



# Certificate / Certificat Zertifikat / 合格証

AVC 2105173 C004

exida hereby confirms that the:

**Solenoid Valves  
Series R384, R484, R385, R485, & R487**

**Avcon Controls Pvt. Ltd.  
Maharashtra - India**

Has been assessed per the relevant requirements of:

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

and meets requirements providing a level of integrity to:

**Systematic Capability: SC 3 (SIL 3 Capable)**

**Random Capability: Type A, Route 2<sub>H</sub> Device**

**PFH/PFD<sub>avg</sub> and Architecture Constraints  
must be verified for each application**

**Safety Function:**

The solenoid valve will move to the designed safe position when de-energized / energized within the specified safety time.

**Application Restrictions:**

The unit must be properly designed into a Safety Instrumented Function per the Safety Manual requirements.

The manufacturer may use the mark:



Revision 1.0 December 12, 2023  
Surveillance Audit Due  
December 15, 2026



Evaluating Assessor

Certifying Assessor

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**Systematic Capability: SC 3 (SIL 3 Capable)**

**Random Capability: Type A, Route 2<sub>H</sub> Device**

**PFH/PFD<sub>avg</sub> and Architecture Constraints must be verified for each application**

**Systematic Capability:**

The product has met manufacturer design process requirements of Safety Integrity Level (SIL) 3. These are intended to achieve sufficient integrity against systematic errors of design by the manufacturer.

A Safety Instrumented Function (SIF) designed with this product must not be used at a SIL level higher than stated.

**Random Capability:**

The SIL limit imposed by the Architectural Constraints must be met for each element. This device meets *exida* criteria for Route 2<sub>H</sub>.

**Versions:**

Valve Group	Valve Type Series	Coil Rating
R384E	R384E06	AC: 14VA; DC: 8 Watts
R484E	R484E06	AC: 14VA; DC: 8 Watts
R385E	R385E06	AC: 5VA; DC: 6.5 Watts
R485E	R485E06	AC: 5VA; DC: 6.5 Watts
R487E	R487E06	AC: 5VA; DC: 6.5 Watts

**IEC 61508 Failure Rates in FIT\***

Valve	Trip Configuration - Static Application	$\lambda_{SD}$	$\lambda_{SU}$	$\lambda_{DD}$	$\lambda_{DU}$
R384, R385, R484, R485 (5-way)	Input to Cyl 2 & Cyl 1 to Exhaust	0	210	0	347
	Input to Cyl 1 & Cyl 2 to Exhaust	0	78	0	422
R384, R385, R484, R485 (3-way)	Cyl 1 to Exhaust	0	180	0	315
	Input to Cyl 1	0	46	0	375
R487 (5-way)	All Configurations	0	200	0	539
R487 (3-way)	Cyl 1 to Exhaust	0	122	0	509
	Input to Cyl 1	0	170	0	461

\* FIT = 1 failure / 10<sup>9</sup> hours

**SIL Verification:**

The Safety Integrity Level (SIL) of an entire Safety Instrumented Function (SIF) must be verified via a calculation of PFH/PFD<sub>avg</sub> considering redundant architectures, proof test interval, proof test effectiveness, any automatic diagnostics, average repair time and the specific failure rates of all products included in the SIF. Each element must be checked to assure compliance with minimum hardware fault tolerance (HFT) requirements.

The following documents are a mandatory part of certification:

**Assessment Report:** AVC 21/05-173 R006 V1R1 (or later)

**Safety Manual:** SM-SVRS-DRG-001 R0



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Sellersville, PA 18960

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