# Sensor Actuator Interface Active

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</table>
SAI bus systems – Overview

**Introduction**

**SAI Active Universal**
Universal compact modules

**SAI Active Universal Pro**
Extendable I/O-System

**SAI Active Line**
Narrow compact modules

**SAI Active AS-Interface**
Modular plug-on modules

**SAI AS-Interface Line**
Narrow compact modules
SAI Active family

The SAI-Active family encompasses fieldbus components for PROFIBUS-DP, DeviceNet™, CANopen, Industrial Ethernet and AS-Interface and supports the aim of entirely modular and decentralised industrial automation extending from the lowest field level to the control level. Automation technology with this kind of structure is transparent, efficient and cost effective. To fully benefit from the cost-saving effects of fieldbus-networked I/O systems, the input and/or output units should be distributed “locally” directly where the process operates. Modules with IP67 ingress protection class are for use in environments with high levels of harmful substances and moisture.

The various product series are designed for different applications. The Line series is of very compact design so that the devices find space even for applications in restricted conditions. The modularity of the hood-type distribution boards gives users the advantage of installing the electronics and connection level separately and being able to choose the right I/O configuration, fieldbus and connection type for the respective requirements.

The Universal family wins over through extended diagnostic capabilities and modern design and is equipped for the latest requirements.

The Extension Pro supports special functions and enables considerably more I/O points per fieldbus node. The Extension IO modules are designed especially small for this.

The following manuals are available for ordering. The EDS and GSD files will be made available for download on the Weidmüller home page (www.weidmueller.com).

### Manuals

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<tr>
<td>Gateway 16DI</td>
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Introduction

The SAI-Active Universal range is the result of the many years of experience Weidmüller has gained with distributors for industry. Besides the established fieldbus systems – PROFIBUS-DP, DeviceNet™ and CANopen – the range also includes Industrial Ethernet modules. The following Ethernet dialects are supported:

- EtherNet/IP
- Modbus TCP

The housing has been tailored to the demands of industry. That is why it is resistant to aggressive cleaning agents, vibration, shocks and heat, and is sealed against water and dust ingress.

Connection technology

The concept behind the new distributors promotes rapid and simple installation in harsh environments. Conventional, standardised M8 and M12 connectors form the backbone of the Weidmüller connection concept. Robust metal threaded rings plus standard pin assignments ensure safety and fewer mistakes during wiring. Two M12 connections are provided for the fieldbus – there is no need for an external T-piece and the modules can be easily interconnected. As specified in the standards, B-coding is used for PROFIBUS-DP, A-coding for DeviceNet™ and CANopen. The functional earth is easy to connect thanks to a metal clip in the fixing hole. Secure contact is created automatically when the module is screwed to an earthed metal base. In other situations there is sufficient space at the screw position for a round cable lug for connecting an earthing cable. Two central fixing holes ensure simple and reliable mounting. The configuration area for the module is situated below the transparent cover. Two rotary switches are provided for setting the fieldbus addresses – up to max. 126 for PROFIBUS-DP.
Power supply

The modules can be supplied with up to four different voltages. In addition to the module voltage, which is also used for the inputs, three supply terminals are available for the outputs. The outputs can also be switched off separately to suit the application. Two cross connects provide the option of bridging the electrical power supply.

Illumination concept

The illuminated configuration area is still unique and represents a very interesting feature. It indicates that the module is on and operating. Furthermore, it is easier to see the two rotary switches for setting the fieldbus addresses. I/O statuses are indicated by means of cleverly designed optical fibres arranged like arrowheads. These point in the direction of the markings and connectors. The light also illuminates the corresponding marker, which allows it to be quickly and clearly read under working conditions. In addition, the voltage supplies, group diagnostic messages and fieldbus statuses are indicated by means of seven status indicators.

Labelling

A marker is available for every I/O channel as well as two markers for the module as a whole. The markers do not have to be fitted individually on the I/O side. Marker strips offer the added advantage of rapid installation. An additional 40 mm wide marker has been specially adapted to suit the module. This allows longer texts such as markings with up to 40 characters to be fitted and clearly read without hindrance.

Diagnosis

Every I/O channel is constantly scanned for errors. If an error is detected, this is indicated directly at the connection and a signal is sent via the fieldbus. The individual channel diagnostics is complemented by a module diagnosis for overvoltages, short-circuits and the fieldbus.

Outputs

The outputs are short-circuit-proof and protected against polarity reversal. Two outputs which can be operated with max. 2 A output power are available for high-performance actuators. The 16DI/8DO allows the user to customise the configuration to suit the application as well as choose between 16DI and 8DI/8DO.

Analogue modules

The analogue combination module is uniquely versatile. The configuration between current and voltage is selected via the configuration software of the master. Further connection options, e.g. PT 100, are possible with Jackpac®. These modules are simply installed between distributor and sensor to convert the signals. The module can accept additional digital inputs.

Complementary products

Cables and accessories provide a perfect finish to the Weidmüller range of distributors. A MultiCard is included with each module for marking purposes. The new M12 blanking plugs can now be fitted more easily manually and with the correct torque using the Weidmüller Screwty tool. Two additional slots allow the plug to be fitted with either a small or large slotted screwdriver.
Introduction

SAI Active Universal Pro

The trend from IP20 to IP67 or from switchgear cabinets to cabinet-less machines has reached a peak with IP67 I/O slaves. These plug & play solutions completely do away with connection of individual conductors. This not only saves time, errors when connecting individual wires no longer occur. IP67 bus modules are the most modern and cost-effective solution for the connection of sensors and actuators.

What is a sub-bus system?

Machine installations nowadays use standardised bus systems. In Europe, for example, PROFIBUS-DP is mostly used and in North America, DeviceNet. The controllers provide the respective interfaces, making connection of a bus system very simple. Nevertheless, there can be isolated problems. The two most significant are:

- The number of addresses is limited. With modular designs in which each slave is a true station with bus address, the total number of channels is limited.
- The costs for a PROFIBUS slave are higher than those for a slave that integrates a manufacturer-specific bus.

For these reasons, sub-bus systems have become established especially in large installations. Sub-bus systems enable I/O stations to supply further I/O stations via an additional line independent of the main bus. The advantage of SAI Universal Pro is that the gateways are slaves themselves and can therefore process I/O information. That means sensors and actuators can be directly connected to gateways from Weidmüller.

What do I have to consider?

Stand-alone modules or sub-bus system instead

Both systems are necessary and offer the optimal solution in your applications. What is important is finding the right solution for the respective application. You are then faced with the question of when which solution is optimal. The usual solution nowadays is to position a gateway directly after the controller and to wire the entire machine with the sub-bus system. The reasons for this are the transmission rates and the limited length of a sub-line.

For the connecting cables between the sub-bus modules, it is important to use a cost-effective solution and not to introduce new special accessories. For connecting the sub-bus stations, Weidmüller uses M8 shielded sensor cables.

This is new.

Transparent connection

The monitoring of each individual connection means that errors are quickly detected and eliminated. On the one hand, all I/O channels are diagnosed and, on the other, the sub-bus line is monitored at every Extension IO.

This means that faulty wiring is immediately detected in the course of installation. In addition, the gateway IO passes a message to the PLC stating exactly where the error is located in the sub-bus connection.
**Transmission reliability**

To ensure the same transmission reliability in the bus system as in the main line, the SAI Universal PRO system uses CAN. As a result of the many applications in the market, this solution in particular is especially cost-effective and resistant to faults.

**There are many IO gateways available** such as PROFIBUS-DP, DeviceNet, USB and the Ethernet dialects: EtherNet/IP and Modbus TCP.

The gateways have 16 digital inputs and the USB module additionally has 8 outputs. The USB is connected to a USB port on a PC and works on any USB port once the relevant drivers have been installed. An implementation using the Modbus standard protocol is possible.

**Extension IO modules**

In addition to the familiar digital input and output modules, the SAI Pro system also includes a counter module, thermo, PT100 and analogue modules. This extensive range offers all the possibilities.

**Special labelling concept**

Our modular terminals usually use marker strips. We have logically transferred this system to the SAI Active Universal and Universal Pro modules. It goes without saying that the labels can be printed using the PrintJet.

**Special illumination concept**

As on our standard SAI Universal modules, the Pro modules have illuminated markers to make recognition particularly easy and for relating the LEDs to the channels.

**Flexible assembly**

The transverse holes enable mounting of the Extension IO modules from the side. Elongated holes help with assembly alignment.

**Technical features**

<table>
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<th>Feature</th>
<th>Value</th>
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<td>Max. no. stations</td>
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<tr>
<td>Bus structure</td>
<td>Line</td>
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<tr>
<td>Max. length</td>
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<tr>
<td>Addressing</td>
<td>Automatic</td>
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When planning the automation of a facility, you must have a wide variety of components available. This engineering table provides you, on one page, with all the relevant information from each Universal Pro component.

<table>
<thead>
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<th>PROFIBUS Gateway</th>
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<td>16DI Gateway PROFIBUS-DP</td>
<td>SAI-AU M12 PB GW 16DI</td>
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<tr>
<td>16DI Stand-alone modules for PROFIBUS-DP</td>
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<td>SAI-AU M12 PB 16DI/8DO</td>
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<td>4AI/2AO/4DI</td>
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<td>DP terminating resistor</td>
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<table>
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SAI Active Universal – Standards

The SAI Universal Family is tested according to the strictest industrial standards. These tests take place in accredited laboratories. Before the sealing test, the modules are subjected to an aging process.

### Conforming to EMC directives

<table>
<thead>
<tr>
<th>Testing standard</th>
<th>Test result</th>
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<td>EN 61000-4-2 (Electrostatic discharge)</td>
<td>Criterion B</td>
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<td>EN 61000-4-3 (Immunity to radiated interference)</td>
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<td>EN 61000-4-4 (Burst)</td>
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<tr>
<td>EN 61000-4-5 (Surge)</td>
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</tr>
<tr>
<td>EN 61000-4-6 (Immunity to conductive disturbances)</td>
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</tr>
<tr>
<td>EN 61000-4-8 (Magnetic field 50 Hz)</td>
<td>Criterion A</td>
</tr>
</tbody>
</table>

### Mechanical tests

<table>
<thead>
<tr>
<th>Testing standard</th>
<th>Test result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resistance to vibration, acc. to EN 60068-2-6</td>
<td>Sinusoidal vibrations 10...150 Hz, 0.75 mm and 100 m/s²</td>
</tr>
<tr>
<td>Schock test, acc. to EN 60068-2-27</td>
<td>Schock testing with 300 m/s² and 9 ms</td>
</tr>
<tr>
<td>Schock test, acc. to EN 60068-2-29</td>
<td>Continuous shock testing with 250 m/s² and 6 ms</td>
</tr>
</tbody>
</table>

### Climate tests

<table>
<thead>
<tr>
<th>Testing standard</th>
<th>Test result</th>
</tr>
</thead>
<tbody>
<tr>
<td>EN 60529</td>
<td>Protection class IP 67 (test after 168 hours aging at +85 °C and 2 hours at -25 °C)</td>
</tr>
<tr>
<td>EN 61131-2</td>
<td>Operating temperature, min.-max. 0 °C...60 °C</td>
</tr>
<tr>
<td></td>
<td>Storage temperature, min.-max. -25 °C...+85 °C</td>
</tr>
<tr>
<td>EN 60068-2-30</td>
<td>Humidity 5%...95%</td>
</tr>
</tbody>
</table>

### UL standards

<table>
<thead>
<tr>
<th>Testing standard</th>
<th>Test result</th>
</tr>
</thead>
<tbody>
<tr>
<td>UL 50 provides</td>
<td>Hosetdown test, icing Test (enclosure marked Type 4, 4X) for accessories for Programmable Controllers</td>
</tr>
</tbody>
</table>
Introduction

SAI-Bluetooth

The Concept

A Bluetooth master can perform wireless communication with up to six slave stations. All stations function as field devices with IP67 protection. The connection from the sensor or actuator utilizes a M12 connector.

The Implementation

The Bluetooth gateway (master) functions as a slave in a PROFIBUS-DP network. It is configured with GSD files, together with the slaves.

Besides communication with Bluetooth stations, the gateway features an additional 12 digital inputs with M12 connectors. Up to 31 Bluetooth masters can be operated within one application. Each gateway can communicate with up to six of its slaves using the WIRELESSopen protocol, which is based on the CANopen standard.
The Products

- PROFIBUS slave with 12 digital inputs and Bluetooth gateway function (master) for 6 Bluetooth slaves
- Bluetooth slave with 16 digital inputs
- Bluetooth slave with 8 digital inputs and 8 digital inputs or outputs (configurable)
- Bluetooth slave with 4 digital and 4 analogue inputs and 2 digital and 2 analogue outputs

All I/O signals on M12 connectors

Advantages

- Interference-resistant data communication without cable, e.g., for mobile sections of the facility.
- Classic distributor with the standard installation procedure
- Configuration as standard PROFIBUS-DP components
- Full network transparency also for wireless stations
- Convenient address settings, in illuminated address space
- Comprehensive diagnosis and status display on each module, for operating voltages and communication
- Generous surface for identification marking, with background lighting and arrow-shaped status display. Additional colour display change in event of I/O error
The PROFIBUS-DP system

**Principle**

PROFIBUS-DP is a master–slave system consisting of one master (usually implemented in the PLC) and up to 31 slaves per segment. During operation, the master constantly interrogates the slave stations. Several masters can also be integrated within one network to relay the transmission authorisation (token passing). PROFIBUS-DP uses a physical layer based on the RS 485 standard which has performed excellently in industrial applications.

The system uses a shielded, twisted pair cable and is extremely resistant to electrical interference. PROFIBUS-DP is suitable for connecting a large number of I/O points. Up to 126 addressable subscribers enable the connection of thousands of analogue and digital I/O points within a network.

Every PROFIBUS-DP module has a so-called GSD file which contains detailed information about the module (I/O data volume, possible transmission rates, update status, etc.). The station GSD file is required in order to configure a station within the PROFIBUS-DP system.

The GSD files are available on the Weidmüller website at www.weidmueller.com.

**Network structure**

The network is a line structure with an active bus terminator at both ends. To activate the bus terminator, in the PG version the connector box must be pulled out of the bus terminator and the switch set to position 1.

The M12 version uses a bus terminator connector (order No. 1784770000).

Ideally, there should be no stub cables; Weidmüller modules have two special connections for the fieldbus.

**Maximum system extension**

PROFIBUS-DP can accommodate max. 32 devices per segment. One segment corresponds to a subsection between two repeaters. If no repeaters are used, the complete network corresponds to one segment. The following table indicates the maximum extension options.

<table>
<thead>
<tr>
<th>Transmission rate</th>
<th>Length of bus line</th>
<th>Stub cable length</th>
<th>No. of repeaters (max.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.6 kBit/s</td>
<td>1200 m</td>
<td>6.6 m</td>
<td>7</td>
</tr>
<tr>
<td>18.2 kBit/s</td>
<td>1200 m</td>
<td>6.6 m</td>
<td>7</td>
</tr>
<tr>
<td>93.75 kBit/s</td>
<td>1200 m</td>
<td>6.6 m</td>
<td>7</td>
</tr>
<tr>
<td>187.5 kBit/s</td>
<td>1200 m</td>
<td>6.6 m</td>
<td>7</td>
</tr>
<tr>
<td>500 kBit/s</td>
<td>400 m</td>
<td>6.6 m</td>
<td>7</td>
</tr>
<tr>
<td>1.5 MBit/s</td>
<td>200 m</td>
<td>6.6 m</td>
<td>4</td>
</tr>
<tr>
<td>12 MBit/s</td>
<td>100 m</td>
<td>preferably none</td>
<td>4</td>
</tr>
</tbody>
</table>

Max. 126 nodes can be addressed at all transmission rates. The maximum extension with 7 repeaters is 9.6 km (8 x 1.2 km).

**Addressing**

The address setting for the corresponding station is set manually by means of two coded rotary switches.

**Transmission rate**

The transmission rate must be identical throughout the whole network, and is defined by the master. The bps rate is compared automatically upon switching on. No adjustments need to be made at the module.

At 12 Mbps the typical response time is < 1 ms per 1000 I/O points.

The bps rate cannot be changed during operation!
### PROFIBUS-DP Universal

#### Ordering data

<table>
<thead>
<tr>
<th>Type of plug-on fitting</th>
<th>Qty.</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAI-AU M8 PB 16DI</td>
<td>1</td>
<td>1906500000</td>
</tr>
<tr>
<td>SAI-AU M8 PB 16DI/8DO</td>
<td>1</td>
<td>1906640000</td>
</tr>
</tbody>
</table>

#### Technical data of bus system

- **Bus sharing unit**: Slave
- **Transmission rate**: Max. 12 Mbps
- **Fieldbus interface**: RS 485
- **Potential isolation**: Yes
- **Station address**: Rotary switch 1-125
- **Baud rate**: Automatic

#### Technical data

**General data**
- **Insulation material for housing**: PBT
- **UL 94 flammability rating**: V-0
- **Operating temperature**: 0 °C ... 55 °C
- **Storage temperature**: -25 °C ... 70 °C
- **Protection class**: IP 67

**Electrical data**
- **Operating voltage**: 24.0 V DC (18...30 V)
- **Max. current-carrying capacity per output signal**: 0.5 A / 2.0 A
- **Output levels**: Short-circuit-protected
- **Total current, max.**: 8 A
- **Digital inputs**: TYPE 1 to EN 61131-2
- **Analogue outputs**: -10...+10 V, 0...10 V, 0...20 mA, 4...20 mA
- **Analogue inputs**: -10...+10 V, 0...10 V, 0...20 mA, 4...20 mA
- **Resolution**: 12-bit
- **Accuracy**: < 0.2 %

#### Note

- Voltage supply with standard M12 plug-in connectors (see Chap. D)

#### Accessories

<table>
<thead>
<tr>
<th>Male plug</th>
<th>Type</th>
<th>Qty.</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metal plug PROFIBUS-DP, plug M12, B-coded, straight</td>
<td>SAI8SM 5/8S M12 SP B-COD</td>
<td>1</td>
<td>1784790000</td>
</tr>
<tr>
<td>Metal plug PROFIBUS-DP, socket M12, B-coded, straight</td>
<td>SAI8SM 5/8S M12 SP B-COD</td>
<td>1</td>
<td>1784780000</td>
</tr>
<tr>
<td>Terminating plug H0 in M12 plug</td>
<td>SAI8END PB M12 SP B-COD</td>
<td>1</td>
<td>1784770000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Accessories</th>
<th>Type</th>
<th>Qty.</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male plug</td>
<td>ESL 8/12.5/43.3 SAI AU</td>
<td>5</td>
<td>1912130000</td>
</tr>
<tr>
<td>M12 protective cap</td>
<td>SAI SK-M12-UNI</td>
<td>20</td>
<td>2330260000</td>
</tr>
<tr>
<td>M8 protective cap</td>
<td>SAI SK M8</td>
<td>50</td>
<td>1802760000</td>
</tr>
</tbody>
</table>

Voltage supply with standard M12 plug-in connectors (see Chap. D)
# Ordering data

<table>
<thead>
<tr>
<th>Plug-on type</th>
<th>Qty.</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>8 inputs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 outputs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 inputs / 4 outputs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16 inputs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 inputs / 8 outputs</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Note**

- VA plug-in connectors on p. D.11

---

# Technical data bus system

<table>
<thead>
<tr>
<th>Bus sharing unit</th>
<th>Slave</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transmission rate</td>
<td>Max. 12 Mbps</td>
</tr>
<tr>
<td>Diagnostic display</td>
<td>red</td>
</tr>
<tr>
<td>Fieldbus interface</td>
<td>RS 485</td>
</tr>
<tr>
<td>Potential isolation</td>
<td>Yes</td>
</tr>
<tr>
<td>Station address</td>
<td>Rotary switch 1-99</td>
</tr>
<tr>
<td>Baud rate</td>
<td>automatic</td>
</tr>
</tbody>
</table>

**Technical data plug-on modules**

### General data electronics-module

- Insulation material of housing: V4A
- Flammability class: UL 94 V-0
- Operation temperature: 0 °C ... 55 °C
- Storage temperature: -25 °C ... 70 °C
- Ingress protection class: IP 69 k

### Electrical data electronics-module

- Operating voltage: 24.0 V DC (20.4 ... 28.8 V)
- Operation voltage indicator: LED green (UL)
- Max. current carrying capacity per output signal: 2.0 A (derating)
- Output levels: Short-circuit-protected
- Total current, max.: 8 A
- Digital inputs: TYPE 1 to EN 61131-2
- Input current at "0": < 1.5 mA
- Input current at "1": > 2 mA
- Switching threshold: 9 V
- E/A function indicator: LED red/green (Uq)
- Sensor voltage indicator: LED red/green (Uq)

### Mechanical data screw connection version

- Diameter of feeder
- Conductor cross-section, max.
- Diameter of bus line

**Note**

---

# Accessories

<table>
<thead>
<tr>
<th>Connectable conduct. SAI-distrib. pass. (UT), codeable</th>
<th>Qty.</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Male plug**

- Metal plug PROFIBUS-DP: plug M12, B-coded, straight: SAISM 5/6S M12 5P B-COD 1 1784790000
- Metal plug PROFIBUS-DP: socket M12, B-coded, straight: SABIM 5/6S M12 5P B-COD 1 1784780000
- Terminating plug PB in M12 plug: SAI END PB M12 5P B-COD 1 1784770000
### Ordering data

<table>
<thead>
<tr>
<th>Bus system</th>
<th>Qty.</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAI-AU M12 PB GW 16DI</td>
<td>1</td>
<td>1938500000</td>
</tr>
<tr>
<td>SAI-AU M12 EN GW 16DI</td>
<td>1</td>
<td>1938570000</td>
</tr>
<tr>
<td>SAI-AU M12 IE GW 16DI</td>
<td>1</td>
<td>1938580000</td>
</tr>
<tr>
<td>SAI-AU M12 USB GW 8I8O</td>
<td>1</td>
<td>1962240000</td>
</tr>
</tbody>
</table>

### Technical data of bus system

**General data**
- Insulation material of housing: PBT
- Flammability class: UL 94, V0
- Operation temperature: 0 °C ... 60 °C
- Storage temperature: -20 °C ... 85 °C
- Ingress protection class: IP 67

**Electrical data**
- Operating voltage: 24.0 V DC (18...30 V)
- Max. current carrying capacity per output signal: 0.5 A
- Output levels: Short-circuit-protected
- Total current, max.: 4 A
- Digital inputs: TYPE 1 to EN 61131-2
- E/A function indicator LED yellow
- Sensor voltage indicator LED green

### Accessories

<table>
<thead>
<tr>
<th>Type</th>
<th>Qty.</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marker, transparent</td>
<td>5</td>
<td>1912130000</td>
</tr>
<tr>
<td>M12 protective cap</td>
<td>20</td>
<td>2330260000</td>
</tr>
</tbody>
</table>
...
Extension IO digital modules

Ordering data

<table>
<thead>
<tr>
<th>Plug-on type</th>
<th>Qty.</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAI-AU M8 SB 8DI</td>
<td>1</td>
<td>1938600000</td>
</tr>
<tr>
<td>SAI-AU M8 SB 8DO 2A</td>
<td>1</td>
<td>1938660000</td>
</tr>
<tr>
<td>SAI-AU M8 SB 8DOI</td>
<td>1</td>
<td>1938630000</td>
</tr>
<tr>
<td>SAI-AU M12 SB 8DI</td>
<td>1</td>
<td>1938610000</td>
</tr>
<tr>
<td>SAI-AU M12 SB 8DO 2A</td>
<td>1</td>
<td>1938680000</td>
</tr>
<tr>
<td>SAI-AU M12 SB 8DOI</td>
<td>1</td>
<td>1938640000</td>
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</table>

Note

Technical data

<table>
<thead>
<tr>
<th>Technical data plug-on modules</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input filter</td>
</tr>
<tr>
<td>Max. current carrying capacity per output signal</td>
</tr>
<tr>
<td>Total current max.</td>
</tr>
<tr>
<td>Digital inputs</td>
</tr>
<tr>
<td>E/A function indicator</td>
</tr>
<tr>
<td>Sensor voltage indicator</td>
</tr>
</tbody>
</table>

Note

Accessories

<table>
<thead>
<tr>
<th>Type</th>
<th>Qty.</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>ESG 8/13.5/43.3 SAI AU</td>
<td>5</td>
<td>1912130000</td>
</tr>
<tr>
<td>SAI-SK-M12-UNI</td>
<td>20</td>
<td>2330260000</td>
</tr>
<tr>
<td>SAI-SK-M8</td>
<td>50</td>
<td>1602760000</td>
</tr>
</tbody>
</table>

Note

UL certification in preparation
Universal Pro

Extension IO analogue modules

SAI-AU Analog

M12

Ordering data

<table>
<thead>
<tr>
<th>Plug-on type</th>
<th>Qty.</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAI-AU M12 SB 4AI</td>
<td>1</td>
<td>1938690000</td>
</tr>
<tr>
<td>SAI-AU M12 SB 4AO</td>
<td>1</td>
<td>1938700000</td>
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</tbody>
</table>

Note

Technical data

<table>
<thead>
<tr>
<th>Bus sharing unit</th>
<th>15</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transmission rate</td>
<td>red</td>
</tr>
<tr>
<td>Fieldbus interface</td>
<td></td>
</tr>
<tr>
<td>Potential isolation</td>
<td>No</td>
</tr>
<tr>
<td>Station address</td>
<td>automatic</td>
</tr>
<tr>
<td>Baud rate</td>
<td>automatic</td>
</tr>
<tr>
<td>Insulation material of housing</td>
<td>PBT</td>
</tr>
<tr>
<td>Flammability class UL 94</td>
<td>5VA</td>
</tr>
<tr>
<td>Operation temperature</td>
<td>0 °C ... 60 °C</td>
</tr>
<tr>
<td>Storage temperature</td>
<td>-25 °C ... 85 °C</td>
</tr>
<tr>
<td>Ingress protection class</td>
<td>IP 67</td>
</tr>
<tr>
<td>Operating voltage</td>
<td>24.0 V DC (20.4...28.8 V)</td>
</tr>
<tr>
<td>Output levels</td>
<td>Short-circuit-protected</td>
</tr>
</tbody>
</table>

Note

Technical data plug-on modules

<table>
<thead>
<tr>
<th>General data electronics-module</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scan interval for each channel</td>
</tr>
<tr>
<td>Accuracy</td>
</tr>
<tr>
<td>Offset error</td>
</tr>
<tr>
<td>Linearity</td>
</tr>
<tr>
<td>Temperature coefficient</td>
</tr>
<tr>
<td>Voltage ranges</td>
</tr>
<tr>
<td>Current ranges</td>
</tr>
</tbody>
</table>

Inputs

| Input resistance              | ≥ 100 kΩ |
| Resolution voltage range     | 11 bit + 1 bit sign (1 LSB = 4.88 mV) |
| Maximum input current (differential) | -50 mA, +50 mA |
| Input resistance (load)       | ≤ 125 Ω |
| Resolution current range     | 11-bit (1 LSB = 9.76 µA) |

Outputs

| Analogue bandwidth           | 100 Hz |
| Load resistance voltage range | ≥ 1 kΩ |
| Resolution voltage range     | 11 bit + 1 bit sign |
| Load resistance current range | ≤ 600 Ω |
| Resolution current range     | 12-bit |

Note

Accessories

<table>
<thead>
<tr>
<th>Type</th>
<th>Qty.</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marker, transparent</td>
<td>5</td>
<td>1912130000</td>
</tr>
<tr>
<td>M12 protective cap</td>
<td>20</td>
<td>2330260000</td>
</tr>
<tr>
<td>M8 protective cap</td>
<td>50</td>
<td>1602760000</td>
</tr>
</tbody>
</table>

Note

UL certification in preparation
### Technical data

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bus sharing unit</td>
<td>15</td>
</tr>
<tr>
<td>Transmission rate</td>
<td>red</td>
</tr>
<tr>
<td>Fieldbus interface</td>
<td></td>
</tr>
<tr>
<td>Potential isolation</td>
<td>No</td>
</tr>
<tr>
<td>Station address</td>
<td>automatic</td>
</tr>
<tr>
<td>Baud rate</td>
<td>automatic</td>
</tr>
<tr>
<td>Insulation material of housing</td>
<td>PBT</td>
</tr>
<tr>
<td>Flammability class UL 94</td>
<td>5VA</td>
</tr>
<tr>
<td>Operation temperature</td>
<td>0 °C ... 60 °C</td>
</tr>
<tr>
<td>Storage temperature</td>
<td>-25 °C ... 85 °C</td>
</tr>
<tr>
<td>Ingress protection class</td>
<td>IP 67</td>
</tr>
<tr>
<td>Operating voltage</td>
<td>24.0 V DC (20.4...28.8 V)</td>
</tr>
<tr>
<td>Output levels</td>
<td>Short-circuit-protected</td>
</tr>
</tbody>
</table>

### Technical data plug-on modules

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>General data electronics-module</td>
<td></td>
</tr>
<tr>
<td>Counter depth</td>
<td>32-Bit</td>
</tr>
<tr>
<td>Switching frequency</td>
<td>100 kHz</td>
</tr>
<tr>
<td>No. inputs</td>
<td>2 x enables; 2 x counters; 2 x count directions</td>
</tr>
<tr>
<td>Voltage rating inputs</td>
<td>24 V DC</td>
</tr>
<tr>
<td>No. outputs</td>
<td>2</td>
</tr>
<tr>
<td>Output current outputs</td>
<td>0.5 A</td>
</tr>
</tbody>
</table>

### Accessories

<table>
<thead>
<tr>
<th>Type</th>
<th>Qty.</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marker, transparent</td>
<td>5</td>
<td>1912130000</td>
</tr>
<tr>
<td>M12 protective cap</td>
<td>20</td>
<td>2330260000</td>
</tr>
<tr>
<td>M8 protective cap</td>
<td>50</td>
<td>1602760000</td>
</tr>
</tbody>
</table>
### Ordering data

<table>
<thead>
<tr>
<th>Type</th>
<th>Qty.</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAI-AU M12 SB 4Thermo</td>
<td>1</td>
<td>1938720000</td>
</tr>
</tbody>
</table>

### Technical data

#### General data electronics-module

- Sensor types: Type J, K, L, B, E, N, R, S, T, U, mV measurement
- Temperature range: depends on sensor type (preset type K: -100 °C ... 1370 °C)
- Resolution: 0.1 °C per digit
- Conversion time: 250 ms (configurable up to 70 ms)
- Measurement error: < ± 0.5% (of measurement range end value)
- Input filter: configurable
- Cold-junction compensation: External PT1000 connection to pins 1 and 3 (GND)

#### General data plug-on modules

- Station address: automatic
- Baud rate: automatic
- Insulation material of housing: PBT
- Flammability class UL 94: V-0
- Operation temperature: 0 °C ... 60 °C
- Storage temperature: -25 °C ... 85 °C
- Ingress protection class: IP 67
- Operating voltage: 24.0 V DC (20.4...28.8 V)
- Output levels: Short-circuit-protected

### Accessories

<table>
<thead>
<tr>
<th>Type</th>
<th>Qty.</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marker, transparent</td>
<td>E35 8/13.3/43.3 SAI AU</td>
<td>5</td>
</tr>
<tr>
<td>M12 protective cap</td>
<td>SAI-SK-M12-UNI</td>
<td>20</td>
</tr>
<tr>
<td>M8 protective cap</td>
<td>SAI-SK-M8</td>
<td>50</td>
</tr>
</tbody>
</table>

### UL certification

- UL certification: in preparation
Extension IO PT100 modules

SAI-AU PT100

M12

Ordering data

<table>
<thead>
<tr>
<th>Type</th>
<th>Qty.</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAI-AU M12 SB 4PT100</td>
<td>1</td>
<td>1938710000</td>
</tr>
</tbody>
</table>

Note

Technical data

Bus sharing unit 15
Transmission rate red
Fieldbus interface
Potential isolation No
Station address automatic
Baud rate automatic
Insulation material of housing PBT
Flammability class UL 94 5VA
Operation temperature 0 °C ... 60 °C
Storage temperature -25 °C ... 85 °C
Ingress protection class IP 67
Operating voltage 24.0 V DC (20.4...28.8 V)
Output levels Short-circuit-protected

Note

Technical data plug-on modules

General data

Sensor types N100;N1000;N120;PT100;PT1000;PT200;PT300;PT500
Potentiometer connection Resistance measurement
Temperature range for PT sensors -200 °C ... +650 °C
Temperature range for Ni sensors -60 °C ... +250 °C
Resistance measurement max. 4000 Ω
Potentiometer 100 to 4000 Ω (3-conductor connection)
Resolution 0.1 °C per digit
Conversion time 250 ms (configurable up to 65 ms)
Measurement error ± 1 °C
Input filter configurable
Measured current typ. 0.5 mA

Note

UL certification in preparation

Accessories

<table>
<thead>
<tr>
<th>Type</th>
<th>Qty.</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marker, transparent</td>
<td>E95 8/13/5/43.3 SAI AU</td>
<td>5</td>
</tr>
<tr>
<td>M12 protective cap</td>
<td>SAI-SK-M12-UNI</td>
<td>20</td>
</tr>
<tr>
<td>M8 protective cap</td>
<td>SAI-SK M8</td>
<td>50</td>
</tr>
</tbody>
</table>
DeviceNet™ system

Principle

DeviceNet™ is a fieldbus system from the USA that is being increasingly employed in Europe and Asia. In terms of the physical layers 1 and 2 of the ISO 7-layer model, DeviceNet™ is based on CAN (Controller Area Network).

The ISO application layer (layer 7) in DeviceNet™ makes use of the so-called “Common Industrial Protocol” (CIP). This is an open standard which is also used for ControlNet™ and Ethernet/IP. In the future this will enable permanent communication between the field level and the Internet.

DeviceNet™ is a multi-master system and its protocol prioritises the data traffic in such a way that I/O signals have a higher priority than configuration data.

Every DeviceNet™ module has a so-called EDS file (Electronic Data Sheet), containing an exact description of the module. All information about I/O and status data required by a master, e.g. a PLC or IPC, are saved in this file and can be used to integrate the module step by step into the control program.

The EDS files are available for downloading on the Weidmüller website at www.weidmueller.com.

Network structure

ISO 11898 prescribes a line structure for the DeviceNet™ network.

A line structure has a terminating resistor of 120Ω at each end. A bus terminator connector (order No. 1784760000) can be plugged into the “Bus OUT” output socket of the Weidmüller DeviceNet™ SAI distributors.

Ideally, there should be no stub cables; Weidmüller modules have two special connections for the fieldbus. The number of subscribers is limited to 63.

Addressing

Any address from 1 to 63 is possible. The address setting of the station can be set manually at the device or via the master. Two coded rotary switches are located underneath the cap, with separate adjustment of tens and units.

Bus line length, transmission rate

The maximum length of the bus line depends on the transmission rate (baud rate). The following table serves as a guide for an optimum bus design:

<table>
<thead>
<tr>
<th>Max. bus expansion in m</th>
<th>Data rate in kbps</th>
</tr>
</thead>
<tbody>
<tr>
<td>500</td>
<td>125</td>
</tr>
<tr>
<td>250</td>
<td>250</td>
</tr>
<tr>
<td>100</td>
<td>500</td>
</tr>
</tbody>
</table>

DeviceNet™ (M12 A-coded)

<table>
<thead>
<tr>
<th>Pin</th>
<th>Assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>shield</td>
</tr>
<tr>
<td>2</td>
<td>Vplus</td>
</tr>
<tr>
<td>3</td>
<td>CAN-GND</td>
</tr>
<tr>
<td>4</td>
<td>CAN-H</td>
</tr>
<tr>
<td>5</td>
<td>CAN-L</td>
</tr>
</tbody>
</table>

Housing

shield

Pin Assignment
**DeviceNet™ Universal**

### Ordering data

<table>
<thead>
<tr>
<th>Type of plug-on fitting</th>
<th>Qty.</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAI-AU M8 DN 16DI</td>
<td>1</td>
<td>1906730000</td>
</tr>
<tr>
<td>SAI-AU M8 DN 16DI/8DO</td>
<td>1</td>
<td>1906740000</td>
</tr>
<tr>
<td>SAI-AU M12 DN 16DX</td>
<td>1</td>
<td>1906700000</td>
</tr>
<tr>
<td>SAI-AU M12 DN 16DX/8DO</td>
<td>1</td>
<td>1906710000</td>
</tr>
<tr>
<td>SAI-AU M12 DN 16DI/8DO</td>
<td>1</td>
<td>1906720000</td>
</tr>
</tbody>
</table>

### Technical data

**General data**
- Insulation material for housing: PBT
- UL 94 flammability rating: V-0
- Operating temperature: -20 °C ... +70 °C
- Storage temperature: -25 °C ... 70 °C
- Protection class: IP 67

**Electrical data**
- Operating voltage: 24.0 V DC (18...30 V)
- Max. current-carrying capacity per output signal: 0.5 A / 2.0 A
- Output levels: Short-circuit-protected
- Total current max.: 8 A
- Digital inputs: TYPE 1 to EN 61131-2
- Analogue inputs: -10...+10 V, -10 V...20 mA / 4...20 mA
- Analogue outputs: -10...+10 V, -10 V...20 mA / 4...20 mA
- Resolution: 12-bit
- Accuracy: < 0.2 %

### Accessories

- **Male plug**
  - Terminating resistor in M12 plug: SAI-EN-D CAN-M12 5P A-COD 1 1784760000
  - Metal plug, pin M12, 5-pole, A-coded shield: SAI-MS-5/S8 M12 5P A-COD 1 1784740000
  - Metal plug, socket M12, 5-pole, A-coded shield: SAI-B-M/S8 M12 5P A-COD 1 1784790000

- **Accessories**
  - Marker, transparent: ESL 8/13.5/43.3 SAI AU 5 1912130000
  - M12 protective cap: SAI-SK-M12-UNI 20 2330260000
  - M8 protective cap: SAI-SK-M8 50 1802760000

Voltage supply with standard M12 plug-in connectors (see Chap. D)
The CANopen system

Principle
A CAN network is based on a server–client principle with a serial bus connecting network subscribers having equal access status. The electrical connection consists of a twisted pair cable with or without shielding depending on the application.

CANopen was defined as a uniform protocol for networking the different CANopen subscribers. The protocol stipulates the significance of the data for the corresponding device type (e.g. I/O modules, drives, shaft encoders, controls).

This means it is now easy for application programmers to use all types of CANopen-compatible components irrespective of the manufacturer.

CANopen subscribers in the same device series organise their data in the same way. The characteristics of these device classes are summarised in “device profiles”.

An object directory is defined in CANopen nodes and describes all device parameters. This is used not only for device description but also as a data access interface by other CANopen devices.

Larger, non-time-critical data quantities are transmitted using “service data objects” (SDO). In addition, at least two “process data objects” (PDO) are available for transmitting process data.

Manufacturer-specific objects and other functions are described in the manual. Every CANopen module has a so-called EDS file (Electronic Data Sheet) containing an exact description of the module. All information about I/O and status data required by a master, e.g. a PLC or IPC, are saved in this file and can be used to integrate the module step by step into the control program.

The EDS files are available for downloading on the Weidmüller website at www.weidmueller.com.

Network structure
ISO 11898 prescribes a line structure for the CANopen network. A line structure has a terminating resistor of 120 ohms at each end.

The cable gland version of the Weidmüller CANopen SAI distributors have an internal switch for activating the terminating resistor.

The M12 version has a bus terminator connector (order No. 1784760000). Ideally, there should be no stub cables; Weidmüller modules have two special connections for the fieldbus.

Addressing
Any address from 1 to 126 is possible with CANopen. The address is set by means of two coded rotary switches in the module.

Bus line length, transmission rate
The maximum length of the bus line depends on the transmission rate (bps rate). The following table serves as a guide for an optimum bus design:

<table>
<thead>
<tr>
<th>Max. bus expansion</th>
<th>Data rate in kbps</th>
</tr>
</thead>
<tbody>
<tr>
<td>7000 m</td>
<td>10</td>
</tr>
<tr>
<td>3500 m</td>
<td>20</td>
</tr>
<tr>
<td>600 m</td>
<td>125</td>
</tr>
<tr>
<td>300 m</td>
<td>250</td>
</tr>
<tr>
<td>90 m</td>
<td>500</td>
</tr>
<tr>
<td>40 m</td>
<td>1000</td>
</tr>
</tbody>
</table>

CANopen (M12 A-coded)

<table>
<thead>
<tr>
<th>Pin</th>
<th>Assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>shield</td>
</tr>
<tr>
<td>2</td>
<td>not used</td>
</tr>
<tr>
<td>3</td>
<td>CAN-GND</td>
</tr>
<tr>
<td>4</td>
<td>CAN-H</td>
</tr>
<tr>
<td>5</td>
<td>CAN-L</td>
</tr>
<tr>
<td>Housing</td>
<td>shield</td>
</tr>
</tbody>
</table>

Pin Assignment

- 1: shield
- 2: not used
- 3: CAN-GND
- 4: CAN-H
- 5: CAN-L
- Housing: shield
Ordering data

<table>
<thead>
<tr>
<th>Type of plug-on fitting</th>
<th>Qty.</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAI-AU M8 CAN 16DI</td>
<td>1</td>
<td>1906680000</td>
</tr>
<tr>
<td>SAI-AU M8 CAN 16DI/8DO</td>
<td>1</td>
<td>1906690000</td>
</tr>
<tr>
<td>SAI-AU M12 CAN 16DI</td>
<td>1</td>
<td>1906650000</td>
</tr>
<tr>
<td>SAI-AU M12 CAN 16DI/8DO</td>
<td>1</td>
<td>1906660000</td>
</tr>
<tr>
<td>SAI-AU M12 CAN 16DI/8DO</td>
<td>1</td>
<td>1906670000</td>
</tr>
</tbody>
</table>

Technical data of bus system

<table>
<thead>
<tr>
<th>Technical data</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bus sharing unit</td>
<td>Slave</td>
</tr>
<tr>
<td>Transmission rate</td>
<td>Max. 1 Mbps</td>
</tr>
<tr>
<td>Diagnostic display</td>
<td>Red</td>
</tr>
<tr>
<td>Fieldbus interface</td>
<td>RS 485</td>
</tr>
<tr>
<td>Potential isolation</td>
<td>Yes</td>
</tr>
<tr>
<td>Station address</td>
<td>Rotary switch 1-125</td>
</tr>
<tr>
<td>Baud rate</td>
<td>Automatic</td>
</tr>
</tbody>
</table>

Note

Technical data

<table>
<thead>
<tr>
<th>General data</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insulation material for housing</td>
<td>PBT</td>
</tr>
<tr>
<td>UL 94 flammability rating</td>
<td>V-0</td>
</tr>
<tr>
<td>Operating temperature</td>
<td>0 °C ... 55 °C</td>
</tr>
<tr>
<td>Storage temperature</td>
<td>-25 °C ... 70 °C</td>
</tr>
<tr>
<td>Protection class</td>
<td>IP 67</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Electrical data</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating voltage</td>
<td>24.0 V DC (18...30 V)</td>
</tr>
<tr>
<td>Max. current-carrying capacity per output signal</td>
<td>0.5 A; 2.0 A</td>
</tr>
<tr>
<td>Output levels</td>
<td>Short-circuit-protected</td>
</tr>
<tr>
<td>Total current, max.</td>
<td>8 A</td>
</tr>
<tr>
<td>Digital inputs</td>
<td>TYPE 1 to EN 61131-2</td>
</tr>
<tr>
<td>Analogue outputs</td>
<td>10...+10 V0...+10 V0...20 mA/4...20 mA</td>
</tr>
<tr>
<td>Analogue inputs</td>
<td>10...+10 V0...+10 V0...20 mA/4...20 mA</td>
</tr>
<tr>
<td>Resolution</td>
<td>12-bit</td>
</tr>
<tr>
<td>Accuracy</td>
<td>&lt; 0.2 %</td>
</tr>
</tbody>
</table>

Note

Accessories

<table>
<thead>
<tr>
<th>Accessories</th>
<th>Type</th>
<th>Qty.</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Terminating resistor in M12 plug</td>
<td>SAIEND CAN-M12 5P A-COD</td>
<td>1</td>
<td>1784760000</td>
</tr>
<tr>
<td>Metal plug, pin M12, 5-pole, A-coded shield</td>
<td>SAI-S-M-5/8S M12 5P A-COD</td>
<td>1</td>
<td>1784740000</td>
</tr>
<tr>
<td>Metal plug, socket M12, 5-pole, A-coded shield</td>
<td>SAI-S-M-5/8S M12 5P A-COD</td>
<td>1</td>
<td>1784750000</td>
</tr>
</tbody>
</table>

Note

Voltage supply with standard M12 plug-in connectors (see Chap. D)
EtherNet/IP

The EtherNet/IP system

Principle

EtherNet/IP (Ethernet Industrial Protocol) is an open standard that was developed by Rockwell Automation and the Open DeviceNet Vendor Association (ODVA) for industrial networks. EtherNet/IP is based on the Ethernet TCP/IP standards and the Common Industrial Protocol (CIP).

CIP an open standard that is implemented in ISO layer 7, and is also used for ControlNet™ and DeviceNet™ installations. This enables continuous communications between the field level and the Internet. The protocol includes a control component for cyclic, real-time-compatible I/O signal transmission (implicit messaging) and an information component for the configuration, diagnosis and management messages (explicit messaging).

The I/O data uses the User Datagram Protocol/Internet Protocol (UDP/IP) and the information data uses TCP/IP protocols.

The IEEE802.3 standard is incremented on layers 1 and 2 (physical media and data link respectively).

Addressing

The Dynamic Host Configuration Protocol (DHCP) is used to assign addresses to modules in EtherNet/IP networks.

Network structure

Like Standard Ethernet, EtherNet/IP installations are also wired with a star structure. The star structure is characterised by a central signal distributor (switch) with individual connections to all the network’s terminals. A line or tree structure can be set up with the help of a 3-port switch in the device or in the proximity of each device.

Weidmüller can supply products for the network infrastructure – please refer to our Industrial Ethernet catalogue.

Transmission rate

The transmission rate is 10 or 100 Mbps. Weidmüller modules detect the transmission rate automatically and set themselves accordingly. The maximum length of the bus cable is the same for both transmission rates.

The following table can serve as a guide for bus installations complying with the standard:

<table>
<thead>
<tr>
<th>Max. bus extension (m)</th>
<th>Data rate (Mbps)</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>10</td>
</tr>
<tr>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>
Modbus TCP

**Principle**

Modbus TCP is a fieldbus system for automation technology based on Ethernet TCP/IP. It has been accepted by the Internet Engineering Task Force (IETF) as a draft RFC standard and has been made available for all to use by Schneider Automation. Modbus TCP is based on Modbus, a well-established industrial application protocol. The Modbus object models remain unchanged.

A connection is set up via TCP/IP by the server (e.g. I/O device) being addressed via port number 502. Commands are initiated by the client (Master) and executed by the server (slave). The length of a Modbus telegram is max. 256 bytes.

**Network structure**

Like Standard Ethernet, Modbus TCP installations are also wired with a star structure. The star structure is characterized by a central signal distributor (switch) with individual connections to all the network's terminals. A line or tree structure can be set up with the help of a 3-port switch in the device or in the proximity of each device.

Weidmüller can supply products for the network infrastructure – please refer to our Industrial Ethernet catalogue.

**Addressing**

The addressing is carried out via a BOOTP (Internet Bootstrap Protocol) inquiry via the client, using the Dynamic Host Configuration Protocol (DHCP), or the user can set the IP address with a software tool.

**Bus extension/transmission rate**

The transmission rate is 10 or 100 Mbps. Weidmüller modules detect the transmission rate automatically and set themselves accordingly. The maximum length of the bus cable is the same for both transmission rates.

The following table can serve as a guide for bus installations complying with the standard:

<table>
<thead>
<tr>
<th>Max. bus extension (m)</th>
<th>Data rate (Mbps)</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>10</td>
</tr>
<tr>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>
Industrial Ethernet

Modbus TCP Universal

Ordering data

<table>
<thead>
<tr>
<th>Type</th>
<th>Qty.</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAI-AU M8 IE 16DI</td>
<td>1</td>
<td>1906880000</td>
</tr>
<tr>
<td>SAI-AU M8 IE 16DI/8DO</td>
<td>1</td>
<td>1906890000</td>
</tr>
<tr>
<td>SAI-AU M12 IE 16DI</td>
<td>1</td>
<td>1906900000</td>
</tr>
<tr>
<td>SAI-AU M12 IE 16DI/8DO</td>
<td>1</td>
<td>1906910000</td>
</tr>
</tbody>
</table>

Technical data of bus system

<table>
<thead>
<tr>
<th>General data</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Insulation material for housing</td>
<td>PBT</td>
</tr>
<tr>
<td>UL 94 flammability rating</td>
<td>V-0</td>
</tr>
<tr>
<td>Operating temperature</td>
<td>0 °C ... 55 °C</td>
</tr>
<tr>
<td>Storage temperature</td>
<td>-25 °C ... 70 °C</td>
</tr>
<tr>
<td>Protection class</td>
<td>IP 67</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Electrical data</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating voltage</td>
<td>24.0 V DC (18...30 V)</td>
</tr>
<tr>
<td>Max. current-carrying capacity per output signal</td>
<td>0.5 A / 2.0 A</td>
</tr>
<tr>
<td>Output levels</td>
<td>Short-circuit-protected</td>
</tr>
<tr>
<td>Total current, max.</td>
<td>8 A</td>
</tr>
<tr>
<td>Digital inputs</td>
<td>TYPE 1 to EN 61131-2</td>
</tr>
<tr>
<td>Analogue outputs</td>
<td>-10...+10 V5... -10 V0... 20 mA4... 20 mA</td>
</tr>
<tr>
<td>Analogue inputs</td>
<td>-10...+10 V5... -10 V0... 20 mA4... 20 mA</td>
</tr>
<tr>
<td>Resolution</td>
<td>12-bit</td>
</tr>
<tr>
<td>Accuracy</td>
<td>&lt; 0.2 %</td>
</tr>
</tbody>
</table>

Note

Technical data

Accessories

<table>
<thead>
<tr>
<th>Male plug</th>
<th>Type</th>
<th>Qty.</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metal plug Ethernet, pin M12, D-coded, straight</td>
<td>SAIM8M-4/8S-M12-4P D-COD</td>
<td>1</td>
<td>1892130000</td>
</tr>
<tr>
<td>Metal plug Ethernet, socket M12, D-coded, straight</td>
<td>SAIM8M-4/8S-M12-4P D-COD</td>
<td>1</td>
<td>1892120000</td>
</tr>
</tbody>
</table>

Accessories

<table>
<thead>
<tr>
<th>Item</th>
<th>Type</th>
<th>Qty.</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marker, transparent</td>
<td>ESL 8/13.5/43.3 SAI AU</td>
<td>5</td>
<td>1912130000</td>
</tr>
<tr>
<td>M12 protective cap</td>
<td>SAI SK-M12-UNI</td>
<td>20</td>
<td>2330260000</td>
</tr>
<tr>
<td>M8 protective cap</td>
<td>SAI SK-M8</td>
<td>50</td>
<td>1802760000</td>
</tr>
</tbody>
</table>

Accessories

Voltage supply with standard M12 plug-in connectors (see Chap. D)
EtherNet/IP Universal

Ordering data

<table>
<thead>
<tr>
<th>Type of plug-on fitting</th>
<th>Qty.</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAI-AU M8 EIP 16DI</td>
<td>1</td>
<td>1906930000</td>
</tr>
<tr>
<td>SAI-AU M8 EIP 16DI/8DO</td>
<td>1</td>
<td>1906940000</td>
</tr>
</tbody>
</table>

Note

Technical data of bus system

<table>
<thead>
<tr>
<th>General data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insulation material for housing: PBT</td>
</tr>
<tr>
<td>UL 94 flammability rating: V-0</td>
</tr>
<tr>
<td>Operating temperature: -25 °C ... 70 °C</td>
</tr>
<tr>
<td>Storage temperature: -25 °C ... 70 °C</td>
</tr>
<tr>
<td>Protection class: IP 67</td>
</tr>
</tbody>
</table>

Electrical data

| Operating voltage: 24.0 V DC (18...30 V) |
| Output levels: Short-circuit-protected |
| Total current, max.: 8 A |
| Digital inputs: TYPE 1 to EN 61131-2 |
| Analogue outputs: -10...+10 V, -10 V0...20 mA, -20 mA |
| Analogue inputs: -10...+10 V, -10 V0...20 mA, -20 mA |
| Resolution: 12-bit |
| Accuracy: < 0.2 % |

Note

Technical data

<table>
<thead>
<tr>
<th>General data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insulation material for housing: PBT</td>
</tr>
<tr>
<td>UL 94 flammability rating: V-0</td>
</tr>
<tr>
<td>Operating temperature: 0 °C ... 55 °C</td>
</tr>
<tr>
<td>Storage temperature: -25 °C ... 70 °C</td>
</tr>
<tr>
<td>Protection class: IP 67</td>
</tr>
</tbody>
</table>

Electrical data

| Operating voltage: 24.0 V DC (18...30 V) |
| Max. current-carrying capacity per output signal: 0.5 A, 2.0 A |
| Total current, max.: 8 A |
| Digital inputs: TYPE 1 to EN 61131-2 |
| Analogue outputs: -10...+10 V, -10 V0...20 mA, -20 mA |
| Analogue inputs: -10...+10 V, -10 V0...20 mA, -20 mA |
| Resolution: 12-bit |
| Accuracy: < 0.2 % |

Note

UL certification in preparation

Accessories

<table>
<thead>
<tr>
<th>Male plug</th>
<th>Type</th>
<th>Qty.</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metal plug Ethernet, pin M12, D-coded, straight</td>
<td>SAI8M-4/9S-M12-4P D-COD</td>
<td>1</td>
<td>1892130000</td>
</tr>
<tr>
<td>Metal plug Ethernet, socket M12, D-coded, straight</td>
<td>SAI8M-4/9S-M12-4P D-COD</td>
<td>1</td>
<td>1892120000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Accessories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marker, transparent</td>
</tr>
<tr>
<td>M12 protective cap</td>
</tr>
<tr>
<td>M8 protective cap</td>
</tr>
</tbody>
</table>

Voltage supply with standard M12 plug-in connectors (see Chap. D)
Switches are the central components of a network. They prevent data collision, allow rapid packet switching and enhance data throughput. Not only do Weidmüller switches meet the demands placed on the Fast Ethernet with its transmission rate of up to 100 Mbit/s, but they are also downward compatible with the older networks that have a transmission rate of 10 Mbit/s (IEEE 802.3). They recognise the speed automatically.

Weidmüller’s unmanaged switches are Plug & Play devices for easy installation of Ethernet networks. They do not need to be either configured or parameterised.

Weidmüller’s managed switches enable industry networks to be structured in order to optimise transport routes and times for network traffic. The various network components are cabled together hierarchically in a physical star. The main distributor in the field, in this case the Industrial Ethernet switch IE-SW-8-M-IP67, is the central switching point. All Weidmüller switches are protocol transparent. Each port forms both a network segment and a collision domain that are intrinsic to the port itself. The entire network bandwidth is available to each of these segments. This results in enhanced network performance not only over the network as a whole, but also in each individual segment. The switch examines each packet passing through for the MAC address of the target segment and is able to forward it directly there.
For direct connection to the network in the field, Weidmüller offers an IP 67 switch with eight Ethernet ports for use in tough environments.

- Robust plastic housing (IP67 ingress protection class) for use in the field, complying with UL94 flammability rating V0
- Strip markers – wide range of marking systems and products
- Eight Ethernet ports with M12-D-coded plug-in connectors
- Temperature range from −40 °C to +60 °C

The features of the managed IP67 switch from Weidmüller include the following:

- Port trunking
- Port mirroring
- VLAN IEEE 802.1Q
- Filtering and forwarding table with fixed entries
- Selective multicast control
- Quality of service
- Configurable relay functions
- Access to the address table
- Configuration via Web interface or terminal program
- SNMP V.1-capability
- RSTP and RapidRing™
- IGMP snooping with querier functions
- Auto-crossing, auto-negotiation, auto-polarity
- Broadcast limitation
- Flow control IEEE 802.3x
- DHCP
- RMON (statistics, history, alarms, occurrences)

Stock control with the Weidmüller Industrial Ethernet Switches in IP67
Industrial Ethernet

**IP 67 unmanaged switch**
- IP 67 housing
- M12 D-coded plug-in connector

**Technical data**

| Housing | Plastic |
| Length/Width/Height | 210 mm/54 mm/31 mm |
| AC input voltage, min.-max. | 8-24 V |
| DC input voltage, min.-max. | 10-36 V |
| Input power AC / DC | max. 5 W |
| Input frequency | 47 - 63 Hz |
| Operating temperature, min.-max. | -40 °C ... +60 °C |
| Storage temperature, min.-max. | -40 °C ... 85 °C |
| Installation | Wall |
| Ingress protection class | IP 67 |
| Data rate | IEEE 802.3, 802.3u, 802.3x |
| Datarate | 10BASE-T/100BASE-TX |
| Coax 100 m | 100 m |
| Functionality | Autonegotiation, redundant voltage supply, error relay for PLC support |
| Flow control | half-duplex/full-duplex |
| Status indication | Power, Link, Status, Run |
| Buffer memory | 256 KByte per 8 ports |
| Address memory | 4 K MAC addresses per 8 ports |
| Approvals | CE, UL508, c-UL |
| Aging | 300 s |

**Ordering data**

| Type | Order No. |
| Ports | IE-SW8-IP67 |
| 8x M12 | 8877190000 |

**Note**

**Accessories**

| Type | Order No. |
| M12 protective cap | SAI-SK-M12-UNI |
| | 2330260000 |
**IP 67 managed switch**

Industrial Ethernet on the machine itself with simple and secure M12 plug-in connectors.

With their IP 67 class of protection and operating temperature range of -40°C to +60°C, these switches are ideal for use in the field.

The following features are supported:

- Autonegotiation
- Redundant voltage supply
- Error relay for PLC support
- SNMP V1
- Rapid Ring™
- RSTP 802.3w
- IGMP snooping
- Querier
- Port mirroring
- Port filtering
- Port setup functionality
- VLAN
- QoS
- TOS
- DiffServ
- MAC-based trunking
- Autocrossover
- Autopolarity
- Filtering and forwarding table
- DHCP-Client

---

### Technical data

<table>
<thead>
<tr>
<th>Housing</th>
<th>Length/Width/Height 210 mm/54 mm/31 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC input voltage</td>
<td>8-24 V AC</td>
</tr>
<tr>
<td>DC input voltage</td>
<td>10-36 V DC</td>
</tr>
<tr>
<td>Input power AC / DC</td>
<td>max. 5 W</td>
</tr>
<tr>
<td>Input frequency</td>
<td>47 - 63 Hz</td>
</tr>
<tr>
<td>Operating temperature, min.-max.</td>
<td>-40°C ... +60°C</td>
</tr>
<tr>
<td>Storage temperature, min.-max.</td>
<td>-40°C ... +85°C</td>
</tr>
<tr>
<td>Ingress protection class</td>
<td>IP 67</td>
</tr>
<tr>
<td>Standard</td>
<td>IEEE 802.3, 802.3u, 802.3x</td>
</tr>
<tr>
<td>Data rate</td>
<td>10BASE-T/100BASE-TX</td>
</tr>
<tr>
<td>Segment length</td>
<td>Cooper 100 m</td>
</tr>
<tr>
<td>Functionality</td>
<td>Autonegotiation, redundant voltage supply, ring structure, error relay for PLC support half-duplex/full duplex</td>
</tr>
<tr>
<td>Flow control</td>
<td>Power; Link; Status; Run</td>
</tr>
<tr>
<td>Status indication</td>
<td>256 KByte per 8 ports</td>
</tr>
<tr>
<td>Buffer memory</td>
<td>4 K MAC address</td>
</tr>
<tr>
<td>Address memory</td>
<td>CE, UL508, c-UL</td>
</tr>
<tr>
<td>Approvals</td>
<td>300 s</td>
</tr>
<tr>
<td>Aging</td>
<td></td>
</tr>
</tbody>
</table>

---

### Ordering data

<table>
<thead>
<tr>
<th>Ports</th>
<th>8x M12</th>
<th>Type</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>IE-SW8-M-IP67</td>
<td>8877200000</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SAI-SK-M12-UNI</td>
<td>2330260000</td>
<td></td>
</tr>
<tr>
<td></td>
<td>IE-C-RS232-M12</td>
<td>8874290000</td>
<td></td>
</tr>
</tbody>
</table>

### Accessories

- M12 protective cap
- Communication cable

---

**Note**
### Bluetooth Gateway

**SAI Active Bluetooth Gateway**

#### Ordering data

<table>
<thead>
<tr>
<th>Type of plug-on fitting</th>
<th>Qty.</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 digital inputs</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Technical data of bus system

<table>
<thead>
<tr>
<th>Bus sharing unit</th>
<th>Slave</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transmission rate</td>
<td>Max. 12 Mbps</td>
</tr>
<tr>
<td>Diagnostic display</td>
<td>red</td>
</tr>
<tr>
<td>Fieldbus interface</td>
<td>RS 485</td>
</tr>
<tr>
<td>Potential isolation</td>
<td>Yes</td>
</tr>
<tr>
<td>Station address</td>
<td>Rotary switch 1-125</td>
</tr>
<tr>
<td>Baud rate</td>
<td>automatic</td>
</tr>
</tbody>
</table>

#### Technical data

**General data**
- Insulation material for housing: PBT
- UL 94 flammability rating: V-0
- Operating temperature: 0 °C ... 55 °C
- Storage temperature: -25 °C ... 70 °C
- Protection class: IP 67

**Electrical data**
- Operating voltage: 24.0 V DC (18…30 V)
- Digital outputs: TYPE 1 to EN 61131-2

#### Accessories

<table>
<thead>
<tr>
<th>Male plug</th>
<th>Type</th>
<th>Qty.</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metal plug PROFIBUS-DP, plug M12, B-coded, straight</td>
<td>SAIM 5/8S M12 6P B-COD</td>
<td>1</td>
<td>1784790000</td>
</tr>
<tr>
<td>Metal plug PROFIBUS-DP, socket M12, B-coded, straight</td>
<td>SAIBM 5/8S M12 6P B-COD</td>
<td>1</td>
<td>1784780000</td>
</tr>
<tr>
<td>Terminating plug H9 in M12 plug</td>
<td>SAIEND PB M12 6P B-COD</td>
<td>1</td>
<td>1784770000</td>
</tr>
</tbody>
</table>

| Marker, transparent | ESG 8/13.5/43.3 SAI AU | 5 | 1912130000 |
| M12 protective cap | SAI-SK-M12-UNI | 20 | 8330260000 |
### Ordering data

<table>
<thead>
<tr>
<th>Type of plug-on fitting</th>
<th>Type</th>
<th>Qty.</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>16 digital inputs</td>
<td>SAI-AU M12 BT 16DI</td>
<td>1</td>
<td>1006940000</td>
</tr>
<tr>
<td>16 digital inputs / 8 digital outputs</td>
<td>SAI-AU M12 BT 16DI/8DO</td>
<td>1</td>
<td>1006930000</td>
</tr>
<tr>
<td>4 inputs analogue and digital / 2 outputs analogue und digital</td>
<td>SAI-AU M12 BT4AI2AO2DIO</td>
<td>1</td>
<td>1006920000</td>
</tr>
</tbody>
</table>

### Technical data

#### General data
- **Insulation material for housing**: PBT
- **UL 94 flammability rating**: V-0
- **Operating temperature**: 0 °C ... 55 °C
- **Storage temperature**: -25 °C ... 70 °C
- **Protection class**: IP 67

#### Electrical data
- **Operating voltage**: 24.0 V DC (18…30 V)
- **Max. current-carrying capacity per output signal**: 0.5 A / 2.0 A
- **Output levels**: Short-circuit-protected
- **Total current, max.**: 8 A
- **Digital inputs**: TYPE 1 to EN 61131-2
- **Analogue outputs**: -10...+10 V0...+10 V0...20 mA / 4...20 mA
- **Analogue inputs**: -10...+10 V0...+10 V0...20 mA / 4...20 mA
- **Resolution**: 12-bit
- **Accuracy**: < 0.2 %

### Accessories

<table>
<thead>
<tr>
<th>Male plug</th>
<th>Type</th>
<th>Qty.</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marker, transparent</td>
<td>ESG 8/13.5/43.3 SAI AU</td>
<td>5</td>
<td>1912130000</td>
</tr>
<tr>
<td>M12 protective cap</td>
<td>SAI-SK-M12-UNI</td>
<td>20</td>
<td>8330260000</td>
</tr>
</tbody>
</table>
The AS-Interface is defined in the standards EN 50295 and IEC 62026-2. The ASI bus was developed to satisfy the need for a system that guarantees low-cost data transmission. To achieve this, a number of decisions were made. The system is specialised for the transmission of digital signals, for example. In addition, use of the otherwise usual shielded cables was abandoned and a simple unshielded, but coded twisted pair system was chosen. The necessary data security was achieved through transmission in Manchester code.

A separate power supply is not required for input modules since these are powered via the data cable. Since the original definition did not satisfy requirements, the system was further developed to enable transmission of analogue data in addition, and the number of stations was increased. ASI has since become established in various sectors. The important limiting factors are:

- The number of stations may not exceed 62.
- The necessary speed may not be less than 5 ms for 31 slaves or 10 ms for 62 slaves.

Weidmüller offers its SAI AS-Interface Modular distributors in M12 and IDC in Versions 2.0 and 2.1. The most noteworthy advantages are pluggable electronics, infrared addressing and the high IP68 (M12) ingress protection class. The M12 threaded metal ring remains a special feature, since it offers greater solidity and reliability.

### Pluggable electronics

The connection element is mechanically separate from the electronics. This makes it possible to install the entire sensor-actuator cabling before the electronics are plugged in, making it easy to replace the electronics without having to undo the wiring.

### Infrared addressing

The unreliability suffered with the earlier system of addressing via M12 is eliminated. Loose contacts are a thing of the past, as are leaks at the addressing socket.

### IP68 ingress protection class with special marking

The approval tests at Weidmüller are checked for ageing. AS Interface hood-type distributors are first checked for leaks after 168 hours of ageing. This is done by measuring resistance under water. This test procedure guarantees extremely resistant distributors.

### Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transmission rate</td>
<td>167 kbaud</td>
</tr>
<tr>
<td>Max. segment length</td>
<td>100 m</td>
</tr>
<tr>
<td>Cycle times</td>
<td>5 ms (31 slaves), 10 ms (62 slaves)</td>
</tr>
<tr>
<td>Number of stations</td>
<td>31 for standard slaves, 62 for A/B slaves</td>
</tr>
</tbody>
</table>
### AS-Interface Modular

**Ordering data**

<table>
<thead>
<tr>
<th>Plug-on type</th>
<th>Qty.</th>
<th>Type</th>
<th>Qty.</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 inputs</td>
<td>1</td>
<td>SAI-ASI-S H.4E</td>
<td>1</td>
<td>7902090000</td>
</tr>
<tr>
<td>4 outputs</td>
<td></td>
<td>SAI-ASI-S H.4A</td>
<td>1</td>
<td>1799270000</td>
</tr>
<tr>
<td>2 inputs / 2 outputs</td>
<td></td>
<td>SAI-ASI-S H.2E/2A</td>
<td>1</td>
<td>1799280000</td>
</tr>
<tr>
<td>4 inputs / 4 outputs</td>
<td></td>
<td>SAI-ASI-S H.4E/4A</td>
<td>1</td>
<td>7902100000</td>
</tr>
</tbody>
</table>

**Technical data of bus system**

<table>
<thead>
<tr>
<th>Bus sharing unit</th>
<th>Slave</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of stations</td>
<td>31/62</td>
</tr>
<tr>
<td>Transmission rate</td>
<td>167 kbits</td>
</tr>
<tr>
<td>Diagnostic display</td>
<td>red</td>
</tr>
<tr>
<td>Station address</td>
<td>Infrared</td>
</tr>
<tr>
<td>AS-interface specification</td>
<td>V2.1</td>
</tr>
</tbody>
</table>

**Technical data**

<table>
<thead>
<tr>
<th>General data</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Insulation material of housing</td>
<td>PBT</td>
</tr>
<tr>
<td>Flammability class UL 94</td>
<td>V-0</td>
</tr>
<tr>
<td>Operation temperature</td>
<td>-20 °C ... 70 °C</td>
</tr>
<tr>
<td>Storage temperature</td>
<td>-40 °C ... 85 °C</td>
</tr>
<tr>
<td>Ingress protection class</td>
<td>IP 68</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Electrical data</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating voltage</td>
<td>26.5 ... 31.6 V</td>
</tr>
<tr>
<td>Max. current carrying capacity per output signal</td>
<td>2 A</td>
</tr>
<tr>
<td>Digital inputs</td>
<td>TYPE 1 to EN 61131-2</td>
</tr>
<tr>
<td>E/A function indicator</td>
<td>LED yellow</td>
</tr>
<tr>
<td>Sensor voltage indicator</td>
<td>LED green</td>
</tr>
</tbody>
</table>

**Accessories**

<table>
<thead>
<tr>
<th>Base parts for 4 I/O channel modules</th>
<th>Type</th>
<th>Qty.</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>With 4 No. M12 connections</td>
<td>SAI-ASI 4E W BOTTOM</td>
<td>1</td>
<td>1762470000</td>
</tr>
<tr>
<td>With 4 insulation displacement connections</td>
<td>SAI-ASI 4 IDC BOTTOM</td>
<td>1</td>
<td>1917370000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Base parts for 8 I/O channel modules</th>
<th>Type</th>
<th>Qty.</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>With 8 No. M12 connections</td>
<td>SAI-ASI 4E/4A W BOTTOM</td>
<td>1</td>
<td>1762290000</td>
</tr>
<tr>
<td>With 8 insulation displacement connections</td>
<td>SAI-ASI 8 IDC BOTTOM</td>
<td>1</td>
<td>1917360000</td>
</tr>
</tbody>
</table>
The new space-saving SAI AS-Interface family makes new applications possible. The narrow 24 mm form of the modules means that they can fit into a very small installation space. The length is also remarkable, since the M8 module with 4 connections is only 123 mm long.

The ribbon cable locks into the base part, while the coded cable rules out the possibility of misconnection. The piercing connectors make the module easy to connect with the help of a screwdriver. Pure input modules only require the yellow ribbon cable. The additional voltage for the outputs is fed to the module via the black cable.

The implementation of the new AS-Interface specification 3.0 means that modules with 8 inputs on one address with 62 slaves are possible in one network. Also modules with 4 inputs and 4 outputs with 62 slaves are now available. These modules require an M4 master.

All modules are certified by the AS-Interface Association and conform to the AS-Interface specifications.

The outputs as well as the supply for sensors are protected against short circuits and overload. These faults are signalled to the master using the peripheral bit. At the same time, the AS-I and fault LEDs blink alternately red/green in accordance with the AS-Interface specification.

All outputs can be simultaneously operated at the maximum current capacity of 0.5 A.

The housing has IP67 class of protection, which guarantees resistance to water and dust. The addressing is performed via the infrared adapter with the user-friendly hand programming tool.

With the Weidmüller MultiCard markers, each I/O point can be individually marked, while a further marker is available for the complete module.

There are eight module versions, with four different I/O configurations available:

- 4 inputs
- 8 inputs
- 4 outputs
- 4 inputs and 4 outputs

Each I/O variant is available in two connection versions. The sensors or actuators can be connected with 5-pole M12 or 3-pole M8 plug-in connectors.
AS-Interface Line

Ordering data

<table>
<thead>
<tr>
<th>Plug-on type</th>
<th>Qty.</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 inputs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 outputs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 inputs / 2 outputs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 inputs / 4 outputs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 inputs</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note

Technical data of bus system

- **Bus sharing unit**: Slave
- **No. of stations**: 62
- **Transmission rate**: 167 kbits
- **Diagnostic display**: Red
- **Station address**: Infrared
- **AS-Interface specification**: V3.0

Technical data

<table>
<thead>
<tr>
<th>General data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insulation material of housing</td>
</tr>
<tr>
<td>Flammability class UL 94</td>
</tr>
<tr>
<td>Operation temperature</td>
</tr>
<tr>
<td>Storage temperature</td>
</tr>
<tr>
<td>Ingress protection class</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Electrical data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating voltage</td>
</tr>
<tr>
<td>Max. current carrying capacity per output signal</td>
</tr>
<tr>
<td>Output levels</td>
</tr>
<tr>
<td>Total current, max.</td>
</tr>
<tr>
<td>Digital inputs</td>
</tr>
<tr>
<td>I/O function indicator</td>
</tr>
<tr>
<td>Sensor voltage indicator</td>
</tr>
</tbody>
</table>

Note

Accessories

- **Base parts for 4 I/O channel modules**
- **Base parts for 8 I/O channel modules**
AS-Interface Line

AS-Interface programming accessories

AS-Interface infrared programming adapter

AS-Interface IR adapter for addressing AS-Interface modules with infrared interface.

- Usable with handheld address programmer (order no. 1805410000).
- Converts TTL signals of the handheld addressing unit into optical signals for the AS-Interface modules and vice versa.
- Connection to addressing unit by M12 plug-in connector and infrared head to AS-Interface modules.
- Cable length 1 m

Handheld AS-Interface address programmer

Function

- Addressing or programming of up to 62 slaves. Display of all slaves present on the bus, reading and writing of slave addresses and slave parameters. Switches between and displays the various operating modes by means of a MODE button. Display of the "peripheral fault flag" (Version 2.1). Addressing of slaves via optical data interface (Version 2.1) with special IR adapters.

Power supply

- Built-in rechargeable battery. Charging time approx. 12 hours. Operating time with fully charged battery: 8 hours, corresponding to around 250 read/write operations. 230 V AC charger included. IP20 class of protection.

Ordering data

<table>
<thead>
<tr>
<th>Type</th>
<th>Qty</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAI-ASI IR adapter</td>
<td>1</td>
<td>1804500000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Type</th>
<th>Qty</th>
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</tr>
</thead>
<tbody>
<tr>
<td>SAI-ASI handheld</td>
<td>1</td>
<td>1805410000</td>
</tr>
</tbody>
</table>
AS-Interface power supply

**Technical data**

- **Input**
  - Input voltage: 85 – 272 V DC / 120 – 400 V AC
  - Input current: max. 0.85 Aeff
  - Back-up fuse: 30.5 V DC / 4.0 A

- **Output**
  - Output voltage: 30.5 V DC
  - Max. output current: 4.0 A

- **Fuse data**
  - Resistance to high voltages: not needed because of short-circuit resistance
  - Class of protection: IP20 (VGB4)

- **Operational and environmental data**
  - Operating temperature: –30°…+70°
  - Storage temperature: –30°…+105°
  - Relative humidity: 95 % relative humidity, average for year
  - Pollution severity: 2 acc. to VD 0110 part 1

- **General data**
  - Dimensions (B x H x T): 79 x 100 x 120 mm
  - Housing colour: black
  - Weight: 1.5 kg
  - Protection class: IP 20

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**Ordering data**

<table>
<thead>
<tr>
<th>Type</th>
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</tr>
</thead>
<tbody>
<tr>
<td>SAI-ASI PU 4A</td>
<td>1</td>
<td>1002830000</td>
</tr>
</tbody>
</table>

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**Gateway PROFIBUS-DP-AS-Interface**

**Technical data**

- **Rated operational current**
  - Master power supply A, approx. 200 mA from the AS-i-circuit
- **Rated operational voltage**
  - AS-i-voltage: 30 V DC
- **Connections**
  - 9-pole PROFIBUS Sub-D
- **Baud rates**
  - 9.6 kHz, 12.000 Kbps
- **AS-i-cycle time**
  - 150 µs (number of slaves + 2)
- **Insulation voltage**
  - > 500 V acc. to EN 50082, EN 50081 / automatic detection
- **Ambient temperature**
  - 0 °C … +55 °C
- **Storage temperature**
  - –25 °C … +85 °C
- **Dimensions (L, B, H)**
  - 120 mm, 75 mm, 83 mm
- **Weight**
  - 460 g
- **Protection class**
  - 3.0

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**Ordering data**

<table>
<thead>
<tr>
<th>Type</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Gateway AS-i PBDP 3.0</td>
<td>1</td>
<td>1004040000</td>
</tr>
</tbody>
</table>

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**Indicators**

- **LCD**
- **LED green (power)**
- **LED green/red (MNS)**
- **LED red (config error)**
- **LED green (U AS-i)**
- **LED green (AS-i active)**
- **LED yellow (prj mode)**
- **Buttons**

- **AS-i slave address indicator, error messages**
- **power supply OK**
- **PROFIBUS-DP status**
- **configuration error**
- **AS-i voltage OK**
- **AS-i operation normal**
- **automatic slave programming possible**
- **configuration mode active**
- **2 (mode/set)**
## AS-Interface Line

### AS-Interface ribbon cables

#### Technical data

<table>
<thead>
<tr>
<th>Use</th>
<th>AS-Interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colour</td>
<td>yellow, black</td>
</tr>
<tr>
<td>Type of cable</td>
<td>profiled cable</td>
</tr>
<tr>
<td>Conductor cross-section</td>
<td>2 x 1.5 mm²</td>
</tr>
<tr>
<td>Material</td>
<td>EPDM (rubber)</td>
</tr>
<tr>
<td>Halogen-free</td>
<td>yes</td>
</tr>
<tr>
<td>Temperature range (at rest)</td>
<td>-40 °C ... +85 °C</td>
</tr>
<tr>
<td>Temperature range (moving)</td>
<td>-25 °C ... +85 °C</td>
</tr>
<tr>
<td>Flammability class</td>
<td>flammable</td>
</tr>
<tr>
<td>Ozone/weather resistant</td>
<td>partially resistant</td>
</tr>
<tr>
<td>Minimum bending radii</td>
<td>fixed: 12 mm movable: 24 mm</td>
</tr>
<tr>
<td>Flexural properties</td>
<td>no break after 30,000 backward and forward movements</td>
</tr>
</tbody>
</table>

#### Technical data

<table>
<thead>
<tr>
<th>Connection AS-Interface</th>
<th>ribbon cable</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. connectable cables</td>
<td>2</td>
</tr>
<tr>
<td>Type of cable</td>
<td>ribbon cable, yellow + black</td>
</tr>
<tr>
<td>Flexible lead cross-section</td>
<td>1.5 mm²</td>
</tr>
<tr>
<td>Connection type</td>
<td>piercing technology</td>
</tr>
<tr>
<td>Type of cable</td>
<td>PUR solid</td>
</tr>
<tr>
<td>Conductor cross-section</td>
<td>0.34 mm²</td>
</tr>
<tr>
<td>Cable length</td>
<td>2 m</td>
</tr>
<tr>
<td>Operating voltage</td>
<td>≤ 40 V</td>
</tr>
<tr>
<td>Operating current</td>
<td>≤ 4 A</td>
</tr>
</tbody>
</table>

#### General data

| Pollution severity DIN EN 0110 | 3 |
| Ambient temperature           | -25 °C ... +70 °C |
| Storage temperature           | -40 °C ... +85 °C |
| Housing material              | PA 6-GF-RR |
| Shock resistance              | 30 g/11 ms |
| Vibration resistance          | 10 ... 55 Hz; 1.0 mm amplitude |
| Specific data                 | IP 67 |
| Weight                        | 20 g |
| Pin assignment                | AS-Interface “+” blue, AS-Interface “-” brown |

#### Ordering data

<table>
<thead>
<tr>
<th>Type</th>
<th>Designation</th>
<th>Qty.</th>
<th>Order No.</th>
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</thead>
<tbody>
<tr>
<td>AS-KG-ge</td>
<td>Ribbon cable yellow</td>
<td>100 m</td>
<td>9455110000</td>
</tr>
<tr>
<td>AS-KG-sw</td>
<td>Ribbon cable black</td>
<td>100 m</td>
<td>9455120000</td>
</tr>
<tr>
<td>SAI-ASI T FR</td>
<td></td>
<td></td>
<td>1925010000</td>
</tr>
</tbody>
</table>

### Coupling module single from ribbon cable to round cable

#### Ordering data

<table>
<thead>
<tr>
<th>Type</th>
<th>Qty.</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAI-ASI T FR</td>
<td>1</td>
<td>1925010000</td>
</tr>
</tbody>
</table>
## Technical data

### Bridge module ribbon cable
- **Connection AS-Interface**: No. connectable cables, Type of cable, Flexible lead cross-section, Connection type, Type of cable, Conductor cross-section, Cable length, Operating voltage, Operating current
- **General data**: Pollution severity DIN EN 0110, Ambient temperature, Storage temperature, Housing material, Shock resistance, Vibration resistance
- **Specific data**: Ingress protection class DIN 40050, Weight, Pin assignment, Pin 1, Pin 2, Pin 3, Pin 4
- **Technical data**:
  - **Connection AS-Interface**: ribbon cable, No. connectable cables, Type of cable, Flexible lead cross-section, Connection type, Type of cable, Conductor cross-section, Cable length, Operating voltage, Operating current
  - **General data**: Pollution severity DIN EN 0110, Ambient temperature, Storage temperature, Housing material, Shock resistance, Vibration resistance
  - **Specific data**: Ingress protection class DIN 40050, Weight, Pin assignment, Pin 1, Pin 2, Pin 3, Pin 4
- **Ordering data**:
  - **Type**: SAI-ASI T FF
  - **Qty.**: 1
  - **Order No.**: 1924990000

### Coupling module ribbon cable
- **Connection AS-Interface**: No. connectable cables, Type of cable, Flexible lead cross-section, Connection type, Type of cable, Conductor cross-section, Cable length, Operating voltage, Operating current
- **General data**: Pollution severity DIN EN 0110, Ambient temperature, Storage temperature, Housing material, Shock resistance, Vibration resistance
- **Specific data**: Ingress protection class DIN 40050, Weight, Pin assignment, Pin 1, Pin 2, Pin 3, Pin 4
- **Technical data**:
  - **Connection AS-Interface**: ribbon cable, No. connectable cables, Type of cable, Flexible lead cross-section, Connection type, Type of cable, Conductor cross-section, Cable length, Operating voltage, Operating current
  - **General data**: Pollution severity DIN EN 0110, Ambient temperature, Storage temperature, Housing material, Shock resistance, Vibration resistance
  - **Specific data**: Ingress protection class DIN 40050, Weight, Pin assignment, Pin 1, Pin 2, Pin 3, Pin 4
- **Ordering data**:
  - **Type**: SAI-ASI T FF R
  - **Qty.**: 1
  - **Order No.**: 1924980000

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**SAI Active**

**C.43**

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**Weidmüller**
The SAI-E distributor processes the signals in the proximity of the sensors. The current range includes products for the logic functions AND, OR, NAND and NOR; other functions are in preparation. Four inputs have a logical link with one output.

These versions are available with a plastic hood and M12 plug-in connector in “plug & play” format, or with a metal hood and cable gland for customer assembly. The logic distributor with the plastic hood can be connected to the PCB either directly or by means of a pre-assembled M12 cable.

There are many advantages to processing signals locally: Users no longer need a lead with many poles, and also save both time and materials. Savings are also possible in the PLC, i.e. at the input cards because now only one input is used instead of four.

The advantages:
- Savings in costs
- Savings in material: – cables with fewer wires
  – fewer input ports needed at the PLC
  – fewer cables to be connected
  – fewer faults
- Hoods can be simply mounted on a standard base module

If an input is not being used, a simulation connector can be used to set an input to the active state.