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MANUAL

Inductive Coupling System M30-1

Validity

0E010980	Induktivkoppler M30-1 Base	09.03.2023	V2	EN
0E010981	Induktivkoppler M30-1 Remote	09.03.2023	V2	EN

Original

Content

Safety instructions

Important!
Vor Inbetriebnahme ist die Betriebsanleitung sorgfältig zu lesen.

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.

Authorized personnel

Installation and commissioning are only permitted by trained specialist personnel.

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.

Operating faults

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

Meaning of the warnings

It is essential to observe the warnings in this manual and the measures described to avoid danger. The warnings contain the following signal words, which indicate the seriousness of the danger:

⚠ Danger

Denotes an immediate hazard that will result in serious injury or death to persons if not avoided.

⚠ Caution!

Indicates a potential hazard that can lead to minor injury to persons or damage to property if it is not avoided.

Attention

Indicates a situation which, if not avoided, may result in property damage.
The following warnings apply to the handling of the present product.

Caution!

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!

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)

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.

Function

The inductive coupling system has the task of transmitting 1 binary 24V PLC signal unidirectionally and without contact from a mobile unit (remote) to a stationary evaluation unit (base). In addition to the signal transmission of the PLC control signal, sufficient electrical energy for the power supply of sensors or actuators is also transmitted to the mobile unit without contact. The figure below shows the basic structure of contactless signal transmission.

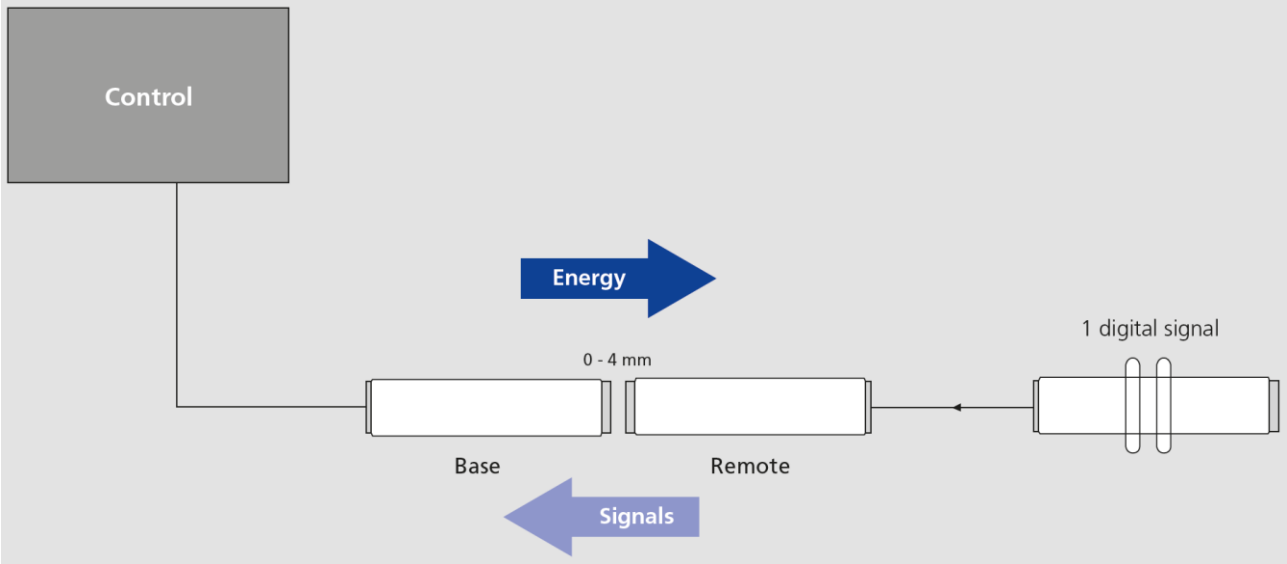


Figure 1 Function of the inductive transmission system

Comparable to a transformer with separate primary and secondary windings, the contactless transmission has a stationary (base) and a mobile (remote) component. These are arranged axially opposite each other at a defined distance and ensure the transmission of energy and signals without contact on an inductive basis. The transmission is independent of the axial angular position of the components with one another. Ideally, the transmitted signals behave as if a direct electrical connection from the sensor to the evaluation unit or actuator to the control unit would be available (plug replacement).

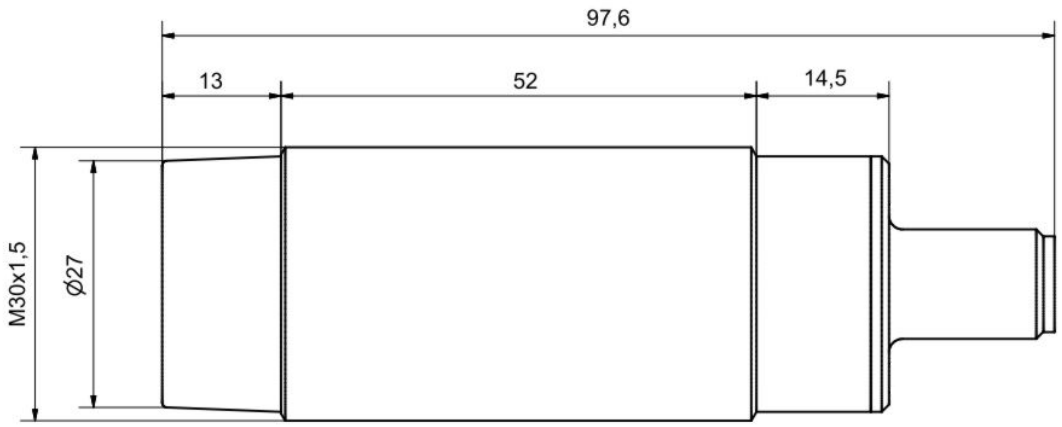
The system is modular, in a coated brass or stainless steel housing with a standard M30x1.5 thread, so that it can be integrated into automation systems at short notice and with manageable effort. All important interfaces are designed to be separable, so that they can be exchanged for maintenance and service with little expenditure of time. The electrical and mechanical interfaces of the various components are described in the following chapters. The individual functional elements were designed in such a way that reverse polarity of the 24V supply on the primary side will not cause any permanent damage. Nevertheless, for reasons of safety, the installation of the components must always be carried out in a voltage-free state. In addition, it must be ensured that only the sensors or actuators intended for this purpose may be connected to the signal connections on the base and remote unit. Signal outputs must never be connected to the 24V supply voltage. For safety reasons, it is recommended that the primary 24 V supply of the system be limited to a maximum current of 1 A.

Technical Data

Stationary Unit (Base)

Length	97.6 mm
Housing thread	M30x1.5
Housing material	Brass, coated
Protection class	IP67 (in plugged condition)
Operating temperature	0…+50°C
Supply voltage	24 V DC ±10%
Power consumption	< 800mA
Reverse polarity protection	Yes
Display LEDs	Power on: green (slow blinking) Remote detected: green (static) Error: fast blinking
Connection	Connector Plug M12x1 4-pol
Installation type	Not align

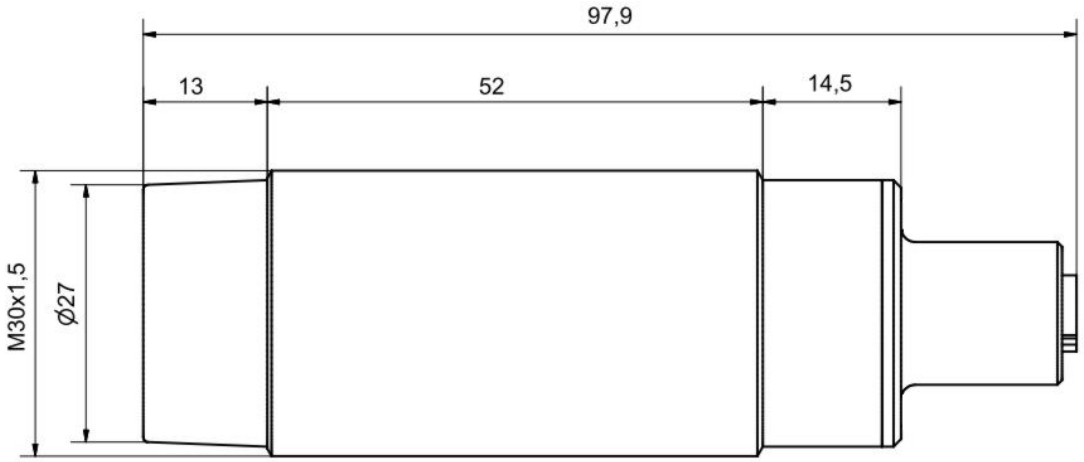
Dimensions:



Mobile Unit (Remote)

Length	98 mm
Housing thread	M30x1.5
Housing material	Brass, coated
Protection class	IP67 (in plugged condition)
Operating temperature	0…+50°C
Output voltage	24V DC ±10%
Power output	< 500mA
Short circuit protection	Yes
Number of digital signals	1 Input
Connection	Connector Socket M12x1 4-pol
Installation type	Not align

Dimensions:



Interfaces

Interfaces stationary unit (Base)

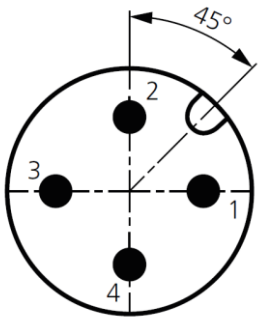
Interfaces stationary unit - mechanical

Weight of the stationary unit	160g
Thread of the housing	M30x1.5

Interfaces stationary unit - electrical

The stationary unit is supplied with 24 VDC ± 10% from the control / PLC. We recommend limiting the power supply to a maximum of 1 A. The connector of the stationary unit is assigned as follows:

Plug M12 Pin assignment:

Connections Base Unit M12x1 4-pol Plug		
Pin	Name	
1	24V IN	
2	OUT1	
3	GND	
4	Data Valid OUT	

Interfaces mobile Unit (Remote)

Interfaces mobile unit - mecanical

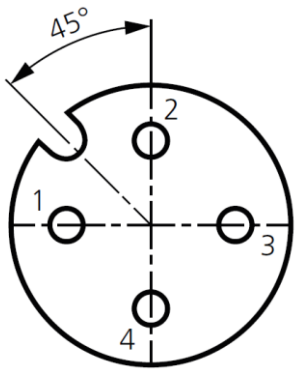
Weight of the mobile unit	160g
Thread of the housing	M30x1.5

Interfaces mobile unit - electrical

The connector of the mobile unit is assigned as follows:

Socket M12 Pin assignment:

Connections Remote Unit M12x1 4-pol Socket	
Pin	Name
1	24V OUT
2	IN1
3	GND
4	-



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 measures to protect the receiver from overvoltage peaks.

Integration

The integration of the stationary and the mobile unit of the contactless transmission is carried out by mounting in an axial orientation, taking into account the limit distance. The assembly must take place in the (electrical) voltage-free state.
The following sections describe important installation instructions that must be observed for correct operation.

Mutual influence in parallel operation

Attention!

Improper assembly can impair the function of the system and lead to damage. The values specified for the installation must therefore be observed.

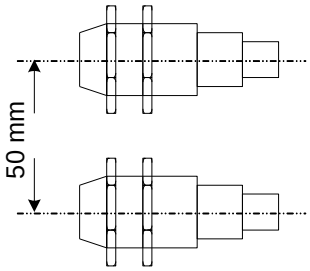


Figure 2 Influence each other

Installation in metal

Attention!

The coupler can be damaged by induction effects, metallic objects in the vicinity of the coil cap lead to overheating. When installing in metal, the specified minimum distances must be observed.

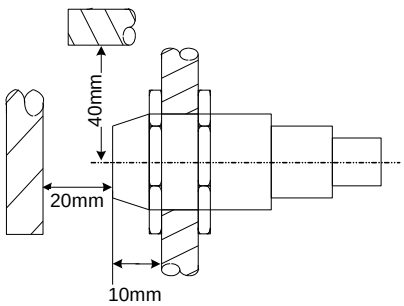
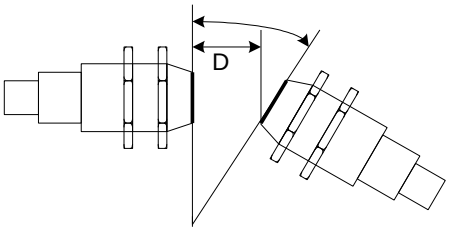


Figure 3 Installation in metal

Permissible angular misalignment

The permissible angular misalignment enables function in special installation positions.



Distance D	Angle °
1mm	23°
2mm	20°
3mm	15°
4mm	10°

Figure 4 Angular misalignment

Permissible offset

The maximum lateral offset between the stationary and mobile unit is ± 3mm

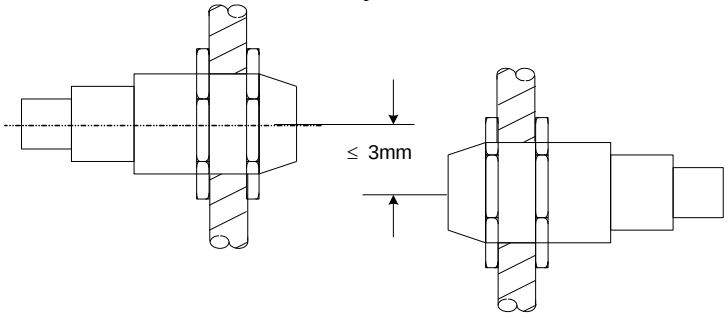


Figure 5 Offset

Installation

Commissioning can only take place after the entire transmission chain has been fully established. The simplest way of checking the system can be implemented with a 24V power supply, one or more analog sources and a digital ammeter (DAM). The transmission chain with the pin assignments based on these components is shown below.

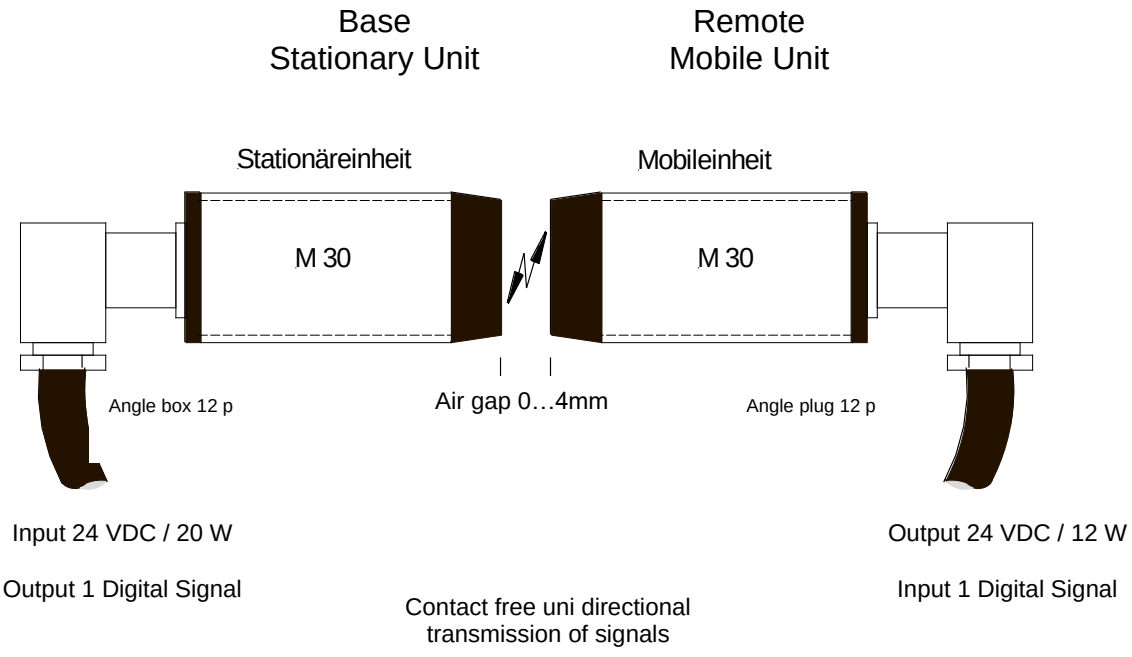


Bild 6 Transmission

After switching on the supply voltage of 24V, the following steps should be initiated to check the correct function:

- Check current consumption: <500mA
- Check the LEDs of the stationary unit (green and yellow LEDs on)
- Check the wire break monitoring; if a sensor line is interrupted, the corresponding current is set to 0mA

If irregularities occur during one of the above tests, all electrical connections and the mechanical distances of the entire transmission path must be checked again. If there are no obvious faults, any defective units can be isolated and eliminated by exchanging individual components (replacement modules). It is therefore recommended to keep a spare parts package for service purposes.

Troubleshooting

The occurrence of malfunctions will primarily become noticeable through the lack of interface signals or through the occurrence of implausible measurements. The troubleshooting should be carried out according to the following checklist:

- Check the mechanically correct installation
- Measurement of the voltage supply and the current consumption
- If there are no obvious faults, replace components with spare parts, replace the entire system if necessary

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