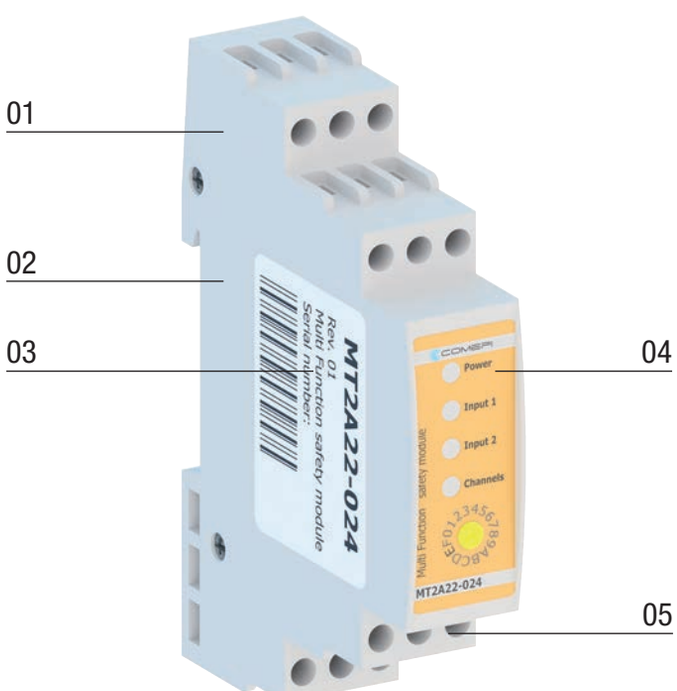
**01 Casing**
- Plastic casing IP40
- Standard dimension 18 x 90 mm.

**02 DIN rail mounting**

**03 Output contacts**
- 2NO instantaneous + 2NO delayed **(MT2A22-024)**
- 4NO instantaneous **(MS2A40-024)**
- 3NA instantaneous + 1NO instantaneous **(MS2A31-024)**

**04 LED indicators for status, supply and diagnostic**
- Power
- Input 1
- Input 2
- Feedback on outgoing channels

**05 Electrical connection**
- IP20 terminal blocks
- 1 or 2 x 0,75…1,5 mm²

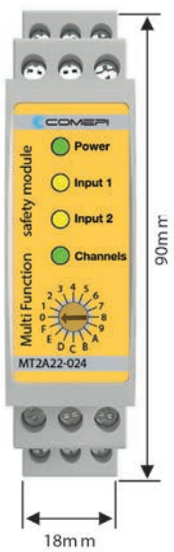


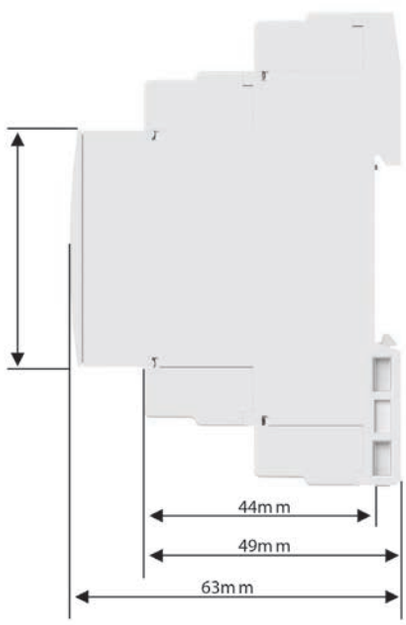
# Safety modules
## Multifunction Safety modules

## APPLICATIONS
Multifunction safety modules are able to monitor multiple safety functions of industrial machinery, protecting operators from dangerous moving parts of the machine. The COMEPI modules provide a safety-related interruption of a safety circuit. These devices are compliant with the requirements of EN ISO 13849-1, EN 61508, EN62061 and may be used in applications with E-Stops, E-Gates, limit switches, non-contact switches, safety light curtains (ESPE Type4 and Type 2), safety light beams (single beam) and safety mats.

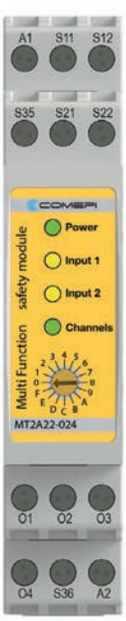
## MAIN FEATURES
COMEPI provides up to 4 Output Signal Switching Devices. The correct opening and closing of the safety function OSSDs is tested automatically.
All the modules provide at least 1 auxiliary output.
MS2A22-024 model output actuation delay, can be easily set via the hex-switch, selected from a choice of 15 pre-defined configurations, from 0 to 30 sec.
MT2A22-024 include 2 delayed digital outputs and two instantaneous digital outputs.
4 LEDs on the front panel indicate the status and any possible errors during operation.

## DIMENSIONS



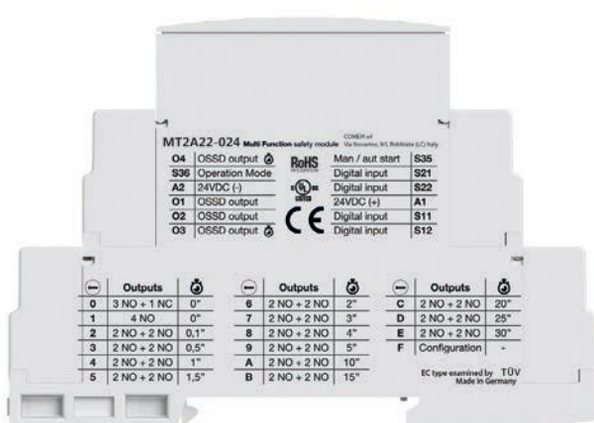




## ELECTRICAL CONNECTION




| | |
|---|---|
| **A1** | 24VDC (+) |
| **S11** | Digital input |
| **S12** | Digital input |
| **S35** | Man / aut start |
| **S21** | Digital input |
| **S22** | Digital input |

| | |
|---|---|
| **O1** | OSSD output |
| **O2** | OSSD output |
| **O3** | OSSD output |
| **O4** | OSSD output |
| **S36** | Operation Mode |
| **A2** | 24VDC (-) |



# Safety modules

## Multifunction Safety modules - Main features

The MT2 and MS2 series multifunction safety modules are equipped with OSSD electronic safety outputs, suitable for monitoring safety circuits including electro-mechanical and electronic devices (ESPE type 2 and type 4); MT2 and MS2 modules are devices designed in category 4, with Performance Level "e" in accordance with EN ISO 13849-1, as well as conforming to SIL 3, SIL cl3 functional safety according to EN 62061.

| Overwiev | MT2A22-024 | MS2A31-024 | MS2A40-024 |
|---|---|---|---|
| **Safety functions** | E-stop, ESPE Type 4 and Type 2 safety magnetic sensors, interlocks, limit switches, E-gate, safety mats | E-stop, ESPE Type 4 and Type 2 safety magnetic sensors, interlocks, limit switches, E-gate, safety mats | E-stop, ESPE Type 4 and Type 2 safety magnetic sensors, interlocks, limit switches, E-gate, safety mats |
| **Type of safety outputs** | OSSD (Output signal switching device) | OSSD (Output signal switching device) | OSSD (Output signal switching device) |
| **Number of safety outputs** | Selectable via hex-switch<br>2 delayed + 2 instantaneous<br>4 instantaneous<br>3 instantaneous | 3 instantaneous | 4 instantaneous |
| **Auxiliary outputs** | 1 instantaneous | 1 instantaneous | |
| **Stard mode** | Automatic, manual or monitorated manual | Automatic, manual or monitorated manual | Automatic, manual or monitorated manual |
| **Connection type** | Screw terminals | Screw terminals | Screw terminals |
| **Safety parameters** | Cat. 4, PL e, SIL 3, SILcL 3 | Cat. 4, PL e, SIL 3, SILcL 3 | Cat. 4, PL e, SIL 3, SILcL 3 |
| **Approvals** | CE, cULus, EC type by TÜV | CE, cULus, EC type by TÜV | CE, cULus, EC type by TÜV |
| **Power supply** | 24Vdc ±20% | 24Vdc ±20% | 24Vdc ±20% |
| **Dimensions (H x W x D)** | 90 x 17,5 x 63 mm | 90 x 17,5 x 63 mm | 90 x 17,5 x 63 mm |

## Suggested application within MT2A22-024 device

Multifunctional safety module with delayed contacts is suitable to control the unlocking of a FEP-Series interlocking device. The NO OSSD output can be delayed for a time equal to the inerthia of the machinery, providing unlocking signal to the device when the dangerous situation has ran out. This connection can be set with all Electrical Lock versions.

## Multifunction Safety modules - When to use our products

| Overwiev | MT2A22-024 | MS2A31-024 | MS2A40-024 |
|---|---|---|---|
| **Emergency buttons** | ✓ | ✓ | ✓ |
| **Emergency gates** | ✓ | ✓ | ✓ |
| **Limit switch** | ✓ | ✓ | ✓ |
| **Sensors** | ✓ | ✓ | ✓ |
| **Safety light curtains (ESPE Type 4, Type 2)** | ✓ | ✓ | ✓ |
| **Safety light curtains (single beam)** | ✓ | ✓ | ✓ |
| **Safety mats** | ✓ | ✓ | ✓ |

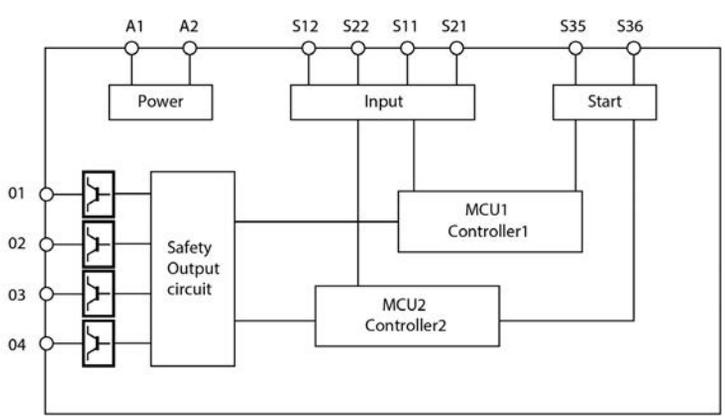
# Safety modules

## Multifunction Safety modules - Technical Data

| | | MS2-MT2 Series |
|---|---|---|
| **Standards** | | EN60947-1, EN60947-5-1, EN61000-6-2, EN61000-4, EN61326-3-1, EN60204-1, EN ISO 13849-1, EN ISO 12100-1, EN ISO 12100-2 EN62061, EN1037, EN60664-1, EN60529 |
| **Directives** | | 2014/35/UE low voltage<br>2006/42/CE machinery<br>2014/30/UE electromagnetic<br>2014/30/UE EMC |
| **Certifications - Approvals** | | CE - UL - TUV |
| **Air temperature** near the device | | |
| – during operation | °C | 0 ... + 55 |
| – for storage | °C | – 25 ... + 55 |
| **Protection against electrical shocks** (acc. to IEC 60536) | | Class II |
| **Degree of protection** (according to IEC 60529 and EN 60529) | | Casing IP5X - Terminal blocks IP20 |
| **Pollution degree** | | 3 external, 2 internal |
| **Safety integrity level** (Sil CL) (according to IEC 61508, IEC 62061) | | Up to Sil 3 |
| **Performance level** (PL) (according to EN ISO 13849-1) | | Up to PLe |
| **Safety category** (according to EN ISO 13849-1) | | Up to Cat 4 |
| **Mechanical durability** | | 10 millions of operations |
| **Electrical durability** | | 100.000 operations |
| **MTTFd** | | 2403 a (55 °C) / 1268 a (65 °C) |
| **Diagnostic coverage** | | H |
| **PFHd** | | 1,89 $E^{-9}$ (55 °C) / 3,58 $E^{-9}$ (65 °C) |

## Electrical Data

| | |
|---|---|
| **Rated insulation voltage $U_i$** (acc. to IEC/EN 60947-1) | 250 V (degree of pollution 3) |
| **Rated impulse withstand voltage $U_{imp}$** (acc. to IEC/EN 60947-1) | 4 kV |
| **Power supply** | |
| Rated operating voltage $U_N$ (±15%) | 24 Vdc (10% max residual ripple in DC) |
| Rated power consumption | max current ≤ 400 mA - max drop voltage ≤ 2 V |
| **Control circuit** | |
| Protection against short circuits | Resistance PTC with intervention operating time >100ms, reset time >3s - Ih=0,5A |
| Input max resistance | 50Ω |
| Input max current | 30mA |
| **Output circuit** | |
| Utilization categories (according to EN 60947-1) | DC 13, Ue = 24 V, Ie = 6 A (6 oper/minute) |
| Max switching voltage | 300 Vdc |
| Switching current range (per contact) | min 10 mA - max 6A (external protection fuse 6A F type) |
| Conventional free air thermal current $I_{th}$ | 6A (max current sum: 64$A^2$) |
| Max contact resistance | 100 mΩ |



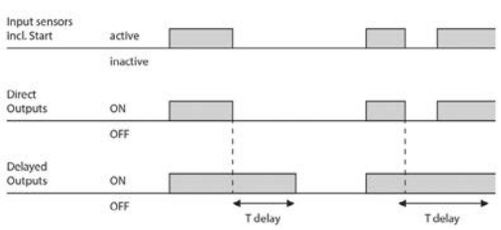

**Download**

Instruction sheet – OSSD safety modules MT2, MS2, MS3

CE declaration

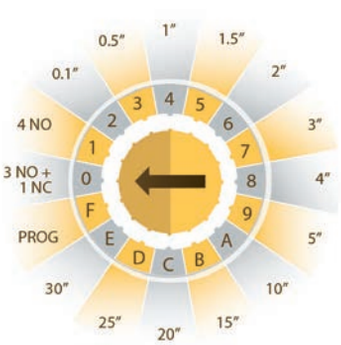
# Safety modules

## OSSD - Output signal switching device

| | | |
|---|---|---|
| **Normally Open (NO) Outputs** | **A** | The NO outputs react by closing their respective NO relays. At Startup are swiched off |
| | **B** | They switch on when the safety sensors are active and the application has been started |
| | **C** | In case of a Fail-Safe the NOs are swiched off |
| | **D** | If the power supply fails, the NOs are swiched off |
| **Normally Closed (NC) Output** | **A** | In most cases the NC types react alternately to the NO types, if the NOs are switched on, the NCs are switched off and vice versa |
| | **B** | During the configuration the nNCs are switched off |
| | **C** | In case of a Fail-Safe the NCs are switched off |
| | **D** | If the power supplyb fails, the NCs are switched off |
| | **E** | The NC is not a safety output |
| **Delayed NO Outputs** | **A** | There are 2 NOs delayed |
|  | **B** | The behaviour is off-delayed and retriggerable |

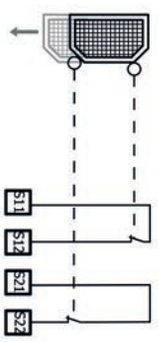
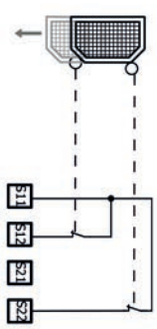
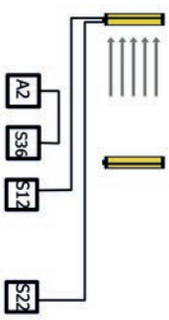
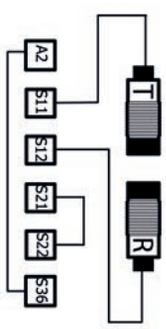
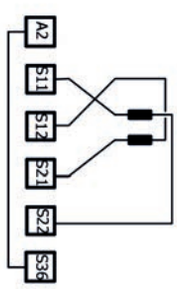
## Available output configuration (MT2A22-024 only)

| Configuration | Hex-position | Delay [s] |
|---|---|---|
| 3 NO + 1 NC | 0 | 0 |
| 4 NO | 1 | 0 |
| 2 NO direct + 2 NO delayed | 2 | 0,1 |
| 2 NO direct + 2 NO delayed | 3 | 0,5 |
| 2 NO direct + 2 NO delayed | 4 | 1 |
| 2 NO direct + 2 NO delayed | 5 | 1,5 |
| 2 NO direct + 2 NO delayed | 6 | 2 |
| 2 NO direct + 2 NO delayed | 7 | 3 |
| 2 NO direct + 2 NO delayed | 8 | 4 |
| 2 NO direct + 2 NO delayed | 9 | 5 |
| 2 NO direct + 2 NO delayed | A | 10 |
| 2 NO direct + 2 NO delayed | B | 15 |
| 2 NO direct + 2 NO delayed | C | 20 |
| 2 NO direct + 2 NO delayed | D | 25 |
| 2 NO direct + 2 NO delayed | E | 30 |
| PROGRAMMING | F | – |

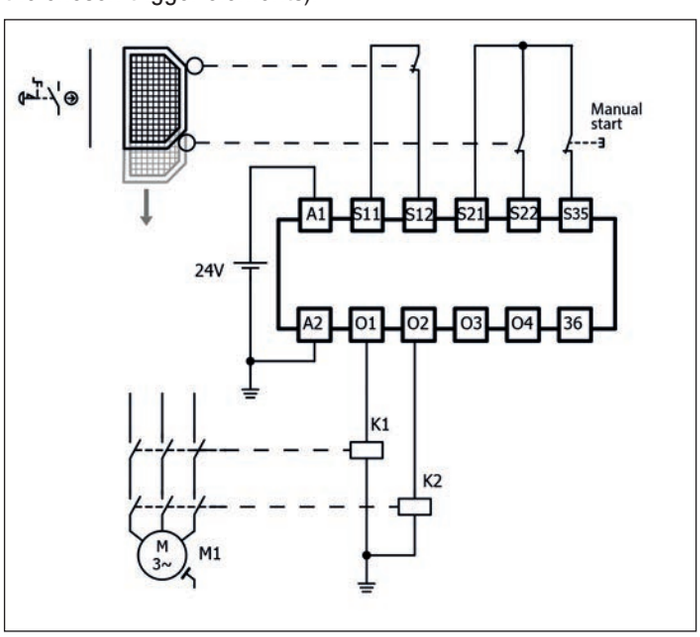
# Safety modules
## Operation configuration

The applications below show the correct wiring for the COMEPI devices.

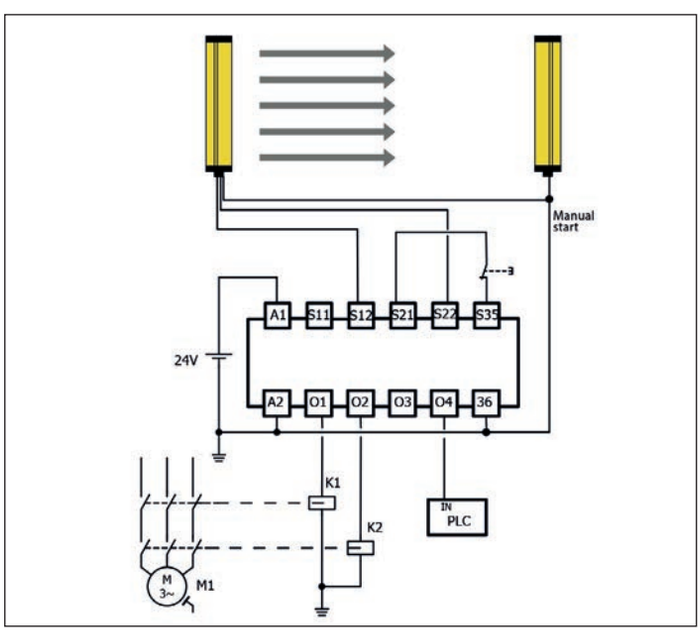
| N° configuration | SC1 | SC2 | SC3 | SC4 | SC5 | SC6 |
|---|---|---|---|---|---|---|
| **Input type** | E-stop<br>E-gate | E-stop<br>E-gate | E-stop<br>E-gate | ESPE<br>type 4 | ESPE<br>type 2 | Safety<br>mat |
| **Channel** | 2 | 2 | 1 | 2 | 1 | – |
| **N° wires** | 4 | 3 | 2 | – | 2 | 4 |
| **Wiring** |  |  |  |  |  |  |
| **Safety category** | Cat. 4 | Cat. 3 | Cat. 2 | Cat. 4 | Cat. 2 | Cat. 3 |
| **Performance level** | PL e | PL d | PL c | PL e | PL c | PL e |
| **Safety integrity level** | SIL 3 | SIL 2 | SIL 1 | SIL 3 | SIL 1 | SIL 3 |
| **Response time** | 20 msec | 20 msec | 20 msec | 20 msec | 25 msec | 20 msec |

## Example of applications

Cat 4; PLe, SIL3 possible (also depending on the output wiring and the chosen trigger elements).

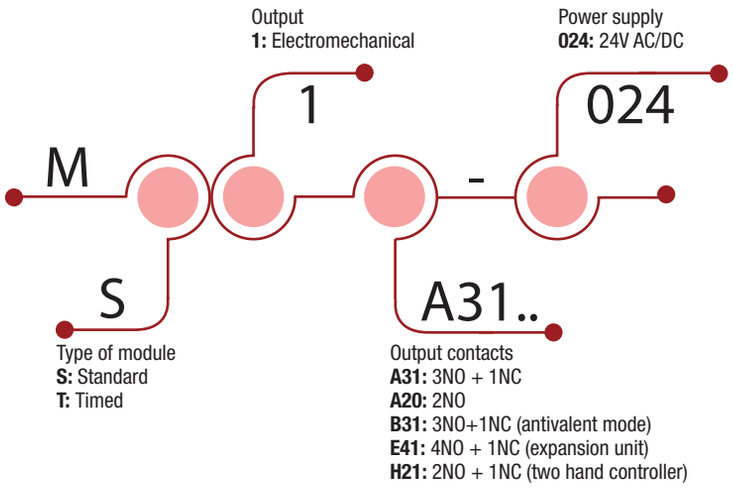



Cat 4; PLe; SIL3 possible (depending on the ESPE)



# Safety modules
## Electromechanical Safety modules

## APPROVALS:




## HOW IS IT MADE?

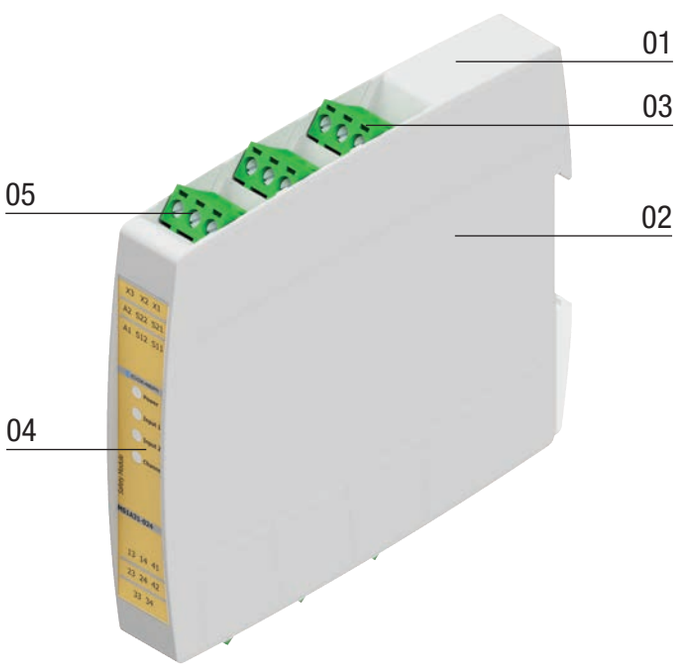
**01 Casing**
- Indelible laser marking
- Plastic casing (IP40)
- Standard dimension 18 x 90 mm.

**02 DIN rail mounting**

**03 Output contacts**
- Electromechanical
- NO for safety purpose
- NC for auxiliary signal

**04 LED indicators for status, supply and diagnostic**
- Power
- Input 1
- Input 2
- Feedback on outgoing channels

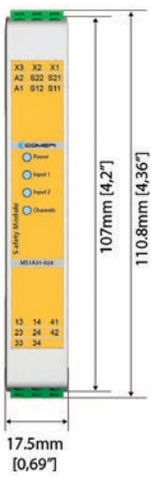
**05 Electrical connection**
- IP20 terminal blocks
- 1 or 2 x 0,75…1,5 $mm^2$
- detachable coded terminals



# Safety modules
## Electromechanical Safety modules

## DESCRIPTION
MS1 - Electromechanical Safety Modules 2 channels configuration for safety systems up to SIL 3 (according to EN62061) and PL e (according to EN ISO 13849-1). Suitable for control of limit switches for safety gates, safety magnetic sensors, and emergency stops

## DIMENSIONS





## MS1A31-024 / MS1A20-024

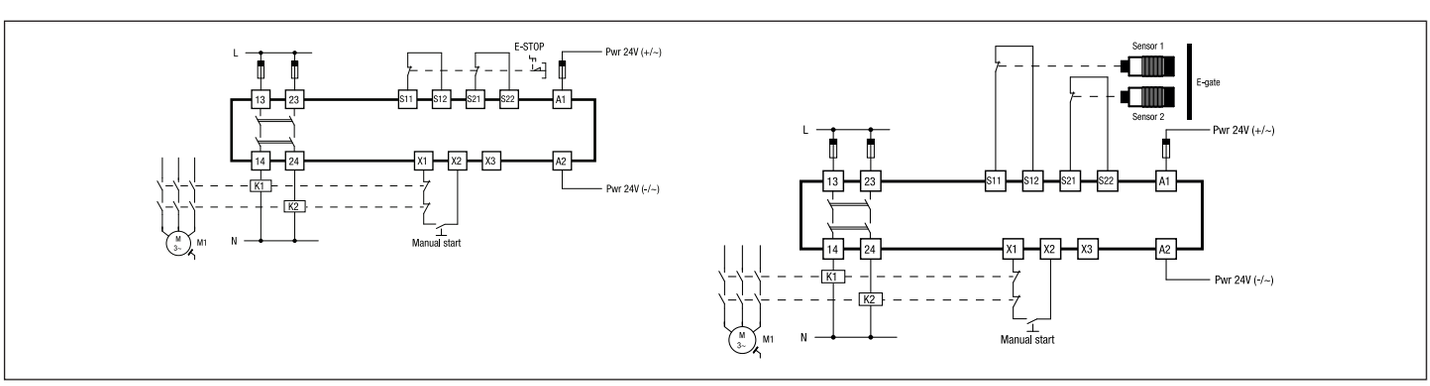
**MS1A31-24** and **MS1A20-024** safety modules are designed to provide interruption of safety circuits in applications with emergency stops, magnetic safety sensors, safety light curtains, safety switches and electromechanical interlocks.
They are also used to check the safety circuits of the cabin and inspection of the lifting pit, in compliance with lift standards EN81-20 and EN81-50.

## APPLICATIONS
- Industrial machinery
- Emergency stop monitoring
- Control of interlocks on safety gates
- Lift livelling
- Lift inspection and maintenance
- Car wash equipment
- Conveyour
- Recycling machinery

**MS1A20-024**
**X1-X2:** manual start / automatic start
**X1-X3:** monitored manual start S11-
**S12:** channel 1 NO input
**S21-S22:** channel 2 NO input
**A1:** power supply 24 Vdc (+)/Vac(~)
**A2:** power supply 24 Vdc (-)/Vac(~)
**13-14:** NO safety output
**23-24:** NO safety output

**MS1A31-024**
**X1-X2:** manual start / automatic start
**X1-X3:** monitored manual start S11-
**S12:** channel 1 NO input
**S21-S22:** channel 2 NO input
**A1:** power supply 24 Vdc (+)/Vac(~)
**A2:** power supply 24 Vdc (-)/Vac(~)
**13-14:** NO safety output
**23-24:** NO safety output
**33-34:** NO safety output
**41-42:** NC auxiliary output

## EXAMPLE OF APPLICATION



# Safety modules
## Electromechanical Safety modules

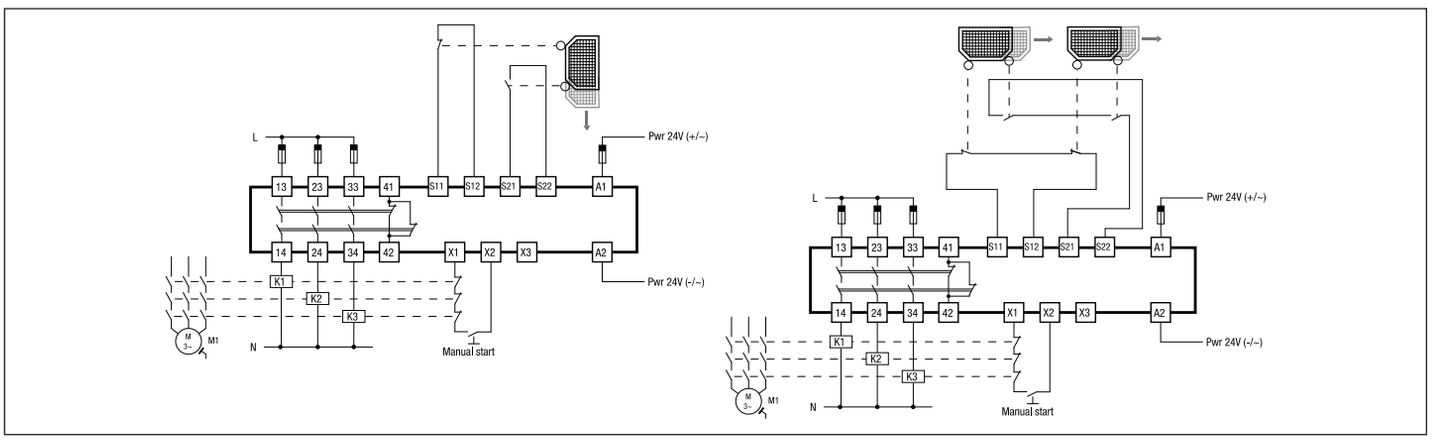
## MS1B31-024

The **MS1B31-024** security module is designed to monitor and control the status of security gates, accesses single or multiple, equipped with magnetic switches and safety limit switches that perform the interlock function with antivalent principle (NO + NC signal).

### APPLICATIONS
- Industrial machinery
- Car wash equipment
- Conveyour
- Recycling machinery

**X1-X2:** manual start / automatic start
**X1-X3:** monitored manual start S11-
**S12:** channel 1 NC input
**S21-S22:** channel 2 NO input
**A1:** power supply 24 Vdc (+)/Vac (~)
**A2:** power supply 24 Vdc (-)/Vac (~)
**13-14:** NO safety output
**23-24:** NO safety output
**33-34:** NO safety output
**41-42:** NC auxiliary output

### EXAMPLE OF APPLICATION



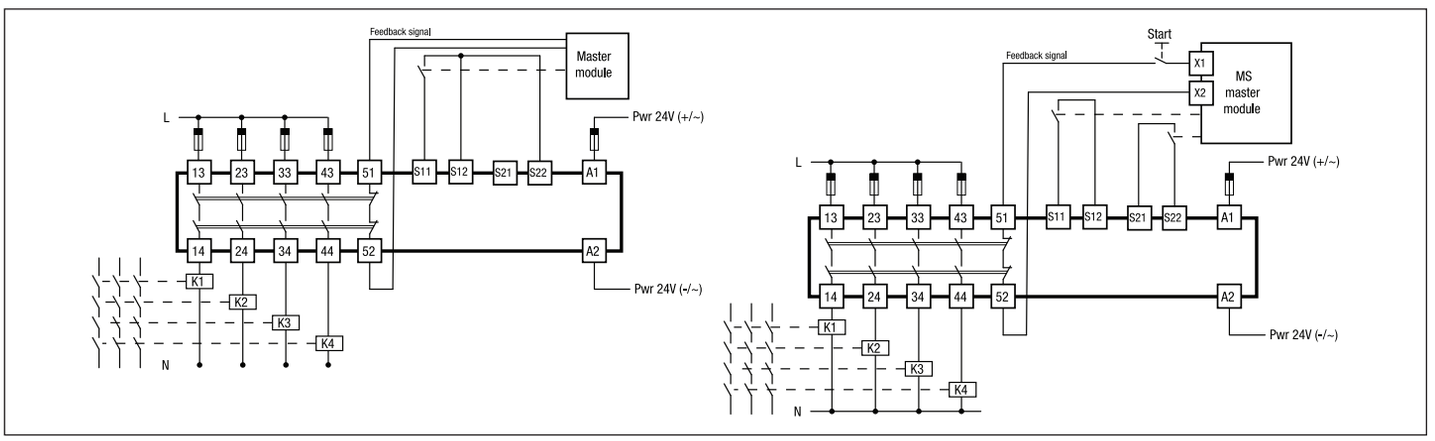

## MS1E41-024

**MS1E41-024** is an expansion unit that allows to extend the number of electromechanical safety outputs, if controlled by a master safety module. It can work with safety modules with electromechanical relays MS1 series or with OSSD outputs MS2 and MT2 series.

### APPLICATIONS
- Industrial machinery
- Car wash equipment
- Conveyour
- Recycling machinery

**S11-S12:** channel 1 NO input
**S21-S22:** channel 2 NO input
**A1:** power supply 24 Vdc (+)/Vac (~)
**A2:** power supply 24 Vdc (-)/Vac (~)
**13-14:** NO safety output
**23-24:** NO safety output
**33-34:** NO safety output
**43-44:** NO safety output
**51-52:** NC feedback output

### EXAMPLE OF APPLICATION



# MS1H21-024

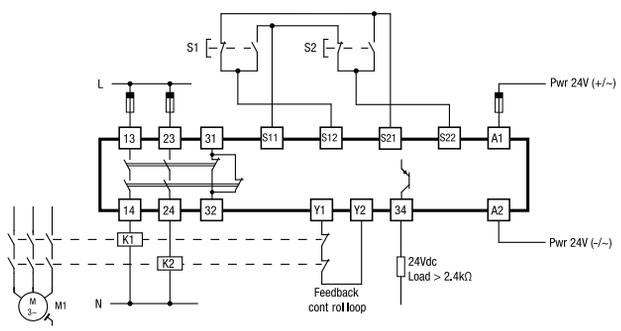
**MS1H21-024** is the solution to safely monitor and control the operation of two-hand control consoles (type III C according to EN ISO 13851). The device enables safety control outputs only if the two console buttons are activated by the operator simultaneously or with a maximum interval of 500ms from each button.

## APPLICATIONS

- Two-hand control consoles

**S11-S12:** channel 1 NO input
**S21-S22:** channel 2 NO input
**Y1-Y2:** NC feedback input
**A1:** power supply 24 Vdc (+)/Vac (~)
**A2:** power supply 24 Vdc (-)/Vac (~)
**13-14:** NO safety output
**23-24:** NO safety output
**31-32:** NC auxiliary output
**34:** PNP auxiliary output

## EXAMPLE OF APPLICATION



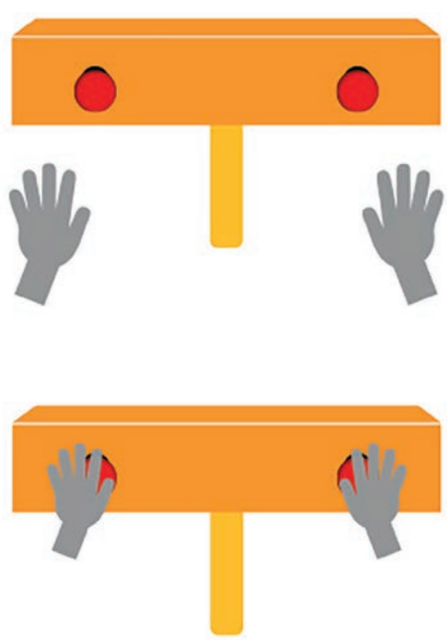

## Functional description

### A

1 (S11-S12) and channel 2 (S21-S22) inputs are open, while the NC contact of S1 (on the console) is closed between S11 and S22, and the NC contact of S2 (on the console) is closed between S12 and S21.

### B

The NO safety outputs are switched off.



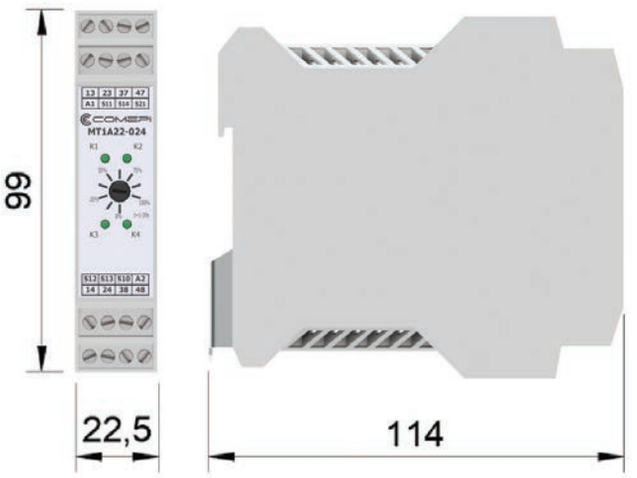
# Safety modules

## Electromechanical safety modules with delayed outputs

## DESCRIPTION

**MT1** - Electromechanical Safety Modules 2 channels configuration for safety systems up to SIL 3 (according to EN62061) and PL e (according to EN ISO 13849-1). Suitable for control of limit switches for safety gates, safety magnetic sensors, and E-STOP

## DIMENSIONS



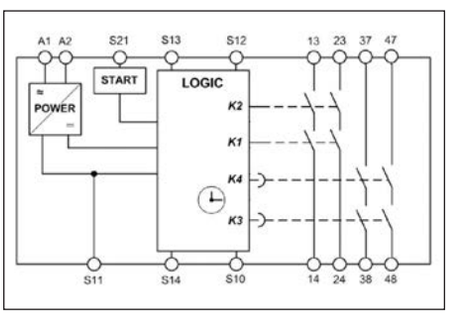

## MT1A22-024

**MT1A22-024** is an emergency stop safety relay combination that combines non-time-delayed and tim-deelayed contacts in a very compact housing.
This permits dangerous components of a system to be switched o quickly and safely in an emergency situation.
At the same time, other circuits can continue to be supplied with voltage for up to 30 seconds to allow a tool to be moved to its idle position or to brake following parts, for example.

## APPLICATIONS

- Industrial machinery
- Emergency stop monitoring
- Control of interlocks on safety gates
- Lift livelling
- Lift inspection and maintenance
- Car wash equipment
- Conveyour
- Recycling machinery

**MT1A22-024**
**A1:** Power supply
**A2 :** Power supply
**S11:** DC 24 V control voltage
**S10:** Control line
**S12:** Control line
**S13:** Control line
**S14:** Control line
**S21:** Start control line
**13-14:** Safety contact 1 (nd)
**23-24:** Safety contact 2 (nd)
**37-38:** Safety contact 3 (d)
**47-48:** Safety contact 4 (d)




## EXAMPLE OF APPLICATION

Depending on the application or the result of the risk assessment according to EN ISO 13849-1, the device must be wired as shown in Fig. 4 to Fig. 14. Non-time delayed contacts can be used up to category 4, PL e, time-delayed safety contacts up to category 3, PL e.

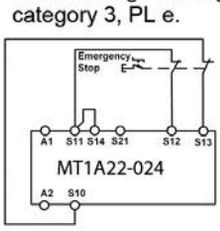



***Fig. 4:***
*Two-channel emergency stop circuit with short circuit and earth fault monitoring.*
*(up to category 4, PL e, SIL 3)*

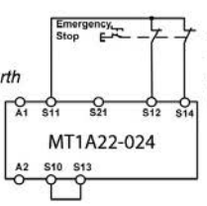



***Fig. 5:***
*Two-channel emergency stop circuit with earth fault monitoring.*
*(up to category 3, PL d, SIL 2)*

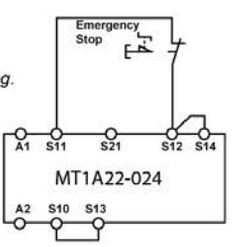



***Fig. 6:***
*Single-channel emergency stop circuit with earth fault monitoring.*
*(up to category 1, PL c, SIL 1)*

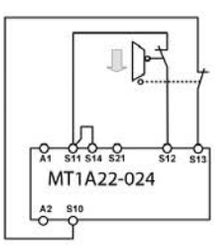



***Fig. 7:***
*Two-channel sliding guard monitoring with short circuit and earth fault monitoring.*
*(up to category 4, PL e, SIL 3)*

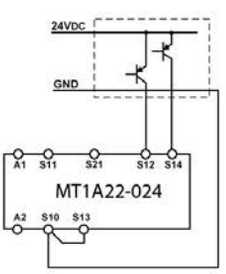



***Fig. 8:***
*Two-channel emergency stop with pnp-outputs/OSSD-outputs* ***with*** *short circuit monitoring.*
*(up to category 4, PL e, SIL 3)*

# Safety modules

## Electromechanical Safety modules - Main features

The **MS1-MT1** range of multifunction safety modules, designed in Category 4, Performance level "e" in accordance with the Machine Directive EN ISO 13849-1, provides for safety control outputs with electromechanical forcibly guided relays and can monitor a vast range of electromechanical safety devices.

| Overview | MS1A20-024 | MS1A31-024 | MS1B31-024 | MS1E41-024 | MS1H21-024 | MT1A22-024 |
|---|---|---|---|---|---|---|
| **Safety functions** | E-stop, safety magnetic sensors interlocks, limitswitches E-gate, lift levelling | E-stop, safety magnetic sensors interlocks, limitswitches E-gate, lift levelling | Safety magnetic sensors E-gate in antivalent mode | Relay expansion unit | Two-hand control device | E-stop, safety magnetic sensors interlocks, limitswitches E-gate, devices with OSSD outputs |
| **Type of safety outputs** | Voltage free contact output, relays with forcibly guided contacts | Voltage free contact output, relays with forcibly guided contacts | Voltage free contact output, relays with forcibly guided contacts | Voltage free contact output, relays with forcibly guided contacts | Voltage free contact output, relays with forcibly guided contacts | Voltage free contact output, relays with forcibly guided contacts |
| **Number of safety outputs** | 2 NO | 3 NO | 3 NO | 4 NO | 2 NO | 4NO (2nd/2d) |
| **Auxiliary outputs** | / | 1 NC | 1 NC | 1 NC | 1 NC + 1 PNP | / |
| **Delayed contacts** | NO | NO | NO | NO | NO | 2NO adjustable from 0 to 30s |
| **Start mode** | Automatic, manual or monitorated manual | Automatic, manual or monitorated manual | Automatic, manual or monitorated manual | – | Two-hand control device | Automatic or or manual |
| **Connection type** | Pluggable screw terminals | Pluggable screw terminals | Pluggable screw terminals | Pluggable screw terminals | Pluggable screw terminals | Screw terminals |
| **Safety parameters** | Cat. 4, PL e, EN81-20, EN81-50 | Cat. 4, PL e, EN81-20, EN81-50 | Cat. 4, PL e | Cat. 4, PL e | Cat. 4, PL e | Cat. 4, PLe (nd) Cat. 3, PLe (d) |
| **Approvals** | CE, cULus EC type by TÜV | CE, cULus EC type by TÜV | CE, cULus EC type by TÜV | CE, cULus EC type by TÜV | CE, cULus EC type by TÜV | CE, cULus EC type by TÜV |
| **Power supply** | 24Vdc ± 10% or 24 Vac -15/+10% 50 + 60 Hz | 24Vdc ± 10% or 24 Vac -15/+10% 50 + 60 Hz | 24Vdc ± 10% or 24 Vac -15/+10% 50 + 60 Hz | 24Vdc ± 10% or 24 Vac -15/+10% 50 + 60 Hz | 24Vdc ± 10% or 24 Vac -15/+10% 50 + 60 Hz | 24Vdc ± 10% or 24 Vac ± 10% 50 + 60 Hz |
| **Dimensions (H x W x D)** | 110,8x17,5x121,1 mm | 110,8x17,5x121,1 mm | 110,8x17,5x121,1 mm | 110,8x17,5x121,1 mm | 110,8x17,5x121,1 mm | 99x22.5x114mm |

## Multifunction Safety modules - When to use our products

| Overview | MS1A20-024 | MS1A31-024 | MS1B31-024 | MS1E41-024 | MS1H21-024 | MT1A22-024 |
|---|---|---|---|---|---|---|
| **Emergency buttons** | ✓ | ✓ | | | | ✓ |
| **Emergency gates** | ✓ | ✓ | | | | ✓ |
| **Emergency gates with function antivalent (1NO 1NC)** | | | ✓ | | | |
| **Limit switches** | ✓ | ✓ | | | | ✓ |
| **Limit switch with function antivalent (1NO 1NC)** | | | ✓ | | | |
| **Sensors** | ✓ | ✓ | | | | ✓ |
| **Sensors with function antivalent (1NO 1NC)** | | | ✓ | | | |
| **Elevator leveling** | ✓ | ✓ | | | | |
| **Two hand control devices** | | | | ✓ | | |
| **Expansion unit** | | | | | ✓ | |
| **Devices with OSSD outputs** | | | | | | ✓ |

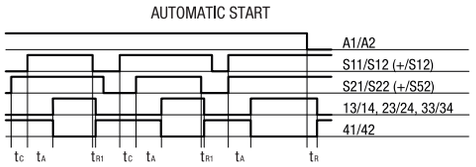
# Safety modules

## Electromechanical Safety modules - Technical Data

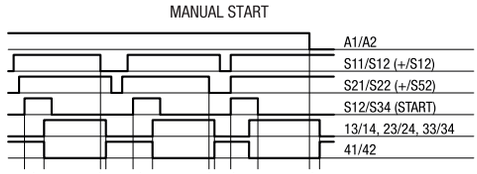
| | | Serie MS1 | Serie MT1 |
|---|---|---|---|
| **Standards** | | EN60947-1, EN60947-5-1, EN61000-6-2, EN61000-4, EN61326-3-1, EN60204-1, EN ISO 13849-1, EN ISO 12100-1, EN ISO 12100-2 EN62061, EN1037, EN60664-1, EN60529 | |
| **Directives** | | 2014/35/UE low voltage 2006/42/CE machinery 2014/30/UE electromagnetic | |
| **Certifications - Approvals** | | CE - TUV - UL - EAC | |
| **Air temperature** near the device | | | |
| – during operation | °C | – 25 ... + 55 | – 15 ... + 40 |
| – for storage | °C | – 25 ... + 55 | – 15 ... + 40 |
| **Protection against electrical shocks** (acc. to IEC 60536) | | Class II | |
| **Degree of protection** (according to IEC 60529 and EN 60529 | | Casing IP40 - Terminal blocks IP20 | IP20 |
| **Pollution degree** | | 3 external, 2 internal | |
| **Safety integrity level** (Sil CL) (according to EN IEC 62061) | | Up to Sil 3 | |
| **Performance level** (PL) (according to EN ISO 13849-1) | | Up to PLe | |
| **Safety category** (according to EN ISO 13849-1) | | Up to Cat 4 | Up to Cat. 4 for instantaneous contacts Up to Cat. 3 for delayed contacts |
| **Mechanical durability** | | 10 millions of operations | |
| **Electrical durability** | | 100.000 operations | |
| **MTTFd** | | 218 (for 24 Vac/dc) 147 (for 120 Vac and 230 Vac) | 62 |
| **Diagnostic coverage** | | 99% | 99% for non-delayed contacts 90% for delayed contacts |
| **PFHd** | | 4,58 $E^{-10}$ (for 24 Vac/dc) 6,61 $E^{-10}$ (for 120 Vac and 230 Vac) | 8,84 $E^{-8}$ delayed contacts 84,22 $E^{-8}$ non-delayed contacts |
| **Electrical Data** | | | |
| **Rated insulation voltage $U_i$** (acc. to IEC/EN 60947-1) | | 250 V (degree of pollution 3) | |
| **Rated impulse withstand voltage $U_{imp}$** (acc. to IEC/EN 60947-1) | | 4 kV | |
| **Power supply** | | | |
| Rated operating voltage $U_N$ (±15%) | | 24 Vac/dc (10% max residual riple in DC) - 120 Vac - 230 Vac | |
| Rated power consumption | | max 5 VA (ac) - max 2 W (dc) | max 5.3 VA (ac) - max 4.7 W (dc) |
| **Control circuit** | | | |
| Protection against short circuits | | Resistance PTC with intervention operating time >100ms, reset time >3s - Ih=0,5A | |
| Input max resistance | | 50Ω | |
| Input max current | | 30mA | |
| **Output circuit** | | | |
| Utilization categories (according to EN 60947-1) | | AC 15, Ue = 230 V, Ie = 3 A DC 13, Ue = 24 V, Ie = 6 A | AC: 250 V, 2000 VA, 8 A for ohmic load 250 V, 3 A AC-15 DC: 40 V, 320 W, 8 A for ohmic load 24 V, 3 A DC-13 |
| Max switching voltage | | 240 Vac / 300 Vdc | 250 Vac |
| Switching current range (per contact) | | min 10 mA - max 6A (external protection fuse 6A F type) | 5 V, 10 mA |
| Conventional free air thermal current $I_{th}$ | | 6A (max current sum: 64A2) | 15A |
| Max contact resistance | | 100 mΩ | |

FUNCTIONAL DIAGRAMS

AUTOMATIC START

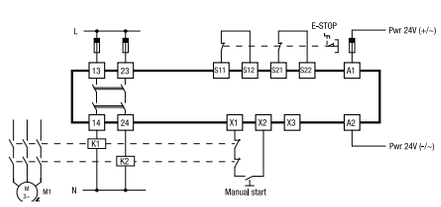



MANUAL START




tMIN: Min. period of START impulse: > 250 ms
tC: Simultaneity time: infinity
tA: Operating time: < 200 ms
tR1: Releasing time: <20 ms
tR: Releasing time in absence of power supply: <70 ms

**Example of connection with safety magnetic sensors**




**Download**
Instruction sheet – Safety modules MS1
CE declaration