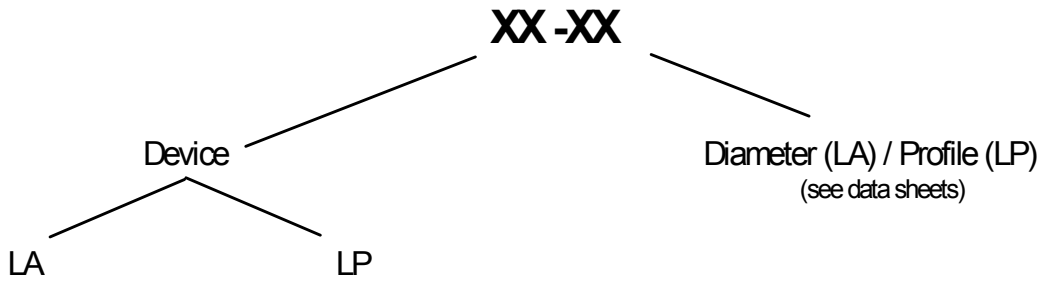
Linear-absolute position sensors 7

7 Linear-absolute position sensors

7.1 Explanatory notes

The various types of linear-absolute position sensors belonging to the series described in this section all comply with the mechanical, electrical and connection specifications of the TR standard.
The TR encoders also offer a variety of customization options, however (please consult the sales department for versions differing from the data sheets). Possible adaptation options are shown in subsection "Alternative designs", page 7-10.

Series definition



Device

LA: Linear-absolute position sensor
Linear-absolute position measuring system for measuring lengths of up to a maximum of 3000 mm (> 3000 mm on request). If the position sensor (ring magnet) is moved mechanically in the de-energized state, the current position is available as soon as the supply voltage is switched on again. The LA system is a contactless, non-wearing system, and the position sensor is a permanent magnet which requires no voltage supply, so that there is no need for a trailing cable installation.

LP: Linear-absolute position sensor in edgewise instrument case
Linear-absolute position measuring system for measuring lengths of up to a maximum of 3000 mm (> 3000 mm on request). In the LP position sensor, the measuring path is protected inside an aluminium extruded case. If the position sensor (ring magnet) is moved mechanically in the de-energized state, the current position is available as soon as the supply voltage is switched on again. The LP system is a contactless, non-wearing system, and the position sensor is a permanent magnet which requires no voltage supply, so that there is no need for a trailing cable installation. For easier assembly of the position sensor, the LP can be supplied with a measuring slide. In this case, the guiding or distance of the position sensor from the instrument case is adjusted by the measuring slide, on which a simple driver is mounted.

7.2 Functional description

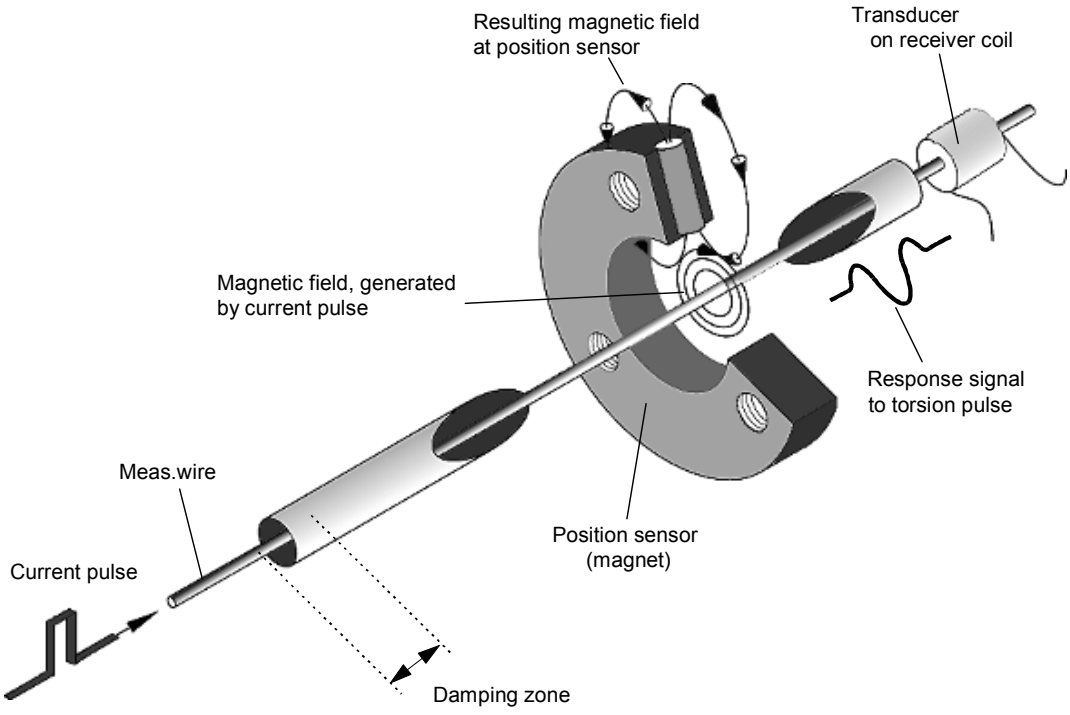
The measuring principle is based on a transit time measurement (ultrasonic). The ultrasonic transit time is path-proportional and is evaluated in an electronic system. Clamped inside a protective tube is a magnetostrictive wire is through which current pulses are transmitted, thus generating a ring-shaped magnetic field around the wire.

The position sensor function is performed by a contactless magnet system whose magnetic field affects the measuring wire (conductor). The second ring-shaped magnetic field generated by current pulses forms a magnetostriction at the measuring station due to the existence of two differently oriented magnetic fields.

The ultrasonic signals thus produced are propagated in both directions from the position sensor. The ultrasonic signal is recorded via a transducer in the sensor head and converted to an electrical pulse. The ultrasonic waves moving towards the end of the bar are absorbed in the damping zone.

The time lag between the emission of the current pulse and the arrival of the torsional pulse is converted to path information by the measuring electronics and supplied at the output as a digital or analog signal.

Sketch:



7.3 Applications

Linear movements are recorded directly and converted to electrical information which can be fed to subsequent units such as displays, controllers and computers for further processing.

Different interface modules allow connection to interfaces for standard PLC or NC controllers or industrial PCs.

The pressure-resistant design of the LA systems allows it to be installed directly in hydraulic cylinders, whereby the measuring rod reaches a compressive strength of 600 bar (tested by German Technical Inspectorate).

In general, LA/LP absolute position sensors can also be used in tough environmental conditions including corrosive media, dust, concrete, pressure, splash water and cooling water.

Examples of typical applications of linear absolute position sensors:

- Hydraulic presses
- Machine tools or transfer machines
- Handling systems
- Die-casting machines
- Foundries
- Woodworking machines
- Roll stands and straightening plants
- Packaging machines
- Filling level detection for foodstuffs and hose water
- etc.

7.3.1 Notes on applications with LA-80 system

The linear-absolute position sensor LA-80 is specially designed for use with chemically corrosive media or in electroplating shops. In order to ensure a high media resistance, the measuring system is made of polypropylene plastic (PP). However, the properties of this plastic undergo different changes depending on the substances in which they are used. The following tables show how the plastic reacts to different substances.

Media resistance	Key		
	+	Swelling Weight loss Elongation at break unchanged	< 3% < 0.5%
	/	Swelling Weight loss Elongation at break	3-8% 0.5-5% < 50%
	-	Swelling Weight loss Elongation at break	> 8% > 5% > 50%
	V *	Discoloration Boiling temperature	

Substance	Concentration	Behavior of PP at		
		20°C	60°C	100°C
Sulphur dioxide, dry and damp	Any	+	+	
Sulphur dioxide, aqueous	Any	+	+	
Carbon bisulphide		/		
Sodium sulphide, aqueous	Any	+	+	
Sulphuric acid, aqueous	Up to 50%	+	+	
Sulphuric acid, aqueous	70%	+	/	
Sulphuric acid, aqueous	80%	+	/	
Sulphuric acid, aqueous	98%	/	-	
Sulphur trioxide		-		
Hydrogen sulphide, dry	100%	+	+	
Hydrogen sulphide, aqueous	Saturated	+	+	
Sulphurous acid		+	+	
Seawater		+	+	+
Soap solution, aqueous	Any	+	+	
Mustard		+		
Silver nitrate		+	+	
Silver nitrate, aqueous	Any	+	+	+
Silver salts, aqueous	Cold saturated	+	+	
Silicon oil	Technically pure	+	+	+
Soda, aqueous	Any	+	+	
Soya bean oil		+	/	
Spindle oil		+	-	
Spirits		+		
Detergent	Normal	+	+	
Starch, aqueous	Up to 100%	+	+	
Starch syrup		+	+	
Stearic acid		+	/	
Coal tar oil		+V		
Styrene		/	-	
Sulphates, aqueous solutions	Any	+	+	
Sulphuryl chloride		-		
Tallow	Technically pure	+	+	
Turpentine oil	Technically pure	-		
White spirit	Technically pure	/	-	
Tetrabromethane		/ to -		
Tetrachlorethane		/	-	
Tetrachlorethylene		/	-	

Substance	Concentration	Behavior of PP at		
		20°C	60°C	100°C
Calcium chloride, aqueous	Any	+	+	+
Calcium hydroxide		+	+	
Calcium hypochlorite, aqueous (suspension)	Any	+	+	
Calcium nitrate, aqueous	50%	+	+	
Calcium oxide (powder)		+	+	
Calcium phosphate		+	+	
Calcium sulphate		+	+	
Camphor		+		
Camphor oil		-		
Carbolic acid		+	+V	
Cetylic alcohol (hexadecanol)		+		
Quinine		+	+	
Chlorine, gaseous, dry		-		
Chlorine, gaseous, damp		-		
Chlorine, liquid		-		
Chloroethanol	Technically pure	+	+V	
Chloral hydrate, aqueous	Any			
Chlorobenzene				
Chlorinated bleaching lime with 12.5% active chlorine		/	/	-
Chloracetic acid (mono), aqueous	Any	+	+	
Chlorinated lime		+	+	
Chloromethane, gaseous	Technically pure	/	-	
Chloroform	Technically pure	/	-	
Chlorosulphonic acid		-		
Hydrogen chloride		/	-	
Hydrochloric gas, dry and damp		+	+	
Chrome alum, aqueous	Any	+	+	
Chrome anode slime		+		
Chromic acid, aqueous	50%	/V	/V	
Chromic salts, aqueous	Any	+	+	
Chromic-sulphuric acid mixture		-		
Chromium trioxide, aqueous	50%	/V	/V	
Citrus juices		+	+	
Brandy		+		
Cola concentrate		+	+	

7.4 Assembly instructions

General

Before mounting LA position sensors, make sure there are no strong magnetic and electric interference fields in the vicinity.

Non-permissible interference fields may impair the measuring accuracy. ***The field strength in the vicinity of the measuring rod must not exceed 3 mT.***

Mechanics of LA system

The measured value is fed contactlessly to the sensor rod via the magnetic field of the position sensor. The precision of the measured values depends, among other factors, on the symmetry of the magnetic field geometry. As far as the mechanical components are concerned, this means that the position sensor must be mounted centrally in relation to the rod, and must be guided exactly parallel in the axial direction.

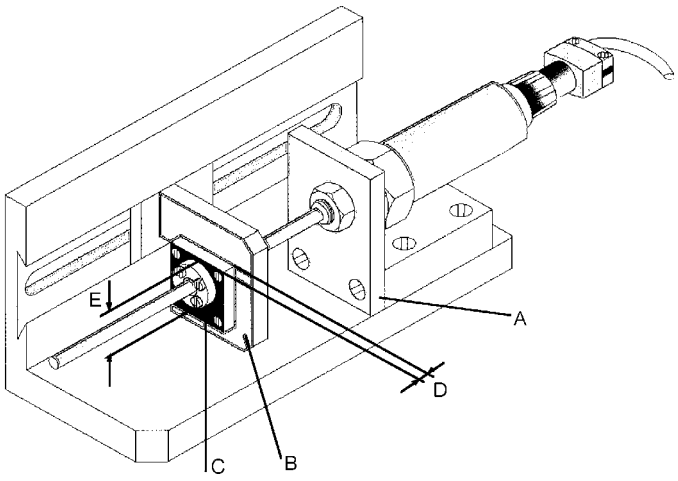
Mechanics of LP system

The position sensor is relatively easy to mount, as it does not require a mechanical guide. The optimal anti-friction properties of the measuring slide are complemented by the contactless scanning of the measuring position. To avoid additional wear on the slideways of the measuring slide, the tolerance values (angular and parallel displacement) must be maintained.
The precision of the measured values depends, among other factors, on the symmetry of the magnetic field geometry. In the case of LP systems without a measuring slide, this means that the position sensor of the measuring system has to be guided precisely, axially and vertically parallel. The maximum distance of 4 mm between the position sensor and instrument case must not be exceeded.

Important points to note when assembling the position sensor:

- Do not open
- Do not knock or tap
- Do not drill or weld
- Do not bend sensor rod

Assembly diagram, LA system



A Mounting device for linear-absolute position sensor

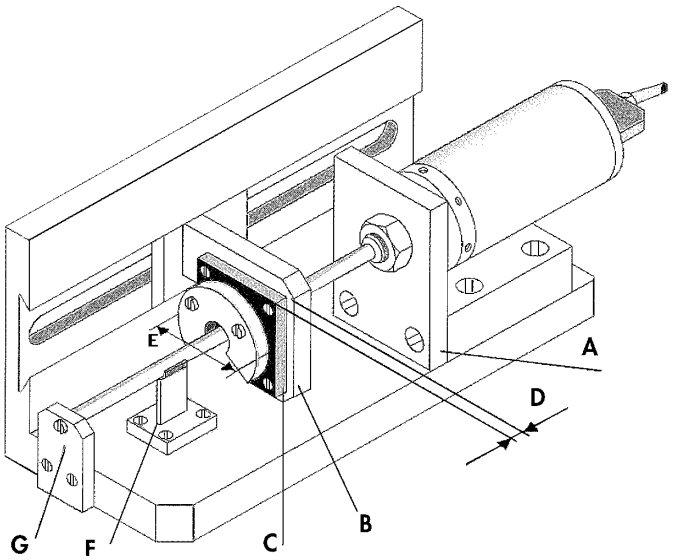
B Slide

C Position sensor spacer

D If A and B consist of magnetic materials, a 10 mm thick spacer C made of non-magnetic material must be provided.

E If the position sensor is installed in magnetic materials, a distance of > 3 mm must be maintained all the way round.
The position sensor must be fastened with screws made of non-magnetic materials (e.g. brass, aluminium, plastic, etc.).

This data also applies to the alternative position sensor LP-38 without a measuring slide!



F Recommended rod support for rod lengths > 1.5 m (suggested rod support)

G Rod tip mounting arrangement
Mounting options F + G if required

7.5 Alternative designs

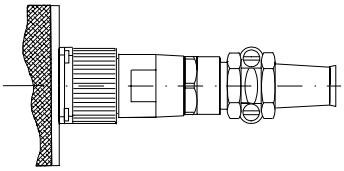
Connecting equipment

The TR position sensors can be supplied with various plug or cable outlets. It is advisable to use a plug if the wiring and sensor assembly are to be performed at different times or if a sensor needs to be replaced quickly and easily. On the sensor side, you will normally find a flanged plug (pins); to connect this, you will need a coupling or cable socket into which to plug the cable or control unit. Specifications and details of plug types are available on request.

Examples

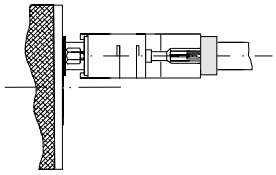
LA-66 - P/NSW

26 Pin Round Connector



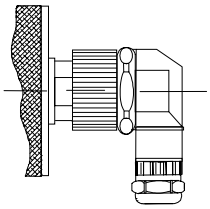
LA-66 - P/NSW

25 PIN SUB-D



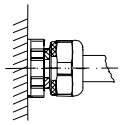
LA-66 / LP-38

12 Pin Round Connector (bended)



LA-66 / LA-41 / LP-38

Cable Gland, axial



Electrical

The sensor types can be supplied with different electrical properties in order to adapt them to the servo electronics.

Note

You should check with the sales department to make sure the adaptation options listed below are suitable for your specific position sensor type.

Output circuits

- Push-pull
- Push-pull with tristate
- Open collector
- Open emitter
- TTL
- Cable driver

Encoder with integrated heating and thermostat

- Extended temperature range

Special inputs and outputs

- On request

Special designs

- On request

Linear-Encoder LA-41-K A

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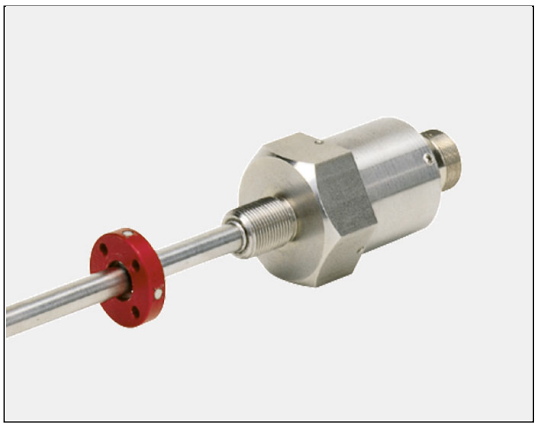

- **High Pressure Type, Makes it Possible for Installation into Hydraulic Cylinders**
- **For Linear Measurement**
- **Non Contact and Wear Free**
- **Adjustment via set-inputs**
- **Analog Interface**
- **Housing length: 66 mm**

Electrical Data

Measurement Principle	Magnetostrictive
Measuring Length (Stroke) Standard (mm)	150, 300, 500, 700, 750, 1000, 1500, 2000, 2500, 3000
	> 3000 by request
Resolution	max. 0.1 mm
Operating Voltage	24 V DC ± 10 %
Power Dissipation (No Load)	< 4 Watt
Analog Voltage Interface	0 - 10 V, 10 - 0 V, ±5 V, ±10 V
Impedance	min. 680 Ω
Analog Current Interface	0 - 20 mA, 4 - 20 mA
Impedance	max. 500 Ω
Cycle Time	See Dimensional Drawing
Data Transmission Length	
Dependent on Shield Design	max. 10 m for Analog Voltage Interface,
	max. 1000 m for Analog Current Interface
Inputs	
Zero Set	For setting the start point of the analog signal
Span Set	For setting the end point of the analog signal
Logic Levels	"0" < + 2 V DC, "1" > + 8 V DC, max. 30 V DC
Pin Configuration	Upon request

Environmental Data

Electromagnetic compatibility (EMC)	EN 61000-4-2 (IEC-801-2) / EN 61000-4-4 (IEC-801-4)
Operating Temperature	0°-70°C (32° to 158° F) (Optional -20° to +70°C) (-4° to 158° F)
Storage Temperature	-30° to +80°C (-22° to 178° F)
Relative Humidity	98 % (non condensing)
*Protection Class	IP 65 (DIN 40 050)

* The protection class of the sensor can be effected by the type of connector used.

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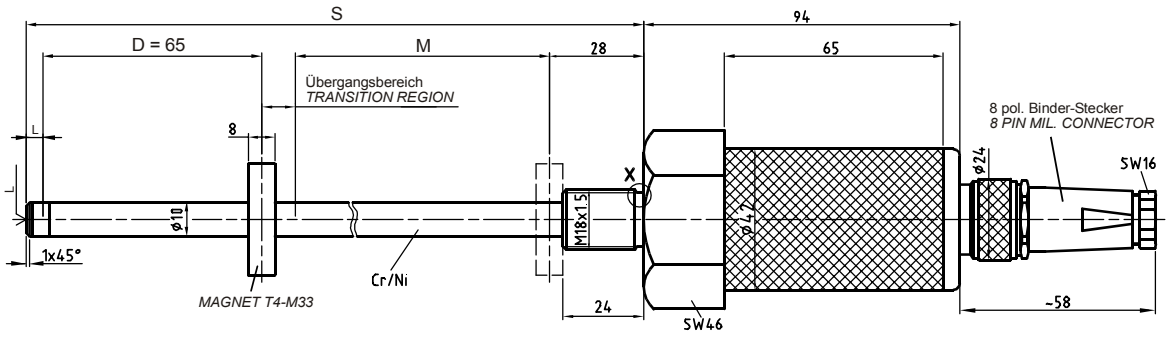
Linear-Encoder LA-41-K A

Mechanical Data

Linearity	< 0.05 % of Stroke Length
Reproducibility	≤ 0,01 mm
Hysteresis	< 0.1 mm
Temperature Coefficient	< 5 µm / °C
Vibration (Sinus 50-2000 Hz) according to DIN IEC 68-2-6	≤ 100 m/s² (10g)
Shock (11ms) according to DIN IEC 68-2-27	≤ 1000 m/s² (100g)
Pressure Resistance (Option)	600 bar static
Rod Material	Cr/Ni-alloy
Magnetic Interference (at rod circumference)	< 3 mT (milli Tesla)
Operating Speed and Mounting Orientation	No restrictions
Magnet Type (Standard)	T4-M33
Magnet Type (Option)	T3-U64
Rod Mounting	Option
Mechanical Special Types	Upon Request
Connector	8 pin MIL-Connector

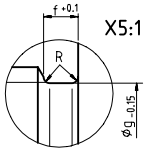
Dimensional Drawing



S = Stablänge
D = Dämpfungszone: Keine Herstellergarantie für die Meßdaten
M = Meßlänge: Typenbezogener Meßweg
L = 5 mm Zusatzlänge mit M4x5 bei Option Stabspitzenlagerung

S = TOTAL LENGTH
D = DAMPENING ZONE: IN THIS AREA NO MEASURING SIGNAL IS PRODUCED
M = STROKE LENGTH
L = 5 MM ADDITIONAL LENGTH WITH M4x5 FOR OPTION ROD MOUNTING

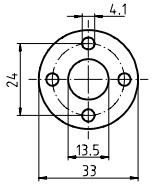
Einzelheit "X"
DETAIL "X"



Maße entsprechen Einschraubzapfen DIN 3852-F
DIMENSIONED TO DIN 3852-F

G	*f*	*g*	*R*	*O-RING*
M18x1.5	*2.3*	*15.9*	*0.4*	*15.4x2.1*

MAGNET T4-M33



Meßlänge M (mm) *STROKE LENGTH M (mm)*	Stablänge S (mm) *TOTAL LENGTH S (MM)*	Zykluszeit (ms) *CYCLE (ms)*	Auflösung (mm) *RESOLUTION (MM)*
150	250	0,5	0,1
300	400	0,5	0,1
500	600	0,5	0,12
700	800	1	0,17
750	850	1	0,18
1000	1100	1	0,25
1500	1600	2	0,37
2000	2100	2	0,5
2500	2600	2	0,6
3000	3100	2	0,75

Linear-Encoder LA-41-K SS

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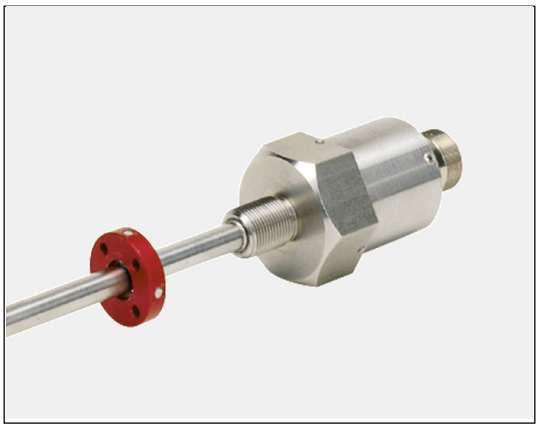

- **High Pressure Type, Makes it Possible for Installation into Hydraulic Cylinders**
- **For Linear Measurement**
- **Non Contact and Wear Free**
- **Start / Stop Interface**
- **Housing length: 66 mm**

Electrical Data

Measurement Principle	Magnetostrictive
Measuring Length (Stroke) Standard (mm)	150, 300, 500, 700, 750, 1000, 1500, 2000, 2500, 3000, > 3000 by request
Resolution	Dependent on external electronics
Operating Voltage	
TTL-Version	15-27 V DC, Power Dissipation (No Load) < 1.5 Watt
TTL-Version	± 15 V DC, Power Dissipation (No Load) < 1.5 Watt
RS422-Version	24 V DC, Power Dissipation (No Load) < 1.5 Watt
Start / Stop Interface	Start / Stop-Signal for external electronics
Data Transmission Length	max. 15 m with TTL-Version, max. 500 m with RS422-Version
Cycle Time	See Dimensional Drawing
Inputs	
Start-Signal (TTL-Version)	TTL-voltage ("Active-High", Impedance = 470 Ω)
Start-Signal (RS422-Version)	Differential Input
Outputs	
Stop-Signal (TTL-Version)	"H" = 5 V, "L" ≤ 0.2 V ("Active-High ", Impedance = 220 Ω)
Stop-Signal (RS422-Version)	Differential Output
External Electronics	- TR-Module. AK-8, - Siemens Interface Module IP 241, - Philips Positioning Interface 9404 4620 0301, - Bernecker + Rainer, - Harms und Wende etc…
Pin Configuration	Upon Request

Environmental Data

Electromagnetic compatibility (EMC)	EN 61000-4-2 (IEC-801-2) / EN 61000-4-4 (IEC-801-4)
Operating Temperature	0°-70°C (32° to 158° F) (Optional -20° to +70°C) (-4° to 158° F)
Storage Temperature	-30° to +80°C (-22° to 178° F)
Relative Humidity	98 % (non condensing)
*Protection Class	IP 65 (DIN 40 050)

* The protection class of the sensor can be effected by the type of connector used.

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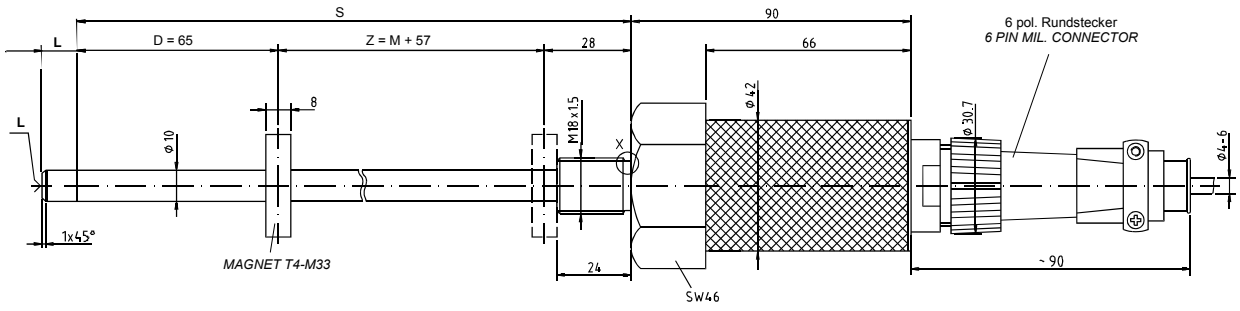
Linear-Encoder LA-41-K SS

Mechanical Data

Linearity	< 0.05 % of Stroke Length
Repeatability	≤ 0.01 mm
Hysteresis	< 0.1 mm
Temperature Coefficient	< 5 µm / °C
Vibration (Sinus 50-2000 Hz)	
per DIN IEC 68-2-6	≤ 100 m/s² (10g)
Shock (11ms) per DIN IEC 68-2-27	≤ 1000 m/s² (100g)
Pressure Resistance (Option)	600 bar
Rod Material	Cr/Ni-alloy
Magnetic Field	< 3 mT (milli Tesla)
Operating Speed and Mounting Orientation	No restrictions
Magnet Type (Standard)	T4-M33
Magnet Type(Option)	T3-U64
Rod Mounting	Option
Mechanical Special Types	Upon Request
Connector	6 pin MIL- Connector

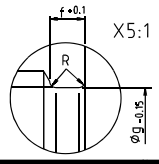
Dimensional Drawing



S = Stablänge
D = Dämpfungszone: Keine Herstellergarantie für die Meßdaten
M = Meßlänge: Typenbezogener Meßweg
Z = Zentraler Meßbereich: Typenbezogener Meßweg + 57 mm Reserve
L = 5 mm Zusatzlänge mit M4x5 bei Option Stabspitzenlagerung

S = TOTAL LENGTH
D = DAMPENING ZONE: IN THIS AREA NO MEASURING SIGNAL IS PRODUCED
M = STROKE LENGTH
Z = CENTRAL MEASURING AREA: EFFECTIVE AREA + 57 MM RESERVE
L = 5 MM ADDITIONAL LENGTH WITH M4x5 FOR OPTION ROD MOUNTING

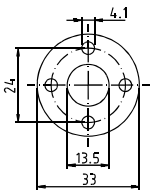
Einzelheit "X"
DETAIL "X"



Maße entsprechen Einschraubzapfen DIN 3852-F
DIMENSIONED TO DIN 3852-F

G	*f*	*g*	*R*	*O-RING*
M18x1.5	*2.3*	*15.9*	*0.4*	*15.4x2.1*

MAGNET T4-M33



Meßlänge M (mm) *STROKE LENGTH M (mm)*	Stablänge S (mm) *TOTAL LENGTH S (MM)*	Zykluszeit (µs) *CYCLE (µs)*
150	300	120
300	450	175
500	650	310
700	850	335
750	900	340
1000	1150	450
1500	1650	615
2000	2150	890
2500	2650	1065
3000	3150	1230

Linear-Encoder LA-41-K SSI

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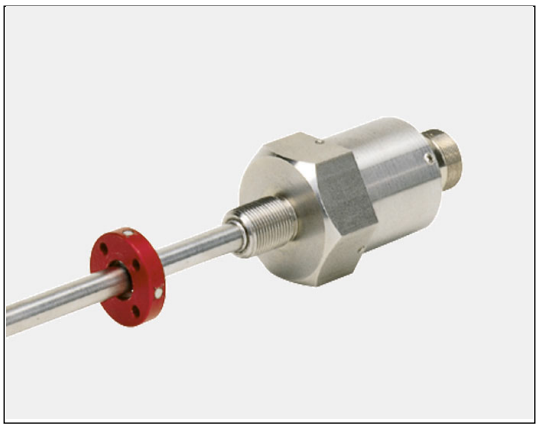

- **High Pressure Type, Makes it Possible for Installation into Hydraulic Cylinders**
- **For Linear Measurement**
- **Non Contact and Wear Free**
- **Programmable and Scaleable**
- **SSI (Synchronous Serial Interface)**
- **Housing length: 42 mm**

Electrical Data

Measurement Principle	Magnetostrictive
Measuring Length (Stroke) Standard (mm)	150, 300, 500, 700, 750, 1000, 1500, 2000, 2500, 3000
	> 3000 by request
Sensor Capacity	max. 20 Bit
* Resolution	max. 0.01 mm
Operating Voltage	19-27 V DC
Power Dissipation (No Load)	< 5 Watt
Programmable via RS485	PT-100N Programming Terminal
* Output Code (programmable)	Binary, Gray, BCD
Clock Input	Opto Coupler
Clock Frequency	95 kHz - 1 MHz
Cycle Time	See Dimensional Drawing
Transmission Cable Length	Dependent on cable Cross Section, Shielding, Clock Frequency etc.…
Data Output	RS422 (2-wire)
Input Options	
* Forward / Reverse	Change direction of count
* Preset	Adjust absolute position to a set value
Logic Levels	“0“ < + 2 VDC, “1“ > + 8 V DC, max. 30 VDC
Pin Configuration	Upon Request

* Programmable Parameters

Environmental Data

Electromagnetic compatibility (EMC)	EN 61000-4-2 (IEC-801-2) / EN 61000-4-4 (IEC-801-4)
Operating Temperature	0°-70°C (32° to 158° F) (Optional -20° to +70°C) (-4° to 158° F)
Storage Temperature	-30° to +80°C (-22° to 178° F)
Relative Humidity	98 % (non condensing)
*Protection Class	IP 65 (DIN 40 050)

* The protection class of the sensor can be effected by the type of connector used.

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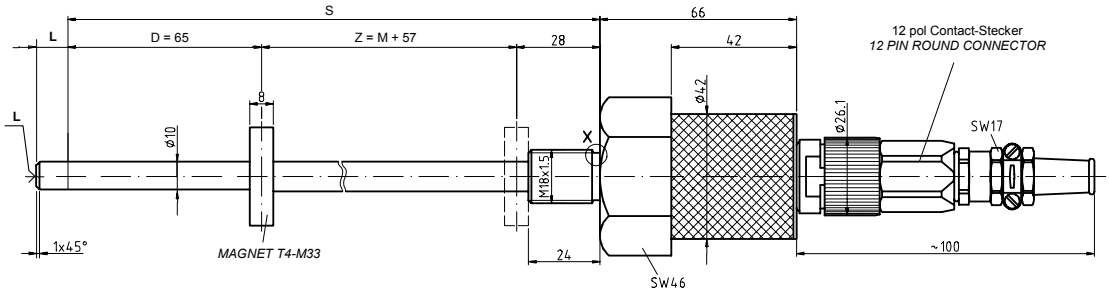
Linear-Encoder LA-41-K SSI

Mechanical Data

Linearity	< 0.05 % of Stroke Length
Repeatability	≤ 0.01 mm
Hysteresis	< 0.1 mm
Temperature Coefficient	< 5 µm / °C
Vibration (Sinus 50-2000 Hz)	
per DIN IEC 68-2-6	≤ 100 m/s^2 (10g)
Shock (11ms) per DIN IEC 68-2-27	≤ 1000 m/s^2 (100g)
Pressure Resistance (Option)	600 bar
Rod Material	Cr/Ni-alloy
Magnetic Field	< 3 mT (milli Tesla)
Operating Speed and Mounting Orientation	No restrictions
Magnet Type (Standard)	T4-M33
Magnet Type(Option)	T3-U64
Rod Mounting	Option
Mechanical Special Types	Upon Request
Connector	12 pin Contact Connector

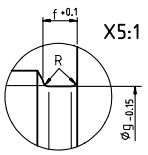
Dimensional Drawing



S = Stablänge
D = Dämpfungszone: Keine Herstellergarantie für die Meßdaten
M = Meßlänge: Typenbezogener Meßweg
Z = Zentraler Meßbereich: Typenbezogener Meßweg + 57 mm Reserve
L = 5 mm Zusatzlänge mit M4x5 bei Option Stabspitzenlagerung

S = TOTAL LENGTH
D = DAMPENING ZONE: IN THIS AREA NO MEASURING SIGNAL IS PRODUCED
M = STROKE LENGTH
Z = CENTRAL MEASURING AREA: EFFECTIVE AREA + 57 MM RESERVE
L = 5 MM ADDITIONAL LENGTH WITH M4x5 FOR OPTION ROD MOUNTING

Einzelheit "X"
DETAIL "X"

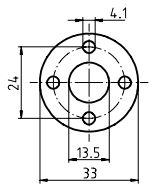


Maße entsprechen Einschraubzapfen DIN 3852-F

DIMENSIONED TO DIN 3852-F

G	*f*	*g*	*R*	*O-RING*
M18x1.5	*2.3*	*15.9*	*0.4*	*15.4x2.1*

MAGNET T4-M33



Meßlänge M (mm) *STROKE LENGTH M (mm)*	Stablänge S (mm) *TOTAL LENGTH S (MM)*	Zykluszeit (ms) *CYCLE (ms)*
150	300	1,4
300	450	1,4
500	650	1,4
700	850	1,4
750	900	1,4
1000	1150	1,8
1500	1650	2,7
2000	2150	3,6
2500	2650	4,5
3000	3150	5,4

Linear-Encoder LA-41 ISI

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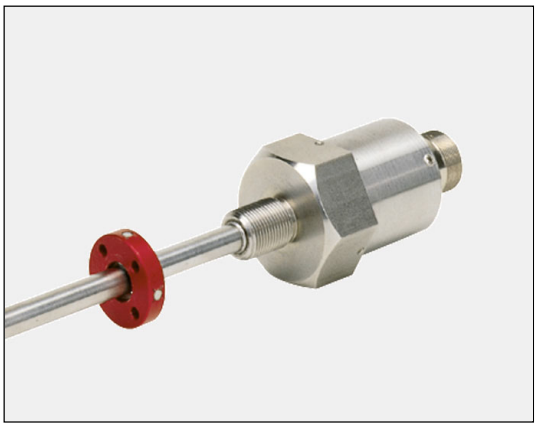

- **High Pressure Type, Makes it Possible for Installation into Hydraulic Cylinders**
- **For Linear Measurement**
- **Non Contact and Wear Free**
- **Programmable, scaleable**
- **ISI (Incremental Serial Interface)**

Electrical Data

Measurement Principle	Magnetostrictive
Measuring Length (Stroke) Standard (mm)	150, 300, 500, 700, 750, 1000, 1500, 2000, 2500, 3000, > 3000 by request
Sensor Capacity	max. 20 Bit
* Resolution	max. 0.01 mm
Operating Voltage	19-27 V DC
Power Dissipation (No Load)	< 5 Watt
Programmable via RS485	PT-100N Programming Terminal
Inputs	
* Load Input	Request for Encoder Position
* Preset	Adjust absolute position to a given set value (i.e. zero set)
Logic Levels	“0“ < +2 VDC, “1“ > + 8 VDC, max. 30 VDC
Output Options	Push-Pull (15 mA) or RS422
* Load Output	Verification of Load Request
Channel 1	A
Channel 1 neg.	A neg.
Channel 2	B
Channel 2 neg.	B neg.
* Load Frequency	Programmable (4 kHz to approx. 120 kHz)
Operating Speed	max. 1m/s at a resolution of 0,01 mm
Cycle Time	See Dimensional Drawing
Pin Configuration	Upon Request

*Programmable Parameters

Environmental Data

Electromagnetic compatibility (EMC)	EN 61000-4-2 (IEC-801-2) / EN 61000-4-4 (IEC-801-4)
Operating Temperature	0°-70°C (32° to 158° F) (Optional -20° to +70°C) (-4° to 158° F)
Storage Temperature	-30° to +80°C (-22° to 178° F)
Relative Humidity	98 % (non condensing)
*Protection Class	IP 65 (DIN 40 050)

* The protection class of the sensor can be effected by the type of connector used.

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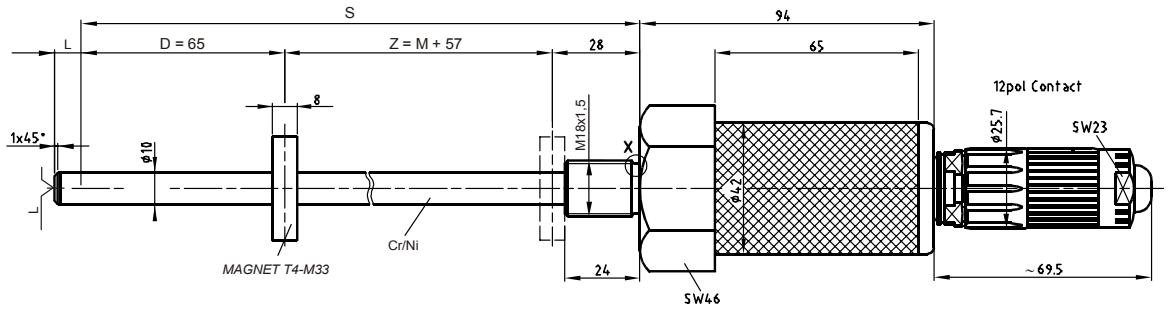
Mechanical Data

Linearity	< 0.05 % of Stroke Length
Repeatability	≤ 0.01 mm
Hysteresis	< 0.1 mm
Temperature Coefficient	< 5 µm / °C
Vibration (Sinus 50-2000 Hz)	
per DIN IEC 68-2-6	≤ 100 m/s² (10g)
Shock (11ms) per DIN IEC 68-2-27	≤ 1000 m/s² (100g)
Pressure Resistance (Option)	600 bar
Rod Material	Cr/Ni-alloy
Magnetic Field	< 3 mT (milli Tesla)
Operating Speed and Mounting Orientation	No restrictions
Magnet Type (Standard)	T4-M33
Magnet Type(Option)	T3-U64
Rod Mounting	Option
Mechanical Special Types	Upon Request
Connector	12 pin Contact Connector

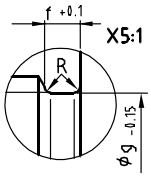
Dimensional Drawing



S = Stablänge
D = Dämpfungszone: Keine Herstellergarantie für die Messdaten
M = Messlänge: Typenbezogener Messweg
Z = Zentraler Messbereich: Typenbezogener Messweg + 57 mm Reserve
L = 5 mm Zusatzlänge mit M4x5 bei Option Stabspitzenlagerung

S = TOTAL LENGTH
D = DAMPENING ZONE: IN THIS AREA NO MEASURING SIGNAL IS PRODUCED
M = STROKE LENGTH
Z = CENTRAL MEASURING AREA: EFFECTIVE AREA + 57 mm RESERVE
L = 5 mm ADDITIONAL LENGTH WITH M4x5 FOR OPTION ROD MOUNTING

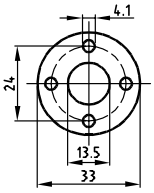
Einzelheit "X"
DETAIL "X"



Maße entsprechen Einschraubzapfen DIN 3852-F
DIMENSIONED TO DIN 3852-F

G	f	g	R	O-Ring
M18x1.5	2.3	15.9	0.4	15.4x2.1

MAGNET T4-M33



Messlänge M (mm) *STROKE LENGTH M (mm)*	Stablänge S (mm) *TOTAL LENGTH S (mm)*	Zykluszeit (ms) *CYCLE (ms)*
150	300	1,0
300	450	1,0
500	650	1,5
700	850	2,0
750	900	2,0
1000	1150	2,0
1500	1650	2,75
2000	2150	3,5
2500	2650	4,5
3000	3150	5,25

Linear-Encoder LA-41-K CANopen

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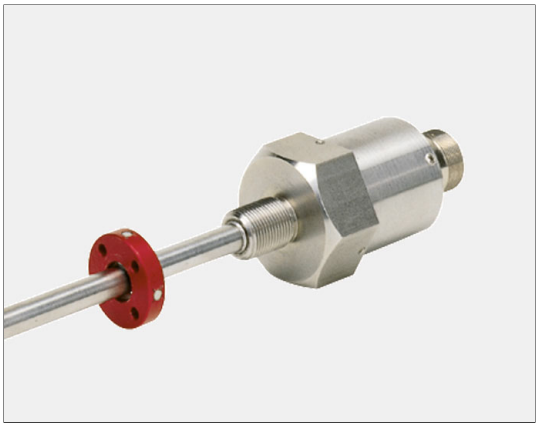

- **High Pressure Type, Makes it Possible for Installation into Hydraulic Cylinders**
- **For Linear Measurement**
- **Non Contact and Wear Free**
- **Programmable over the CAN-Bus**
- **CAN-Bus-Interface (CANopen-Protocol)**
- **Housing length: 65 mm**

Electrical Data

Measurement Principle	Magnetostrictive
Measuring Length (Stroke) Standard (mm)	150, 300, 500, 700, 750, 1000, 1500, 2000, 2500, 3000
	> 3000 by Request
Sensor Capacity	max. 20 Bit
Resolution	max. 0.01 mm
Operating Voltage	19-27 V DC
Power Dissipation (No Load)	< 5 Watt
Programming via CAN-Bus	CAN-Bus-Interface (ISO/DIS 11898)
Data Protocol	CAN 2.0 A
	Encoder CANopen Device Protocol CIA DS-406 V1.0
Output Code	Binary
Baud Rate (adjustable by switch)	20 kbaud, Transmission Distance Up To 2500 m
	125 kbaud, Transmission Distance Up To 500 m
	500 kbaud, Transmission Distance Up To 100 m
	1 Mbaud, Transmission Distance Up To 25 m
Programmable Parameters	
Count Direction	
Output Code	
Preset	
Cycle Time	See Dimensional Drawing
Pin Configuration	Upon Request

Environmental Data

Electromagnetic compatibility (EMC)	EN 61000-4-2 (IEC-801-2) / EN 61000-4-4 (IEC-801-4)
Operating Temperature	0°-70°C (32° to 158° F) (Optional -20° to +70°C) (-4° to 158° F)
Storage Temperature	-30° to +80°C (-22° to 178° F)
Relative Humidity	98 % (non condensing)
*Protection Class	IP 43 (DIN 40 050)

* The protection class of the sensor can be effected by the type of connector used.

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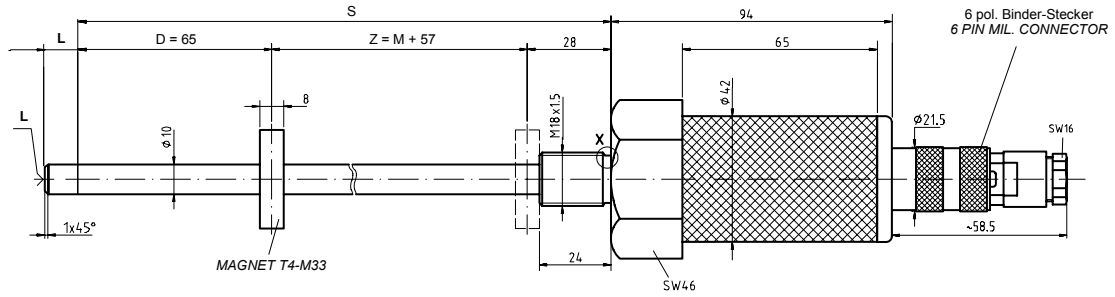
Linear-Encoder LA-41-K CANopen

Mechanical Data

Linearity	< 0.05 % of Stroke Length
Repeatability	≤ 0.01 mm
Hysteresis	< 0.1 mm
Temperature Coefficient	< 5 µm / °C
Vibration (Sinus 50-2000 Hz)	
per DIN IEC 68-2-6	≤ 100 m/s^2 (10g)
Shock (11ms) per DIN IEC 68-2-27	≤ 1000 m/s^2 (100g)
Pressure Resistance (Option)	600 bar
Rod Material	Cr/Ni-alloy
Magnetic Field	< 3 mT (milli Tesla)
Operating Speed and Mounting Orientation	No restrictions
Magnet Type (Standard)	T4-M33
Magnet Type (Option)	T3-U64
Rod Mounting	Option
Mechanical Special Types	Upon Request
Connector	6 pin MIL - Connector

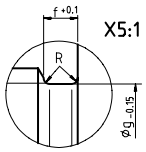
Dimensional Drawing



S = Stablänge
D = Dämpfungszone: Keine Herstellergarantie für die Meßdaten
M = Meßlänge: Typenbezogener Meßweg
Z = Zentraler Meßbereich: Typenbezogener Meßweg + 57 mm Reserve
L = 5 mm Zusatzlänge mit M4x5 bei Option Stabspitzenlagerung

S = TOTAL LENGTH
D = DAMPENING ZONE: IN THIS AREA NO MEASURING SIGNAL IS PRODUCED
M = STROKE LENGTH
Z = CENTRAL MEASURING AREA: EFFECTIVE AREA + 57 MM RESERVE
L = 5 MM ADDITIONAL LENGTH WITH M4x5 FOR OPTION ROD MOUNTING

Einzelheit "X"
DETAIL "X"

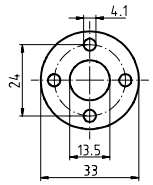


Maße entsprechen Einschraubzapfen DIN 3852-F

DIMENSIONED TO DIN 3852-F

G	*f*	*g*	*R*	*O-RING*
M18x1.5	*2.3*	*15.9*	*0.4*	*15.4x2.1*

MAGNET T4-M33



Meßlänge M (mm) *STROKE LENGTH M (mm)*	Stablänge S (mm) *TOTAL LENGTH S (MM)*	Zykluszeit (ms) *CYCLE (ms)*
150	300	1,4
300	450	1,4
500	650	1,4
700	850	1,4
750	900	1,4
1000	1150	1,8
1500	1650	2,7
2000	2150	3,6
2500	2650	4,5
3000	3150	5,4

Linear-Encoder LA-42-K SSI

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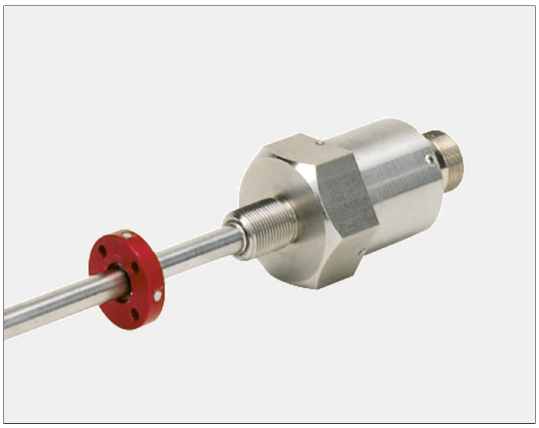

- **High Pressure Type, Makes it Possible for Installation into Hydraulic Cylinders**
- **For Linear Measurement**
- **Non Contact and Wear Free**
- **Programmable and Scaleable**
- **SSI (Synchronous Serial Interface)**

7

Electrical Data

Measurement Principle	Magnetostrictive
Measuring Length (Stroke) Standard (mm)	150, 300, 500, 700, 750, 1000, 1500, 2000, 2500, 3000
	> 3000 by request
Sensor Capacity	max. 20 Bit
* Resolution	max. 0.01 mm
Operating Voltage	19-27 V DC
Power Dissipation (No Load)	< 5 Watt
Programmable via RS485	PT-100N Programming Terminal
* Output Code (programmable)	Binary, Gray, BCD
Clock Input	Opto Coupler
Clock Frequency	95 kHz - 1 MHz
Cycle Time	See Dimensional Drawing
Transmission Cable Length	Dependent on cable Cross Section, Shielding, Clock Frequency etc.…
Data Output	RS422 (2-wire)
Input Options	
* Forward / Reverse	Change direction of count
* Preset	Adjust absolute position to a set value
Logic Levels	“0“ < + 2 VDC, “1“ > + 8 V DC, max. 30 VDC
Pin Configuration	Upon Request

* Programmable Parameters

Environmental Data

Electromagnetic compatibility (EMC)	EN 61000-4-2 (IEC-801-2) / EN 61000-4-4 (IEC-801-4)
Operating Temperature	0°-70°C (32° to 158° F) (Optional -20° to +70°C) (-4° to 158° F)
Storage Temperature	-30° to +80°C (-22° to 178° F)
Relative Humidity	98 % (non condensing)
*Protection Class	IP 65 (DIN 40 050)

* The protection class of the sensor can be effected by the type of connector used.

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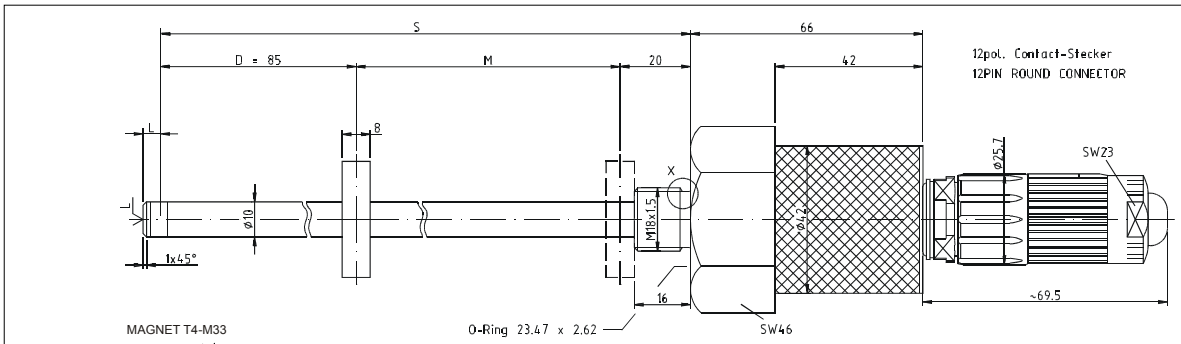
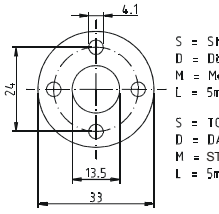
Linear-Encoder LA-42-K SSI

Mechanical Data

Linearity	< 0.05 % of Stroke Length
Repeatability	≤ 0.01 mm
Hysteresis	< 0.1 mm
Temperature Coefficient	< 5 µm / °C
Vibration (Sinus 50-2000 Hz)	
per DIN IEC 68-2-6	≤ 100 m/s^2 (10g)
Shock (11ms) per DIN IEC 68-2-27	≤ 1000 m/s^2 (100g)
Pressure Resistance (Option)	600 bar
Rod Material	Cr/Ni-alloy
Magnetic Field	< 3 mT (milli Tesla)
Operating Speed and Mounting Orientation	No restrictions
Magnet Type (Standard)	T4-M33
Magnet Type(Option)	T3-U64
Rod Mounting	Option
Mechanical Special Types	Upon Request
Connector	12 pin Contact Connector

Dimensional Drawing



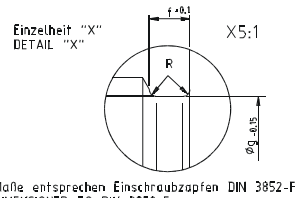


S = Stablänge
D = Dämpfungszone: keine Herstellergarantie für die Meßdaten
M = Meßlänge: typenbezogener Meßweg
L = 5mm Zusatzlänge mit M4x5 bei Option Stabspizenlagerung

S = TOTAL LENGTH
D = DAMPENING ZONE: IN THIS AREA NO MEASURING SIGNAL IS PRODUCED
M = STROKE LENGTH
L = 5mm ADDITIONAL LENGTH WITH M4X5 FOR OPTION ROD MOUNTING

Meßlänge M (mm) STROKE LENGTH M (mm)	Stablänge S (mm) TOTAL LENGTH S (mm)	Zykluszeit (ms) CYCLE (ms)
100	205	1.4
300	405	1.4
500	605	1.4
700	805	1.4
750	855	1.4
1000	1105	1.8
1500	1605	2.7
2000	2105	3.6
2500	2605	4.5
3000	3105	5.4

G	f	g	R	O-Ring
M18x1.5	2.3	15.9	0.4	15.4x2.1



Maße entsprechen Einschraubzapfen DIN 3852-F
DIMENSIONED TO DIN 3852-F

Linear-Encoder LA-65-H SSI

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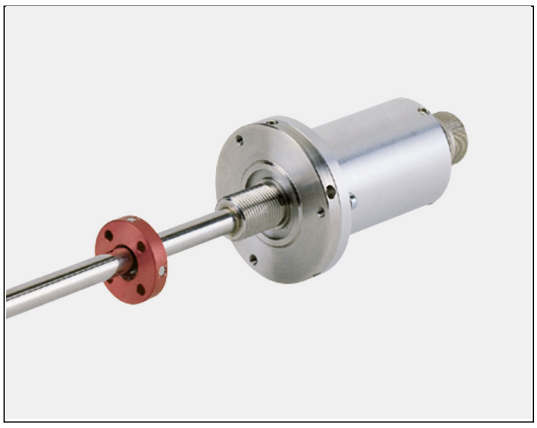

- **Special housing for mounting in hydraulic cylinders, easy interchangeability**
- **For Linear Measurement**
- **Non Contact and Wear Free**
- **Programmable, scaleable**
- **SSI (Synchronous-Serial Interface)**

Electrical Data

Measurement Principle	Magnetostrictive
Measuring Length (Stroke) Standard (mm)	150, 300, 500, 700, 750, 1000, 1500, 2000, 2500, 3000
	> 3000 by request
Sensor Capacity	max. 20 Bit
* Resolution	max. 0.01 mm
Operating Voltage	19-27 V DC
Power Dissipation (No Load)	< 5 Watt
Programmable via RS485	PT-100N Programming Terminal
* Output Code (programmable)	Binary, Gray, BCD
Clock Input	Opto Coupler
Clock Frequency	95 kHz - 1 MHz
Cycle Time	See Dimensional Drawing
Transmission Cable Length	Dependent on cable Cross Section, Shielding, Clock Frequency etc.…
Data Output	RS422 (2-wire)
Input Options	
* Forward / Reverse	Change direction of count
* Preset	Adjust absolute position to a set value
Logic Levels	“0“ < + 2 VDC, “1“ > + 8 V DC, max. 30 VDC
Pin Configuration	Upon Request

* Programmable Parameters

Environmental Data

Electromagnetic compatibility (EMC)	EN 61000-4-2 (IEC-801-2) / EN 61000-4-4 (IEC-801-4)
Operating Temperature	0°-70°C (32° to 158° F) (Optional -20° to +70°C) (-4° to 158° F)
Storage Temperature	-30° to +80°C (-22° to 178° F)
Relative Humidity	98 % (non condensing)
*Protection Class	IP 65 (DIN 40 050)

* The protection class of the sensor can be effected by the type of connector used.

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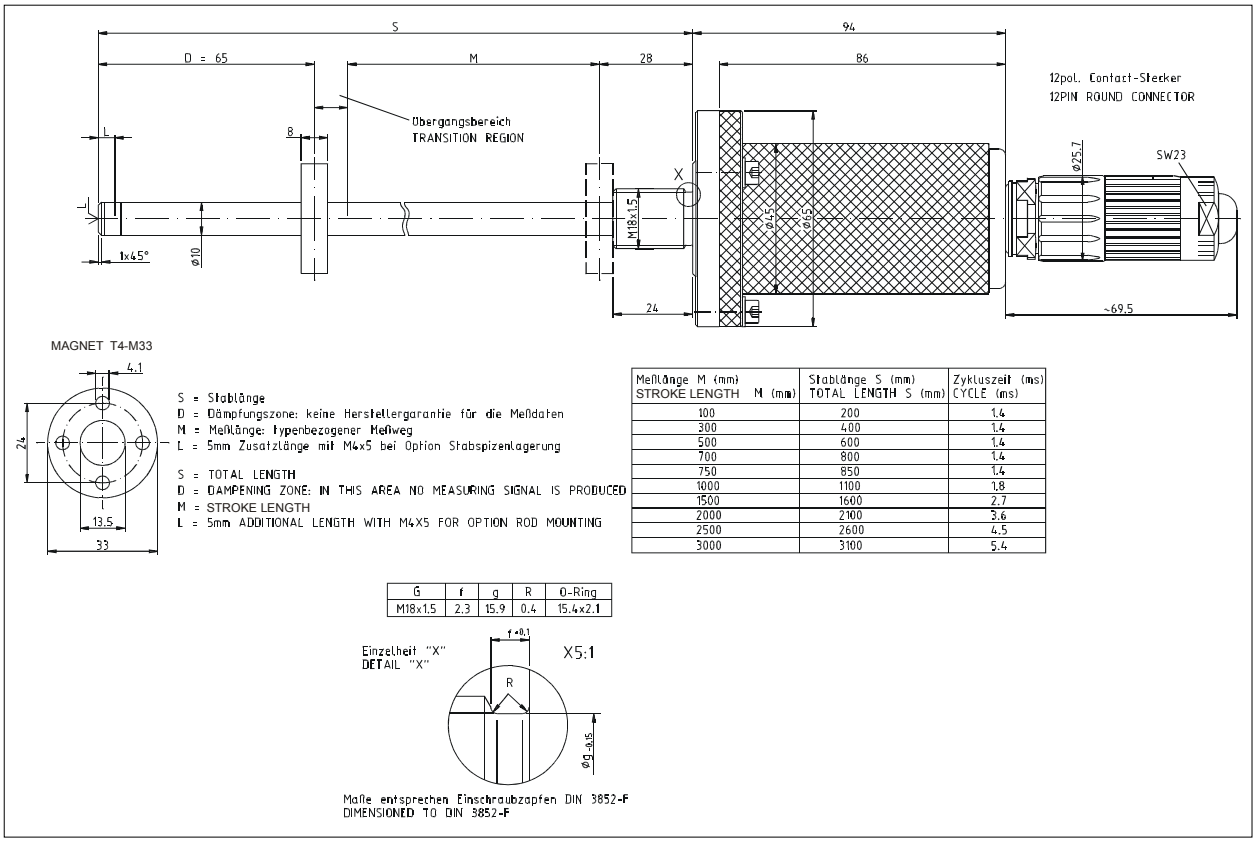
Linear-Encoder LA-65-H SSI

Mechanical Data

Linearity	< 0.05 % of Stroke Length
Repeatability	≤ 0.01 mm
Hysteresis	< 0.1 mm
Temperature Coefficient	< 5 µm / °C
Vibration (Sinus 50-2000 Hz)	
per DIN IEC 68-2-6	≤ 100 m/s^2 (10g)
Shock (11ms) per DIN IEC 68-2-27	≤ 1000 m/s^2 (100g)
Pressure Resistance (Option)	600 bar
Rod Material	Cr/Ni-alloy
Magnetic Field	< 3 mT (milli Tesla)
Operating Speed and Mounting Orientation	No restrictions
Magnet Type (Standard)	T4-M33
Magnet Type(Option)	T3-U64
Rod Mounting	Option
Mechanical Special Types	Upon Request
Connector	12 pin Contact Connector

Dimensional Drawing



Meßlänge M (mm) STROKE LENGTH M (mm)	Stablänge S (mm) TOTAL LENGTH S (mm)	Zykluszeit (ms) CYCLE (ms)
100	200	1.4
300	400	1.4
500	600	1.4
700	800	1.4
750	850	1.4
1000	1100	1.8
1500	1600	2.7
2000	2100	3.6
2500	2600	4.5
3000	3100	5.4

G	f	g	R	O-Ring
M18x1.5	2.3	15.9	0.4	15.4x2.1

Linear-Encoder LA-65-H ISI

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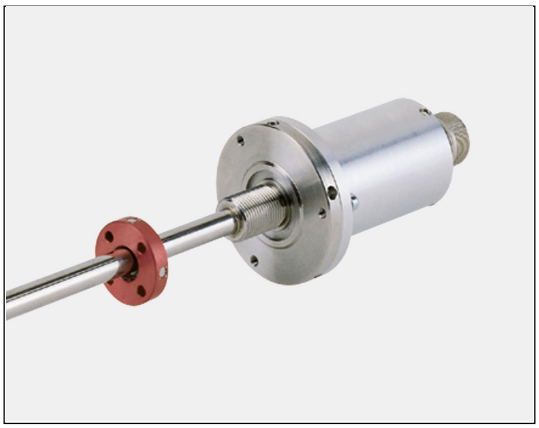

- **Special housing for mounting in hydraulic cylinders, easy interchangeability**
- **For Linear Measurement**
- **Non Contact and Wear Free**
- **Programmable, scaleable**
- **ISI (Incremental Serial Interface)**

Electrical Data

Measurement Principle	Magnetostrictive
Measuring Length (Stroke) Standard (mm)	150, 300, 500, 700, 750, 1000, 1500, 2000, 2500, 3000
	> 3000 by request
Sensor Capacity	max. 20 Bit
* Resolution	max. 0.01 mm
Operating Voltage	19-27 V DC
Power Dissipation (No Load)	< 5 Watt
Programmable via RS485	PT-100N Programming Terminal
Inputs	
* Load Input	Request for Encoder Position
* Preset	Adjust absolute position to a given set value (i.e. zero set)
Logic Levels	“0“ < +2 VDC, “1“ > + 8 VDC, max. 30 VDC
Output Options	Push-Pull (15 mA) or RS422
* Load Output	Verification of Load Request
Channel 1	A
Channel 1 neg.	A neg.
Channel 2	B
Channel 2 neg.	B neg.
Operating Speed	max. 1m/s at a resolution of 0,01 mm
Cycle Time	See Dimensional Drawing
Pin Configuration	Upon Request
*Programmable Parameters	

Environmental Data

Electromagnetic compatibility (EMC)	EN 61000-4-2 (IEC-801-2) / EN 61000-4-4 (IEC-801-4)
Operating Temperature	0°-70°C (32° to 158° F) (Optional -20° to +70°C) (-4° to 158° F)
Storage Temperature	-30° to +80°C (-22° to 178° F)
Relative Humidity	98 % (non condensing)
*Protection Class	IP 65 (DIN 40 050)

* The protection class of the sensor can be effected by the type of connector used.

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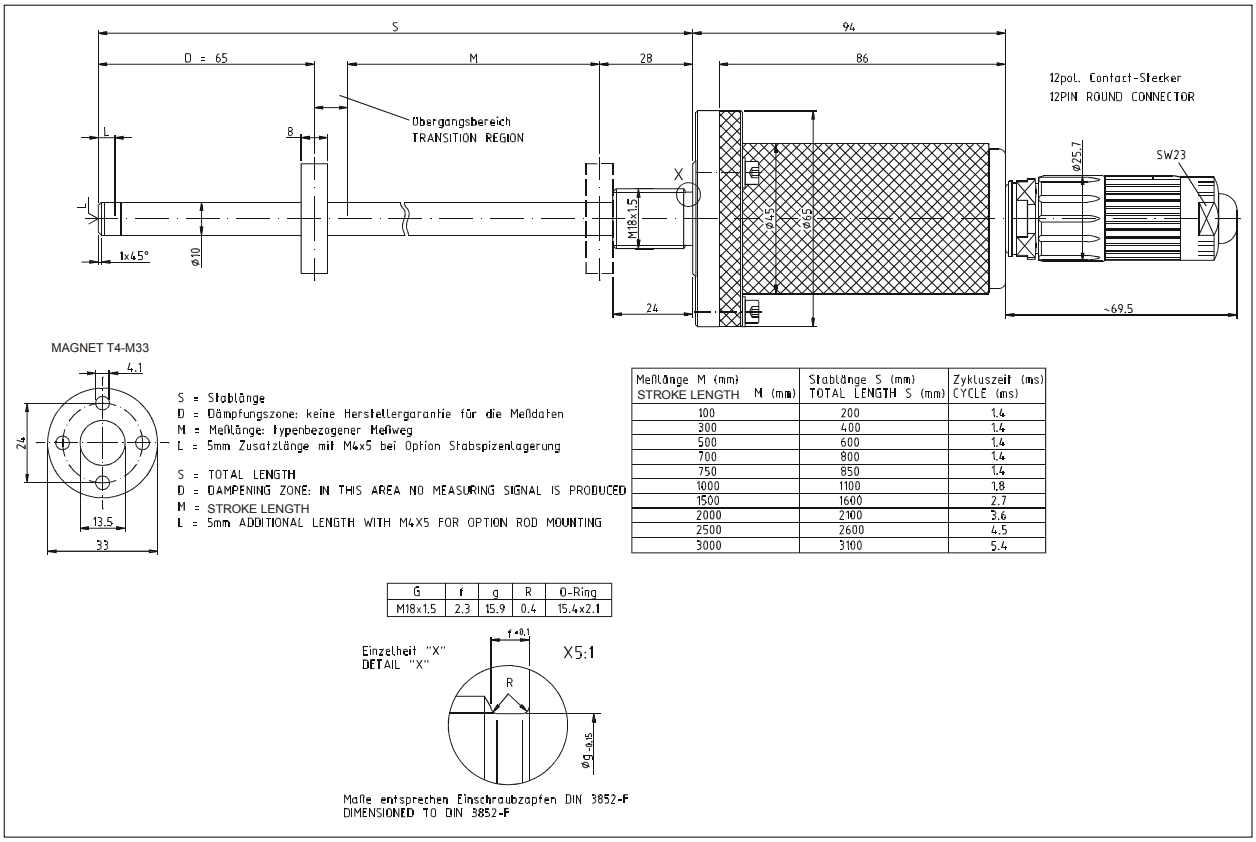
Linear-Encoder LA-65-H ISI

Mechanical Data

Linearity	< 0.05 % of Stroke Length
Repeatability	≤ 0.01 mm
Hysteresis	< 0.1 mm
Temperature Coefficient	< 5 µm / °C
Vibration (Sinus 50-2000 Hz)	
per DIN IEC 68-2-6	≤ 100 m/s^2 (10g)
Shock (11ms) per DIN IEC 68-2-27	≤ 1000 m/s^2 (100g)
Pressure Resistance (Option)	600 bar
Rod Material	Cr/Ni-alloy
Magnetic Field	< 3 mT (milli Tesla)
Operating Speed and Mounting Orientation	No restrictions
Magnet Type (Standard)	T4-M33
Magnet Type(Option)	T3-U64
Rod Mounting	Option
Mechanical Special Types	Upon Request
Connector	12 pin Contact Connector

Dimensional Drawing



Meßlänge M (mm) STROKE LENGTH M (mm)	Stablänge S (mm) TOTAL LENGTH S (mm)	Zykluszeit (ms) CYCLE (ms)
100	200	1.4
300	400	1.4
500	600	1.4
700	800	1.4
750	850	1.4
1000	1100	1.8
1500	1600	2.7
2000	2100	3.6
2500	2600	4.5
3000	3100	5.4

G	f	g	R	O-Ring
M18x1.5	2.3	15.9	0.4	15.4x2.1

Linear-Encoder LA-65-H A

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- **Special housing for mounting in hydraulic cylinders, easy interchangeability**
- **For Linear Measurement**
- **Non Contact and Wear Free**
- **Adjustable over set inputs**
- **Analog Interface**

Electrical Data

Measurement Principle	Magnetostrictive
Measuring Length (Stroke) Standard (mm)	150, 300, 500, 700, 750, 1000, 1500, 2000, 2500, 3000
	> 3000 by request
Resolution	max. 0.05 mm
Operating Voltage	24 V DC ± 10 %
Power Dissipation (no load)	< 4 Watt
Analog Voltage Interface	0 - 10 V, 10 - 0 V, ± 5 V, ± 10 V
Impedance	min. 680 Ω
Analog Current Interface	0 - 20 mA, 4 - 20 mA
Impedance	max. 500 Ω
Cycle Time	See Dimensional Drawing
Data Transmission Length	
Dependent on Shield Design	max. 10 m for Analog Voltage Interface
	max. 1000 m for Analog Current Interface
Inputs	
Zero Set	For setting the start point of the analog signal
Span Set	For setting the end point of the analog signal
Logic Levels	"0" < + 2 V DC, "1" > + 8 V DC, max. 30 VDC
Pin Configuration	Upon request

Environmental Data

Electromagnetic compatibility (EMC)	EN 61000-4-2 (IEC-801-2) / EN 61000-4-4 (IEC-801-4)
Operating Temperature	0°-70°C (32° to 158° F) (Optional -20° to +70°C) (-4° to 158° F)
Storage Temperature	-30° to +80°C (-22° to 178° F)
Relative Humidity	98 % (non condensing)
*Protection Class	IP 43 (DIN 40 050)

* The protection class of the sensor can be effected by the type of connector used.

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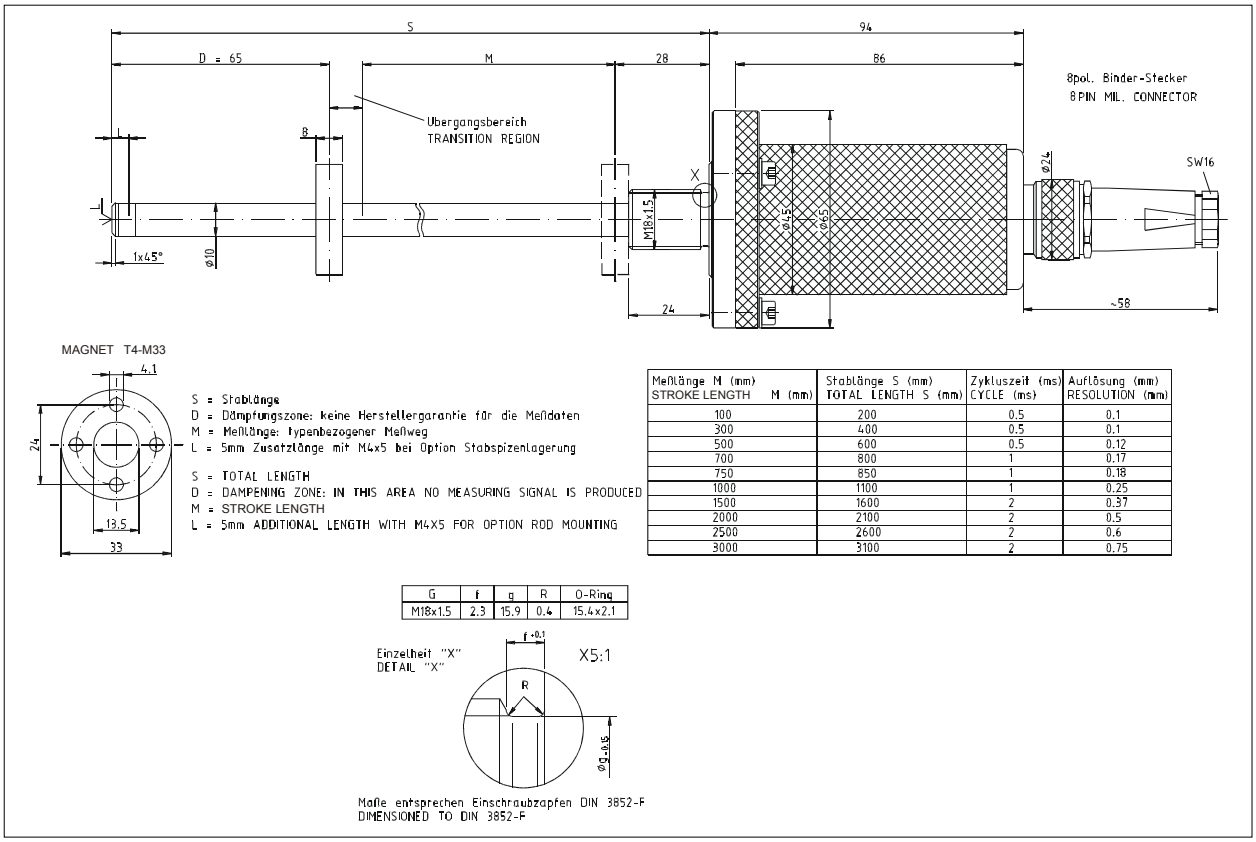
Linear-Encoder LA-65-H A

Mechanical Data

Linearity	< 0.05 % of Stroke Length
Repeatability	≤ 0.01 mm
Hysteresis	< 0.1 mm
Temperature Coefficient	< 5 µm / °C
Vibration (Sinus 50-2000 Hz)	
per DIN IEC 68-2-6	≤ 100 m/s^2 (10g)
Shock (11ms) per DIN IEC 68-2-27	≤ 1000 m/s^2 (100g)
Pressure Resistance (Option)	600 bar
Rod Material	Cr/Ni-alloy
Magnetic Field	< 3 mT (milli Tesla)
Operating Speed and Mounting Orientation	No restrictions
Magnet Type (Standard)	T4-M33
Magnet Type (Option)	T3-U64
Rod Mounting	Option
Mechanical Special Types	Upon Request
Connector	8 pin MIL-Connector

Dimensional Drawing



Meßlänge M (mm) STROKE LENGTH M (mm)	Stablänge S (mm) TOTAL LENGTH S (mm)	Zykluszeit (ms) CYCLE (ms)	Auflösung (mm) RESOLUTION (mm)
100	200	0.5	0.1
300	400	0.5	0.1
500	600	0.5	0.12
700	800	1	0.17
750	850	1	0.18
1000	1100	1	0.25
1500	1600	2	0.37
2000	2100	2	0.5
2500	2600	2	0.6
3000	3100	2	0.75

G	f	g	R	O-Ring
M18x1.5	2.3	15.9	0.4	15.4x2.1

Linear-Encoder LA-65-H CANopen

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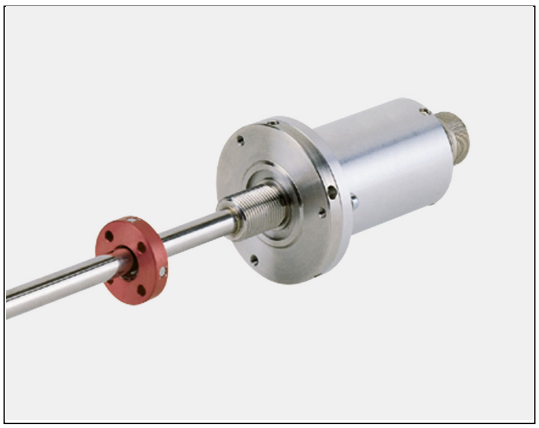
VIA BUS



- **Special housing for mounting in hydraulic cylinders, easy interchangeability**
- **For Linear Measurement**
- **Non Contact and Wear Free**
- **Programmable over the CAN-Bus**
- **CAN-Bus-Interface (CANopen-Protocol)**

7

Electrical Data

Measurement Principle	Magnetostrictive
Measuring Length (Stroke) Standard (mm)	150, 300, 500, 700, 750, 1000, 1500, 2000, 2500, 3000
	> 3000 by Request
Sensor Capacity	max. 20 Bit
Resolution	max. 0.01 mm
Operating Voltage	19-27 V DC
Power Dissipation (No Load)	< 5 Watt
Programming via CAN-Bus	CAN-Bus-Interface (ISO/DIS 11898)
Data Protocol	CAN 2.0 A
	Encoder CANopen Device Protocol CIA DS-406 V1.0
Output Code	Binary
Baud Rate (adjustable by switch)	20 kbaud, Transmission Distance Up To 2500 m
	125 kbaud, Transmission Distance Up To 500 m
	500 kbaud, Transmission Distance Up To 100 m
	1 Mbaud, Transmission Distance Up To 25 m
Programmable Parameters	
Count Direction	
Output Code	
Preset	
Cycle Time	See Dimensional Drawing
Pin Configuration	Upon Request

Environmental Data

Electromagnetic compatibility (EMC)	EN 61000-4-2 (IEC-801-2) / EN 61000-4-4 (IEC-801-4)
Operating Temperature	0°-70°C (32° to 158° F) (Optional -20° to +70°C) (-4° to 158° F)
Storage Temperature	-30° to +80°C (-22° to 178° F)
Relative Humidity	98 % (non condensing)
*Protection Class	IP 65 (DIN 40 050)

* The protection class of the sensor can be effected by the type of connector used.

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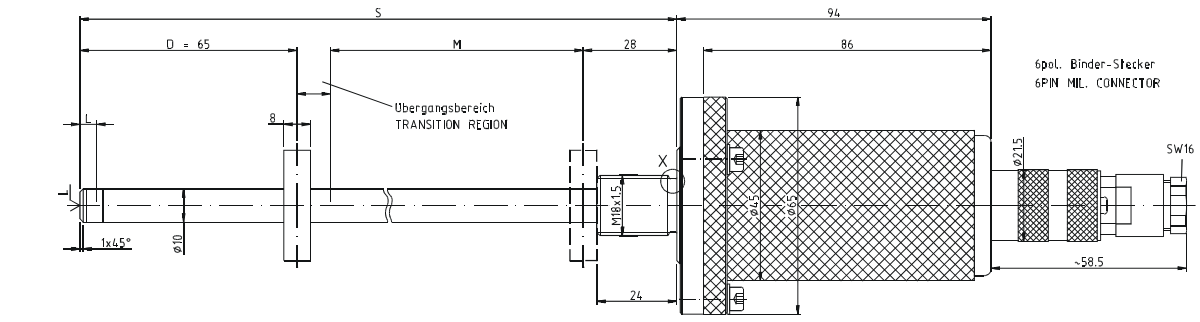
Linear-Encoder LA-65-H CANopen

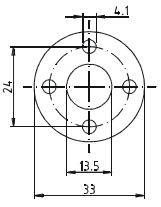
Mechanical Data

Linearity	< 0.05 % of Stroke Length
Repeatability	≤ 0.01 mm
Hysteresis	< 0.1 mm
Temperature Coefficient	< 5 µm / °C
Vibration (Sinus 50-2000 Hz)	
per DIN IEC 68-2-6	≤ 100 m/s^2 (10g)
Shock (11ms) per DIN IEC 68-2-27	≤ 1000 m/s^2 (100g)
Pressure Resistance (Option)	600 bar
Rod Material	Cr/Ni-alloy
Magnetic Field	< 3 mT (milli Tesla)
Operating Speed and Mounting Orientation	No restrictions
Magnet Type (Standard)	T4-M33
Magnet Type (Option)	T3-U64
Rod Mounting	Option
Mechanical Special Types	Upon Request
Connector	6 pin MIL-Connector

Dimensional Drawing



MAGNET T4-M33

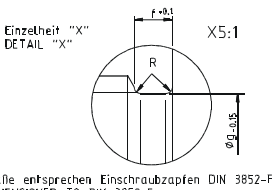


S = Stablänge
D = Dämpfungszone: keine Herstellergarantie für die Meßdaten
M = Meßlänge: typenbezogener Meßweg
L = 5mm Zusatzlänge mit M4x5 bei Option Stabspitzenlagerung

S = TOTAL LENGTH
D = DAMPENING ZONE: IN THIS AREA NO MEASURING SIGNAL IS PRODUCED
M = STROKE LENGTH
L = 5mm ADDITIONAL LENGTH WITH M4X5 FOR OPTION ROD MOUNTING

Meßlänge M (mm) STROKE LENGTH M (mm)	Stablänge S (mm) TOTAL LENGTH S (mm)	Zykluszeit (ms) CYCLE (ms)
100	200	1.4
300	400	1.4
500	600	1.4
700	800	1.4
750	850	1.4
1000	1100	1.8
1500	1600	2.7
2000	2100	3.6
2500	2600	4.5
3000	3100	5.4

G	f	g	R	O-Ring
M18x1.5	2.3	15.9	0.4	15.4x2.1



Maße entsprechen Einschraubzapfen DIN 3852-F
DIMENSIONED TO DIN 3852-F

Linear-Encoder LA-66-K A

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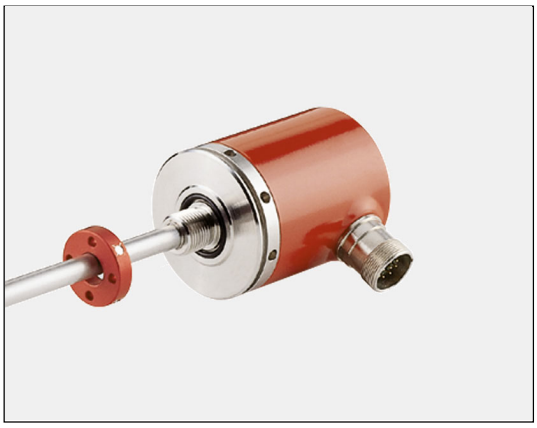

- **High Pressure Type, Makes it Possible for Installation into Hydraulic Cylinders**
- **For Linear Measurement**
- **Non Contact and Wear Free**
- **Justify over set inputs**
- **Analog Interface**

Electrical Data

Measurement Principle	Magnetostrictive
Measuring Length (Stroke) Standard (mm)	150, 300, 500, 700, 750, 1000, 1500, 2000, 2500, 3000
	> 3000 by request
Resolution	max. 0.05 mm
Operating Voltage	24 V DC ± 10 %
Power Dissipation (no load)	< 4 Watt
Analog Voltage Interface	0 - 10 V, 10 - 0 V, ± 5 V, ± 10 V
Impedance	min. 680 Ω
Analog Current Interface	0 - 20 mA, 4 - 20 mA
Impedance	max. 500 Ω
Cycle Time	See Dimensional Drawing
Data Transmission Length	
Dependent on Shield Design	max. 10 m for Analog Voltage Interface
	max. 1000 m for Analog Current Interface
Inputs	
Zero Set	For setting the start point of the analog signal
Span Set	For setting the end point of the analog signal
Logic Levels	"0" < + 2 V DC, "1" > + 8 V DC, max. 30 VDC
Pin Configuration	Upon request

Environmental Data

Electromagnetic compatibility (EMC)	EN 61000-4-2 (IEC-801-2) / EN 61000-4-4 (IEC-801-4)
Operating Temperature	0°-70°C (32° to 158° F) (Optional -20° to +70°C) (-4° to 158° F)
Storage Temperature	-30° to +80°C (-22° to 178° F)
Relative Humidity	98 % (non condensing)
*Protection Class	IP 65 (DIN 40 050)

* The protection class of the sensor can be effected by the type of connector used.

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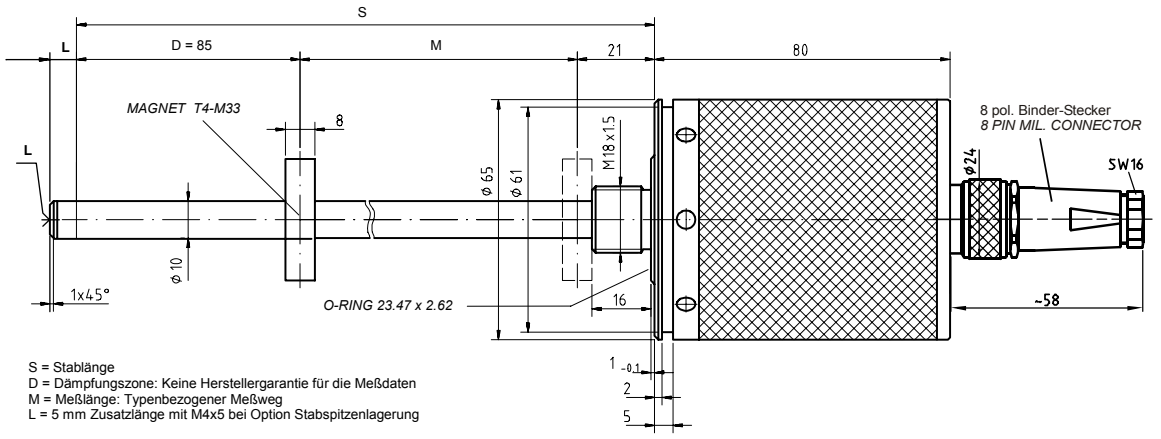
Linear-Encoder LA-66-K A

Mechanical Data

Linearity	< 0.05 % of Stroke Length
Repeatability	≤ 0.01 mm
Hysteresis	< 0.1 mm
Temperature Coefficient	< 5 µm / °C
Vibration (Sinus 50-2000 Hz)	
per DIN IEC 68-2-6	≤ 100 m/s² (10g)
Shock (11ms) per DIN IEC 68-2-27	≤ 1000 m/s² (100g)
Pressure Resistance (Option)	600 bar
Rod Material	Cr/Ni-alloy
Magnetic Field	< 3 mT (milli Tesla)
Operating Speed and Mounting Orientation	No restrictions
Magnet Type (Standard)	T4-M33
Rod Mounting	Option
Mechanical Special Types	Upon Request
Connector	8 pin MIL-Connector

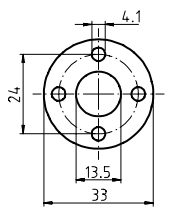
Dimensional Drawing



S = Stablänge
D = Dämpfungszone: Keine Herstellergarantie für die Meßdaten
M = Meßlänge: Typenbezogener Meßweg
L = 5 mm Zusatzlänge mit M4x5 bei Option Stabspitzenlagerung

S = TOTAL LENGTH
D = DAMPENING ZONE: IN THIS AREA NO MEASURING SIGNAL IS PRODUCED
M =STROKE LENGTH
L = 5 MM ADDITIONAL LENGTH WITH M4x5 FOR OPTION ROD MOUNTING

MAGNET T4-M33



Meßlänge M (mm) *STROKE LENGTH M (mm)*	Stablänge S (mm) *TOTAL LENGTH S (MM)*	Zykluszeit (ms) *CYCLE (ms)*	Auflösung (mm) *RESOLUTION (MM)*
150	256	0,5	0,1
300	406	0,5	0,1
500	606	0,5	0,12
700	806	1	0,17
750	856	1	0,18
1000	1106	1	0,25
1500	1606	2	0,37
2000	2106	2	0,5
2500	2606	2	0,6
3000	3106	2	0,75

Linear-Encoder LA-66-K SS

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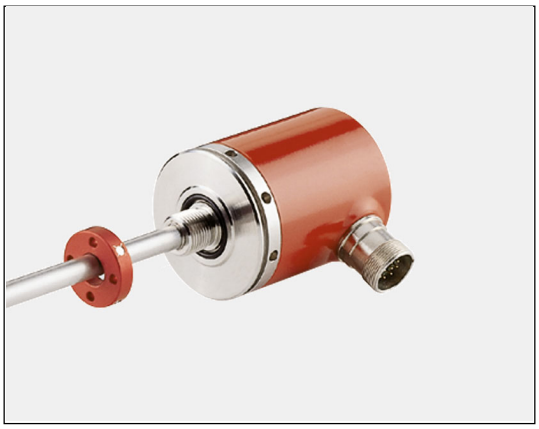

- **High Pressure Type, Makes it Possible for Installation into Hydraulic Cylinders**
- **For Linear Measurement**
- **Non Contact and Wear Free**
- **Start / Stop Interface**

7

Electrical Data

Measurement Principle	Magnetostrictive
Measuring Length (Stroke) Standard (mm)	150, 300, 500, 700, 750, 1000, 1500, 2000, 2500, 3000, > 3000 by request
Resolution	Dependent on external electronics
Operating Voltage	
TTL-Version	15-27 V DC, Power Dissipation (No Load) < 1.5 Watt
TTL-Version	± 15 V DC, Power Dissipation (No Load) < 1.5 Watt
RS422-Version	24 V DC, Power Dissipation (No Load) < 1.5 Watt
Start / Stop Interface	Start / Stop-Signal for external electronics
Data Transmission Length	max. 15 m with TTL-Version, max. 500 m with RS422-Version
Cycle Time	See Dimensional Drawing
Inputs	
Start-Signal (TTL-Version)	TTL-voltage ("Active-High", Impedance = 470 Ω)
Start-Signal (RS422-Version)	Differential Input
Outputs	
Stop-Signal (TTL-Version)	"H" = 5 V, "L" ≤ 0.2 V ("Active-High ", Impedance = 220 Ω)
Stop-Signal (RS422-Version)	Differential Output
External Electronics	- TR-Module. AK-8, - Siemens Interface Module IP 241, - Philips Positioning Interface 9404 4620 0301, - Bernecker + Rainer, - Harms und Wende etc…
Pin Configuration	Upon Request

Environmental Data

Electromagnetic compatibility (EMC)	EN 61000-4-2 (IEC-801-2) / EN 61000-4-4 (IEC-801-4)
Operating Temperature	0°-70°C (32° to 158° F) (Optional -20° to +70°C) (-4° to 158° F)
Storage Temperature	-30° to +80°C (-22° to 178° F)
Relative Humidity	98 % (non condensing)
*Protection Class	IP 65 (DIN 40 050)

* The protection class of the sensor can be effected by the type of connector used.

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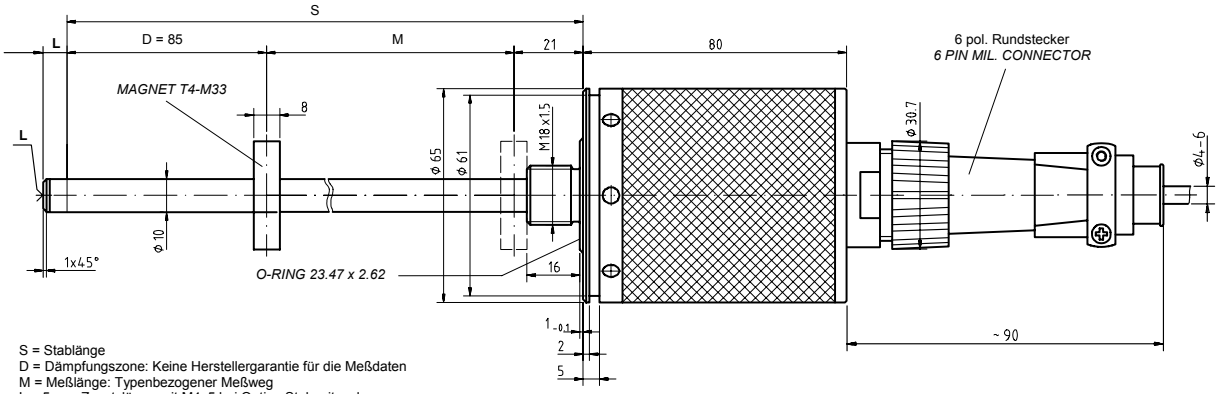
Linear-Encoder LA-66-K SS

Mechanical Data

Linearity	< 0.05 % of Stroke Length
Repeatability	≤ 0.01 mm
Hysteresis	< 0.1 mm
Temperature Coefficient	< 5 µm / °C
Vibration (Sinus 50-2000 Hz)	
per DIN IEC 68-2-6	≤ 100 m/s² (10g)
Shock (11ms) per DIN IEC 68-2-27	≤ 1000 m/s² (100g)
Pressure Resistance (Option)	600 bar
Rod Material	Cr/Ni-alloy
Magnetic Field	< 3 mT (milli Tesla)
Operating Speed and Mounting Orientation	No restrictions
Magnet Type (Standard)	T4-M33
Magnet Type(Option)	T3-U64
Rod Mounting	Option
Mechanical Special Types	Upon Request
Connector	6 pin MIL-Connector

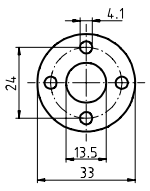
Dimensional Drawing



S = Stablänge
D = Dämpfungszone: Keine Herstellergarantie für die Meßdaten
M = Meßlänge: Typenbezogener Meßweg
L = 5 mm Zusatzlänge mit M4x5 bei Option Stabspitzenlagerung

S = TOTAL LENGTH
D = DAMPENING ZONE: IN THIS AREA NO MEASURING SIGNAL IS PRODUCED
M = STROKE LENGTH
L = 5 MM ADDITIONAL LENGTH WITH M4x5 FOR OPTION ROD MOUNTING

MAGNET T4-M33



Meßlänge M (mm) *STROKE LENGTH M (mm)*	Stablänge S (mm) *TOTAL LENGTH S (MM)*	Zykluszeit (µs) *CYCLE (µs)*
150	256	120
300	406	175
500	606	310
700	806	335
750	856	340
1000	1106	450
1500	1606	615
2000	2106	890
2500	2606	1065
3000	3106	1230

Linear-Encoder LA-66-K SSI

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- **Pressure proof model, direct installation into hydraulic cylinder is possible**
- **Sensing of linear motion**
- **Non contact and no wear sensing**
- **Programmable, scaleable**
- **SSI (Synchronous-Serial Interface)**

Electrical Data

Measuring Principle	Magnetostrictive
Standard Measuring length (mm)	150, 300, 500, 700, 750, 1000, 1500, 2000, 2500, 3000
	> 3000 upon request
Sensor Capacity	max. 20 bit
* Resolution	max. 0,01 mm
Operating Voltage	19-27 V DC
Power Dissipation (No Load)	< 5 W
Programming via RS485	PC IBM compatible (EPROG), Programming-Terminal PT-100N
* Output Code (programmable)	Binary, Gray, BCD
Clock Input	Opto-coupler
Clock Rate	95 kHz - 1 MHz
Cycle Time	See Dimension Drawing
Data Transmission Length	Dependent on Cable Section, Shield, Clock Rate etc.
Data Output	RS422 (2-wire)
Inputs	
* F/R	Count Direction
* Preset	Electronic Adjustment
Logic Levels	“0“ < + 2 V DC, “1“ > + 8 V DC, max. 30 V DC
Pin Configuration	Upon Request

* Programmable Parameter

Environmental Data

Electromagnetic compatibility (EMC)	EN 61000-4-2 (IEC-801-2) / EN 61000-4-4 (IEC-801-4)
Operating Temperature	0°-70°C (32° to 158° F) (Optional -20° to +70°C) (-4° to 158° F)
Storage Temperature	-30° to +80°C (-22° to 178° F)
Relative Humidity	98 % (non condensing)
* Protection Class	IP 65 (DIN 40 050)

* Protection is determined by connector specified

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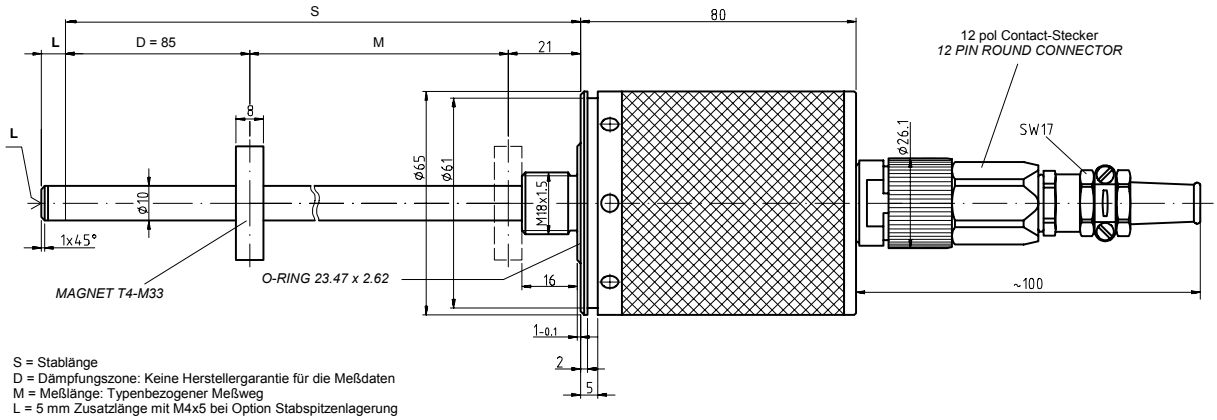
Mechanical Data

Linearity	< 0.05 % of Stroke Length
Reproducibility	≤ 0,01 mm
Hysteresis	< 0.1 mm
Temperature Coefficient	< 5 µm / °C
Vibration (Sinus 50-2000 Hz) according to DIN IEC 68-2-6	≤ 100 m/s² (10g)
Shock (11ms) according to DIN IEC 68-2-27	≤ 1000 m/s² (100g)
Pressure Resistance (Option)	600 bar static
Rod Material	Cr/Ni-alloy
Magnetic Interference (at rod circumference)	< 3 mT (milli Tesla)
Operating Speed and Mounting Orientation	No restrictions
Magnet Type (Standard)	T4-M33
Magnet Type (Option)	T3-U64
Rod Mounting	Option
Mechanical Special Types	upon request
Connection	12 pin connector

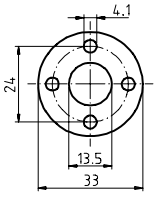
Dimensional Drawing



S = Stablänge
D = Dämpfungszone: Keine Herstellergarantie für die Meßdaten
M = Meßlänge: Typenbezogener Meßweg
L = 5 mm Zusatzlänge mit M4x5 bei Option Stabspitzenlagerung

S = TOTAL LENGTH
D = DAMPENING ZONE: IN THIS AREA NO MEASURING SIGNAL IS PRODUCED
M = STROKE LENGTH
L = 5 MM ADDITIONAL LENGTH WITH M4x5 FOR OPTION ROD MOUNTING

MAGNET T4-M33



Meßlänge M (mm) *STROKE LENGTH M (mm)*	Stablänge S (mm) *TOTAL LENGTH S (MM)*	Zykluszeit (ms) *CYCLE (ms)*
150	256	1,4
300	406	1,4
500	606	1,4
700	806	1,4
750	856	1,4
1000	1106	1,8
1500	1606	2,7
2000	2106	3,6
2500	2606	4,5
3000	3106	5,4

Linear-Encoder LA-66-K ASI

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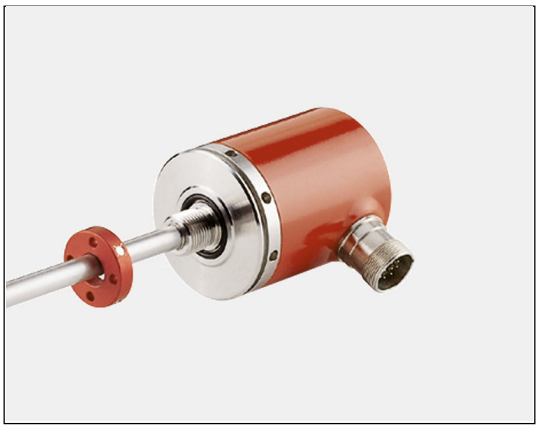

- **High Pressure Type, Makes it Possible for Installation into Hydraulic Cylinders**
- **For Linear Measurement**
- **Non Contact and Wear Free**
- **ASI (Asynchronous Serial Interface)**

Electrical Data

Measurement Principle	Magnetostrictive
Measuring Length (Stroke) Standard (mm)	150, 300, 500, 700, 750, 1000, 1500, 2000, 2500, 3000
	> 3000 by request
Sensor Capacity	max. 20 Bit
Resolution	max. 0.01 mm
Operating Voltage	19-27 V DC
Power Dissipation (No Load)	< 5 Watt
Output Code	BCD, Binary, Gray
Baud Rate	4800, 9600, 19200, 38400
Data Output	RS422 (2-wire)
Communication Format	1 Start Bit, 7 Data Bits, 1 Parity Bit, 2 Stop Bits
Data Format	ASCII
Standard Communication	ASCII, 6 Character + CR
Baud Rate	4800
Input Options	
Forward / Reverse	Change direction of count
Preset	Adjust absolute position to a given set value (i.e. zero set)
Logic Levels	“0“ < + 2 V DC, “1“ > + 8 V DC, max. 30 VDC
Pin Configuration	Upon Request

Environmental Data

Electromagnetic compatibility (EMC)	EN 61000-4-2 (IEC-801-2) / EN 61000-4-4 (IEC-801-4)
Operating Temperature	0°-70°C (32° to 158° F) (Optional -20° to +70°C) (-4° to 158° F)
Storage Temperature	-30° to +80°C (-22° to 178° F)
Relative Humidity	98 % (non condensing)
*Protection Class	IP 65 (DIN 40 050)

* The protection class of the sensor can be effected by the type of connector used.

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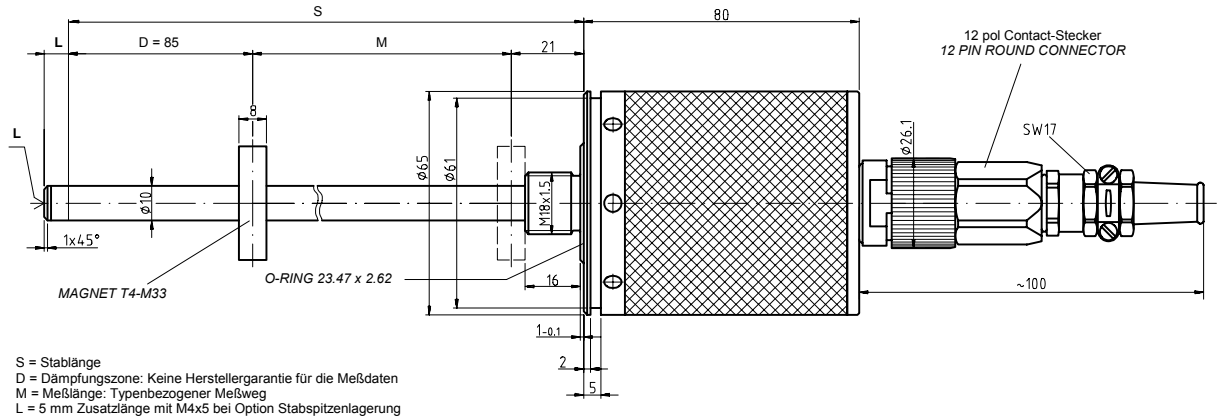
Linear-Encoder LA-66-K ASI

Mechanical Data

Linearity	< 0.05 % of Stroke Length
Repeatability	≤ 0.01 mm
Hysteresis	< 0.1 mm
Temperature Coefficient	< 5 µm / °C
Vibration (Sinus 50-2000 Hz)	
per DIN IEC 68-2-6	≤ 100 m/s^2 (10g)
Shock (11ms) per DIN IEC 68-2-27	≤ 1000 m/s^2 (100g)
Pressure Resistance (Option)	600 bar
Rod Material	Cr/Ni-alloy
Magnetic Field	< 3 mT (milli Tesla)
Operating Speed and Mounting Orientation	No restrictions
Magnet Type (Standard)	T4-M33
Magnet Type(Option)	T3-U64
Rod Mounting	Option
Mechanical Special Types	Upon Request
Connector	12 pin Contact Connector

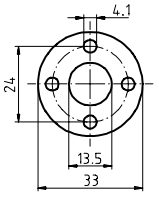
Dimensional Drawing



S = Stablänge
D = Dämpfungszone: Keine Herstellergarantie für die Meßdaten
M = Meßlänge: Typenbezogener Meßweg
L = 5 mm Zusatzlänge mit M4x5 bei Option Stabspitzenlagerung

S = TOTAL LENGTH
D = DAMPENING ZONE: IN THIS AREA NO MEASURING SIGNAL IS PRODUCED
M = STROKE LENGTH
L = 5 MM ADDITIONAL LENGTH WITH M4x5 FOR OPTION ROD MOUNTING

MAGNET T4-M33



Meßlänge M (mm) *STROKE LENGTH M (mm)*	Stablänge S (mm) *TOTAL LENGTH S (MM)*	Zykluszeit (ms) *CYCLE (ms)*
150	256	1,4
300	406	1,4
500	606	1,4
700	806	1,4
750	856	1,4
1000	1106	1,8
1500	1606	2,7
2000	2106	3,6
2500	2606	4,5
3000	3106	5,4

Linear-Encoder LA-66-K ISI

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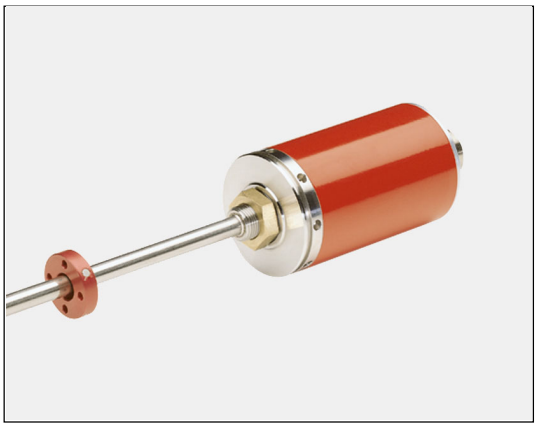

- **High Pressure Type, Makes it Possible for Installation into Hydraulic Cylinders**
- **For Linear Measurement**
- **Non Contact and Wear Free**
- **Programmable and Scaleable**
- **ISI (Incremental Serial Interface)**

7

Electrical Data

Measurement Principle	Magnetostrictive
Measuring Length (Stroke) Standard (mm)	150, 300, 500, 700, 750, 1000, 1500, 2000, 2500, 3000
	> 3000 by request
Sensor Capacity	max. 20 Bit
* Resolution	max. 0.01 mm
Operating Voltage	19-27 V DC
Power Dissipation (No Load)	< 5 Watt
Programmable via RS485	IBM PC Compatible EPROG Software, PT-100N Programming Terminal
Inputs	
* Load Input	Request for Encoder Position
* Preset	Adjust absolute position to a given set value (i.e. zero set)
Logic Levels	"0" < +2 VDC, "1" > + 8 VDC, max. 30 VDC
Output Options	Push-Pull (15 mA) or RS422
* Load Output	Verification of Load Request
Channel 1	A
Channel 1 neg.	A neg.
Channel 2	B
Channel 2 neg.	B neg.
Operating Speed	max. 1m/s at a resolution of 0,01 mm
Cycle Time	See Dimensional Drawing
Pin Configuration	Upon Request

*Programmable Parameters

Environmental Data

Electromagnetic compatibility (EMC)	EN 61000-4-2 (IEC-801-2) / EN 61000-4-4 (IEC-801-4)
Operating Temperature	0°-70°C (32° to 158° F) (Optional -20° to +70°C) (-4° to 158° F)
Storage Temperature	-30° to +80°C (-22° to 178° F)
Relative Humidity	98 % (non condensing)
*Protection Class	IP 65 (DIN 40 050)

* The protection class of the sensor can be effected by the type of connector used.

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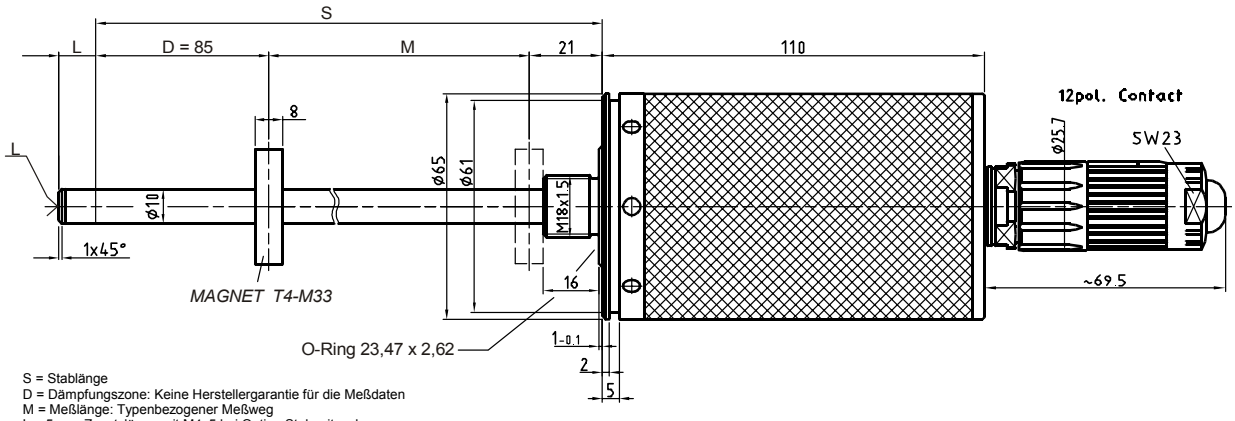
Mechanical Data

Linearity	< 0.05 % of Stroke Length
Repeatability	≤ 0.01 mm
Hysteresis	< 0.1 mm
Temperature Coefficient	< 5 µm / °C
Vibration (Sinus 50-2000 Hz)	
per DIN IEC 68-2-6	≤ 100 m/s² (10g)
Shock (11ms) per DIN IEC 68-2-27	≤ 1000 m/s² (100g)
Pressure Resistance (Option)	600 bar
Rod Material	Cr/Ni-alloy
Magnetic Field	< 3 mT (milli Tesla)
Operating Speed and Mounting Orientation	No restrictions
Magnet Type (Standard)	T4-M33
Magnet Type(Option)	T3-U64
Rod Mounting	Option
Mechanical Special Types	Upon Request
Connector	12 pin Contact Connector

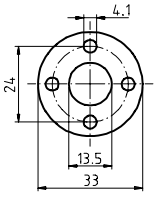
Dimensional Drawing



S = Stablänge
D = Dämpfungszone: Keine Herstellergarantie für die Meßdaten
M = Meßlänge: Typenbezogener Meßweg
L = 5 mm Zusatzlänge mit M4x5 bei Option Stabspitzenlagerung

S = TOTAL LENGTH
D = DAMPENING ZONE: IN THIS AREA NO MEASURING SIGNAL IS PRODUCED
M = STROKE LENGTH
L = 5 MM ADDITIONAL LENGTH WITH M4x5 FOR OPTION ROD MOUNTING

MAGNET T4-M33



Meßlänge M (mm) *STROKE LENGTH M (mm)*	Stablänge S (mm) *TOTAL LENGTH S (MM)*	Zykluszeit (ms) *CYCLE (ms)*
150	256	1,4
300	406	1,4
500	606	1,4
700	806	1,4
750	856	1,4
1000	1106	1,8
1500	1606	2,7
2000	2106	3,6
2500	2606	4,5
3000	3106	5,4

Linear-Encoder LA-66-K P

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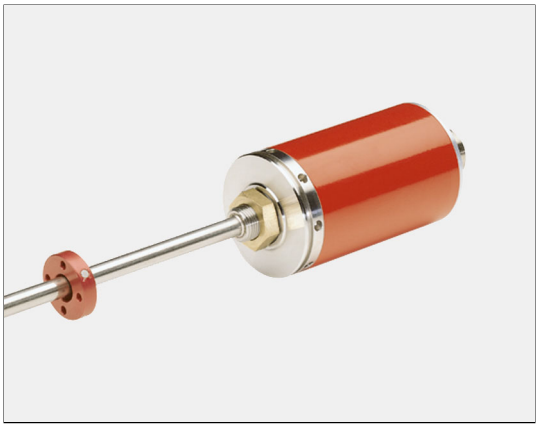

- **High Pressure Type, Makes it Possible for Installation into Hydraulic Cylinders**
- **For Linear Measurement**
- **Non Contact and Wear Free**
- **Programmable and Scaleable**
- **Parallel Interface**

Electrical Data

Measurement Principle	Magnetostrictive
Measuring Length (Stroke) Standard (mm)	150, 300, 500, 700, 750, 1000, 1500, 2000, 2500, 3000, > 3000 by request
Sensor Capacity	max. 20 Bit
* Resolution	max. 0.01 mm
Operating Voltage	19-27 V DC
Power Dissipation (No Load)	< 5 Watt
Programmable via RS485	IBM PC Compatible EPROG Software, PT-100N Programming Terminal
Output Code (programmable)	Binary, BCD, Gray
Output Options	Push-Pull, Open Collector, Open Emitter (max. 35 V)
Maximum Current	100 mA / Short Circuit Protected
Input Options	
* Forward / Reverse	Change direction of count
* Preset	Adjust absolute position to a given value
* Latch	Freezes data lines
* Bus	For multiplexing many encoders. Only to be used with Open Collector or Open Emitter Output drivers
Logic Levels	"0" < + 2 VDC, "1" > + 8 V DC, max. 30 VDC
Cycle Time	See Dimensional Drawings
Pin Configuration	Upon Request

* Programmable Parameters

Environmental Data

Electromagnetic compatibility (EMC)	EN 61000-4-2 (IEC-801-2) / EN 61000-4-4 (IEC-801-4)
Operating Temperature	0°-70°C (32° to 158° F) (Optional -20° to +70°C) (-4° to 158° F)
Storage Temperature	-30° to +80°C (-22° to 178° F)
Relative Humidity	98 % (non condensing)
*Protection Class	IP 65 (DIN 40 050)

* The protection class of the sensor can be effected by the type of connector used.

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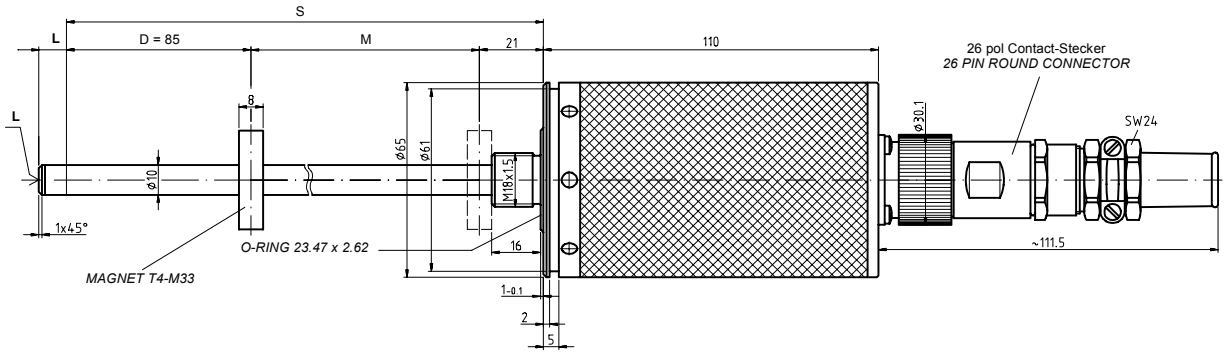
Linear-Encoder LA-66-K P

Mechanical Data

Linearity	< 0.05 % of Stroke Length
Repeatability	≤ 0.01 mm
Hysteresis	< 0.1 mm
Temperature Coefficient	< 5 µm / °C
Vibration (Sinus 50-2000 Hz)	
per DIN IEC 68-2-6	≤ 100 m/s^2 (10g)
Shock (11ms) per DIN IEC 68-2-27	≤ 1000 m/s^2 (100g)
Pressure Resistance (Option)	600 bar
Rod Material	Cr/Ni-alloy
Magnetic Field	< 3 mT (milli Tesla)
Operating Speed and Mounting Orientation	No restrictions
Magnet Type (Standard)	T4-M33
Magnet Type(Option)	T3-U64
Rod Mounting	Option
Mechanical Special Types	Upon Request
Connector	26 pin Contact Connector

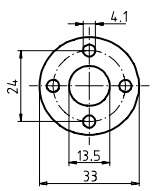
Dimensional Drawing



S = Stablänge
D = Dämpfungszone: Keine Herstellergarantie für die Meßdaten
M = Meßlänge: Typenbezogener Meßweg
L = 5 mm Zusatzlänge mit M4x5 bei Option Stabspitzenlagerung

S = TOTAL LENGTH
D = DAMPENING ZONE: IN THIS AREA NO MEASURING SIGNAL IS PRODUCED
M = STROKE LENGTH
L = 5 MM ADDITIONAL LENGTH WITH M4x5 FOR OPTION ROD MOUNTING

MAGNET T4-M33



Meßlänge M (mm) *STROKE LENGTH M (mm)*	Stablänge S (mm) *TOTAL LENGTH S (MM)*	Zykluszeit (ms) *CYCLE (ms)*
150	256	1,4
300	406	1,4
500	606	1,4
700	806	1,4
750	856	1,4
1000	1106	1,8
1500	1606	2,7
2000	2106	3,6
2500	2606	4,5
3000	3106	5,4

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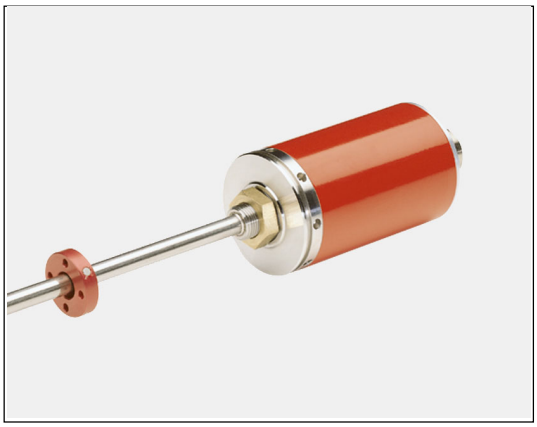
Linear-Encoder LA-66-K CAM



- **High Pressure Type, Makes it Possible for Installation into Hydraulic Cylinders**
- **For Linear Measurement**
- **Non Contact and Wear Free**
- **Programmable and Scaleable**
- **Number of Cams - 8**

Electrical Data

Measurement Principle	Magnetostrictive
Measuring Length (Stroke) Standard (mm)	150, 300, 500, 700, 750, 1000, 1500, 2000, 2500, 3000
	> 3000 by request
Number of Cams	8 Outputs, 1 Cam per output
	Additional outputs and Cams available upon request
* Resolution	max. 0.01 mm
Operating Voltage	19-27 V DC
Power Dissipation (No Load)	< 5 Watt
Programmable via RS485	PT-100N Programming Terminal
* Output Code	Programmable Cams
Output Options	Push-Pull, Open Collector, Open Emitter (max. 35 V)
Number of Outputs	8 plus Inverted Signals
Maximum Current	100 mA / Short Circuit Protected
Inputs	
* Forward / Reverse	Change count direction
* Preset	Adjust absolute position to a given value (i.e. zero set)
Logic Levels	“0“ < + 2 V DC, “1“ > + 8 V DC, max. 30 V DC
Cycle Time	See Dimensional Drawing
Pin Configuration	Upon Request

* Programmable Parameters

Environmental Data

Electromagnetic compatibility (EMC)	EN 61000-4-2 (IEC-801-2) / EN 61000-4-4 (IEC-801-4)
Operating Temperature	0°-70°C (32° to 158° F) (Optional -20° to +70°C) (-4° to 158° F)
Storage Temperature	-30° to +80°C (-22° to 178° F)
Relative Humidity	98 % (non condensing)
*Protection Class	IP 65 (DIN 40 050)

* The protection class of the sensor can be effected by the type of connector used.

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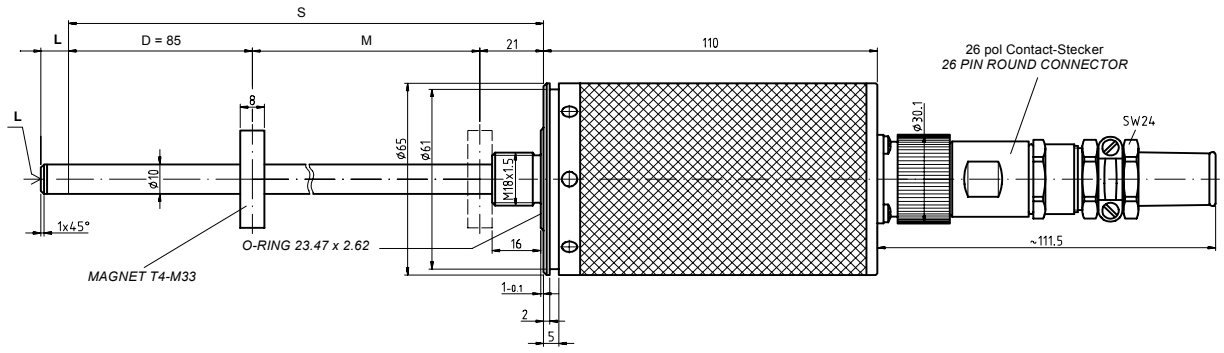
Linear-Encoder LA-66-K CAM

Mechanical Data

Linearity	< 0.05 % of Stroke Length
Repeatability	≤ 0.01 mm
Hysteresis	< 0.1 mm
Temperature Coefficient	< 5 µm / °C
Vibration (Sinus 50-2000 Hz)	
per DIN IEC 68-2-6	≤ 100 m/s^2 (10g)
Shock (11ms) per DIN IEC 68-2-27	≤ 1000 m/s^2 (100g)
Pressure Resistance (Option)	600 bar
Rod Material	Cr/Ni-alloy
Magnetic Field	< 3 mT (milli Tesla)
Operating Speed and Mounting Orientation	No restrictions
Magnet Type (Standard)	T4-M33
Magnet Type(Option)	T3-U64
Rod Mounting	Option
Mechanical Special Types	Upon Request
Connector	26 pin Contact Connector

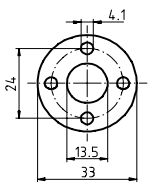
Dimensional Drawing



S = Stablänge
D = Dämpfungszone: Keine Herstellergarantie für die Meßdaten
M = Meßlänge: Typenbezogener Meßweg
L = 5 mm Zusatzlänge mit M4x5 bei Option Stabspitzenlagerung

S = TOTAL LENGTH
D = DAMPENING ZONE: IN THIS AREA NO MEASURING SIGNAL IS PRODUCED
M = STROKE LENGTH
L = 5 MM ADDITIONAL LENGTH WITH M4x5 FOR OPTION ROD MOUNTING

MAGNET T4-M33



Meßlänge M (mm) *STROKE LENGTH M (mm)*	Stablänge S (mm) *TOTAL LENGTH S (MM)*	Zykluszeit (ms) *CYCLE (ms)*
150	256	1,4
300	406	1,4
500	606	1,4
700	806	1,4
750	856	1,4
1000	1106	1,8
1500	1606	2,7
2000	2106	3,6
2500	2606	4,5
3000	3106	5,4

Linear-Encoder LA-66-K IBS

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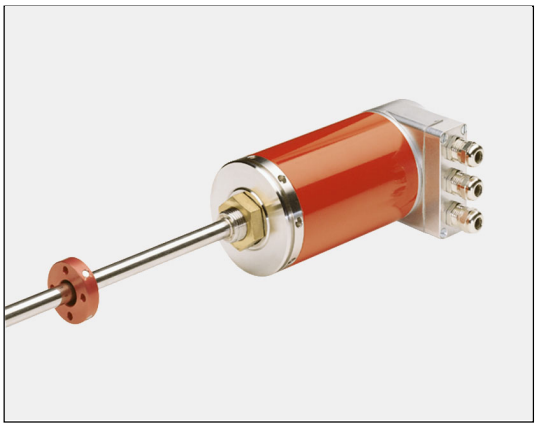

- **High Pressure Type, Makes it Possible for Installation into Hydraulic Cylinders**
- **For Linear Measurement**
- **Non Contact and Wear Free**
- **Programmable via INTERBUS-S**
- **IBS INTERBUS-S Interface**

7

Electrical Data

Measurement Principle	Magnetostrictive
Measuring Length (Stroke) Standard (mm)	150, 300, 500, 700, 750, 1000, 1500, 2000, 2500, 3000
	> 3000 by request
Sensor Capacity	max. 20 Bit
* Resolution	max. 0.01 mm
Operating Voltage	19-27 V DC
Power Dissipation (No Load)	< 4 Watt
Programmable via INTERBUS-S	2 Wire Long Distance Field Bus, RS422, Electrically Isolated
Output Code	Binary
Baud Rate	300 kbaud min., 500 kbaud max., Including Control and Status Bytes
Identification Number	51 decimal
Programmable Parameters via IBS bus	
Count Direction	
Number of Counts per Length	
Preset Value	
Adjustf Absolute Value	
Inputs	
Forward / Reverse	Change count direction
Preset	Adjust absolute position to a given value (i.e. zero set)
Logic Levels	“0“ < + 2 V DC, “1“ > + 8 V DC, max. 30 V DC
Cycle Time	See Dimensional Drawing
Option	Multi-Sensor Type
Number of possible Sensors	12, minimum distance of the sensors 50 mm
Pin Configuration	Upon Request

Environmental Data

Electromagnetic compatibility (EMC)	EN 61000-4-2 (IEC-801-2) / EN 61000-4-4 (IEC-801-4)
Operating Temperature	0°-70°C (32° to 158° F) (Optional -20° to +70°C) (-4° to 158° F)
Storage Temperature	-30° to +80°C (-22° to 178° F)
Relative Humidity	98 % (non condensing)
*Protection Class	IP 65 (DIN 40 050)

* The protection class of the sensor can be effected by the type of cable used.

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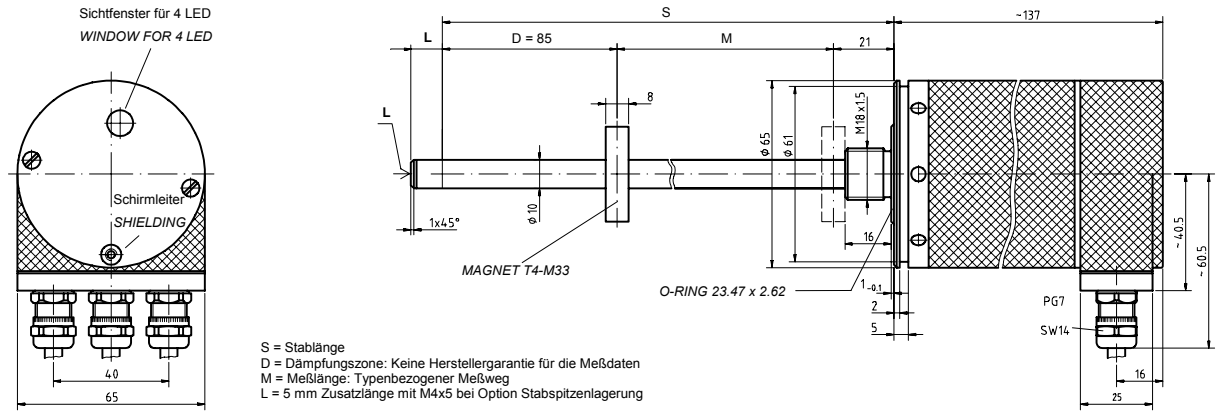
Linear-Encoder LA-66-K IBS

Mechanical Data

Linearity	< 0.05 % of Stroke Length
Repeatability	≤ 0.01 mm
Hysteresis	< 0.1 mm
Temperature Coefficient	< 5 µm / °C
Vibration (Sinus 50-2000 Hz)	
per DIN IEC 68-2-6	≤ 100 m/s^2 (10g)
Shock (11ms) per DIN IEC 68-2-27	≤ 1000 m/s^2 (100g)
Pressure Resistance (Option)	600 bar
Rod Material	Cr/Ni-alloy
Magnetic Field	< 3 mT (milli Tesla)
Operating Speed and Mounting Orientation	No restrictions
Magnet Type (Standard)	T4-M33
Magnet Type(Option)	T3-U64
Rod Mounting	Option
Mechanical Special Types	Upon Request
Connector	3 x PG 7 radial mount

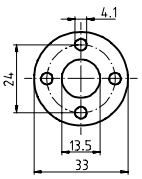
Dimensional Drawing



S = Stablänge
D = Dämpfungszone: Keine Herstellergarantie für die Meßdaten
M = Meßlänge: Typenbezogener Meßweg
L = 5 mm Zusatzlänge mit M4x5 bei Option Stabspitzenlagerung

S = TOTAL LENGTH
D = DAMPENING ZONE: IN THIS AREA NO MEASURING SIGNAL IS PRODUCED
M = STROKE LENGTH
L = 5 MM ADDITIONAL LENGTH WITH M4x5 FOR OPTION ROD MOUNTING

MAGNET T4-M33



Für Schirmleiter:
Schraube M4x8 und Kabelschuh,
mit Zahnscheibe nach DIN 6797-A
4.3-FSt unterlegt.

FOR SHIELDING:
USE METRIC SCREW M4X8 WITH FORKED TERMINAL.
FOR GOOD CONTACT TO HOUSING USE A STUDDED DISK DIN 6797-A 4.3-FST.

Meßlänge M (mm) *STROKE LENGTH M (mm)*	Stablänge S (mm) *TOTAL LENGTH S (MM)*	Zykluszeit (ms) *CYCLE (ms)*
150	256	1,4
300	406	1,4
500	606	1,4
700	806	1,4
750	856	1,4
1000	1106	1,8
1500	1606	2,7
2000	2106	3,6
2500	2606	4,5
3000	3106	5,4

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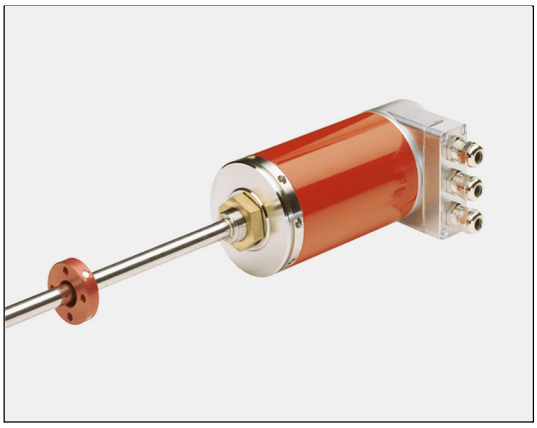
Germany

Linear-Encoder LA-66-K PROFIBUS (PNO)



- **High Pressure Type, Makes it Possible for Installation into Hydraulic Cylinders**
- **For Linear Measurement**
- **Non Contact and Wear Free**
- **Parametrizable via the PROFIBUS according PNO-Profile CLASS2**
- **PROFIBUS-DP Interface**

Electrical Data

Measurement Principle	Magnetostrictive
Measuring Length (Stroke) Standard (mm)	150, 300, 500, 700, 750, 1000, 1500, 2000, 2500, 3000
	> 3000 by request
Sensor Capacity	max. 20 Bit
* Resolution	max. 0.01 mm
Operating Voltage	19-27 V DC
Power Dissipation (No Load)	< 4 Watt
Output Code	Binary
Data Protocol	PROFIBUS-DP protocol according DIN E 19 245 T.3
Baud Rate	max. 12 Mbaud
Station Address	3 - 99, adjustable via BCD switches
Inputs	
* Forward / Reverse	Change count direction
* Preset	Adjust absolute position to a given value (i.e. zero set)
Logic Levels	“0“ < + 2 V DC, “1“ > + 8 V DC, max. 30 V DC
Cycle Time	See Dimensional Drawing
Option	Multi-Sensor Type
Number of possible Sensors	12, minimum distance of the sensors 50 mm
Pin Configuration	Upon Request

* Programmable Parameters

Environmental Data

Electromagnetic compatibility (EMC)	EN 61000-4-2 (IEC-801-2) / EN 61000-4-4 (IEC-801-4)
Operating Temperature	0°-70°C (32° to 158° F) (Optional -20° to +70°C) (-4° to 158° F)
Storage Temperature	-30° to +80°C (-22° to 178° F)
Relative Humidity	98 % (non condensing)
*Protection Class	IP 65 (DIN 40 050)

* The protection class of the sensor can be effected by the type of cable used.

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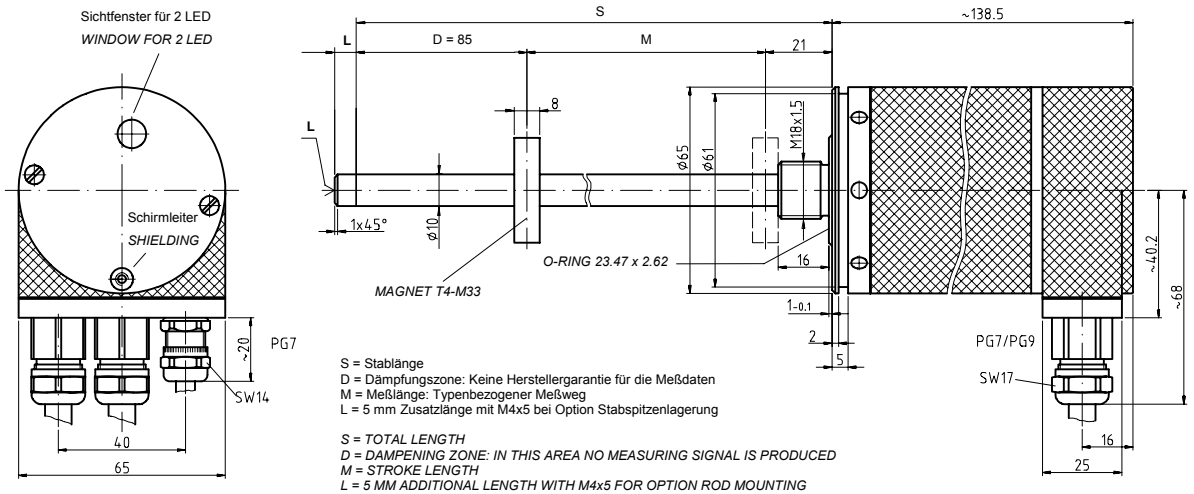
Linear-Encoder LA-66-K PROFIBUS (PNO)

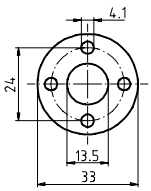
Mechanical Data

Linearity	< 0.05 % of Stroke Length
Repeatability	≤ 0.01 mm
Hysteresis	< 0.1 mm
Temperature Coefficient	< 5 µm / °C
Vibration (Sinus 50-2000 Hz)	
per DIN IEC 68-2-6	≤ 100 m/s^2 (10g)
Shock (11ms) per DIN IEC 68-2-27	≤ 1000 m/s^2 (100g)
Pressure Resistance (Option)	600 bar
Rod Material	Cr/Ni-alloy
Magnetic Field	< 3 mT (milli Tesla)
Operating Speed and Mounting Orientation	No restrictions
Magnet Type (Standard)	T4-M33
Magnet Type(Option)	T3-U64
Rod Mounting	Option
Mechanical Special Types	Upon Request
Connector	1 x PG 7, 2 x PG 7 / 9 radial mount

Dimensional Drawing



MAGNET T4-M33



Für Schirmleiter:
Schraube M4x8 und Kabelschuh,
mit Zahnscheibe nach DIN 6797-A
4.3-FSt unterlegt.

FOR SHIELDING:
USE METRIC SCREW M4X8 WITH FORKED TERMINAL.
FOR GOOD CONTACT TO HOUSING USE A STUDDED DISK DIN 6797-A 4.3-FST.

Meßlänge M (mm) *STROKE LENGTH M (mm)*	Stablänge S (mm) *TOTAL LENGTH S (MM)*	Zykluszeit (ms) *CYCLE (ms)*
150	256	1,4
300	406	1,4
500	606	1,4
700	806	1,4
750	856	1,4
1000	1106	1,8
1500	1606	2,7
2000	2106	3,6
2500	2606	4,5
3000	3106	5,4

Linear-Encoder LA-66-K FIPIO

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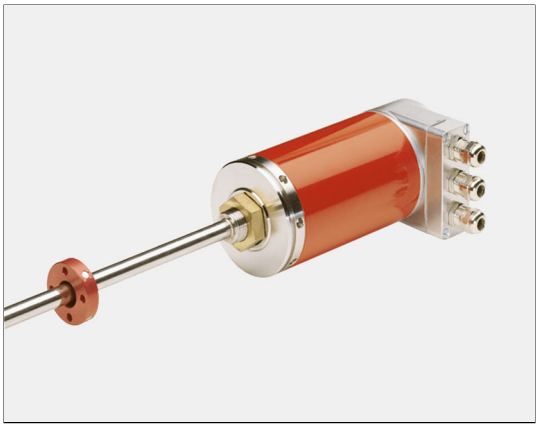
VIA BUS



- **High Pressure Type, Makes it Possible for Installation into Hydraulic Cylinders**
- **For Linear Measurement**
- **Non Contact and Wear Free**
- **Programmable via FIPIO**
- **FIPIO Interface**

Electrical Data

Measurement Principle	Magnetostrictive
Measuring Length (Stroke) Standard (mm)	150, 300, 500, 700, 750, 1000, 1500, 2000, 2500, 3000
	> 3000 by request
Sensor Capacity	max. 20 Bit
* Resolution	max. 0.01 mm
Operating Voltage	19-27 V DC
Power Dissipation (No Load)	< 4 Watt
Programmable via FIPIO	FIPIO / FSD C8
Output Code	Binary
Baud Rate	following FIPIO standards
Station Adress	1-127
Programmable Parameters via FIPIO	- Direction of counting - Measuring length in steps - Preset adjustment - Up / Down - Limit switches - Cams
Cycle Time	See Dimensional Drawing
Pin Configuration	Upon Request

Environmental Data

Electromagnetic compatibility (EMC)	EN 61000-4-2 (IEC-801-2) / EN 61000-4-4 (IEC-801-4)
Operating Temperature	0°-70°C (32° to 158° F) (Optional -20° to +70°C) (-4° to 158° F)
Storage Temperature	-30° to +80°C (-22° to 178° F)
Relative Humidity	98 % (non condensing)
*Protection Class	IP 65 (DIN 40 050)

* The protection class of the sensor can be effected by the type of cable used.

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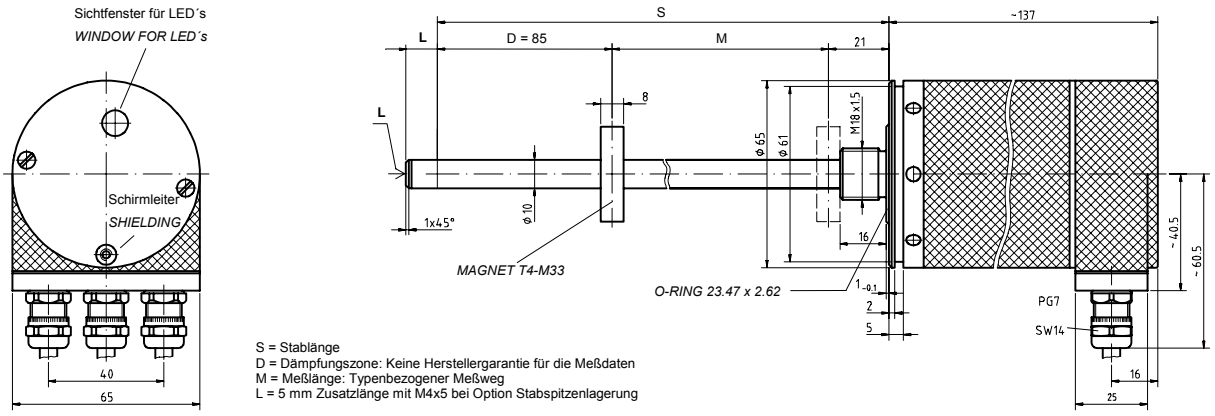
Linear-Encoder LA-66-K FIPIO

Mechanical Data

Linearity	< 0.05 % of Stroke Length
Repeatability	≤ 0.01 mm
Hysteresis	< 0.1 mm
Temperature Coefficient	< 30 ppm / °C
Vibration (Sinus 50-2000 Hz)	
per DIN IEC 68-2-6	≤ 100 m/s^2 (10g)
Shock (11ms) per DIN IEC 68-2-27	≤ 1000 m/s^2 (100g)
Pressure Resistance (Option)	600 bar
Rod Material	Cr/Ni-alloy
Magnetic Field	< 3 mT (milli Tesla)
Operating Speed and Mounting Orientation	No restrictions
Magnet Type (Standard)	T4-M33
Magnet Type(Option)	T3-U64
Rod Mounting	Option
Mechanical Special Types	Upon Request
Connector	3 x PG 7 radial mount

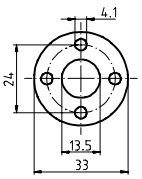
Dimensional Drawing



S = Stablänge
D = Dämpfungszone: Keine Herstellergarantie für die Meßdaten
M = Meßlänge: Typenbezogener Meßweg
L = 5 mm Zusatzlänge mit M4x5 bei Option Stabspitzenlagerung

S = TOTAL LENGTH
D = DAMPENING ZONE: IN THIS AREA NO MEASURING SIGNAL IS PRODUCED
M = STROKE LENGTH
L = 5 MM ADDITIONAL LENGTH WITH M4x5 FOR OPTION ROD MOUNTING

MAGNET T4-M33



Für Schirmleiter:
Schraube M4x8 und Kabelschuh,
mit Zahnscheibe nach DIN 6797-A
4.3-FSt unterlegt.

FOR SHIELDING:
USE METRIC SCREW M4X8 WITH FORKED TERMINAL.
FOR GOOD CONTACT TO HOUSING USE A STUDDED DISK DIN 6797-A 4.3-FST.

Meßlänge M (mm) *STROKE LENGTH M (mm)*	Stablänge S (mm) *TOTAL LENGTH S (MM)*	Zykluszeit (ms) *CYCLE (ms)*
150	256	1,4
300	406	1,4
500	606	1,4
700	806	1,4
750	856	1,4
1000	1106	1,8
1500	1606	2,7
2000	2106	3,6
2500	2606	4,5
3000	3106	5,4

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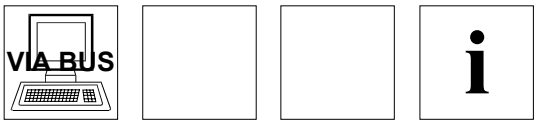
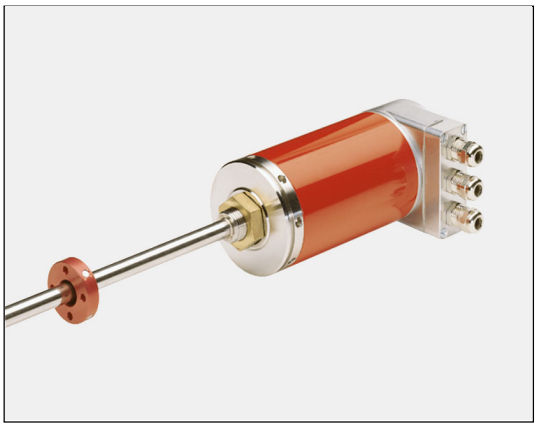
Linear-Encoder LA-66-K LWL





- **High Pressure Type, Makes it Possible for Installation into Hydraulic Cylinders**
- **For Linear Measurement**
- **Non Contact and Wear Free**
- **Programmable via LWL-Ring**
- **LWL Fiber Optic Interface**

7

Electrical Data

Measurement Principle	Magnetostrictive
Measuring Length (Stroke) Standard (mm)	150, 300, 500, 700, 750, 1000, 1500, 2000, 2500, 3000
	> 3000 by request
Sensor Capacity	max. 20 Bit
* Resolution	max. 0.01 mm
Operating Voltage	19-27 V DC
Power Dissipation (No Load)	< 6 Watt
Programmable via LWL-Ring	in connection with
	• PC Compatible Central-Module
	• SIMATIC-S5 Compatible Central-Module
	• VMEbus
	• SMP-Bus Upon Request
Transmission Media LWL	Plastic (“APF” - All Plastic Fiber) or Glass (“PCS” - Plastic Coated Silicon)
Maximum Cable Length between two points	600 m with Glass Cable, 45 m with plastic cable (Radius □ 30 mm)
Output Code	Binary
Baud Rate	2,5 Mbaud in fiber optic ring
Maximum Points	max. 254
Programmable Parameters	
Count Direction	
Number of Counts per Length	
Preset Value	
Adjust Absolute Value	

Environmental Data

Electromagnetic compatibility (EMC)	EN 61000-4-2 (IEC-801-2) / EN 61000-4-4 (IEC-801-4)
Operating Temperature	0°-70°C (32° to 158° F) (Optional -20° to +70°C) (-4° to 158° F)
Storage Temperature	-30° to +80°C (-22° to 178° F)
Relative Humidity	98 % (non condensing)
*Protection Class	IP 65 (DIN 40 050)

* The protection class of the sensor can be effected by the type of cable used.

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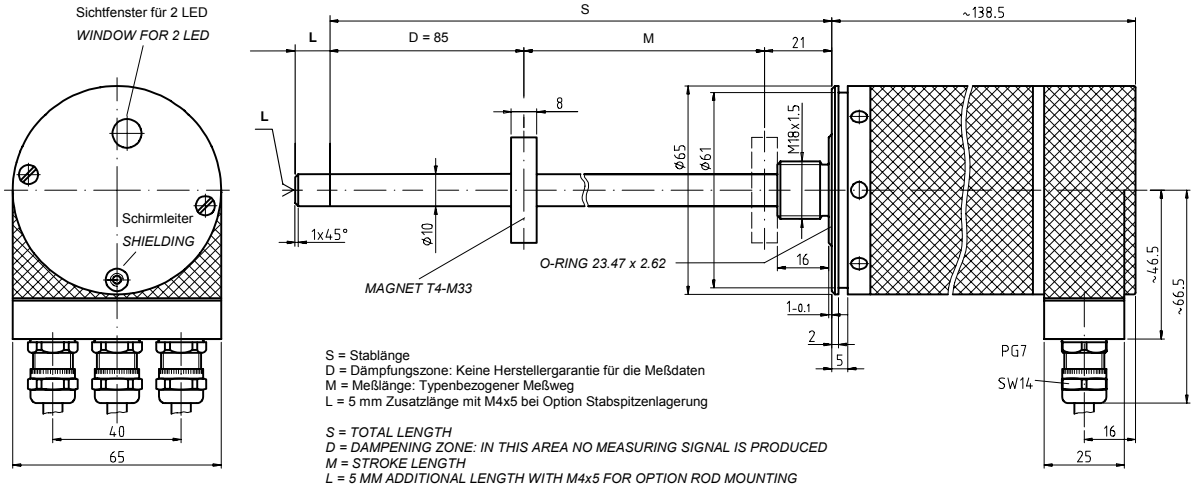
Mechanical Data

Linearity	< 0.05 % of Stroke Length
Repeatability	≤ 0.01 mm
Hysteresis	< 0.1 mm
Temperature Coefficient	< 5 µm / °C
Vibration (Sinus 50-2000 Hz)	
per DIN IEC 68-2-6	≤ 100 m/s² (10g)
Shock (11ms) per DIN IEC 68-2-27	≤ 1000 m/s² (100g)
Pressure Resistance (Option)	600 bar
Rod Material	Cr/Ni-alloy
Magnetic Field	< 3 mT (milli Tesla)
Operating Speed and Mounting Orientation	No restrictions
Magnet Type (Standard)	T4-M33
Magnet Type(Option)	T3-U64
Rod Mounting	Option
Mechanical Special Types	Upon Request
Connector	3 x PG 7 radial mount

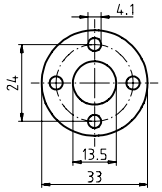
Dimensional Drawing



S = Stablänge
D = Dämpfungszone: Keine Herstellergarantie für die Meßdaten
M = Meßlänge: Typenbezogener Meßweg
L = 5 mm Zusatzlänge mit M4x5 bei Option Stabspitzenlagerung

S = TOTAL LENGTH
D = DAMPENING ZONE: IN THIS AREA NO MEASURING SIGNAL IS PRODUCED
M = STROKE LENGTH
L = 5 MM ADDITIONAL LENGTH WITH M4x5 FOR OPTION ROD MOUNTING

MAGNET T4-M33



Für Schirmleiter:
Schraube M4x8 und Kabelschuh,
mit Zahnscheibe nach DIN 6797-A
4.3-FSt unterlegt.

FOR SHIELDING:
USE METRIC SCREW M4X8 WITH FORKED TERMINAL.
FOR GOOD CONTACT TO HOUSING USE A STUDDED DISK DIN 6797-A 4.3-FST.

Meßlänge M (mm) *STROKE LENGTH M (mm)*	Stablänge S (mm) *TOTAL LENGTH S (MM)*	Zykluszeit (ms) *CYCLE (ms)*
150	256	1,4
300	406	1,4
500	606	1,4
700	806	1,4
750	856	1,4
1000	1106	1,8
1500	1606	2,7
2000	2106	3,6
2500	2606	4,5
3000	3106	5,4

Linear-Encoder LA-80 A

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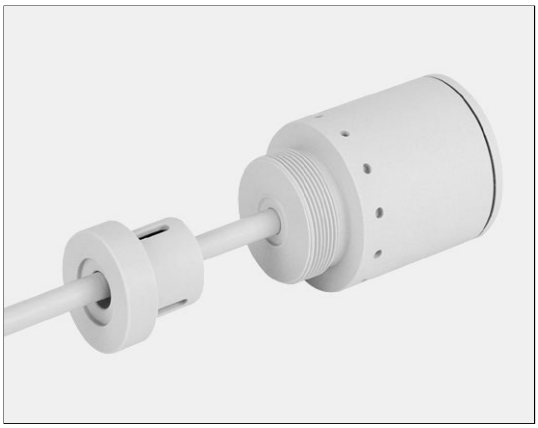

- **Suitable for installation in chemically aggressive environments and plating area's**
- **For Linear Measurement**
- **Non Contact and Wear Free**
- **Adjustment via set-inputs**
- **Analog - Interface**

Electrical Data

Measurement Principle	Magnetostrictive
Measuring Length (Stroke) Standard (mm)	100, 150, 200, 250, 300, 350, 400, 450, 500, 550, 600, 650, 700, 750, 800, 850, 900, 950, 1000, > 1000 on request
Sensor Capacity	12 Bit
Operating Voltage	24 V DC ± 10 %
Power Dissipation (no load)	< 4 Watt
Analog Voltage Interface	0 - 10 V, 10 - 0 V, ± 5 V, ± 10 V
Impedance	min. 680 Ω
Analog Current Interface	0 - 20 mA, 4 - 20 mA
Impedance	max. 500 Ω
Cycle Time	See Dimensional Drawing
Data Transmission Length	
Dependent on Shield Design	max. 10 m for Analog Voltage Interface max. 1000 m for Analog Current Interface
Inputs	
Zero Set	For setting the start point of the analog signal
Span Set	For setting the end point of the analog signal
Logic Levels	"0" < + 2 V DC, "1" > + 8 V DC, max. 30 VDC
Pin Configuration	Upon Request

Environmental Data

Electromagnetic compatibility (EMC)	EN 61000-4-2 (IEC-801-2) / EN 61000-4-4 (IEC-801-4)
Operating Temperature	0°-70°C (32° to 158° F) (Optional -20° to +70°C) (-4° to 158° F)
Storage Temperature	-30° to +80°C (-22° to 178° F)
Relative Humidity	98 % (non condensing)
*Protection Class	IP 65 (DIN 40 050)
*Protection Class	depending on connector used up to IP 65 (DIN 40 050)

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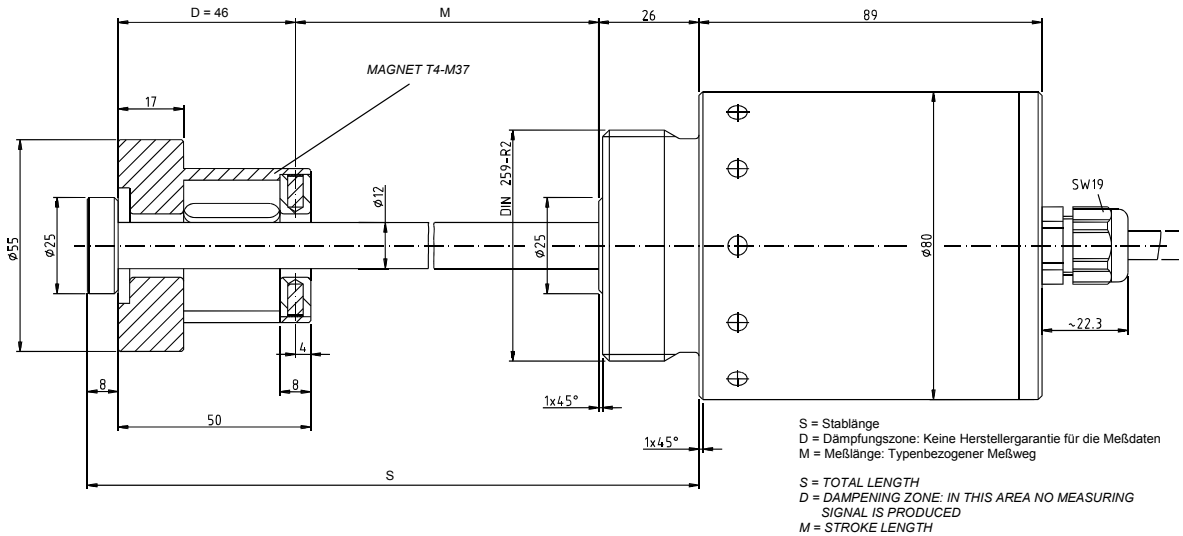
Mechanical Data

Linearity	< 0.05 % of Stroke Length
Repeatability	≤ 0.01 mm
Hysteresis	< 0.1 mm
Temperature Coefficient	< 5 µm / °C
Vibration (Sinus 50-2000 Hz)	
per DIN IEC 68-2-6	≤ 100 m/s^2 (10g)
Shock (11ms) per DIN IEC 68-2-27	≤ 1000 m/s^2 (100g)
Pressure Resistance (Option)	600 bar
Rod Material	Polypropylene
Magnetic Field (at measurement plane)	< 3 mT (milli Tesla)
Operating Speed and Mounting Orientation	No restrictions
Magnet Type	Floating T4-M37
Special Mechanical Design	on Request
* Connector	PG axial

* Other connectors available on Request.

Dimensional Drawing



S = Stablänge
D = Dämpfungszone: Keine Herstellergarantie für die Meßdaten
M = Meßlänge: Typenbezogener Meßweg

S = TOTAL LENGTH
D = DAMPENING ZONE: IN THIS AREA NO MEASURING SIGNAL IS PRODUCED
M = STROKE LENGTH

Meßlänge M (mm) *STROKE LENGTH M (mm)*	Stablänge S (mm) *TOTAL LENGTH S (MM)*	Zykluszeit (ms) *CYCLE (ms)*	Meßlänge M (mm) *STROKE LENGTH M (mm)*	Stablänge S (mm) *TOTAL LENGTH S (MM)*	Zykluszeit (ms) *CYCLE (ms)*
100	180	1,5	600	680	1,5
150	230	1,5	650	730	1,5
200	280	1,5	700	780	1,5
250	330	1,5	750	830	1,5
300	380	1,5	800	880	1,5
350	430	1,5	850	930	1,5
400	480	1,5	900	980	1,5
450	530	1,5	950	1030	1,5
500	580	1,5	1000	1080	1,5
550	630	1,5	-	-	-

Linear-Encoder LA-80 SSI

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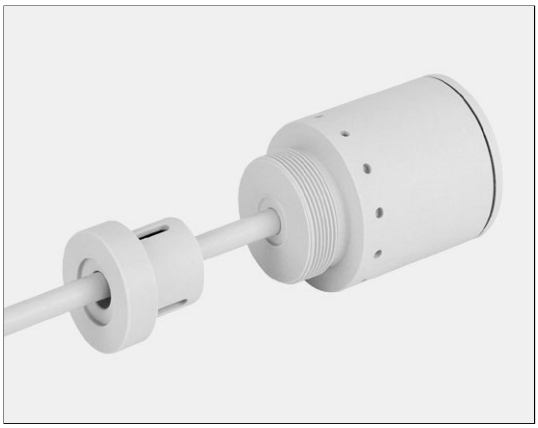

- **Suitable for installation in chemically aggressive environments and plating area's**
- **For Linear Measurement**
- **Non Contact and Wear Free**
- **Programmable and Scaleable**
- **SSI (Synchronous Serial Interface)**

7

Electrical Data

Measurement Principle	Magnetostrictive
Measuring Length (Stroke) Standard (mm)	100, 150, 200, 250, 300, 350, 400, 450, 500, 550, 600, 650, 700, 750, 800, 850, 900, 950, 1000, > 1000 on request
Sensor Capacity	max. 20 Bit
* Resolution	max. 0.1 mm
Operating Voltage	19-27 V DC
Power Dissipation (No Load)	< 5 Watt
Programmable via RS485	PC IBM Compatible EPROG Software, PT-100N Programming Terminal
* Output Code (programmable)	Binary, Gray, BCD
Clock Input	Opto Coupler
Clock Frequency	95 kHz - 1 MHz
Cycle Time	See Dimensional Drawing
Transmission Cable Length	Dependent on cable Cross Section, Shielding, Clock Frequency etc.…
Data Output	RS422 (2-wire)
Input Options	
* Forward / Reverse	Change direction of count
* Preset	Adjust absolute position to a set value
Logic Levels	"0" < + 2 VDC, "1" > + 8 V DC, max. 30 VDC
Pin Configuration	Upon Request

* Programmable Parameters

Environmental Data

Electromagnetic compatibility (EMC)	EN 61000-4-2 (IEC-801-2) / EN 61000-4-4 (IEC-801-4)
Operating Temperature	0°-70°C (32° to 158° F) (Optional -20° to +70°C) (-4° to 158° F)
Storage Temperature	-30° to +80°C (-22° to 178° F)
Relative Humidity	98 % (non condensing)
*Protection Class	IP 65 (DIN 40 050)
*Protection Class	depending on connector used up to IP 65 (DIN 40 050)

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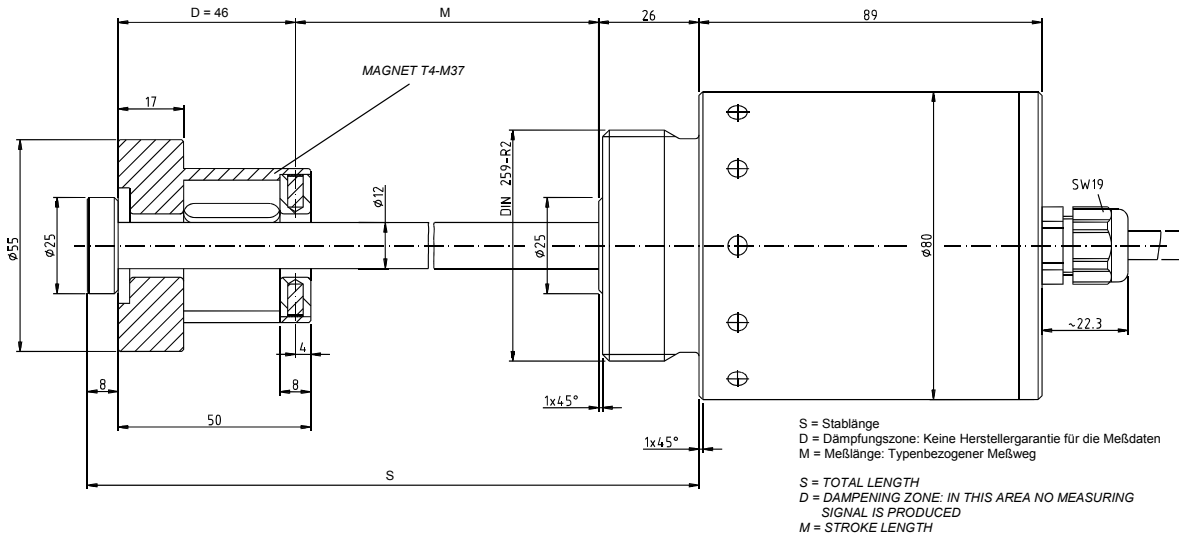
Mechanical Data

Linearity	< 0.05 % of Stroke Length
Repeatability	≤ 0.01 mm
Hysteresis	< 0.1 mm
Temperature Coefficient	< 5 µm / °C
Vibration (Sinus 50-2000 Hz)	
per DIN IEC 68-2-6	≤ 100 m/s^2 (10g)
Shock (11ms) per DIN IEC 68-2-27	≤ 1000 m/s^2 (100g)
Pressure Resistance (Option)	600 bar
Rod Material	Polypropylene
Magnetic Field (at measurement plane)	< 3 mT (milli Tesla)
Operating Speed and Mounting Orientation	No restrictions
Magnet Type	Floating T4-M37
Special Mechanical Design	on request
* Connector	PG axial

* Other connectors available on Request.

Dimensional Drawing



S = Stablänge
D = Dämpfungszone: Keine Herstellergarantie für die Meßdaten
M = Meßlänge: Typenbezogener Meßweg

S = TOTAL LENGTH
D = DAMPENING ZONE: IN THIS AREA NO MEASURING SIGNAL IS PRODUCED
M = STROKE LENGTH

Meßlänge M (mm) *STROKE LENGTH M (mm)*	Stablänge S (mm) *TOTAL LENGTH S (MM)*	Zykluszeit (ms) *CYCLE (ms)*	Meßlänge M (mm) *STROKE LENGTH M (mm)*	Stablänge S (mm) *TOTAL LENGTH S (MM)*	Zykluszeit (ms) *CYCLE (ms)*
100	180	1,5	600	680	1,5
150	230	1,5	650	730	1,5
200	280	1,5	700	780	1,5
250	330	1,5	750	830	1,5
300	380	1,5	800	880	1,5
350	430	1,5	850	930	1,5
400	480	1,5	900	980	1,5
450	530	1,5	950	1030	1,5
500	580	1,5	1000	1080	1,5
550	630	1,5	-	-	-

Linear-Encoder LP-38 A

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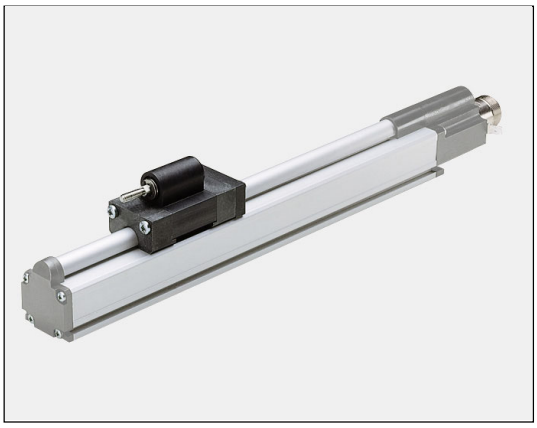

- **For Linear Measurement**
- **Non Contact and Wear Free**
- **Adjustment via set-inputs**
- **Simple Assembly with Standard Housings**
- **Analog-Interface**

Electrical Data

Measurement Principle	Magnetostrictive
Measuring Length (Stroke) Standard (mm)	150, 300, 500, 700, 750, 1000, 1500, 2000, 2500, 3000
	> 3000 by request
Resolution	max. 0.1 mm
Operating Voltage	24 V DC ± 10 %
Power Dissipation (No Load)	< 4 Watt
Analog Voltage Interface	0 - 10 V, 10 - 0 V, ± 5 V, ± 10 V
Impedance	min. 680 Ω
Analog Current Interface	0 - 20 mA, 4 - 20 mA
Impedance	max. 500 Ω
Cycle Time	See Dimensional Drawing
Data Transmission Length	
Dependent on Shield Design	max. 10 m for Analog Voltage Interface
	max. 1000 m for Analog Current Interface
Inputs	
Zero Set	For setting the start point of the analog signal
Span Set	For setting the end point of the analog signal
Logic Levels	"0" < + 2 V DC, "1" > + 8 V DC, max. 30 VDC
Pin Configuration	Upon Request

Environmental Data

Electromagnetic compatibility (EMC)	EN 61000-4-2 (IEC-801-2) / EN 61000-4-4 (IEC-801-4)
Operating Temperature	0°-70°C (32° to 158° F) (Optional -20° to +70°C) (-4° to 158° F)
Storage Temperature	-30° to +80°C (-22° to 178° F)
Relative Humidity	98 % (non condensing)
*Protection Class	IP 65 (DIN 40 050)

* The protection class of the sensor can be effected by the type of connector used.

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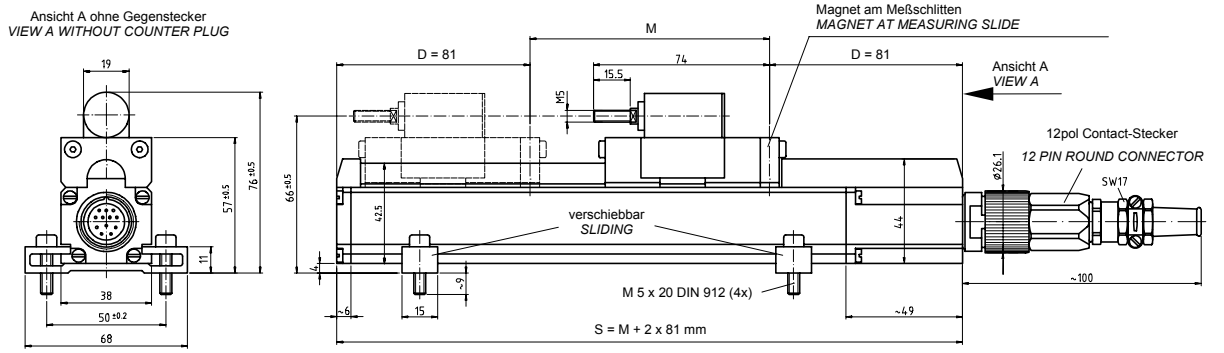
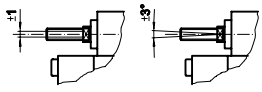
Linear-Encoder LP-38 A

Mechanical Data

Linearity	< 0.05 % of Stroke Length
Repeatability	≤ 0.01 mm
Hysteresis	< 0.1 mm
Temperature Coefficient	< 5 µm / °C
Vibration (Sinus 50-2000 Hz)	
per DIN IEC 68-2-6	≤ 100 m/s^2 (10g)
Shock (11ms) per DIN IEC 68-2-27	≤ 1000 m/s^2 (100g)
Magnetic Field	< 3 mT (milli Tesla)
Operating Speed and Mounting Orientation	No restrictions
Magnet Type	T4-U3820
Mechanical Special Types	Upon Request
Connector	12 pin Contact Connector

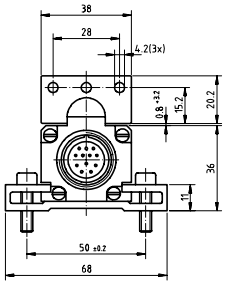
Dimensional Drawing





Magnet und Ansicht A ohne Meßschlitten

MAGNET AND VIEW A OF THE MODEL WITHOUT MEASURING SLIDE



S = Stablänge
D = Dämpfungszone: Keine Herstellergarantie für die Meßdaten
M = Meßlänge: Typenbezogener Meßweg

S = TOTAL LENGTH
D = DAMPENING ZONE: IN THIS AREA NO MEASURING SIGNAL IS PRODUCED
M = STROKE LENGTH

Meßlänge M (mm) *STROKE LENGTH M (mm)*	Stablänge S (mm) *TOTAL LENGTH S (MM)*	Zykluszeit (ms) *CYCLE (ms)*	Auflösung (mm) *RESOLUTION (MM)*
150	312	2,5	0,1
300	462	2,5	0,1
500	662	2,5	0,12
700	862	2,5	0,17
750	912	2,5	0,18
1000	1162	2,5	0,25
1500	1662	2,5	0,37
2000	2162	2,5	0,5
2500	2662	2,5	0,6
3000	3162	2,5	0,75

Linear-Encoder LP-38 SS

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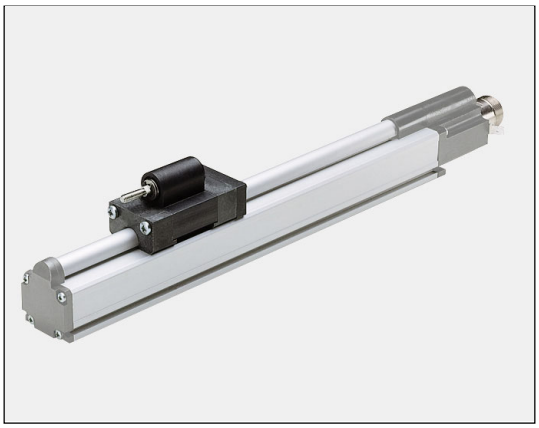

- **For Linear Measurement**
- **Non Contact and Wear Free**
- **Simple Assembly with Standard Housing**
- **Start / Stop-Interface**

Electrical Data

Measurement Principle	Magnetostrictive
Measuring Length (Stroke) Standard (mm)	150, 300, 500, 700, 750, 1000, 1500, 2000, 2500, 3000, > 3000 by Request
Resolution	Dependent on external electronics
Operating Voltage	
TTL-Version	15-27 V DC, Power Dissipation (No Load) < 1.5 Watt
TTL-Version	± 15 V DC, Power Dissipation (No Load) < 1.5 Watt
RS422-Version	24 V DC, Power Dissipation (No Load) < 1.5 Watt
Start / Stop Interface	Start / Stop-Signal for external electronics
Data Transmission Length	max. 15 m with TTL-Version, max. 500 m with RS422-Version
Cycle Time	See Dimensional Drawing
Inputs	
Start-Signal (TTL-Version)	TTL-voltage ("Active-High", Impedance = 470 Ohm)
Start-Signal (RS422-Version)	Differential Input
Outputs	
Stop-Signal (TTL-Version)	"H" = 5 V, "L" ≤ 0,2 V ("Active-High ", Impedance = 220 Ohm)
Stop-Signal (RS422-Version)	Differential Output
External Electronics	- TR-Module. AK-8, - Siemens Interface Module IP 241, - Philips Positioning Interface 9404 4620 0301, - Bernecker + Rainer, - Harms und Wende etc…
Pin Configuration	Upon Request

Environmental Data

Electromagnetic compatibility (EMC)	EN 61000-4-2 (IEC-801-2) / EN 61000-4-4 (IEC-801-4)
Operating Temperature	0°-70°C (32° to 158° F) (Optional -20° to +70°C) (-4° to 158° F)
Storage Temperature	-30° to +80°C (-22° to 178° F)
Relative Humidity	98 % (non condensing)
*Protection Class	IP 65 (DIN 40 050)

* The protection class of the sensor can be effected by the type of connector used.

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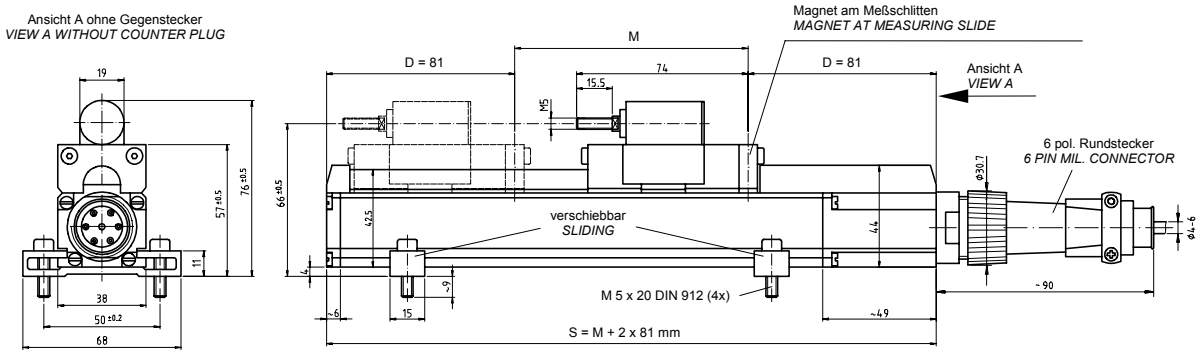
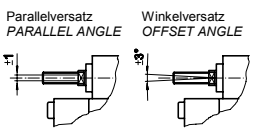
Mechanical Data

Linearity	< 0.05 % of Stroke Length
Repeatability	≤ 0.01 mm
Hysteresis	< 0.1 mm
Temperature Coefficient	< 5 µm / °C
Vibration (Sinus 50-2000 Hz)	
per DIN IEC 68-2-6	≤ 100 m/s^2 (10g)
Shock (11ms) per DIN IEC 68-2-27	≤ 1000 m/s^2 (100g)
Magnetic Field	< 3 mT (milli Tesla)
Operating Speed and Mounting Orientation	No restrictions
Magnet Type	T4-U3820
Mechanical Special Types	Upon Request
Connector	6 pin MIL connector

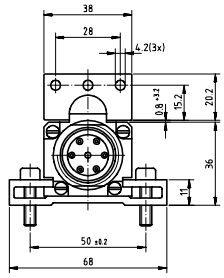
Dimensional Drawing





Magnet und Ansicht A ohne Meßschlitten

MAGNET AND VIEW A OF THE MODEL WITHOUT MEASURING SLIDE



S = Stablänge
D = Dämpfungszone: Keine Herstellergarantie für die Meßdaten
M = Meßlänge: Typenbezogener Meßweg

S = TOTAL LENGTH
D = DAMPENING ZONE: IN THIS AREA NO MEASURING SIGNAL IS PRODUCED
M = STROKE LENGTH

Meßlänge M (mm) *STROKE LENGTH M (mm)*	Stablänge S (mm) *TOTAL LENGTH S (MM)*	Zykluszeit (µs) *CYCLE (µs)*
150	312	120
300	462	175
500	662	310
700	862	335
750	912	340
1000	1162	450
1500	1662	615
2000	2162	890
2500	2662	1065
3000	3162	1230

Linear-Encoder LP-38 SSI

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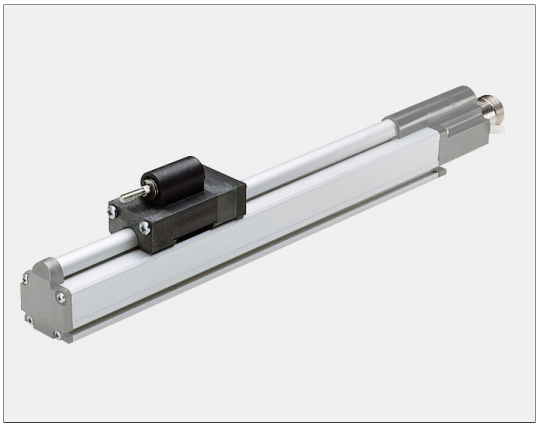

- **For Linear Measurement**
- **Non Contact and Wear Free**
- **Programmable and Scaleable**
- **Simple Assembly with Standard Housing**
- **SSI-Interface (Synchronous-Serial Interface)**

Electrical Data

Measurement Principle	Magnetostrictive
Measuring Length (Stroke) Standard (mm)	150, 300, 500, 700, 750, 1000, 1500, 2000, 2500, 3000
	> 3000 by Request
Sensor Capacity	max. 20 Bit
* Resolution	max. 0.01 mm
Operating Voltage	19-27 V DC
Power Dissipation (No Load)	< 5 Watt
Programmable via RS485	PT-100N Programming Terminal
* Output Code (programmable)	Binary, Gray, BCD
Clock Input	Opto Coupler
Clock Frequency	95 kHz - 1 MHz
Cycle Time	See Dimensional Drawing
Transmission Cable Length	Dependent on cable Cross Section, Shielding, Clock Frequency etc.…
Data Output	RS422 (2-wire)
Input Options	
* Forward / Reverse	Change direction of count
* Preset	Adjust absolute position to a set value
Logic Levels	"0" < + 2 V DC, "1" > + 8 V DC, max. 30 VDC
Pin Configuration	Upon Request

* Programmable Parameters

Environmental Data

Electromagnetic compatibility (EMC)	EN 61000-4-2 (IEC-801-2) / EN 61000-4-4 (IEC-801-4)
Operating Temperature	0°-70°C (32° to 158° F) (Optional -20° to +70°C) (-4° to 158° F)
Storage Temperature	-30° to +80°C (-22° to 178° F)
Relative Humidity	98 % (non condensing)
*Protection Class	IP 65 (DIN 40 050)

* The protection class of the sensor can be effected by the type of connector used.

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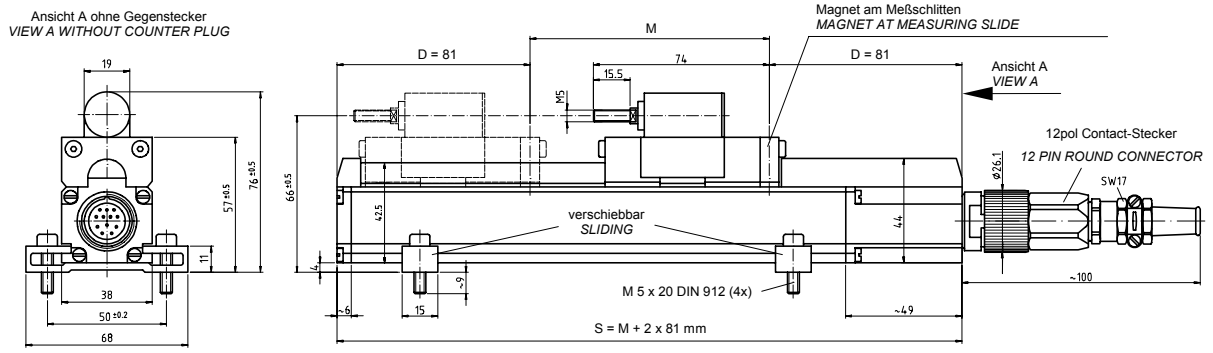
Mechanical Data

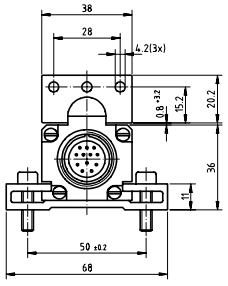
Linearity	< 0.05 % of Stroke Length
Repeatability	≤ 0.01 mm
Hysteresis	< 0.1 mm
Temperature Coefficient	< 5 µm / °C
Vibration (Sinus 50-2000 Hz)	
per DIN IEC 68-2-6	≤ 100 m/s^2 (10g)
Shock (11ms) per DIN IEC 68-2-27	≤ 1000 m/s^2 (100g)
Magnetic Field	< 3 mT (milli Tesla)
Operating Speed and Mounting Orientation	No restrictions
Magnet Type	T4-U3820
Mechanical Special Types	Upon Request
Connector	12 pin Contact Connector

Dimensional Drawing



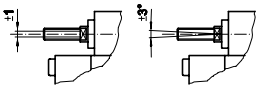
Magnet und Ansicht A ohne Meßschlitten

MAGNET AND VIEW A OF THE MODEL WITHOUT MEASURING SLIDE



Parallelversatz *PARALLEL ANGLE*

Winkelversatz *OFFSET ANGLE*



S = Stablänge
D = Dämpfungszone: Keine Herstellergarantie für die Meßdaten
M = Meßlänge: Typenbezogener Meßweg

S = TOTAL LENGTH
D = DAMPENING ZONE: IN THIS AREA NO MEASURING SIGNAL IS PRODUCED
M = STROKE LENGTH

Meßlänge M (mm) *STROKE LENGTH M (mm)*	Stablänge S (mm) *TOTAL LENGTH S (MM)*	Zykluszeit (ms) *CYCLE (ms)*
150	312	1,4
300	462	1,4
500	662	1,4
700	862	1,4
750	912	1,4
1000	1162	1,8
1500	1662	2,7
2000	2162	3,6
2500	2662	4,5
3000	3162	5,4

Linear-Encoder LP-38 ASI

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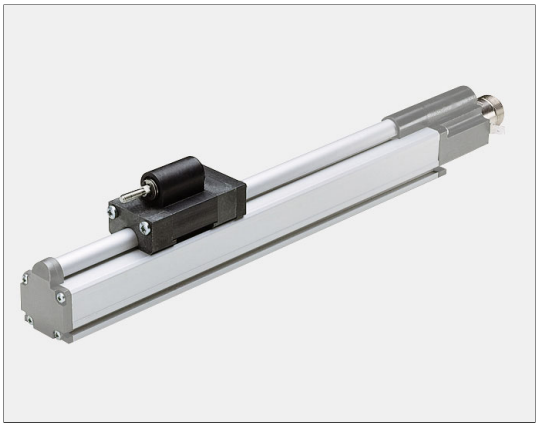

- **For Linear Measurement**
- **Non Contact and Wear Free**
- **Simple Assembly with Standard Housing**
- **ASI-Interface (Asynchronous-Serial Interface)**

Electrical Data

Measurement Principle	Magnetostrictive
Measuring Length (Stroke) Standard (mm)	150, 300, 500, 700, 750, 1000, 1500, 2000, 2500, 3000
	> 3000 by request
Sensor Capacity	max. 20 Bit
Resolution	max. 0.01 mm
Operating Voltage	19-27 V DC
Power Dissipation (No Load)	< 5 Watt
Output Code	BCD, Binary, Gray
Baud Rate	4800, 9600, 19200, 38400
Data Output	RS422 (2-wire)
Communication Format	1 Start Bit, 7 Data Bits, 1 Parity Bit, 2 Stop Bits
Data Format	ASCII
Standard Communication	ASCII, 6 Character + CR
Baud Rate	4800
Other Communication Formats	Upon Request
Input Options	
Forward / Reverse	Change direction of count
Preset	Adjust absolute position to a given set value (i.e. zero set)
Logic Levels	"0" < + 2 V DC, "1" > + 8 V DC, max. 30 VDC
Pin Configuration	Upon Request

Environmental Data

Electromagnetic compatibility (EMC)	EN 61000-4-2 (IEC-801-2) / EN 61000-4-4 (IEC-801-4)
Operating Temperature	0°-70°C (32° to 158° F) (Optional -20° to +70°C) (-4° to 158° F)
Storage Temperature	-30° to +80°C (-22° to 178° F)
Relative Humidity	98 % (non condensing)
*Protection Class	IP 65 (DIN 40 050)

* The protection class of the sensor can be effected by the type of connector used.

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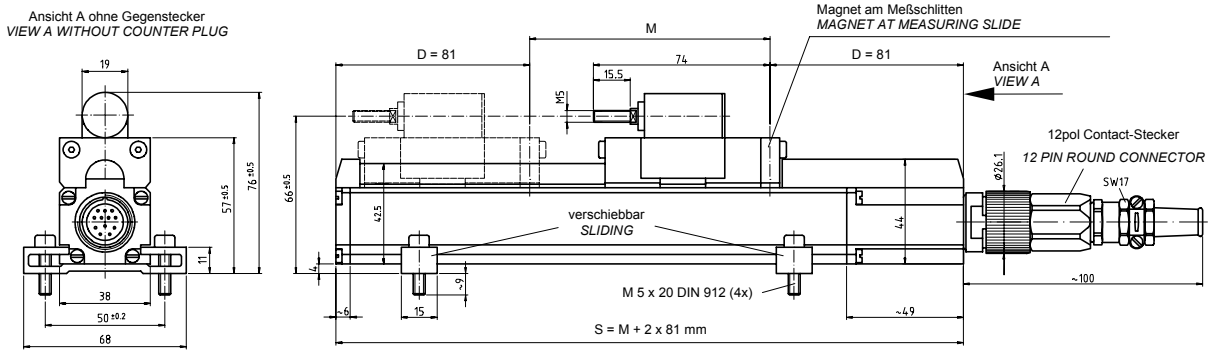
Mechanical Data

Linearity	< 0.05 % of Stroke Length
Repeatability	≤ 0.01 mm
Hysteresis	< 0.1 mm
Temperature Coefficient	< 5 µm / °C
Vibration (Sinus 50-2000 Hz)	
per DIN IEC 68-2-6	≤ 100 m/s² (10g)
Shock (11ms) per DIN IEC 68-2-27	≤ 1000 m/s² (100g)
Magnetic Field	< 3 mT (milli Tesla)
Operating Speed and Mounting Orientation	No restrictions
Magnet Type	T4-U3820
Mechanical Special Types	Upon Request
Connector	12 pin Contact Connector

Dimensional Drawing



S = Stablänge
D = Dämpfungszone: Keine Herstellergarantie für die Meßdaten
M = Meßlänge: Typenbezogener Meßweg

S = TOTAL LENGTH
D = DAMPENING ZONE: IN THIS AREA NO MEASURING SIGNAL IS PRODUCED
M = STROKE LENGTH

Meßlänge M (mm) *STROKE LENGTH M (mm)*	Stablänge S (mm) *TOTAL LENGTH S (MM)*	Zykluszeit (ms) *CYCLE (ms)*
150	312	1,4
300	462	1,4
500	662	1,4
700	862	1,4
750	912	1,4
1000	1162	1,8
1500	1662	2,7
2000	2162	3,6
2500	2662	4,5
3000	3162	5,4

Linear-Encoder LP-38 ISI

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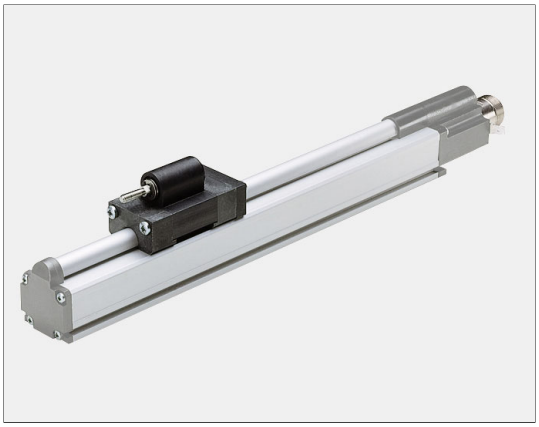

- **For Linear Measurement**
- **Non Contact and Wear Free**
- **Programmable and Scaleable**
- **Simple Assembly with Standard Housing**
- **ISI (Incremental-Serial Interface)**

Electrical Data

Measurement Principle	Magnetostrictive
Measuring Length (Stroke) Standard (mm)	150, 300, 500, 700, 750, 1000, 1500, 2000, 2500, 3000
	> 3000 by Request
Sensor Capacity	max. 20 Bit
* Resolution	max. 0.01 mm
Operating Voltage	19-27 V DC
Power Dissipation (No Load)	< 5 Watt
Programmable via RS485	PT-100N Programming Terminal
Inputs	
* Load Input	Request for Encoder Position
* Preset	Adjust absolute position to a given set value (i.e. zero set)
Logic Levels	"0" < 8 VDC, "1" > + 11 VDC, max. 30 VDC
Output Options	Push-Pull (15 mA) or RS422
* Load Output	Verification of Load Request
Channel 1	A
Channel 1 neg.	A neg.
Channel 2	B
Channel 2 neg.	B neg.
Operating Speed	max. 1m/s at a resolution of 0,01 mm
Cycle Time	See Dimensional Drawing
Pin Configuration	Upon Request

*Programmable Parameters

Environmental Data

Electromagnetic compatibility (EMC)	EN 61000-4-2 (IEC-801-2) / EN 61000-4-4 (IEC-801-4)
Operating Temperature	0°-70°C (32° to 158° F) (Optional -20° to +70°C) (-4° to 158° F)
Storage Temperature	-30° to +80°C (-22° to 178° F)
Relative Humidity	98 % (non condensing)
*Protection Class	IP 65 (DIN 40 050)

* The protection class of the sensor can be effected by the type of connector used.

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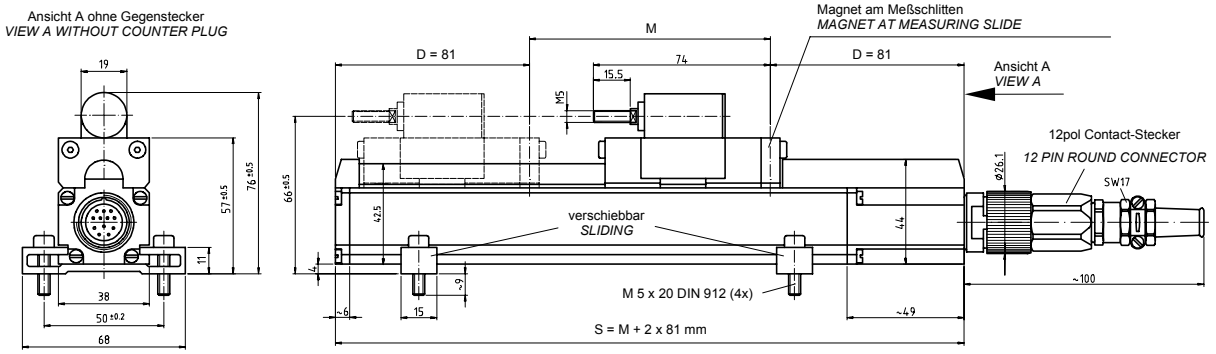
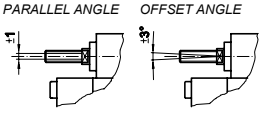
Linear-Encoder LP-38 ISI

Mechanical Data

Linearity	< 0.05 % of Stroke Length
Repeatability	≤ 0.01 mm
Hysteresis	< 0.1 mm
Temperature Coefficient	< 5 µm / °C
Vibration (Sinus 50-2000 Hz)	
per DIN IEC 68-2-6	≤ 100 m/s² (10g)
Shock (11ms) per DIN IEC 68-2-27	≤ 1000 m/s² (100g)
Magnetic Field	< 3 mT (milli Tesla)
Operating Speed and Mounting Orientation	No restrictions
Magnet Type	T4-U3820
Mechanical Special Types	Upon Request
Connector	12 pin Contact Connector

Dimensional Drawing



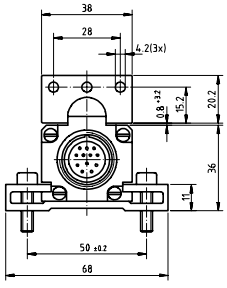


S = Stablänge
D = Dämpfungszone: Keine Herstellergarantie für die Meßdaten
M = Meßlänge: Typenbezogener Meßweg

S = TOTAL LENGTH
D = DAMPENING ZONE: IN THIS AREA NO MEASURING SIGNAL IS PRODUCED
M = STROKE LENGTH

Magnet und Ansicht A ohne Meßschlitten

MAGNET AND VIEW A OF THE MODEL WITHOUT MEASURING SLIDE



Meßlänge M (mm) *STROKE LENGTH M (mm)*	Stablänge S (mm) *TOTAL LENGTH S (MM)*	Zykluszeit (ms) *CYCLE (ms)*
150	312	1,4
300	462	1,4
500	662	1,4
700	862	1,4
750	912	1,4
1000	1162	1,8
1500	1662	2,7
2000	2162	3,6
2500	2662	4,5
3000	3162	5,4

Linear-Encoder LP-38 CAN - Device Net

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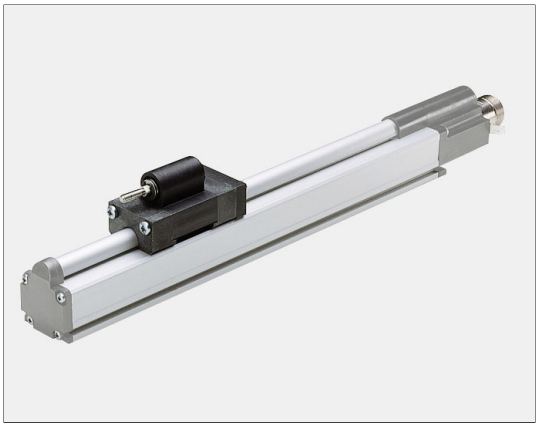

- **For Linear Measurement**
- **Non Contact and Wear Free**
- **Programmable via the CAN-Bus**
- **Simple Assembly with Standard Housing**
- **CAN-Bus-Interface (Device Net Protocol)**

Electrical Data

Measurement Principle	Magnetostrictive
Measuring Length (Stroke) Standard (mm)	150, 300, 500, 700, 750, 1000, 1500, 2000, 2500, 3000
	> 3000 by Request
Sensor Capacity	max. 20 Bit
Resolution	max. 0.01 mm
Operating Voltage	19-27 V DC
Power Dissipation (no load)	< 5 Watt
Programming via CAN-Bus	CAN-Bus-Interface (ISO/DIS 11898)
Data Protocol	CAN 2.0 A
Output Code	Binary (Standard), Gray (programmable)
Baud Rate (adjustable by switch)	125 kbaud, Transmission Distance Up To 500 m
	250 kbaud, Transmission Distance Up To 250 m
	500 kbaud, Transmission Distance Up To 100 m
Programmable Parameters	
Count Direction	
Output Code	
Cycle Time	See Dimensional Drawing
Pin Configuration	Upon Request

Environmental Data

Electromagnetic compatibility (EMC)	EN 61000-4-2 (IEC-801-2) / EN 61000-4-4 (IEC-801-4)
Operating Temperature	0°-70°C (32° to 158° F) (Optional -20° to +70°C) (-4° to 158° F)
Storage Temperature	-30° to +80°C (-22° to 178° F)
Relative Humidity	98 % (non condensing)
*Protection Class	IP 43 (DIN 40 050)

* The protection class of the sensor can be effected by the type of connector used.

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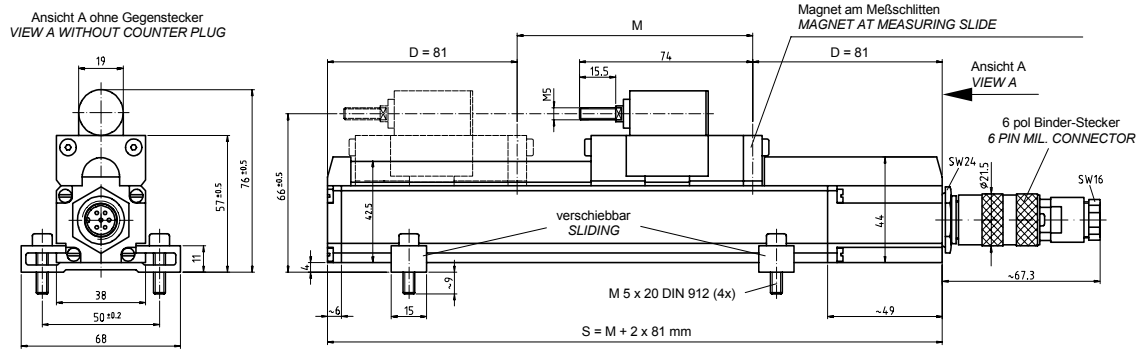
Mechanical Data

Linearity	< 0.05 % of Stroke Length
Repeatability	≤ 0.01 mm
Hysteresis	< 0.1 mm
Temperature Coefficient	< 5 µm / °C
Vibration (Sinus 50-2000 Hz)	
per DIN IEC 68-2-6	≤ 100 m/s^2 (10g)
Shock (11ms) per DIN IEC 68-2-27	≤ 1000 m/s^2 (100g)
Magnetic Field	< 3 mT (milli Tesla)
Operating Speed and Mounting Orientation	No restrictions
Magnet Type	T4-U3820
Mechanical Special Types	Upon Request
Connector	6 pin MIL - Connector

Dimensional Drawing



S = Stablänge
D = Dämpfungszone: Keine Herstellergarantie für die Meßdaten
M = Meßlänge: Typenbezogener Meßweg

S = TOTAL LENGTH
D = DAMPENING ZONE: IN THIS AREA NO MEASURING SIGNAL IS PRODUCED
M = STROKE LENGTH

Meßlänge M (mm) *STROKE LENGTH M (mm)*	Stablänge S (mm) *TOTAL LENGTH S (MM)*	Zykluszeit (ms) *CYCLE (ms)*
150	312	1,4
300	462	1,4
500	662	1,4
700	862	1,4
750	912	1,4
1000	1162	1,8
1500	1662	2,7
2000	2162	3,6
2500	2662	4,5
3000	3162	5,4

Linear-Encoder LP-38 CANopen

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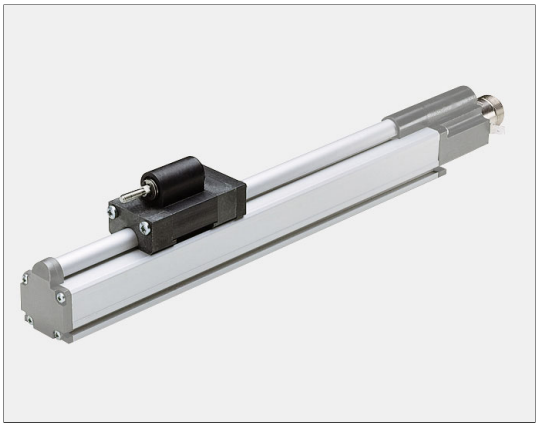

- **For Linear Measurement**
- **Non Contact and Wear Free**
- **Programmable via the CAN-Bus**
- **Simple Assembly with Standard Housing**
- **CAN-Bus-Interface (CANopen-Protocol)**

7

Electrical Data

Measurement Principle	Magnetostrictive
Measuring Length (Stroke) Standard (mm)	150, 300, 500, 700, 750, 1000, 1500, 2000, 2500, 3000
	> 3000 by Request
Sensor Capacity	max. 20 Bit
Resolution	max. 0.01 mm
Operating Voltage	19-27 V DC
Power Dissipation (No Noad)	< 5 Watt
Programming via CAN-Bus	CAN-Bus-Interface (ISO/DIS 11898)
Data Protocol	CAN 2.0 A
	Encoder CANopen Device Protocol CIA DS-406 V1.0
Output Code	Binary
Baud Rate (adjustable by switch)	20 kbaud, Transmission Distance Up To 2500 m
	125 kbaud, Transmission Distance Up To 500 m
	500 kbaud, Transmission Distance Up To 100 m
	1 Mbaud, Transmission Distance Up To 25 m
Programmable Parameters	
Count Direction	
Output Code	
Preset	
Cycle Time	See Dimensional Drawing
Option	Multi-Sensor Type
Number of possible Sensors	16, minimum distance of the sensors 50 mm
Pin Configuration	Upon Request

Environmental Data

Electromagnetic compatibility (EMC)	EN 61000-4-2 (IEC-801-2) / EN 61000-4-4 (IEC-801-4)
Operating Temperature	0°-70°C (32° to 158° F) (Optional -20° to +70°C) (-4° to 158° F)
Storage Temperature	-30° to +80°C (-22° to 178° F)
Relative Humidity	98 % (non condensing)
*Protection Class	IP 43 (DIN 40 050)

* The protection class of the sensor can be effected by the type of connector used.

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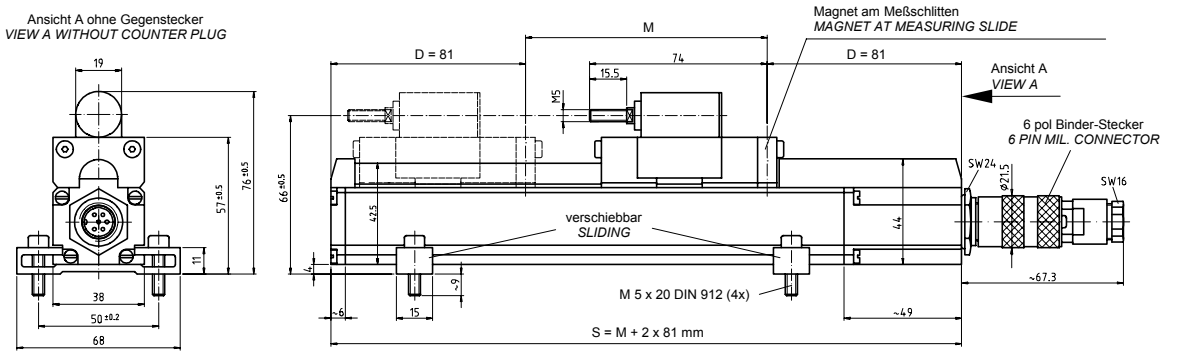
Mechanical Data

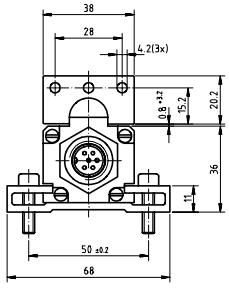
Linearity	< 0.05 % of Stroke Length
Repeatability	≤ 0.01 mm
Hysteresis	< 0.1 mm
Temperature Coefficient	< 5 µm / °C
Vibration (Sinus 50-2000 Hz)	
per DIN IEC 68-2-6	≤ 100 m/s^2 (10g)
Shock (11ms) per DIN IEC 68-2-27	≤ 1000 m/s^2 (100g)
Magnetic Field	< 3 mT (milli Tesla)
Operating Speed and Mounting Orientation	No restrictions
Magnet Type	T4-U3820
Mechanical Special Types	Upon Request
Connector	6 pin MIL - Connector

Dimensional Drawing

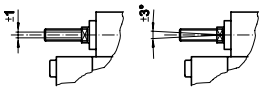


Magnet und Ansicht A ohne Meßschlitten

MAGNET AND VIEW A OF THE MODEL WITHOUT MEASURING SLIDE



Parallelversatz *PARALLEL ANGLE* Winkelversatz *OFFSET ANGLE*



S = Stablänge
D = Dämpfungszone: Keine Herstellergarantie für die Meßdaten
M = Meßlänge: Typenbezogener Meßweg

S = TOTAL LENGTH
D = DAMPENING ZONE: IN THIS AREA NO MEASURING SIGNAL IS PRODUCED
M = STROKE LENGTH

Meßlänge M (mm) *STROKE LENGTH M (mm)*	Stablänge S (mm) *TOTAL LENGTH S (MM)*	Zykluszeit (ms) *CYCLE (ms)*
150	312	1,4
300	462	1,4
500	662	1,4
700	862	1,4
750	912	1,4
1000	1162	1,8
1500	1662	2,7
2000	2162	3,6
2500	2662	4,5
3000	3162	5,4

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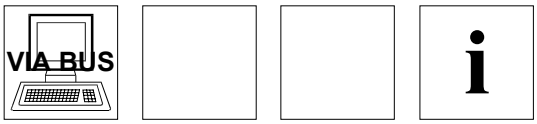
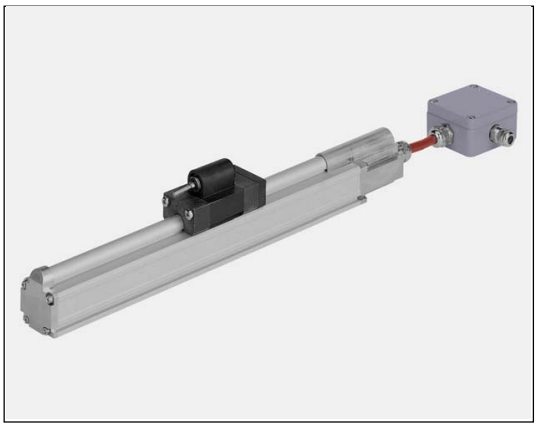
Linear-Encoder LP-38 PROFIBUS (PNO)





- **For Linear Measurement**
- **Non Contact and Wear Free**
- **Parametrizable via the PROFIBUS according PNO-Profile CLASS2**
- **Simple Assembly with Standard Housing**
- **PROFIBUS-DP Interface**

7

Electrical Data

Measurement Principle	Magnetostrictive
Measuring Length (Stroke) Standard (mm)	150, 300, 500, 700, 750, 1000, 1500, 2000, 2500, 3000
	> 3000 by request
Sensor Capacity	max. 20 Bit
* Resolution	max. 0.01 mm
Operating Voltage	19-27 V DC
Power Dissipation (No Load)	< 4 Watt
Output Code	Binary
Data Protocol	PROFIBUS-DP protocol according DIN E 19 245 T.3
Baud Rate	max. 12 Mbaud
Station Address	3 - 99, adjustable via BCD switches
Cycle Time	See Dimensional Drawing
Option	Multi-Sensor Type
Number of possible Sensors	12, minimum distance of the sensors 50 mm
Pin Configuration	Upon Request

* Programmable Parameters

Environmental Data

Electromagnetic compatibility (EMC)	EN 61000-4-2 (IEC-801-2) / EN 61000-4-4 (IEC-801-4)
Operating Temperature	0°-70°C (32° to 158° F) (Optional -20° to +70°C) (-4° to 158° F)
Storage Temperature	-30° to +80°C (-22° to 178° F)
Relative Humidity	98 % (non condensing)
*Protection Class	IP 65 (DIN 40 050)

* The protection class of the sensor can be effected by the type of cable used.

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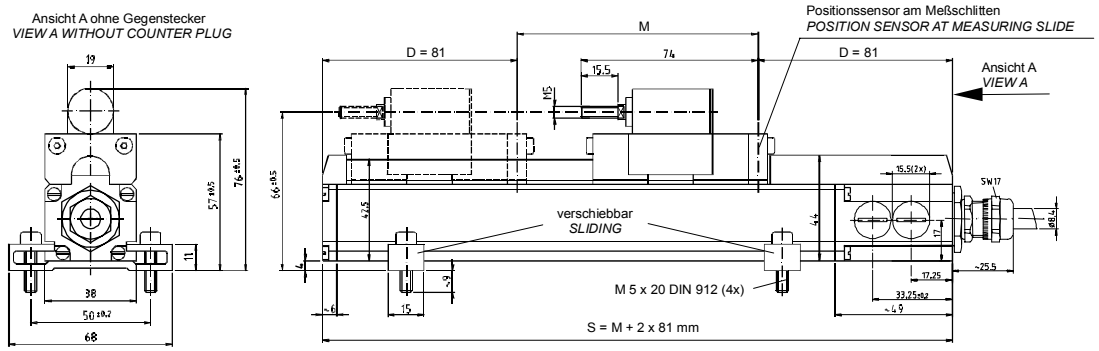
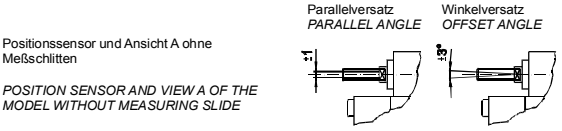
Mechanical Data

Linearity	< 0.05 % of Stroke Length
Repeatability	≤ 0.01 mm
Hysteresis	< 0.1 mm
Temperature Coefficient	< 5 µm / °C
Vibration (Sinus 50-2000 Hz)	
per DIN IEC 68-2-6	≤ 100 m/s^2 (10g)
Shock (11ms) per DIN IEC 68-2-27	≤ 1000 m/s^2 (100g)
Magnetic Field	< 3 mT (milli Tesla)
Operating Speed and Mounting Orientation	No restrictions
Magnet Type	T4-U3820
Mechanical Special Types	Upon Request
Connector	Connector-box with cable glands

Dimensional Drawing



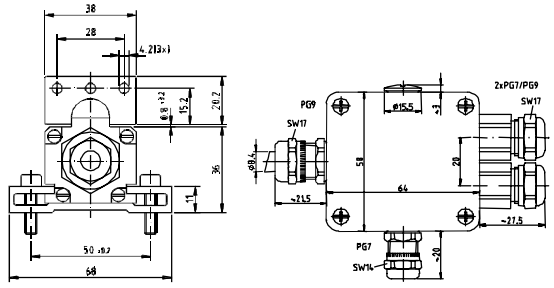


Positionssensor und Ansicht A ohne Meßschlitten

POSITION SENSOR AND VIEW A OF THE MODEL WITHOUT MEASURING SLIDE

S = Stablänge
D = Dämpfungszone: Keine Herstellergarantie für die Meßdaten
M = Meßlänge: Typenbezogener Meßweg

S = TOTAL LENGTH
D = DAMPENING ZONE: IN THIS AREA NO MEASURING SIGNAL IS PRODUCED
M = EFFECTIVE LENGTH



Meßlänge M (mm) *EFFECTIVE LENGTH M (mm)*	Stablänge S (mm) *TOTAL LENGTH S (MM)*	Zykluszeit (ms) *CYCLE (ms)*
150	312	1,4
300	462	1,4
500	662	1,4
700	862	1,4
750	912	1,4
1000	1162	1,8
1500	1662	2,7
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