COPY OF THE ORIGINAL

INSTRUCTION MANUAL

Inductive coupler system

F180 Ethernet

Preliminary

worldwide • weltweit • worldwide

Date: 2023-09
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Language: English

SMW AUTOBLOK

Content

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 safety instructions

 **Danger!**

 **Danger to the environment!**

 **General precept sign!**

 **Follow the instructions!**

 **General warning sign!**

 **Caution: Hot surface!**

 **No access for persons with pacemakers**

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

Axial coupler

Inductive Coupling System

■ **Contact free transmission of energy and signals**

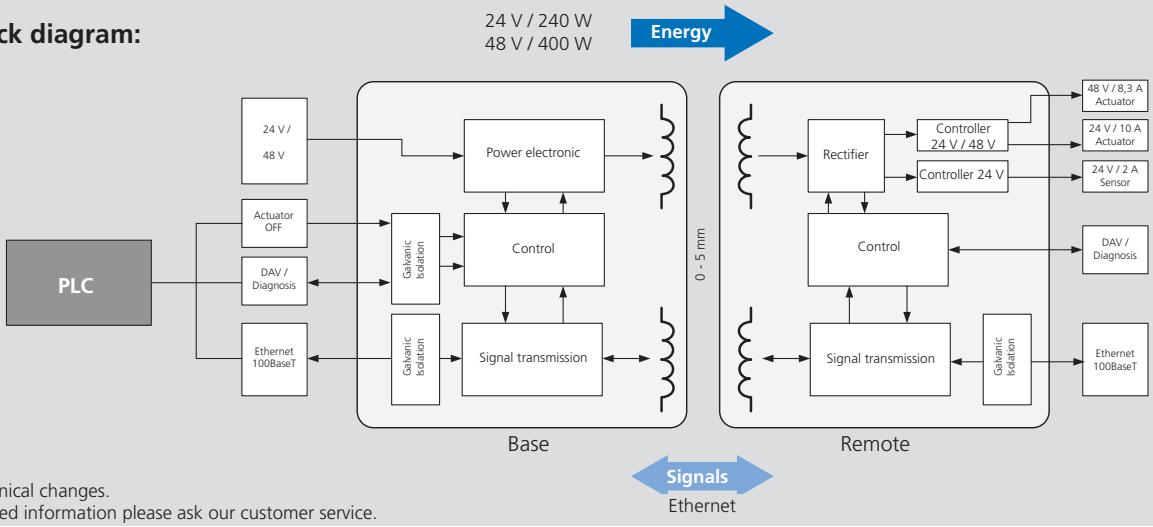
Application/customer benefits

- Contact free, safe 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
- Multi-level 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 (settable)
- 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: IP 67

Block diagram:



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

Inductive coupling system F180 Ethernet		
SMW-electronics 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	< 1 s	

*max 400 W total

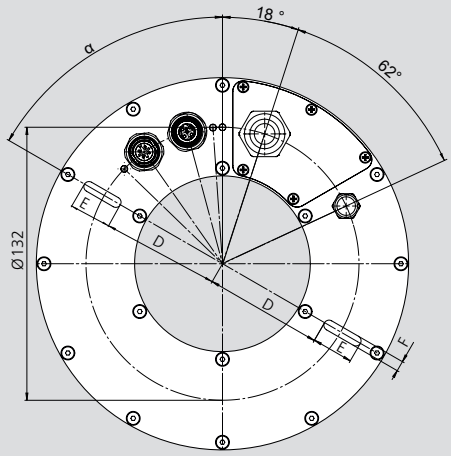
Inductive Coupling System

■ Stationary Unit - Base
■ Mobile Unit - Remote

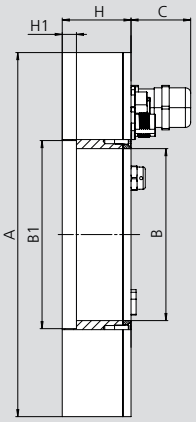
F180 Ethernet

Axial coupler

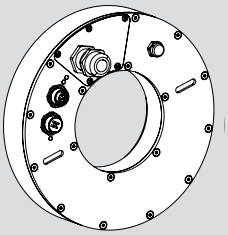
Base / Remote:



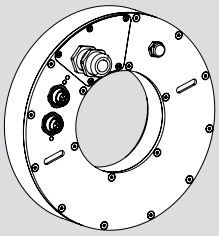
Base / Remote:



Base:



Remote:



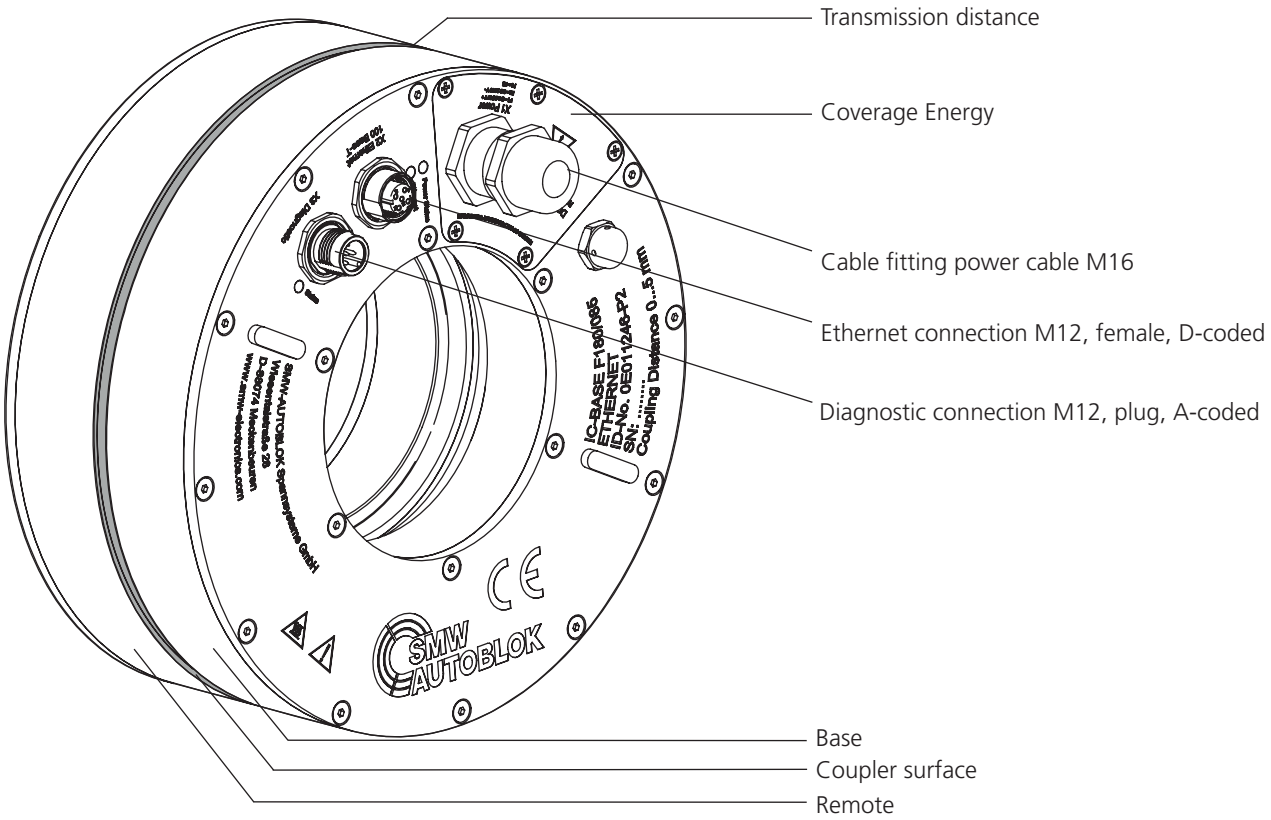
Subject to technical changes.
For more detailed information please ask our customer service.

Inductive coupling system F180 Ethernet			
SMW-electronics 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		IP 67	

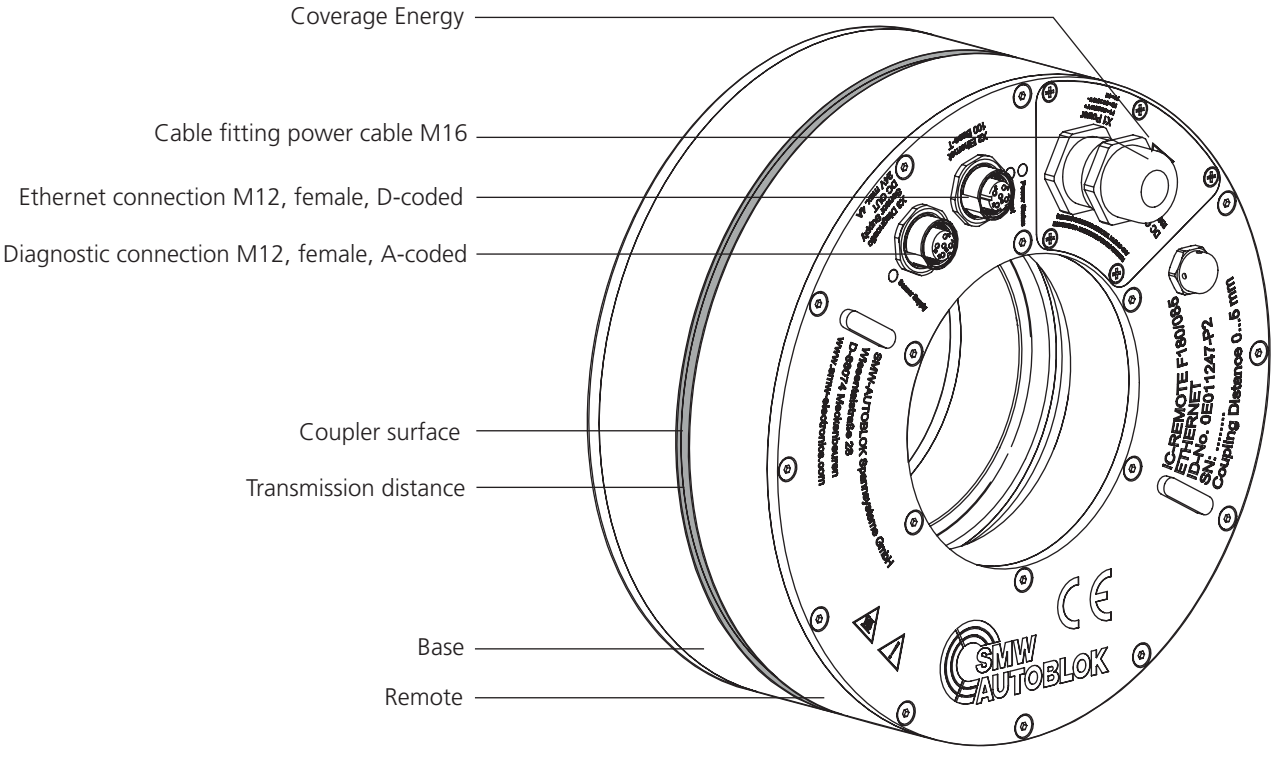
Function Base	
LED Power	
Color	Green/red
Function	Off » Unit not supplied with voltage (or undervoltage)
	On (green) » Voltage ok and mobile unit has been detected
	2 Hz green 50/ 50% » Operating temperature in critical range
	1 Hz green 25/75% » Voltage ok but no mobile unit detected
	1 Hz red/green » Incompatible mobile unit detected
	2 Hz red » Foreign element detected
	5 Hz red » Internal error
LED Signal transmission Ethernet	
Color	Yellow/red
Function	Off » No mobile unit detected
	On/yellow » Signal transmission ready
	1 Hz yellow » Data packets are being transmitted
	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)
LED Energy transmission	
Color	Yellow/red
Function	Off » No mobile unit detected
	On (yellow) » Unit coupled, voltage output ok
	1 Hz red/yellow » Short circuit at voltage output sensor
	3 Hz red/yellow » Short circuit at voltage output actuator
	3 Hz red » Short circuit at both voltage outputs
	5 Hz red » Internal error

Function Remote	
LED Actuator	
Color	Green/red
Function	Off » Unit not paired
	On (green) » Unit paired, voltage output actuator ok
	Flashes 2 Hz red » Unit paired but short circuit on actuator
	Flashes 5 Hz red » Internal error
LED Sensor supply	
Color	Green/red
Function	Off » Unit not paired
	On (green) » Unit paired, voltage output sensor (24 V) ok
	Flashes 2 Hz red » Unit paired but short circuit on sensor (24 V)
	Flashes 5 Hz red » Internal error
LED Signal transmission	
Color	Yellow/red
Function	Off » No mobile unit detected
	On/yellow » Signal transmission ready
	Flashes 1 Hz yellow » Data packets are being transmitted
	Flashes 3 Hz yellow » 50% of the transmission bandwidth used (10 s)
	Flashes 8 Hz red » Data packets were discarded (in the last 10 s)
	On/red » Error in data transmission (internal error)

View Base



View Remote



Description of function

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.

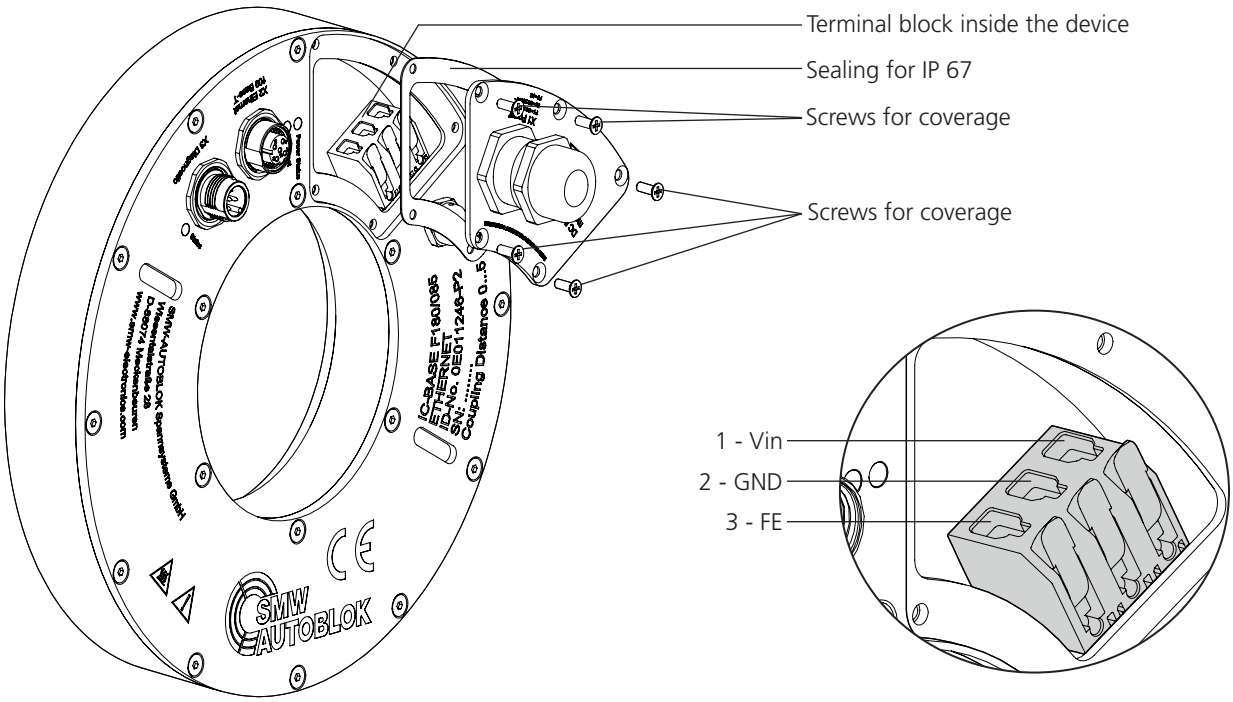
The F180 inductive coupling system consists of a stationary unit (base) and a mobile unit (remote). Both units are to be mounted axially facing each other at a distance of 0 to 5 mm for 24V or 0 to 3 mm for 48V on the coupling surface.

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.

Power connection

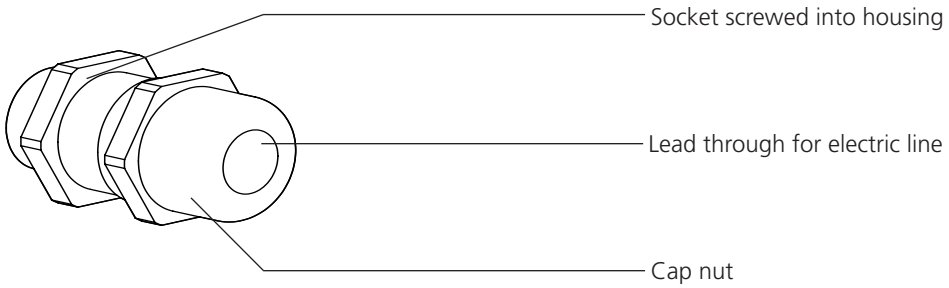


Notice

The terminal block is accessible by removing the five screws under the coverage energy.

Insert the sealing gasket before mounting the coverage.

Cable fitting M16



Cable fitting M16 suitable for cable diameters from 5 bis 10 mm.
Note the specified tightening torque, 8 Nm for the cap nut.

Start-up

Notice

Use base coupler 0E011246-P2 only with remote coupler 0E011247-P2.

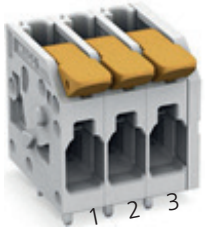
The start-up can only occur after the entire transmission chain of base and remote has been comletely set up. The installation of the components must always be performed in a (electrical) power-free state.

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

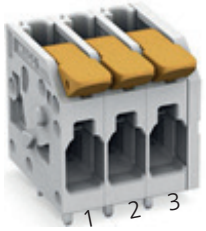


PIN	Function
1	DC 24/48 V +
2	DC 24/48 V -
3	FE (Functional ground)

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 2.5mm² 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!

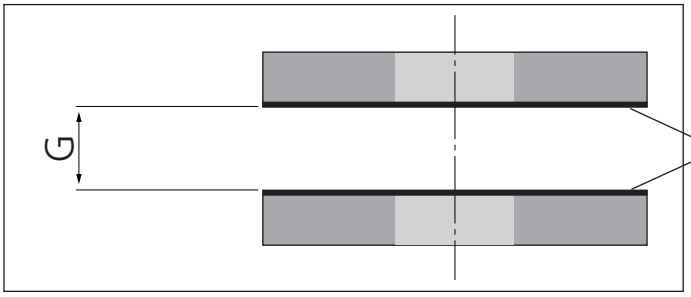
In order to meet the EMC requirements, the receiver cable must not be longer than 15 m. If a longer cable is nevertheless used, take all steps to protect the receiver from overvoltage peaks.

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



Operating voltage 24 V distance G ≤ 6 mm

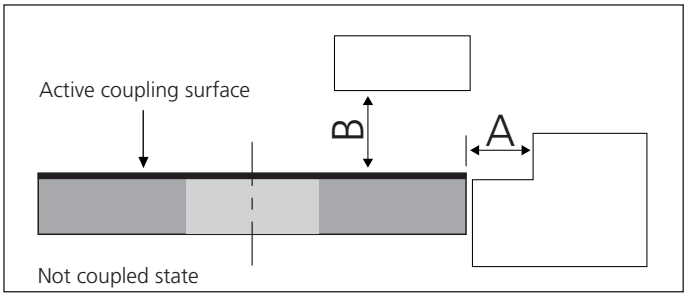
Operating voltage 48 V distance G ≤ 3 mm

Active coupling surface

Installation in metall

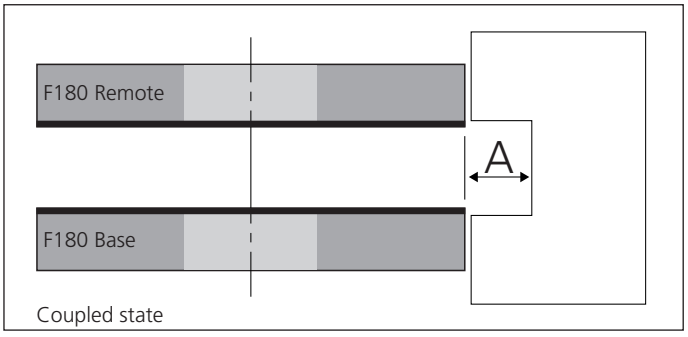
Attention!

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.



Distance A > 1 mm

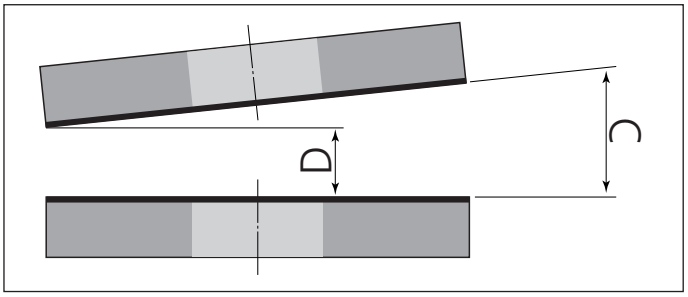
Distance B > 30 mm



Distance A > 1 mm

Permissible angle offset

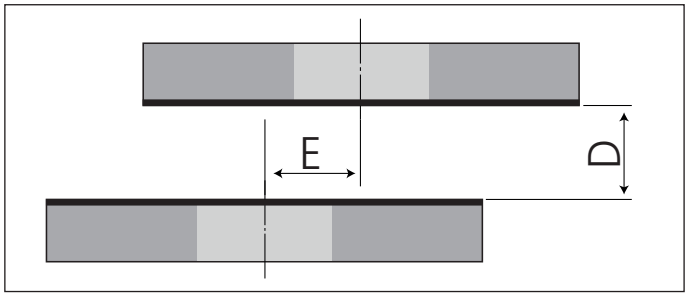
The permissible angle offset allows function in special mounting positions.



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 enviroment 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.

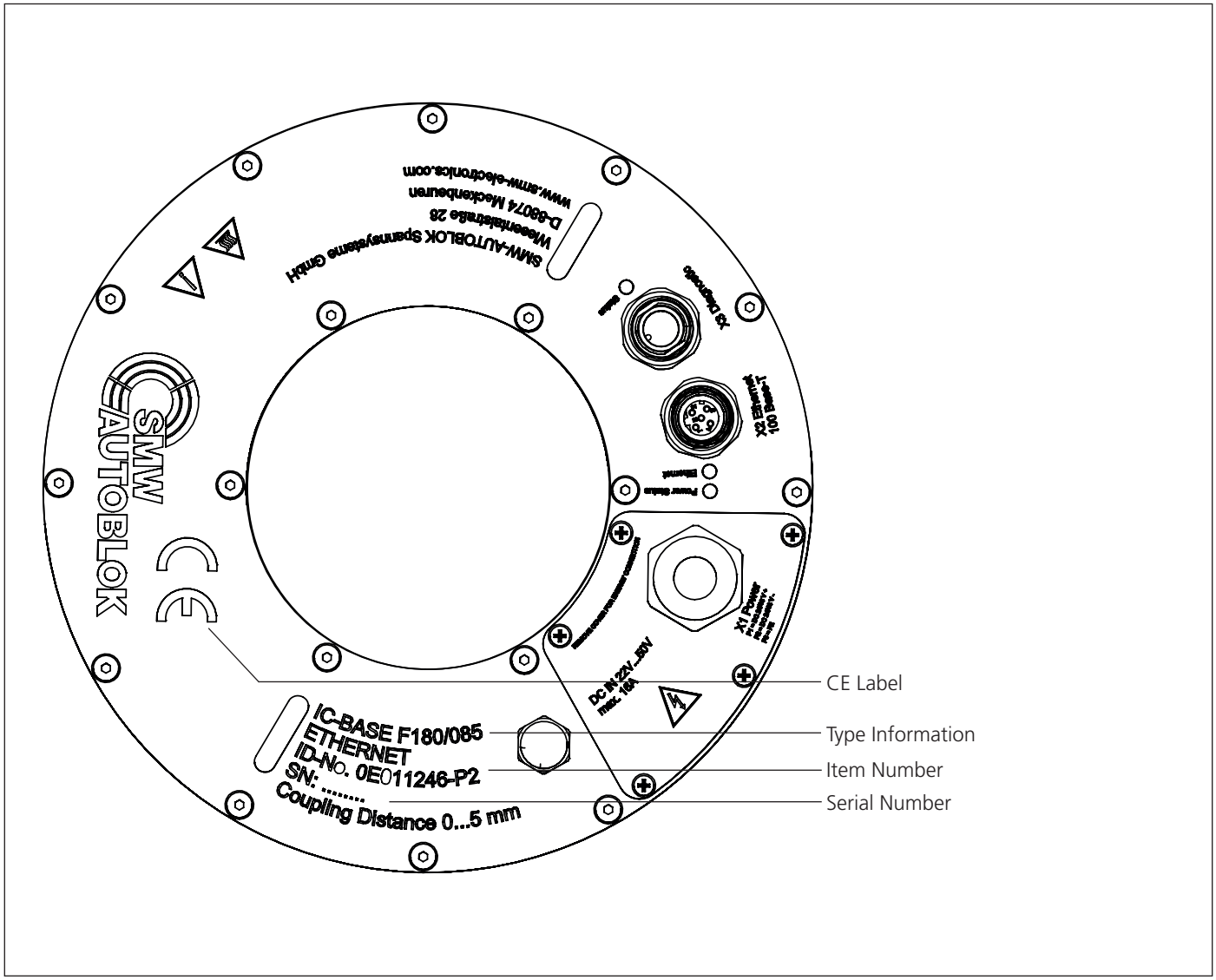
Attention!

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.

Notes

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.



Contact:

SMW-AUTOBLOK Spannsysteme GmbH
Postfach 1151 • D-88070 Meckenbeuren
Wiesentalstraße 28 • D - 88074 Meckenbeuren
Tel.: +49 (0) 7542 - 405 - 0

Vertrieb Inland:
Fax: +49 (0) 7542 - 3886
E-Mail ➢ vertrieb@smw-autoblok.de

Sales International:
Fax: +49 (0) 7542 - 405 - 181
E-Mail ➢ sales@smw-autoblok.de

12 months warranty

Product: Inductive coupler system F180 Ethernet

SMW-AUTOBLOK 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 purchase.

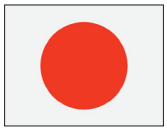
In order to maintain the warranty, the return must be carried out in the original packaging.

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

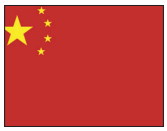
The manufacturer otherwise retains the right not to admit warranty claims.

Germany
SMW-AUTOBLOK Spannsysteme GmbH
Postfach 1151 • D-88070 Meckenbeuren
Wiesentalstraße 28 • D-88074 Meckenbeuren
Tel.: +49 (0) 7542 - 405 - 0
Vertrieb Inland ➤ vertrieb@smw-autoblok.de
Fax: +49 (0) 7542 - 3886
Sales International ➤ sales@smw-autoblok.de
Fax: +49 (0) 7542 - 405 - 181

U.S.A.
SMW-AUTOBLOK Corporation
285 Egidi Drive - Wheeling, IL 60090
Tel. +1 847 - 215 - 0591
Fax +1 847 - 215 - 0594
E-mail ➤ autoblok@smwautoblok.com



Japan
SMW-AUTOBLOK Japan Inc.
1-56 Hira, Nishi-Ku
Nagoya
Tel. +81 (0) 52 - 504 - 0203
Fax +81 (0) 52 - 504 - 0205
E-mail ➤ infosaj@smwautoblok.co.jp

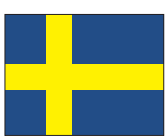


China
SMW-AUTOBLOK (Shanghai) Work Holding Co.,Ltd.
Building 6, No.72, JinWen Road, KongGang
Industrial Zone, ZhuQiao Town, Pudong District
201323, Shanghai P.R. China
Tel. +86 21 - 5810 - 6396
Fax +86 21 - 5810 - 6395
E-mail ➤ china@smwautoblok.cn

Mexico
SMW-AUTOBLOK Mexico, S.A. de C.V.
Acceso III No. 16 Int. 9
Condominio Quadrum
Industrial Benito Juarez
Queretaro, Qro. C.P. 76120
Tel. +52 (442) 209 - 5118
Fax +52 (442) 209 - 5121
E-mail ➤ smwmex@smwautoblok.mx

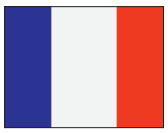
India
SMW-AUTOBLOK Workholding Pvt. Ltd.,
Plot No. 4, Weikfield Industrial Estate,
Gat No. 1251, Sanaswadi, Tal - Shirur,
Dist – Pune. 412 208
Tel. +91 2137 - 616 974
E-mail ➤ info@smwautoblok.in

Turkey
SMW AUTOBLOK Makina San, Ve Tic. Ltd. ti.
Yeni ehir Mah, Osmanli Blv, Volume Kurtkoy Ofis
No:9, Kat:1, D:4, 32912, Pendik Istanbul
Tel. +90 216 629 - 2019
E-mail ➤ info@smwautoblok.com.tr



Sweden / Norway
SMW-AUTOBLOK Scandinavia AB
Kasernvägen 2
SE - 281 35 Hässleholm
Tel. +46 (0) 761 420 111
E-mail ➤ info@smw-autoblok.se

Italy
AUTOBLOK s.p.a.
Via Duca D'Aosta n.24
Fraz. Novaretto
I-10040 Caprie - Torino
Tel. +39 011 - 9638411
Tel. +39 011 - 9632020
Fax +39 011 - 9632288
E-mail ➤ info@smwautoblok.it

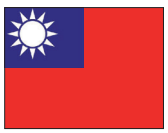


France
SMW-AUTOBLOK
17, Avenue des Frères Montgolfier - Z.I. Mi-Plaine
F-69680 Chassieu
Tel. +33 (0) 4.72.79.18.18
Fax +33 (0) 4.72.79.18.19
E-mail ➤ autoblok@smwautoblok.fr

Great Britain
SMW-AUTOBLOK Telbrook Ltd.
7 Wilford Industrial Estate
Ruddington Lane, Wilford
GB-Nottingham, NG11 7EP
Tel. +44 (0) 115 - 982 1133
E-mail ➤ info@smw-autoblok-telbrook.co.uk

Spain
SMW-AUTOBLOK IBERICA, S.L.
Ursalto 4 – Pab. 9-10 Pol. 27
20014 Donostia - San Sebastián (Gipuzkoa)
Tel.: +34 943 - 225 079
Fax: +34 943 - 225 074
E-mail ➤ info@smwautoblok.es

Canada
SMW AUTOBLOK CANADA CORP
1460 The Queensway - Suite 219
Etobicoke,ON M8Z 1S7
Tel. +1 416 - 316 - 3839
E-mail ➤ info@smwautoblok.ca



Taiwan
AUTOBLOK Company Ltd.
No.6, Shuyi Rd., South Dist.,
Taichung, Taiwan
Tel. +886 4-226 10826
Fax +886 4-226 12109
E-mail ➤ taiwan@smwautoblok.tw

Czech Republic / Slovakia
SMW-AUTOBLOK s.r.o.
Merhautova 20
CZ - 613 00 Brno
Tel. +420 513 034 157
E-mail ➤ info@smw-autoblok.cz

Poland
SMW-AUTOBLOK Poland Sp. z.o.o
Stalowa 17
41-506 Chorzów
Tel. +48 736 059 699
E-mail ➤ info@smwautoblok.pl

Korea
SMW-AUTOBLOK KOREA CO., LTD.
1502-ho, Charyong-ro 48beon-gil,
Uichang-gu, Changwon-si
Gyeongsangnam-do, 51391, Republic of Korea
Tel. +82 55 264 9505
E-mail ➤ info-korea@smw-autoblok.net

SMW AUTOBLOK
www.smw-autoblok.de