

IT'S INTEGRATED!

Absolute FSI 900 for safe motion



Simplify the encoder installation while making sure that speed, acceleration, and end positions keep within safe limits in a functionally safe manner, certified in accordance with SIL2/PLd category 3. Meet the new product from Leine&Linde: FSI 900 – with functional safety integrated!

Leine & Linde presents a brand new product series with integrated safe functions, the FSI series, where FSI means Functional Safety Integrated. FSI 900 monitors rotating movement, and acts immediately to make sure none of the user-configured limits will be exceeded. Together with the integrated failsafe relay outputs, the FSI 900 is more than an encoder. It is a safety system – all in one package.

The FSI 900 is mounted on a motor shaft, winch drum, drill, roll drum, wheel or wind turbine. To achieve the safety func-

tions required in its application, the FSI is based on an absolute encoder. The safe absolute scanning reads out unique values for every position, not even losing its position when the machine is restarted. Movement cannot go unnoticed where FSI 900 is mounted.

Define and monitor safe speed, end limits, acceleration, or standstill. By connecting FSI 900 to the emergency stop loop or directly to selected braking functions, it will use its failsafe relay outputs to break the control unit and enter the state defined as failsafe, when a set limit is reached. Thereby the Machinery Directive for functional safety is fulfilled in a reliable way by the FSI 900 alone.

After certification, the product fulfils the EN ISO 13849-1, EN IEC 62061, IEC 61508, and EN IEC 61800-5-2 for safety in accordance with SIL2/PLd, category 3.

Following functions can be realized with the FSI 900

Safe switch-off

STO – Safe torque off
SBC – Safe brake control

Safe standstill

SS1 – Safe stop 1
SS2 – Safe stop 2
SOS – Safe operating stop

Safe motion

SLS – Safely-limited speed
SSR – Safe speed range
SDI – Safe direction
SLA – Safely-limited acceleration
SAR – Safe acceleration range

Safe monitoring

SSM – Safe speed monitor

Safe positioning

SLI – Safely-limited increment
SLP – Safely-limited position
SCA – Safe cam

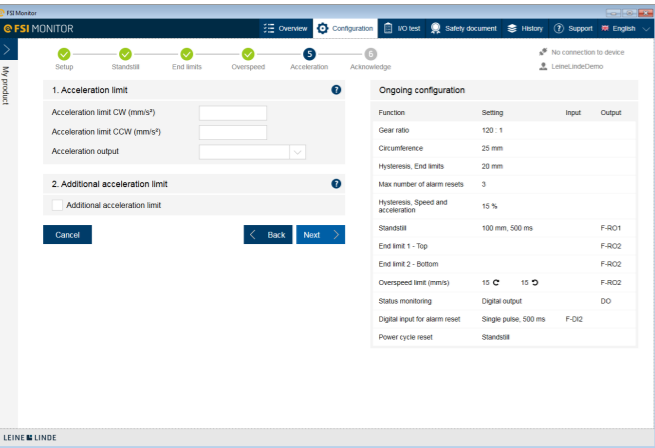
All-in-one for reliable safety!

An advantage with FSI 900 is that everything that is needed to fulfil the desired safe functions, including the necessary certification, is integrated in one and the same product. There is no need for separate relays or mechanical end limit switches, as all this is integrated.

Safe is truly safe when nothing can go wrong. Focus is usability and simplicity!

FSI Monitor for configuration of safe limits

FSI 900 is so versatile it can be adapted to the needs for safety in any encoder application – and many more! Configuration of the safe limits is made on site, in the product's software FSI Monitor, by the safety coordinator, so that risk for errors is minimised. The software set-up can be exported to other units, in case there are more than one machine that uses the same limit values.

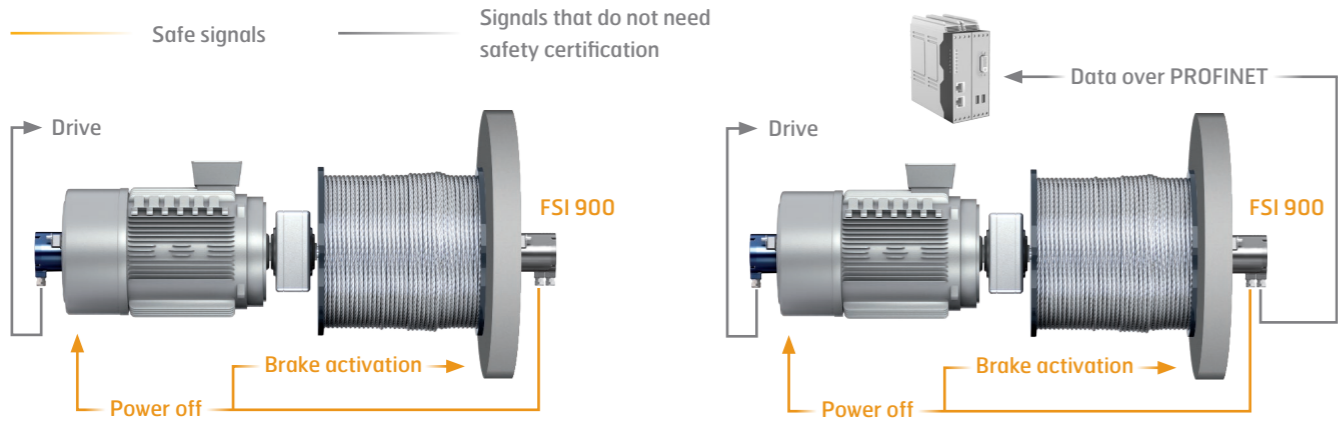


All the necessary documents – at once

Certificates, lists of configured parameters, or history logs – all of this is available in the FSI product and can be downloaded onto a computer or printed for the safety documentation.

Part of the control system – but manages safe functions separately

FSI 900 can be ordered with PROFINET fieldbus communication, for access of the encoder's speed and position data. This makes FSI 900 part of the control system, but the product still takes care of the safe functions separately. The PLC used in the system **does not need** safety certification. The PLC output is not part of the safety certification, and the communication to the PLC takes part in the normal, standardized way.



System for safe monitoring without PLC

System for safe monitoring with PLC



Standard robust design

Extremely robust construction in accordance with Leine & Linde standards.

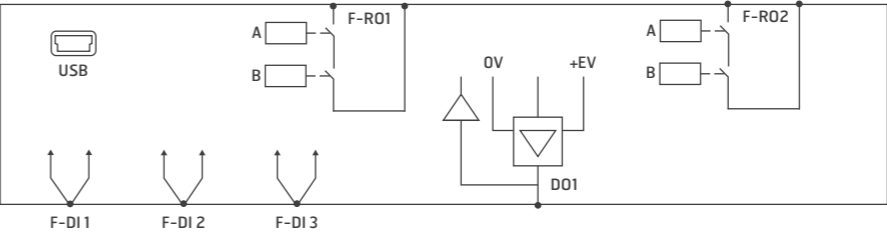
Absolute inductive scanning with safe singleturn and multiturn – ensuring safety even at power off.

Available with 11 mm and 14 mm shaft, or hollow-shaft. Key or keyway for mechanically slipfree installation.

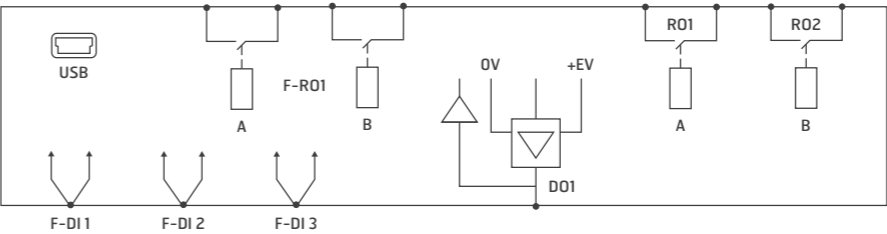
Safety values

MTTF_d > 100 years
PFH = 11,2 x 10⁻⁹ h⁻¹
DC = 95%
Mission time (T_m) = 20 years

FSI 900 - Configuration variants



Interface		Function
USB	Interface to PC program	Monitoring, configuration, diagnostics
F-R01 to F-R02	Failsafe relay outputs 1 and 2	Switches at end positions, acceleration, overspeed and standstill
F-DI1 to F-DI3	Failsafe digital inputs 1 to 3	Confirmation of alerts and errors
DO1	Non-secure digital output	Information on status of encoder functions



Interface		Function
USB	Interface to PC program	Monitoring, configuration, diagnostics
F-R01	Failsafe relay outputs	Switches at end positions, acceleration, overspeed and standstill
R01 to R02	Non-secure relay outputs	Signaling of end positions or acceleration and overspeed
F-DI1 to F-DI3	Failsafe digital inputs 1 to 3	Confirmation of alerts and errors
DO1	Non-secure digital output	Information on status of encoder functions

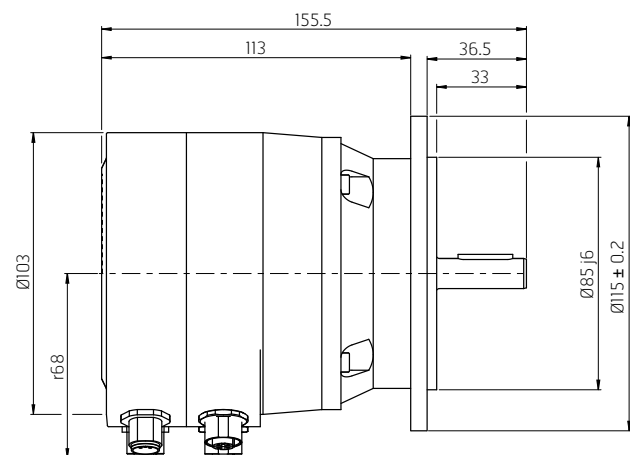
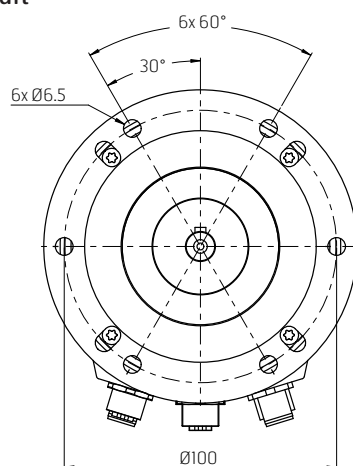
Technical data

FSI 900

Shaft size	Hollow shaft with key way Solid shaft with key
Operating temperature	-30°C...+70°C
Ingress protection class [IEC 60529]	IP67 (IP66 at shaft inlet)
Vibration [IEC 60068-2-6]	10 g RMS, 10-500 Hz
Shock [IEC 60068-2-27]	100 g/11 ms, 200 g/6 ms
Shaft load axial / radial	100 N /200 N
Rotational speed max	5000 rpm
Output interface	PROFINET IRT
Power supply	18-30 Vdc
Connection type	Connector

Dimensions

FSI 900 – Solid shaft



FSI 900 –Hollow shaft

