

# 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**

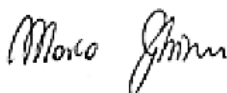
Tested in accordance with:

**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



TÜV NORD Italia S.r.l. (TÜV NORD Group)  
Via Filippo Turati, 70 20023 Cerro Maggiore (MI) [www.tuev-nord.it](http://www.tuev-nord.it)

Cerro Maggiore, 2023-08-07  
[prodotto@tuev-nord.it](mailto:prodotto@tuev-nord.it)

*Please also pay attention to the information stated overleaf*

# ANNEX

Annex 1, page 1 of 1

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 <sup>(1)</sup>	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
$\lambda_{TOT}$	5.688E-07	1.468E-07
$\lambda_{SD}$	0.000E+00	0.000E+00
$\lambda_{SU}$	2.081E-07	4.612E-08
$\lambda_{DD}$	0.000E+00	0.000E+00
$\lambda_{DU}$	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 <sup>(2)</sup>	2.21E-03	6.03E-04
PST interval	≤ 12 months	≤ 12 months
FPT interval	≤ 36 months	≤ 36 months
$\beta$ and $\beta_D$ factor	10%	10%
MTTR	8 h	8 h
Hardware Safety Integrity	Route 2 <sub>H</sub>	Route 2 <sub>H</sub>
Systematic Safety Integrity	Route 2 <sub>S</sub>	Route 2 <sub>S</sub>

(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.