

Inductive coupler system

F180 Ethernet



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Content

Safety instructions	5
Tecnical data	6
Description of function	8
Installation	10
Typeplate	17
Warranty	18



INSTRUCTION MANUAL

Inductive coupler system F180 Ethernet

Validity:

0E011246	Inductive coupler F180 Ethernet Base	28.02.2022	V1	EN
0E011247	Inductive coupler F180 Ethernet Remote	28.02.2022	V1	EN

Thank you for purchasing your F180 Ethernet inductive coupler system..

This **instruction manual** contains the installation, the functional description and the operation of the „**F180 Ethernet**“.

SMW-AUTOBLOK reserves the right to make **changes without notice**.

This **instruction manual is a part of the „F180 Ethernet “** and must be passed to the new owner in case of sale.

This **instruction manual may not be** -in whole or in part- **copied** without our written agreement.



Please read the instruction manual carefully before installation and use and always follow the regulations.

Please note especially the sections which are marked with the following signs:



- Danger of injury or danger to life if instructions are not followed.
- Danger of damage to the sensor, the machine or the components.



General precept sign!



General warning sign!



Caution: Hot surface!



No access for persons with pacemakers



Danger to the environment!



Follow the instructions!

1. Intended use

The device is designed to transmit energy and signals without contact. The system must not be used in applications where the safety of persons depends on the device function.

Liability claims against the manufacturer expire in the event of damage caused by:

- unauthorized tampering
- use not in accordance with the intended purpose
- use, installation, handling contrary to the regulations of these operating instructions.

2. Authorized personnel

Installation and commissioning are only permitted by trained specialist operators.

3. Visual inspection

Please check the product for visible damage prior to use!

4. Duties of the operator

The operator must ensure that the locally applicable national and international safety regulations are observed. The unit may only be operated with an approved power supply.

5. Operating faults

In case of defective and unrecoverable device malfunctions, put the device out of operation and secure it against unauthorized use.

6. Caution: Hot surface!

Danger of burns from hot surfaces!

The active surface heats up even under normal operating conditions.

Keep hands and objects away from the active surface.

Avoid contact of metallic objects on the active surface.

Fire hazard!

7. Protection against electromagnetic fields during operation and assembly

The permissible values according to VDE 0848 Part 3-1 are observed from a distance of > 3 mm. Persons with physical aids (e.g. pacemakers) may be exposed to health hazards due to the magnetic fields emitted by the coupler system. The minimum distance for this group of persons is > 5 mm. The operator must ensure that this minimum distance is also maintained during operation by taking suitable measures.

8. Certification

With the CE mark we confirm that our products comply with the requirements of the EC Directives 2004/108/EC (EMC) and the EMC Act.

In an accredited EMC laboratory, proof was provided that the products meet the EMC requirements of the basic technical standards:

- EN 61000-6-4 (emitted interference) and
- EN 61000-6-2 (immunity to interference)



In case of doubts or questions please ask SMW-AUTOBLOK or one of our authorized offices.



Before the start up, the operating instructions must be read carefully.

F180 Ethernet

Inductive Coupling System

Axial coupler

■ Contact free transmission of energy and signals



Application/customer benefits

- Contact free transmission of energy and signals between moving / rotating and stationary components
- Application examples: Packaging machines, special machines, automation, machine tools, printing machines, robot applications (EOAT)
- Substitution of slip ring / connector
- Dynamic Pairing
- Wear and maintenance free
- Protective functions: Temperature monitoring, foreign object detection
- Status LED with good visibility

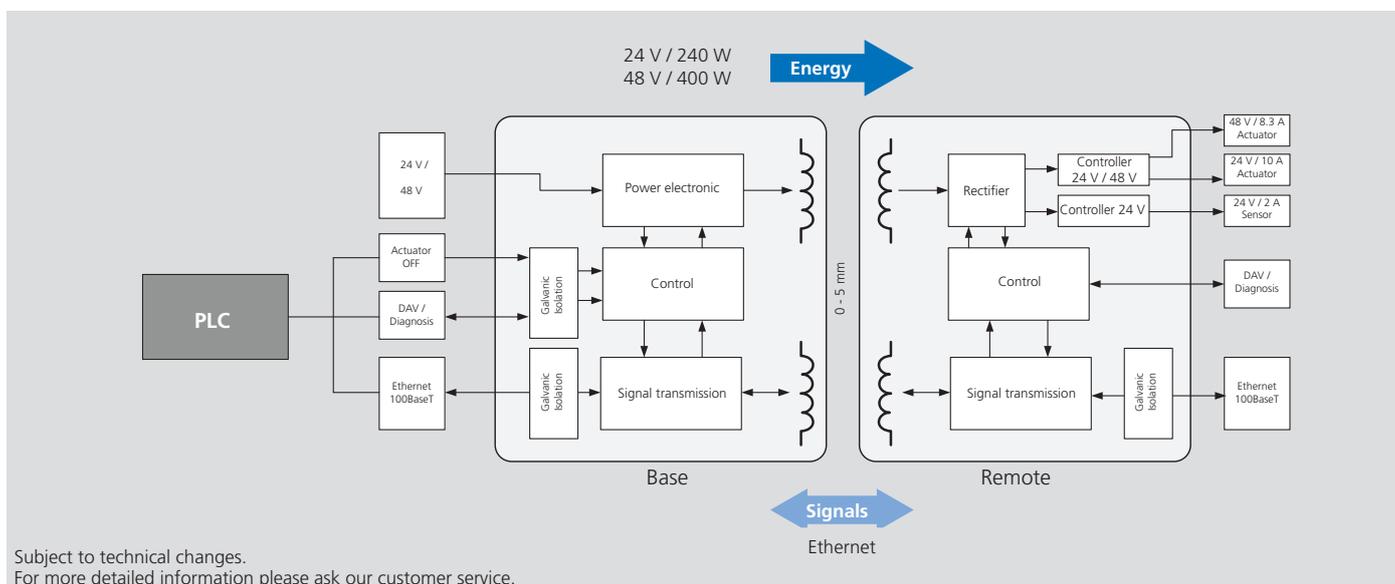
Technical features

- Diameter: 180 mm / Through hole: 85 mm
- Operating voltage: 24 V or 48 V
- Transmission distance: 0 - 5 mm at 24 V or 0 - 3 mm at 48 V
- Energy transmission: 24 V / 240 W or 48 V / 400 W (adjustable)
- Signal transmission: Ethernet 100 Base-T
- Transmission bandwidth < 5 MBit/s
- Connections: M12 Ethernet (D-coded), M12 Diagnosis (A-coded), terminal block (Energy)
- Protection class: IP67

Block diagram

Standard equipment

Inductive coupler base oder remote



Subject to technical changes.
For more detailed information please ask our customer service.

Inductive coupling system F180 Ethernet

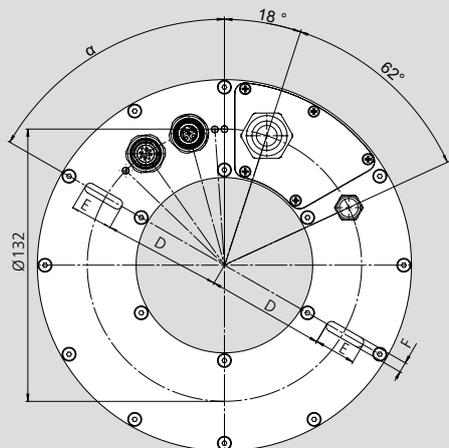
Type	Base	Remote
Id. No.	0E011246	0E011247
Operating temperature (body surface)	-20° C ... +60° C	
Stocking temperature	-20° C ... +60° C	
Transmission distance	0 mm ... 5 mm (24 V) 0 mm ... 3 mm (48 V)	
Operating voltage	24 V / 48 V	-
Output voltage (Actuator supply)*	-	24 V DC / 10 A 48 V DC / 8.3 A
Output voltage (Sensor supply)*	-	24 V DC / 4 A
Signal transmission	Ethernet 100 Base-T	
LED function display	3 LEDs 2-color	
Current consumption (base)	15 A (24 V) 12 A (48 V)	-
Overload protection / short-circuit protection	✓	✓
Reverse polarity protection	-	< 50 mV
Data valid output	max. 100 mA	-
Ready delay	< 5 s	

*max 400 W total

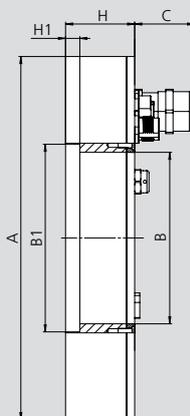
- Stationary Unit - Base
- Mobile Unit - Remote

Axial coupler

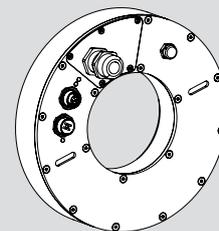
Base / Remote:



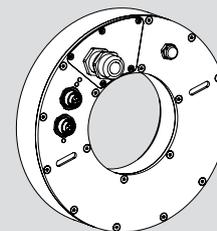
Base / Remote:



Base:



Remote:



Subject to technical changes.
For more detailed information please ask our customer service.

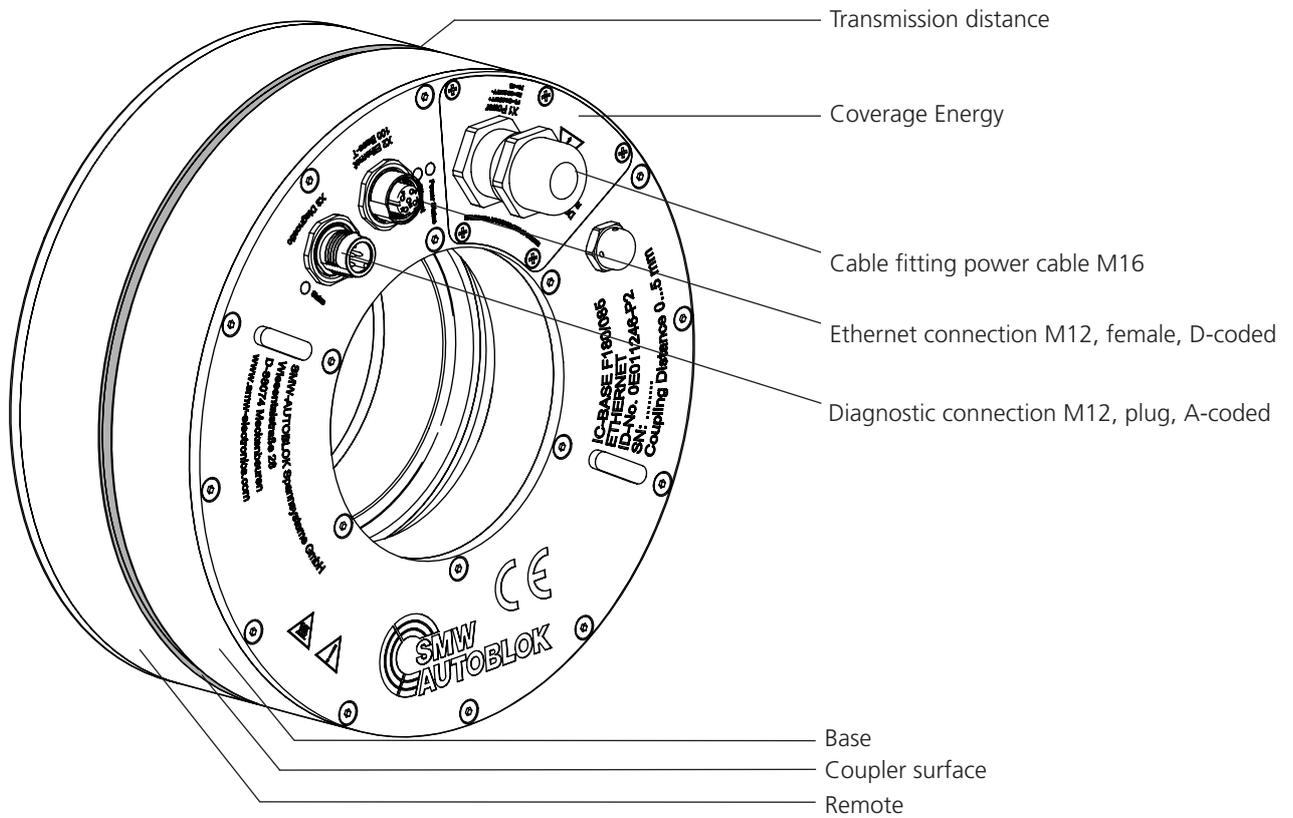
Inductive coupling system F180 Ethernet

Type		Base	Remote
Id. No.		0E011246	0E011247
A	mm		180
B	mm		85
B1	mm		93
C	mm		29.5
D	mm		57
E	mm		20
F	mm		5
H	mm		34
H1	mm		7
α	degree		60

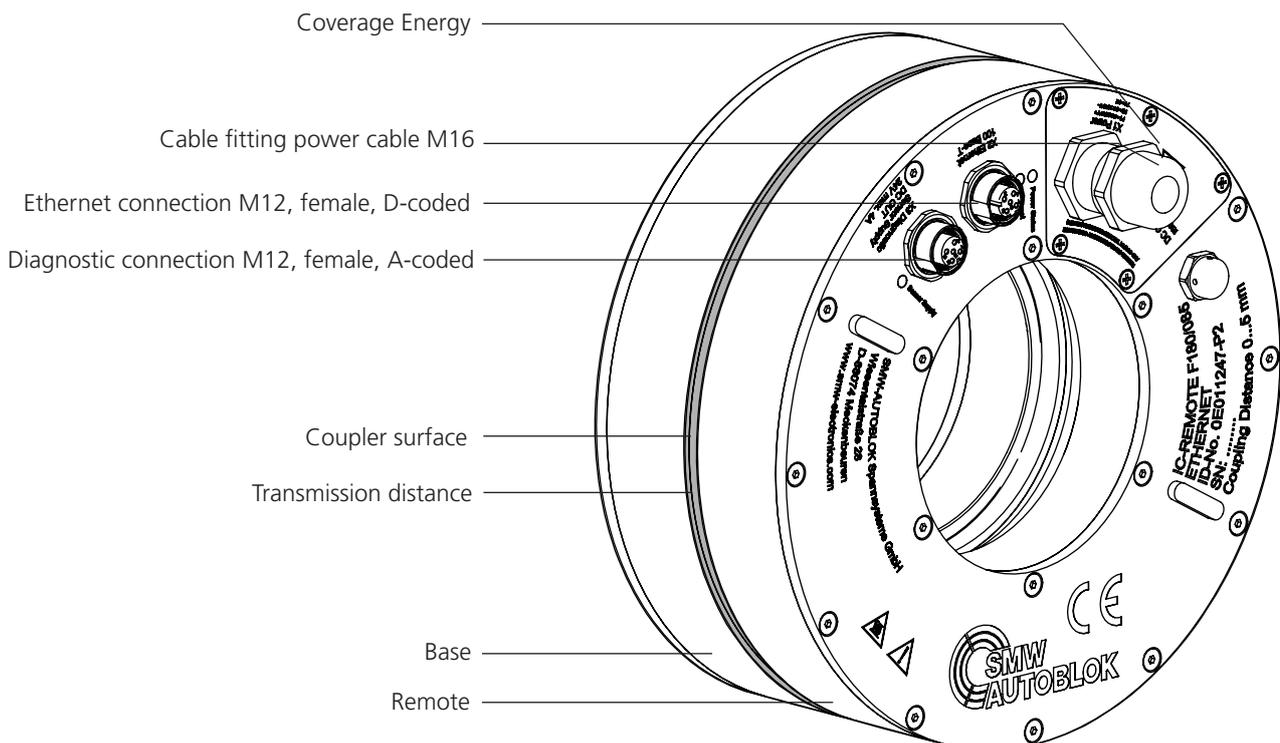
Housing material		Al, GFK	
Protection class		IP67	
Weight	kg	1,172	1,275

Function Base		Function Remote	
LED Power		LED Actuator	
Color	Green/red	Color	Green/red
Function	Off » Unit not supplied with voltage (or undervoltage)	Function	Off » Unit not paired
	On (green) » Voltage ok and mobile unit has been detected		On (green) » Unit paired, voltage output actuator ok
	2 Hz green 50/ 50% » Operating temperature in critical range		Flashes 2 Hz red » Unit paired but short circuit on actuator
	1 Hz green 25/75% » Voltage ok but no mobile unit detected		Flashes 5 Hz red » Internal error
	1 Hz red/green » Incompatible mobile unit detected		
	2 Hz red » Foreign element detected		
5 Hz red » Internal error		LED Sensor supply	
LED Signal transmission Ethernet		Color	Green/red
Color	Yellow/red	Function	Off » Unit not paired
	Off » No mobile unit detected		On (green) » Unit paired, voltage output sensor (24 V) ok
	On/yellow » Signal transmission ready		Flashes 2 Hz red » Unit paired but short circuit on sensor (24 V)
	1 Hz yellow » Data packets are being transmitted		Flashes 5 Hz red » Internal error
	3 Hz yellow » 50% of the transmission bandwidth used (10 s)		
	8 Hz red » Data packets were discarded (in the last 10 s)		
On/red » Error in data transmission (internal error)		Color	Yellow/red
LED Energy transmission		Function	Off » No mobile unit detected
Color	Yellow/red		On/yellow » Signal transmission ready
	Off » No mobile unit detected		Flashes 1 Hz yellow » Data packets are being transmitted
	On (yellow) » Unit coupled, voltage output ok		Flashes 3 Hz yellow » 50% of the transmission bandwidth used (10 s)
	1 Hz red/yellow » Short circuit at voltage output sensor		Flashes 8 Hz red » Data packets were discarded (in the last 10 s)
	3 Hz red/yellow » Short circuit at voltage output actuator		On/red » Error in data transmission (internal error)
	3 Hz red » Short circuit at both voltage outputs		
5 Hz red » Internal error			

View Base



View Remote



Description

The F180 inductive coupling system is used to operate electronic components of automation technology such as fieldbus gateways, sensors or actuators on mobile, dynamically variable or rotating units in machine and plant parts.

A contactless signal transmission takes place between a stationary unit (base) and a mobile unit (remote).

In addition to signal transmission, electrical energy is also transmitted without contact to the mobile unit (remote) for the power supply of sensors or actuators.

The F180 inductive coupling system is designed for high power, allowing the operation of a wide range of suitable actuators such as magnetic valves, servo motors or linear drives.

The F180 inductive coupling system consists of a stationary unit (base) and a mobile unit (remote). Both units are to be mounted axially facing each other at a distance of 0 to 5 mm for 24V or 0 to 3 mm for 48V on the coupling surface.

An integrated coil system ensures the transmission of the energy and the signals on a contactless inductive principle.

The transmission is independent of whether there is a rotating movement of the mobile unit or not.

In addition, the system has a temperature protection function and is protected according to IP 67.

The system is designed as a plug and play solution, so that integration into the customer's system is possible with minimal effort. All important interfaces are designed to be detachable, so that replacement during maintenance and service is possible without delay. The stationary and mobile units are compatible and interchangeable (dynamic pairing).

The electrical and mechanical interfaces for the individual function units are described in the following chapters.

Start-up

Notice

Use base coupler OE011246-P2 only with remote coupler OE011247-P2.

The start-up can only occur after the entire transmission chain of base and remote has been completely set up. The installation of the components must always be performed in a (electrical) power-free state.

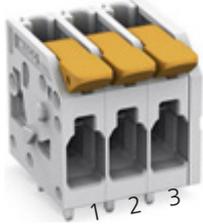
Operation can only be performed with a power supply limited to 15 A at a voltage up to 24 V/ 12 A at a voltage up to 48 V + or another overcurrent protection device.

A correct coupling between Base and Remote is indicated by the Data Valid signal.

Connectors Base

Power supply

Terminal inside the unit (sealed)



Terminal block with screw terminal (plug-in terminal) for 2.5mm² wires with PG fitting connection

PIN	Function
1	DC 24/48 V +
2	DC 24/48 V -
3	FE (Functional ground)

Diagnose

Plug type

M12 male 4-pin, A-coded

Pin assignment

PIN	Function
1	DC 24 V + (IN)
2	IN Actuator voltage ON/OFF
3	DC 24 V -
4	OUT Data Valid

Ethernet

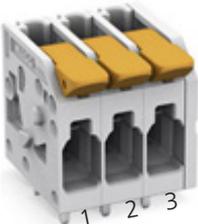
Plug type

M12 female, D-coded, inside the housing

Pin assignment

PIN	Function
1	TX +
2	RX +
3	TX -
4	RX -

Connectors Remote

Actuator supply	
Terminal inside the unit (sealed)	Terminal block with screw terminal (plug-in terminal) for 2.5mm ² wires with PG fitting connection
	
PIN	Function
1	DC 24/48 V +
2	DC 24/48 V -
3	FE (Functional ground)

Output voltage selection	
Switch inside the device	Terminal block with screw terminal (plug-in terminal) for cable bridge (small) 2 pin
PIN	Function
1	Sel 1 jumper set actuator U = 48 V
2	Sel 2 jumper not set actuator U = 24 V

Sensor supply diagnostic	
Plug type	M12 female 4-polig, A-coded
Pin assignment	
PIN	Function
1	DC 24 V + sensor supply (OUT)
2	nc.
3	DC 24 V - sensor supply (OUT)
4	OUT Data Valid

Ethernet	
Plug type	M12 female, D-coded, inside the housing
Pin assignment	
PIN	Function
1	TX +
2	RX +
3	TX -
4	RX -

Attention!

Damage to the remote unit due to overvoltage peaks if the cables are too long!

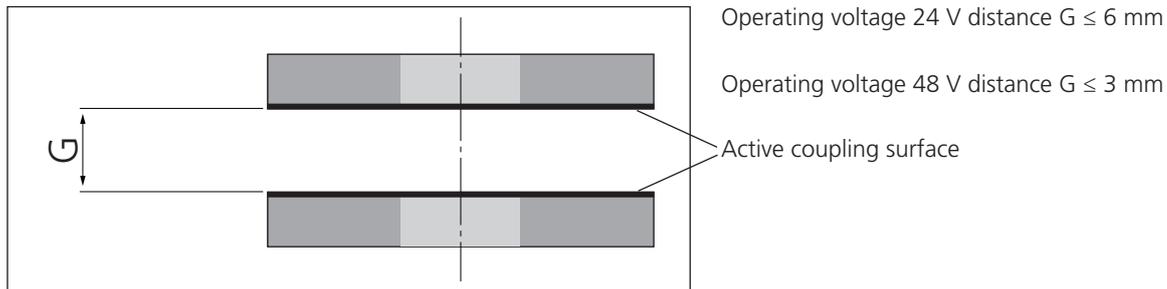
In order to meet the EMC requirements, the receiver cable must not be longer than 15 m. If a longer cable is nevertheless used, take all steps to protect the receiver from overvoltage peaks.

Integration

The base and remote units of the contactless transmission are integrated by mounting them in axial alignment in compliance with the installation specifications. The assembly must be performed in a (electrical) power-free state. The following sections describe valid installation instructions that must be strictly followed for correct operation.

We recommend to use the coupler with a coupling distance of 2 mm.

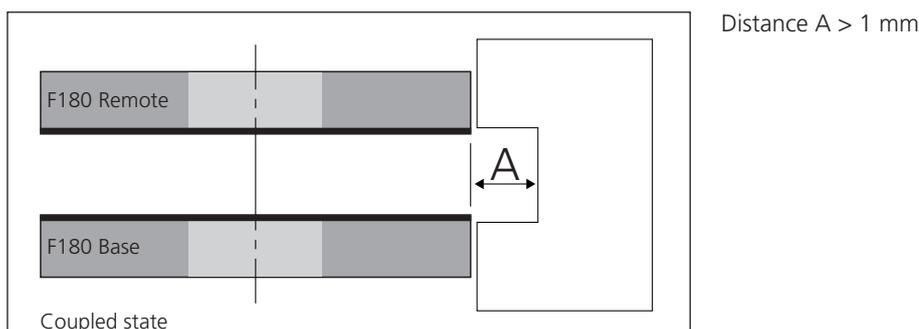
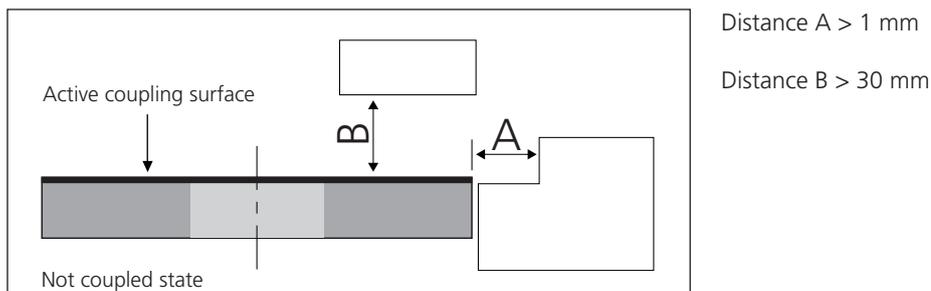
Distance to each other



Installation in metall

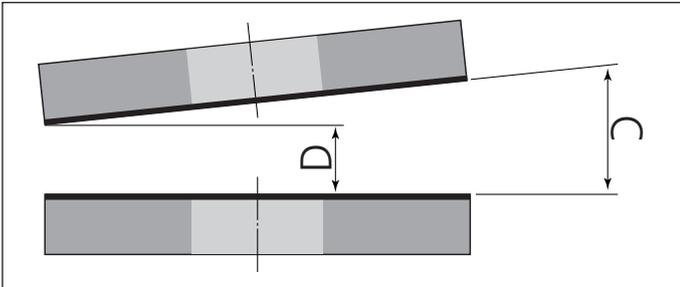
Attention!

Metal objects in the area near the active coupling surfaces can heat up strongly due to the magnetic field generated by the coupler. Therefore, the specified minimum distances must be strictly followed when installing in metal.



Permissible angle offset

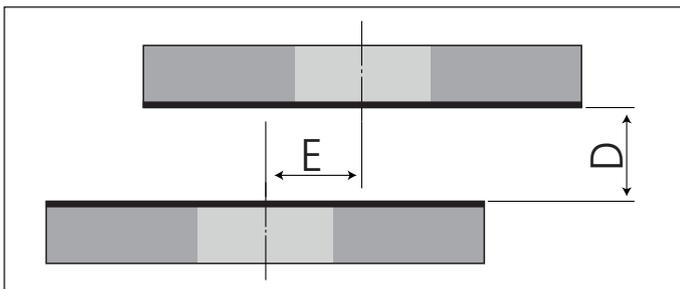
The permissible angle offset allows function in special mounting positions.



Distance D	Angle °
0 mm	< 2°
2 mm	< 1°

Permissible side offset

The maximum side offset between base and remote unit is ± 1 mm.



Side offset $E < 1$ mm

Attention!

The factors like environment temperature, distance, angle offset and side offset can affect the amount of energy transfer.

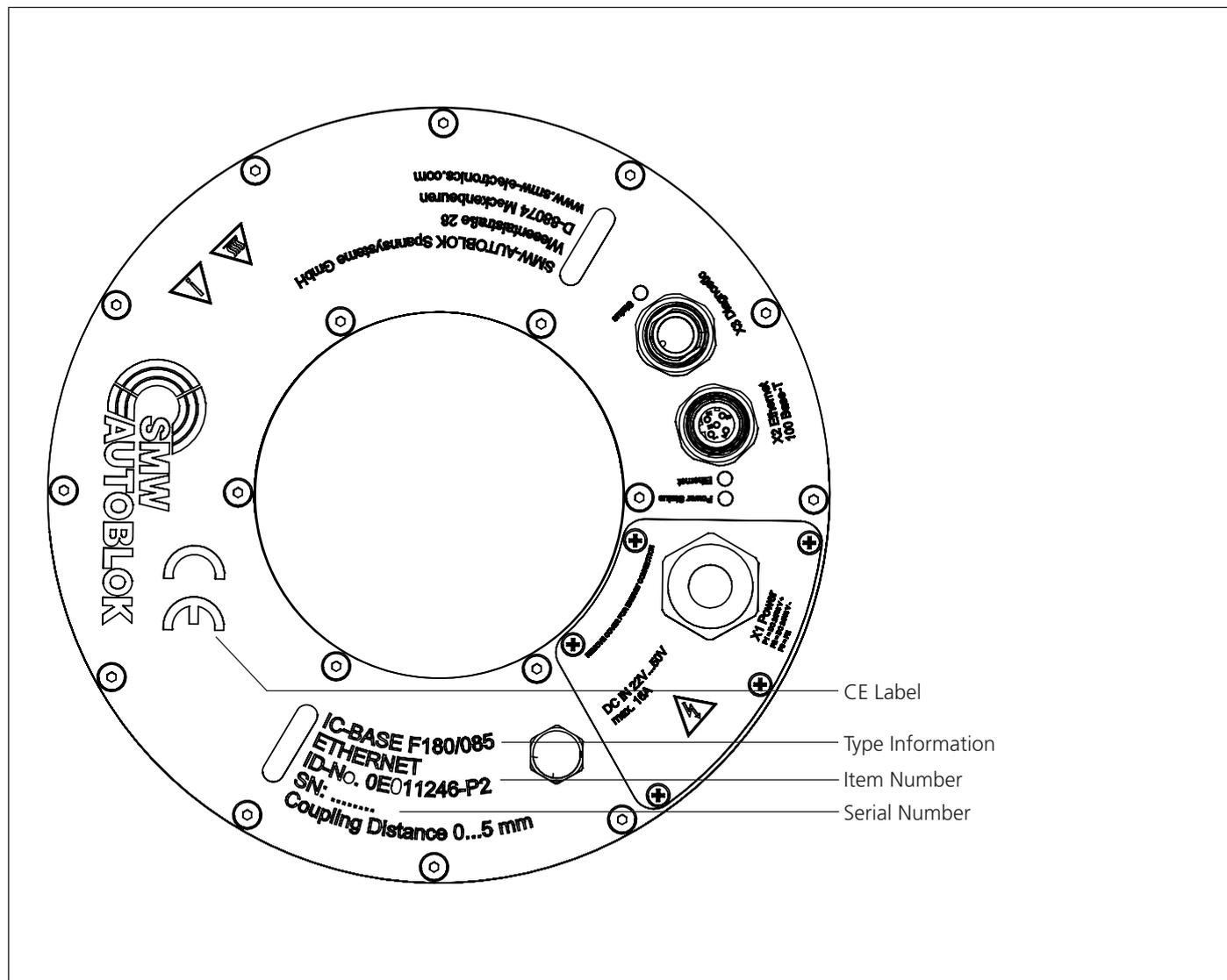
The coupler works optimal centric at $D = 1$ to 2 mm.

Attention!

No liability in case of damage to the coupling surfaces caused by the use of the product, for example as a result of insufficient cleanliness. If the coupling surfaces are subject to contamination during operation, suitable action (blowing air and / or flushing) must be performed.

Typeplate and contact

If you have any questions about the product or if you wish to place order, please specify the type and item number on the typeplate of the inductive coupling system.



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12 months warranty

Product: Inductive coupler system F180 Ethernet

SMW-ELECTRONICS guarantees the proper function of the inductive coupling system, if the operation and storage are in accordance with the technical specifications of this operating manual.

In the case that the inductive coupling system does not meet the specified requirements and values, after checking the facts, repair or replacement will be carried out.

In case of production defects, the inductive coupling system will be repaired free of charge within the warranty period.

The warranty period will be 12 months starting from the date of delivery.

In order to maintain the warranty, the return must be carried out in the original packaging.

In addition, a description of the malfunction must be included.

The manufacturer otherwise retains the right not to admit warranty claims.



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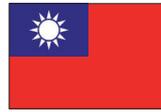
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