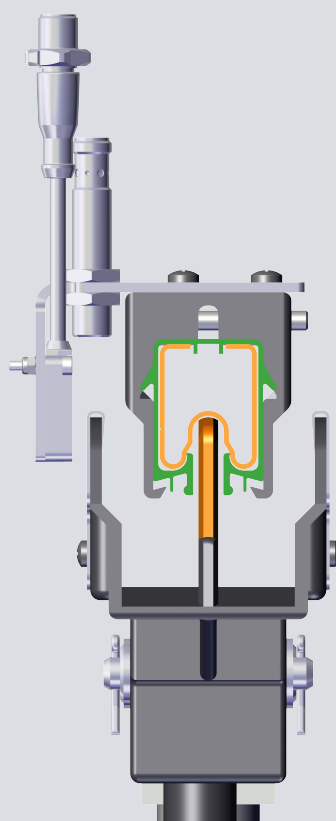




TECHNICAL DOCUMENTATION

KVT
FOR U35



**INSTALLATION MANUAL
SYSTEM MANUAL
EN V 1.02**

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1 GENERAL

1.1 About these instructions

1.2 Symbols

Safety instructions in this manual are identified by symbols. Each safety instruction begins with a signal word that indicates the severity of the hazard. The various types of warnings and safety instructions and their structure are explained below.



DANGER!

The source of the hazard is described here.

This combination of a symbol and a signal word indicates an immediately dangerous situation that will result in death or serious injury unless avoided.

► The actions to prevent the hazard are identified here.



DANGER!

The source of an electrical hazard is described here.

This combination of a symbol and a signal word indicates an immediately dangerous situation related to electricity that will result in death or serious injury unless avoided.

► The actions to prevent the hazard are identified here.



WARNING!

The source of the hazard is described here.

This combination of a symbol and a signal word indicates a potentially dangerous situation that may result in death or serious injury unless avoided.

► The actions to prevent the hazard are identified here.



CAUTION!

The source of the hazard is described here.

This combination of a symbol and a signal word indicates a potentially dangerous situation that may result in light or moderate injury unless avoided.

► The actions to prevent the hazard are identified here.



NOTICE!

The source of the hazard is described here.

This combination of a symbol and a signal word indicates a potentially dangerous situation that may result in property or environmental damage unless avoided.

► The actions to prevent the hazard are identified here.

**NOTICE!**

This indicates a reference to another place in this text or another document.

This combination of a symbol and a signal word indicates a reference to another place in this text or in a different document.

- The places in the text or references to other documents are identified here.

**TIPS AND RECOMMENDATIONS!**

- Simple tips and recommendations from our long years of experience are provided here.

1.3 Copyright protection

The contents of this manual are protected by copyright. Their use is permitted within the scope of the use of the installation. No further use is permitted without the written permission of the manufacturer. This manual may not be copied, given to any third party, reproduced in any form or by any means, including, but not limited to, exploitation and / or communication of the contents without the written permission of the manufacturer, except for internal purposes.

1.4 Disclaimer

The information in this document has been compiled in consideration of applicable standards and regulations, accepted rules of engineering, as well as our years of knowledge and experience.

The manufacturer shall not be liable for damages resulting from:

- Failure to observe the technical documentation
- Uses other than the intended use
- Use by personnel without the required training
- Unauthorized modifications or technical changes
- Use of non-approved spare parts or accessories

The actual scope of delivery may vary from the descriptions and images in this document in case of custom versions, the selection of additional order options, or due to latest technical changes.

The obligations agreed in the supply contract, the general terms and conditions and the terms and conditions of delivery, and the laws and regulations applicable at the time the contract was signed all apply.

We reserve the right to make technical changes to improve the usability and for further development.

1.5 Customer service

Paul Vahle GmbH & Co. KG
Westicker Str. 52
Tel: +49 (0) 2307 704-0
Fax: +49(0) 2307 704-4 44
59174 Kamen, GERMANY
Email: info@vahle.de
Web: http://www.vahle.de
Country of origin: Germany

1.6 Warranty

1.6.1 Warranty terms and conditions

The information in this document has been compiled in consideration of applicable standards and regulations, accepted rules of engineering, as well as our accumulated years of knowledge and experience.

The warranty period and the scope of the warranty are defined in the terms of the contract and the general terms and conditions of delivery of Vahle GmbH & Co. KG.

Our general terms of warranty and delivery are published on our website. www.vahle.de



WARNING!

No liability in case of unauthorized changes, modifications, or accessories!

Changes or modifications to the delivered product require the permission of the manufacturer. Genuine spare parts and manufacturer-approved accessories provide safety. The use of non-approved parts voids any liability of the manufacturer.

► Always consult the manufacturer first!

The warranty immediately expires if one or several of the following situations arise(s):

- If the product is modified without permission from Vahle.
- If the operator independently performs repairs during the warranty period or has repairs performed by third parties.
- If the product has been handled or maintained inappropriately.
- If parts are used that are not original parts approved by Vahle.
- If the information in this documentation is not observed.

2 SAFETY INSTRUCTIONS

2.1 Safety

This section gives an overview of all important safety aspects relating to the protection of personnel as well as the safe use and fault-free operation. Other, task-specific safety instructions can be found in the sections on the individual phases of the product's life.



DANGER!

Failure to observe the safety instructions may result in risks to life and health!

2.2 General risks

The following section describes residual risks that arise even if the product is used as intended. Observe the safety instructions listed here in the other sections of these instructions to reduce the risk of injuries or damage to property and equipment and to avoid dangerous situations.

Do not change or modify the system inappropriately!



WARNING!

Risk of death from improper replacement or removal!

Errors during the removal or replacement of components may cause life-threatening situations or significant property damage

- Observe the safety instructions before beginning any removal work.
-

2.2.1 Danger from electrical energy

Perform the following safety work according to VDE 0105-100 (this work must be carried out by a qualified electrician, see chapter: "2 security").

Activate

The required separation distances must be established.

Secure against restart

During work, a prohibition sign must be attached reliably on switching handles or drives of switches, control units, pressure and sensing devices, safety parts, circuit breakers that have been used to unlock a system part or that can be used to connect electricity. If this is not possible, then the clearly associated prohibition sign must be nearby. Existing mechanical interlocking devices against restart must be used for manually operated switches.

Determine absence of voltage

Absence of voltage is to be determined at or as close as possible to the work site at all pins. Absence of voltage must be checked with a voltage tester immediately before and after use.

Grounding and short-circuiting

Parts on which work will be performed at the work place must first be grounded and then short circuited. Grounding and short-circuiting must be visible from the workplace. Deviating from the above, it is permitted to ground and short-circuit near the work place if this is required due to local conditions or for safety reasons. Devices for grounding and short-circuiting must always first be connected with the grounding system or the ground electrode and afterwards with the parts to be grounded. Grounding and short circuiting may be waived in certain low-voltage systems (see VDE 0100-100).

Cover adjacent, live parts or isolate them

Before starting work, check whether it is appropriate to make adjacent parts voltage-free.



DANGER!

Danger of death due to electrical current!

Contact with live parts can result in life-threatening injuries.

- Make sure that the relevant components are not live or under voltage, and that there is no unauthorized approximation.

2.3 Responsibilities of the operating company

Definition of the operating company

The owner is listed in the order confirmation and has the following owner obligations:

Owner obligations

The system is put to commercial use. The owner of the system is therefore subject to laws and regulations on workplace health and safety. In addition to the safety instructions in this document, the safety, accident prevention, and environmental regulations for the system's field of application must be followed. The following applies in particular:

- The owner ensures protection against electric shock (contact protection).
- The owner must inform himself about applicable workplace health and safety regulations and conduct a risk assessment for additional hazards that may arise from the special operating conditions at the installation site. These must be implemented as facility instructions for the operation of the system.
- Over the entire time, the owner has to verify that the instructions drafted by him for the operation of the system conform to the current state of applicable regulations and adapt the instructions as necessary.
- The owner must clearly define responsibilities for the installation, operation, maintenance, and cleaning of the system.
- The owner must ensure that all employees who handle the system have read and understood the operating instructions. The owner is also required to provide training periodically and instruct personnel about the risks.

The owner is also responsible for ensuring that the system is always in good technical condition. The following therefore applies:

- The owner must ensure that the maintenance intervals described in this documentation are observed.
- Control and safety devices provided by the owner for the operation of the system must be checked for completeness and functional safety.
- The owner must ensure that assembly and installation comply with EN 60204.
- The owner must ensure that all components are de-energized in the event of an emergency off. This applies in particular to the parallel busbar.

2.4 Personnel requirements

2.4.1 Qualifications

The tasks described in this manual present various requirements to the qualifications of the persons performing them.



WARNING!

Hazard in case of insufficient qualification of personnel!

Insufficiently qualified persons are unable to judge the risks when working on the system, which puts them and others at risk of severe or fatal injuries.

- ▶ All work must be performed by qualified personnel only.
- ▶ Insufficiently qualified personnel must stay out of the work area.

Operator

The operator has been instructed by the owner about the tasks assigned to him and the risks of inappropriate actions. An operator may perform tasks that go beyond normal operation only if this is indicated in the instructions and the owner has expressly assigned him with such a task.

Electrically qualified person (see VDE 0105-100)

Due to their professional training, knowledge, experience, and knowledge of the relevant standards and regulations, professional electricians are able to carry out work on electrical installations and to independently recognize and avoid possible hazards. The professional electrician has been specifically trained for his/her professional working environment and is conversant with the relevant standards and regulations.

Qualified personnel

Qualified personnel are able, based on their technical training, knowledge, experience, and familiarity with applicable regulations, to perform the assigned tasks and independently detect and avoid potential hazards.

Instructed personnel

The instructed person has been instructed by the owner about the assigned tasks and the risks of inappropriate actions. Such persons must also have read and understood these safety instructions and observe them during their work.

This may need to be confirmed by the customer/user with a signature.

2.5 Personal protective equipment

Every person who is instructed to work on the system or in the vicinity of the system (support personnel) must wear personal protective clothing/equipment for the suitable type of their work. Personal protective equipment has the purpose of protecting personnel against hazards to their health and safety at work. The owner is responsible for ensuring that protective equipment is worn.

Personal protective equipment is described below:



Safety shoes

Safety shoes protect against falling parts as well as against slipping.



Protective goggles

Protective goggles protect against flying particles and liquid sprays.



Helmet

Helmets protect against falling or flying parts and materials.



Gloves

Gloves protect hands against chafing and abrasion, cuts and punctures, as well as against contact with hot surfaces.



Protective work clothes

Work clothing is close fitting and resistant to tearing, with close-fitting sleeves and without any projecting parts. It is designed to protect against being caught by moving parts of machinery. However, it must not reduce mobility. Do not wear rings, necklaces, or other jewelry. Long hair must be covered (cap, hat, hairnet or similar). Fall-arrest equipment, face and hearing protection acc. to DGUV Regulation 112-189.



Hearing protection

To protect against severe and permanent hearing loss.



Breathing protection

To protect against severe and chronic conditions of the airways.

2.6 Safety devices



WARNING!

Danger from non-functional safety devices!

Non-functional or disabled safety devices cause a risk of severe injuries or even death.

- ▶ Before beginning any work, verify that all safety devices are functional and installed properly.
- ▶ Never disable or override safety devices.

In addition to locally applicable safety regulations, the following safety instructions must be observed.

The following accident prevention regulations (UVV; Germany), and the new Accident Prevention Regulations – Principles of Prevention (DGUV Regulation 1; Germany) must always be observed.

2.7 Conduct in case of danger or accident

Precautions:

- Have first-aid equipment (first-aid kit, blankets etc.) and fire extinguisher ready.
- Maintain free access for emergency services vehicles.

Conduct in case of accident:

- Secure site of accident and call first aid personnel.
- Alert emergency services.
- Provide first aid

2.8 Signage

The following symbols and instruction signs are located in the work area. They relate to the immediate environment in which they are installed.



DANGER!

Danger of death due to electrical current!

Contact with live parts can result in life-threatening injuries.

- Make sure that the relevant components are not live or under voltage, and that there is no unauthorized approximation.



WARNING!

Danger from illegible signs!

Over time, labels and signs can get dirty or can become unreadable in other ways, which means that the dangers are not identified and that operating instructions cannot be followed.

- Always keep all safety, warning and operating instructions in a legible condition.



NOTICE!

Follow instructions!

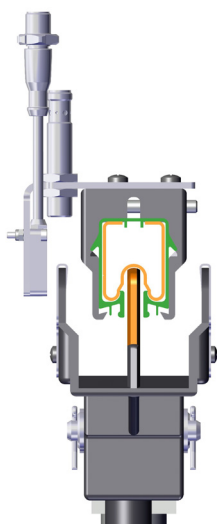
Only use the designated product after this documentation has been completely read and understood.



3 LAYOUT AND FUNCTION

3.1 KVT

Carbon wear and presence tester for the U35 conductor rail system



KVT U35	
ID no.	176 117
Weight [kg]	0.652
Passage speed [m/min]	180
Not approved for [mm]	90 (only on request)
Phase spacings	130
Connection cable	5m with socket (see 7.2 Power cable with bushing)
Funnel operation only by prior arrangement	

3.2 Sensors

Wear sensor



Sensor- IFS304	
Weight [g]	26.9
Dimensions [mm]	M12 x 1 / L = 60
Phase spacing [mm]	4
Operating voltage [V DC]	10 to 30
Current draw [mA]	< 20
Ambient temperature [°C]	- 40 to 85
Protection class	IP 69K

Presence sensor



Sensor- IQ2012	
Weight [g]	41.4
Dimensions [mm]	20 x 8 32
Phase spacing [mm]	8
Operating voltage [V DC]	10 to 30
Current draw [mA]	< 20
Ambient temperature [°C]	- 40 to 85
Protection class	IP 68



4 COMMISSIONING

4.1 Safety instructions for commissioning



DANGER!

Danger of death due to electrical current!

Contact with live parts can result in life-threatening injuries.

- Make sure that the relevant components are not live or under voltage, and that there is no unauthorized approximation.



WARNING!

Danger of fingers being pinched

Risk of injury due to crushing of the extremities.

- Do not reach into the area of the machine.
- During operation, make sure that no unauthorized persons are in the area of the machine.

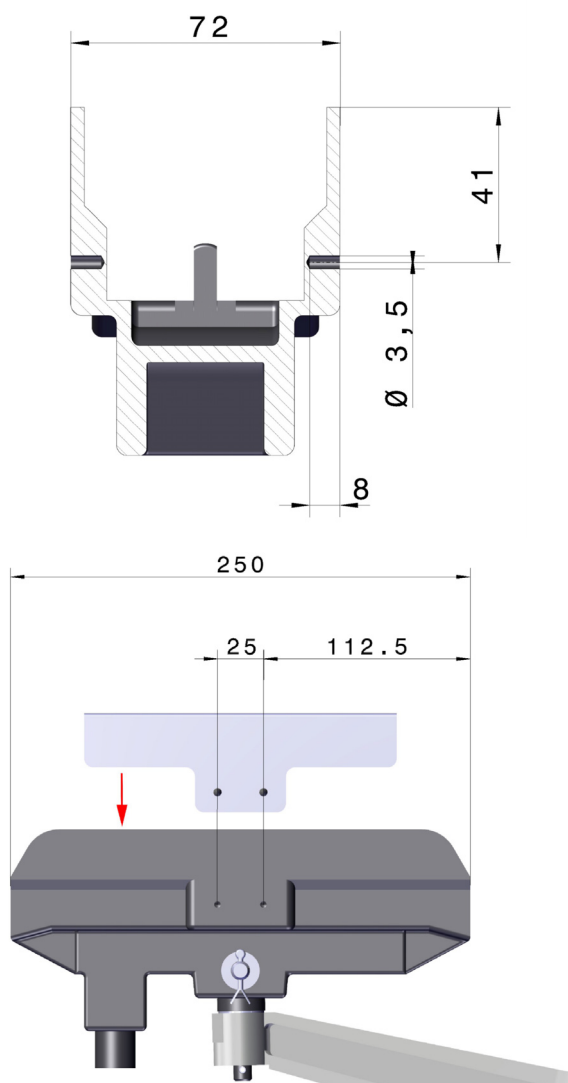


NOTICE!

The general safety and installation instructions in the original U35 operating instructions must be observed and complied with.



4.2 Installation



Preparation pantograph

Required tools:

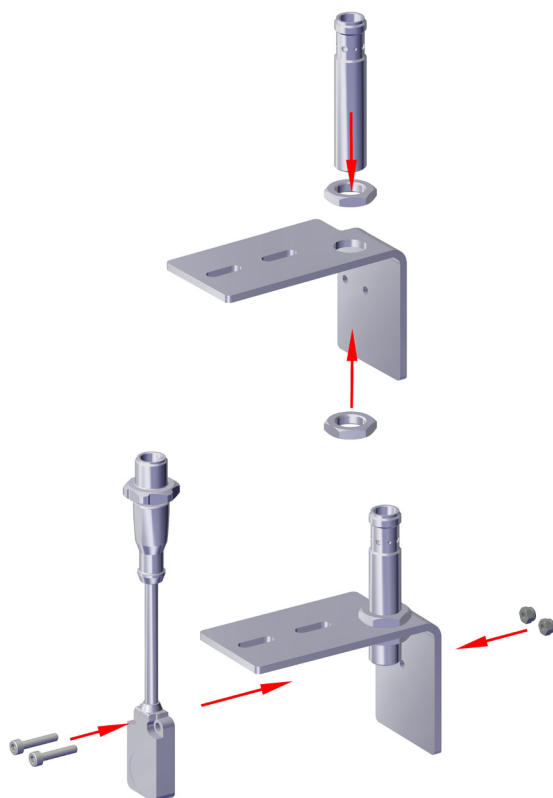
- ✂ Drill 3.5 mm
- ✂ Screw driver PH2

Assembly steps:

NOTICE!

- Make the hole only on the side of the carbon mount facing the sensor.
- The coal socket must not be drilled through completely.

1. Create the holes according to the illustration.
2. Place the sensor contact plate on the collector's carbon brush socket and fasten the sensor contact plate with two screws.



Preparation sensor mounting plate

Required tools:

- ✂ Maul wrench 17 mm
- ✂ Allen wrench Gr. 2.5
- ✂ Open-end wrench SW 5.5 or SW 5.5 socket wrench

Assembly steps:

1. Attach the wear sensor (IFS304) to the sensor mounting plate as shown. Secure the nuts with Loctite 243.
2. Attach the presence sensor (IQ2012) to the sensor mounting plate as shown.

Installation of KVT

Required tools:

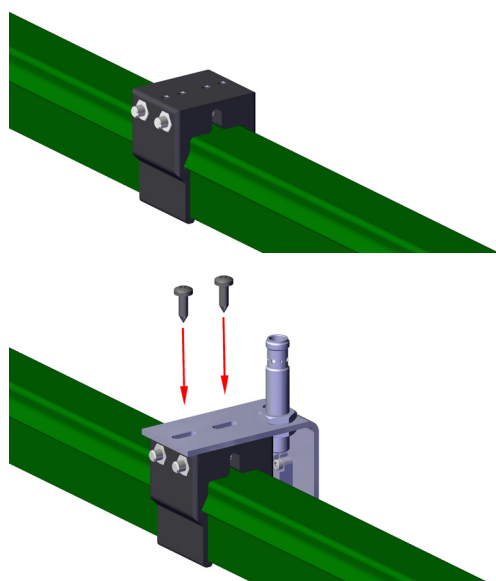
- ✂ Screw driver PH2
- ✂ Allen wrench Gr. 5

Prerequisites:

- ✓ The KVT must be mounted on the fixed point (for fixed points, see original U35 operating instructions). If this is not possible, a minimum distance of 100 mm to the next suspension must be maintained.

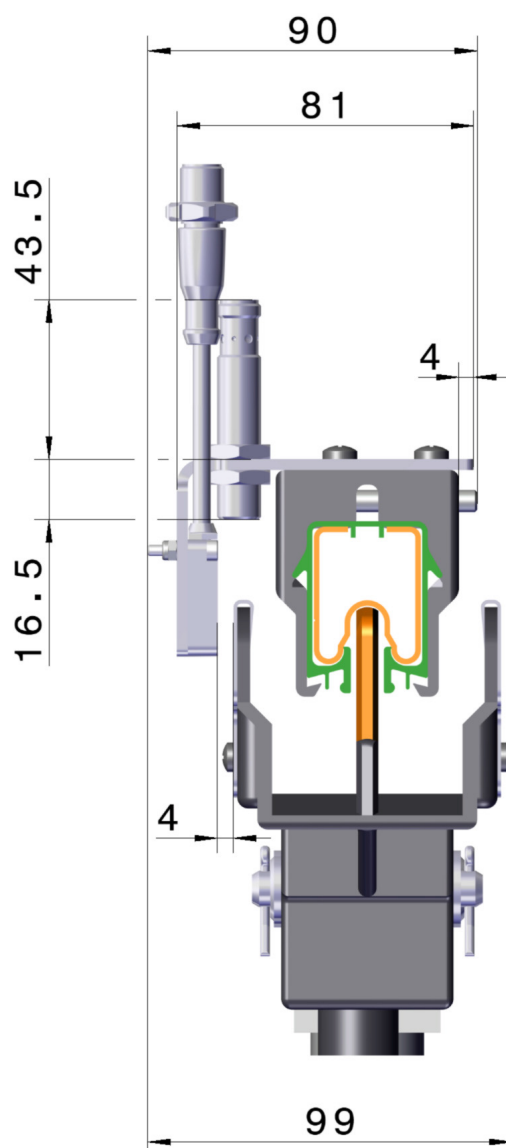
Assembly steps:

1. Place the fuse terminal halves on the conductor rail and fasten them with M6 cap screw and nut.
2. Place the sensor mounting plate with the sensors centered on the fuse terminal halves. Fasten the sensor mounting plate with two self-tapping screws 4.8x16.
3. Check the position of the sensors. The dimensions must match the figure 4.3 Condition after the installation, page 17.
4. Connect the sensors to the controller and power supply (see 7.2 Power cable with bushing).





4.3 Condition after the installation



4.4 Operation



NOTICE!

Perform a functional check before operation.

- For the function check, the sensors must be correctly connected to the power supply. The control can be done with a metallic object. Both sensors have an LED indicator, which makes a contact visible. The IQ2012 has an additional LED indicator when it is powered.
- The current collector must be able to pass through the KVT without any problems. There must be no skewing or noise.

5 TRANSPORT AND STORAGE

5.1 Safety instructions for transport and storage

**NOTICE!**

Damage due to improper transport or storage. Improper transport or storage may cause significant property damage!

- ▶ Storage temperature: 0 °C to +45 °C
- ▶ Storage location: Indoors, dry, no exposure to chemicals.
- ▶ Do not expose to direct sunlight.
- ▶ Exercise caution and observe the symbols on the packaging while unloading the pieces at delivery or during transport on the facilities.

5.2 Transport inspection

Check the delivery for completeness and transport damage upon receipt!

If any external damage is found:

- Refuse delivery or accept delivery only conditionally.
- Note the scope of the damage in the transport documents or on the carrier's delivery note.

**NOTICE!**

The delivery may be damaged during transport!

Report all defects as soon as they are found. Claims for damages can only be made during the applicable period.

- ▶ Document and report the defects found.

6 DISASSEMBLY AND DISPOSAL

6.1 Preparation for disassembly

- Switch off the system and secure it against switching back on.
- Physically disconnect the entire power supply from the system.
- Loosen and remove all screws.



DANGER!

Danger of death due to electrical current!

Contact with live parts can result in life-threatening injuries.

- Make sure that the relevant components are not live or under voltage, and that there is no unauthorized approximation.

6.2 Disassembly

During disassembly, always observe the information in section 2 .



WARNING!

Risk of death from improper replacement or removal!

Errors during the removal or replacement of components may cause life-threatening situations or significant property damage

- Observe the safety instructions before beginning any removal work.



CAUTION!

All accessories must be checked for wear.

Only defect-free parts may be reused.

- Use only genuine VAHLE spare parts.

6.3 Disposal

When the system reaches the end of its useful life, the system must be dismantled and disposed of in an environmentally sound manner in accordance with the valid local regulations and laws.



NOTICE!

Electronic scrap is hazardous waste. For its disposal, please observe the locally applicable regulations and relevant laws in the respective country.

7 APPENDIX

7.1 Sensor-IFS304/Sensor-IQ2012

Info card

Inductive Kplus sensors



i This info card serves as a supplement to the main position sensors catalogue and to the individual data sheets. For further information and contact addresses please visit our homepage at www.ifm.com

Intended use

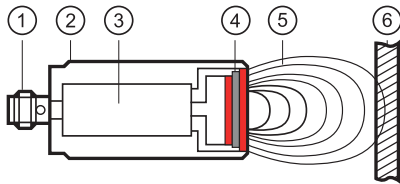
While in use the products are exposed to influences which may have an effect on function, life, quality and reliability of the product.

It is the customer's responsibility to ensure that the products are suitable for the intended application. This applies in particular to applications in hazardous areas and with adverse environmental influence such as pressure, chemicals, temperature fluctuations, moisture and radiation as well as mechanical stress, especially if the products are not installed properly.

Using the products in applications where the safety of people depends on the function of the product is not permitted. Non-compliance may result in death or serious injuries.

Operating principle of an inductive Kplus sensor

Same sensing range on all metals (correction factor = 1). A transmitting and receiving coil system on a PCB constitutes a transformer. Electrically conductive materials in the near field affect the coupling factor of the transformer. The change of the coupling factor is converted into a switched output. By not using a ferrite core, the inductive Kplus sensors are less sensitive to interference caused by strong magnetic fields.

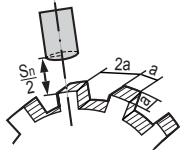


- ① Connection
- ② Housing
- ③ Evaluation circuit
- ④ PCB with transmitting and receiving coil
- ⑤ Alternating electromagnetic field = active zone
- ⑥ Target = electrically conductive material

Glossary of important terms

Active zone	Area above the sensing face in which the sensor reacts to the approach of the target.	
Output function	Normally open:	Object within the active zone > output switched.
	Normally closed:	Object within the active zone > output blocked.
	Positive switching:	positive output signal (to L-).
	Negative switching:	negative output signal (to L+).
Rated insulation voltage	DC units with protection class II: 250 V DC units with protection class III: 60 V DC	
Rated short-circuit current	For short-circuit-proof units: 100 A	
Rated impulse withstand voltage	DC units with protection class II: 4 kV (Δ overvoltage category III) DC units with protection class III: 60 V DC: 0.8 kV (Δ overvoltage category II)	
Power-on delay time	The time the sensor needs to be ready for operation after application of the operating voltage (in the millisecond range).	
Operating voltage	The voltage range in which the sensor functions safely. A stabilised and smoothed direct voltage should be used! Take into account residual ripple!	
Utilisation category	DC units: DC-13 (control of solenoids)	

Hysteresis	Difference between the switch-on and the switch-off point.
Short-circuit protection	ifm sensors are protected against excessive current by means of a pulsed short-circuit protection. The inrush current of incandescent lamps, electronic relays and low resistance loads may cause this protection to cut in and turn the sensor off!
Standard target	Square steel plate (e.g. S235JR) of a thickness of 1 mm with a side length (a) equal to the diameter of the sensing face or 3 x S _N , depending on which value is the highest.
Product standard	IEC 60947-5-2
Repeatability	Difference between any two S _r measurements. Max. 10 % of S _r .
Switch point drift	Shift in the switch point owing to changes in the ambient temperature.
Switching frequency	Damping with standard target (a x a) at half S _N . The ratio damped to undamped (mark to space) = 1 : 2.



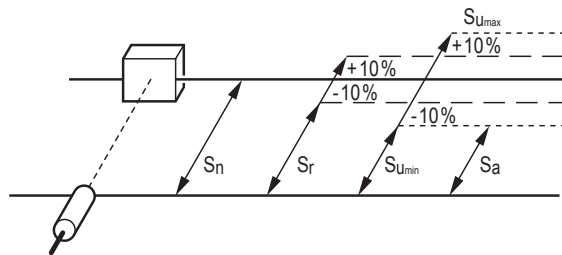
Protection	IPxy	According to IEC 60529
	IP68	Test condition: 1 m water depth for 7 days
	IP69k	To ISO 20653 (replacement for DIN 40050-9)
Current consumption	Current for the internal supply of 3-wire DC units.	
Transport and storage conditions	Unless otherwise indicated in the data sheet, the following applies: Transport and storage temperature: Min. = - 40 °C. Max. = max. ambient temperature according to the data sheet. The relative air humidity (RH) must not exceed 50 % at +70 °C. At lower temperatures, a higher air humidity is permissible. Shelf life: 5 years. Transport and storage height: no restrictions.	
Degree of soiling	Inductive proximity sensors are designed for degree of soiling 3.	
Maintenance, repair and disposal	If used correctly, no maintenance and repair measures are necessary. Only the manufacturer is allowed to repair the unit. After use dispose of the unit in an environmentally friendly way in accordance with the applicable national regulations.	

Info card

Inductive Kplus sensors

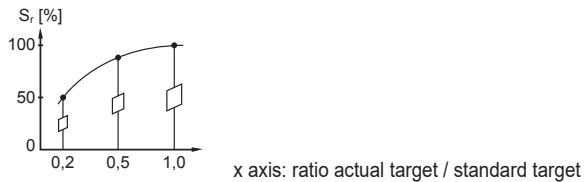


Sensing range (referred to the standard target)

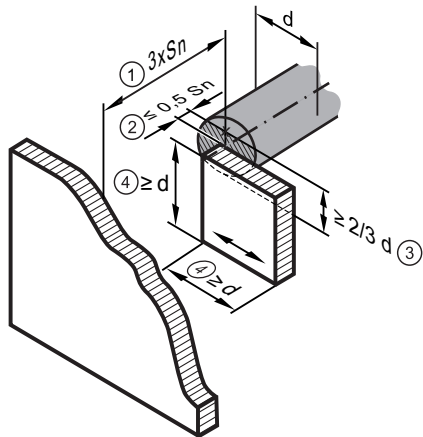


- Nominal sensing range S_n = characteristic value of the unit
- Real sensing range S_r = individual deviation at room temperature between 90 % and 110 % of S_n
- Useful sensing range S_u = switch point drift between 90 % ($S_{u\min}$) and 110 % ($S_{u\max}$) of S_r
- Assured sensing range = operating distance S_a = reliably switched between 0 % and 81 % of S_n
- Safe switch-off distance = $S_{u\max}$ + max. hysteresis = 143 % of S_n

Influence of the target size



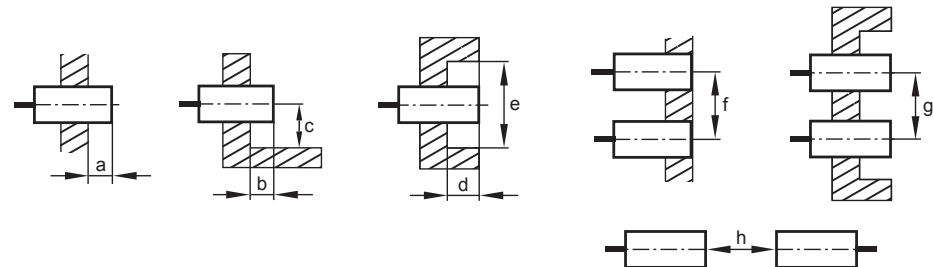
Recommended detection conditions



- ① Distance to the background
- ② Recommended target distance
- ③ Recommended degree of coverage of the sensing face
- ④ Recommended target size

Tips on flush and non-flush mounting in metal

Installation instructions cylindrical designs



		S_n	a	b	c	d	e	f	g	h
M8	b	1,5	-	-	7	-	-	16		8x S_n
		3	-	-	7	-	-	16		
	nb	4	8	8	12	8	32	-	32	
		6	8	12	12	12	32	-	32	
M12	b	3	-	-	8	-	-	24	-	
		4	-	-	8	-	-	24	-	
	nb	8	10	10	18	16	36	-	48	
		10	12	20	18	20	48	-	48	
M18	b	5	-	-	11	-	-	36	-	
		8	-	-	11	-	-	36	-	
	nb	12	15	15	27	24	54	-	72	
		15	18	30	27	30	72	-	72	
M30	b	10	-	-	17	-	-	60	-	
		15	-	-	17	-	-	60	-	
	nb	22	22,5	22,5	45	37	90	-	150	
		30	30	37	45	37	150	-	150	

Installation instructions rectangular designs → see enclosed operating instructions or www.ifm.com

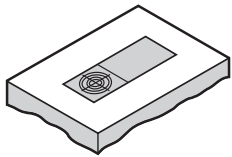
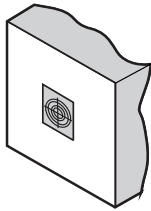
Info card

Inductive Kplus sensors

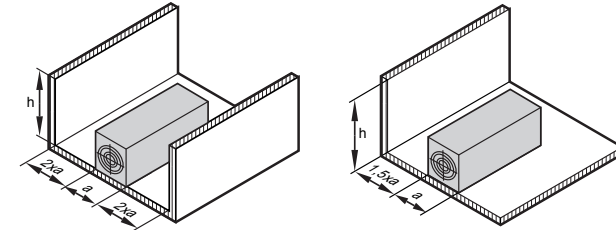


Installation instructions rectangular designs

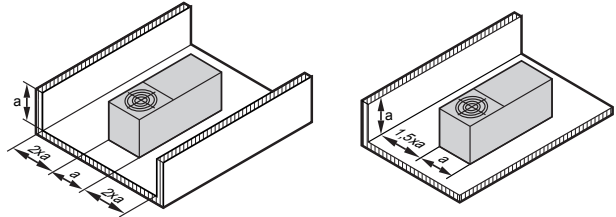
Flush:



Non-flush:



$h = \text{any}$



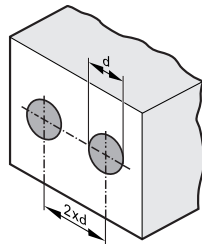
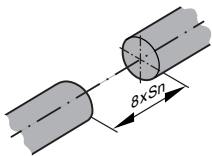
i If the required clear space is not observed for non-flush units, the sensor is predamped. This may lead to permanent switching.

i Possibly deviating installation instructions for rectangular units with increased sensing range
→ Notes on mounting and operation.

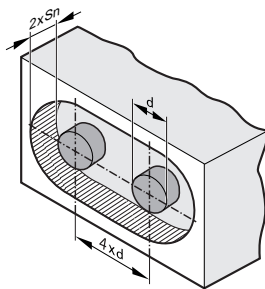
Minimum clearance for installing units of the same type (side-by-side installation)

Applies to cylindrical and rectangular sensors.

Flush:

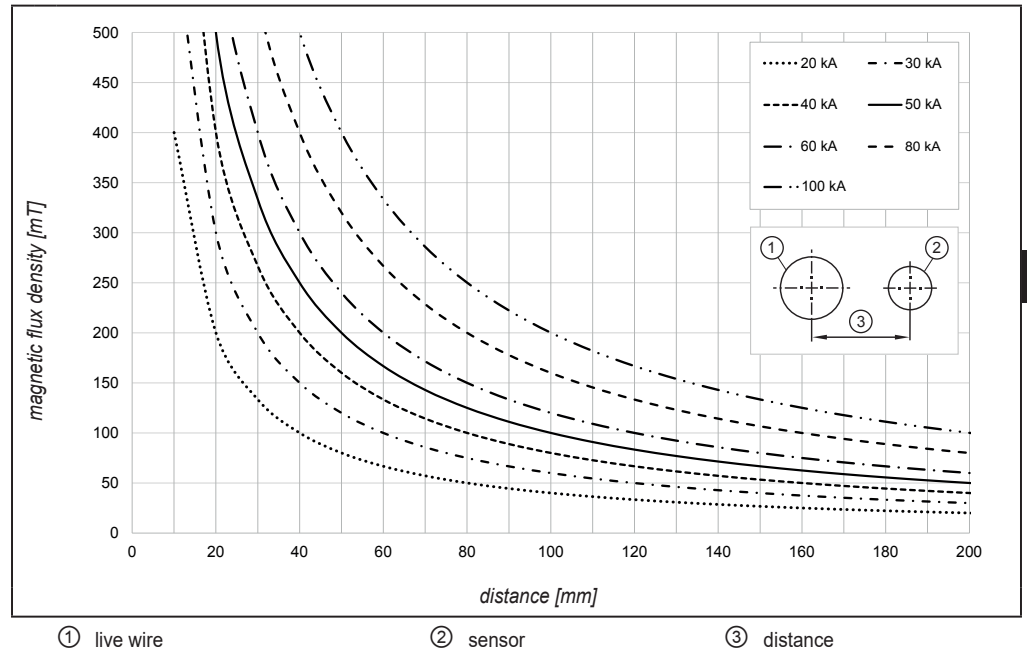


Non-flush:



i The minimum distance between units may only be disregarded for units with different oscillator frequencies or different sensing principles.

Magnetic flux density depending on distance and current



Info card

Inductive Kplus sensors

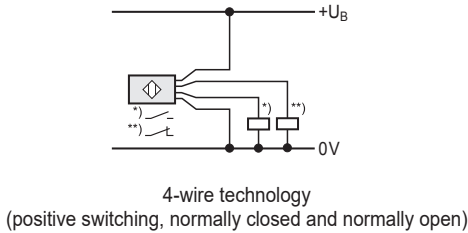
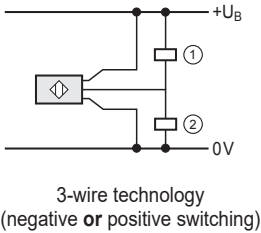


Electrical connection

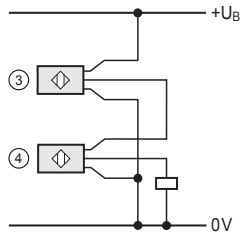
! The unit must be connected by a qualified electrician.

- ① Negative switching
- ② Positive switching
- ③ Sensor 1
- ④ Sensor n

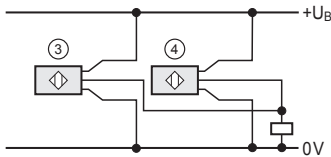
Connection systems



Series connection (AND)



Parallel connection (OR)



Series connection of 3-wire units
Max. 4 units. Power-on delay times, voltage drops and current consumption add up. $U_{B\ min}$ (sensor) and $U_{HIGH\ min}$ (load) must remain unchanged.

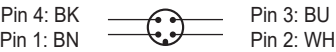
Parallel connection 3-wire units
The current consumption of all non-switched units adds up. The units can be used in combination with mechanical switches.

Configuration of cables and connectors

Colours: BK: black, BN brown, BU: blue, WH: white
Standard configuration for 3-wire DC:

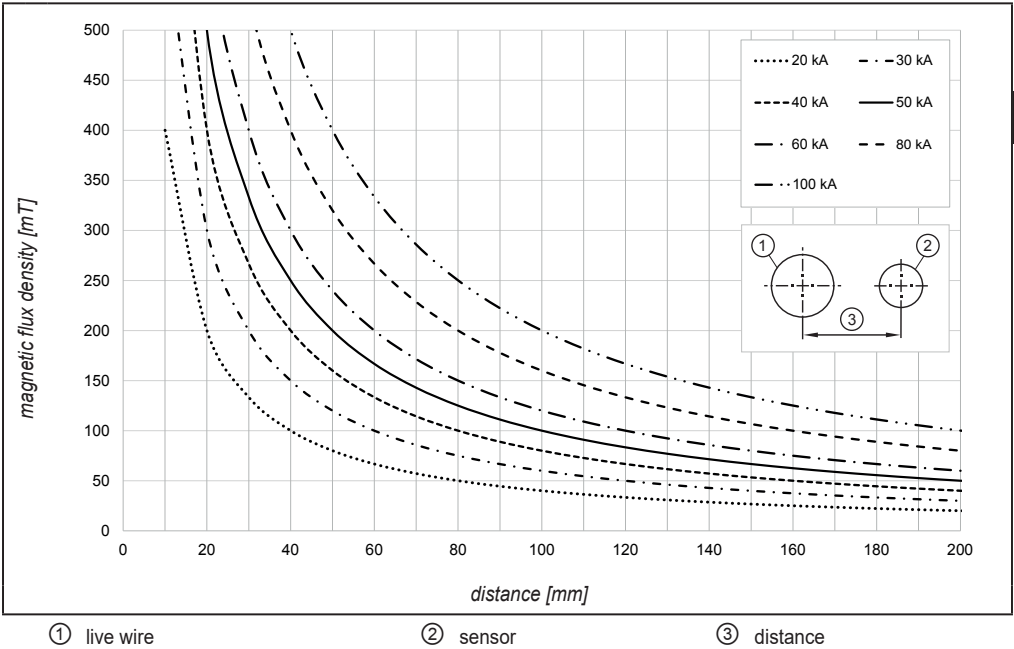
		Cable	US-100 plug
L+		BN	Pin 1 / BN
L-		BU	Pin 3 / BU
Output		BK	Pin 2 / WH Pin 4 / BK

Pin configuration of the US-100 connectors (view onto the plug at the unit)



Please refer to the wiring diagrams in our main catalogue for position sensors for the cable and the pin configuration as well as the unit data of special versions.

Magnetic flux density depending on distance and current



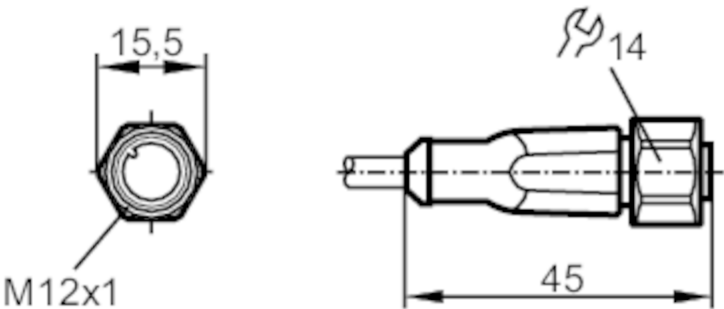
UK

7.2 Power cable with bushing



Female cordset

ADOGH040VAS0005H04



Application		
System		Free from silicone; Halogen-free; gold-plated contacts; Drag chain suitability
Application		applications in particularly harsh environments
Free from silicone		yes
Electrical data		
Operating voltage	[V]	< 250 AC / < 300 DC
Protection class		II
Max. current load total	[A]	4
Operating conditions		
Ambient temperature	[°C]	-40...90
Note on ambient temperature		cULus: ...75
Ambient temperature (moving)	[°C]	-25...90
Note on ambient temperature (moving)		cULus: ...75
Storage temperature	[°C]	-25...55
Storage humidity	[%]	10...100
Other climatic conditions for storage according to stated class		1K22/ DIN 60721-3-1
Protection		IP 65; IP 67; IP 68; IP 69K

EVM002



Female cordset

ADOGH040VAS0005H04

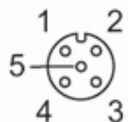
Tests / approvals		
Vibration resistance	EN 60068-2-6 Fc	20 g (10...3000 Hz) / -20 °C / 50 °C
		50 sweep cycles per frequency; 1 octave per minute in 3 axes
Shock resistance	EN 60068-2-27 Ea	100 g 11 ms half-sine; 6 shocks each in every direction along the three coordinate axes / -40 °C / 85 °C
Continuous shock resistance	EN 60068-2-29 Eb	40 g 6 ms; 4000 shocks each in every direction of the 3 coordinate axes / -20 °C / 50 °C
Fast temperature changes	EN 60068-2-14 Na	TA = -40°C; TB = 85°C; t1 = 30 min; t2 = < 10 s 50 cycles
Salt spray test	EN 60068-2-52 Kb	severity level 5 (4 test cycles)

Mechanical data		
Weight	[g]	177.2
Dimensions	[mm]	15.5 x 15.5 x 45
Material		housing: TPU (urethane) orange; sealing: FKM
Material nut		stainless steel (1.4404 / 316L)
Drag chain suitability		yes
Drag chain suitability	Bending radius for flexible applications	min. 10 x cable diameter
	Travel speed	max. 3.3 m/s for a horizontal travel length of 5 m and max. acceleration of 5 m/s ²
	Bending cycles	> 5 Mio.
	Torsional strain	± 180 °/m

Remarks	
Pack quantity	1 pcs.

Electrical connection
Cable: 5 m, PUR, Halogen-free, black, Ø 4.9 mm; 4 x 0.34 mm ² (42 x Ø 0.1 mm)

Electrical connection - Socket
Connector: 1 x M12, straight; Locking: stainless steel (1.4404 / 316L); Contacts: gold-plated; Tightening torque: 0.6...1.5 Nm

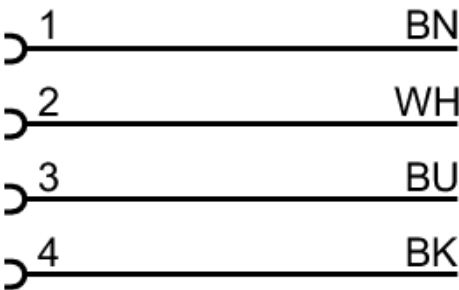




Female cordset

ADOGH040VAS0005H04

Connection



Core colors :

BK = black

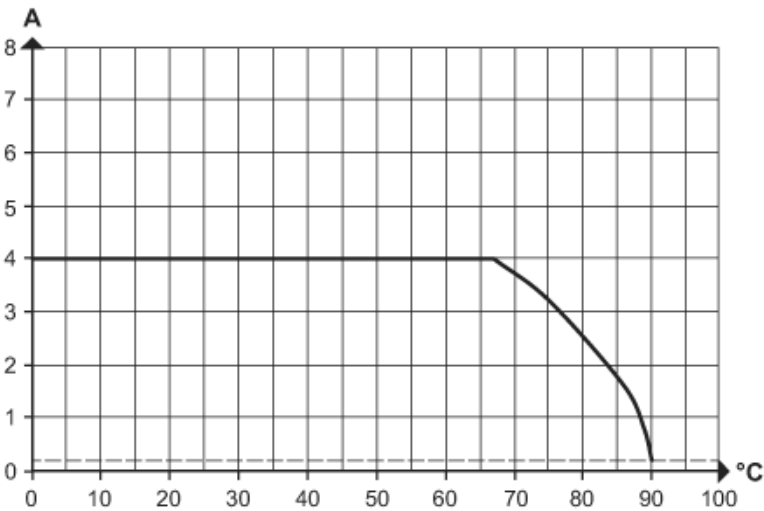
BN = brown

BU = blue

WH = white

Diagrams and graphs

Characteristic curve for derating



Derating $I_{max} \cdot 0.8$ (DIN EN 60512-5-2)

X Ambient temperature [°C]

Y Current [A]



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Technical Documentation