

SIMA² MASTER STATION

The high performance control system for actuators



Easy system integration

Flexible, easy to scale and ready to perform: SIMA² Master Station is the perfect platform for the control and supervision of actuators via standardised fieldbus systems. SIMA² Master Station optimises the communication between the host and field level. Premium process efficiency and continuous plant availability are catered for.

SIMA² AS INTEGRAL COMPONENT WITHIN THE DCS

SIMA² Master Station provides simplified integration of AUMA actuators and further field devices within the superordinate DCS. It takes over actuator control and evaluation of a multitude of feedback signals. The DCS is less solicited during commissioning as well as during active plant operation. Thanks to the integrated fault tolerance, SIMA² Master Station ensures premium plant availability. Acting as a central diagnostic hub, SIMA² contributes considerably to plant transparency.

Fast commissioning

Upon delivery, the SIMA² Master Station is immediately ready for integration and operation. At DCS level, SIMA² Master Station is the only network participant to be integrated. Integration of actuators is effortless and convenient when using the SIMA² Master Station. The integral and intuitive user interface allows straightforward actuator control, all while supervising their feedback signals. Communication parameters can be easily set and fieldbus networks configured, commissioned and tested. No DCS is required – commissioning at field level is consequently independent of the host level.

Relieving the host

During operation, host communication is reduced to an absolute minimum. SIMA² Master Station distributes the individual operation commands to every actuator. Receiving the status signals of all actuators at cyclic intervals, it transmits to the host the concentrated data required for conventional operation only.

Premium plant availability

Integral redundancy at all levels caters for communication safety and process control. SIMA² Master Station continuously supervises all communication channels and all participants of the fieldbus network. In the event of a fault, changeover to the redundant channel is seamless without interruption.

Simple diagnostics

SIMA² Master Station provides you with complete plant transparency at any time. At a glance, you can identify the overall system status including all actuators. Faults are clearly structured for easy visibility. Fault identification and remedy is thus straightforward. A multitude of diagnostic functions allow for efficient asset management.

Gateway function

SIMA² Master Station can be deployed as a gateway when different communication systems and protocols between field devices and DCS have to be harmonised.

SIMA² MASTER STATION



SIMA² AS STAND-ALONE CONTROL SYSTEM

SIMA² Master Station offers clear advantages for deployment in plants without their own DCS. As a pre-configured overall system, SIMA² Master Station ensures the complete communication to actuators via fieldbus. All connected actuators can be controlled manually via the multi-touchscreen, in spite of being at a remote location.

SOLUTIONS FOR ALL MARKETS

As a control solution easy to scale, SIMA² Master Station is suitable for any type and size of plant. It can be deployed in any industrial sector, from the oil & gas industry, to water processing, to power plants and process industry. Master Station is a particular asset for vast sites with a high number of actuators, for example, in tank farms or refineries. But even in smaller plants, the handling of the connected actuators can be considerably simplified.



Value adding at all levels

SIMA² Master Station sets standards in terms of integration facility and availability: It provides high connectivity, short reaction times and premium reliability. Intuitive operation, fast commissioning and low investment expenditure reduce the total cost of ownership.

4 FIELDBUS NETWORKS

- > Up to 4 separate networks per SIMA²
- > Up to 247 field devices per network
- > Up to 988 field devices per SIMA²
- > Single-channel and/or redundant fieldbus topologies

100 % OPEN STANDARDS

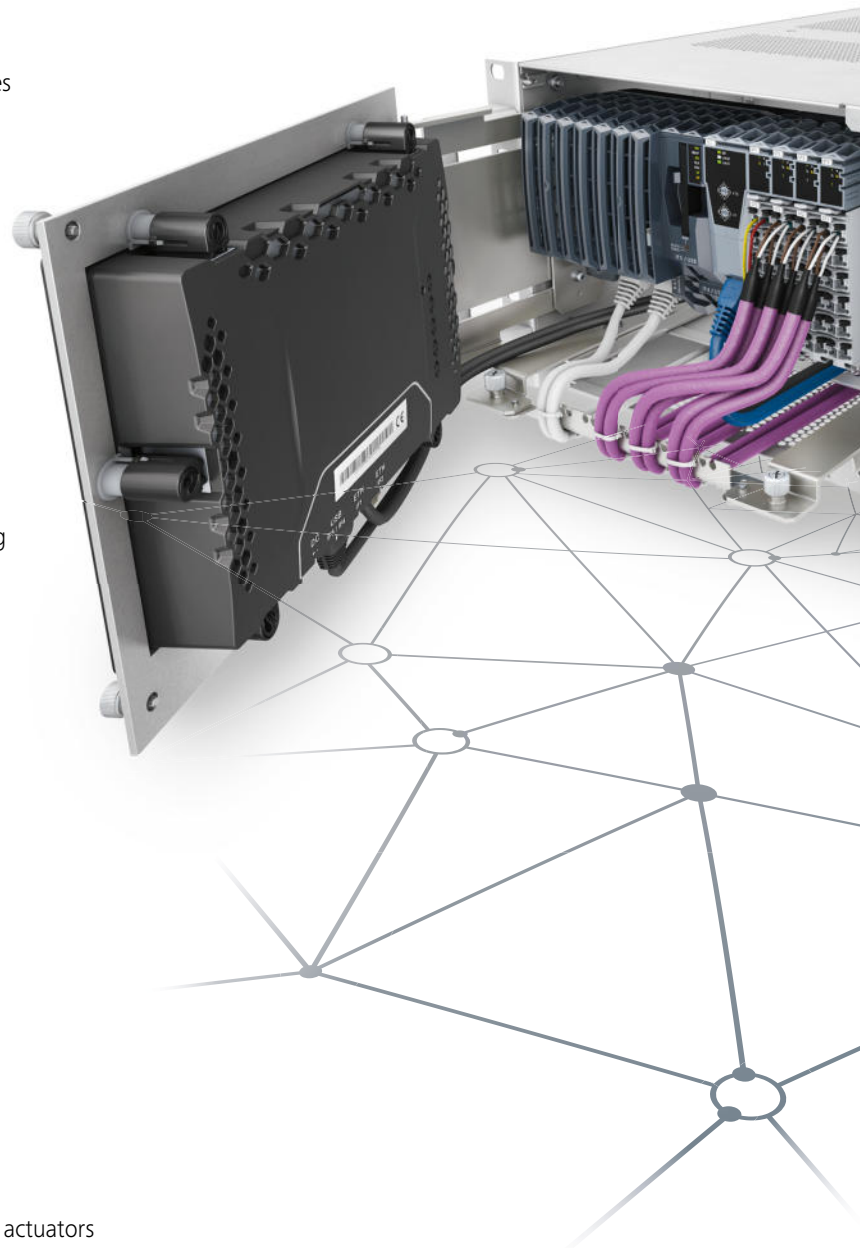
- > Exclusively standardised, robust and proven communication protocols
- > Modbus RTU or Profibus DP to the field devices
- > Modbus RTU and/or Modbus TCP/IP to the host
- > Device integration irrespective of the manufacturer providing long-term security of investment

HIGH SPEED

- > Minimum cycle times
- > Short reaction times
- > High performing communication

PLUG & PLAY

- > Easy integration of AUMA actuators
- > Integration of third party devices, such as actuators from different suppliers, sensors, flowmeters, remote I/Os or pumps.
- > Flexible configuration options for communication with the host



FUTURE IN MIND

- > State-of-the-art and high performance hardware and software design
- > Simple horizontal and vertical data exchange
- > Ethernet ports for network connections and service intervention
- > Built-in OPC UA interface
- > Integrated web server
- > Time synchronisation via NTP

HIGHEST AVAILABILITY

- > Variety of redundancy options at all levels
- > Scalable emergency shutdown functions
- > Premium plant availability and safety

EASY OPERATION

- > Integral 7" multi-touchscreen
- > Remote access via browser
- > Intuitive user interface
- > Easy manual control of all actuators
- > Fast commissioning

DIAGNOSTICS AT A GLANCE

- > Overall plant transparency
- > Status displays for all system levels
- > Central diagnostic hub for all actuators
- > Supervision of hardware and communication channels
- > Easy and fast trouble shooting
- > Efficient asset management

ECONOMICAL

- > Compact design for installation into control cabinet
- > Two SIMA² subsystems per 19" housing possible (for hot standby system redundancy or two independent SIMA² subsystems)
- > Pre-configurable in the factory
- > Ergonomic mounting
- > Low installation and investment cost

FLEXIBLE

- > Scalable and expandable
- > Large variety of housing options
- > Complete solutions including control cabinet, also for outdoor installation



High performance within the network

Thanks to the outstanding connectivity and efficient fieldbus communication, SIMA² Master Station is the perfect integration platform for actuators.

4 FIELDBUS NETWORKS PER SIMA² MASTER STATION

A single SIMA² Master Station can manage up to four independent, galvanically isolated and logically separated actuator networks. Supported are loop topology as well as classical single-channel or redundant line topology.

Altogether 247 network participants can be controlled per network – a total of up to 988 actuators per SIMA² Master Station. Maximum cable length up to 296 km.

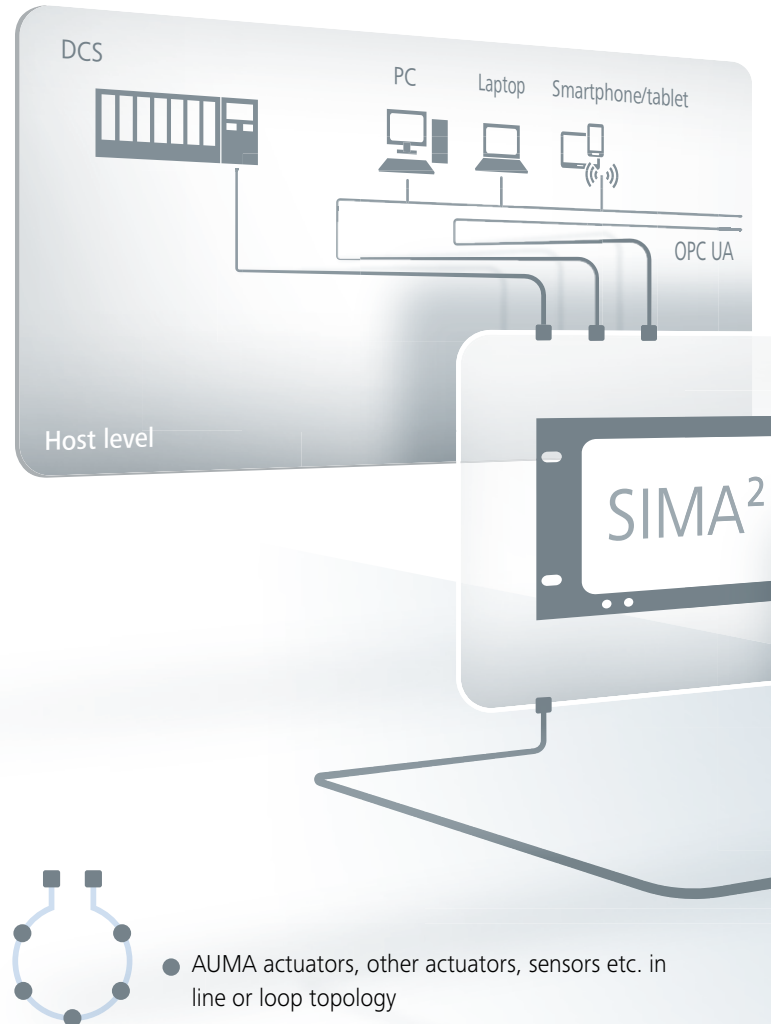
Consequently, the SIMA² Master Station offers flexible and easy to scale solutions for any plant. High numbers of actuators can easily be integrated to satisfy the requirements, even with demanding long distances on site.

100 % OPEN STANDARDS

With SIMA² Master Station, AUMA combines the philosophy, successful across decades, with focus on the internationally standardised communication protocols which have proven their superiority in many thousands of plants. Thanks to SIMA², you benefit from AUMA's long standing experience with installations of several hundred thousand actuators equipped with digital communication interfaces.

When communicating with the actuators, SIMA² Master Station supports Modbus RTU and Profibus DP while communicating with the host, Modbus RTU and Modbus TCP/IP are supported.

As a plant operator, you can rely on robust, efficient and fast communication. The installation is not based on a single manufacturer and you can considerably increase your long-term security of investment.

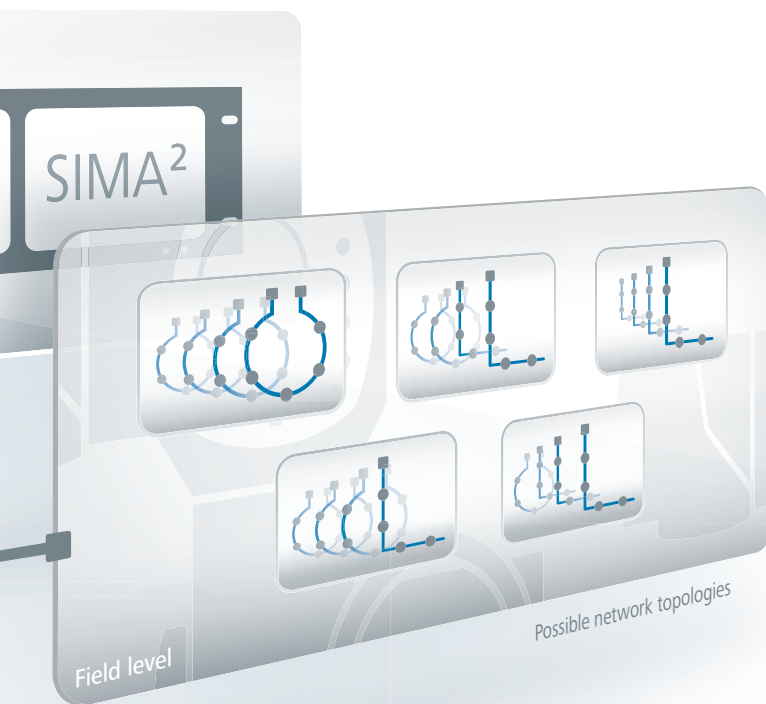


HIGH SPEED COMMUNICATION

The high performance communication of the SIMA² Master Station, via standardised fieldbus protocols, ensure extremely short cycle and reaction times. Short cycle times represent a valuable advantage for the efficiency of automated processes. This applies in particular to processes requiring continuous and reliable feedback regarding the valve position. Short reaction times ensure the swift transmission of operation commands to the actuators.

Specified cycle and reaction times mainly depend on the fieldbus protocol and the related configuration, as well as the number of actuators. When using Modbus RTU and 30 AUMA actuators, cycle times of < 0.5 s can be achieved. Reaction times for actuator control amounts to < 0.1 s for this configuration. When applying Profibus DP, these two times are significantly shortened.

COMMUNICATION



UPGRADE OF FORMER SIMA MASTER STATION

Upgrade from the previous SIMA Master Station to the new SIMA² Master Station in existing sites can easily be done.

FUTURE IN MIND

SIMA² Master Station uses state-of-the-art hardware and software design. The built-in OPC UA interface is decisive for the future when considering IIoT applications.

Thanks to the integral Ethernet interfaces, SIMA² Master Station opens up new opportunities relating to data exchange, automation and networking to host systems. An example of which being with the AUMA Cloud.

WIRELESS AND FOC

Data transmission is not merely limited to copper cables and IEEE 823.3 or RS-485, as physical basis for communication. Even wireless systems and fibre optic cables can be used.

EASY INTEGRATION

SIMA² Master Station is ideally suited for easier integration and control of AUMA actuators with Modbus RTU or Profibus DP interfaces.

Thanks to the standardised fieldbus protocols, integration of other field devices with Modbus RTU or Profibus DP interface are also possible. This includes actuators from third party manufacturers, sensors, flowmeters, remote I/Os and pumps.

Simple sensors with 4 – 20 mA interface or discrete output signals can be integrated into the SIMA² Master Station, thanks to the integral AUMA actuator controls.

Highest availability

With their multitude of redundancy options, easy to scale and combine, SIMA² Master Stations ensure smooth plant operation and premium availability. Additional emergency shutdown functions increase plant safety.

REDUNDANT COMMUNICATION TO THE HOST

Communication between SIMA² and the host can be made on two channels via Modbus RTU or Modbus TCP/IP.

In addition, it is possible to combine the two technologies and to establish one Modbus RTU and one Modbus TCP/IP connection to the host.

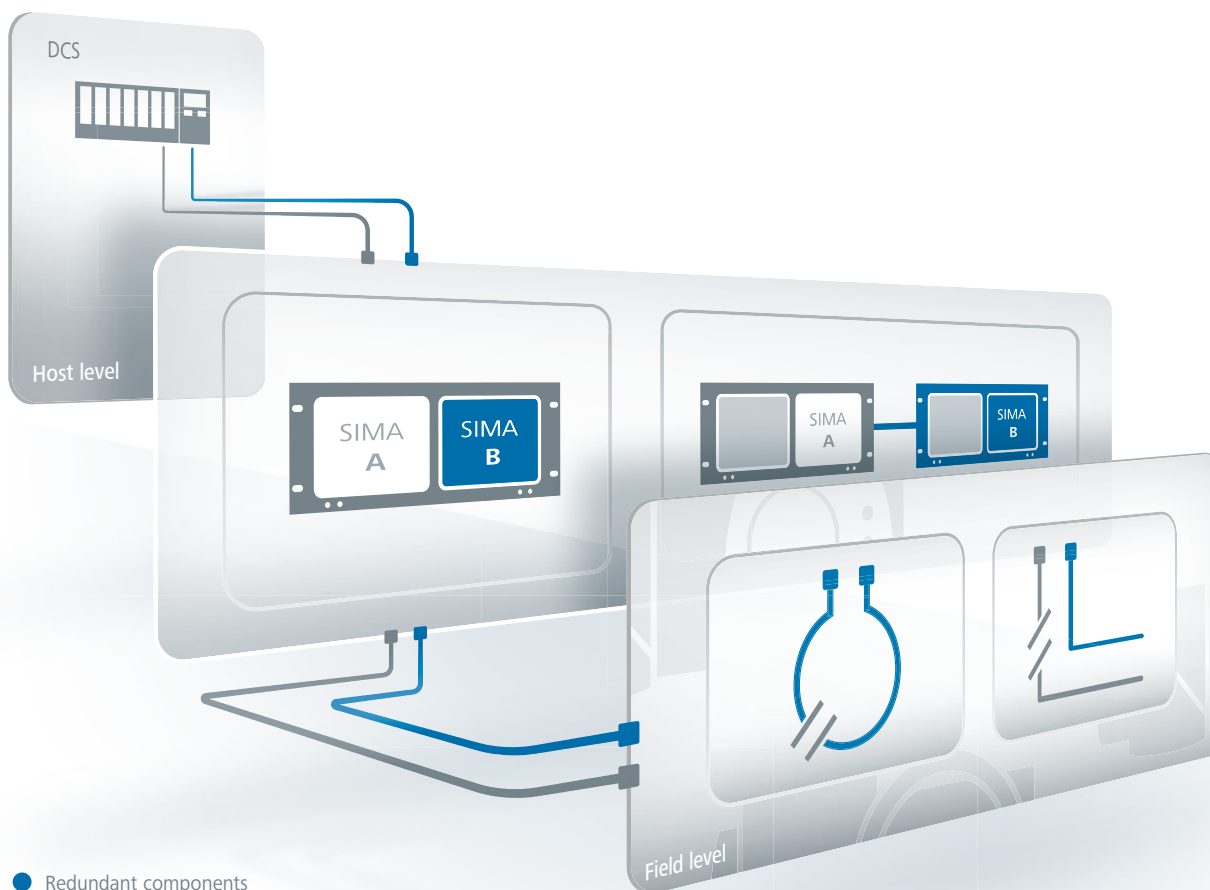
REDUNDANT COMMUNICATION TO FIELD DEVICES

Redundant loop topology with Modbus RTU

A significant advantage of loop topologies is the integral redundancy. If communication fails at a specific position within the loop, SIMA² Master Station considers both segments as individual lines and all actuators remain accessible. In addition, thanks to the repeater function integrated within the actuators, long cabling of up to 296 km for up to 247 actuators without additional network components is feasible.

Redundant line topology with Modbus RTU or Profibus DP

The connection from SIMA² Master Station to the field devices is made on two channels; this means that two separate fieldbus cables are installed for each actuator. Failure of one of the communication channels initiates immediate change-over to the second channel. In this scheme, all actuators remain accessible. Cable lengths up to approx. 10 km are feasible. Depending on the extent of the fieldbus system, additional network components may be required.



REDUNDANCY & EMERGENCY SHUTDOWN

HOT STANDBY SYSTEM REDUNDANCY

A hot standby system configuration comprises of two complete SIMA² subsystems, operated in pairs. Both SIMA² subsystems operate independently of each other. All sub-assemblies are available twice: from power supply to CPU and multi-touchscreen, right through to all required interfaces of field devices and host. Both SIMA² subsystems can be located in a joint housing or in two separate housings.

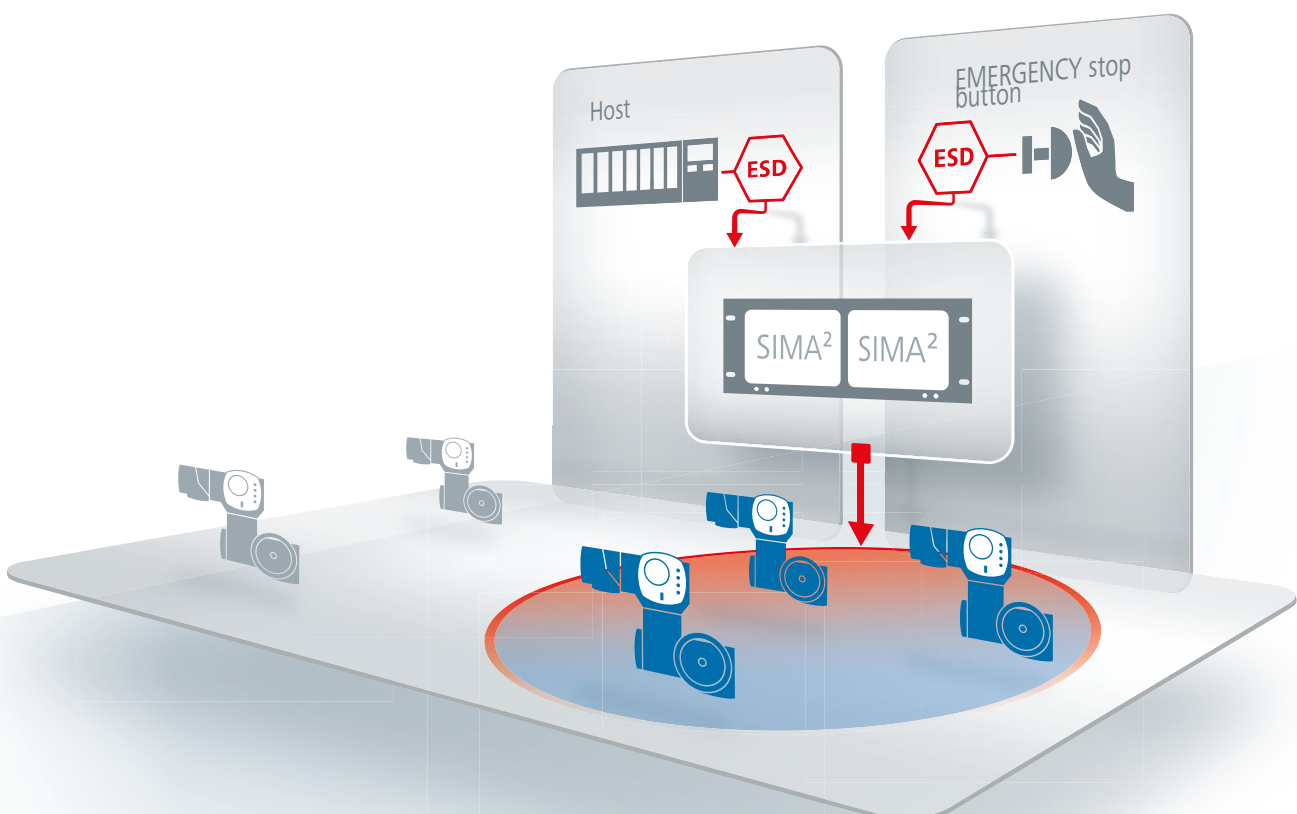
In standard operation, system control is always hosted by SIMA A subsystem. Meanwhile, SIMA B subsystem is working in standby operation, continuously monitoring the overall system. In case of SIMA A failure, control is given by SIMA B. The plant operation is therefore seamless without any failures.

EMERGENCY SHUTDOWN

Furthermore, SIMA² Master Station supports various options for executing emergency schemes, such as emergency shutdown (ESD). Emergency shutdown schemes can safeguard that specific valves are opened or closed in the event of a failure. Therefore, the plant can be operated in an overall safe state.

The following emergency shutdown schemes are possible:

- > ESD command to actuator groups
Up to eight actuator groups can be defined via the SIMA² user interface. In case of emergency, they receive the same ESD signal. Each actuator group can be assigned to one of the maximum eight discrete hardware inputs of the SIMA² Master Station. To trigger ESD operation for an actuator group, an ESD signal is issued and sent by the host or an EMERGENCY stop button to the respective hardware input (hard ESD).
- > ESD command to individual actuators
Furthermore, it is possible to transmit the ESD command as explicit ESD signal from the host via SIMA² to individual actuators (soft ESD).
As an alternative, the individual actuators can be equipped with a discrete ESD hardware input and thus receive the ESD signal directly and independently of SIMA².



Easy operation – easy diagnostics

SIMA² Master Station operation is as easy as handling your smartphone. Intuitive and convenient – either using the integral multi-touchscreen or via an external web browser. Change your settings, control your actuators or call for feedback signals. The status of the overall systems is visible at a glance thanks to its clear structure. A multitude of diagnostic functions are very helpful during troubleshooting and asset management.

OPERATIONAL CHOICES

You may operate SIMA² from your favourite end device: Either directly via the integral 7" multi-touchscreen or remotely via PC, laptop, tablet or smartphone. Thanks to the integral web server, the same comfortable user interface is available for both the touchscreen and also the standard web browser. The language setting can be changed during the running operation.

Password-protected user levels prevent unauthorised access to the functions. In addition, SIMA² configuration can be adapted to local manual control of actuators on a validation signal issued by the host only.

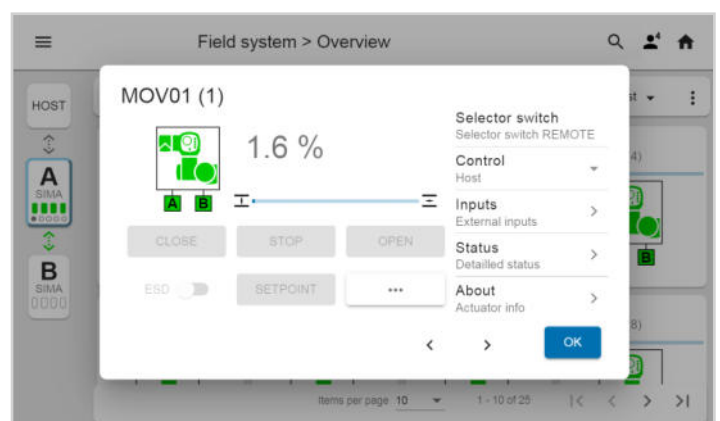
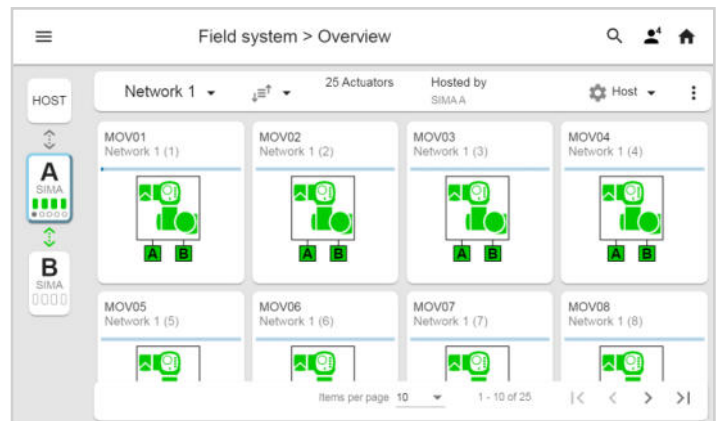
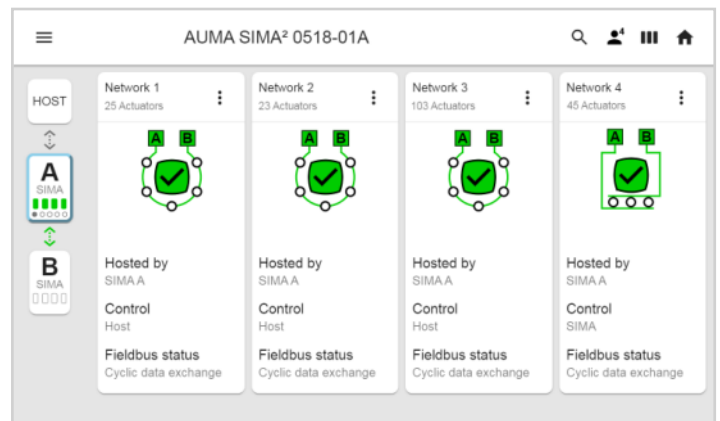
INTUITIVE AND EASY TO USE

Easy to use and grouped graphic representations visualise the network structures. Configure the communication parameters and networks by simple touch or call detailed diagnostic information.

Thanks to the intuitive user interface, navigate in just a few steps through the network levels down to the individual actuators. You will receive important information on each actuator, e.g. actual position and status.

Actuator commissioning is made extremely easy thanks to the SIMA² Master Station. Large buttons are available for controlling the actuators by simple touch while supervising the feedback signals. Consequently, no DCS is required.

Automated processes like the automatic loop configuration save both time and cost.



SOFTWARE

PLANT TRANSPARENCY AT A GLANCE

You must anticipate any potential problems to ensure premium plant availability. With SIMA² Master Station, this has never been so easy. As a centralised diagnostic hub, it simplifies fault detection at all levels, from the overall system down to the individual actuator.

At a glance, you can check your system’s status:
Green – everything is OK. Orange – warning signals are available.
Red – faults have occurred.

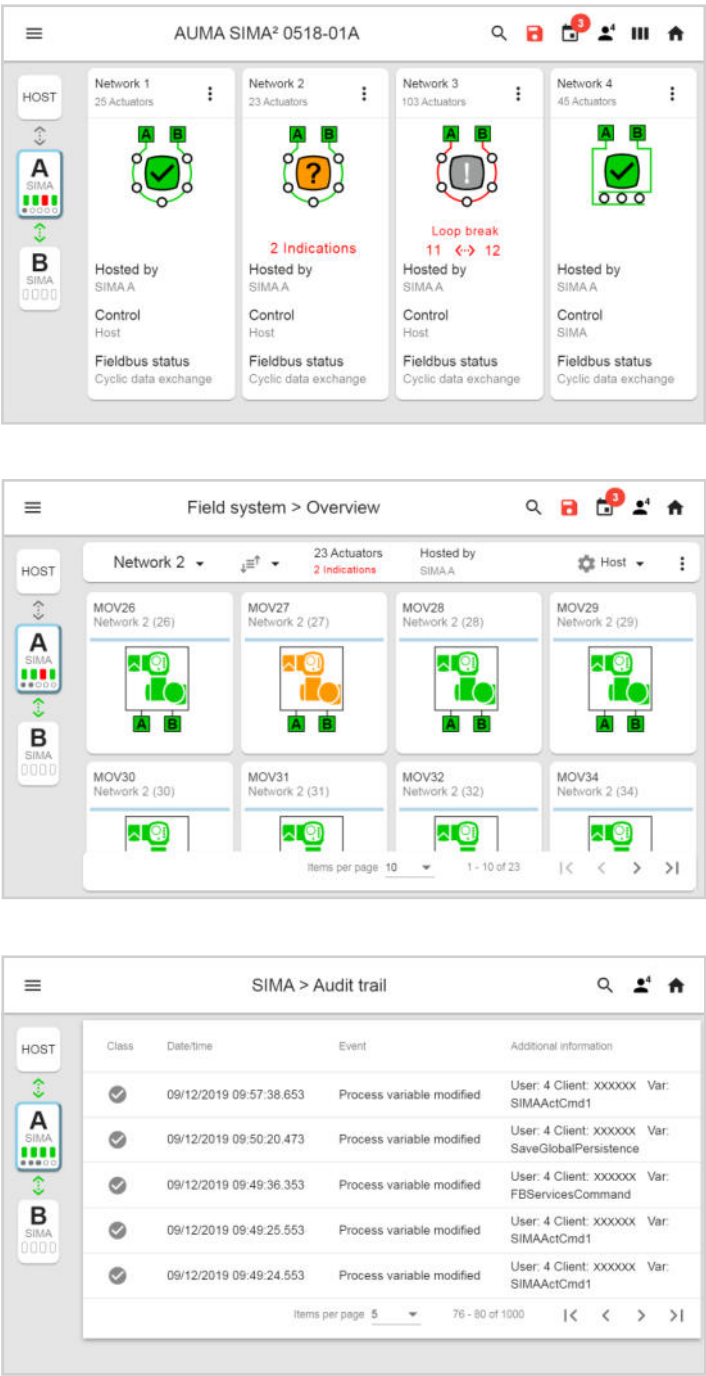
The clear colour coding is available throughout all network levels. If required, you can quickly and intuitively browse to the affected communication channel or actuator. Detailed information in terms of configuration and status facilitate diagnostics and accelerate troubleshooting and fault remedy.

SIMA² Master Station diagnostic representation is based on the diagnostic classification and icons by NAMUR NE 107. Fast and homogeneous diagnostics is available for the operators.

COMPREHENSIVE DATA LOGGING

All events and faults are recorded and can thus be traced. SIMA² Master Station continuously supervises all communication channels and all participants of the network. Occurring hardware and communication faults are recorded, displayed and logged. Furthermore, each user entry is logged via audit trails.

The Network Time Protocol (NTP) is used to harmonise the SIMA² Master Station’s clock with the site network to synchronise the time stamp of SIMA² with the host clock information.



Economical and flexible

Thanks to the compact installation feature respecting ergonomic design, SIMA² Master Station minimises installation and investment expenditure. A multitude of turnkey housing options allow easy installation and perfect fit for any environment.

INSTALLATION AND ASSEMBLY

COMPACT DESIGN

SIMA² Master Station is extremely compact in design. A 19" standard housing offers space for two SIMA² subsystems, either as hot standby system redundancy or as two independent SIMA² subsystems.

With 4 U, SIMA² Master Station only requires minimum space for installation. The front panel with the monitor can be opened wide for installation. Thus, no additional space is required above or below the Master Station, ensuring installation into a control cabinet to be seamless.

ERGONOMICS

Premium ergonomics and accessibility were a prime focus for SIMA² Master Station design:

- > All connections for communication with the host, the Ethernet network or the actuators are taken from the front.
- > When opening the front panel, the electronics can be pulled out allowing perfect accessibility of all ports even in confined control cabinet spaces.
- > The cables run underneath the housing, for increased tidiness and optimisation of space constraints.





FLEXIBLE SOLUTIONS FOR ALL REQUIREMENTS

AUMA supplies the SIMA² Master Station with a choice of mounting options as required by our valued customers: 19" rack mount, standard housing or turnkey solutions pre-installed within the control cabinet or inside a weatherproof housing for outdoor installation.

Housing variants

The following housing variants are possible:

- > Housing for 19" rack mount within control cabinets
- > Housing for installation on control cabinet rear
- > Desktop housing with front handles and knuckle feet

System configurations

The following basic system configurations are possible:

- > Single channel SIMA² Master Station
One SIMA² subsystem only in one housing
- > Dual SIMA² system:
Two SIMA² subsystems in one housing, independent of each other
- > Hot standby system redundancy
Two SIMA² subsystems in redundant configuration either in a joint housing or in two separate housings

If required, several SIMA² Master Stations can be integrated within the same control cabinet on top of each other

Project-specific control cabinet

On request, the SIMA² Master Station can be individually supplied to your specifications within a tailored control cabinet:

- > Including all requested components, e.g. network components, power supplies, FOC and control cabinet ventilation
- > The components are pre-installed within the system control cabinet and completely prepared for commissioning.

Special solutions

For special requirements, we offer complete solutions, readily installed e.g.:

- > Weatherproof IP65 housing with integrated climatic control for outside installation at high ambient temperatures, e.g. in the desert (field mounted master station)
- > Compact IP55 wall housing

TECHNICAL DATA

In the following, please note the most important technical data for SIMA² Master Station.

For further information, refer to the separate technical data sheets.

Housing	Standard:	Housing for installation in 19" systems Dimensions: 4 U/84 HP Integral 7" multi-touchscreen as user interface
	Options:	Housing for installation on control cabinet mounting plate Dimensions (W x H x D): 483 x 177 x 340 mm
		Desktop housing with front handle and knuckle feet
Power supply, mains frequency	Standard:	1-phase AC current: 110 – 240 V AC +/-10 %, 50/60 Hz +/-10 %
	Options:	DC current: 24 V DC, approx. 1 A
Supported field devices	The following AUMA actuators are suitable for connection to the SIMA² Master Station: > SA .2, SAR .2, SAV .2, SARV .2 multi-turn actuators or SQ .2, SQR .2 part-turn actuators in combination with AC 01.2 or ACV 01.2 actuator controls > SAEx .2, SAREx .2, SAVEx .2, SARVEx .2 multi-turn actuators or SQEx .2, SQREx .2 part-turn actuators in combination with ACExC 01.2 or ACVExC 01.2 actuator controls > Multi-turn actuators of the i-matic (DiM(Ex), DiMR(Ex)) type range as well as part-turn actuators of the DPiM(Ex) type range > Multi-turn actuators of type range SEVEN, globe valve actuators of type ranges SVC and SVM, part-turn actuators of type ranges SGC and SGM Other field devices with Modbus RTU or Profibus DP interface on request	
Communication to field devices	Each SIMA ² Master Station supports up to four different, galvanically and logically separated fieldbus networks to the actuators with the following characteristics:	
	Modbus RTU (RS-485)	Single-channel or redundant line topology: > Cable length without repeater max. 1.2 km, with repeater approx. 10 km > Number of actuators: without repeater max. 32, with repeater max. 247 Redundant loop topology: > Automatic and interference-free changing of the communication path in case of a fault within the RS-485 loop system. > Repeater function within the actuator controls, thus, no external repeaters are required for cable lengths of max. 1.2 km between actuators > Cable length: max. 296 km (without external repeaters) > Number of actuators: max. 247
	Profibus DP (RS-485)	Single-channel or redundant line topology: > Cable length without repeater max. 1.2 km, with repeater approx. 10 km > Number of actuators: without repeater max. 32, with repeater max. 125
Communication to the DCS	Standard	Without integration into a superordinate automation system (stand-alone mode)
	Options	> Modbus RTU in single-channel or redundant version (RS-485) > Modbus TCP/IP in single-channel or redundant version (Ethernet)
Hot standby system redundancy (option)	For redundant applications, SIMA ² can be implemented as redundant configuration. Two separate SIMA ² subsystems continuously monitor each other; if one SIMA ² subsystem fails, the redundant subsystem will automatically take over. Version in one housing or two separate housings (only available in combination with Modbus RTU as communication protocol between SIMA ² and actuators)	
Dual operation (option)	For applications with space constraints inside the control cabinet, two galvanically and logically isolated SIMA ² subsystems can be located within a joint housing.	
System interfaces	The number of available RS-485 and Ethernet interfaces depends on the number of fieldbus networks, the type of communication to the host and the selected redundancy model. At least one Ethernet port (RJ45) is available for diagnostics or for integrating the optional OPC UA server within an automation network, two further USB ports are used for transmitting configuration and diagnostic data.	
Service conditions	Enclosure protection according to EN 60529	Standard: IP20 (higher enclosure protection on request)
	Ambient temperature	-20 °C to +50 °C (higher ambient temperatures on request)
	Humidity	5 % to 90 % (non-condensing)
Options and accessories	> RS-485 overvoltage protection > Digital inputs, nominal voltage 24 V DC, type 1 input characteristics (according to EN 61131-2), current consumption approx. 3.75 mA, suitable for e.g. discrete control signals for activating the ESD function, for control cabinet monitoring functions or enabling the user interface > Digital outputs, suitable for e.g. configurable alarm output > Front handle and knuckle feet, suitable for 19" pull out systems and bench housing > Customised control cabinet, based on RITTAL IT, 19" rack (800 x 800 x 2,200 mm) > Project-specific software programming > Project design	

Worldwide support

AUMA does not only offer highly efficient and reliable products. AUMA also offers competent support in all questions relating to the deployment and integration of electric actuators – on a global scale.

EXPERTISE IN YOUR NEIGHBOURHOOD

Benefit from more than 50 years experience in the field of electric valve automation. Our actuator solutions have been proven in the field through several hundred thousands of sophisticated solutions all around the world.

As a worldwide operating manufacturer, AUMA has a tight sales and service network with subsidiaries and representative offices in more than 70 countries.

Our focus is on long-term and reliable partnerships. All around the globe, we cooperate with planners, system integrators, contractors, valve manufacturers and further partners. Our skilled experts support you in all phases of project processing, from the project phase right through to specification and integration.

COMPREHENSIVE SERVICE

Our comprehensive service portfolio will accompany and assist you throughout the total lifetime of our products.

Our portfolio goes beyond assembly and commissioning to fieldbus integration, fieldbus analysis, training, maintenance, repair and spare parts delivery right through to digital services.

Experienced AUMA service engineers are available on site all around the globe to support you finding solutions and ensuring smooth plant operation.

AUMA – YOUR COMPETENT PARTNER



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