wieland

podis®MOT FA C 3I/RS485 (SEW)

AS-Interface field distributor for the MOVILINK® protocol

Installation and Operating Manual

Document number BA000345
Revised edition

Dear customer,

Congratulations on your new components of the podis decentral automation system. You are the owner of an AS interface technology product. It allows for the control of drives in industrial systems.

Please familiarize yourself with this documentation. It contains all the information and help required for proper operation of your podis system. If you still have questions or require any help, our experts are gladly at your disposal using the contact options listed below.

Hotline **Technical Service** (technical questions about accessories, operating principle, product features and application options of the podis energy bus system):

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1.1 Version management

Document BA000345		
Version	**Date**	**Author**
First edition	01.03.2006	Dr.-Ing. T. Kluck
Revised edition	6.10.2006	Dr.-Ing. T. Kluck

1.2 Additional documents

Documents from Wieland Electric

Wieland Electric provides the following documents for the podis® system:

- podis® CON manual, order no. 00.000.0059.0
- Operating manual for the AS-i hand-held terminal

Documents from suppliers

The following documents are provided by suppliers:

- MOVIMOT® MM03C-MM3XC operating instructions (SEW Eurodrive, document number 1121 8126 / EN)
- MOVIMOT® MM03B-MM30B operating instructions (SEW Eurodrive, document number 1050 5814 / EN)
- Operating manual of the AS-i master

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The simple mentioning by itself does not imply that the trademark is not protected by the rights of others!

1.3 Contents

1.4 About these operating instructions

What do these operating instructions describe?

These operating instructions provide support for the installation, commissioning, and maintenance of the podis MOT FA C 3I/RS485 MOVIMOT field distributor.

It contains instructions for programming, configuring, and parameterizing the field distributor.

Who should use these operating instructions?

These operating instructions contain the information required for the intended use of the products described herein.

podis systems may be installed only by qualified personnel while adhering to the respective regulations of the VDE (Association of German Electricians). For this reason, these operating instructions are intended for technically qualified personnel (e.g. skilled persons, electrical engineers) who is either

- familiar with the safety concepts of automation technology as project planning and programming personnel, or
- trained in handling equipment of automation technology as operating personnel and familiar with the contents of these instructions pertaining to the operation, or
- trained as installation, commissioning, and maintenance personnel which enables them to perform operations on equipment of automation technology and who is authorized to commission, ground, and identify electrical circuits and devices or systems according to the standards of safety engineering.

Special requirements are:

- Basic knowledge of AS interface technology
- Basic knowledge of decentral drive systems

Safety instructions

These operating instructions use different safety instructions depending upon the hazard potential:

DANGER
"Danger" identifies a direct dangerous situation or a direct dangerous condition which, if not avoided, causes serious injuries or death. The use of this sign is restricted to extreme situations.

WARNING
"Warning" identifies a potentially dangerous situation or a potentially dangerous condition which, if not avoided, may cause serious injuries or death.

CAUTION
"Caution" identifies a potentially dangerous situation or a potentially dangerous condition which, if not avoided, may cause minor or non-serious injuries or death. "Caution" is also used to warn about unsafe handling or obvious misuse. "Caution" is also used for situations in which property damage or personal injuries may occur.

NOTICE
"Notice" identifies information that is directly or indirectly related to the safety of personnel or property. It is not used for dangers or dangerous situations.

"Danger" or "warning" generally refers to a risk to life or limb. In this case, property damages are considered only if there is also a risk to bodily injury corresponding to the danger level.

1.5 Intended use

The podis MOT FA C field distributor with RS485 interface (MOVILINK protocol) is an AS interface actuator/sensor module on the podis energy bus for the control and energy supply of SEW MOVIMOT AC motors with integrated frequency inverter and serial communication (RS485).

The energy bus systems have been constructed according to engineering standards and recognized engineering safety regulations. Yet in their application they can still pose hazards to the safety or life of the operator or a third party, or damage to machines, systems or other property.

The energy bus systems must only be used when in proper working condition, as well as according to its intended application, with due regard to safety, awareness of any hazards and following the operating guidelines. Reliable and safe operation of the control system is dependent on proper shipping, storage and installation, as well as careful operation and maintenance. In particular, any factors affecting safety must be eliminated immediately.

For proper usage of the energy bus systems, the instructions presented in this manual must be followed for the mechanical and electrical installation, activation and operation of the systems.

Never install or commission damaged products. Damages should be filed immediately with the transport company.

Before applying supply voltage to the field distributor, the top part (electronics cover) must be installed and fastened onto the bottom part.

DANGER

Before opening the equipment (e.g. removing the electronics cover), the energy bus segment must be de-energized. Dangerous voltages can be present up to one minute after disconnecting the supply (voltage in the DC links for decentral frequency inverters or power supplies).

During operation, do not disconnect or connect any plug connections to the attached consumers.

For the project planning, installation and commissioning of the energy bus systems as part of the supply of machines and their controllers, the machine manufacturer and user must observe the safety regulations of machine directive 89/392/EWG. For the specific application case, the national accident prevention regulations apply. Observe the applicable safety and accident prevention regulations for the respective application cases, such as the machine protection directive. All safety devices of the controlled machine must be implemented in such a way that they operate independent of the controller. EMERGENCY OFF devices according to IEC 204 (corresponding to DIN VDE 113) must remain effective in all operating modes of the system. In an EMERGENCY OFF case, the supply voltages of all switching elements controlled by the controller must be switched off.

The field distributor is intended exclusively for automation tasks in industrial systems and machines. Any other or additional use beyond that is considered to be unintended use. The manufacturer is not liable for any damages resulting from it.

For the intended use of the automation systems, the instructions described in these operating instructions for the mechanical and electrical assembly, commissioning and operation must be observed.

Personnel selection and qualification

All project planning, programming, installation, commissioning, operation and maintenance work in conjunction with the podis electronics products may be performed only by trained personnel (e.g. skilled persons, electrical engineers). The project planning and programming personnel must be familiar with the safety concepts of automation technology.

The operating personnel must be trained in handling the controller and be familiar with the operating instructions. The installation, commissioning and maintenance personnel must have training that allows them to perform operations on automation systems.

Obvious misuse

Warnings about obvious misuse and unsafe handling are featured at the corresponding locations.

NOTICE
The manufacturer is not liable for damages resulting from improper use.

1.6 Project planning, programming, installation, commissioning, and operation

With respect to their application, the field distributors of the podis series are generally a part of larger systems or plants in which machines are controlled. For the project planning, installation and commissioning of the podis systems as part of the control of machines, the machine manufacturer and user must, therefore, observe the safety regulations of machine directive 89/392/EWG. For the specific application case, the national accident prevention regulations apply, such as VBG 4.0.

All safety devices of the controlled machine must be implemented in such a way that they operate independent of the controller. EMERGENCY OFF devices must remain effective in all operating modes of the controller. In an EMERGENCY OFF case, the supply voltages of all switching elements controlled by the controller must be switched off. A safety relay can be used for this purpose.

Precautions must be taken that an interrupted control program can be properly started again after voltage dips and power failures. No dangerous operating states may occur, not even briefly. If necessary, EMERGENCY OFF must be forced. To prevent an open circuit on the signal side from causing undefined states in the controller, the corresponding safety measures must be taken for the I/O coupling with respect to hardware and software. Devices of the control technology and their controls must be installed in such a way that they are sufficiently protected against inadvertent activation.

The automation devices must be de-energized before they are assembled or disassembled or the design is changed.

1.7 Maintenance and servicing

If the active device requires measuring or testing work, the regulations and execution instructions of accident prevention regulation VBG 4.0 must be observed. A suitable electric tool must be used.

Repairs involving control components may be performed only by authorized repair locations. Unauthorized opening and tampering or improper repairs can cause physical injuries or property damages.

Before opening the device, always disconnect the connection to the supply system (unplug the power plug or open the isolation switch).

Control modules may be changed only in the de-energized state. Disassembly and assembly must be carried out according to the mechanical equipment mounting directives.

1.8 Prevention of property damages and bodily injuries

The voltage values must not be less than or greater than the voltage values listed in the technical data since it may lead to malfunctions or damage to the devices.

If errors occur in the automation equipment that may cause heavy property damages or even bodily injuries, additional external safety measures must be taken or devices must be created that will ensure or force a defined operating state in case of an error (e.g. by means of independent limit switches, mechanical interlocks, etc.).

1.9 Dangers from electrical energy

WARNING
Opening the housing or removing the covers of system components provides access to various parts that may contain dangerous voltage levels.

The user must ensure that unauthorized and improper operation is prevented.

All personnel must be thoroughly familiar with all sources of hazards and measures for operating and servicing the equipment as per the guidelines in the operating instructions.

2 podis®MOT FA C 3I/RS485 Device description

2.1 General

The podis MOT FA C field distributor with RS485 interface (MOVILINK protocol) is an AS interface actuator/sensor module on the podis energy bus for the control and energy supply of SEW MOVIMOT AC motors with integrated frequency inverter and serial communication (RS485).

The drive is controlled in cyclical operation with a 4-bit input/output process image. Six fixed setpoints and three ramps can be selected and their values be changed.

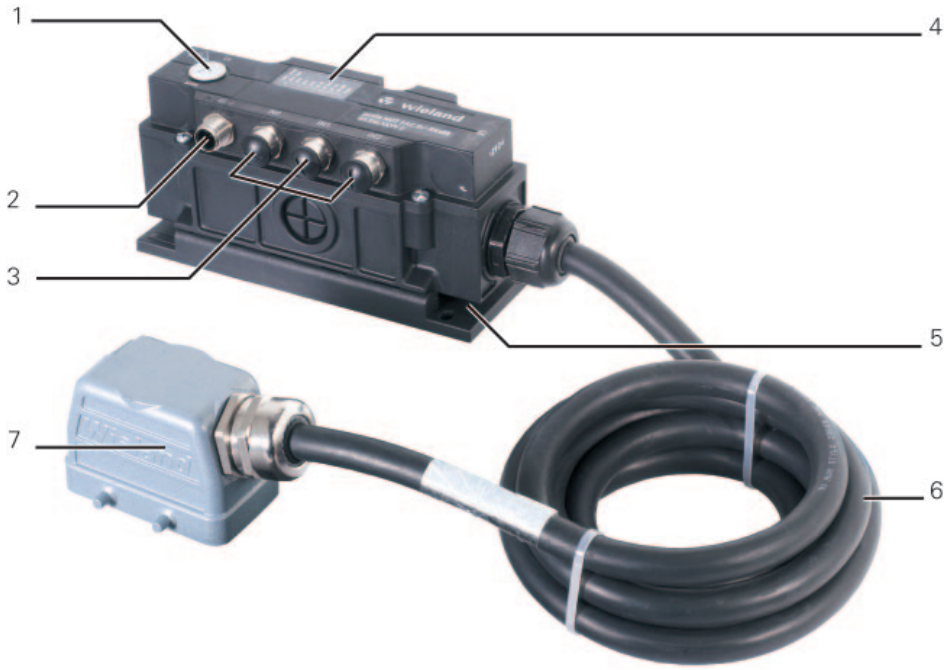
The connection between field distributor and drive is implemented using a prefabricated hybrid cable and plug connector.

Using prefabricated M12 connecting lines allows for connecting 2-wire and 3-wire sensors to the three free inputs. The sensors are supplied in the podis field distributor from the AS interface.

The field distributor is directly connected to the AS-i hand-held terminal (83.209.2204.0) and addressed using the AS-i programming cable (83.209.2205.0).

To display the current switching state and the status of the inputs, each channel features an LED in the housing cover of the field distributor.

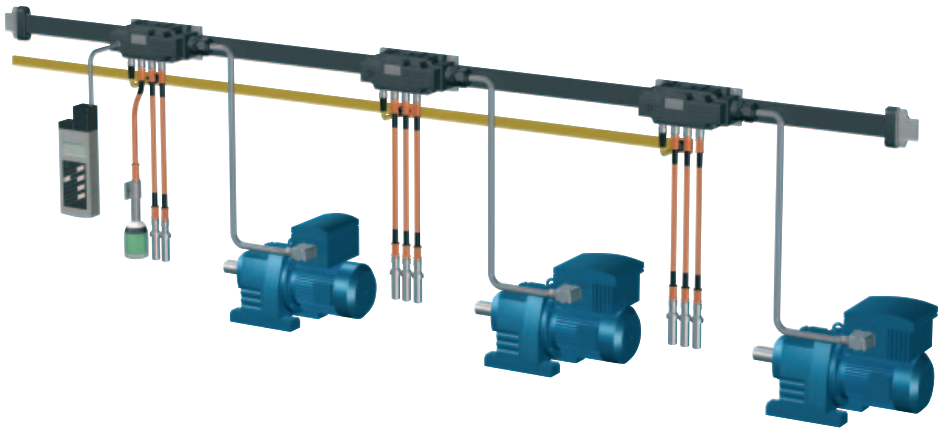
The connection to the AS-i transmission line is carried out via M12 connecting plug. If the AS-i flat cable is to be used, the AS-i spur line and the AS-i adapter must be used. The contact to the energy bus is established via contact screws.



podis®MOT FA C 3I/RS485 MOVIMOT®

1 Addressing socket [ADDR]
2 AS interface connection [AS-i (X2)]
3 Connections of digital inputs [IN0(X3)] [IN1(X4)] [IN2(X5)]
4 LED displays
5 Insertion space for flat cable
6 Hybrid cable to the drive
7 Motor connection coupling (X1)

Example for a podis® system



podis®MOT in AS-i field application

2.2 Mechanical design / housing

Based on its mechanical design, the housing of the podis MOT FA C 3I/RS485 MOVIMOT is divided into an upper part (called "hood") and a lower part (denoted as "base").

Hood

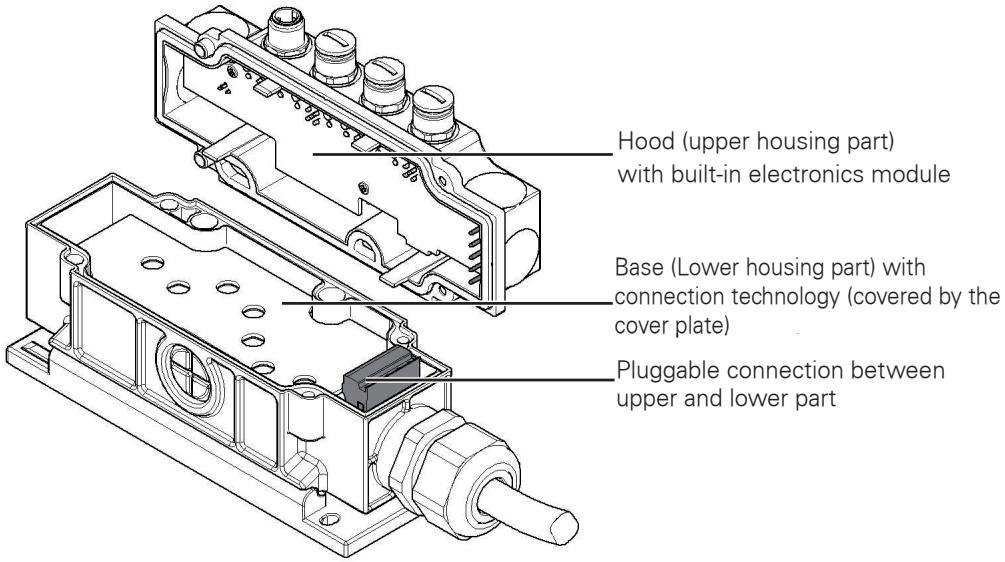
The hood contains the functionality, i.e., the electronics for controlling the drive. The hood is fastened onto the base using four screws.

Base

The base of the housing contains the connection technology for the podis energy bus.

Electrical connection

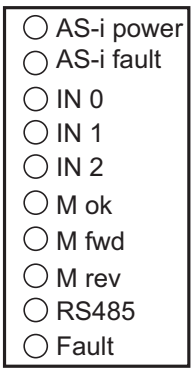
The electrical connection between hood and base is implemented via a cable harness from the lower part connected to a printed circuit board (PCB) pluggable connector in the hood.



podis®MOT (opened)

2.3 Display, control and connection elements

Status LEDs



Nr.	Color	Designation	Meaning	I/O bit
1	green	AS-i power	AS-i power ok	
2	red	AS-i fault	Fault of AS-i	
3	yellow	IN 0	Input M12	E0
4	yellow	IN 1	Input M12	E1
5	yellow	IN 2	Input M12	E2
6	yellow	M ok	Motor is operational	E3
7	yellow	M fwd	CW rotation of motor	
8	yellow	M rev	CCW rotation of motor	
9	yellow	RS485	Status of serial interface	
10	red	Fault	Fault of motor	

The status LEDs on the housing cover provide information about the status of the field distributor. See also section 7.1, "Malfunctions and their remedies".

AS-i hand-held terminal

The addressing is carried out via an external hand-held terminal connected to the addressing socket.

podis®MOT with AS-i hand-held terminal

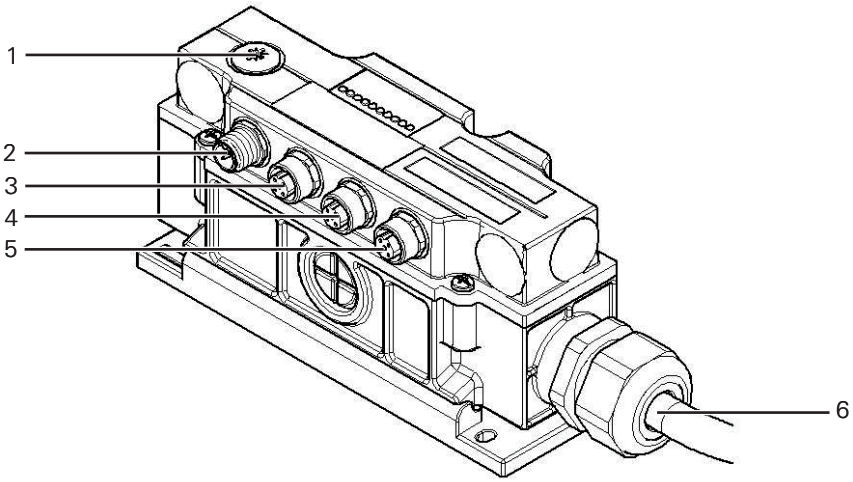
NOTICE
The description and operation of the AS-i hand-held terminal can be found in the operating instructions of the AS-i hand-held terminal.

Repair switch

If the field distributor version features a repair switch, it is used to disconnect the voltage supply for maintenance and repair work on the attached motor.

The podis MOT features the following connections:

Connections at the podis®MOT



Connections at the podis®MOT

1	ADDR	Connection of the AS-i hand-held terminal
2	AS-i (X2)	Connection of the AS-i spur line
3	IN0 (X3)	Digital M12 input to connect a sensor
4	IN1 (X4)	Digital M12 input to connect a sensor
5	IN2 (X5)	Digital M12 input to connect a sensor
6	X1	Hybrid cable (firmly wired) to connect the drive control

2.4 Technical data

AC input	
• Input voltage V_{supply}	230/400 VAC
• Supply frequency input	50 Hz ± 10% (45 Hz ... 55 Hz)
AC output	
• Output voltage	V_{supply} (input voltage)
• Output current per phase	max. 16 A
• Output frequency	50 Hz ± 10% (45 Hz ... 55 Hz)
MOVIMOT electronics supply	
• Input voltage	24VDC ± 20% (19.2V ... 28.8V)
• Power consumption	approx. 0.2W (per MOVIMOT)
• Switch-on current	1 A
AS interface	
• AS-i specification	V2.11, Single Slave, Profile S7.4, Identifier 74F0
• Number of addressable slaves	31
• Address range of slaves	0 ... 31
• Line length	max. 30 cm spur line per module + 100 m AS interface line
• AS-i voltage, minimum	26.5V
• Current consumption from AS-i	max. 280 mA
• Addressing option	DC socket 1.3 mm
Digital inputs	
• Digital inputs (via AS-i)	3
• Input current	typ. 5 mA
• Input resistance	typ. 5 kohm
• Supply current of initiators	max. 50 mA for each initiator
• Signal level V_{high} / V_{low}	+15V ... +31.5V / -3V ... +5V
• Scan time	approx. 5 ms
Outputs (hybrid line)	RS485 interface, integrated bus termination; 24VDC supply voltage, damping diode; L1, L2, L3 and PE, line length max. 5 m
General data	
• Environmental conditions (overall system)	Industrial atmosphere
• Pollution degree	III
• Overvoltage category	3
• Fire behavior of contact carriers	min. UL94V2
• Temperature - operating environment	0...50 °C
• Temperature - storage/transport	-25 °C ... +60 °C / -25 °C ... +70 °C
• Vibration	IEC 60721 Class 3M6
• Air humidity	100 %, non-condensing
• Enclosure	IP 65 acc. to EN 60529
• Protection class	Class 1 acc. to 60536
• Protection category	3
• Mounting position	As required (preferably horizontal wall mounting)
• Dimensions	See section 3.2, "Installation dimensions"

2.5 Ordering information

Article number

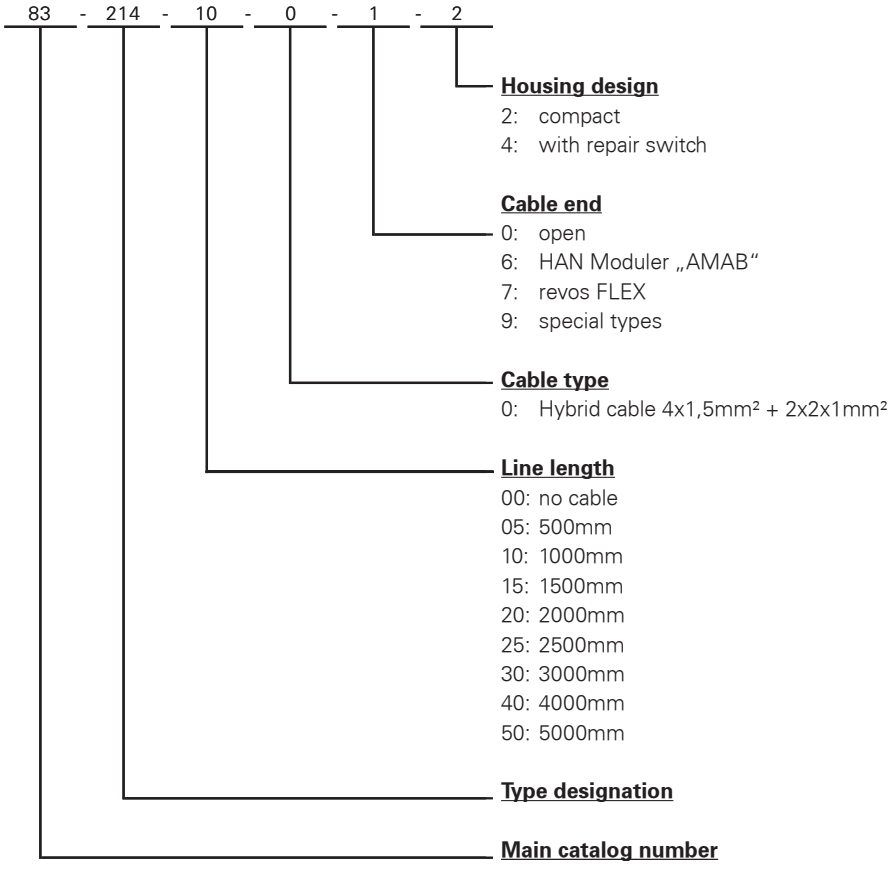
Field distributor	
• podis MOT FA C 3I/RS485 (AMA6)	83.214.xx06.2
• podis MOT FA C 3I/RS485 (revos FLEX)	83.214.xx07.2
• podis MOT FA C 3I/RS485 (open end)	83.214.xx00.2
• podis MOT FA C 3I/RS485 (AMA6)+Rep.	83.214.xx06.4
• podis MOT FA C 3I/RS485 (revos FLEX)+Rep.	83.214.xx07.4
• podis MOT FA C 3I/RS485 (open end)+Rep.	83.214.xx00.4

Accessories	
• Prefabricated connecting line (spur line) AS-i, length 30 cm	83.209.2203.0
• Counterpart to revos FLEX connector	99.700.1357.1
• AS-i branching profile line M12	83.209.2201.0
• AS-i hand-held terminal	83.209.2204.1
• Sealing sleeve	Z1.005.6553.1

Spare parts	
• Electronics module	83.209.2102.2
• Motor cable, complete	Upon request

Order number key

The coding of the article number, particularly the information about line length ("xx"), can be taken from the following order number key.



3 Installation

3.1 Prerequisites

Mounting site

The supporting surface must be a flat, vibration-free, and torsionally rigid structure. Mounting to an uneven surface can cause housing distortion.

Required fastening material

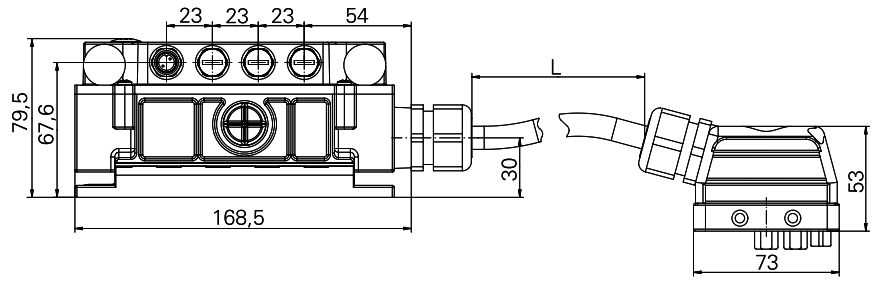
Three M4 screws and three washers (not part of the supply).

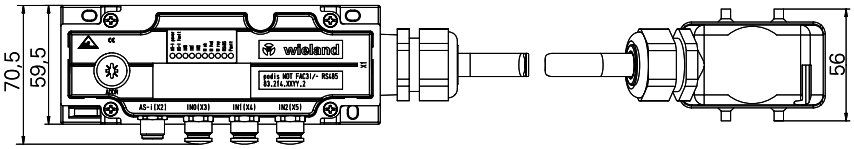
NOTICE
The hybrid cable is for non-trailing use only.

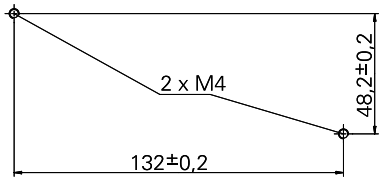
3.2 Dimensions

(values in mm)

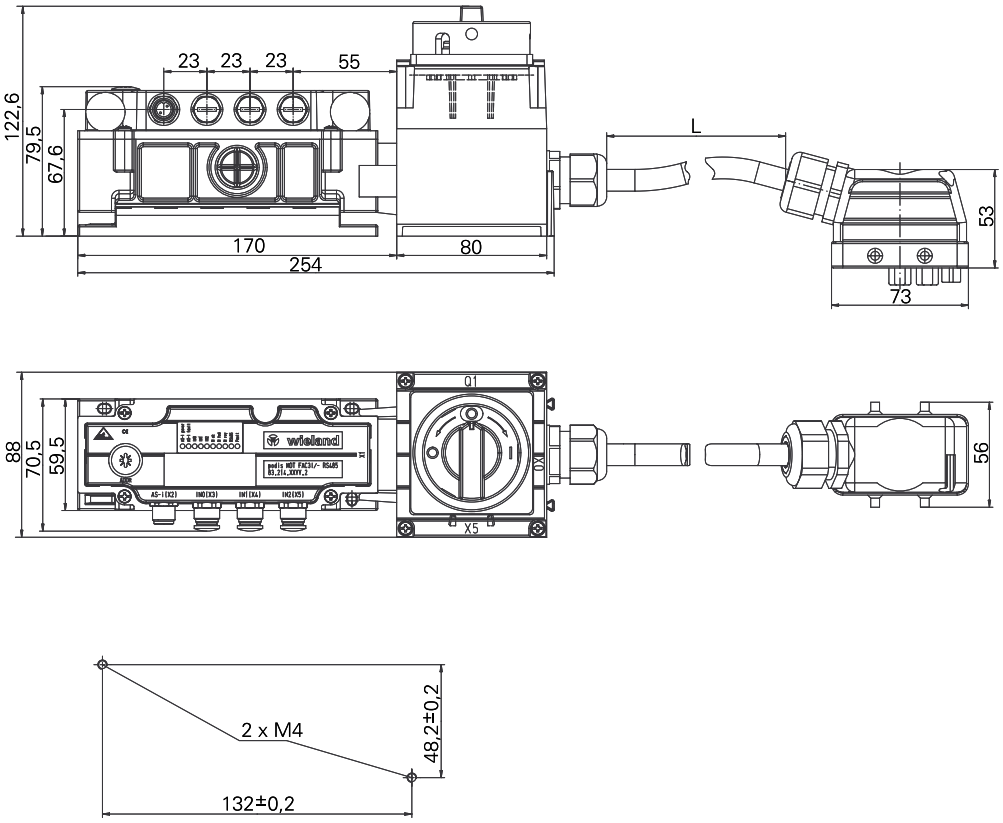
Dimensions 83.214.xxxx.2





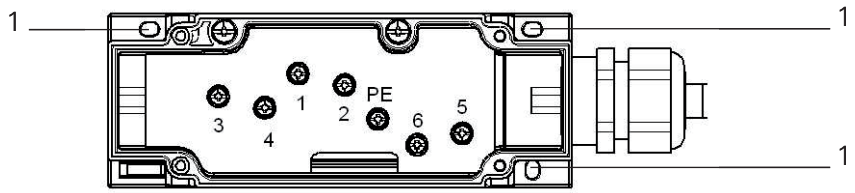


Dimensions
83.214.xxxx.4



3.3 Mounting

NOTICE
Use only the provided boreholes for the mounting on the supporting surface. Additional boreholes at different positions are not allowed!



1 - Boreholes for fastening screws

Procedure

To install the unit, proceed as follows:

1. Copy the borehole diagram (see the corresponding block diagram) onto the mounting surface.
   - The installation of the podis MOT on the mounting surface is carried out according to local conditions in accordance with the borehole diagram.
2. Fasten the podis MOT on the supporting surface using three M4 screws.
   - Use the washers.
   - Observe the alignment according to the planned routing of the podis flat cable.

4 Electrical Installation

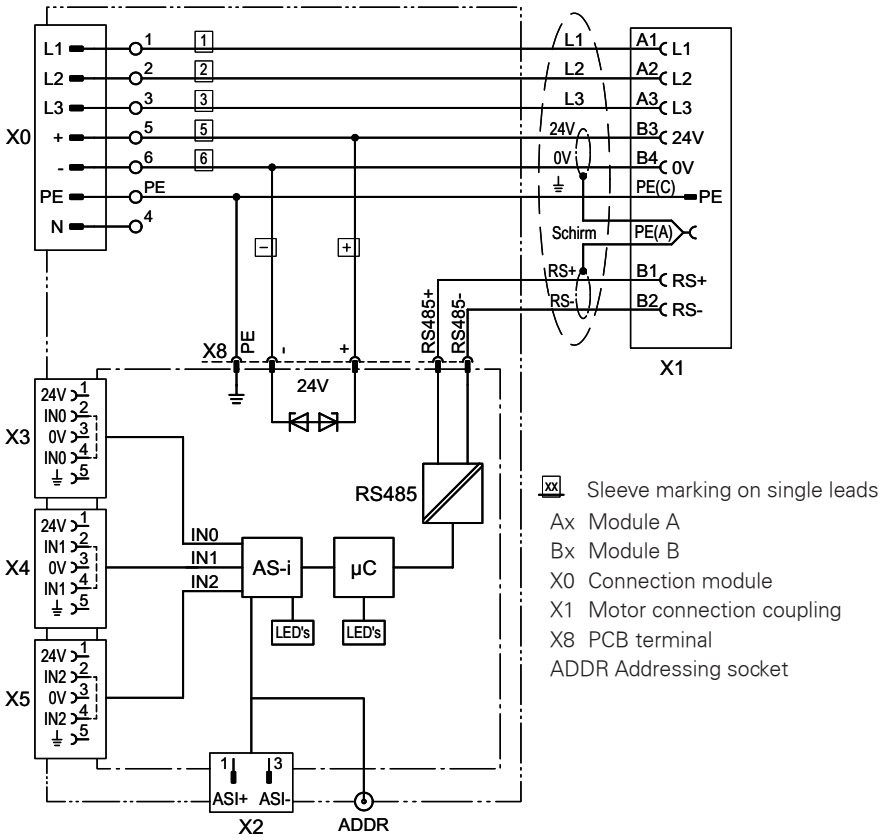
WARNING

The podisCON manual 00.000.0059.0 must be taken into account for the routing and connection of the flat cable.

- All electrical installation work and connections are only to be carried out by a qualified and trained electrician!
- To be observed are also the valid safety and accident prevention regulations!
- The plug connections must never be connected or disconnected under load!
- The entire flat cabling is to be disconnected from the voltage supply before opening and removing the electronic cover!
- When installing extra-low voltage circuits together with low-voltage circuits in a line, the cable must be protected against mechanical damage in hazardous areas by using e.g. cable trunking, steel conduit or an equivalent form of protection!

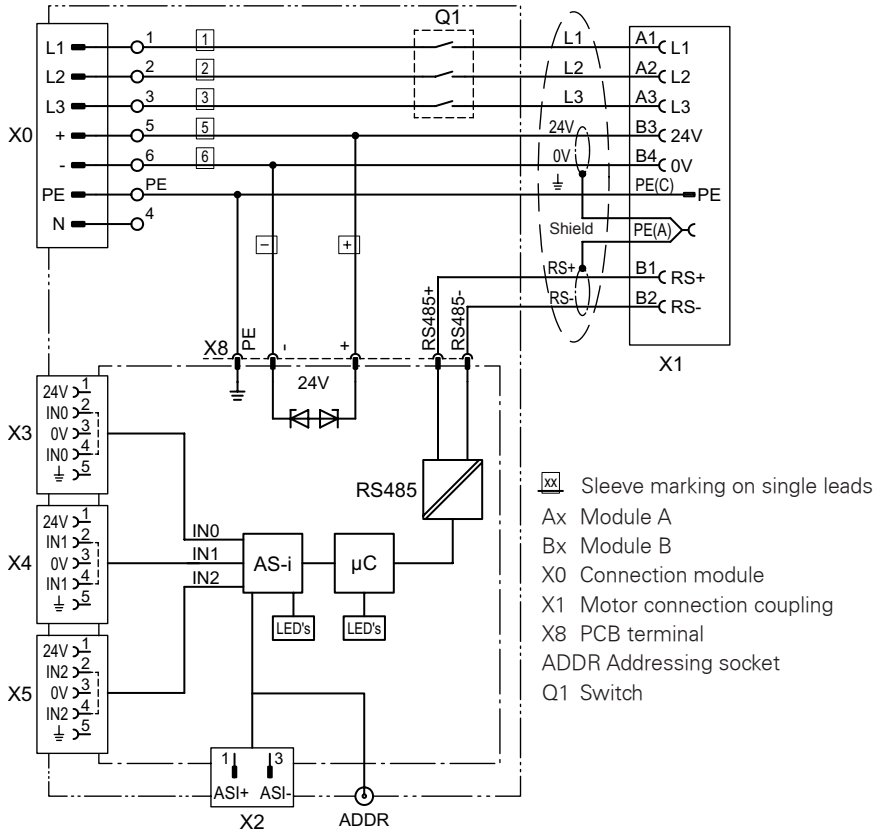
4.1 Block diagrams

Block diagram 83.214.xx06.2 (AMA6)



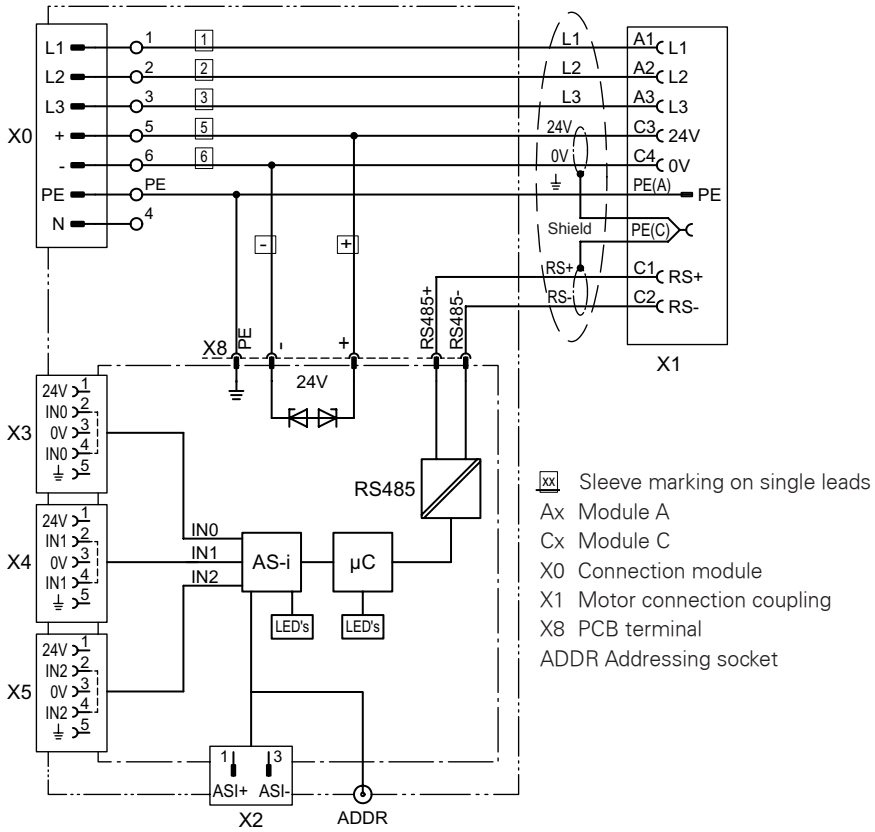
xx Sleeve marking on single leads
Ax Module A
Bx Module B
X0 Connection module
X1 Motor connection coupling
X8 PCB terminal
ADDR Addressing socket

Block diagram 83.214.xx06.4 (AMA6)



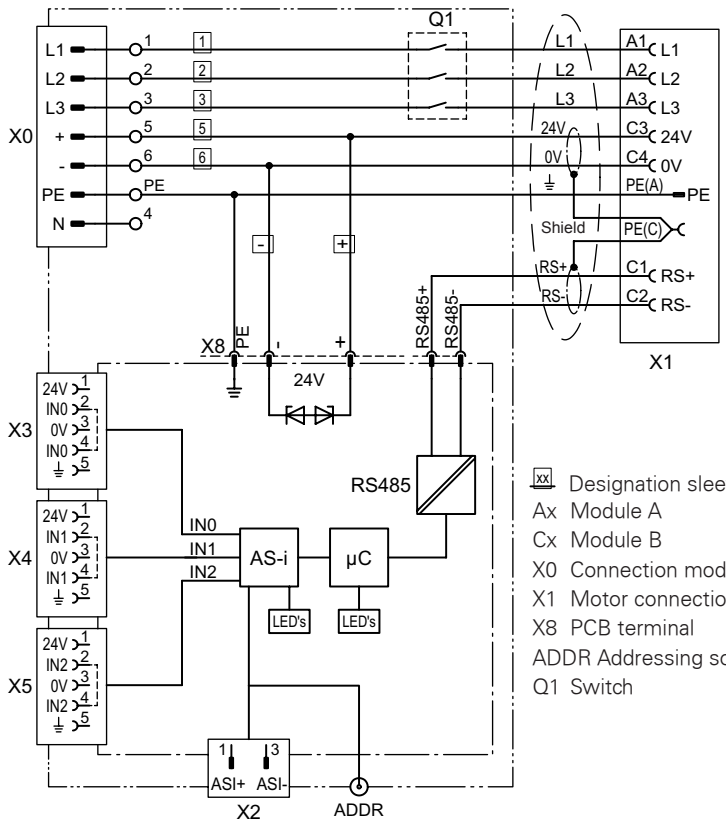
xx Sleeve marking on single leads
Ax Module A
Bx Module B
X0 Connection module
X1 Motor connection coupling
X8 PCB terminal
ADDR Addressing socket
Q1 Switch

Block diagram 83.214.xx07.2 (revos FLEX)



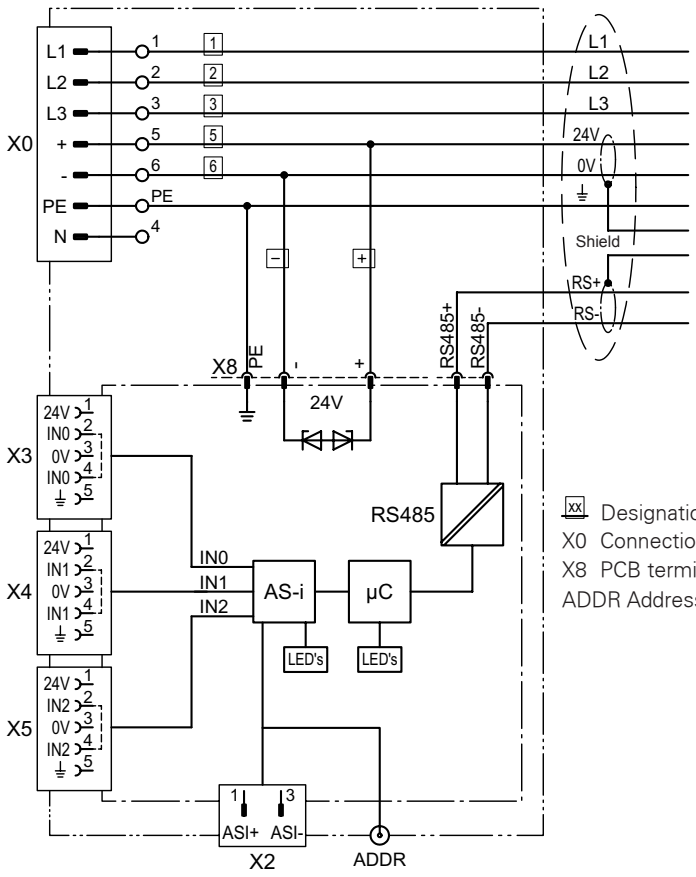
xx Sleeve marking on single leads
Ax Module A
Cx Module C
X0 Connection module
X1 Motor connection coupling
X8 PCB terminal
ADDR Addressing socket

Block diagram 83.214.xx07.4 (revos FLEX)



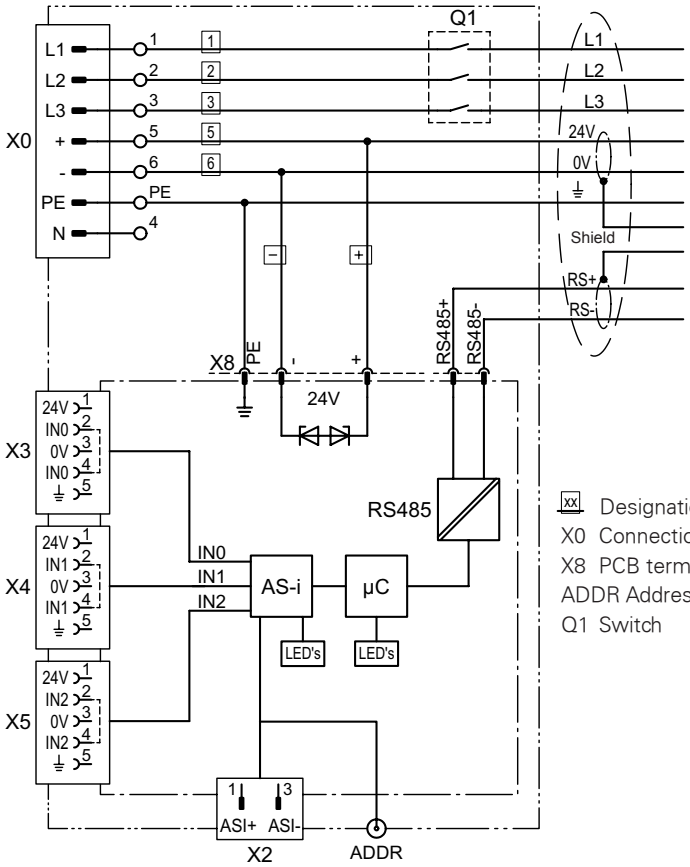
xx Designation sleeve on single core
Ax Module A
Cx Module B
X0 Connection module
X1 Motor connection coupling
X8 PCB terminal
ADDR Addressing socket
Q1 Switch

Block diagram 83.214.xx00.2 (open cable end)



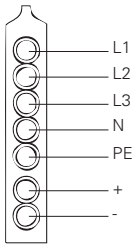
xx Designation sleeve on single core
X0 Connection module
X8 PCB terminal
ADDR Addressing socket

Block diagram 83.214.xx00.4 (open cable end)



XX Designation sleeve on single core
X0 Connection module
X8 PCB terminal
ADDR Addressing socket
Q1 Switch

4.2 Connection to the podis® energy bus



Conductor assignment of podis® flat cable

Conductor	PVC (gray, 7 x 2.5 mm²)	EVA (black, 7 x 4 mm²)
L1	brown	1 (black)
L2	black	2 (black)
L3	grey	3 (black)
N	blue	4 (black)
PE	green/yellow	PE green/yellow
+	red	5 (black)
–	white	6 (black)

The illustrated assignment of conductors in the podis flat cable must be followed for the field distributor to ensure proper operation.

Auxiliary voltage to supply the inputs and outputs must be taken from a reliably separated current supply (PELV according to IEC 60364-4-41)!

NOTICE

The podis flat cable is coded, thereby preventing an incorrect insertion.

Use of contact screws

The electrical connection on the energy bus flat cable is carried out by screwing in the insulation penetrating contact screws.

It is recommended to use a cordless driver with adjustable torque.

The following notices must be observed when handling contact screws:

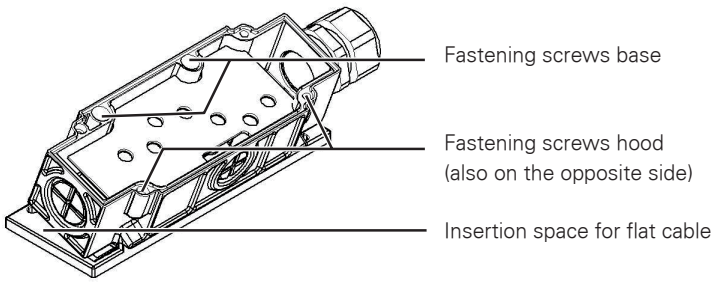
CAUTION

- All contact screws must be screwed in completely.
- Use a pneumatic or electrical screwdriver.
- Use Phillips no.1 screwdriver blades with a shaft length of at least 45 mm.
- Maximum torque is 1 Nm.
- Screwed-in contact screws may never be removed again! If a podis MOT is removed from the flat cable the podis sealing sleeve (Z1.005.6553.1) is to be used to seal the contact spots.
- Only use original screws from Wieland Electric.
- Operation with broken or damaged screws is prohibited.
- The cable ties must not be removed, and the contact screw cover must be fitted after completing installation.

Procedure

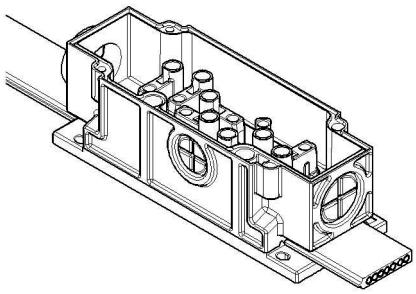
Proceed as follows to connect the field distributor to the energy bus:

1. Remove the fastening screws of the hood (upper housing part) and slightly lift it.
2. If necessary: Remove the electrical plug connection X8 between hood and base (lower part of housing) and remove the hood.
3. Remove the two fastening screws, open up the base and place the flat cable inside in the correct direction (according to the coding).



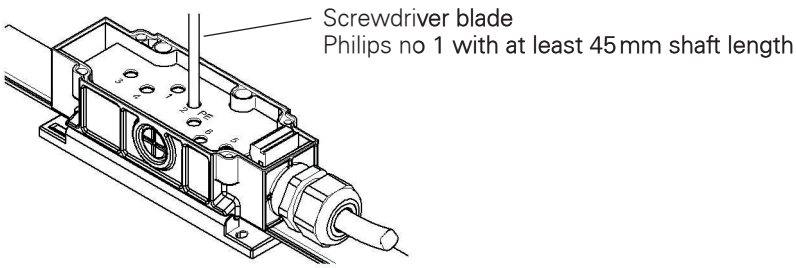
Opened base

4. Close the base and secure it with the two fastening screws.

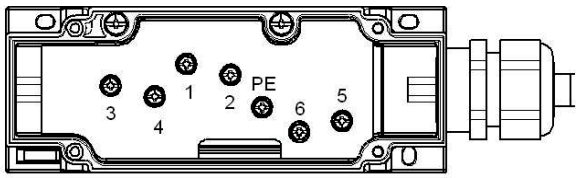


Flat cable inserted and base closed

5. Screw in the contact screws.
   - Screw all contact screws (also those not needed) into the flat cable.
   - Torque: 1 Nm



Screwing in the contact screws



Connection assignment in the field distributor

Connection assignment

1	L1
2	L2
3	L3
4	N
5	+
6	–
PE	PE

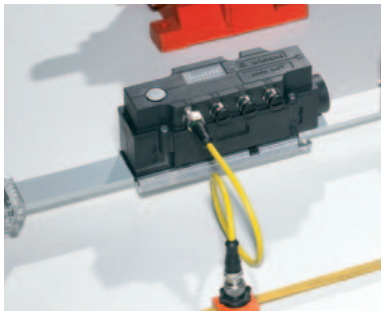
6. If disconnected: Reinsert the electrical plug connection between hood and base.
7. Fasten the hood with the four fastening screws.
   - Ensure that the unit is tight and that none of the connecting lines are squashed.

4.3 Connection to the AS-Interface

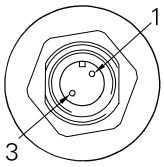
Connect the AS-i interface (M12 connector at the podis MOT FA C 3I/RS485 MOVIMOT) via the yellow AS-i cable with the AS-i network.

It is recommended to establish the connection via the AS-i profile cable adapter and AS-i spur line. Both parts are available as accessories from Wieland Electric GmbH (see below).

AS-i connection



Connection assignment



Pin	Brief description	Note
1	AS-i +	AS interface +
3	AS-i –	AS interface –

AS-i connection X2 (M12, external view of the plug-in contacts)

AS-i accessories

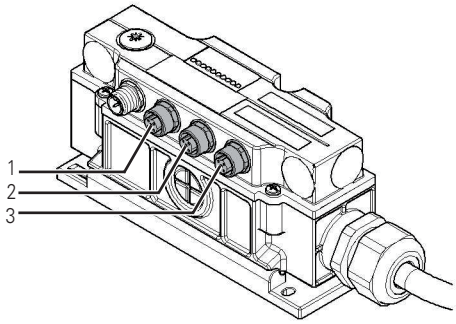
AS-i spur line, length 30 cm 83.209.2203.0

AS-i profile cable adapter 83.209.2201.0

4.4 Connection of sensors and actuators

At the podis MOT FA C 3I/RS485 MOVIMOT, three digital inputs can be connected to the AS-i interface via M12 sockets, see the block diagram in chapter 3.1.

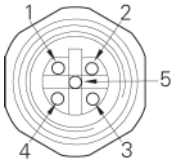
Digital inputs



Digital inputs

1 IN0 (X3)
2 IN1 (X4)
3 IN2 (X5)

Connection assignment of digital inputs



(external view)

Pin	Brief description	Note
1	24V	24VDC sensor supply (*)
2	IN	Switched input
3	0V	0V of sensor supply (*)
4	IN	Switched input
5	Ground	Equipotential bonding

(*) The digital inputs at X3, X4 and X5 are supplied from AS-i.

WARNING

To maintain IP 65 type of enclosure, protective caps must be mounted on all unoccupied inputs or outputs!

4.5 Connection of MOVIMOT®

MOVIMOT is connected by means of a hybrid line. The hybrid line is firmly connected at the podis MOT. The connection at MOVIMOT can be implemented in different ways.

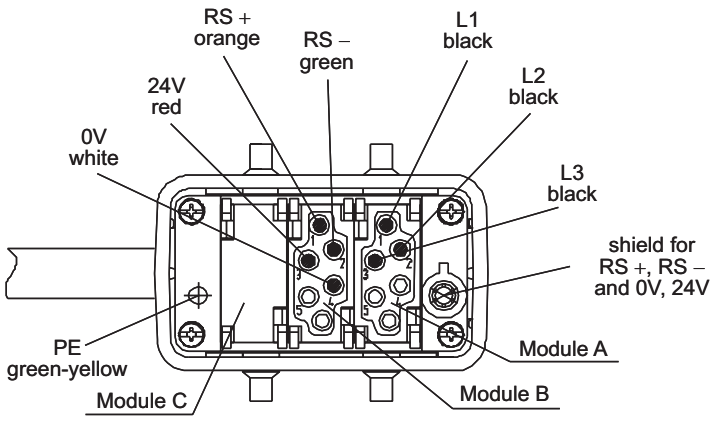
Cable ends

Code	Cable end
6	Modular inserts form Harting
7	revos FLEX
0	open

If the variant with industrial plug connector and HAN modular inserts is selected, then the "AMA6" plug option is required for MOVIMOT.

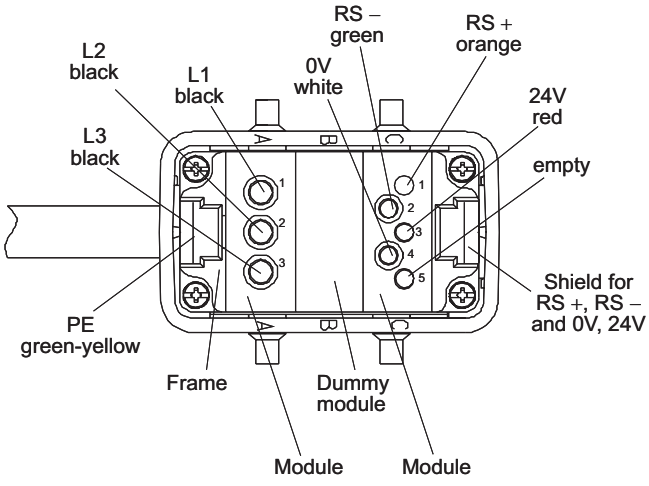
Please observe the ordering notes of the drive.

Connector assignment of modular insert from Harting



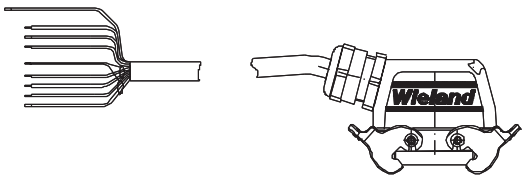
Connector assignment at podis®MOT with HAN® modular insert

Connector assignment revos FLEX insert



Connector assignment at podis®MOT with use of revos FLEX

If the connector interface at the drive cannot be equipped with the correct revos FLEX connector, the connection set shown below (counterpart to the revos FLEX connector, for part no. see ordering notes/accessories on page 2.7) may also be used.



Counterpart to revos FLEX connector

Connection at terminals (open cable end)

If no plug connection is desired, the conductors can also be connected directly to the terminals of the MOVIMOT. In this case, the following assignment must be adhered to:

MOVIMOT terminal	Core designation
L1	L1 black
L2	L2 black
L3	L3 black
PE	yellow-green
⊥ (ground)	(–) 0V white
+24VDC	(+) 24V red
RS+	+ RS485 orange
RS–	– RS485 green
⏚ (shield)	⏚ (shield)

5 Commissioning

5.1 Preparing the MOVIMOT®

Operating the podis MOT requires a few settings on the MOVIMOT. Information about the individual settings can be found in the operating instructions of MOVIMOT (see section 1.2, “Additional documents”).

The following settings must be performed:

- Setting the RS485 slave address "1" at MOVIMOT via DIP switch S1.
- Setting the minimum frequency via switch F2. The speed setpoint is preset relative as a percentage referenced to the maximum speed adjusted by means of the setpoint potentiometer F1.

The ramp setting at MOVIMOT via the potentiometer is not incorporated if the RS485 interface is used.

The following setting is optional and applies to MOVIMOT series „C“ only:

- Activating the brake release via DIP switch S2/2 (for details, consult the MOVIMOT MM03C-MM3XC operating manual; see section 1.2, „Additional documents“)

5.2 Setting the AS-i slave address at the podis®MOT 3I/RS485

After its mechanical and electrical installation, the slave address must be set at the podis MOT.

The assignment of the desired AS-i slave address is carried out either via the AS-i master or via an AS-i hand-held terminal (see the operating instructions of the AS-i master or the AS-i hand-held terminal).

The podis MOT devices are delivered from the factory with address "0" (standard according to AS interface specification).

podis®MOT with AS-i hand-held terminal

Procedure

Proceed as follows to set the slave address:

1. Remove the cap from the addressing socket.
2. Insert the addressing cable (jack plug) of the addressing device into the addressing socket of the field distributor.
3. Preset the address. See the operating instructions of the addressing device.
4. Remove the addressing cable and close the addressing socket again with the cap.

5.3 Manual operation / on-site operation

The AS-i hand-held terminal can be used to read in the inputs of an AS-i slave or setting the outputs. This allows for a simple precommissioning without the podis MOT being connected to a control system.

If the addressing device is used to select the operating mode "Read and write data". the drive can be controlled by setting the output bits.

WARNING

When plugging the cable from the AS-i handheld terminal into the addressing socket of the podis MOT, any AS-i connection that may exist is decoupled at the M12 socket. Interlocks at the controller are no longer effective.
By setting the output data bit via the AS-i hand-held terminal, the drive can start to move.

For this reason, this operating mode should be used for test purposes only.

5.4 The AS-i interface

The AS-i interface at the podis MOT allows for the control of MOVIMOT AC motors. The MOVIMOT is controlled in cyclical operation with a 4-bit input/output process image.

podis MOT uses the expanded AS-i slave profile S7.4 with the settings (IO=7, ID=4, ID1=F, and ID2=0) for this purpose.

This slave profile allows for cyclical data exchange of four I/O bits. It is also possible to read parameter data (READ PARAMETER STRING) and diagnostic data (READ DIAGNOSTIC STRING) and to write to the AS-i slave (WRITE PARAMETER STRING). The MOVILINK protocol from SEW-Eurodrive is used for the MOVIMOT.

The following functions have been implemented:

Functions

Drive functions	I/O functions
Six fixed setpoints (can be freely parameterized) Three ramps (can be freely parameterized)	Three digital inputs

Cyclical data exchange: master > slave

In the cyclical master-slave operation, the six fixed setpoints are optionally controlled with ramp 1 or 2 based on the following binary table of the AS-i output bits:

Bit 3	Bit 2	Bit 1	Bit 0	Function	Dec.
0	0	0	0	Quick stop / block	0
0	0	0	1	Stop / ramp 1 or 2†	1
0	0	1	0	Enable speed 11 / ramp 1	2
0	0	1	1	Enable speed 12 / ramp 1	3
0	1	0	0	Enable speed 13 / ramp 1	4
0	1	0	1	Enable speed 21 / ramp 1	5
0	1	1	0	Enable speed 22 / ramp 1	6
0	1	1	1	Enable speed 23 / ramp 1	7
1	0	0	0	Enable speed 11 / ramp 2	8
1	0	0	1	Enable speed 12 / ramp 2	9
1	0	1	0	Enable speed 13 / ramp 2	10
1	0	1	1	Enable speed 21 / ramp 2	11
1	1	0	0	Enable speed 22 / ramp 2	12
1	1	0	1	Enable speed 23 / ramp 2	13
1	1	1	0	Release brake‡	14
1	1	1	1	Reset	15

† The last ramp applied is being used

‡ Applies to MOVIMOT series „C“ only. For details on activation and use, consult the respective MOVIMOT operating instructions.

Cyclical data exchange: slave > master

In the cyclical slave-master operation, the conditions of the three sensor inputs and a "Ready for Operation" message of the MOVIMOT drive are returned based on the following binary table of the AS-i input bits:

Process inputs	Function
Bit 0	X3 / "1" = 24V
Bit 1	X4 / "1" = 24V
Bit 2	X5 / "1" = 24V
Bit 3	"1" = MOVIMOT ready

Parameter description

By changing the operating mode at the AS-Interface master, the parameter data of the interface can be changed between podis MOT and MOVIMOT. Based on a start index (defined by MOVIMOT), the following values can be changed. The delivery state of the podis MOT devices features the specified default values listed in the table.

Index		Access type	Type	Default	Meaning
20hex	32dec	read / write	INT16	5%=0333hex	Setpoint n11
21hex	33dec	read / write	INT16	50%=2000hex	Setpoint n12
22hex	34dec	read / write	INT16	100%=4000hex	Setpoint n13
23hex	35dec	read / write	INT16	-5%=FCCDhex	Setpoint n21
24hex	36dec	read / write	INT16	-50%=E000hex	Setpoint n22
25hex	37dec	read / write	INT16	-100%=C000hex	Setpoint n23
26hex	38dec	read / write	UINT16	1000	Ramp 1 [ms]
27hex	39dec	read / write	UINT16	3000	Ramp 2 [ms]
28hex	40dec	read / write	UINT16	100	Quick stop ramp [ms]

Parameter and diagnostic strings can be transferred during the operation of MOVIMOT. If the transfer takes more than one second, the MOVIMOT drive is stopped via PA1.

CAUTION

If parameter data are continuously exchanged in quick succession between controller and podis MOT, the cyclical (binary) data transfer may be prevented.
In this case, it is no longer possible to control or switch off the MOVIMOT drive!

This is a system behavior of AS-i and cannot be influenced by the device manufacturer.

To exclude this case, it is recommended to avoid the cyclical exchange of parameter data on the AS-i bus on principle. This does not limit the functionality of the podis MOT field distributor in any way.

NOTICE

- During the parameter transfer, the status of the sensor inputs is "frozen". A change of the signal status at the sensor input is not recognized during the parameter transfer. The status of the inputs is not updated until the parameter transfer has been completed.
- To be able to read and write parameters according to AS-i slave profile 7.4, the AS-i interface master must support these commands. This is not always the case with older AS interface masters. More details can be found in the operating instructions of your AS interface master.

Writing parameter strings

When writing parameter strings, the first two bytes are interpreted as start index.

	[1]		[2]									
Byte	1	2	3	4	5	6	7	8			65	66
	0	**0**	**2**	**0**								
			[3]		[4]		[5]				[6]	

Parameter string

Legend

[1] Start index (example: Index 32dec = 20hex)
[2] Parameter data (max. 34 bytes)
[3] Data for "Start index" parameter
[4] Data for "Start index + 1" parameter
[5] Data for "Start index + 2" parameter
[6] Data for "Start index + 31" parameter

The following bytes (max. 34) are the data that are written in the subsequent indexes. The first byte is the higher-value byte. The number of bytes transferred must always be even.

If only two bytes are written, only the index for the next read command is set. No parameters are changed.

Example: Setting the speed values n11 to n23:

Byte	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	0 0	2 0	0 6	6 7	1 9	0 0	2 6	6 C	3 0	0 7	3 9	A 2	E 0	0 0
	Start index		10%		40%		60%		75%		90%		-50%	
			n11		n12		n13		n21		n22		n23	

Calculation of speeds

The speed setpoint is preset relative as a percentage referenced to the maximum speed adjusted by means of the setpoint potentiometer F1.

The speed selection is carried out in percent as a value between "0" and f_{max}. The speed is calculated as follows:

Coding: C000hex = -100% (CCW rotation)
4000hex = +100% (CW rotation)
1 digit = 0.0061%

Example: 90% f_{max}, CCW direction of rotation
-90 / 0.0061 = -14746dec = C65Ehex

Percent	CW rotation		CCW rotation	
	Dec	Hex	Dec	Hex
100	16384	4000	-16384	C000
95	15565	3CCC	-15565	C334
90	14746	3999	-14746	C65E
85	13926	3666	-13926	C99A
80	13107	3333	-13107	CCCD
75	12288	3000	-12288	D000
70	11469	2CCC	-11469	D334
65	10650	2999	-10650	D667
60	9830	2666	-9830	D99A
55	9011	2333	-9011	DCCD
50	8192	2000	-8192	E000
45	7373	1CCC	-7373	E334
40	6554	1999	-6554	E667
35	5734	1666	-5734	E99A
30	4915	1333	-4915	ECCD
25	4096	1000	-4096	F000
20	3277	0CCC	-3277	F334
15	2458	0999	-2458	F667
10	1638	0666	-1638	F99A
5	819	0333	-819	FCCD
1	164	00A3	-164	FF5D
0,1	16	0010	-16	FFF0

Calculation of ramp times

The current integrator ramp is transferred to MOVIMOT in process output data word PA3.

Coding: 1 digit = 1 ms
Range: 100 ... 10000 ms
Example: 2.0 s = 2000 ms = 2000dec = 07D0hex

NOTICE

The ramp set at the MOVIMOT via switch t1 is not used. Ramps 1 and 2 as well as the quick stop ramp are used.

Time [s]	Setting [ms]	
	Dec	Hex
0,5	500	01F4
1	1000	03E8
1,5	1500	05DC
2	2000	07D0
2,5	2500	09C4
3	3000	0BB8
3,5	3500	0DAC
4	4000	0FA0
4,5	4500	1194
5	5000	1388
5,5	5500	157C
6	6000	1770
6,5	6500	1964
7	7000	1B58
7,5	7500	1D4C
8	8000	1F40
8,5	8500	2134
9	9000	2328
9,5	9500	251C
10	10000	2710

Saving the parameter data in flash memory

The values for speed and ramps transferred to the field distributor with the command "Write_Parameter" are buffered in the internal RAM. With fault-related changes of the values in RAM (e.g. significant exceeding of EMC limit values), the field distributor reloads the values stored in the flash memory into the RAM.

It is, therefore, recommended to permanently store the speed and ramp parameters in the flash memory after every resetting. This can be accomplished either by switching the AS-i voltage for the field distributor off and on again or by interrupting the communication with the AS-i bus.

Proceed as follows to save the speed and ramp parameters in the flash memory:

1. Transfer the parameter data to the slaves.
2. Switch the master "offline".
   ⇒ The slaves go "offline".
3. Switch the master "online" again.
   ⇒ The slaves go "online", the transferred parameters are saved in the flash memories.

Reading parameter strings

The two bytes of the parameter written last are always read. Each read process increases the index by 1. If no reading or writing has taken place since switch-on, the index is at 0020hex.

To read a specific index, a 2-byte write command must be sent that sets the index for the next read command.

When reading a parameter, the first two bytes identify the index. The two following bytes represent the content (date) of the index read. The first byte is the higher-value byte.

Byte	1	2	3	4
	0 0 2 1		**1 0 0 0**	
	[1]		[2]	

Parameter string

Legend

[1] Index to be read (example index 33dec = 21hex)

[2] Date from index (example n12 = 1000hex = 25%)

Reading diagnostic data

The diagnostic string can be used to read the current process data of the MOVILINK profile via AS-i.

Byte	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	2 7 1 C		**0 2 0 6**		**0 0 0 0**		**0 0 0 0**		**0 0 6 4**		**0 2 0 6**		**0 0 0 0**		**0 E 0 6**	
	[1]		[2]		PO1		PO2		PO3		PI1		PI2		PI3	

Structure of the 16-byte long diagnostic string

Legend

PO Process output data

PI Process input data

[1] Version of podis MOT

[2] Status message:
Communication to MOVIMOT correct = PI1

If no data exchange with MOVIMOT has taken place:

PO1	= 0
PO2	= 0
PO3	= 0
PI1	= 5B20hex
PI2	= 0000hex
PI3	= 0020hex

I/O errors

In case of a communication error to MOVIMOT, PI1 is set to 5B20hex.

6 Operation

6.1 Functional check

Check whether the device and the control function properly. The operating state is displayed by the status LEDs (see figure in chapter 2.3) as follows:

Color	Designation	Status	Meaning
green	AS-i power	constantly on	AS-i voltage supply is correct
		off	AS-i supply is missing
red	AS-i fault	constantly on	Communication error at AS interface, slave does not participate in normal data traffic (e.g. slave address "0")
		flashing	Periphery error, e.g. short circuit of AS-i voltage
		off	AS-i communication is correct
yellow	IN 0	constantly on	Signal voltage IN0 high level
		off	Signal voltage IN0 low level
yellow	IN 1	constantly on	Signal voltage IN1 high level
		off	Signal voltage IN1 low level
yellow	IN 2	constantly on	Signal voltage IN21 high level
		off	Signal voltage IN2 low level
yellow	M ok	constantly on	MOVIMOT operational
		flashing	MOVIMOT not operational
		off	Communication connection to MOVIMOT is interrupted
yellow	M fwd	constantly on	Motor turns CW
		off	Motor does not turn CW
yellow	M rev	constantly on	Motor turns CCW
		off	Motor does not turn CCW
yellow	RS485	constantly on	Connection to MOVIMOT is interrupted
		flashing	Connection to MOVIMOT is temporarily interrupted
		off	Connection to MOVIMOT is flawless
red	Fault	constantly on	MOVIMOT reports fault code*
		off	No MOVIMOT fault

* Fault code, see operating instructions of MOVIMOT

7 Troubleshooting

7.1 Malfunctions and their remedies

Malfunctions may be corrected only by qualified and authorized electricians.

If the information in the table below is not sufficient to remove the malfunction, contact the technical support of Wieland.

Status LED / malfunction	Cause	Remedy
'AS-i fault' is constantly on / M ok flashes	Module is not recognized by the AS-i master	Check AS-i address, initialize master
'AS-i fault' flashes	Overload or short circuit at the initiators	Check wiring or current consumption
'RS485' and 'Fault' are constantly on	Connection to MOVIMOT was not and still is not possible	Check 24VDC supply voltage of MOVIMOT Check RS485 (address setting at MOVIMOT)
'RS485' flashes	RS485 connection temporarily interrupted	Check cables and terminals
'RS485' is constantly on	RS485 connection interrupted	Check RS+ and RS- Clamping points and cables
'Fault' is constantly on	MOVIMOT reports a fault	Check 400VAC supply of MOVIMOT see fault table*
'M ok' is constantly on and 'M fwd' is off	CW direction of rotation in terminal strip not enabled	Connect 24V to terminal "R"
'M ok' is constantly on and 'M rev' is off	CCW direction of rotation in terminal strip not enabled	Connect 24V to terminal "L"
'M ok' and 'M fwd' or 'M rev' are constantly on - a motor does not turn or with minimum speed only	Speed parameter preset with zero	Check parameters READ parameter / transferred desired parameter to podis MOT with WRITE parameter
'M ok' to 'Fault' are flashing at a rate of 0.5 sec	No connection established to MOVIMOT Write, read or checksum error EEPROM	Switch 24V supply off and on Rewrite parameter set completely! (additional information Wieland technical support)

*Fault table, see operating instructions of MOVIMOT

7.2 Replacing the electronics module

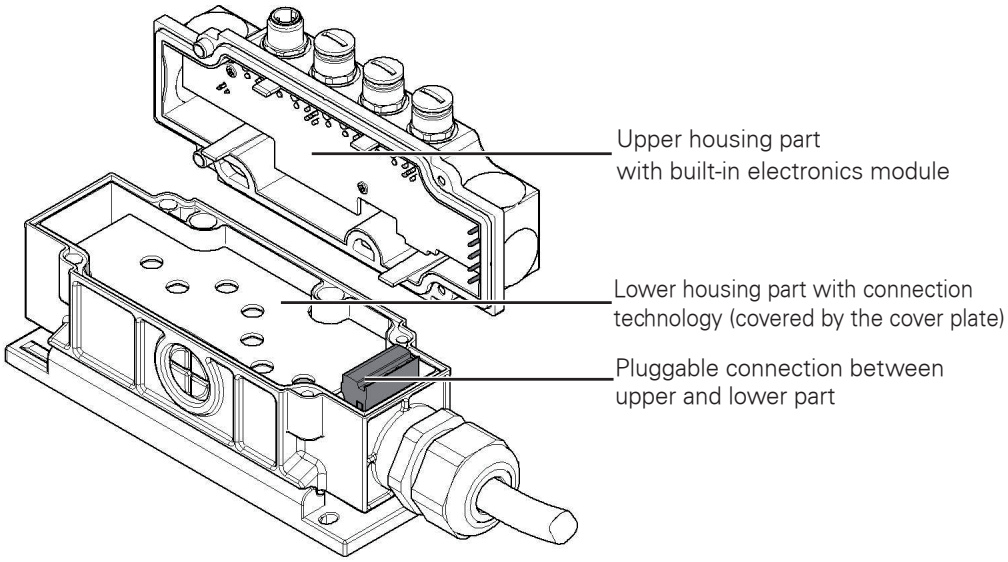
The electronics module is built into the hood (electronics cover).

WARNING

- All electrical installation work and connections are only to be carried out by a qualified and trained electrician!
- To be observed are also the valid safety and accident prevention regulations!
- The plug connections must never be connected or disconnected under load!
- The entire flat cabling is to be disconnected from the voltage supply before opening and removing the electronic cover!

Proceed as follows to replace the electronics module:

1. Remove the four fastening screws of the electronics cover.
2. Unplug connector X8.
3. Replace the complete electronics cover with a new one.
4. Plug the connector X8 into the connection in the electronics cover.
5. Attach the electronics cover with the four fastening screws.
   - Ensure that it is sealed tight and that none of the connecting cables are squashed.
   - The electronics module has been replaced.
6. Finally, check the AS-i addressing.



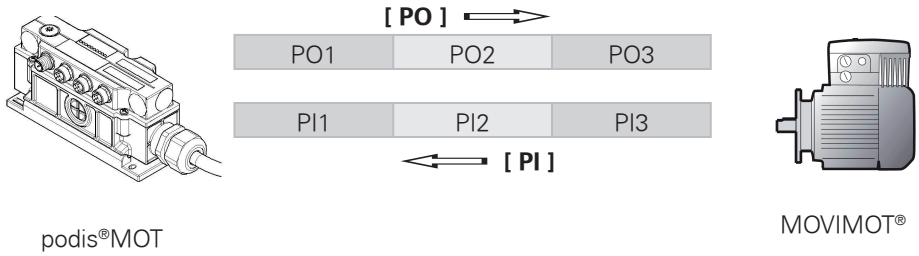
podis®MOT (opened)

8 MOVILINK® device profile

8.1 Communication of podis®MOT - MOVIMOT®

The communication between the AS-i interface of the field distributor and MOVIMOT is performed according to the uniform MOVILINK profile for SEW-Eurodrive drive inverters with three process data words.

PO	**Process output data**	**PI**	Process input data
PO1	**Control word**	**PI1**	Status word 1
PO2	**Speed (%)**	**PI2**	Output current
PO3	**Ramp**	**PI3**	Status word 2



Communication between podis®MOT and MOVIMOT®

NOTICE
The exact description of the MOVILINK profile can be found in the relevant documentation of SEW-Eurodrive.

wieland

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