

# HIPPS (High Integrity Pressure Protection System)



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process instrumentation

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## About Us



Autocontrol Process Instrumentation (API) Originates from Autocontrol Technologies, a Company established in 1994 Italy.

Autocontrol Process Instrumentation (API) provide the complete Design, Engineering, Integration, fabrication, Technical support, Test, Commissioning and handover for all package system for Oil & Gas, Petrochemical, Chemical and Power industries as per the customer requirement. We also focused on Sensing Technologies, Measuring Instruments, Controlling Equipment, Automation Systems and all related Accessories. While API's activities cover a wider range of products, services and packages.

API's products are approved by International and National Oil and Gas Operators, Energy, Utilities and Industrial Companies.

We study and research on your requested systems and utilize best and competitive Technologies and instruments to meet your requirements.

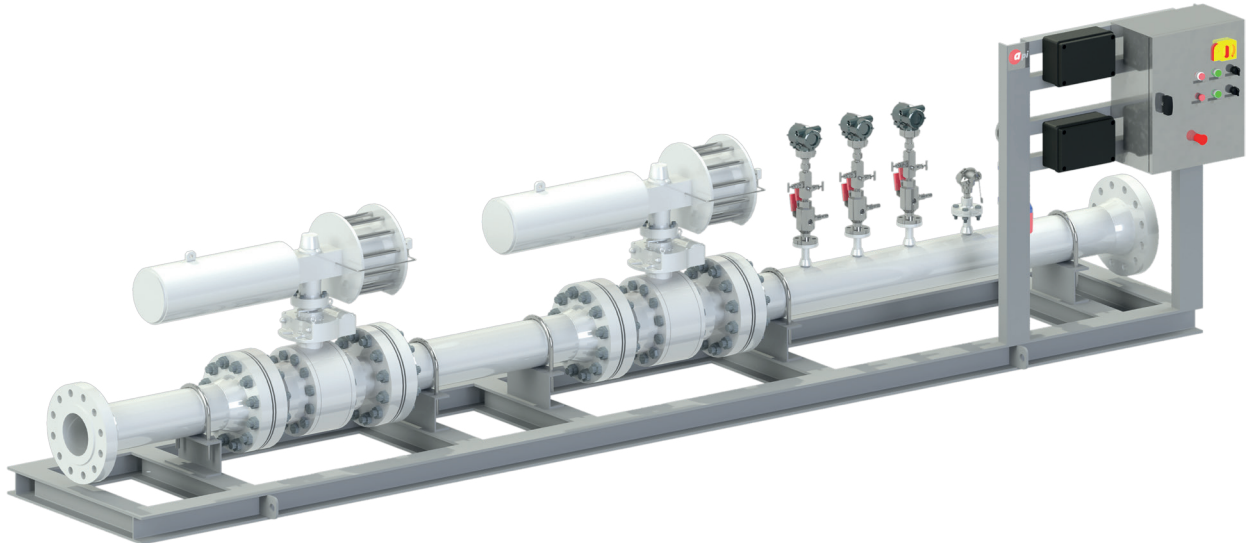
For more information, please ask for a copy of our integrated company profile, or visit:

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Whatever you need, we can sense it...  
Measure it... Control it and if necessary...  
automate it....



## High Integrity Pressure Protection system (HIPPS)



HIPPS is the acronym for High Integrity Pressure Protection System. The main function of HIPPS is an independently instrumented system whose function is to protect an installation from the overpressure produced in the pressure rate of the same, isolating the low pressure part from it.

The idea of HIPPS is to be used instead of traditional safety system such as relief devices with four main advantages:

- Environment protection: relief systems release the service fluid to the atmosphere which while HIPPS avoid fluid to be released out the system keeping the environment free of emissions.
- HIPPS have to be safety level equal or higher than the traditional relief methods; calculated safety levels show the HIPPS to be ten times more reliable than the traditional methods.
- Creating a frontier between two parts of the installation allows the downstream part of the valves of the HIPPS to have lower pressure and therefore, to reduce the cost of pipes and related pressure equipments installed on that part.

Autocontrol Process Instrumentation (API) HIPPS system is supplied with three Pressure transmitters that monitor the pressure in the line and provide the information to the next element.

API also has strong experience and provides Logic solver which is the device in charge of processing the signals received from pressure transmitters and it is configured to send the signal to operate the actuated valves, when the received input is above the pre-configured pressure value.

# High Integrity Pressure Protection system (HIPPS)

## Standards & Safety Integrity Levels:

**HIPPS are designed according to the following standards:**

- IEC 61508: "Functional Safety of Electrical / Electronic / Programmable Electronic Safety Related system"
- IEC 61511: "Functional Safety: safety instrument systems for the process industry sector"
- ANSI/ISA S84.01: "Application of Safety Instrumented system of the Processed Industries"

Standards mentioned above are performance based so design of HIPPS is also based on the required Safety Integrity Level (SIL). SIL has four categories, from 1 to 4, and it is defined by plant end user by means of making a risk analysis of the process and it is related to the fulfillment of the tolerance risk; this means that SIL level results of the combinations of two factors:

- Frequency of fail occurrence
- Consideration of the consequences of fail (dangerous failure or safe failure)

Safety Instrumented Function (SIF) defines the level of protection against failure and it is defined by the Probability of Failure on demand (PFD). PFD avg is defined as the average probability of failure the safety function between 0 to 1. Standard E1C61508 defines the maximum allowable PFD avg valve depending how often the demand of SIF is:

- High demand: safety demand interval shorter then one year
- Low demand: safety demand interval longer then a year

SIL level is related to this PFD avg valve and must be considered for the complete functional loop, all its elements and between them, Autocontrol Process Instrumentation (API) has the capability to make the SIL calculation of the integrated package. Certification to be made by a recognized Third party. Autocontrol Process Instrument ( API) is able to provide complete HIPPS package system qualified for SIL 3 & SIL 4 based on the required redundancies, partial stroke test, etc. In addition, Autocontrol Process Instrumentation (API) can provide the complete HIPPS system SKID mounted, with all the components assembled, connected and tested together in order to be installed directly in to the plant.

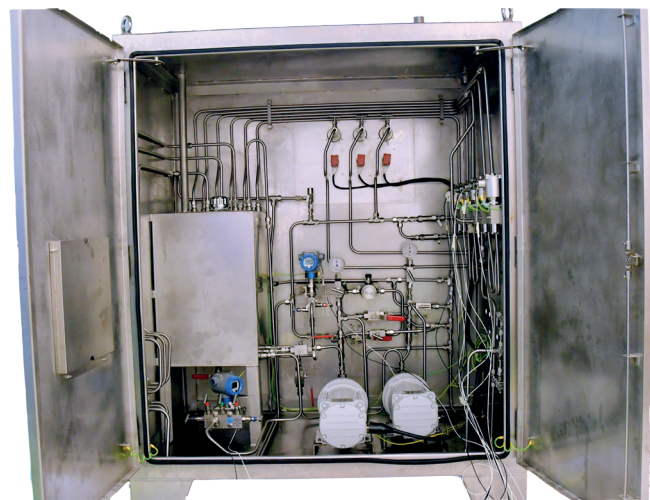
Safety Integrity Level	Probability of Failure on Demand	Probability of Failure on Demand
SIL 4	$>10^5$ to $<10^4$	100,000 to 10,000
SIL 3	$>10^4$ to $<10^3$	10,000 to 1,000
SIL 2	$>10^3$ to $<10^2$	1,000 to 100
SIL 1	$>10^2$ to $<10^1$	100 to 10

# High Integrity Pressure Protection system (HIPPS)

## Hydraulic Power Unit (HPU):

The hydraulic (mechanical) HIPPS provides a self-contained, independent protection system operated on demand with one-out-of-two (1oo2) or two-out-of-three (2oo3) (voting) pressure sensor inputs, a hydraulic logic solver, and two spring-return hydraulically actuated safety valves. The unit is

Typically self powered and can be provided with additional real-time controls via a hydraulic power unit (HPU). This pressurizes the system and opens the safety shutdown valves. The system remains open (armed) until an abnormal condition is detected. If an abnormal condition is detected, then the system closes the two actuated final element valves, protecting the downstream production or facility.



## High Integrity Pressure Protection system (HIPPS)

### Logic Solver:

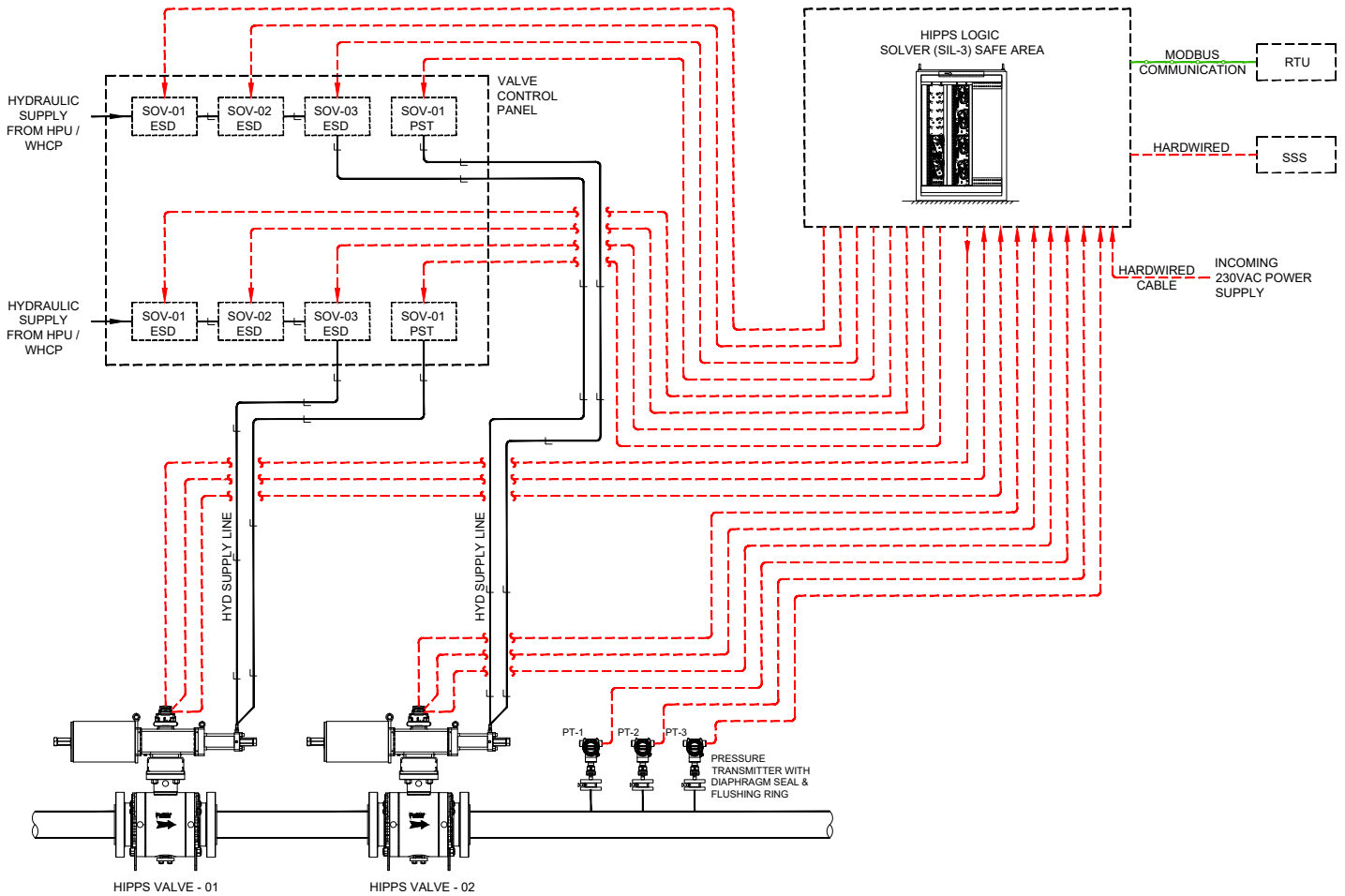
A logic solver is an electric safety system that combines digital and analogue signals to monitor the status of the HIPPS inputs and determine if a safety valve has to be closed.

All HIPPS logic solver hardware is designed and certified in compliance with SIL3 or SIL4 performance requirements, as provided in IEC 61508. Additionally, ANSI/ISA S84.00.01- 1996 and IEC 61511 recommend the HIPPS safety logic to be independent from the basic process control and lower layer protection systems. Although the logic solver can be provided with fully pneumatic logic solver (requiring no power consumption), solid state, or programmable electronic systems (PES); the preferred IMI CCI solution uses the PES to provide a high level of self diagnostics, enhanced availability and fault tolerance.



# High Integrity Pressure Protection system (HIPPS)

## System Architecture:



## Installation, Commissioning & Service

### Installation & Commissioning:

Many of our clients have engaged us in the installation and commissioning of the equipment we supply and can therefore be fully confident in site system performance, safety and reliability as was engineered.

### Benefits:

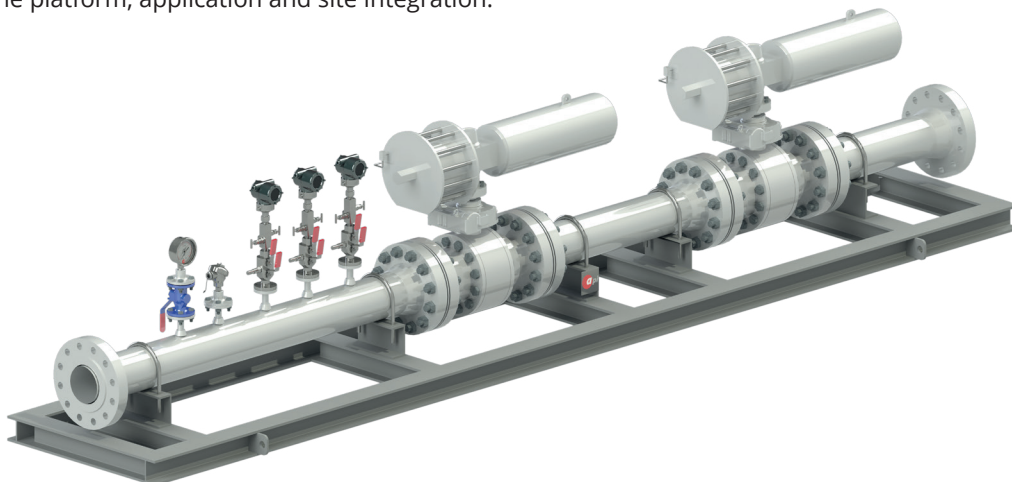
- Turn-key, fully seamless integrated solution, one stop shop with added advantages of foresight.
- Single point of contact and accountability
- Installation and commissioning by engineers experienced and cognizant with the platform and design and who can deliver Innovative Solutions to unexpected site issues as are often encountered.
- Bespoke arrangements
- Immediate and full access to the project engineering team responsible for the application design to advise in any unforeseen site Implementation problems at no additional cost.

### Key Business Benefits Derived:

- Confidence in effective and competent installation and commissioning with easy access to engineering base support
- Contributes to lifetime performance, functional efficacy and safety.
- Cost effective, simplifies management overhead with reduced contractual risk.
- Ensures against third party systematic errors with immediate and/or potential later incurred costs.

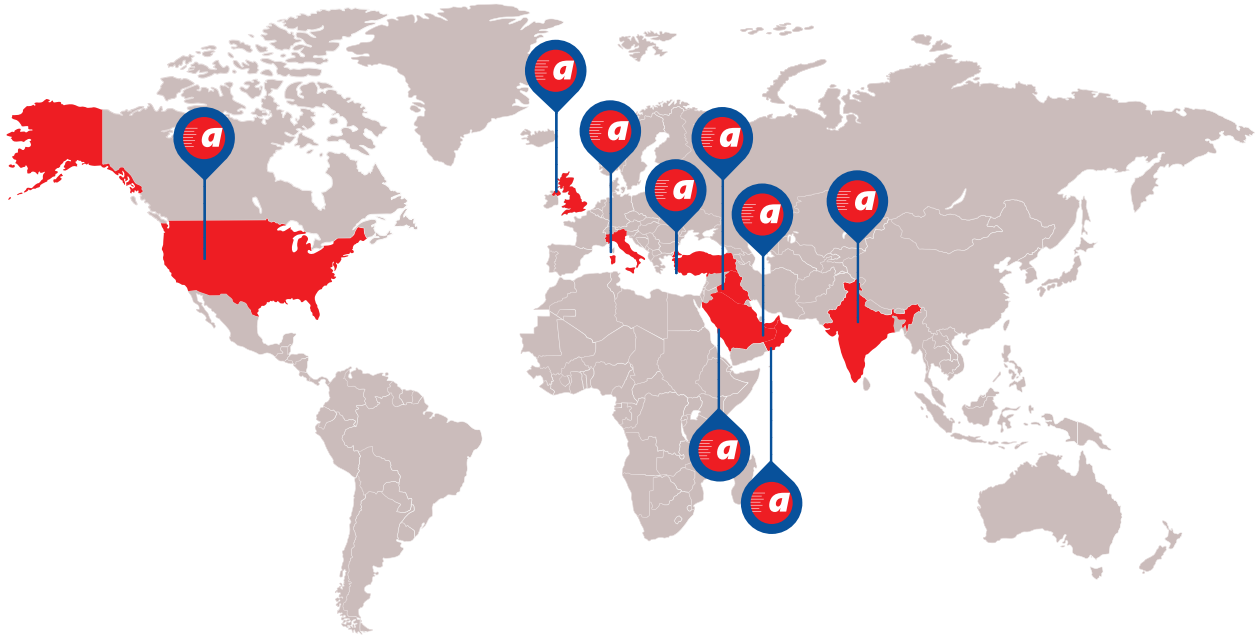
### Our Service offering:

The system you have purchased has been engineered, manufactured and tested to the highest standard. However, we recognize that The system will serve its purpose to the maximum efficacy where competent engineering is engaged throughout its entire life cycle and not just up to point of delivery and later application of highly competent operations and maintenance. An engineering solution that is well designed, built and tested can easily be compromised by insufficiently enlightened installation or Commissioning that can act in detriment to the longer term system performance, safety, reliability and application. It is more often So, as an imperative, that installation and commissioning requires extensive knowledge of the platform, application and site Integration.





## Our Global Presence



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# Notes

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