

Installation instructions for AS-Interface networks

(As of: October 1998)

What is to be taken into account when AS-i networks are planned?

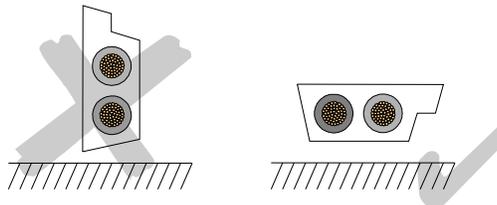
The AS-Interface is designed as an electrically-isolated and symmetrical-to-ground system. Therefore its noise protection is in general sufficient in industrial environments without any additional measures such as screening or the like.

It should, however, be noted that the symmetry to ground is not impaired at too high an extent. The following is to be noted in particular:

- Using certified products: Only products with the AS-Interface certification mark (logo with shadow) have undergone the strict tests of the authorised testing body and proven to have a high symmetry to ground and noise immunity.



- Avoid unfavourable, not symmetrical-to-ground cable laying across long distances:



This also means the separate laying of the two AS-i cores which is absolutely to be avoided. A simple measure to improve symmetry to ground can be twisting the core ends or the twisted laying of the AS-i cable.

- Ungrounded sensors/actuators: The grounding of peripheral units connected electrically with the AS-i potential is not according to specification. With regard to high noise immunity it should be avoided at any rate.
- Grounding of the "screen" connection at the power supply (see page 3).

How can you test if there are any ground faults in the AS-i network?

The existence of ground faults in the AS-i networks can be easily verified as follows:

- remove the ground connection with the marking "screen" at the AS-i power supply,

- measure the voltage between ASI+ and ground as well as ground and ASI- by means of a standard multimeter.

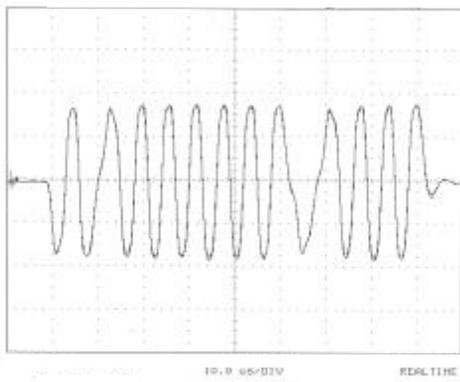
Both measurements should show approx. 15VDC. If the difference between the two measured results exceeds approximately 5V, there is a ground fault problem. This can be localised and remedied by disconnecting parts of the AS-i network section by section.

In general we recommend installation of a ground fault monitor in the AS-i network.

How can you check if the AS-i network has been set up correctly?

Checking the correct set-up necessitates measurement and evaluation of the impedance between the wires and to ground in a wide frequency range. One possible evaluation is assessing the shape of the AS-i signals on the cable which, however, requires expert knowledge and an oscilloscope. This can be requested via the specialist at ifm or the After-Sales Service in Essen.

A first analysis is possible by comparing the following oscillograms:

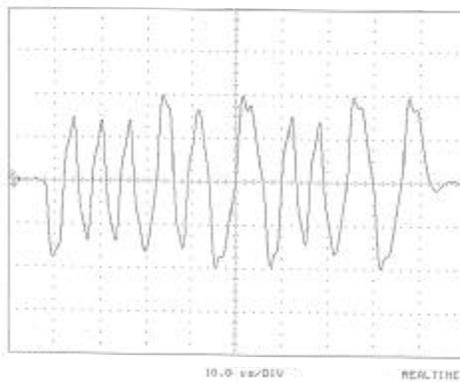


Symptoms:

Amplitude between 3Vpp and 8Vpp
 first pulse: same amplitude as others
 short pulses: same amplitude as long pulses
 long pulses: same amplitude as short pulses
 small overshoot at end of sequence

Conclusion:

everything ok



Symptoms:

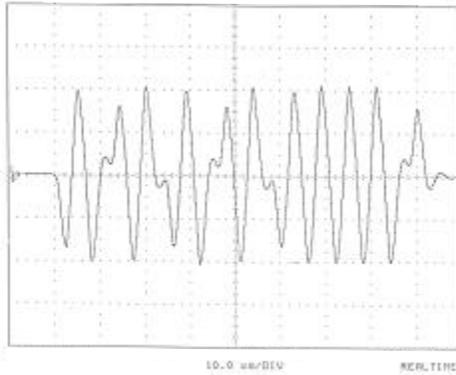
first pulse: higher than following pulses
 short pulses: lower amplitude
 long pulses: higher amplitude

Cause:

high capacitive load

Possible reaction:

reduce length of network



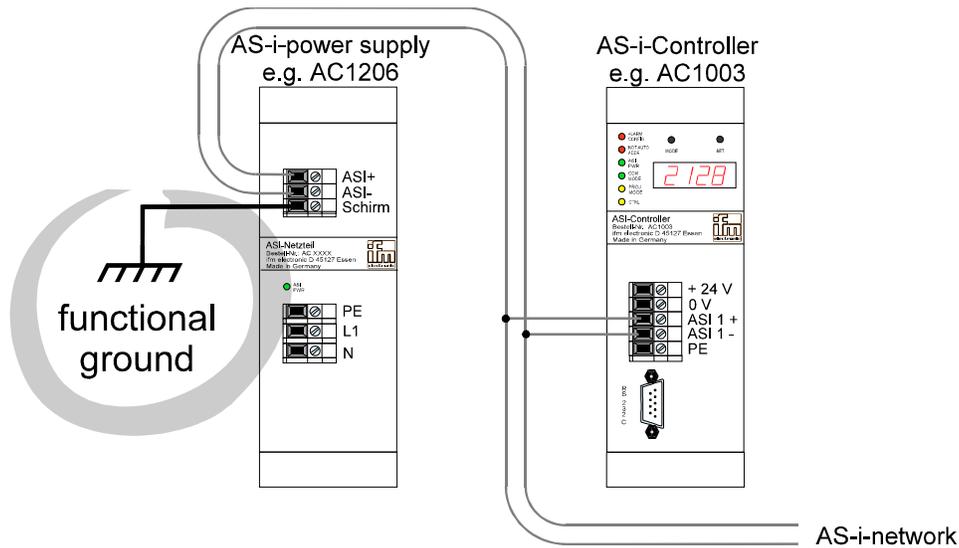
Symptoms:
 first pulse: lower than following pulses
 short pulses: higher amplitude
 long pulses: lower amplitude

Cause:
 high inductive load

Possible reaction:
 compensate with additional capacities

What else can be done to ensure high noise immunity?

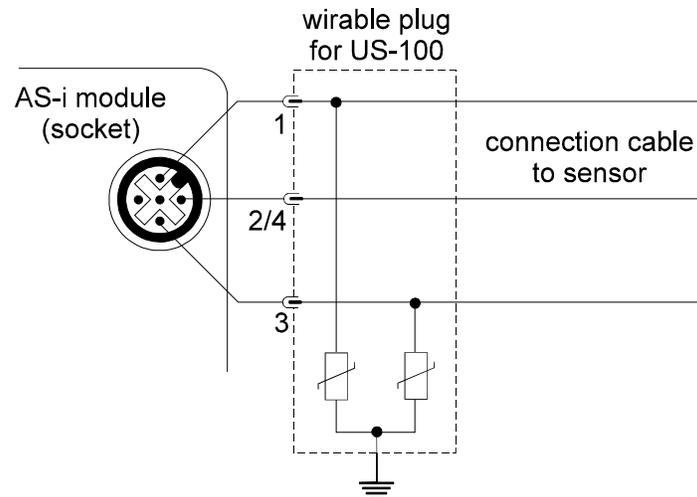
The connection "screen" on the AS-i power supply should be connected directly and with good HF characteristics to the potential equalization of the machine or plant. This is not a grounding measure for reasons of safety but a functional grounding so that the AS-i cable can be operated symmetrically to GND. If a screened AS-i cable is used, the cable screen is also to be connected there (and only there).



A good symmetry to other electrical sources of interference (speed-controlled drives, welding plant, etc.) should be kept (see page 4).

The connecting cables between the active I/O modules and the sensors and actuators connected to them should not be longer than 2m.

Where high electrostatic charges are to be expected (e.g. on polishing machines, injection moulding machines or when plastic film is wound up or unwound) it may be necessary to take the following additional protective measures:



The varistors which can be mounted into a wirable plug prevent the occurrence of high electrostatic charges. One of these plugs per module is sufficient.

What cable qualities are suitable as alternative to the yellow AS-i cable?

If the standard AS-i cable cannot or should not be used, there are the following cable qualities as alternative:

H05VV-F2X1.5
 (N)YHCY-O 2X1.5
 DeviceNet Thick Cable (Data Pair)

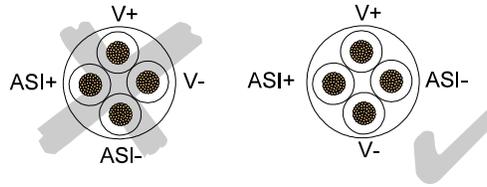
Other, even multi-cored cables with cross sections of between 0.75mm^2 and 2.5mm^2 are often also suitable. The current requirement as well as the resulting voltage drop have, however, to be taken into account. In case of doubt the ifm specialist is to be consulted.

In the event of short branches or spur lines up to approx. 2m other cross sections may also be used.

May the AS-i cable be laid in parallel to power lines?

Usually the AS-i communication is not impaired if both cables are laid in parallel across long distances or if they are routed in one multi-cored cable (ensure proper insulation capacity!). AS-i cables have also been successfully used in conjunction with slip rings as well as conductor rails in parallel to the voltage supply.

It is, however, generally recommended to keep a symmetry as high as possible against potential sources of interference in addition to the symmetry to ground.



Twisting of the cable cores to compensate for the source of interference can, if possible, also be considered in this case as a measure to reduce interference. If this also proves to be insufficient, screening measures will have to be taken.

What is to be taken into account when an 8A AS-i network is used?

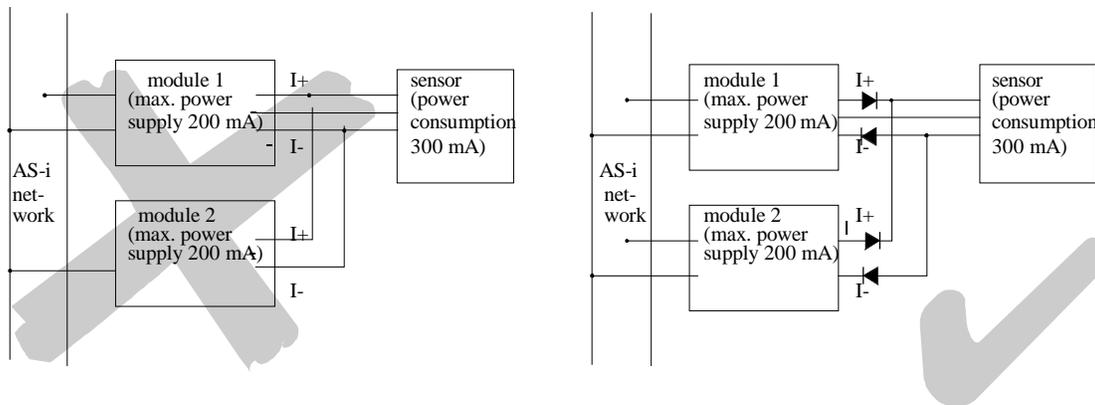
If more than the usual 2A current are carried via the AS-i cable, the following conditions have to be taken into account when the network is designed:

- The voltage drop across the AS-i cable increases. For orientation: If 2A are carried via a 100m cable with a cross section of 1.5mm², the voltage drop is approx. 5V.
- The contacts of the isolation displacement technology are only designed for certain maximum permanent currents rated distinctly below 8A. In this case the data sheet of the manufacturer has to be consulted. Examples:

- | | |
|---|----|
| - isolation displacement connector T splitter (AC5005): | 1A |
| - FC isolation displacement connector (E70096, E70098, E70099): | 2A |
| - FC coupling module (AC5000): | 2A |

May several AS-i modules be connected in parallel to increase power consumption?

This can only be done if the following two points are observed:



- the modules should be installed in close proximity to each other and
- the connecting cables should be decoupled via diodes (see drawing).

Can the AS-Interface be used in zones 2 and 11 hazardous areas?

The "Regulation concerning electrical plant in hazardous areas" (ElexV) as well as the related administration regulations apply to the installation of an electrical plant in hazardous areas. This regulation also governs the approval of electrical apparatus.

Most AS-i products are units where no sparks, electric arcs or impermissibly high temperatures occur when they are used in accordance with the instructions. Therefore they are in general suitable for use in zone 2 and zone 11 hazardous areas. In individual cases this will have to be clarified by a Manufacturer's Declaration.