Original operating instructions

MSI 420.TMC-03

TMC 66 Legacy

SAFE IMPLEMENTATION AND OPERATION

The Sensor People

We reserve the right to make technical changes
EN 2023/11/02 - 50143065

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Exemption of liability

Leuze electronic GmbH + Co. KG is not liable in the following cases:

- Safety relay is not used as intended.
- Safety notices are not adhered to.
- Reasonably foreseeable misuse is not taken into account.
- Mounting and electrical connection are not properly performed.
- Proper function is not tested (see Table 4.3 on page 13).
- Changes (e.g., constructional) are made to the safety relay.
- Changes are made to the software configuration.
- The supplied memory card is changed without corresponding instruction from Leuze electronic.

1 About this document

This document is a translation of the original operating instructions for the product MSI 420.TMC-03. It describes handling of the discontinued TMC 66 (Leuze article no. 50082121) and how to replace the TMC 66 for the substitute MSI 420.TMC-03. The latter is also referred to below as the *TMC 66 Legacy* solution.

1.1 Useful documents

This document contains only the most important facts and information relevant to this specific application (*TMC 66 Legacy*). For further details or specific data sheet information, please refer to the following documents:

MSI 400 hardware manual

The German and English version of the manual can be downloaded at our website *www.leuze.com* by entering the article number (50142625). Please also refer to the manual for the used protective sensor.

1.2 Delivery contents and part number

Table 1.1: Delivery contents and part numbers

Part no.	Designation	Description
50142625	MSI 420.TMC-03	*TMC 66 Legacy* complete solution
	Scope of delivery	
	MSI 420-03	Configurable compact safety control with spring-cage terminals including operating instructions for the MSI 400 system.
	MSI-SD-CARD	Preconfigured memory card, inserted in the MSI 420-03.
	MSI-SD-COVER	Cover to protect the memory card, installed.
	User's guide MSI 420.TMC-03	Complete user's guide (this document) can be downloaded at *www.leuze.com* by entering the article number (50142625).

1.3 EC Declaration of Conformity

The device meets the basic requirements and the other relevant provisions of the machinery directive 2006/42/EC.

The manufacturer of the product, Leuze electronic GmbH & Co KG in D-73277 Owen, possesses a certified quality assurance system in accordance with ISO 9001.

1.4 Download Area

You can find the original operating instructions and the EU Declaration of Conformity by entering the part number of the device in the search field on our website *www.leuze.com*.

The part number can be read on the name plate of the device under the "Part No." entry.

2 System overview

The *TMC 66 Legacy* system is based on the MSI 400 safe compact control from Leuze electronic. The system is a substitute for the TMC 66 (Leuze electronic article no. 50082121) and is used only as a replacement solution.

NOTE
During development of the replacement solution, great importance was placed on 1:1 exchangeability (wiring and functionality) with the TMC 66. Nevertheless, some aspects with respect to the handling and system behavior of the replacement solution differ from the TMC 66. The main differences are described at the appropriate point in this document.

NOTE
When designing new systems with muting, we recommend using our MLC SPG (Smart Process Gating). This system will enable you to completely dispense with muting sensors. This will not only save space, but will also reduce the amount of mounting and installation work required. We would be glad to advise you in a personal consultation.

The solution essentially consists of a hardware component and software functionality specifically configured for this application. The latter emulates the original behavior of the TMC 66, thus enabling simple replacement of the old device.

NOTE
The supplied software functionality was developed and tested in accordance with the directives applicable for so-called SRASW (Safety-Related Application Software), as defined in ISO 13849-1.

The software functionality is already stored on the supplied memory card on delivery. The program has already been verified so that the program sequence is executed automatically as soon as the MSI 420.TMC-03 is connected to the supply voltage and has completed a self test.

⚠ ATTENTION
↳ Before connecting the MSI 420.TMC-03 to the supply voltage, make sure that the device has been connected in accordance with the supplied wiring plan. ↳ Commissioning may only be performed by a competent person and following the steps given in the section Electrical connection and commissioning (see chapter 4 "Electrical connection and commissioning").

Owing to the preconfigured memory card, it is not necessary to make any changes to the logic program during commissioning.

If the memory card needs to be changed, this must always be done by a Leuze electronic service technician.

If Leuze electronic explicitly instructs you to change the memory card (e.g. in the event of an update), this can be done by a competent person, taking the relevant work instructions into consideration.

2.1 Features

Four different operating modes are available:

- Operating mode 1: Start/restart interlock **active**; contactor monitoring **inactive**
- Operating mode 2: Start/restart interlock **inactive**; contactor monitoring **inactive**
- Operating mode 3: Start/restart interlock **active**; contactor monitoring **active**
- Operating mode 4: Start/restart interlock **inactive**; contactor monitoring **active**

The respective operating mode is selected by means of a wire bridge, see table 4.2 "Selection of operating mode".

Three signal outputs for indicating the status (for details, see chapter 5 "Diagnostics messages")

- Error
- Safety on
- Error indication

2.2 System limits

The maximum attainable performance level of the overall system is limited to **PL c (ISO 13849-1)**.

Differences to TMC 66:

- Muting lamp can be connected to output Q3.
  Attention: The output is 24 V positive switching (see connection example see Figure 4.1).
  The TMC 66 was 0 V negative switching.
- No monitoring of the muting lamp because this function is no longer stipulated in the relevant standards. This means that a defective muting lamp is not detected by the MSI 420.TMC-03.
- No 7-segment display. Instead, the error display is implemented using three diagnostics outputs (see chapter 5 "Diagnostics messages").
- The safety outputs of the MSI 420.TMC-03 units are semiconductor outputs with a switching power of up to 4 A. If potential-free outputs are required, a relay must additionally be used.
- No DIP switches for setting the different operating modes. The operating mode is selected via a bit pattern at the inputs of the MSI 420.TMC-03 (see chapter 4 "Electrical connection and commissioning").
- The system is not designed for connection with muting signals from the PLC (see IEC 62046). Only the sensor types described in chapter 2.3 should be used as muting sensors.

2.3 Muting sensors

Throughbeam or retro-reflective photoelectric sensors with activation input (PNP HIGH active) can be used as muting senders for the MSI 420.TMC-03.

2.4 Protective sensors

The used protective sensor must achieve at least the following characteristic safety values. Type 2 (acc. to 61496-2), PL c and category 2 (acc. to ISO 13849-1). Furthermore, the information in the manual of the used protective sensors must also be observed.

2.5 System response time

The response time is the time taken for the safety function to be called.

Example: The time from entry into the protective sensor until shutdown of the machine.

When the safety distance as defined in ISO 13855 and required for the respective application is calculated, a total reaction time of 35.6 ms must be factored in for the response time of the MSI 420.TMC-03 (MSI 400 hardware + software functionality).

The response times of the sensor and actuator must be considered separately and must be taken from the respective manufacturer's manual.

3 Description of functions

By means of muting, the protective function of the safety sensor can be temporarily and properly suppressed, e.g. if objects are to be transported out of the danger zone through the protective field. The OSSDs of the MSI 420.TMC-03 remain in the ON state in spite of interruption of the protective sensor.

3.1 Arrangement of the muting sensors

Muting sensors detect the transport material and supply the signals necessary for muting. Standard IEC 62046 provides basic information on arranging the muting sensors. This information must be observed when mounting the muting sensors.

⚠ WARNING

Serious accidents caused by incorrect set-up!

If the distance between transmitter and receiver is larger than the width of the object so that gaps of more than 180 mm are created, suitable measures, e.g. through additional guarding, must be taken to stop the dangerous movement before persons enter the area.

- Make sure that no persons can reach the danger zone alongside the transport material during muting.
- Make sure that muting is only temporarily activated and only as long as the access to the danger zone is blocked by the transport material.

NOTE

If accessible distances exist between the transport material and the safety sensor, PS mats or wicket gates monitored with safety switches have been tried, tested and proven as additional safeguards. Such measures prevent injuries caused, for example, by crushing in the access area.

⚠ WARNING

Unintentionally triggered muting may result in serious injury!

- Mount the muting sensors in such a way that muting cannot be unintentionally triggered by a person, e.g. by simultaneously activating the muting sensors with a foot.
- Mount the muting indicator so that it is always visible from all sides.

⚠ WARNING

Risk of death through inadequate protection of the muting sensors!

- Protection against unintended initiation of the (permanent) bridging through mechanical damage and/or misalignment of muting sensors (acc. to IEC 62046).

Operation of the MSI 420.TMC-03 is described below based on the various phases of the muting process.

3.2 Signals

Table 3.1: Signals

Signals at MSI 400		Source	Description
Control 1	Input	E.g. standard PLC (source A)	Preparations for muting
Control 2	Input	E.g. motor contactor of conveyor belt (source B)	Preparations for muting

Signals at MSI 400		Source	Description
Start 1	Start 1 IN, input	Muting sensor 1, receiver	A test cycle initiated by the MSI 400 checks whether an edge change predefined at "Start 1 OUT/Start 2 OUT" is registered by the muting sensor and returned to the MSI 400 via "Start 1 IN/ Start 2 IN".
	Start 1 OUT, output	Muting sensor 1, transmitter	
Start 2	Start 2 IN, input	Muting sensor 2, receiver	
	Start 2 OUT, output	Muting sensor 2, transmitter	
SLS receiver	Input	Protective sensor	Receiver of the protective sensor
SLS transmitter	Test output	Protective sensor	Transmitter of the protective sensor
Start/activation input	Input	External sensor or PLC	Depending on the operating mode, this input functions as the start input or activation input

3.3 Muting phases

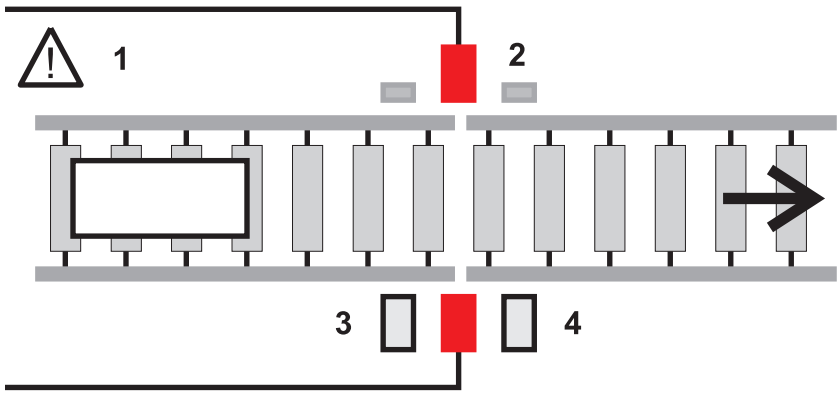
Phase 1 - Preparing muting

First, the two control signal inputs on the MSI 400 must be activated, i.e. a HIGH signal must be present at each input. When doing so, it is essential to ensure that the control signals originate from different signal sources. Typically, the **Control 1** signal is generated by the PLC whereas the **Control 2** signal comes from the conveyor belt (e.g. motor contactor).

The sequence in which the control signals are applied is irrelevant for operation of the MSI 400. The time period between application of **Control 1** and **Control 2** can be between 0 ms and any length of time. The control signals must remain active (HIGH level) throughout the entire muting process.

To test the muting sensors, the MSI 400 outputs a test pulse at the **Start 1 OUT** / **Start 2 OUT** outputs. Each time an edge change is requested, a maximum reaction time (tR) of 240 ms is available for the sensors. This means that at the **Start 1 IN** / **Start 2 IN** inputs the MSI 400 expects them to follow the predefined signal change within the predefined time. The muting function is ready as soon as testing of **Start 1** and **Start 2** has been successfully completed.

If tR is exceeded, muting is not initiated and an error message is output (see chapter 5 "Diagnostics messages").

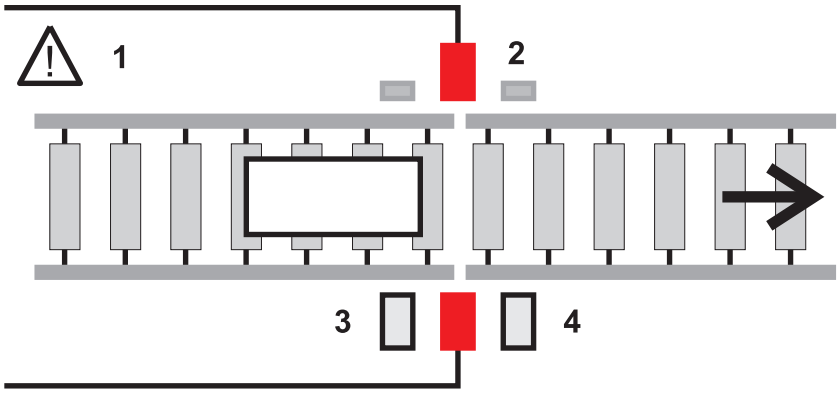


1 Danger zone
2 Protective sensor
3 Start 1
4 Start 2

Figure 3.1: Phase 1 - Muting preparation is activated by applying the control signals. The pallet is still completely inside the danger zone.

Phase 2 - Activating muting

As soon as the first muting sensor is interrupted, i.e. the **Start 1** signal is LOW, the protective sensor is bridged - muting is active.

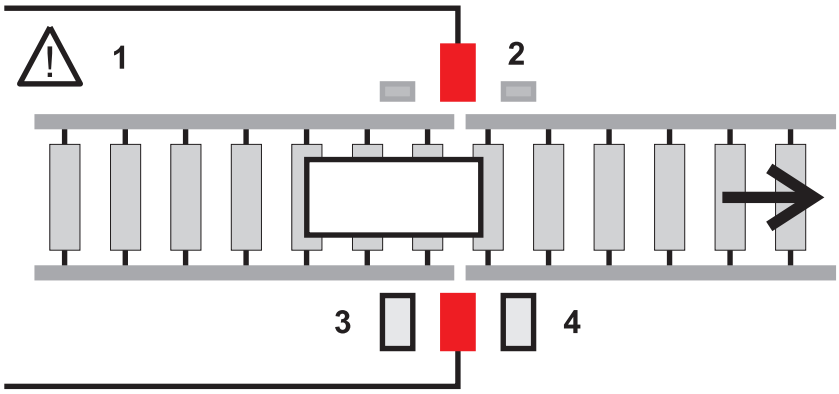


1 Danger zone
2 Protective sensor
3 Start 1
4 Start 2

Figure 3.2: Phase 2 - Muting is activated by the interruption of Start 1.

Phase 3 - Interruption of the protective sensor

While the transport material occupies the first muting sensor, the protective sensor is additionally interrupted. As the system is in the muting state, the safety outputs are not deactivated.

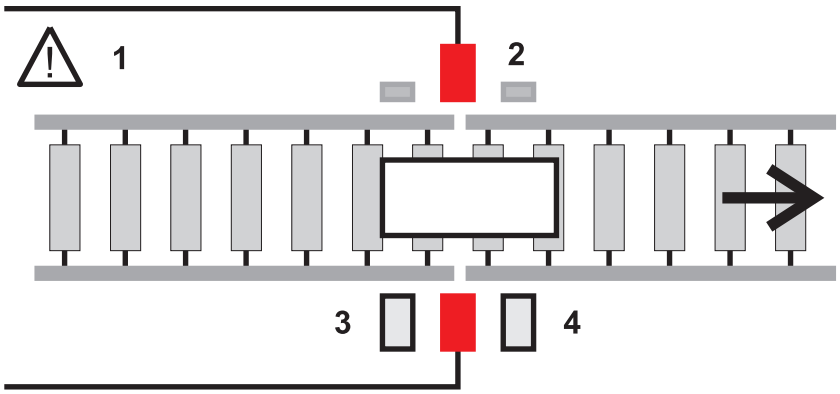


1 Danger zone
2 Protective sensor
3 Start 1
4 Start 2

Figure 3.3: Phase 3 - Protective sensor is interrupted.

Phase 4 - Interruption of Start 2

At the earliest 5 ms after Start 1 has been interrupted, **Start 2** is also allowed to be interrupted by the transport material. During this phase, the two muting sensors (i.e. both start signals) as well as the protective sensor must be occupied (LOW level).



1 Danger zone
2 Protective sensor
3 Start 1
4 Start 2

Figure 3.4: Phase 4 - Continuation of the muting process with occupancy of Start 2 by the pallet.

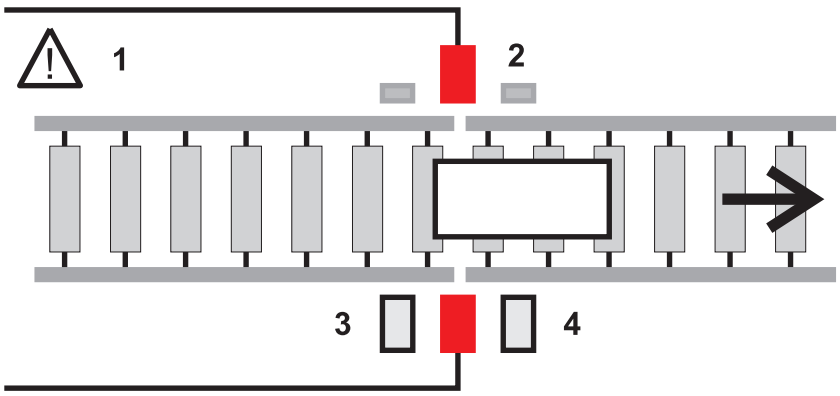
A maximum time between occupancy of **Start 1** and **Start 2** is not monitored by the device.

NOTE
Important: To ensure that the direction of the pallet (from the danger zone into the safe zone) is detected correctly, Start 2 must be occupied before Start 1 becomes free again. If an error is detected during direction monitoring, the muting process is terminated and an error message is activated (see chapter 5 "Diagnostics messages").

NOTE
Unnecessarily long muting should be avoided in all cases.

Phase 5 - Start 1 becomes free

The transport material releases muting sensor 1 (**Start 1**) again while the protective sensor is still interrupted.

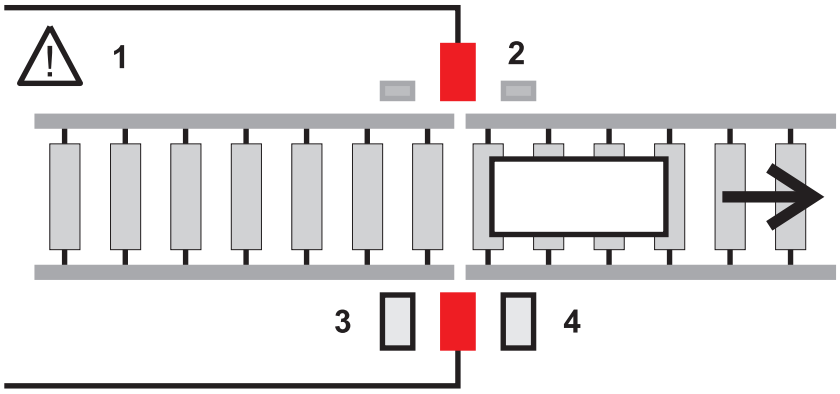


1 Danger zone
2 Protective sensor
3 Start 1
4 Start 2

Figure 3.5: Phase 5 - Muting continues even after Start 1 has been released.

Phase 6 - Protective sensor becomes free

Muting still remains active after the transport material releases the protective sensor again.

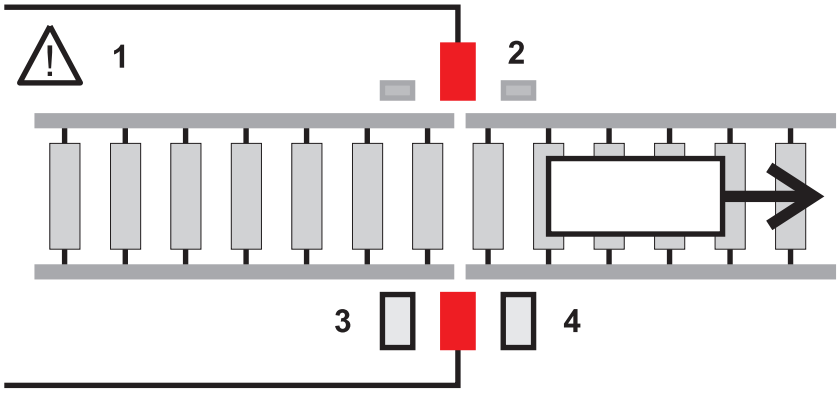


1 Danger zone
2 Protective sensor
3 Start 1
4 Start 2

Figure 3.6: Phase 6 - Protective sensor becomes free again.

Phase 7 - End of muting

The muting process is only ended and the protective sensor only resumes normal operation again after the second muting sensor (**Start 2**) is no longer occupied by the pallet.



1 Danger zone
2 Protective sensor
3 Start 1
4 Start 2

Figure 3.7: Phase 7 - End of muting

The muting process is generally ended as soon as one of the following signal changes occurs:

Control signals switched off

- Deactivation of **Control 1** (signal change from HIGH to LOW)
- Deactivation of **Control 2** (signal change from HIGH to LOW)

Start 2 switched on

- Activation of **Start 2** (signal change from LOW to HIGH)

As soon as the MSI 400 detects one of the listed signal changes, bridging of the protective sensor is canceled immediately.

3.4 Override - Starting system with occupied protective sensor

The Override function allows transported objects to be removed if they have come to a standstill in the protective field of the protective device (e.g. photoelectric sensor) due to power failures, the triggering of an emergency stop, muting errors or other similar circumstances.

⚠ WARNING
Unmonitored overrides may result in serious injury! ↳ A person with the necessary competence must observe the procedure exactly. ↳ Make certain that the danger zone can be viewed from the start button and that the entire process can be observed by a responsible person. ↳ Before and during the override, ensure that there are no people in the danger zone. ↳ Override does not work if EDM is in **Error mode** or **Operator mode Error**.

If a valid override sequence with a LOW-HIGH-LOW transition (min. 350 ms and max. 3 s; longer or shorter pulses ignored) occurs at input I2, the release output becomes HIGH as if the muting conditions were fulfilled.

The override sequence is performed by input I9.

↳ Press input I9 (at least 100 ms)

↳ Release input I9

↳ Press input I9 and hold for 5 seconds, then **Override** is activated

↳ Outputs Q1 and Q2 are set to ON until the input I9 is held (max. time for the override is 120 seconds).

3.5 Reactivation of muting

Reactivation of the bridging function is only possible after the system has been reset to the base state.

To do this, the following conditions must be satisfied:

- **Control 1** signal set to LOW potential
- **Control 2** signal set to LOW potential
- **Start 1 IN** signal set to HIGH potential
- **Start 2 IN** signal set to HIGH potential

Muting can then be restarted by activating the two control signals.

4 Electrical connection and commissioning

Before you begin with the installation and commissioning of the *TMC 66 Legacy*, please observe the following notes:

- Make sure that the system is disconnected from the power supply.
- Make sure that no one is in the danger zone.
- Check the danger zone and take measures to prevent persons from entering (e.g. erect warning signs, set up cordons or similar).

NOTE
Laying cables! ↳ Lay all connection cables and signal lines within the electrical installation space or permanently in cable ducts. ↳ Lay the cables and lines so that they are protected against external damages. ↳ For further information: see EN ISO 13849-2, Table D.4.

Step 1: Replace the defective TMC 66 with the MSI 420.TMC-03

The table below shows the wiring for the existing signals.

Table 4.1: Rewiring TMC 66 to MSI 420.TMC-03

TMC 66	MSI 420.TMC-03	Designation	Comment
1	T1	SLS activation	
2	I1	SLS input	
3	I2	Start/activation input	see chapter 3 "Description of functions"
4	I3	Contactor monitoring input	Only relevant in operating mode 3 and 4
5	IQ1	"Error" signal output	
6	IQ2	"Safety on" signal output	
7	IQ3	Start 1 active	Muting sensor transmitter
8	I4	Start 1 edge	Muting sensor receiver
9	IQ4	Start 2 active	Muting sensor transmitter
10	I5	Start 2 edge	Muting sensor receiver
11	A1/B1/B2	+ 24 V	
12	A2	GND	
13	I6	Control 1	
14	I7	Control 2	
15	Q3	Indicator light 1	Muting lamp not monitored by the MSI 420.TMC-03
16	n.c.	Indicator light 2	MSI 420.TMC-03 provides only one output for the muting lamp
n.c.	Q4	"Error indication" signal output	see chapter 5 "Diagnostics messages"
17/18	Q1	Safety output 1	Semiconductor output (PNP)

TMC 66	MSI 420.TMC-03	Designation	Comment
19/20	Q2	Safety output 2	Semiconductor output (PNP)
n.c.	I9	Override	see chapter 3.4 "Override - Starting system with occupied protective sensor"
n.c.	I10	Selection of operating mode	see table 4.2 "Selection of operating mode"
n.c.	I11	Selection of operating mode	see table 4.2 "Selection of operating mode"
n.c.	I12	Selection of operating mode	see table 4.2 "Selection of operating mode"

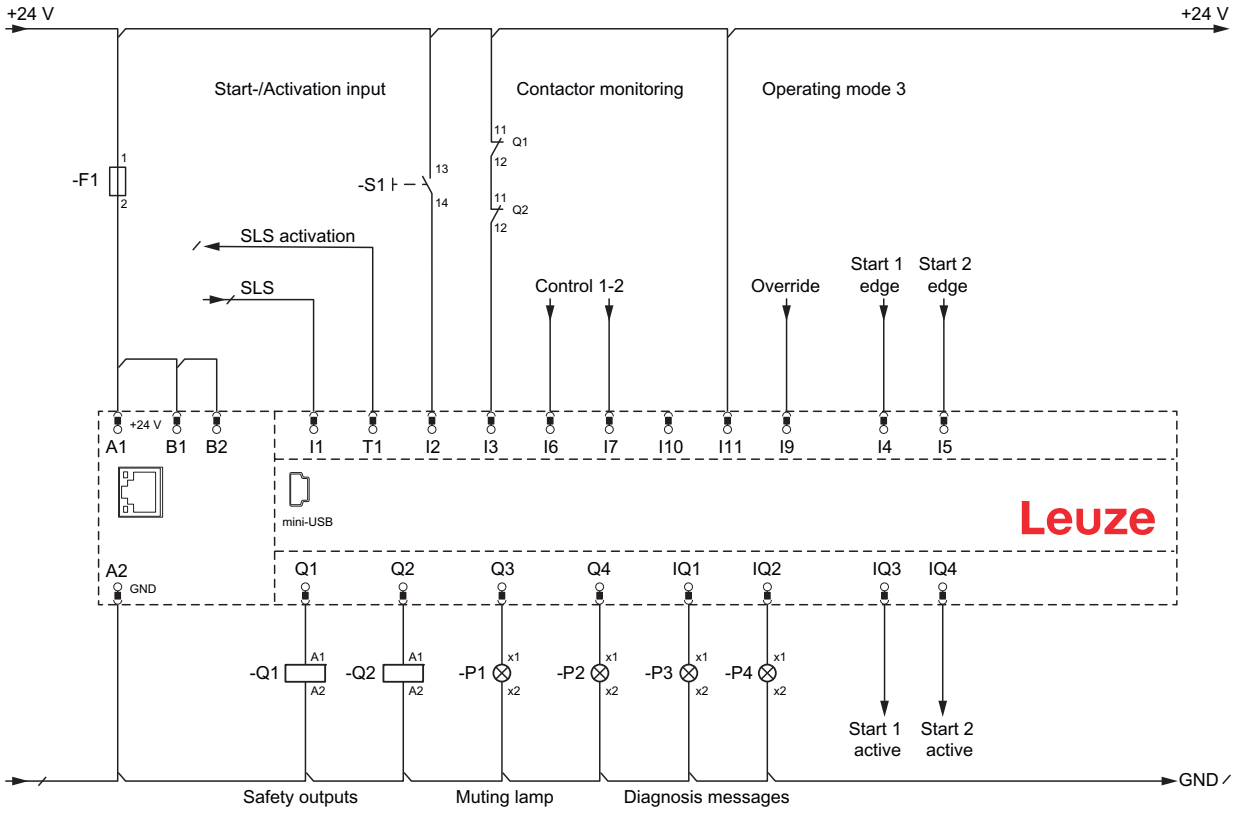


Figure 4.1: Connection example for MSI 420.TMC-03 with start/restart interlock and contactor monitoring (operating mode 3)

Step 2: Selection of operating mode

To select the desired operating mode, install the corresponding wire bridges as specified in table 4.2. In the delivery state, no wire bridges are installed, hence operating mode 1 is configured. The selected operating mode must be validated by a competent person. If, for example, operating mode 3 has been selected, it must be checked whether both the start/restart interlock and the contactor monitoring are active in the application.

Table 4.2: Selection of operating mode

	MSI 420.TMC-03	Selection
Operating mode 1	Start/restart interlock active, contactor monitoring inactive	I10 (n.c), I11 (n.c), I12 (n.c)
Operating mode 2	Start/restart interlock inactive, contactor monitoring inactive	I10 ->24V
Operating mode 3	Start/restart interlock active, contactor monitoring active	I11 ->24V
Operating mode 4	Start/restart interlock inactive, contactor monitoring active	I12 ->24V

Step 3: Check alignment of muting sensors and protective sensor

Before the supply voltage is applied for the first time, it should be checked whether the muting sensors and the protective sensor are aligned in accordance with the product-specific operating instructions and not concealed by other objects.

Step 4: Apply supply voltage

Switch on the supply voltage of the MSI 420.TMC-03 and wait until the control has performed the self test (approx. 5 seconds). The following indicators now light up on the front of the MSI 400:

PWR/EC LED: green
The voltage supply is between 16.8 V and 30 V.

MS LED: green
The control is started.

CV LED: orange
The project on the control has been verified. The control will start automatically.

If the device is not in this state, table 5.1 „Diagnostics messages“ in this document or the operating instructions supplied with MSI 420 (chapter 3.2 "Interfaces and display elements") can be used for the purpose of error diagnosis.

Step 5: Make ready for operation

The start/activation input (I2) functions in two ways in the operating modes with/without start/restart interlock:

- In the operating mode with start/restart interlock, the MSI 420.TMC-03 expects two signal changes as the switch-on signal (sensor function). A fault in the start button, e.g. caused by welded contacts, is reliably detected by the MSI 420.TMC-03.
- In the operating mode without start/restart interlock, the input functions as an activation input and must be supplied with power via the 24 V voltage supply. As soon as a HIGH active signal is present at I2 and the protective field is free, the safety outputs are closed.

Step 6: Check operation of MSI 420.TMC-03

After successful commissioning, operation of the device can be fully tested. To do this, proceed as follows:

- Interrupt the protective sensor; the safety outputs Q1/Q2 must change their status display. From green (active) to red (inactive). The downstream contactors are switched off and the dangerous movement is stopped.
- Align the muting sensors (inputs I4/I5 must be green/active)
- Connect the two control inputs (I6/I7 must be green/active)
- Allow the transport material to pass through the protective sensors as described in chapter 3.3.

The following checklist should also be observed. It will provide assistance when performing the general check on a safety-relevant system.

Table 4.3: Checklist

Check:	Yes	No	n. a. not applicable
Does the configured operating mode meet the requirements of the application and has it been validated by a competent person?			
Is the safety sensor operated acc. to the specific environmental conditions that are to be maintained?			
Are safety sensor, connection cables, connectors, protection caps and command devices undamaged and without any sign of manipulation?			
Does the safety sensor satisfy the required safety level (PL, SIL, category)?			
Are the safety-related switching outputs (OSSDs) integrated in the downstream machine control acc. to the required safety category?			
Are switching elements that are controlled by the safety sensor monitored according to the required safety level (PL, SIL, category) (e.g., contactors through EDM)?			
Are all points of operation near the safety sensor accessible only through the protective field of the safety sensor?			
Are the necessary additional protective devices in the immediate surroundings (e.g., safety guard) properly mounted and secured against tampering?			
If it is possible to be present undetected between the safety sensor and point of operation: is an assigned start/restart interlock functional?			
Is the command device for unlocking the start/restart interlock mounted in such a way that it cannot be reached from within the danger zone and so that the complete danger zone can be seen from the installation location?			
Has the maximum stopping time of the machine been measured and documented?			
Is the required safety distance maintained?			
Does interruption with a test object intended for this purpose cause the dangerous movement(s) to stop?			
Is the safety sensor effective during the entire dangerous movement(s)?			
Is the safety sensor effective in all relevant operating modes of the machine?			

Check:	Yes	No	n. a. not applicable
Is start-up of dangerous movements reliably prevented if an active light beam or the protective field is interrupted with a test object intended for this purpose?			
Was the sensor detection capacity successfully tested?			
Were distances to reflective surfaces taken into account during configuration and no reflection bypasses subsequently detected?			
Are notices for regular testing of the safety sensor legible to the operator and are they located in a highly visible location?			
Are changes to the safety function (e.g. SPG, blanking, protective field switchover) not easy to achieve through tampering?			
Have steps been taken to ensure that whenever changes are made to the configuration of the safety control, the safety functions undergo a complete check?			
Has the protective function been checked in accordance with the testing instructions given in this documentation? In particular: a) Function check on the command devices, sensors and actuators connected to the safety control b) Testing of all shutdown paths			
Are settings that could result in an unsafe state possible only by means of key, password or tool?			
Are there incentives that pose stimulus for tampering?			
Were the operators instructed prior to starting work?			

If errors occur during the test/function check, please contact our hotline (see chapter 7 "Service and support").

5 Diagnostics messages

Potential errors are indicated in two ways. Errors associated with the connected signals are indicated by flashing of the LED assigned to the input. The LED stops flashing as soon as the error has been corrected.

In addition, three outputs of the MSI 420.TMC-03 are used for error diagnostics.

Safety on (output IQ2) - The signal output is active whenever the safety outputs of the MSI 420.TMC-03 are carrying a HIGH signal.

Error (output IQ1) - The signal output is active whenever an error is present.

Error indication (output Q4) - The signal output provides information on the specific error.

Table 5.1: Diagnostics messages

Safety on (IQ2)	Error (IQ1)	Error indication (Q4)	Status	Measures
Active	Inactive	Inactive	Normal operation	None
Inactive	Active	Active 1x every 5 sec	EDM error	Check operation and wear of the output contactors.
Inactive	Active	Active 2x every 5 sec	Error during testing of Start 1	Check that muting sensor 1 is connected and operating correctly.
Inactive	Active	Active 3x every 5 sec	Error during testing of Start 2	Check that muting sensor 2 is connected and operating correctly.
Inactive	Active	Active 4x every 5 sec	Muting error	An error occurred during the muting process. Check the muting sensors. In order to reset a muting error, all muting sensors must become LOW again and the OSSD signal of the ESPE must be HIGH.
Inactive	Active	Inactive	SLS interrupted	SLS must be reset by reset signal.

6 Maintenance

The following section provides information on regular checks and the replacement of MSI 400 modules.

Do not attempt to remove, repair or modify the MSI 400 modules. This can lead to the loss of the safety function(s). Furthermore, all warranty claims against Leuze electronic GmbH will be void.

6.1 Regular checks on protective device by competent persons

- Check the system in accordance with the nationally applicable regulations and within the time periods specified therein. This is intended to reveal any changes made to the machine or any tampering with the protective device after initial commissioning.
- Each safety application must be checked at a time interval of your choosing. The effectiveness of the protective devices must be checked by authorized persons who have been instructed to do so.
- If changes have been made to the machine or protective device or the safety control has been modified or repaired, then check the system again according to the checklist shown above (see table 4.3).
- Perform inspections on a regular or daily basis in order to keep the MSI 400 modules in an optimum operating condition.
- Check that the MSI 400 modules are implemented such that all technical data for the device is complied with.
- Check the mounting conditions and whether the wiring of the MSI 400 modules has been installed correctly.
- In order to ensure the reliability of the safety functions, verify at regular intervals that they meet the requirements of the application and comply with all regulations and standards (e.g. regular checks).

7 Service and support

Service hotline

You can find the contact information for the hotline in your country on our website *www.leuze.com* under **Contact and support**.

Repair service and returns

Defective devices are repaired in our service centers competently and quickly. We offer you an extensive service packet to keep any system downtimes to a minimum. Our service center requires the following information:

- Your customer number
- Product description or part description
- Serial number or batch number
- Reason for requesting support together with a description

Please register the merchandise concerned. Simply register return of the merchandise on our website *www.leuze.com* under **Contact and support > Repair service and returns**.

To ensure quick and easy processing of your request, we will send you a returns order with the returns address in digital form.