

Displacement Transducers

Displacement Transducers



GEFRAN

Our Know how,
Your Solution.

Gefran displacement transducers: reliability, precision, simple and quick installation

Gefran has designed and produced displacement sensors for over 15 years. Over a million installed transducers and in-depth knowledge of processes to be measured guarantee top performance and an excellent quality/price ratio.

Gefran produces the sensitive element of its transducers in-house, and is therefore able to guarantee reliability and precision of measurement.

Gefran displacement transducers are based on two different technologies: potentiometric, which guarantees the flexibility of a wide range developed over the years, and magnetostrictive, an advanced solution that provides higher performance thanks to its contactless measurement system.

The following are some of the main features of Gefran displacement transducers:

- Measurement of absolute position: when the system is switched on, the transducer immediately gives the real position without having to run mechanical repositioning.
- Life: from 100 million strokes of potentiometric transducers to practically unlimited for magnetostrictive transducers, thanks to the lack of contact between the transducer and the cursor.
- High resolution of output signal: from practically infinite for potentiometers to 2μ for magnetostrictive transducers.
- Easy installation and simple connection to most commercially available instruments and PLCs.
- Ability to simultaneously control multiple cursors with the same transducer and provide shift speed (MK4/IK4-C in CANopen and MK4/IK2P in Profibus from 1 to 4 cursors. Analog MK4-A up to a maximum of two cursors. Multicursor in digital model MK4-D Start&Stop).



NEW PRODUCT

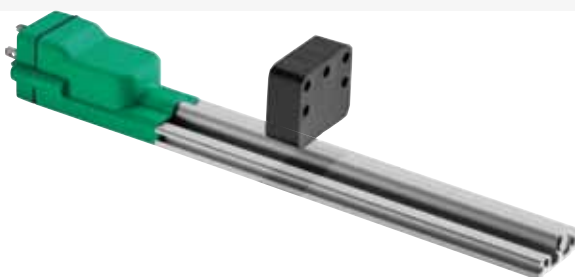
The result of constant research and innovation, this new technological solution uses a new sensitive element to read the magnetic cursors.

The structure of the sensitive element has been simplified and optimized thanks to innovative technological solutions developed and patented by Gefran.

In its simple structure, **ONDA** contains all of the performance features needed to satisfy application requirements:

- a simplified sensitive element makes the transducer even more compact
- a simple, modular structure ensures greater reliability and simpler maintenance
- the uniqueness of the solutions adopted guarantees maximum performance

To launch this new technology, Gefran introduces a magnetostrictive displacement transducer with a completely new profile: **ONP1-A**, available with analog output in voltage or in current.



GUIDE TO CHOOSING THE BEST TRANSDUCER

STROKE LENGTH

GEFRAN potentiometric and magnetostrictive transducers measure linear displacement on strokes from a minimum of 10 mm to a maximum of 4000 mm. It is important to remember that two strokes are usually specified:

- Mechanical stroke: the actual shift of the transducer cursor;
- Useful electrical stroke: the part of the mechanical stroke on which transducer linearity is guaranteed.

This means that when studying the application, you have to choose a transducer with a useful electrical stroke greater than or equal to the maximum shift of the moving part.

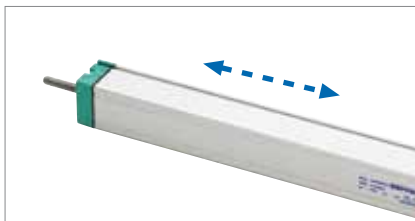
TYPES OF ACTUATORS

To detect the shift of an object, the transducer has a mobile part that is normally attached to the object itself. This mobile part is usually one of two types:

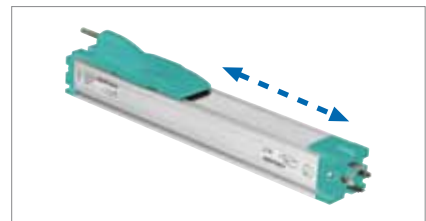
- rod: this is the traditional system used by potentiometers, and consists of a rod inserted in the transducer body and transmits the shift to the interior of the sensor;
- cursor: this system permits more compact solutions thanks to the use of a cursor attached to the moving part to be measured.

It is available on some potentiometers (series PK, PME and PMI) and on most magnetostrictives.

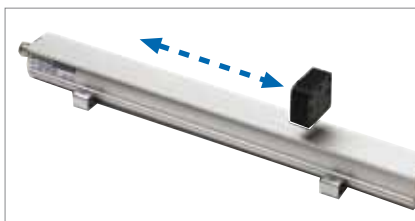
Note that the cursor can be guided (slide or ring) or completely free from the transducer (floating cursor).



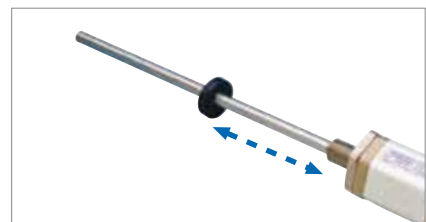
LT



PK



MK

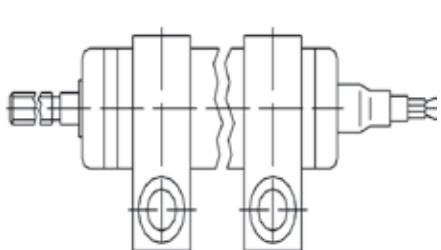


IK

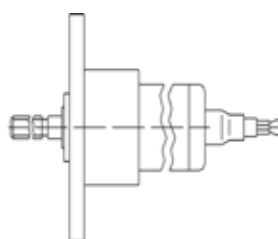
INSTALLATION

The transducer can be installed on three types of supports:

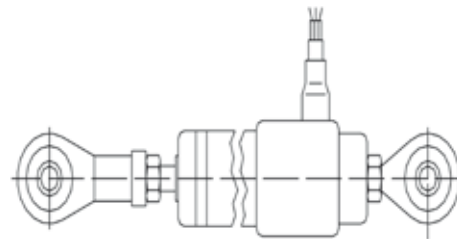
- **brackets:** the traditional method; requires a free surface for installation and uses two or more brackets based on the length of the transducer;
- **flanges:** ideal in applications in which the rod has to pass through a hole and the transducer has to be attached to the walls of the hole; in this case, you have to pay careful attention to conditions of use, especially in case of long strokes;
- **self-aligning joints:** these are used to attach the ends of the transducer directly to the moving parts; it eliminates other attachment points and allows measurement of unaligned movements; this system is unsuitable for very long strokes.



PZ34-S: bracket ■ ■ ■ ■



PZ34-F: flange ■ ■ ■



PZ34-A: joint ■ ■ ■ ■ ■

PROTECTION LEVEL

Depending on their structure and technology, GEFRA linear displacement transducers guarantee different levels of protection against dust and liquids. You can choose within a range of IP40 to IP68, as shown on the following table:

IP40	IP60	IP65	IP67	IP68
PK	LT	LT	RK2 - RK4	IC
PA1	PZ12	PC	MK4	
PY1	PZ34	PR65	IK4	
PY2		ONP1	PME	
PY3			PMA	
PS			LT67	
			PC67	
			PZ67	
			PMI / PMISL / PMISLE	

COMMUNICATION INTERFACE

Potentiometers supply a ratiometric output in voltage. This means that the output voltage range depends on the voltage use to feed the transducer.

ATTENTION! The potentiometer must NOT be used as a variable resistance.

If you want a 0..10 VDC or 4..20 mA conditioned signal as a potentiometer output, you can connect a PCIR conditioner to the device output.

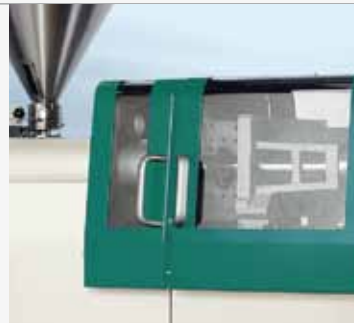
Magnetostrictive transducers let you choose the most appropriate output interface for the application:

- analog output in voltage: 0..5 VDC/5..0 VDC, 0..10 VDC/10..0 VDC, ± 5 VDC, ± 10 VDC
- analog output in current: 0..20 mA, 4..20 mA
- digital output: start/stop [multicursor], PWM [monocursor]
- SSI output: 16, 21, 24, 25 bit in binary or Gray code
- CANopen output: CiA DP 3.01 rel.4.0 and DS406
- Profibus output: DPVO on RS485

PLASTIC AND RUBBER INJECTION PRESSES:
measures displacement of 4 main movements: load, injection, die opening/closing, extraction.



BLOWING MACHINES:
measures displacement of die opening/closing, die translation, Parison check.



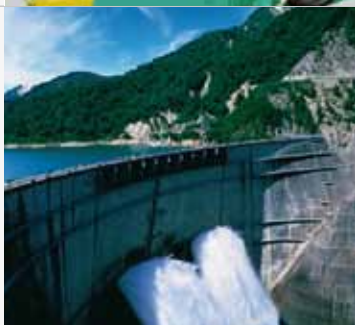
MATERIALS WORKING:
measures displacement of tools such as brushes, wheels or rolls used in working metal, wood, marble, ceramics.



HYDRAULIC AND PNEUMATIC CYLINDERS:
piston displacement check - the transducer is internal and a magnetic ring cursor is attached to the piston to track its movement.



GEOTECHNICS:
use of transducers for subsidence meters and strain gauges for structural monitoring - cylindrical models are preferred.



AUTOMATIVE TEST MACHINES:
tuning of suspensions on prototypes and competition models. Test benches. Racing cars. Crash tests.



FARM AND EARTH MOVEMENT MACHINES:
check position of mechanical arms, bucket angle, plough height off ground, crushers, sizing of asphalting machines.



FOOD INDUSTRY:
check quantity of substance distributed by filling syringes or other injector machines.



RENEWABLE ENERGIES:
check position of solar trackers, check pitch of wind generators, check valves and bulkheads in hydroelectric plants.



LEVEL CHECKS:
measure level of liquids in tanks via selection of float.



SHORT STROKES



MODEL

LT

PC

PK

USEFUL ELECTRICAL STROKE RANGE

50..900 mm

50..750 mm

100..2000 mm

INDEPENDENT LINEARITY

 $\pm 0,05\%$
 $\pm 0,05\%$
 $\pm 0,05\%$

RESOLUTION

Infinite

Infinite

Infinite

WORK TEMPERATURE RANGE

-30..+100°C

-30..+100°C

-30..+100°C

MAXIMUM DISPLACEMENT SPEED

10 m/sec

5 m/sec

10 m/sec

PROTECTION LEVEL

IP60 (model -S)
IP65 (model -P)

IP65

IP40

ACTUATOR

Rod

Rod

Sliding cursor

INSTALLATION

Brackets
(variable distances between
centers)

Self-aligning
joints

Brackets
(variable distances between
centers)

APPLICATIONS

(0.01 mm) and reliability in
measurement and control
applications, even under
harsh conditions.
Brackets allow installation in
most appropriate position.

The best solution for
mechanical applications and
vehicle development,
automation and robotics,
thanks to its sturdiness and
accuracy.

The absence of a rod lets the
cursor be used along the axis
for longer strokes.

INJECTION PRESSES
HYDRAULIC PRESSES
SANDERS

BENDERS
SANDERS
EARTH MOVING

INJECTION PRESSES
WOODWORKING



PA1



PZ12



PZ34

25..150 mm

25..250 mm

25..300 mm

± 0,2% on 25
± 0,1% from 50 to 100
± 0,05% from 125 to 150

± 0,2% on 25
± 0,1% from 50 to 100
± 0,05% from 125 to 250

± 0,2% on 25
± 0,1% from 50 to 100
± 0,05% from 125 to 300

Infinite

Infinite

Infinite

-30..+100°C

-30..+100°C

-30..+100°C

5 m/sec

10 m/sec

10 m/sec

IP40

IP60
(on request: IP65)

IP60
(on request: IP65)

Rod

Rod

Rod

Brackets
(variable distances between
centers)

Brackets (model -S)
Joints (model -A)
Flange (model -F)

Brackets (model -S)
Joints (model -A)
Flange (model -F)

Compact. A joint provides
greater tolerance in
movement.
Reliable even at high
speeds or if subject to
impact and vibration.

Problems traditionally associated with rotative
potentiometers (especially reliability, life, accuracy and
speed) are eliminated.
The ability to attach joints provides error-free operation
even in case of misalignment between transducer axis and
direction of movements.

BENDERS
SANDERS
TRANSFER MACHINES

GLASS WORKING AND CUTTING
GEOTECHNICAL TEST AND INSPECTION MACHINES

ALTA IMPERMEABILITA'



MODEL	PME12	PMI12	PMISL
USEFUL ELECTRICAL STROKE RANGE	50..1000 mm	50..1000 mm	50..1000 mm
INDEPENDENT LINEARITY	± 0,1% from 50 to 100 ± 0,05% from 150 to 1000	± 0,1% from 50 to 100 ± 0,05% from 150 to 1000	± 0,35%
RESOLUTIONE	Infinite	Infinite	Infinite
WORK TEMPERATURE RANGE	-30..+100°C	-30..+100°C	-30..+100°C
MAXIMUM DISPLACEMENT SPEED	5 m/sec	5 m/sec	5 m/sec
PROTECTION LEVEL	IP67	IP67	IP67
ACTUATOR	Ring cursor	Ring cursor	Ring cursor
INSTALLATION	Brackets (variable distances between centers)	Flange	Flange
APPLICATIONS	<p>For pneumatic cylinders. Pre-wired models or models with connector. High protection level and sturdiness guarantee long life.</p> <p>INJECTION PRESSES PNEUM. CYLINDERS GEOTECHNICS SANDERS GLASS MACHINES</p>	<p>For hydraulic cylinders. Model with threaded flange lets you install transducer without removing cylinder.</p> <p>GEOTECHNICS UTILITY VEHICLES HYDRAULIC CYLINDERS BOTTLING</p>	<p>For hydraulic cylinders, where smaller rods are necessary dimensions. As in the PMI12, the model with threaded flange lets you install the transducer without removing the cylinder.</p> <p>GEOTECHNICS UTILITY VEHICLES HYDRAULIC CYLINDERS BOTTLING</p>



PMISLE



PMA12



IC

50..1000 mm

50..1000 mm

100..550 mm

 $\pm 0,35\%$
 $\pm 0,1\%$ from 50 to 100
 $\pm 0,05\%$ from 150 to 1000
 $\pm 0,1\%$

Infinite

Infinite

Infinite

 $-30..+80^{\circ}\text{C}$ $-30..+100^{\circ}\text{C}$ $-30..+100^{\circ}\text{C}$

5 m/sec

5 m/sec

1,5 m/sec

IP67

IP67

IP68

Ring cursor

Rod

Ring cursor

Flange

Self-aligning joints

Flange

For in-cylinder applications that require an economic solution with integrated analog signal.

Coaxial rod for installation with self-aligning joints. Low friction, self-cleaning rod completely in anodized aluminum.

The best solution for installation in small spaces. Used especially inside hydraulic cylinders.

GEOTECHNICS
UTILITY VEHICLES
HYDRAULIC CYLINDERS
BOTTLING

INJECTION PRESSES
EARTH MOVING
ELEVATORS
SANDERS
LEATHERWORKING

HYDRAULIC CYLINDERS

COMPARATORS



MODEL

PY1
PY2
PY3

USEFUL ELECTRICAL STROKE RANGE

25..150 mm

10..100 mm

10..50 mm

INDEPENDENT LINEARITY

± 0,2% on 25
± 0,1% from 50 to 100
± 0,05% on 150

± 0,3% on 10
± 0,2% on 25
± 0,1% from 50 to 100

± 0,3% on 10
± 0,2% on 25
± 0,1% on 50

RESOLUTION

Infinite

Infinite

Infinite

WORK TEMPERATURE RANGE

-30..+100°C

-30..+100°C

-30..+100°C

MAXIMUM DISPLACEMENT SPEED

10 m/sec

10 m/sec

10 m/sec

PROTECTION LEVEL

IP40

IP40

IP40

ACTUATOR

Rod

Rod
with return spring

Rod
with return spring

INSTALLATION

Brackets
(variable distances
between centers)

Brackets
(variable distances
between centers)

Brackets
(variable distances
between centers)

APPLICATIONS

Compact.
Double support for measurement rod.
Side connection permits through-rod structure, guaranteeing greater overall sturdiness of the sensor.
Model PY1 has a joint for greater tolerance in movement.
PY2 and PY3 automatically position the head thanks to the return spring, making them the best solution for precise checks on cams or products leaving an automatic production line.

GEOTECHNICS
SANDERS
CERAMIC MACHINES (thickness and planarity check)
WOODWORKING MACHINES (thickness and planarity check)



LT67



PC67



PZ67A



PZ67S

50..900 mm

50..750 mm

25..300 mm

25..300 mm

 $\pm 0,05\%$
 $\pm 0,075\% \times \text{stroke} \leq 150\text{mm}$
 $\pm 0,05\%$
 $\pm 0,075\% \times \text{stroke} \leq 150\text{mm}$
 $\pm 0,2\%$ on 25
 $\pm 0,1\%$ from 50 to 100
 $\pm 0,05\%$ from 125 to 300

 $\pm 0,2\%$ on 25
 $\pm 0,1\%$ from 50 to 100
 $\pm 0,05\%$ from 125 to 300

Infinite

Infinite

Infinite

Infinite

-30..+100°C

-30..+100°C

-30..+100°C

-30..+100°C

Standard: 3 msec
(max: 5 msec)Standard: 3 msec
(max: 5 msec)Standard: 3 msec
(max: 5 msec)Standard: 3 msec
(max: 5 msec)

IP67

IP67

IP67

IP67

Rod

Rod

Rod

Rod

Brackets
(variable distances
between centers)

Self-aligning joints

Self-aligning joints

Brackets
(variable distances
between centers)

is designed to guarantee a high protection level (IP67) in applications under harsh conditions and outdoors, where it may be necessary to work in the direct presence of dust, dirt, or liquids [not in prolonged immersion].

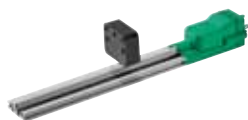
INJECTION PRESSES

MOBILE HYDRAULICS
AGRICULTURAL MACHINES
EARTH MOVING

TEST BENCH EQUIPMENT

GLASS WORKS
WOOD WORKS

PROFILE



MODEL

ONP1-A

MK4-A

MK4-D

USEFUL ELECTRICAL STROKE RANGE

50..1500 mm

50..4000 mm

50..4000 mm

INDEPENDENT LINEARITY

± 0,04%

± 0,02%

± 0,02%

RESOLUTION

Infinite

Infinite

max10 µm

WORK TEMPERATURE RANGE

-20..+75°C

-30..+75°C

-30..+75°C

MAXIMUM DISPLACEMENT SPEED

10 m/sec

10 m/sec

10 m/sec

INTERFACE

Analog

Analog

Digital

MEASUREMENT TAKEN

1 cursor
(single direct output)

1 cursor (single output)
1 cursor (normal+reverse)
1 cursor (displacement+speed)
2 cursors

1 cursor
(PWM)
Multicursor
(start/stop)

PROTECTION LEVEL

IP65

IP67

IP67

INSTALLATION

Brackets
(variable distances
between centers)

Brackets
(variable distances
between centers)

Brackets
(variable distances
between centers)

APPLICATIONS

Optimized model: works with a wide range of accessories, guarantees maximum simplicity and economy of installation, with one of the highest performance levels in its class.

High precision guaranteed by better linearity than with potentiometers. Ideal for harsh environments thanks to high protection level. Analog or digital interface for direct link to PLC. Brackets allow installation in most appropriate position.

INJECTION PRESSES
MARBLE AND CERAMIC WORKING
METALWORKING

INJECTION PRESSES
PLASTIC AND GLASS BLOWING
MARBLE AND CERAMIC WORKING
METALWORKING



MK4-S



MK4-C



MK4-P

50..4000 mm

50..4000 mm

50..4000 mm

± 0,02%

± 0,02%

± 0,02%

max 2 µm

max 2 µm

fino a 5 µm

-30..+75°C

-30..+75°C

-30..+75°C

10 m/sec

10 m/sec

10 m/sec

SSI

CANopen

PROFIBUS

1 cursor

from 1 to 4 cursors

from 1 to 4 cursors

IP67

IP67

IP67

Brackets
(variable distances between
centers)

Brackets
(variable distances between
centers)

Brackets
(variable distances
between centers)

SSI digital interface allows
high-precision absolute
displacements.

CANopen interface
allows connection via
fieldbus.

The Profibus fieldbus
communication interface
permits integration in complex
systems with large
communication distances,
guaranteeing safe and rapid
data transmission.

SERVO-DRIVES
ROBOTICS

PRESSES
ROBOTICS
MACHINE TOOLS

INJECTION PRESSES
STEEL WORKS
PLANT AUTOMATION

ROD				
<div> <div></div> <div>Magnetostriuctive displacement transducers</div> <div></div> </div>	MODEL	<div>  </div> <div>IK4-A</div> <div>.....</div>	<div>  </div> <div>IK4-S</div> <div>.....</div>	<div>  </div> <div>IK4-C</div> <div>.....</div>
	USEFUL ELECTRICAL STROKE RANGE	50..4000 mm	50..4000 mm	50..4000 mm
	INDEPENDENT LINEARITY	± 0,02%	± 0,02%	± 0,02%
	RESOLUTION	infinite	max 2 µm	max 2 µm
	WORK TEMPERATURE RANGE	-30..+75°C	-30..+75°C	-30..+75°C
	MAXIMUM DISPLACEMENT SPEED	10 m/sec	10 m/sec	10 m/sec
	INTERFACE	Analog	SSI	CANopen
	MEASUREMENT TAKEN	1 cursor (normal+reverse)	1 cursor	From 1 to 4 cursors (displacement+speed)
	PROTECTION LEVEL	IP67	IP67	IP67
	INSTALLATION	Flange	Flange	Flange
	APPLICATIONS	<p>The IK4 line's new mechanical structure offers improved features for in-cylinder use, including a series of new models, free rotation of the connector head, and replacement of internal electronics without removal of the transducer.</p> <p>HYDRAULIC SYSTEMS FOR PLANT AUTOMATION INDUSTRIAL HYDRAULICS LEVEL CHECKS</p>	<p>The digital SSI interface ensures high-precision absolute displacements.</p> <p>HYDRAULIC SYSTEMS FOR METALWORKING</p>	<p>Precision of digital signal plus practical CANopen interface allows adaptation in existing plants using standard communication systems..</p> <p>HYDRAULIC SYSTEMS FOR METALWORKING</p>
14				



IK2-P



RK-2



RK-4

50..4000 mm

50..4000 mm

50..4000 mm

 $\pm 0,02\%$
 $\pm 0,02\%$
 $\pm 0,02\%$

max 5 μm

infinite

infinite

-30..+75°C

-30..+90°C

-30..+90°C

10 m/sec

10 m/sec

10 m/sec

PROFIBUS

Analog
Digital
CANopen (option
remote electronic)

Analog

From 1 to 4 cursors

1 cursor

1 cursor

IP67

IP67

IP67

Flange

Internal flange

Threaded external flange

The Profibus fieldbus communication interface allows integration in complex systems with extensive transmission distances, guaranteeing safe and rapid data transmission.

The overall dimensions of the sensor are among the smallest on the market. The optional and remotable (maximum of 50 meters) electronics allows the use of advanced interfaces without affecting sensor size, for in-cylinder installation.

HYDRAULIC SYSTEMS FOR PLANT AUTOMATION

EARTH MOVING
AGRICULTURAL MACHINES
UTILITY VEHICLES
INDUSTRIAL HYDRAULICS



MODEL

PS09

PS11

PS20

PR65

USEFUL ELECTRICAL
STROKE RANGE $340^{\circ} \pm 4^{\circ}$ $345^{\circ} \pm 4^{\circ}$ $350^{\circ} \pm 4^{\circ}$ $345^{\circ} \pm 4^{\circ}$ INDEPENDENT
LINEARITY $\pm 1 \dots \pm 0,05\%$
(on request) $\pm 1 \dots \pm 0,05\%$
(on request) $\pm 1 \dots \pm 0,05\%$
(on request) $\pm 1 \dots \pm 0,05\%$
(on request)

RESOLUTION

Infinite

Infinite

Infinite

Infinite

WORK TEMPERATURE
RANGE $-55..+100^{\circ}\text{C}$ $-55..+100^{\circ}\text{C}$ $-55..+100^{\circ}\text{C}$ $-55..+100^{\circ}\text{C}$ MAXIMUM ROTATION
SPEED

600 U/min

600 U/min

600 U/min

600 U/min

MAXIMUM TORQUE

0,20 Ncm

0,20 Ncm

0,20 Ncm

1,8 Ncm

PROTECTION LEVEL

IP40

IP40

IP40

IP65

INSTALLATION

Servo
(flange)Servo
(flange)Servo
(flange)Servo
(flange)

OUTSIDE DIAMETER

22,25 mm

27,05 mm

50,80 mm

55 mm

SHAFT DIAMETER

3,175 mm

3,175 mm

6,35 mm

6 mm

APPLICATIONS

For measurement, control, and instrumentation applications.
A high-precision angular displacement transducer that satisfies the requirements of most analog applications.
Stainless steel shaft, gold-welded terminals; all metal parts protected against corrosion.

High protection level, all-metal housing.

SIGNAL CONDITIONERS FOR POTENTIOMETRIC TRANSDUCERS

PCIR-101: Output 0...10Vdc
PCIR-102: Output 4...20mA



Interface module integrated in female connector
(directly connectable to series LT and PK)
Standard output 0..10Vcc (PCIR 101)
Standard output 4..20mA (PCIR 102)
High linearity (0.01% FSO)
Lower Zero and Span thermal drift
Settable Zero and Span

PCIR-A: Output 0...10Vdc



High input impedance (>100 MOhm)
Standard output 0..10Vcc
Linearity error: 0.02% FSO
Thermal drift: 0.01% FSO/°C
Simultaneous control of two transducers
Preset for DIN EN50035 and EN50022 mounting
MOR031 female connector

JOINTS FOR POTENTIOMETRIC TRANSDUCERS PKIT015: for pot. series LT



CUSORS FOR MAGNETOSTRICTIVE TRANSDUCERS

SERIES MK4 / ONP1

PCUR034



PCUR035



PCUR036



PCUR037



PCUR135



PCUR136



PCUR137



SERIES IK

PCUR026



PCUR027



PCUR022



PCUR023



PCUR024



Ø int. 12,5 mm
Ø ext. 54 mm
length 70 mm

Ø int. 15 mm
Ø ext. 54 mm
length 70 mm

Ø int. 13,5 mm
Ø ext. 32,8 mm
length 7,9 mm

Ø int. 13,5 mm
Ø ext. 32,8 mm
length 7,9 mm

Ø int. 13,5 mm
Ø ext. 32,8 mm
length 7,9 mm

FEMALE CONNECTOR FOR POTENTIOMETRIC TRANSDUCERS

Models:

CODE	DESCRIPTION	LT	PC	PK	PA1	PME12	IC	PY1 PY2 PY3
CON002	3-pin female mating connector; IP40 protection	LT-H	PC-H					
CON006	4-pin female mating connector (DIN43650A)	LT-M	PC-M	PK-M				
CON008	4-pin female mating connector (DIN43650C)							
CON011	5-pin female mating connector; IP40 protection	LT-B	PC-B	PK-B	PA1-C			PY-C
CON012	5-pin female mating connector; IP67 protection	LT-B	PC-B	PK-B	PA1-C			PY-C
CON013	Angled 5-pin female mating connector IP40 protection	LT-B	PC-B	PK-B	PA1-C			PY-C
CON050	Angled 4-pin M12 female mating connector; IP67 protection							
CON293	4-pin M12 female mating connector; IP67 protection							
CON300	6-pin female mating connector						IC-C	
CAV010	Female connector + 2mt of wired cable PVC (for PME model)					PME12-C		
CON021	6-pin female mating connector; IP40; DIN45322							
CON022	6-pin female mating connector; IP67; DIN45322							
CON023	Angled 6-pin female mating connector; IP67; DIN45322							
CON026	8-pin female mating connector; IP40; DIN45326							
CON027	8-pin female mating connector; IP67; DIN45326							
CON028	Angled 8-pin female mating connector; IP67; DIN45326							
CON031	5-pin M12 female mating connector; IP67							
CON035	8-pin M12 female mating connector; IP67							
CON041	Angled 5-pin M12 female mating connector; IP67							
CON042	Angled 8-pin M12 female mating connector; IP67							
CON380	5-pin M12 male connector code-B (for MK4/IK2-P)							
CON390	5-pin M12 female connector code-B (for MK4/IK2-P)							
CON049	Profibus terminal (M12 axial male connector) for MK4/IK2-P							
CON460	8-pin M12 male mating connector; IP67 (for RK-EK connection)							
CAV002	Female connector with 2 meter cable lenght; IP67 protection							
CAV003	Female connector with 5 meter cable lenght; IP67 protection							
CAV004	Female connector with 10 meter cable lenght; IP67 protection							
CAV009	Female connector with 15 meter cable lenght; IP67 protection							
CAV005	90° angled female connector with 2 meter cable lenght; IP67 protection							
CAV006	90° angled female connector with 5 meter cable lenght; IP67 protection							
CAV007	90° angled female connector with 10 meter cable lenght; IP67 protection							
CAV008	90° angled female connector with 15 meter cable lenght; IP67 protection							
CAV011	Female connector with 2 meter cable lenght IP67 protection							
CAV012	Female connector with 5 meter cable lenght IP67 protection							
CAV013	Female connector with 10 meter cable lenght IP67 protection							
CAV015	Female connector with 15 meter cable lenght IP67 protection							
CAV021	90° angled female connector with 2 meter cable lenght IP67 protection							
CAV022	90° angled female connector with 5 meter cable lenght IP67 protection							
CAV023	90° angled female connector with 10 meter cable lenght IP67 protection							
CAV024	90° angled female connector with 15 meter cable lenght IP67 protection							
PCAV700	4-pin M8 female connector, with 3 meters cable for Profibus							
PCAV701	4-pin M8 female connector, with 5 meters cable for Profibus							
PCAV702	5-pin M12 female connector, with 3 meters cable for Profibus							
PCAV703	5-pin M12 male connector, with 3 meters cable for Profibus							
PCAV704	5-pin M12 female connector, with 5 meters cable for Profibus							
PCAV705	5-pin M12 male connector, with 5 meters cable for Profibus							

LT67 PC67 PZ67	ONP1-A	MK4-A	MK4-D	MK4-S	MK4-C	MK4-P	IK4-A	IK4-S	IK4-C	IK2-P	RK2	RK4
	ONP1-A-M											
LT67/PC67/PZ67-S												
LT67/PC67/PZ67-S												
PZ67-A												
		MK4-A-B	MK4-D-B	MK4-S-B	MK4-C-B		IK4-A-B	IK4-S-B	IK4-C-B/C-X		RK2+EK_ _-B	
		MK4-A-B	MK4-D-B	MK4-S-B	MK4-C-B		IK4-A-B	IK4-S-B	IK4-C-B/C-X		RK2+EK_ _-B	
		MK4-A-B	MK4-D-B	MK4-S-B	MK4-C-B		IK4-A-B	IK4-S-B	IK4-C-B/C-X		RK2+EK_ _-B	
		MK4-A-C	MK4-D-C	MK4-S-C								
		MK4-A-C	MK4-D-C	MK4-S-C								
		MK4-A-C	MK4-D-C	MK4-S-C								
		MK4-A-A			MK4-C-A		IK4-A-A		IK4-C-A/C-Y		RK2+EK_ _-M	
		MK4-A-H	MK4-D-H	MK4-S-H								
		MK4-A-A			MK4-C-A		IK4-A-A		IK4-C-A/C-Y		RK2+EK_ _-M	
		MK4-A-H	MK4-D-H	MK4-S-H								
						MK4-P-W				IK2-P-W		
						MK4-P-W				IK2-P-W		
						MK4-P-W				IK2-P-W		
											RK2+EK_	
		MK4-A-H	MK4-D-H	MK4-S-H								
		MK4-A-H	MK4-D-H	MK4-S-H								
		MK4-A-H	MK4-D-H	MK4-S-H								
		MK4-A-H	MK4-D-H	MK4-S-H								
		MK4-A-H	MK4-D-H	MK4-S-H								
		MK4-A-H	MK4-D-H	MK4-S-H								
		MK4-A-H	MK4-D-H	MK4-S-H								
		MK4-A-H	MK4-D-H	MK4-S-H								
		MK4-A-A			MK4-C-A		IK4-A-A		IK4-C-A/C-Y		RK2+EK_ _-M	RK4
		MK4-A-A			MK4-C-A		IK4-A-A		IK4-C-A/C-Y		RK2+EK_ _-M	RK4
		MK4-A-A			MK4-C-A		IK4-A-A		IK4-C-A/C-Y		RK2+EK_ _-M	RK4
		MK4-A-A			MK4-C-A		IK4-A-A		IK4-C-A/C-Y		RK2+EK_ _-M	RK4
		MK4-A-A			MK4-C-A		IK4-A-A		IK4-C-A/C-Y		RK2+EK_ _-M	RK4
		MK4-A-A			MK4-C-A		IK4-A-A		IK4-C-A/C-Y		RK2+EK_ _-M	RK4
		MK4-A-A			MK4-C-A		IK4-A-A		IK4-C-A/C-Y		RK2+EK_ _-M	RK4
		MK4-A-A			MK4-C-A		IK4-A-A		IK4-C-A/C-Y		RK2+EK_ _-M	RK4
						MK4-P-W				IK2-P-W		
						MK4-P-W				IK2-P-W		
						MK4-P-W				IK2-P-W		
						MK4-P-W				IK2-P-W		
						MK4-P-W				IK2-P-W		
						MK4-P-W				IK2-P-W		

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