



CERTIFICATE OF COMPLIANCE

Certificate Number:
C538203-PA-DNV-KOR

Rev 0

Project No:
PRJN-233684-2021-AST-KOR

This Certificate consists of 3 pages including this page.

This is to certify that the product(s)

Smart Valve Positioner

With name and/or type designation(s)

ASD-5 and ASD-7

Manufactured by

Power-Genex Ltd

address

99, Eunbong-ro, Namdong-gu, Incheon 21639 South Korea

has been assessed with respect to

IEC 61508:2010 Parts 1 and 2

To comply the hardware safety integrity requirement of

Safety Integrity Level (SIL) 2 Capable with HFT=0.

Safety Integrity Level (SIL) 3 Capable with HFT=1.

Further details of the product and conditions for approval are given overleaf.

Seoul, 2022-04-21
for **DNV Supply Chain &**
Product Assurance

This Certificate is valid until
2027-04-20

J.S.

DNV SCPA office:
Seoul

Jang Sup Lee
Area Manager Korea

This Certificate is subject to terms and conditions overleaf. Any significant change in design or construction may render this Certificate invalid.

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Certificate history

Revision	Description	Factory Inspection Report No.	Issue Date
0	Original certificate	2022-9283, Rev 0	2022-04-21

Products covered by this Certificate

Product	Product name
Smart Valve Positioner	ASD-5 (Type Rotary and Linear)
Smart Valve Positioner	ASD-7 (Type Rotary and Linear)

Technical Documentation

Factory inspection report: 2022-9283, Rev 0

Verification covered by this Certificate

Hardware Element Type:

- Type A

Safety Function:

- Safety Shutdown
- If 0mA input, the Positioner outputs the pressure to OUT2 port, and OUT1 port is blocked(Return to original position).
- If 0mA input, the pneumatic module depressurizes the actuator, and the integrated return spring moves the valve and actuator to a predefined end position (OPEN or CLOSED).

Determination of SIL:

Classification		PFD _{AVG}	Proof test interval*	Safe Failure Fraction (SFF)	Determination of SIL
ASD-5	Rotary	8.59E-03	1 year (8760 h)	87.07 %	SIL 2 (HFT = 0) SIL 3 (HFT = 1)
	Linear	8.55E-03	1 year (8760 h)	88.06 %	SIL 2 (HFT = 0) SIL 3 (HFT = 1)
ASD-7	Rotary	9.77E-03	1 year (8760 h)	73.57 %	SIL 2 (HFT = 0) SIL 3 (HFT = 1)
	Linear	9.77E-03	1 year (8760 h)	76.85 %	SIL 2 (HFT = 0) SIL 3 (HFT = 1)

* The hardware SIL shall be verified in further application with periodical proof test.

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Failure rates in FIT:

Product Name		λ_{Total}	λ_S	λ_{DD}	λ_{DU}
ASD-5	Rotary	15093.3	564.9	0.0	1951.3
	Linear	16273.4	561.9	0.0	1942.4
ASD-7	Rotary	8394.6	1300.7	0.0	2218.4
	Linear	9578.3	1299.6	0.0	2217.5

Validity of Certificate

The Certificate holder is to keep DNV informed of any significant changes in its configuration management and requirement other conditions that may affect.

Renewal of Certificate

The Certificate holder is to apply for renewal of Certificate at least three (3) months before the period of validity expires.

Suspension/withdrawal of approval

If the Certificate holder fails to fulfil the conditions of certification, DNV may suspend/withdraw the certificate at any time.

Terms and conditions

The certificate is subject to the following terms and conditions:

*The Certificate is only valid for the product(s) listed above
The Certificate is concerned with the design of the product, only*

END OF CERTIFICATE