MURR ELEKTRONIK

Handbuch

Manual

Manuel

MASI65 M12
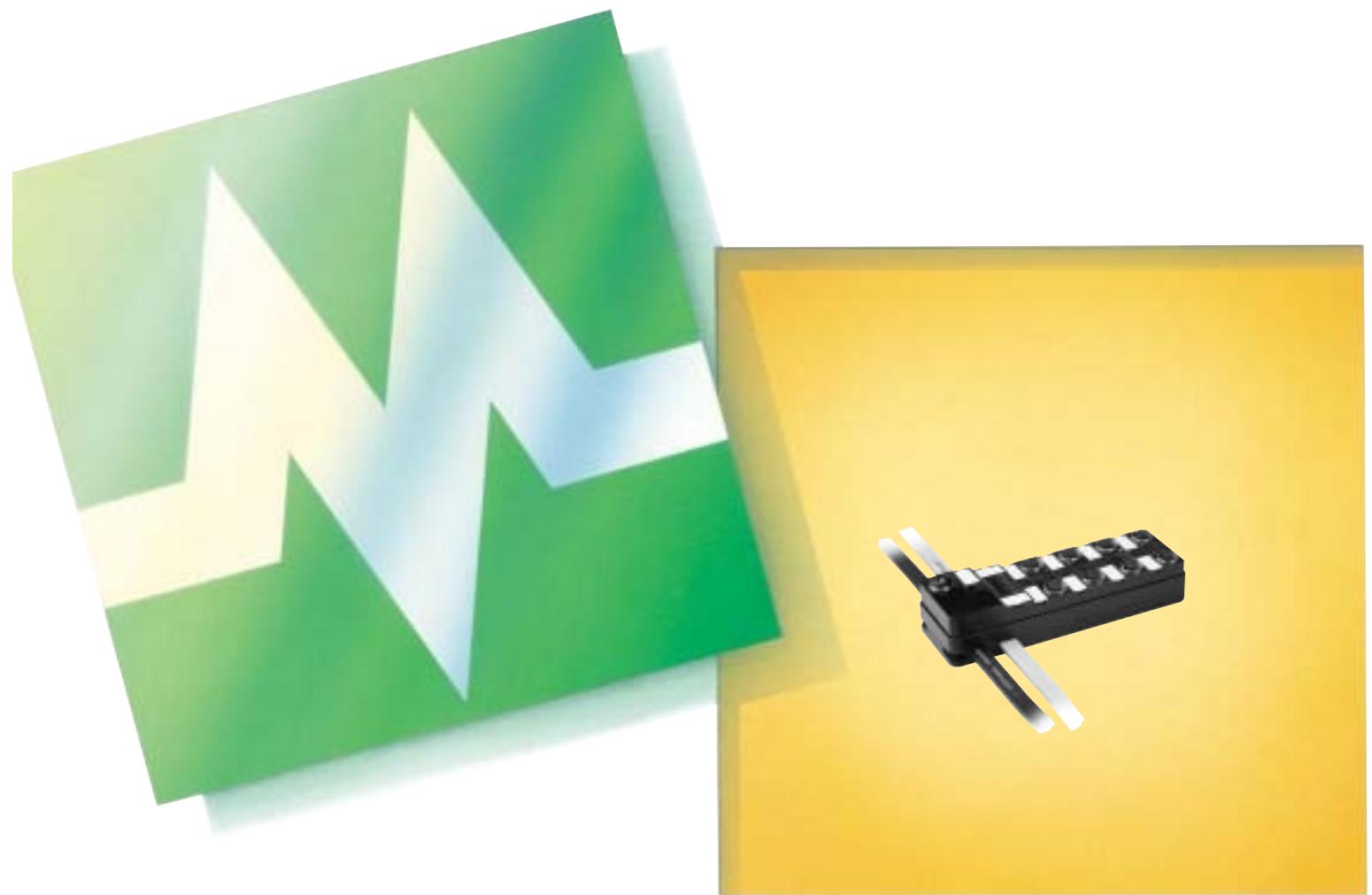
Concerning this manual :

The text, illustrations, diagrams and examples used in this manual serve solely for the purpose of explanation, operation and application of Input/Output modules of the MASI65-M12 series.

If you should have any further reaching questions regarding the installation and set-up of the equipment described in this manual, please don't hesitate to contact us. We would be glad to assist you any time.

Murrelektronik reserves the right to make technical changes or modifications to the devices and to this manual without prior notice.

Chapter overview :

The "Safety Information" section must be read without fail **prior** to working with the products and the system. This section contains information required for safe installation and handling.

The "Configuration Information" section directs itself to system planners. It offers important information and details relevant to successful configuration.

The "Installation" section provides details regarding installation, in both mechanical and electrical context. This chapter addresses itself in particular to qualified and trained electricians responsible for the assembly and installation of system components.

The "Setup" and "Diagnosis" sections are intended for the setup personnel. They offer important notes and information with regard to the rapid and uncomplicated setup of modular modules and of the whole system.

MASI65-M12 Series
User's Manual

Art.-No.	Description
55570	MASI65 DI8/0,4A Y 8xM12
55571	MASI65 DI4/0,2A DO4/2A Y 8xM12
55572	MASI65 DI8/0,4A BV Y 8xM12
55573	MASI65 DI4/0,2A BV Y 4xM12
55574	MASI65 DO4/0,5A Y 4xM12
55610	MASI65 DI4/0,2A 4xM12
55612	MASI65 DI8/0,4A 8xM12
55614	MASI65 DO4/0,5A 4xM12
55615	MASI65 DO4/2A 4xM12
55616	MASI65 DO8/0,5A 8xM12
55618	MASI65 DI4/0,2A DO4/0,5A 8xM12
55619	MASI65 DI4/1,6A DO4/2A 8xM12
55622	MASI65 DI4/0,2A BV 4xM12
55623	MASI65 DI8/0,4A BV 8xM12
55624	MASI65 DI4/0,2A DO4/2A 8xM12
55625	MASI65 DI2/0,2A DO2/2A 4xM12
55628	MASI65 DI4/0,2A DO4/0,5A Y 8xM12
55629	MASI65 DI4/0,2A Y 4xM12
55675	MASI65 DI4/0,15A DO3/2A AB Y 7xM12
55676	MASI65 DI8/0,2A AB Y 8xM12
55677	MASI65 DI4/1,6A DO3/2A AB Y 7xM12

User's manual : Art. No. 55 645   Version 1.1

Table of contents

Manual additions / Corrections

Vers.	Section	Additions / Corrections	Date / Name
1.0		Issued	D. Kaulisch / M.H.
1.1		MVK12-ASI => MASI65-M12	27.07.04 ERW

Notes :

1   Safety information

1.1   Designated use

The input and output modules of the MASI65-M12 series are designated for use only in those areas as described in this manual.

Strict adherence to the data specified in this manual must be ensured. The products avec been developed, manufactured, tested and documented in compliance with current safety codes.

The equipment poses no danger to operating personnel or material if configuration, assembly and operation are performed in compliance with the stated handling and safety regulations.

Unqualified intervention in the hardware and software of our equipment, disregard of warning labels found on the equipment or non-observance of the information in this product manual can result in injury or serious damage to man and/or material.

Only supplementary or extension devices that have been recommended by Murrelektronik may be employed in conjuction with products of the MASI65-M12 series.

Any application or usage beyond and above this shall be regarded as non-designated.

1.2 Target groups

This manual addresses itself exclusively to qualified and trained electricians knowledgeable in the safety standards of automation technology.

Only a qualified, trained electrical tradesman knowledgeable in the safety standards of automation technology may perform configuration, installation, set-up, maintenance and testing of the equipment.

Only Murrelektronik technical personnel are allowed to undertake intervention in the hardware and software of our equipment, insomuch as this is not described in this manual.

1.3 Regulations

Current safety and accident prevention laws valid for a specific application must be observed in the configuration, installation, setup, maintenance and testing of the equipment.

1.3.1 EU directives

This equipment fulfills the requirements of EC directive 89/336/EEC „Electromagnetic compatibility".

There are no restrictions to applications in residential, business and industrial areas, including industrial facilities large and small.

1.3.2 Electrical safety

All devices connected to this equipment must fulfill PELV directives (Protected Extra Low Voltage) according to HD 384.4.41.

1.3.3 General information

a) The designated function of this equipment is guaranteed only if the conditions for installation, system extension, operation and maintenance are complied with.

b) Only system extensions and cables are allowed with meet the requirements and regulations for safety, electromagnetic compatibility and, where applicable, telecommunications transmission equipment and specifications.
The installation of other extensions may violate these requirements and regulations or damage the equipment.
Information concerning the type of system expansions and cables that are permitted, can be obtained either from your Murrelektronik distributor or taken from this manual.

c) The designated operation of the equipment is guaranteed only with the housing fully installed.

d) This product is designed and manufactured to assure protection against damage if designated usage and proper maintenance are observed.

1.4 Information regarding standards

1.4.1 Equipment standards

- EN 50295   Low voltage switching devices – Control systems and device interfaces – Actuator Sensor Interface (AS-I).

- EN 60 947-1   Low voltage switching devices
Part 1 : General conventions.

1.4.2 EMC Standards

- EN 50295   Low voltage switching devices – Control systems and device interfaces – Actuator Sensor Interface (AS-I).

- EN 55011   **I**ndustrial, **S**cientific and **M**edical high frequency equipment - Radio interference - Limit values and sensing methods.

- EN 61000-4-2   EMC Part 4 : Testing and sensing methods
Main section 2 :
- Test of immunity to static electrical discharge according to basic EMC standards.

- EN 61000-4-3   EMC Part 4 : Testing and sensing methods
Main section 3 :
- Test of immunity to RF electromagnetic fields.

- EN 61000-4-4   EMC Part 4 : Testing and sensing methods
Main section 4 :
- Test of immunity to rapid transient disturbances/burst - EMC basic standards.

- EN 61000-4-6   EMC Part 4 : Testing and sensing methods
Main section 6 :
- Test of immunity to asymmetric RF input
- EMC basic standard.

- AS-i Complete Specification Version 2.1, Section 8 EMC.

1.4.3 Safety standards

- EN 60 295   Low voltage switching devices – Control systems and device interfaces – Actuator Sensor Interface (AS-I).

- EN 60 947-1   Low voltage switching devices
Part 1 : General conventions.

- EN 60 529   Type of housing protection (IP-Code).

- VDE 0100   Part 410/HD 384.4.41 Installation of power systems and equipment with nominal voltages up to 1 000V
Part 4 : Protective measures.
- Chapter 41 : Protection against electrocution.

1.5 Explanation of symbols

1.6 Use of attention signs

Notes containing important information are specially marked. These are illustrated as follows :

Attention text ....

1.6.1 Use of danger signs

Danger signs are additionally marked with an enclosing frame.

	CAUTION : **Disregard of safety measures may result in damage to equipment and other serious consequences.**

	DANGER : **Non-compliance with the relevant safety measures poses a danger to the health and life of the user.**

1.6.2 Use of numbering in illustrations

Illustrations are numbered with white numbers in black, round fields.
Example :   ❿   Text 1......
              ❶   Text 2......
              ❷   Text 3......

The explanatory text follows in tabular form under the same number, in direct context to the preceding illustration.

1.6.3 Use of handling instructions

Handling instructions describe the sequence of steps during installation, setup, operation and maintenance that must be strictly observed.

The numbering (black numerals in round white fields) is given in a sequential and ascending order.
Example :   ①   Instruction 1........
              ②   Instruction 2........
              ③   Instruction 3........

1.6.4 Use of foot notes

Supplementary information is marked with superscripted numerals (example. : Text Text [1] Text Text).
These are explained in the form of footnotes beneath tables or text at the end of the page.

2   Configuration information

2.1 System description

The AS-Interface is a simple and cost-saving wiring system based on a 2-wire cable for data and power transmission to sensors over a distance of up to 100 m. System expansion > 100 m is possible with the use of repeaters.

The application area concentrates mainly on lower level industrial automation for networking simple and mostly binary sensors and actuators.
The AS-Interface is a substitute for traditional wiring between sensors, actuators and the PLC. System-based mechanisms effectively support setup, operation and maintenance.

Every AS-Interface system requires a control unit, the master. This is available as a PLC specific module, a PC card or a gateway. The application program on the control system or PC controls the decentralized I/O groups (slaves) via the master. The master performs cyclical information exchange between the master and the slaves independently. According to standard specifications, an AS-Interface network supports the operation of maximum 31 slaves. According to extended specifications, it supports the operation of maximum 62 modules.

There are two types of slaves : active and passive modules.

Active modules are slaves with interfaces linking to common binary sensors and actuators. Each data transmission cycle between the master and the slave is limited to 4 input data bits and 4 output data bits. This kind of structure and the length of the data messages support the operation of up to 124 inputs and 124 outputs (standard specifications).
The extended specification supports the operation of 248 inputs and 186 outputs.
Passive modules are typically fitted with a standard electromechanical interface (for ex. round plug connector M12) for a direct connection of sensors and actuators to the AS-Interface integrated into the field bus cable.

In order to ensure an accurate data transmission between the master and the slaves, each slave - A or B - must be assigned to a specific address configurable from 1 to 31.
Addressing can either be performed by a manual addressing device or by the master itself.

AS-Interface products are generally marked by specific logos. Such identifications allow to distinguish between certified products and such products that are AS-Interface certified by the manufacturer.

Fig. 2-1 : AS-Interface

Fig. 2-2 : Marking

Owing to the signal shape for the data transmission, it is not necessary to provide terminating resistors. Thanks to the intelligent data protocol, AS-Interface systems are extremely non-sensitive to disturbance. Consequently, you can use a non-screened bus cable.

The structure of AS-Interface systems can be compared to an ordinary electrical installation with different network topologies : line, star or tree structure.
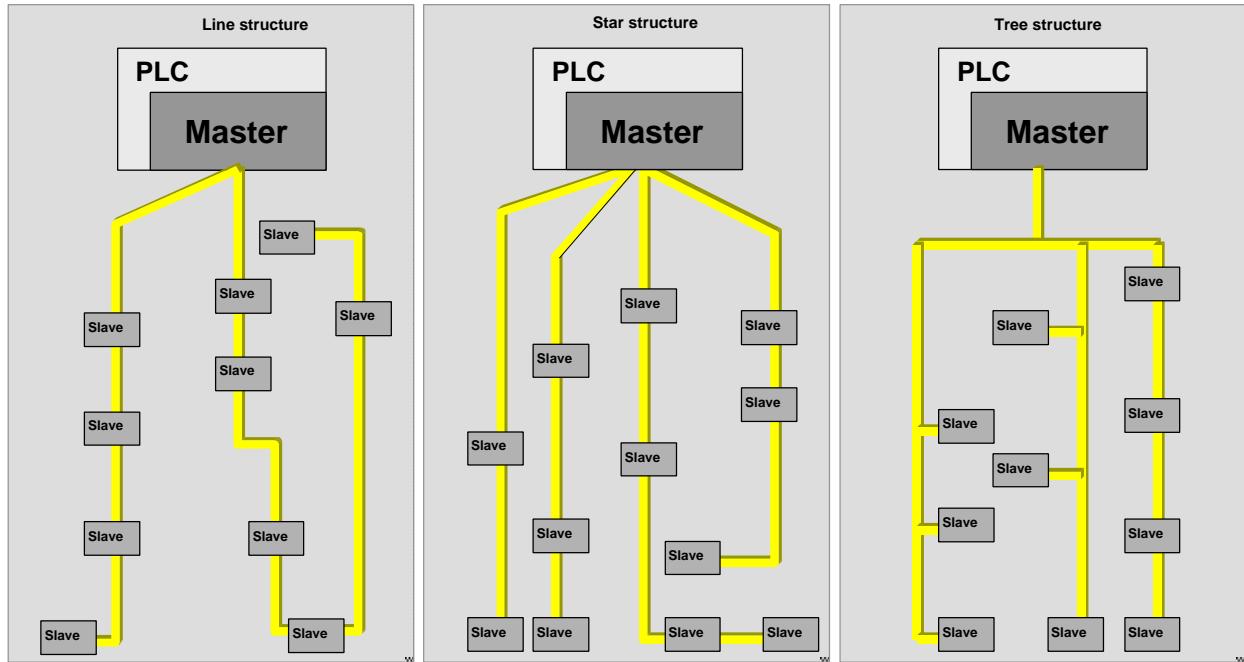
Fig. 2-3 : Topology of the *AS-Interface* system

The data cycle time depends on the network topology and the entire scope of the system. For a complete system with 31 slaves it is about 5 ms and with 62 slaves (extended specifications) about 10 ms.

2.2 System data

Topology	Tree structure
Transfer medium	Two-wire cable (non-screened) for data and power (up to 8A)
Cable length	Sum of all lines of derivation: max. 100 m
Number of slaves	Max. 31 or max. 62
Number of binary elements (according to the specification 2.0)	Up to 4 sensors and actuators per slave (max. 124, bidirectional max. 248 for a complete system)
Number of binary elements (according to the specification 2.1)	Up to 4 sensors and 3 actuators per slave (max. 248 inputs and 186 outputs for a complete system)
Addresses	A specific address for each slave between 1...31 or 1-31 A and 1-31 B (extended specification).
Addressing mode	By means of a manual addressing device or via the master.
Messages	Cyclic messages from the master to the individual slaves (master call) with instant reply from slave (slave reply).
Bit rate	4 bits of informative data per slave and message.
Data cycle time	5 ms with 31 slaves 10 ms with 62 slaves.
Error recognition	Identification of faulty messages, automatic repeat.
Master functions	- System initialization - Automatic slave detection - Non-cyclical parameter transmission - Bus and slave diagnosis - Error messages to control - Automatic addressing when a slave is replaced.

Table 2.2–1 : AS-Interface system data

2.3 Information for the beginner

AS-Interface is a field bus system for industrial application whose advantages include no only its ease of handling in planning and application but also the good overview of the total system.

To make the system even easier and safer for beginners to use, we recommend proceeding as outlined in the checklist below :

Work phase	Questions	Note
Planning	How many I/O's are required in total ?	This determines whether one or more AS-Interface systems will be needed for realization.
Planning	How great is the system power requirement ?	Important for the selection of suitable system power supply units. Never switch AS-Interface power supply units in parallel !
Planning	How large is the total scope of the system ?	Repeaters must be used if the sum of all cable lengths exceeds 100 m.
Configuration	How are the modules to be assigned ?	To avoid addressing errors, create an assignment scheme and carefully label all addressed modules accordingly !
Installation	Where will the modules be installed ?	Depends on the module enclosure type : either in a switch cabinet or terminal box. Place modules of enclosure type IP 67 close to sensors and actuators for the sake of greater efficiency.
Setup	How will the system configuration be executed ?	In configuration mode (master operating mode) the detected slave profiles are automatically read in by the master.
Setup	Have all slaves been detected by the master ?	When all slaves have been detected, the master should be switched into protected operating mode. This enables exhaustive diagnostics.
Setup	How can a simple I/O function test be performed ?	Quick and straightforward with special, easy to use setup tools [1] or via the gateway with graphics display. Alternatively with the PLC Software Tool.

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[1] e.g. : ASI Control Tools Article No 55714

2.4 Electrical specification

2.4.1 System cables

To meet individual application requirements, system wiring on the field bus side can be realized either with round cables[2] or also with the yellow ribbon cable[3] characteristic for AS-Interface systems.

Cables are basically of the 2-wire type without PE cable. Cable screening in not necessary thanks to the transmission technology.

> Two electrical aspects are decisive in the selection of a suitable transmission cable :
> a) **DC resistance** (line cross-section)
>   for reasons of auxiliary power transfer
> b) **Transmission characteristics**
>   Impedance from 80 to 120 ohms for 167 kHz

Additional auxiliary power is usually required for actuators. For an easy installation of ribbon cables, these are identified by different colours.

> Cables
>
> | | | |
> |---|---|---|
> | yellow | - | AS-Interface field bus cable |
> | black | - | 24V DC auxiliary power |
> | red | - | 230V AC auxiliary power |
>
> Cable leads
>
> | | | |
> |---|---|---|
> | brown | - | Field bus system cable (ASI+) |
> | | | 24V DC (+24V DC) auxiliary power |
> | | | AC auxiliary power |
> | blue | - | Field bus system cable (ASI-) |
> | | | 24V DC (0V) auxiliary power |
> | | | AC auxiliary power |

AS-Interface products with direct connection for ribbon cable carry a geometric code. This offers reliable protection against electrical polarity reversal.

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[2] Art. No 55 747
[3] Art. No. 55 743
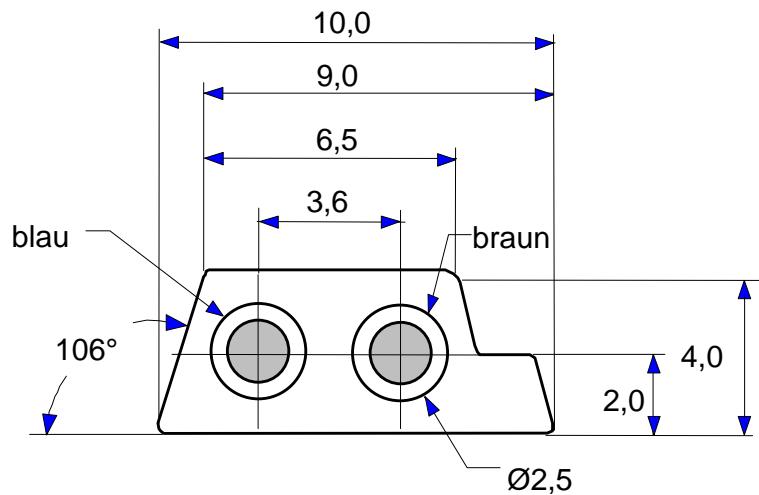
Fig. *2-4 : AS-Interface* cable
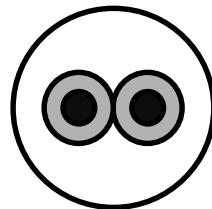
Fig. 2-5 : *AS-Interface round cable according to DIN VDE 0281 Part 402*

For standard profiled cables, the strand insulation is made of a rubber compound. For more critical applications, particularly as regards chemical stability, TPE or PUR cables are available.
The main area of application is the stationary wiring of machines and installations in a rough environment.

For the transmission cable, you can also use a common 2-wire round cable without PE cable, particularly for chained applications or wiring in switch cabinets.

2.4.2 System power supply

Fig. 2-6 : AS-Interface system power supply

AS-Interface systems require a 29,5V to 31,6V DC power supply conforming to IEC directives (PELV : Protected Extra Low Voltage).

> **Each AS-Interface branch requires its own power supply.**

The data filter integrated into the power supply constitutes the basic difference in comparison with usual industrial power supplies. It enables the transmission of both power and data.

2.4.3 Voltage drop

System-related limit values regarding system power supply must be strictly observed if maximum functional safety and fault-free operation are to be ensured.

> ⚠ **Always ensure that the system voltage, measured at the slave furthest away from the system power supply, does not drop below 26,5V DC.**

A voltage drop, dependent on the load current, results in the system cable as the sensors and actuators are supplied centrally from the AS-Interface power supply unit.

> ❗ **In critical cases, optimization can be achieved by changing the location of the system power supply unit within the system layout and by using power supply cables of a greater conductor cross-section (only for round cables).**

AS-Interface modules with digital inputs support the direct connection of commercially available sensors. The voltage needed to operate the sensors is supplied by a slave internal power supply taken from the bus.
With the lowest admissible supply voltage at slave level and with regard to voltage drops in the slave, optimal power supply of sensors is always guaranteed.

> ⚠ **The sensor power supplies of different AS-Interface modules supplied by the bus cable are not grounded and should in no case be coupled !**

2.4.4 Cable cross-sections

The chief determining factor in selecting a suitable transmission cable in regard to energy transfer is the DC resistance.

Initial conditions :

- the cable length is 100 m
- 31 slaves are connected to the cable at regular intervals, and
- the current consumption of 65 mA is the same for all slaves (total current : 2 A)

The table below shows the resulting drop of voltage between the power supply inputs and the connecting point of the last slave :

Cable cross-section in mm²	0,75	1,5	2,5
DC resistance in mOhm/m	52,0	26,6	16,0
Max. voltage drop in en V	5,4	2,7	1,6

Table 2.4–1 : Influence of various cross-sections

2.5 Slave profile

Each slave is marked with a specific profile to assure unequivocal identification by the AS-Interface master. This profile is permanently programmed by the manufacturer and cannot be changed. The conditions for this are listed in the AS-Interface specifications. The profile consists of one data byte including the identification code (ID-Code) as well as the Inputs/Outputs code (I/O-Code). These data determine the slave function ("ID-Code") and the I/O configuration ("I/O Code").

The slave profile information (ID- and I/O-Code) is very important for an easy replacement of slaves in the system. It enables the master to check if the current configuration corresponds to the reference configuration.

2.6 Adressing

Fig. 2-7 : Manual addressing device

Each slave must be programmed with a unique address before setting up the AS-Interface system. To do so, you can use an addressing device[4] or perform this configuration online via the master. Refer to the corresponding description.

> **Addresses are non-volatile : they remain stored even in case of power cutoff and can be changed a least 15 times per slave.**
> **Slaves conforming to the specification 2.1 are fitted with a chip including an EEPROM to store addresses. Addressing is not limited for such slaves.**

---

[4] Addressing device Art. No 55696

According to the standard specifications, addresses can be assigned from 1 to 31.
For systems conforming to the extended specifications (up to 62 slaves) the available address range is from 1A to 31A and 1B to 31B.

The installation of an appropriate master is required when using AS-Interface systems conforming to the extended specifications !

In a system you can generally operate simultaneously slaves conforming to standard specifications and slaves conforming to the specifications.
Is this case, standard slaves are identified as slaves of type 'A' by the master. The same address that is not used in group 'B' is no more available.

New slaves that are not yet addressed are always allocated to the address 0. Although they have been recognized by the master, they are not included into the communication process.
When replacing a slave while the system is operating (maintenance, repair, etc.) it is automatically allocated to the address 0 by the master (↳Chapter 2.8 Automatic configuration).

2.7 System configuration

The system setup is established during the configuration phase ; the master must be used in configuration mode. In this mode, the master automatically recognizes the slaves connected to the bus. The features of the system, the "ID-Code" and "I/O-Code" as well as the slave addresses are stored by the master.

> ⚠️ **In case of system extensions that are not in conformity with the AS-Interface specifications, it is possible that some slaves are not detected by the master.**

As soon as the whole system is configured and the master is operating in "Protected mode" the differences in relation to the configured system can be automatically detected by the master (e.g. slave failures, damaged bus cable or system extensions).

System configuration can be performed by an addressing device or directly via the master. The configuration procedures are different according to the selected mode.

2.7.1 Configuration with an AS-Interface addressing device

①   Address the slaves with the addressing device.
       (For slaves with an addressing plug, this operation can be performed after step ②).
②   Install the slaves and connect them to the system cable.
③   Switch the master into configuration mode (↳Master user's manual).
④   Check if all the slaves have been detected and stored into the LDS list (List of Detected Slaves), (↳Master user's manual).
⑤   Configure the system (↳Master user's manual).
⑥   Switch into protected configuration mode (↳Master user's manual).
⑦   Check the master displays. The display of configuration errors must not be enabled. (↳Master user's manual).

2.7.2 Configuration via the AS-Interface master

① Switch the master into configuration mode (⇨Master user's manual).
② Connect the slave to the AS-Interface system cable.
③ Change the slave address via the master (⇨Master user's manual).
④ Repeat steps ② and ③ until all the slaves are connected and addressed.
⑤ Check if all the slaves have been detected and stored into the LDS list (List of Detected Slaves) (⇨Master user's manual).
⑥ Configure the system (⇨Master user's manual).
⑦ Switch into protected configuration mode (⇨Master user's manual).
⑧ Check the master displays. The display of configuration errors must not be enabled. (⇨Master user's manual).

2.8 Automatic configuration

In case of a slave failure while the system is operating, it can be easily replaced by a new slave if the following conditions are complied with :

①   the master must be in protected operating mode and the automatic configuration must be active,
②   failure of only one slave,
③   the new slave is assigned to address 0,
④   the profile of the new slave is identical to the profile (stored by the master) of the slave to be replaced.

Only under these conditions the new slave is integrated into the system and automatically configured by the master, which immediately assigns the address of the faulty slave.

Modules DI8 and DO8 have both 2 cascading slaves.
These modules cannot be addressed by automatic configuration.

2.9 Cascading slaves

Each AS-I Slave has a 4-bit data capacity.
For this reason DI8 and DO8 modules have both 2 slaves, so as to have 8 inputs or outputs.
These slaves are cascade-connected.
Addressing the second slave is only possible, if the first one has been assigned to an address different from 0 by means of the addressing device or the master.

2.10 AB Slaves

According to the extended specification, it is possible to address 62 slaves : between 1A ... 31A and 1B ... 31B.
Addressing AB slaves requires an addressing device, which supports the extended specification 2.1.

3 Installation information

3.1 Mounting

3.1.1 Screwed mounting

Modules of the MVK12 series can be attached directly to an installation panel or to a machine. Mounting holes (A,B,C or D) are provided for this purpose.
Before attaching the module, it must be assured that the mounting surface is smooth and even to prevent mechanical stress in the housing.
Modules are attached by three M4x12 screws.
Dimensions are the same as for passive distribution systems from Murrelektronik.
This enables an easier conversion to the AS-Interface system.

3.1.2 Screwed mounting of an 8-way module
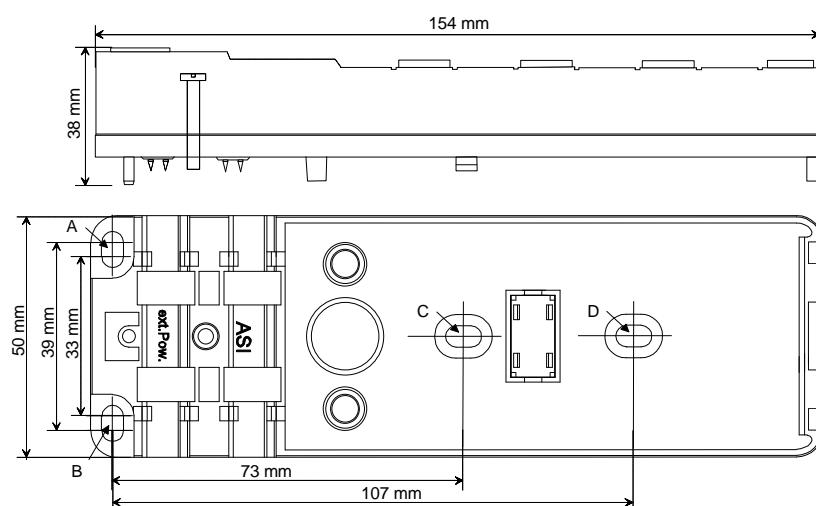
Fig. 3-1 : Mounting of a MASI65-M12 8-way module

3.1.3 Screwed mounting of a 4-way module
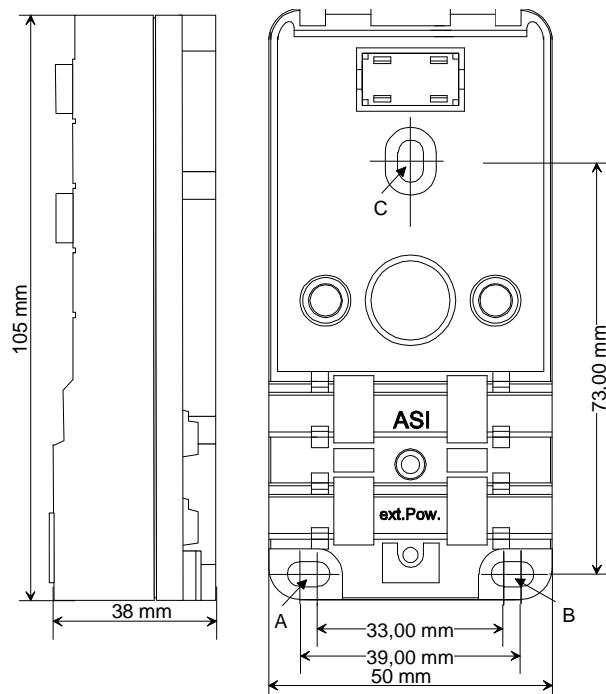
Fig. 3-2 : Mounting of a MASI65-M12 4-way module

3.1.4 DIN-rail mounting

Modules can also be mounted on a DIN-rail.
In this case, they are provided with a rail mounting adapter according to DIN EN 50 022. When attaching the module, it must be assured that the snap-in mechanism is tight fit.
When ordering such modules, 59 must be added in front of the Art. No.

Example :   55610 MASI65-M12 DI4   Screwed mounting
                 5955610 MASI65-M12 DI4   DIN-rail mounting

❶   Spring
❷   FE panel
❸   Threaded insert
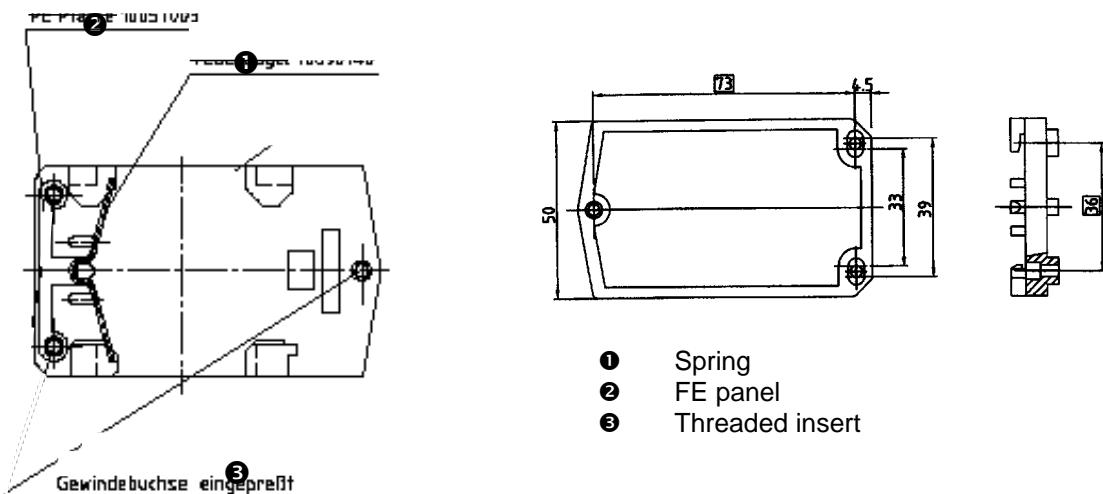
Fig. 3-3 : Adapter for DIN-rail mounting

3.2   Wiring

3.2.1   Field bus

AS-Interface field bus wiring is effected using a 2-wire cable conforming to AS-Interface[5] specifications

Cable

Flat cable (yellow)	**1,5mm²**
Round cable (black)	**1,5mm² ou 2,5mm²**

Wires

brown	**-**	**Field bus system cable (ASI+)**
blue	**-**	**Field bus system cable (ASI-)**

We recommend the use of round cables for wirings in switch cabinets.

3.2.2   Power supply

An additional power supply source may become necessary as soon as the energy delivered by the slave from de bus is not sufficient for the current consumption of the AS-Interface slave and the corresponding peripheral components such as sensors and/or actuators.

Typical applications requiring an additional power supply :

- Photoelectric safety locking,
- Inductive loads (switching devices, valves, etc..).

The additional power supply unit must be fitted with a protection cutoff device and must be in conformity with PELV directives according to IEC 364-4-41.
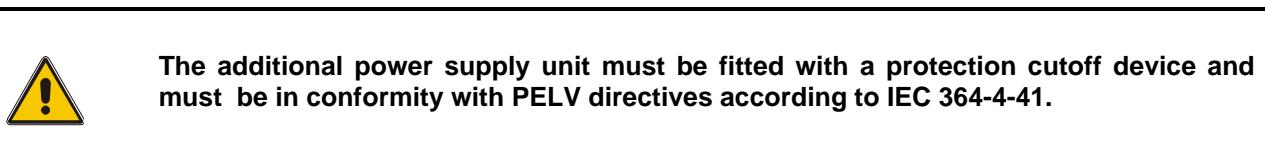
Wiring in switch cabinets is effected with single wires. It is also possible to use an adapted round cable or the specific profiled flat cable.

Flat cable

black	**-**	**Auxiliary supply 24V DC**
red	**-**	**Auxiliary supply 230V AC**

Wires

brown	**-**	**Auxiliary supply AC or 24V DC (+24V DC)**
blue	**-**	**Auxiliary supply AC or 24V DC (0V)**

[5] see Chapter 2.4.1 : System cables

3.2.3 Functional Earth (FE) connection

The metallic Functional Earth connection and the two fastening screws on the front side enable a low impedance module connection to the earth.

FE panel
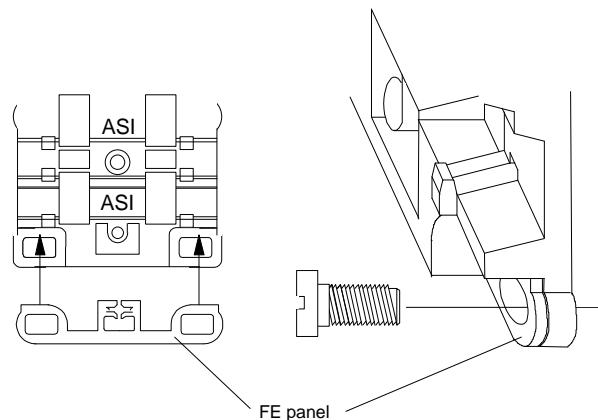
Fig. 3-4 : MASI65-M12 FE connection

4 Module connection technique

4.1 Field bus connection

4.1.1 Cable layout

Câble plat AS-i

brown +

blue -

15

27
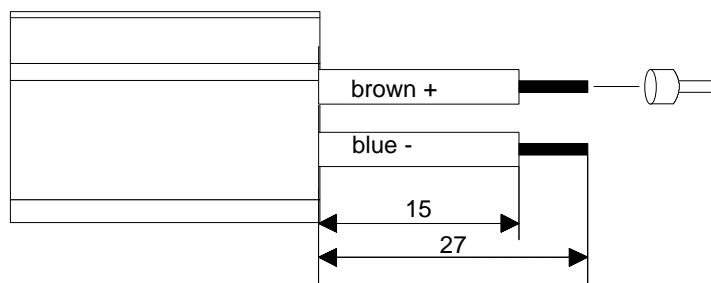
Fig. 4-1 : ASI flat cable layout

4.1.2 Bus cable connection

Bus connection is performed using the AS-I yellow profiled cable ; it is carried out by vampire contact.
The cable is attached by inserting it into the cable guide of the installation panel.

ASI

Ext. Pow.
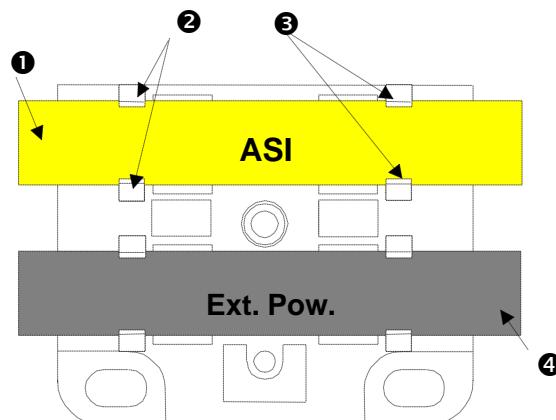
❶   AS-I bus flat cable
❷-❸: Cable guide
❹   Power supply flat cable

The module is snapped-in from the top side and attached by using a screw on the installation panel (Fig. 4-2.). The tightening torque is 1 +/- 0,1Nm.
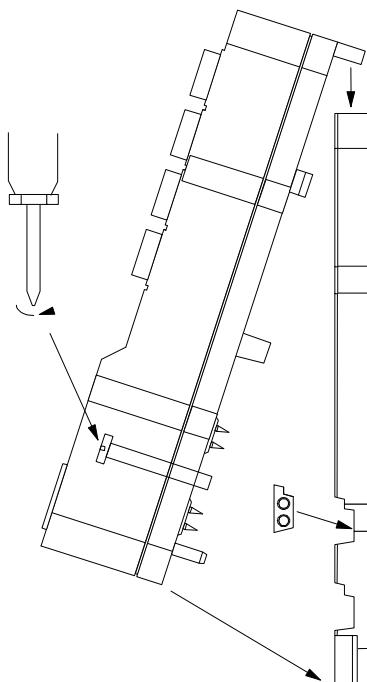
Fig. 4-2 : MASI65-M12 module mounting

When the end of the profiled cable is in the module, it is necessary to install a termination cap (Art. No 55746) (Fig. 4-3.), to avoid dust and humidity inside de module.

❶   Termination element
❷   Cable
❸   Termination cap
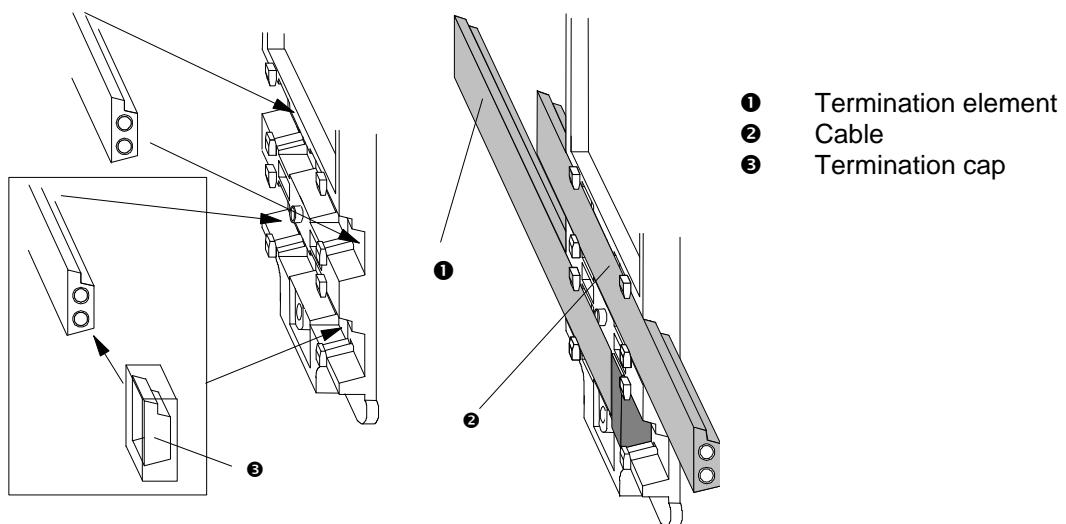
Fig. 4-3 : MASI65-M12 bus connection

4.1.3 Bus branching function

MASI65-M12 modules support the bus branching function.
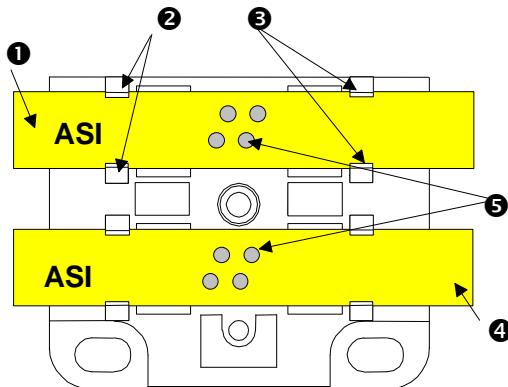
Fig. 4-4 : Bus branching

❶-❹ :   AS-I bus flat cables
❷-❸ :   Cable guide
❺ :   AS-I duct openings, internal link between the upper and lower bus connection

The following modules support the bus branching function :

55572	MASI65-M12 DI8 0,4A
55573	MASI65-M12 DI4 0,2A
55622	MASI65-M12 DI4 0,2A
55623	MASI65-M12 DI8 0,4A

**The bus branching function can partially induce high cumulated currents !
In all cases, make sure that the cumulated current is lower than 4 A.**

4.2 Power supply connection

4.2.1 Cable layout

Câble plat AS-i

brown +

blue -

15

27
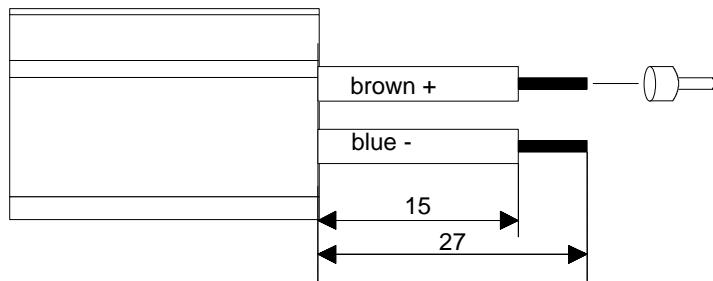
Fig. 4-5 : Supply cable layout

4.2.2 Auxiliary supply connection

Power supply of actuators is assured by an AS-I black cable (Art. No 55744) ; it is carried out by vampire contact.
The cable is attached by inserting it into the cable guide "Ext. Pow." of the installation panel.

ASI

Ext. Pow.
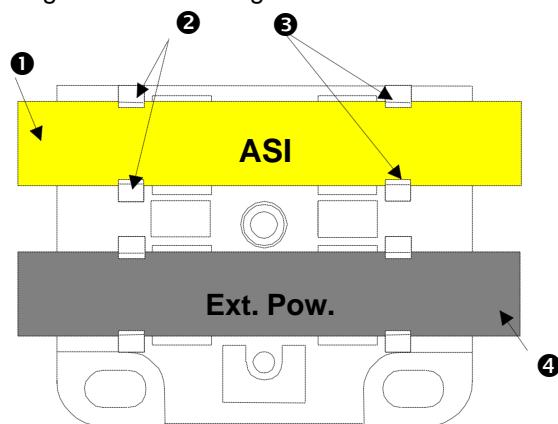
Fig. 4-6 : Auxiliary power connection

❶   AS-I bus flat cable
❷-❸: Cable guide
❹   Power supply cable

When the end of the profiled cable is in the module, it is necessary to install a termination cap (Art. No 55746), to avoid dust and humidity inside de module.

❶ Termination element
❷ Cable
❸ Termination cap
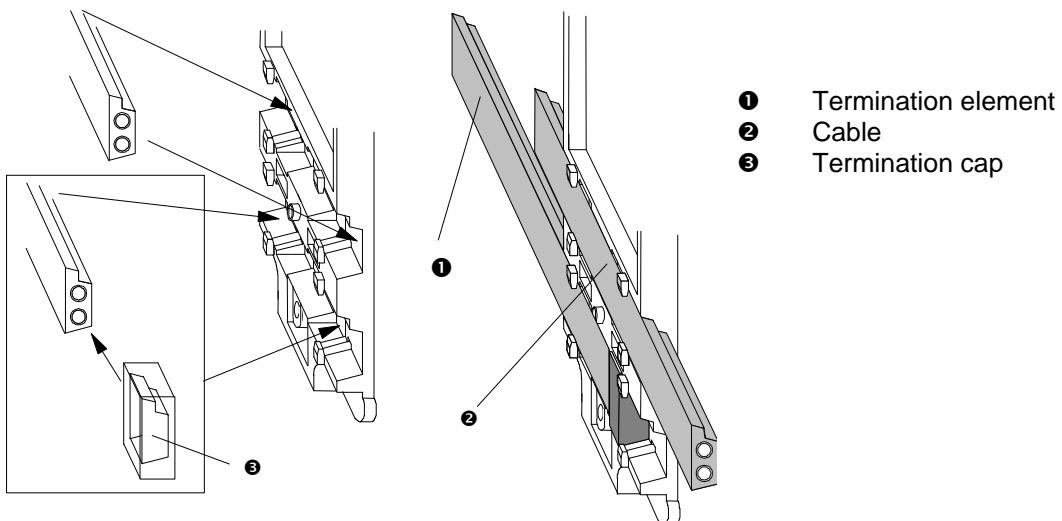
Fig. 4-7 : Power supply connection

Routing the power supply forward induces partially high cumulated currents ! In all cases it must be assured not to exceed the max. admissible current of cables.

4.3 Sensor and transmitter connection

According to the module type, the power supply of connected sensors or transmitters is provided by the AS-Interface system power supply unit or by auxiliary supplies.

Supply of sensors/transmitters	MASI65-M12
from the system	Art. No : 55570 Art. No : 55571 Art. No : 55572 Art. No : 55573 Art. No : 55610 Art. No : 55612 Art. No : 55618 Art. No : 55622 Art. No : 55623 Art. No : 55624 Art. No : 55625 Art. No : 55628 Art. No : 55629 Art. No : 55675 Art. No : 55676
from auxiliary supply	Art. No : 55619 Art. No : 55677

Table 4.3–1: List of modules

The 24V DC power supply of sensors is furnished by the AS-Interface system power supply unit and is electronically protected against overload and short-circuit. All sensors and transmitters connected to a Murrelektronik AS-Interface module are supplied by the same power source.

> **The power supply of sensors from the system's supply unit is not grounded. Never connect the sensor supply or sensors/transmitters to other modules.**

4.3.1 Pin arrangement of the round plug connector M12 with single signal assignment

On standard modules, the pins 2 and 4 of the round plug connector M12 are strapped.
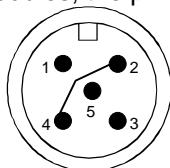
Fig. 4-8 : Pin arrangement of the round plug connectors *M12 on MASI65-M12 modules*

1:      Sensor supply +
2:      Strapping to pin 4
3:      Sensor supply -
4:      Input signal
5:      FE

4.3.2 Pin arrangement of the round plug connector M12 with double signal assignment

On modules with double signal assignment (Y wiring) the inputs of the round plug connectors M12 odd numbers (1,3,5,7) (pin 4) and the pin 2 of the round plug connectors M12 even numbers (0,2,4,6) are strapped.
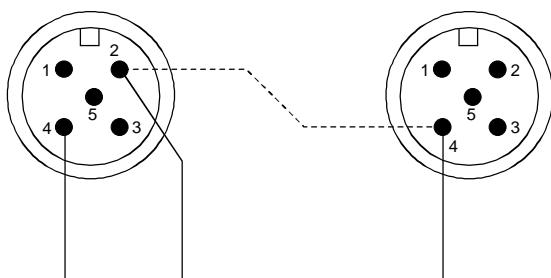
Fig. 4-9 : Pin arrangement of the round plug connectors M12 with Y wiring

Inputs : I0, I2, I4, I6,

1 :   Sensor supply +
2 :   Input signal I1,I3,I5,I7
3 :   Sensor supply -
4 :   Input signal I0, I2, I4, I6
5 :   FE

Inputs : I1, I3, I5, I7

1 :   Sensor supply +
2 :   Not allocated
3 :   Sensor supply -
4 :   Input signal I1, I3, I5, I7
5 :   FE

> **When connecting sensors, make sure not to twist the round plug connector M12 but only the ring nut.**
> **Round plug connectors M12 that are not used, must be obturated by a M12 cap (Art. N° 55468) to ensure the housing protection (IP).**

4.4 Actuator connection (loads)

The loads connected to the MASI65-M12 module are supplied by auxiliary power supply.
For MASI65-M12 modules the output voltage is electronically protected against short-circuit and overload.
The max. admissible load on outputs goes from 0,5A to 2A.
The capacity of outputs is indicated in the installation manual of each module.

> ⚠️ **The module outputs of the MASI65-M12 range and the corresponding potentials must in no case be galvanic-connected to the inputs or outputs of other AS-Interface modules**

4.4.1 Pin arrangement of the round plug connector M12 with single signal assignment

On standard modules the output signal is allocated to pin 4 of the round plug connector M12.
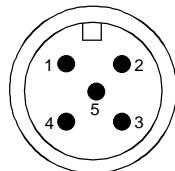
Fig 4-10 : Pin arrangement of the round plug connector M12 on a standard module

1 :   Not allocated
2 :   Not allocated
3 :   0 V
4 :   Output signal
5 :   FE

4.4.2 Pin arrangement of the round plug connector M12 with double signal assignment

On modules with double signal assignment (Y wiring) the outputs of the round plug connectors M12 odd numbers (O1,O3,O5,O7) (pin 4) and pin 2 of the round plug connectors M12 even numbers (O0,O2,O4,O6) are strapped.
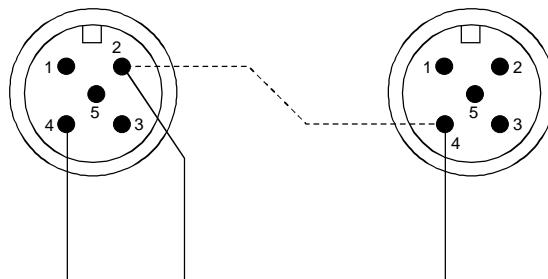
Fig. 4-11: Pin arrangement of the round plug connectors M12 with Y wiring

Outputs : O0,O2, O4, O6   Outputs : O1, O3, O5, O7

1 :   Not allocated   1 :   Not allocated
2 :   Output signal O1, O3, O5, O7   2 :   Not allocated
3 :   0 V   3 :   0 V
4 :   Output signal O0,O2, O4, O6   4 :   Output signal O1, O3,O5,O7
5 :   FE   5 :   FE

4.5 Addressing device connection

Each slave must be addressed before using the AS-Interface system. For this purpose, use a manual addressing device[6] or the master (online). Refer to the corresponding procedure.

4.5.1 Addressing interface for MASI65-M12 modules

Modules are fitted with a specific plug for addressing devices. When inserting the addressing link, the module is automatically cut from the field bus for as long as it is connected to the addressing device. This way addressing is possible even after the system set-up and the connection of the field bus cable to the AS-Interface.

To be able to address a MASI65-M12 module, remove the M12 cap from the addressing plug (8).
Connect the addressing device to the addressing plug of the module.
Refer to the device instructions to address the slaves.
Possible addresses for standard AS-I slaves are : 1 to 31 or 1A to 31A.
Slaves are provided with the default address 0.

❽ : **Adressing plug**
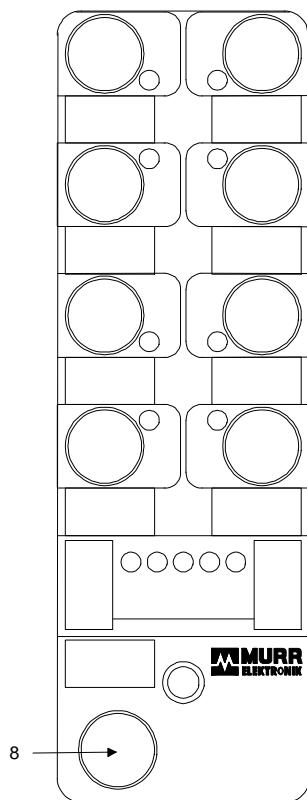
Fig 4-12 : Interface for MASI65-M12 addressing device

Module addressing with a manual addressing device requires no auxiliary supply.

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[6] Addressing device Art. No 55 696

5 Diagnosis displays

Diagnostic information is an important prerequisite for easy setup.
Errors can be quickly identified and rectified through clear information regarding the field bus system, the I/O module and connected peripheral components such as sensors and actuators.

All MASI65-M12 series modules feature separate, clearly arranged displays for bus status, device status and I/O status. These displays are located on the front of the module housing.
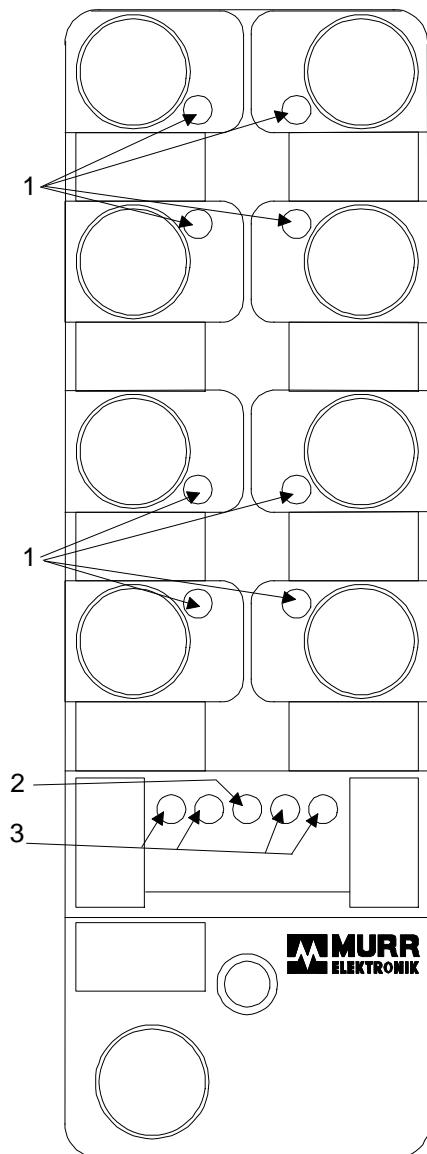
❶: LED Status display
❷: LED Voltage display
❸: LED Diagnosis display

Fig. 5-1 : Diagnosis displays MVK12

5.1 Bus / Device status displays

The LED's on the front of the module are marked ('AS-I' and 'Err') for clear information and represent a static or flashing LED display.

AS-I (green)	ERR (red)	Status
○	○	absence of AS-I operating voltage
○	✷	no data communication
✷	○	module OK
⊙	✷	slave with address 0
○	⊙	Sensor supply is shorted / overloaded

○   off   ⊙   flashing   ✷   on

Table 5.1–1: Bus / Device status displays

5.2 I/O status display

A status display is allocated individually to each input and output. According to the function the display is as follows : 'I1...In' for inputs or 'O1…On' for outputs. The display is located directly next to the corresponding M12 socket and makes it possible to recognize the status of peripheral components such as sensors and actuators.

LED (yellow)	Status
○	input / output deactivated
✷	input / output activated

○:   off   ✷: on

Table 5.2–1 : I/O status display

5.3 Auxiliary supply

The power supply of the modules are equipped with an auxiliary supply (green LED).
In this case, possible undervoltage is not detected.
The auxiliary supply must be galvanic-separated according to IEC 364-4-1 (PELV).

6   Short-circuit/Overload response

6.1 Sensor / transmitter supply

6.1.1   MASI65-M12 standard slaves with SAP4.0

A short-circuit or an overload on the sensor supply causes a reset, which disconnects the AS-I slave from the network ; the master considers this status as a configuration error.
The master indicates configuration errors by static display of the „config err" LED.

The slave indicates the configuration error by static display of the red LED „ERROR".
The „AS-I" LED is off.
When the cause of the short-circuit or overload has been corrected, the error status is automatically reset.

6.1.2   MASI65-M12 standard and AB slaves with SAP4.1

A short-circuit or an overload on the sensor supply causes a reset, which disconnects the AS-I slave from the network ; the master considers this status as a configuration error.
The master indicates configuration errors by static display of the „config err" LED.

The slave indicates the configuration error by static display of the red LED „ERROR".
The „AS-I" LED is off.
When the cause of the short-circuit or overload has been corrected, the error status is automatically reset.

6.2 Outputs

6.2.1   MASI65-M12 standard slaves with SAP4.0

A short-circuit or an overload on the outputs causes a reset, which disconnects the AS-I slave from the network ; the master considers this status as a configuration error.
The master indicates configuration errors by static display of the „config err" LED.

The slave indicates the configuration error by static display of the red LED „ERROR".
The „AS-I" LED is off.
When the cause of the short-circuit or overload has been corrected, the error status is automatically reset.

6.2.2   MASI65-M12 standard and AB slaves with SAP4.1

A short-circuit or an overload on the outputs corresponds to a peripheral error (FID) of the slave ; error indicated by the master if it is in conformity with the specification 2.1.
The master indicates such errors by flashing display of the „config err" LED.

The slave indicates the error (FID) by alternative flashing display of the red LED „ERROR" and the green LED „AS-I".
When the cause of the error has been corrected, the error status is automatically reset.

> **Standard slaves can be fitted with an AS-i SAP4.1 or AS-i SAP4.0 chip.**
> **SAP4.1 and SAP4.0 have different ID2 codes.**
> **The ID2 code is only indicated for SAP4.1 not for SAP4.0.**
> **You can find the ID codes in the corresponding installation manual.**

7 Data sheets for the MASI65-M12 series

7.1 Interference immunity data

EMC
EN 61000-4-3 RF-Field ....10 V/m
ENV 50204 RF-Field GSM ....10 V/m
EN 61000-4-4 Burst..± 1KV / ± 2KV
EN 61000-4-2 ESD..± 4KV / ± 8KV
EN 50081-1 Interference field strength ....QP 30 dBµV/m (30-230 MHz)
....QP 37 dBµV/m (230-1000 MHz)

7.2 MASI65-M12 product-specific data Standard slaves

7.2.1 MASI65 DI8/0,4A Y 8xM12   Art. No. : 55570

ASI slave IP 67 with 8 digital inputs and Y distribution

Technical data

ASI connection
ASI Bus voltage.. 26,5…31,6VDC
Reverse polarity protection .... integrated
Profile (code IO/ID/ID2).. 2 x 0/1/F
Total current usage .... max. 450 mA
Connection (flat cable) .... ASI standard yellow cable
.... 2x1,5mm² ASI+, ASI-

Inputs
Voltage range... 0-30VDC according to IEC1131-2
- Signal 0 .... $I_{in} \leq 2$ mA $U_{in} \leq 5$ V
- Signal 1 .... $I_{in} \geq 6$ mA $U_{in} \geq 11$ V
Input current.. ≤ 11 mA
Max. admissible current .... max. 400mA
Short-circuit/overload protection .... integrated

Inputs are galvanic-connected to the ASI bus.
Do not connected them to an auxiliary power supply unit.

Miscellaneous
Temperature range ....   0...+60 °C
Enclosure type according to DIN 40050...........................   IP 67
Weight..   ~ 160 g
Dimensions ....   154x50x38 mm

7.2.2 MASI65-M12 DI4/0,2A DO4/2A Y 8xM12   Art. No : 55 571

ASI slave IP67 with 4 digital inputs, 4 digital outputs TOR and Y distribution

Technical data

ASI connection
ASI Bus voltage ....26,5…31,6VDC
Reverse polarity protection..integrated
Profile (code IO/ID/ID2) 7/F/E
Total current usage ....max. 250 mA
Connection (flat cable)..ASI standard yellow cable
....2x1,5mm² ASI+, ASI-

Auxiliary supply
Operating voltage range..Ub 20 … 30 VDC
Reverse polarity protection..integrated
Connection (flat cable)..ASI standard black cable
....2x1,5mm² 24V, 0V

The auxiliary supply must be galvanic-separated according to IEC 364-4-41 (PELV).

Inputs
Voltage range ....0-30VDC according to IEC1131-2
- Signal 0 ....$Iin \leq 2$ mA $Uin \leq 5$ V
- Signal 1 ....$Iin \geq 6$ mA $Uin \geq 11$ V
Input current ....≤ 11 mA
Max. admissible current ....max. 200mA
Short-circuit/overload protection.......................................integrated

Inputs are galvanic-connnected to the ASI bus.
Do not connect them to an auxiliary supply unit.

Outputs
Max. admissible current ....IL 2 A 50% ED
Total current (max.)...4 A
Output voltage ....Ub - 0,8V typ.
Switching frequency ....100 Hz at resistive load
....0,2 Hz at inductive load
Short-circuit protection..integrated
Overload protection ....2 A

Miscellaneous
Temperature range..0...+60 °C
Enclosure type according to DIN 40050 ....IP 67
Weight ....~ 160 g
Dimensions...154x50x38 mm

Nr. E201820   Nr. 32402

7.2.3   MASI65 DI8/0,4A BV Y 8xM12   Art. No : 55572

ASI slave IP67 with 8 digitial inputs, bus branching function and Y distribution

<u>**Technical data**</u>

ASI connection
ASI Bus voltage.. 26,5…31,6VDC
Reverse polarity protection .... integrated
Profile (code IO/ID/ID2)... 2 x 0/1/F
Total current usage .... max. 450 mA
Connection (flat cable) .... ASI standard yellow cable
.... 2x1,5mm² ASI+, ASI-

Inputs
Voltage range.. 0-30VDC according to IEC1131-2
- Signal 0 .... lin $\leq$ 2 mA   Uin $\leq$ 5 V
- Signal 1 .... lin $\geq$ 6 mA   Uin $\geq$ 11 V
Input current.. $\leq$ 11 mA
Max. admissible current .... max. 400mA
Short-circuit/overload protection .... integrated

Inputs are galvanic-connected to the ASI bus.
Do not connect them to an auxiliary supply unit.

Miscellaneous
Temperature range .... 0...+60 °C
Enclosure type according to DIN 40050............................ IP 67
Weight... ~ 160 g
Dimensions .... 154x50x38 mm

Nr. E201820   Nr. 32402

7.2.4   MASI65 DI4/0,2A BV Y 4xM12   Art. No : 55573

ASI slave IP67 with 4 digital inputs, bus branching function and Y distribution

Technical data

ASI connection
ASI Bus voltage ....26,5…31,6VDC
Reverse polarity protection..integrated
Profile (code IO/ID/ID2) 0/1/F
Total current usage ....max. 250 mA
Connection (flat cable)..ASI standard yellow cable
....2x1,5mm² ASI+, ASI-

Inputs
Voltage range ....0-30VDC according to IEC1131-2
- Signal 0 ....Iin ≤ 2 mA   Uin ≤ 5 V
- Signal 1 ....Iin ≥ 6 mA   Uin ≥ 11 V
Input current ....≤ 11 mA
Max. admissible current ....max. 200mA
Short-circuit/overload protection..integrated

Inputs are galvanic-connnected to the ASI bus.
Do not connect them to an auxiliary supply unit.

Miscellaneous
Temperature range..0...+60C
Enclosure type according to DIN 40050 ....IP 67
Weight ....~ 100 g
Dimensions...105x50x38 mm

Nr. E201820   Nr. 32402

7.2.5 MASI65 DI4/0,2A 4xM12   Art. No : 55610

ASI slave IP67 with 4 digital inputs

Technical data

ASI connection
ASI Bus voltage... 26,5…31,6VDC
Reverse polarity protection .... integrated
Profile (code IO/ID/ID2).. 0/0/F
Total current usage .... max. 250 mA
Connection (flat cable) .... ASI standard yellow cable
.... 2x1,5mm² ASI+, ASI-

Inputs
Voltage range.. 0-30VDC according to IEC1131-2
- Signal 0 .... Iin $\leq$ 2 mA   Uin $\leq$ 5 V
- Signal 1 .... Iin $\geq$ 6 mA   Uin $\geq$ 11 V
Input current... $\leq$ 11 mA
Max. admissible current .... max. 200mA
Short-circuit/overload protection .... integrated

Inputs are galvanic-connected to the ASI bus.
Do not connect them to an auxiliary supply unit.

Miscellaneous
Temperature range .... 0...+60 °C
Enclosure type according to DIN 40050............................ IP 67
Weight... ~ 100 g
Dimensions .... 105x50x38 mm

Nr. E201820   Nr. 32402

7.2.6   MASI65 DI8/0,4A 8xM12   Art. No : 55612

ASI slave IP67 with 8 digital inputs

Technical data

ASI connection
ASI Bus voltage ....26,5…31,6VDC
Reverse polarity protection..integrated
Profile (code IO/ID/ID2) ....2 x 0/0/F
Total current usage ....max. 450 mA
Connection (flat cable)...ASI standard yellow cable
....2x1,5mm² ASI+, ASI-

Inputs
Voltage range ....0-30VDC according to IEC1131-2
- Signal 0 ....Iin $\leq$ 2 mA   Uin $\leq$ 5 V
- Signal 1 ....Iin $\geq$ 6 mA   Uin $\geq$ 11 V
Input current ....$\leq$ 11 mA
Max. admissible current ....max. 400mA
Short-circuit/overload protection..integrated

Inputs are galvanic-connected to the ASI bus.
Do not connect them to an auxiliary supply unit.

Miscellaneous
Temperature range..0...+60 °C
Enclosure type according to DIN 40050 ....IP 67
Weight ....~ 160 g
Dimensions...154x50x38 mm

Nr. E201820

Nr. 32402

M MURR ELEKTRONIK

7.2.7 MASI65 DO4/0,5A 4xM12   Art. No : 55614

ASI slave IP67 with 4 digital outputs

Technical data

ASI connection
ASI Bus voltage.. 26,5…31,6VDC
Reverse polarity protection .... integrated
Profile (code IO/ID/ID2).. 8/0/E
Total current usage .... max. 50 mA
Connection (flat cable) .... ASI standard yellow cable
.... 2x1,5mm² ASI+, ASI-

Auxiliary supply
Operating voltage range... Ub 20 … 30 VDC
Reverse polarity protection .... integrated
Connection (flat cable) .... ASI standard black cable
.... 2x1,5mm² 24V, 0V

The auxiliary supply must be galvanic-separated according to IEC 364-4-41 (PELV).

Outputs
Max. admissible current .... IL 0,5 A 100% ED
Total admissible current... 2 A
Output voltage.. Ub - 0,8V typ.
Switching frequency... 100 Hz at resistive load
.... 0,2 Hz at inductive load
Short-circuit protection .... integrated
Overload protection.. 1 A

Miscellaneous
Temperature range .... 0...+60 °C
Enclosure type according to DIN 40050............................. IP 67
Weight.. ~ 100 g
Dimensions .... 105x50x38 mm

$C \in$

Nr. E201820

Nr. 32402

7.2.8 MASI65 DO4/2A 4xM12 Art. No : 55615

ASI slave IP67 with 4 digital outputs

Technical data

ASI connection

ASI Bus voltage ....26,5…31,6VDC
Reverse polarity protection...integrated
Profile (code IO/ID/ID2) 8/0/E
Total current usage ....max. 50 mA
Connection (flat cable)...ASI standard yellow cable
....2x1,5mm² ASI+, ASI-

Auxiliary supply

Operating voltage range..Ub 20 … 30 VDC
Reverse polarity protection...integrated
Connection (flat cable)...ASI standard black cable
....2x1,5mm² 24V, 0V

The auxiliary supply must be galvanic-separated according to IEC 364-4-41 (PELV).

Outputs

Max. admissible current ....IL 2 A 50% ED
Total admissible current ....4 A
Output voltage ....Ub - 0,8V typ.
Switching frequency ....100 Hz at resistive load
....0,2 Hz at inductive load
Short-circuit protection..integrated
Overload protection ....2 A

Miscellaneous

Temperature range..0...+60 °C
Enclosure type according to DIN 40050 ....IP 67
Weight ....~ 100 g
Dimensions..105x50x38 mm

Nr. E201820   Nr. 32402

7.2.9 MASI65 DO8/0,5A 8xM12   **Art. No : 55616**

ASI slave IP67 with 8 digital outputs

<u>**Technical data**</u>

ASI connection

ASI Bus voltage	26,5…31,6VDC
Reverse polarity protection	integrated
Profile (code IO/ID/ID2)	2 x 8/0/E
Total current usage	max. 50 mA
Connection (flat cable)	ASI standard yellow cable
	2x1,5mm² ASI+, ASI-

Auxiliary supply

Operating voltage range	Ub 20 … 30 VDC
Reverse polarity protection	integrated
Connection (flat cable)	ASI standard black cable
	2x1,5mm² 24V, 0V

The auxiliary supply must be galvanic-separated according to IEC 364-4-41 (PELV).

Outputs

Max. admissible current	IL 0,5 A 100% ED
Total admissible current	4 A
Output voltage	Ub - 0,8V typ.
Switching frequency	100 Hz at resistive load
	0,2 Hz at inductive load
Short-circuit protection	integrated
Overload protection	1 A

Miscellaneous

Temperature range	0...+60 °C
Enclosure type according to DIN 40050	IP 67
Weight	~ 140 g
Dimensions	154x50x38 mm

$C\,\epsilon$

Nr. E201820   **Nr. 32402**

MURR ELEKTRONIK

7.2.10 MASI65 DI4/0,2A DO4/0,5A 8xM12   Art. No : 55618

ASI slave IP67 with 4 digital inputs / 4 digital outputs

Technical data

ASI connection
ASI Bus voltage ....26,5…31,6VDC
Reverse polarity protection..integrated
Profile (code IO/ID/ID2) 7/0/E
Total current usage ....max. 250 mA
Connection (flat cable)..ASI standard yellow cable
....2x1,5mm² ASI+, ASI-

Auxiliary supply
Operating voltage range...Ub 20 … 30 VDC
Reverse polarity protection..integrated
Connection (flat cable)..ASI standard black cable
....2x1,5mm² 24V, 0V

The auxiliary supply must be galvanic-separated according to IEC 364-4-41 (PELV).

Inputs
Voltage range ....0-30VDC according to IEC1131-2
- Signal 0 ....$Iin \leq 2$ mA $Uin \leq 5$ V
- Signal 1 ....$Iin \geq 6$ mA $Uin \geq 11$ V
Input current ....≤ 11 mA
Max. admissible current ....max. 200mA
Short-circuit/overload protection...integrated

Inputs are galvanic-connected to the ASI bus.
Do not connect them to an auxiliary supply unit.

Outputs
Max. admissible current ....IL 0,5 A 100% ED
Total admissible current ....4 A
Output voltage ....Ub - 0,8V typ.
Switching frequency ....100 Hz at resistive load
....0,2 Hz at inductive load
Short-circuit protection..integrated
Overload protection ....1 A

Miscellaneous
Temperature range...0...+60 °C
Enclosure type according to DIN 40050 ....IP 67
Weight ....~ 160 g
Dimensions...154x50x38 mm

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7.2.11 MASI65 DI4/1,6A DO4/2A 8xM12   Art. No : 55619

ASI slave IP67 with 4 digital inputs / 4 digital outputs

Technical data

ASI connection
ASI Bus voltage.. 26,5…31,6VDC
Reverse polarity protection .... integrated
Profile (code IO/ID/ID2)... 7/0/E
Total current usage .... max. 50 mA
Connection (flat cable) .... ASI standard yellow cable
.... 2x1,5mm² ASI+, ASI-

Auxiliary supply
Operating voltage range... Ub 20 … 30 VDC
Reverse polarity protection .... integrated
Connection (flat cable) .... ASI standard black cable
.... 2x1,5mm² 24V, 0V

The auxiliary supply must be galvanic-separated according to IEC 364-4-41 (PELV).

Inputs
Voltage range.. 0-30VDC according to IEC1131-2
- Signal 0 .... $I_{in} \leq 2$ mA $U_{in} \leq 5$ V
- Signal 1 .... $I_{in} \geq 6$ mA $U_{in} \geq 11$ V
Input current... ≤ 11 mA
Max. admissible current .... max. 1,6A
Short-circuit/overload protection .... integrated

Inputs are supplied by the auxiliary supply (Ub).

Outputs
Max. admissible current .... IL 2 A 50% ED
Total admissible current.. 4 A
Output voltage... Ub - 0,8V typ.
Switching frequency.. 100 Hz at resistive load
.... 0,2 Hz at inductive load
Short-circuit protection .... integrated
Overload protection... 2 A

Miscellaneous
Temperature range .... 0...+60 °C
Enclosure type according to DIN 40050............................. IP 67
Weight.. ~ 160 g
Dimensions .... 154x50x38 mm

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7.2.12 MASI65 DI4/0,2A BV 4xM12   Art. No : 55622

ASI slave IP67 with 4 digital inputs and bus branching function.

Technical data

ASI connection
ASI Bus voltage ....26,5…31,6VDC
Reverse polarity protection...integrated
Profile (code IO/ID/ID2) 0/0/F
Total consumption ....max. 250 mA
Connection (flat cable)...ASI standard yellow cable
....2x1,5mm² ASI+, ASI-

Inputs
Voltage range ....0-30VDC according to IEC1131-2
- Signal 0 ....Iin ≤ 2 mA   Uin ≤ 5 V
- Signal 1 ....Iin ≥ 6 mA   Uin ≥ 11 V
Input current ....≤ 11 mA
Max. admissible current ....max. 200mA
Short-circuit/overload protection.......................................integrated

Inputs are galvanic-connected to the ASI bus.
Do not connect them to an auxiliary supply unit.

Miscellaneous
Temperature range...0...+60 °C
Enclosure type according to DIN 40050 ....IP 67
Weight ....~ 100 g
Dimensions..105x50x38 mm

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7.2.13 MASI65 DI8/0,4A 8xM12   Art. No : 55623

ASI slave IP67 with 8 digital inputs and bus branching function.

<u>**Technical data**</u>

ASI connection
ASI Bus voltage.. 26,5…31,6VDC
Reversal polarity protection... integrated
Profile (code IO/ID/ID2).. 2 x 0/0/F
Total current usage .... max. 450 mA
Connection (flat cable) .... ASI standard yellow cable
 .... 2x1,5mm² ASI+, ASI-

Inputs
Voltage range.. 0-30VDC according to IEC1131-2
- Signal 0 .... $I_{in} \leq 2$ mA $U_{in} \leq 5$ V
- Signal 1 .... $I_{in} \geq 6$ mA $U_{in} \geq 11$ V
Input current... ≤ 11 mA
Max. admissible current .... max. 400mA
Short-circuit/overload protection .... integrated

Inputs are galvanic-connected to the ASI bus.
Do not connect them to an auxiliary supply unit.

Miscellaneous
Temperature range .... 0...+60 °C
Enclosure type according to DIN 40050............................ IP 67
Weight... ~ 160 g
Dimensions .... 154x50x38 mm

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7.2.14 MASI65 DI4/0,2A DO4/2A 8xM12   Art. No : 55624

ASI slave IP67 with 4 digital inputs / 4 digital outputs.

Technical data

ASI connection
ASI Bus voltage ....26,5…31,6VDC
Reverse polarity protection..integrated
Profile (code IO/ID/ID2) 7/0/E
Total current usage ....max. 250 mA
Connection (flat cable)...ASI standard yellow cable
....2x1,5mm² ASI+, ASI-

Auxiliary sypply
Operating voltage range ....Ub 20 … 30 VDC
Reverse polarity protection..integrated
Connection (flat cable)...ASI standard black cable
....2x1,5mm² 24V, 0V

The auxiliary supply must be galvanic-separated according to IEC 364-4-41 (PELV).

Inputs
Voltage range ....0-30VDC according to IEC1131-2
- Signal 0 ....$Iin \leq 2$ mA $Uin \leq 5$ V
- Signal 1 ....$Iin \geq 6$ mA $Uin \geq 11$ V
Input current ....≤ 11 mA
Max. admissible current ....max. 200mA
Short-circuit/overload protection...integrated

Inputs are galvanic-connected to the ASI bus.
Do not connect them to an auxiliary supply unit.

Outputs
Max. admissible current ....IL 2 A 50% ED
Total admissible current ....4 A
Output voltage ....Ub - 0,8V typ.
Switching frequency ....100 Hz at resistive load
....0,2 Hz at inductive load
Short-circuit protection...integrated
Overload protection ....2 A

Miscellaneous
Temperature range...0...+60 °C
Enclosure type according to DIN 40050 ....IP 67
Weight ....~ 160 g
Dimensions...154x50x38 mm

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7.2.15 MASI65 DI2/0,2A DO2/2A 4xM12   Art. No : 55625

ASI slave IP67 with 2 digital inputs / 2 digital outputs.

Technical data

ASI connection
ASI Bus voltage.. 26,5…31,6VDC
Reverse polarity protection .... integrated
Profile (code IO/ID/ID2).. 3/0/E
Total current usage .... max. 250 mA
Connection (flat cable) .... ASI standard yellow cable
.... 2x1,5mm² ASI+, ASI-

Auxiliary supply
Operating voltage range.. Ub 20 … 30 VDC
Reverse polarity protection .... integrated
Connection (flat cable) .... ASI standard black cable
.... 2x1,5mm² 24V, 0V

The auxiliary supply must be galvanic-separated according to IEC 364-4-41 (PELV).

Inputs
Volgage range.. 0-30VDC according to IEC1131-2
- Signal 0 .... $Iin \leq 2$ mA $Uin \leq 5$ V
- Signal 1 .... $Iin \geq 6$ mA $Uin \geq 11$ V
Input current... ≤ 11 mA
Max. admissible current .... max. 200mA
Short-circuit/overload protection .... integrated

Inputs are galvanic-connected to the ASI bus.
Do not connect them to an auxiliary supply unit.

Outputs
Max. admissible current... IL 2 A 100% ED
Total admissible current... 4 A
Output voltage... Ub - 0,8V typ.
Switching frequency .... 100 Hz at resistive load
.... 0,2 Hz at inductive load
Short-circuit protection .... integrated
Overload protection... 2 A

Miscellaneous
Temperature range .... 0...+60 °C
Enclosure type according to DIN 40050............................ IP 67
Weight... ~ 100 g
Dimensions .... 105x50x38 mm

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7.2.16 MASI65 DI4/0,2A DO4/0,5A Y 8xM12 Art. No : 55628

ASI slave IP67 with 4 digital inputs / 4 digital outputs and Y distribution.

Technical data

ASI connection
ASI Bus voltage ....26,5…31,6VDC
Reverse polarity protection...integrated
Profile (code IO/ID/ID2) 7/F/E
Total current usage ....max. 250 mA
Connection (flat cable)..ASI standard yellow cable 2x1,5mm² ASI+, ASI-

Auxiliary supply
Operating voltage range..Ub 20 … 30 VDC
Reverse polarity protection...integrated
Connection (flat cable)..ASI standard black cable 2x1,5mm² 24V, 0V

The auxiliary supply must be galvanic-separated according to IEC 364-4-41 (PELV).

Inputs
Voltage range ....0-30VDC according to IEC1131-2
- Signal 0 ....$Iin \leq 2$ mA $Uin \leq 5$ V
- Signal 1 ....$Iin \geq 6$ mA $Uin \geq 11$ V
Input current ....≤ 11 mA
Max. admissible current ....max. 200mA
Short-circuit/overload protection.......................................integrated

Inputs are galvanic-connected to the ASI bus.
Do not connect them to an auxiliary supply unit.

Outputs
Max. admissible current ....IL 0,5 A 100% ED
Total admissible current ....2 A
Output voltage ....Ub - 0,8V typ.
Switching frequency ....100 Hz at resistive load
....0,2 Hz at inductive load
Short-circuit protection..integrated
Overload protection ....1 A

Miscellaneous
Temperature range..0...+60 °C
Enclosure type according to DIN 40050 ....IP 67
Weight ....~ 160 g
Dimensions...154x50x38 mm

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7.2.17 MASI65 DI4/0,2A Y 4xM12   Art. No : 55629

ASI slave IP67 with 4 digital inputs and Y distribution.

Technical data

ASI connection
ASI Bus voltage.. 26,5…31,6VDC
Reverse polarity protection .... integrated
Profile (code IO/ID/ID2).. 0/1/F
Total current usage .... max. 250 mA
Connection (flat cable) .... ASI standard yellow cable
.... 2x1,5mm² ASI+, ASI-

Inputs
Voltage range... 0-30VDC according to IEC1131-2
- Signal 0 .... $I_{in} \leq 2$ mA $U_{in} \leq 5$ V
- Signal 1 .... $I_{in} \geq 6$ mA $U_{in} \geq 11$ V
Input current.. ≤ 11 mA
Max. admissible current .... max. 200mA
Short-circuit/overload protection .... integrated

Inputs are galvanic-connected to the ASI bus.
Do not connect them to an auxiliary supply unit.

Miscellaneous
Temperature range .... 0...+60 °C
Enclosure type according to DIN 40050............................. IP 67
Weight.. ~ 100 g
Dimensions .... 105x50x38 mm

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7.3 MVK12 AB product-specific technical data AB slaves

7.3.1 MASI65 DI4/0,2A DO3/2A AB Y 8xM12   Art. No : 55 675

ASI slave IP67 with 4 digital inputs, 3 digital outputs and Y distribution.

Technical data

ASI connection
ASI Bus voltage...26,5…31,6VDC
Reverse polarity protection...integrated
Profile (code IO/ID/ID2) 7/A/E
Total current usage ....max. 250 mA
Connection (flat cable)...ASI standard yellow cable
....2x1,5mm² ASI+, ASI-

Auxiliary supply
Operating voltage range ....Ub 20 … 30 VDC
Reverse polarity protection...integrated
Connection (flat cable)...ASI standard black cable
....2x1,5mm² 24V, 0V

The auxiliary supply must be galvanic-separated according to IEC 364-4-41 (PELV).

Inputs
Voltage range ....0-30VDC according to IEC1131-2
- Signal 0 ....$Iin \leq 2$ mA $Uin \leq 5$ V
- Signal 1 ....$Iin \geq 6$ mA $Uin \geq 11$ V
Input current ....≤ 11 mA
Max. admissible current ....max. 200mA
Short-circuit/overload protection..integrated

Inputs are galvanic-connected to the ASI bus.
Do not connect them to an auxiliary supply unit.

Outputs
Max. admissible current ....IL 0,5 A 100% ED
Total admissible current ....2 A
Output voltage ....Ub - 0,8V typ.
Switching frequency ....100 Hz at resistive load
....0,2 Hz at inductive load
Short-circuit protection...integrated
Overload protection ....1 A

Miscellaneous
Temperature range...0...+60 °C
Enclosure type according to DIN 40050 ....IP 67
Weight ....~ 160 g
Dimensions..154x50x38 mm

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7.3.2 MASI65 DI8/0,2A AB Y 8xM12   Art. No : 55676

ASI slave IP67 with 8 digital inputs and Y distribution.

Technical data

ASI connection
ASI Bus voltage .... 26,5…31,6VDC
Reverse polarity protection .... integrated
Profile (code IO/ID/ID2) .... 2 x 0/0/F
Total current usage .... max. 250 mA
Connection (flat cable) .... ASI standard yellow cable
 .... 2x1,5mm² ASI+, ASI-

Inputs
Voltage range .... 0-30VDC according to IEC1131-2
- Signal 0 .... Iin $\leq$ 2 mA   Uin $\leq$ 5 V
- Signal 1 .... Iin $\geq$ 6 mA   Uin $\geq$ 11 V
Input current .... $\leq$ 11 mA
Max. admissible current .... max. 400mA
Short-circuit/overload protection .... integrated

Inputs are galvanic-connected to the ASI bus.
Do not connect them to an auxiliary supply unit.

Miscellaneous
Temperature range .... 0...+60 °C
Enclosure type according to DIN 40050 .... IP 67
Weight .... ~ 160 g
Dimensions .... 154x50x38 mm

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7.3.3 MASI65 DI4/1,6A DO3/2A AB Y 8xM12   Art. No : 55677

ASI slave IP67 with 4 digital inputs, 3 digital outputs and Y distribution.

Technical data

ASI connection
ASI Bus voltage ....26,5…31,6VDC
Reverse polarity protection..integrated
Profile (code IO/ID/ID2) 7/0/E
Total current usage ....max. 50 mA
Connection (flat cable)..ASI standard yellow cable
....2x1,5mm² ASI+, ASI-

Auxiliary supply
Operating voltage range ....Ub 20 … 30 VDC
Reverse polarity protection..integrated
Connection (flat cable)..ASI standard black cable
....2x1,5mm² 24V, 0V

The auxiliary supply must be galvanic-separated according to IEC 364-4-41 (PELV).

Inputs
Voltage range ....0-30VDC according to IEC1131-2
- Signal 0 ....$Iin \leq 2$ mA $Uin \leq 5$ V
- Signal 1 ....$Iin \geq 6$ mA $Uin \geq 11$ V
Input current ....≤ 11 mA
Max. admissible current ....max. 1,6A
Short-circuit/overload protection......................................integrated

Inputs are supplied by the auxiliary supply (Ub).

Outputs
Max. admissible current ....IL 2 A 50% ED
Total admissible current ....4 A
Output voltage ....Ub - 0,8V typ.
Switching frequency ....100 Hz at resistive load
....0,2 Hz at inductive load
Short-circuit protection..integrated
Overload protection ....2 A

Miscellaneous
Temperature range..0...+60 °C
Enclosure type according to DIN 40050 ....IP 67
Weight ....~ 160 g
Dimensions..154x50x38 mm

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8   Modules versions and features

8.1 MASI65-M12 : 8-way module
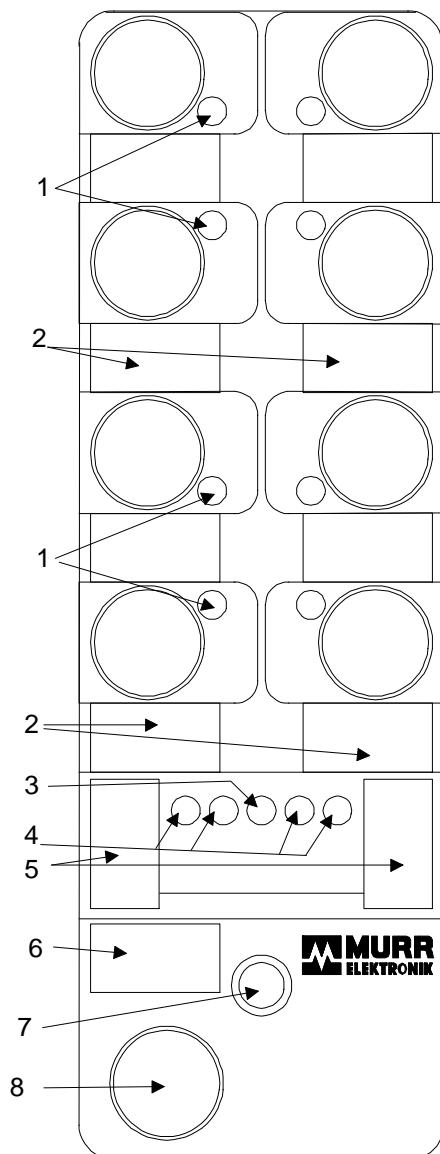
❶: Status display elements

❷: Identification label

❸: Voltage LED

❹: Diagnostic LED

❺: Slave identification label

❻: Module identification label

❼: Central screw

❽: Addressing plug

8.2 MASI65-M12 : 4-way module
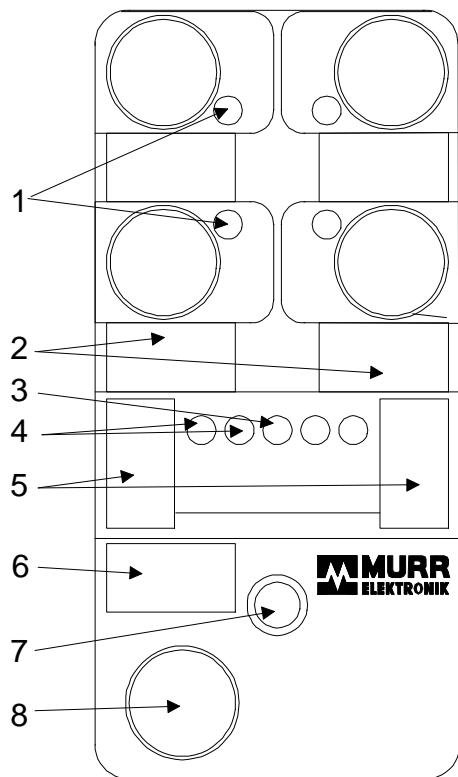
❶ : Status display elements

❷ : Identification label

❸ : Diagnostic LED

❹ : Slave identification label

❺ : Module identification label

❻ : Central screw

❼ : Addressing plug

9 List of illustrations

10 List of tables