...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component and hydraulic body are modular design which can be detached easily; Hydraulic fluid doesn't need to be withdrawn when doing sensor calibration or replacement.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 machine 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 designed 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

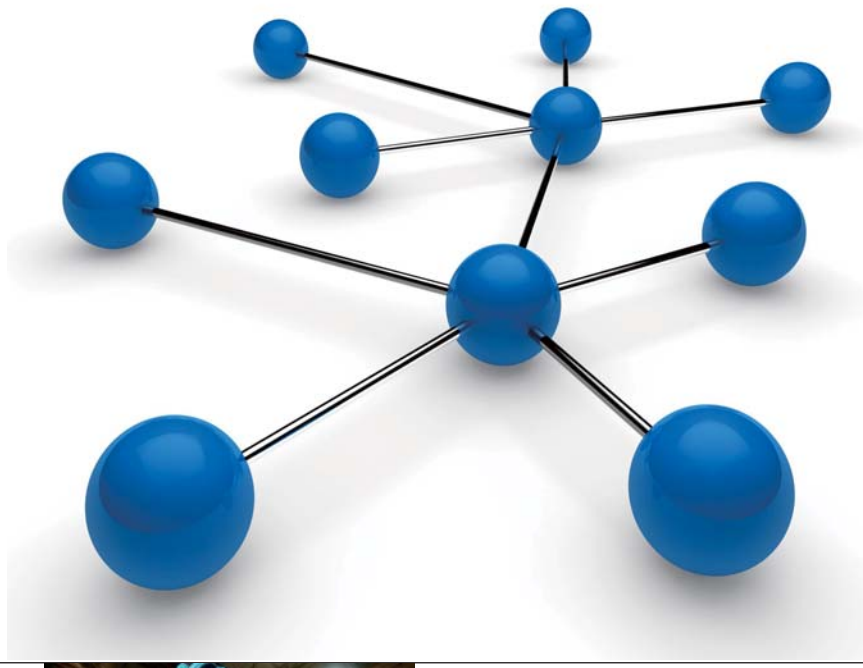
F model is designed for very long stroke lengths and linear measurements on an arc. Standard stroke length begins from 2500mm up to 20 meters. The F model has variety of outputs including analog, serial digital and fieldbus interfaces.

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

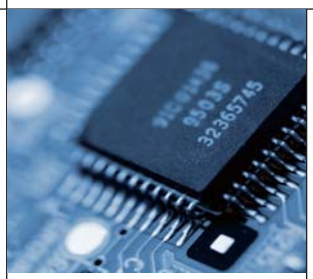
The 19 series order code cosists of two parts: output code and installation code

For example, select the preferred output signal such as SSI 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) P3.3 - P3.13						(Installation code) P3.15 - P3.19					

For example: SSI output with hydraulic rod (H)

1	9	2	1	G	1	1	0	0	D	7	0	H	0	2	2	5	2	1
SSI output code												Hydraulic rod installation code						

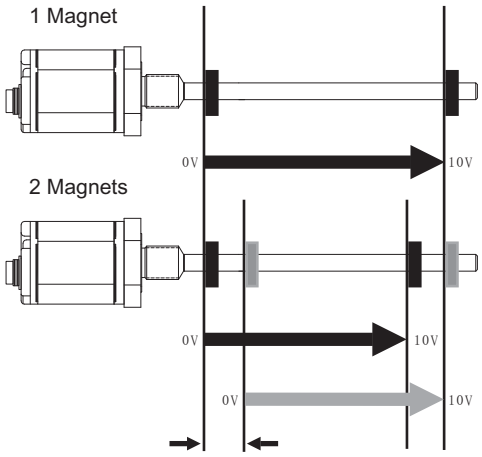


high precision & reliability...

Specifications

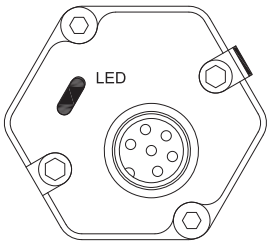
Order Code	190	191	193
Output	Voltage	Current	Start / Stop Digital
Measurement Type	Linear displacement		
Measured Variables	For dual magnets, mini distance of 76mm in between		Single magnet
Resolution	16 Bit D/A, 0.0015% (minimum 1µm)		0.1 / 0.01 / 0.005mm
Repeatability	< ±0.001% of full scale (minimum ±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		

Magnet Assigment



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

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.

Programming Tools

Order Code	1700 951 018
Discription	19 Series Analog Programming Tool

The 19 series analog programming tool can be used to set the “zero” and “end” values anywhere within the nominal factory stroke range.

Order Code (Output Code)

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

3 or 7 digits

Output

1 Output / 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 / 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 Output / 1 Magnet Position

004 = 0 - 10V, 10 - 0V
104 = 4 - 20mA, 20 - 4mA
044 = +10 to -10V, -10V to +10V

2 Outputs / 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)

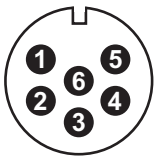
xxx.x: Velocity range: 0.1 - 10 m/s (0001 - 0100)
Ex: 0 - 5.5 m/s = 0 - 10V, code = 003 0055
unit m/s

xxx.x: Velocity range: 25 - 90 mm/s (1025 - 1090)
Ex: 0 - 60 mm/s = 4 - 20mA, code = 103 1060
unit mm/s

Connection Type

D60 = 6 pin male receptacle M16 (Connector not included)
R02 = 2m PVC Direct Cable, Option: R01-R10 (1-10m)
H02 = 2m PUR Direct Cable, Option: H01-H10 (1-10m)
T02 = 2m Teflon Direct Cable, Option: T01-T10 (1-10m)

Pin Assignments for 190 / 191

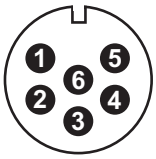


	D60 Pin	Cable
1	Output 1	Black
2	DC Gnd	White
3	Output 2	Yellow
4	DC Gnd	Green
5	+24 Vdc	Red
6	0 Vdc	Blue

(View toward sensor pins)

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

Pin Assignments for 193



	D60 Pin	Cable
1	Stop (-)	Black
2	Stop (+)	White
3	Start (+)	Yellow
4	Start (-)	Green
5	+24 Vdc	Red
6	0 Vdc	Blue

(View toward sensor pins)

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

Order Code (Output Code)

1 9 3 X 0 X X X

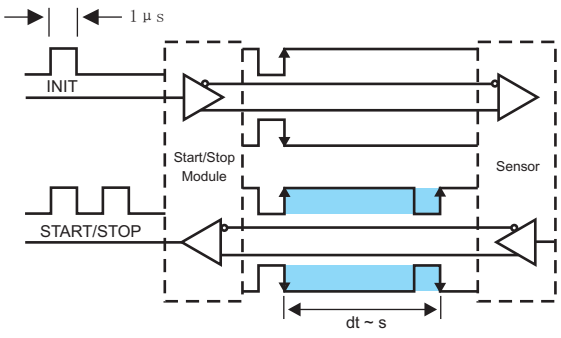
Output

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

Connection Type

D60 = 6 pin male receptacle M16 (Connector not included)
R02 = 2m PVC Direct Cable, Option: R01-R10 (1-10m)
H02 = 2m PUR Direct Cable, Option: H01-H10 (1-10m)

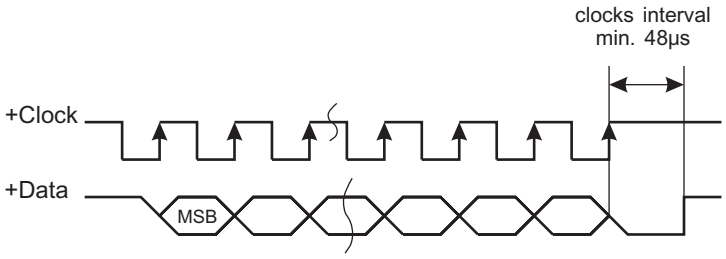
Logic Diagram for 193 Start / Stop



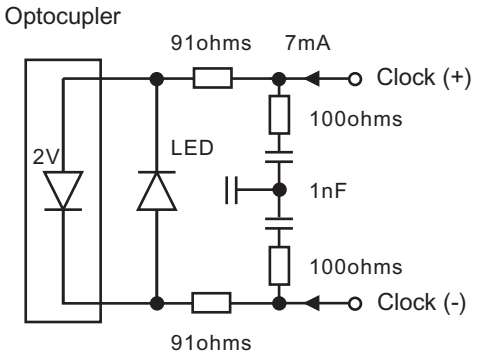
Specifications

Order Code	192
Output	SSI
Measurement Type	Linear displacement
Data Format	Binary or Grey
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℃, 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

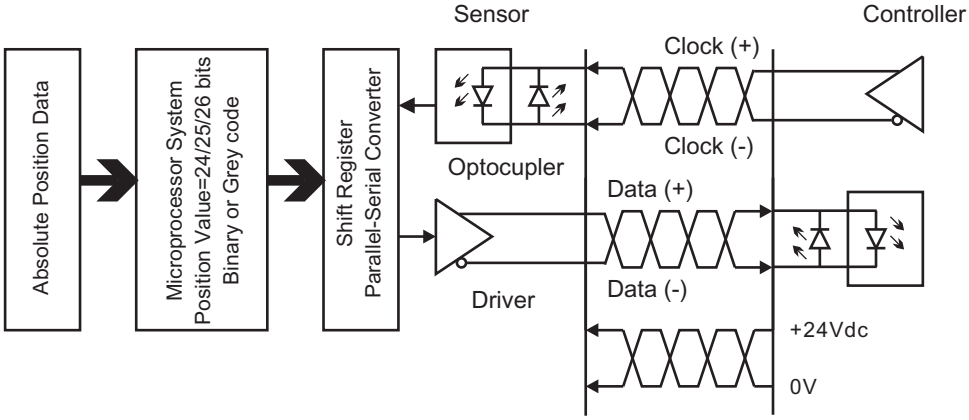
Timing Diagram



Sensor Input



Logic Diagram



Order Code (Output Code)

1	9	2	X	X	X	X	X	X	X	X	X

Data Length

1 = 25 bits
2 = 24 bits
3 = 26 bits

Output Format

B = Binary
G = Gray Code

Resolution

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

Function

1 = Standard

Options

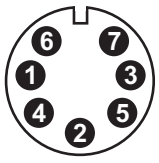
00 = Measuring direction forward
01 = Measuring direction reverse
02 = Measuring direction forward, synchronised measurement
05 = Measuring direction forward, Bit 25 = alarm, Bit 26 = parity even

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.

Connection Type

D70 = 7 pin male receptacle M16 (Connector not included)
R02 = 2m PVC Direct Cable, Option: R01-R10 (1-10m)
H02 = 2m PUR Direct Cable, Option: H01-H10 (1-10m)
T02 = 2m Teflon Direct Cable, Option: T01-T10 (1-10m)

Pin Assignments

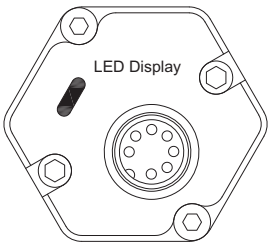


	D70 Pin	Cable
1	Data (-)	Black
2	Data (+)	White
3	Clock (+)	Yellow
4	Clock (-)	Green
5	+24 Vdc	Red
6	0 Vdc	Blue
7	N.C.	

(View toward sensor pins)

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

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.

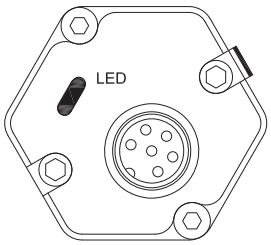
Specifications

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

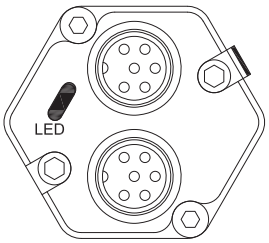
Resolution	CANopen		CANbasic	
- Displacement	5µm	2µm	5µm	2µm
- Speed	0.5mm/s	0.2mm/s	1.0mm/s	0.1mm/s

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

Diagnostic Display



D60 / D61 Connection

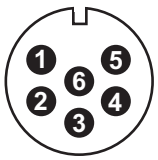


D62 Connection

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



(View toward sensor pins)

	D60/D61 Pin	Cable
1	CAN (-)	Black
2	CAN (+)	White
3	N.C.	Yellow
4	N.C.	Green
5	+24 Vdc	Red
6	0 Vdc	Blue

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

Order Code (Output Code)

1	9	4	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 6 = 100µm
2 = 2µm 5 = 20µm

Connection Type

D60 = 6 pin male receptacle M16 with termination resistor
D61 = 6 pin male receptacle M16
D62 = 2 x 6 pin male receptacle M16
R02 = 2m PVC Direct Cable, Option: R01-R10 (1-10m)
H02 = 2m PUR Direct Cable, Option: H01-H10 (1-10m)
T02 = 2m Teflon Direct Cable, Option: T01-T10 (1-10m)

Magnet Number

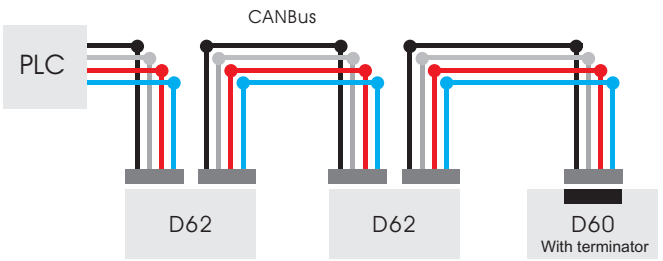
Z__ = 02 - 03 pcs of Magnet (If output 207 is selected)

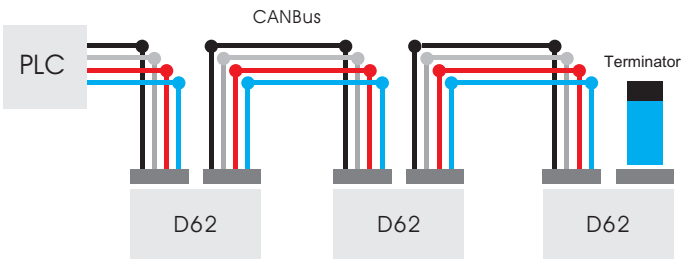
Baud Rate	Cable Length
1000 Kbd	25M
500 Kbd	100M
250 Kbd	250M
125 Kbd	500M

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

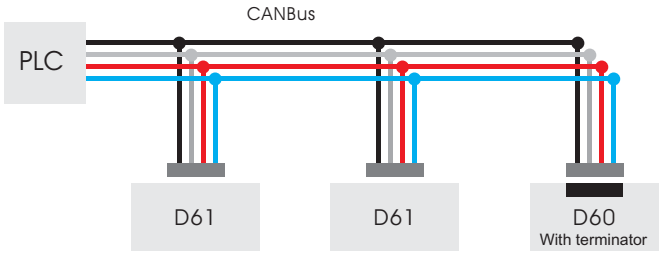
Network Topology

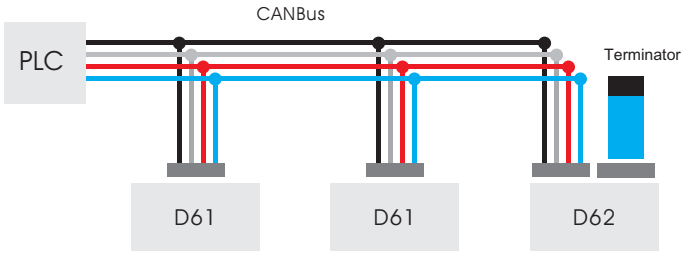
Bus Network Topology





Star Network Topology





Terminator Order Code
1800 951 044

Specifications

Order Code	1 9 5
Output	Profibus-DP digital output
Measurement Type	Linear displacement
Data Protocol	Profibus-DP (EN-50 170)
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	D53 / D63 / Cable outlet
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 5 X X X X X X X X X X X

Connection Type

D53 = 1 x 5 pin male receptacle M12
1 x 5 pin female receptacle M12
1 x 4 pin male receptacle M8
(Connector not included)

D63 = 2 x 6-pin (M16), male/female.
(Connector not included)

A_ _ = Integral cable.
A05 = 5 meter cable (1-20 m)

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

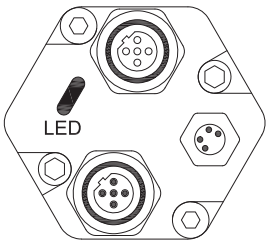
The 19 series Profibus-DP interface fulfill the requirement of EN50170. The position transducer adopts the non-contact magnetostrictive measuring technology with direct transmission of RS-485 standard in a baud rate of 12 Mbits/s. Profibus wiring uses shielded twisted pair cable and can be used to connect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

D53 multi-drop connector outlet is 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.

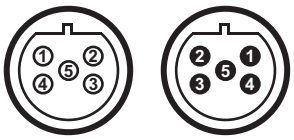
Profibus Addressing

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.

D53 Pin / Cable Assignments



D53 Connection



M12 female M12 male

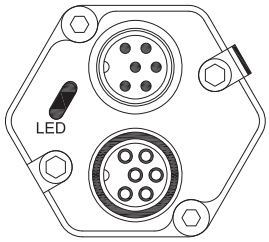
(View toward sensor pins)

Pin	Cable	D53 / Cable outlet
1	N.A	VP (Bus termination) female connector only
2	Green	RxD/TxD-N(Bus)
3	N.A	D Gnd (Bus termination) female connector only
4	Red	RxD/TxD-P(Bus)
5	Shield	Shield

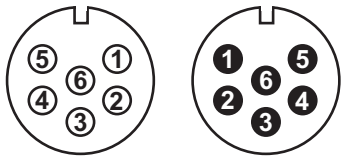
Power Male Receptacle

1	+ 24 Vdc
2	N.C.
3	0 Vdc
4	N.C.

D63 Pin Assignments



D63 Connection

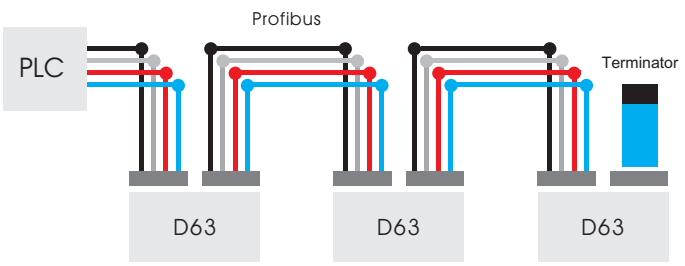


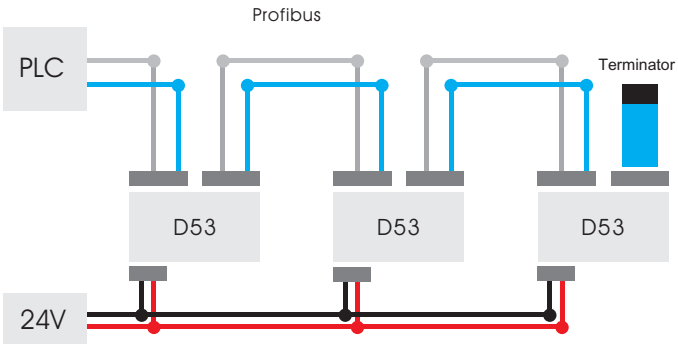
M16 Female M16 Male

(View toward sensor pins)

	D63
1	RxD/TxD-N(Bus)
2	RxD/TxD-P(Bus)
3	D Gnd (Bus termination) female connector only
4	VP (Bus termination) female connector only
5	+24 Vdc
6	0 Vdc

Network Topology





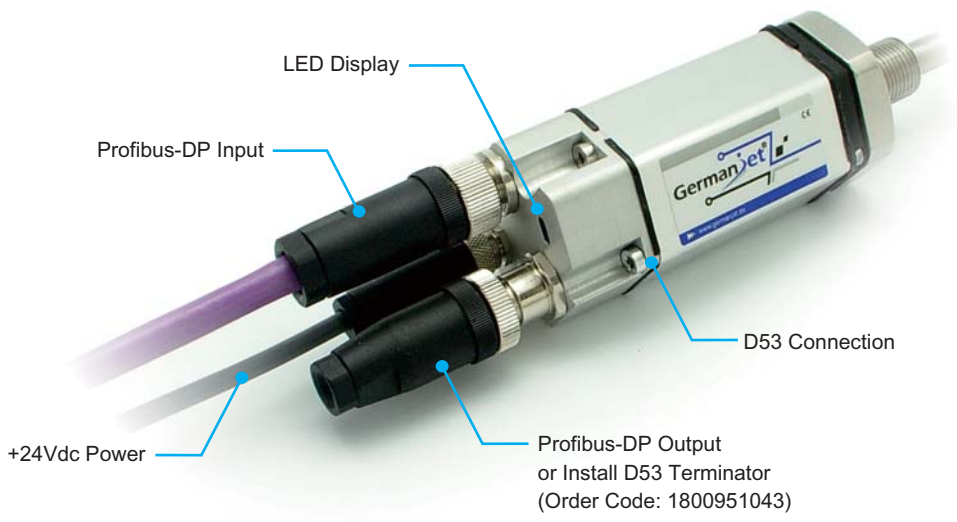
Terminator

Receptacle	Order Code
D53	1800 951 043

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.



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 X X X

Hardware
2 = Standard

Output Protocol
02 = DeviceNet

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

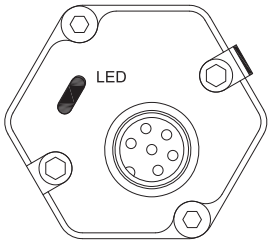
Resolution
1 = 5µm
2 = 2µm

Type
1 = Standard

Connection Type
D60 = 6 pin male receptacle M16 with termination resistor
D61 = 6 pin male receptacle M16

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

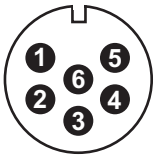
Diagnostic Display



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



	D60/D61 Pin
1	CAN (-)
2	CAN (+)
3	N.C.
4	N.C.
5	+24 Vdc
6	0 Vdc

(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)

Specifications

Order Code	1 9 7
Output	EtherCAT
Measurement Type	Linear displacement
Data Protocol	100 Base-Tx, Fast Ethernet
Output Signal	Simultaneous multi-position and velocity measurements up to 3 magnets
Baud Rate	Max. 100Mbit/s
Resolution	Position: 1 to 1000µm selectable / Velocity: 1µm/s depend on velocity and stroke
Repeatability	< ±0.001% of full scale (minimum ±2.5µm)
Non-Linearity	< ±0.01% of full scale (minimum ±50µm)
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	D56
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 7 X X X X X X X X X X X

Connection Type

D56 = 2 x 4 pin female receptacle M12
1 x 4 pin male receptacle M8
(Connector not included)

Input Voltage

1 = +24Vdc

Output

E101 = EtherCAT, position and velocity, 1 magnet
E102 = EtherCAT, position and velocity, maximum 3 magnets

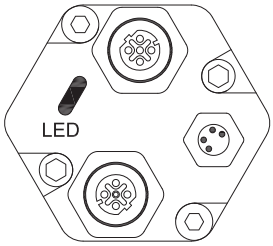
Magnet Number

Z__ = 02 - 03 pcs of Magnet (If output E102 is selected)

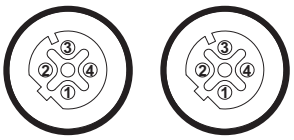
EtherCAT Interface

The 19 series EtherCAT interface fulfill the requirement of EtherCAT 100 Base-Tx standard. EtherCAT (Ethernet for Control Automation Technology) is the state-of-the-art interface developed by Beckhoff Automation. This interface is supported by EtherCAT Technology Group.

D62 Pin Assignments



D56 Connection



M12 female M12 female

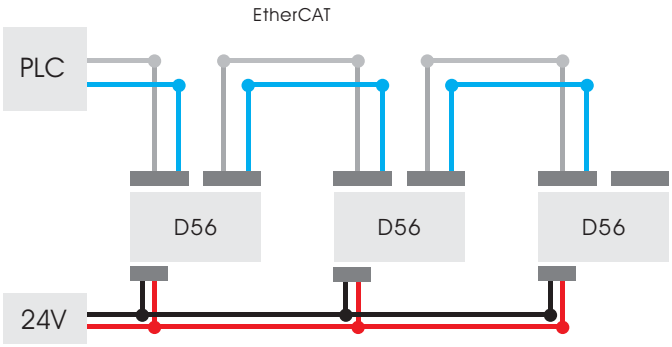
(View toward sensor pins)

1	Tx +
2	Rx +
3	Tx -
4	Rx -

1	+ 24 Vdc
2	N.C.
3	0 Vdc
4	N.C.

Power Male Receptacle

Network Topology



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.

Specifications

Order Code	1 9 9
Output	Profinet
Measurement Type	Linear displacement
Data Protocol	Encoder Profile 4.1
Output Signal	Profinet RT / IRT version 2.3
Baud Rate	Max. 100Mbit/s
Resolution	Position: 1 to 100µm selectable
Repeatability	< ±0.001% of full scale (minimum ±2.5µm)
Non-Linearity	< ±0.01% of full scale (minimum ±50µm)
Update Time	0.5 ms up to 715 mm / 1.0 ms up to 2000 mm
	2.0 ms up to 4500 mm / 4.0 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	2 female receptacle M12 / 1 male receptacle M8
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 61000-6-3, Immunity EN 61000-6-2, EN 61000-4-2/3/4/6

Order Code (Output Code)

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

Connection Type

D56 = 2 x 5 pin female receptacle M12
1 x 4 pin male receptacle M8
(Connector not included)

Input Voltage

1 = +24Vdc

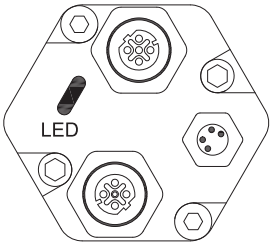
Output

U401 = Profinet RT&IRT Encoder Profile, 1 magnet
U402 = Profinet RT&IRT Encoder Profile, maximum 3 magnets

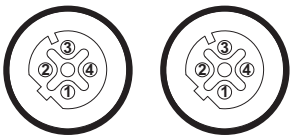
Magnet Number

Z__ = 02 - 03 pcs of Magnet (If output U402 is selected)

D56 Pin Assignments



D56 Connection



M12 female M12 female

(View toward sensor pins)

1	Tx +
2	Rx +
3	Tx -
4	Rx -
5	N.C.

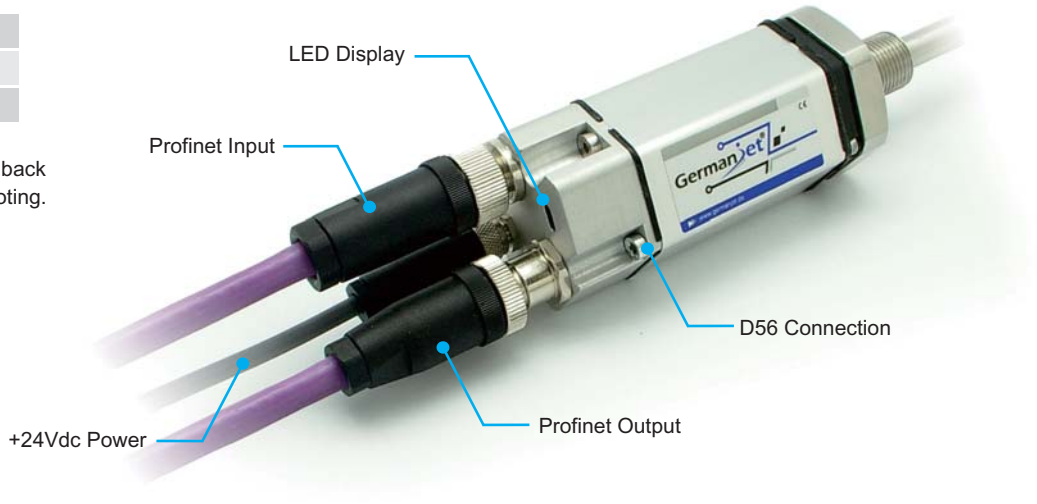
Power Male Receptacle

1	+ 24 Vdc
2	N.C.
3	0 Vdc
4	N.C.

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.



Order Code (Installation Code)

H X X X X X 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)

Mounting thread

1 = 3/4" 16 - UNF 3A
2 = M18 x 1.5
3 = Raised-face 3/4" 16 - UNF 3A
4 = M22 x 1.5-6g (rod Ø 12.7 mm)

Magnet type

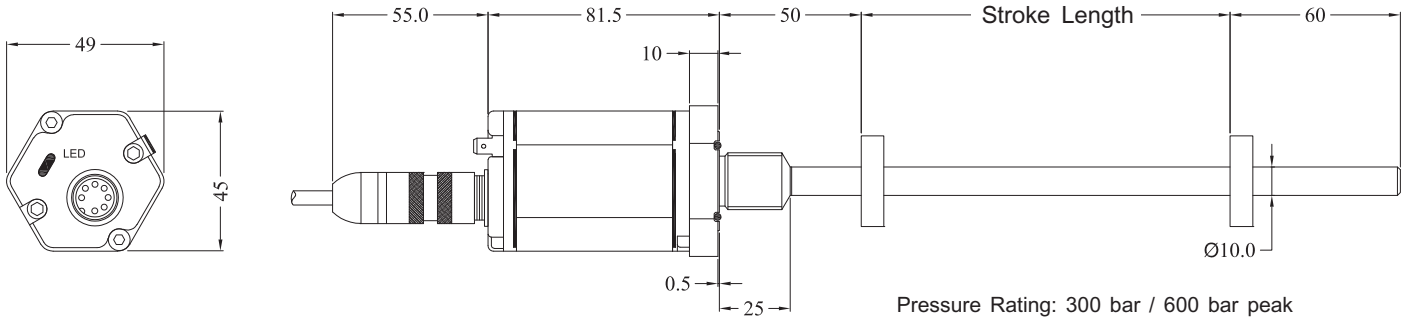
1 = Dia. 33mm ring
2 = Dia. 25mm ring
3 = Floating ball
4 = Large floating
5 = Dia. 32mm ring
6 = Dia. 60mm ring

Option

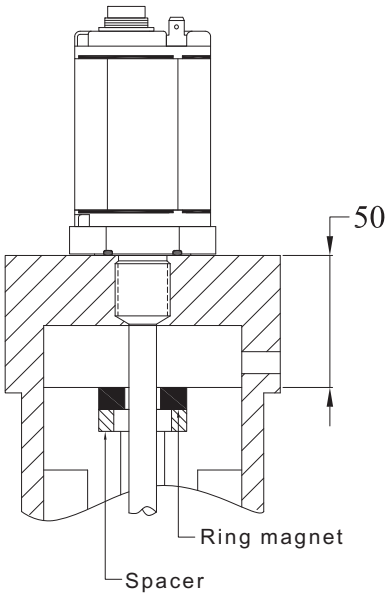
BF = 30mm front dead zone

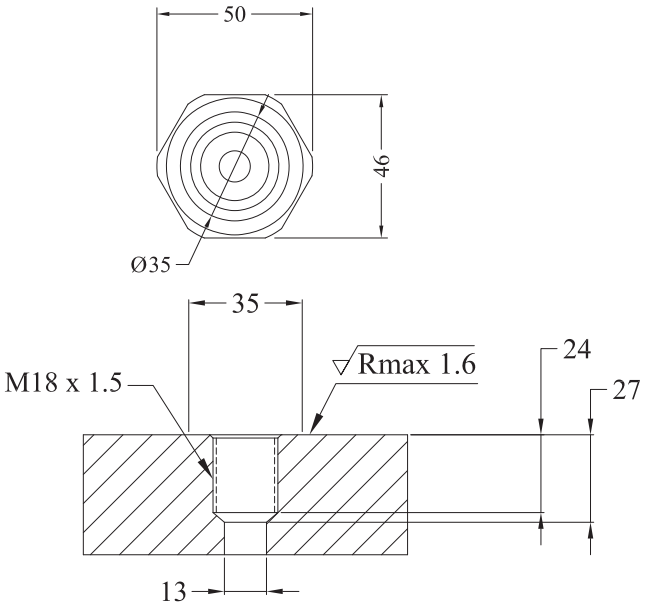
Installation

Series	mm
Profibus 195	102
EtherCAT 197	102



Pressure Rating: 300 bar / 600 bar peak





Order Code (Installation Code)

P 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

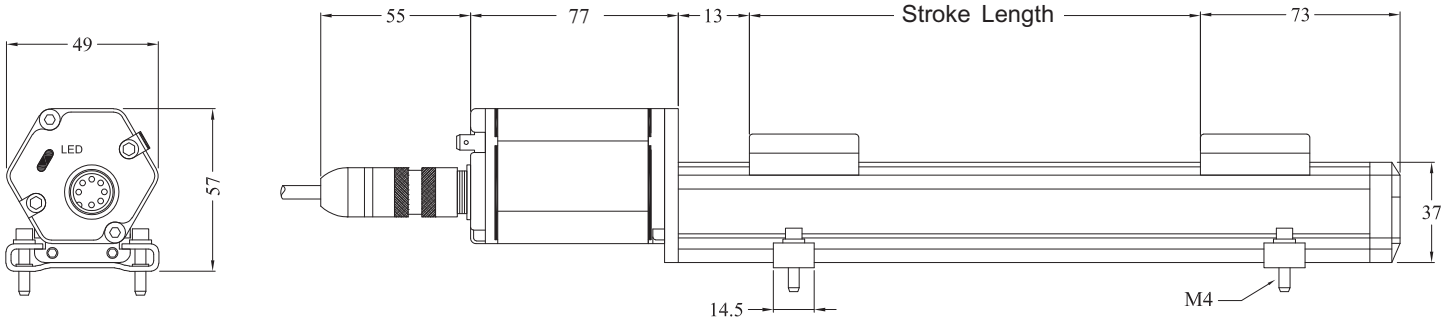
1 = 42.5mm mounting
2 = 42.5mm isolation mounting
3 = 50mm mounting

Magnet Type

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

Installation

Series	mm
Profibus 195	97
EtherCAT 197	97



easy of installation ...

Order Code (Installation Code)

D X X X X X 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
2 = Side cable entry

Sensor Rod Style

1 = 34.5 dia. fitting flange
2 = M18 x 1.5 rod style
3 = 26.92 dia. fitting flange
4 = 3/4" 16 - UNF 3A rod style

Magnet type

1 = Dia. 33mm ring
2 = Dia. 25mm ring
4 = Dia. 60mm ring
5 = Dia. 32mm ring

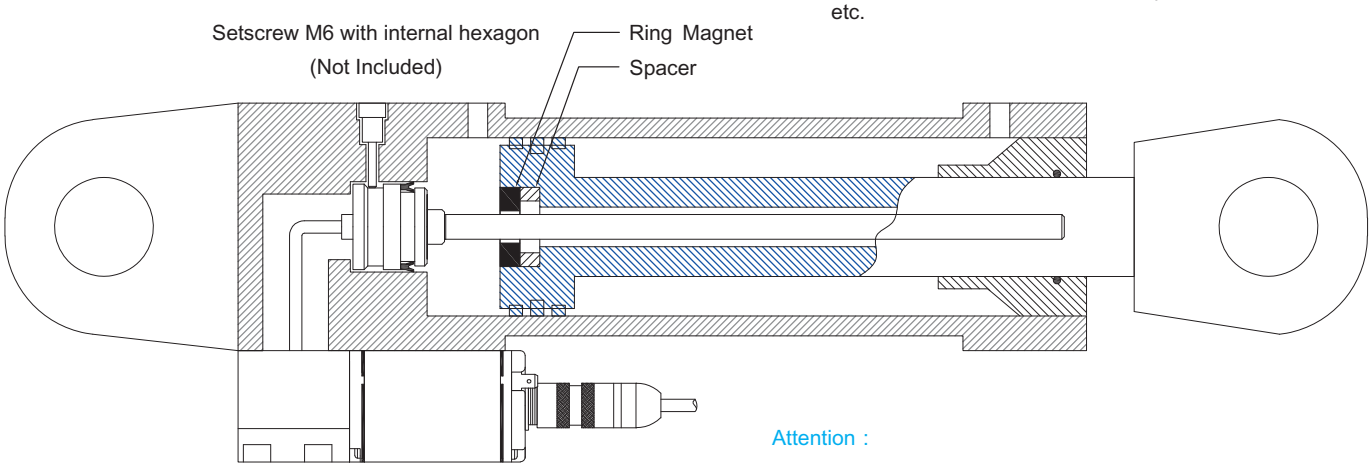
Integral Cable of Sensor Rod

Bottom cable entry	Side cable entry
1 = 170mm cable with connector	4 = 250mm cable with connector
2 = 230mm cable with connector	5 = 400mm cable with connector
3 = 350mm cable with connector	6 = 600mm cable with connector

Installation Example

Mounting Ring Magnet

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



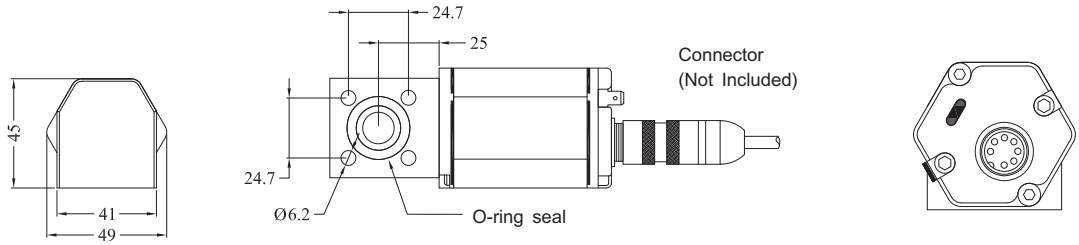
Attention :

The ring magnet should not intouch with the sensor rod.

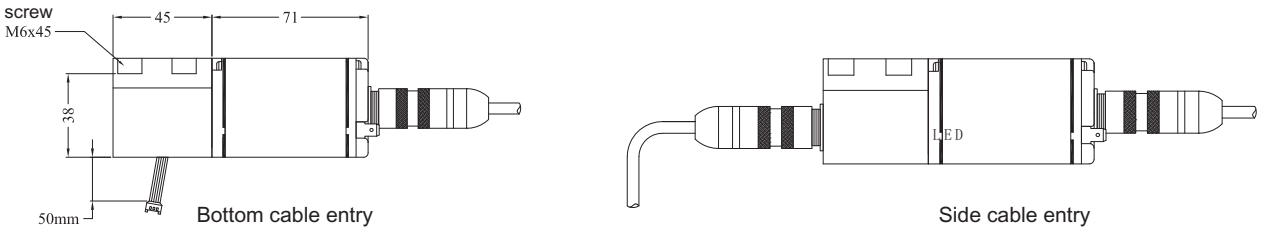
The bore in the piston rod is dependent on the hydraulic pressure and the pistons velocity. The minimum drilling should be 13mm. Do not exceed the peak pressure.

The sensor rod should be protected against wear.

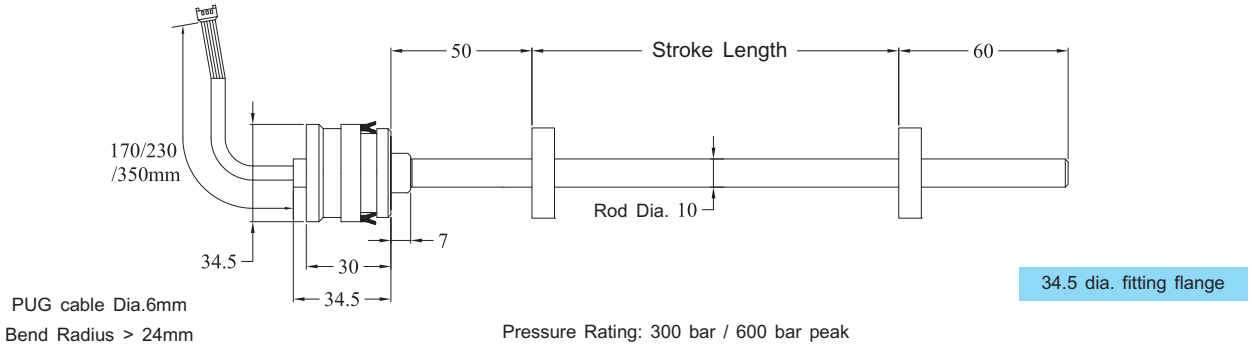
Installation Instrustion



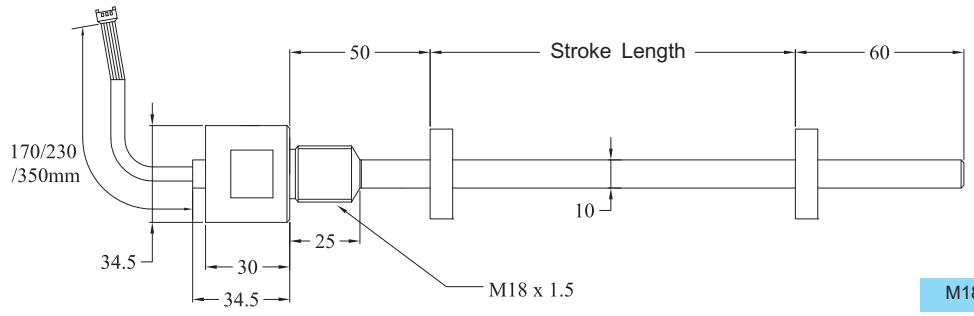
Series	mm
Profibus 195	92
EtherCAT 197	92



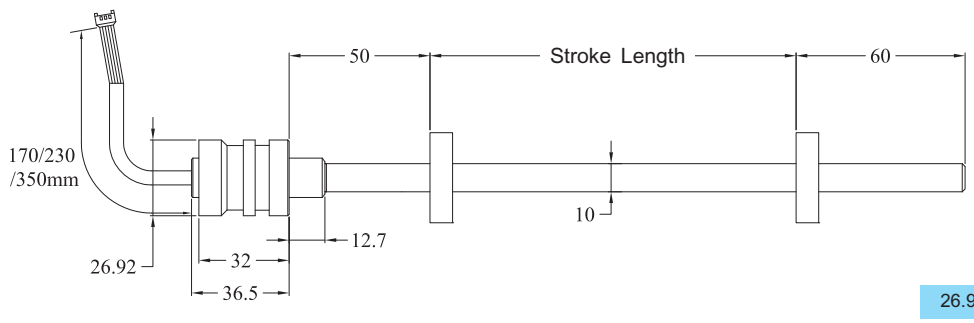
Sensor Rod Style



34.5 dia. fitting flange

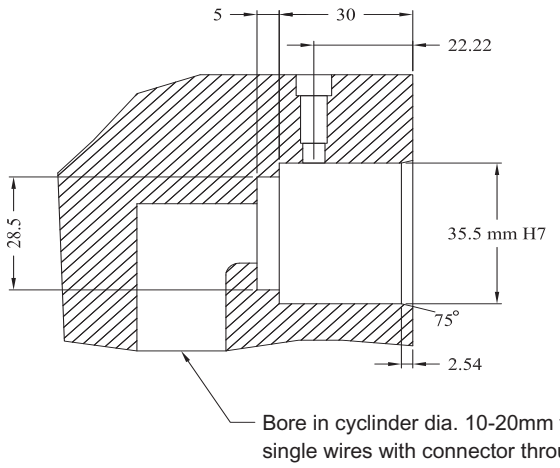


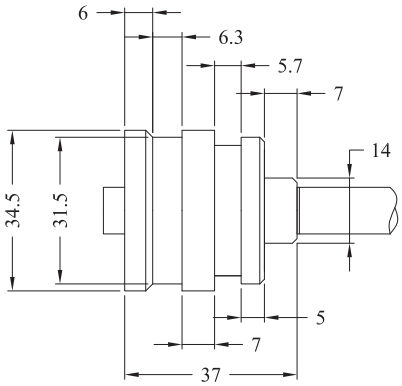
M18 x 1.5 rod style



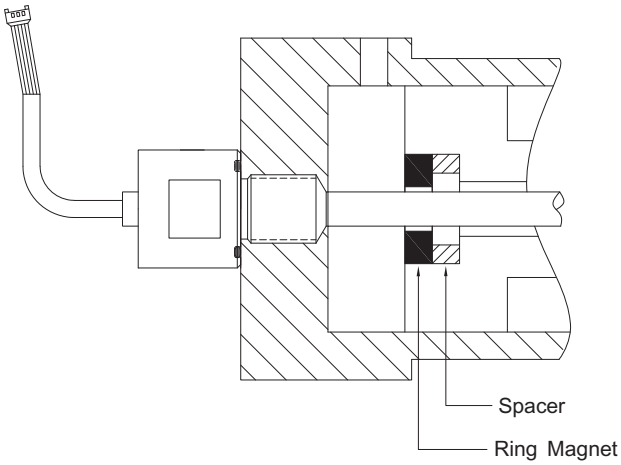
26.92 dia. fitting flange

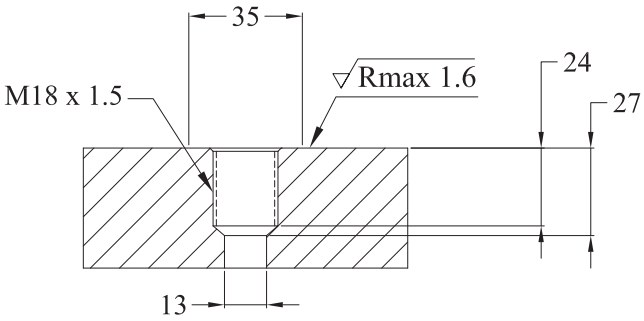
Mounting Detail



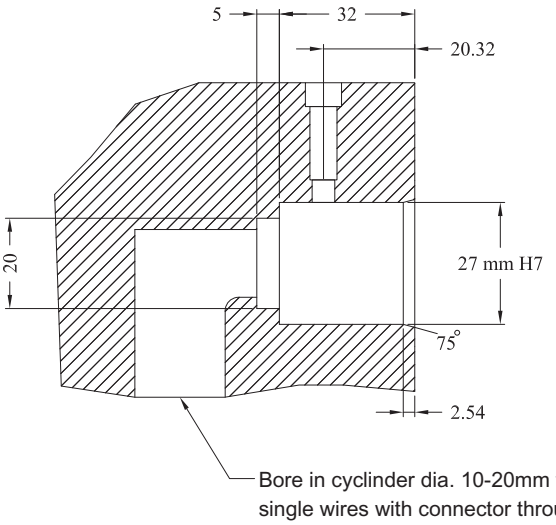


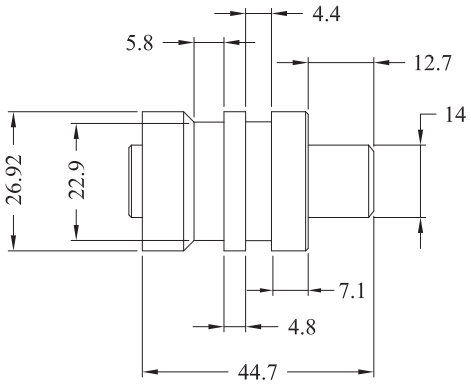
34.5 dia. fitting flange



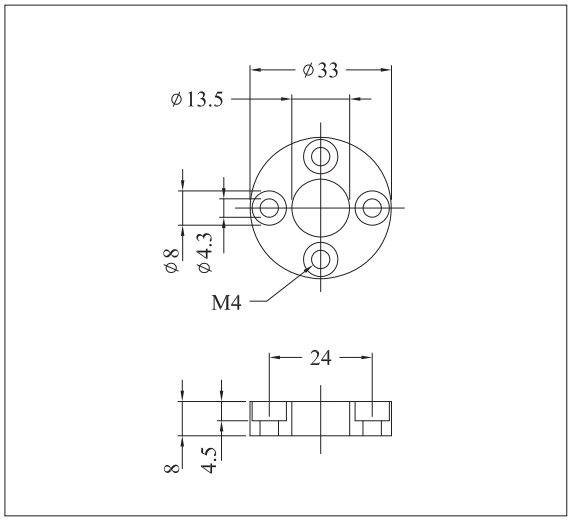
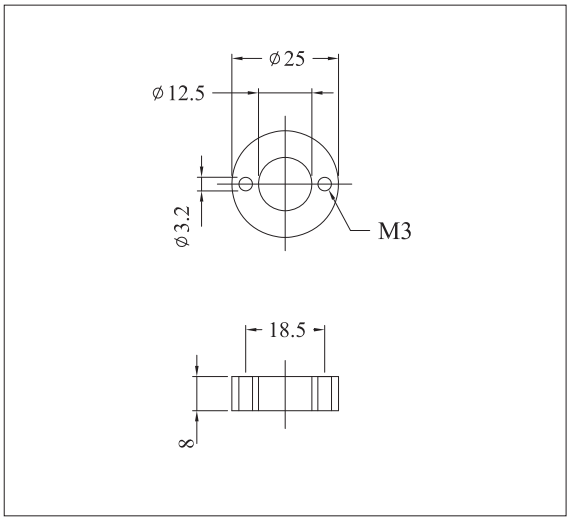


M18 x 1.5 rod style

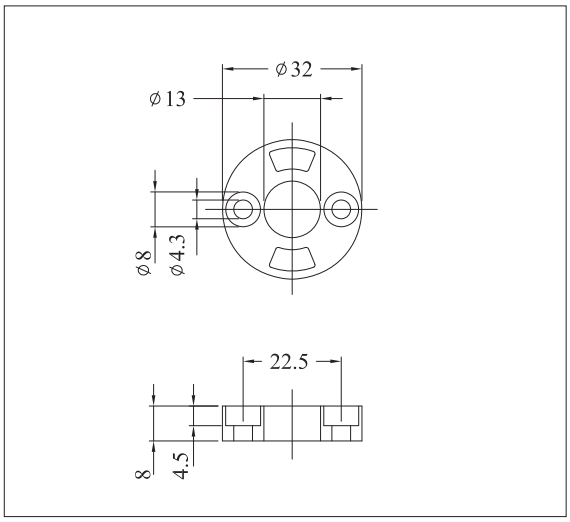
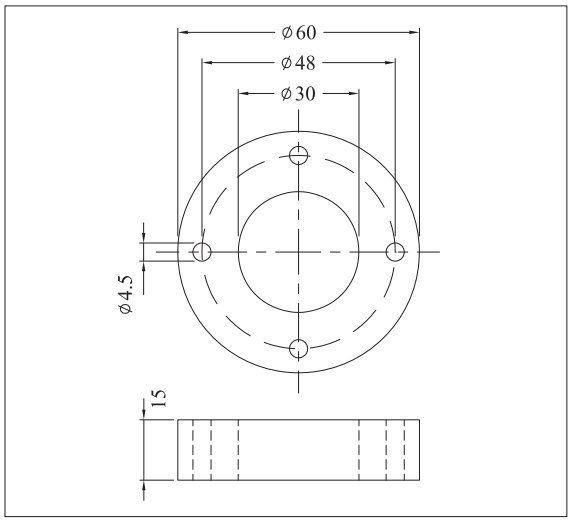




26.92 dia. fitting flange

Discription	Dia. 33mm ring	Dia. 25mm ring
Order Code	1700 951 001	1700 951 003
		
Material	Plastic	Plastic
Weight	~8g	~8g

Discription	Dia. 33mm Spacer	Dia. 25mm Spacer
Order Code	1700 951 002	1700 951 004
Material	Plastic	Plastic

Discription	Dia. 32mm ring	Dia. 60mm ring
Order Code	1700 951 020	1900 951 004
		
Material	Plastic	Plastic
Weight	~8g	~30g

Dia. 32mm Spacer
1700 951 021
Plastic

Order Code (Installation Code)

F 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

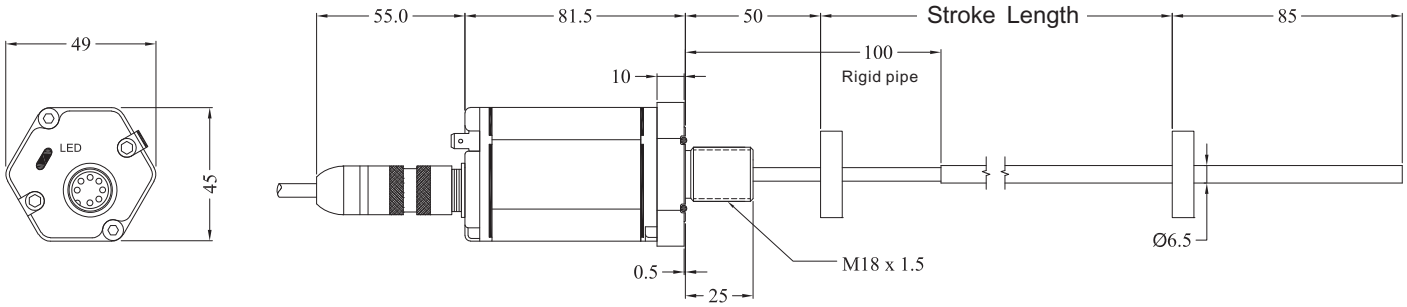
1 = 10.0 mm Dia.
2 = 12.7 mm Dia.

Magnet type

1 = Dia. 33mm ring
2 = Dia. 60mm ring
3 = Large floating

Dimensions

Series	mm
Profibus 195	102
EtherCAT 197	102



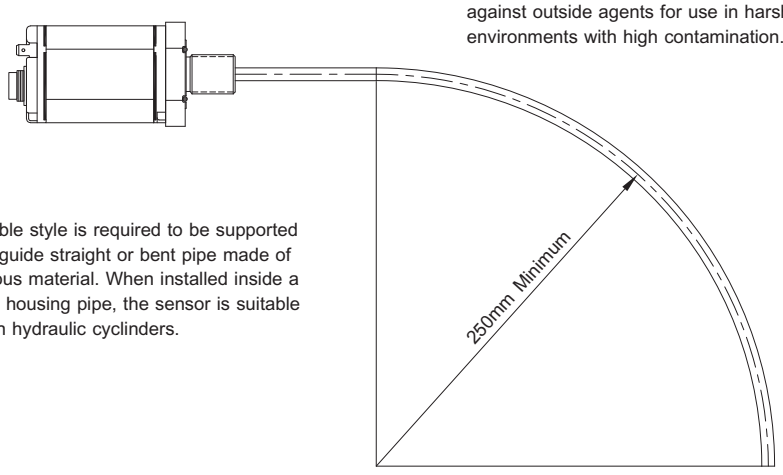
Total sensor length tolerances are :

<8000mm stroke lengths, +8mm tolerance

>8000mm stroke lengths, +15mm/-5mm tolerance

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

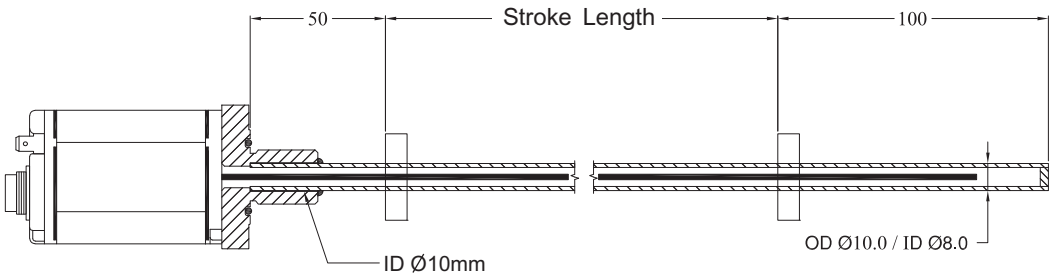
The flexible style is housed in a Teflon coated stainless steel for full protection against outside agents for use in harsh environments with high contamination.



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.

Installation Dimensions

Stroke length <8000mm, front dead zone is 50mm
Stroke length >8000mm, front dead zone is 130mm

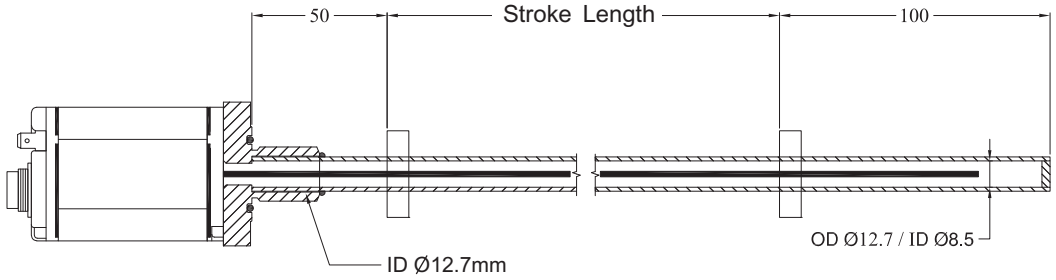


Pressure housing pipe for ID 10mm flange :
Pipe OD <10mm
Pipe ID > 8mm

Stroke Length < 8000mm
- Pipe Length = Stroke Length + 150mm

Stroke Length > 8000mm
- Pipe Length = Stroke Length + 230mm

Stroke length <8000mm, front dead zone is 50mm
Stroke length >8000mm, front dead zone is 130mm



Pressure housing pipe for ID 12.7mm flange :
Pipe OD <12.7mm
Pipe ID > 8.5mm

Stroke Length < 8000mm
- Pipe Length = Stroke Length + 150mm

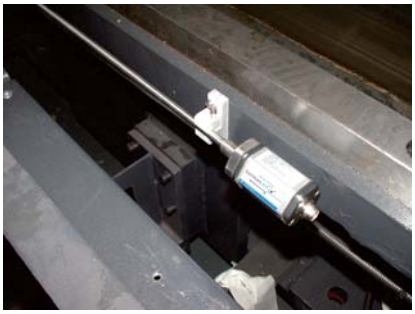
Stroke Length > 8000mm
- Pipe Length = Stroke Length + 230mm

* Select Dia. 60mm ring magnet
or High floating magnet

Installation Instrustion

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

Connection example with thread



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