Non-Contact Absolute Position Transducer

MAGNETOSTRICTIVE

TECHNOLOGY

Germanjet®

PART OF YOUR POSITIONING

# ...Experts in non-contact sensing

for extremely accurate, low-noise, and wear-free absolute position feedback

Our philosophy ...

Leading technology revolutionary can determine who will hold the competitive advantage today and tomorrow. Germanjet has been in the position to be the trendsetter for sensing revolution. Recognizing promising ideas and identify new approach to challenge has always been one of the most significant elements in our technology planning. To accomplish all this, we closely align our R&D activities toward our business strategy.

Our team is young, dynamic, and committed. Their excellent qualifications allow them to provide exceptional support to customers all around the world. Open and devoted cooperation results in an extraordinarily high degree of identification with the company.

In order to act proactively to our customers' technological needs, Germanjet Advance Sensing and Control Technology (ASCT) group was formed to specialize in designing intelligent product and solution. No matter how diverse and difficult the requirement is, our goal is to provide the highest possible performance with the most optimum service and price.
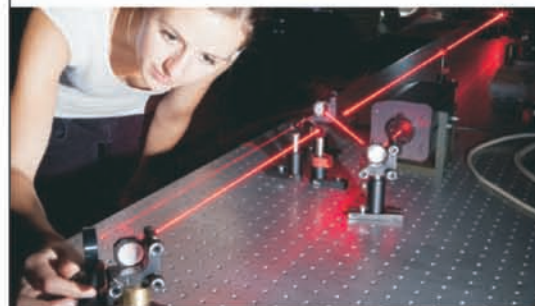
Worldwide Vision

Our team excellent qualifications allow them to provide exceptional support to customers all around the world.

Parisan control is an advance close-loop control system for blow molding machine. Non-contact absolute position transducer feedbacks the valve position to controller to precisely control the thickness of the bottle.

Non-contact Technology

Absolute Position

IP 67 Protection

Easy Installation

The fundamental principle of the magnetostrictive transducer is by analyzing the feedback sonic wave induced by an interaction of two magnetic fields. The first magnetic field is produced by the moveable magnetic cursor which attached at the moving component of a machine. The second field is generated by the pulse initiator. After the two magnetic fields interact, a sonic wave is induced and detected by the sonic wave analyzer.

By examining the characteristic of the wave pattern, the embedded microprocessor is able to generate the corresponding analog output signal to indicate the position of the machine. As a result, precise non-contact position is achieved with absolutely no wear to the sensing components.
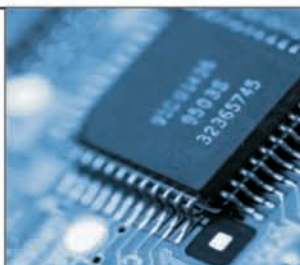
high precision & reliability...

Electromagnetic Compatibility refers to the ability of equipment to perform satisfactorily in its electromagnetic environment without introducing intolerable interference into any thing in that environment.

The equipment must have a certain level of "immunity" to the Electromagnetic Interference (EMI) present in its environment so that it is not "susceptible" to that EMI. Product, in certain country, has to fulfill EMC test in order to be distributed legally.

Our EMC laboratory is fully compatible with ISO/IEC 17025:1996 standard. And our product are passed all required EMC tests and meet the CE standard.

| Standard	Description
EN 61000-6-3	Emission standard for residential, commercial and light-industrial environments
EN 61000-6-2	Immunity for industrial environments
EN 61000-4-2	Electrostatic discharge immunity test
EN 61000-4-3	Radiated, radio-frequency, electromagnetic field immunity test
EN 61000-4-4	Electrical fast transient/burst immunity test
EN 61000-4-6	Immunity to conducted disturbances, induced by radio-frequency fields
EN 61000-4-8	Power frequency magnetic field immunity test
	Temperature fatigue test
	Liquid and dust protection test
	Shock and vibration test
	On site shock and vibration test

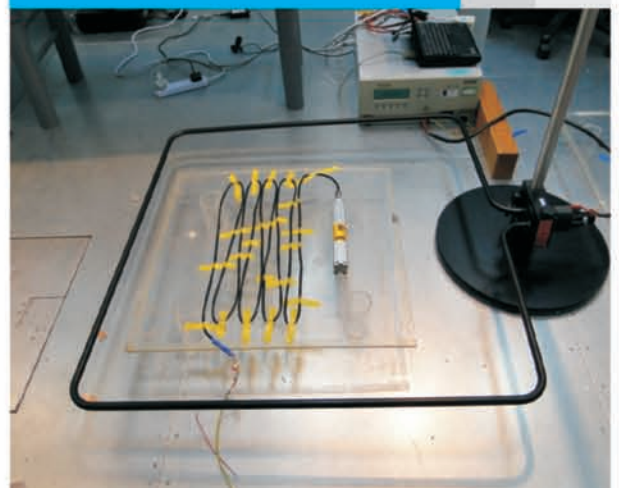Emission standard for residential, commercial and light-industrial environments
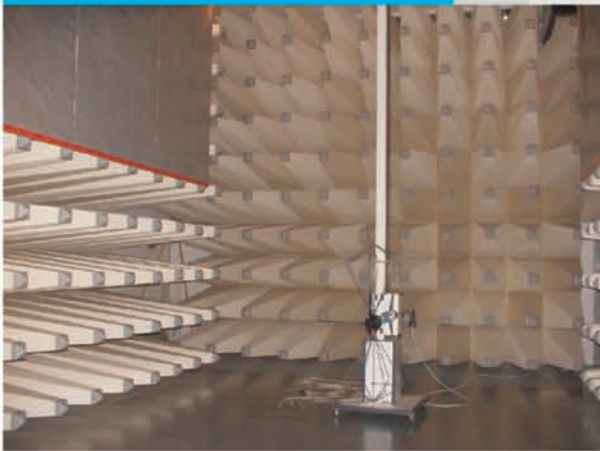
Radiated, radio-frequency, electromagnetic field immunity test
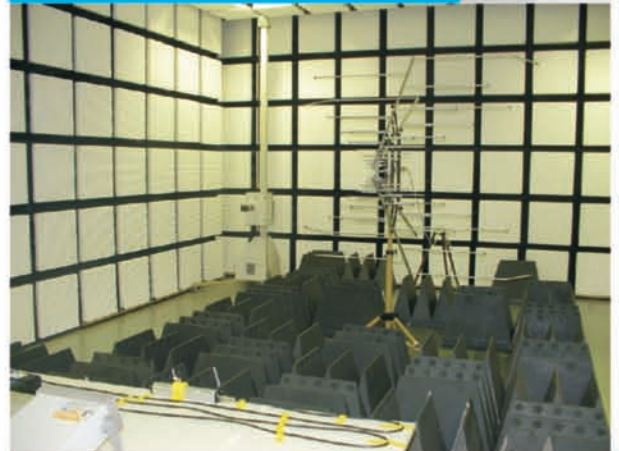
Shock and vibration test laboratory

Power frequency magnetic field immunity test

# $\mathsf{C\,E}$ *Quality and certification....*

Temperature fatigue test

Product in most working environment would experience certain degree of shock and vibration. The purpose of shock and vibration test is to have product going through a similar simulated environment.

During design phase and pre-production cycle, our product would undergo a series of intensive shock and vibration tests. Machine such as plastic injection machine induces a severe level of vibration. In order to make sure our product overcome the actual challenge, we also perform a series of on-site test.

On-site shock and vibration test
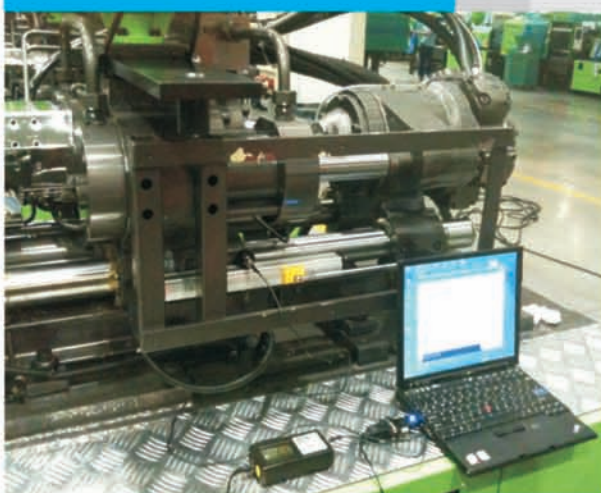
Liquid and dust protection

...19 Series
Non-Contact Sensor

19 series is the state-of-the-art digital position transducer. It adopts the non-contact magnetrostrictive measuring technology for precise, accurate, and absolute measurement. The non-contact feature provides exceptional ease of installation and guarantees almost unlimited mechanical life expectancy.

This special sensor was designed for use in harsh environments, such as petrochemical, oil refinery, and power plant, with high contamination and presence of dust. 19 series has a wide variety of signal output selection included analog, serial digital and fieldbus interfaces.

H model - hydraulic rod

H model is designed for hydraulic cylinder. Hydraulic body is made by stainless steel; it can be inserted directly into hydraulic cylinder. Electronic component and hydraulic body are modular design which can be detached easily; Hydraulic fluid doesn't need to be withdrawn when doing sensor calibration or replacement. This design greatly reduces the down time and improves efficiency.

P model - aluminium profile

P model is designed for machine equipment. The high versatile IP67 profile housing offers full protection against outside agents for use in harsh environments with high contamination and presence of dust. Mounting is accomplished using clamps that allow precise mechanical adjustment.

D model - sensing rod detached

D model is design for hydraulic cylinder with limited head space or clevis rod ends hydraulic cylinder. Sensing rod is made by stainless steel which installed inside the hydraulic cylinder. It is connected to the electronic module installed at the outside of the cylinder by a robust cable.

F model - flex sensor housing

F model is design for very long stroke lengths and linear measurements on an arc. Standard stroke length begins from 2500mm up to 10 meters. And longer lengths are available for special applications. The F model is available with all 19 series outputs including analog, serial digital and fieldbus interfaces.
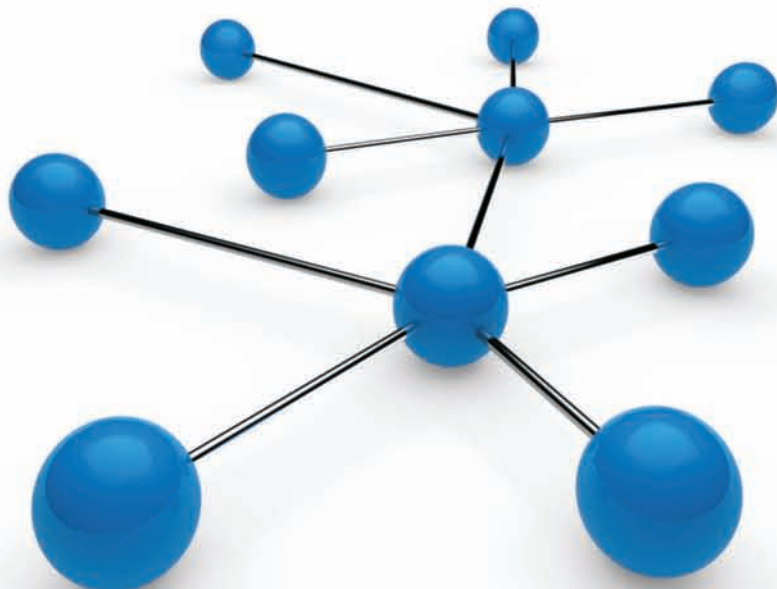
high precision with extreme reliability...

Digital Fieldbus Connection...

This professional series adopts the non-contact magnetostrictive technology for precise, direct and absolute position feedback. Output signals include:

- Programmable analog output
- Start/Stop pulse interface
- Synchronous serial SSI interface
- CANbus
- Profibus
- DeviceNet
- EtherCAT

Order Code

The 19 series order code cosists of two parts: output code and installation code

For example, select the preferred output signal such as SSI, CANbus, etc and then choice the suitable installation profile such as hydraulic rod (H)

1	9	X	X	X	X		X	X	X	X	X	X

(Output code)
P11 - P20

(Installation code)
P21 - P26

For example: SSI output with hydraulic rod (H)

1	9	2	1	G	1	1	0	0		H	0	2	2	5	2	1

SSI output code

Hydraulic rod installation code

high precision & reliability...

Specifications

Order Code	1 9 0	1 9 1
Output	Voltage	Current
Measurement Type	Linear displacement	

Measured Variables	For dual magnets, kept minimum distance of 76mm in between
Resolution	16 Bit D/A, 0.0015% (minimum 1μm)
Repeatability	< ±0.001% of full scale (minimum ±2.5μm)
Non-Linearity	< ±0.01% of full scale (minimum ±40μm)
Update Time	0.5 ms up to 1200 mm / 1.0 ms up to 2400 mm
	2.0 ms up to 4800 mm / 5.0 ms up to 7600 mm

Input Voltage	+24Vdc (20.4 - 28.8Vdc)
Input Protection	Polarity protection up to -30Vdc, Over voltage protection up to 36Vdc
Power Consumption	100mA (stroke range dependent)
Dielectric Strength	500Vdc (DC ground to machine ground)
Connector Type	D60 Male

Operation Temp.	-40 to 75℃, Humility 90% non-condensing
Sealing	IP 67 (with connector)
Vibration Rating	15g / 10-2000Hz / IEC standard 68-2-6
Shock Rating	100g single hit per IEC standard 68-2-27
EMC	Emission EN 68000-6-3, Immunity EN 61000-6-2, EN 61000-4-2/3/4/6

Order Code (Output Code)

1 9 X X X X X X X

Output

3 or 7 digits

1 Output with 1 Magnet Position

001 = 0 - 10V
011 = 10 - 0V
021 = 0 - 5V
031 = 5 - 0V
041 = -10 - +10V
051 = -5 - +5V
101 = 4 - 20mA
111 = 20 - 4mA
121 = 0 - 20mA
131 = 20 - 0mA
141 = 0 - 24mA
151 = 24 - 0mA

2 Outputs with 2 Magnets Position

002 = 0 - 10V,0 - 10V
012 = 10 - 0V,10 - 0V
022 = 0 - 5V
032 = 5 - 0V
042 = -10 - +10V
052 = -5 - +5V
102 = 4 - 20mA
112 = 20 - 4mA
122 = 0 - 20mA
132 = 20 - 0mA
142 = 0 - 24mA
152 = 24 - 0mA

2 Outputs with 1 Magnet (Position + Velocity)

003 xxx.x = 0 - 10V (Position), 0(Mini. Velocity) - 10V (Max. Velocity)
013 xxx.x = 10 - 0V (Position), 0(Mini. Velocity) - 10V (Max. Velocity)
103 xxx.x = 4 - 20mA (Position), 4(Mini. Velocity) - 20mA (Max. Velocity)
113 xxx.x = 20 - 4mA (Position), 4(Mini. Velocity) - 20mA (Max. Velocity)

Velocity range: 0.001 - 10m/s
Sample: 0 - 5.5m/s = 0 - 10V, code = 0030055

19 series sensors are preconfigured at the factory by model code designation. If needed, we offer programming tools for modifying sensor active electrical stroke and output types.

Pin Assignments
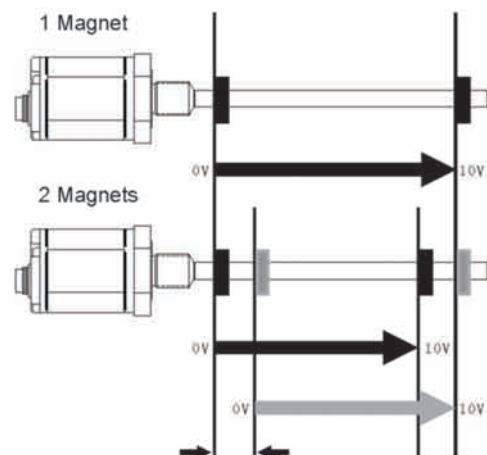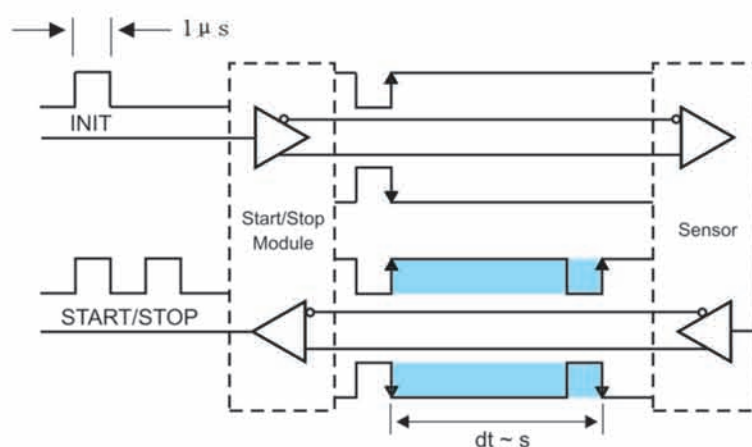

1	Output 1
2	DC Gnd
3	Output 2
4	DC Gnd
5	+24 Vdc
6	0 Vdc

(View toward sensor pins)

Cable shield connects to connector shell and grounded at controller side.

Magnet Assigment

1 Magnet

2 Magnets

When using dual magnets, there is a minimum distance of 76mm need to be kept in between.

Order Code	1 9 3
Output	(Start / Stop) Digital Output
Measurement Type	Linear Displacement
Resolution	0.1 / 0.01 / 0.005mm

Repeatability	< ±0.001% of full scale (minimun ±2.5µm)
Non-Linearity	< ±0.01% of full scale (minimun ±40µm)
Update Time	0.5 ms up to 1200 mm / 1.0 ms up to 2400 mm
	2.0 ms up to 4800 mm / 5.0 ms up to 7600 mm

Input Voltage	+24Vdc (20.4 - 28.8Vdc)
Input Protection	Polarity protection up to -30Vdc, Over voltage protection up to 36Vdc
Power Consumption	100mA (stroke range dependent)
Dielectric Strength	500Vdc (DC ground to machine ground)
Connector Type	D60 Male

Operation Temp.	-40 to 75℃, Humility 90% non-condensing
Sealing	IP 67 (with connector)
Vibration Rating	15g / 10-2000Hz / IEC standard 68-2-6
Shock Rating	100g single hit per IEC standard 68-2-27
EMC	Emission EN 68000-6-3, Immunity EN 61000-6-2, EN 61000-4-2/3/4/6

Order Code (Output Code)

1 9 3 X 0

Output

1 = +24Vdc (20.4 - 28.8Vdc)
2 = +9Vdc to +28Vdc

Logic Diagram

Pin Assignments

1	Stop (-)
2	Stop (+)
3	Start (+)
4	Start (-)
5	+24Vdc
6	0Vdc

(View toward sensor pins)

Cable shield connects to connector shell and grounded at controller side.

Specifications

Order Code	1 9 2					
Output	SSI					
Measurement Type	Linear displacement					
Data Format	Binary or Grey, optional Parity and Errorbit					
Data Length	8 - 32 bits					
Data Speed	Cable Length :	<3	<50	<100	<200	<400	m

	Baud rate :	1000	<400	<300	<200	<100	kBd
Update Time	Measuring Length :	300	750	1000	2000	5000	mm
	Measurement/sec :	3.7	3.0	2.3	1.2	0.5	kHz

Resolution	Displacement : 1 / 2 / 5 / 10 / 20 / 50 / 100 μm
Repeatability	< ±0.001% of full scale (minimum ±2.5μm)
Non-Linearity	< ±0.01% of full scale (minimum ±40μm)
Update Time	0.5 ms up to 1200 mm / 1.0 ms up to 2400 mm
	2.0 ms up to 4800 mm / 5.0 ms up to 7600 mm

Input Voltage	+24Vdc (20.4 - 28.8Vdc)
Input Protection	Polarity protection up to -30Vdc, Over voltage protection up to 36Vdc
Power Consumption	100mA (stroke range dependent)
Dielectric Strength	500Vdc (DC ground to machine ground)
Connector Type	D70 Male

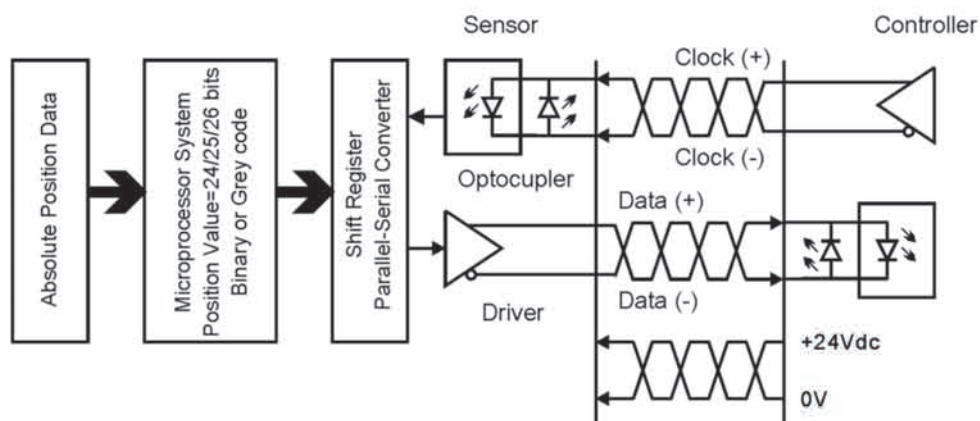|	
Operation Temp.	-40 to 75°C, Humility 90% non-condensing
Sealing	IP 67 (with connector)
Vibration Rating	15g / 10-2000Hz / IEC standard 68-2-6
Shock Rating	100g single hit per IEC standard 68-2-27
EMC	Emission EN 68000-6-3, Immunity EN 61000-6-2, EN 61000-4-2/3/4/6

Timing Diagram
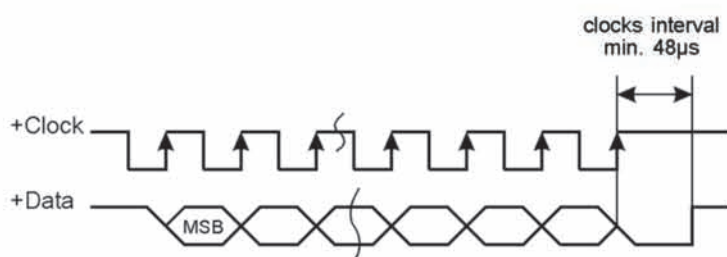
Sensor Input

Logic Diagram

germanjet.de
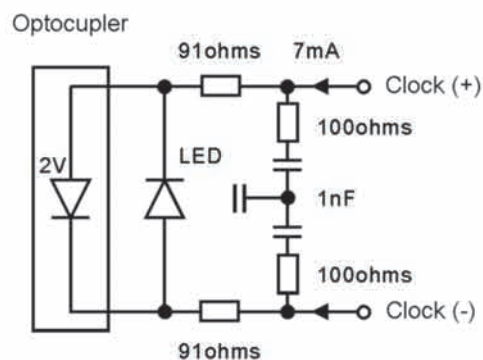
Order Code (Output Code)

1 9 2 X X X X X X X

Data Length

1 = 25 bits
2 = 24 bits

Output Format

B = Binary

G = Grey Code

Resolution

1 = 5µm	2 = 10µm
3 = 50µm	4 = 100µm
5 = 20µm	6 = 2µm
8 = 1µm	

Resolution

1 = Standard

Options

00 = Measuring direction forward
01 = Measuring direction reverse

Remark: Direction forward means position reading become larger while magnet move away from electronic carriage. Direction backward means position reading become smaller while magnet move away from electronic carriage.
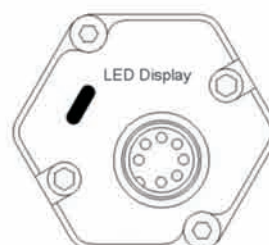
Pin Assignments

1	Data (-)
2	Data (+)
3	Clock (+)
4	Clock (-)
5	+24Vdc
6	0Vdc
7	n.c.

(View toward sensor pins)

Cable shield connects to connector shell and grounded at controller side.

Diagnostic Display

LED Display

Green	Red	Description
ON	OFF	Normal function
ON	ON	Magnet not detected

Integrated LEDs provide basic visual feedback for normal sensor operation and troubleshooting.

high precision & reliability...

Specifications

Order Code	194
Output	CANBus
Measurement Type	Linear displacement
Data Protocol	CANopen: CIA Standard DS-301 V3.0
	CANbasic : CAN 2.0A

Baud Rate	Baud rate : 1000 800 500 250 125 50 20 Kbit/s
	Cable length : <25 <50 <100 <250 <500 <1000 <2500 m

	CANopen		CANbasic	
Resolution				
- Displacement	5µm	2µm	5µm	2µm
- Speed	0.5mm/s	0.2mm/s	1.0mm/s	0.1mm/s

Repeatability	< ±0.001% of full scale (minimum ±2.5µm)
Non-Linearity	< ±0.01% of full scale (minimum ±40µm)
Update Time	0.5 ms up to 1200 mm / 1.0 ms up to 2400 mm
	2.0 ms up to 4800 mm / 5.0 ms up to 7600 mm

Input Voltage	+24Vdc (20.4 - 28.8Vdc)
Input Protection	Polarity protection up to -30Vdc, Over voltage protection up to 36Vdc
Power Consumption	100mA (stroke range dependent)
Dielectric Strength	500Vdc (DC ground to machine ground)
Connector Type	D60 Male

Operation Temp.	-40 to 75℃, Humility 90% non-condensing
Sealing	IP 67 (with connector)
Vibration Rating	15g / 10-2000Hz / IEC standard 68-2-6
Shock Rating	100g single hit per IEC standard 68-2-27
EMC	Emission EN 68000-6-3, Immunity EN 61000-6-2, EN 68000-4-2/3/4/6

Order Code (Output Code)

1 9 4 X X X X X X X X X X X X

Protocol

101 = CANbasic
207 = Multi-Position CANbasic
304 = CANopen

Baud Rate

1 = 1000 kBit/s
2 = 500 kBit/s
3 = 250 kBit/s
4 = 125 kBit/s

Resolution

1 = 5µm   4 = 10µm
2 = 2µm   5 = 20µm

Connection Type

D60 = 6 pin male receptacle M16 with termination resistor
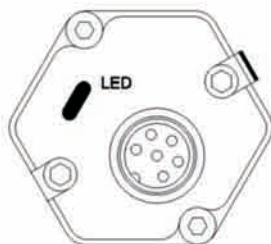D61 = 6 pin male receptacle M16
D62 = 2x6 pin male receptacle M16

Magnet Number

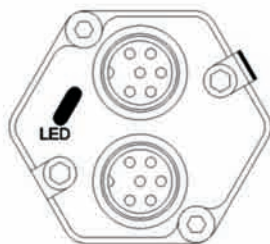Z__ = 02 - 03 pcs of Magnet (If output 207 is selected)

Baud Rate	Cable Length
1000 Kbd	25M
500 Kbd	100M
250 Kbd	250M
125 Kbd	500M

Remark: CANbus protocol parameters are chosen by customer and controller, not decided by Germanjet.

D60 / D61 Connection

D62 Connection

Green	Red	Description
ON	OFF	Normal function
ON	ON	Magnet not detected

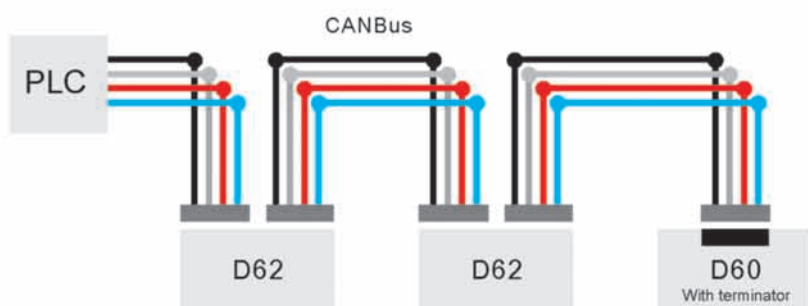Integrated LEDs provide basic visual feedback for normal sensor operation and troubleshooting.

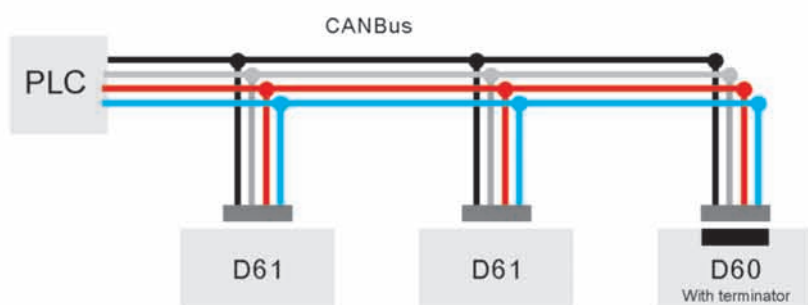| 1	CAN(-)
2	CAN(+)
3	N.C.
4	N.C.
5	+24Vdc
6	0Vdc

(View toward sensor pins)

Cable shield connects to connector shell and grounded at controller side.
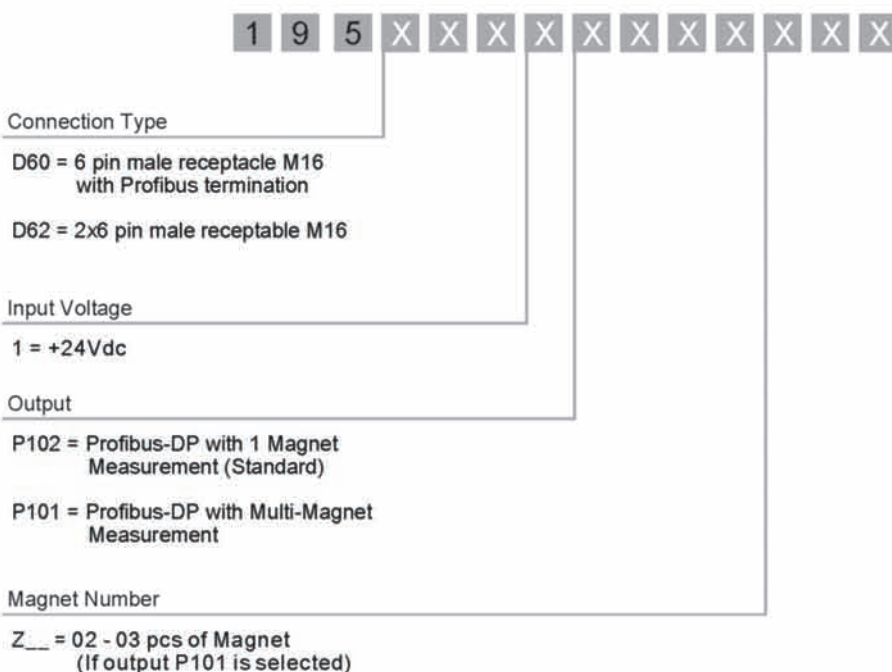
Network Topology

CANBus

PLC

D62

D62

D60
With terminator

Bus Network Topology

CANBus

PLC

D61

D61

D60
With terminator

Star Network Topology

CANopen

Specifications

Order Code	1 9 5
Output	Profibus-DP digital output
Measurement Type	Linear displacement
Data Protocol	Profibus-DP (EN-50170)
Output Signal	Profibus-DP System according ISO 74498
Baud Rate	Max 12Mbit/s
Resolution	Position: 5μm/ other values selectable via GSD file
Repeatability	< ±0.001% of full scale (minimum ±2.5μm)
Non-Linearity	< ±0.01% of full scale (minimum ±40μm)
Update Time	0.5 ms up to 1200 mm / 1.0 ms up to 2400 mm
	2.0 ms up to 4800 mm / 5.0 ms up to 7600 mm
Input Voltage	+24Vdc (20.4 - 28.8Vdc)
Input Protection	Polarity protection up to -30Vdc, Over voltage protection up to 36Vdc
Power Consumption	100mA (stroke range dependent)
Dielectric Strength	500Vdc (DC ground to machine ground)
Connector Type	D60 Male
Operation Temp.	-40 to 75°C, Humility 90% non-condensing
Sealing	IP 67 (with connector)
Vibration Rating	15g / 10-2000Hz / IEC standard 68-2-6
Shock Rating	100g single hit per IEC standard 68-2-27
EMC	Emission EN 68000-6-3, Immunity EN 61000-6-2, EN 68000-4-2/3/4/6

Order Code (Output Code)

1 9 5 X X X X X X X X X X X X

Connection Type

D60 = 6 pin male receptacle M16 with Profibus termination

D62 = 2x6 pin male receptable M16

Input Voltage

1 = +24Vdc

Output

P102 = Profibus-DP with 1 Magnet Measurement (Standard)

P101 = Profibus-DP with Multi-Magnet Measurement

Magnet Number

Z__ = 02 - 03 pcs of Magnet (If output P101 is selected)

Profibus Interface

The 19 series Profibus-DP interface fulfill the requirement of EN50170. The position transducer adopts the non-contact magnetostrictive measuring technology with direct transmission of RS-485 standard in a baud rate of 12 Mbits/s. Profibus wiring uses shielded twisted pair cable and can be used to connect up to 32 devices in a single segment (piece of cable).

D62 multi-drop connector outlet and D60 connector outlet with bus termination are available. Profibus provides useful functions for diagnostics and configuration by loading the GSD (Electronic Device Data Sheet) into the bus. The file is available to be downloaded at www.germanjet.de.

Diagnostic Display
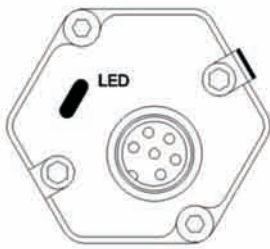
D60 / D61 Connection
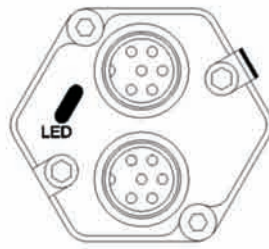
D62 Connection

Green	Red	Description
ON	OFF	Normal function
ON	ON	Magnet not detected

Integrated LEDs provide basic visual feedback for normal sensor operation and troubleshooting.
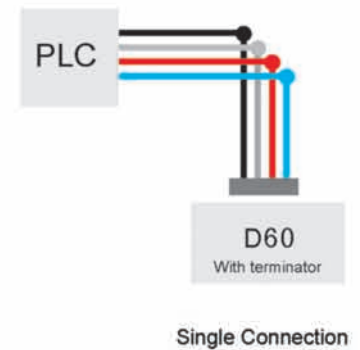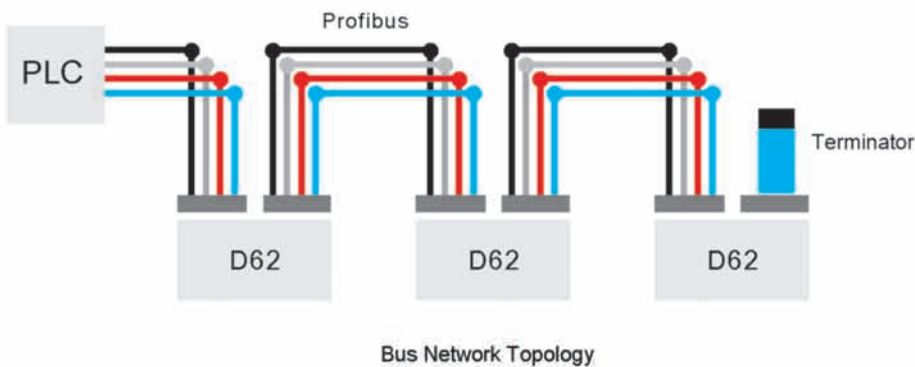
Pin Assignments

1	RxD/TxD-N(Bus)
2	RxD/TxD-P(Bus)
3	No connection
4	No connection
5	+24Vdc
6	0Vdc

(View toward sensor pins)

Cable shield connects to connector shell and grounded at controller side.

Network Topology

Profibus

PLC

Terminator

D62   D62   D62

Bus Network Topology

PLC

D60
With terminator

Single Connection

Profibus Addressing

Normally addressing is done by Profibus SetSlaveAddress. If some master systems do not support this standard, or customers controller can not handle, direct addressing is recommended.
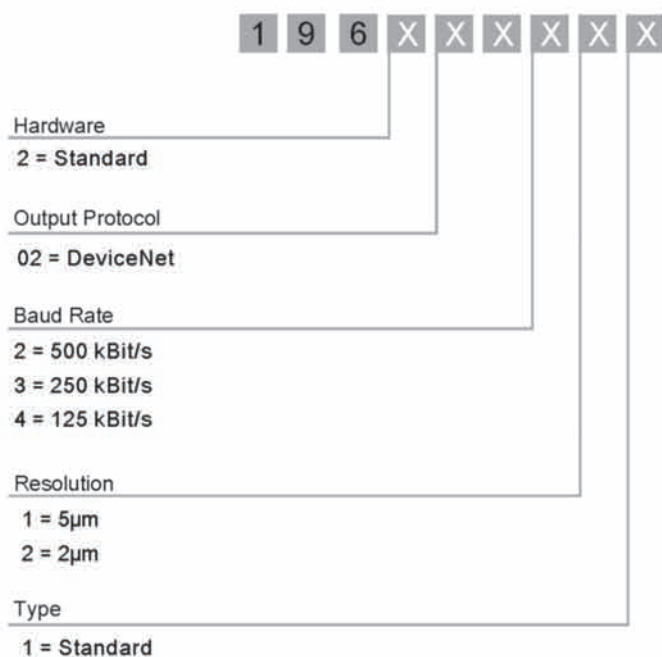
high precision & reliability...

PROFI
BUS ®

germanjet.de

Specifications

Order Code	1 9 6
Output	DeviceNet digital output
Measurement Type	Linear displacement
Data Protocol	DeviceNet 2.0 Version
Output Signal	CAN FieldBus System ISO 11898
Baud Rate	Baud rate : 500 250 125 Kbit/s
	Cable length : <100 <250 <500 m

Resolution	2μm or 5μm
Repeatability	< ±0.001% of full scale (minimum ±2.5μm)
Non-Linearity	< ±0.01% of full scale (minimum ±40μm)
Update Time	0.5 ms up to 1200 mm / 1.0 ms up to 2400 mm
	2.0 ms up to 4800 mm / 5.0 ms up to 7600 mm

Input Voltage	+24Vdc (20.4 - 28.8Vdc)
Input Protection	Polarity protection up to -30Vdc, Over voltage protection up to 36Vdc
Power Consumption	100mA (stroke range dependent)
Dielectric Strength	500Vdc (DC ground to machine ground)
Connector Type	D60 Male

Operation Temp.	-40 to 75℃, Humility 90% non-condensing
Sealing	IP 67 (with connector)
Vibration Rating	15g / 10-2000Hz / IEC standard 68-2-6
Shock Rating	100g single hit per IEC standard 68-2-27
EMC	Emission EN 68000-6-3, Immunity EN 61000-6-2, EN 68000-4-2/3/4/6

Order Code (Output Code)

1 9 6 X X X X X X

Hardware
2 = Standard

Output Protocol
02 = DeviceNet

Baud Rate
2 = 500 kBit/s
3 = 250 kBit/s
4 = 125 kBit/s

Resolution
1 = 5μm
2 = 2μm

Type
1 = Standard

Remark: DeviceNet protocol parameters are chosen by customer and controller, not decided by Germanjet.

Diagnostic Display
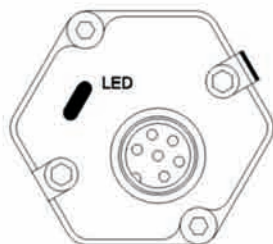
Green	Red	Description
ON	OFF	Normal function
ON	ON	Magnet not detected

Integrated LEDs provide basic visual feedback for normal sensor operation and troubleshooting.

Pin Assignments

1	CAN (-)
2	CAN (+)
3	N.C.
4	N.C.
5	+24Vdc
6	0Vdc

(View toward sensor pins)

Cable shield connects to connector shell and grounded at controller side.

DeviceNet Protocol

DeviceNet is layered on top of the CAN (Controller Area Network) technology and takes advantage of CAN, making it low-cost and robust. DeviceNet supports maxinium 500 Kbit/s data rates. Position resolution can be up to 2µm. Nodes are distributed along a DeviceNet network by the means of a trunkline-dropline topology. Nodes can be easily removed and added to reduce production downtime, increase network flexibility, and decrease troubleshooting time.

The DeviceNet installation is quick and easy. Each sensor is provided with an Electronical Data Sheet (EDS). All sensor parameters are installed into the network using the EDS file. The file is available to be downloaded at www.germanjet.de.

A PC programming tool, such as DeviceNet Manager offered by Rockwell Automation, is used to set the node identifier and baud rate. (Factory node setting is 63 and the baud rate is 500 Kbit/s)

advance fieldbus technology ...

Order Code (Installation Code)

| H | X | X | X | X | 2 | X | X |

Stroke Length (mm)

0075, 0100, 0125, 0150, 0175,
0200, 0225, 0250, 0275, 0300,
0325, 0350, 0375, 0400, 0425,
0450, 0475 (25mm increment after)

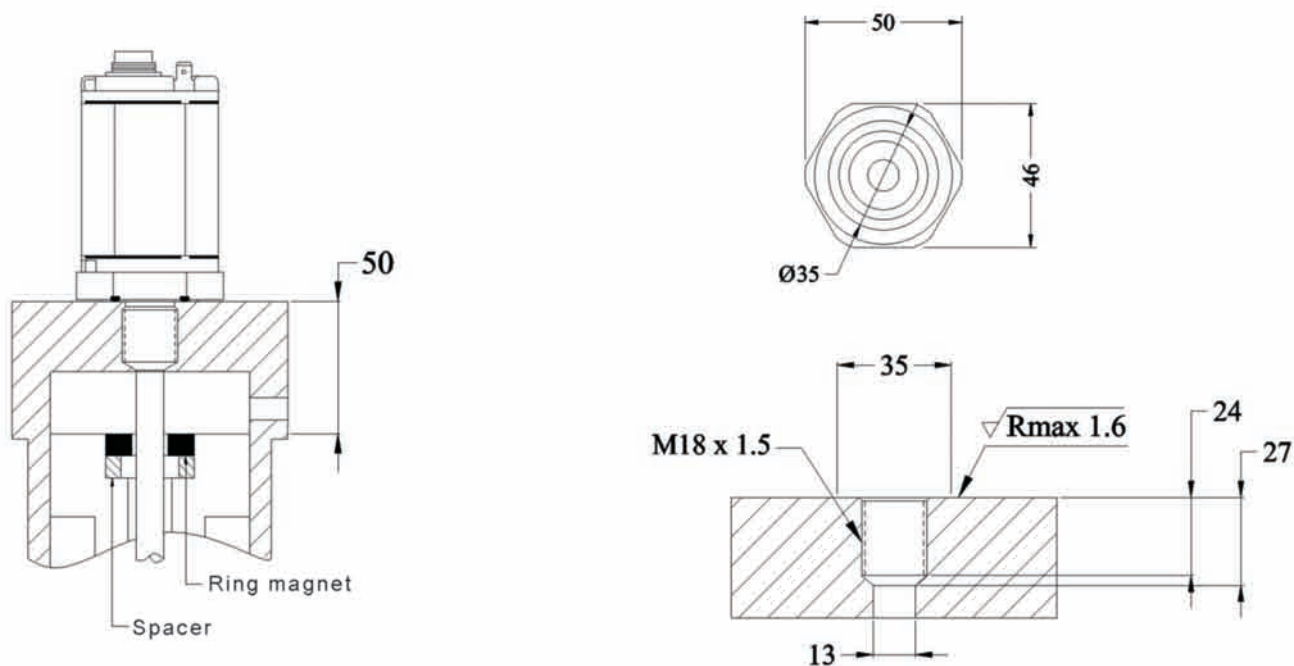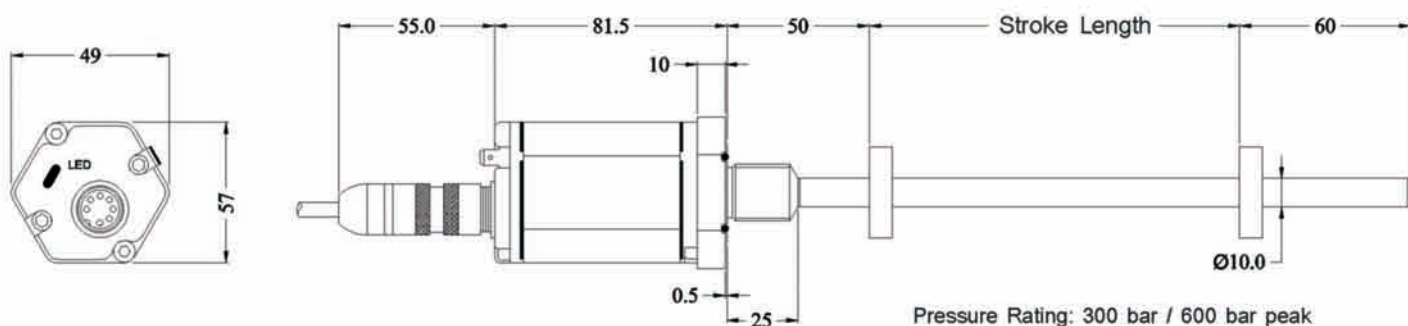**Mounting thread**

2 = M18 x 1.5

Magnet type

1 = Dia. 33mm ring
2 = Dia. 25mm ring
3 = Floating ball
4 = Dia. 60mm ring

Connector and Cable

1 = D60/D70 (depend on output format)

2 = Cable outlet (Not apply to D62 connector)
(P.A4 for cable length)

Installation

49

57

LED

55.0 81.5 50 Stroke Length 60

10

$\varnothing 10.0$

0.5

25

Pressure Rating: 300 bar / 600 bar peak

50

46

$\varnothing 35$

50

Ring magnet

Spacer

35

M18 x 1.5

$\triangledown$ Rmax 1.6

24

27

13

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P X X X X X X X

Stroke Length (mm)

0125, 0150, 0200, 0225, 0250
0275, 0325, 0350, 0410, 0450
0475, 0500, 0550, 0575, 0600
0650, 0700, 0800, 0850, 0925
0950, 1000, 1050, 1150, 1300
1400, 1550, 1650, 1800, 2050
2300, 2550, 2800, 3050, 3150
3300, 3550, 4050 (Other length upon request)

Mounting

1 = 42.5mm mounting
2 = 42.5mm isolation mounting
3 = 50mm mounting

Magnet Type

1 = Captive
2 = Floating
3 = Die-cast
4 = Large floating

Connector and Cable

1 = D60/D70 (depend on output format)
2 = Cable outlet (Not apply to D62 connector)
            (P.A4 for cable length)

Installation

55   7 77   13   Stroke Length   73

49

LED

57

37

14.5   M4

easy of installation ...

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22
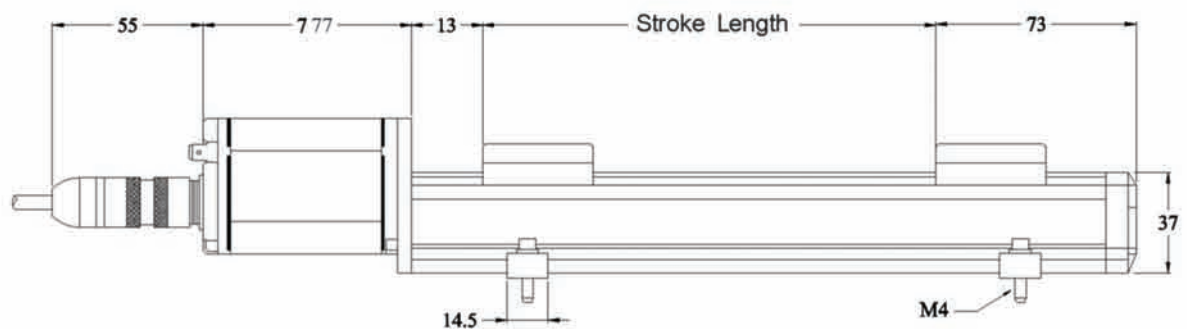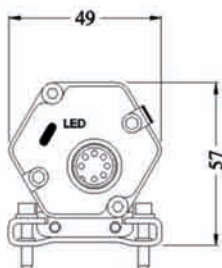
Order Code (Installation Code)

D X X X X 1 1 X X X

Stroke Length (mm)

0075, 0100, 0125, 0150, 0175,
0200, 0225, 0250, 0275, 0300,
0325, 0350, 0375, 0400, 0425,
0450, 0475 (25mm increment after)

Sensor Electronic

1 = Bottom cable entry

Sensor Rod Style

1 = Fitting flange

Magnet type

1 = Dia. 33mm ring
2 = Dia. 25mm ring
4 = Dia. 60mm ring

Integral Cable of Sensor Rod

1 = 170mm cable with connector
2 = 230mm cable with connector
3 = 350mm cable with connector

Connector and Cable

1 = D60/D70 (depend on output format)
2 = Cable outlet (Not apply to D62 connector)
         (P.A4 for cable length)

Installation Example
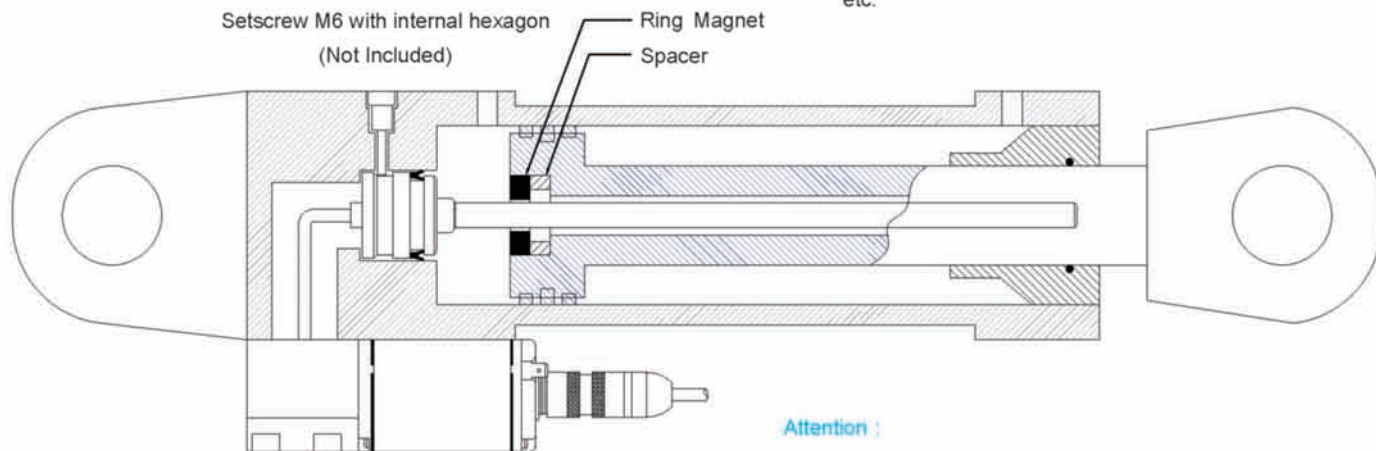
Mounting Ring Magnet

Mount the magnet with the non-magnetic material for entrainment, screws, spacers, etc.

Setscrew M6 with internal hexagon
(Not Included)

Ring Magnet

Spacer

Attention :

The ring magnet should not intouch with the sensor rod.

The bore in the piston rod is dependent on the hydraulic pressure and the pistons velocity. The minimum drilling should be 13mm. Do not exceed the peak pressure.

The sensor rod should be protected against wear.

24.7

25

24.7

Ø6.2

O- ring seal

Connector
(Not Included)

45

41

49

recommanded screw
M6x45

45

71

38

50mm

Cable bottom entry

LED

50

Stroke Length

60

170/230
/350mm

PUG cable Dia.6mm
Bend Radius > 24mm

34.5

30

34.5

7

Rod Dia. 10

Pressure Rating: 300 bar / 600 bar peak

Mounting Detail

5

30

22.22

28.5

35.5 mm H7

75°

2.54

Bore in cyclinder dia. 10-20mm to push
single wires with connector through

6

6.3

5.7

7

34.5

31.5

14

5

7

37

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24
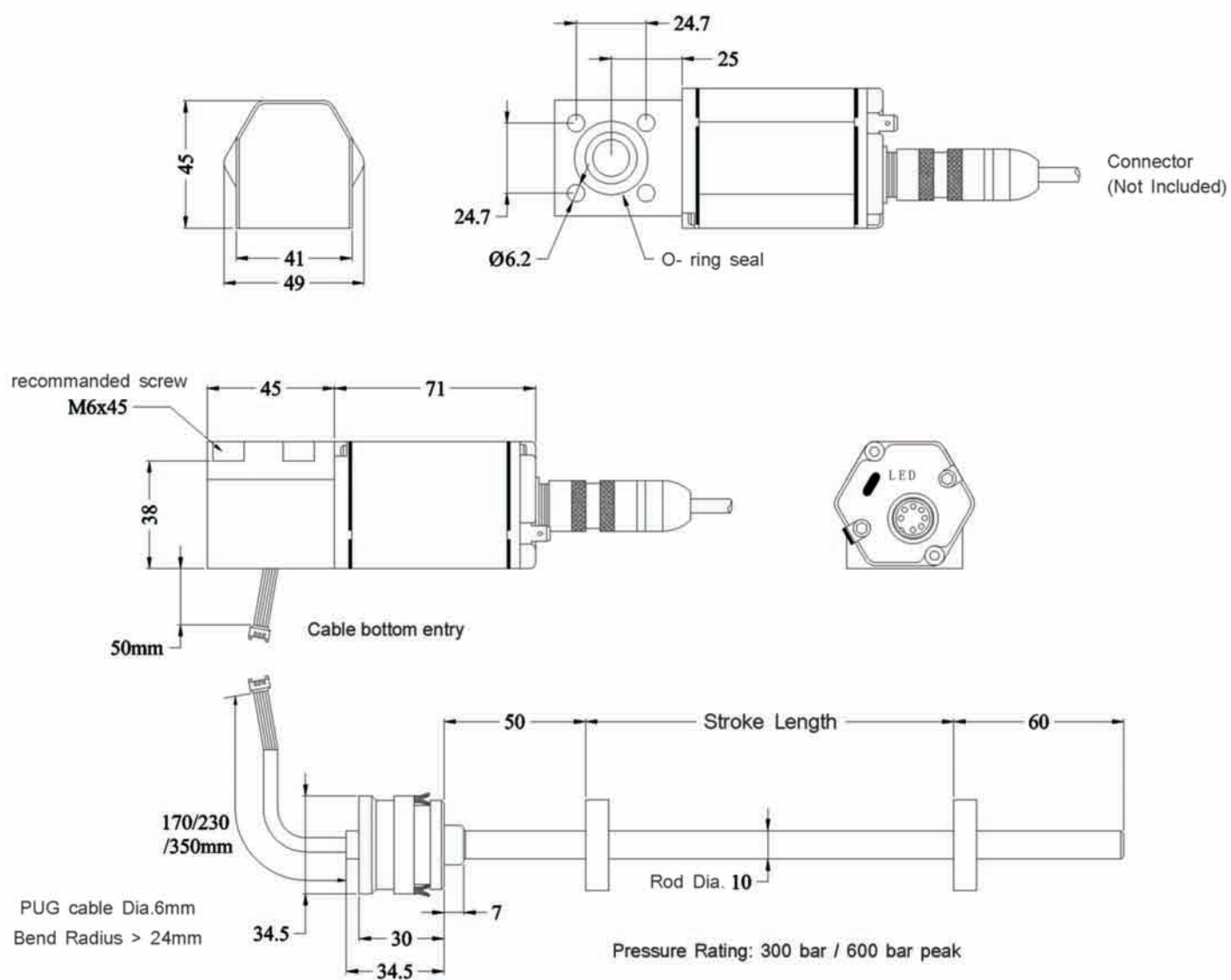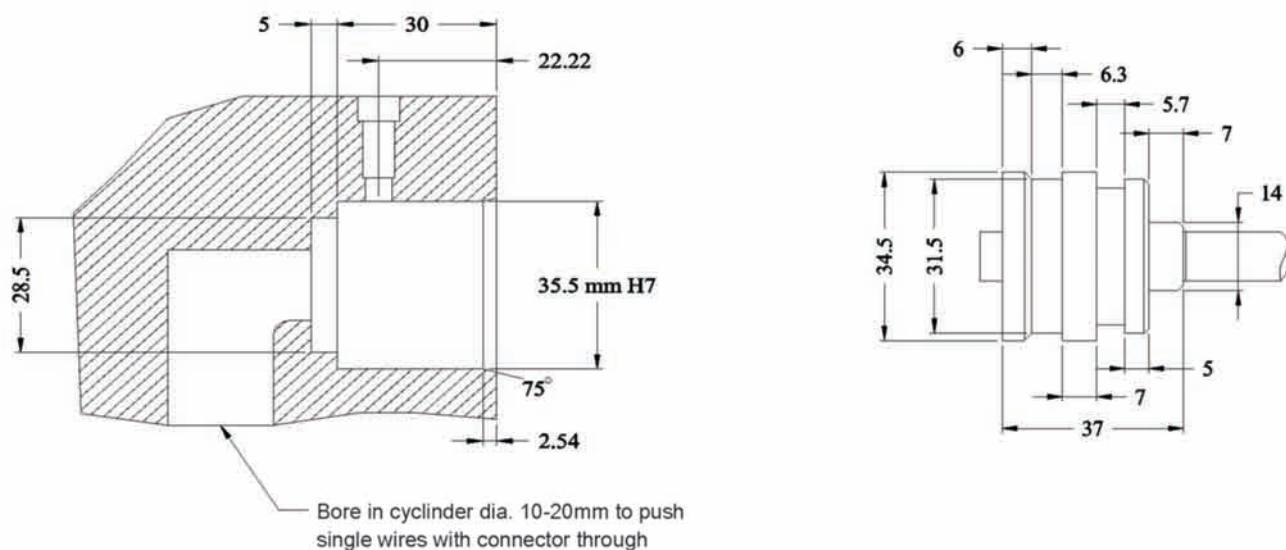
Order Code (Installation Code)

F X X X X X X X X X X

Stroke Length (mm)

02500, 02525, 02550, 02575,
02600, 02625, 02650, 02675,
02700, 02725, 02750, 02775,
(25mm increment after)

Flange Internal Diameter

1 = 10.0 mm Dia.
2 = 12.7 mm Dia.

Magnet type

1 = Outer Dia. 33mm, Inner Dia. 13.5mm ring
2 = Outer Dia. 60mm, Inner Dia. 33.0mm ring
3 = Large floating

Connector and Cable

1 = D60/D70 (depend on output format)
2 = Cable outlet (Not apply to D62 connector)
           (P.A4 for cable length)

Dimensions

49

57

LED

55.0

81.5
(Profibus 85mm)

50

Stroke Length

85

10

100
Rigid pipe

0.5

25

M18 x 1.5

Ø6.5
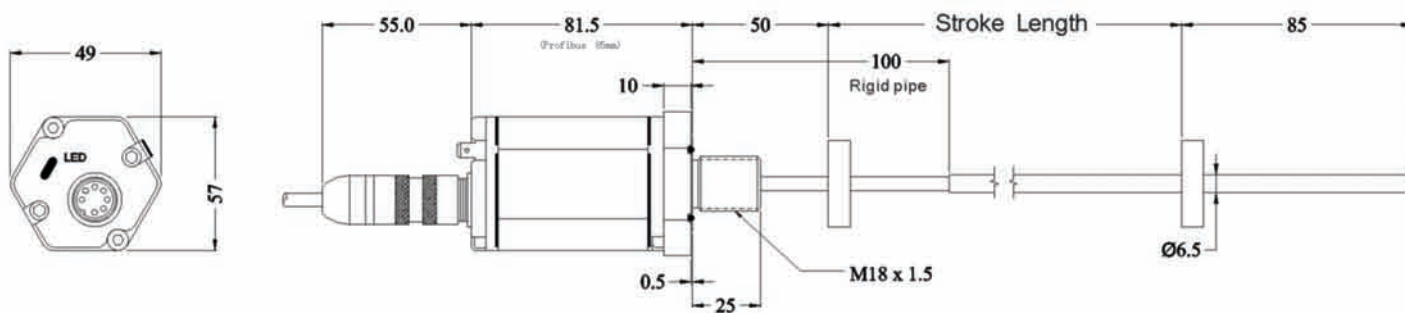
Total sensor length tolerances are :

+8mm up to 7600mm stroke lengths

+15mm / -5mm over 7600mm stroke lengths

* Tolerances of total length have no influence for the measuring stroke length

The flexible style is required to be supported inside a guide straight or bent pipe made of non-ferrous material. When installed inside a pressure housing pipe, the sensor is suitable for use in hydraulic cyclinders.

The flexible style is housed in a Teflon coated stainless steel for full protection against outside agents for use in harsh environments with high contamination.

250mm Minimum

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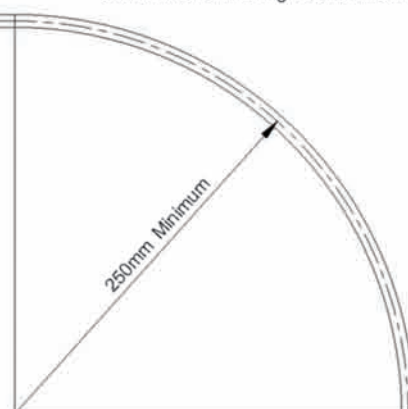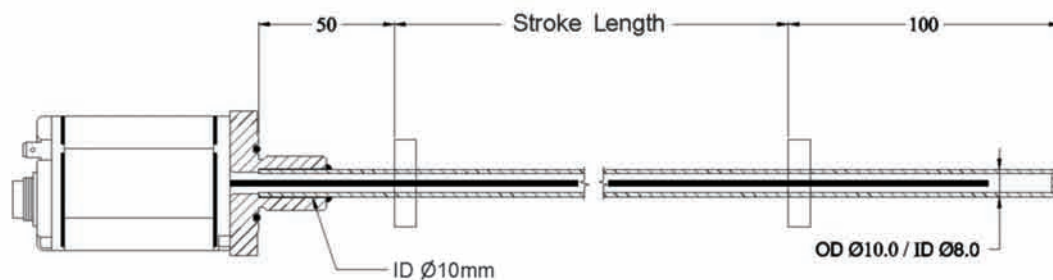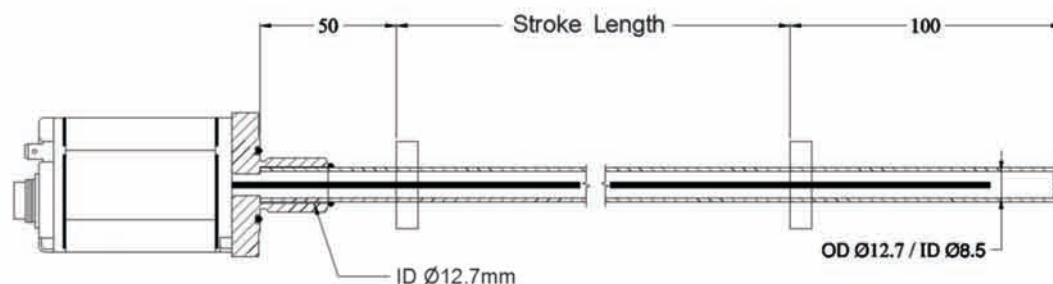
Pressure housing pipe for ID 10mm flange :

Pipe length = stroke length + 150mm

Pipe OD <10mm

Pipe ID > 8mm

50 — Stroke Length — 100

ID Ø10mm

OD Ø10.0 / ID Ø8.0

Pressure housing pipe for ID 12.7mm flange :

Pipe length = stroke length + 150mm

Pipe OD <12.7mm

Pipe ID > 8.5mm

* must use ID 30mm ring magnet

50 — Stroke Length — 100

ID Ø12.7mm

OD Ø12.7 / ID Ø8.5

Installation Instrustion

In urgent situation, 19F can be delivered immediately and economically on site to shorten unexpected machine downtime.

Welding can be applied to best accommodate the connection.
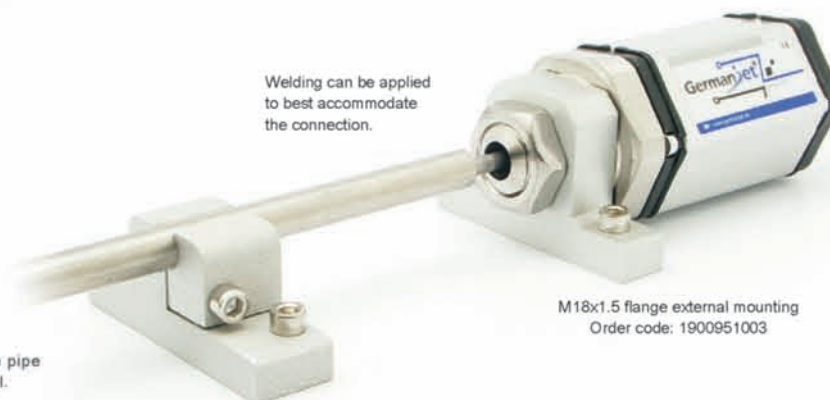
M18x1.5 flange external mounting
Order code: 1900951003

19F is placed inside a guide pipe made of non-ferrous material.

10mm dia. housing pipe mounting
Order code: 1900951002
(Install for every 500mm)

An installation of 7600mm long of 19F for 6600 ton two plated plastic injection machine.

Discription	Captive	Floating
For series	18 Series	18 Series
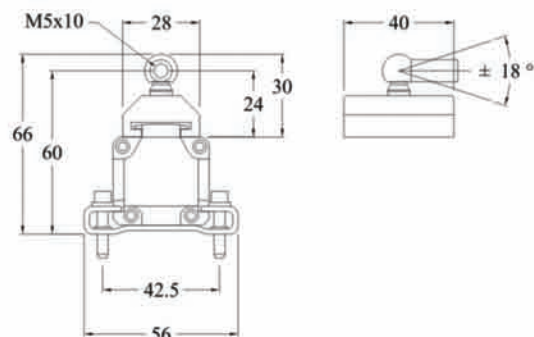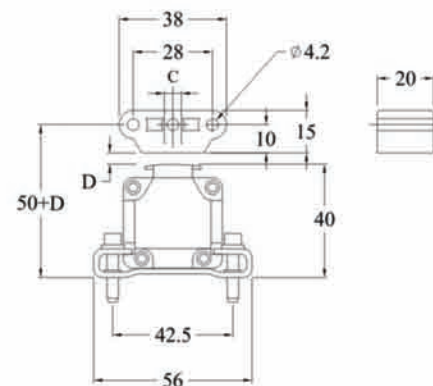
Order Code	1 8 0 0 9 5 1 0 0 1	1 8 0 0 9 5 1 0 0 2
Material	Plastic	Plastic
Weight	~30g	~12g
Vertical distance (D)	Fixed	0.1 - 4mm
Lateral offset (C)	Fixed	±8 m m
Operation Temperature	- 4 0 t o 7 5℃	- 4 0 t o 7 5℃

Discription	Die-cast	Large floating
For series	18 Series	18 Series
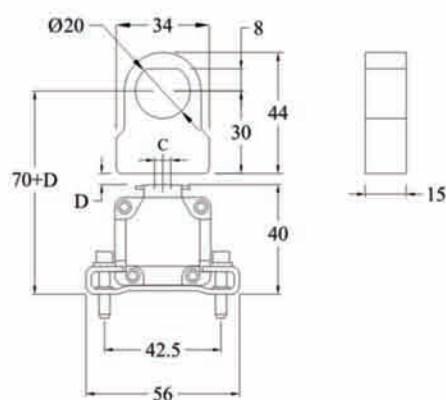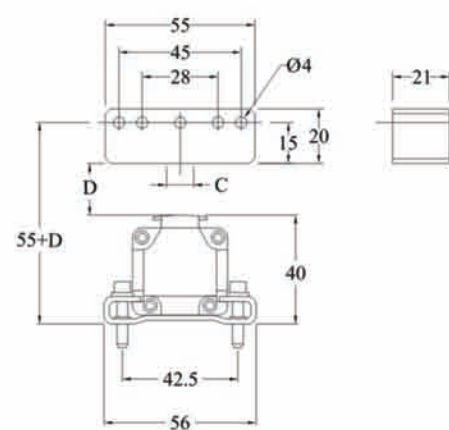
Order Code	1 8 0 0 9 5 1 0 0 3	1 8 0 0 9 5 1 0 0 4
Material	Plastic	Plastic
Weight	~12g	~40g
Vertical distance (D)	0.1 - 4mm	0.1 - 10mm
Lateral offset (C)	±8 m m	±2 0 m m
Operation Temperature	- 4 0 t o 7 5℃	- 4 0 t o 7 5℃

Discription	Floating Ball	Floating Ball	Floating Ball	Floating Ball
Order Code	1700 951 005	1700 951 006	1700 951 007	1700 951 008
Material	304 SS	304 SS	304 SS	304 SS
Inside Dia. (ID)	15 mm	23 mm	23 mm	9 mm
Out Dia./Height	52 x 52 mm	75 x 70 mm	125 x 120 mm	28 x 28 mm
Density	0.7	0.7	0.7	0.7
Pressure Rating	40 bar	40 bar	40 bar	40 bar

Discription	Floating Marker	Floating Marker	Floating Marker	Floating Marker
Order Code	1700 951 009	1700 951 010	1700 951 011	1700 951 012
Material	PP Plastic	PP Plastic	PP Plastic	PP Plastic
Inside Dia. (ID)	8 mm	8 mm	9 mm	9 mm
Out Dia./Height	18 x 8 mm	19 x 17 mm	24 x 10 mm	26 x 17 mm
Density	0.7	0.7	0.7	0.7

* use for special 7mm Stainless Steel tube

Discription	Floating Ball Stopper	Floating Ball Stopper
Order Code	1700 951 013	1700 951 014
Material	304 SS	304 SS
Inside Dia. (ID)	10 mm	7 mm
Out Dia./Height	20 x 13 mm	16 x 13 mm

Discription	10mm dia. housing pipe mounting	M18x1.5 flange external mounting
For series	17/19 Series	17/19 Series
Order Code	1 9 0 0 9 5 1 0 0 2	1 9 0 0 9 5 1 0 0 3

	35 Ø10 19.5 25 10 50 70 5 10 20 Ø5.4	70 35 Ø19 41.75 10 25 10 50 Ø5.4 7.5 15

Material	Aluminium	Aluminium
Weight	~30g	~45g

Discription	Dia. 33mm ring	Dia. 25mm ring
For series	12/17/19 Series	12/17/19 Series
Order Code	1 7 0 0 9 5 1 0 0 1	1 7 0 0 9 5 1 0 0 3

Material	Plastic	Plastic
Weight	~8g	~8g

Discription	Dia. 33mm Spacer	Dia. 25mm Spacer
Order Code	1 7 0 0 9 5 1 0 0 2	1 7 0 0 9 5 1 0 0 4
Material	Plastic	Plastic

Discription	Dia. 60mm ring
For series	17/19 Series
Order Code	1 9 0 0 9 5 1 0 0 4

25mm ring

60mm ring

33mm ring

Material	Plastic
Weight	~30g

Discription	42.5mm Mounting	42.5mm Isolation Mounting
For series	18 Series	18 Series

Order Code	1 8 0 0 9 5 1 0 0 7	1 8 0 0 9 5 1 0 0 8
Material	Stainless Steel	Stainless Steel
Installation	M4 x 20 (not included)	M4 x 20 (not included)
Torque	Max. 4 Nm	Max. 0.5 Nm

Discription	50mm Mounting	
For series	18 Series	

42.5mm Isolation Mounting

50mm Mounting

42.5mm Mounting

Order Code	1 8 0 0 9 5 1 0 0 9	
Material	Stainless Steel	
Installation	M5 x 20 (not included)	
Torque	Max. 5 Nm	

Magnetic Floating Ball

Large Floating Magnet

Captive Magnet

Die-cast Magnet

Floating Magnet
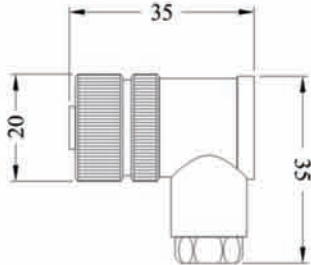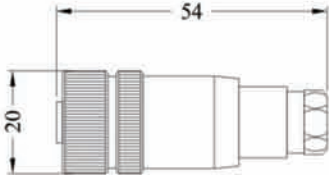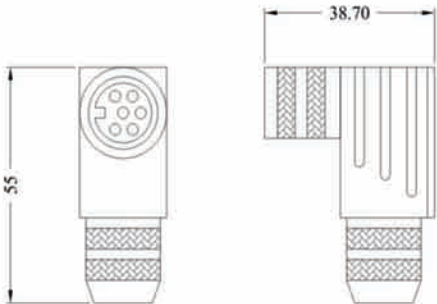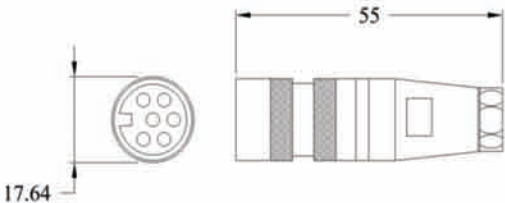
Discription	M12 90Deg Connector (Female)	M12 Connector (Female)
Cable Diameter	6 - 8 m m	6 - 8 m m
Material	Cu Zn / Plastic	Cu Zn / Plastic

Model	5 Pins	8 Pins	5 Pins	8 Pins
Order Code	1 8 0 0 9 5 1 0 1 8	1 8 0 0 9 5 1 0 2 7	1 8 0 0 9 5 1 0 1 7	1 8 0 0 9 5 1 0 2 6

Discription	90Deg. 6/7pin. Connector (female)		6/7pin. Connector (female)	
Model	D 6 0	D 7 0	D 6 0	D 7 0

Order Code	1 8 0 0 9 5 1 0 1 1	1 8 0 0 9 5 1 0 1 3	1 8 0 0 9 5 1 0 1 0	1 8 0 0 9 5 1 0 1 2
Material	Housing: Zinc nickel platedl		Housing: Zinc nickel platedl	
Weight	~ 6 0 g		~ 4 0 g	

Order Code	1800 951 028
Discription	Profibus Terminator

Profibus operates at high frequencies transmission medium called RS485. This terminator absorbs reflections of the signal where the copper cable segment ends.

Order Code	1800 951 032
Discription	Profibus Simulator

The master simulator can be used to check the sensors functions and to change the slave address. The magnet positions can be read out and diagnostic data.

Order Code	1700 951 018
Discription	19 Analog Programmer

This service tools is used for modifying sensor active measuring stroke (null and span) via external cable. There is no need to open the sensors electronic cartridge.

3 Twisted Pairs Cable Order Code

1	8	0	0	9	5	1	1	X	X

Cable Length

Please select the cable length in unit Meter
For example, 01 = 1 Meter
(Cable price not include connector)
If purchase the connector together, we can install the connector with cable for free of charge.

PVC shield twisted pair 3 x 2 x 0.2mm²

Color Code	D60	D70	4 Pins Voltage	4 Pins Current
Black	1	1	P3	N.C
White	2	2	P3 Gnd.	N.C
Yellow	3	3	P2	P2
Green	4	4	P2 Gnd.	P2 Gnd.
Red	5	5	P1	P1
Blue	6	6	P4	P4

Color Code	5P M12 Voltage	5P M12 Current	8P M12 Digital
Black	2	2	4
White	5	5	3
Yellow	4	N.C	1
Green	5	N.C	2
Red	1	1	7
Blue	3	3	8

D60 90Deg Connector

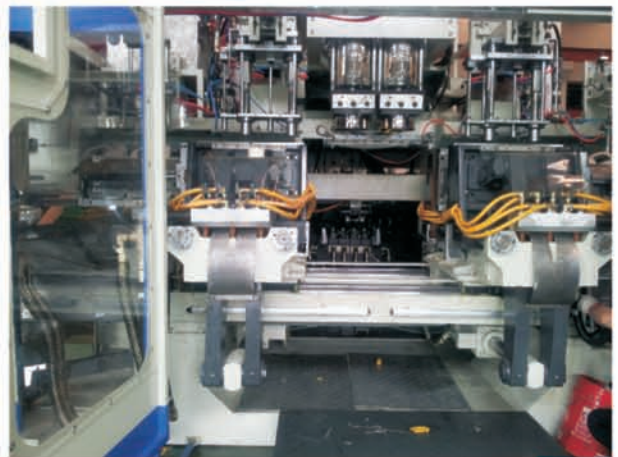D60 Connector

easy of installation ...

Two plates plastic injection machine use
Germanjet fully digital solution

Wood forming machine
use Germanjet 17 and 18 series

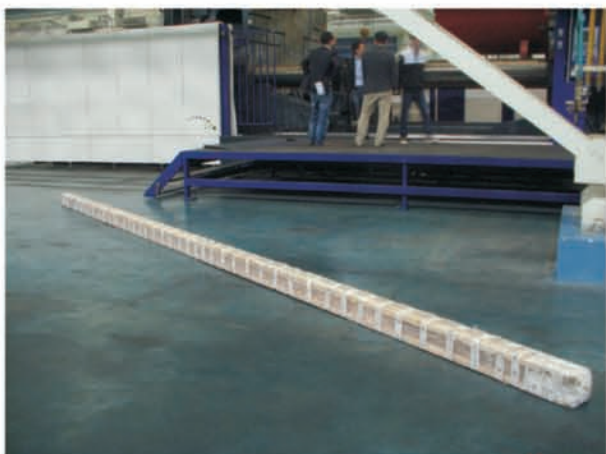Mold closing at die-cast machine. injection
speed at 10m/s

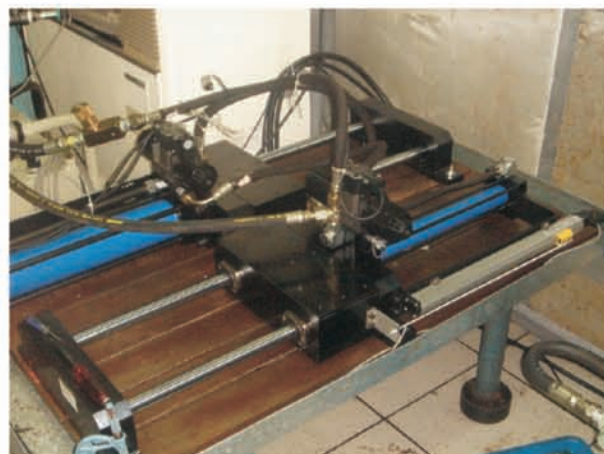Fast mold shifting at blow molding machine

Automatic Control Valve
use 17 series

Product unloading machine

6600 ton two plates plastic injection machine
Germanjet 19 series 7600mm CANBus

University laboratory testing equipment

Packaging machine used IP67 Germanjet
18 series

Garbage burning gasifiers use 19 series

Heavy duty hydraulic press

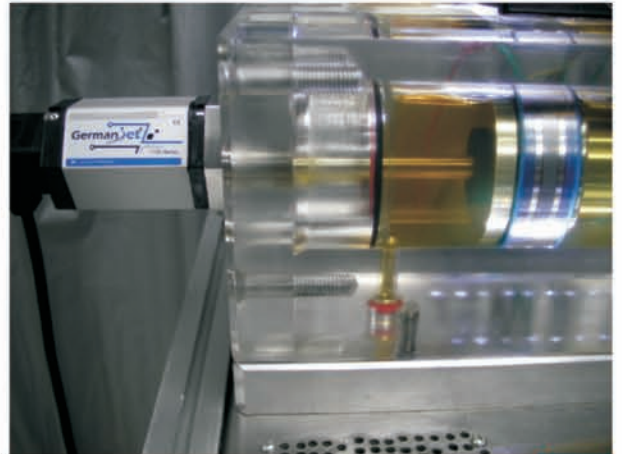Hot chamber die-cast machine
used Germanjet 17 series

germanjet.de

Hydro-forming machine

Stainless Steel Rolling Machine used
Germanjet 19 series

Steel Mill used Germanjet 19 series SSI

Crystall cyclinder demo at university

6550mm hydraulic cyclinder
uses 19 series

Handheld testing equipment

germanjet.de

Large two-plate plastic injection machine used Germanjet 12 Series

Automotive exhaust pipe bending machine used Germanjet 17 series

Multi-color plastic second injector

Sand cast molding machines use 18 series


Large hydraulic press uses 19 series

Parisan control used Germanjet 12 series

Transducer on machine calibration

To make sure the nominal stroke length is fully covered, all analog position transducers' output signal were calibrated slightly wider than the stroke. After installation, the machine needs to go through calibration. The step is as follow.

1) Move the machine to home position and record the transducer reading.
Example: at home, the transducer reading = 0.2V

2) Move the machine away from home position, measure the actual movement and record the transducer reading.
Example: actual movement = 98mm,
transducer actual movement reading = 9.5V

3) Calculate the "slope"
Slope = actual movement / (transducer actual movement reading - transducer home reading).
Example: slope = 98mm / (9.5V - 0.2V) = 10.537

4) Calculate the "datum"
Datum = slope x transducer home reading
Example: datum = 10.537 x 0.2V = 2.106

5) Machine position = (slope x transducer reading) - datum
Example: machine position = (10.537 x transducer reading) - 2.106

Machine Movement

98mm

Slope

Home

Datum

0

0.2V

9.5V

Transducer reading
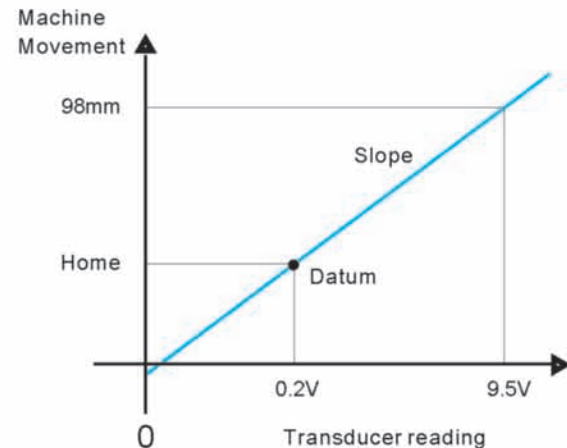
International Protection Rating (IP)

IP X X

Solid particle protection

4 = >1mm object size protected against

5 = Ingress of dust is not entirely prevented, but it must not enter in sufficient quantity to interfere with the satisfactory operation of the equipment;

6 = No ingress of dust; complete protection against contact

Liquid ingress protection

0 = Not protected

5 = Water projected by a nozzle (6.3mm) against enclosure from any direction shall have no harmful effects.

7 = Ingress of water in harmful quantity shall not be possible when the enclosure is immersed in water under defined conditions of pressure and time (up to 1 m of submersion).

Transducer may in touch with dust and water, having proper IP rating is needed. Potentiometer IP rating is IP 40 or 50 but non-contact position transducer IP rating is IP 65 or even 67.

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Installation of floating magnet is very simple. Compared to captive magnet, floating magnet can truly demonstrate the advantage of non-contact sensing and eliminate the wear of captive magnet socket.