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VERITAS**

SAFETY INTEGRITY LEVEL - FUNCTIONAL SAFETY CERTIFICATE

IT FILE 18.IT.3069228.726 doc. n° TC2211/18/PC/pc rev. 00

Name and address of the manufacturer:	DECIMA SRL via Lisbona 32 Padova (PD) – Italy info@decima1948.com
Type(s) of product and component manufactured:	CURIO SYSTEM 4.0 – STAGE SYSTEM CONTROL
Hardware Version:	V1.0.0 dated 5 October 2018
Software Version:	V1.0.0 dated 5 October 2018
Safety Function:	Safety related functions for automated system for control of stage machines including cybersecurity of the system.
Product designation:	See Annex
Reference standards :	IEC 61508 part 1 : 2010 IEC 61508 part 2 : 2010 IEC 61508 part 3 : 2010 IEC 61508 part 4 : 2010 IEC 61508 part 5 : 2010 IEC 61508 part 6 : 2010 IEC 61508 part 7 : 2010 IEC TR 62443-3-1 : 2009 IEC 62443-3-3 : 2013
Safety Assessment Report:	CURIO_CERT_0061 REV 1.0 SAFETY ANALISIS REPORT 5 OCT 2018

RESULTS:

Systematic integrity:	SIL 3 capable Route 1S: hardware compliance with the requirements for the avoidance of systematic faults and the requirements for the control of systematic faults Route 3S (software only): compliance with the requirements of IEC 61508-3, 7.4.2.1;
Random Integrity:	SIL 3 vs SIL 2 (depending on intended safety function, See annex), Type B System assessed against: Route 2H.

PFD_{AVG} and architecture constraints must be verified for each application, as per IEC 61508 and IEC62061.



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Annex. Safety functions.

•SIF1_A:

Machine A - Shutdown of power contactors through a local circuit breaker installed on the machine

SIL claimed 2 (SIL reached 3)

•SIF1_B:

Machine A - Shutdown of brakes contactors through a local circuit breaker installed on the machine

SIL claimed 2 (SIL reached 3)

•SIF2_A:

Machine A - Shutdown of power contactors through limit switches installed on the machine

SIL claimed 2 (SIL reached 3)

•SIF2_B:

Machine A - Shutdown of brakes contactors through limit switches installed on the machine

SIL claimed 2 (SIL reached 3)

•SIF3_A:

Machine A – Shutdown of power contactors through 2 encoders installed on the machine

SIL claimed 3 (SIL reached 3)

•SIF3_B:

Machine A – Shutdown of brakes contactors through 2 encoders installed on the machine

SIL claimed 3 (SIL reached 3)

•SIF4_A:

Machine A – Shutdown of power contactors through a load cell installed on the machine

SIL claimed 3 (SIL reached 3)

•SIF4_B:

Machine A – Shutdown of brakes contactors through a load cell installed on the machine

SIL claimed 3 (SIL reached 3)

•SIF5_A:

Machine A – Shutdown of power contactors through safety edge with safety control unit (crushing system up)

SIL claimed 3 (SIL reached 3)

•SIF5_B:

Machine A – Shutdown of brakes contactors through safety edge with safety control unit (crushing system up)

SIL claimed 3 (SIL reached 3)

•SIF6_A:

Machine A – Shutdown of power contactors through safety edge with safety control unit (crushing system dn)

SIL claimed 3 (SIL reached 3)

•SIF6_B:

Machine A – Shutdown of brakes contactors through safety edge with safety control unit (crushing system dn)

SIL claimed 3 (SIL reached 3)



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Annex. Safety functions.

•SIF7_A:

Machine A – Shutdown of power contactors through safety switch with solenoid and separate actuator

SIL claimed 3 (SIL reached 3)

•SIF7_B:

Machine A – Shutdown of brakes contactors through safety switch with solenoid and separate actuator

SIL claimed 3 (SIL reached 3)

•SIF8_A:

Machine A – Shutdown of solenoid of door actuator through 2 encoders installed on the machine

SIL claimed 3 (SIL reached 3)

•SIF9_A:

Machine A – Shutdown of power contactors through a selector installed on LCP/ECP

SIL claimed 3 (SIL reached 3)

•SIF9_B:

Machine A – Shutdown of brakes contactors through a selector installed on LCP/ECP

SIL claimed 3 (SIL reached 3)

•SIF10_A:

Machine A – Shutdown of power contactors through an emergency pushbutton installed on LCP/ECP (mode LCP/ECP)

SIL claimed 2 (SIL reached 3)

•SIF10_B:

Machine A – Shutdown of brakes contactors through an emergency pushbutton installed on LCP/ECP (mode LCP/ECP)

SIL claimed 2 (SIL reached 3)

•SIF11_B:

Machine A – Shutdown of brakes contactors through the button “enable” installed on LCP/ECP (mode LCP/ECP)

SIL claimed 2 (SIL reached 3)

•SIF12_A:

Machine A – Shutdown of power contactors through a selector “Test brake 1” installed on LCP/ECP (mode LCP/ECP)

SIL claimed 3 (SIL reached 3)

•SIF12_B:

Machine A – Shutdown of brakes contactors through a selector “Test brake 1” installed on LCP/ECP (mode LCP/ECP)

SIL claimed 3 (SIL reached 3)

•SIF13_A:

Machine A – Shutdown of power contactors through a selector “Test brake 2” installed on LCP/ECP (mode LCP/ECP)

SIL claimed 3 (SIL reached 3)



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Annex. Safety functions.

•SIF13_B:

Machine A – Shutdown of brakes contactors through a selector “Test brake 2” installed on LCP/ECP (mode LCP/ECP)

SIL claimed 3 (SIL reached 3)

•SIF21_A:

Machine A – Shutdown of power contactors through a general emergency stop pushbutton installed on the console (in mode MCS)

SIL claimed 3 (SIL reached 3)

•SIF21_B:

Machine A – Shutdown of brakes contactors through a general emergency stop pushbutton installed on the console (in mode MCS)

SIL claimed 3 (SIL reached 3)

•SIF22_A:

Machine A – Shutdown of power contactors through a general emergency stop pushbutton (in mode MCS)

SIL claimed 3 (SIL reached 3)

•SIF22_B:

Machine A – Shutdown of brakes contactors through a general emergency stop pushbutton (in mode MCS)

SIL claimed 3 (SIL reached 3)

•SIF23_B:

Machine A – General shutdown of brakes contactors through a button “Enable” of a joystick installed on the console (in mode MCS)

SIL claimed 2 (SIL reached 2)

Applications restrictions

The unit must be properly designed into a Safety Instrumented Function as per manufacturer instructions and safety manual.

The safety integrity level (SIL) of the entire safety instrumented function (SIF) must be verified through calculation of PFD_{AVG} considering appropriate architectures, proof test interval, automatic diagnostics, repair time and specific failure rates of all products of the SIF. Each subsystem must be checked to assure compliance with minimum hardware fault tolerance (HFT) requirements.

Compiled by:

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Bureau Veritas Italia S.p.A.

Approved by:

Paolo Lega



This approval remains valid for 3 years on condition that no significant changes are made to the product, facility, production rate and its quality system.