



Italia

# COMPLIANCE

with IEC EN 61508:2010

Certificate No.: C-IS-236484-02

CERTIFICATE OWNER: PENTAIR VALVES L.T.D.  
Victoria Road, Leeds  
LS11 5UG. U.K.

WE HEREWITH CONFIRM THAT  
THE PREMIAIR TYPES PRA, MRA, MRP AND ARP ACTUATORS  
RACK & PINION DOUBLE ACTING & SPRING RETURN  
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-236484-02) according to IEC EN 61508:2010, under fulfillment of the conditions listed in the Report R-IS-236484-02-Rev.1 dated January 14<sup>th</sup> 2014 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 actuators

Official Report No.: R-IS-236484-02 Rev.1

Expiry Date January, 13<sup>th</sup> 2017

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 DOCUMENT C-IS-215477-02

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

Sesto San Giovanni, January, 14<sup>th</sup> 2014



TUV ITALIA SH  
Industry Service Division  
Director

Gennaro Oliva

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## SUMMARY TABLE T – IS – 236484 – 02

<i>E/EE/EP safety-related system (final element)</i>	Premiair types PRA, MRA, MRP and ARP actuators Rack & Pinion produced by Pentair Valves Ltd					
<i>System type</i>	Type A					
<i>Size</i>	002 - 025 Type		037- 088 Type		180 Type	
<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 Functional Proof Test with time interval not higher than 36 months		Execution of Partial Stroke Test with time interval not higher than 4 months AND Full Functional Proof Test with time interval not higher than 18 months		Execution of Partial Stroke Test with time interval not higher than 3 months AND Full Functional Proof Test with time interval not higher than 9 months	
$\lambda_{TOT}$	1,472E-08		4,854E-08		7,939E-07	
$\lambda_{SD}$	9,478E-09		3,126E-08		5,113E-07	
$\lambda_{SU}$	0,000E+00		0,000E+00		0,000E+00	
$\lambda_{DD}$	0,000E+00		0,000E+00		0,000E+00	
$\lambda_{DU}$	5,238E-09		1,728E-08		2,826E-07	
$\lambda_{DU,PST}$	4,346E-09		1,434E-08		2,345E-07	
$\lambda_{DU,FPT}$	8,916E-10		2,941E-09		4,810E-08	
$PFDD^{(1)}$	3,075E-05		4,025E-05		4,147E-04	
$\beta$ and $\beta_D$ factor	10%		10%		10%	
<i>MTTR</i>	8 h		8 h		8 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>	
<p><b>Remarks</b>  <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>						

SIL classification according to Standards IEC EN 61508:2010 (Chapters: 2, 4, 6, 7) for the Premiair types PRA, MRA, TRP and ARP actuators produced by Pentair Valves Ltd



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NOTE : The present table is integral part of the Document: C-IS-236484-02

Date : January, 14th 2014