ReeR

MOSAIC

Modular Safety Integrated Controller

Catalog n.14

INTRODUCTION

Mosaic is a modular, configurable safety controller for protecting machines or plants. Mosaic is capable of monitoring several safety sensors and commands, such as safety light curtains, laser scanners, photocells, mechanical switches, mats, emergency stops, two-hand controls, concentrating management of these in a single, flexible device. Thanks to MCT modules, parts of the Mosaic System can be decentralized in remote cabinets with respect to the master unit M1.

Mosaic offers numerous advantages compared with safety solutions based on traditional components, such as relay type safety modules, as it:
- Reduces the number of components and therefore footprint and wiring
- Promotes faster electrical cabinet construction
- Affords the necessary logical configuration using a single, simple programming software, facilitating modifications by machine designers
- Makes it possible to set up tamper-proof safety systems
- Simplifies machine maintenance through the MCM memory card, which can be used to transfer the configuration program to a new Mosaic in just a few simple steps.

Mosaic is certified to the highest safety levels established by industrial safety standards: SIL 3, SILCL 3, PL e, Cat. 4.

SYSTEM DESCRIPTION

Mosaic comprises a master unit (M1) configurable via the MSD (Mosaic Safety Designer) graphic interface – provided with each master unit at no extra cost – and a maximum of 14 expansion units connectable to M1 via the MSC proprietary bus.

The **M1 master unit**, which can also be used in stand-alone mode, features 8 safety inputs and 2 separate programmable dual channel solid state outputs. Available expansion units include: MI8O2 with inputs and outputs, MI8, MI12T8 and MI16 with inputs only, MO2 and MO4 with outputs only, MR2 and MR4 with guided contact safety relays.

Expansion units are also available that permit connection for diagnostics and data communication purposes to the most common industrial Fieldbus systems: MBP (Profibus DP), MBC (CANopen), MBD (DeviceNET), MBEI (Ethernet IP), MBEC (EtherCAT), MBEP (PROFINET), MBU (Universal Serial Bus).

The Mosaic system can be equipped with a maximum of 128 inputs and 16 OSSD pairs. The master module and expansion units communicate via the 5-way MSC (Mosaic Safety Communication) bus (ReeR proprietary), physically located on the back of each module.

Through the **MCT** bus-transfer it is possible to remote the I/O expantion units.

The **Mosaic Safety Designer (MSD)** software, installed on a PC, can be used to create complex logical conditions using logical operators and safety functions, such as muting, timer, counters, memories, etc. via an easy, intuitive graphic configuration interface.

Configuration data are transferred to the M1 unit via a USB link. An application held on M1 can be saved on the MCM proprietary memory card (optional) for fast transfer of the configuration data to other M1 modules.

Safety Level: SIL 3 – SILCL 3 – PL e – Cat. 4 – Type 4

Complies with the following Directives and standards**:**
- 2006/42/EC "Machinery Directive"
- 2004/108/EC "Electromagnetic Compatibility (EMC)"
- 2006/95/EC "Low Voltage Directive (LVD)"
- CEI EN 61131-2: "Programmable Controllers, part 2: Equipment requirements and tests"
- EN ISO 13849-1: "Safety of machinery: Safety-related parts of control systems – Part 1: General principles for design"
- EN ISO 13849-2: "Safety of machinery: Safety-related parts of control systems – Part 2: Validation"
- EN 954-1: "Safety of machinery – Safety-related parts of control systems – General principles for design"
- IEC/EN 61496-1: "Safety of machinery: Electro-Sensitive Protection Equipment, Part 1: General requirements and tests"
- IEC/EN 62061 "Safety of machinery - Functional safety of safety-related electrical, electronic and programmable electronic control systems"
- IEC 61508-1: "Functional safety of electrical, electronic and programmable electronic safety-related systems – Part 1: General requirements"
- IEC 61508-2: "Functional safety of electrical, electronic and programmable electronic safety-related systems – Part 2: Requirements for electrical, electronic and programmable electronic safety-related systems"
- IEC 61508-3: " Functional safety of electrical, electronic and programmable electronic safety-related systems – Part 3: Software requirements"
- IEC 61784-3: "Industrial communication networks - Profiles - Part 3: Functional safety fieldbuses - General rules and profile definitions"
- IEC/TS 62046 Ed. 2 "Safety of machinery - Application of protective equipment to detect the presence of persons"
- UL (C+US) mark for USA and Canada.

Safety level:
SIL **3**
SIL 3 – SILCL 3 PL e – Cat. 4

Main system features
- Compact design: single module dimensions 22.5 x 99 x 114.5 mm
- Removable terminal blocks, screw contacts
- Can be used with the main safety sensors and commands
- Easy, intuitive graphic configuration software (MSD - Mosaic Safety Designer) provided with the M1 at no extra cost
- Wide range of software-configurable safety functions and logical operators
- Removable memory card for saving configuration data (MCM - Mosaic Configuration Memory)
- Communication between units on proprietary high-speed bus (MSC - Mosaic Safety Communication)
- Max. 14 expansion units in addition to the M1 Master, excluding relay modules
- Max. 128 inputs and 16 OSSD pairs
- Digital safety inputs, programmable individually or in pairs, with the possibility of monitoring via dedicated output signals
- Possibility of programming filters and delays for each single input
- Possibility of programming output activation and de-activation delays
- Possibility of independent control of pairs of outputs
- Programmable diagnostic output signals
- Simple diagnostics via front led signalling, configuration software, bus expansion modules

99 mm

22.5 mm

114.5 mm

108 mm
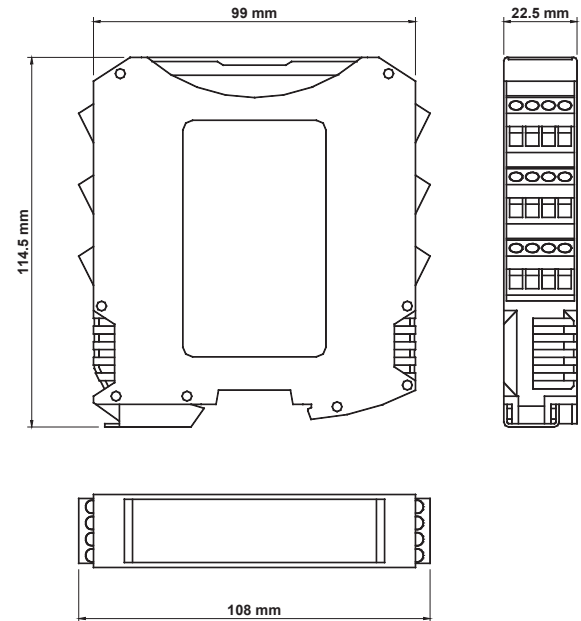
Description of Master module M1
- Main unit, also usable as a stand-alone device, able to control any other expansion units
- Configurable from PC via USB interface using MSD software
- 8 digital inputs
- 2 OSSD pairs with 400mA output current
- 4 test outputs for sensor monitoring
- 2 programmable digital signal outputs
- 2 inputs for Start/Restart interlock and external device monitoring (EDM)
- MCM configuration memory card slot
- LOG file containing the last 5 configuration modifications in chronological order, with date of modification
- 24 connectors in 22.5 mm
- Possible connection with ReeR MSC rear bus for connection with other expansion units

The Mosaic M1 master is equipped with a USB 2.0 serial bus for the connection to a PC on which the MSD (Mosaic Safety Designer) configuration software is held.

USB CONNECTOR

Mosaic Configuration Memory – MCM
Mosaic MCM is a proprietary removable memory card (optional) that can be used to save Mosaic configuration data for subsequent transfer to a new device without using a PC.
The configuration in the MCM overwrites any other configuration present on M1, replacing this with that contained in MCM.
This configuration replacement function can be disabled on M1 via the MSD (Mosaic Safety Designer) configuration software.
Overwrite operations are recorded in chronological order in the MOSAIC M1 LOG file.

2

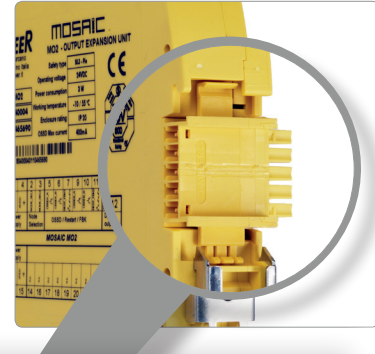# MOSAIC

Mosaic Safety Communication – MSC

Mosaic MSC permits communication between the various units through a proprietary 5-way high-speed bus.

The MSC modular connectors can be used to connect the various expansion units to M1.

The connectors are physically located on the back of each unit and are housed in the rail guide of the electrical cabinet

The M1 master unit does not include the MSC connector (not necessary if expansion units are not used). To connect the M1 to the first expansion unit, one MSC connector must be ordered.

Each expansion unit is supplied with its own MSC connector

Description of the expansion units

MOSAIC MI8O2

- I/O expansion unit
- 8 digital inputs
- 2 OSSD pairs with 400mA output current
- 4 test outputs for sensor monitoring
- 2 programmable digital signal outputs
- 2 inputs for Start/Restart interlock and external device monitoring (EDM)
- 24 terminal points in 22.5 mm
- Connectable to M1 via MSC proprietary bus

MOSAIC MI8 – MI16

- Input expansion unit:
    - MI8 − 8 digital inputs
    - MI16 − 16 digital inputs
- 4 test outputs for sensor monitoring
- 16/24 terminal points in 22.5 mm
- Connectable to M1 via MSC proprietary bus

MOSAIC MI12T8

- Input expansion unit: 12 digital inputs
- 8 test outputs for sensor monitoring: can control up to four 4-wire safety mats
- 24 terminal points in 22.5 mm
- Connectable to M1 via MSC proprietary bus

MOSAIC MO2 – MO4

- Output expansion units:
    - MO2 - 2 OSSD pairs
    - MO4 - 4 OSSD pairs
- Output current - 400mA
- 2/4 programmable digital signal outputs
- 2/4 inputs for Start/Restart interlock and external device monitoring (EDM)
- 16/24 terminal points in 22.5 mm
- Connectable to M1 via MSC proprietary bus

MOSAIC MR2 – MR4

■ Safety relay modules:
   - MR2 - 2 relays – 2 NO + 1 NC   Connectable to 1 OSSD pair
   - MR4 - 4 relays – 4 NO + 2 NC   Connectable to 2 independent OSSD pairs
■ 2/4 safety relays with 6A 250 VAC guided contacts
■ 1/2 NC contacts for external device monitoring (EDM)
■ 16/24 terminal points in 22.5 mm

Each NO contact is interrupted twice by 2 safety relays.
Mosaic MR2 and MR4 are passive units that can also be used separately from the Mosaic system.
The MR expansion units do not require MSC as they are wired directly to the selected OSSD.

MOSAIC MB

Expansion unit for the connection to the most common industrial Fieldbus systems for diagnostics
and data communication:
■ MBP   – **Profibus DP**
■ MBD   – **DeviceNET**
■ MBC   – **CANopen**
■ MBEI – **Ethernet IP**
■ MBEC – **EtherCAT**
■ MBEP – **PROFINET**
■ MBU   – **Universal Serial Bus**

The MB units can be connected to M1 via MSC proprietary bus.

MOSAIC MCT   NEW PRODUCT

Master Unit M1

■ Mosaic MSC-bus transfer
■ Easy connection by terminals
■ Up to 100 mt connection lenght
   (with RS 485 compatible shielded cable)
■ 16 terminals in 22.5 mm

4

TECHNICAL FEATURES

Module	M1	MI8O2	MI8 - MI16	MI12T8	MO2 - MO4	MR2 - MR4	MCT	MBx
Description	Programmable Master unit	I/O Expansion unit	Input Expansion units	Input Expansion units	Output Expansion units	Guided contact relay output Expansion units	Bus Transfer Expansion units	Expansion units for Bus*
USB	yes	-	-	-	-	-	-	yes
Housing for MCM	yes	-	-	-	-	-	-	-
Connection with MSC bus	yes	yes	yes	yes	yes	-	yes	yes
MSC connector provided	no	yes	yes	yes	yes	-	yes	yes
Safety Level	SIL 3 – SILCL 3 according to IEC 61508 - IEC 62061 PL e – Cat. 4 according to ISO 13849-1					-	-	-
Safety inputs	8	8	8 – 16	12	-	-	-	-
Safety outputs (OSSD)	2 pairs PNP - 400 mA	2 pairs PNP - 400 mA	-	-	2 – 4 pairs PNP 400 mA	-	-	-
Programmable signal outputs	2 PNP - 100 mA	2 PNP - 100 mA	-	-	2 – 4 PNP - 100 mA	-	-	-
Test outputs	4	4	4	8	-	-	-	-
Safety relay outputs	-	-	-	-	-	2 NO + 1 NC 6A 250 VAC 4 NO + 2 NC 6A 250 VAC	-	-
Start/Restart inputs and external device monitoring (EDM)	2	2	-	-	2 – 4	-	-	-
Led signalling	input/output status and fault diagnostics					output status	output status	diagnostics
Power supply (VDC)	24 ± 20%							
Electrical connections	removable terminal blocks, screw contacts							
Operating temperature (°C)	-10 to 55							
Storage temperature (°C)	- 20 to 85							
Protection rating	IP 20 for housing IP 2X for terminal block							
Fastening	rail fastening according to EN 50022-35 standard							
Dimensions h x w x d (mm)	99 x 22,5 x 114							

* Non-safety I/Os are provided using the Bus Expansion unit.

Mosaic Safety Designer - MSD

MSD (Mosaic Safety Designer) is the easy-to-use, intuitive MOSAIC configuration software.
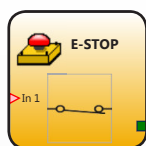
MSD main features:

- "Drag&Drop" configuration of all safety functions
- Functional validation of design included
- 2-level password management for the prevention of unauthorised accesses and therefore of incidental modifications or tampering with system configuration
- Configuration of parameters of function blocks, for example:
  - single- or double-channel NO or NC inputs
  - test outputs for monitoring of electro-mechanical sensors and photocells and related electrical connections
  - automatic, manual and monitored manual restart
  - concurrency control of two channels
  - contact anti-rebound filters and timers
  - start-up test
- Single or bi-directional 2 or 4 sensor muting function blocks
- Real-time monitoring of I/O status
- Runs on PC. Minimum system requirements:
  - RAM: 256 MB
  - Hard disk: free space > 100Mbyte
  - USB connector: 1.1 or 2.0
  - Windows XP SP3 / Vista / Windows 7
  - Microsoft Framework 3.5 (or Higher)
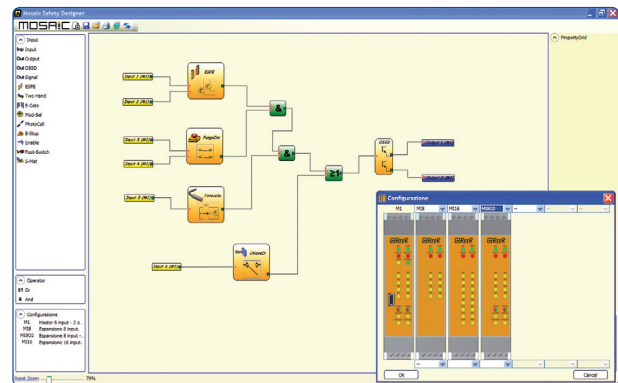
MAIN FUNCTION BLOCKS

INPUT OBJECTS

E STOP – EMERGENCY STOP	E-GATE – DEVICE FOR MOVABLE GUARDS
E-STOP checks the status of the inputs connected to an emergency stop device. Test outputs may be used. Configurable inputs for contacts: 1 NC or 2 NC.	E-GATE checks the status of the inputs connected to a device for movable guards, such as doors and gates. Test outputs may be used. Configurable inputs for contacts: 2 NC or 1 NC + 1 NO.
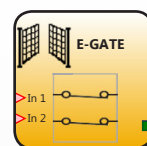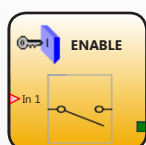
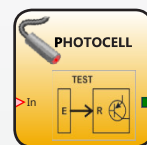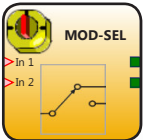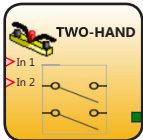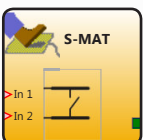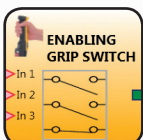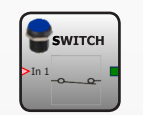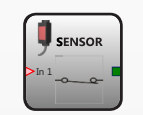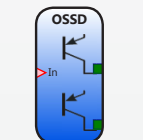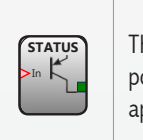| ENABLE – ENABLE KEY	ESPE - OPTO-ELECTRONIC SAFETY BARRIER OR SAFETY LASER SCANNER
ENABLE checks the status of the inputs connected to a key type manual control device. Test outputs may be used. Configurable inputs for contacts: 1 NO or 2 NO.	ESPE checks the status of the inputs of a safety light curtain or safety laser scanner with two self-monitored static outputs. Any device with OSSD output is accepted.
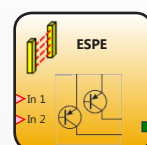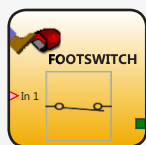
FOOTSWITCH	SAFETY PHOTOCELL
FOOTSWITCH checks the status of the inputs connected to a safety footswitch. Test outputs may be used. Configurable inputs for contacts: 1 NC or 1 NO or 2 NC or 1 NO + 1 NC.	PHOTOCELL checks the status of the inputs connected to one or to a series of two non self-monitored safety photocells. Test outputs must be used.

6

MOD-SEL – SAFETY SELECTOR		TWO-HAND SAFETY CONTROL	
	MOD-SEL checks the status of the inputs connected to a functioning mode selector (up to 4 inputs). Configurable inputs for two, three or four position selectors.		TWO-HAND checks the status of the inputs connected to a two-hand safety control device. Test outputs may be used Configurable inputs for contacts: 2 NC or 2 NO + 2 NC.
S-MAT – SAFETY MAT		**ENABLING GRIP SWITCH**	
	S-MAT checks the status of the inputs connected to a safety mat or safety edge. Test outputs must be used Cannot be used with 2-wire safety mats with terminal resistance.		ENABLING GRIP SWITCH checks the status of the inputs connected to an enabling (aka deadman) switch. Tests output may be used. Configurable inputs for contacts: 2 NO + 1 NC
SWITCH		**SENSOR**	
	SWITCH checks the status of the input connected to a non-safety button or switch A test output may be used.		SENSOR checks the status of the input connected to a non-safety sensor. A test output may be used.

OUTPUT OBJECTS

OSSD (safety outputs)		STATUS (programmable signal output)	
	OSSD is a pair of solid state PNP safety outputs. For each OSSD output, it is possible, via a dedicated input, to obtain manual or automatic reset and EDM control of external relays.		Through the STATUS programmable non safety output, it is possible to monitor any point of the logical scheme of the application.

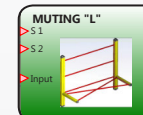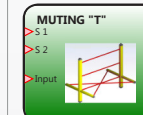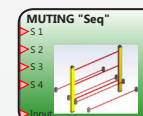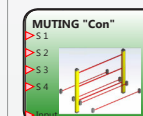# OPERATOR FUNCTION BLOKS

MUTING OPERATORS

The Muting function permits the automatic, temporary and safe disabling of the ESPE at certain stages in the machine cycle.
There are two main types of applications:
  1 - To permit access to the hazardous area by personnel during the non-hazardous part of the machine cycle.
  2 - To permit the passage of materials and prevent access by personnel. For example: palletiser applications.

The following parameters for the various Muting functions can be configured via the MSD:
- Sensors time: regulation of concurrency control of sensor activation.
- Timeout: the time, in seconds, within which the Muting cycle must be completed.
- Muting Enable: permits enabling of the Muting function only when necessary (for example, only when the conveyor is moving).
- Direction: in the case of bi-directional Muting, a compulsory direction of transit can be set.
- End Muting: in the case of 4-sensor Muting, it is possible to select whether Muting must end when the ESPE or the sensors are cleared.
- Blind Time: if muting is terminated by the ESPE, a muting closing delay can be activated. For example, in case of objects that protrude from the pallet.
- End of Muting time: in the case of "L" logic muting, this parameter can be used to set an end of muting time limit after the first sensor is cleared.
- Override function with 2 operating modes: a) manual action with hold to run; b) automatic with pulse command. In both cases the timeout can be parameterized.
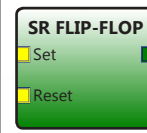
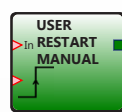| "L" logic 2-sensor muting for one-way transit, output only		"T" logic 2-sensor muting for bi-directional transit	
	"L" logic MUTING permits muting via 2 external sensors (S1 and S2). Muting is activated if the two sensors are interrupted at the same time. Clearing of the ESPE determines end of muting.		"T" logic MUTING permits muting via 2 external sensors (S1 and S2). Muting is activated if the two sensors are interrupted at the same time.
"T" logic 4-sensor "sequential" muting for bi-directional transit		**"T" logic 4-sensor "concurrent" muting for bi-directional transit**	
	"Sequential" logic MUTING permits muting via 4 external sensors (S1, S2, S3 and S4). The logical sequence of occupation of the sensors is checked.		"Concurrent" logic MUTING permits muting via 2 pairs of external sensors (S1, S2 and S3, S4). Concurrent occupation of the sensors of the single pairs is checked.

MEMORY OPERATORS

MEMORY type operators allow the user to memorise signals coming from the objects forming the application. The MEMORY operators are:
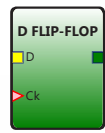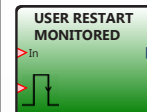
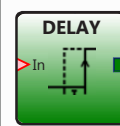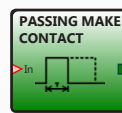| D FLIP FLOP		SR FLIP FLOP	
	D FLIP FLOP permits memorisation on the Q output of the status present at D input on the rising edge of the Ck input.		SR FLIP FLOP permits memorisation on the Q output of the status set via Set and Reset.
MANUAL USER RESTART		**MONITORED USER RESTART**	
	MANUAL USER RESTART makes it possible to memorise the Restart signal on a rising edge of the Res input.		MONITORED USER RESTART makes it possible to memorise the Restart signal on a rising edge followed by a falling edge of the Res input.

TIMER OPERATORS

TIMER type operators permit generation of a signal for the set time.
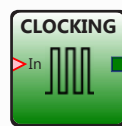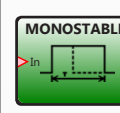
| CLOCKING		DELAY	
	CLOCKING outputs a signal with the set period if the input is high (1).		DELAY makes it possible to apply a delay to a signal, switching the output after the set time if the signal on the input changes status.
PASSING MAKE CONTACT		**MONOSTABLE**	
	PASSING MAKE CONTACT provides an output that replicates the signal present on the input. When the input signal remains high (1) for longer than the set time, the output goes low (0).		MONOSTABLE outputs a signal starting from the rising edge on the input, lasting for the set time.

COUNTER OPERATOR

The COUNTER type operator permits generation of a signal on reaching the set number.
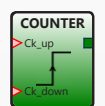
FUNCTIONS

SINGLE-BREAK/DOUBLE-BREAK function allows the cyclical operation to be performed through an interruption of the controlled field.
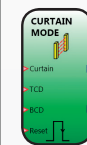
COUNTER		SINGLE-BREAK / DOUBLE-BREAK	
	The output will be high (1) if all the inputs are high (1).		SINGLE BREAK: the machine cycle restarts when the protected field has been interrupted and released once. DOUBLE BREAK: the machine cycle restarts when the protected field has been interrupted and released twice.

LOGICAL OPERATORS

AND		NAND	
	The output will be high (1) if all the inputs are high (1).		The output will be low (0) if all the inputs are high (1).
OR		**NOR**	
	The output will be high (1) if at least one of the inputs is high (1)		The output will be low (0) if at least one of the inputs is high (1).
XOR		**XNOR**	
	The output will be low (0) if all the inputs are in the same logical status.		The output will be high (1) if all the inputs are in the same logical status.
NOT		**MULTIPLEXER**	
	NOT inverts the logical status of the input.		MULTIPLEXER permits the transfer to the output of one of the input signals according to the corresponding active selection input.
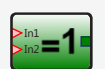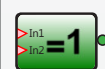
Application Example 1

SAFETY MANAGEMENT OF A PALLETISING SYSTEM WITH TWO ROBOTIC CELLS

The system comprises a conveyor that transports boxes to two robotic palletisation cells.

The machine is completely protected by a fence with three access gates (one for each robotic cell and one for the conveyor area) equipped with a safety switch. When the gate of the robotic cell is opened, the corresponding robot stops. When the conveyor area gate is opened the entire plant stops.

The completed pallets are collected by a forklift truck through the access gate which is protected by a safety light curtain. The related manual restart control is located close to each light curtain.
Occupation of each light curtain causes the related robot to stop.
Passing through a safety light curtain without stopping the working process is only permitted when the corresponding robot is stopped.

The system is equipped with four emergency push buttons.
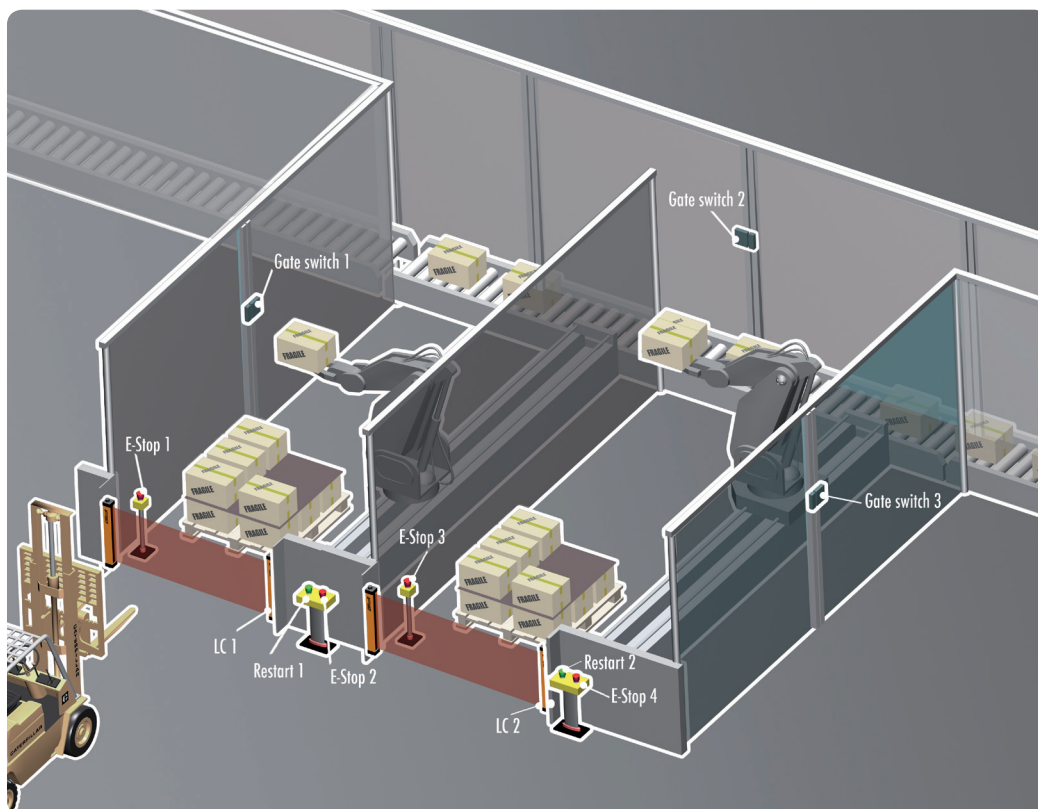
Total safety devices:
- 2 safety light curtains
- 2 restart buttons for the safety light curtains
- 3 safety gate switches
- 4 emergency push buttons

Using conventional components — safety relay modules — to build up the safety circuit, it would be necessary to use at least six safety modules, wired to each other in order to perform the required functions:
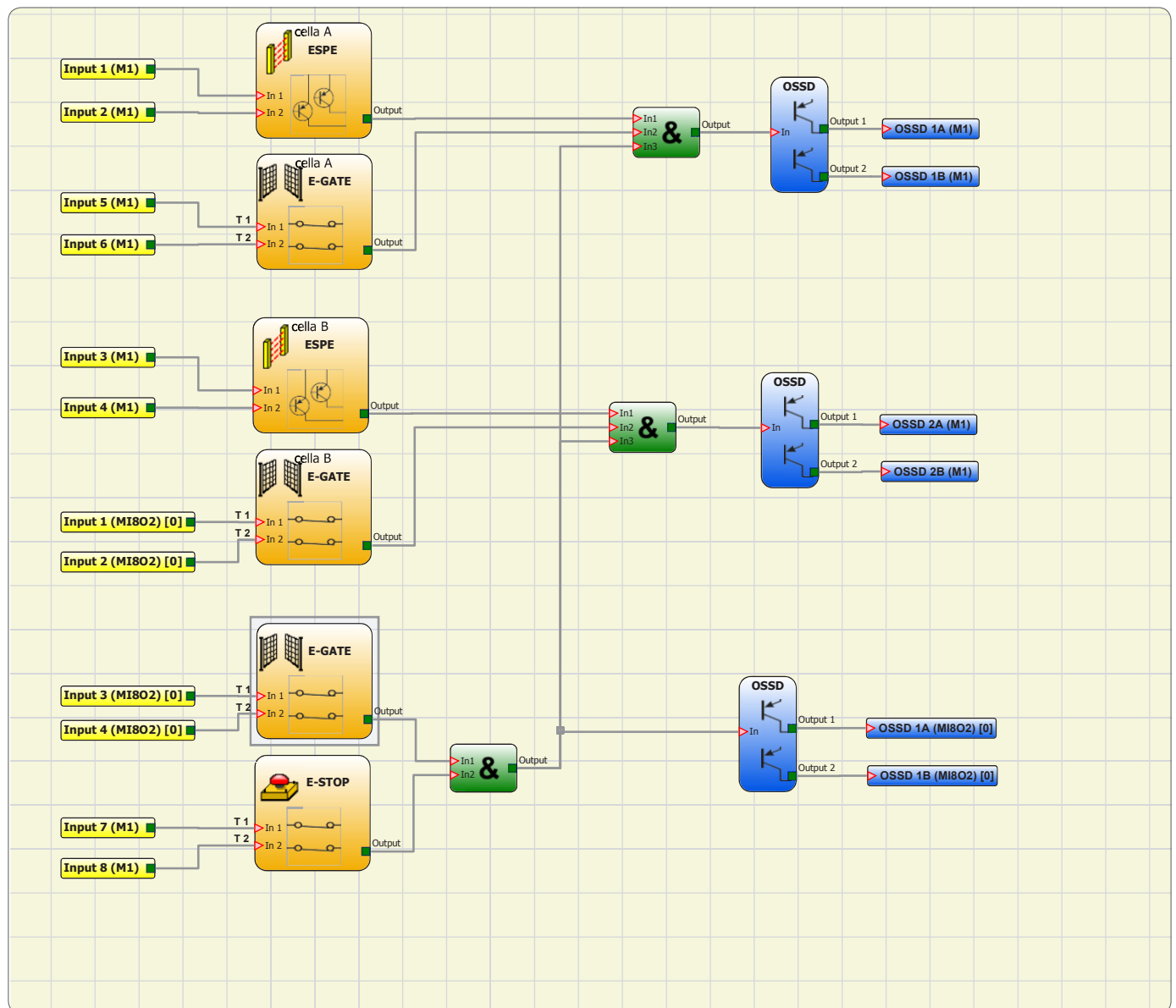- 2 safety relays for the light curtains
- 3 safety relays for the gate switches
- 1 safety relay for the emergency stop

SOLUTION WITH MOSAIC

Using Mosaic to build up the safety circuit, it is sufficient to use:
- 1 main unit M1
- 1 expansion unit MI8O2

which provide a total of: 16 inputs, 4 OSSD pairs, 8 test outputs, 4 signal outputs.

Application Example 2

SAFETY MANAGEMENT OF A MACHINING CENTRE WITH ALTERNATE LOAD / UNLOAD

The operator is required to load and unload the workpiece.

The machine is protected by two horizontal safety light curtains. In this case, each light curtain must be equipped with the muting function so as to permit access to the hazardous area by personnel during the non-hazardous part of the machine cycle.
Depending on the position of the tool, which is the hazardous element, one of the two light curtains (the one facing the tool working area) is active, while the other is muted so that the operator can load/unload the workpiece. The Muting condition of the two safety light curtains will then be inverted when the tool is required to operate on the opposite side of the machine.
The machine is completely protected by a fence with an access gate equipped with a safety switch. When the gate is opened, the machine stops.
The related manual restart control is located close to each safety light curtain.
The system is equipped with three emergency push buttons which, if activated, stop the machine.
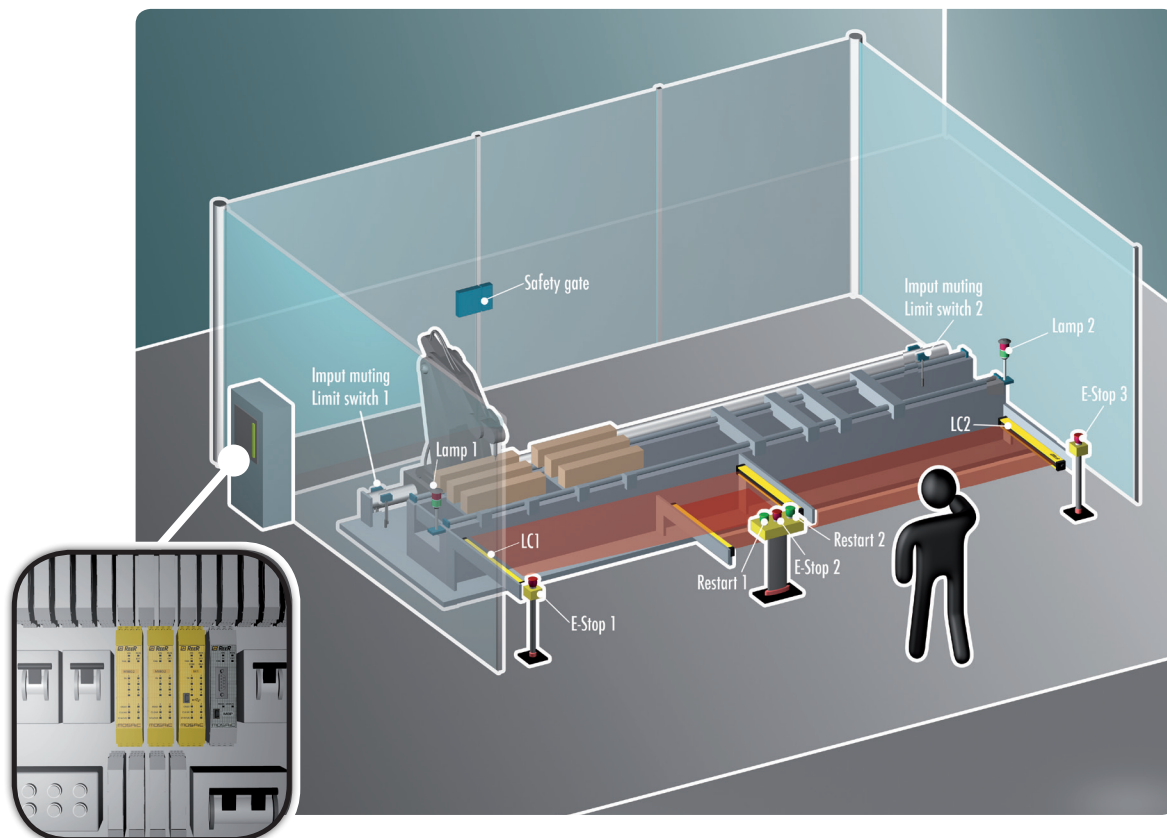
Total safety components:
- 2 safety light curtains
- 2 restart buttons for the safety light curtains
- 1 safety gate switch
- 3 emergency push buttons

Using conventional components – safety relay modules – to build up the safety circuit, four safety modules would be necessary:
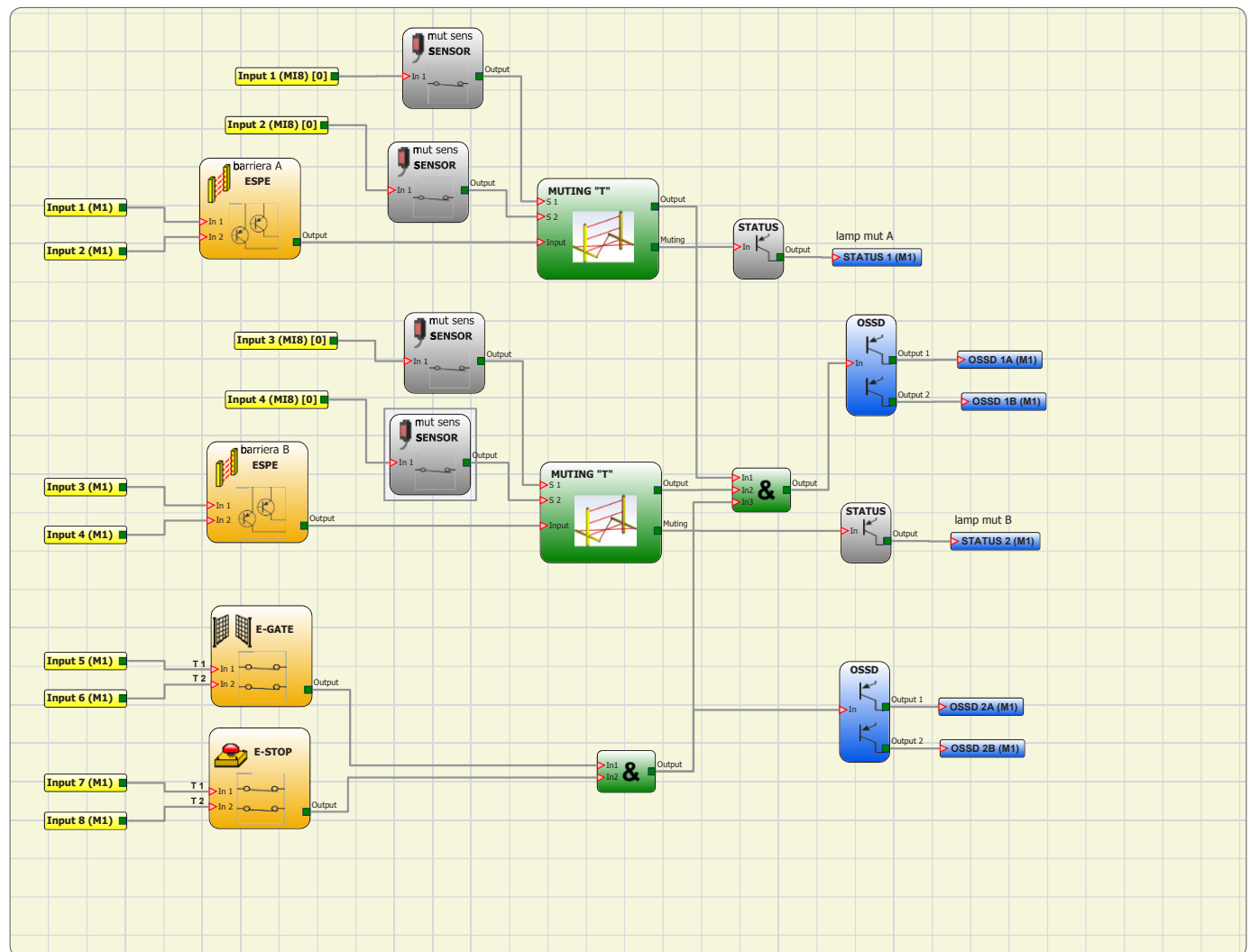- 2 safety modules for the safety light curtains with muting function
- 1 safety module for the gate switch
- 1 safety module for the emergency stop

SOLUTION WITH MOSAIC

Using Mosaic to build up the safety circuit, it is sufficient to use:
- 1 main unit M1
- 1 expansion unit MI8

which provide a total of: 16 inputs, 2 OSSD pairs, 8 test outputs, 2 signal outputs.

Comments:

Using MOSAIC, all the safety logic circuitry is implemented using the graphic interface and not by hard-wiring the outputs of the relay modules to each other. Correct functioning of the logic circuitry is checked during the design phase by the VALIDATION function and can be tested with the MONITOR function during installation. During the design phase, safety functions can be easily added or removed, for example adding other sensors or zones.

Start up tests can be inserted in order to detect any attempt of by-passing the safety system, which is always a possibility with traditional relay modules. The two-level password provides protection against unauthorised modification of system configuration.

Conclusions:

The two examples have been intentionally simplified. In reality, it is often necessary to implement a great number of functions such as delays, filters or more complex safety logics that combine signals from several sources. This would entail the use of numerous relay modules, thereby further complicating implementation of the logic circuitry, wiring and final cost. MOSAIC provides designers with all the logical safety functions and these can be immediately combined using only the MSD graphic interface.

MOSAIC

Model	Ordering code	Description
M1	1100000	Main unit 8 inputs - 2 OSSD pairs
MI8O2	1100010	Expansion unit 8 inputs - 2 OSSD pairs
MI8	1100020	Expansion unit 8 inputs
MI16	1100021	Expansion unit 16 inputs
MI12T8	1100022	Expansion unit 12 inputs
MO2	1100030	Expansion unit 2 OSSD pairs
MO4	1100031	Expansion unit 4 OSSD pairs
MR2	1100040	Safety relay module with 2 2NO+1NC guided contacts
MR4	1100041	Safety relay module with 4 2NO+1NC guided contacts
MBP	1100050	Expansion unit Profibus DP
MBD	1100051	Expansion unit DeviceNet
MBC	1100052	Expansion unit CANopen
MBEC	1100053	Expansion unit EtherCAT
MBEI	1100054	Expansion unit Ethernet IP
MBEP	1100055	Expansion unit PROFINET
MBU	1100056	Expansion unit Universal Serial Bus
MCT	1100057	Mosaic MSC - bus transfer unit
MCM	1100060	Mosaic Configuration Memory – Memory Card
MSC	1100061	Mosaic Safety Communication – Connector
CSU	1100062	USB A cable – mini B, length 1,8 m

ORDERING INFORMATION

A CD Rom containing the MSD configuration software. multi-language instruction manual and CE declaration of conformity is supplied with each M1 unit.

The M1 master unit does not include the MSC connector (not necessary if expansion units are not used). To connect the M1 to the first expansion unit, one MSC connector must be ordered.
Each expansion unit is supplied with its own MSC connector.

The MR2 and MR4 safety relay modules are only connected to the other units via hard-wiring and do not therefore require the MSC connector.

ꞰⱤ REER

REER S.p.A.

10153 TORINO – Italy
Via Carcano, 32
Tel. +39 011 2482215
Fax +39 011 859867

www.reer.it
info@reer.it

8946164