GEFRAN

Manual Installation of Contactless Magnetostrictive

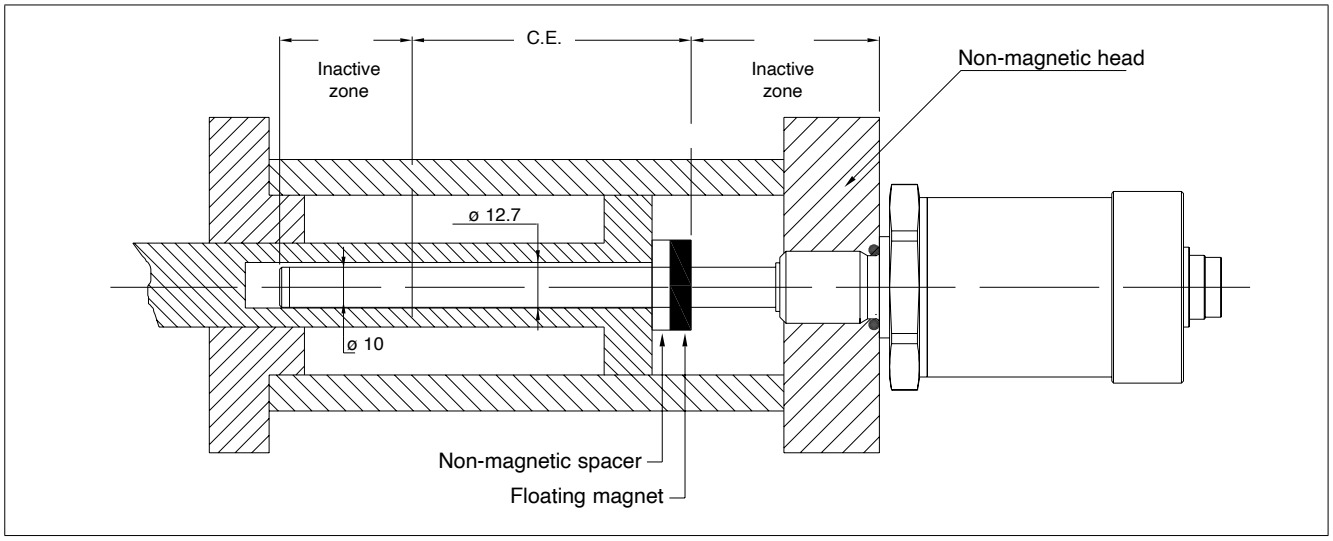
cod. 85192N **Edition** 04/2024

Contenuti

1. GENERAL PRECAUTIONS

- The transducer must be installed away from sources of magnetic fields, both static and 50 Hz (electric motors, solenoids, etc.).
- If it uses a floating cursor (PCUR039/PCUR202), the assembly support must be made with nonmagnetic material.
- The transducer connection cable must be wired separate from power cables and/or solenoid controls, drives, or remote switches.
- The 24 VDC feed must be dedicated to the transducers or must be drawn directly from the power terminals and as near as possible.
- Since the transducer cursor is a magnet, make sure there are no iron filings or small fragments of magnetic metal near the transducer. This could produce an accumulation of material on the cursor, with consequent sliding problems.
- The cylinder head (in which the threaded hole will be drilled for inserting the transducer) must be made of nonmagnetic material. If not, the residual magnetization caused by drilling the threaded hole must be less than 4 Gauss.
- The system must be used only in accordance with the required protection level.
- The sensor must be protected against accidental knocks and used in accordance with the instrument's ambient characteristics and performance levels.
- The sensors must be powered with non-distributed networks and always at lengths of less than 30 mt.
- In case of outdoor installations, follow the instructions in paragraph 6.

1.1. Mounting inside a cylinder



2. ANALOGS

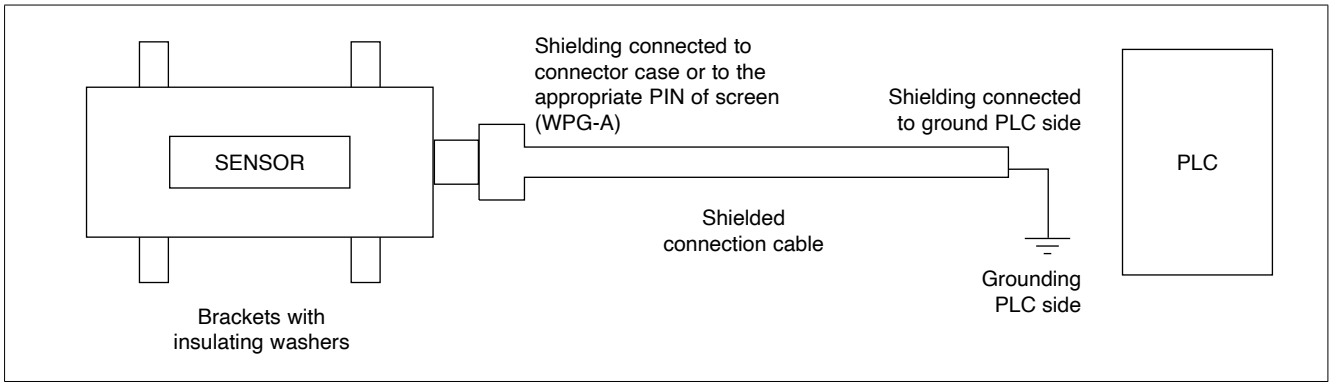
Transducers: WPG-A/MK4-A/WPP-A/WPA-A/WRG-A/WRP-A/WRA-A/RK-4

Outputs: 0...10V, 4...20mA

Installation notes WPG-A/MK4-A/WPP-A/WPA-A
- To guarantee the correct electrical insulation of the transducer from the machine, always assemble the brackets using the plastic whashers provided in the package as shownin the fig. a and fig. b.
- The braiding of the shielded transducer connection cable must be connected to the case of the female connector or to the appropriate PIN of screen (WPG-A) so that the shielding is connected to the transducer case.
- The cable shielding on PLC side must be grounded.

In the UL environment the devices must be supplied with a Class 2 Power Supply (as for NEC) or LPS Power Supply (as for EN 60950).
If devices are permanently connected to the machine it's requested an external switch or circuit breaker and external overcurrent protection.

2.1. Installation guideline



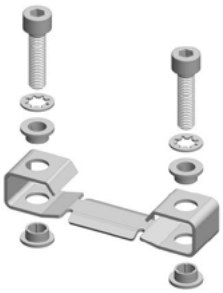


fig. a

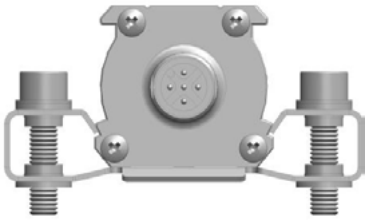
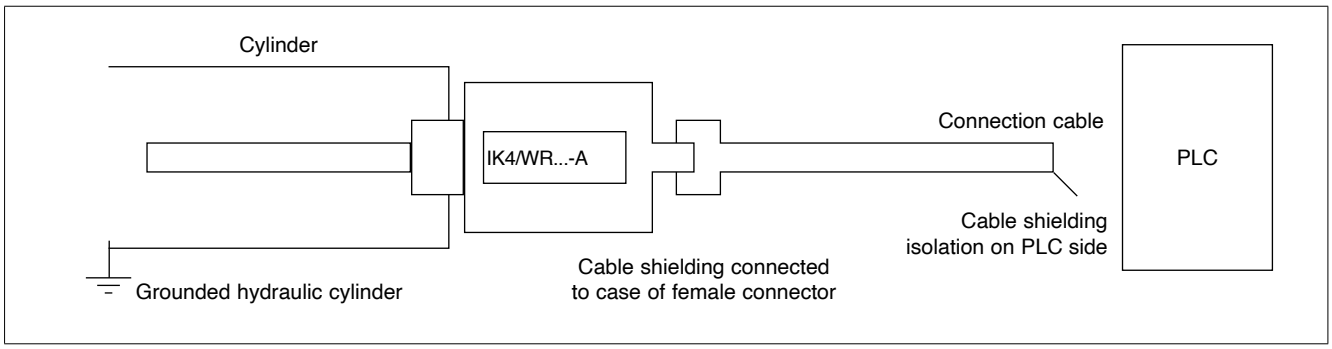


fig. b

installation notes IK4-A/WRG-A/WRP-A/WRA-A/RK
- The transducer must be on a grounded metallic cylinder.
- The braiding of the shielded transducer connection cable must be connected to the case of the female connector so that the shielding is connected to the transducer case.
- The cable shielding on PLC side must be isolated.

In the UL environment the devices must be supplied with a Class 2 Power Supply (as for NEC) or LPS Power Supply (as for EN 60950).
If devices are permanently connected to the machine it's requested an external switch or circuit breaker and external overcurrent protection.

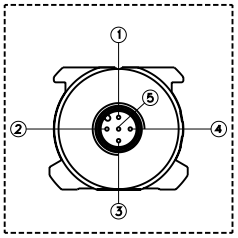


Note:
if the transducer is installed in a cylinder isolated from the ground, the cable shielding on PLC side must be grounded.

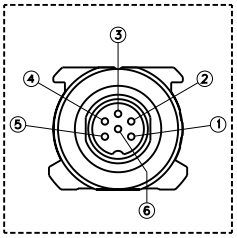
2.2. Electrical connections (series MK4-A/WPP-A/WPA-A)

Series **MK4-A**

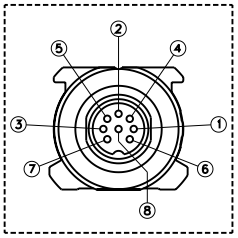
OUTPUT MK4-A-A



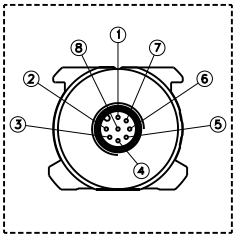
OUTPUT MK4-A-B



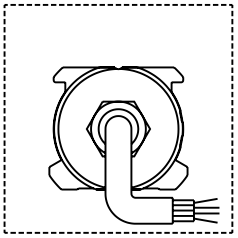
OUTPUT MK4-A-C



OUTPUT MK4-A-H



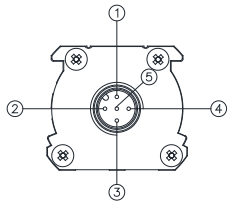
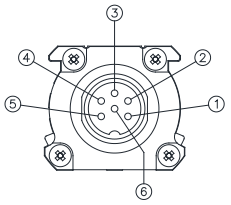
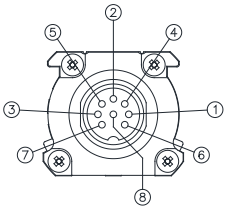
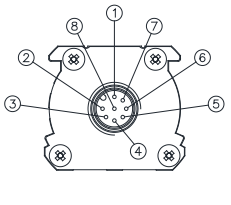
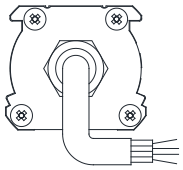
OUTPUT MK4-A-F



	CONNECTORS				CABLES	OPTIONAL CABLES FOR	
Function	**MK4-A-A**	**MK4-A-B**	**MK4-A-C**	**MK4-A-H**	**MK4-A-F**	**MK4-A-A**	**MK4-A-H**
	5-pin M12	*6-pin M16*	*8-pin M16*	*8-pin M12*	*Standard cable*	*Pre-assembled 5 pin*	*Pre-assembled 8 pin*
Output cursor 1 0,1...10,1V 0...10V 4...20mA 0...20mA -10...+10V -5...+5V	1	1	5 (1*)	5	Grey	Brown	Green
GND ***Output cursor 1*** (0V)	2	2	2	1	Pink	White	Yellow
Inverse output cursor 1 ***Output cursor 2*** ***Output speed*** (not present on W version) 0...10V 4...20mA 0...20mA -10...+10V -5...+5V	3	3	3	3	Yellow	Blue	Pink
GND ***Output cursor 1*** ***Output cursor 2*** ***Output speed*** (0V)	2	4	6	2	Pink	White	Grey
Power supply +	5	5	7	7	Brown	Grey	Brown
Power supply GND	4	6	8	6	White	Black	Blue
n.c.	-	-	4	4	-	-	Red
n.c.	-	-	1(5*)	8	-	-	White

(*) = for version 4...20mA / 0...20mA
The transducer case must be grounded with the cable sheathing on the control system side only.

Series **WPP-A**

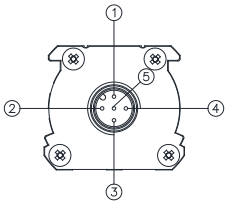
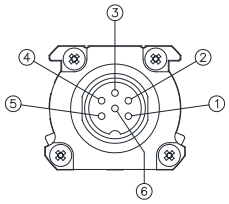
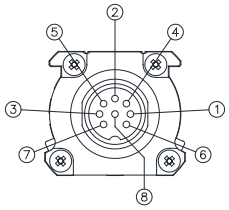
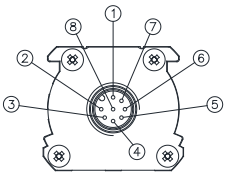
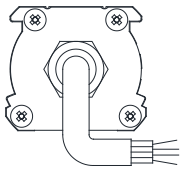
OUTPUT WPP-A-A	OUTPUT WPP-A-B	OUTPUT WPP-A-C	OUTPUT WPP-A-H	OUTPUT WPP-A-F
				

	CONNECTORS				CABLES	OPTIONAL CABLES FOR	
Function	**WPP-A-A**	**WPP-A-B**	**WPP-A-C**	**WPP-A-H**	**WPP-A-F**	**WPP-A-A**	**WPP-A-H**
	5 pin M12	*6 pin M16*	*8 pin M16*	*8 pin M12*	*Standard cable*	*Pre-assembled 5 pin*	*Pre-assembled 8 pin*
Output cursor 1 0...10V 4...20mA 0...20mA	1	1	5 (1*)	5	Grey	Brown	Green
GND ***Output cursor 1*** (0V)	2	2	2	1	Pink	White	Yellow
Inverse output cursor 1 ***Output cursor 2*** ***Output speed*** 0...10V 4...20mA 0...20mA	3	3	3	3	Yellow	Blue	Pink
GND ***Output cursor 1*** ***Output cursor 2*** ***Output speed*** (0V)	2	4	6	2	Pink	White	Grey
Power supply+	5	5	7	7	Brown	Grey	Brown
Power supply GND	4	6	8	6	White	Black	Blue
n.c.	-	-	4	4	-	-	Red
n.c.	-	-	1(5*)	8	-	-	White

(*) = for version 4...20mA / 0...20mA

The transducer case must be grounded with the cable sheathing on the control system side only.

Series **WPA-A**

OUTPUT WPA-A-A	OUTPUT WPA-A-B	OUTPUT WPA-A-C	OUTPUT WPA-A-H	OUTPUT WPA-A-F/R
				

	CONNECTORS				CABLES	OPTIONAL CABLES FOR	
Function	**WPA-A-A**	**WPA-A-B**	**WPA-A-C(***)**	**WPA-A-H**	**WPA-A-F/R**	**WPA-A-A**	**WPA-A-H**
	5 pin M12	*6 pin M16*	*8 pin M16*	*8 pin M12*	*Standard cable*	*Pre-assembled 5 pin*	*Pre-assembled 8 pin*
Output cursor 1 0...10V 4...20mA 0...20mA	1	1	5 (1*)	5	Grey	Brown	Green
GND ***Output cursor 1*** (0V)	2	2	2	1	Pink	White	Yellow
Inverse output cursor 1 ***Output cursor 2*** ***Output speed*** 0...10V 4...20mA 0...20mA	3	3	3	3	Yellow	Blue	Pink
GND ***Output cursor 1*** ***Output cursor 2*** ***Output speed*** (0V)	2	4	6	2	Pink	White	Grey
Power supply+	5	5	7	7	Brown	Grey	Brown
Power supply GND	4	6	8	6	White	Black	Blue
n.c.	-	-	4	4	-	-	Red
n.c.	-	-	1(5*)	8	-	-	White
Temperature ratings	-25+80 °C	-30+85 °C	-30+85 °C	-30+85 °C	-30+80 °C / -30+75 °C	-25+80 °C	-25+80 °C

(*) = for version 4...20mA / 0...20mA

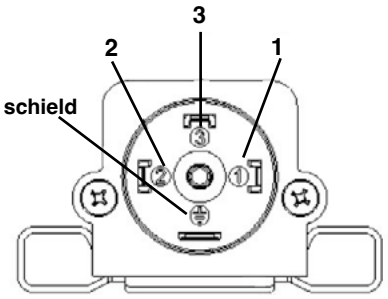
(**) The operating temperature ranges, except where expressly indicated, are also applicable in the UL scope.
The transducer case must be grounded with the cable sheathing on the control system side only.

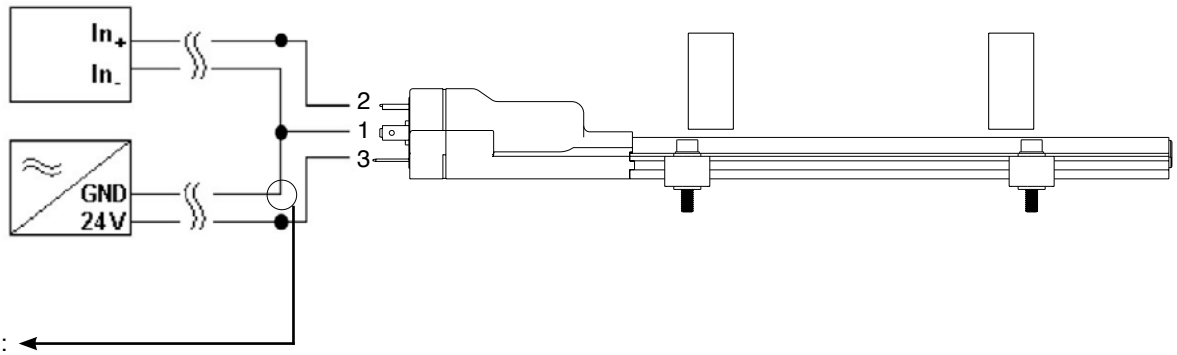
(***) Not available with UL certification.

2.3. Electrical connections (series WPG-A)

Series **WPG-A**

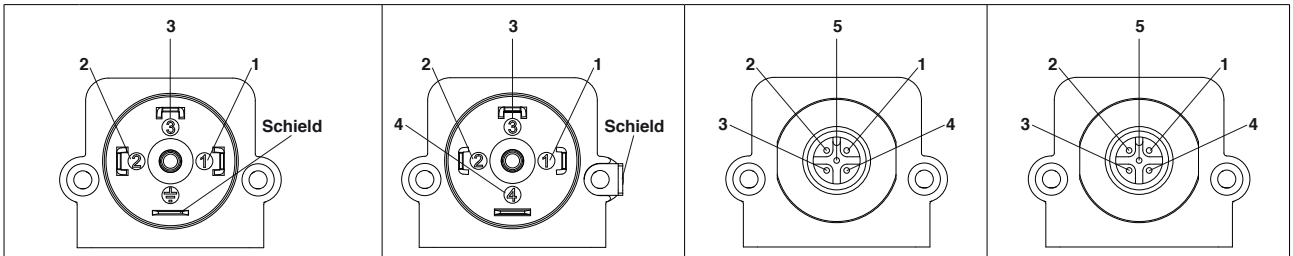
PIN	FUNCTION
1	Power supply -
2	Output
3	Power supply +
⏚	Cable Shield (must be connected to the panel side, too)





Note:
Make a connection as close as possible to transducer

Series **WPG-A**

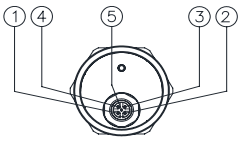


	WPG-A-M-(N/W/E/M/R/S)	WPG-A-M-(J/Q/Z)	WPG-A-A-(N/W/E/M/R/S)	WPG-A-A-(J/Q/Z)
PIN	Valve single output	Valve double output	5 pin M12 single output	5 pin M12 double output
1	Power supply -	Power supply -	Direct output	Direct output
2	Direct output	Direct output	GND ouput	GND ouput
3	Power supply +	Power supply +	n.d.	Reverse output
4	Schield	Reverse output	Power supply -	Power supply -
5			Power supply +	Power supply +
⏚		Schield	Connector body	Connector body

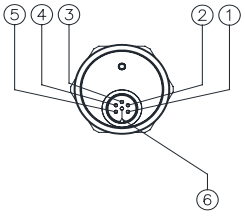
2.4. Electrical connections (series IK4-A/WRP-A/WRA-A/WRG-A)

Series **IK4-A / WRG-A**

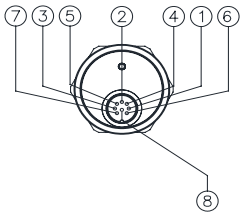
OUTPUT IK4-A-A / WRG-A-A



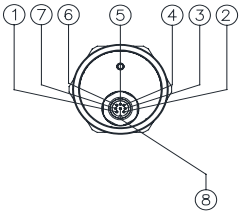
OUTPUT IK4-A-B / WRG-A-B



OUTPUT IK4-A-C



OUTPUT IK4-A-H

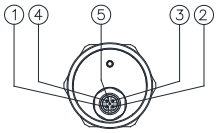


OUTPUT IK4-A-F/R

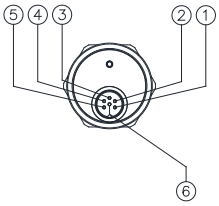
	CONNECTORS				CABLES	OPTIONAL CABLES	
Function	**IK4-A-A / WRG-A-A**	**IK4-A-B / WRG-A-B**	**IK4-A-C**	**IK4-A-H**	**IK4-A-F/R**	**CAV00_**	**CAV01_/CAV02_**
	5 pin M12	6 pin M16	8 pin M16	8 pin M12	Standard cables	Pre-assembled cable 8 pin IK4A-H	Pre-assembled cable 5 pin IK4A-A
Output 1 (position) 0...10V 4...20mA 0...20mA	1	1	5 (1*)	5	Grey	Green	Brown
GND Output 1 (0V)	2	2	2	1	Pink	Yellow	White
Output 2 (inverse position) 10...0V 20...4mA 20...0mA	3	3	3	3	Yellow	Pink	Blue
GND Output 2 (0V)	2	4	6	2	Green	Grey	White
Power supply +	5	5	7	7	Brown	Brown	Grey
Power supply GND	4	6	8	6	White	Blue	Black
n.c.	-	-	4	4	-	Red	-
n.c.	-	-	1 (*5)	8	-	White	-

Series **WRP-A**

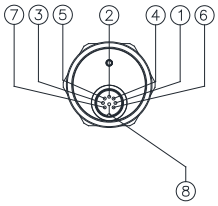
Output **WRP-A-A**



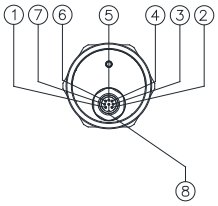
Output **WRP-A-B**



Output **WRP-A-C**



Output **WRP-A-H**



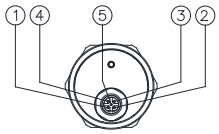
Output **WRP-A-F/R**

	CONNECTORS				CABLES	OPTIONAL CABLES	
Function	**WRP-A-A**	**WRP-A-B**	**WRP-A-C**	**WRP-A-H**	**WRP-A-F/R**	**CAV00_**	**CAV01_/CAV02_**
	5 pin M12	6 pin M16	8 pin M16	8 pin M12	Standard cables	Pre-assembled cable 8 pin WRP-A-H	Pre-assembled cable 5 pin WRP-A-A
Output 1 (position) 0...10V 4...20mA 0...20mA	1	1	5 (1*)	5	Grey	Green	Brown
GND **Output 1** (0V)	2	2	2	1	Pink	Yellow	White
Output 2 **(inverse position)** 10...0V 20...4mA 20...0mA	3	3	3	3	Yellow	Pink	Blue
GND **Output 2** (0V)	2	4	6	2	Green	Grey	White
Power supply +	5	5	7	7	Brown	Brown	Grey
Power supply GND	4	6	8	6	White	Blue	Black
n.c.	-	-	4	4	-	Red	-
n.c.	-	-	1 (*5)	8	-	White	-

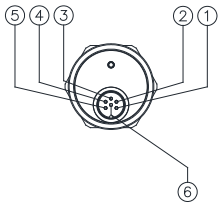
(*) = for version 4...20mA / 0...20mA

Series **WRA-A**

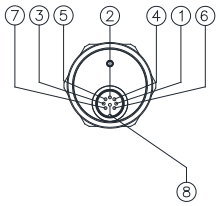
Output **WRA-A-A**



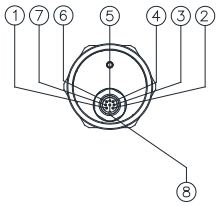
Output **WRA-A-B**



Output **WRA-A-C(***)**



Output **WRA-A-H**



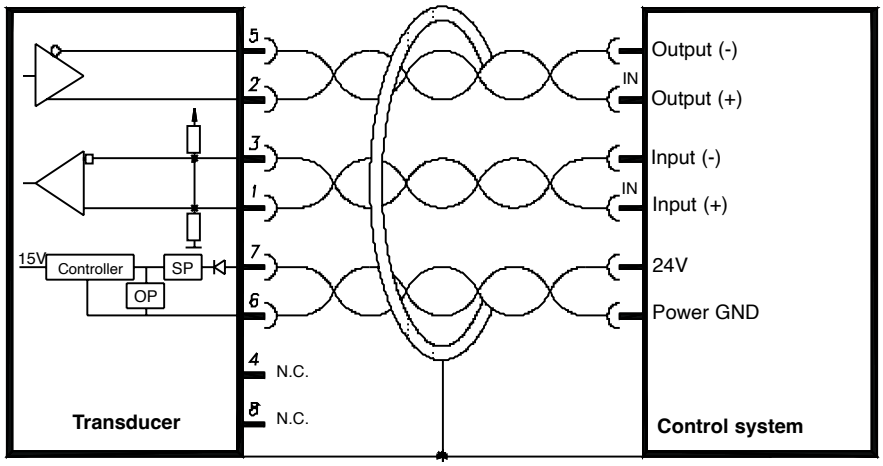
Output **WRA-A-F/R**

	CONNECTORS				**CABLES**	**OPTIONAL CABLES**	
Function	**WRA-A-A**	**WRA-A-B**	**WRA-A-C**	**WRA-A-H**	**WRA-A-F/R**	**CAV00_**	**CAV01_/CAV02_**
	5 pin M12	6 pin M16	8 pin M16	8 pin M12	Standard cables	Pre-assembled cable 8 pin WRA-A-H	Pre-assembled cable 5 pin WRA-A-A
Output 1 (position) 0...10V 4...20mA 0...20mA	1	1	5 (1*)	5	Grey	Green	Brown
GND Output 1 (0V)	2	2	2	1	Pink	Yellow	White
Output 2 **(inverse position)** 10...0V 20...4mA 20...0mA	3	3	3	3	Yellow	Pink	Blue
GND Output 2 (0V)	2	4	6	2	Green	Grey	White
Power supply +	5	5	7	7	Brown	Brown	Grey
Power supply GND	4	6	8	6	White	Blue	Black
n.c.	-	-	4	4	-	Red	-
n.c.	-	-	1 (*5)	8	-	White	-
Temperatura ratings **	-25+80 °C	-30+85 °C	-30+85 °C	-30+85 °C	-30+80 °C / -30+75 °C	-25+80 °C	-25+80 °C

(*) = for version 4...20mA / 0...20mA
(**) The operating temperature ranges, except where expressly indicated, are also applicable in the UL scope.
(***) Not available with UL certification.

Series **RK-2**

Electrical connections (RK - 2 - _ _ _ _ - S)



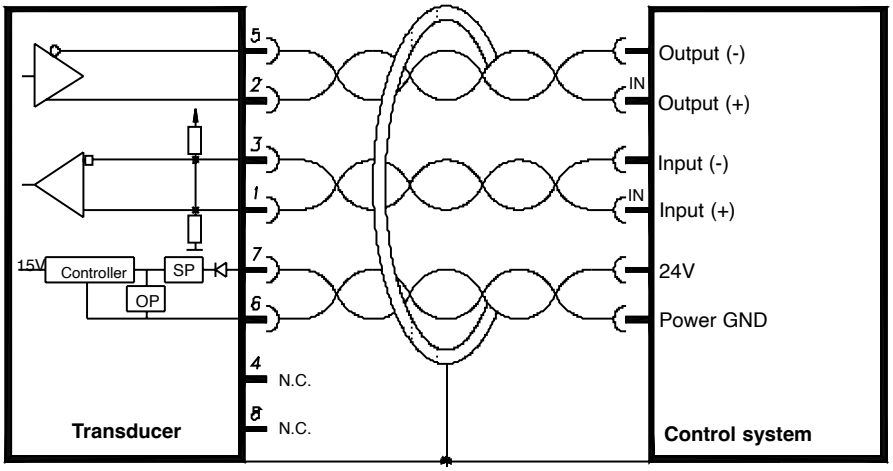
RK-_-_ _ _ _ -S	Cable
Output (+)	Gray
Output (-)	Green
Input (+)	Yellow
Input (-)	Pink
Power supply +	Brown
Power supply	
GND	Blue

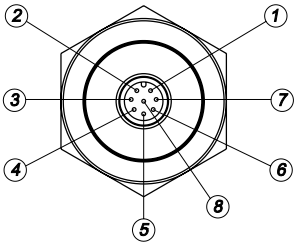
Electrical connections (RK - 2 - _ _ _ _ - N / K / E)

RK-_-_ _ _ _ -N	RK-_-_ _ _ _ -K	RK-_-_ _ _ _ -E	Cable
Output 0,1...10,1Vdc	Output 0,1...5,1Vdc	Output 4...20mA	Yellow
Output GND	Output GND	Output GND	Pink
Power supply +	Power supply +	Power supply +	Brown
Power supply GND	Power supply GND	Power supply GND	Blue

Series **RK-4**

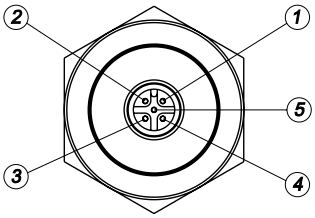
Electrical connections (RK - 4 - _ _ _ _ - S)





1	Input +
2	Output +
3	Input -
4	n.c.
5	Output -
6	Power supply GND
7	Power supply +
8	n.c.

Electrical connections (RK - 4 - _ _ _ _ - N / K / E)



	RK-4-_ _ _ _ -N	**RK-4-_ _ _ _ -K**	**RK-4-_ _ _ _ -E**
1	Output 0,1...10,1Vdc	Output 0,1...5,1Vdc	Output 4...20mA
2	Output GND	Output GND	Output GND
3	n.c.	n.c.	n.c.
4	Power supply GND	Power supply GND	Power supply GND
5	Power supply +	Power supply +	Power supply +

3. SSI

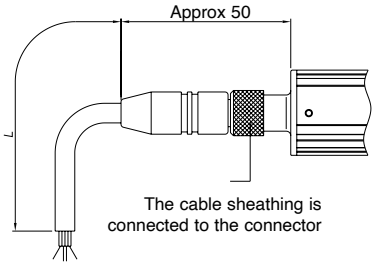
Transducers: MK4-S/IK4-S/WPP-S/WPA-S/WRP-S/WRA-S

Outputs: MK4-S/IK4-S/WPP-S/WPA-S/WRP-S/WRA-S

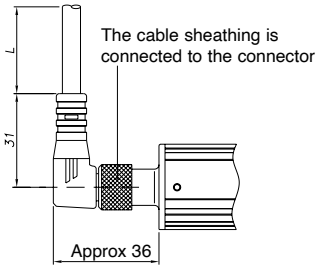
Installation notes
- Connections with instructions taken from MK4-S/WPP-S/WPA-S data-sheet.
- Braiding grounded on PLC side for both MK/WP and IK/WR.
- The braiding must always be wired so that it is electrically connected to the connector case on transducer side.
- Cable length is based on baud rate.

3.1. Optional cables

PRE-ASSEMBLED CABLE WITH STRAIGHT CONNECTOR



PRE-ASSEMBLED CABLE WITH 90° CONNECTOR

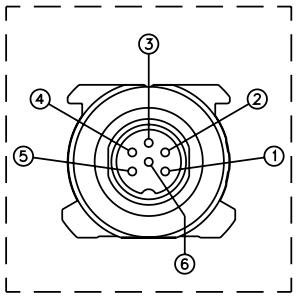


8-pin cable code		MK4-S/WPP-S/WPA-S-H	
Length "L"		CODE	
		Straight cable	Cable to 90°
2	mt	**CAV002**	**CAV005**
5	mt	**CAV003**	**CAV006**
10	mt	**CAV004**	**CAV007**
15	mt	**CAV009**	**CAV008**

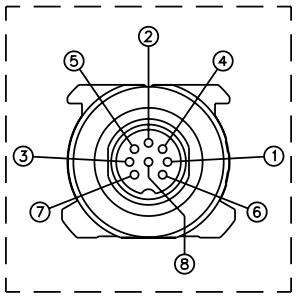
3.2. Electrical connections (series MK4-S/WPP-S/WPA-S)

Series **MK4-S**

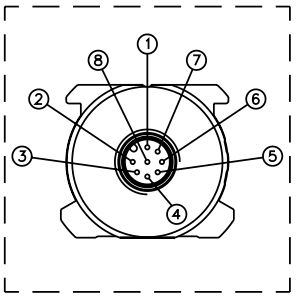
OUTPUT MK4-S-B



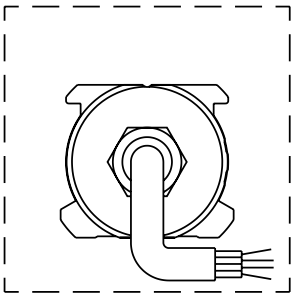
USCITA MK4-S-C



USCITA MK4-S-H



USCITA MK4-S-F/R

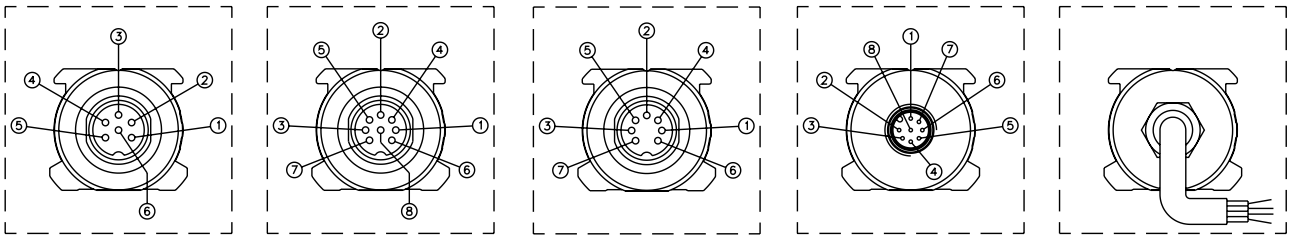


Function	MK4-S-B	MK4-S-C	MK4-S-H	MK4-S-F	MK4-S-R	CAV00X
	6-pin M16	*8-pin M16*	*8-pin M12*	*Cable output*	*PUR cable output*	*Optional 8-pin cable*
Data -	1	5	5	Orange	White	Green
Data +	2	2	2	Orange / White	Blue	Gray
Clock +	3	1	3	Green / White	Gray	Pink
Clock -	4	3	1	Green	Yellow	Yellow
Power supply +	5	7	7	Blue / White	Green	Brown
Power supply GND	6	6	6	Blue	Brown	Blue
n.c.	-	8	8	-	Pink	White
n.c.	-	4	4	-	-	Red

The transducer case must be grounded with the cable sheathing on the control system side only

Series **WPP-S**

OUTPUT WPP-S-B **OUTPUT WPP-S-C** **OUTPUT WPP-S-D** **OUTPUT WPP-S-H** **OUTPUT WPP-S-F/R**

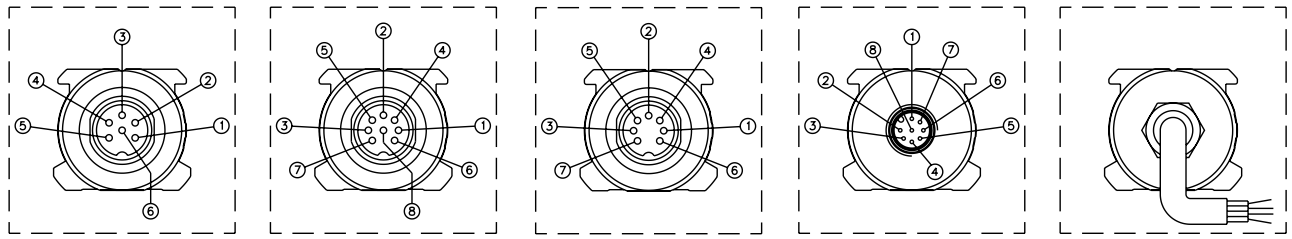


Function	WPP-S-B	WPP-S-C	WPP-S-D	WPP-S-H	WPP-S-F	WPP-S-R	CAV00X
	6-pin M16	*8-pin M16*	*7-pin M16*	*8-pin M12*	*Cable output*	*PUR cable output*	*Optional 8-pin cable*
Data -	1	5	1	5	Orange	Pink	Green
Data +	2	2	2	2	Orange / White	Blue	Gray
Clock +	3	1	3	3	Green / White	Gray	Pink
Clock -	4	3	4	1	Green	Yellow	Yellow
Power supply +	5	7	5	7	Blue / White	Green	Brown
Power supply GND	6	6	6	6	Blue	Brown	Blue
n.c.	-	8	7	8	-	-	White
n.c.	-	4	-	4	-	-	Red

The transducer case must be grounded with the cable sheathing on the control system side only.

Series **WPA-S**

OUTPUT WPA-S-B **OUTPUT WPA-S-C** **OUTPUT WPA-S-D** **OUTPUT WPA-S-H** **OUTPUT WPA-S-F/R**



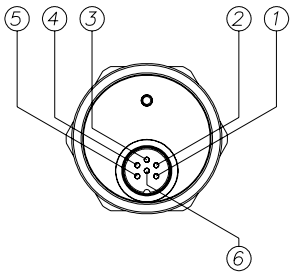
Function	WPA-S-B	WPA-S-C	WPA-S-D	WPA-S-H	WPA-S-F	WPA-S-R	CAV00X
	6-pin M16	*8-pin M16*	*7-pin M16*	*8-pin M12*	*Cable output*	*PUR cable output*	*Optional 8-pin cable*
Data -	1	5	1	5	Orange	Pink	Green
Data +	2	2	2	2	Orange / White	Blue	Gray
Clock +	3	1	3	3	Green / White	Gray	Pink
Clock -	4	3	4	1	Green	Yellow	Yellow
Power supply +	5	7	5	7	Blue / White	Green	Brown
Power supply GND	6	6	6	6	Blue	Brown	Blue
n.c.	-	8	7	8	-	-	White
n.c.	-	4	-	4	-	-	Red

The transducer case must be grounded with the cable sheathing on the control system side only.

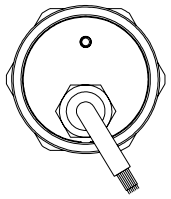
3.3. Electrical connections (series IK4-S/WRP-S/WRA-S)

Series **IK4-S**

OUTPUT IK4-S-B



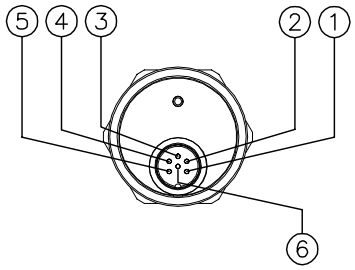
OUTPUT IK4-S-F/R



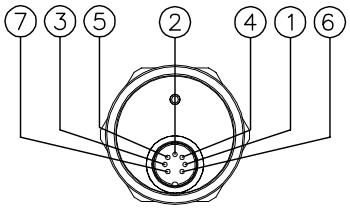
Function	IK4-S-B	IK4-S-F	IK4-S-R
	6-pin M16	*Cable output*	*PUR cable output*
Data -	1	Orange	Pink
Data +	2	Orange / White	Blue
Clock +	3	Green / White	Gray
Clock -	4	Green	Yellow
Power supply +	5	Blue / White	Green
Power supply GND	6	Blue	Brown
n.c.	-	-	-
n.c.	-	-	-

Series **WRP-S**

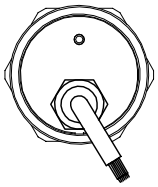
OUTPUT WRP-S-B



OUTPUT WRP-S-D



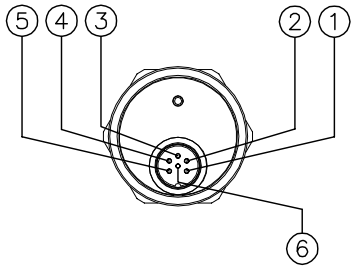
OUTPUT WRP-S-F/R



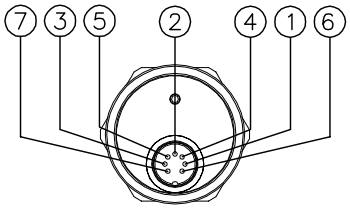
Function	WRP-S-B	WRP-S-D	WRP-S-F	WRP-S-R
	6-pin M16	*7-pin M16*	*Cable output*	*PUR cable output*
Data -	1	1	Orange	Pink
Data +	2	2	Orange / White	Blue
Clock +	3	3	Green / White	Gray
Clock -	4	4	Green	Yellow
Power supply +	5	5	Blue / White	Green
Power supply GND	6	6	Blue	Brown
n.c.	-	7	-	-
n.c.	-	-	-	-

Serie **WRA-S**

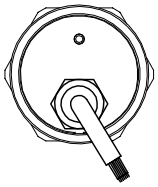
OUTPUT WRA-S-B



OUTPUT WRA-S-D



OUTPUT WRA-S-F/R



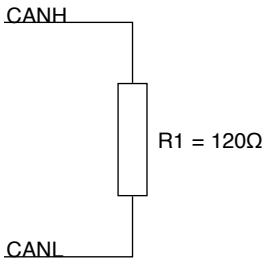
Function	WRA-S-B	WRA-S-D	WRA-S-F	WRA-S-R
	6-pin M16	*7-pin M16*	*Cable output*	*PUR cable output*
Data -	1	1	Orange	Pink
Data +	2	2	Orange / White	Blue
Clock +	3	3	Green / White	Gray
Clock -	4	4	Green	Yellow
Power supply +	5	5	Blue / White	Green
Power supply GND	6	6	Blue	Brown
n.c.	-	7	-	-
n.c.	-	-	-	-

4. CAN ISO 11898

Transducers: MK4-C / IK4-C

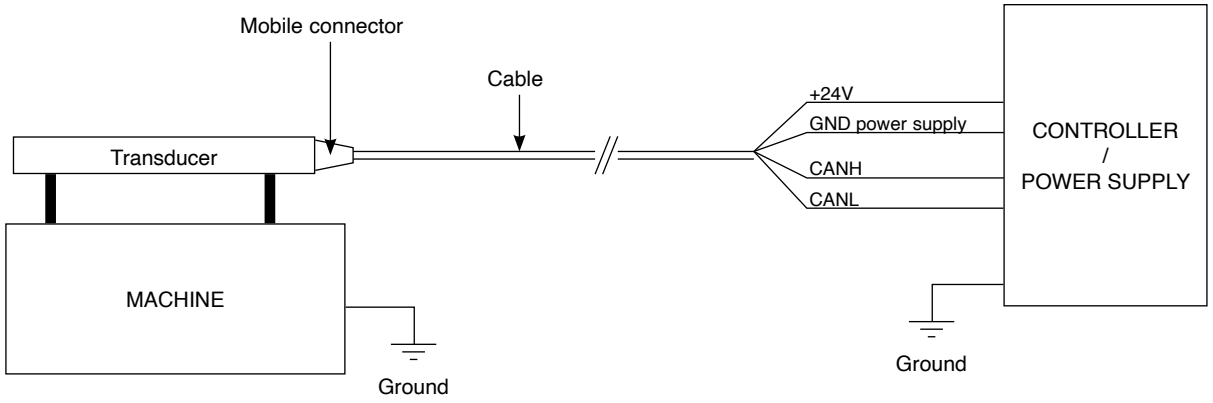
Outputs: CANopen DP406

Installation notes
- Make sure that the transducer body is electrically connected to the machine body (ground).
- If a shielded, prewired cable was not purchased, make sure to connect the braiding (shielding) of the cable to the body of the mobile female connector.
- DO NOT connect the power supply GND to earth or to the cable shielding.
- Connect the cable shielding only on transducer side and not on power supply side.
- Make sure that there is a terminator plug (120Ω resistor between CANH and CANL lines) at the beginning and end of the network.



- For inside cylinder applications, make sure that the cylinder head is not magnetized.

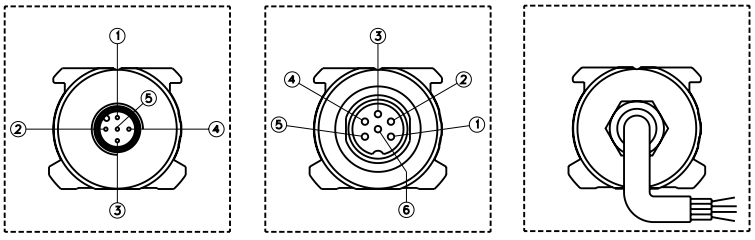
4.1. Standard installation



4.2. Electrical connections (series MK4-C)

Series **MK4-C**

OUTPUT MK4-C-A **OUTPUT MK4-C-B** **OUTPUT MK4-C-F**



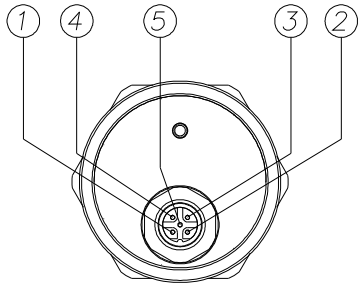
Function	Connector (B) Pin°	Connector (A) Pin°	Cable (Wire color)
CAN L	1	5	Blue
CAN H	2	4	White
n.c.	3	1	-
n.c.	4	-	-
Power + Vdc	5	2	Red
GND power supply	6	3	Black

ATTENTION ! Do not connect the GND to the ground or to the cable sheathing

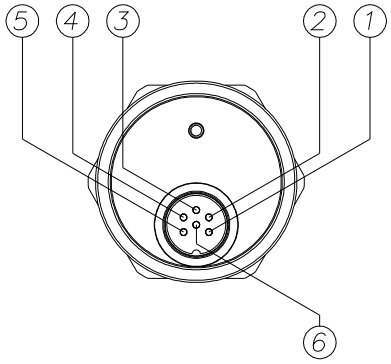
4.3. Electrical connections (series IK4-C)

Serie **IK4-C**

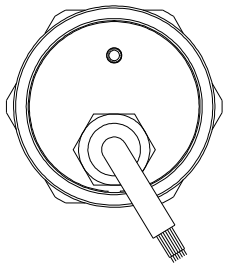
OUTPUT IK4-C-A



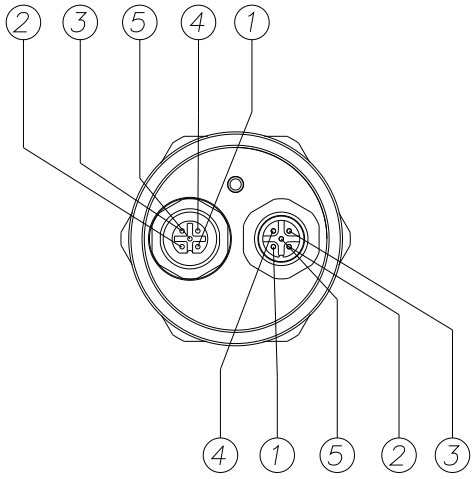
OUTPUT IK4-C-B



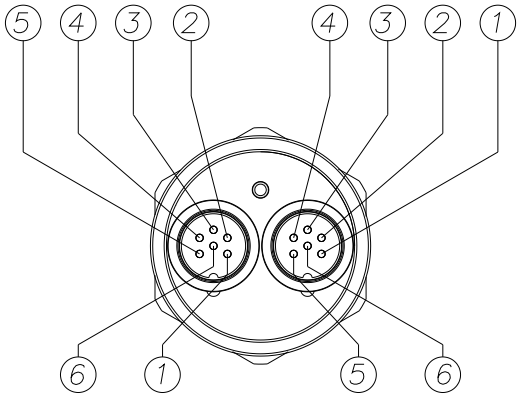
OUTPUT IK4-C-F



OUTPUT IK4-C-Y



OUTPUT IK4-C-X



Function	CONNECTORS						CABLE
	IK4-C-A	IK4-C-B	IK4-C-Y		IK4-C-X		IK4-C-F
	5-pin M12	6-pin M16	Double connector 5-pin M12 (male + female)		Double connector 6-pin M16 (male + female)		Standard cable 4-pin
			male	female	male 1	male 2	
CAN L	**5**	**1**	**5**	**5**	**1**	**1**	**BLUE**
CAN H	**4**	**2**	**4**	**4**	**2**	**2**	**WHITE**
CAN GND (n.c.)	**1**	**3**	**1**	**1**	**3**	**3**	**-**
n.c.	**-**	**4**	**-**	**-**	**4**	**4**	**-**
Power supply +	**2**	**5**	**2**	**2**	**5**	**5**	**RED**
Power supply GND	**3**	**6**	**3**	**3**	**6**	**6**	**BLACK**

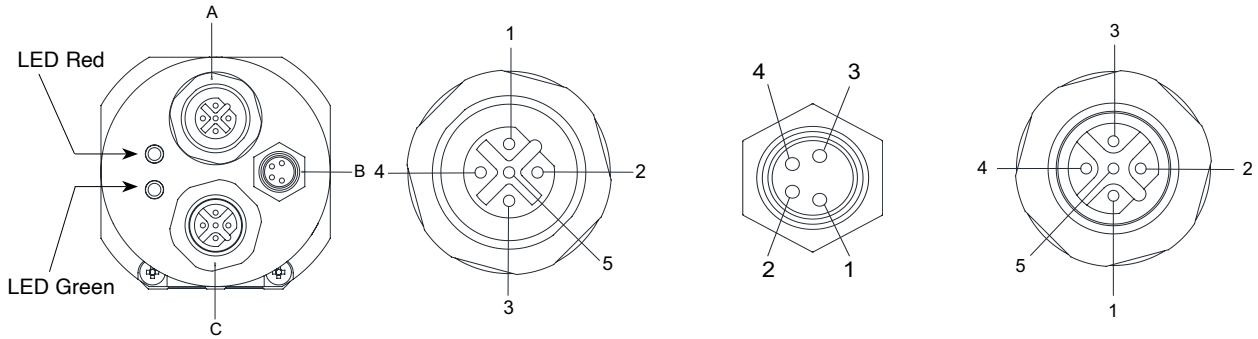
5. PROFIBUS DPV0 IEC61158

Transducers: MK4-P / IK4-P

Installation notes
- Connections with the information obtained from the datasheet dell'MK4-P and IK4-P
- Braiding grounded on PLC side for both MK and IK.
- The braiding must always be wired so that it is electrically connected to the connector case on transducer side.
- Cable length is based on baud rate.

5.1. Electrical connections (series MK4-P / IK4-P)

OUTPUT MK4PW/IK4PW



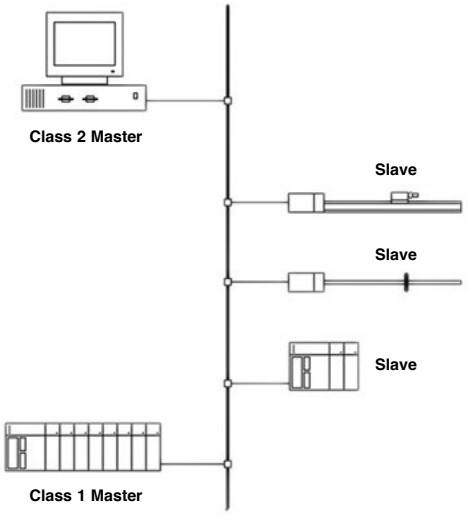
CONNECTOR A (M12 female)	
1	5VD_ISO
2	LINE_A/N
3	GND_ISO
4	LINE_B/P
5	GROUND

CONNECTOR B (M8 male)	
1	24V
2	N.C.
3	0V
4	N.C.
5	GROUND

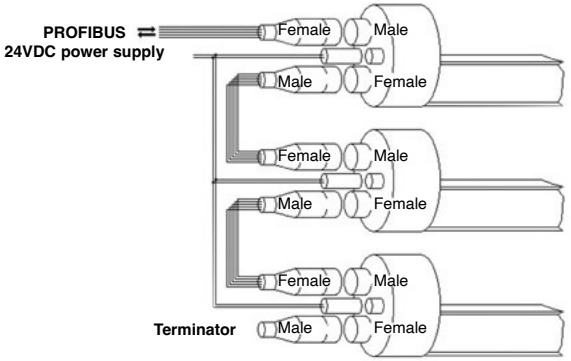
CONNECTOR C (M12 male)	
1	5VD_ISO
2	LINE_A/N
3	GND_ISO
4	LINE_B/P
5	GROUND

5.2. Profibus structure and connections

A Profibus network lets you connect peripheral Slave devices (transducers or actuators) to Class 1 Master central control units (typically PLCs). The network software is installed with a Class 2 Master containing a database with the GSD files of all connected devices. The network is designed and parameterized with a graphics tool, then the configuration is downloaded to the Class 1 Masters in the network.
The Class 1 Master(s) start(s) the communication process with the peripheral devices according to the configuration received from the Class 2 Master.
This process includes an initial data exchange regarding Slave identification, parameterization, and configuration.
When this phase is done, application management begins with exchange of process data on the network.
The GSD file contains all information on device identification, supported functions, and length/format of data packets.



Connection with two M12 connectors + 1 M8 connector:
- no T connection required
- standard M12 and M8 connectors
- separate power supply line (ideal for use of programmer)
- for power supply: use a shielded cable with metal connector and shield connected to connector case



5.3. Cable type and transmission speed

The cables must have the following characteristics:

Parameter		Cable Type A
Impedance	ohm	135...165
Capacity	pF/m	< 30
Loop resistance	ohm/km	< 110
Section of the core	mm²	> 0.34 (AWG 22/1)

With this type of cable lengths to reach a bus segment, depending on the speed are:

Transfer Rate	**kbit/s**	9.6	31.25	45.45	93.75	187.5	500	1500	3000	6000	12000
Cable length	**mm**	1200	1200	1200	1000	1000	400	200	100	100	100

5.4. Optional cables

M8 4-pin axial female connector, pre-wired with 3-meter cable for power supply	**PCAV700**
M8 4-pin axial female connector, pre-wired with 5-meter cable for power supply	**PCAV701**
M12 5-pin axial female connector, pre-wired with 3-meter cable for communication	**PCAV702**
M12 5-pin axial female connector, pre-wired with 5-meter cable for communication	**PCAV704**
M12 5-pin axial male connector, pre-wired with 3-meter cable for communication	**PCAV703**
M12 5-pin axial male connector, pre-wired with 5-meter cable for communication	**PCAV705**

5.5. Optional accessoires

Profibus terminator (axial M12 male connector)	**CON049**
Pre–assembled cable with M12 5pin straight male connector	**CON380**
Pre–assembled cable with M12 5pin straight female connector	**CON390**
Node number programmer	**PNP-1**
Downloadable GSD file from the website www.gefran.com	

5.6. Optional node number programmer

The PNP-1 node number programmer lets you read and set the node number on a Profibus network for MK4-P and IK4-P series sensors.
This accessory component is used if you do not have a Class 2 Master programmer.
See the PNP-1 programmer technical sheet and manual for detailed information.

6. IO-LINK V1.1

Transducers: WPL

For IO-Link application use a not shielded cable as defined by the IO-Link standard.

1.Typical installation (recommended)
A: Sensor
B: Connection cable
C: Shield grounded on the PLC side/Master IO-Link
D: PLC/Master IO-Link

2.To guarantee correct electrical transducer insulation from the machine system, always assemble the brackets using the plastic bushings provided in the package as per the diagram in fig. a and b.

6.1. Standard installation

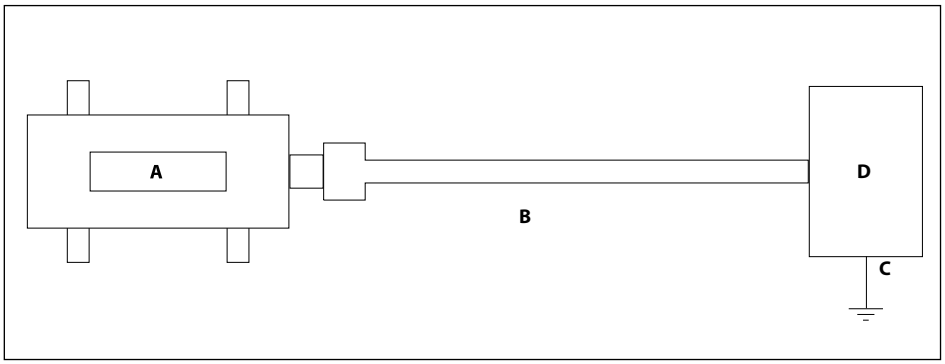


fig. a.

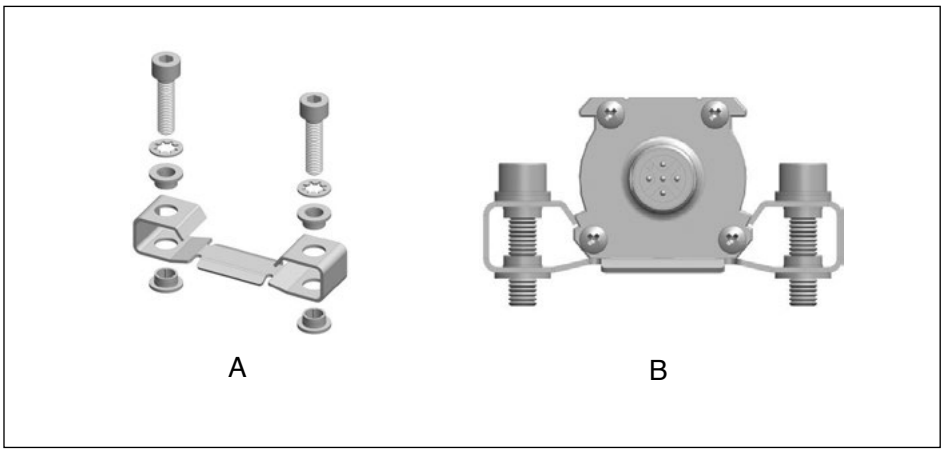
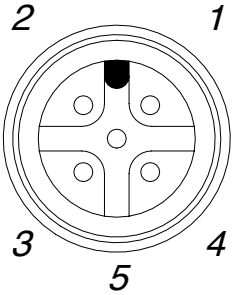


fig. b.

6.2. Electrical connections

5 pin M12x1 connector	M12x1 5 pin Connector	IO-LINK Output
	1	V+
	2	DO (*)
	3	V-
	4	IO-Link
	5	N.C.

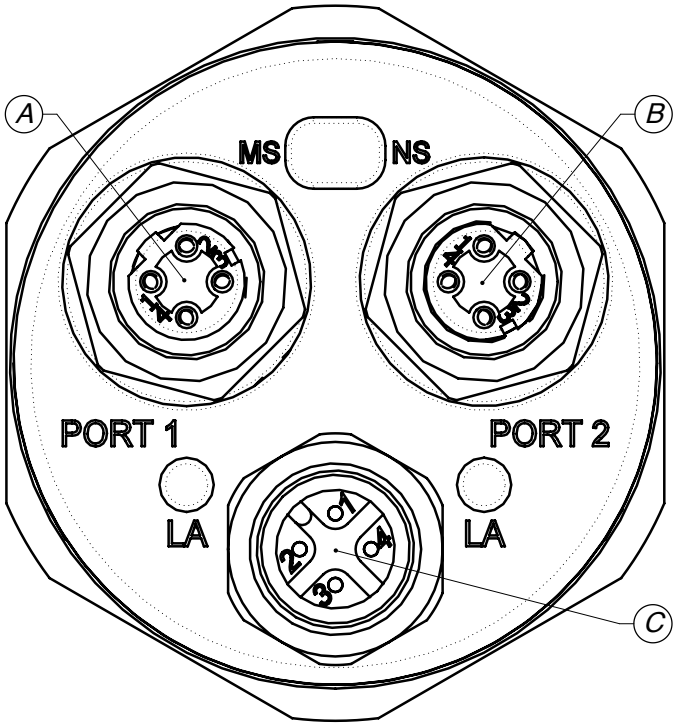
7. PROFINET ETHERNET, IEEE 802.3.

WPA-F / WRA-F magnetostrictive transducer implements Profinet IO communication.
Profinet is a digital communication standard developed and maintained by PI (Profibus and Profinet International).
The digital communication allows the transfer of data between the Device (the WPA-F/WRA-F transducer) and the Master (PLC) through a network.
These data are:
- Process data, such as position, speed, status of the device
- Acyclic data, as parameterization, statistic, diagnostic data

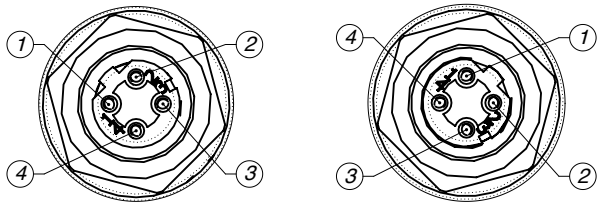
Profinet standard provides a descriptor file called GSDML (General Station Description based on XML format).
This file allows a clear identification of the device and comprehension of data provided and exchanged.
Please refer to Gefran website for the download of GSDML files.
This manual is not designed to describe the “PROFINET” Fieldbus, as it is presumed the user is familiar with the same and will refer if any updates are required to the above-mentioned standard or the official PROFIBUS CONSORTIUM and PROFINET International website (PI), http://www.profibus.com/.

6.3. Electrical installations

The transducer must be grounded (normally through the machine body or equipment it is installed on).
Connect cables shielding to ground at cabinet side (control equipment or PLC).
To prevent interference, separate the power cables from signal cables.
The WPA-F/WRA-F transducer provides 3 connectors on its head:
- 2x M12 Female 4 poles D coded for Fieldbus connection (A-B in the image below)
- 1x M12 Male 4 poles A coded for bringing Power Supply to the device (C in the image below)

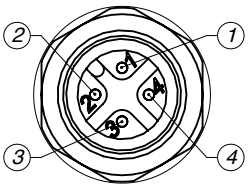


- Port1 - Port 2 M12 4P Female D-coded connector connection



M12 Female 4 poles D coded connector (Port1 – Port 2)	Pinout
1	Tx+
2	Rx+
3	Tx-
4	Rx-

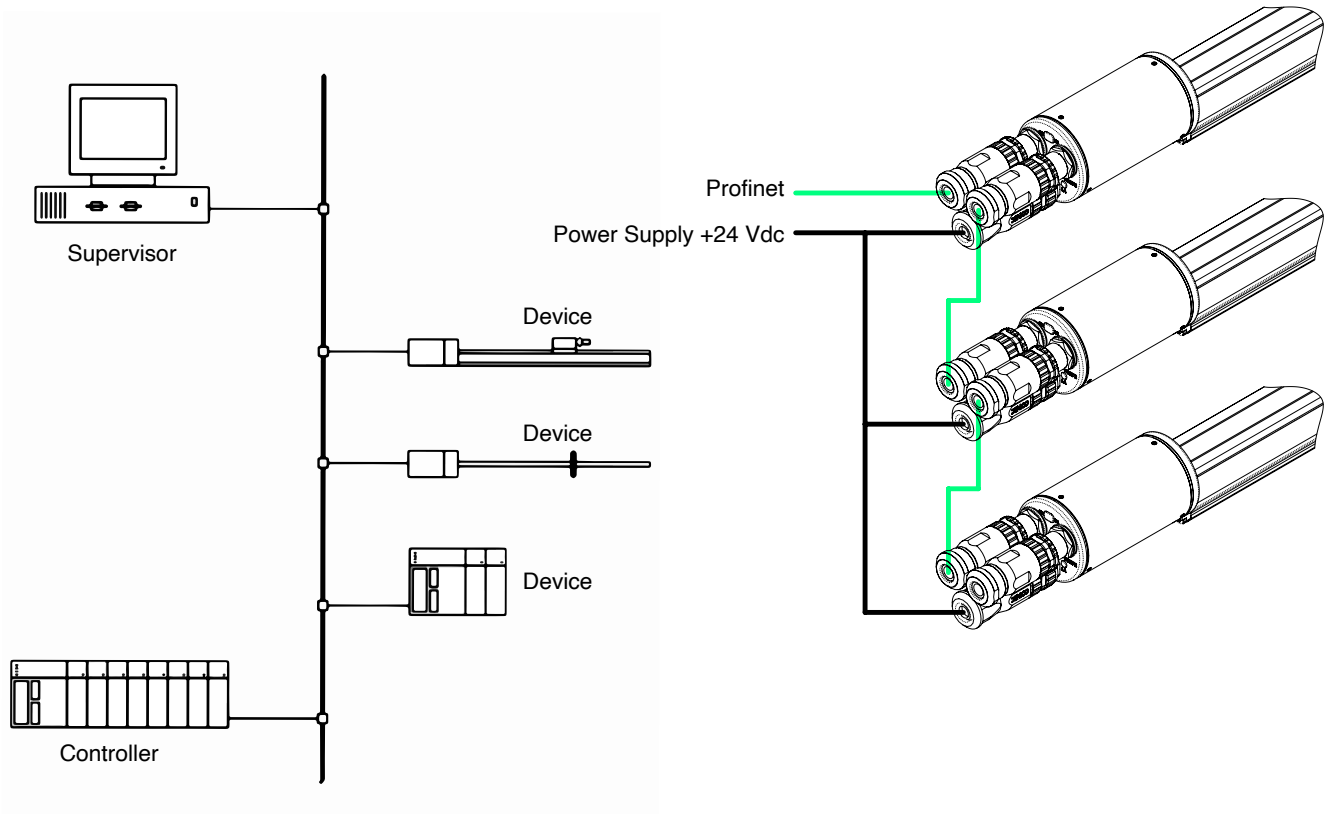
- Power Supply M12 4P Male A-coded connector connection



M12 Male 4 poles A coded connector (Power Supply)	Pinout
1	V+
2	NC
3	0V
4	NC

7.1. Profinet structure and connection

We recommend the use of a CAT5 Ethernet cable or above STP or UTP. The maximum distance between two Ethernet network nodes must be less than 100m.
For Power Supply use a shielded cable with metal connector and shield connected to connector case.



7.4. Main comunication features

The WPA-F/WRA-F is available with different Communication Profiles, according to ordering code:
- a standard IO profile, so called General Profile
- an Encoder profile, compliant with v. 4.2 Class 4

Indipendently from profile the WPA-F/WRA-F is available with RT and IRT communication with min device interval up to 250 us (for IRT only).
The Isochronous communication can be set inside the network tool (TIA Portal as an example), following the menus related to “Real Time Settings”.

Ethernet Baud Rate	Max 100 Mbit/s
Data Transport Layer	Ethernet, IEEE 802.3
PNIO version	**2.3**
Real Time Communication	**RT & IRT Class 3**
Profile	General (Manufacturer) Profile or Encoder Profile v 4.2 Class 4
Min Device Interval	1 ms (RT) 250μs IRT
Address	Discovery and Configuration Protocol (DCP)
Default IP	**0.0.0.0**
Default Name	“gefran-wxa-pn-gp” for General Profile “gefran-wxa-pn-ep” for Encoder Profile

7.2. Optional cables

Connectors for power supply

5 pin female connector	**CON031**
5-pin female connector, 90° angle	**CON041**

Cables for power supply

Straight cable 2m	**CAV011**
Straight cable 5m	**CAV012**
Straight cable 10m	**CAV013**
Straight cable 15m	**CAV015**
Cable 90° 2m	**CAV021**
Cable 90° 5m	**CAV022**
Cable 90° 10m	**CAV023**
Cable 90° 15m	**CAV024/CAV280**

Profinet connection connectors

Connector M12 Male 4 poles D-coded straight	**CON089**

Profinet connection cables

Pre-wired cable 5m 2x M12 Male 4 poles D-coded straight	**CAV815**
Pre-wired cable 5m M12 Male 4 poles D-coded straight RJ45 male straight	**CAV816**
M12 F connector protection cap	**TAP1001**

7.3. Optional accessories

Steel brackets, interaxis 42.5mm	**PKIT090**
Steel brackets, interaxis 50mm	**PKIT091**

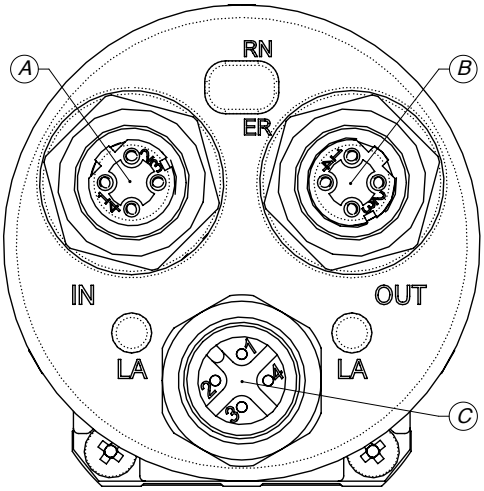
8. ETHERCAT II, IEEE 802.3.

WPA-E / WRA-E magnetostrictive transducer implements CANopen over EtherCAT (CoE) protocol.
EtherCAT is a digital communication standard developed by Beckoff and maintained by EtherCAT Technology Group (ETG).
The digital communication allows the transfer of data between the Device (the WPA-E/WRA-E transducer) and the Master (PLC) through a network.
These data are:
- Process data, such as position, speed, status of the device
- Acyclic data, as parameterization, statistic, diagnostic data

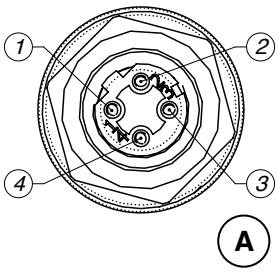
EtherCAT standard provides a descriptor file called ESI (EtherCAT Slave Information, based in XML format).
This file allows a clear identification of the device and comprehension of data provided and exchanged.
Please refer to Gefran website for the download of ESI file.
This manual is not designed to describe the EtherCAT protocol, please refer to EtherCAT website (https://www.ethercat.org/) for any information about EtherCAT protocol standard.

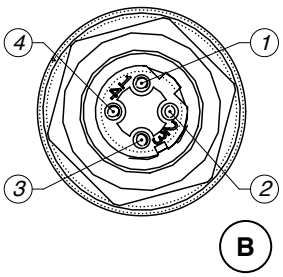
8.1. Electrical installations

The transducer must be grounded (normally through the machine body or equipment it is installed on).
Connect cables shielding to ground at cabinet side (control equipment or PLC).
To prevent interference, separate the power cables from signal cables.
The WPA-E/WRA-E transducer provides 3 connectors on its head:
- 2x M12 Female 4 poles D coded for Fieldbus connection (A-B in the image below)
- 1x M12 Male 4 poles A coded for bringing Power Supply to the device (C in the image below)



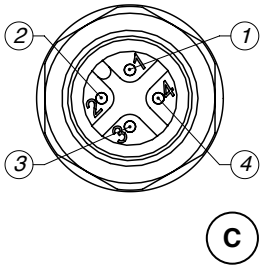
IN - OUT M12 4P Female D-coded connector connection





M12 Female 4 poles D coded connector (IN - OUT)	Pinout
1	Tx+
2	Rx+
3	Tx-
4	Rx-

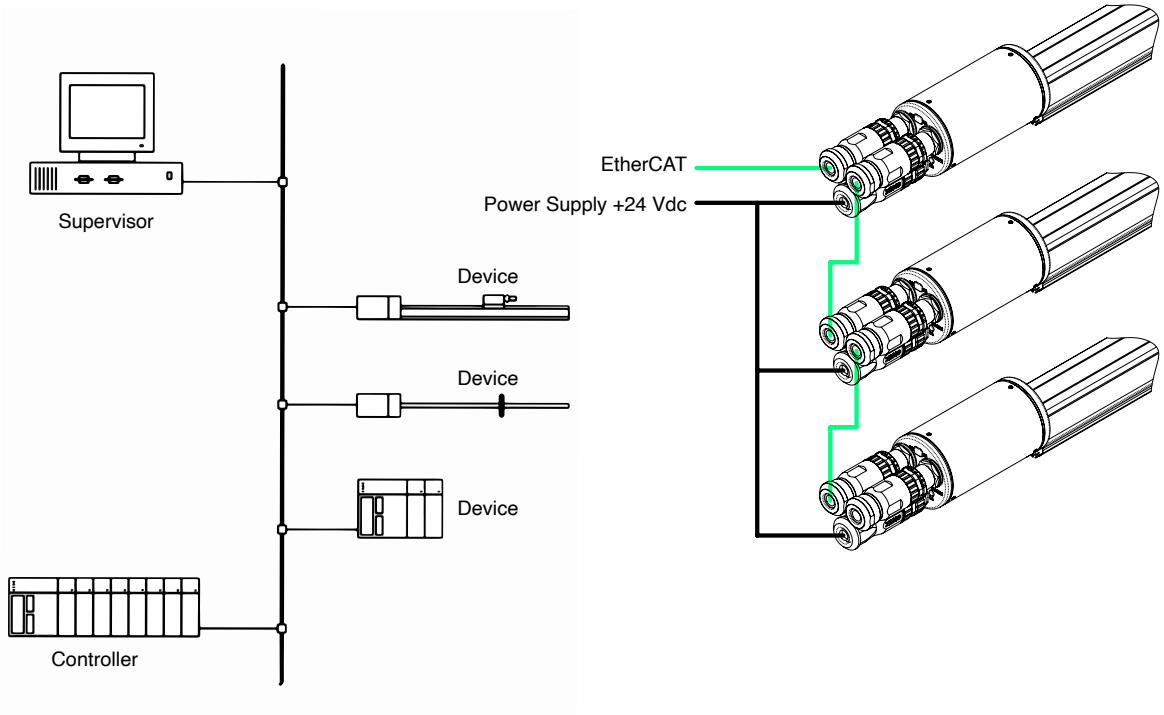
Power Supply M12 4P Male A-coded connector connection



M12 Male 4 poles A coded connector (Power Supply)	Pinout
1	V+
2	NC
3	0V
4	NC

8.2. Ethercat structure and connection

We recommend the use of a CAT5 Ethernet cable or above STP or UTP. The maximum distance between two Ethernet network nodes must be less than 100m.
For Power Supply use a shielded cable with metal connector and shield connected to connector case.



8.3. Main communication features

With EtherCAT CoE protocol process data and alarms are always transferred in real time, data object and profile are described in ESI file.
WPA-E can be operated in Free Run mode or in Synchronous mode. WPA-E in Distributed Clocks (DC) mode offers synchronous communication with a minimum cycle time of 250us

Ethernet Baud Rate	Max 100 Mbit/s
Data Transport Layer	Ethernet, IEEE 802.3
EtherCat Protocol	CoE
EtherCAT Vendor ID	0x00000093
CoE Profile	DS406, Class 1
Communication Min. Cycle Time	250us

8.4. Optional cables

Connectors for power supply	
5 pin female connector	**CON031**
5-pin female connector, 90° angle	**CON041**
Cables for power supply	
Straight cable 2m	**CAV011**
Straight cable 5m	**CAV012**
Straight cable 10m	**CAV013**
Straight cable 15m	**CAV015**
Cable 90° 2m	**CAV021**
Cable 90° 5m	**CAV022**
Cable 90° 10m	**CAV023**
Cable 90° 15m	**CAV024/CAV280**
EtherCAT connection connectors	
Connector M12 Male 4 poles D-coded straight	**CON089**
EtherCAT connection cables	
Pre-wired cable 5m 2x M12 Male 4 poles D-coded straight	**CAV815**
Pre-wired cable 5m M12 Male 4 poles D-coded straight RJ45 male straight	**CAV816**
M12 F connector protection cap	**TAP1001**

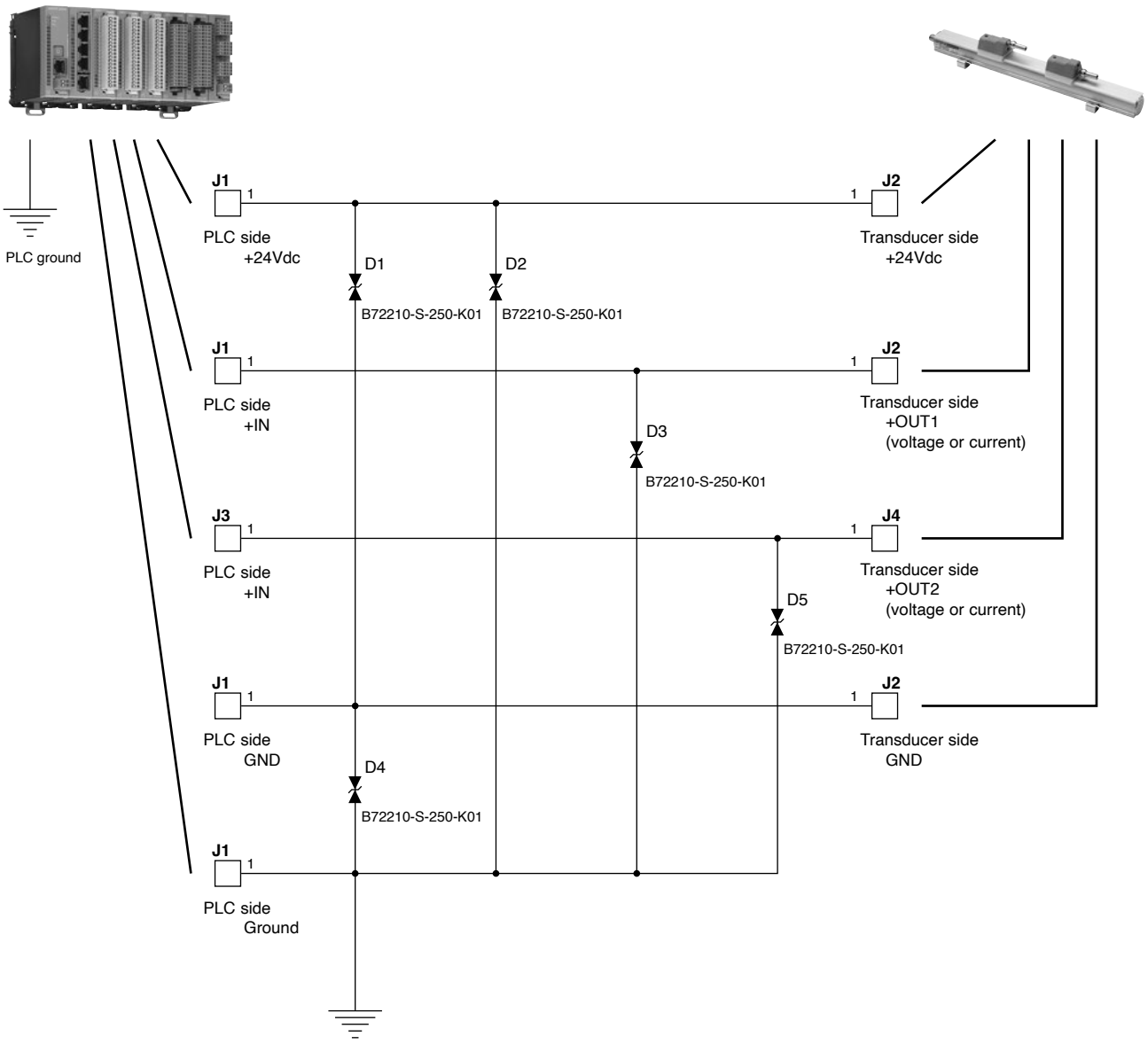
Note: *For further information (order codes, technical specifications, etc.) please contact Gefran or write to: info@gefran.com.*

8.5. Optional accessories

Steel brackets, interaxis 42.5mm	**PKIT090**
Steel brackets, interaxis 50mm	**PKIT091**

9. PROTECTION FOR OUTDOOR INSTALLATIONS OF ANALOG SENSORS

Analog magnetostrictive WPG/MK4/WPP/WPA/IK4/WRG/WRP/WRA
voltage current output



10. STANDARD REFERENCE

Gefran products, described in this manual, are compliant to the European Directive 2014/30/EU.
They are tested according to the standard EN 61326-1 “Electrical equipment for measurement, control and laboratory use - EMC requirements”, Part 1 “general requirements and EN 61326-2-3 “Electrical equipment for measurement, control and laboratory use - EMC requirements”, Part 2-3: Particular requirements - Test configuration, operational conditions and performance criteria for transducers with integrated or remote signal conditioning.

Electromagnetic Compatibility (EMC) requirements are classified in two types: Emission requirements, Immunity requirements

Emission requirementsa
For class B equipment the limits, the measuring methods and the provisions given in CISPR11, EN 61000-3-2 and EN 61000-3-3 apply.
Equipment classification and choice of respective limits shall be determined after taking into account the intended environment and emission requirement in the areas of use

Immunity requirements
The immunity test requirements are given table 1 for ONDA and table 2 for HYPERWAVE.
The tests shall be conducted in accordance with the basic standards. The tests shall be carried out one at time.

Table 1. Requirements for immunity testing for devices used in industrial environments (ONDA technology)

Port	Test	Basic standard	Value required by the standard	Value obtained by ONDA	Performance required by the standard	Performance obtained by ONDA
Enclosure	Electrostatic discharge (ESD)	EN 61000-4-2	4/8 kV contact/air	4/8 kV contact/air	B	A
	EM field	EN 61000-4-3	10 V/m (from 80 MHz to 1 GHz) 3V/m (from 1,4 GHz to 2 GHz) 1 V/m (from 2,0 GHz to 2,7 GHz)	10 V/m (from 80 MHz to 1 GHz) 3V/m (from 1,4 GHz to 2 GHz) 1 V/m (from 2,0 GHz to 2,7 GHz)	A	A
	Magnetic field	EN 61000-4-8	30 A/m	400 A/m	A	A
Power supply V DC	Burst	EN 61000-4-4	2 kV (5/50 ns, 5 kHz)	2 kV (5/50 ns, 5 kHz)	B	A
	Surge	EN 61000-4-5	1 kV/ 2kV	1 kV/ 2kV	B	B
	Conducted RF	EN 61000-4-6	3 V/m (from 150 kHz to 80 MHz)	10 V/m (from 150 kHz to 80 MHz)	A	A
I/O signal/ control (including functional earth lines)	Burst	EN 61000-4-4	1 kV (5/50 ns, 5 kHz)	2 kV (5/50 ns, 5 kHz)	B	A
	Surge	EN 61000-4-5	1 kV	1 kV	B	B
	Conducted RF	EN 61000-4-6	3 V (from 150 kHz to 80 MHz)	10 V/m (from 150 kHz to 80 MHz)	A	A

Table 2. Requirements for immunity testing for devices used in industrial environments (HYPERWAVE technology)

Port	Test	Basic standard	Value required by the standard	Value obtained by HYPERWAVE	Performance required by the standard	Performance obtained by HYPERWAVE
Enclosure	Electrostatic discharge (ESD)	EN 61000-4-2	4/8 kV contact/air	16/8 kV contact/air	B	A
	EM field	EN 61000-4-3	10 V/m (from 80 MHz to 1 GHz) 3V/m (from 1,4 GHz to 2 GHz) 1 V/m (from 2,0 GHz to 2,7 GHz)	10 V/m (from 80 MHz to 2,7 GHz)	A	A
	Magnetic field	EN 61000-4-8	30 A/m	796 A/m	A	A
Power supply V DC	Burst	EN 61000-4-4	2 kV (5/50 ns, 5 Hz)	4 kV (5/50 ns, 5 Hz)	B	A
	Surge	EN 61000-4-5	1 kV/ 2kV	1 kV / 2 kV	B	A
	Conducted RF	EN 61000-4-6	3 V/m (from 150 kHz to 80 MHz)	10 V/m (from 150 kHz to 80 MHz)	A	A
I/O signal/ control (including functional earth lines)	Burst	EN 61000-4-4	1 kV (5/50 ns, 5 kHz)	4 kV (5/50 ns, 5 kHz)	B	A
	Surge	EN 61000-4-5	1 kV	1 kV	B	A
	Conducted RF	EN 61000-4-6	3 V (from 10 kHz to 80 MHz)	10 V/m (from 150 kHz to 80 MHz)	A	A

Criteria A: Normal performances within specification limits
Criteria B: Temporary degradation or loss of performance which is self-recoverable
Criteria C: Temporary degradation or loss of performances which requires operator intervention

Performance criterion A
During testing, normal performance within the specification limits.
Example
If electronic equipment is required to work with high reliability, the EUT shall operate without any apparent degradation from the manufacturer's specification.

Performance criterion B
During testing, temporary degradation, or loss of function or performance which is selfrecovering.
Example
During testing, an analogue function value may deviate. After the test, the deviation vanishes.

Performance criterion C
During testing, temporary degradation, or loss of function or performance which requires operator intervention or system reset occurs.
Example
In the case of an interruption in the mains longer than the specified buffer time, the power supply unit of the equipment is switched off. The switch-on may be automatic or carried out by the operator.

Copy of the conformity declaration is available for download on the Gefran web site www.gefran.com

GEFRAN

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