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SMX

SAFETY CONTROLLERS FOR MACHINES AND SYSTEMS

Safety advanced® - SafePLC meets drive
Fit for any application!





SMX

SAFELY INTO THE FUTURE WITH SMX FROM BBH PRODUCTS.

The SMX is the perfect answer to new safety tasks in mechanical and plant engineering.

Whether you require the safe processing of light curtain, door monitors and locks, Emergency Stop, two-hand control or safe motion control port speed opposition monitoring in multi-axis mode, the SMX series enables you to implement your safety tasks easily, quickly and economically.

- Suitable up to PL e in compliance with EN ISO 13849-1
- Safe, type-tested logic controller under Annex IV of the new Machinery Directive 2006/42/EC
- Integral safety functions in compliance with EN 61800-5-2
- Modular design
- Interface for all standard fieldbus systems

SMX SERIES / SAFETY CONTROLLER

with integral technology functions

- 3000 SAFETY INSTRUCTIONS
- 226 PRE-TESTED SAFETY FUNCTIONS
- SECURE COMMUNICATION
- SCALABLE EXPANSION LEVELS
- FULL RANGE OF FUNCTIONS TO COMPLY WITH STANDARDS



FIT FOR ANY APPLICATION.

SafePLC® meets drive - Safety advanced®

The implementation of the new Machinery Directive is child's play with the SMX safety controller.

Whether you require simple safe I/O logic, a safety controller for medium-sized machines with up to 12 axes or you have a complex challenge with up to 32

decentral safety modules – SMX delivers the perfect solution to any problem. The SMX series are easily expandable and can be integrated into any standard and safety control environment easily using communication modules.

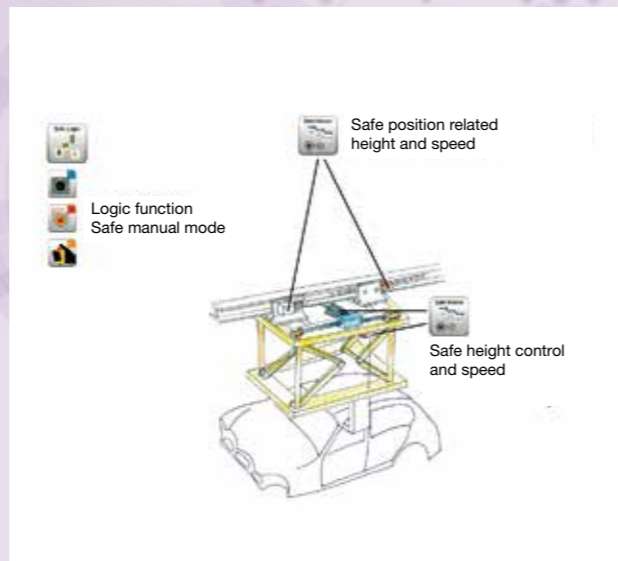
SMX COMPACT SAFETY CONTROLLER | SMX 10/11/12 - SAFE MASTER IN THE COMPACT SERIES

SMX 10 SMX 11 SMX 12



Why complicate a solution with a number of logic relays – the SMX Compact provides the answer to all applications safely and easily. The benefits of the SMX Compact are obvious – no need to keep of various safety relays for each function and as easy to program as to configure a relay solution.

Starting with safe I/O processing of a few signals to sophisticated drive monitoring, the SMX Compact can solve any safety task for small machines and system cells safely and compactly.

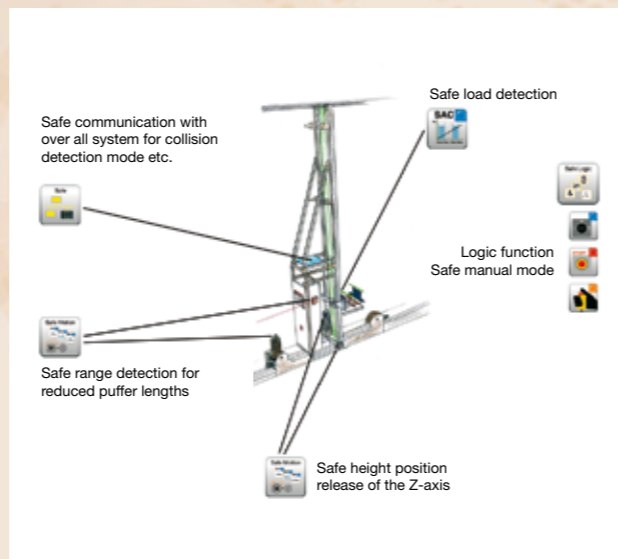


SMX COMPACT SAFETY CONTROLLER SMX 10/11/12 SAFE FIELDBUS SLAVE IN THE COMPACT SERIES

SMX11-2/DNM SMX 12-2/DNM SMX12/DNM



The safe solution when standard equipment reach their limits. More complex safety applications often exceed the abilities of safety functions integrated in drive controllers. The SMX Compact (/4x or /DNM) series provides the answer to demanding safety tasks. Safe position monitoring and zone identification, multi-axis functions, collision monitoring – the SMX Compact (/4x or /DNM) series with safe fieldbus communication in conjunction with an F-host solve this problem. Communication with an arbitrary master controller takes place through safe bus systems such as FSoE or PROFISAFE. Safe process values for speed, position, braking distance, direction of rotation and torque can be supplied to the master controller for processing. Even without bus communication a reaction can be obtained within 3 ms and a safe state generated.



SMX LOGIC CONTROLLERS

are the ideal solution for any safety task.

The integrated functions for digital safety processing such as sensors, command units and shut-down channels enable typical safety tasks to be performed very easily.

But SMX offers much more! Integrated monitoring functions with lots of additional practical functions

enable you to realize any challenge easily and transparently.

Safety advanced® in fact – a matter of course for SMX. Safe motion monitoring with the highest demands – no problem with SMX.

SMX MODULAR SAFETY CONTROLLER | SMX100 SAFE MASTER IN THE MODULAR SERIES

SMX 100-1 SMX 100-2 SMX 100-4



A uniform solution for all machine safety-related tasks. The SMX Modular is the ideal solution for safety tasks on small and medium machines. With up to 3000 possible PLC commands and more than 280 type-tested safety functions, it can secure even complex machining and production centres easily and transparently.

The modular structure of the SMX Modular series, with basic modules in various configuration levels, with I/O expansions and technology modules, enables it to cover the entire spectrum of machine safety.

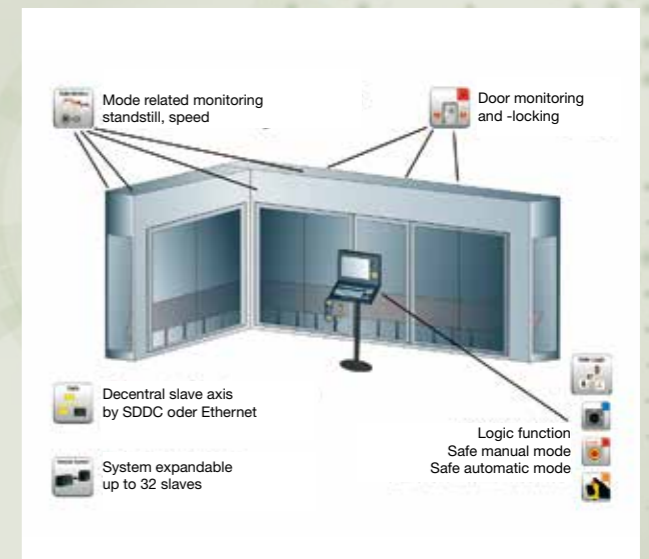


SMX MODULAR SAFETY CONTROLLER SMX100 SAFE MASTER IN THE MODULAR SERIES

SMX 100-1/DNM SMX 100-2/DNM SMX 100-4/DNM



If safety solutions for machines and systems are required for a high number of drive axes, speed of reaction or complex functions with a large number of decentral I/O modules, the SMX 100/DNM is the perfect solution. Acting as a safe master for various Ethernet-based fieldbuses (PROFINET, EtherCAT, Industrial Ethernet), the SMX 100/DNM together with the I/O and technology modules in this series delivers an extremely powerful and easy to program platform for practically every safety application. The decentral system architecture of the SMX 100/DNM with its master, I/O and technology modules enables a high configuration level with up to 32 slaves and the same number of drive axes. It can be integrated into the overall architecture of the standard control system effortlessly using the configuration software supplied with it.





SAFE PLC[®] convenient programming

SAFE PMT[®] application-friendly parameterisation



COMMAND UNITS, SENSORS AND CONTROLLER ARCHITECTURE

All conventional command devices and sensors used in safety applications such as buttons, Emergency Stops, door contacts, two-hand buttons, light curtains, mode selection switches and limit switches are available using icons in the form of preconfigured elements. When included in the terminal scheme, these elements are assigned to the module to which it is physically connected.

AXIS-/SENSOR CONFIGURATION

One or two sensors are required depending on the safety category to enable safe speed and/or position identification of the various axes in the system.

A separate menu with wide-ranging entry and calculation help is provided for the configuration of the sensor type and the technical data as well as for the axis-related resolution. This makes it possible to find the correct input data without requiring any special prior knowledge.

MODULVERWALTUNG/GERÄTEZUORDNUNG

The various modules (inputs/outputs and axis monitors) are assigned to the senses and functions of the machine/system on the basis of the required performance level. For example, for a three-dimensional movement of three connected drive axes, and axis module is required for x, y and z. It is of no consequence for safety monitoring whether electric, pneumatic or hydraulic drives are used.

CONVENIENT PROGRAMMING

The new SafePLC2 programming interface meets the needs of a modern programming interface and for the first time combines all the series of our safety controllers with each other. The view of the programming interface can be customised to suit the needs of every user. A very extensive library with sensors and actors is already available to users. These can be adjusted and extended to suit the needs of the customer.

NETWORK DIAGRAM

If network-based safety controls are used, the relevant network cards are displayed and diagnosed.

WIRING DIAGRAM

A wiring diagram is automatically generated by the configuration of the safety controllers and the sensors and actors. This can be exported to EPLAN.

FUNCTION DIAGRAM

Function diagram-based programming with logic elements. The monitoring functions can be linked to each other by logical operators. The speeds, accelerations and positions of multiple axes are monitored relative to each other. The monitoring tasks which are implemented can be distributed and documented very clearly using various pages.

GROUP FUNCTION

Tested function modules can be taken from a library or bespoke function modules can be defined, protected and saved for reuse.

MONITORING FUNCTION

Powerful functions for motion monitoring such as speed, standstill, zone and direction monitors as well as Emergency Stop, destination travel and step size monitoring are available for selection. The functions can be parameterised immediately on a context basis after they have been selected.

SAFE PMT

Access unique customising and choose between parameterisation or free programming for your safety solution.

The SafePMT software tool created from practice enables your safety specialists to prepare a library of bespoke pre-validated safety applications for your company.

SafePMT enables you to decide which parameters (safety curtains, access doors present yes/no, limit values for standstill monitoring or safely reduced speed, etc.) can be changed by commissioning, service or maintenance personnel. This means that you only have to select the safety application from your library and validate the amended parameters for each machine type – and hey presto you have a safety solution which complies with all the standards.

This prevents unauthorised manipulation as well as excessive threshold values, etc. There is no need for training on the programming or on a specific interface. This guarantees very short service times and also eliminates error sources.

SAFE PLC® MEETS DRIVE

SafePLC® meets Drive - Safety advanced®

With its integral technology functions, the SMX series ensures that a safety task can be implemented quickly and easily. An extensive library of functions is available for pre-processing sensors (inputs) or actuators (outputs), above all for safe drive monitoring. Simple linking of input, monitoring and output functions using logic blocks means that even extensive safety functions can be established very quickly and transparently. All the functions are open in terms of the sensors, drives and actuators used. Independent of the drive technology used, whether that means an electric drive with a vector or frequency controller, pneumatic or hydraulic drives, the SMX series delivers the ideal solution for complete safety management in mechanical and plant engineering.

SENSOR / ACTOR

Safety functions for sensor/actor processing deliver massive simplification in terms of programming. The programming work for the logical/temporal comparison of multiple inputs on the safety sensors is not required. Instead of this the required processing can be selected quickly and easily using the peripheral configuration menu. Each input and output element only appears in

the programme editor is a function block, already reduced to a single logic signal. Conventional safety controllers are restricted to logic processing or to the reduced word processing of data. A safe drive monitor such as that required in the European Machinery Directive is therefore difficult to achieve. The SMX series, on the other hand, delivers complete future-safety. Using the safety functions integrated in the firmware for drive monitoring, the new tasks can be implemented quickly and efficiently.

SAFETY FUNCTIONS IN COMPLIANCE WITH EN 61800-5-2

Independent of the drive technology, SMX provides all the functions required by EN 61800-5-2 for drive monitoring and also delivers practical function extensions. Whether that means single or multi-axis mode, a simple inverter or high-quality servo drive, electrical, hydraulic or pneumatic drive unit, the safety functions integrated in the firmware are easy to use and guarantee full future-safety.










































	Designation	Function	Parameter
	Enable button	1 or 2 input signals, logical and optional time comparison of the two inputs, optional acknowledge request after start and monitoring. Reduction to 1 logic output for processing	Breaker/Maker function of input signals, 1 or 2 switching contacts, impulse assignment optional, start monitoring, acknowledge y/n
	Emergency Stop	Logical and optional time comparison of the two inputs, optional acknowledge request after start/activation. Reduction to 1 logic output for processing	1 or 2 switching contacts, impulse assignment optional, time monitoring of input signals y/n, start monitoring, acknowledge y/n
	Door lock	1, 2 or 3 input signals, logical and optional time comparison of the input signals, optional acknowledge request after start/opening. Reduction to 1 logic output for processing	1, 2 or 3 switching contacts, impulse assignment optional, time monitoring of input signals y/n, start monitoring, acknowledge y/n
	2-hand button	2 or 4 input signals, monitoring the input signals to EN 574 Certified function for 2-hand control, reduction to 1 logic output for processing	2 makers or 2 changeover contacts, impulse assignment
	Limit switch	1 or 2 input signals, logical and optional time comparison of the two inputs, optional acknowledge request after start/actuation and monitored start. Reduction to 1 logic output for processing	Breaker/Maker function of input signals, 1 or 2 switching contacts, impulse assignment optional, time monitoring of input signal y/n, start monitoring, acknowledge y/n
	Light curtain	1 or 2 input signals, logical and optional time comparison of the two inputs, optional acknowledge request after start/actuation and monitored start. Reduction to 1 logic output for processing	1 maker or 1 changeover contact, impulse assignment optional, time monitoring of input signals y/n, start monitoring, acknowledge y/n
	Operating mode selector switch	2 or 3 input signals, logical monitoring of the input signals. Reduction to 2 or 3 outputs	2 or 3 input signals, impulse assignment
	Scanner	1, 2 or 3 input signals, logical and optional time comparison of the two inputs, optional acknowledge request after start/actuation and monitored start. Reduction to 1 logic output for processing	1, 2 or 3 switching contact, impulse assignment optional, time monitoring of input signals y/n, start monitoring, acknowledge y/n
	Safety mat	1 or 2 analogue input signals, response threshold can be selected, optional acknowledge request after start/actuation and monitored start. Reduction to 1 logic signal	1 or 2 analogue or digital input signals, response threshold can be parameterised, time monitoring of input signals y/n, start monitoring, acknowledge y/n
	Start button	Selectable function for acknowledging and/or start monitoring and/or alarm reset	Acknowledge function y/n, logic reset y/n, alarm reset y/n
	Muting	Hide foreseeable contours in light barriers and light grilles	Acknowledge function y/n, logic reset y/n, alarm reset y/n
	Enable button	Input of a dead man's circuit	Impulse assignment optional, start monitoring, 1 or 2 input signals
	Reset button	Monitored input. Allows alarms and/or logic to be reset	Type of start monitor, logic and/or alarm reset, impulse assignment
	Relay out	Optional linking of 2 relay outputs to form a safe shut-down channel. Monitoring of external contactors/relays using external switch contacts can be selected. Reduction of the switching signal to 1 logic signal	Single or combined operation. Monitoring of the external switchgear y/n, delay time for external monitoring
	High/Low out	Optional linkage of 1 pair of high/low to form a safe shut-down channel. Monitoring of external contactors/relays using external switch contacts can be selected. Reduction of the switching signal to 1 logic signal	Single or combined operation. Monitoring of the external switchgear y/n, delay time for external monitoring
	Digital out	Safe digital output. Monitoring of external contactors/relays using external switch contacts can be selected	Monitoring of the external switchgear y/n, delay time for external monitoring

	Abb.	Designation	Function	SMX Safety Advanced additional function
	SSX	Safe Stop 1 or 2	Monitoring the braking ramp and shutting down the motor after a standstill has been reached (SS1) or monitoring the braking ramp and SOS after a standstill has been reached (SS1) Corresponds to stop category 1 or 2 to DIN EN 60204-1	Monitoring the expected delay. The duration of the delay can be parameterised (S smoothing)
	SOS	Safe Operation Stop	Monitoring standstill when the motor is active	Speed or relative position monitoring, Optional fast channel monitoring (2 ms)
	SLA	Safely-limited acceleration	Monitoring when an acceleration limit value is exceeded	Filter value for acceleration can be parameterised
	SLS	Safely-limited speed	Monitoring a speed limit value	Optional monitoring of the delay to reduced speed, filter value for reduced speed can be parameterised
	SLT	Safely-limited torque	Monitoring a torque / force limit value	Optional zone monitoring, addition of two values, can be parameterised, filter can be parameterised
	SLP	Safely-limited position	Exceeding a position limit value is monitored	The duration of the delay can be parameterised (S form), braking monitoring, speed/position limit curve can be parameterised for monitoring the approach
	SEL	Safe emergency limit	Safe monitoring of the minimum and maximum position and the permitted position range. Optional monitoring of the speed/position limit curve to minimise the worst case overtravel distance.	Minimum position value, maximum position value, Optional delay and smoothing form/time.
	SLI	Safely-limited increment	Compliance with a specified step size during movement is monitored	Direction monitoring, maximum movement in the opposite direction can be parameterised
	SDI	Safe direction	The unintended movement direction of the motor is monitored	Maximum movement in the opposite direction can be parameterised
	SBC	Safe brake control	Safe actuation and monitoring of an external brake	Brake monitoring active, optional braking distance monitoring, brake test function
	SCA	Safe cam	Whilst the motor position is in a specified range, a safe output signal is generated	Optionally inverted range monitor, optional speed monitoring in the range, optional speed/position limit curve, can be parameterised for monitoring the approach to range limits
	SSM	Safe speed monitor	Whilst the motor speed is lower than a specified value, a safe output signal is generated	Rotational speed limit value, filter value can be parameterised
	SAR	Safe acceleration range	Compliance with the acceleration of the motor within specified limit values is monitored	Rotational speed limit value, filter value can be parameterised
	ECS	Encoder control muting	Error status of the speed/position sensor	-
	PDM	Position deviation muting	Muting of the deviation monitor in 2-sensor mode	Activation in the event of an alarm or active input, activation test
	SBT	Safe brake test	Safe monitoring and testing of external, mechanical brakes or internal motor brakes	Bespoke function with all the required parameters, suitable for one or two brakes per direction of movement
	SAC	Safely analogue control	Monitoring and analogue input signal	Basis for safe analogue processing such as load, torque or weight
	SSR	Safe speed range	Safe speed range monitor	Not just speed range but also with acceleration and tolerance for briefly exceeding the defined range
	STR	Safe torque range	Safe torque range monitor	Possible in a combination of speed and rotational direction
	SMT	Safe monitor temperature	Safe monitoring of the temperature of a monitor	Also suitable for process engineering requirements
	ACS	Analogue control muting	Muting of the diagnostics for analogue input interface	Suppression of failed sensors during commissioning states to allow reduced operation
	ICS	Input control muting	Muting of the diagnostics for Digital inputs	Suppression of failed sensors during commissioning states to allow reduced operation
	DEM	Dynamic encoder muting	Speed-dependent muting function and status output for diagnostic function for monitoring the speed sensors	Muting of encoder signals if no safety-relevant conditions are satisfied
	PRF	Position reference function	Adjustment of safe encoder of values to static position	Encoder values can be checked and fix control points adjusted as often as required for slippage-based applications, for example
	SMF	Safe matrix function	Safe cell properties in a matrix which can be changed by events on a safety basis	Safe function for database cooperation such as storage positions, changeable interfering contours, stores, dynamic prohibited zones
	EOS	External encoder offset	Offset of an encoder is adjusted to new conditions on a safety basis	Function for adjusting static encoders two mechanical changes such as a new HOME position, change dimensions, etc. without reparameterisation.



SAFE CONTROLLER / SAFE PLC

SMX 10 / 11 / 12

Safe master in the Compact series

- Miniature safety controller suitable to PL e / EN ISO 13849-1 or SIL3 / IEC 61508
- Programming or parameterisation is possible on a serial and Ethernet basis
- Technology functions for drive monitoring (max. 2 axes) and analogue process sensors
- Can be expanded up to max. 42 safe digital inputs, 12 safe digital outputs, max. 20 safe digital I/Os, max. 11 safe relay outputs, max. 10 signal outputs
- Up to 4 master modules in all series can communicate with each other safely via SMMC
- Optional: communication modules (SMX5x)(5, interface/DNM)(6 unsafe bidirectional fieldbus communication



- | | |
|--------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|
| (1) From firmware version 05-xx-xx-xx | (6) Various manifestations:
(Can be combined with all basic modules) |
| (2) Maximum two encoders per axis | /D Decentral SDDC and SMMC interface (2x RJ 45) |
| (3) Including TTL / SINCOS / SSI / Proxi-SW | Communication interface for decentral slave and master modules |
| (4) Including TTL / SINCOS / SSI / Proxi-SW / incremental HTL / resolver | /xN Fieldbus interface (2x RJ 45) |
| (5) Fieldbus versions: SMX51 CAN2.0 / SMX52 PROFIBUS / SMX53 PROFINET / SMX54 CANopen / SMX55 EtherCAT / SMX57 DeviceNet | Standard, safe fieldbus |
| (7) Optional also in analogue version
For example: SMX10A | PROFINET (PROFISAFE), EtherCAT (FSoE), EtherNet/IP, Modbus/TCP |
| | /xB Fieldbus interface (Sub-D) |
| | Standard and safe fieldbus |
| | PROFIBUS (PROFISAFE) |
| | /xxM Memory card (mini SD) |
| | Storage medium for safety program |

Module: Basic	SMX10	SMX10R	SMX11	SMX11-2	SMX12	SMX12-2
Maximum expansions	2	2	2	2	2	2
Safe digital inputs	14	14	14	14	14	14
Safe digital I/Os	-	-	-	-	-	-
Safe digital outputs pp/pn switching	2/4 ₍₁₎	2/4 ₍₁₎	2/4 ₍₁₎	2/4 ₍₁₎	2/4 ₍₁₎	2/4 ₍₁₎
Safe relay outputs	2	6	2	2	2	2
Auxiliary outputs	2	2	2	2	2	2
Clock outputs	2	2	2	2	2	2
Optional safe analogue inputs	2 ₍₇₎	-	-	-	2 ₍₇₎	2 ₍₇₎
Optional communication interface	Yes ₍₅₎	Yes ₍₅₎	Yes ₍₅₎	Yes ₍₅₎	Yes ₍₅₎	Yes ₍₅₎
Expandable communication interface	Yes ₍₆₎	Yes ₍₆₎	Yes ₍₆₎	Yes ₍₆₎	Yes ₍₆₎	Yes ₍₆₎
Safe axis monitor	-	-	Yes	Yes	Yes	Yes
Maximum axes	-	-	1	1	2	2
Maximum number of encoder interfaces	-	-	3 _(2,3)	5 _(2,4)	4 _(2,3)	8 _(2,4)
Dimensions (HxDxW, mm)	100x115x45	100x115x67,5	100x115x45	100x115x67,5	100x115x67,5	100x115x112,5

Module: Expansion	SMX31	SMX31R	SMX31R-4
	Central		
Safe digital inputs	12	12	12
Safe digital I/Os	10	2	6
Safe digital outputs pp/pn switching	-	-	-
Safe relay outputs	-	8	4
Auxiliary outputs	2	2	2
Clock outputs	2	2	2
Dimensions (HxDxW, mm)	100x115x45	100x115x90	100x115x67,5



SAFE CONTROLLER / SAFE PLC

SMX 10 / 11 / 12

Safe fieldbus slave in the Compact series

- Miniature safety controller suitable to PLe / EN ISO 13849-1 or SIL3 / IEC 61508
- Programming or parameterisation is possible on a serial or Ethernet basis
- Technology functions for drive monitoring (max. 2 axes) and analogue process sensors
- Can be expanded up to max. 42 safe digital inputs, 12 safe digital outputs, max. 20 safe digital I/Os, max. 11 safe relay outputs, max. 10 signal outputs
- Standard safety protocols PROFISAFE and FSoE
- Up to 4 basic modules in all series can communicate with each other safely via SMMC
- Optional: communication modules (SMX5x)(5, interface(/DNM)(6 safe and unsafe bidirectional fieldbus communication



- | | |
|--------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|
| (1) From firmware version 05-xx-xx-xx | (6) Various manifestations:
(Can be combined with all basic modules) |
| (2) Maximum two encoders per axis | /D Decentral SDDC and SMMC interface (2x RJ 45) |
| (3) Including TTL / SINCOS / SSI / Proxi-SW | Communication interface for decentral slave and master modules |
| (4) Including TTL / SINCOS / SSI / Proxi-SW / incremental HTL / resolver | /xN Fieldbus interface (2x RJ 45) |
| (5) Fieldbus versions: SMX51 CAN2.0 / SMX52 PROFIBUS / SMX53 PROFINET / SMX54 CANopen / SMX55 EtherCAT / SMX57 DeviceNet | Standard, safe fieldbus
PROFINET (PROFISAFE), EtherCAT (FSoE),
EtherNet/IP, Modbus/TCP |
| (7) Optional also in analogue version
For example: SMX10A | /xB Fieldbus interface (Sub-D) |
| | Standard and safe fieldbus
PROFIBUS (PROFISAFE) |
| | /xxM Memory card (mini SD) |
| | Storage medium for safety program |
| | /4x Safe fieldbus interface PROFISAFE / FSoE |

Module: Basic	SMX10	SMX10R	SMX11	SMX11-2	SMX12	SMX12-2
Maximum expansions	2	2	2	2	2	2
Safe digital inputs	14	14	14	14	14	14
Safe digital I/Os	-	-	-	-	-	-
Safe digital outputs pp/pn switching	2/4 ₍₁₎	2/4 ₍₁₎	2/4 ₍₁₎	2/4 ₍₁₎	2/4 ₍₁₎	2/4 ₍₁₎
Safe relay outputs	2	6	2	2	2	2
Auxiliary outputs	2	2	2	2	2	2
Clock outputs	2	2	2	2	2	2
Optional safe analogue inputs	2 ₍₇₎	-	-	-	2 ₍₇₎	2 ₍₇₎
Optional communication interface	Yes ₍₅₎	Yes ₍₅₎	Yes ₍₅₎	Yes ₍₅₎	Yes ₍₅₎	Yes ₍₅₎
Expandable communication interface	Yes ₍₆₎	Yes ₍₆₎	Yes ₍₆₎	Yes ₍₆₎	Yes ₍₆₎	Yes ₍₆₎
Safe axis monitor	-	-	Yes	Yes	Yes	Yes
Maximum axes	-	-	1	1	2	2
Maximum number of encoder interfaces	-	-	3 _(2,3)	5 _(2,4)	4 _(2,3)	8 _(2,4)
Dimensions (HxDxW, mm)	100x115x45	100x115x67,5	100x115x45	100x115x67,5	100x115x67,5	100x115x112,5

Module: Expansion	SMX31	SMX31R	SMX31R-4
	Central		
Safe digital inputs	12	12	12
Safe digital I/Os	10	2	6
Safe digital outputs pp/pn switching	-	-	-
Safe relay outputs	-	8	4
Auxiliary outputs	2	2	2
Clock outputs	2	2	2
Dimensions (HxDxW, mm)	100x115x45	100x115x90	100x115x67,5



SAFE CONTROLLER / SAFE PLC

SMX 100

Safe master in the Modular series

- Miniature safety controller suitable to PI e / EN ISO 13849-1 oder SIL3 / IEC 61508
- Programming or parameterisation is possible on a serial or Ethernet basis
- Technology functions for drive monitoring (max. 12 axes) and analogue process sensors
- Can be expanded up to max. 125 safe digital inputs, 36 safe digital outputs, max. 120 safe digital I/Os, max. 50 safe relay outputs, max. 42 signal outputs
- Up to 4 basic modules in all series can communicate with each other safely via SMMC
- Optional: communication interface (/5x(5), /DNM(6) unsafe bidirectional fieldbus communication)



- | | |
|--------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|
| (1) From firmware version 05-xx-xx-xx | (6) Various manifestations:
(Can be combined with all basic modules) |
| (2) Maximum two encoders per axis | /D Decentral SDDC and SMMC interface (2x RJ 45) |
| (3) Including TTL / SINCOS / SSI / Proxi-SW | Communication interface for decentral slave and master modules |
| (4) Including TTL / SINCOS / SSI / Proxi-SW / incremental HTL / resolver | /xN Fieldbus interface (2x RJ 45) |
| (5) Fieldbus versions: SMX51 CAN2.0 / SMX52 PROFIBUS / SMX53 PROFINET / SMX54 CANopen / SMX55 EtherCAT / SMX57 DeviceNet | Standard, safe fieldbus |
| (7) Optional also in analogue version
For example: SMX122A | /xB Fieldbus interface (Sub-D) |
| | Standard and secure fieldbus |
| | /xxM Memory card (mini SD) |
| | Storage medium for safety program |

Modules	SMX100-1	SMX100-2	SMX100-4	SMX131	SMX131R	SMX131R-4	SMX132-0/D	SMX132-0R/D	SMX132-1/D	SMX132-1R/D
	Basic			I/O expansion central			I/O expansion decentral			
Maximum expansions	8	8	8	-	-	-	-	-	-	-
Safe digital inputs	14	14	14	12	12	12	12	12	12	12
Safe digital I/Os	-	20	40	10	2	6	-	-	10	10
Safe digital outputs pp/pn switching	2/4 ₍₁₎	2/4 ₍₁₎	2/4 ₍₁₎	-	-	-	4	-	4	-
Safe relay outputs	2	2	2	-	8	4	2	6	2	6
Auxiliary outputs	2	6	10	2	2	2	2	2	4	4
Clock outputs	2	2	2	2	2	2	2	2	2	2
Optional communication interface	Yes _(5,6)	Yes _(5,6)	Yes _(5,6)	-	-	-	-	-	-	-
Dimensions (HxDxW, mm)	100x115x45	100x115x90	100x115x135	100x115x45	100x115x90	100x115x67,5	100x115x67,5	100x115x90	100x115x90	100x115x112,5

Module: Axis expansion	SMX121	SMX121-2	SMX122	SMX122-2	SMX111	SMX111-2	SMX112	SMX112-2
	Central				Decentral			
Maximum expansions	-	-	-	-	-	-	-	-
Safe digital inputs	12	12	12	12	14	14	14	14
Safe digital outputs pp/pn switching	-	-	-	-	2/4 ₍₁₎	2/4 ₍₁₎	2/4 ₍₁₎	2/4 ₍₁₎
Safe relay outputs	-	-	-	-	2	2	2	2
Auxiliary outputs	-	-	-	-	2	2	2	2
Clock outputs	-	-	-	-	2	2	2	2
Optional safe analogue inputs	-	-	2 ₍₇₎	2 ₍₇₎	-	-	2 ₍₇₎	2 ₍₇₎
Optional communication interface	-	-	-	-	Yes ₍₆₎	Yes ₍₆₎	Yes ₍₆₎	Yes ₍₆₎
Safe axis monitoring	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Maximum axes	1	1	2	2	1	1	2	2
Maximum number of encoder interfaces	3 _(2,3)	5 _(2,4)	4 _(2,3)	8 _(2,4)	3 _(2,3)	5 _(2,4)	4 _(2,3)	8 _(2,4)
Dimensions (HxDxW, mm)	100x115x22,5	100x115x45	100x115x45	100x115x90	100x115x67,5	100x115x90	100x115x90	100x115x135



SAFE CONTROLLER / SAFE PLC

SMX 100

Safe fieldbus slave in the Modular series

- Miniature safety controller suitable to PLe / EN ISO 13849-1 oder SIL3 / IEC 61508
- Programming or parameterisation is possible on a serial or Ethernet basis
- Technology functions for drive monitoring (max. 12 axes) and analogue process sensors
- Can be expanded up to max. 125 safe digital inputs, 36 safe digital outputs, max. 120 safe digital I/Os, max. 50 safe relay outputs, max. 42 signal outputs
- Standard safety protocols PROFISAFE and FSoE
- Optional: communication interface (/5x(5), /DNM(6) safe and unsafe bidirectional fieldbus communication



- | | |
|--------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|
| (1) From firmware version 05-xx-xx-xx | (6) Various manifestations:
(Can be combined with all basic modules) |
| (2) Maximum two encoders per axis | /D Decentral SDDC and SMMC interface (2x RJ 45) |
| (3) Including TTL / SINCOS / SSI / Proxi-SW | Communication interface for decentral slave and master modules |
| (4) Including TTL / SINCOS / SSI / Proxi-SW / incremental HTL / resolver | /xN Fieldbus interface (2x RJ 45) |
| (5) Fieldbus versions: SMX51 CAN2.0 / SMX52 PROFIBUS / SMX53 PROFINET / SMX54 CANopen / SMX55 EtherCAT / SMX57 DeviceNet | Standard, safe fieldbus PROFINET (PROFISAFE), EtherCAT (FSoE), EtherNet/IP, Modbus/TCP |
| (7) Optional also in analogue version
For example: SMX122A | /xB Fieldbus interface (Sub-D) |
| | Standard and secure fieldbus PROFIBUS (PROFISAFE) |
| | /xxM Memory card (mini SD) |
| | Storage medium for safety program |

Modules	SMX100-1	SMX100-2	SMX100-4	SMX131	SMX131R	SMX131R-4	SMX132-0/D	SMX132-0R/D	SMX132-1/D	SMX132-1R/D
	Basic			I/O expansion central			I/O expansion decentral			
Maximum expansions	8	8	8	-	-	-	-	-	-	-
Safe digital inputs	14	14	14	12	12	12	12	12	12	12
Safe digital I/Os	-	20	40	10	2	6	-	-	10	10
Safe digital outputs pp/pn switching	2/4 ₍₁₎	2/4 ₍₁₎	2/4 ₍₁₎	-	-	-	4	-	4	-
Safe relay outputs	2	2	2	-	8	4	2	6	2	6
Auxiliary outputs	2	6	10	2	2	2	2	2	4	4
Clock outputs	2	2	2	2	2	2	2	2	2	2
Optional communication interface	Yes _(5,6)	Yes _(5,6)	Yes _(5,6)	-	-	-	-	-	-	-
Dimensions (HxDxW, mm)	100x115x45	100x115x90	100x115x135	100x115x45	100x115x90	100x115x67,5	100x115x67,5	100x115x90	100x115x90	100x115x112,5

Module: Axis expansion	SMX121	SMX121-2	SMX122	SMX122-2	SMX111	SMX111-2	SMX112	SMX112-2
	Central				Decentral			
Maximum expansions	-	-	-	-	-	-	-	-
Safe digital inputs	12	12	12	12	14	14	14	14
Safe digital outputs pp/pn switching	-	-	-	-	2/4 ₍₁₎	2/4 ₍₁₎	2/4 ₍₁₎	2/4 ₍₁₎
Safe relay outputs	-	-	-	-	2	2	2	2
Auxiliary outputs	-	-	-	-	2	2	2	2
Clock outputs	-	-	-	-	2	2	2	2
Optional safe analogue inputs	-	-	2 ₍₇₎	2 ₍₇₎	-	-	2 ₍₇₎	2 ₍₇₎
Optional communication interface	-	-	-	-	Yes ₍₆₎	Yes ₍₆₎	Yes ₍₆₎	Yes ₍₆₎
Safe axis monitoring	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Maximum axes	1	1	2	2	1	1	2	2
Maximum number of encoder interfaces	3 _(2,3)	5 _(2,4)	4 _(2,3)	8 _(2,4)	3 _(2,3)	5 _(2,4)	4 _(2,3)	8 _(2,4)
Dimensions (HxDxW, mm)	100x115x22,5	100x115x45	100x115x45	100x115x90	100x115x67,5	100x115x90	100x115x90	100x115x135

SMMC / SDDC

Secure data exchange

SMMC communication enable a secure data exchange of 2 bytes between multiple SDDC masters. Communication takes place without a master for coordinating the data. This means that data exchange between available subscribers is always possible. This principle means that an incomplete or separated network can work in part areas without changing the configuration.

To be able to coordinate multiple SDDC masters with different cycle times, an SMMC cycle time is parameterised which must be obeyed by all subscribers. This cycle time is the lowest common multiple of the cycle time of the various subscribers.

1	Communication by an SMX Compact with <ul style="list-style-type: none"> Central expansion modules via SDDC CAN backplane bus SMMC via Ethernet
2	Communication by an SMX Modular with <ul style="list-style-type: none"> Central expansion modules via SDDC CAN backplane bus SMMC via Ethernet
3	Communication by an SMX Compact with <ul style="list-style-type: none"> Decentral expansion modules via SDDC Ethernet SMMC via Ethernet
4	Communication by an SMX Modular with <ul style="list-style-type: none"> Decentral expansion modules via SDDC Ethernet SMMC via Ethernet



SDDC ETH (decentral)

Safe device-device communication



SMMC

Safe master-master communication



SDDC CAN (central)

Safe device-device communication

