

samos[®] PRO MOTION

SAFE MOTION

Safe Speed, Direction and Position Monitoring
for Machines and Plants.



SAMOS[®] PRO COMPACT PLUS MOTION LIBRARY.

Integrated + programmable + intuitive.

SAFE STANDSTILL
MONITORING



SAFE
DIRECTION



SAFE SPEED
RANGE



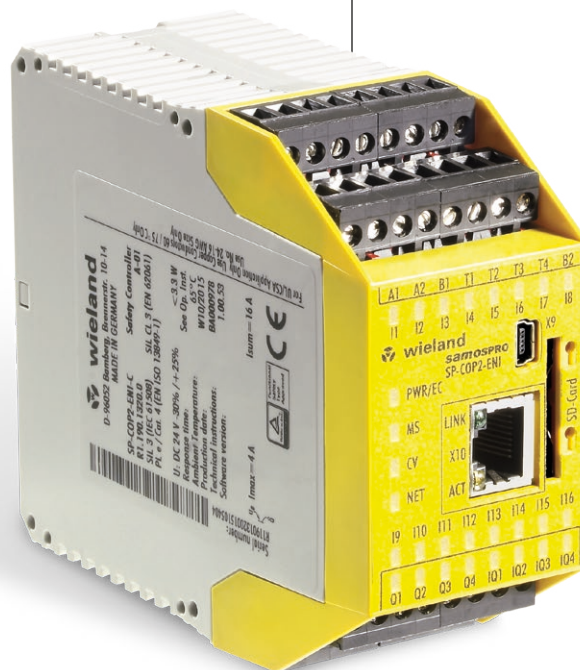
SAFELY LIMITED
SPEED



SAFE SPEED
MONITORING



SAFELY LIMITED
POSITION



samos[®] PRO COMPACT PLUS

- + Motion in basic module
- + Industrial Ethernet on board
- + Fast inputs of up to 70 kHz



HTL INCREMENTAL ENCODER

- Highest safety level up to SIL3/PLe
- Simple and reliable operation
- Comfortable usage without toothed wheel



INITIATORS

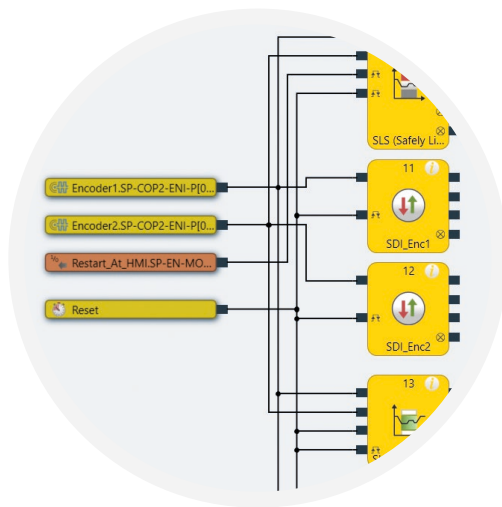
- Monitoring of 2 Axes up to PLd
- Scalable for single and multiple axes
- Cost effective installation for retrofit



FUNCTION OVERVIEW

WHAT IS SAFE MOTION MONITORING?

- Motion sensors provides pulses during movement
- samos® PRO COMPACT PLUS converts pulses to speed, angle, position and direction
- Motion functions compare current values with limits
- Functions are defined in EN 61800-5-2
- If an allowed limit or range is exceeded
 - Motor can be stopped safely
 - Doors can be locked or unlocked
 - An alarm can be activated

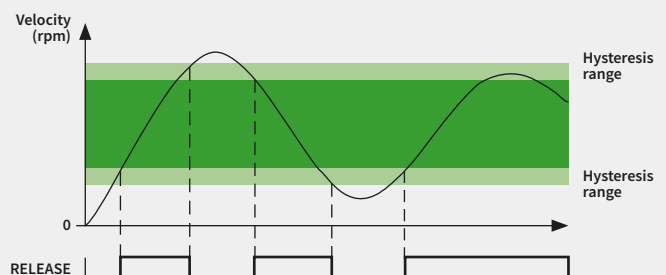


UP TO 100 SPEED OR POSITION RANGES WITH ONE BASIC MODULE

- One sensor input used for many functions
- Flexible units for limits (SSI or North American)
- Each motion function block monitors up to 4 limits
- Up to 25 speed monitoring functions in a module

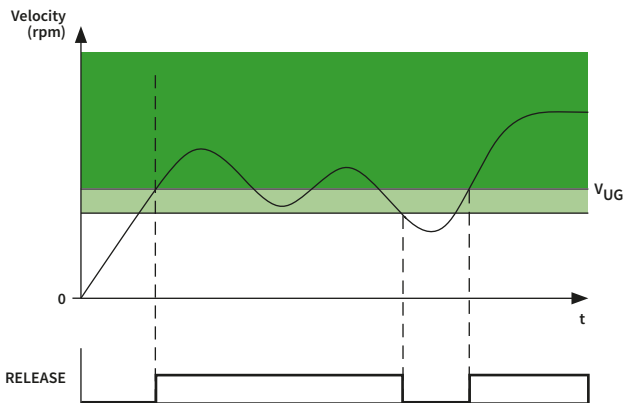
ADJUSTABLE HYSTERESIS AGAINST OSCILLATIONS

- Oscillations of speed or position is very normal
- Especially asynchronous motors regulated weakly
- Solution: Configurable hysteresis for each range
- Release goes to HIGH if value enters inner zone
- Release goes to LOW if value exits the outer zone
- No frequent switching at oscillation points



PROFESSIONAL DIAGNOSTICS AND RESET

- Each motion function offers comfortable reset:
 - Reset input to acknowledge errors
 - Reset required output to inform that errors are solved
- Blinking of Reset Required can be configured
- Error outputs can be shown optionally:
 - Error: Lump sum error output
 - Sensor Related Errors: Stuck-At-Low, Stuck-At-High, etc.
 - Function Related Errors: Discrepancy of two sensors, etc.
- Easy visualisation on lamps, HMI ECO panels and PLCs!

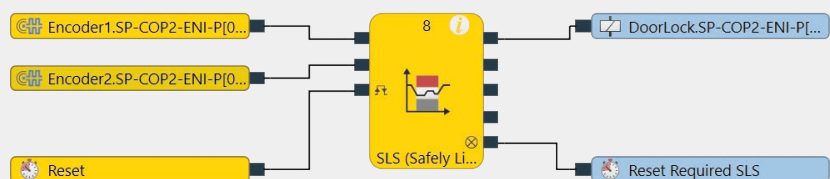


SMOOTH PEAKS WITH SAMPLING INTERVAL

- Measuring interval affects:
 - Reaction time
 - System behaviour with peaks
 - Measurement accuracy
- Short measuring intervals allow a faster response time, short peaks are not filtered
- Long measuring intervals cause longer reaction time, integrated filter reduce short peaks
- Automatic calculation of measuring accuracy by samos® PLAN 6

SPEED COMPARISON FOR BROKEN SHAFT DETECTION

- Scaling factors to synchronise two sensors
- Flexible comparison methods of two motion sensors
- Optional comparison with or without direction
- Configurable time to tolerate peaks
- Flexible results depending on application

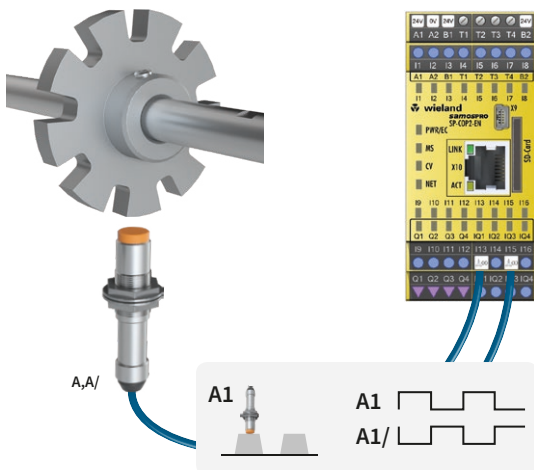
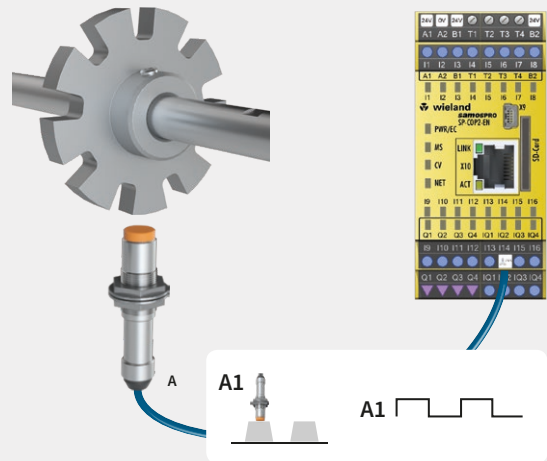




SENSORS AND SAFETY LEVELS

PROXIMITY SENSOR – TRACK A

- Standard sensor, single channel
- Sensor output must be PNP
- Toothed gear with any pulse ratio (ideal 1:1)
- Typically 3-wire sensors
- Up to 2 axes with 1 samos® PRO COMPACT PLUS
- Maximal reachable safety level for monitoring:
 - Speed: Cat1, PLc, SIL1
 - Position and Direction: not applicable

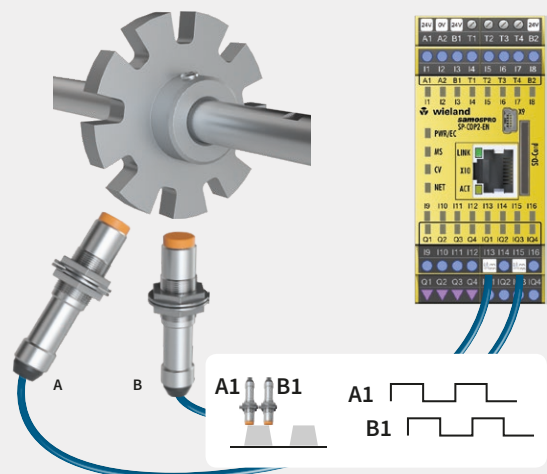


PROXIMITY SENSOR, ANTIVALENT – TRACKS A, A/

- Standard sensor, antivalent (NO/NC)
- Sensor output must be PNP
- Toothed gear with any pulse ratio (ideal 1:1)
- Typically 4-wire sensors
- Up to 2 axes with 1 samos® PRO COMPACT PLUS
- Maximal reachable safety level for monitoring:
 - Speed: Cat1, PLc, SIL1
 - Position and Direction: not applicable

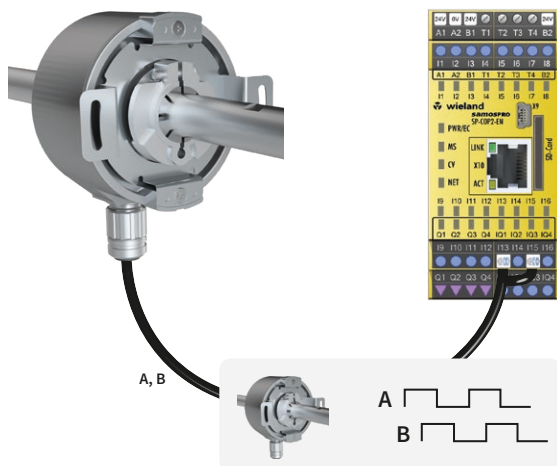
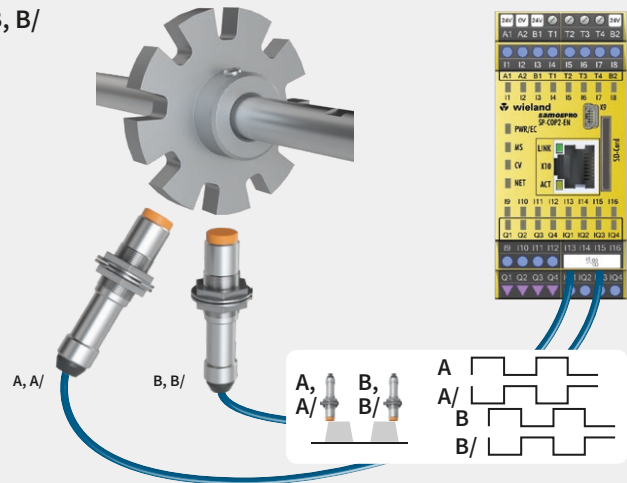
2 PROXIMITY SENSORS – TRACKS A, B

- 2 standard sensors, single channel
- Sensor output must be PNP
- Toothed gear with any pulse ratio (ideal 1:1)
- Flexible phase shift (ideal 90°)
- Typically 3-wire sensors
- Up to 2 axes with 1 samos® PRO COMPACT PLUS
- Distanced inputs against cross short circuit
- Maximal reachable safety level for monitoring:
 - Speed: Cat2, PLd, SIL2
 - Position and Direction: Cat1, PLc, SIL1



2 PROXIMITY SENSORS, ANTIVALENT – TRACKS A, A/, B, B/

- 2 standard sensors, antivalent
- Sensor output must be PNP
- Toothed gear with any pulse ratio (ideal 1:1)
- Flexible phase shift (ideal 90°)
- Typically 4-wire sensors
- 1 axis with 1 samos® PRO COMPACT PLUS
- Maximal reachable safety level for monitoring:
 - Speed: Cat2, PLd, SIL3
 - Position and Direction: Cat2, PLd, SIL3

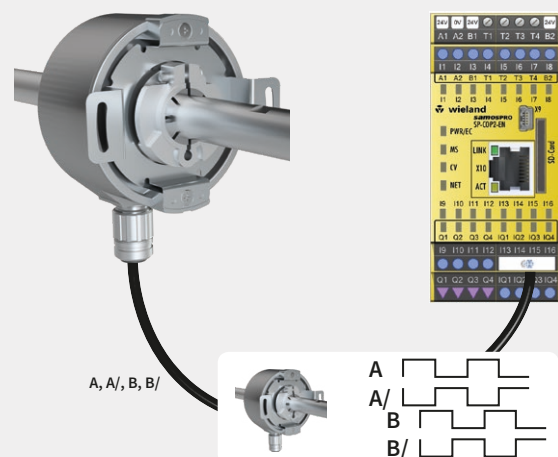


HTL INCREMENTAL ENCODER- SINGLE ENDED

- HTL incremental encoder with 2 tracks
- Desired sensor output is push-pull due to cable break detection
- No extra mechanic necessary
- Typically 6 or 8-wire encoders
- 2 axes with 1 samos® PRO COMPACT PLUS
- Maximal reachable safety level for all functions:
 - Standard Encoders: CatB, PLb
 - Safe Encoders: individual calculation necessary

HTL INCREMENTAL ENCODER, ANTIVALENT

- HTL incremental encoder with 4 tracks
- Desired sensor output is push-pull due to cable break detection
- No extra mechanic necessary
- Typically 8-wire encoders
- Only 1 axis with 1 samos® PRO COMPACT PLUS
- Maximal reachable safety level:
 - Standard Encoders: CatB, PLb, SIL2
 - SENC Safe Encoders: Cat4, PLe, SIL3

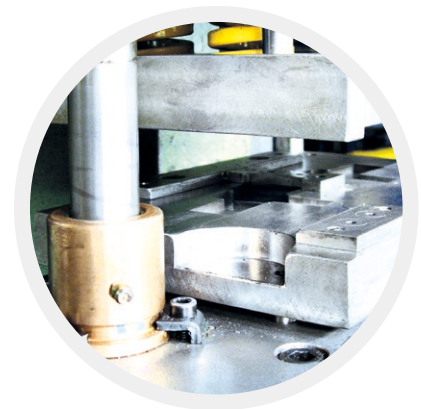
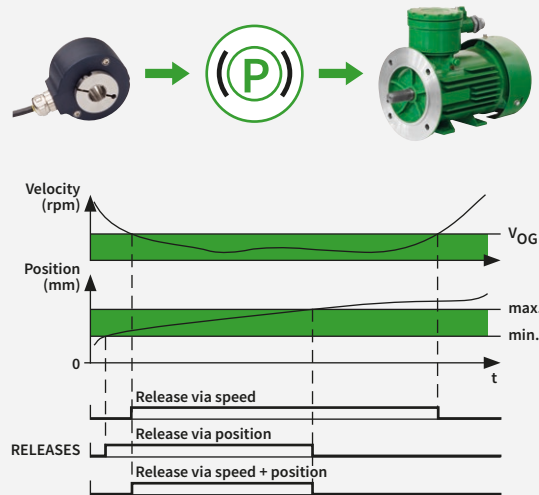




MOTION FUNCTION SAFE STANDSTILL MONITORING

FUNCTIONALITY

- Safe standstill monitoring with position and speed window
- Ensures that axis remains still and does not move
- Different modes for standstill monitoring:
 - Speed window: Speed of axis cannot exceed a limit
 - Position window: Axis cannot move out of position window
 - Combination of speed and position window
- Referencing input for the current standstill position
- Two sensors with speed and position comparison
 - Redundancy to increase safety level
 - Redundancy to increase the availability



APPLICATION FIELDS

- Setup and calibration of machines
- Tool change in CNC Machines and presses
- Service and maintenance of escalators
- Cleaning of machines and plants
- Quality of process in ultrasound welding

YOUR BENEFITS

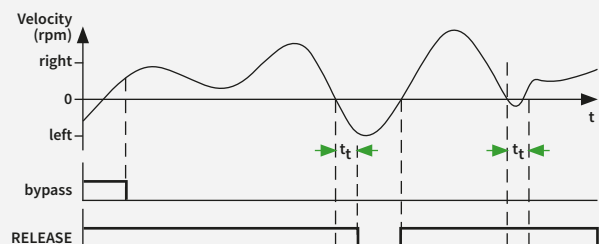
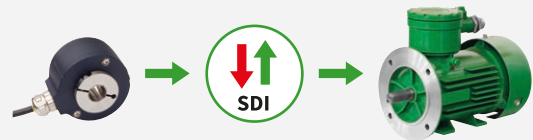
- + Solves problems with vibrations using position window
- + Monitors vertical axes and slowly sliding loads
- + Guarantees process quality with highest safety level



MOTION FUNCTION SAFE DIRECTION

FUNCTIONALITY

- Safe direction monitoring with an allowed direction
- Ensures that drive rotates in selected direction
- Tolerance time against short direction changes
- Two sensors with direction comparison (after version F-xx)
 - Redundancy to increase safety level
 - Redundancy to increase the availability



APPLICATION FIELDS

- Safe closing in gate systems
- Safe direction of rollers in printing machines
- Switching safety scanners in AGVs
- Muting in upwards direction at presses
- Safe direction in conveyors against motor damage

YOUR BENEFITS

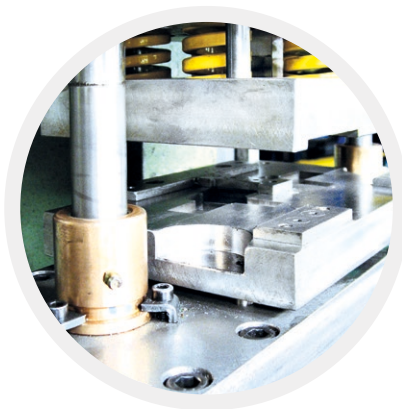
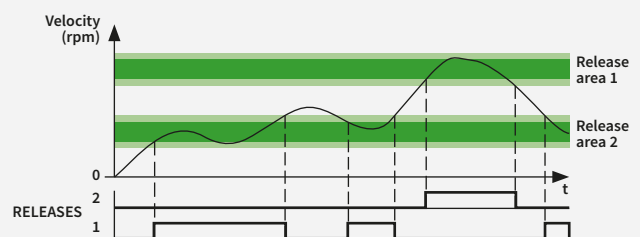
- + Ensures human safety in gate systems
- + Safe setup and maintenance of machines
- + Increases production efficiency in presses
- + Reduces financial damages protecting drives



MOTION FUNCTION SAFE SPEED RANGE

FUNCTIONALITY

- Safe speed monitoring with upper and lower limit
- Ensures that drive runs in a speed range
- Filtering unwanted peaks with sampling interval
- Two sensors with speed comparison for
 - Redundancy to increase safety level
 - Redundancy to increase the availability
 - Broken shaft detection
- Tolerance time against short deviations
- Flexible speed comparison with or without direction



APPLICATION FIELDS

- Zone switching in AGV applications
- Broken shaft monitoring in presses and wind turbines
- Speed range monitoring in pumps
- Air conditioning of critical areas
- Fans for the export of dangerous gases
- Identification of motor blockages

YOUR BENEFITS

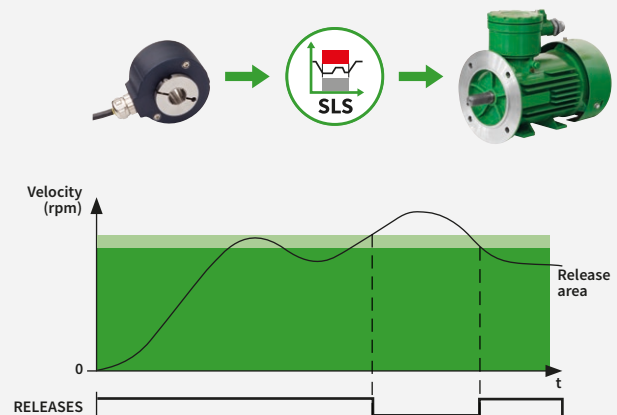
- + Accident free efficiency in intralogistics
- + Ensures human safety due to air conditioning
- + Protects investment due to fluid supply or removal
- + Fullfills safety with broken shaft detection



MOTION FUNCTION SAFELY LIMITED SPEED

FUNCTIONALITY

- Safe Speed monitoring with upper limit
- Ensures that drive does not exceed a speed
- Filtering unwanted peaks with sampling interval
- Two sensors with speed comparison for
 - Redundancy to increase safety level
 - Redundancy to increase the availability
 - Broken shaft detection
- Tolerance time against short deviations
- Flexible speed comparison with or without direction



APPLICATION FIELDS

- Setup and calibration of machines
- Tool change in CNC Machines
- Manual feeding of winder
- Manual teaching of robotics
- Overspeed detection in wind turbines
- Maximum speed monitoring in centrifuges
- Overspeed detection in amusement parks

YOUR BENEFITS

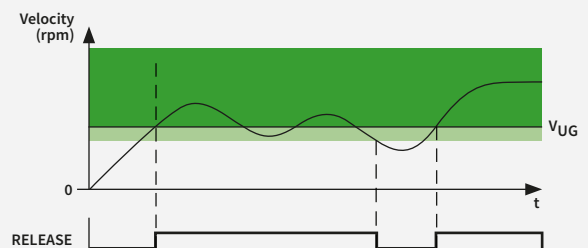
- + Ensures human safety during service and maintenance
- + Continues production allowing human interactions
- + Accelerates setup time of the machine
- + Protects components and high investments



MOTION FUNCTION SAFE SPEED MONITORING

FUNCTIONALITY

- Safe speed monitoring with lower limit
- Ensures that drive runs above a defined speed
- Filtering unwanted peaks with measuring interval
- Two sensors with speed comparison for
 - Redundancy to increase safety level
 - Redundancy to increase the availability
 - Broken shaft detection
- Tolerance time against short deviations
- Flexible speed comparison with or without direction



APPLICATION FIELDS

- Minimal speed monitoring in pumps, fans
- Monitoring of fans for carrying out hazardous gases or for the supply of air
- Minimum speed of laser head in cutting machines
- Quality of production in mixers and breweries

YOUR BENEFITS

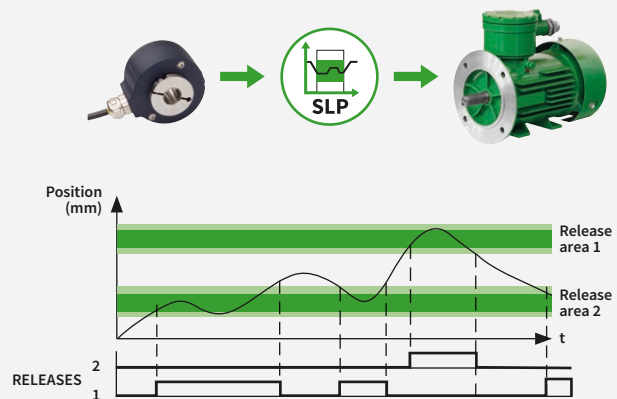
- + Ensures human safety due to air conditioning
- + Protects investments with reliable fluid supply or discharge
- + Guarantees the quality of production
- + Eliminates the need for multiple speed monitors or motion modules



MOTION FUNCTION SAFELY LIMITED POSITION

FUNCTIONALITY

- Safe position monitoring with upper and lower limit
- Ensures that axis remains in permitted position range
- Up to 100 position ranges (CAMs) in one module
- Maximum distance of travel configurable per samos® PLAN 6
- Easy homing thanks optional input and start position
- Modulo option for infinite axes or turning tables
- Two sensors with position comparison
 - Redundancy to increase safety level
 - Redundancy to increase the availability



APPLICATION FIELDS

- Safe working zone for material feeding and removal
- Working zone for cartesian robotics
- Safe angle range for rotary tables
- Maximal gap between tools in injection moulding machines
- Safe positioning range for cranes

YOUR BENEFITS

- + Ensures human safety in production zones
- + Component protection during setup and operation
- + Production quality for rotary tables
- + Protection of human and investment in cranes



SAFE HTL ENCODER SENC

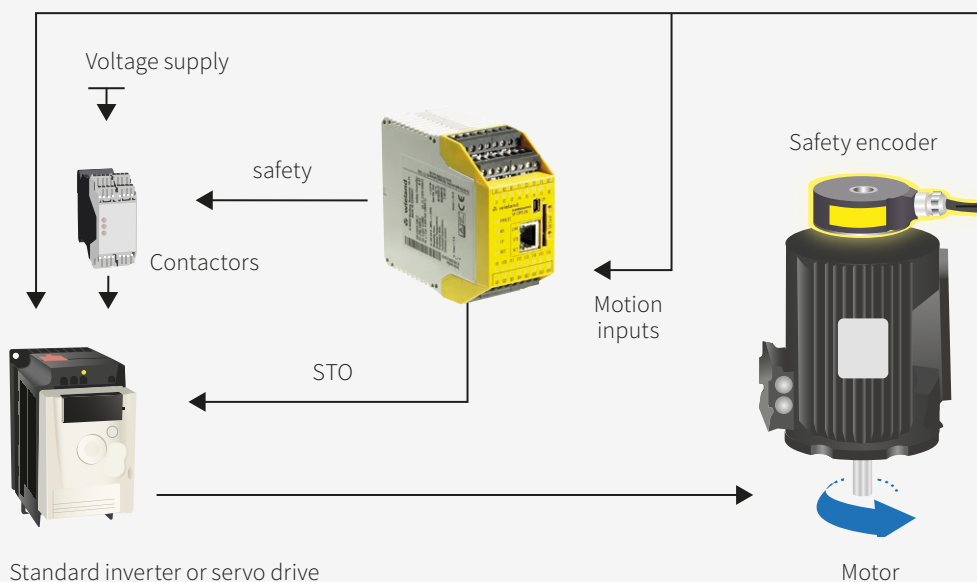
APPLICATIONS FOR SAMOS® PRO COMPACT PLUS

- Safe monitoring of motors, drives or axes
- Safe rotational speed, rotational direction or position monitoring to IEC 61800-5-2
- Standstill monitoring for commissioning or maintenance



FEATURES

- Rotational speed or position monitoring to SIL3 (acc. IEC 61508) and PLe (acc. EN 13849)
- Special form fit with the positive lock for hollow shafts
- Compact 58 flange size with minimum space requirement inside the machine
- Flexible mounting with hollow shaft, solid shaft or axial connector
- Compatible HTL output for fast safe inputs on samos® PRO COMPACT PLUS
- Resolutions from 360 ppr, 512 ppr and 1024 ppr depending on accuracy requirement
- PUR encoder cable resistant to oil, UV, ozone and solvents
- Over 100,000 hours of service life of ball bearings at hollow shaft encoder
- Maximum peak speed of 9000 rpm and continuous speed of 4000 rpm



SOLUTION FOR MODULAR SAFETY

Safety level:
to SIL3/PLe



INFO TO GO

OUR WIELAND BROCHURE SERVICE

To make your workflow easier, we provide all of our product catalogs and industry brochures for you in the download area of our website.

<https://www.wieland-electric.com/en/download>



Further information and a product overview is available here:

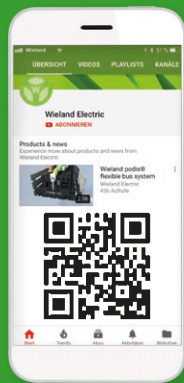
SAMOS® PRO COMPACT
Compact safety
Art. No. 0881.1



SAFETY CATALOG
Safe system solutions for automation
Art. No. 0860.1



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