# AS-interface®

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A Worldwide AS-interface® Solution

InterlinkBT™ - A Banner-TURCK Bus Products Company

InterlinkBT is a joint venture between two renowned sensor companies, TURCK, Inc. and Banner Engineering, to focus specifically on bus products. The experience and advanced bus technologies of these companies are now combined, resulting in the industry’s broadest, most complete line of stations, junctions, cordsets and components for device-level networks. InterlinkBT is the industry’s bus I/O specialist and leading supplier of top-quality bus products. Most importantly, InterlinkBT is your best solution to connect input/output devices to open buses.

Bihl+Wiedemann

Bihl+Wiedemann, known as “the AS-i master company”, is the leading supplier of AS-i masters and gateways. Their broad product range enables users to select from a wide variety of higher level fieldbuses or PC control solutions. Additionally, Bihl+Wiedemann provides many analog AS-i slaves, PC-board level devices and AS-i accessory products. InterlinkBT is the North American distributor for Bihl+Wiedemann.

InterlinkBT’s AS-interface® Catalog

The product offering in this catalog is significantly enhanced by InterlinkBT’s partnership with Bihl+Wiedemann. InterlinkBT’s rugged discrete slaves and physical media are now combined with Bihl+Wiedemann’s expertise in the area of AS-interface® masters, analog slaves and custom products. All products are presented here to provide you with a complete AS-interface® solution.

Connection Technology

InterlinkBT has the products for interconnecting all your devices on an AS-interface® network. By simply plugging components together these products allow for quick installations of new plant layouts and easy alterations to existing installations. InterlinkBT’s junction blocks are rugged and can be mounted in aggressive environments. Drop count can vary from 4 to 8 with the choice of minifast® or eurofast® connector sizes.

InterlinkBT cable exceeds AS-interface® specifications for impedance and attenuation. Pre-molded cordsets are available with either minifast® or eurofast® connector sizes. You can reliably use InterlinkBT connection products in the harshest of environments.
Slaves

The AS-interface® slaves offered here allow the use of standard (non-AS-i intelligent) input and output devices on an AS-i network. A range of I/O types is offered including discrete, analog and RTD. Protection choices range from rugged IP65 and IP67 slaves which can be mounted outside an enclosure to IP20 units with screw connections to "bare" PC board items designed for inclusion in existing products.

Connectors

The easy to install and maintain features of AS-interface® are maximized by using connectorized parts whenever possible. A few minutes of layout and bill-of-material planning can replace hours of costly wire installation. In addition, product replacement is greatly facilitated by using industrial grade quick disconnect plug-and-play receptacles.

InterlinkBT uses two industrial standardized connectors; minifast® and eurofast®. In one variation or another these two standardized connectors are produced by the thousands. Rough estimates put the “Mini” style at over 10,000 per day and the “Micro” at over 25,000 per day. They are used in every industry that requires rugged economic plug-and-play connectorization. Both were standardized by GIS (German Industrial Standards) in their early design. Today they are recognized standards throughout the world.

The sheer volume means that the build processes for these two standards are understood, tooled, automated, and economical. The volume and breadth of applications means that broad selections of off-the-shelf products are available.

Generally two materials are offered for coupling nuts; nickel-plated brass and stainless steel. The mating pins and sleeves are gold-plated brass. The body is made of polyurethane and is injection molded to the cable jacket to provide strain relief and to seal the connections from the atmosphere.

The minifast® pin and sleeve are rated at 9 amps and the eurofast® are rated at 4 amps.

Junction Tees

The junction tees shown in this catalog are passive hubs. Although no conditioning or monitoring takes place, some junctions have short circuit protection. The boxes are made from two different materials; nylon or polyurethane overmold. Both housings are available with either 316 stainless steel or nickel-plated brass connectors.

The junction boxes are rated NEMA 1, 3, 4, 4X, 12, 13 and IEC IP67. These ratings are conditional, requiring the cordset or cap to be installed.
What is AS-interface®?

AS-interface® is a simple, low-level, industrial data bus. It is intended to be easy to plan, install and maintain and can be a great solution for smaller systems or for users who are new to networks. At the physical level AS-interface® (or AS-i as it is also known) consists simply of a single untwisted pair of wires. This wire pair carries bus power with data superimposed on top.

Version 2.1

Originally AS-i was designed to allow up to 31 slave devices on a single network. Each slave could provide a maximum of 4 discrete input points and 4 discrete output points. Analog signals were available, but the user had to implement special function blocks in the master to allow a full word (16-bits) of data to be broken into multiple messages (only 4 bits could be transmitted at a time). The latest version of AS-i, version 2.1, allows up to 62 slaves with 4 discrete inputs and 3 discrete outputs each and also specifies analog specific slave profiles which make the transmission of analog data transparent to the user. The extended address range (and the limitation to 3 outputs) is achieved by using one output bit as an "A/B" address bit. Thus version 2.1 slaves now have addresses in the range 1A through 31A and 1B through 31B. It is important to note that version 2.0 slaves can be used in conjunction with version 2.1 slaves on the same system, but that they will occupy both the A and B addresses for their assigned number. It should also be mentioned that analog slaves typically occupy both the A and B slots.

Flat and Round Cable

When AS-i was first developed it was intended for use with flat cable using an insulation displacement (jacket piercing) connection method. That cable was self healing and would allow users to install a system with a minimum of planning. While this solution is good for many applications, some require a more protected and rugged connection technology. The use of round cable with M12 (eurowatt®) connectors has become the standard for these applications. Both solutions are readily available and InterlinkBT provides slaves which can be used with either.

Powering AS-i Networks

Because power and data exist together on AS-i there must be some method of applying power to the bus without suppressing the data signal with the power supply circuitry. The method used for this is called "data decoupling" or "power supply conditioning". It involves placing a special filter between the power supply and the AS-i signal/power line. Power supplies with this feature built in are available, as are certain other products.

Power can be applied to the network in different ways. In some cases the master and slaves are both powered from the same power supply (must be decoupled in this case)(see Figure A). In other cases the master is powered by a standard type power supply and the slaves are powered by a separate decoupled supply (see Figure B). A third option is that the master contains the decoupling circuitry (see Figure C). In this option the master feeds power through the decoupler and powers the slaves. Diagrams illustrating these cases are shown on the following page, and a more detailed description of how these options are used with Bihl+Wiedemann AS-i masters is given on page 6.
Visit InterlinkBT on the Internet: [http://www.interlinkbt.com](http://www.interlinkbt.com)

Figure A

- Master
- AS-I Network
- Decoupling Filter
- Power Supply
- Slaves

The power supply and the decoupler may be contained in a single unit.

Figure B

- Standard power supply
- Master
- AS-I Network
- Decoupling Filter
- Power Supply
- Slaves

The power supply and the decoupler may be contained in a single unit.

Figure C

- Standard power supply
- Master
- AS-I Network

In this case the master contains the decoupling filter and applies filtered power to the AS-I network.

Slaves
Power Supply Concepts

Bihl+Wiedemann AS-interface® gateways and masters offer different power supply configurations to increase user options. The two main divisions are master power supply "A", where the master can be powered directly from the AS-i network, and master power supply "N", where the master provides optional power supply decoupling circuitry. Choosing either a single or dual AS-i network gateway or master further increases these options.

Master Power Supply A

Single Master
The master (or gateway) does not require its own power supply. It is connected directly to the AS-i line and draws power from the network power supply. Current consumption by the master is typically ~200 mA.

Dual Master
With the jumpers installed the master is powered directly from the AS-i network (typically ~200 mA consumed). Without the jumpers the master requires its own separate power supply (AS-i decoupling not required). The second AS-i network always needs its own AS-i decoupled power supply.

Master Power Supply N

Single Master
With the jumpers installed the master provides data decoupling up to 2 A from a standard power supply to the AS-i network, allowing the master and network to use a single common supply. With the jumpers removed the network requires its own separate decoupled power supply.

Dual Master
With the jumpers in place the master decouples power for both AS-i networks, allowing a single standard power supply to be used. With the jumpers removed the master is powered by its own standard supply and both AS-i networks are powered by a single separate decoupled power supply. Note that in this case both AS-i networks share a power supply.
The AS-interface® masters offered in this catalog fall into four basic categories: Gateways, Stand-Alone Controllers, PLC cards and PC Cards. Some of the master products may have features of more than one of these categories. To help select the right master for a given application a brief description of each type is given here. All the master products in this catalog are made by Bihl+Wiedemann.

**Gateways**
AS-i gateways act as a master on the AS-i network and a slave on a higher-level fieldbus system. They allow, for example, connecting an entire AS-i network as a single node on a DeviceNet system. The AS-i master component controls the AS-i network and reports its data to the fieldbus system via the slave component. In this catalog gateways are given for Profibus®-DP, DeviceNet™, Interbus™, CANopen, Modbus™, Modbus Plus™ and Ethernet (Modbus™ TCP).

**Stand-Alone Controllers**
Some AS-i masters have the capability to contain and run a small control program on their own. These typically connect to a PC via a serial port to enable configuration and downloading of the control program. Stand-alone controllers are not required to be connected to the PC while they are running and can be a good solution for low level remote control.

**PLC Cards**
These are cards that fit into a PLC back plane much like traditional I/O cards. They allow greater distribution of I/O, with less wiring involved. While the concept of fieldbus masters as PLC cards is not new, not many AS-i masters have been made for these systems in the past. This catalog offers a new AS-i PLC card for the Allen-Bradley CompactLogix™ and MicroLogix 1500 systems, and an upcoming card for the A-B ControlLogix platform.

**PC cards**
These include AS-i masters that are designed to fit on a standard computer bus (i.e. PCI). The concept is similar to the PLC card solution, but the PC control allows for greater flexibility and customization in the control program and visual interface. PC cards are offered for standard PCI, ISA and PC104 systems.
Bus Topology

Topology is a term that applies to buses. It describes how the data lines connect the nodes together. The first bus goes back to the original telegraph - two data lines hanging on wooden poles going from telegraph station to telegraph station.

**Bus** - the simple straight-line topology is called a bus. Another term used is “Daisy Chain”, where the trunk simply runs from device to device.

![Bus Diagram]

**Branch** - a common bus can have branches, and sometimes the branches can have branches. Another term used to describe the branches is “drops” or “spurs”. Depending on the bus the branches may be restricted to just a few centimeters or a free-form topology with restrictions only on the cumulative distance of all data lines. AS-i does not have a specific limit on drop length.

![Branch Diagram]

**Star** - the bus lines radiate from a single point. A junction (either passive or active) looks like a star.

![Star Diagram]

AS-i may be connected with any of these topologies, or may even incorporate several of them in areas of a simple system. The only limit to AS-i’s layout is that only up to 100 meters of cable can be used on a segment.
Glossary

**Master** - The node that has control on the network. In AS-i the master does not have a numeric address. It initiates all requests and all responses are directed to it.

**Slave** - Nodes that respond to master control. AS-i slaves can have a numeric address from 1 through 31 (version 2.1 allows A and B slaves to have addresses 1A through 31A and 1B through 31B).

**Single Slave** - On AS-i, a slave that does not support extended (A/B) addressing. Version 2.0 slaves are single slaves, as are most analog slaves.

**A/B Slave** - A slave that supports AS-i’s extended addressing scheme. These slaves can only have up to three output bits, since the fourth is used to identify the A/B address. Most version 2.1 discrete slaves are A/B slaves.

**Flat Cable** - A mechanically polarized cable with a flat profile that supports insulation displacement technology. It allows a system to be installed by laying the cable out and later connecting slaves as needed.

**Insulation Displacement** - An electrical connection method. Sharp metal contact “teeth” penetrate the jacket of a cable or wires to make the contact.

**Round Cable** - Traditional electrical cable with a round profile. Electrical connections are normally made via **eurofast®** or **minifast®** connectors or with screw terminals. Round cable is normally more suited to harsh environments than flat cable.

**Brick** - Connectorized passive junction hub.

**Busline** - The physical wiring of a network (bus) system.

**Drop (or Dropline)** - A branch from the main section of the busline (or trunk).

**Trunk (or Trunkline)** - The main section of the busline. Normally the trunk is cabling connecting the most extreme distances on the network. AS-i has no defined trunk due to its flexible wiring rules.

**Gateway** - A node that allows communication between two network protocols. Normally a gateway is a master on a low level system and a slave on a higher level system. The data from the lower level is mapped as I/O information on the higher level slave.

**Power Conditioner** - A device used to couple power and data onto the same wire for certain networks. AS-i requires power and data on a common wire pair, so a power conditioner must be used. Some power supplies have this feature built in. Also called a “decoupler”.

**Decoupler** - See “power conditioner”.

**Segment** - A physical portion of a network defined by some boundary. Usually refers to sections bounded by repeaters.

**Repeater** - A device which allows the extension of a network by reading data bits and rebroadcasting them. Repeaters normally add some delay on the bus, so certain limitations will apply. Repeaters typically do not use a network address.

**Tee** - A junction typically having one drop port (normally shaped like the letter T).

**Spanner** - A slave that exists on two networks at the same time. Data can be passed from one network to the other using the slave’s I/O data map.
## Quick Selection Guide

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<td>2.1</td>
<td>1</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>ASI-SCAN-AB BW1488</td>
<td>ControlLogix</td>
<td>41</td>
<td>2.1</td>
<td>2</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>ASI-MM232 BW1147</td>
<td>RS-232</td>
<td>38</td>
<td>2.0</td>
<td>2</td>
<td>A</td>
<td>N</td>
</tr>
<tr>
<td>ASI-MM232 BW1150</td>
<td>RS-232</td>
<td>38</td>
<td>2.0</td>
<td>2</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>ASI-MM232 BW1247</td>
<td>RS-232</td>
<td>38</td>
<td>2.1</td>
<td>1</td>
<td>A</td>
<td>N</td>
</tr>
<tr>
<td>ASI-MM232 BW1248</td>
<td>RS-232</td>
<td>38</td>
<td>2.1</td>
<td>1</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>ASI-MM485 BW1276</td>
<td>RS-485</td>
<td>39</td>
<td>2.1</td>
<td>1</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>ASI-MMPCI BW1195</td>
<td>PCI</td>
<td>43</td>
<td>2.1</td>
<td>2</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>ASI-MMISA BW1228</td>
<td>ISA</td>
<td>44</td>
<td>2.1</td>
<td>1</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>ASI-MMPC104 BW1229</td>
<td>PC104</td>
<td>45</td>
<td>2.1</td>
<td>1</td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>
## Network Specifications

### v2.0 and v2.1

<table>
<thead>
<tr>
<th>Parameter</th>
<th>v2.0</th>
<th>v2.1</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Bus type</strong></td>
<td>Master-to-slave, single master</td>
<td></td>
</tr>
<tr>
<td><strong>Bus topology</strong></td>
<td>Free form, unrestricted branching</td>
<td></td>
</tr>
<tr>
<td><strong>Physical distance on a single signal segment</strong></td>
<td>100 meters</td>
<td></td>
</tr>
<tr>
<td><strong>Physical distance with 2 repeaters and master in the center</strong></td>
<td>500 meters</td>
<td></td>
</tr>
<tr>
<td><strong>Transmission signal</strong></td>
<td>Alternate Pulse Modulation with Manchester II bit encoding imposed upon 18 to 30VDC bus power carrier</td>
<td></td>
</tr>
<tr>
<td><strong>Speed</strong></td>
<td>167.5 kbps, 5 msec to read / write 31 v2.0 discrete nodes, 10 msec to read/write 62 v2.1 discrete nodes</td>
<td></td>
</tr>
<tr>
<td><strong>Bus power</strong></td>
<td>Up to 8 amps using the same 2 wires as the data signal</td>
<td></td>
</tr>
<tr>
<td><strong>Attendance check per scan</strong></td>
<td>Yes, an attendance list is programmed in the master and checked each scan</td>
<td>Yes, defined by slave profile</td>
</tr>
<tr>
<td><strong>Error detection</strong></td>
<td>Yes, single parity bit check and bit repetition</td>
<td></td>
</tr>
<tr>
<td><strong>Error correction</strong></td>
<td>Yes, master will poll the node again if it doesn’t understand. If the node doesn’t understand the master it won’t respond, then the master will poll the node again after a time-out.</td>
<td>Yes, defined by slave profile</td>
</tr>
<tr>
<td><strong>Address setting</strong></td>
<td>Off line via a hand held programmer or online via the master. Some masters are capable of automatically addressing swap-out nodes during replacement.</td>
<td></td>
</tr>
</tbody>
</table>

### v2.0

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total number of nodes</strong></td>
<td>31 slaves and 1 master</td>
</tr>
<tr>
<td><strong>Input/Output bits per slave</strong></td>
<td>4/4</td>
</tr>
<tr>
<td><strong>Analog capability</strong></td>
<td>Yes, but not standardized</td>
</tr>
<tr>
<td><strong>Total discrete input/output points per network</strong></td>
<td>124 In / 124 Out</td>
</tr>
</tbody>
</table>

### v2.1

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total number of nodes</strong></td>
<td>62 slaves and 1 master</td>
</tr>
<tr>
<td><strong>Input/Output bits per slave</strong></td>
<td>4/3</td>
</tr>
<tr>
<td><strong>Analog capability</strong></td>
<td>Yes, defined by slave profile</td>
</tr>
<tr>
<td><strong>Total discrete input/output points per network</strong></td>
<td>248 In / 168 Out</td>
</tr>
<tr>
<td><strong>Maximum number of analog points per network</strong></td>
<td>124</td>
</tr>
</tbody>
</table>
AS-interface® Slaves
**Discrete Input Slave - IP67**

This *busstop®* module provides 4 short circuit protected channels for discrete PNP inputs on AS-interface®. Each channel supports a 2- or 3-wire 24 VDC sensor. The combined sensor current of all four channels is limited to 200 mA. The station is fully encapsulated and potted and is intended for use directly on a machine with no need for a separate enclosure. This module supports both round cable (via a *eurofast®* connector) and AS-i standard flat cable.

### Specifications

#### Electrical
- Operating voltage: 18-31 VDC (from AS-i network)
- Operating current: <50 mA (from AS-i network) plus sensor current
- AS-i version: 2.0

#### Connections
- AS-interface®: *eurofast®* or flat cable (via included base module)
- I/O: *eurofast®*

#### Mechanical
- Operating temperature: -25...+70°C
- Protection: IP67
**Discrete Output Slave - IP67**

This **busstop®** module provides 4 short circuit protected sourcing channels for discrete outputs on AS-interface®. Each output provides up to 2 A of current, while the combined output current of all four channels is limited to 4 A. The station is fully encapsulated and potted and is intended for use directly on a machine with no need for a separate enclosure. This module supports both round cable (via a **eurofast®** connector) and AS-i standard flat cable, with separate connectors for AS-i and auxiliary power.

### Description

This **busstop®** module provides 4 short circuit protected sourcing channels for discrete outputs on AS-interface®. Each output provides up to 2 A of current, while the combined output current of all four channels is limited to 4 A. The station is fully encapsulated and potted and is intended for use directly on a machine with no need for a separate enclosure. This module supports both round cable (via a **eurofast®** connector) and AS-i standard flat cable, with separate connectors for AS-i and auxiliary power.

### Dimensions

- **Mounting Screw**: M4 (3) Not Included

### Specifications

**Electrical**
- Operating voltage: 18-31 VDC (from AS-i network)
- Operating current: <50 mA (from AS-i network)
- Output current: max. 4 A combined (from auxiliary power)
- AS-i version: 2.0

**Connections**
- AS-interface®: **eurofast®** or flat cable (via included base module)
- Auxiliary power: **eurofast®** or flat cable (via included base module)
- I/O: **eurofast®**

**Mechanical**
- Operating temperature: -25...+70°C
- Protection: IP67

### Outputs

<table>
<thead>
<tr>
<th>Bus</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 NC</td>
<td>1 NC</td>
<td></td>
</tr>
<tr>
<td>1 NC</td>
<td>1 NC</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Aux</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 NC</td>
<td>1 NC</td>
<td></td>
</tr>
<tr>
<td>1 NC</td>
<td>1 NC</td>
<td></td>
</tr>
</tbody>
</table>

---

**Courtesy of Steven Engineering, Inc.-230 Ryan Way, South San Francisco, CA 94080-6370-Main Office: (650) 588-9200-Outside Local Area: (800) 258-9200-www.stevenengineering.com**
**Discrete Input/Output Slave - IP67**

These **busstop®** modules provide discrete PNP input and sourcing output channels on AS-interface®. Each output provides up to 2 A of current. The total combined input current for all sensors is limited to 200 mA. The stations are fully encapsulated and potted and are intended for use directly on a machine with no need for a separate enclosure. These modules support both round cable (via a **eurofast®** connector) and AS-i standard flat cable, with separate connectors for AS-i and auxiliary power.

### Specifications

**Electrical**
- Operating voltage: 18-31 VDC (from AS-i network)
- Operating current: <50 mA (from AS-i network)
- Output current: (from auxiliary power)
  - AS-IOM-22-1000 max. 2 A combined
  - AS-IOM-44-1000 max. 4 A combined
- Input current: max. 200 mA combined (from AS-i network)
- AS-i version: 2.0

**Connections**
- AS-interface®: **eurofast®** or flat cable (via included base module)
- Auxiliary power: **eurofast®** or flat cable (via included base module)
- I/O: **eurofast®**

**Mechanical**
- Operating temperature: -25...+70°C
- Protection: IP67

<table>
<thead>
<tr>
<th>Model</th>
<th>Inputs/Outputs</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASI-IOM-22-1000</td>
<td>2 in/2 out</td>
</tr>
<tr>
<td>ASI-IOM-44-1000</td>
<td>4 in/4 out</td>
</tr>
</tbody>
</table>

**Dimensions**

![Diagram of the Discrete Input/Output Slave - IP67 module.]
Analog Input Slave - IP65

These analog input stations each support up to 2 channels of data for transmission via slave profile 7.3. When used with a version 2.1 master the analog data transfer is transparent to the user (see page 4). Each channel features 16-bit data resolution. Parameters can be set through software to enable power supply filtering and to enable/disable fault monitoring. Additionally channel 2 can be disabled to increase the network update rate of channel 1, if only one sensor is to be used.

### Specifications

<table>
<thead>
<tr>
<th>Channels</th>
<th>ASI-AI-2 BW1232</th>
<th>ASI-AI-2 BW1233</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internal resistance</td>
<td>50Ω</td>
<td>100Ω</td>
</tr>
<tr>
<td>Resolution</td>
<td>1µA</td>
<td>1mV</td>
</tr>
<tr>
<td>Range of values</td>
<td>4000...20000(dec)</td>
<td>0...10000(dec)</td>
</tr>
</tbody>
</table>

### Description

- Operating voltage: 18-31.6 VDC (from AS-i network)
- Operating current: <80 mA (from AS-i network)

### Dimensions

- AS-interface®: standard base module (see pages 70, 71) with auxiliary supply
- I/O: tension clamps / cable glands
- AS-i version: 2.1

### Electrical

- Operating temperature: 0...+70°C
- Protection: IP65 (when used with base module)
Pt100 Input Slave - IP65

This analog input station supports up to 4 channels of data for transmission via slave profile 7.3. When used with a version 2.1 master the analog data transfer is transparent to the user (see page 4). Each channel features 16-bit data resolution. Parameters can be set through software to enable power supply filtering and to enable/disable fault monitoring. Additionally channels 2 through 4 can be disabled to increase the network update rate of the used channels.

 Specifications

<table>
<thead>
<tr>
<th>Channels</th>
<th>Resolution: 0.1°C</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Range of values: -200...+850°C</td>
</tr>
</tbody>
</table>

 Electrical

- Operating voltage: 18-31.6 VDC (from AS-i network)
- Operating current: < 80 mA (from AS-i network)
- AS-i version: 2.1

 Connections

- AS-interface®: standard base module (see pages 70, 71) with auxiliary supply
- I/O: Tension clamps

 Mechanical

- Operating temperature: 0...+70°C
- Protection: IP65 (when used with base module)
**Analog Output Slave - IP65**

These analog output stations each support up to 2 channels of data for transmission via slave profile 7.3. When used with a version 2.1 master the analog data transfer is transparent to the user (see page 4). Each channel features 16-bit data resolution. Parameters can be set through software to enable/disable fault monitoring.

<table>
<thead>
<tr>
<th>Channels</th>
<th>ASI-AO-2 BW1234</th>
<th>ASI-AO-2 BW1235</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resolution:</td>
<td>1µA</td>
<td>1mV</td>
</tr>
<tr>
<td>Range of values:</td>
<td>0...20000(dec)</td>
<td>0...10000(dec)</td>
</tr>
</tbody>
</table>

**Description**

When used with a version 2.1 master the analog data transfer is transparent to the user (see page 4). Each channel features 16-bit data resolution. Parameters can be set through software to enable/disable fault monitoring.

**Dimensions**

These analog output stations each support up to 2 channels of data for transmission via slave profile 7.3. When used with a version 2.1 master the analog data transfer is transparent to the user (see page 4). Each channel features 16-bit data resolution. Parameters can be set through software to enable/disable fault monitoring.

**Specifications**

- Operating voltage: 18-31.6 VDC (from AS-i network)
- Operating current: <80 mA (from AS-i network)
- AS-i version: 2.1

**Electrical**

- Operating voltage: 18-31.6 VDC (from AS-i network)
- Operating current: <80 mA (from AS-i network)
- AS-i version: 2.1

**Connections**

- AS-interface®: standard base module (see pages 70, 71) with auxiliary supply
- I/O: tension clamps / cable glands

**Mechanical**

- Operating temperature: 0...+70°C
- Protection: IP65 (when used with base module)
Analog Input Slave - IP20

These analog input stations supports up to 4 channels of data for transmission via slave profile 7.3. When used with a version 2.1 master the analog data transfer is transparent to the user (see page 4). Each channel features 16-bit data resolution. Parameters can be set through software to enable power supply filtering and to enable/disable fault monitoring. Additionally channels 2 through 4 can be disabled to increase the network update rate of the used channels. Attached sensors can be powered by the AS-interface® network or an external supply.

### Electrical
- Operating voltage: 18-31.6 VDC (from AS-i network)
- Operating current: < 80 mA (from AS-i network)
- AS-i version: 2.1

### Connections
- AS-interface®: Screw terminals
- I/O: Screw terminals

### Mechanical
- Operating temperature: 0...+70°C
- Protection: IP20

### Specifications

<table>
<thead>
<tr>
<th>Channels</th>
<th>ASI-AI-2 BW1232</th>
<th>ASI-AI-2 BW1233</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internal resistance</td>
<td>50Ω</td>
<td>100kΩ</td>
</tr>
<tr>
<td>Resolution</td>
<td>1µA</td>
<td>1mV</td>
</tr>
<tr>
<td>Range of values</td>
<td>4000...20000(dec)</td>
<td>0...10000(dec)</td>
</tr>
</tbody>
</table>
**Analog Input Slave - IP20**

This analog input station supports up to 2 channels of data for transmission via slave profile 7.3. When used with a version 2.1 master the analog data transfer is transparent to the user (see page 4). Each channel features 16-bit data resolution. Parameters can be set through software to enable power supply filtering and to enable/disable fault monitoring. Additionally channel 2 can be disabled to increase the network update rate of channel 1, if only one sensor is to be used. Attached sensors can be powered by the AS-interface® network or an external supply.

**ASI-AI-2 BW1345**

4...20 mA or 0...10 V

---

**Description**

---

**Dimensions**

---

**Specifications**

**Electrical**
- Operating voltage: 18-31.6 VDC (from AS-i network)
- Operating current: < 80 mA (from AS-i network)
- AS-i version: 2.1

**Connections**
- AS-interface®: Screw terminals
- I/O: Screw terminals

**Mechanical**
- Operating temperature: 0...+70°C
- Protection: IP20

<table>
<thead>
<tr>
<th>Channels</th>
<th>Current Input</th>
<th>Voltage Input</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internal resistance</td>
<td>50Ω</td>
<td>100kΩ</td>
</tr>
<tr>
<td>Resolution</td>
<td>1μA</td>
<td>1mV</td>
</tr>
<tr>
<td>Range of values</td>
<td>4000...20000(dec)</td>
<td>0...10000(dec)</td>
</tr>
</tbody>
</table>
Pt100 Input Slave - IP20

This analog input station supports up to 4 channels of data for transmission via slave profile 7.3. When used with a version 2.1 master the analog data transfer is transparent to the user (see page 4). Each channel features 16-bit data resolution. Parameters can be set through software to enable power supply filtering and to enable/disable fault monitoring. Additionally channels 2 through 4 can be disabled to increase the network update rate of the used channels. Attached sensors can be powered by the AS-interface® network or an external supply.

Specifications

- **Electrical**
  - Operating voltage: 18-31.6 VDC (from AS-i network)
  - Operating current: < 80 mA (from AS-i network)
  - AS-i version: 2.1

- **Connections**
  - AS-interface®: Screw terminals
  - I/O: Screw terminals

- **Mechanical**
  - Operating temperature: 0...+70°C
  - Protection: IP20

- **Channels**
  - Internal resistance: 50Ω
  - Resolution: 0.1°C
  - Range of values: -200...+850°C
Analog Output Slave - IP20

These analog output stations each support up to 4 channels of data for transmission via slave profile 7.3. When used with a version 2.1 master the analog data transfer is transparent to the user (see page 4). Each channel features 16-bit data resolution. Parameters can be set through software to enable/disable fault monitoring. Outputs can be powered either by AS-interface® or an external supply.

ASI-AO-4 BW1366
0...20 mA
ASI-AO-4 BW1367
0...10 V

### Description

These analog output stations each support up to 4 channels of data for transmission via slave profile 7.3. When used with a version 2.1 master the analog data transfer is transparent to the user (see page 4). Each channel features 16-bit data resolution. Parameters can be set through software to enable/disable fault monitoring. Outputs can be powered either by AS-interface® or an external supply.

### Specifications

**Electrical**
- Operating voltage: 18-31.6 VDC (from AS-i network)
- Operating current: < 80 mA (from AS-i network)
- AS-i version: 2.1

**Connections**
- AS-interface®: Screw terminals
- I/O: Screw terminals

**Mechanical**
- Operating temperature: 0...+70°C
- Protection: IP20

**Channels**
- Resolution: 1μA
- Range of values: 0...20000(dec)

ASI-AO-2 BW1366
ASI-AO-2 BW1367
1mV
0...10000(dec)
Analog Output Slave - IP20

This analog output station supports up to 2 channels of data for transmission via slaves profile 7.3. When used with a version 2.1 master the analog data transfer is transparent to the user (see page 4). Each channel features 16-bit data resolution. Parameters can be set through software to enable/disable fault monitoring. Data channels can be auto recognized as current or voltage type, or can be specified by parameter bits. The user can choose to power the output devices from the bus or an external supply.

Specifications

- **Electrical**
  - Operating voltage: 18-31.6 VDC (from AS-i network)
  - Operating current: < 80 mA (from AS-i network)
  - AS-i version: 2.1

- **Connections**
  - AS-interface®: Screw terminals
  - I/O: Screw terminals

- **Mechanical**
  - Operating temperature: 0...+70°C
  - Protection: IP20

- **Channels**
  - Internal resistance: Current output, Voltage output
  - Resolution: 1µA, 1mV
  - Range of values: 0...20000(dec), 0...10000(dec)
**PC-board Slave - 2 in/2 out**

These open-frame slaves provide discrete input and output channels on AS-interface®. Each output provides up to 80 mA of current, with the total output current limited to 80 mA. The PC-board slaves are intended for OEM applications, or where a user needs to make an existing device compatible with AS-interface®. Bus and I/O connections can be made either with edge wiring pins, screw terminal blocks or through holes.

### Specifications

<table>
<thead>
<tr>
<th>Description</th>
<th>Dimensions</th>
</tr>
</thead>
</table>

**Electrical**
- Operating voltage: 20-30 VDC (from AS-i network)
- Operating current: <200 mA (from AS-i network)
- Output current: <80 mA per output (max. 80 mA total)
- AS-i version: 2.1

**Connections**
- All connections through wiring pins, screw terminals or through holes

**Mechanical**
- Operating temperature: -25...+70°C
- Protection: Open-frame

### Connections

<table>
<thead>
<tr>
<th>Description</th>
<th>Dimensions</th>
</tr>
</thead>
</table>
**PC-board Slave - 4 in/4 out**

These open-frame slaves provide discrete input and output channels on AS-interface®. Each output provides up to 100 mA of current. The PC-board slaves are intended for OEM applications, or where a user needs to make an existing device compatible with AS-interface®. Bus and I/O connections can be made either with edge wiring pins or with screw terminal blocks. Modules are available with and without galvanic I/O isolation.

**Specifications**

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASI-IOM-PCB BW1218</td>
<td>Wiring pins</td>
</tr>
<tr>
<td>ASI-IOM-PCB BW1219</td>
<td>Screw terminals</td>
</tr>
<tr>
<td>ASI-IOM-PCB BW1388</td>
<td>Wiring pins, galvanic isolated I/O</td>
</tr>
<tr>
<td>ASI-IOM-PCB BW1389</td>
<td>Screw terminals, galvanic isolated I/O</td>
</tr>
</tbody>
</table>

**Dimensions**

- Operating voltage: 20-30 VDC (from AS-I network)
- Operating current: <20 mA (from AS-I network)
- Output current: non-isolated: 100 mA per output (max. 180 mA total) isolated: 100 mA per output (max. 200 mA total)
- AS-i version: 2.0

**Connections**

- All connections through wiring pins or screw terminals

**Mechanical**

- Operating temperature: -25...+70°C
- Protection: Open-frame
PC-board Slave - 4 in/3 out

These open-frame slaves provide discrete input and output channels on AS-interface®. Each output provides up to 80 mA of current, with the sum of all outputs limited to 80 mA. The PC-board slaves are intended for OEM applications, or where a user needs to make an existing device compatible with AS-interface®. Bus and I/O connections can be made either with edge wiring pins or with screw terminal blocks. The 4 in/3 out PC-board slave meets AS-i version 2.1 specifications and is used in the A/B addressing scheme.

### Specifications

<table>
<thead>
<tr>
<th>Wiring pins</th>
<th>Screw terminals</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASI-IOM-PCB BW1386</td>
<td>ASI-IOM-PCB BW1387</td>
</tr>
</tbody>
</table>

### Description

Electrical
- Operating voltage: 20-30 VDC (from AS-I network)
- Operating current: <20 mA (from AS-I network)
- Output current: 80 mA per channel (max. 80 mA total)
- AS-i version: 2.1

Connections
- All connections through wiring pins or screw terminals

Mechanical
- Operating temperature: -25...+70°C
- Protection: Open-frame
**PC-board Slave - 8 in**

These open-frame slaves provide 8 discrete input channels on AS-interface®. The PC-board slaves are intended for OEM applications, or where a user needs to make an existing device compatible with AS-i. Bus and I/O connections can be made either with edge wiring pins or with screw terminal blocks. The 8 in PC-board slave meets AS-i version 2.1 specifications and occupies 2 addresses in the A/B addressing scheme.

### Specifications

<table>
<thead>
<tr>
<th></th>
<th>ASI-IOM-PCB BW1351</th>
<th>ASI-IOM-PCB BW1352</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wiring pins</td>
<td></td>
<td>Screw terminals</td>
</tr>
</tbody>
</table>

### Description

- **Electrical**
  - Operating voltage: 20-30 VDC (from AS-i network)
  - Operating current: <20 mA (from AS-i network) + sum of sensor currents (limited to 200 mA total)
  - AS-i version: 2.1

- **Connections**
  - All connections through wiring pins or screw terminals

- **Mechanical**
  - Operating temperature: -25...+70°C
  - Protection: Open-frame

### Dimensions
AS-interface® Masters
**Profibus®-DP/AS-interface® Gateway - With Graphical Display**

Each Profibus®-DP/AS-interface® gateway allows the connection of a complete AS-i network (31 slaves on version 2.0, 62 slaves on version 2.1) as a single slave on a Profibus®-DP network. Data is provided to Profibus® cyclically via DPV0 and acyclically through the DPV1 extensions. Using the graphical LCD display and large on unit push buttons makes the device configuration quick and easy. The on-board display is also used for testing and diagnostics. This gateway is available with one or two AS-i masters.

### Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>Feature</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASI-DPG BW1307</td>
<td>Single master, power supply A style</td>
</tr>
<tr>
<td>ASI-DPG BW1309</td>
<td>Dual master, power supply A style</td>
</tr>
<tr>
<td>ASI-DPG BW1310</td>
<td>Dual master, power supply N style</td>
</tr>
</tbody>
</table>

### Electrical

- Operating voltage: 24VDC (18-31.6 VDC range)
- Operating current: ~200mA from AS-i power supply (+70mA from AS-i #2 if dual master)
- ~290mA if power supply configuration N is used
- AS-i version: 2.1

### Connections

- AS-interface®: screw terminals
- Profibus®-DP: D9 connector
- Power supply: screw terminal

### Settings

- Via graphical display or through software
Profibus®-DP/AS-interface® Gateway - IP65

The IP65 gateway is designed for use in applications where a more protected and rugged device is required. Each Profibus®-DP/AS-interface® gateway allows the connection of a complete AS-i network (31 slaves on version 2.0, 62 slaves on version 2.1) as a single slave on a Profibus®-DP network. Data is provided to Profibus® cyclically via DPV0 and acyclically through the DPV1 extensions. Configuration and diagnostics can be performed using the numerical display or AS-i Control Tools software.

<table>
<thead>
<tr>
<th>Specifications</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td></td>
</tr>
<tr>
<td>Dimensions</td>
<td></td>
</tr>
<tr>
<td>Electrical</td>
<td></td>
</tr>
<tr>
<td>Connections</td>
<td></td>
</tr>
<tr>
<td>Settings</td>
<td></td>
</tr>
</tbody>
</table>

- Operating voltage: 24VDC from AS-i line (18-31.6 VDC range)
- Operating current: ~200mA from AS-i power supply
- AS-i version: 2.1

- AS-interface®: standard base module (see pages 70, 71) with auxiliary supply
- Profibus®-DP: PG9 cable gland with cage clamps (ASI-DPG BW1253)
- Power supply: from AS-i eurofast® connector (ASI-DPG BW1371)

- Via LED display or through software
DeviceNet™/AS-interface® Gateway - With Graphical Display

Description

Each DeviceNet™/AS-interface® gateway allows the connection of a complete AS-i network (31 slaves on version 2.0, 62 slaves on version 2.1) as a single slave on a DeviceNet™ network. Using the graphical LCD display and large on-unit push buttons makes the device configuration quick and easy. The on-board display is also used for testing and diagnostics. This gateway is available with one or two AS-i masters.

Specifications

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>ASI-DNG BW1334</td>
<td>Single master, power supply A style</td>
</tr>
<tr>
<td>ASI-DNG BW1335</td>
<td>Dual master, power supply N style</td>
</tr>
</tbody>
</table>

Dimensions

Electrical

- Operating voltage: 24VDC (18-31.6 VDC range)
- Operating current: ~200mA from AS-i power supply (power supply configuration A)
  ~200mA +70mA per AS-i circuit (power supply configuration N)
- AS-i version: 2.1

Connections

- AS-interface®: screw terminals
- DeviceNet™: linear style DeviceNet connector
- Power supply: screw terminal

Settings

- Via graphical display or through software
CANopen/AS-interface® Gateway - With Graphical Display

Each CANopen/AS-interface® gateway allows the connection of a complete AS-i network (31 slaves on version 2.0, 62 slaves on version 2.1) as a single slave on a CANopen network. Using the graphical LCD display and large on-unit push buttons makes the device configuration quick and easy. The on-board display is also used for testing and diagnostics. This gateway is available with one or two AS-i masters.

### Specifications

<table>
<thead>
<tr>
<th></th>
<th>ASI-COG BW1448</th>
<th>ASI-COG BW1449</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single master, power supply A style</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dual master, power supply N style</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Description

- **Electrical**
  - Operating voltage: 24VDC (18-31.6 VDC range)
  - Operating current: ~200mA from AS-i power supply (power supply configuration A)
  - ~200mA +70mA per AS-i circuit (power supply configuration N)
  - AS-i version: 2.1

- **Connections**
  - AS-interface®: screw terminals
  - CANopen: 5-pin linear connector
  - Power supply: screw terminal

- **Settings**
  - Via graphical display or through software
Interbus™/AS-interface® Gateway

The IP65 gateway is designed for use in applications where a more protected and rugged device is required. Each Interbus™/AS-interface® gateway allows the connection of a complete AS-i network (31 slaves on version 2.0) as a single remote bus slave on an Interbus™ network. Data is provided to Interbus™ as 9 words of the standard Interbus™ process channel. Configuration and diagnostics can be performed using the numerical display or AS-i Control Tools software.

Specifications

- **Electrical**
  - Operating voltage: 24VDC (18-31.6 VDC range)
  - Operating current: ~200mA from AS-i power supply
  - AS-i version: 2.0

- **Connections**
  - AS-interface®: standard base module (see pages 70, 71) with auxiliary supply
  - Interbus™: PG9 cable gland with cage clamps
  - Power supply: from AS-i

- **Settings**
  - Via LED display or through software

Dimensions

AS-IBG BW1127 Cable glands

Courtesy of Steven Engineering, Inc.-230 Ryan Way, South San Francisco, CA 94080-6370-Main Office: (650) 588-9200-Outside Local Area: (800) 258-9200-www.stevenengineering.com
**Modbus™/AS-interface® Gateway - Dual Master**

Each Modbus™/AS-interface® gateway allows the connection of up to two complete AS-i networks (62 slaves each on version 2.1) as a single node on a Modbus™ network. Data is provided to Modbus™ via standard data access methods. Configuration and diagnostics can be performed using the numerical LCD display or AS-i Control Tools software, as well as via the Modbus™ interface.

### Specifications

<table>
<thead>
<tr>
<th>ASI-MBG BW1141</th>
<th>Power supply A style, RS-232C</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASI-MBG BW1144</td>
<td>Power supply N style, RS-232C</td>
</tr>
<tr>
<td>ASI-MBG BW1142</td>
<td>Power supply A style, RS-485</td>
</tr>
<tr>
<td>ASI-MBG BW1145</td>
<td>Power supply N style, RS-485</td>
</tr>
</tbody>
</table>

### Electrical

- Operating voltage: 24 VDC (18-31.6 VDC range)
- Operating current: \(~200 \text{ mA (from AS-i power supply A), } +70 \text{ mA for circuit } \#2\)
  \(\sim70 \text{ mA from each circuit and } \sim150 \text{ mA from ext. supply (power supply N)}\)
- AS-i version: 2.1

### Connections

- AS-interface®: screw terminals
- Modbus™: D9 connector
- Power supply: screw terminals

### Settings

- Via numerical display or through software
**Modbus™/AS-interface® Gateway - IP65**

The IP65 gateway is designed for use in applications where a more protected and rugged device is required. Each Modbus™/AS-interface® gateway allows the connection of a complete AS-i network (31 slaves on version 2.0) as a single node on a Modbus™ network. Data is provided to Modbus™ via standard data access methods over an RS-485 interface. Configuration and diagnostics can be performed using the numerical display or AS-i Control Tools software.

### Electrical
- Operating voltage: 24 VDC (18-31.6 VDC range)
- Operating current: ~200 mA (from AS-i power supply)
- AS-i version: 2.0

### Connections
- AS-interface®: standard base module (see pages 70, 71) with auxiliary supply
- Modbus™: PG9 cable gland with cage clamps
- Power supply: from AS-i

### Settings
- Via LED display or through software
Modbus Plus™/AS-interface® Gateway - With Standard Display

Each Modbus Plus™/AS-interface® gateway allows the connection of a complete AS-i network (31 slaves on version 2.0) as a single node on a Modbus™ network. Data is provided to Modbus™ via standard data access methods. Configuration and diagnostics can be performed using the numerical LCD display or AS-i Control Tools software, as well as via the Modbus Plus™ interface.

### Specifications

#### Electrical
- Operating voltage: 24 VDC (18-31.6 VDC range)
- Operating current: ~200 mA (from AS-i power supply if configuration A is used)
- ~70 mA from AS-i and ~150 mA from ext. supply if configuration N is used
- AS-i version: 2.0

#### Connections
- AS-interface®: screw terminals
- Modbus™: D9 connector
- Power supply: screw terminals

#### Settings
- Via numerical display or through software

### Power Supplies

- ASI-MBPG BW1090: Power supply A style
- ASI-MBPG BW1091: Power supply N style
Serial AS-interface® Master - With MINI-PLC Control

Each serial AS-interface® master allows the connection of one or two complete AS-i networks (31 slaves each on version 2.0, 62 slaves each on version 2.1). A data connection for monitoring and configuration is made to a PC via an RS-232C interface. Configuration and diagnostics can be performed using the numerical LCD display or AS-i Control Tools software. The mini-PLC control feature allows the downloading of an instruction list control program to the master for local I/O control.

Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASI-MM232 BW1147</td>
<td>Power supply A style, v2.0, dual</td>
</tr>
<tr>
<td>ASI-MM232 BW1150</td>
<td>Power supply N style, v2.0, dual</td>
</tr>
<tr>
<td>ASI-MM232 BW1247</td>
<td>Power supply A style, v2.1, single</td>
</tr>
<tr>
<td>ASI-MM232 BW1248</td>
<td>Power supply N style, v2.1, single</td>
</tr>
</tbody>
</table>

Electrical

- Operating voltage: 24 VDC (18-31.6 VDC range)
- Operating current: ~200 mA (from AS-i power supply if configuration A is used)
  ~70 mA from AS-i and ~150 mA from ext. supply if configuration N is used

Connections

- AS-interface®: screw terminals
- RS-232: D9 connector
- Power supply: screw terminals

Settings

- Via numerical display or through software
Serial AS-interface® Master (IP65) - With Mini-PLC Control

The IP65 gateway is designed for use in applications where a more protected and rugged device is required. Each serial AS-interface® master allows the connection of a complete AS-i network (31 slaves on version 2.0, 62 slaves on version 2.1). A data connection for monitoring and configuration is made to a PC via an RS-485 interface. Configuration and diagnostics can be performed using the numerical LED display or AS-i Control Tools software. The mini-PLC control feature allows the downloading of an instruction list control program to the master for local I/O control.

Description

Dimensions

Specifications

Electrical
- Operating voltage: 24 VDC (18-31.6 VDC range) from AS-i power supply
- Operating current: ~200 mA from AS-i power supply
- AS-i version: 2.1

Connections
- AS-interface®: standard base module (see pages 70, 71) with auxiliary supply
- RS-485: PG9 cable gland with cage clamps
- Power supply: from AS-i

Settings
- Via numerical display or through software
PLC Scanner for CompactLogix™ & MicroLogix™ 1500

Each scanner allows the connection of a complete AS-interface® network (62 slaves on version 2.1) to an Allen-Bradley CompactLogix™ or MicroLogix™ 1500 PLC system. The scanner is an AS-i master and provides the I/O data directly into the PLC table. Configuration is done using AS-i Control Tools software or with the on-unit push buttons and LED readout. Connection to a computer for configuration is done using CORD-DSUB BW1417 (see page 86).

**Description**

<table>
<thead>
<tr>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Electrical</strong></td>
</tr>
<tr>
<td>• Operating voltage: 18-31.6 VDC (from AS-i power supply)</td>
</tr>
<tr>
<td>• Operating current: &lt;100 mA (from AS-i power supply)</td>
</tr>
<tr>
<td>• AS-i version: 2.1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Connections</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>• AS-interface®: Combicon style connector</td>
</tr>
<tr>
<td>• PLC interface: via backplane</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Mechanical</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Operating temperature: 0…+55°C</td>
</tr>
<tr>
<td>• Protection: IP20</td>
</tr>
</tbody>
</table>
PLC Scanner for ControlLogix™

This scanner allows the connection of two complete AS-interface® networks (62 slaves each on version 2.1) to an Allen-Bradley ControlLogix™ PLC system. The scanner is a dual AS-i master and provides the I/O data directly into the PLC table. Configuration is done using push buttons and the on-unit display or AS-i Control Tools software. The scanner supports all AS-i 2.1 functions including extended addressing of slaves, seamless transfer of analog data and extended peripheral diagnostics.


Specifications

**Electrical**
- Operating voltage: 18-31.6 VDC (from AS-i power supply)
- Operating current: ~70 mA (from AS-i power supply), ~150 mA from ControlLogix
- AS-i version: 2.1

**Mechanical**
- Operating temperature: 0...+55°C
- Protection: IP20
Ethernet/AS-interface® Gateway

Each Ethernet/AS-interface® gateway allows the connection of a complete AS-i network (31 slaves on version 2.0, 62 slaves on version 2.1) as a single slave on an Ethernet Modbus™/TCP system. Data is provided to the Ethernet system via standard Modbus™/TCP functions and registers. Configuration and diagnostics can be performed using the numerical LCD display or AS-i Control Tools software. This gateway is available with one or two AS-i masters.

### Specifications

**Electrical**
- Operating voltage: 24VDC (18-31.6 VDC range)
- Operating current: ~200mA from AS-i power supply (+70mA from AS-i #2 if dual master) ~290mA if power supply configuration N is used
- AS-i version: 2.1

**Connections**
- AS-interface®: screw terminals
- Ethernet: standard RJ45 connector per IEEE 802.3 specification
- Power supply: screw terminal

**Settings**
- Via numerical display or through software
**PC Master Card - PCI Interface**

Each PCI card allows the connection up to two complete AS-interface® networks. (31 slaves each on version 2.0, 62 slaves each on version 2.1). Data access and configuration is done using the AS-i Control Tools software package. An on-board AS-i Control implementation acts as a PLC to process data from the AS-i network. An event mechanism provides fast data exchange between the AS-i card and the PC. This allows more resources to be used by the higher level application. Normally no interrupts are needed, but the AS-i board is capable of generating interrupts cyclically or as needed. This device is “plug and play” capable and all driver files are available for download. A control program up to 4 Kb in size can be downloaded to the master.

**Electrical**
- Operating voltage: 5 VDC on PCI / 18-31.6 VDC range on AS-i
- Operating current: ~200 mA from power supply, ~70 mA from AS-i
- AS-i version: 2.1

**Connections**
- AS-interface®: screw terminal COMBICON connectors
- PC: standard PCI bus

**Settings**
- Through software
**Description**

Each ISA card allows the connection of a complete AS-interface® network (31 slaves each on version 2.0, 62 slaves each on version 2.1). Data access and configuration is done using the AS-i Control Tools software package. An on-board AS-i Control implementation allows the unit to act as a PLC to control I/O data. If used without the AS-i control the card functions as a pure AS-i master, with the PC controlling I/O data. The card manages the AS-i network completely, freeing up resources for the PC. Normally no interrupts are needed, but the card is able to generate event based interrupts. All driver files for this device are available for download. A control program can be downloaded to the master from AS-I Control Tools.

**Specifications**

- Operating voltage: 5 VDC on ISA / 18-31.6 VDC range on AS-i
- Operating current: ~200 mA from power supply, ~70 mA from AS-i
- AS-i version: 2.1

**Connections**

- AS-interface®: screw terminals COMBICON connectors
- PC: standard ISA bus

**Settings**

- Through software
**PC Master Card - PC104 Interface**

![PC Master Card Image](image)

### Description

Each PC104 card allows the connection of a complete AS-interface® network (31 slaves each on version 2.0, 62 slaves each on version 2.1). Data access and configuration are done using the AS-i Control Tools software package. An on-board AS-i Control unit performs as a PLC while a separate watchdog monitors the PC104 system. While the AS-i master controls the AS-i network the computers resources can be used for other applications or a user interface to the AS-i system. The card can also be used as a bare AS-i master, with logic being controlled by the PC. There is normally no need for a PC interrupt, but the module can generate them cyclically or as needed. Several cards may share one interrupt. All driver files for this device are available for download. A control program can be downloaded to the master from AS-i Control Tools. As well as being used in PC104 systems this master can be an embedded AS-i master in certain controllers.

### Electrical

- Operating voltage: 5 VDC on PC104 / 18-31.6 VDC range on AS-i
- Operating current: ~200 mA from power supply, ~70 mA from AS-i
- AS-i version: 2.1

### Connections

- AS-interface®: screw terminal COMBICON connector
- PC: standard PC104 bus (16-bit connector)

### Settings

- Through software
AS-interface® Cables and Cordsets
**Connector Specifications**

**minifast® Connector**
- 7/8” - 16UNF thread
- 100% electrically tested
- Meets: SAE H1738-2
- Current Rating: 9A
- Voltage Rating: 300V
- Protection: NEMA 1,3,4,6P IEC IP67
- Temperature: -30°C to +85°C
- Oscillation: 65mm (2.5in.) to 125mm (5in.)
- Pull Strength: 100 lbs - 5 to 12.5 cycles/sec. for 2 million cycles

**Eurofast® Connector**
- M12 x 1 thread
- 100% electrically tested
- Meets: IEC 61076
- Current Rating: 4A
- Voltage Rating: 300V
- Protection: NEMA 1,3,4,6P and IEC IP67
- Temperature: -30°C to +85°C
- Vibration: 10 to 500 Hz and 0/35mm or 5g
- Pull Strength: 50 lbs
Pre-molded fieldbus cables ensure simple and secure wiring of the connected fieldbus components. Time-consuming wiring of individual components and bus communication problems due to wiring errors or incomplete shielding are eliminated. Molded polyurethane insulation provides IP67 protection. Standard lengths of pre-molded cordsets and bulk cable are listed below. Consult the factory for other lengths.

<table>
<thead>
<tr>
<th>Cordsets</th>
<th>Bulk Cable</th>
</tr>
</thead>
<tbody>
<tr>
<td>meters</td>
<td>feet</td>
</tr>
<tr>
<td>0.3</td>
<td>1.0</td>
</tr>
<tr>
<td>0.5</td>
<td>1.6</td>
</tr>
<tr>
<td>1.0</td>
<td>3.3</td>
</tr>
<tr>
<td>1.5</td>
<td>4.9</td>
</tr>
<tr>
<td>2.0</td>
<td>6.6</td>
</tr>
<tr>
<td>2.5</td>
<td>8.2</td>
</tr>
<tr>
<td>3.0</td>
<td>9.8</td>
</tr>
<tr>
<td>4.0</td>
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<td>5.0</td>
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<td>6.0</td>
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<td>8.0</td>
<td>26.0</td>
</tr>
<tr>
<td>10</td>
<td>33.0</td>
</tr>
<tr>
<td>15</td>
<td>49.0</td>
</tr>
<tr>
<td>20</td>
<td>66.0</td>
</tr>
<tr>
<td>25</td>
<td>82.0</td>
</tr>
<tr>
<td>30</td>
<td>98.0</td>
</tr>
<tr>
<td>40</td>
<td>131.0</td>
</tr>
<tr>
<td>50</td>
<td>164.0</td>
</tr>
</tbody>
</table>

Other lengths are available upon request.

Unit Conversions:

- 1 meter = 3.2808 feet
- 1 meter = 39.37 inches

Tolerances:

- 0-1 meter: ±35 / - 0 mm
- > 1 m: ±85/-0 mm or +4% of length
- which ever is greater
**eurofast® Part Number Keys**

### Cordsets

- **Designator for eurofast®**
  - **R**: Straight
  - **W**: Right Angle

- **Gender**
  - **S**: Male Connector
  - **K**: Female Connector

- **Coupling Nut Material**
  - **V**: Stainless Steel
  - (Blank): Nickel-Plated Brass

- **Cable Type (x)**
  - **25x** (see page 56)

- **Length in Meters (**)**

### Receptacles

- **Designator for eurofast®**
  - **F**: Male Connector
  - **K**: Female Connector

- **Gender**
  - **S**: Male Connector
  - **K**: Female Connector

- **Coupling Nut Material**
  - **V**: Stainless Steel
  - (Blank): Nickel-Plated Brass

- **Cable Type (x)**
  - **25x** (see page 56)

- **Length in Meters (**)**
**minifast® Part Number Keys**

### Cordsets

<table>
<thead>
<tr>
<th>Component</th>
<th>Key</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>R</td>
<td>Straight</td>
</tr>
<tr>
<td></td>
<td>W</td>
<td>Right Angle</td>
</tr>
<tr>
<td></td>
<td>M</td>
<td>Nickel-Plated Brass</td>
</tr>
<tr>
<td></td>
<td>V</td>
<td>Stainless Steel</td>
</tr>
<tr>
<td></td>
<td>(Blank)</td>
<td>PA 6.6 (Nylon)</td>
</tr>
<tr>
<td>Length in Meters (*)</td>
<td>M</td>
<td></td>
</tr>
<tr>
<td>Cable Type (x)</td>
<td>S</td>
<td>Male Connector</td>
</tr>
<tr>
<td></td>
<td>K</td>
<td>Female Connector</td>
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<tr>
<td></td>
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<td>Male Connector</td>
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<tr>
<td></td>
<td>F</td>
<td>Female Connector</td>
</tr>
<tr>
<td></td>
<td>(Blank)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>M</td>
<td>Nickel-Plated Brass</td>
</tr>
<tr>
<td></td>
<td>V</td>
<td>Stainless Steel</td>
</tr>
<tr>
<td></td>
<td>M</td>
<td>PA 6.6 (Nylon)</td>
</tr>
</tbody>
</table>

### Receptacles

<table>
<thead>
<tr>
<th>Component</th>
<th>Key</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>R</td>
<td>Straight</td>
</tr>
<tr>
<td></td>
<td>M</td>
<td>Nickel-Plated Brass</td>
</tr>
<tr>
<td></td>
<td>V</td>
<td>Stainless Steel</td>
</tr>
<tr>
<td></td>
<td>(Blank)</td>
<td>PA 6.6 (Nylon)</td>
</tr>
<tr>
<td>Length in Meters (*)</td>
<td>M</td>
<td></td>
</tr>
<tr>
<td>Cable Type (x)</td>
<td>S</td>
<td>Male Connector</td>
</tr>
<tr>
<td></td>
<td>K</td>
<td>Female Connector</td>
</tr>
<tr>
<td></td>
<td>R</td>
<td>Straight</td>
</tr>
<tr>
<td></td>
<td>W</td>
<td>Right Angle</td>
</tr>
<tr>
<td></td>
<td>V</td>
<td>Male Connector</td>
</tr>
<tr>
<td></td>
<td>F</td>
<td>Female Connector</td>
</tr>
<tr>
<td></td>
<td>(Blank)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>M</td>
<td>Nickel-Plated Brass</td>
</tr>
<tr>
<td></td>
<td>V</td>
<td>Stainless Steel</td>
</tr>
<tr>
<td></td>
<td>M</td>
<td>PA 6.6 (Nylon)</td>
</tr>
</tbody>
</table>
# AS-interface® - Cordsets

<table>
<thead>
<tr>
<th>minifast®</th>
<th>eurofast®</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pin (Male)</strong></td>
<td><strong>Socket (Female)</strong></td>
</tr>
<tr>
<td>RSM</td>
<td>WSM</td>
</tr>
<tr>
<td>RSM</td>
<td>WSM</td>
</tr>
<tr>
<td>WSM</td>
<td>WSM</td>
</tr>
<tr>
<td>RKM</td>
<td>RKM</td>
</tr>
<tr>
<td>WSM</td>
<td>WSM</td>
</tr>
<tr>
<td>WKM</td>
<td>WKM</td>
</tr>
<tr>
<td>RKM</td>
<td>RKM</td>
</tr>
<tr>
<td>RKM</td>
<td>RKM</td>
</tr>
<tr>
<td>WKM</td>
<td>WKM</td>
</tr>
<tr>
<td>RSC</td>
<td>RSC</td>
</tr>
<tr>
<td>WKC</td>
<td>WKC</td>
</tr>
</tbody>
</table>

- Indicates cable type
- Indicates length in meters

Note: For stainless steel coupling nuts change M to V (minifast®) or add V after C (eurofast®). Example: RSM...to RSV... or RSC...to RSCV

Bulk cable, see page 49 for standard lengths

Example: WSM RSC 252-*M
### AS-interface® - Cordsets

#### eurofast®

<table>
<thead>
<tr>
<th>Pin (Male)</th>
<th>Socket (Female)</th>
<th>Pin (Male)</th>
<th>Socket (Female)</th>
<th>Pin (Male)</th>
<th>Socket (Female)</th>
</tr>
</thead>
<tbody>
<tr>
<td>WSC</td>
<td>RKC</td>
<td>WKC</td>
<td>RSFP</td>
<td>RKFP</td>
<td>FSFD</td>
</tr>
</tbody>
</table>

#### minifast® bulkhead

<table>
<thead>
<tr>
<th>Pin (Male)</th>
<th>Socket (Female)</th>
<th>Pin (Male)</th>
<th>Socket (Female)</th>
</tr>
</thead>
<tbody>
<tr>
<td>WSC</td>
<td>RKC</td>
<td>WKC</td>
<td>RSFP</td>
</tr>
</tbody>
</table>

#### eurofast® bulkhead

<table>
<thead>
<tr>
<th>Pin (Male)</th>
<th>Socket (Female)</th>
</tr>
</thead>
<tbody>
<tr>
<td>WSC</td>
<td>RKC</td>
</tr>
<tr>
<td>WSC 25- *M</td>
<td>RKC 25- *M</td>
</tr>
<tr>
<td>RSM WSC 25- *M</td>
<td>RSM RKC 25- *M</td>
</tr>
<tr>
<td>WSV WSCV 25- *M</td>
<td>WSV RKCV 25- *M</td>
</tr>
<tr>
<td>RKV WSCV 25- *M</td>
<td>RKV RKCV 25- *M</td>
</tr>
<tr>
<td>WKM WSC 25- *M</td>
<td>WKM RKC 25- *M</td>
</tr>
<tr>
<td>RSC WSC 25- *M</td>
<td>RSC RKC 25- *M</td>
</tr>
<tr>
<td>WSC WSC 25- *M</td>
<td>WSC RKC 25- *M</td>
</tr>
<tr>
<td>RKC RKC 25- *M</td>
<td>RKC WKC 25- *M</td>
</tr>
<tr>
<td>WKC WKC 25- *M</td>
<td>WKC RSFP 25- *M</td>
</tr>
</tbody>
</table>
minifast® Cordset and Receptacle Connector Dimensions and Pinouts

**RSM-***

**RKM-***

**WSM-***

**WKM-***

**RSFP-***

**RKFP-***

**Mounting Installation**

- **MALE**
  1. Brown (+)
  2. N/C
  3. Blue (-)
  4. N/C

- **FEMALE**
**Eurofast® Cordset and Receptacle Connector Dimensions and Pinouts**

**RSC-**

**RKC-**

**WSC-**

**WKC-**

**FSFD-**

**FKFD-**

**Mounting Installation**

**Male**

1. Brown (+)
2. N/C
3. Blue (-)
4. N/C

**Female**

1. N/C
2. Blue (-)
3. N/C
4. Brown (+)
## AS-interface® - Cable Specifications

AS-interface® cable that meets the requirements of EN50295e for communication up to 167 Kbaud.

### Data Rate and Maximum Cable Length/Segment

<table>
<thead>
<tr>
<th>Data Rate</th>
<th>Maximum Cable Length/Segment</th>
</tr>
</thead>
<tbody>
<tr>
<td>167 Kbaud</td>
<td>100 m</td>
</tr>
</tbody>
</table>

### AS-interface® - Cable Specifications

<table>
<thead>
<tr>
<th>Type</th>
<th>Rating</th>
<th>Data Pair</th>
<th>Outer Jacket</th>
<th>Bulk Cable No.</th>
<th>Figure</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NEC / CEC</td>
<td>AWG</td>
<td>DCR (/1000 ft) Insulation</td>
<td>Material Color Nominal O.D.</td>
<td></td>
</tr>
<tr>
<td>250</td>
<td></td>
<td>2/18 AWG Blue / Brown</td>
<td>6.5 Ohms TPE-S</td>
<td>PTE Yellow Flat</td>
<td>RB21603-*M</td>
</tr>
<tr>
<td>251</td>
<td></td>
<td>2/18 AWG Blue / Brown</td>
<td>6.5 Ohms TPE-S</td>
<td>PTE Black Flat</td>
<td>RB21605-*M</td>
</tr>
<tr>
<td>252</td>
<td>NEC PLTC / ITC CEC CMG</td>
<td>2/18 AWG Blue / Brown</td>
<td>6.5 Ohms PVC</td>
<td>PVC Yellow 7.3 mm (.285 in)</td>
<td>RB50792-*M</td>
</tr>
<tr>
<td>252BK</td>
<td>105°C 300V</td>
<td>NEC PLTC / ITC CEC CMG</td>
<td>2/18 AWG Blue / Brown</td>
<td>PVC Black 6.0 mm (.235 in)</td>
<td>RB50791-*M</td>
</tr>
<tr>
<td>253</td>
<td>105°C 300V</td>
<td>NEC PLTC / ITC CEC CMG</td>
<td>2/18 AWG Blue / Brown</td>
<td>PVC Light Gray Flat</td>
<td>RB50782-*M</td>
</tr>
<tr>
<td>254</td>
<td>105°C 300V</td>
<td>NEC PLTC / ITC CEC CMG</td>
<td>2/16 AWG Blue / Brown</td>
<td>PVC Yellow 7.3 mm (.285 in)</td>
<td>RB50852-*M</td>
</tr>
<tr>
<td>254B</td>
<td>105°C 300V</td>
<td>NEC PLTC / ITC CEC CMG</td>
<td>2/16 AWG Blue / Brown</td>
<td>PVC Blue 7.3 mm (.285 in)</td>
<td>RB50852-*M</td>
</tr>
<tr>
<td>255</td>
<td>105°C 300V</td>
<td>NEC PLTC / ITC CEC HL CMG</td>
<td>2/16 AWG Blue / Brown</td>
<td>Armor / PVC Yellow 13.5 mm (.530 in)</td>
<td>RB50966-*M</td>
</tr>
</tbody>
</table>

Note: Cable “252” is being phased out and replaced by cable “254”

---

![Jacket](image1)

**Figure A**

![Armorfast cable](image2)

**Figure B**

![Flat cable](image3)

**Figure C**
Conduit Adapter

<table>
<thead>
<tr>
<th></th>
<th>minifast®</th>
<th>eurofast®</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-port</td>
<td>BCA 25-M223</td>
<td>BCA 25-E223</td>
</tr>
<tr>
<td>1-port</td>
<td>BCA 25-M123</td>
<td>BCA 25-E123</td>
</tr>
</tbody>
</table>

The conduit adapter attaches to a standard conduit body for transition to minifast® or eurofast® connectors.

* Gasket and mounting hardware included (8-32 x 1/2")

Conduit Bodies

<table>
<thead>
<tr>
<th>Shape</th>
<th>Style</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>Form 8 Mark 9</td>
<td>C28 C29</td>
</tr>
<tr>
<td>LB</td>
<td>Form 8 Mark 9</td>
<td>LB28 LB29</td>
</tr>
<tr>
<td>LL</td>
<td>Form 8 Mark 9</td>
<td>LL28 LL29</td>
</tr>
<tr>
<td>LR</td>
<td>Form 8 Mark 9</td>
<td>LR28 LR29</td>
</tr>
</tbody>
</table>

Dimensions

Conduit Bodies

CROUSE - HINDS Hub Size = 3/4

Visit InterlinkBT on the Internet: [http://www.interlinkbt.com](http://www.interlinkbt.com)
**Device Gland Receptacle**

<table>
<thead>
<tr>
<th>Selection Guide</th>
<th>eurofast®</th>
<th>minifast®</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/2 - NPT</td>
<td>FSV 25-*M / 14.5</td>
<td>RSFV 25-*M / 14.5</td>
</tr>
<tr>
<td>M20</td>
<td>FSV 25-*M / M20</td>
<td>RSFV 25-*M / M20</td>
</tr>
</tbody>
</table>

---

**FSV 25-*M / 14.5**

![FSV 25-*M / 14.5 Diagram](image1)

**FSV 25-*M / M20**

![FSV 25-*M / M20 Diagram](image2)

**RSFV 25-*M / 14.5**

![RSFV 25-*M / 14.5 Diagram](image3)

**RSFV 25-*M / M20**

![RSFV 25-*M / M20 Diagram](image4)

---

**minifast®**

1. Brown (+)
2. N/C
3. Blue (-)
4. N/C

**eurofast®**

1. Brown (+)
2. N/C
3. Blue (-)
4. N/C
**Panel Mount Receptacle - minifast®, eurofast®**

<table>
<thead>
<tr>
<th>Selection Guide</th>
<th>Female</th>
<th>Male</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>minifast®</strong></td>
<td>RKF 25 - &quot;M&quot;</td>
<td>RSF 25 - &quot;M&quot;</td>
</tr>
<tr>
<td><strong>eurofast®</strong></td>
<td>FK 25 - &quot;M&quot;</td>
<td>FS 25 - &quot;M&quot;</td>
</tr>
<tr>
<td><strong>minifast®</strong></td>
<td>RKF 252 - &quot;M&quot;</td>
<td>RSF 252 - &quot;M&quot;</td>
</tr>
<tr>
<td><strong>eurofast®</strong></td>
<td>FK 252 - &quot;M&quot;</td>
<td>FS 252 - &quot;M&quot;</td>
</tr>
</tbody>
</table>

**Part numbers on diagrams represent solder cups only.**

For stainless steel add “V” to housing identifier. Example: RKF...to RKFV or FK...to FKV...

**Female**
1. Brown (+)
2. N/C
3. Blue (-)
4. N/C

**eurofast®**
1. Brown (+)
2. N/C
3. Blue (-)
4. N/C
### Tee

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Dimensions</th>
<th>Description</th>
</tr>
</thead>
</table>
| **RSM 2RKM 25** |  | `minifast®` tee  
• data, power |
| **RSM FKM RKM 25** |  | `minifast®` trunk / `eurofast®` drop  
• data, power |
| **RKC 2RSC 25** |  | `eurofast®` tee  
• data, power  
• mounts directly on station |

Note: For stainless steel coupling nuts:  
Change part number (RSM 2RKM... RSV 2RKV...)  

Note: For stainless steel coupling nuts:  
Change part number (RKC 2RSC... RKCV 2RSCV...)
## Gender Changer and Elbow Connector

![Image of Gender Changer and Elbow Connector](image)

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Dimensions</th>
<th>Description</th>
</tr>
</thead>
</table>
| RSM RSM 25  | ![Image of RSM RSM 25](image) | **minifast®** Male Gender Changer  
- female cordset to male receptacle |
| RKM RKM 25  | ![Image of RKM RKM 25](image) | **minifast®** Female Gender Changer  
- male cordset to female receptacle |
| WSM RKM 25  | ![Image of WSM RKM 25](image) | **minifast®** Elbow  
- right angle male to female connector |
| RSM 25-FK 4.5* | ![Image of RSM 25-FK 4.5*](image) | **minifast®** to **eurofast®** Adapter  
- **minifast®** male to **eurofast®** female connector |

Note: For stainless steel coupling nuts:
- Change part number (RSM RSM...RSV RSV...)  
- Consult factory for availability of stainless steel.
Field Wireable Connector - minifast®

Selection Guide

<table>
<thead>
<tr>
<th></th>
<th>Aluminum&lt;sup&gt;x&lt;/sup&gt;</th>
<th>Stainless Steel&lt;sup&gt;x&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>B 4149-0/9</td>
<td>BV 4149-0/9</td>
</tr>
<tr>
<td>Male</td>
<td>BS 4149-0/9</td>
<td>BSV 4149-0/9</td>
</tr>
</tbody>
</table>

<sup>x</sup> - coupling nut
housing material - nylon

B 4149-0/9

BS 4149-0/9

BV 4149-0/9

BSV 4149-0/9

Male

1. Brown (+)
2. N/C
3. Blue (-)
4. N/C

Female

1. Brown (+)
2. N/C
3. Blue (-)
4. N/C
Field Wireable Connector - eurofast®

<table>
<thead>
<tr>
<th>Selection Guide</th>
<th>Straight</th>
<th>Right Angle</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>B8141-0</td>
<td>B8241-0</td>
</tr>
<tr>
<td>Male</td>
<td>BS8141-0</td>
<td>BS8241-0</td>
</tr>
</tbody>
</table>

**B8141-0**

1. Brown (+)
2. N/C
3. Blue (-)
4. N/C

**B8241-0**

1. N/C
2. N/C
3. Brown (+)
4. Brown (+)

**BS8141-0**

1. Brown (+)
2. N/C
3. Blue (-)
4. N/C

**BS8241-0**

1. N/C
2. N/C
3. Brown (+)
4. Brown (+)

female eurofast®
Rating: 3 A, 36 VDC

male eurofast®
Rating: 3 A, 36 VDC
**Field Wireable Tee**

The Field Wireable Tee is a hybrid connection offering system-wide “plug-and-play” convenience. This allows an extremely rapid changeover to a connectorized network, often in less than 15 minutes. The Field Wireable IP67 Tee features standardized minifast® connectors for the drop connection and field wireable terminals on the trunk connections. This provides the best of both worlds, reliable connections on the short lengths and ease of installation planning on the long trunk runs.

### Description

### Dimensions

### Specifications

<table>
<thead>
<tr>
<th>Pin</th>
<th>Designation</th>
<th>Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>V +</td>
<td>Brown</td>
</tr>
<tr>
<td>2</td>
<td>N/C</td>
<td>N/C</td>
</tr>
<tr>
<td>3</td>
<td>V -</td>
<td>Blue</td>
</tr>
<tr>
<td>4</td>
<td>N/C</td>
<td>N/C</td>
</tr>
</tbody>
</table>
Junction Tee Part Number Key

JT BS - 25 SC - M 6 3 3

**Connector Material**
- 3 = Stainless Steel
- 4 = Nickel-Plated Brass

**Housing**
- 3 = Polyurethane (JTBS only)
- 4 = Hytrel (JTBS only)

**Number of Ports**
- 4 = 4 ports
- 6 = 6 ports
- 8 = 8 ports

**Connector Type**
- M = minifast®
- E = eurofast®

**Protection**
- SC = Short Circuit
- (Blank) = None

**Bus System**
- 25 = AS-interface®

**Junction Tee**
- JT = Junction Tee
- JB = Junction Box
The AS-interface® junction tee is designed for on machine or in environment use. Mechanically rugged, the new overmolded design provides unparalleled corrosive resistance. Models are available with short circuit protection to limit current draw for individual drops.

** JTBS-25SC-E434 **

** Dimensions **

<table>
<thead>
<tr>
<th>Measurement</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall Length</td>
<td>8.77 [222.9]</td>
</tr>
<tr>
<td>Width</td>
<td>1.79 [45.5]</td>
</tr>
<tr>
<td>Height</td>
<td>1.30 [33.0]</td>
</tr>
</tbody>
</table>

** Specifications **

** Electrical**
- Short Circuit Protection: 280 mA ($I_{sc}$)
- Open Circuit Voltage: 33 VDC
- Current Consumption: 11 mA

** Diagnostic**
- LED Indicators
  - Power - GREEN = On
  - Short Circuit - RED = Shorted

*Short Circuit Protection (only available with SC models)
## Quick Selection Guide

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Number of Ports</th>
<th>Connector Size</th>
<th>Overmold Material</th>
<th>Connector Material</th>
<th>Short Circuit Protected</th>
</tr>
</thead>
<tbody>
<tr>
<td>JTBS-25-M433</td>
<td>4</td>
<td>mini</td>
<td>polyurethane</td>
<td>stainless steel</td>
<td>No</td>
</tr>
<tr>
<td>JTBS-25-M434</td>
<td>4</td>
<td>mini</td>
<td>polyurethane</td>
<td>nickel-plated brass</td>
<td>No</td>
</tr>
<tr>
<td>JTBS-25-M633</td>
<td>6</td>
<td>mini</td>
<td>polyurethane</td>
<td>stainless steel</td>
<td>No</td>
</tr>
<tr>
<td>JTBS-25-M634</td>
<td>6</td>
<td>mini</td>
<td>polyurethane</td>
<td>nickel-plated brass</td>
<td>No</td>
</tr>
<tr>
<td>JTBS-25SC-M433</td>
<td>4</td>
<td>mini</td>
<td>polyurethane</td>
<td>stainless steel</td>
<td>Yes</td>
</tr>
<tr>
<td>JTBS-25SC-M434</td>
<td>4</td>
<td>mini</td>
<td>polyurethane</td>
<td>nickel-plated brass</td>
<td>Yes</td>
</tr>
<tr>
<td>JTBS-25SC-M633</td>
<td>6</td>
<td>mini</td>
<td>polyurethane</td>
<td>stainless steel</td>
<td>Yes</td>
</tr>
<tr>
<td>JTBS-25SC-M634</td>
<td>6</td>
<td>mini</td>
<td>polyurethane</td>
<td>nickel-plated brass</td>
<td>Yes</td>
</tr>
<tr>
<td>JTBS-25-E433</td>
<td>4</td>
<td>euro</td>
<td>polyurethane</td>
<td>stainless steel</td>
<td>No</td>
</tr>
<tr>
<td>JTBS-25-E434</td>
<td>4</td>
<td>euro</td>
<td>polyurethane</td>
<td>nickel-plated brass</td>
<td>No</td>
</tr>
<tr>
<td>JTBS-25-E633</td>
<td>6</td>
<td>euro</td>
<td>polyurethane</td>
<td>stainless steel</td>
<td>No</td>
</tr>
<tr>
<td>JTBS-25-E634</td>
<td>6</td>
<td>euro</td>
<td>polyurethane</td>
<td>nickel-plated brass</td>
<td>No</td>
</tr>
<tr>
<td>JTBS-25SC-E433</td>
<td>4</td>
<td>euro</td>
<td>polyurethane</td>
<td>stainless steel</td>
<td>Yes</td>
</tr>
<tr>
<td>JTBS-25SC-E434</td>
<td>4</td>
<td>euro</td>
<td>polyurethane</td>
<td>nickel-plated brass</td>
<td>Yes</td>
</tr>
<tr>
<td>JTBS-25SC-E633</td>
<td>6</td>
<td>euro</td>
<td>polyurethane</td>
<td>stainless steel</td>
<td>Yes</td>
</tr>
<tr>
<td>JTBS-25SC-E634</td>
<td>6</td>
<td>euro</td>
<td>polyurethane</td>
<td>nickel-plated brass</td>
<td>Yes</td>
</tr>
</tbody>
</table>
**minifast®-to-eurofast® Passive Multiport Junction (Brick)**

This junction box features front mount *minifast®* connectors for the trunk and *eurofast®* for the drops. The unit is fully potted and housed in a nylon enclosure.

### Specifications

<table>
<thead>
<tr>
<th>Description</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Electrical</strong></td>
<td><strong>Mechanical</strong></td>
</tr>
<tr>
<td>Operating voltage: 300 V (max)</td>
<td>Housing material: nylon</td>
</tr>
<tr>
<td>Operating current: 9.0 A (<em>minifast®</em> max), 4.0 A (<em>eurofast®</em> max)</td>
<td>Connector material: PUR (insert), Nickel-plated brass (coupling nut)</td>
</tr>
<tr>
<td></td>
<td>Protection: IP67 (when receptacles are connected or plugged)</td>
</tr>
<tr>
<td></td>
<td>Operating temperature: -25°C to +70°C (-13°F to +158°F)</td>
</tr>
</tbody>
</table>
**Flat Cable/eurofast® Adapter**

These adapters allow the mixing of standard AS-i flat cable with eurofast® round cable in the same system. This may be needed when going from a dry to a wet environment, or to an area where better sealing and more rugged connectors are required. The 4 port model requires a standard base module (see page 70, 71) and allows 4 separate eurofast® cords to be connected.

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASI-PM-1 BW1238</td>
<td>![](ASI-PM-1 BW1238.png)</td>
</tr>
<tr>
<td>ASI-PM-1 BW1239</td>
<td>![](ASI-PM-1 BW1239.png)</td>
</tr>
<tr>
<td>ASI-PM 41</td>
<td>![](ASI-PM 41.png)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASI-PM-1 BW1238</td>
<td>![](ASI-PM-1 BW1238.png)</td>
</tr>
<tr>
<td>ASI-PM-1 BW1239</td>
<td>![](ASI-PM-1 BW1239.png)</td>
</tr>
<tr>
<td>ASI-PM 41</td>
<td>![](ASI-PM 41.png)</td>
</tr>
</tbody>
</table>

Visit [InterlinkBT on the Internet](http://www.interlinkbt.com)

**Description**

**Dimensions**

Courtesy of Steven Engineering, Inc.-230 Ryan Way, South San Francisco, CA 94080-6370-Main Office: (650) 588-9200-Outside Local Area: (800) 258-9200-www.stevenengineering.com
Standard Base Module - Round Cable

These base modules are designed for connecting Bihl+Wiedemann IP65 AS-interface® devices or Consortium style slaves to AS-i systems using round AS-i cable. Options are available for external auxiliary power or two AS-i cables. The cables are connected through PG11 glands to screw terminals.

**Connections**
- AS-interface®: Screw terminals
- Auxiliary power (if available): Screw terminals

**Specifications**

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASI-BM BW1182</td>
<td>2 network ports</td>
</tr>
<tr>
<td>ASI-BM BW1183</td>
<td>1 network port, 1 auxiliary power port</td>
</tr>
</tbody>
</table>

**Dimensions**

- 80.0 [3.15]
- 45.0 [1.77]
- 33.3 [1.31]
Standard Base Module - Flat Cable

These base modules are designed for connecting Bihl+Wiedemann IP65 AS-interface® devices or Consortium style slaves to AS-i standard flat cable. Options are available for external auxiliary power or two AS-i cables to facilitate branching of a flat cable system.

<table>
<thead>
<tr>
<th>Model</th>
<th>Connections</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASI-BM BW1180</td>
<td>AS-interface®: Standard flat cable</td>
<td>2 network ports</td>
</tr>
<tr>
<td>ASI-BM BW1181</td>
<td>Auxiliary power (if available): Standard flat cable</td>
<td>1 network port, 1 auxiliary power port</td>
</tr>
<tr>
<td>ASI-BM BW1438</td>
<td></td>
<td>2 network ports, addresses port</td>
</tr>
</tbody>
</table>

Description

Dimensions

Specifications

Connections
- AS-interface®: Standard flat cable
- Auxiliary power (if available): Standard flat cable

Environmental
- Operating temperature: -25...+60°C
- Storage temperature: -25...+85°C
In division 2 systems non-incendive equipment can use quick disconnect connectors as long as they are protected with a Lokfast™ Guard. The Lokfast™ Guard mechanically prevents separation.

**Mechanical**
- Dimensions: 43mm X D/A X 39mm
- Material: Nylon 6
- Environmental: Sun Resistant, UV Stable
- Operating Temperature: -30°C to 100°C
- Flammability: UL94 (5=V-0; 4=V-1; 3=V-2; 1=HB)

SHLD, MINI FW - available for field wireable connectors
Minifast® closure caps are for unused ports on junction boxes.

- Stainless steel
- IP67 rated

### Dimensions

**RSMV BC**

- .76 [19.4]
- .92 [23.4]
- .89 [22.7]
- .97 [24.6]

**RKMV BC**

- .65 [16.6]
- .78 [19.9]
- 7/8-16
AS-interface® Accessories
The AS-interface® power supply is designed for direct connection to the AS-i network. Since data and power both use the same wire pair the power supply features data decoupling filters so the data is not seen by the power regulation circuitry. This power supply provides 30 VDC at 2.8 A for the AS-i system.

**Description**

- Input: 115/230 VAC (switchable)
- Output voltage: 30 VDC (decoupling for AS-i networks)
- Output current: up to 2.8 A

**Connections**

- Screw terminals

**Mechanical**

- Operating temperature: -25...+80°C
- Protection: IP20

**Dimensions**

![Power Supply Dimensions Diagram]
**Power Extender**

The AS-interface® power extender is used for extending the distance between the power supply (typically in a cabinet) and the AS-i network. The power extender resides between the power supply and the network and incorporates data decoupling circuitry to allow a standard power supply to be used. This unit decouples data up to 2.8 A at 30 V for the AS-i network, with self-recovering short circuit protection. Additionally, multiple power extenders can be used to allow a single standard power supply to connect to several AS-i networks, significantly reducing the cost of powering large AS-i installations.

---

**Description**

The AS-interface® power extender is used for extending the distance between the power supply (typically in a cabinet) and the AS-i network. The power extender resides between the power supply and the network and incorporates data decoupling circuitry to allow a standard power supply to be used. This unit decouples data up to 2.8 A at 30 V for the AS-i network, with self-recovering short circuit protection. Additionally, multiple power extenders can be used to allow a single standard power supply to connect to several AS-i networks, significantly reducing the cost of powering large AS-i installations.

---

**Dimensions**

![Dimensions Diagram]

*shown with base module

---

**Specifications**

**Electrical**
- Output voltage: 30 VDC (decoupling for AS-i networks)
- Output current: up to 2.8 A
- Short circuit protection: 3 A, self-recovering

**Connections**
- Standard base module (see page 70, 71) with auxiliary power connection
- Bases sold separately

**Mechanical**
- Operating temperature: 0...+70°C
- Protection: IP65
Spanner Module

Description

The AS-interface® Spanner Module allows two separate AS-i networks to communicate with each other. This is easily accomplished through the internal connection of two 4-in/4-out slaves, one assigned to each of the two networks. The inputs of one slaves are directly connected as outputs of the other, allowing information to be transferred between masters as simply as writing outputs. Two versions are available: an IP20 module with COMBICON connectors and an IP65 version for standard base modules.

Dimensions

Electrical

- Operating voltage: 20-30 VDC (from AS-i network)
- Operating current: < 80 mA per slaves (from AS-i network)
- AS-i version: 2.0

Specifications

Connections

- ASI-CPL BW1187  COMBICON connectors
- ASI-CPL BW1280  Standard base module (see page 70, 71) with auxiliary power connection

Mechanical

- Operating temperature: 0...+55°C
- Protection: ASI-CPL BW1187  IP20
             ASI-CPL BW1280  IP65
The AS-interface® Repeater is used to extend the length of an AS-i network. Normally AS-i allows up to 100 meters of cable on a segment. Up to two repeaters are allowed to extend this length to a total of (normally) 300 meters. By placing the master in the center of the network and using repeaters symmetrically on either side a theoretical maximum network length of 500 meters can be achieved. The repeater reads AS-i messages and retransmits them to provide a clean, amplified signal. No AS-i address is occupied by this device.

*shown with base module

**Specifications**

- **Electrical**
  - Output voltage: 18...30 VDC (from AS-i)
  - Output current: 60 mA per segment (120 mA total)

- **Connections**
  - Standard base module (see pages 70, 71) with auxiliary power connection
  - Flat cable base included

- **Mechanical**
  - Operating temperature: -10...+55°C
  - Protection: IP65
**Profibus®-DP Master Simulator**

The Profibus® Master Simulator is used to aid in troubleshooting and configuration of Profibus®-DP slaves. The included software is able to read GSD files, allowing specific slave configuration and the display of diagnostic information text. Input data can be read and output data written cyclically through the Profibus®-DP interface. Additionally, with the DPV1 version acyclic data is possible with slaves supporting the DPV1 extensions. The included master simulator software can also scan an entire Profibus® network and identify all connected slaves. The software drivers and examples are available to allow users to write their own custom interface software.

**Electrical**
- Operating voltage: 5 V from Profibus®
- Operating current: <60 mA

**Connections**
- PC: Standard D9 serial connector
- Profibus®-DP: D9 connector according to Profibus® specifications
- Power supply: RS-232 from PC / Profibus® from attached slave
Profibus®-DP Serial Master

The Profibus® Serial Master is used to aid in troubleshooting and configuration of Profibus®-DP slaves. The included software is able to read GSD files, allowing specific slave configuration and the display of diagnostic information text. Input data can be read and output data written cyclically through the Profibus®-DP interface. The serial master also can be used as a class 2 master in a Profibus®-DP system. Additionally, with the DPV1 version acyclic data is possible with slaves supporting the DPV1 extensions. The included master simulator software can also scan an entire Profibus® network and identify all connected slaves. The software drivers and examples are available to allow users to write their own custom interface software.

Electrical
- Operating voltage: 24 VDC
- Operating current: < 60 mA

Connections
- PC: Standard D9 serial connector
- Profibus®-DP: D9 connector according to Profibus® specification
- Power supply: COMBICON plug

Data Transfer Rates
- RS-232: 19200 baud
- Profibus®-DP: 9600 baud to 1.5 Mbaud
DeviceNet™ Master Simulator

The DeviceNet™ Master Simulator is used to aid in troubleshooting and configuration of DeviceNet™ slaves. The included software can establish communication with a DeviceNet™ slave with no need to read the EDS file. Slave attributes can be read and written in order to configure a slave, or diagnose errors. The included software allows access to attributes as well as slave I/O data. Example programs and DLL files are also available to allow the user to create their own custom software interface. The master simulator is also used to connect AS-interface®/DeviceNet™ gateways to a PC for configuration and monitoring.

**Description**

**Specifications**

- **Electrical**
  - Operating voltage: MS-DN BW1420 From USB
                        MS-DN BW1255 From parallel port

- **Connections**
  - PC: MS-DN BW1420 MS-DN BW1255
    Standard USB Standard parallel port interface (25-pin D-sub)
  - DeviceNet™: 9-pin D-sub pin 2=CAN_L, pin 7=CAN_H
**CANopen Master Simulator**

The CANopen Master Simulator is used to aid in troubleshooting and configuration of CANopen slaves. The included software can establish communication with a CANopen slave with no need to read the EDS file. I/O data can be read and written, and diagnostic information can be displayed. The master simulator is also used to connect AS-i/CANopen gateways to a PC for configuration and monitoring.

**Description**

**Specifications**

<table>
<thead>
<tr>
<th>Electrical</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating voltage: From USB</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Connections</th>
</tr>
</thead>
<tbody>
<tr>
<td>PC: Standard USB</td>
</tr>
<tr>
<td>CANopen: 9-pin D-sub pin 2=CAN_L, pin 7=CAN_H</td>
</tr>
</tbody>
</table>
**Serial Interface Converter**

![Serial Interface Converter Image]

**Description**

The Serial Interface Converter is used to connect an AS-interface® master with RS-485 interface to a PC for configuration and monitoring. The converter requires no external power supply, and is simply inserted between the PC serial port and the RS-485 device. Only one RS-485 device may be connected to the converter at a time.

**Specifications**

- **Electrical**
  - Operating voltage: From the serial port of the PC

- **Data rates**
  - Up to 57.6 kbaud

- **Connections**
  - PC: Standard serial port connection (9-pin D-sub, RS-232)
  - RS-485: 9-pin D-sub
System Analyzer

The AS-i System Analyzer is a perfect complement to the diagnostic capabilities of Bihl+Wiedemann masters. The easy to use diagnostic software provides simple graphical indications of the health of a slave, without requiring the user to be an AS-i expert. An easy statistics mode shows faulty messages as well as repeated data for all connected slaves. Test data can be stored for statistical analysis offline. Several expert functions are also available to extend the troubleshooting capabilities for advanced users.

This analyzer is a passive listening device and does not consume an AS-i address.

**Electrical**
- Operating voltage: from AS-i
- Operating current: ~70 mA (from AS-i)
- AS-i version: 2.1

**Connections**
- AS-interface®: screw terminals
- PC: RS-232 via D9 connector
- Trigger input (24 V): screw terminals
- Trigger input (TTL): screw terminals

**Memory**
- stores up to 256,000 messages
**PC Interface Cable**

<table>
<thead>
<tr>
<th>Cable Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CORD-DSUB BW1058</td>
<td>IP65 masters (RS485 and Profinet®-DP)</td>
</tr>
<tr>
<td>CORD-DSUB BW1097</td>
<td>D9 to D9 extension (RS232, RS485)</td>
</tr>
<tr>
<td>CORD-DSUB BW1226</td>
<td>D9 to CAN connection (CANopen and DeviceNet™)</td>
</tr>
<tr>
<td>RJ45 RJ45 CR 840-2M</td>
<td>Ethernet RJ45 crossover</td>
</tr>
<tr>
<td>CORD-DSUB BW1417</td>
<td>Programming cable for ASI-SCAN-AB BW1416, BW 1488</td>
</tr>
</tbody>
</table>

These are cables for connecting various AS-interface® gateways to a PC for programming, control or monitoring. Normally these cables are connected between the PC, master simulator or interface converter and the gateway or master being used.

**CORD-DSUB BW1058**

<table>
<thead>
<tr>
<th>Pin</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
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</tbody>
</table>

9-pin D-Shell to 9-pin D-Shell

**CORD-DSUB BW1097**

<table>
<thead>
<tr>
<th>Pin</th>
<th>Description</th>
</tr>
</thead>
<tbody>
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</table>

9-pin D-Shell to leads

**CORD-DSUB BW1226**

<table>
<thead>
<tr>
<th>Pin</th>
<th>Description</th>
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<tbody>
<tr>
<td>1</td>
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<td>3</td>
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<tr>
<td>4</td>
<td>4 - CAN_L</td>
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<tr>
<td>5</td>
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<td>6</td>
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</tbody>
</table>

9-pin D-Shell to Combicon connector

**RJ45 RJ45 CR 840-2M**

<table>
<thead>
<tr>
<th>Pin</th>
<th>Description</th>
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<tbody>
<tr>
<td>1</td>
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</tbody>
</table>

RJ45 to RJ45 Crossover

**CORD-DSUB BW1417**

<table>
<thead>
<tr>
<th>Pin</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
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<td>5</td>
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</tbody>
</table>

Programming cable for ASI-SCAN-AB BW1416, BW1488
PLUG & PLAY work

Installations
Plug and play connectorization has been commonly used in industries ranging from appliance manufacturing to industrial sensing for many years. These industries have found it necessary to compete in a business climate where speed and consistency of connection are top priorities. Connectorization is the perfect complement to AS-interface® systems. The concepts and goals are the same: reduced installation time, reduced troubleshooting required and simple expansion. The use of an AS-i system minimizes point-to-point wiring, which can be time consuming to install and difficult to troubleshoot. Connectorization takes this even further by reducing manually terminated wiring and almost eliminating troubleshooting problems. Of course unforeseen problems are difficult to measure during the initial planning stages. However, problems do happen resulting in real costs – delayed startups, scrapped product, etc. The plants that have implemented plug-and-play connectorization claim up to 75% reduction in start-up. These are real cost savings.

Cost Savings

The initial capital cost is the major factor in selecting a method of connecting devices. These costs include both material and installation. Incorporating plug-and-play connectivity will typically cost 10 to 60 percent less than point-to-point wiring. Actual savings will, of course, depend on the size and complexity of the installation.

Other factors to consider include reduced design cost, reduced maintenance cost, reduced troubleshooting cost and reduced expansion cost. Some of these savings can be difficult to identify until the situation arises. However, once installation begins these costs can very quickly change from a potential savings to real money saved.

Power Considerations

Typically AS-i devices draw power from the network cable. Most inputs are powered from the network, and in some cases outputs are as well. This must be considered when designing an AS-i system. Normally the voltage required at all points on the network is 18-31 VDC. Most AS-i specific power supplies are rated at 30 VDC, but in some cases a standard 24VDC supply will be used. Depending on the length and type of cable used and the current draw there will be a voltage drop over the area of the network. This drop relative to the power supply rating must be taken into account and it must be ensured that every device on the network is supplied with at minimum 18 VDC.

See the figure below for a sample layout used to demonstrate how to compute the amperage rating necessary for an AS-i power supply. The table that follows identifies the parts in the diagram and the lengths of the cable segments. For this example we’ll assume that all drops from tees and junctions are 2 meters and that all cable is 252 type (see page 56) and that each station is using it’s full current load (for station and I/O). We will also assume that the distance from the power supply to the AS-i master is negligible and that we are using a 30 VDC AS-i power supply.
Power Considerations (continued)

To do the nodal analysis we need to start at the far end of the network and work backward. So, starting at Node 4 we need to find the current drawn from the bus line for each station. All of the drops from Node 4 are ASI-OM-4-1000 stations, and can be found on page 15. Looking up the data we find that this station draws up to 50 mA from the AS-i network. Note that the output points themselves are powered from a separate auxiliary power supply. The auxiliary power calculations can be done using a similar nodal analysis, but are ignored here as it is a separate power system altogether. So now we know that I(d), I(e), I(f) and I(g) are 50 mA each, for a total current from Node 4 of 200 mA. Using the direction of the arrows for reference, the current entering and leaving a single node must be equal, so we also know that I(3) is the sum total of I(d), I(e), I(f) and I(g), or 200 mA.

Next we find the total current leaving Node 3. The station connected to the tee here is an ASI-IM-4-1000 (page 14). In this case the AS-i network powers the inputs, so we must account for their current draw. This gives us a worst-case current of 250 mA. Adding this to I(3) tells us that I(2) is 200 mA + 250 mA = 450 mA.
A similar calculation is done at Node 2. The slave on the drop is the same as for Node 3, so I(1) can be found by
250 mA + 450 mA = 700 mA.

Node 1 is where the master is connected. In this example we are using a ASI-DPG BW1309 (page 30). Looking
at the catalog page we see that this gateway draws 200 mA from the AS-i network. Now we can show that I(total)
= 200 mA + 700 mA = 900 mA. This is the total current draw for this network.

A good rule of thumb to follow is to size the power supply about 25% larger than the total current draw to allow for
devices with high inrush current etc. So now our worst case current requirement for this network is 900 mA +
0.25(900 mA) = 1125 mA = 1.125 A.

**Voltage Drop Calculation**

The voltage drop at each node in the system can be calculated with the aid of some of the values obtained in the
current analysis. We want to find the voltage at each node to ensure that none are below 18 VDC.

For the voltage we start from the left to determine the voltage at Node 1. Since we assumed that the length of
cable from the power supply to the master is negligible the voltage at Node 1 (and at the master) is 30 VDC.

Next we want the voltage at Node 2. We use Ohm’s Law (V = I * R), knowing that I(1) = 700 mA and that R = 6.5
Ω/1000 ft (or 0.0213 Ω/m). Since the length from Node 1 to Node 2 is 30 m the calculation becomes V(drop) =
700 mA * (30 m * 0.0213 Ω/m) = 0.447 V. Since this is a drop the voltage at Node 2 can be found by subtracting it
from the voltage at Node 1. This gives the voltage at Node 2 as 30 V − 0.447 V = 29.553 V.

There will be a slight voltage drop to the device connected to Node 2, but since the cable length is only 2 m the
resistance will be less than 0.05 Ω and the drop will be very small.

The voltage at Node 3 is found the same way, only using I(2). The voltage drop calculation gives V(drop) = 450
mA * (30 m * 0.0213 Ω/m) = 0.287 V. Subtracting this from the voltage at Node 2 shows that V(Node 3) = 29.553 V
− 0.287 V = 29.266 V.

Similarly the voltage drop between Node 3 and Node 4 is V(drop) = 200 mA * (35 m * 0.0213 Ω/m) = 0.149 V, and
the voltage at Node 4 is V(Node 4) = 29.622 V − 0.149 V = 29.117 V.

The above calculations show that the entire voltage drop across the network is less than 1 V at the worst case.
This means that the system should function fine with a wide margin.
Installation of Cable Types

Proper management of cabling systems can mean the difference between a dependable and smooth operating installation and costly recurring down time. The suggestions outlined below illustrate some of the common sources of problems and provide simple and effective solutions.

Proper Bend Radius for Fixed and Moving Applications

Providing sufficient bend radius will allow the cable to absorb the energy of bending over a greater portion of its length, increasing its effective working life. Small increases in the radius of the bend can produce substantial increases in cable life.

Fixed Applications
Minimum bend radius 5 x cable diameter

Moving Applications
Minimum bend radius 10 x cable diameter

Eliminating Stress Points in Cable Dress

Installing cables to allow for adequate stress loops and freedom of motion increases the life of the cables. InterlinkBT cordsets incorporate molded strain reliefs that will assist in preventing stress.

Strain Relief
Correct
Incorrect
Cable Bundling Techniques

When bundling several cables together, always keep the bundle loose enough to move within itself. Tightly tied bundles create both compression and tension stresses when the bundle is moved.

Correct

Incorrect

Tying Cables with Cable Ties

When tying cable with self locking ties, always leave the ties loose enough for the cables to slide freely under the tie. Over-tightening will create stress concentrations that can cause the conductors to fail prematurely. Never tighten the tie to the point where the cable jacket becomes deformed or pinched.

Correct

Incorrect
There are basically four types of cable suitable for network installations. They are Type MC, Type TC, Type PLTC and Type ITC cable. Due to the similarities of the PLTC and ITC requirements cables will often carry a dual PLTC / ITC rating. Type ITC cable is for instrumentation and control circuits operating at less than 150 V and less than 5 A. Type PLTC cable is Power Limited Tray Cable, suitable for 300 volts. Industrial networks are typically 9-32 volt systems that run at low current. In addition, ITC cable can be enclosed in a smooth metallic sheath, a continuous corrugated metallic sheath, or interlocking tape armor applied over the nonmetallic sheath of an ITC cable.

The acronyms of each of the cables are expanded as follows:

- ITC - Instrumentation tray cable
- PLTC - power limited tray cable
- TC – tray cable
- MC – metal clad

Type ITC cable offers a great deal of flexibility in Class I, Division 2 installations. The basic installation guides require mechanical protection and minimized open wiring lengths. This serves to protect the cable from potential damage. Some of the basic guidelines are noted in Article 727.6 of the NEC. The summary below may be used as a guideline. However, the local government inspection agency has final jurisdiction on the interpretation of the code.

**Armorfast® ITC Cables** may be used for open wiring. The cable must be supported and secured every 1.8 m (6 ft).

**Standard ITC Cables** may be used for open wiring without a metallic sheath or armor between cable tray and equipment in lengths not to exceed 15 m (50 ft), where the cable is supported and protected against physical damage using mechanical protection, such as struts, angles or channels. The cable shall be supported and secured at intervals not exceeding 1.8 m (6 ft).

### Installation of Network Cable in Cable Tray

**Installation of Network with Cables Rated 600V or Less**

Network type PLTC is rated for 300 volts. Network cables may be mixed with other cables rated at either 300 or 600 volts. Traditional instrumentation cable was often installed in a separate tray because of the volume of cables. With networks the number of cables is reduced dramatically, and as such may now be practical to install in the same tray as other general purpose cabling.

Network cables and branch circuit cables have been installed in the same cable trays without barriers with excellent performance and reliability.

**Installation of Network Cable with Cables Rated Over 600V**

Network cable may be installed with cables rated over 600V if the cable rated over 600 volts is Type MC (Metal Clad) or if the cables are separated with a fixed solid barrier of a material compatible with the cable tray.

### Cable Tray Loads

Although network wiring greatly reduces the loads in the cable tray they must still be calculated. The table below indicates the weight per 1000 ft. of cable.

<table>
<thead>
<tr>
<th>Cable</th>
<th>Examples</th>
<th>Weight (lbs / 1000 ft.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AS-i</td>
<td>252, 252BK, 254, 254B</td>
<td>58.0297</td>
</tr>
<tr>
<td>AS-i <strong>armorfast®</strong></td>
<td>255</td>
<td>106.80851</td>
</tr>
</tbody>
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