WAGO SPEEDWAY 767

Modular IP67 I/O System

WAGO®
INNOVATIVE CONNECTIONS

RUN ERR CS
RX TX
COM
WAGE
krono
WERRLING

Where previously discrete wiring was once required, fieldbuses now provide communication between control unit, system and machine. Depending on equipment type, cabinet-free automation systems help minimize costs for planning, start-up, and servicing. To continue leading the way, WAGO has accelerated its modular *SPEEDWAY 767* I/O-SYSTEM, boosting the performance of IP67-rated components.

WAGO = SPEEDWAY 767

Modular IP67 I/O System

In addition to requiring a high degree of protection, a robust deisgn and standardized connection technology, there is an increasing demand for highly functional IP67 features that were once only reserved for IP20 systems, such as:

- High-Speed Data Exchange
- Programmable
- Parameterizable
- Diagnostic capable
- Updatable

Typically, machines and systems must be tailored to suit individual requirements while meeting tight customer deadlines. Customer requirements can be incorporated easily and rapidly and then the system can be designed and installed. This makes modular IP67 systems ideal, as they are easily scalable and expandable. These systems allow machines to be first mounted in the factory, tested and then accepted by the customers. Then, they are dismantled, re-installed on customer's site and put into operation.

WAGO *SPEEDWAY 767*
offers all of these features.

System Features

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- Application-oriented signal acquisition/output

High-Performance Data Transfer Page 8
- Fast data exchange

Programmable via CoDeSys 3 Page 9
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Excellent Protection **Page 18**
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- User-friendly modules design

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- ETHERNET system incl. accessories

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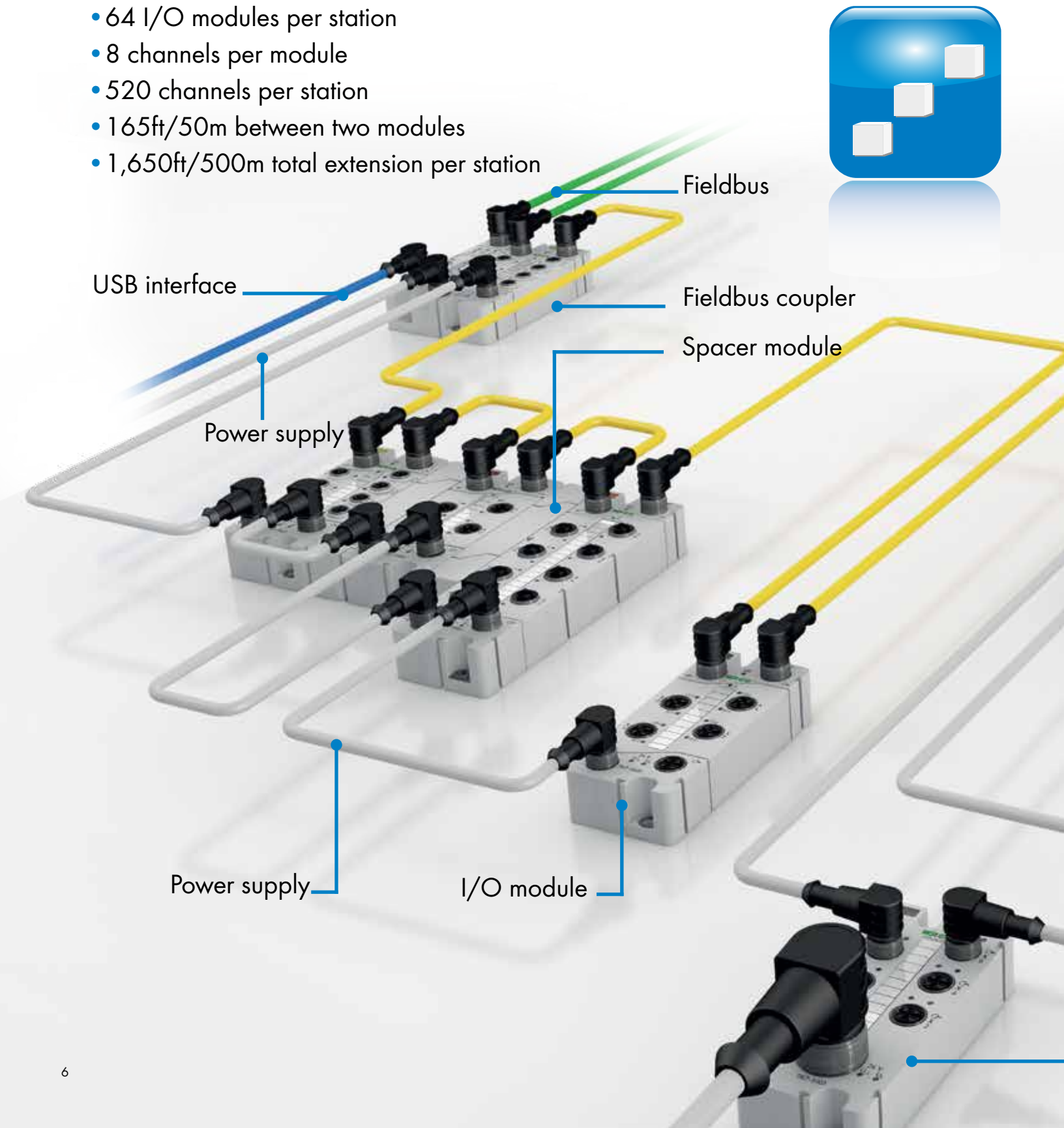
- *SPEEDWAY* components

Modular Design

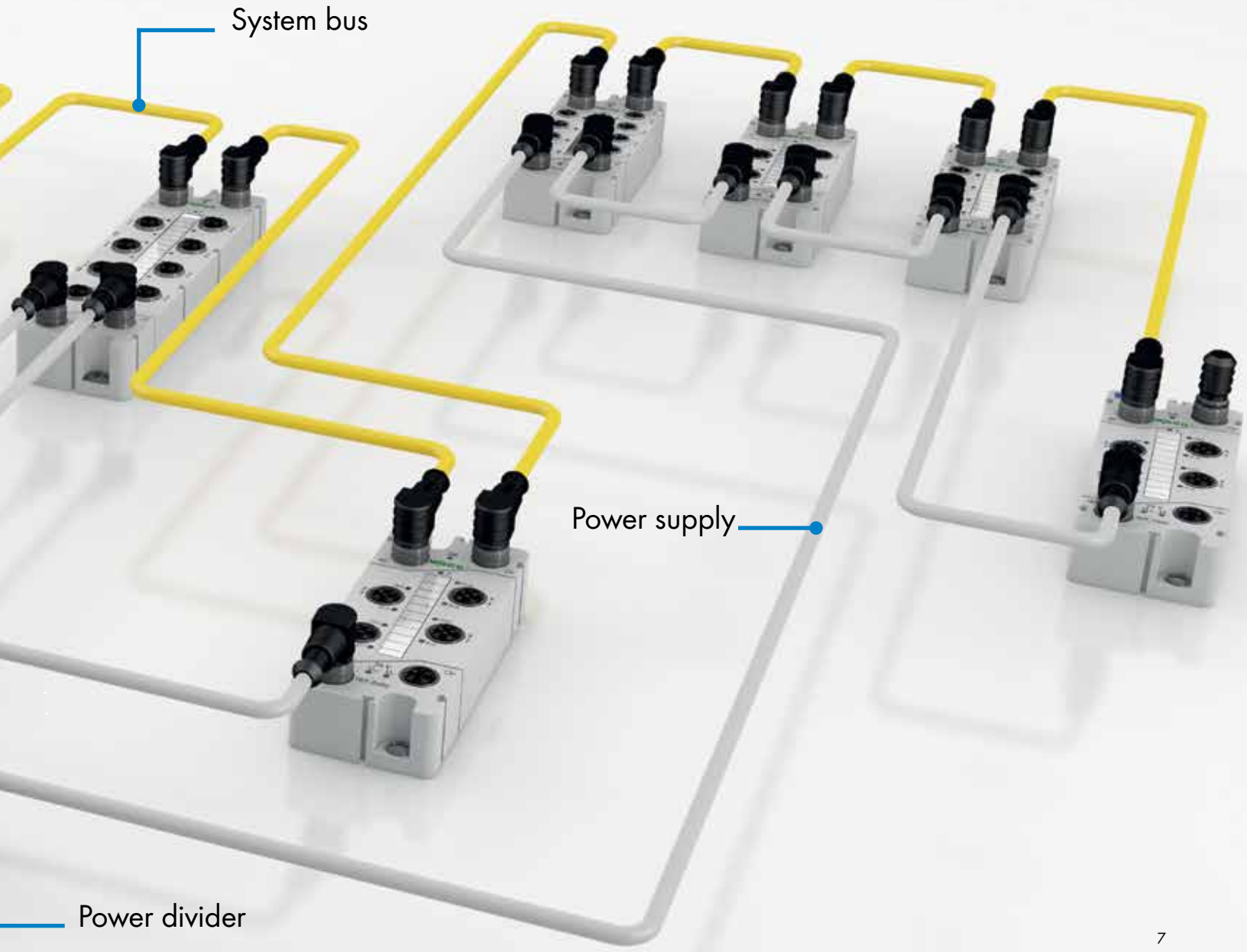
Application-Oriented Signal Acquisition/Output

Up to:

- 64 I/O modules per station
- 8 channels per module
- 520 channels per station
- 165ft/50m between two modules
- 1,650ft/500m total extension per station



WAGO *SPEEDWAY 767* is a modular IP67 I/O system. *SPEEDWAY* connects to a fieldbus and on to higher-level control systems via a (programmable) fieldbus coupler. The fieldbus coupler features digital inputs. An integrated system bus interface allows connection to other I/O modules (e.g., analog, digital). This permits signals to be received and transmitted directly in the field. When used in areas of high signal concentration, the modules can be installed in an extremely compact manner. The I/O modules are connected to each other via data line (system bus) and supply line, allowing multiple power supplies to be used (e.g., when higher power demand is required or greater distances must be bridged). Depending on the fieldbus type, configuration, programming, servicing and diagnostics can be performed via integrated USB port and fieldbus interface.



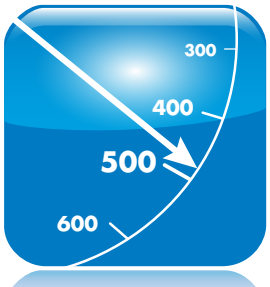
High-Performance Data Transfer

Fast Data Exchange

- Up to 512 digital signals, approx. 700µs
- Up to 256 digital signals + 64 analog signals, approx. 700µs
- Up to 32 digital signals + 8 analog signals, approx. 400µs

Increasing degrees of system automation and the trend toward fast ETHERNET-based controllers or fieldbus protocols call for a high communication bandwidth. Large data volumes are forwarded in short cycles for signal acquisition and transmission within the I/O system.

WAGO *SPEEDWAY 767* is designed for this purpose, also offering high synchrony, low jitter/skew and low latency for optimal control of dynamic system processes.

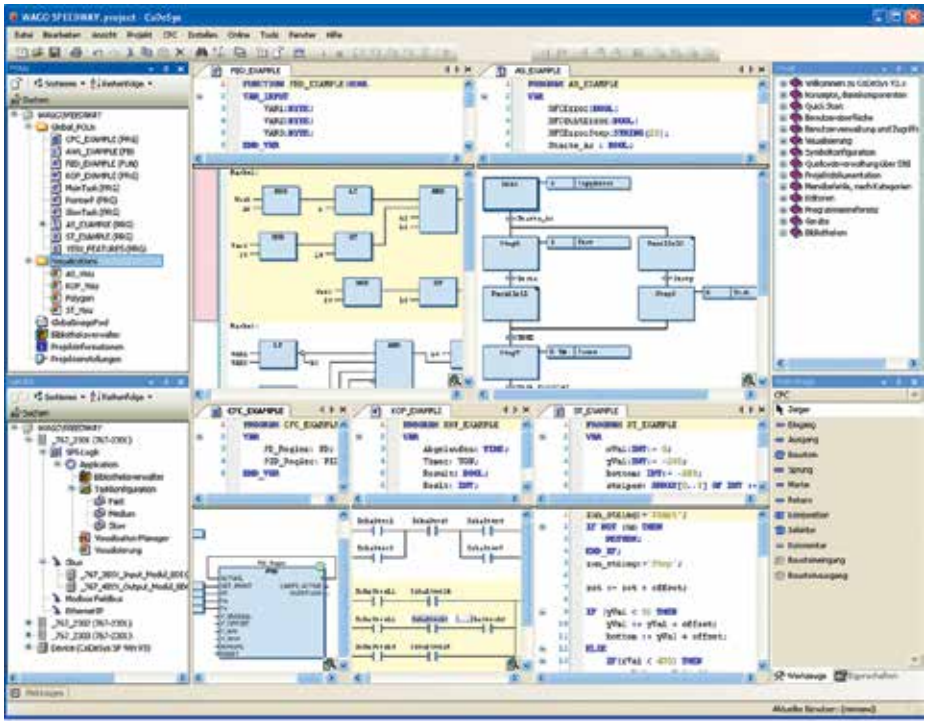


Programmable via CoDeSys 3

Integrated Signal Preprocessing

- Object-oriented programming to IEC 61131-3
- One application easily manages different control systems
- Direct cross-communication between control systems

CoDeSys



Automation configurations are continuously decentralized and modularized. The WAGO *SPEEDWAY 767* PLCs (programmable to IEC 61131-3) were engineered to these standards. These programmable units optimize the system's dynamic response. By preprocessing signals on site, the signal volume for the higher-level controller is minimized. This enables devices to maintain autonomous operation, as well as independent start-up and operation. Moreover, decentralized intelligence can ensure that device downtime does not lead to a loss of the entire process – system availability is retained.

Wide Variety of Parameterization Options

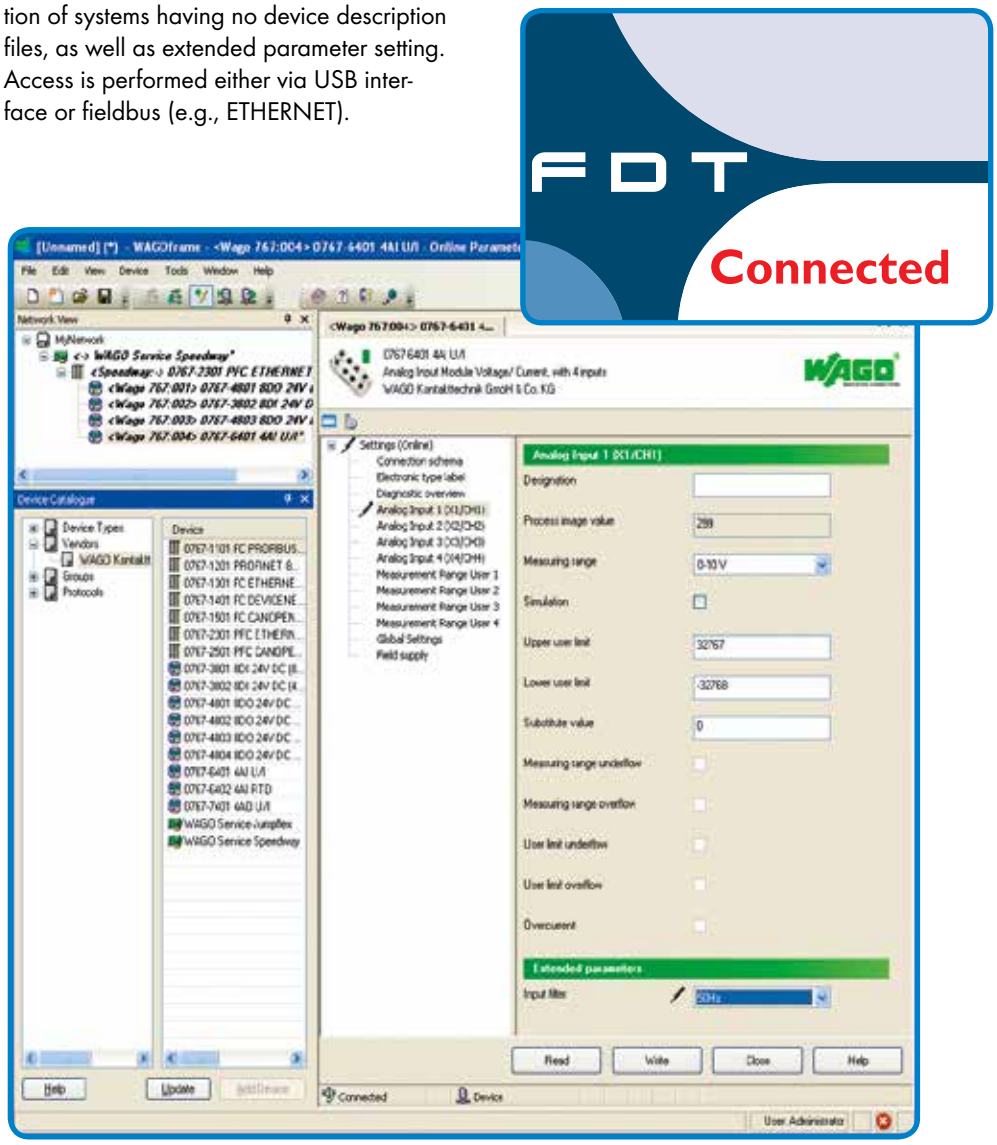
Fieldbus Dependent/Independent

- Extraordinarily high degree of module parameterization
- Fieldbus-independent parameterization via GSD, GSDML and EDS files
- Fieldbus-independent, advanced parameterization via FDT/DTM technology
- Online diagnostics and simulation

All *SPEEDWAY* components can be extensively parameterized. This allows the user to cover a wide range of functions with only a few base modules, as well as flexible system adaptations. Except for only a few modules, parameter setting is performed channel-by-channel. This greatly reduces the number of modules and versions required, minimizing supply and inventory costs.

Depending on the fieldbus used, parameter setting is performed via device description files (e.g., GSD, GSDML, EDS). DTM device drivers based on FDT technology are also provided. These files can be loaded via FDT frame application and allow parameterization of systems having no device description files, as well as extended parameter setting. Access is performed either via USB interface or fieldbus (e.g., ETHERNET).

Examples:
Digital Input Module: filter, inversion, simulation, diagnostics
Digital Output Module: inversion, substitute value strategy, manual mode, simulation, diagnostics
Digital Input/Output Module: operating mode, filter, inversion, substitute value strategy, manual mode, simulation, diagnostics
Analog Input Module U/I: voltage/current measuring range, threshold values, filter, simulation, diagnostics
Analog Input Module RTD: RTD measuring range, connection type, threshold values, integration time, linearization, simulation, diagnostics
Analog Input Module TC: Thermocouple measuring range, threshold values, integration time, linearization, simulation, diagnostics
Analog Output Module U/I: voltage/current measuring range, substitute value strategy, manual mode, simulation, diagnostics



Easy to Service

Updatable, Parameter-Saving and Flexible

- Updatable
- System parameter handling
- "Options handling" for PROFIBUS

Updatable
Acquisition and operating costs of a system are steadily increasing. This is why your return on investment is now more important than ever. The *SPEEDWAY 767* System is updatable, providing a valuable contribution to cost optimization.

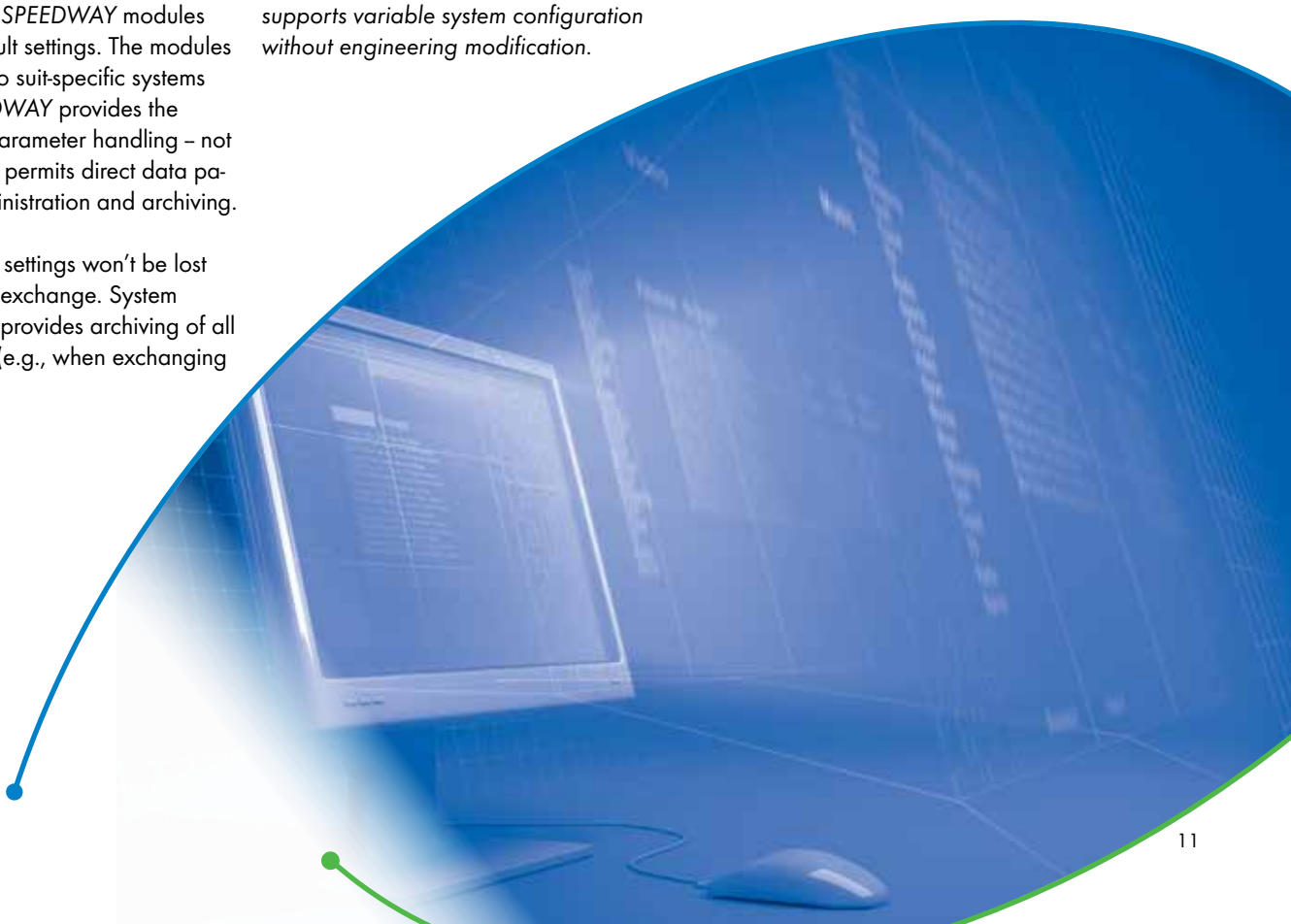
Both coupler and I/O module firmware can be easily updated. This allows quick access to new functionalities, while errors can be fixed without replacing components.

System parameter handling
All parameterizable *SPEEDWAY* modules feature factory default settings. The modules can be customized to suit-specific systems requirements. *SPEEDWAY* provides the freedom of system parameter handling – not every control system permits direct data parameterization, administration and archiving.

This way, parameter settings won't be lost in case of a module exchange. System parameter handling provides archiving of all settings and checks (e.g., when exchanging an I/O module) if the right replacement module is used. In the event of a failure, parameter data can be restored quickly and reliably. Optionally, current hardware, software and firmware versions can be checked.

"Options handling"
Operation-related, variable I/O station configurations of a system (e.g., tool replacement in processing center) can often only be customized with extensive engineering before a changed production process can start. *With PROFIBUS, SPEEDWAY 767 supports variable system configuration without engineering modification.*

Supporting this, the higher-level control system defines various expansion stages within a maximum engineering configuration. This allows the control system to identify a *SPEEDWAY* station modification (number and type of modules) and run a sub-program without engineering modification.



Fieldbus Independence

Meeting Specific Market/System Requirements

In order to fulfill specific market and system requirements, *SPEEDWAY 767* supports the fieldbuses shown. For addressing hardware and setting model-specific operation modes, the fieldbus coupler features a display panel. A protective cover safeguards contents from environmental influences and unintended contact.

An USB interface (COM) provides direct system access for programming, parameter-setting and servicing.

- LED and software supported
- Module-by-module and channel-by-channel
- Parameterizable

Asynchronous and Synchronous Diagnostics

Fast and Precise Error Analysis

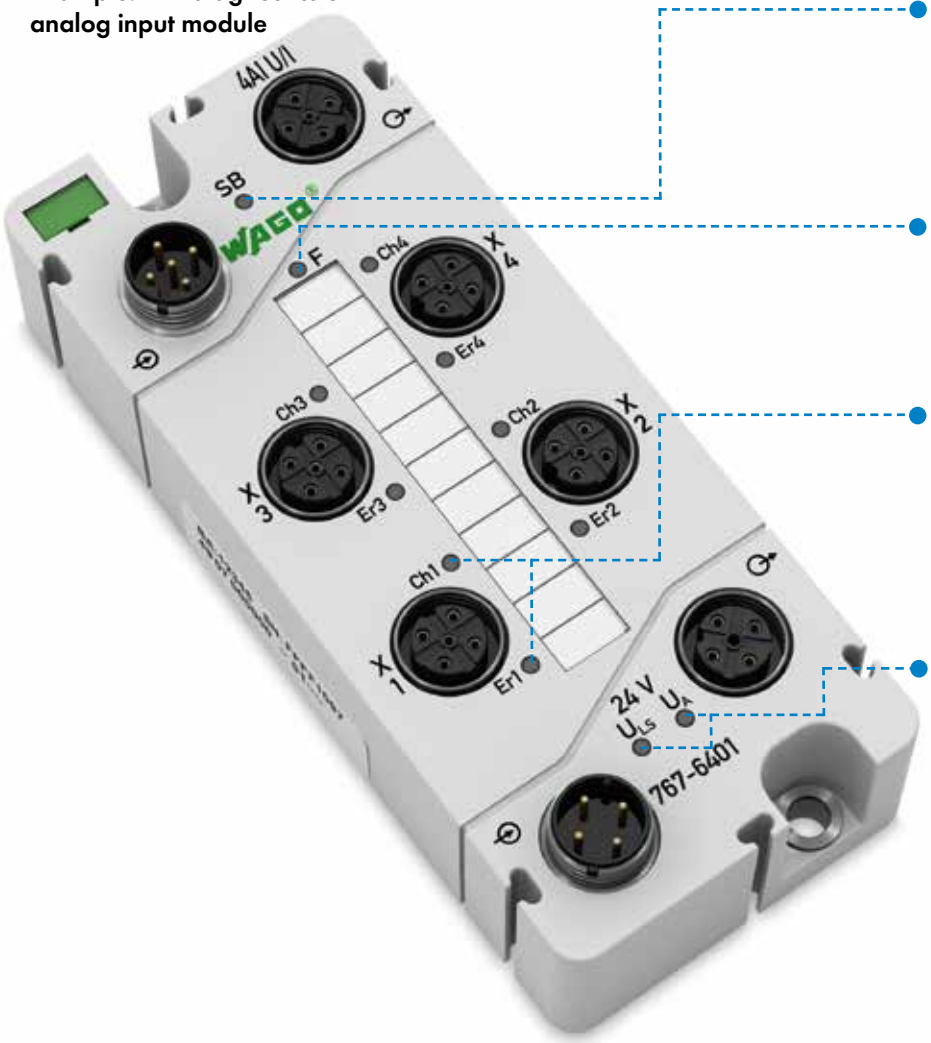
One of the greatest challenges for manufacturers of automation devices is making and keeping the engineering manageable. This is especially important for trouble-shooting.

For the IP67 systems, the diagnostic capability is especially significant due to the widespread distribution of a system. Thus, all WAGO *SPEEDWAY 767* devices deliver diagnostic data.

A distinction should always be made between module- and channel-specific error messages. The quantity and type of diagnostic information is increasingly being determined by intelligent modules – this facilitates in-depth error analysis. However, this also inevitably leads to an increase in diagnostic data.

The transfer of this data must occur with virtually no delay and without influencing the cycle time. Asynchronous and synchronous transfer mechanisms are therefore supported to meet these challenges, minimizing downtime.

Example: LED diagnostics of analog input module



SB LED:
Module status indication during communication (e.g., operation state, error)

F LED:
Indication of channel-wide errors (e.g., short circuit of sensor supply)

Ch/Er LED:
Channel-related status indication (e.g., operation state) and error (e.g., measuring range underflow or overflow, overload)

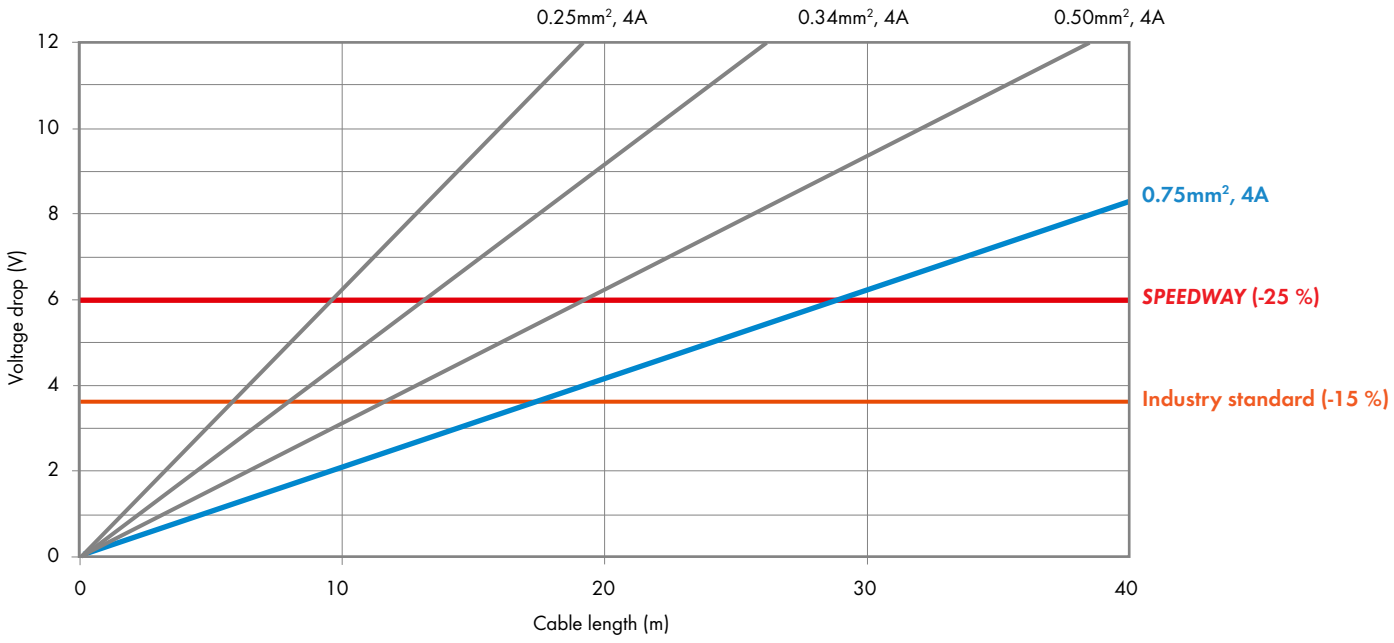
Power LED:
Logic, sensor and actuator supply indication

Efficient Power Supply Solution

Convenient Module Supply

- M12 supply connections
- 18 AWG/0.75mm² cable cross-section
- -25%...+30% voltage fluctuation range
- Individual and group power supply
- Separate actuator supply up to 8A
- Electrically isolated power supplies

Power loss diagram



Select *SPEEDWAY 767* Modules are equipped with M12 connections for supplying energy to modules over great distances. Compared with M8 connections, they offer a connection cross-section of 18 AWG/0.75mm² instead of 22 AWG /0.34mm². The related lower line resistance causes a lower voltage drop on the line. In connection with the larger voltage fluctuation range integrated in the modules, greater distances can be bridged between power supply unit and *SPEEDWAY 767*.

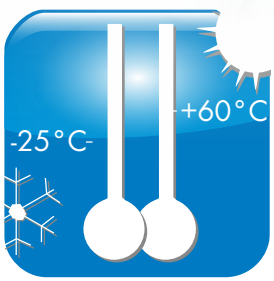
An M12 connection contains two lines (logic and sensor supply, as well as actuator supply).

A second supply connection allows for supply groups, or an additional supply for higher power requirements when using 2A output modules. Electrical separations in the modules' power supplies guarantee smooth operation of the system in the event of an error (e.g., short circuit of the actuators).

Inspection and diagnosis of the supply is performed along the entire cable run.

Temperature Range of -25 °C to +60 °C

Ideal for Extreme Environments



Even in sub-zero temperatures, WAGO *SPEEDWAY 767* will perform reliably. Despite the temperature, additional signal jumpering via passive distributors and sensor/actuator boxes in connection with active IP20 I/O systems is unnecessary. Harsh environmental conditions can be met and additional applications realized. This reduces costs associated with additional materials, assembly and operation.

+60

+60°

-25 °C

-25 °C

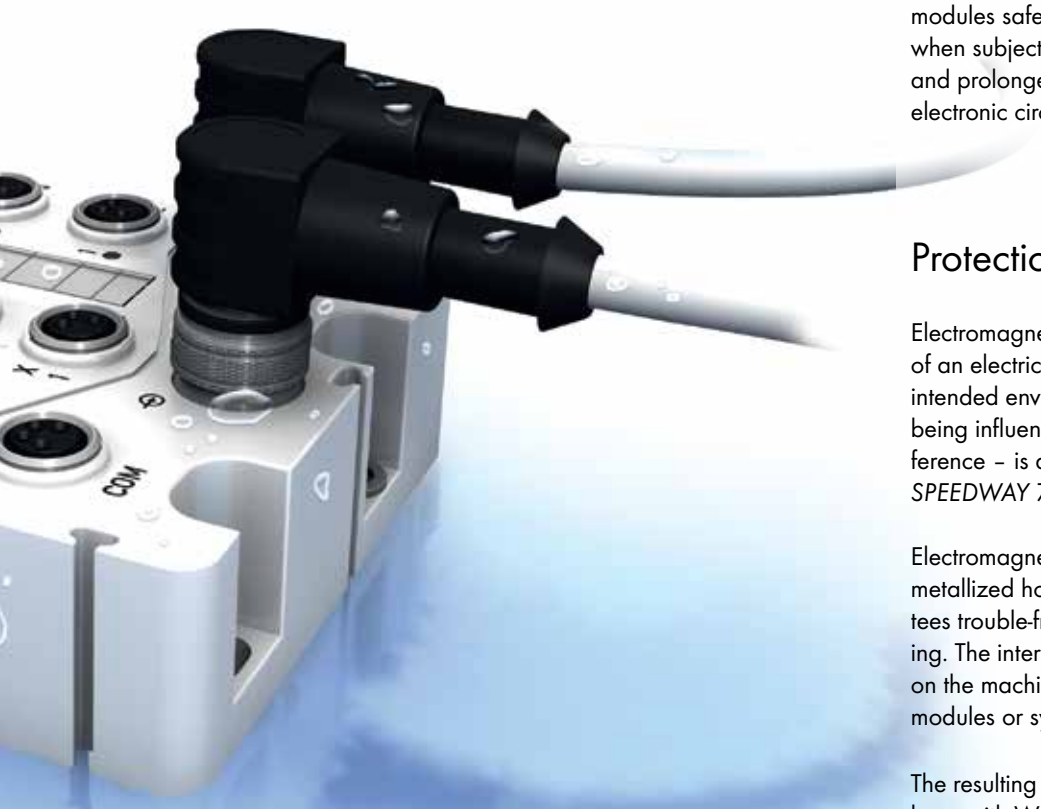
-25 °C

+60 °C

Excellent Protection

EMC, Water and Dust Protection

- IP67 degree of protection, fully encapsulated
- Inner-metallized housings
- Integrated shield plates



Uncompromising protection, even in the harshest environments

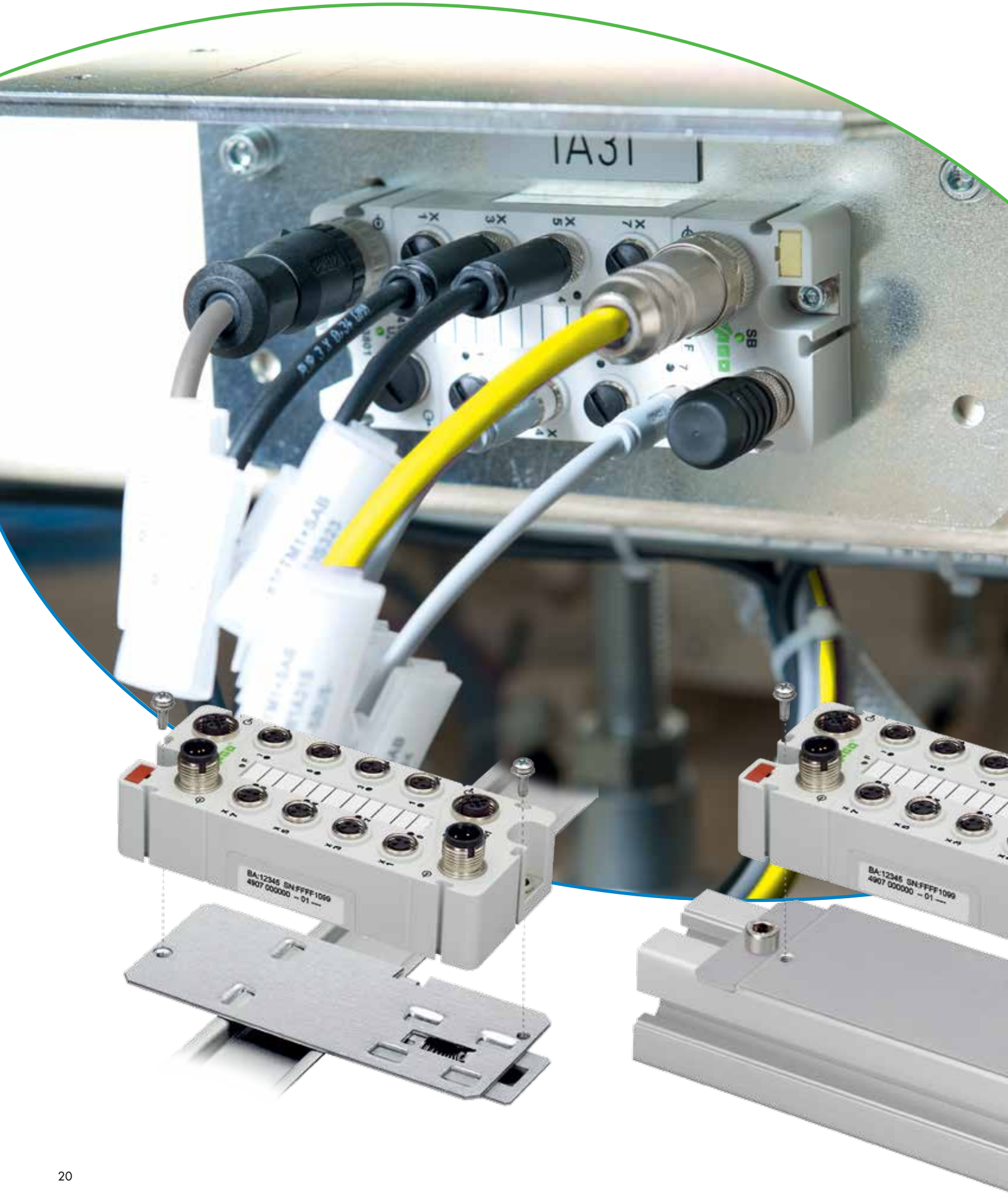
All modules offer IP67-grade protection and robust construction. Fully encapsulated modules safeguard system operation, even when subjected to temperature extremes and prolonged periods of vibration. The electronic circuit is thus protected long-term.

Protection both inside and outside

Electromagnetic compatibility – the ability of an electrical component to operate in its intended environment without causing or being influenced by electromagnetic interference – is a central feature of the WAGO *SPEEDWAY 767* system.

Electromagnetic shielding made of both metallized housing and shield plate guarantees trouble-free operation within the housing. The interferences are deflected directly on the machine via the mounting rail of the modules or system.

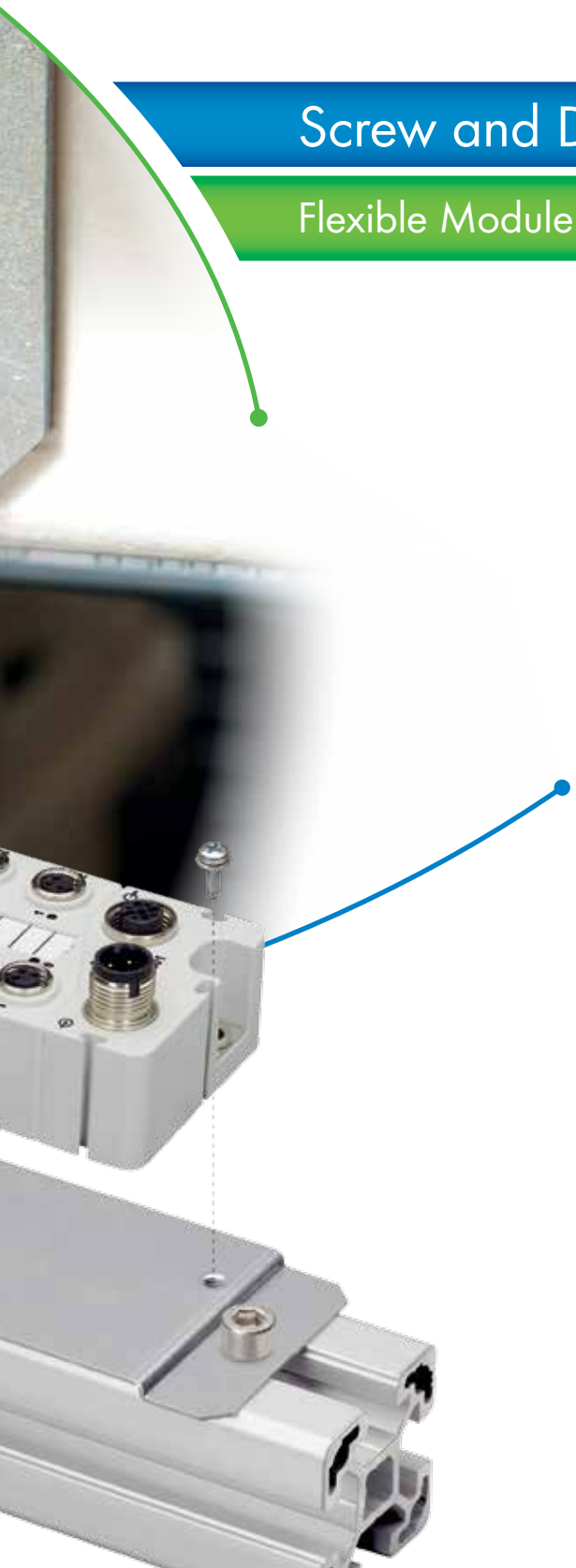
The resulting *SPEEDWAY 767* Modules keep with WAGO's philosophy of exceeding standard requirements.


1A31

- Carrier rail adapter
- Profile adapter
- CNOMO standard compliance

Screw and DIN-Rail Mount Options

Flexible Module Assembly



The modules can be directly screwed onto the machine. Extensive engineering ensures compliance with standardized specifications from the CNOMO guidelines. Because passive distribution boxes and sensor/actuator boxes are also accounted for, WAGO *SPEEDWAY 767* eases the transition from passive to active automation and supports the development of mixed systems through standardized assembly dimensions.
DIN and CNOMO adaptors for *SPEEDWAY* housing are available for flexible mounting options.

Ergonomic Design

User-Friendly Module Design

- Clear arrangement of connectors, LEDs and marking areas
- Exclusive use of standard M8/M12 connectors
- Detailed text and symbol identification
- Marking strips or WMB markers for customer marking
- Optimum cable layout/LED arrangement
- Clear serial number identification
- Compact design

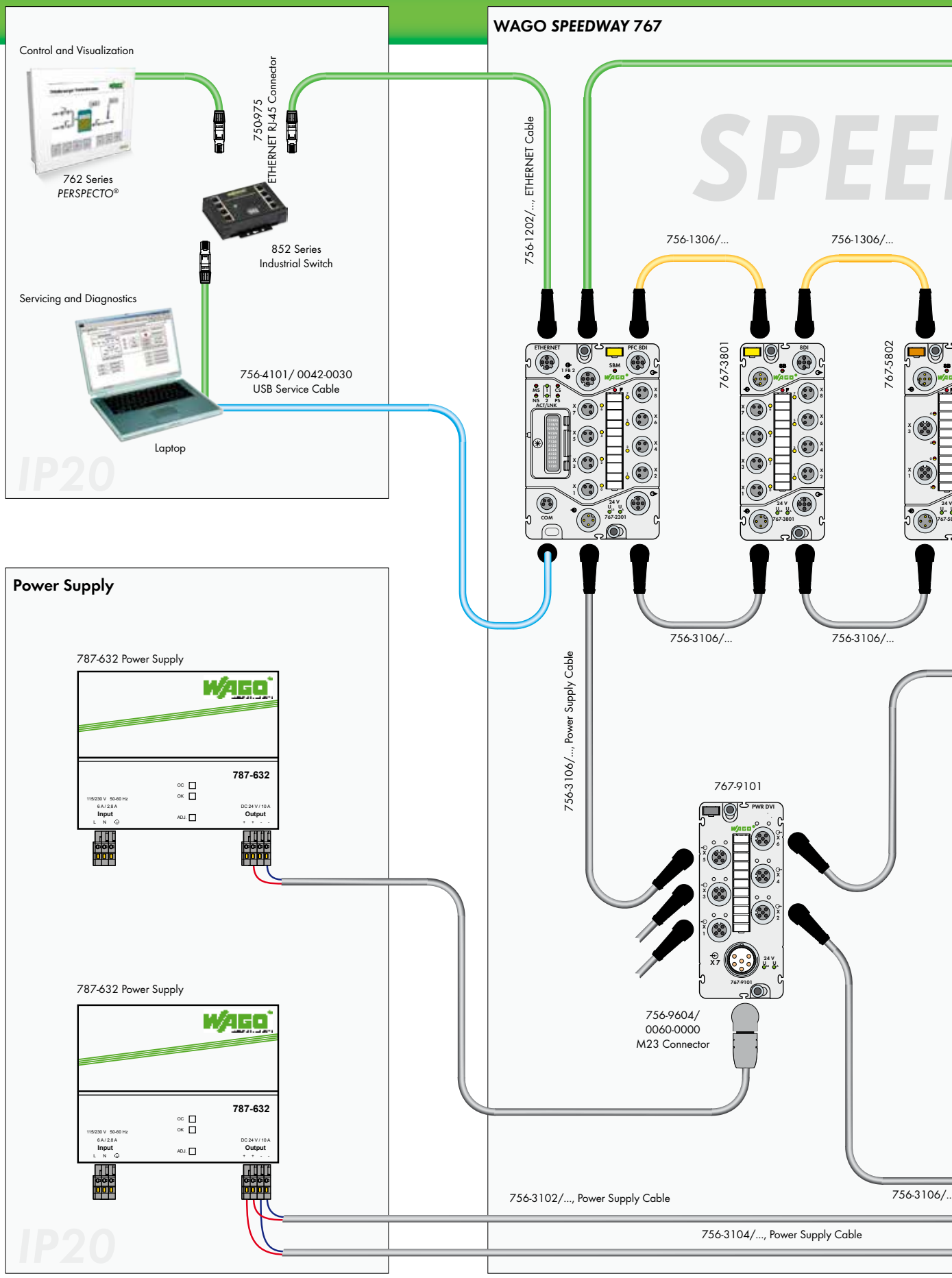
WAGO *SPEEDWAY 767* does not require specialty cables and connectors. Standardized M8 (3 poles) and M12 (4 to 5 poles) connections simplify both assembly and procurement.

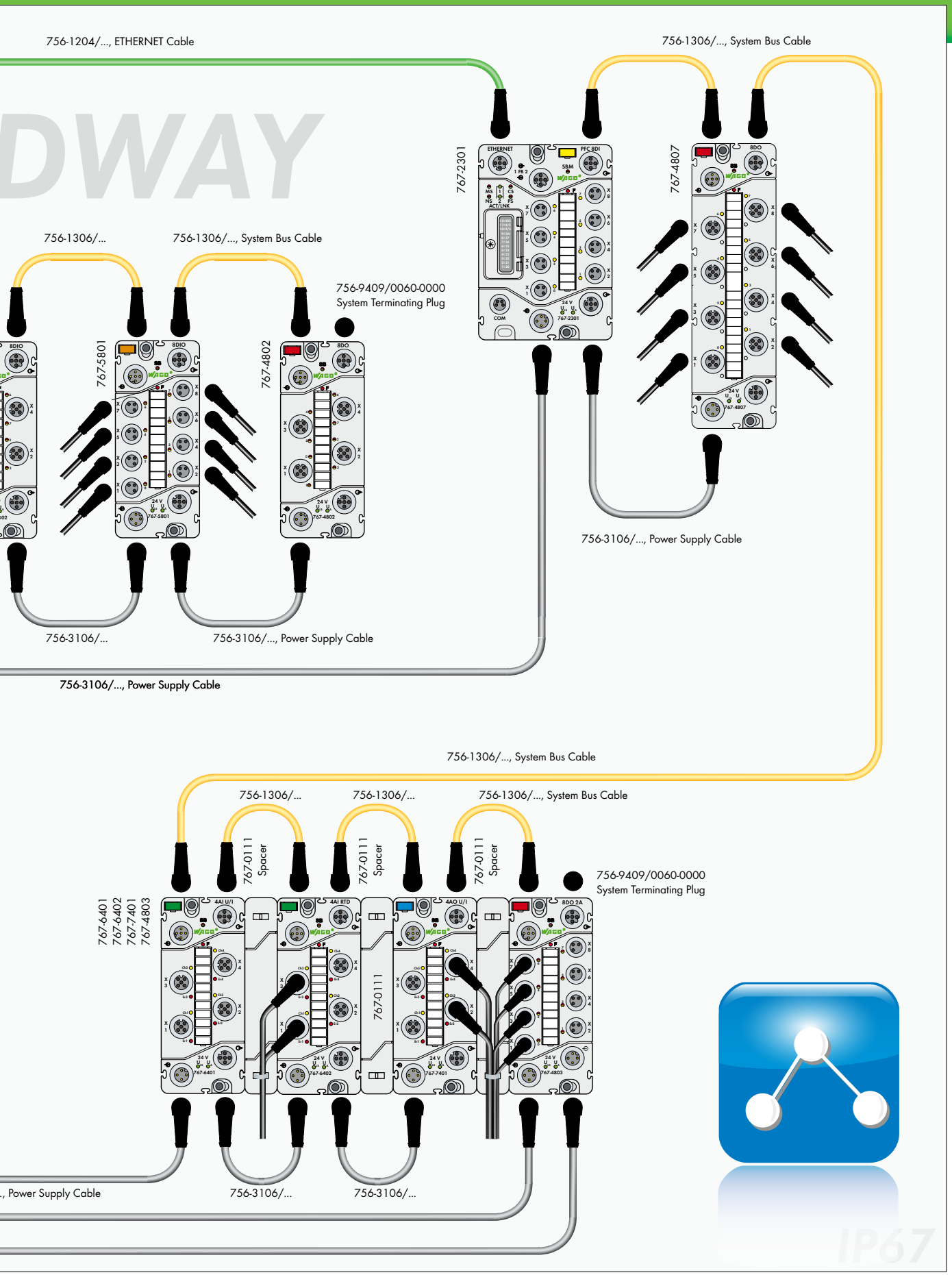
Connecting the fieldbus, system bus, power supply and sensors/actuators is performed via coded M12 connectors. This avoids errors in cable connection.

In addition, the device connections are manufactured from metal. Compared to plastic versions, this prevents liquid intrusion that could occur from metal cable connectors being inadvertently cross threaded.

Ergonomics played an important role in the development of WAGO *SPEEDWAY 767*. The result is a lightweight, compact design that can be used in the most compact areas of machines. Clearly visible printing, labeling and status LEDs provide quick access to module information.

Topology Example (ETHERNET System incl. Accessories)




756-1204/..., ETHERNET Cable
756-1306/..., System Bus Cable
767-2301
767-4807
756-1306/...
756-1306/..., System Bus Cable
756-9409/0060-0000
System Terminating Plug
767-5801
767-4802
756-3106/..., Power Supply Cable
756-3106/...
756-3106/..., Power Supply Cable
756-3106/..., Power Supply Cable
756-1306/..., System Bus Cable
756-1306/...
756-1306/...
756-1306/..., System Bus Cable
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Spacer
767-0111
Spacer
767-0111
Spacer
756-9409/0060-0000
System Terminating Plug
767-6401
767-6402
767-7401
767-4803
767-0111
, Power Supply Cable
756-3106/...
756-3106/...
IP67

Modules Overview

SPEEDWAY Components

Identification	Description	Item No.
Fieldbus Couplers (FC)		
FC PROFIBUS DP, 8 DI, 24VDC	PROFIBUS-DP/V1 Coupler, incl. 8 digital inputs	767-1101
FC PROFINET IO, 8 DI, 24VDC	PROFINET IO Coupler, incl. 8 digital inputs	767-1201
FC ETHERNET, 8 DI, 24VDC	ETHERNET Coupler, incl. 8 digital inputs	767-1301
FC Sercos, 8 DI, 24VDC	Sercos Coupler, incl. 8 digital inputs	767-1311
FC DeviceNet, 8 DI, 24VDC	DeviceNet Coupler, incl. 8 digital inputs	767-1401
FC CANopen, 8 DI, 24VDC	CANopen Coupler, incl. 8 digital inputs	767-1501
PLCs or Programmable Fieldbus Couplers (PFC)		
PFC ETHERNET, 8 DI, 24VDC	Programmable ETHERNET Coupler, incl. 8 digital inputs	767-2301
PFC CANopen, 8 DI, 24VDC	Programmable CANopen Coupler, incl. 8 digital inputs	767-2501
Digital Input Modules (DI)		
8 DI, 24VDC (8 x M8)	8 digital inputs	767-3801
8 DI, 24VDC (4 x M12)	8 digital inputs	767-3802
8 DI, 24VDC (8 x M8)	8 digital inputs, low-side switching	767-3803
8 DI, 24VDC (4 x M12)	8 digital inputs, low-side switching	767-3804
8 DI, 24VDC (8 x M12)	8 digital inputs	767-3805
Digital Output Modules (DO) .../0000-0800 Interference-Free Version		
8 DO, 24VDC, 0.5A (8 x M8)	8 digital outputs, 0.5A	767-4801 767-4801/0000-0800
8 DO, 24VDC, 0.5A (4 x M12)	8 digital outputs, 0.5A	767-4802 767-4802/0000-0800
8 DO, 24VDC, 2.0A (8 x M8)	8 digital outputs, 2.0A	767-4803 767-4803/0000-0800
8 DO, 24VDC, 2.0A (4 x M12)	8 digital outputs, 2.0A	767-4804 767-4804/0000-0800

Identification	Description	Item No.
Digital Output Modules (DO) .../0000-0800 Interference-Free Version		
8 DO, 24VDC, 0.5A (8 x M8)	8 digital outputs, 0.5A, low-side switching	767-4805
8 DO, 24VDC, 0.5A (4 x M12)	8 digital outputs, 0.5A, low-side switching	767-4806
8 DO, 24VDC, 0.5A (8 x M12)	8 digital outputs, 0.5A	767-4807 767-4807/0000-0800
Specialty Modules .../0000-0800 Interference-Free Version		
Serial Interface RS-232, RS-422/ -485 (4 x M12)	2 serial interfaces + 4 digital inputs/outputs	767-5203
8 DIO, 24VDC, 0.5A (8 x M8)	8 digital inputs/outputs, 0.5A	767-5801 767-5801/0000-0800
8 DIO, 24VDC, 0.5A (4 x M12)	8 digital inputs/outputs, 0.5A	767-5802 767-5801/0000-0800
8 DIO, 24VDC, 0.5A (8 x M12)	8 digital inputs/outputs, 0.5A	767-5803 767-5803/0000-0800
8 DI, 24VDC, HS (4 x 12)	8 digital inputs, <10µs delay	767-3801
8 DO, 24VDC, HS (4 x M12)	8 digital outputs , 0.1A, <1µs delay	767-4808
4 DIO, 24VDC, 0.2A HS (4 x M12)	4 digital inputs/outputs, 0.2A, <10µs/<1µs delay	767-5401
Analog Input Modules (AI)		
4 AI U/I	4 analog inputs, voltage/current (0-20mA, 0-22mA, 4-20mA, ±20mA, 0-10V, ±10V)	767-6401
4 AI RTD	4 analog inputs, RTD (Pt100/200/500/1000, Ni100/120/1000 Resistance: 1kΩ/2kΩ, Potentiometer adjustment: 0-100%)	767-6402
4 AI TC	4 analog inputs, thermocouple (type: B/C/E/J/K/N/R/S/T, voltage: ±36/±72/±145/±290mV)	767-6403
Analog Output Modules (AO)		
4 AO U/I	4 analog outputs, voltage/current (0-20mA, 4-20mA, ±20mA, 0-10V, ±10V)	767-7401
Supply Modules		
Power Divider (1 x M23 + 6 x M12)	Power divider	767-9101

WAGO Service Worldwide

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