SAFETY NONSTOP



Update overview HIMax product catalogue

V3	V4	V5	V6
Update package	Update package	Update package	Update package
November 2010	November 2011	September 2012	January 2014
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		4.4.0	4.4.0
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	5.1.0		5.1.0
	5.2.0	5.2.0	5.2.0
	600	600	600
	0.0.0	0.0.0	0.0.0
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	6.3.0	6.3.0	6.3.0
		6.4.1	6.4.1
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		6.6.2	670
6.7.1		6.7.1	0.1.0
		6.7.2	(72)
		6.7.4	6.7.3
		6.8.0	
	610.0	610.0	
	6.10.1	6.10.1	
	6.10.2	6.10.2	
	6.10.3	6.10.3	
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	6.10.6	6.10.6	
	6.10.8	6.10.8	
		6.11.0	
	7.0.0	0.12.0	
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Transparency from A to Z

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HIMA: The company Safety. Nonstop.

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Maximum safety and profitability The HIMA nonstop philosophy

HIMA is the world's leading designer and manufacturer of automated safety solutions. Everything we do, think and create is designed to help you achieve nonstop safety.

The result of this philosophy: solutions that provide maximum safety and uninterrupted plant operations.

HIMA solutions increase your efficiency through:

- Avoiding over- and under-dimensioning
- Maximum plant uptime
- Reduced investment and lifecycle costs
- Future-proof, lifetime flexibility
- Superior ease of use

A history of looking forward

Founded in Germany in 1908, HIMA began establishing safety automation milestones in 1970 when the company introduced the world's first TÜV-certified safety system. Since then, HIMA systems have protected operations at the world's largest oil, gas, chemical, pharmaceutical and power companies. Today, HIMA's expertise is also being used to develop new, creative solutions for the rail sector, logistics and machine safety.

HIMA highlights:

- The world's leading and only independent designer and manufacturer of automated safety solutions
- More than 40 years of experience
- More than 30,000 systems installed in over 80 countries
- Long-term commitment of a 100-year-old, familyowned company
- More TÜV-certified safety specialists than any other safety systems manufacturer
- World's first TÜV-certified safety system
- Industry's largest range of flexible and scalable product platforms
- Proven system integration with any DCS and automation environment
- 100% made in Germany





Creating precise solutions HIMA products

HIMA provides the industry's largest selection of flexible and scalable safety systems for almost every safety-critical application in the process industry, the rail sector and for logistics and machine safety. Our systems are based on safety technology that's been proven and refined for decades, and which can be integrated easily into every automation environment on the basis of cross-manufacturer, open communications standards. Our solutions guarantee safe and economical plant operation.

HIMA systems adapt to any number of I/Os, to every type of I/O, to central and distributed applications, to all availability requirements and to integration with every DCS. All HIMA systems can be used for SIL 3 applications (in accordance with IEC 61508). Our Planar4 system can be used for SIL 4 applications.

NONSTOF



Creating intelligent connections HIMA DCS integration solutions

Full integration with DCS operating and monitoring functions

The advantages of a HIMA solution, including nonstop operation, can be combined with all leading distributed control systems (DCS). DCS SIS integration is achieved through high-capacity, cross-manufacturer communication standards. Based on the extensive integration know-how of our DCS competence team, HIMA assumes responsibility for DCS SIS integration and provides the required functionality (ICSS by HIMA). HIMA solutions offer features such as:

- Integration of alarms and events into the alarm management of the DCS
- · Integration of faceplates for operating and monitoring
- Transfer and visualisation of diagnostic data
- Transfer and visualisation of process data and safety-related locking states
- Timestamp transfer
- Maintenance overwrite switch (MOS)
- Partial stroke test (PST)
- Start-up bypass (SUB)

The HIMA DCS Competence Team

All leading control systems are installed at HIMA. The HIMA DCS competence team continuously tests all integration options, thoroughly documents them and develops efficient, pretested configurations. Based on this extensive integration know-how of our DCS competence team, HIMA assumes responsibility for DCS SIS integration and provides the required functionalities (ICSS by HIMA).



Version 6, Subject to change and errors, 96 9000530 0114

Learn more about systems integration at our website: http://www.hima.com/Solutions/Integration_solutions_default.php



Safety is inseparable HIMA LIFECYCLE SERVICES

Comply with your legal and economic responsibilities

Anyone who is planning, constructing or operating a processing plant today is confronted with an array of new and complex laws, regulations and standards in the area of 'functional safety'. Safety considerations must, for example, be applied across the entire lifecycle of the plant and be integrated into each and every phase, from the initial analysis through project execution all the way to operation.

This new complexity, coupled with growing cost pressure and more aggressive project schedules makes it increasingly difficult for project managers to meet their legal and economic responsibilities.

In response, HIMA has developed the HIMA LIFECYCLE SERVICES concept.

We offer qualified, sophisticated and coordinated services for all phases of the safety lifecycle - an expression of our nonstop philosophy. HIMA possesses specialist safety knowledge which is often missing from today's planning and operating staff. Due to our independence, we are able to work in any project constellation: we accept both subtasks and complete projects, and work for end customers as well as part of a team with EPC, MAC and DCS manufacturers.

The concept provided by HIMA LIFECYCLE SERVICES offers an overview of all functional safety requirements and consistently supports the right decision at the right time.





HIMA LIFECYCLE SERVICES The right decision at each stage



Benefits from these advantages:

- Full conformity with the latest standards resulting in full legal security (including IEC 61511, Seveso II Directive)
- Considerable reduction in planning and implementation errors and their negative effects on schedules and budgets
- Reduction of insurance premiums by up to 20%
- No underspending on protection ensuring that the required risk reduction is achieved
- No overspending on protection resulting in optimised capital costs
- High productivity, product quality and plant availability
- Reduced OPEX, e.g., thanks to optimised maintenance costs

Training courses

In accordance with the new safety standards, all members of a safety-critical project must provide proof of their personal qualification. HIMA offers you a comprehensive and high-quality training programme for your development, operating and maintenance personnel.

You can choose between product-specific or projectspecific, tailor-made training. Training can be conducted at one of the HIMA training centres or on-site at your premises. Our functional safety courses include those that lead to TÜV certification.



On location worldwide The HIMA group

Our products and services are delivered worldwide through a steadily growing network of group companies, sales and service centres, and representatives. Currently, we are in more than 50 countries. Count on us to be where you need us: on location.

With HIMA, you always deal with qualified safety specialists. In addition, you know that the solution you receive will be safe and efficient and will comply with regional requirements and regulations. Safety, after all, knows no boundaries. A detailed list of our group companies and representatives is available on our website: http://www.hima.com/contact





More flexibility, productivity and future dependability:

2.1.0
2.1.0
2.2.0
2.2.0
2.2.1
2.3.0



More flexibility, productivity and future dependability HIMax comes with big benefits

HIMax is a flexible SIL 3 platform for safety-critical production processes that have to run continuously. HIMax can be adapted to any plant size, response time and fault tolerance requirements. It works with centralised and distributed applications alike. HIMax ensures maximum plant availability and easily accommodates plant modifications.

HIMax benefit 1: Maximum plant availability

HIMax runs nonstop. That means uninterrupted system operation throughout the life of your plant.

- HIMax's XMR architecture eliminates single points of failure. Redundancy can be customised to ensure optimal protection, while preventing false alarms.
- All changes, upgrades and service can be done without stopping the HIMax system.
- Even proof tests mandated by current industry standards can be conducted online without any interruption of the safety system.
- HIMax protects against common-cause effects (such as ambient conditions) via physical separation of redundant components.
- HIMax is based on the world's most proven safety system technology.

HIMax benefit 2: Optimising plant efficiency

HIMax performance gives rise to new, safe ways of optimising processes. For example, it allows mathematical and statistical models for dynamic process control to be integrated, and for process values to be checked more frequently in the safety system.



Critical processes with continuously changing process variables can thus operate closer to their limits. In an ethylene cracker, for example, the dynamic process variable of temperature can be kept one to two degrees closer to the critical limit, which increases the plant's productivity considerably while maintaining full process safety and availability.







More flexibility, productivity and future dependability HIMax comes with big benefits

HIMax benefit 3: Low life-cycle costs and high flexibility

With HIMax you buy into the future, getting the safety you need today and the ability to easily change your processes and plant tomorrow. You pay for exactly what you need when you need it ... today, tomorrow and 10 years from now. HIMax is the safety platform you can build your future on. As your business changes and grows, HIMax can change and grow with it.

How HIMax increases profitability:

- Optimised acquisition costs HIMax can be expanded and modified "just in time."
- No costly downtime changes can be made without interrupting operations.
- HIMax can be your single platform for all I/Os, response times and fault tolerance requirements, and for centralised and distributed applications.
- Save engineering time and costs using a flexible, intuitive and easily adaptable platform.
- Future-proof investment HIMax integrates with any process control system that you use today or in the future.
- Unprecedented performance HIMax lets you integrate more I/O points (up to 12,800) and more complex applications in each system.
- HIMax is cost-effective, with different rack sizes to match your physical space requirements and a range of installation and wiring options.

 No hidden software costs - with your SILworX software licence, you get a single intuitive software tool for all tasks.

HIMax benefit 4: Making safety simpler

HIMax is easier to operate than any other system available today. This ease of use helps reduce human errors and saves valuable engineering and installation time.

HIMax makes your work easier through the following features:

- Automatic module detection
- Fully integrated and protected power distribution, eliminating the need for external wiring
- Fast implementation via HIMA SILworX, a user-friendly software tool with an intuitive interface, self-documentation and embedded version control
- Accelerated commissioning because the hardware is built and tested without an application program (loop check mode)
- Comprehensive diagnostics, automatic recording of 5,000 events per CPU
- Built-in user management for hardware and software
- HART protocol support simplifies asset management solutions.





More flexibility, productivity and future dependability The HIMax Safety Simulator X-OTS

HIMax benefit 5:

Improve safety and profitability through simulation with X-OTS HIMax Safety Simulator

X-OTS is based on HIMA's programming tool SILworX and a corresponding number of extended soft controller.

- Application software can be checked in real scenarios prior to commissioning, leading to shorter commissioning times
- Shorter commissioning times lead to an earlier plant start up and to a higher plant efficiency
- Application software can already be optimized prior to start up
- Avoiding of plant trips by improved behaviour of operators

Basic functionalities

- Each HIMax controller will be simulated by one soft controller
- Up to 10 soft controller can be run on one PC (performance depending)
- Simulation of the real programs incl. multitasking with configurable cycle times
- Connection
 - Soft controller ↔ process simulation
 - Soft controller ↔ DCS simulation
 via OPC DA interface (→ I/O data and communication
 variables of the HIMax are transferred to OPC tags)
- Control of the special OTS functions also via OPC tags
 - Start/Stop/Pause/Continue
 - · Save/load snapshots/initial conditions
 - Setting of realtime factor time lapse/slow motion
- Reusability of snapshots/initial conditions also after program changes!
- Communication between the different soft controller via safe**ethernet** and OPC DA/A&E

The X-OTS HIMax Safety Simulator adds the aspects of safety to the classical OTS (Operator Training System)



In use all around the world HIMax references

The list of HIMax references is constantly expanding

- ABB South Africa (PTY) Ltd, Sunninghill, South Africa | Matla Power Station RSA
- AKZO NOBEL, Arnhem, Netherlands | IP Incinerator Mons
- AMK Abfallentsorgungsges., Iserlohn, Germany | Umbau der NS/MS Schaltanlage für AMK Iserlohn
- Angola LNG Ltd., Soyo, Zaire Provence, Angola | HIMax System Hardware Angola LNG
- Anwil A.S., Wloclawek, Poland | TMC system
- AviComp Controls GmbH, Leipzig, Germany | P03950 - HPCL (India Control Retrofit) Projekt
- BASF Antwerpen N.V., Antwerpen 4, Belgium | Central Tankfarm E55
- BASF Construction Chemicals, Midrand, South Africa | SPLC Impl. DeltaT, Durban South Africa
- BASF Performance Products, Zwentendorf/Donau, Austria | Dispersionsanlage Pischelsdorf
- BASF Performance Products plc., Bradford West, Yorkshire BD12 OJZ, Great Britain | Bead Safety Concept (BSC) FPLC for Line 2-8 - BASF Bradford
- BASF Schwarzheide GmbH, Schwarzheide, Germany | SSPS Peol Anlage Schwarzheide
- BASF SE, Ludwigshafen, Germany | N416/N420, HNO-Anlage, Teilanlagen 1-6
- Bayer CropScience GmbH, Frankfurt, Germany | HIMax-SSPS für BCSBE
- Bayer MaterialScience AG, Dormagen, Germany | Umbau Chlorverdichter, Turbo 4
- Bayer MaterialScience China, Shanghai, China | Hardware for Bayer TDI TDA Plant
- Bayer Technology Services GmbH, Leverkusen, Germany | Tanklager und ISD, Gebäude B597
- BAYERNOIL, Vohburg, Germany | Sauerwasserstripper (SWS), Anlage 44, BT Vohburg
- Bhushan Steel Itd., Thekoloi, India | Bhushan Pelletizing Plant 3,85 MTPY, Job-No. 1078-11
- Bilfinger GreyLogix GmbH, Flensburg, Germany | SCS/FGS System - Fluxys Winksele
- BK GIULINI GmbH, Ladenburg, Germany | Umbau der Kammeröfen 1-3
- BP Cherry Point Refinery, Cherry Point, USA | Hardware for Cherry point Refinery
- BP Europa SE, Lingen, Germany | Zentrale Messwarte
- BP Gelsenkirchen GmbH, Gelsenkirchen, Germany |

Modernisierung Ofen BA-101

- BP Texas City Refinery, Texas City, USA | Hardware for Texas City Refinery
- Bunde-Etzel-Pipeline, Westerstede, Germany | (pipe) Bunde Gaspipline
- Cegelec Deutschland GmbH, Frankfurt/Main, Germany | (pipe) MERGER FBG
- Clariant Produkte, Burgkirchen, Germany | Geb. 647, EO-Tanklager und Rohstofftanklager
- Deutsche Transalpine, Munich, Germany | C94 Upgrade deutscher Teil
- DOMO Caproleuna GmbH, Leuna, Germany | Phenolanlage, Erweiterung 6110040
- Dyneon GmbH, Burgkirchen, Germany | Fluorthermoplast-Anlage
- Dzerjinsk Chemical Plant, Dzerjinsk, Russia | Oxide Ethylene Unit
- EDF, Cordemais, France | EDF Brennersteuerung Kesselschutz Cordemais
- Egypt Hydrocarbon Corporation, Mohandessin, Giza, Egypt | EHC-Egypt, EHC-Project, NA/LDAN Complex, Ain Sokhna
- ESSO BELGIUM, Antwerpen, Belgium | Hansa dock/B419 changes - HPHT OSBL
- Esso Petroleum Co Ltd, Fawley, Southhampton, Great Britain | FMT - Replacement of Rochester P1
- Evonik Degussa GmbH, Marl, Germany | Polyöl-Anlage Bau 9184
- Evonik Industries AG, Marl, Germany | Druckabsicherung Ethylenpipeline HIMax
- Evonik Services GmbH, Marl, Germany | Neubau Polyöl-Anlage ,Polyvest'/(HTPB)
- ExxonMobil, Praha 3, Czech Republic | Project 10033-6 - SIS Replacement F5101/02 + Air Preheater
- ExxonMobil Chemical Holland BV, Botlek - Rotterdam, Netherlands
- ExxonMobil Refining & Supply, Antwerpen, Belgium | Solvent Truck Loading ExxonMobil Antwerp
- Foster Wheeler Italiana s.r.l., Corsico (Milano), Italy | APS LP + IHLCO PROJECT
- FVS-Fernwärme-Verbund Saar, Völklingen, Germany | Brennersteuerung für Spitzenkessel
- Hatch Associates Pty Ltd, Brisbane, Australia | Hardware for Koniambo Nickel Project SIS
- HBG Hydranten-Betriebs OHG, Frankfurt/Main, Germany | Austausch Pumpengruppe III, Tanklager

Your HIMA sales representative can give you more information about additional HIMax projects.



- Henkel AG & Co. KGaA, Düsseldorf, Germany | Modernisierung Kohlekessel 1
- HOLBORN Europa Raffinerie GmbH, Hamburg, Germany | HIMax/Upgrade
- HP Consulting Planungsbüro, Grenzach-Wyhlen, Germany | Brennersteuerung für BASF, in W241
- IEP Industrielle Elektro, Wien, Austria | Biogasanlage EVM
- INEOS Manufacturing Köln GmbH, Cologne, Germany | Luftkondensatoren und C3-Hydrierung – Luko (HIMax)
- Ineos nv, Zwijndrecht, Belgium | C2T-Project
- INEOS Vinyls, Wilhelmshaven, Germany | JETTY Messwarte + Anleger 2 und 3
- InfraServ GmbH & Co., Burgkirchen, Germany | Technikum G337 - Dyneon
- Inpex Browse Ltd, Perth, Australia | CPF
- INSTEP, Kuala Terengganu, Malaysia | HIMax Demo system for Petronas Institute
- Instrumentos & Controles S.A., Bogota D.C., Colombia | New HIMax Demo System
- j&k regeltechnik gmbh, Starnberg, Germany | Zoofenster – Hotel Waldorf Astoria
- KG Deutsche Gasrußwerke, Dortmund, Germany | Update Sicherheitssteuerung Reaktor 4
- KH-Automation Projects GmbH, Fuldabrück, Germany | AMK Iserlohn
- KRONOS TITAN GmbH, Leverkusen, Germany | Erweiterung HIMax Strasse B/C
- Kuwait Oil Company (K.S.C.), Ahmadi, Kuwait | Wara Pressure Maintenance Project
- LANXESS N.V., Antwerpen, Belgium | HIMax Project
- LANXESS N.V., Kallo, Belgium | LXS-GF HIMax
- Leicom GmbH, Frankfurt/Main, Germany | DBblue, Deutsche Bank, Frankfurt
- LLC SPB-XXI, Moscow, Russia | ESD for Offshore
- Loesche GmbH, Düsseldorf, Germany | Brennersteuerung OITA - Coal
- M+W Process Automation, Melsele, Belgium | Black Diamond - Tank Farm E1500 (OSBL)
- M+W Process Automation GmbH, Ludwigshafen, Germany | Salpetersäureanlage, BASF
- MAN Diesel & Turbo SE, Oberhausen, Germany | LUDAXNO
- MCL Control S. A., Caracas, Venezuela | New HIMax Demo System
- Mehldau & Steinfath, Hamburg, Germany | M&S ACAI Brazil
- Metso Automation Oy, Tampere, Finland | LUNA SIS, UPM-Kymmene Oy, 53200 Lappeenranta, Finland
- MIPRO OY, Mikkeli, Finland | New HIMax Demo System
- MiRO MineraloeIraffinerie, Karlsruhe, Germany | Ofensicherheit/OSI
- MOMENTIVE, Leverkusen, Germany | HIMax für neuen Schaltraum in Gebäude V14
- Nederlandse Aardolie, Assen, Netherlands | Upgrade NAM Den Helder Nogat
- Novy Urengoy Gas, Novy Urengoy, Russia | Title 900 - Power Plant & Utilities
- OMV Deutschland GmbH, Burghausen, Germany | Umbau Kessel 4 Mischbrenner
- Origin Energy New Zealand, New Plymouth, New Zealand | Hardware for Origin Energy Ahuroa Stage 2A

- Orion Engineered Carbons GmbH, Cologne, Germany | Modernisierung Messwarte
- OXEA GmbH, Oberhausen, Germany | (2013) Upgrade der PES im Flüssigkeitstanklager +NH3+DMA
- PCK Raffinerie GmbH, Schwedt/Oder, Germany | HIMax-System als SSPS
- PEMEX, Poza Rica, Mexico | Hardware delivery for Poza Rica FGS
- Petrobras Petroleo, Rio de Janeiro, Brazil | Comperj HAI subcontract to HPH
- PIDMCO A/C Oil Industries Eng., Teheran, Iran | SHIRAZUR
- Process Control & Integration, Randburg, South Africa | Ammonia Plant ESD, Sasol, Sasolburg
- QATAR PETROCHEMICAL CO. LTD, Doha, Qatar | Fire & Gas System for LDPE3 Plant, QAPCO
- Raffinerie Heide GmbH, Heide/Holstein, Germany | Ersatzteile 9120595
- RWE Service GmbH Gundremmingen, Germany | Pumpensteuerung Hauptkühlmittelpumpen
- Shell Deutschland Oil GmbH, Hamburg, Germany | Feuerlöschanlage
- Shell Sarnia, Sarnia, Canada | Hardware for SIS Upgrade
- Siemens AG, Mannheim, Germany | C800, D800, TDI-Plant, Blockfeld
- SIOT S.p.A., San Dorligo Della Valle/Trieste, Italy | C94 Upgrade italienischer Teil
- SIPCHEM, Jubail Industrial City, Saudi Arabia | EVA Plant and Utilities II Expansion Project
- Solvay Chemicals GmbH, Bernburg, Germany | Kesselschutz SPS am Abhitzedampferzeuger 1
- Speciality Polymers Antwerp, Zwijndrecht, Belgium | SCIS Upgrade in the LDPE PLANT
- SScope, Ciudad de Mexico, D.F., Mexico | New HIMax Demo System
- TATA Steel Ltd., Jamshedpur, India | Pelletizing Plant 768 m² - TATA Steel India
- Todd Taranaki, Tikorangi, New Zealand | Hardware for Todd LPG Recovery Plant
- TOTAL E&P NORGE, Stavanger, Norway | Martin Linge Phase 1 und Phase 2
- Transneft, Moscow, Russia | Fire alarm system
- Tronox Pigments (Holland) B.V., Botlek Rt / Rozenburg, Netherlands | UPOX 1
- Turkmenistan Railways, Asgabat, Turkmenistan | Savronik, Turkmenistan_01
- Vattenfall Europe, Boxberg/Oberlausitz, Germany | Neubau Block R in Boxberg
- Vattenfall Europe Hamburg AG, Hamburg, Germany | KW Moorburg, Kesselschutz
- VESTOLIT GmbH & Co. KG, Marl, Germany | TA200
- Vinnolit GmbH & Co. KG, Burgkirchen, Germany | VinCon, HIMax-Erweiterung PES Bau 133
- YARA Brunsbüttel GmbH, Brunsbüttel, Germany | Rectisol-Anlage, Erweiterung + Redundanzkonfiguration
- Yara Sluiskil B.V., Sluiskil, Netherlands | Migratie Reformer E

3 HIMax: The mechanical concept Flexibility at every level

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Flexible rack configuration Precision safety	3.3.0
Connector boards Quick to hook up	3.4.0
Fan modules Long life spans	3.5.0



Modules Flexible and durable

HIMax's modular approach simplifies handling and reduces assembly, connection and conversion times.

• Each module has its own durable casing.

HIMax units are divided into system bus, processor, communication, and input and output modules. All are enclosed in easy-to-handle, extremely durable casings made from highquality plastic. The electronic components are protected permanently against mechanical, electromagnetic and electrostatic influences. A special varnish further protects the PCBs in each module against moisture, mildew, harmful gasses and electrically conductive coal dust. This varnish complies with the "conformal coating" requirements described in ANSI / ISA-S 71.04.

• Fast module replacement - without detaching field wiring

Installing the modules on the base plate is quick and easy. Mechanical coding makes it impossible to connect a module in the wrong location. Simply place the module into the base plate, press down and secure it with a single screw. Wiring is not affected, because it is set up separately on the level below. This replacement ensures quick repair times (MTTR), improving productivity.



• Less wiring - more performance

All channels are secure against short circuits. Current distribution and fuse protection are provided automatically. There is no need to plan or wire an external fuse level. The processing of I/O values and scaling is accomplished within the modules themselves. This reduces the burden on processor modules and facilitates powerful, fast solutions even in very large plants with thousands of I/O points.





Three base plate sizes A stable base for flexible solutions

Each HIMax module is mounted on a sturdy base plate. The power supply and system bus are integrated into the base plate - and both are redundant. The power supply is sufficient for the module and can also supply as much as 63 A through the bus bars for output. Completely passive in design, the base plates are designed to last a lifetime of a plant.

Base plates are available in 3 different sizes - for racks with 10, 15 or 18 slots. All can be wall-mounted. The version for 15-module racks is also available for 19" cabinet mounting.



 Modules
 Wiring

 Wiring
 15

 18

Unloaded base plate

Loaded base plate



Flexible rack configuration Precision safety



Racks can be equipped in many ways

Communication between modules takes place at 1 GBit/s via system bus modules. Depending on requirements, one or two system bus modules can be accommodated in the first two slots of a base plate. System bus modules enable star-structured communication among the modules of a system. This means that each module within a system can communicate directly with every other module in the system. If one connection is faulty, it will not affect the other connections.

If two system bus modules are plugged in, communication with the module suffering from a faulty connection can still be maintained via the redundant system bus.

A system can consist of up to 16 base plates of equal specification

The system bus modules also facilitate communication between the base plates. To accomplish this, system bus modules must be present on every base plate.

Conventional Ethernet cables (at least CAT.6) are used to connect the base plates. A distance of 100 m can be bridged using copper cables. Special media converters can also be used to convert the data for transmission along optical fibres. In this case, a distance of up to 20 km can be bridged



using a system bus. Additional slots are not required for this extension. If further extensions are required, it is possible to network up to 255 participants using safe**ethernet.**

This modular approach provides a highly flexible and compact configuration.



Connector boards Quick to hook up

Connector boards are mounted on the base plate and are used to connect the modules to the field. Different connector boards are available for each type of module.

If you divide the system into a module level and a connector level, you will not have to disconnect the field wiring when a module is swapped.

Connector boards with either twin or triple wire connectors are available for each channel.

Connector boards also distribute the transmitter feed signal.

Connector boards can be connected during ongoing operation of the system.

The following versions are available:

- Direct wiring using terminal strips. Standard terminal strips feature screw terminals but can be equipped with spring clamps.
 - Mono and redundant
 - This type of connector is especially suitable for smaller applications.
- Multicore cables connected to a Field Termination Assembly (FTA).
 - Mono and redundant
 - This type of wiring is especially suitable when using an additional distribution level.

In the case of a redundant connection, the actuators and/or sensors are only connected at one point, and the signals are automatically distributed to two modules.







Fan modules Long life spans

Powerful fans are included in every HIMax cabinet. The temperature of its environment determines the useful life of an electronic module. A 10 °C increase in temperature can cut its life span in half. Continuous cooling can keep the system operating even in hot environments.

HIMax system fans are so powerful that even if one in three fans fails at an ambient temperature of 60 $^{\circ}$ C, the modules will not become critically hot.

All fan modules can be supplied with redundant power and automatically monitored. If the HIMax system detects a fault, the affected fan module can be quickly replaced while operation continues.

We can also supply fans suited to extremely high ambient temperatures, as well as fans that are especially quiet and can last for 10 years.







Foundations of nonstop operation:	
Lifelong availability based on maximum fault tolerance	4.1.0
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Foundations of nonstop operation

XMR architecture

Lifelong availability based on maximum fault tolerance



XMR® - Single, x=1, SIL=3

XMR® - Dual, x=2, SIL=3



XMR[®] - Triple, x=3, SIL=3



4.1.0

XMR[®] - Quad, x=4, SIL=3

HIMax's XMR architecture increases fault tolerance while preserving full safety levels (SIL 3). All HIMax modules are safe under single-channel operation without time constraints (SIL 3), which streamlines setup and makes the system highly scalable.

XMR architecture is designed to increase availability. Every HIMax module can be operated in QMR (Quadruple Modular Redundant), TMR (Triple Modular Redundant), Dual or Single modes, and programming time is the same for all modes. Complete single-fault tolerance applies from the dual structure upwards: in the event of a fault you can replace the faulty module online at any time and without restrictions.

OUTPU'

Every I/O module can be operated using one or more CPUs. As many as 4 CPU modules can be used in one system, and up to 4 I/O modules can act on the same sensor or actuator at the same time.

It is possible to operate with permanent redundant modules or to work with reserved slots.

Redundant wiring is set up using special connector boards, for which adjacent modules are used. You can wire together modules located on different base plates. This is done either directly via terminal strips or by using special FTAs.

If redundancy is reduced in the event of a fault, safety is not impaired. With HIMax, operation is maintained at SIL 3 even during single-channel operation and without time limit. In terms of availability, XMR can suffer a 4-3-2-1 degradation and still maintain the SIL 3 safety level.

Unique protection against common-cause faults

The system bus makes it possible to wire together modules on spatially separated base plates. This can be done either directly via terminal strips or using special FTAs.



Foundations of nonstop operation

Online expandability

HIMax grows with the tasks you set it

Aside from XMR architecture, online expandability is the next major factor in nonstop operation.

With HIMax, application programs and hardware can be changed while operation continues, at any time. The update is then written to a second memory area, after which the system switches seamlessly to the update. This method of intelligent memory management ensures that the controller is always operational regardless of whether it is mono or redundant. There is no limit to the number of times a program can be reloaded during operation. Even operating systems can be updated during operation.

I/O modules, their associated connector boards, base plates and remote components can also be added during operation. The same applies to new base plates and remote components. All can be modified without having to stop the plant.

Online expandability of hardware and software guarantees maximum flexibility during the entire life cycle.





Self-education

Automatically updated

If the system diagnoses an internal fault, the module involved can be replaced quickly during operation. Only a few moves are required.

If a processor module is swapped, the new module is automatically brought up to date with the currently operative modules. The parameter setting and the user program are imported from the functional processor module and then loaded.

"Self-education" has other benefits for the user:

- Your inventory of spare parts will be smaller
- You do not have to search for correct software versions

- When replacing a processor module, you do not have to connect a computer, which eliminates subsequent potential fault causes.





Foundations of nonstop operation

Proof test

Testing without stopping

According to IEC 61508 and IEC 61511, every safety system must be subjected to a proof test at regular intervals. A proof test is designed to reveal any faults, so the system can be restored and fulfil its intended function.

The proof test interval for HIMax's semiconductor modules is 10 years. In the relay modules, the current and number of switching cycles are measured in order to test the status of the relay. This means that, depending on the load of the relay, the relay module can continue to be operated after the proof test and does not have to be replaced.

A HIMax controller can be subjected to a proof test by testing the entire safety circuit. In practice, a shorter testing interval (6-12 months) is required for the field unit's inputs and outputs than for the HIMax controller (10 years). If the user tests the entire safety circuit on the field unit schedule, then the HIMax controller is automatically included in that test. This has been confirmed by TÜV.

Generally speaking, you can plan your proof tests according to your plant's operational requirements. If the plant is stopped anyway, then a complete proof test can be performed on the HIMax by turning the controller on and back off again.

Transparent, fast diagnosis

Detailed information via LEDs and SILworX

HIMax tests its own functionality regularly, using self-diagnosis. This diagnostic information can be observed on the modules themselves via coloured LEDs that show the full range of operating statuses. You can see at a glance whether redundant parts are available, whether the system bus is working properly, whether an internal fault has been recognised in the system and whether a fault exists in the field.

Because more than 90 % of all faults originate on the field side, it is important to detect faults such as short circuits and



wiring breakages quickly. HIMax indicates the faulty channel, saving you the time it would take to find the fault.

SILworX, the fully integrated engineering tool, can be used to obtain more detailed information via its online diagnostic features, which display operating statuses over time. You can connect a computer running SILworX at any point in the network, further speeding up the search for faults.





Foundations of unrivalled performance

The system components

Faster, more powerful, more efficient

HIMax defines a completely new performance category. Its power is based on high-performance system components and intelligent system architectures, including:

- High-performance RISK processors for fast calculations
- Processing of all field signals in the I/O modules, which means that analog values are processed at the same time as digital values.
- Implementation of a system bus with a 1 GBit/s transmission speed.
- Multitasking capabilities: 32 user programs can be run simultaneously, with each program having its own cycle time.
- All this produces impressive performance specifications:
- Calculating 1,000 PID controllers increases the cycle time by less than 10 ms.
- Events are recorded (SOE sequence of events) at a 1 ms resolution.
- Complex mathematical models can be integrated and calculated.
- Up to 2,048 I/Os per cabinet
- A system with up to 12,800 I/Os
- Per system with 200 I/O modules on maximum with 16 racks
- 250 systems per network

The diagram shows cycle times. For example, the cycle time for 1,000 I/Os (half analog, half digital I/Os) is just 50 ms.









Foundations of unrivalled performance

Multitasking

Run up to 32 user programs simultaneously

The HIMax multitasking operating system lets you run up to 32 independent user programs in one system. Each program has its own safety-related checksum. This means that a section of the system can be overhauled or extended without affecting the other programs in any way. HIMax's multitasking capacity enables use of individual programs with their own cycle times. This, in turn, allows you to integrate slower parts of the plant (such as a burner management system) and timecritical areas (such as turbine machinery control) with the central HIMax system. It also means that fixed cycle times are possible for every application.

With its multitasking capacity, the HIMax system demonstrates just how efficient and economical a modern safety system can be.



The new standard for sequence of events (SOE)

Storage for 5,000 events

Event recording is of importance, especially when searching for faults, because it is on that basis that the cause of a fault is determined. The events are recorded directly in the I/O modules in order to document them as quickly and accurately as possible; only afterwards are they sent to the processor modules.



Each HIMax system can define up to 20,000 different events and store up to 5,000 events. This applies to both analog and digital information. With digital values, every change constitutes an event. In the case of analog values, four thresholds can be defined. Every time the value exceeds or drops below a threshold, an event is triggered.

In the processor modules, all of the values are recorded together with their cycle times – if required. Alternatively, events can be recorded directly in the I/O modules every millisecond. Events are recorded at 1 µs precision.

This data is sent to other systems via OPC AE. Different systems can be synchronised between the HIMax systems via SNTP, or by using external time servers that derive their time from systems such as NAVSTAR-GPS. This enables you to make decisions on the same time basis even if the system is spread out over long distances. You will find the cause of faults more quickly and be able to resolve them faster.





Safety-related networksTailored to requirements5.1.0Integration with control systemsA wide range of solutions for all leading manufacturers5.2.0SecurityIndividual protection against external influences5.3.0



Safety-related networks Tailored to requirements

HIMA uses the Ethernet standard in order to set up safety-related distributed applications.

This provides customers with network solutions that are flexible and ready for future demands. All necessary parameters – such as IP address, network mask, routes and standard gateway – can be set up in accordance with the Ethernet standard.

Each processor module and each communication module can have its own settings. The content of telegrams used for safety-related communication is generated in the processor modules. The physical connection can be set up either through the processor modules or via the communication modules.

Safety-related communication can share a network with other protocols (shared media). The safety level is not affected by the network. This means that a wide range of transmission media can be used, including:

- TX / FX
- ISDN
- SHDSL
- Wireless solutions

To increase availability, two communication lines can be set up in parallel. You can also use standard redundancy mechanism such as HiPERRing or RSTP (Rapid Spanning Tree Protocol). Each controller can communicate directly with 255 other safety-related units (HIMax, HIMatrix and HIMatrix RIOs). The programming system and the OPC server are also counted as participants in the safe**ethernet** network. A reload is always possible.

Up to 64 connections between two controllers are possible also up to 1,100 bytes can be transmitted.

Larger quantities of data are distributed over a number of cycles. Data quantities of up to 100 KB can be exchanged safely between participants, and up to 512 KB within the system as a whole.

Communication to another projects can be achieved using proxy resources. Data transmission is done using UDP and is very efficient, because it can be arranged to the special time requirements in the industrial automation. It enables fast response times while placing low burdens on the network.

The system generates data only if there is an active connection. If the system detects an interrupted connection, either a replacement value (the initial value) can be used, or a response can be triggered in the user program. Once the connection has been re-established, communication resumes automatically.







Safety-related networks Remote Rack functionality via system bus

Remote Rack functionality offers the ability to distribute up to 16 racks of a HIMax system in free topology

Distributed solution with racks connected with switches, copper cables and fibre optics can be used in any valid Ethernet structure like lines, stars and trees. Even with only using the X-SB modules now the ports UP, DOWN and DIAG can be used to enhance the capabilities of network design. The maximum distance is about 10,000 km. Compared to the line topology the use of a star topology offers the chance to switch off any IO rack without loosing the others. Take this solution into account when

- more than 3 racks are involved,
- · topologies other than lines are required and
- longer distances than 10 km per direction are requested.



Advantages

HIMax Remote Rack functionality offers:

- Full redundant communication via internal system bus
- A vast variety of distribution degrees in full redundancy
- A simplified engineering
- A tailored economic solutions
- Because Remote Rack functionality works synchronous, it is even faster than distributed CPUs via safe**ethernet**
- · The chance to increase the availability of the system



Distributed solution with racks connected with copper cables and a maximum distance of 100 m between the racks in a line.



Distributed solution with racks connected with media converters via fibre optics and a maximum system expansion of ~20 km in a line.

Integration with control systems A wide range of solutions for all leading manufacturers

Full integration with DCS operating and monitoring functions.

The advantages of a HIMA solution, including nonstop operation, can be combined with all leading distributed control systems (DCS). DCS SIS integration is achieved through high-capacity, cross-manufacturer communication standards. Based on the extensive integration know-how of our DCS competence team, HIMA assumes responsibility for DCS SIS integration and provides the required functionality (ICSS by HIMA).

HIMA solutions offer features such as:

- Integration of alarms and events into the alarm management of the DCS
- Integration of faceplates for operating and monitoring
- Transfer and visualisation of diagnostic data
- Transfer and visualisation of process data and safety-related locking states
- Timestamp transfer
- Maintenance overwrite switch (MOS)
- Partial stroke test (PST)
- Start-up bypass (SUB)



5.2.0

Supported protocols include:

- OPC DA and OPC A&E
- Modbus TCP Master & Slave
- Modbus RS485 Master & Slave
- PROFIBUS DP Master & Slave
- PROFINET IO Controller & Device
- Send & Receive TCP
- HART over IP
- ComUserTask, programmable protocols



Security Individual protection against external influences

Open integration based on a standard Ethernet network offers many benefits.

One of them is easy and efficient remote access. Remote intervention can significantly increase plant operating time and reduce repair time, but critical internal functions must be protected against unwelcome outside influences.

HIMax is designed to detect and ignore nonsensical and harmful commands. For example, telegrams whose content does not correspond with the standard are erased and not answered.

Because HIMax uses Ethernet technology, you can use fire-

walls, VPNs, VLANs and other established security mechanisms with it. HIMax also offers its own additional protection. Access is subject to a range of rights and is password secured. Access to the CPU via a system bus module does not permit access to the automation network (separate), thus blocking an attack through this channel.

Other special features enforce isolation. Variables in the user program can be used to:

- Deactivate "forcing"
- Enable pure read-only access during operation
- Deactivate the possibility of reloading

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6 HIMax: The Hardware in Detail Functionality and Facts

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X-BASE PLATE Base Plate

6.1.0

HIMax[®]

The X-BASE PLATE is the base plate for the HIMax system. All modules and connector boards are mounted on one of these base plates. The power supply and the star-shaped system bus are already integrated in the X-BASE PLATE. Each X-BASE PLATE is suitable for wall mounting. The 15-module version for 15 modules can also be delivered as a variant for 19" cabinet mounting. Integrated connector boards for two system bus modules are standard equipment for the X-BASE PLATE. The connector boards for all remaining modules can be flexibly installed, even during operation.

Product	Part no.	Description		
X-BASE PLATE 10 01	99 3001001	Base plate with 10 slots		
X-BASE PLATE 15 01	99 3001501	Base plate with 15 slots		
X-BASE PLATE 15 02	99 3001502	Base plate with 15 slots, for 19" mounting		
X-BASE PLATE 18 01	99 30018 01	Base plate with 18 slots		
X-BLK 01	63 2590802	Blank module for I/ O slots		
X-BLK 02	63 2590801	Blank module for CPU/ COM slots		
X-BLK 03	63 2590800	Blank module for SB slots		
X-CB 003 01	63 2590907	Connector board for blank module		
X-SR CB 01	67 9995256	Strain relief for connector board		
X-FRONT COVER 10 01	99 3001021	Front cover for X-BASE PLATE 10 01		
X-FRONT COVER 15 01	99 3001521	Front cover for X-BASE PLATE 15 01		
X-FRONT COVER 15 02	99 3001522	Front cover for X-BASE PLATE 15 02		
X-FRONT COVER 18 01	99 3001821	Front cover for X-BASE PLATE 18 01		
Specifications, Dimensions	and Weight			
Operating voltage		24 VDC, L1+/ L1- and L2+/ L2-, -15%+20%, rp ≤ 5%		
Power supply unit		with safe insulation in accordance with IEC 61131-2		
Operating voltage connection	n	Redundant L1+, L2+		
Total current		max. 63 A		
Fuse (external)		max. 63 A (line protection fuse)		
Backplane material		Stainless steel		
Material of the mech. attachi	ng parts	Aluminum		
Operating temperature		from 0 °C to +60 °C		
Storage temperature		from -40 °C to +85 °C		
Humidity		max. 95% relative humidity, non-condensing		
Type of protection		IP20		

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Protection class	III in accordance with IEC/EN 61131-2				
Pollution	Pollution degree II in accordance with IEC/EN 61131-2				
Altitude	< 2000 m				
Dimensions	(H x W x D) in mm (approx.)				
X-BASE PLATE 10 01	533 x 358 x 60 (without modules) 533 x 358 x 276 (with modules)				
X-BASE PLATE 15 01	533 x 505.5 x 60 (without modules) 533 x 505.5 x 276 (with modules)				
X-BASE PLATE 15 02	533 x 483 x 260 (without modules) 533 x 483 x 276 (with modules)				
X-BASE PLATE 18 01	533 x 594 x 60 (without modules) 533 x 594 x 276 (with modules)				
Weight (without modules) approx.					
X-BASE PLATE 10 01	6.1 kg				
X-BASE PLATE 15 01	8.4 kg				
X-BASE PLATE 15 02	11.1 kg				
X-BASE PLATE 18 01	9.7 kg				

Specifications, Dimensions and Weight (Continued from X-BASE PLATE Base Plate)


HIMax[®]

The system fan can be redundantly powered and easily replaced during operation. A signaling contact is used to monitor voltage and rotation speed. The system fan is used to protect the system against overheating. The performance of the individual fans is designed such that sufficiently strong air circulation is ensured even if one ventilator fails.

Product	Part no.	Description	
X-FAN 10 01	99 3001011	2 fans for X-BASE PLATE 10 01	
X-FAN 15 01	99 3001511	3 fans for X-BASE PLATE 15 01	
X-FAN 15 02	99 3001512	3 fans for X-BASE PLATE 15 02	2
X-FAN 18 01	99 3001811	4 fans for X-BASE PLATE 18 01	l
X-FAN 10 03	99 3001013	2 fans for X-BASE PLATE 10 01	
X-FAN 15 03	99 3001513	3 fans for X-BASE PLATE 15 01	
X-FAN 15 04	99 3001514	3 fans for X-BASE PLATE 15 02	2
X-FAN 18 03	99 3001813	4 fans for X-BASE PLATE 18 01	
Specifications, Dimensions	and Weight		
Operating voltage		24 VDC	
Fault relay switching current		30 VDC/ 4 A	
Product		Current input (max. 4 A)	Air flow/ sound pressure level
X-FAN 10 01		2 A	60 dB (A)/ 275 m³/ h
X-FAN 15 01		3 A	60 dB (A)/ 275 m ³ / h
X-FAN 15 02		3 A	60 dB (A)/ 275 m³/ h
X-FAN 18 01		4 A	60 dB (A)/ 275 m ³ / h
X-FAN 10 03		0.4 A	42 dB (A)/ 184 m³/ h
X-FAN 15 03		0.6 A	42 dB (A)/ 184 m³/ h
X-FAN 15 04		0.6 A	42 dB (A)/ 184 m³/ h
X-FAN 18 03		0.8 A	42 dB (A)/ 184 m³/ h
Material		Aluminum	
Operating temperature		from 0 °C to +60 °C	
Storage temperature		from -40 °C to +85 °C	
Humidity		max. 95 % relative humidity, n	on-condensing
Type of protection		IP20	
Protection class		III in accordance with IEC/EN 6	i1131-2
Pollution		Pollution degree II in accordan	ce with IEC/EN 61131-2
Altitude		< 2000 mm	
Dimensions: Height		88.1 mm (for the remaining val	lue see X-BASE PLATE)



Weight approx.		
X-FAN 10 01	2.7	kg
X-FAN 15 01	3.5	kg
X-FAN 15 02	3.5	kg
X-FAN 18 01	4.5	kg
X-FAN 10 03	2.7	kg
X-FAN 15 03	3.5	kg
X-FAN 15 04	3.5	kg
X-FAN 18 03	4.5	kg

Specifications, Dimensions and Weight (Continued from X-FAN System Fan)



Comparative Overview of the Modules Edition 01-12-2013 6.3.0

HIMax[®]

The following tables provide an overview of the modules currently available. They should offer you a comparative guideline for the first planning steps.

Central Modules	Туре	Description
System bus module	X-SB 01	
Processor module	X-CPU 01	For high performance requirements and critical control applications, 4 x RJ-45
Processor module	X-CPU 31	For small and mid-size safety applications, 4 x RJ-45
Communication module	X-COM 01	2 x 9-pole D-sub, 4 x RJ-45
Digital Input Modules	Туре	Description
Digital input module	X-DI 64 01	64 channels, 24 VDC
Digital input module	X-DI 32 01	32 channels, 24 VDC
Digital input module	X-DI 32 02	32 channels, 8.2 VDC, proximity switches
Digital input module	X-DI 32 03	32 channels, 48 VDC
Digital input module	X-DI 32 04	32 channels, 24 VDC, SOE
Digital input module	X-DI 32 05	32 channels, 8.2 VDC, proximity switches, SOE
Digital input module	X-DI 16 01	16 channels, 120 VAC
Analog Input Modules	Туре	Description
Analog Input Modules Analog input module	Туре X-AI 32 01	Description 32 channels, 420 mA
Analog Input Modules Analog input module Analog input module	Type X-AI 32 01 X-AI 32 02	Description 32 channels, 420 mA 32 channels, 420 mA, SOE
Analog Input Modules Analog input module Analog input module Counter module	Type X-AI 32 01 X-AI 32 02 X-CI 24 01	Description 32 channels, 420 mA 32 channels, 420 mA, SOE 24 channels, 020 kHz
Analog Input Modules Analog input module Analog input module Counter module Digital Output Modules	Type X-AI 32 01 X-AI 32 02 X-CI 24 01 Type	Description32 channels, 420 mA32 channels, 420 mA, SOE24 channels, 020 kHzDescription
Analog Input Modules Analog input module Analog input module Counter module Digital Output Modules Digital output module	Type X-AI 32 01 X-AI 32 02 X-CI 24 01 Type X-DO 32 01	Description32 channels, 420 mA32 channels, 420 mA, SOE24 channels, 020 kHzDescription32 channels, 24 VDC, 0.5 A, short-circuit monitoring SC, individual channel shut-off
Analog Input ModulesAnalog input moduleAnalog input moduleCounter moduleDigital Output ModulesDigital output moduleDigital output module	Type X-AI 32 01 X-AI 32 02 X-CI 24 01 Type X-DO 32 01 X-DO 24 01	Description32 channels, 420 mA32 channels, 420 mA, SOE24 channels, 020 kHzDescription32 channels, 24 VDC, 0.5 A, short-circuit monitoring SC, individual channel shut-off24 channels, 24 VDC, 0.5 A, line monitoring (open-circuits OC/ short-circuits SC), individual channel shut-off
Analog Input ModulesAnalog input moduleAnalog input moduleCounter moduleDigital Output ModulesDigital output moduleDigital output moduleDigital output moduleDigital output moduleDigital output module	Type X-AI 32 01 X-AI 32 02 X-CI 24 01 Type X-DO 32 01 X-DO 24 01 X-DO 24 02	Description32 channels, 420 mA32 channels, 420 mA, SOE24 channels, 020 kHzDescription32 channels, 24 VDC, 0.5 A, short-circuit monitoring SC, individual channel shut-off24 channels, 24 VDC, 0.5 A, line monitoring (open-circuits OC/ short-circuits SC), individual channel shut-off24 channels, 48 VDC, 0.5 A, line monitoring (open-circuits OC/ short-circuits SC), individual channel shut-off
Analog Input ModulesAnalog input moduleAnalog input moduleCounter moduleDigital Output ModulesDigital output moduleDigital output moduleDigital output moduleRelay output modules	Type X-AI 32 01 X-AI 32 02 X-CI 24 01 Type X-DO 32 01 X-DO 24 01 X-DO 24 02 X-DO 12 01	Description32 channels, 420 mA32 channels, 420 mA, SOE24 channels, 020 kHzDescription32 channels, 24 VDC, 0.5 A, short-circuit monitoring SC, individual channel shut-off24 channels, 24 VDC, 0.5 A, line monitoring (open-circuits OC/ short-circuits SC), individual channel shut-off24 channels, 48 VDC, 0.5 A, line monitoring (open-circuits OC/ short-circuits SC), individual channel shut-off24 channels, 48 VDC, 0.5 A, line monitoring (open-circuits OC/ short-circuits SC), individual channel shut-off12 channels, 230 VAC/ VDC, current measurement, switching operation counting

All modules are approved for safety-related operation up to SIL 3 in accordance with IEC 61508, IEC 61511 and IEC 62061. [continued on back page]



Analog Output Modules	Туре	Description
Analog output module	X-AO 16 01	16 channels, 420 mA, pairwise galvanically isolated
Dimensions	Туре	Description
Module size	All	310 x 29.2 x 230 mm
NonSIL Modules	Туре	Description
Digital input module	X-DI 64 51	64 channels, 24 VDC
Digital input module	X-DI 32 51	32 channels, 24 VDC
Digital input module	X-DI 32 52	32 channels, 8.2 VDC, proximity switch, line monitoring SC/ OC
Digital output module	X-DO 32 51	32 channels, 24 VDC, 0.5 A, protected outputs
Relay module	X-DO 12 51	12 channels, 230 VAC/ VDC
Analog input/ temperature module	X-AI 16 51	16 channels, 0/ 420 mA, ±280 mV, galvanically isolated, TC, Pt100, SIL 1
Analog input module	X-AI 32 51	32 channels, 0/ 420 mA, line monitoring SC/ OC
Counter module	X-CI 24 51	24 channels, 020 kHz
Analog output module	X-AO 16 51	16 channels, 0/ 420 mA
Further Modules	Туре	Description
HART communication module	X-HART 32 01	32 modems, SIL 3, X-AI 32 01, X-AI 32 02, X-AI 32 51, X-AO 16 01, X-AO 16 51
Overspeed trip module	X-MIO 7/6 01	3 counter, 4 digital input, 5 digital output, 1 relay channel, SIL 3
Dimensions	Туре	Description
Module size	All	310 x 29.2 x 230 mm



X-SB 01 System Bus Module

6.4.0

HIMax[®]

The system bus module organizes the communication of all modules on one or several X-BASE PLATEs. The star-shaped communication structure within the X-BASE PLATE has the advantage that the individual modules cannot interact. The system bus module can be installed individually or redundantly. The "UP" and "DOWN" Ethernet ports are only used for networking different X-BASE PLATE modules.

Product	Part no.	Description
X-SB 01	98 5210207	System bus module, SIL 3
X-CB 002	Upon request	Connector board (spare part)
Specifications, Dimensions	and Weight	
Supply voltage		24 VDC
Current input		max. 0.65 A
Housing material		Polyamide (fire-retardant in accordance with NFPA 72)
Operating temperature		from 0 °C to +60 °C
Storage temperature		from -40 °C to +85 °C
Humidity		max. 95% relative humidity, non-condensing
Type of protection		IP20
Protection class		III in accordance with IEC/EN 61131-2
Pollution		Pollution degree II in accordance with IEC/EN 61131-2
Altitude		< 2000 m
Dimensions		310 x 29.2 x 230 (H x W x D) in mm
Weight approx.		1.2 kg

Notes

• Ethernet interface for PADT: 1 x RJ-45 10/ 100 Base-T, (Autoneg) free-configurable, no auto crossover

• System bus ports (UP/ DOWN) in accordance with plans for connection using 1:1 Ethernet cable

• For better differentiation, HIMA recommends using red cables for system bus A (left) and green cables for system bus B (right).

• Extension using fiber-optic cables: with released media converters only







X-CPU 01 Processor Module

6.4.1

HIMax[®]

The processor module is used to safely process the user program and safely communicate with I/O modules and external units. It is particularly suited for high performance requirements and critical control applications. Programs and operating systems can be updated during operation. Each processor module is certified for use up to SIL 3, without restrictions. If additional processor modules are used, their only function is to increase availability.

Product	Part no.	Description
X-CPU 01	98 5210211	Processor module, SIL 3
X-CB 001 01	98 5020047	Connector board for processor module
Specifications, Dimensions	and Weight	
Operating voltage		24 VDC
Current input		1.4 A
Housing material		Polyamide (fire-retardant in accordance with NFPA 72)
Operating temperature		from 0 °C to +60 °C (monitored by the system)
Storage temperature		from -40 °C to +85 °C
Humidity		max. 95% relative humidity, non-condensing
Type of protection		IP20
Protection class		III in accordance with IEC/EN 61131-2
Pollution		Pollution degree II
Altitude		< 2,000 m
Dimensions		310 x 29.2 x 236 (H x W x D) in mm
Weight approx.		1.3 kg
Program and data memory		10 MB less 4 kB for CRCs
Data memory for retain variables		32 kB
Buffer for date/time		5 days, gold capacitor (maintenance free)
Number of event definitions		20,000
Size of the non-volatile even	t buffer	5,000 events

Notes

Ethernet interfaces: 4 x RJ-45 (10/100/1,000 Mbit/s, Autoneg, auto crossover) for connection to PADT, OPC, safeethernet
 All 4 Ethernet ports are internally connected with one another via a switch.

A mode switch (Init, Stop, Run) defines how the processor module should behave when restarted:

1. Init - The processor module only uses the factory settings for Ethernet ports and user management.

2. Stop - It loads the configuration from the memory, but it does not start. The settings for Ethernet ports and user management are taken from memory.

3. Run - It loads the configuration from the memory and starts the user program.

This switch $\ensuremath{\textbf{cannot}}$ be used to influence the system currently operating.





HIMax[®]

The communication module is used to tie the HIMax systems to third-party systems. Each module has 2 fieldbus interfaces, and 4 Ethernet ports and can process up to 6 protocols.

Product	Part no.	Description
X-COM 01 0XY	98 52600XY*	Communication module, SIL 3
X-CB 001 02	98 5020008	Connector board * X
		 X* = Code for fieldbus submodule 1 (fieldbus interface 1) Y* = Code for fieldbus submodule 2 (fieldbus interface 2) * Y Code description: O No fieldbus submodule inserted. 1 RS485 Submodule for Modbus master & slave inserted. 2 Submodule for PROFIBUS DP master inserted. 3 Submodule for PROFIBUS DP slave inserted. 5 RS232 for ComUserTask 6 RS422 for ComUserTask

Ethernet protocols

Ethernet port, 4 x RJ-45 (10/ 100 Mbit Autoneg, auto crossover).

All 4 Ethernet ports are internally connected with one another via a switch.

HIMA safe ethernet	included	
SNTP server/ client (Simple Network Time Protocol)	included	
Modbus master TCP/ UDP	89 4000001	
Modbus slave TCP/ UDP	89 4000002	
TCP Send/ Receive	89 4000007	
ComUserTask	89 4000012	

Fieldbus interfaces

2 x D-sub 9-pole female, in a	ccordance with the or	dered parts
Modbus master RS485 FB1/ FB2	89 4000003	
Modbus slave RS485 FB1/ FB2	89 4000004	
PROFIBUS DP master (FB1 and FB2)	89 4000005	
PROFIBUS DP slave (FB1/ FB2)	89 4000006	
RS232 module	89 4000014	
RS422 module	89 4000017	

[continued on back page]

(HIMA

Fieldbus Interfaces (Continued from X-COM Communication Module)		
Operating voltage	24 VDC	
Current input	min. 0.25 A max. 0.4 A	
Housing material	Polyamide (fire-retardant in accordance with NFPA 72)	
Operating temperature	from 0 °C to +60 °C	
Storage temperature	from -40 °C to +85 °C	
Humidity	max. 95% relative humidity, non-condensing	
Type of protection	IP20	
Protection class	III in accordance with IEC/EN 61131-2	
Pollution	Pollution degree II in accordance with IEC/EN 61131-2	
Altitude	< 2000 m	
Dimensions	310 x 29.2 x 230 (H x W x D) in mm	

1.3 kg

Weight





X-CPU 31 Processor Module

6.4.3

HIMax[®]

The processor module is used to safely process the user program and safely communicate with I/O modules and external units. It is particularly suited for small and mid-size safety applications.

Programs and operating systems can be updated during operation.

The module manages the communication of all modules on a X-BASE PLATE. The module can be installed single (XMR = 1) or redundant (XMR = 2). Each processor module is certified for use up to SIL 3, without restrictions. An additional processor module increases solely the availability of the system.

Product	Part no.	Description
X-CPU 31	98 5010246	Processor module, SIL 3
X-CB 002 07	98 5020708	Connector board (X-BASE PLATE 10 31, 2 x X-CPU 31)
X-CB 002 08	98 5020709	Connector board (X-BASE PLATE 15 31, 2 x X-CPU 31)
X-CB 002 09	98 5020710	Connector board (X-BASE PLATE 18 31, 2 x X-CPU 31)
Specifications, Dimensions and Weight		

Operating voltage	24 VDC
Current input	0.75 A
Housing material	Polyamide (fire-retardant in accordance with NFPA 72)
Operating temperature	from 0 °C to +60 °C (monitored by the system)
Storage temperature	from -40 °C to +85 °C
Humidity	max. 95% relative humidity, non-condensing
Type of protection	IP20
Protection class	III in accordance with IEC/EN 61131-2
Pollution	Pollution degree II
Altitude	< 2,000 m
Dimensions	310 x 29.2 x 236 (H x W x D) in mm
Weight approx.	1.0 kg
Program and data memory	5 MB less 64 kB for CRCs
Data memory for retain variables	32 kB
Buffer for date/ time	5 days, gold capacitor (maintenance free)
Number of event definitions	20,000
Size of the non-volatile event buffer	5,000 events

Notes

• System bus interfaces: 2 x RJ-45 (1,000 Mbit/s, Autoneg, auto crossover) for connection of extension racks

• Ethernet interfaces: 2 x RJ-45 (10/100 Mbit/s, Autoneg, auto crossover) for connections: PADT, OPC, safe**ethernet**

• Ethernet interfaces Eth1 and Eth2 are connected directly to the processor system.

A mode switch (Init, Stop, Run) defines how the processor module should behave when restarted:

- 1. Init The processor module only uses the factory settings for Ethernet ports and user management.
- 2. Stop It loads the configuration from the memory, but it does not start. The settings for Ethernet ports and user management are taken from memory.

3. Run - It loads the configuration from the memory and starts the user program.

This switch **cannot** be used to influence the system currently operating.







X-DI 32 01 Digital Input Module

6.5.0

HIMax[®]

The digital X-DI 32 01 input module is used to evaluate up to 32 digital input signals. The 24 V-current sinking logic inputs comply with the standards in accordance with IEC 61131-2. A 24 VDC power supply for proximity switches or contacts is available for every 4 inputs.

Product	Part no.	Description
X-DI 32 01	98 5210201	Digital input module, SIL 3
X-CB 015 01	98 5020167	Connector board with screw terminals
X-CB 015 02	98 5020168	Redundant connector board with screw terminals
X-CB 015 03	98 5020169	Connector board with cable plug
X-CB 015 04	98 5020170	Redundant connector board with cable plug
X-CA 001 01 8	98 5050701-8	Cable, 32 channels → FTA, 8 m
X-CA 001 01 15	98 5050701-15	Cable, 32 channels → FTA, 15 m
X-CA 001 01 30	98 5050701-30	Cable, 32 channels → FTA, 30 m

Specifications, Dimensions and Weight

Operating voltage	24 VDC
Current input	min. 600 mA (without channels/ proximity switch supplies) max. 1.5 A (with 32 channels and proximity switch supplies)
Number of channels	32, non-galvanically isolated
Rated input voltage	0 24 V
Switching point, typically	9.3 V ±0.4 V (2.1 mA ± 0.15 mA)
Voltage level: low	-3 5 V
Voltage level: high	11 30 V
Input current operating range	-3 30 V (current limited to approx. 2.5 mA)
Additional current input per channel	min. < 3 mA (without proximity switch supply) max. 25 mA (with proximity switch supply)
Number of proximity switch supplies	8 with 4 outputs each
Output voltage for proximity switch supply	Operating voltage less 2.5 V
Output current of the proximity switch supply	100 mA for each group short-circuit-proof

The proximity switch supplies are monitored for undervoltage (< 16 VDC). If a fault occurs, the corresponding status "Channel X Supply OK" is set to FALSE. A short-circuit in the proximity switch supply triggers the undervoltage detection. The output current is pulsed < 250 mA, as long as the proximity switch supply is short-circuited.

Housing material	Polyamide (fire-retardant in accordance with NFPA 72)
Operating temperature	from 0 °C to +60 °C
Storage temperature	from -40 °C to +85 °C
Humidity	max. 95% relative humidity, non-condensing
Type of protection	IP20
Protection class	III in accordance with IEC/EN 61131-2



Pollution	Pollution degree II in accordance with IEC/EN 61131-2
Altitude	< 2000 m
Dimensions	310 x 29.2 x 230 (H x W x D) in mm
Weight approx.	1.0 kg



X-DI 32 02 Digital Input Module for Proximity Switches 6.5.1

HIMax[®]

The digital X-DI 32 02 input module is used to evaluate up to 32 safety proximity switches, proximity switches in accordance with EN 60947-5-6 (NAMUR) or wired contacts. Four short-circuit-proof supplies feed eight supply outputs each.

Product	Part no.	Description
X-DI 32 02	98 5210202	Digital input module, SIL 3
X-CB 005 01	98 5020023	Connector board with screw terminals
X-CB 005 02	98 5020056	Redundant connector board with screw terminals
X-CB 005 03	98 5020024	Connector board with cable plug
X-CB 005 04	98 5020061	Redundant connector board with cable plug
X-CA 002 01 8	98 5050707-8	Cable, 32 channels → FTA, 8 m
X-CA 002 01 15	98 5050707-15	Cable, 32 channels → FTA, 15 m
X-CA 002 01 30	98 5050707-30	Cable, 32 channels → FTA, 30 m

Specifications, Dimensions and Weight

Operating voltage	24 VDC		
Current input	min. 450 mA (without channels/ proximity switch supplies) max. 1 A (in case of short-circuit of the supplies)		
Number of channels	32, non-galvanically isolated		
Proximity switch in accordance with EN 60947-5			
Switch-on threshold L \rightarrow H	1.80 mA		
Switch-off threshold $H \rightarrow L$	1.40 mA		
Open-circuit	≤ 0.200 mA		
Short-circuit	≥ 6.550 mA		
Safety proximity switches in accordance with EN 60947-5-6			
Switch-on threshold $L \rightarrow H$	1.80 mA		
Switch-off threshold $H \rightarrow L$	1.40 mA		
Open-circuit	≤ 0.200 mA		
Short-circuit	≥ 4.825 mA		
Output voltage for proximity switch supply	8.2 VDC, ± 6%		
Wired mechanical contact: Via series and shunt resistor with line monitoring			

A supply is switched off if its total current is exceeded (> 200 mA). If the overload disappears within 30 seconds, the proximity switch supply is switched on again. If the overload is still present after 30 seconds, the module attempts to restart the proximity switch supply in intervals of 60 seconds. Short transient interferences (< 5 ms) do not cause the proximity switch supply to switch off. Further, the supplies are monitored for overvoltage, undervoltage and overcurrent. If a fault occurs, the corresponding status Supply OK is set to FALSE.



Specifications, Dimensions and Weight (Continued from X-DI 32 02 Digital Input Module for Proximity Switches)

Rated input current	09.25 mA
Input current operating range	09.3 mA
Resolution	12-bit (LSB 100 nA)
Shunt for current measurement	1000 Ω (on connector board)
Wire length	The wire length depends on the wire resistance \leq 50 Ω in accordance with EN 60 947-5-6
Accuracy intrinsic errors	$< \pm 0.5\%$ incl. shunt
Accuracy operating errors	$<\pm$ 1% at 060 °C, incl. shunt
Safety-related accuracy	< ± 2%
Housing material	Polyamide (fire-retardant in accordance with NFPA 72)
Operating temperature	from 0 °C to +60 °C
Storage temperature	from -40 °C to +85 °C
Humidity	max. 95% relative humidity, non-condensing
Type of protection	IP20
Protection class	III in accordance with IEC/EN 61131-2
Pollution	Pollution degree II in accordance with IEC/EN 61131-2
Altitude	< 2000 m
Dimensions	310 x 29.2 x 230 (H x W x D) in mm
Weight approx.	1.12 kg



X-DI 32 04 Digital Input Module

6.5.2

HIMax[®]

The digital X-DI 32 O4 input module is used to evaluate up to 32 digital input signals. The 24 V-current sinking logic inputs comply with the standards in accordance with IEC 61131-2. A 24 VDC power supply for proximity switches or contacts is available for every 4 inputs. The module is suitable for fast recording sequences of events (SOE).

Product	Part no.	Description
X-DI 32 04	98 5210230	Digital input module, SIL 3
X-CB 015 01	98 5020167	Connector board with screw terminals
X-CB 015 02	98 5020168	Redundant connector board with screw terminals
X-CB 015 03	98 5020169	Connector board with cable plug
X-CB 015 04	98 5020170	Redundant connector board with cable plug
X-CA 001 01 8	98 5050701-8	Cable, 32 channels → FTA, 8 m
X-CA 001 01 15	98 5050701-15	Cable, 32 channels → FTA, 15 m
X-CA 001 01 30	98 5050701-30	Cable, 32 channels → FTA, 30 m

Specifications, Dimensions and Weight

Operating voltage	24 VDC
Current input	min. 400 mA (without channels/ proximity switch supplies) max. 1.5 A (with 32 channels and proximity switch supplies)
Number of channels	32, non-galvanically isolated
Rated input voltage	0 24 V
Switching point, typically	9.4 V ± 0.8 V (2.1 mA ± 0.3 mA)
Voltage level: low	-3 5 V
Voltage level: high	11 30 V
Input current operating range	-3 30 V (current limited to approx. 2.5 mA)
Additional current input per channel	min. < 3 mA (without proximity switch supply) max. 25 mA (with proximity switch supply)
Number of proximity switch supplies	8 with 4 outputs each
Output voltage for proximity switch supply	Operating voltage less 2.5 V
Output current of the proximity switch supply	100 mA for each group, short-circuit-proof

The proximity switch supplies are monitored for undervoltage (< 16 VDC). If a fault occurs, the corresponding status "Channel X Supply OK" is set to FALSE. A short-circuit in the proximity switch supply triggers the undervoltage detection. The output current is pulsed < 250 mA, as long as the proximity switch supply is short-circuited.

Housing material	Polyamide (fire-retardant in accordance with NFPA 72)
Operating temperature	from 0 °C to +60 °C
Storage temperature	from -40 °C to +85 °C
Humidity	max. 95% relative humidity, non-condensing
Type of protection	IP20



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specifications,	Dimensions and	i weight (Continueu	110111 X-DI 32	04 Digital Input Mo	Juule)

Protection class	III in accordance with IEC/EN 61131-2
Pollution	Pollution degree II in accordance with IEC/EN 61131-2
Altitude	< 2000 m
Dimensions	310 x 29.2 x 230 (H x W x D) in mm
Weight approx.	1.0 kg



X-DI 32 05 Digital Input Module for Proximity Switches 6.5.3

HIMax[®]

The digital X-DI 32 05 input module is used to evaluate up to 32 safety proximity switches, proximity switches in accordance with EN 60947-5-6 (NAMUR) or wired contacts. Four short-circuit-proof 8.2 VDC supplies feed eight supply outputs each. The module is suitable for fast recording sequences of events (SOE).

Product	Part no.	Description
X-DI 32 05	98 5210231	Digital input module, SIL 3
X-CB 005 01	98 5020023	Connector board with screw terminals
X-CB 005 02	98 5020056	Redundant connector board with screw terminals
X-CB 005 03	98 5020024	Connector board with cable plug
X-CB 005 04	98 5020061	Redundant connector board with cable plug
X-CA 002 01 8	98 5050707-8	Cable, 32 channels → FTA, 8 m
X-CA 002 01 15	98 5050707-15	Cable, 32 channels → FTA, 15 m
X-CA 002 01 30	98 5050707-30	Cable, 32 channels → FTA, 30 m

Specifications, Dimensions and Weight

Operating voltage	24 VDC			
Current input	min. 450 mA (without channels/ proximity switch supplies) max. 1 A (in case of short-circuit of the supplies)			
Number of channels	32, non-galvanically isolated			
Proximity switch in accordance with EN 60947-5				
Switch-on threshold L \rightarrow H	1.80 mA			
Switch-off threshold $H \rightarrow L$	1.40 mA			
Open-circuit	≤ 0.200 mA			
Short-circuit	≥ 6.550 mA			
Safety proximity switches in accordance with EN 60947-5-6				
Switch-on threshold L \rightarrow H	1.80 mA			
Switch-off threshold $H \rightarrow L$	1.40 mA			
Open-circuit	≤ 0.200 mA			
Short-circuit	≥ 4.825 mA			
Output voltage for proximity switch supply	8.2 VDC, ± 6%			
Wired mechanical contact: Via series and shunt resistor with line monitoring				

A supply is switched off if its total current is exceeded (> 200 mA). If the overload disappears within 30 seconds, the proximity switch supply is switched on again. If the overload is still present after 30 seconds, the module attempts to restart the proximity switch supply in intervals of 60 seconds. Short transient interferences (< 5 ms) do not cause the proximity switch supply to switch off. Further, the supplies are monitored for overvoltage, undervoltage and overcurrent. If a fault occurs, the corresponding status Supply OK is set to FALSE.



0 ... 9.25 mA Rated input current Input current operating range 0 ... 9.3 mA Resolution 12-bit (LSB 100 nA) Shunt for current measurement 1000 Ω (on connector board) Wire length The wire length depends on the wire resistance \leq 50 Ω in accordance with EN 60 947-5-6 Accuracy intrinsic errors $< \pm 0.5\%$ incl. shunt < ± 1% at 0 ... 60 °C, incl. shunt Accuracy operating errors Safety-related accuracy < ± 2% Housing material Polyamide (fire-retardant in accordance with NFPA 72) Operating temperature from 0 °C to +60 °C from -40 °C to +85 °C Storage temperature Humidity max. 95% relative humidity, non-condensing Type of protection IP20 Protection class III in accordance with IEC/EN 61131-2

< 2000 m

1.12 kg

Pollution Altitude

Dimensions Weight approx. Pollution degree II in accordance with IEC/EN 61131-2

310 x 29.2 x 230 (H x W x D) in mm

Specifications, Dimensions and Weight (Continued from X-DI 32 05 Digital Input Module for Proximity Switches)



X-DI 64 01 Digital Input Module

6.5.4

HIMax[®]

The digital X-DI 64 01 input module is used to evaluate up to 64 digital input signals. The 24 V current sinking logic inputs comply with the standards in accordance with IEC 61131-2. A power supply for proximity switches or contacts is available for every 8 inputs.

Product	Part no.	Description
X-DI 64 01	98 5210212	Digital input module, SIL 3
X-CB 006 01	98 5020033	Connector board with screw terminals
X-CB 006 02	98 5020098	Redundant connector board with screw terminals
X-CB 006 03	98 5020034	Connector board with cable plug
X-CB 006 04	98 5020110	Redundant connector board with cable plug
X-CA 003 01 8	98 5050722-8	System cable, 8 m, single/ redundant FTA
X-CA 003 01 15	98 5050722-15	System cable, 15 m, single/ redundant FTA
X-CA 003 01 30	98 5050722-30	System cable, 30 m, single/ redundant FTA

Specifications, Dimensions and Weight

Operating voltage	24 VDC
Current input	min. 400 mA (without channels/ proximity switch supplies) max. 1.5 A (with 64 channels and proximity switch supplies)
Current input per channel	max. 4 mA
Number of channels	64, non-galvanically isolated
Rated input current	0 24 V
Switching point, typically	9.4 V ±0.8 V (2.1 mA ±0.3 mA)
Input current operating range	-3 30 V (current limited to 2.3 2.9 mA)
Number of proximity switch supplies	8 with 8 outputs each
Output voltage for proximity switch supply	Supply voltage -2.5 V
Output current of the proximity switch supply	100 mA for each group, short-circuit-proof

The proximity switch supplies are monitored for undervoltage (< 17 VDC). If a fault occurs, the corresponding status "Channel X Supply OK" is set to FALSE. A short-circuit in the proximity switch supply triggers the undervoltage detection. The output current is pulsed < 250 mA, as long as the proximity switch supply is short-circuited.



Specifications, Dimensions and Weight (Continued from X-DI 64 01 Digital Input Module)

Housing material	Synthetic material (fire-retardant in accordance with NFPA 72)
Operating temperature	from 0 °C to +60 °C
Storage temperature	from -40 °C to +85 °C
Humidity	max. 95% relative humidity, non-condensing
Type of protection	IP20
Protection class	III in accordance with IEC/EN 61131-2
Pollution	Pollution degree II in accordance with IEC/EN 61131-2
Altitude	< 2000 m
Dimensions	310 x 29.2 x 230 (H x W x D) in mm
Weight approx.	1.1 kg



X-DI 32 03 Digital Input Module

6.5.5

HIMax[®]

The digital X-DI 32 03 input module is used to evaluate up to 32 digital input signals. The 48 VDC or 24 VDC current sinking logic inputs comply with the standards in accordance with IEC 61131-2. A power supply for proximity switches or contacts is available for every 4 inputs.

Product	Part no.	Description
X-DI 32 03	98 5210221	Digital input module, SIL 3
X-CB 015 01	98 5020167	Connector board with screw terminals
X-CB 015 02	98 5020168	Redundant connector board with screw terminals
X-CB 015 03	98 5020169	Connector board with cable plug
X-CB 015 04	98 5020170	Redundant connector board with cable plug
X-CA 001 01 8	98 5050701-8	System cable, 8 m, single/ redundant FTA
X-CA 001 01 15	98 5050701-15	System cable, 15 m, single/ redundant FTA
X-CA 001 01 30	98 5050701-30	System cable, 30 m, single/ redundant FTA

Specifications, Dimensions and Weight

Operating voltage	24 VDC
Current input	min. 400 mA
	max. 1.5 A
Number of channels	32, non-galvanically isolated
External supply voltage	0 48 VDC (nominal range 48 V, -15 % +20 %) or 0 24 VDC (nominal range 24 V, -15 % +20 %) Supply via connector board
Current input	min. 50 mA max. 1.5 A
Current input per channel	max. 4 mA
Switching point, typically	13.3 V ±0.8 V (2.1 mA ±0.5 mA)
Input current operating range	-3 60 V (current limited to 2.3 2.9 mA)
Number of proximity switch supplies	8 with 4 outputs each
Output voltage for proximity switch supply	Supply voltage -2.5 V
Output current of the proximity switch supply	100 mA for each group, short-circuit-proof

The proximity switch supplies are monitored for undervoltage (< 17 VDC). If a fault occurs, the corresponding status "Channel X Supply OK" is set to FALSE. A short-circuit in the proximity switch supply triggers the undervoltage detection. The output current is pulsed < 250 mA, as long as the proximity switch supply is short-circuited.

Housing material	Synthetic material (fire-retardant in accordance with NFPA 72)			
Operating temperature	from 0 °C to +60 °C			
Storage temperature	from -40 °C to +85 °C			
Humidity	max. 95% relative humidity, non-condensing			
Type of protection	IP20			
Protection class	III in accordance with IEC/EN 61131-2			



Specifications	, Dimensions and	l Weight	(Continued from	X-DI 32	03 Digital Input Module)
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Pollution	Pollution degree II in accordance with IEC/EN 61131-2
Altitude	< 2000 m
Dimensions	310 x 29.2 x 230 (H x W x D) in mm
Weight approx.	1.1 kg



X-DI 16 01 Digital Input Module

6.5.6

HIMax[®]

The digital X-DI 16 01 input module is used to evaluate up to 16 digital input signals. The 48 VAC through 120 VAC current sinking logic inputs comply with the standards in accordance with IEC 61131-2. The 8 short-circuit-proof supplies feed 2 supply outputs each.

Product	Part no.	Descript	tion	
X-DI 16 01	98 5210222	Digital in	put module, SIL 3	
X-CB 007 01	98 5020131	Connect	or board with screw terminals	
X-CB 007 02	98 5020132	Redunda	int connector board with screw terminals	
X-CB 007 03	98 5020133	Connect	or Board with system cable set	
X-CB 007 04	98 5020134	Redunda	nt connector board with system cable set	
Specifications, Dimensions	and Weight			
Operating voltage		24 VDC		
Current input		500 mA		
Current input per channel		max. 5 mA		
Number of channels		16, non-galvanically isolated		
External supply voltage		110 VDC or 48/120 VAC, supply via connector board		
Frequency		50/60 Hz sine (-6% +4%)		
Input current operating rang	e	0 130 VAC (current limited to approx. 5 mA)		
Standby current		50 mA		
Maximum current input		2.5 A		
Switching point		Us: 31.6 V (-2.5 V +4 V), (2.1 mA ±0.3 mA) Ueff: 22.4 V (-2 V +3 V), (1.05 mA ±0.15 mA)		
Output voltage for supply		External supply voltage – 3 VAC		
Output current for supply		50 mA for each group, short-circuit-proof		
The supplies are monitored f	or undervoltage (< 2	5 VAC). If	a fault occurs, the corresponding status "Channel X Supply OK"	

The supplies are monitored for undervoltage (< 25 VAC). If a fault occurs, the corresponding status "Channel X Supply OK" is set to FALSE. A short-circuit in the supply triggers the undervoltage detection. The output current is pulsed < 250 mA while the supply is short-circuited.

Housing material	Synthetic material (fire-retardant in accordance with NFPA 72)
Operating temperature	from 0 °C to +60 °C
Storage temperature	from -40 °C to +85 °C
Humidity	max. 95% relative humidity, non-condensing
Type of protection	IP20
Protection class	III in accordance with IEC/EN 61131-2
Pollution	Pollution degree II in accordance with IEC/EN 61131-2
Altitude	< 2000 m
Dimensions	310 x 29.2 x 230 (H x W x D) in mm
Weight approx.	1.2 kg





X-AI 32 01 Analog Input Module (4 ... 20 mA) 6.6.0

HIMax[®]

The analog X-AI 32 01 input module has 32 current inputs. A short-circuit-proof supply is available for each input. Transmitters and safety transmitters can thus be evaluated. Two-wire or three-wire transmitters with a maximum supply current of 30 mA can be connected to the input module.

Product	Part no.	Description
X-AI 32 01	98 5210213	Analog input module, SIL 3
X-CB 008 01	98 5020019	Connector board with screw terminals
X-CB 008 02	98 5020059	Redundant connector board with screw terminals
X-CB 008 03	98 5020020	Connector board with cable plug
X-CB 008 04	98 5020064	Redundant connector board with cable plug
X-CB 008 05	98 5020066	Connector board with cable plug, redundant FTA
X-CA 005 01 8	98 5050704-8	Cable, 32 channels → FTA, 8 m
X-CA 005 01 15	98 505070-15	Cable, 32 channels → FTA, 15 m
X-CA 005 01 30	98 5050704-30	Cable, 32 channels → FTA, 30 m

Specifications, Dimensions and Weight

Operating voltage	24 VDC
Current input	min. 500 mA (without channels/ transmitter supplies) max. 1.5 A (if the transmitter supplies are short-circuited)
Number of channels	32, galvanically isolated from one another
Rated input current	0/4 20 mA
Input current operating range	0 22.5 mA
Resolution	12-bit
Value of LSB	6.35 μΑ
Shunt for current measurement	200 Ω (on connector board)
Maximum permitted current via shunt	≤ 50 mA
Withstand voltage of the input	≤ 10 VDC
Interference voltage suppression	> 60 dB (common mode 50/ 60 Hz)



Specifications, Dimensions and Weight (Continued from X-AI 32 01 Analog Input Module (4...20 mA))

Measurement final value faults		
Accuracy intrinsic errors	0.2% incl. shunt	
Accuracy operating errors	0.3% at 0 60 °C, incl. shunt	
Accuracy with HART communication	1.0% incl. shunt	
Settling time to 99% of the process value when the input signal changes	15 ms	
Safety-related accuracy	±1%	
Output voltage for transmitter supply	26.5 VDC +0/ -15%	
Output current of transmitter supply	Max. 30 mA	
Maximum connectable load	\leq 750 Ω at 22.5 mA	
Monitoring of transmitter supply	Fault < 22.5 30 VDC < fault	
Short-circuit current of transmitter supply	≤ 35 mA	
If more than 12 supplies are closed for longer than 3 seconds, the entire transmitter supply is switched off. If the overload disappears within 30 seconds, the transmitter supply is switched on again.		
overload disappears within 30 seconds, the transm	nitter supply is switched on again.	
overload disappears within 30 seconds, the transr Housing material	nitter supply is switched on again. Polyamide (fire-retardant in accordance with NFPA 72)	
overload disappears within 30 seconds, the transr Housing material Operating temperature	nitter supply is switched on again. Polyamide (fire-retardant in accordance with NFPA 72) from 0 °C to +60 °C	
overload disappears within 30 seconds, the transm Housing material Operating temperature Storage temperature	nitter supply is switched on again. Polyamide (fire-retardant in accordance with NFPA 72) from 0 °C to +60 °C from -40 °C to +85 °C	
overload disappears within 30 seconds, the transm Housing material Operating temperature Storage temperature Humidity	nitter supply is switched on again. Polyamide (fire-retardant in accordance with NFPA 72) from 0 °C to +60 °C from -40 °C to +85 °C max. 95% relative humidity, non-condensing	
overload disappears within 30 seconds, the transm Housing material Operating temperature Storage temperature Humidity Type of protection	nitter supply is switched on again. Polyamide (fire-retardant in accordance with NFPA 72) from 0 °C to +60 °C from -40 °C to +85 °C max. 95% relative humidity, non-condensing IP20	
overload disappears within 30 seconds, the transmission Housing material Operating temperature Storage temperature Humidity Type of protection Protection class	nitter supply is switched on again. Polyamide (fire-retardant in accordance with NFPA 72) from 0 °C to +60 °C from -40 °C to +85 °C max. 95% relative humidity, non-condensing IP20 III in accordance with IEC/EN 61131-2	
overload disappears within 30 seconds, the transmission Housing material Operating temperature Storage temperature Humidity Type of protection Protection class Pollution	nitter supply is switched on again. Polyamide (fire-retardant in accordance with NFPA 72) from 0 °C to +60 °C from -40 °C to +85 °C max. 95% relative humidity, non-condensing IP20 III in accordance with IEC/EN 61131-2 Pollution degree II in accordance with IEC/EN 61131-2	
overload disappears within 30 seconds, the transmer Housing material Operating temperature Storage temperature Humidity Type of protection Protection class Pollution Altitude	nitter supply is switched on again. Polyamide (fire-retardant in accordance with NFPA 72) from 0 °C to +60 °C from -40 °C to +85 °C max. 95% relative humidity, non-condensing IP20 III in accordance with IEC/EN 61131-2 Pollution degree II in accordance with IEC/EN 61131-2 < 2000 m	
overload disappears within 30 seconds, the transmission Housing material Operating temperature Storage temperature Humidity Type of protection Protection class Pollution Altitude Dimensions	nitter supply is switched on again. Polyamide (fire-retardant in accordance with NFPA 72) from 0 °C to +60 °C from -40 °C to +85 °C max. 95% relative humidity, non-condensing IP20 III in accordance with IEC/EN 61131-2 Pollution degree II in accordance with IEC/EN 61131-2 < 2000 m 310 x 29.2 x 230 (H x W x D) in mm	



X-AI 32 02 Analog Input Module (4 ... 20 mA)

6.6.1

HIMax[®]

The analog X-AI 32 02 input module has 32 current inputs. A short-circuit-proof supply is available for each input. Transmitters and safety transmitters can thus be evaluated. Two-wire or three-wire transmitters with a maximum supply current of 30 mA can be connected to the input module. The module is suitable for fast recording sequences of events (SOE).

Product	Part no.	Description
X-AI 32 02	98 5210229	Analog input module, SIL 3
X-CB 008 01	98 5020019	Connector board with screw terminals
X-CB 008 02	98 5020059	Redundant connector board with screw terminals
X-CB 008 03	98 5020020	Connector board with cable plug
X-CB 008 04	98 5020064	Redundant connector board with cable plug
X-CA 005 01 8	98 5050704-8	Cable, 32 channels → FTA, 8 m
X-CA 005 01 15	98 5050704-15	Cable, 32 channels → FTA, 15 m
X-CA 005 01 30	98 5050704-30	Cable, 32 channels → FTA, 30 m

Specifications, Dimensions and Weight

Operating voltage	24 VDC
Current input	min. 500 mA (without channels/ transmitter supplies) max. 1.5 A (if the transmitter supplies are short-circuited)
Number of channels	32, galvanically isolated from one another
Rated input current	0/ 4 20 mA
Input current operating range	0 22.5 mA
Resolution	12-bit
Value of LSB	6.35 μΑ
Shunt for current measurement	200 Ω (on connector board)
Maximum permitted current via shunt	≤ 50 mA
Withstand voltage of the input	≤ 10 VDC
Interference voltage suppression	> 60 dB (common mode 50/ 60 Hz)
Measurement final value faults	
Accuracy intrinsic errors	0.2% incl. shunt
Accuracy operating errors	0.3% at 0 60 °C, incl. shunt
Accuracy with HART communication	1.0% incl. shunt
Settling time to 99% of the process value when the input signal changes	15 ms
Safety-related accuracy	±1%
Output voltage for transmitter supply	26.5 VDC +0/ -15%
Output current of transmitter supply	max. 30 mA
Maximum connectable load	≤ 750 Ω at 22.5 mA



Specifications, Dimensions and Weight (Continued from X-AI 32 02 Analog Input Module (4...20 mA))

Monitoring of transmitter supply	Fault < 22.5 30 VDC < fault	
Short-circuit current of transmitter supply	≤ 35 mA	
If more than 12 supplies are closed for longer than 3 seconds, the entire transmitter supply is switched off. If the overload disappears within 30 seconds, the transmitter supply is switched on again.		
Housing material	Polyamide (fire-retardant in accordance with NFPA 72)	
Operating temperature	from 0 °C to +60 °C	
Storage temperature	from -40 °C to +85 °C	
Humidity	max. 95% relative humidity, non-condensing	
Type of protection	IP20	
Protection class	III in accordance with IEC/EN 61131-2	
Pollution	Pollution degree II in accordance with IEC/EN 61131-2	
Altitude	< 2000 m	
Dimensions	310 x 29.2 x 230 (H x W x D) in mm	
Weight approx.	1.4 kg	



X-CI 24 01 Counter Module (0...20 kHz)

HIMax[®]

The X-CI 24 01 counter module has 24 inputs that can measure frequencies in the range of 0...20 kHz. A short-circuit-proof supply is assigned to each input. The 24 module inputs can be either configured for proximity switches or for switching contacts.

Product	Part no.	Description
X-CI 24 01	98 5210220	Counter module, SIL 3
X-CB 013 01	98 5020094	Connector board with screw terminals
X-CB 013 02	98 5020100	Redundant connector board with screw terminals
X-CB 013 03	98 5020106	Connector board with cable plug
X-CB 013 04	98 5020112	Redundant connector board with cable plug
X-CA 005 01 8	98 5050704-8	System cable, 8 m, single/ redundant FTA
X-CA 005 01 15	98 5050704-15	System cable, 15 m, single/ redundant FTA
X-CA 005 01 30	98 5050704-30	System cable, 30 m, single/ redundant FTA
Specifications, Dimensions and Weight		
Operating voltage		24 VDC
Current input		0.7 A without load
Current input for 24 V per ch	annel at high level	Control circuit device of type 3: 5.5 mA, max. 30 mA Proximity switch: typ. 1 mA, max. 10 mA
Number of channels		24, galvanically isolated
Count frequency		0 20 kHz
Resolution		0.1 Hz
Counter resolution		32-bit
Pulse width in one-phase ope	eration	min. 16.5 μs
Edge distance of two phases operation	in two-phase	min. 6 μs
Accuracy of pulse count		±1 pulse
Accuracy of frequency and rotational speed measureme	nt	Depending on the type evaluation
Safety-related accuracy		±1% of final value
Proximity switch in accordan	ce with EN 60947-5	
Line resistance		max. 50 Ω
Switch-on threshold		1.8 mA
Switch-off threshold		1.4 mA
Open-circuit		< 0.2 mA
Short-circuit		> 6.5 mA



Control circuit devices in accordance with EN 61131-2	
Wire length	1000 m
Switch-on threshold	> 10 V
Switch-off threshold	< 8 V
Output voltage for supply	8.2 VDC ±10 % 24 VDC -15% ±20%
Short-circuit current, per supply	> 30 mA
The 24 inputs have a common ground. To recogniz	ze the rotation direction, the inputs are wired to 12 channel pairs.
Housing material	Synthetic material (fire-retardant in accordance with NFPA 72)
Operating temperature	from 0 °C to +60 °C
Storage temperature	from -40 °C to +85 °C
Humidity	max. 95% relative humidity, non-condensing
Type of protection	IP20
Protection class	III in accordance with IEC/EN 61131-2
Pollution	Pollution degree II in accordance with IEC/EN 61131-2
Altitude	< 2000 m
Dimensions	310 x 29.2 x 230 (H x W x D) in mm
Weight approx.	1.2 kg

Specifications, Dimensions and Weight (Continued from X-CI 24 01 Counter Module (0...20 kHz))



X-DO 24 01 Digital Output Module

6.7.0

HIMax[®]

The digital X-DO 24 01 output module has 24 digital 24 V outputs with max. 0.5 A per channel. It is suitable for connecting ohmic, inductive and capacitive loads. If the individual channels are overloaded, they are switched off and cyclically reactivated. Integrated, channel-by-channel diagnosis for open-circuits and line short-circuits.

Product	Part no.	Description
X-DO 24 01	98 5210203	Digital Output Module, SIL 3
X-CB 009 01	98 5020021	Connector board with screw terminals
X-CB 009 02	98 5020042	Redundant connector board with screw terminals
X-CB 009 03	98 5020022	Connector board with cable plug
X-CB 009 04	98 5020043	Redundant connector board with cable plug
X-CA 006 01 8	98 5050737-8	System cable, 8 m, single/ redundant FTA
X-CA 006 01 15	98 5050737-15	System cable, 15 m, single/ redundant FTA
X-CA 006 01 30	98 5050737-30	System cable, 30 m, single/ redundant FTA

Specifications, Dimensions and Weight

Operating voltage	24 VDC
Current input	min. 0.5 A
	max. 16 A
Number of channels	24, non-galvanically isolated
Level of the outputs	
At low level	max.1V with L+ = 24 V (min. load 2400 Ohm)
Leakage current (at low level)	< 500 μΑ
At high level	min. 23.2 V with L+ = 24 V (max. load 42 Ohm)
Overcurrent interruption	I > 0.75 A for T > 50 ms
Current limiting (in the event of short-circuit)	approx. 2 A, each channel
Switching time of the channels (with ohmic load)	≤ 100 μs
Ohmic load to nom. rated current	0.5 A
Inductive load	max. 50 H
Lamp load (24 V lamps)	4 W
Capacitive load max.	100 µF
Line monitoring	
Open-circuit (OC) threshold	≤ 5 mA
Short-circuit (SC) threshold	> 0.75 A
Test pulse (with ohmic load)	typ. 200 μs
Overload protection of the outputs, transient	60 V (max. 73 V)



Housing material	Polyamide (fire-retardant in accordance with NFPA 72)
Operating temperature	from 0 °C to +60 °C
Storage temperature	from -40 °C to +85 °C
Humidity	max. 95% relative humidity, non-condensing
Type of protection	IP20
Protection class	III in accordance with IEC/EN 61131-2
Pollution	Pollution degree II
Altitude	< 2000 m
Dimensions	310 x 29.2 x 230 (H x W x D) in mm
Weight approx.	1.0 kg

Specifications, Dimensions and Weight (Continued from X-DO 24 01 Digital Output Module)



HIMax[®]

The X-DO 12 O1 relay module has 12 potential-free relay outputs for 230 VAC/ VDC. To ensure the maximum life time, both switching operations and corresponding current consumption are monitored. To determine the wear due to contact erosion, the X-DO 12 O1 measures the current on channel, in intervals of 140 ms. The actual current for each contact is measured. In case of redundancy, the current is distributed.

Product	Part no.	Description
X-DO 12 01	98 5210204	Relay module, SIL 3
X-CB 011 01	98 5020017	Connector board with screw terminals
X-CB 011 02	98 5020057	Redundant connector board with screw terminals
X-CB 011 03	98 5020018	Connector board with cable plug
X-CB 011 04	98 5020062	Redundant connector board with cable plug
X-CB Cover 01	98 5050001	Cover for connector boards with screw terminals
X-CA 007 01 8	98 5050713-8	Cable, 24 channels → FTA, 8 m
X-CA 007 01 15	98 5050713-15	Cable, 24 channels → FTA, 15 m
X-CA 007 01 30	98 5050713-30	Cable, 24 channels → FTA, 30 m

Specifications, Dimensions and Weight

Operating voltage	24 VDC
Current input	max. 0.5 A
Number of channels	12, potential-free
Total switching current (all channels)	max. 30 A
Switching voltage	5 250 VAC/ VDC
Switching current per channel	5 mA4 A (external fusing)
Switching frequency	max. 4 Hz
Switching time (energized contact closed)	10 ms
Reset time (de-energized contact closed, without wiring)	3 ms
Bounce time for the energized contact	2 ms
Contact material	AgCuNi + 0.2 0.4 μm Au
Life time: mechanical	\geq 10 x 10 ⁶ switching operations
Life time: electrical	\geq 2.5 x 10 ⁵ switching operations with ohmic full load
Housing material	Polyamide (fire-retardant in accordance with NFPA 72)
Operating temperature	from 0 °C to +60 °C
Storage temperature	from -40 °C to +85 °C
Humidity	max. 95% relative humidity, non-condensing
Type of protection	IP20
Protection class	II in accordance with IEC/EN 61131-2

[continued on back page]



6.7.1

Specifications, Dimensions and Weight (Continued from X-DO 12 O1 Relay Module)

Pollution	Pollution degree II in accordance with IEC/EN 61131-2
Altitude	< 2000 m
Dimensions	310 x 29.2 x 230 (H x W x D) in mm
Weight approx.	1.6 kg

Currents and Fuses

		Standard applications	Standard applications	Burner applications in accordance with VDE 0116, EN 50156
Switching operations		< 100 000	< 250 000	< 250 000
Switching capacity DC (induction free)	≤ 30 VDC	max. 4.00 A	max. 4.00 A	Fuse 3.15 A
	≤ 70 VDC	max. 1.25 A	max. 1.25 A	Fuse 0.63 A
	≤ 127 VDC	max. 0.50 A	max. 0.50 A	Fuse 0.315 A
	≤ 250 VDC	max. 0.28 A	max. 0.25 A	Fuse 0.125 A
Switching capacity DC	≤ 30 VDC	max. 0.80 A	max. 0.50 A	Fuse 0.315 A
(ind. load tau L/ R = 40 ms)	≤ 70 VDC	max. 0.32 A	max. 0.20 A	Fuse 0.125 A
	≤ 127 VDC	max. 0.19 A	max. 0.12 A	Fuse 0.063 A
	≤ 250 VDC	max. 0.10 A	max. 0.06 A	Not specified
Switching capacity AC (induction free)	≤ 125 VAC	max. 4.00 A	max. 3.00 A	Fuse 1.25 A
	≤ 250 VAC	max. 4.00 A	max. 1.50 A	Fuse 0.63 A
Switching capacity AC $\cos \phi > 0.5$	≤ 125 VAC	max. 3.00 A	max. 1.20 A	Fuse 0.63 A
	≤ 250 VAC	max. 1.50 A	max. 0.60 A	Fuse 0.315 A



X-DO 32 01 Digital Output Module

6.7.2

HIMax[®]

The digital X-DO 32 01 output module has 32 digital 24 VDC outputs with max. 0.5 A per channel. It is suitable for connecting ohmic, inductive and capacitive loads. If the individual channels are overloaded, they are switched off and cyclically reactivated. Integrated, channel-by-channel diagnosis for short-circuits.

Product	Part no.	Description
X-DO 12 01	98 5210219	Digital output module, SIL 3
X-CB 009 01	98 5020021	Connector board with screw terminals
X-CB 009 02	98 5020042	Redundant connector board with screw terminals
X-CB 009 03	98 5020022	Connector board with cable plug
X-CB 009 04	98 5020043	Redundant connector board with cable plug
X-CA 006 01 8	98 5050737-8	System cable, 8 m, single/ redundant FTA
X-CA 006 01 15	98 5050737-15	System cable, 15 m, single/ redundant FTA
X-CA 006 01 30	98 5050737-30	System cable, 30 m, single/ redundant FTA

Specifications, Dimensions and Weight

Operating voltage	24 VDC
Current input	min. 0.5 A
	max. 16 A
Number of channels	32, non-galvanically isolated
Level of the outputs	
At low level	max.1V with L+ = 24 V (min. load 200 kOhm)
Leakage current (at low level)	≤ 500 μA
With high level	min. 22.2 V at L+ = 24 V (max. load 32 Ohm)
Overcurrent interruption	I > 0.8 A
Current limiting (in the event of short-circuit)	approx. 2 A, each channel
Switching time of the channels (with ohmic load)	≥ 100 µs
Ohmic load to nom. rated current	0.5 A (range 0.01 0.6 A)
Inductive load	10 H
Lamp load (24 V lamps)	4 W
Capacitive load max.	100 μF
Line monitoring	
Short-circuit (SC) threshold	0.8 A (range 0.8 0.85 A)
Test pulse (with ohmic load)	typ. 200 μs
Overload protection of the outputs, transient	33 V (max. 43 V)

Specifications, Dimensions and Weight (Continued from X-DO 32 O1 Digital Output Module)

Housing material	Synthetic material (fire-retardant in accordance with NFPA 72)
Operating temperature	from 0 °C to +60 °C
Storage temperature	from -40 °C to +85 °C
Humidity	max. 95 % relative humidity, non-condensing
Type of protection	IP20
Protection class	III in accordance with IEC/EN 61131-2
Pollution	Pollution degree II
Altitude	< 2000 m
Dimensions	310 x 29.2 x 230 (H x W x D) in mm
Weight approx.	1.1 kg



X-DO 24 02 Digital Output Module

6.7.3

HIMax[®]

The digital X-DO 24 O2 output module has 24 digital 48 VDC or 24 VDC outputs with max. 0.5 A per channel. It is suitable for connecting ohmic, inductive and capacitive loads. If the individual channels are overloaded, they are switched off and cyclically reactivated. Integrated, channel-by-channel diagnosis for open-circuits and short-circuits:

Product	Part no.	Description
X-DO 24 02	98 5210214	Digital output module, SIL 3
X-CB 010 01	98 5020035	Connector board with screw terminals
X-CB 010 02	98 5020044	Redundant connector board with screw terminals
X-CB 010 03	98 5020036	Connector board with cable plug
X-CB 010 04	98 5020045	Redundant connector board with cable plug
X-CA 006 01 8	98 5050737-8	System cable, 8 m, single/ redundant FTA
X-CA 006 01 15	98 5050737-15	System cable, 15 m, single/ redundant FTA
X-CA 006 01 30	98 5050737-30	System cable, 30 m, single/ redundant FTA

Specifications, Dimensions and Weight

Operating voltage	24 VDC
Current input	min. 0.5 A
Number of channels	24, non-galvanically isolated
External supply voltage	48 VDC or 24 VDC, -15 % +20 % Supply via connector board
Level of the outputs	
At low level	max.1V with L+ = 24 V (min. load 200 kOhm)
Leakage current (at low level)	≤ 500 μA
With high level	min. 22.2 V at L+ = 24 V (max. load 32 Ohm)
Overcurrent interruption	I > 0,75 A
Current limiting (in the event of short-circuit)	Approx. 2 A per channel
Total current permitted for the module	max. 12 A
Switching time of the channels (with ohmic load)	≤ 100 μs
Ohmic load to nom. rated current	0.5 A
Inductive load	max.1H
Lamp load (24 V lamps)	max. 4 W
Capacitive load	100 µF
Line monitoring	
Open-circuit (OC) threshold	≤ 2 mA (48 VDC), ≤ 5 mA (24 VDC)
Short-circuit (SC) threshold	0.75 A (range 0,75 0.8 A)
Test pulse (with ohmic load)	typ. 200 μs
Overload protection of the outputs, transient	60 V (max. 73 V)



Housing material	Synthetic material (fire-retardant in accordance with NFPA 72)
Operating temperature	from 0 °C to +60 °C
Storage temperature	from -40 °C to +85 °C
Humidity	max. 95 % relative humidity, non-condensing
Type of protection	IP20
Protection class	III in accordance with IEC/EN 61131-2
Pollution	Pollution degree II
Altitude	< 2000 m
Dimensions	310 x 29.2 x 230 (H x W x D) in mm
Weight approx.	1.1 kg

Specifications, Dimensions and Weight (Continued from X-DO 24 02 Digital Output Module)
X-DO 12 02 Digital Output Module

6.7.4

HIMax[®]

The digital X-DO 12 O2 output module has 12 digital 24 VDC outputs with max. 2 A per channel. It is suitable for connecting ohmic, inductive and capacitive loads. If the individual channels are overloaded, they are switched off and cyclically reactivated. Integrated, channel-by-channel diagnosis for short-circuits.

Product	Part no.	Description
X-DO 12 02	98 5210218	Digital output module, SIL 3
X-CB 012 01	98 5020021	Connector board with screw terminals
X-CB 012 02	98 5020042	Redundant connector board with screw terminals
X-CB 012 03	98 5020022	Connector board with cable plug
X-CB 012 04	98 5020043	Redundant connector board with cable plug
X-CA 008 01 8	98 5050737-8	System cable, 8 m, single/ redundant FTA
X-CA 008 01 15	98 5050737-15	System cable, 15 m, single/ redundant FTA
X-CA 008 01 30	98 5050737-30	System cable, 30 m, single/ redundant FTA

Specifications, Dimensions and Weight

Operating voltage	24 VDC
Current input	0.5 A
Number of channels	12, non-galvanically isolated
External supply voltage	24 VDC, -15 % +20 % Supply via connector board
Level of the outputs	
At low level	max.1V with L+ = 24 V (min. load 200 kOhm)
Leakage current (at low level)	≤ 500 μA
At high level	min. 22.2 V with L+ = 24 V (max. load 32 Ohm)
Overcurrent interruption	I>2.5 A
Current limiting (in the event of short-circuit)	6 A per channel
Total current permitted for the module	max. 12 A
Switching time of the channels (with ohmic load)	200 µs
Ohmic load to nom. rated current	2 A
Inductive load	max. 10 H
Lamp load (24 V lamps)	max. 20 W
Capacitive load max.	max. 100 μF
Short-circuit monitoring	
Short-circuit (SC) threshold	2.5 A (range 2.5 2.6 A)
Test pulse (with ohmic load)	typ. 200 μs
Overload protection of the outputs, transient	33 V (max. 43 V)

[continued on back page]



Specifications, Dimensions and Weight (Continued from X-DO 12 O2 Digital Output Module)

Housing material	Synthetic material (fire-retardant in accordance with NFPA 72)
Operating temperature	from 0 °C to +60 °C
Storage temperature	from -40 °C to +85 °C
Humidity	max. 95 % relative humidity, non-condensing
Type of protection	IP20
Protection class	III in accordance with IEC/EN 61131-2
Pollution	Pollution degree II
Altitude	< 2000 m
Dimensions	310 x 29.2 x 230 (H x W x D) in mm
Weight approx.	1.1 kg



X-AO 16 01 Analog Output Module (4...20 mA) 6.8.0

HIMax[®]

The X-AO 16 O1 analog module is equipped with 16 current outputs with single-channel wiring and with 8 current outputs with redundant wiring. The output nominal range is 4 to 20 mA. The analog outputs are suitable for connecting ohmic, inductive and capacitive loads and lamps.

Product	Part no.	Description
X-AO 16 01	98 5210210	Analog input module, SIL 3
X-CB 014 01	98 5020025	Connector board with screw terminals
X-CB 014 02	98 5020058	Redundant connector board with screw terminals
X-CB 014 03	98 5020026	Connector board with cable plug
X-CB 014 04	98 5020063	Redundant connector board with cable plug
X-CA 011 01 8	98 5050758-8	System cable, 8 m, single/ redundant FTA
X-CA 011 01 15	98 5050758-15	System cable, 15 m, single/ redundant FTA
X-CA 011 01 30	98 5050758-30	System cable, 30 m, single/ redundant FTA

Specifications, Dimensions and Weight

Operating voltage	24 VDC
Current input	min. 0.6 A
Current input per channel pair	80 mA
Number of outputs	16, with single-channel wiring 8, with redundant wiring
Nominal range	4 20 mA
Output current operating range	0 23 mA
Resolution	16 bit (10 000 digit in SILworX)
Value of LSB	≤ 2 μA
Ohmic load	max. 600 Ω
Inductive load	max.1mH
Capacitive load	max. 100 μF
Measurement accuracy at 25 °C, max.	\leq 0.2% of final value
Temperature coefficient	$\leq \pm 0,05$ of final value
Accuracy with HART communication	2 % of final value
Linearity error	$\leq \pm 0.1\%$
Settling time	5 ms
Safety-related accuracy	±2% of final value

2 of these outputs (AO1 and AO2; AO3 and AO4...AO15 and AO16) have a common ground potential. The remaining channel pairs and the supply voltage are electrically isolated.

Housing material	Synthetic material (fire-retardant in accordance with NFPA 72)
Operating temperature	from 0 °C to +60 °C





	· · · · ·
Storage temperature	from -40 °C to +85 °C
Humidity	max. 95 % relative humidity, non-condensing
Type of protection	IP20
Protection class	III in accordance with IEC/EN 61131-2
Pollution	Pollution degree II in accordance with IEC/EN 61131-2
Altitude	< 2000 m
Dimensions	310 x 29.2 x 230 (H x W x D) in mm
Weight approx.	1.2 kg

Specifications, Dimensions and Weight (Continued from X-AO 16 01 Analog Output Module (4 ... 20 mA))



X-FTA Field Termination Assembly

6.9.0

HIMax[®]

The FTAs are mounted on the DIN rails of the control or a marshalling cabinets and connect the individual actuators or sensors of the field zone to the input and output levels via connector boards and system cables. The FTAs are available with system cable supply on the left or the right side. The FTAs of type X-FTA XXX 02 are used to set the redundancy on the FTA by connecting a second system cable.

Product	Part no.	Description			
X-FTA 001 01L	98 5030014	FTA left (terminals	s, single system cab	le)	
X-FTA 002 01L	98 5030015	FTA left (terminals	s, two-wire connecti	on, single system c	able)
X-FTA 002 01R	98 5030023	FTA right (termina	lls, two-wire connec	tion, single system	cable)
X-FTA 006 01L	98 5030018	FTA left (terminals	s, single system cab	le)	
X-FTA 001 02L	98 5030009	FTA left (terminals	s, redundant system	cable)	
X-FTA 002 02L	98 5030019	FTA left (terminals	s, two-wire connecti	on, redundant syst	em cable)
X-FTA 002 02R	98 5030025	FTA right (termina	lls, two-wire connec	tion, redundant sys	stem cable)
X-FTA 003 02L	98 5030011	FTA left (terminals	s, single/ redundant	system cable)	
X-FTA 003 02R	98 5030026	FTA right (termina	lls, single/ redundar	nt system cable)	
X-FTA 005 02L	98 5030020	FTA left (terminals	, single/ redundant	system cable) fuse 4	4 A time-lag
X-FTA 006 02L	98 5230021	FTA left (terminals	s, redundant system	cable)	
X-FTA 007 02L	98 5230013	FTA left (terminals	s, redundant system	cable)	
X-FTA 008 02L	98 5230010	FTA left (terminals	s, redundant system	cable)	
X-FTA 009 02L	98 5230022	FTA left (terminals	s, redundant system	cable)	
Use					
X-FTA 001		X-DI 32 01	X-DI 32 03	X-DI 32 04	
X-FTA 002		X-AI 32 01	X-AI 32 02	X-AO 16 01	X-CI 24 01
		X-DI 32 01	X-DI 32 02	X-DI 32 03	X-DI 32 04
		X-DI 32 05	X-DO 32 01	X-DO 24 01	X-DO 24 02
X-FTA 003		X-DI 64 01			
X-FTA 005		X-DO 12 01			
X-FTA 006		X-DO 12 02			
X-FTA 007		X-AI 32 01	X-AI 32 02		
X-FTA 008		X-DI 32 02	X-DI 32 05		
X-FTA 009		X-AO 16 01			
Specifications, Dimensions and Weight					
X-FTA 001, X-FTA 002, 2	X-FTA 003, X-FTA (007, X-FTA 008 _	, X-FTA 009:		
Current load on each termina	al	0.75 A			

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Terminal cross-section	0.22.5 mm ² flexible
X-FTA 005:	
Current load on each terminal	4 A
Terminal cross-section	0.22.5 mm ² flexible (rows of terminals B, D, E)
Terminal cross-section	0.24 mm ² flexible (rows of terminals A, C)
Operating temperature	from 0 °C to +60 °C
Storage temperature	from -40 °C to +85 °C
Humidity	max. 95% relative humidity, non-condensing
Type of protection	IP20
Protection class	III in accordance with IEC/EN 61131-2
Pollution	Pollution degree II in accordance with IEC/EN 61131-2
Altitude	< 2000 mm
Mounting position	Horizontal or vertical
Mounting	On 35 mm DIN rail

Specifications, Dimensions and Weight (Continued from X-FTA Field Termination Assembly)

The FTAs X-FTA 002 01 and X-FTA 002 02 are delivered with a shield connection terminal block, a coding schema and the required fastening screws. A coding plate can be used to encode the FTAs such that only the corresponding system cable can be connected.

Dimensions (H x W x D)	
X-FTA 001 01	183 x 111 x 42 mm
	183 x 111 x 85 mm with cable plug/ system cable
X-FTA 001 02	253 x 133 x 42 mm 253 x 133 x 85 mm with cable plug/ system cable
X-FTA 002 01	183 x 111 x 48 mm 183 x 111 x 85 mm with cable plug/ system cable
X-FTA 002 02	253 x 133 x 48 mm 253 x 133 x 85 mm with cable plug/ system cable
X-FTA 003 02	359 x 111 x 42 mm 359 x 111 x 85 mm with cable plug/ system cable
X-FTA 005 02	258 x 111 x 60 mm 258 x 111 x 95 mm with cable plug/ system cable
X-FTA 006 01	183 x 111 x 42 mm 183 x 111 x 85 mm with cable plug/ system cable
X-FTA 006 02	253 x 133 x 42 mm 253 x 133 x 85 mm with cable plug/ system cable
X-FTA 007/ 008/ 009/ 02	253 x 133 x 48 mm 253 x 133 x 85 mm with cable plug/ system cable
Weight	5251,000 g



HIMax[®]

The digital X-DI 64 51 input module is used to evaluate up to 64 digital input signals. The 24 V current sinking logic inputs comply with the standards in accordance with IEC 61131-2. A power supply for proximity switches or contacts is available for every 8 inputs.

Part no.	Description
98 5010223	Digital input module, NonSIL
98 5025033	Connector board with screw terminals
98 5025098	Redundant connector board with screw terminals
98 5020034	Connector board with cable plug
98 5025110	Redundant connector board with cable plug
98 5050722-8	System cable, 8 m, single/ redundant FTA
98 5050722-15	System cable, 15 m, single/ redundant FTA
98 5050722-30	System cable, 30 m, single/ redundant FTA
	Part no. 98 5010223 98 5025033 98 5025098 98 5020034 98 5025110 98 5050722-8 98 5050722-15 98 5050722-30

Specifications, Dimensions and Weight

Operating voltage	24 VDC
Current input	min. 400 mA (without channels/ proximity switch supplies) max. 800 A (with 64 channels and proximity switch supplies)
Current input per channel	max. 4 mA
Number of channels	64, non-galvanically isolated
Rated input current	0 24 V
Switching point, typically	9.4 V ±0.8 V (2.1 mA ±0.3 mA)
Input current operating range	-3 30 V (current limited to 2.3 2.9 mA)
Number of proximity switch supplies	8 with 8 outputs each
Output voltage for proximity switch supply	Supply voltage -2.5 V
Output current of the proximity switch supply	120 mA for each group, short-circuit-proof
Housing material	Synthetic material (fire-retardant in accordance with NFPA 72)
Operating temperature	from 0 °C to +60 °C
Storage temperature	from -40 °C to +85 °C
Humidity	max. 95% relative humidity, non-condensing
Type of protection	IP20
Protection class	III in accordance with IEC/EN 61131-2
Pollution	Pollution degree II in accordance with IEC/EN 61131-2
Altitude	< 2000 m
Dimensions	310 x 29.2 x 230 (H x W x D) in mm
Weight approx.	0.95 kg



6.10.0



HIMax[®]

The digital X-DI 32 51 input module is used to evaluate up to 32 digital input signals. The 24 V-current sinking logic inputs comply with the standards in accordance with IEC 61131-2. A 24 VDC power supply for proximity switches or contacts is available for every 4 inputs.

Product	Part no.	Description
X-DI 32 51	98 5010245	Digital input module, NonSIL
X-CB 015 51	98 5025167	Connector board with screw terminals
X-CB 015 52	98 5025168	Redundant connector board with screw terminals
X-CB 015 53	98 5025169	Connector board with cable plug
X-CB 015 54	98 5025170	Redundant conector board with cable plug
X-CA 001 01 8	98 5050701-8	Cable, 32 channels → FTA, 8 m
X-CA 001 01 15	98 5050701-15	Cable, 32 channels → FTA, 15 m
X-CA 001 01 30	98 5050701-30	Cable, 32 channels → FTA, 30 m
Specifications, Dimensions and Weight		

Specifications, Dimensions and Weight

Operating voltage	24 VDC
Current input	min. 600 mA (without channels/ proximity switch supplies) max. 1.5 A (with 32 channels and proximity switch supplies)
Number of channels	32, non-galvanically isolated
Rated input voltage	0 24 V
Switching point, typically	9.3 V ±0.4 V (2.1 mA ±0.15 mA)
Voltage level: low	-3 5 V
Voltage level: high	11 30 V
Input current operating range	-3 30 V (current limited to approx. ca. 2.5 mA)
Additional current input per channel	min. < 1 mA (without proximity switch supply) max. 26 mA (with proximity switch supply)
Number of proximity switch supplies	8 with 4 outputs each
Output voltage for proximity switch supply	Operating voltage less 2.5 V
Output current of the proximity switch supply	100 mA for each group short-circuit-proof
Housing material	Polyamide (fire-retardant in accordance with NFPA 72)
Operating temperature	from 0 °C to +60 °C
Storage temperature	from -40 °C to +85 °C
Humidity	max. 95% relative humidity, non-condensing
Type of protection	IP20
Protection class	III in accordance with IEC/EN 61131-2

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6.10.1

Specifications, Dimensions and Weight (Continued noin A Di SZ Si Digital input Module)
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Pollution	Pollution degree II in accordance with IEC/EN 61131-2
Altitude	< 2000 m
Dimensions	310 x 29.2 x 230 (H x W x D) in mm
Weight approx.	1.0 kg



X-DI 32 52 Digital Input Module

6.10.2

HIMax[®]

The digital X-DI 32 52 input module is used to evaluate up to 32 safety proximity switches, proximity switches in accordance with EN 60947-5-6 (NAMUR) or wired contacts. 4 short-circuit-proof supplies feed 8 supply outputs each.

Product	Part no.	Description
X-DI 32 52	98 5010236	Digital input module, NonSIL
X-CB 005 55	98 5025065	Connector board with cable plug, redundant FTA
X-CB 005 51	98 5025023	Connector board with screw terminals
X-CB 005 52	98 5025056	Redundant connector board with srew terminals
X-CB 005 53	98 5025024	Connector board with cable plug
X-CB 005 54	98 5025061	Redundant connector board with cable plug
X-CA 002 01 8	98 5050707-8	Cable, 32 channels → FTA, 8 m
X-CA 002 01 15	98 5050707-15	Cable, 32 channels \rightarrow FTA, 15 m
X-CA 002 01 30	98 5050707-30	Cable, 32 channels → FTA, 30 m
Specifications, Dimensions	and Weight	
Operating voltage		24 VDC
Current input		min. 450 mA (without channels/ proximity switch supplies) max. 1 A (in case of short-circuit of the supplies)
Number of channels		32, non-galvanically isolated
Proximity switch in accordance with EN 60947-5:		
Switch-on threshold $L \rightarrow H$		1.70 mA
Switch-off threshold $H \rightarrow L$		1.50 mA
Open-circuit		≤ 0.2 mA
Short-circuit		≥ 6.25 mA
Output voltage for proximity	switch supply	8.2 VDC, ±5%
Wired mechanical contact: Via series and shunt resistor with line monitoring		
Rated input current		0 9 mA
Input current operating range		0 9.3 mA
Resolution		12-bit (LSB 100 nA)
Shunt for current measurement		1000 Ω (on connector board)
Wire length		The wire length depends on the wire resistance \leq 50 Ω in accordance with EN 60 947-5-6
Accuracy intrinsic errors		$< \pm 0.5\%$ incl. shunt
Accuracy operating errors		< ±1% at 0 60 °C, incl. shunt



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Housing material	Polyamide (fire-retardant in accordance with NFPA 72)
Operating temperature	from 0 °C to +60 °C
Storage temperature	from -40 °C to +85 °C
Humidity	max. 95% relative humidity, non-condensing
Type of protection	IP20
Protection class	III in accordance with IEC/EN 61131-2
Pollution	Pollution degree II in accordance with IEC/EN 61131-2
Altitude	< 2000 m
Dimensions	310 x 29.2 x 230 (H x W x D) in mm
Weight approx.	0.9 kg

Specifications, Dimensions and Weight (Continued from X-DI 32 52 Digital Input Module)



HIMax[®]

The digital X-DO 32 51 output module has 32 digital 24 VDC outputs with max. 0.5 A per channel. It is suitable for connecting ohmic, inductive and capacitive loads. If an output overload is detected, the corresponding channel is switched off and automatically switched on again after 5 seconds as soon as the overload is no longer present.

Product	Part no.	Description
X-DO 32 51	98 5010224	Digital output module, NonSIL
X-CB 009 51	98 5025021	Connector board with screw terminals
X-CB 009 53	98 5020022	Connector board with cable plug
X-CA 006 01 8	98 5050737-8	System cable, 8 m, single/ redundant FTA
X-CA 006 01 15	98 5050737-15	System cable, 15 m, single/ redundant FTA
X-CA 006 01 30	98 5050737-30	System cable, 30 m, single/ redundant FTA
Specifications, Dimensions	and Weight	
Operating voltage		24 VDC
Current input		min. 0.5 A max. 12.5 A
Number of channels		32, non-galvanically isolated
Level of the outputs		
Leakage current (at low level)		< 500 μΑ
max. output current		approx. 0.7 A, for each channel
Switching time of the channels (with ohmic load)		≥ 100 µs
Ohmic load to nom. rated cur	rent	0.5 A (range 0.01 0.6 A)
Inductive load		2 H
Lamp load (24 V lamps)		4 W
Capacitive load max.		100 µF
Overload protection of the outputs, transient		33 V (max. 43 V)
Housing material		Synthetic material (fire-retardant in accordance with NFPA 72)
Operating temperature		from 0 °C to +60 °C
Storage temperature		from -40 °C to +85 °C
Humidity		max. 95% relative humidity, non-condensing
Type of protection		IP20
Protection class		III in accordance with IEC/EN 61131-2
Pollution		Pollution degree II
Altitude		< 2000 m
Dimensions		310 x 29.2 x 230 (H x W x D) in mm
Weight approx.		1.1 kg



6.10.3

X-DO 12 51 Relay Module

6.10.4

HIMax[®]

The X-DO 12 51 relay module has 12 potential-free relay outputs for 250 VAC/ VDC.

Product	Part no.	Description
X-DO 12 51	98 5010226	Relay module, NonSIL
X-CB 011 51	98 5025017	Connector board with screw terminals
X-CB 011 53	98 5025018	Connector board with cable plug
X-CB Cover 01	98 5050001	Cover for connector boards with screw terminals
X-CA 007 01 8	98 5050713-8	Cable, 24 channels → FTA, 8 m
X-CA 007 01 15	98 5050713-15	Cable, 24 channels → FTA, 15 m
X-CA 007 01 30	98 5050713-30	Cable, 24 channels → FTA, 30 m
Specifications, Dimensions and Weight		
Operating voltage		24 VDC
Current input		max. 0.3 A
Number of channels		12, potential-free
Total switching current (all channels)		max. 30 A
Switching voltage		5 250 VAC/ VDC
Switching current per channel		max. 4 A (external fusing)
Switching frequency		max. 20 Hz
Contact material		AgNi + 0.15 gold plated
Life time: mechanical		\geq 30 x 10 ⁶ switching operations
Life time: electrical		\ge 5 x 10 ⁵ at 2 A switching current \ge 3 x 10 ⁵ at 4 A switching current
Housing material		Polyamide (fire-retardant in accordance with NFPA 72)
Operating temperature		from 0 °C to +60 °C
Storage temperature		from -40 °C to +85 °C
Humidity		max. 95% relative humidity, non-condensing
Type of protection		IP20
Protection class		II in accordance with IEC/EN 61131-2
Pollution		Pollution degree II in accordance with IEC/EN 61131-2
Altitude		< 2000 m
Dimensions		310 x 29.2 x 230 (H x W x D) in mm
Weight approx.		0.75 kg





X-AI 16 51 Analog Input Module

6.10.5

HIMax[®]

The analog X-AI 16 51 input module has 16 inputs which are electrically isolated from one another. The inputs may be used to evaluate the measured values of sensors, Pt100 resistance thermometers and thermocouples. The module provides 2 current sources for operating the Pt100 resistance thermometer.

Product	Part no.	Description
X-AI 16 51	98 5210228	Analog input module, NonSIL
X-CB 020 51	98 5025174	Connector board with screw terminals, for Pt100 and TC
X-CB 020 53	98 5025175	Connector board with cable plug, for Pt100 and TC
X-CB 021 51	98 5225400	Connector board with screw terminals, for sensors
X-CB 021 53	98 5225401	Connector board with cable plug, for sensors
X-CA 014 01 8	98 5050766-8	Cable, 16 channels → FTA, 8 m
X-CA 014 01 15	98 5050766-15	Cable, 16 channels → FTA, 15 m
X-CA 014 01 30	98 5050766-30	Cable, 16 channels → FTA, 30 m

Specifications, Dimensions and Weight

Operating voltage	24 VDC
Voltage measurement	min. 500 mA (without channels/ current sources) max. 600 mA
Number of channels	16, galvanically isolated from one another
Current measurement operating range	0 20 mA
Voltage measurement operating range	-280 +280 mV
Resolution	14-bit
Shunt for current measurement	12.5 Ω , mounted on connector board X-CB 021
Maximum permitted current via shunt	50 mA
Withstand voltage of the input	30 VDC
Interference voltage suppression	> 60 dB (common mode 50/ 60 Hz)
Metrological accuracy on the entire temperature range (-10 °C +70 °C)	$\pm 4\%$ of final value
Settling time to 99% of the process value when the input signal changes	15 ms
Output voltage for transmitter supply	28.5 VDC, +0/ -10%
Output current for transmitter supply	max. 0.5 mA

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Housing material	Polyamide (fire-retardant in accordance with NFPA 72)
Operating temperature	from 0 °C to +60 °C
Storage temperature	from -40 °C to +85 °C
Humidity	max. 95% relative humidity, non-condensing
Type of protection	IP20
Protection class	III in accordance with IEC/EN 61131-2
Pollution	Pollution degree II in accordance with IEC/EN 61131-2
Altitude	< 2000 m
Dimensions	310 x 29.2 x 230 (H x W x D) in mm
Weight approx.	1.4 kg

Specifications, Dimensions and Weight (Continued from X-AI 16 51 Analog Input Module)



X-AI 32 51 Analog Input Module

6.10.6

HIMax[®]

The analog X-AI 32 51 input module has 32 current inputs. A short-circuit-proof supply is available for each input. Two-wire or three-wire transmitters with a maximum supply current of 30 mA can be connected to the input module.

Product	Part no.	Description
X-AI 32 51	98 5010225	Analog input module, NonSIL
X-CB 005 52	98 5025059	Redundant connector board with screw terminals
X-CB 008 51	98 5025019	Connector board with screw terminals
X-CB 008 53	98 5025020	Connector board with cable plug
X-CB 008 54	98 5025064	Redundant connector board with cable plug
X-CB 008 55	98 5025066	Connector board with cable plug, redundant FTA
X-CA 005 01 8	98 5050704-8	Cable, 32 channels → FTA, 8 m
X-CA 005 01 15	98 5050704-15	Cable, 32 channels → FTA, 15 m
X-CA 005 01 30	98 5050704-30	Cable, 32 channels → FTA, 30 m
Specifications, Dimensions and Weight		
Operating voltage		24 VDC
Current input		min. 500 mA (without channels/ transmitter supplies) max. 1.5 A (if the transmitter supplies are short-circuited)
Number of channels		32, galvanically isolated from one another
Rated input current		0/ 4 20 mA
Input current operating range		0 22.5 mA
Resolution of the A/D converter		16-bit
Shunt for current measurement		200 Ω (on connector board)
Maximum permitted current via shunt		≤ 50 mA
Withstand voltage of the input		≤ 10 VDC

> 60 dB (common mode 50/ 60 Hz)

1.0%, incl. shunt

25.5 VDC ±10 %

 \leq 750 Ω at 22.5 mA

max. 32 mA

15 ms

Interference voltage suppression

Accuracy with HART communication

Output voltage for transmitter supply

Output current for transmitter supply

when the input signal changes

Maximum connectable load

Settling time to 99% of the process value

range (-10 °C ... +70 °C)

Metrological accuracy on the entire temperature ±0.20% of final value



Specifications, Dimensions and Weight (Continued from X-AI 32 51 Analog Input Module)

Housing material	Polyamide (fire-retardant in accordance with NFPA 72)
Operating temperature	from 0 °C to +60 °C
Storage temperature	from -40 °C to +85 °C
Humidity	max. 95% relative humidity, non-condensing
Type of protection	IP20
Protection class	III in accordance with IEC/EN 61131-2
Pollution	Pollution degree II in accordance with IEC/EN 61131-2
Altitude	< 2000 m
Dimensions	310 x 29.2 x 230 (H x W x D) in mm
Weight approx.	1.4 kg



X-CI 24 51 Counter Module

HIMax[®]

The X-Cl 24 51 counter module has 24 inputs that can measure frequencies in the range of 0...20 kHz. A short-circuit-proof supply is assigned to each input. The 24 module inputs can be either configured for proximity switches or for switching contacts.

Product	Part no.	Description
X-CI 24 51	98 5010233	Counter module, NonSIL
X-CB 013 51	98 5025094	Connector board with screw terminals
X-CB 013 53	98 5025106	Connector board with cable plug
X-CA 005 01 8	98 5050704-8	System cable, 8 m, single/ redundant FTA
X-CA 005 01 15	98 5050704-15	System cable, 15 m, single/ redundant FTA
X-CA 005 01 30	98 5050704-30	System cable, 30 m, single/ redundant FTA
Specifications, Dimensions	and Weight	
Operating voltage		24 VDC
Current input		0.33 A without load
Current input per channel, w	ith high level	5.5 mA at 24 VDC 1 mA at 8.2 VDC
Number of channels		24, galvanically isolated
Count frequency		0 20 kHz
Resolution		0.1 Hz
Counter resolution		32-bit
Pulse width in one-phase ope	eration	min. 16.66 µs at 20 kHz
Edge distance of two phases in	two-phase operation	min. 6 µs
Accuracy of pulse count		±1 pulse
Proximity switch in accordan	ce with EN 60947-5	
Line resistance		max. 50 Ω
Switch-on threshold		1.8 mA
Switch-off threshold		1.4 mA
Open-circuit		< 0.2 mA
Short-circuit		> 6.5 mA
Control circuit devices in acc EN 61131-2	ordance with	
Wire length		1000 m
Switch-on threshold		> 10 V
Switch-off threshold		< 8 V
Output voltage for supply		8.2 VDC ±10% 24 VDC -15%±20%
Short-circuit current, per sup	pply	> 30 mA



Specifications, Dimensions and Weight (Continued from X-CI 24 51 Counter Module)

The 24 inputs have a common ground. To recognize the rotation direction, the inputs are wired to 12 channel pairs.		
Housing material	Synthetic material (fire-retardant in accordance with NFPA 72)	
Operating temperature	from 0 °C to +60 °C	
Storage temperature	from -40 °C to +85 °C	
Humidity	max. 95% relative humidity, non-condensing	
Type of protection	IP20	
Protection class	III in accordance with IEC/EN 61131-2	
Pollution	Pollution degree II in accordance with IEC/EN 61131-2	
Altitude	< 2000 m	
Dimensions	310 x 29.2 x 230 (H x W x D) in mm	
Weight approx.	0.9 kg	



X-AO 16 51 Analog Output Module

6.10.8

HIMax[®]

The analog X-AO 16 51 module has 16 current outputs. The output nominal range is 4 to 20 mA. The analog outputs are suitable for connecting ohmic, inductive and capacitive loads.

Product	Part no.	Description
X-AO 16 51	98 5010227	Analog input module, NonSIL
X-CB 014 51	98 5025025	Connector board with screw terminals
X-CB 014 53	98 5025026	Connector board with cable plug
X-CA 011 01 8	98 5050758-8	System cable, 8 m, single/ redundant FTA
X-CA 011 01 15	98 5050758-15	System cable, 15 m, single/ redundant FTA
X-CA 011 01 30	98 5050758-30	System cable, 30 m, single/ redundant FTA
Specifications, Dimensions	and Weight	
Operating voltage		24 VDC
Current input		min. 0.24 A
Current input per channel pa	ir	30 mA
Number of channels		16, pairwise galvanically isolated
Nominal range		4 20 mA
Output current operating rar	nge	0 22.5 mA
Resolution		16-bit
Value of LSB		≤ 2 μA
Ohmic load		max. 600 Ω
Inductive load		max.1mH
Capacitive load		max. 100 μF
Measurement accuracy at 25	o°C, max.	$\leq 0.2\%$ of final value
Temperature coefficient		$\leq \pm 0.05/$ K of final value
Accuracy with HART commu	nication	1.0%, incl. shunt
Linearity error		$\leq \pm 0.1\%$
Settling time		5 ms
Channel 1 through 16 (AO1A	.016) have a common	ground potential.

[continued on back page]



Specifications, Dimensions and Weight (Continued from X-AO 16 51 Analog Output Module)	
Lieucine meterial	Cumbhatia material (fire retardant in accordance un

Housing material	Synthetic material (fire-retardant in accordance with NFPA 72)
Operating temperature	from 0 °C to +60 °C
Storage temperature	from -40 °C to +85 °C
Humidity	max. 95% relative humidity, non-condensing
Type of protection	IP20
Protection class	III in accordance with IEC/EN 61131-2
Pollution	Pollution degree II in accordance with IEC/EN 61131-2
Altitude	< 2000 m
Dimensions	310 x 29.2 x 230 (H x W x D) in mm
Weight approx.	1.2 kg



HIMax[®]

The HART communication module X-HART 32 01 has 32 channels and is suitable for use in the HIMax programmable electronic system (PES). The module provides communications with transmitters and actuators in combination with the HART input and output modules.

Product	Part no.	Description
X-HART 32 01	98 5210247	HART communication module
Connector boards for analog	input modules (X-AI	32 01 or X-AI 32 02)
X-CB 016 01	98 5220187	Connector board with screw terminals
X-CB 016 02	98 5220188	Redundant connector board with screw terminals
X-CB 016 03	98 5220189	Connector board with cable plug
X-CB 016 04	98 5220190	Redundant connector board with cable plug
Connector board for analog i	nput module (X-AI 32	51)
X-CB 016 51	98 5025187	Connector board with screw terminals
X-CB 016 52	98 5025188	Redundant connector board with screw terminals
X-CB 016 53	98 5025189	Connector board with cable plug
X-CB 016 54	98 5025190	Redundant connector board with cable plug
Connector board for analog output module (X-AO 16 01)		
X-CB 017 01	98 5020192	Connector board with screw terminals
X-CB 017 02	98 5220193	Redundant connector board with screw terminals
X-CB 017 03	98 5020194	Connector board with cable plug
X-CB 017 04	98 5220195	Redundant connector board with cable plug
X-CB 017 51	98 5025192	Connector board with screw terminals
X-CB 017 53	98 5025194	Connector board with cable plug
System cables for analog input modules (X-AI 32 01, X-AI 32 02 or X-AI 32 51)		
X-CA 005 01 8	98 5050704-8	System cable, single FTA, 8 m
X-CA 005 01 15	98 5050704-15	System cable, single FTA, 15 m
X-CA 005 01 30	98 5050704-30	System cable, single FTA, 30 m
System cables for analog output module (X-AO 16 01)		
X-CA 011 01 8	98 5050758-8	System cable, single FTA, 8 m
X-CA 011 01 15	98 5050758-15	System cable, single FTA, 15 m
X-CA 011 01 30	98 5050758-30	System cable, single FTA, 30 m

[continued on back page]



6.11.0

Operating voltage	24 VDC
Current input	Min. 0.3 A Max. 0.4 A
Output impedance	230 600 Ω
Ohmic load	Max. 600 Ω
Inductive load	Max. 1 mH
Capacitive load	Max. 100 μF in parallel to the ohmic load
Crosstalk (channel to channel) DC, AC 50 Hz and 60 Hz	Not detectable > 70 dB in the range 0.3 150 kHz
Crosstalk (group to group) DC, AC 50 Hz and 60 Hz	> 70 dB
Hardware response time of safety switch	\leq 500 μ s opening of the HART module safety switches
Hardware response time of the channel switches	\leq 500 μ s opening of the channel switches
Capacitive galvanic separation of the 32 HART ch	annels from one another. No electrical isolation!
Housing material	Polyamide (fire retardant in accordance with NFPA 72)
Operating temperature	0 +60 °C
Storage temperature	-40 °C +85 °C
Humidity	Max. 95 % relative humidity, non-condensing
Type of protection	IP 20
Protection class	III in accordance with IEC/EN 61131-2
Pollution	Pollution degree II in accordance with IEC/EN 61131-2
Altitude	< 2000 m
Dimensions	310 x 29.2 x 230 (H x W x D in mm)
Weight approx.	1.0 kg

Specifications, Dimensions and Weight (Continued from X-HART 32 01 HART Module)



X-MIO 7/6 O1 Overspeed Trip Module (Trip Function, 0 ... 35 kHz) 6.12.0

HIMax[®]

The overspeed protection module, X-MIO 7/6 01, provides speed monitoring along with an EMERGENCY OFF switch (trip function) for turbines. The module thus comes equipped with three safety-oriented measurement inputs (0 ... 35kHz), three safety-oriented rotation direction inputs, four safety-oriented digital inputs and five safety-oriented digital outputs. In addition, the module has a relay output as potential-free signal contact.

The module has completely independent hardware that functions independently and decoupled from the control system. Applications in accordance with API 670 may be implemented. The module fulfils the speed monitoring requirements of API 670 and the required shut-down routine for turbines.

Product	Part no.	Description
X-MIO 7/6 01	98 5210238	Overspeed trip module
X-CB 018 02	98 5020179	Redundant connector board with screw terminals
X-CB 018 06	98 5020181	Triple redundant connector board with screw terminals
X-CB 018 04	98 5020180	Redundant connector board with cable plug
X-CB 018 07	98 5020182	Triple redundant connector board with cable plug
X-CA 005 01 8	98 5050704-8	System cable, single/redundant FTA, 8 m
X-CA 005 01 15	98 5050704-15	System cable, single/redundant FTA, 15 m
X-CA 005 01 30	98 5050704-30	System cable, single/redundant FTA, 30 m
X-CA 008 01 8	98 5050746-8	System cable, single/redundant FTA, 8 m
X-CA 008 01 15	98 5050746-15	System cable, single/redundant FTA, 15 m
X-CA 008 01 30	98 5050746-30	System cable, single/redundant FTA, 30 m

Specifications,	Dimensions	and	Weight
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Operating voltage	24 VDC
Current input	0.5 A without load
	Max. 12 A at 24 VDC
Inputs for measuring the frequency	
Number of measuring inputs	3
Number of inputs, static rotation direction signal	3
Frequency	0 35 kHz
Measured value resolution	32 Bit
Accuracy of rotation speed measurement	± 0.1 % of the measured value, min. ± 1 Hz
(frequency)	
Safety-related accuracy for rotation speed	\pm 0.1 % of the measured value, min. \pm 2 Hz
medsurement	
Control circuit devices in accordance with EN 61131-2	
Wire length	1000 m
Switch-on threshold	> 10 V
Switch-off threshold	< 8 V

[continued on back page]



Supply for measuring inputs	
Number of supplies	3
Output voltage for supply	24 VDC -15 % +20 %
Output current supply	Max. 80 mA
Digital inputs	
Number of inputs	3 + 1 reset input
Rated input voltage	0 24 V
Switching point, typically	9.3 V ± 0,4 V (2.1 mA ± 0.15 mA)
Input voltage operating range	-3 30 V (current limited to approx. 2.5 mA)
Supply for digital inputs	
Number of supplies	4
Output voltage for supply	Supply voltage -2.5 V
Output voltage for each supply	Max. 25 mA
Digital outputs	
Number of outputs	5, unipolar with ground L-
Output voltage	L+ minus internal voltage drop
Leakage current (with low level)	Max. 1 mA
Current limiting in the event of short-circuit	approx. 4.33 A for each channel
Ohmic load to nom. rated current	2 A
Inductive load	Max. 10 H
Capacitive load	Inrush current max. 3 A for t < 2.5 s
Line monitoring	
Short-circuit (SC) threshold	3.3 A for t > 6 ms, 2.1 A for t > 2.5 s
The measuring inputs have a common ground.	
Housing material	Polyamide (fire retardant in accordance with NFPA 72)
Operating temperature	0 +60 °C
Storage temperature	-40 °C +85 °C
Humidity	Max. 95 % relative humidity, non-condensing
Type of protection	IP 20
Protection class	III in accordance with IEC/EN 61131-2
Pollution	Pollution degree II in accordance with IEC/EN 61131-2
Altitude	< 2000 m
Dimensions	310 x 29.2 x 230 (H x W x D in mm)
Weight approx.	1.05 kg

Specifications, Dimensions and Weight (Continued from X-MIO 7/6 O1 Overspeed Trip Module)

SILworX: The fully integrated engineering tool Leads more quickly to results

Features in brief	7.1.0
Engineering at the highest level	7.1.1
The licence model	
A licence for all functions	7.2.0
System requirements	
Compatible with Windows [®] XP and Windows [®] 7	7.2.0



Features in brief Engineering at the highest level

SILworX is:

- 1. Configuration, programming and diagnostic tool in one
- 2. Simple to learn
- 3. Efficient to use
- 4. Safe to use



1. Configuration, programming and diagnostic tool in one SILworX is the fully integrated configuration, programming and diagnostic tool for all tasks throughout the entire system life cycle.

SILworX can be used to program HIMax systems and well as HIMatrix controls and RIOs. In doing so, up to 255 controls can be processed in a single project. A graphic editor supports the configuration of the hardware.

SILworX supports the user with intuitive controls. The action bar displays the essential control elements and guides the user through the typical tasks when programming a safety control. The organization in tabs allows for guick switching between the editors. Such intuitive controls speed up the engineering, commissioning and servicing of the system. User errors can thus be avoided.

2. Simple to learn

SILworX conforms to the standard for programmable logic controls IEC 61131-3. You may use functional block languages and sequential functional charts to suit your needs. You may use also programming language Structured Text (ST) for more efficient programming of calculations and C-Code function block option for using pretested C-Code within safety systems. All IEC 61131-3 functions and variable types are available for safety-related programming. In addition, a library with application blocks developed in accordance with IEC 61511 comes with the product. It allows complete freedom for the efficient and clear design of your programs.

People are led step by step through the program so that beginners and service personal can be trained as quickly as possible.

SILworX helps ELOP II users, since the operating and functions in the FBS editors are derived from ELOP II.



Features in brief Engineering at the highest level

3. Efficient to use

- · Integrated documentation with preview and pdf functions
- Clear programming in graphic editors
- Project-wide cross references and go-to functions ease use through direct navigation between all points of use. Online too.

Typical function blocks and copying of typical within the FBS editor makes it easier to program repeated functions and saves time when engineering (BULK engineering).

Organizing and saving of force values in watch pages makes commissioning and repeated inspections easier.

The search/replace function in all structure trees and table views makes navigation easier in large lists and allows for the error-free adaptation of texts.

The powerful filter function makes sure that the requested functions and variables are found as quickly as possible.

The XML-based import and export functions allow for the simple data exchange with CAD and CAE systems. All editor screens are colour coded. The SILworX user thus always has an overview whether in edit mode, in offline simulation or in the online test.

4. Safe to use

- Helps avoid user errors
- Syntax errors are detected and displayed in the code generation at the latest.
- Parameter errors are automatically reported and do not need to searched, saving time.

- User management can grant various user rights for access to project data or controls.
- · Can be run with any virus scanners and firewalls.

If users grant approval, it is possible to force process parameters at any time. One particularly helpful aspect is that the entire I/O level can be tested through forcing without user programs. It is thus possible to test the complete wiring of the equipment while the generation of the user program is carried out independently at the same time.

An offline simulation is also available to further speed the engineering processes and program validation. It provides beginners with the assurance of testing programs ahead of time without connected controls. The online test function is available for commissioning and testing. In it the current values and force states are displayed in the logic.

In addition to the online test, an online view is available in the control panel as well as diagnostic possibilities for hardware and communication. Automatic project backups during each loading procedure prevents data from being lost, eases project management and helps when tracking changes (version management). During acceptance and during version entry, the safe version comparator is an irreplaceable tool. It can be used to identify changes so that only altered those parts of the program that have been changed are inspected and tested. Detail displays of changes to hardware and logic using CRC pro function block and jump function to the changed parts support the user.



Intuitive user interface with full drag-and-drop programming



The licence model A licence for all functions

A single fully integrated software tool for all tasks throughout the entire lifecycle.

The SILworX licence applies to all configuration, programming and diagnostic tools. SILworX is copy protected by hardware licencing. An unlimited number of systems can be programmed with one licence.





Two different licence types are supported:

1. Hardlock licence:

Portable USB Stick included in delivery. Benefit: Use SILworX on several PCs with one licence.

2. Softlock licence:

The licence is bound to a PC workstation. Advantage: It is always available on the selected PC and needs no USB stick which could potentially get lost.

The Softlock Licence is bound to the main board and to the Windows® Partition ID. Changing the Windows Partition or exchanging the main board causes the Softlock Licence to expire.

Each SILworX installation must be activated, either by a Softlock or Hardlock Licence. With each ordered licence you receive a licence number on the delivery note and invoice. This licence number is used to request one licence activation for a dedicated hardware component. For more information about licence activation, please see the Supplementary sheet for Installation and Licensing of SILworX.

System requirements

- Intel[®] Pentium[®] 4
- 256 MB free RAM
- 500 MB free hard disk space
- Resolution 1024 x 768
- Ethernet interface
- Microsoft[®] Windows[®] XP Professional (32-bit) Service Pack 3 or higher
- Windows[®] 7 Professional/Ultimate (64-bit) (tested with Ultimate)



HIMax: The certificates Compliant with every major safety

standards

8

Standards	
The HIMax system is approved for use worldwide	8.1.0
Certificates	
HIMA produced the world's first TÜV-tested	
safety system	8.2.0



Standards The HIMax system is approved for use worldwide



"Safety. Nonstop" is our promise. The experience gained in 40 years of development of safety-related systems directly flows into our products. Top-most quality in development, production and verification is the minimum. We do not accept compromises when we certify our systems. You are therefore on the safe side with all imaginable applications. HIMax is worldwide approved.

The entire HIMax system complies with the following standards:

X-CPU 01, X-CPU 31

- IEC 61508:2000, Teil 1-7
- IEC 61511:2004
- ANSI/I SA-84.00.01-2004
- EN ISO 13849-1:2008+ AC:2009 (PL e)
- EN 62061:2005
- EN 50156-1:2004
- EN 12067-2:2004
- EN 298:2003
- EN 61131-2:2007
- EN 50130-4:2011
- EN 61000-6-2:2005
- EN 61000-6-4:2007
- EN 54-2:1997 +AC:1999 +A1:2006
- NFPA 85:2011, 86:2011, 72:2010
- EN 60079-15:2010 ATEX (Zone 2, T4)
- ANSI/ISA-S 71.04 Class G3 (Tropicalisation)

X-CPU 01

- UL (UL 508)
- cUL (CSA-C22.2 Nr. 142)
- FM CLASS 1 DIV2 (FM 3600, 3611, 3810)
- Achilles Level I Certification
- SIL 4 (CENELEC)
- BUREAU VERITAS
- DNV (DET NORSKE VERITAS)
- GOST R Certificate
- GOST R Ex Certificate
- Russia RMRS

The certifications are continually updated. Upon request, we will gladly provide special certificates, e.g., for specific countries.























Certificates











Certificates

	PM Approval 113 Boolean Providence Tempping P.O. Boo 1992 Nonwood, M.A. ESTRO 1983. T. 198 Niki 4398 F. 181-192-2023 T. 198 Niki 4398 F. 181-192-2023
CERTIF	ICATE OF COMPLIANCE
HAZARDOUS (C	LASSIFIED) LOCATION ELECTRICAL EQUIPMENT
This certificate is issued	for the following equipment:
HiMax, Safety Relate NI/1/2/ABCD; T4A	of System Ta = 60°C
Modula Names, Dee NI 1/2 / ABCD, 15 T X-58 01 X-C0 12 01 X-D1 32 01 X-D1 32 02 X-D0 12 01 X-D0 24 01	Safety Functions R.J. = 40°C Safety-mixed System Data Module Commy-claded Medida Safety-mixed Collar (Next Module 22 In: (NAMUR) Safety-mixed Collars (Data) (Safety 22 In: (NAMUR) Safety-mixed Collars (Data) (Safety 24 Collars) (DA) Safety-mixed Collar (Data) (Safety 24 Collars) (DA)
Module Names, The NU1/2/ABCD: T4A X-CPU 01 X-AI 32 01	Safety Function 58, 3 Fa = 60°C Safety-related CPU Module Safety-related Analogue Input Module, 32 In. (54, 20mA)
Paid connections T NI 1727 ABCD, T9 T X-TM DO 12 01 01 X-TM DO 24 01 01 X-TM D0 24 01 01 X-TM D0 20 101 X-TM D0 32 02 01	Initiat for LB and DD Fail Territation Assertary for X-BO 12 01 Fail Territation Assertary for X-BO 22 01 Feed Territation Assertary for X-DI 22 01 Feed Territation Assertary for X-DI 22 02
Field connections T NU1/2/ABCD; T4A X-TM AL32 01 01	erminal for Al Ta = 80°C Pried Termination Assembly for X-Al 32 D1
X-Base Plate-ab NU1/2/ABCD; T8 T a = No. cf sids = 10, b = Type of Mounting	a = 60°C 15 or 19 D1(bladglane) or 52 (19" Frank)
att	3033064 Paos 1 of 3









Certificates

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	IKAT		V	Nr	./No. 968/EZ	274.06/0
Prütgegenstand Product lested	Safety Related Pe Electronic System	grammable	Zertifikals- inhaber Licence holder	HIMA Paul Hil Albert-Basser 68782 Brühl b Germany	debrandt GrebH + mann-Straße 28 ei Mannhoim	Co. KG
Typbezeichnung Type designation	HIMax-System		Hersteller Manufacturer	wie Zertifikats same as licen	inhaber ce holder	
Prüfgrundlagen Godes and standards forming the basis of testing		IEC 61508, P IEC 61511:20 EN ISO 1384 EN 62061:20 EN 50158-12 EN 12067-22 EN 298:2003 EN 230:2005	art 1 - 7:2000 04 9-1:2008 05 1004 2004	EN EN EN NF	61131-2:2007 61000-6-2:2005 61000-6-4:2007 54-2:1997/A1:200 PA 85:2007 PA 85:2007 PA 72:2007	7
Bestimmungsponälle Verwendung Intended application		Safety Relat Burner Mana the demand,	ed Programmal gement (BMS), safe state is the	ble Electronic emergency shu de-energized st	System for proci t down and machinate	ess control inery, when
		Applications, where the demand state is the de-energized or energized state. The system is suitable for safety related applications up to SEL 2 (EC 61553), eC 51511 and EV 62051), Cut 4 and Fu (EV 8010 5340-1) considering the results of the test report-no. 969/EZ 274.0509 detec 2010-15-3				
Beaondana Bedingun Specific requirement	igent 5	For the use of the systems the least report mentioned above, the Safety Manual, the user guides and the official list of product documentation, hardware components and software modules released by HIMA and TÜV Reventione have to he considered.				
Dieses Zertifikat ist	guiltig bis 30.10.20	14.				
This certificate is va	Ind until 2014-10-3	 Der Prüfberich fikales. Der Inhaber ei berechtigt, die abgehildeten P The teat suppr certificate. The holder of a the teat mark heated. 	HA:: 968/EZ 274: nes für den Prote mit dem Protes No: 968/EZ 274: a valid ficence cer shown opposite	05/03 vom 30.10 pagensland göltig enstand übereins ehen. 06/09 dated 2001 tillicate for the pr to producte, while	2009 ist Bestandtei am Ganatimégunga- dimmenden Erzeugn 9-10-30 is an integro coluct tested is auth ch are identical with	cleases Zeti Auswebses is lose mit der al part of the prized to affe 1 the produc
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Glossary Transparency from A to Z

ACL ... Access Control Lists ADSL ... Asymmetric Digital Subscriber Line **AES** ... Advanced Encryption Standard AI ... Analog Input **AIO** ... Analog Input/Output AO ... Analog Output AWG ... American Wire Gauge

BD ... Building Distributor BMS ... Burner Management System BS ... British Standard BTS ... Basic Transceiver Station

C&E ... Cause and Effect **CAPEX** ... Capital expenses CC ... Common Criteria CD ... Campus Distributor CE ... Communauté Européenne CHAP ... Challenge Handshake Authentication Protocol CPU ... Central Processing Unit **CRC** ... Cyclic Redundancy Check

DCS ... Distributed Control System DDoS ... Distributed Denial of Service **DES** ... Data Encryption Standard **DFS** ... Dynamic Frequency Selection DHCP ... Dynamic Host Configuration Protocol **DI** ... Digital Input **DIO** ... Digital Input/Output **DNS** ... Domain Name Service DO ... Digital Output **DUT** ... Device Under Test **DSL** ... Digital Subscriber Line **DSSS** ... Direct Sequence Spread Spectrum; Codemultiplex DTM ... Device Type Manager E2F ... ELOP II Factory EAP ... Extensible Authentication Protocol EAP-MD5 Extensible Authentication Protocol EAP-TLS Extensible Authentication Protocol EAP-TTLS Extensible Authentication Protocol EDD ... Electronic Data Description **EDDL** ... Electronic device description Language **EIA** ... Electronic Industries Alliance ESD ... Electrostatic Discharge ESS ... Essential ESS ... Extended Service Set **ESSID** ... Extended Service Set Identity ETSI ... European Telecommunications Standards Institute EUC ... Equipment Under Control FAT ... Factory Acceptance Test FB ... Feldbus FBD ... Function Block Diaaram FD ... Floor Distributor FDT ... Field Device Tool **FF** ... Foundation Fieldbus FHSS ... Frequency Hopping

Spread Spectrum FPGA ... Field Programable Gate Array FTA ... Field Termination Assembly FTE ... Fault Tollerant Ethernet

GBE ... Giga Bit Ethernet GE ... Gigabit Ethernet **GOF** ... Glass Optical Fibre **GPRS** ... General Packet **Radio Service** GSM ... Global System for Mobile Communications GUI ... Graphic User Interface

HiRRP ... Hirschmann Redundant Router Protocol HMI ... Human Machine Interface HVO ... HIMA Virtual Office HSRP ... Hot Standby Routing Protocol

IAPP-Roaming ... Roaming (Inter Access Point Protocol) **ID** ... Intermediate Distributor IEC ... International Electrotechnical Commission **IEEE** ... Institute of Electrical and Electronics Engineers **IETF** ... Internet Engineering Task Force **IITD** ... Industrial IT Design IPSec ... Internet Protocol Security ISO ... International Standardization Organization IV ... Initialization Vector

LC ... Line Control LTA ... Less Than Addequate MAC ... Main Automation Contractor MAC ... Media Access Control MD5 ... Message Digest Algorithm 5 MIB ... Management Information Base MIC ... Message Integrity Check **MICE** ... Mechanical Ingress **Climatic Electromagnetic**

MIMO ... Multiple In Multiple Out MMI ... Man Machine Interface MTBF ... Mean Time Between Failures MTTF ... Mean Time to Failure MTTR ... Mean Time To Repair NAT ... Network Adress

Translation NooM ... N out of M NTP ... Network Time Protocol

OEM ... Original Equipment Manufacturer **OF** ... Optical Fibre OFDM ... Orthogonal Frequency Divison Multiplex **OLE** ... Object Linking and Embeddina **OLH** ... Online Help **OLT** ... Online Test **OPC** ... OLE for Process Control **OPEX** ... Operational Expenses **OSPF** ... Open Shortest Path First

PADT ... Programming and Debugging Tool IEC 61131-3 PAT ... Port Adress Translation PDA ... Personal Digital Assistant PFD ... Probability of Failure on Demand PFH ... Probability of Failure per Hour PKI ... Public Key Infrastructure PL ... Performance Level **PoE** ... Power over Ethernet



Glossary Transparency from A to Z

POF ... Polymer Optical Fibre POP3 ... Post Office Protocol PPP ... Point to Point Protocol PPTP ... Point to Point Tunneling Protocol PSK ... Preshared Kes PTP ... Precission Time Protocol

QoS ... Quality of Service

R ... Read

Protocoll

R/W ... Read/Write
RADIUS ... Remote Authentication Dial-In User Service;
RC4 ... Ron's Cipher 4
RFC ... Request for Comments
RFQ ... Request for Quotation
RIO ... Remote Input Output
RIP ... Router Information
Protocol
RSA ... Ronald L. Rivest, Adi
Shamir und Leonard Adleman
RSTP ... Rapid Spanning Tree

S/MIME ... Secure / Multipurpose Internet Mail Extensions SAT ... Site Acceptance Test SB ... Systembus (Modul) SCADA ... Supervisory Control and Datacquisition SDS ... Security Data Sheet SDSL ... Single Line Digital Subscriber Line se ... safeethernet SER ... Sequence of Event Recordina SFC ... Sequential Function Chart SFF ... Safe Failure Fraction SHA ... Secure Hash Algorithm SHF ... Super High Frequency SID ... SPS IPC Drives SIL ... Safety Integrity Level (IEC 61508)

SMTP ... Simple Mail Transfer Protocol

SNMP ... Simple Network Management Protocol SNR ... signal-to-noise ratio SNTP ... Simple Network Time Protocol (RFC 1769) SOAP ... Simple Object Access Protocol SOE ... Sequence of Event SP ... Service Pack SRS ... System-Rack-Slot SSID ... Service Set Identity SSL ... Secure Socket Layer ST ... Structured Text STR ... Spourious Trip Rate

TACACS ... Terminal Access Controller Access Control System

TCI ... Tool Calling Interface TCP ... Transport Control -> Protocol TCP/IP Transmission Control Protocol/Internet Protocol (ARP, ICMP, IP, UDP, TCP, HTTP, FTP, TFTP) **TIA** ... Telecommunications Industry Association TKIP ... Temporal Key Integrity Protocol TLS ... Transport-Layer Security TMC ... Turbine Machinery Control TMO ... Timeout TO ... Telecommunication Outlet ToC ... Table of Compliance **TPC** ... Transmission Power Control

UDP ... User Datagram Protocol UHF ... Ultra High Frequency UMTS ... Universal Mobile Telecommunication System VAN ... Virtual Automation-Network VLAN ... Virtual Local Area Network VPN ... Virtual Private Network VRRP ... Virtual Router Redundancy Protocol

WAN ... Wide Area Network WD ... Watchdog WDS ... Wireless Distribution System WECA ... Wireless Ethernet Compatibility Alliance WiFi-Alliance WEP ... Wired Equivalent Privacy WiFi ... Wireless Fidelity WiFi-Alliance ... Wireless **Fidelity Aliance** WISP ... Wireless Internet Service Provider WPA ... WiFi Proteced Access wysiwyg ... What you see ist what you get



