FUNCTIONAL SAFETY ASSESSMENT

This certifies, that the company

IMI Critical Engineering Korea Co., Ltd.
14 Dangdong 2-ro, Munsan-eup, Paju-si,
Gyeonggi-do Korea 10816

Manufacturing plant:	**IMI Critical Engineering Korea Co., Ltd.** **14 Dangdong 2-ro, Munsan-eup, Paju-si,** **Gyeonggi-do** **Korea 10816**
Description of product: (Details see Annex 1)	**Pneumatic Multi spring-return Diaphragm Actuator – Type: MSD III**
Tested in accordance with:	**IEC 61508:2010 Parts 1, 2, 4, 5, 6, 7**

Registration No. 18 16805 02
Test Report No. PS-23877-23-M-01
File reference 23877-01

Validity
from 2023-08-07
until 2028-08-07

Inspection & Certification Services TÜV TÜV NORD Italia S.r.l.

TÜV NORD Italia S.r.l. (TÜV NORD Group)
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Cerro Maggiore, 2023-08-07
prodotto@tuev-nord.it

Please also pay attention to the information stated overleaf

ANNEX

to Functional Safety Assessment Registration No. **18 16805 02**

E/EE/EP safety-related system (final element)	Pneumatic Multi spring-return Diaphragm Actuator by CCI Ltd.	
Type (Class)	**MSD III**	**MSD III**
Environment / Application (1)	According to the safety manual	According to the safety manual
Safety Function Definition	Direct acting (Trip to open)	Reverse acting (Trip to close)
Max SIL (with HFT = 1)	SIL3	SIL3
Max SIL (with HFT = 0)	SIL2	SIL2
SC	3	3
λ_{TOT}	5.688E-07	1.468E-07
λ_{SD}	0.000E+00	0.000E+00
λ_{SU}	2.081E-07	4.612E-08
λ_{DD}	0.000E+00	0.000E+00
λ_{DU}	3.570E-07	9.971E-08
$\lambda_{DU,FPT}$	7.335E-08	1.893E-08
$\lambda_{DU,PST}$	2.837E-07	8.078E-08
PFD(2)	2.21E-03	6.03E-04
PST interval	≤ 12 months	≤ 12 months
FPT interval	≤ 36 months	≤ 36 months
β and β_D factor	10%	10%
MTTR	8 h	8 h
Hardware Safety Integrity	Route 2_H	Route 2_H
Systematic Safety Integrity	Route 2_S	Route 2_S

(1) Category identified according to specific environment and application. Refer to the product safety manual for the detailed information on the categories.

(2) PFD of reference calculated on the basis of a Full Functional Proof Test and Partial Proof Test with time intervals reported for HFT = 0 configuration only. This time intervals are considered by TÜV NORD 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 the SIL reported.