



Italia

# COMPLIANCE

with IEC EN 61508

Certificate No.: C-IS 233809 – 01

CERTIFICATE OWNER: G.T. Attuatori S.r.l.  
Via Leonardo da Vinci, 3  
20090 Cusago (MI)

WE HEREWITH CONFIRM THAT  
THE PNEUMATIC ROTARY ACTUATORS  
(DOUBLE ACTING & SINGLE ACTING)  
MEET THE SIL REQUIREMENTS DETAILED IN THE ANNEXED TABLES  
FOR THE SAFETY FUNCTION:

*“Complete switching on demand (open to closed & closed to open) with correct torque as for technical data sheets, in low demand mode of operation”*

Examination result: The below described report was found to meet the standard defined requirements of the safety levels detailed in the following tables (T-IS-233809-01) according to IEC 61508 and 61511, under fulfillment of the conditions listed in the Report R-IS-233809-01-Rev.1 dated June 26<sup>th</sup> 2013 in its currently valid version, on which this Certificate is based

Examination parameters: Construction/Functional characteristics and reliability and availability parameters of the above pneumatic rotary actuators

Official Report No.: R-IS-233809 – 01-Rev.1

Expiry Date June 25<sup>th</sup> 2016

IT IS TO BE INTENDED THAT THE ABOVE OFFICIAL REPORT AND ITS ANNEXES ARE AN INTEGRAL PART OF THIS DOCUMENT  
THE PRESENT DOCUMENT SUBSTITUTES AND REPEALS THE DOCUMENTS C-IS 182065 – 01

Reference Standard IEC EN 61508:2010 Part 2, 4, 6, 7

Sesto San Giovanni, June 26<sup>th</sup> 2013

TÜV ITALIA Srl  
Industry Service Division  
Director  
  
Gennaro Oliva



ZERTIFIKAT ◆ CERTIFICATE ◆ CERTIFICADO ◆ CERTIFICAT ◆ 認証証書 ◆



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## SUMMARY TABLE T – IS – 233809 - 01

<i>E/EE/EP safety-related system (final element)</i>	Pneumatic rotary actuators double acting series produced by G.T. ATTUATORI					
<i>System type</i>	Type A					
<i>Size</i>	Class a (14 Nm < torque < 120 Nm)		Class b (120 Nm < torque < 690 Nm)		Class c (690 Nm < torque < 8000 Nm)	
<i>Safety Function Definition</i>	Complete switching on demand (open to closed & closed to open) with correct torque as for technical data sheets in low demand mode of operation					
<i>Max SIL</i>	SIL 2 with HFT = 0 (single actuator configuration)	SIL3 with HFT = 1 (redundant configuration)	SIL 2 with HFT = 0 (single actuator configuration)	SIL3 with HFT = 1 (redundant configuration)	SIL 2 with HFT = 0 (single actuator configuration)	SIL3 with HFT = 1 (redundant configuration)
<i>Additional requirements for the max SIL classification</i>	Execution of Partial Stroke Test with time interval not higher than 12 months and Full Proof Test with time interval not higher than 36 months		Execution of Partial Stroke Test with time interval not higher than 12 months and Full Proof Test with time interval not higher than 36 months		Execution of Partial Stroke Test with time interval not higher than 12 months and Full Proof Test with time interval not higher than 36 months	
$\lambda_{TOT}$	9,651E-09		1,207E-08		2,333E-07	
$\lambda_{SD}$	9,308E-09		1,164E-08		2,249E-07	
$\lambda_{SU}$	0,000E+00		0,000E+00		0,000E+00	
$\lambda_{DD}$	0,000E+00		0,000E+00		0,000E+00	
$\lambda_{DU}$	3,435E-10		4,298E-10		8,302E-09	
$\lambda_{DU,PST}$	2,850E-10		3,566E-10		6,889E-09	
$\lambda_{DU,FPT}$	5,847E-11		7,316E-11		1,413E-09	
$PFDD^0$	2,017E-06		2,523E-06		4,874E-05	
$\beta$ and $\beta_D$ factor	10%		10%		10%	
<i>MTTR</i>	0,08 h		0,10 h		0,30 h	
<i>Hardware Safety Integrity</i>	Route 2 <sub>II</sub>		Route 2 <sub>II</sub>		Route 2 <sub>II</sub>	
<i>Systematic Safety Integrity</i>	Route 2 <sub>S</sub>		Route 2 <sub>S</sub>		Route 2 <sub>S</sub>	
<b>Remarks</b>						
<p><i>PFDD</i> of reference calculated on the basis of a Full Functional Proof Test with time interval reported in the line Additional requirements for the max SIL classification for HFT = 0 configuration. This time intervals are considered by TÜV as reasonably consistent with the implementation of the equipment for safety related-applications, with reference to the overall range of results shown in the report, where other possible combination of time intervals adequate for a classification up to SIL 2 are reported. Note that, concerning Full Proof Tests, time intervals for higher than 36 months are considered by TÜV as not adequate and consistent for equipment for safety related applications.</p>						

Table 1 – SIL classification according to Standards IEC EN 61508:2010 (Chapters: 2, 4, 6, 7) for the pneumatic rotary actuators double acting produced by G.T. Attuatori S.r.l.



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NOTE : The present table is integral part of the Document: C-IS-233809-01

Date : June, 26<sup>th</sup> 2013



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## SUMMARY TABLE T – IS – 233809 - 01

<i>E/EE/EP safety-related system (final element)</i>	Pneumatic rotary actuators single acting series produced by G.T. ATTUATORI					
<i>System type</i>	Type A					
<i>Size</i>	<i>Class a (15 Nm &lt; torque &lt; 64 Nm)</i>	<i>Class b (64 Nm &lt; torque &lt; 344 Nm)</i>				<i>Class c (344 Nm &lt; torque &lt; 7860 Nm)</i>
<i>Safety Function Definition</i>	<i>Complete switching on demand (open to closed &amp; closed to open) with correct torque as for technical data sheets in low demand mode of operation</i>					
<i>Max SIL</i>	<b>SIL 2 with HFT = 0 (single actuator configuration)</b>	<b>SIL3 with HFT = 1 (redundant configuration)</b>	<b>SIL 2 with HFT = 0 (single actuator configuration)</b>	<b>SIL3 with HFT = 1 (redundant configuration)</b>	<b>SIL 2 with HFT = 0 (single actuator configuration)</b>	<b>SIL3 with HFT = 1 (redundant configuration)</b>
<i>Additional requirements for the max SIL classification</i>	<i>Execution of Partial Stroke Test with time interval not higher than 12 months and Full Proof Test with time interval not higher than 36 months</i>		<i>Execution of Partial Stroke Test with time interval not higher than 12 months and Full Proof Test with time interval not higher than 36 months</i>		<i>Execution of Partial Stroke Test with time interval not higher than 12 months and Full Proof Test with time interval not higher than 36 months</i>	
$\lambda_{TOT}$	2,584E-09		2,258E-08		5,809E-08	
$\lambda_{SD}$	2,492E-09		2,177E-08		5,602E-08	
$\lambda_{SU}$	0,000E+00		0,000E+00		0,000E+00	
$\lambda_{DD}$	0,000E+00		0,000E+00		0,000E+00	
$\lambda_{DU}$	9,199E-11		8,036E-10		2,067E-09	
$\lambda_{DU,PST}$	7,633E-11		6,668E-10		1,716E-09	
* $\lambda_{DU,FFT}$	1,566E-11		1,368E-10		3,519E-10	
$PFDF^{(1)}$	5,401E-07		4,718E-06		1,214E-05	
<b><math>\beta</math> and <math>\beta_D</math> factor</b>	10%		10%		10%	
<b>MTTR</b>	0,10 h		0,15 h		0,40 h	
<b>Hardware Safety Integrity</b>	Route 2 <sub>H</sub>		Route 2 <sub>H</sub>		Route 2 <sub>H</sub>	
<b>Systematic Safety Integrity</b>	Route 2 <sub>S</sub>		Route 2 <sub>S</sub>		Route 2 <sub>S</sub>	
<p><b>Remarks</b>  <i>PFDF of reference calculated on the basis of a Full Functional Proof Test with time interval reported in the line Additional requirements for the max SIL classification for HFT = 0 configuration. This time intervals are considered by TÜV as reasonably consistent with the implementation of the equipment for safety related-applications, with reference to the overall range of results shown in the report, where other possible combination of time intervals adequate for a classification up to SIL 2 are reported. Note that, concerning Full Proof Tests, time intervals for higher than 36 months are considered by TÜV as not adequate and consistent for equipment for safety related applications.</i></p>						

Table 2 – SIL classification according to Standards IEC EN 61508:2010 (Chapters: 2, 4, 6, 7) for the pneumatic rotary actuators single acting produced by G.T. Attuatori S.r.l.



T – IS – 233809 – 01

NOTE : The present table is integral part of the Document: C-IS-233809-01

Date : June, 26<sup>th</sup> 2013