

Installation Instructions

Original Instructions



Allen-Bradley
by ROCKWELL AUTOMATION



MSR22LM Safety Relay Module

Catalog Number 440R-P23071

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Summary of Changes

This publication contains the following new or updated information. This list includes substantive updates only and is not intended to reflect all changes.

Topic	Page
Updated Product Overview	1
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Updated Compliance with EU Directives	13

Product Overview

Before installing, operating, or maintaining this device, these instructions must be carefully read and understood.



SHOCK HAZARD: Dangerous voltage.
Electric shock results in death or serious injury.
Disconnect all power supplies before you service equipment.



ATTENTION:

- Safe operation of the device is only guaranteed when using certified components.
- Only qualified personnel must perform installation and configuration.

General Notes

The product hereby described was developed to perform safety functions as a part of a whole installation or machine. A complete safety system normally includes sensors, evaluation units, signals, and logical modules for safe disconnections. The manufacturer of the installation or machine is responsible for verifying the proper functioning of the whole system. Rockwell Automation cannot guarantee all specifications of an installation or machine that was not designed by Rockwell Automation. The total concept of the control system into which the device is integrated must be validated by the user. Rockwell Automation also takes over no liability for recommendations that are given or implied in the following description. The following description implies no modification of the general Rockwell Automation terms of delivery, warranty, or liability claims.

Designated Use

The MSR22LM safety relay interrupts a safety circuit in a safe way. In applications with light curtains it can be operated in protection, muting and stepping mode to protect people and machinery.

When used in accordance with its intended purpose and following these operating instructions, this device presents no known residual risks. Nonobservance can lead to personal injuries and damages to property.

Safety Notes



ATTENTION: Risk of electrocution!
Danger to life of risk of serious injuries.

- Disconnect the system and device from the power supply and confirm they remain disconnected during electrical installation.
- The device may only be used for the applications that are described in the mutually applicable operating instructions/ data sheet. The notes in the respective documentation must be heeded. The permissible ambient conditions must be observed.
- The contact protection of the elements that are connected and the insulation of the supply cables must be designed in accordance with the requirements in the operating instructions / data sheet.
- Note the VDE and local regulations, particularly ones related to protective measures.



ATTENTION: Risk of fire or other thermal hazards!
Danger to life, risk of serious injuries or property damage.

- The device may only be used for the applications that are described in the mutually applicable operating instructions/ data sheet. The notes in the respective documentation must be heeded. The permissible ambient conditions must be observed. In particular, the current limit curve must be heeded.
- The device may only be installed and put into operation by experts who are familiar with this technical documentation and the applicable health and safety and accident prevention regulations.



ATTENTION: Functional error!
Danger to life, risk of serious injuries or property damage.

- The device may only be used for the applications that are described in the mutually applicable operating instructions / data sheet. The notes in the respective documentation must be heeded. The permissible ambient conditions must be observed.
- The device may only be installed and put into operation by experts who are familiar with this technical documentation and the applicable health and safety and accident prevention regulations.
- The unit should be panel mounted in an enclosure that is rated at IP54 or better. Dust and dampness can lead to malfunction.



ATTENTION: Installation fault!
 Danger to life, risk of serious injuries or property damage.

- Make sure of sufficient protection circuitry at all output contacts for capacitive and inductive loads.

IMPORTANT

- The safety function must be triggered during commissioning.
- On the MSR22LM safety relay, the N.C. contact 31-32 must only be used as monitoring contact.
- Not suitable for machines where the area behind the light curtain is accessible.
- Only qualified personnel should configure the settings with the power supply disconnected.
- Before removing the front plate, the person must be discharged to ground.
- The muting lamp must conform to IEC/EN 61 496-1 section A7.4
- If an input is not used, 2 wire links have to be made according to picture 8 on the terminals S-1/S-2 and S-4/S-3.
- Opening the device or making any unauthorized change voids any warranty

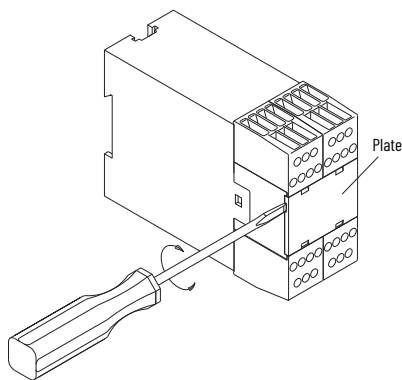
Features

- Certifications: CE Marked, TÜV Certified, cULus Listed
- According to:
 - Performance Level (PL) e and category 4 to EN ISO 13849-1
 - SIL Claimed Level (SIL CL) 3 to IEC/EN 62061
 - Safety Integrity Level (SIL 3) to IEC/EN 61508
- To connect maximum:
 - Three light curtains 2-channel
 - Two light curtains 2-channel and two muting sensors 1-channel
 - One light curtain 2-channel and four muting sensors 1-channel
 - Two light curtains 2-channel and keyswitch for stepping operation
- Additionally: Start button and machine contact with line fault detection
- Broken wire detection on light curtain input
- Outputs:
 - 3 N.O. or 2 N.O. and 1 N.C.
 - Two semiconductor outputs, protected against short circuit and overload
- Multifunction device, different functions selectable by rotational switches:
 - Protective operation (for example, light curtains)
 - Protective operation with muting (for example, conveyors)
 - Signal sequence of muting sensors can be selected
 - Override function via Start button
 - Stepping operation (for example, on presses)
 - Optionally with keyswitch
 - 1, 2, or 3 steps possible
 - Setting of number of steps possible via selector switch
- Suitable to connect light curtains of type 4 or self-testing light curtains type 2 according to IEC/EN 61 496-1, cross fault monitoring in the light curtain
- Under- and overvoltage detection and indication
- Reaction time: 30 ms, max
- Status indicators for RUN and Channel 1, 2
- Width: 45 mm (1.8 in.)

Applications

Protection of personnel and machines (for example, presses and conveyors).

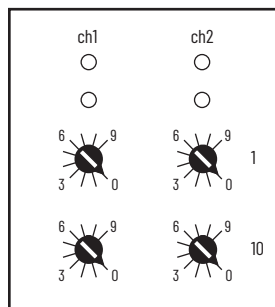
Setting



EXAMPLE:

- Required function: Protective operation with manual start, with muting, four muting sensors, maximum 30 s muting time.
- Setting: Upper switches set to 5 for both processors. Lower switches set to 2 for both processors.

Figure 1 - Inside View



The function setting of the MSR22LM safety relay is made by four rotational switches behind the front plate (see Figure 1). The switches on the left make the setting for processor 1 (status indicator run 1) and the switches on the right for processor (status indicator run 2). For both processors, the same functions must be set. On the upper switches (1), the main function is adjusted. On the lower switches (10), the setting of the muting time (Protective operation) or the number of steps (stepping operation) is adjustable.

On muting or stepping function the light curtains, LC 2 and LC 3 are always in protective operation with manual start.

Table 1 - Protective Operation without Muting

		Switch 10: Start Mode and Feedback Input									
		0	1	2	3	4	5	6	7	8	9
		Without Feedback Input					With Feedback Input				
Switch 1	0	LC 1 Auto Manu	LC 2 Auto Manu	LC 3 Auto Manu	Not allowed (fault 5)	Auto Manu	Auto Manu	Auto Manu	Not allowed (fault 5)		
	1	LC 1 Manu Manu	LC 2 Manu Auto	LC 3 Manu Manu		Auto Auto	Manu Manu	Auto Auto		Auto Auto	

Table 2 - Protective Operation with Muting

		Switch 10: a = Maximum Muting Time b = Maximum Synchronizing Time										
		0	1	2	3	4	5	6	7	8	9	
Switch 1	2	LC S1 Auto, Muting 2 sensors	a: 10 s / b: 3 s	a: 20 s / b: 3 s	a: 30 s / b: 3 s	a: 1 min / b: 6 s	a: 5 min / b: 30 s	a: 15 min / b: 90 s	a: 30 min / b: 3 min	a: 1 h / b: 3 min	a: 8 h / b: 3 min	No muting time monitoring
	3	LC S1 Manu, Muting 2 sensors										
	4	LC S1 Auto, Muting 4 sensors										
	5	LC S1 Manu, Muting 4 sensors										

Table 3 - Stepping Operation

			Switch 10: Number of Steps				
			0	1	2	3	4...9
Switch 1	6	Stepping Operation, Contact Type 1, Start Sequence: Stepping and Start	Selectable by keyswitch	1 step	2 step	3 step	Not allowed (fault 5)
	7	Stepping Operation, Contact Type 2, Start Sequence: Stepping and Start					
	8	Stepping Operation, Contact Type 1, Start Sequence: Start and Stepping					
	9	Stepping Operation, Contact Type 2, Start Sequence: Start and Stepping					

Status Indicators

Status Indicator	Description
Lower green indicators K1, K2	ON when K1 and K2 are energized
Upper yellow status indicator run 1	<ul style="list-style-type: none"> Permanent on, when relay K1 and K2 are energized Flashes (1 Hz) when the unit waits for the start signal after fault-free operation (powerup of the unit) Flashes fast (approx. 3 Hz) when the Start button is pressed and all conditions for an override are fulfilled during muting Flashes fast (approx. 3 Hz) when at stepping operation the unit waits for interruption of the light curtain Flashes with failure code to indicate normal indication states that disable the energization of the output relays (for example, after not allowed interruption of the light curtain) until the Start button is pressed Flashes with failure code to indicate special failures (for example, undervoltage)
Semiconductor output 48	<ul style="list-style-type: none"> Off, when unit is on special failure mode Normally off when relays K1 and K2 are energized Continuously on, when unit in muting mode Shows the same failure codes as status indicator run 1 (except on special failures)
Upper yellow status indicator run 2	<ul style="list-style-type: none"> Permanent on, when unit operates correctly Flashes with failure code to indicate special operation failures (for example, undervoltage)
Semiconductor output 58	<ul style="list-style-type: none"> Off, when unit is on special failure mode Off, when relays K1 and K2 are energized Symmetric flashing, when a normal functional state is active that disables the energization of the output relays (for example, not allowed interruption of a light curtain) Permanent on, when waiting for start

Operation Modes

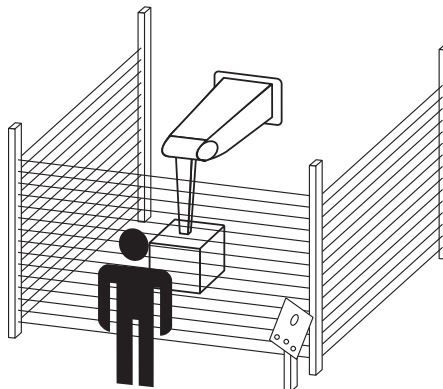
Operation Mode 0, 1: Protective Operation

Application (for example, for light curtains) to secure dangerous areas (without feedback input see [Figure 10 on page 7](#) or with feedback input see [Figure 11 on page 7](#))

- Connection up to three light curtains
- Manual or automatic start possible for each light curtain
- With or without feedback input for external contactors

Possible settings:

		Switch 10: Start Mode and Feedback Input									
		0	1	2	3	4	5	6	7	8	9
Switch 1	0	LC 1 LC 2 LC 3	Auto Manu Manu	Auto Auto Manu	Auto Auto Manu	Not allowed (fault 5)	Auto Manu Manu	Auto Auto Manu	Auto Auto Manu	Not allowed (fault 5)	
	1	LC 1 LC 2 LC 3	Manu Manu Manu	Auto Auto Manu	Auto Auto Auto		Manu Manu Manu	Auto Auto Manu	Auto Auto Auto		

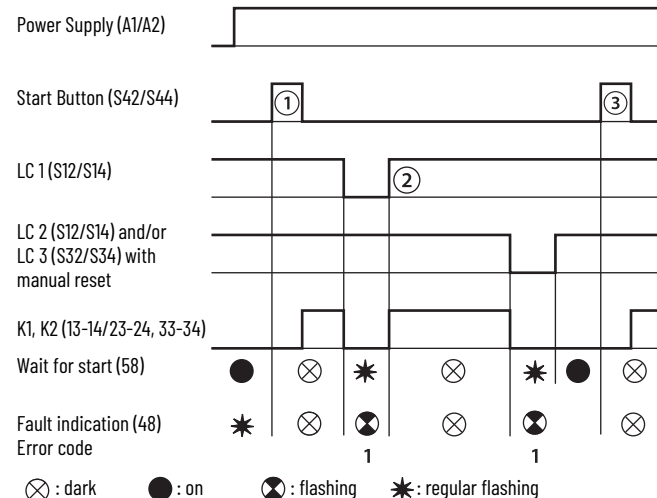


- Automatic start
On automatic start, the contacts K1 and K2 are energized when the light curtain that is set for auto start is free after interruption. It is necessary that the other light curtains with manual start are not interrupted.
- Manual start
On manual start, the contacts K1 and K2 are energized when the light barrier that is set for manual start is free after interruption and the Start button is pressed (3 in [Figure 2](#)).

The Start button must be activated in two conditions:

- After return of the supply voltage (1 in [Figure 2](#)), when minimum one light curtain is programmed for manual start
- When one light curtain with manual start was interrupted (3 in [Figure 2](#))

Figure 2 - Function Diagram



For application examples, see [Application Examples on page 7](#).

Operation Mode 2, 3, 4, 5: Protective Operation With Muting

Application (for example, for conveyors)

- One or two light curtains
- Muting of light curtain 1
- Two or four muting sensors with different input sequences
- LC1 with auto or manual start
- LC2 always with manual start
- Override via Start button
- Manual start is always necessary after supply voltage is connected

Muting

Muting means to disable temporarily the protective function of a light curtain. This function is used to transport material through a light curtain without stopping the machine. The differentiation between material and people is done by additional muting sensors, which have to create a certain switching sequence together with the light curtain when material passes the light curtain. The muting control starts then the muting cycle for the time that the material is passing the light curtain. It must not be possible that a person activates the muting sensors in the same switching sequence as the material. To realize this function, two different switching sequences can be chosen on the MSR22LM safety relay either with two or four muting sensors. This configuration makes sure that if a person passes the light curtain the dangerous movement of the machine is stopped immediately. A muting lamp that is controlled and monitored by the MSR22LM safety relay indicates the muting cycle. The maximum muting time can be set in 10 steps between 10 s and infinite.

If the light curtain is still interrupted after the maximum permitted muting time (for example, by blocked material) the contacts K1, K2 open. The muting lamp and the status indicator run 1 show failure code 4.

Starting by pressing the Start button is only possible if the muting lamp is working and the light curtain to be muted is free of interruption. During the muting cycle, a wrong switching sequence or exceeding the maximum muting time leads to failure code 4. This failure can only be reset by pressing the Start button. The muting sensors have to be installed in a way that the correct sequence cannot be achieved manually or by passing the light curtain (see IEC/EN 61 491-1)

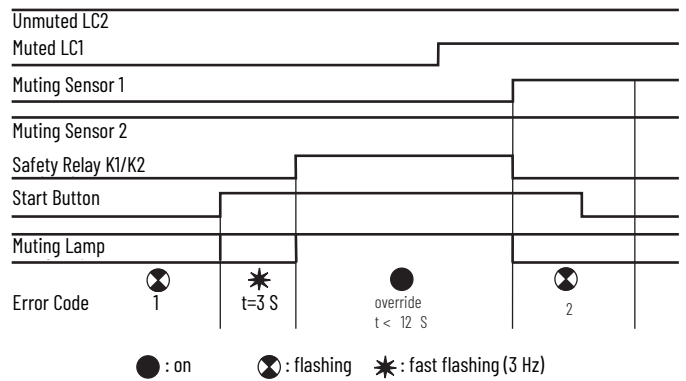
Possible settings:

		Switch 10:									
		a = Maximum Muting Time b = Maximum Synchronizing Time									
		0	1	2	3	4	5	6	7	8	9
Switch 1	2	a: 10 s / b: 3 s	a: 20 s / b: 3 s	a: 30 s / b: 3 s	a: 1 min / b: 6 s	a: 5 min / b: 30 s	a: 15 min / b: 90 s	a: 30 min / b: 3 min	a: 1 h / b: 3 min	a: 8 h / b: 3 min	No muting time monitoring
	3										
	4										
	5										

Override

If transported material blocks the monitored area and the outputs K1, K2 are switched off, the muting lamp flashes fast (approx. 3 Hz). The operator can activate the outputs K1, K2 by pressing the Start button for more than 3 s for a maximum time of 12 s until the muting sensor are again inactive or the start button is released again.

Figure 3 - Example for an Override Cycle When Muting with Two Sensors



In all function diagrams, the part "monitored operation" is the phase where the unit differentiates between people and material.

Figure 4 - Using Two Muting Sensors

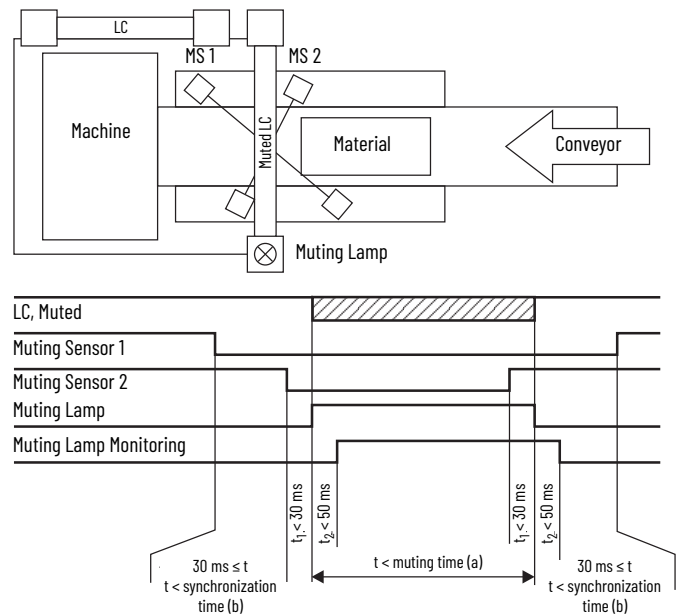
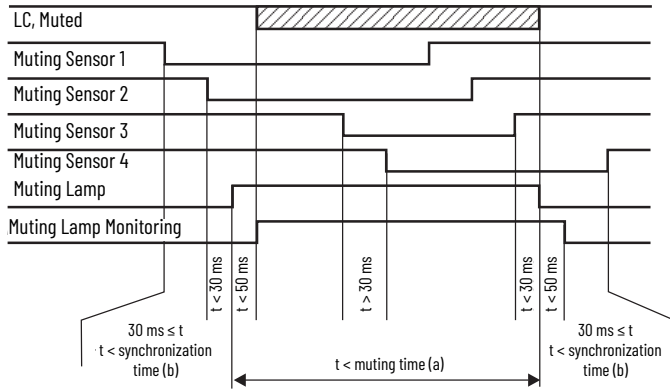
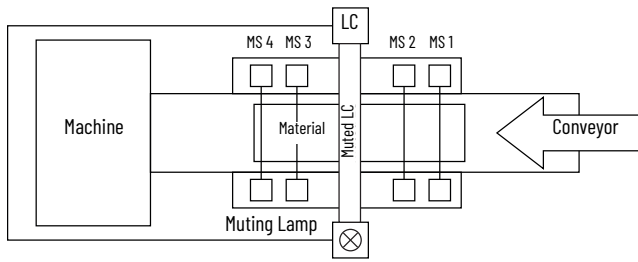


Figure 5 - Using Four Muting Sensors



For application examples, see [Application Examples on page 7](#).

Contact Reinforcement

If external relays or contactors are used to reinforce or multiply the contacts of the safety relays, they must be monitored by feeding back one N.C. contact of each relay/contactor into the start circuit (see [Figure 16 on page 10](#)).

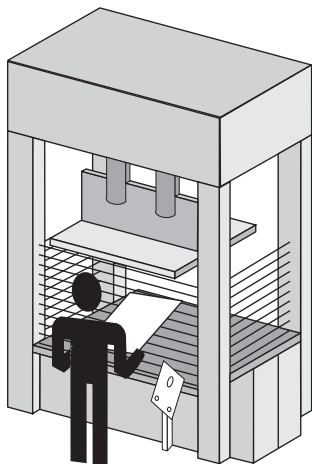
Operation Mode 6, 7, 8, 9: Stepping Operation

Application (for example, for presses) with manual operation and automatic start

- Maximum three light curtains
- LC2 and LC3 always with manual start

Setting functions:

- 1, 2, or 3 steps
- Two different start sequences
- Two ways of monitoring the machine contact
- Number of steps that are fixed or settable with keyswitch



Stepping operation enables automatic restart of a machine (Press) after a certain number of accesses into the protected area of the first LC. This Operation consists of start sequence and normal sequence.

Possible settings:

Stepping Operation

		Switch 10: Number of Steps				
		0	1	2	3	4...9
Switch 1	6	Stepping Operation, Contact Type 1, Start Sequence: Stepping and Start				
	7	Stepping Operation, Contact Type 2, Start Sequence: Stepping and Start				
	8	Stepping Operation, Contact Type 1, Start Sequence: Start and Stepping				
	9	Stepping Operation, Contact Type 2, Start Sequence: Start and Stepping				
		Selectable by keyswitch	1 step	2 step	3 step	Not allowed (fault 5)

Start Sequence

To enable the machine at startup on stepping operation 2, different start sequences can be chosen:

1. The required number of interruptions of the LC must be completed and then the Start button must be pressed.
2. The Start button is pressed first, and after that the required number of interruptions must be completed.

A flashing lamp (terminal 48) signals the request to start the operation (for example, two steps according to the following diagrams). A continuous light on a lamp (terminal 58) signals the request to press the Start button. After finishing the starting sequence correctly, the lamps go off and the contact K1 and K2 close.

Figure 6 - Start Sequence: Two Steps and Start Button

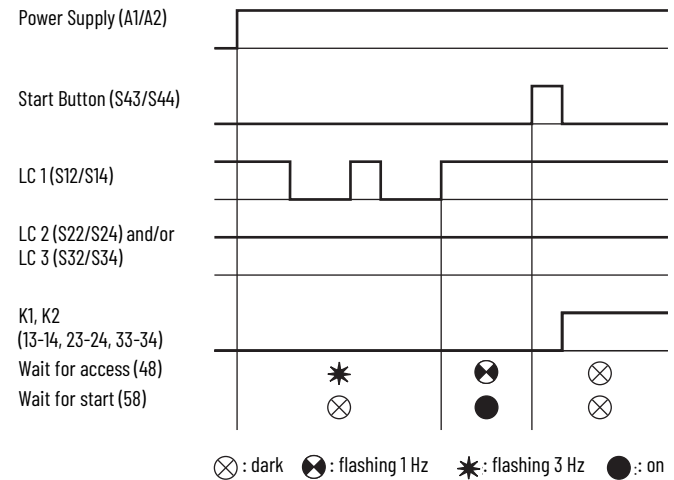
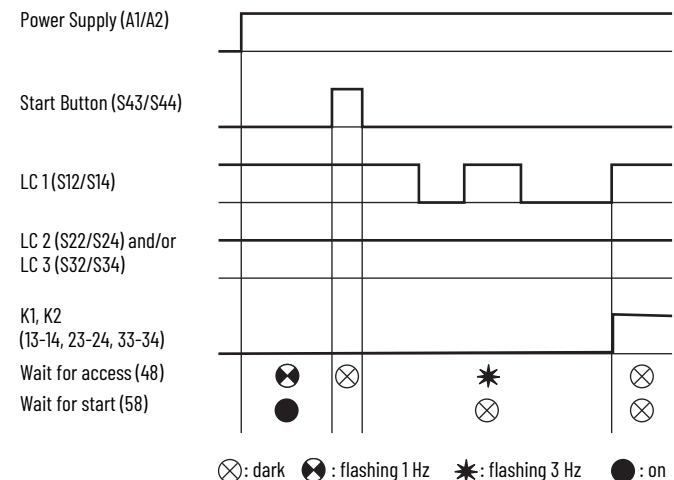


Figure 7 - Start Sequence: Start Button and Two Steps



Normal Sequence

A correct starting sequence is necessary to run the normal operating sequence. In the normal operating sequence, the machine movement is signaled to the light curtain by opening and closing of the machine contact. The output contacts of the MSR22LM safety relay are opened when the machine contact opens. After that, the operator must interrupt the LC for the required number of times to start again the machine operation. All necessary steps must be completed within 30 s. The demand to access is indicated on fast flashing (3 Hz) output 48. When the required number of interruptions on the LC is completed, the lamp goes off and the contacts K1 and K2 close.

Machine Contact

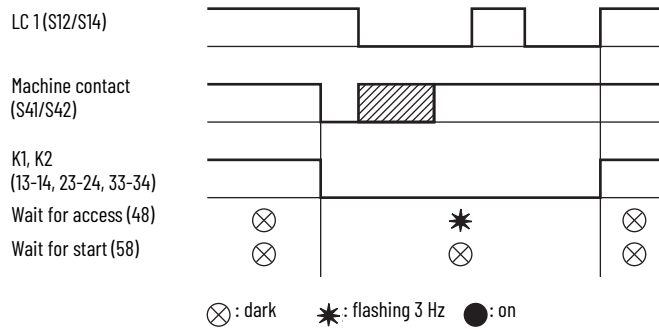
A machine contact must be connected to terminals S41 and S42 of the MSR22LM safety relay. It opens and closes depending on the machine movement.

Monitoring of the Machine Contact

Two ways of monitoring are selectable:

- Mode 1
In this mode, the access to the LC must only be done when the machine contact has been opened and closed again. An exception is when the access is done while the contact is open and continues while the contact closes.
- Mode 2
In this mode, the accesses are accepted already when the machine contact is open. The machine is only enabled when all accesses are completed and the machine contact is closed again.

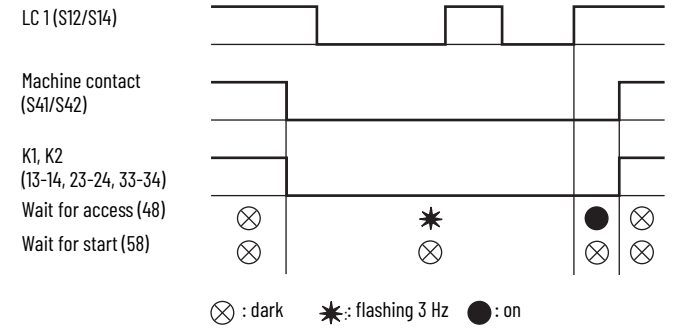
Figure 8 - Application: Presses with Normal to Fast Movement



Forbidden Access into the Light Curtain

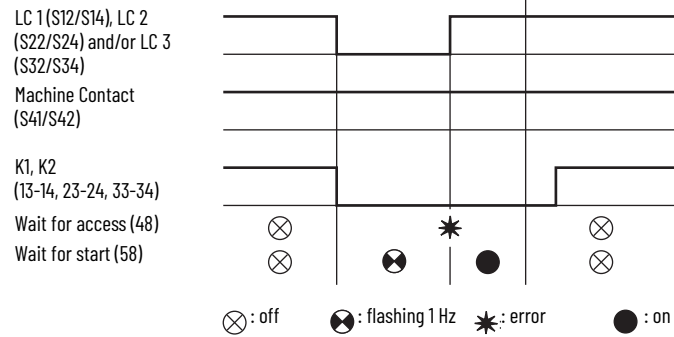
On forbidden access, the lamp (on terminal 58) shows symmetric flashing.

Figure 9 - Application: Presses with Slow Movement



The lamp on terminal 48 flashes with code 1. After finishing the access, the lamp on terminal 58 returns to permanent light and signals that the machine can be started with the Start button.

Start Button (S43/S44)



Application Examples

Operation Mode 0, 1: Protective Operation

Figure 10 - Protective Operation with Three Light Curtains, Manual or Auto Start, Setting Without Feedback Input

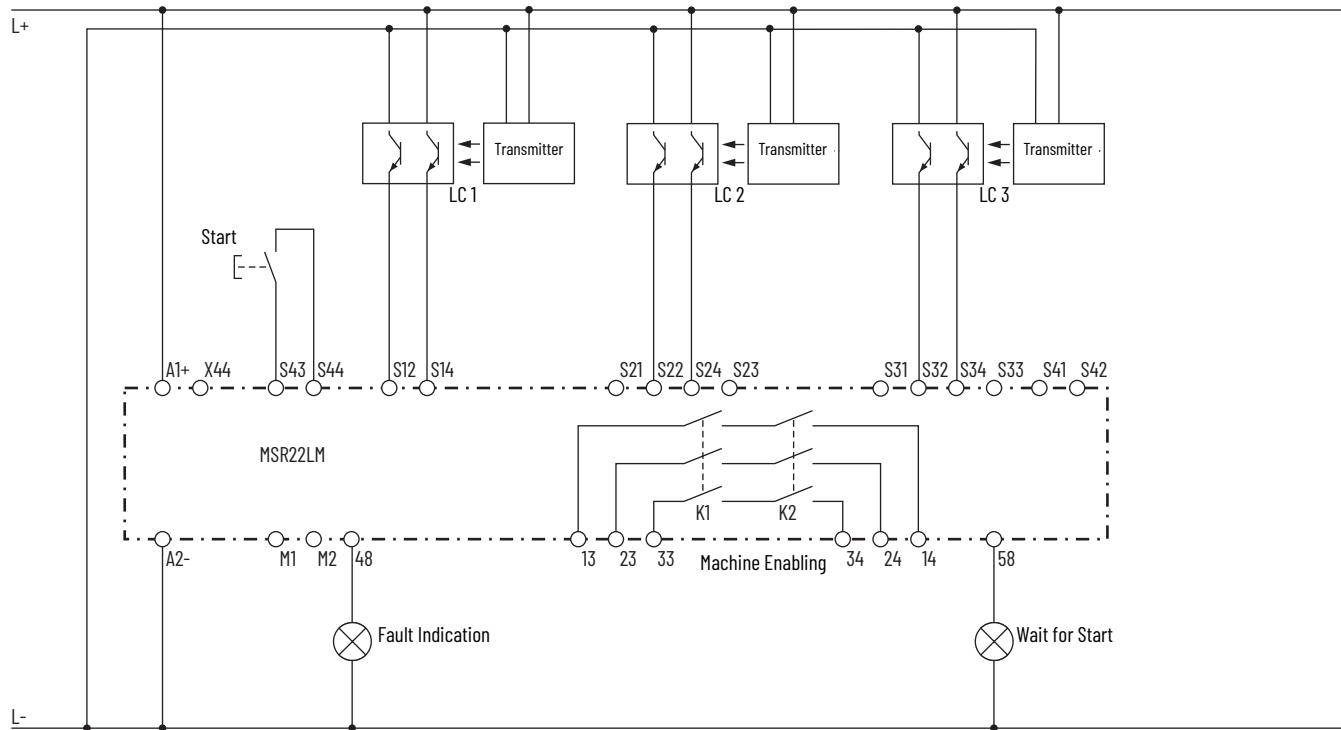
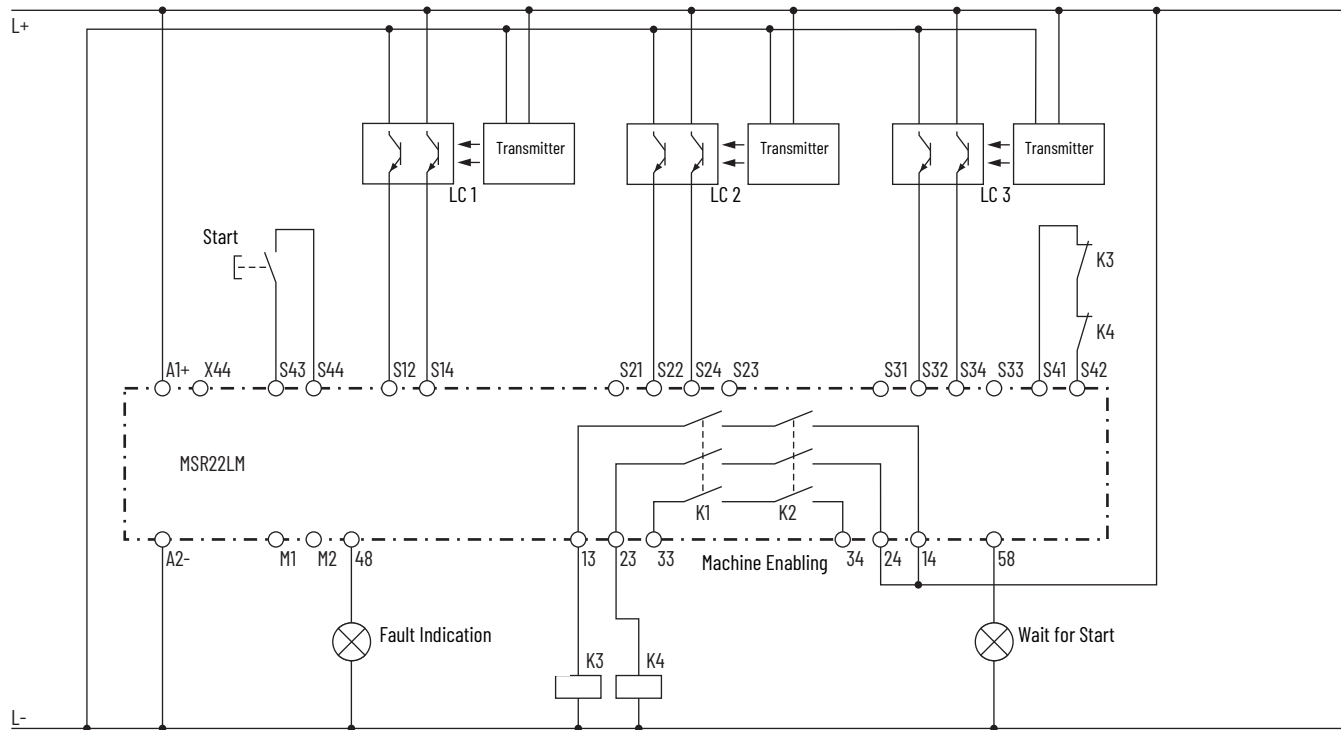


Figure 11 - Protective Operation With Three Light Curtains, Manual or Auto Start, Setting With Feedback Input



Operation Mode 2, 3, 4, 5: Protective Operation With Muting

Figure 12 - Protective Operation with Muting a Light Curtain Via Two Muting Sensors, Two Light Curtains

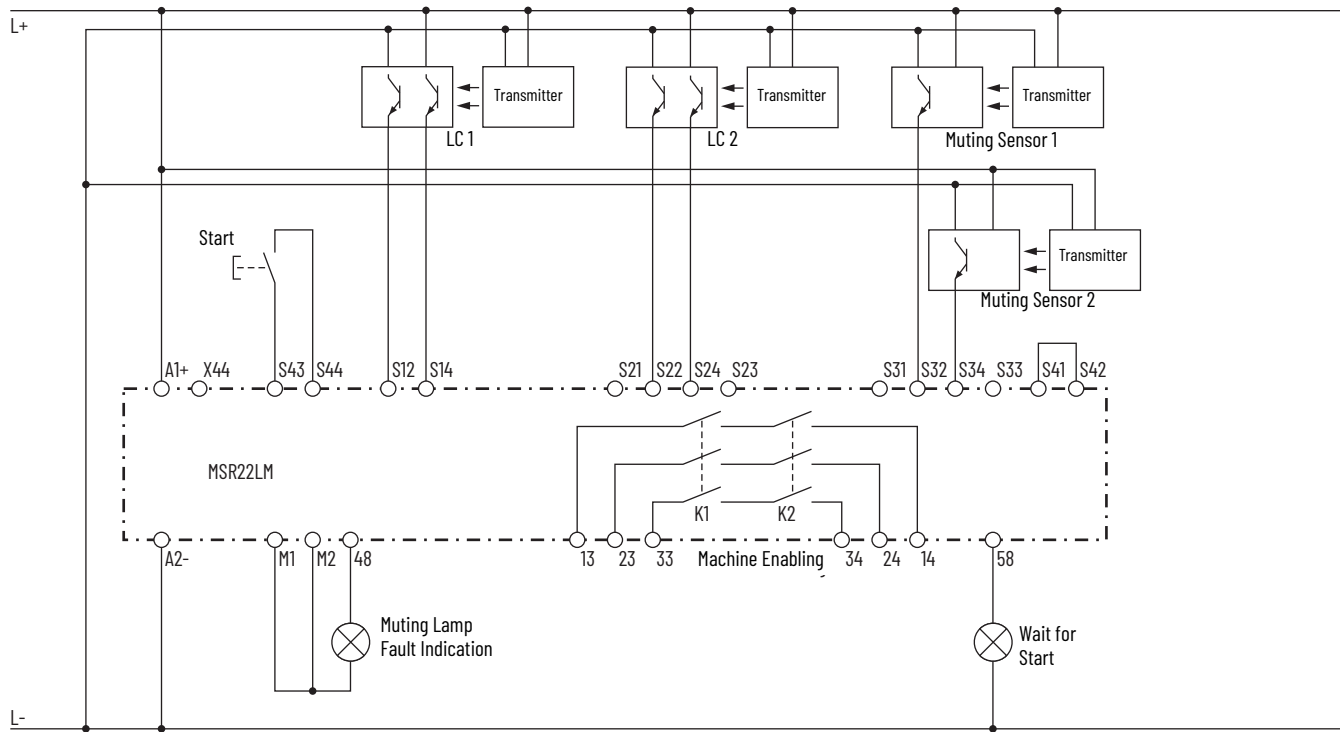


Figure 13 - Protective Operation with Muting, One Light Curtain, Four Muting Sensors

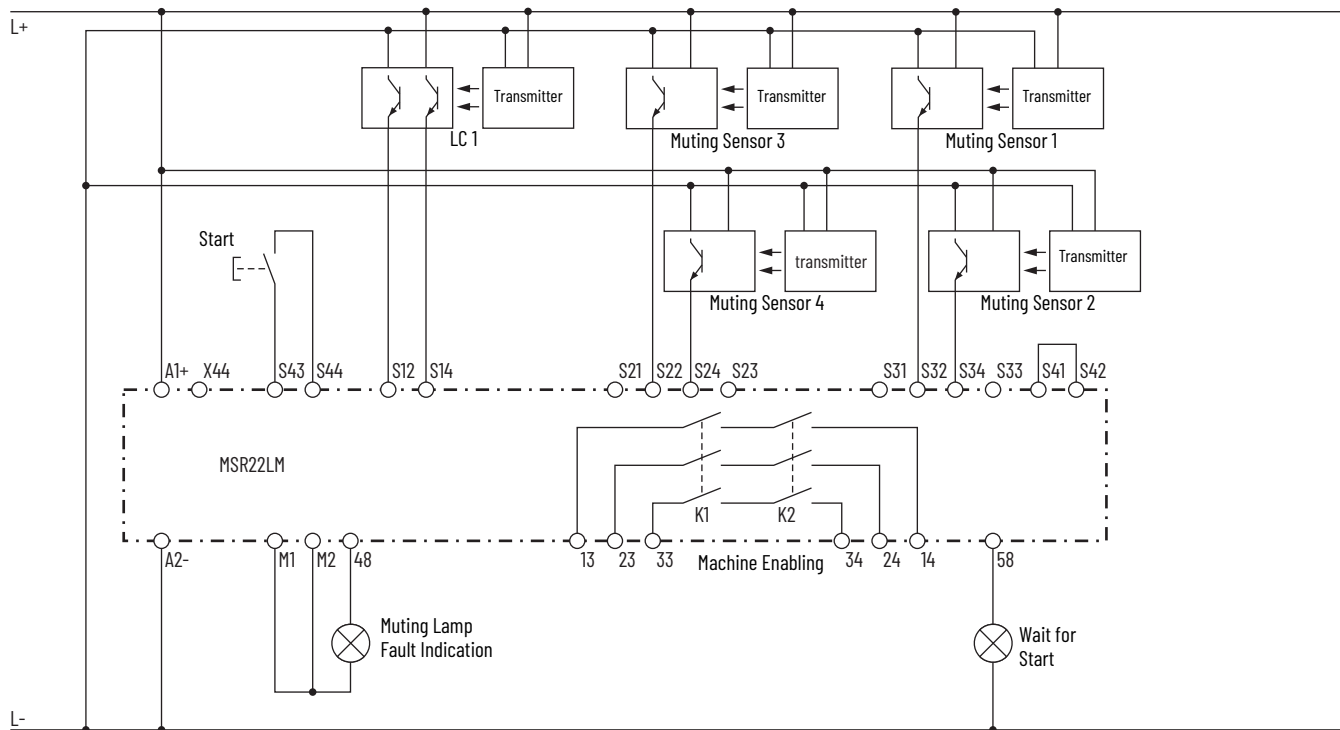
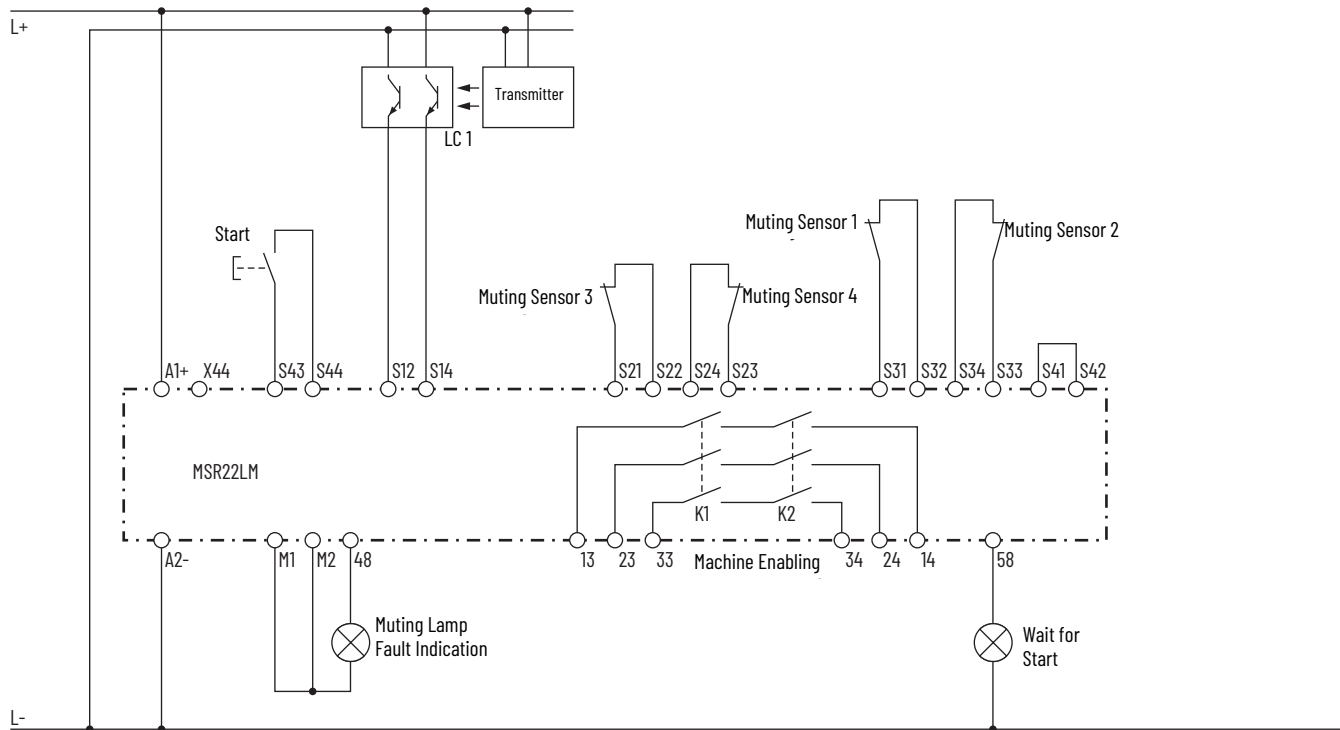


Figure 14 - Protective Operation with Muting via Four Muting Sensor Contacts



Operation Mode 6, 7, 8: Stepping Operation

Figure 15 - Stepping Operation with Three Light Curtains

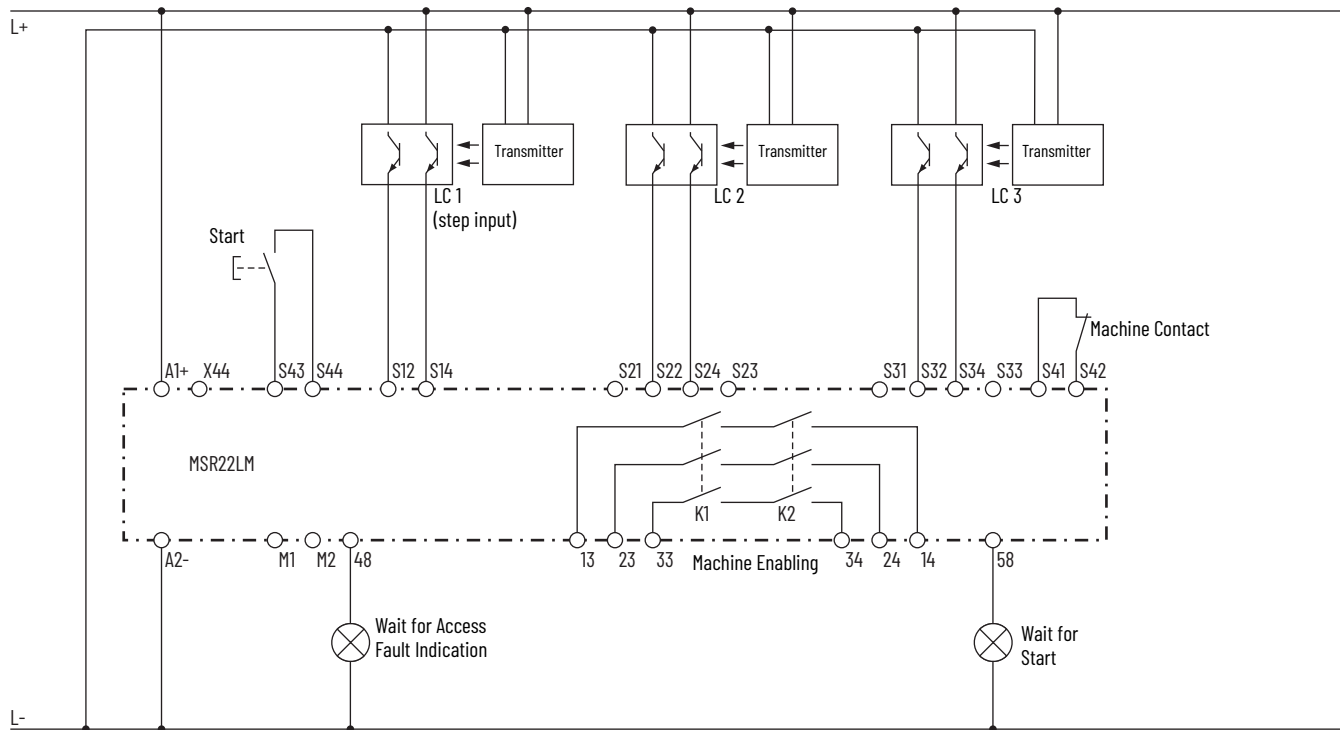
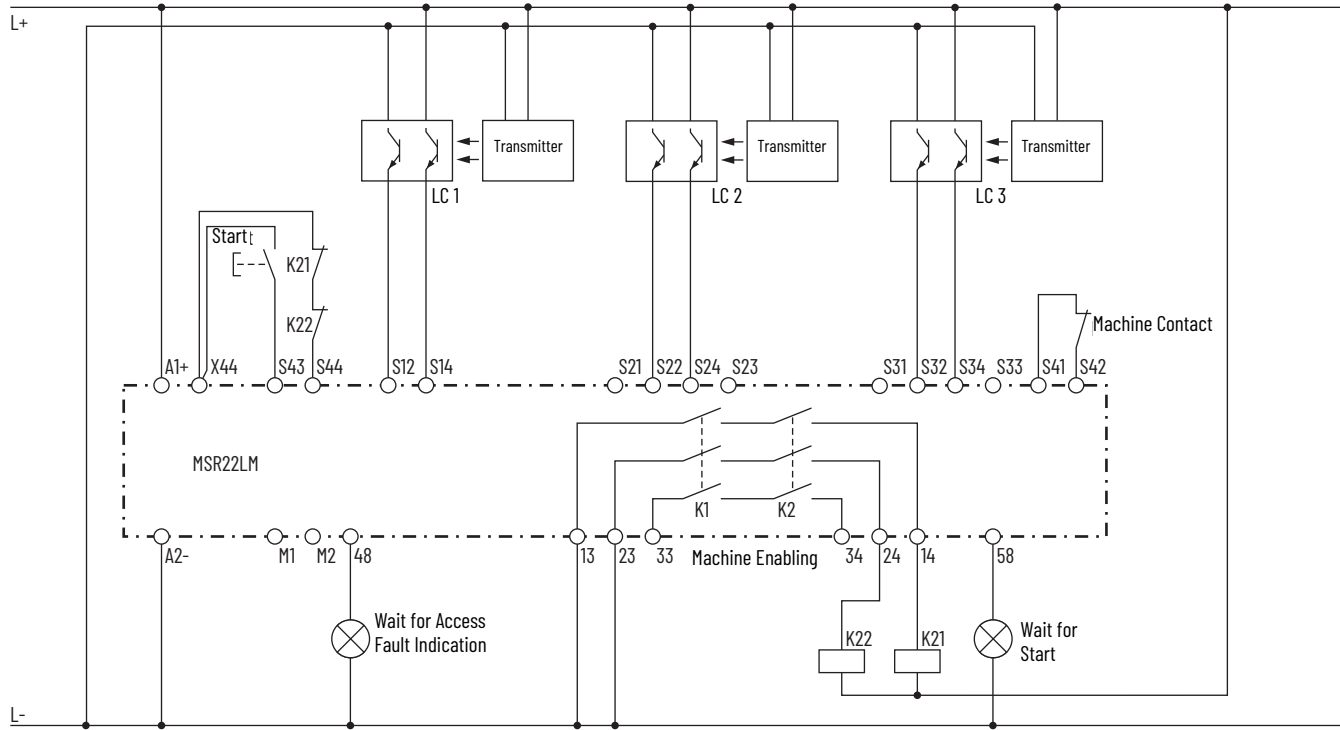
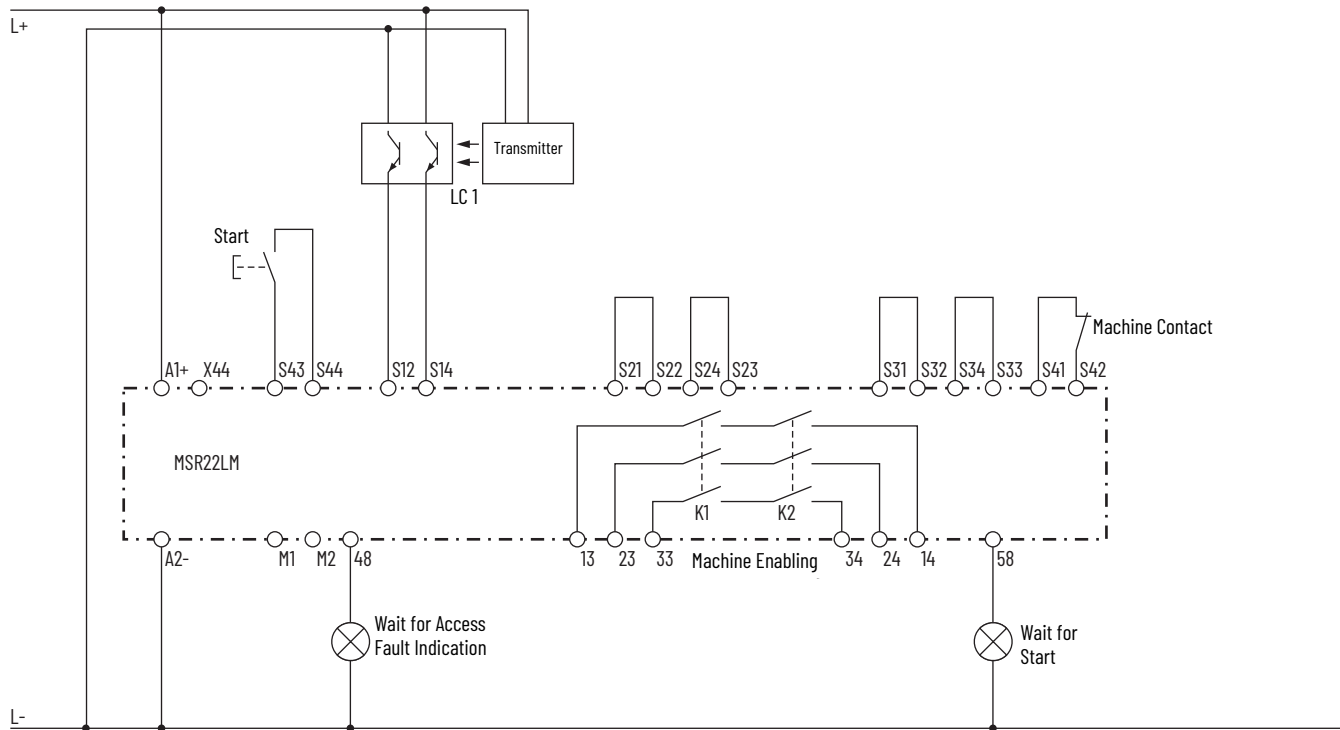


Figure 16 - Stepping Operation With 3 Light Curtains and Contact Reinforcement by External Contactors, 2-channel Operation (Switching of Feedback Input Can Also Be Used At Protective Operation With Muting)



The feedback circuit of the external relays is only tested when the module is started by pressing the push button. When using this circuit, the safe function has to be tested in regular intervals. This can be done by interrupting a light curtain so that a reset requires activation of the Start button. Activation of the module is only possible when all external relays are de-energized.

Figure 17 - Stepping Operation With One Light Curtain (With All Different Operating Modes Unused Inputs Must Be Linked)



Operation Mode 6, 7, 8, 9: Stepping Operation With Keyswitch

Application (for example, for presses) with changing number of accesses

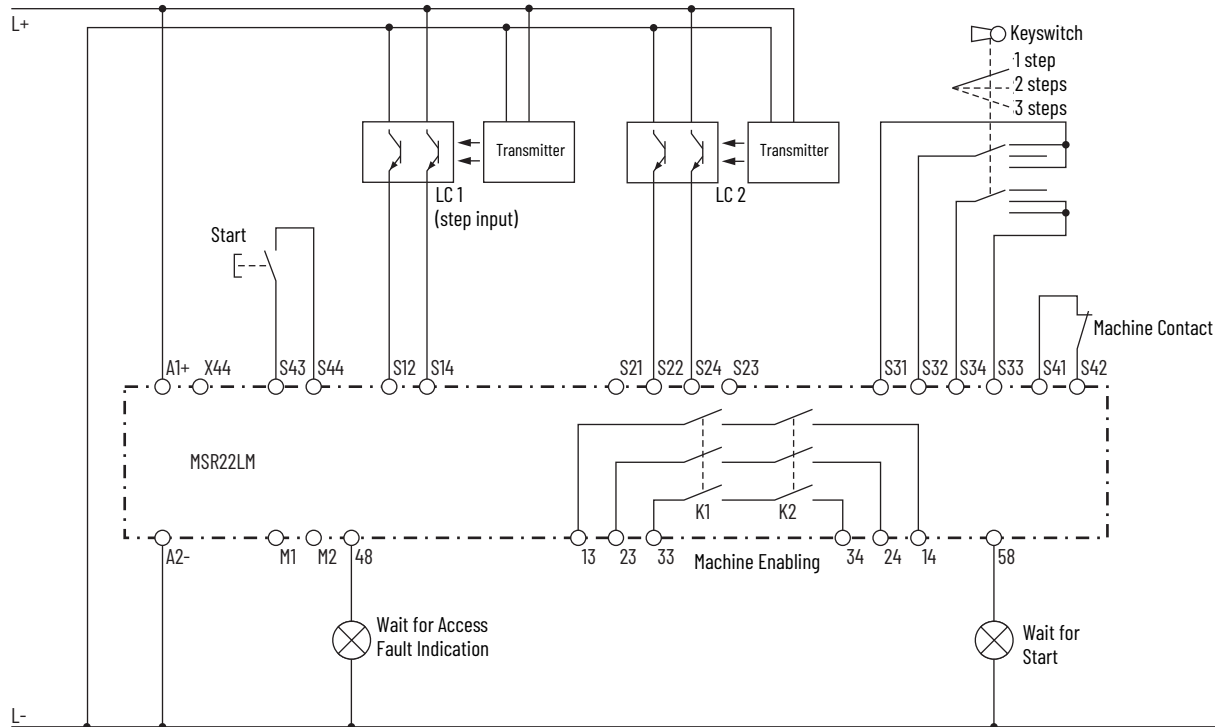
- Selection with keyswitch: 1, 2, or 3 steps

Enable New Setting

A changed number of steps is only recognized at standstill (K1 and K2 open).

A failure indication 3 on the lamp (terminal 48) signals the new number of steps. Pressing the Start button restarts the unit. After that, the normal start sequence complete switch Start button and number of accesses must be completed to enable the machine with the new number of steps.

Figure 18 - Stepping Operation with Keyswitch



Troubleshooting

When a failure is detected the relays K1, K2 are de-energized. Different flashing codes on the status indicators run 1 and run 2 indicate the different failures. The failures are split into two groups:

- Failure group 1: System failure
On occurrence of such a failure, the unit locks out and shows the failure code, the module can only be reset by switching the unit off and on again. These failures are only indicated on status indicator run 1 and/or run 2. Simultaneously, two different codes can be indicated on the two status indicators. The outputs (48 and 58) are always off in this state.
- Failure group 2: Function failure
These failure codes are only displayed on status indicator run 1 and output 48 while status indicator run 2 remains on permanently. The relays K1, K2 are de-energized in this state, the module is still active and the relays can be activated by pressing the Start button after the failure has been removed.

Table 4 - System Failure: Indicated Only on Status Indicator Run 1 and/or Run 2)

No. (1)	Description	Measures and notes
0	Internal failure (status indicators off)	If both status indicators are off, the relay is defective and has to be sent back for examination.
5	Faulty setting	1. The switches on both channels are not identically. 2. The selected setting is not allowed.
6	Undervoltage detection	Left status indicator is flashing when the voltage drops under the allowed level (< approx. 0.85 UN). After returned to normal, a reset is made (similar to power up of the unit).
	Oversvoltage detection	The right status indicator is flashing when the voltage rises over the allowed level of > approx. 1.15 UN + 5% residual ripple.
7	Input failure	1. A short circuit occurred on the start button or machine contact input. 2. Both signals of one LC are not identically (short circuit, broken wire of defective LC)
8	Failure on output contacts K1, K2	Check the output K1, K2 circuit and contact current, the relay has to be repaired.
9, 10, 11	Internal failure	Try to evaluate the circumstances that led to this fault and check with the supplier or manufacturer.
12, 13	Internal failure	The relay has to be repaired.

(1) Number of flash pulses in a series.

Table 5 - Function Failure: Indication on Status Indicator Run 1 and Output 48

No. (1)	Description	Measures and notes
1	LC failure	1. One LC has been interrupted. 2. All LC inputs that are not used must be bridged: LC 2: S21-S22, S23-S24 LC 3: S31-S32, S33-S34
2	Failure on Start button	1. During startup of the unit and initializing, the Start button must not be pressed. 2. The Start button must not be pressed longer than 3 seconds.
3	Protective operation failure in feed back circuit	An operating mode with feedback circuit is selected and the circuit that is connected to S41-S42 is not closed before activation of K1, K2.
	Stepping operation contact failure	1. The machine contact is not closed in initial position (waiting for start). 2. With contact type 1, the machine contact was not closed at the end of the required first interruption of the light curtain.
4	Muting failure (blocked LC)	The selected maximum muting time had been exceeded (muting lamp on).
	Muting failure (lamp)	1. The muting lamp is not connected between terminals 48 and M1 and M2. 2. The necessary bridge is not connected between terminal S41-S42. 3. The muting lamp is defective. 4. The measuring circuit for the muting lamp is defective, the unit has to be repaired.
5	Stepping operation (key failure)	Both contacts of the keyswitch to select the number of steps are open

(1) Number of flash pulses in a series.

Table 6 - Status Indication

Status indicator run 1 and output 48 are flashing fast with 3 Hz	
Muting operation: Override possible	Minimum one muting sensor is active, LC 1 is interrupted, and the Start button is pressed. After 3 seconds with an activated Start button, the override is started for maximum 12 seconds.
Stepping operation: Wait for access	The unit is waiting for the required number of interruptions of the LC so that the safety relays can be activated.

Circuit Diagrams

Figure 19 - MSR22LM.03

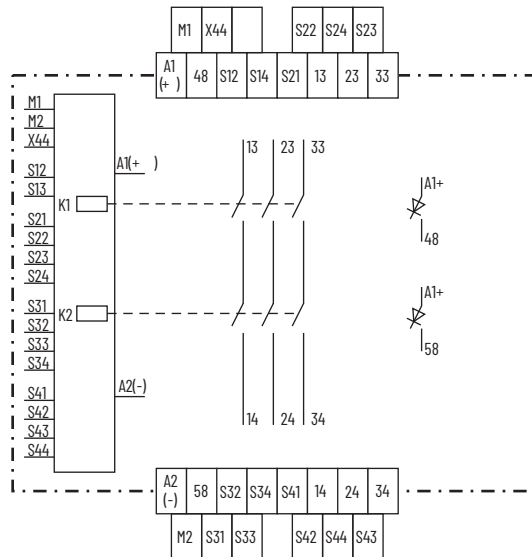
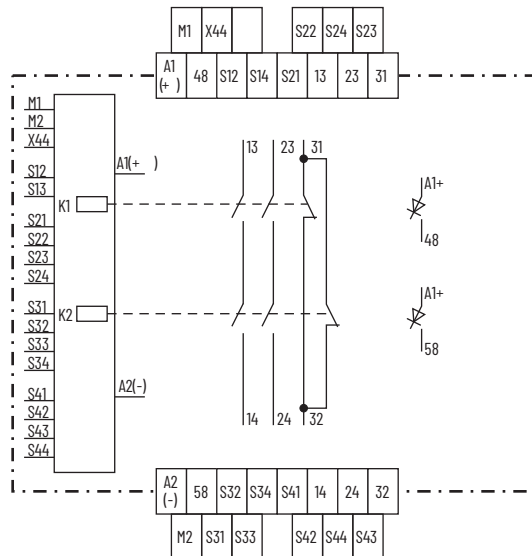


Figure 20 - MSR22LM.22



Connection Terminals

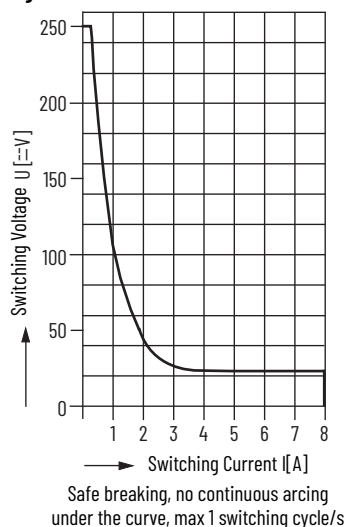
Terminal Designation	Signal Description
A1+	+ / L
A2	- / N
S12, S14, S22, S24, S32, S34, S42, S44, M1, M2	Inputs
S21, S23, S31, S33, S33, S41, S43	Outputs
13, 14, 23, 24, 33, 34	Forcibly guided N.O. contacts for release circuit
31, 32	Forcibly guided N.C. contacts for release circuit
48, 58	Semiconductor monitoring output
X44	Free junction terminal, volt free

Specifications

Attribute	Value
Certifications	CE Marked for all applicable directives, cULus Listed, UKCA Marked for all applicable regulations, and TÜV Certified
Input	
Nominal voltage U_N	24V DC
Voltage range at max 5% residual ripple	0.85...1.15 U_N
Nominal consumption	170 mA, max (no load on semiconductor outputs)
Control voltage on S21, S23, S31, S33, S41, S43, S48, S58	DC 23V at U_N
Control current on S12, S14, S22, S24, S32, S34, S42, S44	Each 4.5 mA at U_N
Minimum voltage on terminals S12, S14, S22, S24, S32, S34, S42, S44	DC 16V
Short circuit protection	Internal with PTC
Minimum current on M1, M2	25 mA with active lamp
Output	
Contacts	2 N.O., 1 N.C. contacts The N.C. contact must only be used as monitoring contact.
Contact type	Relay, forcibly guided
Operate delay typ. at U_N	<ul style="list-style-type: none"> Manual start: 50 ms, max Automatic start: 1.5 s, max Automatic restart: 55 ms, max
Release delay (reaction time)	30 ms, max (50 ms, max when failure on LC and only one input channel de-energizes)
Output voltage	<ul style="list-style-type: none"> 250V AC DC: see Figure 21
Switching of low loads	≥100 mV
Thermal current I_{th}	5 A
Switching capacity	<ul style="list-style-type: none"> To AC 15: 3 A/230V AC; IEC/EN 60947-5-1 N.O. contact: 2 A/230V AC; IEC/EN 60947-5-1 N.C. contact to DC 13 at 0.1 Hz: 8 A/24V DC; IEC/EN 60947-5-1
Electrical life	To AC 15 at 2 A, 230V AC: 105 switching cycles IEC/EN 60947-5-1
Permissible switching frequency	1200 switching cycles/h, max
Short circuit strength	<ul style="list-style-type: none"> Max fuse rating: 6 A gG / gL IEC/EN 60947-5-1 Line circuit breaker: C 8 A
Mechanical life	10 x 10 ⁶ switching cycles
Semiconductor Outputs	
Output (terminal 48 and 58)	Transistors, plus-switching
Output voltage	DC 24V, max 100 mA continuous current, max 400 mA for 0.5 s internal short circuit, over temperature, and overload protection
General Data	
Operating mode	Continuous operation
Temperature range	<ul style="list-style-type: none"> Operation: 0...50 °C (32...122 °F) Storage: -25...+85 °C (-13...185 °F)
Altitude	≤ 2000 m (6561.7 ft)
Clearance and creepage distances Rated impulse voltage/pollution degree	4 kV / 2 (basis insulation) IEC/EN 60664-1
EMC	<ul style="list-style-type: none"> Electrostatic discharge: 8 kV (air) IEC/EN 61000-4-2 (according to test degree 3) HF irradiation: 80 MHz...2.7 GHz: 10V / m IEC/EN 61000-4-3 Fast transients on wires for power supply A1-A2: 2 kV IEC/EN 61000-4-4 On wires for signals and control: 2 kV IEC/EN 61000-4-4 Surge voltages between wires for power supply: 1 kV IEC/EN 61000-4-5 Between wire and ground: 2 kV IEC/EN 61000-4-5 HF wire guided: 10V IEC/EN 61000-4-6 Interference suppression: Limit value class A EN 55011
Degree of protection	According to IEC/EN 61496-1, the unit has to be installed in a housing with protection degree 54.
Housing	IP40 IEC/EN 60529
Terminals	IP20 IEC/EN 60529
Housing	Thermoplastic with VO behavior according to UL subject 94
Vibration resistance	According to IEC/EN 61496-1: Amplitude 0.35 mm IEC/EN 60068-2-6 Frequency 10...55 Hz
Shock resistance	<ul style="list-style-type: none"> Acceleration: 10 g Impulse length: 16 ms Number of shocks: 1000 per axis on 3 axis
Climate resistance	0/050/04 IEC/EN 60068-1

Attribute	Value
Terminal designation	EN 50005
Wire mounting	Terminal screws M 3.5 Box terminal with wire protection
Mounting torque	0.8 N•m
Mounting	DIN rail IEC/EN 60 715
Weight	320 g (0.71 lb)
Dimensions	
Width x height x depth	45 x 84 x 121 mm (1.8 x 3.31 x 4.76 in.)

Figure 21 - Arc Limit Curve



UL Data

The safety functions were not evaluated by UL. Listing is accomplished according to requirements of Standard UL 508, "general use applications"

Attribute	Value
Nominal voltage U_N	DC 24V
Ambient temperature	0...50 °C (32...122 °F)
Switching capacity	<ul style="list-style-type: none"> Ambient temperature 50 °C (122 °F): Pilot duty B300; 5 A, 250V AC G.P.; 5 A, 24V DC Semiconductor outputs: 24V DC, 100 mA
Wire connection	<ul style="list-style-type: none"> 60 °C (140 °F)/ 75 °C (167 °F) copper conductors only AWG 20 - 12 Str Torque 0.8 N•m (7.1 in•lb) AWG 20 - 14 Str Torque 0.8 N•m (7.1 in•lb)

Compliance with EU Directives

Rockwell Automation herewith declares that the MSR22LM safety relay is in conformity with the provisions of the following EU directive(s) and UK regulations (including all applicable amendments), and that the respective standards and/or technical specifications have been used as a basis for this declaration.

You may obtain the EU and UK Declaration of Conformity with the standards used at rok.auto/certifications.

EU Directives/UK Regulations used:

- Machinery Directive / Supply of Machinery (Safety) Regulations
- EMC Directive / Electrical Equipment (Safety) Regulations
- RoHS Directive / Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations

Notes:

Notes:

Rockwell Automation Support

Use these resources to access support information.

Technical Support Center	Find help with how-to videos, FAQs, chat, user forums, Knowledgebase, and product notification updates.	rok.auto/support
Local Technical Support Phone Numbers	Locate the telephone number for your country.	rok.auto/phonesupport
Technical Documentation Center	Quickly access and download technical specifications, installation instructions, and user manuals.	rok.auto/techdocs
Literature Library	Find installation instructions, manuals, brochures, and technical data publications.	rok.auto/literature
Product Compatibility and Download Center (PCDC)	Download firmware, associated files (such as AOP, EDS, and DTM), and access product release notes.	rok.auto/pcdc

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Waste Electrical and Electronic Equipment (WEEE)



At the end of life, this equipment should be collected separately from any unsorted municipal waste.

Rockwell Automation maintains current product environmental compliance information on its website at rok.auto/pec.

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