

CERTIFICATE



BETAB.V. 080432 P0007 C01.2

exida Certification S.A. hereby confirms that the

BETA Pressure, Temperature and Vacuum Switches

BETA B.V.

Rijswijk, The Netherlands

Has been assessed according to the relevant requirements of

IEC 61508:2000

Parts 1 - 2, and meets requirements providing a level of integrity to

Systematic Integrity : SIL 2 Capable

**Random Integrity : Type A device, PFD_{AVG} and
architecture constraints must
be verified for each application**

Safety Function

The air-relay / micro switch will de-energize when the input pressure, or temperature, rises above, or falls below, the set-point within the stated safety accuracy.

Application Restrictions

The unit must be properly designed into a Safety Instrumented Function per the requirements in the Installation, Operations and Maintenance and Safety Manuals for the respective switch type.



Assessor



Certifying Assessor

Date: 10 August 2012

exida Certification SA, Nyon, Switzerland



Systematic Integrity: SIL 2 Capable

The product has met manufacturer design process requirements of Safety Integrity Level (SIL) 2. These are intended to achieve sufficient integrity against systematic errors of design by the manufacturer.

For a Pressure, Temperature and Vacuum Switch used in final element assembly, SIL must also be verified for the specific application using the following failure data:

Summary for the Pressure, Temperature and Vacuum Switches:

Type A device

IEC 61508:2000 failure rates in FIT [:=10⁻⁹/h]

Switch	λ_{safe}	$\lambda_{dang.}$	λ_{total}
Pressure switches C.-P....- series, air-relay	431	212	643
Pressure switches W.-P....- or C.-P....- or Z.-P....- or B.-P....- series, micro-switch	276	124	400
Temperature switches C.-T....- series, air-relay	394	233	627
Temperature switches W.-T....- or C.-T....- or Z.-T....- or B.-T....- series, micro-switch	248	134	382
Vacuum switches W.-V....- or C.-V....- or Z.-V....- or B.-V....- series	171	80	251
Differential pressure switches W.-D....- or C.-D....- or G.-D....- or Z.-D....- series	813	255	1068

All failure rates are given in FIT =10⁻⁹/h

SIL Verification:

The Safety Integrity Level (SIL) of an entire Safety Instrumented Function (SIF) must be verified via a calculation of PFD_{AVG} 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 subsystem must be checked to assure compliance with minimum hardware fault tolerance (HFT) requirements.

The following documents are mandatory parts this certificate:

BETA 0804-32-C R004 V1R1 Assessment report.

BETA B.V. Safety Manual Rev. A.