hima/process_automation

HIMA

The safe decision.

Every market, particularly the global process industry, is under ever-increasing pressure from competition. Greater demand for cost-effectiveness in the planning and operation of safety-related applications combined with the need to adhere to new standards such as IEC 61508/61511, prEN 50156, EN 61131 or ATEX are pushing existing technologies to their limits. New approaches are needed.

HIMA – the market leader in safety-related process automation technology – has opened up a whole new world in terms of performance, productivity, flexibility and cost-savings based on an extended range of products and services. We have installed more systems around the world than any other company and have over 35 years' experience, so we know that cost-effective application solutions can only be achieved by adopting a holistic approach based on the entire life-cycle of an application.

In addition to system hardware and software, safety consulting, project management, training and service are other essential components of our Safety Element concept for automation processes. HIMA's global presence and experience with national and international requirements and standards is the key to your success – and ours.

Follow HIMA into a new age of safety-related process automation and remain *in**process*** with our intelligent solutions.

Photo: BASF

The process industry demands...

... value for money. This requires, in particular, smooth, uninterrupted automation of those processes that present a high risk potential. To protect people, the environment and equipment, safety systems are used that now have to fulfill many more criteria other than simply performing safety functions.

Safety. Safety systems always have to conform to the latest standards such as IEC 61508, prEN 50156, EN 61131 or ATEX in order to fulfil all the relevant statutory, normative and insurance industry regulations. And not every safety system meets these requirements.

Availability. If processes are to be cost-effective, then they must run continuously. It is not acceptable for them to stop because of errors in the safety system. The safety system's fault tolerance is therefore one of the most important characteristics for keeping the process safe **and** available.

Cost saving. The start-up costs combined with reliability, maintenance and upgrade costs determine the cost-effectiveness of a safety system. This requires high-quality systems with flexible technology and appropriate services to reduce the overall life-cycle costs.

Openness. The level of networking in automation solutions is growing all the time. At the same time, there is a growing desire to reduce the number of different bus systems. Simple integration of components from various vendors requires automation systems that are based on internationally-accepted communication standards.

HIMA: intelligence and concentration.

Concentrating on a target is one way to maximise performance. HIMA became the technological leader in this segment decades ago by specialising in safety systems. This leading position is supported by 35 years' experience and expertise gained from installing more than 16,000 systems world-wide. Over this period, companies in the process industry have learned to trust the proven performance of HIMA technology.

HIMA products such as **H41q/H51q**, ***HIMatrix*** and **Planar4** were developed for different applications in order to meet customer requirements and cost-effectiveness. The HIMA systems' capacity for communication and integration is just as important as their flexibility when automating mono or redundant configuration system architectures in small to large processes that are either centralised or distributed.

At HIMA, customers' requirements and the available technology are combined to create intelligent solutions that both fulfil the conventional needs of the process industry and offer a firm basis for potential added value.

All HIMA systems can be used in mono-configurations up to SIL 3/AK 6, thus offering considerable potential savings compared to 2oo3/TMR systems.

The HIMA H41q/H51q systems have the lowest probability of failure of all safety systems *

HIMatrix controllers and safeethernet: the fastest safety system and safety bus in the world

H41q/H51q systems are the first 2oo4D/QMR systems in the world with IEC 61508 certification

** Calculations based on IEC 61508*

1970
The world's first TÜV-approved safety system

1986
The world's first TÜV-approved PES

1991
The world's first TÜV-approved reverse compiler

1997
The world's first TÜV-approved redundant 2oo4D/QMR system

1997
The world's first TÜV-approved safety-related Ethernet communication

2002
The world's first TÜV-approved PES with safe communication via Ethernet for factory automation

2003
The world's first TÜV-confirmed SIL calculation tool

H41q/H51q ***HIMatrix*** ***Planar4*** ***Support***

HIMA safety technology.

All HIMA systems offer maximum safety. Intelligent diagnostic routines combined with integrated dual processor technology on the other allow the **H41q/H51q** and ***HIMatrix*** system families to be used in mono-configurations for applications up to IEC 61508/DIN 19250 to SIL 3/AK 6 without time limits or regular checking. The same applies to **Planar4** systems, but in this case up to SIL 4/AK 7.

If we compare HIMA safety technology with that of 2oo3/TMR systems, we find a number of economic advantages in addition to the safety benefits. 2oo3/TMR systems only achieve safety through a triplicated structure. All calculations have to be carried out 3 times and the results then have to be compared with one another (so-called voting systems). The system is not safe unless there is absolute agreement between them. While HIMA systems offer maximum safety with a mono-configuration, 2oo3/TMR systems require triplicated architecture – which is a considerable disadvantage in terms of cost.

In addition to safety, the fault tolerance also guarantees cost-effectiveness. A redundant structure is only required in HIMA systems to increase the fault tolerance and thus the availability of processes. In contrast to conventional 2oo3/TMR systems, redundant 2oo4D/QMR systems can continue to operate without limit in the event of an error. Production processes are therefore safe, available and cost-effective.

1. Diagnostics
A complete, automatic diagnostic check takes place during every HIMA system work cycle. Errors are identified and isolated quickly and reliably.

2. Dual processor
HIMA systems have dual processors on every CPU. Both processors are constantly checked at nanosecond intervals by a safety-related hardware comparator. This inherent redundancy allows HIMA systems to meet requirements up to SIL 3/AK 6 in a mono-configuration.

3. Degradation
In contrast to the 2oo3/ TMR systems, redundant 2oo4D/ QMR systems can continue to operate without limitation after an internal system error occurs.

	Error-free operation	*First error*	*Second error*
2oo3/TMR	**3**	**2** **Shut-down** after a time limit has elapsed	**0** **Shut-down**
2oo4D/QMR	**4**	**2** **Operation continues without limit**	**0** **Safe status**

Behaviour in the event of an error at the CPU level

Openness in communication creates independence. As the primary monitoring system, safety systems necessarily have to exchange data with many other systems. To ensure long-term cost-effectiveness, HIMA has always embraced from the concept of integration based on open and internationally-accepted communication standards such as OPC, Profibus or MODBUS.

The benefits of open communication compared to vendor-specific, proprietary protocols and technology are obvious: from the reduced costs and risks of integration, consistent data organisation and transparency through to a reduction in the variety of buses and the associated engineering, maintenance and training.

In addition to the main requirements for safety systems, each individual application has further specific requirements in terms of safety, availability and flexibility. The following examples document how all the leading companies in the process industry worldwide use tailored HIMA safety technology.

H41q/H51q

HIMatrix

Planar4

Agip · Aventis · BASF · Basell · Bayer · BAYERNOIL · Borealis · BP Amoco · BSL Olefin Group · Celanese Chemopetrol Litvinov · Clariant · Crompton · Degussa · Deutsche BP · Dillinger Steelworks · DSM · Elf Atochem EVC · ExxonMobil · Finnish Railways · GPIC · HOLBORN EUROPA REFINERY · Hoffmann-La Roche · ICI · IFFCO INEOS Phenolchemie · INFINEUM · ISAB Energy · KOC · Lonza · MERCK · MIRO · MRPL · NAM · OMV · PCK · PDO · Peroxid Chemie · PETRONAS · PIDEC · Qatar Petrochemicals · RUHR OEL · SASOL · SCHERING Shell & DEA Oil · SKW · Statoil · Thai Petrochemical · TOTAL · TVK · Wacker Chemie

H41q/H51q ***HIMatrix*** ***Planar4*** ***Support***

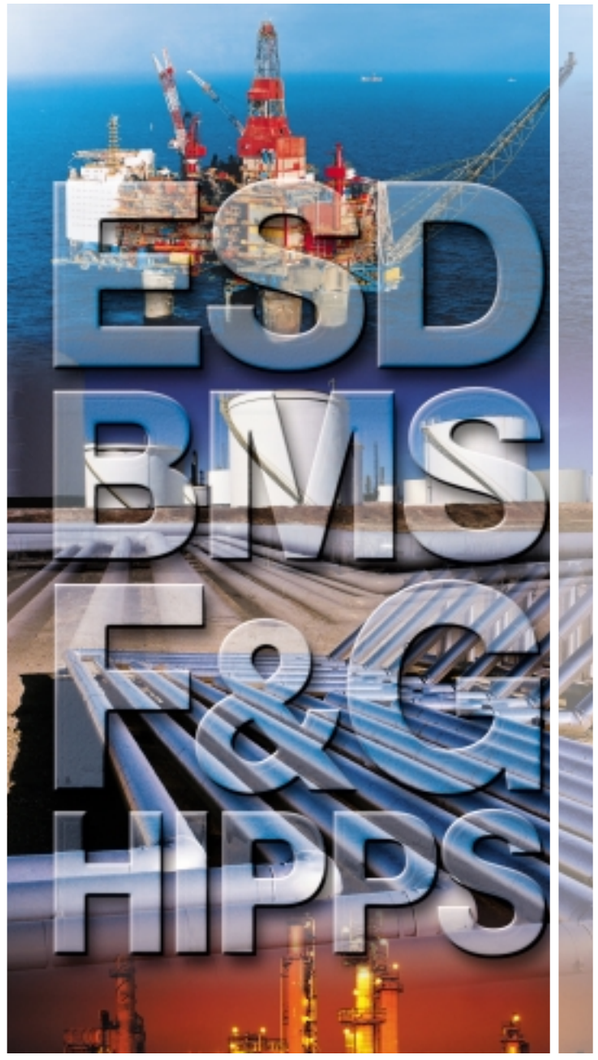
Complex applications:

Automation processes in the chemical and petrochemical industries are generally highly complex and have many potential hazards. They also have to operate without interruption if they are to be cost-effective. The safety systems currently used include:

- **Emergency shut-down systems (ESD)**
- **Burner management systems (BMS)**
- **Fire and gas systems (F&G)**
- **High-integrity pressure protection systems (HIPPS)**

These systems have to fulfil a number of important requirements:

- Centralised automation of large numbers of I/Os
- Redundancy concepts that maximise the safety system's fault tolerance and therefore the availability of the production process
- Ability to process a large and varied number of I/O signals
- Easy to link to commonly used control and visualisation systems
- Replacement of defective modules during operation
- Software upgrades carried out online
- Low maintenance costs
- Monitoring for open and short circuits



- Safety-related networking of several systems, even over long distances
- Absolute conformity of all system components with the latest standards, such as IEC 61508, in response to normative, statutory and insurance industry conditions
- Compliance with application-specific standards such as: NFPA 72 for F&G systems, prEN 50156 for BMS systems, ATEX

The H41q/H51q system family is the ideal solution for such applications – and has proven its worth over the years.

Reference projects

Project	*Customer*	*Country*	*Application*	*Number of I/Os*
SECCO	BP	China	ESD	11.984
Gas drilling South Pars 6, 7, 8	NIOC	Iran	ESD, F&G, HIPPS	10.168
Refinery	Midor	Egypt	ESD, BMS	6.300
Refinery	PCK Schwedt	Germany	ESD, BMS	5.500
Ammonia/methanol	Sirte Oil Company	Libya	ESD, BMS	3.500
IGCC Plant	ISAB Energy	Italy	ESD, F&G	3.500
Polyethylene plant	Atofina, Carling	France	ESD, F&G, BMS	3.500
Gas drilling and preparation/onshore	SANTOS	Australia	ESD, F&G, BMS	3.000
Mars project	Shell Chemie, Moerdijk	Netherlands	ESD, F&G	3.000
Gas drilling Cawthorne phase 1	Shell Nigeria	Nigeria	ESD, F&G	2.834
Fertiliser production	ABF	Malaysia	ESD	2.295
GL4Z	Sonatrach, Arzew	Algeria	BMS	1.200

Complex applications with H41q/H51q systems.

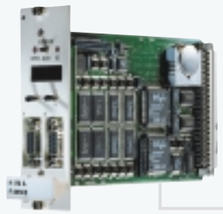
The **H41q/H51q** systems were the world's first safety systems to use the HIQuad technology developed by HIMA. This 2oo4D/QMR architecture were introduced as the existing safety technology based on dual or 2oo3/TMR systems had reached their limits of performance and cost-effectiveness.

The **H41q/H51q** systems now offer for the first time the option of using mono-configuration systems up to SIL 3/AK 6. Since maximum safety is always guaranteed, redundancy can be tailored exactly to match the economic and technical needs of the application concerned, while providing the optimum combination of safety and availability.

These systems now lead the field in safety technology: IEC 61508 calculations show that **H41q/H51q** systems have the lowest probability of failure of all safety systems and are the first IEC 61508-certified 2oo4D/QMR systems in the world.

Overview of the benefits

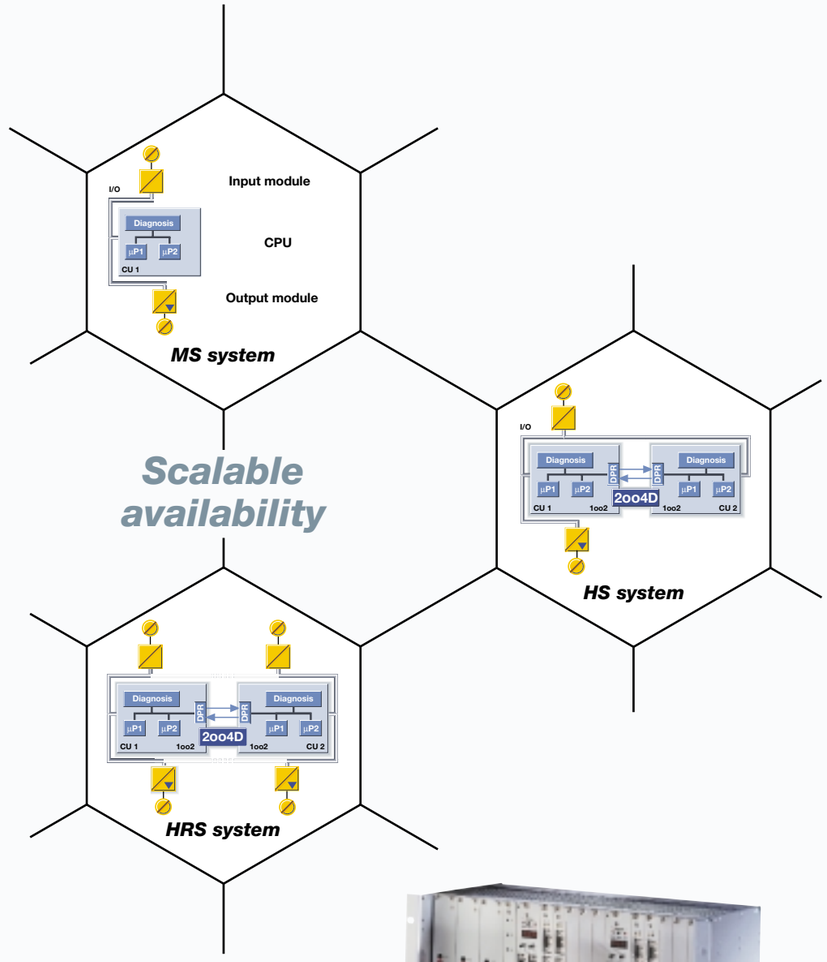
- **Mono-configuration SIL 3/AK 6**
- **Maximum fault tolerance**
- **Flexible redundancy management**
- **Comprehensive and proven range of I/Os**
- **Modules can be replaced online**
- **Programs can be upgraded online**
- **Easy to integrate**
- **Safety-related networking over safe**ethernet
- **Drag&drop engineering**



HIQuad Technology *is a 2oo4D/QMR (Quadruple Modular Redundant) architecture developed by HIMA to meet the needs of the process industry.* ***HIQuad Technology*** *is characterised by dual processors on every CPU.*

Both processors are constantly checked at nanosecond intervals by a safety-related hardware comparator, fulfill requirements up to SIL 3/AK 6 with a mono-configuration.

With a redundant architecture, communication to the second CPU is established via fast dual-port RAM (DPR), and results in a 2oo4D/QMR architecture.



The combination of scalable availability at the I/O level and/or CPU level with maximum safety at all times allows the system to be precisely matched to the economic and technical needs of the application concerned.

MS system
Universal mono-configuration safety up to SIL 3/AK 6.
Maximum economy - minimum hardware.

HS system
Second CPU, creating a 2oo4D/QMR structure for maximum availability and fault tolerance centrally.

HRS system
Total redundancy of CPUs, I/O bus and I/O modules. Maximum availability and fault tolerance across the entire system.

H41q

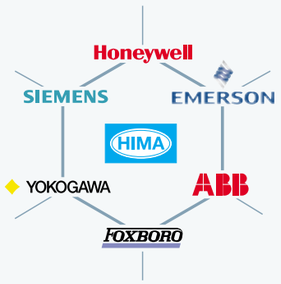
H51q

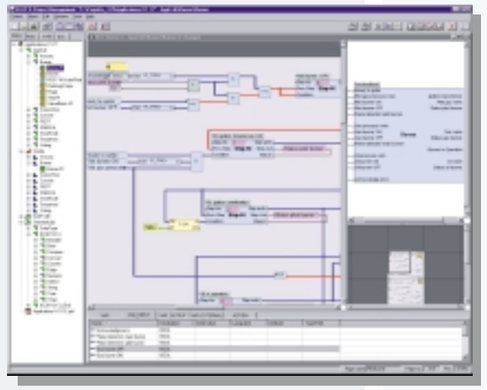

Photo: BASF

Complex applications with H41q/H51q systems.

Integration. The ease with which H41q/H51q systems can be integrated into all leading control systems is based on international communication standards such as OPC Data Access, OPC Alarm&Event, Profibus DP and MODBUS RTU. The time stamps from the HIMA systems are transferred both via the OPC Alarm&Event server and via MODBUS RTU.

Safety-related networking. The H41q/H51q systems can be networked in a safety-related way using safe**ethernet** (standard Ethernet) or HIPRO-S (RS 485) in order to construct safe, distributed applications. Safety networks up to SIL 3 with transmission speeds of up to 100 Mbit/s can be implemented using standard Ethernet components.

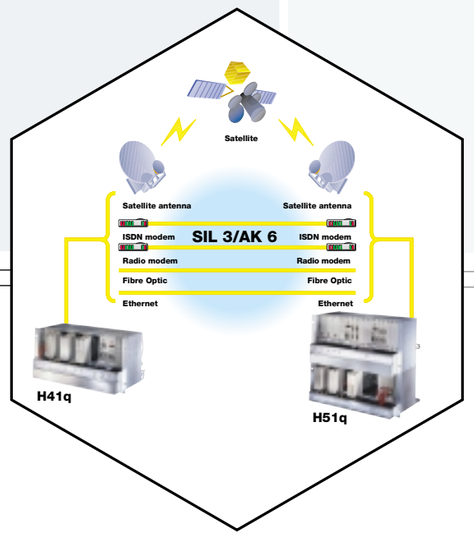




ELOP II by HIMA

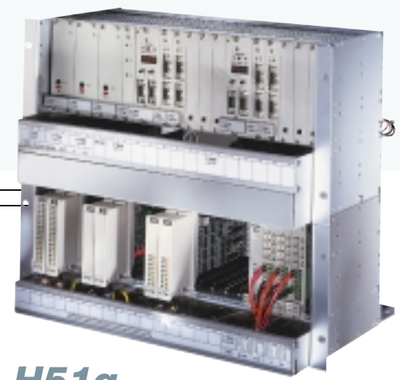
ELOP II - The efficient engineering tool

- Straightforward planning, programming, diagnostics and system and communication documentation
- IEC-61131-3-compliant
- Easy to program with function block diagrams (FBD) and sequential function charts (SFC)
- Windows NT/2000-compliant
- Full-graphics programming with drag&drop functionality
- Can be operated safely without any need for special hardware or safety expertise
- Function blocks with TÜV certification.
- Use of all IEC 61131-3 functions and variable types for safety-related programs
- Offline simulation of all functions
- Online logic test



H41q/H51q systems
- ***Proven 19" technology***
- ***Compact H41q systems: up to 208 I/O points***
- ***Modular H51q systems: 208 or more I/O points***
- ***Use of the same I/O modules***
- ***Use of the same programming system***

H41q



H51q

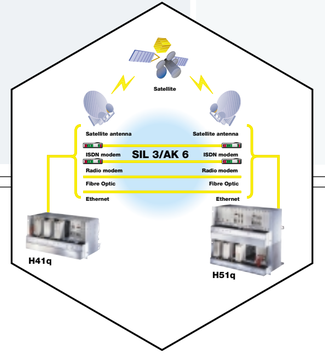

Photo: BASF

Complex applications with H41q/H51q systems.

Integration. The ease with which H41q/H51q systems can be integrated into all leading control systems is based on international communication standards such as OPC Data Access, OPC Alarm&Event, Profibus DP and MODBUS RTU. The time stamps from the HIMA systems are transferred both via the OPC Alarm&Event server and via MODBUS RTU.

Safety-related networking. The H41q/H51q systems can be networked in a safety-related way using safe**ethernet** (standard Ethernet) or HIPRO-S (RS 485) in order to construct safe, distributed applications. Safety networks up to SIL 3 with transmission speeds of up to 100 Mbit/s can be implemented using standard Ethernet components.

Honeywell · SIEMENS · EMERSON · HIMA · YOKOGAWA · ABB · FOXBORO



Distribution fuse-board
18 circuit breakers slots, total current up to 150 A
Closed-circuit current monitoring loop

I/O subrack

Various analog and digital I/O modules

Special I/O modules for (Ex)i signals

Counter modules

I/O modules with open/short-circuit monitoring

I/O modules for various signal voltages

Modular power supplies
Input voltage 230 or 115 V AC
Output voltage 24 V DC, 40 A
and 48 V DC, 20 A
Redundant operation is possible

Central subrack

High-redundant CPUs in 2oo4D/QMR configuration

Communication modules for safe**ethernet**/Ethernet/Profibus/MODBUS

Standards/testing principles

- **IEC 61508 to SIL 3, DIN V 19250 to AK 6, EN 954-1 to category 4**
- **prEN 50156, NFPA 8501, NFPA 8502**
- **EN54-2, NFPA 72**
- **EN61000, EN 50082-2, EN 50081-2, EN 61131-2**
- **ATEX 94/9/EG, EN 1127-1, EN 61508**
- **Factory Mutual (FM), CSA, GOST R**

Configurable availability for constant safety

The H41q and H51q system families use the same extensive range of I/O modules. This allows them to be individually matched to application-specific requirements, and makes upgrades, obtaining spare parts, training and documentation much easier.

The use of I/O modules with integral Ex separation eliminates a complete cabinet level.

The new F3349 module allows shut-down channel-by-channel. If one channel fails, only this channel is shut down. All the others continue to work without failure, which increases process availability.

CPUs		SIL	Communication interfaces	Programming interfaces	Protocols	Note
CPU	**F8650E**	3	2	Yes	MODBUS, master/slave, HIPRO-S/N-slave	CPUs for H51q each with 1 MB user, operating system and data memory
	F8652E	3	2	Yes	MODBUS, master/slave, HIPRO-S/N-slave	CPUs for H41q each with 1 MB user, operating system and data memory
Communication modules	**F8621A**	3	2	Yes	MODBUS-slave, HIPRO-S/N-slave	RS485 interfaces
	F8627	3*	1	-	OPC DA, OPC A&E, safe**ethernet**	100 Base-T, RJ45 interface
	F8628	0	1	-	Profibus-DP slave	

I/O modules		SIL	Channels	LB/LS	Ex	Note
Input modules digital	**F3236**	3	16	-	-	Contacts, 1 signal 24 V DC
	F3240	3	16	-	-	Contacts, 1 signal 110 DC/127 V AC
	F3248	3	16	-	-	Contacts, 1 signal 48 V DC
Input modules Initiator	**F3237**	3	8	Yes	-	SN-, NAMUR initiators, wired contacts
	F3238	3	8	Yes	Yes	SN-, NAMUR initiators, wired contacts, 8 DU wide, ATEX
Input modules analog	**F6214**	3	4	Yes	-	Current, voltage, integrated transmitter supply sources
	F6217	3	8	Yes	-	Current, voltage
	F6221	3	8	Yes	Yes	Current, voltage, ATEX
Output modules digital	**F3325**	3	6	-	Yes	Ex transmitter supply module for F6221, ATEX
	F3330	3	8	-	-	24 V DC to 0,5 A
	F3331	3	8	Yes	-	24 V DC to 0,5 A
	F3333	3	4	-	-	24 V DC to 2 A
	F3334	3	4	Yes	-	24 V DC to 2 A
	F3335	3	4	-	Yes	24 V DC, ATEX
	F3348	3	8	-	-	48 V DC to 0,5 A
NEW	**F3349**	3	8	Yes	-	24 V DC/48 V DC to 0,5 A
Output modules analog	**F6705**	3	2	-	-	Current
Special modules	**F3430**	3	4	-	-	Relay module, 110 V DC/250 V AC to 4 A
	F5220	3	2	Yes	-	Counter module initiator, 5 V DC, 24 V DC to 1 MHz, 2 integral digital outputs 24 V DC to 0,5 A
	F6220	3	8	Yes	Yes	Ex thermocouple module, ATEX

* in conjunction with safety-related protocol

Mono-configuration applications:

There are whole ranges of safety applications that do not need redundant safety systems, either because process availability is non-critical or because the necessary redundancy already exists within the process. Typical applications include:

- **Safety-related telecontrol systems for pipelines**
- **Distributed automated pharmaceutical applications**
- **BMS solutions for single and multi burner systems**
- **Distributed, safety-related fire and gas systems**
- **Turbine control**
- **Wellhead control**

These applications place special requirements on safety systems, including the possibility of implementing powerful, safety-related distributed applications and very fast response times, in both individual PESs and safety-related networked systems.

When just a few safety-related I/Os are used, cost-effective solutions are required. These must offer greater flexibility compared to conventional relay-based technology. An extremely compact, space-saving arrangement is a must in this context.

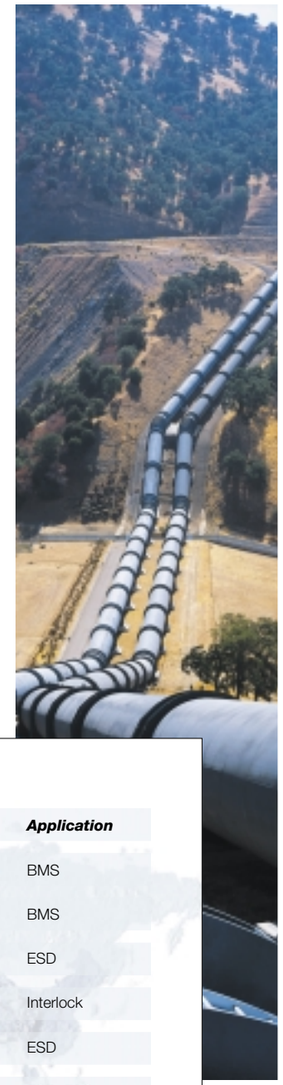
Safety systems are subject to a whole range of standards, so it is extremely important that all system components conform to the latest standards, such as IEC 61508, and fulfil the application-specific standards.


Photo: UMAG

It is important for safety-related automation systems to be easily linked to the commonly available control and visualisation systems.

To guarantee maximum flexibility of the system for networked applications, a variety of different transmission media have to be used for safety-related data transmission.

With the ***HIMatrix*** systems and safe**ethernet**, HIMA offers a combination of the fastest safety controller available with the fastest safety bus in the world. This forms the basis for new and cost-effective safety solutions for mono-configuration applications.



Reference projects

Project	*Customer*	*Country*	*Application*
Darwin LNG	Phillips Petroleum	Australia	BMS
Burner controller	Gyproc	Belgium	BMS
Pharma/batch processes	Boehringer Ingelheim	Germany	ESD
Access control	Glaverbal	France	Interlock
Gas storage	Air Liquide	Italy	ESD
Wellhead control	Swift Energy	New Zealand	ESD, F&G
Burner controller	New Zealand Gas Corporation	New Zealand	BMS
Pipeline	Zeton B.V.	Netherlands	ESD
Gas storage	Air Liquide	Spain	ESD
Gold Mine/Minewinder	Placer Dome	South Africa	ESD

Mono-configuration applications with HIMatrix systems.

The safety-related controllers and remote I/O modules from the ***HIMatrix*** series were designed especially for time-critical applications with no redundancy requirements.

The performance, compactness and ease of assembly provide solutions for applications in which the use of safety controllers used to be technically impossible or was ruled out on cost grounds.

The extensive range of hardware and the safety-related networking of systems over safe**ethernet** allow them to be matched exactly to the plant structure.

safe**ethernet** can be used to create distributed, safety-related automation concepts using standard Ethernet components and functionality. Safety-related communication can be integrated into existing Ethernet networks. There is no need to install a separate safety bus.

Structures with either centralised or decentralised distributed intelligence can be implemented, and have a number of advantages: availability upon demand, step-by-step planning and commissioning, less wiring required, and all ***HIMatrix*** systems can be configured and monitored from each individual system.

*safe**ethernet***

***Based on standard Ethernet technology and with TÜV certification,** safe**ethernet** speeds up the transmission of safety-related data to 100 Mbit/s, and can therefore be used to build powerful, distributed safety applications.*

HIMatrix-products		***Analogue/ digital inputs***	***Analogue/ digital outputs***	***Ethernet switch ports***	***Line monitoring****	***Special features***
Compact PES	**F35**	8 / 24	- / 8	4	-	incl. 2 x 100 kHz counters, approved for use in Ex Zone 2
	F31	- / 20	- / 8	2	yes	no fieldbus interfaces
	F30	- / 20	- / 8	4	yes	-
	F20	- / 8	- / 8	2	-	8 individual channels, parameterised as input or output
Remote-I/O	**F3 DIO 20/8 01**	- / 20	- / 8	2	yes	multi-master-compatible, approved for use in Ex Zone 2
	F3 DIO 20/8 02	- / 20	- / 8	2	yes	single-master
	F1 DI 16	- / 16	- / -	2	yes	single-master
	F2 DO 16	- / -	- / 16	2	-	single-master, 8 x 2 A outputs, 8 x 0.5 A outputs
	F2 DO 8	- / -	- / 8	2	-	single-master, relay outputs up to 230 V contact voltage
	F2 DO 4	- / -	- / 4	2	-	single-master, up to 5 A load
	F3 AIO 8/4	8 / -	4** / -	2	-	single-master, supply for NAMUR initiators and 24 V
Modular PES	**F60**	- / -	- / -	4	-	6 slots for any type of I/O module
I/O-modules	**AI 8**	8 / -	- / -	-	-	-
	DI 32	- / 32	- / -	-	yes[1]	[1] cross-circuit in connection with DIO 24/16
	DI 24	- / 24	- / -	-	-	110 V input voltage
	MI 24	24 / 24	- / -	-	-	current inputs 4-20 mA, alternative NAMUR inputs
	DIO 24/16	- / 24	- / 16	-	yes	-
	CIO 2/4	- / -	- / 4	-	-	2 counters up to 1 MHz
	AO 8	- / -	8 / -	-	yes	-
	DO 8	- / -	- / 8	-	-	relay outputs up to 230 V contact voltage

** Not safe

* Configurable

HIMatrix

ELOP II by HIMA FACTORY

ELOP II Factory – the efficient engineering tool

This special version of the proven ELOP II offers the following advantages:

- Straightforward planning, programming, diagnostics and system and communication documentation
- IEC 61131-3-compliant
- Easy to program with function block diagrams (FBD) and sequential function charts (SFC)
- Windows NT/2000-compliant
- Full-graphics programming with drag&drop functionality
- Can be operated safely without any need for special hardware or safety expertise
- Automatic network configuration (plug&play)
- System based, central programming via safe**ethernet**
- Function blocks with TÜV/BG certification
- Use of all IEC 61131-3 functions and variable types for safety-related programs
- Offline simulation of all functions
- Online logic test

Overview of the benefits

- **Certified to SIL 3, AK 6, Cat. 4, IEC 61508, IEC 61131, prEN 50156, EN 954, DIN V 19250, NFPA, ATEX**
- **Can be used in Ex zone 2**
- **Response time < – 20 ms**
- **Cycle time for 1 K program approx. 0.02 ms**
- **Communication via** safe**ethernet, Profibus, OPC DA, MODBUS RTU/TCP, Siemens Send&Receive**

Applications to SIL 4/AK 7:

The primary applications for hard-wired safety-related controllers are automated processes that represent an extremely high potential risk to people, equipment and the environment and for which safety is the highest priority.

SIL 4/AK 7 requirements can be found in the following typical applications:

- **High-integrity pressure protection systems**
- **Emergency stop systems on drilling platforms**
- **Extremely time-critical safety circuits**
- **Primary cut-out systems**

The application-specific programming for these systems is hard-wired, rather than carried out via the software making it very robust. Once installed, these processes will run for years without modification. They are also known as "fit and forget" systems.

Hard-wired systems must guarantee that all system components conform absolutely to standards such as IEC 61508, NFPA 72 and prEN 50156 in order to meet normative, statutory and insurance conditions. Additional redundancy concepts are needed to increase availability. Other basic requirements are ease of connection to commonly available control and visualisation systems and the option of monitoring for open and short circuits.

The HIMA Planar4 system is the only safety system that IEC 61508 allows to be used up to SIL 4/AK 7.

Reference projects

Project	*Customer*	*Country*	*Application*
Pipeline	Air Liquide	Belgium	ESD
FPSO/drilling platform	CNOOC	China	HIPPS
Oil pumping	Conoco	Indonesia	HIPPS
South Pars 1 Offshore	NIOC	Iran	HIPPS
HDPE plant, Marapol	Marun Petrochemical Company	Iran	ESD
Chlorine electrolysis	NAM	Netherlands	HIPPS
Forcados Yokri/Estuary	Shell/SPDC	Nigeria	ESD, F&G
Gullfaks A/C drilling platform	Statoil	Norway	HIPPS
Troll drilling platform	Statoil	Norway	HIPPS
Tune drilling platform	Norsk Hydro	Norway	HIPPS
LDPE	Borealis	Austria	ESD, Interlock


Figure: BASF

Applications to SIL 4/AK 7 with Planar4 systems.

The **Planar4** system was developed especially for applications with safety requirements up to SIL 4/AK 7, and is the only system in the world that may be used up to SIL 4 in conformity with IEC 61508.

Only the hard-wired system from HIMA integrates inputs, logic processing and outputs on every module. The application-specific programming of the Planar4 system is carried out using various wiring techniques such as solder, Termipoint or Wire Wrap on the backplane bus board. This greatly reduces the engineering complexity and the amount of wiring involved.

The Planar4 systems are the first hard-wired systems with integral diagnostics and communication capability. The diagnostics ensure rapid error signalling and easy trouble-shooting – even for untrained personnel. An efficient remote diagnostic system can be created when combined with the communication options.

Input and output statuses, limit and time values can be transferred via OPC DA, Profibus DP or MODBUS to control and visualisation systems. OPC Alarm&Event can also be used to transfer events, i.e. HIMA signals with time stamp.

All Planar4 modules can be used in a redundant structure in order to increase availability.

Input modules

Modules for proximity switches (including (Ex)i) with line monitoring

Output modules

Modules with prelogic, short-circuit-resistant 3 W, 24 W and 60 V/24 W outputs

Limit minitor

0 ... 20 mA, two channels, each with two limit values

Relay amplifier

Relay amplifier with prelogic and monitored output fuses. Switching voltages 24 V, 48/60 V, 110/127 V, 220/230 V

Logic modules

AND element

OR element

Blocking element

2of3 selection

Timer function

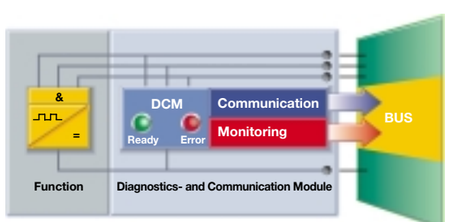
Other modules

Fuse group with monitoring

Communication module, reset module

RS 485 (MODBUS, Profibus DP)
Ethernet (OPC)

Planar4



Integrated diagnostics and communication capability

Overview of the benefits

- **Can be used for SIL 4/AK 7**
- **MTBF > 200 years**
- **Switching time 2–10 ms**
- **Scalable redundancy**
- **Communication via OPC, Profibus DP, MODBUS**
- **Monitoring for open and short circuits**
- **Space-saving 19" technology**

Safety life-cycle support.

Production processes can only be guaranteed to be cost-effective and safe if we consider the entire life-cycle of a plant. This approach is reflected in the new IEC 61508 standard, which does not simply relate to individual components of safety-related automation. It also considers the comprehensive structure of a safety loop – from the initial concept through to decommissioning of the plant.

New requirements have to be placed on the project management, hardware and software, training, documentation and servicing to ensure that a plant conforms to standards, and then to run it cost-effectively.

In this respect, operators, contractors and system integrators require much more than just hardware and software from the suppliers of safety systems. They now need comprehensive support from skilled contacts during every phase of the project – both locally and world-wide.

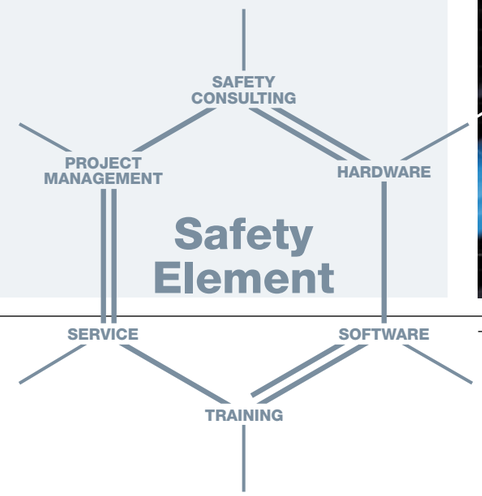
The process industry demands advice at the process design stage, support for selecting the right safety strategy/systems and instrumentation and access to experience and expertise.

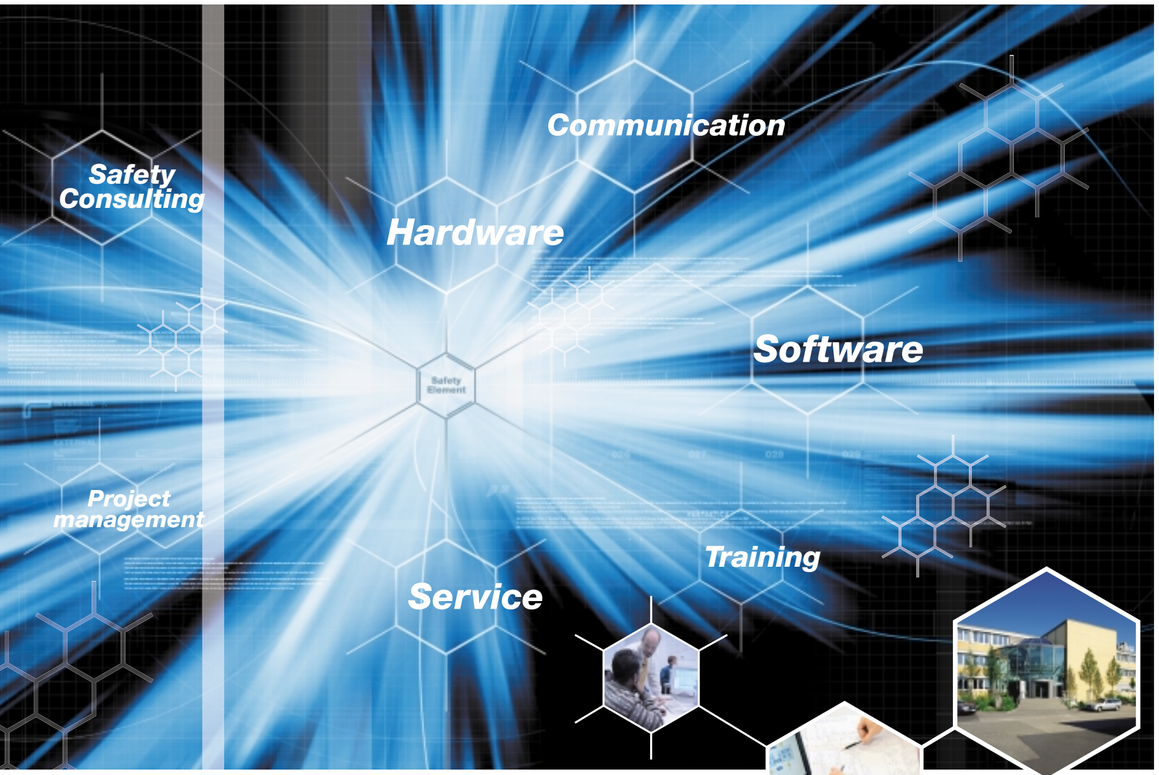
The holistic approach on which IEC 61508 is based corresponds entirely to the HIMA philosophy of providing comprehensive safety in automation technology. This philosophy is expressed in the safety element model.

In addition to superior hardware and software, safety consulting, project management, training and service are other essential components of our concept of the HIMA Safety Element.

It is the interaction between these dimensions that creates complete application solutions from safety systems, sensors, actuators, integration concepts, tested interfaces and off-the-shelf function blocks.

With the Safety Element, HIMA can offer safety life-cycle support – world-wide.





IEC-61508-conformity with the Safety Element.

Safety Consulting. Advice on the safety aspects of plant planning guarantees significant cost benefits, even at the very early stages. This advice naturally incorporates all the questions associated with safety standards compliance and the consequences of not doing so.

Project management. The IEC 61508-compliant project management system comprises international project coordination and implementation by qualified local contacts, from the tendering phase right through to commissioning. Using intelligent tools such as project-specific databases, systematically-created hardware and software typicals and engineering with high-level understanding of the process, HIMA can ensure that your projects will be completed technically correctly, cost-effectively and on time.

Service. HIMA has a world-wide presence with its own Service Centres and experienced representatives, and can offer a 24-hour service in all the key regions of the world. Skilled employees are always available locally.

Training. Individual project-specific training courses can be arranged, in addition to courses in the basic principles. These can be held either in one of HIMA's training centres around the world or on the customer's premises.

With safety life-cycle support from HIMA, you remain *in*process.

SILence® by HIMA

The world's first TÜV-confirmed SIL calculation tool according to IEC 61508 allows you to automatically calculate the PFD, PFH, SFF and MTTF values of entire safety loops using drag&drop.

Fax response

I would like to know more about the HIMA range of products and services. Please send me more information on the following topics:

- ⬡ H41q/H51q
- ⬡ HIMatrix
- ⬡ Communcation and Integration
- ⬡ ELOP II
- ⬡ ELOP II Factory
- ⬡ Training programme
- ⬡ Planar4
- ⬡ SILence
- ⬡ Services

⬡ **I have a specific question.**

⬡ **I would like to arrange a date for a presentation.**

Please call me back on_____ at_____.

Further information on these topics can also be found at www.hima.com.

Company

Name *Title*

Department/Position

Address

Town, post code

Telephone *Mobile*

Fax

E-Mail

Date and signature

HIMA Paul Hildebrandt GmbH + Co KG
P.O. Box 1261 · 68777 Brühl
Telephone.: (+49 62 02) 7 09-0 · Telefax: (+49 62 02) 7 09-1 07
E-mail: info@hima.com · Internet: www.hima.com

HIMA Paul Hildebrandt GmbH + Co KG
P.O. Box 1261 · 68777 Brühl
Telephone.: (+49 62 02) 7 09-0 · Telefax: (+49 62 02) 7 09-1 07
E-mail: info@hima.com · Internet: www.hima.com