



AS-Interface Modules
with Plug-N-Play
Connectivity Reduce
Overall Installation and
Maintenance Costs.

AS-Interface Introduction

Common Industrial Protocol

AS-i (Actuator Sensor Interface) was designed as a simple system for the quick data exchange of binary signals. Research, spawned by market demands, has made it possible to transmit analog data as well (also see "The new AS-i-specification V2.1"). That data, however, must not be time-critical, since the transmission of an analog value requires several data cycles

The biggest advantage of AS-i is the quick and uncomplicated installation of the system. Communication (Manchester Encoding) and power supply are transmitted via a 2-wire cable. By using piercing technology for contacting the cable it is possible to insert a new slave at any point in the system. In addition, the arbitrary structure of the bus (line, tree, star, ...) permits the perfect adaptation to the relevant plant or machine.

AS-i is mainly used for small machines, as a subsystem for more complex bus systems (e.g. PROFIBUS-DP) or as an easy introduction to bus technology.

AS-Interface is an open standard. Thus, it is possible to operate different bus participants made by different manufacturers in one network.

About Lumberg Automation AS-i Products

Lumberg Automation remains true to the AS-i easy installation concept and offers compact, solid module technology to the customer. The IP67 components have been designed to use directly on machines.

The flat cable shown below is commonly used with AS-i. However, for some applications such as C-tracks, Lumberg provides connections for round cable for all modules as well.

Technical Data

Transmission media: Unshielded 2-wire cable for power supply (module electronics and sensors) and data transmission (Manchester Encoding and optionally mechanically encoded flat or round cable.



AS-i Module depicted with flat cable and M12 field attachable connectors and junctions.

Network Topology

The bus can be built arbitrarily (line, star, tree, ...). Terminating resistors are not required.

Bus Access

- Monomaster system
- Master-slave access

Number of Slaves

- 31 slaves by using standard slaves
- 62 slaves by using A/B slaves with profile 2.1

Standard Transmission Rates and Segment Lengths

- Transmission rate: 167 kbaud
- Max. segment length: 100 m Bus cycle time
- Standard slaves max. 5 ms in case of full arrangement (31 slaves)
- Just A or B slave per address max. 5 ms in case of full arrangement (31 slaves)
- A and B slave per address max. 10 ms in case of full arrangement (62 slaves)



Be Certain with Belden

Addressing

AS-i slaves are generally addressed via software (the default address is generally "0" for all AS-i slaves). This can be done in several ways:

- **Via the master:** The slaves are connected to the master consecutively. The latter automatically identifies the kind of slave and starts communicating. Then the slave can be addressed.
- **Via an addressing unit:** All AS-i slaves can be addressed with the standard addressing unit "0913 ATL 003" (the Lumberg flat cable modules require the adapter "0913 ATL 002 / 0.35M"; modules according to profile 2.1 require the adapter" 0913 ATL 004 / 1 M).
- **Automatic addressing:** If a slave in a network fails, AS-i offers the option of auto-addressing. The defective slave is replaced by an identical one. The master identifies this slave and automatically addresses it to the address of the missing slave.

Diagnostic system

According to the AS-i specification 2.1 periphery errors like short circuit or overload can be sent to the master in the form of a collective diagnostic. In addition, there is a status LED on the relevant slave.

The New AS-i Specification Version 2.1










With the introduced AS-i specification V. 2.1 some innovations have been integrated into the AS-i system. The most important alteration is the possibility to operate 62 (instead of 31) slaves in one network. This became possible by the introduction of a differentiation between A and B slaves (e.g. 1A + 1B). To achieve that, the system had to be designed with one output per slave less (max. 4I/30).

The new specification is downward compatible, and old AS-i slaves can be operated in one network together with new ones. In addition to that, the processing of analog values was improved. The transmission of analog values are integrated in the master. This means that specific function blocks need not be used any more.

Transmission Rate	AS-i Specification Version 2.0	AS-i Specification Version 2.1
Slave	Standard	A/B Slave
Max. Number of Slaves	31	64
Max. Number of Inputs	4 Inputs x 31 slaves = 124 Inputs	4 Inputs x 62 slaves = 248 Inputs
Max. Number of Outputs	4 Outputs x 31 slaves = 124 Outputs	3 Outputs x 62 slaves = 186 Outputs <small>(one output is needed for the A/B addressing)</small>
Cycle Time	5ms for 31 slaves	10ms for 62 slaves
Analog Value Processing	via functional blocks	integrated in the master

Table 1: Admissible transmission rates

Product Characteristics

-  Especially suitable for robotic applications (resistance to torsion).
-  Very good resistance to oils, coolants and lubricants as well as emulsions.
-  Suitable for use in C-Tracks.
-  Very good resistance to flying weld slag (e.g.) unfinished constructions).
-  Very good resistance to acids, lye and chemical cleaning agents.
-  Very good electromagnetic resistance (EMC) and shielded systems.
-  Very good vibration and shock resistance.
-  UL approved.
-  UL/CSA approved.



Integrated AS-i application.