

# FUNCTIONAL SAFETY CERTIFICATE

CERTIFICATO – ZERTIFIKAT – CERTIFICADO – CERTIFICAT

The product:

*Universal solenoid valves series Steel Line*

Manufactured by:

*PNEUMAX S.p.A.  
Via Cascina Barbellina 10  
24050 Lurano (BG) – Italy*

suitable for the following safety function(s):

The valve moves to the predefined safe state when de-energized (if operating in DETT mode) or when energized (if operating in ETT mode)

has been assessed per the relevant requirements of

**IEC 61508:2010 Parts 1 to 2**

and meets the requirements providing the following:

## Systematic Capability:

The compliance with the requirements for the avoidance of systematic faults and the requirements for the control of systematic faults have been achieved following the compliance Route 1<sub>S</sub>.

**SC 3**

## Hardware Safety Integrity:

The constraints on hardware safety integrity have been verified in order to achieve a sufficiently robust architecture taking into account the level of element and subsystem complexity following the compliance Route 1<sub>H</sub>.

**Type  
A**

## Random Safety Integrity:

The estimated safety integrity, for each safety function, due to random hardware safe and dangerous failures rates (excluding "no part" and "no effect" contribution).

**See  
page  
2**

The architectural constraints and the effects of random failures (PFH/PFD<sub>Avg</sub>) must be verified for each specific application and safety function implemented by the E/E/PE safety-related system.

Certified by:

**BYHON**

BYHON Certification Director:

*Francesco Rosati*

Rosati Francesco



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The design of each Safety Instrumented Function (SIF) shall meet the requirements listed in the reference standards that shall be selected by taking into account the specific application. Specific activities necessary to investigate and reach a judgment on the adequacy of the functional safety achieved by the E/E/PE safety-related system or compliant items (elements/subsystems) has been conducted by an independent assessor.

The following failure rates data shall be used to the PFH/PFD<sub>Avg</sub> estimation, taking into consideration all parameters such as redundancy, architectural constraints, diagnostic capability, also introduced by the whole system, including the considerations about the proof test and its effectiveness, mean time of restoration, up to the maintenance capability and its minimum characteristics.

Device failure rates

Models	Configuration	Operating mode	$\lambda_s$	$\lambda_{DU}$	$\lambda_{DD}$
SS##U32###01## 3/2 Universal solenoid valve spring return	3/2 N.C.	DETT	188	202	-
		ETT	-	489	-
	3/2 N.O.	DETT	26	315	-
	3/2 Diverter	DETT	26	315	-
	3/2 Selector	DETT	26	315	-
SS##U32###P1## 3/2 Universal solenoid valve spring return with manual override push	3/2 N.C.	DETT	216	258	-
		ETT	40	524	-
	3/2 N.O.	DETT	54	371	-
	3/2 Diverter	DETT	54	371	-
	3/2 Selector	DETT	54	371	-
SS##U32###R1## 3/2 Universal solenoid valve spring return with manual reset	3/2 N.C.	DETT	195	270	-
	3/2 N.O.	DETT	34	383	-
	3/2 Diverter	DETT	34	383	-
	3/2 Selector	DETT	34	383	-

Note:

- All failure rates are in FIT (Failure In Time 1 FIT = 1 failure /  $10^9$  hours).
- The prescriptions contained in the safety manual TF241001-USV-MA shall be followed.
- The device is suitable for applications up to SIL 1 in simplex configuration (HFT=0), up to SIL 2 in redundant configuration (HFT=1) and up to SIL 3 in redundant configuration (HFT=2).

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PNMX-UNSOV-ENS-A01

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The Functional Safety Assessment report no.

25-PNX-UNSOV-FSA-01

dated:  
January 9<sup>th</sup>, 2025

is an integral part of this certificate



Mod\_12\_CB Rev08

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