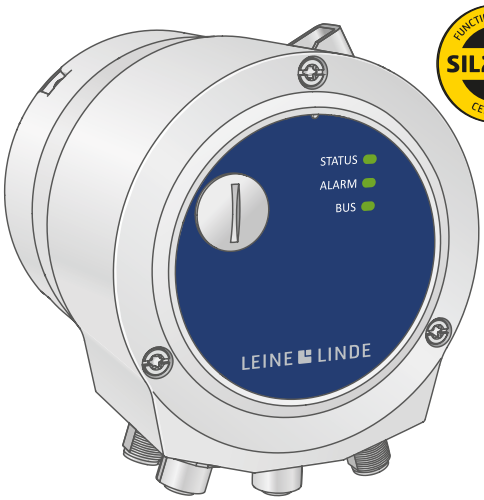
Encoder models

FSI
984, 985, 986, 987



Mounting instructions

LEINE LINDE

I138046-01, ver. 05
I138046-05-A-03

Automation and Metrology International, LLC
1-888-354-2525 | sales@auto-met.com
8808 Tyler Blvd, Mentor, OH 44060 | Request a quote: auto-met.com

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Leine Linde is a Swedish company dedicated to production of encoders for heavy duty applications. Some of the values offered by Leine Linde are local technical support and possibility of 24 hours express delivery.

On our website **www.leinelinde.com** you can find data sheets and other product information.

Configuration software for FSI Monitor is available in the support section at **www.leinelinde.com**







Before installation please read this manual carefully. Failure to follow the instructions and safety regulations can lead to serious injury, considerable damage or death. The English version is the original instruction.



The following models presented in the code keys are fully covered by the mounting instructions.

F S I 9 8 | | | | | | | | | | | | | | |

Model
984 = Two failsafe relay outputs
985 = Two failsafe relay outputs and process data interface
986 = One failsafe relay output
987 = One failsafe relay output and process data interface

Shaft
0 = Hollow shaft Ø20 mm with keyway
1 = Solid shaft Ø11 mm with key nut
4 = Solid shaft Ø14 mm with key nut
5 = Solid taper shaft Ø16 mm with key nut
9 = Customer application adaption

Flange
0 = No torque bracket (hollow shaft)
2 = Torque bracket 120° (hollow shaft)
3 = Torque bracket 330° (hollow shaft)
8 = Euro-flange B10 (solid shaft)
9 = Customer-specific flange

Safety functions
80 = All safety functions
81 = Standstill
82 = End limits
83 = Overspeed
84 = Acceleration
85 = End limits and standstill (not available for FSI 986/987)
86 = End limits, standstill and overspeed (not available for FSI 986/987)
87 = Overspeed and acceleration
88 = Overspeed, acceleration and standstill (not available for FSI 986/987)
89 = Pre-configured safety function
90 = Pre-configured safety function with switch (affecting connector options)

Connection safety functions

I/O electronics	Connection type
3 = Relay outputs and digital inputs	M12 connector

Process data interface

Type	Resolution	Connection type
00 = No Process data interface		1xM12 connector
01 = EnDat 2.1 Singelturn	19 bit	2xM12 connector
02 = EnDat 2.1 multiturn	19 + 12 bit	2xM12 connector
61 = PROFINET singleturn	19 bit	3xM12 connector
62 = PROFINET multiturn	19 + 12 bit	3xM12 connector
93 = RS422 (18-30 V / 5 V)		1xM23 connector 12 pin
94 = RS422 (18-30 V / 5 V)		1xM20 cable gland
95 = HTL (18-30 V / 18-30 V)		1xM23 connector 12 pin
96 = HTL (18-30 V / 18-30 V)		1xM20 cable gland
99 = Customer specific data interface		

Incremental resolution
1-16384 ppr

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1

Safety information

1.1 Intended use

The purpose of the FSI product series is to monitor safety critical parameters and assert relay output to be able to control the machine in a safe way. These parameters can be configured for:

- Standstill
- End limits
- Overspeed
- Acceleration

The safety functions are all configured in FSI Monitor, a PC-software configuration tool provided by Leine & Linde AB.

1.2 Safety functions

The FSI product series can be configured for the following safety functions:

- Assert alarm output if speed and/or acceleration of the application device is outside allowed limits.
- Assert alarm output if position of the application device is outside allowed limits.
- Assert alarm output if the application device is indicating movement (standstill detection).

By using the above functions, the system builder can create the following speed- and position-related safety functions defined in IEC 61800-5-2:2016:

STO – Safe torque off
SS1 – Safe stop 1
SS2 – Safe stop 2
SOS – Safe operating stop
SLA – Safely-limited acceleration
SLS – Safely-limited speed
SLP – Safely-limited position
SLI – Safely-limited increment
SDI – Safe direction
SBC – Safe brake control
SCA – Safe cam
SSM – Safe speed monitoring

1.3 Validation of safety function

Configuration of safety functions is processed in the software provided and sold by Leine & Linde AB. The software, FSI Monitor, generates a validation document for all safety function parameters in the configuration. It is in responsibility of the user to store this document for any further use.

It is also possible to make the configuration with failsafe digital inputs.

It is the responsibility of the user to validate the configuration to the safety application.

Note: The user has full responsibility of the machine when the USB is plugged into the FSI 900 or during configuration with digital inputs.

1.4 Safety metric and targets

EN 62061:2005/A1/A2, IEC 62061:2005/AMD1/AMD2
IEC 61800-5-2:2016
IEC 61508-1:2010/EN 61508-1:2010/SS-EN 61508-1:2011
IEC 61508-2:2010/EN 61508-2:2010/SS-EN 61508-2:2011
- SIL2
- PFH ≤ $1x10^{-7}$ failures/hour
- Route 1_H and 1_S, Systematic Capability (SC2)

EN ISO 13849-1:2015
- MTTFd >1141 years
- PLd, category 3

Safety process time: 130 ms for speed and acceleration, 30 ms for position
Mission time: 20 years
Lifetime bearings (at maximum load): $4,5x10^9$ accumulated turns
Resolutions safety functions: 12+12 bit (single turn + multi turn)

Mounting instruction fulfills the requirements of IEC 61800-5-2.

1

Safety information

1.5 Before installation

To avoid damage to persons and property, only qualified personnel is entitled to work with the encoder. The term qualified personnel refers to persons fully familiar with the application and relevant safety measures.
The qualified person must have profound knowledge of the national accident prevention regulations.
Person responsible of the encoder installation must enable a secure protection of the encoder back cover in order to avoid non-authorized configurations via the USB-port.
After installation and exchange, an acceptance test according to the manufacturer's information of the machine must be performed.

Commissioning is only permitted in strict compliance with relevant directives.

The encoder complies with relevant directives according to DoC. The wiring, connection and functionality in chapter 8 "Electrical mounting" must be strictly followed.

Note: the encoder needs 18-30 Vdc power supply also during the configuration.

Ripple currents through the ball bearings of the encoder are not permissible.

The implementation of the product must be coordinated with the demands of the responsible assessor.
Do not install or operate damaged products. Report damages immediately to the responsible personnel/manager.

Do not clean the encoder with thinners, alcohol or benzine.

Encoders that have contributed to the failure of a safety function in the application must be returned to Leine Linde AB, Strängnäs, together with the fasteners (screws).

Data transmitted via process data interface must not be used for safety functions.

To reduce the risk of wrapping of the multiturn counter only 3/4 of the multiturn area is allowed to be used for safety functions.

1.6 Operating and service

Storage temperature	-30 °C…+85 °C
Operating temperature	-30 °C…+70 °C
Shock [IEC 60068-2-27]	1000 m/s² / 11 ms 2000 m/s² / 6 ms
Axial shaft force	100 N
Radial shaft force	Ø11 mm 100 N
	Ø14 mm 200 N
	Ø20 mm 200 N
	Ø16 mm 200 N
Vibration [IEC 60068-2-64]	100 m/s² 10-500 Hz
Ingress protection	IP66 and IP67
Humidity	Max 95% RH non-condensing
Altitude	Max 3000 m
Weight	Approx. 3700 g
Maximum operating speed	5000 rpm
Maximum angular acceleration	1000 rad/s²
Max magnetic field	300 A/m

FSI product series must always be de-energized before installation and removal, or before disconnecting signal lines. For this purpose all live supply lines to FSI product series must be checked for safe isolation from supply.

The FSI product series requires no service during use and is not repairable. No parts of the encoder are allowed to be replaced.

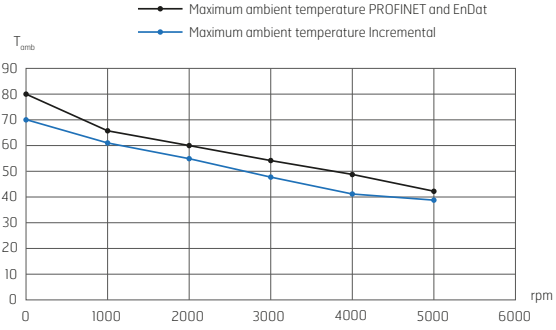
When installing or removing FSI product series appropriate measures must be applied to prevent electrostatic discharge to the externally arranged terminal and plug connections. Contact with such terminals should be reduced to a minimum and earthing should by means of e.g. an earthing strap should take place before and during these procedures. Follow the instructions given in “Risk of bodily injury” and “Risk of damage to the product” to avoid a potential danger situation or damage FSI product series.
The FSI 900 can be mounted and dis-mounted as long as the instructions in this document are fulfilled.

1

Safety information

The proof test interval of FSI 900 product series is one (1) year, and requires test by power cycle.

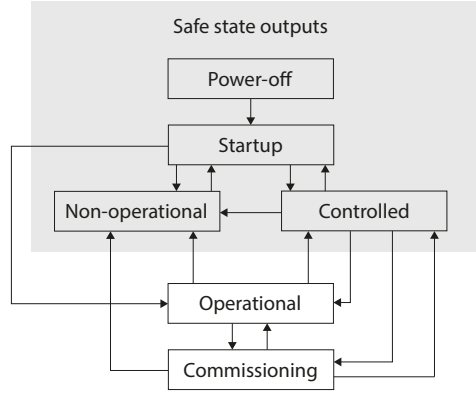
A temperature alarm will place the FSI 900 in safe state if any temperature sensor measures a temperature higher than 85 °C. By subtracting the self-heating, produced from the FSI 900 electronics and the shaft, from the alarm level, it is possible to determine the maximum ambient temperature at different rpm, without the FSI 900 entering safe state.



2.1

The FSI product, operations

This section describes the operation of the unit.



Startup state

In this state the unit performs configuration integrity checks, communication checks, and HW checks. If the checks are OK, the unit enters operational state. In the startup state all alarm outputs have their Safe State value.

Operational state

In operational state the unit checks the configured limit values and activates the appropriate alarm signals.

Controlled state

The unit enters the controlled state if a fault is detected from which the unit may recover without risk. An example would be if the configuration data is erroneous or missing, in which case the unit could enter operational state if the user provides the unit with correct configuration data. In the controlled state all alarm outputs have their Safe State value.

Non-operational state

The unit enters the non-operational state when a serious fault is detected. Overvoltage, overtemperature and FPGA physical configuration CRC error would be examples of causes for entering the non-operational state. The only way to recover from non-operational state is by power cycling. In the non-operational state the unit shall put all alarm outputs to their Safe State value.

Commissioning state

The unit enters commissioning state as a result of a USB command sequence in combination with an active USB power input. In commissioning state a connected PC can, via the USB interface, download configuration parameters, set the end limits and alter the state of the alarm outputs in order to test them.

In case the unit is configured for end limit-set or zero-set with F-DI, commissioning state can also be reached by applying correct pulse or pulses on F-DI.

In this state the operator is responsible of the safe operation.

2.2

The FSI product, safety functions

The FSI product is available in different options depending on the customer's need. The enabled functions in the products are determined by the code key, refer to page 5.

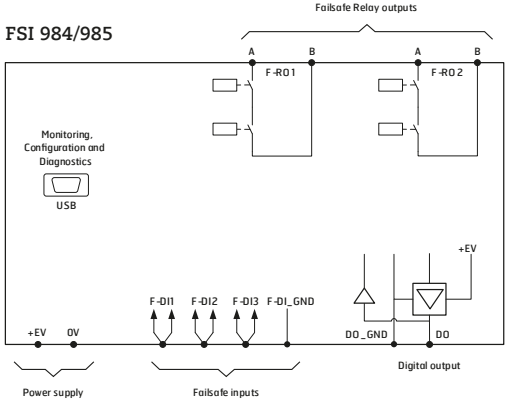
Terminal name	Type	Function/ configuration options
DO	Non-safe digital output 0.2 A	Status output: High level: Safe operation Low level: Alarm active Pulse train output: A pulsed signal to be used as an F-DI feedback signal for contactor monitoring.
RO	Non-safe signal relay output (NO) ≤ 0.2 A Max 30 Vdc	Indicate which safety function triggered the alarm. End limits 1 and 2, or: Overspeed and Acceleration
F-RO	Safe relay (NO) output Category 3 ≤ 0.2 A Max 30 Vdc	Speed limit alarm Position limit alarm Acceleration limit alarm Standstill alarm
F-DI	Safe digital input Category 3 According to EN 61131-2, digital inputs type 2.	Alarm acknowledge: Acknowledge and reset of Alarms and Faults. Speed limit selection: Selection between Safe low or Safe high speed and/or Acceleration End limit-set / End limit-set enable: Adjusting the sensor values to the end limit positions of the application Zero-set / Zero-set enable: Adjusting the sensor value to the application zero-position

The different relay options of the FSI product

The relays are open when the encoder is powered off and during safe state. The following pictures illustrate how relay options are built in within the FSI product.

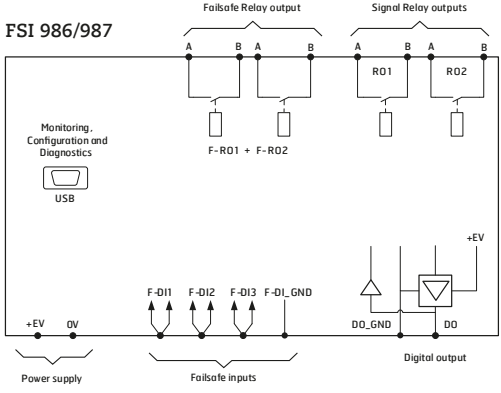
FSI 984 and 985 have two failsafe relay outputs connected in a chain, to achieve category 3 with time-dependent signal

FSI 984/985



FSI 986 and 987 have one failsafe relay output (F-RO1 + F-RO2) and two signal relay outputs (RO1 and RO2). F-RO1 and F-RO2 operate in parallel and both need to be used to achieve category 3..

FSI 986/987



2.2

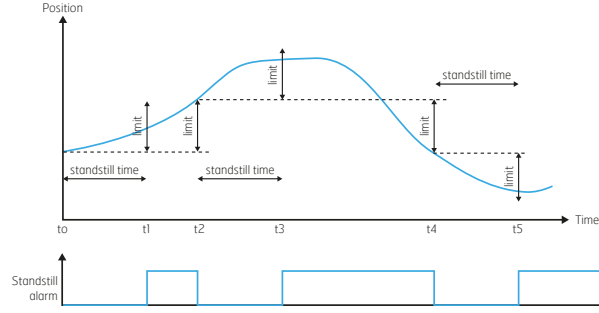
The FSI product, safety functions

Description of the safety functions

A brief description of the safety functions available in the FSI product.

Standstill

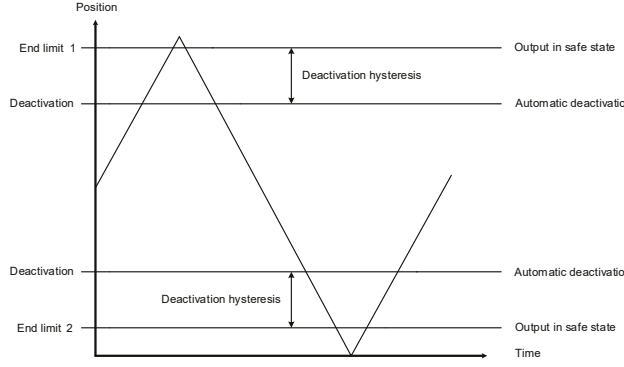
Maximum allowed movement at standstill is monitored to avoid a dangerous movement.



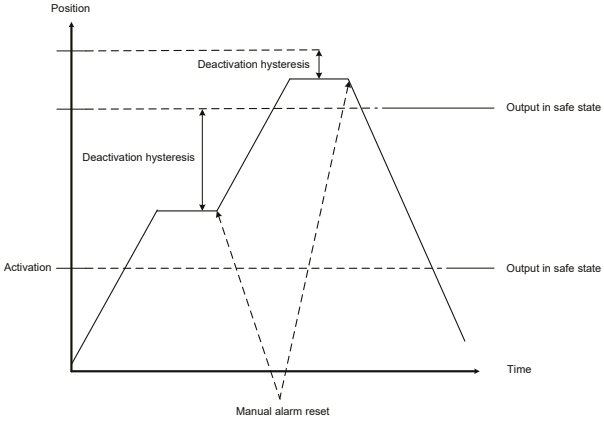
End limits

To ensure only movements within an operating area end limits are configured to specify the allowed range, if outside this range, the alarm activated can be reset either automatically or manually.

Automatic alarm reset

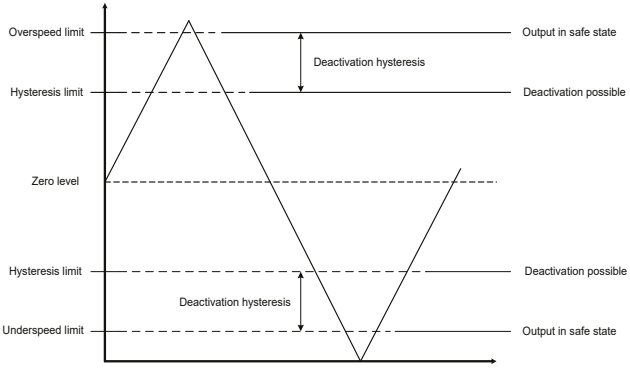


Manual alarm reset



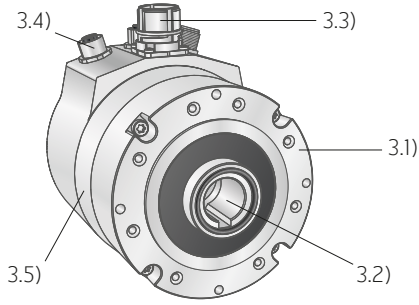
Overspeed and acceleration

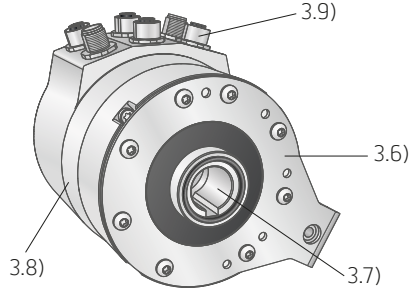
The FSI 900 monitors the speed- and acceleration limits configured by the user. If a limit is reached the alarm will be activated. Alarms for overspeed and acceleration are reset by either a power cycle or a digital input.

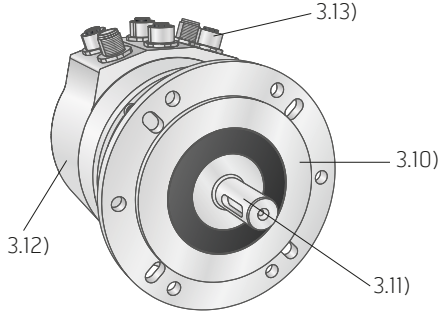


3

Parts of the products







FSI 985/987 Incremental

3.1 Flange
3.2 Hollow shaft
3.3 M23 connector
3.4 M12 connectors
3.5 Terminal cover

For mating flange and shaft, see chapter 9.

FSI 984/985/986/987

3.6 Torque bracket (120° or 330°)
3.7 Hollow shaft
3.8 Terminal cover
3.9 M12 connectors

For torque support and mating shaft, see chapter 9.

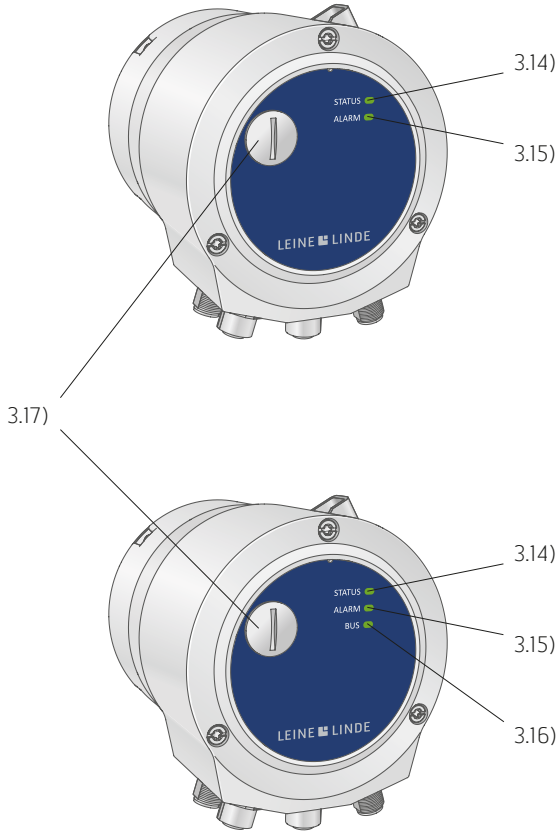
FSI 984/985/986/987

3.10 Euro flange
3.11 Solid shaft (different types)
3.12 Terminal cover
3.13 M12 connectors

For mating flange and coupling, see chapter 9.

3

Parts of the products



3.14 Status LED

LED indication	Description
OFF	No power
GREEN	OK, unit in operational state
Flashing GREEN	OK, unit in commissioning
Flashing RED	Not OK, unit in controlled state
RED	Not OK, system fault, unit in non-operational state

3.15 Alarm LED

LED indication	Description
OFF	No power
GREEN	No alarm
Flashing GREEN	No alarm, test interval reached. The encoder must be subjected to a proof test.
RED	One or more alarm outputs in safe state

3.16 Bus LED PROFINET

LED indication	Description	Cause
OFF	No Power	
GREEN	Data exchange and encoder functions properly	
Flashing* RED	Parameterization fault, no data exchange. Criteria: Data exchange correct, however the encoder did not switch to the data exchange mode.	Slave not configured yet or wrong configuration Wrong station address assigned Actual configuration of the salve differs from the nominal configuration
RED	No connection to another device. Criteria: No data exchange.	Bus disconnected Master not available / switched off

*) The flashing frequency is 0.5 Hz. Minimal indication time is 3 seconds.

3.17 USB Cover

4

Risk of bodily injury

4.1)



4.2)



Important before mounting begins:

4.1 Switch off the power.

4.2 Make sure the machine is at a standstill. The product is to be mounted on a rotating part that can cause bodily injury when in motion.

Note:
By connecting the FSI 900 by the USB port, the user has full responsibility of the machine.

5

Risk of damage to the product

5.1)



5.2)



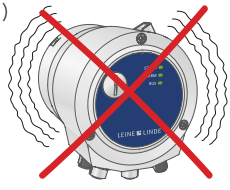
5.3)



5.4)



5.5)



5.6)



5.7)



The product is a precision measuring instrument. It should be handled with care, by experienced personnel. The warnings below apply in the event of effects outside the limit values stated in chapter 1.6.

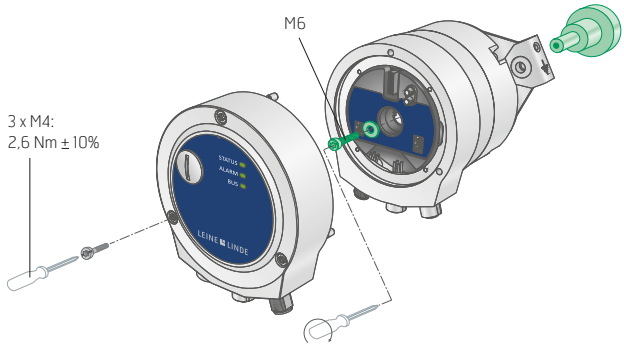
The product may be damaged

5.1 by ESD discharges if the electronics are touched
5.2 if the shaft is exposed to high mechanical forces
5.3 by moisture or chemical fluids (do not install cable pointing upwards)
5.4 if it is exposed to extreme temperatures
5.5 if it is exposed to powerful vibrations or shock
5.6 by short-circuits or an excessively high supply voltage
5.7 by impacts or knocks or other physical damage.

Note:
Do not use a damaged encoder, it is not considered safe.

6.1

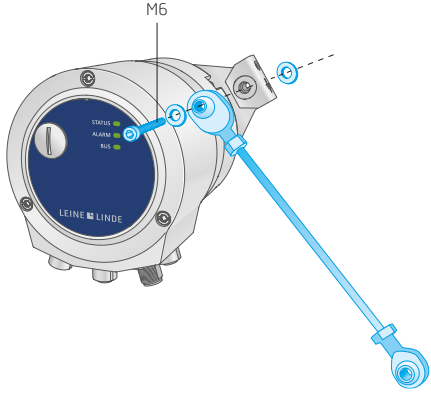
Mounting of hollow shaft



See chapter 9 for mating requirements.

6.2

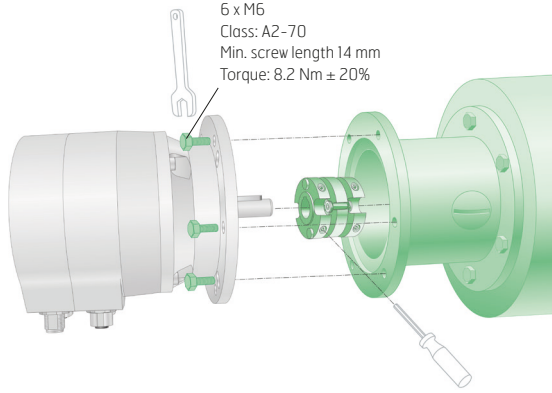
Mounting of torque arm



The torque rod must be dimensioned for a minimum of 180 N (pull/pressure). See chapter 9 for mating requirements. Other torque rods than those supplied by Leine Linde are not within the scope of the certificate.

6.3

Mounting of solid shaft



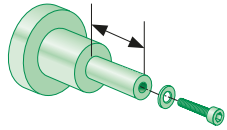
The coupling must be dimensioned for a minimum of 9 Nm. See chapter 9 for mating requirements.

- Part from customer
- Accessories from Leine Linde (to be ordered separately, see page 48)
- Tools for mounting

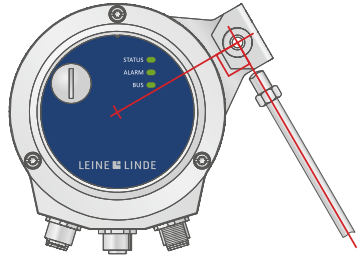
7.1

Check points for mechanical mounting, hollow shaft

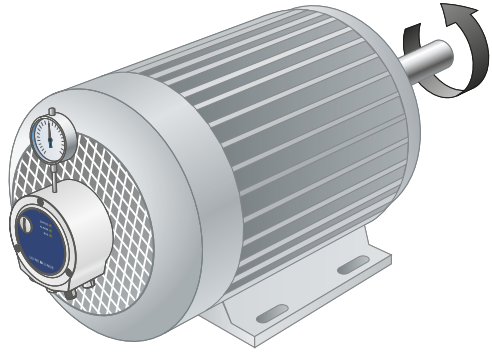
7.1.1)



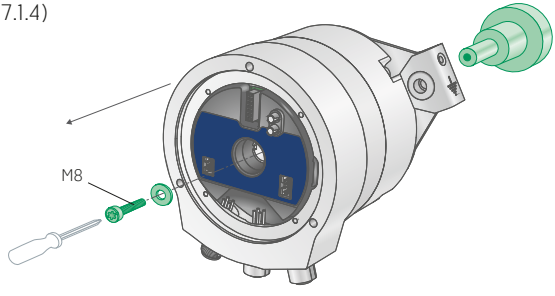
7.1.2)



7.1.3)



7.1.4)

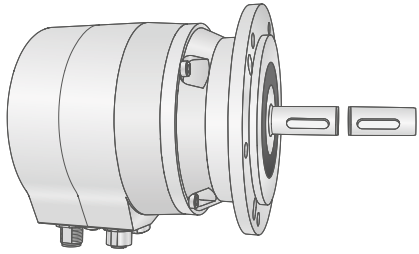


7.1.1 Check that the dimensions of the mating shaft matches the specifications according to the drawing in chapter 9.
7.1.2 See chapter 9 for mating requirements.
7.1.3 Check the encoder's radial runout with slow rotation of complete assembly. The runout should not exceed 0.1 mm, as this may shorten the encoder's service life or influence the system accuracy.
7.1.4 Dismounting; Use M8 screw, if necessary, to detach the encoder.

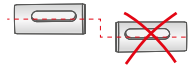
7.2

Check points for mechanical mounting, solid shaft

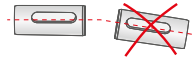
7.2.1)



a)



b)



c)

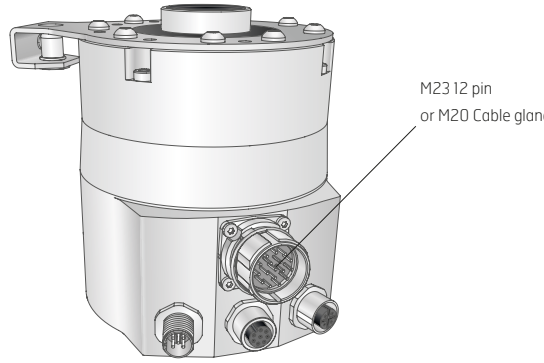


7.2.1 Minimise the displacement between the two mating shafts.
Always try to avoid
a) radial displacement
b) angle displacement
c) axial movement.

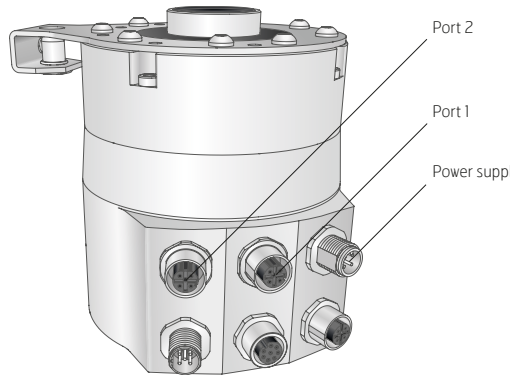
8

Electrical mounting

8.1 Incremental



8.2 PROFINET



Power supply

The FSI 900 must be powered by a PELV system (according to EN 60204-1) supplying at least 2 A, Um=30 Vdc (+E Volt).

8.1 Incremental

PIN	M20 Cable gland	M23 12 pin
1	S00	S90 inv.
2	S00 inv.	
3	S90	Sref
4	S90 inv.	Sref inv.
5	Sref	S00
6	Sref inv.	S00 inv.
7	Alarm +	
8	Alarm -	S90
9	0 Volt	Alarm +
10	+E Volt (18...30Vdc)	0 Volt
11		Alarm -
12		+E Volt (18...30Vdc)
13		

8.2 PROFINET

Cabling for power supply has to be according to PROFINET standards.

Signal	Function	Pin
+E Volt (18-30 Vdc)	Power supply	1
Not connected	-	2
0 Volt	0 Volt	3
Not connected	-	4

The M12 connector used for power supply of the encoder is constituted by a 4-pin male shielded A-coded version. Ensure that the cable's bending radius exceeds the permitted minimum value.

The M12 connector used for PROFINET communication is constituted by two 4-pin female shielded D-coded versions. Ensure that the cable's bending radius exceeds the permitted minimum values.

Signal	Function	Pin
Tx+	Transmission data +	1
Tx-	Transmission data -	3
Rx+	Receiver data +	2
Rx-	Receiver data -	4

For more information about PROFINET communication supported by Leine Linde encoders, refer to "PROFINET Gateways & Encoders Manual / User Guide".

8

Electrical mounting

8.3 EnDat



8.3 EnDat

A wide range of fieldbus interfaces are accessible by using the EnDat interface together with a Leine Linde CRG (Compact Robust Gateway). Cabling for power supply has to be according to EnDat standards.

For more information about the communication interface, refer to the corresponding Gateway manual.

Signal	Function	Pin
+E Volt (18-30 Vdc)	Power supply	1
Not connected	-	2
0 Volt	0 Volt	3
Not connected	-	4

The M12 connector used for power supply of the encoder is constituted by a 4-pin male shielded A-coded version. Ensure that the cable's bending radius exceeds the permitted minimum value.

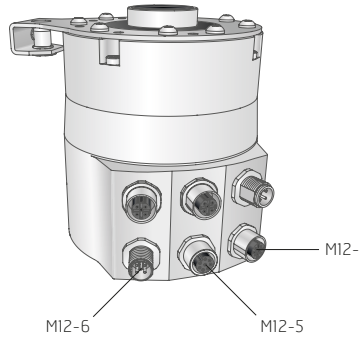
Function	Pin
0 Volt sense	1
+5 Volt sense	2
Data	3
Data inverted	4
0 Volt	5
Clock inverted	6
Clock	7
+5 Volt	8

The M12 connector used for EnDat 2.1 communication between the encoder and the Gateway is an 8-pin male shielded A-coded version. Ensure that the cable's bending radius exceeds the permitted minimum values.

8

Electrical mounting

8.4 Connection Safety function



8.4 Connection Safety function

Functions for FSI 984/985 with 2 failsafe relay outputs and 1 digital output	Pin
M12–4: 5pM12 female B-coded, shielded	
F-RO1 – A	1
DO	2
F-RO2 – A	3
DO_GND	4
M12–5: 5pM12 female B-coded, shielded	
F-RO1 – B	1
F-RO2 – B	3
M12–6: 5pM12 male B-coded, shielded	
F-DI1	1
F-DI2	2
F-DI3	3
F-DI_GND	4

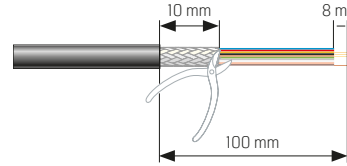
Functions for FSI 986/987 with 1 failsafe relay output (two failsafe relays in parallel), 1 digital output and 2 signal relay outputs	Pin
M12–4: 5pM12 female B-coded, shielded	
F-RO1 – A	1
DO	2
F-RO2 - A	3
DO_GND	4
M12–5: 8pM12 female A-coded, shielded	
F-RO1 – B	1
F-RO2 – B	3
RO1 - A	4
RO1 - B	5
RO2 - A	6
RO2 - B	7
M12–6: 5pM12 male B-coded, shielded	
F-DI1	1
F-DI2	2
F-DI3	3
F-DI_GND	4

Note: Both F-RO1 and F-RO2 need to be connected to achieve category 3.

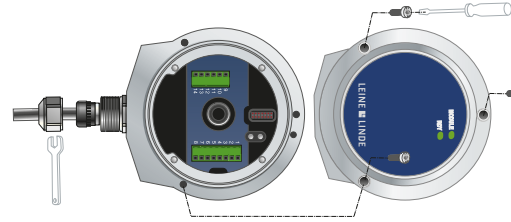
8

Electrical mounting

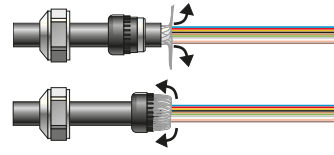
1)



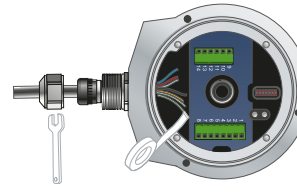
2)



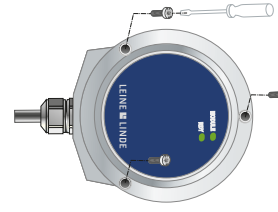
3)



4)



5)



Fit cable*, using the following steps:

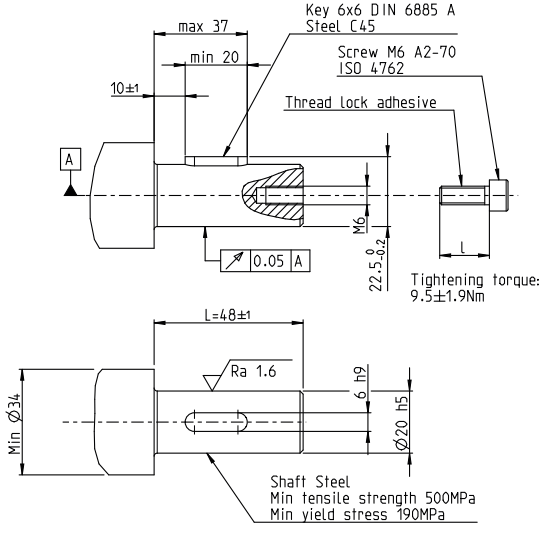
Step 1. Strip the cable according to the dimensions in the illustration.
Step 2. Open the terminal cover and unscrew the cable bushing.
Step 3. Fold the cable shield backwards over the shell ring.
Step 4. Connect the wires according to the product label. Insulate any wire that is not being used.Tighten all terminal screws (including any unused ones). Tighten the cable bushing.
Step 5. Close the terminal cover and fasten the screws. See required torque, chapter 6.1.

* Does not apply to models with connector.

9

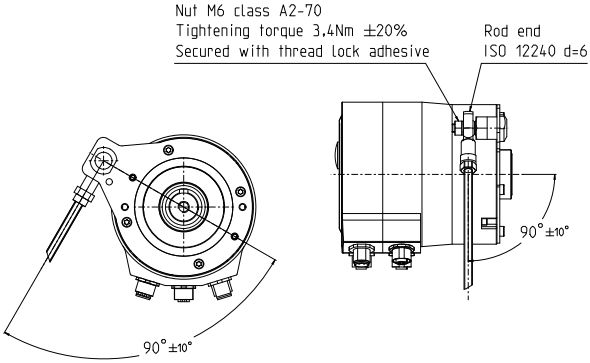
Mating shaft drawing

Shaft interface Hollow shaft Ø20 mm with keyway

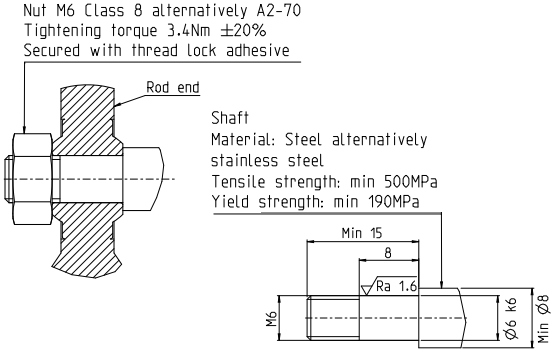


Shaft length L [mm]	Min screw length L [mm]
47	17
48	16
49	15

Torque bracket



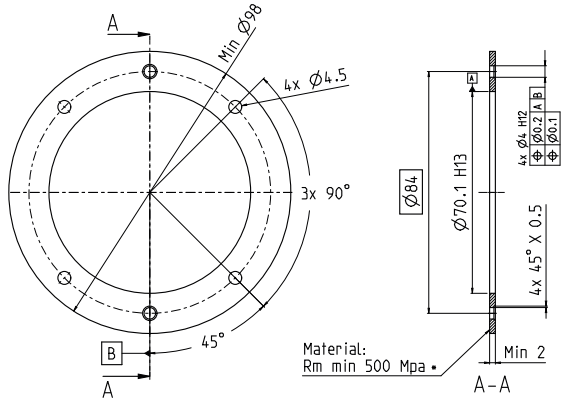
Torque rod

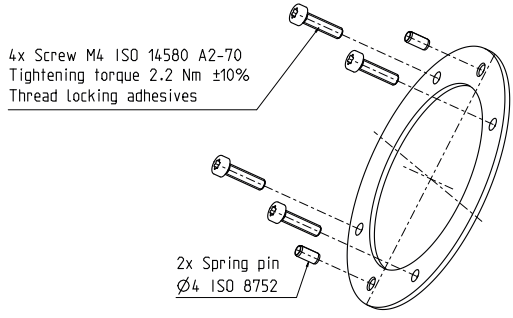


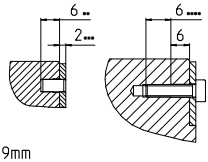
9

Mating shaft drawing

Standard flange

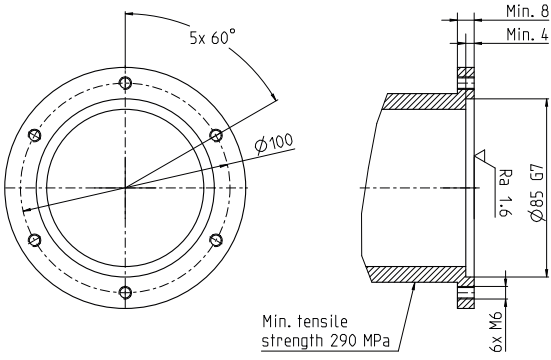






* Rm = Tensile strength
** Press fit engagement length 6mm
*** Min press fit engagement length 2mm
**** Min tread engagement length 6mm, max 9mm

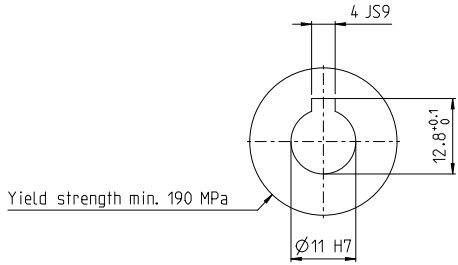
Mating for euro flange



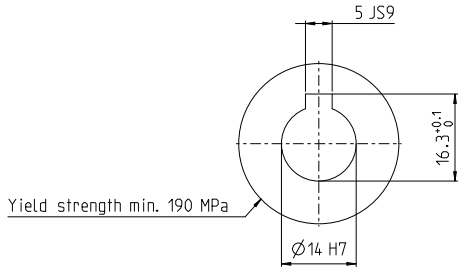
9

Mating shaft drawing

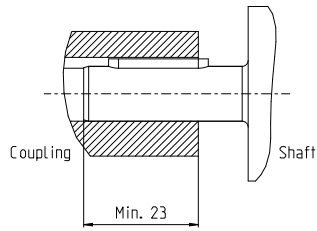
Shaft interface solid shaft Ø11 mm with key nut



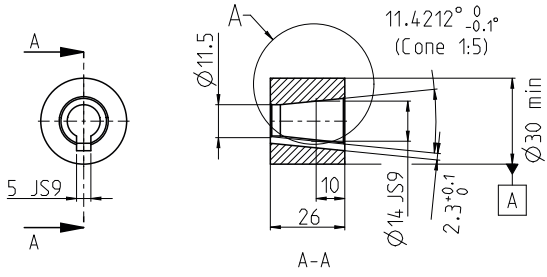
Shaft interface solid shaft Ø 14 mm with key nut

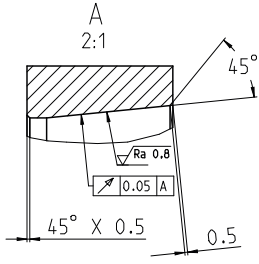


Shaft engagement in coupling



Shaft interface solid taper shaft Ø 16 mm with key nut

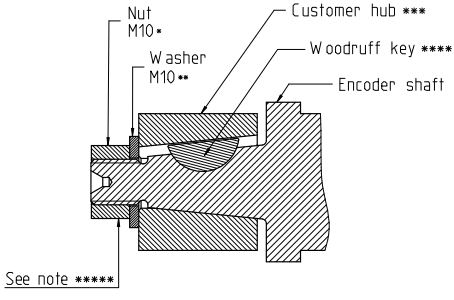




* Nut M10 ISO 4032 A2-70.
** Washer M10 DIN EN ISO 7089, hardness class 140 HV.
*** Customer hub, Rm min 500 Mpa.
**** Woodruff key 5x6.5 ISO 3912.
***** Tightening torque 12.3 ± 1.3 Nm, nut thread secured with locking adhesive.

Rm = Tensile strength.

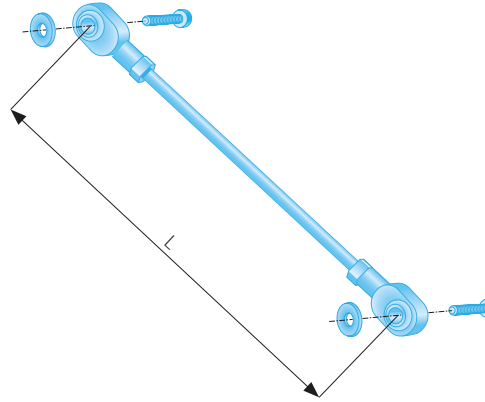
Ra 1.6 (Ra 0.8)



10

Accessories

10.1)



10.1 Torque arm **M6**
Part number 1205170, specify length (min 70 mm, max 500 mm) when ordering.

11

Certificates and approvals

11.1)



11.2)



11.3)



Leine Linde products conform to several standards and approvals. Certificates and documentation may be provided upon request to your local Leine Linde representative.

11.1 **UL/CSA standards, type approval**
Most Leine Linde products have been type tested in accordance with IEC 61010. The product box label states if the product conforms to the standard. When the product is to be operated in accordance with IEC 61010-1, the power must be supplied from an isolated secondary circuit with current or energy or power limitation as per IEC 61010-1, IEC 60950-1, or by a class 2 secondary circuit as specified in UL 1310.

11.2 **CE marking and Declaration of conformity**
The encoder conforms to the protection requirements of Council Directive 2014/30/EU related to EMC. The product box label states conformity. The encoder conforms to the Machinery Directive 2006/42/EC.

11.3 **SIL2/PLd information**
EN ISO 13849-1:2015
IEC 61800-5-2:2016
IEC 61508-1:2010/EN 61508-1:2010/SS-EN 61508-1:2011
IEC 61508-2:2010/EN 61508-2:2010/SS-EN 61508-2:2011
EN IEC 62061:2021

ZERTIFIKAT ◆ CERTIFICATE ◆ 证书 ◆ CEPTИФИКАТ ◆ CERTIFICADO ◆ CERTIFICAT

EC-Attestation

No. D1 038896 0022 Rev. 00

Holder of Certificate:	**Leine & Linde AB** Olivehällsvägen 8 645 42 Strängnäs SWEDEN
Product:	**Safety components** **Motion Monitoring Unit**
Model(s):	**FSI9xx**
Parameters:	Motion monitoring unit for safety-critical parameters with safe relay output. Safety functions: Standstill/End limits/Overspeed/Acceleration. Safety assessment of mechanics included. The certified components are listed in the report LS90347C in the current valid revision.
Directives / Standards:	2006/42/EC IEC 61508-1:2010 (SIL 2) IEC 61508-2:2010 (SIL 2) EN ISO 13849-1:2015 (Cat. 3, PL d) IEC 61800-5-2:2016 (SIL 2) EN IEC 62061:2021 (maximum SIL 2)

This EC-Attestation is issued according to the listed directives. It confirms that the equipment complies with the essential requirements and objectives of those directives and refers only to the sample provided for testing and certification. It expires in the event of changes relating to products of the listed directives. The certificate holder is responsible for the consistent manufacturing of the product in compliance with the test sample submitted to us. For details see: www.tuvsud.com/ps-cert

Test report no.: LS90347C

Date, 2021-11-02

(Christian Dirmeier)

Page 1 of 1

After preparation of the necessary technical documentation as well as the EC conformity declaration the required CE marking can be affixed on the product. Other relevant directives have to be observed.

TÜV SÜD Product Service GmbH • Certification Body • Ridlerstraße 65 • 80339 Munich • Germany

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Declaration of conformity

LEINE LINDE

EU Declaration of Conformity

Leine&Linde AB
Olivehällsvägen 8
SE-645 42 Strängnäs
SWEDEN
T +46-(0)152-265 00
F +4 6 -(0)152-26505

FSI 9XX series encoders

We herewith declare that the above mentioned products are in conformity with the provision of the following directives of the European Commission:

EMC Directive 2014/30/EU

Machinery Directive 2006/42/EC

RoHS 2 Directive 2011/65/EU with amendment 2015/863/EU

The equipment complies with the directives by meeting the following harmonized standards:

EN 61000-6-2:2005 Generic immunity standard: Industrial environment

EN 61000-6-4:2007/A1:2011 Generic emission standard: Industrial environment

EN 61326-3-1:2017 Immunity requirements for safety-related systems and for equipment intended to perform safety-related functions (functional safety)

EN ISO 13849-1:2015 (Cat. 3, PL d) Safety of Machinery – Safety-related parts of control systems, Part 1: General principles for design

IEC 61508-1:2010 (SIL 2) Functional safety of electrical/electronic/programmable electronic safety-related systems, Part 1: General requirements

IEC 61508-2:2010 (SIL 2) Functional safety of electrical/electronic/programmable electronic safety-related systems, Part 2: Requirements for electrical/electronic/programmable electronic safety-related systems

IEC 61800-5-2:2016 (SIL 2) Adjustable speed and electrical power drive systems – Part 5-2: Safety requirements – Functional

EN IEC 62061:2021(maximum SIL 2) Safety of machinery – Functional safety of safety-related electrical, electronic and programmable electronic control systems

EN IEC 63000:2018 Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances

EC-Attestation No. D1 038896 0022 Rev. 00

Strängnäs, 3 Dec 2021

Lars-Albert Ahlström
R&D Manager

These certificate documents can be downloaded from **www.leinelinde.com**.

Products from Leine Linde are usually components in larger systems. These applications require the system as a whole to be tested, and do not depend on the component specifications only.

Instructions in these mounting instructions apply to products from Leine Linde, not for the system as a whole. If products are used in a way for which they are not intended, this is at the user's own risk.

Specifications in this document can be changed without prior notice.



This product is to be disposed of separately.



Montageanleitungen auf weiteren Sprachen sind auf Anfrage erhältlich.
Bitte kontaktieren Sie **info@leinelinde.com**



根据要求可提供其他语言版本的安装说明。
请联系 **info@leinelinde.com**



Monteringsanvisningar på ytterligare språk finns tillgängliga på förfrågan.
Var vänlig kontakta **info@leinelinde.com**



Hay instrucciones de montaje en otros idiomas disponibles a petición del cliente.
Póngase en contacto **info@leinelinde.com**



Инструкции по установке на других языках предоставляются по запросу.
Электронная почта для отправки запроса **info@leinelinde.com**

DECEMBER 2023

Automation and Metrology International, LLC
1-888-354-2525
auto-met.com