

# MOSAIC

## MODULAR SAFETY INTEGRATED CONTROLLER

The MOSAIC system is a unique safety controller that's modular, expandable and configurable for managing all safety functions of a single machine or an entire plant. It offers cost reductions with minimal wiring.



### COMMS



#### **MOSAIC-MBEI**

Industrial Fieldbus:  
EtherNet/IP.

#### **MOSAIC-MBEM**

Industrial Fieldbus:  
ModBus TCP/IP.

### DIGITAL INPUTS



#### **MOSAIC-MI8**

8 digital inputs and four test outputs.

#### **MOSAIC-MI16**

16 digital inputs and 4 test outputs.

#### **MOSAIC-MI12T8**

12 digital inputs, 8 test outputs.

### I/O EXPANSION UNIT



#### **MOSAIC-MI8O2**

8 digital inputs, 2 EDM/  
RST inputs, 4 test outputs,  
2 OSSD pairs, and 2 status  
outputs.

#### **MOSAIC-MI8O4**

8 digital inputs, 4 test outputs,  
4 individual or 2 pair OSSD outputs, and  
4 configurable I/O.

### SPEED MONITORING

#### **MOSAIC-MV0**

2 prox switch inputs.

#### **MOSAIC-MV1T**

1 TTL encoder and  
2 prox switch inputs.

#### **MOSAIC-MV1H**

1 HTL encoder and 2 prox switch inputs.

#### **MOSAIC-MV1S**

1 SIN/COS encoder and 2 prox switch inputs.

#### **MOSAIC-MV2T**

2 TTL encoder and 2 prox switch inputs.

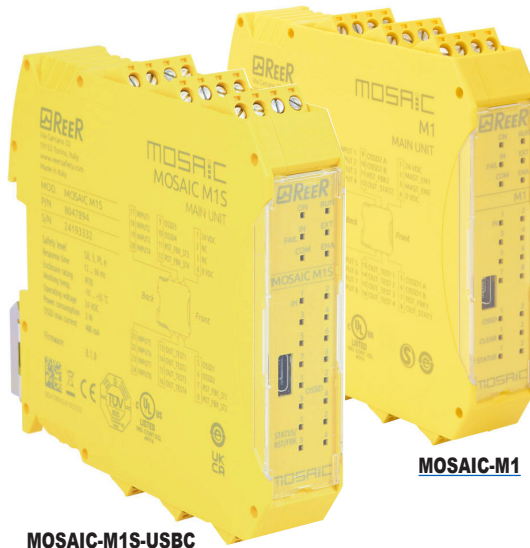
#### **MOSAIC-MV2H**

2 HTL encoder and 2 prox switch inputs.

#### **MOSAIC-MV2S**

2 SIN/COS encoder and 2 prox switch inputs.

# MOSAIC SYSTEM



**MOSAIC-M1**

**MOSAIC-M1S-USBC**

MOSAIC M1, M1S, or M1S-USBC controller units are able to interface with up to 14 individual expansion modules (up to a maximum of 4 of any one module type).

Controller units can also be used in a stand-alone configuration.

Blue-highlighted modules work only with the **MOSAIC-M1S** or **MOSAIC-M1S-USBC** controller.

### SAFETY RELAYS

#### **MOSAIC-MR2**

2 relays – 2 NO + 1 NC connectable to 1 OSSD pair + 1 NC contact for external device monitoring. 2 safety relays with guided contacts. Screw contacts.



#### **MOSAIC-MR4**

4 relays – 4 NO + 2 NC connectable to 2 OSSD pair + 2 NC contacts for external device monitoring. 4 safety relays with guided contacts. Screw contacts.

These extension relays can connect to the outputs on the MOSAIC M1, M1S, or to any of the output cards

### DIGITAL OUTPUTS

#### **MOSAIC-MO2**

2 EDM/RST inputs, 2 OSSD pairs and 2 status outputs.



#### **MOSAIC-MO4**

4 EDM/RST inputs, 4 OSSD pairs and 4 status outputs.

#### **MOSAIC-MOR4**

4 single-channel outputs or 2 dual-channel outputs.

#### **MOSAIC-MOR4S8**

4 single-channel outputs or 2 dual-channel outputs with 8 status outputs.

#### **MOSAIC-MO4L**

4 individual or 2 pair OSSD outputs, and 4 configurable I/O.

### ANALOG INPUTS

#### **MOSAIC-MA4**

4 analog inputs.



### STATUS OUTPUTS

#### **MOSAIC-MOS8**

8 status outputs.

#### **MOSAIC-MOS16**

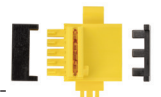
16 status outputs.



### ACCESSORIES

#### **MOSAIC-MSC-C**

Safety communication bus connector and terminal end caps. Required to connect additional module to MOSAIC-M1, MOSAIC-M1S, or MOSAIC-M1S-USBC.



#### **MOSAIC-MCM, MOSAIC-MCMB**

A proprietary removable memory card that can be used to save MOSAIC configuration data for subsequent transfer to a new device without using a PC.



# ReeR MOSAIC-M1S Enhanced Safety Controller

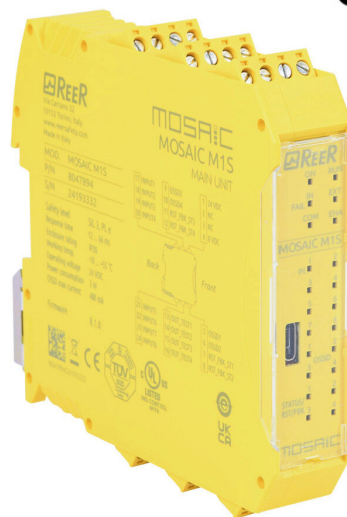


The ReeR MOSAIC (MODular Safety Integrated Controller) makes it easy to manage safety systems and sensors. It is modular, expandable, and configurable for managing all safety functions of a single machine or an entire plant. The main MOSAIC-M1S or MOSAIC-M1S-USBC unit is able to control a variety of expansion modules.

MOSAIC-MSC-C five-way ReeR proprietary buss is required to expand the controller. Buss connector not included.

## Features

- Able to stand alone or to control other expansion modules
- Eight digital inputs
- Four configurable I/O for start/restart interlock, external device monitoring (EDM) and output status monitoring
- Four individual or two pair output switching signal device (OSSD) signals
- Four test outputs
- Compact 22.5 mm housing suitable for DIN rail mounting
- All functions are configured through the MOSAIC graphical Safety Designer Software via a built-in USB 2.0 connector. Cable sold separately.



**MOSAIC-M1S-USBC**

### Safety Data per EN 13849-1

|                                 |        |
|---------------------------------|--------|
| <b>Category</b>                 | 4      |
| <b>Performance level</b>        | e      |
| <b>MTTF<sub>d</sub> (years)</b> | 30-100 |
| <b>DC<sub>avg</sub></b>         | High   |

### Safety Data per IEC/EN 62061, IEC/EN 61508

|                                |                     |
|--------------------------------|---------------------|
| <b>SIL CL</b>                  | 3                   |
| <b>SIL</b>                     | 3                   |
| <b>HFT</b>                     | 1                   |
| <b>DC<sub>avg</sub></b>        | High                |
| <b>SFF</b>                     | 99.8%               |
| <b>PFH<sub>d</sub> (t-20a)</b> | 1.44e <sup>-8</sup> |

Safety data is dependent on circuit architecture. See manual for further details.



| MOSAIC Modular Safety Integrated Controller |          |         |                         |                                                            |                                |                                           |                  |                     |
|---------------------------------------------|----------|---------|-------------------------|------------------------------------------------------------|--------------------------------|-------------------------------------------|------------------|---------------------|
| Part Number                                 | Price    | Voltage | Inputs                  | Outputs                                                    | Configurable I/O               | Connection                                | Programming Port | Drawing             |
| <u><b>MOSAIC-M1S</b></u>                    | Retired  | 24VDC   | 8 digital safety inputs | 4 individual or 2 pair OSSD safety outputs, 4 test outputs | 4 terminals: FBK_RST or STATUS | Removable terminal blocks, screw contacts | USB-B mini       | <a href="#">PDF</a> |
| <u><b>MOSAIC-M1S-USBC</b></u>               | \$463.00 |         |                         |                                                            |                                |                                           | USB-C            | <a href="#">PDF</a> |

## MOSAIC-M1S Specifications

| General Specifications                    |                                                                                                                                                                  |
|-------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Operating Temperature</b>              | -10°C to +55°C [14°F to 131°F]                                                                                                                                   |
| <b>Storage Temperature</b>                | -20°C to +85°C [-4°F to 185°F]                                                                                                                                   |
| <b>Altitude</b>                           | 2000m (max)                                                                                                                                                      |
| <b>Vibration Resistance</b>               | Tested to IEC 60068-2-6                                                                                                                                          |
| <b>Degree of Protection</b>               | IP 20                                                                                                                                                            |
| <b>Housing</b>                            | Polyamide                                                                                                                                                        |
| <b>Weight</b>                             | 260g [9.17 oz]                                                                                                                                                   |
| <b>Agency Approvals and Standard</b>      | cULus, CE, TÜV                                                                                                                                                   |
| <b>Terminal Designation per EN 50 005</b> | AWG 12-30 solid/stranded. Use 60/75°C copper (Cu) conductor only.                                                                                                |
| <b>Wire Fixing</b>                        | Screw pluggable terminal blocks. Terminal tightening torque 5-7 lb•in (0.6-0.7 N•m).                                                                             |
| <b>USB Connection</b>                     | Type B mini-USB connector                                                                                                                                        |
| Specifications                            |                                                                                                                                                                  |
| <b>Nominal Voltage</b>                    | 24VDC                                                                                                                                                            |
| <b>Voltage Range</b>                      | ± 20%                                                                                                                                                            |
| <b>Maximum Consumption</b>                | 3W                                                                                                                                                               |
| <b>Digital Inputs</b>                     | 8 PNP active high                                                                                                                                                |
| <b>Test Outputs</b>                       | 4 test outputs to monitor short circuits                                                                                                                         |
| <b>OSSD Outputs</b>                       | 4 individual or 2 pair solid state safety outputs – PNP active high 400ma @ 24VDC max                                                                            |
| <b>Configurable I/O</b>                   | 4 terminals to be used for I/O – Input: EDM, feedback, reset, restart – Output: status monitoring                                                                |
| Expansion                                 |                                                                                                                                                                  |
| <b>Minimum Number of Modules</b>          | 1 (MOSAIC-M1S used as stand-alone module)<br>(8 inputs, up to 4 EDM/RST, 4 safety outputs, up to 4 status outputs)                                               |
| <b>Maximum Number of Modules</b>          | 15 (MOSAIC-M1S plus 14 expansion modules)<br>(128 inputs, 16 EDM/RST, 32 safety outputs, 48 status outputs)<br>No more than 4 expansion modules of the same type |

Note: See product manual for complete details.

Note: To obtain the most current agency approval information, see the Agency Approval Checklist section on the specific part number's web page.

# Electrical Connections To MOSAIC-M1S



- Wire size range: AWG 12-30 (solid/stranded) (UL).
- Use 60/75°C copper (Cu) conductor only.
- Turn off power before making connections.
- The supply voltage must be 24VDC  $\pm$  20% (PELV, in compliance with the standard EN 60204-1 (Chapter 6.4).
- Do not use the MOSAIC to supply power to external devices.
- The same ground connection (0VDC) must be used for all system components.
- Separate power supplies are recommended for the safety module and for other electrical power equipment (electric motors, inverters, frequency converters) or other sources of disturbance.
- Cables used for connections of longer than 50m [164ft] must have a cross-section of at least 1mm<sup>2</sup> (AWG16).

| MOSAIC-M1S and MOSAIC-M1S-USBC Module Connections |                         |        |                               |
|---------------------------------------------------|-------------------------|--------|-------------------------------|
| Terminal                                          | Signal                  | Type   | Description                   |
| 1                                                 | 24VDC                   | –      | 24VDC power supply            |
| 2                                                 | Not connected           | –      | –                             |
| 3                                                 | Not connected           | –      | –                             |
| 4                                                 | 0VDC                    | –      | 0VDC power supply             |
| 5                                                 | OSSD1                   | Output | Static safety output 1        |
| 6                                                 | OSSD2                   | Output | Static safety output 2        |
| 7                                                 | RESTART_FBK1 or STATUS1 | Input  | Feedback/Restart 1            |
|                                                   |                         | Output | SIL 1 / PLc                   |
| 8                                                 | RESTART_FBK2 or STATUS2 | Input  | Feedback/Restart 2            |
|                                                   |                         | Output | SIL 1 / PLc                   |
| 9                                                 | OSSD3                   | Output | Static safety output 3        |
| 10                                                | OSSD4                   | Output | Static safety output 4        |
| 11                                                | RESTART_FBK3 or STATUS3 | Input  | Feedback/Restart 3            |
|                                                   |                         | Output | SIL 1 / PLc                   |
| 12                                                | RESTART_FBK4 or STATUS4 | Input  | Feedback/Restart 4            |
|                                                   |                         | Output | SIL 1 / PLc                   |
| 13                                                | OUT_TEST1               | Output | Short circuit detected output |
| 14                                                | OUT_TEST2               | Output | Short circuit detected output |
| 15                                                | OUT_TEST3               | Output | Short circuit detected output |
| 16                                                | OUT_TEST4               | Output | Short circuit detected output |
| 17                                                | INPUT1                  | Input  | Digital input 1               |
| 18                                                | INPUT2                  | Input  | Digital input 2               |
| 19                                                | INPUT3                  | Input  | Digital input 3               |
| 20                                                | INPUT4                  | Input  | Digital input 4               |
| 21                                                | INPUT5                  | Input  | Digital input 5               |
| 22                                                | INPUT6                  | Input  | Digital input 6               |
| 23                                                | INPUT7                  | Input  | Digital input 7               |
| 24                                                | INPUT8                  | Input  | Digital input 8               |

Please see ReeR MOSAIC Supplemental Manual for basic wiring examples.

# ReeR MOSAIC Accessories

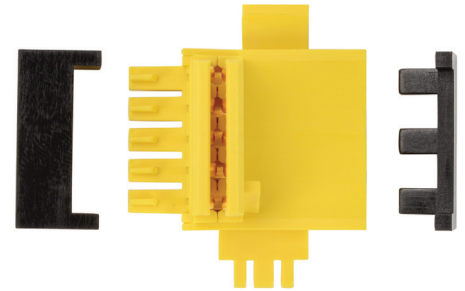


## ReeR MOSAIC-MSC-C Connector

The ReeR MOSAIC (MODular SAFety Integrated Controller) MSC-C Safety Communication Connector with terminal end caps (MSCPC) permits communication between various system units. Required to connect any additional cards to the [MOSAIC-M1](#), [MOSAIC-M1S](#), or [MOSAIC-M1S-USBC](#).

### Features

- 5-way connector for communication among MOSAIC modules
- Comes in the box with all expansion modules and is only needed for the [MOSAIC-M1](#), [MOSAIC-M1S](#), or [MOSAIC-M1S-USBC](#) unit



**MOSAIC-MSC-C**

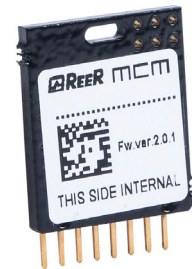
| MOSAIC-MSC-C Connector       |         |                                                                                                                    |
|------------------------------|---------|--------------------------------------------------------------------------------------------------------------------|
| Part Number                  | Price   | Description                                                                                                        |
| <a href="#">MOSAIC-MSC-C</a> | \$16.00 | Safety communication connector with terminal end caps (MSCPC). Permits communication between various system units. |

Note: See product manual for complete details.

Note: To obtain the most current agency approval information, see the Agency Approval Checklist section on the specific part number's web page.

## ReeR MOSAIC-MCM Memory Card

The ReeR MOSAIC (MODular SAFety Integrated Controller) MCM Memory Card is a proprietary removable memory card that can be used to save MOSAIC configuration data for subsequent transfer to a new device without using a PC.



**MOSAIC-MCMB**

| MOSAIC-MCM Memory Card      |         |                   |                                                                                                                                                  |
|-----------------------------|---------|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|
| Part Number                 | Price   | For Use With      | Description                                                                                                                                      |
| <a href="#">MOSAIC-MCM</a>  | \$43.50 | MOSAIC-M1 and M1S | Proprietary removable memory card that can be used to save MOSAIC configuration data for subsequent transfer to a new device without using a PC. |
| <a href="#">MOSAIC-MCMB</a> | \$34.00 | MOSAIC-M1S-USBC   |                                                                                                                                                  |

Note: See product manual for complete details.

Note: To obtain the most current agency approval information, see the Agency Approval Checklist section on the specific part number's web page.

## ReeR Programming Cable

The ReeR MOSAIC (MODular SAFety Integrated Controller) programming cable is an interconnection cable used to connect the [MOSAIC-M1](#), [MOSAIC-M1S](#), or [MOSAIC-M1S-USBC](#) to a PC for programming with the MSD configuration software.



**MOSAIC-CSU**

| MOSAIC CSU Cable            |         |             |             |                       |                          |
|-----------------------------|---------|-------------|-------------|-----------------------|--------------------------|
| Part Number                 | Price   | Connector A | Connector B | Cable Length (ft [m]) | For Use With             |
| <a href="#">MOSAIC-CSU</a>  | \$32.50 | USB-A       | USB-B Mini  | 5.91 [1.8]            | MOSAIC-M1 and MOSAIC-M1S |
| <a href="#">USB-CBL-AC6</a> | \$7.75  |             | USB-C       | 6 [1.83]              | MOSAIC-M1S-USBC          |

Note: See product manual for complete details.

# Safety Products



*Warning: Safety products sold by AutomationDirect are Safety components only. The purchaser/installer is solely responsible for the application of these components and ensuring all necessary steps have been taken to assure each application and use meets all performance and applicable safety requirements and/or local, national and/or international safety codes as required by the application. AutomationDirect cannot certify that our products, used solely or in conjunction with other AutomationDirect or other vendors' products, will assure safety for any application. Any person using or applying any products sold by AutomationDirect is responsible for learning the safety requirements for their individual application and applying them, and therefore assumes all risks, and accepts full and complete responsibility, for the selection and suitability of the product for their respective application.*

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