














MOSAIC M1S MASTER MODULE

Important safety instructions

 This safety alert symbol indicates a potential **personal safety hazard**. Failure to comply with instructions bearing this symbol could pose a very serious risk to personnel.

 This symbol indicates an important instruction.

-  The MOSAIC is built to the following safety levels: SIL 3, SILCL 3, PL e, Cat. 4, Type 4 in accordance with the applicable standards. However, the definitive SIL and PL of the application will depend on the number of safety components, their parameters and the connections that are made, as per the risk analysis.
-  Read the "Applicable Standards" section carefully.
-  Perform an in-depth risk analysis to determine the appropriate safety level for your specific application, on the basis of all the applicable standards.
-  Programming/configuration of the Mosaic is the sole responsibility of the installer or user.
-  The device must be programmed/configured in accordance with the application-specific risk analysis and all the applicable standards.
-  Once you have programmed/configured and installed the Mosaic and all the relative devices, run a complete application safety test (see "TESTING the system", in the manual included on the CDROM attached).
-  Always test the complete system whenever new safety components are added (see "TESTING the system", in the manual included on the CDROM attached).
-  Reer is not responsible for these operations or any risks in connection therewith.
-  Reference should be made to the handbooks and the relative product and/or application standards to ensure correct use of devices connected to the Mosaic within the specific application.
-  The ambient temperature in the place where the system is installed must be compatible with the operating temperature parameters stated on the product label and in the specifications.
-  For all matters concerning safety, if necessary, contact your country's competent safety authorities or the competent trade association.

 This information is about the usage and parametrisation of Mosaic. Reer takes no responsibility for the solutions adopted by customers concerning the circuits, the electrical diagrams and the chosen configuration parameters of their application. The implemented circuits and electrical diagrams and the choice of the system configuration parameter values, including those of Mosaic, are fully under the responsibility of the user.

Overview

- MOSAIC is a modular safety controller. It consists of a master unit (M1S), which can be configured using the MSD graphic interface, and a number of expansion units connected to the M1S via the proprietary MSC bus.
- For the mechanical fastening follow the instructions in the manual included on the CDROM attached.

Electrical connections

- Install safety units in an enclosure with a protection class of at least IP54.
- The supply voltage to the units must be 24Vdc \pm 20% (PELV, in compliance with the standard EN 60204-1 (Chapter 6.4)).
- Do not use the MOSAIC to supply external devices.
- The same ground connection (0VDC) must be used for all system components.

Instructions concerning connection cables.

- Wire size range: AWG 12÷30, (solid/stranded) (UL).
- Use 60/75°C copper (Cu) conductor only.
- We recommend the use of separate power supplies 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 must have a cross-section of at least 1mm² (AWG16).

CONNECTIONS				
TERMINAL	SIGNAL	TYPE	DESCRIPTION	OPERATION
1	24VDC	-	24VDC power supply	-
2	NC	-	-	-
3	NC	-	-	-
4	0VDC	-	0VDC power supply	-
5	OSSD1_A	Output	Solid State Safety Output 1	PNP active high
6	OSSD1_B	Output	Solid State Safety Output 2	PNP active high
7	RESTART_FBK1/ STATUS1	Input/ Output	Feedback/Restart 1	Input according to EN 61131-2
			Programmable signal output	Programmable signal output
8	RESTART_FBK2/ STATUS2	Input/ Output	Feedback/Restart 2	Input according to EN 61131-2
			Programmable signal output	Programmable signal output
9	OSSD2_A	Output	Solid State Safety Output 3	PNP active high
10	OSSD2_B	Output	Solid State Safety Output 4	PNP active high
11	RESTART_FBK3/ STATUS3	Input/ Output	Feedback/Restart 3	Input according to EN 61131-2
			Programmable signal output	Programmable signal output
12	RESTART_FBK4/ STATUS4	Input/ Output	Feedback/Restart 4	Input according to EN 61131-2
			Programmable signal output	Programmable signal output
13	OUT_TEST1	Output	Short circuit detected output	PNP active high
14	OUT_TEST2	Output	Short circuit detected output	PNP active high
15	OUT_TEST3	Output	Short circuit detected output	PNP active high
16	OUT_TEST4	Output	Short circuit detected output	PNP active high
17	INPUT1	Input	Digital input 1	Input according to EN 61131-2
18	INPUT2	Input	Digital input 2	Input according to EN 61131-2
19	INPUT3	Input	Digital input 3	Input according to EN 61131-2
20	INPUT4	Input	Digital input 4	Input according to EN 61131-2
21	INPUT5	Input	Digital input 5	Input according to EN 61131-2
22	INPUT6	Input	Digital input 6	Input according to EN 61131-2
23	INPUT7	Input	Digital input 7	Input according to EN 61131-2
24	INPUT8	Input	Digital input 8	Input according to EN 61131-2

INSTALLING THE SOFTWARE

PC HARDWARE requirements

- RAM: \geq 256 MB
(adequate to run *Windows XP SP3 + Framework 3.5*)
- Hard disk: \geq 300Mbyte of free space
- USB connector: 1.1 or 2.0
- CD-ROM drive

PC SOFTWARE requirements

- Windows XP with Service Pack 3 installed (or higher OS).

➔ Microsoft Framework 3.5 (or higher) must be installed on the PC

INPUTS

USB Connector

Mosaic Master M1S comes with a USB 2.0 connector for the connection to a PC that is hosting the configuration software (MSD Safety Mosaic Designer).

Mosaic Configuration Memory (MCM)

A backup memory, called MCM (optional) can be installed in the MOSAIC master M1S and used to save the SW configuration parameters.

The MCM is written each time a new project is sent from the PC to the M1S.

RESTART_FBK

The RESTART_FBK signal input allows the MOSAIC to verify an EDM (External Device Monitoring) feedback signal (series of contacts) from the external contactors, and to monitor Manual/Automatic operation (See all the possible connections in the manual included on the CDROM attached).

- ⚠ If the application requires it, the response time of the external contactors must be verified by an additional device.
- ⚠ The RESTART command must be installed outside the danger area in a position where the danger area and the entire work area concerned are clearly visible.
- ⚠ It must not be possible to reach the control from inside the danger area.

OUTPUTS

OUT STATUS

The OUT STATUS signal (pin 7-8-11-12) is a programmable digital output that can indicate the status of:

- An input.
- An output.
- A node of the logic diagram designed using the MSD.

➔ The STATUS signal outputs are shared with the feedback/restart inputs of the OSSDs. To use them, the corresponding OSSD must be used with automatic reset without external feedback monitoring. For example, to use the STATUS1 output (Terminal 7), you must program OSSD1 (by means of the MSD software) with automatic reset without K feedback monitoring.

OUT TEST

The OUT TEST signals must be used to monitor the presence of short-circuits or overloads on the inputs.

OSSD

The OSSD (static semiconductor safety outputs) are short circuit protected. They supply:

- In the ON condition: $U_v - 0,75V \div U_v$ (where U_v is $24V \pm 20\%$)
- In the OFF condition: $0V \div 2V$ r.m.s.

The maximum load of $400mA@24V$ corresponds to a minimum resistive load of 60Ω . The maximum capacitive load is $0.82\mu F$. The maximum inductive load is $30mH$.



CHECKLIST AFTER INSTALLATION

The MOSAIC system is able to detect the faults that occurs in each own module. Anyway to have the system perfect operation perform the following checks at start up and at least every one year:

1. *Operate a complete system TEST (see "TESTING the system", in the manual included on the CDROM attached).*
2. *Verify that all the cables are correctly inserted and the terminal blocks well screwed.*
3. *Verify that all the leds (indicators) light on correctly.*
4. *Verify the positioning of all the sensors connected to MOSAIC.*
5. *Verify the correct fixing of MOSAIC to the Omega rail.*
6. *Verify that all the external indicators (lamps) work properly.*

TECHNICAL FEATURES

PFH_d (IEC 61508:2010)	1,34E-08
Rated voltage	24VDC ± 20%
Dissipated power	3W max
Digital INPUTS (No./description)	8 / PNP active high according to EN 61131-2
INPUT FBK/RESTART (No./description)	4 / EDM control / possible Automatic or Manual operation with RESTART button
Test OUTPUT (No./description)	4 / to check for short-circuits – overloads
Signaling OUTPUTS (No./description)	4 / programmable – PNP active high
OSSD (No./description)	4 single / solid state safety outputs PNP active high 400mA@24VDC max Interface type C class 3 (ZVEI CB24I)
SLOT for MCM card	Available
Connection to PC	USB 2.0 (Hi Speed) – Max cable length: 3m
Connection to slave units	via MSC 5-way ReeR proprietary bus

-  In order to ensure the correct operation of the M1S module, careful and full compliance with all the rules, instructions and warnings stated in the MOSAIC manual included in the MSD CD are essential.
-  ReeR s.p.a. declines all responsibility for events arising from non-compliance with all or part of the aforesaid instructions.



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