

POSITION  
TRANSDUCERS



**GEFRAN**



Gefran is the world leader with forty years in the design and production of solutions for **measuring, controlling, and driving industrial production processes**.

We have branches in 14 countries and a network of over 80 worldwide distributors.

## QUALITY AND TECHNOLOGY

Gefran has been designing and manufacturing position sensors for over 40 years.

More than a million transducers installed and an in-depth knowledge of measurement processes guarantee performance and an elevated quality/price ratio.

Gefran is the **manufacturer of the sensitive component** of its transducers and is thus able to guarantee product reliability and precision of measurement as well as the flexibility in customization for the client.

Gefran's position transducers are based on **two different technologies**: first, **potentiometric** technology providing a broad flexible range developed over the years; second, **magnetostrictive** technology that provides fully-developed solutions with superior performance due to the non-contact measurement system.

### Characteristics of Gefran's position transducers:

- **Measures the definite position**: upon switching the system on, the transducer immediately reads the actual position without having to perform any mechanical repositioning.
- **Extensive lifespan**: from 100 million movements of the potentiometric transducers to the virtually unlimited lifespan of the magnetostrictive transducers as a result of the lack of contact between the transducer and its position reader.
- **High resolution output signal**: practically infinite for the potentiometers and  $2\mu$  for the magnetostrictive transducers.
- **Easy installation and simple connection** to the most common tools and PLCs on the market.
- **Manages cursors using** the same transducer and reads the speed of movement (**MK4-C / IK4-C** in CANopen up to 2 cursors; **MK4-P / IK4-P** Profibus interface up to 4 cursors; analogue; **MK4-A** up to a maximum of 2 cursors).
- Rod from 10 mm up to 4000 mm

## SERVICES

A team of Gefran experts works with the customer to select the ideal product for its application and to help install and configure devices.

Gefran offers a wide range of courses at different levels for the technical-commercial study of the Gefran product range as well as specific courses *on demand*.



## APPLICATIONS



**PLASTIC AND RUBBER INJECTION PRESSES**



**METAL PROCESSING**



**GEOTECHNICS**



**AGRICULTURAL AND EARTH-MOVING MACHINES**



**RENEWABLE ENERGIES**



**BLOWING MACHINES**



**HYDRAULIC AND PNEUMATIC CYLINDERS**



**TEST MACHINES FOR AUTOMOTIVE SECTOR**



**FOOD INDUSTRY**



**LEVEL CONTROL**



**SURFACE TREATMENT MACHINES**



**WOOD MILLING MACHINES**

# THE MAGNETOSTRICTIVE SOLUTION



Constant and systematic is the activity of researching and innovating in order to improve and optimize the performance of the position sensors with magnetostrictive technology.

Patented by Gefran, ONDA is the sensing element which was designed with the target to simplify and optimize the transduction element.

These are the main characteristics of ONDA:

- a **simplified sensing element** that allows to further reduce the transducer dimensions
- a **simple and modular structure** in order to obtain a greater reliability and ease maintenance
- **unique solutions** which guarantee maximum performance in its class.

# GUIDE TO SELECTION

## LEVEL OF PROTECTION

According to the structure and technology used, GEFTRAN's linear position transducers are able to provide different levels of protection against dust and liquids.

Ranges from IP40 to IP67 can be chosen, according to the following table:

IP40	IP60	IP65	IP67
PK	LT	LT	RK2 - RK4
PA1	PZ12	PC	MK4
PY1	PZ34	PR65	IK4/SK4
PY2		ONP1	PME
PY3			PMA
PS			LT67
			PC67
			PZ67
			PMI / PMISL / PMISLE
			RK5 (IP69K installed)
			IC

# COMMUNICATION INTERFACE

The potentiometers provide a ratiometric voltage output.

This means that the range of output voltage depends on the voltage used to power the transducer.

Use the sensor as a **voltage divider** with a max current across the cursor  $I_c \leq 0.1\mu A$ .

**WARNING! The potentiometer must not be used as a variable resistor.**

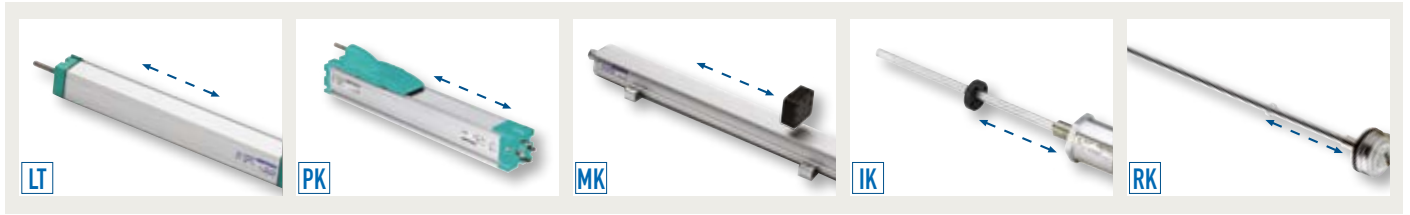
If you wish to obtain a conditioned signal 0..10 Vdc or 4..20 mA as the potentiometer's output, a PCIR signal conditioner can be connected to the output of the device.

Available also the version the potentiometric version PMISLE with integrated analogue output 4..20mA.

The magnetostrictive transducers, on the other hand, allow you to choose the output interface that best suits your application needs:

- analogue voltage output: 0..5Vcc/5..0Vcc, 0..10Vcc/10..0Vcc
- analogue current output: 0..20mA, 4..20mA
- SSI output: 16, 21, 24, 25 bit binary or Gray code
- CANopen output: CiA DP 3.01 rel.4.0 and DS406
- Profibus output: DPV0 on RS485 according to IEC 61158





## STROKE LENGTH: UP TO 4000 mm

When choosing a transducer, it is important to remember that two different strokes exist:

- **Mechanical stroke:** the actual shift that the transducer's cursor is able to make;
- **Useful electrical stroke:** the part of the mechanical stroke in which transducer linearity is guaranteed.

Therefore, when designing an application, you should choose a transducer with a useful electrical stroke that is equal to or greater than the maximum displacement carried out by the moving part.

## TYPES OF ACTUATORS

In order to measure the displacement of an object, the transducer has a mobile part that is usually attached to the object itself.

Two types of mobile parts are normally used:

- **stem:** the classical system used by potentiometers which consists of a rod connected to the transducer's body that transmits the shift to the inner parts of the sensor;

- **cursor:** a system that provides for more compact solutions thanks to the use of a cursor which becomes integral with the moving part to be measured.

Some models of potentiometers, such as the PME series, are characterized by an **external magnetic actuator** linked to an internal measurement cursor. The magnetic cursor replaces the shaft, making the instrument even more compact.

## 3 FASTENING SYSTEMS

Three types of supports can be used to install the transducer:

- **brackets:** the most traditional method; a free surface and two or more brackets according to the length of the transducer are required to install the transducer;
- **flanges:** ideal for applications where the stem needs to pass through a hole and the transducer needs to be fixed on the walls of the hole;

the conditions of use need to be considered, especially in relation to high strokes;

- **self-aligning articulated joints:** used to fasten the ends of the transducer directly to the moving parts; other fastening points can be eliminated and offset movements can be measured; this system is not intended for particularly long strokes.



# GUIDE TO SELECTION OF TRANSDUCER

## POTENTIOMETRIC TECHNOLOGY



MODELS	INSTALLATION
Long stroke potentiometers	Brackets
	Self-aligning ball joints
Short stroke potentiometers	Brackets
	Brackets Flange Self-aligning ball joints
	Brackets
	Self-aligning ball joints
Magnetic drag potentiometers	Brackets
	Self-aligning ball joints
	Flange
Exposed tracks potentiometers	Flange
Rotary potentiometers	Brackets

## MAGNETOSTRICTIVE TECHNOLOGY



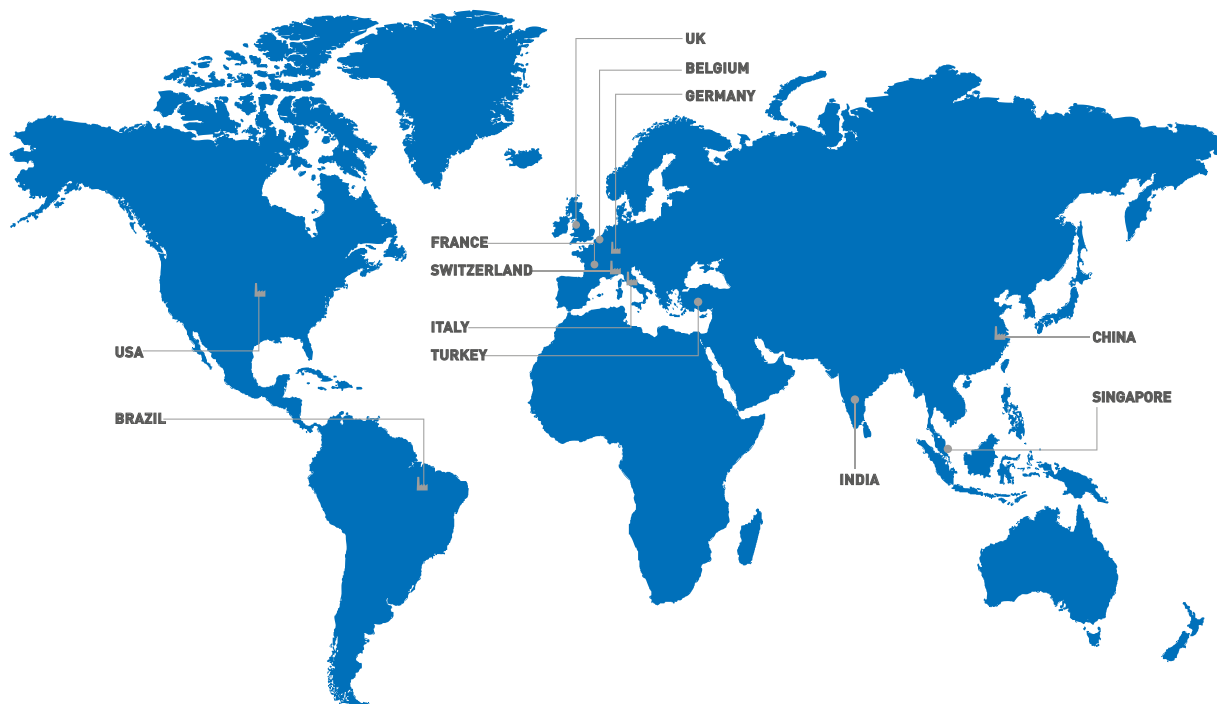
INSTALLATION	MECHANICS
Standard	Profile
In cylinder	Threaded head
	Flanged head



## POSITION TRANSDUCERS

	PERFORMANCE	OUTPUTS	SERIES
	Guaranteed IP67	Potentiometric output	LT67
	Vibration resistance		LT
	No "pump effect"		PK
	Robust product		PC
	Guaranteed IP67		PC67
	Small dimensions	Potentiometric output	PA1
	Through-rod structure		PY1
	Return spring		PY2
			PY3
	Installation flexibility 1/2" cylindrical housing		PZ12
	Installation flexibility 3/4" cylindrical housing		PZ34
			PZ67-S
	Guaranteed IP67		PZ67-A
	For pneumatic cylinders		PME
	Installation flexibility		PMA
	AISI 316 stainless steel body	Potentiometric output	PMI
	Diameter reduced to 12.7 mm		PMI-SL
	Integrated analog output		PMI-SLE
	For oleodynamic cylinders	Potentiometric output	IC
	Installation flexibility	Potentiometric output	PS
	Robust product		PR65

	PERFORMANCE	INTERFACE	SERIES
	Optimized version	Analogue	ONP1-A
	High performance	Analogue	MK4-A
		SSI	MK4-S
		CANopen	MK4-C
		Profibus	MK4-P
		Optimized version	Analogue
	High performance	Analogue	IK4-A/SK4-A
		SSI	IK4-S
		CANopen	IK4-C
		Profibus	IK4-P
		Optimized version	Analogue
	High performance	Analogue	RK5
	High performance	CANopen	RK5-C



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# GEFRAN

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