5 SYSTEM OPERATION

5

The QuadSafe RM-4 module receives ouputs from up to four safety devices and produces a single pair of OSSD outputs. The system consists of a DIN box with two rows of removable terminal blocks, and is wired to up to four safety devices.

5.1. OPERATING STATES

The Output Signal Switching Devices (OSSD A and OSSD B) are QuadSafe RM-4 components that connect to the machine control system. When a safety device detection zone is interrupted, the QuadSafe RM-4 OSSD responds by going to the off state.

The operating condition of an QuadSafe RM-4 safety device system is described in terms of states. The following operating states exist for the QuadSafe RM-4 module.

5.1.1 MACHINE RUN

The green MACHINE RUN indicator is lit, the OSSD outputs are on, and the AUXILIARY output responds in a manner consistent with its set operating mode. The protected machine is allowed to operate. Pressing and releasing the START button has no effect.

5.1.2 MACHINE STOP

The red MACHINE STOP indicator is lit, the OSSD outputs are off, and the AUXILIARY output is off. The protected machine is not allowed to operate. Pressing and releasing the START button has no effect.

5.1.3 INTERLOCK

The yellow INTERLOCK indicator is lit, and the Start Required Lamp output is on. The AUXILIARY output is off. The INTERLOCK state does not allow the protected machine to operate until the START button is pressed and released.

5.1.4 LOCKOUT (FAULT)

The yellow INTERLOCK indicator is blinking, and the Start Required lamp is blinking. The AUXILIARY output responds in a manner consistent with its set operating mode. This state does not allow the protected machine to operate until the fault is removed and the START button is pressed and released or power is cycled.

Table 5-1 QuadSafe RM-4 operating states and corresponding outputs

Output	Machine Run	Machine Stop	Interlock	Lockout
Green LED: Machine Run	On	Off	Off	Off
Red LED: Machine Stop	Off	On	On	On
Yellow LED: Interlock	Off	Off	On	Blinking
Start Required Lamp Output	Off	Off	On	Blinking
OSSD A Output	On	Off	Off	Off
OSSD B Output	On	Off	Off	Off
QuadSafe RM-4 Auxiliary Output:				
– Follow OSSD Indication Mode	On	Off	Off	Off
– Fault Indication Mode	Off	Off	Off	On

6 CABLE LENGTHS

6

6.1. INPUT SIGNAL CABLE LENGTHS

— Safety Device OSSD inputs: Use 20 AWG shielded wire with cable capacitance < 100 pF/ft., max length 60m (198 ft)

— MPCE Monitor input: Use 22 AWG unshielded wire, max length 10m (33 ft)

— Start input: Use 22 AWG unshielded wire, max length 60m (198 ft)

6.2. OUTPUT SIGNAL CABLE LENGTHS

— OSSD A and OSSD B outputs and return: Use 20 AWG unshielded wire with cable capacitance < 100 pF/ft., max length 10m (33 ft)

— QuadSafe RM-4 Auxiliary outputs (PNP Out and NPN Out): Use 20 AWG unshielded wire, max length 10m (33 ft)

— Start Required lamp output: Use 20 AWG unshielded wire, max length 60m (198 ft)

7 SAFETY DISTANCE

7

A

ENGLISH

WARNING! Never install a QuadSafe RM-4 safety device system without regard to the safety distance. If the safety devices connected to the QuadSafe RM-4 system are mounted too close to the point of operation hazard, the machine may not stop in time to prevent an operator injury.

A safety device system must be mounted far enough from the machine danger zone so the machine will stop before a hand or other body part reaches the hazardous area. This distance is called the safety distance. It is a calculated number based on a formula. See the user's manual for the 4600, 4700 or BeamSafe safety device for safe mounting distance formulas.

8 DIAGNOSTIC DISPLAY

The controller contains a two-digit diagnostic display, which presents numeric codes indicating both normal operation and system fault status. .

8.1. OPERATIONAL CODES

The operational codes are described in the table below

Code Displayed	System Status
00	Normal operation
01	Waiting for start input
88	Start operation power-up indication

8.2. DIP SWITCH FAULT CODES

The DIP switch fault codes are described in the table below.

Code Displayed	Fault Indicated
21	Wrong operation mode selection
22	Changed during operation
23	DIP switch settings not redundant
24	DIP switch hardware fault
25	Start switch did not toggle
27	More safety devices present than selected

8.3. OSSD CODES

The OSSD fault codes are described in the table below.

Code Displayed	Fault Indicated
31	OSSD outputs shorted together
32	OSSD A shorted to power
33	OSSD B shorted to power
34	OSSD A shorted to ground
35	OSSD B shorted to ground

8.4. MPCE CODES

The MPCE fault codes are described in the table below.

Code Displayed	Fault Indicated
41	Wrong before activation
42	Wrong before activation
43	Wrong on power on

8.5. INTERNAL QUADSAFE RM-4 FAULT CODE

The Internal Fault codes are described in the table below.

Code Displayed	Internal Fault
50	Consult STI at 888-510-4357

9 QUADSAFE RM-4 SPECIFICATIONS

9

9.1. SPECIFICATIONS

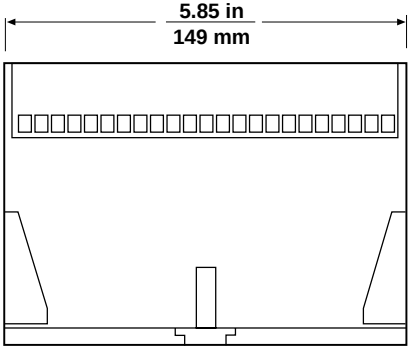
Safety Output:	Two PNP outputs each sourcing 625 mA @ 24 VDC
Auxiliary (non-safety) Output	– NPN output sinking 100 mA @ 24 VDC. – PNP sourcing 500 mA @ 24 VDC.
MPCE Monitor	50mA @ 24 VDC (QuadSafe RM-4 sourcing current)
Maximum Response Time	<1 millisecond
Power Input	24 VDC± 10% – Power for QuadSafe RM-4 only: 3 Watts – Power for QuadSafe RM-4 supplying four maximum length 4600 series safety light curtains and max. loads on outputs: 120 Watts (See Table 9-1*Power Supply Requirement* for more details)
Start Input	Start switch is a N/C SPST momentary contact switch providing contact closure to the QuadSafe RM-4 power return. – Current through switch with 1 light curtain connected to QuadSafe RM-4: 18mA @ 24 VDC – Current through switch with 4 light curtains connected to QuadSafe RM-4: 40mA @ 24VDC
Start Required Lamp Output	Current Sinking(NPN) output 500 mA max @ 24VDC
Temperature	0 to 55 degrees C (32 to 131° F)
Relative Humidity	95% maximum, non-condensing
Enclosure Rating	Controller: IP20
Indicator Lights	Machine Run, Machine Stop, Interlock/Fault two-digit diagnostic display, MPCE Fault, and light curtain OSSD clear LEDs.

Specifications subject to change without notice.

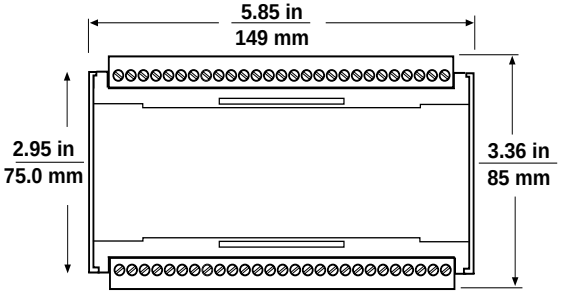
Table 9-1 Power Supply Requirement

Total System Components	Power Supply Requirements				
	50 watts	75 watts	100 watts	125 watts	150 watts
RM4/4 MS4600/ 2 Relays					X
RM4/3 MS4600/ 2 Relays				X	
RM4/2 MS4600/ 2 Relays			X		
RM4/1 MS4600/ 2 Relays		X			
RM4/1 MS4600/ 2 PLC Inputs	X				

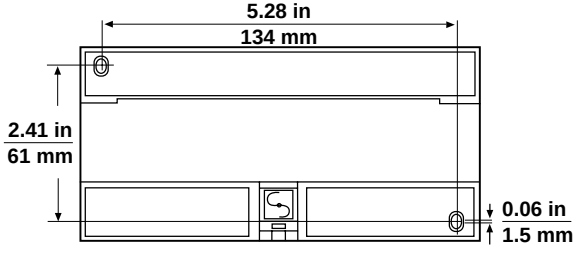
9.2. MECHANICAL DRAWING



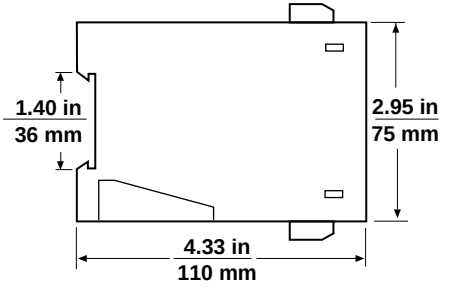
FRONT VIEW



TOP VIEW



BOTTOM VIEW



RIGHT SIDE VIEW